Firmware for a märklin locomotive decoder		
decoder	mLD / 3 - märklin Lok Decoder / 3	
track	H0	
logs	Analog: AC, DC Digital: MM, DCC, MFX +	
Article	-	
type	**Series decoder / game world**	
Version (fwd)	3.2.2.0	
date	19th. May 2020	

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changelog

This changelog is intended to help you identify improvements to the firmware from version to version were carried out. Please understand that minor or insignificant changes are not here can be mentioned. Jumps in the version numbers indicate internal developments that were not delivered.

Version: 3.2.2.0 (19. May 2020)

- Bugfix: A bug in DCC mapping has been fixed
- Bugfix: Fixed an issue where locomotives with connected buffers stopped restlessly
- Bugfix: Fixed an issue where Analog AC could no longer be approached after changing direction
- Bugfix: Software PWM now goes correctly to the initial state when all outputs are switched off
- Bugfix: Fixed an error that resulted in a Märklin sound module that SUSI Wait was no longer observed
- Bugfix: Fixed an error that prevented you from triggering measurements under DCC and MM
- Bugfix: Misconduct eliminated when stopping and bridging were zero
- Bugfix: Fixed an error that prevented a decoder with a buffer from being operated on a decoder tester
- Bugfix: Fixed internal sound processing bug
- Bugfix: Fixed an issue that prevented starting after stopping in a brake line
- Bugfix: A bug in the clue behavior has been fixed

Version: 3.2.1.0 (01. August 2019)

- Maintenance: Several internal processes have been improved
- Improvement: Improved shutdown behavior when overcurrent on the motor
- Improvement: Detection of the sensor signal improved
- Improvement: Reading out SUSI-CVs improved
- Improvement: driving behavior Analog AC improved
- Improvement: Sensor input 3 better de-prolled when starting
- Bugfix: Fixed an issue where locomotives with a sine motor were no longer driven correctly
- Bugfix: Fixed an issue where the locomotive shrugged again after stopping
- Bugfix: If the direction reversal bit is set, the direction can now be changed correctly with a change of direction
- Bugfix: If the direction reversal bit is set, a change of trip no longer leads to a change of direction
- Bugfix: Problems related to the Mfx login when connected 60974 or other buffers have been corrected
- Bugfix: Fixed bug where SUSI participants were confused

- Bugfix: Registration at mfx headquarters has been improved
- Bugfix: Fixed an issue with automatic control measurement
- Bugfix: Fixed an issue where some locomotives were driven restlessly in analog AC mode
- Bugfix: Follow-up error from the improved mfx login if outputs were still active were fixed, outputs could not be switched in DCC
- Bugfix: Distance between steam strikes in three-cylinder locomotives corrected again. With this change, it may be necessary for individual three-cylinder locomotives with sound moddul that the distances between the steam strikes have to be reset
- Bugfix: With mLD3, the sound outputs are now only displayed when a Märklin sound module is connected
- Bugfix: With mLD3, only the sound parameters that support the Märklin sound module are now displayed
- Bugfix: With the mLD3, the SUSI block is hidden if only one Märklin sound module is connected
- Bugfix: With the mLD3 with connected Märklin sound module, triggered sounds are now correctly redirected to the SUSI bus
- Bugfix: When changing the format to Märklin Motorola, active functions larger than 15 are switched off
- Bugfix: Fixed an issue where dimmed aux outputs flickered
- Bugfix: A bug in the special function Random has been fixed
- Bugfix: Various errors in the display of mfx parameters have been corrected
- Bugfix: When waking up to Analog AC, the functions that are digitally active are no longer incorrectly adopted

Version: 3.2.0.3 (06. December 2018)

- Feature: New output mode Switch exact time
- Feature: New output mode minimum time switch
- Feature: New output mode Switch on exact time and switch it off with sensor
- Feature: New output mode Switch on permanently
- Feature: New output mode buffer control
- Feature: Mapping expanded by eight AND gates
- Feature: Mapping expanded by eight OR gates
- Feature: Mapping expanded by eight XODER gates
- Feature: mapping expanded by four flip-flops
- Feature: Constant braking distance introduced, adjustable via CV
- Improvement: There are fewer disruptions during programming in DCC
- Improvement: The overcurrent detection has been improved
- Improvement: The speed of the SUSI bus has been increased
- Improvement: The driving characteristics in analog AC mode have been improved
- Improvement: Stop function with constant braking distance has been improved
- Improvement: The steam blow can now also be routed into the mapping, for example to control a smoke set
- Improvement: New engine type 8 for engines that only need a short EMC measurement break (Robel, div. Bell anchor etc.)
- Improvement: SUSI buffer control for external capacitive voltage buffer adjustable via CV
- Improvement: New function "motor stop" for controlling function models
- Improvement: New command "SUSI-Slow" for function models (Limits the maximum speed when the stage is extended / crane / etc.)
- Improvement: Current-limited motor output, adjustable for digital and analog operation via CV in %
- Improvement: Current-limited AUX outputs, adjustable via CV in mA
- Improvement: Asymptotic leakage of the locomotive has been improved
- Improvement: Recognition of Märklin SUSI participants
- Improvement: Clean up and expand the mfx / CC structure
- Bugfix: Allow DCC service mode, even if DCC was not previously operated
- Bugfix: An error in which some locomotives started during the mfx registration process has been fixed
- Bugfix: A bug in the flip-flops has been fixed
- Bugfix: Several small bugs in SUSI voltage buffer operation have been fixed

- Bugfix: Fixed an issue where the game world function was switched off after an update
- Bugfix: The detection of the direction of travel in analog DC mode has been improved
- Bugfix: Improve communication with the new Märklin decoder tester
- Bugfix: A bug in which old data was still partially available after reprogramming was fixed
- Bugfix: Motor twitches and flickering lights removed during AC switching pulse
- Bugfix: Logical function Corrected change of trip
- Bugfix: Fixed error when switching on / off of aux
- Bugfix: Fixed errors in the control part
- Bugfix: Fixed bug in mfx processing
- Bugfix: The susceptibility to faults in prelling sensors has been reduced
- Bugfix: The control of the SUSI voltage buffer has been revised
- Bugfix: A bug in the calculation of the SUSI cycle has been fixed
- Bugfix: Sound CVs are only displayed when the Märklin sound module is connected
- Bugfix: State changes to the flip-flops now correctly trigger rule editing
- Bugfix: A SUSI buffer is now reliably switched off during DCC programming
- Bugfix: Fixed an issue where communication between mDecoderTool3 and decoder tester was disrupted

Version: 3.0.1.12 (25. January 2018)

- Feature: New output mode for new telex coupling (FGL coupling)
- Bugfix: Determine the load only while driving and whether with or without consumption

Version: 3.0.1.10 (22. November 2017)

- Bugfix: Format change revised according to Motorola, track reception improved
- Bugfix: Fixed a bug in DC brake line when driving forward

Version: 3.0.1.9 (14. June 2017)

- Improvement: The BUS functions extended to F20 (SUSI)
- Improvement: In Motorola, the 4th. Address the F16 available
- Bugfix: When stopping / going or off / on a control center, the DC brake line is revised

Version: 3.0.1.8 (11. April 2017)

- Improvement: A track H0 decoder as a spare parts decoder for track 1 with more motor current
- Improvement: Track H0 decoder for track 1 with more motor current, analog mode revised
- Bugfix: Fixed bug when changing format to Motorola
- Bugfix: Fixed error in the 2-point controller for automatic processes (Coupling waltz)
- Bugfix: Programming already programmed decoders with other projects, not all CV areas have been programmed correctly
- Bugfix: Recognition and resolution of a DC brake line revised
- Bugfix: Fixed flashing of the outputs when switching on, e.g. with dimmed or zoomed output

Version: 3.0.1.5 (31. August 2016)

- Improvement: Adaptive overcurrent detection for digital and analog operation
- Improvement: 5VDC on the mtc21 also in analog mode
- Improvement: Overcurrent shutdown revised at the physical outputs
- Bugfix: Fixed directional reversal error in analog mode
- Bugfix: factor load now independent of the fill levels of the operating materials

Version: 3.0.1.2 (10. May 2016)

- Corresponds to the first delivery condition
