COMPAQ

Software Product Description

PRODUCT NAME:	**HS Family of Array Controllers Optional Operating Software for HSOF Versions 2.7, 3.0, 3.1, 3.2, 3.4, and 3.7**	**SPD: 54.38.03**

Description

The HS Family of Array Controllers Optional Operating Software is a set of software products that execute within the controllers providing additional capabilities beyond the controller's basic operating software (HSOF). HS Family of Array Controllers Optional Operating Software currently includes the following separately-licensed capabilities:

- Write-back cache capability that enhances I/O performance

- RAID capability that provides high data availability (tolerance of disk failures) at a lower cost than disk mirroring

- Disk mirroring capability that provides maximum data protection at improved performance over RAID

The write-back cache capability, the RAID capability, and the disk mirroring capability are controllable through the HS Family of Array Controllers command language interpreter (CLI) and can be restricted to operate only on certain disks.

These capabilities are available for HSJ40, HSJ30, HSD30, HS1CP, and HSZ40 Array Controllers and al require that write-back cache hardware be available on the controller. The following sections describe these functions.

Write-Back Cache Capability

The write-back cache capability provides the following functions:

- Stores data to be written temporarily in the controller's write-back cache and informs the host that the write request is complete. This allows the host to continue working without waiting for data to be written to disk media.

- Writes the data stored in cache to the disk media based on a least-recently-used cache flushing policy or when a device has been inactive for a defined time.

- Consolidates contiguously-located data blocks from multiple host write requests into a single device request to reduce average latency.

- On recovery from a controller failure (for example, a power outage), detects that unwritten data still exists in cache and writes it to disk media before enabling normal controller operations.

The write-back cache capability is available only as part of a package that includes a license to use the write-back cache software and batteries that provide backup power to preserve the cache contents in the event of a system power failure.

RAID Capability

The RAID capability provides the following functions:

- Manages up to 14 sets of between 3 and 14 disks as RAIDsets (limited by the controller configuration restrictions). A RAIDset is viewed by the host as a single disk and can tolerate the failure of a single member disk without loss of ability to deliver data to hosts.

- Dynamically adjusts between RAID Level 3 and RAID Level 5-like data protection algorithms depending on instantaneous workload.

- Maintains consistency of data and parity across all member disks in a RAIDset. This includes recovery from media errors.

- Detects failure of a single RAIDset member disk and invokes data regeneration algorithms to provide continued data availability to hosts.

- Captures a designated spare (if one exists) in the event of a member disk failure and reconstructs the data and parity of the failed member disk onto it.

- The algorithms for calculating the default and maximum chunksize for containers changed beginning with Version 2.7. For additional information regarding default chunksize, refer to the respective controller HSOF Release Notes for Version 3.7.

Disk Mirroring Capability

The disk mirroring capability provides the following functions:

- Real-time maintenance of up to six identical copies of data on mirrorsets of separate disks attached to a single HS* Array Controller.

- Protects data against disk failure by replicating all data on each member of the mirrorset. Disk mirroring offers extremely high data reliability.

- Striping of mirrorsets, for high-performance access to large amounts of highly-available data.

- Captures a designated spare (if one exists) in the event of a mirrorset member disk failure and reconstructs the data of the failed member disk onto it.

- Ability to increase or decrease the number of members in a mirrorset as requirements change.

- Flexible policy options for determining both how read requests are satisfied and the speed of copying when a new member is being added.

- HSOF Software disk mirroring can utilize the UNMIRROR CLI command to change devices back to a single-disk unit.

Limits on the Total Number of Storagesets

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

- 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 any given unit.

- There can be a maximum of 4 partitions per disk or storageset.

Restrictions on Moving Storagesets to Previous Software Versions

In software Version 2.5, striped mirrorsets reported a different disk geometry than the same nonmirrored stripeset. This was changed in Version 2.7 such that striped mirrorsets initialized under Version 2.7 report a disk geometry identical to the same nonmirrored stripeset.

Due to this improvement (which is included in Version 2.7 and later versions), customers should seek Customer Service Support in moving stripesets from Version 2.5 and earlier versions of software to the currently supported HSOF Versions 3.1., 3.2, 3.4, or 3.7.

Hardware Requirements

HS Family of Array Controllers Optional Software executes on any of the HS Family of Array Controllers: HSJ30, HSJ40, HSD30, HS1CP, or HSZ40. It is distributed on the same PCMCIA Program Card that contains the basic array controller operating software (HSOF). Valid configurations for HS Family of Array Controllers Optional Software are the same as those of the underlying controller platform.

> **NOTE:** Configuration guidelines for the HS Family of Array Controllers are provided in the latest version of the *StorageWorks™ Array Controllers HS Family of Array Controllers User's Guide*, EK-HSFAM-UG. D01 or the *Configuring Your StorageWorks HSZ70 Array Controller*, EK-HSZ40-CG. B01.

Software Requirements

HS Family of Array Controllers Optional Software Requires HSOF V3.1 or later for write-back cache, RAID, and disk mirroring options.

Use of the Write-Back Cache software license requires that the HSx30/40 cache module and HSx30/40 cache batteries be installed. To purchase batteries, contact your local Compaq™ Customer Service Representative.

Optional Software

None.

Distribution Media

HS Family of Array Controllers Optional Operating Software is shipped on the same PCMCIA program card that contains the basic HSOF array controller operating software. No separate media or documentation needed.

Ordering Information

HS Family of Array Controllers Optional Operating Software is shipped as part of the HSOF software. However, a license key is required to utilize this optional functionality. Table 1 contains the list of license order numbers for the write-back cache, RAID, and disk mirroring options.

Table 1 License Key Order Numbers

Part Number	Description
QL-3HVA9-AA	HSD Write-Back Cache Software License
QL-4D6A9-AA	HS1CP Write-Back Cache Software License
QL-3HWA9-AA	HSJ Write-Back Cache Software License
QL-3HXA9-AA	HSZ Write-Back Cache Software License
QL-3HYA9-AA	HSD30 RAID Software License
QL-4D7A9-AA	HS1CP RAID Software License
QL-3HZA9-AA	HSJ30/40 RAID Software License
QL-3J0A9-AA	HSZ40 RAID Software License
QL-4DRA9-AA	HSD30 Mirroring Software License
QL-4E3A9-AA	HS1CP Mirroring Software License
QL-4DSA9-AA	HSD30/40 Mirroring Software License
QL-4DTA9-AA	HSZ40 Mirroring Software License

For self-maintenance customers, or others who require separate ordering of software media and documentation, HSOF for the HSx Array Controllers may be ordered separately as listed in Table 2.

Table 2 Software and Documentation Part Numbers

Part Number	Description
QA-0W9AB-HS	Media and documentation for HSJ30/HSJ40 Array Controllers
QA-2YHAB-HS	Media and documentation for HSD30/HS1CP Array Controllers
QA-2YJAD-HS	Media and documentation for HSZ40-Bx/Cx Array Controllers

For additional information on available licenses, services, and media, refer to the appropriate price book.

Software Licensing

The license deliverable for the HSJ-series, HSD30/HS1CP-series, and the HSZ40-Bx/Cx Array Controllers, is an HS Family Array Controllers Optional Software License (key and letter). The array controller utility called the Software Licensing System (FLS) must be used to install the license key for proper software option functionality.

Software Product Services

A variety of service options are available from Compaq. For more information, contact your local Compaq office or distributor.

Software service for HSOF software is covered under the terms and conditions of the integrated Hardware and Software Customer Service contracts.

Software Warranty

Warranty for this software product as provided by Compaq, includes 90 days conformance to the Software Product Description (SPD) and 90 days telephone support.

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