DIGITAL AXPvme

Firmware Update Procedures

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Maynard, Massachusetts

First Printing, July 1994
This revision, March 1999

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This document was prepared using VAX DOCUMENT Version 2.1.

Contents

Preface

Purpose of This Guide

This document discusses changes that have been made to the DIGITAL AXPvme firmware. This document also explains how to use the DIGITAL AXPvme Firmware Update Utility to update DIGITAL AXPvme firmware electronically.

Intended Audience

This document is intended for:

- Manufacturing personnel responsible for updating DIGITAL AXPvme firmware.
- Repair personnel responsible for upgrading DIGITAL AXPvme modules.
- Individuals responsible for maintaining DIGITAL AXPvme systems, typically field service representatives or system managers.

Release Notes

The major functional change in this release includes support for EWX0_MODE, which is required for DIGITAL UNIX V4.0D).

Conventions

The following conventions are used in this guide:

Convention	Description
RZ2*x*	RZ2*x* refers to an RZ-series fixed disk drive, such as the RZ24L, RZ25, or RZ26.
Return	A key name in a box indicates that you press the corresponding key on the keyboard.
Ctrl/*x*	A sequence such as Ctrl/*x* indicates that you must hold down the key labeled Ctrl while pressing key *x*.
show config	Command names appear in bold type. Commands are note case-sensitive except where specifically indicated.
`>>> show auto_action`	This typeface denotes example input and output.
`>>> set` *`variable`*	Variables for which you must supply a value are shown in italic type.

Associated Documentation

For information on how to use the console firmware commands, see the following product documentation:

Title	Part Number
DIGITAL AXPvme Single Board Computer Installation Guide	EK–EBV1X–IN
DIGITAL AXPvme Single Board Computer Technical Description	EK–EBV1X–TD

Reader Comments

DIGITAL welcomes comments on this or any other manual. Send your comments to DIGITAL at the following address:

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1
Overview of the Update Process

The DIGITAL AXPvme firmware resides in Flash Erasable Programmable Read Only Memory (FEPROM) on the VME system module. FEPROMs provide non-volatile storage of the DIGITAL AXPvme PALcode, diagnostics, console interface, and bootstrap. An advantage of this technology is that you can erase, reprogram, and verify the entire image in the FEPROMs in circuit without replacing parts.

The FEPROM technology for DIGITAL AXPvme modules requires you to erase an entire part before reprogramming it. Hence, there is a small "window of vulnerability", when the DIGITAL AXPvme has inoperable firmware. Normally, this window is less than thirty seconds. Nonetheless, you should allow an update to run to completion without interruption.

The only DIGITAL AXPvme Firmware image that you can update is the Alpha SRM firmware image (512KB) used for booting the DIGITAL UNIX operating system or VxWorks for Alpha AXP kernel.

The update utility first performs consistency checks to verify that the image is appropriate for the system and that the new version supersedes the current version. It then erases, reprograms, and verifies the entire FEPROM.

Once the update completes successfully, you must cycle power to the system to allow it to unload the firmware from the FEPROMs. You can then resume normal system operation.

1.1 Supported CPU Modules and New Features

This firmware update version, V17.0, supports the following CPU modules:

- AXPvme 64
- AXPvme 64LC
- AXPvme 160
- AXPvme 100
- AXPvme 230

New features included support for EWX0_MODE, which is required for DIGITAL UNIX V4.0D.

1.2 Operating System Firmware Revision Requirements

Table 1–1 lists the operating system firmware revision requirements.

Table 1–1 Operating System Firmware Revision Requirements

SRM Firmware	DIGITAL UNIX	VxWorks
12.0	<3.0B	<3.1A
14.0	3.0B to <4.0	3.1A to 3.2
15.0	4.0 to 4.0C	5.2 or greater
16.0	4.0 to 4.0C	5.2 or greater
17.0	4.0D or greater	5.2 or greater

1.3 Firmware Update Files

Table 1–2 lists the files which are relevant to the update process.

Table 1–2 Firmware Update Utility Files

File	Blocks	Usage
axpvme_v17_0.sys	1957	Bootable file used for Maintenance Operation Protocol (MOP) network updates.
axpvme_v17_0.exe	1956	Bootable file used for CD-ROM updates.
axpvme_v170_fw_relnote.ps	~175	Firmware update utility release notes in PostScript format.
axpvme_v170_fw_relnote.txt	~75	Firmware update utility release notes in ASCII text format.

1.4 Updating the Firmware

The procedure for updating the firmware takes about five minutes. Chapters 2 through 4 explain the steps associated with:

- Preparing the system for the firmware update
- Updating the firmware
- Completing post-update instructions

If you have problems with the update procedure, contact your local Customer Support Center.

2 Preparing the System for a Firmware Update

To prepare a DIGITAL AXPvme system for a firmware update, you must:

1. Shut down the operating system
2. Enable updates
3. Halt the system
4. Disable the automatic boot option
5. Disable power-on diagnostics
6. Reset the system
7. Identify the current version of the firmware and PALcode

This chapter explains how to complete these steps.

2.1 Shutting Down the Operating System

The first step to updating the DIGITAL AXPvme firmware is to place the DIGITAL AXPvme system in a quiescent state by shutting down the operating system.

Note

Before shutting down the operating system, be sure to consult the system manager.

2.2 Enable Updates

After shutting down the operating system, enable firmware updates by closing module DIP switch #2.

2.3 Halting the System

After you enable updates, halt the system by pressing the HALT button on the system's front panel. The SRM console prompt (>>>) should appear on the operator console.

2.4 Disabling Automatic Boot Option

Once the console prompt appears, disable the automatic boot option (if the option is enabled) by setting the environment variable AUTO_ACTION to HALT. The following example uses the console command **show** to check the variable's current setting and uses the command **set** to set the value to HALT.

```
>>>  show auto_action
auto_action          BOOT
>>>  set auto_action halt
>>>  show auto_action
auto_action          HALT
>>>
```

2.5 Disable Power-On Diagnostics

You must also make sure that power-on diagnostics are disabled. To disable the diagnostics, use the **set** command to set the environment variable MODE to FASTBOOT. For example:

```
>>>  set mode fastboot
>>>
```

Note

You should keep a record of the environment variables that you set so you can set them back to their original values after completing the update.

2.6 Resetting the System

Once the environment is configured correctly, you must place the system in an initialized state by resetting the system. To reset the system, press the RESET button on the front panel. The DIGITAL AXPvme should reset itself and return the console prompt (>>>).

2.7 Identifying the Current Firmware and PALcode Versions

After resetting the system, identify the current version of the firmware and PALcode. To determine the versions, enter the **show** command with the environment variables VERSION and PAL, respectively. For example:

```
>>>  show version
version              V16.0-0  Oct 18 1996, 11:15:50
>>>  show pal
pal                  VMS PALcode V5.56-4, OSF PALcode X1.45-9
>>>
```

3
Updating the Firmware

You can update the firmware from either of the following:

- CD–ROM
- A network server

Note

Be sure to wait for updates to run to completion without interruption.

3.1 Updating the Firmware from CD–ROM

To update the firmware from CD–ROM:

1. Power down the DIGITAL AXPvme system.
2. Connect the proper CD–ROM drive to the SCSI bus.
3. Use the **show device** command to verify the CD–ROM drive is configured and installed correctly.
4. Insert the firmware upgrade CD–ROM into the CD–ROM drive.
5. Boot the Firmware Update Utility.
6. Update the firmware.

Sections 3.1.1 and 3.1.2 explain how to boot the Firmware Update Utility and update the firmware.

3.1.1 Booting the Firmware Update Utility

To boot the Firmware Update Utility, enter the **boot** command at the console prompt with the name of the CD–ROM drive in which the firmware upgrade CD–ROM has been inserted. If you do not know the name of the CD–ROM drive, you can get the name by using the **show device** console command. When issuing the **boot** command, you must specify *0,a0* for the **flags** option.

The system responds to the **boot** command by displaying:

- System-specific "README-FIRST" information
- The name of the latest Firmware Update Utility boot file
- The prompt `Bootfile:`

The following example shows how to boot the Firmware Update Utility from CD–ROM drive dka400:

```
>>>boot -fl 0,a0 dka400
(boot dka400.4.0.2.0 -flags 0,a0)
block 0 of dka400.4.0.2.0 is a valid boot block
reading 1002 blocks from dka400.4.0.2.0
bootstrap code read in
base = 102000, image_start = 0, image_bytes = 7d400
initializing HWRPB at 2000
initializing page table at f4000
initializing machine state
setting affinity to the primary CPU
jumping to bootstrap code
Bootfile:
```

At this point, press Return or Enter to load the current version of the utility or type the name of a specific boot file (for example, `[axpvme]axpvme_v16_0.exe`) to load a previous version of the utility.

Note

The name of the boot file changes with each new release.

For example:

```
Bootfile: Return

VMS PALcode V5.56-7, OSF PALcode X1.45-12

starting console on CPU 0
initialized idle PCB
initializing semaphores
initializing heap
initializing driver structures
initializing idle process PID
XDELTA not enabled.
initializing file system
interrupts ON
initializing timer data structures
lowering IPL
counted 15624750 cycles in 100 ticks
CPU 0 speed is 4.33 ns (230 MHz)
System Memory Size: 32MBs
Quick verify test of memory.
The default Cluster 1 bitmap will be used
probing hose 0, PCI
entering idle loop
bus 0, slot 1 -- ewa -- DECchip 21040-AA
bus 0, slot 2 -- pka -- NCR 53C810
Station Address: 08-00-2b-e2-48-5d
Skipping powerup tests...
Digital AXPvme Model 230 Common Console V17.0-0, built on Aug 27 1997 at 10:16:08
>>>
```

3.1.2 Updating the Firmware

After booting the image of the Firmware Update Utility, update the firmware on the DIGITAL AXPvme module by issuing the **update** command. For example:

```
>>> update
(update -path -medullarom -target console)

new: 17.0-0

        Note: Module DIP Switch #2 must be CLOSED to enable Updates!
```

```
                FEPROM UPDATE UTILITY
                       -----> CAUTION <-----
        EXECUTING THIS PROGRAM WILL CHANGE YOUR CURRENT ROM!

Do you really want to continue [Y/N] ?:y

       DO NOT ATTEMPT TO INTERRUPT PROGRAM EXECUTION!
        DOING SO MAY RESULT IN LOSS OF OPERABLE STATE.

The program will take at most several minutes.

Programming Flash Device at PCI memory:0, Data from Memory:16ec20

Starting erasure..
PCI Memory Offset 0h, Block Size 65536 .Block: ..0..1..2..3..4..5..6..7
erase completed..starting programming

Starting programming...
programming completed

Verifying...
Update successful

        Note: Module DIP Switch #2 should be OPENED to disable Updates!

>>>
```

Note

When updating the flash ROMS on AXPvme modules, the output that is displayed is dependent on the CPU being used and may differ from the preceding example.

3.2 Updating the Firmware from a Network Server

To update the firmware from a network server:

1. Copy the MOP and BOOTP loadable files from the CD–ROM onto your server system.
2. Update MOP (.sys).
3. Update BOOTP (.exe).

3.2.1 Copying MOP and BOOTP Loadable Files from the CD–ROM

The first step to updating the firmware from a network server is to copy the MOP and BOOTP loadable files from the CD–ROM to your DIGITAL UNIX or openVMS server system.

The .sys and .exe files are located on the CD in the ISO 9660 file structure. To access this file structure on a VMS system, the CD must be mounted using the following command:

```
$ mount/media=cd [diskdrivename] UPDATE_V40/bold
```

On a VMS system, the files are located in the directory [AXPVME].

On a DIGITAL UNIX system, the files are located in directory /AXPVME/.

If you are using an Information Server, the console image resides in the directory `[sys0.sysexe]` directory on the CD–ROM.

Note

The file names change with each new release.

Copy the MOP loadable file (.sys) to the MOM$LOAD directory of the server and enable MOP services.

Copy the BOOTP loadable file (.exe) to the appropriate area on the server and enable BOOTP services.

3.2.2 Booting and Updating MOP

Issue the following **boot** command, to boot the MOP loadable file:

```
>>>boot -file  axpvme_v17_0 -flags 0,a0 -protocol mop ewa0
(boot ewa0.0.0.1.0 -file  axpvme_v17_0 -flags 0,a0)

Trying MOP boot.
.....................

Network load complete.
Host name: host responding to MOP request
Host address: address of above host

bootstrap code read in
base = 110000, image_start = 0, image_bytes = f4800
initializing HWRPB at 2000
initializing page table at 170000
initializing machine state
setting affinity to the primary CPU
jumping to bootstrap code

VMS PALcode V5.56-7, OSF PALcode X1.45-12

starting console on CPU 0
initializing idle PCB
initializing semaphores
initializing heap
initializing driver structures
initializing idle process PID
XDELTA not enabled.
initializing file system
interrupts ON
initializing timer data structures
lowering IPL
CPU 0 speed is 4.33 ns (231MHz)
System Memory Size: 64MBs
Quick verify test of memory.
Setting system speed to 5
The default Cluster 1 bitmap will be used
probing hose 0, PCI
entering idle loop
bus 0, slot 1 -- ewa -- DECchip 21040-AA
bus 0, slot 2 -- pka -- NCR 53C810
Station Address: 08-00-2b-e6-70-61
Skipping powerup tests...
Digital AXPvme Model 230 Common Console V17.0-0, built on Aug 28 1997 at
13:51:28
>>>
```

Once MOP is booted, update it by issuing the **update** command as follows:

```
>>> update
(update -path -medullarom -target console)

new: 17.0-0

        Note: Module DIP Switch #2 must be CLOSED to enable Updates!

                 FEPROM UPDATE UTILITY
                        -----> CAUTION <-----
        EXECUTING THIS PROGRAM WILL CHANGE YOUR CURRENT ROM!

Do you really want to continue [Y/N] ?:y

       DO NOT ATTEMPT TO INTERRUPT PROGRAM EXECUTION!
        DOING SO MAY RESULT IN LOSS OF OPERABLE STATE.

The program will take at most several minutes.

Programming Flash Device at PCI memory:0, Data from Memory:16ec20

Starting erasure..
PCI Memory Offset 0h, Block Size 65536 .Block: ..0..1..2..3..4..5..6..7
erase completed..starting programming

Starting programming...
programming completed

Verifying...
Update successful

        Note: Module DIP Switch #2 should be OPENED to disable Updates!

>>>
```

Note

When updating the flash ROMs on DIGITAL AXPvme modules, the output text that is displayed is dependent on the CPU being used and may differ from the preceding example.

3.2.3 Updating BOOTP

To update with BOOTP, issue the following commands from the AXPvme console prompt after the appropriate EXE file has been loaded into the server area:

```
>>> set ewa0_protocols BOOTP
>>> boot ewa0
(boot ewa0.0.0.1.0 -flags 0)

Trying BOOTP boot.

Broadcasting BOOTP Request...
Received BOOTP Packet File Name is: /var/adm/ris/axpvme_v17_0.exe
local inet address: x.x.x.x.x (IP address of AXPvme)
remote inet address: x.x.x.x.x (IP address of RIS server)
TFTP Read File Name: /var/adm/ris/axpvme_v17_0.exe
netmask = 255.0.0.0
Server is on same subnet as client.
...............
bootstrap code read in
base = 10a000, image_start = 0, image_bytes = f4800
initializing HWRPB at 2000
initializing page table at fc000
initializing machine state
setting affinity to the primary CPU
jumping to bootstrap code
```

```
VMS PALcode V5.56-7, OSF PALcode V1.45-12

Starting console on CPU 0
initializing idle PCB
initializing semaphores
initializing heap
initializing driver structures
initializing idle process PID
XDELTA not enabled.
initializing file system
interrupts ON
initializing timer data structures
lowering IPL
CPU 0 speed is 4.33 ns (231 MHz)
create dead_eater
create poll
create timer
create powerup
System Memory Size: 32MBs
Quick verify test of memory.
Setting system speed to 5
The default Cluster 1 bitmap will be used
probing hose 0, PCI
entering idle loop
bus 0, slot 1 -- ewa -- DECchip 21040-AA
bus 0, slot 2 -- pka -- NCR 53C810
Station Address: 00-00-f8-23-70-f5
Skipping powerup tests...
Digital AXPvme Model 230 Common Console V17.0-0, built on Aug 28 1997 at
13:51:28
>>> update
(update -path mudullarom -target console)

new: 17.0-0

    Note: module DIP Switch #2 must be CLOSED to enable Updates!

                    FEPROM UPDATE UTILITY
                    -----> CAUTION <-----
    EXECUTING THIS PROGRAM WILL CHANGE YOUR CURRENT ROM!

Do you really want to continue [Y/N] ? :y

    DO NOT ATTEMPT TO INTERRUPT PROGRAM EXECUTION!
    DOING SO MAY RESULT IN LOSS OF OPERABLE STATE.

The program will take at most several minutes.
Programming Flash Device at PCI Memory:0, Data from Memory:16e020

Starting erasure..
PCI Memory Offset oh, Block Size 65536 .Block: ..0..1..2..3..4..5..6..7
erase completed...starting programming

Starting programming...
programming completed

Verifying...
Update successful

    Note: Module DIP Switch #2 should be OPENED to disable Updates!

>>>
```

Note

When updating the flash ROMs on DIGITAL AXPvme modules, the output text that is displayed is dependent on the CPU being used and may differ from the preceding example.

4
Post-Update Instructions

When you finish updating the firmware, you must:

1. Restore environment variables, such as AUTO_ACTION and MODE, to their original state.
2. Open module DIP switch #2 to disable further updates of the console image.
3. Cycle power or reset the system to unload the FEPROMs and start running the new firmware.
4. Reboot the operating system.

If the update fails, contact your local Customer Support Center.