AlphaServer 2x00, 2x00A Loadable Firmware Update Utility User Guide and Release Notes

For **AlphaServer 2x00 Model 4/xxx**
SRM Console Version V5.3-2
ARC Console Version V4.58-0

For **AlphaServer 2x00 Model 5/xxx**
SRM Console Version V5.3-6
ARC Console Version V4.58-0

For **AlphaServer 2100A Model 4/xxx**
SRM Console Version V5.3-10
ARC Console Version V4.58-0

For **AlphaServer 2100A Model 5/xxx**
SRM Console Version V5.3-14
ARC Console Version V4.58-0

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Contents

Preface v

1 RELEASE NOTES: IMPORTANT—READ ME FIRST

1.1 Too Many B2110-AA Modules are Diagnosed as No Problem Found 1–1
1.1.1 Console Image Check 1–1
1.1.2 Please Help Reduce the Number of No Problem Founds 1–1
1.2 Functional changes introduced in this release. 1–2
1.3 Before You Begin a Firmware Update 1–2
1.4 EISA Configuration Utility (ECU) Kit Information 1–2
1.5 Systems Configured with SWXCR RAID Controller 1–3
1.6 Systems Configured with a CIPCA PCI-CI adapter 1–3
1.6.1 CIPCA driver not started under NT or UNIX 1–3
1.6.2 New HEAP_EXPAND environment variable (for 3 or more CIPCAs) 1–3
1.6.3 Determining HEAP_EXPAND Setting 1–4
1.7 Known Anomalies, Restrictions and Workarounds 1–4
1.7.1 Restriction on ARC console from Alpha Firmware CD V3.7 1–4
1.7.2 Restriction on DE500-AA 1–4
1.7.3 Anomalies Common to All Supported Operating Systems 1–5
1.7.4 OpenVMS and DIGITAL UNIX 1–5
1.7.4.1 DE500 in auto-negotiate mode 1–5
1.7.5 OpenVMS Specific Anomalies 1–6
1.7.6 DIGITAL UNIX Specific Anomalies 1–6
1.7.7 Windows NT Specific Anomalies 1–7

2 Overview of the Update Process

2.1 Update Steps to Load SRM and ARC Console Firmware 2–2
2.2 Firmware Update Files 2–2

3 Preparing the System for a Firmware Update

3.1 Steps for DIGITAL UNIX or OpenVMS users 3–1
3.1.1 Shutting Down the Operating System 3–1
3.1.2 Halting the System 3–1
3.1.3 Update settings for autoboot and os_type 3–2
3.1.4 Resetting the System 3–2
3.1.5 Identifying the Current SRM Firmware Version 3–2
3.2 Steps for Windows NT Users 3–2
3.2.1 Shutting Down the Operating System 3–2

4 Booting the Loadable Update Utility

4.1 Booting the Loadable Update Utility to Update Console Firmware from CD 4–1
4.1.1 Steps to Update Firmware for DIGITAL UNIX and OpenVMS Users 4–1
4.1.2 A Log File of Booting the LFU from CD-ROM 4–2
4.1.3 Steps to Update Firmare from CD for Windows NT Users 4–3
4.2 Booting the Update Utility from the Ethernet 4–3
4.2.1 Setting Up a MOP Boot Server Under OpenVMS 4–4
4.2.2 Setting Up an InfoServer for MOP Booting 4–4
4.2.3 Booting the Update Utility on the Client 4–4

5 Using the LFU

5.1 New LFU Scripts to Simplify System Upgrading/Downgrading 5–1
5.2 Previous release LFU features 5–2
5.3 Steps to Update All LFU Supported Firmware 5–4
5.4 Steps to Update the SRM Console and ARC Firmware 5–4
5.5 Steps to Update the Fail-safe Loader 5–5
5.6 Steps to Make a Dual SRM Console for a Known Good Spare 5–5
5.7 Clearing ARC NVRAM 5–5

6 Post-Update Instructions

7 Running the EISA Configuration Utility (ECU)

7.1 ECU from the SRM prompt 7–1
7.2 ECU from the ARC Boot menu 7–1
7.3 Stepping Through the ARC Menus 7–2
7.4 Stepping Through the ECU Dialog Boxes 7–2

8 SRM Console Firmware Security Features

8.1 Security Features Overview 8–1
8.2 Security Commands 8–1
8.2.1 set password 8–1
8.2.2 set secure 8–2
8.2.3 login 8–3
8.2.4 clear password 8–4
8.3 Secure Mode Functions 8–4
8.3.1 boot 8–4
8.3.2 Boot Examples 8–4
8.3.3 start and continue 8–5
8.3.4 Ctrl/x 8–5

A LFU Utility Functions

A.1 Display A–1
A.2 Exit A–1
A.3 List A–1
A.4 Readme A–1
A.5 Update A–1
A.6 Verify A–2

A.7 ? or Help A–2

B AlphaServer 2000/2100/2100A Older Firmware Revision Matrix Tables

B.1 Firmware Revision Matrix - Aug97-Oct97 for AlphaServer 2x00 Model 4/xxx B–1
B.2 Firmware Revision Matrix - Dec95-Dec96 for AlphaServer 2x00 Model 4/xxx B–2
B.3 Firmware Revision Matrix - Jan95-Aug95 for AlphaServer 2x00 Model 4/xxx B–3
B.4 Firmware Revision Matrix - Oct94-Dec94 for AlphaServer 2x00 Model 4/xxx B–4
B.5 Firmware Revision Matrix - May94-Sep94 for AlphaServer 2x00 Model 4/xxx B–5
B.6 Firmware Revision Matrix - Oct97 for AlphaServer 2x00 Model 5/xxx . . . B–6
B.7 Firmware Revision Matrix - May96-Aug97 for AlphaServer 2x00 Model 5/xxx B–6
B.8 Firmware Revision Matrix - May95-Mar96 for AlphaServer 2x00 Model 5/xxx B–7
B.9 Firmware Revision Matrix - Feb98-Oct97 for AlphaServer 2100A Model 4/xxx B–8
B.10 Firmware Revision Matrix - Mar96-Dec96 for AlphaServer 2100A Model 4/xxx B–9
B.11 Firmware Revision Matrix - Feb98-Oct97 for AlphaServer 2100A Model 5/xxx B–10
B.12 Firmware Revision Matrix - Mar96-Dec96 for AlphaServer 2100A Model 5/xxx B–11

C Changes from Previous Firmware Releases - V3.7 to V5.2

C.1 V5.2 Release C–1
C.2 V5.1 Release C–1
C.2.1 CCMAB - Memory Channel 2 . . . . . C–1
C.3 V5.0 Release C–1
C.4 V4.9 Release C–1
C.4.1 Console Notes for the DE500-AA/DE500-BA Fast EtherWorks Adapters C–2
C.4.1.1 Set EW*0_Mode Auto-Negotiate Examples C–2
C.4.1.2 Behavior Note on Systems with Multiple DE500's on OpenVMS Systems C–3
C.5 V4.7 Release C–3
C.5.1 Bug Fixes C–3
C.5.2 Anomaly Seen on AlphaServer 2100 Systems with DE425's C–3
C.5.3 Problems with files on the V3.7 Alpha Firmware CD C–3
C.5.4 ARC Console Support for the 120ns NVRAM C–3
C.5.5 Additional Characters to Support Japanese Keyboard C–4
C.5.6 Additional Information on the Set Language Console Command C–4
C.5.7 Support for the DE500-AA Fast EtherWORKS Adapter C–4
C.5.7.1 Set EW*0_Mode Auto-Negotiate C–5
C.5.7.2 Behavior Note on Systems with Multiple DE500-AA's C–5
C.5.8 About SRM Console Port Environment Variables C–5
C.5.9 An Anomaly Seen with Rev A2 PCEB and with DE425's C–7
C.6 V4.5 Release C–7

C.6.1 Anomaly Seen on AlphaServer 2100A with KZPSA's Behind the PCI-to-PCI Bridge . . . C–8
C.6.2 Anomaly Fixed in ARC Console V4.57-0 . . . C–9
C.7 New Console Environment Variables for the KCRCM Remote Console Module . . . C–9
C.7.1 About the KCRCM . . . C–10
C.8 V4.4 Release . . . C–10
C.9 V4.3 Release . . . C–12
C.10 V4.2 Release . . . C–15
C.11 V4.1 Release . . . C–15
C.12 V4.0 Release . . . C–17
C.13 V3.11 FIS Only Release . . . C–18
C.14 V3.9-89 Release . . . C–18
C.15 V3.8-54 FIS Only Release . . . C–19
C.16 V3.8-49 Release . . . C–19
C.17 V3.7 FIS Only Release . . . C–20

D Upgrading SWXCR Firmware on Systems Configured with a RAID Controller

D.0.1 What You Need to Update SWXCR Firmware . . . D–1
D.0.2 Create a RAID Standalone Configuration Utility [RCU] Floppy Diskette . . . D–1
D.1 How to Upgrade RAID Firmware . . . D–2
D.2 Upgrading RAID Firmware is Done in Two Parts . . . D–2
D.2.1 Upgrading RAID Part 1 - Set RAID controller Parameters . . . D–2
D.2.2 Upgrading RAID Part 2 - Update the Standalone Configuration Utility Firmware . . . D–3
D.2.2.1 Update SWXCR Controller Firmware via RCU Diskette . . . D–3
D.2.2.2 You Cannot Update SWXCR Controller Firmware with just the Alpha Firmware CD V5.4 . . . D–3
D.2.2.3 Verify the SWXCR Controller Firmware Update . . . D–3
D.2.2.4 How to Load the New .CFG File(s) - EISA Only . . . D–4

E Updating Firmware from the Fail-safe Loader

F Upgrading Firmware on B2110-AA and B2111-AA Modules

F.1 Update Procedure . . . F–1
F.1.1 Update Materials . . . F–1
F.1.2 Update Sequence . . . F–1
F.1.3 Updating Firmware on AlphaServer 2x00 Model 4/xxx Systems . . . F–2
F.1.4 Updating Firmware on AlphaServer 2x00 Model 5/xxx Systems . . . F–2

G Returning a B2110-AA or B2111-AA as a Known Good Spare

G.1 Using make_dual_srm AlphaServer 2x00 Model 4/xxx Systems . . . G–1
G.2 Using make_dual_srm on AlphaServer 2x00 Model 5/xxx Systems . . . G–1

H Upgrading an AlphaServer from a Model 4/2xx to a Model 5/250

I Downgrading an AlphaServer 2100A/2x00 from a Model 5/xxx to a Model 4/xxx

J AlphaServer 2100 to AlphaServer 2100A Firmware Upgrade

K RESTORE_NVRAM and SAVE_NVRAM

K.1 Restore NVRAM data to EEROM/TOY from a floppy file. K–1
K.2 Save NVRAM data in EEROM/TOY to a floppy file. K–2

Figures

3–1 AlphaServer 2000/AlphaServer 2100/AlphaServer 2100A Operator Control Panel 3–1

Tables

1 Console Minimum Firmware and Software Revisions AlphaServer 2x00 Model 4/xxx vii
2 Console Minimum Firmware and Software Revisions AlphaServer 2x00 Model 5/xxx viii
3 Console Minimum Firmware and Software Revisions AlphaServer 2100A Model 4/xxx ix
4 Console Minimum Firmware and Software Revisions AlphaServer 2100A Model 5/xxx x
5 Minimum Revisions for Option Firmware and Configuration Utilities xi
1–1 Firmware Required for an Update 1–2
2–1 LFU Files 2–3
5–1 New LFU Scripts 5–1
5–2 LFU Supported Option Firmware 5–3
B–1 Console Minimum Firmware and Software Revisions - Aug97 . . . . . B–1
B–2 Console Minimum Firmware and Software Revisions - Dec95-Dec96 . . . . . B–2
B–3 Console Minimum Firmware and Software Revisions - Jan95-Aug95 . . . . . B–3
B–4 Console Minimum Firmware and Software Revisions - Oct94-Dec94 . . . . . B–4
B–5 Console Minimum Firmware and Software Revisions - May94-Sep94 . . . . . B–5
B–6 Console Minimum Firmware and Software Revisions - Oct97 . . . . . B–6
B–7 Console Minimum Firmware and Software Revisions - May95-Aug97 . . . . . B–6
B–8 Console Minimum Firmware and Software Revisions - May95-Mar96 . . . . . B–7
B–9 Console Minimum Firmware and Software Revisions - Feb98-Oct97 . . . . . B–8

B–10 Console Minimum Firmware and Software Revisions - Mar96 . . . . . B–9
B–11 Console Minimum Firmware and Software Revisions - Feb98-Oct97 . . . . . B–10
B–12 Console Minimum Firmware and Software Revisions - Mar96 . . . . . B–11
D–1 SWXCR .Cfg files D–4
J–1 AlphaServer 2100 to AlphaServer 2100A Firmware Upgrade J–1

Preface

Purpose of This Guide

This document describes the AlphaServer 2000, AlphaServer 2100 and AlphaServer 2100A systems Loadable Firmware Update Utility (LFU) and lists any changes in this firmware release from previous firmware releases.

The document also describes the procedure to electronically update firmware on AlphaServer 2000, AlphaServer 2100 and AlphaServer 2100A systems.

Refer to the **Tables** for current revision information. Refer to **Chapter 1** for additional information about this release which may pertain to your system. Refer to **Appendix B** for additional previous release revision information.

Note

References to DIGITAL UNIX in this document refere also to Compaq Tru64 UNIX.

Intended Audience

This document is intended for the following audience:

- Manufacturing personnel responsible for the firmware updates on the AlphaServer 2000, AlphaServer 2100 or AlphaServer 2100A systems.
- Repair personnel responsible for upgrading AlphaServer 2000, AlphaServer 2100 or AlphaServer 2100A systems modules.
- Individuals responsible for maintaining AlphaServer 2000, AlphaServer 2100 or AlphaServer 2100A systems.

Related Documents

The following related documentation is also available:

- *AlphaServer 2100A Owner's Guide* (EK-2100A-OP)
- *AlphaServer 2100 Owner's Guide* (EK-KN450-OP)
- *AlphaServer 2000 Owner's Guide* (EK-400MP-IN)
- *AlphaServer 2000/2100/2100 RM/2100 CAB Series Service Guide* (EK-KN450-SV)
- *AlphaServer 2100 RM Installation/Owner's Guide* (EK-KN45x-RM)
- *AlphaServer 2000/2100/2100A Firmware Reference Guide* (EK-AXPFW-RM)

- *StorageWorks RAID Array 200 Subsystems Controller Installation and Standalone Utility User's Guide - EK-SWRA2-IG*
- *AlphaServer 2000/2100/2100RM KN470 or Higher CPU upgrade - EK-KN470-IN*
- *AlphaServer 2000/2100/2100RM KN470 or Higher CPU upgrade - EK-KN470-IN*

AlphaServer Technical Information via the World Wide Web

- http://www.ftp.digital.com/info/alphaserver/tech_docs/alphasrv2100/

How To Order Additional Documentation

If you need help with ordering additional documentation, call 800-DIGITAL (800-344-4825) and press 2 for technical assistance.

Conventions Used in This Guide

This document uses the following conventions:

KEY	Indicates a key on your keyboard.
CTRL/key	Indicates control characters. For example, Control C is shown as CTRL/C and indicates that both the CTRL and the C must be pressed simultaneously.
|	Change bars are used to indicate the information that has changed for this release.

Revision Matrix - AlphaServer 2x00 Model 4/xxx

The firmware from this release is on the Alpha Firmware CD V5.4. Use the matrix to determine what is the mininum console revision required to run a specific operating system.

Table 1 Console Minimum Firmware and Software Revisions AlphaServer 2x00 Model 4/xxx

Alpha Firmware Update CD			
Release	V5.4	V5.3	V5.2
Date	Apr-99	Nov-99	June-98
AlphaServer 2x00 Model 4/xxx Firmware			
SRM Firmware	V5.3-2	V5.3-2	V5.2-50
ARC Firmware	V4.58-0	V4.57-0	V4.56-0
VMS PAL	V5.56-7	V5.56-7	V5.56-7
OSF PAL	V1.45-12	V1.45-12	V1.45-12
Operating Systems			
OpenVMS	V7.1,7.2	V7.1	
DIGITAL UNIX	V4.0F	V4.0E	
Windows NT	V4.0	V4.0	

Revision Matrix - AlphaServer 2x00 Model 5/xxx

The firmware from this release is on the Alpha Firmware CD V5.4.

Table 2 Console Minimum Firmware and Software Revisions AlphaServer 2x00 Model 5/xxx

Alpha Firmware Update CD			
Release	V5.4	V5.3	V5.2
Date	Apr-99	Nov-99	June-98
AlphaServer 2x00 Model 5/xxx Firmware			
SRM Console	V5.3-6	V5.3-6	V5.2-54
ARC Firmware	V4.58-0	V4.57-0	V4.56-0
VMS PAL	V1.20-3	V1.20-3	V1.19-3
OSF PAL	V1.22-1	V1.22-1	V1.21-1
ISP1020	V5.57	V5.57	V5.54
Operating Systems			
OpenVMS	V7.1,7.2	V7.1	
DIGITAL UNIX	V4.0F	V4.0E	
Windows NT	V4.0	V4.0	

Revision Matrix - AlphaServer 2100A Model 4/xxx

The firmware from this release is on the Alpha Firmware CD V5.4.

Table 3 Console Minimum Firmware and Software Revisions AlphaServer 2100A Model 4/xxx

Alpha Firmware Update CD			
Release	V5.4	V5.3	V5.2
Date	Apr-99	Nov-99	June-98
AlphaServer 2100A Model 4/xxx Firmware			
SRM Firmware	V5.3-10	V5.3-10	V5.2-58
ARC Firmware	V4.58-0	V4.57-0	V4.56-0
VMS PAL	V5.56-7	V5.56-7	V5.56-7
OSF PAL	V1.45-12	V1.45-12	V1.45-12
ISP1020	V5.57	V5.57	V5.54
Operating Systems			
OpenVMS	V7.1,7.2	V7.1	
DIGITAL UNIX	V4.0F	V4.0E	
Windows NT	V4.0	V4.0	

Revision Matrix - AlphaServer 2100A Model 5/xxx

The firmware from this release is on the Alpha Firmware CD V5.4.

Table 4 Console Minimum Firmware and Software Revisions AlphaServer 2100A Model 5/xxx

Alpha Firmware Update CD			
Release	V5.4	V5.3	V5.2
Date	Apr-99	Nov-99	June-98
AlphaServer 2100A Model 5/xxx Firmware			
SRM Firmware	V5.3-14	V5.3-14	V5.2-62
ARC Firmware	V4.58-0	V4.57-0	V4.56-0
VMS PAL	V1.20-3	V1.20-3	V1.19-3
OSF PAL	V1.22-1	V1.22-1	V1.22-1
ISP1020	V5.57	V5.57	V5.54
Operating Systems			
OpenVMS	V7.1,7.2	V7.1	
DIGITAL UNIX	V4.0F	V4.0E	
Windows NT	V4.0	V4.0	

Revision Matrix for Option Firmware and Configuration Utilities

The firmware from this release is on the Alpha Firmware CD V5.4.

Table 5 Minimum Revisions for Option Firmware and Configuration Utilities

Alpha Firmware Update CD			
Release	V5.4	V5.3	V5.2
Date	Apr-99	Nov-99	June-98
Options Firmware			
DEFEA-Rev.1	V1.3	V1.3	V1.3
DEFEA-Rev.2	V3.10	V3.10	V3.10
DEFPA	V3.10	V3.10	V3.10
KZPSA	A11	A11	A11
CIPCA	A420	A315	A315
CCMAB	V22		
EISA Configuration Utility			
OpenVMS and DIGITAL UNIX ECU	V1.11	V1.11	V1.10
Windows NT ECU	V1.11	V1.11	V1.10
ECU Kit	V1.11	V1.11	V1.10
RAID - Standalone Configuration Utility			
RCU[2]	V3.11	V3.11	V3.11
EISA SWXCR FW	V2.16	V2.16	V2.16
PCI SWXCR FW	V2.36	V2.36	V2.36

[2]For other firmware revisions dial 1-800-STORWORK

1

RELEASE NOTES: IMPORTANT—READ ME FIRST

1.1 Too Many B2110-AA Modules are Diagnosed as No Problem Found

A LARGE number of B2110-AA modules diagnosed by the repair center are NO PROBLEM FOUND [NPF]. Most of the modules only required reloading console firmware. Diagnosing modules is expensive and a high NPF percentage can indicate that the technical bulletins or console release notes are not being used as best they can.

1.1.1 Console Image Check

To help reduce the npf rate, this release of console firmware will check to determine if the ARC console firmware image size is valid. A valid ARC console image size indicates that the B2110 or B2111 flashroms do not contain dual SRM consoles.

This check occurs whenever the ARC, NT or ECU command is invoked. If the console discovers an invalid ARC image, the user will see the following message from the console. You can expect to see this message when you install a new B2110-AA or B2111-AA.

```
P00>>> ARC console image is invalid, update FLASH ROM!
```

If you see this message, boot the LFU to update your flashroms - which contain the SRM and ARC consoles and the fail-safe loader. To update flashroms, refer to Section 4.1.

1.1.2 Please Help Reduce the Number of No Problem Founds

- Use the technical bulletin [EK-B2110-CL] or console release notes to upgrade console firmware after replacing a B2110-AA or a B2111-AA. A technical bulletin should come with each B2110-AA or B2111-AA.
- A B2110-AA or a B2111-AA from the repair center initially has dual SRM consoles. There is no ARC console nor any fail-safe loader. The technical bulletin guides you to update console firmware to a normal state - one SRM console, one ARC console, and one fail-safe loader.
- Before returning a B2110-AA or a B2111-AA as a known good spare, be sure to load the dual srm consoles as described in the technical bulletin and in the console firmware release notes. The **make_dual_srm** script is described in Table 5–1.

1.2 Functional changes introduced in this release.

- The only change being introduced with this release is new ARC firmware. All other release notes are the same as for the V5.3 release
- New QLogic ISP firmware - version V5.57
- New ARC firmware - version V4.58
- New Environment Variable, SCSI_RESET
  - SCSI_RESET may be set to ON or OFF. The default setting is ON which means that the scsi bus(es) will be reset anytime the console is powered-up, reset, or initialized. This is the way that previous versions behaved, so you need to do nothing to retain the original behavior. If you don't want your scsi bus(es) to be reset by the console you can set SCSI_RESET to OFF. There is only one SCSI_RESET environment variable that applies to all buses. Note that, in addition to setting SCSI_RESET to OFF, you may also have to use the appropriate configuration utility for your adapter to disable scsi bus resets.
- Device recognition added for PBXDP-AB and PBXDP-AC

1.3 Before You Begin a Firmware Update

Before you do an update, check the revision matrix tables for details related to the Firmware CD, EISA Configuration Utility, and RAID Configuration Utility.

Table 1–1 Firmware Required for an Update

Item	Part Number	Order Number
Alpha Firmware CD V5.4 or later	AG-RCFBC-BS	
EISA Configuration Utility for Windows NT Diskette	V1.9 (AK-PYCJK-CA)	(QA-01YAA-HC)
EISA Configuration Utility for OpenVMS & DIGITAL UNIX	V1.11a (AK-Q2CRM-CA)	(QA-01YAA-HC)
RAID Configuration Utility Diskette [2]	——	[1]

[1] Alpha Mega Kit - StorageWorks EBR MUL SRL RX23 PKG - QB-2XHAH-SB

[2] V3.11 for AlphaServer 2x00 Model 4/xxx and AlphaServer 2x00 Model 5/xxx

1.4 EISA Configuration Utility (ECU) Kit Information

Kit number (QA-01YAA-HC) is an orderable part number for customers who have already purchased hardware that included the ECU and licensing and need another copy of the ECU. Kit content:

- V1.11a (AK-Q2CRM-CA) for OpenVMS and DIGITAL UNIX
- V1.9 (AK-PYCJK-CA) for Windows NT

Kit number (QC-01YAA-HC) is shipped with new hardware and includes the appropriate license sticker. Kit content:

- V1.11a (AK-Q2CRM-CA) for OpenVMS and DIGITAL UNIX

- V1.9 (AK-QF1GC-CA) for Windows NT

Reminder

Use the appropriate ECU diskette for your operating system. Review the sections on Known Anomalies for any firmware, ECU and system configuration dependencies.

1.5 Systems Configured with SWXCR RAID Controller

Update RAID firmware to the latest revision level. The standalone configuration utility V3.11 is required for AlphaServer 2000/2100/2100A systems. To upgrade RAID firmware, refer to Appendix D.

1.6 Systems Configured with a CIPCA PCI-CI adapter

1.6.1 CIPCA driver not started under NT or UNIX

The console's CIPCA device driver is only started if the os_type environment variable is set to "OpenVMS" or "VMS". If the os_type environment variable is set to "NT", "OSF", or "UNIX", the CIPCA driver will not start and an informational message is printed during powerup:

```
os_type: UNIX - console CIPCA driver not started
```

1.6.2 New HEAP_EXPAND environment variable (for 3 or more CIPCAs)

Some CIPCA installations, particularly those with 3 or more CIPCAs in their system may have experienced a console crash with the error:

```
insufficient dynamic memory
```

This indicates the console requires more memory to run the CIPCA drivers. A new environment variable, heap_expand, has been added to facilitate expanding the console heap.

The possible settings for heap_expand are:

- NONE (default)
- 64K
- 128K
- 256K
- 512K
- 1024K
- -64K
- -128K

You can observe the effects of heap_expand through the display of the dynamic command. First, issue a dyn command and observe the "zone size" on the first line. Then change heap_expand, re-init the system, issue a dyn command and observe the increased "zone size". Below is a session log where the heap has been expanded from 881856 bytes to 1930432 bytes, an increase of 1024K bytes.

```
P00>>>dyn
zone     zone       used    used       free    free       utili-
address  size       blocks  bytes      blocks  bytes      zation
-------- ---------- ------- ---------- ------- ---------- -------
000309B0 881856     413     336576     36      545312      38 %
0002CA20 65069056   1       32         1       65069056     0 %
P00>>>show heap_expand
heap_expand             NONE
P00>>>set heap_expand 1024k
P00>>>init

VMS PALcode V5.56-4, OSF PALcode X1.45-9

starting console on CPU 0
 .
 .
 .
AlphaServer 2000 Console X4.6-627, built on Aug 6 1996 at 01:45:43
P00>>>dyn
zone     zone       used    used       free    free       utili-
address  size       blocks  bytes      blocks  bytes      zation
-------- ---------- ------- ---------- ------- ---------- -------
000309B0 1930432    413     344704     36      1585760     17 %
0002CA20 64020480   1       32         1       64020480     0 %
```

1.6.3 Determining HEAP_EXPAND Setting

For configurations with CIPCA devices that have experienced the "insufficient dynamic memory" console crash (notable those with 3 or more CIPCAs), the heap_expand environment variable will alleviate that problem. The heap requirements are dependent on the system configuration, taking into account all options. A rule of thumb for setting the heap_expand environment variable is:

Number of CIPCAs	heap_expand
1	NONE
2	64K
3	128K
4	256K
5	512K

1.7 Known Anomalies, Restrictions and Workarounds

1.7.1 Restriction on ARC console from Alpha Firmware CD V3.7

Do not update AlphaServer 2x00 console firmware from this CD. The V4.49 ARC console, on this CD only, does not support systems with the 120ns NVRAM. Updating your system and running ARC utilities like the ECU or RCU or running Windows NT Server V4.0 may cause data corruption to the NVRAM.

1.7.2 Restriction on DE500-AA

The DE500-AA is not supported by the console prior to the V3.8 release of the Alpha Firmware CD (December 1996). Before then, the DE500-AA should not be used as a console MOP or BOOTP device due to the potential loss of packets, a possible mismatch of address frames, or other data integrity anomalies.

1.7.3 Anomalies Common to All Supported Operating Systems

The following is a list of known anomalies, restrictions and workarounds for all supported operating systems:

- For firmware updates, clearing the ARC portion of NVRAM is optional.
- For EISA configuration changes, clear the ARC portion of NVRAM using "clear_arc_nvram". Record configuration data on Windows NT before clearing the ARC portion of the NVRAM.
- Internal StorageWorks disks must be left at the default spin up option of 2 disks started every 6 seconds. Do not change this value.
- AlphaServer 2x00 Model 4/xxx systems with ARC firmware version V4.25 or later requires the EISA Configuration Utility [ECU] V1.8 or later for systems configured with 256 MB of memory or multiples of 256MB of memory.
- AlphaServer 2x00 Model 5/xxx systems with ARC firmware version V4.30 or later requires ECU V1.8 or later and the RAID Standalone Configuration Utility V3.11 .
- Set the value of EW*0_MODE to one of the following values depending on your network wire type. After you set the value make sure you **init** your system.

  "a" for AUI thickwire (or thinwire for DE435)
  "b" for BNC
  "fast" for FAST (100Mbps)
  "fastf" for Fast, Full Duplex
  "fu" for Full Duplex, Twisted-Pair
  "t" for Twisted-Pair

Note

Set ew*0_mode to the appropriate value even when the current setting appears correct, or else improper network behavior could result. Make sure to type "init" after you have set ew*0_mode.

```
P00>>> set ewa0_mode twisted-pair
P00>>> init
```

1.7.4 OpenVMS and DIGITAL UNIX

1.7.4.1 DE500 in auto-negotiate mode

Auto-negotiation mode is NOT RECOMMENDED on systems with more than one DE500 because of possible considerable delay when booting or when restarting the operating system. This is because the operating system starts/stops drivers several times during a boot or reboot. It is recommended that you set the DE500 to the line speed of the ethernet wire instead of using auto-negotiate mode.

1.7.5 OpenVMS Specific Anomalies

The following is a list of known anomalies, restrictions and workarounds specific for the OpenVMS operating system:

- The console command "SHOW DEVICE" may cause the system to hang under certain conditions - when the command is issued after a CTRL/P under OpenVMS, or when the command is issued after an OpenVMS "SHUTDOWN". The workaround solution is, after you do an OpenVMS shutdown, to issue an "INIT" command followed by a "SHOW DEVICE" command.
- For AlphaServer 2x00 Model 5/xxx systems with a mix of B2040-AA and B2040-AB CPUs - OpenVMS may not boot under the following condition: if your system is configured with a B2040-AB in CPU slot 0 and a B2040-AA in CPU slot 1, and if the B2020-AB in slot 0 becomes disabled. To prevent this anomaly use your B2040-AA in CPU slot 0 and your B2040-AB in slot 1. This anomaly will be fixed in a future release of OpenVMS.
- The console environment variable OS_TYPE must be set to OpenVMS on AlphaServer 2x00 Model 5/xxx systems which contain a mix of Pass-2 and Pass-4 CPU modules.
- The environment variable, bus_probe_algorithm, defaults to the value of "new". This is the REQUIRED setting for OpenVMS version V6.2 or later releases. The new setting can result in differences between console controller letter assignment and operating system controller letter assignment, especially if any PCI to PCI bridges are present in the system.
  The environment variable, bus_probe_algorithm, can be reset back to "old" to restore existing controller letter assignment. After you change this environment variable issue a console `init` command or reset the system.

  ```
  P00>>>set bus_probe_algorithm old
  P00>>> init
  ```

  OpenVMS 6.1 Specific

  OpenVMS Version 6.1 requires bus_probe_algorithm set to "old".

- Previous release notes on APB.EXE and EW$EWBTDRIVER.EXE specific for OpenVMS V6.1 have been moved to the appendix under the heading Functional Changes introduced in V3.8-49
- Occasionally upon booting OpenVMS V6.1 on a multi-processor system a warning message will be displayed stating the CPUs are not running at the same speed. This warning message can be ignored on systems that are configured with the same CPU variants in the system.

1.7.6 DIGITAL UNIX Specific Anomalies

The following is a list of known anomalies and workarounds specific to the DIGITAL UNIX operating system (previously called OSF/1):

- Incompatability between OSF/1 version V3.0 (347) and DEFEA EISA FDDI adapter firmware V2.46. Systems that may still be using this OS version should **not** update EISA FDDI firmware to version V2.46.

- The console environment variable **OS_TYPE** must be set to UNIX on AlphaServer 2x00 Model 5/xxx systems that have a mix of pass-2 and pass-4 CPU modules.
- When installing DIGITAL UNIX from the graphics console, the screen may scroll past the following instructions to set console environment variables and to boot the operating system. If you experience this symptom do the following to continue with the installation:

```
P00>>> set boot_osflags a
P00>>> set bootdef_dev <your boot disk>
P00>>> boot
```

- The environment variable, bus_probe_algorithm, must be set to NEW for use with DIGITAL UNIX version V3.0B or later. When this environment variable is changed the system must then be power cycled, reset or initialized.
- Due to changes in both the console firmware and OSF code, OSF images prior to version V3.0 (V2.0B and V2.1) require a patch to boot with console version V3.6-83 or later. The following patch should be added to your NVRAM prior to booting pre-V3.0 OSF systems.

```
P00>>>edit nvram
*10 d -q pmem:2CB0 0
*20 d -q pmem:2CC8 0
*exit
P00>>>cat nvram
d -q pmem:2CB0 0
d -q pmem:2CC8 0
P00>>>nvram
P00>>>boot..... # boot operating system or reset then boot.
```

- The environment variable EW*_protocols is only created for EWA0. It is saved in NVRAM and will be used for any EW*_protocols. To use EWB0, you will have to create the environment variable EWB0_PROTOCOLS then set it to the desired protocol. The example shows how to create the environment variable EWB0_PROTOCOLS and set the protocol to bootp:

```
P00>>>set ewb0_protocols bootp
```

Helpful Hint

To maintain the environment variable across power failures and system resets you should edit the nvram. For example:

```
P00>>>edit nvram
*10 set ewb0_protocols bootp
*exit
P00>>>cat nvram
set ewb0_protocols bootp
P00>>>nvram
```

1.7.7 Windows NT Specific Anomalies

The following is a list of known anomalies, restrictions, and workarounds specific for the Windows NT operating system:

- Windows NT supports only pass-4 EV5 CPUs on AlphaServer 2x00 Model 5/xxx systems. The ARC console will not allow you to boot Windows NT otherwise.
- Service Note for WindowsNT systems with DEFEA and VGA modules.

If you plan to replace a Compaq Qvision 1024E VGA module with a #9GXE, you must first change the DEFEA IRQ level before replacing the VGA module. With the Windows NT ECU, the DEFEA and the #9GXE VGA module are assigned the same default interrupt request level [IRQ] of 9. If the IRQ level for the DEFEA is not changed the console can hang during power-up. To avoid a console hang, do the following:

```
P00>>> clear_arc_nvram
Power-down system and replace Compaq 1024E VGA module with #9GXE module.
Power-up system
P00>>> runecu
Change the DEFEA's IRQ level to "10 Not-Shared".
Save Settings
Reset System
Boot NT
```

- A problem installing Microsoft Windows NT (Daytona release) was found with the initial FIS 3.7 release. If your computer contains any unformatted (raw) or foreign formatted (e.g. DIGITAL UNIX (formerly OSF/1) or OpenVMS) hard drives, a virus alert may appear during Windows NT installation. This problem is the result of Windows NT's conservative approach toward virus control and is not a problem of the console firmware. Even though the drive may not be infected with a virus, Windows NT treats any drive it cannot read during installation as possibly infected and aborts the installation. If the virus alert appears, there are two ways to resolve this problem either:

  1. Remove all RZ disks except the disk on which Windows NT is to be built or
  2. Run ARCINST.EXE to create a system partition on each disk drive. For more information refer to the topic HARD DISK PREPARATION FOR WINDOWS NT on the AlphaServer 2100: READ THIS FIRST document (October 1994, Order number EK-KN450-CL.D01).

2

Overview of the Update Process

Console firmware for the AlphaServer 2000/2100/2100A systems resides in Flash Erasable Programmable Read Only Memory (FEPROM). FEPROMs provide non-volatile storage of system PALcode, diagnostics, console interface, and bootstrap. FEPROMS reside on either a Standard I/O module or on a backplane.

An advantage of this technology is that FEPROMs may be erased, reprogrammed, and verified without replacement of parts. A slight disadvantage is that the entire FEPROM must be erased before being reprogrammed. Hence, there is a small "window of vulnerability", when a system has inoperable firmware. Normally, this window is less than thirty seconds. Therefore it is important to allow a firmware update to complete.

Note

An update should be allowed to execute undisturbed.

The AlphaServer 2000/2100/2100A systems have three distinct console firmware images:

- SRM - the Alpha System Reference Manual console image (512KB) is used for booting OpenVMS and DIGITAL UNIX. This image is updated along with the ARC.
- ARC - the Alpha Advanced RISC Computing console image (256KB) is used for booting Microsoft Windows NT, invoking the EISA and RAID Standalone Configuration Utility (ECU and RCU respectively). This image is updated along with the SRM.
- FSL - the fail-safe loader (256KB) is a minimal recovery program used to boot update firmware in the event the SRM or ARC images are corrupted. Normally, the fail-safe loader does not have to be updated each time you update the SRM and ARC images.

The Loadable Firmware Update Utility (LFU) is a bootable variant of the ROM-based console, which includes the FEPROM images for the SRM and ARC console. To update firmware, the LFU first performs consistency checks to verify that the firmware image is appropriate for the system and the new firmware version supercedes the current version. The LFU then erases, reprograms, and verifies the entire FEPROM. The update firmware process is similar for both the SRM and ARC images.

Once the firmware update has completed successfully, you must then reset or cycle power to allow the system to unload the firmware from the FEPROMs. After this has been done, normal operation of the system may be resumed.

2.1 Update Steps to Load SRM and ARC Console Firmware

The update procedure for SRM console and ARC firmware will take about five minutes and is comprised of the following steps:

1. Shut down the operating system.
2. Invoke the LFU from the console.
3. Update the SRM and ARC firmware images and options firmware.
4. Wait for update to complete!
5. Exit the LFU
6. Reset the system after the updates have completed successfully.
7. Rerun the EISA Configuration Utility, only if the configuration changes.
8. Reboot the operating system.

If you have problems with the update procedure please contact your local Customer Support Center (CSC).

2.2 Firmware Update Files

Table 2–1 lists the files which are relevant to the update process. CD boots or diskette boots use the .EXE files. Network boots use the .SYS files.

Table 2–1 LFU Files

File	Usage
AlphaServer 2x00 Model 4/xxx: as2100_e4_v5_4.exe/.sys AlphaServer 2x00 Model 5/xxx: as2100_e5_v5_4.exe/.sys AlphaServer 2100A Model 4/xxx: as2100a_e4_v5_4.exe/.sys AlphaServer 2100A Model 5/xxx: as2100a_e5_v5_4.exe/.sys	This is the menu-driven (VGA) or CLI driven (serial line) bootable update utility which carries the ROM images with it.
Alpha2100_v53_fw_relnote.txt/.ps	User Guide and Release Notes . This document is available in both text and postscript formats.
as2x00fw.txt/.sys	Current console file required in the update process for adapter option updates. Vxx_* is the specific release version of the file.
dfeaa130.sys/	Firmware update image for the DEFEA (EISA-based DEC FDDI controller) module. Pass 1 module only.
dfeab310.sys/	Firmware update image for the DEFEA (EISA-based DEC FDDI controller) module. All modules after pass 1.
dfxaa310.sys/	Firmware update image for the DEFPA (PCI-based DEC FDDI controller) module.
kzpsaa11.sys/	Firmware update image for the KZPSA (fast wide differential PCI to SCSI adapter) module.
cipca315.sys./	Firmware update image for the CIPCA (PCI to CI controller) module

These update utility files may be found on the Alpha Firmware CD V5.4 in the [alpha2100] directory. The adapter options firmware may be found in the [options] directory. The release notes may be found in the [doc] directory.

3

Preparing the System for a Firmware Update

This chapter describes the steps required to prepare the AlphaServer 2000, AlphaServer 2100, or AlphaServer 2100A system for a firmware update from the SRM console.

3.1 Steps for DIGITAL UNIX or OpenVMS users

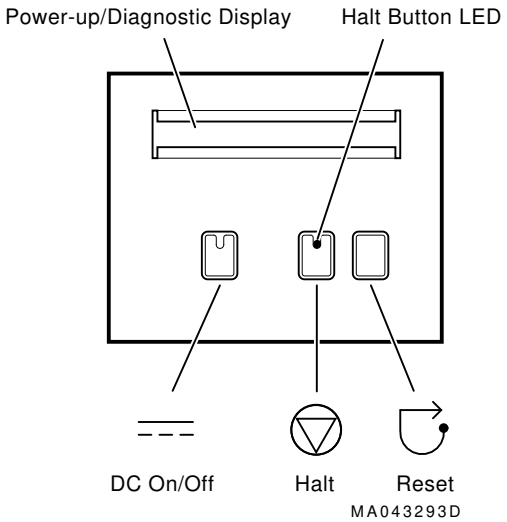
3.1.1 Shutting Down the Operating System

Prior to performing the firmware update, the operating system should be shutdown. Request the system manager to shutdown the operating system.

3.1.2 Halting the System

Once the operating system has been shutdown, halt the system by pressing the HALT button to the "in" position on the Operator Control Panel. Refer to Figure 3–1.

Figure 3–1 AlphaServer 2000/AlphaServer 2100/AlphaServer 2100A Operator Control Panel



The SRM console prompt,

```
P00>>>
```

should appear on the operator console. Firmware versions prior to version V3.6-83 display a three angle prompt on uni-processor systems.

```
>>>
```

3.1.3 Update settings for autoboot and os_type

Disable autoboot if the system is so configured by modifying the environment variable "auto_action".

```
P00>>>  show auto_action
auto_action          BOOT
P00>>>  set auto_action halt
P00>>>
P00>>>  show os_type
os_type              VMS
```

Now press the HALT button to the "out" position.

3.1.4 Resetting the System

Ensure a known initialized state by cycling power or performing a hardware reset with either the DC ON or the RESET button on the Operator Control Panel. (Refer to Figure 3–1.) At this point the system will reset, rerun diagnostics, and return to the console prompt.

```
P00>>>
```

3.1.5 Identifying the Current SRM Firmware Version

You can determine the current version of the firmware and PALcode by using the console `show version` and `show pal` commands. The following example shows those commands issued on an AlphaServer 2100 Model 5/250 system running console code V4.4-7:

```
P00>>>  show version
version                 V4,4-7  Feb 9 1996  17:43:31
P00>>>  show pal
pal                     VMS PALcode V1.17-3, OSF PALcode V1.21-1
P00>>>
```

3.2 Steps for Windows NT Users

3.2.1 Shutting Down the Operating System

Prior to performing the firmware update, the operating system should be shutdown to the ARC Boot menu.

4

Booting the Loadable Update Utility

The Loadable Update Utility [LFU] can be booted from a CD, from a properly built diskette, or from a network device. The following sections describe the procedures to boot the LFU from various devices. Updating firmware with the LFU may be performed from either the VGA monitor [with console set to graphics] or from the serial line terminal on COM1 [with console set to serial].

4.1 Booting the Loadable Update Utility to Update Console Firmware from CD

4.1.1 Steps to Update Firmware for DIGITAL UNIX and OpenVMS Users

The LFU is booted from the Alpha Firmware CD V5.4. To invoke the LFU, shutdown the operating system and reset the system as previously described. Insert the Alpha Firmware CD V5.4 in the system CD drive and "boot" the CD from the SRM console. An explanation of how the flags are used is contained in the paragraph following this example.

```
P00>>> boot -flag 0,a0 <cdrom-drive-name>
P00>>> boot -flag 0,a0 dka600
.
jumping to bootstrap code
(for AlphaServer 2x00 Model 4/xxx systems enter)
Bootfile: [alpha2100]as2100_e4_v5_4.exe

(for AlphaServer 2x00 Model 5/xxx systems enter)
Bootfile: [alpha2100]as2100_e5_v5_4.exe

(for AlphaServer 2100A Model 4/xxx systems enter)
Bootfile: [alpha2100]as2100a_e4_v5_4.exe

(for AlphaServer 2100A Model 5/xxx systems enter)
Bootfile: [alpha2100]as2100a_e5_v5_4.exe
.
```

The SRM console performs a "solicited boot" using the console `boot` command with the `-flag` option. The boot flags, "0,a0" are interpreted by the Alpha Primary Bootstrap [APB]. The APB interprets the first boot flag "0" as specifying disk root "sys0", however, in this example it is ignored. The APB interprets the second boot flag "a0" as specifying a solicited named file boot of a headerless image. At the "Bootfile:" prompt enter the directory and appropriate filename.

Moments after the bootfile is entered the LFU menu and prompt will appear.

```
UPD>
```

For AlphaServer 2x00 Model 5/xxx systems enter the operating system type.

```
Please enter your operating systems OS_TYPE:
[NT,UNIX,OpenVMS]:
```

You must enter the OS_TYPE for your system in order to continue with the update utility. This is to ensure that the operating system receives the correct information when probing the CPUs. After you enter an OS_TYPE the update utility continues with a menu display followed by the update prompt on the VGA (or a serial line terminal on COM1).

When the update utility has booted successfully, go to Chapter 5. The example illustrates booting the LFU from CD-ROM on an AlphaServer 2100 Model 5/250.

4.1.2 A Log File of Booting the LFU from CD-ROM

```
P00>>>boot -fl 0,a0 dka600
(boot dka600.6.0.1.0 -flags 0,a0)
block 0 of dka600.6.0.1.0 is a valid boot block
reading 989 blocks from dka600.6.0.1.0
bootstrap code read in
base = 200000, image_start = 0, image_bytes = 7ba00
initializing HWRPB at 2000
initializing page table at 1f2000
initializing machine state
setting affinity to the primary CPU
jumping to bootstrap code

Bootfile: [alpha2100]as2100_e5_v5_0.exe

VMS PALcode V1.17-3, OSF PALcode V1.21-1

starting console on CPU 0
initialized idle PCB
initializing semaphores
initializing heap
initial heap 1c0c0
memory low limit = 1fe000
heap = 1c0c0, 13fc0
initializing driver structures
initializing idle process PID
XDELTA not enabled
initializing file system
initializing timer data structures
lowering IPL
CPU 0 speed is 4.00 ns (250MHz)
access NVRAM
entering idle loop
Starting Memory Diagnostics
Memory Diagnostics completed
probing hose 0, PCI
probing PCI-to-EISA bridge, bus 1
bus 0, slot 0 -- ewa -- DECchip 21040-AA
bus 0, slot 1 -- pka -- NCR 53C810
bus 1, slot 2 -- era -- DE422
bus 1, slot 3 -- fra -- DEFEA
bus 1, slot 6 -- ewb -- DE425
bus 1, slot 8 -- vga -- Compaq Qvision
bus 0, slot 6 -- ewc -- DECchip 21040-AA
bus 0, slot 7 -- dra -- Mylex DAC960
bus 0, slot 8 -- pkb -- QLogic ISP1020
initializing keyboard

Checking dka600.6.0.1.0 for the option files. . .
Copying options firmware from dka600.6.0.1.0 . . .
Copying DFEAA130 from dka600.6.0.1.0. . .
Copying DFEAB246 from dka600.6.0.1.0. . .
Copying DFPAA246 from dka600.6.0.1.0. . .
Copying KZPSAA10 from dka600.6.0.1.0. . .
Copying CIPCAA111 from dka600.6.0.1.0. . .
```

```
Please enter your operating systems OS_TYPE:
 [NT,UNIX,OpenVMS]: u

               ***** Loadable Firmware Update Utility *****
--------------------------------------------------------------------------------
 Function    Description
--------------------------------------------------------------------------------

 Display     Displays the system's configuration table.
 Exit        Done exit LFU (reset).
 List        Lists the device, revision, firmware name, and update revision.
 Readme      Lists important release information.
 Update      Replaces current firmware with loadable data image.
 Verify      Compares loadable and hardware images.
 ? or Help   Scrolls this function table.
--------------------------------------------------------------------------------

UPD>
```

When the update utility has booted successfully, go to Chapter 5.

4.1.3 Steps to Update Firmare from CD for Windows NT Users

From the ARC Boot menu

1. Select: **Supplementary menu**... Enter
2. Insert the Alpha Firmware CD V5.4 into the CD_ROM drive.
3. From the supplementary menu select: **Install new Firmware** ... Enter

You should then see the following message displayed:

```
Searching for the update tool on CD_ROM and floppy...
```

Followed by the update menu.

When the update utility has booted successfully, go to Chapter 5.

4.2 Booting the Update Utility from the Ethernet

To perform a firmware update on the network, the *client* system (system to be updated) and the *server* system (system that serves boot requests) must be on the same Ethernet segment. The Maintenance Operation Protocol (MOP) is the transport used to perform the network image copy.

Note

Contact your system manager to select a candidate server and provide access to the service area.

1. Set up a system on the network to be the boot server.
2. Copy the update files to the service area on the boot server. The .SYS files are contained on the firmware CD in [SYS0.SYSEXE].

4.2.1 Setting Up a MOP Boot Server Under OpenVMS

On OpenVMS, the update server must be a boot server, that is, the system's NCP circuit must have service enabled. Copy the .SYS files into the MOM$LOAD directory of the server as shown in the following example:

```
(for AlphaServer 2x00 Model 4/xxx systems enter)
$  copy as2100_e4_v5_4.sys  mom$load:*.*

(for AlphaServer 2x00 Model 5/xxx systems enter)
$  copy as2100_e5_v5_4.sys  mom$load:*.*

(for AlphaServer 2100A Model 4/xxx systems enter)
$  copy as2100a_e4_v5_4.sys  mom$load:*.*

(for AlphaServer 2100A Model 5/xxx systems enter)
$  copy as2100a_e5_v5_4.sys  mom$load:*.*

(and for all systems copy the adapter options files)
$  copy as2x00fw.sys  mom$load:*.*
$  copy dfeaa130.sys  mom$load:*.*
$  copy dfeab310.sys  mom$load:*.*
$  copy dfxaa310.sys  mom$load:*.*
$  copy kzpsaa11.sys  mom$load:*.*
$  copy cipca315.sys  mom$load:*.*
```

4.2.2 Setting Up an InfoServer for MOP Booting

When using an InfoServer place the Alpha Firmware CD V5.4 into any available CDROM drive on the InfoServer. Enable MOP service on the InfoServer (consult the InfoServer documentation for setting up MOP service).

4.2.3 Booting the Update Utility on the Client

Once the server has been set up, return to the AlphaServer 2000, AlphaServer 2100 or AlphaServer 2100A console. Since the current MOP service limits solicited file names to fifteen characters, omit the .SYS extension when entering the Ethernet boot file name. The server will provide the extension.

```
(for AlphaServer 2x00 Model 4/xxx systems enter)
>>>  boot ewa0 -file as2100_e4_v5_4

(for AlphaServer 2x00 Model 5/xxx systems enter)
>>>  boot ewa0 -file as2100_e5_v5_4

(for AlphaServer 2100A Model 4/xxx systems enter)
>>>  boot ewa0 -file as2100a_e4_v5_4

(for AlphaServer 2100A Model 5/xxx systems enter)
>>>  boot ewa0 -file as2100a_e5_v5_4
.
.
```

Note

If you are booting the update utility from an InfoServer on the Ethernet with a version of firmware before V3.6, be sure to type the file name in UPPER CASE.

After several moments the LFU menu and prompt

```
UPD>
```

will appear on VGA (or a serial line terminal on COM1). When the update utility has booted successfully, go to Chapter 5.

Note

If this file does not boot on your system, recheck your network configuration and the boot server and try again.

5
Using the LFU

The loadable firmware update utility [LFU] has booted successfully when you see the LFU menu and UPD> prompt displayed on the console terminal. You now can automatically update the SRM and ARC consoles and/or option firmware. You cannot update the fail-safe loader [fsl] from this prompt. Steps to update the SRM & ARC consoles, option firmware, and the fsl are described in this chapter.

Refer to Appendix A for an explanation of the various functions and commands or type help <command> at the UPD> prompt.

Shown below is the LFU menu.

```
 ***** Loadable Firmware Update Utility *****
--------------------------------------------------------------
  Function    Description
--------------------------------------------------------------
Display     Displays the system's configuration table.
Exit        Done exit LFU (reset).
List        Lists the device, revision, firmware name and found by LFU.
Readme      Lists important release information.
Update      Replaces current firmware with loadable data image.
Verify      Compares loadable and hardware images.
? or Help   Scrolls this function table.
--------------------------------------------------------------
UPD>
```

5.1 New LFU Scripts to Simplify System Upgrading/Downgrading

The new LFU scripts were added to simplify system upgrading, downgrading, dual srm consoles, and reading release notes from CD. These scripts were introduced in the V3.5 CD.

To execute these scripts, type the name of the script at the UPD> prompt.

Table 5–1 New LFU Scripts

Script-Name	Description
read_rel_notes	Use this script to read the release notes from CD or floppy. If you booted the LFU from CD, then just type read_rel_notes. If you booted the LFU from floppy, insert the floppy containing the release notes and then type read_rel_notes.
cpu_downgrade	This script will blast an EV4 SRM ROM image, and an EV4 ARC ROM image into the flash roms. Use this script if you are downgrading from an EV5 CPU to an EV4 CPU. If you booted the LFU from CD, just type **cpu_downgrade**. If you booted from floppy, insert the floppy containing sbsrmrom.exe, slsrmrom.exe, and sbarcrom.exe, and then type **cpu_downgrade**.

(continued on next page)

Table 5–1 (Cont.) New LFU Scripts

Script-Name	Description
cpu_upgrade	This script will blast an EV5 SRM ROM image, and an EV5 ARC ROM image into the flash roms. Use this script if you are upgrading from an EV4 CPU to an EV5 CPU. If you booted the LFU from CD, just type **cpu_upgrade**. If you booted from floppy, insert the floppy containing gmsrmrom.exe, glsrmrom.exe, and gmarcrom.exe, and then type **cpu_upgrade**.
make_dual_srm	This script will blast an EV5 SRM ROM image into bank 0 of the flash ROM on the IO module (the Standard IO for AlphaServer 2100) and the IO motherboard for AlphaServer 2000 and AlphaServer 2100A, and an EV4 SRM image into bank 1, thereby returning a good IO module to a state where it can be returned as a field spare. Since AlphaServer 2000/2100/2100A IO modules are shipped from Stage I with dual SRM consoles (Bank 0 EV5 SRM and Bank 1 EV4 SRM), and neither fail-safe loader nor ARC firmware, this script restores a normally configured IO module to the Stage I state. This applies to Sable SIO(BA2110-AA), DemiSable IO (BA2111-AA), Rackmount IO(54-24129-01), and Lynx IO (54-24283-01). If you booted the LFU from CD, just type "make_dual_srm". If you booted from floppy, insert the floppy containing sbsrmrom.exe and slsrmrom.exe, and then type **make_dual_srm**.)
	caution This script must only be run from either S*UPGRADE or G*UPDATE (AS2100_E5_*upgrade or AS2100A_E5_*upgrade), NOT S*UPDATE(AS2100_E4_*update or AS2100A_E4_*update).
update_fsl	This script will update the fail-safe loader, using the fail-safe image that is encapsulated in the LFU.

```
Example to system downgrade from a Model 5/xxx to a Model 4/xxx:

P00>>> Boot -fl 0,a0
Bootfile: [alpha2100]as2100_e5_v4_6.exe
...
UPD> cpu_downgrade
EXECUTING THIS SCRIPT WILL DOWNGRADE YOUR MODEL 5/XXX CONSOLE
FIRMWARE TO MODEL 4/XXX CONSOLE FIRMWARE
Copying srm firmware...

Confirm update on:
srmflash
[Y/(N)]y
WARNING: updates may take several minutes to complete for each device.

     DO NOT ABORT!

srmflash        Updateing to 4.x6-xxx...  Verifying 4.x-xxx...   PASSED.

UPD> [ downgrade is complete when you get this prompt ]
       [ Now you can power down the system to replace CPU modules ]
End of downgrade example
```

5.2 Previous release LFU features

- For AlphaServer 2x00 Model 5/xxx the user is prompted to enter an OS_ TYPE before being able to update firmware. The correct value for the console variable OS_TYPE is required for DIGITAL UNIX and for OpenVMS on the AlphaServer 2x00 Model 5/xxx systems with pass-2 and pass-4 CPU's.
- A readme file that includes important release information.

- Changes to the method of updating the console firmware and adapter option firmware.
- Update support for selected adapters: DEFEA, DEFPA and KZPSA.

Expect a Longer Completion Time

Expect an "Update" to take several minutes longer when more devices are added to the system and included in the update.

Table 5–2 LFU Supported Option Firmware

Option	Firmware Revision
CIPCA	A315
DEFEA - Rev. 1	V1.3
DEFEA - Rev. 2	V3.10
DEFPA	V3.10
KZPSA	A11

Important: Please review the information in the readme file before starting the update by typing *readme* at the UPD> prompt. This is an EXAMPLE of what you will see from a AlphaServer 2x00 Model 5/xxx system updating from console V4.2

```
UPD>readme

------------------------------------------------------------------------------
   Release Notes Brief - IMPORTANT -- READ ME FIRST

1. Please read the firmware release notes before updating your firmware.

2. Make sure the console environment variable OS_TYPE is set to the appropriate
   value [ NT, OPENVMS, UNIX ] before booting your operating system.

3. Minimum Revision Information
   ----------------------------
   SRM   ARC  ECU    RCU
   ----------------------------
   V4.2   V4.39  V1.8 V3.11
   ----------------------------

4. The console environment variable BUS_PROBE_ALGORITHM is set to NEW for
   versions of DIGITAL UNIX and OpenVMS listed below. If you change the
   value of BUS_PROBE_ALGORITHM you must power cycle the system for the value
   to have effect.
   -------------------------------------------------
                           BUS_PROBE_ALGORITHM
   DIGITAL UNIX V3.0B or later  new
   V3.0  or earlier old
   OpenVMS  V6.2  or later  new
   V6.1   old
   WindowsNT      Not Applicable
   -------------------------------------------------

5. Helpful Hints on using the UPDATE and LIST command
```

```
   UPD> update *arc*  to update ARC console firmware
   UPD> update *srm*  to update SRM console firmware
   UPD> list       to display adapters in your system that are supported
        by the Loadable Firmware Utility [LFU]
------------------------------------------------------------------------------
UPD>
```

Use the `list` command to see what additional adapters are present whose firmware can be updated. This example indicates firmware for one DEFEA (EISA-to-FDDI adapter), one DEFPA (PCI-FDDI adapter), one KZPSA (PCI-to-SCSI adapter), and the ARC and SRM consoles.

```
UPD>list

Device  Current Revision    Filename    Update Revision

fra0     1.3             dfeaa_fw  1.3
fra1        1.3             dfeab_fw    2.46
fwa0        2.46            dfpaa_fw    2.46
pkb0        A07             kzpsa_fw    A09
arcflash  4.36-0              arcrom    4.43-1
srmflash  4.2-18              srmrom    4.3-222

UPD>
```

5.3 Steps to Update All LFU Supported Firmware

To update all LFU recognized firmware options (which includes the CIPCA, DEFEA, DEFPA, and the KZPSA adapter) in addition to the ARC and SRM console, Type *Update*, then enter Yes to the confirmation prompt.

```
UPD> Update

Confirm update on:
fra0
arcflash
srmflash
[Y/(N)]  Y [Type Yes to proceed with the update]
```

5.4 Steps to Update the SRM Console and ARC Firmware

Note

Two separate commands need to be issued to update the SRM and ARC firmware.

1. To update ARC firmware, at the UPD> prompt: type update *arc* then type Yes to the confirmation prompt.

```
UPD>update *arc*
Confirm update on:
arcflash
[Y/(N)] Y
```

Caution

The update will take several minutes **Do not terminate the update.** Allow it to complete. Failure to do so may result in an inoperable system.

2. To update SRM console firmware, at the UPD> prompt: type update *srm* then type Yes to the confirmation prompt.

```
UPD>update *srm*
Confirm update on:
srmflash
[Y/(N)] Y
```

Caution

The update will take several minutes **Do not terminate the update.** Allow it to complete. Failure to do so may result in an inoperable system.

3. When the SRM console and ARC firmware updates are complete you can exit the LFU or use the `update` command to update the firmware on supported adapters.

```
UPD>exit
```

4. Answer No to the question "Do you want to do a manual update[y/(n)]".

```
Do you want to do a manual update [y/(n)] n
```

5. Reset the system to start running the new console code.

```
Please reset the system
```

5.5 Steps to Update the Fail-safe Loader

The fail-safe-loader is updated when the Loadable Firmware Utility is in manual mode. An example to update the fsl is as follows:

```
UPD> update_fsl
...
UPD>

   Reset the system after the update has completed successfully
```

5.6 Steps to Make a Dual SRM Console for a Known Good Spare

Make a dual srm console ONLY when you want to create a known good spare of module or backplane. An example to make dual srm consoles is as follows:

```
UPD> make_dual_srm
...
UPD>

    Power down system and remove module or backplane as a
    known good spare.
    Restore system module or backplane.
```

5.7 Clearing ARC NVRAM

If the update completed successfully and you will be adding or removing EISA modules then you should clear the ARC NVRAM data before running the ECU.

Windows NT users should record the current ARC boot selections and environment variables. Enter the ARC firmware and record the information using the setup menu.

Example:

```
P00>>> clear_arc_nvram
.
. Wait a few moments
.
P00>>> runecu
```

6
Post-Update Instructions

When the update completes, the system is still running the update utility. The operator must cycle power or reset the system to unload the FEPROMs and start running the new firmware. If removing or adding new EISA adapters, it is then necessary to rerun the ECU, see Chapter 7.

Reminder

It is recommended you clear_arc_nvram before running the appropriate ECU.

DIGITAL UNIX and OpenVMS users should restore auto_action, ewa0_mode, os_type and any other environment variables to their prior state. Reset the system and boot the operating system. Once this is done, normal operation of the system may proceed.

If the update failed, contact your Customer Support Center.

7

Running the EISA Configuration Utility (ECU)

If you are adding or removing EISA modules then it is necessary to rerun the ECU to reformat the NVRAM data.

Important

There are two variants of the ECU, one for OpenVMS and DIGITAL UNIX and another for Windows NT. Be sure to use the appropriate ECU diskette for your operating system.

Insert the ECU diskette in the floppy drive.

7.1 ECU from the SRM prompt

If the system is at the SRM console prompt on the VGA, the user can run the ECU, as shown in the following example:

```
P00>>> runecu   or ecu
loading ARC firmware
resetting all I/O busses
.
.
.
```

This step may take a minute or so, to load the ARC firmware and then boot the ECU from the diskette. If this was successful, the ECU may now be run using the **graphics terminal** (VGA) and keyboard so skip to Section 7.4. If you see diplayed a menu on the VGA monitor indicating that certain data should be reinitialized skip to Section 7.3.

7.2 ECU from the ARC Boot menu

If the system is at the ARC Boot menu:

- Select: Supplementary menu... Enter
- Select: Set up the system... Enter
- Windows NT users may take this opportunity to restore their boot selections and environment variables.
- Select: Run EISA configuration utility from floppy Enter

7.3 Stepping Through the ARC Menus

If the ARC firmware encountered invalid data in NVRAM, it may display a menu on the VGA monitor indicating that certain data should be reinitialized. In this case use the following procedure, else skip to Section 7.4. Starting from the ARC Boot menu on the graphics terminal using the cursor control keys:

- Select: Supplementary menu... Enter
- Select: Set up the system... Enter
- Select: Set system time Enter
  Set the current date and time.
- Select: Set default environment variables Enter
  Hit Enter to select all defaults.
- Select: Set default configuration Enter
  Hit Enter to select all defaults.

Note

If the yellow highlight remains, ignore it and continue.

- Windows NT users may take this opportunity to restore their boot selections and environment variables.
- Select: Run EISA configuration utility from diskette Enter

7.4 Stepping Through the ECU Dialog Boxes

The ECU will display a few dialog boxes on the VGA monitor. When these begin to appear do the following.

- At the main dialog box, Hit Enter.
- At the "ID Mismatch" dialog box, Hit Enter (and wait about 30 seconds).
- At the main selection dialog box select: "5) Save and Exit", Hit Enter.
- To the save configuration, Hit Enter.
- To the exit utility, Hit Enter.

The ECU should save the configuration information in NVRAM and then return to the ARC firmware menu. At this point the system should have valid ECU data and be in a consistent state for further system operation.

Reset the system.

8

SRM Console Firmware Security Features

Introduction

This chapter explains how to implement security features on the SRM console. The security features are intended to prevent unauthorized persons from tampering with the system from the SRM console interface.

In This Chapter

This chapter contains the following topics:

- Security Features Overview
- Security Commands
- Secure Mode Functions

8.1 Security Features Overview

The SRM console firmware contains console security features intended to prevent unauthorized personnel from modifying the system parameters or otherwise tampering with the system from the console. The security features include new commands and new parameters to some existing commands. The following two console modes are supported:

- Secure mode allows you to perform a limited number of console commands: `start, continue, boot` (with stored parameters), and `login` commands.
- User mode allows you to perform all SRM console commands.

Note

The security features work only if access to the system hardware is denied to unauthorized personnel. Be sure to keep the front panel of the system locked and make the key available only to authorized personnel.

8.2 Security Commands

8.2.1 set password

The `set password` command allows you to set the console password for the first time or to change an existing password. You do not have to set the password if you do not wish to operate in secure mode.

- If the password has been set previously, the console prompts you for the new password and verification, then prompts you for the old password. The password is not changed if the validation password entered does not match the existing password in the NVRAM.

- If the password has not been set, the console prompts you for the new password and verification.

The password length must be between 15 and 30 alphanumeric characters. Any characters entered after the 30th character are truncated and are not stored.

Examples:

Set Password for the First Time (Successful)

```
POO>>> set password
Please enter the password: < password is not echoed >
Please enter the password again: < validation is not echoed >
P00>>>
```

Change an Existing Password (Successful)

```
P00>>> set password
Please enter the password:
Please enter the password again:
Now enter the old password:
P00>>>
```

Password Too Short Error

```
P00>>> set password
Please enter the password: < input is not echoed >
Password length must be between 15 and 30 characters
P00>>>
```

Password Validation Error

```
P00>>> set password
Please enter the password: < password is not echoed >
Please enter the password again: < validation is not echoed >
Validation error
P00>>>
```

8.2.2 set secure

The `set secure` command allows you to enable the security features without requiring you to restart the console. If the password has been set, the console will be secured and only the `start, continue, boot` (using the stored parameters), and `login` commands can be performed. If the password has not been set, you are prompted to set the password. See the `set password` command for instructions.

Examples:

Set Secure When Password Has Been Set

```
P00>>> set secure
Console is secure
P00>>>
P00>>> show boot_file
Console is secure
```

Set Secure When Password Has Not Been Set

```
P00>>> set secure
Secure not set. Please set the password.
P00>>>
```

8.2.3 login

The `login` command allows you to turn off the security features and gain access to all of the SRM console commands during a particular session. The system automatically returns to secure mode as soon as you enter one of the following commands: `boot, continue, start` or when you initialize the system.

The `login` command works as follows: When you enter `login`, you are prompted for the current system password. If no password has been set, you are prompted that there is no password in NVRAM. You do not have to set a password if you do not wish to.

- If the password has been set, the following prompt is displayed:

  ```
  Please enter the password:
  ```

- If the password you enter matches the password in NVRAM when the prompt is redisplayed, the console is no longer in the secure mode and all of the console commands can be performed.
- If you have forgotten the current password, use the `login` command in conjunction with the Halt button to clear the password, as described below:

  1. Make sure the Halt button is in the ‘‘out’’ position (not lit).
  2. Enter the `login` command:

     ```
     P00>>> login
     ```

  3. When the `Enter Password:` prompt is displayed, press the Halt button (the button should light up), then press Return.
  4. Press the Halt button to the ‘‘out’’ position (not lit). The password is now cleared and the console cannot be put into secure mode unless you set a new password.

Note

If you enter `login` with the Halt button in (lit), the command will fail, even if you entered the correct password. This prevents an intruder from depressing the Halt button and locking the front panel. Also, if you leave the Halt button in (lit) after you clear the password, the system will not boot.

Examples:

Valid Login When Secure Feature Is Not Set

```
P00>>> login
Secure not set. Please set the password.
P00>>>
```

Valid Login When Secure Feature Is Set

```
P00>>> login
Please enter the password: < password is not echoed >
P00>>>
```

Invalid Login When Secure Feature Is Set

```
P00>>> login
Please enter the password: < password is not echoed >
Invalid password
P00>>>
```

8.2.4 clear password

The `clear password` command clears the environment variable, password, setting it to zero. This command is used when you want access to all of the SRM console commands, but the system is in secure mode. In order to use `clear password`, you must know the current password.

To clear the password without knowing the current password, you must use the `login` command in conjunction with the Halt button, as described in the section on the `login` command.

Examples:

Successful Clear Password Command

In this example, the `clear password` command was entered with the valid password:

```
P00>>> clear password
Please enter the password: < enter password (not echoed) >
Password successfully cleared
P00>>>
```

Unsuccessful Clear Password Command

In this example, the `clear password` command was entered with an invalid password:

```
P00>>> clear password
Please enter the password:  < invalid password entered
(not echoed) >
Console is secure
P00>>>
```

8.3 Secure Mode Functions

Secure mode allows you to perform only the `boot` command (using the stored parameters) and `login, continue` and `start` commands.

8.3.1 boot

When the console is in the secure mode, the `boot` command will not accept command line parameters. The console will boot using the environment variables stored in NVRAM (`boot_file`, `bootdef_dev`, `boot_flags`).

After a successful boot, the console is secured if there is a valid password. The `boot` command will accept parameters when the console is not in secure mode.

8.3.2 Boot Examples

Successful Boot from Secure System

```
P00>>> boot
(boot eza0.0.6.0 -file myfile.sys -flags 0)

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

Unsuccessful Boot from Secure System

```
P00>>> set boot_file myfile.sys
Console is secure
P00>>>
P00>>> boot -file myfile_ev4p2
Console is secure - parameters are not allowed
P00>>> boot -halt
console is secure - parameters are not allowed
P00>>> boot ezb0
Console is secure - parameters are not allowed

P00>>>
```

8.3.3 start and continue

The `start` and `continue` commands are valid on a secure console. After the commands are executed, the console is secured if there is a valid password. This prevents an intruder from halting the system and having access to a console that is not secure.

8.3.4 Ctrl/x

Ctrl/x will not create a foreground shell during the power-up script.

Ctrl/x is disabled during the power-up sequence to prevent an unauthorized user from initiating a foreground shell that may not be secure.

A

LFU Utility Functions

The following is a list of the LFU Utility commands available at the LFU prompt.

More examples are in Chapter 5

A.1 Display

```
UPD> Help Display
 Displays the system's configuration table.
    This is helpful to locate the specific device to
    update or verify.
```

A.2 Exit

```
 UPD> help exit
 Done with updating so leave. If any devices failed
 update then it will confirm your intention to EXIT.
```

A.3 List

```
 UPD> help list
 Lists the device, revision, firmware name and if found by LFU.
 This helps to understand what devices LFU can update or verify
 and firmware that would be used to update or verify with.
```

A.4 Readme

```
 UPD> help readme
  Lists important release information.
```

A.5 Update

```
 Update a particular device with LFU's firmware.
 For example:
 update        to update all LFU-supported devices found in this system
 update *SRM*  to update the SRM console
 update *ARC*  to update the ARC console
 update fra0   to update device fra0 - DEFEA firmware

 Use the LIST command to see the supported LFU devices

 UPD> help update
Update a particular device with LFU's firmware.
   The command format is: UPDATE [device] [-PATH filename]
   For example:
           update *
       or  update

   Will update all LFU supported devices found in this system

           update io

   Will update the device named IO
   Use the LIST command to see the supported LFU devices
```

```
You can optionally update a device with different firmware
than defaulted to by LFU, by using the -PATH switch.
For example:
        update io -path mopdl:new_firm/eza0

Will update the device named IO with firmware NEW_FIRM
from the network.
```

A.6 Verify

```
 UPD> help verify
Verify a particular device with LFU's firmware.
  The command format is: VERIFY [device] [-PATH filename]

  for example:
          verify *
       or  verify

   Will verify all LFU supported devices found in this system

          verify io

   Will verify the device named IO
   Use the LIST command to see the supported LFU devices

   You can optionally verify a device with different firmware than
   defaulted to by LFU, by using the -PATH switch.
   For example:
          verify io -path mopdl:new_firm/eza0

   Will verify the device named IO with firmware NEW_FIRM from the
   network.

 More Examples:
 UPD> verify
 UPD> verify *arc*
 UPD> verify fra0
 UPD> verify fra0 -path mopdl:new_firm/ewa0
```

A.7 ? or Help

```
Type HELP <command> for additional information
or type help to see the list of commands
For example:
        HELP UPDATE
Will give you help on the update command
```

B

AlphaServer 2000/2100/2100A Older Firmware Revision Matrix Tables

B.1 Firmware Revision Matrix - Aug97-Oct97 for AlphaServer 2x00 Model 4/xxx

Table B–1 Console Minimum Firmware and Software Revisions - Aug97

Alpha Firmware Update CD			
Release	V5.1	V5.0	V4.0
Date	Feb-98	Oct-97	Aug-97
AlphaServer 2x00 Model 4/xxx Firmware			
SRM Firmware	V5.1-173	V5.0-75	V4.9-138
ARC Firmware	V4.56-0	V4.54-0	V4.54-0
VMS PAL	V5.56-7	V5.56-7	V5.56-7
OSF PAL	V1.45-12	V1.45-12	V1.45-12
ISP1020	V5.53	V5.27	V2.10
Operating Systems			
OpenVMS	V7.1	V7.1	V7.1
DIGITAL UNIX	V4.0B	V4.0B	V4.0B
Windows NT	V4.0	V4.0	V4.0

B.2 Firmware Revision Matrix - Dec95-Dec96 for AlphaServer 2x00 Model 4/xxx

Table B–2 Console Minimum Firmware and Software Revisions - Dec95-Dec96

Alpha Firmware Update CD					
	Release	V3.8	V4.6A	V3.6	V3.5	V3.4
	Date	Dec-96	Oct-96	May-96	Mar-96	Dec-95
AlphaServer 2x00 Model 4/xxx Firmware					
	SRM Firmware	V4.7-143	V4.6-242	V4.5-51	V4.4-3	V4.3-222
	ARC Firmware	V4.50-1	V4.50-1	V4.47-2	V4.44-0	V4.43-1
	VMS PAL	V5.56-6	V5.56-4	V5.56-3	V5.53-8	X5.48-117
	OSF PAL	X1.45-12	X1.45-9	V1.45-7	V1.45-1	X1.35-81
	ISP1020			V2.10	V2.10	
Operating Systems					
	OpenVMS		V6.2-1H3	V6.2-1H2	V6.2-1H2	V7.0
	DIGITAL UNIX		V4.0	V3.2-D ,footref.(2)	V3.2D-1 [2]	V3.2D-1
	Windows NT		V3.51	V3.51	V3.5-1	V3.5-1

[2]DIGITAL UNIX V4.0 when available

B.3 Firmware Revision Matrix - Jan95-Aug95 for AlphaServer 2x00 Model 4/xxx

Table B–3 Console Minimum Firmware and Software Revisions - Jan95-Aug95

Alpha Firmware Update CD					
	Release	[1]	V3.3	V3.2	[1]	V3.1
	Date	Aug-95	Aug-95	May-95	Mar-95	Jan-95
AlphaServer 2x00 Model 4/xxx Firmware					
	SRM Firmware	V4.2-18	V4.1-42	V4.0-3	V3.11-19	V3.9-89
	SRM BIOS Emulator	V1.12	V1.12	V1.12		
	ARC BIOS Emulator	V1.13	V1.11	V1.11	V1.07	V1.07
	ARC Firmware	V4.36	V4.36	V4.25	V3.5-31	V3.5-31
	VMS PAL	X5.48-94	X5.48-94	X5.48-94	X5.48-89	X5.48-87
	OSF PAL	X1.35-59	X1.35-59	X1.35-59	X1.35-55	X1.35-55
	ISP1020	V2.02	V2.02	V1.27	V1.27	—-
EISA Configuration Utility					
	ECU Kit	V1.8	V1.3	V1.3	V1.3	V1.3
	OpenVMS and DIGITAL UNIX	V1.8	V1.8	V1.8	V1.7	V1.7
	Windows NT	V1.8	V1.8	V1.8	V1.6	V1.6
RAID Configuration Utility					
	RCU	V3.11	V3.11	V3.11	V3.08	V3.0x
	EISA SWXCR FW	V2.15	V2.15	V2.15	V2.15	V2.1x(D01)
	PCI SWXCR FW	V2.19	V2.19	V2.19	V2.19	V2.1x(A01)
Operating Systems					
	OpenVMS	V6.2	V6.2	V6.2	V6.1	V6.1
	DIGITAL UNIX	V3.2C	V3.2C	V3.2	V3.2	V3.2
	Windows NT	V3.5-1	V3.5-1	V3.5-1	V3.5	V3.5

[1] Factory Installed Software release

B.4 Firmware Revision Matrix - Oct94-Dec94 for AlphaServer 2x00 Model 4/xxx

Table B–4 Console Minimum Firmware and Software Revisions - Oct94-Dec94

Alpha Firmware Update CD				
	Release	[2]FIS	V3.0	[1]FIS
	Date	Dec-94	Dec-94	14-Oct-94
AlphaServer 2100 Firmware				
	SRM Console	V3.8-54	V3.8-49	V3.7-33
	VMS PAL	X5.48-64	X5.48-64	X5.48-33
	OSF PAL	X1.35-42	X1.35-42	X1.35-23
	ARC Firmware	V3.5-31	V3.5-31	V3.5-30
	BIOS Emulator	V1.07	V1.07	V1.07
EISA Configuration Utility				
	ECU Kit	V1.2	V1.2	V1.2
	OpenVMS and OSF ECU	V1.5	V1.5	V1.5
	Windows NT ECU	V1.5	V1.5	V1.5
RAID Configuration Utility				
	RCU	V3.0x	V3.0x	V2.23
	EISA SWXCR FW	V2.1x(D01)	V2.1x(D01)	V1.99(B01,C01)
	PCI SWXCR FW	V2.1x(A01)	V2.1x(A01)	——
Operating Systems				
	OpenVMS	V6.1	V6.1	V6.1
	DIGITAL UNIX[3]	V3.1	V3.1	V3.0
	Windows NT	V3.5	V3.5	V3.5

[1]FIS - Factory Installed Software release targeted for Windows NT version V3.5 (based on Build 807) systems. This release, console SRM V3.7-33 and ARC V3.5-30, supercedes the initial release to manufacturing of console SRM V3.7-23 and ARC V3.5-27.

[2]Factory Installed Software release, required for the AlphaServer 2000

[3]formerly OSF/1

B.5 Firmware Revision Matrix - May94-Sep94 for AlphaServer 2x00 Model 4/xxx

Table B–5 Console Minimum Firmware and Software Revisions - May94-Sep94

Alpha Firmware Update CD			
Release	[1]FIS	V2.9	V2.8
Date	14-Sep-94	Aug-94	May-94
AlphaServer 2100 Firmware			
SRM Console	V3.7-23	V3.6-83	V3.5-26
VMS PAL	X5.48-33	X5.48-33	X5.48O
OSF PAL	X1.35-23	X1.35-23	X1.35I
ARC Firmware	V3.5-27	V3.5-23	V3.5-11
BIOS Emulator	V1.07	V1.06	V1.0?
EISA Configuration Utility			
ECU Kit	V1.2	V1.1	V1.0
OpenVMS and OSF ECU	V1.5	V1.5	V1.4
Windows NT ECU	V1.5	V1.5	V1.3
RAID Configuration Utility			
RCU	V2.23	V2.23	V2.23
EISA SWXCR FW	V1.99(B01,C01)	V1.99	V1.99
Operating Systems			
OpenVMS	V6.1	V6.1	V6.1
DIGITAL UNIX[2]	V3.0	V3.0	V2.0B
Windows NT	V3.5	Beta2	Beta1

[1]Factory Installed Software release, initial release

[2]formerly OSF/1

B.6 Firmware Revision Matrix - Oct97 for AlphaServer 2x00 Model 5/xxx

Table B–6 Console Minimum Firmware and Software Revisions - Oct97

Alpha Firmware Update CD		
Release	V5.1	V5.0
Date	Feb-98	Oct-97
AlphaServer 2x00 Model 5/xxx Firmware		
SRM Console	V5.1-178	V5.0-80
ARC Firmware	V4.56-0	V4.54-0
VMS PAL	V1.19-3	V1.19-3
OSF PAL	V1.21-1	V1.21-1
ISP1020	V5.53	V5.27
Operating Systems		
OpenVMS	V7.1	V7.1
DIGITAL UNIX	V4.0D	V4.0D
Windows NT	V4.0	V4.0

B.7 Firmware Revision Matrix - May96-Aug97 for AlphaServer 2x00 Model 5/xxx

Table B–7 Console Minimum Firmware and Software Revisions - May95-Aug97

Alpha Firmware Update CD				
Release	V4.0	V3.8	V4.6A	V3.6
Date	Aug-97	Dec-96	Oct-96	May-96
AlphaServer 2x00 Model 5/xxx Firmware				
SRM Console	V4.9-143	V4.7-148	V4.6-255	V4.5-56
ARC Firmware	V4.54-0	V4.50-1	V4.50-1	V4.47-2
VMS PAL	V1.19-3	V1.19-2	V1.18-2	V1.18-1
OSF PAL	V1.21-1	V1.21-1	V1.21-1	V1.21-1
ISP1020	V2.10			

B.7 Firmware Revision Matrix - May96-Aug97 for AlphaServer 2x00 Model 5/xxx

Operating Systems					
Operating Systems					
OpenVMS	V7.1		V6.2-1H3	V6.2-1H2	
DIGITAL UNIX	V4.0B		V3.2-F [2]	V3.2-D	
Windows NT	V4.0		V3.5-1	V3.5-1	

[2]DIGITAL UNIX V4.0 when available

B.8 Firmware Revision Matrix - May95-Mar96 for AlphaServer 2x00 Model 5/xxx

Table B–8 Console Minimum Firmware and Software Revisions - May95-Mar96

Alpha Firmware Update CD					
Release	V3.5	V3.4	[1]	V3.3	V3.2
Date	Mar-96	Dec-95	Aug-95	Aug-95	May-95
AlphaServer 2x00 Model 5/xxx Firmware					
SRM Console	V4.4-7	V4.3-226	V4.2-22	V4.1-46	V4.0-7
ARC Firmware	V4.44-0	V4.43-1	V4.39	V4.1-34	V4.30
VMS PAL	V1.17-3	V1.15-4	V1.14-1	V1.13-1	V1.13-1
OSF PAL	V1.45-1	V1.18-3	V1.17-1	V1.17-1	V1.17-1
ISP1020	V2.10	V2.10	V2.02	V2.02	V1.27
Operating Systems					
OpenVMS	V6.2-1H2	V7.0	V6.2	V6.2	V6.2
DIGITAL UNIX	V3.2D-1 [2]	V3.2D-1	V3.2C	V3.2C	V3.2 HW4
Windows NT	V3.51	V3.5-1	V3.5-1	V3.5-1	V3.5-1

[1]Factory Installed Software [FIS] release

[2]DIGITAL UNIX V4.0 when available

B.9 Firmware Revision Matrix - Feb98-Oct97 for AlphaServer 2100A Model 4/xxx

Table B–9 Console Minimum Firmware and Software Revisions - Feb98-Oct97

Alpha Firmware Update CD				
	Release	V5.1	V5.0	V4.0
	Date	Feb-98	Oct-97	Aug-97
AlphaServer 2100A Model 4/xxx Firmware				
	SRM Firmware	V5.1-182	V5.0-84	V4.9-147
	ARC Firmware	V4.56-0	V4.54-0	V4.54-0
	VMS PAL	V5.56-7	V5.56-7	V5.56-7
	OSF PAL	V1.45-12	V1.45-12	V1.45-12
	ISP1020	V5.53	V5.27	V2.10
Operating Systems				
	OpenVMS	V7.1	V7.1	V7.1
	DIGITAL UNIX	V4.0B	V4.0B	V4.0B
	Windows NT	V4.04	V4.0	V4.0

B.10 Firmware Revision Matrix - Mar96-Dec96 for AlphaServer 2100A Model 4/xxx

Table B–10 Console Minimum Firmware and Software Revisions - Mar96

Alpha Firmware Update CD				
Release	V3.8	V4.6A	V3.6	V3.5
Date	Dec-96	Oct-96	May-96	Mar-96
AlphaServer 2100A Model 4/xxx Firmware				
SRM Firmware	V4.7-152	V4.6-245	V4.5-60	V4.4-12
ARC Firmware	V4.50-1	V4.50-1	V4.47-2	V4.44-0
VMS PAL	V5.56-6	V5.56-4	V5.56-3	V5.53-8
OSF PAL	X1.45-12	X1.45-9	V1.45-7	V1.45-1
ISP1020				V2.10
Operating Systems				
OpenVMS		V6.2-1H3	V6.2-1H2	V6.2-1H2
DIGITAL UNIX		V3.2-F	V3.2-D	V3.2D-2
Windows NT		V3.51	V3.51	V3.51

B.11 Firmware Revision Matrix - Feb98-Oct97 for AlphaServer 2100A Model 5/xxx

Table B–11 Console Minimum Firmware and Software Revisions - Feb98-Oct97

Alpha Firmware Update CD				
	Release	V5.1	V5.0	V4.0
	Date	Feb-98	Oct-97	Aug-97
AlphaServer 2100A Model 5/xxx Firmware				
	SRM Firmware	V5.1-187	V5.0-89	V4.9-152
	ARC Firmware	V4.56-0	V4.54-0	V4.54-0
	VMS PAL	V1.19-3	V1.19-3	V1.19-3
	OSF PAL	V1.22-1	V1.22-1	V1.21-1
	ISP1020	V5.53	V5.27	V2.10
Operating Systems				
	OpenVMS	V7.1	V7.1	V7.1
	DIGITAL UNIX	V4.0B	V4.0B	V4.0B
	Windows NT	V4.0	V4.0	V4.0

B.12 Firmware Revision Matrix - Mar96-Dec96 for AlphaServer 2100A Model 5/xxx

Table B–12 Console Minimum Firmware and Software Revisions - Mar96

Alpha Firmware Update CD				
Release	V3.8	V4.6A	V3.6	V3.5
Date	Dec-96	Oct-96	May-96	Mar-96
AlphaServer 2100A Model 5/xxx Firmware				
SRM Firmware	V4.7-157	V4.6-249	V4.5-64	V4.4-16
ARC Firmware	V4.51-1	V4.50-1	V4.47-2	V4.44-0
VMS PAL	V1.19-2	V1.18-2	V1.18-1	V1.17-3
OSF PAL	V1.21-1	V1.21-1	V1.21-1	V1.21-1
ISP1020				V2.10
Operating Systems				
OpenVMS		V6.2-1H3	V6.2-1H2	V6.2-1H2
DIGITAL UNIX		V3.2-F	V3.2-D	V3.2D-2
Windows NT		V3.51	V3.51	V3.51

C

Changes from Previous Firmware Releases - V3.7 to V5.2

C.1 V5.2 Release

- New QLogic ISP firmware - version V5.54

C.2 V5.1 Release

- New QLogic ISP firmware - version V5.53
- Added support for DE500-FA
- Added support for CCMAB

C.2.1 CCMAB - Memory Channel 2

This release includes latent support of LFU updates for the Memory Channel 2 (CCMAB) adapter. The LFU utility lists the Memory Channel adapter as an updatable device. However, there is no firmware file present for performing the update. This is indicated by the "missing file" text which appears for MC2 under the UPD>list command. Attempting to update the adapter will cause an expected failure that is not fatal. A future release of the Alpha Systems Firmware Update CD will include the necessary firmware file and at that point updates will be able to complete successfully.

Note

It is important to note that this LFU update ability is only supported for Memory Channel 2 adapters. Prior generations, including Memory Channel 1 and 1.5, cannot be updated via LFU.

C.3 V5.0 Release

- New QLogic ISP firmware - version V5.27
- New KZPSA firmware - version A11

C.4 V4.9 Release

- New ARC firmware - version V4.54-0
- Firmware images V*_SBUPGRADE and V*_SLUPGRADE are no longer included on the CD. The cpu_upgrade script that has been included in the update images since the V3.5 CD accomplishes the same task. See the chapter on Using the LFU for information on how to use the cpu_upgrade script.

C.4 V4.9 Release

- New firmware option file, DFXAA310.SYS for devices DEFPA and DEFEA(rev 3) replaces DFPAA246.SYS.
- New scripts included in update image, save_nvram and restore_nvram, provide a way to save the contents of nvram to a floppy.(especially useful if the SIO module(AS2100) or motherboard(AS2100A) must be swapped) - See Appendix K.
- Support for the DE500-BA Fast EtherWORKS PCI 10/100-TX Adapter

C.4.1 Console Notes for the DE500-AA/DE500-BA Fast EtherWorks Adapters

V4.9 console supports the DE500-BA Fast EtherWORKS PCI 10/100-TX Adapter as a boot device. The console has supported the DE500-AA Fast EtherWORKS PCI 10/100-TX Adapter as a boot device since the V4.7 console firmware release. The DE500-BA is similar in function as the DE500-AA which supports:

- 10BaseT half and full duplex
- 100BaseTx half and full duplex
- auto-negotiation

Auto-negotiation is a mechanism to advertise, to detect, and to negotiate line speed abilities of auto-negotiate-supported devices on an ethernet wire. In auto-negotiation mode the user does not need to know the line speed of auto-negotiation-supported devices on the other end of an ethernet wire.

Important

Note: Auto-negotiation mode is NOT RECOMMENDED if you know the speed of your ethernet because of possible considerable delay when booting or when restarting the OpenVMS operating system. This is because an operating system starts/stops device drivers three times before the operating system is on-line.
Use auto-negotiate ONLY if the DE500-*A is connected to an ethernet which supports auto-negotiation. Otherwise the DE500-*A will respond to default to 100Base TX full-duplex.

C.4.1.1 Set EW*0_Mode Auto-Negotiate Examples

```
Example to set the DE500-AA or DE500-BA into auto-negotiate mode:

>>> set ewa0_mode auto-negotiate

The DE500-*A advertises its abilities on the ethernet wire by sending
a link code word. If the DE500-*A does not get a response (a link
cord word by another auto-negotiation supported device, the DE500-*A
will set its line speed to 100BaseTx full-duplex.

It will take several seconds before you see the console
prompt >>> to get the DE500-*A into auto-negotiate mode.


Example when setting auto-negotiate mode on a system where the
ethernet does not support auto-negotiate or there is no response
from the ethernet.

From the console you see the following response:

 >>> set ewc0_mode auto-negotiate (this takes several seconds)
 ewc0: link failed : Using 100BaseTX full duplex

In the above case change ewc0_mode to Twisted to use the DE500-*A in
a 10BaseTx environment.
```

```
End of examples.
```

C.4.1.2 Behavior Note on Systems with Multiple DE500's on OpenVMS Systems

Operating Systems may take longer than average to reboot when the systems have multiple DE500's that are all enabled for auto-negotiate mode. This is because of the time it may take for auto-negotiation mode to stabilize for each ethernet adapter.
Auto-negotiation mode is not recommended on OpenVMS systems with more the one DE500.

C.5 V4.7 Release

- ARC Console support for the 120ns NVRAM
- Additional Character Support for Japanese keyboard
- Enhancements to LK411 keyboard driver for all supported languages
- Support for the DE500-AA Fast EtherWORKS PCI 10/100-TX adapter

C.5.1 Bug Fixes

- Fix Reset of Memory Channel adapter during a PCI reset
- ARC fix for ncr810 timeout on AlphaServer 2000A systems
- Related to this Firmware Release
  - DIGITAL UNIX V4.0A, V4.0B
  - OpenVMS V7.0, V7.1
  - CIPCA Option firmware is now version A315

C.5.2 Anomaly Seen on AlphaServer 2100 Systems with DE425's

- Refer to section Section C.5.9

C.5.3 Problems with files on the V3.7 Alpha Firmware CD

The firmware in this release notes is on the V3.8 CD. There were problems with firmware files on the Alpha Firmware 3.7 CD. The problems had to do with the following:

- ARC console incompatibility with 120ns NVRAM as descibed below
- LFU not able to recognize nor update adapter firmware

The above problems have been fixed in this release.

C.5.4 ARC Console Support for the 120ns NVRAM

The ARC console V4.50 supports the 120ns NVRAM. The previous version of ARC console V4.49 shipped on the V3.6 Alpha Firmware CD is NOT to be used on systems with the 120ns NVRAM. The 120ns NVRAM is identified by the marking: 28C64-J12.

```
The location of 120ns NVRAM is as follows:

- On AS2100A pedestal motherboard, 54-24129-xx: near the
   middle of the board, to the right of the SCSI connector,
   and above the DALLAS clock chip. The component is on a
   socket about 3/4 of an inch square.  Location E49.
```

```
- On AS2100A rackmount motherboard, 54-24283-01: component
   location E47.

- On the STD I/O: B2110-AA: with the fingers of the module
   away from you, all the way to the right, and just below
   the DALLAS clock chip. Location E30

- On the AS2000 motherboard: B2111-AA: about the middle of
  the board close to the DALLAS clock chip. Location E47.
```

C.5.5 Additional Characters to Support Japanese Keyboard

This code release includes additional support which includes characters "\", "|" and "_".

C.5.6 Additional Information on the Set Language Console Command

Type "set language 99" for a list of valid values for the "set language " command or refer to the following example:

```
P00>>>
 P00>>>set language 99
 bad value - valid selections:
               0          -   none
              30          -   Dansk
              32          -   Deutsch (Deutschland/Osterreich)
              34          -   Deutsch (Schweiz)
              36          -   English (American)
              38          -   English (British/Irish)
              3a          -   Espanol
              3c          -   Francais
              3e          -   Francais (Canadian)
              40          -   Francais (Suisse Romande)
              42          -   Italiano
              44          -   Nederlands
              46          -   Norsk
              48          -   Portugues
              4a          -   Suomi
              4c          -   Svenska
              4e          -   Belgisch-Nederlands
              50          -   Japanese (JIS)
              52          -   Japanese (ANSI)
 bad value - language not modified
 P00>>>
```

C.5.7 Support for the DE500-AA Fast EtherWORKS Adapter

The console now supports the DE500-AA Fast EtherWORKS PCI 10/100-TX Adapter. The DE500-AA supports auto-negotiation which is a mechanism to determine the speed of the ethernet and adjust the DE500-AA speed to the fastest compatible speed of the ethernet.

Caution

Use Auto-negotiation only when the ethernet, which the DE500-AA is connected to, fully supports this mechanism.

Auto-negotiation works from the console in the following way: If a DE500-AA is connected to an ethernet which supports auto-negotiation and is on-line (such that the ethernet device on the other end of the wire is running an operating system, then the DE500-AA line speed will be set to a negotiated speed of the ethernet. If the ethernet does not support auto-negotiation or the device on the other end of the ethernet is off-line (the operating system is not running), then the line speed of the DE500-AA will default to 100BASE TX full duplex.

Auto-negotiation is enabled on the DE500-AA from the console environment ew*0_mode; where * is the device id. e.g. ewa0_mode. Set ew*0_mode is explained in the next section.

C.5.7.1 Set EW*0_Mode Auto-Negotiate

To enable auto-negotiate mode in the DE500-AA do the following:

```
Note: Only use this mode if your ethernet environment supports
auto-negotiation. Otherwise set the mode to Twisted for 10BaseTx
or to Fast or FastFD for 100BaseTX half-duplex or full-duplex
respectively,

P00>>> set ew*0_mode auto-negotiate
Example:
P00>>> set ewa0_mode auto-negotiate

It will take several seconds before you see the P00>>> prompt
to get the DE500-AA into auto-negotiate mode.

Warning: Use auto-negotiate ONLY if the DE500-AA is connected to
an ethernet which supports auto-negotiate. Otherwise the DE500-AA
will respond to default to 100Base TX full-duplex. See Examples:

Example-1: When setting to auto-negotiate on a system where the
ethernet does not support auto-negotiate or there is no response
from the ethernet. From the console you see the following:

 P00>>> set ewc0_mode auto-negotiate (this takes a few seconds)
 ewc0: link failed : Using 100BaseTX full duplex

In the above case change ewc0_mode to Twisted to use the DE500-AA in
a 10BaseTx environment.

Example-2: When setting to auto-negotiate on a system where the
ethernet does not support auto-negotiate but supports 100BaseTX
half duplex;

 P00>>> set ewc0_mode auto-negotiate
 ewc0: link failed : Using 100BaseTX full duplex

In the above case change ewc0_mode to FAST to use the DE500-AA in
a 100BaseTx half-duplex environment.

Example-3: When setting to auto-negotiate on a system where the
ethernet does not support auto-negotiate but supports 100BaseTX
full duplex;

 P00>>> set ewc0_mode auto-negotiate (wait a few seconds)
 ewc0: link failed : Using 100BaseTX full duplex

In the above case change ewc0_mode to FASTFD to use the DE500-AA in
a 100BaseTx Full Duplex environment.

End of examples.
```

C.5.7.2 Behavior Note on Systems with Multiple DE500-AA's

Operating Systems may take longer than average to reboot when the systems have multiple DE500-AA that are all set to auto-negotiate mode. This is because of the time it may take for auto-negotiation mode to stabilize for each DE500-AA.

C.5.8 About SRM Console Port Environment Variables

Below is a list of console port environment variables (EVs) that are used to configure the standard UART ports COM1 and COM2 found in industry standard "combo" chips. On most Alpha systems COM1 is the standard serial console. On some Alpha systems COM2 is used as an alternate console port. These EVs will be maintained by the console and assigned to IDs in the SRM platform specific range (0x40-0x7F).

The console port COMx EVs are non-volatile and will be maintained by the SRM console. Operating systems may reference these COMx EVs for port setup using SET_ENV/GET_ENV/SAVE_ENV SRM callbacks.

By default both ports are currently set to 8 data bits, 1 stop bit, and no parity. This seems to be the industry standard and current setting for console, OpenVMS, and UNIX.

WARNING: VMS only supports the default values for COM1 and neither VMS nor UNIX currently use COM2 values.

- COM1_BAUD (Non-Volatile,Read/Write)
- COM2_BAUD (Non-Volatile,Read/Write)

  These EVs control the Baud rate on the serial ports COM1 and COM2. Below is the list of valid Baud value strings. The default is 9600. Note, it is possible to set the COMx port Baud rates to values listed as "not supported", however, these Baud rates are not tested.

  - "50" (not supported)
  - "75" (not supported)
  - "110" (not supported)
  - "134.5" (not supported)
  - "150" (not supported)
  - "300"
  - "600"
  - "1200"
  - "1800" (not supported)
  - "2000" (not supported)
  - "2400"
  - "3600" (not supported)
  - "4800"
  - "7200" (not supported)
  - "9600" (default)
  - "19200"
  - "38400"
  - "57600" (not supported)
- COM1_MODEM (Non-Volatile,Read/Write)
- COM2_MODEM (Non-Volatile,Read/Write)

  These EVs are used to indicate the presence of a modem on the serial ports COM1 and COM2. The default is OFF. Note, the SRM console will always assert DTR regardless of the setting of this variable, since it is both simpler and smaller to implement, and there are no deleterious side affects from doing so.

  - "OFF" (No modem present, default)
  - "ON" (Modem present)

- COM1_FLOW (Non-Volatile,Read/Write)
- COM2_FLOW (Non-Volatile,Read/Write)

  These EVs are used to indicate the method to be used for flow control on the console serial ports COM1 and COM2. The default setting is SOFTWARE.

  - "NONE" (No flow control)
  - "SOFTWARE" (Use XON/XOFF, Default)
  - "HARDWARE" (Use modem signals CTS/RTS)
  - "BOTH" (Use SOFTWARE and HARDWARE)

C.5.9 An Anomaly Seen with Rev A2 PCEB and with DE425's

This information applies ONLY to AlphaServer 2100 systems.

Under very heavy PCI and EISA Bus load a System hang (21164 timeout) may occur in systems configured with a DE425 Ethernet card, a B2110 Standard I/O card with Rev A2 PCEB Chip, and one or more PCI cards. If you experience this symptom, it is recommended that you either replace the B2110 which has Rev B0 or greater PCEB chips, or install a SRM console patch. Replacing the B2110 is the preferred action.

PCEB chip identification and patch instructions are as follows:

```
Identification of PCEB chip:-

  P00>>>e -b econfig:20008

Return Value:
  03 = Rev A2 PCEB (PCEB chip marked with SZ865)
  04 = Rev B0 PCEB (PCEB chip marked with SZ891)
  5 = Rev B1 PCEB (PCEB chip marked with SZ955)

If return value is 03 apply Patch or replace B2110

  P00>>>edit nvram
        * 10 deposit -l econfig:20040 00F09960
        * EXIT
  P00>>>INIT

The Patch sets the PCI arbitration to a state used in the V4.2 console;
PCI arbitration is set to round-robin mode, and Guaranteed Access
Time (GAT mode) is turned on.
```

The above information does not apply to the AlphaServer 2000 nor to AlphaServer 2x00A systems.

C.6 V4.5 Release

- Bug Fixes
  - KZPSC RAID with 16MB,32MB or larger caches - bug fix
  - KZPSA driver fix for disappearing devices
  - Inet driver fix to ensure 2-stage bootp booting from the console
  - DE500 driver fix for full-duplex mode
- New ARC Console Firmware V4.57-0
- New CIPCA firmware

Changes from Previous Firmware Releases - V3.7 to V5.2
C.6 V4.5 Release

- New SRM console environment variables for the KCRCM remote console module. Refer to Section C.7 for details.
- Enhancements
  - ISP1020 driver updated to recognize KZPBA of different clock speeds
  - Extended flashrom check for a valid ARC console. See Section 1.1 for details.
- Related to this Firmware Release
  - DIGITAL UNIX V4.0 & V3.2-F
  - OpenVMS V6.2-1H3 & V7.0
  - New EISA Configuration Utility V1.9 for Windows NT
  - New EISA Configuration Utility V1.9 for OpenVMS/DIGITAL UNIX
  - What's New in ECU V1.9 for OpenVMS/DIGITAL UNIX
    - !dec6400.cfg DIGITAL AlphaServer 4100 Family System Board
    - !isa6400.cfg DIGITAL ATI ISA Mach64 VGA Gaphics Board
    - !isa4000.cfg Dialogic Voice Card Adapter
    - !isa4010.cfg Dialogic DTI?2xx, DMX, MSI/C Adapter
    - aisa3000.cfg PCMCIA Adapter
    - adec4250.cfg DIGITAL EtherWORKS Turbo EISA - updated - Adds a UNIX only Network Mode function where you can manually force a specific option to connect to either the Twisted Pair cable connector or one of the AUI port connectors. Features the "auto sense" option to use either module connector.

C.6.1 Anomaly Seen on AlphaServer 2100A with KZPSA's Behind the PCI-to-PCI Bridge

The console may issue a message with older KZPSA's installed on the PCI bus behind the PCI-to-PCI Bridge chip [PPB]. The message may occur on power-up or after an INIT command. The message can be ignored for OpenVMS and DIGITAL UNIX systems.

```
Example output:
...
*** unable to assign PCI base address
*** bus 2, slot 9, function 0, size 00001000 (16 bit I/O)
...
End of example output
```

The message is informational for Windows NT systems because Windows NT systems currently do not support the KZPSA behind the PPB. The KZPSA is supported when installed in front of the PPB.

C.6.2 Anomaly Fixed in ARC Console V4.57-0

With earlier ARC consoles, the ECU may report a bogus symptom on AlphaServer 2100A systems configured with certain options.

```
Configuration where symptom was observed:

AlphaServer 2100A Model 4/275 with:

Secondary PCI
PCI0 DE435 PCI1 DEFPA PCI2 KZPAA PCI3 KZPAA
Primary PCI
PCI4  PCI5 KZPSA PCI6 KZPSA      PCI7 S3 Trio64/Trio32

Symptom is displayed after the ECU is invoked from the console:

         ***************Automatic Add*********************
         * The configuration (CFG) file listed below is    *
         * needed for one of your boards and is not on the *
         * current drive....                               *
         *                                                 *
         *      CFG File: A@@@0000.CFG / !@@@0000.CFG      *
         *      Embedded                                   *
         *                      .                          *
         ***************************************************
```

Upgrade console firmware if you see this symptom.

C.7 New Console Environment Variables for the KCRCM Remote Console Module

Console environment variables [EV] were added to this firmware release for the KCRCM remote console module. The new console EV's are:

- rcm_answer
- rcm_dialout
- rcm_init

The KCRCM uses the above console EV's during its operational phases - initialization, ring detection, answer, and hangup. EV's rcm_init and rcm_answer contain factory default command strings. The default command strings, which are stored in the KCRCM NVRAM, are shown below. Using the EV rcm_dialout is described in the next section.

```
Example:

P00>>> show rcm_*

rcm_init AT&F0EVS0=0S12=50
rcm_dialout
rcm_answer ATXA

P00>>> set rcm_answer "new answer string"

End of Example
```

C.7 New Console Environment Variables for the KCRCM Remote Console Module

C.7.1 About the KCRCM

The KCRCM remote console module allows a user to remotely perform system management tasks via an AlphaServer's COM port. One feature of the KCRCM is to automatically dialout an "alert string" through its modem port when the KCRCM detects a power failure within the system in which it is installed. To configure the KCRCM for dialout you must set the console EV "rcm_dialout" with an alert string. When the KCRCM detects a power failure, the "alert string" is sent to the modem connected to the KCRCM modem port. From this point the modem will dial the "alert string" it received via the KCRCM. Examples to set and to clear rcm_dialout from the SRM console are shown below:

```
format:

P00>>> set rcm_dialout "ATDT<alert-string>#;"
                        ^                  ^

^ ATDT is required at the beginning of the string,
  "#;" is required at the end of the string.

In the following example, the KCRCM uses an alert string to instruct a modem to:
- dial the number (ATDT9,) of the paging service (800-555-1212)
- pause for a few seconds and then (,,,,,,)
- enter the phone number of the server (555-3434)
- hangup (#)
- return to command mode (;)

P00>>> set rcm_dialout "ATDT9,18005551212,,,,,,,5553434#;"

To clear the alert string do the following:

P00>>>set rcm_dialout ""

Refer to the KCRCM manual for additional details.
Manual Order Number EK-KCRCM-IN
End of example
```

C.8 V4.4 Release

- Option Firmware
  - KZPSA revision A11
  - CIPCA revision A315
- Boot device support for the DE422 EISA Ethernet Controller is no longer available starting with the previous release V4.3 console code. Only boot support has been removed. Other support is present and the device can still be used for ethernet traffic etc., just not for booting via the DE422. If the DE422 is the sole boot device on the AlphaServer 2x00 system then the console code should *NOT* be updated but must be maintained at revision V4.2 or earlier. Upgrading the hardware to a DE425, DE435, DE450 or DE500 will permit updating to the current console code with boot support for those devices.
- Code fix to include support for bootp across multiple subnets.
- CIPCA (CI to PCI Controller) support.

  Latent support was available in V4.3 code.
- KFPSA (PCI to DSSI adapter) support.
- MEMORY CHANNEL support.

  Latent support was available in V4.3 code.

- Code fix to properly recognize the KFESB under the `show fru` and `show config` commands. This also corrects the controller letters output in the powerup display.
- For Network booting of update files:
  - Code fix for the problem of a long delay when a scratch floppy is not inserted into the floppy drive.
  - Code fix for the problem of adapter options files that would appear to successfully copy even if file was not present
  - The LFU has been modified to provide more flexibility for those who use network booting. After the question asking for the boot device, another question will be displayed, asking for the name of the options firmware files list. You may hit <return> to use the default file name (AS2X00FW), or enter the filename of another list that you would prefer to use. This capability was added so that multiple versions of the console firmware and options firmware could be kept on the same mop server. In addition to the files AS2X00FW.SYS and AS2X00FW.TXT, each release will now also include a copy of these files that will be prefixed by the version number of the console firmware. For example, for this release the copies will be named V44_AS2X00FW.SYS and V44_AS2X00FW.TXT. Anyone updating an older version of the console firmware could also update their options with firmware that was released at the same time as the console firmware by entering the name of the list associated with that particular version. The following is an example of the output:

```
Option files were not found on CD or floppy. If you want to load
the options firmware, please enter the device on which the files
are located(ewa0), or just hit <return> to proceed with a
standard console update: ewa0

Please enter the name of the options firmware files list, or
hit <return> to use the default filename(AS2X00FW): V44_AS2X00FW
.....
Network load complete.
.
```

- Some new scripts have been added to the LFU. To execute these scripts type "exit" at the UPD> prompt and then answer "y" to the question that asks if you want to go to manual mode. At the manual mode P00>>> prompt, type the name of the script you want. If you want to get back to the UPD> prompt from manual mode, type "lfu".

```
P00>>> lfu
```

The following is a list of the script names and a brief description of each:

- read_rel_notes - Use this script to read the release notes from CD or floppy. If you booted the LFU from CD, then just type read_rel_notes. If you booted the LFU from floppy, insert the floppy containing the release notes and then type read_rel_notes.
- update_fsl - This script will update the fail-safe loader, using the fail-safe image that is encapsulated in the LFU.

- downgrade - This script will blast an EV4 SRM ROM image, and an EV4 ARC ROM image into the flash roms. Use this script if you are downgrading from an EV5 CPU to an EV4 CPU. If you booted the LFU from CD, just type "downgrade". If you booted from floppy, insert the floppy containing sbsrmrom.exe, slsrmrom.exe, and sbarcrom.exe, and then type **downgrade**.

- The pci_read_mult environment variable is not needed and has been removed from the AlphaServer 2100A systems console code.
- ISO9660 driver fix for an off-by-one error
- Code fix to the ethernet driver that corrects intermittent failures seen on some systems.

C.9 V4.3 Release

- Boot device support for the DE422, EISA Ethernet Controller, is no longer available with this release. If the DE422 is the sole boot device on the AlphaServer 2x00 system then the console code should *NOT* be updated to V4.3 but must be maintained at revision V4.2 or earlier.
- Option Firmware
  - ISP1020 revision 2.10 (replaces 2.02)
  - KZPSA revision A09 (replaces A08)
- Functional changes
  - Changes for French (language variant 3C - Francais) keyboard support for LK411 and PCXAL.
  - Additions or changes to console environment variables
    - The environment variable, kbd_hardware_type has been added for French (language variant 3C - Francais) keyboard support of both the LK411 and the PCXAL keyboard. The valid selections for this variable are LK411 or PCXAL. The default value is PCXAL. If you are using the LK411 and have language variant set to 3C (Francais) then please set the kbd_hardware_type for LK411. You must powercycle or reset the system to put the new setting into effect.

```
P00>>>show kbd_hardware_type
kbd_hardware_type       PXCXAL
P00>>set kbd_hardware_type LK411

power cycle or reset the system

P00>>>show kbd_hardware_type
kbd_hardware_type       LK411
```

    - New options for **ew*0_mode**: FAST and FASTFD (FAST, Full Duplex) have been added for 100BaseT Ethernet network connection with supported Ethernet controller. You must initialize your system (type init at the console prompt) after you set ew*0_mode to a particular option.
    - The environment variable, pci_arb, has been added. On AlphaServer 2x00 systems, the default setting for the pci_arb environment variable is "Fixed". On AlphaServer 2100A systems, the default setting for the pci_arb environment variable is "Partial-Rotating". Do not alter the

default for your system, as alteration could result in degraded system performance.

- Previous versions of the update utility contained firmware images for various hardware options. In order to reduce the size of the update utility, the option firmware is no longer included as part of the update image. Instead, the files are copied into memory when the update utility is booted, resulting in some differences in the way it is booted. When booting from CD there is nothing extra to do since all the options firmware is on the CD. The only difference in this case is in the output. Messages are printed for each firmware file that is copied.

```
example output:
Checking dka600.6.0.1.0 for the option files. .
Copying options firmware from dka600.6.0.1.0 . . .
Copying DFEAA130 from dka600.6.0.1.0. . .
Copying DFEAB246 from dka600.6.0.1.0. . .
Copying DFPAA246 from dka600.6.0.1.0. . .
Copying KZPSAA09 from dka600.6.0.1.0. . .
Copying CIPCAX0D from dka600.6.0.1.0. . .

                    ***** Loadable Firmware Update Utility *****
```

When booting from floppy you will be asked for a second floppy which contains the options firmware. At this point you can insert the second floppy if you want the options firmware, or you can just hit return to go directly to the UPD> prompt where you can still update the SRM and ARC console firmware.

Note

Copying these files from floppy is slow and may take three to four minutes.

```
example output:
Checking dva0 for the option files.
If you have a floppy containing option firmware, please insert it now and
hit <return> when ready. Or just hit <return> to proceed with the standard
console update.
Copying options firmware from dva0 . . .
Copying DFEAA130 from dva0. . .
Copying DFEAB246 from dva0. . .
Copying DFPAA246 from dva0. . .
Copying KZPSAA09 from dva0. . .
Copying CIPCAX0D from dva0. . .

                    ***** Loadable Firmware Update Utility *****
```

When booting over the ethernet, the update utility still looks for the options firmware on CD and floppy first. When the files are not found on CD or floppy, you will be asked to enter the name of the device from which you are updating. Enter the device name as it appeared in your boot string (i.e. ewa0), or if you don't want the options firmware, just hit return to go to the update prompt where you will still be able to update the SRM and ARC console firmware. If you intend to copy the options firmware, you must copy it to your mop server when you copy the update

utility. The following files will need to be copied to your mop server for options firmware updates:

as2x00fw.sys
cipcax0d.sys
dfeaa130.sys
dfeab246.sys
dfpaa246.sys
kzpsaa09.sys

Note

If your mop server is running V3 mop protocol, moploading will be slow because, by default, the console sends V4 requests first. You can speed things up if you want by hitting ^X to get to the console prompt and entering the console commands "P00>>>SET MOPV3_BOOT 1" and "P00>>>EXIT".

```
example output:
Option files were not found on CD or floppy. If you want to load
the options firmware, please enter the device on which the files
are located, or just hit <return> to proceed with a standard console
update: ewa0
.....
Network load complete.
.....
Network load complete.
Host name: MAY21
Host address: aa-00-04-00-e2-74

Copying options firmware from ewa0 . . .
Copying DFEAA130 from ewa0. . .
.....
Network load complete.
Host name: AFW1
Host address: aa-00-04-00-84-76

Copying DFEAB246 from ewa0. . .
.....
Network load complete.
Host name: HTST1
Host address: aa-00-04-00-47-f4

Copying DFPAA246 from ewa0. . .
.....
Network load complete.
Host name: HTST1
Host address: aa-00-04-00-47-f4

Copying KZPSAA09 from ewa0. . .
.....
Network load complete.
Host name: HTST1
Host address: aa-00-04-00-47-f4

Copying CIPCAX0D from ewa0. . .
.....
Network load complete.
Host name: HTST1
Host address: aa-00-04-00-47-f4
```

```
***** Loadable Firmware Update Utility *****
```

The messages are only indicating that the options firmware has been copied into memory, it has not been loaded into the devices. You still have to use the update command to blast the firmware into the flash roms on each device.

- New ARC V4.57-0 console for AlphaServer 2x00 Model 4/xxx includes:
  - Support for Alphaserver 2100A
  - Fixes the problem introduced in ARC console version V4.39 that caused EISA data to be deleted when the ARC console was booted.

C.10 V4.2 Release

- Bug Fixes
  - The console "SHOW CONFIG" command now properly recognizes pass-4 EV5 CPU's on AlphaServer 2x00 Model 5/xxx systems.
- Enhancements
  - The Loadable Firmware Utility [LFU] now prompts the user to enter an OS_TYPE before updating firmware. This is to allow OpenVMS and DIGITAL UNIX to properly boot AlphaServer 2x00 Model 5/xxx systems with both pass-2 and pass-4 EV5 CPUs.
  - Console support is now enabled for the DE450 and DE500 ethernet modules.
- A New ARC V4.57-0 console for AlphaServer 2x00 Model 5/xxx systems now includes the following attributes:
  - Checks for Pass-4 EV5 CPUs. The ARC console will not boot Windows NT if your AlphaServer 2x00 Model 5/xxx system has pass-2 EV5 CPU(s). WindowsNT officially supports only pass-4 EV5 CPUs.
  - A notable behavior change with the V3.9 ARC console is that if you remove an EISA module, the ARC database will automatically be updated on powerup and you do not have to run the ECU. However, if you insert a new module, you will still have to run the ECU.

C.11 V4.1 Release

- Bug Fixes
  - EISA NVRAM - address-space problem fixed.
  - New KZPSA Firmware Version A08 - which fixes a write-data/interrupt problem that may occur with heavily loaded storage configurations running OpenVMS and DIGITAL UNIX.
  - TGA24 Horizontal Sync Problem fixed for PBXGA-BA and PBXGA-CA modules
  - Install firmware from ARC console fixed. The bug existed only on Model 4/275 and Model 5/250 systems.
  - Code change to memory initialization; to fix a problem with the new 128MB memory module (MS451-DA) and with any larger size memory modules.

- Code change to correctly size SIMMs on EV5 systems with multiple SIMM carriers; where 16Mbit DRAMS are in the second slot. Symptom: Incorrect configuration size will show up in the console "show memory" display.

- Option Firmware
  - KZPSA revision A08 (replaces A07)
  - DEFEA revision 2.46 (replaces 2.30)
  - ISP1020 revision 2.02 (replaces 1.27)
- Console Enhancements
  - The default value for the environment variable PCI_READ_MULT is set to OFF. The default value was set to ON.
  - Console command SET CONSOLE SERIAL forces all output to the serial port. Output for the ARC console and the EISA Configuration Utility used to go to the VGA if the VGA keyboard was plugged in.
  - Console command SET COM1_BAUD or SET COM2_BAUD [baud-value] changes the baud rate of the COM1 or COM2 port respectively. e.g. SET COM1_BAUD [baud-value]. The [baud-value] range is [300, 600, 1200, 2400, 4800, 9600, 19200 bauds] where default baud rate is 9600 bds.
  - The value stored for console environment variable **tt_allow_login** is now non-volatile. Non-volatile means the last value saved is preserved across system initializations, cold bootstraps, and long power outages.
- New ARC V4.57-0 console for AlphaServer 2x00 Model 4/xxx includes:
  - Support for more than 1GB memory on SMP systems.
  - Support for Scatter/Gather DMA buffer allocation
  - Support to verify the correct version of the Standalone RAID Configuration Utility [RCU] which is now rev 3.11. RCU V3.11 files are on the Alpha Firmware CD V5.4 in directory \utility\swxcrmgr\. Refer to section Appendix D for details.
- Release Notes Additional Information [see Appendix]
  - Instructions on how to create a RAID Configuration Utility [RCU] floppy Refer to Appendix D
  - Instructions on how to upgrade firmware using the fail-safe loader Refer to Appendix E
  - Instructions on how to upgrade firmware on Rev K B2110-AA modules Refer to Appendix F
  - Instructions on how to upgrade and downgrade firmware Refer to Appendix H and Appendix I

C.12 V4.0 Release

A patch is required for Systems with a Rev. F02 Motherboard. The patch applies only to these systems with console firmware version V4.0 or V3.11. The patch is not required in V4.1 or later firmware. AlphaServer 2100 systems with revision F02 motherboards include the T2-Pass-3 [pci-tulip chip] and PCI prefetching enabled. These systems require the following patch to disable PCI prefetching.

```
To identify the revision of the T2 chip enter the following
examine (e) command at the console prompt:

P00>>>e 38e000004 -p -b
pmem:        38E000004 02
                       ^^

Examine the byte of data returned.
A value of 04 or 05 indicates T2 Pass 3.
A value of 02 or 03 indicates T2 Pass 2.
Systems returning a value of 04 or 05 require the following
patch to disable PCI prefetching.

For Systems with V4.0 console firmware do the following:
-----------------------------------------------------------------

P00>>> set pci_read_mult off

For systems with V3.11 console firmware apply the following
patch in NVRAM
-----------------------------------------------------------------
P00>>> e -p -q 838e000000
pmem:        838e000000 FE10008423000180
                              ^
                              |
               (PCI pre-fetching enable bit)
P00>>> edit nvram
*list
*nn d -p -q  838E000000 FE00008423000180  ! nn = next available
       !      line number
                                          ! Sets PCI prefetching
       ! disabled
*exit                                     ! Write to NVRAM
P00>>> nvram [enter]                      ! Execute NVRAM

P00>>> e -p -q 8383000000
pmem:        838E000000 FE00008423000180  ! Ensure the bit is off

NVRAM will be executed during subsequent powerup automatically.
-----------------------------------------------------------------
```

- Changes to the Loadable Firmware Update Utility [LFU]
  - A **Readme** selection added to highlight important release information
  - A new method to update SRM and ARC console firmware. Refer to Chapter 5 for details.
  - Options added to update firmware for DEFEAs, DEFPAs, KZPSAs adapters
- Changes to console environment variables
  - New options for **ew*0_mode**: BNC and Full Duplex, Twisted-Pair has been added. The "auto-sensing" option is no longer valid and has been removed. You must initialize your system (type init at the console prompt) after you set ew*0_mode to a particular option.

    - A new default value for **bus_probe_algorithm**. The default value is "new" to support new releases of OpenVMS and DIGITAL UNIX. Change this value back to "old" if you have OpenVMS Version 6.1, or you have DIGITAL UNIX V3.0 or earlier.

- New SRM BIOS emulator code, version V1.12. The SRM console now uses BIOS emulation for graphics adapter initialization. Hence, console ouput on the VGA monitor on power-up and reset may be delayed. Powerup progress may still be observed on the operator control panel. This change does not affect systems which use the serial line console.
- New ARC V4.25 console code for AlphaServer 2x00 Model 4/xxx includes:
    - Unicode support for Internationalization
    - New ARC BIOS version V1.11
    - Support for running cnfgdiag with a dual KZPSA configuration
    - Fix for identifying RAID logical drives (IPMT case)

C.13 V3.11 FIS Only Release

- A fix for a KFESA hang problem in OpenVMS V6.1 under the SRM console V3.9-89.
- A fix for a diskette initialization failure in OpenVMS V6.1 under the SRM console V3.9-89.
- A fix to the pwrup script to correct disk testing failures under the SRM console V3.9-89.
- A fix for dual FDDI configurations and OSF/1 installation failure.
- Additional SCSI and MSCP code changes to ensure good crash dump output under OpenVMS when another system on the SCSI bus is generating a high I/O load.
- KZPSA support
- Alpha VME 2100 code support

C.14 V3.9-89 Release

- Support for EISA FDDI booting.
- Support for using the TGA as a console.
- Support for Console Secure mode. (see Chapter 8)
- Better support for the tt_allow_login environment variable. i.e. if set to 0, all devices except for the console will ignore ^C, ^O, ^T, and ^X.
- Ability to edit NVRAM on QLogic ISP1020 SCSI ports.
- Code changes to minimize the screen resets under LFU.
- Fix to allow the DE422 to run in 32KB mode.

- Dynamic memory was extended in the sys_exer script to allow it to run on systems with large numbers of disks.

  Note

  If you run sys_exer, you must do an init before booting to return the heap size back to normal. Kill_diags will no longer suffice.

- Fixes a crash when using a KFESA on an AlphaServer2100 with exactly 2GB of memory.
- Drivers are now started in >>>show device, to provide a consistent picture of device availability.
- Several fixes to the console SCSI driver to support multi-host SCSI busses.
- Waits are removed in >>>show boot* and >>>boot if a boot device is no longer present or available.
- Fixes a problem where the console could crash due to syntax errors. i.e. as in the case with unterminated strings.
- There is much less output to the screen when the console is in graphics mode.The screen will remain blank during the memory tests and I/O probing. When in serial mode, the serial port will still get the same output as before.
- Messages of the type "waiting for 'device' to change mode to 'nnn'" are more descriptive. A typical message would be: "waiting for 'device' to poll".
- Devices for which there are no ECU data will no longer be started. Previous versions of the console would warn of the EISA configuration error, but would still attempt to start the device. Now, you will have to run the ECU or the device will not be started at all. A sample of the output:

```
probing hose 1, EISA
ECU error, slot 4, found DEC2E00, expected nothing

EISA Configuration Error
Run the EISA Configuration Utility

bus 0, slot 4 -- pua -- DEC2E00 -- no ECU data, not initializing
```

C.15 V3.8-54 FIS Only Release

A 256 MB of memory configuration problem on the AlphaServer 2000 was found after the V3.8-49 SRM console code went into production. A fix for the problem has been implemented in the FIS only release of SRM console V3.8-54 and also in V3.9-52.

C.16 V3.8-49 Release

- Support for the AlphaServer 2000 system.
- Support for the following adapters:
  - PCI NVRAM for OSF
  - PCI Multi-port RAID Controller

- Quad Ethernet, (DE436-AA)

The following notes have been moved from the OpenVMS Specific anomalies section

- A new APB.EXE (Network System Initial Load Function Program) for OpenVMS V6.1 users is required for systems being updated with console version V3.8. A change in the console device address allocation algorithm requires the new APB.EXE file. The APB.EXE file is located on the V3.1 in the SYS0.SYSEXE directory. Copy this file from your CD to the SYS$COMMON:[SYSEXE] area using the /contiguous qualifier as shown in the example.

```
$ copy/contig device:[directory]APB.EXE
SYS$COMMON:[SYSEXE]H
$ copy/contig dka600:[sys0.sysexe]apb.exe sys$common:[sysexe]
```

If the AlphaServer system is a satellite system and updated to V3.8 then the server system of that cluster must use:

- the new APB.EXE
- a new ethernet driver - SYS$EWBTDRIVER.EXE

Copy the APB.EXE from the CD to the **server's** SYS$COMMON:[SYSEXE] area and then writeboot the file.

```
For example
$ copy/contig device:[directory]APB.EXE SYS$COMMON:[SYSEXE]
$  mcr writeboot
   Update VAX portion of boot block (default is Y) : n
   Update AXP portion of boot block (default is Y) : y
   Enter AXP boot file : SYS$COMMON:[SYSEXE]APB.EXE
```

The SYS$EWBTDRIVER.EXE file must be copied to the **server's** SYS$COMMON:[SYS$LDR] area.

```
$ copy device:[directory]SYS$EWBTDRIVER.EXE SYS$COMMON:[SYS$LDR]
```

The SYS$EWBTDRIVER.EXE file is part of the OpenVMS V6.1-1H1 kit /release.

Without the new APB.EXE file, the following error will be displayed when selecting Find Service from the program menu:

```
ERROR: Unable to write to network
```

Without the new SYS$EWBTDRIVER.EXE on the server system, unexpected interrupt and/or exception errors with subsequent register and dump information will be displayed when attempting a satellite boot.

C.17 V3.7 FIS Only Release

- The SRM console banners have been changed to reflect the new product naming convention for the AlphaServer 2100 systems.

```
-----------------------------------------------------------------
String Old                                  New
-----------------------------------------------------------------
HWRPB   DIGITAL 2100 Server Model A400MP  AlphaServer 2100 4/200
Name
Console Alpha AXP (tm) Server             AlphaServer 2100
Banner
OCP  Alpha AXP 190Mhz                   Model 4/200
Banner
-----------------------------------------------------------------
```

- The SRM console VGA driver has been changed to fix the anomaly with the Number 9 card, which blanks the video display following an NT shutdown.
- The SRM console PALcode initialization routine no longer overwrites the speed control bits in CPU CSR6(14:13) and CSR15(14:8).
- The ARC firmware now supports PCI-to-PCI bridges.
- The ARC firmware "Supplementary Menu" replaces "List available boot devices" with a more detailed "Show hardware configuration".
- The ARC firmware corrects the problem on systems configured with a large number of disks (>24) where the system would hang in "Initializing device drivers:" or crash into the Windows NT firmware Monitor.

D

Upgrading SWXCR Firmware on Systems Configured with a RAID Controller

Systems configured with a SWXCR RAID controller and with ARC console V4.36 or later, must update SWXCR firmware. Refer to the Revision Matrix Tables 1 thru 4 in the beginning of this release notes for the current firmware revision for your system.

D.0.1 What You Need to Update SWXCR Firmware

To update SWXCR firmware you need the following RCU floppy diskette:

"Standalone RAID Array 200 Software V3.0 or greater for AXP Systems" [RCU] Part number AK-Q6TFC-CA or greater

If you do NOT have this diskette, you can create one using the procedure below and using the Alpha Firmware CD V5.4. After you create an RCU diskette, proceed to the section "How to Upgrade RAID Firmware".

make a floppy first

It is recommended that you make an RCU floppy diskette first. You will need the RCU floppy diskette to update the EISA Configuration Utility [ECU] floppy with the new config files.

D.0.2 Create a RAID Standalone Configuration Utility [RCU] Floppy Diskette

You need a PC with a CD-ROM and floppy drive to create your RCU on floppy diskette. The RCU files are located in a directory on the Alpha Firmware CD V5.4.

Copy the appropriate files from CD-ROM to Floppy diskette as descibed below.

On your PC do the following:

1. Insert Firmware CD-ROM in drive
2. Insert formatted floppy diskette in drive A:
3. Select File Manger
    1. Select Window
    2. Select New Window
    3. Select Tile Horizontally
    4. Select CD-ROM drive in one window
    5. Select Floppy drive in the other window

6. Select the directory \utility\swxcrmgr\ in cd window
7. Copy ALL files from the \utility\swxcrmgr\ directory to the floppy diskette
   e.g. \utility\swxcrmgr*.* to A:\

4. exit File Manager

You now have a Standalone Raid Configuration Utility [RCU] diskette to upgrade RAID firmware.

D.1 How to Upgrade RAID Firmware

D.2 Upgrading RAID Firmware is Done in Two Parts

- Set RAID Controller Parameters
- Update the Standalone Configuration Utility Firmware

References:
AlphaServer 2000/2100/2100RM KN470 or Higher CPU upgrade - EK-KN470-IN
StorageWorks RAID Array 200 Subsystems Controller Installation and Standalone Utility User's Guide - EK-SWRA2-IG [1]

D.2.1 Upgrading RAID Part 1 - Set RAID controller Parameters

- First make sure you already have updated your ARC console firmware
- Then make sure you run the EISA Configuration Utility
- Invoke the ARC console
- Select Run a Program from the Boot Menu
- Insert Standalone RAID configuration diskette into floppy drive
  - enter a:swxcrmgr or cd:\utility\swxcrmgr\swxcrmgr [1]
  - select Controller Setup
  - select Hardware Parameters - verify values
    1. Battery-backup = Disabled (Enabled if you have battery backup)
    2. StorageWorks fault Management = Enabled
    3. press ESC
  - select Startup Parameters - verify values
    1. Spin up option = Automatic
    2. Number of devices per spin = 2
    3. Delay (Seconds) = 6
    4. press ESC
  - select Data Parameters - verify values
    - Default rebuild rate = 50
    - Stripe size (K bytes) = 8
    - Controller read ahead = Disabled

[1] From Alpha Firmware CD V5.4

    - press ESC
- exit Controller Setup - press ESC key again
- Save Parameters
    - Save altered controller configuration? = Yes
    - press ESC
- exit from the RCU utility

D.2.2 Upgrading RAID Part 2 - Update the Standalone Configuration Utility Firmware

Firmware should be updated to the following revisions:

- V2.15 for EISA controllers
- V2.19 for PCI controllers

D.2.2.1 Update SWXCR Controller Firmware via RCU Diskette

The process to update firmware is as follows: Insert the RCU diskette in drive then invoke the ARC console. From the ARC console Boot menu, select "Run a Program" and enter one of the following. See note about multiple controllers.

- a:swxcrfw swxcrfwa.216 [for Single EISA Controller]
- a:swxcrfw swxcrfwp.236 [for Single PCI Controller]
- a:swxcrfw swxcrfwa.216 swxcrfwa.216 swxcrfwp.236 [for Multiple Controllers]

Note

For Multiple Controllers, update the EISA controllers firmware first, then update the PCI controller firmware.

The utility displays a series of messages.
You will be prompted with a message to "press a key to proceed".
The final message prompts you to "cycle the system power".
Cycle power to complete the update.

Note

Once the firmware is updated you can no longer use the .cfg files on the ECU for the EISA RAID controller.

D.2.2.2 You Cannot Update SWXCR Controller Firmware with just the Alpha Firmware CD V5.4

You need an RCU floppy to update firmware. See Section D.0.2 for details.

D.2.2.3 Verify the SWXCR Controller Firmware Update

- Start the Standalone Configuration Utility - enter a:swxcrfw or cd:\utility\swxcrmgr\swxcrfw from the ARC console
- Verify firmware update by reviewing the firmware version displayed on the Main menu
    - for a PCI controller - exit utility and remove utility diskette

- for a EISA controller that was V1.99 or earlier prior to the firmware update, select the appropriate new .cfg file and copy it to your ECU diskette.

Table D–1 SWXCR .Cfg files

File	Usage
!MLX0077.CFG	1-channel controller running Windows NT
!MLX0075.CFG	3-channel controller running Windows NT
AMLX0077.CFG	1-channel controller running DIGITAL UNIX or OpenVMS
AMLX0075.CFG	3-channel controller running DIGITAL UNIX or OpenVMS

D.2.2.4 How to Load the New .CFG File(s) - EISA Only

Load RCU Floppy diskette only

To save your SWXCR configuration, you need to update your ECU floppy with the new configuration files [.cfg]. You can update your ECU with new .cfg files from only the RCU floppy diskette. You cannot update the ECU with new config files from files that are on Alpha Firmware CD V5.4. Refer to Section D.0.2 if need to make an RCU floppy diskette.

To load a new .cfg file do the following:

1. run the ECU
   For OpenVMS or DIGITAL UNIX users:
   - insert ECU diskette into floppy drive
   - type ecu at the P00>>> prompt

     ```
     P00>>>ecu
     ```

   For Windows NT users:
   - from the Boot menu select: Supplementary menu...
   - from Supplementary menu select: Set up the system...
   - from the Setup menu select: Run EISA configuration utility from floppy
2. Press enter at the first screen that appears. If you get an I.D. mismatch message, press return to continue
3. Choose Selection 2: Add or remove boards from the next screen and press enter.
4. Arrow down to the EISA slot that has the SWXCR-EA or the SWXCR-EB then do the following:
   1. Remove Board - press the "remove" key on the keypad to delete the board. Press enter to confirm, the slot should now be empty.
   2. Add board - press the insert here key (next to the remove key). Remove the ECU diskette and insert the Standalone RAID Array 200 diskette and press enter. In about 45 seconds you should see the .cfg files that were found on the RAID diskette.

3. Select the appropriate .cfg file:

   !MLX0075.CFG DIGITAL SWXCR-EB (3-ch) EISA RAID cntlr
   !MLX0077.CFG DIGITAL SWXCR-EA (1-ch) EISA RAID cntlr
   AMLX0075.CFG SWXCR-EB (3-ch) EISA RAID Cntlr for OSF, VMS
   AMLX0077.CFG SWXCR-EA (1-ch) EISA RAID Cntlr for OSF, VMS
   Windows NT users select one of the !MLX... files
   OpenVMS /DIGITAL UNIX users select one of the AMLX... files

   then press enter.

4. When prompted for destination diskette, remove the RAID diskette and reinsert the ECU diskette and press return. !!!MAKE SURE THE ECU DISKETTE IS WRITE ENABLED!!! Press enter to confirm the board.
5. Choose the slot in which the board is installed and press enter, (the slot should already be highlighted).
6. The next screen should display the board in the slot you selected, press the insert here key to add it.
7. Press enter at the add screen. This may take up to 5 minutes as it is copying all the config files from the floppy into memory.
8. Once it's completed, choose the correct adapter from the list and press enter then press enter to confirm.
9. Now you can press F10 twice to get back to the 5 option menu.
10. Select step 3: View or edit details to verify the correct board is at the slot you selected.
11. IMPORTANT, select step 5: Save and Exit to save the new configuration.

E

Updating Firmware from the Fail-safe Loader

If your system displays the ash> prompt on power-up, the console detected a possible firmware error and has "failed over" to the fail-safe loader. The failover allows one to restore the main SRM and ARC console.

Here's a log file updating an EV4 from the FSL. Booting from the CD was not supported in FSL versions before V3.6. If you have an older version you must use a floppy. To downgrade from an EV5 to an EV4, see Appendix H.

```
[The system powers-up to the fail-safe loader ash> prompt]

AlphaServer 2100 Console V4.0-2, built on May  1 1995 17:53:25
ash>
ash>help

type 'init -driver {device}' to start a selected driver or
type 'init -driver 6' to start all available drivers.

Use the boot command to boot the selected device.
Other commands available:
ls, set, show, clear, edit, boot

Note: An operating system cannot be booted from this console.

ash>init -driver 6
ash>sh dev
dka0.0.0.1.0              DKA0            RZ28  435E
dka600.6.0.1.0            DKA600     SONY CD-ROM CDU-541  4.5d
dva0.0.0.1000.0           DVA0                           RX26
mka400.4.0.1.0            MKA400                  TLZ06  0435
mka500.5.0.1.0            MKA500                  TZK11  00A1
ewa0.0.0.0.0              EWA0       08-00-2B-E2-55-36
ewb0.0.0.2000.0           EWB0       08-00-2B-E2-70-3B
pka0.7.0.1.0              PKA0       SCSI Bus ID 7
ash>boot -fl 0,a0 dka600

(boot dka600.6.0.1.0 -flags 0,a0)
block 0 of dka600.6.0.1.0 is a valid boot block
reading 1035 blocks from dka600.6.0.1.0
bootstrap code read in
base = 200000, image_start = 0, image_bytes = 81600
initializing HWRPB at 2000
initializing page table at 1f2000
initializing machine state
setting affinity to the primary CPU
jumping to bootstrap code
Bootfile: [alpha2100]as2100_e4_v4_3.exe
```

Updating Firmware from the Fail-safe Loader

```
VMS PALcode X5.48-117, OSF PALcode X1.35-81
starting console on CPU 0
initialized idle PCB
initializing semaphores
initializing heap
initial heap 1c0c0
memory low limit = 1fa000
heap = 1c0c0, 13fc0
initializing driver structures
initializing idle process PID
XDELTA not enabled
initializing file system
initializing timer data structures
lowering IPL
CPU 0 speed is 5.26 ns (190MHz)
access NVRAM
Starting Memory Diagnostics
Memory Diagnostics completed
probing hose 0, PCI
probing PCI-to-EISA bridge, bus 1
entering idle loop
bus 0, slot 0 -- ewa -- DECchip 21040-AA
bus 0, slot 1 -- pka -- NCR 53C810
bus 1, slot 4 -- vga -- ISA VGA
bus 1, slot 6 -- pkb -- Adaptec 1740
bus 1, slot 7 -- dra -- Mylex DAC960
bus 0, slot 7 -- tga -- DECchip ZLXp 21030
initializing keyboard

Checking dka600.6.0.1.0 for the option files. . .
Copying options firmware from dka600.6.0.1.0 . . .
Copying DFEAA130 from dka600.6.0.1.0. . .
Copying DFEAB246 from dka600.6.0.1.0. . .
Copying DFPAA246 from dka600.6.0.1.0. . .
Copying KZPSAA09 from dka600.6.0.1.0. . .
Copying CIPCAX0D from dka600.6.0.1.0. . .

               ***** Loadable Firmware Update Utility *****
--------------------------------------------------------------------------------
 Function    Description
--------------------------------------------------------------------------------

 Display     Displays the system's configuration table.
 Exit        Done exit LFU (reset).
 List        Lists the device, revision, firmware name, and update revision.
 Readme      Lists important release information.
 Update      Replaces current firmware with loadable data image.
 Verify      Compares loadable and hardware images.
 ? or Help   Scrolls this function table.
--------------------------------------------------------------------------------
UPD> update *srm*

Confirm update on:
srmflash
[Y/(N)]y
WARNING: updates may take several minutes to complete for each device.

                          DO NOT ABORT!

srmflash        Updating to 4.3-222...  Verifying 4.3-222...  PASSED.

UPD> update *arc*

Confirm update on:
arcflash
[Y/(N)]y
WARNING: updates may take several minutes to complete for each
device.
                          DO NOT ABORT!
```

```
arcflash   Updating to 4.43-1...  Verifying 4.43-1...  PASSED.

UPD>
UPD> exit
Do you want to do a manual update? [y/(n)] n
Please reset the system......

VMS PALcode X5.48-117, OSF PALcode X1.35-81
starting console on CPU 0
initialized idle PCB
initializing semaphores
initializing heap
initial heap 1c0c0
memory low limit = 134000
heap = 1c0c0, 13fc0
initializing driver structures
initializing idle process PID
XDELTA not enabled
initializing file system
initializing timer data structures
lowering IPL
CPU 0 speed is 5.26 ns (190MHz)
access NVRAM
entering idle loop
Starting Memory Diagnostics
Testing CSIC on Memory Module 0
Testing all memory banks in parallel
Testing Memory bank 0
Testing Memory bank 1
Testing Memory bank 2
Testing Memory bank 3
Configuring Memory Modules
Configured memory size = 20000000
Memory Diagnostics completed
probing hose 0, PCI
probing PCI-to-EISA bridge, bus 1
bus 0, slot 0 -- ewa -- DECchip 21040-AA
bus 0, slot 1 -- pka -- NCR 53C810
bus 1, slot 4 -- vga -- ISA VGA
bus 1, slot 6 -- pkb -- Adaptec 1740
bus 1, slot 7 -- dra -- Mylex DAC960
bus 0, slot 7 -- tga -- DECchip ZLXp 21030
initializing keyboard
Memory Testing and Configuration Status
Module   Size    Base Addr   Intlv Mode  Intlv Unit  Status
------   -----   ---------   ----------  ----------  ------
  0      512MB   00000000      1-Way         0       Passed
Total Bad Pages 0
environment variable mopv3_boot created
AlphaServer 2100 Console V4.3-222, built on Nov 29 1995 at 19:58:46
P00>>>
```

F

Upgrading Firmware on B2110-AA and B2111-AA Modules

The B2110-AA revision K and later, and B2111-AA revision F and later replacement hardware comes with non-standard firmware. It comes with a dual SRM console which allows booting ONLY to console level. There is no ARC console nor is there a fail-safe loader. After you install this module at the customer site you **MUST** load the appropriate standard firmware.

F.1 Update Procedure

F.1.1 Update Materials

You need the following materials to update firmware:

- Rev K or later B2110-AA standard I/O module for AlphaServer 2100 systems
  or
- Rev F or later B2111-AA I/O backplane module for AlphaServer 2000 systems
- CD-ROM -Alpha AXP Update Firmware V3.2 or later

F.1.2 Update Sequence

- Install J5 jumper (for fail-safe loader)
- Install module
- Power up system
- Insert Firmware Update CD
- Update firmware (using procedure below)
- Remove Firmware Update CD
- Power down
- Remove J5 jumper

Caution

Before you start, make sure J5 is installed and J6 is removed. When you are finished, make sure J5 is removed and J6 is always removed.

F.1.3 Updating Firmware on AlphaServer 2x00 Model 4/xxx Systems

```
Install Firmware Update CD
P00>>>    boot -fl 0,a0 dka600
Bootfile: [alpha2100]as2100_e4_v4_1.exe  [ if using V3.3 CD ]
Bootfile: [alpha2100]as2100_e4_v4_3.exe  [ if using V3.4 CD ]
Bootfile: [alpha2100]as2100_e4_v4_4.exe  [ if using V3.5 CD ]
Bootfile: [alpha2100]as2100_e4_v4_5.exe  [ if using V3.6 CD ]
UPD>   update *srm*
srmflash
[Y/[N]:  Y

Caution - The update will take several minutes. Allow update to complete.
   Failure to do so my results in an inoperable system.

UPD> update *ARC*
arcflash
[Y/[N]:  Y

Caution - The update will take several minutes. Allow update to complete.
   Failure to do so my results in an inoperable system.

UPD> exit

Answer Yes to the following to update the fail-safe loader:

Do you want to do a manual update? [y/(n)]:   Y

P00>>>  update -path fslrom -target fslflash -i
(update -path fslrom -target fslflash)
new: 4.3-221
old:<a number pattern>
...

P00>>> LFU
UPD>>> EXIT
Do you want to do a manual update? [y/(n)]:   No

Please reset the system ...

This completes the firmware update. You can now run the ECU then
boot your operating system.
```

F.1.4 Updating Firmware on AlphaServer 2x00 Model 5/xxx Systems

```
Install Firmware Update CD
P00>>>    boot -fl 0,a0 dka600
Bootfile: [alpha2100]as2100_e5_v4_1.exe  [ if using V3.3 CD ]
Bootfile: [alpha2100]as2100_e5_v4_3.exe  [ if using V3.4 CD ]
Bootfile: [alpha2100]as2100_e5_v4_4.exe  [ if using V3.5 CD ]
Bootfile: [alpha2100]as2100_e5_v4_5.exe  [ if using V3.6 CD ]
UPD>   update *srm*
srmflash
[Y/[N]:  Y

Caution - The update will take several minutes. Allow update to complete.
   Failure to do so my results in an inoperable system.

UPD> update *ARC*
arcflash
[Y/[N]:  Y

Caution - The update will take several minutes. Allow update to complete.
   Failure to do so my results in an inoperable system.

UPD> exit

Answer Yes to the following to update the fail-safe loader:

Do you want to do a manual update? [y/(n)]:   Y
```

```
P00>>>  update -path fslrom -target fslflash -i
(update -path fslrom -target fslflash)
new: 4.3-225
old:<a number pattern>
...

P00>>> LFU
UPD>>> EXIT
Do you want to do a manual update? [y/(n)]:   No

Please reset the system ...

This completes the firmware update. You can now run the ECU then
boot your operating system.
```

G

Returning a B2110-AA or B2111-AA as a Known Good Spare

A B2110 or a B2111 is a known good spare when it contains DUAL SRM CONSOLES - which is a copy of both the Model 4/xxx and Model 5/xxx SRM consoles. A known good spare has no ARC console nor fail-safe loader. The ARC console and fail-safe loader is installed after a known good spare is installed and the system is powered up to the SRM console prompt.

Field Service is **required** to restore firmware to dual SRM consoles **BEFORE** returning a B2110 or a B2110 to stock as a known good spare.

The procedure to blast a B2110 or a B2111 with dual srm consoles is shown as follows. The console script "make_dual_srm" is available from the Alpha Systems Firmware Update CD Version 3.5 or later.

G.1 Using make_dual_srm AlphaServer 2x00 Model 4/xxx Systems

```
Install J5 Jumper on Module
Install Module
Install Firmware Update CD
P00>>>    boot -fl 0,a0 dka600
Bootfile: [alpha2100]V44_sbupgrade.exe  [if using V3.5 CD ]
Bootfile: [alpha2100]V45_sbupgrade.exe  [if using V3.6 CD ]

UPD> exit
Do you want to do a manual update? [y/(n)]:   Yes
P00>>>  make_dual_srm
Power down
Remove the B2110 or B2111 as the known good spare.
```

G.2 Using make_dual_srm on AlphaServer 2x00 Model 5/xxx Systems

```
Install J5 Jumper on Module
Install Module
Install Firmware Update CD
P00>>>    boot -fl 0,a0 dka600
Bootfile: [alpha2100]as2100_e5_v4_5.exe  [ using V3.6 CD ]

UPD> make_dual_srm
Power down
Remove module and return it as a known good spare.
```

H

Upgrading an AlphaServer from a Model 4/2xx to a Model 5/250

Upgrading means to replace EV4-class CPU modules with EV5-class CPU modules, and means to replace console firmware.

You must first replace the appropriate console firmware before replacing CPU modules. The upgrade procedure is as follows:

1. invoke the Load Firmware Utility to do an automatic firmware update
2. update console firmware - type update after the UPD> prompt
3. power down system
4. replace EV4-class CPU Module(s) with EV5-class CPU modules
5. power up

References: AlphaServer 2000/2100/2100RM KN470 or Higher CPU upgrade - EK-KN470-IN

```
This example shows how to upgrade console firmware using firmware from
an Alpha firmware CD-ROM:

[Part 1 & 2]
P00>>>boot -flag 0,a0
Bootfile: [alpha2100]v45_sbupgrade.exe  [from CD-ROM V3.6]
...
                ***** Loadable Firmware Update Utility *****
--------------------------------------------------------------------------------
 Function    Description
--------------------------------------------------------------------------------
 Display     Displays the system's configuration table.
 Exit        Done exit LFU (reset).
 List        Lists the device, revision, firmware name, and update revision.
 Readme      Lists important release information.
 Update      Replaces current firmware with loadable data image.
 Verify      Compares loadable and hardware images.
 ? or Help   Scrolls this function table.
--------------------------------------------------------------------------------
UPD> update

Confirm update on:
arcflash
srmflash
[Y/(N)]  y

WARNING: updates may take several minutes to complete for each device.

                          DO NOT ABORT!
arcflash        Updating to 4.44-0...  Verifying 4.44-0...  PASSED.
srmflash        Updating to 4.4-7...  Verifying 4.4-7...  PASSED.

UPD> exit
```

```
Do you want to do a manual update? [y/(n)] n
Please reset the system......

[Part 3]
Power-down the system
[Part 4]
Replace EV4 CPU module(s) with EV5 CPU module(s)
[Part 5]
Power-up system
The system upgrade is now complete.

End of example
```

I

Downgrading an AlphaServer 2100A/2x00 from a Model 5/xxx to a Model 4/xxx

Downgrading means to change the CPU(s) in your AlphaServer from EV5-class to EV4-class CPU and means to change the console firmware. Console firmware is different on Model 5/xxx and Model 4/xxx systems.

When doing a downgrade, console firmware is always changed first. The procedure to downgrade is the same on AlphaServer 2100A or AlphaServer 2x00 systems except for the console firmware file selected from the Alpha Firmware CD-ROM. Use Alpha Systems Firmware Update CD Version 3.5 or later because the console firmware file contains a built-in downgrade script.

If you are doing a permanent downgrade, then the fail-safe loader must also be re-blasted for EV4 CPUs. The downgrade procedure is shown below. After you have completed the downrade refer to section Section 5.5 if you need to downgrade the fail-safe loader. The procedure is as follows:

1. Install Alpha Firmware CD V3.5 or later
2. Invoke the Loadable Firmware Utility [LFU]
3. Exit to do a manual update - type EXIT after the UPD> prompt then type y
4. Invoke the firmware downgrade script - Type "downgrade" after the P00>>> prompt
5. Power down system after the downgrade completes.
6. Replace EV5-class CPU module(s) with EV4-class CPU module(s)
7. Power up
8. Update fail-safe loader if this is a permanent downgrade

```
This example illustrates the downgrade procedure.

[Part 1 thru 4]
[Insert AlphaFirmware CD V3.5 or later into CD-ROM drive]
```

Downgrading an AlphaServer 2100A/2x00 from a Model 5/xxx to a Model 4/xxx

```
P00>>>    boot -fl 0,a0 dka600   [V3.6 CD used in this example]
Bootfile: [alpha2100]as2100a_e5_v4_5.exe [For AlphaServer 2x00A systems]
or
Bootfile: [alpha2100]as2100_e5_v4_5.exe  [For AlphaServer 2x00 systems]
...
------------------------------------------------------------------------------
 Function    Description
------------------------------------------------------------------------------
 Display     Displays the system's configuration table.
 Exit        Done exit LFU (reset).
 List        Lists the device, revision, firmware name, and update revision.
 Readme      Lists important release information.
 Update      Replaces current firmware with loadable data image.
 Verify      Compares loadable and hardware images.
 ? or Help   Scrolls this function table.
------------------------------------------------------------------------------
UPD> exit
Do you want to do a manual update? [y/(n)]:   y
P00>>> downgrade

[ Part 5 ]
Power down system

[ Part 6 ]
Replace CPU module(s)

[ Part 7 ]
Power-up system
The downgrade is now complete

-----------------------------------------
Downgrade example from an edited log file:
-----------------------------------------
P00>>>boot -fl 0,a0 dka600
Bootfile: [alpha2100]as2100_e5_v4_5.exe
(boot dka600.6.0.1.0 -flags 0,a0)
...
Checking dka600.6.0.1.0 for the option files. . .
Copying options firmware from dka600.6.0.1.0 . . .
Copying DFEAA130 from dka600.6.0.1.0. . .
Copying DFEAB246 from dka600.6.0.1.0. . .
Copying DFPAA246 from dka600.6.0.1.0. . .
Copying KZPSAA10 from dka600.6.0.1.0. . .
Copying CIPCA111 from dka600.6.0.1.0. . .

Please enter your operating systems OS_TYPE:
  [NT,UNIX,OpenVMS]: U

               ***** Loadable Firmware Update Utility *****
------------------------------------------------------------------------------
 Function    Description
------------------------------------------------------------------------------

 Display     Displays the system's configuration table.
 Exit        Done exit LFU (reset).
 List        Lists the device, revision, firmware name, and update revision.
 Readme      Lists important release information.
 Update      Replaces current firmware with loadable data image.
 Verify      Compares loadable and hardware images.
 ? or Help   Scrolls this function table.
------------------------------------------------------------------------------

UPD> cpu_downgrade
```

```
Copying srm firmware...
(update -path sbsrmrom -target srmflash)
new: 4.4-3
old: 4.4-7
Signatures don't match
Consistency checks failed, continuing anyway.
   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.
Setting to all 0s...
Setting to all 1s...
Programming...
Setting to all 0s...
Setting to all 1s...
Programming...
Verifying...
Update successful
Copying arc firmware...
(update -path sbarcrom -target arcflash)

new: 4.44-0
old: 4.44-0
   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.
Setting to all 0s...
Setting to all 1s...
Programming...
Verifying...
Update successful
P00>>>

End of log file

[power down system]
[replace EV5 CPU module(s) with EV4 CPU module(s)]
[power up system]

End of example
```

J

AlphaServer 2100 to AlphaServer 2100A Firmware Upgrade

Table J–1 AlphaServer 2100 to AlphaServer 2100A Firmware Upgrade

Verify FSL Switches on Backplane - References: Manual:EK-2100A-UP.A01		
Disable FSL Enable	Off	top switch - left position
Enable FSL Console Update	On	bottom switch - right position
Update Firmware from Alpha Firmware CD V5.4		
Clear NVRAMS		P00>>> clear_srm_nvram
		P00>>> clear_arc_nvram
Set OS_OSTYPE		P00>>> set os_type Unix or VMS
Set console		P00>>> set console graphics [if you only have a graphics head]
Init System		P00>>> init
Boot Firmware CD		P00>>> boot -fl 0,a0 dka600
Select Bootfile	for Model 4/xxx	Bootfile: [alpha2100]as2100a_e4_v5_4.exe
	for Model 5/xxx	Bootfile: [alpha2100]as2100a_e5_v5_4.exe
Update Consoles		LFU> update , [Y/[N] Y , UPD> EXIT
Update FSL		UPD> update_fsl [1] , [Y/[N] Y , Power down system
Power down system		
Disable FSL Console Update	On	bottom switch - left position
Power up system		
Firmware Upgrade is now Completed		
Update EISA Configuration	Run the ECU utility	Refer to Section 7.4
Update StorageWorks Raid Controller [if applicable]	Run the RCU Utility	Refer to Section D.1

K

RESTORE_NVRAM and SAVE_NVRAM

K.1 Restore NVRAM data to EEROM/TOY from a floppy file.

Restore the system NVRAM data to 8KB EEROM and/or last 50 TOY RAM bytes from a floppy containing the NVRAM save file(s). By default, if no script argument is specified, all NVRAM is restored from file ALLNVRAM.SAV.

Syntax

restore_nvram {all,arc,srm,toy}

Arguments

group
Specifies the group of NVRAM data to be restored. One of the following:

- all : All of the 8KB EEROM and 50 bytes of TOY RAM are restored from file allnvram.sav. This is the default, if no argument is specified.
- arc : ARC (AlphaBIOS) data in first 6KB of the 8KB EEROM is restored from file arcnvram.sav.
- srm : SRM console data in last 2KB of the 8KB EEROM is restored from file srmnvram.sav.
- toy : TOY data in last 50 bytes of 64 bytes in TOY RAM is restored from file toynvram.sav.

Examples

```
To restore a previously saved ARC NVRAM image:
          >>>restore_nvram arc
          Restore arc NVRAM data from the file fat:arcnvram.sav/dva0.0.0.1000.0.
          Please insert the floppy containing this file...
          ...and enter "y" and press Return to continue.
          y
          Looking for file fat:arcnvram.sav/dva0.0.0.1000.0...
          ...Found it.
          Restoring system NVRAM data...
          ...Succeeded.
          >>>
```

K.2 Save NVRAM data in EEROM/TOY to a floppy file.

Save the system NVRAM data from 8KB EEROM and last 50 TOY RAM bytes onto a write-UN-locked FAT formatted floppy to a file. By default, if no script argument is specified, all NVRAM is saved to file ALLNVRAM.SAV. If the file already exists, then a copy of the original file is made to *.BAK. If that file exists, it is overwritten. Note, attempts to write to a write-locked floppy fail silently.

Syntax

save_nvram {all,arc,srm,toy}

Arguments

group
Specifies the group of NVRAM data to be saved. One of the following:

- all : All of the 8KB EEROM and 50 bytes of TOY RAM are saved in file allnvram.sav. This is the default, if no argument is specified.
- arc : ARC (AlphaBIOS) data in first 6KB of the 8KB EEROM is saved in file arcnvram.sav.
- srm : SRM console data in last 2KB of the 8KB EEROM is saved in file srmnvram.sav.
- toy : TOY console data in the 50 bytes of TOY RAM is saved in file toynvram.sav.

Examples

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To save all the system NVRAM to an image on floppy:
        >>> save_nvram
        Save all NVRAM data to file fat:allnvram.sav/dva0.0.0.1000.0.
        If file already exists, first copy original to a .bak file.
        Please insert a write-UN-locked, FAT formatted floppy...
        ...and enter "y" and press Return to continue.
        y
        Checking for a FAT formatted floppy...
        ...Found it.
        Checking for existing fat:allnvram.sav/dva0.0.0.1000.0...
        ...Found one.
        Copying fat:allnvram.sav/dva0.0.0.1000.0 to .bak file...
        ...Succeeded.
        Copying all NVRAM to fat:allnvram.sav/dva0.0.0.1000.0...
        ...Succeeded.
        >>>
```