

Sun™ StorEdge™ LibMON™ 2.0 Installation and User's Guide



THE NETWORK IS THE COMPUTER™

Sun Microsystems, Inc.
901 San Antonio Road
Palo Alto, CA 94303-4900 USA
650 960-1300 Fax 650 969-9131

Part No. 805-5045-11
November 1998, Revision A

Send comments about this document to: docfeedback@sun.com

Copyright 1998 Sun Microsystems, Inc., 901 San Antonio Road • Palo Alto, CA 94303 USA. All rights reserved.

This product or document is protected by copyright and distributed under licenses restricting its use, copying, distribution, and decompilation. No part of this product or document may be reproduced in any form by any means without prior written authorization of Sun and its licensors, if any. Third-party software, including font technology, is copyrighted and licensed from Sun suppliers.

Parts of the product may be derived from Berkeley BSD systems, licensed from the University of California. UNIX is a registered trademark in the U.S. and other countries, exclusively licensed through X/Open Company, Ltd.

Sun, Sun Microsystems, the Sun logo, AnswerBook, Solaris, Java, the Java Coffee Cup, HotJava, NFS, Sun StorEdge LibMON, Ultra, and Ultra Enterprise are trademarks, registered trademarks, or service marks of Sun Microsystems, Inc. in the U.S. and other countries. All SPARC trademarks are used under license and are trademarks or registered trademarks of SPARC International, Inc. in the U.S. and other countries. Products bearing SPARC trademarks are based upon an architecture developed by Sun Microsystems, Inc. Netscape is a trademark of Netscape Communications Corporation.

The OPEN LOOK and Sun™ Graphical User Interface was developed by Sun Microsystems, Inc. for its users and licensees. Sun acknowledges the pioneering efforts of Xerox in researching and developing the concept of visual or graphical user interfaces for the computer industry. Sun holds a non-exclusive license from Xerox to the Xerox Graphical User Interface, which license also covers Sun's licensees who implement OPEN LOOK GUIs and otherwise comply with Sun's written license agreements.

RESTRICTED RIGHTS: Use, duplication, or disclosure by the U.S. Government is subject to restrictions of FAR 52.227-14(g)(2)(6/87) and FAR 52.227-19(6/87), or DFAR 252.227-7015(b)(6/95) and DFAR 227.7202-3(a).

DOCUMENTATION IS PROVIDED "AS IS" AND ALL EXPRESS OR IMPLIED CONDITIONS, REPRESENTATIONS AND WARRANTIES, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT, ARE DISCLAIMED, EXCEPT TO THE EXTENT THAT SUCH DISCLAIMERS ARE HELD TO BE LEGALLY INVALID.

Copyright 1998 Sun Microsystems, Inc., 901 San Antonio Road • Palo Alto, CA 94303 Etats-Unis. Tous droits réservés.

Ce produit ou document est protégé par un copyright et distribué avec des licences qui en restreignent l'utilisation, la copie, la distribution, et la décompilation. Aucune partie de ce produit ou document ne peut être reproduite sous aucune forme, par quelque moyen que ce soit, sans l'autorisation préalable et écrite de Sun et de ses bailleurs de licence, s'il y en a. Le logiciel détenu par des tiers, et qui comprend la technologie relative aux polices de caractères, est protégé par un copyright et licencié par des fournisseurs de Sun.

Des parties de ce produit pourront être dérivées des systèmes Berkeley BSD licenciés par l'Université de Californie. UNIX est une marque déposée aux Etats-Unis et dans d'autres pays et licenciée exclusivement par X/Open Company, Ltd.

Sun, Sun Microsystems, le logo Sun, AnswerBook, Solaris, Java, le logo Java Coffee Cup, HotJava, NFS, Sun StorEdge LibMON, Ultra, et Ultra Enterprise sont des marques de fabrique ou des marques déposées, ou marques de service, de Sun Microsystems, Inc. aux Etats-Unis et dans d'autres pays. Toutes les marques SPARC sont utilisées sous licence et sont des marques de fabrique ou des marques déposées de SPARC International, Inc. aux Etats-Unis et dans d'autres pays. Les produits portant les marques SPARC sont basés sur une architecture développée par Sun Microsystems, Inc. Netscape est une marque de Netscape Communications Corporation.

L'interface d'utilisation graphique OPEN LOOK et Sun™ a été développée par Sun Microsystems, Inc. pour ses utilisateurs et licenciés. Sun reconnaît les efforts de pionniers de Xerox pour la recherche et le développement du concept des interfaces d'utilisation visuelle ou graphique pour l'industrie de l'informatique. Sun détient une licence non exclusive de Xerox sur l'interface d'utilisation graphique Xerox, cette licence couvrant également les licenciés de Sun qui mettent en place l'interface d'utilisation graphique OPEN LOOK et qui en outre se conforment aux licences écrites de Sun.

CETTE PUBLICATION EST FOURNIE "EN L'ETAT" ET AUCUNE GARANTIE, EXPRESSE OU IMPLICITE, N'EST ACCORDEE, Y COMPRIS DES GARANTIES CONCERNANT LA VALEUR MARCHANDE, L'APTITUDE DE LA PUBLICATION A REPENDRE A UNE UTILISATION PARTICULIERE, OU LE FAIT QU'ELLE NE SOIT PAS CONTREFAISANTE DE PRODUIT DE TIERS. CE DENI DE GARANTIE NE S'APPLIQUERAIT PAS, DANS LA MESURE OU IL SERAIT TENU JURIDIQUEMENT NUL ET NON AVENU.



Contents

Preface xiii

1. Installing the Sun StorEdge LibMON Software 1

Server Requirements 1

Supported Libraries 2

Supported Hardware Systems 2

Supported Operating Environments 2

Disk Space 3

Memory 3

CD-ROM Drive 3

Swap Space 3

Client Requirements 4

Supported Systems 4

Internet Browsers 4

Before You Begin 5

Obtaining the LibMON License 6

▼ To Obtain a Product License 6

Installing LibMON	7
Upgrading from LibMON 1.0	8
Where to Install LibMON Software Components	8
How the LibMON CD-ROM Is Organized	8
▼ To Mount the CD-ROM	10
▼ To Install the Apache HTTP Server	11
▼ To Install the LWperl5 and LibMON Packages	12
Installing the LibMON License	13
▼ To Install the Product License	13
Configuring the Apache HTTP Server	14
▼ To Verify the Apache HTTP Server Installation	14
Managing HTTP Server Users	15
▼ To Add a User	15
▼ To Delete a User	17
▼ To Change a User's Password	17
Customizing LibMON	18
▼ To Change the LibMON Poll Interval	18
▼ To Change the LibMON Port Assignment	20
▼ To Change the Database and Log Directories	22
▼ To Identify the Version of LibMON Software	23
Removing LibMON	24
▼ To Remove the LibMON Package	24
▼ To Remove the Apache HTTP Server Package	25
▼ To Remove the LWperl5 Package	25

2. Getting Started With Sun StorEdge LibMON 27

Starting LibMON 27

▼ To Start the HTTP Server 28

▼ To Start the LibMON Server 28

▼ To Access the LibMON Start Page 29

Accessing the LibMON Home Page 30

▼ To Use the LibMON Express Method 30

▼ To Use the Client Install Method 32

Setting Bookmarks 33

Setting Up LibMON 33

▼ To Determine the Library Device Names 34

▼ To Create the Library 34

LibMON Security 37

Navigating LibMON 38

Using LibMON Help 40

Stopping LibMON 41

▼ To Stop LibMON 41

3. Using Sun StorEdge LibMON 43

Exploring the LibMON Home Page 44

Using the Menus 45

The LibMON Home Menu 45

The Create Menu 45

The View Menu 46

The Selected Menu 46

Using the Library Management Area 47

Using the Event Management Area 49

Managing Libraries 50

▼ To Create a New Library 50

Using Duplicate Entries 52

▼ To Select a Library 53

▼ To Select the Library Page Layout 53

▼ To Set the Library Display Attributes 54

▼ To Set the Library Sort Order 56

▼ To View Detailed Library Information 57

Selecting the Physical or Logical View Page 62

Using the Physical View Page 62

Using the Logical View Page 64

Using Automatic Event Notification 65

▼ To Set Up Threshold-Based Notification 65

▼ To Set Up Library Availability-Based Notification 70

▼ To Create a Command Definition File 71

Using the Service Features 74

▼ To Connect the Server to the Library 74

▼ To Place the Library Offline 75

▼ To Place the Library Online 75

▼ To Initiate an Actuator Self-Test 76

▼ To Download New Firmware to the Library 76

▼ To Delete a Library 77

Managing Events 78

- ▼ To Select an Event 78
- ▼ To Set the Event Display Attributes 78
- ▼ To Set the Event Sort Order 80
- ▼ To View Detailed Event Information 82
- ▼ To Delete an Event 83

Managing Contacts 84

- ▼ To Create a New Contact 84
- ▼ To Assign a Contact to a Library 85
- ▼ To List the Contacts 86
- ▼ To Select a Contact 86
- ▼ To Set the Contact Display Attributes 87
- ▼ To Set the Contact Sort Order 88
- ▼ To View Detailed Contact Information 89
- ▼ To Delete a Contact 91

4. Troubleshooting 93

Common Questions 93

Error Messages 102

Server Error Messages 102

LibMON Error Messages 103

Glossary 109

Index 113

Figures

FIGURE 1-1	CD-ROM Organization	9
FIGURE 2-1	The LibMON Start Page	29
FIGURE 2-2	The LibMON Home Page	31
FIGURE 2-3	The Library Device Name Dialog Box	34
FIGURE 2-4	The Create Library Property Book Dialog Box	35
FIGURE 2-5	LibMON Fixed Window Elements	38
FIGURE 2-6	The LibMON Help Screen	40
FIGURE 3-1	The LibMON Home Page	44
FIGURE 3-2	The LibMON Home Page With Table View Selected	48
FIGURE 3-3	The Library Device Name Dialog Box	50
FIGURE 3-4	The Create Library Property Book Dialog Box	51
FIGURE 3-5	The LibMON Home Page Properties Dialog Box	53
FIGURE 3-6	The Library Display Attributes Dialog Box	54
FIGURE 3-7	The Library Sort Order Dialog Box	56
FIGURE 3-8	The Library Property Book Page	58
FIGURE 3-9	The Physical View Page	63
FIGURE 3-10	The Logical View Page	64
FIGURE 3-11	A Sample Set Threshold Dialog Box	66
FIGURE 3-12	The Event Display Attributes Dialog Box	78

FIGURE 3-13	The Event Sort Order Dialog Box	80
FIGURE 3-14	The Event Property Book Page	82
FIGURE 3-15	The Create Contact Property Book Dialog Box	84
FIGURE 3-16	The Contact List Page	86
FIGURE 3-17	The Contact Display Attributes Dialog Box	87
FIGURE 3-18	The Contact Sort Order Dialog Box	88
FIGURE 3-19	The Contact Property Book Page	90

Tables

TABLE P-1	Typographic Conventions	xv
TABLE P-2	Shell Prompts	xvi
TABLE P-3	Related Documentation	xvi
TABLE 1-1	Disk Space Requirements	3
TABLE 1-2	Language Directories	9
TABLE 2-1	LibMON Express Method vs. Client Install Method	30
TABLE 2-2	URLs	33
TABLE 2-3	LibMON Window Elements	39
TABLE 3-1	Library Display Attributes	55
TABLE 3-2	Library Sort Order Attributes	56
TABLE 3-3	Library Property Book Page Field Descriptions	59
TABLE 3-4	Library Parameters	67
TABLE 3-5	Tape Drive Parameters	68
TABLE 3-6	Command Definition File Keywords	71
TABLE 3-7	LibMON Predefined Arguments	72
TABLE 3-8	Event Display Attributes	79
TABLE 3-9	Event Sort Order Attributes	81
TABLE 3-10	Event Property Book Page Field Descriptions	83
TABLE 3-11	Create Contact Property Book Dialog Box Field Descriptions	85
TABLE 3-12	Contact Display Attributes	87

TABLE 3-13	Contact Sort Order Attributes	89
TABLE 4-1	Server Error Messages	102
TABLE 4-2	LibMON GUI Error Messages	103

Preface

The *Sun StorEdge LibMON 2.0 Installation and User's Guide* describes how to install and use the Sun™ StorEdge™ LibMON™ 2.0 software.

For information about installing and using the Sun™ StorEdge™ LibAgent 2.0 SNMP subagent, included on the LibMON CD-ROM, refer to the *Sun StorEdge LibAgent 2.0 Installation and User's Guide*.

What Is LibMON?

LibMON is a tape library administration and monitoring tool. You use LibMON to:

- Set up and configure tape libraries for monitoring
- Monitor the status of library robotics, drives, and cartridges
- View detailed tape library event information and troubleshoot problems
- Automatically notify tape library administrators of important events via email
- Automatically execute user-defined scripts when important events occur
- Access service functions, such as downloading firmware and placing the library on or offline

LibMON is an application based on the Java™ technology that runs on a Sun™ server attached to your tape library. LibMON tasks are initiated using remote “point and click” operations through a Web browser with a Java-based graphical user interface. LibMON automatically downloads and runs a set of Java-based applets on a client when you open the LibMON Web URL (Uniform Resource Locator) from your Internet browser.

Who Should Use This Book

The *Sun StorEdge LibMON 2.0 Installation and User's Guide* is intended for the person who installs LibMON and anyone who uses it.

This guide describes the minimum system requirements for LibMON, and details the installation procedures for LibMON and related software. It is assumed that anyone installing LibMON is an experienced computer user familiar with the Sun Solaris™ operating environment.

Users of LibMON are typically responsible for monitoring and maintaining Sun StorEdge tape libraries. This guide explains how to use LibMON to remotely access libraries, view library and event status, and troubleshoot system errors. It is assumed that users have some experience accessing and navigating the World Wide Web and using standard Web browser tools.

If you are an experienced system administrator and have used Web browsers, you will find LibMON a very familiar and intuitive tool to use. You may need to refer to this guide only to answer specific questions about LibMON functionality.

If you are relatively new to library administration or to Web browsers, this guide provides detailed instructions for navigating and using the different LibMON Web pages.

How This Book Is Organized

Chapter 1 describes how to install and configure LibMON and its related software.

Chapter 2 describes how to start LibMON, how to set up LibMON the first time you use it, and how to use the basic LibMON features to navigate the pages and access help.

Chapter 3 describes how to use LibMON to monitor library and event status. It details the functions available in the Library, Event, and Contact managers.

Chapter 4 lists common problems or errors you may encounter while using LibMON and contains suggestions for resolving them.

This book concludes with a glossary and an index.

Using UNIX Commands

This document may not contain information on basic UNIX™ commands and procedures such as shutting down the system, booting the system, and configuring devices.

See one or more of the following for this information:

- *Solaris 2.x Handbook for SMCC Peripherals*
- AnswerBook™ online documentation for the Solaris 2.x software environment
- Other software documentation that you received with your system

Typographic Conventions

TABLE P-1 Typographic Conventions

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

Shell Prompts

TABLE P-2 Shell Prompts

Shell	Prompt
C shell	<i>machine_name%</i>
C shell superuser	<i>machine_name#</i>
Bourne shell and Korn shell	\$
Bourne shell and Korn shell superuser	#

Related Documentation

TABLE P-3 Related Documentation

Application	Title	Part Number
Installation	<i>Sun StorEdge LibMON 2.0 and Sun StorEdge LibAgent 2.0</i>	804-6142-xx
Installation	<i>Sun StorEdge LibAgent 2.0 Installation and User's Guide</i>	805-5055-xx
Installation	<i>Sun StorEdge LibMON 2.0 Release Notes</i>	805-5065-xx
Installation	<i>Sun StorEdge LibAgent 2.0 Release Notes</i>	805-5103-xx

Online Documentation

An online version of this guide is provided on the LibMON CD-ROM, in the following directory:

`/cdrom/sun_libmon_2_0/Docs/LibMON/locale/`

where:

- *cdrom* is the system path name of the CDROM drive
- *locale* is the directory that corresponds to the language you wish to use: English (`en_US`) or Japanese (`ja_JP`)

The guide is in HTML format, and can be viewed using your Internet browser.

Sun Welcomes Your Comments

We are interested in improving our documentation and welcome your comments and suggestions. You can email your comments to us at:

`docfeedback@sun.com`

Please include the part number of your document in the subject line of your email.

Installing the Sun StorEdge LibMON Software

This chapter describes the requirements your system must meet prior to installation and explains how to install the LibMON software on your Sun Solaris system.

Note – Before installing LibMON, install and configure your Sun StorEdge tape library. Your tape library must be physically attached to your Sun system in order for the LibMON installation to complete successfully. Refer to the documentation that came with the library.

Server Requirements

The *server* is the computer to which the library is attached and on which you will install the LibMON software. The following sections list the requirements for the server:

- Supported Libraries—page 2
- Supported Hardware Systems—page 2
- Supported Operating Environments—page 2
- Disk Space—page 3
- Memory—page 3
- Swap Space—page 3

Supported Libraries

LibMON is designed to support the following tape libraries:

- Sun StorEdge L1000
- Sun StorEdge L1800
- Sun StorEdge L3500
- Sun StorEdge L140
- Sun StorEdge L400
- Sun StorEdge 4mm DDS-3 Autoloader

Supported Hardware Systems

LibMON is designed to run on the following Sun systems:

- SPARCcenter™ 2000E
- SPARCserver™ 5
- SPARCserver 10
- SPARCserver 20
- SPARCserver 1000E
- Sun Enterprise™ 2
- Sun Enterprise 250
- Sun Enterprise 450
- Sun Enterprise 3000
- Sun Enterprise 3500
- Sun Enterprise 4000
- Sun Enterprise 4500
- Sun Enterprise 5000
- Sun Enterprise 5500
- Sun Enterprise 6000
- Sun Enterprise 6500
- Sun Enterprise 10000

Supported Operating Environments

The server must use the Solaris Version 2.5, 2.5.1, or 2.6 operating environment.

Disk Space

TABLE 1-1 Disk Space Requirements

Software Component	Space Required	Location
LibMON	17 megabytes	/opt directory on the server (or directory specified during installation)
LibMON database	5 megabytes	/var directory on the server
HTTP server	Varies by server; 7 megabytes for Apache HTTP Server	Server

Memory

The server should have at least 64 megabytes of RAM. Additional memory enhances LibMON performance.

CD-ROM Drive

To install LibMON, you need a CD-ROM drive connected to your system or to another system on the same network.

Swap Space

In general, the swap space on the server should be at least twice the amount of memory installed. For example, if the server has 256 megabytes of memory, it should have at least 512 megabytes of swap space.

Client Requirements

The *client* is the computer you use to access the LibMON URL and monitor the library (this may be the same computer as the server). The following sections detail requirements for the client:

- Supported Systems—page 4
- Internet Browsers—page 4

Supported Systems

LibMON supports the following client systems:

- Solaris 2.5, 2.5.1, or 2.6 operating environment
 - SPARCstation™ or better
 - At least 32 megabytes memory
- Microsoft Windows 95 or Microsoft Windows NT operating environment
 - Pentium, Pentium Pro, or Pentium II processor, 133 MHz or faster
 - At least 32 megabytes memory
 - Monitor with resolution of 800 x 600 or better

Internet Browsers

To access the LibMON URL, you must install Internet browser software on the client. This software is not provided on the LibMON CD-ROM; you must obtain and install the Internet browser independently.

LibMON supports the following Internet browsers:

- Netscape™ Navigator version 4.06
You can download this browser from <http://www.netscape.com/>.
- HotJava™ version 1.1.2, 1.1.3, or 1.1.4
You can download this browser from <http://www.javasoft.com/>.
- Internet Explorer version 4.01

Note – Netscape Navigator version 4.05 and below are not supported by LibMON.

Note – The browser software must support the Java Developer's Kit (JDK) version 1.1 or later.

For the latest information about Internet browsers and LibMON, refer to the *Sun StorEdge LibMON 2.0 Release Notes*.

Your Internet browser preferences should be set to the following minimum requirements:

- Disk Cache = 5 megabytes
- Memory Cache = 5 megabytes
- Verify Page = Every Time

Before You Begin

Before installing the LibMON software on your Sun Solaris system, read this overview of the installation and licensing process for LibMON. Following the steps in this overview will ensure that the setup of LibMON on your system is simple and easy.

1. Find your Proof of License Certificate in your product package.

The Proof of License Certificate includes product information that you must furnish to request a product license. It tells you how to contact the Sun License Center.

2. Obtain a product license for your copy of LibMON (see “Obtaining the LibMON License” on page 6).

3. Install and configure your Sun StorEdge tape library.

Your tape library must be physically attached to your Sun system for the LibMON software installation to complete successfully. Refer to the documentation for your tape library.

4. Install the LibMON software (see “Installing LibMON” on page 7).

5. Install the LibMON product license (see “Installing the LibMON License” on page 13).

Obtaining the LibMON License

LibMON uses the FLEXlm license manager product to control product use. You can install LibMON before obtaining a license file, but the server requires a valid license file to run.

▼ To Obtain a Product License

1. Get a copy of the License Request Form.

This form is located on the LibMON CD-ROM, in the `/cdrom/sun_libmon_2_0/Docs/LibMON/locale` directory, where:

- `cdrom` is the system path name of the CD-ROM drive you are using to install the software
- `locale` is the directory for the language you are using: English (`en_US`) or Japanese (`ja_JP`)

2. Fill out the required information on the License Request Form; refer to the Proof of License Certificate to complete the product information section.

The license file is locked to a specific host. You will need to provide the host name and the `hostid` value for the server.

- To get the host name, type:

```
# hostname
```

- To get the `hostid`, type:

```
# hostid
```

3. Return the License Request Form to the nearest Sun License Center, as specified on your Proof of License Certificate.

You can find up-to-date information about contacting the Sun License Center, including hours of operation, at:

<http://www.sun.com/licensing>

After you return the License Request Form to the nearest Sun License Center, you will receive product license information within one business day via email or fax. This information includes a file named `LibMON-2.0`, which is the LibMON product license.

The following is a sample LibMON license file. This file is valid for a server with the host name `harvest` and the `hostid` `80803ac3`:

```
SERVER harvest 80803ac3 10534
DAEMON atlp __ATLP_DAEMON_DIR__
FEATURE lmonbs atlp 1.000 11-sep-1998 1 3B0A30E196B662B033E1
```

Installing LibMON

The LibMON CD-ROM provides the following software:

- Apache HTTP Server software package, version 1.2.5
- The LWperl5 package (GNU Perl), version 5.002
- The LibMON package, version 2.0

This package includes the Java Runtime Environment (JRE), HTML files, Java class files, and other binaries used by LibMON.

Note – Install the LibMON package and the HTTP server software on the server computer. The LWperl5 package can be installed on the server or NFS™ network-mounted from another computer.

You install the Apache HTTP Server package, the LWperl5 package, and the LibMON package using `pkgadd`.

Note – The `pkgadd` command installs the software packages in the `/opt` directory unless you specify otherwise. This guide assumes that you are using the default directory. If you install the packages in a top level directory other than `/opt`, you will need to modify the command lines in this guide to specify the new directory.

Refer to the *Solaris Software and AnswerBook Packages Administration Guide* for detailed information on packages and `pkgadd`.

Upgrading from LibMON 1.0

Before installing LibMON 2.0, you must remove the LibMON 1.0 software from the system. Refer to the removal instructions in the *Sun Enterprise Library Monitor Installation and User's Guide* (Part No. 805-1041-10).

Any customizations you have made to the Apache HTTP Server software will be lost when you remove LibMON 1.0.

Where to Install LibMON Software Components

The LibMON package and the HTTP server package must be installed on the server computer. The LWperl5 package can be installed on the server, or it can be NFS network-mounted from another computer. The Internet browser should be installed on the client.

Note – The server and the client may be the same computer.

How the LibMON CD-ROM Is Organized

The LibMON CD-ROM is divided into four second-level directories: `Product`, `Tools`, `Docs`, and `Patches`.

- The `Product` directory contains the installation files for LibMON and LibAgent. It is divided into two directories: `LibMON` and `LibAgent`. The `LibMON` and `LibAgent` directories are divided into subdirectories by language (see TABLE 1-2), then by operating environment.
- The `Tools` directory contains the Apache HTTP Server software package. This package is used in conjunction with LibMON.
- The `Docs` directory contains the README files and online documentation for LibMON and LibAgent. The `Docs` directory is divided into subdirectories by language (see TABLE 1-2).
- The `Patches` directory contains patches required for the LibAgent product.

LibMON is supported in both English and Japanese. The following table lists the location of the product and documentation files for each language.

TABLE 1-2 Language Directories

Language	Product files located in:	Online documentation files located in:
English	Product/LibMON/en_US	Docs/LibMON/en_US
Japanese	Product/LibMON/ja_JP	Docs/LibMON/ja_JP

The following illustration shows the organization of the CD-ROM using English (en_US/) as an example.

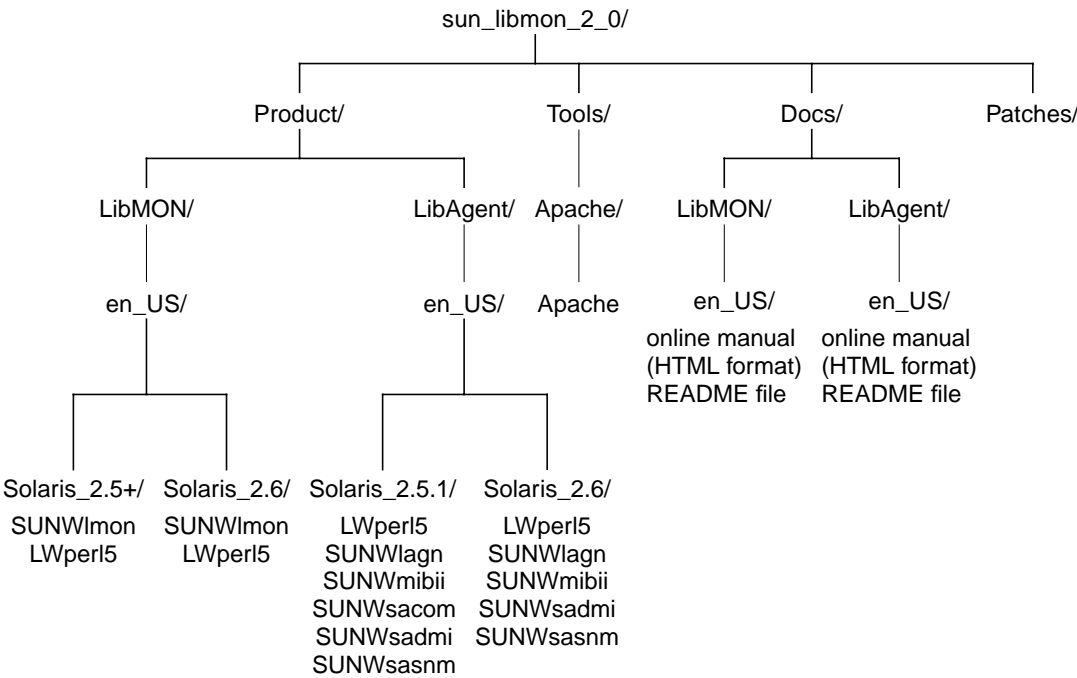


FIGURE 1-1 CD-ROM Organization

▼ To Mount the CD-ROM

Note – If you are installing LibMON from a CD-ROM drive connected to the server, there is no need to mount the CD-ROM; it is automatically mounted by the volume management software when you insert it into the CD-ROM drive.

If you are installing LibMON from a CD-ROM drive attached to a remote system, you must first mount the remote CD-ROM on the server:

1. Insert the LibMON CD-ROM into the CD-ROM drive on the remote system.

The volume management software on the remote system mounts the CD-ROM automatically.

2. At the remote machine as `root`, share the CD-ROM drive.

```
remote# share -F nfs -o ro,anon=0 -d "CD-ROM Directory" \  
/cdrom/sun_libmon_2_0
```

This line assumes you do not want to restrict access to certain groups. If you do want to restrict access, refer to the Solaris `share (1M)` man page for further information.

3. On the server, log in as `root` and create the directory `/cdrom/sun_libmon_2_0`.

```
local% su root  
Password: root-password  
local# mkdir /cdrom/sun_libmon_2_0
```

4. Mount the CD-ROM.

```
local# mount remotehostname:/cdrom/sun_libmon_2_0 \  
/cdrom/sun_libmon_2_0
```

▼ To Install the Apache HTTP Server

1. Insert the LibMON CD-ROM into the CD-ROM drive.
2. Become `root` on the server.

```
% su root
password:
#
```

3. Add the Apache HTTP Server package.

```
# pkgadd -d /cdrom/sun_libmon_2_0/Tools/Apache
```

where *cdrom* is the system path name of the CD-ROM drive you are using to install the software.

The system displays the following prompt:

```
The following package is available:

1   Apache   Apache HTTP Server
          (sparc) 1.2.5

Select package(s) you wish to process (or 'all'
to process all packages). (default:all) [?,??,
q]: all
```

4. Type `all`.
5. Follow the prompts on the screen:
 - When you are prompted for information, accept the default setting.
 - When you are prompted for a yes or no response, select `Yes`.
6. When the installation is complete, type `q` to exit the `pkgadd` command.

▼ To Install the LWperl5 and LibMON Packages

Note – LibMON is supported in both English and Japanese. The CD-ROM is divided into subdirectories by product, locale for each language, and operating environment. To install a specific language, you must change directories to the desired locale and operating environment, and then run the `pkgadd` script from that directory.

1. Insert the LibMON CD-ROM into the CD-ROM drive.

2. Become `root` on the server.

```
% su root
password:
#
```

3. Add the LWperl5 and LibMON packages.

```
# pkgadd -d /cdrom/sun_libmon_2_0/Product/LibMON/locale/OS Version
```

where:

- *cdrom* is the system path name of the CD-ROM drive you are using to install the software
- *locale* is the directory for the language you wish to install: English (`en_US`) or Japanese (`ja_JP`)
- *OS Version* is either `Solaris_2.5+` (for Solaris 2.5x) or `Solaris_2.6` (for Solaris 2.6)

The system displays the following prompt:

```
The following packages are available:

1  LWperl5      perl
                        (sparc) 5.0

2  SUNWlmon     Sun Enterprise Library Monitor
                        (sparc) 2.0,REV=xx.xx.xx

Select package(s) you wish to process (or 'all'
to process all packages). (default:all) [?,??,
q]: all
```

4. Type `all`.

Note – If you decide to install these packages individually, make sure to install the `LWperl5` package (1) before you install the `SUNWlmon` package (2). The `LWperl5` package must be present in order for the `SUNWlmon` package to install correctly.

5. Follow the prompts on the screen:

- When you are prompted for information, accept the default setting.
- When you are prompted for a yes or no response, select `Yes`.

6. When the installation is complete, type `q` to exit the `pkgadd` command.

Installing the LibMON License

Now that you have installed the LibMON software, you must install the LibMON product license. You obtained this license by following the procedure in “To Obtain a Product License” on page 6.

▼ To Install the Product License

When you receive the LibMON product license information, it should include a file named `LibMON-2.0`. This is the LibMON product license.

1. **Locate the `license.dat` file in the `/opt/SUNWlmon/license` directory.**
2. **Log on as `root`.**
3. **Copy the contents of the LibMON license file (`LibMON-2.0`) into the `license.dat` file, or rename the `LibMON-2.0` file as `license.dat` and replace the existing `license.dat` file in the `/opt/SUNWlmon/license` directory.**

4. Install the LibMON license:

```
# cd /opt/SUNWlmon/license
# ./INSTALL-LICENSE
```

The system displays the following message:

```
Modifying license file...
```

The LibMON license is now installed.

To start the LibMON server without configuring the Apache HTTP server or customizing LibMON, see “Starting LibMON” on page 27.

Configuring the Apache HTTP Server

Upon installation, the Apache HTTP Server package is automatically configured to run with LibMON.

Note – The default Apache HTTP Server password file is preconfigured with an `admin` and a `guest` user. The password for both users is `demo`. To change the password and to add or delete users, see “Managing HTTP Server Users” on page 15.

▼ To Verify the Apache HTTP Server Installation

1. As `root`, start the Apache HTTP Server software on the server.

```
# /opt/Apache/apache_1.2.5/START-Apache
```


2. Start the Internet browser on the client and open the following URL:

```
http://hostname
```

where *hostname* is the host name of the server where the Apache HTTP Server software is installed.

If the Apache HTTP Server software is installed correctly, the browser displays the Apache initial installation banner reading *It Worked*.

Note – The server and the client can be the same computer.

Managing HTTP Server Users

To use LibMON, a user must have authorized access to the HTTP server. If you followed the default installation instructions for the HTTP server software, two users are already set up: *admin* and *guest*. The default password for both users is *demo*.

Depending on your site security needs, you may need to add, delete, or modify a user. Each user has a user name and password.

▼ To Add a User

1. As *root*, change to the `/opt/Apache/apache_1.2.5` directory and stop the HTTP server.

```
# /opt/Apache/apache_1.2.5/STOP-Apache
```

2. Change to the `/opt/Apache/apache_1.2.5/support` directory and run the `htpasswd` command.

```
# cd /opt/Apache/apache_1.2.5/support
# ./htpasswd /opt/Apache/apache_1.2.5/conf/passwd username
```

where *username* is the name of the new user. You must type a password for the new user.

3. Open the Apache configuration file (`access.conf`) located in the `/opt/Apache/apache_1.2.5/conf` directory.

4. Locate the appropriate section of the `access.conf` file:

- If the new user will access LibMON using the LibMON Express method, locate the section labeled:
LibMON standard directory with *usertype* privileges
where *usertype* is the type of user you want to add: admin or guest.
- If the user will access LibMON using the Client Install method, locate the section of the file labeled:
LibMON client installation directory with *usertype* privileges
where *usertype* is the type of user you want to add: admin or guest.

For a description of the LibMON Express and Client Install methods, see “Accessing the LibMON Home Page” on page 30.

5. In the section you identified in step 4, locate the line starting:

```
require user usertype
```

where *usertype* is the type of user you want to add: admin or guest.

6. Add the new user name to the end of the line.

For example, if the existing line read:

```
require user admin John Paul
```

and you wanted to add a new admin user, George, you would edit the line to read:

```
require user admin John Paul George
```

7. Save and close the `access.conf` file.

8. Restart the HTTP server.

```
# /opt/Apache/apache_1.2.5/START-Apache
```

▼ To Delete a User

1. As root, change to the `/opt/Apache/apache_1.2.5` directory and stop the HTTP server.

```
# /opt/Apache/apache_1.2.5/STOP-Apache
```

2. Edit the `passwd` file, located in the `/opt/Apache/apache_1.2.5/conf` directory, and remove the line with the specified user name.
3. Open the Apache configuration file (`access.conf`) located in the `/opt/Apache/apache_1.2.5/conf` directory.
4. Locate the line or lines that contain the user name you wish to delete.
 - To delete a user with admin privileges, remove the user name from the line or lines that begin with `require user admin`.
 - To delete a user with guest privileges, remove the user name from the line or lines that begin with `require user guest`.
5. Save and close the `access.conf` file.
6. Restart the HTTP server.

```
# /opt/Apache/apache_1.2.5/START-Apache
```

▼ To Change a User's Password

1. As root, change to the `/opt/Apache/apache_1.2.5` directory and stop the HTTP server.

```
# /opt/Apache/apache_1.2.5/STOP-Apache
```

2. Change to the `/opt/Apache/apache_1.2.5/support` directory and run the `htpasswd` command.

```
# cd /opt/Apache/apache_1.2.5/support
# ./htpasswd /opt/Apache/apache_1.2.5/conf/passwd username
```

where *username* is the name of the existing user.

3. Follow the prompts on the screen to set the new password.
4. Once the new password is set, restart the HTTP server.

```
# /opt/Adobe/apache_1.2.5/START-Apache
```

Customizing LibMON

After installing LibMON, you can configure it to meet your site needs. This section describes the options you can customize.

Before performing any of the operations in this section, log in as `root`.

```
local% su root
Password: root-password
#
```

▼ To Change the LibMON Poll Interval

The default poll interval is 5 minutes. The poll interval sets:

- How often SCSI events are detected (when the client is not actively monitoring the server with an Internet browser)
- How often the server sends a full set of library information to the client (when a GUI is present)

You can change the poll interval by using a command line argument when you start LibMON.

Note – If you set the poll interval to less than 15 seconds for a single tape library attached to the server, it is likely that one poll cycle will not complete fully before another one is scheduled to begin. Poll intervals of less than 5 minutes are not recommended.

1. Log in as `root`.
2. If the LibMON server is running, stop it.

```
# /opt/SUNWlmon/STOP-LibMON
```

The system displays the following message.

```
Shutting down LibMON server...
Shutting down license server...
#
```

3. Open the LibMON startup script (`START-LibMON`).
4. Edit the following line in the LibMON startup script:

```
${NOHUP} ${TOP}/JRE/bin/jre ${OPT_NATIVE_THREADS} \
-D"atl.serverInstallDir=${TOP}" \
atl.server.Server > ${TOP}/LibMON.log 2>&1 &
```

to read as follows:

```
${NOHUP} ${TOP}/JRE/bin/jre ${OPT_NATIVE_THREADS} \
-D"atl.service.lib.pollInterval=newpoll" \
-D"atl.serverInstallDir=${TOP}" \
atl.server.Server > ${TOP}/LibMON.log 2>&1 &
```

where *newpoll* is the desired poll interval (in milliseconds). For example, to change the poll interval to 300 seconds (5 minutes), enter 300000.

Note – The value for the poll interval is specified in milliseconds, and must be enclosed in quotation marks.

5. Start the LibMON server.

```
# /opt/SUNWlmon/START-LibMON
```

The system displays the following message.

```
Starting license server...
Starting LibMON server...
#
```

▼ To Change the LibMON Port Assignment

The server accepts requests and sends data to clients using port 7467. If there is a conflict because some other software product is using this port, you can change this port value.

1. **Log in as root.**
2. **If the LibMON server is running, stop it.**

```
# /opt/SUNWlmon/STOP-LibMON
```

The system displays the following message.

```
Shutting down LibMON server...
Shutting down license server...
#
```

3. Open the request port cgi file.

The path for the request port cgi file is as follows:

```
/opt/Apache/apache_1.2.5/htdocs/LibMON/atl-cgi-bin/
getrequestport
```

4. **In the request port cgi file, replace the number 7467 with the desired port value (for example, 8000).**
5. **Open the LibMON startup script (START-LibMON).**

6. Edit the following line in the LibMON startup script:

```
{NOHUP} ${TOP}/JRE/bin/jre ${OPT_NATIVE_THREADS} \  
-D"atl.serverInstallDir=${TOP}" \  
atl.server.Server > ${TOP}/LibMON.log 2>&1 &
```

to read as follows:

```
{NOHUP} ${TOP}/JRE/bin/jre ${OPT_NATIVE_THREADS} \  
-D"atl.serverInstallDir=${TOP}" \  
-D"atl.comm.server.requestPort=portvalue" \  
atl.server.Server > ${TOP}/LibMON.log 2>&1 &
```

where *portvalue* is the desired port value.

7. Open the LibMON shutdown script (STOP-LibMON).

8. Edit the following line in the LibMON shutdown script:

```
{TOP}/JRE/bin/jre -D"atl.serverInstallDir=${TOP}"  
atl.server.Shutdown
```

to read as follows:

```
{TOP}/JRE/bin/jre -D"atl.serverInstallDir=${TOP}" \  
-D"atl.comm.server.requestPort=portvalue" atl.server.Shutdown
```

where *portvalue* is the desired port value.

9. Restart LibMON.

```
# /opt/SUNWlmon/START-LibMON
```

The system displays the following message.

```
Starting license server...  
Starting LibMON server...  
#
```

▼ To Change the Database and Log Directories

The server maintains an event log and a database that maintain libraries and contacts. By default, these are located in the following directories:

- /var/opt/SUNWlmon/db
- /var/opt/SUNWlmon/log

To place the database and event log files in another directory:

1. **Log in as root.**
2. **If the LibMON server is running, stop it.**

```
# /opt/SUNWlmon/STOP-LibMON
```

The system displays the following message.

```
Shutting down LibMON server...
Shutting down license server...
#
```

3. **Create two new directories and set the correct permissions.**

```
mkdir -p db_directoryname
mkdir -p log_directoryname
chmod -R 775 db_directoryname
chmod -R 775 log_directoryname
```

where:

- *db_directoryname* is the new database directory
- *log_directoryname* is the new log directory

4. **Open the LibMON startup script (START-LibMON).**

5. Edit the following line in the LibMON startup script:

```
{NOHUP} ${TOP}/JRE/bin/jre ${OPT_NATIVE_THREADS} \  
-D"atl.serverInstallDir=${TOP}" \  
atl.server.Server > ${TOP}/LibMON.log 2>&1 &
```

to read as follows:

```
{NOHUP} ${TOP}/JRE/bin/jre ${OPT_NATIVE_THREADS} \  
-D"atl.serverInstallDir=${TOP}" \  
-D"atl.db.dbDir=db_directoryname" \  
-D"atl.eventLogDir=log_directoryname" \  
atl.server.Server > ${TOP}/LibMON.log 2>&1 &
```

where:

- *db_directoryname* is the new database directory
- *log_directoryname* is the new log directory

6. Start the LibMON server.

```
# /opt/SUNWlmon/START-LibMON
```

The system displays the following message.

```
Starting license server...  
Starting LibMON server...  
#
```

▼ To Identify the Version of LibMON Software

To identify which version of LibMON you have installed, log in as `root` on the server and execute the following command:

```
# /opt/SUNWlmon/START-LibMON -v
```

This command does not start the LibMON server.

Removing LibMON

This section describes the process for removing LibMON and the associated software from the server.

▼ To Remove the LibMON Package

1. Become `root` on the server.

```
% su root
password:
#
```

2. Stop the server.

```
# /opt/SUNWlmon/STOP-LibMON
```

The system displays the following message.

```
Shutting down LibMON server...
Shutting down license server...
#
```

3. Remove the LibMON package.

```
# pkgrm SUNWlmon
```

▼ To Remove the Apache HTTP Server Package

1. Become `root` on the server.

```
% su root
password:
#
```

2. Shut down the Apache HTTP Server.

```
# /opt/Apache/apache_1.2.5/STOP-Apache
```

3. Remove the Apache HTTP Server package.

```
# pkgrm Apache
```

▼ To Remove the LWperl5 Package

1. Become `root` on the server.

```
% su root
password:
#
```

2. Remove the `LWperl5` package.

```
# pkgrm LWperl5
```

The system prompts you:

```
Do you want to remove this package?
```

Caution – If there are other packages installed that depend on the `LWperl5` package, the system displays a warning message listing the package dependencies. If you see this message, *do not* remove the `LWperl5` package. Type `q` to quit the `pkgrm` operation and skip the rest of this procedure.

3. Type `y` and press Return.

The system displays the following prompt:

```
Removal of <LWperl5> was successful.
```

Getting Started With Sun StorEdge LibMON

After you have installed LibMON (see “Installing the Sun StorEdge LibMON Software” on page 1), take a few minutes to explore the different LibMON features and navigate the LibMON Web pages. If you have used Web browsers to access Web sites, LibMON will look very familiar.

This chapter covers the following topics:

- Starting LibMON—page 27
- Setting Up LibMON—page 33
- LibMON Security—page 37
- Navigating LibMON—page 38
- Using LibMON Help—page 40
- Stopping LibMON—page 41

Starting LibMON

This section describes how to start the HTTP server and LibMON and how to open the LibMON URL using Internet browser software. You must start the HTTP server prior to starting LibMON.

Note – The procedures in this section assume that you selected the default installation options. The steps may vary if you have customized the installation.

▼ To Start the HTTP Server

To run LibMON, you must have an HTTP server running on your Sun system. Refer to “To Install the Apache HTTP Server” on page 11 for installation instructions.

To start the HTTP server, execute the following command as `root`:

```
# /opt/Apache/apache_1.2.5/START-Apache
```

▼ To Start the LibMON Server

You must start the HTTP server before you start LibMON (see the previous section, “To Start the HTTP Server”).

1. If you have not already done so, install a valid license file.

This file is necessary for LibMON to run. See “Installing the LibMON License” on page 13 for more information.

2. Execute the following command as `root`:

```
# /opt/SUNWlmon/START-LibMON
```

Note – If your tape library contains one or more tape drives that are not connected to the server, use this command with the `-dup` option (`/opt/SUNWlmon/START-LibMON -dup`).

The system displays the following message.

```
Starting license server...
Starting LibMON server...
#
```

If LibMON does not start successfully, it is important to run the following command as `root` to ensure that all LibMON daemons are shut down properly:

```
# /opt/SUNWlmon/STOP-LibMON
```

If LibMON still does not start successfully, refer to “Troubleshooting” on page 93.

▼ To Access the LibMON Start Page

1. Open your Internet browser and enter the following URL:

`http://hostname/LibMON`

where *hostname* is the name of the server where the tape library is attached.
The browser displays the LibMON Start Page.



FIGURE 2-1 The LibMON Start Page

Accessing the LibMON Home Page

The LibMON Start Page provides instructions for accessing the LibMON Home Page by each of the following methods:

- The LibMON Express method downloads a Java archive (.jar) file each time you access LibMON. This method is appropriate when the client and the server are on a LAN with a fast connection.
- The Client Install method saves the .jar file on the client hard drive so it need not be downloaded each time you access LibMON. This method is appropriate when the client accesses the server via a slower modem or network. It requires a one-time installation procedure on the client.

TABLE 2-1 discusses the pros and cons of each of these methods.

TABLE 2-1 LibMON Express Method vs. Client Install Method

Method	Pros	Cons
LibMON Express	Any network client can reach the LibMON Home Page. No client installation procedure is required. You always access the most recent version of LibMON.	Depending on the speed of your network connection, the LibMON Home Page may be slow to load because the .jar file is downloaded first.
Client Install	Because the .jar file is already stored on the client hard disk, the LibMON Home Page opens quickly.	A one-time client installation is required. You must repeat the client installation procedure each time you install a new version of LibMON on the server.

▼ To Use the LibMON Express Method

1. **Click one of the options (Privileged User Log-in or Guest User Log-in) directly underneath the heading “LibMON Express” on the LibMON Start Page.**

The browser displays a dialog box prompting you to type a user name and password.

2. Type your HTTP server user name and password and click OK.

Note – The default Apache HTTP Server password file is preconfigured with an admin and a guest user. The password for both users is demo.

To add a user, see “To Add a User” on page 15.

LibMON starts and displays the LibMON Home Page, and then it displays a dialog box with the message, “Currently, there are no libraries defined at the LibMON server at host: *hostname*.”

3. Click OK to close the dialog box.

To add a library and begin using LibMON, see “Setting Up LibMON” on page 33.



FIGURE 2-2 The LibMON Home Page

▼ To Use the Client Install Method

1. **Select the Client Installation Instructions option on the LibMON Start Page.**
2. **Follow the directions on the Client Installation page to download the Java archive (.jar) file and to configure the client.**

Note – You only need to perform this procedure once.

3. **Click one of the options (Privileged User Log-in or Guest User Log-in) directly underneath the heading “Client Install” on the LibMON Start Page.**

The browser displays a dialog box prompting you to type a user name and password.

4. **Type your HTTP server user name and password and click OK.**

Note – The default Apache HTTP Server password file is preconfigured with an `admin` and a `guest` user. The password for both users is `demo`.

To add a user, see “To Add a User” on page 15.

LibMON starts and displays the LibMON Home Page (see FIGURE 2-2).

If there are no libraries created, LibMON displays a dialog box with the message, “Currently, there are no libraries defined at the LibMON server at host: *hostname*.”

To add a library and begin using LibMON, see “Setting Up LibMON” on page 33.

Setting Bookmarks

You may want to set a bookmark in the Internet browser to bring you to the LibMON Home Page quickly. TABLE 2-2 lists the URLs that access the LibMON Home Page directly for each method and privilege level:

TABLE 2-2 URLs

Method	Privilege Level	URL
LibMON Express	Privileged	http://hostname/LibMON/standard/admin/LibMON.shtml
	Guest	http://hostname/LibMON/standard/guest/LibMON.shtml
Client Install	Privileged	http://hostname/LibMON/remote_inst/admin/LibMON.shtml
	Guest	http:// <i>hostname</i> /LibMON/remote_inst/guest/LibMON.shtml where <i>hostname</i> is the name of the server system to which the tape library is attached.

Setting Up LibMON

This section provides the information you need to create and begin monitoring your library quickly. For a complete description of LibMON features, see “Using Sun StorEdge LibMON” on page 43.

Before you can monitor a library in LibMON, you must create it. This two-part process involves:

- Determining device names for the media changer and tape drives in your library (see the following section, “To Determine the Library Device Names”)
- Entering the library information (creating the library) in LibMON (see “To Create the Library” on page 34)

Note – When creating or updating a library with LibMON, ensure that the library is not in use by another application. This allows LibMON to gather the initial information required to monitor the library.

▼ To Determine the Library Device Names

To create a library, you must enter device names for each medium changer (robot) and tape drive in the library.

1. **Execute the following command as root:**

```
# /opt/SUNWlmon/SCAN-DEVICES
```

This command runs a utility that lists all medium changers and tape drives attached to the server. The command output lists the Device Name, Product Name, Adapter, and SCSI ID for each device.

2. **Make a note of the name for each device.**

▼ To Create the Library

Note – The instructions in this section assume you are monitoring a library in which all tape drives are connected to the LibMON server. If the library tape drives are connected to more than one host, create the library following the instructions in “To Create a New Library” on page 50.

1. **Access LibMON as described in “Accessing the LibMON Home Page” on page 30.**
2. **On the Create menu, click Library.**

The Library Device Name dialog box opens.



FIGURE 2-3 The Library Device Name Dialog Box

3. **Type the medium changer device name and click OK.**

You made a note of this device name when you ran the `SCAN-DEVICES` utility (see “To Determine the Library Device Names” on page 34).

LibMON performs the initial verification and information gathering process, and then it opens the Create Library Property Book dialog box.



FIGURE 2-4 The Create Library Property Book Dialog Box

The left side of the dialog box, labeled Sections, provides hypertext links to the sections of the dialog box:

- The Configuration section contains information about the library, including the library name, product ID, location, serial number, firmware revision and which features are enabled.
- The Device Names section contains the system device information for the medium changer and tape drives within the library. You entered this information when you created the library. This section also allows you to set up threshold-based notification for library devices.
- The Contact section displays information about the contact assigned to the library.
- The Actions section indicates whether notification is enabled, and what type of notification (email or user-defined) will be used for library availability-based events.
- The Service Module section specifies which serial port will be used for the service functions. The default setting is `/dev/ttya`.

For a complete description of the options in each of these sections, see TABLE 3-3.

4. Click Device Names.

The dialog box displays the Device Names section.

5. Type the device names for the tape drives.

You determined these names by running the `SCAN-DEVICES` utility (see “To Determine the Library Device Names” on page 34).

Note – Be sure the device names you enter are consistent with those used by your backup software. For example, if your backup software uses `/dev/rmt/0cbrn`, you should use the same device name for LibMON. In most cases, you should select a device name associated with the “no rewind” device.

6. Enter any other library information you have at this time.

7. Click OK.

The tape library device names are verified, the library is entered in the database, and LibMON monitoring for that tape library is initiated.

LibMON Security

LibMON automatically verifies the user name and password whenever a client attempts to open any LibMON URL. Only valid users are allowed access to LibMON. This password verification function is performed in conjunction with the HTTP server software.

LibMON provides two security levels:

- **ADMIN**—The admin security level allows access to all LibMON functions. This security level is for tape library administrators. Users with this security level can add, change, or delete any object within LibMON.
- **GUEST**—The guest security level allows read-only access to LibMON. This security level is for general users. Users with this security level cannot enter, modify, or delete any LibMON settings that affect other users.

For example, if you follow the installation procedure in “To Install the Apache HTTP Server” on page 11 and are running the Apache HTTP server software, two default users are created automatically:

- An Admin class user with username `admin` and password `demo`.
- A Guest class user with username `guest` and password `demo`.

Both the Admin and Guest security levels require a user name and password combination to access LibMON. Creating, modifying, and deleting user passwords is controlled by the HTTP server software. The number of LibMON users with Admin and Guest privileges can vary according to your site needs. “Managing HTTP Server Users” on page 15 describes how to add a new user.

Navigating LibMON

You can navigate through the LibMON application using standard Web browser controls or with buttons and menu options available in LibMON pages.

Refer to your browser's online help for information about its navigational tools.

LibMON pages consist of four fixed elements:

- LibMON banner
- Dominion strip
- Menu bar
- Management areas

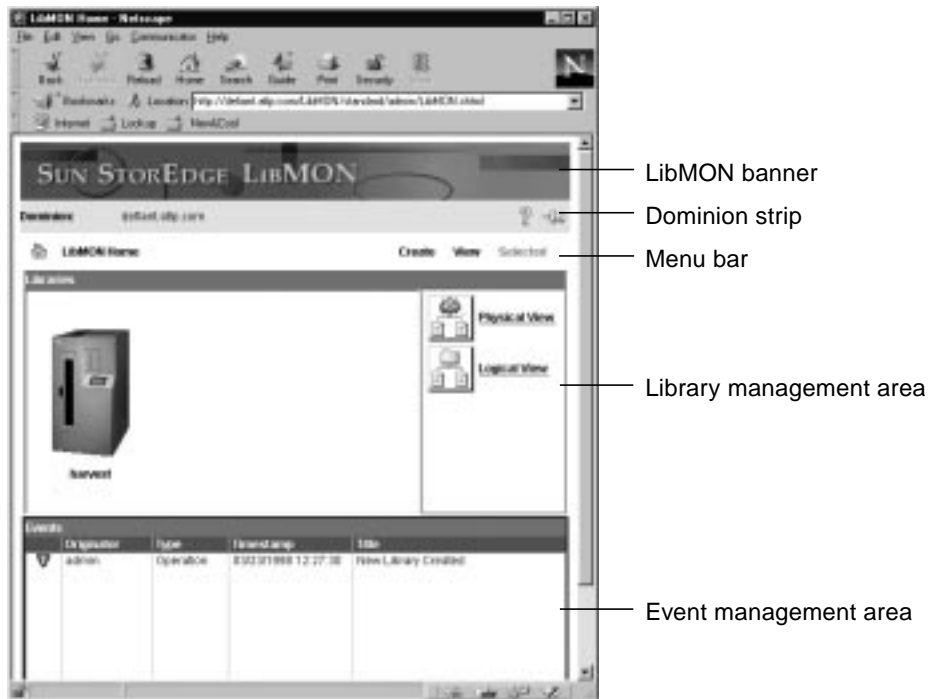


FIGURE 2-5 LibMON Fixed Window Elements

TABLE 2-3 describes each fixed element.

TABLE 2-3 LibMON Window Elements

Window Element	Description
LibMON banner	Displays the name of the software.
Dominion Strip	<p>The left side of this section contains the Dominion field, which indicates the name of the server to which the libraries are attached.</p> <p>Two icons are displayed to the right of the dominion name:</p> <ul style="list-style-type: none">• Help—Clicking this icon opens LibMON online help.• Stick Page Push Pin—Clicking a LibMON button or menu item normally starts a new page or applet. When the push pin icon is selected, clicking a LibMON button or menu item starts a new page or applet in a new browser window. The browser-specific buttons and menu controls (for example, back/next buttons) have no effect.
Menu Bar	<p>The content of the menu bar varies by page; however, it functions consistently for every page. The LibMON menus are all pop-up menus.</p> <p>The four types of menus that can exist in the menu bar are:</p> <ul style="list-style-type: none">• The page menu (at the left side of the menu bar), which allows you to alter the page layout or navigate to other LibMON subsystems. The name and functionality of this menu varies depending on the page.• The Create menu, which allows you to create new Library or Contact objects.• The View menu, which allows you to set the display attributes or sort order for the selected management area.• The Selected menu, which provides options for the selected management area or LibMON object. The options available in this menu depend on which management area or object you have selected.
Management Area	The content of this section varies by page and may include a Library, Event, or Contact manager.

Using LibMON Help

LibMON provides an integrated, HTML-based help subsystem. You can navigate through LibMON Help using the standard Web browser controls and hypertext references embedded in the LibMON help system.



To access LibMON Help, click the help icon. This icon is at the right side of the dominion strip, near the top of all LibMON Web pages, as shown in FIGURE 2-5.

FIGURE 2-6 shows the LibMON Help screen.



FIGURE 2-6 The LibMON Help Screen

The left side of the Help screen provides a list of topics. To view information about a topic, click it. The right side of the Help screen displays the contents of the currently selected topic.

Stopping LibMON

To ensure that all LibMON daemons are shut down properly, always use the `STOP-LibMON` script to stop LibMON.

▼ To Stop LibMON

1. Execute the following command as `root` to stop LibMON:

```
# /opt/SUNWlmon/STOP-LibMON
```

The system displays the following message.

```
Shutting down LibMON server...
Shutting down license server...
#
```

2. Execute the following command as `root` to stop the Apache HTTP server:

```
# /opt/Apache/apache_1.2.5/STOP-Apache
```

Note – It is not necessary to stop the HTTP server. LibMON may be started and stopped while the HTTP server is running.

Using Sun StorEdge LibMON

This chapter explains how to use the pages and dialog boxes in LibMON. It covers the following topics:

- Exploring the LibMON Home Page—page 44
- Managing Libraries—page 50
- Managing Events—page 78
- Managing Contacts—page 84

See “Getting Started With Sun StorEdge LibMON” on page 27 for a description of how to open the LibMON Home Page, set up the software the first time you use it, and use some of the basic Web browser features of LibMON.

Exploring the LibMON Home Page

The LibMON Home Page is the first page you see each time you open LibMON. This page graphically illustrates dynamic library event and summary information.

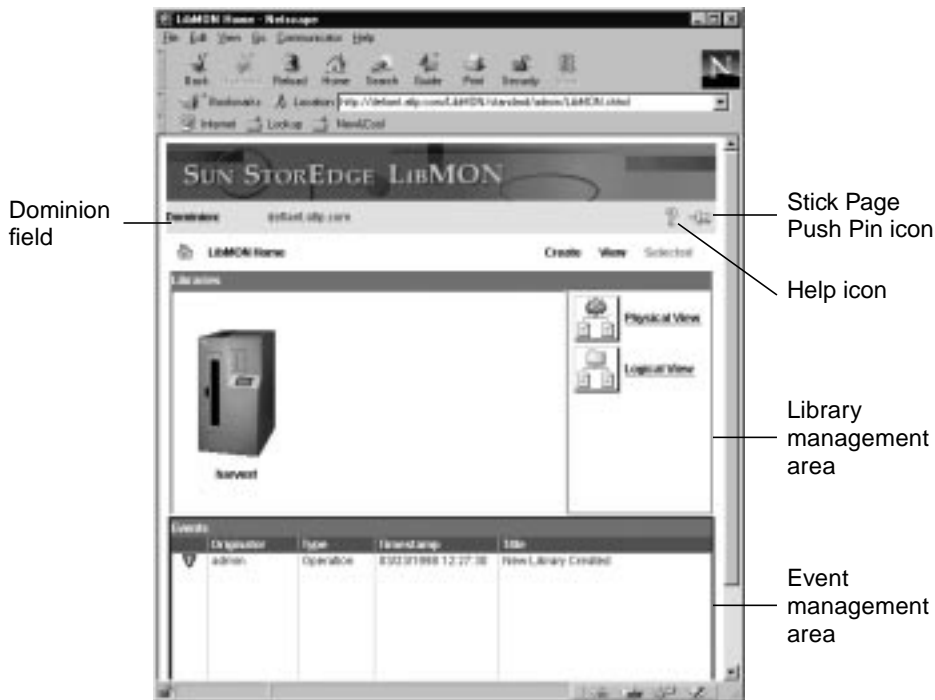


FIGURE 3-1 The LibMON Home Page

The content area of the LibMON Home Page is divided into two management areas:

- The library management area, which displays summary information about monitored libraries.
- The event management area, which displays summary information about library and LibMON system events.

The dominion field at the top of the LibMON Home Page displays the name of the server. To the right of this field are the Help icon and the Stick Page Push Pin icon. These icons appear on each LibMON Web page. For more information about these and other fixed window elements, see TABLE 2-3.

Using the Menus

You can access four menus from the LibMON Home Page:

- The LibMON Home Menu—page 45
- The Create Menu—page 45
- The View Menu—page 46
- The Selected Menu—page 46

The LibMON Home Menu

The options on this menu allow you to customize the library page layout, refresh the library information, and navigate to the Contact List Page.

Menu Item	Description
Properties	Opens the LibMON Home Page Properties dialog box, which allows you to change how the library information is displayed in the library management area. For more information about this dialog box, see “To Select the Library Page Layout” on page 53.
Refresh	Initiates the gathering of new SCSI data and updates the contents of the library management area with the results. The screen blinks slightly when it is updated.
Contact List	Opens the Contact List Page. See “To List the Contacts” on page 86 for a description of this page and how to use it.

The Create Menu

This menu includes options for creating new libraries and contacts.

Menu Item	Description
Library	Opens the Library Device Name dialog box, enabling you to create a new library to be managed by LibMON. After installing LibMON, use this option to create the library description for the library being monitored.
Contact	Opens the Create Contact Property Book dialog box, which allows you to add contacts to the Contact List Page.

The View Menu

This menu provides options that allow you to change the display attributes and sort order for the selected management area.

Menu Item	Description
Display	Opens the Display Attributes dialog box, which allows you to choose the display attributes shown in the selected management area.
Sort	Opens the Sort Order dialog box, which allows you to specify the sort order for the selected management area.

Note – LibMON maintains a set of preferences for each LibMON user. The settings you choose in the Display Attributes and Sort Order dialog boxes will be used each time you log in to LibMON.

The Selected Menu

The options on this menu vary depending upon the management area or object type selected.

Note – Some items on the Selected menu are available to `admin` level users only. These options do not appear on the menu if you are logged in as a `guest`.

Note – If a management area is selected, but no object within the management area is selected, the Selected menu is not available.

If a library is selected, the following menu options are available:

Menu Item	Description
Properties ¹	Opens the Library Property Book Page for the selected library.
Physical View	Displays the Physical View Page for the selected library.
Logical View	Displays the Logical View Page for the selected library.
Delete ¹	Deletes the selected library.
Library Online ^{1, 2}	Places the library online.

Menu Item	Description
Library Offline ^{1, 2}	Places the library offline.
Library Selftest ^{1, 2}	Initiates an actuator self-test of the library.
Firmware Download ^{1, 2}	Downloads the selected firmware file to the selected library.

1. These options are not available to guest level users.

2. These options are available only for the following libraries: the Sun StorEdge L1000, the Sun StorEdge L1800, and the Sun StorEdge L3500.

If an event is selected, the following menu options are available:

Menu Item	Description
Properties	Opens the Event Property Book Page for the selected event. This option is not available if more than one event is selected.
Delete ¹	Deletes the selected event.

1. This option is not available to guest level users.

Using the Library Management Area

The left side of the library management area provides summary information for each managed library in either a large icon or table format, depending on the setting of the Library Page Layout option. To access this option, select Properties from the LibMON Home menu. The available settings are:

- **Large Icon View.** When this view is selected, LibMON displays an image of the library, with the library name under it. This is the default view and is shown in FIGURE 3-1.
- **Table View.** When this view is selected, the library information appears in a table format (see FIGURE 3-2). The second column displays the name of the library. You can configure the information displayed in subsequent columns using the Library Display Attributes dialog box (see “To Set the Library Display Attributes” on page 54).

Note – For more information about the Library Page Layout option, see “To Select the Library Page Layout” on page 53.



FIGURE 3-2 The LibMON Home Page With Table View Selected

A library is considered available when LibMON is able to communicate with the tape library successfully—without any errors indicating a warning or failure condition. When a library is not available, LibMON displays the library image or library icon against a red background.

Note – When a library is not available, you cannot navigate to the Property Book Page, Physical View Page, or Logical View Page for that library.

At the right side of the library management area are two buttons: Physical View and Logical View. These buttons provide links to the Physical View and Logical View Pages. For more information about these pages, see “Selecting the Physical or Logical View Page” on page 62.

Note – These buttons are active only when a library is selected and available.

Using the Event Management Area

The event management area, at the bottom of the LibMON Home Page, summarizes the library and LibMON system events logged by the server. The events are displayed in table format.

Each row in the table corresponds to an event in the log. By default, the icon in the first column indicates the event category:

- A green information icon indicates an information message (for example, `New Library Created`).
- A yellow warning icon indicates a warning situation that could make the library unavailable, but does *not* indicate a hardware failure (for example, `Tape Library is Offline`).
- A red warning icon indicates a hardware failure has been detected, or LibMON is unable to communicate with the tape library (for example, `System Error Occurred`).

Subsequent columns are user-configurable, as defined in the Event Display Attributes dialog box. For more information, see “To Set the Event Display Attributes” on page 78.

The Event manager automatically updates the contents of the event management area when LibMON detects a new event. LibMON adds new events to the table in the order specified in the Event Sort Order dialog box.

For a complete list of library events that are reported to LibMON, refer to the SCSI specification information provided in the library documentation.

Managing Libraries

The library management area, at the top of the LibMON Home Page, provides information on the status of each library connected to the server (see FIGURE 3-1).

- To Create a New Library—page 50
- To Select a Library—page 53
- To Select the Library Page Layout—page 53
- To Set the Library Display Attributes—page 54
- To Set the Library Sort Order—page 56
- To View Detailed Library Information—page 57
- Selecting the Physical or Logical View Page—page 62
- Using Automatic Event Notification—page 65
- Using the Service Features—page 74
- To Delete a Library—page 77

▼ To Create a New Library

Note – When creating or updating a library with LibMON, make sure the library is not in use by another application. This allows LibMON to gather the initial information required to monitor the library.

1. On the Create menu, click Library.

LibMON opens the Library Device Name dialog box.



FIGURE 3-3 The Library Device Name Dialog Box

2. Type the medium changer device name and click OK.

You made a note of this device name when you ran the `SCAN-DEVICES` utility (see “To Determine the Library Device Names” on page 34).

LibMON performs the initial verification and information gathering process and opens the Create Library Property Book dialog box.



FIGURE 3-4 The Create Library Property Book Dialog Box

The left side of the dialog box, labeled Sections, provides hypertext links to the sections of the dialog box:

- The Configuration section contains information about the library, including the library name, product ID, location, serial number, firmware revision and which features are enabled.
- The Device Names section contains the system device information for the medium changer and tape drives within the library. You entered this information when you created the library.
- The Contact section displays information about the contact assigned to the library.
- The Actions section indicates whether notification is enabled, and what type of notification (email or user-defined) will be used for library availability-based events.
- The Service Module section specifies which serial port will be used for the service functions. The default setting is `/dev/ttya`.

For a complete description of the options in each of these sections, see TABLE 3-3.

3. Click Device Names.

The dialog box displays the Device Names section.

4. Enter the device names for the tape drives:

- a. If the tape drive is connected to the server, enter the device name you determined when you ran the `SCAN-DEVICES` utility (see “To Determine the Library Device Names” on page 34).**
- b. If the tape drive is *not* connected to the server, enter a duplicate device name for the drive.**
For an explanation of duplicate device name entries, see “Using Duplicate Entries” on page 52.

Note – Be sure the device names you enter are consistent with those used by your backup software. In most cases, you should select a device name associated with the “no rewind” device.

5. Enter any other library information you have at this time.

6. Click OK to save your changes.

The tape library device names are verified, the library is entered in the database, and LibMON monitoring for that tape library is initiated.

To exit the Create Library Property Book dialog box without creating a library, click Cancel.

Using Duplicate Entries

Note – LibMON cannot monitor tape drives that are not connected to the server, nor does it allow you to create a library without completing the Tape Drive device name fields. If the library contains tape drives that are connected to another host, bypass these restrictions by creating a duplicate entry for each unconnected tape drive.

Duplicate device name entries are necessary when you are using LibMON to monitor a library in which one or more tape drives are connected to a host other than the LibMON server.

LibMON does not allow you to create duplicate entries unless you start LibMON with the `-dup` option. To start LibMON with the `-dup` option, execute the following as root:

```
# /opt/SUNWlmon/START-LIBMON -dup
```

For example, if the tape library has four drives, but only two of the drives (/dev/rmt/0n and /dev/rmt/1n) are connected to the LibMON server, you must enter either of the two valid device names for the two remaining tape drives. The completed Device Names section would show:

Tape Drive 0: /dev/rmt/0n
Tape Drive 1: /dev/rmt/1n
Tape Drive 2: /dev/rmt/0n (duplicate entry)
Tape Drive 3: /dev/rmt/0n (duplicate entry)

In this case, LibMON displays the contents of each drive on the Physical and Logical View Pages. However, the drive data displayed is that of the named physical drive.

▼ To Select a Library

Before you can configure the display attributes of a library or access detailed information for a library, you must select it.

- **To select a library, click the library in the library management area of the LibMON Home Page.**

When a black border appears around the library (Large Icon View) or the library is highlighted (Table View), it is selected. To deselect a library, click it again.

▼ To Select the Library Page Layout

The Library Page Layout option is set to Large Icon View by default. To change this setting:

1. **Go to the LibMON Home Page.**
On the LibMON Home menu, click Properties.
2. **LibMON displays the LibMON Home Page Properties dialog box.**



FIGURE 3-5 The LibMON Home Page Properties Dialog Box

3. Select a setting for the Library Page Layout option: Large Icon View or Table View.

For a description of each of these settings, see “Using the Library Management Area” on page 47.

4. Click OK to save your setting and return to the LibMON Home Page.

To restore the previous option setting, click Reset. To return to the LibMON Home Page without saving the new setting, click Cancel.

Note – LibMON saves this setting as a user preference. Each time you log in to LibMON, it uses this setting.

▼ To Set the Library Display Attributes

1. On the LibMON Home Page, select a library.

2. On the View menu, click Display.

LibMON displays the Library Display Attributes dialog box.



FIGURE 3-6 The Library Display Attributes Dialog Box

3. **Select an attribute in the list, and then click the Add or Remove buttons to move it to or from the Show Attributes box.**

Note – The attributes you select appear in the library management area when Table View is selected. If Large Icon View is selected, the library management area displays only the first attribute in the list.

Note – The Show Attributes box must contain at least one attribute.

The following table describes the library display attributes that are available.

TABLE 3-1 Library Display Attributes

Attribute	Description
Library Name ¹	The name of the library, if defined. If the library name is not defined, the library is listed by the device name for the media changer (robot).
Serial Number	The serial number of the library.
Library Location ¹	The location of the library.
Product ID ¹	The unique Product ID for the library model.
Contact Name ¹	The name of the contact assigned to the library.
Contact Email	The email address for the contact.
Contact Phone	The phone number for the contact.
Contact Pager	The pager number for the contact.

1. These attributes are displayed by default.

4. **Click OK to save your changes and exit the Library Display Attributes dialog box.**

To restore the previously saved settings, click Reset. To exit the Library Display Attributes dialog box without saving any changes, click Cancel.

Note – LibMON saves these settings as user preferences. Each time you log in to LibMON, it uses these settings.

▼ To Set the Library Sort Order

- 1. On the LibMON Home Page, select a library.
- 2. On the View menu, click Sort.

LibMON displays the Library Sort Order dialog box.



FIGURE 3-7 The Library Sort Order Dialog Box

- 3. Select an attribute in the list, and then click the Add or Remove buttons to move it to or from the Sort Order box.

The attributes in the Sort Order box are the sorting keys for the library management area when Table View is selected.

Note – The Sort Order box must contain at least one but no more than two attributes.

The following table describes the sort order attributes that are available.

TABLE 3-2 Library Sort Order Attributes

Attribute	Description
Library Name ¹	The name of the library, if defined. If the library name is not defined, the library is listed by the device name for the media changer (robot).
Library Location	The location of the library.
Contact Name	The name of the contact assigned to the library.

1. This attribute is the default primary key used for sorting.

4. **To move an attribute up or down in the Sort Order box, click the up or down arrow buttons.**

The placement of an attribute in the Sort Order box determines whether it is a primary or secondary sorting key.

5. **Select Ascending or Descending:**

- If you select Ascending, LibMON sorts the attributes in the library table in ascending order.
- If you select Descending, LibMON sorts the attributes in the library table in descending order.

6. **Click OK to save your changes and exit the Library Sort Order dialog box.**

To restore the previously saved settings, click Reset. To exit the Library Sort Order dialog box without saving any changes, click Cancel.

Note – LibMON saves these settings as user preferences. Each time you log in to LibMON, it uses these settings.

▼ To View Detailed Library Information

LibMON maintains a Library Property Book Page for each monitored library. This page contains all the information you entered when you created the library, and enables you to set thresholds for each library device (robot or tape drive).

To open the Library Property Book Page for a library:

1. **On the LibMON Home Page, select the library.**
2. **On the Selected menu, click Properties.**

LibMON opens the Library Property Book Page for the selected library.



FIGURE 3-8 The Library Property Book Page

The left side of the page, labeled Sections, provides hypertext links to the sections of the page.

3. To navigate to a section, click its link:

- The Configuration section contains information about the library, including the library name, product ID, location, serial number, firmware revision and which features are enabled.
- The Device Names section contains the system device information for the medium changer and tape drives within the library. You entered this information when you created the library. This section also allows you to set up threshold-based notification for library devices.
- The Contact section displays information about the contact assigned to the library.
- The Actions section indicates whether notification is enabled, and what type of notification (email or user-defined) will be used for library availability-based events.
- The Service Module section specifies which serial port will be used for the service functions. The default setting is `/dev/ttya`.

The following table provides a detailed description of each field on the Library Property Book Page.

TABLE 3-3 Library Property Book Page Field Descriptions

Section Name	Field/Option	Description
Configuration	Library Name	This field allows you to enter a name for the library. If no name is entered in this field, LibMON refers to the library by the device name for the medium changer (robot).
	Serial Number	This field allows you to enter the library serial number. This number is located on the back panel of the tape library.
	Library Location	This field allows you to enter the location of the library (for example, the room number).
	Product ID	This field displays the unique Product ID for the tape library model. LibMON automatically sets this value as the result of a SCSI inquiry. You cannot change this value.
	Product Revision	This field displays the firmware revision level. LibMON automatically sets this value as the result of a SCSI inquiry. You cannot change this value.
	Automatic Cleaning	Initially, the value in this field is set by LibMON as the result of a SCSI mode sense. You can change this setting: <ul style="list-style-type: none"> • 'On' enables the automatic drive cleaning feature. • 'Off' disables the automatic drive cleaning feature. This option is not available for all tape libraries.
	Automatic Inventory	Initially, the value in this field is set by LibMON as the result of a SCSI mode sense. You can change this setting: <ul style="list-style-type: none"> • 'On' enables the automatic inventory feature, causing the library to inventory all elements before going online. • 'Off' disables the automatic inventory feature. When this feature is disabled, the library inventories itself only when the Init Element Status or Init Element Status with Range commands are issued. This option is not available for all tape libraries.

TABLE 3-3 Library Property Book Page Field Descriptions

Section Name	Field/Option	Description
Configuration (continued)	Barcode Label Checking	Initially, the value in this field is set by LibMON as the result of a SCSI mode sense. You can change this setting: <ul style="list-style-type: none"> • ‘On’ enables the bar code label checking feature. When this feature is enabled, the library scans all the bar code labels when it performs an inventory prior to going online. • ‘Off’ disables the bar code label checking feature. When this feature is disabled, the bar code labels are not scanned. Note: The tape library performs bar code scanning only as part of its normal inventory process. If you change this option setting, the tapes in the library will not be re-scanned until an inventory occurs. This option is not available for all tape libraries.
	Drive Load Retry	Initially, the value in this field is set by LibMON as the result of a SCSI mode sense. You can change this setting: <ul style="list-style-type: none"> • ‘On’ enables the drive load retry feature. • ‘Off’ disables the drive load retry feature. Note: We recommend you do not change this setting. This option is not available for all tape libraries.
Device Names	Robot	This field displays the device name for the medium changer. You entered this value when you created the library.
	Tape Drive x	These fields display the device names of the tape drives. You entered these values when you created the library.
	Set Threshold	Clicking the Set Threshold button (to the right of each device name field) opens a Set Threshold dialog box for the device. For more information about setting thresholds, see “To Set Up Threshold-Based Notification” on page 65. This option is not available in the Create Library Property Book dialog box.
Contact	Contact Name	This list box allows you to select the contact person for the library. This list is built from the contacts on the Contact List Page.
	Phone	This field displays the phone number defined for the contact.

TABLE 3-3 Library Property Book Page Field Descriptions

Section Name	Field/Option	Description
Contact (continued)	Email Addresses	This field displays the email addresses defined for the contact. If email notification is enabled and a library availability-based or threshold-based event occurs, email messages will be sent to each email address shown.
Actions— Library Available Actions	Email	Library Available Actions are triggered when the library becomes available. This field (Email) allows you to enable or disable email notification of library available events. <ul style="list-style-type: none"> • ‘On’ enables email notification. • ‘Off’ disables email notification.
	User-Defined	This field allows you to enable or disable user-defined notification of library available events. <ul style="list-style-type: none"> • ‘On’ enables user-defined notification. • ‘Off’ disables user-defined notification.
	Action	This list box allows you to select the user-defined command that LibMON will execute when a library becomes available. See “To Set Up Library Availability-Based Notification” on page 70 and “To Create a Command Definition File” on page 71.
Actions— Library Unavailable Actions	Email	Library Unavailable Actions are triggered when the library becomes unavailable. This field (Email) allows you to enable or disable email notification of library unavailable events. <ul style="list-style-type: none"> • ‘On’ enables email notification. • ‘Off’ disables email notification.
	User-Defined	This field allows you to enable or disable user-defined notification of library unavailable events. <ul style="list-style-type: none"> • ‘On’ enables user-defined notification. • ‘Off’ disables user-defined notification.
	Action	This list box allows you to select the user-defined command that LibMON will execute when a library becomes unavailable. See “To Set Up Library Availability-Based Notification” on page 70 and “To Create a Command Definition File” on page 71.
Service Module	Serial Port	This field displays the serial port used to issue service commands to the library. The default setting is <code>/dev/ttya</code> .

4. If desired, make changes to the settings on this page.
5. Click Apply to save your changes.

Note – If you move to another LibMON page without clicking Apply, any changes you have made will be lost.

To return to the previously saved settings, click Reset.

Selecting the Physical or Logical View Page

LibMON provides two pages for monitoring library information: the Physical View Page and the Logical View Page. These pages provide the same information, but in different formats.

- The Physical View Page displays a physical representation of the library.
- The Logical View Page displays a hierarchical representation of the library.

Both of these pages provide detailed information about the library, the robot (medium changer), the storage bins, the import/export bin(s), and the tape drives.

There are several ways to access the Physical or Logical View Pages for a library:

- Select the library on the LibMON Home Page, and then open the Selected menu and click Physical View or Logical View.
- Select the library on the LibMON Home Page, and then click either the Physical View or the Logical View buttons at the right of the library management area.
- On the Library Property Book Page, open the Library menu and select Physical View or Logical View.
- On the Physical View Page, access the Logical View Page by opening the Library menu and selecting Logical View.
- On the Logical View Page, access the Physical View Page by opening the Library menu and selecting Physical View.

Using the Physical View Page

The Physical View Page displays an image representing the internal configuration of the library (FIGURE 3-9).

Note – FIGURE 3-9 shows the Physical View Page for a Sun StorEdge L1800 library. Although the appearance of the Physical View Page depends on the library you are using, all Physical View Pages operate as described in this section.



FIGURE 3-9 The Physical View Page

The left side of the page shows an internal physical view of the library. Icons represent the media (tape cartridges) present in the storage bins, the import/export elements, the tape drives, and the robot. No icon is shown if the bin, drive, or robot is empty. The icons also indicate whether the media has a bar code label, and whether it is a cleaning tape.

Note – The library image displays only the tape drives that are available to LibMON. If you remove a tape drive from the library, it does not appear on the Physical View Page.

Note – If the load port is open, LibMON displays the word ‘OPEN’ over the import/export area.

To view information about a library component:

- Click the icon that represents the component. LibMON displays the component information in the Information section (right side) of the page.

Using the Logical View Page

The Logical View Page displays a hierarchical representation of the library components (FIGURE 3-10).

Note – FIGURE 3-10 shows the Logical View Page for a Sun StorEdge L1800 library. Although the component information on the Logical View Page depends on the library you are using, all Logical View Pages operate as described in this section.



FIGURE 3-10 The Logical View Page

The left side of the page displays a hierarchical tree structure that represents the internal components of the library. The right side of the page displays detailed library component information.

To use the Logical View Page:

- To view all the components in a folder, click the Expand (+) button next to the folder name.
- To hide all the components in a folder, click the Collapse (-) button next to the folder name.
- To view detailed information about a library component, click the library component on the left side of the page. Once the component is selected, LibMON displays its information in the Information section (on the right side of the page).

Using Automatic Event Notification

You can set up automatic event notification for two types of library events:

- Threshold-based events
- Library availability-based events

▼ To Set Up Threshold-Based Notification

LibMON allows you to set various thresholds for each device within the library. When the device exceeds a set threshold, LibMON automatically notifies the library contact by sending an email message and/or executing a user-defined command. This feature is intended to provide notification of conditions that could eventually cause a library component to become unavailable.

Note – No single set of threshold values is appropriate for all libraries and drives. Select thresholds that are appropriate for the library and drives you are using.

You set threshold values through the Library Property Book Page.

1. **On the LibMON Home Page, select the library for which you want to set threshold values.**
2. **On the Selected menu, click Properties.**
LibMON opens the Library Property Book Page for the selected library.
3. **On the left side of the page, click Device Names.**

The page displays the Device Names section. This section displays the device names for the robot and each tape drive within the library. To the right of each device name field is a Set Threshold button.

4. Click the **Set Threshold** button that corresponds to the device for which you want to set threshold values.

LibMON opens the Set Threshold dialog box for the device.



FIGURE 3-11 A Sample Set Threshold Dialog Box

Note – The parameters displayed in the Set Threshold dialog box depend on the type and model of the device monitored; therefore, the dialog box displayed on your system will probably appear somewhat different from the one shown above.

The Threshold table (at the bottom of the dialog box) displays the parameters for which you can set thresholds, and the current threshold values.

TABLE 3-4 describes each of the library parameters. The parameters displayed vary depending on the type of library you are using.

TABLE 3-4 Library Parameters

Parameter	Description
Barcode scan retries	The number of barcode scan retries.
Cartridge seated	Whether the cartridge is seated.
Door closed	Whether the door is closed.
Drive handle moves	The number of attempted drive handle moves.
Drive handle retries	The number of drive handle retries.
Drive load retries	The number of drive load retries.
Drum home	Whether the drum is home.
Extension axis moves	The number of individual extension axis moves.
Extension correction steps	The number of extension correction steps.
Extension moves	The number of individual extension moves.
Extension retries	The number of extension retries.
Gripper home	Whether the gripper is home.
Gripper moves	The number of individual gripper moves.
Gripper retries	The number of gripper retries.
Horizontal correction steps	The number of horizontal correction steps.
Horizontal moves	The number of individual horizontal moves.
Horizontal retries	The number of horizontal retries.
Key locked	Whether the key is locked.
Moves from a bin	The number of attempted moves from a bin.
Moves from a drive	The number of attempted moves from a drive. The recommended value for this parameter is 100,000.
Moves from a load port	The number of attempted moves from the load port.
Moves to a bin	The number of attempted moves to a bin.
Moves to a drive	The number of attempted moves to a drive. The recommended value for this parameter is 100,000.
Moves to a load port	The number of attempted moves to the load port.
Partial grip retries	The number of partially gripped cartridge retries.
Pick from drive retries	The number of pick from drive retries.

TABLE 3-4 Library Parameters

Parameter	Description
Place into drive retries	The number of place into drive retries.
Rotary moves	The number of attempted rotary axis moves.
Rotary retries	The number of rotary axis retries.
Time powered on	The number of seconds the system has been powered on.
Time processing commands	The number of seconds spent processing commands.
Total number of moves	The total number of moves.
Total number of pick retries	The total number of pick retries.
Total number of put retries	The total number of put retries.
Total number of scan failures	The total number of scan failures.
Total number of scan retries	The total number of scan retries.
Total number of scans	The total number of scans.
Vertical correction steps	The number of vertical correction steps.
Vertical moves	The number of individual vertical moves.
Vertical retries	The number of vertical retries.

TABLE 3-5 describes each of the tape drive parameters. The parameters displayed vary depending on the type of tape drive installed.

TABLE 3-5 Tape Drive Parameters

Parameter	Description
Read compression ratio	The read compression ratio.
Read corrected errors	The number of read errors that have been corrected.
Read hard errors	The number of read errors that have not been corrected.
Total re-reads	The number of rereads.
Total re-writes	The number of rewrites.
Write compression ratio	The write compression ratio.
Write corrected errors	The number of write errors that have been corrected.
Write hard errors	The number of write errors that have not been corrected.

5. **To set a threshold for a parameter, click the Parameter Name in the table.**

LibMON displays the Parameter Name in the Selected Threshold field near the top of the dialog box.

6. **In the Threshold Value field, enter the desired numeric value for the threshold.**

Note – This value must be numeric, and must be greater than the value displayed in the Current Value column of the Thresholds table.

As you enter the value, it appears in the Threshold Value column.

7. **To select email notification, turn the Email option On.**

8. **To select user-defined notification, turn the User-Defined option On, and then select the desired action from the Action list box.**

The Action list box lists the commands for which you have created command definition files. To create a command definition file to be used for User-Defined notification, see “To Create a Command Definition File” on page 71.

9. **Repeat steps 5 through 8 for each threshold value you wish to set.**

To return the currently selected threshold to its previously saved setting, click Reset.
To return all the threshold settings to their previous values, click Reset All.

10. **Click OK to save your threshold settings and exit the Set Threshold dialog box.**

Note – If you move to another LibMON page without clicking OK, your new threshold settings will be lost.

To exit the dialog box without saving any settings, click Cancel.

▼ To Set Up Library Availability-Based Notification

You can configure LibMON to notify you automatically when the library transitions between available and unavailable states. You do this through the Library Property Book Page.

1. On the LibMON Home Page, select the library.

2. On the Selected menu, click Properties.

LibMON displays the Library Property Book Page for the library you selected.

3. On the left side of the page, click Actions.

The right side of the page displays the Actions section. This section consists of two subsections: Library Available Actions and Library Unavailable Actions:

- Library Available Actions occur when the library becomes available for use by software products.
- Library Unavailable Actions occur when the library becomes unavailable for use by software products.

These subsections control how you will be notified of library availability-based events.

4. To select email notification, turn the Email option On.

5. To select user-defined notification, turn the User-Defined option On, and then select the desired action from the Action list box.

The Action list box lists the commands for which you have created command definition files. To create a command definition file to be used for User-Defined notification, see “To Create a Command Definition File” on page 71.

6. Click Apply to save your changes.

Note – If you move to another LibMON page without clicking Apply, your new settings will be lost.

To return to the previously saved settings, click Reset.

▼ To Create a Command Definition File

Command definition files specify what actions will be executed when a library event occurs that triggers user-defined notification. Each command definition file must be located in the `/SUNWlmon/command/user` directory, and have the extension `.des`. For your assistance, the `/SUNWlmon/command/user` directory contains a template file, `template.des`.

Each line of the command definition file should contain one of the following:

- A keyword—Each file must contain the keywords listed in TABLE 3-6, in the order they are listed.
- A keyword value—A keyword value begins on the line following the keyword and continues on the following lines until the next keyword, blank line, or comment line.
- A blank line.
- A comment line—A comment line must begin with a pound (#) character in column 1.

The following table describes the keywords that must appear in the command definition file.

TABLE 3-6 Command Definition File Keywords

Keyword	Description
PATH	The full path where the command to be executed is located. The default path of <code>/opt/SUNWlmon/command/user</code> will be used if you do not specify a path.
NAME ¹	The name of the executable file or script to be executed.
TITLE	This is the title that will be listed in the Action box (in the Actions section of the Library Property Book Page). If you do not specify a title, the Action box will display the name of the executable file.
ARGUMENTS	The command line arguments for the executable or script. Arguments preceded with the percent sign are LibMON predefined arguments that will be substituted with appropriate values when the action is initiated. Arguments can all be on one line or can span multiple lines.
DESCRIPTION	Provides a more lengthy description of the command to be executed.

1. You must specify a value for this keyword. All other values are optional.

The following table lists the LibMON predefined arguments.

Note – The availability of some arguments depends on the type of trigger that initiates the command: a library availability-based trigger or a threshold-based trigger.

TABLE 3-7 LibMON Predefined Arguments

Argument Name	Description	Library Availability Trigger	Threshold Trigger
CONTACT_EMAIL	The email address(es) for the contact assigned to the originating library, if defined.	X	X
CONTACT_FAX	The fax number for the contact assigned to the originating library, if defined.	X	X
CONTACT_NAME	The name of contact assigned to the originating library, if defined.	X	X
CONTACT_PAGE	The page number for the contact assigned to the originating library, if defined.	X	X
CONTACT_PHONE	The phone number for the contact assigned to the originating library, if defined.	X	X
DEVICE_NAME	The device name on which the trigger is based.		X
EVENT_DESCRIPTION	A description of the event.	X	X
EVENT_ORIGINATOR	The event originator.	X	X
EVENT_RECOVERY_MESSAGE	The recovery message associated with the event.	X	X
EVENT_SEVERITY	The event severity level.	X	X
EVENT_TIMESTAMP	The string representation of the date using the local convention.	X	X
EVENT_TITLE	The event title.	X	X
EVENT_TYPESPECIFICDATA	Specific data related to the event type.	X	X
HOST_NAME	The hostname of the server.	X	X

TABLE 3-7 LibMON Predefined Arguments

Argument Name	Description	Library Availability Trigger	Threshold Trigger
LIBRARY_AVAILABILITY	The status of the library: available or unavailable.	X	X
LIBRARY_LOCATION	The location of the library, if defined.	X	X
LIBRARY_NAME	The name of the library, if defined.	X	X
PARAMETER_NAME	The parameter name for the trigger.		X
PARAMETER_VALUE	The parameter value for the trigger.		X
THRESHOLD_VALUE	The threshold to which the parameter value is being compared.		X

The following is a sample command definition file.

```

PATH
/export/LibMON/bin

NAME
buildEvent.sh

TITLE
Display Event Information

ARGUMENTS
%LIBRARY_NAME %HOST_NAME %LIBRARY_LOCATION %EVENT_TIMESTAMP
%EVENT_TITLE %EVENT_DESCRIPTION %EVENT_TYPESPECIFICDATA
%EVENT_RECOVERY_MESSAGE

DESCRIPTION
Display event information in an xterm and ring a bell

```

The sample file above defines a command with the title “Display Event Information.” When an action associated with this command definition is initiated, the `buildEvent.sh` command in the `/export/LibMON/bin` directory is executed.

When building command definition files, use the `CHECK-USER-COMMANDS` script in the `/opt/SUNWlmon` directory to verify correct syntax usage. When you are sure the command definition file is correct, either restart the LibMON server or select the Refresh option on the LibMON Home Page. This causes the server to recognize the new command definition.

Using the Service Features

In addition to monitoring the library, LibMON allows you to initiate serial port commands to the library. These features are available only to `admin` level users.

The service features are supported by the following libraries:

- Sun StorEdge L1000
- Sun StorEdge L1800
- Sun StorEdge L3500

Note – If you are using a library other than those listed above, you will not be able to use the service features.

▼ To Connect the Server to the Library

Before you can use any of the service commands, you must connect the server to the library.

1. **Connect one end of a serial cable to the DIAGNOSTIC port at the back of the tape library.**
2. **Connect the other end of the serial cable to a serial port on the server.**
3. **Start LibMON and access the LibMON Home Page.**
4. **Select the library.**
5. **On the Selected menu, click Properties.**

LibMON opens the Library Property Book Page for the selected library.

6. In the Service Module section, make sure the serial port setting is valid for the serial port to which the library is connected. If not, change the setting.

The default setting is `/dev/ttya`.

7. Click **Apply** to save any changes and exit the Library Property Book Page.

Note – If you move to another LibMON page without clicking **Apply**, any changes you have made will be lost.

▼ To Place the Library Offline

1. On the LibMON Home Page, select the library.

2. On the Selected menu, click **Library Offline**.

LibMON displays a dialog box, prompting you to confirm the command.

3. Click **OK** to place the library offline.

To abort the command, click **Cancel**.

LibMON places the library offline. When LibMON detects that the library is offline, it adds the event to the event management area and displays the library image against a red background.

▼ To Place the Library Online

1. On the LibMON Home Page, select the library.

2. On the Selected menu, click **Library Online**.

LibMON displays a dialog box, prompting you to confirm the command.

3. Click **OK** to place the library online.

To abort the command, click **Cancel**.

LibMON places the library online. When LibMON detects that the library is online, it adds the event to the event management area and displays the library image against a transparent background.

▼ To Initiate an Actuator Self-Test

The actuator self-test sends a short electrical pulse to the extension axis, gripper, and drive door motors and then reads the encoder or sensor data associated with each motor. This operation is used to verify that these motors and their associated encoder or sensors respond as instructed.

1. **On the LibMON Home Page, select the library.**
2. **On the Selected menu, click Library Selftest.**

LibMON displays a dialog box, prompting you to confirm the command.

3. **Click OK to start the test.**

To abort the command, click Cancel.

LibMON places the library offline (if necessary) and initiates the actuator self-test.

When the test is complete, LibMON returns all the axes to their home positions, and returns the library to the state it was in (online or offline) when the command was initiated.

▼ To Download New Firmware to the Library



Caution – Be careful when performing this procedure. If you download the wrong firmware file, the library may be rendered temporarily unusable.

Note – Before initiating a firmware download, shut down all processes (except LibMON) that issue SCSI requests to the library. This includes storage software products. Failure to stop these processes may cause the firmware download to fail.

1. **Copy the firmware file onto the server (the recommended directory is `/opt/SUNWlmon/service_module/firmware`).**

The file must have the extension `.hex`.

2. **On the LibMON Home Page, select the library.**
3. **On the Selected menu, click Firmware Download.**

LibMON displays the Firmware Download File Selection dialog box, prompting you to select the desired firmware file.

4. Select the file:

- a. The Known Files list displays all the firmware files in the `/opt/SUNWlmon/service_module/firmware` directory and subdirectories. If the firmware file is in this directory, select the check box next to Known Files and select the desired file from the list box.**
- b. If the firmware file is not in the `/opt/SUNWlmon/service_module/firmware` directory, select the check box next to Full Path, and then type the full path and file name in the Full Path field.**

5. Click OK to exit the dialog box.

LibMON displays a dialog box, prompting you to confirm the download.

6. Click OK to start the test.

LibMON places the library offline (if necessary) and initiates the firmware download. The Firmware Download Progress dialog box graphically displays the progress of the download.

7. To close the Firmware Download Progress dialog box before the download is complete, click OK.

Note – Closing the Firmware Download Progress dialog box does not interrupt the firmware download.

When the download is complete, the Firmware Download Progress dialog box automatically disappears and LibMON displays a dialog box prompting you to cycle power to the library.

8. Turn the library off, and then turn it back on.

This completes the firmware download operation.

▼ To Delete a Library

1. Select the library you wish to delete.

2. On the Selected menu, click Delete.

LibMON displays a dialog box, prompting you to confirm the deletion.

3. To delete the library, click Yes.

LibMON deletes the library from the library management area.

Managing Events

The event management area, at the bottom of the LibMON Home Page, lists the events that have been logged at the server for the monitored libraries and system events. The events are displayed in a table format (see FIGURE 3-1).

- To Select an Event—page 78
- To Set the Event Display Attributes—page 78
- To Set the Event Sort Order—page 80
- To View Detailed Event Information—page 82
- To Delete an Event—page 83

▼ To Select an Event

Before you can configure the display attributes of an event or access detailed event information, you select it.

- To select an event, click the event in the event management area of the LibMON Home Page.
- To select multiple events, click each event you want to select.

When an event is highlighted, it is selected. To deselect an event, click it again.

▼ To Set the Event Display Attributes

1. On the LibMON Home Page, select an event.
2. On the View menu, click Display.

LibMON displays the Event Display Attributes dialog box.



FIGURE 3-12 The Event Display Attributes Dialog Box

3. Select an attribute in the list, and then click the Add or Remove buttons to move it to or from the Show Attributes box.

Note – The Show Attributes box must contain at least one attribute.

The attributes you select appear in the event management area. TABLE 3-8 describes the event display attributes that are available.

TABLE 3-8 Event Display Attributes

Attribute	Description
Originator ¹	When the event type is Device, the Originator field displays the library name, if one is defined. If a library name has not been defined, the Originator field displays the device name of the medium changer for the tape library. When the event type is Operation, the Originator field displays the user name of the LibMON user who performed the operation.
Event Type ¹	LibMON generates two types of events: Device and Operation. <ul style="list-style-type: none">• Device events are generated when an exceptional condition has been detected as a result of running the SCSI commands for the tape library.• Operation events are generated when a LibMON contact or library is created, updated, or deleted.
Timestamp ¹	The time the event was generated.
Title ¹	A summary of the event.
Severity	LibMON uses three severity levels: <ul style="list-style-type: none">• Information events are indicated by a green event icon. They indicate a condition that will not make the library unavailable. All Operation events are information events.• Warning events are indicated by a yellow icon. They indicate a condition (other than a hardware failure) that will probably make the library unavailable.• Failure events are indicated by a red icon. They indicate a hardware failure condition.

1. These attributes are displayed by default.

4. Click OK to save your changes and exit the Event Display Attributes dialog box.

To restore the previously saved settings, click Reset. To exit the Event Display Attributes dialog box without saving any changes, click Cancel.

Note – LibMON saves these settings as user preferences. Each time you log in to LibMON, it uses these settings.

▼ To Set the Event Sort Order

1. On the LibMON Home Page, select an event.
2. On the View menu, click Sort.

LibMON displays the Event Sort Order dialog box.



FIGURE 3-13 The Event Sort Order Dialog Box

3. Select an attribute in the list, and then click the Add or Remove buttons to move it to or from the Sort Order box.

The attributes in the Sort Order box are the sorting keys for the event management area.

Note – The Sort Order box must contain at least one but no more than two attributes.

The following table describes the event sort order attributes that are available.

TABLE 3-9 Event Sort Order Attributes

Attribute	Description
Originator	When the event type is Device, the Originator field displays the library name, if one is defined. If a library name has not been defined, the Originator field displays the device name of the medium changer for the tape library. When the event type is Operation, the Originator field displays the user name of the LibMON user who performed the operation.
Event Type	LibMON generates two types of events: Device and Operation. <ul style="list-style-type: none">• Device events are generated when an exceptional condition has been detected as a result of running the SCSI commands for the tape library.• Operation events are generated when a LibMON contact or library is created, updated, or deleted.
Timestamp ¹	The time the event was generated.

1. This attribute is the default primary key used for sorting.

4. To move an attribute up or down in the Sort Order box, click the up or down arrow buttons.

The placement of an attribute in the Sort Order box determines whether it is a primary or secondary sorting key.

5. Select Ascending or Descending:

- If you select Ascending, LibMON sorts the attributes in the event table in ascending order.
- If you select Descending, LibMON sorts the attributes in the event table in descending order.

6. Click OK to save your changes and exit the Event Sort Order dialog box.

To restore the previously saved settings, click Reset. To exit the Event Sort Order dialog box without saving any changes, click Cancel.

Note – LibMON saves these settings as user preferences. Each time you log in to LibMON, it uses these settings.

▼ To View Detailed Event Information

LibMON maintains a Event Property Book Page for each event. To open the Event Property Book Page for an event:

1. On the LibMON Home Page, select the event.

Note – Select only one event. If multiple events are selected, the Properties option in the Selected menu is not available.

2. On the Selected menu, click Properties.

LibMON opens the Event Property Book Page for the selected event.



FIGURE 3-14 The Event Property Book Page

The left side of the page, labeled Sections, provides hypertext links to the sections of the page.

3. To navigate to a section, click its link:

- The Information section provides general information about the event.
- The Description section describes the event in more detail.
- The Recovery Message section provides the recommended steps to correct the error condition. If the event is not an error condition, this field is blank.

The following table provides a detailed description of each field on the Event Property Book Page.

TABLE 3-10 Event Property Book Page Field Descriptions

Field/Option	Description
Originator	This field displays the originator of the event: <ul style="list-style-type: none">• When the event type is Device, this field displays the library name where the event occurred. If no library name is defined, this field displays the device name of the medium changer for the tape library.• When the event type is Operation, this field displays the name of the LibMON user who performed the operation.
Timestamp	This field displays the time the event was generated.
Title	This field displays the title of the event.
Severity	This field displays the severity of the event: Information, Warning, and Failure.
Type	This field displays the event type: Device or Operation.
Type Specific Data	This field displays data specific to the event type.
Description	This field provides a more detailed description of the event.
Recovery Message	This field provides the recommended steps to correct the error condition. If the event is not an error condition, this field is blank.

▼ To Delete an Event

1. Select the event or events you wish to delete.

2. On the Selected menu, click Delete.

LibMON displays a dialog box, prompting you to confirm the deletion.

3. To delete the Event, click Yes.

LibMON removes the event or events from the event management area.

Managing Contacts

The Contact List Page provides information about the contacts involved in library management.

- To Create a New Contact—page 84
- To Assign a Contact to a Library—page 85
- To List the Contacts—page 86
- To Select a Contact—page 86
- To Set the Contact Display Attributes—page 87
- To Set the Contact Sort Order—page 88
- To View Detailed Contact Information—page 89
- To Delete a Contact—page 91

▼ To Create a New Contact

1. On the **Create** menu, click **Contact**.

The Create Contact Property Book dialog box opens.



FIGURE 3-15 The Create Contact Property Book Dialog Box

The following table provides a detailed description of each field on the Event Property Book Page.

TABLE 3-11 Create Contact Property Book Dialog Box Field Descriptions

Field/Option	Description
Name	The name of the contact.
Phone	The phone number for the contact.
Email Addresses	The email address (or addresses) for the contact. Separate multiple email addresses with a comma.
Pager	The pager number for the contact.
Fax	The fax number for the contact.

2. **Type the contact personal information.**
3. **Click OK to save your settings and exit the Create Contact Property Book dialog box.**

▼ To Assign a Contact to a Library

To assign a contact to a library:

1. **If you have not already added the contact to the Contact List, do so, referring to “To Create a New Contact” on page 84.**
2. **On the LibMON Home Page, select the library to which you want to assign a contact.**
3. **On the Selected menu, click Properties.**
LibMON displays the Library Property Book Page for the selected library.
4. **On the left side of the page, click Contact.**
The Library Property Book Page displays the Contact section.
5. **Select the desired contact name from the Contact Name list box.**
LibMON automatically completes the Phone and Email Addresses fields using information from the Contact List Page.
6. **Click Apply to save the contact.**

Note – If you move to another LibMON page without clicking Apply, any changes you have made will be lost.

▼ To List the Contacts

1. Access the LibMON Home Page.
2. On the LibMON Home menu, click Contact List.

LibMON opens the Contact List Page.



FIGURE 3-16 The Contact List Page

▼ To Select a Contact

You must select a contact before you can change the contact display attributes or access detailed information about the contact.

- To select a contact, click the contact in the contact management area.

When the contact is highlighted, it is selected. To deselect a contact, click it again.

▼ To Set the Contact Display Attributes

1. On the Contact List Page, select a contact.

2. On the View menu, click Display.

LibMON displays the Contact Display Attributes dialog box.



FIGURE 3-17 The Contact Display Attributes Dialog Box

3. Select an attribute in the list, and then click the Add or Remove buttons to move it to or from the Show Attributes box.

Note – The Show Attributes box must contain at least one attribute.

The attributes you select appear in the contact management area. The following table describes the contact display attributes that are available.

TABLE 3-12 Contact Display Attributes

Attribute	Description
Name ¹	The name of the contact.
Email ¹	The email address for the contact.
Phone ¹	The phone number for the contact.
Pager	The pager number for the contact.
Fax	The fax number for the contact.

1. These attributes are displayed by default.

4. Click OK to save your changes and exit the Contact Display Attributes dialog box.

To restore the previously saved settings, click Reset. To exit the Contact Display Attributes dialog box without saving any changes, click Cancel.

Note – LibMON saves these settings as user preferences. Each time you log in to LibMON, it uses these settings.

▼ To Set the Contact Sort Order

1. On the Contact List Page, select a contact.
2. On the View menu, click Sort.

LibMON displays the Contact Sort Order dialog box.



FIGURE 3-18 The Contact Sort Order Dialog Box

3. Select an attribute in the list, and then click the Add or Remove buttons to move it to or from the Sort Order box.

The attributes in the Sort Order box are the sorting keys for the contact management area.

Note – The Sort Order box must contain at least one but no more than two attributes.

The following table describes the contact sort order attributes that are available.

TABLE 3-13 Contact Sort Order Attributes

Attribute	Description
Name ¹	The name of the contact.
Email	The email address for the contact.

1. This attribute is the default primary key used for sorting.

4. To move an attribute up or down in the Sort Order box, click the up or down arrow buttons.

The placement of an attribute in the Sort Order box determines whether it is a primary or secondary sorting key.

5. Select Ascending or Descending:

- If you select Ascending, LibMON sorts the attributes in the contact table in ascending order.
- If you select Descending, LibMON sorts the attributes in the contact table in descending order.

6. Click OK to save your changes and exit the Contact Sort Order dialog box.

To restore the previously saved settings, click Reset. To exit the Contact Sort Order dialog box without saving any changes, click Cancel.

Note – LibMON saves these settings as user preferences. Each time you log in to LibMON, it uses these settings.

▼ To View Detailed Contact Information

LibMON maintains a Contact Property Book Page for each contact. This page contains all the information you entered when you created the contact.

To open the Contact Property Book Page for a contact:

- 1. On the Contact List Page, select the contact.**
- 2. On the Selected menu, click Properties.**

LibMON opens the Contact Property Book Page for the selected contact.



FIGURE 3-19 The Contact Property Book Page

The fields on this page are identical to those in the Create Contact Property Book dialog box (see “To Create a New Contact” on page 84).

3. If desired, make changes to the settings on this page.
4. Click **Apply** to save your changes.

Note – If you move to another LibMON page without clicking **Apply**, any changes you have made will be lost.

To return to the previously saved settings, click **Reset**.

▼ To Delete a Contact

1. Select the contact you wish to delete.

2. On the Selected menu, click Delete.

LibMON displays a dialog box, prompting you to confirm the deletion.

3. To delete the contact, click Yes.

LibMON deletes the contact from the Contact List Page.

Troubleshooting

Common Questions

This section lists common questions you may have while installing and using the LibMON software. Use this section as a guide to resolve problems encountered while operating LibMON. For a listing of error messages and possible solutions, see “Error Messages” on page 102.

I cannot communicate with the tape library.

First, verify that power is applied to the tape library and the library is powered on. The LEDs on the front panel of each drive should also be on. See your drive product manual for a explanation of the front panel LEDs.

Most SCSI bus communication problems are due to cabling or termination problems. Verify that each of the SCSI cable connectors are fully engaged. Ensure that all busses are properly terminated.

How do I determine the device name for my medium changer?

The medium changer is the robot inside your tape library. When LibMON is installed, the LibMON pass-through driver is loaded and a symbolic link to the medium changer pass-through driver is created. When a single tape library is attached to the server, the medium changer device name is usually `/dev/passthru0`.

To verify the device name on your server, see “To Determine the Library Device Names” on page 34.

How do I determine the device names for my tape drives?

The server tape drive device files are created automatically when the server boots. The server uses the entry in `/usr/kernel/st.conf` to build the device files.

You must also verify that the `st.conf` file contains the proper entries for the tape drives. Refer to the *Sun StorEdge Tape Library Installation Guide* that came with your library (Part No. 805-0210-xx/805-1040-xx) for more information about the `st.conf` file.

Note – If you change the `st.conf` file, you must reboot the server for the changes to take effect. The *Sun StorEdge Tape Library Installation Guide* that came with your library (Part No. 805-0210-xx/805-1040-xx) describes the proper way to shut down and reboot the server.

Use the `SCAN-DEVICES` utility (included on the LibMON CD-ROM) to determine the medium changer and tape drive device names. “To Determine the Library Device Names” on page 34.

Note – Be sure the device names you use are consistent with those used by your backup software. For example, if your backup software uses `/dev/rmt/0cbrn`, you should use the same device name for LibMON.

My storage software is reporting an I/O error when accessing a tape in a tape drive.

It is important that the tape drive device name in the Library Property Book agrees exactly with the device name used by the storage software. If necessary, open the Library Property Book and change the tape drive device names. Click Apply to complete the library update operation.

I cannot determine the SCSI bus device addresses.

LibMON does not require you to enter the SCSI bus device addresses for a library. However, knowing the SCSI address for each tape drive may help you in identifying the correct device name to use for each library when multiple tape libraries are attached to a single server.

For example, the default factory settings for a Sun StorEdge L1800 are as follows:

Device	SCSI ID
Tape Library	0
Top Tape Drive	2
Second Tape Drive	3
Third Tape Drive	4
Bottom Tape Drive	5

You can verify the settings from the front control panel of the Sun StorEdge tape library. Refer to the *Sun StorEdge Tape Library Installation Guide* that came with your library (Part No. 805-0210-xx/805-1040-xx) for more details.

Note – If you change the SCSI address of any device, you must cycle power to the library and reboot the server for the change to take effect. Refer to the *Sun StorEdge Tape Library Installation Guide* that came with your library (Part No. 805-0210-xx/805-1040-xx) for more details about the proper way to shut down and reboot the server.

I received an error message Device Name File: /dev/passthru1 does not exist *when creating a library.*

When the server boots, it automatically creates device files for all tape libraries attached to the server. The files are located in /dev. For example, if you have one tape library attached to the server, verify /dev/passthru0 is present. The device name for a second library would be /dev/passthru1. Each tape library will have a separate device name.

You must reboot the server to create the device files if they don't exist. Refer to the *Sun StorEdge Tape Library Installation Guide* that came with your library (Part No. 805-0210-xx/805-1040-xx) for more information about the proper way to shut down and reboot the server.

I cannot log in to the system.

Your system administrator can provide you with a password. LibMON does not directly control user passwords. Passwords are handled by the HTTP server. LibMON must run with an NCSA compatible HTTP server, such as the Apache server. If you are running the Apache HTTP server, see “Managing HTTP Server Users” on page 15. If you are running another HTTP server, refer to the HTTP server documentation.

I cannot modify the configuration.

There are two user types in LibMON: Guest and Admin. Guest users are prevented from creating, deleting, or modifying any of the LibMON settings. Admin users, usually system administrators, can create, delete or modify any LibMON setting.

Contact your system administrator to modify the configuration or to receive Admin status.

My client browser does not work.

Verify that you are using a supported browser. See “Internet Browsers” on page 4 for the list of supported browsers.

Make sure that the environment variable `CLASSPATH` is not set before starting your browser. To unset this environment variable for Solaris, execute the following command from the shell where the browser application is started:

```
% unsetenv CLASSPATH
```

Note – If you used the Client Install method to access LibMON, make sure the `CLASSPATH` variable refers to the `SUNWlmon.jar` file only.

When running LibMON as a client from a Web browser, the following preferences are suggested:

- Memory Cache = 5 megabytes
- Disk Cache = 5 megabytes
- Verify Document = Every Time

Verify that the server, where the HTTP server software and LibMON are installed, is network-reachable from your machine. In Solaris, you can use the `ping` command to verify this. For example, to `ping` the machine named `harvest`, use the following command:

```
% ping harvest
```

If the machine is reachable, the `ping` command will reply with the output:

```
% harvest is alive
```

I am not receiving email notification of library events.

You will need to check two LibMON pages:

- 1. Select the library on the LibMON Home Page.**
- 2. On the Selected menu, click Properties.**
The Library Property Book Page opens.
- 3. In the Actions section, make sure the Email option is set to On.**
- 4. In the Contact section, verify that your name is listed as the contact for the library, and that your email address is entered correctly.**
- 5. If any of the contact information is incorrect, correct it on the Contact List Page:**
 - a. Return to the LibMON Home Page.**
 - b. On the LibMON Home menu, click Contact List.**
LibMON opens the Contact List Page.
 - c. Correct the necessary contact information.**

What do I do when I receive an email notification?

1. Log into LibMON as an admin user.

If the tape library is in an unavailable state (indicated by a red background for the tape library), there will be a red or yellow alert icon in the Event table in the LibMON Home Page.

2. Select the event on the LibMON Home Page, and then open the Selected menu and click Properties.

LibMON opens the Event Property Book Page.

3. Follow the instructions in the recovery message section to solve the problem.

The tape library on the Physical View Page of LibMON appears empty.

The tape library may have become unavailable. Check your event log to verify that the tape library is online and operating normally.

I am unable to select any option on a LibMON page.

Verify that there is not a dialog box hidden behind another window. LibMON dialog boxes are modal, so if a dialog is displayed, none of the operations in the parent window are selectable.

Events, libraries, or contacts are not maintained in the LibMON databases between LibMON client sessions.

Verify that the LibMON databases have the correct ownership and read/write privileges. The default LibMON installation places the LibMON databases in the `/var/opt/SUNWlmon` directory. The top level directories are named `db` and `log`. The `root` user must have read/write access to these databases. If the ownership or permissions are incorrect, they should be changed to `root` ownership and read/write permissions. To do this, execute the following commands:

```
chown -R root /var/opt/SUNWlmon/db
chown -R root /var/opt/SUNWlmon/log
chmod -R 775 /var/opt/SUNWlmon/db
chmod -R 775 /var/opt/SUNWlmon/log
```

The .jar file I downloaded using the client installation instructions does not run and appears to be corrupt.

Verify that the .jar file you downloaded, SUNWlmon.jar, is the same size as the original .jar file on the server (/opt/Apache/apache_1.2.5/htdocs/LibMON/standard/SUNWlmon.jar).

If the file sizes do not match, your HTTP server is probably not using the correct mime type setting for .jar files. The correct setting is mime_type=application/octet-stream. Consult your web server administrator to find out how to change this setting.

The LibMON pkgadd command did not complete successfully.

If the following message was received during LibMON installation:

```
Adding 'pt' driver ...
drvconfig: System call 'modctl_modconfig' failed: No such device
or address
Warning: Driver (pt) configuration failed. System could not
install driver.
pkgadd: ERROR: postinstall script did not complete successfully
```

Verify that the tape library is attached to the server, powered on, and configured correctly according to your tape library installation guide. Then, use pkgrm to remove the LibMON package and re-install LibMON.

For other types of errors, take action based on the message that is output during the LibMON pkgadd process. Then, use pkgrm to remove the LibMON package and re-install LibMON.

Note – If LibMON pkgadd fails for any reason, always perform a pkgrm to remove the LibMON package, and then re-install the package using the pkgadd facility once the problem has been fixed.

LibMON exits with the message Cannot open database
/var/opt/SUNWlmon/db *or* /var/opt/SUNWlmon/log.

LibMON must be started by the root user. Verify that you are executing the START-LibMON script as the root user. Also, verify that the LibMON databases exist and are owned by the root user.

LibMON exits with the message Exception creating server socket: java.net.SocketException: Address already in use.

Verify that LibMON is not already running. If LibMON is not running, the problem may be that another application is running at the default ports used by LibMON. See “To Change the LibMON Port Assignment” on page 20 for a description of how to change the default LibMON port assignment.

When I navigate to the LibMON Home Page, nothing is displayed on the screen.

If the network is very busy or the network connection is very slow, there may be a considerable delay before the LibMON Home Page is displayed.

The Apache HTTP server exits with the message httpd: could not open transfer log file /opt/Apache/apache_1.2.5/logs/access_log. open: Permission denied.

The Apache HTTP server is configured to be run by the root user. If you are running it as someone other than the root user, verify that all files are owned by you. You also need to edit the httpd.conf file in the /opt/Apache/apache_1.2.5/conf directory and change the value of Port 80 to a number that is greater than 2000. The URL must indicate the port number that the HTTP server is monitoring. For example, if the value in httpd.conf is Port 3500 and the server name is harvest, use the following URL to open the LibMON Home Page:

`http://harvest:3500/LibMON`

The Create Library Property Book window is too large for the screen.

This problem may occur on Windows systems using a screen resolution of 800x600. Try changing the screen resolution to 1024x768.

I am already running a web server. Can I still run LibMON using the Apache HTTP server?

Yes. When already running a web server, the simplest way to run LibMON is to use the Apache HTTP server (which is already configured for LibMON), but to run the Apache HTTP server at a port other than the default HTTP port (80).

1. **Open the** `/opt/Apache/apache_1.2.5/conf/httpd.conf` **file.**
2. **Change the Port value to a unused port value other than 80 (for example, 3500).**
3. **Save and close the** `httpd.conf` **file.**
4. **As root, start the Apache HTTP server:**

```
# /opt/Apache/apache_1.2.5/START-Apache
```

When accessing the LibMON Start Page, you will need to indicate the port number to which the Apache HTTP server is listening. Use the following URL to open the LibMON Start Page:

```
http://hostname:portvalue/LibMON
```

where:

- *hostname* is the name of the server
- *portvalue* is the port value you set in the `httpd.conf` file

For example, if the value in the `httpd.conf` file is 3500 and the server name is harvest, you would use the following URL:

```
http://harvest:3500/LibMON
```

Error Messages

Server Error Messages

The following table lists error messages you may see when starting the server.

TABLE 4-1 Server Error Messages

Error Message	Probable Cause/Suggested Action
Cannot open database <i>database path</i>	<p>The database or event log permissions are not correct. Make sure that the permissions are set to read/write. See “Events, libraries, or contacts are not maintained in the LibMON databases between LibMON client sessions.” on page 98.</p> <p>The database directory does not exist. See “To Change the Database and Log Directories” on page 22.</p>
Error getting license: <i>license error</i>	<p>There has been an error checking out a license for this product. Either you do not have a valid license or there is some other licensing problem. See “Obtaining the LibMON License” on page 6.</p> <p>The server is already running.</p>
Exception creating server socket	<p>The LibMON server had a problem creating the server socket.</p> <p>Make sure that the server socket does not conflict with another application that is running on the server host.</p> <p>See “To Change the LibMON Port Assignment” on page 20.</p>

LibMON Error Messages

The following table lists error messages that appear in the LibMON GUI.

TABLE 4-2 LibMON GUI Error Messages

Error Message	Description/Suggested Action
A medium changer device name is required for library creation.	You must provide a medium changer name to create a library.
At least one attribute must be assigned to the display.	In the Display Attributes dialog, you must select at least one attribute to be displayed. <ol style="list-style-type: none">1. Select one of the attributes in the Hide Attributes list.2. Select the Add button to add the attribute to the Show Attributes list.3. Select OK to save your changes.
At least one attribute must be assigned to the sort order.	In the Sort Order dialog box, you must select at least one attribute to be the primary sort. <ol style="list-style-type: none">1. Select one of the attributes in the Available Attributes list.2. Select the Add button to add the attribute to the Sort Order list.3. Select OK to save your changes.
At least one event must be selected from the list of events to perform a delete operation.	<ol style="list-style-type: none">1. Select the event you want to delete.2. On the Selected menu, click Delete.
Cannot create contact <i>contact name</i> for the following reason: The server is in an unknown state. If this problem persists please restart the server.	The server has reached an unknown state. Retry the last operation performed. If the message persists, restart the LibMON server.
Cannot create library <i>library name</i> for the following reason: The server is in an unknown state. If this problem persists please restart the server.	The server has reached an unknown state. Retry the last operation performed. If the message persists, restart the LibMON server.
Cannot delete contact <i>contact name</i> , it is no longer in the database.	This contact has been deleted from the database and therefore cannot be deleted. Return to the Contact List Page to view the current list of contacts.

TABLE 4-2 LibMON GUI Error Messages

Error Message	Description/Suggested Action
Cannot delete library <i>library name</i> , it is no longer in the database.	This library has already been deleted from the database and therefore cannot be deleted. Return to the LibMON Home Page to view the current list of libraries.
Cannot parse library poll interval value.	The poll interval value set in the START-LibMON script is invalid. See “To Change the LibMON Poll Interval” on page 18.
Cannot service library, it no longer exists in the database.	The library you are attempting to service no longer exists in the database. Reload the LibMON Home Page and select a valid library.
Cannot update contact <i>contact name</i> , it is no longer in the database.	This contact has been deleted from the database and therefore cannot be updated. Return to the Contact List Page to view the current list of contacts.
Cannot update library <i>library name</i> , it is no longer in the database.	This library has already been deleted from the database and therefore cannot be updated. Return to the LibMON Home Page to view the current list of libraries.
Could not find file: <i>filename</i> .	The command description file is not in the predefined user command directory. This file should be in the /opt/SUNWlmon/command/user directory.
Could not start the <i>applet name</i> applet.	Exit the browser and restart the LibMON Home Page and navigate to the applet that failed. If the problem persists the LibMON installation may be corrupted or you may be running the wrong version of the browser. See “Internet Browsers” on page 4.
Data transport names must be unique.	The data transport names provided for the medium changer must be unique. If the library is connected to multiple hosts, see “Using Duplicate Entries” on page 52.
Duplicate command title: <i>command title</i> .	The command title is the value for the keyword TITLE in one of the command user description files. Each TITLE value must be unique. Change the value for TITLE and restart the server or refresh the user command from the GUI.
Duplicate device name: <i>device name(s)</i> .	No duplicate devices name are allowed. If your library is connected to multiple hosts, see “Using Duplicate Entries” on page 52.

TABLE 4-2 LibMON GUI Error Messages

Error Message	Description/Suggested Action
Error building user command.	An error occurred while building the user defined commands. Refer to the event log for a more detailed description of the problem.
Error getting scsi information for medium changer device <i>medium changer name</i> - <i>SCSI error code</i> .	There was an error collecting SCSI information for the named medium changer device. Make sure the library is connected and on line.
Installed client version (<i>clientVersion</i>) does not match server version (<i>serverVersion</i>), go back to LibMON Start Page and perform Client Installation again.	The version of the client software you are running does not match the version of the LibMON server to which you are trying to connect. Update your client software via the Client Installation instructions on the LibMON Start Page. See "To Use the Client Install Method" on page 32.
IO exception parsing file: <i>filename</i> .	An IO exception occurred while parsing this file. Make sure the file has the correct read/write permissions.
Medium changer device <i>medium changer name</i> not supported - Product Variant <i>product id</i> NOT supported.	The medium changer is not supported by the LibMON server. Make sure your library is supported.
Medium changer device name <i>device name</i> already exists in the database.	The medium changer device name already exist in the database. Duplicate device names are not allowed.
Medium changer device name file <i>medium changer name</i> does not exist.	The supplied medium changer name does not exist on the LibMON server host. The name must be a valid medium changer name. See "To Determine the Library Device Names" on page 34.
Medium changer device name file <i>medium changer name</i> is a directory.	The supplied medium changer name is a directory on the LibMON server host. The name must be a valid medium changer name. See "To Determine the Library Device Names" on page 34.
Missing command name in file: <i>filename</i> .	The named description file is missing the keyword <i>NAME</i> which names the executable or script to be started. In the description file, the command name should be on the line directly below the <i>NAME</i> keyword.
Mode select setting failed, try again.	Occasionally the mode select setting fails because the library is performing another operation. Try the operation again.

TABLE 4-2 LibMON GUI Error Messages

Error Message	Description/Suggested Action
Only two attributes may be assigned as sort order keys at any one time. The first attribute is used as the primary sort order key and the second attribute is used as the secondary sort order key.	You selected more than two attributes as sort order keys in the Library, Event, or Contact Sort Order dialog box.
Request timed out.	The current request has timed out. Retry the operation.
Security exception accessing firmware directory.	The directory containing the firmware files cannot be accessed. Make sure the directory permissions are set correctly.
Serial command did not complete: <i>serial command</i> , check serial cables, cycle power on library and retry command.	The serial command failed to complete. Check serial cables, cycle power to the library and retry the command.
Serial Command Failed: <i>error text</i> , closing device.	The serial command failed. Check serial cables, cycle power to the library and retry the command.
Serial Command Failed: <i>serial command</i> , invalid firmware download file <i>download file</i> . Check for valid file. Retry command.	Make sure that the firmware download file is of the correct type and has not been corrupted. Retry the command.
<i>Serial command</i> timed out.	<p>The serial command timed out.</p> <ul style="list-style-type: none"> • Check serial cables • Make sure the port is valid and has proper permissions set • Make sure the library is in a valid state • Retry the command <p>If the problem persists, cycle power to the library and retry the command.</p>
Serial model definition not available for library <i>library name</i> .	Serial service is not available for this library. See “Using the Service Features” on page 74 for a list of libraries that support serial service.
Serial port not specified for library <i>library name</i> .	<p>A serial port is not specified for the library. To specify a serial port:</p> <ol style="list-style-type: none"> 1. Select the library on the LibMON Home Page. 2. On the Selected menu, click Properties. 3. On the Library Property Book Page, enter the correct serial port in the Serial Port field.

TABLE 4-2 LibMON GUI Error Messages

Error Message	Description/Suggested Action
Server firmware directory does not exist.	The directory where the firmware files reside does not exist. For details on where to place firmware files, see “To Download New Firmware to the Library” on page 76.
The database entry for library <i>library name</i> is corrupted. Please re-create library.	The library data in the data base is corrupted. Delete and re-create the library. See “To Delete a Library” on page 77 and “To Create a New Library” on page 50.
The following devices are not supported: <i>list of devices</i> .	The devices listed are not supported by the LibMON server.
The server is in an unknown state. If this problem persists please restart the server.	The server has reached an unknown state. Retry the last operation performed. If the message persists, please restart the LibMON server.
The threshold value must be a value greater than or equal to the selected log sense parameters current value prior to turning on email or user defined actions.	You have selected an invalid threshold value. The threshold value must be numeric, and must be greater than or equal to the current value for the selected parameter.
This library is currently executing serial command <i>serial command</i> , retry after command completes.	The library is currently busy executing a serial command. Please wait for the command to finish and retry the command.
To create a new contact, you must enter data in at least one of the contact fields and then select the OK button.	In the Create Contact Property Book dialog box: 1. Type information into at least one of the fields. 2. Click OK.

TABLE 4-2 LibMON GUI Error Messages

Error Message	Description/Suggested Action
Unable to close serial port <i>serial port</i> .	The serial port could not be closed. Make sure the port is valid and has proper permissions set.
Unable to open serial port <i>serial port</i> , cannot execute serial command.	The serial port cannot be opened. Make sure the port is valid and has proper permissions set.
You must enter a full path name for the firmware file when this option is selected.	<p>You have not entered the full path for the firmware file in the Firmware Download File Selection dialog box.</p> <p>If you know the full path for the firmware file:</p> <ol style="list-style-type: none">1. Select the check box next to Full Path.2. Type the full path for the firmware file.3. Click OK. <p>If you do not know the full path for the firmware file:</p> <ol style="list-style-type: none">1. Select the check box next to Known Files.2. Select a firmware file from the Known Files list.3. Click OK.

Glossary

applet	A mini-application, created in Java, that allows for animation, data processing, or real-time information updates. Each LibMON page is an applet.
actuators	Robotic components that move inside the library to manipulate cartridges. These include the gripper, extension axis, vertical and horizontal axes.
Apply button	Makes changes to the properties and attributes of a page or dialog box without closing it.
Cancel button	Discards changes to the properties and attributes of a page or dialog box and closes it.
command button display area	A fixed element at the bottom of each LibMON Property Book Page that contains the command buttons: OK, Reset, and Cancel.
compound page	Contains two or more managers with independent contents and display properties. A compound page provides the ability to tie together different managed object containers on a single page.
Create menu	A LibMON menu that contains options for creating a set of objects supported by the management domain.
dialog box	A LibMON window that “pops up” from the Web browser after the user performs a specified action. For example, if the user selects the Sort option from the View menu, the Sort Order dialog box opens, enabling the user to select the sort order for the selected management area.
event	A change in the state of a library, possibly an error condition or a change in the LibMON database.
HTTP	Hypertext Transfer Protocol. A protocol used to transfer HTML code, Java applets, and other information over a network or the Internet.
import/export bin	A tape library container used to move tape cartridges into and out of the tape library.
Java	Sun Microsystem’s programming language for the Internet.

LibMON Home Page	The first page displayed when a user accesses LibMON. This page contains the library management area and the event management area. Both areas display summary information about libraries and events. The information displayed is user-configurable, as defined in the Sort Order and Display Attributes dialog boxes.
Logical View Page	A LibMON page that displays a hierarchical representation of a tape library and detailed information about each component in the library.
medium changer	The assembly in the library that picks and places the cartridges. Also known as the robot.
Manager	A LibMON components used to collect and present information about objects and services, and the relationships between them. In LibMON, there are three managers, the Library manager, the Event manager, and the Contact manager.
OK button	Commits changes made to a dialog box and closes it.
page management area	Used to display the managers that make up the page for managed objects and services.
page properties	The display and configuration attributes of a page.
Physical View Page	A LibMON page that displays a physical representation of the tape library and detailed information about each component in the library.
Reset button	Returns the values in a dialog box to the default (or previously saved) values.
robot	The mechanism within the tape library that moves the tape cartridges, also called the medium changer.
Selected menu	A LibMON menu that contains the options available for a selected object. The contents of this menu depend on the type of object that is selected.
Sort Order dialog box	A dialog box used to define the sort order of items displayed in the Library, Event, or Contact manager.
storage bin	A tape library container in which the robot (medium changer) stores a tape cartridge.
tape drive	A device that reads from and writes data to a tape cartridge.
tape library	A robotic storage and retrieval system for tape cartridges, used mainly for backup and archival purposes.
URL	Uniform Resource Locator. A server address used by clients, such as Web browsers, to access information over the network using HTTP and other protocols.

- Web browser** A client application that renders HTML code in a Graphical User Interface (GUI) and uses and other Internet protocols to communicate with web servers. For example, Netscape Navigator is a Web browser.
- Web server** A server process that provides Web services based on HTTP and other Internet protocols.

Index

A

- admin security level, 37
- Apache HTTP server
 - configuring, 14 to 18
 - installing, 11
 - removing, 25
 - starting, 28
 - stopping, 41
 - verifying the installation, 14

B

- bookmarks, setting, 33

C

- CD-ROM organization, 8
- Client Install, 30, 32
- client requirements
 - Internet browsers, 4 to 5
 - operating environments, 4
 - supported systems, 4
- command definition file, creating, 71

contact

- assigning to a library, 85
- creating, 84
- deleting, 91
- display attributes, setting, 87
- list, accessing, 86
- properties, displaying, 89
- selecting, 86
- sort order, setting, 88
- Contact List Page, accessing, 86
- Create menu, 45
- creating
 - command definition file, 71
 - contact, 84
 - library, 33 to 36, 50 to 53

D

- default password and username, 37
- deleting
 - contact, 91
 - event, 83
 - library, 77
- device names
 - determining, 34
 - duplicate entries, 52
- directory structure, CD-ROM, 8
- disk space, 3

- display attributes, setting
 - contact, 87
 - event, 78
 - library, 54
- downloading firmware, 76

E

- email notification, 65 to 72
- error messages, 102 to 108
- event
 - deleting, 83
 - display attributes, setting, 78
 - management area, 49
 - properties, displaying, 82
 - selecting, 78
 - sort order, setting, 80

F

- Firmware Download command, 76

G

- guest security level, 37

H

- help, LibMON, 40
- hostid, determining, 6
- hostname, determining, 6

I

- installing the software, 7 to 13
 - Apache HTTP server, 11
 - LibMON package, 12
 - LWperl5 package, 12
 - mounting the CD-ROM, 10
- Internet browsers, 4 to 5

L

- language directories, 9
- LibMON
 - distribution CD, 7
 - Help, online, 40
 - license
 - installing, 13
 - obtaining, 6
 - package
 - installing, 12
 - removing, 24
 - poll interval, changing, 18
 - port assignment, changing, 20
 - starting, 28
 - stopping, 41
 - version, identifying, 23
- LibMON Express, 30
- LibMON Home menu, 45
- LibMON Home Page, 44 to 49
 - accessing, 30
 - Client Install, 30, 32
 - LibMON Express, 30
 - menus
 - Create, 45
 - LibMON Home, 45
 - Selected, 46
 - View, 46
 - overview, 38
- LibMON Start Page, accessing, 29
- libraries, supported, 2
- library
 - contact, assigning, 85
 - creating, 33 to 36, 50 to 53
 - deleting, 77
 - display attributes, setting, 54
 - Library Page Layout, 53
 - management area, 47
 - properties, displaying, 57
 - selecting, 53
 - sort order, setting, 56
- Library Offline command, 75
- Library Online command, 75
- Library Page Layout option, 47, 53
- Library Property Book Page, 57
- Library Selftest command, 76

- license
 - installing, 13
 - obtaining, 6
- locale directories, 9
- Logical View Page, 62, 64
- LWperl5 package
 - installing, 12
 - removing, 25

M

- management area
 - event, 49
 - library, 47
- memory, 3
- menus
 - Create, 45
 - LibMON Home, 45
 - Selected, 46
 - View, 46

N

- notification, automatic, 65 to 72
 - creating a command definition file, 71
 - library availability-based, 70
 - threshold-based, 65 to 69

O

- online help, LibMON, 40
- operating environments, 2, 4

P

- password, 37
- Physical View Page, 62
- poll interval, changing, 18
- port assignment, changing, 20
- problems, solving, 93 to 108

- properties
 - contact, 89
 - event, 82
 - library, 57

R

- removing
 - Apache HTTP server package, 25
 - LibMON package, 24
 - LWperl5 package, 25
- requirements
 - client
 - Internet browsers, 4 to 5
 - operating environments, 4
 - supported systems, 4
 - server
 - disk space, 3
 - memory, 3
 - operating environments, 2
 - supported hardware systems, 2
 - swap space, 3

S

- SCAN-DEVICES, 34
- security, 37
- Selected menu, 46
- selecting
 - contact, 86
 - event, 78
 - library, 53
- server requirements
 - disk space, 3
 - memory, 3
 - operating environments, 2
 - supported hardware systems, 2
 - swap space, 3
- service module functions
 - Firmware Download, 76
 - Library Offline, 75
 - Library Online, 75
 - Library Selftest, 76
 - preparing to use, 74

- sort order, setting
 - contact, 88
 - event, 80
 - library, 56
- starting
 - Apache HTTP server, 28
 - LibMON, 28
- stopping
 - Apache HTTP server, 41
 - LibMON, 41
- Sun hardware systems, 2
- supported libraries, 2
- swap space, 3

T

- thresholds, setting, 65 to 69
- troubleshooting
 - common questions, 93 to 100
 - error messages, 102 to 108

U

- user-defined notification, 65 to 72
- username, default, 37
- users
 - adding, 15
 - changing passwords, 17
 - deleting, 17

V

- View menu, 46