AlphaServer DS20

V5.7 Console Firmware Release Notes

August 1999

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1 Scope

The document lists significant changes in this firmware release and describes methods to update console firmware and console-supported I/O options firmware. This document does not describe console firmware internals or console architecture.

1.1 Audience

The audience for this document is intended for individuals responsible for operating system installations and upgrades, for console firmware updates and for (console-supported) I/O options firmware updates.

1.2 Golden Rules on Updating Firmware

Update console firmware before installing or updating an operating system. Update both consoles (SRM and AlphaBIOS) to ensure compatibility with the associated operating system. SRM console firmware is used for Tru64 Unix and OpenVMS systems. AlphaBIOS console firmware is used for WindowsNT.

1.3 Internet Access to Firmware

Internet access to console firmware and to AlphaBIOS/HAL and NT Drivers.

www.compaq.com/support/ (click on ***Alpha Systems*** under the "***Downloadable Drivers & Utilities***" menu).

http://www.compaq.com/support/files/alphant/index.html (Current version of BIOS, HAL and NT Drivers)

2 Read Me First

2.1 Console Changes This Release

The release notes and firmware are on the V5.7 Alpha Systems Firmware Update CD. This release contains the following:

- PALcode fix for systems with redundant power supplies. The firmware will now handle a power supply failure properly and not cause a VMS cpusanity crash. Note that variation 17-04735-02 of the power harness from the power supply to the power transition module is also required for systems with redundant power supplies.
- IDE driver bug fix. IDE CD drives can now handle dual CD installs properly.
- AIC78xx driver bug fix. CD drives connected through Adaptec AIC78xx adapters are now sized properly.
- Support for DS-KZPCC-CE
- New console commands "run bios" and "show bios" added. See section 2.1.1

2.1.1 Show Bios/Run Bios Console Commands

The *show bios* command lists the location of each BIOS extension ROM in the system. Location is displayed in the form hose bus slot function type. The *run bios* command invokes code on the BIOS extension ROM on a PCI option at the PCI location indicated by **hose**, **bus**, and **slot** parameters, and the optional **function** parameter.

When you enter the *run bios* command, the system first does a bus reset. You are then prompted to type a control sequence within a certain number of seconds to enter the utility. The control sequence depends on the PCI option. See the documentation supplied with the option for information on running the utility.

The *show bios*/*run bios* commands are run from a graphics console terminal. Make sure console is in graphics mode. In the following example, the *run bios* command executes code on the BIOS extension ROM on the DS-KZPCC-CE option(shown as I2O in the example).

```
>>>set console graphics
>>> init
…
>>>show bios
Hose Bus  Slot  FunctionType
0    0    7    0          DEC PowerStorm
Hose Bus  Slot  FunctionType
1    2    0    0          NCR 53C875
1    3    4    0          I2O
>>>run bios 1 3 4
```

2.2 Operating System/Console Firmware Revision Matrix

The following matrix shows the minimum operating system version required with this console firmware release.

Table 2-1 AlphaServer DS20 Operating System and Firmware Revision Matrix

Firmware CD V5.7	**April 2000**

Operating System	
OpenVMS	V7.1-2 + required patches
Tru64 Unix	V4.0E
Windows NT	V4.0
Console Firmware	
SRM Version	V5.7-8
AlphaBIOS Version	V5.70

2.3 Known Anomalies

2.3.1 AlphaBIOS V5.70 requires HAL Revision G

READ THIS
BEFORE
INSTALLING THE FIRMWARE

AlphaBIOS 5.70 supports changes introduced in HAL Revision G for systems based on the Alpha 21264 CPU. You **must** install HAL Revision G on your system **before** attempting to install AlphaBIOS 5.70. Otherwise, the system will hang at boot time.

See the AlphaBIOS 5.70 Section of the AlphaBIOS release notes for additional details.

2.3.2 When the Console KGPSA Driver starts.

When the console KGPSA driver starts, you may see the error message "pga0.0.0.2.4 - Nvram read failed". This message indicates that NVRAM on the KGPSA is unformatted or not working properly. The more likely reason is that the NVRAM is unformatted. The NVRAM was always unformatted prior to V5.6.

As of V5.6, a portion of the NVRAM on the KGPSA adapter is used to indicate if the adapter should be initialized for a Fabric (Switch) topology or a Loop topology. By default, the console initializes the KGPSA to a Fabric topolgy.
The NVRAM will automatically be formatted when the topology is set.

See the WWIDMGR USERS MANUAL for more information on the "wwidmgr -set adap" command. (http://ftp.digital.com/pub/DEC/Alpha/firmware/v5.6/doc/wwidmgr.*)

```
LP00>>>wwidmgr -show ada
item    adapter              WWN              Cur. Topo  Next Topo
pga0.0.0.8.1 - Nvram read failed.
[ 0] kgpsaa0.0.0.8.1     1000-0000-c920-05ab          FABRIC     UNAVAIL
pgb0.0.0.10.1 - Nvram read failed.
[ 1] kgpsab0.0.0.10.1    1000-0000-c921-0ce0          FABRIC     UNAVAIL
[9999] All of the above.
LP00>>>wwidmgr -set adapter -item 9999 -topo fabric
pga0.0.0.8.1 - Nvram read failed.
Reformatting nvram
pgb0.0.0.10.1 - Nvram read failed.
Reformatting nvram
LP00>>>wwidmgr -show ada
item    adapter              WWN              Cur. Topo  Next Topo
[ 0] pga0.0.0.8.1     1000-0000-c920-05ab          FABRIC     FABRIC
[ 1] pgb0.0.0.10.1    1000-0000-c921-0ce0          FABRIC     FABRIC
[9999] All of the above.
LP00>>>init
```

KNOWN PROBLEM:

You may see a "*** MBX not ready ***" error when formatting the Nvram with the "wwidmgr -set ada" command. Reissuing this command should succeed:

```
P00>>>wwidmgr -set ada -item 9999 -topo fab
pga0.0.0.6.1 - Nvram read failed.
Reformatting nvram
*** MBX not ready ***
pgb0.0.0.1.2 - Nvram read failed.
Reformatting nvram
P00>>>wwidmgr -show ada
item adapter WWN Cur. Topo Next Topo
*** MBX not ready ***
pga0.0.0.6.1 - Nvram format incorrect.
[ 0] pga0.0.0.6.1 1000-0000-c920-a763 FABRIC UNAVAIL
[ 1] pgb0.0.0.1.2 1000-0000-c920-c9fe FABRIC FABRIC
[9999] All of the above.
P00>>>wwidmgr -set ada -item 9999 -topo fab
P00>>>wwidmgr -show ada
item adapter WWN Cur. Topo Next Topo
[ 0] pga0.0.0.6.1 1000-0000-c920-a763 FABRIC FABRIC
```

[1] pgb0.0.0.1.2 1000-0000-c920-c9fe FABRIC FABRIC
[9999] All of the above.

KNOWN PROBLEM:

The command "wwidmgr -quickset -item <n>" MUST also have the "-unit" qualifier on the line. The WWIDMGR USERS' GUIDE says:
"If no unit number is specified, console will generate one that is a hashed value of the WWID."
This functionality is not working properly, and a -unit MUST be specified.

3 Firmware Update Procedure

This chapter explains how to invoke the Loadable Firmware utility [LFU] to update AlphaServer firmware from the SRM or AlphaBIOS console. Firmware update information is also described in the Owners Guide.

AlphaServer systems recently shipped may have a higher firmware revision than the firmware revision listed in this release. *Do not load firmware that is older than what is presently installed.* A higher firmware revision usually indicates support for the currently shipping operating system. The revision number of the console firmware and the Alpha Firmware CD are mutually exclusive.

3.1 Update Firmware from the SRM Console

The following procedure shows how to update console and I/O option firmware. To update only I/O option firmware, select the option name after the update command e.g. UPD> update pka0. Type LIST to display available option names.

Insert Firmware CD into drive	>>> show device	Find the CD-ROM device ID e.g. dka500
Boot the Alpha Firmware CD	>>> Boot dka500	Boot code determines the AlphaServer type
Press the Enter key after Bootfile:	Bootfile:	Press enter to use default firmware
Type update	UPD> update	Update console and i/o option firmware
Exit the LFU	UPD>exit	Exiting will initialize the system

Example updating firmware from the SRM console:

>>> show device
dka500.5.0.2000.1 DKA500 RRD47 1206

>>> **boot dka500** (Firmware CD is inserted in CD Drive)

block 0 of dka500.5.0.2000.1 is a valid boot block reading 989 blocks from dka500.5.0.2000.1
bootstrap code read in base = 156000, image_start = 0, image_bytes = 7ba00
initializing HWRPB at 2000
initializing page table at 148000
initializing machine state
setting affinity to the primary CPU
jumping to bootstrap code

[Release notes are displayed]

Bootfile: [press Enter-key]

eb.....ea.e9.e8.e7.e6.

Checking dka500.5.0.1000.0 for the option firmware files…

***** 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,update rev
Update Replaces current firmware with loadable data image.
Verify Compares loadable and hardware images.
? or Help Scrolls this function table.

UPD> **update**

answer **Yes** to all questions then exit

UPD> **exit**

End of Example

The firmware is now loaded into ROM. Typing exit will reset the AlphaServer system which invokes the new firmware.

3.2 Update Firmware from the AlphaBIOS Console

The following procedures show how to update console and I/O option firmware. To get to the AlphaBIOS console menu from Windows NT, shutdown the operating system then reset the system. To get to the AlphaBIOS console from the SRM console prompt >>> , type "***set os_type NT***" then reset the system or type >>> ***alp*** from the SRM console.

Insert Alpha Firmware CD into CD-ROM drive	
Select "Supplementary Menu"	to get to the "Install New Firmware" menu item
Select "Install New Firmware"	to invoke the LFU from the Alpha Firmware CD.
Type "***update***" after the UPD> prompt	to update console and i/o option firmware
Type "***exit***" after the firmware has updated	to reset the system

3.3 Loadable Firmware Utility [LFU] Commands

The Loadable Firmware Utility is the mechanism to update console and I/O option firmware. This section describes the most commonly used LFU commands. Type HELP at the LFU prompt (UPD>) to list all LFU commands.

3.3.1 Update Command

Use the update command to update console and/or I/O option firmware.

UPD> **update** [update will updates both console(s) and I/O option firmware]
UPD> **update <option-name>** e.g. >>> update ccmab02

3.3.2 List Command

Use the list command to show a list of memory-loaded images and currently supported flash ROMs. In the following example three devices are installed in a system that can be firmware-updated.

```
UPD> list
Device   Current Revision    Filename      Update Revision
Abios      5.68              abios_fw      5.70
Srm_fw     5.5               SRM           5.4
UPD>
```

4 Using the FFAUTO and FFNEXT Environment Variables

This section describes how to use console environment variables FFAUTO and FFNEXT to force devices (e.g. disks) from a "not connected" state to a "connected" state to make them bootable. The console does not allow booting devices that are in the "not connected" state.

FFAUTO and FFNEXT are used for situations and configurations where an operator needs to force the console to boot a "not connected" device. These console environment variables were introduced in console firmware V5.5 (August 1999).

4.1 Background On Device States

4.1.1 Behavior of "Not Connected" Devices

HSZ8x disk array controllers or HSG8x array controllers may have their disks in a "connected" or "not connected" state. In MULTIBUS mode, a disk state of "not connected" is normal and correct. Because the console does not allow booting devices in the "not connected" state, attempted to boot a "not connected" disk produces the console error message below:

```
P00>>>b dga40.1003
resetting all I/O buses
VGA Bios failed, status = 1
(boot dga40.1003.0.6.0 -flags 0)
dga40.1003.0.6.0 is not connected
failed to open dga40.1003.0.6.0
```

Therefore, to successfully boot a disk, select either a "connected" disk or use the FFAUTO or FFNEXT command.

4.1.2 Determining a "Not Connected" Device from an HSZ80 or HSG80

The HSZ8x or HSG8x console can help the operator determine where a disk device is connected. In this HSG80 console example below, the state of disk device d40 is 'ONLINE to this controller' therefore connected.

```
HSG80> show d40
    LUN                                             Uses             Used by
------------------------------------------------------------------------------

  D40                                               DISK50000
        LUN ID:      6000-1FE1-0000-04A0-FFFF-FFFE-0005-0000
        IDENTIFIER = 40
        Switches:
          RUN                     NOWRITE_PROTECT        READ_CACHE
          READAHEAD_CACHE
          MAXIMUM_CACHED_TRANSFER_SIZE = 32
        Access:
          ALL
        State:
          ONLINE to this controller
          Not reserved
          NOPREFERRED_PATH
        Size: 4110480 blocks
        Geometry (C/H/S): ( 3045 / 16 / 85 )
```

4.1.3 Determining a "Not Connected" Device from the SRM Console

There are a couple of methods:

1. The console error message at boot time, as previously shown, is one way to determine a "Not Connected"device. This console error message is also displayed when a console disk exerciser attempts to exercise a "Not Connected" device.
2. Using the WWIDMGR command, the console can also display the status of fibre channel devices controlled by an HSG8x.

```
P00>>>wwidmgr -show wwid -udid 40 –full

[0] UDID:40 WWID:01000010:6000-1fe1-0000-04a0-ffff-fffe-0005-0000 (ev:wwid0)
 - current_unit:40 current_col: 1 default_unit: 5901
        via adapter      via fc_nport          Con    DID     Lun
 -       pga0.0.0.6.0  5000-1fe1-0000-04a2  Yes   210313    40
 -       pga0.0.0.6.0  5000-1fe1-0000-04a1  Yes   210513    40
 -       pga0.0.0.6.0  5000-1fe1-0000-04a4  No    210713    40
```

4.2 Forcing the Console to Use a "Not Connected" Device

4.2.1 Using FFAUTO to Autoboot a "Not Connected" Devices

FFAUTO determines console behavior when the system is trying to autoboot. An autoboot is any boot other than a manual **>>>boot** command issued at the SRM console by a user. FFAUTO can be set to ON or OFF. The default state is OFF where console behavior is not affected. FFAUTO is stored in non-volatile memory therefore its state persists across system resets and power cycles.

>>> set FFAUTO ON

In the ON state, console behavior is affected during an autoboot. When the console is trying to autoboot, the console attempts to boot from each "connected" device listed in bootdef_dev. If the console reaches the end of the bootdef_dev list without successfully booting, the console goes to the beginning of the bootdef_dev list and attempts booting again. Disks that are found in the "not connected" state are changed to the "connected state", thereby enabling the console to access that device.

4.2.1.1 Example Using the FFAUTO Environment Variable

```
P00>>>set FFAUTO ON
P00>>>set bootdef_dev dga40.1003
P00>>>b
(boot dga40.1003.0.6.0 -flags 0)
dga40.1003.0.6.0 is not connected
failed to open dga40.1003.0.6.0
P00>>>init

VMS PALcode V5.56-7, OSF PALcode V1.45-12
starting console on CPU 0
CPU 0 booting

(boot dga40.1003.0.6.0 -flags 0)
dga40.1003.0.6.0 is not connected
failed to open dga40.1003.0.6.0

Retrying, type ^C to abort...

(boot dga40.1003.0.6.0 -flags 0)
block 0 of dga40.1003.0.6.0 is a valid boot block
reading 896 blocks from dga40.1003.0.6.0
bootstrap code read in
base = 200000, image_start = 0, image_bytes = 70000
initializing HWRPB at 2000
initializing page table at 1ff0000
initializing machine state
setting affinity to the primary CPU
jumping to bootstrap code
```

4.2.2 Using FFNEXT on "Not Connected" Devices

FFNEXT determines the console behavior of the next command issued to a "not connected" device. FFNEXT can be set to either OFF or ON. The default-state is OFF where console behavior is not affected. FFNEXT is a volatile environment variable and its value is temporary therefore does not propagate across a system reset or reboot.

>>> set FFNEXT ON

In the ON-state, the console will change the next "not connected" device to a "connected" state for booting. The FFNEXT state is automatically reset to OFF after the console changes device state from "not connected" to "connected".

Resetting FFNEXT to OFF protects the user from accidentally changing the state of disks. Stated in another way, FFNEXT is a one shot. It stays in effect until a "Not Connected" device is accessed.

4.2.2.1 EXAMPLE: FFNEXT

```
P00>>>b dga40.1001
(boot dga40.1001.0.6.0 -flags 0)
dga40.1001.0.6.0 is not connected
failed to open dga40.1001.0.6.0
P00>>>set ffnext on
P00>>>b dga40.1001
(boot dga40.1001.0.6.0 -flags 0)
block 0 of dga40.1001.0.6.0 is a valid boot block
reading 896 blocks from dga40.1001.0.6.0
bootstrap code read in
base = 200000, image_start = 0, image_bytes = 70000
initializing HWRPB at 2000
initializing page table at 1ff0000
initializing machine state
setting affinity to the primary CPU
jumping to bootstrap code


    OpenVMS (TM) Alpha Operating System, Version X6PC-SSB


halted CPU 0
halt code = 5
HALT instruction executed
PC = ffffffff8b4e2ba4
P00>>>show ffnext
ffnext              OFF

End of Examples
```