StorageWorks™ Array Controller

HSJ50 Array Controller Operating Software Version 5.0 Release Notes

Order Number: EK–HSJ50–RN. A01

This document summarizes features and characteristics of the HSJ50 array controller operating software Version 5.0 that are not covered elsewhere in the documentation. These release notes also contain instructions for installing the software.

Digital Equipment Corporation
Maynard, Massachusetts

July, 1996

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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.

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Contents

Introduction

These release notes provide information for the HSJ50 array controller operating software Version 5.0[1] not covered elsewhere in the documentation. This document should be used by individuals responsible for configuring, installing, and using the HSJ50 controllers.

Read this entire document before installing the software.

Topics Covered

These release notes cover the following topics:

- Hardware and software supported by HSOF Software Version 5.0
- 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 5.0 release package consists of the following:

- A cover letter
- The HSJ50 documentation set:
  – *Configuring your StorageWorks subsystem, HSJ50 Array Controllers*
  – *Servicing your StorageWorks subsystem, HSJ50 Array Controllers*
  – *CLI Reference Manual*
  – *HSJ50 Array Controller Operating Software Version 5.0 Release Notes*
  – *HSJ50 Array Controller Operating Software (HSOF), Version 5.0 Software Product Description*
- A PCMCIA program card containing HSOF software Version 5.0

[1] The OpenVMS™ SHOW CLUSTER command and the HSOF software SHOW THIS_CONTROLLER command display the version as “V50J”.

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 Software Version 5.0.

Hardware Support

HSOF Software Version 5.0 supports the following revisions or higher for the HSJ50 controllers and associated hardware:

- HSJ50 controller module
- Version 3 cache module, hardware revision A
- BA350–MA controller shelf
- BA350–S*x* device shelf
- BA356–S*x* wide device shelf with 8-bit I/O module (BA35X-MG)
- 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 Software Version 5.0 on HSJ50 controllers is supported by the following operating system versions, within the limitations described in *Configuring your StorageWorks subsystem, HSJ50 Array Controllers*:

- OpenVMS Alpha™ Version 6.1 or higher
- OpenVMS VAX™ Version 5.5–2 or higher

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)

Device Support

HSOF Software Version 5.0 supports the devices listed in Table 1 through Table 4 at the indicated hardware and microcode levels or higher.

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

Table 1: Supported Disk Devices

Device	Capacity in Gigabytes	Minimum Microcode Version	Minimum Hardware Version
RZ25-VA	0.426	0900	B01
RZ26-VA	1.05	T392	D02
RZ26L-VA, VW	1.05	440C	A01
RZ26N-VA, VW	1.05	446	A01
RZ28-VA, VW	2.1	435E	B01
RZ28B-VA	2.1	0003	A01
RZ28D-VA, VW	2.1	0008	A01
RZ28M-VA, VW	2.1	466	A01
RZ29B-VA, VW	4.3	0007	B01
RZ74-VA	3.57	T427B	B07
SWXD3-SF	1.05	446	A01
SWXD3-WF	1.05	446	A01
SWXD3-SH	2.1	446	A01
SWD3-WH	2.1	446	A01
SWXD3-SG	2.1	0008	A01
SWXD3-WG	2.1	0008	A01
SWXDE-SE	4.3	0007	C02
SWXD3-WE	4.3	0007	A01

Note: VW models require BA356 wide device shelves and an 8-bit I/O module

Table 2: Supported CDROM Readers and Optical Disk Drives

Device	Capacity in Gigabytes	Minimum Microcode Version	Minimum Hardware Version	Comments
RRD42-VB, VU	0.6	1.1a	A01	Note 3
RRD43-VA	0.6	0064	A02	Note 3
RRD44-VA	0.6	3493	A02	Note 3
RRD45-VA, VU	0.6	1645	A01	Note 3
RWZ52-VA	0.6 per side	3404	A01	Note 1, 3
RW524	19	1.37	A01	Notes 2, 3,5
RW525	19	2.17	A01	Note 2, 3, 5
RW530	38	6.15	A01	Notes 2, 3, 5
RW531	38	0.35	A01	Notes 2, 3, 5
RW532	76	0.35	A01	Notes 2, 3, 5
RW534	104	5.20	A01	Notes 2, 3, 5
RW536	170	5.20	A01	Notes 2, 3, 4, 5

Note 1: Device is a magneto-optical disk

Note 2: Device is an optical juke box

Note 3: Do not warm swap this device. Make sure that the device shelf power is off when inserting or removing a magneto-optical disk device.

Note 4: To add this device to your configuration you must do the following:

SET OPTICAL container-name *P T L* TRANSFER_RATE_REQUESTED=ASYNC

Note 5: Drive firmware revision for all jukeboxes is 3404.

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	0.1069	V096	D01
EZ54R-VA	0.4277	V096	A01
EZ58R-VA	0.8553	V109	C01
EZ64-VA	0.475	V064	A01
EZ69-VA	0.950	V064	A01

Do not warm swap solid state disk devices. Make sure that the device shelf power is off when inserting or removing a solid state disk device.

Table 4: Supported Tape Devices

Device	Capacity in Gigabytes	Minimum Microcode Version	Minimum Hardware Version	Comments
TKZ60-EC	0.440	111	B01	Note 1
TKZ61	6	0611	A01	Note 1, 4
TKZ62	24 (Compressed)	0611	A01	Note 1, 4
TL810	1000 (Compressed)	1.10 robot/V40 drive	A01	Notes 1, 2
TL812	1040/2080	1.20 robot/CC33 drive	A01	Notes 1, 2
TL820 (Revision A01)	5200 (Compressed)	1d3M robot/V40 drive	L1	Notes 1, 2
TL822	5080/10560	1g4F robot/CC33	A01	Notes 1, 2
TL826	3520/7040	1g4F robot/CC33 drive	A01	Notes 1, 2
TLZ06-VA	4 (Compressed)	0491	A04	
TLZ07-VA	8 (Compressed)	04AQ	AX01	
TLZ09-VA	4/8	165	A01	
TLZ6L-VA	16 (Compressed)	0491	A01	Note 4
TLZ7L-VA	8 (Compressed)	4BQE	A02	Note 4
TSZ07-AA	0.140	0309	A01	Note 1
TZ86-VA	6	430B	A02	
TZ87-VA	20 (Compressed)	930A	A01	
TZ87N-VA	20 (Compressed)	930A	A01	Note 3
TZ87-TA	20 (Compressed)	9514	B02	Notes 1, 2
TZ867-AE, AF	42	430B	A01	Note 1
TZ875-NT	100 (Compressed)	930A	A01	Note 1
TZ875-TA	100 (Compressed)	930A	A01	Note 1
TZ877-AE, AF	140	930A	A01	Note 1
TZ88N-VA	20/40	CC33	A01	Note 3
TZ885-NT	100/200	CC33	A01	Notes 1, 3
TZ885-TA	100/200	CC33	A01	Notes 1, 3
TZ887-AE	140/280	CC33	A01	Notes 1, 3

Note 1: Requires 0.2 meter SCSI–1 to SCSI–2 transition cable (Digital internal part number 17–03831–01 for table top DWZZA–AA, and Digital part number 17–04367–01 for SBB DWZZA–VA and DWZZB–VW).

Note 2: Requires DWZZA/DWZZB single-ended to differential SCSI signal converter.

Note 3: Cannot read TK50, TK70, or TZ30 format tapes.

Note 4: Loader operates in sequential mode only.

New Features

The following list briefly describes HSJ50 features that were not available with HSJ30 and HSJ40 controllers. A new feature is defined as a modification to the software that adds functionality to the controller. For more information on these features, see *Configuring your StorageWorks subsystem* and *Servicing your StorageWorks subsystem.*

Partitioning

HSOF Software Version 5.0 allows you to divide a storageset or disk drive into smaller parts, called partitions, each of which can be presented to the host as its own storage unit.

You can create up to four partitions per disk drive, RAIDset, mirrorset, stripeset, or striped mirrorset. Each partition has its own MSCP unit number so that the host can send I/O requests to the partition just as it would to any unpartitioned storageset or device. Because the partitions are separately addressable, you can use them to service more than one user group or application from the same container.

See *Configuring your StorageWorks subsystem* for more information on partitioning.

Hardware Version 3 Larger Cache Module

The HSJ50 controller with HSOF Version 5.0 software uses a new hardware Version 3 cache module with cache memory sizes of 32, 64, or 128 MB. HSOF Version 5.0 software requires a minimum of a 32 MB cache module. The controller and software automatically recognize the larger cache, once it is installed.

The hardware Version 3 cache module uses an external cache battery (ECB) to power the write-back cache memory in case of a power outage. The ECB connects directly to a connector in the cache module's front bezel with a short ECB cable.

You can identify a hardware Version 3 cache module by looking for a separate front bezel mounted to the module. You can also identify the cache revision using the CLI SHOW THIS_CONTROLLER or SHOW OTHER_CONTROLLER commands.

See *Servicing your StorageWorks subsystem* for instructions on how to install the new cache module and external cache battery storage building block (ECB SBB).

CI 4K Packets

A new CLI command allows you to set the controller to send and receive larger (4K) packets over the CI interface. This can improve I/O performance to the host. Your host CI adapter must also be able to support larger packets. At the time of this writing, only the CIPCA adapter supports 4K packets. See *Configuring your StorageWorks subsystem* for instructions on how to enable

4K packets. Refer to the *Avoiding Problem Situtions* section of these release notes for cluster restrictions of other controllers when using 4K packets.

Note: All CI clusters with CIPCA host adapters need to be aware of the following restriction: If you wish to use HSC40 or HSC70 controllers in the same cluster with your HSJ50 array controllers, the HSC controllers MUST contain revision F or higher L109 modules to coexist on CI clusters with CIPCAs. This is a permanent restriction.

Ability to Install New Tape Drive Microcode

HSOF Software Version 5.0 allows you to use the controller's HSUTIL program to install new microcode to the following tape drives, as well as to disk drives:

- TZ86
- TZ867
- TZ87
- TZ875
- TZ877
- TZ88
- TZ885
- TZ887
- TLZ09

See *Servicing your StorageWorks subsystem* for instructions on how to install new device microcode. The controller from which HSUTIL is ran must be reinitialized after the HSUTIL operation is completed.

Support for Larger Disk Drives

HSOF Software Version 5.0 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 120GB, regardless of the size of the member drives.

Faster Storageset Initialization

The initialize command has been optimized in Version 5.0, and runs significantly faster than on previous versions of HSOF software. The time to initialize a large RAIDset is less than 30 seconds.

Multiple Disk Drive Formatting

You can perform a low-level format on up to seven disk drives at once with HSOF Version 5.0 software. See *Servicing your StorageWorks subsystem* for instructions on how to format disk drives.

Configuration Saved on Disk

A new CLI option causes the controllers to save a copy of the controller configuration on one or more disk drives in the subsystem. The saved information is updated whenever the configuration is changed. Should a nonredundant controller be replaced by another controller with no configuration, the saved configuration is restored from one of the devices to the controller.

The information saved includes the controller settings, device, storageset and unit configurations, and software patches. Note that any container initialized with the SAVE_CONFIGURATION option cannot be used on previous HSJ30 or HSJ40 array controller HSOF software versions. See the *HSJ50 Configuring your StorageWorks subsystem* manual and the *CLI Reference* manual for instructions on how to enable this feature. See the *HSJ50 Servicing your StorageWorks subsystem* manual for instructions on how to replace a failed controller.

Software Patches Saved to Disk

HSOF software Version 5.0 saves any installed patches on disks initialized with the SAVE_CONFIGURATION option. Should you need to replace a controller and restore the configuration from disk, you do not have to reenter any software patches.

CLI Type Ahead, Recall, and Editing

HSOF Software Version 5.0 gives you more flexibility when entering CLI commands. You do not need to wait for the current command to complete before entering the next command. You can recall any of the last four commands entered, and then edit that command to save time when entering new commands.

See *Configuring your StorageWorks subsystem* and the *CLI Reference Manual* for more information on entering CLI commands.

Set SCSI Speed for Devices

In configurations that must use long SCSI cables between the HSJ50 controller and a device, it is possible for the initiator and target to negotiate a faster data rate than is supported by the cable length. HSOF Software Version 5.0 has new CLI commands to set the maximum data transfer rate between the controller and any device to 10MHz, 5MHz, or asynchronous mode.

See *Configuring your StorageWorks subsystem* and the *CLI Reference Manual* for more information on setting the data transfer rate with regards to SCSI cable lengths.

Maintenance Terminal Port Speeds

HSOF software version 5.0 supports terminal port connections at 4800, 9600, and 19200 BPS. Connections speeds at 300, 1200, and 2400 BPS are not supported.

Clarifications

This section presents clarifications on controller behavior in certain situations.

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.

In a future release Digital intends to properly identify the Port, Target, LUN of the first physical device in the storageset in all possible cases. In cases where it is not possible to identify the first physical device in a storageset, the intention is to set the PTL values to 255 and provide storageset specific information in the Device Product ID field to aid in identifying the logical device involved in the event.

Reinitialize After HSUTIL Operations

After you have completed operations using the HSUTIL program you must reinitialize the controller from which you ran HSUTIL before resuming normal operations.

Operating Constraints

This section describes the operating constraints for HSOF Software Version 5.0. 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.

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.
- 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 DEC 7000 and DEC 10000 systems provided the DEC 7000/10000 console code is at Version 3.1 or higher.

CFMENU Constraints

The CFMENU utility cannot be used to partition striped-mirrorsets. You must use CLI commands to manually partition striped-mirrorsets.

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.

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.

Running CONFIG or CFMENU Utilities During Backup Operations

Do not run the CONFIG or CFMENU utilities during a tape backup 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 *Configuring your StorageWorks subsystem* and *Servicing your StorageWorks subsystem*:

(none identified)

Installation

Follow the instructions for connecting the subsystem to the host in the *HSJ50 Configuring your StorageWorks subsystem manual.*

Identifying Your HSOF Software Revision Level

You can identify HSOF Software Version 5.0 by entering the SHOW THIS_CONTROLLER command at the CLI prompt. The resulting display lists the software revision level as version "V50J."

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).