# Firmware Release Notes: Class 5 SmartMotor Standard/CANopen

## Moog Animatics Firmware Update Revision History

| Release Date | Software Version | Changes | Functions and items effected |
|---|---|---|---|
| 1/9/2018 | 5.0.4.42 | Various bug fixes.<br><br>Improvements made to encoder index correction for incremental encoders.<br><br>Added configurable functionality to map internal index mark to output. | <br><br><br><br><br>EOIDX() |
| 8/29/2017 | 5.0.4.36 | Various bug fixes.<br><br>Encoder index correction implemented for incremental internal encoders.<br><br>Negative applications of MFMUL/MFDIV no longer toggles direction. (-) indicates the negative direction and (+) indicates the positive direction. | <br><br><br><br><br>MFMUL, MFDIV (When MFSDC(x,0) or MFSDC(x,1)) |
| 6/23/2016 | 5.0.4.31 | Various bug fixes.<br><br>Allow MDB while in MDH commutation mode.  (Only class 5 D-series supports MDH mode.)<br><br>Low-resolution external encoder mode support. | |

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| | | CANOpen Mastering added. | CANOpen EDS file now: SM5_0V3R4.eds |
| | | Improvement to object 0x2209 that allows cam master from network to resume cam from current state instead of restart. | RSDORD, x=SDORD, SDOWR, NMT, RCAN(4), x=CAN(4) |
| | | Added special command SYSCTL(1,x) to control bootup MTB state. | SYSCTL() |
| | | ENCCTL command was causing watchdog if ABS encoder not actually enabled. Added check to bypass the ENCCTL functions in this case. | ENCCTL() |
| | | Combitronics support for RTRQ. | RTRQ over Combitronics |
| | | Ping command support over Combitronics. | |
| | | Encoder-hall runaway check status bit moved to give its own status bit: status word 6, bit 5. | Status word 6, bit 5 |
| | | Encrypted SMXE user program download over CANOpen. | |
| | | Misc improvements to downloading user program over CANOpen. | |
| | | Gearing over CANOpen (mode of operation -11). | Object 0x2208 data |
| | | Time sync over Combitronics. | |
| | | Cam mode start at arbitrary master values. | |
| | | Resume G(9) cam function. | |
| | | CANOpen timer tick moved to main ISR to maintain better alignment with motor timebase when a sync producer. | |

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| | | Hybrid mode MDH, MDHV= for D-series only.<br><br>Current limit improvements for D-series motors. | |
| | 5.0.4.8 | Removed restriction of RB and RW to status words locally available over Combitronics.<br>IN command without parenthesis is now allowed inside PRINT statements and array locations, i.e. PRINT(IN) and Ral[IN&3]. | RB and RW over Combitronics<br><br>PRINT and array variables with IN or SP2 as arguments |
| | 5.0.4.7 | Updated EDS file for CANOpen implementation.<br><br>Improved handling of simultaneous Combitronics commands through user program and serial port.<br><br>Modified CANOpen object 2309h to return error when commanded to call a subroutine that doesn't exist.<br><br>Set IO fault (Status Word 3, bit 7) if onboard 24V IO fails to initiate on startup.<br><br>Improved robustness of encoder failure detection.<br><br>Adjusted O= and OSH= functions to not trigger an encoder loss related position error.<br><br>Increased buffer for CANOpen object 2500h.<br><br>Added DMX setting COMCTL(4,x) to define the base aw[] array location for DMX.<br><br>Implemented release of MTB in CANOpen through command -10 to object. | CANOpen master configuration<br><br>Combitronic commands over serial<br><br>CANOpen object 2309h<br><br>24V IO and Status Word 3, bit 7<br><br>Encoder failure detection<br><br>Encoder failure detection<br><br>CANOpen object 2500h<br><br>DMX<br><br>CANOpen and MTB<br><br>CANOpen object 6040h |

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| | | Implemented slow to (X stop) when CANOpen object 6040h 15->7 (drive operation disable.) | |
| | | | DMX |
| | | DMX support added on COM1. | |
| | | | CANOpen object 6502h and homing |
| | | CAN object 6502h updated to show homing is supported. | |
| | | | CANOpen writing to user status word |
| | | SmartMotor user status word 13 writable in CANOpen (Object 2304h, sub-index 14.) | |
| | | | CANOpen objects: 2205h, 2206h |
| | | Added software limit objects: 2205h, 2206h. | |
| | | | CANOpen object 2309 |
| | | Object 2309 expanded with commands for hardware and software limits. | |
| | | | CANOpen object 6041h |
| | | Implemented error in status word object 6041h when unsupported homing method selected. | |
| | | | IIC |
| | | Improved handling of commands across several statements in IIC. | |
| | | | CANOpen I/O access using 60FDh and 60FEh |
| | | Adjusted digital I/O access through 60FDh and 60FEh for CiA DS402 Compliance. | |
| | | | CANOpen PDO support |
| | | Added support for asynchronous (event-driven) transmit PDO (type 255). | |
| | | | CANOpen revision in object 1018 |
| | | Changed major rev number in object 1018, sub 3: Identity object, revision number from 00001000h to 00002000h. | |
| | | | CANOpen objects: 1001h, 2309, 6040h, 6041h, 6077h |
| | | Implemented objects: 1001h, 2309, 6040h, 6041h, 6077h. | |
| | | | CANOpen object 2305h and RUN? command |
| | | Changed 2305h RUN/END bit to accommodate RUN? in user program. | |

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| | | Removed unused objects: 1007, 1010, 1011, 1012, 1280, 605C, 6072, 607D, 607E.<br><br>Implemented CANCTL(12,x) to allow user to set a status bit.<br><br>Implemented RCAN(x), where x is 1,2,3 in CANOpen to show the NMT state, Controlword, and Statusword.<br><br>Adjusted Halt option to have the drive remain enabled.<br><br>Changes to limits and default values of objects: 605Ah, 605Bh, 605Eh.<br><br>Added homing mode support methods: 1, 2, 17, 18, 33, 34, 35. | CANOpen objects: 1007, 1010, 1011, 1012, 1280, 605C, 6072, 607D, 607E<br><br>User program control of CANOpen<br><br>CANOpen status reporting<br><br><br>CANOpen Halt<br><br>CANOpen objects: 605Ah, 605B, 605Eh<br><br>CANOpen homing |
| | 5.0.3.61 | Added Bit at Word 3, Bit 10 to show when motor is limiting current.<br><br>Increased priority to current limiting algorithm. | Current limit improved and tied to Status Word 3 Bit 10 |
| | 5.0.3.60 | Implemented runaway detection on internal encoder failure.<br><br>Low voltage fault now only triggers when movement is commanded.<br><br>Drive ready Word 0 Bit 0 will be low if any faults, or low bus voltage.<br><br>BRKTRJ mode repaired where G command occasionally ignored.<br><br>Increased speed of response from X and S stop commands, where there had been a slight delay. | Internal encoder<br><br>Voltage status bits<br><br>Status Word 0 Bit 0<br><br>BRKTRJ command in conjunction with G<br><br>Stop commands X and S |
| 3/7/13 | 5.0.3.45 | Returns functionality to position modulo report command RPMA. | Position Modulo Report RPMA |
| 1/3/2012 | 5.0.3.44 | Improved VL= (velocity limit) to allow wider range: 0 to 32767. Note that units are still in RPM. | VL= command, velocity limit fault |

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|  |  | ECS(value) command added. SRC(0) null encoder so SRC updates immediately in all cases. | Traverse Mode, Follow Mode, SRC Command |
|  |  | Combitronic support created for:<br><br>MFLTP:axis= , MFHTP:axis= , MFCTP(arg,arg):axis , MFL(arg,arg):axis , MFH(arg,arg):axis , MFSDC(arg,2):axis , ECS(arg):axis , SRC(arg):axis | Traverse and Take-Up Features |
| 4/16/2012 | 5.0.3.41 | Improved handling of data collisions enabling faster data throughput without causing CANbus timeout errors | This affects CAN data collision on any motor to motor communications |