SPP-UX V5.3 Distribution Notice

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SPP-UX V5.3 Distribution Notice

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1 Overview

This notice describes the March 1998 Exemplar SPP-UX V5.3 software release. Please refer to this document before reporting problems; your questions may be answered here.

Hardware requirements

This Software Distribution supports all Exemplar platforms except the Exemplar 1000 Series, which is not covered by this release. Acceptable platforms include the following systems:

- Hewlett Packard Exemplar SPP-1200/XA systems
- Hewlett Packard Exemplar SPP-1200/CD systems
- Hewlett Packard Exemplar SPP-1600/XA systems
- Hewlett Packard Exemplar SPP-1600/CD systems
- Hewlett Packard Exemplar SPP-2000 S-Class Systems
- Hewlett Packard Exemplar SPP-2200 S-Class Systems
- Hewlett Packard Exemplar SPP-2000 X-Class Systems
- Hewlett Packard Exemplar SPP-2200 X-Class Systems

A test station must be connected to the DaRT (diagnostic) bus of the hypernode of the Exemplar system through the test station's `lan1` Ethernet port.

Software requirements

This software distribution supports upgrade paths from all previous releases of Exemplar software. The release is directly upgradeable from any 5.x release and upgradeable via a scratch install path for all previous releases. For details on scratch upgrade procedures from 4.X and earlier releases, refer to the *SPP-UX V5.2 Distribution Notice*.

2 Contents

The software in these tables is delivered on separate DAT cartridges.

Table 1 products must be installed on SPP-1200 and SPP-1600 Series test stations running HP-UX 9.05.

Table 2 products must be installed on SPP-2000 and SPP-2200 Series test stations running HP-UX 10.20.

Table 3 shows all products for the Exemplar System, these products are delivered on a DAT cartridge labeled SPP-UX/OPTIONAL PRODUCTS V5.3.

Also included with this release are two additional DAT cartridges:

- SCRATCH INSTALL V5.3

  This tape is required when upgrading from any release previous to SPP-UX 5.0 or for emergency restoration procedures.
- LAYERED PRODUCTS PATCH V5.3

  Includes any additional software related to layered products.

Table 1 list products to be installed on SPP 1200/1600 test stations.

Table 1 Test Station Software for SPP1200/1600 V5.3

Product	Version	Part Number	Disk Space Used
1-1-installsw	7.4	B5655-10010	56K
1-Diags	8.0	B5655-10042	280M
1-OBP	2.0.3	B5655-10037	52K
1-SPP-UX_ts_901	5.3	B5655-10067	7M

Table 2 list products to be installed on 2000/2200 series test stations.

Table 2 Test Station Software for SPP2000/2200 V5.3

Product	Version	Part Number	Disk Space Used
1-ExDiags	4.1	B6044-10014	218M
1-POST	4.1	B6044-10013	150K
1-OBP	3.1.7	B5655-10065	52K
1-PDC_ENTRY	3.1.7	B5655-10066	27M
1-SPP-UX_ts	5.3	B5655-10064	7M

Table 3 lists the Exemplar SPP-UX systems software and optional products. Underlined products are bundled with product SPP-UX.

Table 3 SPP-UX/Optional Products V5.3

Product	Version	Part Number	Disk Space Used
C-ANSI-C	1.2.4	B5620-10003	14M
C-Plus-Plus	11.0.2	B5630-10003	2M
CXTools - CXdb, CXpa, Cxtrace	4.3	B5639-10009	30M
FORTRAN	1.2.5	B5600-10003	18M
FORTRAN90	1.1.131	B5876-10003	20M
MPI	1.3.1	B5880-10003	6M
PVM	3.3.11	B5885-10001	10M
MLIB	5.0	B5649-10003	26M
NQS	2.3	B5589-10001	3M
SILO	1.1	B5655-10015	10M
SPP-UX (bundle)	5.3	B5655-10063	1K
SPP-UX_env	5.3	B5655-10060	17M
SPP-UX_libc	5.3	B5655-10061	10M
SPP-UX_ls	1.5	B5655-10017	1M
SPP-UX_mk	5.3	B5655-10058	30M
SPP-UX_server	5.3	B5655-10059	28M
SPPXMOTIF	2.0.1	B5655-10027	19M
SX	2.1	B5655-10056	50M
TMR	1.3.1	B6017-10001	50M
VAST90	3.4.2	B5610-10001	50M

Exemplar System Software descriptions

SPP-UX - A bundle that is used to install all required SPP-UX core products.

C-ANSI-C - HP bundled C compiler and ANSI compatible compiler.

CXTools - A bundle of CXdb, CXpa, and CXtrace.

C-Plus-Plus - HP C++ compiler.

CXdb - The Symbolic Debugger.

CXpa - The Performance Analyzer.

CXtrace - Graphical trace tool for PVM/MPI applications.

FORTRAN - HP Fortran 77 compiler.

FORTRAN90 - HP Fortran 90 compiler.

MLIB - Mathematical libraries.

MPI - MPI message passing software.

NQS - Batch queue utility.

PVM - PVM message passing software.

SILO - Provides mount and dismount services for StorageTek tape silo.

SPP-UX_env - SPP-UX systems software environment.

SPP-UX_libc - Libraries, include files, and compiler support.

SPP-UX_ls - FLEXlm license server.

SPP-UX_mk - SPP-UX operating system microkernel.

SPP-UX_mpi - HP MPI Runtime bundle. Minimum set of MPI utilities needed to execute existing MPI applications, namely "mpirun" and its manpage. MPI applications that need to execute on a cluster or on multiple subcomplexes require the HP MPI Runtime Bundle. It is not possible to create MPI applications using the HP MPI Runtime bundle alone. You must license and install the optional HP MPI product that includes the libraries needed to build MPI applications.

The HP MPI Runtime Bundle is overwritten when the HP MPI optional product is installed.

SPP-UX_server - SPP-UX Operating System server.

SPPXMOTIF - The HP-UX X11 VueDevKit.

SX - System Exerciser, a generic test driver used for stress testing Exemplar S-Class SPP Systems. SX has an interactive GUI interface.

TMR - Provides mount and dismount services for the C494 automated tape library.

VAST90 - Fortran 90 compiler/interpreter.

3 Installation Overview / Upgrade Preparation

Your installation kit consists of the following materials:

- Five DAT Cartridges:
  - "SPP-UX/OPTIONAL PRODUCTS V5.3," Part Number B5655-60029. Contains the Exemplar Operating System, SPP-UX V5.3, as well as the Systems Software and Optional Products for your Exemplar.
  - "TEST STATION SOFTWARE FOR SPP2000/2200," Part Number B5655-10064. Contains the Test Station software components required for an SPP-2000/2200 (X and S-class system) test station.
  - "TEST STATION SOFTWARE FOR SPP1200/1600," Part Number B5655-10067. Contains the Test Station software components required for an SPP-1200 or SPP-1600 class test station.
  - "SCRATCH INSTALL V5.3," Part Number B5655-60030. Contains the components required to build an entire SPP-UX V5.3 root disk from scratch. This tape is used when upgrading from versions of SPP-UX prior to V5.3, or if your root disk has become unrecoverably damaged and must be re-created.
  - "LAYERED PRODUCTS PATCH V5.3," Contains any required patches for the layered products.

- *SPP-UX 5.3 Release Notice*, Part Number B5655-90050.
- *SPP-UX V5.3 Distribution Notice* (this document).

After installation, online versions of release notices for most products listed in Table 3 will be located in /usr/share/doc.

Contact the HP Resource Center if your installation kit is incomplete.

Upgrade paths

If you are upgrading from Version 5.0 or later of SPP-UX follow the instructions in Chapter 5 on Upgrading Exemplar systems software and optional products.

If you are upgrading from a previous version of SPP-UX you will need to follow the instructions for scratch installation in chapter 4 of this document, or upgrade to SPP-UX V5.0 or later and then follow instructions in Chapter 5.

4 Scratch Installation

This chapter contains instructions for performing a scratch installation of SPP-UX in the event that the working copy of your operating system is damaged or destroyed.

Caution

Do not perform a scratch installation without first reading all of the instructions in this document. Failure to follow these instructions can result in unrecoverable loss of data on your system.

Scratch Installation Prerequisites

This installation procedure requires that the following conditions be met:

- Your Exemplar system must have at least one properly functioning hard disk drive installed. For a full root scratch installation, this disk must have a capacity of at least 2 GB if it is unlabeled. If it is labeled, it must have at least 900Mb of free space. The scratch installation program will provide you with a list of disk drives on your system that meet these requirements.

  The scratch installation program refers to the hard disk on which you install the working copy of SPP-UX as the *root device.*
- You must be running version 3.1 or later of OBP PROM (OBP). If you are unsure what version of OBP you are running, you can determine that by looking at the banner OBP prints when it boots. OBP version 3.1 was bundled with SPP-UX V5.2. Thus, if your Exemplar system was running SPP-UX V5.2 or later, you have a version of OBP later than V3.1. If you were running a version of SPP-UX earlier than V5.2, or a version of OBP earlier than V3.1, you must upgrade your system to those versions.
- You need a copy of the Exemplar SPP-UX V5.3 Scratch Installation DAT cartridge.

Preinstallation Tasks

Perform the following tasks before starting the scratch installation procedure:

Step 1 Perform this step only if your root disk is unusable and has to be replaced. Move the new root disk into SCSI ID 0x2.

1. Power off the peripheral chassis.
2. Remove the bad disk from SCSI ID 0x2; replace it with the new disk.
3. Restore power to the peripheral chassis.

Step 2 At the OBP prompt from the Exemplar System Console window, make sure that the rmt0 device is aliased to the Exemplar DAT drive. Use the `devalias` command to see the current setting of the alias:

```
[0:3] ok devalias
rmt0     /mbus@0/ffec0000/sbus@f,fcffff00/Convex,afws@1,10000/st@0,0
```

The example above shows a typical device alias for a tape device on an SPP 1200 or SPP 1600. On an SPP 2000/2200, a typical device alias for a tape device would look like the following:

```
rmt0  /pci@fe,290000/qlisp@1000,0/st@0,0
```

If this alias is not set or is not correct, use the `show-map` command to get the device path you need to alias the device to rmt0:

```
[0:3] ok show-devs
/pci@fe,290000/qlisp@1000,0/st
```

Copy this value to your X windows text buffer; then enter the following command at the OBP prompt, pasting the value in the text buffer after `rmt0`:

```
[0:3] ok nvalias rmt0 /pci@fe,290000/qlisp@1000,0/st@0,0
```

Note **"@0,0" was appended to the device path returned by the show-devs command.**

Step 3 Reset the system:

```
[0:3] ok reset
```

Insert the Exemplar Scratch Install DAT cartridge into your Exemplar system's DAT drive. The Scratch Install DAT cartridge is labelled:

Scratch Install
Exemplar SPP-UX v5.3

Step 4 When a new Exemplar System Console window appears on the test station, enter the following commands in the console window at the OBP prompt:

```
[0:3] ok set-boot-virtual
[0:3] ok boot rmt0 -noheader
```

Note **The option "-noheader" is required if your Exemplar system is running OBP V3.1 or later. OBP prints its version information each time it boots. If you are unsure what version of OBP you are using, look for the banner when OBP boots. All SPP 1200/1600 machines should omit "-noheader".**

Step 5 The scratch installation program displays some information in the console window, followed by the following menu:

```
Are you ready to begin the installation?
0. No
1. Yes
2. Exit
Choice (default is 1):
```

Enter 1 at the prompt and press the Return key to continue the installation procedure.

Step 6 The scratch installation program lists the devices installed on the Exemplar system that can be used to install the Exemplar Scratch Tape:

```
Searching for install devices .......

Select an Install Device

------------------------

0. rmt0
1. Other user specified device
2. Help
3. Exit
```

Enter 0 to select the DAT drive attached to node 0 (`rmt0`).

Step 7 The scratch installation program displays a list of choices for the type of scratch installation you can perform:

```
Select an Installation Type

--------------------------

1.  Minimum bootable root file system
2.  Full root file system
3.  Other user specified device
4.  Help
5.  Exit
Choice (default is 2):
```

If you want to attempt to repair your root filesystem, you may do so by installing a minimum root filesystem on another partition, booting on the minimum root filesystem, and attempting to repair the damaged root filesystem. If you believe that your root filesystem is damaged beyond repair, you should install a full root file system. The instructions for installing a full root file system are detailed in the sections immediately following this. If you would like to attempt to install a miniroot file system, skip to the section labeled "Mini-root Scratch Installation."

Full Root Scratch Installation

In order to perform a Full Root Scratch Installation, you should have completed the steps listed above in the "Preinstallation Tasks." To perform a Full Root Scratch Installation, select option 2 in the menu shown above in Step 7. Enter 2 and press Return to perform a full root installation.

At this point, the scratch installation program prints the options you have selected and prompts you to enter 1 if you wish to continue with these options.

Next, the scratch installation program prints a message instructing you to insert the installation media into the installation device you have selected if you have not done so already. Make sure that the Exemplar Scratch Installation DAT cartridge is inserted into the device you have selected, then press the Return key to continue.

If you choose to install on a new disk, unplug the old root disk before beginning. The install will set the label of the new disk to sd0 and would conflict with the old root disk. Another way to avoid the conflict is to use diskutil and relabel the old root disk to some name other than sd0. You will need to use the `Force remap` command from diskutil as the current root disk is active.

Step 1 The scratch installation program displays a list of devices that are connected to an fcode-enabled Ultra-SCSI controller that can be used as a root device for the installation. The list may look like the following:

```
Searching for root devices .......
Select a new Root Device to Install
-----------------------------------
0.  sd6a     20480K     <No Description>
1.  sd6b     1048576K   Default Pager Partition    D
2.  sd6c     40960K     Crashdump Partition        C
3.  sd3a     2048000K   <No Description>
4.  sd3b     2048000K   <No Description>
5.  Other user specified device
6. Help
7. Exit
Choice:
```

Note **The disk you choose will be relabelled and partitioned; all data previously on the disk will be lost.**

If you do not see the device that you intend to use as your root device, you can increase the selections by fcode-enabling additional Ultra-SCSI controllers. It is recommended that you have no more than three Ultra-SCSI controllers fcode-enabled. To fcode-enable other controllers, exit the scratch install program and enter the OBP commands like those shown below. (The example below would fcode-enable Epic 2, slot 1.)

```
[0:3] ok setenv pci[2]-fcode-enable 1
[0:3] ok reset
```

If you need to exit the scratch install program to fcode enable more Ultra-SCSI controllers, do so now, and then go back to Step 4 of the Preinstallation Tasks and begin once more from there. Otherwise, enter the number corresponding to the device on which you wish to install SPP-UX V5.3 and press the Return key.

The scratch installation program displays the root device you have selected and prompts you to verify that this is the device you want to use. If this information is correct, type 1 and press the Return key.

```
You have selected the root device:
Description:   sd3a
  Hardware Path:
/pci@fe,10000/qlisp@0,0/sd@2,0:a
                    SCSI ID 2 ^^^^^^
```

Note **Write down the hardware path returned from the selection above. It will be needed in Step 5.**

```
is this ok?
  0.    No
  1.    Yes
  2.    Exit
```

Step 2 Make sure that the hardware path information is correct before continuing. If you have installed a new root disk in SCSI ID 0x2, the hardware path should contain the information shown previously for an SPP 2000/2200.

Caution

Failure to verify the hardware path can result in the loss of all data on a disk.

Step 3 The scratch installation program copies SPP-UX V5.3 to the root device and creates a root filesystem, a paging partition, a miniroot partition, a crashdump partition, and a user space partition on the device. The program prints a message each time one MB of disk space has been formatted and written. This operation is finished when the program prints the following message:

```
899 Megabytes read, 899 Megabytes written
```

This step takes approximately 45 minutes.

Step 4 When the installation is completed, you must reboot OBP before booting your new root disk. Enter the `reset` command at the OBP prompt:

```
[0:3] ok reset
```

Step 5 Before you boot SPP-UX, validate that your boot device hardware path matches the path to the disk drive that you have just written to and correct it if necessary. Also, confirm that the boot-directory is set to /stand/spp1 for SPP1200 and SPP1600 class machines, or /stand/spp3 for SPP2000 (X and S-class machines.) One may examine the current boot device hardware path by using the `printenv boot-device` command at the OBP prompt.

Step 6 Boot the Exemplar system by typing the following command in the Exemplar System Console window at the OBP prompt:

```
[0:3] ok boot
```

Step 7 Since a new root disk has been built, you will have to reenter the networking configuration for your Ethernet interface.The following prompt displays:

```
Are you ready to link this system to a network?
Press [y]es, [n]o, or [a]bort, then press [Return] y
```

Enter `y` to answer the networking questions with the information specific to your system.

Note

If you select "yes", this script will only configure the Ethernet interface. To configure any other interfaces (such as FDDI, HIPPI, or ATM), you must edit the file /etc/rc.config.d/netconf after SPP-UX finishes booting. For detailed instructions on how to use the /etc/rc.config.d/netconf file, refer to the *Exemplar Networking Guide, S-Class Servers*.

The Exemplar root filesystem is now ready to use. If you like, you may also perform the steps listed in the next section to install the backup miniroot partition. This may save you time later if your root filesystem ever becomes damaged and you would like to boot on the miniroot filesystem to repair it.

Further information on configuring your SPP-UX system is available in the *SPP-UX System Administration Guide.*

Mini-root scratch installation

This procedure installs a minimal root filesystem on the disk partition that you specify. Use this procedure if you intend to recover your old root filesystem and reinstall it. If your old root filesystem is irrecoverable, you need to perform a full root installation.

In order to perform a mini-root scratch installation, you must have completed the steps detailed in the section above titled "Preinstallation Tasks." In Step 7, of the pre-installation tasks, the scratch install program displays a list of choices for the types of scratch installation you can perform:

```
Select an Installation Type

-------------------------

1.  Minimum bootable root filesystem

2.  Full root filesystem

3.  Other user specified device

4.  Help

5.  Exit

Choice (default is 2):
```

Select 1 to perform a miniroot installation. The scratch installation program prints a message instructing you to insert the installation media into the installation device you have selected if you have not done so already. Make sure that the Exemplar Scratch Installation DAT cartridge is inserted into the device you have selected, then press the Return key to continue.

Step 1 The scratch installation program displays a list of devices that are attached to fcode-enabled Ultra-SCSI controllers that can be used as a root device for the installation. The list may look like the following:

```
Searching for root devices .......

Select a new Root Device to Install

---------------------------------

0.  sd0a          819200K     Root and /usr filesystem

1.  sd0b         1048576K     Default Pager Partition       D

2.  sd0c           40960K     Crashdump Partition           C

3.  sd0d         2048000K     <No Description>

4.  sd6a           20480K     <No Description>

5.  sd6b         1048576K     Default Pager Partition       D

6.  sd6c           40960K     Crashdump Partition           C
```

```
7.  sd3a            2048000K      <No Description>
8.  sd3b            2048000K      <No Description>
9.  Other user specified device
10. Help
11. Exit
Choice: 6
```

If you do not see the device that you intend to use as your mini-root device, you can increase the selections by fcode-enabling additional Ultra-SCSI controllers. It is recommended that you have no more than three Ultra-SCSI controllers fcode-enabled. To fcode-enable other controllers, exit the scratch install program and enter the OBP commands like those shown below. (The example below would fcode-enable Epic 2, slot 1.)

```
[0:3] ok setenv pci[2]-fcode-enable 1
[0:3] ok reset
```

If you need to exit the scratch install program to fcode enable more Ultra-SCSI controllers, do so now, and then go back to Step 4 of the Preinstallation Tasks and begin once more from there. Otherwise, select a miniroot or a crashdump partition from the list of available disk partitions or any other partition containing at least 50MB (over 100MB is highly recommended) that can be destroyed. Enter the number corresponding to the device on which you wish to install the SPP-UX miniroot and press the Return key.

Step 2 The scratch installation program displays the install device and the root device you have selected and prompts you to verify that these are the devices you want to use.

```
You have selected the root device:
  Description:   sd6c
  Hardware Path:
/pci@fe,10000/qlisp@0,0/sd@2,0:c
is this ok?
  0.    No
  1.    Yes
  2.    Exit
```

If this information is correct, enter 1 and press the Return key. If the information is not correct, enter 0 and press the Return key. Remember the hardware path that is returned; you will need this information to boot the miniroot filesystem.

The scratch installation again prompts you to verify the install device and the root device. Select 1 and press Return if this information is correct.

Step 3 The scratch installation program copies a miniroot SPP-UX image and creates a miniroot filesystem on the partition. The program prints a message each time one MB of disk space has been formatted and written. This operation is finished when the program prints a message of the following format:

```
47 Megabytes read, 47 Megabytes written
1535+1 records in
1535+1 records out
```

This step takes less than five minutes.

Step 4 When the installation is completed, you must reboot OBP before booting on your new miniroot disk partition. Enter a reset command at the OBP prompt:

```
[0:3] ok reset
```

Step 5 Use the OBP `show-devs` command to find the device path for the miniroot partition that you just created. From the OBP window, enter the following command:

```
[0:3] ok show-devs
```

The device path for the miniroot partition is displayed as follows:

```
/pci@fe,10000/qlisp@0,0/sd
```

Step 6 Boot the Exemplar system by typing the following command in the Exemplar System Console window at the OBP prompt:

`[0:3] ok` **`boot`** *device_path* **`-root`** *partition*

In the example above (as shown in Step 2), you would enter:

```
[0:3] ok boot /pci@fe,10000/qlisp@0,0/sd@2,0:c -root sd6c
```

Step 7 You now have a read/write filesystem and a working subset of SPP-UX v5.3. You can now attempt to recover your old root filesystem. The most common utilities for doing this are:

`fsck`

`frecover` (for backups made with fbackup)

`restore` (for backups made with dump)

For examples of these utilities, see the next section, "Miniroot troubleshooting procedures".

Man pages are not available on the miniroot filesystem. Use an sppuser window on the test station to view the man page for the utility you are using.

Step 8 When you have recovered your old root filesystem, you can boot the old filesystem from the OBP prompt by entering the following command:

```
[0:3] ok boot
```

Filesystem troubleshooting

This section contains procedures for recovering and restoring a damaged filesystem. The following commands must be executed as root.

Warning

Do not restore an entire SPP-UX V4.2 root filesystem into an SPP-UX V5.2 system. The root filesystem layout changed substantially from V4.2 to V5.2.

Miniroot troubleshooting procedures

Once you have installed and booted a miniroot system, you have use of a subset of the SPP-UX utilities. Only a limited number of /dev files are created on miniroot; you can use the `diskutil` utility to create /dev files for disks that do not have them.

Using the `diskutil` utility

In order to recover a filesystem, there must be a device file for the device the filesystem resides on in the /dev directory. To create a device file if one does not exist, enter the following commands:

```
SPP> diskutil
Diskutil: show disk
Diskutil: select disk sdxx (xx is a disk for which no device file exists; xx can be 0-99)
Diskutil: quit
```

Using the `fsck` utility

The first utility you should run to try to restore a damaged filesystem after booting a miniroot filesystem is `fsck`. Enter the following command (assuming sd0a is the disk partition containing the damaged root filesystem):

```
SPP> fsck /dev/dsk/sd0a
```

`fsck` presents a dialog that identifies problems with the filesystem on the disk you are checking and prompts you as to whether you want `fsck` to try to fix those problems.

If you decide to restore the root filesystem from a dump or an `fbackup` tape, use the appropriate utility—`restore` or `frecover`.

Using the `restore` utility

To restore a root filesystem from a dump tape, use the following example:

```
SPP> newfs -v -b 8192 -f 1024 /dev/rdsk/sd0a scalios
SPP> mkdir /restore
SPP> mount /dev/dsk/sd0a /restore
SPP> cd /restore
```

Insert the dump tape into the Exemplar DAT drive attached to node 0, then enter the following command:

```
SPP> restore r
```

Using the `frecover` utility

To restore a root filesystem from an `fbackup` tape, use the following example:

```
SPP> cd /
SPP> mkdir /recover
SPP> mount /dev/dsk/sd0a /recover
```

```
SPP> cd /recover

SPP> /etc/frecover -r -o -X -f /dev/rmt/0m
```

A single-CPU system subcomplex is necessary to perform backups and recoveries.

Full root troubleshooting procedures

Once you have performed a full root scratch installation, you can attempt to restore the old root filesystem from a dump or an `fbackup` tape. Use the appropriate utility—`restore` or `frecover`.

Using the restore utility

To restore a root filesystem from a dump tape, insert the dump tape into the Exemplar DAT drive attached to node 0, then enter the following commands:

```
SPP> cd /

SPP> restore r
```

Using the frecover utility

To restore a root filesystem from an `fbackup` tape, insert the `fbackup` tape into the Exemplar DAT drive attached to node 0, then enter the following commands:

```
SPP> cd /

SPP> /etc/frecover -r -o -X -f /dev/rmt/0m
```

A single-CPU system subcomplex is necessary to perform backups and recoveries. See the *SPP-UX System Administration Guide* for information on creating a subcomplex configuration.

5 Upgrading Exemplar Systems Software and Optional Products

This chapter describes the procedures for upgrading the SPP-UX operating system and optional layered software products.

SPP-UX V5.0 or greater must be installed prior to starting this installation. If the system is currently running an earlier version (e.g. SPP-UX V4.1), the system must be scratch installed to SPP-UX V5.3. See Chapter 4 on Scratch Install before continuing.

Before you begin, read Chapter 10, "Software licenses". Obtain your FLEXlm license keys before you begin this installation process; you have received a hard copy with this distribution. An online version is available on the HP WWW server. If you are a registered user of the HP Customer Web Server, you may obtain an electronic copy of your license keys from the server. This page (including registration instructions) can be reached at http://www.convex.com:90. This is a free service to all HP customers. If you do not have access to the HP net, contact the HP Response center for an electronic version. Refer to Chapter 11, "Getting Assistance," for more information.

This procedure installs the latest version of SPP-UX and Exemplar System Software and Optional Products on your Exemplar system. Insert the Systems Software and Optional Products DAT cartridge containing SPP-UX V5.3 into the DAT drive on node 0. This tape is labelled:

```
P.N. B5655-60012
Systems Software and Optional Products
Exemplar SPP-UX 5.3
```

Note

The node 0 DAT drive is not the same DAT drive that is connected to the test station.

Step 1 Start the `swagentd` daemon if it is not already running. Enter the following command in the Exemplar System console window to start the daemon:

```
/usr/sbin/swagentd
```

Troubleshooting Tip: If you are executing this process after a Scratch Install, you must configure networking before `swagentd` will run properly. If you answered the networking questions when you booted the first time on your SPP-UX V5.3 system, you supplied a hostname, IP address, and timezone, at a minimum. If you did this, SPP-UX continued the boot process and configured networking. If you did not do so at that time, `swagentd` may report the following error:

```
ERROR:   swagentd exiting due to initialization error in background
process.  Check the logfile "/var/adm/sw/swagentd.log" for
more information.
```

If you see this message, the log file will contain the following message:

```
ERROR:   Failure registering as Remote Procedure Call server using
protocol sequence "ncacn_ip_tcp" with endpoint "2121".  status
ffffffd (unknown facility)
ERROR:   Terminating prematurely - cannot inquire RPC bindings.  status
ffffffd (unknown facility)
```

To correct this, you must configure networking and then reboot. To do this, you must either use the script /etc/set_parms, or you must edit the file /etc/rc.config.d/netconf. For more information on configuring networking, refer to *Exemplar Networking Guide, S-Class Servers*.

Step 2 Install SPP-UX from the Systems Software and Optional Products DAT cartridge. Enter the following command:

```
/usr/sbin/swinstall -x rpc_timeout=9 -x reinstall=true -x
allow_downdate=true -x allow_multiple_versions=true -x
mount_all_filesystems=false -s /dev/rmt/0m '*'
```

This takes approximately 30 minutes to complete.

Note

If /dev/rmt/0m is not found then use the OBP mkmap command to map the tape device.

Example:

```
[0:0] ok mkmap 0 /pci@fe,29000/qlisp@1000/st@0,0
[0:0] ok reset
```

Step 3 Reboot the machine.

Note

See the Release Notices for each layered product. Release notices may contain information about how to set user PATH and MANPATH variables in order to have access to the newl- installed product.

6 Installing 2000/2200 Series Test Station Software

This procedure installs Exemplar Test Station Software for 2000/2200 Series Systems on HP-UX 10.20 based Exemplar test stations.

If the test station for your 2000/2200 Series System is not currently running HP-UX 10.20, it must be upgraded before continuing with this procedure. Contact the HP Response Center for information on upgrading your Test Station to HP-UX 10.20.

Step 1 Shut down SPP-UX on all nodes. From the Exemplar system console window for node 0, enter the following command:

```
# /etc/shutdown -h now
```

Step 2 Log in to the test station as the superuser (root) and bring the test station to single-user mode with the following command:

```
# /etc/shutdown now
```

Step 3 Issue the following command to verify that the `swagentd` daemon is running:

```
# ps -ef |grep swagentd
```

If the daemon is running, you should see something like this:

```
root   322     1  0 13:58:09 ? 0:00 /usr/sbin/swagentd
```

If `swagentd` is not running, issue the following command to start it:

```
/usr/sbin/swagentd
```

Insert the DAT cartridge titled "*2000 SERIES TEST STATION SOFTWARE*" into the DAT drive on the test station. Enter the following command (all one line), to install all products.

```
/usr/sbin/swinstall -x reinstall=true -s /dev/rmt/0m -x
allow_multiple_versions=true -x allow_downdate=true '*'
```

This command takes about 20-25 minutes to complete.

If this is a single-node system, and no Terminal Server (MTS) is attached, proceed to Step 4.

Note

On multinode systems with more than 2 nodes requiring a Terminal Server (MTS), it is important to save information in files used by the MTS. Issue the following commands to copy the appropriate files:

```
cp /spp/data/conserver.cf /spp/data/conserver.cf.mts
cp /etc/inetd.conf /etc/inetd.conf.mts
cp /etc/services /etc/services.save.mts
```

Step 4 Issue the `ts.install` command as shown below:

```
# cd /spp/scripts/inst
# /ts.install
```

If no Terminal Server (MTS) is attached, proceed to Step 5.

If an MTS is attached to the Test Station, the files that were saved in Step 3 can now be copied by issuing the following commands:

```
cp /spp/data/conserver.cf.mts /spp/data/conserver.cf
cp /etc/inetd.conf.mts /etc/inetd.conf
cp /etc/services.save.mts /etc/services
```

Step 5 Reboot the test station with the following command:

 # /etc/reboot

Log onto the test station as sppuser. Wait for the `ccmd` command to display the following message in the test station console window.

```
Database Generation Complete
```

Firmware installation

This section describes how to install firmware onto the Exemplar System.

Caution

The procedure used to load OBP resets all NVRAM parameters to default values (including any device mappings). Before installing firmware, save current values to a local file using cut-and-paste and the OBP `printenv` and `show-map` commands. These values will be used after OBP installation to restore your site-specific settings.

Step 1 If no sppconsole window is present on the test station display, start the console by issuing the following command:

```
sppuser > /spp/scripts/sppconsole
```

Step 2 If no OBP prompt appears in the sppconsole window, reboot OBP by issuing the following command from another sppuser window:

```
sppuser > do_reset
```

Note

The `do_reset` may take 3-4 minutes to complete.

Step 3 If you do not have an OBP prompt, type the following keystroke in the sppconsole window:

<control> **CTRL-e c d (Control-e followed by "c" then "d")**

<control> **CTRL-e c o (Control-e followed by "c" then "o")**

<control> **CTRL-e c f (Control-e followed by "c" then "f")**

Issue the following `sppconsole` command to verify that a console window connection can be established for each node in the system:

```
sppconsole [node#]
```

The system returns a message as shown below:

```
/users/sppuser$ sppconsole 4
[enter "^Ec?" for help]
[console: node4 console line is down -- use "^Eco" to reopen]
[read-only -- use "^Ecf" to attach, "^Ec?" for help]
```

To close the connection, issue the following command in the console window:

<control> **CTRL-e c . (Control-e followed by "c" and then ".")**

The `fw_install` man page provides a synopsis of the instructions below. This allows you to use your mouse to cut and paste these instructions.

Issue the following command to view the `fw_install` man page:

```
sppuser> man fw_install
```

Then, issue the following commands from a test station window:

```
sppuser> load_eprom -n mu-0000 -c /spp/firmware/jtag_core.fw
sppuser> load_eprom -n mu-0000 -j /spp/firmware/jtag.fw
```

Repeat for all nodes in the system by changing the `mu-0000` argument to that of the node being updated.

Step 4 Power cycle the node(s) by turning off keyswitch to activate new JTAG firmware.

Step 5 Wait for `ccmd` to connect with JTAG firmware.

Step 6 Wait for the following messages from ccmd to be output to the test station console window (usually the upper left hand window):

```
INFO: Scan interrogation underway.
INFO: Database generation complete.
```

Verify that new JTAG firmware has been loaded by issuing the following command:

```
sppuser> jf-node_info -c
```

The correct version of firmware should now be displayed as in the example below:

```
15.99.111.100     0x089a (2202) jtag 4.1 1998/01/08 17:32:03
                                jtag_core 4.1 1998/01/08 17:31:34
```

If the firmware revision is not "4.1" the problem must be corrected before proceeding to the next step.

Step 7 Wait for the OBP boot to complete. The system should display the `ok` prompt.

Step 8 Load the diagnostic LIF header by issuing the following command:

```
sppuser> load_eprom -n mu-0000 -l /spp/firmware/diaglifhdr.fw
```

Repeat the above command for all nodes in the system by changing the `mu-0000` argument to that of the node being updated.

Verify that `load_eprom` completes successfuly and no errors are reported.

If an error is reported during `load_eprom`, the problem must be corrected before proceeding to the next step.

Step 9 Configure the node to boot OBP.

```
sppuser> ccmu put 0 boot_module 1 : push 0
```

Repeat for all nodes in the system by changing the "0" arguments to the number of the node being updated.

Now reset the system by issuing the `do_reset` command from a shell window as shown below:

```
sppuser> do_reset
```

Step 10 Load the remaining firmware via OBP. First verify that the `/spp/data/dl-diags` script looks like the example below. View the script from a test station shell window by typing:

```
sppuser>less /spp/scripts/dl-diags
```

The script should look like the example below. Note the backslash (\) at the beginning of a line is used to uncomment or disregard that line. Only one line shown below is uncommented.

```
fwcp 15.99.111.99:/spp/firmware/post.fw POST
fwcp 15.99.111.99:/spp/firmware/test_controller.fw TC
fwcp 15.99.111.99:/spp/firmware/arch3000.fw ARCH3000
fwcp 15.99.111.99:/spp/firmware/cpu3000.fw CPU3000
fwcp 15.99.111.99:/spp/firmware/intra3000.fw INTRA3000
fwcp 15.99.111.99:/spp/firmware/inter3000.fw INTER3000
fwcp 15.99.111.99:/spp/firmware/io3000.fw IO3000
fwcp 15.99.111.99:/spp/firmware/diodc.fw DIODC
fwcp 15.99.111.99:/spp/firmware/mem3000.fw MEM3000
fwcp 15.99.111.99:/spp/firmware/uscsi.fw USCSI
fwcp 15.99.111.99:/spp/firmware/uscsi_rom.fw USCSI_ROM
fwcp 15.99.111.99:/spp/unsupported/rdr_dumper.fw RDR_DUMPER
fwcp 15.99.111.99:/spp/firmware/spp.pdc SPP_PDC
\ fwcp 15.99.111.99:/spp/firmware/texBoot.fw
fwcp 15.99.111.99:/spp/firmware/entry.pdc /flash@0,0
fwcp 15.99.111.99:/spp/firmware/obp.pdc OBP
```

Download the new firmware by entering the following commands at the OBP `ok` prompt:

```
[0:0] ok bcast nvsave
[0:0] ok bcast source core@f0,f0000000/lan@0,d30000;15.99.111.99:/spp/scripts/dl-diags
[0:0]ok  reset
```

Step 11 Restore the NVRAM parameters. Wait for OBP to complete booting. Issue the following command at the OBP `ok` prompt:

```
[0:0]ok bcast nvrestore
```

Step 12 Display the firmware revisions for each node. At the sppuser prompt. issue the `flash_info` command, as shown below:

```
sppuser> flash_info 0
```

The new firmware revisions should now be displayed. The following shows what the output may look like:

```
Program Name       Version      Date       Build Level
-------------------------------------------------------

post               4.1          1998/01/09

rdr_dumper         4.1          1997/11/15

test_controller    4.1          1998/01/06

mem3000            4.1          1998/01/06

arch3000           4.1          1998/01/06

intra3000          4.1          1998/01/06

inter3000          4.1          1998/01/06

cpu3000            4.1          1998/01/06

io3000             4.1          1998/01/06

diodc              4.1          1998/01/08
```

Run `flash_info` on each node in the system by changing the `0` argument to the node number being restored.

If the versions displayed are not "4.1" the problem must be corrected before proceeding to next step.

Step 13 Verify that the correct version of OBP is loaded by issuing the following command at the OBP prompt:

```
[0:0]ok bcast banner
```

The banner for each node should appear displaying the new version of obp. The ouput should look like this:

```
SPP2000, OBP Release 3.1.7, compiled 98/01/15 13:47:04

16 CPUs, 4096 MB memory installed, no I/O available.

Complex Serial Number: 72123, Node Serial Number: 2012345.

Network address 0:a0:d9:0:b8:49, OBP IP Number 15.99.111.150.
```

If the firmware revision is not "3.1.7" the problem must be corrected before proceeding to next step.

Step 14 Some of the most common OBP parameters should be restored when the `nvrestore` command is run, as described in Step 1. These parameters are listed below, and are provided as a reference on how to restore them if `nvrestore` does not work properly.

```
[0:0]ok bcast setenv boot-mode sppux

[0:0]ok bcast setenv diag-switch? false

[0:0]ok bcast setenv dns-ip# 15.99.111.99

[0:0]ok bcast setenv cti-cache-size 128
```

Note **Size may be site-specific.**

```
[0:0]ok bcast setenv 80bit-dimms?
```

Note **Set to "false" if 88bit dimms are installed; this is always the case on multinode systems. Set to "true" if 80bit dimms are installed.**

```
[0:0]ok setenv boot-device /pci@fe,290000/qlisp@1000,0/sd@2,0:a
```

Note **`boot-device` may be site-specific. It is only set on node 0.**

Step 15 Once the OBP parameter settings have been verified, issue the following `do_reset` command from the test station shell window:

```
sppuser> do_reset
```

Note **More information on the site specific settings can be found on the pages that follow.**

Device Mappings

In order to map the physical devices connected to the system, the OBP `show-devs` command should be run to get a listing of the devices. Run the command at the OBP prompt and retain the output for use in following steps.

Note **Ultra SCSI controllers that are fcode enabled will show up with "qlisp" in the hardware path. If they are not enabled, they will appear with "pci1077,1020" in the hardware path as shown in the bold in the following example:**

```
[0:0] ok show-devs
/pci@fe,290000
/pci@fe,90000
/HP,PA80000@fc,20000
/HP,PA80000@fc,30000
.
.
.
/HP,PA80000@fc,3b0000
/virtual-memory@0,fffa0000
/memory@0,0
/sim@0,0
/core@f0,f0000000
/pty
/openprom
/chosen
```

```
/aliases
/options
/packages
/pci@fe,290000/qlisp@1000,0
/pci@fe,290000/pci1011,9@0,0
/pci@fe,290000/qlisp@1000,0/st
/pci@fe,290000/qlisp@1000,0/sd
/pci@fe,90000/pci1077,1020@1000,0
/pci@fe,90000/pci1077,1020@1000,0/st
/pci@fe,90000/pci1077,1020@1000,0/sd
/core@f0,f0000000/sram@0,800000/core@f0,f0000000/tty@
0,d46000
/core@f0,f0000000/lan@0,d30000
/core@f0,f0000000/lcd@0,d4c000
/core@f0,f0000000/nvram@0,d00000
/core@f0,f0000000/rtc@0,d07ff8
/core@f0,f0000000/epuc@0,c00000
/core@f0,f0000000/emuc@0,c10000
/core@f0,f0000000/flash
/packages/firmware
/packages/dns
/packages/inet
/packages/obp-tftp
/packages/deblocker
/packages/tape-label
/packages/disk-label
/packages/lif
/packages/nfs
/packages/hfs
/packages/firmware/isp-fw-v2-10
```

Mapping Tape Devices

Identify the PCI bus and slot that the tape device you wish to map is connected to. Find the entry in the `show-devs` output and cut the line that ends with 'st' with your mouse. You will need to know the SCSI id and logical unit number (LUN) that you want to use for the device. Use the following command to map the tape device(s). Also see the "I/O Layout" section for additional graphical information on the physical device layout.

```
[0:0] ok mkmap 0 /pci@fe,290000/qlisp@1000,0/st@0,0
```

Note

In the example above, text after mkmap 0 was pasted from the mouse cut buffer and then the @0,0 was appended so as to indicate the correct SCSI id and logical unit id. (LUN). The format is (hardware path)@(scsi id,LUN).

Mapping Network Devices

Identify the PCI bus and the slot that the network controller is located in. Find the entry in the show-devs output and cut the line that contains pci1011,9 (for Ethernet controllers) or pci1011,f (for FDDI controllers) with your mouse. You will need to know what logical number you want to use with the network device your are mapping. Use the following command(s) to map the network device(s).

```
[0:0] ok mkmap 0 /pci@fe,290000/pci1011,9@0,0
              ^
             le0

[0:0] ok mkmap 0 /pci@fe,90000/pci1011,f@0,0
              ^
             fddi0
```

Verifying and Removing Mappings

Use the `show-map` command in OBP to verify your mappings.

```
[0:0] ok show-map
Flag  Unit  Device Pathname
         0  /pci@fe,290000/qlisp@1000,0/st@0,0
         0  /pci@fe,290000/pci1011,9@0,0
         0  /pci@fe,90000/pci1011,f@0,0
```

To remove a mapping, use the `rmmap` command followed by the hardware path. Then use the `show-map` command to verify that the mapping has been removed.

```
[0:0] ok rmmap /pci@fe,290000/pci1011,9@0,0
[0:0] ok show-map
Flag  Unit  Device Pathname
         0  /pci@fe,290000/qlisp@1000,0/st@0,0
         0  /pci@fe,90000/pci1011,f@0,0
```

After all mappings are made or removed, issue a reset at the OBP prompt.

```
[0:0] ok reset
```

Booting the System

The following procedure sets the boot parameters in OBP and boots the Exemplar System. In the "I/O layout" section following, there is some information that will help you determine what your parameters should be set to.

Step 1 From the OBP prompt, enter the following command to check your boot device:

```
[0:0] ok printenv boot-device
```

```
Parameter Name:  boot-device
Current Value:
/pci@fe,10000/qlisp@0,0/sd@2,0:a
Default Value:
/pci@fe,210000/qlisp@1000,0/sd@2,0:a
```

Step 2 If the boot-device parameter is not correct, use the `setenv` command to correct it (using the previously saved value), otherwise proceed to Step 3. To reset the default:

```
[0:0] ok set-default boot-device
```

To set a specific value, use the OBP `setenv` command:

```
[0:0] ok setenv boot-device /pci@fe,210000/qlisp@1000,0/sd@2,0:a
```

Note **This would set the boot-device to partition a, disk at scsi id 0x2, EPIC 4, slot 18.**

Step 3 Verify that the controller for your boot-device is fcode enabled.

```
[0:0] ok printenv pci[4]-fcode-enable
Parameter Name:  pci[4]-fcode-enable
Current Value:
2
Default Value:
```

Note **The example above is examining the settings for epic 4. In this case slot 18 would be fcode enabled.**

Step 4 If the fcode enable is not correct, use the `setenv` command to correct it and perform an OBP `reset` command. Otherwise, proceed to Step 5.

```
[0:0] ok setenv pci[4]-fcode-enable 2
[0:0] ok reset
```

Note **The example above would fcode enable the controller on epic 4 slot 2. The accepted values for each epic (or pci bus) are 0,1, and 2 for the 3 slots on each epic. You can enable multiple slots on the epic by putting a comma in between the slot numbers.**

```
[0:0] ok setenv pci[4]-fcode-enable 0,1,2
```

To clear the parameter use the following command:

```
[0:0] ok set-default pci[4]-fcode-enable
```

Step 5 Make sure that the boot-directory parameter is set to/stand/spp3. If it is not, correct it with the `set-default` command. To examine the current boot-directory value, enter the following command:

```
[0:0] ok printenv boot-directory
Parameter Name:  boot-directory
Current Value:
```

```
/stand/spp3/old

Default Value:

/stand/spp3
```

To reset the boot-directory value to the default, enter the following command:

```
[0:0] ok set-default boot-directory
```

Step 6 Once all parameters are set, enter the `nvsave` command at the OBP prompt. This will save all of the OBP parameters and device mappings.

```
[0:0] ok nvsave
```

To restore those parameters in the future, use the `nvrestore` command from the OBP prompt:

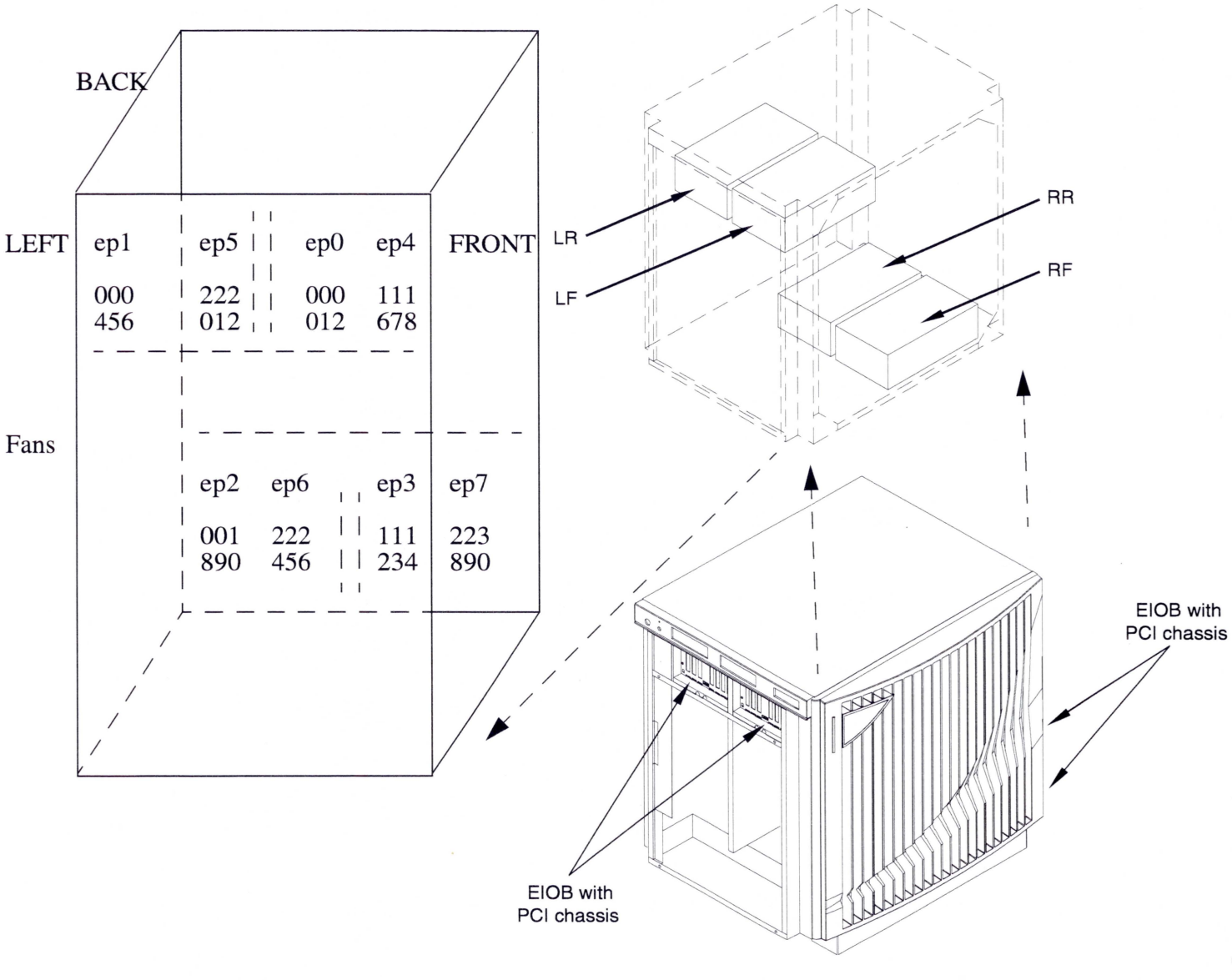
```
[0:0] ok nvrestore
```

Step 7 Once your parameters are set, boot the Exemplar System.

```
[0:0] ok boot
Device        :/pci@fe,210000/qlisp@1000,0/sd@2,0:a
Directory     :/stand/spp3
File          :mach
Arguments     :No arguments.

QLogic ISP1040 firmware version 2.10 loaded and executing.
Loading       : /stand/spp3/tunables . 3824 bytes loaded.
Loading       : /stand/spp3/server ..............
                .
                .
                .
```

Note **Epic numbering used here is based upon pac numbering (i.e. ep1 is on pac1).**



The following examples are intended to assist in understanding the OBP names, physical locations, and hardware paths of devices in the system.

```
/pci@fe,10000/pci1077,1020@1000,0
      |
       ---- epic# where the addresses correspond to
            epic0     /pci@fe,10000
            epic1     /pci@fe,90000
            epic2     /pci@fe,110000
            epic3     /pci@fe,190000
            epic4     /pci@fe,210000
            epic5     /pci@fe,290000
            epic6     /pci@fe,310000
            epic7     /pci@fe,390000

/pci@fe,10000/pci1077,1020@1000,0
               |
                ---- device name where devices without fcode
                     are named as "pci<vid>,<did>" where vid and
                     did are the vendor and device id assigned
                     by the pci consortium

/pci@fe,10000/pci1077,1020@1000,0
                            |
                             --- This component specifies the physical
                                 slot on that pci bus. Device slots
                                 appear every 0x800 bytes in the first
                                 number. Multifunction devices change
                                 the second number.

/pci@fe,10000/pci1077,1020@1000,0/st@1,1
                                      |
                                       --- scsi tape node with target
                                           id of 1 and logical unit id of 1
```

The OS prints out paths to devices as

```
( node : dev : x : y )
```

where x and y are dependent upon the device. For SCSI peripherals, x is the target id and y is the logical unit id. The real key is the "dev" value. It is a number from 0 - 31. See the previous I/O Layout drawing.

PCI card mappings

- Epic was designed for 4 pci devices per epic/pci bus hence the 4 slot numbers per epic even though in this generation of machine there is only physically room for 3.
- Single function devices show up on the pci bus configuration space every 0x800 bytes. Since there are only 3 per pci bus in our system, they show up as 0x0, 0x800, 0x1000. e.g.

```
epic 4, first pci slot
   OR
   /pci@fe,210000/qlisp@0,0
   OR
   (4:16)

epic 4, second pci slot
   OR
   /pci@fe,210000/qlisp@800,0
   OR
   (4:17)

epic 4, third pci slot
   OR
   /pci@fe,210000/qlisp@1000,0
   OR
   (4:18)

   There is no fourth slot
```

- In general, pci cards will have a name which is constructed from "pci" and the vendor and device id's assigned to them by the PCI consortium. Our devices are:

```
DEC FDDI    : vendor=0x1011, device=0xf:      /pci@fe,210000/pci1011,f@0,0
DEC ETHER   : vendor=0x1011, device=0x9:      /pci@fe,210000/pci1011,9@0,0
QLOGIC SCSI: vendor=0x1077  device=0x1020:   /pci@fe,210000/pci1077,1020@0,0
QLOGIC SCSI: with fcode :                     /pci@fe,10000/qlisp@0,0
```

HIPPI firmware installation

To install Genroco firmware onto the Destination and Source controllers perform the following steps:

Step 1 Shut down the system to the OBP prompt.

Step 2 Enter the following command from the OBP prompt

```
[0:0] ok source /core@f0,f0000000/lan@0,d30000;15.99.111.99:/spp/firmware/pcirom.fth
```

Step 3 Determine the EPIC and slot numbers of the Source and Destination controllers. Do this by entering the `show-devs` command at the OBP prompt and look for entries containing pci5555. For example, you might see:

```
/pci@fe,210000/pci5555,3@0,0

/pci@fe,210000/pci5555,3@800,0
```

The entry 'pci@fe,210000' indicates the EPIC # on which the controller is installed. Your numbers might differ, so use the following guide:

```
pci@fe,390000 is epic 7
pci@fe,310000 is epic 6
pci@fe,290000 is epic 5
pci@fe,210000 is epic 4
pci@fe,190000 is epic 3
pci@fe,110000 is epic 2
pci@fe,90000  is epic 1
pci@fe,10000  is epic 0
```

The references to '0,0' and '800,0' at the end of the lines indicate the slot # of the controller. Again, your numbers may differ, so use the following guide:

```
pci555,3@0,0      is slot 0
pci555,3@800,0    is slot 1
pci555,3@1000,0   is slot 2
```

Step 4 The format of the command to download the firmware is:

fwcp15.99.111.99:/spp/firmware/phfv623.img/pcirom@<epic#>,<slot#>

In the example from Step 3, you would enter the following commands from the OBP prompt to download the firmware:

```
[0:0] ok fwcp 15.99.111.99:/spp/firmware/phfv623.img /pcirom@4,0
[0:0] ok fwcp 15.99.111.99:/spp/firmware/phfv623.img /pcirom@4,1
```

Step 5 Enter the `reset` command at the OBP prompt, then boot the system as normal.

7 Installing SPP 1200/1600 Test Station Software

This procedure installs Exemplar Test Station Software for SPP 1200/1600 Systems on HP-UX 9.05 based Exemplar test stations.

YourtTest station must be running HP-UX 9.05. Test Stations running 10.20 are not supported for connection to SPP 1200/1600 Exemplar Systems.

Step 1 If SPP-UX is booted, shut down SPP-UX on all nodes. From the Exemplar system console window for node 0, enter the following command:

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

Step 2 Log in to the test station as `root` and bring the test station to single-user mode with the following command:

```
# /etc/shutdown now
```

Step 3 Insert the DAT cartridge titled 'TEST STATION SOFTWARE FOR SPP1200/1600 V5.3' into the DAT drive on the test station.

Step 4 If /etc/installsw does not exist, perform the following, otherwise proceed to Step 5. Using the `installsw` program, install the test station software products.

Note

In the `tar` command below, watch the output for the lines shown. Since installsw is near the beginning of the tape, waiting beyond the extraction of installsw is not required. Answer "y" up to and including the extraction of installsw, then you may interrupt out of the command (after 15 seconds).

```
# cd /
# tar -xw 1-1-installsw
x 1-1-installsw/Installsw/: y
x 1-1-installsw/Installsw/etc/: y
x 1-1-installsw/Installsw/etc/installsw: y
x 1-1-installsw/Installsw/usr/: y
x 1-1-installsw/Installsw/usr/man/: y
x 1-1-installsw/Installsw/usr/man/man1m/: y
x 1-1-installsw/Installsw/usr/man/man1m/installsw.1m: y
```

Note

After answering yes to the above line, wait 15 seconds and press CTRL-C.

```
# mv 1-1-installsw/Installsw/etc/installsw/etc/installsw
# rm -rf 1-1-installsw
```

Step 5 Enter the following command:

```
# /etc/installsw -s /dev/rmt/0m
```

`installsw` displays a list of products on the DAT cartridge. Select all products. The install operation takes approximately 15 minutes to complete.

Step 6 Reboot the test station using the `/etc/reboot` command, and log in as `sppuser`.

Wait for `/spp/bin/ccmd -d` to start. You can check for this in an sppdsh window with the following command:

```
sppdsh > ps -deaf | grep ccmd
```

Also, make sure that the database generation has completed before continuing on to the next step, Loading Exemplar firmware. Watch for the following message to appear in the test station message output window:

```
done with database generation
```

The test station software installation procedure is complete.

Loading Exemplar firmware

This procedure loads the new firmware from the Exemplar test station to the Exemplar system.

Step 1 If a node console does not appear within 30 seconds of the message `done with database generation`, enter the following in an sppdsh window:

```
sppdsh > /spp/scripts/start_console
```

Step 2 Enter the following command:

```
sppdsh > do_reset
```

Step 3 Enter the `node_info` command to determine the number nodes present; verify that this matches your hardware.

Step 4 Save the current state of OBP. This is a manual process of displaying OBP mappings, aliases, etc. Record them so that you may re-enter them once the new OBP has been loaded. At the OBP prompt, enter the following commands for each node:

```
ok n node
```

where *n* is the node number.

```
ok show-map
```

Record any mappings for later use.

```
ok devalias
```

Record any aliases for later use.

```
ok boot-device type
```

Record the boot device path for node 0 only.

```
ok printenv
```

Record any settings of DNS-ip# and OBP-ip#.

Repeat the above for each node in the system.

Step 5 For each hypernode present, enter the following commands in the `sppdsh` window and watch for errors. If any of these commands fail more than twice, contact the HP Response Center for assistance.

```
sppdsh> load_obp nodeid
sppdsh> load_mufw nodeid
```

```
sppdsh> load_pl nodeid
```

Step 6 Configure the hardware parameters for your machine by entering the following commands:

```
sppdsh> ccmu
Welcome to the Convex Configuration Manager Utility
ccmu: 8.0 (Thu Jun 6 18:04:32 1996)
ccmu: defaulting to the following nodes: 0
ccmu> up
ccmu> get usememsize usecachesize
node   value       parm    parm
 0    0x00000003     17    USEMEMSIZE
 0    0x00000000     19    USECACHESIZE
```

Verify that these parameters are correct for your configuration. If not, correct them with the `put` command. For single node systems, `usecachesize` should always be 0.

For `usecachesize`, available values are:

0x00000000 - (0 MB per slice)
0x00000001 - (4 MB per slice)
0x00000002 - (8 MB per slice)
0x00000003 - (16 MB per slice)
0x00000004 - (32 MB per slice)
0x00000005 - (64 MB per slice)
0x00000006 - (128 MB per slice)
0x00000007- (256 MB per slice)

For `usememsize`, available values are:

0x00000005 - (1024 MB board)
0x00000004 - (512 MB board)
0x00000003 - (256 MB board)
0x00000002- (128 MB board)
0x00000001 - (64 MB board)

```
ccmu> auto
```

If any "not as expected" lines appear, use the `put` command to correct the inconsistencies. Run the `auto` command again and make sure it completes without any further "not as expected" lines.

```
ccmu> get initwhat
node  value     parm  parm
 0  0x5880cfff    1  INITWHAT
```

STARTPL PLCPUINIT PLINITMEM PLLOADOBP MUERRENABLE INITLAND INITSLICE3 INITSLICE2 INITSLICE1 INITSLICE0 INITSCI3 INITSCI2 INITSCI1 INITSCI0 INITCXBAR DORESET PWRCLKCHECK GO

Make sure that `initwhat` begins with 0x588*xxxxx* (where '*xxxxx*' is the last 5 digits of the `initwhat` value. If not, correct it with the `put` command.

```
ccmu> put initwhat 0x588xxxxx.
ccmu> down
ccmu> push
ccmu> quit
```

For more information, refer to the *Diagnostics & CST 8.0 Release Notice.*

Step 7 Reset the Exemplar system. Enter the following command:

```
sppdsh> do_reset 1
```

When a System Console window appears with the OBP prompt, continue with the next section. With some releases of OBP, the OBP parameter 'cluster-boot?' will be set to true. This will cause a console window to be started for each node. The following details how to change this behavior:

Step 8 In an sppdsh window, do the following:

```
sppdsh > sn_cnsl -F 1
```

At the OBP prompt for node 0, enter the following:

```
[0:0] ok setenv +g cluster-boot? false
[0:0] ok boot-device /mbus@0,ffec0000/sbus@f,fcffff00/Convex,afws@1,10000:nar
row/sd@2,0:a
```

The above is the standard default setting for SCSI sbus (slot 0, unit 0). If this matches the *boot-device type* output you recorded earlier, you do not need to re-enter it. To change it to the "first" PCI slot (slot 2 unit 0), enter the following:

```
[0:0] ok setenv boot-device /mbus@0,ffec0000/pci@f,fefffF00/qlisp@0,0/sd@2,0:a
```

Next, set up the boot-directory. At the OBP prompt for node 0, enter the following:

```
[0:0] ok setenv boot-directory /stand/spp1
```

With the mouse still in the sppdsh window, type **CTRL-E C** . (control-e, C, period). This will get you out of the node 0 console and back to the sppdsh window prompt.
Now you can set *cluster-boot? false* for successive nodes.

```
[0:0] ok 1 node
[0:0] ok setenv +g cluster-boot? false
[0:0] ok 2 node
[0:0] ok setenv +g cluster-boot? false
```

and so on for each node in the system.

Step 9 In an sppdsh window, do the following:

```
sppdsh > sn_cnsl -F n
```

where *n* is the node # +1.

At the OBP prompt for node *n*, enter the following:

```
[0:0] ok setenv cluster-boot? false
```

With the cursor still in the sppdsh window, type **CTRL-E C** . (control-e, C, period). This will get you out of the node 0 console and back to the sppdsh window prompt.

Repeat this step for all nodes other than node 0.

Step 10 In the sppdsh window enter the following:

```
sppdsh> do_reset
```

Step 11 In an sppdsh window, enter the following:

```
sppdsh> sn_cnsl -F 1
```

At the OBP prompt for node 0, enter the following:

```
[0:0] ok 0 node
```

You will now be in the console window for node 0. In the previous section, "Loading Exemplar Firmware," you saved any OBP mappings, environmental variables, and aliases that you set up on OBP. At this time, re-enter any maps, environmental variables, or aliases recorded earlier, for each node. Be sure to map any tape devices, network devices, and your boot device. For help in setting up device mappings, see the sections below that describe the mapping procedures for each device. The boot-device does not need to be set again on node 0. You can now move between nodes by entering the following.

```
ok n node
```

where *n* is the node number.

Once all settings have been re-entered for each node, save all OBP settings by doing the following.

```
[0:0] ok 0 node
```

```
[0:0] ok reset
```

With the mouse still in the sppdsh window type **CTRL-E C** . (control-e, C, period). This will get you out of the node 0 console and back to the sppdsh window prompt.

Step 12 Reboot the test station using the `/etc/reboot` command, and log in as sppuser.

Wait for */spp/bin/ccmd -d* to start. You can check for this in an sppdsh window with the following command:

```
sppdsh > ps -deaf | grep ccmd
```

Wait to see that database generation has completed. You do this by watching for the message `done with database generation` to appear in the test station message output window.

In an sspdsh window, enter the following:

```
sppdsh> do_reset
```

When the system console window appears and the OBP prompt displays, you may boot the Exemplar system as described in the next section.

Booting Your System

After you have completed the instructions in the preceding sections, you are ready to boot SPP-UX. In order to complete this upgrade, you must now boot SPP-UX V5.3 on your new SPP-UX V5.3 root disk. If you have not already done so, set the OBP boot-device and boot-directory, and boot SPP-UX V5.3. For example:

```
[0:0] ok setenv boot-device /mbus@0,ffec0000/pci@f,fefff00/qlisp@0,0/sd@2,0:a
[0:0] ok setenv boot-directory /stand/spp1
```

Note

Be sure to use the boot device that you installed your SPP-UX V5.3 root filesystem onto.

If you have successfully set your boot-device and boot-directory, you are ready to boot SPP-UX V5.3 by entering the following command:

```
[0:0] ok boot
```

After you boot your system, proceed to Chapter 5 to upgrade Exemplar systems software and optional products, if you have not done so already.

Note

When you boot for the first time on your SPP-UX V5.3 system, the local networking information that you are prompted to enter (hostname and IP address) is used to configure your Ethernet device. If you enter the hostname and IP address for your FDDI interface at that time, your networking interface will not work. You may correct this by editing the file /etc/rc.config.d/netconf. If you only specified one interface (i.e., if you have not yet run /etc/set_parms for additional interfaces), you should have a line in the netconf file that looks like the following:

INTERFACE_NAME(0)=le0

If the corresponding IP address is for your FDDI interface, you can correct this problem by changing the string "le0" to "fddi0".

Creating device mappings for FDDI controllers

For node 0 and each other node that has an FDDI controller attached to it, create a logical device mapping for each FDDI controller to OBP.

Step 1 In the Exemplar System Console window, enter the following commands at the OBP prompt:

```
[0:0] ok n node
[0:0] ok show-devs
```

where *n* is the node number.

Step 2 Find the device path that includes the string 'fddi' or 'cddi'. Enter that entire line of text as *fddistring* in the following command (you can use the X Windows copy and paste functions to copy this line of text onto the command line):

```
[0:0] ok mkmap -n n fddistring
```

where *n* is the network interface adapter number. If you have one network controller per node, you can use the node number as the value of *n*.

Repeat Steps 1 and 2 for each node of the system.

Step 3 Save the new mappings by entering the following commands:

```
[0:0] ok 0 node
[0:0] ok reset
```

Creating device mappings for Ethernet controllers

For each node that has an Ethernet controller attached to it, create a logical device mapping for each Ethernet controller to OBP.

Step 1 In the Exemplar System Console window, enter the following commands at the OBP prompt:

```
[0:0] ok n node
[0:0] ok show-devs
```

where *n* is the node number.

Step 2 Find the device path that includes the string '`le`'. Enter that entire line of text as *lestring* in the following command (you can use the X Windows copy and paste functions to copy this line of text onto the command line):

```
[0:0] ok mkmap -n n lestring
```

where *n* is the network interface adapter number. If you have one network controller per node, you can use the node number as the value of *n*.

Repeat Steps 1 and 2 for each node of the system.

Step 3 Save the new mappings you created in the previous step by entering the following commands:

```
[0:0] ok 0 node
[0:0] ok reset
```

Creating device mappings for ATM controllers

For each node that has an ATM controller attached to it, create a logical device mapping for each ATM controller to OBP.

Step 1 In the Exemplar System Console window, enter the following commands at the OBP prompt:

```
[0:0] ok n node
[0:0] ok show-devs
```

where *n* is the node number.

Step 2 Find the device path that includes the string 'ia'. Enter that entire line of text as *iastring* in the following command (you can use the X Windows copy and paste functions to copy this line of text onto the command line):

```
[0:0] ok mkmap -n n iastring
```

where *n* is the network interface adapter number. If you have one network controller per node, you can use the node number as the value of *n*.

Repeat Steps 1 and 2 for each node of the system.

Step 3 Save the new mappings you created in the previous step by entering the following commands:

```
[0:0] ok 0 node
[0:0] ok reset
```

Creating device mappings for HIPPI

No OBP setup is needed for a HIPPI device.

Creating device mappings for PCI SCSI disk as the boot device

For each node that has an PCI SCSI disk controller attached to it, create a logical device mapping for each PCI SCSI disk controller to OBP

Step 1 In the Exemplar System Console window, enter the following command at the OBP prompt:

```
[0:0] ok boot-device type
/mbus@0,ffec0000/sbus@f,fcffff00/Convex,afws@1,10000:narrow/sd@2,0:a
```

This is the standard default setting for SCSI sbus (slot 0, unit 0). To change that to the "first" PCI slot (slot 2 unit 0) enter the following:

```
[0:0] ok setenv boot-device /mbus@0,ffec0000/pci@f,fefffff00/qlisp@0,0/sd@2,0:a
[0:0] ok reset
```

Creating device mappings for tape devices

For each tape drive attached to the system, create a logical device mapping for OBP. You must perform this procedure for all DAT drives attached to the system and any other tape drives you have attached to the system with SCSI controllers.

Step 1 Boot SPP-UX by entering the following command at the OBP prompt:

```
[0:0] ok boot
```

Step 2 Make a note of all messages with the following format that appear when the SPP-UX microkernel boots:

```
scsi tape node:unit&sbus:target_id:LUN attached as DAT, but unmapped
```

or

```
scsi tape node:unit&sbus:target_id:LUN attached as 3480, but unmapped
```

where

node

Is the node to which the device is attached.

unit&sbus

Identifies the mbus unit and sbus to which the device is connected, using the following mapping:

0 = mbus0, sbus0

1 = mbus0, sbus1

2 = mbus0, sbus2

3 = mbus0, sbus3

4 = mbus1, sbus0

5 = mbus1, sbus1

6 = mbus1, sbus2

7 = mbus1, sbus3

target_id

Is the SCSI target ID for the device.

LUN

Is the SCSI logical unit number for the device.

Step 3 Return the Exemplar system to the control of OBP by entering the `reboot` command in the Exemplar System Console window:

```
/etc/reboot
```

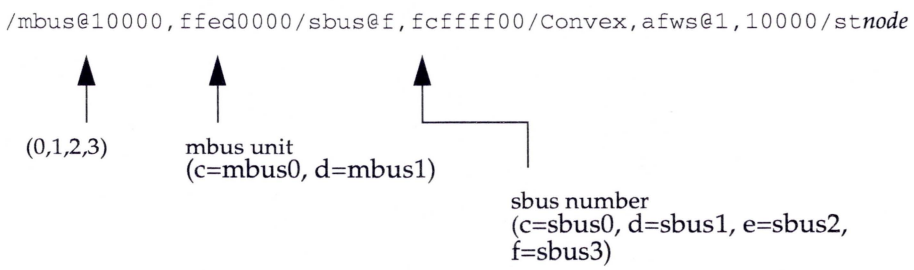
Step 4 Next, enter the `show-devs` command to locate the entries in the device table for the SCSI tape controllers:

```
[0:0] ok show-devs
```

The entry for a SCSI tape controller begins with the string `/mbus` and ends with the string `/st`; for example:

/mbus@10000,ffed0000/sbus@f,fcffff00/Convex,afws@1,10000/st

Identify the device entry for the SCSI tape controller that corresponds to each tape drive for which a message appeared in Step 2. The following example illustrates characters in the device path which correspond to the fields in the messages you received in Step 2:



In this example, the controller is attached to node 1, mbus unit 1, and sbus controller 0. This SCSI tape controller would be the controller for the devices identified in the following message:

```
scsi tape 1:4:3:1 attached as 3480, but unmapped
```

Step 5 Create a device map entry for the tape drive identified by each message you received in Step 2.

1. Switch to the node to which the tape device is attached using the OBP `node` command.
2. Choose a one- or two-digit tape unit identifier that you will use to refer to that tape drive in SPP-UX.
3. Enter that name as *tape_unit* in the OBP `mkmap` command. Enter the entire line of text for the tape drive's SCSI controller that you identified in Step 4 as *controllerstring* in the `mkmap` command (you can use the X Windows copy and paste functions to copy this line of text onto the command line). Add the @ character followed by the *target_id* and *LUN* for the device:

```
[0:0] ok node node
[0:0] ok mkmap tape_unit controllerstring@target_id,LUN
```

For example, to create a device map entry for a 3480 cartridge tape drive for which you had received the message (from Step 2) "`scsi tape 1:4:3:1 attached as 3480, but unmapped`" and assign it to tape unit 0 under SPP-UX (/dev/tape/tc0), you could use the following command:

```
[0:0] ok mkmap 0
/mbus@10000,ffed0000/sbus@f,fcffff00/Convex,afws@1,10000/st@3,1
```

There are separate name spaces for DAT drives and 3480 cartridge tape drives. You can therefore have a DAT drive and a 3480 cartridge tape drive that both have an OS tape unit identifier of 0.

Step 6 Save the new mappings you created in the previous step by entering the following commands:

```
[0:0] ok 0 node
[0:0] ok reset
```

Your tape device installation is complete.

8 Disk Layout

The Exemplar V5.3 Master Disk has the following partition layout:

```
Logical disk name: sd0
partition table: (space available for file systems = 4194144)
part    offset      size    | partition description          | flags
-------------------------------------------------------------------
 a:          8K   921600K  |Root                            |
 b:     921608K    49152K  |Miniroot                        |
 c:     970760K   102400K  |Crashdump                       | C
 d:    1073160K  1024000K  |Paging                          | D
 e:    2097160K   897016K  |Backup /                        |
 f:    3094176K  1099968K  |                                |
```

The **a**: partition is used for the root filesystem.

The **b:** partition is a miniroot filesystem that may be booted in an emergency in order to restore the root partition (if desired - from **e:** using the *dd* utility).

The **c**: partition is a Crashdump partition used to dump OS data structures in the event of a system crash.

The **d**: partition is for the default pager.

The **e:** partition is a complete copy of the **a**: partition for use as a redundant copy of root.

Any of the partitions past **d:** may be modified or removed without affecting the normal functioning of SPP-UX.

9 Subcomplex Overview

Configuring Subcomplexes

You must load a subcomplex configuration before users log in, and user activity must be directed to a particular user subcomplex.

Global memory must reside in physically contiguous blocks of 16MB. In order to guarantee that global memory can be allocated to a specific subcomplex, you must configure the subcomplexes before user programs are run on the system. Otherwise, physical memory will become fragmented, and it will become impossible to allocate sufficient physical memory for use as global memory.

There are recommended subcomplex configuration files in the directory /etc/newconfig. There are separate files for systems containing 1, 2, 3, and 4 hypernodes; the files are named `1node.scm`, `2node.scm`, `3node.scm`, and `4node.scm`.

You can load an SCM subcomplex file onto the system by logging in as `root` and entering the following command:

```
# scm -l subcomplex_configuration_filename
```

For example, to load the recommended subcomplex configuration file for a 2-node system, log in as `root` and entering the following command:

```
# scm -l /etc/newconfig/2node.scm
```

Running Processes in an SCM Subcomplex

Once you have loaded an SCM subcomplex configuration file, inform users to run all of their processes in this subcomplex. Users can automatically run all their processes in the `user` subcomplex by adding the following line at the bottom of their .cshrc or .profile file:

```
# exec mpa -sc user
```

Alternatively, users can create a `user` subcomplex shell by entering the following command:

```
# exec mpa -sc user /usr/bin/sh
```

The subcomplex configuration currently active on the system can be obtained by entering the command:

```
# scm -c
```

To use the graphical interface, be sure to set the environmental variable DISPLAY, then enter the following command:

```
# scm
```

See the mpa(1) and scm(1M) man pages for more information about using subcomplexes.

10 Software licenses

The licensing information you need is available to you in two places:

- A hardcopy printout is bundled with your distribution tape.
- An online version is available on the HP WWW server. If you are a registered user of our Customer Web Server, you may obtain an electronic copy of your license keys from the server. This page (including registration instructions) can be reached at **http://www.convex.com:90**. If you do not have access to the HP net, contact the HP Response Center for an electronic version.

Activating software licensing

To activate the license for an Exemplar software product, edit the file /usr/local/flexlm/licenses/convex.dat. Add the license key to this file on a new line, after the `SERVER` and the `DAEMON` statements. Each license key consists of two lines with a continuation symbol (\) at the end of the first line. The license key is similar to the following example:

```
FEATURE sppux convex_ls 99.990 1-jan-2099 0 1234567890ABCDEF123\
VENDOR_STRING=UIDS=0;PART=710-008990-005 HOSTID=1000b ck=82
```

Configuring the FLEXlm license manager

SPP-UX V5.3 includes the FLEXlm license manager *`SPP-UX_ls`*. To configure the license manager for your Exemplar system, perform the following steps:

Step 1 Place the license keys furnished for your site into /usr/local/flexlm/licenses/convex.dat.

Step 2 Start the license daemon (`/usr/local/flexlm/lmgrd`) by entering the following command:

```
# /usr/local/flexlm/rc.convex.flex
```

Normally the license daemon is started by default during the boot process.

Informing users about software licensing

Since licensing is a new feature for HP software products, you should inform your users what to do if they are denied access to a licensed product. The following paragraph is an example of a message you can send to your users.

"This Hewlett Packard software product is controlled by a software license manager. If the license server does not allow you to use a licensed software product, or if the license server is not working, the operating system prints an error message with the following format:

```
Unable to obtain license for product: reason
```

When you see a message with this format, copy the entire message text and send it to your system administrator."

11 Getting assistance

If you have questions about this distribution, contact the HP Response Center.

- Within the continental U.S., call 1 (800) 952-0379.
- From Canada, call 1 (800) 345-2384.
- All other locations, contact the nearest HP office.

The Response Center recommends using the `contact` utility to report a hardware, software, or documentation problem. Refer to the contact(1) man page for complete details.