
Booting and Shutdown in HP-UX Release 11i Version 1.5

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1 **Booting and Shutdown in HP-UX Release 11i Version 1.5**

The following white paper is excerpts from sections of Chapter 5, “Administering A System: Booting and Shutdown” in *Managing Systems and Workgroups: A Guide for HP-UX System Administrators*. These sections are updated here to reflect changes made in booting and reconfiguring of the kernel for HP-UX Release 11i Version 1.5.

Other documents that are referred to in this white paper can be found at the following web site: <http://docs.hp.com>

Booting From an Alternate Kernel

By default, the boot process will use the main kernel file `/stand/vmunix` to find the kernel to boot from. To boot from a different kernel, you must interact with the initial program loader (IPL/ISL) and specify a different main kernel file:

- Step 1.** Follow the procedure for booting from an alternate device (given below) to the point where you can interact with the initial program loader (IPL/ISL).
- Step 2.** As part of the device-file argument in the `hpux boot` command, specify the HP-UX path name of the main kernel file of the alternate kernel that you want to boot. For example:

```
ISL> hpux boot disk(2/4.0.0;0)/stand/alt_kernel_file_name
```

NOTE

Although the kernel is no longer composed of the single main kernel file (by default `/stand/vmunix`); the main kernel file carries the name of the kernel and contains internal kernel identification that is used by the boot loader to obtain information about all of the kernel components that need to be loaded during the boot process.

If you have performed whole kernel configuration following the steps outlined in the white paper *Reconfiguring the Kernel in HP-UX Release 11i Version 1.5*, the newly configured kernel should have been properly updated using `kmupdate` (1M). By running `kmupdate`, not only does the newly configured kernel become bootable, but it becomes the default kernel accessible from `/stand/vmunix`. Therefore, you do not need to specify an alternate main kernel file path name to boot a newly configured kernel.

You may want to boot from a different kernel when `/stand/vmunix` fails to boot, and you want to boot from the previous kernel saved by the `kmupdate` command (`/stand/vmunix.prev`). You may also want to boot from a kernel with a different name that you have saved using the recommended procedures in the section “Saving a Backup Kernel Permanently” in the white paper *Reconfiguring the Kernel in HP-UX Release 11i Version 1.5*.

Booting From an Alternate Device

There are times when you will need to boot from a device other than the device that you normally boot from. For example, if your primary boot disk fails, you will need to boot your system either from a different disk or from a recovery tape.

- Step 1.** Take control of the boot process so that `autoboot/autosearch` will not attempt to boot the system automatically from your primary boot device:

Server Systems

If the `autoboot` and `autosearch` flags are enabled, PDC will provide you with a 10 second delay in which to manually override the automatic boot process. Press any key during these 10 seconds.

PDC will ask you:

```
Boot from primary boot path (Y or N)?
```

Answer no:

```
Boot from primary boot path (Y or N)? N
```

PDC will then ask you:

```
Boot from alternate boot path (Y or N)?
```

If the alternate boot path is the correct hardware path for the device that you want to boot from, enter **Y**. If, as in the is example, the alternate boot path is *not* the desired hardware path, answer **N**:

```
Boot from alternate boot path (Y or N)? N
```

You will then be prompted to enter a command:

```
Enter boot path, command, or ?>
```

V-Class Servers

If the `autoboot` and `autosearch` flags are enabled, the boot process will provide you with a 10 second delay in which to manually override an automatic boot. Press any key during these 10 seconds.

Workstations

Booting From an Alternate Device

As the system is booting, press the ESC (escape) key to stop the automatic boot process.

Step 2. Specify the hardware path name of the device that you want to boot from:

Server Systems

Enter the command:

```
Enter boot path, command, or ?> boot hardware_path
```

Where *hardware_path* is the hardware path to the device that you want to boot from.

You will then be asked:

```
Interact with IPL (Y or N)?
```

If you are booting from the standard kernel file name (`/stand/vmunix`) and do not need to boot to single-user mode or LVM maintenance mode, you do not need to interact with IPL (ISL). Answer **N**.

If you need to specify a different kernel name, or boot into a special mode, you *do* need to interact with ISL. Answer **Y**.

NOTE

IPL in the system prompt above refers to the Initial Program Loader, which is ISL.

```
Interact with IPL (Y or N)? Y
```

```
ISL>
```

V-Class Servers

Enter the command:

```
command: boot hardware_path
```

Where *hardware_path* is the hardware path to the device that you want to boot from. If the alternate boot path listed on the system console represents the device/path that you want to boot from, *hardware_path* can be specified as "ALT":

command: **boot alt**

Workstations

On HP 9000 workstations, once PDC has finished loading ISL, instead of executing commands from the `autoexecute` file, ISL will prompt you to manually enter a command:

b) Boot from a specified device

s) Search for bootable devices

a) Enter Boot Administration modex) Exit and continue boot sequence?) HelpSelect from menu:

If you enter **s** at the menu prompt, the system will now (re)display the list of places you can boot from. At this point you may have a number of options:

- Specify that you want to boot from the address defined as the alternate boot path:

Select from menu: **b alt**

- Specify the boot selection number (P_0 , ..., P_n) as the argument to the boot command. For example:

Select from menu: **b P3**

- Specify a specific disk device to boot from as the argument to the boot command. For example:

Select from menu: **b scsi.4**

- Specify a the lan address of another computer in your local network segment to boot from. For example:

Select from menu: **b lan.123456-789ABC.3.6**

Avoiding a Shutdown When Possible

There are times when a normal, planned shutdown is appropriate. But as server downtime becomes less desired and accepted, OLA/R (on-line addition and replace) functionality and DLKMs (dynamically loadable kernel modules) can help you to avoid shutting down a server in many cases.

On-line Addition and Replacement of PCI Cards (OLA/R)

HP-UX's On-line Addition and Replacement of PCI Cards (OLA/R) features enable you to replace a faulty interface card or add a new interface card to a running system, without impacting the system's users.

Refer to *Configuring HP-UX for Peripherals* for detailed OLA/R concepts and procedures.

Dynamically Loadable Kernel Modules (DLKM)

The DLKM infrastructure is an HP-UX operating system feature that enables you to dynamically load "DLKM-enabled" kernel modules into, or unload them from, the running HP-UX kernel, without the need to re-link the entire kernel and reboot the system. Although the base HP-UX Release 11i Version 1.5 is not released with DLKM-enabled kernel modules, certain optional and add-on HP-UX software is available as DLKM-enabled modules. Refer to the white paper *Managing and Developing Dynamically Loadable Kernel Modules* for detailed DLKM concepts and procedures.

Using HP-UX Commands to Configure Dump Devices into the HP-UX Release 11i Version 1.5 Kernel

You can edit your `system` file and use the `config` program to build your new kernel.

- Step 1.** Edit your `system` file (the file that `config` will use to build your new kernel). This file is usually the file `/stand/system`, but can be another file if you prefer.

Dump to Hardware Device For each hardware dump device you want to configure into the kernel, add a dump statement in the area of the file designated * `Kernel Device info` (immediately prior to any tunable parameter definitions). For example:

```
dump 2/0/1.5.0
```

```
dump 56/52.3.0
```

NOTE

For systems *that boot with LVM*, either `dump lvol` or `dump none` *must* be present! Without one of these, any `dump hardware_path` statements are ignored.

Dump to Logical Volume

In the case of logical volumes, it is not necessary to define each volume that you want to use as a dump device. If you want to dump to logical volumes, the logical volumes must meet *all* of the following requirements:

- Each logical volume to be used as a dump device must be part of the root volume group (`vg00`). For details on configuring logical volumes as kernel dump devices, see the `lvlnboot` (1M) manpage.
- The logical volumes to be used as dump devices must be contiguous (no disk striping, or bad-block reallocation is permitted for dump logical volumes)
- The logical volume cannot be used for file system storage, because the whole logical volume will be used

To use logical volumes for dump devices (regardless of how many logical volumes you want to use), include the following dump statement in the system file:

```
dump lvol
```

Configuring No Dump Devices

To configure a kernel with no dump device, use the following dump statement in the system file:

```
dump none
```

NOTE

If you truly want no dump device to be configured into the kernel, you *must* use the above statement (`dump none`). Omitting dump statements altogether from the `system` file will result in a kernel that uses the primary paging device (swap device) as the dump device.

- Step 2.** Once you have edited the `system` file, build a new kernel file using the `mk_kernel` command (see “Steps to Perform Whole Kernel Configuration Using HP-UX Commands” in the white paper *Reconfiguring the Kernel in HP-UX Release 11i Version 1.5* for details on how to do this).
- Step 3.** Perform a kernel update using the `kmupdate` command (see “Steps to Perform Whole Kernel Configuration Using HP-UX Commands” in the white paper *Reconfiguring the Kernel in HP-UX Release 11i Version 1.5* for details on how to do this)
- Step 4.** Reboot your system to activate your new dump device definitions.