Hot-Swap Procedures Guide

D Class

HP 9000 Enterprise Servers

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Preface

This edition of the *Hot -Swap Procedure's Guide* is intended for trained and experienced personnel.

This guide contains technical information about HP 9000 D Class Enterprise Server. At the time of publication, all models may have Hot-Swap Disk Modules installed.

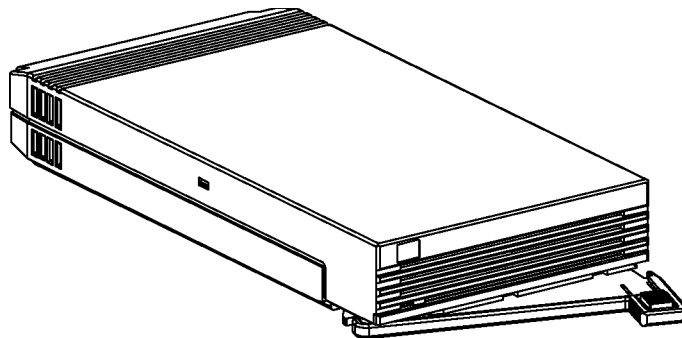# 1 Hot-Swap Disk Module for HP 9000 D Class Enterprise Servers

Overview:

The HP 9000 D Class Enterprise Server implements the use of the newly developed HP Hot-Swap, hard disk drives on a common Fast/Wide SCSI bus. The hot-swap feature implies the ability to remove or add an inactive disk drive module to a system while DC power is still applied and the SCSI bus is still active.

Two versions of the Hot-Swap chassis have been implemented. The D2XX systems will offer an optional Hot-Swap upgrade which will allow the low end servers to replace their single-ended SCSI disks with the Fast/Wide SCSI hot-swap disk modules. This upgrade will supply a Hot-Swap module that will support up to two hot-swap disk modules. The D3XX systems will come standard with a Hot-Swap module that supports up to five hot-swap disk modules.

Figure 1-1   **Hot-Swap Disk Modules**

pshtpl2

The hot-swap disk modules used in the HP 9000 D Class Enterprise Server are low-profile disks that can have 1, 2, 4, or 9 gigabyte capacity. Each module contains a low-profile disk, EMI shielding, and an interface PCA.

Hot-Swap Disk Features

- The delay start feature prevents large surge currents from occurring when several disk drives spin up at the same time. Spin delays are also necessary for hot-swap event detection when LVM mirroring is used. The delay spin signal is hard strapped active on all but the top position which is normally the "root" drive.

- The delay spin feature causes the spin-up to delay for a time approximately equal to ten times the SCSI address selected for a given drive in seconds. Delay spin can be overridden if the software attempts to access a disk drive before it has timed out and begun its spin up. The disk in the top position will spin-up as soon as power is applied.

- The remote spin feature gives the controlling software complete control over the disk drive spindle motor. Software can accordingly issue appropriate SCSI commands to spin-up or spin-down on the drive. The current HP UNIX software does not support this feature; therefore, it is hard disabled at the Hot-Swap backplane.

The module addresses are hard wired on the PCA for each position in the Hot-Swap module. A switch position on the backplane selects one of two address ranges.
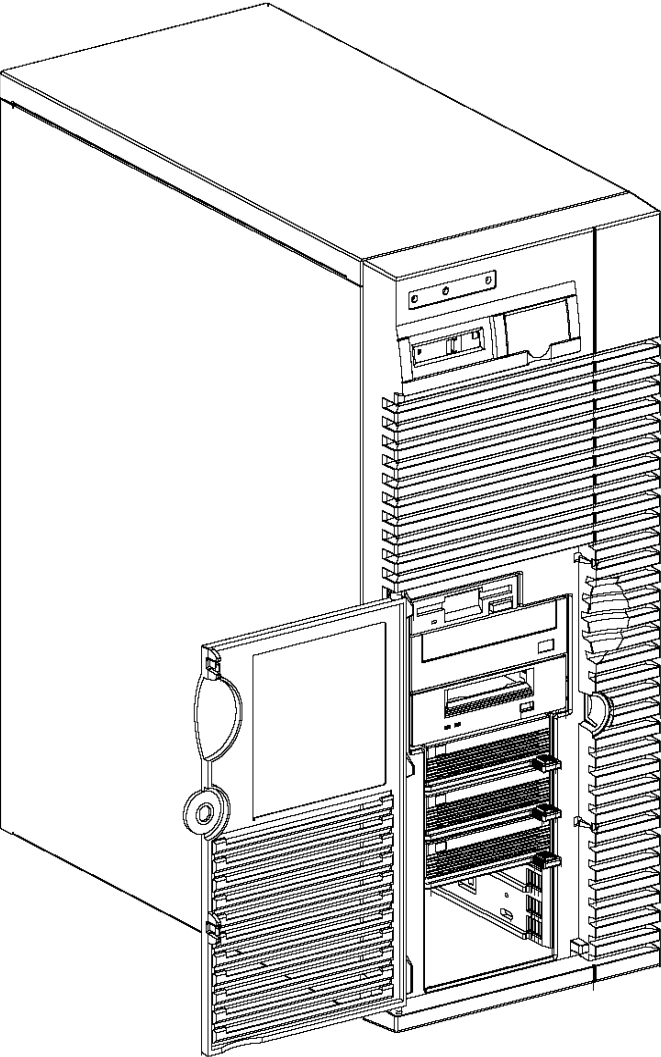
Hot-Swap Bay

The hot-swap bay is common to both the D3XX system package and the D2XX optional add on product.

Figure 1-2 **Hot-Swap Disk Bay**

LVM Patches

Customers using manual hot swap on HP-UX 10.01, will need to pick up two LVM patches to install on their system. There will be two documents included in every D Class Enterprise Server informing the customer of the patch and the manual procedure.

With HP-UX 10.10 or later, the LVM patches will be included in the OS.

Hot Swap Example

The following example describes a particular system problem where the solution is to replace a hot-swap disk module.

Example configuration:

Volume group /dev/vg00 contains the three disks, with the logical volume configuration as shown:

Table 1-1   **Example Configuration**

Volume Description	Volume Description	Volume Description
lvol 1	lvol 3	lvol 4
lvol 2	lvol 4	lvol 5
lvol 3	lvol 5	

```
hardware address        52.6.0          52.5.0          52.4.0
device file (/dev/dsk/)  c2t6d0          c2t5d0          c2t4d0
```

The system problem for this example is that the disk at hardware address 52.4.0 has a head crash, and as a result it is unusable. The steps described in the *Hot-Swap Procedure* section of this document outline a method that can be used to recover from this state.

1. All of the replaced disk's in-use extents, must belong to mirrored logical volumes which were created with the 'strict' option (-s).

2. You must have an up to date configuration backup file. This is done by default each time an LVM command changes the LVM configuration.

    The default backup file's path is:

    /etc/lvmconf/base_vg_name.conf.

3. The replacement disk must be the same product ID as the replaced one.

NOTE

HP often uses different manufacturers for disks having the same product number. The hotswap manual procedure will not update the disk driver's internal information to that of the replaced disk.

The replacement disk will have the same capacity and blocksize as the defective disk because they have the same product number. The only field that could be incorrect is the string specifying the vendor's name. This will not affect the behavior of the LVM. If it is desired to update the manufacturers' name, then the disk's volume group must be deactivated and reactivated.

4. You must have previously installed the following two software patches:

*   PHKL_5840, kernel (HP-UX version 10.01 only)

*   PHCO_5841, utility (HP-UX version 10.01 only)

Hot-Swap Procedure

Follow these steps to replace a hot-swap disk module.

Step 1

*   Check if the LVM found the physical volume to be defective when the volume group was activated.

*   The *vgchange* would have printed the following message on the console:

    ```
    WARNING:

    VGCHANGE:WARNING: COULDN'T ATTACH TO THE VOLUME GROUP PHYSICAL
    ```

```
  VOLUME "/DEV/DSK/cXtXdX"
```

```
THE PATH OF THE PHYSICAL VOLUME REFERS TO A DEVICE THAT DOES
 NOT EXIST, OR IS NOT CONFIGURED INTO THE KERNAL.
```

• If the status of the *vgchange* is unknown, you may check if this occurred by doing a *vgdisplay* command:

vgdisplay <VG name>

For our example:

vgdisplay /dev/vg00

• If the disk was defective at *vgchange* time, the following messages will be printed one or more times.

```
WARNING:

VGDISPLAY: WARNING: COULDN'T QUERY PHYSICAL VOLUME
          "/DEV/DSK/cXtXdX"
THE SPECIFIED PATH DOES NOT CORRESPOND TO PHYSICAL VOLUME
ATTACHED

TO THE VOLUME GROUP.
VGDISPLAY: WARNING: COULDN'T QUERY ALL OF THE PHYSICAL VOLUMES
.
```

• If you see these messages, the disk was defective at the time the volume group was activated.

Hot swapping a disk which was defective during activation requires a different sequence of commands. Skip to the alternative procedure, *"Hot Swap Procedure for Unattached Physical Volumes,"* at the end of this document.

Otherwise, your disk became defective after the *vgchange* and you must continue with step 2 of this procedure.

Step 2

• Reduce any logical volumes that have mirror copies on the faulty disk so that they no longer mirror onto that disk (note the -A n option):

lvreduce -m 0 -A n <LV name> /dev/dsk/cXtXdX (for 1 way mirroring)

OR

lvreduce -m 1 -A n <LV name> /dev/dsk/cXtXdX (for 2 way mirroring)

For our example:

lvreduce -m 0 -A n /dev/vg00/lvol4 /dev/dsk/c2t4d0

lvreduce -m 0 -A n /dev/vg00/lvol5 /dev/dsk/c2t4d0

Step 3

- Replace the faulty disk. Please refer to the appropriate administration guide for instructions on how to replace the disk.

- Do an *ioscan* on the replaced disk to insure that it is accessible and also as a double check that it is a proper replacement. (See note under Step 3, on page 5.)

For our example:

ioscan /dev/dsk/c2t4d

Step 4

- Restore the LVM configuration/headers onto the replaced disk from your backup of the LVM configuration:

  # vgcfgrestore -n <volume group name> /dev/rdsk/cXtXdX

- where X is the Logical unit number of the disk that has been replaced.

  For our example:

  # vgcfgrestore -n /dev/vg00 /dev/rdsk/c2t4d0

Step 5

- Attach the new disk to the active volume group with the *vgchange* command.

  # vgchange -a y <volume group name>

  For our example:

  # vgchange -a y /dev/vg00

Step 6

- If this disk is not a mirror of a root disk, then skip this step.

- The *mkboot* command must be run.

  For our example:

  # mkboot /dev/rdsk/c2t4d0

- After running the *mkboot* command, do an *lvlnboot -R* to relink the replaced disk into the Boot Data Reserved Area of all the Physical Volumes in the Volume Group.

  # lvlnboot -R

Step 7

- *Lvextend* the mirrors back onto the replaced disk. This may take several minutes as it will have to copy all the data from the original copy of the data to the mirrored extents. The logical volume(s) are still accessible to users' applications during this command.

lvextend -m 1 <LV name> /dev/dsk/cXtXdX

OR

lvextend -m 2 LV name /dev/dsk/cXtXdX for 3-way mirroring

For our example:

lvextend -m 1 /dev/vg00/lvol4 /dev/dsk/c2t4d0

lvextend -m 1 /dev/vg00/lvol5 /dev/dsk/c2t4d0

At this stage, your system should be fully functioning.

Hot Swap Procedure for Unattached Physical Volumes

Follow these steps to replace a hot-swap disk module for unattached physical volumes.

Step 1

- Replace the faulty disk.

- Do an ioscan on the replaced disk to insure that it is accessible and also as a double check that it is a proper replacement. (See note under Step 3, on page 5.)

  For our example:

  # ioscan /dev/dsk/c2t4d0

Step 2

- Restore the LVM configuration/headers onto the replaced disk from your backup of the LVM configuration:

  # vgcfgrestore -n <volume group name> /dev/rdsk/cXtXdX

- where X is the Logical unit number of the disk that has been replaced.

  For our example:

  # vgcfgrestore -n /dev/vg00 /dev/rdsk/c2t4d0

Step 3

- Attach the new disk to the active volume group with the *vgchange* command.

  # *vgchange* -a y <volume group name>

  For our example:

  # *vgchange* -a y /dev/vg00

Step 4

- If this disk is not a mirror of a root disk, then skip this step.

- The mkboot command must be run.

  For our example:

  # mkboot /dev/rdsk/c2t4d0

- After running the mkboot command, do an *lvlnboot -R* to relink the replaced disk into the Boot Data Reserved Area of all the Physical Volumes in the Volume Group.

  # lvlnboot -R

Step 5

- Resynchronize the mirrors of the replaced disk. This may take several minutes as it will have to copy all the data from the original copy of the data to the mirrored extents. The logical volume(s) are still accessible to users' applications during this command.

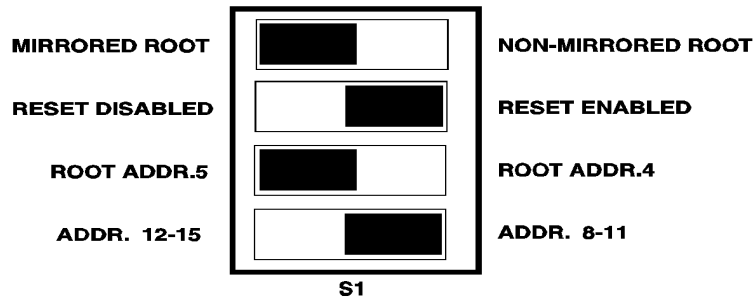 # vgsync <VG name>

  For our example:

  # vgsync /dev/vg00

Troubleshooting

The hot-swap PCA contains a four position dip switch. It is set at the factory for disk mirroring. If the system doesn't respond, check to make sure the switch is set to disk mirroring.

Figure 1-3   **Configuration Switch**

MIRRORED ROOT   NON-MIRRORED ROOT

RESET DISABLED   RESET ENABLED

ROOT ADDR.5   ROOT ADDR.4

ADDR. 12-15   ADDR. 8-11

S1

hsswitch.tif

Mirrored Root Switch Position:

The first position is labeled MIRRORED ROOT / NON-MIRRORED ROOT. When set to mirrored root, the top most disk module will exhibit a normal spin delay of either 40 or 50 seconds, dependent on the root address setting. Spin delays are necessary for modules included in LVM mirroring. The non-mirrored root setting will allow the top most disk to begin spin-up at power on. The default setting is mirrored root.

Reset Switch Position:

The second position is labeled RESET DISABLED / RESET ENABLED. This switch determines if the hot-swap event reset circuitry is active or inactive. The default setting is reset enabled.

Root Address Switch Position:

The third position is labeled ROOT ADDR.5 / ROOT ADDR.4. This switch selects the SCSI address of the top most disk module (root disk) independent of the other disk module locations. The default setting is root addr.5.

Address Switch Position:

The fourth position is labeled ADDR.12-15 / ADDR.8-11. The lower four disk module positions in a Model D3xx system will either be 12, 13,14, and 15, or 8, 9, 01, and 11. In the Model D2xx system optional hot-swap bay, the second disk position will either be 12 or 8. The default setting is addr. 8-11.