README.TXT

Adaptec ASR-8405/ASR-8805/ASR-8885/ASR-8885Q/ASR-81605Z/ASR-81605ZQ SAS/SATA AID Controllers
Adaptec ASR-7805/ASR-7805Q/ASR-71605/ASR-71605Q/ASR-71605E/ASR-71685/ASR-72405/ASR-78165 SAS/SATA RAID Controllers
Adaptec ASR-6405/ASR-6445/ASR-6805/ASR-6805Q/ASR-6405E/ASR-6805E/ASR-6805E R5 SAS/SATA RAID Controllers
Adaptec ASR-6405T/ASR-6805T/ASR-6805TQ SAS/SATA RAID Controllers
AFM-700/AFM-600 Flash Backup Unit

NOTE: All Adaptec by PMC products are UL listed and for use only with UL listed ITE.

as of June 16, 2015

Please review this file for important information about issues and errata that were discovered after completion of the standard product documentation. In the case of conflict between various parts of the documentation set, this file contains the most current information.

The following information is available in this file:

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1. New Features in this Release

o Support for Adaptec ASR-81605Z SAS RAID Controller

o Adaptec Series 6, 7, 8 SAS RAID Controllers refresh, including:

- Support for new operating systems

- Updated Linux drivers with improved performance and 'linux dd' support for RHEL and CentOS

- Enhanced flash backup unit error reporting

- Improved throughput for RAID 1 sequential reads when read cache is disabled and write cache is enabled

- History buffer enhancements (call stack/SCSI command descriptor block/debug information in log entries)

- Bugfixes

o Die temperature warning limit raised on Adaptec Series 7 and Series 8 controllers from 95 deg C to 102 deg C; resume limit raised from 90 deg C to 97 deg C (ie, after reaching 97C degrees, the buzzer turns off)

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2. Software and Documentation

2.1 Driver & Utility Software

NOTE: You can download the latest versions of firmware, BIOS, driver software and utilities from the Adaptec Web Site at start.adaptec.com.

o Adaptec Firmware/BIOS/Drivers Version 1.08

o Adaptec maxView Storage Manager/ARCCONF Version 1.08

Drivers for this release have been tested and certified on the following operating systems. You can load the drivers on out-of-box operating system versions, the latest service pack, or software update. Compatibility issues may be seen with untested OS versions.

Microsoft Windows Drivers:

o Windows Server 2012 R2, 64-bit
o Windows Server 2008, 32-bit and 64-bit
o Windows Server 2008 R2, 64-bit
o Windows SBS 2011, 64-bit
o Windows 7, 32-bit and 64-bit
o Windows 8, Windows 8.1, 32-bit and 64-bit

Linux Drivers:

o Red Hat Enterprise Linux 7.1, 64-bit
o Red Hat Enterprise Linux 6.6, 5.11, 32-bit and 64-bit
o SuSE Linux Enterprise Server 12, 64-bit
o SuSE Linux Enterprise Server 11, 10, 32-bit and 64-bit
o Debian Linux 7.8, 32-bit and 64-bit
o Ubuntu Linux 14.10, 14.04.1, 12.04.3, 32-bit and 64-bit
o Fedora Linux 21, 32-bit and 64-bit
o CentOS 7.1, 64-bit
o CentOS 6.6, 5.11, 32-bit and 64-bit

FreeBSD Drivers:

o FreeBSD 10.1, 9.3, 32-bit and 64-bit

Virtual OS Drivers:

o VMware ESXi 5.5
o VMware ESXi 6.0
o Citrix XenServer 6.5

Solaris Drivers:

o Solaris 10 U11
o Solaris 11.2*

*Not Supported on Bootable Arrays; see Section 3.7.

2.2 Documentation

NOTE: You can download the latest documentation from the Adaptec Web Site at start.adaptec.com.

PDF Format (English/Japanese):

o Adaptec SAS RAID Controllers Installation and User's Guide
o Adaptec RAID Controller Command Line Utility User's Guide
o maxView Storage Manager User's Guide
o Adaptec SAS RAID Controllers Quick Start Guide (multi-language)

HTML and Text Format:

o maxView Storage Manager Online Help
o Adaptec SAS RAID Controllers README.TXT file
o maxView Storage Manager README.TXT file

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3. Installation and Setup

3.1 Installation Instructions

The Adaptec SAS RAID Controllers Installation and User's Guide contains complete installation information for the controllers and drivers. The Adaptec RAID Controllers Command Line Utility User's Guide contains complete installation information for ARCCONF. The maxView Storage Manager User's Guide contains complete installation information for the maxView Storage Manager software.

3.2 SAS HD Cable Insertion

Be sure to orient external SAS HD cables correctly, prior to insertion on Adaptec Series 7/8 RAID controllers. With most standard implementations (Molex, Amphenol, FCI receptacles), it's possible to defeat the mechanical keying of the mini-SAS HD plug connector system by turning the plug upside-down.

3.3 Flash Backup Unit Setup

3.3.1 Supercapacitor Setup with Adaptec Series 6Q Controllers

With Adaptec Series 6Q controllers, you must affix the supercapacitor module to the computer chassis with cable ties. For instructions, refer to the Flash Backup Unit Installation Guide, available at the Adaptec Web site at start.adaptec.com.

NOTE: The RAID Controller User's Guide describes how to install the supercapacitor module using the mounting plate method. The instructions apply only to Adaptec Series 7Q/8Q/8ZQ controllers and Adaptec Series 7/8 controllers with optional flash backup unit.

3.3.2 AFM-700 Cross-Controller Migration

Migrating the AFM-700 daughterboard/supercacpacitor module from one controller series to another is not supported in this release; eg, from an Adaptec Series 7 controller to an Adaptec Series 8, or vice-versa.

3.3.3 Status LEDs

The AFM-700 Flash Backup Unit includes three LEDs to help you monitor status. See the labels on daughterboard PCB for LED locations.

LED 'DS2': Charger Enabled

DS2 Solid on	Charger Enabled
DS2 Blinks	Charger Off (during cap learn cycle)
DS2 Temporary Blinks	No Supercapacitor attached

LED 'DS3': Supercapacitor power indication;
Supercapacitor charge Bleeding LED

LED 'DS4': Blinks faster when backup in progress

3.4 Partition Setup

- Logical drives with >2TB of storage require GPT partitioning (GUID Partition Table) for OS installation or use as a data container.

  NOTE: Windows creates MBR partitions (Master Boot Record), by default, which can address only 2TB of storage space. If the logical drive is >2TB, it is segmented into two partitions without warning, one up to 2TB, the other with the remaining disk space. Linux displays a pop-up message that the disk needs to be partitioned.

- Before attempting to install an operating system in uEFI mode, you must delete all MBR partitions from the disk or reformat the disk with GPT. The installation may fail if you try to install on a disk with a MBR partitioning scheme. See also Section 4.11.

3.5 DKMS Driver Setup

Driver installation instructions for Red Hat Linux and CentOS

with Dynamic Kernel Module Support (DKMS) are provided in the RAID Controllers Installation and User's Guide. DKMS ensures that the driver remains installed across OS updates.

NOTE: For DKMS driver instructions for other linux OSs (eg, Fedora), contact Adaptec Support or check the Adaptec Support Knowledgebase (ASK) at ask.adaptec.com.

3.6 Windows Setup

- When installing the driver on a Windows 2012 R2 system with two controllers installed (Adaptec Series 7 or Series 8) and at least one logical drive on each controller, the OS fails to detect the logical drives during installation. (The issue is not seen with only one controller.)

  WORKAROUND: Use the Windows inbox driver for installation, then update with the Adaptec driver after the installation completes.

- When installing the driver on Windows SBS 2011 Essential, the installer times out before listing all discovered drives. The number of listed drives varies, depending on the drive type (eg, SAS vs SATA). This is a limitation in the Windows SBS installer; the Adaptec device driver detects all attached drives.

- See also, Section 3.9.1, "Windows Setup with 4K Sector Drives."

3.7 Solaris 11 Setup

- To install the in-box driver on Solaris 11:

  1. Remove the old Adaptec driver if already installed on your computer, then reboot:

     ```
     pkginfo -l SUNWaac
     pkg uninstall aac
     ```

  2. Install the new in-box driver, then reboot:

     ```
     pkgadd -d AAC.PKG
     ```

- Installing Solaris 11 on a bootable array is not supported in this release.

3.8 Fedora Linux Setup

To avoid a known PCIe Active State Power Management issue under Fedora Linux 14, you must add the OS option `pcie_aspm=off` in the GRUB bootloader file "menu.lst". Follow these steps:

1. When the first Fedora installation screen appears, press the 'Tab' key.
2. Before pressing the first 'reboot' button, edit grub/menu.lst:
   - Press Alt+F2
   - cd /mnt/sysimage/boot/grub/
   - Open the menu.lst file
3. Add 'pcie_aspm=off' just after 'rhgb quiet'. The new line should look like this:
   ```
   root (hd0,0)
   kernel /vmlinuz-2.6.33.3-85.fc13.i686.PAE... rhgb quiet pcie_aspm=off
   ```

3.9 Booting from 4K Sector Hard Drives

Boot support for 4K sector hard drives varies by vendor and OS version, and is supported on uEFI systems only. (For more information, see the Adaptec Knowledge Base at http://ask.adaptec.com.)

3.9.1 Windows Setup with 4K Sector Drives

To install Windows on a 4K sector drive in uEFI mode:

- Refresh the screen after the driver is installed.
- Delete the two extra partitions (created erroneously) before continuing: the 'Recovery' partition and the 'System' partition.
- Do NOT remove the USB driver disk until the installation completes. If you remove the USB drive early, Windows displays a message saying it could not continue to the next phase of the installation.

3.10 uEFI Secure Boot Setup

If your RHEL 7, SLES 11 SP3, or SLES 12 system is booted with

uEFI Secure Boot, you must add a public key to the MOK list (Machine Owner Key) before installing the driver on an existing OS.

To add the key to the MOK list using the mokutil utility:

```
mokutil --import aacraid_key_pub.der
```

Enter and confirm a password for the MOK enrollment request, then reboot. The pending MOK key enrollment request will be noticed by shim.efi, which will launch MokManager.efi to allow you to complete the enrollment from the uEFI console.

Enter the password you previously associated with this request (using mokutil), or enter your root password, then confirm the enrollment. The public key is added to the MOK list, which is persistent. Once a key is on the MOK list, it is propagated automatically to the system key ring for this and subsequent reboots, when uEFI Secure Boot is enabled.

3.11 Adaptec maxCache Setup

- maxCache SSD caching is supported on Adaptec Series Q controllers only
- The maximum number of SSDs that you can install on a controller for maxCache applications is:

  8885Q/81605ZQ: up to 8 SSDs, with 2TB total capacity
  7805Q/71605Q: up to 8 SSDs, with 2TB total capacity
  6805Q/6805TQ: up to 8 SSDs, with 1TB total capacity

  See www.adaptec.com/compatibility for a list of maxCache-compatible SSD drives.

3.12 Dual Firmware Flash Image Support

Adaptec Series 7 and Adaptec Series 8 controllers support active and passive firmware images. Built-in logic determines the "right time" to update from passive to active, either at shutdown or boot up, and is designed to protect against image corruption or data loss due to power failure during image update. If the update occurs in the boot path, a server reboot is expected. Additionally, you must be running the latest drivers.

NOTE: This feature is enabled only when upgrading from and to a firmware version that supports dual firmware images. For customers upgrading from an Adaptec release prior May 2013 (specifically, Firmware Version 7.2.0, Build 30260), there is no change in behavior. The firmware image is updated in one stage.

3.13 Adaptec Flash Utility (AFU) Support

Adaptec Series 8 controllers do not support the DOS-based Adaptec Flash Utility (described in the user's guide). To flash a Series 8 controller, use the uEFI BIOS, ARCCONF, maxView Storage Manager, or the maxView Storage Manager bootable USB image.

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4. Known Limitations

4.1 Linux Boot Device

Regardless of which device you select to install the OS, the boot record is always written to Device 0. As a result, Linux will fail to boot if you delete or swap away Device 0. For example, if you create three arrays in the BIOS--VOL-0, VOL-1, and VOL-2--install the OS on VOL-1, then swap VOL-0 and VOL-2, Linux will fail to boot. Restore the original array sequence and Linux boots normally. Ideally, you should always install on Device 0.

4.2 OS Installation with RAW Devices

With Adaptec Series 7 and Adaptec Series 8 controllers, installing the OS in a mixed configuration with RAID Arrays and RAW devices is not supported.

WORKAROUND: Remove the RAW devices, install the OS on the RAID array, then re-install the RAW devices.

4.3 Adaptec Series 6 Controller Issues

The following issues are seen only with Adaptec Series 6 RAID controllers:

- Due to a PCIe configuration problem with ASUS Z9PE-D8 WS motherboards, Adaptec Series 6 controllers are not detected in slots with x8 links (eg, slots, 2,4,6).

  WORKAROUND: Use a slot with x16 links.

- Hybrid RAID 10 logical drives (comprised of an equal number of SSDs and HDDs) are not built correctly in the CTRL-A BIOS; the segment order is incorrect.

  WORKAROUND: Create the Hybrid RAID 10 in maxView Storage Manager or ARCCONF.

4.4 Hot-plugging the Flash Backup Module

Hot-plugging the AFM-700/AFM-600 supercapacitor (flash backup) module is not recommended. Doing so may result in unusual status updates, such as Preparing to Dead to Ready.

4.5 ATAPI Device Support

Adaptec Series 6, Series 7, and Series 8 RAID controllers do not support ATAPI CD-ROM, DVD, or tape devices.

4.6 System Compatibility Issues

- Discovery of Series 7 RAID controllers during system POST may be delayed in some PCIe 3.0 systems, if link-up errors occur during PCIe link negotiation. These link-up errors occur rarely, are corrected automatically, and pose no risk of performance or data integrity issues. If your system is configured to log correctable PCIe errors you may see a small number of errors recorded at the time of link training.

- With an Adaptec Series 7/8 controller connected to an ASUS P8Z77V-LK motherboard, the controller may not be detected in slot 7.

  WORKAROUND: Use slot 2 or slot 5.

- With an Adaptec Series 7/8 controller connected to an ASUS P8B-M motherboard, the CTRL-A BIOS fails to load automatically after POST.

  WORKAROUND: Press ENTER to load the BIOS during POST.

- Intel servers do not completely clear popup messages when there are multiple popups in a single operation in the uEFI/HII interface.

- With the HP StorageWorks D2700 enclosure, a maximum of 25 SAS drives or 24 SATA drives are supported. Slot 0 cannot be used with SATA drives.

- Promise J630 and J830 enclosures are not supported in this release.

4.7 Drive Compatibility Issues

- OCZ Vertex 4 SSDs are not supported in this release.

- With Seagate Constellation ES drives (eg, ST3500514NS) with FW SN11, a medium error might result in SCSI command timeouts, depending on the I/O load. This condition might be seen when creating a logical drive with the 'build' initialization method.

- With Hitachi HUA721050KLA330 hard drives, the drive LED blinks just once when using the CTRL-A BIOS 'Identify Drive' option. The LED blinks continuously if blinked from ARCCONF or maxView Storage Manager.

- With HP LTO-4 Ultrium 1840 tape drives, backup fails with Adaptec Series 7 controllers.

  WORKAROUND: Upgrade the drive firmware to A63D using an on-board SAS or SATA controller, then try again.

- With Tandberg LTO-4 tape drives, backup fails during longer write sequences with Adaptec Series 7 and Adaptec Series 8 controllers. The error is seen during writes in the 10GB-20GB range, causing the operation to be aborted.

4.8 RAID 50/RAID 60, Max Drives

The maximum number of drives in a RAID 50 or RAID 60 differ between maxView Storage Manager, ARCCONF, and the BIOS:

- BIOS and ARCCONF: 128 drives max

  RAID 50 - From 2-16 legs with 3-32 drives/leg
  RAID 60 - From 2-16 legs with 4-16 drives/leg

- maxView Storage Manager:

  Assumes 2 legs for RAID 50/RAID 60 (non-selectable)
  RAID 50 3-32 drives/leg (64 total)
  RAID 60 4-16 drives/leg (32 total)

4.9 Solaris 32-bit Array Size Limits

Due to an OS limitation in Solaris 32-bit systems, the practical size limit for an array on Solaris 32 is 1TB.

NOTE: If you create a >1TB array, OS tools, such as format or fdisk, won't detect them.

4.10 SLES 11 Boot Device Migration Issues

By default, SuSE Linux uses the 'by-id' method to identify drives/partitions on the boot device. As a result, migration from one controller to another (eg, ASR-8885 to ASR-81605ZQ) fails because the original boot drive ID is not found on the new controller.

WORKAROUND: Switch to the "by-uuid" method, then perform the migration.

Step #1: Use the blkid command (built-in utility) to find the UUIDs of file systems

```
sles11sp1boot:~ # blkid
/dev/sda1: UUID="4512cf7d-4e22-4dfa-8991-4084dae41409" TYPE="swap"
/dev/sda2: UUID="b144a0a2-b7fc-47fd-8459-ba40d0f663cd" TYPE="ext3"
```

Step #2:

(a) cd /etc
(b) edit fstab file
(c) Change the "by-id" names of file systems to their corresponding "uuid" names found in Step #1

Note: Make a backup of the fstab file before modifying it.

Step #3:

(a) cd /boot/grub
(b) edit menu.lst file
(c) Change the "by-id" names of file systems to their corresponding "uuid" names found in Step #1

Note: Make a backup of the menu.lst file before modifying it.

Step #4:

(a) Shutdown the SUSE system
(b) Change the HBA/controller
(c) Boot the system

4.11 uEFI BIOS Issues

- The uEFI utility may become unresponsive after 15-30 minutes of continuous use when you perform a large number of steps or continuously navigate through multiple screens (array creation, deletion, viewing array properties, etc.).

  WORKAROUND: Restart the server if uEFI becomes unresponsive.

- Using "FW Update from Media" and "Save Support Archive" in the same uEFI session may cause the system to become unresponsive.

  WORKAROUND: Restart the server if uEFI becomes unresponsive.

- uEFI-mode setup is not supported on Supermicro X9SCL-LN4F and X9DRi-F motherboards.

4.12 BIOS Feature Disparity: Selectable Performance Mode

In the Legacy (CTRL-A) BIOS, the Selectable Performance Mode option is enabled for controllers operating in HBA Mode. This differs from maxView Storage Manager and ARCCONF, which disable Selectable Performance Mode if the controller is in HBA Mode.

4.13 Simple Volume Support

In this release, you can create a maximum of 128 Simple Volumes in maxView Storage Manager, ARCCONF, or the BIOS.

4.14 Auto-Volume Support

- Changing a controller into Auto-Volume mode (ARCCONF/BIOS) is not supported if the configuration includes any logical device type other than Simple Volume, including a maxCache Device. The mode switch from RAID mode to Auto-Volume mode is blocked if any other type of logical volume exists (including maxCache). After switching to Auto-Volume mode, you can create and delete Simple Volumes only in maxView Storage Manager, ARCCONF, and the BIOS.

- In Auto-Volume mode, only the first 128 RAW drives are converted to Simple Volumes; the rest of the RAW drives remain unchanged. If you uninitialize a Ready drive while the controller is in Auto-Volume mode, the firmware converts the drive automatically until the Simple Volume count reaches the maximum.

4.15 Force Rebuild in CTRL-A and uEFI BIOS

With Automatic Failover disabled, Force Rebuild in the CTRL-A (Legacy) BIOS fails if you insert a new drive in place of a pulled member drive. If same member drive is pulled and re-inserted, the logical drive rebuilds successfully. In the uEFI BIOS, Force Rebuild fails in both cases; that is, inserting a new drive or re-inserting the pulled member drive.

4.16 Kernel Warning on Enclosure Power Off

On Linux systems running kernel version 3.3 or older (eg, RHEL 6.5), powering off an enclosure may result in a kernel warning because the enclosure device goes offline before the attached drives go offline. To avoid these warnings, install the kernel patch provided at this link:

https://git.kernel.org/cgit/linux/kernel/git/jejb/scsi.git/commit/?h=fixes&id=11e52a699afff576606ceb6cf697270459f1a4aa

NOTE: The issue is not seen with newer Linux distributions, such as RHEL 7, which uses Linux kernel 3.10.

4.17 hdparm Support

On Windows and Linux, the 'hdparm -i' command, used to set and view ATA hard disk drive parameters, is not supported for direct-attached drives on Adaptec SAS controllers. Since 'hdparm -i' is designed for native libata/ide drivers, the command works as designed and the behavior is expected.

WORKAROUND: Use the 'hdparm -I' command instead.

4.18 HDA Mode Reset

Adaptec Series 6/7/8 RAID controllers use the HDA mode jumper on the controller board for performing a controller reset. If a HDA reset is required, contact Adaptec Support for assistance.

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