



ATTO Technology, Inc.

# Product Release Notes

## Celerity 8Gb Fibre Channel Multipath Director Release V3.26MP – macOS®

### 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 Celerity 8Gb Fibre Channel adapter product version 3.26MP, which was released on April 16<sup>th</sup> 2018. This information pertains to macOS® 10.11 and later.

### 2. Changes

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- **Version 3.26MP (Released 04/16/2018)**
  - **Note:** It is recommended that the latest flash bundle available on ATTO website be utilized with this driver release.
  - **New Features/Enhancements**
    - Added support for a new flash bundle format that supports smaller download portions compatible with the maximum transfer size for the driver
    - Additional support for Promise VTrak E630f and the DotHill DH3000
    - Improvements to displaying which offline devices are being presented to the OS (and displayed in ConfigTool).
      - Note: As a result of this change, previously saved configurations may need to be deleted and resaved to display correctly after reboot
    - Added a link reset to the rescan functionality to cover whole targets that have not been discovered yet.
- **Version 3.25MP (Released 12/18/2017)**
  - **Note:** It is recommended that the latest flash bundle available on ATTO website be utilized with this driver release.
  - **New Features/Enhancements**
    - Added atdevinfo, atfcinfo, and atlocate CLI tools to the release package
    - Add HP MSA 2050 support
    - Full Inquiry data is now reported for multipathed devices.
- **Version 3.20MP (Released 09/25/2017)**
  - **Note:** It is recommended that the latest flash bundle available on ATTO website be utilized with this driver release.
  - **New Features/Enhancements**
    - Improvements to scheduling and processing device management
    - Changed the method for reporting device changes to macOS
- **Version 3.16MP (Released 05/03/2017)**
  - **Note:** It is recommended that the latest flash bundle available on ATTO website be used with this driver release.
  - **New Features/Enhancements**
    - Changed the default maximum transfer size to 512KB to improve 3<sup>rd</sup> party storage controller performance.
    - Added support for the Seagate 5825 storage array

- **Version 3.10MP (Released 12/20/2016)**
  - **Note:** It is recommended that the latest flash bundle available on ATTO website be used with this driver release.
  - **New Features/Enhancement**
    - Added support for Dot Hill 6424 and 6844 storage.
    - Improved the speed of reporting devices to the OS.
    - Changed the default maximum transfer size to 512KB to improve third party storage controller performance.
  
- **Version 3.05MP (Released 09/20/2016)**
  - **Note:** It is recommended that the latest flash bundle available on ATTO website be used with this driver release.
  - **New Features/Enhancement**
    - Added support for macOS Sierra
    - Added '-t <number>' option to system NVRAM parameters to change the number of targets.
    - Enabled LU-based MP for Quantum QXS storage.
    - Resolved potential driver hang if I/O errors occur during OS device scanning.
  
- **Version 3.00MP (Released 06/30/2016)**
  - **Note:** It is recommended that the latest flash bundle available on ATTO website be used with this driver release.
  - **New Features/Enhancement**
    - Added support for LU-based multipathing.
    - Added support for configuring an alias.
    - Addressed a potential for failover to fail when large numbers of LUNs are present.
    - Addressed issues that could cause excessive completion times for failover or discovery.
  
- **Version 2.56MP (Released 05/09/2016)**
  - **Note:** It is recommended that the latest flash bundle available on ATTO website be used with this driver release.
  - **New Features/Enhancement**
    - Corrected an issue with Reinstate Recovery Qualifier not being properly rejected when sent by a target to the adapter.
  
- **Version 2.55MP (Released 01/21/2016)**
  - **Note:** It is recommended that the latest flash bundle available on ATTO website be used with this driver release.
  - **New Features/Enhancement**
    - Resolved a connection issue with previous versions of EMC storage
    - Enhanced event log messages for temperature events.
  
- **Version 2.50MP (Released 8/06/2015)**
  - **Note:** It is recommended that the latest flash bundle available on ATTO website be used with this driver release.
  - **New Features/Enhancement**
    - Added support for 10.11
    - Improved system resource utilization when using event logging services
    - Implemented T10-PI management improvements
    - Fixed a max transfer size processing issue
    - Added support for Dot Hill arrays
  
- **Version 2.45MP (Released 3/16/2015)**
  - **Note:** It is recommended that the latest flash bundle available on ATTO website be used with this driver release.
  - **New Features/Enhancement**
    - ALUA devices are now allowed to change the path mode from disabled to the default
    - For Thunderbolt topologies, addressed an issue to properly manage multipathing configurations across Thunderbolt cable pulls.

- Fixed an issue with discovery with a Cisco switch
  - Active/non-optimized paths are activated in the same manner as standby path by default.
  - Corrected identifier determination for some storage. As a result, previously saved configuration will no longer be in effect for some arrays. The configuration must be resaved after upgrading.
- **Version 2.41MP (Released 1/15/2015)**
  - **Note:** It is recommended that the latest flash bundle available on ATTO website be used with this driver release.
  - **New Features/Enhancement**
    - Added support for certain DotHill arrays.
    - Added support for certain Quantum StorNext arrays.
- **Version 2.40MP (Released 10/30/2014)**
  - **Note:** It is recommended that the latest flash bundle available on ATTO website be used with this driver release.
  - **New Features/Enhancement**
    - Fixed a fabric discovery issue.
    - **Version 2.35MP (Released 9/25/2014)**
  - **Note:** It is recommended that the latest flash bundle available on ATTO website be used with this driver release.
  - **New Features/Enhancement**
    - Enhanced diagnostic capabilities with improved event logging
    - Added support for atreset
    - Added support for device display in atinfo
    - Addressed an issue where IO to a LUN could be stalled
    - Set default so that active/non-optimized paths are activated for IO in the same manner as standby paths
- **Version 2.30MP (Released 3/24/2014)**
  - **Note:** It is recommended that the latest flash bundle available on ATTO website be used with this driver release.
  - **New Features/Enhancement**
    - Added support for atmpinfo diagnostic output.
    - Added support for user driven rescanning for all paths to devices.
    - Corrected an issue with execution throttle
    - Corrected a kernel panic that may occur when unloading a driver
- **Version 2.25MP (Released 2/06/2014)**
  - **Note:** It is recommended that the latest flash bundle available on ATTO website be used with this driver release.
  - **New Features/Enhancement**
    - Corrected an issue with path discovery for paths that are deactivated immediately after being found.
    - Addressed an issue with deactivating paths that are disabled due to I/O errors.
    - Fixed an issue where discovery or failover of a path could be delayed by a transitioning asymmetric access state for a port group that did not apply to the path.
    - Resolved an issue where simultaneously reporting device changes on multiple HBA channels could result in the multipathed devices from being activated
    - Addressed an issue where path selection could prematurely fail an I/O when the last remaining path failed simultaneously
    - Corrected an issue where path rediscovery would not activate the path after the link down timeout previously expired
    - Paths that have a scan pending are considered retrying so I/O is suspended when no paths are active.
    - Feature added to allow path activations and deactivations during the link down timeout period to coordinate with other device events to prevent invalid path states.

- Added support for new variations of the Report LUNs command used by some storage arrays.
  - Added PCIe pause support for Thunderbolt hot plugging in OS X 10.9.
- **Version 2.13MP (Released 6/27/2013)**
  - **Note:** It is recommended that the latest flash bundle available on ATTO website be used with this driver release.
  - **New Features/Enhancements**
    - Corrected an issue where I/O could be stopped to a device after a link goes down.
- **Version 2.05MP (Released 12/18/2012)**
  - **Note:** It is recommended that the latest flash bundle available on ATTO website be used with this driver release.
  - **New Features/Enhancements**
    - Resolved an issue with target identifier determination.
- **Version 2.04MP (Released 10/31/2012)**
  - **Note:** It is recommended that the latest flash bundle available on ATTO website be used with this driver release.
  - **New Features/Enhancements**
    - Corrected an issue that could cause paths to not be rediscovered during a link down timeout period if a bus scan failed while the link was down.
    - Corrected an issue with the event logging that would cause the wrong time to be logged after the system was put to sleep. Note that both the driver and event logging application are not compatible with previous releases.
- **Version 2.03MP (Released 10/11/2012)**
  - **Note:** It is recommended that the latest flash bundle available on ATTO website be used with this driver release.
  - **New Features/Enhancements**
    - Added support for PowerPC systems.
    - Updated the memory allocation for x64 platforms for compatibility with OS X 10.8.2 and later.
    - Added support for performing explicit failover and failback for active non-optimized paths for some arrays.
    - Added ability to disable failback.
    - Resolved issues in path management processing to properly handle paths that have failback scheduled.
    - Feature added to improve command error processing during path scanning and activation.
    - Resolved issues in path activation that could cause I/O to be suspended even though a path is available for I/O.
- **Version 2.02MP (Released 7/25/2012)**
  - **Note:** It is recommended that the latest flash bundle available on ATTO website be used with this driver release.
  - **New Features/Enhancements**
    - Added support for Mac OS X Mountain Lion (10.8).
    - Note this driver version does not support OS X Tiger (10.4), or earlier.
- **Version 2.01MP (Released 4/23/2012)**
  - **Note:** It is recommended that the latest flash bundle available on ATTO website be used with this driver release.
  - **New Features/Enhancements**
    - Addressed an incompatibility with certain Promise devices running in Point-to-Point mode.
    - Corrected an issue in which setting a saved multipathing configuration could fail when the device is not configurable.
    - Resolved an issue for devices that reported improper inquiry data.
    - Added a feature enhancement for Thunderbolt hot plugging.

- **Version 2.0MP (Released 2/2/2012)**
  - **Note:** It is recommended that the latest flash bundle available on ATTO website be used with this driver release.
  - **New Features/Enhancements**
    - Added MSI protocol support for 64-bit platforms.
    - Feature enhancement related to report errors and operation in degraded mode.
    - Added support for Thunderbolt hot plugging.
    - Added a dynamic execution throttle to handle device queue full and busy conditions.
    - Resolved an issue where stalled I/O could prevent devices from being reported to the OS.
    - The policy for handling SCSI errors with ASC=4 and ASCQ=0,4-9 has changed. The errors are no longer counted toward the failover error threshold. They are still reported as I/O errors in the ATTO ConfigTool.
  
- **Version 1.44MP (Released 07/29/2011)**
  - **Note:** It is recommended that the latest flash bundle available on ATTO website be used with this driver release.
  - **New Features/Enhancements**
    - Corrected an issue where a path could be rescanned that is known to be unavailable.
    - The –mpcfg system NVRAM switch has been removed.
    - The default status for I/O errors unhandled by the driver has been changed to enable OS X multipathing failover for those errors.
  
- **Version 1.43MP (Released 06/10/2011)**
  - **Note:** It is recommended that the latest flash bundle available on ATTO website be used with this driver release.
  - **New Features/Enhancements**
    - Added a feature to enable the driver in Thunderbolt topologies.
    - This version is included on the Mac OS X 10.7 (Lion) DVD.
    - Corrected a small timing window in which loading a saved configuration may fail.
    - The standard inquiry data for multipathed devices was modified to clear the TPGS field to disable ALUA support in OS X Lion.
  
- **Version 1.42MP (Released 03/28/2011)**
  - **Note:** It is recommended that the latest flash bundle available on ATTO website be used with this driver release.
  - **New Features/Enhancements**
    - When a device returns sense data of 06/29/00 (Power On/Reset), all paths to the device are rescanned for changes.
    - Added a feature to update the OS if the vendor ID, product ID, or SCSI device type in the Inquiry data for a device changes.
    - A link speed of 8Gb/s is now reported to OS X.
  
- **Version 1.41MP (Released 02/17/2011)**
  - **Note:** It is recommended that the latest flash bundle available on ATTO website be used with this driver release.
  - **New Features/Enhancements**
    - Added a feature to immediately resume I/O to the first path that becomes available prior to the link down timeout expiring.
    - An issue was corrected that could exhaust system memory when a disk LUN was removed and replaced with LUNZ.
  
- **Version 1.40MP (Released 02/03/2011)**
  - **Note:** It is recommended that the latest flash bundle available on ATTO website be used with this driver release.
  - **New Features/Enhancements**
    - Added support for the Access LUN in some arrays.
    - ATTOCelerityFC8MpLog has been replaced by atmpinfo.
    - Added support for EMC CLARiiON AX series storage.

- Added support for HP MSA series storage.
  - Target based identifiers in Inquiry VPD page 0x83 are given priority over LUN based identifiers in determining how to multipath devices.
  - Internal commands are retried during asymmetric access state transitions.
  - Corrected a potential driver crash when an adapter is reset and fails to recover.
  - CLI tools have been added to the driver package.
  - For PowerPC systems, the PCIe link speed and width values reported to the Configuration Tool have been corrected.
- **Version 1.35MP (Released 0728/2010)**
  - **Note:** It is recommended that the latest flash bundle available on ATTO website be used with this driver release.
  - **New Features/Enhancements**
    - Added support for T10-DIF
      - T10-DIF support in 8Gb Celerity is always enabled.
      - T10-DIF support implies that the driver will detect if a disk drive is formatted for T10-DIF. Upon detection of T10-DIF, the driver will automatically generate the DIF field on the writes, and check it on the reads.
      - This feature does not provide a mechanism to format the drive
    - Feature improvement related to interoperability.
- **Version 1.34MP (Released 06/22/2010)**
  - **Note:** It is recommended that the latest flash bundle available on ATTO website be used with this driver release.
  - **New Features/Enhancements**
    - The SCSI parity errors will be retried.
    - Resolved a possible issue where interrupts would no longer be processed after a chip reset.
    - Resolved a possible issue where FC exchanges could be lost after a port down event.
- **Version 1.33MP (Released 03/24/2010)**
  - **Note:** It is recommended that the latest flash bundle available on ATTO website be used with this driver release.
  - **New Features/Enhancements**
    - When configuring the path modes for a device that supports ALUA, the path can only be disabled. If the configured path mode is the same as what was determined via ALUA, it is silently ignored and failover/failback mechanisms will continue to operate as if the configuration was not set.
    - When performing explicit failover, the amount of time allowed for the failover to occur was increased from 30 seconds to 2 minutes.
    - When performing explicit failover, data underruns are retried to prevent failures in the failover process.
    - After performing explicit failover, if a path no longer responds to an Inquiry command, the path is taken offline.
    - When only alternate paths configured by ALUA are present, all paths are activated for I/O.
- **Version 1.32MP (Released 01/20/2010)**
  - **Note:** It is recommended that the latest flash bundle available on ATTO website be used with this driver release.
  - **New Features/Enhancements**
    - Enhancements have been made to the I/O transfer size to resolve an issue with MacPro4,1 systems when the transfer size is greater than or equal to 32MB – 20KB (0x1FF9000).
    - While processing device state changes, the driver will continue processing device changes to prevent a stall.
    - When a multipathing configuration is deleted, the path states are updated to correspond to the default path modes.

- **Version 1.31MP (Released 12/04/2009)**
  - **Note:** It is recommended that the latest flash bundle available on ATTO website be used with this driver release.
  - **New Features/Enhancements**
    - Sense data with a sense key of Recovered Error is converted to successful command completion.
    - The driver will wait up to 5 seconds for the system NVRAM options to become available to load advanced driver options.
    - Resolved a possible crash in Snow Leopard if highly fragmented or very large amount of memory is in use.
    - Enhancements to the adapter locate functionality.
    - Fixed the potential for I/O to be disabled for LUNs after they have been explicitly moved for failover/failback.
    - The ALUA unavailable state is now displayed as disabled in the Configuration Tool instead of an alternate.
    - Features have been added to delay reporting devices to OS X until explicit failover/failback is completed to prevent a potential driver hang.
    - When performing explicit failover using the Set Target Port Groups command, target port groups in the unavailable state are not included.
    - Timeouts for internally generated bus scan and failover commands are retried.
    - Timeout values for internally generated bus scan and failover commands are based on the link down timeout value instead of a fixed value.
  
- **Version 1.30MP (Released 9/9/2009)**
  - **Note:** It is recommended that the latest flash bundle available on ATTO website be used with this driver release.
  - **New Features/Enhancements**
    - A Test Unit Ready command is now performed during a path scan to detect “Logical Unit Not Ready, Manual Intervention Required” and setup the path as a standby instead of waiting for an I/O from the OS.
    - When receiving sense data for “Logical Unit Not Ready, Manual Intervention Required,” the command will be retried infinitely. Also, corrections were made to the ALUA standby emulation so saving configurations does not revert the path to the default state.
    - Added the Read/Write Time Out Duration properties to specify timeouts for read/write commands. The timeout is the value of the link down timeout in NVRAM plus 1 second if the link down timeout is configured (non-zero). When the link down timeout is zero, the timeout is 10 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 command retry count is dynamically calculated to be the path count plus three.
    - Corrected the adapter type in saved configurations to prevent the 4Gb Celerity driver from emulating devices attached to an 8Gb adapter. As a result, configurations saved in previous drivers may not be honored by this driver. It is recommended that all configurations be deleted prior to upgrading and resaved afterwards.
    - When a device is removed, its login will be terminated immediately to allow failover to occur instead of potentially waiting for the link down timeout to expire.
    - Corrected an issue where removing the last path to a device would cause other previously removed paths to be erroneously activated.
    - Corrected an issue where pulling a cable may not have deactivated a path while the link down timer was in effect.
    - Increased the default I/O resources allocated to reduce the likelihood of resource exhaustion.
    - In the 32-bit Intel driver, mapping of 64-bit application memory is now done correctly. This only affected the multipathing log utility in Snow Leopard capable drivers when run on 32-bit Leopard or Snow Leopard systems.
    - Added timestamps to the event logging.
    - Corrected the S\_ID in FLOGI Accept.
    - Corrected the path state to stay active while the link down timeout period is in effect.
    - Added a separate failover error counter for timeouts. A path will be logically disabled if three consecutive timeouts occur.

- Retries performed by the OS X SAM driver have been disabled to prevent excessive I/O completion times when timeouts occur. The Celerity driver handles all retries.
  - All vendor specific SCSI errors are retried.
  - Corrected an issue with Arbitrated Loop that could cause negotiation to fail if the loop went up, down, and then back up in a short period of time.
  - Fixed memory corruption that could occur if a device configuration was saved and the device later changed the device identifier in Inquiry VPD page 0x83.
  - Sense data with a sense key of Recovered Error is converted to successful command completion.
- **Version 1.20MP (Released 4/29/2009)**
  - **Note:** It is recommended that the latest flash bundle available on ATTO website be used with this driver release.
  - **New Features/Enhancements**
    - Updated the Uninstall.command script to display “Permission denied” when the sudo password is incorrect or blank. Note that the script will not work when the account has no password. See <http://support.apple.com/kb/TA25121>
    - Integrated TSDK 6.10.
    - Auto topology now gives P2P a little more preference.
    - Added features to accommodate a switch that was improperly assigning Area and Domain to certain Port IDs.
    - The default Interrupt Coalescing setting is now None.
    - Added new activation behavior for ALUA standby and unavailable states. Unavailable paths will never be activated. Standby paths will be activated only when active paths (optimized or non-optimized) are not available.
    - Sense data for ASC/ASCQ 0x04/0x0B, Logical Unit Not Ready, Target Port In A Standby State will be infinitely retried.
    - When a path set contains all alternate paths, one of those alternates will be activated.
    - Fixed a scenario where non-optimized paths would not be deactivated when an optimized path came online.
    - Revised the path set rescan delays and corrected the timing when multiple rescans are queued. For the HP EVA, ALUA state changes and EVA-specific failover/failback events still result in a five second delay. ALUA state changes for other storage have a 500ms delay. LUN inventory changes have no delay.
    - Fixed an issue where a logical unit with a saved configuration that was not present would not be seen by the operating system if (a) a logical unit with a higher LUN was present or (b) a rescan of the device took place after the saved configuration was sent to the driver. The unavailable logical unit was erroneously activated which bypassed the emulation and caused the OS to get errors for all commands. Therefore, the logical unit was not found by the OS.
    - When a device returns sense data of “Logical Unit Not Ready, Manual Intervention Required”, the path will be converted to a standby path.
- **Version 1.10MP (Released 02/27/2009)**
  - **Note:** It is recommended that the latest flash bundle available on ATTO website be used with this driver release.
  - **New Features/Enhancements**
    - Opened up the basic ALUA support for the HP EVA to all storage devices. By default, non-optimized paths will not be activated unless all optimized paths are unavailable, path configuration is allowed, and path modes will be dynamically configured based on ALUA states only if a path has not been configured for a particular mode. HP behavior has not changed.
    - Corrected the path set status when one or more paths are configured as disabled or have been logically disabled by the driver due to errors.
    - When a device returns sense data of Logical Unit Not Supported, the path is logically disabled for that LUN.
    - When a device returns sense data for Report LUNs Data Has Changed, all paths to that device are rescanned for LUN changes.
    - Fixed a bug in logout processing that would temporarily re-activate the path for I/O resulting in I/O errors.



- Added a system NVRAM setting to disable OEM customization: “-mpcfg nooem”.
  - Fixed out-of-resource processing to correctly pend, rebuild, and restart I/O while maintaining original I/O order. This issue required a heavy I/O load with various lengths to reproduce.
  - Fixed logging of port login/logout events.
  - Speed negotiation is limited to what the SFP supports.
  - Resolved an issue where RSCNs would not get processed after a certain number of them were received.
- **Version 1.01MP (Released 01/07/2009)**
  - **Note:** It is recommended that the latest flash bundle available on ATTO website be used with this driver release.
  - **New Features/Enhancements**
    - Fixed the transfer length when issuing the Report LUNs command to conform to SCSI specification.
    - The entire CDB is now output in the event log for command and SCSI errors.
    - The ASCQ is now output in the event log for SCSI errors.
- **Version 1.00MP (Released 08/26/2008)**
  - **Note:** It is recommended that the latest flash bundle available on ATTO website be used with this driver release.
  - **New Features/Enhancements**
    - Initial release of Mac drivers for the Celerity 8Gb FC adapters

### 3. Known Issues/Advisements

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- “Deep” sleep is supported only on Intel Macs. PowerPC Macs will sleep, but not “deep” sleep, so the sleep light will not pulsate. As a result, when PowerPC systems are put to sleep, the fan speed will increase to the max until the system is awakened.
- macOS High Sierra has introduced User-Approved Kernel Extension Loading. For additional information on this update, please visit: <http://developer.apple.com/library/content/technotes/tn2459>

### 4. Affected Products

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Product Name	SKU
Celerity FC 81EN	CTFC-81EN-000
Celerity FC 82EN	CTFC-82EN-000
Celerity FC 84EN	CTFC-84EN-000

### 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 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](mailto:techsupport@attotech.com)