



StorageTek™ Addendum 95845Y1 Code Release 5.8.0c

L1400x Tape Library and Pass-Thru Port

Operator's Guide

Part Number: Addendum_95845Y1

Revision: A



StorageTek™

Addendum 95845Y1
Code Release 5.8.0c
L1400x Tape Library
and Pass-Thru Port
Operator's Guide

Sun Microsystems, Inc.
www.sun.com

Part No. Addendum 95845Y1
October 2006, Revision A

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Revision History

Date	Revision	Description
October 2006	A	Initial Release

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Preface

This book is an addendum to the L700x/L1400x Tape Libraries and Pass-Thru Port Operator's Guide, Part Number 95845, and is intended to supplement the information in that document.

This document provides information for L1400M1 control interface code level 5.8.0c, and has illustrations of user interface pages specifically for this code level. Screens from earlier code levels may appear similar, and much of the information provided here applies to those earlier code releases.

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

Organization of This Publication

This table provides a general overview of the chapters in this publication.

Chapter 1	"L1400 Product Update" Provides an overview of the available L1400M, L1400P, and L1400MA products, including a list of the most-recent available upgrades and conversions. Provides theory and procedural information about partitioning, and about the Continuous Capacity feature in the L1400 library family
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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 you 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.

Warning – Possible Physical Injury. A warning alerts you 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 – Posibles lesiones. 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.

Typographic Conventions

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

* The settings on your browser might differ from these settings.

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Notices

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Caution – Potential equipment damage: Cables that connect peripherals must be shielded and grounded; refer to descriptions in the cable 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 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:

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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.

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

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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.

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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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Personal Safety

EN60950-1:2001 Statement

The following statement pertains to products that require a ground connection at the wall outlet.

Norway:

Apparatet må tilkoples jordet stikkontakt

Finland:

Laite on liitettävä suojamaadoituskoskettimilla varustettuun pistorasiaan

Sweden:

Apparaten skall anslutas till jordat uttag

Denmark:

For tilslutning af de øvrige ledere, se medfølgende installationsvejledning.

Safety Precautions

Warning – Possible Physical Injury. On-the-job safety is important; therefore, observe the following safety precautions while you engage in any maintenance activity. Failing to follow these precautions could result in serious injury.

- Remove all conductive jewelry, such as watches and rings, before you service powered-on equipment.
- Avoid electrical shock. Be careful when you work near power connectors and supplies.
- Power-off the equipment that is being serviced before you remove a field replaceable unit (FRU) or other component. Remember that dangerous voltages could still be present in some areas even though power is off.
- Ground all test equipment and power tools.
- Be aware that the product hardware might have sharp edges that could injure you. Handle the equipment carefully and wear the appropriate gloves.

- Lift objects properly; read the information in “Lifting Techniques”.
- Do not remove, cut, or relocate any floor tiles indiscriminately. Before you manipulate floor tiles, be sure that you understand the customer’s environment and receive the customer’s approval. Remember, each situation is different.
- Enforce good housekeeping practices in the equipment area to help prevent fires and accidents.

Note – Important things to investigate and to be aware of include the use of Halon® gas, under-the-floor smoke detectors, and cables to other equipment installed nearby.

Lifting Techniques

Lifting, regardless of how much or how little, can create serious back stress. If you follow these guidelines, you can reduce the risk of back injury:

- Do not twist your body to pick up something or to put it down. Twisting puts extreme pressure on your back, especially when you lift or carry objects. Instead of twisting, make the task two separate moves; first lift, and then use your feet to turn your body.
- Plan the lift; first examine the object and then determine how it should be lifted and where it will be placed.
- Choose the appropriate lifting technique. Examine the weight, size, location, frequency, and direction of the lift. Plan to avoid awkward postures, and determine if material-handling aids are needed.
- Place your feet shoulder-width apart, and place one foot a little behind the other. Keep your back straight because even light loads can significantly increase pressure on your spine when you lean forward.
- Whenever you can, grip the load with your whole hand, and use two hands.
- Carry objects at elbow height and close to your body. The farther away you hold an object, the more force it puts on your lower back.
- Lift with your legs instead of your back. Leg muscles are some of the strongest in the body. When you squat and lift with your legs, you can lift more weight safely.
- Alternate lifting tasks with tasks that are less stressful to the same muscles. This technique ensures that your muscles have some recovery time.

Shoulder, Elbow, Wrist, and Hand Safety

Follow these guidelines to minimize the possibility of injury to your shoulders, elbows, wrists, and hands.

- Work within your safety zone—the area between shoulder level and knuckle level of your lowered hands. You face less chance of injury when you work or lift in this area.
- Keep your elbows bent to keep loads close to your body and to decrease the amount of force necessary to do the job. If you use this posture, you will put less weight and pressure on your shoulder.
- Be sure to keep your wrists straight. Avoid bending, extending, or twisting your wrists for long periods of time.

- Do not use a pinch grip to lift large or heavy loads because the way you lift also can affect the tendons in your hand. When you grasp an object between your thumb and fingers, you put a lot of tension on hand and wrist tendons. Use both hands—use one for a while, and then use the other—to give them rest.

Precauciones de seguridad

Advertencia – Posibles lesiones. La seguridad laboral es importante. Por consiguiente, adopte las siguientes precauciones de seguridad al realizar cualquier tarea de mantenimiento. El incumplimiento de dichas precauciones puede conllevar graves lesiones.

- Antes de realizar cualquier tarea en equipos eléctricos conectados, quítese las joyas y accesorios conductores de electricidad, como relojes y anillos.
- Evite las descargas eléctricas. Tenga cuidado al trabajar en la proximidades de conectores y alimentaciones eléctricas.
- Antes de extraer unidad sustituible in situ u otro componente, apague el equipo y desconéctelo de la red eléctrica. Recuerde que, incluso si están apagados, en algunas áreas pueden quedar tensiones peligrosas.
- Ponga a tierra todos los equipos de prueba y herramientas eléctricas.
- El producto puede tener bordes afilados, susceptibles de provocar lesiones. Manipule el equipo adoptando las precauciones adecuadas, y utilice guantes.
- Para levantar objetos, consulte la información de [“Técnicas de levantamiento de objetos” on page 21.](#)
- No quite, corte ni cambie de lugar indiscriminadamente las baldosas. Antes de manipular baldosas, asegúrese de conocer el entorno del cliente y de recibir su autorización. Recuerde que cada situación es diferente.
- Establezca, y haga cumplir, métodos de orden y limpieza en el área de equipos para evitar incendios y accidentes.

Nota – Entre los factores importantes que deben tenerse en cuenta es la presencia de gas Halón®, detectores de humo subterráneos y cables conductores a otros equipos instalados en las proximidades.

Técnicas de levantamiento de objetos

El levantar equipos o componentes, independientemente de su peso o tamaño, puede provocar serias lesiones lumbares. Siguiendo estas directrices podrá reducir los riesgos de lesiones.

- No incline el cuerpo para levantar o bajar algo. Esta posición supone una tensión extrema para la espalda, en especial al levantar o transportar objetos. En lugar de inclinarse, efectúe dos movimientos: primero levante el componente y, a continuación, utilice los pies para girar el cuerpo.

- Estos movimientos deben planificarse. En primer lugar, examine el objeto y determine cómo va a levantarlo y dónde va a colocarlo.
- Seleccione la técnica de levantamiento adecuada. Examine el peso y tamaño del objeto, su ubicación y frecuencia y dirección en que vaya a levantarlo. La planificación debe hacerse de tal modo que se eviten posturas incómodas. Determine si son necesarios accesorios para la manipulación de materiales.
- Separe bien las piernas y coloque una ligeramente detrás de la otra. Mantenga la espalda recta, porque incluso pesos ligeros pueden incrementar significativamente la presión sobre la espina dorsal al inclinarse hacia adelante.
- En la medida de lo posible, sostenga la carga con toda la mano, y utilice ambas manos.
- Transporte los objetos a la altura del codo y próximos a su cuerpo. Cuanto más lejos tenga que transportar un objeto, más presión aplicará sobre la zona lumbar.
- Levante el objeto haciendo fuerza con las piernas, y no con la espalda. Los músculos de las piernas se cuentan entre los más fuertes del cuerpo. Al acuclillarse y levantar un peso con las piernas, tendrá mayor tolerancia al peso.
- Alterne estas tareas con otras menos pesadas para los mismos músculos. De este modo, los músculos dispondrán de un cierto tiempo de recuperación.

Seguridad de hombros, codos, muñecas y manos

Siga estas instrucciones para reducir al mínimo las posibilidades de lesionarse los hombros, codos, muñecas y manos.

- Trabaje dentro de su zona de seguridad, el área entre el nivel de los hombros y el nivel de los nudillos. Trabajando o levantando objetos dentro de esta área se expondrá a menos probabilidades de lesiones.
- Mantenga los codos inclinados para mantener las cargas próximas a su cuerpo y reducir la fuerza necesaria para realizar la tarea. Con esta postura, aplicará menos peso y presión sobre los hombros.
- Asegúrese de mantener las muñecas rectas. Evite doblarlas, extenderlas o torcerlas durante períodos de tiempo prolongados.
- No levante cargas grandes o pesadas con el puño cerrado, porque el modo de levantarlas también afecta a los tendones de la mano. Al tomar un objeto entre el pulgar y los dedos se aplica mucha tensión a las manos y tendones de las muñecas. Utilice ambas manos alternativamente, para permitir que descansen.

Fiber-optic Safety

Warning – Possible Physical Injury. *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 your eyes.

Be especially careful when you use optical instruments with this equipment. Such instruments might increase the likelihood of injury to your eyes.

Radiation exposure: Use of controls or adjustment or performance of procedures other than those specified herein might result in hazardous radiation exposure.

The laser transceivers in fiber-optic equipment can pose dangers to personal safety. Ensure that anyone who works with this 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 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 μ W. StorageTek's Class 1 Laser Products comply with EN60825-1:1994+A1+A2 and with sections 21 CFR 1040.10 and 1040.11 of the Food and Drug Administration (FDA) regulations.

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 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

Seguridad de fibras ópticas

Advertencia – Posibles lesiones. *Riesgo para la vista. Nunca mire directamente el interior de un cable de fibra óptica, un conector de fibra óptica o un módulo tranceptor 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.

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

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. Todos los transceptores de láser tienen una potencia de salida inferior a 70 μ W. Los productos láser Clase 1 de StorageTek cumplen lo dispuesto por la norma EN60825-1:1994+A1+A2, así como con las secciones 21 CFR 1040.10 y 1040.11 de la Food and Drug Administration (FDA) de EE.UU.

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:

<p>PRODUCTO LÁSER CLASE 1 LASER KLASSE 1 APPAREIL A LASER DE CLASSE 1 COMPATIBLE CON LAS SECCIONES 21 CFR 1040.10 Y 1040.11</p>

Product Precautions

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.

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

L1400 Product Update

Basics

This Addendum was written for L1400M1 control interface code level 5.8.0c. It displays screenshots specifically for this code level. However, earlier code levels may look similar and many of the descriptions still apply to earlier code levels.

This chapter contains the following sections:

TABLE P-1

Basics on page 27	Provides an overview of the available L1400M1, L1400P1, and L1400MA products, including a list of the most-recent available upgrades and conversions.
Partitioning on page 31	Provides theory and procedural information about partitioning in the L1400 library family
Continuous Capacity on page 51	Provides theory and procedural information about the Continuous Capacity feature in the L1400 library family

Additional L1400 Library Conversions Available

The following table provides a description of the newest additions to the L1400 family of libraries:

TABLE 1-1 Additional Available L1400 Library Configurations and Conversions

Configuration/Conversion	Description
L1400MA Tape Library	This new base library is used ONLY in ACSLS environments. Partitioning is not available. The L1400M1 library remains unsupported by ACSLS. The L1400P1 library can connect to the L1400MA.
L1400M0/MA to L1400M1	For customers that have an older L1400M0 library or for customers that need to convert their L1400MA-ACSLs library to an L1400M1, there is an x-option (conversion upgrade) to accomplish conversion.
L700Exx to L1400P1	There are also new conversions for the L700e tape libraries which convert the library to an L1400P1. This conversion is required to connect an L700e library to an L1400 library (L1400M1 or L1400MA).

Note – In the L1400MA library, capacity upgrades are managed through ACSLS. Capacity upgrades require both ACSLS and library capacity feature/parts purchase. Only ACSLS license keys are required.

L1400 Library Overview

The L1400 libraries are a family of libraries based on the L700e library, but with advanced features. The library was launched in Jan 2005 and enhanced in Oct 2005.

The L1400 consists of two libraries, each sold separately.

Note – Because of the product name, some people assume that the L1400M is always sold as two libraries with the PTP-this assumption is inaccurate. The "1400" indicates the maximum capacity of the library solution (1344), not the capacity of any single component.

The L1400M is always the first library and the L1400P is always the second library. The L1400P connects to the L1400M with a Pass-Thru Port (PTP). The L1400P is only used when expanding the L1400M.

When customer capacity requirements demand more than the 678 slots of the L1400M, the L1400P frame can be added. This can be done at the initial purchase or at a later time, depending on the customer need.

Ordering information can be found in the *L180/L700x/L1400x Tape Libraries Ordering and Configuration Guide*, Part Number MT9112.

L1400 Management and Control Function Enhancements

The L1400 library management/control functions have been enhanced to provide three key features:

- Partitioning: Native logical partitioning support, enabling tape consolidation.
- Continuous Capacity Technology: Enables a capacity on demand growth model for quick and easy cartridge slot capacity growth.
- Aggregation: Native management of the PTP without the need for ACSLS.

Partitioning

Partitioning is an optional feature of the L1400M1 tape library. It is used to share the library with multiple hosts or applications. Partitioning supports tape consolidation projects. Partitioning is available as a feature of the L1400M1 library (feature code: L1400M1-PART) or as a conversion bill (C/B: 102096).

Note – An access key must be requested from the Customer Resource Center (CRC) and entered into the L1400M1 interface management page to enable the partitioning feature.

Partitioning Overview

Partitioning with the L1400M is logical partitioning, performed by the interface control card of the L1400M1 library or the SN3300 of the L1400M0 library. The end user can assign specific cartridge slots, drives, and CAP slots to a partition. The partition is then mapped to a backup application. Each partition is presented to the application as a different L700 library.

Logical Partitioning

When Sun uses the term "logical partitioning" in reference to tape libraries, it refers to how mixed media is supported. Sun Any Cartridge Any Slot™ technology allows us to assign the cartridge cells to a partition without any physical cell restrictions. So the customer can assign these slots to any partition, using any drive technology as they see fit, and they can change these slot assignments quickly, easily, and without disruption—there are no physical components to change.

Other solutions cannot support mixed media and therefore use different "physical" cell arrays to support different media types. Since these arrays are physically different for different technologies, we refer to them as having "physical partitioning". Competitive physical partitioning solutions are less flexible because:

1. They can't support mixed media within a partition.
2. To change a partition a customer may have to open up the library and physically install arrays or swap arrays.
3. Capacity planning becomes more difficult because slot capacity can only be used as it was originally planned—no flexibility.
4. Repurposing the library and using different tape technology is difficult because all the arrays may need to be changed.

Note – Code release 5.8.0c allows partitions to be created and saved without any disruption. Prior to code 5.8.0c the interface card needed to be rebooted (not the library, just the interface card) which would take roughly 32 seconds.

How L1400 Logical Partitioning Works

The L1400 allows definition of a maximum of six partitions.

Note – Competitors offer a higher number of partitions, but we rarely see the need for more than 2-3 partitions, so six has been more than enough for our customers.

While the L1400M Partitioning feature enables sharing the library as a whole with multiple applications/hosts, specific resources within the library (Cartridge Slots, Tape Drives, and CAP Slots) cannot be shared. To enable true sharing of these individual assets you must purchase and install ACSLS. If you want to run ACSLS with an L1400 library, you need to order an L1400MA library.

Each partition is presented to backup applications as its own L700 library with a unique SCSI ID. The ID is an 11 character string consisting of three parts:

- The first three characters always start with "STK"
- The next six characters are the serial number of the interface card or the SN3300 if it is an L1400M0 library. This serial number is made up of six characters which always begin with "AO", the serial number looks like "A0xxxx"
- The last two characters indicate the partition number, partitions one through six ("01" through "06").

For example the serial numbers for partitions 1-6 would look like the following:

- Partition 1: STKA0xxxx01
- Partition 2: STKA0xxxx02
- Partition 3: STKA0xxxx03
- Partition 4: STKA0xxxx04
- Partition 5: STKA0xxxx05
- Partition 6: STKA0xxxx06

All hosts connect to the FC port on the library interface control card through a FC switch (the FC switch is not included with the library, customers provide their own switches or one must be ordered separately). Make sure that the library is zoned so all the hosts can see the interface control card. Assignment of partitions to hosts is covered in [“Assigning Hosts/Backup Applications to Partitions”](#) on page 43.

Partitioning allows multiple hosts to have access to the same L1400M library via a single FC port on the interface control card. The L1400M interface control card uses LUN management to prevent conflicts, restricting host access to specific partitions by assigning each partition to a different FC LUN. Each host is then presented specific LUN(s) based on the WWN of the host.

For example, one NetBackup host may see LUN 0 (Partition 1) and a TSM host may only see LUN 1 (Partition 2) when they perform discovery on the library. Each partition/LUN in turn is assigned specific library resources (cartridge slots, tape drives, and CAP slots), so the hosts can only see the library resources that are assigned to their partition.

Note – To minimize PTP exchanges, we recommend keeping partitions within a single frame unless size dictates they use resources from the other frame.

Ordering a Partitioning Access Key

You must request an access key in order to enable the partitioning feature.

After your sales order is placed in the system, you can request an access key. Keys can be requested by anyone possessing the necessary information to place the request: AE, SE, CSE, the customer, etc.

Request a key by going to the CRC SW licensing site (see link below).

<https://www.support.storagetek.com/globalnavigation/support/generalpublic/default.htm>

1. Log in to the CRC
2. Click on the "Tools & Services" link
3. Click the "Software Keys" link
4. Click on the "L1400M Key Order Form" link.

FIGURE 1-1 on page 34 shows the L1400M key order form. The fields marked with an asterisk are required fields. TABLE 1-2 describes the form fields:

TABLE 1-2 Key Order Form Fields

Field	Description
Installer's E-Mail Address	This field could be the customer e-mail address as these keys are customer installable
Number of Slots	Type in the total number of slots the customer will end with. For example, if the customer was upgrading a 300 slot library and ordering 100 slots, you should type in "400"
Hardware Serial Number	If you are ordering a key for an L1400M1 model, type in the serial number of the L1400M1 library. If this request is not for an L1400M1 library, leave blank
Router Serial Number	If you are ordering a key for an L1400M0 model, type in the serial number of the SN33000. SN3300 serial numbers are 6 characters and begin with "A0" ("A0xxxx"). If this request is not for an L1400M0 library, leave blank.
New/Upgrade/ Partitioning key	<ul style="list-style-type: none"> ■ Select "New" if your request is for a access key and part of a new L1400M library purchase. ■ Select "Upgrade" if your request is for a access key and is a capacity upgrade for an existing L1400M library. ■ Select "Partitioning" is the customer is purchasing the L1400M partitioning feature. Partitioning is discussed in more detail in the L1400 Partitioning FAQ.

After the request is placed, a 25 alphanumeric software key will be sent to the e-mail address entered in the form.

Please allow 2 business days for processing. Keys are issued from 7:30am - 3:30pm. For information, questions or to EXPEDITE the Software Keys please call 1-800-436-5554 option 3, or 303-661-7667.

Note – This process is also used to order additional capacity, aggregation, and/or PTP management.

FIGURE 1-1 L1400M Key Order Form

File Edit View Favorites Tools Help

Address https://www.support.storageitek.com/GlobalNavigation/Support/ToolsAndServices/Tools/swkeys/GENERALPUBLIC/L1400MKey_Order.htm Go

STORAGETEK Customer Resource Center SEARCH

CRC Home
Welcome, RYAN DUFFY [Log Out](#) [Contribute](#) or [Edit Content](#)

CRC Home **L1400M Key Order Form**

Knowledgebase Search

Current Products

End of Support

Code Downloads

News and Announcements

Tools & Services

- CRC Tools
- Software Keys
- TRANSFER Premium Feature Key Request
- Get Key
- FSC Lookup
- Support File Upload
- CS Tools
- Software Level Upgrade Form
- Emergency Software Key
- Library Admin Help
- Interop Tool
- Software Manufacturing and Distribution
- User Services
- Support Cases
- Software/Hardware Enhancement Request
- Install Quick Close
- Product Support
- HIPER Subscriptions
- Site Support
- Subscriptions

* All fields are required for license keys.

*SAP Sales order number:

*Company Name:

Customer Address:

Customer Site ID:

Installer's Name:

Installer's Phone Number:

*Installer's Email Address:

StorageTek Field Contact: (if different from above)

STK Field contact's e-mail address: (32 characters)

*Number of Slots:

*Hardware serial number:

*Router serial number:

*New/Upgrade/Partitioning key (please specify one):
 New
 Upgrade
 Partitioning

A **PTP management functionality key** is required for all L1400P1 installations. This key is the same for every install.
License Key is: 4LKP355NVXZPLWN2LQD69NPNB.
Refer to the L700x/L1400xx Installation manual for additional details.

Comments:

Submit

Done Local intranet

Installing a Partitioning Access Key

Refer to the "L1400 Interface Control Module User Guide," P/N 96231A for complete instructions on connecting to the management interface.

Perform the following steps to install the partitioning access key.

1. Go to the L1400M control interface web management page by typing in the IP address of the interface card.
2. The Main Menu on the left side of the screen (FIGURE 1-2) has an item labeled "Licensing" or "Features". Click on that menu item to view the page where the software keys are entered and all current access is listed.

FIGURE 1-2 L1400 ICM Main Menu.

The screenshot shows the L1400M Interface Control Module web management interface. At the top, there is a header with the Storagetek logo and the text "L1400M INTERFACE CONTROL MODULE". Below the header, there are several status indicators: PWR, SERIAL, 10/100, LINK ACT, FIBRE CHANNEL, and SCSI LVD. A note below the header says "To change configuration settings, you may click on ports and buses." On the left side, there is a "MAIN MENU" with options: Home, System, Ports, Discovery, Mapping, Partitioning, Statistics, Utilities, Features, Report, and Reboot. The main content area is titled "ADVANCED SOFTWARE LICENSED FEATURES" and contains the following text: "Please enter a key below and press Add or Disable:". Below this is a text input field labeled "Enter Key:" with "Add" and "Disable" buttons. Further down, it says "Press Add to use a key to enable a feature. Press Disable to use a key to disable a feature." Below this is a "FEATURE LIST" table.

Feature	Status
300 Slot Capacity	The Feature is Not Enabled
400 Slot Capacity	The Feature is Not Enabled
500 Slot Capacity	The Feature is Not Enabled
600 Slot Capacity	The Feature is Enabled
700 Slot Capacity	The Feature is Not Enabled
800 Slot Capacity	The Feature is Enabled
900 Slot Capacity	The Feature is Not Enabled
1000 Slot Capacity	The Feature is Enabled
1100 Slot Capacity	The Feature is Not Enabled
1200 Slot Capacity	The Feature is Not Enabled
1300 Slot Capacity	The Feature is Not Enabled
1344 Slot Capacity	The Feature is Not Enabled
Library Partitioning	The Feature is Enabled
Capacity On Demand	The Feature is Enabled
Library Aggregation	The Feature is Enabled

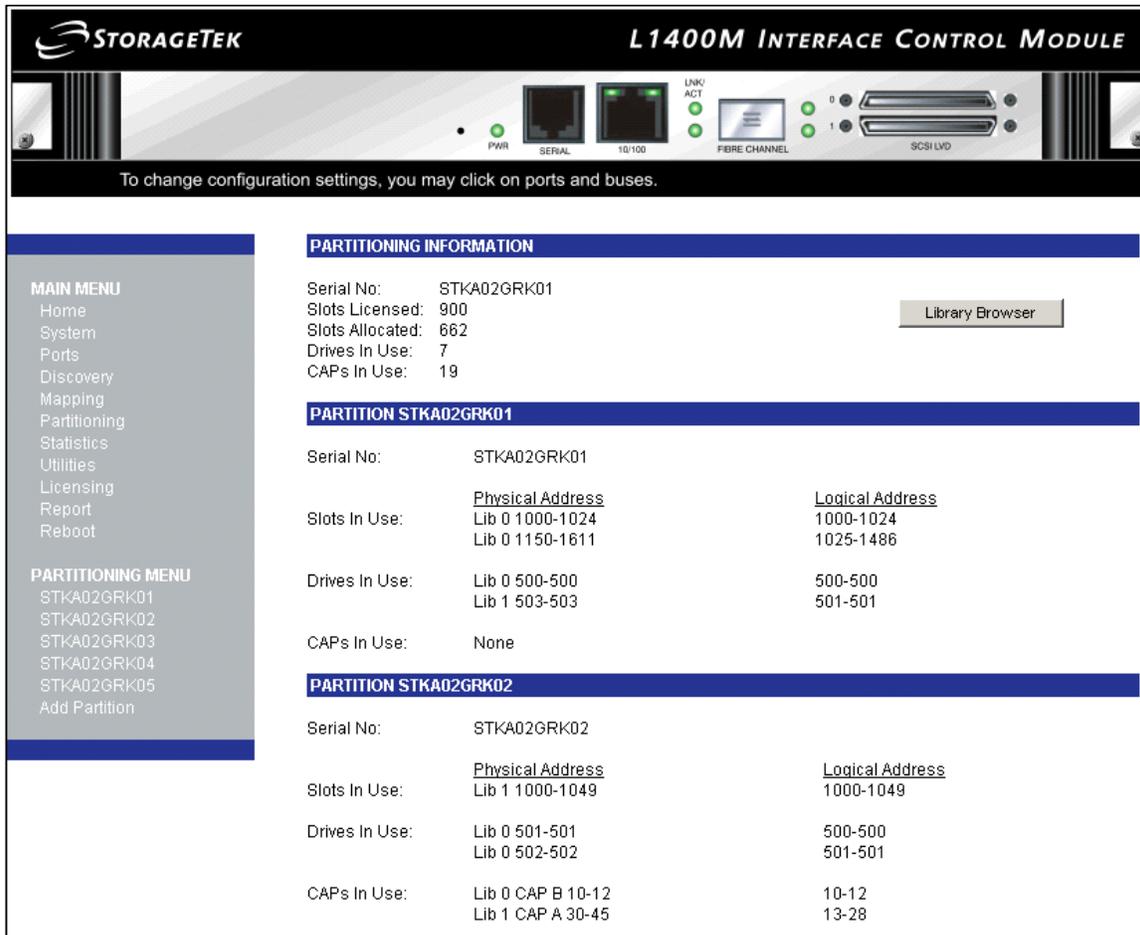
Note – When you enable partitioning your library will no longer be seen by any hosts until you create a partition(s) and assign it to a host. The process of creating partitions and assigning them to hosts is covered in subsequent sections.

Assigning Library Resources to Partitions

To begin creating a partition and assigning resources, click on the "Partitioning" item on the Main Menu of the web management interface (see FIGURE 1-3 below).

1. Select the partitioning menu to show the partitioning summary page. The summary page will display any summary information for any existing partitions. In addition, any existing partitions will be listed on the Main Menu under the Partitioning Menu. [FIGURE 1-3](#) shows the first two partition summaries, but the others can be found by scrolling down.

FIGURE 1-3 L1400 ICM Summary Page.



2. To create a new partition select "Add Partition" or to edit an existing partition, select the partition name under the Partitioning Menu. If all six partitions have been created, the "Add Partition" menu item will no longer be available. If one of the partition names are selected (STKA02GRK01 - STKA02GRK05) then the summary page for that partition is displayed-see screenshot on the next page.

The specific partition summary page has two buttons at the top of the page. The "Delete Partition" button on the right is used to delete this specific partition. When you click on the "Delete Partition" button you will be asked for confirmation-if you confirm the delete this partition will be deleted.

If you click on the "Edit Partition" button, the Slot Edit page for this partition will open. Clicking on the "Edit Partition" button or the "Add Partition" on the Main Menu will effectively open the same page-the Slot Edit page.

Note – All library resources (cartridge slots, drives, and CAP slots) are assigned by using the library element addresses; these element addresses are listed in the GUI. There are also element maps in the L700/1400 technical manuals which can be downloaded from the Sun StorageTek Customer Resource Center web site.

FIGURE 1-4 Partition Information Screen

The screenshot shows the StorageTek L1400M Interface Control Module GUI. At the top, there is a header with the StorageTek logo and the text "L1400M INTERFACE CONTROL MODULE". Below the header is a row of icons representing various ports: PWR, SERIAL, 10/100, FIBRE CHANNEL, and SCSI LVD. A message below the icons reads: "To change configuration settings, you may click on ports and buses."

The main content area is divided into two sections. The left section is a navigation menu with the following items:

- MAIN MENU
 - Home
 - System
 - Ports
 - Discovery
 - Mapping
 - Partitioning
 - Statistics
 - Utilities
 - Licensing
 - Report
 - Reboot
- PARTITIONING MENU
 - STKA02GRK01
 - STKA02GRK02
 - STKA02GRK03
 - STKA02GRK04
 - STKA02GRK05
 - Add Partition

The right section is titled "PARTITION STKA02GRK01 INFORMATION" and contains the following information:

Serial No: STKA02GRK01

Slots In Use:

Physical Address	Logical Address
Lib 0 1000-1024	1000-1024
Lib 0 1150-1611	1025-1486

Drives In Use:

Lib 0 500-500	500-500
Lib 1 503-503	501-501

CAPs In Use: None

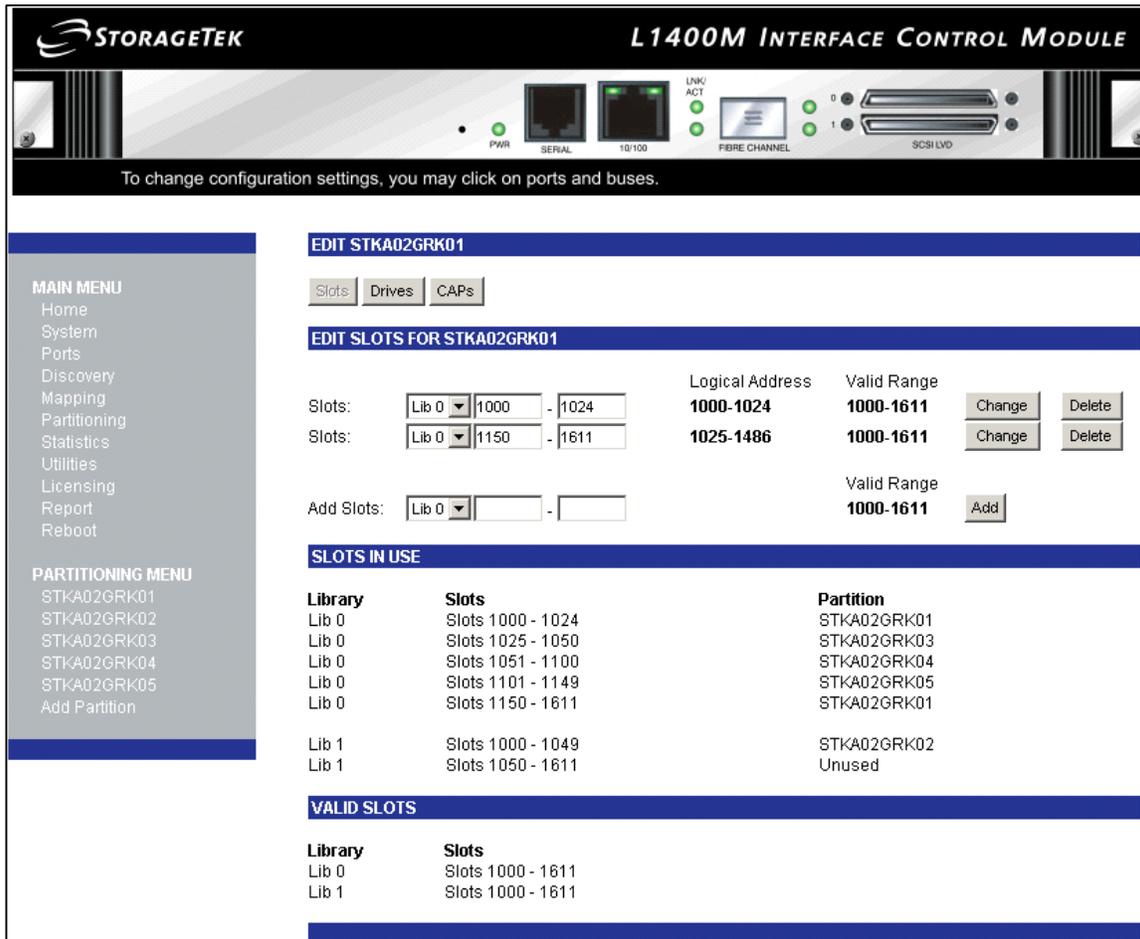
Assigning Cartridge Slots to a Partition

When "Add Partition" or "Edit Partition" is selected, the Slot Edit page is displayed (FIGURE 1-5 on page 38). The slots are assigned to a partition by entering the slot element address ranges you want to assign to the partition. You can assign up to 10 element address ranges per partition so your cartridge slots within a partition do not have to be contiguous. Allowing non-contiguous slot assignment allows the customer to grow their partitions without having to reconfigure their library.

In a dual frame installation (L1400M0/M1 and L1400P1) the element ranges are defined by first identifying which library they are from, "Lib 0" or "Lib 1". Generally speaking, the L1400M1 will be Lib 0 and the L1400P will be Lib 1. While slots within a partition can span across libraries, each element range 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

FIGURE 1-5 Edit Slots Page



The Edit Slots screen is divided into four vertical sections. The bottom two sections provide information regarding the slots available in the library, the current assignments in place, and the slots that are currently unused. In FIGURE 1-5 there is only one group of slots that are available, one group in each library - slots 1050-1161 in Lib 1. If you want to assign slots other than the ones available, you must first delete the slot ranges as they are assigned to other libraries.

The second section from the top (EDIT SLOTS FOR STKA0xxxxxx) is where you actually assign the slots. The "Slots:" lines list the slots that are currently assigned and you can change them by typing new slot ranges in the data entry windows and clicking the "Change" button. To delete this range click the "Delete" button.

To add a new slot range:

1. first select the library (Lib 0 or Lib 1) from the pick list.
2. Next type in the starting and ending element addresses in the data entry windows.
3. Last, click the "Add" button and your selection will be added to the "Slot:" list.

To edit an existing allocation simply edit the existing slot range and click "Change". Making any slots allocation changes causes two new buttons to be displayed on the screen (FIGURE 1-6): "Revert to Saved" and "Save Changes". Use the "Save Changes" to save the changes you have made, use the "Revert to Saved" to cancel you changes and revert back to the last saved allocation.

FIGURE 1-6 Save Changes Page

The screenshot displays the 'EDIT STKA02GRK01' configuration page. At the top, there is a hardware status bar with icons for PWR, SERIAL, 10/100, LINK ACT, FIBRE CHANNEL, and SCSI LVD. Below this is a navigation menu on the left with sections for MAIN MENU and PARTITIONING MENU. The main content area is titled 'EDIT STKA02GRK01' and includes buttons for 'Slots', 'Drives', 'CAPs', 'Revert to Saved', and 'Save Changes'. The 'EDIT SLOTS FOR STKA02GRK01' section contains a table of slot allocations:

Slots:	Logical Address	Valid Range	Change	Delete
Lib 0 1000 - 1024	1000-1024	1000-1611	Change	Delete
Lib 0 1150 - 1601	1025-1476	1000-1611	Change	Delete

Below this is an 'Add Slots' section with a dropdown for 'Lib 0' and input fields for slot ranges, and a 'Valid Range' of 1000-1611 with an 'Add' button.

The 'SLOTS IN USE' section contains a table:

Library	Slots	Partition
Lib 0	Slots 1000 - 1024	STKA02GRK01
Lib 0	Slots 1025 - 1050	STKA02GRK03
Lib 0	Slots 1051 - 1100	STKA02GRK04
Lib 0	Slots 1101 - 1149	STKA02GRK05
Lib 0	Slots 1150 - 1601	STKA02GRK01
Lib 0	Slots 1602 - 1611	Unused
Lib 1	Slots 1000 - 1049	STKA02GRK02
Lib 1	Slots 1050 - 1611	Unused

The 'VALID SLOTS' section contains a table:

Library	Slots
Lib 0	Slots 1000 - 1611
Lib 1	Slots 1000 - 1611

Note – Element addresses are entered in ranges: the first window is the starting address, the second window is the ending address. To assign only one slot, enter the same element address in both windows.

When you are finished editing slot allocations to this partition and have saved your changes, you can continue editing drives and CAPs for this partition by clicking the "Drives" or "CAPs" buttons at the top of the page or move to any other Menu item on the left side of the screen.

Assigning Drives to a Partition

You must be on one of the Partitioning Edit pages (see [FIGURE 1-6 on page 39](#)), click on the "Drives" button. By clicking this button the Edit Drives page will be displayed (see [FIGURE 1-7 on page 41](#)). When assigning drives there are two rules:

- Any number of drives can be assigned to a partition.
- Drives cannot be shared with more than one partition.

Note – "L1400M1 Partitioning is implemented in the control path only. Within the control path, drives can only be seen by the hosts/applications assigned to the same partition as the drives. Partitioning is not executed in the data path, so any host can see any drive-but they can only issue control commands to their drives. Restricting data ath access to the drives can be accomplished by zoning the switch.

The Edit Drives page is structured in the same way as the Edit Slots page, with four sections (see "[Assigning Cartridge Slots to a Partition](#)" on page 37). The bottom two sections display the drive resources summaries, listing what is installed in the library and their current assignments. The "DRIVES IN USE" section provides the information you need to make drive assignments. The "Drives" column provides the element address of each drive installed in the library. The "Identifier" column lists the drive serial numbers, and the "Partition" column identifies the drive's current assignment.

The "EDIT DRIVES FOR STKA0xxxxxx" section (second section from the top) is where you actually assign drives or edit current assignments. You make these assignments by typing in drive element addresses in the "Add Drives:" data entry windows. Click the "Add" button after you have entered the drive element addresses. Edit current drive assignments by changing the element addresses and clicking the "Change" button. Delete a drive assignment by clicking the "Delete" button.

Making any drive allocation changes causes two new buttons to be displayed on the screen (see [FIGURE 1-7 on page 41](#)): "Revert to Saved" and "Save Changes". Use the "Save Changes" to save the changes you have made, use the "Revert to Saved" to cancel you changes and revert back to the last saved allocation.

The entry for element addresses are in ranges: the first window is the starting address, the second window is the ending address. To assign only one drive, enter the same element address in the both windows. As with cartridge slots, you can enter up to 10 element ranges for drives for each partition.

Note – While all the drives element addresses do not need to be sequential, it is not recommended to use one range for each drive as this would artificially limit the partition to only 10 drives.

When you are finished editing drive assignments to this partition and have saved your changes, you can continue editing slots and CAPs for this partition by clicking the "Slots" or "CAPs" buttons at the top of the page or move to any other Menu item on the left side of the screen.

FIGURE 1-7 Edit Drives Page.

STORAGE TEK **L1400M INTERFACE CONTROL MODULE**

To change configuration settings, you may click on ports and buses.

EDIT STKA02GRK01

Slots Drives CAPs Revert to Saved Save Changes

EDIT DRIVES FOR STKA02GRK01

Drives:	Logical Address	Valid Range	Change	Delete
Lib 0 500 - 500	500-500	500-502	Change	Delete
Lib 1 503 - 503	501-501	500-503	Change	Delete

Add Drives: Lib 0 [] - [] Valid Range 500-502 Add

DRIVES IN USE

Library	Drive	Type	Identifier	Partition
Lib 0	Drive 500	Quantum SDLT600	RX0403AMC00407	STKA02GRK01
Lib 0	Drive 501	Quantum SDLT600	RX0403AMC00093	STKA02GRK02
Lib 0	Drive 502	Quantum SDLT600	RX0349AMC00110	STKA02GRK02
Lib 1	Drive 500	Quantum SDLT600	RX0406AMC00469	STKA02GRK04
Lib 1	Drive 501	IBM Ultrium 3 LTO	1200020049	STKA02GRK05
Lib 1	Drive 502	HP Ultrium 3 LTO	HU104461CC	STKA02GRK03
Lib 1	Drive 503	IBM Ultrium 3 LTO	1210013544	STKA02GRK01

VALID DRIVES

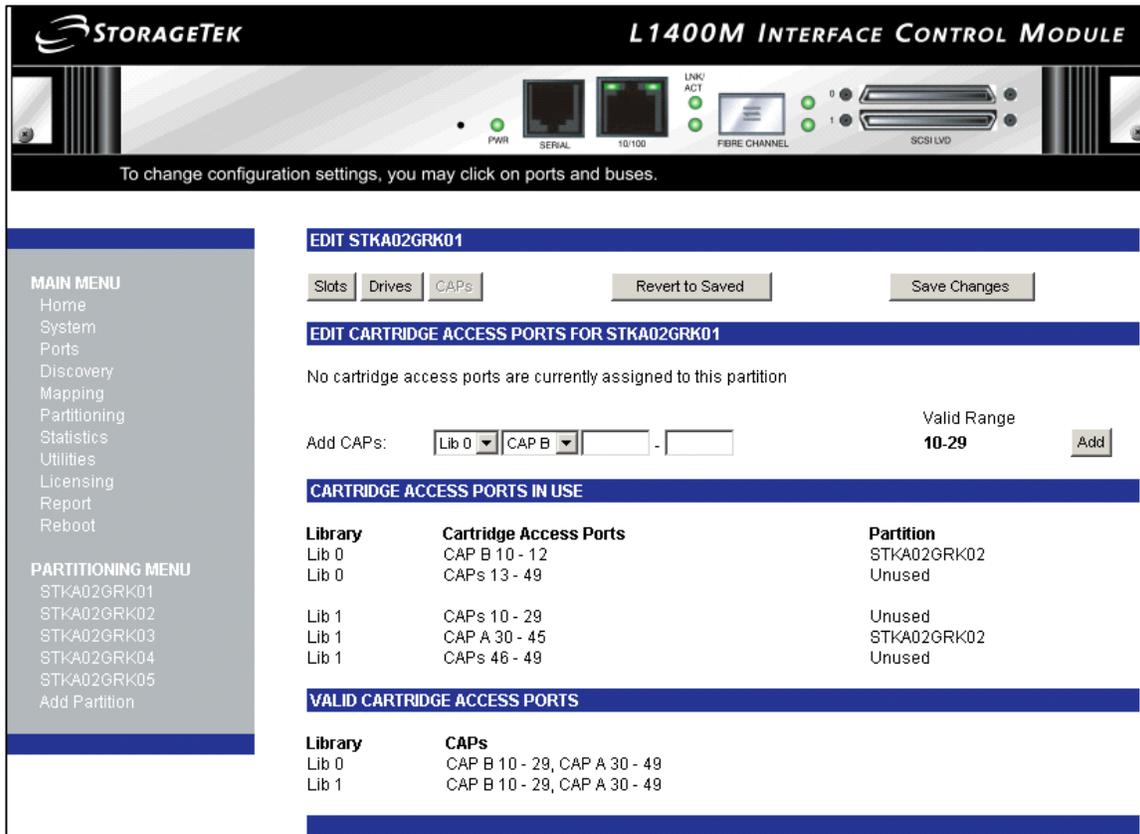
Library	Drives
Lib 0	Drives 500 - 502
Lib 1	Drives 500 - 503

Assigning CAPs to a Partition

CAP slots are assigned in the same manner as cartridge slots and tape drives. You must be on one of the Partitioning Edit pages (see [FIGURE 1-6 on page 39](#)), click on the "CAPs" button. By clicking this button the Edit CAPs page will be displayed (see [FIGURE 1-8 on page 42](#)). When assigning CAPs there are two rules:

- CAP slots can only be assigned to one partition; there is no sharing.
- There is one restriction to keep in mind when assigning CAP slots: In a dual library solution with a PTP, there are two CAP A's and the possibility of having two CAP B's installed (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. This restriction means that if a partition will have CAP slots in both libraries (Lib0 and Lib1) then one of the libraries will have to CAP A slots and the other library will have to be CAP B slots.

FIGURE 1-8 Edit Cartridge Access Port Page



The CAP Partitioning page (FIGURE 1-8) is structured in the same way as the other Partitioning pages, with four sections.

The bottom two sections provide information on the current CAP slots and their assignments. The "CARTRIDGE ACCESS PORTS IN USE" section identifies which CAP slots are available. The "VALID CARTRIDGE ACCESS PORTS" list the physical CAP slots that are installed.

To add a new CAP slot range:

1. first select the library (Lib 0 or Lib 1) from the pick list
2. Select the CAP from the pick list (CAP A or CAP B).
3. Type in the starting and ending element addresses of the CAP slots in the data entry windows.
4. Last, click the "Add" button and your selection will be added to the "CAPs:" list.

Making any CAP allocation changes causes two new buttons to be displayed on the screen (see FIGURE 1-8): "Revert to Saved" and "Save Changes". Use the "Save Changes" to save the changes you have made, use the "Revert to Saved" to cancel you changes and revert back to the last saved allocation.

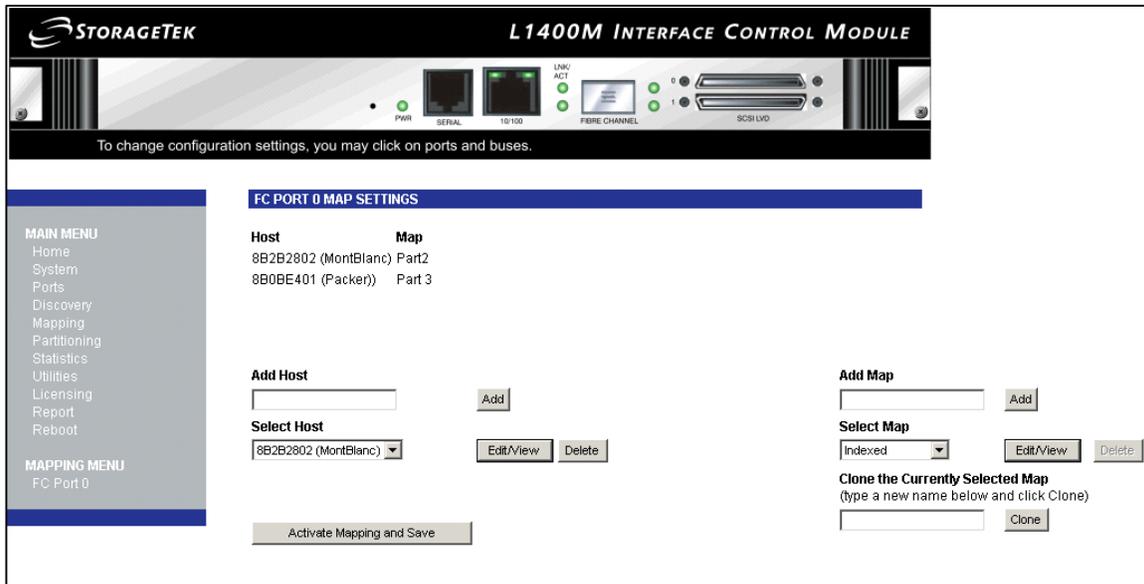
The entry for element addresses are in ranges: the first window is the starting address, the second window is the ending address. To assign only one slot, enter the same element address in the both windows. Each partition can have up to 10 element address ranges to assign CAP slots; 10 ranges are more than enough for CAPs.

When you are finished editing CAP assignments to this partition and have saved your changes you can continue editing slots and drives for this partition by clicking the "Slots" or "Drives" buttons at the top of the page or move to any other Menu item on the left side of the screen.

Assigning Hosts/Backup Applications to Partitions

Partitions are assigned to hosts via the mapping function. Click on the "Mapping" menu item in the Main Menu of the interface control GUI. When the Mapping item is selected the Mapping page will be displayed (FIGURE 1-9).

FIGURE 1-9 Mapping Page

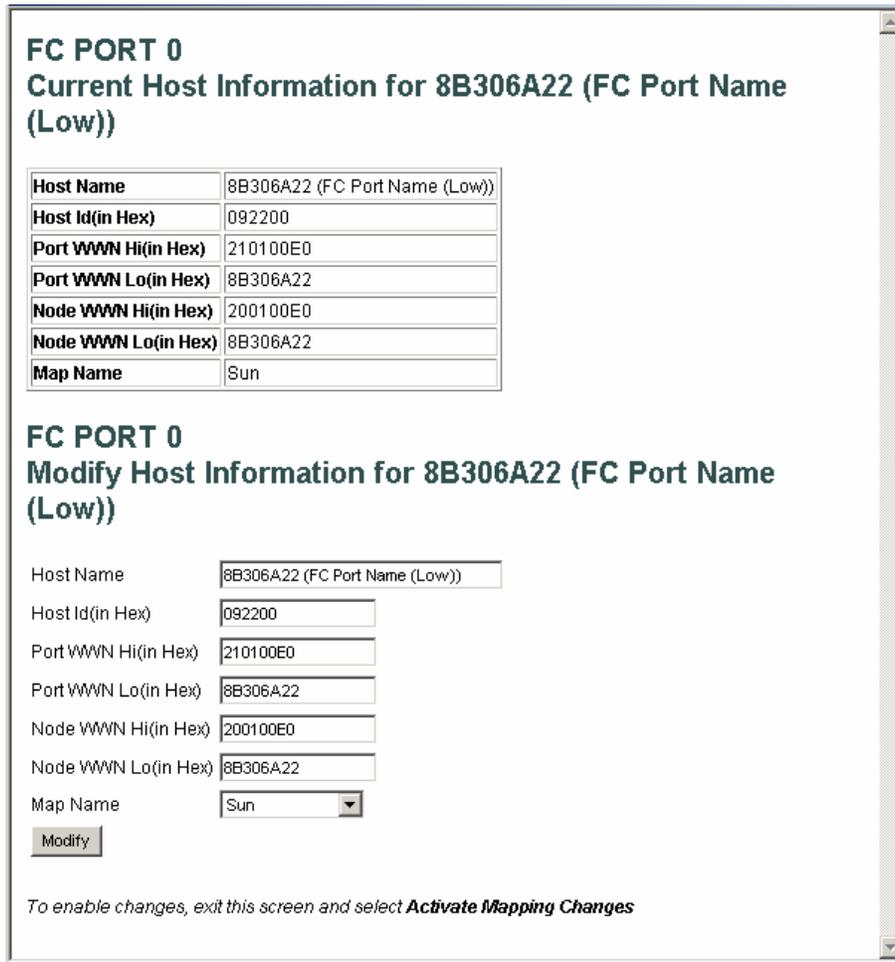


The information at the top of the page lists existing host/map assignments. To assign a partition to a host or change an existing host/map assignment:

1. Select the host in the "Select Host" window at the bottom of the screen.
2. When the desired host is displayed in the window, click the "Edit/View" button. Clicking this button will open a pop-up window (see FIGURE 1-10 on page 44).

In the pop-up window, the current host information is displayed in the top half of the window.

FIGURE 1-10 Host Port Information Window



3. If you want to make any changes to the host information, make the changes in the "Modify Host Information" section.

Note – Often the end user will want to add a more user friendly name to the end of the "Host Name".

4. To add a partition to this host simply click on the "Map Name" pick list and all of the partitions you have created will appear. When a partition is created through the process defined in the previous sections, a "map" is automatically created as well. The default mapping is one partition to one map. These "partition maps" are listed by the partition name ("STKA0xxxxx"). Select the partition you wish to assign from the list.
5. When you have completed any host information changes and selected your partition, click the "Modify" button and the window will close.

6. To finalize your host/partition mapping, click the "Activate Mapping and Save" button located on the bottom of the Mapping page. At this point you have completed the entire partitioning creation and assignment process.

Users can create more complex maps, as needed.

Note – Refer to the documentation on the Customer Resource Center for more information about creating and changing maps. This document only describes a simple mapping exercise.

Changing the Default Maps

On the right side of the Mapping Page is the area where you can create and modify maps (see [FIGURE 1-9 on page 43](#)).

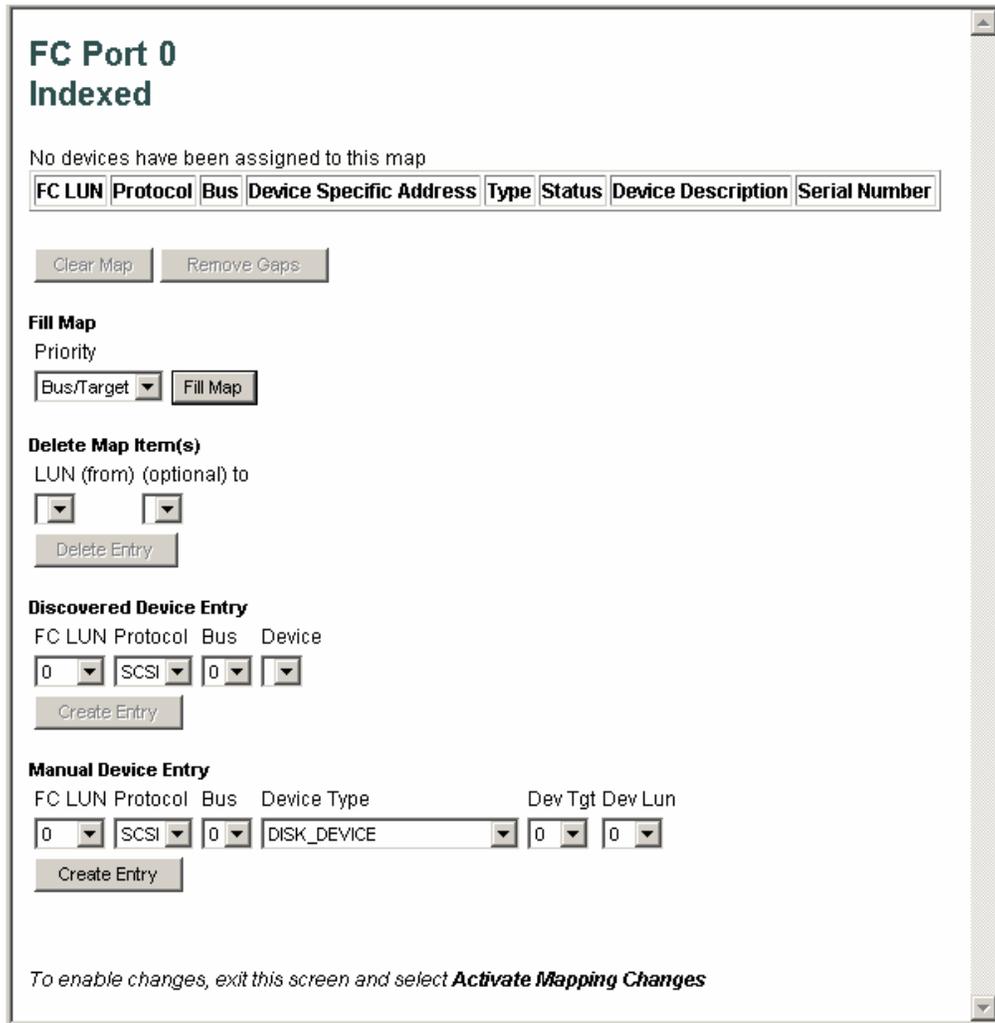
To add a new map, type in the name of the new map in the "Add Map" data entry window and click the "Add" button. Then Select the newly created map in the "Select Map" pick list and click on the "Edit/View" button; then the edit map pop-up window will appear ([FIGURE 1-11 on page 46](#)). Edit the map information as appropriate, then click the "Activate Mapping Changes" button on the Mapping page.

Editing the Default Partition Maps

The "partition maps" can be viewed by clicking the "Select Map" selection on the right side of the Mapping page. By clicking on the "Select Map" drop down list, a list of the current maps will be displayed. The default names for partition maps one through six are STKA0xxxx01 through STKA0xxxx06.

1. Select the partition map you want to edit and click the "Edit/View" button, the Edit/View Map pop-up window will appear (see [FIGURE 1-11](#)).
2. Edit the information as needed. When finished, click the "Activate Mapping Changes" button on the Mapping page.

FIGURE 1-11 Edit/View Map Window



Partitioned Element Address Presentation

The L1400 libraries use the same physical element addressing as the L700e. The physical addresses are well documented within the L700/1400 technical manuals located on the CRC, but the physical addresses for the L1400 are as follows:

- Medium Transport Element (Robot or Changer) is 0
- Storage Elements (Cartridge Slots)
 - Begins at 1000
 - Max slot configuration ends at 1677
- Data Transfer Elements (Tape Drives) starts at 500
 - Begins at 500
 - Max drive configuration ends at 519
- Import/Export Elements (CAP slots)

- Single CAP: CAP-A, 10 - 29
- Two CAPs: CAP-A, 30-49 ; CAP-B, 10 - 29

The partition element addresses are referred to as "logical" addresses, and the physical library's element addresses as "physical" addresses. Each partition always begins the logical element addressing by using the L1400 base physical addresses for each element type. Each partition begins its logical addressing with the following addresses:

- Medium Transport Element (Robot or Changer) is 0
- Storage Elements (Cartridge Slots) starts at 1000 (0x3e8)
- Data Transfer Elements (Tape Drives) starts at 500 (0x1f4)
- Import/Export Elements (CAP slots) starts at 10 (0xa)

The element addresses are then incremented up by the number of elements being addressed. [TABLE 1-3](#) below provides an example of a single frame L1400M1 library with four partitions.

TABLE 1-3 Example: Physical Address / Logical Partition Address

Partition	Physical Address of Tape Library	Logical Partition Address Presented to Application
Partition #1	0	0
Cart. Slots	1000-1199	1000-1199
Tape Drives	500-501	500-501
CAP Slots	10-14	10-14
Partition #2	0	0
Cart. Slots	1200-1299	1000-1099
Tape Drives	502	500
CAP Slots	15-19	10-14
Partition #3	0	0
Cart. Slots	1300-1399, 1450-1677	1000-1327
Tape Drives	503-508	500-505
CAP Slots	20-27	10-17
Partition #4	0	0
Cart. Slots	1400-1499	1000-1049
Tape Drives	509	500
CAP Slots	28-29	10-11

The L1400M interface controller keeps a translation map that can translate the logical addresses contained in Changer commands received by each virtual Changer LUN to the correct physical address of the assigned elements in the physical library (according to the partitioning resource assignments). Responses from the physical library (to commands sent to the library - e.g. Read Element Status) have to have the physical element addresses contained in them "mapped" back to "logical" element addresses.

In an aggregated environment (L1400M1/L1400P1 with a PTP), another layer of addressing is needed to manage the physical addresses of the L1400P1 library -- an aggregated layer. The physical addresses of the L1400P1 library are exactly the same as the physical addresses of the L1400M1 library. Host applications cannot manage these duplicate addresses; these applications need one sequential addressing scheme.

To create one sequential address scheme across the L1400M1/L1400P1 libraries, the interface controller appends the L1400P1 physical addresses of each element type to those in the first frame, creating one contiguous group of element addresses. Thus there is an additional translation of element addresses in the L1400P1, the aggregated physical address layer.

In an aggregated environment, the physical cartridge slot addresses of the L400M1 run from 1000 - 1671, and the aggregated slot addresses of the L1400P1 run from 1672 - 2343. These aggregated slot addresses are what is presented to the application. To the host application it looks like one contiguous address space from 1000 - 2343. This extra layer of aggregation is a potential cause for confusion as partitioning resource assignments in the GUI still use the true physical addresses and are differentiated by a "Lib 0" and "Lib 1" qualifier.

You can see the translation of the logical and aggregated addresses to physical address by going to the "Capacity Mgmt" page or the "Partitioning" page and clicking the "Library Browser" button.

Address Translation Table

A translation table for logical to physical/aggregated addresses is available for interface control cards with 5.8.0c code or later.

1. On the Main Menu, click on the "Capacity Mgmt" menu item; the Capacity Mgmt page will display (FIGURE 1-12).

FIGURE 1-12 Capacity Management Information Page.

The screenshot shows the StorageTek L1400M Interface Control Module GUI. At the top, there is a header with the StorageTek logo and the text "L1400M INTERFACE CONTROL MODULE". Below the header is a navigation bar with icons for PWR, SERIAL, 10/100, FIBRE CHANNEL, and SCSI LVD. A note below the navigation bar says "To change configuration settings, you may click on ports and buses."

The main content area is divided into two sections:

- CAPACITY MANAGEMENT INFORMATION**: Contains two buttons: "Edit Capacity Management" and "Library Browser".
- SERIAL NUMBER AND SLOT LICENSING**: Contains a table with the following data:

Serial No:	STKA02GRM01	
Slots Licensed:	700	
Slots Allocated:	700	
Slots In Use:	<u>Physical Address</u>	<u>Logical Address</u>
	Lib 0 1000-1671	1000-1671
	Lib 1 1000-1027	1672-1699
Drives In Use:	Lib 0 500-506	500-506
	Lib 1 500-503	507-510
CAPs In Use:	Lib 0 CAP A 10-29	10-29
	Lib 1 CAP A 10-29	30-49

On the left side of the screenshot, there is a "MAIN MENU" with the following items: Home, System, Ports, Discovery, Mapping, Capacity Mgmt, Statistics, Utilities, Licensing, Report, and Reboot.

2. Clicking on the "Library Browser" button will open a pop-up window that displays detailed addressing information; see FIGURE 1-13 on page 50. The information contained in the "Library Browser" is divided by tabs, there are two main tab's, one for each physical library, and four tabs under each library tab:

- Slots
- Drives
- CAPs
- PTP

Each of these tabs provide information listed in [TABLE 1-4](#).

TABLE 1-4 Address Translation Window Information Tabs

Tab	Description
Address	the physical address
Vol Tag	volser of the cartridge in this slot
Media Type	the type of media in this slot
Src Address	the address of the element that the tape was in before it was moved to the current location. Usually the information tells you what slot a tape normally is in when it is currently in a drive-the tape might be in element 500 (a drive) with a source address of 1010 (a slot, the normal home for the tape)
Partition	provides the logical address presented to the host

FIGURE 1-13 Address Translation Window

The screenshot shows a web browser window titled "Library Element Browser - Microsoft Internet Explorer provided by StorageTek". The main content area is divided into two sections: "Library 0" and "Library 1". Under "Library 0", there are sub-sections for "Slots", "Drives", "CAPs", and "PTP". A "Goto:" field is set to "1000 - 1024" with navigation buttons for "Prev", "Next", "Move...", and "Refresh". Below this is a table with the following data:

Address	Vol Tag	Media Type	Src Addr	Partition
1000	Empty			STKA02GRK01 - 1000
1001	Empty			STKA02GRK01 - 1001
1002	000192	Super DLT Generation 2 Data		STKA02GRK01 - 1002
1003	000191	Super DLT Generation 2 Data		STKA02GRK01 - 1003
1004	Empty			STKA02GRK01 - 1004
1005	Empty			STKA02GRK01 - 1005
1006	Empty			STKA02GRK01 - 1006
1007	Empty			STKA02GRK01 - 1007
1008	Empty			STKA02GRK01 - 1008
1009	Empty			STKA02GRK01 - 1009
1010	Empty			STKA02GRK01 - 1010
1011	ENG013	Super DLT Generation 2 Data		STKA02GRK01 - 1011
1012	Empty			STKA02GRK01 - 1012
1013	Empty			STKA02GRK01 - 1013
1014	Empty			STKA02GRK01 - 1014
1015	Empty			STKA02GRK01 - 1015
1016	Empty			STKA02GRK01 - 1016
1017	Empty			STKA02GRK01 - 1017
1018	Empty			STKA02GRK01 - 1018
1019	Empty			STKA02GRK01 - 1019
1020	Empty			STKA02GRK01 - 1020
1021	Empty			STKA02GRK01 - 1021
1022	Empty			STKA02GRK01 - 1022
1023	Empty			STKA02GRK01 - 1023
1024	Empty			STKA02GRK01 - 1024

Continuous Capacity

Continuous Capacity technology is used to provide a capacity-on-demand model for cartridge slot capacity. It provides an easy and flexible way to grow cartridge capacity.

In the L1400 libraries there is a difference between physical cartridge slot capacity and accessible cartridge slot capacity. All L1400 libraries ship with the maximum physical slot capacity installed, but not all of these slots are usable by the customer.

Capacity beyond the default number of cartridge slots is ordered in 100 slot increments.

Capacity upgrades within a library frame are non-disruptive. There is a disruption when the second frame and PTP are installed after the first frame is in use.

Note – Depending on the controller code level installed, there may be a brief 32 second outage for each capacity upgrade installed:

Customers using code level 5.8.0c and higher can upgrade capacity non-disruptively.

Code levels lower than 5.8.0c need to reboot the interface control card after the capacity key is enabled. This reboot process for this code level is quick (roughly 32 seconds) and should not cause problems in this customer base.

The default process is to sequentially add capacity based on the physical element address. If this default method is followed, then nothing else needs to be done, and the capacity will automatically be released when the key is "Added".

If you want to choose specific non-sequential physical slots, then after each capacity key that is entered you must use the Capacity Management menu item to allocate the slots used. This user allocation is required if any previous slots are out of sequence.

If you assign slots that are out of sequence, a new addressing scheme will be used to present the slot element addresses to the host application. These logical addresses are explained in more detail in section [“Continuous Capacity Cartridge Slot Presentation” on page 57](#).

Ordering a Capacity Access Key

You must request an access key in order to release access to physical slots within the L1400 libraries.

After your sales order is placed in the system, you can request an access key. Keys can be requested by anyone possessing the necessary information to place the request: AE, SE, CSE, the customer, etc.

Note – You must request an access key in order to gain access beyond 200 slots. Even with new library orders, keys must be requested.

Request a key by going to the CRC SW licensing site (see link below).

<https://www.support.storagetek.com/globalnavigation/support/generalpublic/default.htm>

1. Log in to the CRC
2. Click on the "Tools & Services" link
3. Click the "Software Keys" link
4. Click on the "L1400M Key Order Form" link.

FIGURE 1-14 on page 53 shows the L1400M key order form. The fields marked with an asterisk are required fields. TABLE 1-5 describes the form fields:

TABLE 1-5 Key Order Form Fields

Field	Description
Installer's E-Mail Address	This field could be the customer e-mail address as these keys are customer installable
Number of Slots	Type in the total number of slots the customer will end with. For example, if the customer was upgrading a 300 slot library and ordering 100 slots, you should type in "400"
Hardware Serial Number	If you are ordering a key for an L1400M1 model, type in the serial number of the L1400M1 library. If this request is not for an L1400M1 library, leave blank
Router Serial Number	If you are ordering a key for an L1400M0 model, type in the serial number of the SN3300. SN3300 serial numbers are 6 characters and begin with "A0" ("A0xxxx"). If this request is not for an L1400M0 library, leave blank.
New/Upgrade/ Partitioning key	<ul style="list-style-type: none"> ■ Select "New" if your request is for a access key and part of a new L1400M library purchase. ■ Select "Upgrade" if your request is for a access key and is a capacity upgrade for an existing L1400M library. ■ Select "Partitioning" is the customer is purchasing the L1400M partitioning feature. Partitioning is discussed in more detail in the L1400 Partitioning FAQ.

After the request is placed, a 25 alphanumeric software key will be sent to the e-mail address entered in the form.

Please allow 2 business days for processing. Keys are issued from 7:30am - 3:30pm. For information, questions or to EXPEDITE the Software Keys please call 1-800-436-5554 option 3, or 303-661-7667.

Note – This process is also used to order partitioning, aggregation, and/or PTP management.

FIGURE 1-14 L1400 Key Order Form.

File Edit View Favorites Tools Help

Address https://www.support.storageitek.com/GlobalNavigation/Support/ToolsAndServices/Tools/swkeys/GENERALPUBLIC/L1400MKey_Order.ht Go

STORAGETEK Customer Resource Center SEARCH

CRC Home
Welcome, RYAN DUFFY [Log Out](#) [Contribute](#) or [Edit Content](#)

CRC Home **L1400M Key Order Form**

Knowledgebase Search

Current Products

End of Support

Code Downloads

News and Announcements

Tools & Services

- CRC Tools
- Software Keys
- TRANSFER Premium Feature Key Request
- Get Key
- FSC Lookup
- Support File Upload
- CS Tools
- Software Level Upgrade Form
- Emergency Software Key
- Library Admin Help
- Interop Tool
- Software Manufacturing and Distribution
- User Services
- Support Cases
- Software/Hardware Enhancement Request
- Install Quick Close
- Product Support
- HIPER Subscriptions
- Site Support
- Subscriptions

StorageTek's Customer

* All fields are required for license keys.

*SAP Sales order number:

*Company Name:

Customer Address:

Customer Site ID:

Installer's Name:

Installer's Phone Number:

*Installer's Email Address:

StorageTek Field Contact: (if different from above)

STK Field contact's e-mail address: (32 characters)

*Number of Slots:

*Hardware serial number:

*Router serial number:

*New/Upgrade/Partitioning key (please specify one):
 New
 Upgrade
 Partitioning

A **PTP management functionality key** is required for all L1400P1 installations.
 This key is the same for every install.
License Key is: 4LKP355NVXZPLWN2LQD69NPNB.
 Refer to the L700x/L1400xx Installation manual for additional details.

Comments:

Submit

Done Local intranet

Installing a Capacity Access Key

Refer to the "L1400 Interface Control Module User Guide," P/N 96231A for complete instructions on connecting to the management interface.

Perform the following steps to install the capacity access key.

1. Go to the L1400M control interface web management page by typing in the IP address of the interface card.
2. The Main Menu on the left side of the screen (FIGURE 1-15) has an item labeled "Licensing" or "Features". Click on that menu item to view the page where the software keys are entered and all current access is listed.
3. Enter the software key in the "Enter Key" data entry window and click on the "Add" button.

FIGURE 1-15 L1400 ICM Main Menu

To change configuration settings, you may click on ports and buses.

MAIN MENU

- Home
- System
- Ports
- Discovery
- Mapping
- Partitioning
- Statistics
- Utilities
- Features
- Report
- Reboot

ADVANCED SOFTWARE LICENSED FEATURES

Please enter a key below and press Add or Disable:

Enter Key:

Press Add to use a key to enable a feature.
Press Disable to use a key to disable a feature.

FEATURE LIST

Feature	Status
300 Slot Capacity	The Feature is Not Enabled
400 Slot Capacity	The Feature is Not Enabled
500 Slot Capacity	The Feature is Not Enabled
600 Slot Capacity	The Feature is Enabled
700 Slot Capacity	The Feature is Not Enabled
800 Slot Capacity	The Feature is Enabled
900 Slot Capacity	The Feature is Not Enabled
1000 Slot Capacity	The Feature is Enabled
1100 Slot Capacity	The Feature is Not Enabled
1200 Slot Capacity	The Feature is Not Enabled
1300 Slot Capacity	The Feature is Not Enabled
1344 Slot Capacity	The Feature is Not Enabled
Library Partitioning	The Feature is Enabled
Capacity On Demand	The Feature is Enabled
Library Aggregation	The Feature is Enabled

Note – After adding capacity, a reboot is only necessary for code levels below 5.8.0c.

After the capacity key is entered, the access to the slots is released.

Allocating Capacity

1. On the Main Menu, click on the "Capacity Mgmt" item. The Capacity Management page is displayed as shown in [FIGURE 1-16](#), below.

This page shows the slots, drives, and CAPs that are in use; both the physical and logical addresses are displayed.

FIGURE 1-16 Capacity Management Page.

The screenshot shows the StorageTek L1400M Interface Control Module web interface. At the top, there is a header with the StorageTek logo and the title 'L1400M INTERFACE CONTROL MODULE'. Below the header, there are several status indicators: PWR, SERIAL, 10/100, UNK ACT, FIBRE CHANNEL, and SCSI LVD. A message below the indicators says 'To change configuration settings, you may click on ports and buses.'

The main content area is divided into two columns. The left column is a 'MAIN MENU' with the following items: Home, System, Ports, Discovery, Mapping, Capacity Mgmt, Statistics, Utilities, Licensing, Report, and Reboot. The right column is titled 'CAPACITY MANAGEMENT INFORMATION' and contains two buttons: 'Edit Capacity Management' and 'Library Browser'. Below this is a section titled 'SERIAL NUMBER AND SLOT LICENSING' which displays the following information:

Serial No: STKA02GRM01
 Slots Licensed: 700
 Slots Allocated: 700

Below this is a table showing 'Slots In Use', 'Drives In Use', and 'CAPs In Use' with their physical and logical addresses.

	Physical Address	Logical Address
Slots In Use:	Lib 0 1000-1671	1000-1671
	Lib 1 1000-1027	1672-1699
Drives In Use:	Lib 0 500-506	500-506
	Lib 1 500-503	507-510
CAPs In Use:	Lib 0 CAP A 10-29	10-29
	Lib 1 CAP A 10-29	30-49

2. To allocate new capacity, click on "Edit Capacity Management." the Edit Capacity Management page is displayed as shown in [FIGURE 1-17](#) on page 56, below.

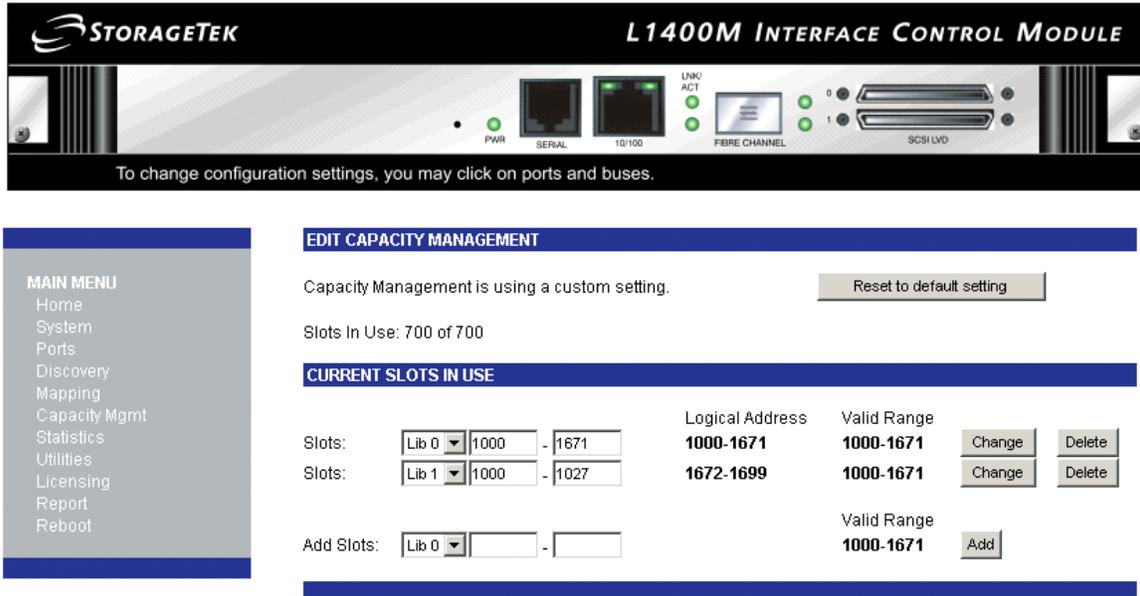
This page will display the slots ranges that are currently assigned. Up to 10 slot ranges can be used to assign capacity.

Note – Element addresses are entered in ranges: the first window is the starting address, and the second window is the ending address. To assign only one slot, enter the same element address in the both windows.

3. To add a new slot range:
 - a. Select the library (Lib 0 or Lib 1) from the pick list; Lib 1 will only be displayed if the Aggregation feature is enabled and the L1400P1 library has been installed.
 - b. Next type in the starting and ending element addresses in the data entry windows.
 - c. Last, click the "Add" button and your selection will be added to the "Slot:" list.

Note – To edit an existing allocation simply edit the existing slot range and click "Change". To delete a range, click the corresponding "Delete" button.

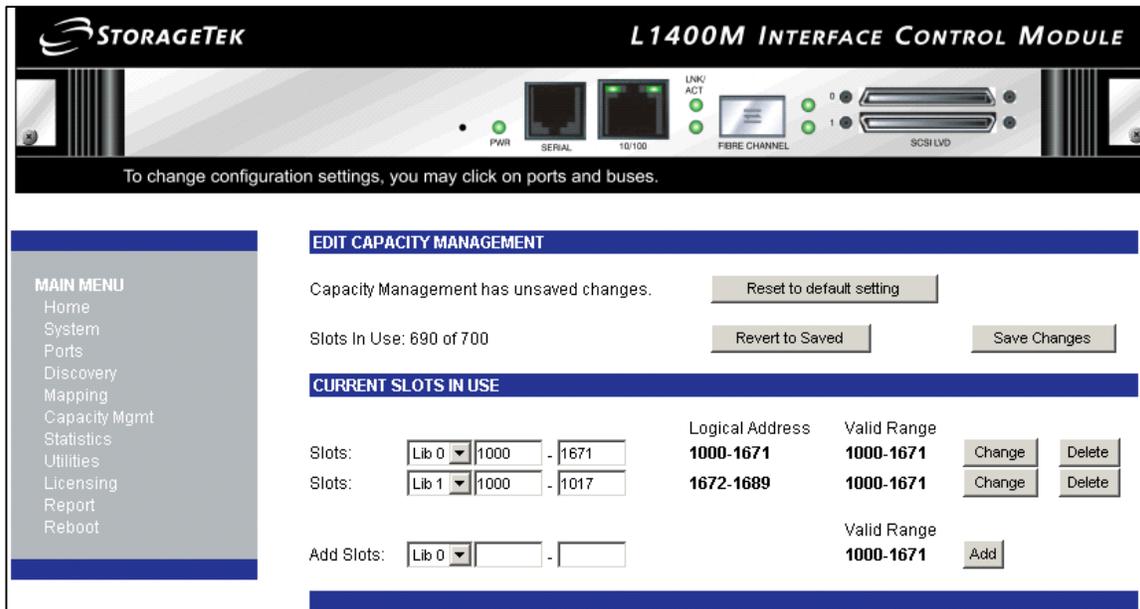
FIGURE 1-17 Edit Capacity Management Page.



4. Making any slot allocation changes causes two new buttons to be displayed on the screen (see FIGURE 1-18): "Revert to Saved" and "Save Changes".

Use the "Save Changes" to save the changes you have made, use the "Revert to Saved" to cancel changes and revert back to the last saved allocation.

FIGURE 1-18 "Save Changes" Page.



Continuous Capacity Cartridge Slot Presentation

The L1400 libraries use the same physical element addressing as the L700e. The physical addresses are well documented within the L700/1400 technical manuals located on the CRC, but the physical addresses for the L1400 are as follows:

- Medium Transport Element (Robot or Changer) is 0
- Storage Elements (Cartridge Slots)
 - Begins at 1000
 - Max slot configuration ends at 1677
- Data Transfer Elements (Tape Drives) starts at 500
 - Begins at 500
 - Max drive configuration ends at 519
- Import/Export Elements (CAP slots)
 - Single CAP: CAP-A, 10 - 29
 - Two CAPs: CAP-A, 30-49 ; CAP-B, 10 - 29

Logical addresses are needed anytime the physical address cannot be used. SCSI element address must be sequential and if the physical addresses are not sequential, due to non-sequential slots being allocated in the Capacity Management page or due to the L1400P1 library being installed. In these cases a logical address is used to keep the slot presentation to the host application sequential.

When logical addresses are used, the addressing scheme still begins at the starting points of the physical addresses listed below.

- Medium Transport Element (Robot or Changer) is 0
- Storage Elements (Cartridge Slots) starts at 1000 (0x3e8)
- Data Transfer Elements (Tape Drives) starts at 500 (0x1f4)
- Import/Export Elements (CAP slots) starts at 10 (0xa)

Then the element addresses are incremented up by the number of elements being addressed. [TABLE 1-6](#) below provides an example of a dual frame L1400M1/L1400P1 library with a single CAP in each frame, 27 tape drives, and a 900 slot license.

TABLE 1-6 Physical Address / Logical Partition Address

Partition	Physical Address of Tape Library	Logical Partition Address Presented to Application
L1400M1	0	0
Cart. Slots	1000-1611	1000-1611
Tape Drives	500-519	500-519
CAP Slots	10-29	10-29
L1400P1	0	N/A
Cart. Slots	1000-1287	1612-1899
Tape Drives	500-506	520-526
CAP Slots	10-29	30-49

The physical addresses of the L1400P1 library are exactly the same as the physical addresses of the L1400M1 library. Host applications cannot manage these duplicate addresses, these applications need one sequential addressing scheme.

To create one sequential address scheme across the L1400M1/L1400P1 libraries, the interface controller appends the L1400P1 physical addresses of each element type to those in the first frame, creating one contiguous group of element addresses. Thus, there is an additional translation of element addresses in the L1400P1. This is the aggregated physical address layer.

In an aggregated environment, the physical cartridge slot addresses of the L400M1 run from 1000 - 1671, and the aggregated slot addresses of the L1400P1 run from 1672 - 2343. These aggregated slot addresses are what is presented to the application. To the host application it appears as one contiguous address space from 1000 - 2343. This extra layer of aggregation is a potential cause for confusion as partitioning resource assignments in the GUI still use the true physical addresses and are differentiated by a "Lib 0" and "Lib 1" qualifier.

The L1400M interface controller keeps a translation map that can translate the logical addresses contained in Changer commands received by each virtual Changer LUN to the correct physical address of the assigned elements in the physical library (according to the partitioning resource assignments). Responses from the physical library (to commands sent to the library - e.g. Read Element Status) have to have the physical element addresses contained in them "mapped" back to "logical" element addresses.

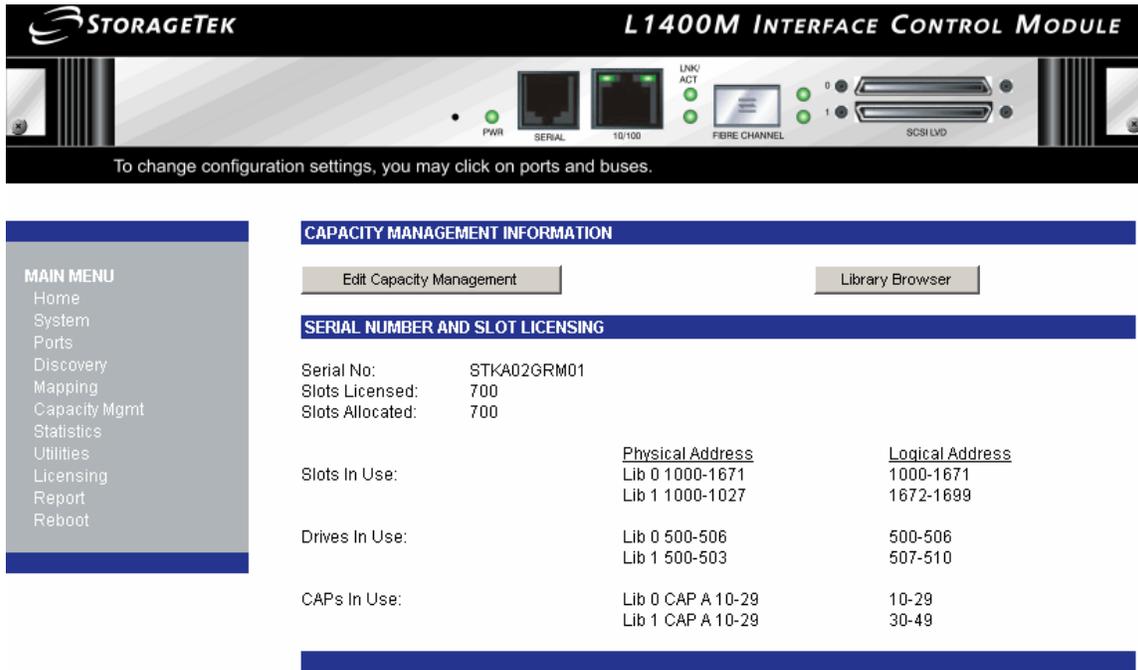
You can see the translation of the logical and aggregated addresses to physical address by going to the "Capacity Mgmt" page-they will be listed in the columns "Physical Address" and "Logical Address" (see screenshot below). For additional information click the "Library Browser" button.

Address Translation Table

A translation table of the logical to physical/aggregated addresses is available for interface control cards with 5.8.0c code or later.

1. On the Main Menu, click on the "Capacity Mgmt" menu item; the Capacity Mgmt page will display ([FIGURE 1-19 on page 59](#)).

FIGURE 1-19 Capacity Management Information Page.



2. Clicking on the "Library Browser" button will open a pop-up window that displays detailed addressing information; see [FIGURE 1-20 on page 60](#).

At the top there are the library tabs:

- If an L1400MA library is installed as a single frame, only the "Lib 0" tab is displayed.
- If an L1400M1 library is installed with an L1400P1 library (dual frame with PTP), both the "Lib 0" and the "Lib 1" tabs are displayed.

Generally speaking, the L1400M1 = Lib 0 and the L1400P1 = Lib 1. Each "Lib #" tab displays the same sub-tabs:

- a. Slots: Slots sub-tabs provide information listed in [TABLE 1-7 on page 60](#).
- b. Drives: Drives sub-tabs provide information listed in [TABLE 1-8 on page 61](#), and are shown in [FIGURE 1-21 on page 61](#)
- c. CAPs: CAP sub-tabs provide information listed in [TABLE 1-9 on page 62](#), and are shown in [FIGURE 1-22 on page 62](#)
- d. PTP: sub-tabs provide information listed in [TABLE 1-10 on page 63](#), and are shown in [FIGURE 1-23 on page 63](#)

FIGURE 1-20 Address Translation Window, Slots Tab

Address	Vol Tag	Media Type	Src Addr	In Use
1000	Empty			In Use - 1000
1001	Empty			In Use - 1001
1002	Empty			In Use - 1002
1003	Empty			In Use - 1003
1004	Empty			In Use - 1004
1005	Empty			In Use - 1005
1006	Empty			In Use - 1006
1007	Empty			In Use - 1007
1008	Empty			In Use - 1008
1009	Empty			In Use - 1009
1010	CLI160	LTO Gen 3 Data	9	In Use - 1010
1011	Empty			In Use - 1011
1012	Empty			In Use - 1012
1013	Empty			In Use - 1013
1014	Empty			In Use - 1014
1015	Empty			In Use - 1015
1016	Empty			In Use - 1016
1017	Empty			In Use - 1017

TABLE 1-7 Address Translation Window, Slots Tabs

Tab	Description
Address	the physical address
Vol Tag	volser of the cartridge in this slot
Media Type	the type of media in this slot
Src Address	the address of the element that the tape was in before it was moved to the current location. Usually the information tells you what slot a tape normally is in when it is currently in a drive-the tape might be in element 500 (a drive) with a source address of 1010 (a slot, the normal home for the tape)
In Use	provides the logical address presented to the host-this column is labeled "Partitioning" when the Partitioning feature is enabled.

FIGURE 1-21 .Address Translation Window, Drives Tab.

Address	Drive Type	Id	Vol Tag	Media Type	Src Addr
500	Quantum SDLT220	PMB51H0083	000132	Super DLT Cartridge	1000
501	IBM Ultrium 2 LTO	1100224350	000748	100 GB Ultrium 1 LTO	1001
502	HP Ultrium 3 LTO	HU10608PRM	EN1758	100 GB Ultrium 1 LTO	1002
503	StorageTek 9940	456000002735	EVL535	9940 Cartridge	1003
504	Quantum SDLT600	Rx0342AMC00028	EVT135	Super DLT Generation 2 Data	1004
505	Certance Ultrium 1 LTO	HL004ER	EN1418	100 GB Ultrium 1 LTO	1005
506	HP Ultrium 3 LTO	HU104471P0	STK300	100 GB Ultrium 1 LTO	1006

TABLE 1-8 Address Translation Window, Drive Tabs

Tab	Description
Address	the physical address of the drives
Drive Type	the drive manufacturer technology type of the drive
Id	the drive serial number
Vol Tag	the volser of the media in the drive; only displays if media is in the drive
Media Type	the type of media in the drive; only displays if media is in the drive.
Src Addr	the source address (usually a slot address) of the cartridge currently in the drive

FIGURE 1-22 Address Translation Window, CAPs Tab.

Address	Vol Tag	Media Type	Src Addr
10	Empty		
11	000143	Super DLT Cartridge	
12	EVT137	Super DLT Generation 2 Data	
13	CLI147	LTO Gen 3 Data	
14	Empty		
15	CLI120	LTO Gen 3 Data	
16	Empty		
17	000003	200 GB Ultrium 2 LTO	
18	PTP244	100 GB Ultrium 1 LTO	
19	PTP223	Super DLT Cartridge	
20	Empty		
21	Empty		
22	Empty		
23	Empty		
24	Empty		
25	Empty		
26	Empty		
27	Empty		
28	Empty		
29	Empty		

TABLE 1-9 Address Translation Window, CAPs Tabs

Tab	Description
Address	the physical address of the CAP slots
Vol Tag	the volser of the media in the CAP; only displays if media is in the CAP
Media Type	the type of media in the CAP; only displays if media is in the CAP.
Src Addr	the source address (usually a slot address) of the cartridge currently in the CAP

FIGURE 1-23 Address Translation Window, PTP Tabs.

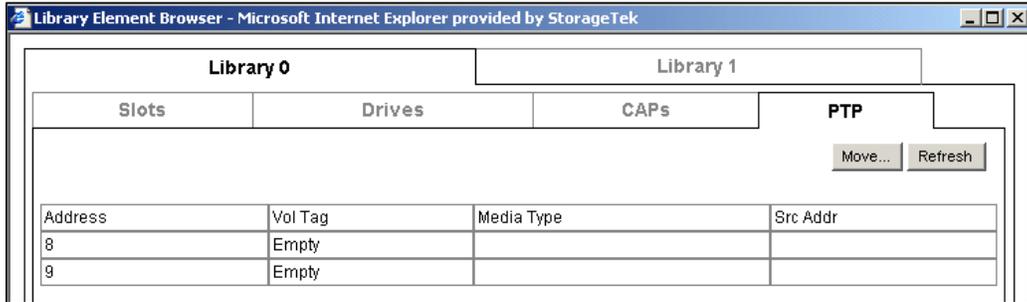


TABLE 1-10 Address Translation Window, PTP Tabs

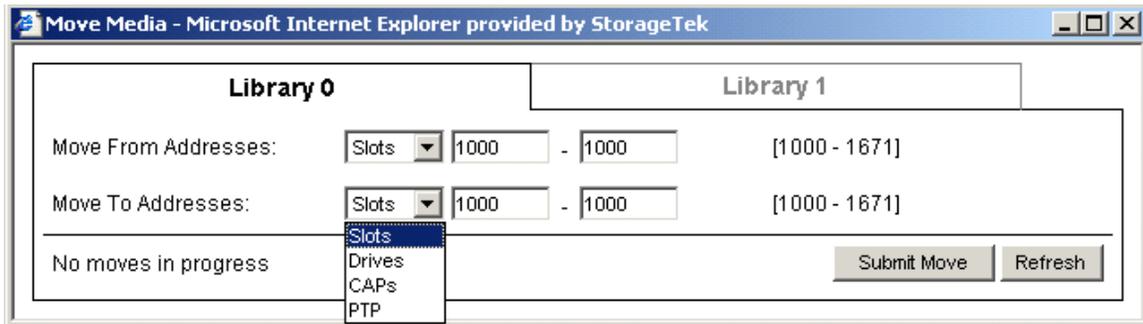
Tab	Description
Address	the physical address of the PTP slots
Vol Tag	the volser of the media in the PTP; only displays if media is in the PTP
Media Type	the type of media in the PTP; only displays if media is in the PTP.
Src Addr	the source address (usually a slot address) of the cartridge currently in the PTP

Moving Media, Single Library

Caution – Moving media outside the host application can cause serious problems with the application. We strongly recommend using the host application for any media movement needs.

When the "Move..." button is clicked on any library browser page, the "Move Media" pop-up window appears (FIGURE 1-24 on page 64). Notice the same "Lib 0" and "Lib 1" tabs as in the other library browser windows. The "Lib 1" tab only displays if the L1400P1 is installed.

FIGURE 1-24 Move Media Window.



1. Select the library where the media resides (Lib 0 or Lib 1).
 - a. Click on the "Move From Addresses:" pick list and select the location of the media you wish to move from the list of Slots, Drives, CAPs, and PTP.
The valid physical element address ranges will appear on the far right.
 - b. Enter the element address ranges of the media you wish to move in the windows.
To move multiple pieces of media at once enter the starting address in the first window and the ending address in the second window.
To move a single piece of media, enter the same address in both windows.
 - c. Select the "Move To Addresses:" select target addresses in the same manner as the "from" addresses were selected. Make sure the target addresses are empty by checking the destination with library browser.
2. Click on the "Submit Move" button. A confirmation window appears (FIGURE 1-25). Click "OK."

Note – If there is a problem with your request, such as the destination address being full, the request will fail. If the address ranges do not match, an error message will display.

A message at the bottom of the Move Media window tracks the move progress. When the move is complete the message will read "No moves in progress."

Clicking the "Cancel" button returns you to the Move Media window, and the move is not executed.

FIGURE 1-25 Confirmation Window.



Moving Media with the Pass-Thru Port

Moving media across the PTP to the other library is accomplished by executing two separate moves.

Note – Before you start, make sure the PTP slots are available using the library browser.

1. Move the media from the source library to the PTP (you can only move two pieces of media at one time to the PTP).
2. After the move to the PTP is completed, click on the target library tab and move the media from the PTP to the destination cell addresses.

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