



# Spectra T950 Library

## Site Preparation Guide



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## Part Number

90940015 Revision J

## Revision History

| Revision | Date           | Description                                    |
|----------|----------------|--|
| A        | June 2006      | Initial release.                               |
| B        | September 2007 | Added support for up to eight frames.          |
| C        | December 2008  | Specification updates.                         |
| D        | September 2009 | New template, general cleanup.                 |
| E        | May 2012       | New template, corrections, and updates.        |
| F        | July 2012      | Added bulk TAP.                                |
| G        | April 2013     | Added T950B.                                   |
| H        | March 2015     | Updated trademarks and grounding requirements. |
| I        | February 2019  | Updated for new drive types.                   |
| J        | February 2021  | Updated for Dual AC2 (16A).                    |

- Notes:**
- To make sure you have the most current version of this guide check the Spectra Logic Technical Support portal at [support.spectralogic.com/documentation/user-guides/](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 [support.spectralogic.com/documentation/release-notes/](https://support.spectralogic.com/documentation/release-notes/).

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## Warnings

A document listing all warnings found in Spectra Tape Libraries documentation, in English and 27 other languages, is available on the Spectra Logic website at [support.spectralogic.com/documentation](http://support.spectralogic.com/documentation).



**WARNING**

Library frames are very heavy (see product specifications for details). Use extreme caution and proper equipment when moving these, and ensure that your floor has adequate structural integrity.



**WARNING**

Line voltage exists at these connectors.

Only qualified personnel should attempt to conduct this test.

Use extreme caution when taking measurements.



**WARNING**

Boxed and unboxed library components weigh from 200 to 400 pounds each (91 to 181 kg) or more. Use extreme caution and proper equipment when moving these.



**WARNING**

The ties around the shipping crates are secured very tightly; the tension may cause them to whip outward when cut. Use care when cutting the ties so that you will not be hit.

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# Contacting Spectra Logic

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## To Obtain General Information

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## Spectra Logic Technical Support

**Technical Support Portal:** [support.spectralogic.com](http://support.spectralogic.com)

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## Spectra Logic Sales

**Website:** [shop.spectralogic.com](http://shop.spectralogic.com)

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**Phone:** 1.800.833.1132 or 1.303.449.6400  
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**Email:** [sales@spectralogic.com](mailto:sales@spectralogic.com)

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**Phone:** 44 (0) 870.112.2150  
**Fax:** 44 (0) 870.112.2175  
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## To Obtain Documentation

**Spectra Logic Website:** [support.spectralogic.com/documentation](http://support.spectralogic.com/documentation)

# Contents

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|  |           |
|--|-----------|
| <b>About This Guide</b>                              | <b>6</b>  |
| INTENDED AUDIENCE .....                              | 6         |
| RELATED INFORMATION .....                            | 6         |
| <b>Chapter 1 – Library Overview</b>                  | <b>9</b>  |
| FRONT PANEL COMPONENTS .....                         | 10        |
| MAIN AND DRIVE FRAME EXPANSION REAR COMPONENTS ..... | 12        |
| BULK TAP EXPANSION FRAME .....                       | 13        |
| MEDIA EXPANSION FRAMES .....                         | 13        |
| LIBRARY CAPACITY .....                               | 13        |
| <b>Chapter 2 – Site Requirements</b>                 | <b>15</b> |
| PHYSICAL REQUIREMENTS .....                          | 15        |
| Data Center Flooring .....                           | 15        |
| Space Requirements .....                             | 17        |
| Power Requirements .....                             | 21        |
| Power Rating .....                                   | 23        |
| NETWORK CABLING REQUIREMENTS .....                   | 28        |
| ENVIRONMENTAL REQUIREMENTS .....                     | 30        |
| <b>Chapter 3 – Preparing for Installation</b>        | <b>32</b> |
| RECEIVING AND STORING THE LIBRARY .....              | 33        |
| Acclimating the Library .....                        | 33        |
| UNPACKING AND MOVING THE LIBRARY .....               | 34        |
| Structural Integrity of Flooring .....               | 34        |
| Required Equipment .....                             | 34        |
| Clearances .....                                     | 35        |
| Tilting .....  | 35        |
| MOVING THE LIBRARY AFTER INSTALLATION .....          | 36        |
| <b>Site Preparation Checklist</b>                    | <b>37</b> |

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# ABOUT THIS GUIDE

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This guide describes site preparation requirements and guidelines for the installation of a Spectra® T950 library. Unless otherwise specified, the requirements for both T950 and T950B libraries are the same and “T950” is used to refer to both.

This guide includes precautions for safety and handling, as well as facility requirements for the library’s environment, cabling, and placement. It also provides a checklist that you can use to help ensure that your site is prepared before your library arrives.

## INTENDED AUDIENCE

This guide is intended for data center administrators preparing a site for a T950 library installation. It provides reference information for facility managers, electricians, IT professionals, and other specialists who will have roles in preparing the site.

## RELATED INFORMATION

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

### **Spectra T950 Library**

This guide and the following documents related to the Spectra T950B Library are available as PDF files on the Spectra Logic website at: [support.spectralogic.com/documentation](http://support.spectralogic.com/documentation).

- The *Spectra T950 Library User Guide* describes how to configure, use, maintain, and troubleshoot the library. It also provides specifications for the library.
- The *Spectra T950 Library 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 T950 Library BlueScale Toolbar Option Map* provides a quick reference for locating the options and commands available through the BlueScale user interface.
- 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, the Spectra SKLM Encryption key management system, and KMIP Encryption key management. 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 T950 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](https://support.spectralogic.com).

- The *T950 Library Release Notes and Documentation Updates* provides the most up-to-date information about the T950, drives, and media.

## LTO Ultrium Tape Drives

The following documents provide information that is applicable to all IBM LTO tape drives.

- *IBM Tape Device Drivers Installation and User's Guide*  
**Note:** This guide also provides information about using the IBM Tape Diagnostic Tool (ITDT) to troubleshoot drive problems.
- *IBM TotalStorage LTO Ultrium Tape Drive: SCSI Reference* (LTO-1 through LTO-4)
- *IBM TotalStorage LTO Ultrium Tape Drive: SCSI Reference* (LTO-5 and later)

For drive-specific information, search for the product name (for example, LTO 5) on the documentation page on the IBM website. You can also search the IBM Support Portal at:

<https://www.ibm.com/support/knowledgecenter/>.

## TS11xx Technology Drives

The following documents provide information that is applicable to TS11xx technology drives.

- [IBM System Storage Tape Drive 3592 SCSI Reference](#)
- [IBM Tape Device Drivers Installation and User's Guide](#)

**Note:** This guide also provides information about using the IBM Tape Diagnostic Tool (ITDT) to troubleshoot drive problems.

## Spectra SKLM Server

For additional information that can assist you during the installation and configuration of your server, see the following website:

- [IBM Security Key Lifecycle Manager welcome page](#)

## KMIP

See the documentation specific to your server.

## Typographical Conventions

This document uses the following conventions to highlight important information:



### **WARNING**

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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**

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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

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## Library Overview

The Spectra T950 enterprise-class libraries are designed and built to meet the stringent requirements for data integrity, data security, and high reliability in the enterprise environment.

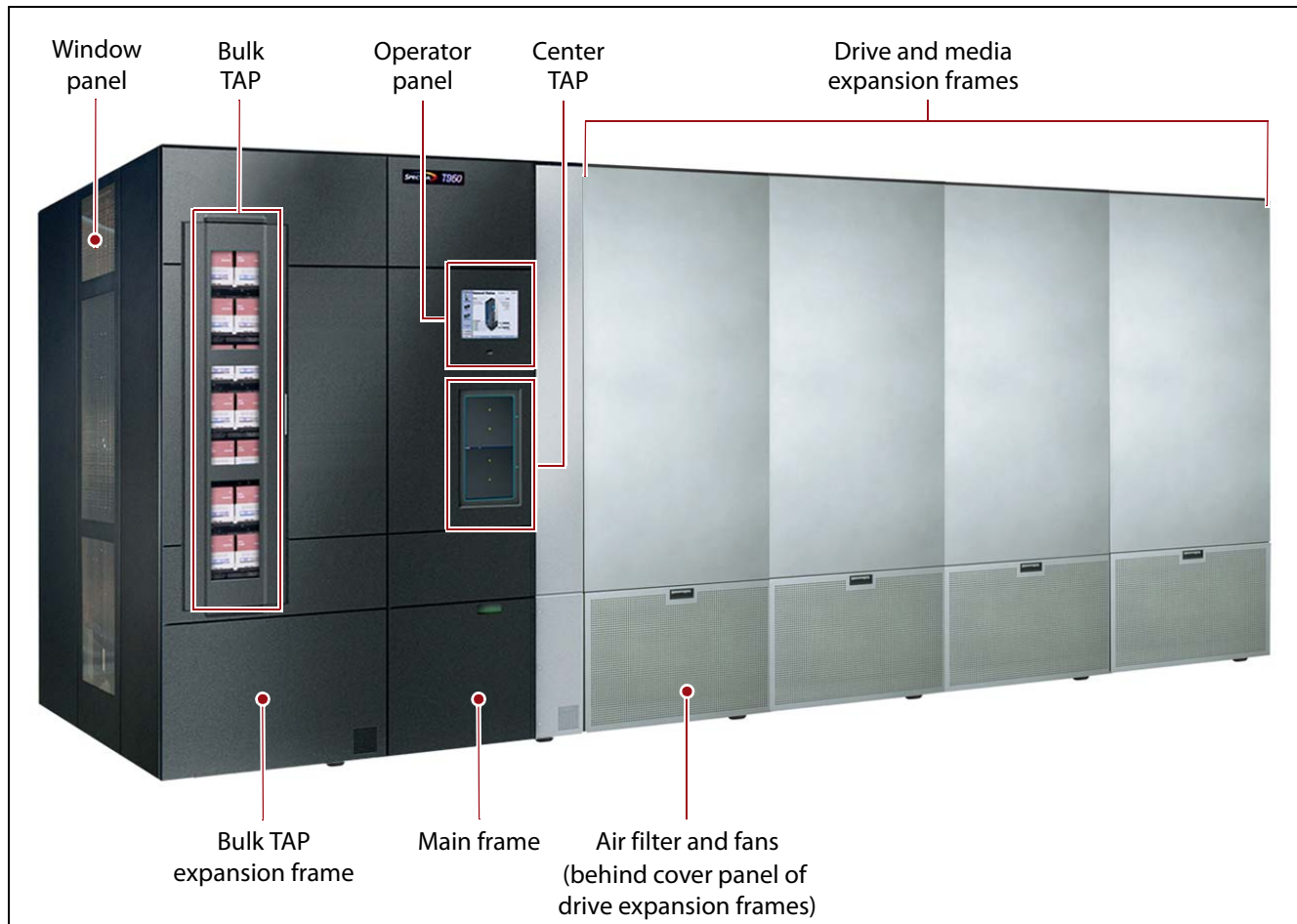
The following sections provide an overview of the library components. Depending on the options you ordered, some of the components shown may not be included in your library. For detailed descriptions of the library components and media, read the Library Overview chapter in the *Spectra T950 Library User Guide* for your library.

The library will be installed by a certified Spectra Logic field engineer. The information in the following sections is provided for your reference only. This document is not an installation guide.

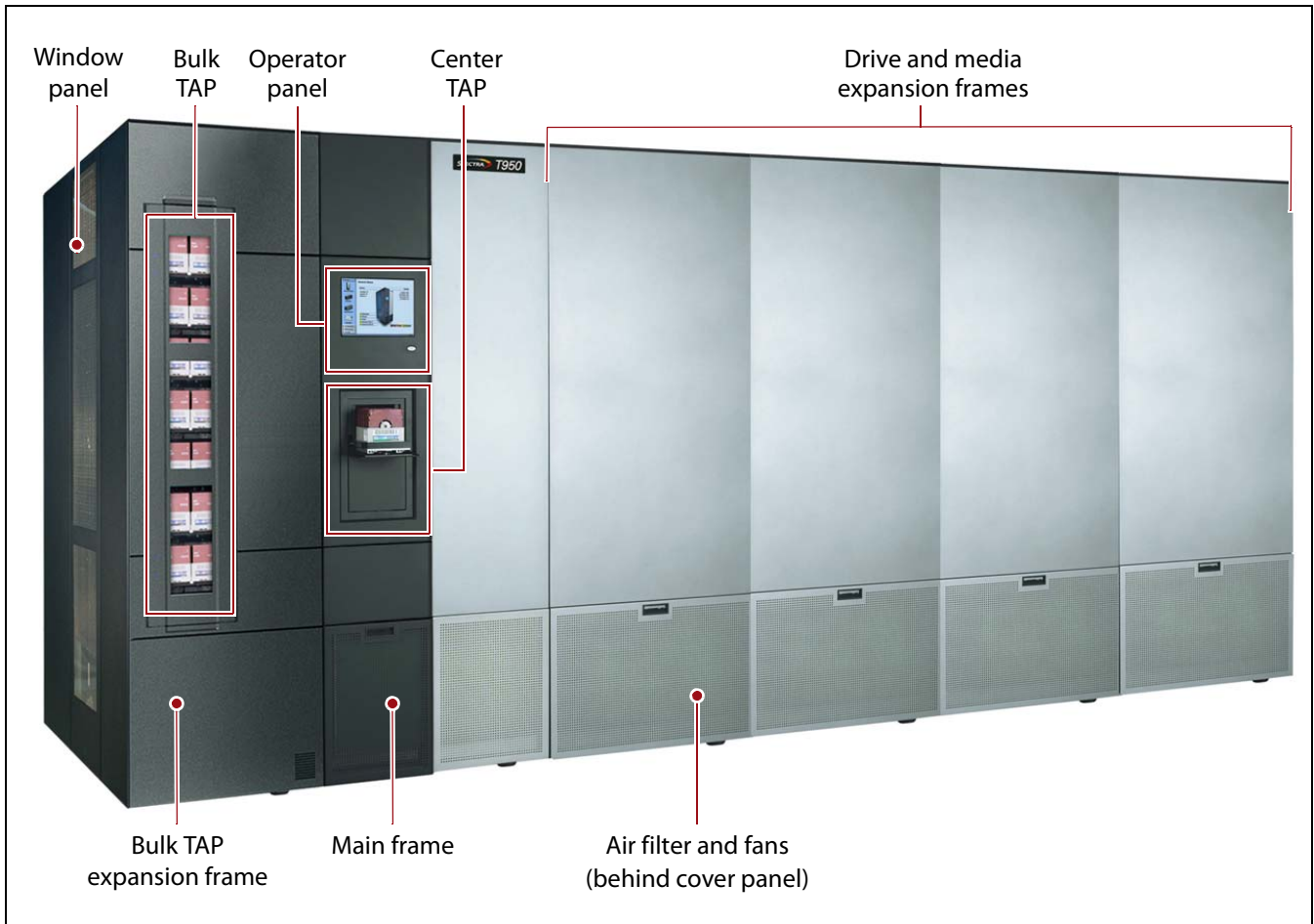
| Topic  |         |
|--|---------|
| Front Panel Components                         | page 10 |
| Main and Drive Frame Expansion Rear Components | page 12 |
| Bulk TAP Expansion Frame                       | page 13 |
| Media Expansion Frames                         | page 13 |
| Library Capacity                               | page 13 |

## FRONT PANEL COMPONENTS

Figure 1 shows the front components of a multi-frame T950B library and Figure 2 on page 11 shows a T950 library. The figures also show the relative locations of the main frame and the expansion frames. T950B main frames have a centered center TAP and operator panel; T950 main frames have an offset center TeraPack<sup>®</sup> Access Port (TAP) and operator panel. T950B media expansion frames do not have a filter on the front at the bottom; T950 media expansion frames do.



**Figure 1** T950B library with optional bulk TAP expansion frame.

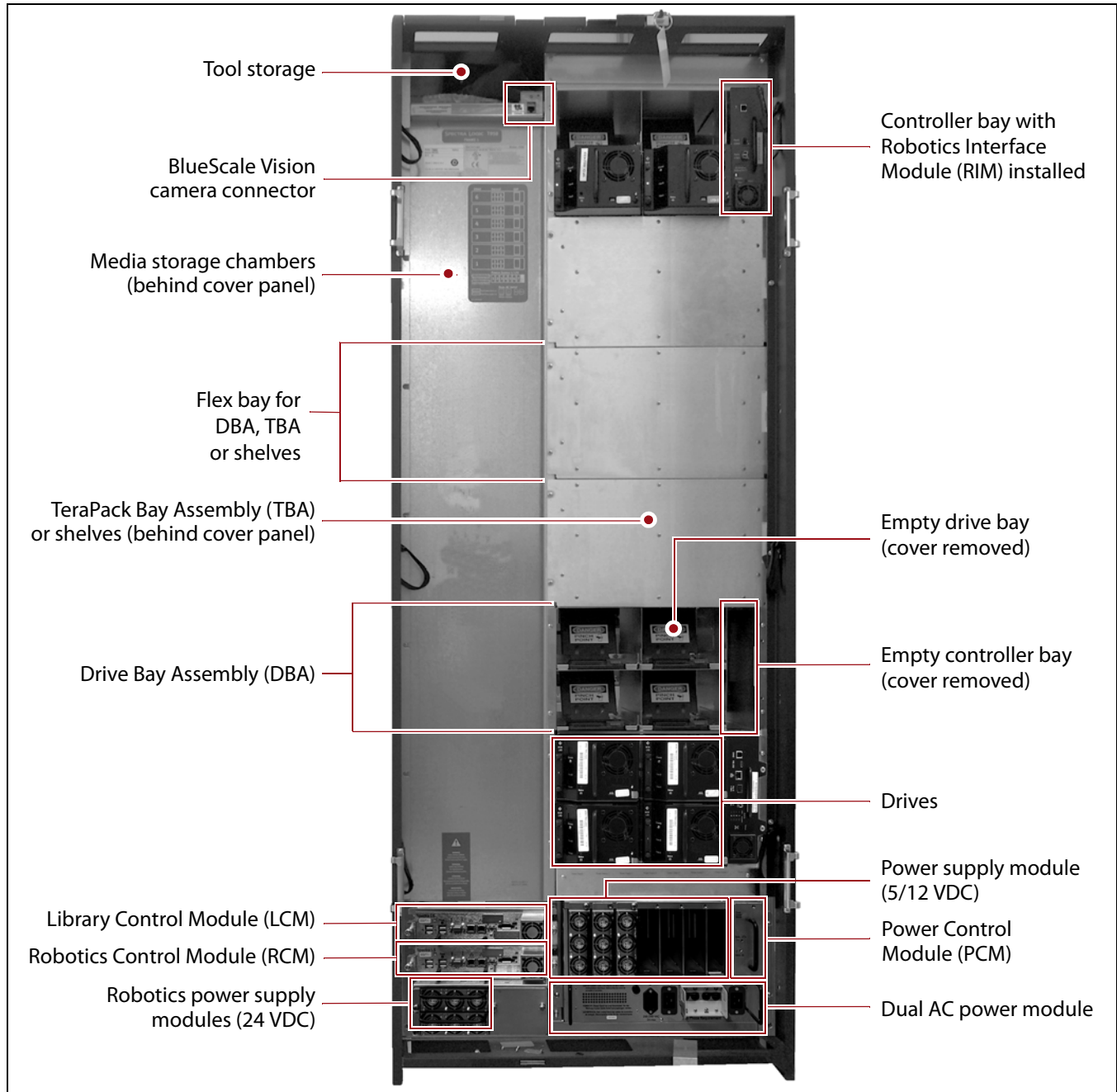


**Figure 2** T950 library with optional bulk TAP expansion frame.

# MAIN AND DRIVE FRAME EXPANSION REAR COMPONENTS

Figure 3 shows the rear panel components of the library’s main and drive expansion frames.

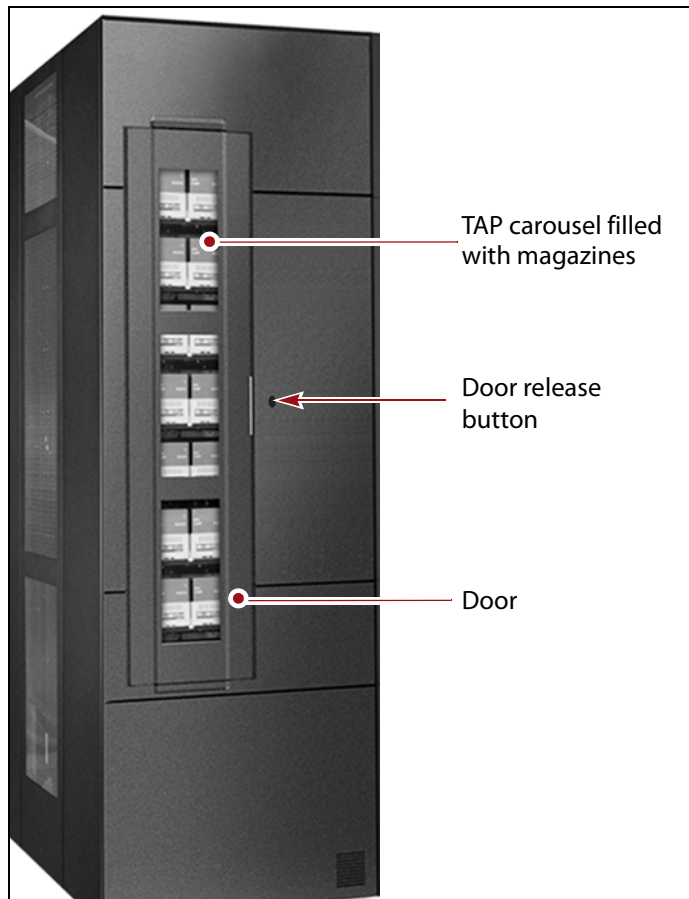
**Note:** Any bays that do not contain components have covers installed to maintain proper air circulation through the library.



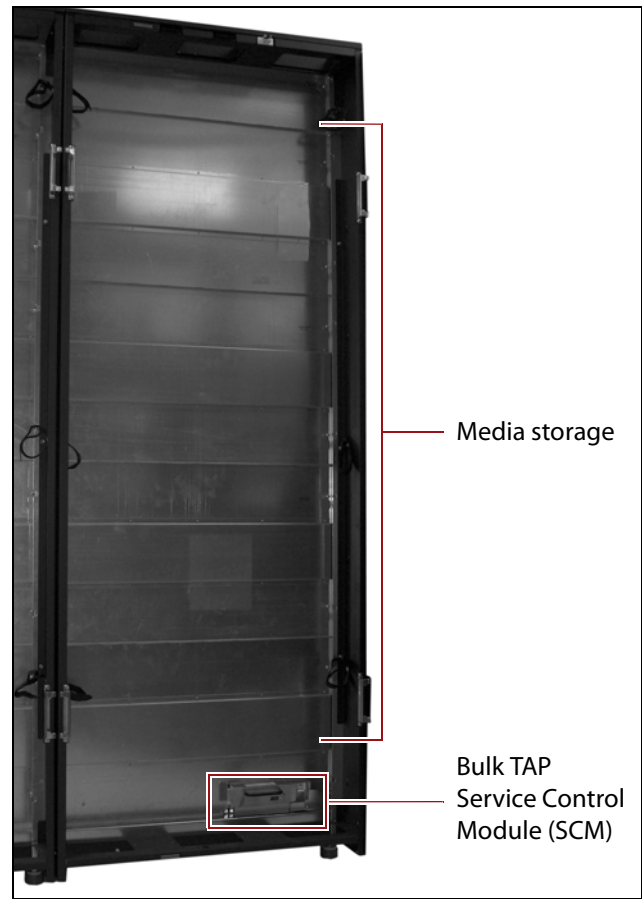
**Figure 3** Library rear components (main frame, doors removed).

## BULK TAP EXPANSION FRAME

The bulk TeraPack Access Port (bulk TAP) expansion frame is used to import or export up to 14 magazines in a single operation.



**Figure 4** The front of the bulk TAP media frame.



**Figure 5** The back of the bulk TAP media frame (doors removed).

## MEDIA EXPANSION FRAMES

Media expansion frames are for media storage only and do not include any active front or rear panel components.

## LIBRARY CAPACITY

The T950's modular design makes it possible to increase media capacity or the number of drives in the library to meet storage and performance needs as they evolve. Expansion frames can be added to the basic single-frame library for a maximum of eight frames.

The following table shows the number of media storage chambers, slots, and drives in each type of frame in the T950.

| Frame Type                           | Number of Chambers <sup>a</sup> | Number of slots | Maximum Number of Drives |
|--------------------------------------|---------------------------------|-----------------|--------------------------|
| <b>LTO Library</b>                   |                                 |                 |                          |
| <b>T950 main</b>                     |                                 |                 |                          |
| ▪ 3 DBAs/3 TBAs                      | 95                              | 950             | 12                       |
| ▪ 6 DBAs                             | 83                              | 830             | 24                       |
| <b>T950B main</b>                    |                                 |                 |                          |
| ▪ 1 DBA/shelves                      | 100                             | 1000            | 4                        |
| ▪ 3 DBAs/3 TBAs or shelves           | 92                              | 920             | 12                       |
| ▪ 6 DBAs                             | 80                              | 800             | 24                       |
| <b>T950B main with a bulk TAP</b>    |                                 |                 |                          |
| ▪ 1 DBA/shelves                      | 110                             | 1100            | 4                        |
| ▪ 3 DBAs/3 TBAs or shelves           | 98                              | 980             | 12                       |
| ▪ 6 DBAs                             | 80                              | 800             | 24                       |
| <b>Drive expansion (optional)</b>    |                                 |                 |                          |
| ▪ 3 DBAs/3 TBAs                      | 101                             | 1010            | 12                       |
| ▪ 3 DBAs/shelves                     | 107                             | 1070            | 12                       |
| ▪ 6 DBAs                             | 89                              | 890             | 24                       |
| <b>Media expansion (optional)</b>    | 130                             | 1300            | None                     |
| <b>Bulk TAP expansion (optional)</b> | 91                              | 910             | None                     |
| <b>TS11x0 Technology Library</b>     |                                 |                 |                          |
| <b>T950B main</b>                    |                                 |                 |                          |
| ▪ 1 DBA/shelves                      | 82                              | 738             | 4                        |
| ▪ 3 DBAs/shelves                     | 76                              | 684             | 12                       |
| ▪ 6 DBAs/shelves                     | 66                              | 594             | 24                       |
| <b>T950B main with a bulk TAP</b>    |                                 |                 |                          |
| ▪ 1 DBA/shelves                      | 90                              | 810             | 4                        |
| ▪ 3 DBAs/shelves                     | 81                              | 729             | 12                       |
| ▪ 6 DBAs/shelves                     | 66                              | 594             | 24                       |
| <b>Drive expansion (optional)</b>    |                                 |                 |                          |
| ▪ 3 DBAs/shelves                     | 90                              | 810             | 12                       |
| ▪ 6 DBAs                             | 75                              | 675             | 24                       |
| <b>Media expansion (optional)</b>    | 110                             | 990             | None                     |
| <b>Bulk TAP expansion (optional)</b> | 77                              | 693             | None                     |

a. A single magazine is stored in each chamber. Each LTO magazine contains 10 slots. Each TS11x0 technology magazine contains 9 slots.

# CHAPTER 2

## Site Requirements

This chapter describes the site requirements for the library. Make sure that the location where the library will be installed meets these requirements before the Spectra Logic field engineer arrives to install the library.

| Topic                        |           |
|------------------------------|-----------|
| Physical Requirements        | this page |
| Data Center Flooring         | page 15   |
| Space Requirements           | page 17   |
| Power Requirements           | page 21   |
| Network Cabling Requirements | page 28   |
| Environmental Requirements   | page 30   |

### PHYSICAL REQUIREMENTS

The following physical requirements apply to the location where the library will be installed. Meeting these requirements sets the necessary parameters for successfully operating the library, as well as ensuring adequate clearances for, maintenance access to, and expansion of the library.

#### Data Center Flooring

The flooring where you plan to install the library is an important part of the installation and operation planning. Make sure that it has adequate structural integrity to handle the weight and leveling requirements of the library.



#### **WARNING**

Library frames are very heavy (see product specifications for details). Use extreme caution and proper equipment when moving these, and ensure that your floor has adequate structural integrity.



**Library Weight** The following table shows the size and weight specifications for the library frames and other components.

- All dimensions and weights are approximate.
- To calculate the approximate weight of a loaded library, calculate the total weight for all of the frames and then add the weight for each drive, RIM, and power supply, plus the weight of each full TeraPack magazine.
- To calculate the dimensions of the entire library, total the dimensions for each frame and add 1.625 inches (4.13 cm) to account for the outer cover panels on each side of the library.
- When calculating space requirements, include the service access requirements described in [Space Planning and Service Access Requirements](#) on page 18.

| Parameter                   | Main Frame   | Drive Expansion Frame                              | Media Expansion Frame   | Bulk TAP Media Expansion Frame |
|-----------------------------|--|--|---|--------------------------------|
| Height <sup>a</sup>         | 79.125 to 82 in. (201.0 to 208.3 cm)   |  |   |                                |
| Width                       | 29 in. (73.7 cm)   |  |   |                                |
| Depth <sup>b</sup>          | 43.25 in. (109.9 cm)   |  |   |                                |
| Weight <sup>c</sup>         | <b>T950</b><br>6D0T: 954 lb (433 kg)<br>3D3T: 933 lb (423 kg)<br><b>T950B</b><br>6D0T: 895 lb (406 kg)<br>3D3T: 876 lb (397 kg)  | 6D0T: 720 lb (327 kg)<br>3D3T: 750 lb (340 kg)     | <b>T950</b><br>547 lb (248 kg)<br><br><b>T950B</b><br>538 lb (244 kg)     | 800 lb (363 kg)                |
| Each tape drive             | <ul style="list-style-type: none"> <li>▪ LTO-4: 11.5 lb (5.2 kg)</li> <li>▪ LTO-5: 11.6 lb (5.3 kg)</li> <li>▪ LTO-6: 11.6 lb (5.3 kg)</li> <li>▪ LTO-7: 11.2 (5.1 kg)</li> <li>▪ LTO-8: 11.0 (5.0 kg)</li> <li>▪ TS11xx technology: 17.5 lb (8 kg)</li> </ul> |  | N/A   |                                |
| Each TeraPack magazine      | <ul style="list-style-type: none"> <li>▪ with ten LTO cartridges: 5.1 lb (2.3 kg)</li> <li>▪ with nine TS11xx technology cartridges: 5.6 lb (2.5 kg)</li> </ul>  |  |   |                                |
| Each RIM                    | 5.0 lb (2.3 kg)  |  | N/A   |                                |
| Each power supply           | 4.0 lb (1.8 kg)  |  | N/A   |                                |
| Fully loaded maximum weight | <b>T950</b><br>6D0T: 1,722 lb (781 kg)<br>3D3T: 1,608 lb (729 kg)<br><b>T950B</b><br>6D0T: 1,648 lb (748 kg)<br>3D3T: 1,535 lb (696 kg)  | 6D0T: 1,510 lb (685 kg)<br>3D3T: 1,447 lb (656 kg) | <b>T950</b><br>1,210 lb (549 kg)<br><br><b>T950B</b><br>1,201 lb (545 kg) | 1,335 lb (606 kg)              |

a. The height of each frame can be adjusted to allow frame-to-frame leveling on uneven floors.

b. These dimensions represent the frames with the front and back cover panels installed.

c. These weights are with no drives, RIMs, power supplies, or media installed.



Data center floors may require reinforcement to hold the library's weight. Check your site's flooring for load-bearing specifications.

**Caution**

Spectra Logic is not responsible for damage caused to the library or its surroundings if the floor is not adequately reinforced. Inadequate floor reinforcement can allow the library to sag, causing misalignment of the frames and robotic motion failures.

**Weight-Distribution Plates** If you would like to install the library on weight-distributing plates, Spectra Logic recommends steel plates with the minimum dimensions of 36 x 30 x 0.25 inches (91.4 x 76.2 x 0.6 cm). Plates should be placed under the feet at the front and back of each frame junction and under the outer feet of the right-most and left-most frames of a multi-frame library.

**Note:** After determining the positions for the plates, attach them to the floor to prevent them from moving as you roll the frames into place.

**Flooring Type** The floor where the library is to be installed must be level, and must be hard flooring, such as cement or tile—do not install the library on carpeting. This requirement is particularly important when installing a multi-frame library, because all frames must be precisely aligned. Carpeting also increases the risk of static discharge when operating the library.

**Caution**

The library must be installed on a level, hard-surfaced floor such as cement or tile.

A small amount of floor unevenness can be compensated for using the levelers on each library frame.

## Space Requirements

### Library Frames Placement

The bulk TAP, if present, must always be the left-most frame as viewed from the front of the library. The main frame must be positioned as the left-most frame or the frame immediately to the right of the bulk TAP. Up to four drive expansion frames can be located immediately to the right of the main frame. Media frames can be located to the right of the main frame and any drive frames. A maximum of eight frames is allowed.

## Space Planning and Service Access Requirements

**Recommended Clearance** Providing 3 ft (0.9 m) of clearance on each side of the library is highly recommended.

**T950B Minimum Clearance** A minimum of 2 ft (0.6 m) of clearance is required on the left and right ends of the library to provide service access to the library. If data center equipment is on rolling racks and can be easily moved to provide 2 ft (0.6 m) of clearance on each end of the library, then having equipment adjacent to the ends of the library is acceptable. In addition, a minimum of 2 ft (0.6 m) of clearance at the front and back of the main frame, each drive expansion frame, and the bulk TAP frame is required for airflow and for service and operator access.

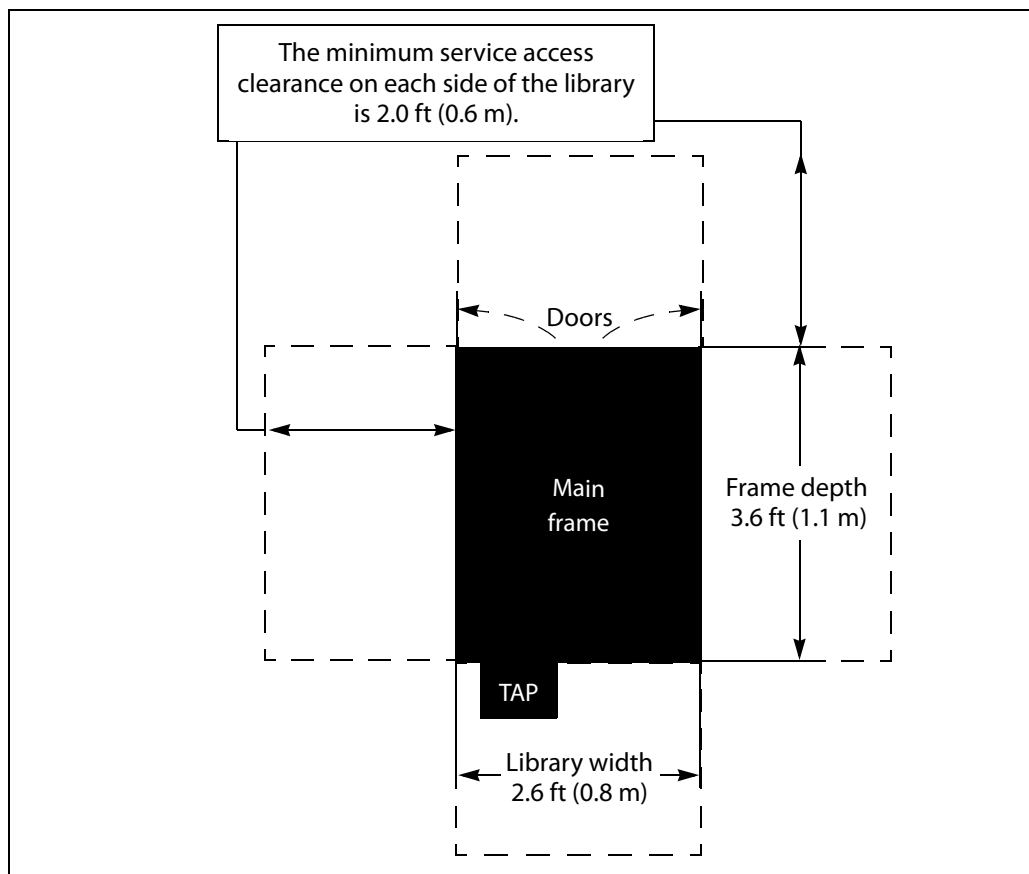


### Important

Providing 3 ft (0.9 m) of clearance on each side of the library is highly recommended.

**Single-Frame Library** Figure 6 shows the space required for a single-frame library, including the minimum access clearance.

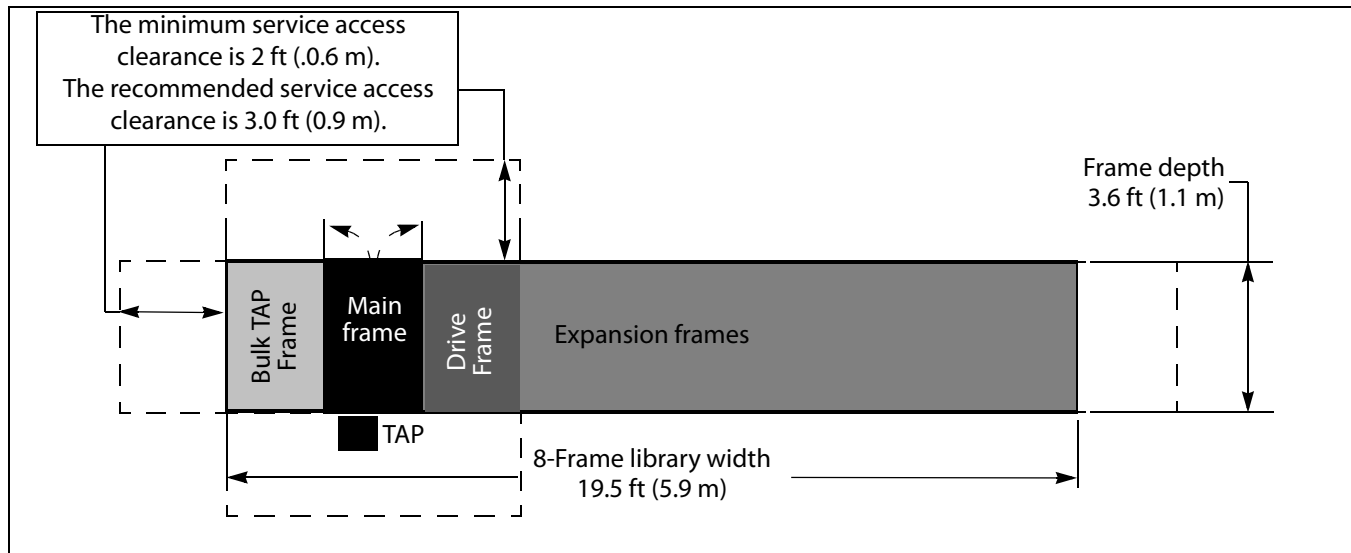
**Note:** All dimensions are rounded to the nearest tenth.



**Figure 6** A single-frame T950, including minimum service access clearance.

**Multi-Frame T950 Library** Figure 7 shows the total space required for an eight-frame library, including the recommended access clearance.

**Note:** All dimensions are rounded to the nearest tenth.



**Figure 7** Dimensions of the eight-frame T950.

The following table shows the width of a T950 library, and the width with the minimum and recommended access clearance on each end of the library. The depth of all main, drive and bulk tap frames, including the minimum access clearance, is 7.6 ft (2.3 m) and including the recommended access clearance is 9.6 ft (2.9 m).

| Number of Frames    | Library Width <sup>a</sup> | Width with Minimum Service Access <sup>a</sup> | Width with Recommended Service Access <sup>a</sup> |
|---------------------|----------------------------|--|--|
| <b>One Frame</b>    | 2.6 ft (0.8 m)             | 6.6 ft (2.0 m)                                 | 8.6 ft (2.6 m)                                     |
| <b>Two Frames</b>   | 5.0 ft (1.5 m)             | 9.0 ft (2.7 m)                                 | 11.0 ft (3.3 m)                                    |
| <b>Three Frames</b> | 7.4 ft (2.3 m)             | 11.4 ft (3.5 m)                                | 13.4 ft (4.1 m)                                    |
| <b>Four Frames</b>  | 9.8 ft (3.0 m)             | 13.8 ft (4.2 m)                                | 15.8 ft (4.8 m)                                    |
| <b>Five Frames</b>  | 12.2 ft (3.7 m)            | 16.2 ft (4.9 m)                                | 18.2 ft (5.5 m)                                    |
| <b>Six Frames</b>   | 14.6 ft (4.5 m)            | 18.6 ft (5.7 m)                                | 20.6 ft (6.3 m)                                    |
| <b>Eight Frames</b> | 19.5 ft (5.9 m)            | 23.5 ft (7.2 m)                                | 25.5 ft (7.8 m)                                    |

a. All dimensions are rounded to the nearest tenth.

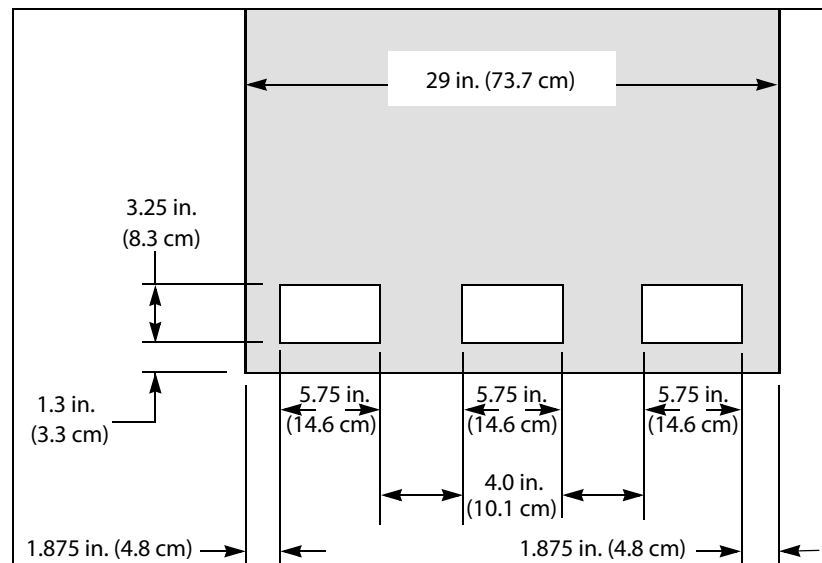
## Floor and Ceiling Cable Access

Figure 8 and Figure 9 on page 20 provide the dimensions for cable access holes for main and drive expansion frames. See Figure 11 on page 28 to see the location of these access holes in a frame. The dimensions are different for the floor and ceiling access holes. Be sure to consider the structural integrity of the floor before cutting holes in the floor for access.

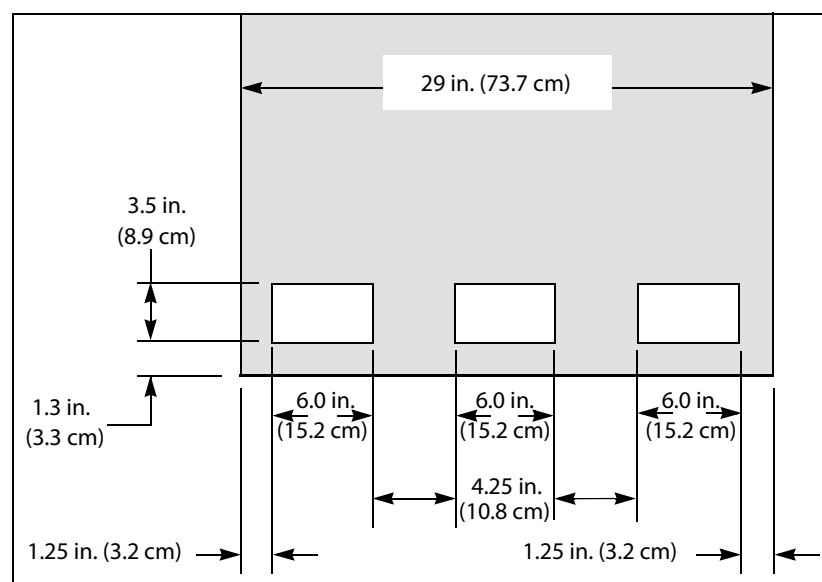


### WARNING

Library frames are very heavy (see product specifications for details). Use extreme caution and proper equipment when moving these, and ensure that your floor has adequate structural integrity.



**Figure 8** Ceiling cable access for main and drive expansion frames.



**Figure 9** Floor cable access for main and drive expansion frames.

## Power Requirements

### Input Power Requirements

The main frame and drive expansion frames include dual AC power modules. When using a redundant power configuration, connect each input on the dual AC power module to a separate branch circuit, which allows for failover in the event of a power failure in one of the circuits.

### Dual AC2 Power Requirements



#### Caution

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The requirements below are for the Dual AC2 with 16 A Convenience Outlet, which currently ships with new libraries. If you are preparing a site for moving an existing library with a different Dual AC power module, contact Spectra Logic Technical Support (see [Contacting Spectra Logic on page 8](#)) for instructions.

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The main frame and drive expansion frames include dual AC power modules. When using a redundant power configuration, connect each input on the dual AC power module to a separate branch circuit, which allows for failover in the event of a power failure in one of the circuits.

### Dual AC2 Line to Neutral Testing

For volatages above 140VAC Line to neutral, it is critical that the power cords for the Dual AC2 have Neutral and Line assigned correctly.



#### WARNING

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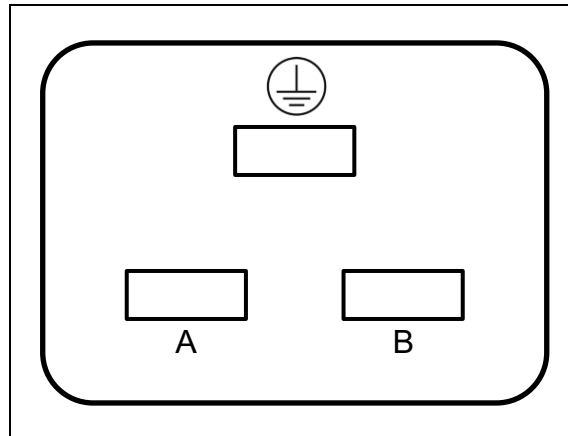
Line voltage exists at these connectors.

Only qualified personnel should attempt to conduct this test.

Use extreme caution when taking measurements.

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The instructions below use the contact locations shown in [Figure 10](#).



**Figure 10** C19 connector contact layout.

1. Using a voltmeter set to a range that includes 400 VAC, measure the voltage between ground and the contact labeled “A”.
  - a. Insert one probe into the contact labeled with the ground symbol inside a circle in the image.
  - b. Insert the other probe into the contact labeled “A”.
  - c. Record the measurement.
2. Repeat [Step 1](#) for the contact labeled “B”.
3. Repeat [Step 1](#) through [Step 2](#) for the second power cord.
  - If any of the measurements **are greater than 250 VAC**, inform the electrician that there is a problem.
  - If any of the measurements **are greater than 140 VAC but less than 250 VAC**, then continue [Verify Contact “A” is a Neutral](#).
  - If all of the measurements **are less than 140 VAC**, continue with [Verify Line to Line Voltage](#).

#### Verify Contact “A” is a Neutral

1. Using the measurements taken in [Step 1](#), determine if contact “A” is a neutral.
  - If contact “A” for either power cord **measures greater** than 10 VAC, inform the electrician that there is a problem with the neutral and line assignments that must be fixed.



#### Caution

It is critical that the neutral conductor be assigned the left position on the connector on each power cord connector. Damage to the Dual AC2 will result if the neutral is not correctly assigned.

- If contact “A” for both power cords **measures less** than 10 VAC, continue with the next step.

2. Measure the neutral to neutral voltage for the two power cords.
  - a. Using a voltmeter set to a range that includes 250 VAC, insert one probe into the contact labeled “A” of one AC power cord.
  - b. Insert the other probe into the contact labeled “A” of the other AC power cord.
  - c. The measurement must be less than 10 VAC.
    - If the measurement **is greater** than 10 VAC, inform the electrician that there is a problem.
    - If the measurement **is less** than 10 VAC, the AC power cords are ready for installing the library.

### Verify Line to Line Voltage

If neither of the measurements are greater than 140 VAC, then measure the voltage between contact “A” and contact “B”.

- a. Using a voltmeter set to a range that includes 250 VAC, insert one probe into contact “A”.
- b. Insert the other probe into contact “B”.
- c. The measured value should be 190 to 260 VAC.
  - If the measurement **is not** between 190 to 260 VAC, inform the electrician that there is a problem.
  - If the measurement **is** between 190 to 260 VAC, then repeat [Step a](#) to [Step c](#) for the second power cord. If the measurement **is** between 190 to 260 VAC for the both power cords, the AC power cords are ready for installing the library.

## Power Rating

Each library frame is rated at 200-240 VAC at 16 amps (3840 watts maximum). This power rating is based on a main frame with 24 LTO drives and 6 RIMs, which is the configuration for maximum power consumption by a single frame. The frames are *not* rated at 120 VAC due to the high current required to supply the product.

## Power Cord Specifications

The power cords included with the library are considered part of the library and are not intended for use with any other equipment. See [Supply-End Connector Types on page 25](#) for the different types of cords available from Spectra Logic.

- Notes:**
- The supply-end connector is considered the disconnect for the unit. Make sure that the socket-outlet for the AC connection is in an accessible location near the library.
  - The power cord must meet the specifications for the country where the library will be installed.

**North America and Korea 200–240 VAC Power Cord** The criteria for a 200-volt to 240-volt AC power cord in North America and Korea are as follows:

| Parameter              | Specification   |
|------------------------|---|
| Power cordage          | SJT type, three-conductor, 14 AWG minimum <sup>a</sup>  |
| Power input connectors | <ul style="list-style-type: none"> <li>▪ <b>Male:</b> Connector must be of the proper type, rating, and safety approval (see <a href="#">Supply-End Connector Types on page 25</a>).</li> <li>▪ <b>Female:</b> IEC 60320 C19</li> </ul> |

a. Power cord must comply with local electrical code.




**International 200–240 VAC Power Cord** The criteria for an international 200-volt to 240-volt AC power cord are as follows:

| Parameter              | Specification  |
|------------------------|--|
| Power cordage          | Flexible, HAR (harmonized) type H05VV-F, three conductor, cord with minimum conductor size of 1.7 square millimeters (0.0026350 square inches).  |
| Power input connectors | <ul style="list-style-type: none"> <li>▪ <b>Male:</b> Connector must be of the proper type, rating, and safety approval for the intended country (see <a href="#">Supply-End Connector Types on page 25</a>).</li> <li>▪ <b>Female:</b> IEC 60320 C19</li> </ul> |



## Supply-End Connector Types

The supply-end connector on the cord depends on the country where the library will be installed. The following table shows the supply-end connector types used in each country.

| Part Number | Country of Use                     | Plug Style  | Length           | Appearance  |
|-------------|------------------------------------|-------------|------------------|---|
| 9594        | North America, Korea               | NEMA L6-20P | 14.8 ft (4.5 m)  |  |
| 7029        | North America, Korea               | NEMA L6-30P | 14.8 ft (4.5 m)  |   |
| 6807        | Japan                              | NEMA L6-20P | 13.9 ft (4.24 m) |  |
| 8665        | United Kingdom, Continental Europe | IEC 60309   | 15 ft (4.6 m)    |  |

## Grounding Requirements

Due to electromagnetic interference (EMI) filtering in each dual AC power module, the leakage current for main frames and drive frames is such that they require a secure connection from the chassis of the unit to an earth ground.

Use one or more of the following methods for securing a ground connection when installing a main frame or drive frame:

- Notes:**
- Cord lock brackets and cords with locking connectors are not compatible and cannot be used simultaneously.
  - Expansion Frame Power Modules do not require locking cords or special grounding.
  - Add cord lock brackets (Spectra Logic part number 5497) to all main and drive frames. See “Installing Cord Locks” in the *Spectra T950 Library User Guide* for more information.
  - Use a cord with locking connectors at both ends, such as L6-20P to locking C19 (Spectra Logic part number 9594).

**Power Outlet Location** The twist lock supply-end connector is considered the power disconnect for the unit. The outlet must therefore be installed in an accessible location near the library.

**Power Receptacles** The power receptacles for the main frame and the drive expansion frames are located in the lower right-hand corner of the frame as you face the back of the library (see [Figure 3 on page 12](#)).

The following table shows the number of power receptacles on each frame type.

| Frame Type            | Number of Power Outlets |
|-----------------------|-------------------------|
| Main Frame            | 2 <sup>a</sup>          |
| Drive Expansion Frame | 2 <sup>a</sup>          |
| Media Expansion Frame | 0                       |
| Bulk TAP Media Frame  | 0                       |

a. The second connection is the redundant or failover connection.

## Power Consumption and Cooling Requirements

The power and cooling requirements for the library depend on the number and type of drives installed. The following table provides the maximum power consumption and heat load for the base library and for each additional component added to the base library. Use this information to calculate the total maximum power consumption and heat load values, which can be used to build a power budget for the library.

All values are measured at the AC input and include power supply efficiency. The values are averages of observed hardware. In general, the lighter the load on the power supplies, the less efficient they are. The power supply efficiency in turn affects the power draw of all components.

| Component                                 | Power Consumption (watts)   | Heat Load, Continuous (BTU/hour) |
|---|---|----------------------------------|
| Main frame <sup>a</sup>                   | 183   | 625                              |
| Drive frame <sup>a</sup>                  | 139   | 475                              |
| Media frame in frame location 2 through 6 | 110   | 376                              |
| Media frame in frame location 7 or 8      | 14  | 48                               |
| Bulk TAP frame                            | 125   | 427                              |
| 5/12 VDC power supply                     | 33  | 113                              |
| 24 VDC power supply                       | 29  | 99                               |
| RIM                                       | 12  | 41                               |
| LTO-8 Fibre Channel Full-Height           | <ul style="list-style-type: none"> <li>▪ Read/write: 40</li> <li>▪ Idle: 15 <sup>b</sup></li> </ul>   | Read/write: 136                  |
| LTO-8 Fibre Channel or SAS Half-Height    | <ul style="list-style-type: none"> <li>▪ Read/write: 43</li> <li>▪ Idle: 14 <sup>b</sup></li> </ul>   | Read/write: 164                  |
| LTO-7 Fibre Channel Full-Height           | <ul style="list-style-type: none"> <li>▪ Read/write: 31</li> <li>▪ Idle: 20 <sup>b</sup></li> </ul>   | Read/write: 106                  |
| LTO-7 Fibre Channel or SAS Half-Height    | <ul style="list-style-type: none"> <li>▪ Read/write: 31</li> <li>▪ Idle: 20 <sup>b</sup></li> </ul>   | Read/write: 106                  |
| LTO-6 Fibre Channel                       | <ul style="list-style-type: none"> <li>▪ Read/write: 28</li> <li>▪ Idle: 8 <sup>b</sup></li> </ul>    | Read/write: 95                   |
| LTO-5, Fibre Channel                      | <ul style="list-style-type: none"> <li>▪ Read/write: 37</li> <li>▪ Idle: 19 <sup>b</sup></li> </ul>   | Read/write: 126                  |
| LTO-4, Fibre Channel                      | <ul style="list-style-type: none"> <li>▪ Read/write: 37</li> <li>▪ Idle: 17.5 <sup>b</sup></li> </ul> | Read/write: 123                  |
| LTO-3, Fibre Channel                      | <ul style="list-style-type: none"> <li>▪ Read/write: 29</li> <li>▪ Idle: 15 <sup>b</sup></li> </ul>   | Read/write: 99                   |
| TS1155 technology                         | <ul style="list-style-type: none"> <li>▪ Read/write: 60</li> <li>▪ Idle: 19<sup>b</sup></li> </ul>    | Read/write: 205                  |
| TS1150 technology                         | <ul style="list-style-type: none"> <li>▪ Read/write: 55</li> <li>▪ Idle: 38 <sup>b</sup></li> </ul>   | Read/write: 188                  |
| TS1140 technology                         | <ul style="list-style-type: none"> <li>▪ Read/write: 53</li> <li>▪ Idle: 30 <sup>b</sup></li> </ul>   | Read/write: 181                  |

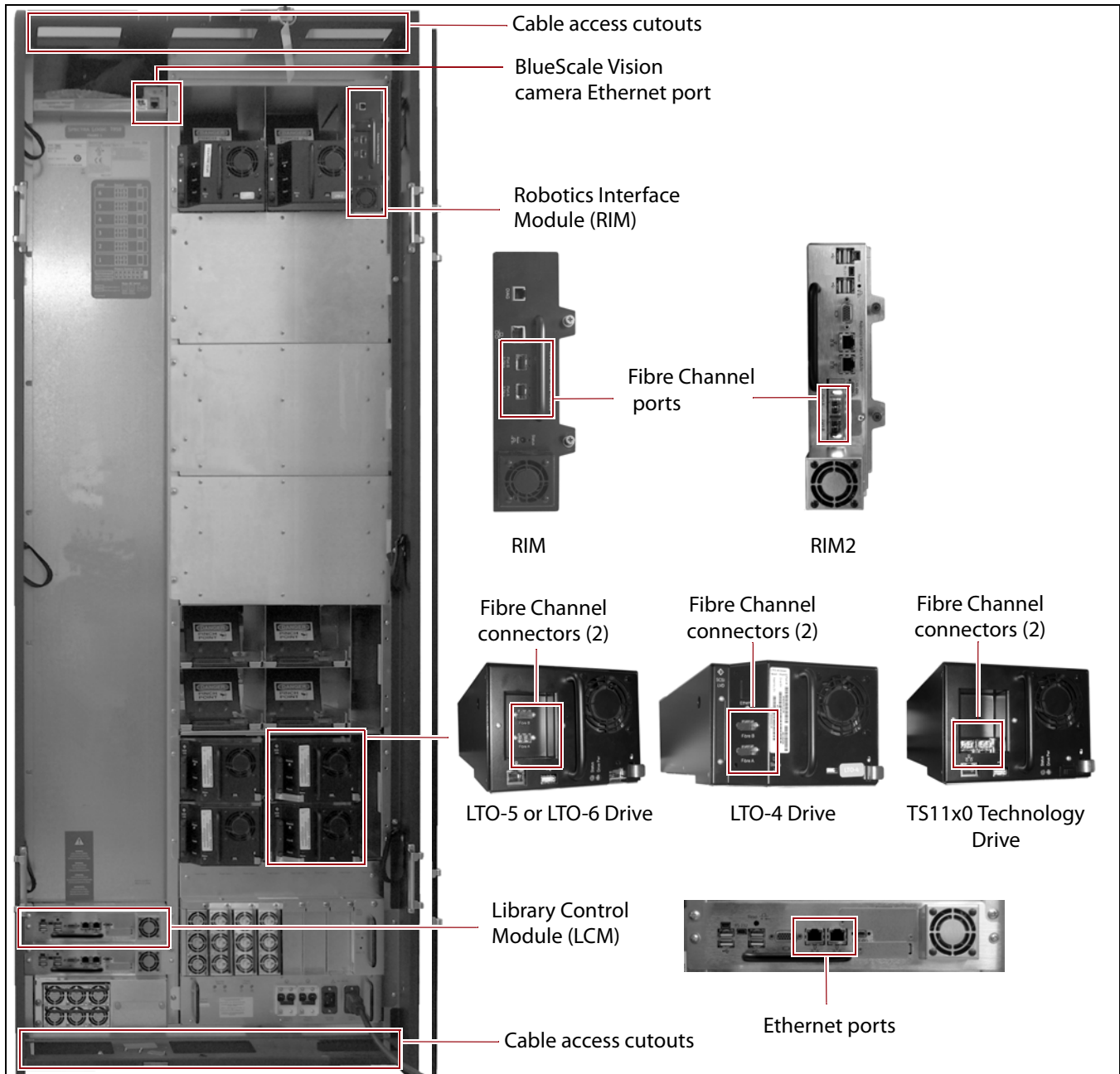
a. Assumes one 5/12 volt power supply and one 24 volt power supply; no drives or RIMs installed.

b. No cartridge loaded.

# NETWORK CABLING REQUIREMENTS

The library can accommodate cabling from either the bottom or the top of the library. See [Floor and Ceiling Cable Access](#) on page 20 for additional information.

Use [Figure 11](#) and the descriptions that follow to plan network connectivity for the library installation.



**Figure 11** Locations for network cable connections.

**Library Access** Provide a Category 5 (10/100BaseT connection) data-grade Ethernet cable that is compliant with EIA/TIA 568 from an active Ethernet network. This cable must be connected to an Ethernet port on the LCM for remote access to the library's BlueScale web interface and to allow for the library to automatically email notifications to users and AutoSupport tickets to Spectra Logic Technical Support. During installation, the library's connection is set up with the library's IP address, subnet, proxy server, and other IP configuration settings.



**Caution** Some port scanning software can interfere with remote library sessions.

**Host Access** Provide one or two optical fiber cables from the arbitrated loop or switched fabric, to Fibre Channel port(s) on a RIM in each partition to provide the hosts with access to the medium changer. Depending on the wavelength, the cables must comply with the following specifications in the Fibre Channel standard (FC-PI-2):

- **50-micron** — 400-M5-SN-I classification
- **62.5 micron** — 400-M6-SN-I classification (not supported for RIM2)

#### **Tape Drive Access**

- **Fibre Channel** — Provide one optical fiber cable from the arbitrated loop or switched fabric, to a Fibre Channel port on each drive, to provide the hosts with access to the drives. Depending on the wavelength, the cables must comply with the following specifications in the Fibre Channel standard (FC-PI-2):
  - **50-micron** — 400-M5-SN-I classification
  - **62.5 micron** — 400-M6-SN-I classification (not supported for LTO-6 or later generation drives or TS11xx technology drives)

The following table can be used to determine the maximum length for an M5 cable.

| <b>Data Rate / Link Speed</b> | <b>M5 (OM2) cable</b> | <b>M5E (OM3) cable</b> | <b>M5F (OM4) cable</b> |
|-------------------------------|-----------------------|------------------------|------------------------|
| <b>1 Gbps</b>                 | 1640 ft (500 m)       | Not Specified          | Not Specified          |
| <b>2 Gbps</b>                 | 984 ft (300 m)        | Not Specified          | Not Specified          |
| <b>4 Gbps</b>                 | 492 ft (150 m)        | 1247 ft (380 m)        | 1312 ft (400 m)        |
| <b>8 Gbps</b>                 | 164 ft (50 m)         | 492 ft (150 m)         | 623 ft (190 m)         |

- **Serial Attached SCSI (SAS)** — SAS tape drives support the point-to-point Serial Attached SCSI protocol. Connecting these drives to the host network requires a SFF-8088 SAS cable rated for 6 Gb/second that does not exceed 13 feet (4 m).

**BlueScale Vision Camera Access** One BlueScale Vision camera is included with the main frame. Additional cameras can be installed in the expansion frames. To comply with EMC requirements, provide a shielded Category 5 (10/100BaseT connection) data-grade cable or a similar Category 5 cable from an active Ethernet network to each camera.

## ENVIRONMENTAL REQUIREMENTS

The following sections list the general environmental specifications for the library.

**Air Flow** Air flows through the library from front to back. In data centers using a hot aisle/cold aisle layout, position the library so that the cold aisle is in front of the library (cold air in), and the hot aisle is behind the library (hot air out).

**Air Quality** Keep the location as free of airborne particulates as possible. To eliminate obvious sources of particulates, do not permit anyone to smoke, eat, or drink near the storage area, and do not place the library near a copier or printer that may emit toner and paper dust.

**Temperature, Humidity, and Altitude** The library is equipped with internal fans that operate as much as is necessary for the number of DBAs installed. The fans keep the library's internal temperature within specifications as long as the data center environment is within specifications. The following tables outlines the necessary data center and storage area specifications.

| Operating Environmental Specification        |   |
|--|---|
| Humidity                                     | 20% to 80% (non-condensing)   |
| Humidity gradient                            | Less than 10% per hour  |
| Ambient temperature <sup>a</sup>             | <b>LTO:</b> 50° F to 90° F (10° C to 32° C)<br><b>TS11x0 Technology:</b> 61° F to 90° F<br>(16° C to 32° C) |
| Maximum temperature change rate <sup>b</sup> | 18° F per hour (10° C per hour),<br>non-condensing  |
| Maximum wet bulb temperature                 | 77° F (25° C)   |
| Altitude                                     | Sea level to 10,000 ft (3,048 m)  |

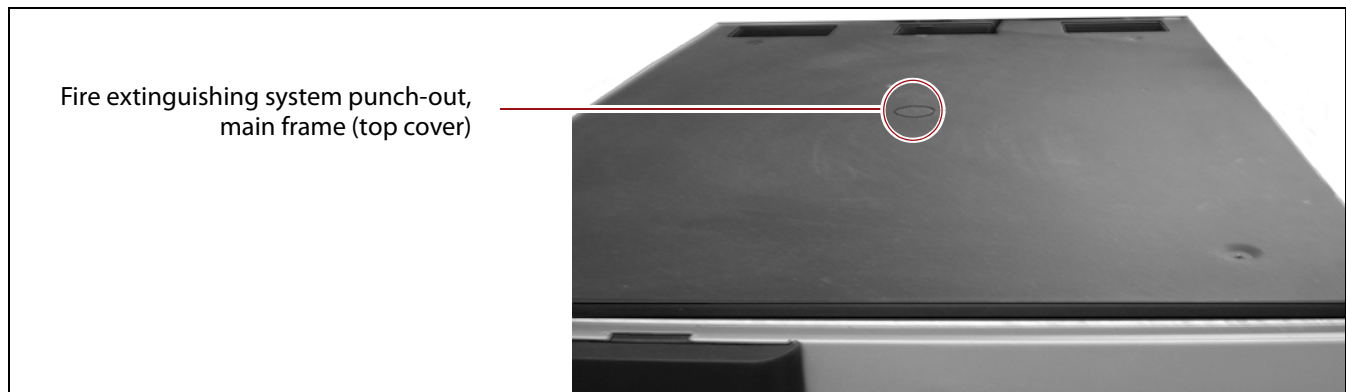
a. The maximum ambient temperature must not exceed 86° F (30° C) when G2 F-QIPs are installed in the library.

b. The temperature and humidity must be allowed to stabilize in the specified ambient environment for 24 hours.

| <b>Storing<sup>a</sup> and Shipping (Non-Operating) Environment Specification</b> |                                    |
|---|------------------------------------|
| Humidity  | 10% to 95% (non-condensing)        |
| Temperature   | –40° F to 149° F (–40° C to 65° C) |
| Altitude  | Sea level to 40,000 ft (12,192 m)  |

- a. The library is in its original packaging. The packaging is designed to protect the library from condensation caused by extreme temperature variations of 27° F (15° C) or more. When the library is moved from a cold storage environment to a warm operating environment, it must be acclimated in its packaging for at least 24 hours before opening to prevent serious condensation damage from occurring.

**Fire Protection** To comply with the OSHA Directive for Fixed Extinguishing Systems (General, 1910.160), the library has a punch-out in the cover for each frame and a corresponding punch-out in the top of each frame for the purpose of attaching a hose or nozzle from your site's fire extinguishing system.



**Figure 12** Location of the fire extinguishing system access opening in the top of the library.

**Shock and Vibration** The library will operate normally after experiencing shock loads as specified in the following table. The operating shock levels indicate how much shock the library can withstand while the enclosed drives are reading and writing data. The non-operating and storage shock levels indicate how much shock the library can withstand when it is not operating. After experiencing this amount of shock, the library will operate normally.

| <b>Specification</b>      | <b>Operating</b>   | <b>Storing and Shipping (Non-Operating Environment)<sup>a</sup></b>   |
|---------------------------|--|---|
| Shock                     | 2 g pk ½ sine wave for 10 msec<br>(3 axes, 2 shocks per axis, minimum)   | 2 g pk ½ sine wave for 10 msec<br>(3 axes, 2 shocks per axis, minimum)  |
| Vibration<br>(Swept Sine) | 5 Hz – 500 Hz – 5 Hz<br>5 – 22 Hz, 0.01-inch DA displacement<br>22 – 500 Hz, 0.25G pk @ ½ octave<br>(minimum three axes) | 5 Hz – 500 Hz – 5 Hz<br>5 – 31 Hz, 0.02-inch DA displacement<br>31 – 500 Hz, 1G pk @ ½ octave<br>(minimum three axes) |
| Vibration<br>(Random)     | 0.5 Grms, 0 – 3000 Hz (single axis)  | 1 – 200 Hz @ 1.156 Grms.<br>Bottom face only for 60 minutes.  |

- a. Specifications are for the library in its original packaging.

# CHAPTER 3

## Preparing for Installation

The library will be installed by a certified Spectra Logic field engineer. This chapter outlines the requirements for storing and moving the library and its components. Make sure that you review these requirements carefully. The information is provided to ensure that the installation site meets the necessary requirements *before* the Spectra Logic field representative arrives.

| Topic                                 |         |
|---------------------------------------|---------|
| Receiving and Storing the Library     | page 33 |
| Unpacking and Moving the Library      | page 34 |
| Moving the Library After Installation | page 36 |

**WARNING**

Library frames are very heavy (see product specifications for details). Use extreme caution and proper equipment when moving these, and ensure that your floor has adequate structural integrity.

**WARNING**

Boxed and unboxed library components weigh from 200 to 400 pounds each (91 to 181 kg) or more. Use extreme caution and proper equipment when moving these.

**WARNING**

The ties around the shipping crates are secured very tightly; the tension may cause them to whip outward when cut. Use care when cutting the ties so that you will not be hit.



## RECEIVING AND STORING THE LIBRARY

Before the library arrives, make sure that your receiving and storage areas can accommodate the pallet and boxes used to ship the library and its components. The library is shipped in multiple boxes: one for each library frame and others for the library components such as drives, controllers (RIMs), TeraPack magazines, and media. The boxes are shipped on pallets. The following table provides the approximate dimensions and weights of the pallet and boxes used to ship the library.

|   | Height                          | Width                            | Depth                           | Weight <sup>a</sup>                  |
|---|---------------------------------|----------------------------------|---------------------------------|--------------------------------------|
| <b>Crated Frame <sup>b</sup></b>        | 7.2 ft (2.2 m)                  | 3.5 ft (1.1 m)                   | 4.6 ft (1.4 m)                  | 1,200 to 1,300 lb<br>(544 to 590 kg) |
| <b>Crated VAX Column <sup>c</sup></b>   | 8 ft (2.4 m)                    | 2.6 ft (0.8 m)                   | 2.1 ft (0.6 m)                  | 200 lb (91 kg)                       |
| <b>Crated HAX Rail <sup>c</sup></b>     |                                 |                                  |                                 |                                      |
| ▪ 2-frame                               | 6.1 ft (1.9 m)                  | 2.3 ft (0.7 m)                   | 1.0 ft (0.3 m)                  | 110 lb (50 kg)                       |
| ▪ 3-frame                               | 7.7 ft (2.3 m)                  | 3.0 ft (0.9 m)                   | 1.4 ft (0.4 m)                  | 150 lb (68 kg)                       |
| ▪ 5-frame                               | 12.5 ft (3.8 m)                 | 1.8 ft (0.5 m)                   | 0.7 ft (0.2 m)                  | 120 lb (54 kg)                       |
| ▪ 6-frame                               | 15.0 ft (4.6 m)                 | 1.8 ft (0.5 m)                   | 1.1 ft (0.3 m)                  | 120 lb (54 kg)                       |
| ▪ 8-frame <sup>d</sup>                  | 7.3 ft (2.2 m)                  | 2.0 ft (0.6 m)                   | 1.4 ft (0.4 m)                  | 85 lb (39 kg)                        |
| <b>Component Pallet <sup>e, f</sup></b> | 1.8 to 5.0 ft<br>(0.6 to 1.5 m) | 3.5 to 14.9 ft<br>(1.1 to 4.6 m) | 1.8 to 5.0 ft<br>(0.6 to 1.5 m) | 200 to 400 lb<br>(91 to 181 kg)      |

- a. The weight does not include drives, media, RIMs, transporter, or power supply modules.
- b. Each frame is shipped in a separate crate.
- c. A single frame library ships with the VAX column installed in the frame.
- d. Shipped in a palletized package rather than a crate.
- e. Assumes multiple components are shipped together on a single pallet. Components may also be shipped individually.
- f. The size and weight of the component pallet depends on the number and type of components shipped. To calculate the approximate weight of all the components, add 11.6 lb (5.3 kg) for each LTO drive, 17.5 lb (8 kg) for each TS11x0 drive, 5 lb (2.3 kg) for each full LTO TeraPack magazine, 5.6 lb (2.5 kg) for each full TS11x0 technology TeraPack magazine, 5 lb (2.3 kg) for each RIM, and 4 lb (1.8 kg) for each power supply.

In preparation for the installation, locate the accessory box, which may have shipped and arrived separately from the library. This box contains option activation keys, the library documentation kit, and additional information that you should read before the library is installed. Make sure that you do not lose any of the option activation keys.

## Acclimating the Library

Allow time for the library to acclimate to the working environment when you move it from the loading dock.



### Caution

When the library is moved from a cold storage environment to a warm operating environment, it must be acclimated in its packaging for at least 24 hours before opening to prevent serious condensation damage from occurring.

# UNPACKING AND MOVING THE LIBRARY

The following sections describe the requirements to safely unpack and maneuver library and component crates from storage to their operating location.

**Caution**

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Keep all library and components crated while moving them to the data center. If the data center is not able to accommodate the crates, contact Spectra Logic Professional Services in advance of the installation date. See [Contacting Spectra Logic on page 4](#).

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## Structural Integrity of Flooring

Ensure that all floors that will be traversed can withstand the weights of the crated components shown in [Receiving and Storing the Library on page 33](#).

## Required Equipment

Ensure that any equipment used to move the library components can transport the weights shown in [Receiving and Storing the Library on page 33](#).

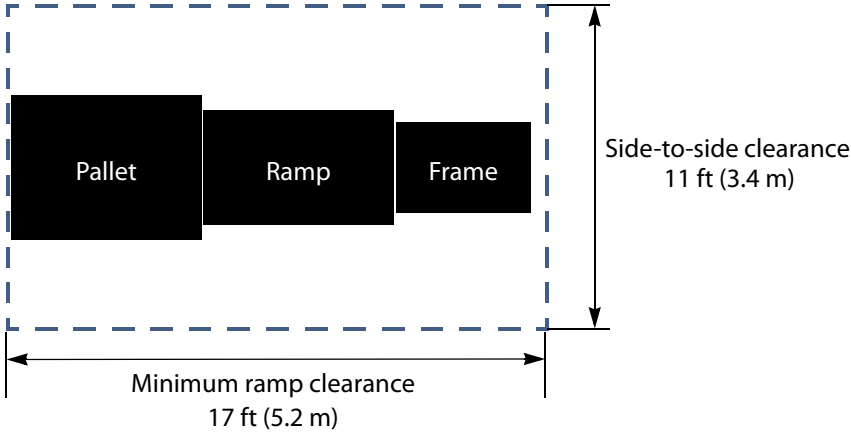
**Level Surfaces** A pallet jack or forklift is required to move the crates on a level surface.

**Stairways** A stair crawler or other special equipment must be used to traverse stairways. A ramp can sometimes be used to traverse one or two stairs.

## Clearances

Before moving the library and components to where they will be installed, make sure that you have access to necessary doorways, stairways, hallways, and elevators, as well as adequate clearance to move through them with the equipment.

**Note:** All lengths are approximate.

| Clearance for...                         | Requirement  |
|--|--|
| Unpacking                                | <p>Sufficient space to both remove the library from its packaging and unpack the boxes containing the additional components.</p>  <ul style="list-style-type: none"> <li>▪ Allow a minimum of approximately 17 ft (5.2 m) on the ramp side of the pallet to unload the library and approximately 4 ft (1.2 m) on each side and above the crate to remove the packaging.</li> <li>▪ Allow a minimum of 12 ft by 12 ft (3.7 m by 3.7 m) of open space for maneuvering the individual frames from their crates.</li> </ul> |
| Doorways                                 | Doorways (including thresholds) must be taller than 6.7 ft (2 m) and wider than 4 ft (1.2 m).  |
| Stairwell width and height               | Stairwells must be taller than 7.5 ft (2.3 m) and wider than 4 ft (1.2 m).   |
| Stairwell and hallway corners            | Stairwell and hallway corners should be wider than 5.6 ft (1.7 m).   |
| Elevator width, height, and weight limit | Elevators and elevator doors should be taller than 7.5 ft (2.3 m) and wider than 4 ft (1.2 m). If using an elevator to move the crates, it must be able to accommodate the size and weight of the crates. See <a href="#">Receiving and Storing the Library</a> on page 33 for details.  |

## Tilting

Make sure that you do not tilt the frames from vertical while moving them.



### Caution

If you tilt the library, Spectra Logic is not responsible for any damage caused to the library or its components, or for any damage caused to your site.

## MOVING THE LIBRARY AFTER INSTALLATION

The library hardware is configured to ensure proper thermal control, air flow, and dust filtering. After the library is installed, do not move the library.



### **Important**

Moving the library without assistance from a Spectra Certified field engineer will void your service contract. Contact Spectra Logic Professional Services for assistance if you need to relocate your library (see [Contacting Spectra Logic on page 4](#)).

Contact Spectra Logic Technical Support before making any changes to your library hardware or performing any service operations.

# Site Preparation Checklist

Use this checklist to ensure that all of the requirements have been met prior to delivery of your library.

| <b>Site Requirements</b>                       |  |
|--|--|
| <b>Data Center Flooring on page 15</b>         |  |
| <input type="checkbox"/>                       | Flooring is hard (not carpeted) and capable of supporting the weight of the library.   |
| <input type="checkbox"/>                       | Weight distribution plates have been installed (optional).   |
| <input type="checkbox"/>                       | Flooring is level.   |
| <b>Space Requirements on page 17</b>           |  |
| <input type="checkbox"/>                       | Space is available for the library's height, width, and depth.   |
| <input type="checkbox"/>                       | Space is available for service and operator access.  |
| <input type="checkbox"/>                       | Space is available for future growth (optional).   |
| <input type="checkbox"/>                       | Cables can be routed to the library's cable access areas.  |
| <b>Power Requirements on page 21</b>           |  |
| <input type="checkbox"/>                       | Electrical and peripheral equipment cabling is complete and organized.   |
| <input type="checkbox"/>                       | Proper number and type of outlets are available at the required locations.   |
| <input type="checkbox"/>                       | Electrical circuits meet power requirements.   |
| <input type="checkbox"/>                       | Two separate branch circuits, meeting the power requirements, are available to allow for failover in the event of a power failure in one of the circuits (optional). |
| <b>Network Cabling Requirements on page 28</b> |  |
| <input type="checkbox"/>                       | Cabling for remote access to the library's BlueScale web interface is complete and organized.  |
| <input type="checkbox"/>                       | Cabling for host access to the library is complete and organized.  |
| <input type="checkbox"/>                       | Cabling for host access to the tape drives is complete and organized.  |
| <input type="checkbox"/>                       | Cabling for access to the BlueScale Vision Camera(s) is complete and organized.  |

| <b>Environmental Requirements on page 30</b>        |  |
|---|--|
| <input type="checkbox"/>                            | Airflow and air quality meet the library's specifications.   |
| <input type="checkbox"/>                            | Temperature and humidity are within the library's specifications.  |
| <input type="checkbox"/>                            | Fire suppression equipment is in place (optional).   |
| <input type="checkbox"/>                            | Vibration and shock will not exceed the library's specifications.  |
| <b>Preparing for Installation</b>                   |  |
| <b>Receiving and Storing the Library on page 33</b> |  |
| <input type="checkbox"/>                            | The receiving/storage area can handle the size and weight of each crated library frame as well as the crate(s) of library components.  |
| <input type="checkbox"/>                            | The delivery and installation schedule allows 24 hours for the library to acclimate before installation.   |
| <b>Unpacking and Moving the Library on page 34</b>  |  |
| <input type="checkbox"/>                            | Floors to be traversed can handle the weight of the crated frames.   |
| <input type="checkbox"/>                            | Transportation equipment—forklift, pallet jack, and/or stair crawler—is available and can handle the weight of the crated frames.  |
| <input type="checkbox"/>                            | Doorways, stairwells, hallways, and elevators allow the size of the crated library without tilting.  |
| <input type="checkbox"/>                            | Elevators can handle the weight of the crated library.   |
| <input type="checkbox"/>                            | Space is available in the data center where the library is to be installed for the crates and crate ramp, with extra space for maneuvering.  |
| <input type="checkbox"/>                            | If the path, transportation equipment, or data center is not able to accommodate the crates, contact Spectra Logic Professional Services in advance of the installation date. See <a href="#">Contacting Spectra Logic on page 4</a> . |