HP 800 Series Support Kit for Model TZ88 20/40 GB DLT Tape Family

StorageWorks™

Supported Products

This kit provides support on the HP 800 series platform for the StorageWorks family of 20/40GB DLT Tape Drives and Mini-libraries. The following StorageWorks products are supported on HP Series 9000/S800 servers running HP-UX 9.04, HP-UX 10.01, or HP-UX 10.10:

SWXTL-CA	20/40GB DLT Tape Drive Model TZ88 Tape Drive in StorageWorks Building Block
SWXTL-CT	20/40GB DLT Tape Drive Model TZ88 Tabletop Tape Drive
SWXTL-CL	100/200GB DLT Tape Mini-library Model TZ885 Tabletop
SWXTL-CM mount	100/200GB DLT Tape Mini-library Model TZ885 Rack-
SWXTL-CO	140/280GB DLT Tape Mini-library Model TZ887 Tabletop
SWXTL-CR mount	140/280GB DLT Tape Mini-library Model TZ887 Rack-

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Introduction

The HP 9000/S800 servers, employing the HP Precision Bus (P–Bus or HP–PB) architecture, use the *tape2* driver to communicate with tape devices. The adapter used for the single-ended narrow (SE) bus is P/N A1703–60003, and the adapter used for the fast, wide, differential (FWD) bus is P/N 28606–60001.

Only certain tape devices will function with this driver. The TZ882DLT utility supplied in this kit will change the identity of the TZ88x to its equivalent DLT4x00 counterpart. It will then be recognized and usable to the operating system.

The HP 9000/S800 servers employing the HP High Speed Channel Bus (HSC), and running HP–UX 10.x, use the *stape* driver to communicate with tape devices. S700 workstations running V10.x also use this driver. The adapter used for the HSC fast, wide, differential (FWD) bus is P/N A2969A.

The TZ88 drive or mini-library is ready for use with this driver, and no identity change is necessary to communicate with the operating system. Simply connect the drive and perform the system administrative tasks as outlined in Appendix E of the user's guide. Certain application programs, however, may not recognize the TZ88x device and will require the use of the TZ882DLT utility to change its identity. Refer to the documentation supplied with your particular application to determine which tape device it supports.

For those systems using the *stape* driver, no special kernel configurations are necessary to change the device identity. If your application requires a device identity of DLT4x00, simply execute the utility as below, specifying the appropriate drive device file as the argument:

```
./TZ882DLT /dev/rmt/c0t1d0BEST
```

In summary, a DLT device running on a *tape2* driver always requires an identity change to DLT4x00. A DLT device running on an *stape* driver generally does not require an identity change unless an application, such as OmniBack II, requires a DLT identity.

HP 9000/S800 Servers HP-UX 9.04

To install a 20/40GB DLT family device on an HP Series 9000/S800 server running HP-UX 9.04, follow the directions which follow:

- **Connecting the Tape Drive/Mini Library**

1. Power down and physically connect the StorageWorks DLT tape drive or Mini-library to the system.

- **Installing HP-UX Patch PHKL_7643**

2. Install HP-UX kernel patch PHKL_7643 or equivalent. This patch, provided by HP, provides generic DLT support on a HP 9000/S800 platform running HP-UX 9.04. You can check whether this patch is already installed by issuing the following command:

```
#what /hp-ux | grep PHKL_7643
```

If any output is produced, this patch has already been applied. Otherwise, retrieve this patch from HP and install it according to the instructions supplied with the patch.

- **Installing HP Pass-thru Driver**

3. Install the HP provided *SCSI pass-thru* driver if it is not already built into the kernel. You can check whether this driver is already installed by issuing the following command:

> **#ls /etc.conf/lib/libspt.a**

Check for proper revision of the *pass-thru* driver by using the following command:

> **what /etc/conf/lib/libspt.a**

If the revision is anything other than, scsi_pt.c $Revision: 2.1.1.2
$ $Date: 95/03/24 14:50:24 $ PATCH_9.04 (PHKL_5405)   then install
 patch PHKL_5405 as in step A. If the correct revision is present, do not install the patch and proceed with the *pass-thru* driver installation in step B.

A. Installing Patch PHKL_5405

If the *NIO SCSI pass-thru* driver is not present, install it as follows:

- Log into the systems as **root**

- Save old versions of the library and the boot kernel (as a precaution, in case you need to restore the system to the present state)

  > **#cd /etc/conf/lib**

  > **#cp libhp-ux.a libhp-ux.aORIG**

  > **#cp /hp-ux /hp-uxORIG**

- copy the patch PHKL_5405 into the /tmp directory. Change to the /tmp directory and unshare the patch:

#cd /tmp

#sh PHKL_5405
- Follow the instructions in the patch text file.

- After the system has booted, verify that the patch drivers are in the new kernel by typing:.

#what /hp-ux | grep 5405

You should see:

**scsi_pt.c $Revision: 2.1.1.2 $ $Date: 95/03/24 14:50:24 $
PATCH_9.04 (PHKL_5405)**

NOTE

These instructions are based upon the HP-UX man page for scsi_pt (man 7 scsi_pt). Please refer to this man page if more details are desired regarding any aspect of the *pass-thru* driver installation.

B. Installing the Driver

- Get information about peripherals attached to your system:

    #ioscan -f

- Make a backup copy of the original /etc/master file.

    #cp /etc/master /etc/master.nospt

- Edit the **/etc/master** file and add the lines from the file **/etc/contrib/bin/master.diff** to your **/etc/master** file where other drivers are defined.

- Add the library **"libspt.a"** to the **loadorder** statement in the **/etc/master** file.

- Make a backup copy of the kernel gen file in **/etc/conf/gen** (typically named **/etc/conf/gen/S800**).

    #cp /etc/conf/gen/S800 /etc/conf/gen/S800.nospt

- Edit the gen file, adding the include statement for the *SCSI pass-thru* driver (*spt*) at the end of the include statements.

    include spt;

- Add an "io statement". The io statement is used to include drivers that do not support autoconfiguration. In this case, the "io statement" is needed to map the *spt* driver to the TZ88 at hardware path 0/16.0.0.

The following line is an excerpt from the ioscan that describes the TZ88:

```
Class      LU H/W Path  Driver                      S/W Status


============================================================
unknown  -  0/16.0.0  Bus_converter.scsi1.target.? No_Driver
```

- Use the output from ioscan to select an unused S800 Class LU. The example below uses S800 Class LU 2. If the device class is not in the kernel, any LU will work.

  The corresponding "io statement" looks like this:

```
io {
  bus_converter address 0 {
    scsi1 address 16 {target address 0 {  /*TZ88 SCSI ID (0)*/
      spt lu 2 address 0;     /*TZ88 SCSI LU (0), Class LU 2*/
            }
          }
        }
    }
```

- On a system without a bus converter, simply leave out the bus_converter line in the io statement and the corresponding closing brace.

  scsi1 is the NIO SCSI device driver,
  16 is the NIO SCSI card ID.
  target address 0 indicates SCSI ID 0.
  In the line **spt lu 2 address 0; address 0** indicates SCSI LUN 0.

The required "spt lu" entry:
- is driver dependent
- must be unique and in the range of 0 to 0xff inclusive
- can be arbitrarily assigned it does not have to be in sequence.

NOTE

Do not confuse the s800 class LU with the SCSI lu! The class LU is an identifier of the device class instance. The SCSI lu is an address extension within the same SCSI ID.

- Change directories to the build directory.

  #cd /etc/conf/gen

- Run uxgen to build the new kernel.

    ```
    #/etc/uxgen S800
    ```

- Make a backup copy of the system's current kernel, and move the new kernel into place.

    ```
    #mv /hp-ux /hp-ux.nospt
    ```

    ```
    #mv /etc/conf/S800/hp-ux /hp-ux
    ```

- Reboot the system.

    ```
    #/etc/shutdown -r 0
    ```

- **Executing the StorageWorks Utility**

4. Boot the kernel with the *SCSI pass-thru* driver and execute the Digital supplied utility provided with this kit as follows:

    - Once the system reboots login as root. The TZ88 should now have the *spt* driver attached.

    - Run the ioscan command to verify that the system configuration is what you expect.

    - The *spt* driver should be tied to the appropriate hardware, and the S/W Status should read ok.

    ```
        #ioscan -f -C spt

    Class LU H/W Path Driver                      S/W Status

    ================================================================
        spt   2  0/16.0.0 bus_converter.scsi1.target.spt ok
    ```

    - Make device special files for the pass-thru devices. The character major number is 105, and the minor number format is 0x00LU00, where LU is the Logical Unit assigned to the device (see ioscan(1M)). This example makes the device special file for the spt mapped device at LU 2.

    ```
        #mknod /dev/rmt/DLT c 105 0x000200
    ```

- Extract the utility program TZ882DLT from the supplied 4mm DAT tape:

  #cpio -icvumB < *4mm_DAT_tape_drive_device_file*

  > **NOTE**
  >
  > This tape was written using an ASCII header. The files may be extracted on any UNIX platform with the above command.

- Execute the program supplied to change the productid string:

 # ./TZ882DLT /dev/rmt/DLT

- The program will return a message stating whether or not the change was successful. If it was not, refer to the troubleshooting section. If it was successful, move the original kernel back in place and reboot it. You can now use the StorageWorks DLT drive or Mini-library.

- **Using the DLT Tape Drive**

5. Reboot the original kernel without the *SCSI pass-thru* driver but with patch PHKL_7643.

    - Run ioscan -f and ensure that the *tape2* driver is now attached to the StorageWorks device, now displayed as a DLT4000, DLT4500 or DLT4700 depending on the device. You are now able to use the drive on the HP 9000/S800 server running HP-UX 9.04

      #ioscan -f

- **Troubleshooting the Installation**

6. If the *NIO SCSI pass-thru* driver is not working:

    - Verify the proper configuration of the *SCSI pass-thru* driver into the kernel

      #lsdev | grep spt

    - Verify that the hardware is set up properly.

    #ioscan -f

      - Check that the device is connected, and that its SCSI Bus address is set properly.
      - Check the reference manual for the device to verify that it is configured properly.
      - Check that the SCSI Bus is properly terminated.

- Verify that the device is operational using some other driver if possible. If a hardware problem is suspected, the *SCSI pass-thru* driver must be unconfigured for that device and the HP specific device driver must be configured before any diagnostic software can be run.

- Verify the special device file.

#ll /dev/rmt/DLT

- Find the major number for the SCSI pass-thru driver. For example, **lsdev -d spt** might show:

#lsdev -d spt

```
Character       Block          Driver          Class
   105            -1            spt             spt
```

- Find the target SCSI ID and SCSI LUN for StorageWorks device. For example **ioscan -f -C spt** might show:

#ioscan -f -C spt

```
Class LU  H/W Path   Driver                        S/W Status

================================================================
spt   2   0/16.0.0   bus_converter.scsi1.target.spt ok
```

- In this example there is one desired device:
  Device #1, target SCSI ID = 0, SCSI LUN = 2

- Verify that this is the same value used in the special device file. In this example, **ll /dev/rmt/DLT** should show:

#ll /dev/rmt/DLT
crw-rw-rw- 1 root sys 105 0x000200 Dec 14 15:10 DLT

HP 9000/S800 Servers HP-UX 10.01 or 10.10

To install a 20/40GB DLT family device on an HSC architecture server running HP-UX 10.01 or 10.10 simply connect and perform the necessary system administration tasks specified in the user's guide. No device modifications are necessary to communicate with the operating system.

To install a 20/40GB DLT family device on the HP–P bus of an HP Series 9000/S800 server running HP-UX 10.01 or 10.10, follow these directions:

- **Connecting the Tape Drive/Mini Library**

1. Power down and physically connect the StorageWorks DLT tape drive or Mini-library to the system.

- **Installing HP-UX Patch PHKL_7861 (for 10.01) or PHKL_7853 (for 10.10)**

2. Install the appropriate HP-UX kernel patch listed above. These patches, provided by HP, provide generic DLT support on the HP 9000/S800 platform running HP-UX 10.01 and 10.10. You can check whether this patch is already installed by issuing the following command:

    ```
    #what /stand/vmunix | grep PHKL_7861
    ```

    For HP-UX V10.10, substitute PHKL_7853.

    If any output is produced, this patch has already been applied. Otherwise, retrieve this patch from HP and install it according to the instructions supplied with the patch.

- **Installing HP Pass-thru driver**

3. Install the HP provided *SCSI pass-thru* driver patch PHKL_5406 if it is not already built into the kernel.

    The SCSI pass-thru file set comes with the core system and will exist after an install or an update. The files in this set (and their proper destinations) are:

    ```
    Filename      Protections      Full path
    libspt.a      -r--r--r--       /usr/conf/lib/libspt.a
    scsi_io.c     -r--r--r--       /usr/contrib/src/scsi_io.c
    scsi_pt.7     -r--r--r--       /usr/share/man/man7.Z/scsi_pt.7
    spt           -r--r--r--       /usr/conf/master.d/spt
    ```

    The following configuration steps need to be completed to successfully use the *NIO SCSI pass-thru* driver. This driver does not auto-configure on P–BUS architecture servers.

    - Go to the build area:

    ```
    # cd /stand/build
    ```

- Create a system file from your existing kernel:

```
# /usr/lbin/sysadm/system_prep -s system
```

- Get information about peripherals attached to your system:

```
# ioscan -f
```

- Check that the tape device is displayed as in the following example:

```
tape 0 56/40.4.0 tape2 CLAIMED DEVICE DEC TZ88 (c) DEC
```

- If the drive is not displayed, check all connections and cables. Also check for possible SCSI ID conflicts

- Check if the *SCSI pass-thru* driver is already configured into your current kernel:
```
# grep spt system
```

- If a **spt** line was printed similar to the following, the *pass-thru* driver is already configured, and you may proceed to step 4, Executing the StorageWorks Utility.

```
driver 56/40.4.0 spt
```

- Otherwise, add a line to the end of the system file as in the following:

```
# cat >> system
driver <path> spt
   ...
^D              # control "D" to exit the cat command
```

<path> = complete hardware path of desired device (from **ioscan** cmd). For the above example, use **56/40.4.0**. This binds the *spt* driver to the tape device.

- Create the **conf.c** and **config.mk** files:

```
# /usr/sbin/config -s system
```

- Build a new kernel:

```
# make -f config.mk
```

- Verify that the *pass-thru* driver has been built into the new kernel. (A line giving the revision information should be printed):

```
# what ./vmunix_test | grep scsi_pt
```

- Save the old system file:

```
# mv /stand/system /stand/system.prev
```

- Move the new system file to be the current one:

```
# mv ./system /stand/system
```

- Save the old kernel:

```
# mv /stand/vmunix /stand/vmunix.prev
```

Move the new kernel to be the current one:

```
# mv ./vmunix_test /stand/vmunix
```

- Boot the system from the new kernel:

```
# exec reboot
```

- **Executing the StorageWorks Utility**

4. Boot the kernel with the SCSI pass-thru driver, create the necessary device files and execute the Digital utility supplied with this kit as follows:

- Login as root.

- Verify the peripheral configuration:

```
# ioscan -f
```

The TZ88 should now have the *spt* driver attached as in the following:

```
spt 0 56/40.4.0 spt CLAIMED DEVICE DEC TZ88 (c) DEC
```

- Determine the major number for the *SCSI pass-thru* driver. This will be the number displayed in the character column of the following command:

```
# lsdev -d spt
```

You should see an output similar to the following:

```
Character      Block      Driver      Class
   75            -1          spt         spt
```

- Create the special device file to access the scsi_pt peripheral (refer to the example in the troubleshooting section):

`# mknod /dev/rmt/DLT c <major #> <minor #>`

<major #> = character major number (from lsdev cmd) — In the above example, this is 75.

<minor #> = minor number in the format 0xIITL00

II = 2 digit card instance number (from **`ioscan`** cmd; proper **`ext_bus`** entry)

T = Target ID number (SCSI ID) — In the above example, this is 4.

L = Lun number (SCSI LUN) — In the above example, this is 0.

00 = Reserved fields, must be zero

- Extract the utility program TZ882DLT from the supplied 4mm DAT tape:

`#cpio -icvumB < 4mm_DAT_tape_drive_device_file`

NOTE

This tape was written using an ASCII header. The files may be extracted on any UNIX platform with the above command.

- Execute the program supplied to change the productid string:

`# ./TZ882DLT /dev/rmt/DLT`

- The program will return a message stating whether or not the change was successful. If it was not, refer to the troubleshooting section. If it was successful, move the original kernel back in place and reboot it. You can now use the StorageWorks DLT drive or Mini-library.

- **Using the DLT Tape Drive**

5. Reboot the kernel without the *SCSI pass-thru* driver but with the patch PHKL_7861 or PHKL_7853.

- Run ioscan -f and ensure that the *tape2* driver is now attached to the StorageWorks device, now displayed as a DLT4000, DLT4500 or DLT4700 depending on the device. You are now able to use the drive on the HP 9000/S800 server running HP-UX 10.01 or 10.10.

`#ioscan -f`

- **Troubleshooting the Installation**

6. If the *NIO SCSI pass-thru* driver is not working:

  - Verify the proper configuration of the *SCSI pass-thru* driver into the kernel.

  # lsdev -d spt
  - Verify that the hardware is set up properly. **ioscan -f**
    - Check that the device is connected, and that its SCSI Bus address is set properly.
    - Check the reference manual for the device to verify that it is configured properly.
    - Check that the SCSI Bus is properly terminated.
    - Verify that the device is operational using some other driver if possible. If a hardware problem is suspected, the *SCSI pass-thru* driver must be unconfigured for that device and the HP specific device driver must be configured before any diagnostic software can be run.

  - Verify the special device file.

  # ll /dev/rmt/DLT

  - Find the major number for the SCSI pass-thru driver. For example, **lsdev -d spt** might show:

  # lsdev -d spt

```
        Character       Block       Driver          Class
           75            -1         spt             spt
```

  - Find the card instance number, target SCSI ID and SCSI LUN for the desired device. For example **ioscan -kf** might show:

```
Class    I  H/W Path  Driver S/W State H/W Type  Descri ption

================================================================
bc       0              root   CLAIMED    BUS_NEXUS
ext_bus 2  8            scsi1  CLAIMED    INTERFACE HP 28655A - SC
target  0  8.4          target CLAIMED    DEVICE
spt     0  8.4.0        spt    CLAIMED    DEVICE    DEC     TZ88
          ...
```

  - In this example there is one desired device:
    Device #1, card instance number = 2, target SCSI ID = 4,
    SCSI LUN = 0

- Verify that this is the same value used in the special device file. In this example, `ll /dev/rmt/DLT` should show:

```
# ll /dev/rmt/DLT
crw-rw-rw-   1 root  sys  75 0x024000 Dec 14 15:10 DLT
```