ATTO Technology, Inc.

Product Release Notes

ExpressSAS 6Gb RAID Flash Bundle v190125

1. General Release Information

These product release notes define the new features, changes, known issues and release details that apply to **ExpressSAS 6Gb RAID**, firmware version **190125**, that was released on **01/29/2019**.

2. Changes

- *Version 190125/BIOS v4.20/EFI v2.55 (Released 01/29/2019)*
  - **New Features**
    - Incorporated firmware version 4.44
  - **Incident Resolutions/Bug Fixes/Changes**
    - Resolved an issue where disk drives were disconnected during Media Scan, causing a Watchdog event.
    - Resolved an issue where certain HGST SATA3 drives were not spinning up properly.
    - Resolved an issue where Dell MD3060e storage experienced intermittent stability issues due to unexpected Read errors.
    - Corrected an issue where Media Scan reported the wrong length scanned.
    - Resolved an issue where regeneration was not occurring on Reads when vendor specific errors occur.
    - Resolved an issue where certain Seagate drives, on rare occasions, got into a DATA ABORT loop.

- *Version 171023/BIOS v4.20/EFI v3.55 (Released 11/01/2017)*
  - **New Features**
    - Incorporated firmware version 4.43
  - **Incident Resolutions/Bug Fixes/Changes**
    - Resolved an issue where the RAID adapter with CacheAssure installed would not identify itself correctly.
    - Resolved an issue where the RAID adapter causes a system hang because of a TASK ABORT/LUN RESET loop.
    - Modified media scan stripe handling to eliminate the potential for long RAID group build/rebuild times with certain corner case configurations.

- *Version 170209/BIOS v4.20/EFI v3.55 (Released 2/14/2017)*
  - **New Features**
    - Incorporated firmware version 4.42
  - **Incident Resolutions/Bug Fixes/Changes**
    - Resolved a rare issue where not all drives would appear after a scan

- *Version 161206/BIOS v4.20/EFI v3.55 (Released 12/14/2016)*
  - **New Features**
    - Incorporated firmware version 4.41
    - TLR has been disabled due to a hardware limitation.
  - **Incident Resolutions/Bug Fixes/Changes**
    - Resolved an issue where temporary state conditions were improperly stamped to metadata, resulting in poor data transfer performance.
    - Resolved logging issues where the RAID adapter would generate INFO error messages upon reboot and erroneous WARN messages.

- ***Version 160930/BIOS v4.20/EFI v3.55 (Released 10/04/2016)***
  - **New Features**
    - Incorporated firmware version 4.40
    - Implemented new media scan algorithms that are more scalable and greatly reduce consumed I/O bandwidth; media scan now automatically scheduled to start one week after completion of previous scan; RAIDMediaScanPriority added to CLI.
    - Significant modifications to rebuild algorithms; guarded rebuild increases data availability while preventing the introduction of silent data corruption.
    - Board temperature now logged hourly if temperature reaches 60 degrees C.
  - **Incident Resolutions/Bug Fixes/Changes**
    - Resolved issue where RAID group would incorrectly auto-rebuild when blockdevclean command issued.
    - Resolved an issue with member status of stale drives.
    - Resolved rare issue where surprise cable pull resulted in the adapter becoming unresponsive.
    - Modified QFULL logging parameters to eliminate log spamming.
    - Resolved issue with RMSTATUS CLI command.
    - Resolved RAID group rebuild issues where it would become stuck, or rebuild would restart at 0% after being interrupted

- ***Version 160719/BIOS v4.20/EFI v3.55 (Released 7/20/2016)***
  - **New Features**
    - Incorporated firmware version 4.31
  - **Incident Resolutions/Bug Fixes/Changes**
    - Resolved a rare incompatibility issue with certain RAID CLI commands.

- ***Version 160623/BIOS v4.20/EFI v3.55 (Released 6/28/2016)***
  - **New Features**
    - Incorporated firmware version 4.30
    - Resolved rare performance issues caused by write holes created during some non-sequential data writes.
    - Updated how disk drive serial numbers are displayed.
    - Improved handling of staggered drive spinups that take an extremely long time to complete.
  - **Incident Resolutions/Bug Fixes/Changes**
    - Resolved rare issue where very large buffer could cause a kernel panic.
    - Resolved issue where degraded drives were not properly removed from RAID group inventory during discovery.
    - Modified handling of multiple, simultaneous medium errors to ensure high QoS.
    - Modified logging procedures to reduce the chance of event log spamming.

- ***Version 160316/BIOS v4.20/EFI v3.55 (Released 03/18/2016)***
  - **New Features**
    - Incorporated firmware version 4.25
    - Logging has been modified to make individual log sizes more manageable. Up to five 50MB files will be created, and the oldest will be deleted on a FIFO basis.
  - **Incident Resolutions/Bug Fixes/Changes**
    - Resolved an issue where, in rare instances, loss of a single drive results in events that cause a RAID group to go offline.
    - Resolved a rare condition where RAID rebuild operations fail because of 'stuck' commands.
    - Fixed a nuisance error that generated a fault message when deleting a RAID group during an express initialization.
    - Resolved a memory leak created when virtual block devices within the ATTO VDA remain even when RAID groups are deleted.
    - Fixed an issue where a core log file was not generated in some cases.
    - Fixed an issue where ASCII event logs were not created in some cases.
    - Fixed an issue where some sense key errors were not being reported properly.

- ***Version 160127/BIOS v4.20/EFI v3.55 (Released 01/28/2016)***
  - ○ **New Features**
    - ▪ Incorporated firmware version 4.21
  - ○ **Incident Resolutions/Bug Fixes/Changes**
    - ▪ Resolved an issue where firmware did not properly handle nested SYNC CACHE messages being issued to multiple partitions simultaneously.

- ***Version 151211/BIOS v4.20/EFI v3.55 (Released 12/16/2015)***
  - ○ **New Features**
    - ▪ Incorporated firmware version 4.20
    - ▪ Modified firmware detection process: now detects when the firmware has been reset before the driver has loaded and go degraded instead of attempting to wait for the firmware to become ready.
    - ▪ (EFI only) The EFI driver is now signed to support UEFI Secure Boot.
    - ▪ (BIOS only) Modified start-up process. If the BIOS fails to load because of memory allocation issues, the user is then prompted to enter a location to load the Configuration Utility.
  - ○ **Incident Resolutions/Bug Fixes/Changes**
    - ▪ (EFI only) Fixed a rare issue where the driver would erroneously trigger a heartbeat failure.

- ***Version 150811/BIOS v3.50/EFI v3.50 (Released 08/17/2015)***
  - ○ **New Features**
    - ▪ Incorporated firmware version 4.10
    - ▪ Added support for single member JBOD mode
    - ▪ Send Sync Cache commands are now sent to the drives in parallel
    - ▪ Changed firmware so that it no longer sends Drive Assure re-write commands to faulted drives
    - ▪ Changed drive stamping order, reducing the chance of a bad drive holding up the queue
  - ○ **Incident Resolutions/Bug Fixes/Changes**
    - ▪ Resolved an issue where setting interleave to greater than 512KB caused a significant performance degradation.
    - ▪ Corrected an issue where express initialization failed while pulling cables in a dual domain configuration
    - ▪ Resolved issue causing DriveHealthDisplay to show the Info Exception Count Status as 'unknown' for SAS drives.
    - ▪ Resolved drive pull issue in large drive count configurations, causing commands to be processed incorrectly and output a Stale Dag Function warning.
    - ▪ Fixed XMode Data Abort during Automap after drives are pulled.
    - ▪ Resolved BIOS/EFI boot issue with Supermicro X9DAi system. This fix requires Supermicro BIOS v3.0a, or later, to work properly.
    - ▪ Resolved issues with HP MLS2024 LTO-6 tape library where READ commands were improperly aborted.
    - ▪ Resolved issue with drives that were FAULTED becoming ONLINE or DEGRADED after an adapter reset.
    - ▪ Resolved an issue where PUIS SATA drives were not discovered properly.
    - ▪ Resolved a rare condition where I/O timeouts during initialization caused failures.
    - ▪ Corrected a condition where an excessive number of outstanding I/O requests caused data synchronization issues.
    - ▪ Resolved a rare issue where a disabled IRQ #72 was causing a severe performance degradation.

- ***Version 150604/BIOS v3.50/EFI v3.50 (Released 06/10/2015)***
  - ○ **New Features**
    - ▪ Incorporated firmware version 4.00
    - ▪ Significant upgrades to Unified VDA RAID Engine, including new hot spot coalescing architecture, new pre-fetch engine, and updated RAID data cache management. These changes provide additional performance and stability in various application ecosystems. Note: for customers using "default" settings, the new pre-fetch engine will

automatically use the new "default" setting (default is now "3") following the firmware update. If a setting other than "default" was used, the new firmware will honor that value; however it is important to understand that it will do so using the new pre-fetch algorithms. Unexpected changes to performance may occur, so we highly recommend that customers tuning RAID settings for a specific application should evaluate pre-fetch settings to ensure optimal performance.
- Improved performance for user applications, especially in small block writes and "blended" I/O with large block transfers that have small reads/writes mixed in to the data stream.
- 1GB DRAM Support provides enhanced read ahead caching and higher performance.
- Added RAID/HBA pass through mode support as a new feature
- Improved ESAS RAID adapter platform stability
- Updates to correct wrong Media Scan info being sent
- o **Incident Resolutions/Bug Fixes/Changes**
  - Corrected issue where XOR table aborts on cable pull in dual domain configuration.

- *Version 141212/BIOS v3.50/EFI v3.50 (Released 12/16/2014)*
  - o **New Features**
    - Incorporated firmware version 3.60
    - Improved Sync Cache handling. Timeout increased to 30 seconds; eliminated re-write case; limited to only on-line or degraded members
  - o **Incident Resolutions/Bug Fixes/Changes**
    - Resolved issue where DMA Activate gets a SYNC escape before, or at, SOF, resulting in time-outs. We now retry the frame to prevent the time-out from happening.
    - Resolved issue discovering certain Seagate HDD. Modified discovery process to wait for Signature FIS to be received.
    - Resolved issue where deleted RAID groups were not cleared.
    - Resolved issue where SES slot number wasn't displayed properly.
    - Resolved issue where drives behind an Areca 12Gb expander were not seen.

- *Version 141023/BIOS v3.50/EFI v3.50 (Released 10/24/2014)*
  - o **New Features**
    - Incorporated firmware version 3.55.

- *Version 140805/BIOS v3.50/EFI v3.50 (Released 08/06/2014)*
  - o **It is recommended that firmware version 140805 and BIOS version 3.50 be utilized with this driver release.**
  - o **New Features**
    - Incorporated firmware version 3.50.
    - [BIOS/EFI] Added discovery of RAID50 / RAID60 groups.
    - Modified PHY settings to eliminate instances of CRC errors in certain circumstances.
    - Modified handling of time-outs to eliminate opportunity for cascading time-out issues.
    - Removed '*FanInfo'* CLI command since onboard active cooling not supported.

- *Version 140327/BIOS v3.35/EFI v3.20 (Released 04/02/2014)*
  - o **New Features**
    - Incorporated firmware version 3.30.
  - o **Incident Resolutions/Bug Fixes/Changes**
    - [BIOS] Fixed an issue where devices with a size greater than 2.2TB could not boot because the size was reported incorrectly to the System BIOS.
    - [Config] Add support for Failed and Replaced member status.
    - [Config] Modified behavior so that span depth is not automatically assigned when a group is created with >16 members.
    - [EFI Config] Added Device List menu item. This displays any devices presented to the system, including pass through devices and RAID groups.
    - [EFI] Resolved as issue in the driver to properly respond when the Boot Driver setting is set to Scan Only.
    - Added support for PHY speed control in the ATTO ConfigTool for R6XX Cards
    - Resolved as issue where the adapter buzzer would sound on boot (OS X only)

- Resolved as issue where the adapter would unexpectedly perform a core dump and reset itself.
- Added log message when user sets member status.

- *Version 140113/BIOS v3.32/EFI v3.15 (Released 01/16/2014)*
  - **New Features**
    - Incorporated firmware version 3.25.
  - **Incident Resolutions/Bug Fixes/Changes**
    - SES failures were assigned an event level of INFO in the system logs. These are now assigned CRITICAL levels.
    - Resolved an issue where sync cache cluttered up event logs
    - Resolved an intermittent issue where drives would time out on the same LBA.
    - [BIOS/BIOS Config] Added checks to make sure we are not exceeding memory limitations.

- *Version 131017/BIOS v3.30/EFI v3.15 (Released 10/22/2013)*
  - **New Features**
    - Incorporated controller firmware version 3.21.
  - **Incident Resolutions/Bug Fixes/Changes**
    - Resolved an issue with volumes disappeared after copying large amounts of data
    - Resolved an issue where the RAID adapter WWN was reported incorrectly.

- *Version 130924/BIOS v3.30/EFI v3.15 (Released 09/24/2013)*
  - **New Features**
    - Incorporated controller firmware version 3.20.
  - **Incident Resolutions/Bug Fixes/Changes**
    - [BIOS] Corrected timing issues that could cause the driver to take several minutes to load in certain platforms.
    - [BIOS] Fixed boot hang when using PMM.
    - [Config] Alert the user when a locate operation is performed with no drives selected.
    - [BIOS] Corrected the drive capacity and block size reported to the system BIOS.
    - [EFI] Resolved an issue where the EFI driver did not load automatically when entering the UEFI shell.
    - Resolved an issue that prevented the driver installer from running in Ubuntu 12.4
    - Fixed an infrequent issue with data miscompares on RAID 6 when rebuilding missing drives at different times
    - Fixed a problem where RAID group partitions remain mapped despite group being deleted and SAS cables removed
    - Made improvements to the diagnostic core dump feature
    - Resolved an issue with drives showing up with strange capacity and block sizes
    - Resolved an issue where not all partitions are removed when deleting RAID groups from the ConfigTool.

- *Version 130625/BIOS v3.25/EFI v3.10 (Released 06/27/2013)*
  - **New Features**
    - Incorporated controller firmware version 3.15.
    - [EFI] We now attempt to load only one EFI driver image per driver version in the system. Previously multiple images would be loaded if more than one card was present in a system. If the adapters are different versions multiple images will still be loaded.
  - **Incident Resolutions/Bug Fixes/Changes**
    - [BIOS] Fixed an issue where there was a stall after displaying the device list for systems that switch between video modes during the boot process.
    - [Config] Added CacheAssure status display.
    - [Config] Added the RAID Group operation status to the RAID Group Display window.
    - [Config] Added the ability to mark a RAID group as a boot RAID group on creation. If a boot RAID group is detected during initialization only that RAID group will be presented to the operating system. This only applies to the BIOS and EFI boot drivers.
    - [Config] Display drives by slot instead of by drive index and sort all drive lists by enclosure and slot.

- [Config] Fixed an issue where selecting drives by enclosure would result in extra drives being selected on another adapter.

- ***Version 130404/BIOS v3.16/EFI v3.00 (Released 4/16/2013)***
  - **New Features**
    - Incorporated firmware version 3.05
    - Updated the Flash and Diagnostic utilities to support B2 revision I/O controller.
    - Updated the Flash and Diagnostic utilities to allow multiple channels to be specified on the command line.

- ***Version 130304/BIOS v3.15/EFI v3.00 (Released 3/12/2013)***
  - **New Features**
    - Incorporated firmware version 3.00
  - **Incident Resolutions/Bug Fixes/Changes**
    - [EFI] Corrected the timer frequency that controls several operations including command timeouts.
    - [EFI] Corrected a rare issue that could cause a command to be completed twice.
    - Pass through devices are persistently mapped to prevent data corruption.
    - [BIOS] Fixed a problem where passthrough devices may not be discovered during the bus scan.
    - [BIOS / EFI Config] Added support for SSD RAID groups.
    - [BIOS Config] Update with some of the recent features added to the EFI Configuration Utility.
    - [BIOS] Added POST memory manager (PMM) support.
    - [BIOS / EFI Config] Added the ability to force the SAS link rate.

- ***Version 121213/BIOS v3.11/EFI v2.70 (Released 12/18/2012)***
  - **New Features**
    - Incorporated firmware version 2.90
  - **Incident Resolutions/Bug Fixes/Changes**
    - Resolved various SGPIO issues
    - Resolved issues with staggered spin-up of disk drives

- ***Version 120927/BIOS v3.11/EFI v2.70 (Released 9/27/2012)***
  - **New Features**
    - Incorporated firmware version 2.85

- ***Version 120824/BIOS v3.11/EFI v2.70 (Released 8/24/2012)***
  - **New Features**
    - Incorporated firmware version 2.80
  - **Incident Resolutions/Bug Fixes/Changes**
    - [BIOS] Fixed a problem where the system would hang when another BIOS driver allocated memory in the EBDA area after this driver.
    - Improved SATA error handling mechanisms
    - Improved parity on-the-fly performance
    - Improved device discovery logic
    - Implemented more robust firmware error reporting

- ***Version 120611/BIOS v3.09/EFI v2.70 (Released 6/13/2012)***
  - **New Features**
    - Incorporated firmware version 2.71
  - **Incident Resolutions/Bug Fixes/Changes**
    - Resolved an installation issue present in the 120521 release. Refer to 120521 release notes below for additional details on features and changes.

- ***Version 120521/BIOS v3.09/EFI v2.70 (Released 5/24/2012)***
  - **New Features**
    - Incorporated firmware version 2.70
  - **Incident Resolutions/Bug Fixes/Changes**

- Resolved an issue where the R6xx cards would sometimes fail to notify the user in the event of an overheat condition.
- Corrected various issues involving discovery with the 3-gig Areca Expander.
- Fault LED behavior is now consistent after a drive is replaced.
- Resolved issues causing Mac workstations to occasionally hang during reboot.
- Event log message is now sent if a rebuild cannot be resumed at discovery.
- [EFI] Corrected an issue introduced in the previous release that could cause commands to prematurely timeout.
- [EFI] Fixed several issues with using CD-ROM type devices.
- [EFI] The Open Firmware image has been removed from all EFI flash bundles.

- *Version 120217 (Released 2/22/2012)*
  - **New Features**
    - Incorporated firmware version 2.67
  - **Incident Resolutions/Bug Fixes/Changes**
    - [BIOS/EFI] Resolved issue where "HBA Internal Error" message is displayed when trying to rebuild an invalid RAID group.
    - [EFI] Improvements have been made to keep track of system time more precisely.

- *Version 111209 (Released 12/15/2011)*
  - **New Features**
    - Incorporated firmware version 2.65
    - The Configuration Utility now saves NVRAM settings.
  - **Incident Resolutions/Bug Fixes/Changes**
    - Corrected an issue where the Configuration Utility would incorrectly warn that NVRAM settings were not saved.

- *Version 111012 (Released 10/14/2011)*
  - **New Features**
    - Incorporated firmware version 2.60

- *Version 110926 (Released 09/29/2011)*
  - **New Features**
    - Incorporated firmware version 2.55

- *Version 110622 (Released 06/29/2011)*
  - **New Features**
    - Incorporated firmware version 2.50
    - Significant performance improvements via a new PRD API and addition of Read Direct feature (RAID 5 only).
    - The driver to firmware communication mechanism has been changed. Driver v2.10, or later, is required to support firmware v2.50, and later. Additionally, the v2.10 driver supports earlier firmware versions from v2.00 up through v2.20.
    - Removed support for creating RAID groups with less than 64 KB interleave sizes.
    - Several discovery problems pertaining to externally configurable route tables have been resolved
  - **Incident Resolutions/Bug Fixes/Changes**

    - Corrected issues with SATA NCQ processing under heavy load that could result in temporarily slow or permanently stalled I/O
    - Corrected a memory corruption issue when the NVRAM is saved and the configuration utility is exited and re-entered.
    - Fixed an issue where RAID groups were degraded with iStorage 6G Chassis
    - Fixed an issue with drives disappearing when daisy chaining JMR array
    - Fixed an issue where drives would disappear after returning from Sleep

- *Version 110418 (Released 04/21/2011)*
  - **New Features**
    - Incorporated firmware version 2.20

- In the Configuration Tool, added an LED Control setting to the NVRAM panel

- ***Version 110325 (Released 03/25/11)***
  - o **New Features**
    - Incorporated firmware version 2.12
    - NCQ is now enabled by default.

- ***Version 110211 (Released 02/16/11)***
  - o **New Features**
    - Incorporated VDA firmware version 2.10
    - Performance improvements in IOPs and MB/s applications.
    - CacheAssure™ performance improvements when in High Protection mode.
    - SAS Multiplexing implemented. This enables the user to achieve performance improvements with 6Gb RAID when using slower 3Gb drives.

- ***Version 101119 (Released 11/30/10)***
  - o **New Features**
    - Incorporated firmware version 2.05
    - Enhanced Intelligent Platform Management Interface (IPMI) and Serial Over Lan (SOL) support within BIOS and the configuration utility.

- ***Version 100917 (Released 9/22/2010)***
  - o **Note:** The upgrade from version 1.00 to 2.00 of the driver and firmware must be done in a specific order:
    For Windows and OSX: "Any upgrade from a previous version to 2.00 for the driver and firmware must be done in a specific order. Version 2.00 firmware must be updated first with a flashbundle using the ATTO Configuration Tool. Once the new firmware is flashed, "DO NOT REBOOT," the 2.00 driver should be loaded. Your system will appear to freeze for up to three minutes while the new driver is loaded. A reboot is required to use the new update."
    For Linux: Any upgrade from a previous version to 2.00 for the driver and firmware must also be done in a specific order. Version 2.00 firmware must be updated first with a flashbundle using the ATTO Configuration Tool or the Linux CLI tool, atflash_32 (for 32-bit OS) or atflash_x64 (for 64-bit OS) version 1.01. Once the new firmware is flashed, the 2.00 driver should be loaded using the "install.sh" script as described in the "installation instruction" in driver readme file. When the script asks if you would like to load the driver, type "N" for no and reboot the system to initiate all changes. Please note that if the driver is installed first you will not be able to install the 2.00 firmware using the ATTO Configuration Tool. Downgrading back to 1.00 will allow you to flash the 2.00 firmware.
  - o **New Features**
    - Initial Release and added support for the R60F.
    - Incorporate firmware version 2.00.
    - The driver to firmware communication mechanism has been improved. Driver versions 2.00 and later are only supported with version 2.00 and later firmware

- ***Version 100712 (Released 07/15/10)***
  - o **New Features**
    - Incorporated firmware version 1.10
- ***Version 100520 (Released 05/21/10)***
  - o **New Features**
    - Initial release for the R644, R680 and R608.

3. **Known Issues/Advisements**

- ExpressSAS 6Gb RAID adapters are not currently compatible with Intel and Adaptec 12Gb expanders.
- Occasionally, ExpressSAS R6xx RAID adapters installed in a Thunderbolt expansion chassis may experience a loss of connection to the host. This condition can be resolved with a cold system boot.
- Have seen on rare occasions, in certain configurations, a DI failure with Mac OS X Thunderbolt DataIntegrity.py script
- Adapter can be flashed with only one boot driver at a time. Options are BIOS, EFI 32 bit or EFI 64 bit.

- The BIOS and EFI Configuration Utility have a default over-provisioning value of 0 for SSD RAID groups. This is different than the UVDA firmware default.
- After updating to firmware v2.50, or later, and if you have previously created RAID groups with interleave size less than 64KB, these RAID groups will not be visible. You must use firmware v2.20, or earlier, to continue to use these RAID groups.
- Method to back flash firmware from v2.50 to a previous firmware version when the installed driver is prior to v2.10. This is needed when a new card is purchased but the qualified driver version is not v2.10, or later.
    a. Install driver version that supports firmware v2.50 (v2.10, or later)
    b. Install the desired flash bundle
    c. Reboot the system
    d. Install the previously installed driver (pre-v2.10)

4. Affeted Products

Product Name	SKU
ExpressSAS R644 RAID Adapter	ESAS-R644-000
ExpressSAS R680 RAID Adapter	ESAS-R680-000
ExpressSAS R608 RAID Adapter	ESAS-R608-000
ExpressSAS R60F RAID Adapter	ESAS-R60F-000
ExpressSAS R644 RAID Adapter with CacheAssure	ESAS-R644-C00
ExpressSAS R680 RAID Adapter with CacheAssure	ESAS-R680-C00
ExpressSAS R608 RAID Adapter with CacheAssure	ESAS-R608-C00
ExpressSAS R60F RAID Adapter with CacheAssure	ESAS-R60F-C00

5. Contacting ATTO Support

ATTO Technology, Inc. is renowned for its technical support services. ATTO's goal is to provide you the quickest response possible for your technical support needs, and is available Monday-Friday, 8:00 AM to 8:00 PM EST (except holidays and plant closings).

ATTO Technical Support can be contacted via phone or email:

- Phone: 716.691.1999 ext. 242
- E-Mail: techsupport@attotech.com