IBM LTO-7 Firmware Versions J4D0 (FH) and J4D1 (HH) Release Announcement

May 2018

Preface

This Product Information Bulletin announces the release of IBM LTO-7 firmware updates J4D0 for full-height (FH) drives and J4D1 for half-height (HH) drives. These updates are intended, among other things, to increase overall reliability, improve tape handling, further reduce any possibility of error, and provide continued enhancements to diagnostic capabilities.

Models Affected

These firmwares affects all IBM LTO-7 drives, both FH and HH.

Upgrade Considerations

All systems running code IBM LTO-7 H5B2/H5B3 or HB82/HB83 can be upgraded to LTO-7 J4D0/J4D1.

⚠ **CAUTION:** To prevent data corruption, verify that all active backup and recovery jobs to the NEO tape library are completed prior to performing the upgrade.

Downgrades are Not Supported

Downgrades are not supported.

Functional Improvements

Firmware fixes included with the J4D0 FH and J4D1 HH updates:

- **Improve host interface communications.**
- **Add tension control and error recovery procedures (ERP).**
- **LUN1: Do not set VS bits in inquiry data.**
- **Servo control improvements.**
- **Improve head brush ERP.**
- **Fixes for log sense and tape alert data.**
- **Request clean for errors that require re-chuck ERP.**

Previous Functional Improvements

Firmware fixes since G9Q0 FH and G9Q1 HH updates including HB82/HB83 updates:

- **FCH-Field: Unhandled interrupt due to port offline/online.**
- **ADI panic on NULL exchange request for logout.**
- **Tape path temperature acquisition and reporting improvements.**
- **Host interface improvements.**
- **Read error recovery procedure to use slow speed for better servo tracking.**
- **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 a previous fix, where a cleaning cartridge could appear as a data cartridge 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."
- **Additional refinements to ERPs for FSC 7060 read perm error recovery.**
- **Drive returned incorrect MAM parms 224h, 225h for unit WORM** – The attributes 224h and 225h should return FF FF FF FF FF FF FF FF (8 bytes) for no encrypted logical block. Instead the drive returned 00 00 FF FF FF FF FF FF which was incorrect.
- **MTR eject doesn't return callback when cartridge in sensor is off** – The drive would get stuck in a MTR when there was no cartridge in the drive. Additional case was found.
- **Drive panic due to side effect of CMVC 35664** – Fix panic caused by previous code change for FSC 78B5 errors.
- **Increase size of max MAM attributes** – Fixes a code panic which occurred during an attempt to write/read all 1024 VU host attributes.
- **Incorrect CM tape directory size** – Fix to report the correct CM Tape Directory Page length.
- **Drive panic during POST when disabling crypto via the library.**
- **Change ASC/ASCQ for Out of Space for MAM (Vendor Unique Host Attributes 1400h to 17FFh)** – Send the correct return response of 05/55/06 Out of Space, when a Write Attrib command exceeds the allowable size limit.
- **Drive panic due to unexpected WDT expiration in RFMT header checking** – Fixes a panic caused by a code hang during a Locate command.
- **Drive failed write with a FSC 7265** – Due to a code issue, a good write operation incorrectly triggered FSC 7265 and posted a failure.
- **Drive hang on Lateral Position Recovery error** – Internal testing issue.
- **Add cleaner cartridge support for log page 17h** – The drive code was not correctly handling information for log page 17h for cleaning cartridges.
- **Mode Select 5/2600 CC points to wrong byte** – Fixes a problem where the Mode Select command does not correctly point to the byte in error, in some cases with a 5/2600 Check Condition.
- **Fix incorrect reporting for FSC 7342 (Wrt Unexp Wrap)** – Prevents a case of false reporting of an FSC 7342 error (Wrt on wrong wrap), when it should have been reported as an FSC 7855/7836 PES range error.
- **FSC 7813 should report SCD "6" instead of "3."**
- **Wrong firmware reported in Inq Page C0h** – Fixes a problem where an earlier code change caused the wrong firmware level to be reported in Inq Page C0h.

- **Fix Drive Panic FSC 7076** – When a FM is at EOD near EOW the drive panicked due to an incorrect handling of an abandoned ERP.
- **Fix Drive Panic** – Fixed a drive panic due to MAC queue sequencing issues. Caused by a command being aborted while a WRITE is paused.
- **Improve READ performance of drive on marginal tapes** – Made improvements to help READ marginally written tapes. This may help the following FSCs: 6010, 601D, 7066 and 7060.
- **Fix Drive Panic** – Fixed a drive panic caused by the drive not getting get LPOS, followed by C2 uncorrectable.
- **Fix Drive Panic** – Fixed drive panic caused by too many messages avail during repositioning.
- **FSC 7060 on READ near BOW** – Drive failed for a 4M_RULE_VIOLATION error on a read at near BOW. Drive was using the wrong LPOS for determining the position.
- **More robust handling/prevention of channel hardware conflicts**.
- **Unexpected WP caused FSC 7115** – An unexpected WP value caused the drive to do ERPs until the drive Timed Out.
- **Use CM Tape Directory to validate write pass**.
- **Servo code didn't respond to CHN during calibration causing a drive hang** – Might see a FSC 6017.
- **Fix queue hang after abort** - A Write Filemarks was aborted and the code did not clean up the queue correctly. This hung the queue, and the drive.
- **Optimize writer-offset calibration**.
- **Drive missed C2COMP interrupt twice causing a LBP error**.
- **Optimize MRR, open writers/readers to reduce resource conflicts**.
- **Drive failed at EOD** – Drive did not clear a state after processing EOD causing the drive to timeout.
- **Restrict Iterative Decode ERP to prevent code panic and host timeouts** – Might also help with FSC 7060.
- **VFO miss collection due to dead track by failed calibration** – Reset channel settings to default value before executing ERP.
- **Drive failed on Write** – In skip sync mode the 4m rule was exceeded due to a WP value not being incremented.
- **Optimize Bias Current to improve READ performance**.
- **MTR timeout due to incorrect PWM velocity** – MTR failed due to an incorrect PWM velocity being used, which caused the drive to fail. This caused the drive to appear as if I had a stuck tape.
- **Drive Panic during read/write test** – Drive was not correctly handling duplicate Datasets at a wrap turn during an ERP. This caused the drive to panic. You may see FSC 1055 or 7490 (drive fence because of unexpected reboot) indication in the engineering log if this happens.
- **FSC 7225 on READ** – Drive failed when an INCONSISTENT DSNUM occurred near EOW was encountered.
- **WORM positioning error FSC 6354 near BOP**.
- **Enable long erasure check FSC 7800** – During code check it was found that the long erasure would not run synchronously.
- **FSC 6000 on FC reset** – Drive can get an internal error when a FC reset occurs while positioning.
- **CHN calibration hang** – Fix hang during calibration sequence which resulted in FSC 6017.
- **Drive panic caused by OCM ECC (SEC) error on slave processor** – Enhancement to the kernel system error handler.

- **FSC 7060/7809 on READ** – Track following servo offset initialization was corrected to avoid reading off track.
- **FSC 78B0 improvement (over rotation at stoplock)** – Two changes to fix some causes of FSC 78B0: 1) do not modify DAC offset values set by Mfg, and 2) filter out sudden invalid calculated radius values.
- **LTO7 Srv Wrt Perm from PES range err during skew lock** – Changed the Skew lock threshold to reduce the number of PES range errors which were causing FSC 7830/7836/7378 servo errors. This can be seen when the drive is stressed with vibration or media PES issues.
- **Log page 17h & rd attr parm match for uninit WORM** – On a new WORM cartridge, a read of the MAM data to check the FELO and FULO values, to see if the tape had any encrypted data, would return unexpected data. The drive did not populate these values until after a valid command was issued. This behavior was changed.
- **FSC 78B5 improvement (BOT_EOT shutdown)** – Prevent some cases of FSC 78B5 with improved handling of a "stuck LPOS" condition near wrap turns.
- **Media motion hours of log page 16h is wrongly zero** – MMH in bytes 8-11 (Lifetime Media Motion Hours) in Log Page 16h was not getting reported correctly.
- **Unexpected Drive Panic** – A value was decremented out of range which caused panic.
- **Drive panic on SCSI invoked Diagnostic** – Fix a panic caused by a SCSI invoked diagnostic, when another diagnostic was running.
- **Drive returning previous cleaning cart data** – Drive was returning previous cleaning cartridge data when reading log page 0x30 for thread count when an expired cleaning cartridge is loaded.
- **Fix thread count in LP 17h and 30h for WP carts** – Sets the thread counts to 0 when an uninitialized write protected cart is loaded.
- **Write Attribute command allows <= size of attribute** – A change was made allow MAM attributes in ASCII format to be used in Write Attribute command with less than number of bytes as specified by the SCSI format specifications.
- **FSC 605E on a Write command** – Drive did not have the proper media position after format command fail.
- **Drive failed unload with FSC 2E0C** – Allow unthreading tape even when bottom sensor is off. Previously drive was fenced by 2E0C.
- **Modified the allowed BOT unencrypted label on fully encrypted media** – On some ISVs, the label structure did not match what was expected and turned off the encryption LED, even though the entire tape was encrypted.
- **Drive Panic when out of range segment was about to clear** – Drive code did not set read mode buffer size when reposition to write was executed.
- **BOP cache copy should be aborted before flush operation** – Fixes a drive hang on a Set Capacity command.
- **Find/fix abnormal FIRs in VPD/WorkingSet at POR** – Drive will attempt to recover abnormal channel settings instead of using questionable channel values at POR.
- **Load fail due to tension shutdown** – Fixes an FSC 2E12 caused by a tension shutdown during Servo Init step in the load sequence.
- **Drive hang due to corrupted servo value** – The drive hung due to an internal variable being corrupted. This caused the drive to Timeout on a rewind command.
- **Drive failed with FSC 6000 due to a high number of servo errors while writing** – The drive would sometimes missed interrupts due to the write enable going on and off.

Encryption

- **Next block encryption status behavior was not per the standard** – Fix to correctly update the Encryption Status in the Next Block Encryption Status page to 6 (drive does not have the correct key to decrypt the encrypted block).
- **CRP: Improve CKORx handling** – Some changes were made to better comply with T10 standards.

SAS Drives

- **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 (Mis-corrected Data) is sent which should inform the host that the data that was sent was bad.

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

Library Drives

- **LUN1: Decrease the timeout for LUN1 inquiry caching commands.**
- **Don't check burst length for target data out** – Side effect of a previous fix. The Mode Select caused drive code to incorrectly check the burst length for a command in Target mode and Data Out situation.
- **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.
- **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.
- **ADI: Increase logout IU logout duration parameter** – Drives with longer POST times would sometimes not communicate with some libraries. The logout IU duration parameter was increased to avoid this situation.
- **Return correct data for MP 0Eh [04h]** – Fixes a problem caused by a previous change, where the incorrect serial number was returned in MP 0Eh [04h].

Previous Fixes That Affect Only Certain Drives

SAS Drives

- **SAS: FSC 6000 on SAS Hard Reset** – Fix write state cleanup when a SAS hard reset occurs.

FC Drives

- **Panic on Aborted Write** – Fixes a panic due to incorrect handling of an Aborted Write command during a link reset sequence.

FH Drives

- **MTR eject doesn't return callback when cart in sensor is off** – The drive would get stuck in a MTR when there was no cartridge in the drive.

HH Drives

- **HH Drive failed with a 78B5 while locating to EOD with some Gen 6 media** – The drive failed to report early warning on a high speed locate to EOD (Maxell Gen 6 media).

Library Drives

- **ADI** – Optimize update frequency of VHF device activity changes.
- **LN1: Fixed RES data for short alloc length** – Drive was not handling RES for lengths of <=16 bytes correctly.
- **LIB: Clear VPD for ADI or LDI when switching lib type** – Reset current ADI and LDI parameters in drive VPD, when the drive detects that it is being moved to a library with a different interface type.
- **Task Management on ADT port not causing UA and aborting LUN** – A LUN RESET task management function to the ADC LUN via the sADT port, did not report a UA to be posted as described in SAM4. Updated code to reset the LUN.
- **Lun1 TUR command returning incorrect sense dat**a – Drive was giving "Invalid Field in CDB" check condition on a TUR to LUN1. This was due to an earlier CBD failing and reporting the same sense data for all subsequent TUR requests after this.
- **ADI: burst length set correctly for data transfers** – Drive was sending the correct amount of data according to the burst length set during long data transfers.
- **ADI: Incorrect INXTN/RAA bits in VHF Data** – Even if the clutched cartridge is ejected by mid-tape recovery, INTXN (in transition) bit keeps 1 (should be 0), and RAA (Robotic Access Allow) bit keeps 0 (should be 1).
- **ADI: Check frame size compare to login max size** – Drive was not checking the received frame payload size against the login negotiated maximum payload size.
- **ADI: Check SCSI cmd IU payload size** – Drive did not respond correctly to a Command IU with INVALID Payload length.
- **ADI: Sending wrong data after 100 msec login delay** – Send IR (Initiate Recovery), and expected a IR ACK but received a normal ACK instead.
- **ADI: Sending IRs incorrectly during a PAUSE** – Drive did not hold off IR (Initiate Recovery) when PAUSE sent.
- **ADI: Drive was not posting sense data for data offset error** – During an error injection scenario, the drive did not report any sense data when a data offset error was injected.

Downloads

Firmware update code IBM LTO-7 J4D0 (FH) and J4D1 (HH) are available for download for supported NEO users with active software entitlement agreements. Go to the Overland Storage Customer Support Portal by navigating to the Manage Products page: http://docs.overlandstorage.com/neo