digital™

HSZ50 Array Controller Operating Software

HSOF Version 5.1
Release Notes

Order Number: EK–HSZ50–RN. C01

This document summarizes features and characteristics of the HSZ50 array controller operating software Version 5.1 that are not covered elsewhere in the documentation. These release notes also contain instructions for installing the software.

Software Version: HSOF V5.1

Digital Equipment Corporation
Maynard, Massachusetts

March 1997

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense. Restrictions apply to the use of the local-connection port on this series of controllers; failure to observe these restrictions may result in harmful interference. Always disconnect this port as soon as possible after completing the setup operation. Any changes or modifications made to this equipment may void the user's authority to operate the equipment.

Warning!
This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Achtung!
Dieses ist ein Gerät der Funkstörgrenzwertklasse A. In Wohnbereichen können bei Betrieb dieses Gerätes Rundfunkstörungen auftreten, in welchen Fällen der Benutzer für entsprechende Gegenmaßnahmen verantwortlich ist.

Avertissement!
Cet appareil est un appareil de Classe A. Dans un environnement résidentiel cet appareil peut provoquer des brouillages radioélectriques. Dans ce cas, il peut être demandé à l' utilisateur de prendre les mesures appropriées.

Contents

Introduction

These release notes provide information for the HSZ50 array controller operating software Version 5.1[1] not covered elsewhere in the documentation. This document should be used by individuals responsible for configuring, installing, and using the HSZ50 controllers.

Read this entire document before installing or upgrading the software.

Topics Covered

These release notes cover the following topics:

- Hardware and software supported by HSOF Version 5.1 software
- New features—Modifications in the software that add significant functions that the controller can perform
- Clarifications—Explanations of controller behavior in certain situations
- Operating constraints—Limitations placed on the operation of the controller by the nature of its design
- Avoiding Problem Situations—Information to help you avoid and rec over from unusual controller behavior in certain situations, under specific conditions
- Corrections and additions to the documentation
- Installation instructions
- Identification of the software revision level

Release Package Contents

The Version 5.1 release package consists of the following:

- A cover letter
- The HSZ50 documentation set:
  - *DIGITAL Storageworks HSZ50 Array Controller*
    HSOF Version 5.1
    Configuration Manual
  - *DIGITAL Storageworks HSZ50 Array Controller*
    HSOF Version 5.1
    Service Manual

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[1] The OpenVMS™ SHOW CLUSTER command and the HSOF software SHOW THIS_CONTROLLER command display the version as “V51Z”.

- *DIGITAL Storageworks HSZ50 Array Controller*
  HSOF Version 5.1
  CLI Reference Manual
- *DIGITAL Storageworks Array Controller*
  HSZ50 Array Controller Operating Software HSOF Version 5.1 Release Notes
- *DIGITAL Storageworks Family Array Controller*
  Operating Software (HSOF), Version 5.1 Software Product Description

• A PCMCIA program card containing HSOF software Version 5.1

Intended Audience

This document has been prepared for DIGITAL customers who have purchased HSZ50 array controllers and for DIGITAL Multivendor Customer Services personnel responsible for installing and maintaining systems that include HSZ50 array controllers.

Hardware and Software Support

This section lists the hardware and software compatible with HSOF Version 5.1 software.

Hardware Support

HSOF Version 5.1 Software supports the following revisions for the HSZ50 controllers and associated hardware:

- HSZ50 controller modules, hardware revision A or B
- Version 3 cache module, hardware revision A or B
- BA350–MA controller shelf
- BA350–S*x* device shelf
- BA356–S*x* wide device shelf with 8-bit or 16-bit I/O module (controller operates in 8-bit mode only)
- BA35*x*–HF power supply
- HS35X–BA Single External Cache Battery SBB (with 1 ECB)
- HS35X–BB Dual External Cache Battery SBB (with 2 ECBs)
- HSSIM–AA 32 MB SIMM Pack for Version 3 Cache module upgrades

Operating System Support

HSOF Version 5.1 Software on HSZ50 controllers is supported by the following operating system versions, within the limitations described in *DIGITAL Storageworks HSZ50 Array Controller, HSOF Version 5.1*
Configuration Manual:

- DIGITAL UNIX™ Versions 3.2c, 3.2d, 3.2g, and 4.0b
- DIGITAL UNIX™ Versions 4.0 and 4.0a with the following patches:
  - *V4.0 requires patch OSF 400-114*
  - *V4.0a requires patch OSF 405-034*
- OpenVMS Alpha Version 6.2, 7.0, and 7.1
- Windows NT® Server Version 3.51 and 4.0

Host Adapter Support

The following host adapters are supported by the DIGITAL UNIX operating system for HSZ50 controllers:

Note

Not all host CPUs are adapters. Firmware versions may be listed.

- KZTSA (for DEC 3000™ systems) adapter firmware version A11
- PMAZC (for DEC 3000 systems – requires a DWZZ-series signal converter) adapter firmware version 2.0
- KZMSA (for DEC 7000™ and DEC 10000™ systems and for DIGITAL AlphaServers 8200 and 8400 – requires a DWZZ-series signal converter)
- KZPSA (for DIGITAL AlphaServers 1000/2000/2100/8200/8400/4000/4100) adapter firmware version A10

The following host adapters are supported by the OpenVMS Alpha operating system for HSZ50 controllers:

- KZTSA (for DEC 3000 systems) adapter firmware version A11
- KFTIA (for TurboLaser 8200 embedded SCSI) adapter firmware version 2.46
- PMAZC (for DEC 3000 systems – requires a DWZZ-series signal converter) adapter firmware version 2.1

- KZMSA (for DEC 7000 and DEC 10000 systems – requires a DWZZ-series signal converter)
- KZPAA (for DIGITAL AlphaServers 1000/2000/2100 systems)
- KZPSA (for DIGITAL AlphaServers 1000/2000/2100/8200/8400/4060/4100) adapter firmware version A10

The following host adapters are supported by the Windows NT operating system Version for HSZ50 controllers:

- KZPSA (for DIGITAL AlphaServers 400/1000/2000/2100/4000/4100) adapter firmware version A10

Device Support

HSOF Version 5.1 Software supports the devices listed in Table 1 through Table 4 at the indicated hardware and microcode levels or higher.

Table 1: Supported Disk Drives

Device	Capacity in Gigabytes	Minimum Microcode Version	Minimum Hardware Version
RZ25-VA	0.43	0900	B01
RZ26-VA	1.05	T392	D02
RZ26L-VA/VW[1]	1.05	440C	A01
RZ26N-VA/VW[1]	1.05	446	A01
SWXD3-SF/WF[1]	1.05	446	A01
DS-RZ26N-VZ[1]	1.05	1003	A01
RZ28-VA/VW[1]	2.10	435E	A01
RZ28B-VA	2.10	0003	A01
RZ28D-VA/VW[1]	2.10	0008	A01
SWXD3-SG/WG[1]	2.10	0008	A01
RZ28M-VA/VW[1]	2.10	0466	A01
DS-RZ28M-VZ[1]	2.10	1003	A01
SWXD3-SH/WH[1]	2.10	0466	A01
RZ29B-VA/VW[1]	4.3	0007	B01
SWXD3-SE/WE[1]	4.3	0007	C02/A01
DS-RZ40-VA	9.1	LYGO	A01
RZ74-VA	3.57	T427B	B07

Note:

1. Wide disk drives require a BA356 shelf with an 8-bit I/O module.

Table 2: Supported Tape Drives

Device	Capacity in Gigabytes	Minimum Microcode Version	Minimum Hardware Version	Notes
TL812	960/1920	1.2 robot /CC33 drive	A01	1,2,3,4,5
TL822	5280/10560	1g4F robot /CC33 drive	A01	1,2,3,4,5
TL826	3520/7040	1g4F robot /CC33 drive	A01	1,2,3,4,5
DS-TL893	924/1848T	V2A/5A	A01	1,2,3,4,5
DS-TL894	1.68/3.36T	V1.24	A01	1,2,3,4,5
DS-TL896	6.16/12.32T	V2A/5A	A01	1,2,3,4,5
TZ87-VA	10/20	930A	A01	3,5,6
TZ87N-VA	10/20	930A	A01	3,4,5,6
TZ87-TA	10/20	9514	B02	1,2,3,6
TZ875-NT	50/100	930A	A01	1,3,5,6
TZ875-TA	50/100	930A	A01	1,3,5,6
TZ877-AE/AF	70/140	930A	A01	1,3,5,6
TZ88N-VA	20/40	CC33	A01	3,4,5,6
TZ885-NT/NE	100/200	CC33	A01	1,3,4,5,6
TZ887- NT/NE	140/280	CC33	A01	1,3,4,5,6
DS-TZ89N-VW	35/70	141F	A01	3,4,5,6,7
DS-TZ89N-TA	35/70	141F	A01	1,3,4,5,6

Notes:

Tape devices are not supported on Windows NT™, NOVELL™, Sun Solaris™, HP-UX™ or IBM AIX™ systems.

In the Capacity column, T = Terabytes

1. Requires 0.2 meter SCSI-1 to SCSI-2 transition cable, DIGITAL internal part number 17-03831-01 for DWZZA-AA, and DIGITAL part number 17-04367-01 for SSB DWZZA-VA and DWZZB-VW.
2. Requires DWZZA/DWZZB single-ended to differential SCSI signal converter.
3. Capacity values represent compressed data. The compression factor is device dependent based on individual device algorithms.

4. Cannot read TK50, TK70 or TZ30 formatted tapes.
5. Requires a KZPSA or PMAZC host adapter.
6. Tape device code load is supported.
7. Wide tape devices require a BA356 shelf with an 8-bit I/O module.

Table 3: Supported Solid State Disk Drives

Device	Capacity in Gigabytes	Minimum Microcode Version	Minimum Hardware Version
EZ31-VW	0.134	V064	A01
EZ32-VW	0.268	V064	A01
EZ51R-VA	0.10	V096	D01
EZ54R-VA	0.42	V096	A01
EZ58R-VA	0.85	V109	C01
EZ64-VA	0.475	V064	A01
EZ64-VW	0.475	V070	A01
EZ69-VA	0.950	V064	A01
EZ69-VW	0.950	V070	A01

Note: Do not warm-swap solid-state disk drives. Make sure power to the device shelf is turned off before removing or inserting this device.

Table 4: Supported CD-ROM Readers

Device	Capacity in Gigabytes	Minimum Microcode Version	Minimum Hardware Version
RRD42-VB/VU	0.6	1.1a	A01
RRD43-VA	0.6	0064	A02
RRD44-VA	0.6	3493	A02
RRD45-VA/VU	0.6	1645	A01

Notes:

CD–ROM drives are only supported under the DIGITAL UNIX and OpenVMS operating systems.

Do not warm-swap CD-ROM drives. Make sure power to the device shelf is turned off before removing or inserting this device.

New Features

The following list briefly describes new features that were not available with HSOF Software V5.0. A new feature is defined as a modification to the software that adds functions which can be performed by the controller. For more information on these features, see *DIGITAL Storageworks HSZ50 Array Controller HSOF Version 5.1 Configuration Manual, DIGITAL Storageworks HSZ50 Array Controller HSOF Version 5.1 Service Manual* and the *DIGITAL Storageworks HSZ50 Array Controller HSOF Version 5.1 CLI Reference Manual.*

DILX Enhancement

The HSZ50 controller with HSOF Version 5.1 software has a new version Disk In-Line Exerciser (DILX) that acts on disks configured as single-device, RAIDset, stripeset, mirrorset, stripe-mirrorset or partitioned units.

Ability to Install New Microcode

HSOF Version 5.1 Software allows you to use the controller’s HSUTIL program to install new microcode to the following tape drive:

- TZ89

HSOF Version 5.1 Software also allows you to use the controller’s HSUTIL program to install new microcode to the following solid state disk drives:

- EZ51
- EZ54
- EZ64
- EZ69

See *DIGITAL Storageworks HSZ50 Array Controller HSOF Version 5.1 Service Manual* for instructions on how to install new device microcode.

Set SCSI Speed for Devices

HSOF Version 5.1 software makes it possible for the initiator and target to negotiate a faster data rate than is supported by the cable length. HSOF Version 5.1 software has a new CLI command to set a maximum data transfer rate between the controller and any device.

To set the transfer speed, use the SET command as follows:

SET *device-name* **TRANSFER_RATE_REQUESTED**=*rate*

rate can be one of the following:

`ASYNCHRONOUS`

`10MHZ`

`5MHZ`

The default is 10MHZ.

Clarifications

This section presents clarifications of controller behavior in certain situations.

HSZ50 Recognition by DIGITAL UNIX Versions Prior to V4.0

For the DIGITAL UNIX operating system to recognize the HSZ50 array controller, the "/sys/data/cam_data.c" must be modified. Duplicate the section for the HSZ40 entry. Change HSZ4 to HSZ5. Rebuild the kernel and copy it to the root. Restart the operating system.

Logical Device Event Reports

Under certain circumstances the Port, Target, and LUN fields contained in event reports associated with storageset logical devices, Event Log displays as well as sense data responses, will be set to 255(decimal) instead of the Port, Target, and LUN of the first physical device in the storageset. In addition, when the Port, Target, LUN are set to 255, the Device Type is set to 0 (magnetic disk device), and the Device Product ID and Device Firmware Revision Level fields will be ASCII space filled.

SAVE_CONFIGURATION from Previously Initialized Storagesets

If the storagesets in your configuration were previously initialized with the INITIALIZE container-name SAVE_CONFIGURATION command, saving your configuration to disk, it is not necessary to enter the INITIALIZE command again after you have reconfigured your devices with a new controller.

Using SAVE_CONFIGURATION to Save the Subsystem's Configuration

The controller stores the subsystem's configuration—the storagesets you configured, the qualifiers you set for each, the HSOF patches you've installed, and so on —in its non-volatile memory. This means that, if the controller fails in a nonredundant configuration, you would have to reconfigure the subsystem from scratch. (In a dual-redundant configuration, this information is stored by both controllers, which effectively eliminates the risk of losing it.)

Note

DIGITAL recommends that the SAVE_CONFIGURATION qualifier only be used for nonredundant controller configurations. To save the configuration information for dual-redundant configurations use the SET FAILOVER COPY= command.

If you are operating a nonredundant configuration subsystem, DIGITAL recommends that you save the subsystem's configuration on at least one of the devices or storagesets with the following command:

`INITIALIZE` *`storageset_name`* `SAVE_CONFIGURATION`

When you initialize a device or storageset with the SAVE_CONFIGURATION qualifier , the controller copies the subsystem's configuration to the disk drives. If you use the qualifier for a multi-device storageset, such as a stripeset, the complete information is stored on each device in the storageset. The capacity of a device that is initialized with the SAVE_CONFIGURATION qualifier is reduced by 256KB. This capacity reduction applies to each member of a storageset.

After you initialize a storageset with this qualifier, the controller keeps the copy up to date. For example, every time you add a new storageset, or add a patch to the HSOF software, the controller re-copies the new configuration to all storagesets that were initialized with the SAVE_CONFIGURATION qualifier.

If a controller in a nonredundant-configuration fails, its replacement automatically searches the devices in the subsystem for a saved configuration. If it finds a saved configuration, it transparently loads it into the controller's non-volatile memory and brings the subsystem online. It is not necessary to issue an INITIALIZE command again after you have reconfigured your devices with a new controller.

Considerations for Saving the Subsystem's Configuration

DIGITAL does not recommend initializing all of your storagesets with the SAVE_CONFIGURATION qualifier. Every time you change the subsystem's configuration, the controller writes the new configuration to the storagesets that you initialized with this qualifier. Too many write operations can adversely affect performance.

The SAVE_CONFIGURATION qualifier cannot cross hardware revisions or software versions. SAVE_CONFIGURATION is not available for upgrades of firmware or hardware, and will not perform inter-platform conversions. For example, you cannot use SAVE_CONFIGURATION to upgrade from an HSZ40 to an HSZ50 array controller, or from HSOF V5.0 to V5.1.

Support for Larger Disk Drives

HSOF Version 5.1 software allows you to use disk drives with capacities of up to 120GB. You can use the new partitioning feature to divide large drives into smaller units, or you can configure drives of any size into storagesets, such as RAIDsets or stripesets. The maximum size of a storageset is also 120GB, regardless of the size of the member drives.

Faster Storageset Initialization

The INITIALIZE command was optimized in Version 5.0. The time to initialize a large RAIDset was reduced from several minutes to less than 30 seconds.

Multiple Disk Drive Formatting

Version 5.0 allows you to perform a low-level format on up to seven disk drives at once, as opposed to only one device in previous HSOF software. See the *DIGITAL Storageworks HSZ50 Array Controller HSOF Version 5.1 Service Manual* for instructions on how to format disk drives.

Operating Constraints

This section describes the operating constraints for HSOF Version 5.1 Software. An operating constraint is defined by the parameters within which the controller is designed to operate. Constraints of other system components, such as host adapters, may also be described in this section. Keep these constraints in mind to avoid problems and to obtain the maximum performance available from your controller.

Maintenance Terminal Port Speeds

HSOF Version 5.1 Software supports terminal port connections of 4800, 9600, and 19200 bits per second (bps). Connections speeds at 300, 1200, and 2400 bps are not supported.

Limits on the Total Number of Storagesets

The following limits apply to storagesets configured on a single controller or dual-redundant controller configuration:

- A mirrorset can have a maximum of 6 members.
- A stripeset or RAIDset can have a maximum of 14 members.
- There can be a maximum of 20 mirrorsets or RAIDsets or both.
- There can be a maximum of 30 storagesets including RAIDsets, mirrorsets, and stripesets.
- There can be a maximum of 32 physical device members total for a unit.
- There can be a maximum of 4 partitions per disk or storageset.

Partitioning Not Supported With SCSI Multiple Bus Failover

The SCSI multiple bus failover feature in HSOF Version 5.1 does not support partitioned disks or storagesets. You must delete any existing partitions before enabling multiple bus failover. You cannot create partitions once configured for multiple bus mode.

SCSI Multiple Bus Failover Host Operating System Support

Although the HSZ50 array controller has the capability to support SCSI multiple bus failover, currently, OpenVMS, DIGITAL UNIX, and the Windows NT Server operating systems do not support this feature. Check your operating system's Software Product Description and release notes to determine whether your operating system provides support for this feature.

CFMENU Constraints

CFMENU can only delete one spareset member at a time. You must delete sparesets one at a time by responding Y (yes) to one member, then respond N (no) to the rest of the spareset's members. CFMENU will delete the spareset member.

You can also delete spareset members using the CLI command DELETE SPARESET *disk_name*. While you still have to delete each member individually with separate CLI commands for each one, this is a faster method for deleting multiple spareset members.

CLONE Utility Constraints

The CLONE utility cannot be used with partitioned units.

Low/Failed Battery on Dual-Redundant Configurations with Preferred Paths

If a cache battery goes low or fails for a controller in a dual-redundant configuration and preferred paths are set, that controller's units may go "AVAILABLE" on the "OTHER" controller and INOPERATIVE on it. This causes a MOUNT VERIFY on the units from OpenVMS. You will need to issue the SET unit-name NOPREFERRED_PATH command which will allow the units to go out of MOUNTVERIFY. Later you can reissue the SET unit-name PREFERRED_PATH= command to the affected units.

Avoiding Problem Situations

In certain situations, you may experience unusual controller behavior. This section presents information to help you avoid such situations and to recover from them if they occur.

Use of the SET CACHE_UPS Feature

When the SET CACHE_UPS feature is enabled, the controller ignores the condition of the writeback cache batteries because an uninterruptable power supply (UPS) is assumed to be in use to maintain power to the writeback cache module in the event of a power failure. Note that HSOF software does not have the capability to monitor the remaining capacity of a UPS. There are many variables in a UPS configuration; some configurations may put data at risk if the UPS is exhausted. For example, if UPS power is lost to the entire host/storage system without warning, writeback cache data is maintained by the cache batteries only.

WARNING

Use of this feature without a UPS could result in loss of data.

Device Adds, Moves, and Changes

The controller maintains configuration maps of device types and locations. It uses the location maps to communicate with devices. If you add, move, or change devices while the controller is powered off and without changing the controller configuration first, the controller is not able to work with the changed devices when it returns to service.

Tape Drive Firmware Revision

If you are not using HSUTIL to install new tape firmware, do the following: Before installing a new version of tape drive firmware, delete the tape drive completely from the controller configuration. This prevents interrupts to the drive during the code loading operation. You can add the tape drive back to the configuration after the firmware installation is complete.

Running CONFIG or CFMENU Utilities During Backup or Copy Operations

Do not run the CONFIG or CFMENU utilities during a tape backup or copy operation.

Documentation Additions and Corrections

Following are additions and corrections to *DIGITAL Storageworks HSZ50 Array Controller HSOF Version 5.1 Configuration Manual, DIGITAL Storageworks HSZ50 Array Controller HSOF Version 5.1 Service Manual,* and *DIGITAL Storageworks HSZ50 Array Controller HSOF Version 5.1 CLI Reference Manual.*

(none identified)

Upgrading Array Controller software

This section describes how to upgrade controller software using the program card in both the single and dual-redundant controller configurations. An HSZ operating software upgrade causes a brief interruption in service to attached devices.

CAUTION

If JBOD disks that were initialized on an HSZ40 controller running HSOF Version 27Z using the SAVE_CONFIG option have been moved onto your HSZ50 controller subsystem, see Appendix A to these release notes BEFORE upgrading your HSZ50 controller to HSOF V5.1.

Program card upgrade (single controller configuration)

Use the following procedure to upgrade controller software in a single controller configuration.

1. Halt all I/O activity to the controller using the appropriate procedures for your operating system.
2. Connect a maintenance terminal to the controller.

3. Take the controller out of service:

```
HSZ50> SHUTDOWN THIS_CONTROLLER
```

To ensure the controller has shutdown cleanly, check for the following indications on the controller's OCP:

– *The Reset (//) light is lit continuously.*

– *Port lights 1, 2, and 3 are also lit continuously.*

Caution

Failure to shut down the controller in this step may result in problems with RAIDsets and cache when the controller is reset.

4. Unsnap and remove the program card ESD cover.
5. While pushing and holding down the operator control panel (OCP) Reset (//) button on the controller, eject and remove the program card.
6. While pushing and holding down the OCP Reset (//) button on the controller, insert the new program card.
7. Release the Reset (//) button to initialize the controller.

   After restart, the controller will not allow you to enter any CLI commands for approximately 60 seconds. This delay does not affect unit availability to the host. The delay provides time for the controller internal operations to complete before user commands can change configuration.

   When the controller initializes correctly, the green reset indicator will flash once every second.
8. Replace the ESD cover over the program card by pushing the two plastic push pins on each side of the shield.
9. Resume I/O activity to the controller.

Program card upgrade (dual-redundant configuration)

In a dual-redundant configuration, the software in both controllers must be upgraded simultaneously. Use the following procedure to upgrade controller software in a dual-redundant configuration:

1. Follow steps 1-4 of the single controller configuration procedure for each controller.
2. Follow steps 5-7 of the single controller configuration procedure for both controllers simultaneously.

The two controllers will reinitialize concurrently and will synchronize with each other. The timing of this procedure is not critical, however the program cards should be removed and inserted at approximately the same time (within a few seconds).

3. Replace the ESD covers over both program cards.

4. Resume I/O activity to the controllers.

Identifying Your HSOF Software Revision Level

You can identify HSOF Version 5.1 Software by entering the SHOW THIS_CONTROLLER command at the CLI prompt. The resulting display lists the software revision level as version "V51Z".

Order Numbers

The following table lists order numbers for controller options and preconfigured subsystems.

HSZ50-AF	StorageWorks HSZ50 Array Controller with a 32MB cache module, 32 SCSI-2 device connections, 1 external cache battery in a SBB, one 2-meter ECB cable
HSZ50-AH	StorageWorks HSZ50 Array Controller with a 64 MB cache module, 32 SCSI-2 device connections, 1 external cache battery in a SBB, one 2-meter ECB cable
HSZ50-AJ	StorageWorks HSZ50 Array Controller with a 128 MB cache module, 32 SCSI-2 device connections, 1 external cache battery in a SBB, one 2-meter ECB cable
HSZ52-AF	Two StorageWorks HSZ50 Array Controllers with 32 MB cache modules, 64 SCSI-2 device connections, 2 external cache batteries in a SBB, two 2-meter ECB cables
HSZ52-AH	Two StorageWorks HSZ50 Array Controllers with 64 MB cache modules, 64 SCSI-2 device connections, 2 external cache batteries in a SBB, two 2-meter ECB cables
HSZ52-AJ	Two StorageWorks HSZ50 Array Controllers with 128 MB cache modules, 64 SCSI-2 device connections, 2 external cache batteries in a SBB, two 2-meter ECB cables
HSZ54-AJ	Four StorageWorks HSZ50 Array Controllers with 128 MB cache modules, 144/168 SCSI-2 device connections, 4 external cache batteries in 2 SBBs, four 2-meter ECB cables
HSSIM-AA	One 32 MB SIMM pack for cache module upgrades
HS35X-BA	One replacement external cache battery (ECB) in a SBB.
HS35X-BB	Two replacement external cache batteries in a SBB.

Note: One prerequisite QB-5CJAA-SA software kit is required for EACH controller ordered (two kits for HSZ52 configurations, four kits for HSZ54 configurations).

Appendix A

Possible problem with disks initialized with SAVE_CONFIG under HSOF V2.7 on HSZ40/20/SWXRC Controller

If you initialized a JBOD disk using the SAVE_CONFIGURATION switch on an HSZ40 controller which was running HSOF V2.7, and then moved the disk to your HSZ50 controller subsystem, you should read this appendix. There is a remote possibility that some disks attached to HSZ40/20/SWXRC controllers and the solution products containing them (RA410, SC4200/4600, etc.) may have a problem in the structure of the on-disk file system. Systems which may be affected are those which:

1. Use disks in "JBOD" configuration (that is, disks which are not members of controller-based storagesets such as RAIDsets and mirrorsets)
2. Initialized disks under HSOF V27Z software using the SAVE_CONFIG command AND rebooted the controller BEFORE initializing the disk under the operating system.

Note that the problem does not occur if the file system was built on the disk before the controller was rebooted. Also, the problem does not occur when disks are initialized using SAVE_CONFIG and the platform operating system under HSOF V30Z, V31Z, V50Z, or V51Z.

If a disk built as described above is moved to an HSZ50 controller running HSOF V5.0 or V5.1, problems may occur.

Note that all 2GB and 4GB drives on Windows NT platforms are NOT exposed to this potential problem. Drives on other platforms meeting the above criteria have a small risk of exposure; see the "How to Detect" section of this appendix for procedures to determine whether a disk is exposed.

When a disk being used in a JBOD configuration is initialized with SAVE_CONFIG, the last 500 blocks on the disk are allocated by the controller to store the configuration data.

If the controller running HSOF V27Z software is rebooted BEFORE the disk is initialized by the platform operating system, the controller fails to remember the reduction in disk size and reports the unreduced disk capacity to the operating system. When the operating system subsequently builds the file system, the blocks which SAVE_CONFIG will use to update the configuration data are also included in the file system disk space, creating a potential for both the operating system and the controller to write to the last 500 blocks on disk.

If the file system subsequently overwrites configuration data, the controller recognizes that the data is invalid config data and ignores it. In this case, controller parameters must be manually re-entered when SAVE_CONFIG tries to restore the configuration (unless another drive contains valid config data).

Various configuration events will cause the controller to write the config data to the SAVE_CONFIG area. If the controller overwrites file system data, the results vary depending on the platform operating system and the application.

If a disk which has this problem is moved to a controller running HSOF V51Z software before the differing file system and controller view of the disk capacity is resolved, and the file system tries to access the SAVE_CONFIG area, the controller returns an error to the operating system. The action that the operating system will take upon receiving this error will vary depending on the platform, but may include rendering the entire file system or database inaccessible.

How to Detect Whether You Have This Problem

Windows NT platforms

As previously noted, 2GB and 4GB drives on Windows NT platforms are not exposed to the problem described in this appendix. This problem affects 1GB single-disks units in JBOD configuration with SAVE_CONFIG data stored on them. If you are not using 1GB JBOD disk units with SAVE_CONFIG data saved on them, do not proceed any further. Your system is NOT at risk.

Use the following procedure to check a JBOD 1GB drive with SAVE_CONFIG data saved on it to determine whether it is exposed:

a. Shut down the host computer and wait until shut down is complete

b. Restart the HSZ50 controller(s) by pressing the heart-beat button(s) (Green reset button)

c. Wait a minute, then start the host computer

d. After the host reboots, start up ’Disk Administrator.’

e. Determine which drive on ’Disk Admin’ corresponds to the 1GB JBOD disk to be checked.

f. Check if the JBOD has a 1MB or greater unpartitioned space at the end of disk.

g. If ’f’ is true, the disk does NOT have the problem described in this appendix. Make sure that you never use the last 1MB space, leave it unpartitioned.

h. If ’f’ is false, there is no unpartitioned space at the end of the disk, then the very last 196 Blocks (100KB) on the drive are at risk for the problem described in this appendix. See the "Solution" section below for the recovery procedure.

Novell NetWare platforms

The problem described in this appendix affects single-disks units in JBOD configuration with SAVE_CONFIG data stored on them. If you are not using JBOD disk units with SAVE_CONFIG data saved on them, do not proceed any further. Your system is NOT at risk.

NetWare reserves 2% of the space at the end of each disk for bad block replacement. 500 blocks (256KB) at the end of this 2% space will be exposed to the problem described in this appendix. A 2% space is larger than is generally needed for replacing bad blocks. For example, reserve space on a 4GB, 2GB, and 1GB disk is 80MB, 40MB, and 20MB respectively. The probability of a bad block being replaced in the last 256KB of this reserve space is very small; however, it is possible. Use the following procedure to check a disk in JBOD configuration to determine whether it is exposed:

a. NWSERVER> load install

b. Open "disk options"

c. Open "Modify disk partition and Hot Fix"

d. Select disk drive

e. Choose "Change Hot Fix"

f. Record "Redirection Area", this is the BadBlock size.

g. Calculate 2% of the disk

h. If BadBlock size is less than (2% - 256KB) then the disk is NOT affected.

i. If the BadBlock size is greater than (2% - 256KB) then the disk IS at risk. See the "Solution" section below for the recovery procedure.

Sun Solaris and SunOS platforms

The problem described in this appendix affects single-disks units in JBOD configuration with SAVE_CONFIG data stored on them. If you are not using JBOD disk units with SAVE_CONFIG data saved on them, do not proceed any further. Your system is NOT at risk.

If you followed the installation guide, you are not at risk. This is due to the fact that the default partition layout reserves the last two cylinders for diagnostic purposes. The 500 blocks in question will always reside within those two diagnostic cylinders.

If you changed the default partition layout, AND allocated the two diagnostic cylinders to a partition, you may be at risk.

If disks in your system are at risk of this problem, use the following procedure to check a disk in JBOD configuration to determine whether it is exposed:

a. Use the GUI to display the number of blocks on the unit.

   Do this by selecting the LUN in question, and then choosing LUN parameters from the pull-down menu. Write down this number.

b. Use the TIP command (or an RS-232 terminal) to connect to the controller CLI. If you have problems or questions, this command is documented in the installation guide.

c. Use the CLI command SHOW <*unitname*>, substituting the actual name of the unit in question for <*unitname*>.

d. If the GUI and the CLI report different sizes for the same unit, you are at risk for the problem. See the "Solution" section below for the recovery procedure.

OpenVMS platforms

The problem described in this appendix affects single-disks units in JBOD configuration with SAVE_CONFIG data stored on them. If you have not moved JBOD disk units with SAVE_CONFIG data saved on them to the HSZ50 controller being upgraded to V5.1, do not proceed any further. Your system is NOT at risk.

If disks in your system are at risk of this problem, use the following procedure to check a disk in JBOD configuration to determine whether it is exposed:

a. At the controller prompt, type SHOW DISKnnn (where nnn is the JBOD disk in question).

b. Look for "Configuration being backed up on this container" message.

c. Record the block size capacity displayed by the controller.

d. From the OpenVMS prompt on one of the hosts, mount the disk in question and type the command:

```
$ show device/full dka200:
```

e. Compare the total block size obtained from the "show device" command with the block size capacity obtained in step 'c.'

f. If the reported sizes are different, this disk is at risk for the problem. See the "Solution" section below for the recovery procedure.

DIGITAL UNIX platforms

The problem described in this appendix affects single-disks units in JBOD configuration with SAVE_CONFIG data stored on them. If you are not using JBOD disk units with SAVE_CONFIG data saved on them, do not proceed any further. Your system is NOT at risk.

If disks in your system are at risk of this problem, use the following procedure to check a disk in JBOD configuration to determine whether it is exposed:

a. At the controller prompt, type SHOW DISK*nnn* (where nnn is the JBOD disk in question).

b. Look for "Configuration being backed up on this container" message.

c. Record the block size capacity displayed by the controller.

d. From the DIGITAL UNIX on one of the hosts, type the following commands (rrza18c is used in the following example as the device in question):

```
# disklabel -rw /dev/rrza18c HSZ40
```

```
# disklabel -r /dev/rrza18c  # /dev/rrza18c:
```

e. Compare the sectors/unit output from disklabel command with the block size capacity obtained in step 'c.'

f. If the reported sizes are different, this disk is at risk for the problem. See the "Solution" section below for the recovery procedure.

AIX platforms

The problem described in this appendix affects single-disks units in JBOD configuration with SAVE_CONFIG data stored on them. If you are not using JBOD disk units with SAVE_CONFIG data saved on them, do not proceed any further. Your system is NOT at risk.

If disks in your system are at risk of this problem, use the following procedure to check a disk in JBOD configuration to determine whether it is exposed:

AIX 4.1.4:

a. Sum the raw device as shown in the following command:

```
sum -r /dev/rhdiskN
```

b. If this operation results in a read error as shown below, the disk is at risk for the problem. See the "Solution" section below for the recovery procedure.

```
sum: read error on /dev/rhdiskN
```

AIX 3.2.5:

Disks on systems which have the risk factors described above should be regarded as at risk for the problem described in this appendix.

HP-UX platforms

The problem described in this appendix affects single-disks units in JBOD configuration with SAVE_CONFIG data stored on them. If you are not using JBOD disk units with SAVE_CONFIG data saved on them, do not proceed any further. Your system is NOT at risk.

Disks on systems which have the risk factors described above should be regarded as at risk for the problem described in this appendix.

Solution

1. If you are using SAVE_CONFIG to initialize JBOD disks under HSOF V27Z, be sure to initialize the disk with the platform file system BEFORE rebooting the controller.
2. If you have the risk factors for the problem as described in the SYMPTOM and DETECTION sections above, use the steps below to resolve the discrepancy in controller/operating system views of the disk at the earliest opportunity.

DIGITAL recommends that the recovery process described below be performed BEFORE moving the disk to a controller running V5.1. Any files which may have been written in the SAVE_CONFIG area will be accessible to the operating system after the restore process; however, any such files are suspect and should be carefully examined to ensure that the data they contain is correct, or restored from a previous backup.

a. Back up the unit that contains SAVE_CONFIG information.

b. Unmount the file system(s) contained on that unit.

c. Delete the unit from the configuration in the controller.

d. Initialize the container from the controller without SAVE_CONFIG.

e. Add the unit back into the configuration.

f. Initialize and restore unit from backup.