AlphaServer DS20
V7.2 Firmware Release Notes and Update Procedures

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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. After an operating system shutdown, always re-initialize the system before running the update utility.

1.3 Internet Access to Firmware

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

http://ftp.digital.com/pub/Digital/Alpha/firmware/ (Current version of console firmware)

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

Console Enhancements

- I/O Option Firmware changes
  - DS-KGPSA-CA (LP8000) - Firmware Revision 3.93A0
  - DS-KGPSA-DA (LP9002) - Firmware Revision 3.93A0
  - DS-KGPSA-EA (LP9802) - Firmware Revision 1.91X6
  - DS-A5132-AA (LP10000) - Firmware Revision 1.91X6

- New module naming for the following I/O devices:

  DE602-FA => DE602-F*

  DEGXA-SB/TB => DEGXA-S*/T*

- WWIDMGR code change: do not attempt to get a UDID on a Fibre Channel SAN for SCSI sequential access or SCSI media changer type devices (i.e. tape drives, robot arm)

2.2 Show Bios/Run Bios Console Commands

- **show bios** command lists the location of controllers with a BIOS expansion ROM. Not all controllers have a BIOS expansion ROM. **show bios** command will reset the I/O buses after execution.

P00>>> **show bios <hose> (use 0 or 1 for <hose> , default is 0)**

- **run bios** invokes the BIOS expansion ROM on a supported PCI controller (e.g. KZPCC-CE). This command is commonly used to invoke functions or utilities in the expansion ROM. For example, the KZPCC-CE uses the expansion ROM for its configuration utility.

  P00>>> show config (to get controller name)

  P00>>> **run bios [controller name]** e.g. P00>>> run bios pka0

When you enter the **run bios** command, the system first does a bus reset. You are then prompted to type a control sequence (e.g. Ctrl^D) to enter the PCI options' BIOS utility. The control sequence depends on the PCI option. Refer to the documentation supplied with the PCI option for information on running the utility.

2.3 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 V7.2	**June 2006**
Operating System	
OpenVMS	V7.1-2 + required patches
Tru64 Unix	V4.0F
Windows NT	V4.0
Console Firmware	
SRM Version	V7.2
AlphaBIOS Version	V5.71

2.4 Two SRM Console Environment Variables Added in V7.0 Release

Two SRM generic console environment variables [EVs] were added in the V7.0 release to support customers' requests to have non-volatile EVs accessible (read/write) from the Tru64 UNIX operating system.

2.4.1 user_def1 & user_def2

Format:

P00>>> set user_def<1 or 2> "<any character string>"

Examples:

P00>>> set user_def1 "System_Asset_No: 123456 , System_Location: Green-Zone"

Examining SRM console EV's from Tru64 UNIX: (not all EV's are accessible from the OS)

consvar –g user_def1

user_def1 = System_Asset_No: 123456 , System_Location: Green-Zone

Setting and then examining the result of an SRM console EVs from Tru64 UNIX

consvar –s user_def2 "System_Asset_No: 12341234 , System_Location: Red-Zone"

consvar –g user_def2

user_def2 = System_Asset_No: 12341234 , System_Location: Red-Zone

2.5 Known Anomalies

2.5.1 KVM Console Switch Limitations

2.5.1.1 Run Bios Command in Graphics Mode Not Supported

Use of the SRM "run bios" command from the graphics console when connected through the KVM is not supported and will result in unexpected keyboard behavior. As a workaround, use the SRM "run bios" command fro the serial console via serial port connection

2.5.2 Halting OpenVMS with 3D Labs Oxygen VX1 graphics card

If you have an Oxygen VX1 graphics card with the SRM console set to graphics mode, if you halt your OpenVMS system with the halt button, the graphic monitor will not reset. This action will make the system appear as though it is hung, but it will still accept input from the keyboard. Typing "crash <ret>" will still work and get you back to the console prompt.

2.5.3 Reconfiguring fibre channel switches

If a fibre cable is moved from one fibre channel port to another, the console will need to be initialized before devices can be accessed via the new switch.

2.5.4 Messages from KGPSA devices

Messages similar to "retry ct pga0.0.0.2.6" may occur on systems that have KGPSA devices and are informational and do not represent an error. They result from rejected accesses to a busy fibre channel switch which are allowed and thus retried.

2.5.5 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.

2.5.6 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". See the WWIDMGR USERS MANUAL for information about formatting the NVRAM.

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.

A system reset or re-initialization should be done after the operating system is shut down and before the update utility is run.

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
Re-initialize the system	>>>init	
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 of 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' and therefore is 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
```

5 Firmware Change History

5.1 V7.1

Console Enhancements

- I/O Option Firmware changes
  - New Firmware file HD191X1, revision 1.91X1 for LP9802/FCA-2384
  - New Firmware file TD191A1 , revision 1.91A1, for LP10000/FCA-2684
  - New Firmware file KZPDC356, revision 3.56, for KZPDC.

- Increased the Adaptec SCSI support driver number of support targets from 16 to 32
- KGPSA driver changed to do faster retry on PLOGI frames
- Changes to SCSI driver code enhance page and field length checks for SCSI inquiry responses

Bug Fixes and Other

- Fix for long EVs (>128 characters) being copied to another EV and causing a console crash

5.2 V7.0

Console Enhancements

- Two new SRM console environment variables for customer use. The environment variables "user_def1" and "user_def2" take a string argument and accept any characters within double quotes. These environment variables are nonvolatile and are accessible from the Tru64 UNIXoperating system. They are not accessible from OpenVMS.
  Details in section:2.4

- DEFPA – an increase driver setup time in the data link layers before getting the station ID has been included in this release. This increased setup time occurs only when the driver is first initialized or turned on.

Bug Fixes and Other

- KGPSA and WWIDMGR – increase the number of Nx environment variables from 4 to 8 to support up to 8 boot paths for fibre channel storage

- Fix serial emulation for the Smart Array 5300

5.3 V6.9

Console Enhancements

- None

Bug Fixes and Other

- WWIDMGR HANG Symptom

  A patch has been applied to the fibre-channel support to resolve a problem that causes the WWIDMGR utility to hang and never complete. The hang would occur with the first invocation of the WWIDMGR utility. Configurations where this problem has been seen are: EMC Symmetrix storage arrays utilizing Timefinder or

- SRDF business continuance volumes (BCV) that are in an "established" state, and possibly misconfigured or failing volumes. These volumes may respond to an inquiry from the host as being "not ready". The "not ready" state is indicated by an invalid device id that was accepted as valid by the console. The console software has been modified to bypass volumes with invalid device ids and log the device id information to the console error log.

5.4 V6.8

Console Enhancements

- Console recognition of the Asynchronous Transfer Mode [ATM] Adapters – 3X-DAPBA-FB,3X-DAPBA-UB and 3X-DAPCA-FB
- I/O Option Firmware changes
    - New Firmware file KG8392A2 for LP8000
    - New Firmware file FC2392A2 for LP9002
    - New Firmware file FC8181A5 for LP9802

Bug Fixes and Other

- Change to fix a bug in Fibre Channel which prevented booting, re-booting, and the ability to take crash dumps. This problem was often seen as a cb_open failure.

5.5 V6.7

Console Enhancements

- Loadable *Firmware Utility* – support to update option firmware for the LP10000 (FCA-2684) Fibre Channel Card
- Console recognition of the Asynchronous Transfer Mode [ATM] adapter – 3X-DAPBA-FA, 3X-DAPBA-UA, and 3X-DAPCA-UA
- I/O Option Firmware Changes
    - KZPDC option firmware update to version 3.40 (was 2.94)
    - LP10000 firmware included in firmware CD

Bug Fixes and Other

- Gigabit Ethernet driver:
    - Fix output of link state messages during a callback. Console log when OpenVMS is booting is now cleaner.
    - Fix link status after plugging into a live Ethernet network after the system has been powered up. Symptom: Link light would turn not on after plugging in a wire until a boot or init command.