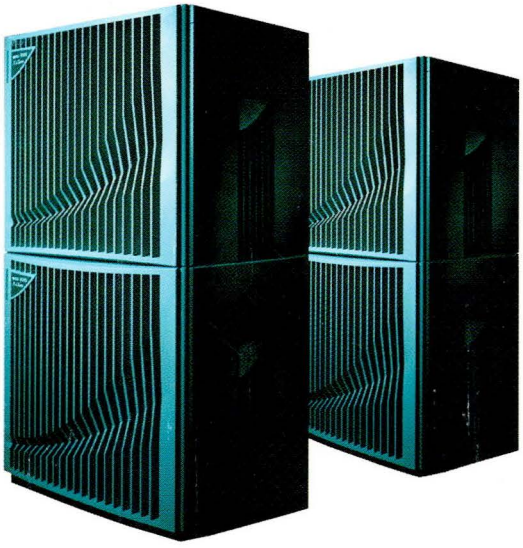
HEWLETT® PACKARD

1200, 1600, S-Class and X-Class Servers



Exemplar Tape Integration Guide

Second Edition

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Preface

The *Exemplar Tape Integration Guide* documents the information necessary for customers to purchase and configure Tier 2 devices for Exemplar 1200, 1600, X-Class, and S-Class servers. This book is not intended to be a tutorial but a reference for customers and field service personnel.

Using this book

This book has the following sections:

- The "Introduction," provides a brief description of each supported device type.
- The "Configuration guidelines," discusses the configuration rules for supported devices.
- "Installation," describes basic installation instructions for SCSI devices including physical connections, power up sequences, software configuration, and firmware verification.
- "Device files" describes the device files required to access the tape drives after installation. These files are created in the /dev/tmid directory using the `MAKEDEV` utility.
- "SCSI connectors" describes the various SCSI connectors associated with for Tier 2 tape drives.

System platforms

The Tier 2 tape devices are supported on the following system platforms running SPP-UX 5.2 or above:

- SPP1200 servers
- SPP1600 servers
- S-Class servers
- X-Class servers

Notational conventions

This section describes notational conventions used in this book.

`bold monospace`	In command examples, **`bold monospace`** identifies input that must be typed exactly as shown.
`monospace`	In paragraph text, `monospace` identifies command names, system calls, and data structures and types. In command examples, `monospace` identifies command output, including error messages.
italic	In paragraph text, *italic* identifies titles of documents. In command syntax diagrams, *italic* identifies variables that you must provide. The following command example uses brackets to indicate that the variable *output_file* is optional: `command` *input_file* [*output_file*]
Horizontal ellipses (...)	In command examples, horizontal ellipses show repetition of the preceding items.

NOTE A note highlights important supplemental information.

CAUTION A caution highlights procedures or information necessary to avoid damage to equipment, damage to software, loss of data, or invalid test results.

Associated Documents

Associated documents include:

- *Expansion Cabinet Installation Guide,* part number A1809-90006, provides technical information about the A1884A/A1897A expansion cabinet.
- *SPP-UX System Administration Guide*, part number B5655-9002, describes the features of SPP-UX, the operating system for Exemplar S-Class Technical Servers.
- *A4706A Installation Notice*, part number A4706-90001, describes how installers are to provide physical hardware path information to customers for use during device integration on Exemplar S-Class and X-Class Technical Servers.

1 Introduction

This chapter describes each of the Tier 2 devices supported in 5.2 and above releases of SPP-UX. Tier 2 devices are products for which Hewlett-Packard provides connectivity with device drivers and other software. Hewlett-Packard does not directly sell or maintain Tier 2 products.

Supported device types

Table 1 shows the supported device types.

Table 1 Supported tape devices and libraries

Vendor	Model	Description	1200/ 1600	S-Class/ X-Class
Exabyte	8505XL	8mm, compression, 14 GB	No	Yes
Quantum	DLT2000	DLT2000	Yes	Yes
Quantum	DLT4000	DLT4000	Yes	Yes
Quantum	DLT7000	DLT7000	No	Yes
Fujitsu	M2481	3480 compatible formatter, compression, 10 cartridge ACL	Yes	Yes
Fujitsu	M2483HD1	3480/90 compatible, compression, 10 cartridge ACL	Yes	Yes
Fujitsu	M2488C	3490E compatible, compression, 10 cartridge (F)ACL	No	Yes
StorageTek	9490 Timberline	3490E compatible, compression	Yes	Yes
StorageTek	SD3 Redwood	SD-3 helical scan, 3480/90 form factor cartridge	Yes	Yes
IBM	3590-B11	Magstar 3590, 10 cartridge ACL	No	Yes

Vendor	Model	Description	1200/ 1600	S-Class/ X-Class
Computer Network Technology	CHL-SAU+ 3200-GTW	Block Mux to SCSI converter	Yes	Yes
StorageTek	9310 Powderhorn	Tape library with 6000 cartridge capacity	Yes	Yes
StorageTek	9360 Wolfcreek	Tape library with 504 to 949 cartridge capacity	Yes	Yes

Exabyte 8505XL, 8mm tape drive

- Stand-alone tape drive
- 8-mm helical scanning mechanism
- 7-GB uncompressed cartridge data capacity
- Hewlett-Packard support of Fast/Narrow Differential SCSI interface version

Quantum DLT 2000, half-inch tape drive

- Stand-alone tape drive
- 15-GB native capacity
- Tape-loadable firmware
- Hewlett-Packard support of Fast/Narrow Differential SCSI interface version

Quantum DLT 4000, half-inch tape drive

- Stand-alone tape drive
- 20-GB native capacity
- Tape-loadable firmware
- Hewlett-Packard support of Fast/Narrow Differential SCSI interface version

Quantum DLT 7000, half-inch tape drive

- Stand-alone tape drive
- 35-GB native capacity
- Tape-loadable firmware
- Hewlett-Packard support of Fast/Wide Differential SCSI interface version

Fujitsu M2481 half-inch cartridge tape drive

- Rack-mount
- Full 3480/3490 IBM read/write compatibility (18-track)
- Hewlett-Packard support of Fast/Narrow Differential SCSI interface version

Fujitsu M2483 half-inch cartridge tape drive

- Rack-mount
- Full 3480/3490 IBM read/write compatibility (18-track)
- Hewlett-Packard support of Fast/Narrow Differential SCSI interface version

Fujitsu M2488C2, 3490E IBM compatible, half-inch tape drive

- Rack-mount 10-cartridge Automated Cartridge Loader (ACL) or Table top Flush-mount 7-cartridge Automated Cartridge Loader (FACL)
- Full IBM 3480/90 read compatibility (18-track)
- Full IBM read/write compatibility (36-track)
- Hewlett-Packard support of Fast/Wide Differential SCSI interface version

StorageTek (STK) 9490 Timberline, half-inch tape drive

- Stand-alone or library mount
- Stand-alone with an optional Cartridge Scratch Loader (CSL) or attached to an automated cartridge subsystem (ACS) such as StorageTek's Nearline or WolfCreek libraries
- Enhanced Capacity cartridge tape (double tape length) and standard length magnetic-tape cartridges supported
- 36-track, read and write supported
- 18-track, read only supported
- Hewlett-Packard support of Fast/Wide Differential SCSI interface version

StorageTek (STK) Redwood SD3

- Up to four helical tape drive devices contained in one SD-3 Cartridge Drive (CD)
- ACS library or stand-alone available with or without Optional Cartridge Scratch Loader (CSL)
- Three cartridge capacities: 10, 25, and 50 Gbytes
- Similar form factor to 3480/3490 cartridge to allow cohabitation with other cartridges of the same family in the STK Powderhorn and Wolfcreek libraries without risk of loading into an incorrect drive
- Hewlett-Packard support of Fast/Wide Differential SCSI interface version

IBM 3590-B11 Magstar tape drive with Automatic Cartridge Facility

- 10 Gbytes uncompressed
- 128-track serpentine longitudinal recording
- Support for rack-mountable models only
- 10-cartridge Automatic Cartridge Facility (ACF)
- Hewlett-Packard support of Fast/Wide Differential SCSI interface version

Computer Network Technology (CNT) CHL-SAU+ 3200-GTW

- SCSI host connection to Block Mux (Bus and Tag) tape devices
- Hewlett-Packard support of Fast/Narrow differential SCSI interface version

Tape libraries

Tape libraries combine a number of tape drives, a robot to move tape cartridges, and storage shelves or racks for tape cartridges. Using a library typically requires a software library management package. This software package interfaces the applications and utilities on the host system to the tape drives and tape cartridges stored in the tape library. Hewlett-Packard offers support for the StorageTek Wolfcreek and Powderhorn tape libraries.

PCI Ultra SCSI controller for external disks and tapes (A4706A)

The PCI Ultra SCSI controller is an intelligent, high-performance, direct memory access (DMA) bus master SCSI host adapter for Hewlett-Packard Exemplar S-Class and X-Class Technical Servers. The controller combines a powerful RISC processor, a SCSI executive processor, and a PCI Local Bus interface in a single chip solution. The controller supports bootable devices and can be used with hard drives, tape drives, and other SCSI devices. The controller is packaged as a single-slot, short card with a direct interface to the 32-bit PCI Local Bus.

The features of the PCI Ultra SCSI controller are listed below:

- Compliance with Intel PCI Local Bus Rev. 2.0 specification
- Compliance with ANSI X3.131-1994 SCSI-2 standard
- Compliance with ANSI X3T10/1071D SCSI-3 Fast-20 standard (Ultra SCSI)
- Asynchronous and synchronous transfer modes
- Several synchronous SCSI data transfer rates supported:
  - Wide and Ultra SCSI (40 Mbytes/sec)
  - Ultra SCSI (20 Mbytes/sec)
  - Fast/Wide SCSI (20 Mbytes/sec)
  - Fast SCSI (10 Mbytes/sec)
  - Normal (5 Mbytes/sec)
- Differential mode supported
- Up to 15 SCSI devices supported
- Logical unit numbers (LUNs) 0-7 supported
- Bus master DMA supported
- Single-chip, high performance SCSI RISC processor

2 Configuration guidelines

This chapter describes the configuration rules, firmware requirements, and controller/cable combinations for supported Tier 2 tape drives.

Configuration rules

Hewlett-Packard supports Tier 2 devices adhering to the following rules of configuration:

- SPP-UX 5.2 and above is required
- OBP 3.1 and above is required for S-Class and X-Class servers
- OBP 2.0.3 and above is required for 1200 and 1600 servers
- Narrow SCSI devices and Wide SCSI devices cannot share the same bus
- The following Narrow SCSI devices are permitted to share the same bus:
  - Exabyte 8505XL tape drive
  - Quantum DLT4000™ tape drive
  - Quantum DLT2000™ tape drive
  - Quantum DLT4700™ tape drive (Tier 1 device)
  - Fujitsu 2481 tape drive
  - Fujitsu 2483 tape drive
- StorageTek tape drives (Timberline and Redwood) can share a dedicated controller
- IBM 3590-B11 tape drives require a dedicated controller
- Maximum of seven Tier 2 devices on both Fast/Narrow and Fast/Wide SCSI busses

  See Table 3 on page 12 for device specific limitations.
- The last device must provide termination
- SCSI ID 7 is reserved for the SCSI controller
- Devices must adhere to the firmware requirements specified in Table 2, "Supported Tier 2 device firmware revision levels", on page 11

Firmware

For the latest supported configurations, including the latest supported firmware revision levels, see the Hewlett-Packard *Exemplar Tape Integration Guide* home page at
http://www.rsn.hp.com/wsg/products/servers/tape
on the World Wide Web. Table 2 contains the current list of supported Tier 2 device firmware revision levels.

Table 2 **Supported Tier 2 device firmware revision levels**

Model	Firmware
Exabyte 8505XL	7T0
Quantum DLT2000	9B3C (as reported by SPP-UX) V60 (as reported by vendor)
Quantum DLT4000	CD50, CD55 (as reported by SPP-UX) V80, V85 (as reported by vendor)
Quantum DLT7000	172D (as reported by SPP-UX) V45 (as reported by vendor)
Fujitsu M2481	14 (as reported by SPP-UX) 14D [a] (as reported by vendor)
Fujitsu M2483HD1	14 (as reported by SPP-UX) 14H (as reported by vendor)
Fujitsu M2488C	4.C.07
StorageTek 9490 Timberline	SPS 823, 4.2.0
StorageTek Redwood SD-3	SPS T822, 2.2.3
IBM 3590-B11	81ED, 8206

a. Supported levels of PCA-CR board firmware are limited to 81040 M through Q.

Controller/cable combinations

Table 3 contains Hewlett-Packard part numbers for Tier 2 controller/ cable combinations along with maximum controller per bus information.

Table 3 Tier 2 device controller/ cable configurations

Model	Interface	Max/ Bus	1200/ 1600	S-Class/ X-Class
Exabyte 8505XL	F/N, Diff	7	Not supported	A4706A [a]
Quantum DLT2000	F/N, Diff	7	SC21000[b]	A4706A [b]
Quantum DLT4000	F/N, Diff	7	SC21000[b]	A4706A [b]
Quantum DLT7000	F/W, Diff	7	Not supported	A4706A
Fujitsu M2481	F/N, Diff	7	SC21000[b]	A4706A [b]
Fujitsu M2483HD1	F/N, Diff	7	SC21000[a]	A4706A [a]
Fujitsu M2488C	F/W, Diff	7	Not supported	A4706A
StorageTek 9490 Timberline	F/W, Diff	4[c]	SC21000	A4706A
StorageTek Redwood SD-3	F/W, Diff	4[c]	SC21000	A4706A
IBM 3590-B11	F/W, Diff	4[c]	Not supported	A4706A
Computer Network Technology CHL-SAU+, 3200-GTW	F/N, Diff	1	SC21000[a]	A4706A[a]

a. Customer must provide conversion from HD-male-68 pigtail to HD-female-50 device connector.
b. Customer must provide conversion from HD-mail-68 pigtail to Cent-female-50 device connector.
c. Requires a dedicated controller with no other devices on the bus (StorageTek tape drives may share a dedicated controller).

Tape libraries

Table 4 contains configuration information for Tier 2 tape library systems.

Table 4 Tape library configurations

Model	Description	Supported S/W	1200/ 1600	S-Class/ X-Class
StorageTek Powderhorn 9310	Up to 6000 cartridge library	ACSLS 5.0.0	Supported	Supported
StorageTek Wolfcreek 9360	504 to 949 cartridge library	ACSLS 5.0.0	Supported	Supported

Computer Network Technology (CNT) CHL-SAU+ 3200-GTW

The CNT SAU+ provides a SCSI gateway to Block Mux devices.

Supported configuration:

- Single Fast/Narrow Differential SCSI bus
- 1 per bus
- Chassis (CNT p/n 3299)
- SCSI Gateway software (CNT p/n N120)
- Modules:
  - Block Mux
    - TSSX Rev. 4A030597, 4C040797
    - TSUI Rev. 4A030597, 4C040797
  - SCSI
    - GGSC Rev. 35120596, 38032897
    - GOLD Rev. 32061296, 33021497
    - SCSI Rev. 2A101196
    - SCST Rev. 00120694
- SCSI hardware (CNT p/n C824, Rev. B)
- Bus and Tag h/w (CNT p/n P111, Rev. K)

3 Installation

This chapter describes generic installation instructions for Tier 2 SCSI tape devices including physical connections, power up sequences, software configuration, and firmware verification.

Overview of installation

The procedure below summarizes the steps in the installation process.

Step 1. Set the SCSI ID on the unit.

NOTE No two devices on the bus can have the same SCSI ID.

Step 2. Check the voltage selector switch to make sure the proper operating voltage is selected.

Step 3. Install the tape drive in a rack or place adjacent to the host system.

Step 4. Attach the power cord.

Step 5. Shut down the host system.

Step 6. Attach the host's SCSI cable to the tape drive (or a daisy-chain cable if connecting to an existing device).

Step 7. Attach the SCSI terminator (or a daisy-chain cable if connecting multiple units).

Step 8. Turn on the tape device.

Step 9. Load a scratch tape.

Step 10. Boot the host system to OBP.

Step 11. Integrate the tape device into the system using the `mkmap` command.

Step 12. Reboot the system.

Step 13. Create device files for the tape device if required.

Step 14. Verify firmware.

Step 15. Test the tape device.

General installation instructions

The following sections provide general instructions on installing and configuring Tier 2 tape drives.

Installing the tape drive

Step 1. Check the SCSI ID and change it, if necessary.

Each device on the SCSI bus must have a unique SCSI ID. The tape drive's SCSI ID may have been preset at the factory. Consult the manufacturer's documentation to determine the current setting. If you need to change the SCSI ID, you can do so now.

NOTE Do not use SCSI ID 7, which is reserved for the host system SCSI controller.

Step 2. Check the voltage selector switch on the rear of the tape drive to make sure it is set for the proper voltage. If it is not, set it at this time according to the manufacturer's instructions. Refer to the electrical specifications for the tape drive provided in the manufacturer's documentation.

CAUTION Do not turn on power to the tape drive without first checking the voltage selector switch. Operating the unit with the wrong input voltage setting may damage the unit.

Step 3. Set up the tape drive as per the manufacturer's instructions. Refer to the *Expansion Cabinet Installation Guide* if the device is to be installed in an expansion cabinet. If you are connecting this unit to the host system, locate the tape device adjacent to the host system, so that the cable reaches both the host and the tape device comfortably.

If you are installing more than one tape drive, locate each unit as close as possible for easy interconnection.

Step 4. Connect the power cord to the tape drive and plug it into a suitable power source.

Connecting to the host

The tape device must be connected to a SCSI controller in the host system. Follow these steps to make the connection:

Step 1. Shut down the system with the `/etc/shutdown` command. Enter:

```
# /etc/shutdown -h time
```

where the *time* argument can be used to schedule a timed shutdown or the keyword `now` can be used to shut down the system immediately. Refer to the *SPP-UX System Administration Guide* or the shutdown(1m) man page for more information.

Step 2. After the shutdown has completed, terminate power to the system by turning the operator panel keyswitch to the OFF position.

Connecting the tape drive

Complete the following steps to connect the host system to the tape drive:

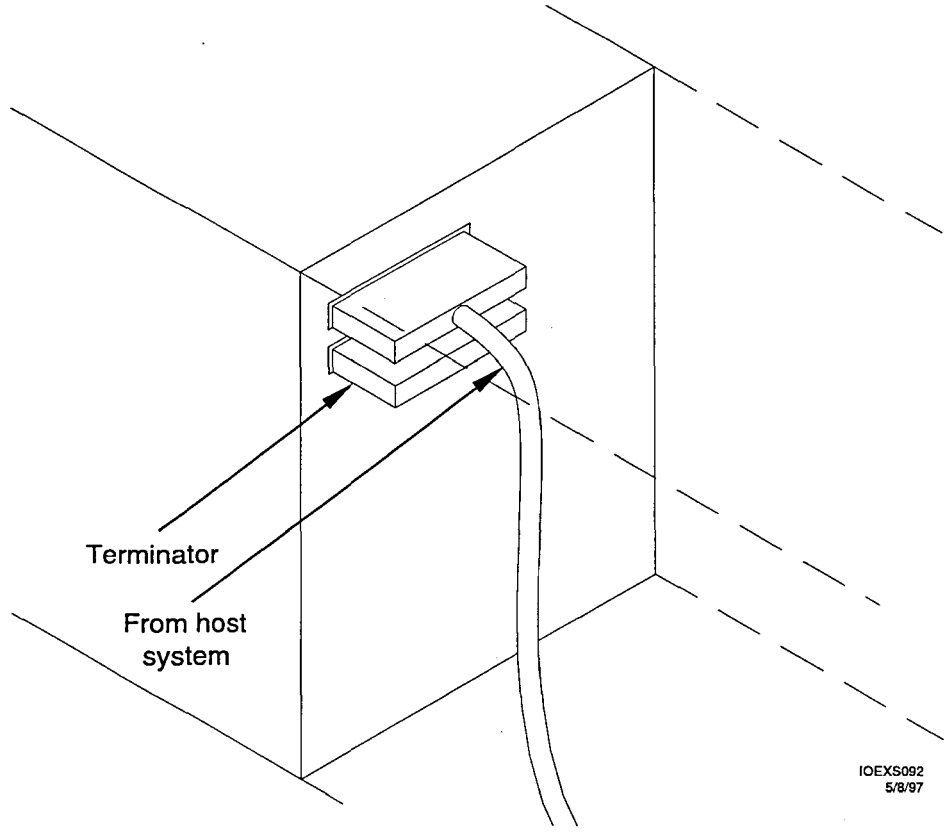
Step 1. Locate the appropriate SCSI cable exiting the host system's cable channel opening, and record the device path information contained on the cable's tag for future use in Step 2 of "Defining the OBP logical device" on page 21.

NOTE During the installation of the SCSI controller, the SCSI cable is tagged with device path information required during the logical-unit to physical-unit mapping portion of this installation procedure. For more information see the *A4706A Installation Notice*, part number A4706-90001.

Step 2. Attach the SCSI cable coming from the host system to one of the SCSI connectors on the rear of the tape drive. Figure 1 shows a generic tape drive SCSI cable connection.

An adapter may be required to connect the host system cable to the tape drive connector. The customer must provide any required connectors. See Table 3, "Tier 2 device controller/ cable configurations", on page 12 and Appendix B, "SCSI connectors" for further information.

Figure 1 **Connecting the tape drive**

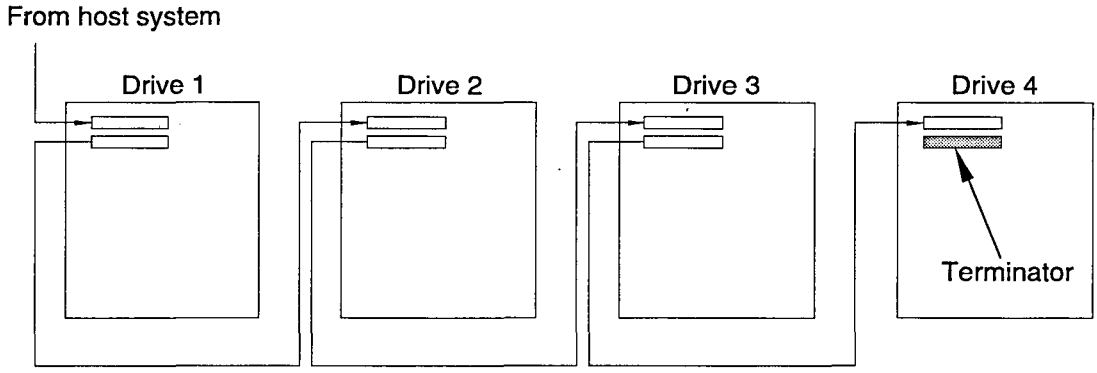


Step 3. If this is the only device you are connecting to this bus, install the SCSI terminator on the second SCSI connector on the rear of the tape drive, as outlined in the manufacturer's documentation. See Figure 1.

If you are connecting additional devices to this SCSI bus, do not install the terminator. Instead, connect a daisy-chain cable to the second SCSI connector on the rear of the first tape drive. Continue chaining devices together as shown in Figure 2. See the configuration rules in Table 3, "Tier 2 device controller/ cable configurations", on page 12 to determine how many devices can be connected to the SCSI bus at one time.

NOTE You must install a SCSI terminator on the last device.

Figure 2 Connecting multiple devices on the same bus



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Software integration

When you add a device to your system or change characteristics of an existing one, you must integrate the device into SPP-UX.

Defining the OBP logical device

Before booting the nodes of your Exemplar system to the operating system level, you must specify a logical unit number for the tape drive at the OpenBoot Prompt (OBP). Perform the following steps to define the device:

Step 1. Restart the host system by turning on the operator panel keyswitch.

Step 2. When the system boots to OBP, define the SPP-UX logical-unit to physical-unit mapping using the `mkmap` command. This mapping is a label for tape and network devices that cannot be labeled like disks. `mkmap` has the following syntax:

`mkmap` *logical_unit_number obp_path*

logical_unit_number

designates the logical-unit number of each device. If this is the first tape drive of a given type (ex:DLT), then the logical-unit number would be 0, the second device would be 1, and so forth.

obp_path

represents the full device name as shown on the SCSI cable tag in Step 1 of "Connecting the tape drive" on page 18.

Use the device path taken from the SCSI cable tag in Step 1 of "Connecting the tape drive" on page 18, and add the SCSI ID and logical unit number to the end of the device path.

For example, on an S-Class or X-Class system, with a device path of /pci@fe,10000/pci1077,1020@0,0/st a SCSI ID of 5, a SCSI logical unit of 1, map the device as logical unit 0 with the following command:

```
ok mkmap 0 /pci@fe,10000/pci1077,1020@0,0/st@5,1
```

Step 3. Use the `show-map` command to verify that the logical unit is correct.

```
ok show-map

Flag  Unit  Device  Pathname

0 /pci@fe,10000/pci1077,1020@0,0/st@5,1
```

Step 4. Reset OBP so that the device tree gets rebuilt with the new logical unit number in place. Enter:

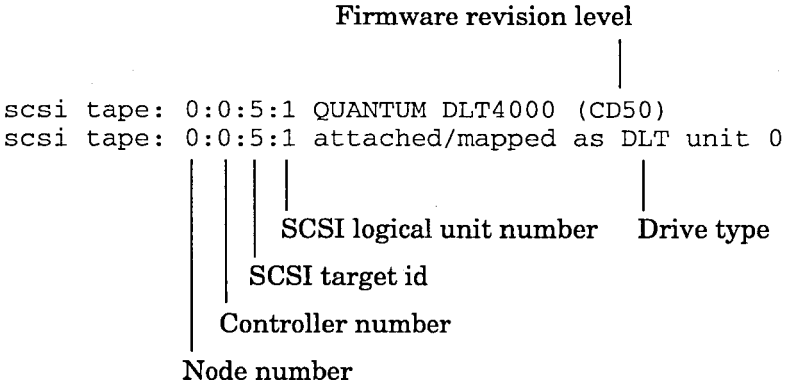
```
ok reset
```

Step 5. Boot the system and verify that the tape drive was probed and attached properly. Enter:

```
ok boot
```

The console displays information about each device as it is probed and attached.

Figure 3 Probe and attach display example



Should the driver not recognize the device during the boot process, the tape drive is attached generically as shown in the following example:

```
scsi tape:0:0:5:1 attached/mapped as GENERIC unit 0
```

CAUTION Operation of generically attached tape drives is unsupported. If the drive is attached as GENERIC, this indicates that the driver was unable to recognize the tape drive as a supported device. The user should verify that mapping has been done properly and that the drive, cables, and terminators have been configured correctly.

Creating device files

Once you have successfully installed and integrated the tape drive, you need to create device files to access the drive. Use the following procedure to create the device files:

Step 1. From the Exemplar console, change your working directory to the /dev directory.

```
# cd /dev
```

Step 2. Run the MAKEDEV command with the tmid argument to create device files for the first four logical units (0 through 3) of each supported device type. Enter:

```
# ./MAKEDEV tmid
```

MAKEDEV creates multiple /dev/tmid/ entries for each unit. For example, device files for the first DLT4000 unit would be:

- rdlt0_10.0
- rdlt0_10.0i
- rdlt0_10.n
- rdlt0_10.ni
- rdlt0_2.6
- rdlt0_2.6n
- rdlt0_20.0
- rdlt0_20.0i
- rdlt0_20.0n
- rdlt0_20.0ni
- rdlt0_6.0

- rdlt0_6.0n
- dlt0cp

`rdlt0_10.0ni`	identifies this as a character device file for a DLT tape drive. In this example, the zero indicates this is the first logical DLT tape drive.
`n`	indicates no rewind
`i`	indicates compression
`cp`	indicates control port used by some 3rd-party applications

To create device files for additional units using the `MAKEDEV` command, enter the `MAKEDEV` command followed by a device type and unit number. For example to create a device file for a fifth DLT tape drive enter:

```
# ./MAKEDEV dlt4
```

See Appendix A, "Device files" for a complete list of Tier 2 device file and device type names.

Verify firmware

Hewlett-Packard only guarantees connectivity to devices meeting the firmware requirements specified in Table 2, "Supported Tier 2 device firmware revision levels", on page 11. Firmware revision levels can be verified by checking the console log or using `scsiutil`.

Console log

The console log contains the device attachment statement containing vendor, product and firmware revision information. See Figure 3 on page 22 for an example of the format. Refer to Table 5 for console log locations.

Table 5 **Console log locations**

S-Class and X-Class	1200 and 1600
/spp/data/consolelog	/spp/data/Console_log

Using `scsiutil`

Firmware revision levels can also be verified using the following procedure:

Step 1. Invoke the `scsiutil` shell by entering:

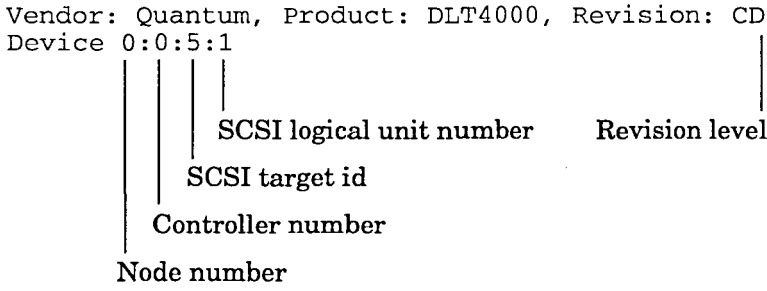
```
# /etc/scsiutil
```

Step 2. Open the device and display the firmware revision level by using the `open` command followed by *node number:controller number: SCSI target id:logical unit number* as reported during the probe and attach. See Figure 3 on page 22 for more information. Enter:

```
su 1> open 0:0:5:1
```

`scsiutil` displays information about the specified device.

Figure 4 **`scsiutil` display example**



Step 3. Close the device and exit `scsiutil` by entering:

```
su 2> close
#
```

For more information about `scsiutil`, refer to the scsiutil(1) man pages.

Obtaining firmware

Contact the tape drive vendor to obtain a copy of the version of firmware supported by Hewlett-Packard for your device. See "Firmware" on page 11 for more information on supported firmware revision levels.

Verify operation

Step 1. Load a scratch tape into the drive.

Step 2. Verify communication with the drive using the `cnx_mt` command:

```
# cnx_mt -t /dev/tmid/rdlt0_6.0n status
# cnx_mt -t /dev/tmid/rdlt0_6.0n rew
```

If an I/O error occurs, verify the following:

- A tape is loaded
- The device was integrated correctly
- The correct firmware is loaded
- The device files were created

Step 3. Check the read/write capability of the drive using the `tar` utility. To write data to the tape, enter:

```
tar cvbf 128 /dev/tmid/rdlt0_6.0 ./etc
```

To read the data back from the tape, enter:

```
tar xvbf 128 /dev/tmid/rdlt0_6.0 >/dev/null
```

If an I/O error occurs, verify the following:

- A tape is loaded
- The device was integrated correctly
- The correct firmware is loaded
- The device files were created

System tunables and the Computer Network Technology (CNT) CHL-SAU+ 3200-GTW

System performance adjustments are required when using the CNT device with a PCI Ultra-SCSI controller. SCSI bus hangs occur during any data transfer unless this performance adjustment is made due to the CNT device accepting Ultra SCSI negotiations, even though it can only handle Fast SCSI transfers correctly.

The system tunables file

The /stand/spp3/tunables file allows you to adjust system performance with tunable parameters. The parameters from this file are read and set for the system each time SPP-UX boots. If you change the values for parameters in /stand/spp3/tunables, the new values take effect the next time the system boots.

The tunables file is located on your Exemplar Technical Server in /stand/spp3/tunables.

The information formerly found in /etc/newconfig/tunables is now located in /usr/newconfig/stand/tunables.

When you install a new version of SPP-UX, your /stand/spp3/tunables file is not automatically updated to add new tunables. Instead, a new tunables file is installed in the /usr/newconfig/stand directory. After installing a new version of SPP-UX, check the /usr/newconfig/stand/tunables file against your /stand/spp3/tunables file to see if new tunables have been added or if the range of values for tunables has changed.

The path to the tunables file is different than stated above if the OBP boot-director variable is set to something other than /stand/spp3.

Making performance adjustments for the CNT

To reduce the controller speed to negotiate fast rate only, add a line to the tunable file for each controller with a CNT attached device. The line should be written in the tunables file using the following format:

`SCSI Controller` *node_controller*`, Minimum Transfer Period:1=100:`

node	The node number
controller	The controller number

Obtain the node number and controller number from the console log if necessary. See "Console log" on page 24 for more information about reading the console log.

For example, using the following tunable:

```
SCSI Controller 0_16, Minimum Transfer Period:1=100:
```

The console displays a CNT device with 4 subunits attaching as shown in Figure 5.

Figure 5 CNT probe and attach display example

```
scsi(qlisp): SCSI Controller (0:16) Min Xfer Prd = 100


scsi(qlisp): SCSI bus scan complete (0:16)

scsi tape: 0:16:4:4 CNT 4781 (0101)
scsi tape: 0:16:4:4 attached/mapped as CNT unit 0
scsi tape: 0:16:4:5 CNT 4781 (0101)
scsi tape: 0:16:4:5 attached/mapped as CNT unit 1
scsi tape: 0:16:4:6 CNT 4781 (0101)
scsi tape: 0:16:4:6 attached/mapped as CNT unit 2
scsi tape: 0:16:4:7 CNT 4781 (0101)
scsi tape: 0:16:4:7 attached/mapped as CNT unit 3
```

Obtaining technical assistance

Technical assistance can be obtained by calling the Technical Assistance Center (TAC) at 1-800-952-0379. Support from the TAC is provided on a time and materials basis only for Tier 2 tape drives.

A Device files

This appendix describes the device files required to access the tape drives after installation. These files are created in the /dev/tmid directory using the MAKEDEV utility.

Device files

After a tape drive has been successfully installed, device files need to be created to allow access to the drive. MAKEDEV creates these multiple files in the /dev/tmid/ directory for each unit. For example, device files for the first DLT4000 would be:

- rdlt0_10.0
- rdlt0_10.0i
- rdlt0_10.n
- rdlt0_10.ni
- rdlt0_2.6
- rdlt0_2.6n
- rdlt0_20.0
- rdlt0_20.0i
- rdlt0_20.0n
- rdlt0_20.0ni
- rdlt0_6.0
- rdlt0_6.0n
- dlt0cp

The device files have the following characteristics:

`rdlt0_10.0ni`
: identifies this as a character device file for a DLT tape drive. In this example, the zero indicates this is the first logical DLT tape drive.

`n`
: indicates no rewind

`i`
: indicates compression

`cp`
: indicates control port used by some 3rd-party applications

The following tables list the device files for Tier 2 tape drives assuming a SCSI ID of 0.

Table 6 **DLT2000 and DLT4000 device files**

rdlt0_10.0	rdlt0_10.0ni	rdlt0_20.0	rdlt0_20.ni
rdlt0_10.0i	rdlt0_2.6	rdlt0_20.0i	rdlt0_6.0
rdlt0_10.0n	rdlt0_2.6n	rdlt0_20.0n	rdlt0_6.0n

Table 7 **Exabyte 8505XL device files**

rexb0_8200	rexb0_8200n	rexb0_8500	rexb0_8500n
rexb0_8200i	rexb0_8200ni	rexb0_8500i	rexb0_8500ni

Table 8 **IBM 3590-B11 device files**

rctp0	rctp0i	rctp0n	rctp0ni

Table 9 **Fujitsu M2481, M2483, M2488, CNT, and STK 9490 Timberline device files**

rtc0	rtc0i	rtc0n	rtc0ni

Table 10 **Redwood SD-3 device files**

rrdw0	rrdw0i	rrdw0n	rrdw0ni

Table 11 shows the device type names used with the MAKEDEV command to create individual device files.

Table 11 Supported tape devices

Vendor	Model	Device type names
Exabyte	8505XL	exb
Quantum	DLT2000	dlt
Quantum	DLT4000	dlt
Quantum	DLT7000	dlt
Fujitsu	M2481	tc
Fujitsu	M2483HD1	tc
Fujitsu	M2488C	tc
StorageTek	9490 Timberline	tc
StorageTek	SD3 Redwood	rdw
IBM	3590-B11	ctp

B SCSI connectors

This appendix describes the various SCSI connectors associated with for Tier 2 tape drives.

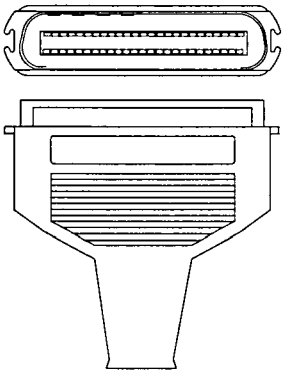
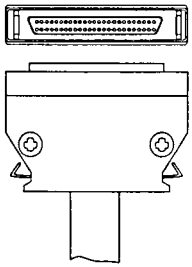
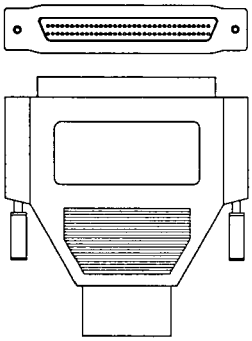
SCSI connector descriptions

Table 12 contains descriptions of the SCSI connectors illustrated in Figure 6.

Table 12 **SCSI connector descriptions**

Type	Description
Cent - M50	Centronics male 50 pin
Cent - FM50	Centronics female 50 pin
HD - M50	High density male 50 pin
HD - FM50	High density female 50 pin
HD - M68	High density male 68 pin
HD - FM68	High density female 68 pin

Figure 6 SCSI connectors

MALE	FEMALE
Cent - M50 	Cent - FM50 
HD - M50 	HD - FM50 
HD - M68 	HD - FM68 

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