Release Notes TwinCAT Tria-Link Library

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.
```