

hp StorageWorks Library and Tape Tools (L&TT)



User Guide

User Guide

hp StorageWorks Library and Tape Tools

Product Version: 3.5 SR2

Ninth Edition (February 2005)

Part Number: 5697-5357

HP StorageWorks Library and Tape Tools (L&TT) is a comprehensive application that provides functions for identifying, testing, updating, and troubleshooting a wide variety of data storage hardware and media.



i n v e n t

© Copyright 2002-2005 Hewlett-Packard Development Company, L.P.

Hewlett-Packard Company makes no warranty of any kind with regard to this material, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose. Hewlett-Packard shall not be liable for errors contained herein or for incidental or consequential damages in connection with the furnishing, performance, or use of this material.

This document contains proprietary information, which is protected by copyright. No part of this document may be photocopied, reproduced, or translated into another language without the prior written consent of Hewlett-Packard. The information contained in this document is subject to change without notice.

Compaq Computer Corporation is a wholly-owned subsidiary of Hewlett-Packard Company.

Microsoft®, MS-DOS®, MS Windows®, Windows®, and Windows NT® are U.S. registered trademarks of Microsoft Corporation.

UNIX® is a registered trademark of The Open Group.

Hewlett-Packard Company shall not be liable for technical or editorial errors or omissions contained herein. The information is provided "as is" without warranty of any kind and is subject to change without notice. The warranties for Hewlett-Packard Company products are set forth in the express limited warranty statements for such products. Nothing herein should be construed as constituting an additional warranty.

Printed in the U.S.A.

HP StorageWorks Library and Tape Tools User Guide
Ninth Edition (February 2005)
Part Number: 5697-5357



Contents

About this Guide	9
Overview	10
Intended Audience	10
Prerequisites	10
Conventions	11
Document Conventions	11
Text Symbols	12
Getting Help	13
HP Technical Support	13
HP Authorized Reseller	13
1 Introduction	14
Software Features	14
Supported Products and Operating Systems	15
Finding Additional Information	16
Getting Support	16
2 Installation	17
Installing L&TT for Windows	18
Upgrading from a Previous Version of L&TT	18
Installation Procedure	18
Reboot Criteria	19
Installing L&TT for NetWare	20
Installing L&TT for HP-UX, Tru64, and Linux	21
Installing L&TT for HP OpenVMS	22
Installing L&TT	22
3 Basic Operation	23
Starting L&TT	24
Using the Splash Screen	25
Scan mode	26

Using the Saved/Manual Scan screen	27
I/O Mode	27
Skip This Dialog in the Future	28
Application Window Layout	29
Using the Device Information Screen	31
Standalone Devices	31
Library and Autoloader Products	33
Using the Firmware Management Screen	35
Using the Tests Screen	36
Using the Support Ticket Generation Screen	37
Starting L&TT	38
Using the Saved/Manual Scan screen	39
Navigating the Screens	41
Using the Device Information Screen	42
Standalone Devices	42
Library and Autoloader Products	43
4 Firmware Management	45
Acquiring Firmware Files	46
Using the Get Files from Web Functionality	47
Accessing the Get Files from Web Dialog Box	47
Selecting and Downloading Updated Firmware Files	48
Viewing Firmware Revision History	49
Uploading Firmware to Devices	50
Advanced Options	52
Acquiring Firmware Files	54
Using the Get Files from the Web functionality (CSI)	54
Uploading Firmware to Devices	55
Advanced Options	56
5 Tests and Utility Functions	58
Test Descriptions	59
Performance Tests	59
Diagnostic Tests	61
Using the Drive Performance Test	66
Using the System Performance Test	70
Performing the System Performance Restore Pre-Test (GUI)	70
Performing the System Performance Backup Pre-Test	72
Performing the System Performance Pre-Tests (CSI)	74

Using the Device Analysis Test	76
Using the Read/Write Test	77
Using the Media Analysis test	78
Using the Library Exerciser Test	79
Running the Tests (GUI Environment)	81
Viewing Test Results	81
Running the Tests (CSI Environment)	82
Viewing Test Results	82
Using the Utility Functions.	83
.	84
6 Support Ticket Generation	85
Generating and Viewing a Support Ticket	86
Generating a Support Ticket	86
Viewing a Support Ticket	87
Setting the Detail Level	87
Using the Tabular View.	88
Other Support Ticket Functionality.	90
Sending a Support Ticket by E-mail	91
Comparing Support Tickets	93
Generating and Viewing a Support Ticket	94
Sending a support ticket by e-mail (CSI).	94
Common Information Reported for All Products.	95
Device-Specific Information Reported.	95
Using the Event Log	96
7 Additional Functionality.	97
Setting Software Preferences	98
Available Options.	99
Using the Internet Update Functionality	101
Using Passwords.	102
Setting Passwords.	102
Using the Front Panel Function.	103
Using the Move Media Function	104
Possible Move Media Error Situations	106
Performing Manual Product Identification.	107
Using the Quiet Mode Feature	108
Using the Installation Check Feature.	109
Using L&TT in Restricted Mode	112

Using the Tool Status Report	113
8 Advanced Installation Topics	116
Windows Installation Topics	116
Installation Types	116
Other Changes to the System	116
Reboot Criteria	117
Running L&TT from a CD-ROM	117
Files Installed on the System	118
Other Changes to the System	119
9 Frequently Asked Questions	120
Windows Environment	121
How do I run L&TT from a CD-ROM?	121
How do I shut down the application in the taskbar?	121
When installing L&TT for Windows, should I uninstall my previous version first? ..	121
Why can't I uninstall L&TT or install a new version?	122
How do I erase an LTO FUP tape?	122
How do I configure e-mail to send support tickets?	122
Does L&TT use any system resources in the background?	123
I am using an authenticated proxy at my site. How do I configure L&TT to connect to the	
HP website to download firmware updates?	123
L&TT starts in "restricted" mode and most functionality is unavailable. What is	
happening?	124
Why doesn't L&TT for Windows "see" devices that are connected to a computer running	
HP-UX?	124
CSI Environment	125
How do I set the password?	125
Why does my display not show any text or only a single line of text on my HP-UX system?	
125	
Why doesn't L&TT for HP-UX "see" some of my devices?	126
Why am I unable to download firmware/script files using the download option in the CSI	
(HP-UX, Linux)?	126
Why doesn't L&TT for Tru64 "see" some of my devices?	127
Why doesn't L&TT for Linux "see" some of my devices?	127
Why doesn't L&TT for Windows "see" devices that are connected to a computer running	
HP-UX?	128
How do I disconnect a SCSI device in Tru64?	128
How do I connect/disconnect a SCSI device in Linux without rebooting?	128

Why doesn't L&TT for OpenVMS "see" my media changer? 128

Index 130

Figures

1 L&TT splash screen 25

2 Saved/Manual Scan screen 26

3 L&TT main screen 29

4 Device Information screen showing a standalone device 32

5 Device Information screen showing a library 33

6 Firmware Management screen 35

7 Tests screen 36

8 Support Ticket Generation screen 37

9 Scan Mode Selection screen 38

10 Saved/Manual Scan screen (CSI) 39

11 CSI Main screen 40

12 Command Help screen accessed from the Main screen 41

13 Device Information screen for a standalone device 42

14 Device Information screen showing a library 43

15 Get Files from Web dialog box—Firmware tab 48

16 Firmware Update screen 50

17 Factory Firmware Overrides dialog box 52

18 Drive Performance screen 65

19 Device Performance Tool screen 67

20 Restore Pre-Test tab of the System Performance screen 69

21 Backup Pre-Test tab of the System Performance screen 71

22 Backup Pre-Test screen (CSI) 73

23 Restore Pre-Test screen (CSI) 74

24 Get Files from Web dialog box—Scripts tab 84

25 Example support ticket with normal detail (Windows version) 88

26 Tabular View window 89

27 E-mail Support Ticket dialog box 91

28 Support ticket comparison results 94

29 L&TT Preferences dialog box (default settings shown) 100

30 L&TT preferences dialog box (CSI version) 101

31 Front panel screen 106

32 Move Media screen 107

33 Move Media screen - example 1a 109

34	Move Media screen - example 1b	109
35	Move Media screen - example 2a	110
36	Move Media screen - example 2b	110
37	Installation Check wizard	115
38	Tool Status Report screen (GUI)	118
39	Tool Status Report screen (CSI)	119

Tables

1	Document Conventions	11
2	L&TT installation directory locations	123

About This Guide

This user guide provides information to help you:

- Understand features and functionality of L&TT
- Effectively use the full functionality of L&TT to obtain maximum performance from your storage hardware, and to test, diagnose, and resolve hardware issues

“About this Guide” topics include:

- [Overview](#)
- [Conventions](#)
- [Getting Help](#)

Overview

This section covers the following topics:

- [Intended Audience](#)
- [Prerequisites](#)

Intended Audience

This book is intended for:

- Users who want to use L&TT to conveniently update firmware in their storage hardware
- Users who need to test, diagnose, and resolve storage hardware issues

Prerequisites

Before you attempt to use L&TT, you should have a basic understanding of the following technologies:

- Storage hardware functionality and operation
- SCSI operation

Conventions

Conventions consist of the following:

- [Document Conventions](#)
- [Text Symbols](#)

Document Conventions

The document conventions included in [Table 1](#) apply in most cases.

Table 1: Document Conventions

Element	Convention
Cross-reference links	Figure 1
Key and field names, screen names, menu items, buttons, and dialog box titles	Bold
File names, application names, and text emphasis	<i>Italics</i>
User input, command names, directory names, and system responses (output and messages)	Monospace font
Variables	<monospace, italic font enclosed in angle brackets>
Website addresses	Underlined sans serif font text: http://www.hp.com

Text Symbols

The following symbols may be found in the text of this guide. They have the following meanings.



WARNING: Text set off in this manner indicates that failure to follow directions in the warning could result in bodily harm or death.



Caution: Text set off in this manner indicates that failure to follow directions could result in damage to equipment or data.

Note: Text set off in this manner presents commentary, sidelights, or interesting points of information.

Getting Help

If you still have a question after reading this guide, contact an HP authorized service provider or access our website: <http://www.hp.com>.

HP Technical Support

Telephone numbers for worldwide technical support are listed on the following HP website: <http://www.hp.com/support/>. From this website, select the country of origin.

Note: For continuous quality improvement, calls may be recorded or monitored.

Be sure to have the following information available before calling:

- Technical support registration number (if applicable)
- Product serial numbers
- Product model names and numbers
- Applicable error messages
- Operating system type and revision level
- Detailed, specific questions

HP Authorized Reseller

For the name of your nearest HP authorized reseller:

- In the United States, call 1-800-345-1518
- In Canada, call 1-800-263-5868
- Elsewhere, see the HP website for locations and telephone numbers: <http://www.hp.com>.

Introduction



HP StorageWorks Library and Tape Tools (L&TT) is a collection of storage hardware management and diagnostic tools for Nearline Tape, Nearline Tape Automation, and Nearline Archival products. L&TT assembles these tools into a single, convenient program.

Software Features

L&TT offers the following features:

- **Installation Check**—L&TT guides you through a basic installation check of your product. The software assists the user in choosing an appropriate HBA and SCSI ID(s), ensuring that the device is detected by the system, and verifying key device functionality.
- **Device Identification**—L&TT clearly identifies the storage products connected to the system, along with key information on product configuration and status.
- **Troubleshooting Tests**—L&TT provides various tests to verify product functionality or to isolate product issues. Tests include device self-tests, read/write tests on drives, exerciser tests for autoloaders and libraries, and specific device utilities.
- **Firmware Upgrades**—L&TT provides a convenient way of updating product firmware, enabling users with an Internet connection to take advantage of ongoing enhancements. The software can be configured to check the Web automatically for firmware updates for connected devices, or users can manually check the Web for updates if the automatic update feature is not desired. If updated firmware is available, the program notifies the user, and the updates can easily be copied to the system. With libraries, users can upgrade the library and the embedded drive firmware in the same operation. Wherever possible, the embedded drives are updated in parallel to reduce time.

- **Support Ticket Generation**—If you experience a problem with a storage product, L&TT can generate a support ticket that includes essential information for troubleshooting the problem. As an alternative to phone support, you can e-mail the support ticket to a support center for assistance. This information streamlines the support process and enables the support staff to better serve you if a support call is made later.

When a support ticket for a device is generated, L&TT performs a Device Analysis test on the device. The support ticket contains generic information about a device, as well as the results of the Device Analysis test. The Device Analysis test can be performed by itself, but HP recommends generating a support ticket because the resulting data is presented in a more useful format.

- **Automatic Notification of Web Updates**—If a connection to the Internet is present and web updates are enabled in the tool preferences, L&TT automatically informs you of the following updates, if available, each time the program is started:
 - New versions of L&TT
 - New firmware files for connected devices
 - New device-specific functionality (such as new or updated tests) for connected devices

Supported Products and Operating Systems

For a complete listing of compatible products, refer to the L&TT Compatibility Matrix found at <http://www.hp.com/support/litcompatibility>.

The level of functionality that L&TT offers for each device varies depending on features of the device, and the degree of device integration into L&TT.

Finding Additional Information

The HP website provides the current version of L&TT for download, and general information about the tool. Access the website at:

<http://www.hp.com/support/tapetools>

Getting Support

E-mail support is available from ltf_team@hp.com. You can expect a response within 24 hours (usually sooner) during a normal business week.

Use this address to obtain support for L&TT, to report bugs, to provide feedback on this manual, to report any issues with the L&TT website, or to provide enhancement suggestions. HP appreciates feedback on how to make improvements for future versions of L&TT.

Note: This address is intended to provide support for L&TT software. This address is NOT for assistance in troubleshooting hardware products. Refer to the documentation that comes with your hardware for support options for that product.

Installation

2

This chapter outlines the procedure for installing L&TT on a Microsoft® Windows®, Novell NetWare, HP-UX, HP Tru64, Linux, or HP OpenVMS platform. The Windows version of L&TT uses a graphical user interface (GUI). All other versions of the program use a command screen interface (CSI).

The information in this chapter and in subsequent chapters is presented for both the GUI and CSI versions of L&TT. When using an electronic version of this documentation, click the appropriate GUI or CSI icon at the beginning of the chapter to quickly jump to the section of documentation that applies to your operating system (OS) or user interface:

Select your OS:



Windows



NetWare



HP-UX, Tru64, and Linux



HP OpenVMS

Installing L&TT for Windows

The Windows version of L&TT uses the InstallShield application. InstallShield lets you choose the installation directory and select other options. It also sets up shortcuts to launch the application in the Start menu and on the desktop. The Start menu shortcuts also provide access to the online help, the *readme* file, and the report viewer.

Upgrading from a Previous Version of L&TT

You must uninstall any previous versions of L&TT before installing the most recent version. To uninstall L&TT, use the Add/Remove Programs applet in the Windows control panel. The uninstall procedure does not remove the installation folder, allowing you to preserve all of your previous L&TT files such as log files, SCSI scripts, and so forth.

Installation Procedure

To install the current Windows version of L&TT:

1. Download or copy the self-extracting executable file to a temporary location.
2. Double-click the self-extracting executable file to launch the installer. The **InstallShield Wizard** screen is displayed.
3. Click **Next**. Read the program license agreement and click **Yes** if you agree to and accept the terms of the license agreement.
4. Read the *readme* file for any last-minute changes to the documentation, then click **Next**. The **Select Features** screen is displayed.
5. Select the desired components to install and click **Next**.

In most cases, the default settings of this screen are adequate. Windows NT 4.0®, Windows 2000, and Windows XP users have the option to install Advanced SCSI Programming Interface (ASPI) support. With Windows 9x installations, the ASPI component is required and automatically included in the L&TT installation process. If ASPI installation is optional with your OS, HP recommends that you not install ASPI support unless you have a good reason to do so.

ASPI support is beneficial when installed storage applications cannot be shut down, and those applications have locked access to the device through the Miniport driver. If ASPI is installed, it is generally not necessary to shut down these applications to access devices through L&TT (although the applications

should not be accessing the devices while L&TT is running). ASPI lets you run L&TT on a locked device without rebooting. Because a reboot is required after installing ASPI, the benefit of using ASPI is not realized the first time L&TT is run, but it is realized on subsequent runs.

6. Select a destination location to install the program. You can accept the default location or click **Browse** to install to a different location. After choosing the destination location, click **Next**.
7. Indicate the program directory in which you want the setup program to create program icons and click **Next**. The program directory is created in the **Programs** directory of the **Start** menu.
8. On the **Ready to start installation process** screen, click **Next**. If you need to review or change installation settings, click **Back**.
9. When installation is complete, click **Finish** to close the InstallShield wizard.

Reboot Criteria

A reboot is required only if your system requires ASPI or an upgrade to the currently installed version. On systems that require ASPI, if the installer detects a previously installed version of ASPI older than v4.57, it will install a more recent version of ASPI, which will require a reboot.

On Windows NT and 2000, ASPI is not installed as part of the operating system. If a reboot is unacceptable, do not select the checkbox for this option in the installation process. If you choose not to install ASPI, you must use the Miniport driver (Miniport I/O mode) to scan for devices.

Issues may arise, however, when using the Miniport I/O mode with devices that use non-standard OS drivers, or are “claimed” by other applications or the OS. When using the Miniport I/O mode when a device is claimed, it may be necessary to shut down any running backup/storage application services to make the device accessible to L&TT. Alternatively, using the ASPI I/O mode may make the device accessible without requiring any further action.

Installing L&TT for NetWare

To install the NetWare version of L&TT:

1. Download the L&TT for NetWare file to a temporary directory.
2. From a client workstation, use any standard unzip utility* to extract the file to the *SYS:System* directory on the NetWare server. Make sure that the option to create a directory is enabled in the archiving software.

Note: * The unzip NLM that comes with later versions of NetWare has not been tested and should not be used to unzip the archive.

Installing L&TT for HP-UX, Tru64, and Linux

To install L&TT for HP-UX, Tru64, or Linux:

1. Log in as root.
2. Navigate to the temporary directory:

```
cd /tmp
```

3. Download or copy the L&TT tar file, *hp_ltt<xx>.tar* (where *<xx>* is the version number) to this directory. If you are copying the file from a different location, enter the following (substitute the directory in which the file currently resides for *<directory name>*):

```
cp /<directory name>/hp_ltt<xx>.tar /tmp
```

4. Untar the L&TT tar file:

```
tar -xvf hp_ltt<xx>.tar
```

5. Run the install script in the */tmp* directory:

```
./install_hpltt<xx>
```

6. After the software is successfully installed, enter the following commands to remove the */tmp/ltt* directory and its contents:

```
cd /tmp
```

```
rm -rf ltt
```

```
rm -rf install_hpltt
```

Installing L&TT for HP OpenVMS

Note: L&TT is supported on HP OpenVMS v7.3-2 and later.

Installing L&TT

1. Download or copy the install file *hp-axpvms-ltt-v<xx>-1.pcsi* (where <xx> is the version number) to a temporary directory.
2. Navigate to the directory you copied the install file to and enter the following command to install L&TT:

```
product install
```

The installation procedure creates the directory structure *opt.ltt* in *sys\$sysdevice:[vms\$common]* and installs all the required files for L&TT.

3. Set the Term to vt100 using the following command:

```
set term /dev=vt100
```

4. Define the logical name “USR” so that it points to the directory *sys\$sysdevice:[vms\$common.opt.ltt.misc.usr]* using the following command:

```
define usr sys$sysdevice:[vms$common.opt.ltt.misc.usr]
```

Basic Operation

3

This chapter describes how to start L&TT and the basic operation of the software. This chapter is divided into two sections: one for using L&TT in a GUI environment (Windows) and one for using L&TT in a CSI environment (NetWare, HP-UX, Tru64, Linux, and OpenVMS). To quickly jump to the appropriate section, click one of the following graphics:



Windows



NetWare, HP-UX, Tru64, Linux, OpenVMS

Starting L&TT

To start L&TT:

- Double-click the L&TT icon on the desktop (if present)
- or -
- Click **Start > Programs > HP StorageWorks Library and Tape Tools > HP L&TT**

GUI Using the Splash Screen

When L&TT is started, the splash screen is displayed. The splash screen gives you the opportunity to exit the application before any SCSI bus activity has taken place. This feature lets you exit the application if it was started unintentionally. This prevents the program from interfering with any backup or other storage applications that may currently be running.

The splash screen also lets you select the initial scan mode and the SCSI I/O mode (if more than one option is available).

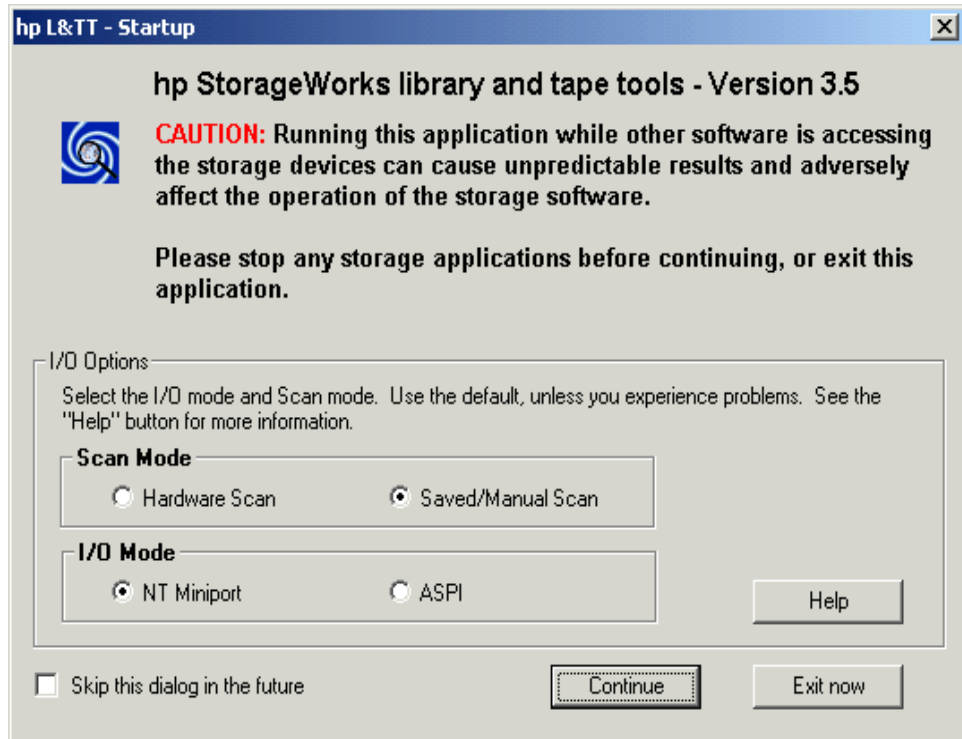


Figure 1: L&TT splash screen

Scan mode

When L&TT starts, it performs a device scan to identify all the devices connected to the computer, either directly or through a SAN. In large SAN environments, this scan can take up to 45 minutes or more.

The first time L&TT is run, it must perform a full hardware scan (**Hardware Scan** option), and the **Saved/Manual Scan** option is disabled. The results of the full hardware scan are automatically saved, so the next time L&TT is started, the **Saved/Manual Scan** option is available.

Note: If you previously selected the **Skip this dialog in the future** checkbox on the splash screen, L&TT performs a full hardware scan. To re-enable the splash screen and change the scan option, select **Preferences** from the **Options** menu. Check the option **Display splash screen at startup** and restart L&TT.

If you select the **Saved/Manual Scan** option and click **Continue**, the **Saved/Manual Scan** screen is displayed.

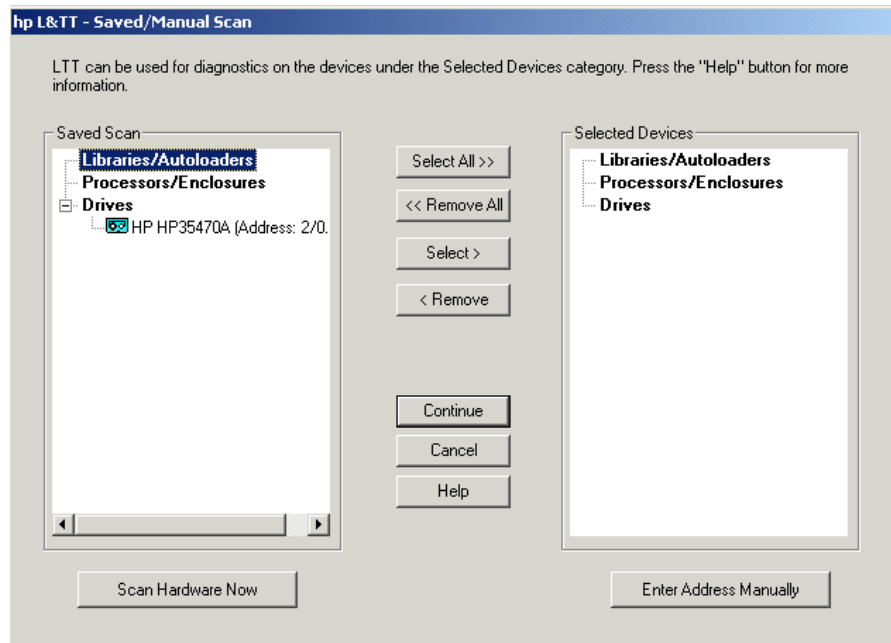


Figure 2: Saved/Manual Scan screen

Using the Saved/Manual Scan screen

The left panel of the **Saved/Manual Scan** screen displays the devices that were detected in the last saved scan. If this list is incomplete (for example, if new hardware has been added since the last scan), click **Scan Hardware Now** to rescan the system for new devices. If you want to manually add a device to the list of devices to be scanned without performing a full hardware scan, click **Enter Address Manually**.

Use the **Select All**, **Remove All**, **Select**, and **Remove** buttons to select devices. Selected devices are displayed in the right panel of the screen, and only selected devices will be scanned and identified by L&TT. Devices that are skipped will not be displayed in the **Device List** on the **L&TT Main** screen.

After selecting all of the devices that you want L&TT to scan and identify, click **Continue** to perform the scan and proceed to the L&TT main screen. L&TT saves the list of selected devices, so the next time you start L&TT and display the **Saved/Manual Scan** screen, L&TT displays all of the previously selected devices in the right panel.

I/O Mode

L&TT selects the input/output (I/O) mode that is most appropriate for the system it is running on. However, this initial screen allows for manual selection of the I/O mode in certain cases. L&TT currently operates in the following two I/O modes:

- **NT Miniport**—uses an interface that is native to Windows NT 4.0, 2000, XP, and Windows Server 2003. This is the preferred I/O mode on systems where it is available because it does not require the installation of the ASPI interface. However, there are some limitations to the Windows NT Miniport I/O mode related to using devices that are “claimed” by other applications, or that are used with non-standard OS drivers. In those cases, selecting the ASPI I/O mode can make a device accessible.

Note: The Windows NT Miniport I/O mode is not available on Windows 9x.

- **ASPI**—uses an optional I/O programming interface that is available on all versions of Windows. This I/O mode can be used with any Windows operating system. It may require the installation or update of additional OS components, possibly requiring a reboot of the system during installation.

Skip This Dialog in the Future

If this checkbox is selected when you click **Continue**, the splash screen is not displayed on subsequent uses of L&TT. The program will continue to use the settings that you selected the last time the splash screen was viewed.

To re-enable the splash screen, select **Preferences** from the **Options** menu. Check the option **Display splash screen at startup** and restart L&TT.

GUI Application Window Layout

After the I/O mode is selected, click **Continue** on the splash screen. The L&TT main screen is displayed. [Figure 3](#) shows the L&TT main screen divided into three sections.

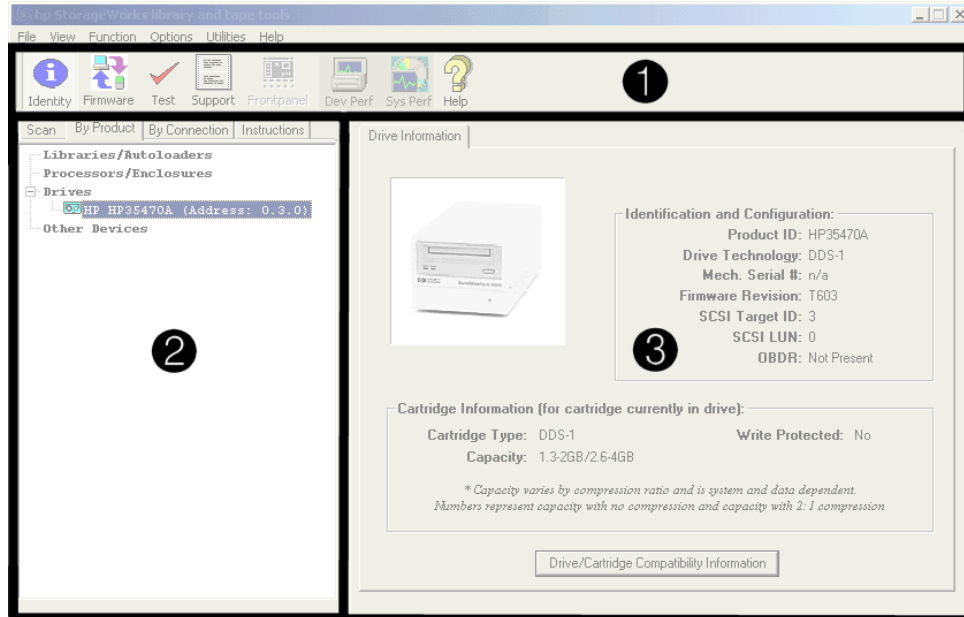


Figure 3: L&TT main screen

The three sections of the L&TT main screen are:

1. **Taskbar**—This section contains buttons that provide quick access to the main functions of L&TT and to the online help system.

Note: Above the Taskbar is the standard Windows menu bar that provides alternate navigation to tool functions, as well as access to a number of other features.

2. **Device List**—This is a multi-function window that offers several options on the following tabs:

- **Scan**—This option provides either a summary status or detailed information (depending on whether **Show Details** or **Hide Details** is selected) about the bus scanning process. If a problem is encountered during the scan, this information may help in determining the cause. When the scan completes successfully, the device list automatically switches to the **By Product** tab.

The **Scan** tab also lets you rescan the bus. If any devices have been hot-swapped or powered on after the OS has booted, in most cases, the rescan feature can discover those devices without requiring a reboot of the system.



Caution: Swapping SCSI devices, including connecting and disconnecting cables and/or terminators, can cause the system to hang or crash.



Caution: On Windows NT 4.0, 2000, XP, and Windows Server 2003, changing devices at a specific SCSI address can cause unpredictable behavior. Parts of the operating system may not detect that the device or device type has changed.

- **By Product**—This option shows a list of all the products connected to the system. The list is grouped into the following four categories:
 - Libraries and autoloaders
 - Drives
 - Enclosures and processors
 - Other devices

The three number fields listed after the device represent the device address. Each field in the address is separated by a period: the first field represents the HBA channel, the second field represents the SCSI ID, and the third field represents the LUN.

Note: When using the Miniport I/O mode, the HBA channel field is shown as “A/B,” where A is the channel and B is the subchannel.

- **By Connection**—This option shows all products connected to the system, grouped by the HBA they are connected to. This view makes it easy to see which devices are connected to the same bus as the device in question, and may help in understanding system I/O performance issues.
 - **Instructions**—This window contains brief instructions on how to use the selected screen. This view can be disabled in the software preferences.
3. **Device Information screen**—All the main functions of the program are displayed in this window. The content of this window depends on the device and tool function selected.

Using the Device Information Screen

When you select a product from the **Device List**, the **Device Information** screen displays information relevant to the device. The **Device List** also changes to display instructions on this page (if the instructions preference is enabled). If another tool function is currently active, then clicking the **Identity** button on the toolbar opens the **Device Information** screen.

The **Device Information** screen provides an overview of the selected hardware device and its current configuration and status.

Standalone Devices

The **Device Information** screen, showing a standalone device, contains a single tab labeled **Drive Information**. The **Device Information** screen has four main sections, as shown in [Figure 4](#).

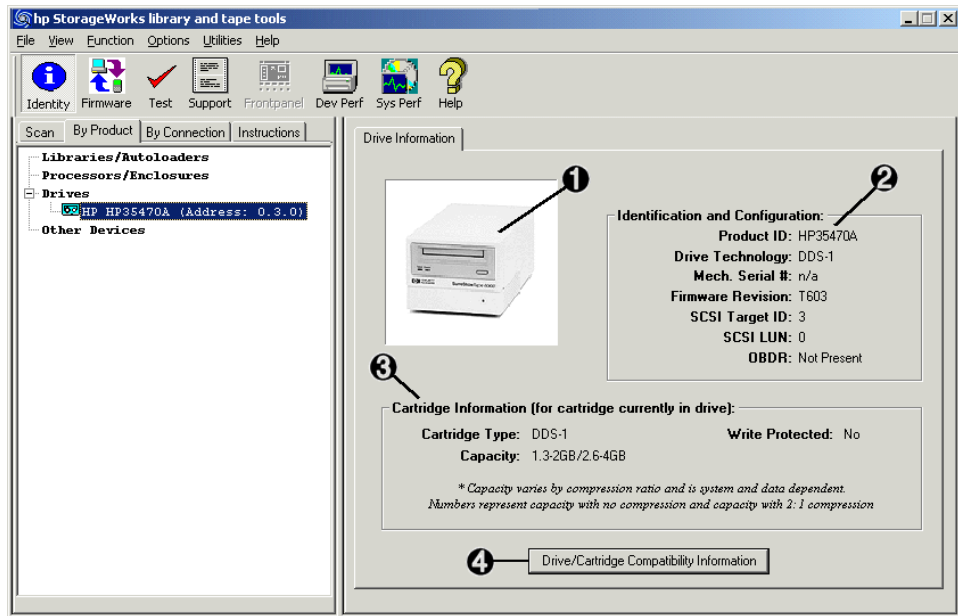


Figure 4: Device Information screen showing a standalone device

①	This provides a visual representation of the selected product (the images are in grayscale).
②	This provides the following general information on the product: <ul style="list-style-type: none"> ■ Product ID (Inquiry String) ■ Drive Technology (DDS/DL/LTO) ■ Mech Serial # (Drive serial number) ■ Firmware Revision ■ SCSI Target ID ■ SCSI LUN
③	If a data cartridge was inserted in the drive when the identity tool was selected (or when the current screen was "refreshed"), information regarding cartridge type, capacity, and write protect status is shown here.
④	Click this button to display a list of media that is compatible with the product.

Library and Autoloader Products

When a library or autoloader is selected in the **Device List**, the **Device Information** screen displays two tabs: one for library information and one for the drives contained within the library, as shown in [Figure 5](#).

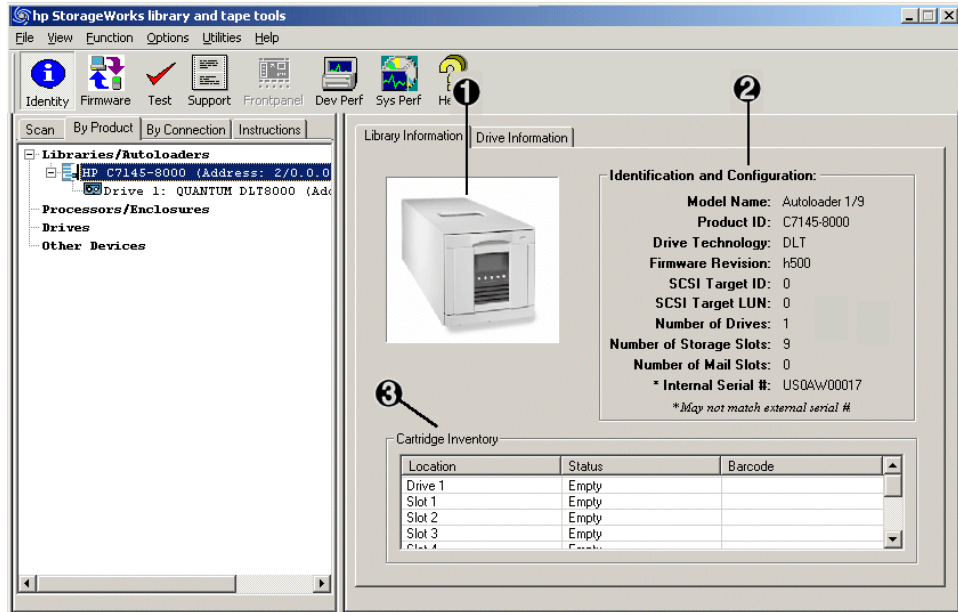


Figure 5: Device Information screen showing a library

①	This provides a visual representation of the selected product (the images are in grayscale).
②	As with a standalone drive, this area provides the relevant information on the selected library product.
③	This provides a cartridge (media) inventory for all the drives and slots. The current status (full or empty) of all the storage elements and the barcode number (if barcode reading is available) is displayed here.

To see information for the drives within the library, select the **Drive Information** tab. This tab displays a screen very similar to the one for standalone products, with the addition of the **Selected Drive** dropdown menu.

Because a library can contain multiple drives, you can select and view information for each drive using the **Selected Drive** dropdown menu. All of the drives in the library are available in the dropdown menu.

Note: Selecting individual drives within a library from the By Product/By Connection device list displays the drive as though it were a standalone product. The recommended method of diagnosing embedded drives is to first select the library they belong to, and then select the specific drive within each tool window.

GUI Using the Firmware Management Screen

The firmware management functionality of L&TT allows easy upgrades to the storage product firmware. To access the **Firmware Management** screen, click the device you want to update in the device list, then click the **Firmware** button on the main toolbar.

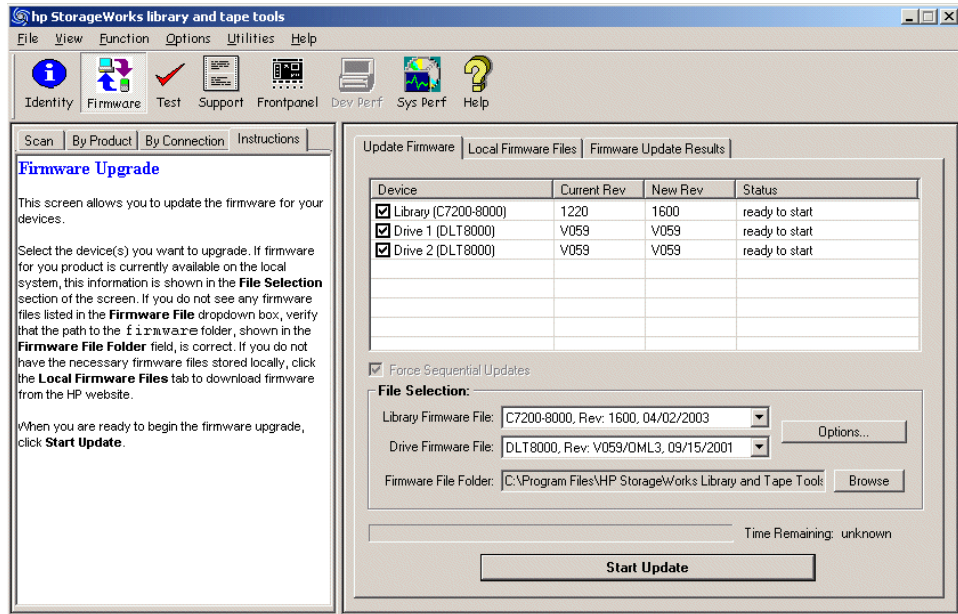


Figure 6: Firmware Management screen

For detailed information about the firmware management functionality of L&TT, see [Firmware Management](#).

GUI Using the Tests Screen

L&TT provides several standard and advanced tests that can be used to check the performance of or to diagnose issues with storage hardware. To access the **Tests** screen, click the device you want to test in the device list, then click the **Tests** button on the main toolbar.

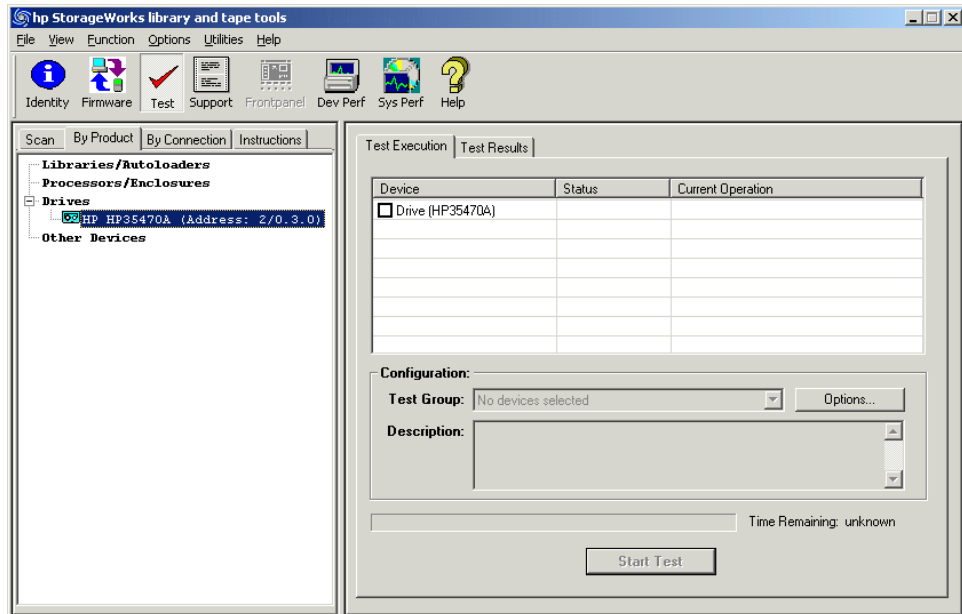


Figure 7: Tests screen

For detailed information about the **Tests** screen, as well as information about how to perform the tests and interpret test results, see [Tests and Utility Functions](#).

GUI Using the Support Ticket Generation Screen

L&TT can automatically generate a support ticket based on information that the program determines about the system. The information in this support ticket can then be used to diagnose storage hardware issues. L&TT can automatically e-mail the support ticket to the HP help desk to assist the help desk technician in resolving issues.

To access the **Support Ticket Generation** screen, click the device you want to generate the support ticket for in the device list, and then click the **Support** button on the main toolbar. **Figure 8** shows the **Support Ticket Generation** screen.

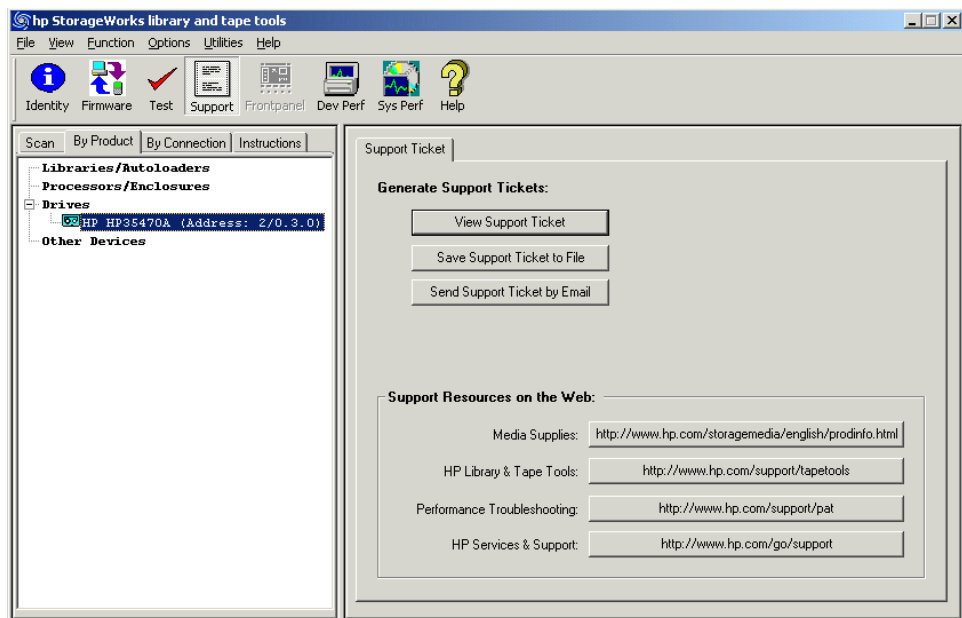


Figure 8: Support Ticket Generation screen

For detailed information about generating and using support tickets, see [Support Ticket Generation](#).

CSI Starting L&TT

To start L&TT:

- For HP-UX, Tru64, and Linux:

Log on as root and execute the following commands:

```
cd /opt/ltt
./hp_ltt
```

- For Novell NetWare:

From the server console, execute the following command:

```
hp_ltt\hp_ltt
```

- For HP OpenVMS:

Run *HP_LTT.EXE* found in the *sys\$sysdevice:[vms\$common.opt.ltt]* directory.

When the CSI version of L&TT is started, the **Scan Mode Selection** screen is displayed.

```
Scan Mode Selection >
-----
A scan mode allows user to select either Hardware scan or Saved/Manual scan.
  1 [X] Hardware Scan
  2 [ ] Saved/Manual Scan

Enter Command>
-----<Enter a blank command for command list>-----
```

Figure 9: Scan Mode Selection screen

When L&TT starts, it performs a device scan to identify all the devices connected to the computer, either directly or through a SAN. In large SAN environments, this scan can take up to 45 minutes or longer.

The first time L&TT is run, it must perform a full hardware scan (**Hardware Scan** option), and the **Saved/Manual Scan** option is disabled. The results of the full hardware scan are automatically saved, so the next time L&TT is started, the **Saved/Manual Scan** option is available.

If you select **Saved/Manual Scan**, the **Saved/Manual Scan** screen is displayed.

```
Scan Mode Selection > Saved/Manual Scan >
-----
You can run scan these devices. Type the corresponding number to select or
deselect. See the command list for additional help.

Libraries/AutoLoaders:
  1 [ ] HP C7145-8000 (Address: 10.4.0[1-/dev/sg3])
  2 [ ] Drive 1:QUANTUM DLT8000 (Address: 10.3.0[1-/dev/sg2])

Processors/Enclosures:
Drives:

Enter Command>_
-----<Enter a blank command for command list>-----
```

Figure 10: Saved/Manual Scan screen (CSI)

Using the Saved/Manual Scan screen

The **Saved/Manual Scan** screen lets you select the devices that you want L&TT to scan and identify. This can save time in a large SAN environment if you are using L&TT to test a single device. Any devices that are not selected will not be scanned, and they will not be displayed in the **Device List** on the L&TT **Main** screen.

The following command options are available:

- `select`—The indicated device or devices will be scanned.
- `selectAll`—All devices will be scanned.
- `clear`—The indicated device or devices will not be scanned.
- `unselectAll`—Clears all devices. No devices will be scanned.
- `enterHWAddrManual`—Lets you manually enter the hardware address of a device to be scanned.
- `hardwarescan`—Performs a full hardware scan. Use this option to update the list of available devices on the **Saved/Manual Scan** screen.

- `continue`—Starts the indicated scan and proceeds to the **Main** screen.
- `up`—Exits the current command level.
- `exit`—Exits L&TT.

When the scan is complete, the **Main** screen is displayed, as shown in [Figure 11](#).

```
Main >
-----
Type the corresponding number to select a device, or enter a blank command for
a command list
Libraries/Auto loaders:
Processors/Enclosures:
Drives:
  1 HP HP35470A <Address: 0.3.0>
Other Devices:

Enter Command>
-----<Enter a blank command for command list>-----
```

Figure 11: CSI Main screen

CSI Navigating the Screens

The top line of each screen displays the current screen name in hierarchical format. Each “level” of screens is separated by the “>” character. On each screen, some of the available commands take you to a lower level in the hierarchy. To move back to the previous level, use the up command. To exit L&TT, use the `exit` command.

On most of the screens, entering a blank command (pressing **Enter** without typing any other text) displays a **Command Help** screen. This screen contains a list of valid commands that can be executed on the original screen from which the **Command Help** screen was accessed. [Figure 12](#) shows the **Command Help** screen accessed from the **Main** screen.

```

Main > Command Help >
-----
You are in the command help menu. Within this menu (only) use the numbers as a
short cut for the corresponding command. Otherwise, type in the command.

#  Command                Description
-  -
1  exit                    Exit the tool
2  options                 Show/Set the current options
3  about                   Show Program version information
4  device                  Selects the device by path
5  load                    Load a support ticket
6  preferences             Change the global preferences
7  review                  Review the scan details
8  select                  Selects the device by number

Enter Command>_
-----<Enter a blank command to return>-----

```

Figure 12: Command Help screen accessed from the Main screen

It is possible to enter a command directly from the **Command Help** screen. To do this, type either the number of the command or the name of the command and press **Enter**. Entering the number of the command only works on the **Command Help** screen. From any other screen, you must type the full name of the command. To exit the **Command Help** screen, enter a blank command (press **Enter**).

Some commands require an argument. For example, the `select` command requires a number that corresponds to the device you want to select in the device list. To select the first device in the list, the syntax is:

```
select 1
```

If you enter a command with an invalid or missing argument, an error message is displayed.

CSI Using the Device Information Screen

When you first select a product from the **Main** screen, the **Device Information** screen is displayed, showing information relevant to the device.

The main purpose of the **Device Information** screen is to provide an overview of the configuration and status of the selected hardware device.

From the **Main** screen, type the following command to access the **Device Information** screen:

```
select <n> (where <n> is the number of the device to be examined)
```

Note: Alternatively, you can omit the `select` command and only enter the device number.

Standalone Devices

Figure 13 shows the **Device Information** screen for a standalone device.

```

Main > Drive Information >
-----
The following is identity information for the selected device. You can use
commands to select functionality to perform on this device.
Product ID           : HP354700
Drive Technology     : DDS-1
Mech. Serial Number  : n/a
Firmware Rev        : T603
Target ID           : 3
Target LUN          : 0
OBDR Capability     : Not Present

Cartridge Information (for cartridge currently in drive):
Cartridge Type      : DDS-1
* Capacity          : 1.3-2GB/2.6-4GB
Write Protected     : No

* Capacity varies by compression ratio and is system and data dependent.
Numbers represent capacity with no compression and with 2:1 compression

Enter Command>_
-----<Enter a blank command for command list>-----

```

Figure 13: Device Information screen for a standalone device

The following general information is displayed:

- Product ID (inquiry string)
- Drive technology
- Mech. serial # (drive serial number)
- Firmware revision
- SCSI target ID
- SCSI LUN
- OBDR capability (if present)

If a data cartridge was inserted in the drive when the **Device Information** screen was displayed, information regarding cartridge type, capacity, and write-protect status is shown.

To see a list of compatible media that can be used with this device, use the `cartridge` command.

Library and Autoloader Products

Figure 14 shows the **Device Information** screen for a library.

```
Main > Identity >
-----
The following is identity information for the selected device. You can use
commands to select functionality to perform on this device.

Product ID           : C7200
Model Name           : Tape Library 2/20
* Internal Serial Number : D01461M0279
Drive Technology      : LTO
Firmware Rev         : 1520
Target ID             : 0
Target LUN           : 0
Number of Drives     : 2
Number of Slots      : 19

* May not match external serial number

Enter Command>
-----<Enter a blank command for command list>-----
```

Figure 14: Device Information screen showing a library

Note: Selecting individual drives within a library from the device list displays the drive as though it were a standalone product. Embedded drives are best diagnosed by selecting the library they belong to, and then selecting the specific drive within each tool window.

From the **Device Information** screen for a library device, use the `cartridge` command to display the slot inventory of the library. The `cartridge` command shows which slots and drives currently have cartridges loaded, and the cartridge barcode if available and applicable.

Firmware Management

4

The Firmware Management functionality of L&TT provides a convenient way to easily upgrade the firmware of connected devices. Library firmware and firmware of drives within the libraries can be upgraded as well. In many cases, multiple drives within the library can be updated simultaneously to save time.

L&TT uses special firmware files that associate the firmware with a particular product. This feature prevents the user from downloading the wrong image and ensures that the downloaded firmware is the same or a newer revision than the current device firmware.

Click your operating environment:



GUI Acquiring Firmware Files

L&TT firmware files are stored in the `Firmware` directory. This directory is a subdirectory of the `HP Library & Tape Tools` installation directory. Before upgrading any firmware, you must first acquire the firmware image file or files and copy them to the `Firmware` directory. Firmware files can be obtained in three ways:

1. Select the device in the device listing and click the **Firmware** button on the main toolbar. On the **Firmware** screen, click the **Local Files** tab, and then click the **Get Files from Web** button at the bottom of the tab. The downloaded files are automatically placed in the `Firmware` directory.
2. From the L&TT menu bar, select **Get Files From Web** from the **File** menu. The software links to the L&TT firmware ftp site and allows the selected firmware files to be copied to your system. Downloaded files are automatically placed in the `Firmware` directory. This option is explained in detail in the following section.
3. Go to www.hp.com/support, choose the product family, then click **software updates and drivers**. The latest firmware file is available in L&TT format. For some products (such as standalone drives), firmware is available as a single file. For other products (such as tape libraries), the firmware is available in a self-extracting bundle that includes library and drive firmware.



Caution: Do not use the **Get Files From Web** functionality within L&TT without an Internet connection. Doing so can cause the system to lock up until it has timed out in the operating system. This timeout value is operating system-specific.

Note: If **Check for Updates on Web** is enabled in the tool preferences, L&TT automatically informs the user when new firmware is available for any of the connected storage products. L&TT performs this check each time it is started (but not more than once per 24-hour period).

Using the Get Files from Web Functionality

The Windows version of L&TT offers comprehensive firmware management functionality that finds and downloads firmware from the HP website. This functionality obtains the most up-to-date information about all available firmware files directly from the HP website. It then compares this data set against the list of devices connected to the system and the current firmware revisions present in those devices. Depending on the selected filter options on the top of the screen, different subsets of firmware files are presented. Firmware files that are needed to bring the connected devices up to the latest firmware revisions are automatically selected.

Accessing the Get Files from Web Dialog Box

You can access the **Get Files from Web** dialog box in two ways:

- Select **Get Files from Web** from the **File** menu
- or -
- Click the **Get Firmware** button on the **Firmware Update** screen

The **Get Files from Web** dialog box is displayed. Click the **Firmware (New Files Available)** tab if it is not already selected. [Figure 15](#) shows the **Get Files from Web** dialog box for firmware.

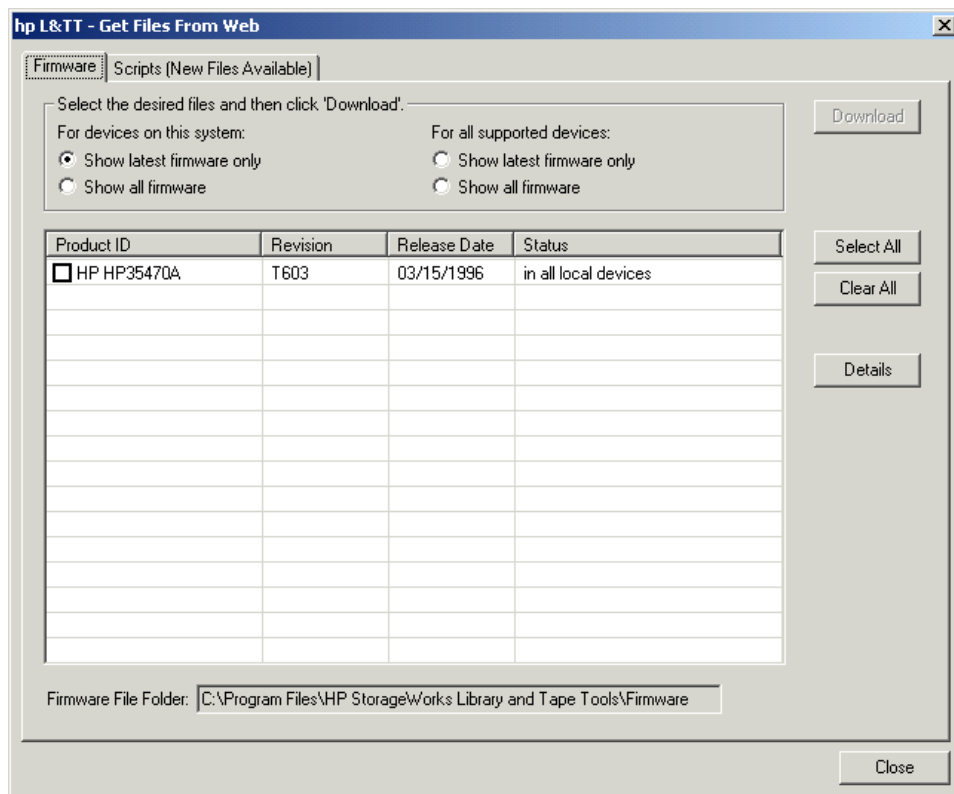


Figure 15: Get Files from Web dialog box—Firmware tab

Selecting and Downloading Updated Firmware Files

The **Get Files from Web** dialog box has four filter options:

- **For devices on this system**—These two options only show firmware files matching devices that are currently connected to the system.
 - **Show latest firmware only** shows the most recent firmware revision for each device.
 - **Show all firmware** shows all firmware revisions for each of these firmware files.

- **For all supported devices**—These two options show firmware files for all devices supported by LTT, even if not currently connected to the system.
 - **Show latest firmware only** shows the most recent firmware revision for each device.
 - **Show all firmware** shows all firmware revisions for each of these firmware files.

Select the appropriate option, and then verify that the correct firmware files are selected. To download the selected files, click **Download**. The files are automatically downloaded to the current firmware directory on the local system. You can now use the firmware update functionality of L&TT to upload the latest firmware to your devices.

Viewing Firmware Revision History

In addition to downloading firmware files, the **Get Files from Web** dialog box provides revision history detail for firmware files. To view the firmware revision history of a device, select a device and click **Details**.

GUI Uploading Firmware to Devices

Before attempting to update any firmware files, you must first acquire the latest firmware files and ensure that they are placed in the `Firmware` directory. If you have not yet done this, see [Acquiring Firmware Files](#).

To upload firmware to a device:

1. Click the device to update in the device list.
2. Click the **Firmware** button on the main toolbar.
3. On the **Update Firmware** tab, click the checkbox to select each device for which you want to update firmware. If firmware is currently available for that device, it is shown in the **Firmware File** dropdown box in the **File Selection** section of the screen.

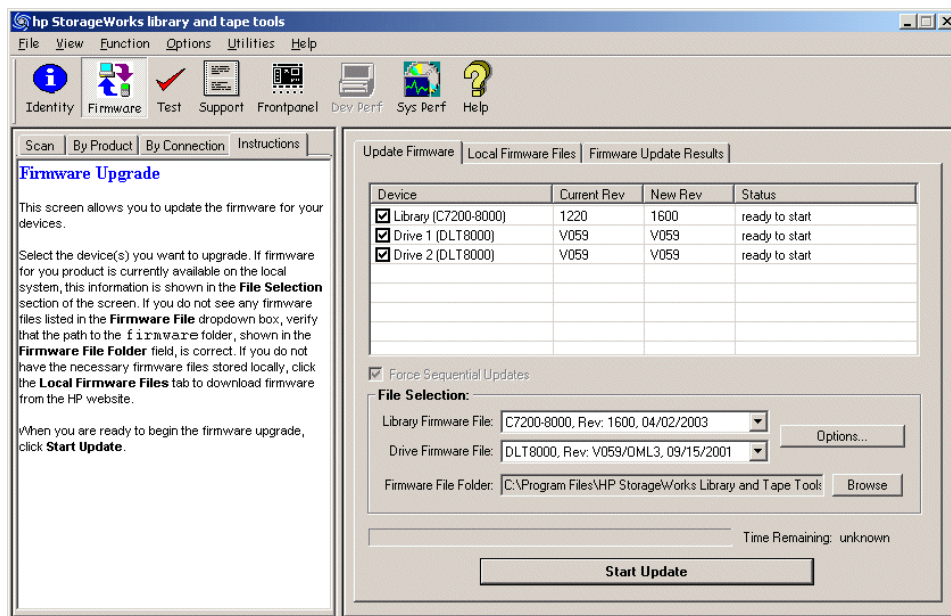


Figure 16: Firmware Update screen

With Windows NT and 9x versions of L&TT, you can select multiple devices and update them simultaneously. With Windows 2000 and above, devices are updated sequentially. In Windows NT and 9x configurations with multiple devices, the **Force Sequential Updates** checkbox gives you the option to

force sequential updates (this is only recommended if you have problems updating devices simultaneously). With Windows 2000 and above, the **Force Sequential Updates** checkbox is checked and cannot be changed.

4. Click the **Start Update** button at the bottom of the screen to begin the update.



Caution: Make sure that no other programs attempt to access the device while the firmware is being updated. Do not interrupt the firmware update. If the firmware update is interrupted, the device may not operate and require physical repair.

L&TT creates a log of all firmware update activity. To view this log, click the **Firmware Update Results** tab. Set the **Current Detail Level** setting to the appropriate level. The default is **Normal**. The firmware log is displayed in a standard tree-view format. If you want to clear the log, click the **Clear Log** button.

GUI Advanced Options

It is sometimes necessary to disable L&TT safeguards to perform more advanced operations. These operations (options) are only available after the necessary password has been entered. To obtain this password, contact HP support. After a password has been entered, the **Options** button on the **Update Firmware** tab becomes available. When you click this button, the **Factory Firmware Overrides** dialog box is displayed (this dialog box varies slightly between drives and libraries):

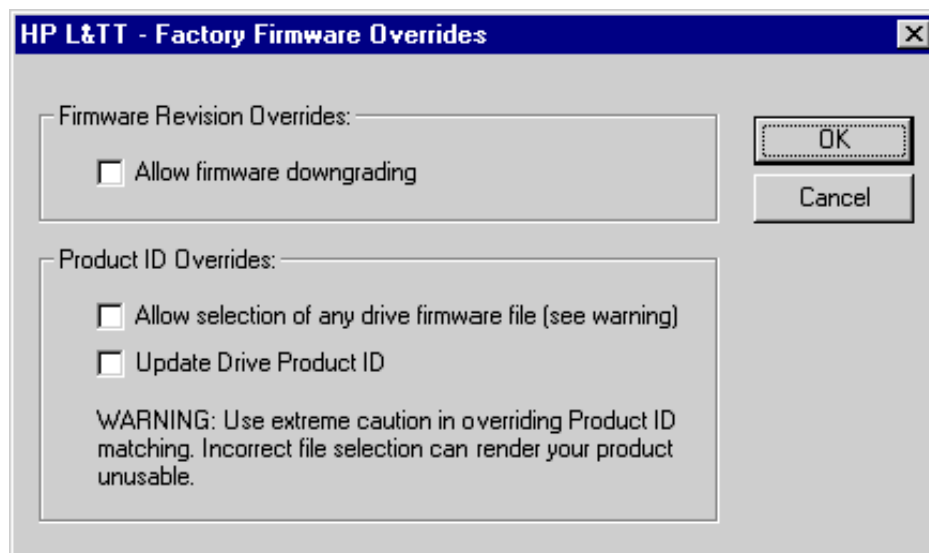


Figure 17: Factory Firmware Overrides dialog box

The **Factory Firmware Overrides** dialog box presents the following three options:

- Allow firmware downgrading**—By default, L&TT does not show files with older revision levels as selectable. On the **Local Firmware Files** tab, the comment field displays the message “downgrade password required.” In most cases, you should use the latest firmware. However, if software incompatibilities or other customer limitations require the use of older firmware revisions, this checkbox lets you downgrade to older firmware revisions.

- **Allow selection of any [drive or library] firmware file**—This option allows mapping of the device firmware to a product, irrespective of the device's product ID. There are a few cases in which the product ID does not match the desired firmware file (and the ID may also need to be updated). One case is when a library is being updated from one drive technology to another. Another case is when the device has a firmware revision string format that differs from that in the firmware file, and the tool cannot determine whether it is newer or older. If incompatible firmware is sent to a device, an error message is displayed.
- **Update [drive or library] product ID**—This writes the product ID from the firmware file to the drive.

Note: A number of products may not support updating the product ID, so use this feature only when you know the device supports it. The most common use of this feature is when updating drive technologies in optical libraries.

CSI Acquiring Firmware Files

L&TT firmware files are stored in the `firmware` directory, which is a subdirectory of the HP Library & Tape Tools installation directory. Before upgrading any firmware, you must first acquire the firmware image file or files and copy them to the `firmware` directory.

To download the latest firmware files:

1. Go to www.hp.com/support, choose the product family, then click **software updates and drivers**. The latest firmware file is available in L&TT format. For some products (such as standalone drives), firmware is available as a single file. For other products (such as tape libraries), the firmware is available in a self-extracting bundle that includes library and drive firmware.
2. Download the file or files to the `firmware` directory.
3. If the downloaded files are self-extracting bundles, extract the contents to the `firmware` directory.

Using the Get Files from the Web functionality (CSI)

The CSI version of L&TT can also find and download firmware from the HP website. This functionality obtains the most up-to-date information about all available firmware files directly from the HP website. It then compares this data set against the list of devices connected to the system and the current firmware revisions present in those devices.

To use the Get Files from Web functionality:

1. From the **Main** screen, enter the download command. The Download Tool screen displays a list of download options.
2. Enter the number of the desired option. If a download option is selected, the **Selector** screen displays a list of available firmware files to download.
3. Enter the number of the desired firmware file to download. The file is downloaded to the `firmware` directory.

CSI Uploading Firmware to Devices

To upload firmware to one or more devices:

1. From the **Main** screen, type the number corresponding to the device to be updated and press **Enter** to display the **Device Information** screen.
2. From the **Device Information** screen, enter the `firmware` command to display the **Firmware Update** screen. Devices that are available for update are listed on this screen.
3. Type the corresponding number of the device you want to update and press **Enter** to mark the device “selected.” If there are multiple devices, repeat this step for each device that you want to update.
4. When all the required devices are selected, enter the `start` command to begin the update process.



Caution: Make sure that no other programs attempt to access the device while the firmware is being updated. Do not interrupt the firmware update. If the firmware update is interrupted, the device may not operate and require physical repair.

L&TT creates a log of all firmware update activity. To view this log, enter the `review` command from the **Firmware Update** screen.

Advanced Options

Sometimes it is necessary to disable L&TT safeguards to perform more advanced operations. These operations (options) are only available after the necessary password has been entered. To obtain this password, contact HP support. To view the **Options** screen, from the **Firmware Update** screen, enter the `options` command.

Before any of the options can be changed, the current password must be set. To set the password:

1. Type the number that corresponds to the password option and press **Enter**. L&TT prompts you to enter a value for “Current password entered.”
2. Type the password and press **Enter**. If the correct password is entered, the remaining options on this screen become available.

Note: All of the options are visible regardless of whether a proper password is entered or not. However, the options are not available without the proper password. After a proper password has been entered, it is not required to re-enter it later.

The following options are available:

- **Allow firmware downgrading**—By default, L&TT does not allow firmware downgrading. In most cases, you should use the latest firmware. However, if software incompatibilities or other customer limitations require the use of older firmware revisions, this option lets you downgrade to older firmware revisions.
- **Allow any firmware file for [drives or libraries]**—This option allows mapping of the device firmware to a product irrespective of the device's product ID. There are a few cases in which the product ID does not match the desired firmware file (and the ID may also need to be updated). One case is when a library is being updated from one drive technology to another. Another case is when the device has a firmware revision string format that differs from that in the firmware file, and the tool cannot determine whether it is newer or older. If incompatible firmware is sent to a device, an error message is displayed.
- **Allow Product ID updates on [drives or libraries]**—This writes the product ID from the firmware file to the drive.

- **Current password entered**—This option lets you enter the factory password. The currently entered password is displayed to the right of the option. If no password has been entered, `Not Set` is displayed.

Note: A number of products may not support updating the product ID, so use this feature only when you know the device supports it. The most common use of this feature is when updating drive technologies in optical libraries.

Tests and Utility Functions

5

L&TT provides numerous tests for analyzing storage hardware. These tests are grouped into two categories: diagnostic tests and performance tests. The performance tests are hardcoded into the program, but several of the diagnostic tests are SCSI script-based. A SCSI script is a sequence of SCSI commands sent to a device, usually for the purpose of testing the device's functionality. SCSI scripts can also be used to perform non-diagnostic utility functions, such as rewinding a tape, recalibrating a tape head, or “exercising” a tape-moving robot arm. A main advantage of SCSI script-based tests is that they can be updated with new functionality and new tests can be added.

L&TT uses the following types of SCSI scripts:

- **Script-based tests** are tests based on scripts that are stored in the `scripts` directory in the L&TT installation directory. The script-based test files have the `*.tst` extension. Users can download new and updated scripts. With the Windows version of L&TT, the management of script files is accomplished through the **Get files from Web** item on the **File** menu.

HP is constantly adding scripts for new devices and updating scripts to enhance the testing functionality of older devices. As new scripts are developed, they are published to the external website in the scripts section.

- **SCSI utility scripts** provide access to generic SCSI operations. These scripts are accessed by selecting **Run Script...** from the **Utilities** menu and have the `*.scc` extension. For more information, see [Using the Utility Functions](#).

Note: Each script file contains information that tells L&TT which devices it is designed to support. When a device is selected, the **Tests** screen displays only tests that are applicable to that particular device.

Note: All scripts have a digital signature and cannot be altered. If they are altered in a text editor, L&TT displays an error message stating that the digital signature is not correct.

Test Descriptions

This section lists the available tests.



Caution: Some tests are destructive to data on the media. When a test is destructive to data, this is indicated in the test description. To prevent data loss, use media that is either new or that contains unimportant data that can be erased. Do not attempt to perform a test unless you are thoroughly familiar with its usage, or have been instructed to do so by HP support personnel.

Note: Some tests listed here are documented in more detail in a separate section. If more information is available, a hyperlink to that section is provided.

Performance Tests

- **Drive Performance Test** writes data to a tape drive and calculates the performance of that drive independently from the disk file system. Use this test in conjunction with the System Performance Test to identify any system bottlenecks. Use a blank tape when performing this test because this test is destructive to data on the tape. The test can also measure tape drive read performance. This test is available for all tape drives. For more information, see [Using the Drive Performance Test](#).
- **System Performance Test** has two modes: The *backup pre-test* measures the read performance of the disk file system (simulating a backup), and the *restore pre-test* measures the write performance of the disk file system (simulating a restore). Use these tests in conjunction with the Drive Performance Test to identify any system bottlenecks. The backup pre-test is read-only and is safe to run on any part of your file system. The restore pre-test creates data in the specified directory and can also be used to create test data for general backup testing. For more information, see [Using the System Performance Test](#).

- **Connectivity Test** examines the ability of the host to communicate with the device. This is a test of the SCSI communication path only; no media is required. This option is useful when trying to establish that the SCSI cables and adapters are working correctly. This test is available for DLT, LTO, DDS, VS80, and VS160 drives.
- **Device Self-Test** executes the internal self-test of the device and reports any failures. This test is useful in confirming that the device itself is operating properly. Not all devices support an internal self-test.
- **Device Analysis Test** runs a device-specific script that carries out a detailed examination of the device. The test examines all available logs from the device to look for any known issues, customer use issues, and common error patterns. The test also provides summary information and presents suggestions as to the cause of certain errors and any remedial actions the user should take. This option is particularly useful if you suspect that there may be a problem with the device. For more information, see [Using the Device Analysis Test](#).
- **Read/Write Test** writes and reads data from tape and checks for accuracy. For more information, see [Using the Read/Write Test](#).
- **Media Validation Test** determines if the drive can read the data on any media currently in the drive. The test is used to determine the quality of the media. The test reads data from the media and calculates the error rate. If the error rate exceeds the maximum allowable threshold, the test will require a cleaning cartridge and a second tape to determine if the problem is with the drive or the tape. The amount of data read depends on the drive type and coverage level of the test, but it generally varies between a few megabytes and one gigabyte. No data is written to tape and the test is not destructive to data. This test is useful if the user suspects that a backup failed because of a bad tape. This test is available for all tape drives.

Note: This test requires that a minimum amount of data is already written on the tape, otherwise the test will fail. This amount of data varies depending on drive technology and options.

Note: For some devices, the Media Validation test has been superseded with the Media Analysis test.

- **Library Exerciser Test** takes a test cartridge from a mail slot and performs random slot-to-slot moves. The test then moves the test cartridge into every available drive and performs a short drive test. This test is intended to exercise the robotics and robot drive hardware. For more information, see [Using the Library Exerciser Test](#).

Diagnostic Tests

- **Data Compression Test** writes a data pattern of known compressibility to tape. The test then rewinds the tape and reads the file just written. The read and write hardware compression ratios are calculated to ascertain that the hardware compression is enabled and working. If the script finds that hardware compression has been disabled by the host or by switch configuration, it reports this to the user. The compression ratios are displayed to the user and should be approximately 2:1. This test is useful if tape capacity or hardware compression is in doubt. This test is available for DLT, LTO, DDS, VS80, and VS160 drives.
- **Firmware Tape Creator Test** takes a firmware image and writes it to a tape cartridge for use as a firmware update (FUP) tape. This test is available for DLT, DLT1, SDLT, VS80, and VS160 drives.
- **DLT SRAM Check Tests (short and long versions)** check drive logs for existing evidence of SRAM chip corruption, and they perform a read/write test to check the drive for susceptibility to SRAM corruption problems. The test is destructive to data on the cartridge in the drive. These tests are only available for DLT drives.
- **LTO Tape Stress Test** performs a rigorous read/write test for the purpose of stress testing the drive. This test is only available for LTO drives.
- **LTO Firmware Tape Creator Test** takes a firmware image and writes it to a tape cartridge for use as a FUP tape.
- **DDS Firmware Tape Creator Test** takes a firmware image and writes it to a tape cartridge for use as a FUP tape.
- **Initialize Element Status Test** executes an `initialize element status` command on the library. This test is available for all libraries.
- **Full Sweep Test** moves the robotics through the full range of motion to help prevent reliability issues with the brush tracks. This test is available for the C7200 and C7145 library models.

- **Restore Factory Settings** checks the configuration parameters of the MO drive and identifies configurations that differ from the factory default settings. If settings differ, the test can reset the drive to the factory defaults. This test is only available for MO drives.
- **LTO Cooling Check** monitors the temperature sensors of an LTO drive while writing data to ensure that the drive is cooling properly when installed in a server.
- **DLT, DLT1, VS80, VS160, SDLT, LTO, and DDS/DAT Assessment Tests** correlate with testing currently done on returned drives. If the assessment test fails, this same drive would probably fail testing within the return process. If the assessment test passes, this same drive would probably pass testing within the return process. Correlation testing between these tests and the test used within the return process has shown good results.

The assessment tests are available for the following drives:

- **DLT Assessment Test:** DLT4000, DLT7000, and DLT8000 drives
- **DLT1 / VS80 / VS160 Assessment Test:** DLT1, VS80 and VS160 drives
- **SDLT Assessment Test:** 110/220 and 160/320 SDLT drives
- **LTO Assessment Test:** LTO1 (Ultrium 215 and 230), LTO 2 (Ultrium 460) drives, and LTO3 drives
- **DDS Assessment Test:** DDS3, DDS4, DAT72 (pre- and post-merger HP drives only)

The DLT, DLT1, VS80, VS160, and SDLT assessment tests perform the following tests:

- SCSI interconnect test
- Review event log entries (which were present prior to running this test)
- Load the test tape
- Quick write/read test
- Soft unload/load test (DLT assessment test only)
- Minimum block size test
- Diagnostic self test (built-in drive function)
- Read/write tests, using various data patterns
- Bit error rate test
- Review new event log entries added during the test

- Unload the test tape

The LTO assessment test performs the following tests:

- Initial preparation
- Review event log entries (which were present prior to running this test)
- SCSI parity check (LTO 1 drives only)
- Cartridge load
- Quick read/write test
- Cartridge unload
- SCSI parity check
- Review new events

The DDS assessment test performs the following tests:

- Review event log entries (which were present prior to running this test)
- Check life data in the serial EEPROM and the fault log
- Load check
- Perform a clean and write test
- Unload check
- MRS switch test
- Read check
- Review new events

- **Media Erase Test** converts a DDS or LTO data tape into a blank tape. This test has the following options:
 - **Quick erase**—This option, which takes approximately one minute to complete, removes the tape directory and writes EOD at the start of the tape, but it does not overwrite the data on the remainder of the tape.
 - **Full erase**—This option, which takes between two to four hours to complete, erases the tape directory and also overwrites all data on the tape.
 - **Secure erase**—This option, which takes between 10 to 20 hours to complete, performs a full erase followed by a rewind. It repeats this four more times for a total of five full erases.

- **ESL Vendor ID** toggles the vendor ID between HP and COMPAQ on ESL libraries having firmware revision 3.40 and later. This may be necessary because firmware revision 3.40 and later has a vendor ID of HP, and there may be some applications that require the vendor ID to be COMPAQ.
- **Media Analysis Test** determines if the drive can read the data on any media currently in the drive. The test is helpful in determining the quality of the media. However, the results are also dependent on the drive's ability to read the media, and therefore the error rate measured is a combination of the drive's ability to read and the quality of the media. If the drive's health is not known, the Read/Write Test (used with known good media) can be used first. For more information, see [Using the Media Analysis test](#).
- **MO Media Validation Test** validates magneto-optical (MO) media and reports any errors or blank spaces present in the media, if any. This is a non-destructive test and is available for all MO devices.
- **SDLT Tape Edge Damage (TED) Test** determines if any SDLT cartridges with tape edge damage are present in an ESL9000 or MSL library. If the test passes, there are no tapes in the library with TED symptoms. If it fails, evidence of tapes with TED has been found, and a message is displayed indicating that the user should run the Read SDLT Media IDs test to locate the specific tapes with TED in the library. The message also instructs the user to contact HP support to identify if any of the drives have the potential to cause tape edge damage, and to have them replaced if any are identified.
- **SDLT Read Media IDs Test** loads each tape in the library into a drive and reads the media ID. At the conclusion of the test, click the Test Results tab to see the media ID, slot number, and barcode of each piece of media in the library. Normal usage for the Read SDLT Media IDs test is in conjunction with the SDLT Tape Edge Damage Test to identify the location of tapes in a library with tape edge damage.

This test assumes that the SDLT tapes have the proper barcode labels with “S” as the 7th character, that the SDLT drives have the latest firmware, and that the library is configured to show all barcode labels. Otherwise, the tapes may not be recognized with this test. If the *Ignore barcode labels when selecting tapes* option is set to True, then the barcodes are ignored. If this option is set to False, then the barcodes are required as described above. The default setting for this option is False.

Additionally, the library must be configured to automatically unload the tape when it is being moved from a drive. For MSL libraries, the Unload Mode option (under the Library Options screen) must be set to implicit. For ESL9000 libraries, the Auto Drive Unload option (under operator/configure options) must be enabled.

Using the Drive Performance Test

The Drive Performance test writes and reads data to/from the specified tape drive and calculates performance data for that drive. The results of the test are shown on the **Drive Performance Results** tab and also written to the event log.



To start the Drive Performance test (Windows version):



Caution: This test is destructive to data on the tape. To avoid loss of data, use a blank tape when performing this test.

Note: The Drive Performance test is unavailable with ASPI I/O mode. You must use NT Miniport I/O mode to perform this test.

1. In the device listing (either the **By Product** or **By Connection** tab), click the drive to test.
2. Click **Dev Perf** on the main toolbar. The **Drive Performance** screen is displayed and the **Tape Drive Performance** tab is selected by default.

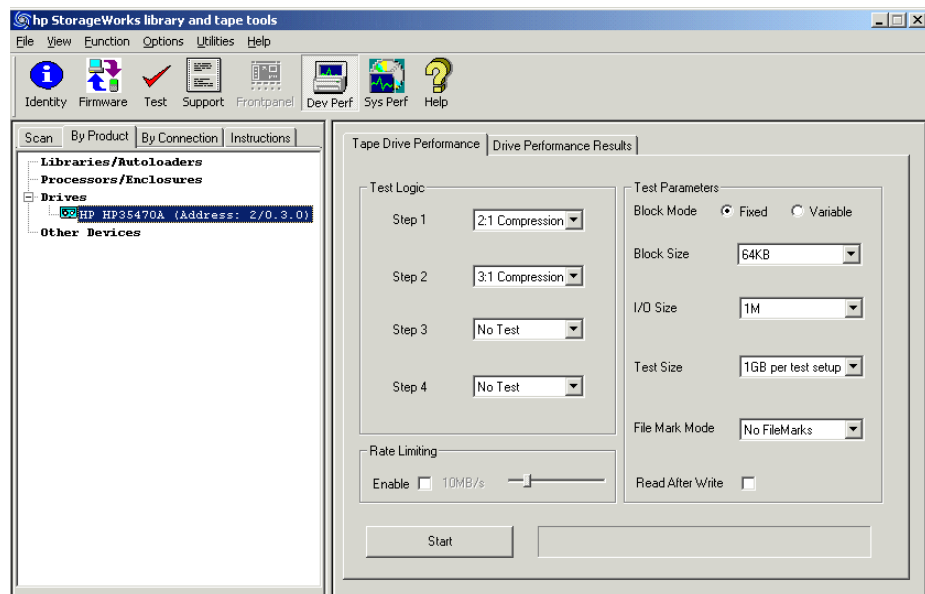


Figure 18: Drive Performance screen

3. In the **Test Logic** section of the screen, use the drop down boxes to select a data type for each of the four tests. The Drive Performance test is actually a series of four write/read subtests (labeled Step 1-4 on the **Drive Performance** screen) that measure performance using different types of data that you can specify.

The following data types can be selected:

- Zeros
- 1.6:1 Compression
- 2:1 Compression
- 3:1 Compression
- 4:1 Compression

You must specify a data type for Step 1, but you can choose not to perform Steps 2 through 4 by selecting **No Test** in the corresponding dropdown box.

4. Specify the following additional parameters:
 - **Block Mode**—choose one of the following:
 - **Fixed**—the test uses a fixed block size (length) that can be specified in the **Block Size** dropdown box.
 - **Variable**—the test uses a different mode of data transfer. When this option is selected, the **Block Size** dropdown box is disabled.
 - **Block Size**—if Block Mode is set to **Fixed**, then specify the size of the data blocks used in the test. Data blocks can be from 16K to 256K. This dropdown box is disabled if Block Mode is set to **Variable**.
 - **I/O Size**—the maximum amount of data to be transferred by a single read/write operation. This length is typically a multiple of the Block Size and ranges from the specified Block Size to 1MB.
 - **Test Size**—the maximum amount of data written/read by the test. Valid choices range from 1GB to 15GB. Larger values increase the time required to perform the test, but they produce more accurate test results.
 - **File Mark Mode**—instructs the test to write a filemark at the specified interval (1MB to 1GB). You can also instruct the test not to write any filemarks.
 - **Read After Write**—when enabled, data is written to the tape and then the tape is read back. When disabled, only write performance is measured. The test evaluates two sets of metrics when enabled, and one when disabled.

- **Rate Limiting**—if rate limiting is enabled, the I/O rate is limited to the specified value.
5. Click **Start** to perform the test. Progress of the test is displayed in the status bar to the right of the **Start** button, and a dialog box will inform you when the test is complete.
 6. Click the **Drive Performance Results** tab to view the results of the test. The results are also written to the event log. See [Using the Event Log](#) for more information.



To start the Drive Performance test (CSI version):

1. Use the `select` command to select the device to be tested.
`select <n>` (where `<n>` is the number of the device to be examined)

Note: The `devperf` command is not available until a device is selected.

2. From the **Main** screen, enter the `devperf` command to display the **Device Performance Tool** screen. The **Device Performance Tool** screen displays several test options with their default settings.

```

Main > Drive Information > Device Performance Tool >
-----
The purpose of this tool is to measure the tape drive performance by checking
how fast the server can access the tape drive independent of the disk
subsystem. It works by transferring pre-loaded data with different compression
ratios directly from the memory of the server to the tape drive.

1.    Set the blocksize to write to tape (blocksize) - 32768
2.    Set the no. of writes/reads to perform (reps) - 4096
3. [ ] Enables the readback test after writing data to the device (readback)
4.    Set the no. of blocks to write to tape/write (count) - 16
5.    Set data pattern to write to tape (pattern) - 2

Enter Command>start
-----<Enter a blank command for command list>-----

```

Figure 19: Device Performance Tool screen

The **Device Performance Tool** screen displays several test options with their default settings.

3. If necessary, change the settings for one or more options. To change the settings, enter the number that corresponds with the option that you want to change. Enter the new value at the prompt. The five available options for this test are:
 - **Blocksize**—specify the blocksize, in bytes, to be written to the tape. Typical values are 32768 (32KB), 65536 (64KB). The default is 65536.
 - **Repetitions**—specify how many write/read operations to perform. The default is 4096.
 - **Readback**—specify whether to enable the readback test after writing data to the device. This option measures read performance in addition to write performance in MB/sec. This option is disabled by default.
 - **Count**—specify how many blocks to write to the tape device per write operation. The default is 16.
 - **Pattern**—specify the data pattern to be written to tape. Enter 2 for 2:1 compression ratio or 3 for 3.1:1 compression ratio. The default is 2.
4. Use the `start` command to start the test.

Using the System Performance Test

The System Performance test writes and reads data to/from the specified directory and calculates performance data for the backup server. The Restore Pre-Test (write) and Backup Pre-Test (read) portions of the tests are actually separate tests and are executed separately.

GUI Performing the System Performance Restore Pre-Test (GUI)

1. Click **Sys Perf** on the main toolbar. The **System Performance** screen is displayed.
2. Click the **Restore Pre-Test** tab.

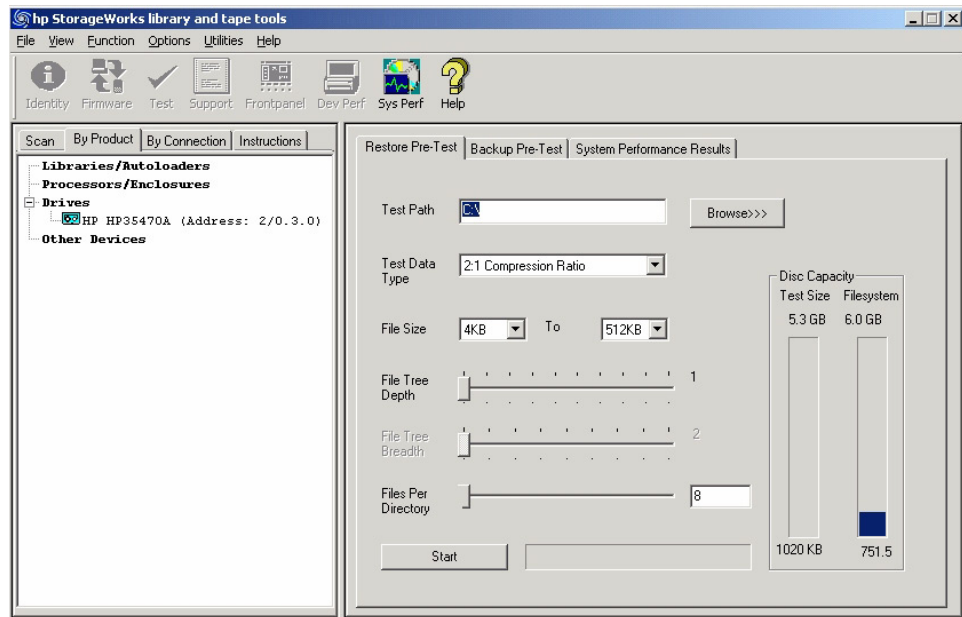


Figure 20: Restore Pre-Test tab of the System Performance screen

3. Specify the following parameters:
 - **Test Path**—enter the destination directory (or use the **Browse>>>** button to browse to the directory) that the test will write data to. This should be a directory on the backup server being tested.

- **Test Data Type**—select the type of data pattern to be written. Choose from the following options:
 - Fixed Byte
 - Incrementing
 - Random
 - Uncompressible Data
 - 2:1 Compression Ratio
 - 3:1 Compression Ratio
 - 4:1 Compression Ratio
- **File Size**—use the two dropdown boxes to specify a range of possible file sizes for the test data.
- **File Tree Depth**—specify the number of levels of subdirectories the program will create from the specified directory.
- **File Tree Breadth**—specify the number of directories to be created within each subdirectory.
- **Files Per Directory**—specify the number of files to be created within each subdirectory.

Note: The gauges in the **Disc Capacity** section of the screen show the amount of disk space required for the System Performance test using the current settings, and the amount of space available in the indicated filesystem. If the required space exceeds the available space, the Test Size gauge displays `OVERFLOW`, and you will be unable to start the test.

4. Click **Start** to perform the test. Progress of the test is displayed in the status bar to the right of the **Start** button, and a dialog box will inform you when the test is complete.
5. Click the **System Performance Results** tab to view the test results. The test results are also written to the event log. See [Using the Event Log](#) for more information.

GUI Performing the System Performance Backup Pre-Test

This test reads data from up to four separate locations on the file system. The reads are concurrent and simulate up to four concurrent backup data streams. The performance of these reads is measured and reported in the System Performance Results tab. Use this test to measure the performance of the file system to be used for backup. Use this test in conjunction with the Drive Performance Test to identify performance bottlenecks in the system. This test is read-only and can be safely run on backup source data.

1. Click **Sys Perf** on the main toolbar. The **System Performance** screen is displayed.
2. Click the **Backup Pre-Test** tab.

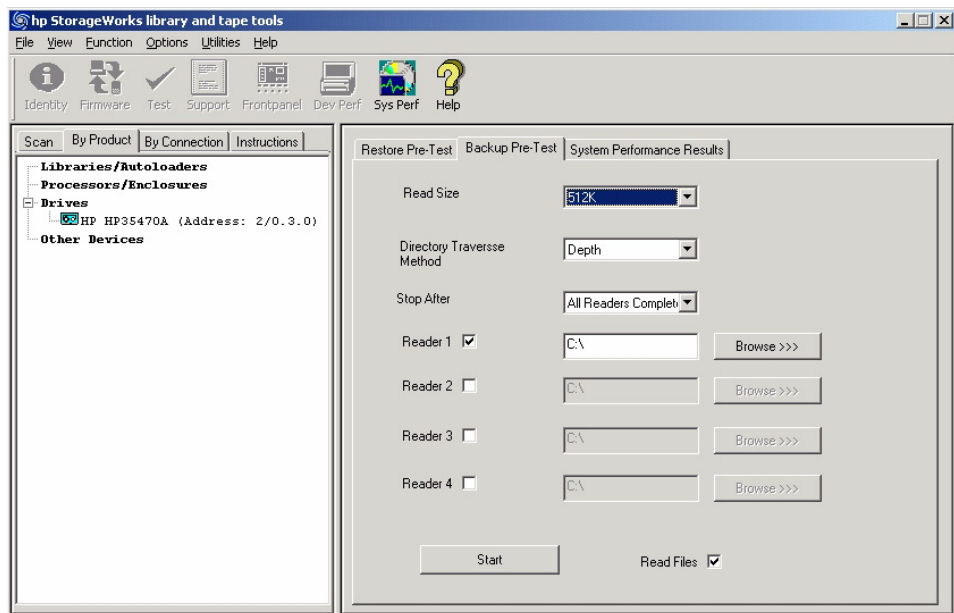


Figure 21: Backup Pre-Test tab of the System Performance screen

3. Specify the following parameters:
 - **Read Size**—enter the maximum block size (in bytes) to transfer.
 - **Directory Traverse Method**—specify one of the following options:
 - Specify **Depth** to have the test read as far down the directory structure as possible before moving laterally to the next directory.

- Specify **Breadth** to read all directories at the same level before moving down to the next subdirectory level.
 - **Stop After**—specify a time limit for the test, or select “All Readers Complete” to continue testing until the test is complete.
 - **Reader [1-4]**—enter up to four target directories (use the **Browse>>>** button to browse to each directory) that the test will read data from. For each Reader, you must have first performed a Restore Pre-Test. Use the same directory or directories that you specified in the Restore Pre-Test(s).
 - **Read Files**—specifies whether the files must be read back from the tape after the write completes.
4. Click **Start** to perform the test. A dialog box will inform you when the test is complete.
 5. Click the **System Performance Results** tab to view the test results. The test results are also written to the event log. See [Using the Event Log](#) for more information.

CSI Performing the System Performance Pre-Tests (CSI)

Note: The System Performance Pre-Tests (backup and restore) are not available for NetWare.

1. From the **Main** screen, enter the following command to display the **System Performance** screen:

```
sysperf
```
2. Enter one of the following commands (depending on which pre-test you want to run):
 - `backup`—runs the Backup Pre-Test
 - `restore`—runs the Restore Pre-Test
3. If necessary, change the settings for one or more options. To change the settings, enter the number that corresponds with the option that you want to change. Enter the new value at the prompt.

Figure 22 shows the **Backup Pre-Test** screen.

```
Main > System Performance Tools > Backup Pre-Test >
-----
The purpose of this tool is to measure the actual read transfer rate from the
disk subsystem by file-by-file or sequential method. This gives the data rate
in MB/sec.

1.   Set blocksize to read files (blocksize) - 32768
2.   Set path to read files (path) - /tmp

Enter Command>start
-----<Enter a blank command for command list>-----
```

Figure 22: Backup Pre-Test screen (CSI)

The two options available for the Backup Pre-Test are:

- **Blocksize**—specify the blocksize, in bytes, to be read. Typical values are 32768 (32KB), 65536 (64KB). The default is 65536.
- **Path**—specify the path to the directory to be read from.

Figure 23 shows the **Restore Pre-Test** screen.

```

Main > System Performance Tools > Restore Pre-Test >
-----
The Performance of the disk subsystem can be measured using this tool. This
creates a directory structure based on file size, directory depth, blocksize
and compression ratio and measures the data rates it achieves. Type the
corresponding number to select/set each option.

1.    Set each file size (filesize) - 4096
2.    Set no. of files to create (nofile) - 5
3.    Set dir where to create dataset (dirpath) - /var/tmp
4.    Set compressibility pattern to create files (pattern) - 5

Enter Command>start
-----<Enter a blank command for command list>-----

```

Figure 23: Restore Pre-Test screen (CSI)

The following options are available for the Restore Pre-Test:

- **Filesize**—specify the size, in bytes, of the test files to be created.
- **Number of Files**—specify the number of files to be created.
- **Directory path**—specify the path of the directory where the test files will be written.
- **Pattern**—specify one of the following data patterns:
 - 1 Fixed byte
 - 2 Incrementing byte
 - 3 Random data
 - 4 1.6:1 compressible data
 - 5 2:1 compressible data

- 6 3.1:1 compressible data
 - 7 4.3:1 compressible data
4. Use the `start` command to start the test.

Using the Device Analysis Test

The Device Analysis test can be executed manually through the **Tests** screen or automatically whenever a support ticket is generated. The Device Analysis test is unique among all the tests offered by L&TT. In addition to performing SCSI operations directly on a device, the Device Analysis test uses a set of predefined, device-specific rules to analyze device logs and configurations. If any known issues are discovered during the analysis, the user is notified of the problem and the program suggests an appropriate course of action.

The Device Analysis test automates failure analysis of a device by determining whether a known or unknown problem with a device exists, if the problem can be resolved in the field through maintenance or simple repair, and whether a device needs to be returned or serviced.

Using the Read/Write Test

The Read/Write test writes and reads data from tape and checks for accuracy. In addition to verifying that the data read back matches the data written, the read/write error rates are also checked. The test fails if the error rates exceed allowable limits. This test can be used to verify the ability of the drive to read and write data independent of the storage application. This test is available for all tape drives.



Caution: Use a blank tape when performing this test because this test is destructive to data on the tape.

The following options are available for this test:

- **Test Time Limit**—specify the time limit in minutes. Enter 0 for no time limit.
- **Data Limit Type**—specify one of the following options to limit the amount of data written/read in each phase:
 - **Time**—limits the amount of data tested based on the time specified in Data Time Limit.
 - **Size**—limits the amount of data tested based on the size specified in Data Size Limit.
 - **Whole tape**—limits the amount of data tested based on the size of the tape.
- **Data Size Limit**—specify the size limit in megabytes of data to be written/read in each phase.
- **Data Time Limit**—specify the time limit, in minutes, for each phase of the test.
- **Block Size**—specify the block size, in kilobytes, to be used in the test.
- **Transfer Size Limit**—specify the maximum data transfer limit, in kilobytes, per command.
- **Block Transfer Type**—specify whether to use a fixed or variable block length.

- **Data Pattern Type**—indicates the type of data pattern used in the test. Specify one of the following data pattern types:
 - **Pattern File**—uses a preset pattern
 - **Random**—generates random patterns
 - **User defined**—uses a user-defined string
- **Data Pattern**—specify a string value to use as a data pattern if the Data Pattern Type is set to “User Defined.”

Using the Media Analysis test

The Media Analysis test reads data from the media and calculates the error rate. If the error rate exceeds the maximum allowable threshold, the test will require a cleaning cartridge and a second tape to determine if the problem is with the drive or the tape. No data is written to tape and the test is not destructive to data. This test is useful if the user suspects that a backup failed because of a bad tape. This test is available for all tape drives.

The following options are available for this test:

- **Test Time Limit**—specify the time limit in minutes. Enter 0 for no time limit.
- **Data Limit Type**—specify one of the following options to limit the amount of data read in each phase:
 - **Time**—limits the amount of data read based on the time specified in **Data Time Limit**.
 - **Size**—limits the amount of data read based on the size specified in **Data Size Limit**.
 - **Whole tape**—limits the amount of data read based on the size of the tape.
- **Amount of data read in each phase**—specify the size limit in megabytes of data to be read in each phase.
- **Time allowed for each data test phase**—specify the time limit, in minutes, for each phase of the test.
- **Transfer Size Limit**—specify the maximum data transfer limit, in kilobytes, per command.

Using the Library Exerciser Test

The Library Exerciser test takes a test cartridge from a mail slot and performs random slot-to-slot moves. The test then moves the test cartridge into every available drive and performs a short drive test. This test is intended to exercise the robotics and robot drive hardware.

The following options are available for this test:

- **Test Time Limit**—specify the time limit in minutes. Enter 0 for no time limit. The default setting is 0.
- **Move Command Timeout**—specify the maximum time allotted, in seconds, for each move command before failure. The default is 600 seconds.
- **Active Slot Range**—specify a range of slots to be tested. Enter a range of slot numbers separated with a dash (for example: 2-5), or enter `all` to specify all slots. The default is “all.”
- **Active Drive Range**—specify a range of drives to be tested. Enter a range of drives separated with a dash (for example: 2-5), or enter `all` to specify all drives. The default is “all.”
- **Drive Type Option**—specify the type of drives to be tested (in libraries that have mixed drive types). Enter the type of drive (for example: LTO or DLT), or enter `all` to test all drive types. The default is “all.”
- **Check Inventory Mode**—specify whether to perform an active inventory check at beginning of the test. The active inventory check can take a long time to perform. The default is “on.”
- **Barcode Mode**—specify how barcodes are handled. Choose one of the following options:
 - **Show all**—shows all barcodes
 - **Show suspect**—shows only suspect barcodes (default)
 - **Off**—does not show barcodes
- **Slot-to-Slot Moves**—select one of the following options for the slot-to-slot test:
 - **All**—moves all cartridges
 - **Random**—moves randomly selected cartridges (default)
 - **Off**—no cartridges are moved
- **Random Coverage**—when Slot-to-Slot Moves is set to “Random,” specify the percentage of units covered during random test. The default is 20%.

- **Drive Load Test**—specify whether or not to perform the Drive Load test. The default setting is “on.”
- **Drive Test Option**—if the Drive Load test is enabled, specify one of the following options:
 - **Off**
 - **Data loop back** (default)
 - **Read-only**
 - **Read/write**
- **Cartridge Load Test**—specify one of the following options for the Cartridge Load test:
 - **Off** (default)
 - **Single drive**
 - **Multiple drives**
 - **All drives**
- **CM Integrity Test**—specify whether to enable the CM integrity check option for LTO drives. The default setting is “on.”

Running the Tests (GUI Environment)

To select and run a test manually:

1. In the device listing (either the **By Product** or **By Connection** tab), click the device to test.
2. Click **Test** on the main toolbar. The **Tests** screen is displayed and the **Test Execution** tab is selected by default.
3. Click the checkbox to the left of the device name that you want to test. The **Test Group** dropdown box is enabled, listing all the tests available for the selected device.
4. In the **Test Group** dropdown box, select the test to perform. A description of the selected test is displayed in the **Description** text box.
5. If any options are available for the selected test, the **Options** button is enabled. Click the **Options** button to review and set the desired options.
6. Click the **Start Test** button to start the test.

Viewing Test Results

After the test has completed, click the **Test Results** tab to view the results. The results of the test are displayed in the **Test** text box. A more detailed Test Operation Log is displayed in the bottom section of the screen. The information is presented as a report in a standard tree-view format. Click the “+” or “-” signs to expand or collapse a section of the report. Select an option in the **Current Detail Level** dropdown box to display more or less information in the Test Operation Log.

Running the Tests (CSI Environment)

To select and run a test manually:

1. On the **Main** screen, enter the number corresponding to the device that you want to test. The **Device Information** screen is displayed.
2. On the **Device Information** screen, enter the `test` command. The **Test** screen is displayed. The **Test** screen displays the currently selected test and lists the available devices to be tested.
3. To select a different test, enter the `picktest` command. On the **Selector** screen, enter the number of the test you want to perform. The **Test** screen is redisplayed and the currently selected test is updated.
4. To select or deselect devices to be tested, enter the corresponding device number to toggle the selected status of the device. To deselect all devices, enter the `clear` command.
5. Enter the `start` command to start the test.
6. When the test is complete, a dialog is displayed showing preliminary results of the test. Press any key to return to the **Test** screen.

Viewing Test Results

To view detailed test results, enter the `review` command. Test results are displayed in a hierarchical format.

Use the `detail` command without any arguments to view the current detail level of the report. Use the `detail` command with a numeric argument to set the detail level. The available detail level arguments are as follows:

- **1** — highlights only
- **2** — normal
- **3** — more details
- **4** — everything
- **5** — factory only (requires a factory password. To enter a password, use the `options` command.)

If necessary, use **Ctrl+U** and **Ctrl+D** to scroll up and down through the results. Use the `find` and `page` commands to quickly locate information in the report.

Using the Utility Functions

Utility functions execute the SCSI utility scripts (files with a *.*scc* extension) stored in the `scripts` directory. These scripts send various SCSI commands to the selected device, but they generally do not return any results.

Many of the utility functions are device-specific and intended only to remedy specific problems that may occur with a particular device.



Caution: Using a script improperly or when it is not required can cause more harm than good—possibly rendering a device inoperable. Do not attempt to use these utility functions unless you are very familiar with SCSI operation, or you have been advised to do so by a technical support representative or a Device Analysis script.

GUI

To use a utility function with the Windows version of L&TT:

1. Select **Run Script...** from the **Utilities** menu to display the **Run Script** dialog.
2. In the **Devices** section, click the checkbox next to the device on which the script will be run.
3. Click **Browse** to select a script file to execute. The utility scripts are located in the `scripts` directory and have a *.*scc* extension. Select a script and click **Open** to return to the **Run Script** dialog.
4. Click **Run Script** at the bottom of the dialog box to run the script. When the script has completed, relevant information is displayed in the **Script Output** and **Script Execution Log** text boxes.

CSI

To use a utility function from the CSI:

1. On the **Main** screen, enter the number corresponding to the device that you want to test. The **Device Information** screen is displayed.
2. Enter the `runscript` command.
3. Enter 1 to specify the script path.
4. Enter the path, including the filename of the script. The utility scripts are located in the `scripts` directory and have a *.*scc* extension.
5. Enter the `start` command to execute the script.
6. Enter any additional information required by the script.

7. Use the `up` or `exit` commands as necessary to exit the tool when the test is complete.

Support Ticket Generation



A major feature of L&TT is the ability to generate a support ticket. In the event of a hardware problem, a support ticket can provide vital information to help in diagnosing and resolving the problem.

When a support ticket is generated, L&TT collects configuration information and executes a Device Analysis test on the selected device. This information can then be viewed, saved, printed, compared to another support ticket, or e-mailed. A support ticket is saved as a log file having the **.ltt* extension. By default, log files are saved to the `log` directory.

The support ticket viewer is built into the L&TT application. The viewer enables viewing of detailed device information and general information on the system it is connected to. This information is displayed in a standard treeview format. The user (or support technician) can change the detail level of the support ticket, browse through the support ticket information, and expand or collapse specific sections of the support ticket as required.

Note: Regardless of the selected detail level, the log file always contains all of the information collected from the product. The support ticket viewer filters this information, depending on the detail level.

L&TT support tickets are saved in a proprietary format and therefore require the support ticket viewer. However, with the Windows version of L&TT, a support ticket can be converted to HTML format using the currently selected detail level. The HTML version can easily be printed or viewed by other users without the support ticket viewer.

Note: After an HTML support ticket has been generated, the detail level within the HTML file cannot be changed. Make sure that the detail level is set to the desired level before generating the HTML report.

Note: In the Windows version of L&TT, right-clicking on any of the text in the support ticket viewer displays a context menu with more options. A quick way to see the entire support ticket is to set the detail level to **everything** or **factory only**, right-click the top support ticket entry, then select **Expand All**.

Generating and Viewing a Support Ticket

To open the **Support** screen:

1. Click a device in the device list (**By Product** or **By Connection** tab) to select it.
2. Click the **Support** button on the main toolbar to display the **Support** screen.

The bottom section of the screen provides resources for finding support on the Web. Clicking any of the buttons in the **Support Resources on the Web** section of the screen opens a browser window to display the corresponding website.

Generating a Support Ticket

The **Support** screen presents three options for generating a support ticket. Each of the following three options has a corresponding button in the **Generate Support Ticket** section of the screen.

- **View Support Ticket**—Click this button to generate the support ticket and immediately view it in the support ticket viewer. The support ticket can later be saved or sent via e-mail. For more information, see [Viewing a Support Ticket](#).
- **Save Support Ticket to File**—Click this button to generate and save the support ticket. The support ticket is saved as a log file with the *.l^{tt} extension. Large support tickets are broken up into multiple log files. The support ticket can later be viewed or sent via e-mail. To view a saved support ticket, open it through Windows Explorer, or use the **Load** command on the **File** menu.
- **Send Support Ticket by E-mail**—Click this button to generate the support ticket and immediately send it via e-mail to an HP support center (or other destination). Clicking this button opens a form that allows you to provide all the necessary information. Complete the form and click the **Send** button to send the e-mail. Using this option does not save a copy of the support ticket locally, so you are advised to click **Save Support Ticket to File** to save a copy for future reference. For more information, see [Sending a Support Ticket by E-mail](#).

Note: When sending a support ticket by e-mail, L&TT provides the option to compress the support ticket.

Viewing a Support Ticket

After a support ticket is generated, it is displayed in the support ticket viewer. This viewer is built into the L&TT program. Information is displayed in a standard tree-view format. Click the “+” and “-” signs to expand and collapse sections of the support ticket. Use the standard navigation keys (**Home**, **End**, **Page Up**, **Page Down**, and the arrow keys), the Windows scroll bars, and the mouse to navigate through the document.

To print the support ticket, select **File > Print** from the menu bar within the support ticket viewer.

Setting the Detail Level

The support ticket can display information in several different levels of detail, depending on the setting displayed in the **Current Detail Level** dropdown box. The following detail level settings are available:

- Highlights only
- Normal
- More detail
- Everything (the highest level the end user can view)
- Factory only (requires a factory password. Contact HP support to obtain a factory password)

Note: The “factory only” detail level is only visible after the factory password has been entered into the software, either from the menu function in the report viewer or in the menu item within the main application. If the factory password is entered via the main application, it is saved in the registry and will not require subsequent re-entry.

Figure 24 shows an example of the information contained in a report with the detail level set to “Normal.”

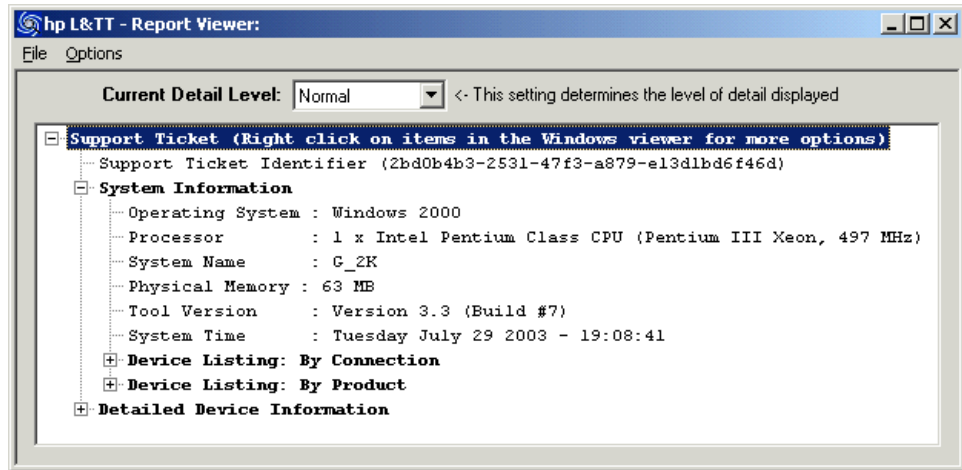



Figure 24: Example support ticket with normal detail (Windows version)

Using the Tabular View

Tabular View is available only when the detail level is set to “factory only.” Items in the support ticket that are preceded with the Tabular View icon () have additional information that can be displayed in Tabular View. To view the additional information in Tabular View, click the icon. One of the following occurs:

- If only one view is available for the item you clicked, then a Tabular View window immediately opens.
- If more than one view is available for the item you clicked, a shortcut menu is displayed. Select the desired option and click **OK**. The Tabular View window opens.

Figure 25 shows an example of a typical Tabular View window.

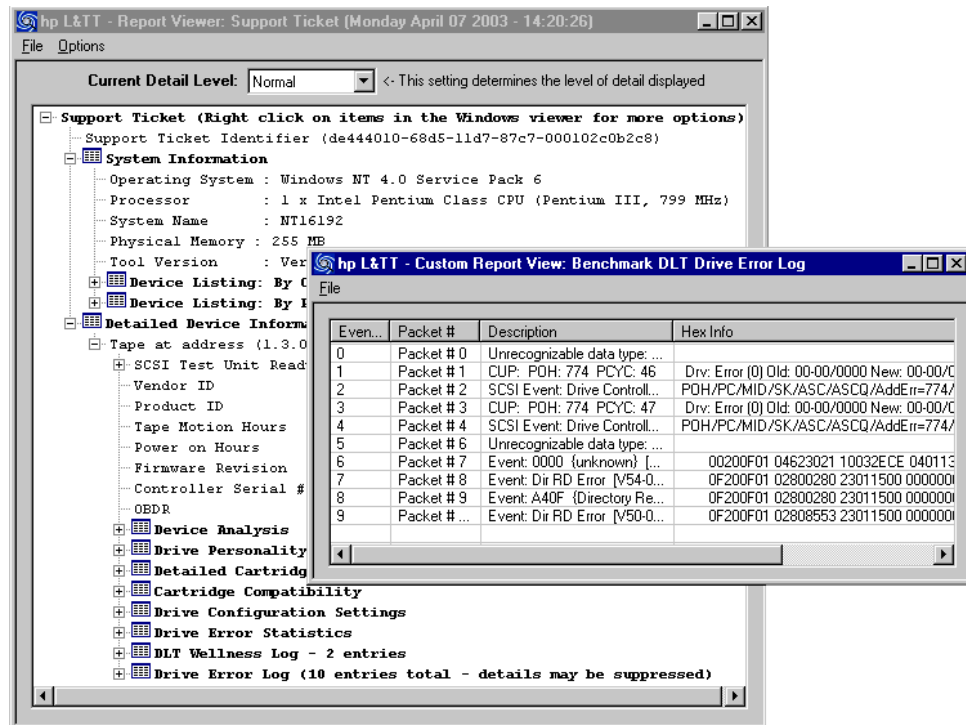


Figure 25: Tabular View window


The Tabular View window supports the following operations:

- **Sorting columns**—Click a column header to sort by that column. Repeatedly clicking the same column header toggles between ascending and descending sort order.
- **Filtering columns**—Right-click a column header and choose **Filter** from the context menu to filter a column. A dialog box prompts you for the filter value. Enter a value and click **Filter**. To remove the filter, right-click the column header again and choose **Clear Filter** from the context menu.
- **Exporting data**—The Tabular View data can be exported as a CSV (comma separated value) file. A CSV file is a text file in which values are separated by a comma (or other specified separator). Data in a CSV file can be imported by a variety of popular spreadsheet and database applications such as Microsoft Excel and Access.

To export Tabular View data to a CSV file, choose **Export** from the **File** menu. Enter the path and filename for the CSV file in the dialog box and click **Save**.

Other Support Ticket Functionality

Right-click any node (line) in the support ticket viewer to display a context menu that exposes additional functionality. Depending on the node that was clicked, the following items may or not be available (unavailable items are greyed out):

- **Expand All**—Selecting this item expands all subitems in the node.
- **Event Explanation**—Selecting this item opens the **Event** window that displays additional information about the event. You can view the the data in either ASCII or hexadecimal format. This feature is available for items preceded with the blue information icon ().
- **Event Data**—Selecting this item opens the **Event Data** window that displays L&TT-specific information about the event.
- **Copy**—Selecting this item copies the current line to the Windows clipboard.
- **Reference Data**—Selecting this item opens the **Reference Data** window that displays reference information pertinent to the current line such as valid ranges and applicable values.

Sending a Support Ticket by E-mail

From the **Support** screen, click **Send Support Ticket by E-mail** to generate the support ticket and immediately send it via e-mail to an HP support center (or other destination). When you click **Send Support Ticket by E-mail**, the **E-mail Support Ticket** dialog box is displayed.

hp L&TT - Email Support Ticket

Step 1: Support Selection

Send to support provider in reference to an open case

Case Reference Number:

Send to support provider to request support by email

Product Number:

Product Serial Number:

Step 2: Select desired e-mail address:

Email Address: ▼

Step 3: Provide additional information:

Company Name:

Contact Name:

Contact Phone:

Contact Email:

Attach Result Log

Attach additional Event Log (only if requested)

Compress the support ticket

Problem Description

Figure 26: E-mail Support Ticket dialog box

Before L&TT can email a support ticket, you must either have a MAPI-compliant e-mail program (such as Microsoft Outlook or Outlook Express), or you must set up an email account through the Windows Control Panel or Internet Explorer. For more information about setting up an e-mail account, see [How do I configure e-mail to send support tickets?](#)

The **E-mail Support Ticket** dialog box is divided into three steps:

1. In **Step 1**, indicate whether this is a new support request or an existing case.
 - If this is a new support request, select the **Send to support provider to request support by e-mail** option (this option is the default). Enter the product number and product serial number in the appropriate fields.
 - If this is an ongoing support case, select the **Send to support provider in reference to an open case** option and enter the case reference number in the appropriate field.
2. In **Step 2**, enter the destination e-mail address. Use the dropdown box to select from a list of HP support providers, or enter the e-mail address manually.
3. In **Step 3**, specify the following additional information:
 - **Contact information**—Enter your company name, contact name, contact phone, and contact e-mail address.
 - **Attach Result Log**—Select this option to attach the support ticket to the e-mail for analysis by HP service personnel.
 - **Attach additional Event Log (only if requested)**—Select this option if you have been requested by HP service personnel to send the event log. For more information about using the event log, see [Using the Event Log](#).
 - **Compress the support ticket**—Select this option to compress the support ticket. This option is selected by default.

Note: Large support tickets are automatically broken down into multiple, smaller sub-ticket components and sent in multiple emails. The master file has an *.l#* extension, and the sub components have a *.dat* extension. To be viewed properly, the recipient of these emails must save all of the sub-ticket components to the same directory. When sending a large support ticket by email, be sure to send all of the components or else the support ticket will be unreadable.

- **Problem description**—Enter a detailed description of the problem you are having.

When you have completed the form, click **Send**.

Note: Large support tickets are automatically broken down into multiple, smaller sub-ticket components and sent in multiple e-mails. The master file has an *.lft* extension, and the sub components have a *.dat* extension. To be viewed properly, the recipient of these e-mails must save all of the sub-ticket components to the same directory. When sending a large support ticket by e-mail, be sure to send all of the components or else the support ticket will be unreadable.

Comparing Support Tickets

L&TT can compare two support tickets and generate a report of the differences. To compare two support tickets:

1. Generate or open the first support ticket to be compared.
2. In the support ticket viewer, select **File > Compare**. The **Open** dialog box is displayed.
3. Select the support ticket to which you want to compare and click **Open**. The comparison results are displayed in a separate window as shown in [Figure 27](#).

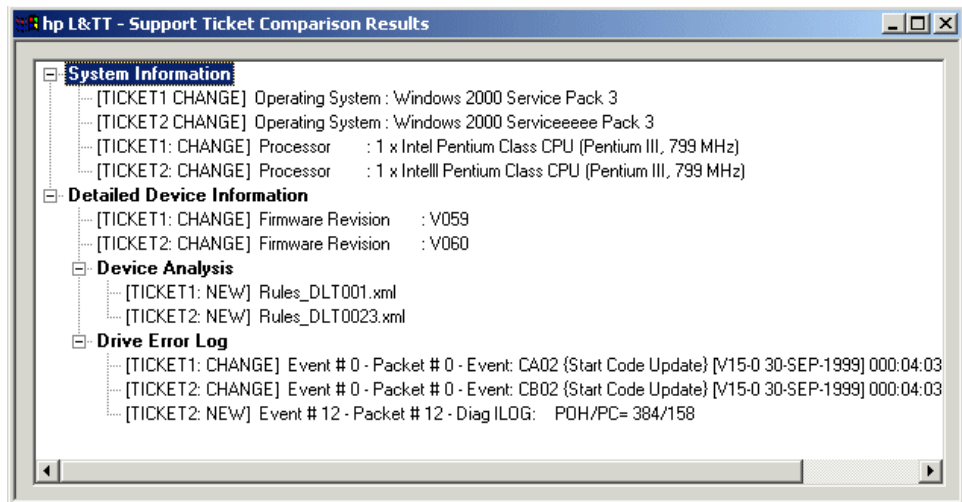


Figure 27: Support ticket comparison results

Generating and Viewing a Support Ticket

To generate and view a support ticket in the CSI environment:

1. From the **Main** screen, select the device for which to create a support ticket. The **Device Information** screen is displayed.
2. Enter the `support` command to access the **Support** screen.
3. From the **Support** screen, do one of the following:
 - Enter the `view` command to view the support ticket.
 - Enter the `save <filename>` command to save the support ticket with the specified filename. The support ticket can be viewed later using the `load` command from the **Main** screen.
 - Enter the `send` command to send the support ticket by e-mail. See [Sending a support ticket by e-mail \(CSI\)](#) for more information.

When viewing the support ticket, use **Ctrl+U** and **Ctrl +D** to scroll up and down through the results. You can also use the `find` and `page` commands to quickly locate information.

Sending a support ticket by e-mail (CSI)

To generate a support ticket and send it via e-mail:

1. From the **Main** screen, select the device for which to create a support ticket. The **Device Information** screen is displayed.
2. Enter the `support` command to access the **Support** screen.
3. From the **Support** screen, enter the `send` command to display the **Send Support Ticket** screen. The **Send Support Ticket** screen displays a list of several parameters that must be entered before the support ticket can be sent. The screen displays the current values for each parameter.
4. Enter the number of the first parameter, and then enter the parameter data at the prompt.
5. Repeat step 4 for each remaining parameter and option.
6. When all the required parameters and options have been specified, enter the `send` command to generate and send the support ticket.

Common Information Reported for All Products

Note: For standalone devices (such as DDS drives), HP recommends that you generate the support ticket when the drive still contains the media with which the drive may have failed. This allows error rate and other information relevant to that cartridge to be examined. When media is removed, many products automatically clear this information. However, for most SureStore tape libraries it is better to have the drives empty; this forces the library drive/media log to be updated.

The following information is included in the support ticket regardless of what products are being analyzed:

- **System information** provides basic host system information such as operating system, processor type, system name, physical memory size, and the current version of L&TT being used. This information also includes a snapshot of the SCSI bus configuration determined by the I/O scan, showing connected devices listed physically and logically.
- **L&TT history** provides a brief history of the L&TT functions the user has accessed such as whether ASPI was installed, how many times L&TT has been run, and which functions have been used.

Device-Specific Information Reported

The support ticket also contains device-specific information that varies by device family.

Using the Event Log

L&TT can generate a detailed event log that captures all L&TT diagnostic interaction with the product, all SCSI commands sent and received by the program, and any software interactions or issues. By default, the event log is not accessible until the factory password has been entered. The information it contains is intended for use by L&TT programmers as a tool for debugging software issues within the program itself.

If you experience a software problem with L&TT:

1. Run L&TT and select **Preferences** from the **Options** menu.
2. Check the **Add I/O history to event log** option and click **OK**.
3. Exit and restart L&TT.
4. Replicate the problem encountered.
5. Using Windows Explorer, navigate to the `logs` directory in the L&TT installation directory. Locate the *Eventlog.ltt* file.
6. Attach the *Eventlog.ltt* file to an e-mail and send it to the L&TT team for diagnosis.
7. Return to L&TT and select **Preferences** from the **Options** menu.
8. Uncheck the **Add I/O history to event log** option and click **OK**. This option should not be left enabled because it can potentially use hundreds of megabytes of disk space.

Note: In the log directory you may also see other event log entries such as *EventLog_backup1.ltt*, *EventLog_backup2.ltt*, *EventLog_backup3.ltt*, and so on. The versions of the event log are numbered in historical order.

Additional Functionality



This chapter describes additional features of the program that are not covered elsewhere in this guide.

- [Setting Software Preferences](#)
- [Using the Internet Update Functionality](#)
- [Using Passwords](#)
- [Using the Front Panel Function](#)
- [Using the Move Media Function](#)
- [Performing Manual Product Identification](#)
- [Using the Quiet Mode Feature](#)
- [Using the Installation Check Feature](#)
- [Using L&TT in Restricted Mode](#)
- [Using the Tool Status Report](#)

Setting Software Preferences

L&TT has many user-definable preferences that control various elements of the program. To access the L&TT preferences:



To set the preferences in the Windows version of L&TT:

Select **Preferences** from the **Options** menu. The preferences dialog is displayed as shown in [Figure 28](#).

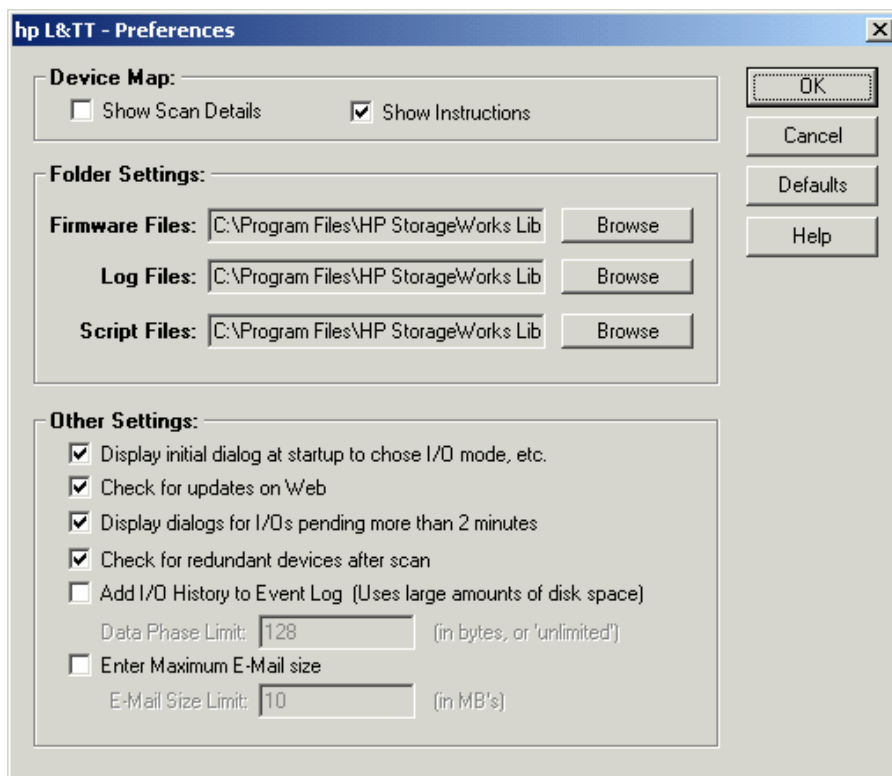


Figure 28: L&TT Preferences dialog box (default settings shown)



To set the preferences in the CSI version of L&TT:

From the **Main** screen, use the preferences command to display the **Preferences** screen.

```

Main > Preferences >
-----
List of all valid options <Main>:
Type the corresponding number to select or deselect each option

 1. Firmware file path <fwpath> - /.../firmware
 2. Log file path <logpath> - /.../logs
 3. Script file path <scriptpath> - /.../scripts
 4. [X] Add IO History to EventLog <iohistenabled>
 5. Data Phase Limit for IO History <iohistlimit> - 128
 6. [X] Check for redundant devices <redundantcheck>
 7. Enter the proxy server name, to enable the webdownload tool. <Prox...
 8. Enter the port number for the proxy. <Port> - 8088
 9. Enter maximum email size in MB <emailsize limit> - 10
10. [X] Current password entered <password> - Set

Enter Command>_-----<Enter a blank command for command list>-----

```

Figure 29: L&TT preferences dialog box (CSI version)

Available Options

The following list describes the available options. Some options are not available with CSI versions of L&TT.

- **Show Scan Details (Windows only)**—Enabling this option causes L&TT to show the SCSI bus scanning process in the **Device List** screen when the program is first started. This option is disabled by default.
- **Show Instructions (Windows only)**—Enabling this option causes L&TT to display instructions in the **Device List** screen. These instructions provide information corresponding to the function displayed in the **Main** screen. More experienced users may want to disable this option.
- **Firmware File Path**—This is the location where L&TT stores and accesses firmware files on your local system. When using the “Get Firmware From Web” feature, firmware files are automatically downloaded to this directory.
- **Log File Path**—This is the location where L&TT stores and accesses log files on your local system. The logs that are stored here are the support and event logs.

- **Script File Path**—This is the location where L&TT stores and accesses device analysis rules files. This is also the default location for SCSI scripts.

Note: For all of the previous three options, the default location of the directory is the L&TT Installation directory.

- **Display splash screen at startup (Windows only)**—Enabling this option causes the L&TT splash screen to be displayed when the program is started. From the splash screen, you can select the I/O mode and other options.
- **Check for updates on the Web (Windows only)**—When this option is enabled, L&TT uses an available Internet connection to look for product updates such as firmware upgrades, new device analysis rules, and new versions of L&TT. The software performs this check once every 24 hours. This functionality is only available if you have an Internet connection. For more information, see the “Internet Update Functionality” section later in this chapter.
- **Display dialogs for I/O pending more than 2 minutes (Windows only)**—When this option is enabled, L&TT displays a status update dialog box during long SCSI operations.
- **Add I/O history to Event Log**—Enabling this option causes L&TT to log all SCSI commands that are sent or received into a log file. This option requires a large amount of disk space and should only be used when requested by L&TT development personnel to aid in the debugging of a potential issue with L&TT. For more information, see [Using the Event Log](#).
- **Data Phase Limit for I/O History**—When the **Add I/O History to Event Log** option is enabled, this option limits the amount of data recorded to the log file for each SCSI command to the number of bytes specified. The default is 128 bytes. To specify a data phase limit, enter any positive number in this field. If you do not want to specify a limit, enter `unlimited`.
- **Current password entered**—This option lets you enter the factory password. The currently entered password is displayed to the right of the option. If no password has been entered, `Not Set` is displayed.
- **Enter Maximum E-Mail size**—This option lets you specify a maximum size (in megabytes) for support tickets. If the support ticket exceeds this size, it will be broken up into smaller subtickets.

GUI Using the Internet Update Functionality

The Windows version of L&TT can automatically notify the user of the following conditions each time the program is started:

- A new version of L&TT has been released
- A new version of firmware is available for a connected storage device
- A new version of device analysis rules is available for a connected storage device

This notification only occurs if the user has the **Check for updates on web** option enabled in the preferences dialog (this option is enabled by default).

If the **Check for updates on web** option is not enabled, select **Get Files from Web** from the **File** menu to manually check for and download updates.

Note: L&TT will only check for updates on the Web once in a 24-hour period.

Using Passwords

A number of tool features are available only when enabled with a password. The password is intended to prevent inexperienced users from accessing functionality that may be particularly harmful to their system if used improperly.

Setting Passwords



To set the password in the Windows version of L&TT:

1. Select **Enable Factory Overrides** from the **Options** menu. The **Factory Password** dialog box is displayed.
2. Enter the password and click **OK**. Assuming the password is valid, you are now able to access the password-protected functions of L&TT.



To set the password in the CSI version of L&TT:

1. From the **Main** screen, enter the preferences command. The **Preferences** screen is displayed.
2. Enter the number that corresponds to the password option. L&TT prompts you for the current password.
3. Enter the password. If the password is valid, then L&TT returns you to the **Preferences** screen. You are now able to access the password-protected functions of L&TT.

GUI Using the Front Panel Function

L&TT provides remote control of the front panel of selected library devices. L&TT reads the contents of the front panel at regular intervals and displays the contents of the L&TT window either in graphic or text form. In addition, L&TT displays a representation of the library's front panel buttons. Clicking a button simulates the user pressing the corresponding button on the library's front panel.

To access this functionality, select the library in the device list and click **Frontpanel** on the main toolbar. The **Front Panel** screen is displayed as shown in Figure 30.

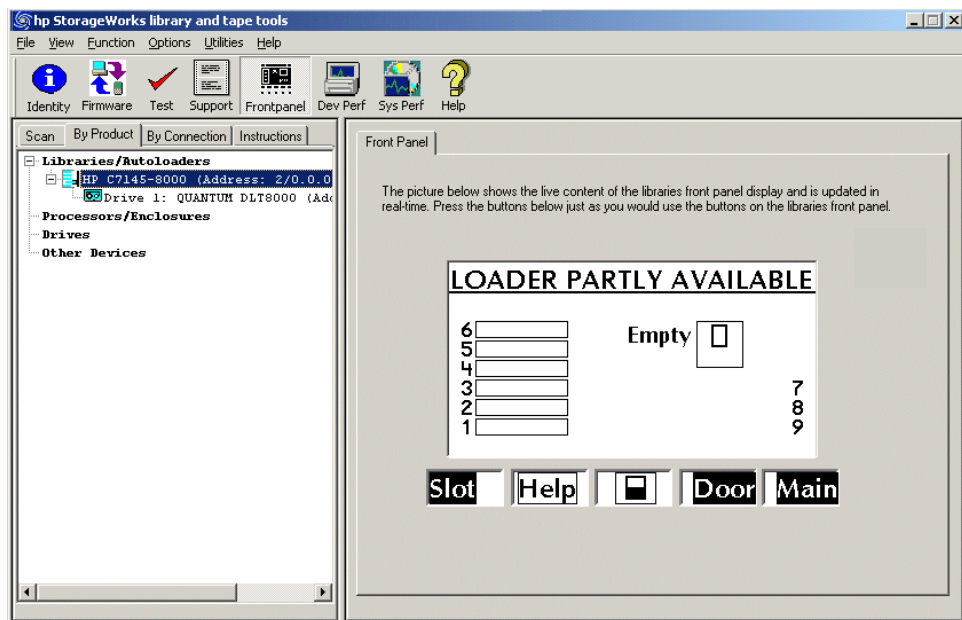


Figure 30: Front panel screen

Using the Move Media Function

Most supported libraries and autoloaders support a set of commands for moving media from one location to another within the device. Whenever possible, L&TT takes advantage of this functionality to provide a convenient way to move media within a library or autoloader. This functionality is supported in both the GUI and CSI versions of L&TT.



With the Windows version of L&TT, the Move Media functionality is incorporated into the **Front Panel** screen. To access this functionality:

1. Select a supported library or autoloader from the device list and click **Frontpanel** on the main toolbar (the **Frontpanel** button is grayed out if both the Move Media and Front Panel functions are not supported for the selected device).
2. On the **Front Panel** screen, click the **Move Media** tab (this tab is not available if the Move Media function is not supported for the selected device). The **Move Media** screen is displayed.

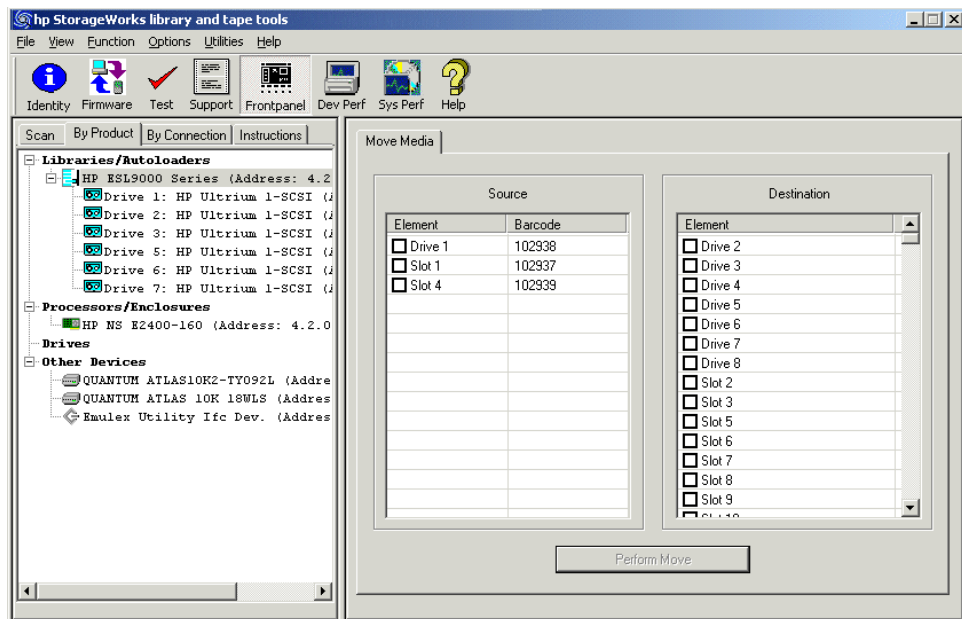


Figure 31: Move Media screen

The **Move Media** screen is divided into two sections showing all available source and destination drives, slots, and mailslots. To move media from one location to another, selected the desired source and destination locations and click **Perform Move**.

Note: Only one item can be moved at a time, so it is not possible to select multiple source or destination locations. The **Perform Move** button is grayed out until a valid source and destination have been selected.



With the CSI version of L&TT, from the **Device Information** screen for a supported library or autoloader, use the `movemedia` command to access the **Move Media** screen. This screen is identical to the Cartridge Inventory screen accessed with the `inventory` command with the exception of the screen name shown in the top line. Use the standard keyboard commands (**Ctrl+U**, **Ctrl+D**) to scroll through the list. To perform the move, use the `move` command.

```
move <source> <destination>
```

The values used for `<source>` and `<destination>` are a combination of the letter `s` for slot, `d` for drive, or `m` for mailslot, and the number of the device. For example, to move media from Slot 4 to Slot 3, enter the following command:

```
move s4 s3
```

To move media from Drive 1 to Mailslot 3, enter the following command:

```
move d1 m3
```

Possible Move Media Error Situations

The following errors may be encountered when attempting to move media through L&TT:

Note: These errors are less common with the Windows version of L&TT because the user interface reduces the number of possible error situations.

1. The source is empty.
2. The destination is full.
3. The picker is full with some other media.
4. The source and destination are the same.
5. Invalid arguments were provided (for example, the slot number is too high or no mail slots on the system).
6. Slot to slot is not supported with this device (you must move slot to drive or drive to slot).
7. The command was acceptable, but there was a SCSI error performing the move. L&TT provides the SCSI error message along with the sense data.

Performing Manual Product Identification

This feature (which requires a password) allows an arbitrary device to be mapped as a specific device family within L&TT. This feature is most commonly used when the product ID (SCSI inquiry) string does not match the string expected by L&TT. The string may have been changed or corrupted, or the product is operating in “boot code” mode.

To manually identify a device:

1. Select a product in the device list.
2. Select **Manual Product Identification** from the **Function** menu.
3. Choose the product family that best matches the selected device.

Note: For L&TT versions prior to 2.7 SR2a, manual product identification (previously called override mapping) was performed by right-clicking the device in the device list and choosing the appropriate product family.

When manual product identification is enabled, L&TT automatically operates in a restricted mode. In this mode, the firmware update options are pre-selected to enable selection of firmware for any product ID and also set the "update product ID" option. To update the product ID, select the proper firmware file and click the **Start Update** button.

Using the Quiet Mode Feature

Depending on the quiet mode argument specified, warning and error dialog boxes may not be displayed in quiet mode. Quiet mode has two possible arguments:

- **Warning**—When the warning argument is specified, L&TT does not display any warning dialogs. L&TT assumes a **Yes** response to all warning dialogs and proceeds with execution.
- **Error**—When the error argument is specified, L&TT does not display warning or error dialogs. L&TT assumes a **Yes** response to all warning and error dialogs and proceeds with execution.



Caution: Quiet mode makes using L&TT more convenient by suppressing warning, error, and confirmation dialogs. However, these same warning, error, and confirmation dialogs are intended to provide an extra level of security to prevent you from accidentally doing something that you did not intend to do. Using quiet mode sacrifices this extra level of security for convenience. HP does not recommend using quiet mode unless you are thoroughly familiar and experienced with L&TT.

To enable the quiet mode feature, launch L&TT from a command prompt using the `quietmode=[error|warning]` argument.

- To launch the Windows version of L&TT with quiet mode enabled, click **Start > Run** and enter the following into the **Run** dialog box:

```
"C:\Program Files\HP StorageWorks Library and Tape Tools\HP_LTT.exe" -o quietmode=[error|warning]
```

- For HP-UX, Tru64, and Linux, log on as root and execute the following commands:

```
cd /opt/ltt
./hp_ltt -o quietmode=[error|warning]
```

- For Novell NetWare, from the server console, execute the following command:

```
hp_ltt\hp_ltt -o quietmode=[error|warning]
```

Using the Installation Check Feature

When run in installcheck mode, L&TT can be used to check the installation of specific devices. L&TT performs several tests on each selected device to determine if the device is configured optimally. In addition, L&TT performs connectivity and configuration tests on all devices. These tests cannot be overridden. All of the tests performed during the installation check can also be run manually with L&TT.

L&TT displays the results of each test and any recommendations.

The installation check feature can be run from the Start menu, or launched from a command prompt using the `mode=installcheck` argument.

To launch L&TT in installcheck mode:

1. Do one of the following:

- Click **Start > Programs > HP StorageWorks Library and Tape Tools > HP L&TT install check**.

-or-

- Click **Start > Run** and enter the following into the **Run** dialog box:

```
"C:\Program Files\HP StorageWorks Library and Tape  
Tools\HP_LTT.exe" -o mode=installcheck
```

The **Installation Check** wizard is displayed.

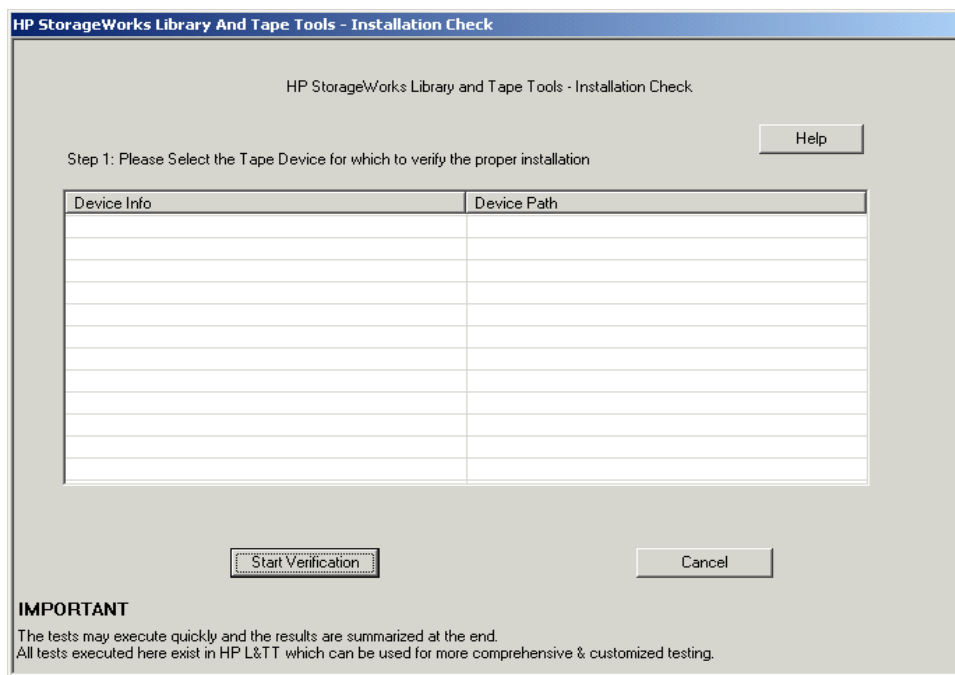


Figure 32: Installation Check wizard

2. Select the device on which to run the installation check and click **Start Verification** to display the next screen of the **Installation Check** wizard.
3. Select any optional tests that you want L&TT to perform. Some tests may not be available for your configuration.
4. Click **Continue Verification** to begin the installation check. The third screen of the **Installation Check** wizard indicates the progress of the installation check. Selected tests are executed sequentially, and the progress of each test is displayed.

The final screen of the **Installation Check** wizard displays the results of the selected tests and any recommendations.

Note: If you need to stop the installation check, click **Abort Installation Check**. The test is aborted after completing the current phase of the test.

5. Click **OK** to close the **Installation Check** wizard. Closing the wizard also closes L&TT. If you want to restart L&TT, launch it as you normally would, without the `mode=installcheck` argument.

Using L&TT in Restricted Mode

When running in restricted mode, only a few of L&TT features are available. Running in restricted mode is not a user option. Rather, L&TT automatically runs in restricted mode when it recognizes an otherwise supported device that has a problem with firmware and requires a firmware upgrade. There are two basic scenarios:

- L&TT recognizes the device, but the device is in “brain dead” mode. This usually indicates that the device firmware is corrupt and the device is responding via boot code only.
- L&TT recognizes the device by means of the product ID code, but L&TT does not recognize the “personality” codes of the device.

If one of these scenarios exist, then L&TT displays a message stating that it is running in restricted mode when it is started. The functionality of L&TT is restricted as follows:

- All features are disabled except for firmware update and support ticket.
- The support ticket shows basic information only and excludes device details.
- For firmware upgrades, L&TT enforces the “Allow all files to be selected” option, and the **Options** button is unavailable because all options are preset.

To exit restricted mode, exit and restart L&TT. L&TT will continue to start in restricted mode until the problem with the offending device is resolved, or the device is disconnected.

Using the Tool Status Report

The Tool Status Report (TSR) is a text file that contains information that can be useful in diagnosing problems with L&TT. The TSR is generated automatically whenever L&TT shuts down unexpectedly. A TSR can also be generated manually. The TSR is available from both the Windows and CSI versions of L&TT.

In the event that L&TT shuts down unexpectedly, you will be prompted with the option to send a TSR to the L&TT support team.



To manually generate a TSR from the Windows version of L&TT:

1. Select **Tool Status Report...** from the **Help** menu to display the **Tool Status Report** screen.

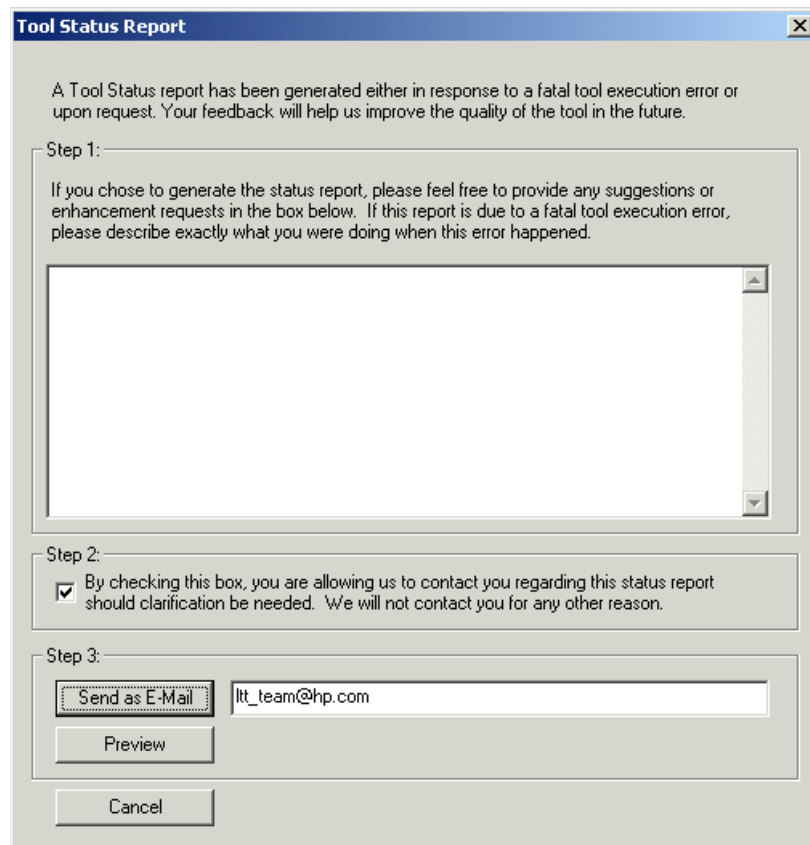


Figure 33: Tool Status Report screen (GUI)

2. Follow the steps outlined on the **Tool Status Report** screen.
3. Click one of the following buttons:
 - **Send as E-Mail**—Click this button to send the TSR in an email. Use the default address (ltt_team@hp.com) to send the TSR to the L&TT support team, or change the email address as needed. This option does not show you the TSR, so if you want to view it, click **Preview** before clicking **Send as E-Mail**.

Note: Before L&TT can email a TSR, you must either have a MAPI-compliant e-mail program (such as Microsoft Outlook or Outlook Express), or you must set up an email account through the Windows Control Panel or Internet Explorer. For more information about setting up an e-mail account, see [How do I configure e-mail to send support tickets?](#)

- **Preview**—Click this button to view the TSR in a text editor.
- **Cancel**—Click this button to close the **Tool Status Report** screen and return to the L&TT **Main** screen.



To manually generate a TSR from the CSI version of L&TT:

1. From the **Main** screen (and certain other screens), enter the `report` command to display the **Tool Status Report** screen.

```

Main > Tool Status Report
-----
A Tool Status report has been generated either in response to a fatal tool
execution error or upon request. Your feedback will help us improve the quality
of tool in the future.

1. If you chose to generate the status report, please feel free to pro...
2. [ X ] By checking this box, you are allowing us to contact you regard...
3. Enter the E-mail address. <E-mail address> - ltt_team@hp.com

Enter Command>
-----<Enter a blank command for command list>-----

```

Figure 34: Tool Status Report screen (CSI)

2. From the **Tool Status Report** screen, enter one of the following commands:
 - `preview`—displays the TSR in a text editor.
 - `send-email`—prompts you for an email address (`ltt_team@hp.com` is the default) and sends the TSR to the specified email address.
 - `up`—exits the current command level.
 - `exit`—exits L&TT.

Advanced Installation Topics

8

GUI Windows Installation Topics

Installation Types

There are currently two main Library & Tape Tools InstallShield bundles:

1. **L&TT Installer, English, End-User Type** (only catalogs for current version)—This is an end-user bundle for customers that has been optimized for size, so downloads are quick. This version can be found on the HP customer websites and allows viewing of support tickets from the same tool version only.
2. **L&TT Installer, English, Support Type** (catalogs for current and all legacy versions)—This is an internal HP support personnel bundle. This version contains the catalogs (files that contain all the strings used in the application) for the current and all previously released versions (back to 2.5). Support personnel can read support tickets generated by the current or any previous version of L&TT.

Other Changes to the System

The L&TT installation adds the following keys to the Windows registry:

```
HKEY_LOCAL_MACHINE\Software\Hewlett-Packard\HP Library  
& Tape Tools
```

```
HKEY_LOCAL_MACHINE\Software\Microsoft\Windows\CurrentV  
ersion\Uninstall
```

Reboot Criteria

A reboot is required only if your system requires ASPI or an upgrade to the currently installed version. On systems that require ASPI, if the installer detects a previously-installed version of ASPI older than v4.57, it will install a more recent version of ASPI requiring a reboot.

On Windows NT and 2000, ASPI is not installed as part of the operating system. If a reboot is unacceptable, do not select the checkbox for this option in the installation process. If you choose not to install ASPI, then you must use the Miniport driver (Miniport I/O mode) to scan for devices.

Issues may arise, however, when using the Miniport I/O mode with devices that use non-standard OS drivers, or are “claimed” by other applications or the OS. When using the Miniport I/O mode when a device is claimed, it may be necessary to shut down any running backup/storage application services to make the device accessible to L&TT. Alternatively, using the ASPI I/O mode may make the device accessible without requiring any further action.

Running L&TT from a CD-ROM

It is possible to create a version of L&TT that can run directly from a CD-ROM without the need for installation or alteration of registry settings. This feature is most useful on Windows NT and Windows 2000. On other Windows platforms, it requires WINASPI to be installed.

To create a version of L&TT that can run from a CD-ROM drive:

1. Fully install L&TT to your computer. If desired, also install any desired firmware files into the `firmware` subdirectory.
2. Remove the logs directory from the L&TT install directory.
3. Write the contents of the L&TT install directory to the root directory of the CD-ROM and close the CD-ROM.
4. Put this CD-ROM into any Windows system and run `HP_LTT.exe` from the root directory.

Files Installed on the System

During installation, L&TT files are installed in the following directories:

Table 2: L&TT installation directory locations

Operating System	Directory Location
HP-UX, Linux, and Tru64	/opt/ltt (main executable is <i>hp_ltt</i>)
Netware	SYS:System\hpltt (main executable is <i>hp_ltt.nlm</i>)
Windows	C:\Program Files\HP Library & Tape Tools (main executable is <i>hp_ltt.exe</i>)

Several sub-directories are created under the main installation directory. These sub-directories are as follows:

- **Catalogs**—This is the location where the message strings for the software are kept. The end-user version has only the catalogs for the latest version of code. With the support personnel installation, catalogs are included for previous versions (back to version 2.5), so support tickets generated by these versions can be viewed.
- **Firmware**—This is the default directory where firmware files are kept. When L&TT is first installed, this directory is usually empty (unless specific firmware images were bundled - such as the 2.7 SR2 release that includes firmware for DDS3 write recalibration). The name and location of the firmware directory can be changed from **Options > Preferences**.
- **Logs**—This is the default directory where L&TT saves event logs and support tickets. This directory is also used to store any script-generated files such as baseline files, results files, and so on.
- **Misc**—This directory is used to hold test data files and L&TT history for the specific devices on the system. These files are used by L&TT itself and not intended for direct viewing.
- **Scripts**—This directory contains all the device analysis rules, add-on tests, and SCSI script files. For more information, see Chapter 5, “Tests and Utility Functions.”

With Windows installations, in addition to the files installed in the main installation directory, some files are installed outside of the main installation directory. If ASPI installation is selected or required, the following files are added/updated (assuming that the Windows system directory is `C:\WINNT`):

- `C:\WINNT\System\winaspi.dll`
- `C:\WINNT\System32\wnaspi32.dll`
- `C:\WINNT\System32\drivers\aspi32.sys`

Other Changes to the System

The same information that the Windows version of L&TT stores in the Windows registry is stored as a text file for the Unix versions. This text file is located in the following directory:

- HPUX & Tru64:
`/.littreg`
- Linux:
`/root/.littreg`

Frequently Asked Questions



This chapter addresses several of the most common questions regarding L&TT software.



Windows Environment

How do I run L&TT from a CD-ROM?

It is possible to create a version of L&TT that can run directly from a CD-ROM without the need for installation or alteration of registry settings. This feature is most useful on Windows NT and Windows 2000. On other Windows platforms, it requires WINASPI to be installed.

To create a version of L&TT that can run from a CD-ROM drive:

1. Fully install L&TT to your computer. If desired, also install any desired firmware files into the firmware subdirectory.
2. Remove the logs directory from the L&TT install directory.
3. Write the contents of the L&TT install directory to the root directory of the CD-ROM and close the CD-ROM.
4. Put this CD-ROM into any Windows system and run *HP_LTT.exe* from the root directory.

How do I shut down the application in the taskbar?

Under certain circumstances, L&TT may not completely shut down. To completely terminate the application:

1. Press **Ctrl+Alt+Del**.
2. Select **Task Manager**.
3. Click the **Processes** tab.
4. Select the process named *HP_LTT.exe* and click **End Process**.

When installing L&TT for Windows, should I uninstall my previous version first?

You must uninstall any previous versions of L&TT before installing the most recent version. To uninstall L&TT, use the Add/Remove Programs applet in the Windows control panel. The uninstall procedure does not remove the installation folder, allowing you to preserve all of your previous L&TT files such as log files, SCSI scripts, and so forth.

Why can't I uninstall L&TT or install a new version?

Some users may have problems uninstalling L&TT or installing a new version after installing or uninstalling a previous version. This is caused by remnants of program information that remain in the Windows registry.

The L&TT team has created a utility to manually remove any remains from previous installations. To obtain this utility, download and execute *hp_ltt_install_support.exe* from the HP Support web site. The utility completely removes any remains of previous installations quickly and safely.

After running this utility, rerun the latest L&TT installation package.

How do I erase an LTO FUP tape?

For LTO, use the *fw_2_data* script.

Note: FUP tapes other than LTO do not need to be erased.

How do I configure e-mail to send support tickets?

To successfully send a support ticket via e-mail directly from L&TT, you must have a MAPI-compliant e-mail client set up for outgoing e-mail. Even if e-mail software (such as Outlook or Outlook Express) is not installed, you can configure a simple e-mail account using the Internet Connection Wizard that comes with Internet Explorer. To access the Internet Connection Wizard:

1. Launch Internet Explorer. If this is the first time to launch Internet Explorer on this machine, the Internet Connection Wizard is displayed automatically. Follow the instructions until you reach the step that asks whether an Internet e-mail account should be set up. Answer **Yes** and skip to Step 5. If this is not the first time to launch Internet Explorer on this machine, proceed with Step 2.
2. Select **Internet Options** from the **Tools** menu.
3. Select the **Connections** tab.
4. Click **Setup** at the top of the dialog to start the Internet Connection Wizard.
5. Enter a display name (this is the "From" name in the e-mail) and click **Next**.

6. Enter the return e-mail address and click **Next**. If there are no e-mail accounts on this system that will be monitored, use your regular e-mail address at which you can be contacted by the recipient of the support ticket.
7. Enter **bogus** as the address for the incoming mail server.
8. In the SMTP mail server field, enter the address of any SMTP mail server within the firewall of your organization that accepts SMTP send requests and click **Next**. If you do not know which address to use, contact your local system administrator or check the mail account settings on your regular e-mail account.
9. If your SMTP server requires a login to send e-mail (most sites only require a login for incoming mail), you must provide proper account information. Otherwise, you can enter **bogus** in both fields. Click **Next**.

Your e-mail is now configured for outgoing mail delivery.

Does L&TT use any system resources in the background?

L&TT is an application, not a service. No part of the application uses any system resources unless the application is manually launched by the user.

I am using an authenticated proxy at my site. How do I configure L&TT to connect to the HP website to download firmware updates?

L&TT uses the same connection properties as Internet Explorer. If you are unable to download from L&TT, you can manually download the latest version of the firmware from the ftp site and place it in the *firmware* directory found in the L&TT program directory.

You can access the L&TT firmware ftp site at:

ftp://ftp.hp.com/pub/information_storage/software/lit/firmware

The firmware files are named using the following convention:

`LTT_<product ID>_<firmware version>.frm`

For example:

`LTT_A5617A_0200.frm`

L&TT starts in “restricted” mode and most functionality is unavailable. What is happening?

L&TT automatically runs in restricted mode when it recognizes an otherwise supported device that has a problem with firmware and requires a firmware upgrade. There are two basic scenarios:

- L&TT recognizes the device, but the device is in “brain dead” mode. This usually indicates that the device firmware is corrupt and the device is responding via boot code only.
- L&TT recognizes the device by means of the product ID code, but L&TT does not recognize the “personality” codes of the device.

If one of these scenarios exist, then L&TT displays a message stating that it is running in restricted mode when it is started. The functionality of L&TT is restricted as follows:

- All features are disabled except for firmware update and support ticket.
- The support ticket shows basic information only and excludes device details.
- For firmware upgrades, L&TT enforces the “Allow all files to be selected” option, and the **Options** button is unavailable because all options are preset.

To exit restricted mode, exit and restart L&TT. L&TT will continue to start in restricted mode until the problem with the offending device is resolved, or the device is disconnected.

Why doesn't L&TT for Windows “see” devices that are connected to a computer running HP-UX?

L&TT does not support a client-server model such as the HP-UX Support Tools Manager. You cannot use L&TT on a Windows workstation to view devices that are connected to a computer running HP-UX.

CSI Environment

How do I set the password?

With a few exceptions, you may at any time enter the `options` command to display the **Options** dialog. The password may be set from this dialog.

Notable exceptions:

- You may not enter the **Options** dialog when you are already in the **Options** dialog.
- You may not enter the **Options** dialog when you are past the first screen in either the **Firmware** dialog or the **Test** dialog.

For instructions on setting the password, see [Setting Passwords](#).

Why does my display not show any text or only a single line of text on my HP-UX system?

Display problems can happen for two reasons:

- If `TERM`, `COLS`, and `ROWS` are set incorrectly there can be problems. Execute the following command:

```
/opt/ltt/hp_ltt -o displaytest
```

Follow the prompts to let L&TT analyze your settings.

- If the patch level of the host machine is too low, curses may not function properly (10.20 systems only). Be sure to apply patch B6378DA or higher.

Why doesn't L&TT for HP-UX "see" some of my devices?

Several things can prevent L&TT from seeing a device in HP-UX:

- If a device shows up in an I/O scan as "NO_HW," this means that the device was previously visible to the system, but currently is not. This could be because the device was unplugged from the SCSI bus or powered down.
- L&TT does not support the NIO bus type. If your system has an HSC or PCI bus, connect your device to that bus. If your system does not have an HSC or PCI bus, unfortunately, L&TT will not work for you.
- The device is connected to an unsupported HBA. Connect the device to an HBA with a supported driver. L&TT supports HBAs with the following drivers:
 - c720
 - c8xx
 - fcpdev
 - fcpmux
- If a device shows up in the I/O scan as "unclaimed," you may have to install or enable the tape driver kernel module using the SAM tool.

Why am I unable to download firmware/script files using the download option in the CSI (HP-UX, Linux)?

If your network is protected by a firewall and web proxy, you must first specify the proxy server name and port name using the **Preferences** screen.

Why doesn't L&TT for Tru64 "see" some of my devices?

Whenever you connect or remove a device, you must reconfigure the CAM and hardware manager layers. Furthermore, Tru64 does not support hot swapping of SCSI devices. To reconfigure the CAM and hardware manager layers:

1. Close L&TT.
2. Use the following command to check for stale devices:

```
/sbin/hwmgr show scsi -full | grep stale
```
3. Remove any stale devices. If you are not sure whether a device is stale or not, remove it anyway. Devices can be rediscovered later. Use the following command to remove a device:

```
/sbin/hwmgr -delete scsi -did <SCSI ID>
```
4. Rescan the SCSI bus.

```
/sbin/hwmgr scan scsi
```
5. Rescan the CAM layer.

```
/sbin/scu scan edt
```
6. Run the following commands to verify the SCSI devices:

```
/sbin/hwmgr show scsi  
/sbin/scu show edt
```
7. Restart L&TT.

Why doesn't L&TT for Linux "see" some of my devices?

To detect a surrogate SCSI device, you must configure the *modules.conf* file for the new device you have connected. After modifying this file, reboot the computer so that the new device is recognized by the *scsi/sg* layer. Linux does not support hot swapping of SCSI devices. To reconfigure the *modules.conf* file:

1. Login as root.
2. Edit the following file:

```
vi /etc/modules.conf
```
3. Add the following line as appropriate:

```
add options scsi_mod max_scsi_luns=128
```
4. Reboot the computer.

Why doesn't L&TT for Windows "see" devices that are connected to a computer running HP-UX?

L&TT does not support a client-server model such as the HP-UX Support Tools Manager. You cannot use L&TT on a Windows workstation to view devices that are connected to a computer running HP-UX.

How do I disconnect a SCSI device in Tru64?

1. Locate the SCSI device in hardware manager:

```
/sbin/hwmgr -show scsi
```
2. Use the following command to delete the SCSI device.

```
/sbin/hwmgr -del scsi -did <SCSI ID>
```
3. Disconnect the device.
4. Make sure that you have removed the corresponding SCSI cable from the HBA.

How do I connect/disconnect a SCSI device in Linux without rebooting?

- To add a new device, connect the device and run the following command:

```
echo "scsi add-single-device <hostid> <busid> <targetid>  
<lunid>" >/proc/scsi/scsi
```
- To remove a device, run the following command and disconnect the device.

```
echo "scsi remove-single-device <hostid> <busid> <targetid>  
<lunid>" >/proc/scsi/scsi
```

Why doesn't L&TT for OpenVMS "see" my media changer?

OpenVMS does not automatically recognize media changer devices. Media changer devices must be associated with the GKDRIVER (generic SCSI driver). To associate media changer devices with GKDRIVER, use the following command in OpenVMS:

```
SYSMAN IO CONNECT <devicename> /DRIVER=SYS$GKDRIVER /NOADAPTER
```

The form for <device name> is G<x><z><uuu> where:

- <x> indicates whether the media changer is connected to a SCSI or Fibre Channel HBA.
 - Use “K” for SCSI.
 - Use “G” for Fibre Channel.
- <z> is the HBA identifier (A-Z).
- <uuu> is the SCSI target ID and LUN ID combined.

For example, with a media changer having SCSI target ID 4, LUN ID 0, and connected to the second SCSI HBA, the device name is GKB400.

- “G” indicates that this device is associated with the generic SCSI driver (GKDRIVER).
- “K” indicates that the device is connected through a SCSI interface.
- “B” is the second SCSI HBA (HBAs typically have names from A to Z).
- “4” is the SCSI target ID.
- “00” is the SCSI LUN ID.

Index

A

- add I/O history to event log option [96](#), [100](#)
- additional information, finding [16](#)
- allow firmware downgrading option [52](#)
- allow selection of any firmware file option [53](#)
- ASPI
 - described [27](#)
 - support [19](#)
- attach additional event log option [92](#)
- attach result log option [92](#)
- audience [10](#)
- authorized reseller, HP [13](#)

B

- brain dead mode [112](#)
- By Connection tab [31](#)
- By Product tab [30](#)

C

- cartridge command [43](#)
- cautions
 - changing devices [30](#)
 - exclusive use of device by L&TT [51](#)
 - improper script usage [83](#)
 - interrupting firmware update [55](#)
 - swapping SCSI devices [30](#)
 - tests destructive to data [59](#)
- changing devices, caution [30](#)
- check for updates on the Web option [46](#), [100](#), [101](#)
- clear command [82](#)
- Command Help screen (CSI) [41](#)

commands

- cartridge [43](#)
- clear [82](#)
- detail [82](#)
- exit [41](#)
- find [82](#), [94](#)
- firmware [55](#)
- load [94](#)
- options [56](#)
- page [82](#), [94](#)
- picktest [82](#)
- preferences [99](#), [102](#)
- review [55](#), [82](#)
- select [41](#), [42](#)
- start [55](#), [82](#)
- support [94](#)
- test [82](#)
- view [94](#)

comma-separated value (CSV) file, exporting data to [89](#)

compatibility matrix [15](#)

connectivity test [60](#)

conventions

- document [11](#)
- text symbols [12](#)

current password entered option [100](#)

D

- DAT acceptance test [62](#)
- data compression test [61](#)
- data phase limit for I/O history option [100](#)
- DDS acceptance test [62](#)
- DDS firmware tape creator test [61](#)

- detail command [82](#)
 - device analysis test [60](#)
 - described [76](#)
 - using [76](#)
 - Device Information screen
 - CSI [42, 43](#)
 - GUI [31](#)
 - device list (GUI) [30](#)
 - Device Performance screen (CSI) [68](#)
 - device self-test [60](#)
 - display dialogs for I/O pending more than 2 minutes option [100](#)
 - display initial dialog at startup option [100](#)
 - DLT acceptance test [62](#)
 - DLT firmware tape creator test [61](#)
 - DLT SRAM check tests [61](#)
 - document
 - conventions [11](#)
 - prerequisites [10](#)
 - related documentation [11](#)
 - Drive Information tab [33](#)
 - Drive Performance screen (GUI) [66](#)
 - drive performance test [59, 66](#)
- E**
- email setup [92, 114, 122](#)
 - Email Support Ticket dialog box (GUI) [91](#)
 - emailing, support ticket [86, 91, 94](#)
 - erasing an LTO FUP tape [122](#)
 - event log
 - described [96](#)
 - using [96](#)
 - exclusive use of device by L&TT, caution [51](#)
 - exit command [41](#)
- F**
- Factory Firmware Overrides dialog box (GUI) [52](#)
 - factory password, obtaining [87](#)
 - features [14](#)
- files installed on the system [118](#)
 - find command [82, 94](#)
 - firmware
 - acquiring (CSI) [54](#)
 - advanced options (GUI) [52](#)
 - allow downgrading [52](#)
 - allow selection of any file [53](#)
 - directory [46](#)
 - downloading [46, 47, 54](#)
 - files, acquiring [46](#)
 - selecting files [48](#)
 - update activity log [51](#)
 - update product ID option [53](#)
 - uploading to devices [50](#)
 - uploading to devices (CSI) [55](#)
 - viewing revision history [49](#)
 - firmware command [55](#)
 - firmware file path option [99](#)
 - Firmware Management screen, GUI [35](#)
 - Front Panel function [103](#)
 - Front Panel screen [103](#)
 - Front Panel screen (GUI) [103](#)
 - full sweep test [61](#)
- G**
- Get Files from Web dialog box (GUI) [48](#)
 - Get Files from Web functionality [47](#)
 - CSI [54](#)
 - getting help [13](#)
- H**
- help, obtaining [13](#)
 - HP
 - authorized reseller [13](#)
 - technical support [13](#)
 - HP-UX
 - installing L&TT [21](#)
 - starting L&TT [38, 108](#)
 - Support Tools Manager [128](#)

I

I/O mode

- ASPI 19, 27, 117
- Miniport 19, 27, 31, 117

icons, GUI and CSI 17

improper script usage, caution 83

initialize element status test 61

installation

- ASPI 19
- changes to Windows registry 116
- directories created 118
- files installed 118
- HP-UX 21
- Linux 21
- NetWare 20
- OpenVMS 22
- problems installing or uninstalling 122
- reboot criteria 19, 117
- Tru64 21
- types of 116
- uninstalling L&TT 18, 121
- upgrading from previous version 18, 121
- Windows 18

Installation Check feature 109

Installation Check wizard 110

installcheck mode 109

Instructions tab 31

Internet Connection Wizard 122

Internet Explorer 122

Internet update functionality, using 101

interrupting firmware update, caution 55

L

L&TT

- display problems 125
- features 14
- main screen layout (GUI) 29
- problems seeing devices 126, 127
- running from a CD-ROM 117, 121
- safeguards, disabling 56
- splash screen 25

starting

- for HP-UX 38
 - for NetWare 38, 108
 - for Tru64 38
 - for Windows 24
 - supported operating systems 15
 - supported products 15
 - terminating 121
 - uninstall utility 122
 - use of system resources 123
- library exerciser test 61, 79
- Linux
- installing L&TT 21
 - starting L&TT 38, 108
- load command 94
- log directory 85
- log file 85
- log file path option 99
- LTO acceptance test 62
- LTO cooling check 62
- LTO firmware tape creator test 61
- LTO FUP tape, erasing 122
- LTO tape stress test 61

M

- Main screen (CSI) 40
- manual product identification feature 107
- MAPI-compliant email programs 92, 114
- media analysis test 64, 78
- media erase test 63
- media validation test 60
- Miniport 27, 31
 - driver 19, 117
 - I/O mode 19, 117
- MO media validation test 64
- Move Media function 104
- Move Media screen 104

N

- navigation, screen 41

NetWare
 installing L&TT 20
 starting L&TT 38, 108

O

OpenVMS
 installing 22
 starting L&TT 38
 options command 56
 Options screen (CSI) 56

P

page command 82, 94
 password
 entering 56
 obtaining 52, 56, 87
 setting 102, 125
 using 102
 picktest command 82
 preferences
 available options 99
 setting 98
 preferences command 99, 102
 Preferences dialog box
 CSI 99
 GUI 98
 prerequisites 10

Q

Quiet Mode feature 108

R

read/write test 59, 60, 77
 related documentation 11
 restore factory settings 62
 restricted mode 112, 124
 review command 55, 82

S

Saved/Manual Scan screen 26
 scan mode

CSI 38
 GUI 26
 Scan Mode Selection screen 38
 Scan tab 30
 screens
 Command Help (CSI) 41
 Device Information (CSI) 42, 43
 Device Information (GUI) 31, 33
 device list (GUI) 30
 Device Performance (CSI) 68
 Drive Performance (GUI) 66
 Email Support Ticket dialog box (GUI) 91
 example support ticket with normal detail (GUI) 88
 Factory Firmware Overrides dialog box (GUI) 52
 Firmware Management (GUI) 35
 Front Panel 103
 Front Panel (GUI) 103
 Get Files from Web dialog box-firmware tab (GUI) 48
 L&TT main screen (GUI) 29
 Main (CSI) 40
 Move Media 104
 navigating 41
 Options (CSI) 56
 Preferences (CSI) 99
 Preferences (GUI) 98
 Saved/Manual Scan 26
 Scan Mode Selection (CSI) 38
 Support Ticket Generation (GUI) 37
 System Performance Backup Pre-Test (CSI) 74
 System Performance Backup Pre-Test (GUI) 72
 System Performance Restore Pre-Test (CSI) 75
 System Performance Restore Pre-Test (GUI) 70
 Tabular View 89
 Tests (GUI) 36
 script file path option 100
 scripts directory 83
 SCSI scripts 58

- SDLT acceptance test [62](#)
 - SDLT Read Media IDs test [64](#)
 - SDLT Tape Edge Damage test [64](#)
 - select command [41](#), [42](#)
 - show instructions option [99](#)
 - show scan details option [99](#)
 - skip this dialog in the future [28](#)
 - splash screen [25](#)
 - start command [55](#), [82](#)
 - support command [94](#)
 - support resources [16](#)
 - support ticket
 - comparing [93](#)
 - compressing [92](#)
 - converting to HTML [85](#)
 - detail level [85](#), [87](#)
 - email setup [92](#), [114](#), [122](#)
 - emailing [86](#), [91](#), [92](#), [114](#)
 - emailing (CSI) [94](#)
 - event data, viewing [90](#)
 - event explanation, viewing [90](#)
 - example screen [88](#)
 - exporting data [89](#)
 - generating [85](#), [86](#), [94](#)
 - information reported [95](#)
 - log file [85](#)
 - other functionality [90](#)
 - reference data, viewing [90](#)
 - saving [86](#)
 - tabular view, using [88](#)
 - viewer [85](#)
 - viewing [86](#), [87](#), [94](#)
 - Support Ticket Generation screen (GUI) [37](#)
 - swapping SCSI devices, caution [30](#)
 - symbols in text [12](#)
 - system performance backup pre-test [72](#)
 - System Performance Backup Pre-Test screen (CSI) [74](#)
 - System Performance Backup Pre-Test screen (GUI) [72](#)
 - system performance restore pre-test [70](#)
 - System Performance Restore Pre-Test screen (CSI) [75](#)
 - System Performance Restore Pre-Test screen (GUI) [70](#)
 - system performance test [59](#), [70](#)
- ## T
- tabs
 - By Connection [31](#)
 - By Product [30](#)
 - Drive Information [33](#)
 - Instructions [31](#)
 - Scan [30](#)
 - Tabular View window [89](#)
 - taskbar [29](#)
 - technical support, HP [13](#)
 - test command [82](#)
 - tests
 - built-in [60](#)
 - descriptions [59](#)
 - destructive to media, caution [59](#)
 - device analysis [76](#)
 - overview [58](#)
 - running (CSI) [82](#)
 - running (GUI) [81](#)
 - script-based [61](#)
 - viewing (CSI) [82](#)
 - viewing (GUI) [81](#)
 - Tests screen
 - GUI [36](#)
 - text symbols [12](#)
 - Tool Status Report
 - CSI [114](#)
 - GUI [113](#)
 - Tru64
 - installing L&TT [21](#)
 - starting L&TT [38](#), [108](#)
- ## U
- uninstall utility [122](#)
 - update product ID option [53](#)

upgrading from previous version [18](#), [121](#)
utility functions [58](#)
 described [83](#)
 using [83](#)

V

view command [94](#)
VS80 / VS160 acceptance test [62](#)

W

websites
 HP support [46](#), [54](#)
 L&TT tapetools [16](#)
Windows
 ASPI support [19](#)
 installing L&TT [18](#)
 Internet Explorer [122](#)
 reboot criteria [19](#), [117](#)
 starting L&TT [24](#)

Figures

1	L&TT splash screen	25
2	Saved/Manual Scan screen	26
3	L&TT main screen	29
4	Device Information screen showing a standalone device	32
5	Device Information screen showing a library	33
6	Firmware Management screen	35
7	Tests screen	36
8	Support Ticket Generation screen	37
9	Scan Mode Selection screen	38
10	Saved/Manual Scan screen (CSI)	39
11	CSI Main screen	40
12	Command Help screen accessed from the Main screen	41
13	Device Information screen for a standalone device	42
14	Device Information screen showing a library	43
15	Get Files from Web dialog box—Firmware tab	48
16	Firmware Update screen	50
17	Factory Firmware Overrides dialog box	52
18	Drive Performance screen	66
19	Device Performance Tool screen	68
20	Restore Pre-Test tab of the System Performance screen	70
21	Backup Pre-Test tab of the System Performance screen	72
22	Backup Pre-Test screen (CSI)	74
23	Restore Pre-Test screen (CSI)	75
24	Example support ticket with normal detail (Windows version)	88
25	Tabular View window	89
26	E-mail Support Ticket dialog box	91
27	Support ticket comparison results	93
28	L&TT Preferences dialog box (default settings shown)	98
29	L&TT preferences dialog box (CSI version)	99
30	Front panel screen	103
31	Move Media screen	104
32	Installation Check wizard	110
33	Tool Status Report screen (GUI)	113
34	Tool Status Report screen (CSI)	114

Tables

1	Document Conventions	11
2	L&TT installation directory locations	118



i n v e n t