Smart Array 5300A Backplane RAID Controller Release Notes

Part Number: AV-RT16F-TE / 192268-003

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These release notes provide supplemental and updated information for the Smart Array 5300A RAID controller that are unavailable elsewhere. Smart Array 5300A (SA5300A) controllers are modular in design and are shipped in one of two product configurations for use in supported AlphaServer systems.

The 3X–KZPDC–BE (SA5302A/128) is a two channel Ultra160 SCSI controller with 128MB of installed cache. The 3X–KZPDC–DF controller (SA5304A/256) provides four channels of SCSI device interconnect and includes 256MB of cache.

Note: *Be sure to review the product documentation and to check the AlphaServer Smart Array 5300A product web site for updates before installing or reconfiguring these controllers.*

The Smart Array 5300A controller product web page is located at:

http://h18002.www1.hp.com/alphaserver/products/storage/sa5300a/

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Intended Audience

This document is intended for customers who install, use, or troubleshoot the KZPDC SmartArray 5300A controller product in AlphaServer systems. It describes KZPDC product updates and known issues or restrictions when using the controller within particular system configurations.

5300A Product Updates

This release announces several Smart Array 5300A product updates which are documented more fully later in these notes. These updates include:

- Controller firmware version 3.56 is available on the V7.1 AlphaServer Firmware CD.
- Updated versions of the Smart Array OpenVMS runtime utilities are available. These versions resolve prior incompatibilities between the version 3 OpenVMS Management Agent kit and the Smart Array Configuration Utility.
- Full support up to platform controller limits is now provided in the OpenVMS Smart Array runtime utilities for KZPDC installations on ES47, ES80, and GS1280 systems.
- OpenVMS versions 7.3-2 and 8.2 support for the KZPDC controller which provides FastPath functionality for improved performance.
- KZPDC AlphaServer system support for OpenVMS and Tru64 UNIX installations on the GS80, GS160, and GS320 platform.

Firmware Support

Controller firmware V3.56 is a required update for KZPDC controller installations on all supported AlphaServer system platforms under OpenVMS or Tru64 UNIX.

The V3.56 firmware image is available on the V7.1 AlphaServer Firmware CD in the OPTIONS subdirectory or from the AlphaServer Firmware web site:

http://ftp.digital.com/pub/DEC/Alpha/firmware/

The following example updates controller instance PYA0 with the V3.56 image after booting the V7.1 Alpha Firmware CD in CD-ROM device DQA0 on any supported AlphaServer system:

```
UPD> update pya0 -p
iso9660:[OPTIONS]kzpdc356.sys/dqa0
```

HP recommends that you also update all AlphaServer system environments hosting the KZPDC product using SRM firmware from the V7.1 (or later) Alpha Firmware CD release.

Operating System Support

SA5300A controllers can be configured for operation under Tru64 UNIX Version 5.1A or Version 5.1B. OpenVMS support is available in Version 7.3-2 and Version 8.2 of the operating system.

The 5300A can be used as the system boot controller or as a data only array controller in all supported operating system environments. Installation requirements vary, depending on the system environment under consideration when the SA5300A is first installed.

The following sections describe the software components required for full support of the 5300A controller in the Tru64 UNIX and OpenVMS operating system environments.

Tru64 UNIX Software Components

To install the 5300A controller on a Tru64 UNIX system, the following minimum components are required:

- New Hardware Delivery 7 (NHD7)
- Patch kit 3 for Version 5.1B
- Patch kit 6 for Version 5.1A

The NHD7 software includes the latest version of the V5.1B and V5.1A patch kits. If you are installing NHD7 for the first time on a new or existing system, follow the instructions included with the NHD software to install the NHD and patch kit software during the same installation procedure.

For existing installations with NHD7 already installed, HP recommends that you upgrade to the latest available patch kit. The *Patch Kit Installation Instructions* will guide you through that process.

You can obtain the NHD7 kit and the latest patch kits from the following web site:

http://www2.itrc.hp.com/service/patch/mainPage.do

OpenVMS Software Components

Support for the Smart Array 5300A is present in the OpenVMS V7.3-2 and OpenVMS V8.2 releases. OpenVMS V7.3-2 introduces Fastpath support in the Smart Array controller driver (PKRdriver). Consult the OpenVMS V7.3-2 *Operating System Release Notes* and *New Features* documentation for more information.

The following OpenVMS software kits and patch updates are the minimum required for SA5300A controller installations:

- OpenVMS Version 8.2 with the following TIMA kit:
  - DEC-AXPVMS-VMS82A_FIBRE_SCSI-V0100

- OpenVMS Version 7.3-2 with the following TIMA kits:
  - DEC-AXPVMS-VMS732_FIBRE_SCSI-V0700
  - DEC-AXPVMS-VMS732_CPU27F-V0100

OpenVMS patches can be downloaded from the following web location:

http://h71000.www7.hp.com/serv_support.html

Runtime Utility Support

Web based utilities are provided for monitoring and configuring the Smart Array 5300A controller and attached storage under OpenVMS and Tru64 UNIX. The monitoring function is made available as part of the HP Insight Management Agents kit for the specific operating system environment.

Online controller array configuration and maintenance functions are provided by the SA5300A Array Configuration Utility (ACU-XE). The ACU-XE utility is installed separately from HP Insight Management Agents kit, but requires the facilities provided by the Management Agent kit. For GS platform support, you must update to at least the V1.5 GS Platform Discovery kit (CPQGS150) or a later release before installing the CPQIM and ACU-XE.

Tru64 UNIX Utility Components

HP Insight Management Agents for Tru64 UNIX

The Tru64 UNIX Insight Management Agent kit version V3.4 provides Smart Array 5300A utility support for V5.1A and V5.1B Tru64 UNIX installations on all AlphaServer system platforms. You can install the V3.4 kit or a kit later than V3.5, but do not use the V3.5 kit. You must also update to the latest GS Platform Discovery kit prior to installing CPQIM and ACU-XE.

The GS Platform View and Discovery Agents software only runs on GS-series AlphaServers. This installation must be done after the Insight Management Agents for Tru64 UNIX have been installed.

The following steps describe how to install the GS Platform View and Discovery software:

1. Log in as root on the Tru64 UNIX system.
2. Download the tape archive of the latest GS Platform View and Discovery from the HP Insight Management Agents for Tru64 UNIX web site to the `/tmp/CPQGS` directory. That web site is:

   http://h30097.www3.hp.com/cma/download.html
3. Click on the Download tab and follow the provided instructions.
4. Extract the GS Platform View and Discovery Agents software from the tape archive file.

   ```
   # cd /tmp/CPQGS
   # tar xvf cpqgsddd.tar
   ```

   The tar utility creates a directory named `cpqgs`*`ddd`*, which contains the GS Platform View and Discovery Agents software.
5. Use the `setld` utility to install the GS Platform View and Discovery Agents software. For example:

   ```
   # /usr/sbin/setld -l cpqgsddd
   ```

   From the `setld` menu, select the first option, "ALL of the above". The `setld` utility will install the subsets for the GS Platform View and Discovery Agents software.
6. Verify that the GS Platform View and Discovery Agents software was installed correctly by entering the following command:

   ```
   # ps agx | grep gshmmod
   ```

   The output will resemble the following:

   ```
   root ... /var/opt/CPQGSddd/web/im/GSview/gshmmod
   ```
7. Delete the temporary directory and its contents. For example:

   ```
   # rm -fr /tmp/CPQGS
   ```

Array Configuration Utility XE for Tru64 UNIX

- The currently supported Array Configuration Utility kit version is V1.30.70.1a. This kit can be installed from the QuickStart CD or from the SA5300A web site.

OpenVMS Utility Components

New releases of the HP Insight Management Agents for OpenVMS and Array Configuration Utility XE address prior incompatibilities between certain versions of the OpenVMS Management Agent kit and the Smart Array Configuration Utility. The following table describes Version compatibility:

OpenVMS Insight Management Agents Kit – ACU-XE Kit Compatibility

OpenVMS Management Agent Kit Version and Package Name	Smart Array Configuration Utility Kit Version and Package Name

Version 3.03, PCSI kit:
`HP-AXPVMS-V73_MGMTAGENTS_V0303-1-1.EXE`
`HP-AXPVMS-V82_MGMTAGENTS_V0303-1-1.EXE`
	Version V0640, PCSI kit:
	`HP-AXPVMS-ACUXE-V0640-11p08-1.PCSI`

Version 3.02, PCSI kit: `HP-AXPVMS-V73_MGMTAGENTS_V0300-36-1.PCSI`	Version B0126, PCSI kit: `HP-AXPVMS-ACUXE-B0126--1.PCSI`
V3.0 and V3.01	No support
Version 2.4, PCSI kit: `CPQ-AXPVMS-V73_MGMTAGENTS_V0204-11-1.PCSI`	Version B0105, PCSI kit: `COMPAQ-AXPVMS-ACUXE-B0105--1.PCSI`

HP Insight Management Agents for OpenVMS

The new V3.03 release of the HP Insight Management Agents for OpenVMS provides full Smart Array utility support for the KZPDC controller under OpenVMS versions 7.3-2 and 8.2. This kit must be

used in conjunction with Smart Array Configuration Utility kit version V0640 or later. Users should upgrade to the most recent agent kit and ACU-XE version.

The V3.03 kit can be obtained from the HP Insight Management Agents for OpenVMS web page located at:

http://h71000.www7.hp.com/openvms/products/mgmt_agents/

HP strongly recommends that you review the instructions in the V3.03 kit *Installation Guide* before attempting to update system/cluster environments that have or have had a V3.02 or pre-V3.02 Management Agent kit installed. Failure to adhere to the prohibition against having WBEM or CPQ$ACUXE processes running within the system or OpenVMS cluster environment can result in incomplete Management Agent kit component delivery.

Array Configuration Utility XE for OpenVMS

The V0640 release of the Smart Array Configuration Utility XE is fully compatible with the HP Insight Management Agents for OpenVMS beginning with Agent kit version 3.03. The following information pertains to the V0640 kit:

- The V0640 kit supersedes the B0126 and B0105 Array Configuration Utility kits found on the web or on older versions of software media CD-ROM supplied with the KZPDC controller.
- The V0640 kit is supported under OpenVMS versions 7.3-2 and 8.2.
- Installation of the V0640 ACU-XE kit must be performed after first installing or updating the system or cluster environment with the V3.03 (or later) Management Agents kit.
- If you install the V0640 kit onto a system or cluster environment that has or has had ACU-XE kits version B0126 or B0105 previously installed, you must use the installation support script `ACUXE_CLEANUP.COM` to perform the utility installation. This script will ensure that pre-installation conditions are appropriate before kit component delivery is initiated and will prepare the system/cluster environment for cluster-wide installation of the kit.

The ACUXE_CLEANUP.COM script is packaged as part of the self-extracting archive containing the B0126 ACU-XE PCSI kit and the V0640 ACU-XE kit and is available from the Smart Array 5300A web site.

After downloading the kit distribution file and placing it in SYS$UPDATE, extract the PCSI kit and the accompanying ACUXE_CLEANUP.COM script by running the .EXE file.

Install and upgrade the ACU-XE utility by following the instruction provided after launching the ACUXE_CLEANUP.COM script as follows:

```
$ @SYS$UPDATE:ACUXE_CLEANUP.COM
```

ACU-XE Scripting Support

Starting with V6.40 the ACU-XE on OpenVMS provides support for scripting. Using ACU-XE scripting the user can capture a SmartArray configuration or create a new configuration using a script file instead of the ACU-XE WEB interface. The command line syntax for ACU-XE scripting is:

```
$ @SYS$SYSROOT:[WBEM.ACUXE]CPQ$ACUXE [option] [filename]
```

Options: (use one only)
`-c` Capture configuration to a script file.
(Default file is ACUCAPT.INI.)
`-i` Input configuration from a script file.
(Default file is ACUINPUT.INI)

Any errors encountered during a script command will be logged in a file called ERROR.INI that the ACU-XE will create in the current working directory. After executing a script command be sure to check if an ERROR.INI file has been created and review the file to determine what if any error's occurred.

For details on ACU-XE script file syntax refer to the HP Array Configuration Users Guide.

In addition to the `-c` and `-i` scripting options, the following `-cli show` option is available:

```
$ @SYS$SYSROOT:[WBEM.ACUXE]CPQ$ACUXE [option]

Options:
-cli show   Show the storage systems current configuration.
```

The following list describes features and restrictions of OpenVMS ACU-XE scripting and CLI:

- The `show` command is the only command supported by CLI.
- To identify a controller in a script, use the following syntax:

  ```
  Controller= Rad X ,Hose Y ,Slot Z ,Device Name PKXX
  ```

  In this syntax, the values `X`, `Y`, `Z` identify the Rad, Hose, and Slot numbers of the controller and PKXX identifies the device name. The Rad, Hose, Slot, and Device Name values for a specific controller can be found with the Management Agents.

  You can also use `Controller= All` for a script command that will be applied to all controllers

- The following script options are not supported:
  - LicenseKey
  - DeleteLicenseKey
  - RAIDArrayID
  - SSPState
  - LogicalDriveSSPState
  - SSPAdaptersWithAccess
- The basic scripting syntax is `Option= Value`. For the Action and Method options, ensure there is no space between the option and the equal (=) sign. For example, use `Action= Configure` not `Action = Configure`.

Web Browser Support

Consult the Release Notes for your Insight Management kit for a list of supported WEB browsers and known browser issues.

KZPDC Event Translation Support

WEBES kit version 4.3.1 or later provides KZPDC event translation of OpenVMS and Tru64 UNIX system error logs. The System Event Analyzer (formerly known as Compaq Analyze), is the WEBES component which permits translation of KZPDC controller events.

WEBES kits are available from the following URL for more information:

http://h18023.www1.hp.com/support/svctools/webes/index.html

Supported HP AlphaServer Systems

Smart Array 5300A controllers are supported on the following AlphaServer systems:

- DS10
- DS15
- DS20E EV68, EV67 p2.6
- DS25
- ES40 EV68
- ES45
- GS80, GS160, GS320
- ES47, ES80, GS1280

KZPDC Product Issues and Restrictions

Platform Specific Issues and Restrictions

Note: *Consult the QuickSpec for the AlphaServer system on which the KZPDC controller will be installed for numbers of controllers supported and other platform specific information.*

DS20E System Issues

- Smart Array 5300A controllers are not supported in DS20E systems in Hose 0.

GS80, GS160 and GS320 System Issues

- KZPDC controller support under OpenVMS on the GS80, GS160, and GS320 system platform is available beginning with version 7.3-2 of the operating system.
- OpenVMS Galaxy system environments on the GS80, GS160, and GS320 platform must be updated with AlphaServer System console version 6.7 (or later) prior to installing the KZPDC controller. System environments that are not partitioned or that employ only hard partitioning are supported with a minimum SRM console version corresponding to the V6.8 Alpha Firmware release.
- The ADFU V1.10A is the minimum revision required for support of GS80, GS160 and GS320 platforms.

ES47, ES80 and GS1280 System Issues

- KZPDC controller placement and configuration in model ES47, ES80, and GS1280 systems is governed by the guidelines included in the platform QuickSpec.
- ES47, ES80, and GS1280 system environments are supported with the Smart Array 5300A runtime utilities under OpenVMS. This support is provided with OpenVMS Management Agents kit version 3.02 and the Smart Array Configuration Utility XE version B0126 and later revisions. The previous restriction has now been removed which limited support of the KZPDC product on the ES47, ES80, and GS1280 platform to a single controller instance per partition when the Smart Array 5300A utilities are installed.
- The ADFU V1.10A is the minimum revision required for support of ES47, ES80 and GS1280 platforms.
- The SRM console environment variable `HEAP_EXPAND` does not

exist on ES47, ES80, and GS1280 platforms. Customers can disregard requirements to set this variable when the KZPDC product is installed on these systems.

AlphaServer System Firmware Issues and Restrictions

- Smart Array 5300A logical volumes configured as operating system dump devices must be resident on the KZPDC controller that is specified by the `bootbios` console environment variable.

Tru64 UNIX Issues and Restrictions

- Smart Array 5300A volumes are not supported as shared SCSI bus storage devices.

OpenVMS Issues and Restrictions

- Prior restrictions on the use of KZPDC logical volumes in Volume Shadowing environments are removed. Consult the Volume Shadowing documentation accompanying your specific OpenVMS release for guidance in configuring this feature.
- Smart Array 5300A volumes are not supported as shared SCSI bus storage devices.
- KZPDC controller support under OpenVMS on the GS80, GS160, and GS320 system platform is available beginning with version 7.3-2 of the operating system.

Runtime Utility Issues and Restrictions

The following items are known issues with the utilities provided with Smart Array 5300A controllers.

- Users are referred to the cautionary advice elsewhere in this document concerning compatibility of the B0126 and B0105 ACU-XE kit with the version 3.xx OpenVMS Management Agents kit.

- Resizing (dragging the border of) the Netscape "HP Array Configuration Utility XE" window, causes the ACU-XE session to end. A new session of ACU-XE will have to be started.
- The GIF shown for an Array with a degraded Logical volume is the same as a GIF for an Array with a failed Logical volume.
- In some Tru64 UNIX systems with large configurations and large numbers of SA5300 logical drives, starting up or exiting, the ACU-XE utility may take an extra long time (up to 20 minutes.) The user might get an impression that the utility is "hung" since no indications of what is actually happening are present. To check if the utility is still in startup or shutdown mode, put your cursor in the bar at the top of the ACU-XE window. If the utility is still active, the cursor will change to an hour glass.
- Resizing the Tru64 UNIX CPQIM middle pane window, between the disks and the detailed information (right pane), results in dropped display data, and both panes turn dark brown/grey. A browser reload refreshes the data and display.
- Critical errors on the Smart Array 5300A controllers are accompanied by red status messages within the Array Configuration Utility. The last statement in each of these messages, "For more information, run the Array Diagnostics Utility.", should be disregarded. Use the WEBES System Event Analyzer to obtain further information about the reported errors.
- When a condition such as a hardware fault occurs, some data may need to be flushed from cache. To perform the cache flush, run the `bios` from the SRM console on the affected controller.
- The ACU-XE can use valuable system resources and should not be left running when not in use. Users are encouraged to start the ACU-XE only when required and shut it down once any configuration changes are completed.
- WSEA V4.4.2 provides limited and missing state information in its bit to text decode of SA5300A events . Translation improvements will be available by installing later revisions of this tool.
- Booting the ADFU on an AlphaServer DS10 with a Maxtor 40GB

IDE DiamondMax Plus 8 drive configured, will hang the system. To work around this problem, pass the string `hdx=none` in the boot flags for each problem drive in the system. The `0` flag will boot the ADFU on the graphical console, from device `dqa0` and will ignore the listed hard drives. For example:

```
>>>b -fl `0 hdb=none hdc=none` dqa0
```

- When exiting the graphics mode of the ADFU utility on ES47, ES80 and GS1280 systems with the console environment variable `set console graphics`, USB 302 errors will be displayed on the graphics console. These are benign and can be removed by issuing a reset at the MBM prompt or avoided by booting the ADFU in graphics mode (`b -fl 0`) with the console environment variable `set console serial`.

```
<esc><esc>MBM
MBM> reset
```

- The first CDROM drive (`DQA0`) must be used to boot the ADFU in systems with multiple CDROM drives.
- With the ACU-XE utility, make sure to create and SAVE at least one logical volume within any newly created array before continuing to create more arrays. Always follow these three basic steps:
    1. create array
    2. create volume
    3. save
- Upon completion of configuration changes to a Tru64 UNIX system configuration of SA5300A with CPQIM340 and ACU-XE V1.3, information may be dropped from the management agent displays. Users are advised to restart the agents as follows:

  ```
  /sbin/init.d/insightd start
  ```

- If CPQIM340 fails to install due to previously installed components, the partially installed files must be manually removed before attempting a reinstall. There is no scripted uninstall procedure. The following is an example of the cleanup

process for the smdb:

1. Change directory to /usr/.smdb
2. Identify partially installed modules ls -l *340* | fold
   Note: that there is a `link` to the cluster area
3. Delete the partially installed modules identified in step 2:
   rm CPQIM340.*
4. Change directory to the cluster link:
   cd /usr/cluster/members/member0/.smdb
   Note: replace 0 with * for all cluster members.
5. Identify the partially installed modules :
   ls -l *340*
6. Delete the partially installed modules:
   rm CPQIM340.*
7. Attempt to re-install CPQIM340.

- After installing and invoking CPQIM340 and CPQACUXE13071A, an error will result when configuring ACU-XE as shown in the following example:

```
# cpqacuxe -h
16862:./acuxebin: /sbin/loader: Fatal Error:
Cannot map library libexpat.so
```

  To avoid this issue, add the following two lines to the beginning of /usr/sbin/cpqacuxe to define the path prior to launch of the ACU-XE :

```
LD_LIBRARY_PATH=/var/opt/CPQIM340/lib
export LD_LIBRARY_PATH
```

  This issue is resolved with later revisions.

- If GSview is running on an AlphaServer GS80, GS160, or GS320, it must be stopped before CPQIM340 or other revisions can be installed.

  1. To determine if gshmmod is running:

```
ps agx | grep -i gshmmod
```

The output will resemble the following:

```
root ... /var/opt/CPQGSddd/web/im/GSview/gshmmod
```

2. If the process is found use the following to stop the process:

   ```
   /sbin/init.d/gshmmod stop
   ```

3. Once the `gshmmod` process is stopped CPQIM340 can be installed and the updated `gshmmod` process restarted.

- The Tru64 UNIX V5.1B-3 patch kit will not install on prior version systems that are configured with CPQIM340 and CPQACUXE installed. Refer to the V5.1B-3 release notes for Management Agent kit removal instructions.
- After configuring volumes under ACU-XE, sometimes the volumes do not become available under OpenVMS. If the configured volume under ACU-XE is not found by OpenVMS, issuing the following command will make the volume available:

  ```
  $MC SYSMAN IO AUTO/LOG
  ```

Firmware Issues and Restrictions

- The maximum possible number of logical drives that can be configured on a Smart Array 5300A controller is 32.
- Logical volume capacity extension is not supported.
- The maximum logical volume size supported by the firmware is 2 Terabytes.
- If a Hot Spare has replaced a failed physical drive within a redundant array, the ACU-XE may show a logical volume having another volume below with "???" as the spare capacity. Replacing the failed drive will cause the array to return to the original configuration.
- In the event of a SCSI bus failure, all logical devices on this bus might become failed. There is a way these devices can be made available to the user (data integrity cannot be guaranteed, however). To do this, shut down your AlphaServer and run `bios` on the controller housing these devices:

  ```
  >>run bios pya0
  ```

  You will be presented with a choice of either recovering (making optimal) these devices or leaving them in the failed state. There is no default option under this scenario, and mandatory ‘user intervention’ is required.

Storage Enclosure Issues and Restrictions

- The following list describes power sequencing rules for avoiding possible array volume state changes that affect the availability of user data:
- When removing power to a storage enclosure attached to a Smart Array controller, first remove power to the host system, followed by powering off the storage enclosure.
- When powering a system on, ensure all storage enclosures attached to a Smart Array controller first receive power before applying power to the host system.
- The BA610-6D internal disk cages are only supported with Nile logic cards P/N 3R-A1629-AA/010615-001 of rev. 0B. Cards with P/N 3R-A1629-AA/010615-001 of rev. 0A are not supported with Smart Array 5300A controllers.
- Customers who own BA610-6D modules with logic cards of P/N 3R-A1629-AA/010615-001 of rev. 0A and want to take advantage of internal RAID must contact HP Field Service to have their 3R-A1629-AA/010615-001 rev. 0A cards replaced.
- When configuring a Smart Array 5300A controller attached to a storage enclosure configured with a dual bus I/O module, each of the enclosure's SCSI bus segments may be attached to a Smart Array controller instance. Connecting a controller or adapter other than another Smart Array controller to the second SCSI bus segment of the enclosure is unsupported.
- If a Smart Array 5300A controller loses communication with a storage enclosure, all physical drives in this enclosure are seen via SNMP Agent as located in an enclosure Bay 255. This typically means there is a hardware problem with the enclosure. Contact HP Services for enclosure troubleshooting support.

Hardware and Connection Details

- The StorageWorks 4400 (MSA30) series of storage enclosures are supported for use with the KZPDC controller at up to Ultra160 SCSI data transfer rates.

- All supported external enclosures ship with Ultra3 SCSI compliant cables. See the QuickSpec for your HP StorageWorks storage enclosure for the list of supported cables.
- The model 4254 P/N 138151-001 (DS-SSL14-RS) contains an Ultra2 capable I/O module which is dual bus only.
- The model 4354 P/N 190211-001 (DS-SL13R-BA) contains an Ultra3 capable I/O module which is dual bus only.
- The model 4214 P/N 103381-001 (DS-SSL14-RM) contains an Ultra2 capable I/O module which is single bus only.
- The model 4314 P/N 190209-001 (DS-SL13R-AA) contains an Ultra3 capable I/O module which is a single bus only.