ULTRIX/ULTRIX Worksystem Software

Boot Commands for DECstation/DECsystem 5000 Model 200 Series Processors

Dear Digital Customer,

Because of changes in the firmware of the DECstation/DECsystem 5000 Model 200 series processors to enhance support for the TURBOchannel, the boot commands have changed. As a result, the boot commands for the DECstation/DECsystem 5000 Model 200 series processors that are listed in the *Basic Installation Guide*, *Guide to System Shutdown and Startup*, *Guide to Diskless Management Services*, and that are displayed on the console during an installation are no longer correct.

After your new firmware is installed, even if you are not reinstalling the ULTRIX operating system, you must reset the environmental variables for the `boot` and `haltaction` commands immediately.

Until the software and documentation can be revised, please refer to this document when booting your DECstation/DECsystem 5000 Model 200 series processor.

1 Booting the DECstation/DECsystem 5000 Model 200 Series Processor

The following sections explain the procedures for:

- Determining the Slot and Unit Numbers of Your Boot Device
- Setting the Console Environmental Variables
- Booting from a System Disk
- Booting from a TK50 Tape
- Booting from a CDROM Disc Kit
- Booting from the Network
- Booting during the Installation

1.1 Determining the Slot and Device Numbers of Your Boot Device

If you are not reinstalling the ULTRIX operating system after your new firmware has been installed, you will need to determine both the slot number of the controller attached to your boot device and the device number of your boot device in order to change the `boot` variable.

The instructions in this section assume that if you have multiple disk drives, CDROM drives, or tape drives, that you know which drive is your boot device.

The instructions in this section also assume that you are booting your system from a logical device controller with a controller number of 0 (0 is the default boot controller number).

This is the most common configuration.

If you are booting from other than controller 0, check the cabling of your hardware to determine which controller you are booting from or, if you are up and running, check the SYSTEM DISK SELECTION section in the `install.log` file in `/usr/var/adm` directory. Then refer to section 1.7.1.2 (booting SCSI devices) or section 1.7.2.2 (booting from the network) of this document for instructions on how to determine the slot number of the controller attached to your boot device.

1.1.1 Determining the Slot Number (Default)

To determine what controllers and devices are configured on your system, type the following command at the console prompt:

```
>> cnfg
```

The `cnfg` command will display the options present on the system, as follows:

```
7:KN0Z-AA          DEC              V5.3a            TCF0             (16 MB)
6:PMAD-AA          DEC              V5.3a            TCF0             (enet:08)
5:PMAZ-AA          DEC              v5.3a            TCF0             (SCSI=7)
2:PMAZ-AA          DEC              v5.3a            TCF0             (SCSI=7)
1:PMAG-AA          DEC              T3.0a            TCF0             (PXG--D=24)
```

The first column always displays slot numbers of the device controllers and the slot numbers differ with each configuration.

However, when you are booting your system from a logical device controller with a controller number of 0 (the default boot controller), the default slot number for the default SCSI boot device will always be 5 and the default slot number for the default network boot device will always be 6.

Table 1 lists the boot information for default SCSI devices that are attached to the controllers identified by the letters "SCSI" in the fifth column of the `cnfg` command display. Table 2 lists the boot information for default network devices that are attached to the controllers identified by the letters "enet" in the fifth column of the `cnfg` command display.

Table 1: Default SCSI Devices

Boot Devices	`cnfg` Controller Identifiers	Device Name	Default Slot Number	Default Controller Number
Tape	SCSI	tz	5	0
Disk	SCSI	rz	5	0
CDROM	SCSI	rz	5	0

Table 2: Default Network Devices

Boot Devices	`cnfg` Controller Identifiers	Device Name	Default Slot Number	Default Controller Number
Network Options	enet	–-	6	0

1.1.2 Determining the Boot Device Number

To determine the device number of your boot device, type a command with the following syntax:

cnfg *slot_number*

For example, to determine the device number of a SCSI disk drive with a controller number of 0 and a slot number of 5, you would type the following command:

```
>> cnfg 5
```

The disk drive would be identified by the words "rz" in the command's display and the device number would immediately follow the "rz" (rz3, in the following example):

```
5:     PMAZ-AA   DEC     V5.3a     TCF0          (SCSI = 7)
-------------------------------------------------------------

          DEV    PID               VID      REV   SCSI DEV
-------------------------------------------------------------
-------------------------------------------------------------
          rz3    RZ56   (C)DEC     DEC      0200    DIR
                                                    SEQ
```

You would then be able to boot your system or set your system's environmental boot variable, since you would know that the slot number of controller 0 is 5, the device name is rz, and device number of the boot device attached to that controller is 3 (rz3).

Note

If the `cnfg` *slot_number* command shows that you have multiple devices configured on the same controller, you will have to know which device is the boot device. If you do not know which device is the boot device, consult your system administrator.

1.2 Setting the Console Environmental Variables

The following sections explain how to set the console environmental variables for the `boot` and `haltaction` commands.

After your new firmware is installed, even if you are not reinstalling the ULTRIX operating system, you must reset the environmental variables for the `boot` and `haltaction` commands immediately. You can also set other console environmental variables. To get a listing of all of the variables, type:

```
>> printenv
```

For more information about the variables and for instructions on how to set each, see your hardware manual.

1.2.1 Setting the boot Variable

You can define the default bootpath and enable or disable automatic boot operations by setting specific console environmental variables, depending on whether you will be booting from the system disk or the network.

1.2.1.1 Setting the System Disk Boot Variable

The `boot` variable sets the default boot device. To set the `boot` variable for the system disk, use a command with the following syntax:

setenv boot *slot_number/device_name_number/unix_kernel* [-a]

Replace *slot_number* with the slot number of the disk controller that is to be the default boot device. Replace *device_name_number* with the name and the device number of the default boot device. Replace *unix_kernel* with the pathname of the unix kernel that is to be the default kernel. Use the `-a` switch to enable booting to multiuser mode by default. Please note that if you use the `-a` switch, everything after the word "boot" must be

surrounded by double quotation marks (").

Multiuser Mode – To set the `boot` environmental variable to boot to multiuser mode by default, you must set the `-a` switch and surround everything after the word "boot" in double quotation marks (").

For example, to set the default boot device to an rz disk at slot 0, drive 1, with `vmunix` as the default kernel, and to set the default to boot to multiuser mode, you would type the following command:

```
>>  setenv boot "0/rz1/vmunix -a"
```

Single-user Mode – To set the `boot` environmental variable to boot to single user mode by default, do not set the `-a` switch.

For example, to set the default boot device to an rz disk at slot 0, drive 1, with `vmunix` as the default kernel, and to set the default to boot to single-user mode, you would type the following command:

```
>> setenv boot 0/rz1/vmunix
```

1.2.1.2 Setting the Network Boot Variable

The `boot` variable sets the default boot device. To set the `boot` variable for the network, use a command with the following syntax:

setenv boot *slot_number*/mop [-a]

Replace *slot_number* with the slot number of the module that is to be the default boot device. Use the `-a` switch to enable booting to multiuser mode by default. Please note that if you use the `-a` switch, everything after the word "boot" must be surrounded by double quotation marks (").

Multiuser Mode – To set the `boot` environmental variable to boot to multiuser mode by default, you must set the `-a` switch and surround everything after the word "boot" in double quotation marks (").

For example, to set the default boot device to the network at slot 0, and to set the default to boot to multiuser mode, you would type the following command:

```
>>  setenv boot "0/mop -a"
```

Single-user Mode – To set the `boot` environmental variable to boot to single user mode by default, do not set the `-a` switch. For example, to set the default boot device to the network at slot 0, and to set the default to boot to single-user mode, you would type the following command:

```
>> setenv boot 0/mop
```

1.2.2 Setting the haltaction Variable

The `haltaction` variable enables or disables automatic boot operation. To set the `haltaction` variable, use a command with the following syntax:

setenv haltaction *variable*

To enable automatic boot mode using the boot variable, set the haltaction variable to `b` by typing the following command:

```
>> setenv haltaction b
```

Note

If you wish to enable automatic rebooting to multiuser mode, you must make sure that when you set the boot variable initially, you use the `-a` switch.

To disable the automatic boot operation (that is, to suppress an automatic reboot after the RESET button has been depressed or as the result of a power on), set the `haltaction` variable to `h` by typing the following command:

```
>> setenv haltaction h
```

To force the system to restart when the reset button is pressed, and thereby do a memory dump, set the `haltaction` variable to `r` by typing the following command:

```
>> setenv haltaction r
```

1.3 Booting From a Disk

You can boot the system disk or an alternate disk or alternate kernel to either single-user or multiuser mode.

1.3.1 Booting From the System Disk

To boot the system disk to single-user or multiuser mode, type the following command:

```
>> boot
```

The system boots the device that was set in the `boot` console environmental variable described previously.

Note

If you wish to boot the default disk or kernel image to multiuser mode, you must make sure that when you set the boot variable initially, you use the `-a` switch.

1.3.2 Booting From an Alternate Disk or Kernel

To boot an alternate disk or kernel image to single-user or multiuser mode use a command with the following syntax:

boot *slot_number*/*device_name_number*/*unix_kernel* [-a]

Replace *slot_number* with the slot number of the controller attached to your boot device. Replace *device_name_number* with the name and the number of the boot device. Replace *unix_kernel* with the pathname of the alternate kernel. Use the `-a` switch to enable booting to multiuser mode.

For example, to boot an alternate kernel at slot 0, drive 5, to multiuser mode, you would type the following command:

```
>> boot 0/rz5/vmunix.new -a
```

1.4 Booting From a TK50 Tape

When doing an installation or booting the standalone kernel for system management tasks, you may have to boot a TK50 tape. After installing the TK50 boot tape, type a command with the following syntax to determine the device number of the drive for your device:

cnfg *slot_number*

For example, if the TK50 is attached to a SCSI controller at slot 5, (this is the most common configuration) you would type the following command:

```
>> cnfg 5
```

The console subsystem displays information that identifies the device number of your tape drive and various other assignments. Use this information to define the tape drive device number when you enter the boot command later on.

After displaying identification information, the console subsystem reissues its prompt. Use a command with the following syntax to boot your system:

boot *slot_number*/tz*device_number*

Replace *slot_number* with the slot number of the tape controller. Replace *device_number* with the device number of the SCSI tape drive from which you are booting.

For example, to boot a SCSI tape (tz) at slot 5, drive 5 to single-user mode, you would type the following command:

```
>> boot 5/tz5
```

1.5 Booting From a CDROM Optical Disc Kit

If your CDROM optical disc is not already in its caddy, follow the instructions in the hardware manual for inserting the optical disc into the caddy.

Follow this procedure to boot the system: Load the CDROM optical disc into the drive. Wait for the drive to be on line and ready.

Use a command with the following syntax to determine the device number of the drive for your device:

cnfg *slot_number*

For example, if the CDROM is attached to a SCSI controller at slot 5, (this is the most common configuration) you would type the following command:

```
>> cnfg 5
```

A display appears that shows what is assigned to each device number on your system. Use a command with the following syntax to boot your system:

boot *slot_number*/rz*device_number*/vmunix [-a]

Replace *slot-number* with the slot number of the CDROM controller. Replace *device-number* with the device number of your RRD40 optical disc drive. Use the -a switch to enable booting to multiuser mode.

For example, to boot the system to multiuser mode from RRD40 optical disc drive number 4 on slot number 1, you would type the following command:

```
>> boot 1/rz4/vmunix -a
```

1.6 Booting From the Network

You boot from the network when you are:

- Booting a diskless system
- Initiating an installation from a remote server
- Booting a standalone kernel from a remote server, in order to perform system management tasks

To boot the system from the network, use a command with the following syntax:

boot *slot_number*/mop [-a]

Replace *slot_number* with the slot number of the network controller. Use the -a switch to enable booting to multiuser mode.

For example, to boot from the network to multiuser mode on slot number 6, you would type the following command:

```
>> boot 6/mop -a
```

1.7 Booting During the Installation

This section explains how to boot your system from the system disk or, if you are a diskless client, from the kernel residing on the diskless server during the installation of your ULTRIX operating system.

During the installation, the bootstrap command sequence is displayed and you are asked to type this command sequence in order to boot your system from the system disk to continue the installation or, if you are a diskless client, from the kernel residing on the diskless server.

Because of changes made to the firmware to enhance support for the TURBOchannel, both the syntax of the bootstrap command sequence and the slot number that is displayed are incorrect.

Therefore, these instructions explain how to determine the correct slot number for your system configuration so that you can type the correct bootstrap command sequence and continue the installation.

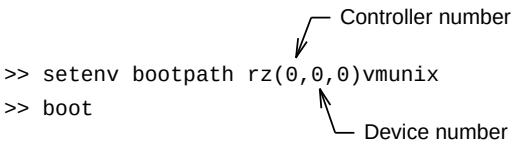
1.7.1 Installing as a Standalone Machine

During the installation, after the system loads the kernel image into main memory and finishes configuring, a bootstrap command sequence like the following is displayed:

```
*** BOOTSTRAP COMMAND SEQUENCE ***

Issue the following console commands to set your default bootpath
variable and to boot your system disk:

        >> setenv bootpath rz(0,0,0)vmunix
        >> boot


The system name assigned to your processor is calypso.
.
.
.
```

This bootstrap command sequence is incorrect. To determine the correct bootstrap command sequence, you will need to note the controller number and the device number that are displayed; the controller number enables you to determine the correct slot number of the controller that is attahced to your disk and you will use the device number exactly as it is displayed to reboot your system. The controller number and the device number in the preceding example are identified for you in the following figure:

Figure 1: Bootstrap Command Sequence: Standalone



Write down both the controller number and the device number displayed by the bootstrap command sequence. You will need them later on.

1.7.1.1 Controller Number Is 0

If the bootstrap command sequence that displays on your system console contains a controller number of 0, then the correct slot number is 5. This is the most common configuration.

Type the following bootstrap command sequence to reboot your system when the incorrect bootstrap command sequence appears on your console:

```
>> setenv boot "5/rz0/vmunix -a"
>> boot
```

The system will reboot and your installation will continue. Please refer to the section on the DECstation/DECsystem 5000 Model 200 series in the *Basic Installation Guide* and the *Advanced Installation Guide* to complete the installation.

1.7.1.2 Controller Number Is Greater Than 0

If the bootstrap command sequence that displays on your system console contains a controller number greater than 0, then you have more than one SCSI controller configured on your system and you have chosen to boot from a system disk connected to a SCSI controller other than the default SCSI controller. To determine the slot number of the SCSI controller of the system disk, follow these steps:

1. When the system prompts you to type the bootstrap command sequence, type the following command at the console instead:

   ```
   >> cnfg
   ```

   The `cnfg` command will display the options present on the system, as follows:

   ```
   7:KN0Z-AA          DEC               V5.3a             TCF0              (16 MB)
   6:PMAD-AA          DEC               V5.3a             TCF0              (enet:08)
   5:PMAZ-AA          DEC               v5.3a             TCF0              (SCSI=7)
   2:PMAZ-AA          DEC               v5.3a             TCF0              (SCSI=7)
   1:PMAG-AA          DEC               T3.0a             TCF0              (PXG--D=24)
   ```

   The first column displays slot numbers. Please note the slot numbers for SCSI options. All SCSI options will be identified by the letters "SCSI" in the fifth column.

   In the above example, the SCSI controller slot numbers that correspond to the SCSI options are 5 and 2.

2. Since your system disk is on a SCSI controller with a controller number greater than 0 (0 is the default controller number for the boot device), you can disregard slot number 5. Slot number 5 always corresponds to the default SCSI controller.

   Of all the SCSI controllers that you have configured on your system, the lowest corresponding SCSI slot number displayed by the `cnfg` command, excluding slot number 5, will correspond to SCSI controller 1. The next highest SCSI slot number will correspond to SCSI controller number 2, and so forth.

   In the above example, the system disk is attached to SCSI controller 1 at slot number 2. The device number, identified in Figure 1, is 0.

3. You would therefore type the following bootstrap command sequence to reboot your system during the installation:

   ```
   >> setenv boot "2/rz0/vmunix -a"
   >> boot
   ```

   The syntax for this command sequence is as follows:

   setenv boot "*slot_number*/rz*device_number*/vmunix -a"
   boot

After you type the correct bootstrap command sequence, the system will reboot and your installation will continue. Please refer to the section on the DECstation/DECsystem 5000 Model 200 series in the *Basic Installation Guide* and the *Advanced Installation Guide* to complete the installation.

1.7.2 Installing as a Diskless Client

During the installation, after the system loads the kernel image into main memory and finishes configuring, a bootstrap command sequence like the following is displayed:

```
*** BOOTSTRAP COMMAND SEQUENCE ***

After the system halts, type the following commands to set the
default bootpath to the network and reboot.

        >> setenv bootpath mop(0)
        >> boot


The system name assigned to your processor is saturn.
.
.
.
```

This bootstrap command sequence is incorrect. To determine the correct bootstrap command sequence, you will need to note the controller number that is displayed; the controller number enables you to determine the correct slot

number of the network controller you will use to reboot your system. The controller number in the preceding example is identified for you in the following figure:

Figure 2: Bootstrap Command Sequence: Diskless

1.7.2.1 Controller Number Is 0

If the bootstrap command sequence that displays on your system console contains a controller number of 0, then the correct slot number is 6. This is the most common configuration.

Type the following bootstrap command sequence to reboot your system when the incorrect bootstrap command sequence appears on your console:

```
>> setenv boot "6/mop -a"
>> boot
```

The system will reboot and your installation will continue. Please refer to the section on the DECstation/DECsystem 5000 Model 200 series in the *Basic Installation Guide* and the *Advanced Installation Guide* to complete the installation.

1.7.2.2 Controller Number Is Greater Than 0

If the bootstrap command sequence that displays on your system console contains a controller number greater than 0, then the diskless server has more than one network controller configured on its system and you are booting from a network controller other than the default network controller. To determine the slot number of the network controller from which you are booting follow these steps:

1. When the system prompts you to type the bootstrap command sequence, type the following command at the console instead:

   ```
   >> cnfg
   ```

   The `cnfg` command will display the options present on the system, as follows:

   ```
   7:KN0Z-AA          DEC              V5.3a            TCF0             (16 MB)
   6:PMAD-AA          DEC              V5.3a            TCF0             (enet:08)
   5:PMAZ-AA          DEC              v5.3a            TCF0             (SCSI=7)
   2:PMAZ-AA          DEC              v5.3a            TCF0             (SCSI=7)
   1:PMAD-AA          DEC              T3.0a            TCF0             (enet:08)
   ```

   The first column displays slot numbers. Please note the slot numbers for network options. All network options will be identified by the letters "enet" in the fifth column.

   In the above example, the slot numbers that correspond to the network controllers are 6 and 1.

2. Since you are to boot from a network controller that has a controller number greater than 0 (0 is the default controller number for boot devices), you can disregard slot number 6. Slot number 6 always corresponds to the default network controller.

   Of all the network controllers that your diskless server has configured on its system, the lowest corresponding network slot number displayed by the `cnfg` command, excluding slot number 6, will correspond to network controller 1. The next highest network slot number will correspond to network controller number 2, and so forth.

   In the above example, you would be booting from network controller 1 at slot number 1.

3. You would therefore type the following bootstrap command sequence to reboot your system during the installation:

```
>> setenv boot "1/mop -a"
>> boot
```

The syntax for this command sequence is as follows:

setenv boot "*slot_number*/mop -a"
boot

After you type the correct bootstrap command sequence, the system will reboot and your installation will continue. Please refer to the section on the DECstation/DECsystem 5000 Model 200 series in the *Basic Installation Guide* and the *Advanced Installation Guide* to complete the installation.