Software release document

Firmware for Product(s): MAC00-EC4 / MAC00-EC41, MIS/MIL 17/23/34/43 with EC option, SMC 66/85 with EC option.

EtherCAT

Latest version: V3.52
Date: 2nd of August 2022
Build: 10277

Description:

Version 3.52 (build 10277, 2nd of August 2022), relative to v3.40, KB:

Requires at least version 24 of ESI file.
Recommended version 26 of ESI file.
Requires at least version 2.22 of MAC400+ firmware
Requires at least version 4.14 of MIS firmware
Requires at least version 1.90.014 of Mactalk, to use all features.

New features:

- Added register 40 for number of destinct "No-sync incidences".
- Added register 41 for number of destinct "Severe No-sync incidences".
- Power LED flashes also if internal SPI communication not running. Used for cyclic communication.
- Bit 19 in module register 48 set if SPI frame error.
- Added new commands for delayed reset etc.
- Support for new RM4 CPU type in MAC motors.

Improvements:

- Decreased internal communication speed to motor when using JVL profile, for increased EMI resilience.
- Greatly increased resilience against "No-sync" incidences, which removes unwanted "Safe-OP" issues.
- Now AL status code 0x0032 is sent to PLC master when internal synchronization between motor controller and EtherCAT module is lost.
- Enables "STO sets error bit" in MIS motors at powerup if not already set.
- MIS motor firmware update over Ethernet possible also when motor has bootloader version > 1.3.
- Possible to issue commands to EtherCAT module via Mactalk Register Workspace pad.
- **CiA402:**
  - Object 0x2103 now also works with MAC800/1000/1200.
  - New error bits (16-21) in MIS motors supported. (Requires version 26 of ESI file to be interpreted correctly in master).

Bug Fixes:

- Possible **rare** write of wrong registers when **very** intensively using SDO (non-cyclic data) solved.

Version 3.40 (build 10160, 7th of September 2020), relative to v3.38, KB:

Requires at least version 24 of ESI file.
Requires at least version 2.22 of MAC400+ firmware
Requires at least version 4.14 of MIS firmware
Requires at least version 1.90.014 of Mactalk, to use all features.

New features:

- Added object 0x2104 - Motor load factor, for MAC400+ motors.
- CiA402:
  - Homing method 33/34 changed to use motor index search.
  - 3ms cycle time allowed if MIS motor.
  - Torque homing for MIS motors (mode -3 and -4).
  - Objects 0x60E0 and 0x60E1 Positive and negative torque limit value.
  - Module register 12 is default homing method.
  - Added invert of limit switches possibillity.
  - Use of MAC400+ High resolution feature in CiA402 profile. *! Only works with the CiA402 modes Profile Position (PP), Profile Velocity (PV) and Homing (HM).*

Bug Fixes:

- CiA402:
  - Resets internal requested position when doing homing method 35/37 if relative position mode is used.
  - Corrected statusword (0x6041) in state FAULT. Is essential for Omron controllers to work correctly.

Version 3.38 (build 10093, 3 April 2018), relative to v3.28, KB:

Requires at least version 2.16 of MAC400+ firmware
Requires at least version 4.02 of MIS firmware
Requires at least version 22 of ESI file.
Requires at least version 1.70.027 of Mactalk, to use all features.

New features:

- Firmware update by UDP. Update of module, motor and encoder firmware's over EtherCAT from Mactalk in both MAC and MIS motors. ***!! It requires connection through a master which supports EoE !!***
- Mactalk scope and eRxP now works over Ethernet.
- Distributed Clock now fully supported with all MAC400+ motors (= now also MAC800), with 1 and 2ms cycle time and max jitter of ±1µs.
- 1ms cycle time and Mactalk over EtherCAT now fully supported with new generation of MIS 34 and 43. Delivered after 1st of August 2017.
- EtherCAT now fully supported with new generation of MIS 17 and 23.
- Added Diagnosis History object (10F3). The last 32 errors and warnings since power-up are accessible in this standard object.
- Motor registers 256-511 now accessible via new object 2013.
- Added "STO triggered" diagnostics code 5383.
- CiA402:
    - If MIS then uses new motor mode CSP for CiA402 CSP mode
    - Object 2103 motor temperature added to MIS and MAC400+ motors.
    - Object 6067, position window added to MIS motors.
    - Object 6077, actual torque added also to MIS motors. Only valid if using closed loop.
    - Object 6062, Position demand value added to MIS motors. Only valid if using closed loop.
    - Object 6403, motor catalog number, exact value read from MIS motors.
    - Object 60F4, follow error added for MIS motors.
    - Added homing method 37.
    - Removed torque on motor in CiA402 state Switched on.
    - Test for motor drive power before changing state to Switched on.
    - Voltage enabled bit in status word now supported for MIS motors and MAC400+ motors.
    - Warning bit in status word if SW limit exceeded, supported with MIS motors.
    - Mode changes between PP, PV, CSV and CSP always possible.
    - If drive power is removed during operation the state is changed to SwitchedOnDisabled (SD).
    - Object Profile Acceleration (6083) not used for CSP, CSV and CST modes.

Bug Fixes:

- HALT bit and Quick Stop does now also work in homing mode
- HALT bit in controlword made level triggered in PP mode
- MIS and bigMAC motor errors in activation of new setpoint fixed
- Memory effect on "new setpoint" when switching from PP to PV and back, removed
- MIS motor quickstop state problems fixed
- Station alias defaults to zero
- CSV mode fixed. Velocity was not transferred to motor
- Don't ruin MAC address and serial number accidently.
- CiA402 init moved to correct phase.
- Set to 1ms of MAC400+ motors work with 2.16.

Version 3.28 (build 1200, 8 July 2015), relative to v3.23, KB:
Requires at least version 2.11 of MAC400+ firmware
Requires at least version 2.06 of MISxxxxxx85 firmware

From the release notes in the .MAF files:
New features:

- Distributed Clock supported, with MAC400 - MAC3000.
  - (MAC800 only with high jitter)
- CSP, CSV modes in CiA402 supported. V.15 ESI file needed.
- CiA402 profile is now factory default.
- If CiA402 enabled then MAC400-3000 motors is forced in 1.0ms cycle.
- ESI file extended a lot including error descriptions.
- Factory defaults restored if protocol type has changed.
- Module I/O can be mirrored to motor for use with eRxP.
- Motor is forced in passive mode before sending 'save in flash'.
- Added homing modes 25 and 26 to zero search blocking test.

Bug Fixes:

- Blocking of cyclic data when Zero searching was permanent.

Detailed descriptions:

- Distributed Clock (DC) with 1 and 2 ms cycle time is supported in the range of MAC motors from MAC400 to MAC3000, with a max. jitter of 1µs (excluding MAC800 which has a max jitter of ±500µs).
- The CiA402 profile extended with the Cyclic Synchron Position (CSP) and Cyclic Synchron Velocity (CSV) modes, to be used with DC. It is only recommended to use these new modes with DC enabled (not in Free run).
- As CiA402 is now widely used, the Factory defaults settings now include the CiA402 drive profile instead of the JVL profile.
- At power up with CiA402 enabled the module checks the motor cycle time setting and change this to 1.0ms if different. This setting is then automatically saved in flash. Therefore the module and motor may do automatic reboot a couple of times after first power up.
- The ESI file is extended to cover for the new CiA402 modes and DC mode. And now also includes a complete offline object description with text strings for modes, errors etc. This makes it more suitable for Omron controllers, and gives a faster load time of the Object Dictionary with TwinCAT.
- In order not to get erroneous configurations, factory defaults are now restored if changing the protocol type. For instance from EtherCAT to EthernetIP. An update of the same protocol type is not influenced.
- Module digital I/O can be mirrored to motor for use in embedded RxP. Enable mirror of outputs by setting bit 8 in module register 6. Enable mirror of inputs by setting bit 9 in module register 6.
- To avoid some misunderstandings, the motor is now forced in passive mode before redirecting the ‘Save in flash’ command to the motor.
- When using the JVL profile and doing zero search with cyclic data, now also the zero search modes 25 and 26 are covered.

Version 3.23 (build 480, 13 May 2013), relative to v3.10, KB:

From the release notes in the .MAF files:
New features:

- Possible to select 8 register PDO data. V.13 XML file needed.
- DSP402 modes: Homing, Profile Velocity, Profile Position, and Dynamic PDO implemented. New XML file v.13 needed, and module register 6, bit 3 has to be set and flashed.
- Writes to the module command register (general command) is made one-shot, when accessing cyclic.
- If having mode register in both cyclic read and cyclic write, the homing modes (12,13 and 14) are made one-shot. Meaning that even though it's transmitted cyclic from the PLC it is not overwritten in the motor. Recommended use: Transmit the homing mode until the read mode from the motor changes, then change to wanted mode.

Bug Fixes:

- Occasional erroneous cyclic readings from MAC050-141 corrected.
- Corrected function of module register 48.

Detailed descriptions:

- 8 register Rx/Tx PDO data can be selected instead of the default 5 registers. Select by checking the "Enable 8 cyclic R/W words" in MacTalk and pressing the "Apply and save" button in the EtherCAT tab. *Requires the new XML file v.13.*
- First release of the CiA DSP402 drive profile, with the modes Homing, Profile velocity and Profile position implemented. It has a completely dynamic PDO, to be setup from the PLC (e.g. TwinCAT). I.e. the cyclic setup in MacTalk is disabled. *Requires the new XML file v.13.*
- In order to use the module command register, when having it placed in the cyclic write list. It is made "one-shot" meaning that every time the command is changed it is executed only once. That means to execute the same command again the command register has to be changed back to zero and then it's possible to issue a new command.
- To overcome the difficulties of doing a homing only with PDO's; is implemented a feature in the EtherCAT module that blocks for further writes to the motor after a Homing is requested, until the Homing is finished. Requires that the motor mode register (2) is placed in both the Rx PDO and the Tx PDO.

Version 3.10 (build 338, 11 July 2012), KB:

From the release notes in the .MAF files:
New features:

- Now possibly to set station alias (module reg. 9).
- 2Mbit communication with MIS34/SMC85.
- PDO like communication with MIS34/SMC85 => Much faster cycle times possibly.
- Common maf-file for MAC00-ECx and MIS34xxxxECxxx.

Detailed descriptions:

Now the same maf-file goes for both the MAC motor modules – MAC00-ECx and MIS34x/SMC85 with EtherCAT – and is named "MAC00_MIS34-EC_x_xx".
In SMC85/MIS34x the internal communication is improved a lot. Both in terms of actual communication speed and in terms of efficient communication. The attainable cycle time is now nearly the same as for MAC400-3000 (~500µs).
Setup of station alias is now implemented, which enables compatibility with Omron PLC's.

Version 3.05 (build 329, 19 April 2012), KB:

Version build solely for MIS34x-EC.

Version 3.04 (build 328, 18 April 2012), KB:

From the release notes in the .MAF files:

Bug Fixes:

Power LED enters known state after re-applying P+.
Poll cycle division factor now only read at power-up, to prevent crashes.

Detailed descriptions:

If P+ is removed while retaining CV the power LED flashes, but when re-applying P+ the power LED entered an unknown state. Now it always enters the normal state with the LED lid.
The module could occasionally reboot if mounted in a MAC140. The problem is solved by changing the way the new net cycle division factor is used. So now it's necessary to change the factor in module register 8 and save in flash and then do a reset before the module uses the new division factor.

Version 3.03 (build 305), KB:

From the release notes in the .MAF files:

New features:

Possibly to reduce poll of motor by a division factor placed in module reg. 8

Detailed descriptions:

Because the MAC50-141 is very slow they cannot cope with the fast cycle times of the Ethernet. Therefore is now introduced a 'net cycle division factor' which divides the net writes so only every second cycle is send to the motor if 2 is written in the division factor register. The net cycle division factor is placed in module register 8, and works with all motors.

Version 3.00:

New features:

MAC050-141 now fully supported.
(Requires version 9.00 or higher of motor firmware)

Version 1.86:

New features:

Module registers can be part of cyclic data.