DIGITAL AXPpci33™

Firmware Update Procedures

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Preface

Purpose of This Guide

This guide is intended for all managers of the DIGITAL AXPpci33 series of systems.

This guide describes how to update the system's firmware using the loadable Firmware Update Utility.

Conventions

The following conventions are used in this guide:

Convention	Description
RZ2x	RZ2x refers to any of the RZ-series fixed disk drives, including the RZ24L, RZ25, and RZ26.
Return	A key name in a box indicates that you press a named key on the keyboard.
Ctrl/x	A sequence such as Ctrl/x indicates that you must hold down the key labeled Ctrl while you press another key.
`show config`	This typeface denotes commands and command output. Commands are not case-sensitive except where specifically indicated.
italics	Italicized letters indicate a variable value that you must provide. For example, `>>> set` *`variable`* Return
Caution	Cautions provide information to prevent damage to equipment or software.
Warning	Warnings contain information to prevent personal injury.

Firmware and Operating System Revisions

Notes

Systems that have shipped recently may have firmware revisions at a higher level than is in this kit. The higher level firmware revisions support the revisions of the operating systems that are currently shipping. Some files on the CD-ROM are from previous firmware releases. Systems should not be loaded with older firmware than is presently installed.

The system firmware on this CD has a unique revision and is independent of the revision of this firmware kit.

Table 1 shows the compatibility between the firmware revisions and revisions of DIGITAL UNIX, and Windows NT.

Table 1 DIGITAL AXPpci33 Series

SRM Firmware	ARC Firmware	DIGITAL UNIX	Windows NT
X4.7-1860	4.50	3.2, 4.0	3.5, 3.51, 4.0, 4.5

Associated Documentation

These firmware release notes do not describe how to use the console firmware commands nor do they list their error codes. You can find information about these subjects in the associated documentation listed in the following table.

Document Title	Language	Part Number
DIGITAL AXPpci33 OEM Design Guide	English	EK-AXPCI-DG

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If you need help with ordering additional documentation, call 800-DIGITAL (800-344-4825) and ask for assistance.

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1

DIGITAL AXPpci33 Firmware Update Procedure

This chapter explains how to update the DIGITAL AXPpci33 firmware. Topics are as follows:

- Upgrading a DIGITAL UNIX system from a CD
- Upgrading a Windows NT system from a CD

1.1 Updating System Firmware

1.1.1 System Firmware

The DIGITAL AXPpci33 Series systems contain two flash ROMs. These can be programmed with either ARC console firmware, for the Windows NT operating system, or with SRM console firmware for the DIGITAL UNIX operating system. See Table 1 for compatible firmware and operating system versions.

1.1.2 Update Utility

Use the update utility to update your ARC or SRM firmware. The update utility contains three images: the update utility itself, the SRM image, and the ARC image.

1.2 Updating a DIGITAL UNIX System

Update a DIGITAL UNIX system as described in the following sections.

1.2.1 Step 1: Turn the System On

Press the power switch to the On (|) position. The following information is displayed:

```
starting console on CPU 0
initialized idle PCB
initializing semaphores
initializing heap
Initial heap 1c0c0
memory low limit = 700000
heap = 1c0c0, 17fc0
initializing driver structures
initializing idle process PID
XDELTA not enabled.
initializing file system
initializing 8259s
initializing timer data structures
lowering IPL
CPU 0 speed is 5.98 ns (167MHz)
```

```
Powerup process has started
CPU ID = 0
Initialize configuration locks etc.
Configure the memory
Initialising ISA/PCI interrupts.
Configure the PCI Bus
Start tt class, port (graphics, keyboard, then serial) drivers
entering idle loop
initializing keyboard
change stdin/out/err channels from nl to tt
Memory size = 64MBytes
testing memory from 800000 to 3816000 ...
Start driver phase 4
access NVRAM
Build this processor's slot in the hwrpb
Backup Cache size = 256Kb
Init SCSI class driver
Start driver phase 5
AXPpci33 Common Console X4.1-1995, built on Jun 13 1995 at 06:33:10
>>>
```

1.2.2 Step 2: Determine the Device ID of the CD-ROM Drive

At the console prompt (>>>), enter the `show device` command.

```
>>>show device

dka0.0.0.6.0              DKA0                            RZ26L  440C
dka400.4.0.6.0            DKA400     TOSHIBA CD-ROM XM-4101TA  0064
dva0.0.0.0.1              DVA0
ena0.0.0.1.1              ENA0              08-00-2B-38-67-6B
pka0.7.0.6.0              PKA0                  SCSI Bus ID 7
```

In the example, the CD-ROM drive has a device ID of DKA400.

1.2.3 Step 3: Load the Firmware Update Utility Compact Disc

1. Remove any compact disc that may already be loaded into the CD drive.
2. Load the Firmware Update compact disc into the drive.

1.2.4 Step 4: Set the auto_action env_var

The auto_action environment variable allows the system to automatically boot the operating system at power on. This feature must be disabled for the update utility to run properly, that is, set to HALT.

1. Display the variable using command: `>>>show auto_action`.
2. If auto action is not set to HALT, use command: `>>>set auto_action HALT`.

Note

This must be reset after the update is done to maintain the original power on behavior.

1.2.5 Step 5: Boot the Firmware Utility Disk

Boot the system from the update utility disk, using the device ID determined in step 2. A prompt will be given for the update file name, as shown :-

```
>>> b -fl 0,A0 dka400
(boot dka400.4.0.6.0 -flags 0,a0)
block 0 of dka400.4.0.6.0 is a valid boot block
reading 1006 blocks from dka400.4.0.6.0
bootstrap code read in
base = 10e000, image_start = 0, image_bytes = 7dc00
initializing HWRPB at 2000
initializing page table at 100000
initializing machine state
setting affinity to the primary CPU
jumping to bootstrap code

Prompt for update file name :-

Bootfile: [decaxppci33]decaxppci33_v1_6.exe

starting console on CPU 0
initialized idle PCB
initializing semaphores
initializing heap
Initial heap 1c0c0
memory low limit = 700000
heap = 1c0c0, 17fc0
initializing driver structures
initializing idle process PID
XDELTA not enabled.
initializing file system
initializing 8259s
initializing timer data structures
lowering IPL
CPU 0 speed is 5.98 ns (167MHz)

Powerup process has started
CPU ID = 0
Initialize configuration locks etc.
Configure the memory
Initialising ISA/PCI interrupts.
Configure the PCI Bus
Start tt class, port (graphics, keyboard, then serial) drivers
entering idle loop
change stdin/out/err channels from nl to tt
Memory size = 64Mbytes
testing memory from 800000 to 3816000 ...
Start driver phase 4
access NVRAM
Build this processor's slot in the hwrpb
Backup Cache size = 256Kb
Init SCSI class driver
AXPpci33 Common Console X4.3-3114, built on Sep 13 1995 at 04:15:18
>>>echo: No such command
echo: No such command
(boot pmem:180000 -flags 0)
bootstrap code read in
base = 180000, image_start = 0, image_bytes = 800000
initializing HWRPB at 2000
initializing page table at 700000
initializing machine state
setting affinity to the primary CPU
jumping to bootstrap code
```

```
************************************************************************
**********************   Firmware Update V1.6   **********************
**********************   System Type: AXPpci33  **********************
************************************************************************

                        Update
                        Verify
                        Help

Apu->
```

1.2.6 Step 6: Update the System

Enter `update arc` to update the system with the ARC firmware or `update srm` to update with the SRM firmware -:

```
Apu-> update srm

APU-I VERIFY LOADED ROM IMAGE
0x0000
APU-I LOADED ROM IMAGE VERIFIED
APU-I VERIFY LOADED ROM IMAGE
0x0000
APU-I LOADED ROM IMAGE VERIFIED
APU-I ****** ROM CONTENTS WILL BE DESTROYED   ******
APU-I ****** READY TO PROGRAM DEVICE ? (Y/N ) ******
```

Type `Y` to start the update procedure.

```
APU-I ROM SET NOT ERASED
APU-I PRECHARGING DEVICE
0x0000
APU-I ERASING ROM DEVICE
0x0000
APU-I PROGRAMMING DEVICE
0x0000
APU-I ROM 1 VERIFYING ROM IMAGE
0x0000
APU-I PROGRAMMING COMPLETED
0x0000
0x0000
Rom Update Successful
```

1.2.7 Step 7: Verify the Checksum

Enter the `verify srm` command to verify that the expected checksum and actual checksum are the same. When updating the ARC firmware the `verify arc` command should be used. An example follows :-

```
Apu-> verify srm

APU-I VERIFY LOADED ROM IMAGE
0x0000
APU-I LOADED ROM IMAGE VERIFIED
0x0000
0x0000
Rom Checksum 0x97
Rom Verify Successful
```

1.2.8 Step 8: Exit from the Firmware Update Utility

Cycle power on the system or hit the reset button.

1. Press the power switch to the Off (O) position.
2. Press the power switch to the On (|) position.

1.3 Updating a Windows NT system

This section describes how to update a system running the Windows NT operating system. Problems exist in certain versions of the Windows NT (ARC) firmware which can cause the update utility to hang. Details are given in section 1.3.5.

1.3.1 Step 1: Shutdown Windows NT and Power cycle the system

1.3.2 Step 2: Go to the Supplementary menu

Select the SUPPLEMENTARY MENU. This menu selection is the last choice in the BOOT MENU.

1.3.3 Step 3: Go to the Install New Firmware selection

When the CDROM is selected, the floppy drive will be checked for media containing the firmware update utility file. This command will timeout if the proper media is not present.

1.3.4 Step 4: Perform Update and System Initialization

The firmware update utility will now start. Use the `update arc` and `verify arc` commands to perform the update. See section 1.2 steps 6 to 8 for more detail. The expected checksum for the V4.42 Windows NT firmware is Ox88.

1.3.5 Step 5: Problems with Updating on a Windows NT System

In V3.5-11 and earlier Windows NT firmware, the CD search path defined for the update utility file is incorrect. The update CD must be placed into a drive on a system running NT. Copy file CDROM\DECAXPPCI33\FWUPDATE.EXE onto a FAT formatted floppy. This floppy can then be used to do the update from the INSTALL NEW FIRMWARE option, as detailed above. The CD must NOT be in the CD drive on the system when the update from floppy is run.

The second problem exists in V3.5-8 and earlier NT firmware. The utility uses the IO device that is selected in the OSF NVR as the display device. If this is not set up for graphics, the utility will try to use COMA for IO and the graphics display will remain blank (blue). In this case the user must attach a terminal to COMA. Setup is 9600 baud, 8 data bits, 1 stop bit and no parity.

A problem exists in all versions of the Windows NT firmware and update utility that may cause the utility to hang if a bridged PCI option card is present in the system. If such a problem is encountered, the bridged card should be removed while the update is performed.

2
Network and InfoServer Upgrades

This chapter explains how to perform network updates. Network upgrades may be used on DIGITAL UNIX systems only, that is, systems running the SRM firmware. Supported mechanisms for network upgrade are :-

- MOP network upgrades
- BOOTP network upgrades
- InfoServer upgrades

Notes

The DIGITAL AXPpci33 system supports two network devices. A Tulip based PCI device (ewa) and an ISA DE205 device (ena). Examples in these sections use ewa0, which is the first Tulip PCI card.

2.1 MOP Network Upgrade

Note

You can use a DIGITAL UNIX system to copy the file from the Firmware Update Utility CD-ROM, but MOP is not supported under DIGITAL UNIX.

The DIGITAL AXPpci33 series of systems to be updated (target system) must be powered on and at the console prompt (>>>).

Table 2-1 lists the steps required to update the firmware on your system from the network. These steps are further detailed on the next page.

Table 2–1 Updating System From Network

Step	Description
1	Place the Firmware Update Utility compact disc into the CD drive on the host system.
2	If the host is a VMS, ULTRIX, or DIGITAL UNIX system, copy the update file from the Firmware Update Utility compact disc.
3	Set up the host system.
4	Enter a network boot command from the target system.
5	Refer to Section 1.2, steps 6-8 to complete update procedure.

2.1.1 Step 1: Load the Firmware Update Utility Compact Disc

1. Remove any compact disc that may already be loaded into the CD drive.
2. Load the Firmware Update compact disc into the drive.

2.1.2 Step 2a: VMS File Copy Instructions

If your host system is VMS, copy the file from the Firmware Update Utility compact disc by entering the following commands at the VMS $ prompt.

```
$ mount /over=id dka400
$ copy dka400:[sys0.sysexe]decaxppci33_v1_6.sys mom$load:
```

This example assumes the CD drive device ID is 4. See section 1.2.2 to determine the ID.

2.1.3 Step 2b: ULTRIX or DIGITAL UNIX File Copy Instructions

If your host system is ULTRIX or DIGITAL UNIX, copy the file from the Firmware Update Utility compact disc by entering the following commands at the ULTRIX or Digital UNIX # prompt.

```
# mount -rt cdfs -o noversion /dev/rz4c /mnt
# cp /mnt/DECAXPPCI33/DECAXPPCI33_V1_6.SYS
/usr/lib/mop/filename
```

This example assumes the CD drive device ID is 4. See section 1.2.2 to determine the ID.

2.1.4 Step 3: Set Up Host

Execute the following when updating using a VMS host. You must use NCP to define the characteristics of the host and target system. You will need OPER privileges.

```
$ MCR NCP set node NODE_NAME service circuit CIRC_NAME
  hardware address 08-00-2B-XX-XX-XX load file
  DECAXPPCI33_V1_6.SYS
$ MCR NCP set circ CIRC_NAME state off
$ MCR NCP set circ CIRC_NAME serv enabled
$ MCR NCP set circ CIRC_NAME state on
```

Note

CIRC_NAME is the logical name of the circuit used by the network.

Execute the following only when updating using an ULTRIX host. Please note that MOP is not supported under DIGITAL UNIX. Make sure the mop_mom process is running. If ps aux|grep mop does not show a mop_mom process, then you must start one by issuing the following command as a superuser:

```
# mop_mom
```

2.1.5 Step 4: Boot the Firmware Update Utility

To start the Firmware Update Utility, enter the boot command at the console prompt on the target system. The following command starts a boot process on ewa0 :-

```
>>> boot ewa0 -fi filename
```

Note

The filename must be entered exactly as displayed by the ULTRIX host.

After the boot process completes, the Firmware Update Utility menu is displayed. Note the Update Utility prompt (APU->). Refer to section 1.2 step 5 for details.

2.1.6 Step 5: Perform Update

To complete the update procedure of your system, refer to Section 1.2, steps 6-8.

2.2 BOOTP Network Upgrade

2.2.1 Step 1: Mount the Firmware Update Utility CD-ROM

```
# mount -rt cdfs -o noversion /dev/rz4c /mnt
```

This example assumes the CD drive device ID is 4. See section 1.2.2 to determine the ID.

2.2.2 Step 2: Modify or Create the Client Database in the /etc/bootptab File

```
(<host_name>:ht:<hw_type>:ha=<hw_address>:
 bf=DECAXPPCI33_V1_6.EXE:ip=<ip_address>)
```

where:

- host_name is the system name in /etc/hosts.
- hw_type is the hardware type. Proteon is ht = 4. Ethernet is ht = 1. Regular token-ring (IEEE 802) is ht = 6.
- hw_address is the hardware address: use the console command show device.
- ip_address is the corresponding Internet protocol address of the system name in /etc/hosts.

The following is an example of a bootptab file:

```
bigsox:ht=1:ha=08002b236423:bf=/MNT/DECAXPPCI33/DECAXPPCI33_V1_6.EXE:ip=16.182.0.87
```

2.2.3 Step 3: Modify or Create the Client Database in the /etc/tftptab File to include the boot file location.

2.2.4 Step 4: Invoke bootpd and tftpd daemons

- Modify the /etc/inetd.conf file. Uncommon the tftp and bootps process. It should look like the following example:

```
tftp   dgram udp wait root    /usr/sbin/tftpd   tftpd/mnt
bootps dgram upd wait root    /usr/sbin/bootpd  bootpd
```

- Find the process /usr/sbin/inetd daemon:

```
# ps aux | grep ine
# kill process#
```

- Restart the inetd daemon:

```
# /usr/sbin/inetd
```

Note

The bootpd and tftp daemon will be removed if the system is rebooted. Refer to the manual pages: bootpd(8) or tftpd(8) for more information.

2.2.5 Step 5: Enter the Following Command

Prior to entering the boot command, the user must perform the generic bootp setup as described in Section 3.2, point 5. To perform the BOOTP upgrade, enter the following command line.

```
>>> boot ewa0
```

After the boot process completes, the Firmware Update Utility menu is displayed. Note the Update Utility prompt (APU->). Refer to section 1.2 step 5 for details.

2.2.6 Step 6: Perform Update and System Initialization

To complete the update procedure of your system, refer to Section 1.2, steps 6-8.

2.3 InfoServer Upgrade

The steps required to update from an infoserver are detailed below. Before beginning, be certain to :-

1. Insert the compact disc into a CD-ROM reader that is connected to the InfoServer.
2. The InfoServer kernel must be at a minimum revision of 2.2 and MOP must be enabled on the InfoServer.

2.3.1 Step 1: Enter the Following Command

To perform an upgrade using the InfoServer, enter the following command line. The filename must be in uppercase.

```
>>> boot ewa0 -fi DECAXPPCI33_V1_6.
```

After the boot process completes, the Firmware Update Utility menu is displayed. Note the Update Utility prompt (APU->). Refer to section 1.2 step 5 for details.

2.3.2 Step 2: Perform Update and System Initialization

To complete the update procedure of your system, refer to Section 1.2, steps 6-8.

3

DIGITAL AXPpci33 Series Firmware Information

This section describes new features and limitations of the present firmware upgrade.

3.1 New Features

This release has bug fixes but no new functionality.

3.2 SRM Firmware Limitations

1. Assigning more than the maximum number of system supported IRQ's results in IRQ resource conflicts. Make sure that you do not have more than 5 options on a DIGITAL AXPpci33 machine which use assignable interrupts. Count the number of ISA options that you have installed, and add the number of PCI options you have installed. If this number exceeds 5, and you have not disabled any of the on board ISA devices via the ISACFG command you may have potential problems.
2. Should a boot file pathname be necessary for either MOP or TCP/IP booting, you should enclose the pathname in quotes. for example:

   ```
   >>>boot ewa0 -file "/dir1/dir2/filename"
   ```

3. When using ISACFG, if you accidentally add or modify an entry with an incorrect entry for IOBASE0- IOBASE5 you cannot reset those 64 bit fields back to 8000000000000000 to make the field unused again. Your only option is to:

   Display the device's information and make a note of the appropriate fields,

   ```
   >>>isacfg -slot # -dev #
   ```

   Remove the device,

   ```
   >>>isacfg -rm -slot # -dev #
   ```

   Then re-add the device where ... represents all of the original parameters you were using except the erroneous IOBASE or MEMLEN entry,

   ```
   >>>isacfg -mk...
   ```

4. If you attempt to boot from the CD ROM drive but do not have media installed you will see a series of "timeout" errors that scroll off the screen. To alleviate this situation, install the CD ROM that will be booted. If you typed in the incorrect device by choosing the CD ROM, hit CTRL/X and then type `>>>init`
5. To attempt to boot using `bootp`, you must do the following for generic bootp setup before booting in the normal fashion to device ewa0,

```
>>> set ewa0_inet_init BOOTP
>>> set ewa0_protocols BOOTP
```

6. DIGITAL UNIX installation problem.

   After the root filesystem has been initialized, three console commands must be typed for a DIGITAL UNIX installation. The DIGITAL UNIX installation prints out the exact commands you should type.

   However a console firmware bug, with certain graphics adapters, clears the screen before the system halts, preventing you from reading the commands that must be typed. Use the following three steps to reconstruct the commands.

   - 1. Use the following command to set the console environment variable that causes an automatic boot to multi-user mode.

     ```
     >>> set boot_osflags A
     ```

   - 2. Specify the default disk to boot. The command format varies depending on the disk chosen for the root filesystem.

     Console firmware names for disks are of the format DKA0, DKB1, and so on, where:

     The first two characters are always 'DK'.

     The second character indicates the controller, for example: 'A' specifies the disk is on the first controller, 'B' specifies the disk is on the second controller.

     The third character is the device unit number, for example: unit zero is '0', unit 1 is '1'.

     DIGITAL UNIX disk names are of the form rz0, rz12, and so on. Disks on the first controller are rz0 through rz7. Disks on the second controller are rz8 through rz15.

     The following example sets the default boot device to be DIGITAL UNIX rz0.

     ```
     >>> set bootdef_dev DKA0
     ```

   - 3. Issue the boot command:

     ```
     >>> boot
     ```