M-Series Firmware History

Library Model	Firmware Version	Part Number	Change History
M20	2.15	509418-000	Click Here
M32	2.15	509486-000	Click Here
M52	2.16	509468-000	Click Here
M104	2.16	509454-000	Click Here
M156	2.16	509455-000	Click Here
M258	2.16	509456-000	Click Here
M500	2.06	509329-000	Click Here

M-SERIES M20 AND M32 FIRMWARE REVISION HISTORY

V2.15 22 Dec 2000 - currently shipping

097 Changed Unit Information in setup menu to display leading zeros in serial number.

096 Added support for Sony (14X) SMO-561 drive.

095 Fixed bug in setup mode Drive Tests where, for 5.2Gb disks, the reported capacity would be half the true value.

V2.14 2 Dec 1999

092 Fixed bug in which Access (door closed) bit of Read Element Status import/export element descriptor would still be set if the import door was opened via the front panel button. This could also cause other problems such as attempted moves to and from the open import door. This bug was inadvertently introduced in version 2.08.

091 Added check for an unexpectedly open import door before moving a cartridge to or from it.

090 Added debounce delay for determination of door closure prior to cartridge movement. Lack of debounce delay was causing Door Open errors.

089 Changed to cycle drive power a final time as part of error recovery sequence, unless NoPwrCyc mode is set, if unable to eject a cartridge from the drive. This was done to clear any pending drive eject signal which may have caused the drive to eject at a later time.

088 Fixed bug in which drive power could have been cycled even if NoPwrCyc mode was set.

087 Fixed bug in which the InEnab and ExEnab bits of the Read Element Status command's import/export element descriptor were not being set to zero when a Prevent/Allow Medium Removal command was issued to put the library in the prevent medium removal state.

V2.13 9 Jun 1999

086 Fixed bug which could cause Read Element Status to report import/export element status as full after a cartridge was exported and the door was closed. Empty/full status now updated upon cartridge insertion or removal rather than at door closure.

085 Fixed bug which caused the library to go off-line temporarily while the import door was being opened from the front panel.

084 Fixed bug in data transfer element descriptor data returned by Read Element Status. If a drive is not configured (i.e., not present), IDValid and LUValid fields will now be set to zero.

081 Fixed bug wherein the timeout was too short when loading drives with the Wait on Load (WaitLoad) option selected.

080 Fixed bug in handling an Abort message from the host after the library had disconnected to process a command. The library was not releasing the SCSI bus.

070 Added enhancement to setup mode Event History display. Pressing left-most key three times will now show current list position relative to end of list (oldest event). This is the same order as the msertest test program.

V2.12 24 Nov 1998

083 Fixed a bug that would log some recoverable errors as unrecoverable.

079 Improved error recovery and error reporting when the vertical path

sensor is blocked by media that is unexpectedly ejected from a drive.

078 Added new bit to event history type. Setting bit 7 will now cause only SCSI commands which effect a change to the library to be logged. Test Unit Ready, Request Sense, Inquiry, Mode Sense, Log Sense, and Read Element Status commands will not be logged in event history list. This was added to reduce the amount of non-relevant information logged for diagnosing library system/host software problems.

077 Changed default event history type to BBh (187) for new library systems.

075 Changed maintenance mode Move Media test to allow scrolling down through elements in addition to scrolling up through them.

074 Added additional symbols to setup menu Error Log display. A period after the error number indicates that this was the first error that occurred for a command. An up-arrow indicates that this was not the first error that occurred for a command and that the error might be related to earlier errors (subsequent errors in the error log).

073 Added additional flag to Mode Select Vendor Unique Special Modes page. If the new LogInfo bit (byte 3 bit 5) is set along with the SetOptions bit (byte 3 bit 7) then subsequent Log Sense commands will return additional information in the Error Log page.

072 Added additional information to Log Sense Error Log page (dependent upon Mode Select LogInfo bit above). Byte 6 has been modified to return FirstErr flag in bit 7 indicating that this was the first error that occurred for a command, Not1st flag in bit 6 indicating that this was not the first error that occurred for a command and that the error might be related to earlier errors (subsequent Error Log pages), and bits 3-5 containing the error type and the format of the additional information bytes. The error types are as follows: 1=general error, and 4=drive related (info bytes contain ASC/ASCQ or drive #).

071 Added additional flag to Log Sense Unit Statistics page. The new InitReqd bit (byte 16 and bit 7) will be set if the next SCSI command using the library's robotics will cause the library to initialize itself.

V2.11 23 Sep 1998

086 Removed extra jogging of picker when rezeroing with the picker in front of a drive with an ejected cartridge.

076 Changed maintenance mode Move Media test to allow scrolling down through elements in addition to scrolling up through them.

067 Fixed bug which would sometimes cause the drive number not to be stored for errors relating to a specific drive.

162 Added error occurrence count (if greater than one) and power-on hours since error occurrence to information display in error log.

062 Changed to display and return the first non-recoverable error encountered for fatal hardware errors, rather than the last error encountered. Typically, the first error encountered occurs at the lowest level of machine control and subsequently generates additional errors at higher levels. By returning the first rather than the last error encountered, more accurate information about the true cause of the problem is available to the host.

060 Rezero will now properly return an ejected disk back into its drive if limited recovery is set.

059 The flip will now realign before homing after a vertical path sensor is intermittently blocked while flipping a cartridge.

V2.10 10 Jun 1998

069 Changed production cycle to only load drives 200 times regardless of DIP switch settings.
066 Changed to make sure all drives are powered up in the event of a SCSI bus reset. Previously, if power was being cycled to a drive for error recovery, and a bus reset was received, drive power was never restored
063 Eliminated requirement of host to send Rezero Unit command to clear an unrecoverable hardware error.

V2.09 21 Jan 1998

068 Added ability to enter maintenance mode from the front panel by holding the second key from the left.
067 Modified load profile and unload drive position for the Plasmon DW260 drive.
066 Added support for Sony F551 drive.
065 Added debounce delay for determination of door closure via Read Element Status command.
064 Changed to make door open key more responsive during SCSI polling.

V2.08 1 Aug 1997

058 Fixed improper message notice when running under Windows 95.
057 Fixed bug which prevented logging of all messages received from host in the event history list.
055 Fixed bug wherein reserved bits in byte 2 of Send Diagnostics command were not being tested.
054 Fixed ignore parity bug.
053 Added error recovery for loss of power or bus reset during Exchange Medium command.

V2.07 27 Mar 1997

052 Fixed bug wherein an invalid Identify message or an Identify message with an invalid LUN could clear a Power-On/Reset Unit Attention condition.
051 Fixed bug which could cause '1' or '2' to be displayed in Setup mode Mode Settings, rather than 'Y'.
050 Added support for Nikon DD53 drive.
041 Fixed bug which could cause Bad Element Code error to be generated in certain jam situations.
040 Fixed bug preventing the incrementing of the recoverable error count in the Log Sense Error Statistics page.
039 Fixed bug which could cause unit lockup on error recovery when a cartridge needs to be exported, the import/export is full, and the operator does not respond to a request to remove the disk and close the door (unit locks up until the door is closed).
038 Fixed bug which would incorrectly record load completion status when a drive failed to load completely and the MIT opto was blocked.
037 Fixed bug which could generate Improper Message error when a second Identify message was received in a selection, even though the message had the same LUNTRN value as the first.
036 Fixed bug in Request Sense BPV and Bit Pointer fields.
035 Changed open import door function to be more responsive to door open sensor. Door can now be opened and quickly closed without generating an error.

V2.06 02 Dec 1996

049 Changes to improve reliability.
048 The offsets will display "value set at 100 "if set at default value when exiting the constants menu if SW2 is on.
047 Fixed element status bug where MTE status could not be set properly to empty or full in M20.
046 Changed DW260 drive delays in between test ready,and spin down/eject commands.
045 Changed demonstration to lessen delays for factory test use only.
044 Changed power reduction load value for DW260 drives to load more softly.
043 Added support for 9101 Pioneer drives
042 Fixed values to position, load, and unload a Maxoptix (Hitachi) drive

V2.05 6 Sep 1996

034 Increased the delay in maintenance mode from 2 seconds to 5 seconds before ejecting a disk from DW260 drives.
033 Added drive type 73 (DW260).
032 Fixed bug which would cause library system to sometimes return Recovered Error sense key status when it should have returned Hardware Error sense key status.
031 Fixed bug which would cause library system to sometimes display EPROM ERROR when it should have displayed and returned a Shipping Screw error.
030 Fixed bug which would cause the Key Pressed field in the Front Panel Display Mode Page of the Mode Sense command to sometimes return an incorrect value.
029 Fixed a bug that caused an Import Door Is Open error when positioning to an element other than the import door (with the import door open).
028 Fixed a bug when positioning to an element with a full MTE, that caused the media in the MTE to be moved into the new element.

V2.04 26 Jun 1996

026 Fixed bug preventing the import door from being opened after a 'NO' selection to the 'TAKE OFFLINE?' prompt.
025 Fixed bug causing inconsistency in level of detail for display messages in Setup Mode.
024 Fixed bug which caused elements to be set to the empty state when Send Volume Tag command was issued with an Undefine operation specified.

V2.03 22 May 1996

--- Initial Release.

M-SERIES M52, M104, M156, AND M258 FIRMWARE REVISION HISTORY

Changes since last release:

V2.16 22 Dec 2000 - currently shipping

226 Changed Unit Information in setup menu to display leading zeros in serial number.

225 Added support for Sony (14X) SMO-561 drive.

224 Fixed bug in setup mode Drive Tests where, for 5.2Gb disks, the reported capacity would be half the true value.

V2.15 2 Dec 1999

221 Fixed bug in which Access (door closed) bit of Read Element Status import/export element descriptor would still be set if the import door was opened via the front panel button. This could also cause other problems such as attempted moves to and from the open import door. This bug was inadvertently introduced in version 2.14.

220 Added check for an unexpectedly open import door before moving a cartridge to or from it.

218 Added debounce delay for determination of door closure prior to cartridge movement. Lack of debounce delay was causing Door Open errors.

217 Changed to cycle drive power a final time as part of error recovery sequence, unless NoPwrCyc mode is set, if unable to eject a cartridge from the drive. This was done to clear any pending drive eject signal which may have caused the drive to eject at a later time.

216 Fixed bug in which the InEnab and ExEnab bits of the Read Element Status command's import/export element descriptor were not being set to zero when a Prevent/Allow Medium Removal command was issued to put the library in the prevent medium removal state.

V2.14 9 Jun 1999

215 Fixed bug that could reduce lift position accuracy and performance.

214 Fixed bug in which a drive was not being spun down early when exchanging a cartridge to it (spin down would not start until the cartridge was picked from the source element).

213 Fixed bug in Move Medium command which prevented a picker from moving a cartridge if the other picker was full.

212 Fixed bug which could cause Read Element Status to report import/export element status as full after a cartridge was exported and the door was closed. Empty/full status now updated upon cartridge insertion or removal rather than at door closure.

211 Fixed bug in handling an Abort message from the host after the library had disconnected to process a command. The library was not releasing the SCSI bus.

210 Fixed bug where if a maintenance mode test was run after scanning the elements with the Slow Scans option set, an Undo Overflow error would be be generated.

209 Fixed bug in logging of MTE in Log Sense event history page.

208 Added enhancements for new phase 3 lift shafts and bearings including a new offset menu option and a prompt displayed the first time this firmware is started in a machine - requesting the type of lift shafts installed (phase 3 or not).

207 Fixed bug wherein the timeout was too short when loading drives with

the Wait on Load (WaitLoad) option selected and no drive cables.

206 Fixed bug which caused the library to go off-line temporarily (i.e., not respond to selection) while the import door was being opened from the front panel.

205 Fixed bug in M104-M258 resulting in incorrect data transfer element descriptors being returned if there was a gap in the drive sequence, i.e., if a drive other than the last drive was not configured (present). The unconfigured drive was being skipped and the descriptors for subsequent drives were being returned in its place.

204 Fixed bug in data transfer element descriptor data returned by Read Element Status. If a drive is not configured (i.e., not present), IDValid and LUValid fields will now be set to zero.

203 Added enhancement to setup mode Event History display. Pressing left-most key three times will now show current list position relative to end of list (oldest event). This is the same order as the msertest test program.

V2.13 24 Nov 1998

201 Reduced the need for the lift to reposition in front of a drive as a result of binding lift bearings or a weak lift motor. The repositioning at a drive could result in a picker misposition error if the picker is extended.

200 Improved pivot positioning accuracy.

197 Will now verify that the changing from one slider to the other is successful before positioning the lift.

199 Improved the detection of lift positioning errors from binding lift bearings or a weak lift motor.

195 Fixed bug which prevented an exchange from a medium transport element to a slot or drive to the other medium transport element. This type of exchange could be used for high throughput and fast time-to-data cartridge swapping if a cartridge was left in an MTE and alternately swapped with a storage slot and then a drive.

194 Fixed bug which prevented a cartridge from being moved from a slider upon power-up if the Limit Recovery flag was not set.

193 Added additional symbols to setup menu Error Log display. A period after the error number indicates that this was the first error that occurred for a command. An up-arrow indicates that this was not the first error that occurred for a command and that the error might be related to earlier errors (subsequent errors in the error log).

192 Added additional flag to Mode Select Vendor Unique Special Modes page. If the new LogInfo bit (byte 3 bit 5) is set along with the SetOptions bit (byte 3 bit 7) then subsequent Log Sense commands will return additional information in the Error Log page.

191 Added additional information to Log Sense Error Log page (dependent upon Mode Select LogInfo bit above). Byte 6 has been modified to return FirstErr flag in bit 7 indicating that this was the first error that occurred for a command, Not1st flag in bit 6 indicating that this was not the first error that occurred for a command and that the error might be related to earlier errors (subsequent Error Log pages), and bits 3-5 containing the error type and the format of the additional information bytes. The error types are as follows: 1=general error, 2=slider related (1st info byte is slider #), 3=column related (1st info byte is column #), 4=drive related (info bytes contain ASC/ASCQ or drive number).

190 Added additional flag to Log Sense Unit Statistics page. The new InitReqd bit (byte 16/28 [M52/others] and bit 7) will be set if the next SCSI command using the library's robotics will cause the library to initialize itself.
188 Will now drive the slider forward at a low power up against a cartridge while the fingers are engaging during a drive unload. This is to square the slider plate to the back of the media.
187 Slider offsets will automatically be biased 50 counts greater than set in the previous versions. This is a onetime adjustment that is indicated on the display when the unit is powered up. It is recommended but not necessary that slider offsets in setup mode are run again after upgrading to this vision. If you later down-rev, or down-rev and then up-rev the firmware, you will need to run slider offsets again.
186 Improved error recovery and error reporting when a vertical path sensor is blocked by media that is unexpectedly ejected from a drive.
183 Added new bit to event history type. Setting bit 7 will now cause only SCSI commands which effect a change to the library to be logged. Test Unit Ready, Request Sense, Inquiry, Mode Sense, Log Sense, and Read Element Status commands will not be logged in event history list. This was added to reduce the amount of non-relevant information logged for diagnosing library system/host software problems.
182 Changed default event history type to BBh (187) for new library systems.
181 Lowered the upper flip elevation to work with a double solenoid picker.
180 Increased the time for the fingers to fully engage in the cartridge before pulling it out of a storage slot.
179 Fixed a bug that would log some recoverable errors as unrecoverable.
178 Fixed a bug that could log the wrong error number (could be any number) on a mispick when in maintenance mode.
167 Fixed bug which could give a slider misposition error if the lift needs to reposition itself in front of a drive.

V2.12 8 Oct 1998
177 Fix bug introduced in last version that would cause possible mis-pick of cartridge when unloading a drive.
176 Fixed a problem which could allow the media in one of the pickers to be driven out of the MTE far enough to hit on the media in the storage area after changing from one picker to the other.
175 Unit will now report a recoverable slider position error if one of the pick fingers misses the media during a pick but is able to grab the media on a retry.

V2.11 23 Sep 1998
172 Removed extra jogging of picker when rezeroing with the picker in front of a drive with an ejected cartridge.
169 Will now be able to detect a slider jam condition when moving a slider to the unload position at a drive.
167 Fixed bug which could give a slider misposition error if the lift needs to reposition itself in front of a drive.
166 Increased the time for the fingers to fully engage in the cartridge before pulling it out of a drive.
165 Reduced the possibility of the slider plate blocking the vertical path sensors when positioned in front of a drive waiting for it to eject a cartridge.
164 Changed maintenance mode Move Media test to allow scrolling down

through elements in addition to scrolling up through them.
163 Added error occurrence count (if greater than one) and power-on hours since error occurrence to information display in error log.
162 Fixed bug which would sometimes cause the drive number not to be stored for errors relating to a specific drive.
160 Changed to display and return the first non-recoverable error encountered for fatal hardware errors, rather than the last error encountered. Typically, the first error encountered occurs at the lowest level of machine control and subsequently generates additional errors at higher levels. By returning the first rather than the last error encountered, more accurate information about the true cause of the problem is available to the host.
157 Improve flip operation for a weak flip motor and return a recoverable flip error for a very weak flip motor.
156 Reduced the starting torque of the flip motor (soft start up).
155 Rezero will now properly return an ejected disk back into its drive if limited recovery is set.
154 The flip will now realign before homing after a vertical path sensor is intermittently blocked while flipping a cartridge.

V2.10 10 Jun 1998
153 Changed production cycle to only load drives 200 times regardless of DIP switch settings.
152 Changed to make sure all drives are powered up in the event of a SCSI bus reset. Previously, if power was being cycled to a drive for error recovery, and a bus reset was received, drive power was never restored.
151 Changed drive offset value for type 77 drive to better center the picker at the drive.
150 Fixed bug in which a unit initialization after a successful exchange operation to a drive would cause the library to try to unload the drive and return the disk.
147 Eliminated requirement of host to send Rezero Unit command to clear an unrecoverable hardware error.
146 Improved the detection of media in a storage slot during a pick or store operation to prevent false element unexpectedly empty errors.
145 Increased the hold off time for detecting a vertical path sensor blockage during a pivot.
144 Reduced parking force on bumpers.

V2.09 21 Jan 1998
142 Added support for Sony F551 drive.
141 Added ability to enter maintenance mode from the front panel by holding the second key from the left.
140 Added debounce delay for determination of door closure via Read Element Status command.
139 Fixed bug in handling of Rezero Unit command with the Limit Recovery option set to No. If a drive was loaded and the original slot from which the drive cartridge came had been filled by another command, the Rezero Unit command was incorrectly returning a hardware error.
137 Fixed error recovery problems for Exchange Medium command.
132 Fixed bug in DRIVE TESTS which prevented some drive and slot numbers from being correctly displayed in the event of an error.
126 Fixed bug with Reserve command third party element reservations.

125 Changed byte 12 of Mode Sense Device Capabilities page since M<->D and M<->S are not allowed in all cases.

V2.08 1 Aug 1997

124 Fixed improper message notice when running under Windows 95.
121 Fixed bug with Reserve command third party element reservations.
120 Fixed bug which prevented logging of all messages received from host in the event history list.
118 Fixed bug wherein reserved bits in byte 2 of Send Diagnostics command were not being tested.
117 Fixed ignore parity bug.
116 Added error recovery for loss of power or bus reset during Exchange Medium command.
115 Fixed error recovery problems for Exchange Medium command.

V2.07 27 Mar 1997

114 Added spin down function for DW260 drives
113 Fixed bug which could generate Improper Message error when a second Identify message was received in a selection, even though the message had the same LUNTRN value as the first.
112 Fixed bug in Request Sense BPV and Bit Pointer fields.
111 Changed open import/export door function to be more responsive to door open sensor. Door can now be opened and quickly closed without generating an error.
110 Changed to return currently active slider as first byte of additional information in error log error parameter for slider errors (errors 3A through 3F).
109 Fixed bug wherein an invalid Identify message or an Identify message with an invalid LUN could clear a Power-On/Reset Unit Attention condition.
108 Fixed bug which prevented Active light from coming on for activity in drives 3-6.
107 Fixed bug which could cause Bad Element Code error to be generated in certain jam situations.
106 Fixed bug preventing the incrementing of the recoverable error count in the Log Sense Error Statistics page.
105 Fixed bug which could cause unit lockup on error recovery when a cartridge needs to be exported, the import/export is full, and the operator does not respond to a request to remove the disk and close the door (unit locks up until the door is closed).
104 Fixed bug would allow and attempt an Exchange command with a picker as the first or second destination.
103 Fixed bug which would cause the wrong disk to be returned to a storage element if an Exchange command failed because a drive could not be loaded.
102 Fixed bug which would incorrectly record load completion status when a drive failed to load completely and an MIT opto was blocked.
101 Added support for Nikon DD53 drive.

V2.06 02 Dec 1996

100 Changes to improve reliability.
099 Added ability to check which MIT opto is blocked.
098 The offsets will display "value set at 100 "if set at default value when exiting the constants menu if SW2 is on.

097 Changed DW260 drive delays between test ready, and spin down/eject commands.
096 Changed demonstration to lessen delays for factory test use only.
095 Added support for 9101 Pioneer drives.

V2.05 26 Sep 1996
082 Fixed a bug that caused an Import Door Is Open error when positioning to an element other than the import/export element (with the import door open).
081 Increased the ready slider time-out from 1 second to 2 seconds.
080 Added retry and verification to the change active slider routine to correct for a resulting element unexpectedly empty error.
079 Added cycle of drive power for Hitachi drives to correct for drive load and unload errors.
078 Increased the delay in maintenance mode from 2 seconds to 5 seconds before ejecting a disk from DW260 drives.
077 Added drive type 73 (DW260).

V2.04 26 Jun 1996
076 Fixed bug preventing the import door from being opened after a 'NO' selection to the 'TAKE OFFLINE?' prompt.
075 Fixed bug causing inconsistency in level of detail for display messages in Setup Mode.
074 Fixed bug which caused elements to be set to the empty state when Send Volume Tag command was issued with an Undefine operation specified.
069 Fixed a bug that prevented retrying a load drive failure.
068 Improved the loading profile for the Hitachi OD172 and Maxoptix T4-2600 drives.

V2.03 22 May 1996
067 Fixed bug in Mode Sense Element Address Assignment Page which prevented returning the proper number of drives for the 104, 156, and 258 slot units if less than 6 drives were installed.
065 Added drive identification to additional error information display.
064 Check for proper operation of the pivot mechanism and pivot sensors when running Library Verify.
063 Check for proper operation of the pivot mechanism and pivot sensors when running tests in setup mode that initialize the unit.
062 Check if index pointers are in range.
061 Changed code to always ask that the import door be closed before checking drives for Drive Tests.
054 Fixed Run graphic in Maintenance Mode MOVE MEDIA test.
053 Fixed bug which caused the generation of error 0Ah - Bad Element Code in certain cases.
052 Fixed a problem when homing the lift after a slider jam occurs that may cause a position error.
051 Added checking in the homing of the lift and slider to see if the shaft encoders are working.
050 Fixed a problem with flip and pivot time-outs. They will now report the correct error instead of only a position failure.
049 Verify if the proper pivot position has been reached.
048 Check for more than one pivot sensor blocked at a time and if a pivot sensor is disconnected.
047 Will report the proper error codes for a jam at a storage slot or at

the import/export element.
046 Clear the displays on the unused DTE board in the M104 unit.
045 Corrected the error codes for a Pivot cable failure, Pivot failure, and Pivot align failure.
044 Improved initialization for the case of a disk protruding from a slot at the MTE.
043 Will now report the proper error if the vertical path sensor is blocked when initializing the flipper.
037 Fixed bug which disallowed exchange with transport address of zero and second destination address equal to source address (exchange cartridge back to original element).
035 Changed to disallow SCSI bus disconnect on spin-down command because of problems with Hitachi drives. This command should return status immediately anyway, so should be no need to disconnect.
034 Fixed bug which prevented front panel button from opening I/O station when pushed immediately after power-up.
033 Removed extra characters from front panel on-line display.
032 Changed operation of SW1-2 Cycle Limit Switch for the M104 and M156 so that when in the ON position all cycle tests except CYCLE 2-DISKS and CYCLE FULL will stop at 2000 cycles. CYCLE 2-DISKS and CYCLE FULL will stop at 4000 cycles for the M104, or 6000 cycles for the M156, as before.
031 Changed to display the drive number along with the error number for errors related to a specific drive.
030 Fixed bug which prevented source and destination elements from being logged in error log in certain cases.
029 Fixed bug wherein Reservation Identification field was not checked for superseding element reservations using the Reserve command (this field must match that used in previous Reserve command if elements are reserved by the same initiator without being first released).
028 Added a 2.5 second wait before loading a disk starting when any drive is unloaded (for the HITACHI OD172 and Maxoptix T4-2600 drives only).

V2.02 22 Feb 1996
027 Fixed bug preventing early drive spin down using SCSI cable.
025 Added missing PS bits in Vendor Unique Mode Sense mode pages to conform with ANSI SCSI-2 specification.
024 Changed StorD bit in Device Capabilities mode page back to 1.
023 Added OpenAcc bit to Vendor Unique mode page to indicate that Open Access Door command is supported.
022 Replaced left/right arrows for previous and next options with down/up symbols.
021 Changed retry delay for busy or non-responding drives from 1 sec to .1 sec for Test Unit Ready and Start Stop Unit commands sent to drives.
020 Fixed bug involving Exchange Medium command with an MTE as the source element.
019 Changed so that when Exchange Medium command is used with drive as destination element and default MTE address of zero, and the Wait On Load option is set, then wait for drive ready will occur at completion of command rather than at drive (i.e.,

the old cartridge is put away while the drive is spinning up).
018 Fixed bug resulting in incorrect values of Field Pointer and Lift Position to be returned in Request Sense sense data.
016 Fixed bug which set source element full on undo of move command even if cartridge could not be placed back in original location.
015 Fixed bug in Mode Sense Front Panel Display Mode Page which prevented keys 3 and 4 from being recognized.
014 Changed downward positioning of the MTE to reduce overshoot.
013 Added drive types 76 (Hitachi OD152), 77 (Hitachi OD172/ Maxoptix T4-2600), and 14 (Sony F541/ IBM 0632 C4x).
011 Reduced the angle of over-travel on the selector nut when changing SLIDERs from 90 degrees to 45 degrees.
010 Fixed bug causing wrong slider to be selected on retry of position operation during Exchange Medium command.
009 Increased flipper drive to insure stop pin rests on stop block.

V2.01 19 Dec 1995
008 Fixed front panel graphic for Maintenance Mode DISK SIDE and CHANGE SLIDERS tests.
007 Changed to return Hardware error sense key (4) rather than Recoverable error sense key (1) for cable failures.
006 Fixed bug which prevented units from completing command for recovered errors.
005 Changed to stop all motors while displaying error messages.
002 Fixed bug causing errors 38h and 3Bh when initializing after power up.
001 Fixed problem causing initialize to fail if a disk is ejected into the inactive slider.

M-SERIES M500 FIRMWARE REVISION HISTORY

V2.06 8 Sep 1999 - currently shipping

-Changed to cycle drive power a final time as part of error recovery sequence, unless NoPwrCyc mode is set, if unable to eject a cartridge from the drive. This was done to clear any pending drive eject signal which may have caused the drive to eject at a later time.
-Fixed bug where if a maintenance mode test was run after scanning the elements with the Slow Scans option set, an Undo Overflow error would be be generated.
-Fixed bug in which the InEnab and ExEnab bits of the Read Element Status command's import/export element descriptor were not being set to zero when a Prevent/Allow Medium Removal command was issued to put the library in the prevent medium removal state.
-Changed to disconnect from SCSI bus during data organization portion of Read Element Status command.
-Fixed bug in handling an Abort message from the host after the library had disconnected to process a command. The library was not releasing the SCSI bus.
-Fixed bug in Send Diagnostics command which would cause it to return Sense key=04 ASC/ASCQ=80/00 if an error occurred on a previous move command.

V2.05 7 Apr 1999

-Fixed bug in Mode Select drive assignments page which would result in the wrong values being used.
-Fixed bug in which a drive was not being spun down early when exchanging a cartridge to it (spin down would not start until the cartridge was picked from the source element).
-Fixed bug in Move Medium command which prevented a picker from moving a cartridge if the other picker was full.
-Fixed bug in Log Select event history page in which a Parameter List Length error would be returned for a valid CDB.
-Fixed bug in Log Sense event history page in which incorrect page length was being returned.
-Fixed bug in which drive option settings were not being set correctly upon power-up. This could also cause the Mode Sense vendor unique mode parameters page to return an improper value for byte 6, the drive options byte.
-Fixed bug in data transfer element descriptor data returned by Read Element Status. If a drive is not present or turned off, IDValid and LUValid fields will now be set to zero.
-Fixed bug which would cause a Mode Parameters Changed unit attention condition to be generated when powering on or off a drive or changing drive id's, even for the initiator effecting the change.
-Fixed bug which prevented exchange of cartridges at mailslot.
-Fixed bug in logging of MTE in Log Sense event history page.
-Fixed incorrect error returned for bad power supply.
-Fixed bug that could reduce lift position accuracy and performance.
-Added enhancements for new phase 3 lift shafts and bearings including a new offset menu option and a prompt displayed the first time this firmware is started in a machine - requesting the type of lift shafts installed (phase 3 or not).
-Added Enable Fast Scsi drive option to setup mode Mode Settings. This option can also be enabled by setting bit 3 (and bit 7) of byte 6 in the Mode Select vendor unique mode parameters page (page 20h). The latest drive cables (rev D) must be used for this option to be effective. Setting this option will allow all library drives to negotiate for synchronous transfer speeds up to 10MB/sec but this option should only be used with the redrive or differential conversion kit and when the number of buses is either 2 or 4 (dual or quad bus configuration).
-Added Open on Export changer option to Mode Settings. This option can also be enabled by setting bit 1 (and bit 7) of byte 3 in the Mode Select vendor unique special modes page (page 21h). Setting this option will cause the mailslot to open when a cartridge is moved to it.
-Added two new fields to Log Sense unit statistics page (page 30h). The new LastMTE field in byte 49, bits 5 and 6, will contain the number of the last MTE used - 1 or 2. The new FlipSide field in byte 49, bit 4, will contain the number of the currently active MTE flip side - 0 or 1.
-Added a delay between powering up pairs of drives when changing Drive Settings in setup mode Mode Settings.

-Added enhancement to setup mode Event History display. Pressing left-most key three times will now show current list position relative to end of list (oldest event). This is the same order as the test program, MSERTEST.

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-Fixed bug wherein setup mode Element Status would always indicate that the import/export element was full.
-Fixed bug which could give a slider misposition error if the lift needs to reposition itself in front of a drive.
-Fixed bug which would cause the number of recoverable errors in the Log Sense Error Statistics page to be greater than the total number of errors. This would also cause the number of unrecoverable errors in the same page to be a negative or very large unsigned number.
-Fixed bug which would generate park failure without explanation if all cartridges were not removed when parking library from setup menu.
-Fixed a problem which could allow the media in one of the pickers to be driven out of the MTE far enough to hit on the media in the storage area after changing from one picker to the other.
-Fixed bug which caused incorrect lift position to be logged for certain errors.
-Fixed bug which caused mismatch between error number and description displayed on front panel in certain cases.
-Fixed bug which prevented an exchange from a medium transport element to a slot or drive to the other medium transport element. This type of exchange could be used for high throughput and fast time-to-data cartridge swapping if a cartridge was left in an MTE and alternately swapped with a storage slot and then a drive.
-Fixed bug which prevented a cartridge from being moved from a slider upon power-up if the Limit Recovery flag was not set.
-Fixed a bug that would log some recoverable errors as unrecoverable.
-Fixed a bug that could log the wrong error number (could be any number) on a mispick when in maintenance mode.
-Changed so that Reserve command issued to changer device will no longer prevent front panel button from opening or closing mailslot. Host soft-ware should use Prevent/Allow Medium Removal command instead. This was changed to ensure compatibility with other M-Series libraries.
-Increased the time for the fingers to fully engage in the cartridge before pulling it out of a drive.
-Reduced the possibility of the slider plate blocking the vertical path sensors when positioned in front of a drive waiting for it to eject a cartridge.
-Will now drive the slider forward at a low power up against a cartridge while the fingers are engaging during a drive unload. This is to square the slider plate to the back of the media.
-Improved error recovery and error reporting when a vertical path sensor is blocked by media that is unexpectedly ejected from a drive.
-Unit will now report a recoverable slider position error if one of the pick fingers misses the media during a pick but is able to grab the media on a retry.
-Will now verify that the changing from one slider to the other is successful before positioning the lift.
-Increased the time for the fingers to fully engage in the cartridge before pulling it out of a storage slot.
-Added new bit to event history type. Setting bit 7 will now cause only SCSI commands which effect a change to the library to be logged. Test Unit Ready, Request Sense, Inquiry, Mode Sense, Log Sense, and Read Element Status commands will not be logged in event history list. This was added to reduce the amount of non-relevant information logged for diagnosing library system/host software problems.
-Changed default event history type to BBh (187) for new library systems.
-Added additional symbols to setup menu Error Log display. A period after the error number indicates that this was the first error that occurred for a command. An up-arrow indicates that this was not the first error that occurred for a command and that the error might be related to earlier errors (subsequent errors in the error log).
-Added additional flag to Mode Select Vendor Unique Mode Parameters page. If the new LogInfo bit (byte 3 bit 5) is set along with the SetOptions bit (byte 3 bit 7) then subsequent Log Sense commands will return additional information in the Error Log page.
-Added additional information to Log Sense Error Log page (dependent upon Mode Select LogInfo bit above).

Byte 6 has been modified to return FirstErr flag in bit 7 indicating that this was the first error that occurred for a command, Not1st flag in bit 6 indicating that this was not the first error that occurred for a command and that the error might be related to earlier errors (subsequent Error Log pages), and bits 3-5 containing the error type and the format of the additional information bytes. The error types are as follows: 1=general error, 2=slider related (1st info byte is slider #), 3=column related (1st info byte is column #), 4=drive related (1st info byte is drive #), 5=SCSI related (info bytes contain ASC/ASCQ, or error code F1h-FFh and low-level SCSI error location code), 6=power supply related (1st info byte is power supply #), or 7=drive control board related (1st info byte is drive control board #).
-Added additional flag to Log Sense Unit Statistics page. The new InitReqd bit (byte 49 bit 7) will be set if the next SCSI command using the library's robotics will cause the library to initialize itself.

V2.03 29 Jul 1998
-Fixed bug which prevented NotBus bit from being set in data transfer element descriptor for drives not on changer bus.
-Fixed bug which could cause the wrong drive to be loaded during library power-on recovery sequence if the library system lost power while moving a cartridge from a drive.
-Fixed bug which prevented library from cycling power to a drive to recover from a load or unload failure.
-Added power-on hours since error occurrence to more information display in error log.
-Changed to display and return the first non-recoverable error encountered for fatal hardware errors, rather than the last error encountered. Typically, the first error encountered occurs at the lowest level of machine control and subsequently generates additional errors at higher levels. By returning the first rather than the last error encountered, more accurate information about the true cause of the problem is available to the host.
-Improve flip operation for a weak flip motor and return a recoverable flip error for a very weak flip motor.
-Reduced the starting torque of the flip motor (soft start up).
-Improved error handling of Open/Close Mailslot command
- added retries and attempt to return to previous state in event of failure.
-Fixed alignment of maintenance mode sensor test sensors (after drive interface cable).
-Added delay to prevent overheating of import/export motor.
-Will now be able to detect a slider jam condition when moving a slider to the unload position at a drive.
-Warning display of overheat condition will no longer interrupt motor movement.

V2.02 27 May 1998
-First production release.