

CompaqStorageWorks[™]

Release Notes for KZPCC-CE (3-Channel) and KZPCC-AC (1-Channel) Backplane RAID Controllers

These release notes contain the most recent supplemental information for the Compaq StorageWorks KZPCC-CE and KZPCC-AC backplane RAID controllers. Both controllers belong to the same controller family, commonly referred to as KZPCC controllers. The KZPCC-CE is a three channel controller. The KZPCC-AC is a one channel controller.

Please note that the user guide and StorageWorks Command Console on-line Help only describe the KZPCC-CE. With the exception of the number of channels, the KZPCC-CE and KZPCC-AC controllers function and operate in a similar manner. If you have a KZPCC-AC, disregard the information in the user guide and on-line Help that relates to using the two additional channels.

Be sure to read these notes before installing the Compaq StorageWorks KZPCC-CE or KZPCC-AC into your server. This information is periodically updated and available on the World Wide Web at:
http://www.compaq.com/products/storageworks/array_scsi_controllers.html

The following software updates are needed for the KZPCC-CE or KZPCC-AC support:

- Compaq Tru64 UNIX operating system version V4.0f with the New Hardware Delivery –3 kit (NHD 3)

The New Hardware Delivery –3 kit (NHD 3) is listed on the World Wide Web as:

NHD-V1_1-2R8_H1 Tru64 UNIX V4.0F New Hardware Support

The web page is:
http://ftp.service.digital.com/public/Digital_UNIX/v4.0f/nhd-v1_1-r8_h1.html

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The optional Tru64 UNIX V4.0F Patch Kit 4, required for the on-line diskconfig utility support is listed on the World Wide Web as:

duv40fas0004-20000613.tar

The web page is:

http://ftp.service.digital.com/public/Digital_UNIX/v4.0f/

- Storage Works Command Console (SWCC) kit version V2.2 is shipped on a CD-ROM with the controller.

The Storage Works Command Console (SWCC) kit will be listed on the World Wide Web as:

SWCC for KZPCC V2.2

The web page is:

http://www.compaq.com/products/storageworks/storage-management-software/command_console.html

- Alpha Console Firmware version V5.8

The Alpha Firmware standing web page is:

<http://ftp.digital.com/pub/Digital/Alpha/firmware>

- Compaq Analyze Version V3.1 is used for KZPCC-CE Event logging.

The Compaq Analyze is listed on the World Wide Web as:

WEBES V3.1

The web page is for the kit and documentation is:

<http://www.support.compaq.com/svctools/webes/index.html/>

Introduction

The KZPCC-CE and KZPCC-AC controllers are high-performance, 64-bit PCI to Ultra2/LVD backplane controllers for use with the Compaq StorageWorks enclosures 4200 (model 4254) and 4300 (models 4354 and 4314).

This document describes any known restrictions or issues when using the controller within your system configuration, and has the following sections:

- An illustration of the KZPCC-AC and a description of its components
- Parts lists for the Compaq StorageWorks KZPCC-CE and KZPCC-AC
- Replacement Parts
- Supported Compaq servers
- Supported operating systems
- Verified device listing
- Restrictions and issues

- Example configurations for the KZPCC-CE and KZPCC-AC controllers

KZPCC-AC Major Components

Figure 1 shows the major components of the KZPCC-AC single-channel controller.

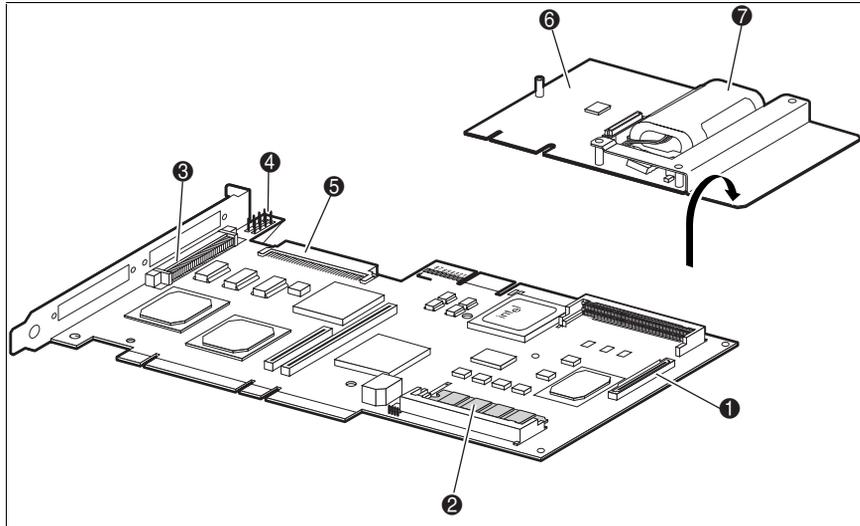


Figure 1. KZPCC-AC Major Components

- | | |
|---|----------------------------------|
| ❶ Battery module connector | ❺ Internal 68-pin SCSI connector |
| ❷ Cache memory DIMM sockets (16 MB installed) | ❻ Battery module |
| ❸ External Ultra2 SCSI connector | ❼ Battery |
| ❹ NVRAM jumper | |

Parts Lists

Table 1
Compaq StorageWorks KZPCC-CE Parts List

Part Number	Revision	Description
(Digital Classic)		
DS-KZPCC-XE	B	Three-Channel, 64-bit PCI to Ultra2/LVD backplane RAID controller with 64MB cache and battery backup
AA-RKL7B-TE	B	Release notes for the KZPCC-CE and KZPCC-AC (this document)
AA-RKL6A-TE	A	Compaq StorageWorks KZPCC-CE User Guide
EK-HSXS-WC	C01	Warranty Terms and Conditions
3R-Q178A-3V	B01	Warranty Addendum
QB-66KAA-SA	B	SWCCKZPCC-CE ALL LIC/CDRM PKG
QA-66KAA-GZ	B	SWCCKZPCC-CE ALL DOC KIT (included with QB-66KAA-SA)
QM-66KAA-AA	A	SWCCKZPCC-CE ALL SYS 1 LIC (included with QB-66KAA-SA)

Table 2
Compaq StorageWorks KZPCC-AC Parts List

Part Number	Revision	Description
(Digital Classic)		
DS-KZPCC-XC	A	Single-channel, 64-bit PCI to Ultra2/LVD backplane RAID controller with 16MB cache and battery backup
AA-RKL7B-TE	B	Release notes for the KZPCC-CE and KZPCC-AC (this document)
AA-RKL6A-TE	A	Compaq StorageWorks KZPCC-CE User Guide
EK-HSXSW-WC	C01	Warranty Terms and Conditions
3R-Q178A-3V	B01	Warranty Addendum
QB-66KAA-SA	B	SWCCKZPCC-CE ALL LIC/CDRM PKG
QA-66KAA-GZ	B	SWCCKZPCC-CE ALL DOC KIT (included with QB-66KAA-SA)
QM-66KAA-AA	A	SWCCKZPCC-CE ALL SYS 1 LIC (included with QB-66KAA-SA)

Replacement Parts

Table 3
KZPCC-CE Replacement Parts

Part Number	Description
DS-MS100-DE	64MB DIMM
DS-KZPCC-UB	Battery replacement kit

Table 4
KZPCC-AC Replacement Parts

Part Number	Description
DS-MS100-DC	16MB DIMM
DS-KZPCC-UB	Battery replacement kit

Supported Compaq Servers

The Compaq StorageWorks KZPCC-CE and KZPCC-AC are supported on the servers: listed in Table 5.

Table 5
Supported Compaq AlphaServers

AlphaServer	Maximum Number of Supported Controllers
DS10	1
ES40	2

NOTE: AlphaServers DS20 and DS20E are not currently supported. The user guide incorrectly states that the DS20 and DS20E are supported.

Supported Operating Systems

The KZPCC-CE and KZPCC-AC are supported on Compaq Tru64 UNIX 4.0F operating system with New Hardware Delivery (NHD) -3 Kit. The Tru64 UNIX Patch Kit 4 is an option needed for a runtime diskconfig utility support.

Support Devices

For a listing of the SCSI devices (disk drives) supported by the KZPCC-CE and KZPCC-AC in 4254, 4354 and 4314 enclosures, see Table 6.

Table 6
Supported Devices for Compaq StorageWorks
Models 4254, 4354, and 4314 Enclosures

Type	Capacity	Speed (RPM)	Part Number
Ultra2/LVD	18.2 GB	10,000	128418-B22 / 3R-A0561-AA
Ultra2/LVD	18.2 GB	7,200	388144-B22 / 3R-A0527-AA
Ultra2/LVD	9.1 GB	10,000	328939-B22 / 3R-A0526-AA
Ultra2/LVD	9.1 GB	7,200	123065-B22 / 3R-A0525-AA
Ultra3/Ultra2 Capable	36.4 GB	10,000	176496-B22 / 3R-A0919-AA
Ultra3/Ultra2 Capable	18.2 GB	10,000	142673-B22 / 3R-A0585-AA
Ultra3/Ultra2 Capable	9.1 GB	10,000	142671-B22 / 3R-A0584-AA
Ultra3/Ultra2 Capable	18.2 GB	15,000	188122-B22 / 3R-A1543-AA
Ultra3/Ultra2 Capable	9.1 GB	15,000	188120-B22 / 3R-A1542-AA

SMOR Restrictions and Issues

- If the SMOR utility is to be used for initial configuration of newly attached storage enclosures, the device enclosures must be power cycled prior to powering up the server and entering the SMOR utility.

- If a build (activity on selected devices) does not start after selecting Set System Config from the file menu in SMOR (RAID 1, 5, 0+1, 0+5 ONLY); then delete those RAID sets, reboot, enter the SMOR utility, and recreate the RAID sets.
- Ignore the serial number displayed in SMOR's Controller Information Pages and instead use the serial number listed on the label found on the controller board.
- Use only the default Controller Configuration Settings found in SMOR unless otherwise noted.
- Use of SMOR is restricted to AlphaServers with graphics console settings (SMOR is not supported under a serial console).
- With multiple KZPCC-CE or KZPCC-AC controllers installed in a system, the order in which they appear in SMOR may be different than the order that they were seen at the system's SRM console. This is due to possible differences between the scan order of the SMOR utility and the system's SRM console.
- Save Firmware feature under the Action menu is currently not supported.
- Due to a new SRM console I2O implementation, you need to use two new SRM console commands to invoke the SMOR utility: "sho bios" is used to examine your KZPCC-CE or KZPCC-AC console configuration, and "run bios pzxo" is used to start the SMOR utility with a specific controller.

StorageWorks Command Console (SWCC) Restrictions and Issues

- The SWCC KZPCC-CE and KZPCC-AC client/agent utilities must be used for effective management and event log reporting of the KZPCC-CE or KZPCC-AC subsystem.
- SWCC client software must be installed on a personal computer running Windows NT 4.0 or Windows 2000. Windows 95&98 also listed, as options in the user guide are no longer supported with the current SWCC releases.
- You can find the version of the Agent, on the Agent Management tab of the Agent Configuration Utility. The Client version can be obtained by displaying the Help > About dialog box in the KZPCC Storage window.
- You may notice text about the DMS Client at the end of the installation. Please ignore this information.

- If the Agent determines all of your controllers are unsupported or you have no controllers available, the Agent program will exit.
- The Agent logs events to the syslog daemon using the "user" facility at the "notify" priority. The output of these will be governed by the setup of the /etc/syslog.conf configuration. If the Agent fails to start check this log to determine the cause.
- The controller has a built in audible alarm, which is silenced by default. This alarm may be enabled through the use of SWCC.
- If the Agent has stopped responding, the dialog box displayed while connecting to the Agent will hang. To remove the dialog box, use the Task Manager to end the kzpcc.exe process on the Client system.
- The firmware does not retain the state of devices that are not part of the configuration between reboots. For example, if the Agent system is rebooted while there is a failed device that is not part of the configuration, the Agent will report the device as available.
- Builds are automatically started by SWCC when the last failed device is made optimal, transitioning the logical drive from reduced to optimal.
- A failed device that has been replaced by a hot spare will assume the failed state and will not be associated with the array. If the system is subsequently rebooted, the failed device will assume the "available" state. This drive should be treated as a failed device.
- When you replace a failed hotspare with a good device, the firmware will still label the device as "failed." To be able to use this device, you must force it to an available state.
- If you have one or more rebuilding arrays and decide to create a new logical unit, SWCC may present reconstructing members of the arrays as available. Although presented as available, SWCC will not let you choose those reconstructing drives as members of new arrays.

Event Logging

- All KZPCC-CE and KZPCC-AC controller events are reported by SWCC and put in the binary.errlog file. Events are then extracted and interpreted by a utility called Compaq Analyze. Compaq Analyze V3.1 is the version that supports the KZPCC-CE and KZPCC-AC controllers.

RAID Restrictions and Issues

- Rebuilds are started on all failed members of a RAID 0 + 1 or RAID 0+5 in reduced mode regardless of how that rebuild is started.

In SMOR a rebuild on a logical drive can be started by either selecting rebuild with the logical drive highlighted, or selecting rebuild with the physical drive highlighted. In SWCC a rebuild is started only by selecting a physical drive.

- Stripe size of the RAID 0 portion of a RAID 0 + 1 or RAID 0+5 is governed by the stripe size of the elements that make up the logical drive.

For the RAID 0+5 case, the stripe size can be adjusted based on the stripe size chosen for the RAID 5 base arrays. However, for the RAID 0 + 1 case, the stripe size is a fixed value and cannot be modified. Although SMOR presents a stripe size for the RAID 0 portion, when creating RAID 0 + 1 and RAID 0 + 5, the value is ignored and overwritten by the firmware based on the stripe size of the base arrays.

- RAIDsets are immediately available for use following completion of the creation steps, even while the RAIDset is building. Activity on the RAIDset members may be present in the absence of other I/O activity during the build of certain RAIDset types.
- There are situations when all drives in a RAID 0+5 can incorrectly be marked failed in the SWCC applet. Specifically, when two physical drives in one of the base arrays fails and a write operation is tried to the logical drive, a cache write back failure occurs. If only a small amount of data is written, so that it is wholly contained on one drive only, all drives in the logical unit get marked failed instead of just the two physical drives that actually failed. In this case, to distinguish between the drives which really experienced hard errors and the good remaining drives in the RAID 0+5, the Eventlogs reported in Compaq Analyze must be examined. Only drives which reported Unrecoverable Hard Errors in the SWCC Sense Data events have actually failed.
- If one of the members of a RAID 0+1 or RAID 0+5 fails during a rebuild operation, the logical unit might not change its state to reduced immediately following the drive failure. This happens because the rebuild operation still continues on the remaining base arrays. Eventually the upper-level array (the logical unit) will become reduced after the rebuild operation is finished. At this point you will be able to recover your RAID 0+1 or RAID 0+5 array by selecting the failed drive in the SWCC applet and manually starting the reconstruction process.

- If a drive fails in one base array (A1) of a RAID 0+1 or RAID 0+5 while the other base array (A2) is reconstructing to a new drive (could be an available hot spare) due to a prior failure in that array, the top level-array may be marked as degraded. For this to occur, there must be an available hot spare in the A1, and A2 must be reconstructing. Additionally the reconstructing drive in A2, as well as the available hot spare in A1, will both be marked as failed in SWCC. In this situation you can recover your RAID 0+1 or RAID 0+5 array by selecting one of these failed members (with a right mouse click) and then manually starting the reconstruction process. The RAID 0+1 or RAID 0+5 will start the reconstruction process.
- The smallest member used in the creation of the RAIDset determines the usable logical drive size. When creating hot spares, make sure the drive is at least as big as the smallest drive member.
- Adding new physical disks to enclosures housing previously configured logical units must only be done when your AlphaServer is powered up and running Tru64 UNIX Operating System. Do not add new disk drives to KZPCC-CE or KZPCC-AC storage arrays having existing configurations when your system is powered down. Failure to observe this restriction can lead to unintended configuration changes causing unrecoverable data loss.

Drive Roaming Restrictions

Moving a logical drive configuration existing on a physical device from one point to another on the KZPCC-CE or KZPCC-AC controller is not supported. If you want to move a physical drive to a different slot within a controller this drive must first be made available (unconfigured) via SWCC.

Logical drives can be reconstructed from one or more members of a logical drive placed in a different controller. This is useful for moving a logical drive from a failed controller to another controller. This reconstruction feature can not be disabled.

To reconstruct a logical drive when moved from a failed controller to a new controller:

1. Power down the system with the failed controller.
2. Remove drives - members of the logical drive.
3. Place drives in a storage enclosure connected to a KZPCC-CE or KZPCC-AC controller on a different system (must be powered down too) or leave the drives in place and replace the failed controller with a new one.

4. Power up the system. You will be able to access your data after you boot the operating system.

NOTE: When adding a disk drive off a shelf to a KZPCC-CE or KZPCC-AC controller on-line (system powered up) it is possible that some previous logical drive configuration data may be resident on the disk. If so the controller may present via SWCC partial or whole RAID arrays derived from that configuration information. In this case you must use SWCC to delete the configuration information on the drive and put the drive to available state.

Device Shelf Restrictions and Issues

- The on-line LED on the disk drive housing should be ignored when used in the Model 4254, 4354 or model 4314 device shelf.
- With the KZPCC-AC controller, installing a disk drive in the slot number 15 is not supported in the Model 4314 device shelf .

Compaq Tru64 UNIX Restrictions and Issues

- Virtual-disk device naming under Compaq Tru64 UNIX:

The format of the UNIX device name for aKZPCC-CE or KZPCC-AC virtual disk is:

`/dev/riNNN[a-h]` for the block special devices

and

`/dev/rriNNN[a-h]` for the character special devices

where NNN is the device number. The UNIX kernel assigns device numbers as follows: device numbers 0 through 127 are assigned to the first controller (in the system scan order); 128 through 255 to the second, and so forth. Whenever a new virtual disk is recognized by the UNIX kernel, it is assigned the lowest unused device number in that controller's range.

If they are created by StorageWorks Command Console, new virtual disks are recognized by the kernel immediately upon creation. Virtual disks that are created via an offline utility are recognized at the next system boot.

A given virtual disk retains the same device number until it is explicitly deleted via StorageWorks Command Console, at which time its device number is made available for assignment to a new virtual disk, as detailed above.

- If there are two KZPCC-CE or KZPCC-AC controllers in your AlphaServer configuration, the Compaq Tru64 UNIX system may become temporarily locked if the power to the AlphaServer is shut off or a SCSI cable is removed from a StorageWorks device pedestal during I/O operations. Your Compaq Tru64 UNIX system is expected to recover in the time frame of 3 to 15 minutes.
- Booting up Tru64 UNIX installed on a KZPCC-CE or KZPCC-AC logical unit in general takes longer time than booting up a SCSI Tru64 UNIX single O/S disk. For example it takes about 2 minutes to boot up a DKX (rz online) device versus 6 minutes for a DZX (ri online) device. This is explained by reads from RAID devices take longer than from a single disk drive.
- When running GENERIC kernel, online management and monitoring is not supported. To run StorageWorks Command Console, use a custom kernel.
- If during a reboot sequence the message "I2O device timed-out exiting INIT state, entering RESET state" displays, shutdown the system (use the shutdown -h now command), perform an initialization (init command) at the console, and then reissue the boot command. Patch Kit 4 fixes this problem.

Cache Memory Restrictions

Use only Compaq part number DIMMs with the KZPCC-CE or KZPCC-AC controller. Follow the procedure in the Maintenance and Troubleshooting section of the user guide to install DIMMs. Currently the KZPCC-CE supports only one 64MB cache memory DIMM, and the KZPCC-AC only supports 16MB of cache memory.

Configuration Examples

Hardware and Connection Details

- All cables used are VHDCI to VHDCI BN37A-xx, where 25 meters is the maximum cable length from the KZPCC-CE to the Compaq StorageWorks Enclosure 4200 (Model 4254) or 4300 (Models 4354 and 4314).

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- The model 4254 P/N 138151-001 (DS-SSL14-RS) contains an Ultra2 capable fault-bus supported I/O module which is dual bus only.
- The model 4354 P/N 190211-001 (DS-SL13R-BA) contains an Ultra3 capable fault bus supported I/O module which is dual bus only.
- The model 4314 P/N 190209-001 (DS-SL13R-AA) contains an Ultra3 capable fault bus supported I/O module which is a single bus only.
- For the models 4254 and 4354 the device ID's on each bus segment will be 0 through 5 and 8, since ID's 6 and 7 are reserved for initiators or EMU's as appropriate.
- For the model 4314 the device ID's on each bus segment will be 0 through 5 and 8 through 14, ID's 6 and 7 are reserved again.
- Also contained in the 4254, 4354 and 4314 is an EMU p/n 70-40064-03 with fault bus support.
- Compaq StorageWorks Enclosure 4200 (model 4254) or 4300 (models 4354 and 4314) device shelves cannot be daisy chained together.

Example Configuration: 3-channel KZPCC-CE controller and 3 LVD SCSI device enclosures

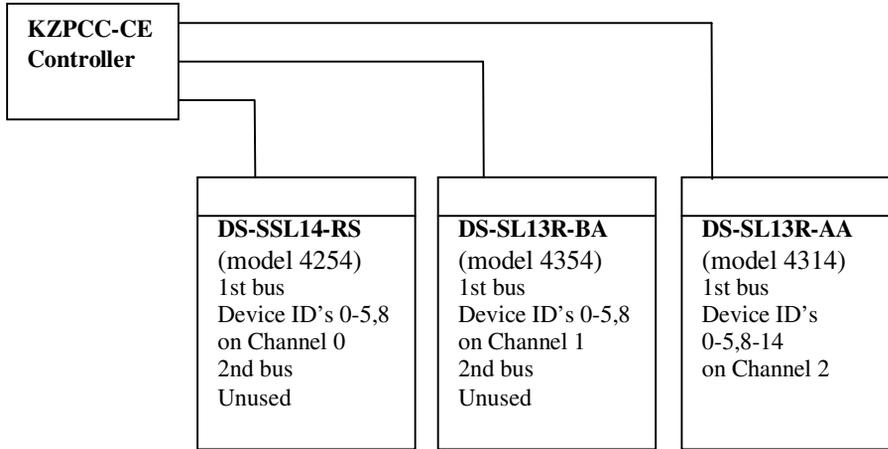


Figure 2. KZPCC-CE, three-channel configuration

Example Configuration: 1-channel KZPCC-AC controller and 1 LVD SCSI device enclosure

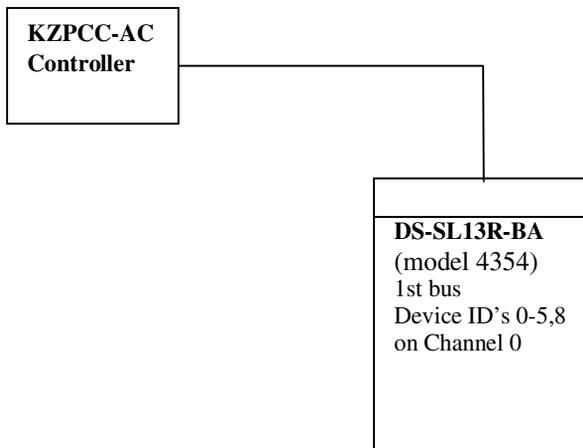


Figure 3. KZPCC-AC connected a 4354 enclosure

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