Using Oracle/StorageTek T10K Drives in a Spectra TFinity Library

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Part Number

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Revision History

Revision	Date	Description
A	January 2018	Initial release.

Notes:

- To make sure you have the most current version of this guide check the Spectra Logic Technical Support portal at https://support.spectralogic.com/documentation/user-guides/.
- To make sure you have the release notes for the most current version of the BlueScale software, check the Spectra Logic Technical Support portal at https://support.spectralogic.com/documentation/release-notes/.
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About This Guide

This guide provides information specific to how to configure and use Oracle's StorageTek T10000A, T10000B, T10000C, or T10000D tape drives, which are referred to in the guide as *T10K* drives, in a Spectra Logic TFinity library. The *Spectra TFinity Library User Guide* provides detailed information about all other aspects of configuring, using, and maintaining your library.

The intended purpose for configuring T10K partitions in a TFinity library is to retrieve and migrate data from T10K tapes. A TFinity library must be configured for mixed media support, contain a high performance transporter (HPT), and be running BlueScale12.7.04, or later in order to support T10K partitions.

Intended Audience

This guide is intended for data center administrators and operators who maintain and operate backup systems. The information in this guide assumes a familiarity with SCSI and Fibre Channel command protocols, as well as with network connectivity protocols such as Fibre Channel and Ethernet. It also assumes a knowledge of technical tasks such as configuring operating systems and installing software drivers.

Related Information

This section contains information about this document and other documents related to the TFinity library.

BlueScale User Interface Screens

The BlueScale® interface changes as new features are added or other modifications are made between software revisions. Therefore, the screens on your library may differ from those shown in this document.

Additional Publications

For additional information about the Spectra TFinity library and its drives, refer to the publications listed in this section.

Spectra Tape Libraries

This guide and the following documents related to the Spectra TFinity library are available as PDF files on the Spectra Logic website at support.spectralogic.com/documentation.

- The *Spectra TFinity Library User Guide* provides detailed information about configuring, using, and maintaining your library.
- The *Spectra Tape Libraries Quick Reference Guide* provides a quick reference for the user interface and instructions for performing day-to-day library operations such as powering on and off, and preparing, importing, and exporting media.
- The *Spectra Tape Libraries BlueScale Toolbar Option Map* provides a quick reference for locating the options and commands available through the BlueScale user interface.
- The *Spectra Tape Libraries Site Preparation Guide* provides information about preparing your site for the installation of the TFinity library.
- The *Spectra BlueScale Vision Camera User Guide* provides detailed information about installing and using the white BlueScale Vision Camera and software.
- The *Vivotek FD8361 Fixed Dome Network Camera User's Manual* provides detailed information about installing and using the black BlueScale Vision Camera and software.
- The *Spectra Tape Libraries Encryption User Guide* provides detailed information about using BlueScale Encryption Standard and Professional Edition and the Spectra SKLM Encryption key management system. It also provides useful information about encryption best practices and recycling encrypted media.
- The *Spectra Tape Libraries SCSI Developer's Guide* provides detailed information about the SCSI and Fibre Channel commands used in the library.
- The *Spectra Tape Libraries XML Command Reference* provides detailed information about using the XML interface with the TFinity library.
- The *Spectra Tape Libraries Warnings* document provides all of the warnings found in Spectra tape libraries documentation, in English and 27 other languages.

The following document is available after logging into your Support portal account at: support.spectralogic.com.

- The *Spectra Tape Libraries Release Notes and Documentation Updates* provides the most up-to-date information about the TFinity library, drives, and media.

StorageTek T10000 Drives

The following documents provide information applicable to StorageTek T10000 drives.

- *StorageTek T10000 Tape Drive Operator's Guide*

Typographical Conventions

This document uses the following conventions to highlight important information:

WARNING Read text marked by the "Warning" icon for information you must know to avoid personal injury.

Caution Read text marked by the "Caution" icon for information you must know to avoid damaging the library, the tape drives, or losing data.

Important Read text marked by the "Important" icon for information that helps you complete a procedure or avoid extra steps.

Note: Read text marked with "Note" for additional information or suggestions about the current topic.

CHAPTER 1

T10K Partition Overview

The Spectra TFinity Library is an enterprise-class, highly scalable library. It provides fast, affordable storage that meets the stringent requirements for data integrity, data security, and high reliability in the enterprise environment. In order to assist users in migrating from libraries containing T10K drives and media to a Spectra Logic TFinity library, partitions with T10K drives can be configured in the TFinity library. Customers are then able to move T10K drives and media to a TFinity library, decommission the Oracle library, and add LTO and/or TS11*xx* technology drives and media into a separate partition on the library for new data and migration of data from the T10K media to a more modern technology.

This chapter describes the library requirements and BlueScale limitations for T10K partitions.

LIBRARY REQUIREMENTS

To support T10K partitions, the TFinity library must have the following:

- The library must be configured for enterprise spacing. A library with LTO spacing can be updated to enterprise spacing in the field.
- The library must use high performance transporters.
- The library must use BlueScale12.7.04.01, or later.
- Due to the length of the T10K drive and drive sled, rear doors on frames with T10K drives installed must be removed.
- A maximum of 12 T10K drives can be installed in a frame. If a frame has fewer than 12 T10K drives installed, for each T10K drive below 12, two LTO or TS11xx technology drives can be installed. For example, If you have ten T10K drives you can also have four LTO or TS11xx technology drives in the frame. If you have four T10K drives you can also have 16 LTO or TS11xx technology drives in that frame.
- An LTO drive cannot be installed in a Drive Bay Assembly to the left (when viewed from the front of the library) of a T10K drive.

BLUESCALE LIMITATIONS

The BlueScale software has the following limitations for T10K partitions and drives.

Auto Drive Clean Partitions with T10K drives cannot utilize cleaning partitions and Auto Drive Clean.

Drive Details Drive details are limited for T10K drives. See Check Drive and DCM Firmware Levels on page 32 for details.

Drive Specific Diagnostics and Utilities No drive update utilities or drive troubleshooting utilities are available for T10K drives, including drive trace gathering.

Drive Lifecycle Management The library does not collect or report drive health information for T10K drives.

Drive Log Collection The library does not collect drive dumps or drive traces from T10K drives.

Drive Performance Monitoring The library does not provide Drive Performance Monitoring for T10K drives.

Encryption Key Management The library does not provide encryption key management for T10K drive-based encryption. It may be possible to read encrypted tapes using external encryption key management software. Consult a Spectra Logic system architect (see Contacting Spectra Logic on page 7) if reading encrypted tapes is required.

Global Spare Partitions with T10K drives cannot utilize global spare drives.

Media Lifecycle Management The library does not collect or report media health information for T10K tapes.

Media Statistics The media statistics displayed on the General Status screen do not include T10K tapes.

Storage Density Metrics Storage Density metrics are not calculated for T10K tapes.

CHAPTER 2

Configuring and Managing Partitions

This chapter describes how to use the BlueScale partition wizard to configure and manage partitions with T10K drives. If you want to create a partition for any other media type, see the *Spectra TFinity Library User Guide*. Other media types have partition creation options not covered by this document.

PARTITION CONFIGURATION OVERVIEW

Partitions divide the library logically so that it appears as one or more physical libraries — one library per configured partition. Partitioning simplifies storage consolidation through the creation of virtual libraries, each with its own drives and media.

Partition Types and Requirements

When configuring partitions, keep in mind the requirements in the following sections.

Global Considerations

The following information applies to both cleaning and storage partitions.

User Privilege Requirements Only users with superuser or administrator privileges can create or modify partitions.

Background operations You cannot create, modify, or delete a partition if the library is actively running a Media Auto Discovery, PreScan, or PostScan operation or if the library is performing certain other background processes (for example, importing or exporting magazines using the bulk TAP).

If you do not want to wait for a Media Auto Discovery, PreScan, or PostScan operation to complete, you can stop the Media Auto Discovery or PreScan operation or pause the PostScan operation. For other background operations, wait for the process to complete.

- To stop Media Auto Discovery or PreScan, click **Stop Discovery** on the Media Lifecycle Management Tools screen.
- To pause PostScan for one hour, click **Pause PostScan** on the Media Lifecycle Management Tools screen.

Configuring and Using Storage Partitions

- The library requires, at a minimum, one storage partition to be configured before you can use the library. Each storage partition must have a minimum of one chamber assigned to the storage pool. Each storage partition must also have at least one drive assigned to it.

- **Chamber Availability** — The number of chambers available for a storage partition depends on how many chambers in the library are licensed, how many chambers are used by other partitions, and whether or not Thin Provisioning is enabled.
  - If Thin Provisioning is not enabled, the library automatically makes any licensed chambers that are not already configured for use in another partition available to be configured in the new partition. If all of the licensed chambers in your library are already assigned to existing partitions, you must modify one or more partitions to make chambers available for creating a new partition.
  - If Thin Provisioning is enabled, up to a combined total of 60,000 elements, including storage slots (not chambers), entry/exit slots (not chambers), and drives are available for each partition, no matter how many chambers are licensed or already assigned to existing partitions. Using Thin Provisioning, it is possible for the combined configured number of storage slots in all partitions to exceed the licensed or physically available number of slots. Empty slots are inaccessible elements until a TeraPack magazine is imported into a partition. At that time, the slots are made accessible to only the partition into which the magazine was imported.
- **Restrictions on the Number of Partitions** — By default, you can only create a single storage partition. If you need additional storage partitions, you must purchase a Shared Library Services (SLS) activation key. With an SLS activation key, you can have a maximum of 16 storage partitions.

  Note: The more partitions in a library, the longer each move can take. If move requests can be sent to several partitions at once, you may need to increase the timeout setting in your storage management software.
- **Restrictions on Exporters** — Each partition is exported by a RIM.
  - The maximum number of physical exporting devices (RIMs) supported by the library is six. If the library contains RIMs in excess of the six exporters, the additional RIMs can be used for failover.
  - If the library has Thin Provisioning enabled, a single RIM can export 60,000 elements. A single RIM2 does not have this limit.
  - If desired, you can configure multiple exporting controllers to a single partition and use your host software to export the same changer interface over the controllers to provide redundancy.

  Notes:
  - A single partition can have, at most, six physical exporting devices configured.
  - A single RIM can export up to eight partitions, but still only count as one exporter; a single RIM2 can export up to 16 partitions, but still only count as one exporter.

Preparing to Configure Partitions

Before you begin configuring partitions, gather the information listed in the following table.

Note: Each chamber holds a single magazine with nine T10K tapes.

Component	Description
Entry/Exit pool number of chambers	Determine the number of chambers to use for the partition's entry/exit pool. The chambers in a storage partition's entry/exit pool provide an interim storage location for cartridges during import and export operations. **Note:** The host storage management software cannot use the cartridges in the entry/exit pool for backup jobs. However, the storage management software can access the cartridges stored in the entry/exit pool to move them into the storage pool.
Storage pool number of chambers	Determine the number of chambers to be used for the partition's storage pool. The cartridges in the storage pool are available for use by the host storage management software that accesses the partition.
Drives assigned to the storage partition	Determine which drives to assign to the partition. Only drives that are already installed in the library are available. Each storage partition must have at least one drive assigned to it.
Robotic control path	Decide on the exporting controller (RIM) for the library's robotics. **Notes:** ▪ If you plan to select both ports on the exporting controller, make sure that the software used with the partition supports using multiple control paths and that the ports are cabled correctly. Selecting both ports provides redundancy, but requires software that supports two control paths to the robotics. ▪ You can select multiple exporting controllers (RIMs) for a partition and use your host software to either export the same changer interface over the controllers to provide redundancy, or send multiple moves to the partition which are analyzed and processed by MediaIQ in the most efficient way. ▪ The maximum number of exporters supported by the library is six. A single RIM can export up to eight partitions, but still only count as one exporter; a single RIM2 can export up to 16 partitions, but still only count as one exporter.
Controller (RIM) port addressing	Decide what port addressing (soft addressing or Loop ID) and Fibre mode (Loop, Fabric, or Auto-negotiate) each port on the controller uses. If you select soft addressing, each Fibre Channel port is assigned a unique address when it connects to the Fibre Channel arbitrated loop, fabric, or SAN. If you do not use soft addressing, each port uses the fixed Loop ID you set.

Creating a Storage Partition

Use the following steps to create a storage partition using the partition wizard.

1. Log in as a user with superuser or administrator privileges. .

2. From the toolbar menu, select **Configuration ···⁘ Partitions** to display the Shared Library Services screen.

   - If one or more partitions already exist, the existing partitions are listed in alphabetical order. Click **New** to display the Name and Media Type screen.

     Note: If the **New** button is not displayed, then all chambers in the library are allocated or the maximum number of partitions already exist. You need to delete or edit an existing partition to free up chambers, license more chambers, or make hardware upgrades that increase the storage capacity of the library before you can create another partition.

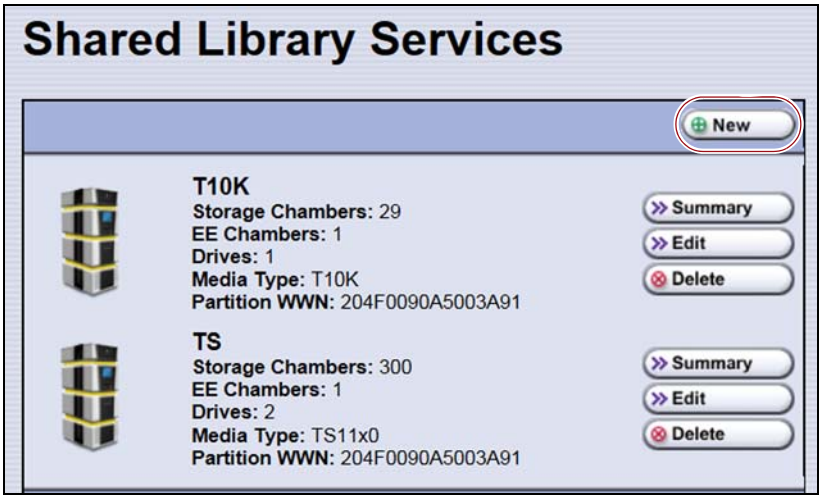

Figure 1 Click **New** on the Shared Library Services screen to begin creating the storage partition.

   - If the library does not currently have any partitions configured, select **Manually create a partition** and click **New** to display the Name and Media Type screen.

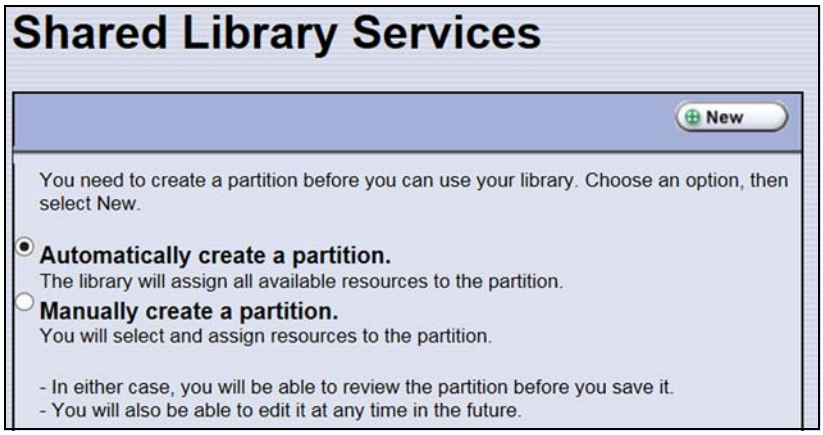

Figure 2 Select **Manually create a partition** on the Shared Library Services screen when there are no partitions.

3. Enter a name for the storage partition and select **T10K** as the media type.

   Note: If the storage partition media type is grayed out, then all licensed chambers are assigned to partitions. Edit an existing partition to free up chambers or purchase a Capacity on Demand key.

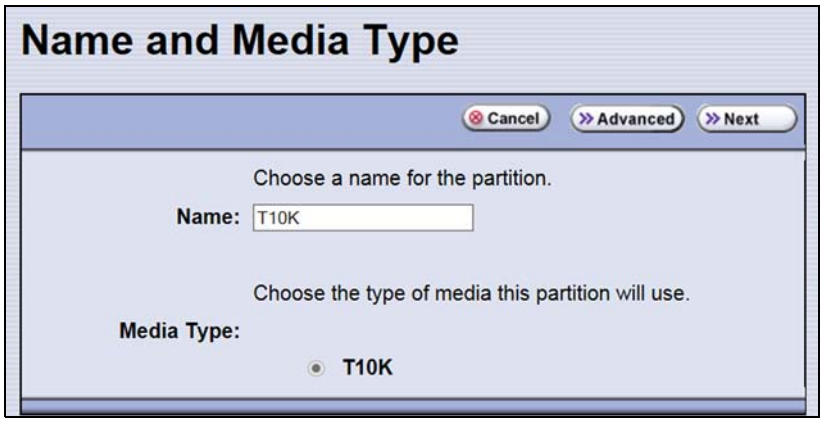

Figure 3 Enter a name for the partition and select **T10K** as the media type.

For this field...	Do the following...
Name	Enter a unique, descriptive name to identify the partition. Names can be any length and can include @ - _ /. and the space character. Partition names over 32 characters causes a scroll bar to display on some screens and are not recommended. The default name for a storage partition is "Partition *n*", where *n* is a number. **Note:** In many of the BlueScale screens, the partitions are listed alphabetically. Keep this in mind when naming your partitions.
Media Type	Select **T10K** to create a storage partition that uses T10K drives and media.

Select the Robotic Control Path

Controllers (RIMs) in the library are used to provide the robotic control path for the partition. The controller "exports" the partition to the hosts, receiving and processing the robotic motion commands sent from the host to move tapes.

Notes:

- A RIM is identified as an F-QIP in the Robotic Control Path screen and other screens that reference the controllers.
- You can select multiple exporting controllers (RIMs) for a partition and use your host software to either export the same changer interface over the controllers to provide redundancy, or send multiple moves to the partition which are analyzed and processed by MediaIQ in the most efficient way.
- The maximum number of exporters supported by the library is six.
- A single RIM can export up to eight partitions, but still only count as one exporter; a single RIM2 can export up to 16 partitions, but still only count as one exporter.

Use the following instructions to select the robotic control path:

1. From the Name and Media Type screen, click **Next**. The Robotic Control Path screen displays a list of the controllers currently installed in the library.

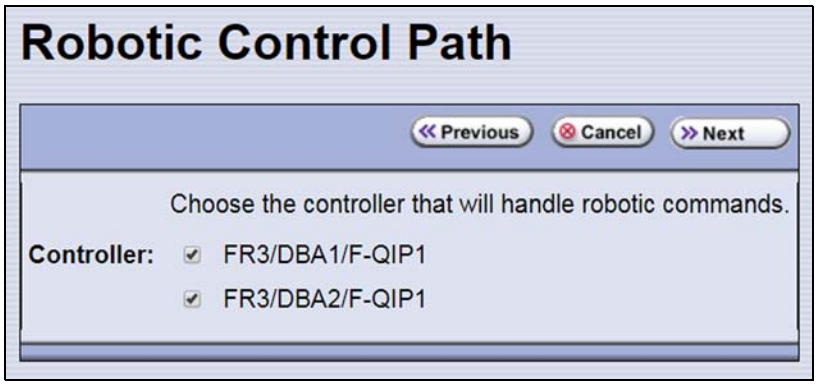

Figure 4 Select the exporting controller.

2. Select the controller(s) to provide the control path for the robotics.

Important

If you want to use the controller failover feature for RIMs, keep the following requirements in mind:

- You must have at least two RIMs installed in the library.
- If you configured controller failover before you configured the storage partition, select the primary controller in the failover pair to provide the robotic control path.

Allocate Chambers and Drives

Use the following steps to allocate chambers and drives for the partition.

1. From the Robotic Control Path screen, click **Next**. The Chambers and Drives screen displays.

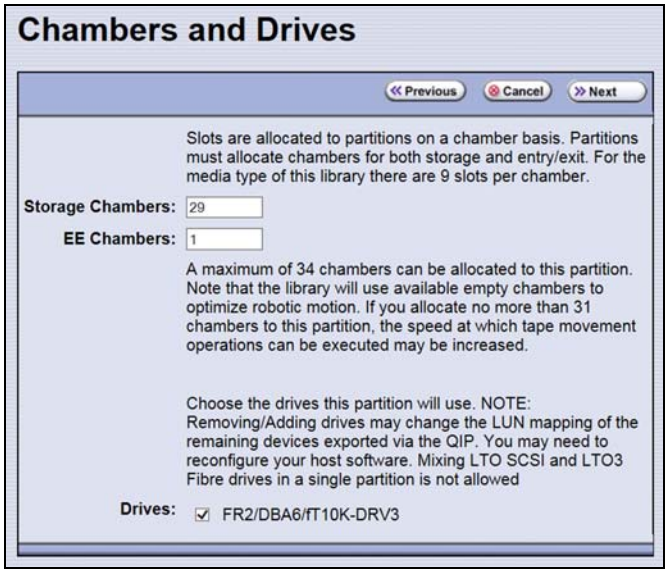

Figure 5 The Chambers and Drives screen for a library without Thin Provisioning enabled.

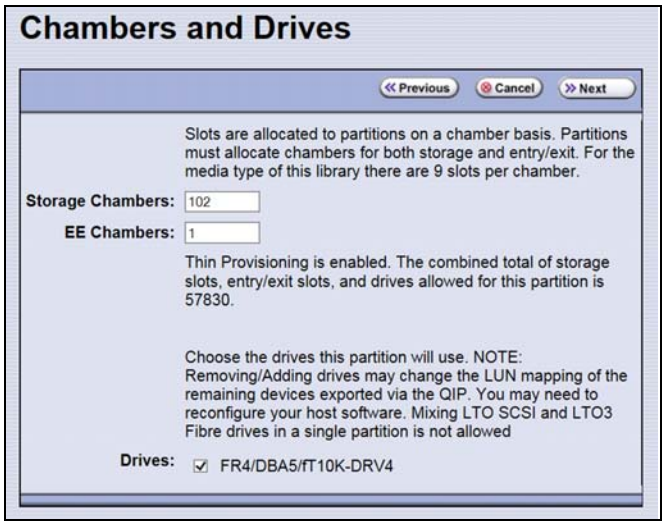

Figure 6 The Chambers and Drives screen for a library with Thin Provisioning enabled.

2. Complete the following information in the Chambers and Drives screen.

For this field...	Do the following...

Storage Chambers	Enter the number of storage chambers to assign to the storage pool for this partition. If Thin Provisioning is not enabled in the library, the screen displays how many chambers are available for the partition. If Thin Provisioning is enabled, the screen displays how many elements (storage slots + entry/exit slots + drives) are allowed.
	Notes:
	▪ Each chamber accommodates one TeraPack magazine with slots for nine T10K cartridges.
	▪ If Thin Provisioning is enabled it is possible for the combined configured number of storage slots in all partitions to exceed the licensed or physically available number of slots.
	▪ If Thin Provisioning is not enabled:
	  ▪ If you plan to create multiple partitions, be sure to reserve enough chambers to configure the other partitions.
	  ▪ If you licensed all of the chambers in the library and want to use a cleaning partition, be sure to reserve enough chambers for the cleaning partition. If you did not license all of the chambers in the library, the unlicensed chambers are available for use in cleaning partitions.

For this field...	Do the following...
EE Chambers	Enter the number of chambers to assign to the entry/exit pool for this partition. **Notes:** ▪ Some storage management software features require an entry/exit pool. Spectra Logic recommends assigning at least one entry/exit chamber. ▪ It is useful for the entry/exit pool to be larger than the expected import/export operations you plan to do on a daily or weekly basis. If you plan to use a bulk TAP for importing or exporting multiple magazines, you may want to assign 14 chambers to the entry/exit pool. ▪ The cartridges stored in the entry/exit pool are not accessible to the storage management software for writing or reading data.
Drives	Select the drives to be dedicated to this partition. The check boxes are grayed out for any installed drives that cannot be used in the partition.

Specify the Partition Users

1. From the Chambers and Drives screen, click **Next**. The Partition Users screen displays.

Figure 7 Select which users can access the partition.

2. Select the users who are allowed access to this partition. Only users who were previously configured can be selected.

Notes:
- All of the users who are configured with operator privileges are listed under **Allow only**. Select one or more of these users to enable partition-based security for operators.
- If you did not configure additional Operator level users, you can do so later and then edit the partition to give them access.
- Superusers and administrators always have full access to all partitions.

Configure the Robotic Path Visibility

Robotic path visibility determines whether one or both of the Fibre Channel ports on the exporting controller provide the robotic control path to the TeraPorter(s).

Use the following steps to configure the robotic path visibility.

1. From the Partition Users screen, click **Next**. The Robotic Path Visibility screen displays.

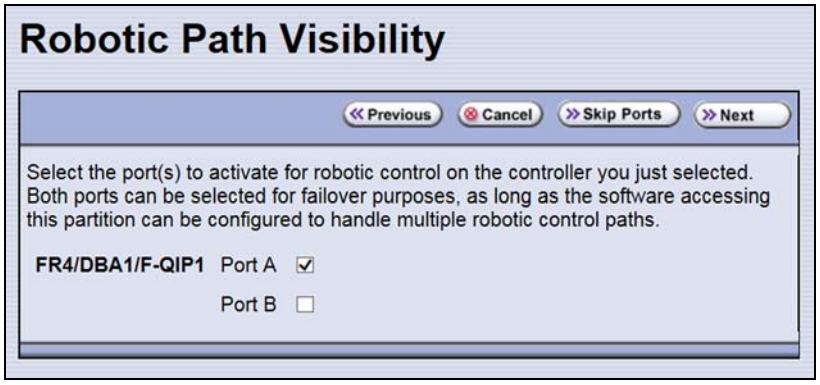

Figure 8 Select the port(s) on the exporting controller(s) that will be used to communicate with the robotics.

2. Select either one or both ports to provide the robotic control path.

Notes:
- Selecting both ports provides a redundant connection to the TeraPorter(s), but requires software that supports two control paths.
- Alternatively, you can use two RIMs and configure controller failover.
- The WWPN of the Fibre Channel port on the exporting controller is used as the WWN for the partition.

Configure the Port Addressing for the Controllers

The RIM you selected to provide the robotic control path for the TeraPorter is said to "export" the partition to the host. In this context, the RIM is referred to as the exporting F-QIP. Use the Exporting F-QIP Settings screen to configures the port addresses for the RIM.

If you previously configured the settings for the exporting controller in the partition and do not want to make any configuration changes, click **Next** on the F-QIP Configuration screen to proceed to Confirming and Saving the Partition Settings on page 26.

Important Any changes to the port addressing affect all partitions exported from the RIM. The RIM needs to stop and restart the fibre ports for the changes to take affect. Only make changes when ALL partitions exported out a RIM are idle.

Use the following steps to configure the port addressing for the exporting controller(s).

1. From the Robotic Path Visibility screen, click **Next**. The Exporting F-QIP Configuration screen displays.

   Note: A RIM can export up to eight partitions; a RIM2 can export up to 16 partitions. If the RIM exports more than one partition, a confirmation screen warns you that any changes you make apply to all partitions associated with the RIM.

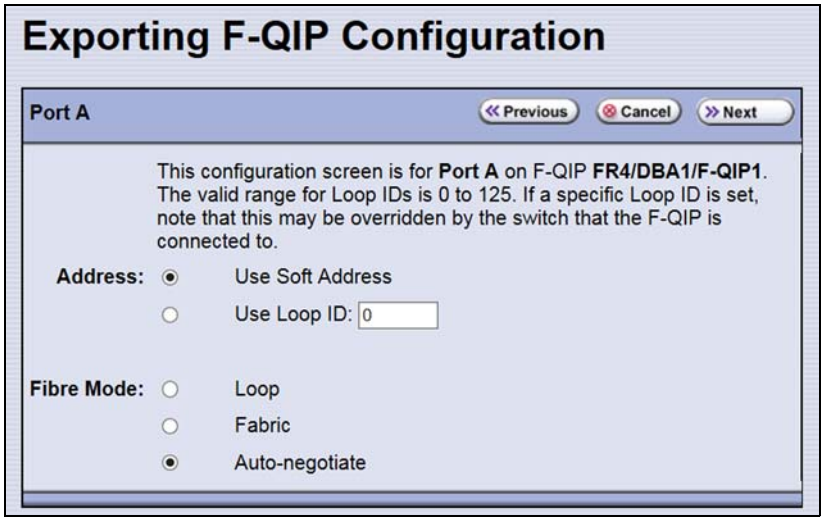

Figure 9 Choose the type of Fibre Channel addressing to be used by the RIM.

2. Select one of the following combinations for the **Address** and **Fibre Mode**:

   - **Use Soft Address** and **Fabric**.
   - **Use Soft Address** and **Auto-negotiate**.
   - **Use Loop ID** and **Loop**. The Loop ID must be between 0 and 125.
   - **Use Loop ID** and **Auto-negotiate**. The Loop ID must be between 0 and 125.

   Note: If you select **Loop** as the Fibre Mode, the Fibre Channel switch to which the RIM is connected may override your settings.

3. If you selected both ports on the Robotics Visibility screen (Configure the Robotic Path Visibility on page 24), repeat the configuration steps in this section for the other Fibre Channel port.

   If you have multiple exporters, repeat the configuration steps in this section for the port(s) on the additional exporters.

   If you only selected one port in the Robotic Path Visibility screen or if you have already configured both ports, proceed to Confirming and Saving the Partition Settings.

CONFIRMING AND SAVING THE PARTITION SETTINGS

After you finish configuring a partition, confirm and save the partition settings to complete the creation process.

Note: If you want to save the configuration to a USB device, connect the device to the USB port on the LCM or the operator panel and allow time for the device to mount before continuing.

1. After you complete the configuration screens for the partition as described in the previous sections, click **Next**. The Save Library Configuration screen displays.

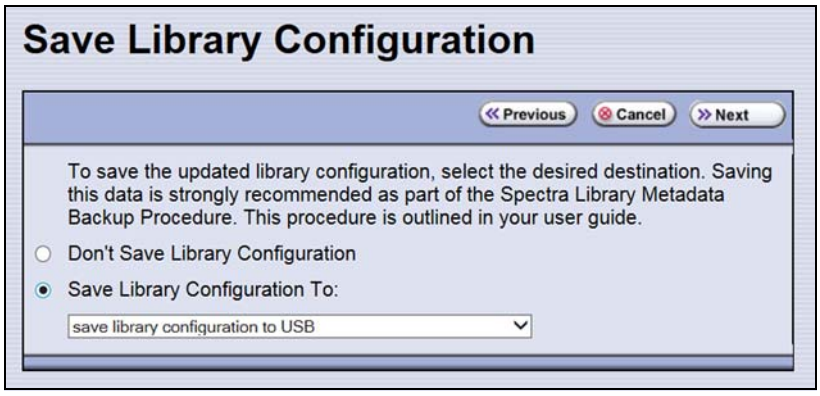

Figure 10 The Save Library Configuration screen.

2. Select whether you want to save the current library configuration.
   - **Don't Save Library Configuration** — A backup of the changed library configuration is not saved.
   - **Save Library Configuration To** (highly recommended) — Saves a backup of the library configuration to the selected destination. Using this option is highly recommended to ensure that you can easily restore the previous library configuration, if necessary.

     Select whether to save the library configuration file to a USB device or to email it to an already-configured mail recipient.

   Note: Do not use the default *autosupport@spectralogic.com* email recipient. Spectra Logic does not save emailed configuration files unless they are specifically requested for troubleshooting.

3. Click **Next**. The Save Partition screen displays.

   Note: The Save Partition screen on your library may be different from the ones shown in Figure 11. The information on this screen varies depending on the type of partition you configured and the options you chose.

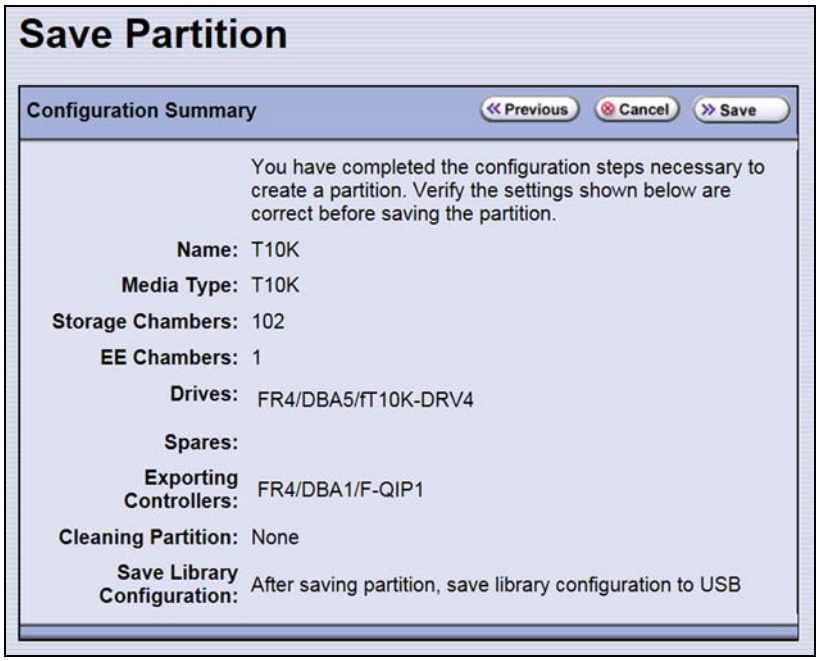

Figure 11 The Save Partition screen.

4. Review the information on the screen and confirm that all settings are correct for this partition's configuration.

   - If the configuration information is correct, proceed to Step 5.
   - If the configuration information is not correct, do one of the following:
     - Click **Previous** to move backward through the configuration screens until you reach the settings that need correcting. As you move backward through the configuration screens, the values reset to their default values. After you reach the desired screen and make the necessary changes, click **Next** to advance through the screens and re-enter the necessary information until you return to the Save Partition screen.

       Note: If the screen requiring the correction is toward the beginning of the configuration process, it may be easiest to click **Cancel** and repeat the entire configuration process.

     - Click **Cancel** to configure the partition again from the beginning.

5. Click **Save**. The library requires several minutes to create the partition, after which the Shared Library Services screen redisplays with the partition you just created added to the list of partitions.

   Note: When you save the partition, the library automatically generates a configuration backup file and saves it to the memory card in the LCM. This backup file contains the library configuration, the MLM and DLM databases, and any BlueScale encryption keys that are currently stored in the library.

CHAPTER 3

Drive Troubleshooting

This chapter describes procedures for dealing with the most common problems encountered with the library's drives. For additional troubleshooting information, refer to the drive documentation (see StorageTek T10000 Drives on page 11).

Note: The library must be under warranty or have a valid service contract in order to qualify for support. Spectra Logic does not warranty, repair, or provide replacements for T10K drives.

TROUBLESHOOTING DRIVES

When you encounter problems with drive operation while using the library's BlueScale user interface, begin troubleshooting by checking the following:

Check...	To...
System messages	Review any system messages that have been posted by the library and take any action described in the message(s).
Drive documentation	Find detailed troubleshooting information for the drive. See StorageTek T10000 Drives on page 11 for information about drive documentation.
Technical Support Portal	Find information about the most current version of BlueScale software and additional service and support tools. You can access the Technical Support portal at support.spectralogic.com. **Note:** Accessing many of the tools available on the Technical Support portal requires creating a user account. ▪ Check the options under the **Documentation** and **Knowledge Base** menus for additional troubleshooting information. ▪ Check the **Service & Contracts** menu to view information about the warranty and service options available for your library as well as the Spectra Certified Media warranty.

The following sections provide more information about troubleshooting drive problems.

Check Drive Sled Status LED

The drive sled Status LED on the drive sled (labeled Status) indicates the operational status of the drive sled (not the drive).

- **Flashing green** — The drive sled is functioning normally.
- **Flashing red/orange** — The drive sled has experienced an error.
- **Alternating flashing green and red/orange** — The drive is ready for replacement.

Check Drive Status LED

The drive status light on the back of the drive sled ((labeled S) may give an indication of drive problems.

Light Color and Pattern	Indicates
Off	Drive powered off
Green - Solid	Normal operation. No dumps present.
Green - Flashing Slowly	Normal operation. Dumps are present.
Green - Flashing Quickly	Firmware update complete
Yellow - Solid	Maintenance mode
Yellow - Flashing Slowly	Initializing
Yellow - Flashing Quickly	Firmware update in progress
Red - Solid	Hardware failure
Red - Flashing Slowly	Booting
Red - Flashing Quickly	Dump in progress
Red and Blue - Alternating	Power on failure
Red and Green - Alternating	Service mode or recurring malfunction

The LED labeled C gives encryption status information. See the *StorageTek T10000 Tape Drive Operator's Guide* for details.

Check Drive and DCM Firmware Levels

Display the Drive Details screen for the drive you suspect is having problems and review the information about the drive. Use the following steps to view information about the individual drives in the library.

1. Log into the library as a user with administrator or superuser privileges.
2. Select **Configuration** ···⁘ **DLM** (or **Drives** if DLM is not enabled) to display the Drives screen.

   Note: The operations available for each drive depend on how you are accessing the BlueScale user interface and whether or not:

   - DLM is enabled
   - The drive is configured in a partition

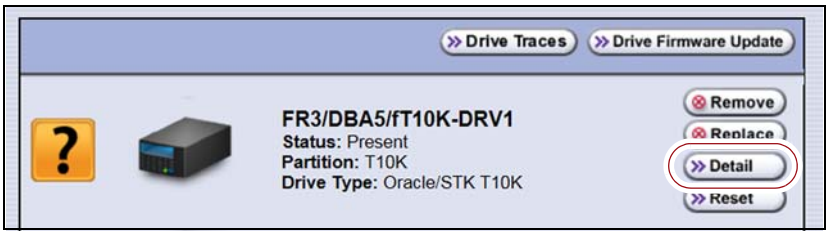

Figure 12 The Drives screen.

3. Click **Detail** next to the drive for which you want to view detailed information. The Drive Details screen displays.

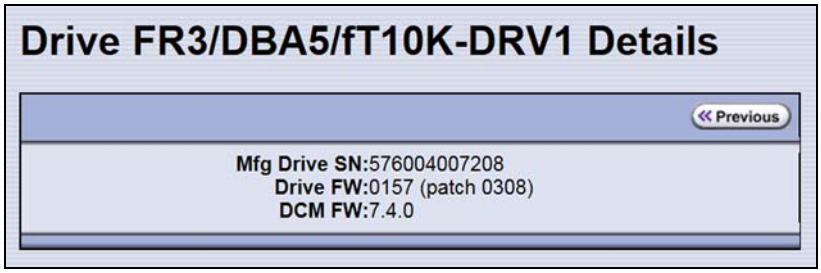

Figure 13 The Drive Details screen.

The Drive Details screen shows the following information:

This field...	Shows...
Mfg Drive SN	The serial number assigned to the physical drive by the drive manufacturer. This serial number is required for tracking the drives when they are not inside the library.
Drive FW	The firmware version being used by the drive itself.
DCM FW	The firmware version being used by the drive sled that houses the drive.

Check for Tape Issues

If you have successfully operated the storage management software and library in the past, but are now experiencing problems reading and writing data, check the following:

Check this...	If...
Write-protect switch setting	You are having trouble writing data to a cartridge. Make sure that the cartridge is write-enabled before importing it into the library.
Cartridge age	A tape cartridge has been in use for a long time or if it has been used frequently, try using a new cartridge.

4. If you experience problems accessing the drives in the library from the storage management software on the host, check the following:

Check...	To...
Interface connections	Make sure that the Fibre Channel connections to the drives are secure.
Software installation	Make sure that your host application is installed and configured correctly (refer to your software documentation). Pay special attention to steps that describe how to configure the software for use with the drive(s).
Host and software requirements	Determine whether a device driver is required. Some operating environments require you to install device drivers before the application software can correctly communicate with the drives.

Clean the Drive

Using drives with dirty heads can reduce drive performance, decrease usable tape capacity, and result in read/write failures which can eventually interrupt data storage.

It may be possible to configure the host software to use a cleaning tape stored in the partition to automatically clean the drives when the software is notified that drive cleaning is necessary.

Alternatively, any user with operator privileges who is assigned to the partition and all users with superuser or administrator privileges can manually clean a drive by importing a cleaning cartridge into the storage partition's entry/exit pool, if necessary, and using the Inventory screen to manually move the cleaning cartridge to the drive. See "No Cleaning Partition Present" in the *Spectra TFinity Library User Guide* for instructions.

Resetting a Drive

Overview You may occasionally need to reset a drive for troubleshooting.

User Privilege Requirements Only a user with superuser or administrator privileges can use the BlueScale software to reset a drive.

Perform the Reset The following steps describe how to reset a drive using the Reset button on the Drives screen.

1. Determine the BlueScale identifier for the drive you want to reset.

   Note: Drives are identified according to their physical location in the library. For example, FR1/DBA2/DRV4 refers to the upper right drive in DBA2 of frame 1.

2. Log into the library as a user with superuser or administrator privileges.
3. Select **Configuration** ···⁘ **DLM** (or **Drives**) to display the Drives screen.

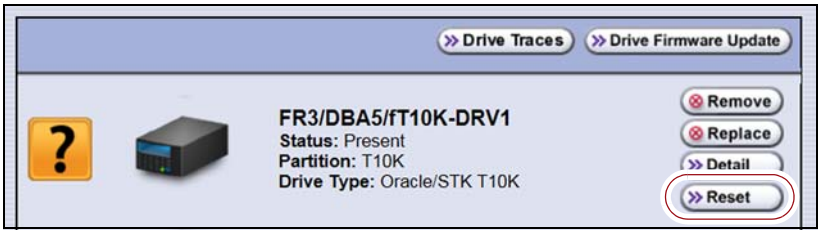

Figure 14 Click **Reset** on the Drives screen.

4. Identify the drive that needs to be reset and click **Reset**. The library power cycles the drive.

   When the drive becomes ready, a status screen displays, showing that the drive was reset.

   Note: When the drive resets, the library posts system messages that the drive disappeared and reappeared.

5. The drive is ready for use.

Adding or Replacing a Drive

When replacing a drive that is assigned to a partition, the new drive must be the same technology and generation as the one you replace and must be installed in a Spectra Logic drive sled. Contact Spectra Logic Professional Services (see Contacting Spectra Logic on page 7) to have drives installed in a drive sled.

Add a Drive to the Library

Important Adding drives to an existing partition can cause the library to reassign element addresses. To avoid errors, make sure that when you install a new drive, you reconfigure the element addresses your storage management software uses to access the drives (refer to your software documentation for instructions).

If your library has unused drive bays, you can install additional drives in Spectra Logic drive sleds.

Caution A maximum of 12 T10K drives can be installed in a frame. If a frame has fewer than 12 T10K drives installed, for each T10K drive below 12, two LTO or TS11*xx* technology drives can be installed. For example, If you have ten T10K drives you can also have four LTO or TS11xx technology drives in the frame. If you have four T10K drives you can also have 16 LTO or TS11xx technology drives in that frame.

1. Log into the library as either a superuser or administrator.
2. Select **Configuration** ···⁘ **DLM** (or **Drives**) to view a list of all the drives currently installed in the library.

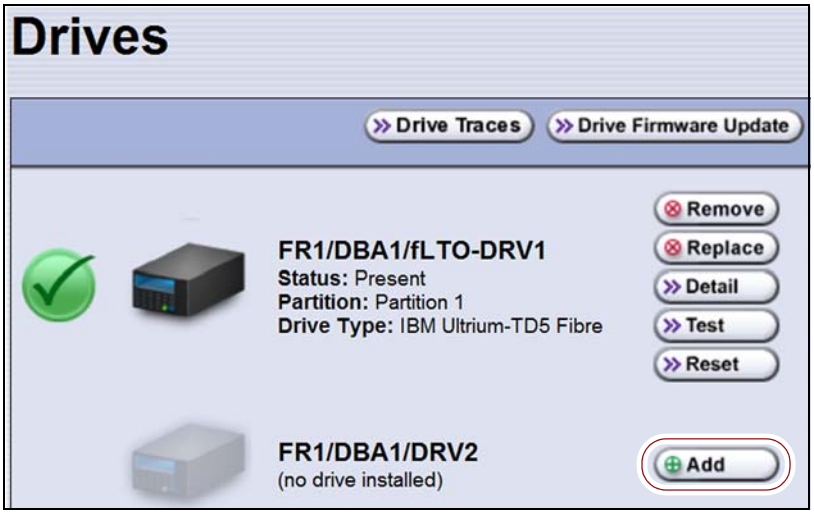

Figure 15 The Drives screen.

3. Click **Add** next to a drive location that does not have a drive installed.
4. Follow the *Spectra T200, T380, T680, T950, and TFinity Drive Installation or Replacement* procedure to install the drive.

   Note: Although T10K is not referenced in the above document, the process is the same.

5. Connect the drive to a Fibre Channel arbitrated loop or fabric where the hosts reside.
6. After you add the drive to the library, you must create or modify a partition to assign it to the partition before you can use it. See Chapter 2 – Configuring and Managing Partitions, beginning on page 15 for information about creating and modifying partitions.

Replace a Drive

To replace a drive that failed, follow the instructions in the *Spectra T200, T380, T680, T950, and TFinity Drive Installation or Replacement* procedure.

Note: Although T10K is not referenced in the above document, the process is the same.

Use the cable you disconnected from the failed drive to connect the new drive to a switch on the arbitrated loop or fabric where the hosts that use the drives reside.

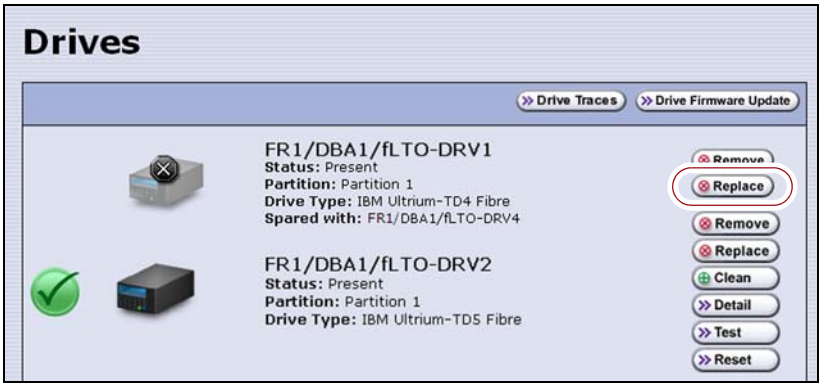

Figure 16 The Drives screen.

Important

Do not click **Remove**. This option removes the drive from the partition. When the replacement drive is installed, it is not assigned to the partition from which the malfunctioning drive was removed.

If you click **Remove** and the selected drive is the only drive in the partition, the partition is deleted.

CHAPTER 4

Specifications

This appendix provides specifications for the Spectra TFinity library with T10K drives:

Note: The specifications in this chapter are subject to change without notice.

LIBRARY SPECIFICATIONS

The following sections provide detailed specifications for the library including data storage capacity, library size and weight, environmental specifications, and shock and vibration specifications.

Data Storage Capacity

The capacity specifications in this section assume that only one type of drive and media is installed in the frame. When using mixed drives and media, the library's capacity depends on the number of frames in the library, the number of drives and slots inside each frame, and the type(s) of drives and media used.

Main Frame

The following table shows the capacity of the library's main frame in its two basic configurations. The information in the table assumes that only one type of tape drive and tape media are installed in the frame.

Tape Drives	T10K TeraPack Magazines (Slots)	Native Capacity (TB) [a]			
		T10000A	T10000B	T10000C	T10000D
1 - 12	78 (702)	351	702	3861	5967
13 - 24	66 (594)	297	594	3267	5049

a. Includes magazines stored in the entry/exit pool. The media stored in the entry/exit pool are not available for use by the application software for writing or reading data until they are moved to the storage pool.

Expansion Frames

The capacity of an expansion frame depends on the type of frame and its configuration. For each expansion frame, add the frame's capacity to that of the main frame to calculate the capacity of the entire library.

Tape Drives	T10K TeraPack Magazines (Slots)	Native Capacity (TB)			
		T10000A	T10000B	T10000C	T10000D
Drive Expansion Frame					
1 - 12	87 (783)	392.5	783	4306.5	6655.5
13 - 24	75 (675)	337.5	675	3712.5	5737.5
Media Expansion Frame					
0	110 (990)	495	990	5445	8415

Service Frame

The service frames are located at each end of the library. The capacity for standard service frames and bulk TAP service frames is the same. Add the capacity of each service frame to the capacity of the other frames to calculate the capacity of the entire library.

Tape Drives	T10K TeraPack Magazines (Slots)	Native Capacity (TB)			
		T10000A	T10000B	T10000C	T10000D
0	42 (378)	189	3780	2079	3213

Weight

The following table shows the weight specifications for the T10K drives and media. To calculate the approximate weight of a loaded library, add the weight of each T10K drive and TeraPack magazine to the weight of the rest of the library as specified in the *Spectra TFinity Library User Guide*.

Drive with sled all types	Each TeraPack magazine with nine T10K cartridges		
	Standard	**Sport**	**Cleaning**
16.95 lb (7.69 kg)	6.25 lb (2.8 kg)	4.7 lb (2.1 kg)	4.8 lb (2.2 kg)

Power Consumption and Cooling Requirements

The power and cooling requirements for the library depend on the number and type of drives installed. The maximum power consumption and heat load for the T10K drives are shown below. Use this information, and the information for the base library in the *Spectra TFinity Library User Guide*, to calculate the total maximum power consumption and heat load values, which can be used to build a power budget for the library.

Component	Power Consumption (watts)	Heat Load, Continuous (BTU/hour)
T10000A-D	▪ **Read/write:** 81 ▪ **Idle:** 49	**Read/write:** 276

Tape Drive and Media Specifications

Refer to the tape drive documentation for drive and media specifications (see StorageTek T10000 Drives on page 11).

Barcode Label Specifications

Symbology Spectra Logic libraries support media labeled using the barcode symbology of USS-39. You can obtain a complete description and definition of this symbology from the *Automatic Identification Manufacturers (AIM)* specification, the *Uniform Symbol Specification (USS-39)*, and the *ANSI MH10.8M-1993 ANSI Barcode* specification.

Application and Orientation The barcode label must be applied to the cartridge so that it fits within the label recess on the edge of the cartridge without curling up on the sides or ends. The label must be oriented so that the barcode characters are along the edge closest to the hub side of the cartridge.

Printed Characters The label can have human-readable alphanumeric characters printed along the top or bottom edge of the label provided there is no conflict or interference with the automation code. This text must include the barcode data, but can also include additional text. The format and colors of the human readable characters is up to the customer and label vendor.

Note: When using barcode labels with alphanumeric characters along the bottom edge, the label must be positioned so that barcode is at least 13.72 mm below the top edge of the cartridge to ensure that the barcode reader can read the label.

Barcode Data The library supports barcode data strings consisting of from 1 to 16 characters, including an optional checksum character. Quiet zones precede and follow the start and stop characters.

The barcode data string on standard Spectra Logic barcode labels consists of a start character, eight alphanumeric characters, a checksum character, and the stop character. Quiet zones precede and follow the start and stop characters.

- The first six (6) characters following the start character can be any combination of upper case A-Z or 0-9 (for example, ABC123) to identify the cartridge Volume Serial Number. The use of "CLN" and "DG{space}" at the beginning of the volume identifier is reserved.
  - The volume identifier "CLN*vnn*" is reserved for cleaning cartridges. When a drive requires cleaning, it requests a specific type of cleaning cartridge.
    - The "*v*" field is an alphanumeric field to identify cleaning cartridge applications, "U" for Universal Cleaning Cartridges or a drive unique identifier.
    - The "*nn*" alphanumeric field is used to track individual cleaning cartridge activity (that is, usage and life).
    - The volume identifier "`DG{space}vnn`" is reserved for diagnostic and service cartridges.
- The last two (2) characters are the media identifier and indicate the cartridge Media Type:
  - T10K cartridge
    - T1 for the standard T10000A and T10000B data cartridge
    - TS for the T10000A and T10000B sport data cartridge
  - T10K T2 cartridge
    - T2 for the standard T10000C and T10000D data cartridge
    - TT for the T10000C and T10000D Sport data cartridge
  - T10K cleaning cartridge
    - CT for the T10000A and T10000B cartridge
    - CC for the T10000C and T10000D cartridge
    - CL for the cleaning cartridge used on the T10000A, T10000B, T10000C, and T10000D drives

- The barcode string can be printed in either direction on the label and must begin and end with a valid start/stop character (*).
- The label must be printed so that barcode data is positioned along the edge of the label that will be closest to the hub side of the cartridge.

The *AIM Uniform Symbol USS-39* specification provides detailed information about the format of the start character, the series of characters that make up the barcode data, the optional checksum character, and the stop character.