



## Spectra 12000™ Library User Guide

### This Guide

This guide describes the installation and operation of the Spectra 12000 automated tape library, including troubleshooting information.

### Related Publications

These publications are also available from Spectra Logic:

- ◆ *Release Notes: Spectra 12000, Spectra 64000* (90910852): provides last-minute information about the library.
- ◆ *Developer Guide: Spectra 12000, Spectra 64000* (90910850): provides SCSI reference material and other reference information useful to application developers.

## Notices

Except as expressly stated herein, Spectra Logic Corporation makes available the Spectra 12000 library and associated documentation on an “as is” basis, without warranty of any kind, either expressed or implied, including but not limited to the implied warranties of merchantability or fitness for a particular purpose. In no event shall Spectra Logic be liable for any loss of profits, loss of business, loss of use or data, interruption of business, or for indirect, special, incidental or consequential damages of any kind, even if Spectra Logic has been advised of the possibility of such damages arising from any defect or error.

Information furnished in this manual is believed to be accurate and reliable. However, no responsibility is assumed by Spectra Logic for its use. Due to continuing research and development, Spectra Logic may revise this publication from time to time without notice, and reserves the right to change any product specification at any time without notice.

Some products or services mentioned in this manual are provided by companies other than Spectra Logic. Inquiries about one or more of these products or services should be sent directly to the company in question. This manual refers to the following brand or product names, registered trademarks, and trademarks that are listed according to their respective owners. These trademarks may be registered in this country, other countries, or both.

Spectra Logic Corporation	Red Hat®	Silicon Graphics Incorporated
Spectra Logic®	Microsoft	IRIX®
Gator™	Microsoft®	Sun Microsystems
Spectra 12000™	Windows 2000™	Java®
Spectra 64000™	Windows NT™	Solaris®
RackPac™		Sun®
Exabyte Corporation	Quantum Corporation	SunOS®
Exabyte™	DLT™	X/Open Company, Ltd.,
EXB-210™	Quantum™	licenses the following:
Mammoth™	Seagate Corporation	UNIX®
Hewlett Packard	Seagate™	
HP™		

## License

You have acquired a Spectra 12000 Library that includes software owned or licensed by Spectra Logic from one or more software licensors (“Software Suppliers”). Such software products, as well as associated media, printed materials and “online” or electronic documentation (“SOFTWARE”) are protected by copyright laws and international copyright treaties, as well as other intellectual property laws and treaties.

If you do not agree to this end user license agreement (“EULA”), do not use the Spectra 12000 Library; instead, promptly contact Spectra Logic for instructions on return of the Spectra 12000 Library for a refund. Any use of the SOFTWARE, including but not limited to use on the Spectra 12000 Library, will constitute your agreement to this eula (or ratification of any previous consent).

**Grant of License.** The SOFTWARE is licensed on a non-exclusive basis, not sold. This EULA grants you the following rights to the SOFTWARE:

You may use the SOFTWARE only on the Spectra 12000 Library.

**Not Fault Tolerant.** The SOFTWARE is not fault tolerant. Spectra Logic has independently determined how to use the SOFTWARE in the Spectra 12000 Library, and suppliers have relied upon Spectra Logic to conduct sufficient testing to determine that the SOFTWARE is suitable for such use.

**No Warranties For the SOFTWARE.** Except as expressly stated herein, the SOFTWARE is provided "AS IS" and with all faults. The entire risk as to satisfactory quality, performance, accuracy, and effort (including lack of negligence) is with you. Also, there is no warranty against interference with your enjoyment of the SOFTWARE or against infringement. If you have received any warranties regarding the SOFTWARE, those warranties do not originate from, and are not binding on SOFTWARE suppliers.

**Note on Java Support.** The SOFTWARE may contain support for programs written in Java. Java technology is not fault tolerant and is not designed, manufactured, or intended for use of resale as online control equipment in hazardous environments requiring fail-safe performance, such as in the operation of nuclear facilities, aircraft navigation or communications systems, air traffic control, direct life support machines, or weapons systems, in which the failure of Java technology could lead directly to death, personal injury, or severe physical or environmental damage.

**No Liability for Certain Damages.** Except as prohibited by law, SOFTWARE suppliers shall have no liability for any indirect, special, consequential or incidental damages arising from or in connection with the use or performance of the SOFTWARE. This limitation shall apply even if any remedy fails of its essential purpose. In no event shall SOFTWARE suppliers, individually, be liable for any amount in excess of U.S. two hundred fifty dollars (U.S. \$250.00).

**Limitations on Reverse Engineering, Decompilation, and Disassembly.** You may not reverse engineer, decompile, or disassemble the SOFTWARE, except and only to the extent that such activity is expressly permitted by applicable law notwithstanding this limitation.

**Software transfer allowed with restrictions.** You may permanently transfer rights under this EULA only as part of a permanent sale or transfer of the Spectra 12000 Library, and only if the recipient agrees to this EULA. If the SOFTWARE is an upgrade, any transfer must also include all prior versions of the SOFTWARE.

**Export restrictions.** Export of the SOFTWARE from the United States is regulated by the Export Administration Regulations (EAR, 15 CFR 730-744) of the U.S. Commerce Department, Bureau of Export Administration. You agree to comply with the EAR in the export or re-export of the SOFTWARE: (i) to any country to which the U.S. has embargoed or restricted the export of goods or services, which as May 1999 include, but are not necessarily limited to Cuba, Iran, Iraq, Libya, North Korea, Sudan, Syria, and the Federal Republic of Yugoslavia (including Serbia, but not Montenegro), or to any national or any such country, wherever located, who intends to transit or transport the SOFTWARE back to such country; (ii) to any person or entity who you know or have reason to know will utilize the SOFTWARE or portion thereof in the design, development or production of nuclear, chemical, or biological weapons; or (iii) to any person or entity who has been prohibited from participating in U.S. export transactions by any federal agency of the U.S. government. You warrant and represent that neither the BXA nor any other U.S. federal agency has suspended, revoked or denied your export privileges.

For additional information see <http://www.microsoft.com/exporting/>.

## Warranty

The Spectra 12000 library is warranted for one year from date of shipment from the factory. This warranty includes a Next Business Day (On-Site) service contract for sites located in North America and the European Union, and is explained as follows:

Access to a Spectra Logic support representative any business day (not including evenings, weekends or holidays) from 8:00 a.m. to 5:00 p.m. Mountain Time

Service visit from a field service representative-upon verification that the unit purchased has malfunctioned, Spectra Logic must be notified by 4:00 p.m. (local time) for a field service representative to be dispatched that day for arrival the following business day.

## Firmware Support Process

The support model for Spectra Logic firmware will be based on the father-grandfather scheme. It will be implemented as follows:

**Current Shipping Release** Any issues found in the current release of firmware will be resolved either with a new patch or a new release, depending on the types of changes needed. The current release will be completely supported.

**One Release Prior to the Current Release** Support will strongly recommend that customers using the previous release of firmware upgrade to the current release. If the customer is unwilling or unable to do this, Spectra Logic will provide patches to the previous release.

**Two Releases Prior to the Current Release** Customers will be asked to upgrade to the current release. There must be a compelling reason to avoid upgrading. Patches to firmware that is two releases prior to the current release will be rare.

## Warnings and Cautions

### Tapes

---

**Caution:** Use only the data cartridges approved for use with the drives in the Spectra 12000 library. Improper data cartridges can cause damage to the drives, library and cartridges.

---

## AC Power

---

**Warning:** Risk of electrical shock. Do not remove the library cover. To remove AC power from the library, unplug the power cord from the power inlet. There are no user serviceable parts within the library.

---



Notices .....	2
License .....	2
Warranty .....	4
Firmware Support Process .....	4
Warnings and Cautions .....	4
<b>Chapter 1. Introduction</b> .....	<b>15</b>
<hr/>	
Introduction .....	16
About the Gator Architecture .....	17
Option Enablement .....	18
A Tour of the Spectra 12000 Library .....	19
The Library Controller Stylus .....	20
A Tour of the Library Controller .....	21
IP Address and User .....	21
Exception Bar .....	22
Toolbars .....	22
General Toolbar .....	23
Configuration Toolbar .....	24
Maintenance Toolbar .....	25
Security Toolbar .....	26
Getting Started .....	27

## **Chapter 2. Installing the Spectra 12000 Library** **29**

---

Preparing a Controlled Environment . . . . .	30
Media and Hardware Environment . . . . .	30
Air Quality . . . . .	30
Unpacking the Spectra 12000 Library . . . . .	31
Connecting the SCSI Cables and Terminators . . . . .	32
Connecting the Fibre Channel Cables . . . . .	33
Connecting the Ethernet Cables . . . . .	35
Turning the Library On and Off . . . . .	36

## **Chapter 3. Using Security** **37**

---

Setting Up Security . . . . .	37
To Set Up a User . . . . .	37
To Delete a User . . . . .	39

## **Chapter 4. Partitioning the Spectra 12000 Library** **41**

---

Displaying the Configuration Toolbar . . . . .	42
Partitioning the Library . . . . .	43

## **Chapter 5. Configuring the Spectra 12000 S-QIP** **47**

---

Displaying the Configuration Toolbar . . . . .	48
Configuring S-QIPs . . . . .	49
S-QIP Configure Controller Screen . . . . .	51

<b>Chapter 6. Configuring the Spectra 12000 Library F-QIP</b>	<b>55</b>
<hr/>	
Displaying the Configuration Toolbar	56
Configuring F-QIPs	56
F-QIP Configure Controller Screen	58
About Serverless Backup	61
Configuring the F-QIP for Serverless Backup	61
Enabling Serverless Backup	62
Serverless Backup F-QIP Setup	62
<b>Chapter 7. Configuring the Spectra 12000 E-QIP</b>	<b>65</b>
<hr/>	
About TAOS™	66
TAOS ITP	66
NDMP Enabled by TAOS	66
Sharing Tape Devices	67
TAOS User Interfaces	67
Connecting to the Serial Port	68
Setting Up the E-QIP	69
Password Configuration	69
Ethernet Configuration	70
Setting Up TAOS ITP	72
TAOS ITP Configuration	72
TAOS ITP Driver Installation	73
Setting Up NDMP Enabled by TAOS	100
Enabling TAOS NDMP	100
Configuring NDMP Enabled by TAOS	101

<b>Chapter 8. Configuring the Drives</b>	<b>107</b>
Configuring SCSI IDs, Emulation and Dip Switch Settings . . . . .	108
<b>Chapter 9. Using the Spectra 12000 Library</b>	<b>113</b>
Checking Library Status . . . . .	114
Checking Robotics . . . . .	115
To Enable Keys . . . . .	115
To Set IP Addresses . . . . .	116
Checking Inventory . . . . .	116
Inserting and Ejecting Cartridges . . . . .	116
Insert New Media . . . . .	117
Eject Media . . . . .	118
Checking Drives . . . . .	121
Checking Drive Status . . . . .	121
The Maintenance Toolbar . . . . .	122
Checking Diagnostics . . . . .	123
Updating Firmware . . . . .	123
Accessing Firmware from a Remote Server . . . . .	125
Accessing Firmware from an Alternate Location . . . . .	125
Reset Picker Parameters . . . . .	127
Viewing the F-QIP Configuration . . . . .	129
Checking Resources in Use . . . . .	130
Deleting a Partition Configuration . . . . .	132

## **Chapter 10. Using the Drive** **133**

---

Bar Code Labels . . . . .	134
Using AIT Data Cartridges . . . . .	135
Write-Protecting and Recording . . . . .	136
Storing Cartridges Outside the Library . . . . .	137
Caring for Data Cartridges . . . . .	137
Cleaning the AIT Drive Heads . . . . .	138

## **Chapter 11. Maintaining the Spectra 12000 Library** **141**

---

Changing the Spectra 12000 Library Air Filters . . . . .	142
Adding Drives . . . . .	144
Adding QIPs . . . . .	149
Troubleshooting the Spectra 12000 Library . . . . .	151
Troubleshooting Library Initialization . . . . .	151
Troubleshooting SCSI Problems . . . . .	151
Troubleshooting Fibre Channel Device Problems . . . . .	152
Purchasing Additional Accessories . . . . .	153
Purchasing Custom Bar Code Label Sequences . . . . .	154
Purchasing CoD . . . . .	154
To enable CoD . . . . .	155

<b>Appendix A. Fibre Channel Cable Requirements</b>	<b>157</b>
<hr/>	
Fibre Channel Cable Requirements . . . . .	157
<b>Appendix B. SCSI Cable and Terminator Requirements</b>	<b>159</b>
<hr/>	
SCSI Cable Requirements . . . . .	159
SCSI Terminator Requirements . . . . .	160
<b>Appendix C. Specifications</b>	<b>161</b>
<hr/>	
Sony AIT Tape Specifications . . . . .	161
Sony AIT-2 Tape Drive Specifications . . . . .	162
Sony AIT-3 Tape Drive Specifications . . . . .	163
Power Requirements . . . . .	164
Spectra 12000 Library . . . . .	164
Operating Environment Limits . . . . .	165
Acoustic Noise Limits . . . . .	165
Shock and Vibration Specifications . . . . .	166
<b>Appendix D. Regulatory and Safety Standards</b>	<b>167</b>
<hr/>	
Safety Standards . . . . .	167
FCC Statement . . . . .	167
EU Declaration of Conformity . . . . .	168
Japan VCCI Class A Statement . . . . .	169
Taiwan BSMI Statement . . . . .	169

<b>Appendix E. Using the TAOS ITP Control Panel to View Settings</b>	<b>171</b>
Opening the TAOS ITP Configuration Control Panel . . . . .	171
Device Discovery . . . . .	172
Installed Devices . . . . .	172
Ethernet . . . . .	172
Password . . . . .	172
Control . . . . .	172
<b>Appendix F. Using the Serial Port Interface</b>	<b>173</b>
Password Configuration . . . . .	175
Fibre Configuration . . . . .	176
Ethernet Configuration . . . . .	177
TAOS ITP Configuration . . . . .	178
TAOS NDMP Configuration . . . . .	179
Enable Options . . . . .	179
Save Changes . . . . .	180
Discard Changes . . . . .	180
Reboot . . . . .	180
Help . . . . .	180
Exit . . . . .	180
<b>Glossary of Terms</b>	<b>181</b>
<b>Index</b>	<b>187</b>



# 1 Introduction

This guide is written for Spectra 12000 library users and reviews the library's installation and use. This chapter covers:

- ◆ Introduction
- ◆ About the Gator Architecture
- ◆ Option Enablement
- ◆ A Tour of the Spectra 12000 Library
- ◆ A Tour of the Library Controller
- ◆ Getting Started

## Introduction

The Spectra 12000 library provides a combination of high reliability, speed, large capacity, ease of use, and built-in redundancy to minimize or eliminate downtime. The Spectra 12000 library's features include:

- ◆ Hot swappable tape drives—you can easily switch drives without tools and without interrupting other backups.
- ◆ Multiple logical libraries partitioned within a single physical library
- ◆ Color touchscreen interface (Library Controller).
- ◆ A single Spectra 12000 library can communicate via Fibre Channel, SCSI, Ethernet or any combination of the three.
- ◆ Scalable to eight drives and 120 cartridges.
- ◆ Support for AIT drives.
- ◆ High reliability-system redundancy allows the library to continue operating while it is being serviced.
- ◆ Import and export tapes either individually or in removable cartridge packs of 15.

## About the Gator Architecture

Both the Spectra 12000 and Spectra 64000 libraries utilize the Gator™ architecture for robotic tape libraries developed by Spectra Logic. Gator architecture in the Spectra 12000 library can be configured with 60 to 120 cartridges and from two to eight tape drives. Gator architecture in the Spectra 64000 library can be configured with up to 640 cartridges and 32 tape drives in a single rack. Gator architecture is based on hot swappable Quad Interface Processor (QIP) boards (S-QIP for HVD SCSI, L-QIP for LVD SCSI, F-QIP for Fibre Channel and E-QIP for Ethernet). The heart of Gator architecture is a counter-balanced rack-and-pinion picker mechanism that can perform more than 600 tape handling operations per hour. Gator architecture includes Shared Library Services™ that allows users to allocate the library's resources across various platforms, software applications and tape drives. Gator architecture offers a color touchscreen user interface that provides access to status information, configuration parameters, and diagnostics.

## Option Enablement

Spectra Logic has added a new feature to the Spectra 12000 library called Option Enablement. Option Enablement allows the user to add several functions to their library:

**CoD™** is a capacity on demand system that allows you to add library storage capacity in increments as small as 15 slots, virtually instantaneously. Slots are key activated and can be purchased in advance or as needed. CoD allows you to efficiently manage your data growth, while eliminating the need for long-range forecasting and expensive retrofits.

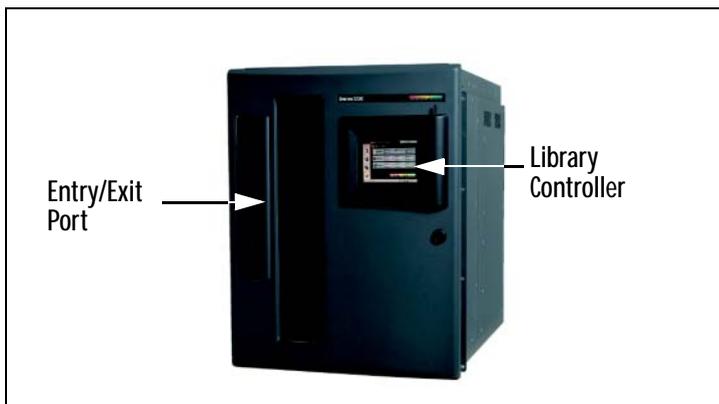
**NDMP Enabled by TAOS** in your library provides a simple and effective storage networking solution for the network attached storage (NAS) filer environment. In this solution, the NDMP (Network Data Management Protocol) feature enables shared backup and restore between multiple filers via your library, which can also be attached directly to the network. The need for dedicated hardware and shared storage software is eliminated, reducing risk and complexity, and lowering the total cost of ownership.

**Serverless Backup Enabled by TAOS** in your library shifts management of the backup and restore process from the server to the library. With this feature enabled, the library is able to communicate directly with other storage devices and can backup data from a disk device directly to tape. The server is no longer needed to manage the data input/output (I/O), therefore freeing up the central processing unit for other tasks. Additionally, now that there is one less device/step in the process, backup and restore performance is improved.

**Remote Library Controller (RLC)** allows for convenient, remote (off-site) access to your library. The Remote Library Controller can manage all library actions, including moving tapes, creating partitions, managing library inventory, monitoring drive and library status and performing configurations. In addition, feature modules, such as CoD and TAOS-enabled NDMP and Serverless Backup can be activated with the Remote Library Controller.

To add any of these functions to your library contact Spectra Logic Technical Support at (800) 227-4637. You will need to know the serial number of your device (as displayed in the Serial # field after tapping the Robotics bar) when you call. Or, go to the Spectra Logic Web site: <http://www.spectralogic.com>, for ordering information.

## A Tour of the Spectra 12000 Library



**Figure 1-1** *Spectra 12000 library, front view.*

The illustration of the front of the Spectra 12000 library (Figure 1-1) shows the Entry/Exit (E/E) ports, through which you can insert and remove cartridges individually or using cartridge packs. Each pack holds up to 15 cartridges at a time. The Library Controller (also called the Gator Control Panel) simplifies the library's use and maintenance.

## The Library Controller Stylus



**Figure 1-2** *The Library Controller stylus.*

**Stylus** Use the stylus to navigate the Library Controller. Touch the screen with the stylus to make a selection. The stylus is designed for safe use with the Library Controller touchscreen.

Store the stylus in the slot located on the top right-hand corner of the Library Controller.

---

**Caution:** Do not use metal objects to navigate the Library Controller. Metal objects may damage the screen.

---

# A Tour of the Library Controller

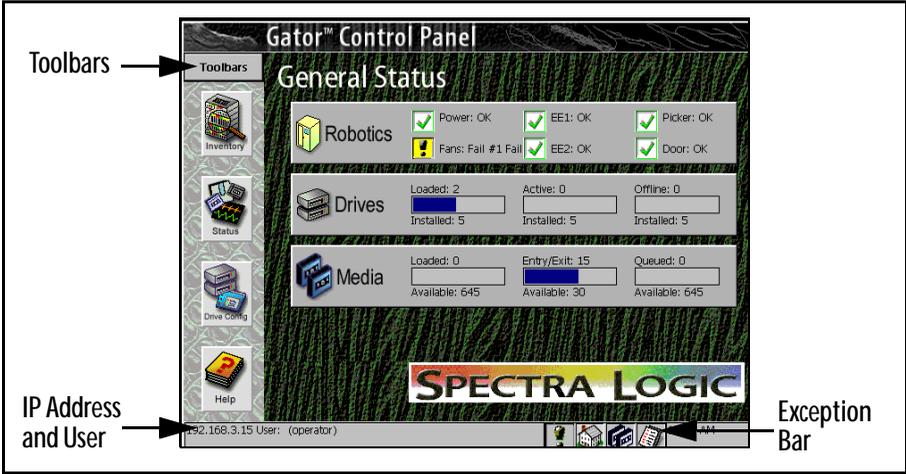


Figure 1-3 General Status screen.

## IP Address and User

The IP Address and User at the bottom of the Library Controller displays the library's IP address and the current user of the library.

## Exception Bar

The Exception Bar contains the Exception, Home, Inventory and Trace Log icons.

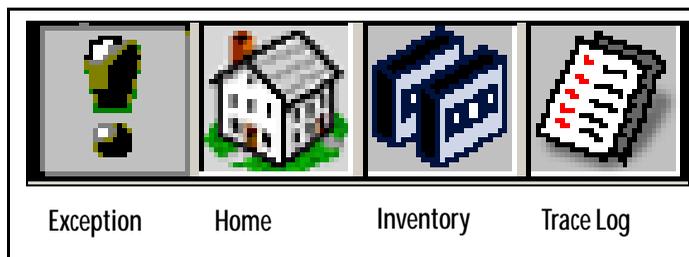


Figure 1-4 *Library Controller Exception Bar.*

**Exception** The Exception icon, a exclamation point, will appear with a yellow background only if the library experiences a problem. Tap the icon to bring up a window where you can view the problem.

**Home** Tap to return to the General Status screen.

**Inventory** Tap to go to the Inventory screen.

## Toolbars

The Library Controller has multiple toolbars; the General toolbar displays by default. To see the list of other toolbars, and to select one, tap **Toolbars**, then select from the pull-down menu.



Figure 1-5 *Toolbars pull-down menu.*

## General Toolbar

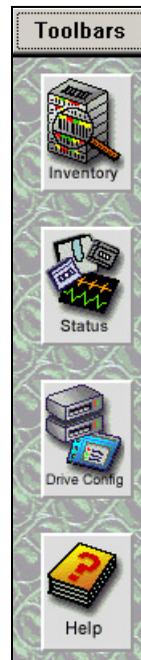
The General toolbar displays commonly used options, including:

**Inventory** Shows transport locations: Use this to move tapes between slots and drives. Select the **Inventory** icon to access logical libraries and slot inventory information.

**Status** Shows information about robotics, drives and media elements.

**Drive Config** Shows drive configuration information, and lets you configure drives. Drive information includes the emulation of the drive, the firmware level, and the SCSI ID assigned to each drive. Use this screen to remove drives or replace them in case of drive problems.

**Help** This button displays online help for the Library Controller.



**Figure 1-6**  
*General toolbar.*

## Configuration Toolbar

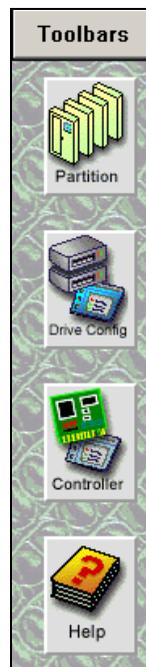
Use the Configuration toolbar to configure the library:

**Partition** Shows partition status. This lets you set up and alter library partitions, assign drives to each partition, assign the number of slots, and name the partition.

**Drive Config** Shows drive configuration information, and lets you configure drives. Drive information includes the emulation of the drive, the firmware level, and the SCSI ID assigned to each drive. Use this to remove drives or replace them in case of drive problems.

**Controller** This shows QIP information and lets you configure controllers.

**Help** This button displays online help for the Library Controller.



**Figure 1-7**  
*Configuration toolbar.*

## Maintenance Toolbar

Use the Maintenance toolbar to handle various library upkeep tasks, including:

**Diagnostics** Field service engineers use diagnostics to identify possible system problems and run tests.

**Update Firmware** Displays Firmware Update screen where you can update the front panel, front panel operating system, library robotics and controller firmware.

**Traces** The traces button is used to help diagnose library problems by tracking the library's activities.

**Help** This button displays online help for the Library Controller.



**Figure 1-8**  
*Maintenance toolbar.*

## Security Toolbar

Use the Security toolbar to handle various library upkeep tasks, including:

**Users** Use the Users button to access the security screen. This allows the user to set up different users with different levels of access and delete users.

**Switch Users** This button allows a new user to log on in place of the previous user.

**Help** This button displays online help for the Library Controller.



**Figure 1-9**  
*Security toolbar.*

## Getting Started

If your Spectra 12000 library is already installed and configured, review *Using the Spectra 12000 Library* on page 113.

To install and configure the Spectra 12000 library, read the chapters in this book in sequence, referring to the *Release Notes: Spectra 12000, Spectra 64000*, as directed.

On the back of the Spectra 12000 library, you'll find the On/Off switch, power cable socket, and the ports for SCSI, Fibre Channel, or Ethernet cables. The Spectra 12000 library holds up to two QIPs (Quad Interface Processors). Each QIP can support up to four drives.

---

**Note:** Spectra 12000 library QIPs and Drives are numbered from the bottom up. QIP #3, for example, would be the third QIP from the bottom.

---

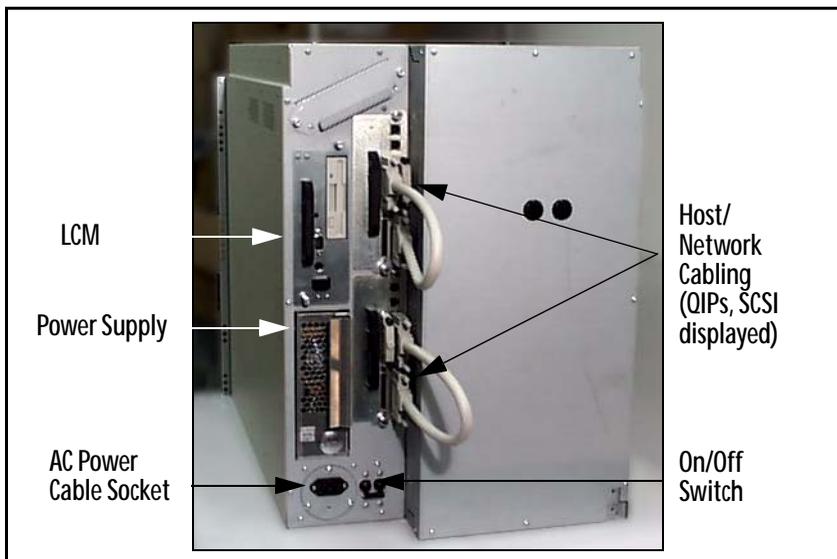


Figure 1-10 *Spectra 12000 library, rear view.*

**QIPs** Quad Interface Processors connect the library to a host using either Fibre Channel (F-QIPs), High Voltage Differential SCSI (S-QIPs), Low

Voltage Differential SCSI (L-QIPs), Ethernet (E-QIPs), or any combination of the above.

To check the status of the F-QIPs on the back of the QIP. In the upper right-hand corner of the F-QIP you can see two lights, labelled Fibre and QIP, corresponding to the Fibre processor and QIP processor. Both lights should be lit up green, indicating the processor's status as good.

**Library Control Module** The Library Control Module (LCM) is a multipurpose controller module with six primary functions. The six functions are to:

- ♦ Control the Entry/Exit Port.
- ♦ Issue diagnostics commands via the diagnostics menu.
- ♦ Control the front door locking solenoids.
- ♦ Run the Library Controller interface program and provide outputs to the main display/touch screen.
- ♦ Issue move commands.
- ♦ Interface with QIPs for the programming of logical libraries, drive configurations and controller configurations.

The LCM connects to the QIPs and robotics via the Controller Area Network (CAN) bus. CAN is a super-robust, low-noise bus technology. Spectra Logic's CAN bus eliminates a QIP as a single point of failure. If a single QIP fails, other QIPs can be configured to take over.

## 2 Installing the Spectra 12000 Library

This chapter reviews:

- ◆ Preparing a Controlled Environment
- ◆ Unpacking the Spectra 12000 Library
- ◆ Connecting the SCSI Cables and Terminators
- ◆ Connecting the Fibre Channel Cables
- ◆ Connecting the Ethernet Cables
- ◆ Turning the Library On and Off

## Preparing a Controlled Environment

### Media and Hardware Environment

When planning the Spectra 12000 library installation, note that the library, drives and media must be maintained in a controlled environment. Environmental extremes cause erratic operation and possible failures.

The Spectra 12000 library is typically mounted in a rack. Make sure the temperature in the rack does not exceed the maximum ambient operating temperature of the library and that the library is well ventilated with adequate air flow at all times.

Library operating specifications are:

- ◆ Temperature: +35°F to +86°F (+2°C to +30°C)
- ◆ Relative humidity: 20 percent to 80 percent (non-condensing)
- ◆ Maximum wet bulb temperature: +77°F (+25°C)

---

**Caution:** Before using any new media, expose media to the local operating environment for 24 hours. This lets the media adjust to the local temperature and humidity.

---

See *Specifications* on page 161 for additional information on the drives and media.

### Air Quality

Large quantities of airborne particles can cause erratic operation of the drives and library. The Spectra 12000 library comes with three intake air filters on the inside of the front door to reduce the airborne particulates in the library.

The table below shows the maximum amount of particulate contamination per cubic foot and cubic meter of air that the library's

filter can handle. If you exceed these limits, filter the air in the room in which the library is housed.

Particle Size (microns)	Number of Particles $\geq$ Particle Size per Cubic Meter	Number of Particles $\geq$ Particle Size per Cubic Foot
0.1	$8.8 \times 10^7$	$2.5 \times 10^6$
0.5	$3.5 \times 10^7$	$1.0 \times 10^6$
5.0	$2.5 \times 10^5$	$7.0 \times 10^3$

## Unpacking the Spectra 12000 Library

Use the *Spectra 12000 Installation and Unpacking Guide*, P.N. 90910884 to unpack and install the library.

---

**Caution:** The Spectra 12000 library is heavy. Use extreme caution when unpacking and lifting the library. You will need more than two people to position the library.

---

The Spectra 12000 library is shipped with the following items:

- ◆ *Spectra 12000 Installation and Unpacking Guide*
- ◆ *Release Notes: Spectra 12000, Spectra 64000.*
- ◆ *Spectra 12000 Library User Guide* (this guide).
- ◆ 15-slot cartridge pack, with cover.
- ◆ AC power cord.
- ◆ Front panel filter element.
- ◆ One or two Quad Interface Processors (QIPs) already installed for Fibre Channel, SCSI, Ethernet, or some combination; with two SCSI terminators per S-QIP or L-QIP.
- ◆ Optionally, up to eight drive sleds ordered with this library. Drives are boxed separately and shipped in the crate with the Spectra 12000 library. See *Adding Drives* on page 144 for more information.

## Connecting the SCSI Cables and Terminators

After you have placed the library carefully and prepared it for operation, you are ready to connect the Spectra 12000 library to the host bus.

There are four 68-pin micro-SCSI connectors per S-QIP or L-QIP on the rear panel to connect the library to the system SCSI buses. The SCSI connectors are labeled SCSI Port 1, IN and OUT; SCSI Port 2, IN and OUT.

To attach SCSI connections between the library and the host:

1. Put in the QIP controller cards, if they are not already installed. For more information on installing QIPs, refer to *Adding QIPs* on page 149.
2. Cable each host adapter to a unique bus on the QIP or daisy-chain it to the next bus.
3. Terminate each SCSI bus.

---

**Note:** All SCSI buses must be terminated at the output of the final SCSI device on the bus (see *SCSI Terminator Requirements* on page 160).

---

4. Connect the AC power cord supplied with the Spectra 12000 library to the AC connector on the rear of the library. Connect the other end to a 110V AC outlet.
5. Put in drive sleds, if they are not already installed. For more information on adding drives, refer to *Adding Drives* on page 144.
6. Go to *Turning the Library On and Off* on page 36 to power up the Spectra 12000 library.

## Connecting the Fibre Channel Cables

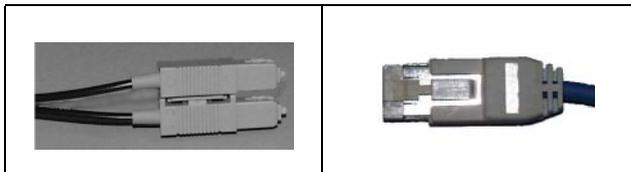


**Figure 2-1** *Spectra 12000 F-QIP in library.*

After you have placed the library carefully and prepared it for operation, you are ready to connect the Spectra 12000 library to the SAN.

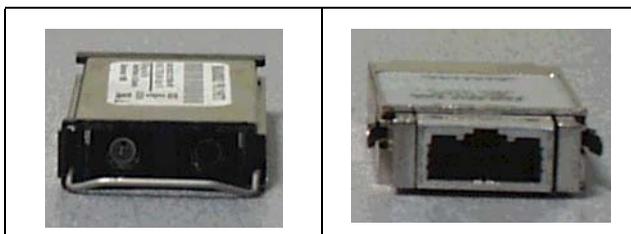
There are two Gigabit Interface Converter (GBIC) ports per F-QIP on the rear panel to connect the library to the host system. The GBIC ports are labeled **Fibre Chnl A** and **Fibre Chnl B**.

The Spectra 12000 library has one of two different kinds of GBICs, either optical with an SC connector or copper wire with an HSSDC serial connector as specified when ordered. The different GBIC types and corresponding cables and connectors are shown below. Contact your Spectra Logic representative for information about converting to a different GBIC type.



**Figure 2-2** *Optical cable for SC GBIC connector.*

**Figure 2-3** *Copper cable for HSSDC GBIC connector.*



**Figure 2-4** *SC GBIC connector.*

**Figure 2-5** *HSSDC GBIC connector.*

To attach the Fibre Channel cables:

1. Consult the documentation for your host operating systems and Fibre Channel adapter cards for information on adding new devices. In particular, look for details on creating and configuring device files or drivers, and whether your system must be restarted before using new devices.
2. Put in the QIP controller cards, if they are not already installed. For more information on installing QIPs, refer to *Adding QIPs* on page 149.
3. Insert the GBICs into the GBIC ports on your library (and in your host HBAs or switch ports, if necessary).
4. Insert the Fibre Channel cables into the GBIC ports according to your configuration and network diagram. Refer to *Partitioning the Spectra 12000 Library* on page 41.

5. Connect the AC power cord supplied with the Spectra 12000 library to the AC connector on the rear of the library. Connect the other end to a 110V AC outlet.
6. Put in the drive sleds, if they are not already installed. See *Adding Drives* on page 144 for more information.
7. Go to *Turning the Library On and Off* on page 36 to power up the Spectra 12000 library.

## Connecting the Ethernet Cables

After you have placed the library carefully and prepared it for operation, you are ready to connect the Spectra 12000 library to the SAN.

To attach Ethernet connection between the library and the network:

1. Put in the QIP controller cards, if they are not already installed. For more information on installing QIPs, refer to *Adding QIPs* on page 149.
2. Attach appropriate fibre optic cables to the Gigabit Ethernet Ports on the E-QIP.
3. Connect the AC power cord supplied with the Spectra 12000 library to the AC connector on the rear of the library. Connect the other end to a 110V AC outlet.
4. Put in drive sleds, if they are not already installed. For more information on adding drives, refer to *Adding Drives* on page 144.
5. Go to *Turning the Library On and Off* on page 36 to power up the Spectra 12000 library.

## Turning the Library On and Off

The Spectra 12000 library power switch is in the lower, left corner of the library's rear panel (Figure 2-6).

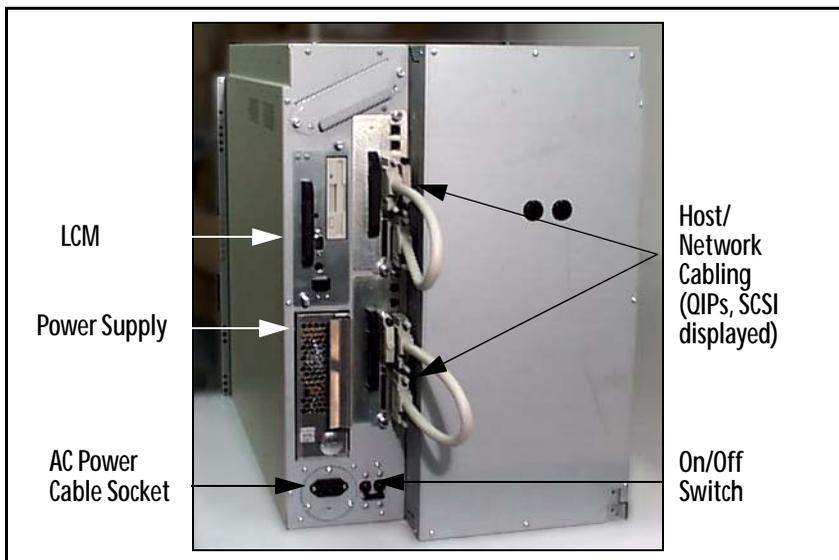


Figure 2-6 Spectra 12000 library, rear view.

## 3 Using Security

Before you begin to configure your library, you should set up the security feature of the Spectra 12000 library.

The Spectra 12000 library has a security feature that allows for three types of users:

- ♦ Super User—A Super User is allowed ultimate control of the library and controls who has access to the library.
- ♦ Administrator—An Administrator is allowed control of the library, but cannot control who has access to the library.
- ♦ Operator—An Operator is allowed only limited access to the library. The Operator can move, remove and add inventory via the Entry/Exit port, but is denied access to more sensitive areas of the library, such as configuration and diagnostics.

### Setting Up Security

Before you set up security, determine who is going to be allowed access to the library, and what level of security that user will have.

#### To Set Up a User

1. On the Library Controller, tap **Toolbars** and then tap **Security**. The Security toolbar displays.

2. Tap **Users**, to display the Security screen (Figure 3-1).



Figure 3-1 *The Security screen.*

3. Select the type of user you want to create in the Group Permissions box.
4. Tap the white text box next to User Name to display the virtual keyboard.
5. Type whatever name you would like to use for the user on the virtual keyboard and then tap **OK**. The name will appear in the User Name box.
6. Using the virtual keyboard, type a password for the user.

---

**Note:** Take care when selecting a password, make a note of it and keep it in a safe place.

---

7. Tap the **Add/Edit User** arrow, the confirmation window will confirm that your security settings have been saved (Figure 3-2). Tap **OK**



**Figure 3-2** *The confirmation window.*

---

**Note:** If this is the first time using your library, you should delete the default Super User (SU) from your library before continuing.

---

## To Delete a User

1. Tap the user name in the Supported Users box to select it.
2. Tap **Delete User**.

---

**Note:** You cannot delete the last Super User listed in the Supported Users box.

---



## 4 Partitioning the Spectra 12000 Library

This chapter includes:

- ◆ Displaying the Configuration Toolbar
- ◆ Partitioning the Library

## Displaying the Configuration Toolbar

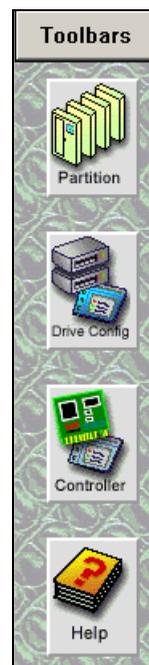
The Library Controller lets you configure the library through the Configuration toolbar. This toolbar provides buttons you can use to configure all aspects of the library:

- ◆ Partitioning the physical library into logical libraries.
- ◆ Configuring drives.
- ◆ Configuring QIPs.

The Library Controller also provides online help for each of the configuration tasks.

To display the Configuration toolbar:

- ◆ Using your finger or a stylus, tap the **Toolbars** button on the Library Controller.
- ◆ Select the **Configuration** toolbar. The following buttons display (Figure 4-1).



**Figure 4-1**  
*Configuration toolbar.*

## Partitioning the Library

The Spectra 12000 library provides Shared Library Services (SLS). You may partition the library so that it performs and looks like more than one partition up to a total of four partitions. Each library can be dedicated for a specific host or application. You always need to set up partitioning on a new library, even if you are using only one partition.

To create a partition on a new library, you will have to unassign slots from the default partition. You must have at least one unassigned set of 15 slots and one unassigned drive to create a new partition. To do this use the following steps.

To set up partitioning:

1. On the Library Controller, tap **Toolbars**, then tap **Configuration**. The Configuration toolbar displays.
2. Tap the **Partition** icon on the Configuration toolbar.
3. The Shared Library Services screen displays a button for the entire library and a button for each configured partition (Figure 4-2).

---

**Note:** On a new library you will see an All Partitions bar and a Library 1 bar.

---

- You can partition the library by editing the default partition (Library 1), and/or creating a new partition.

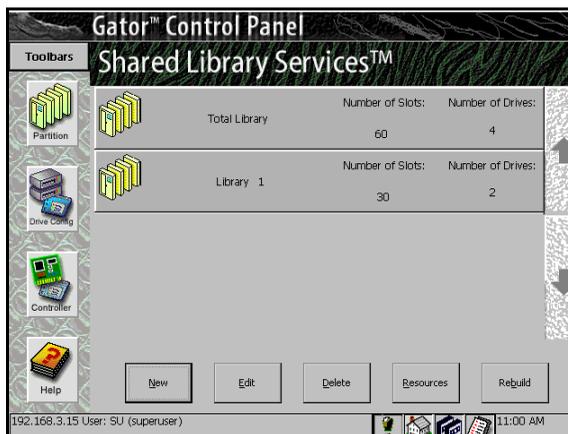


Figure 4-2 Shared Library Services screen.

- To create a new partition, tap **New**. To edit an existing partition, select the library and tap **Edit**. This displays the Edit Partition Configuration window (Figure 4-3).

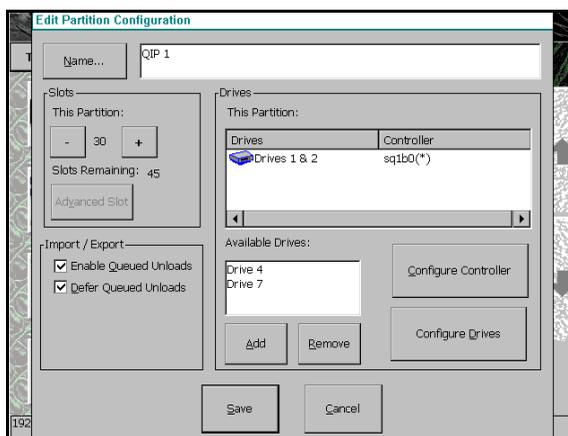


Figure 4-3 Edit Partition Configuration window.

6. Create or edit a partition using this window.

**Name...** Tap the **Name...** button and enter the name in the keyboard dialog.

**Slots** Tap the +/- buttons to add/remove slots in increments of 15. As you add or remove slots, the number of slots in the partition will appear between the +/- buttons, while the Slots Remaining field displays the number of unassigned slots available. When creating multiple partitions, make sure you have enough unassigned slots remaining for other partitions you may be creating.

**Drives** Displays the drives in the partition listed.

**Add** To add a drive, select a drive or pair of drives from the Available Drives Window and tap **Add**. The drive or drives will move to the **This Partition** box and the assigned controller bus will move to the controller list.

**Remove** To remove a drive or pair of drives, select the drive from the list in the **This Partition** box and tap **Remove**. The drive(s) will move to the available list and the bus will be removed from the controller list.

---

**Note:** All drives on a bus must be allocated to the same partition, but all drive locations do not need to be populated.

A controller configured to export a library shows an asterisk next to it. Only one controller in each partition can be configured to export a library.

---

**Enable Queued Unloads and Defer Queued Unloads** We strongly recommend you leave both of these checked.

- ◆ When **Enable Queued Unloads** is checked, your library responds immediately to the host software that an eject was successful. The front panel then moves the “queued” tapes to the E/E port as slots become available.

If all E/E port slots are full, the tapes are marked as having been logically ejected, and it will be reported to the software that they have been ejected. They will then be physically ejected as E/E slots

become available. This is different when **Defer Queued Unloads** is checked.

- ◆ When **Defer Queued Unloads** is checked, the library waits until you have tapped the **Eject Queued Tapes** in the Inventory screen before moving the cartridges you have ejected to the E/E port. Queued ejects allow the library to share the E/E resource and also allow the host software to eject more tapes than a single E/E pack holds.
7. Tap **Save** to save the changes you have made, or **Cancel** to exit without saving any changes.

Now that the partition has been created, proceed to the appropriate chapter for the controller (QIPs) you have assigned to the new partition.

- ◆ To configure the Spectra 12000 S-QIP, go to *Configuring the Spectra 12000 S-QIP* on page 47. You will then need to configure any drives assigned in *Configuring the Drives* on page 107.
- ◆ To configure the Spectra 12000 F-QIP, go to *Configuring the Spectra 12000 Library F-QIP* on page 55. You will then need to configure any drives assigned in *Configuring the Drives* on page 107.
- ◆ To configure the Spectra 12000 E-QIP, go to *Configuring the Spectra 12000 E-QIP* on page 65. You will then need to configure any drives assigned in *Configuring the Drives* on page 107.

## 5 Configuring the Spectra 12000 S-QIP

This chapter includes:

- ◆ Displaying the Configuration Toolbar
- ◆ Configuring S-QIPs
- ◆ S-QIP Configure Controller Screen

## Displaying the Configuration Toolbar

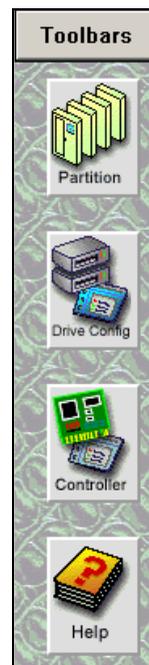
The Library Controller lets you configure the library through the Configuration toolbar. This toolbar provides buttons you can use to configure all aspects of the library:

- ◆ Partitioning the physical library into libraries.
- ◆ Configuring drives.
- ◆ Configuring library QIPs.

The Library Controller also provides online help for each of the configuration tasks.

To display the Configuration toolbar:

- ◆ Using your finger or a stylus, tap the **Toolbars** button on the Library Controller.
- ◆ Select the **Configuration** toolbar (Figure 5-1).



**Figure 5-1**  
*Configuration toolbar.*

## Configuring S-QIPs

The Library Controller allows the user to configure SCSI controllers (S-QIPs) in a number of ways. To configure S-QIPs:

1. From the Configuration toolbar, select the **Partitions** icon. This brings up the Shared Library Services screen.

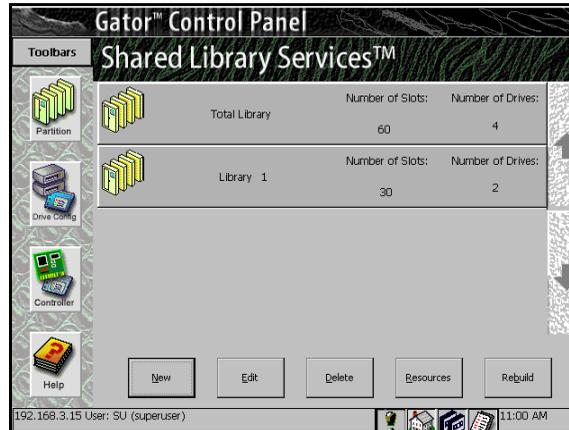


Figure 5-2 *The Shared Library Services screen.*

2. Select the partition with the controller you want to configure.

3. Tap **Edit**. The Edit Partition Configuration window appears (Figure 5-3).

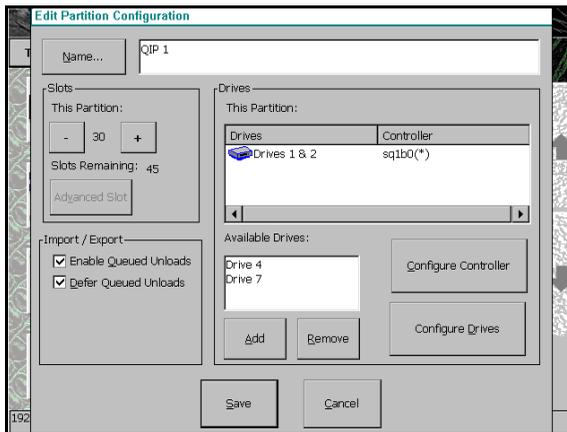


Figure 5-3 *Edit Partition Configuration window.*

4. In the Drives section, select the controller you would like to configure by tapping the drive it is connected to. Tap **Configure Controller**. This brings up the Configure Controller window (Figure 5-4).

## S-QIP Configure Controller Screen

### S-QIP Default ID Settings

---

**Note:** Each S-QIP bus must have an ID unique to that bus. This allows the S-QIP to initiate commands to the drive.

---

Each S-QIP uses two SCSI busses, and each bus must have a SCSI ID unique to that SCSI bus.

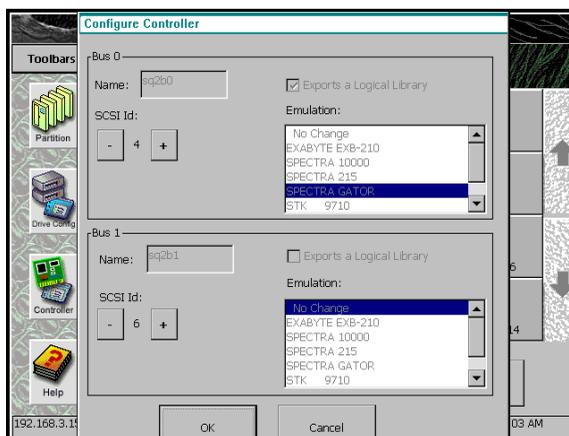


Figure 5-4 *The Configure Controller window.*

In the Configure Controller window, you can implement the following options.

**Name** The assigned bus name displays here.

**SCSI ID** Use the +/- buttons to set SCSI ID of the controller.

**Exports a Logical Library** Check here to configure this S-QIP as having robotic control for a logical library.

---

**Note:** When configuring the Spectra 12000 library as one logical library, one bus on any QIP must have the option Exports a Logical Library enabled to provide the robotics control interface to a host. The Exports a Logical Library check box indicates that this bus is the one that will be assigned to control robotics

When partitioning the Spectra 12000 library into more than one logical library, each of the partitions must have one QIP bus export a logical library for robotics interface. The bus which exports a library must also be configured so that the QIP SCSI ID is unique from all drives on the QIP bus, and any device on the host bus it is attached to.

---

**Emulation** Select an identity you want the library to emulate here. Recommended only if software does not have native support.

You can also use the Controller Configuration screen to configure the QIPs. To do this, tap **Controllers** on the Configuration Toolbar. This opens the Controller Configuration screen (Figure 5-5).



Figure 5-5 Controller Configuration screen.

The Controller Configuration screen displays the following information:

- ◆ Controllers detected by the library.
- ◆ Bus on which the controller resides, and the controller's SCSI ID.
- ◆ Buttons allowing you to scroll through more controllers.
- ◆ Buttons you can use to configure and replace the controllers. (To configure a controller, select the controller and tap **Configure**.)

Go to *Configuring the Drives* on page 107 to complete the configuration procedure.



## 6 Configuring the Spectra 12000 Library F-QIP

This chapter includes:

- ◆ Displaying the Configuration Toolbar
- ◆ Configuring F-QIPs
- ◆ F-QIP Configure Controller Screen
- ◆ About Serverless Backup
- ◆ Configuring the F-QIP for Serverless Backup

## Displaying the Configuration Toolbar

The Library Controller lets you configure the library through the Configuration toolbar. This toolbar provides buttons you can use to configure all aspects of the library:

- ◆ Partitioning the physical library into logical libraries.
- ◆ Configuring drives.
- ◆ Configuring library QIPs.

The Library Controller also provides online help for each of the configuration tasks.

To display the Configuration toolbar:

- ◆ Using the stylus, tap the **Toolbars** button on the Library Controller.
- ◆ Select the **Configuration** toolbar (Figure 6-1).

## Configuring F-QIPs

The Library Controller allows the user to configure Fibre Channel controllers (F-QIPs) in a number of ways. To configure F-QIPs:

1. Go to the Library Controller. Select the **Toolbars** drop down menu and select the **Configuration**.

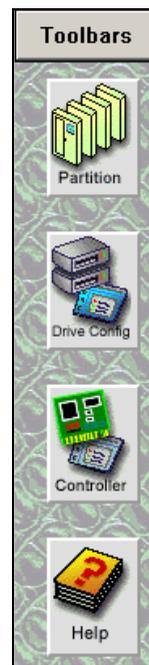


Figure 6-1  
Configuration  
toolbar.

- From Configuration toolbar, select the **Partitions** icon. This brings up the Shared Library Services screen.

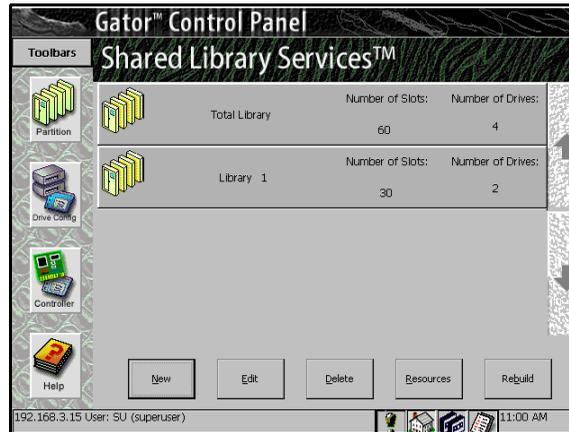


Figure 6-2 Shared Library Services screen.

- Select the partition that contains the controller you want to configure.
- Tap **Edit**. The Edit Partition Configuration window appears (Figure 6-3).

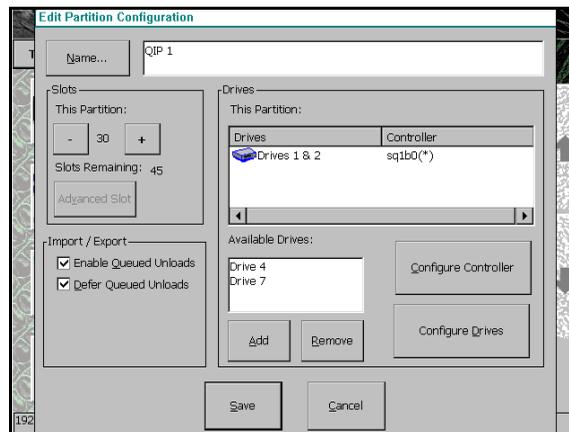


Figure 6-3 Edit Partition Configuration window.

5. In the Drives window, select the controller you want to configure by tapping the drive it is connected to.
6. Tap **Configure Controller**. This brings up the Controller Configuration window.

## F-QIP Configure Controller Screen

In the F-QIP Configure Controller window (Figure 6-4), you can implement the following options.

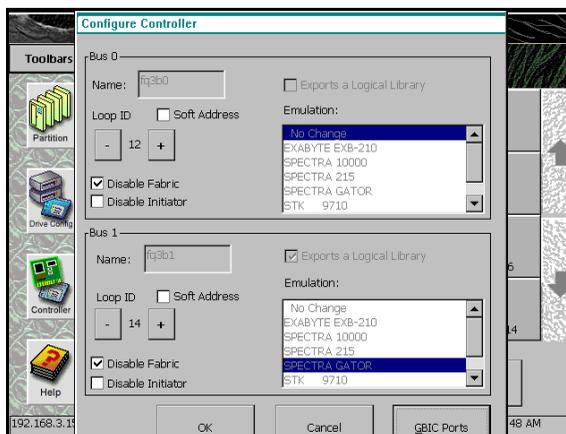


Figure 6-4 F-QIP Configure Controller window.

**Name** The assigned bus name displays here.

**Loop ID/ Soft Address** Soft Address enabled is the default. Otherwise, disable Soft Address and use the +/- buttons to configure desired Hard Address. Soft Address enabled is the default.

**Soft and Hard Addresses** When a Fibre Channel loop initializes, it tries to assign requested ID numbers to devices that use hard addresses. It then dynamically assigns soft addresses to other devices from remaining available numbers. Each device must have a unique address on the loop

ID from 0 to 125. Conflicts arise if two devices try to use the same loop ID, or if more than 126 devices and hosts are connected to the loop.

When the library's address type is set to "soft," the library's loop ID is assigned dynamically whenever the Fibre Channel loop is initialized. When the library's address type is set to "hard," the library always requests the loop ID number you specify in the Configuration screen. If you assign a hard address to the library, make sure no other device on the loop uses the same hard address. If two devices on the same loop have hard addresses set to the same number, only one of the two devices will be accessible. Setting the library address type to "soft" avoids duplication of addresses, but the library address is subject to change any time the Fibre Channel loop initializes.

*A hard address is recommended.*

**Disable Fabric** Select this box to have the F-QIP switch login as a loop ID instead of on fabric.

**Disable Initiator** Check to disable the F-QIP as an initiator on the Loop or Fabric Switch. Initiator disabled is the default. Unless you are absolutely sure you have an environment that supports multi-initiators, you must disable the F-QIP as initiator. If you don't, this could cause conflicts on the loop.

**Exports a Logical Library** Check here to configure a bus on the F-QIP to export a logical library.

---

**Note:** When configuring the Spectra 12000 library as one logical library, one bus on any QIP must have the option Exports a Logical Library enabled to provide the robotics control interface to a host. The Exports a Logical Library check box indicates that this bus is the one that will be assigned to control robotics

When partitioning the Spectra 12000 library into more than one logical library, each of the partitions must have one QIP bus export a logical library for robotics interface.

---

**Emulation** Select an identity you want the library to emulate. This is recommended only if software does not have native support.

GBIC Ports Tap **GBIC Ports** to configure the GBIC ports. The Configure GBIC Ports window appears (Figure 6-5).

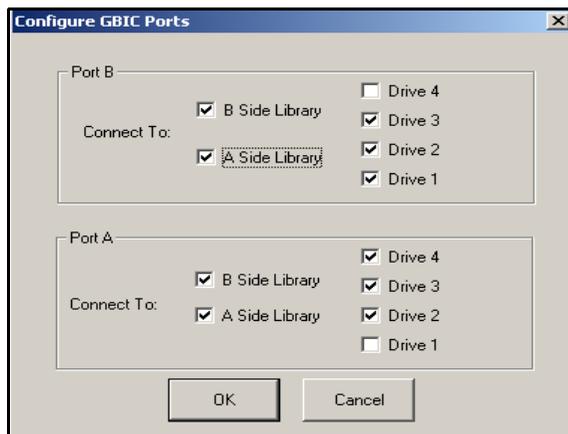


Figure 6-5 Controller GBIC Ports window.

This determines which drives and libraries are available from each GBIC. Side A includes Library 1 and you can assign any or all of the four available drives by checking them. Side B includes Library 2 and you can assign any drives you have not assigned to Side A by checking them. Or, for redundancy and failover, you can check both sides to see all drives.

If multiple hosts are configured to access an overlapping set of drives, access to those drives must be restricted/managed through the backup software.

## About Serverless Backup

Serverless Backup is sometimes referred to as Third Party Copy or Extended Copy (Xcopy). Serverless Backup is a backup architecture in which data flows directly from one storage device to another, bypassing the server. Serverless Backup is made possible when storage devices support the Xcopy commands as specified in the SCSI protocol. The Xcopy command set allows a device to read blocks of data from another compliant device. In a Serverless backup environment the Spectra Logic library reads data from the disk device and writes it directly to tape.

This backup process requires a backup application that has Xcopy functionality. Serverless backups are normally performed in Storage Networking environments since data can be shared by multiple hosts or initiators. The backup application is responsible for determining which blocks on the disk get backed up to tape.

## Configuring the F-QIP for Serverless Backup

Setup of Serverless Backup requires the following steps:

- ◆ Enabling Serverless Backup.
- ◆ Serverless Backup F-QIP Setup.

## Enabling Serverless Backup

1. From the General Status screen, tap **Robotics**. The System Setup screen appears.

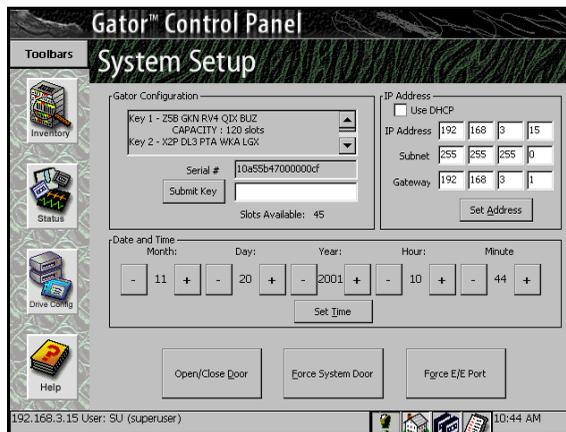


Figure 6-6 The System Setup screen.

2. To enable Serverless Backup, you will need to obtain an activation key from Spectra Logic. Contact Spectra Logic with the serial number of the device, as displayed in the Serial # field, to obtain the activation key.
3. Tap the blank field to the right of **Submit Key**.
4. A virtual keyboard appears. Enter the key.
5. Tap **OK** on the virtual keyboard.
6. Tap **Submit Key**.

## Serverless Backup F-QIP Setup

To use Serverless Backup the F-QIP must be configured as an initiator/target. To enable this mode you will need to uncheck the Disable Initiator box in the Edit F-QIP Configuration menu on the Library Controller.

1. Open the Configuration toolbar and tap **Controller**. The Configure Controller screen appears
2. Select the F-QIP you want to enable Serverless Backup on. The Configure Controller window appears

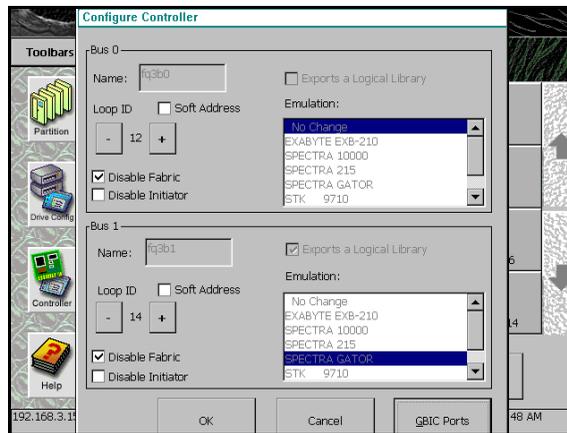


Figure 6-7 The Configure Controller window.

3. Tap the box next to Disable Initiator to uncheck it.  
Go to *Configuring the Drives* on page 107 to complete the configuration procedure.



# 7 Configuring the Spectra 12000 E-QIP

This chapter includes:

- ◆ About TAOS™
- ◆ TAOS User Interfaces
- ◆ Connecting to the Serial Port
- ◆ Setting Up the E-QIP
- ◆ Setting Up TAOS ITP
- ◆ Setting Up NDMP Enabled by TAOS

## About TAOS™

The Spectra Logic TAOS operating system architecture is an innovative approach to sharing tape backup resources among hosts. The TAOS enabled Spectra 12000 E-QIP has an ethernet interface and the ability to enable one of two components: TAOS ITP or TAOS NDMP.

### TAOS ITP

TAOS Internet Tape Protocol (ITP) is enabled on every TAOS enabled E-QIP shipped from the factory. TAOS ITP is used by installing ITP drivers on all hosts that require access to the library. Once the ITP drivers are installed and configured the host sees the E-QIP as a locally attached SCSI device. All applications that work with your existing SCSI devices will work seamlessly with all TAOS enabled devices.

When an application runs, SCSI commands are issued to the ITP driver—a virtual SCSI HBA. These SCSI commands are converted to IP packets by the ITP driver, sent across the network to the E-QIP, then re-assembled into SCSI commands before being sent to the drives.

### NDMP Enabled by TAOS

TAOS Network Data Management Protocol (NDMP) is an optional feature that can be purchased and enabled with an activation key. TAOS NDMP includes an NDMP agent built directly into the E-QIP, so that Network-Attached Storage (NAS) devices that support NDMP can talk directly to the library across the network.

Typically, a backup application host will initiate a backup job and instruct the NAS file system and the library to get ready. They are then instructed to talk to each other to complete the backup. Metadata and management commands may involve the backup server, but the bulk of the data—the information being read/written to tape—passes directly from the NAS device to the tape drives, without detouring through the backup server.

The E-QIP supports versions 2 and 3 of NDMP.

## Sharing Tape Devices

TAOS ITP and TAOS NDMP both allow a set of tape resources to be shared between multiple hosts. Care must be taken to ensure that multiple requests are not being sent to same tape drive at the same time.

With TAOS NDMP, there is typically a backup application server that manages access to the tape drives. Even though multiple NAS devices can access the tape device directly these requests are routed through a single backup server. This server, then, is responsible for managing access to the drives. As long as the devices and NAS clients are configured properly in the software, resource contention is eliminated. Access to TAOS NDMP functionality is also password protected--any NAS host wishing to write to the Spectra 12000 library must authenticate themselves with the correct username and password. This is also generally set up in the backup software.

With TAOS ITP, there may be many backup applications on many hosts, all responsible for managing their own access to the tape drives, and as the E-QIP looks like a locally attached resource to each configured host, each host has no idea that other hosts also have access. There are three ways to manage resource contention with TAOS ITP. First, the E-QIP will only be visible to hosts where the TAOS ITP driver has been installed. Second, the TAOS ITP configuration utilities in the E-QIP allow you to configure IP address ranges of hosts that can access the library. Finally, devices can be locked during use by going through one of the available configuration interfaces. When a device has been locked, no other host can gain access to the drive until it is unlocked.

In any case, if multiple hosts will be accessing the library, some access management scheme must be implemented to prevent stored data written by one host from being overwritten by another.

## TAOS User Interfaces

There are two user interfaces available to access and change TAOS options: a serial port interface and a TAOS ITP control panel (available on Windows systems only). The serial interface is the only way to set the Ethernet configuration of the library, however, once the Ethernet parameters have been set and the unit is connected to your network, the TAOS ITP control panel can be used to view settings.

This chapter will guide you through the installation process for TAOS ITP and TAOS NDMP, using both interfaces. Both are described in further detail in the appendices.

## Connecting to the Serial Port

Connect a serial cable to the E-QIP diagnostic port, labeled **DIAG 1**, with a serial port terminal emulation application like HyperTerminal running on a host computer. The serial port settings are as follows:



Figure 7-1 Serial port settings.

- ◆ Bits per second (BAUD): 115200
- ◆ Data bits: 8
- ◆ Parity: None
- ◆ Stop bits: 1
- ◆ Flow control: None

The TAOS Configuration menu displays:

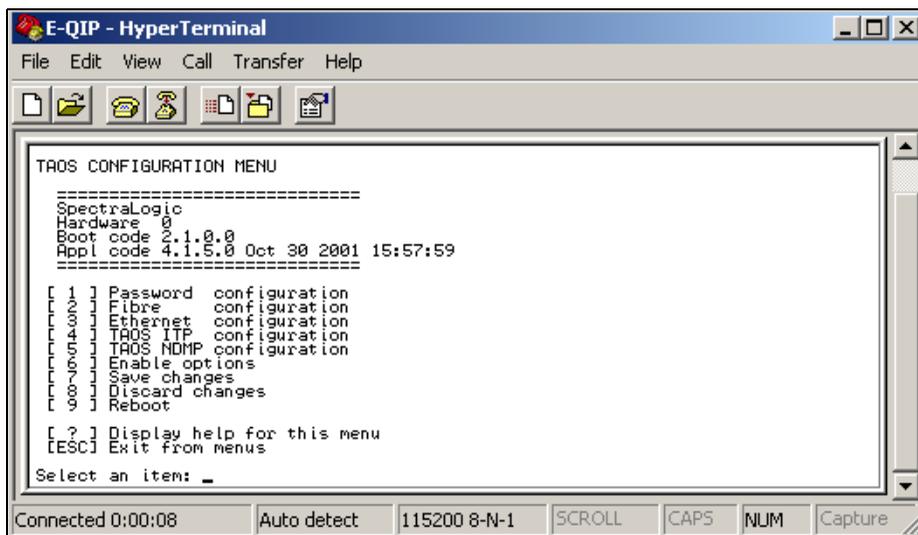


Figure 7-2 The TAOS Configuration menu.

## Setting Up the E-QIP

### Password Configuration

As shipped, the serial port configuration menu is not password protected. To prevent unauthorized users from changing the E-QIP's

configuration settings, you should enable a password. To launch the Password Configuration menu, select 1.

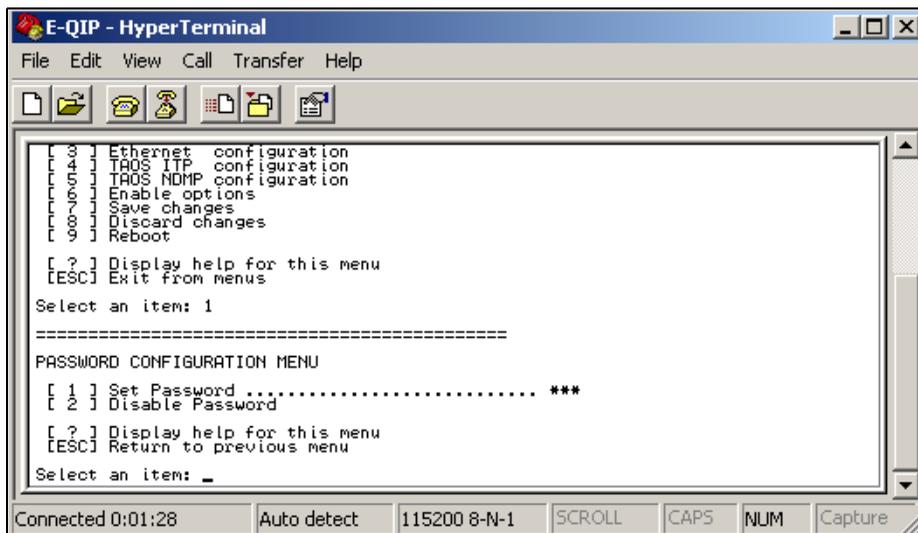


Figure 7-3 *The Password Configuration menu.*

**[1] Set Password:** Select to set or change the password. If changing the password, you will be prompted to enter your password, then prompted to enter it again. When a password is set, it will need to be entered to make any subsequent configuration changes to the unit.

**[2] Disable Password:** Select to disable your password.

**[?] Help:** Displays help for this menu.

**[Esc] Return to Main Menu:** Returns you to the main menu.

## Ethernet Configuration

By default the E-QIP is shipped with an IP address of 10.0.0.254 and a hostname specific to the unit's serial number. You will need to change

these to values appropriate to your site before attaching the E-QIP to your network. To launch the Ethernet Configuration menu, select 3.

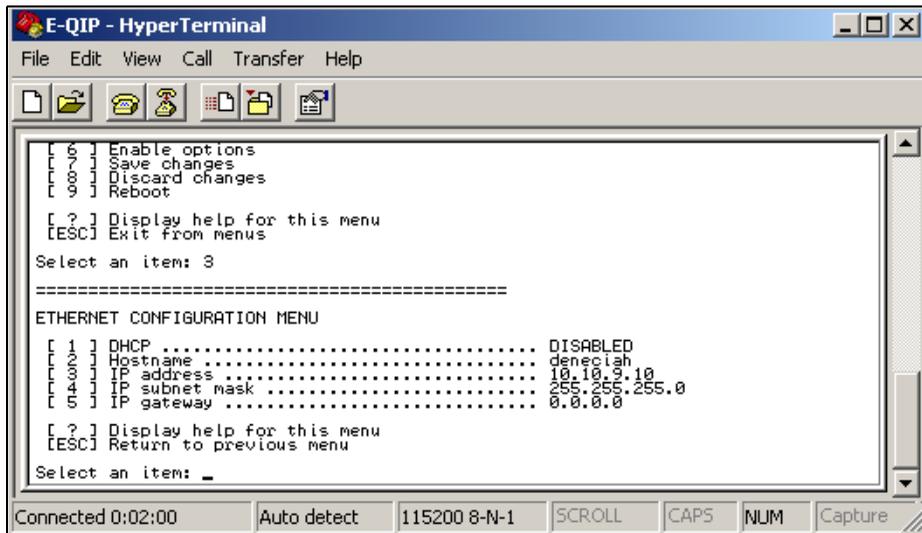


Figure 7-4 *The Ethernet Configuration menu.*

To configure the ethernet port, use the following commands:

**[1] DHCP:** Either enabled or disabled. Make sure to provide a hostname when DHCP is enabled; it is necessary to provide system identification to the DHCP host. If DHCP is disabled, you must provide a static IP address.

---

**Note:** DHCP is supported for use only with TAOS ITP at this time. If you will be using TAOS NDMP you will need to assign a static IP address to the library.

---

**[2] Hostname:** The name for the IP interface. This is used by DHCP, DNS and other communications for name resolution. The hostname should be less than 12 characters to support DHCP and DNS naming conventions.

**[3] IP address:** Standard IP address. This field is not available while in DHCP mode.

[4] IP subnet mask: IP network mask (standard IP parameter).

[5] IP gateway: Gateway address (standard IP parameter).

[?] Help: Displays help for this menu.

[Esc] Returns you to the main menu

## Setting Up TAOS ITP

### TAOS ITP Configuration

As shipped, the E-QIP can be accessed by any host on the network that can see its IP address. Setting up ITP protocol security lets you limit access to the unit by filtering IP address ranges. To launch the ITP Configuration menu, select 4.

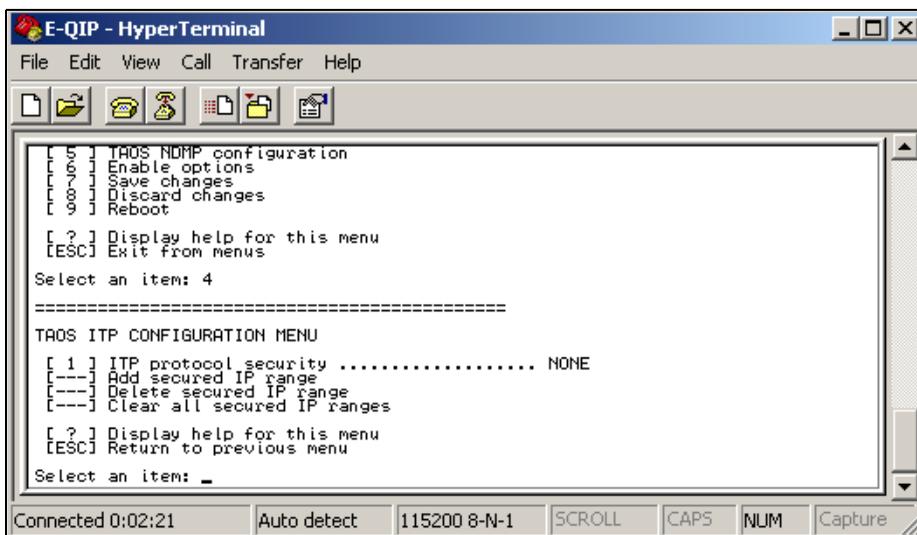


Figure 7-5 The ITP Configuration menu.

[1] ITP security: Select to set ITP security so that only those hosts in specified IP ranges can read/write to the E-QIP.

[2] **Add secured IP range:** If you have set ITP security, use this option to add a secured IP range. If security is turned on, the E-QIP will only respond to hosts in the secured IP address range(s).

[3] **Delete secured IP range:** Use this option to delete a secured IP range.

[4] **Clear all secured IP ranges:** Use this to clear all IP ranges you have secured.

[?] **Help:** Displays help for this menu.

[Esc] Returns you to the main menu

## TAOS ITP Driver Installation

---

**Note:** Operating system information is documented in the following chapters. This information is provided only as a convenience; refer to your operating system for the most current information. If your operating system is not included in this guide, use the installation instructions provided in their documentation.

---

- ♦ To install TAOS ITP on Windows NT, turn to *Installing TAOS ITP on Windows NT* on page 74.
- ♦ To install TAOS ITP on Windows 2000, turn to *Installing TAOS ITP on Windows 2000* on page 81.
- ♦ To install TAOS ITP on Solaris, turn to *Installing TAOS ITP on Solaris* on page 96.
- ♦ To install TAOS ITP on Linux, turn to *Installing TAOS ITP on Linux* on page 98.

## Installing TAOS ITP on Windows NT

To install TAOS ITP on Windows NT:

1. Insert the TAOS ITP disk into your CD-ROM drive and browse to the NT folder on your CD-ROM drive.
2. Double-click on setup to start the InstallShield Wizard.
3. The InstallShield Wizard appears. Click **Next** (Figure 7-6).



Figure 7-6 The InstallShield Wizard window, click Next.

4. Read the License Agreement. If you accept the terms of agreement, check the box labeled **I accept the terms in the license agreement** and click **Next**. (Figure 7-7)

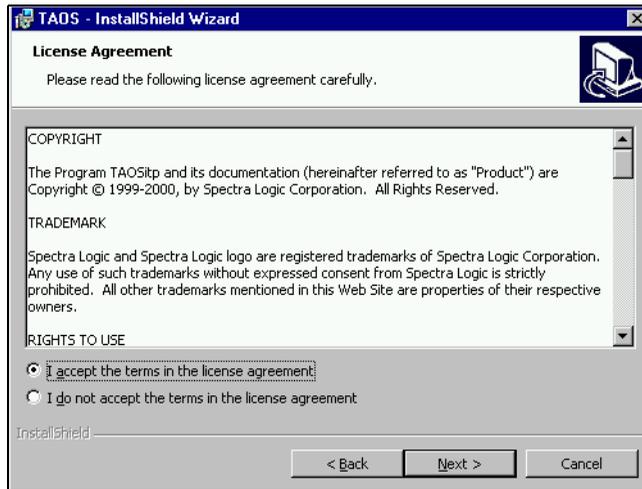


Figure 7-7 The TAOS ITP License Agreement, click Next.

---

**Note:** You must accept the terms of the License Agreement to continue with the installation. You will not be able to click **Next** until you have accepted the terms of the license agreement.

---

5. Click **Next** to install to C:\Program Files\Spectra Logic\TAOS\. Click **Change** to install to a different destination (Figure 7-8).

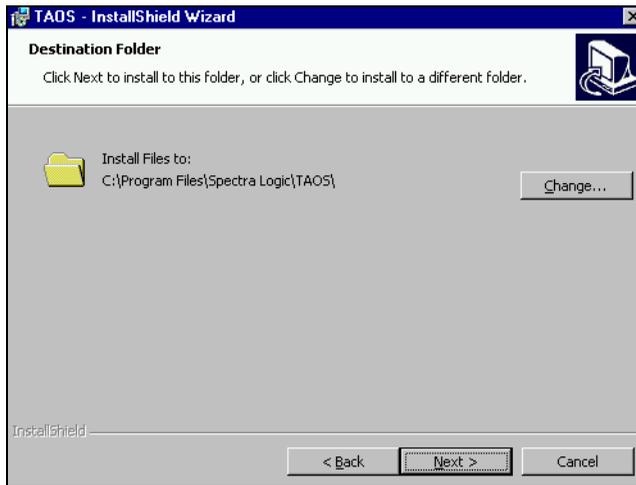
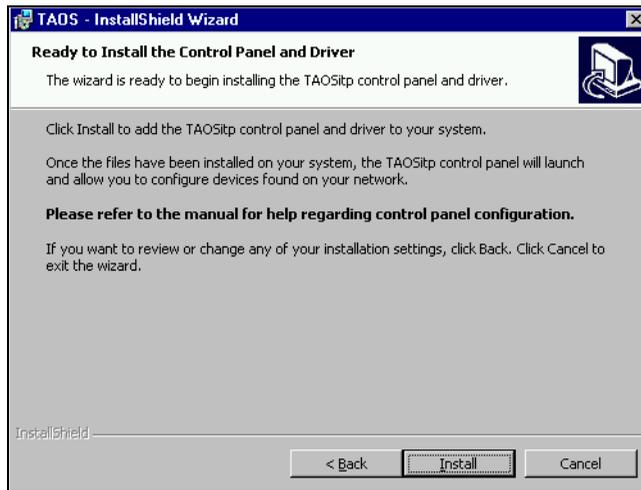


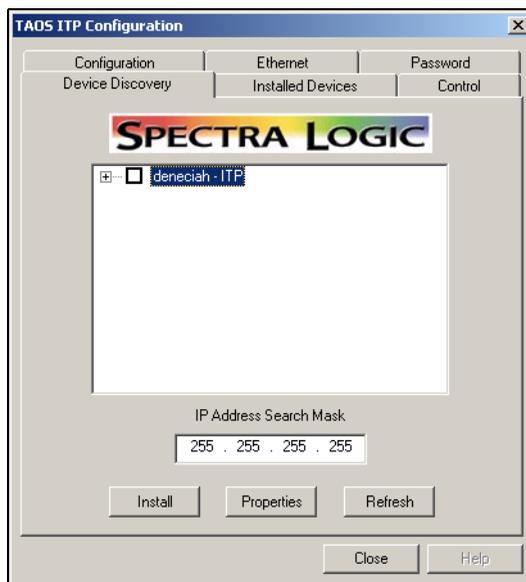
Figure 7-8 *The Destination folder window.*

6. Click **Install** to install the TAOS ITP control panel and driver. Click **Back** to review or change installation settings (Figure 7-9).



**Figure 7-9** *The Install the Control Panel and Driver Window, click Install.*

## 7. The TAOS ITP Configuration window appears (Figure 7-10).



**Figure 7-10** *Device Discovery on the TAOS ITP Configuration control panel.*

---

**Note:** Your library host name will appear instead of deneciah.

---

As long as your Windows NT system and TAOS enabled device are on the same subnet system, the TAOS enabled device will be listed on the Device Discovery window. If your TAOS enabled device is not listed, check your Ethernet connections and click **Refresh**.

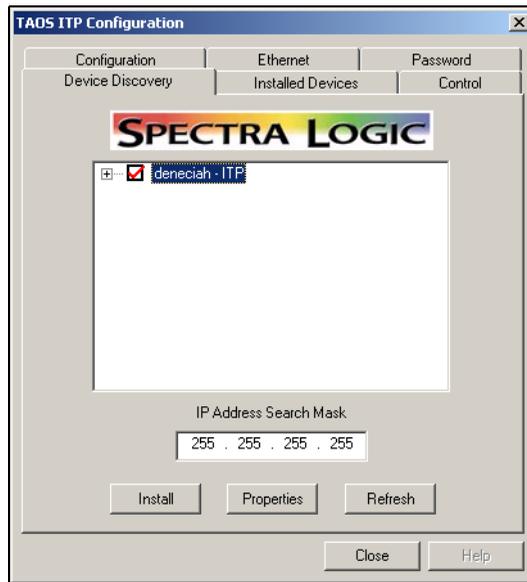
---

**Note:** Each TAOS enabled E-QIP is shipped with a default IP address of 10.0.0.254. If you have not previously changed the IP address of the unit to something unique for your site, you may be unable to see the unit due to an IP address conflict.

---

Once all devices are displayed, continue to Step 8.

8. click on the square box next to the TAOS enabled device to check-mark each TAOS enabled device you want installed (Figure 7-11).



**Figure 7-11** *Device Discovery on the TAOS ITP Configuration control panel, with the device selected.*

9. Click on the + symbol to display all the devices located within the TAOS enabled device and verify all devices are checked.
10. Press **Install**.
11. A dialog box displays, reading Installation Complete. Click **OK**.
12. Click **Close** to close the TAOS ITP Configuration window.

13. Click **Finish** to complete the installation (Figure 7-12).

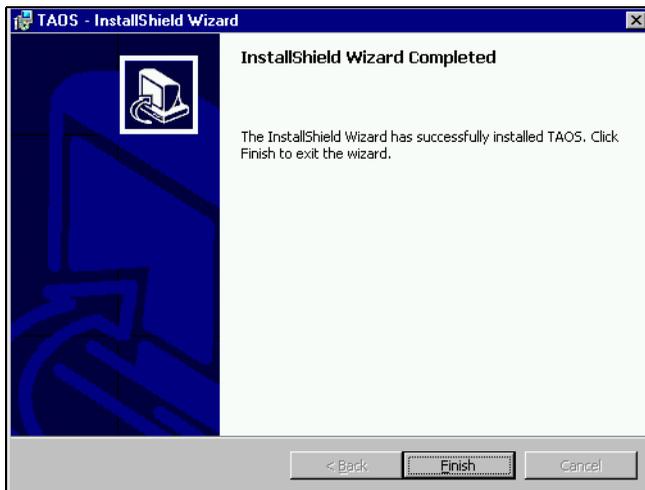


Figure 7-12 *Click Finish.*

14. Click **Yes** to reboot the system (Figure 7-13).

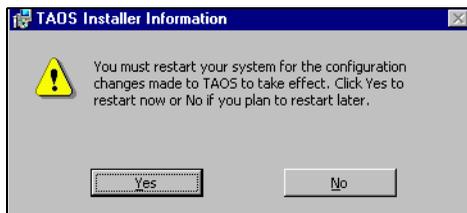


Figure 7-13 *Click Yes.*

Any TAOS devices you have installed are now configured and ready.

## Installing TAOS ITP on Windows 2000

1. Insert the TAOS ITP disk into your CD-ROM drive.
2. Click on **My Computer**, and open the 2000 folder on your CD.
3. Double-click on **setup**.
4. The TAOS ITP InstallShield Wizard launches. Click **Next** to install (Figure 7-14).

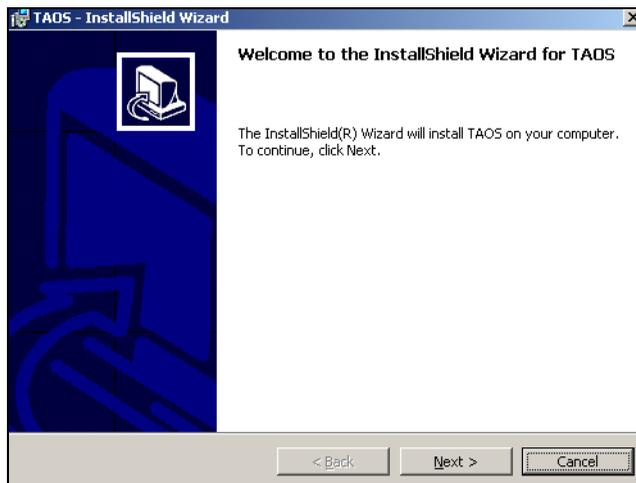


Figure 7-14 The InstallShield Wizard window, click Next.

5. Read the License Agreement. If you accept the terms of the agreement, check the box labeled **I accept the terms in the license agreement** and click **Next** (Figure 7-15).

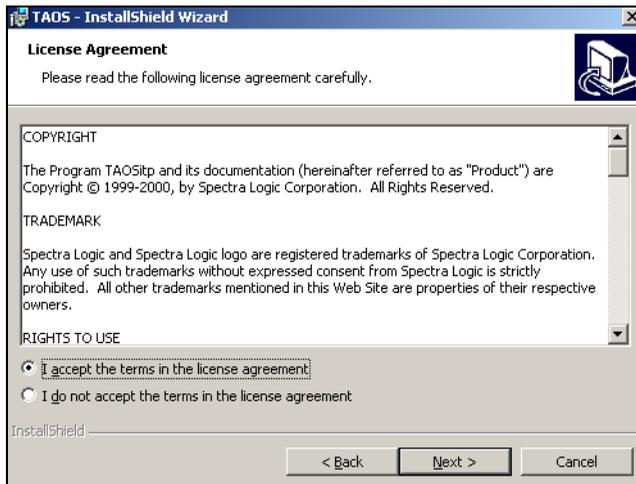


Figure 7-15 *The License Agreement window.*

---

**Note:** You must accept the terms of the License Agreement to continue with the installation. You will not be able to click **Next** until you have accepted the terms of the license agreement.

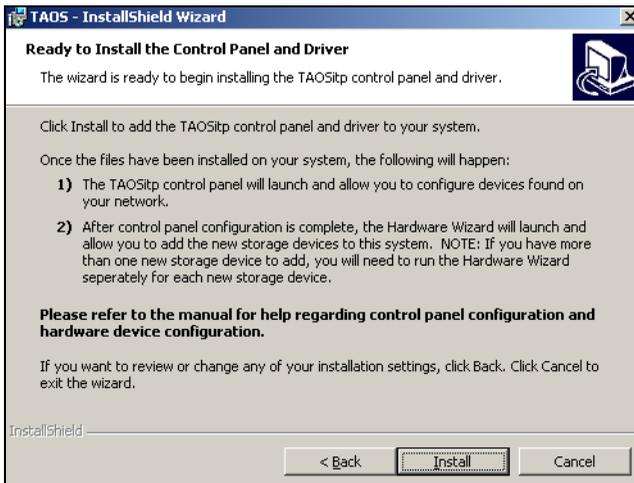
---

6. Click **Next** to install to C:\Program Files\Spectra Logic\TAOS\. Click **Change** to install to a different destination.



Figure 7-16 *The Destination folder window.*

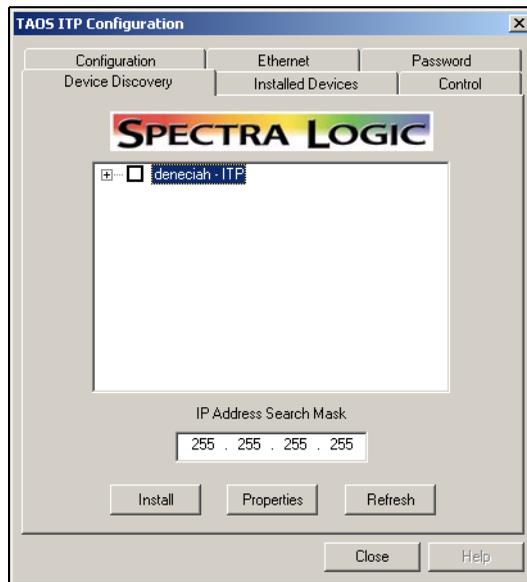
7. Click **Install** to install the TAOS ITP control panel and driver. Click **Back** to review or change installation settings.



**Figure 7-17** *The Install the TAOS ITP control panel and driver Window, click Install.*

8. Wait for the TAOS ITP installation to complete.

9. The TAOS ITP Configuration window appears (Figure 7-18).



**Figure 7-18** *Device Discovery on the TAOS ITP Configuration control panel.*

---

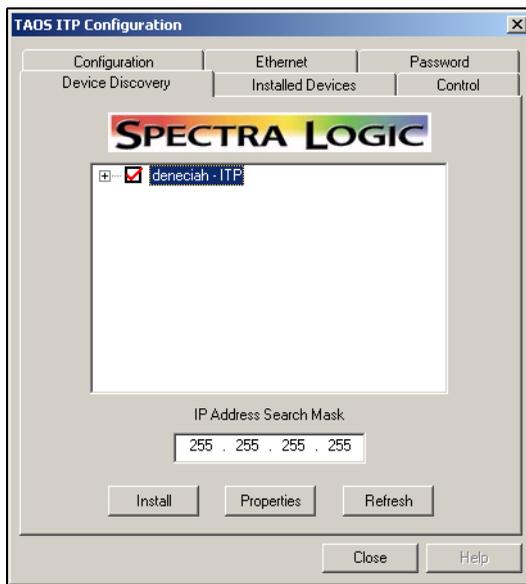
**Note:** Your library host name will appear instead of deneciah.

---

As long as your Windows NT system and TAOS enabled device are on the same subnet system, the TAOS enabled device will be listed in the Device Discovery window. If your TAOS enabled device is not listed, check your Ethernet connections and click **Refresh**.

Once all devices are displayed, continue to Step 10.

- Click on the square box next to the TAOS enabled device to check-mark each TAOS enabled device you want installed (Figure 7-19).



**Figure 7-19** *Device Discovery on the TAOS ITP Configuration control panel, with the device selected.*

- Click on the + symbol to display all the devices located within the TAOS enabled device and verify all devices are checked.
- Press **Install**.
- A dialog box displays, reading Installation Complete. Click **OK**.
- Click **Close** to close the TAOS ITP Configuration window.
- The Add/Remove Hardware Wizard displays. Click **Next**.

---

**Note:** An online text file displays with the Add/Remove Hardware Wizard, walking you through the rest of the hardware installation procedure. Use the online text file in conjunction with the following instructions to install your TAOS enabled hardware.

---

16. Select **Add/Troubleshoot a device** and click **Next** (Figure 7-20).

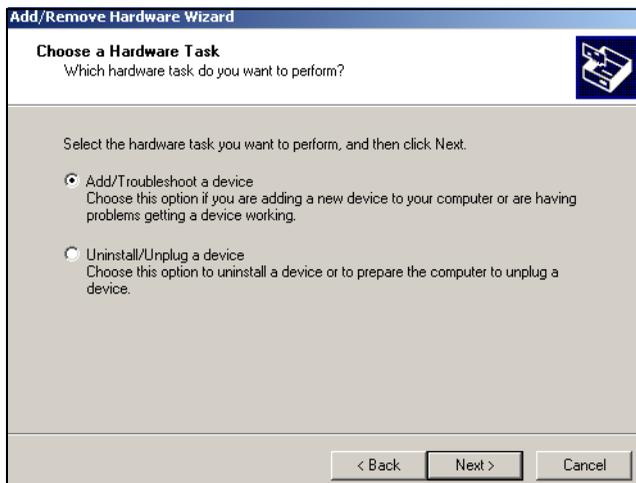


Figure 7-20 *Install the TAOS ITP control panel and driver.*

17. Select **Add a new device** and click **Next** (Figure 7-21).

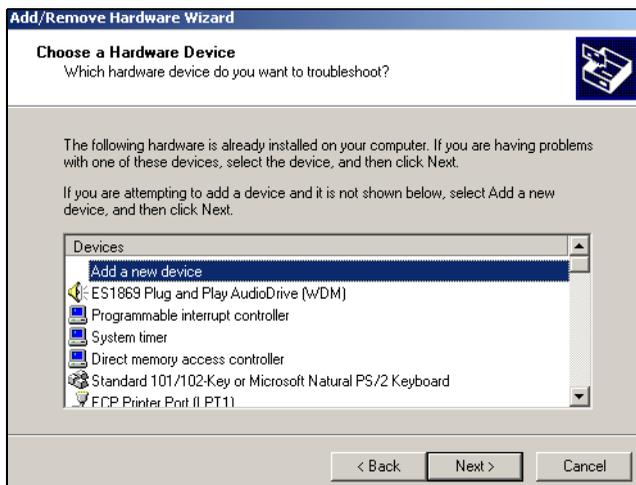


Figure 7-21 *Install the TAOS ITP control panel and driver.*

18. Select **No, I want to select the hardware from a list** and click **Next** (Figure 7-22).

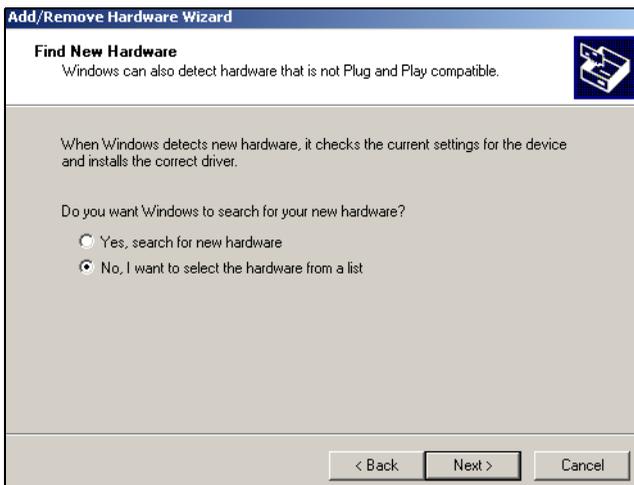


Figure 7-22 The Find New Hardware Window.

19. Highlight **SCSI and RAID controllers** from the list and click **Next** (Figure 7-23).

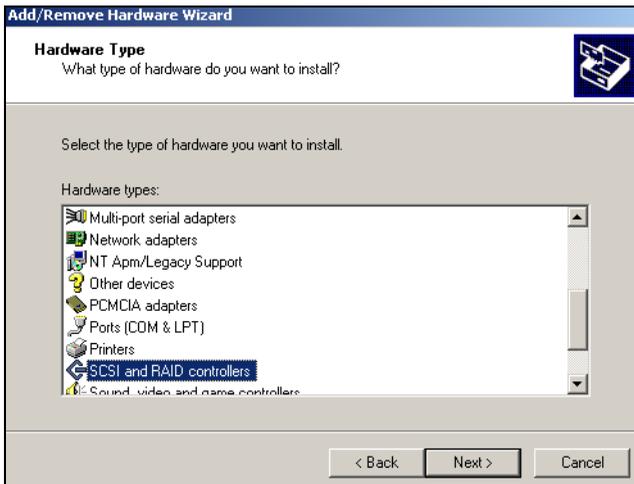


Figure 7-23 The Hardware Type window.

20. Click the **Have Disk...** button (Figure 7-24).

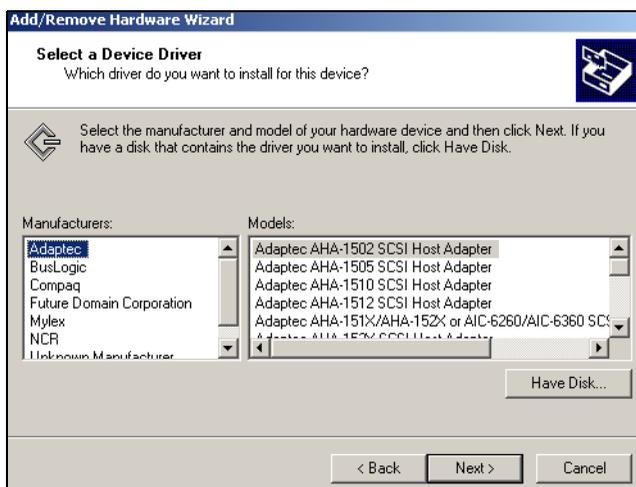


Figure 7-24 The Select a Device Driver window, click Have Disk.

21. Click **Browse**.
22. Navigate to the **TAOSitp.inf** file on your TAOS CD and click **Open**.
23. Click **OK**.

24. Highlight **TAOS TTP SCSI Adapter** and click **Next** (Figure 7-25).

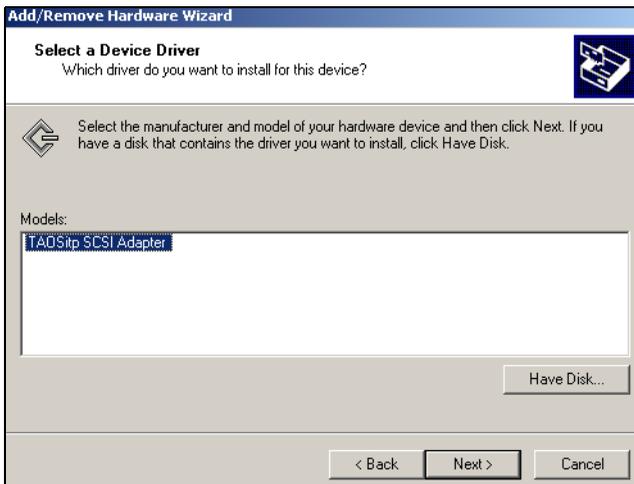


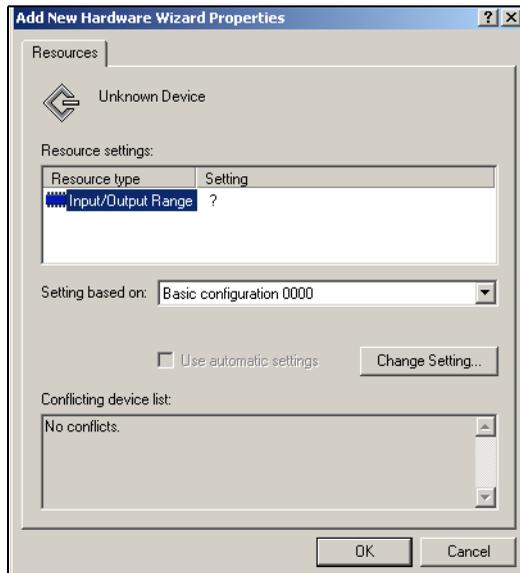
Figure 7-25 The Select a Device Driver Window, click Next.

25. A dialog box appears. Click **OK** (Figure 7-26).



Figure 7-26 An Add Remove Hardware dialog box, click OK.

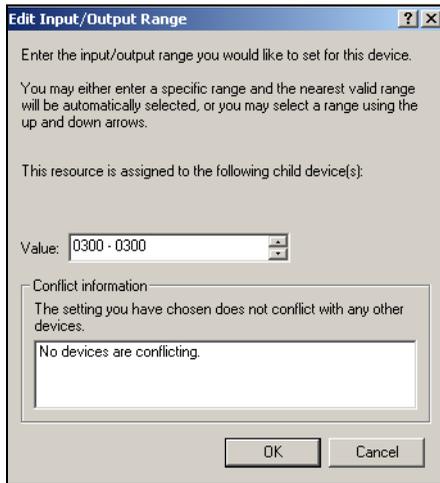
26. Highlight Input/Output Range and click on **Change Setting...** (Figure 7-27).



**Figure 7-27** The Add New Hardware Wizard Properties window, click Change Setting.

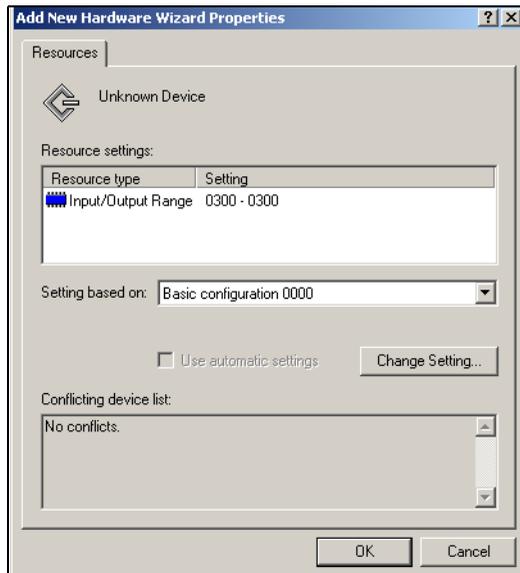
27. The Edit Input/Output Range dialog box appears. Look in the Conflict information field to see if any device conflicts.

28. If no devices are conflicting, click **OK**. If another device does conflict, press the up arrow button to increment the value until no devices conflict, then click **OK** (Figure 7-28).



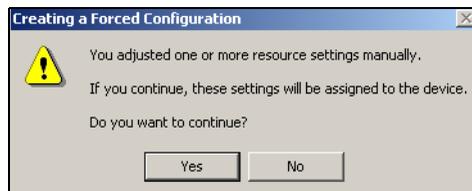
**Figure 7-28** *The Edit Input/Output Range dialog box, click OK.*

29. The Add New Hardware Wizard Properties dialog box reappears. Click **OK**.



**Figure 7-29** The Add New Hardware Wizard Properties window, click OK.

30. Click **Yes** in the Creating a Forced Configuration dialog box (Figure 7-30).



**Figure 7-30** The Creating a Forced Configuration dialog box, click Yes.

31. The Add/Remove Hardware Wizard is now ready to install the driver. Click **Next** (Figure 7-31).

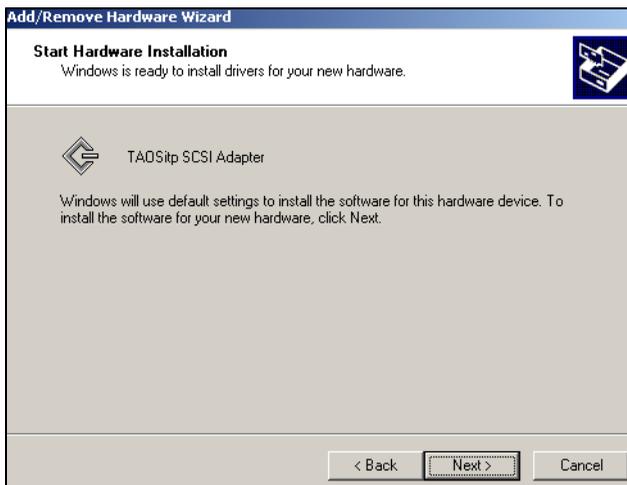


Figure 7-31 The Start Hardware Installation window, click Next.

32. When The Digital Signature Not Found dialog box appears, click **Yes** (Figure 7-32).

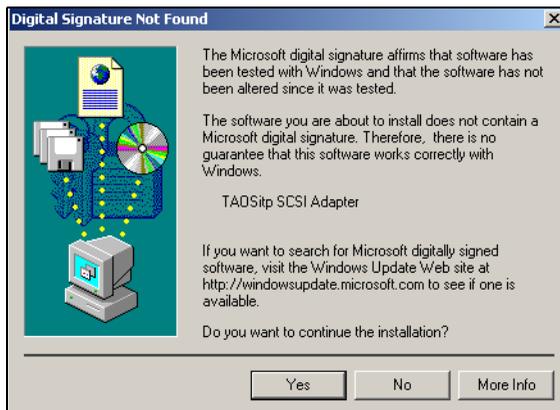


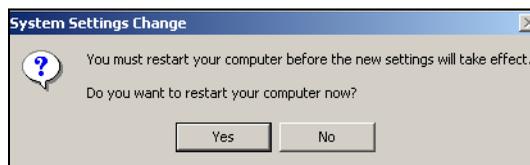
Figure 7-32 The Digital Signature Not Found dialog box, click Yes.

33. Click **Finish** to complete the installation (Figure 7-33).



**Figure 7-33** *The Completing the Add/Remove Hardware Wizard window, click Finish.*

34. Click **Yes** to reboot the system. The TAOS ITP driver will be loaded when the system restarts (Figure 7-34).



**Figure 7-34** *The Systems Settings Change dialog box, click Yes.*

## Installing TAOS ITP on Solaris

TAOS ITP is supported on Solaris versions 2.6 and later.

---

**Caution:** TAOS ITP must be used with a software package that provides a Shared Storage Option (SSO) type arbitration between machines that backup to the library. If you do not have an SSO type option, the only valid configuration is one computer per library. Without an SSO type option, data loss is likely.

---

To install TAOS ITP on a Solaris system:

1. Navigate to the `solaris` directory under the `taos*` directory on the CD-ROM disk.
2. Run the script `install.sh`.
3. Choose a directory to which the script will untar the package. This can be a temporary directory. The install script will start automatically.
4. When prompted `Select package(s) you wish to process (or 'all' to process all packages)`, tap `Enter` to install TAOS ITP.
5. When asked if you want to continue with the installation of TAOS ITP, enter `y`.
6. When prompted again `Select package(s) you wish to process (or 'all' to process all packages)`, enter `q`.
7. Enter `y` to install and configure TAOS enabled devices.

TAOSdiscover searches for TAOS enabled devices and lists each device's target components.

8. Enter the number of a listed device you want to install drivers for.
9. Enter the target number for all targets of this device you will want access to, or just tap `Enter` to select all target numbers.
10. Repeat Step 8 and Step 9 for each device you want installed.

To remove a device, re-enter it. You will then be asked if you want to remove the device.

11. When satisfied with the device list, enter `y` to accept devices.

After configuring the `/devices` and `/dev` directories, links will be created in the appropriate directories for the various target drivers.

Each TAOS device requires a separate instance of the HBA device driver, and will appear as a separate SCSI adapter. The device driver's config file `/usr/kernel/drv/TAOSitp.conf` has one line for each possible instance. Because changes to this file would only be recognized after a reboot, the maximum number of 16 instances are defined in this file by default. To add more TAOS devices at a later time, re-run the discovery process.

1. If you are using backup software, complete any kernel modifications required by the application.
2. Reboot the system using the `boot -r` command.
3. After rebooting, verify that the kernel modifications are correct as follows:
  - i. Insert a tape into a drive using the front panel interface.
  - ii. From Solaris command line, run the command:  
`mt -f /dev/rmt/<device file> status`  
where `<device file>` is the specific device file for the tape drive in which the tape is located.
  - iii. All Solaris machines return the value: `Sony AIT`

If a different value displays, you have not modified `st.conf` correctly; repeat the entire procedure.

## Installing TAOS ITP on Linux

---

**Caution:** TAOS ITP must be used with a software package that provides a Shared Storage Option (SSO) type arbitration between machines that backup to the library. If you do not have an SSO type option, the only valid configuration is one computer per library. Without an SSO type option, data loss is likely.

---

The TAOS ITP driver for Linux is currently released in RPM format only. There are pre-compiled binaries (uniprocessor only at this time) built for the following i386 based platforms:

- ◆ RedHat Linux 6.2
- ◆ RedHat Linux 7.1

To install the TAOS ITP driver for Linux:

1. Navigate to the Linux directory on the CD-ROM disk.
2. Based on the revision of the operating system, select the binary RPM appropriate for the system you want to install.
3. Issue the following command at a shell prompt: `rpm -Uvh <appropriate binary RPM>`
4. To return a list of libraries on the network available for use, issue the following: `/usr/sbin/TAOSdiscover`
5. Enter `y` to install and configure TAOS enabled devices.

TAOSdiscover searches for TAOS enabled devices and lists each device's target components.

6. Enter a listed device number for a device you want to install drivers for.
7. Enter the target number for all targets of this device you will want access to, or just tap Enter to select all target numbers.
8. Repeat Step 8 and Step 9 for each device you want installed.

To remove a device, re-enter it. You will then be asked if you want to remove the device.

To verify connectivity, load a tape to the drive and use the `mt` or the `tar` command. Use the `mtx` command to verify communication with the library.

You are now ready to install the backup package of your choice.

The following files are installed by adding the RPM:

```
/dev/TAOSitp
/etc/TAOSitp
/etc/TAOSitp/connect
/etc/TAOSitp/devices
/etc/TAOSitp/discover
/etc/rc.d/init.d/taos
/lib/modules/(running kernel version)/misc/TAOSitp.o
/usr/sbin/TAOSbusctl
/usr/sbin/TAOSdiscover
/usr/sbin/TAOScontrol
```

## Setting Up NDMP Enabled by TAOS

### Enabling TAOS NDMP

The Options Enablement menu allows you to enable TAOS NDMP Network Backup. To launch the Options Enablement menu, select 6.

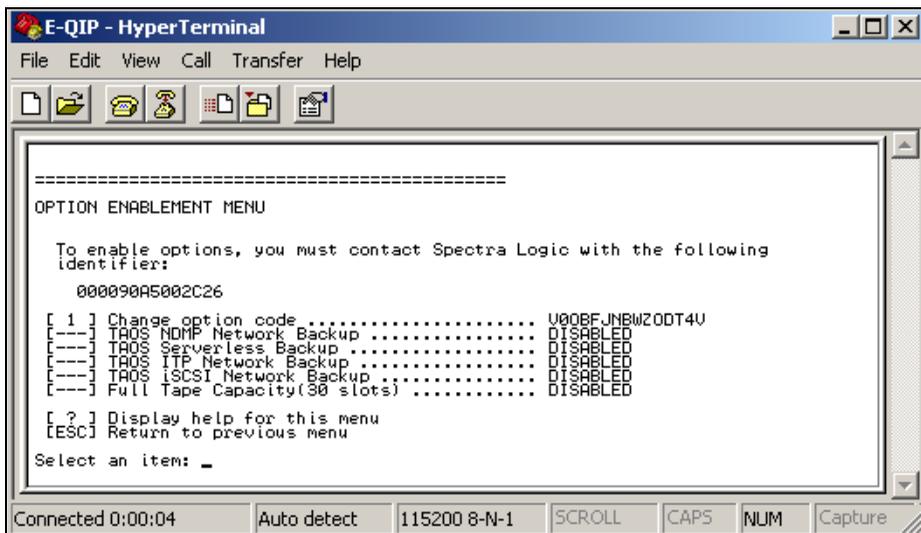


Figure 7-35 *The Option Enablement menu.*

If you will be using NDMP Enabled by TAOS, you will need to obtain an activation key from Spectra Logic to enable the NDMP Enabled by TAOS function. Contact Spectra Logic with the identifier of the device, as displayed on this page, to obtain the activation key.

**[1] Change option code:** Enter the option code from Spectra Logic to enable options.

**[?] Help:** Displays help for this menu.

**[Esc]** Returns you to the main menu.

## Configuring NDMP Enabled by TAOS

You will need to assign a user name and password which will be used to gain access to the backup resources--drives and/or libraries--under the control of the TAOS NDMP agent.

This user name and password will have to be part of the NDMP backup application set up. It will be the backup application that will need to access the tape or library resource.

1. Select **TAOS NDMP configuration** to set the NDMP user name and password.

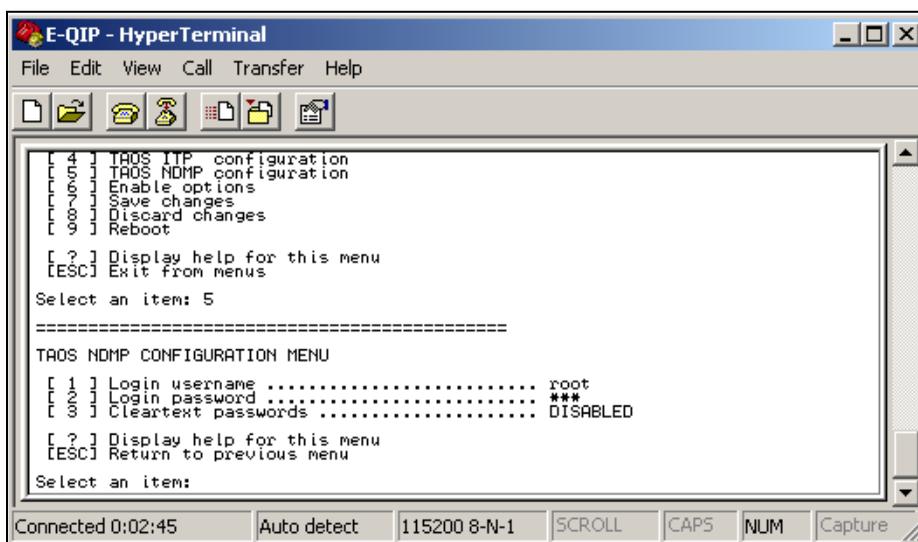


Figure 7-36 The TAOS Configuration menu, select [5] to view the TAOS NDMP Configuration menu.

**Login username** This is the user name that the NDMP backup application will use to gain access to the library resource. The default setting is root.

If the Login username is not root, select [ 1 ] to edit.

- To modify the password select **Login password**. The password will not be echoed.

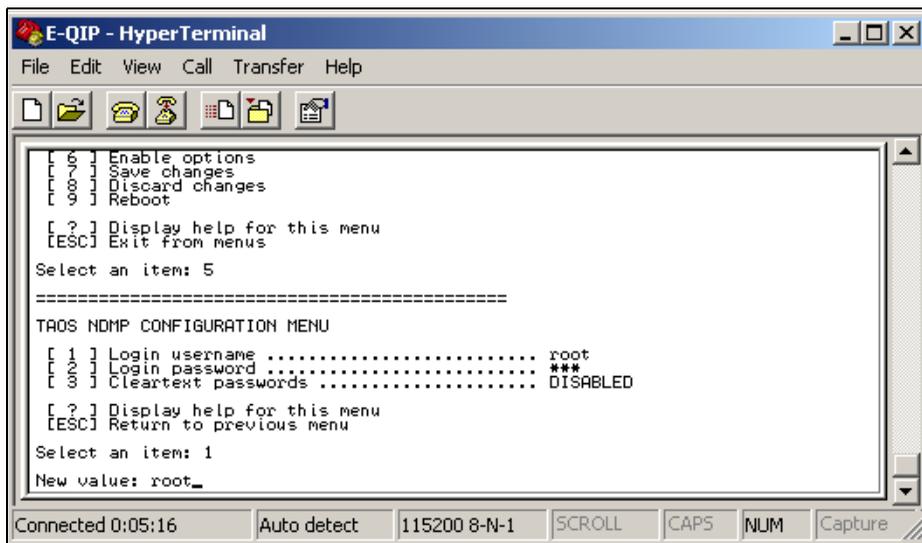


Figure 7-37 The TAOS NDMP Configuration menu, select [2] to login password.

3. Enter the password again to confirm.

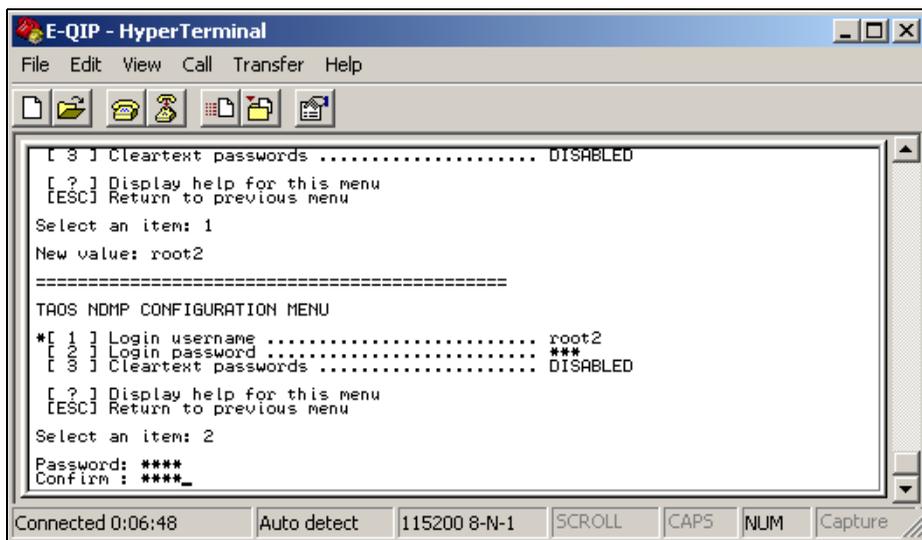


Figure 7-38 *The TAOS NDMP Configuration menu.*

4. Tap **Esc** to return to the main menu.

5. Select **Save changes** to save the NDMP user name and password.

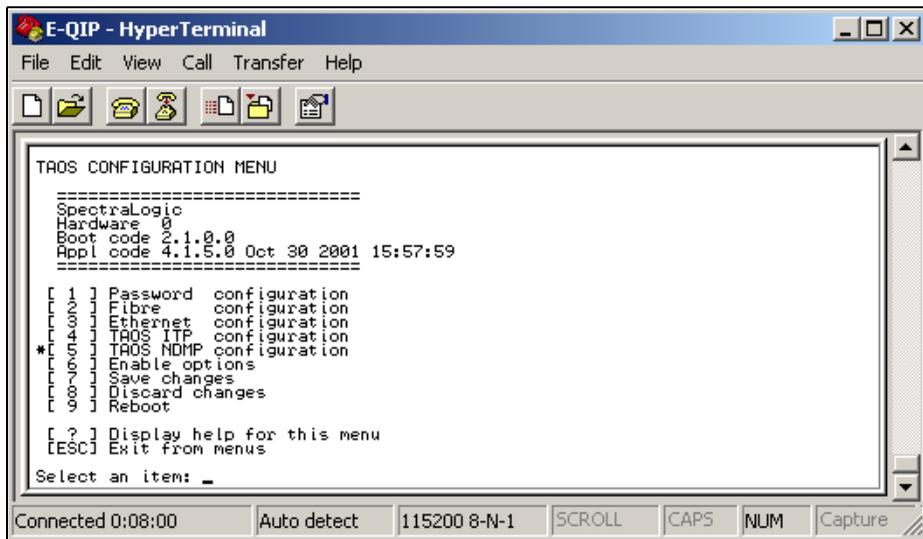


Figure 7-39 The TAOS Configuration menu, select [7] to save changes.

6. Tap *y* to confirm changes.

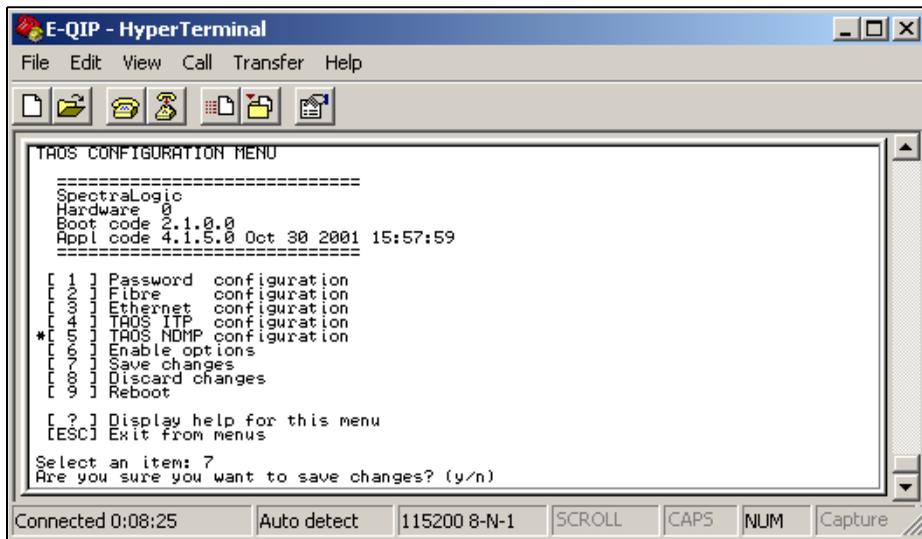


Figure 7-40 *The TAOS Configuration menu.*

7. Tap *y* to reboot.

After a reboot the TAOS NDMP agent is ready for use.



## 8 Configuring the Drives

This chapter includes:

- ◆ Configuring SCSI IDs, Emulation and Dip Switch Settings

## Configuring SCSI IDs, Emulation and Dip Switch Settings

---

**Note:** Setting SCSI IDs applies to S-QIPs and L-QIPs only. F-QIP drive IDs are hard coded and cannot be modified.

---

1. Select **Partitions** from the **Configuration** toolbar. This brings up the Shared Library Services screen.

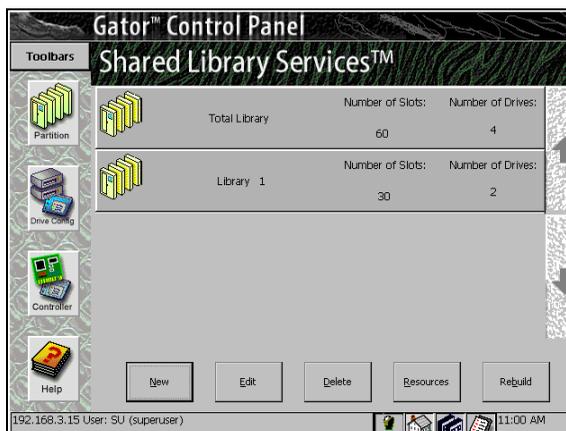


Figure 8-1 Shared Library Services screen.

2. Select the partition that contains the drive you want to configure.

3. Tap **Edit**. The Edit Partition Configuration window appears (Figure 8-2).

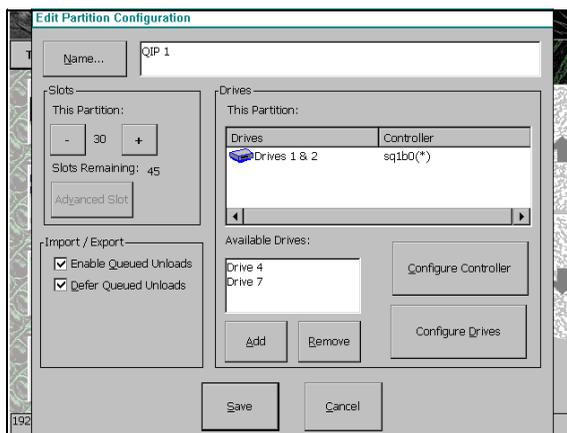


Figure 8-2 Partition Configuration window.

4. In the Drive Configuration screen, select the drive you wish to configure. Tap **Configure Drives**. This brings up the Drive Configuration window (Figure 8-3).

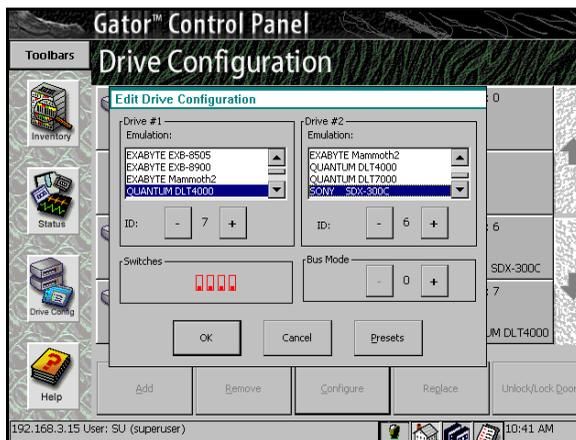


Figure 8-3 Drive Configuration window.

The Drive Configuration screen displays the drive you selected, as well as any other drive on the same bus. For example, if Drive 1 and Drive 2 are on the same bus, the Drive Configuration screen displays them both if you select either one.

From the Drive Configuration screen you can set emulation and SCSI IDs.

5. Tap +/- to select the SCSI ID.

---

**Note:** The drive's SCSI ID must be unique from the QIP bus, other drives on the QIP bus and any device on the host bus it is attached to.

---

Step 6 through Step 11 are only necessary in special circumstances. Refer to the *Spectra Logic Server Setup Guide* to see if you need to set drive switch settings or drive emulation for your operating system.

6. Tap **Presets** to select drive switch settings and emulation for your operating system (Figure 8-4). Select your operating system and tap **OK**. If the selections do not include your operating system, tap **Cancel**.

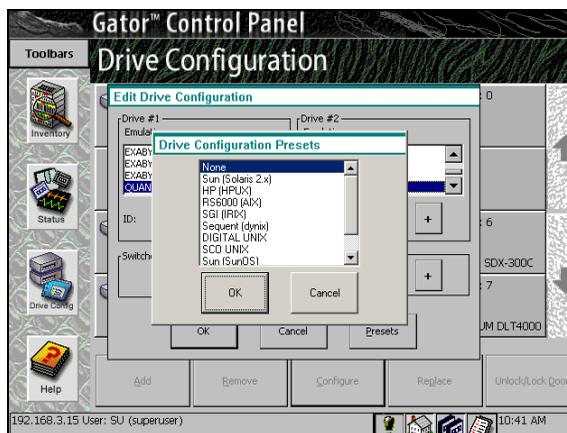


Figure 8-4 Drive Configuration Presets window.

7. If your operating system is not included in the Drive Configuration Presets window, tap **Switches** in the Drive Configuration window. This

opens the Drive Switches window (Figure 8-5). You can set the drive switches manually here.

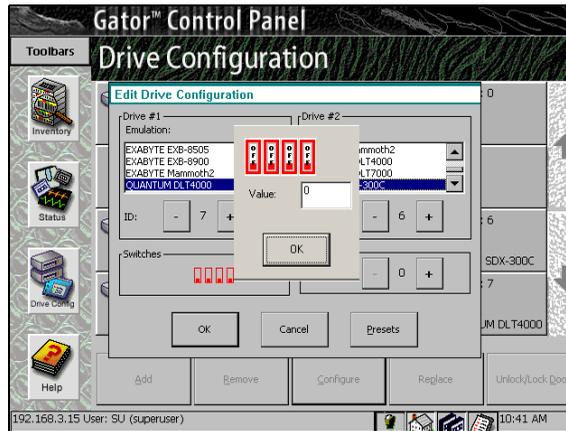


Figure 8-5 Drive switches window.

---

**Note:** Do not set the drive switches manually unless one of the preset drive switch settings doesn't work with your operating system. If you need to set drive switches manually, call Spectra Logic Technical Support at (800) 227-4637 for help.

---

8. Set the switches and tap **OK** to exit.
9. If your operating system is not included in the Drive Configuration Presets window, you can use the **Emulation** option to change the drive SCSI Inquiry identification from the default Sony SDX-500C. You can also add a drive emulation not on the list by using the User Defined option in the Emulation window.
10. Tap **OK** here to save the emulation, dip switch, and SCSI ID settings to the QIP and LCM board. The Library Controller will remember this information when you come back to these screens.
11. Repeat Steps 2 through 10 for each drive. Emulation information displays in the Drive Configuration screen for each drive you have configured.

You can also configure the drives using the Drive Configuration screen. To do this:

1. Tap the **Drives** button on the Configuration Toolbar. This opens the Drive Configuration screen (Figure 8-6).

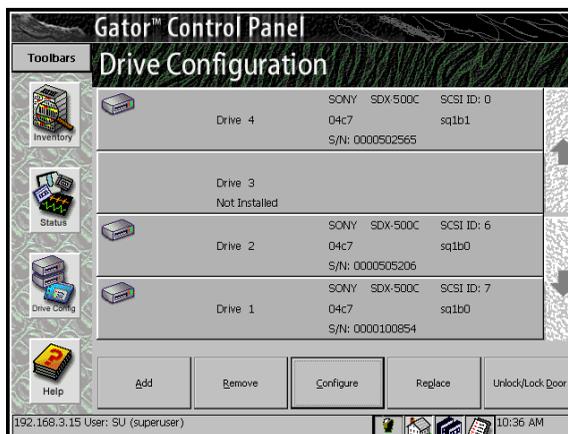


Figure 8-6 Drive Configuration screen.

2. Tap the drive you want to configure and tap **Configure**. The Drive Configuration window appears, displaying the following:
  - ◆ Drives detected by the library.
  - ◆ SCSI bus on which the drive resides, and the drive's SCSI ID.
  - ◆ QIP associated with the drive.
  - ◆ Drive emulation assigned to each pair of drives.
  - ◆ Drive firmware.
  - ◆ Buttons allowing you to scroll through more drives.
  - ◆ Buttons you can use to remove, replace, add and configure the drives. To configure a drive, select the drive and tap **Configure**.
  - ◆ Button you can use to unlock the door.

## 9 Using the Spectra 12000 Library

This chapter reviews:

- ◆ Checking Library Status
- ◆ Checking Robotics
- ◆ Checking Inventory
- ◆ Checking Drives
- ◆ Checking Diagnostics
- ◆ Updating Firmware
- ◆ Viewing the F-QIP Configuration
- ◆ Checking Resources in Use
- ◆ Deleting a Partition Configuration

## Checking Library Status

The General Status screen shows details about the library's robotics, its media and its drives (Figure 9-1).

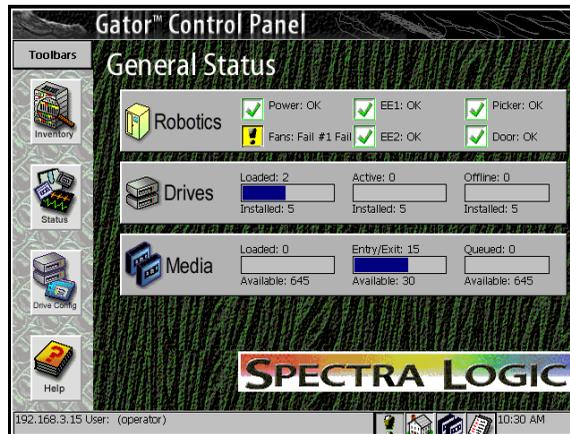


Figure 9-1 General Status screen.

## Checking Robotics

To set system time, access keyed enablement, or set IP addresses:

1. Tap **Robotics**, the System Setup screen appears (Figure 9-2).

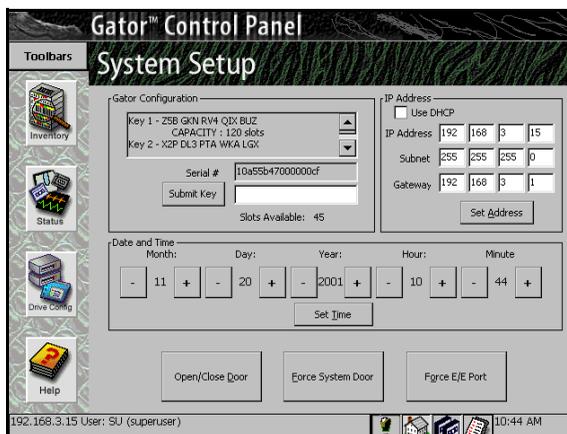


Figure 9-2 System Setup screen.

## To Enable Keys

To enable keys, you will first need to obtain an activation key from Spectra Logic. Contact Spectra Logic with the serial number of the device, as displayed in the Serial # field, to obtain the activation key.

1. Once you have the key, tap the text field next to **Submit Key**. A virtual keyboard appears.
2. Enter the key on the virtual keyboard and tap **OK**. The key will appear in the text field.
3. Tap **Submit Key**. Your keyed option is now enabled.

You can enable the following paid options:

- ◆ CoD. For more information on capacity on demand, see *Purchasing CoD* on page 154.

- ◆ NDMP. For more information, see *Setting Up NDMP Enabled by TAOS* on page 100.
- ◆ Serverless Backup. For more information, see *Configuring the F-QIP for Serverless Backup* on page 61.
- ◆ Remote Library Controller

## To Set IP Addresses

Select **DHCP** if your network provides IP addresses through DHCP, or select **Use Static Address** if you want to assign an IP address.

To assign an IP address, enter the IP address, Subnet Mask and Gateway that you want the library to use, and then tap **Set Address**.

## Checking Inventory

To see more data about inventory, and to insert/eject/move media elements:

Tap **Inventory** in the General toolbar, **Media** on the General Status screen, or the tape icon on the bottom of the screen.

## Inserting and Ejecting Cartridges

We recommend you use the Inventory screen only for inserting new media or to remove ejected tapes from the E/E port. Use your backup software to move AIT cartridges and to eject backups for offsite and offline storage.

## Insert New Media

To insert new media:

1. From the General Status screen, tap **Inventory**. This brings up the Inventory screen (Figure 9-3).

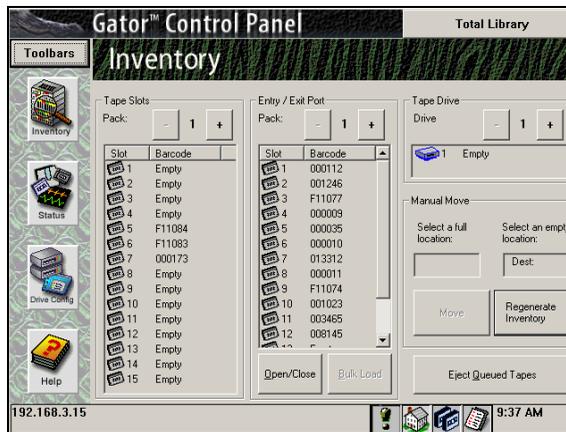


Figure 9-3 *Inventory screen.*

2. Tap **Partitions** in the upper right-hand corner of the screen to display the pull-down menu (Figure 9-4).



Figure 9-4  
*Partitions pull-down menu.*

3. Select the partition where you want to insert media. The Inventory screen now displays information for the partition you selected.
4. Use the +/- buttons from the Tape Slots box to select the cartridge pack where you wish to move the new media.

5. Tap **Open/Close**. A window pops up asking **Open Entry/Exit Port?** Tap **OK**. This opens the E/E port.
6. Insert the new media into any slot. Take note of the slot number.
7. Tap **Open/Close**. A window pops up asking **Close Entry/Exit Port?** Tap **OK**. This closes the E/E port.
8. Select the slot in the E/E port that you noted in Step 6. Then select the slot in which you wish to insert the new media.
9. Tap **Move**.

---

**Note:** To move all the tapes from the E/E port into the current partition, tap Bulk Load. The Library Controller will move all the tapes into the first empty slots it can find.

---

## Eject Media

We recommend you use your backup software to eject media. If you are using your backup software, and the partition you are ejecting media from has both **Enable Queued Unloads** and **Defer Queued Unloads** checked, you can eject media simply by tapping **Eject Queued Tapes** on the Inventory screen.

To eject media through the Library Controller:

1. From the General Status screen, tap **Inventory**. This brings up the Inventory screen (Figure 9-5).



Figure 9-5 Inventory screen.

2. Tap **Total Library** in the upper right corner of the screen to display the pull-down menu (Figure 9-6).



Figure 9-6  
Partitions pull-down  
menu.

3. Select the partition from which you want to eject media. The Inventory screen now shows information for the partition you selected.
4. Use the +/- buttons to select the cartridge pack from which you wish to eject the media.

5. Select the slot (from **Tape Slots** box) that holds the media you wish to eject. Then select a slot in the **Entry/Exit Port** box.
6. Tap **Move**.
7. Tap **Open/Close**. A window pops up asking **Open Entry/Exit Port?** Tap **OK**. This opens the E/E port.
8. Remove the media.
9. Tap **Open/Close**. A window pops up asking **Close Entry/Exit Port?** Tap **OK**. This closes the E/E port.

---

**Note:** To remove all Queued tapes, tap **Eject Queued Tapes**. The Library Controller will find all the tapes that have been queued for eject and move them to the E/E port.

---

We recommend you use your backup software to move tapes. However, from the Inventory screen, you can also:

- ♦ Identify the contents of every slot in the library, and in the E/E port.
- ♦ Identify the contents of every drive.
- ♦ Move all tapes from the E/E cartridge packs into the current partition (using the Bulk Load button).
- ♦ Move cartridges from the source location (slot or drive) to a destination you specify (slot or drive). To move tapes, select a partition and use the +/- buttons to select a cartridge pack. Then select the tape you wish to move, the move destination, and tap **Move**.

## Checking Drives

To see more data about drives, and to configure or replace them:  
From the General status screen, tap **Drives** (Figure 9-7).



Figure 9-7 Drive Configuration screen.

## Checking Drive Status

Select a drive, then tap **Configure**. This takes you to the Drive Configuration screen. This screen is described in greater detail in *Configuring SCSI IDs, Emulation and Dip Switch Settings* on page 108.

## The Maintenance Toolbar

The Maintenance toolbar icons are:

- ◆ Diagnostics
- ◆ Update F/W (firmware)
- ◆ Traces
- ◆ Help



**Figure 9-8**  
*Maintenance  
Toolbar*

## Checking Diagnostics

Field service engineers use **Diagnostics** to identify the source of problems with the library.

## Updating Firmware

---

**Note:** Although the library does not need to be idle to perform firmware updates, the specific part of the library receiving the firmware must be idle. For example, when loading picker firmware, the picker must not be in use.

---

Updates to internal library software (i.e., firmware) are available from Spectra Logic. To view the minimum recommended firmware levels, go to: [http://www.spectralogic.com/support/firmware\\_12k\\_64k.cfm](http://www.spectralogic.com/support/firmware_12k_64k.cfm).

To update:

1. On the Library Controller, tap **Toolbars**, then tap **Maintenance**. The Maintenance toolbar displays.
2. Select **Update F/W**. The Firmware Update screen opens (Figure 9-9).

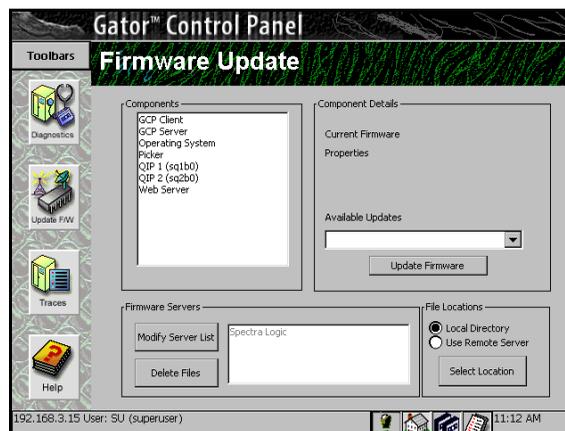


Figure 9-9 *Firmware Update screen.*

3. Select **Local Directory** in the File Locations section. This is where the firmware files will come from.
4. Tap **Select Location**. This will update the available updates list from the local firmware directory.
5. Select the component you want to update from the Components section. The Current Firmware and Available Updates for that component appear in Components detail section.

---

**Note:** If the firmware file you want to update to is not in the list, go to *Accessing Firmware from a Remote Server* on page 125.

---

6. Select the firmware version you want to update to from the Available Updates list, by using the drop down menu.
7. Tap **Update Firmware**. The component you selected will update to the firmware version you selected. A window asks you to wait.

---

**Caution:** Do not interrupt the library while firmware is downloading. This takes less than 10 minutes.

---

8. Repeat for every component to be updated. Only one unit can be updated at a time.

---

**Note:** When you update firmware, the new update file is stored in the local file system. This allows you to upgrade multiple times without downloading the file each time, and keeps the file around in case it needs to be reapplied. Use the **Delete Files** button to remove these files from the file system to reclaim space.

If you Update the picker firmware you will need to reset the picker parameters. Proceed to *Reset Picker Parameters* on page 127.

---

## Accessing Firmware from a Remote Server

If you do not have the specific firmware file you need to update a specific component, you will need to access the file you need from the Spectra Logic server.

To do this:

1. Select Use Remote Server in the File Locations section.
2. Select Spectra Logic from the Firmware Servers list.
3. Select **Select Location**. This will update the Available Updates list from the Remote Server.
4. Go to Step 5 on page 124, to complete the update procedure.

## Accessing Firmware from an Alternate Location

Some sites might not be able to access Spectra Logic's Web site because of firewalls or proxy server configuration. In these instances, the updates can be placed on a local Web server.

To do this:

1. Place the files on an intranet or set up a machine as a Web server. (Windows NT includes a Web server, Microsoft allows a free download for Windows, most Unix and Linux operating systems have HTTPD or can use a free download such as Apache.)
2. Create a `/gator/download` directory on the server and copy the firmware to that location. If another machine can see the Spectra Logic site, copy the files from `www.spectrallogic.com/gator/download`.
3. Test your new Web server by pointing a browser to `http://<your server IP>/gator/download`. You should see a directory of files.
4. Tap **Modify Server List**.
5. The server list appears. Tap **Modify Server List**.
6. Enter the IP address of the new server and a name for the new server.
7. Tap **Add Server**.
8. Select Use Remote Server in the File Locations section.

9. Select Spectra Logic Form the Firmware Servers list.
10. Select **Select Location**. This will update the Available Updates list from the Remote Server.
11. Go to Step 5 on page 124, to complete the update procedure.

### To Upgrade from Floppy Disks (Spectra Logic P.N. 90919021)

If you prefer, you can update firmware from floppy disks. Call Spectra Logic Technical Support at (800) 227-4637 to obtain a floppy disk set.

1. Insert Disk 1 in the LCM disk drive (Figure 9-10).

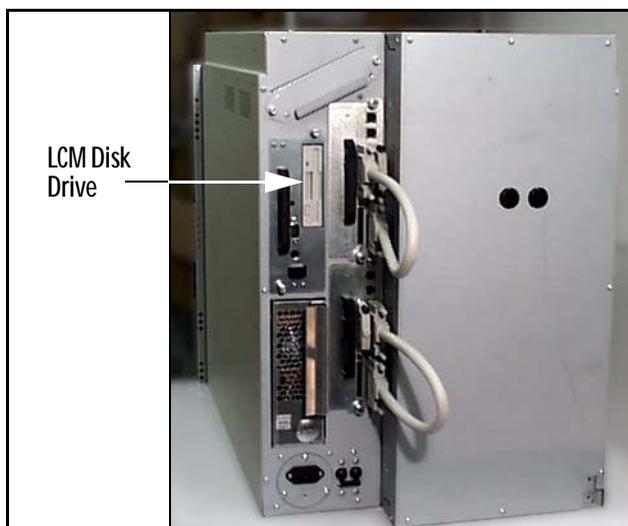


Figure 9-10 *Insert Disk 1 in the LCM disk drive.*

2. Reset the LCM by cycling the power or pressing the reset button on back of LCM.
3. Follow on-screen directions, inserting disks one at a time until operation is complete.
4. Remove all disks and reset the LCM. The operating system and Library Controller will now be upgraded.

5. The Library Controller alerts the user **Configuration of QIP (X) Bus (X) Does Not Match Front Panel** for each logical library. Tap **OK**. This message will not appear after all QIPs have been upgraded.
6. Once you have the firmware files added to the local directory, go to *Updating Firmware* on page 123.

## Reset Picker Parameters

1. From the toolbar menu, select **Maintenance**.
2. Select the **Diagnostics** icon.
3. Select **Advanced**.
4. From the advanced Available Tests list, select **Reset Picker** (Figure 9-11).

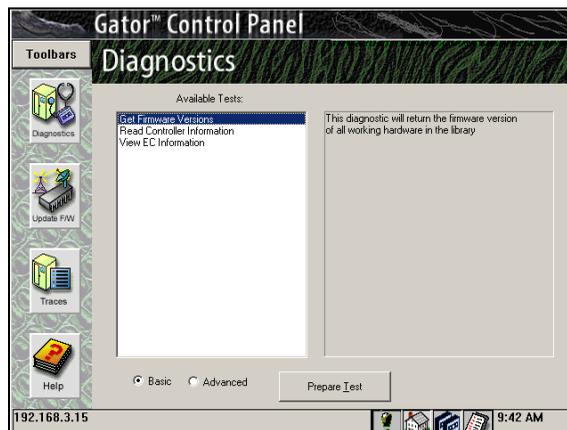


Figure 9-11 *Select Reset Picker.*

5. In the parameters list, use the +/- buttons to set Param1 to **3**.
6. Select **Run Test**.
7. From the Available Tests list, select **Set Picker Version**.
8. If you have a new picker, use the +/- buttons in the parameters list to set Param1 to **1**.  
If you have an old picker, use the +/- buttons in the parameters list to set Param1 to **0**.

9. Select **Run Test**.

10. After the test has completed, restart the library.

## Viewing the F-QIP Configuration

You can view the current F-QIP configurations from the Diagnostics screen. Follow these steps:

1. Go to the Library Controller. Pull down the Toolbars menu and select the **Maintenance** toolbar.
2. Tap the **Diagnostics** icon in the Maintenance toolbar and the Diagnostics screen appears (Figure 9-12).



Figure 9-12 *Diagnostics screen.*

- Use the +/- buttons to select **View F-QIP Configuration** and tap **Run Test**. This brings up the View Diagnostic Trace window, showing the F-QIP configurations (Figure 9-13).

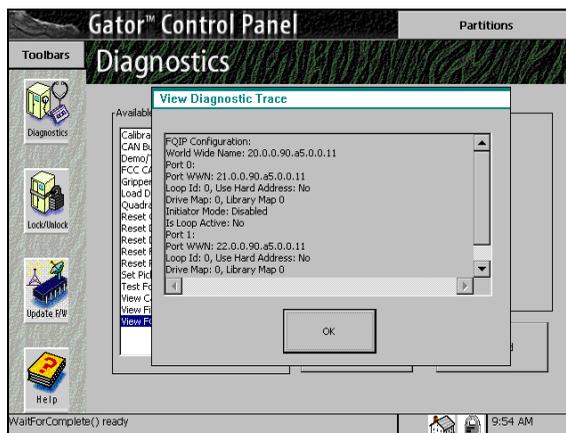


Figure 9-13 F-QIP configuration.

On this screen you can see the current settings for the F-QIP configurations, Loop Address, Disable Initiator settings, etc.

## Checking Resources in Use

From the Configure Partitions screen, you can identify resources. To do this:

- On the Library Controller, tap **Toolbars**, then tap **Configuration**. The Configuration toolbar displays.
- Tap the **Partition** icon on the Configuration toolbar. The Shared Library Services screen displays.

3. Select the partition or **All Partitions**, then tap **Resources**.

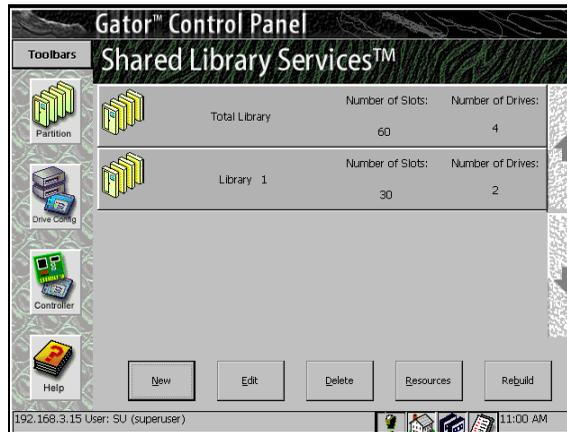


Figure 9-14 *Partition Resources screen.*

4. The Partition Resources screen appears, showing data about drive and controller cards, and their SCSI IDs. It also shows information about magazines in use.

To edit partitions, follow the instructions in *Partitioning the Spectra 12000 Library* on page 41.

## Deleting a Partition Configuration

To delete a configured partition:

1. On the Library Controller, tap **Toolbars**, then tap **Configuration**. The Configuration toolbar displays.
2. Tap the **Partition** icon on the Configuration toolbar. The Shared Library Services screen displays.
3. Select the partition and click **Delete**.

# 10 Using the Drive

This chapter reviews:

- ◆ Bar Code Labels
- ◆ Using AIT Data Cartridges
- ◆ Write-Protecting and Recording
- ◆ Storing Cartridges Outside the Library
- ◆ Caring for Data Cartridges
- ◆ Cleaning the AIT Drive Heads

## Bar Code Labels

Review the following information before attaching bar code labels to the AIT data cartridges.

---

**Note:** Spectra Logic bar code labels are pre-approved for use with the Spectra 12000 library; keep the following information for future reference.

---

**Label Quality** Use labels designed for AIT-2 and AIT-3 data cartridges. Avoid poor quality labels that have poor contrast and resolution.

**Bar Code Type** Use only bar codes with standard 3-in-9 encoding (Standard 39 Code).

**Number of Characters** Use labels with eight or fewer characters (including zeros).

**Checksums** Bar code labels are available with or without checksum characters; the Spectra 12000 library accepts only bar code labels with a checksum character.

---

**Note:** Use AIT Code 39 labels with checksum.

---

Bar code labels allow the Spectra 12000 library to track data cartridges within the library.

Attach the Spectra Logic approved bar code label to the cartridge with the numbers closest to the top of the cartridge (the side with the clear plastic window); make sure the edge of the label is parallel to the edge

of the cartridge as shown below.

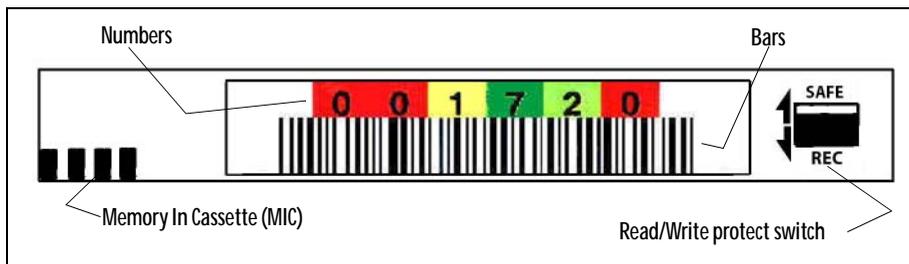


Figure 10-1 Bar code label on AIT-2 cartridge.

## Using AIT Data Cartridges

The AIT-2 and AIT-3 data cartridges are the only cartridge that incorporate the unique Memory In Cassette (MIC) feature. A memory chip built into each tape cartridge holds the tape's entire data structure, history and other user-definable information read directly by the AIT-2 or AIT-3 drive. The MIC feature reduces file access time and expedites the operation of the drive.

Insert the data cartridge in the cartridge pack with the cartridge window facing the top of the magazine. Correctly installed, the data cartridge snaps into the tape slot. Remove the data cartridge by grasping the cartridge and pulling it straight out of the pack.

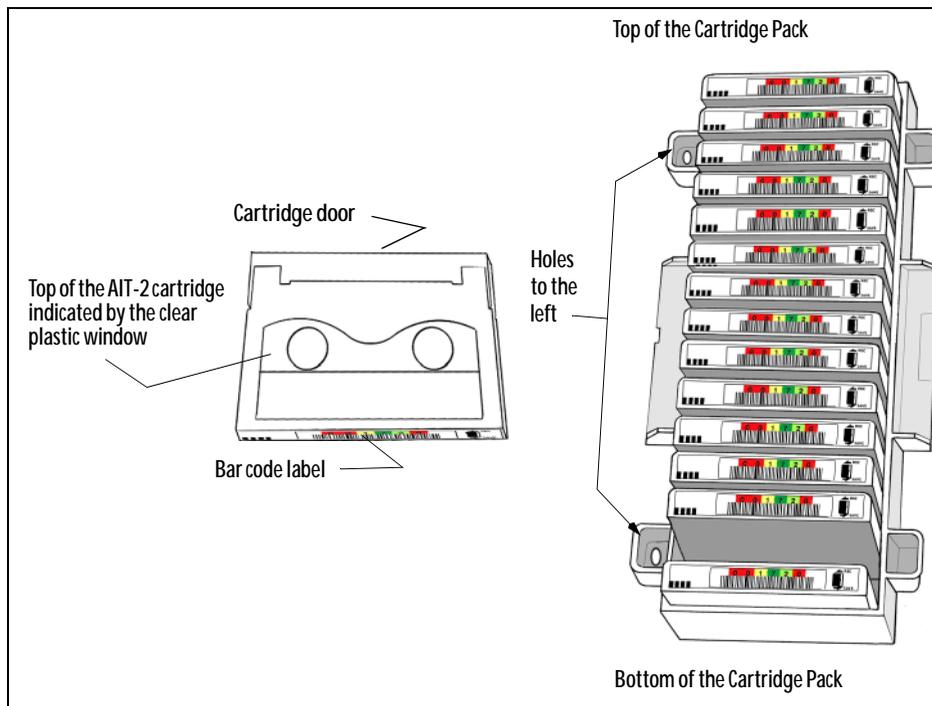


Figure 10-2 *Installing data cartridge into tape slot.*

## Write-Protecting and Recording

The write-protect tab on the cartridge prevents accidental data erasure. To use the write protect tab on the data cartridge:

1. Move the tab on the edge of the data cartridge to the **SAFE** position. With the tab in this position, the tape cannot be written to and data on the tape is safe from accidental erasure.
2. Move the tab to the **REC** position to record data. With the tab in this position, the tape can be written to and data already on tape can be written over and erased.

## Storing Cartridges Outside the Library

Follow these guidelines to store data cartridges in a pack outside the library.

- ◆ Attach the clear plastic lid to the front of the cartridge pack to shield the data cartridges from dust and other debris while in storage.
- ◆ Follow the tape storage suggestions described in *Caring for Data Cartridges* on page 137.
- ◆ Before inserting cartridges in the library, store the cartridges for up to 24 hours in the same room as the library. (The cartridges must be exposed to the library's environment for a time equal to the time it has been in a significantly different environment.)

## Caring for Data Cartridges

Although cartridges are ruggedly built, they must be handled with care to preserve the data that they contain. The following are guidelines for storing and using cartridges.

- ◆ Do not open the tape access door of the cartridge or touch the magnetic tape; one fingerprint can prevent a drive from reading the tape. Handle only the plastic tape cartridge.
- ◆ Keep the cartridge away from sources of electromagnetic fields such as telephones, dictation equipment, mechanical or printing calculators, motors, stereo speakers, and bulk erasers. Do not lay cartridges on a computer monitor or on the base unit of a computer.
- ◆ Keep the cartridge away from direct sunlight and heat sources, such as radiators and warm air ducts.
- ◆ Keep the cartridge free of moisture. Do not wet or submerge a cartridge in liquid.

- ◆ Avoid rapid temperature changes.

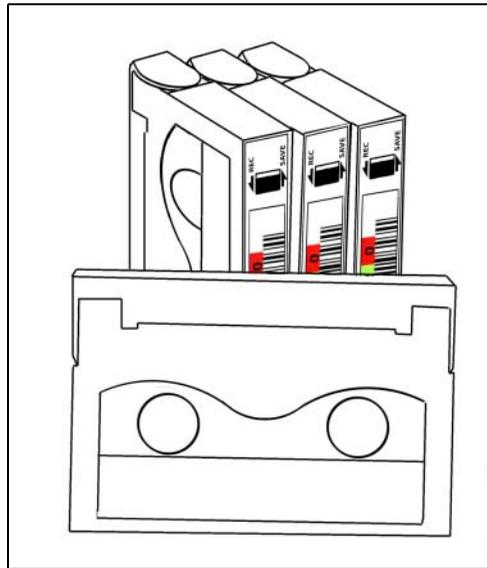


Figure 10-3 *AIT-2 data cartridges.*

## Cleaning the AIT Drive Heads

The Sony AIT drives feature a built in cleaning function to prevent and recover from head contamination. However, occasional cleaning with approved SONY Cleaning Media may be required for excessive head contamination.

Head cleaning should be performed in the following situations:

- ◆ When the drive fails to write or read data correctly.

---

**Note:** Dirty heads are not the only cause of read/write failures. Damaged media can also cause this type of failure.

---

- ◆ Some installations may require scheduled head cleaning using a cleaning cassette. Most software applications have features that allow

scheduled automatic head cleaning of tape libraries. Scheduled cleaning should be considered in installations having high amounts of airborne particulates.

---

**Caution:** Do not use the cleaning cartridge for more than the number of specified cleaning cycles indicated on the cartridge label. Mark the cleaning cartridge each time you use it, or use backup software to track cleaning cartridge usage.

---

To clean the drive heads manually:

1. From the General Status screen, tap **Inventory**. This brings up the Inventory screen.



Figure 10-4 The Inventory screen.

2. Tap the **Open/Close** button. A window pops up asking **Open Entry/Exit Port?** Tap **OK**. This opens the E/E door.
3. Insert the cleaning cartridge in any slot available, taking note of the slot number.
4. Tap the **Open/Close** button. A window pops up asking **Close Entry/Exit Port?** Tap **OK**. This closes the E/E door.
5. Select the slot which holds the cleaning cartridge. Then select the drive you wish to clean.

6. Tap **Move**. The Confirm Move window appears:

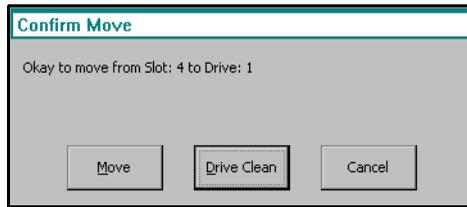


Figure 10-5 *The Confirm Move window.*

7. Tap **Drive Clean**.
8. The cleaning cartridge moves to the selected drive, and begins cleaning the heads automatically. The library moves the cartridge back to the slot you selected for it originally.
9. Tap **Open/Close**. A window pops up asking **Open Entry/Exit Port?** Tap **OK** Remove the cartridge.
10. Tap **Open/Close** again. A window pops up asking **Close Entry/Exit Port?** Tap **OK** This closes the E/E door.

# 11 Maintaining the Spectra 12000 Library

Spectra 12000 libraries are easy to maintain. This chapter reviews:

- ◆ Changing the Spectra 12000 Library Air Filters
- ◆ Adding Drives
- ◆ Adding QIPs
- ◆ Troubleshooting the Spectra 12000 Library
- ◆ Purchasing Additional Accessories
- ◆ Purchasing Custom Bar Code Label Sequences
- ◆ Purchasing CoD

## Changing the Spectra 12000 Library Air Filters

Spectra 12000 libraries have three replaceable filters inside the front door. Inspect filters every three to four months and replace as necessary. If a filter is contaminated, replace it with a new filter. A clogged air filter blocks air movement within the library, resulting in higher temperatures inside the library. High temperatures may cause operational errors. (See *Purchasing Additional Accessories* on page 153.)

To check and replace the filter:

1. Open the front door of the library. To do this:
2. Go to the Library Controller. Select **Status** from the General toolbar. The General Status screen appears (Figure 11-1).

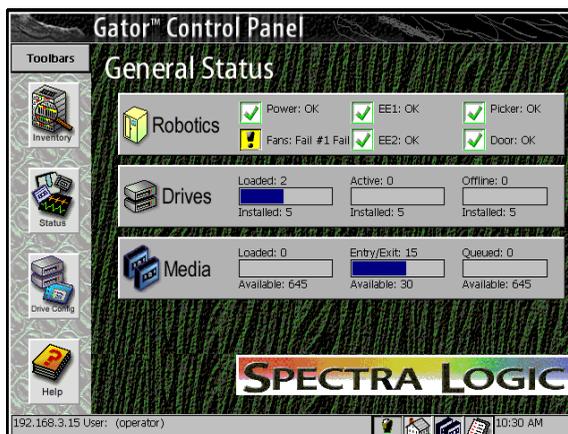


Figure 11-1 The General Status screen.

3. Select **Robotics**. The System Setup screen appears. At the bottom of this screen, tap the button marked **Open System Door**. This disengages the solenoids (electronic door latches).
4. Use the door key to unlock the front door of the library.
5. You can now open the door.
6. Unscrew the two screws that attach the filter assembly to the back of the door.

7. Slide the filter assembly up and out from the door to disengage the four metal hooks.
8. Inspect the filter and replace it if necessary.
9. Remove the old filter by pulling it out from under the six tabs on the filter bracket.
10. Slide the new filter under the four tabs, so that the filtered side is facing the door, and the plastic side is facing the chassis. Ensure the filter is centered in the bracket and is covering all the hexagonal cutouts.
11. Align the four hooks on the filter bracket with the four slots on the door and slide the filter assembly down until it is engaged with the door.
12. Screw down the two screws into the door, making sure all four hooks are fully engaged with the door.
13. Close the front door and use the key to lock the door.

## Adding Drives

The Spectra 12000 library readily accepts additional drives up to a maximum of eight drives. Although robotic operations are disabled when the front door is open, the library continues operation while you add or remove a drive. No tools are required.

1. In the Library Controller, select the General Toolbar.
2. Tap **Drives**.

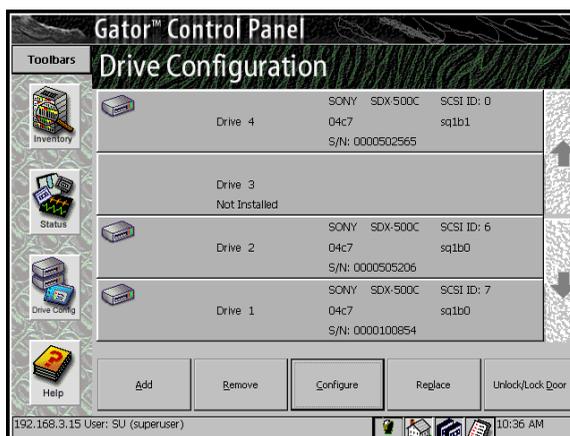


Figure 11-2 The Drive Configuration screen.

3. Select the drive slot where you want to add the drive by tapping on the bar for that drive.
4. Tap **Add**.
5. A Confirm Selection window pops up asking **Okay to add drive?** Tap **OK**.

---

**Note:** When you do this, the solenoid latches on the door should open automatically.

---

6. A window pops up with the message **Open Door and Add Drive. Close and latch door. Tap Ok when complete.**

7. Use the door key to open the library door.
8. Slide the new drive into the appropriate slot for the QIP it will be attached to.



Figure 11-3 *Adding a drive.*

9. Press the drive firmly inward until the LED lights and position it so it is flush with the right side of the library chassis.
10. Close and latch the door of the library.
11. Secure the lock with the key.
12. Tap **OK** on the Control Panel.

13. The Drive Configuration window automatically pops up.

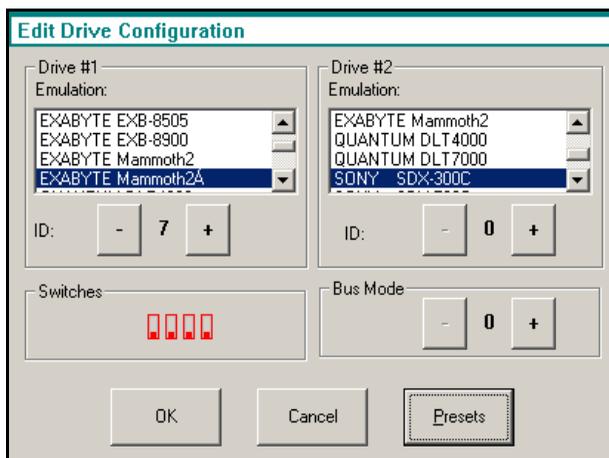


Figure 11-4 The Drive Configuration window.

The Drive Configuration screen displays the drive you added, as well as any other drive on the same bus.

From the Drive Configuration screen, you can set emulation and SCSI IDs.

---

**Note:** Setting SCSI IDs applies to S-QIPs and L-QIPs only. F-QIP and E-QIP drive IDs are hard coded and cannot be modified.

---

14. Tap +/- to select the SCSI ID.

---

**Note:** The drive's SCSI ID must be unique from the QIP bus, other drives on the QIP bus and any device on the host bus it is attached to.

---

15. Tap **Presets** to select drive switch settings and emulation for your operating system (Figure 11-5). Select your operating system and tap **OK**. If the selections do not include your operating system, tap **Cancel**.

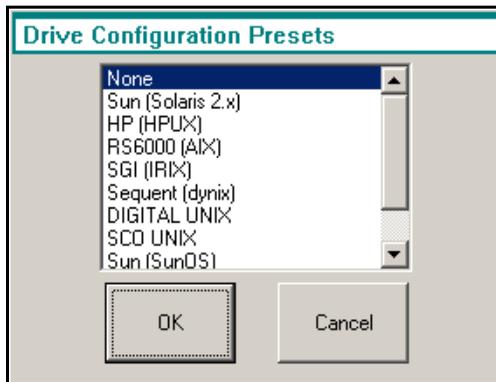


Figure 11-5 The Drive Configuration Presets window.

16. If your operating system is not included in the Drive Configuration Presets window, tap **Switches** in the Drive Configuration window. This opens the Drive Switches window (Figure 11-6). You can set the drive switches manually here.

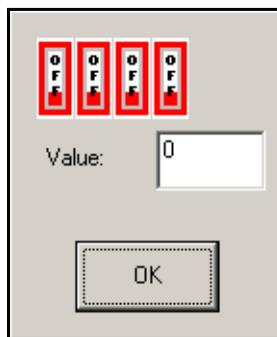


Figure 11-6 The drive switches window.

---

**Note:** Do not set the drive switches manually unless one of the preset drive switch settings doesn't work with your operating system.

If you need to set drive switches manually, call Spectra Logic Technical Support at (800) 227-4637 for help.

---

17. Set the switches and tap **OK** to exit.
18. If your operating system is not included in the Drive Configuration Presets window, you can use the **Emulation** option to change the drive SCSI Inquiry identification from the default Sony SDX-500C or SDX-700C. You can also add a drive emulation not on the list by using the User Defined option in the Emulation window.
19. Tap **OK** here to save the emulation, dip switch, and SCSI ID settings to the QIP and LCM board. The Library Controller will remember this information when you come back to these screens.
20. Repeat Steps 2 through 10 for each drive. Emulation information displays in the Drive Configuration screen for each drive you have configured.

## Adding QIPs

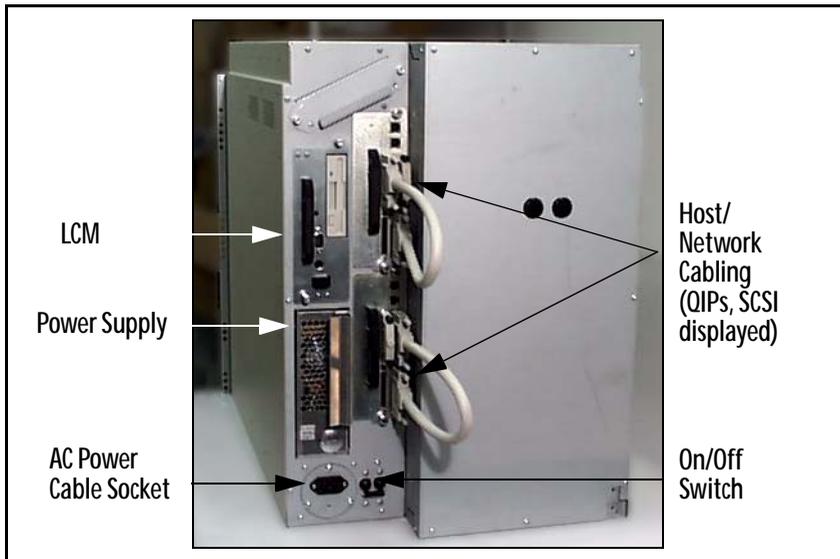


Figure 11-7 *Spectra 12000 library, rear view.*

1. Make sure you have four feet of clearance at the back of the library.

2. Go to the rear panel of the library. Have the new QIP ready. Align it to ride inside the top and bottom rails. Push firmly into place.



Figure 11-8 Adding a QIP.

3. Tighten the two captive screws.
4. Connect cabling, as described in *Connecting the SCSI Cables and Terminators* on page 32.
5. Configure the QIPs:
  - ♦ If an S-QIP turn to *Configuring the Spectra 12000 S-QIP* on page 47.
  - ♦ If an F-QIP turn to *Configuring the Spectra 12000 Library F-QIP* on page 55.
  - ♦ If an E-QIP turn to *Configuring the Spectra 12000 E-QIP* on page 65.

## Troubleshooting the Spectra 12000 Library

The following procedures solve many common problems:

- ◆ Troubleshooting Library Initialization
- ◆ Troubleshooting SCSI Problems
- ◆ Troubleshooting Fibre Channel Device Problems

### Troubleshooting Library Initialization

To troubleshoot problems with the library initialization:

1. Make sure the power cable is securely inserted in the library and the wall outlet.
2. Make sure the door is completely closed and key is turned to the locked position.
3. Make sure each device on the SCSI bus is set to a unique SCSI ID number.

### Troubleshooting SCSI Problems

To troubleshoot problems with a SCSI device:

1. Make sure each SCSI device in your SCSI chain has a unique SCSI ID. If two or more devices have the same ID, the computer may stop when you try to use the robotics or fail to recognize other SCSI devices.
2. Make sure the SCSI host adapter card is firmly seated in the card slot in your server computer.
3. Make sure the SCSI bus is terminated at both ends.
4. Make sure that the terminator is correct for the type of SCSI bus you are using.
5. Make sure all cable connectors are firmly seated.
6. Make sure the chain of SCSI devices is compatible: SCSI-III devices may not function on SCSI II cables; SCSI II devices may not function on SCSI-III cables.

7. Recalculate the length of the SCSI bus including the cables inside the library and server computer. The maximum length specified in *SCSI Cable Requirements* on page 159 includes cables inside the library.

## Troubleshooting Fibre Channel Device Problems

To troubleshoot problems with a Fibre Channel device:

1. Check cable connections to devices.
2. If connecting through a third party device such as a hub or a switch, check functionality on that device. Check link status and activity lights.
3. Make sure the Fibre Channel host adapter card is firmly seated in the card slot in your server computer.
4. Make sure the latest driver has been loaded from the Host Adapter manufacturer's site.
5. Follow guidelines in the *Spectra Logic Server Setup Guide* located on the Spectra Logic Web site at: [www.spectralogic.com](http://www.spectralogic.com).
6. Check if all devices attached to the loop are in our interoperability matrix.
7. Make sure all cable connectors are firmly seated (and screwed in if possible).

## Purchasing Additional Accessories

Spectra Logic accessories are available directly from Spectra Logic (including bar code labels numbered sequentially from 0000000 to 0000179 and from 0000000 to 0000719).

To order approved Spectra Logic accessories, call toll free (800) 833-1132, and ask for a sales representative.

Accessory	Part Number
AIT-2 Data Cartridge Magazine and cover	90870652
170 meter AIT-2 Tapes, 36 GB capacity, with MIC <ul style="list-style-type: none"> <li>• 15 tapes and DCM</li> <li>• single tape</li> </ul>	90870675 5155
230 meter AIT-2 Tapes, 50 GB capacity, with MIC <ul style="list-style-type: none"> <li>• 15 tapes and DCM</li> <li>• single tape</li> </ul>	90870670 5722
AIT-2 cleaning cartridge	4569
180 AIT-2 bar code Labels	92844100
720 AIT-2 bar code labels	90840260
Replacement key set	5529
4 Pack of Spectra 12000 library front door filters	90919015
Stylus	5432

---

**Note:** A complete list of media options is available at <http://www.spectrallogic.com/media.htm>.

---

## Purchasing Custom Bar Code Label Sequences

Bar codes for custom sequences can be purchased through distribution. For information on the required specifications, refer to *Bar Code Labels* on page 134. The part number for AIT bar code labels is: #1699-26 EDP. Companies to contact are:

ISSI Data Products  
22122 20th Ave. S.E.  
Suite 152  
Bothell, WA 98021  
Phone: (206) 343-7283

Richard Young Corporation  
14818 W. 6th Ave.  
Golden, CO 80401  
Phone: (303) 576-5881

## Purchasing CoD

CoD is a capacity on demand feature that allows customers to activate additional capacity in their tape library as their storage needs grow. Spectra Logic's CoD eliminates the need to estimate data growth curves and future storage needs, saving time and money.

With CoD, customers initially purchase a tape library fully populated, but only use and pay for what their current backup needs require. When ready to increase storage needs, customers purchase 15 slot packages that are one and a half terabytes of storage. The upgrade process that used to take weeks, now takes minutes, and customers pay as their storage needs grow.

## To enable CoD

1. From the General Status screen, tap **Robotics**. The System Setup screen appears (Figure 11-9).

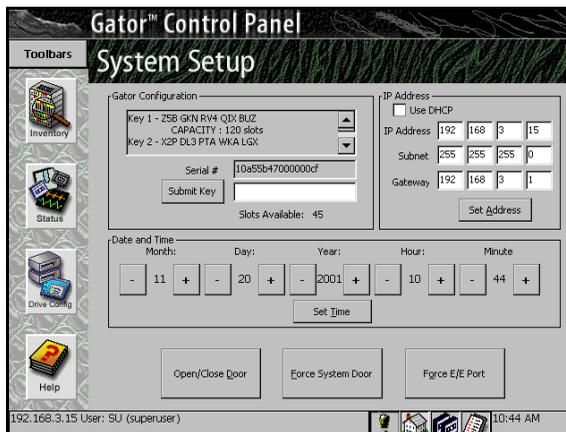


Figure 11-9 *The System Setup screen.*

2. To enable CoD, you will need to obtain an enablement key from Spectra Logic. Contact Spectra Logic with the serial number of the device, as displayed in the Serial # field, to obtain the activation key.
3. Tap the blank field to the right of **Submit Key**.
4. A virtual keyboard appears. Enter the key.
5. Tap **OK** on the virtual keyboard.
6. Tap **Submit Key**.



# Appendix A. Fibre Channel Cable Requirements

To operate correctly, the Spectra 12000 library must meet certain Fibre Channel Cable Requirements:

## Fibre Channel Cable Requirements

All Fibre Channel cabling should comply with *Fibre Channel Physical and Signaling Interface - 3, (Fc-Ph-3), Rev 9.3*.

Cable Feature	Requirement
Standard Construction	Four conductor 1500hm differential, copper wire. Insulated and shielded.
Connector	DB-9 male to DB-9 male or HSSDC connector (SC-duplex for Optical with MIA)
Grounding	Case to Case grounding through shield.



# Appendix B. SCSI Cable and Terminator Requirements

To operate correctly, the Spectra 12000 library must meet certain requirements which are discussed in the following sections:

- ◆ SCSI Cable Requirements
- ◆ SCSI Terminator Requirements

## SCSI Cable Requirements

The following table lists the recommended specifications for a SCSI cable:

Cable Feature	Requirement
Standard Construction	68 conductors (34 twisted pairs with drain wire and shield)
Primary Conductors	Insulated per UL Style 1589 Gauge: #28 AWG minimum stranded (7/34) annealed, tinned copper Insulation: Polypropylene (176° F) (80° C) 0.010 inch nominal
Shielding	80% minimum tinned copper braid over aluminum/mylar foil
Outer Jacket	Insulated per UL Style 2919, polyvinyl chloride (PVC) (176° F) (80° C)
Voltage Rating	30 VAC
Impedance	100 Ohms $\pm$ 10% @ 1.5 MHz
Grounding	Case to case grounding
Connector	68-contact AMP Amplimate 0.050 male, shielded, SCSI-3 connector

The maximum length of the SCSI cable (including the internal and the external cable) depends on the SCSI configuration:

**Differential SCSI** Maximum allowable bus length is 60 feet (20 meters) including the eight inches (20 centimeters) of cabling inside the library.

**LVD SCSI** Maximum allowable bus length is 39 feet (12 meters), including the eight inches (20 centimeters) of cabling inside the library.

Follow these steps to determine if your SCSI configuration complies with the maximum cable length specifications:

1. Measure the length of the SCSI cables between each device on the SCSI bus.
2. Add these lengths together.
3. To that sum, add eight inches (20 centimeters) for the cabling inside each Spectra 12000 library.
4. Differential configurations must not exceed 60 feet (20 meters) in length.
5. LVD SCSI configurations must not exceed 39 feet (12 meters) in length.

## SCSI Terminator Requirements

If the library is the last device on the SCSI bus, a terminator must be attached to the empty SCSI connector on the back of the library.

The SCSI terminator must be the correct SCSI type, either Differential or LVD. Two terminators are provided for each QIP.

---

**Note:** For best performance, use the terminator included with the Spectra 12000 library.

---

# Appendix C. Specifications

This appendix contains the following information.

- ◆ Sony AIT Tape Specifications
- ◆ Sony AIT-2 Tape Drive Specifications
- ◆ Sony AIT-3 Tape Drive Specifications
- ◆ Power Requirements
- ◆ Operating Environment Limits

## Sony AIT Tape Specifications

Sony is the only manufacturer of AIT-2 and AIT-3 tape cartridges. The table below lists the capacity of the AIT-2 or AIT-3 tape cartridge.

---

**Note:** All specifications are subject to change without notice.

---

Tape Type	Manufacturer	Length	Capacity
AIT-2	Sony	170 meters	36.0 GB native, 93.6 GB with ALDC
AIT-2	Sony	230 meters	50 GB native, 130 GB with ALDC
AIT-3	Sony	230 meters	100 GB native, 260 GB with ALDC

## Sony AIT-2 Tape Drive Specifications

The following table summarizes the specifications for the Sony SDX-500C AIT drive.

Parameter	Specification
Ambient operating temperature <sup>a</sup>	+41°F to +104°F (+5°C to +40°C)
Storage temperature	-41°F to +158°F (-40°C to +70°C)
Operating humidity	20% to 80% non-condensing
MTBF	200,000 hours @ 20% duty cycle
Average access time	< 55 seconds
Uncorrectable error rate	< $1 \times 10^{-17}$ bits
Sustained transfer rate <sup>b, c</sup>	6 Mbytes /second native
Burst transfer rate <sup>d</sup>	40 Mbytes/s Synchronous maximum

- a. The upper limit applies to the drives themselves. The temperature limits for the Spectra 12000 library are given in *Operating Environment Limits* on page 165. Be sure there is adequate air flow around the library at all times.
- b. This is a per drive value. Total sustained transfer rate for the library depends on the number of drives installed in the library.
- c. The sustained transfer rate per drive can increase by an average of 2.6 times the specified value with compression. Compression throughput and capacity depends on the type of data.
- d. The actual burst data transfer rate is limited by the performance of the SCSI host bus adapter, the SCSI bus interface controller, and the buffer control hardware of the drive.

## Sony AIT-3 Tape Drive Specifications

The following table summarizes the specifications for the Sony SDX-700C AIT drive.

Parameter	Specification
Ambient operating temperature <sup>a</sup>	+40°F to +104°F (+5°C to +40°C)
Storage temperature	-40°F to +158°F (-40°C to +70°C)
Operating humidity	20% to 80% non-condensing
MTBF	400,000 hours @ 100% duty cycle
Average access time	< 27 seconds
Uncorrectable error rate	< $1 \times 10^{-17}$ bits
Sustained transfer rate <sup>b, c</sup>	12 Mbytes /second native
Burst transfer rate <sup>d</sup>	160 Mbytes/s Synchronous maximum

- a. The upper limit applies to the drives themselves. The temperature limits for the Spectra 12000 library are given in *Operating Environment Limits* on page 165. Be sure there is adequate air flow around the library at all times.
- b. This is a per drive value. Total sustained transfer rate for the library depends on the number of drives installed in the library.
- c. The sustained transfer rate per drive can increase by an average of 2.6 times the specified value with compression. Compression throughput and capacity depends on the type of data.
- d. The actual burst data transfer rate is limited by the performance of the SCSI host bus adapter, the SCSI bus interface controller, and the buffer control hardware of the drive.

## Power Requirements

### Spectra 12000 Library

Power requirements for the Spectra 12000 library are listed in the table below:

Source	Requirements
Input Voltage	100-120 volts-AC at 6 Amps or 200-240 at 3 amps
Input Power	600 Watts maximum
Input Frequency	50/60 Hz

**Power Cable** The power cable included with the Spectra 12000 library is a standard, three conductor cord safe for 120 volt use in the United States and Canada. The cable has a molded NEMA 5-15P male connector to plug in the wall and a molded IEC60320 C13 female connector to plug in the library.

**Outlet** The outlet a customer must provide for the library is a NEMA 5-15R (5=110VAC, 15=Circuit Rated Amperage, R=receptacle).

---

**Note:** To use the library outside of the United States or Canada, the power cord must meet the specifications for that country.

---

## Operating Environment Limits

Place the library and media in a reasonably controlled environment that does not exceed the environment limits listed in the table below.

Condition	Minimum	Maximum
Operating Temperature (Ambient Outside Library)	35° F (2° C)	86° F (30° C)
Storage Temperature	-40° F (-40° C)	158° F (70° C)
Relative Humidity (non-condensing)	20%	80%
Max. wet bulb temperature	N/A	77° F (25° C)
Altitude	sea level (0 m)	9,842 ft (3,000 m)

## Acoustic Noise Limits

The overall A-weighted sound power level (in decibels) for the library does not exceed the limits listed below.

Operating Mode	LWA <sup>a</sup>
Library is powered on and idle	60 dbA
Library is operational (picker is moving and tape drives are streaming)	35 dbA

- a. LWA is the average A-weighted sound power level over the following frequency range: 5Hz to 12.5Hz.

## Shock and Vibration Specifications

Load	Limit
Shock (operating, no data loss)	5.0 peak for 3 ms duration <sup>a</sup>
Shock (non-operating, no device damage)	15 G peak 15 ms duration <sup>a</sup>
Vibration (operating)	0.25 G peak <sup>b</sup>
Vibration (non-operating)	0.5 G peak <sup>b</sup>

a. Half sine, 3 axis, 3 direction, 10 second interval.

b. Swept sine 5 to 500 Hz, 1 Octave per minute, 3 axis, 3 directions.

# Appendix D. Regulatory and Safety Standards

The Spectra 12000 library complies with the following regulatory and safety standards and is authorized to bear the mark of the corresponding agencies.

## Safety Standards

- ◆ UL-1950
- ◆ C-UL (Tested to CSA 950 Standards)

## FCC Statement

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules.

These limits are designed to provide reasonable protection against harmful interference when operated in a commercial environment.

The equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

Operation of this equipment in a residential area is likely to cause harmful interference, in which case, the user will be required to correct the interference at his or her expense.

Any changes or modifications to this equipment not expressly approved by Spectra Logic could void the user's authority to operate this equipment.

## EU Declaration of Conformity

We

Spectra Logic Corporation  
1700 North 55th Street  
Boulder, Colorado 80301 USA

declare under sole responsibility that

Spectra Logic's Spectra 12000 libraries

to which this declaration relates, meets the essential health and safety requirements and is in conformity with the EU Directives listed below using the relevant section of the EU standards and other normative documents.

**EMC Directive 89/366/EEC** Essential health and safety requirements relating to electromagnetic compatibility

**EN 50 081** Electro Magnetic Compatibility - Generic Emission Standard Part 1: Residential, commercial and light industry

**EN 55 022** Radiated/Conducted Emissions

**EN 61 000-3-2** Harmonic Currents Emission

**EN 61 000-3-3** Limitation of Voltage Fluctuation and Flicker

**EN 50 082-1** Electro magnetic compatibility - Generic Immunity Standard Part 1: Residential, commercial and light industry

**EN 61 000-4-2** Electrostatic discharge requirements (ESD)

**EN 61 000-4-3** Radiated, radio frequency electromagnetic field

**EN 61 000-4-4** Electrical fast transients (Burst)

**EN 61 000-4-5** Transients (Surge)

**EN 61 000-4-6** Conducted disturbances inducted by radio-frequency fields

**EN 61 000-4-11** Voltage interruptions, dips, fluctuations

The Spectra 12000 library complies with all safety relevant provisions referring to:

- ◆ Protection against electrical hazards
- ◆ Protection against such hazards as:
  - Mechanical Hazards
  - Fire Hazards
  - Noise
  - Vibration

The safety issues of this information technology equipment type have been evaluated by an accredited third party organization.

The CE marking has been affixed on this device according to the article 10 of the EU Directive 90/336/EEC.

## Japan VCCI Class A Statement

この装置は、クラス A 情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

VCCI-A

## Taiwan BSMI Statement

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



# Appendix E. Using the TAOS ITP Control Panel to View Settings

## Opening the TAOS ITP Configuration Control Panel

To open the TAOS ITP Configuration Control Panel:

1. Click on **Start, Settings, then Control Panel.**
2. Click on the TAOS ITP icon. The Device Discovery option on the TAOS ITP Configuration window displays (Figure 11-10).

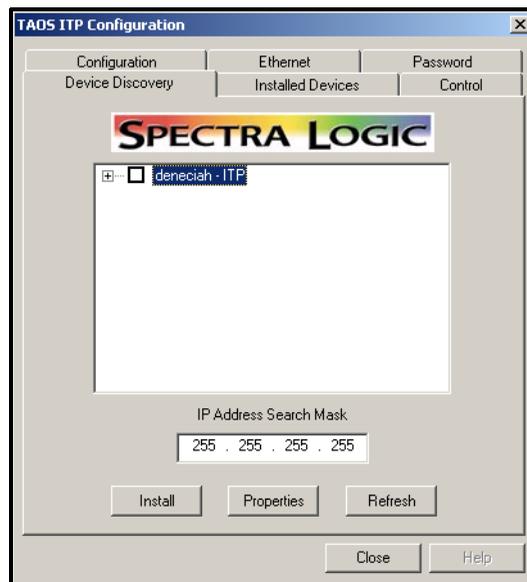


Figure 11-10 The TAOS ITP Configuration control panel.

Use the following screens to configure TAOS ITP:

## **Device Discovery**

Use this screen to view the TAOS enabled new devices attached to the network.

## **Installed Devices**

Use this screen to show installed devices.

## **Ethernet**

Use this to view the standard IP address, the IP network mask, the IP gateway, and whether DHCP has been enabled or disabled.

## **Password**

Use view the configuration password. When a password is set, it will need to be entered to make any configuration changes.

## **Control**

Use to view whether access to the library or components of a library has been restricted to an IP address.

## Appendix F. Using the Serial Port Interface

Connect a serial cable to the E-QIP diagnostic port, labeled DIAG 1, with a serial port terminal emulation application like HyperTerminal running on a host computer. The serial port settings are as follows:



Figure 11-11 *Serial port settings.*

- ◆ Bits per second (BAUD): 115200
- ◆ Data bits: 8
- ◆ Parity: None
- ◆ Stop bits: 1
- ◆ Flow control: None

The TAOS Configuration menu displays:

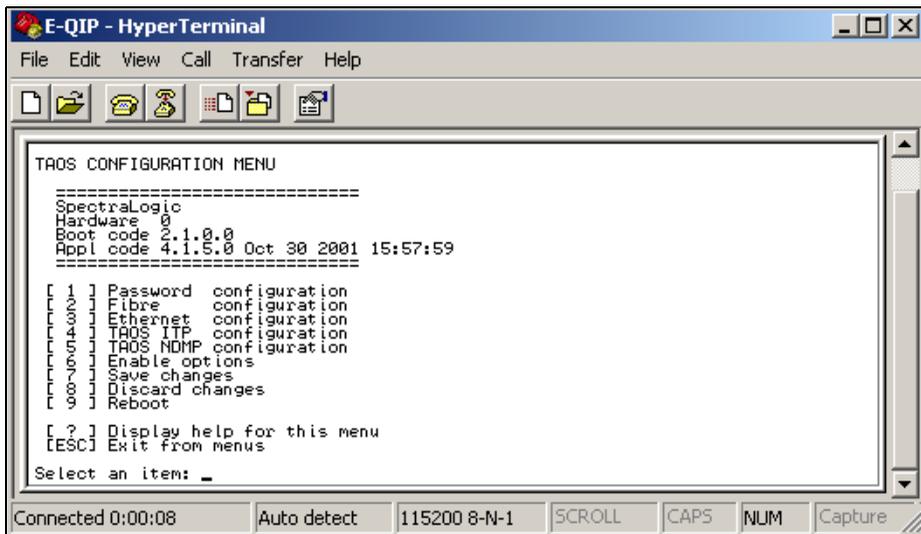


Figure 11-12 The TAOS Configuration menu.

## Password Configuration

The Password Configuration menu allows you to set or change the configuration password. To launch the Password Configuration menu, select 1.

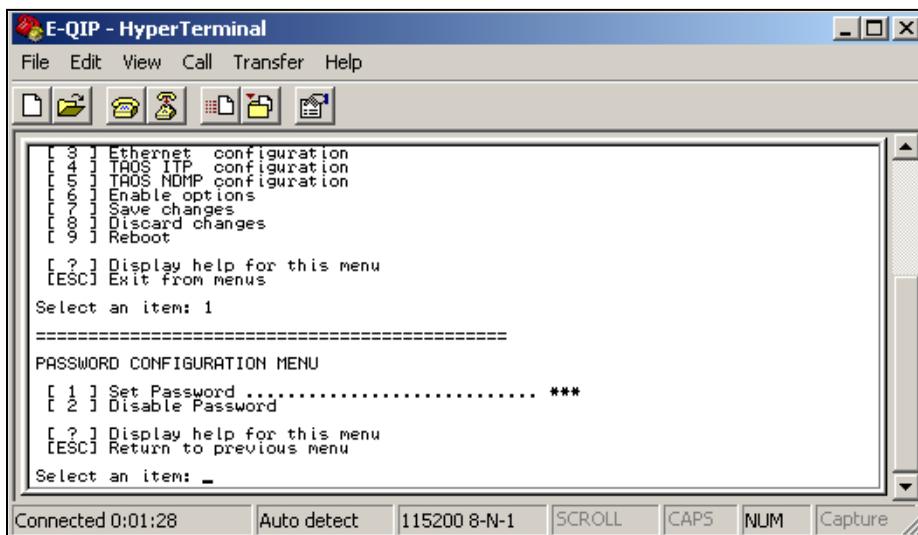


Figure 11-13 The Password Configuration menu.

**[1] Set Password:** Select to set or change the password. If changing the password, you will be prompted to enter your password, then prompted to enter it again. When a password is set, it will need to be entered to make any subsequent configuration changes to the unit.

**[2] Disable Password:** Select to disable your password.

**[?] Help:** Displays help for this menu.

**[Esc] Return to Main Menu:** Returns you to the main menu.

## Fibre Configuration

The Fibre Configuration menu allows you to configure the fibre port. To launch the Fibre Port Configuration menu, select 2.

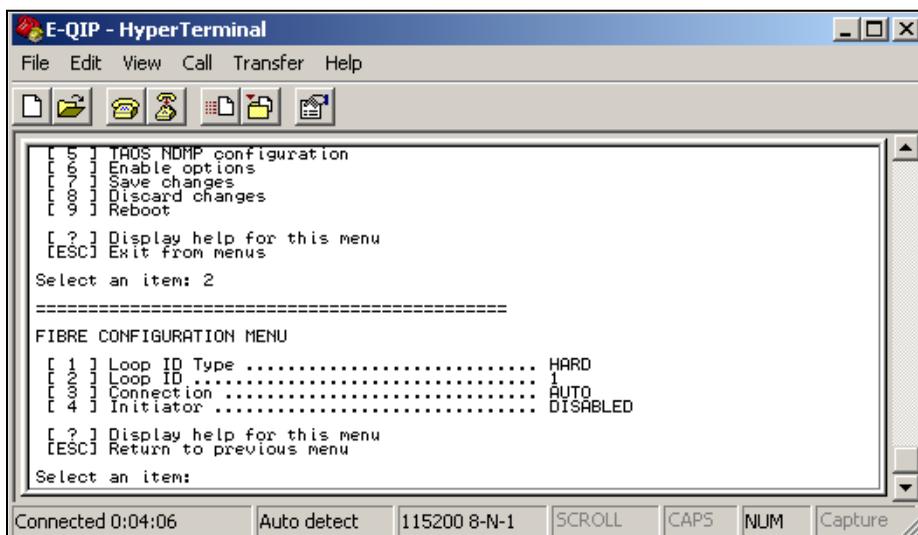


Figure 11-14 The Fibre Configuration menu.

To configure the fibre port, use the following commands:

**[1] Loop ID Type:** Toggles between hard and soft loop ID. If a hard loop ID is selected you will be asked to provide a loop ID number. No loop ID number is needed for a soft loop ID.

**[2] Loop ID:** Only necessary with a hard loop ID.

**[3] Connection:** Prompts for selection of Loop, Fabric or Auto for fibre connection mode.

**[3] Initiator:** Either enabled or disabled. This should be disabled unless your environment can handle multiple fibre initiators on the same loop.

**[?] Help:** Displays help for this menu.

**[Esc] Return to Main Menu:** Returns you to the main menu.

## Ethernet Configuration

The Ethernet Configuration menu allows you to configure the ethernet port. To launch the Ethernet Configuration menu, select 3.

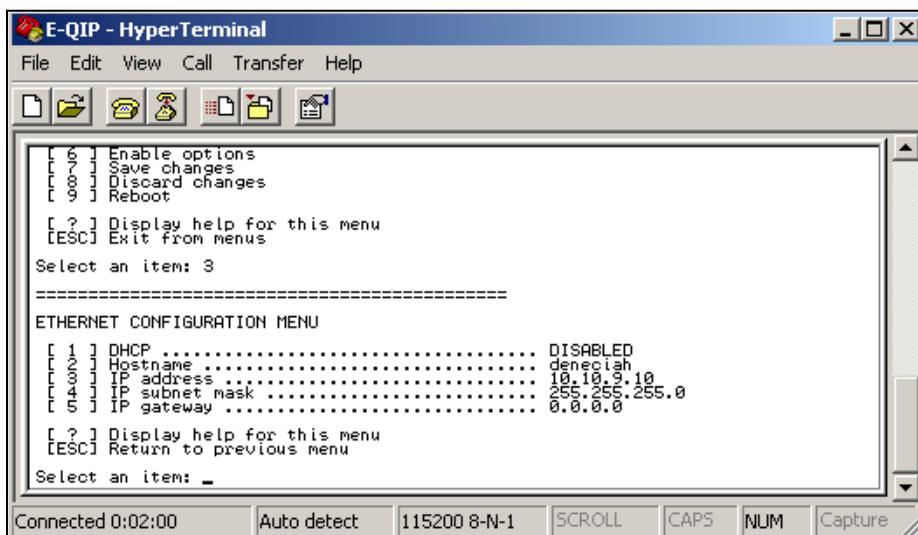


Figure 11-15 *The Ethernet Configuration menu.*

To configure the ethernet port, use the following commands:

**[1] DHCP:** Either enabled or disabled. Make sure to provide a hostname when DHCP is enabled; it is necessary to provide system identification to the DHCP host. If DHCP is disabled, you must provide a static IP address.

**[2] Hostname:** The name for the IP interface. This is used by DHCP and DNS for name resolution. The hostname should be less than 12 characters to support DHCP and DNS naming conventions.

**[3] IP address:** Standard IP address. This field is not available while in DHCP mode.

**[4] IP subnet mask:** IP network mask (standard IP parameter).

**[5] IP gateway:** Gateway address (standard IP parameter).

[?] Help: Displays help for this menu.

[Esc] Returns you to the main menu

## TAOS ITP Configuration

The ITP Configuration menu allows you to set ITP security. To launch the ITP Configuration menu, select 4.

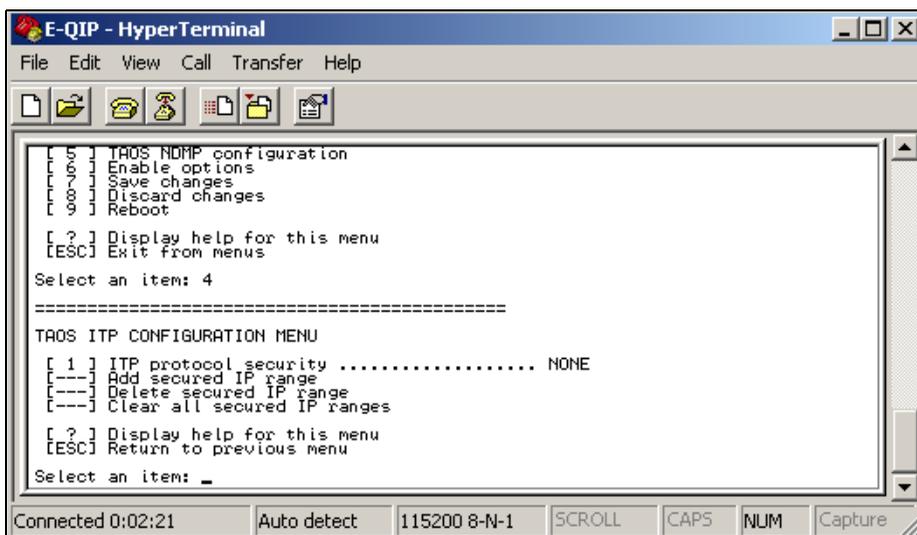


Figure 11-16 *The ITP Configuration menu.*

**[1] ITP security:** Select to set ITP security on devices from those hosts specified within the IP range. If ITP security is not selected, any host on the network can access the TAOS enabled Spectra 12000 library.

**[2] Add secured IP range:** If you have set ITP security, use this option to add a secured IP range. If security is turned on, the Spectra 12000 library will only respond to hosts in the secured IP address range(s).

**[3] Delete secured IP range:** Use this option to delete a secured IP range.

**[4] Clear all secured IP ranges:** Use this to clear all IP ranges you have secured.

[?] Help: Displays help for this menu.

[Esc] Returns you to the main menu

## TAOS NDMP Configuration

To enable and configure TAOS NDMP, refer to *Setting Up NDMP Enabled by TAOS* on page 100.

## Enable Options

The Options Enablement menu allows you to enable and disable paid options for Serverless Backup and NDMP Network Backup. To launch the Options Enablement menu, select 6.

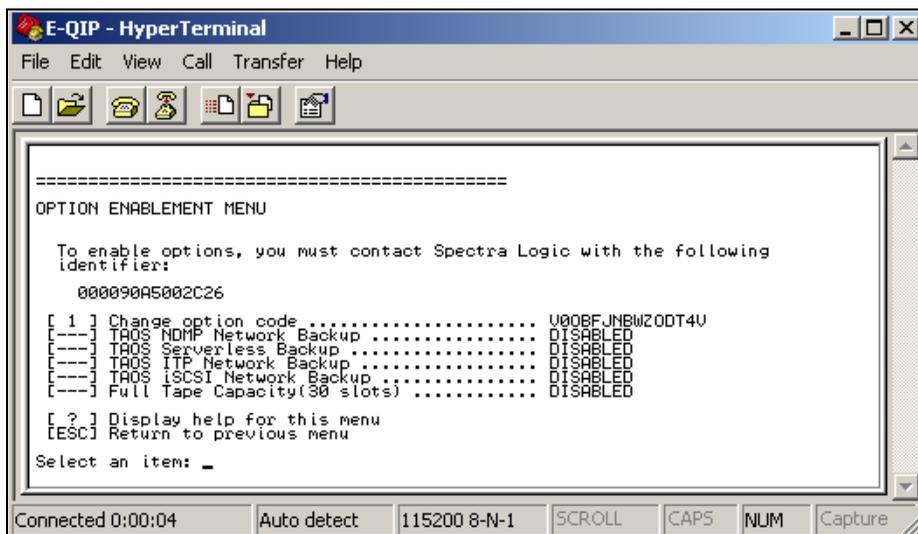


Figure 11-17 *The Option Enablement menu.*

Contact Spectra Logic with the identifier of the device, as displayed on this page, to obtain an option code value that will enable options for this device.

**[1] Change option code:** Enter the option code from Spectra Logic to enable options.

**[?] Help:** Displays help for this menu.

**[Esc]** Returns you to the main menu

## Save Changes

Select 7 to save all changes made during the configuration session.

## Discard Changes

Select 8 to discard all changes made during the configuration session.

## Reboot

Select 9 to reboot. This is highly recommended after all changes and is the only way to make sure user options are congruous with operational variables.

## Help

Select ? to display help for the menu.

## Exit

Tap the **Esc** button to escape from any menu.

# Glossary of Terms

---

**10BaseT** 10-Mbps baseband Ethernet specification using two pairs of twisted-pair cabling, one pair for transmitting data and the other for receiving data. 10BaseT has a distance limit of approximately 328 feet or 100 meters (see Ethernet).

**100BaseT** 100-Mbps baseband Fast Ethernet specification using UTP wiring. 100BaseT link pulses contain more information than those used in 10BaseT (see Ethernet).

---

**AIT** Advanced Intelligent Tape. Sony tape drive products featuring different capacities and transfer rates: AIT-1–35 GB native capacity, 3 MB/s transfer rate; AIT-2–50 GB native capacity, 6 MB/s data transfer rate; AIT-3–100 GB native capacity, 12 MB/s data transfer rate.

**AME** Advanced Metal Evaporated. A type of Sony data tapes that use a process which allows larger amounts of tape to be stored in smaller cartridges and maximizes data, while increasing reliability.

---

**Bus** When referring to a computer system, a bus is a collection of wires through which data is transmitted from one part of a computer to another.

---

**CAN** Controller Area Network. The internal bus system on which the library is controlled.

<b>CoD</b>	A capacity on demand feature of Spectra Logic libraries that allows the user to purchase additional storage capacity instantaneously.
<b>Controller</b>	The controller is the QIP assigned to control each partition. See also, QIP and Partition.
<hr/>	
<b>DHCP</b>	Dynamic Host Configuration Protocol. An Ethernet protocol used in heterogeneous networks.
<hr/>	
<b>E-QIP</b>	Ethernet Quad Interface Processor. A type of QIP used to control the library over an Ethernet interface connection.
<b>ECC</b>	Error correction code.
<b>E/E Port</b>	Entry/Exit Port. The port through which you insert and remove data tape cartridges into your Spectra 12000 or Spectra 64000 libraries.
<b>Ethernet</b>	Ethernet uses a bus or star topology and supports data transfer rates of 10 Mbps and is one of the most widely implemented LAN standards. (See Mbps, and GIG E.)
<hr/>	
<b>F-QIP</b>	Fibre Channel Quad Interface Processor. A type of QIP used to control the library over a Fibre Channel interface connection.
<b>Fibre Channel</b>	Fibre Channel is a type of interface connection that uses optical and copper cables.
<b>Firmware</b>	Software embedded within library hardware. Firmware can be updated with the Library Controller (LC).
<hr/>	
<b>GBIC</b>	Gigabit Interface Converter.

<b>GCP</b>	See LC.
<b>GIG E</b>	Gigabit Ethernet. The latest version of Ethernet, supporting data transfer rates of 1 Gigabit per second.
<b>GUI</b>	Graphical User Interface. The GUI for the Spectra 12000 library and the Spectra 64000 library is the Library Controller (LC).
<hr/>	
<b>HBA</b>	Host Bus Adaptor.
<b>Host</b>	The computer system to which your library is connected.
<b>HVD</b>	High Voltage Differential. HVD is a type of interface connection.
<hr/>	
<b>IP Address</b>	Internet Protocol address allows users to access their library remotely.
<b>I/O</b>	Input/Output.
<b>iSCSI</b>	Enables the transport of SCSI I/O traffic over standard IP networks, such as Gigabit Ethernet.
<b>ITP</b>	Internet Tape Protocol.
<hr/>	
<b>L-QIP</b>	Low Voltage Differential Quad Interface Processor. A type of QIP used to control the library over an LVD SCSI connection.
<b>LAN</b>	Local Area Network. A computer network that spans a relatively small area.
<b>LC</b>	Library Controller. Formerly the Gator Control Panel (GCP).
<b>LCM</b>	Library Control Module. Formerly called Gator Entry Exit Controller (GEEC).

<b>LED</b>	Light Emitting Diode. An electronic device that lights up when electricity is passed through it.
<b>Logical Library</b>	An independently operating subset of the physical library. The subset behaves as though it were its own physical library, using only drives and slots assigned to that logical library on its creation. Logical libraries are configured through the LC. See Partition.
<b>LUN</b>	Logical Unit Number.
<b>LVD</b>	Low Voltage Differential. LVD is a type of interface connection.
<hr/>	
<b>MIC</b>	Memory In Cassette. Referring to a memory chip used in Sony AIT data tape cartridges.
<b>M2</b>	Mammoth 2 is a tape drive developed by Exabyte® Corporation. M2 has a native capacity of 60 GB and a 12 MB/s native transfer rate.
<b>Mbps</b>	Megabits per second, a measure of data transfer speed.
<b>MB/sec</b>	Megabytes per second, a measure of data transfer speed.
<hr/>	
<b>NAS</b>	Network Attached Storage. NAS is a type of network environment that uses a NAS device solely dedicated to file sharing. Storage is not an integral part of the server in a NAS environment. The server still processes the data, but the NAS device delivers the data to the user. A NAS device can exist outside the server in a Local Area Network (LAN).
<b>NDMP</b>	Network Data Management Protocol. Defines a common architecture for the way heterogeneous file servers on a network are backed up.

**OS** Operating System. An OS is used to run applications on your computer interface.

---

**Partition** A process used to assign specific slot addresses and drives of the physical Spectra 12000 library or Spectra 64000 library to one or more logical libraries.

**Physical Library** The entire library, regardless of how it is viewed or used across the network (that is, it may be viewed as one or more logical, or virtual libraries). See also, Logical Library.

---

**QIP** Quad Interface Processor. QIPs run independent logical libraries in a Spectra 12000 library or Spectra 64000 library. QIPs are the controllers of the library partition.

---

**RLC** Remote Library Controller. Remote management for the Spectra 12000 library and Spectra 64000 library. Using a specific IP address, the library can be accessed and run via the internet. Formerly Remote Gator Control Panel (RGCP).

**RGCP** See RLC.

---

**S-QIP** HVD-SCSI Quad Interface Processor.

**SAN** Storage Area Network. A SAN is a network environment involving a high speed subnetwork allowing storage devices to be shared via a server.

**SCSI** Small Computer System Interface. SCSI is an interface connection used to connect peripheral devices to computer systems.

**SLS** Shared Library Services™. A feature of Spectra Logic libraries that allows users to allocate the libraries resources across various platforms.

---

**TAOS™** TAOS is a tape appliance operation system that shares tape backup resources among a large number of users. TAOS makes a tape drive or library accessible to users on a network. TAOS compatible devices are seen by systems with corresponding drivers as natively attached; all applications that work with your existing SCSI backup devices will work seamlessly with TAOS empowered devices. TAOS supports many popular operating systems backup and software applications.

**TDR** Tape device roll-up, used in Silicon Graphics Incorporated (SGI) operating system.

---

**UI** User Interface.

---

**Virtual Library** See Logical Library.

**VXA** A type of tape drive developed by Ecrix with a native capacity of 66 GB and a data transfer rate of 6 MB/sec.

---

**Windows** Windows is a Microsoft operating system.

# Index

---

## A

about  
  TAOS 66  
AC power 164  
  warning 5  
accessories  
  purchasing 153  
air filter  
  replacing 142  
air quality 30  
AIT data cartridges 135

---

## B

bar code labels  
  checksums 134  
  custom sequences 154  
  ordering information 153

---

## C

cabling  
  connecting Fibre Channel 33  
  connecting SCSI 32  
cautions and warnings 4  
checksums 134  
cleaning cartridge  
  ordering 153  
  using 138  
cleaning the AIT drive heads 139  
configuration  
  drives 108  
  ethernet 70, 177  
  fibre 176  
  F-QIP 56  
  ITP security 72, 178  
  NDMP 101  
  password 69, 175  
  S-QIP 49  
  TAOS ITP security 72, 178  
  TAOS NDMP 101  
custom bar code labels 154

---

## D

- data cartridge
  - caring for 137
  - inserting and ejecting 116
  - moving 120
  - purchasing 153
  - specifications 161
  - write-protect tab 136
- data cartridge pack
  - bulk loading 120
  - ordering information 153
  - storing 137
- device problems
  - Fibre Channel 152
  - SCSI 151
- drive
  - adding 144
  - checking drive status 121
  - cleaning the drive heads 138
  - configuring SCSI IDs 108
  - MIC 135
  - specifications 162, 163

---

## E

- E/E
  - cleaning the AIT drive heads 138
  - using to insert/eject cartridges 116
- entry/exit port (see E/E) 19
- environmental parameters 30
- ethernet configuration 70, 177

---

## F

- Fibre Channel
  - cable requirements 157
  - connecting cables 33
  - troubleshooting 152
- fibre configuration 176
- filter clogging 30
- F-QIP
  - configuration 56
  - configure controller screen 58
  - viewing configuration 129

---

## G

- Gator Control Panel
  - tour 21
  - updating firmware 123

---

## I

- installing TAOS ITP
  - on Windows 2000 81
  - on Windows NT 74
- ITP security 72, 178

---

## K

- key
  - ordering replacement 153

---

## L

- labels
  - ordering bar code 153
  - ordering custom 154
  - requirements for bar code 134
- LCM
  - location 27, 36, 149
- library
  - troubleshooting 151
  - troubleshooting initialization 151
- logical library
  - creating 45
- L-QIP
  - location 27, 36, 149

---

## M

- maintenance
  - cleaning drive heads 138
  - data cartridges 137
- MIC, memory in cassette 135

---

## N

- NDMP
  - configuring 101
- no power 151

---

## O

- operating environment 165

---

## P

- partition
  - deleting 132
  - partitioning the library 43
- password
  - configuration 69, 175
- power
  - requirements 164
  - troubleshooting library 151
- purchasing
  - additional accessories 153
  - custom bar code labels 154

---

## R

- REC position on the tape 136
- recording and write-protecting 136
- requirements
  - Fibre Channel cable 157
  - power 164
  - SCSI cable 159
  - terminator 160

---

## S

- SAFE position on tape 136
- SCSI
  - cable requirements 159
  - configure controller screen 51
  - configuring drive SCSI IDs 108
  - connecting the cables 32
  - terminator requirements 160
  - troubleshooting 151
- SLS
  - partitioning the library 43
- specifications
  - environmental 30
  - operating environment 165
  - power 164
  - tape 161
- Spectra 64000
  - parts shipped with 31
- S-QIP
  - configuration 49
  - location 27, 36, 149
- storing cartridges outside the library 137

---

## T

- TAOS
  - overview 66
- TAOS ITP
  - configuration 72, 178
  - enable options 179
  - installation
    - on Windows 2000 81

- on Windows NT 74
    - options enablement 179
- TAOS NDMP
  - configuring 101
- tape
  - caution 4
  - MIC feature 135
  - specifications 161
- terminator requirements 160
- transfer rate per drive 162, 163
- troubleshooting
  - Fibre Channel 152
  - library initialization 151
  - SCSI 151
  - Spectra 64000 library 151

---

## U

- use overview 27
- using the
  - AIT data cartridges 135

---

## W

- warnings and cautions 4
- warranty 4
- Windows 2000
  - installing TAOS ITP 81
- Windows NT
  - installing TAOS ITP 74
- write-protecting and recording 136