Release Notes TwinCAT Tria-Link Library

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

Release 3.10.1.0:

Release Date: 2023-07-07

SVN Revision: 1359

Changes:

- NEW: function block for position settling analysis (TL_PositionSettlingAnalysis)
- FIX: leave of transition states added for coupling mode (MoveSynchronized)

Release 3.10.0.3:

Release Date: 2023-06-14

SVN Revision: 1340

Changes:

- 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 subscribtions 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
=Interpol5_SMOOTH_XXXXXXXX
```

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 tripplets 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 tripplets 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: Improove 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 TLO400 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_DirectFeedResempling2
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 correcly (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 abo 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: Intreface 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 configuredin
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.
```