

Release Notes TwinCAT Tria-Link Library

Release 3.10.3.0:

Release Date: 2024-10-24

SVN Revision: 1478

Changes:

```
new: motion command halt (TL_MC_Halt), minimum firmware 4.23
fix: gantry homing returned a false error
fix: bound check added for TL_Axis2
fix: bound check added for TL_MC_MoveSynchronized(2)
```

Release 3.10.2.0:

Release Date: 2024-03-05

SVN Revision: 1403

Changes:

```
fix: Check axis index range (DirectFeed)
fix: prevent division by zero for TL_AboSubscriberMaster/TL_AboSubscriberMaster5
```

3.10.1: (SVN1359) bugfix 0

```
new: function block for position settling analysis (TL_PositionSettlingAnalysis)
fix: leave of transition states added for coupling mode (MoveSynchronized)
```

3.10.0: (SVN1340) bugfix 3

```
chg: input variable name TL_Axis0.referencePosition changed to
TL_Axis0.referencePos due to a significant function change in drive controlled
homing (gear_factor now taken into account)
fix: the division by zero caused by gear factor equal zero, caught with a new
error message
new: error message if hardware id of trialink adapter is unknown
fix: wrong initialization for legacy drives (slow publish)
fix: time behavior optimized during coupling
fix: actual position was not updated in simulation mode
```

3.9.4: (SVN1326) bugfix 0

fix: prevent invalid fast publish axis data during trialink startup (first time boot)
fix: Omit reset of foreign subscriptions at trialink boot

3.9.3: (SVN1314) bugfix 0

fix: If the AboSubscriber received no abos, there was no interpolation: Caused a wrong actual position update
new: actual velocity output variable added (act_vel) for TL_Axis2 and TL_AxisSlow
chg: set act_vel and act_err to zero if simulation is on

3.9.2: (SVN1312) bugfix 3

chg: The smooth interpolator is now selected by default
fix: Direct feed issues in DMA situations
chg: Minimum firmware release for the TL/1 is now 1.10.63
fix: rebooting Trialink without prior Trialink.Execute:=FALSE could cause RegisterWrite address problems
chg: The error 070 now also reports if Trialink.callFast is not faster than callSlow (fix1)
fix: Clear the message string if the messageId changes
fix: check acceleration feed forward only if OfflineFeedForward is active. (fix2)
fix: Support TL_Trialink for legacy axes: (MC_axis.intern.messageLegacy was not set True within TL_AxisSlow) (fix2)
chg: With new interpolater setpoint filter can be switched off (fix3)
new: Separate the messages descriptions for TwinCAT Trialink from TwinCAT EtherCAT (fix3)
fix: Register offset for Ffx, Ffv, Ffa corrected (fix3)
fix: Condition for float40 register read fixed (fix3)

3.9.1: (SVN1232) bugfix 0

new: Smooth interpolator TL_Axis2::intern.interpolator1.mode =Interpol15_SMOOTH_XXXXXXX

3.9.0: (SVN1228) bugfix 3

new: First official release for the TL/Rev1 PCIe board including DMA, see SCN010 for braking changes

new: TL_Trialink2 now sends XVA triplets by default, see Trialink.pll.enforceXVAtripplets

new: error 79 for an adapter without driver

chg: Trialink.Config.FastFilterFrequency is now also the corner frequency for XVA-based interpolation using TL_Trialink2

new: Twincat events default settings do not throw events anymore

chg: TL_Axis2::messageId for axis messages instead of from errorId

chg: The TAM System Explorer can detach a TwinCAT Axis similar to EtherCAT

3.8.2: (SVN1201) bugfix 5

new: Support Trialink.Config.DmaDisable parameter instead of Trialink.Trialink.Pci.DmaEnable

fix: Initialize fifos to account for dma restart, turn off tx DMAs for TL/1 FW 0x8CB

fix: DirectFeed: Current calculation for offline feed forward (fix2)

fix: Fixed division by gear_factor of the feed forward current and one sample shift corrected (fix3)

new: TL_Trialink2 now sends XVA triplets by default, see Trialink.pll.enforceXVAtripplets (fix4)

fix: TL_Axis2 objects in simulated mode must not try to access errorCounters (fix5)

3.8.1: (SVN1178) bugfix 17

chg: Improve the axisPathInterpolator and use mode Interpol4_MAV_XXXXX as default setting (fixes 3 and 5)

new: Axis State Disabling

chg: MaximumStoppingTimeBeforeBrake and BrakeTimeBeforeDisable are not deprecated anymore but default set to zero

fix: actual position interpolators were not always updated (fix 4)

fix: polynomial coefficients are transmitted based on a scale of 100 us, not as XVA (fix 9)

fix: MaximumBrakingTime = 0 must not skip stop for legacy drives (fix 10)

new: In simulation mode of TL_Trialink act_pos = commanded position (fix 10)

fix: Allow ResetError in enabled state (fix 12)

fix: In simulation mode, we should not propagate errors (fix 13, without SVN 1170)

fix: Revert axisPathInterpolator default mode back to Interpol4_XXXXX (fix 14)

fix: Wrong interpolation timebase for TL_Trialink (fix14) and wrong rounding in tbl.ResamplingSteps (fix 15)

fix: Streaming mode interpolator (fix 17)

3.8.0: (SVN1127) bugfix 18

new: Support TL0400 adapters in adapter mode TL_Trialink2 with DMA and fast publish for act_pos, act_err and digitalInputBits

new: TL_Axis2::digitalInputBits: Use Enum DigitalInputBits as a mask

chg: (!) Obsolete MaximumStoppingTimeBeforeBrakeDepreciated and BrakeTimeBeforeDisableDepreciated

chg: Default Homing-Type is DriveControlled

chg: Remove loopback action during boot

new: Minimum FW Release Adapter 1041 -> 1302 (because of bug in adapter FW 1301)

chg: reduce TL_CH_AX_MAX from 32 to 16

new: Trialink.linkErrorCounter shows sum of all drive CRC counters
TL_Axis2::TL_MC_AXIS_REF.linkErrorCounters.errorCountLink1/2 shows error details

fix: publishMaster2Slave must wait for valid register from axis boot before starting

fix: publishMaster2Slave must be disabled with last generation drives (fix 14)

fix: Prevent calling publishSlave2Master callFast until the slow task finished (fix 14)

fix: The actual position must be calculated with the dedicated function in the fast task (fix 14)

chg: CNC: Sercos Interface Stub, which is required, if an axis is removed and added again (fix 14)

chg: CNC: MAIN_FAST to GEO Task (fix 14)

chg: CNC: Station Address starts with 10 (fix 14)

fix: wrong data type for actual position in DMA mode for new gen drives (fix 16)

fix: No tracking in simulation mode (fix 16)

fix: Remove DMA for Timestamp. Leave DMA for rest (fix 17)

fix: Gear factor was not used for actual position in DMA mode (fix 18)

3.7.5: (SVN1096)

new: Direct feed is now also supported with stream mode (TL_DirectFeedResampling2 has to be used)

chg: With TSD firmware >= 4.3 position latch is executed on drive for digital inputs with sampling rate of 10kHz

chg: Digital inputs renamed from AuxIn1..6 to DigIn1...Dig6 to be consistent with hardware manual

fix: Direct feed: Check is now done just for direct feed axes (bugfix1)

fix: Position latch: version check corrected (bugfix 2)

fix: Direct feed: df-stream does now also support simulated axes (bugfix 2)

fix: Position latch: version check corrected (bugfix 3)

fix: Avoid int32 over-run in timestamp wrap situations with Trialink.Config.FastBufferTicks*FAST-Cycle > 2.5 ms (bugfix 4)

chg: Wait one tick after diagnostic stop before stop logging

new: New axis errors up to 316 AxisCommandError

fix: Include TL_AboSubscriberMaster5 again (bugfix 6)

fix: Extended TL_GetCommutationPosition for register2 (bugfix 7)

```
fix: TL_MC_RegisterRead type mask was not evaluated correctly (bugfix 7)
fix: Switch off command removed as this could interrupt the enabling
sequence(bugfix 8)
fix: RL_MC_Brake and TL_BrakeConfigGet updated for TSD80(bugfix 9)
fix: Switch off axes in case of old drives to avoid STO error - see also bugfix 8
(bugfix 10)
fix: The check for second master in the ring should only be done once to prevent
misleading error 069 (bugfix 11)
fix: Error 317 is set in case PLC is trapped in disabling state (bugfix 12).
new: DPRAM addresses (* 1300 *) (* 1304 *) (bugfix 12).
  chg: Default ResetAdapterOnBoot is now FALSE, was TRUE but disabled completely in
Function block (bugfix 12).
  fix: init of MC_MoveSynchronized::Asettings was not done on restart (bugfix 12).
fix: Withdraw of error 317 and return to run mode in this case. Log signals added.
(bugfix 13)
  fix: If STO started in Disabled state, it sometimes showed STO-Error instead
of STO-Warning due to a drive state transition issue
fix: Add debug code to MoveAbsolute (bugfix 15)
```

3.7.4: (SVN1008)

```
new: Broadcast globaltime every 5 seconds (bugfix 3)
chg: MoveSynchronized2 issues a stop if execute is set to FALSE
  This way we can stop streaming without a drive StreamLossError
chg: Actual position is commanded position in simulation mode
chg: use method ActualPositionFast(Trialink:=Trialink) to get interpolated
positions in the fast task
```

3.7.3: (SVN996)

```
new: Report file generation "triamec-report-2018.txt" on start of
TaskExceedCompensation
chg: default Trialink.Config.FastBufferTicks := 7
fix: reference move caused stream loss error as data stream stoped before coupling
was released (bugfix 1)
```

3.7.2: (SVN982) requires FW>2083 for TSD-drives

```
new: Signals.Homing.State and Distance, old Homing state
Signals.General.HomingState removed
chg: removed Config.Encoder, use drive config
Parameters.PositionController.MasterPositionSource instead (FW>2082)
chg: For TSD-drives we show the actual velocity instead of the commanded velocity
in the state telegram
```

```
chg: Changes to allow homing with option module implemented.  
new: Fast stop implemented  
fix: RDEeDRVERR_PowerLinesNotOk is interpreted as warning if  
RDSedrVST_NotReadyToSwitchOn
```

3.7.1: (SVN913)

```
new: Optimized bus access if using TL_Trialink2 and TL_Axis2 instead of  
TL_Trialink, TL_AxisSlow, TL_AxisFast (FW>=5050 (TS) 2097 (TSD))  
Trialink.Config.FastFilterFrequency is the corner frequency of the commanded  
position filter  
new: Additional input Trialink.Diagnostics.aux allows logging external input data  
fix: replace constants enabled (bugfix 8)
```

3.7.0: (SVN891)

!! breaking: This library requires FW>2087 on TSD devices due to the extended homing state feature

```
new: TL_RegisterRead allows accessing 4 registers at once but has no Reg12_40 and  
Reg4_DWORD outputs anymore  
fix: TL_PositionLatchReg2 can now latch DigInputs, but with bad timing accuracy  
(SLOW_TASK)  
new: TL_MC_HOME supports drive controlled homing for TSD drives (FW>2087)  
chg: The register layout was modified to account for new positionlatch features  
new: Extended state in cyclic also used for homing state
```

3.6.0: (SVN865+)

```
chg: Optimization of FIFO tail access saves system load!  
new: register entries for identification, positionUnit, masterPosition, analogOut  
chg: breaking register changes:  
    OptionModule.FirmwareId renamed to FirmwareRel  
    TOU1[0] renamed to AnalogIn  
chg: Modifications to avoid warnings with compiler newer equal 3.1.40.20  
chg: DirectFeed: Interface modified.  
chg: DirectFeed: Test added to check if velocity and acceleration are within the  
limits.  
chg: DirectFeed: Events for error publication added.  
chg: DirectFeed: Check if table position at the end of the table matches the  
commanded cnc position.  
fix: DirectFeed: Modulo calculation for position check fixed.
```

3.5.0: (SVN799+)

```
new: Function blocks for direct feed re-sampling added
chg: Modifications used for direct feed re-sampling added
```

3.4.1: (SVN782+)

```
new: Reference on adjacent EncoderIndex for TSxxx drives (special application)
      use ConfigurationManager settings:
      ReferenceMethod := TL_Config.ReferenceMethod.Marker
      ReferenceFirstMask := 512; // instead of TL_Config.ReferenceFirstInput.ExtIoA
```

3.4.0: (SVN774)

```
new: Support 24V digitalInput for homing of TSD-drives (same as for old drives)
      (latching not in drive, but in Twincat)
chg: new entry Config.Encoder replaces TL_MC_Power.EncoderIndexForActPosition
chg: Support for FW2077, which does no longer support old register style
chg: BrakeTimeBeforeDisable is discarded with newer drives (TSD)
      because brake time parameter is a config register parameter with newer drives
```

3.3.0: (SVN745)

```
chg: remove debug signal TL_MC_AXIS::rx_test and corresponding
      TL_MC_Power::pub_aux
chg: no set position zero during boot. These changes do only apply for TSD-Series
      drives
chg: Register uses URI-offsets now and is not compatible for TSD80 FW < 2071
      URI take more than 20 bits: extend internal register offset range to 22 bits
chg: rename General.Parameters.DriveName to General.Parameters.DeviceName
new: support for absolute endat with TSD80 EncoderPersistency, ReferenceDone,
      Digital Encoder Signals
new: RCTtCommutationCommands2, Encoder Velocity
```

3.2.1: (SVN730)(TC2 SVN678)

```
chg: homing is now also supported for TSD80
chg: general enhancement of TSD80 support
fix: if axes are coupled, homig did not work in some cases
```

3.2.0: (SVN713)(TC2 SVN678)

new: support for new current controller features of FW2071 of TSD80
 chg: Changes of the drive register layout! Incompatible to earlier FW of the TSD80!

3.1.0 (SVN704, Lib310.0, TC3 only)

new: allow receiving five (single) values per abo
 new: TSD80 support: add register layout 19 MC_AXIS.register2 and support for doubles

3.0.5: (SVN692, Lib 305.4)

new: ReferenceType Tama, see AN108
 fix: Check for Session handler garbage collector limit, fixed
 chg: PLL correction time was 2.5*fastTaskTime, now it is constant 25ms.
 chg: Diagnostic files show position error instead of actual position:Err is not interpolated, act can be seen from cmd in tracking situation(BugFix 4)
 chg: Diagnostics: adaptations for Explorer scope
 chg: reorganize error and event priorities
 chg: avoid double read of publisher abos
 fix: wrong type of PositionController.ControlOutputCurrentQ
 new: Object TL_AboSubscriberMaster5 receives 5 single float values
 Object TL_AboSubscriberMaster receives 1 Float40 and 3 single float values (old)
 new: add missing commit option for Axis Environment
 chg: message 075 not trialink "down", but short "shutting down"
 chg: disable of moving axis first tries an emergency stop
 ifMaximumStoppingTimeBeforeBrake<>0
 chg: pll: adjust with sample time, different windows for boot and error179
 chg: remove obsolete events: 131, 136, 138, 139, 141, 144
 new: couple warning/error: sync 178/179 on pll sync problems
 new: task exceeds compensation

3.0 (SVN639, Lib302.0)

chg: Compatibility changes for TwinCat3... The following are breaking changes:
 variable "method" in homing parameter not allowed in TC3 -> ReferenceMethod
 all axis parameters are now set in TL_AxisSlow.Config
 move Trialink.FastHandler.pll.BufferTicks to Trialink.Config.FastBufferTicks
 move TL_AxisSlow.MC_axis_Home.Position to TL_AxisSlow.referencePosition
 chg: Error 069 has now a smaller priority than 070. New events 178/179
 new: Diagnostic logfile generated on axis errors
 set path in Trialink.Config.RootFolder

an empty path or Trialink.Config.DiagnosticMode is used to disable the feature

- the number of files in this folder is limited to Trialink.Config.DiagnosticNumberOfFiles
- chg: move library_version to Diagnostics
- new: Add errors for STO firmware 1040, no parallel errors 130+260, changed event file
- new: Trialink.Config.TcEventShowReferenceInfos FALSE disables homingmove information messages
- new: Trialink.Config.TcEventShowWarnings FALSE disables all warningmessages
- new: 4th order interpolator for commanded positions accounts for highdynamic trajectories
- new: TL_publishSlave2Master for ts<>ts_Fast or ts/0.1ms<>n
- new: TL_MC_MoveAbsolute can now react in MAIN_FAST, see AN108
- chg: sample codes: new TL_CNC and TL_CNC_AX with task exceed compensation capability

2.2 (SVN553, Lib226)

- new: Preparation FOR DMA with rx-iso, rx-asy, AND tx-sdram
- new: Disable axis errors if Trialink down. STO errors may be configured in Trialink.Config
- new: High resolution actual position
- new: More registers for tama and position control parameters
- chg: TL_AboSubscriberMaster flexible interpolation and modulocapability on src1
- chg: MoveAbsolute and MoveVelocity now signal 152=CommandAborted if anaxis error stops the move before reaching the final state (standstill or ContinuousMotion)
- new: Trialink events "Booting" and "Timeout"
- chg: tiob: remove unused tRefTick, replace TL_TiobFast byTL_AboSubscriberMaster;
- chg: publish: new fifo and SingleInterpolator for TL_AboSubscriberMaster
- new: each axis has its own event source for simultaneous display
- new: Homing: add search info and show them in the event-display

2.1 (SVN502, Lib219)

- chg: bug fix Float40 of lib
- chg: rename FPGA localbus device DEVencoder_in_out to DEVencoder_DigIn
- chg: faster pll initialization
- new: Position-latch feature for digital IOs
- chg: recover MC_Power on communication down (*)
- chg: default direction of moveAbsolute is now shortestway (importantfor modulo axes)
- new: timeout error if boot not successful for 20 seconds
- chg: improve detection of two masters in the loop
- new: readyToOperate output of axis module (bridge voltage and STOdetection)

```
new: distinguish errors and warning for STO and bridge voltage
fix: message events block fixed new error problem
new: independent TwinCat errors for axis and (power/homing)
chg: prios of errorId of TL_AxisSlow
    (1. axis error or warning 2. homing error 3. power error)
fix: dualport ram sync problem on rx_iso fifo and sync warning
fix: TL_publishSlave2Master bug
chg: always set axis position to zero on ring boot
```

2.0 (SVN476, Lib216)

```
new   : major release with changes listed in AN160 (TL_Trialink,
TL_publishSlave2Slave, Homing)
new   : Support STO
new   : AN122 for CNC-Error 70091 in Manual und Auto Mode
fix   : 12 hour bug
chg   : turn off pwm if MC_Power.enable=FALSE
```

1.8 (SVN 393, LIB 177)

```
fix   : Endat 2.1 for more than 32 bits
change: nci-sample code with same structure as cnc
```

1.7 (SVN 383, LIB 176)

```
fix   : moveSync does "shortest move" for proper init of Modulo axes
fix   : Homing Setposition bug.
new   : SetPosition zero during communication startup
new   : generalized register access
change: new homing sequence statemachine
change: rename EnableManager to AxisGroup1 and make global
change: Triamec is now global
change: HMI based on Visual Expres 2010
new   : smart sync to avoid PLL not locked errors
change: Endat 2.1: Improve error reporting and retry
```

1.6 (SVN279, LIB 1.6.7)

```
support new AxisErrors, Endat, modulo spindle, improve interpolator
direct sync in fasthandler, no sync task required anymore
cleanup CNC parameters
change: replace cnc FB "TL_AxisPath" by lib FB "TL_AxisFast"
```

but without IN/OUT components. This allows using a coordinate trafo
change: replace cnc FB "TL_AxisModule" by lib "TL_AxisSlow"
change: ReferenceEnable instead of ReferenceStart
This allows controlled resetting of all axes homing flags
note: encoder was removed because auto-calib is default > FW1030
to use fast encoder or Endat 2.1 see Application Notes.

1.4 (SVN 204)

changed homing behaviour: Clear Homing by Execute:=FALSE
support stopping by an external event (e.g., endswitch-tama)
support brake feature

1.3 Changes to the Beckhoff Sample Code of the HMI:

simplify T-access, see HLI_DoChannelTFunction
moved CNCSystem.T_cmd to CNCSystem.Channel[nChan].T_cmd
moved PLC_PRG/HLI_SetAxisTrackingOperation and HLI_SetAxisFeedHold to
TL_CNC_Status

We removed the following commands in the PLC_PRG

- HLI_SetAxisTrackingOperation in PLC_PRG
- HLI_SetAxisFeedHold

because these are already written in TL_CNC_FromPlc

also be aware, that

- PLCAxisEnable is the global variable of the GUI for enable.