Optimus.2 Eco
2.5" SAS, SSD Product Line Generic

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Revision History

Date	Revision	Description
June 2016	C	Legal Disclaimer updated and Western Digital branding
June 2015	B	K0H0
August 2014	A	K0A0
May 2014	1	K060 Initial Release

ESD Caution – Handling

Static electricity may be discharged through this disk subsystem. In extreme cases, this may temporarily interrupt the operation or damage components. To prevent this, make sure you are working in an ESD- safe environment. For example, before handling the disk subsystem, touch a grounded device, such as a computer case.

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Overview

This document describes the fixes and known issues for the Optimus.2 Eco firmware.

K0H0 Firmware

The K0H0 firmware contains the following fixes:

- Fixed an issue where a read failure may occur after a power cycle due to improper handling of parity data.
- Implemented improvements to Read buffer handling.
- Fixed a possible SCRAM timeout caused by a metadata header write dog being submitted after SCRAM preparation had begun.
- Fixed an issue that would cause HEAD OF QUEUE commands to block other SIMPLE commands that come in after them.
- Implemented WriteLimiter functionality which prevents write commands from starting if there is too much write data already in flight. Note: BypassWriteLimiter mode page bit (default currently =0, meaning this feature is enabled)
- Implemented a correction with sense data errors in Send diagnostic command.
- Fixed an issue to check the ParameterListLength field in the Unmap CDB.
- Changed Persistent Reservation Out command to correctly ignore non 0 Scope values for Service Actions, Register, Register and Ignore, and Clear.
- Changed Persistent Reservation Out command to check Allocation Length and return kPARAMETER_LIST_LENGTH_ERROR if it is !=24 bytes.
- Ensured task_set_index is reset to a known unused value on all cmd_info slots before they start to be used.
- Ensured that overlap_chain is always flagged as invalid on all commands, even immediately after reboot when a slot is being used by a read.
- Avoided faulty ACK/NAK Time Out (ANTO) on certain retries exhausted cases.
- Fixed an issue of detecting extra NAKs.
- Fixed a corner case issue where the response to a mode select command was not correct.
- Added a check to ensure the correct response when a parameter list length results in truncation.
- Avoided early ReadQueue transmits from accessing unexpected DDR location causing single and double bit DDR errors.
- Implemented a change to ensure we report the correct CPU PC address in the SCRAM margining area.
- Fixed an issue where we were not blocking new commands from being accepted after a code download completed writing to NOR flash.
- Added condition to periodically allow recycling to take place.
- Implemented a fix that changed the Sanitize so if it could not access the media to perform its sanitize function, it will now leave the drive in a persistent media state of sanitize_failed, such that the only media access command that can execute is another Sanitize.
- Changed WriteLimiter mode page fields to explicitly be in terms of 4k-pages, even on products which do not use 4K pages.
- Fixed an issue so a TUR prior to auto-re-execution of the aborted Sanitize command will return 03/31/03 (SANITIZE_COMMAND_FAILED) instead of 03/31/00/0B (FTL_SBM_INIT_FAILURE).
- Enabled WriteLimiter by default on all drives to reduce write fragmentation, improve write performance at high QD and xfer-size.
- Fixed and issue with Persistent Reservation Out issues seen in Microsoft "SCSI-3 Persistent Res requirements test" and "Validate Storage Spaces Persistent Reservations test".
- Resolved an issue where the Write Long command, with the PBLOCK bit set to one, was resulting in read errors.
- Fixed issues on the port layer that resulted in TMF watchdog timeouts.
- Fixed an issue where the port layer was reporting an incorrect code for Read errors.
- Made enhancements to the error history buffer (Read Buffer mode 1Ch).
- Resolved an issue where the Write Buffer Echo mode was causing an error.

- Implemented additional parameter codes for Log Pages 2h (Write Error Count), 3h (Read Error Count), and 5h (Verify Error Count). These pages support the following parameter codes:
    - 0000h – Errors without substantial delay
    - 0001h – Errors corrected with possible delays
    - 0002h – Total retries
    - 0003h – Total errors corrected
    - 0004h – Total times the correction algorithm was processed
    - 0005h – Total bytes processed
    - 0006h – Total uncorrected errors
- Improved the way the defect list is calculated.
- Fixed an issue with Initiator Response Timeout.
- Fixed an issue with handling read/verify failed counters for false errors.
- Added a check for data alignment in the Write Buffer command.
- Corrected the way the Write Amplification is calculated.
- Fixed an issue where Read Buffer mode 0 returned an incorrect status.
- Fixed an issue where the Read and Verify counters were getting modified due to false unrecovered errors introduced by the Write Long command.
- Added support for the OVERWRITE service action in the SANITIZE command.
- Changed the Percent Drive Life Used SMART trip threshold from 0% to 2%.
- Fixed an issue where the warning or trip report could be delayed up to 15 minutes when a drive went over temperature. The drive now reports the warn sign or trip immediately.
- Added support for PBLOCK in the Read Long and Write Long commands.
- Reduced the code load time.

Issues still unresolved

- Drive failed with a IOHung on TMF Single Initiator tests.
- Drive failed with a IO Hung during TMF with Extra Traffic.
- Drive became unresponsive on a Hard Reset and TMF for all Single/Multi Initiator Link Up/Down tests.
- Opt.2 Eco drive models cannot be configured for rate matching at 2 different bandwidths. Second port cannot be initialized, when test starts the port disappears.

K0A0 Firmware

The K0A0 firmware contains the following fixes:

- Fixed a rounding error that was causing the drive to report 99% life remaining when it actually had 99.99% life remaining.
- Fixed an issue related to the Inquiry command when the request length is was 0.
- Removed an unnecessary 5 sec delay from Send Diag Short self-test.
- Fixed a bug that caused the SAS Error Statistics log page (36h) to appear empty.
- Fixed an issue to mark SCSI transfer as started when transfer is reattempted.
- Avoided an issue causing a "Device Server Loop hasn't processed in a while" response when reading Application Client Log Pages (0Fh).
- Modified the code to reject a Write Buffer command if the allocation length is larger than the Write Buffer Max Download Size.
- Added support for parameter 5 in the Verify Error Counter log page (05h).
- Added support for the Exit Failure Mode service action in the Sanitize command.
- Fixed an issue where Linux mounted Optimus ECO resulted in an aborted command during read/write.
- Added support for the Address Descriptor Index in the Read Defect command.