digital™

HSJ50 Array Controller Operating Software

HSOF Version 5.1
Release Notes

Order Number: EK–HSJ50–RN. B01

This document summarizes features and characteristics of the HSJ50 array controller operating software Version 5.1 that are not covered elsewhere in the documentation.

Note

These release notes contain instructions for upgrading array controller software that are not included in any other documentation. Keep these release notes near your StorageWorks subsystem.

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

Appendix A

Introduction

These release notes provide information for the HSJ50 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 HSJ50 array controllers.

Read this entire document before installing 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 functionality to the controller
- 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 recover 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 HSJ50 documentation set:
  - *DIGITAL Storageworks HSJ50 Array Controller*
    HSOF Version 5.1
    Configuration Manual
  - *DIGITAL Storageworks HSJ50 Array Controller*
    HSOF Version 5.1
    Service Manual

---

[1] The OpenVMS™ SHOW CLUSTER command and the HSOF software SHOW THIS_CONTROLLER command display the version as "V51J".

- *DIGITAL Storageworks HSJ50 and HSD50 Array Controllers*
  HSOF Version 5.1
  CLI Reference Manual
- *DIGITAL Storageworks Array Controller*
  HSJ50 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 Version 5.1 software

Intended Audience

This document has been prepared for DIGITAL customers who have purchased HSJ50 array controllers and for DIGITAL Multivendor Customer Services personnel responsible for installing and maintaining systems that include HSJ50 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 HSJ50 controllers and associated hardware:

- HSJ50 controller module, hardware revision A
- 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 HSJ50 controllers is supported by the following operating system versions, within the limitations described in *DIGITAL Storageworks HSJ50 Array Controller HSOF Version 5.1 Configuration Manual*:

- OpenVMS Alpha™ Version 6.1, 6.2, 7.0, or 7.1
- OpenVMS VAX™ Version 5.5–2, 6.1, 6.2, 7.0, or 7.1

Host Adapter Support

The following adapters have been tested and are supported in this release.

- CIXCD–AB
  CIXCD–AC (both for XMI-based systems)
- CIBCA–B*x* (for BI-based systems)[1]
- CIPCA (for PCI-based systems)

[1] Supersedes CIBCA-A, which is no longer supported

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	B01
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
TKZ60-EC	.440	111	B01	7
TKZ61	4.4	0611	A01	1
TKZ62	24.0	0616	A01	1,3
TKZ63	2.4	0616	A01	1,3
2T-TKZ64	144	0616	A01	1,3
TL810	480/960	1.10 robot /v40 drive	A01	1,2,3
TL812	960/1920	1.2 robot /CC33 drive	A01	1,2,3,4
TL820, Rev A01	2640/5280	1d3M robot /v40	L1	1,2,3
TL822	5280/10560	1g4F robot /CC33 drive	A01	1,2,3,4
TL826	3520/7040	1g4F robot /CC33 drive	A01	1,2,3,4
DS-TL893	9.24/18.48 T	V2A/5A	A01	1,2,3,4
DS-TL894	1.69/3.36T	V1.24	A01	1,2,3,4
DS-TL896	6.16/12.32 T	V2A/5A	A01	1,2,3,4
TLZ06-VA	4	0491	A04	3
TLZ07-VA	8	04Aq	AX01	3
TLZ09-VA	4/8	v165		
TLZ6L-VA	16	0491	A01	3,7
TLZ7L-VA	8	4BQE	A02	3,7
TLZ9L-VA	32	A020	AX01	3,7
TSZ07-AA	0.140	0309	A01	1
TZ86-VA	6	430B	A02	5
TZ87-VA	10/20	930A	A01	3,5
TZ87N-VA	10/20	930A	A01	3,4,5
TZ87-TA	10/20	9514	B02	1,2,3,5
TZ87N-TA	10/20	930A	A01	1,2,3,5
TZ867-AE/AF	42	430B	A01	1,3,5

Device	Capacity in Gigabytes	Minimum Microcode Version	Minimum Hardware Version	Notes
TZ875-NE	50/100	930A	A01	1,3,5
TZ875-NT	50/100	930A	A01	1,3,5
TZ875-AE/AF	50/100	930A	A01	1,3,5
TZ877-AE/AF	70/140	930A	A01	1,3,5
TZ877-NE	70/140	930A	A01	1,3,5
TZ88N-VA/TA	20/40	CC33	A01	3,4,5
TZ885-NT	100/200	CC33	A01	1,3,4,5
TZ887-NE/NT	140/280	CC33	A01	1,4,5
DS-TZ89N-VW	35/70	141F	A01	3,4,5,6
DS-TZ89N-TA	35/70	141F	A01	1,4,5

Notes:

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. Tape device code load is supported.
6. Wide tape devices require a BA356 shelf with an 8-bit I/O module.
7. Loaders operate in sequential mode only.

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 Drives

Device	Capacity in Gigabytes	Minimum Microcode Version	Minimum Hardware Version	Notes
RRD42-VB/VU	0.6	1.1a	A01	1
RRD43-VA	0.6	0064	A02	1
RRD44-VA	0.6	3493	A02	1
RRD45-VA/VU	0.6	1645	A01	1
RWZ52-VA	0.6 per side	3403	A01	1
RWZ53-VA	2.3/2.6	1.35	AX02	1
RW524	19	1.37 juke box /3404 drive	A01	2
RW525	19	2.17 juke box /3404 drive	A01	2
RW530	38	6.15 juke box /3404 drive	A01	2
RW531	38	0.35 juke box /3404 drive	A01	2
RW532	76	0.35 juke box /3404 drive	A01	2
RW534	104	5.20 juke box /3404 drive	A01	2
RW536	170	5.20 juke box 3404 drive	A01	2,3
RW546	36.8	1.36 juke box /1.35 drive	A01	2,3
RW551	64	1.36 juke box /1.35 drive	A01	2,3
RW552	147	1.36 juke box /1.35 drive	A01	2,3
RW555	294	1.36 juke box /1.35 drive	A01	2,3
RW557	547	1.36 juke box /1.35 drive	A01	2,3

Notes:

1. Do not warm swap this device. Make sure that the device shelf power is off when inserting or removing this device.
2. Requires 0.2 meter SCSI-1 to SCSI-2 transition cable, DIGITAL internal part number 17-03831-01.
3. To add this device to your configuration you must do the following: SET *optical container-name* PTL TRANSFER_RATE_REQUESTED=ASYNC

New Features

The following list briefly describes HSJ50 features that were not available with HSOF V5.0. A new feature is defined as a modification to the software that adds functionality to the controller. For more information on these features, see *DIGITAL Storageworks HSJ50 Array Controller HSOF Version 5.1 Configuration Manual*, *DIGITAL Storageworks HSJ50 Array Controller HSOF Version 5.1 Service Manual* and *DIGITAL Storageworks HSJ50 and HSD50 Array Controllers HSOF Version 5.1 CLI Reference Manual.*

DILX Enhancement

The HSJ50 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 HSJ50 Array Controller HSOF Version 5.1 Service Manual* for instructions on how to install new device microcode.

Clarifications

This section presents clarifications of controller behavior in certain situations.

Only One Qualifier per CLI Command Recommended

Certain qualifiers to CLI commands are incompatible. To avoid problems in this area, only specify one qualifier per CLI command. For example, to set both WRITEBACK_CACHE and NORUN on unit D102, use the following two commands:

```
CLI> SET D102 WRITEBACK_CACHE
CLI> SET D102 NORUN
```

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 HSJ40 to an HSJ50 array controller, or from HSOF V5.0 to V5.1.

Operating Constraints

This section describes the operating constraints for HSOF Version 5.1 software. An operating constraint is a limitation placed on the operation of the controller by the nature of its design. Keep these constraints in mind to avoid problems and to help you to get the maximum performance from your controller.

Maintenance Terminal Port Speeds

HSOF Version 5.1 software supports terminal port connections at 4800, 9600, and 19200 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 configurations:

- 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 and/or RAIDsets.

- There can be a maximum of 30 storagesets (RAIDsets, mirrorsets, and/or stripesets).
- There can be no more than 32 physical device members total for a unit.
- There can be a maximum of 4 partitions per disk or storageset.

Initialization Devices

Controller-attached devices may serve as initialization devices for VAX 7000 and VAX 10000 systems, provided the VAX 7000/10000 console code is at Version 4.0 or higher.

CFMENU Constraints

CFMENU can only delete one spareset member at a time. You must delete sparesets one at a time by responding Y to one member, then respond N 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 an external 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 MOUNT VERIFY. 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 to 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 and uses those maps for communicating 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 do not use HSUTIL to install new tape firmware, you must 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 re-add the tape drive after the firmware installation is complete.

Set Tape Density When Adding Drive and Changing Cartridge Types

When first adding a tape drive to the controller configuration, and when changing to a different type of tape cartridge, be sure to set the tape density from the controller before using the OpenVMS INITIALIZE command. Use a command similar to the following to set the tape density for a tape unit.

```
CLI> SET unit-number DEFAULT_FORMAT=format
```

If you do not set the tape density, the tape may be written at a density other than the one desired. In dual-redundant controller configurations, set the tape density from the controller on which the tape drive is mounted.

Note

DIGITAL recommends the use of the SET tape-unit-number DEFAULT_FORMAT=HOST_SELECTED command with only TSZ07 tape drive. Set the switch to HOST_SELECTED to allow the host to set the tape format.

Running CONFIG or CFMENU Utilities During Backup Operations

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

Changing Host Adapter Types

If for some reason you change your host adapter and maintain the same node number, you MUST reinitialize your controller(s).

Documentation Additions and Corrections

Following are additions and corrections to *DIGITAL Storageworks HSJ50 Array Controller HSOF Version 5.1 Configuration Manual, DIGITAL Storageworks HSJ50 Array Controller HSOF Version 5.1 Service Manual,* and *DIGITAL Storageworks HSJ50 and HSD50 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 HSJ 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 HSJ50 controller subsystem, see Appendix A to these release notes BEFORE upgrading your HSJ50 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:

   ```
   HSJ50> 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 inproblems 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 "V51J."

Order Numbers

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

HSJ50-AF	StorageWorks HSJ50 Array Controller with a 32 MB cache module, 36/42 SCSI-2 device connections, 1 external cache battery in a SBB, one 2-meter ECB cable
HSJ50-AH	StorageWorks HSJ50 Array Controller with a 64 MB cache module, 36/42 SCSI-2 device connections, 1 external cache battery in a SBB, one 2-meter ECB cable
HSJ50-AJ	StorageWorks HSJ50 Array Controller with a 128 MB cache module, 36/42 device connections, 1 external cache battery in a SBB, one 2-meter ECB cable
HSJ52-AF	Two StorageWorks HSJ50Array Controllers with 32 MB cache modules, 72/84 SCSI-2 device connections, 2 external cache batteries in a SBB, two 2-meter ECB cables
HSJ52-AH	Two StorageWorks HSJ50 Array Controllers with 64 MB cache modules, 72/84 SCSI-2 device connections, 2 external cache batteries in a SBB, two 2-meter ECB cables
HSJ52-AJ	Two StorageWorks HSJ50 Array Controllers with 128 MB cache modules, 72/84 SCSI-2 device connections, 2 external cache batteries in a SBB, two 2-meter ECB cables
HSJ54-AJ	Four StorageWorks HSJ50 Array Controllers with 128 MB cache modules, 144/168 SCSI-2 device connections, 4 external cache batteries in two SBBs, four 2-meter ECB cables
HSSIM-AA	32 MB SIMM pack for cache memory upgrades
HS35X-BA	One replacement external cache battery in a SBB
HS35X-BB	Two replacement external cache batteries in a SBB

Note: One prerequisite QB-5C4AA-SA software kit is required for each controller ordered (two kits for HSJ52 configurations, four kits for HSJ54 configurations).

Appendix A

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

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 HSJ50 controller, you should read this appendix.

There is a remote possibility that some disks attached to HSZ40/20/SWXRC 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 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 HSJ50 controller running HSOF V5.0 or V5.1, problems may occur.

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 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 V5.1 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 if You Have This Problem

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 HSJ50 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.

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.