StorageWorks™ Array Controller

HSZ50 Array Controller Operating Software Version 5.0 Release Notes

Order Number: EK–HSZ50–RN. B01

This document summarizes features and characteristics of the HSZ50 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

October, 1996

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 5.0[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 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 HSZ50 documentation set:
  - *Configuring your StorageWorks subsystem, HSZ50 Array Controllers*
  - *Servicing your StorageWorks subsystem, HSZ50 Array Controllers*
  - *CLI Reference Manual*
  - *HSZ50 Array Controller Operating Software Version 5.0 Release Notes*
  - *HSZ50 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 “V50Z”.

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 Software Version 5.0.

Hardware Support

HSOF Software Version 5.0 supports the following revisions or higher for the HSZ50 controllers and associated hardware:

- HSZ50 controller modules
- Version 3 cache module, hardware revision A
- BA350–MA controller shelf
- BA350–S*x* device shelf
- BA356–S*x* wide device shelf with BA35X-MG 8-bit I/O module
- 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 HSZ50 controllers is supported by the following operating system versions, within the limitations described in *Configuring your StorageWorks subsystem, HSZ50 Array Controllers*:

- Digital UNIX™ Versions 3.2c, 3.2d, and 3.2g
- OpenVMS Alpha Version 6.2
- Windows NT® Server Version 3.51

Host Adapter Support

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

- KZTSA (for DEC 3000™ systems) adapter firmware version A11 and higher
- PMAZC (for DEC 3000 systems – requires a DWZZ-series signal converter) adapter firmware version 2.0 and higher
- 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) adapter firmware version A10 and higher

The following host adapters are supported by the OpenVMS Alpha operating system Version 6.2 and higher for HSZ50 controllers:

- KZTSA (for DEC 3000 systems) adapter firmware version A11 and higher
- KFTIA (for TurboLaser 8200 embedded SCSI) adapter firmware version 2.46 and higher
- PMAZC (for DEC 3000 systems – requires a DWZZ-series signal converter) adapter firmware version 2.1 and higher
- 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) adapter firmware version A10 and higher

The following host adapters are supported by the Windows NT operating system Version 3.51 for HSZ50 controllers:

- KZPSA (for Digital AlphaServers 400/1000/2000/2100) adapter firmware version A10 and higher

Device Support

HSOF Software Version 3.0 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	0.426	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
SWXD3-WH	2.1	446	A01
SWXD3-SG	2.1	0008	A01
SWXD3-WG	2.1	0008	A01
SWXD3-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 Tape Drives

Device	Capacity in Gigabytes	Minimum Microcode Version	Minimum Hardware Version	Comments
TL812	1040/2080	1.20 robot/CC33 drive	A01	Notes 1, 2, 4, 5
TL822	5080/10560	1g4F robot/CC33 drive	A01	Notes 1, 2, 4, 5
TL826	3520/7040	1g4F robot/CC33 drive	A01	Notes 1, 2, 4, 5
TZ87-VA	20 (Compressed)	930A	A01	Note 4
TZ87N-VA	20 (Compressed)	930A	A01	Notes 3, 4
TZ87-TA	20 (Compressed)	9514	B02	Notes 1, 2, 4
TZ875-NT	100 (Compressed)	930A	A01	Note 4, 5
TZ875-TA	100 (Compressed)	930A	A01	Note 1, 4, 5
TZ877-AE, AF	140	930A	A01	Note 4, 5
TZ88N-VA	20/40	CC33	A01	Note 3, 4, 5
TZ885-NT	100/200	CC33	A01	Note 1, 3, 4, 5
TZ885-TA	100/200	CC33	A01	Note 1, 3, 4, 5
TZ887-AE	140/280	CC33	A01	Note 1, 3, 4, 5

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: Requires KZPSA or PMAZC host adapter.

Note 5: Not supported on Windows NT systems.

Table 3: 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

Note: CD–ROM drives are only supported under the Digital UNIX operating system.

Table 4: 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.

New Features

The following list briefly describes HSZ50 features that were not available with HSZ40 controllers. A new feature is defined as a modification to the software that adds significant 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 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 HSZ50 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. 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 to the cache module with a short ECB cable.

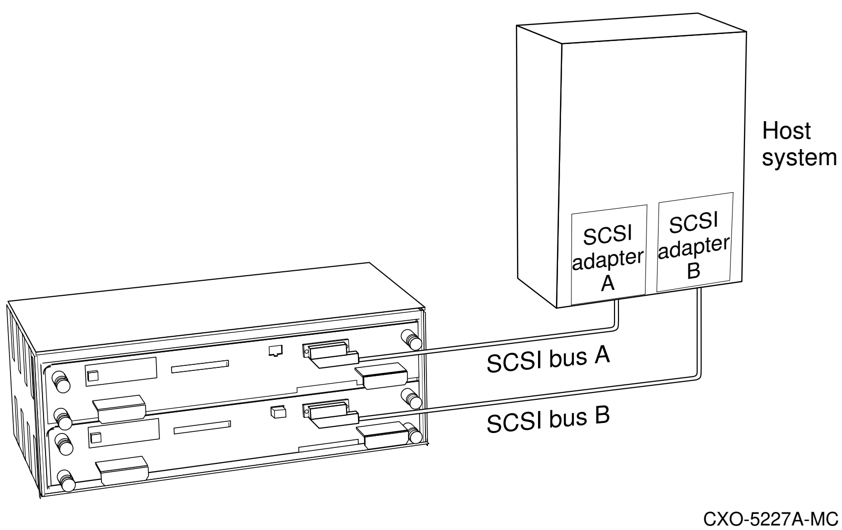
You can identify a hardware Version 3 cache module by looking for a separate front bezel mounted on the module. You can also identify the cache revision using the SHOW THIS_CONTROLLER or SHOW OTHER_CONTROLLER commands.

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

SCSI Multibus Failover

HSOF Software Version 5.0 allows you to connect each HSZ50 controller in a dual-redundant pair to separate host SCSI buses and separate host adapters, as show in Figure 1. This configuration provides redundant paths from the host to the controllers and devices. If one path goes bad, the host can access all devices through the remaining path and controller.

Figure 1: SCSI Multibus Connections



This feature requires host operating system hardware and software support. See the Software Product Description and Release Notes for your operating system to find out if it supports redundant connections and failover. At the time of this writing, the OpenVMS, Digital UNIX, and Windows NT operating systems do not offer software support for this feature. See *Configuring your StorageWorks subsystem* for instructions on how to connect and configure for SCSI multibus failover.

Windows NT Support

HSOF Software Version 5.0 allows you to connect an HSZ50 controller to a Digital Alpha system running the Windows NT operating system. The logical units behind the controller (RAIDsets, mirrorsets, partitions, and so forth) appear as disks to the operating system and can be used as normal storage devices.

See *Configuring your StorageWorks subsystem* for instructions on how to use an HSZ50 controller with Windows NT.

Simultaneous Multiple Operating System Support

HSOF Software Version 5.0 allows you to set a different host function mode for each controller target ID, thus allowing the controllers to work with different host operating systems on the same SCSI bus. Because each host only addresses units through specific controller target IDs, the storage units can be assigned to those hosts as required. The command syntax for setting host function modes is:

```
CLI> SET THIS_CONTROLLER HOST_FUNCTION=(ID, mode)
```

where *ID* is one of the assigned controller target IDs, and *mode* is one of the following:

- A normal
- B IBM host mode
- C HSZ15 compatibility mode
- D Windows NT mode

In dual-redundant configurations, setting the HOST_FUNCTION on one controller also sets the same values on the partner controller. With HSOF Version 5.0, you may use any two of four host modes at one time.

See *Configuring your StorageWorks subsystem* and the *CLI Reference Manual* for more information on setting the controller HOST_FUNCTION.

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:

- TZ87
- TZ875
- TZ877
- TZ88
- TZ885
- TZ887

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.

Device and Unit Failover During Battery Failure

Prior to HSOF Software Version 5.0, if the batteries in a write-back cache module failed, all units that were preferred through the associated controller would become unavailable to the host. With Version 5.0 software, the controller associated with the failed write-back cache battery shuts down and its units now failover to the surviving controller so that they can continue to be accessed by the host.

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 also 120GB, regardless of the size of the member drives.

Faster Storageset Initialization

The INITIALIZE command has been optimized in Version 5.0, and now runs significantly faster. The time to initialize a large RAIDset has been reduced from several minutes to less than 30 seconds.

Multiple Disk Drive Formatting

You can perform a low-level format on up to seven disk drives at once in Version 5.0, as opposed to only one device in previous HSOF software. See *Servicing your StorageWorks subsystem* for instructions on how to format disk drives.

CLI Type Ahead, Recall, and Editing

HSOF Software Version 5.0 gives you more flexibility when entering CLI commands. You no longer 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.

Software Patches Saved to Disk

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

Set SCSI Speed for Host and Devices

In configurations that must use long SCSI cables between the HSZ50 controller and the host system, or between the HSZ50 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 two new CLI commands to set a maximum data transfer rate, either between the controller and the host, or between the controller and any device. Possible settings are 10MHz, 5MHz, or ASYNCHRONOUS mode.

If you have more than one HSZ50 controller on the same SCSI bus connected to one or more hosts, all HSZ50 controllers must be run at the same TRANSFER_RATE_REQUESTED setting (for example, all at 5 Mhz or all at 10 Mhz). (The asynchronous mode is not supported for this release.)

See *Configuring your StorageWorks subsystem* and the *CLI Reference Manual* for more information on setting the data transfer rate.

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.

HSZ50 Recognition by Digital UNIX

In order to have the Digital UNIX operating system recognize the HSZ50 array controller, you need to go into /sys/data/cam_data.c. Find the HSZ40 entry and do a cut and paste to duplicate it. Then change HSZ4 to HSZ5. Rebuild the kernel and copy it to root. Do a reboot.

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 any operations using the HSUTIL program, you must reinitialize the controller from which you ran HSUTIL before resuming normal operations.

SAVE_CONFIGURATION from Previously Initialized Storagesets

If the storagesets in your configuration were previously initialized and the INITIALIZE *container-name* SAVE_CONFIGURATION was issued to save your configuration to disk, it will not be necessary to issue an INITIALIZE command again after you have reconfigured your devices with a new controller.

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. Other constraints of host adapters or other system components may also be described in this section. 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.

Partitioning Not Supported with SCSI Multibus Failover

The SCSI Multibus Failover feature in HSOF Version 5.0 does not support partitioned disks or storagesets. You must delete any existing partitions before enabling multibus failover, and you cannot create partitions once multibus failover is in effect.

SCSI Multibus Failover Host Operating System Support

Although the HSZ50 array controller has the capability to support SCSI multibus failover, at the time of this writing the OpenVMS, Digital UNIX, and Windows NT operating systems do not offer software support for this feature.

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.

Set SCSI Host Speed Restriction

The TRANSFER_RATE_REQUESTED=ASYNCHRONOUS mode for setting SCSI host speed is not supported for this release.

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 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. You can re-add the tape drive after the firmware installation is complete.

Running CONFIG or CFMENU Utilities During Backup Operations

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

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 *HSZ50 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 “V50Z”.

Order Numbers

The following table list 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).