



## ExpressSAS Host Adapter 6Gb v2.01 – Mac® OS X

### 1. General Release Information

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These product release notes define the new features, changes, known issues and release details that apply to the ExpressSAS Host adapter products v2.01 that was released on 4/23/2012. This information pertains to Mac OS X 10.4.2, and later, for PowerPC systems, as well as Mac OS X 10.4.7, and later, for Intel® systems.

### 2. Changes

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- **Version 2.01 (Released 4/23/12)**

- **Note:** It is recommended that firmware dated 9/27/11 be utilized with this driver release.
- **New Features, Enhancements and Changes**
  - Corrected improperly formatted sense data when a successful ATA PASS THROUGH command requests it for an ATA command using the PIO Data In protocol.
  - Added support for *atreset*, *atdevupd*, and *atsastop* CLI tools.
  - The default device wait time when resuming from sleep has been increased to 15 seconds.
  - The driver will again load on OS X versions prior to 10.6.
  - Corrected issues during controller reset recovery where discovery may be suspended until the device wait time expires.
  - Corrected an issue with SGPIO operation where an incorrect data length was reported to applications performing SMP GPIO commands.
  - Corrected several locking issues introduced in the previous release that could cause the driver to hang.
  - Corrected several crashes and hangs that could occur during Thunderbolt hot plugging.
  - Added a workaround so SATA hot plugging works when staggered spinup is enabled.
  - Fixed support for SATA drives with non-512 byte sector sizes.
  - Provided a solution for devices that report improper Inquiry data such that OS X finds LUNs that do not exist.

- **Version 2.00 (Released 1/17/12)**

- **Note:** It is recommended that firmware dated 9/27/11 be utilized with this driver release.
- **New Features, Enhancements and Changes**
  - Thunderbolt hot plugging is supported.
  - Added a dynamic execution throttle to handle device queue full and busy conditions (multipathing only).
  - Added MSI support for 64-bit platforms.
  - Added SCSI-to-ATA translation for the FORMAT UNIT command. See “Known Issues” below for additional information on SAT compliance.
  - The default number of supported targets has been increased from 256 to 512.
  - Added a workaround for Seagate Constellation drives not sending a signature FIS on cable re-plug by resetting the PHY.

- **Version 1.64 (Released 9/29/11)**
  - **Note:** It is recommended that firmware dated 9/27/11 be utilized with this driver release.
  - **New Features, Enhancements and Changes**
    - Corrected a SATA NCQ processing issue introduced in the previous release that could result in stalled I/O.
    - The STP idle time has been lowered to improve SATA performance behind an expander.
    - Several enhancements have been made to improve error reporting and operation in degraded mode.
    - Corrected an error in expander routing that could cause devices to be routed in the wrong order in complex tree-like topologies. This prevents temporarily invalid routing tables in multi-initiator topologies.
    - Discovery has been enhanced to account for multiple link rates throughout the topology. The lowest link rate in a wide port is used for all connections. If the link rate changes, the new rate will take effect when rediscovery completes. If a path to an expander has a lower link rate than the expander to SATA device link, the SATA device is ignored since a connection cannot be opened.
    - SATA device resets during discovery have been replaced by SMP PHY Control hard resets to improve reliability.
    - SGPIO initialization has been updated to prevent the driver from entering degraded mode with 1.11 and later controller firmware.
  
- **Version 1.62 (Released 6/2/11)**
  - **Note:** It is recommended that firmware dated 5/19/11 be utilized with this driver release.
  - **New Features, Enhancements and Changes**
    - Corrected two issues with SATA NCQ processing under heavy load that could result in temporarily slow or permanently stalled I/O.
  
- **Version 1.51 (Released 8/20/10)**
  - **Note:** It is recommended that firmware dated 7/27/10 be utilized with this driver release.
  - The following applies to changes made from release v1.50 to 1.51
  - **New Features, Enhancements and Changes**
    - Enhanced Transport Layer retries to improve Tape Error recovery
  
- **Version 1.50 (Released 7/30/10)**
  - **Note:** It is recommended that firmware dated 7/27/10 be utilized with this driver release.
  - The following applies to changes made from release v1.32 to 1.50
  - **New Features, Enhancements and Changes**
    - Resets modified while doing expander discovery to prevent SATA command timeouts.
    - Corrected an issue where I/O could be prematurely completed with an error prior to the link down timeout expiring.
    - Corrected an issue with SCSI pass through requests initiated by the CLI tools where the command timeout was not honored.
    - Improved check condition returns with ATA Pass Through command.
    - Link negotiation to SATA devices improvements.
    - Changes made to improve the consistency of the state of SATA devices and formatting SATA commands during discovery process.
    - Improved staging of multiple SMP commands to compensate for resource deficiencies.
    - Enhanced Discovery Process by delaying certain SATA commands, while discovery is in progress.
    - Enhanced configuration discovery for expanders that are actively self configuring.
    - Updated the SMP connection time and PHY transmitter settings for increased uptime.
    - Improved recovery for Initiator to Target errors with expanders.
    - Corrected an issue where task management could fail because a device error could not be recovered at the same time.
    - Corrected an issue where a SATA command that was aborted and then retried could be erroneously aborted again.
    - Enhanced SATA device retries for parity errors.

- **Version 1.32 (Released 3/31/10)**
  - **Note:** It is recommended that firmware dated 3/26/10 be utilized with this driver release.
  - The following applies to changes made from release v1.31 to 1.32
  - **New Features, Enhancements and Changes**
    - Enhanced interoperability for SuperMicro chassis with expanders.
    - When an IDENTIFY frame timeout occurs on an expander and/or a controller PHY, a link reset is issued to each PHY to attempt link recovery.
    - Improved controller initialization to allow backup firmware built into the driver to load when the firmware in flash is corrupt.
    - The SMP API has been updated to allow access to the SGPIO interfaces on the controller. Firmware version 1.09 is required for SGPIO operation.
    - Task management timeout enhancements.
    - Improved device discovery during initial driver startup.
    - Additional events have been added for SMP command errors.
    - CSMI interface improvements for reporting an unknown SAS port for a PHY whose link is down.
    - Improved performance when the controller has limited resources to transmit frames within an open connection.
    - Descriptor based sense data support added.
    - Command failures due to an invalid link rate are detected with rediscovery and corrected to account for the new link rate.
    - When a valid SAS port does not exist and a hard reset sequence is detected, a PHY restart is implemented.
    - Added PHY restart when a hard reset sequence is detected, when a valid SAS port does not exist.
    - For SATA drives, after a Stop Unit command has spun down the media, access commands are completed with a SCSI check condition for the message "Not Ready, Initializing Command required."
    - Improved recovery for flash data due to a controller fault.
    - Enhanced discovery of topology changes behind an expander.
    - Improved adapter negotiation rates for SAS devices behind expanders.
  
- **Version 1.31 (Released 01/12/2010)**
  - The following apply to release v1.31
  - **Note:** It is recommended that firmware dated 10/22/09 be utilized with this driver release.
  - The following applies to changes made from release v1.30 to 1.31
  - **New Features, Enhancements and Changes**
    - Driver delay compensation added to allow for smooth booting of Macintosh NVRAM options.
    - Provided solution to work around OS X kernel panic when transfer sizes are greater than 32MB.
  
- **Version 1.30 (Released 10/29/2009)**
  - **Note:** It is recommended that firmware dated 10/22/09 be utilized with this driver release.
  - The following applies to release v1.30
  - **New Features, Enhancements and Changes**
    - Retries performed by the OS X SAM driver enhanced to prevent excessive I/O completion times when timeouts occur.
    - Vendor specific SCSI errors enhanced through retries.
    - CSMI support added.
    - Descriptive strings for sense keys to SCSI error event logging added.
    - CLI tool support added.
    - Enhanced discovery process after an expander routing failure detection.
    - The Immediate bit in the Start Unit command enhanced for SATA device support.
    - SATA drive enhancement when transferring I/O in multiple segments.
    - Improved device wait count setting when handling power cycle devices.
    - Enhanced memory allocation for Snow Leopard.

- Discovery resource management enhanced for improved expander PHY routing accuracy.
  - Data overruns for expander discovery commands are enhanced to support inaccuracies with expanders sending an invalid response length.
- **Version 1.20 (Released 07/31/2009)**
    - **Note:** It is recommended that firmware dated 07/29/09 be utilized with this driver release.
    - The following applies to changes made from release v1.10 to 1.20
    - **New Features, Enhancements and Changes**
      - Documented support for Snow Leopard.
      - Enhanced firmware which contributed in an up to 25% increase in throughput.
      - Added the Read/Write Time Out Duration properties to specify timeouts for read/write commands. The timeout value is 30 seconds. This timeout applies only to devices for which Mac OS X provides an in-box driver (SCSI device types 0, 5, 7, and 14).
      - The supported expander chain depth was increased from 8 to 10.
      - Transport layer retries are explicitly enabled on all commands for SAS 2.0 compliant devices instead of being enabled in the device's mode pages.
      - All command retries are disabled for sequential (e.g. tape) devices.
      - SMP PHY Control command for clearing SATA affiliations improved. Uses the hard reset function instead of the clear affiliation function.
      - Expander enhancements which include discovery process reorganization for clearing SATA affiliations. All devices reported to the OS will have sequential target IDs starting with zero.
      - The heartbeat mechanism has been redesigned to improve I/O resources allocation.
      - Confirmation of I/O completion to the OS prior to reporting a device removal.
      - SCSI check status for data phase errors and other bus events that occur due to signal integrity problems are now retried
      - When a port is reset due to a task management command timeout, the aborted collateral is retried.
      - Enhanced event logging to include retried commands and added timestamps.
      - Added support to the SMP API for discovering direct attached devices. Changed the scatter/gather allocation to improve performance and conserve memory.
      - Improved optimizations and memory allocation to expander discovery process to increase number of drives that can be discovered.
      - The OPEN REJECT RETRY interval is set to 5  $\mu$ s
- **Version 1.10 (Released 03/24/2009)**
    - **Note:** It is recommended that firmware dated 03/20/09 be utilized with this driver release.
    - The following applies to changes made from release v1.01 to 1.10
    - **New Features, Enhancements and Changes**
      - Added the Device Name field to the SAS Identify Address Frame (an optional field added in SAS 2.0).
      - Resolved an issue during initial device discovery that could result in a driver crash if the device rejects a discovery command.
      - Resolved issues with discovery processing when a discovery command timed out
      - SATA devices behind expanders are no longer reset during discovery
      - Improved SATA NCQ processing so performance is maintained as the queue depth increases
      - Improved port down cleanup to ensure all I/O is completed before destroying devices when multiple ports are instantiated
      - Resolved an issue with SCSI-to-ATA translation of the WRITE AND VERIFY commands that would allow NCQ commands to be started between the write and verify phases
      - Now support SMP API
      - Added timeout processing for commands issued through the SMP API
      - SATA NCQ is disabled in NVRAM by default

- **Version 1.01 (Released 02/18/2009)**
  - **Note:** It is recommended that firmware dated 01/28/09 be utilized with this driver release.
  - The following applies to changes made from release v1.00 to 1.01
  - **New Features, Enhancements and Changes**
    - Resolved issues that may cause the driver to crash or hang if a device rejects a discovery command on initial load.
    - Resolved any unexpected target ID changes after a cable pull and reinsertion, when a SATA device is connected behind an expander.
  
- **Version 1.00 (Released 12/11/2008)**
  - **Note:** It is recommended that firmware dated 12/05/08 be utilized with this driver release.
  - The following applies to release v1.00
  - **New Features, Enhancements and Changes**
    - Initial release of ExpressSAS H608 and H680

### 3. Known Issues/Advisements

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- Please refer to the DOS release notes for any known firmware issues.
- The driver is not fully SAT compliant (SCSI-to-ATA Translation for SATA support). The following SCSI commands are not translated: UNMAP, REASSIGN BLOCKS, SECURITY PROTOCOL IN, and SECURITY PROTOCOL OUT. There is no known user impact.
- “Deep” sleep is supported only on Intel Macs. PowerPC Macs will sleep, but not “deep” sleep, so the sleep light will not pulsate. The only side effect is that when PowerPC systems are put to sleep, the fan speed will increase to the max until the system is awakened.

### 4. Affected Products

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Product Name
ExpressSAS H680 Host Adapter
ExpressSAS H608 Host Adapter
ExpressSAS H6F0 Host Adapter
ExpressSAS H60F Host Adapter
ExpressSAS H644 Host Adapter

### 5. Contacting ATTO Support

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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 6:00 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](mailto:techsupport@attotech.com)