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IBM has released a firmware update H970 (Half High code H971). This firmware affects all Gen 5 Full High and HH Drives. This update is intended, among other things, to increase overall reliability, improve tape handling, further reduce any possibility of error, and provide continued enhancements to diagnostic capabilities. Firmware fixes since G9N0 (Half High code G9N1) follow:

Fixes That Affect All Drives

Functional Improvements (Reduce Permanent Errors)

Fix task contention w/turbo counts during TLWR: Prevent race condition during initialization, where TLWR could conflict with host activity and cause an incorrect mode setup.

Panic due to abandoned seg status begin cleared on load: Fixes another case for error handling which involves a FM and EOD at end of wrap. In this scenario, the tape was unloaded right after a recovered error, and the panic occurred on the next load.

Correct data for drive id in MAM parm: Fixes a bug caused by CMVC 34860, where a cleaning cart could appear as a data cart in MAM data.

Add drive behaviors to report a drive panic: To better identify when a drive panic occurs the follow behaviors were added to the drive for a library to monitor. Set TA=3Ah and assert new recovery procedure 10h - "Device initiated reboot. Retrieve device error log".

Diagnostic callback cannot handle concurrent requests: Fix was added to help the drive better handle concurrent requests with LTFS.

Fix error reporting on erase: When a FID write error occurs during an erase sequence, correctly report a media error rather than a code internal error (FSC 6000).

Drive Panic due to side effect of previous change: Fix panic caused by previous code change for FSC 78B5 errors.

Check existence of Cart Content page before updating: Fixes a code panic which occurred when a Set Capacity command was issued with an uninitialized Gen4 WORM cartridge. This problem only existed in LTO5 code.

Motor stall at the beginning of CartInit caused 2E12: Prevents a temporary motor stall during the servo initialization sequence, from causing an FSC 2E12 load error.

Correct supported media type list of log page 14h: Fixes a code problem which caused incorrect values for the supported media types in Log Page 14h.

Better handle issues with buffer corruption recovery: Drive would panic if a data buffer corruption was detected. In some cases this can be handled with a simple read retry from the media

Fix reservation conflict checking: This change fixes reservation conflict checking to match the SCSI spec, and resolves inconsistencies between SPC2 reserve and Persistent Reservations.

Activity duty cycle of log sense 0x14: Fixes a problem with LP 14h, parm 13h, where the activity duty cycle could be incorrectly reported as exceeding 100%.

Race in task management can hang frame processing: Fixes a code race condition at the end of a task management response, which result in an interface hang when processing the next incoming frame.

Improve Log Sense handling: Process a Log Sense command out-of-order when the command is going to fail immediately due to an invalid request.

Thread failure after wake up from power saving: Fixes a problem where the "wake up" sequence from power saving mode could cause a thread failure or a false 12v power error.

Motor stall during unspool caused tape damage: Fixes a code problem where a stall during the tape unspool sequence (possibly due to stiction), resulted in incorrect motor movement and possible tape damage.

Mode Sense page 10h missing PS bit: The page savable (PS) bit was in error when pc=changeable.

Functional Change Requests

FCR3327: LTO5 LP11 Parm 8001 Medium Encryption Status: The LTO-5 drive needs to change to conform to this behavior to better report the encryption status on the HH LED encryption light.

FCR3329: ADC Service Mode (condensate abatement): Implement new support for ADC Service Mode, which allows a library to tell the drive to go into service mode to reduce condensation.

FCR3333: Support DRA using standards based op-codes: Implement new support for the "standards" based op-codes for Dynamic Runtime Attributes, while still maintaining the legacy based vendor unique op-codes.

Fixes That Affect Only Certain Drives

FC Drives

Drive panics due to unique Read abort behavior: When not doing Class 3 error recovery, the HBA sends READ commands and Abort READ commands causing the drive to panic and reboot**.** Class 3 error recovery should be used.

Incorrectly removed turbo exchange: Fixes a code panic for a scenario where the drive incorrectly detached an exchange during SRR on a Read command. An Abort on a subsequent command resulted in the panic.

Library Drives

Clear timeout sense data after sent: Fixes a code bug where sense data from a failed INQ command, was also later incorrectly reported to an IES command. This fix clears the sense data after it is sent.

Drive incorrectly threaded the tape when configured to not thread: When a cartridge is manually pushed into the drive, and the ADC mode page 0e subpage 03 has parameters AMO = 1 and AUTOLOAD MODE = 1**,** the drive would incorrectly thread the tape. It should have mounted the tape, but not threaded the tape.

Panic due to malformed packet tracing: Fixes a code panic caused by a bug in the tracing of malformed data packets on the library/drive interface. After detecting the STX (start character), there was an error in the tracing logic if another STX was detected before the normal ETX (end character) was detected.

Update expected CRN in more cases: Drive was not properly incrementing the CRN (Command Reference Number) when using an invalid task attribute.

Always set MultiP in inquiry data for LUN1

Handle out-of-order TUR to LUN1 correctly: Fixes a code panic caused by incorrect handling of an aborted in-order TUR to LUN1, which was then reissued as an out-of-order TUR.

Handle error checking and aborts on ADI commands: Fix to correctly handle an aborted ADI command. In this case, Mode Sense command was hung, due a prior aborted Mode Select.

Mishandling frame numbers on ACKs for releasing exchanges: Code fix to prevent library interface errors, caused by duplicate non-zero frame numbers when releasing an exchange.

Correctly clean up sense data: Fixes a code problem where the drive incorrectly sent zero sense data. This was due to wrong handling of concurrent requests from the host and library interfaces.

SAS Drives

SAS wrap test sometimes fails: Interrupts were not masked during the loopback test, which could result a frame miscompare and a false wrap test failure.

SAS: Internal CRC failures send wrong data to host: With some HBA suppliers, the drive would send bad data on a CRC error while performing TLR. Also changed the code to not attempt TLR - instead, a check condition with sense key B (aborted command) and ASC/Q of 110A (Miscorrected Data) is sent which should inform the host that the data that was sent was bad.

Handle link stopped in more cases: Code improvement to better handle link stopped scenarios.

Panic due to interrupt being handled in two places: Fix a code panic from a race condition created by a previous change.