

# *Compaq StorageWorks*

## **Dual Channel PCI to Ultra HVD Host Bus Adapter for Tape Libraries**

User Guide

Second Edition (September 2000)  
Part Number AA-RKGAB-TE / 168638-002  
**Compaq Computer Corporation**

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# Contents

## **About This Guide**

Document Structure.....	vii
Related Documents.....	ix
Text Conventions .....	ix
Symbols in Text .....	ix
Symbols on Equipment.....	x
Rack Stability.....	xi
Getting Help.....	xi
Compaq Technical Support.....	xii
Compaq Website .....	xii
Compaq Authorized Reseller .....	xiii

## *Chapter 1*

### **Tape Library Adapter Overview**

Tape Library Adapter Description.....	1-1
Kit Contents .....	1-2
Features.....	1-4
SCSI Connectors .....	1-4
SCSI Channels.....	1-6
LED Connectors .....	1-6
SCSI IDs .....	1-6
Multiple Adapter Installation .....	1-8
SCSI Termination.....	1-8
SCSI Cable Connectors .....	1-9

## *Chapter 2*

### **Upgrading the Firmware and Software**

Upgrading the System ROM .....	2-1
ROMPaq Diskettes .....	2-2
Running System ROMPaq .....	2-3
Installing the Drivers .....	2-4

## *Chapter 3*

### **Installing the Tape Library Adapter**

Getting Started .....	3-1
User-supplied Hardware and Software Requirements .....	3-2
Back up your ProLiant Server or Workstation .....	3-2
Preparing your ProLiant Server or Workstation .....	3-2
Opening your ProLiant Server or Workstation .....	3-3
Installing the Tape Library Adapter .....	3-3
Cabling the Tape Library Adapter .....	3-4
External SCSI Connections .....	3-4
Completing the Installation .....	3-6

## *Chapter 4*

### **Troubleshooting**

System Power-On Problems .....	4-2
SCSI Device Problems .....	4-3

## *Appendix A*

### **Regulatory Compliance Notices**

Federal Communications Commission Notice .....	A-1
Class A Equipment .....	A-2
Class B Equipment .....	A-2
Declaration of Conformity for Products Marked with FCC Logo, United States Only .....	A-3
Modifications .....	A-3
Cables .....	A-3
Canadian Notice (Avis Canadien) .....	A-3
Class A Equipment .....	A-3
Class B Equipment .....	A-4
European Union Notice .....	A-4

## *Appendix B*

### **Electrostatic Discharge**

Grounding Methods .....	B-2
-------------------------	-----

## *Appendix C*

### **Tape Library Adapter Specifications**

Physical Characteristics .....	C-1
Electrical Characteristics.....	C-2
Thermal and Atmospheric Characteristics .....	C-2

## *Index*

### *List of Figures*

Figure 1-1. Package contents .....	1-3
Figure 1-2. SCSI connector locations .....	1-5
Figure 1-3. SCSI activity LED connector locations.....	1-7
Figure 1-4. Identifying SCSI cable connectors.....	1-9
Figure 3-1. External SCSI cabling for a ProLiant server or workstation.....	3-5

### *List of Tables*

Table 1-1 StorageWorks Tape Library Adapter Package Contents .....	1-3
Table 1-2 SCSI Connectors.....	1-5
Table 1-3 SCSI Activity LED Connectors .....	1-7
Table 1-4 SCSI Connectors.....	1-9
Table 3-1 SCSI Cabling .....	3-5
Table 4-1 Power-On Problems Troubleshooting .....	4-2
Table 4-2 SCSI Device Troubleshooting .....	4-3



# About This Guide

This guide is designed to be used for general information and to provide step-by-step instructions for the installation and troubleshooting for your Compaq *StorageWorks™ Dual Channel PCI to Ultra HVD Adapter for Tape Libraries* (tape library adapter).

## Document Structure

### **Chapter 1: Tape Library Adapter Overview**

- Tape Library Adapter description
- Tape Library Adapter Kit contents
- Features
- SCSI Connectors
- SCSI Channel Assignments
- LED Connectors
- SCSI Ids
- Multiple Adapter Installation
- SCSI Termination
- SCSI Cable Connectors

## **Chapter 2: Upgrading the Firmware and Software**

- Upgrading the System ROM
- RomPaq Diskettes
- Running System ROMpaq
- Installing the Drivers

## **Chapter 3: Installing the Tape Library Adapter**

- Getting started
- Preparing your Proliant Server or Workstation
- Opening your Proliant Server or Workstation
- Installing the Tape Library Adapter
- Cabling the Tape Library Adapter
- Completing the Installation

## **Chapter 4: Troubleshooting**

- System Power-on Problems
- SCSI Device Problems

## **Appendix A: Regulatory Compliance Notices**

- Federal Communications Commission Notice
- Canadian Notice
- European Union Notice

## **Appendix B: Electrostatic Discharge**

- Introduction
- Grounding Methods

## **Appendix C: Tape Library Adapter Specifications**

- Physical Characteristics
- Electrical Characteristics
- Thermal and Atmospheric Characteristics

## Related Documents

Consult the manuals that came with your Proliant Server and Tape Library.

## Text Conventions

This document uses the following conventions to distinguish elements of text:

<b>Keys</b>	Keys appear in boldface. A plus sign (+) between two keys indicates that they should be pressed simultaneously.
USER INPUT	User input appears in a different typeface and in uppercase.
<i>FILENAMES</i>	File names appear in uppercase italics.
Menu Options, Command Names, Dialog Box Names	These elements appear in initial capital letters.
COMMANDS, DIRECTORY NAMES, and DRIVE NAMES	These elements appear in uppercase unless case sensitive.
Type	When you are instructed to <i>type</i> information, type the information <b>without</b> pressing the <b>Enter</b> key.
Enter	When you are instructed to <i>enter</i> information, type the information and then press the <b>Enter</b> key.

## Symbols in Text

These 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 loss of life.

---



**CAUTION:** Text set off in this manner indicates that failure to follow directions could result in damage to equipment or loss of information.

---

---

**IMPORTANT:** Text set off in this manner presents clarifying information or specific instructions.

---

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

## Symbols on Equipment

These icons may be located on equipment in areas where hazardous conditions may exist.



Any surface or area of the equipment marked with these symbols indicates the presence of electrical shock hazards. Enclosed area contains no operator serviceable parts.

**WARNING:** To reduce the risk of injury from electrical shock hazards, do not open this enclosure.

---



Any RJ-45 receptacle marked with these symbols indicates a Network Interface Connection.

**WARNING:** To reduce the risk of electrical shock, fire, or damage to the equipment, do not plug telephone or telecommunications connectors into this receptacle.

---



Any surface or area of the equipment marked with these symbols indicates the presence of a hot surface or hot component. If this surface is contacted, the potential for injury exists.

**WARNING:** To reduce the risk of injury from a hot component, allow the surface to cool before touching.

---



Power Supplies or Systems marked with these symbols indicate the equipment is supplied by multiple sources of power.

**WARNING:** To reduce the risk of injury from electrical shock, remove all power cords to completely disconnect power from the system.

---

## Rack Stability



**WARNING:** To reduce the risk of personal injury or damage to the equipment, be sure that:

- The leveling jacks are extended to the floor.
  - The full weight of the rack rests on the leveling jacks.
  - The stabilizing feet are attached to the rack if it is a single rack installation.
  - The racks are coupled together in multiple rack installations.
  - A rack may become unstable if more than one component is extended for any reason. Extend only one component at a time.
- 

## Getting Help

If you have a problem and have exhausted the information in this guide, you can get further information and other help in the following locations.

## **Compaq Technical Support**

You are entitled to free hardware technical telephone support for your product for as long you own the product. A technical support specialist will help you diagnose the problem or guide you to the next step in the warranty process.

In North America, call the Compaq Technical Phone Support Center at 1-800-OK-COMPAQ. This service is available 24 hours a day, 7 days a week. For continuous quality improvement, calls may be recorded or monitored.

Outside North America, call the nearest Compaq Technical Support Phone Center. Telephone numbers for world wide Technical Support Centers are listed on the Compaq website. Access the Compaq website by logging on to the Internet at:

<http://www.compaq.com>

Be sure to have the following information available before you call Compaq:

- Technical support registration number (if applicable)
- Product serial numbers
- Product model names and numbers
- Applicable error messages
- Add-on boards or hardware
- Third-party hardware or software
- Operating system type and revision level

## **Compaq Website**

The Compaq website has information on this product as well as the latest drivers and Flash ROM images. You can access the Compaq website by logging on to the Internet at:

<http://www.compaq.com>

## **Compaq Authorized Reseller**

For the name of your nearest Compaq authorized reseller:

- In the United States, call 1-800-345-1518.
- In Canada, call 1-800-263-5868.
- Elsewhere, see the Compaq website for locations and telephone numbers.



## Tape Library Adapter Overview

### Tape Library Adapter Description

The Compaq StorageWorks™ Dual Channel PCI to Ultra HVD Adapter for Tape Libraries (tape library adapter):

- Supports the Compaq StorageWorks Proliant server or workstation platform tape library options
- Has two independent differential Ultra SCSI channels
- Supports up to two tape drives per channel, for a maximum of four tape drives per adapter
- Works with the following Novell and Microsoft operating systems
  - Novell NetWare 4.11 and 5.0
  - Microsoft Windows NT 4.0
  - Microsoft Windows 2000

**NOTE:** The tape library adapter does not support Microsoft Windows 95 or Windows 98.

## **Kit Contents**

The tape library adapter kit contains the following items  
(see Figure 1-1 and Table 1-1):

- Dual-Channel PCI-to-Ultra SCSI, Differential, Host Bus Adapter
- License agreement
- This user guide
- Release notes
- Warranty card
- Read Me First document
- Compaq Smart Start and Support Software CD that supports the following Operating Systems:
  - Novell NetWare 4.11 and 5.0
  - Microsoft Windows NT 4.0
  - Microsoft Windows 2000

---

**IMPORTANT:** Contact your authorized service representative if any item is missing.

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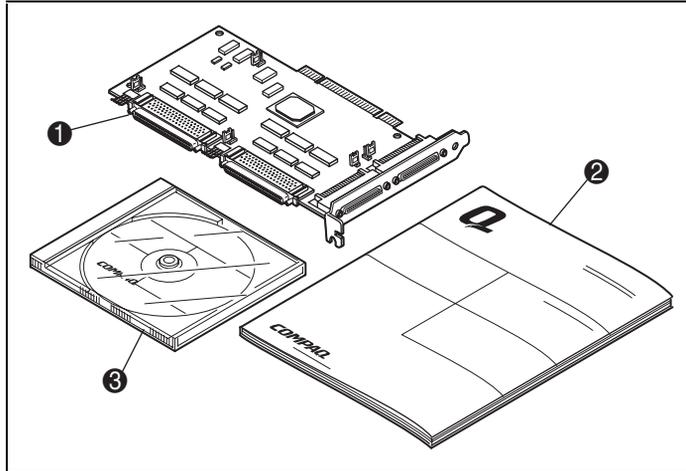


Figure 1-1. Package contents

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**Table 1-1**  
**StorageWorks Tape Library Adapter Package Contents**

Figure Legend	Description
❶	Tape library adapter
❷	Documentation
❸	Compaq Smart Start and Support Software CD

## Features

- Hardware Features
  - Two Very High-Density Cable Interconnect (VHDCI) external connectors support Wide-Ultra SCSI-3
  - Symbios™ SYM53C876 processor
  - PCI 2.1 compliant
  - Onboard NVRAM
- Operational Features
  - Automatic active termination
  - Self resetting term power
  - Multiple Logical Unit Numbers (LUNs) for robotic control commands
  - Supports Wide-UltraSCSI 40 MB/s synchronous transfer rate
- Supported Software
  - Compaq Insight Manager
  - Compaq Smart Start and Support Software

## SCSI Connectors

The tape library adapter has four connectors (see Figure 1-2 and Table 1-2). Only the external connectors are used for the tape library adapter. Do not use the internal connectors.

The two external connectors are standard VHDCI connectors. They are mounted on the slot panel and accessible through the back of your ProLiant server or workstation.

Screwlocks are available for securing external SCSI cables to the VHDCI connectors.

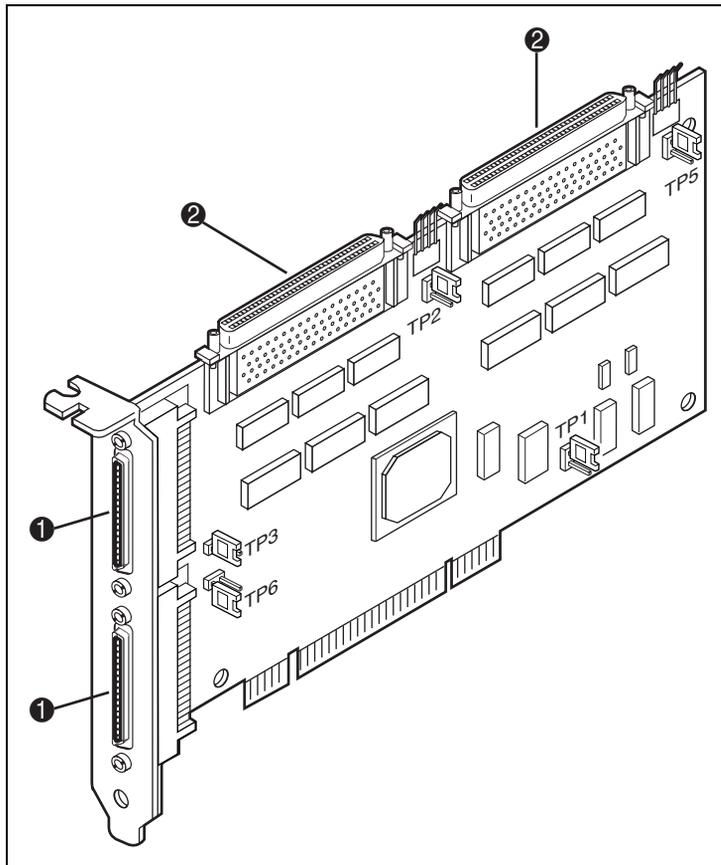


Figure 1-2. SCSI connector locations

**Table 1-2**  
**SCSI Connectors**

Figure Legend	Description
①	Two external 68-pin VHDCI Ultra SCSI connectors (J3 is the top connector; J6 is the bottom)
②	Two internal 68-pin HD SCSI connectors (not supported)

## SCSI Channels

SCSI channel A and SCSI channel B of the tape library adapter each support one external VHDCI connector.

---

**IMPORTANT:** Do not use the internal connectors. Only the external VHDCI connectors are supported.

---

## LED Connectors

The tape library adapter has one SCSI activity LED connector (J4) for SCSI channel A and one SCSI activity LED connector (J7) for SCSI channel B (see Figure 1-3 and Table 1-3).

## SCSI IDs

The tape library adapter contains two SCSI buses (SCSI channel A and SCSI channel B) that support up to 15 SCSI IDs each. Each SCSI bus has both an internal and an external connector. Only the external connector is supported. The peripherals on each bus must have a unique SCSI ID ranging from 6 to 0 and from 15 to 8, with 6 being the highest priority and 8 being the lowest priority.

SCSI IDs on all peripherals must be either set manually with switches or jumpers on the device itself, or set automatically on Compaq products that support hot-pluggable drives.

The SCSI IDs determine the priority of the peripheral device when it attempts to access the SCSI bus. Your ProLiant server or workstation assigns the SCSI adapter to the highest priority by setting the ID of the adapter to 7.

**NOTE:** The adapter supports only two tape devices per channel, or a maximum of four tape devices and one library robot per adapter. No other types of devices are supported.

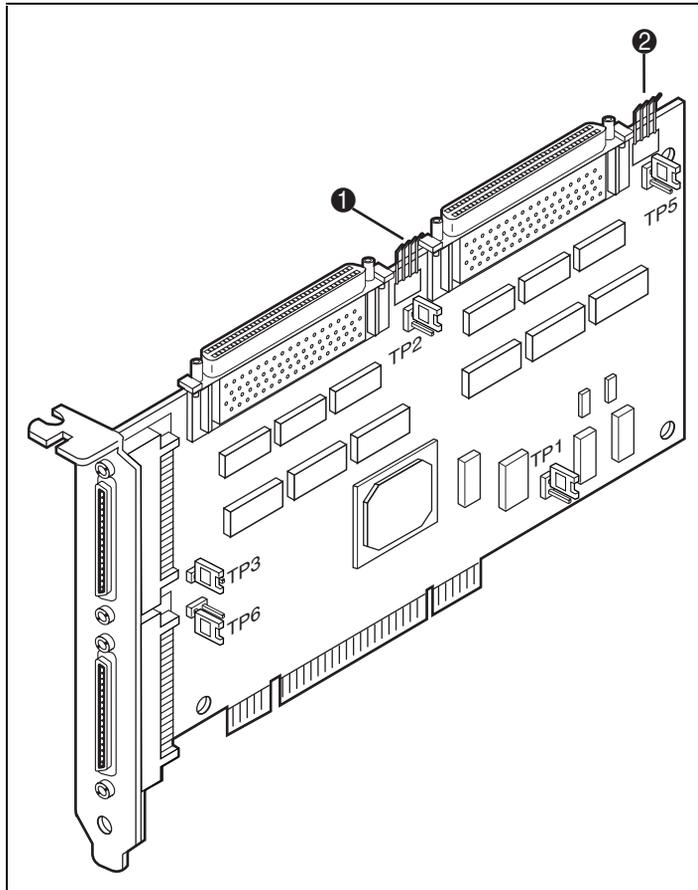


Figure 1-3. SCSI activity LED connector locations

**Table 1-3**  
**SCSI Activity LED Connectors**

Figure Legend	Description
①	SCSI activity LED connector (SCSI channel A)
②	SCSI activity LED connector (SCSI channel B)

## Multiple Adapter Installation

The following considerations apply when you install more than one tape library adapter:

- Each tape library adapter supports a single library robot, and has two independent SCSI channels. Each channel supports two tape drives, for a total of four drives and one robot per adapter.
- Each SCSI channel has its own set of unique SCSI IDs (from 0 to 6 and 8 to 15). Each tape drive on a bus must be assigned its own unique ID.

## SCSI Termination

Both SCSI buses require termination at both ends of the bus to prevent signal degradation. The tape library adapter supplies the termination power at the adapter end of the SCSI buses.



**CAUTION:** To prevent error messages an integrated SCSI controller on the system board of a ProLiant server or workstation must be terminated at all times. The tape library adapter should never be used to replace the integrated SCSI controller.

---

External SCSI buses must also be terminated. This termination is supplied in Compaq external storage systems. Individual SCSI devices in Compaq storage systems should not contain bus termination.

## SCSI Cable Connectors

Figure 1-4 and Table 1-4 shows the various SCSI cables required for installing a tape library adapter.

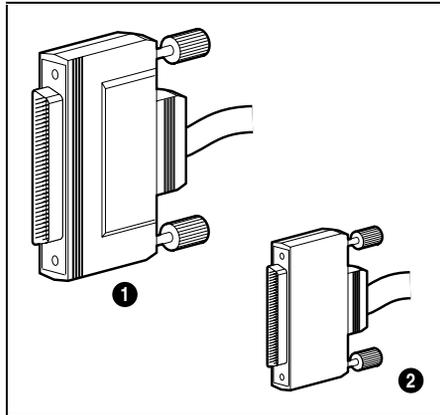


Figure 1-4. Identifying SCSI cable connectors

**Table 1-4**  
**SCSI Connectors**

Figure Legend	Description
①	External SCSI connector (HD)
②	External SCSI connector (VHDCI)

Keep these characteristics of SCSI cables in mind:

- External VHDCI cables are round and have thumbscrews on the connectors. These connector heads are smaller than the 68-pin internal wide SCSI connector heads.
- Internal 68-pin wide SCSI (Wide-Ultra SCSI-3 and Fast-Wide SCSI-2) are narrower than 50-pin SCSI (Fast-SCSI-2) cables.
- Compaq SCSI cables are keyed so they cannot be installed incorrectly.



## *Chapter* **2**

# **Upgrading the Firmware and Software**

**NOTE:** If you are setting up a new system make sure to install the operating system before installing the adapter in the system and driver.

Before installing the Compaq StorageWorks™ Dual Channel PCI to Ultra HVD Adapter for Tape Libraries (tape library adapter) in a Proliant server, verify that your running the most current version of your system ROM. If you are not, upgrade the system ROM. Also, the driver must be upgraded before physically installing the adapter in the Proliant server.

## **Upgrading the System ROM**

The system ROM can be upgraded by flashing it using a special Compaq utility called System ROMPaq. This utility replaces the existing memory contents of the ROM with another version stored in a disk file.

Use the information described in the following sections to access and run System ROMPaq.

## **ROMPaq Diskettes**

The ROMPaq utilities must be run from a diskette. The latest version of the ROMPaq diskette can be created from the Compaq SmartStart and Support Software CD that was supplied with your tape library adapter. Use the latest version of ROMPaq because it effectively supports your new tape library adapter.

### **Materials Needed**

You will need the following items to create a System ROMPaq utility diskette:

- Compaq SmartStart and Support Software CD (supplied in the Compaq tape library adapter option kit)
- One formatted blank diskette
- Access to a ProLiant server or workstation with a bootable CD-ROM drive

### **Creating the ROMPaq Diskette**

To create the ROMPaq diskette:

1. Boot your computer from the Compaq SmartStart and Support Software CD.
2. From the Compaq System Utilities screen, select Create Support Software.
3. At the Diskette Builder screen, select the appropriate option for your ProLiant server or workstation model.
4. Follow the instructions on the screen to create the ROMPaq diskette.

## Running System ROMPaq

The tape library adapter has enhanced capabilities and many existing ProLiant servers or workstations might not be able to take advantage of these capabilities without updated firmware.

Because it is difficult to determine when the firmware must be updated, run the latest System ROMPaq on your ProLiant server or workstation when installing a new tape library adapter.

To run the System ROMPaq:

1. Create the System ROMPaq disk, as described in the “Creating the ROMPaq Diskette” section.
2. Place the System ROMPaq diskette in your ProLiant server or workstation diskette drive.
3. Boot the ProLiant server or workstation by turning on the power.
4. At the Welcome screen, press the **Enter** key.
5. At the Select A Device screen, select your specific ProLiant server or workstation from the list of programmable devices. (This might be the only item in the list). Press the **Enter** key to confirm your selection.

At the Select An Image screen, you will see:

Device to reprogram:	your server
Current ROM revision:	date of existing ROM version
Select Firmware Images:	date of latest ROM version

6. Press the **Enter** key to continue.

Review the information on the Caution screen:

Device to reprogram:	your server
Current ROM revision:	date of existing ROM version
Selected ROM revision:	date of latest ROM version

7. Press the **Enter** key to reprogram the system ROM, or press the **Esc** key to discontinue reprogramming and return to the Select An Image screen.



**CAUTION:** Do not interrupt this cycle. Interrupting the ROM reprogramming will leave the firmware in an unknown state. You might not be able to boot your ProLiant server or workstation if this happens. You will be notified when ROM reprogramming completes.

---

8. When ROMPaq completes reprogramming the system ROM, press the **Enter** key; then press the **Esc** key to exit the System ROMPaq utility.
9. Remove the System ROMPaq diskette and restart your ProLiant server or workstation by cycling the power (cold boot).

## Installing the Drivers

**NOTE:** If you are running a version of Smart Start less than V4.5 on Microsoft Windows NT or less than 4.80 on Windows 2000 systems, the driver must be installed before you install tape library adapter in your ProLiant server or workstation.

You must install the software drivers in your ProLiant server or workstation to enable communication between the processor and the new tape library adapter. The drivers and installation procedures are unique to the operating system being used. Use the information in this section to find the location of the drivers, and necessary installation information for your operating system.

All the drivers and support documentation is on the Compaq SmartStart and Support Software CD (version 4.5 or later) supplied with your tape library adapter.

To access the drivers:

1. Boot your ProLiant server or workstation from the SmartStart and Support Software CD.
2. From the Compaq System Utilities screen, select Create Support Software.
3. From the Diskette Builder screen, create the diskettes using the information given in the following sections. These diskettes will contain the drivers and the necessary documentation to install the drivers on your ProLiant server or workstation.

## Novell NetWare

Use the following procedures to install the drivers for these Novell NetWare operating systems:

- NetWare 5.0
- NetWare 4.11

Select Compaq Support Software for Novell Products and create diskettes for version 4.11 or later. See the *STORAGE.RDM* file for installation information. The driver file name is *CPQSCSI.HAM*.

## Microsoft Windows NT 4.0 or Windows 2000

Select Compaq Support Software for Microsoft Windows NT 4.0 or Windows 2000 and create a diskette. See the *NTREADME.HLP* file (a Windows help file) for installation information. The driver file name is *CPQ32FS2.SYS*.

## Completing the Driver Installation

After installing the driver, shut down the operating system, power down your ProLiant server or workstation, and then go to Chapter 3, “Installing the tape library adapter.”

**NOTE:** For Windows NT 4.0 or higher, use Smart Start 4.50 or higher. For Windows 2000, use Smart Start 4.80 or higher.



# Chapter 3

## Installing the Tape Library Adapter

This chapter describes how to install a Compaq StorageWorks™ Dual Channel PCI to Ultra HVD Adapter for Tape Libraries (tape library adapter) into your Compaq ProLiant server or workstation.



**WARNING:** To reduce the risk of personal injury or damage to the equipment, see the documentation supplied with your ProLiant server or workstation, and observe the appropriate safety precautions and option installation instructions.

---

### Getting Started

Before starting the tape library adapter installation:

- Verify that you have the contents of the tape library adapter kit (see Chapter 1 “Kit Contents”).
- Verify that you have the necessary user-supplied hardware and software (see “User-supplier Hardware and software requirements” located in this chapter).
- Back up your ProLiant server or workstation data files.

**NOTE:** Before installing the adapter make sure to install the operating system.

## User-supplied Hardware and Software Requirements

The tape library adapter requires the following user-supplied hardware and software:

- A ProLiant server or workstation with a PCI local bus, a 3½-inch (1.44 MB) diskette drive (for Windows NT), an available PCI slot, hard drive space to load software drivers, and the associated system hardware manual.

**NOTE:** Novell NetWare 4.11-5.0 or Windows NT 4.0/Windows 2000 are the only supported operating systems.

- SCSI cables necessary to connect SCSI tape drives to the tape library adapter.

## Back up your ProLiant Server or Workstation

Following normal procedures, back up your ProLiant server or workstation data files before installing the tape library adapter.

## Preparing your ProLiant Server or Workstation

Use the following general guidelines to prepare your ProLiant server or workstation for installing the tape library adapter.

To prepare your ProLiant server or workstation:

1. Perform a normal system shutdown.
2. Turn your ProLiant server or workstation off.
3. Turn off all peripheral devices attached to your ProLiant server or workstation.
4. Unplug the AC power cord from the outlet, and then unplug it from your ProLiant server or workstation.
5. Disconnect all peripheral devices attached to your ProLiant server or workstation.

## Opening your ProLiant Server or Workstation

Before installing the tape library adapter, you must open your ProLiant server or workstation chassis to gain access to the PCI bus expansion slots. For instructions on opening your ProLiant server or workstation, see the documentation that came with it.



**WARNING:** To reduce the risk of personal injury from hot surfaces, allow the internal ProLiant server or workstation components to cool before touching them.

---

## Installing the Tape Library Adapter

Use the following general guidelines to install the tape library adapter in your ProLiant server or workstation.



**CAUTION:** Electrostatic discharge (ESD) can damage electronic components. Be sure you are properly grounded before beginning this procedure. See Appendix B for related ESD information.

---

1. Locate an available PCI bus expansion slot. See the documentation that came with your ProLiant server or workstation for the location.
2. Depending on your ProLiant server or workstation model, remove the retaining screw or open the expansion slot latches that secure the PCI slots.
3. Remove the slot cover from the PCI slot. (Save this protective cover for future use.)
4. Install the tape library adapter into the PCI slot and press it firmly into place. The contacts on the adapter edge should be fully seated in the system board connector.
5. Depending on your ProLiant server or workstation model, secure the adapter by replacing the retaining screw or by closing the slot latch.

## **Cabling the Tape Library Adapter**

Each channel of the tape library adapter can be connected to up to 2 tape libraries. The following section provides the cabling information.

### **External SCSI Connections**

To connect the tape library adapter to SCSI tape library drives, you will need an external SCSI cable for each channel to which you are connecting (see Figure 3-1 and Table 3-1):

- To connect to a Wide Ultra2 differential SCSI tape drive use a VHDCI-VHDCI cable
- To connect to a Fast-SCSI-2 differential tape drive, use an external VHDCI-to-narrow SCSI cable.
- To connect to a Fast-Wide SCSI-2, or Wide-Ultra SCSI-3 tape drive, use an external VHDCI-to-wide SCSI cable.

To connect the cable:

1. Connect the appropriate end of the cable to the tape library, according to the instructions that came with the tape library. Make sure to secure the thumbscrews.
2. Attach the VHDCI end of the cable to the tape library adapter.
3. Secure the thumbscrews.

After your cabling is complete, go to “Completing the Installation,” later in this chapter.

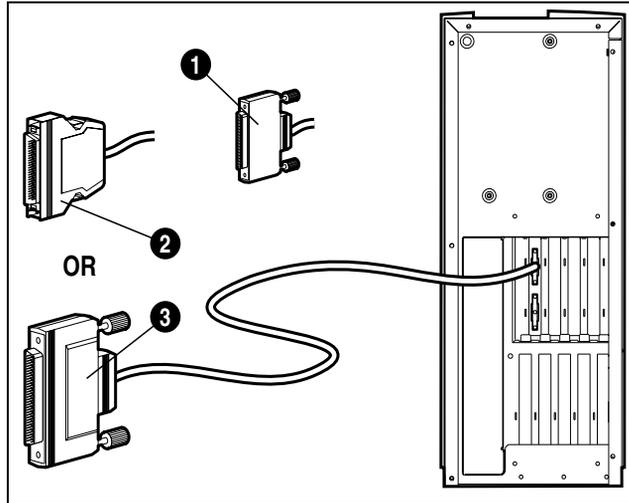


Figure 3-1. External SCSI cabling for a ProLiant server or workstation

**Table 3-1**  
**SCSI Cabling**

Figure Legend	Description
❶	VHDCI-to-VHDCI cable (68 pin)
❷	VHDCI-to-narrow SCSI cable (50 pin)
❸	VHDCI-to-wide SCSI cable (68 pin)

## Completing the Installation

After the cabling and connections are complete, reassemble your ProLiant server or workstation using the following guidelines:

1. Make sure all cables are routed correctly and are not restricting or being pinched by other components. See your ProLiant server or workstation documentation for proper routing of the cables.
2. Reconnect any peripheral devices to your ProLiant server or workstation.
3. Plug the AC power cord into the server, then into a grounded AC outlet.



**CAUTION:** To reduce the risk of electric shock or damage to the equipment, do not disable the power cord grounding plug. The grounding plug is an important safety feature. Plug the power cord into a grounded (earthed) electrical outlet that is easily accessible at all times. Disconnect power from your ProLiant server or workstation by unplugging the power cord from either the electrical outlet or the server.

---

4. Turn on any peripheral devices attached to your ProLiant server or workstation.
5. Turn your ProLiant server or workstation on.

# Chapter 4

## Troubleshooting

This chapter provides some common solutions to problems that can occur when you are installing a Compaq StorageWorks™ Dual Channel PCI to Ultra HVD Adapter for Tape Libraries (tape library adapter). If you experience difficulty in installing or verifying the tape library adapter, use the information in this chapter to isolate and diagnose the problem.

The troubleshooting techniques described in this chapter do not identify all possible problems with your tape library adapter, nor do the actions suggested remedy all problems. If a problem is not described, or if the actions suggested do not solve the problem, call your authorized service representative. For problems that might occur to your Proliant System, refer to your Proliant system documentation.

The troubleshooting information presented in this chapter is divided as follows:

- System power-on problems (Table 4-1)
- SCSI device problems (Table 4-2)

## System Power-On Problems

After you turn on your ProLiant server or workstation the processor performs a series of self-tests. If the system fails, see Table 4-1 for their probable cause and corrective action.

**Table 4-1**  
**Power-On Problems Troubleshooting**

Symptom	Probable Cause	Corrective Action
The system self-test halts or an error message appears.	The system detected an error while running the self-test.	<p>Check that the tape library adapter and system boards are firmly seated in their respective connectors. Check all connections to external devices.</p> <p>Record the number following the question mark in the error message or error summary and call your authorized service representative.</p>
The System crashes when rebooting and shows a blue screen.	The new Windows NT driver has not been installed.	<p>If the tape library adapter has been installed before upgrading to the new Windows NT driver, proceed as follows:</p> <p>Power down your ProLiant server or workstation, remove the StorageWorks Library the tape library adapter or workstation, and then install the new driver (see Chapter 2 'Installing the Drivers'). Always Install the driver before installing the adapter card.</p>

## SCSI Device Problems

Table 4-2 lists a SCSI tape drive problem, specifies the probable causes, and suggests corrective actions for each probable cause.

**Table 4-2**  
**SCSI Device Troubleshooting**

Symptom	Probable Cause	Corrective Action
A SCSI tape drive does not appear in the configuration display.	Duplicate SCSI IDs.	Make sure that each SCSI tape drive has a unique SCSI ID.
	Cable is not connected to the SCSI tape drive.	Check cable connections.
	SCSI tape drives are not plugged in and turned on before system power up.	Power up the tape library, and then power up the system.
	SCSI bus is not terminated properly.	Make sure each end of the SCSI bus is terminated.  Make sure tape drives in the middle of the SCSI bus are not terminated.
	Defective tape drive.	Replace the tape drive.



## **Regulatory Compliance Notices**

### **Federal Communications Commission Notice**

Part 15 of the Federal Communications Commission (FCC) Rules and Regulations has established Radio Frequency (RF) emission limits to provide an interference-free radio frequency spectrum. Many electronic devices, including computers, generate RF energy incidental to their intended function and are, therefore, covered by these rules. These rules place computers and related peripheral devices into two classes, A and B, depending upon their intended installation. Class A devices are those that may reasonably be expected to be installed in a business or commercial environment. Class B devices are those that may reasonably be expected to be installed in a residential environment (that is, personal computers). The FCC requires devices in both classes to bear a label indicating the interference potential of the device as well as additional operating instructions for the user.

The rating label on the device shows which class (A or B) the equipment falls into. Class B devices have a FCC logo or FCC ID on the label. Class A devices do not have a FCC logo or ID on the label. Once the class of the device is determined, refer to the following corresponding statement.

## **Class A Equipment**

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at personal expense.

## **Class B Equipment**

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.

- Increase the separation between the equipment and receiver.

- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

- Consult the dealer or an experienced radio or television technician for help.

## **Declaration of Conformity for Products Marked with FCC Logo, United States Only**

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. For questions regarding this declaration, contact:

Compaq Computer Corporation  
P. O. Box 692000, Mail Stop 510101  
Houston, Texas 77269-2000

Or call 281- 514-3333

To identify this product, refer to the Series number found on the product.

## **Modifications**

The FCC requires the user to be notified that any changes or modifications made to this device that are not expressly approved by Compaq Computer Corporation may void the user's authority to operate the equipment.

## **Cables**

Connections to this device must be made with shielded cables with metallic RFI/EMI connector hoods in order to maintain compliance with FCC Rules and Regulations.

## **Canadian Notice (Avis Canadien)**

### **Class A Equipment**

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

## **Class B Equipment**

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

## **European Union Notice**

Products with the CE Marking comply with both the EMC Directive (89/336/EEC) and the Low Voltage Directive (73/23/EEC) issued by the Commission of the European Community.

Compliance with these directives implies conformity to the following European Norms (in brackets are the equivalent international standards):

EN55022 (CISPR 22) - Electromagnetic Interference

EN50082-1 (IEC801-2, IEC801-3, IEC801-4) - Electromagnetic Immunity

EN60950 (IEC950) - Product Safety

# *Appendix* **B**

## **Electrostatic Discharge**

To prevent damaging the system, be aware of the precautions you need to follow when setting up the system or handling parts. A discharge of static electricity from a finger or other conductor may damage system boards or other static-sensitive devices. This type of damage may reduce the life expectancy of the device.

To prevent electrostatic damage, observe the following precautions:

- Avoid hand contact by transporting and storing products in static-safe containers.
- Keep electrostatic-sensitive parts in their containers until they arrive at static-free workstations.
- Place parts on a grounded surface before removing them from their containers.
- Avoid touching pins, leads, or circuitry.
- Always be properly grounded when touching a static-sensitive component or assembly.

## Grounding Methods

There are several methods for grounding. Use one or more of the following methods when handling or installing electrostatic-sensitive parts:

- Use a wrist strap connected by a ground cord to a grounded workstation or computer chassis. Wrist straps are flexible straps with a minimum of 1 megohm  $\pm 10$  percent resistance in the ground cords. To provide proper ground, wear the strap snug against the skin.
- Use heel straps, toe straps, or boot straps at standing workstations. Wear the straps on both feet when standing on conductive floors or dissipating floor mats.
- Use conductive field service tools.
- Use a portable field service kit with a folding static-dissipating work mat.

If you do not have any of the suggested equipment for proper grounding, have a Compaq authorized reseller install the part.

**NOTE:** For more information on static electricity, or assistance with product installation, contact your Compaq authorized reseller.

## **Tape Library Adapter Specifications**

This appendix provides the physical, electrical, thermal, and atmospheric characteristics for the Compaq StorageWorks™ Dual Channel PCI to Ultra HVD Adapter for Tape Libraries (tape library adapter)

### **Physical Characteristics**

The dimensions of the tape library adapter are 19.05 cm (7.50 in.) x 9.65 cm (3.80 in.) The PCI connection is made through edge connector J1. The internal 16-bit SCSI connection is made through 68-pin high-density connectors J2 or J5. The external SCSI connection is made through 68-pin Very High-Density Connectors J3 or J6. The J3 and J6 connectors extend external to the server are installed in through a bracket attached to the face of the connector.

The bracket is a standard ISA type with a cutout to accommodate the connectors. The J4 and J7 connectors are for connecting the to the server's busy LEDs. It is a 4-pin one-row right angle header wired in parallel with the onboard LED. The component height at the top and bottom of the tape library adapter adheres to the PCI specification.

## Electrical Characteristics

The maximum power requirements of the Library Adapter, including SCSI TERMPWR, under normal operation are as follows:

- +5 VDC  $\pm 5\%$  1.5 A over the operating range 41°F to 131°F (5°C to 55°C)
- +3.3 VDC  $\pm 0.3$  VC 130 mA over the operating range 41°F to 131°F (5°C to 55°C) when operating in a 3.3 VDC PCI slot

Under abnormal conditions such as a short on SCSI TERMPWR, +5 VDC current might be higher. At temperatures of at least 77°F (25°C) a current of 4 A is sustained no longer than 30 seconds before the self-resetting TERMPWR short circuit protection device opens.

## Thermal and Atmospheric Characteristics

The tape library adapter is designed to operate in an environment defined by the following parameters:

- Temperature range (dry bulb): 41°F to 131°F (5°C to 55°C)
- Relative humidity range (non-condensing): 5%-90%
- Maximum dew point temperature: 89°F (32°C)

# Index

## A

attaching cables 3-4

## B

boot straps, using B-2

## C

cables, attaching 3-4  
cabling 3-4  
cabling, connectors 3-4  
cabling, external connections 3-4  
cautions, electrostatic discharge 3-3  
cautions, grounding 3-3  
channel, SCSI 1-6  
characteristics, SCSI cable 1-9  
Compaq authorized reseller xii  
Compaq backing, up your system 3-2  
Compaq website xi  
completing the installation 3-6  
connectors, cabling 3-4  
connectors, LED 1-6  
connectors, SCSI 1-4  
contents, kit 1-2  
creating a system ROMPaq utility diskette 2-2

## D

diskettes, ROMPaq 2-2  
drivers, installing 2-4

## E

electrical characteristics C-2  
electrostatic discharge, obtaining additional information B-2  
electrostatic discharge, precautions B-1  
electrostatic discharge, preventing B-1  
electrostatic discharge, storing products B-1  
electrostatic discharge, transporting products B-1  
electrostatic discharge, types of damage from B-1  
ESD B-1

## F

features 1-4  
firmware and hardware, installing 2-1

## G

getting help x

- getting started 3-1
- grounding methods B-2
- grounding straps,
  - specifications B-2
- grounding straps, wearing B-2
- grounding, suggested equipment for B-2

## H

- hardware/software
  - requirements 3-2
- heel straps, using B-2
- help, additional sources x
- help, Compaq website xi
- help, Compaq authorized resellers,
  - telephone numbers xi
- help, technical support telephone numbers x
- <http://www.compaq.com> xi

## I

- icons, symbols on equipment ix
- Ids, SCSI 1-6
- installation guidelines 3-3
- installation, multiple adapter 1-8
- installing 3-1
- installing drivers 2-4
- installing drivers, Novell Netware 2-5
- installing drivers, Windows NT 4.0 2-5
- installing firmware and hardware 2-1

## K

- kit contents 1-2

## L

- LED connectors 1-6

## M

- materials needed
  - creating system ROMPaq utility diskette 2-2
- multiple adapter installation 1-8

## N

- Novell NetWare, installing drivers 2-5

## O

- opening the server 3-3

## P

- parts, proper handling B-1
- parts, storing B-1
- parts, transporting B-1
- physical characteristics C-1
- preparing the server 3-2

## R

- Regulatory Compliance
  - Federal Communications Commission notice A-1
- Regulatory Compliance, Canadian notice A-3
- Regulatory Compliance, European Union notice A-4
- RJ-45 receptacle ix
- ROMPaq diskettes 2-2
- running system ROMPaq 2-3

## S

- SCSI cables characteristics 1-9
- SCSI channel 1-6
- SCSI connectors 1-4
- SCSI device problems 4-3
- SCSI IDs 1-6
- SCSI termination 1-8
- server, opening 3-3

- server, preparing 3-2
- specifications C-1
- specifications, electrical
  - characteristics C-2
- specifications, physical
  - characteristics C-1
- specifications, thermal and atmospheric characteristics C-2
- static-safe containers, storing products in B-1
- static-safe containers, transporting products in B-1
- symbols in text viii
- symbols on equipment ix
- system power-on problems 4-2
- system ROM, upgrading 2-1
- system ROMPaq utility diskette materials needed 2-2
- system ROMPaq utility diskette, creating 2-2
- system ROMPaq, running 2-3
- system, backing up 3-2
- system, preventing electrostatic damage to B-1

## T

- technical support xi
- telephone numbers xii
- termination, SCSI 1-8
- text conventions viii
- thermal and atmospheric characteristics C-2

- tools, conductive field service type B-2
- troubleshooting 4-1
- troubleshooting, SCSI device problems 4-3
- troubleshooting, system power-on problems 4-2

## U

- upgrading
  - system ROM 2-1
- user-supplied hardware and software requirements 3-2

## W

- warnings
  - electrical shock ix
  - warnings, cooling components 3-3
  - warnings, disconnecting power 3-6
  - warnings, rack stability x
- Windows NT 4.0, installing drivers 2-5
- wrist straps
  - using B-2
- wrist straps, specifications B-2
- www.compaq.com xi

