TMG TE

Industrial Communication
without Borders



Industrial Communication without Borders

Founded in Karlsruhe, Germany in 1987, TMG Technologie Management Gruppe Technologie und Engineering GmbH supports the manufacturing and process industries in unlocking the full value of industrial communication technologies. With nearly four decades of experience, TMG TE is a proven technology partner, helping customers drive sustainable innovation and maximize efficiency.



Connecting Industry. Enabling Innovation

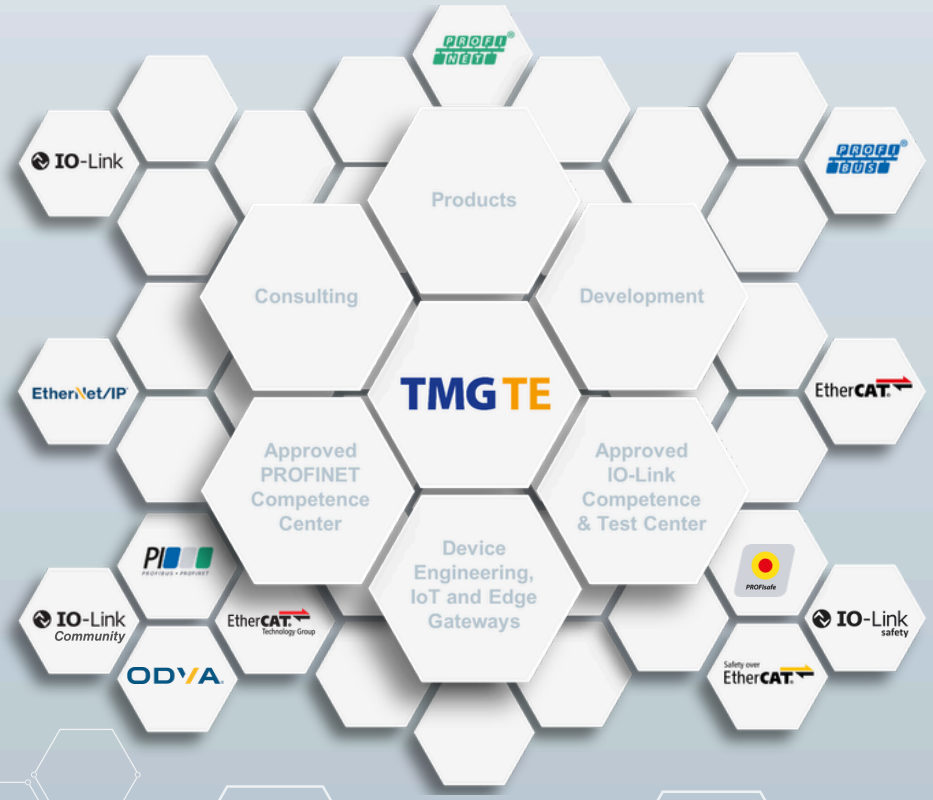
TMG TE, formerly TMG i-tec, has been a pioneer in the successful adoption of PROFIBUS technology in manufacturing and process automation. As industrial networks have evolved toward fully connected systems, the company has expanded its expertise to include PROFINET, EtherNet/IP, and EtherCAT.

Today, TMG TE is at the forefront of digitalizing the field level, enabling seamless integration of sensors and actuators through globally accepted standards. As a leading IO-Link technology provider, the company continues to shape innovation in this space.

Looking ahead, TMG TE is focused on advancing Industry 4.0 and the Internet of Things (IoT), driving closer integration between operational and IT systems. Emerging technologies such as 2-wire Ethernet (APL, SPE) are further extending Ethernet capabilities to the production floor. With a strong international presence, TMG TE successfully delivers its products and services to customers worldwide.

With our extensive experience, we are a trusted partner for technology and service providers in the field of industrial communication technology, especially for PROFINET, EtherNet/IP, IO-Link, EtherCAT and PROFIBUS. TMG TE has a large global market share and is one of the world market leaders for Industrial Communication. Furthermore, TMG TE is an approved competence center for IO-Link and PROFINET and also serves as an approved IO-Link test center.

With our products and services, we support you in integrating communication technologies into your products.



TMG TE at a Glance

TMG TE is a global technology partner for Industrial Communication Standards. We support device and system manufacturers with certified software stacks, tools, test systems and integration services – from concept to market release.

What We Do:

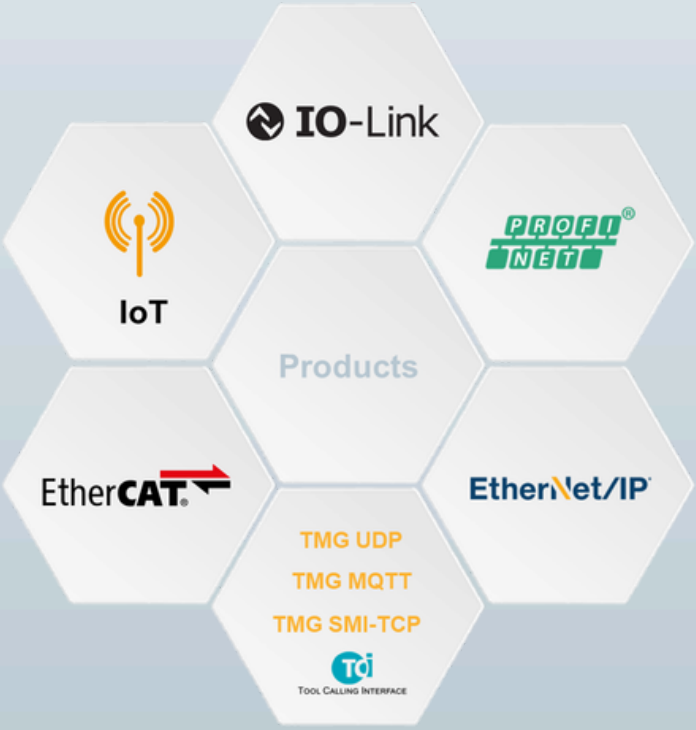


- **Workshops and Technology Trainings**
- **Realization of system and architecture analyses**
- **Problem oriented choice of technology**

- **Specification and design**
- **Development and integration of software solutions**
- **Embedded Software Development**
- **Third party certification support**

- **Industrial Communication Stacks**
- **Engineering & Test Tools**
- **IO-Link Master & Device Products**

PROFINET……..…6
EtherNet/IP…...……8
IO-Link Device Software……...9
IO-Link Master Software…… 10
Functional Safety ……14
IO-Link Engineering & Test Tools……18
IO-Link Master Test Tools……..29



PROFINET DEVICE

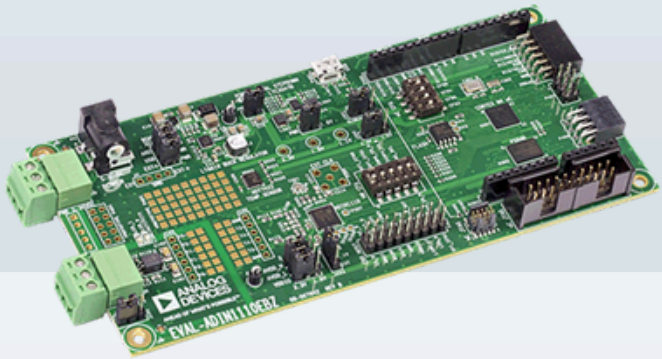
- PROFINET Device Stack
- Integration Services
- Respectively for factory and process automation
- Conformance Test Services

Our PROFINET Device Stack can be used to realize simple devices like IO modules up to high performance devices like drives. The stack is highly portable and can therefore be used on a wide variety of platforms. Option packages such as IRT (Conformance Class C), system redundancy, security and IO-Link integration make the solution scalable.

- Compliant with V2.46 PROFINET specification (V2.5 development on going)
- Certified with conformance class A, B, B (PA) and C
- Small Footprint
- Easily portable to many platforms
- Includes LLDP and MRP client
- Portable to many real-time operating systems such as Free RTOS, embOS, TI-RTOS, Linux (with real-time patch)
- Hardware: Compatible with many 32-bit microprocessors such as Rx, RZ/N , STM32, Sitara AM2x,3x,4x,6x
- Supports PROFINET over APL (Advanced Physical Layer)
- Option packages available for:
  - Security Class 1
  - System redundancy (S2) and dynamic reconfiguration
  - IRT (Conformance Class C)
  - IO-Link integration

TMG TE

ethernet-apl™
advanced physical layer



PROFINET over APL – Reference Integration

- **On Analog Devices EVAL-ADIN1110**
- **On Analog Devices Round board**
- **Compliant with the latest PROFINET specification**
- **Conformance Class B (PA)**
- **System redundancy S2**
- **Dynamic reconfiguration**
- **Security Class 1**



For PROFINET over APL a reference integration for the APL (Advanced Physical Layer) with the ADIN1110 (10BASE-T1L MAC-PHY) from Analog Devices is available to simplify the start of the development and to save time to market.

- with the STM32L4S5QII3P or MAX 32690 and ADIN1110 on evaluation boards from Analog Devices
- with Example application of TMG TE with GSD and GSDX
- FreeRTOS is used as operating system
- LwIP is used as TCP/IP and SNMP stack

EtherNet/IP Adapter Stack

- EtherNet/IP Stack Stack
- Integration Services
- Respectively for factory and process automation
- Conformance Test Services

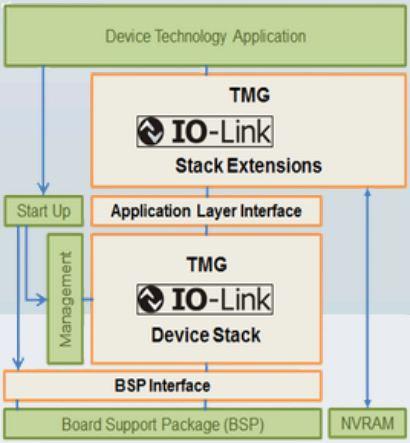
Our EtherNet/IP Adapter Stack is universal and can be used for most field devices. The core of the EtherNet/IP Adapter Stack is completely hardware independent and supports 32-bit microcontrollers. A real-time operating system and TCP/IP stack are required for execution.
The software is delivered as ANSI-C source code incl. user manual and implementation examples.

- Compliant with the latest EtherNet/IP specification
- Includes LLDP Stack
- Easily portable to many platforms
- Hardware: Compatible with many 32-bit microprocessors such as Rx, RZ/N, STM32, Sitara AM2x,3x,4x and 6x
- Portable to any real-time operating system
- such as Free RTOS, embOS, TI-RTOS, Linux (with real-time patch)
- Option packages available for:
  - DLR (announce based) on all platforms
  - DLR (Beacon based) on Renesas RZx and Texas Instruments Sitara
  - IO-Link Integration
  - CIP Security (development on going)

IO-Link Device Software

With the very comfortable TMG TE IO-Link Device Software, simple to complex IO-Link devices can be realized on all platforms in a very short time.

- IO-Link Device Software conformant to the latest IO-Link Package
- Supports all telegram types and bit rates
- Backward compatibility to IO-Link V1.0
- Easy integration on all MCU's (8/16/32 Bit)
- Works with all IO-Link transceivers
- Very small footprint
- Application framework available
- IO-Link Device Firmware Update available



IO-Link Device Stack

The Stack implements the IO-Link communication interface and provides the entire IO-Link functionality for this purpose.

IO-Link Device Stack Extensions

The Stack Extensions implement the IO-Link related Device application with:

- Parameter Manager, Data Storage, Block Parameterization, Event Dispatcher, Device Status and Detailed Device Status, Parameter Consistency Check, Application-Reset and Back-to-Box commands as well as Common Profile
- Production Settings for End of Line configuration

IO-Link Device Firmware Update

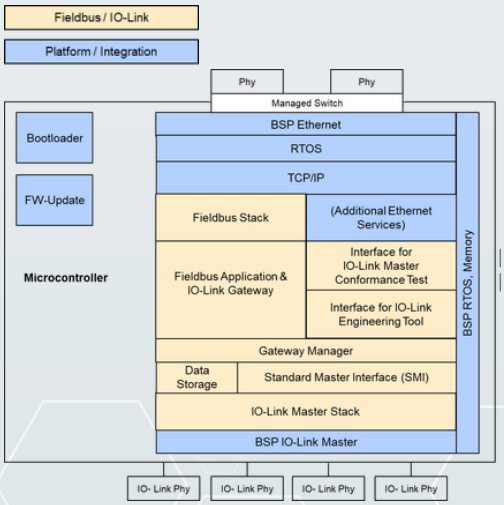
- according to the current IO-Link Profile BLOB Transfer & Firmware Update

IO-Link Master Software

- Support of all IO-Link functionality
- According to the latest IO-Link Package
- Data storage functionality included

The IO-Link Master Software, which is compliant to the latest IO-Link Specification, delivers a complete communication stack incl. Standardized Master Interface (SMI) and TMG SMI-TCP protocol for seamless IO-Link Master integration. Built for high portability across many microcontroller platforms and transceivers. The included SMI-TCP protocol is used to connect to the IO-Link Device Tool, IO-Link Master Test and also for IoT applications. Additional ready to adapt solutions for gateway applications, such as PROFINET, make it the standard for flexible, scalable IO-Link Master solutions.

We also assist in integrating the test interface for conformance testing, fieldbus mapping and integration with the IO-Link Device Tool V6.



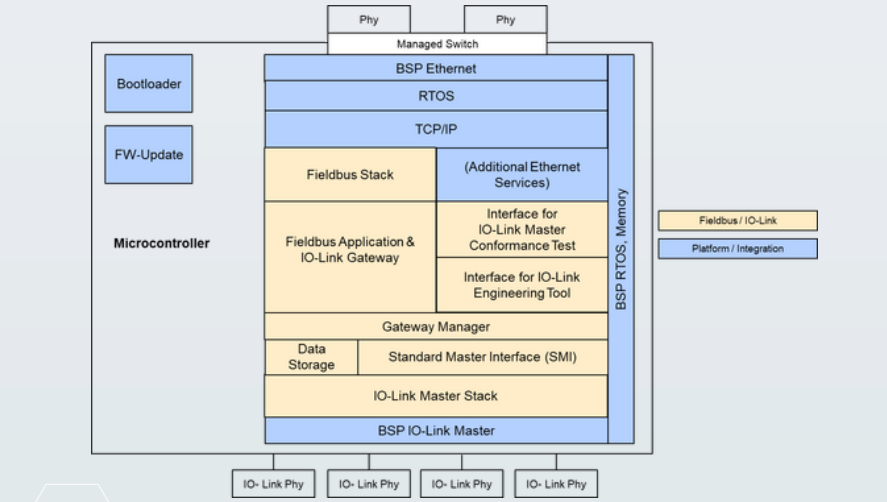
Key features
IO-Link Master Software

- All bit rates: 230.4, 38.4, 4.8 Kbit/s
- 400µs cycle time at 230kBit/s
- All telegram types, compatible to IO-Link V1.0
- ISDU with 8/16 Bit index and 8 Bit subindex
- Events with and without details
- No restriction in number of ports or performance
- Modular design following the specification
- Strictly separation of protocol stack, application and hardware abstraction
- Framehandler Modules for all IO-Link Master Transceivers
- API follows IO-Link Standardized Master Interface (SMI)

- Includes SMI-TCP protocol stack for Engineering, IT and Conformance Test
- Includes Conformance Test Gateway for STCS protocol
- Written in ANSI-C
- Ported to (samples):
  - Rx, V850, 78K0R, ARM9
  - STM32, Sitara AM2,3,4,6 / AMIC, NetX
  - CORTEX M0/M3/M4/H7
  - XC 167, PIC32
  - Microblaze

IO-Link Gateway Solutions

When developing IO-Link masters, not only the respective fieldbus stacks and the IO-Link master stack are required, but also the gateway application that maps the fieldbus to IO-Link.
The ready-made gateway applications from TMG TE implement the available integration specifications. Where specifications are incomplete or not up to date, we have supplemented them accordingly.
Our gateway applications are ready to be adapted to individual customer requirements, enabling TMG TE to implement tailored solutions quickly and efficiently. Manufacturer-specific extensions have been taken into account so that they can be easily supplemented.



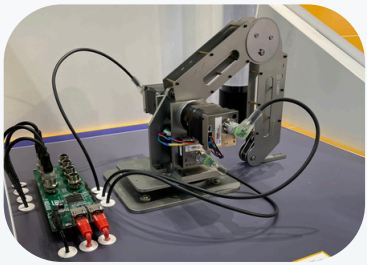
- For PROFINET and EtherNet/IP the stacks from TMG TE are used
- For EtherCAT we use the EtherCAT stack of the ETG / Beckhoff
- We also support the development of IO-Link Safety Masters
  - Certified IO-Link Safety Libraries available

IO-Link Virtual Device Concept

Decentralization helps to structure systems better and improves performance. However, the available solutions are very manufacturer and fieldbus specific. The IO-Link Virtual Device concept from TMG TE offers an approach that uses the standardized integration of IO-Link into higher-level systems and thus also the user's know-how in dealing with IO-Link and the IODD.

The pre-processing function is represented as a virtual IO-Link device. The "function blocks" look like additional ports and are described by IODDs.

- Standardized pre processing
- Integration via IODD
- Applicable for local technology functions
- New catalog category in the tool
- New communication profile to
  configure the ports to be preprocessed
  describe the runtime environment



Use Cases:

- Machine technology functions that are to be implemented independently of the higher-level system
- IO-Link for numeric control and motion control
- Together with time and clock synchronization, applications can be realized here that were previously reserved for EtherCAT or PROFINET CC-C (IRT)
- Simpler, more cost-effective, open and powerful
- Fieldbus devices (PROFINET, EtherNet/IP, EtherCAT, ….) with a common device engineering based on IODD

Functional Safety

TMG offers a wide range of safety solutions for different communication protocols.

IO-Link Safety

The next big step for IO-Link

TMG TE offers:

- TÜV certified Master and Device Stacks
- Engineering Tool
- Offsite Engineering Master
- Safety Device Test System
- Safe Gateways to (in Projects)
  - PROFIsafe
  - FSOE
  - and other

PROFIsafe

TMG TE offers:

- Black Channel Device Stack
- Development services
- based on Siemens PROFIsafe stack

Safety over EtherCAT (FSOE)

- FSOE Master and Device Stack
- Development services

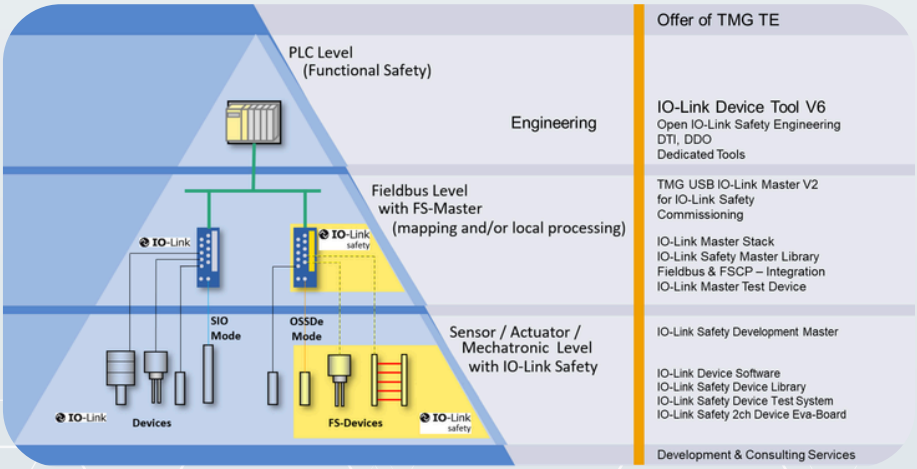
IO-Link Safety Overview

The IO-Link Safety product portfolio from TMG TE delivers a complete set of solutions for developing, commissioning, and validating safe IO-Link systems. It includes software libraries, commissioning and engineering software, protocol testing tools, and integration solutions.

A highlight of the portfolio is the USB IO-Link Master for straightforward PC-based commissioning and diagnostics. The portfolio also encompasses Dedicated Tools for safety-specific tasks, such as parameter support and interfaces (DTI) for safety commissioning workflows.

All products are built on standard IO-Link Safety principles and, where applicable, certified up to SIL 3, enabling reliable and compliant implementation of safety communication in device and master implementations.

IO-Link Safety – Complete Technology and Tools from TMG TE



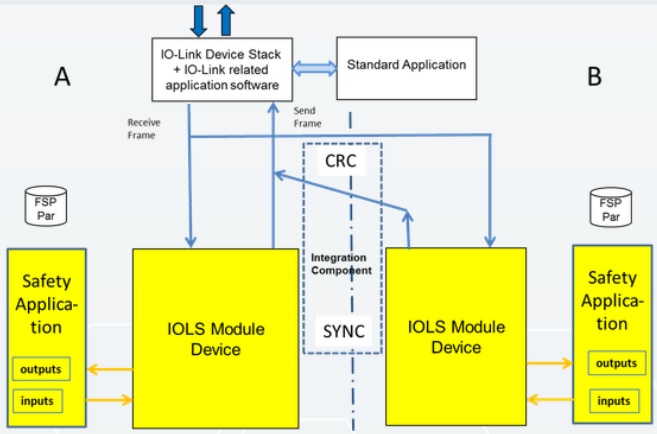
TMG IO-Link Safety Device Library

With the IO-Link Safety Library, IO-Link safety applications can be implemented more easily than ever before. You don't have to do without any of the advantages of the universal and standardized IO-Link interface. On the contrary, you not only use the full scope of all functions of Black Channel communication, but also have a completely safe system in one at the same time.

Designed as a platform-independent software solution, the library integrates easily into various hardware environments and supports two-channel architectures, enabling applications up to Safety Integrity Level SIL 3.

Key Features

- Certified by TÜV Süd
- Supports the latest IO-Link Safety Specification
- Achieves Safety Integrity Level SIL 3
- Easily portable to different platforms
- Consistent separation of safety library (protocol stack) and integration components
- No operating system required



TMG IO-Link Safety Master Library

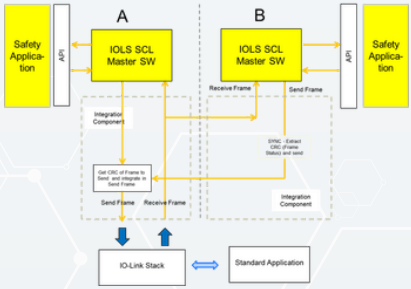
The IO-Link Safety Master Library is a certified software solution for implementing the IO-Link Safety communication protocol on an IO-Link Safety Master. It enables manufacturers to develop safety capable masters that communicate reliably with IO-Link Safety Devices using the standardized IO-Link Safety protocol.

Designed to be platform-independent and highly portable, the library separates the safety communication stack from application integration to simplify adoption into diverse hardware environments. It supports two-channel safety architectures and can achieve Safety Integrity Level SIL 3. The library is TÜV Süd certified, ensuring compliance with safety standards and accelerating development of safety-ready IO-Link masters.

- Certified by TÜV Süd
- Supports the latest IO-Link Safety Specification
- Achieves Safety Integrity Level SIL 3
- Easily portable to different platforms
- Platform and architecture independent approach
  - e.g. 2 or 3 microcontrollers, safe operation system or dual core
- Consistent separation of safety library (protocol stack) and integration components
- No operating system required

Includes User and integration manual with sample integration code:

- For synchronization of the safety controllers for SIL 3 design
- Watchdog, Black channel and application interface
- For IO-Link Safety Masters:
  - Standardized Master Interfaces (SMI) for configuration
  - master safety application: FSCP Mapping, Master Test Interface, Safety Application like F-PLC



TMG USB IO-Link Master V2 SE

(OEM Version available)

TMG TE IO-Link Device Tool V6 - LE included as a free entry-level version

TMG TE IO-Link Master V2 - DLL inluded in the scope of delivery

The TMG USB IO-Link Master V2 SE is designed for the parameterization, monitoring and diagnostics of IO-Link devices. It provides a reliable and easy-to-use USB interface for service and commissioning. The TMG USB IO-Link Master V2 SE can be operated without an external power supply. For applications with higher power demand, an external power supply can be used.

- Suitable for IO-Link version V1.0 and V1.1 devices
- Master cycle time at COM3 400µs
- Port class A
- Protection class: III (operation on safety extra-low voltage)
- Electric connections:
  - USB (Mini USB B, TYP 2.0)
  - Socket, M12
    - Pin 2 can be used both as SIO mode and as a second IO-Link channel when using a Y-cable. This is not included in the scope of delivery.
  - 24V socket for hollow plug of the power supply unit
- Power supply:
  - With supply from USB (5 V / 500 mA)
    - 24V 80 mA for the IO-Link device
  - When supplied with the included plug-in power supply unit
    - 24 V / 1 A for the IO-Link device
- Environmental conditions:
  - Operating ambient temperature: 0 … +45 °C
  - Protection type: IP 20
- Dimensions with/without M12: L x H x W 70/55 mm x 24 mm x 40 mm



Also available as a Bundle

The right Edition. The right capabilities.
Choose the solution that fits your needs!
With DLL integration for custom applications.



TMG USB IO-Link Master V2 SE
+
TMG IO-Link Device Tool V6 - SE / - PE
Hardware and software also available separately.

TMG IO-Link Device Tool V6

Three Editions. More possibilities.

The TMG IO-Link Device Tool V6 is an IO-Link Engineering Tool for the configuration of IO-Link Masters and the parametrization of IO-Link Devices. It is available in three editions with different functionality and master support.

LE
Lite Edition

- IODD Interpreter - supports all IO-Link versions
- IODDfinder
- Generic raw dara display



TMG USB IO-Link Master V2 SE / TS / EMC

SE
Standard Edition

All LE functions plus:

- Scope
- IODD Viewer
- Manufacturer declaration display
- Configurable Device GUI
- Project management
- Firmware Update
- BLOB Upload & Download (Binary Large Object Transfer)
- Event display



additionaly selected USB IO-Link masters from other manufacturers

PE
Professional Edition

All SE functions plus:

- IO-Link Safety
- Variable und Process-Data-Item Details
- Copy device settings
- Data Storage Content
- Virtual Device
- Project documentation
- USB IO-Link Master - Multi Device Projekt
- Project FW update
- Projekt upload & download
- Monitoring



For IO-Link & IO-Link Safety master of several manufacturers

Flexible Combination

Choose the right option for your requirements

Software only
Standard or Professional Edition

Available separately.

Hardware
TMG USB IO-Link Master V2 SE
+ Free Lite Edition/ Windows DLL

Available separately.

Bundles
TMG USB IO-Link Master V2 SE
+ Standard or Professional Edition

Combined Solution.

TMG IO-Link Device Tool V6 - LE - Lite Edition

Core Functions for Working with IO-Link Devices

LE Lite Edition

IODD Interpreter

Clear Device Insights

The IODD Interpreter provides a clear, intuitive overview of device information and functions. Dedicated tabs give quick access to general information, process data, identification data, parameters, and diagnostics.

LE Lite Edition

IODDfinder

Search for the Right IODD

Import IODDs directly from your computer or from the IO-Link Community's IODD Finder. If an IODD is missing, the IO-Link Device Tool automatically searches for and imports the matching file for the connected device.

LE Lite Edition

Generic Raw Data Display

View Raw Data in a Generic Format

The Generic function enables IO-Link devices to be operated even without IODD. The data is displayed as raw data and addressing is done via index and subindex. In addition, there is a pull-down list with the standard parameters. This means that they can be read and written quickly and easily without tedious looking up in the specification or manual.



TMG IO-Link Device Tool V6 - SE - Standard Edition

The Standard Edition (SE) builds on the functions of the Lite Edition and adds functions for visualisation, device handling and project management. It also supports selected compatible USB IO-Link masters from other manufacturers.



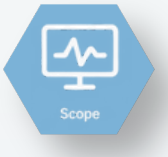
Supports selected USB IO-Link Masters from other manufacturers.



Supports firmware updates for the IO-Link devices.



Provides a graphical device GUI in addition to the IODD table.



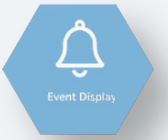
Graphical visualisation of process data in trend curves.



support of BLOB (Binary Large Object Transfer) Upload & Download



GUI settings, parameter sets and Scope settings can be saved project specific and per device type.



Events are displayed in a separate window. A permanently visible button indicates new events.



Displays detailed information on parameters, process data and diagnostics described in the IODD.



Displays the manufacturer declaration.



Manage device configutation and setting within projects.



Access device information, process data, parameters, identification, and diagnostics at a glance.



Import IODDs directly from the IODDfinder, with automatic matching and retrieval for connected devices.



Operate IO-Link devices without an IODD and access raw data and standard parameters quickly.



Provides a catalog with the supported USB IO-Link Masters



Configure the ports of supported IO-Link masters.

TMG IO-Link Device Tool V6 - PE - Professional Edition

The Professional Edition (PE) builds on the Standard Edition and adds extended functions for device handling, project workflows and monitoring. It supports all supported IO-Link and IO-Link Safety masters.

Includes all Standard Edition functions plus the following additional functions

PE
Professional Edition

IO-Link Safety

Operation of IO-Link Safety Master and Devices

Support for additional IO-Link Masters

Support of IO-Link & IO-Link Safety Masters of several manufacturers

Data Storage Content

For pre-parametrization during commisioning of series maschines or IO-Link master replacement.

Monitoring

Recording of all process data, parameters, and events for storage and further analysis.

Virtual Device

Local processing on an IO-Link master and fieldbus - independent engineering.

Project Documentation

Create detailed documentation for your projects.

USB IO-Link Master – Multi Device Project

Store the parametrization of multiple IO-Link devices in one project for pre-parametrization.

Project FW Update

Check all connected devices for firmware updates and select which devices to update.

Project Upload & Download

Upload and download configuration and parametrization of reachable masters and devices.

Copy Device Settings

Transfer settings and read/write variable values form one device to another usig Cut & Paste.

Event Display and Event Log

Save event logs manually or automatically for evaluation.

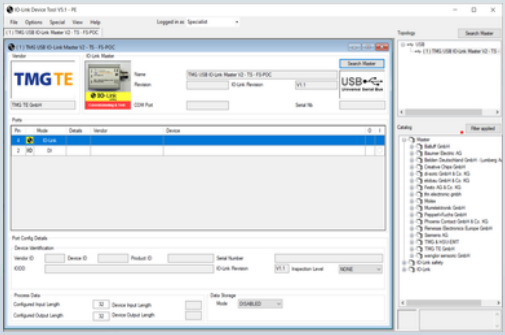
Variable and Process-Data-Item Details

Displays definitions and raw data.

IO-Link Safety Engineering with TMG IO-Link Device Tool V6 - PE

The TMG IO-Link Device Tool V6 supports IO-Link Safety as a partof the Professional Edition (PE). In combination with the TMG USB IO-Link Matsre V2 SE/TS and selected IO-Link Safety Master, Io-Link Safety Devices can be operated and configured. Avaivalbe functionality depends on the respective master manufacturer.

Connected IO-Link Safety Devices can then be parameterized and commissioned seamlessly. For integration of your own IO-Link Safety Master into our tool, please contact us for support and options



Master manufacturer and fieldbus crossing operation

- For IO-Link masters of several manufacturers and for all IO-Link devices.
- The cross-manufacturer, cross-device and cross-fieldbus version follows the requirements of large IO-Link users.
- Executable as independently Windows application
- Integration into PLC engineering tools like TIA Portal
- Operation of IO-Link master without PLC possible
- Master Plug-In for customizing
- Multiple Communication interfaces available

SIEMENS lumbergautomation A BELDEN BRAND PEPPERL+FUCHS
BALLUFF WAGO ifm TMG TE
and more like ... PHOENIX CONTACT SMC FESTO MURR ELEKTRONIK ...
Open to IO-Link masters from many manufacturers

TMG USB IO-Link Master V2 - DLL

Library (free of charge) for using the TMG USB IO-Link Master V2 SE with own software on Windows PCs.

The most important applications are:

- End-of-line testing, configuration and calibration in the production
- System testing
- Applications in laboratory operations where PLCs are not often used

Technical Data

- Can be used with C, C# and Visual Basic (.NET)
- Compatible to TMG USB IO-Link Master V2 SE and TS
- Windows 10 and 11 (32Bit and 64Bit applications)
- Note: The device should not be used for general automation tasks, as the USB interface is not suitable for this.

TMG USB IO-Link Master V2 - IOLS - DLL

Library with IO-Link Safety Extension for using the TMG USB IO-Link Master V2 SE for system test and end-of-line testing, configuration and calibration in the production.

- Technical data like standard DLL
- Subscription license with security functions to prevent misuse for functional safety applications

Important: The software and the TMG USB IO-Link Master V2 SE/TS are fully compliant to the IO-Link Safety communication but not compliant with IEC 61508. It is not allowed to use the software and the device in functional safety applications!

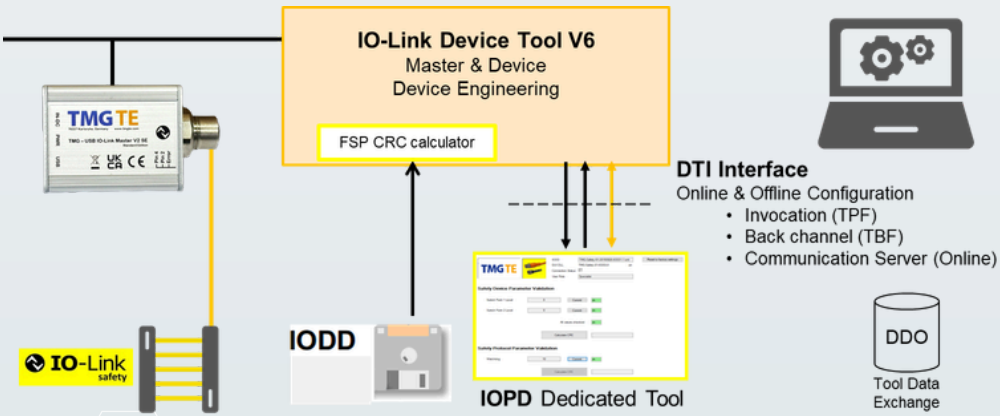
Editions Overview

Functionality	LE	SE	PE
IODD Interpreter	x	x	x
IODDfinder	x	x	x
Raw Data Display (Generic)	x	x	x
Scope		x	x
IODD Viewer		x	x
Manufacturer Declaration Display		x	x
Open IO Device GUI		x	x
Project Management		x	x
Firmware Update		x	x
BLOB (Binary Large Object Transfer)		x	x
Port Configuration		x	x
Device Settings		x	x
Master Catalog		x	x
Support of Additional IO-Link Masters		(x)	x
Event Display and Monitoring		(x)	x
Variable and Process Data Item Details			x
Copy Device Settings			x
Data Storage Content			x
IO-Link Safety			x
Virtual Device			x
Project Documentation			x
USB IO-Link Master – Multi Device Project			x
Project FW Update			x
Project Upload			x
Project Download			x
Monitoring			x

IO-Link Safety Dedicated Tool

A CRC (Cyclic Redundancy Check) is calculated to protect the safety parameters. A special Dedicated Tool is required for this purpose, with that the safety para-meters can be checked, and the CRC can be calculated.

A dedicated tool can communicate with an Engineering Tool via DTI interface. TMG TE has already implemented the DTI interface in the IO-Link Device Tool V6 and has also created prototype Dedicated Tools that can be used as the basis for a customer-specific Dedicated Tool. The solution we provide has been certified by TÜV SÜD with a "technical report".



TMG IO-Link Device Tool V6 - TS - Test System

incl. TMG USB IO-Link Master V2 TS

This version is foreseen for conformance testing and prescribed from the IO-Link Community for manufacturer declaration.

Device Test System

- Additional features to the Standard Edition:
  - Execution of test cases for all IO-Link Devices up to the latest IO-Link Package
  - Creates test report for manufacturer declaration
  - Trace of IO-Link communication
  - Common Profile Test
  - **Protocol Timing Test (as part of the physical layer test)**
  - Test configuration from IODD
  - Easy to use, also for system integrators
- Option packages available:
  - **IO-Link Safety Device Test System**
  - **FW-Update Profile**



TMG IO-Link Device Tool V6 – TS – Option IOLS

While the professional Edition (PE) supports IO-Link Safety communication in commisioning mode, the IO-Link Safety Device Test System additionally allows IO-Link Safety devices to be operated in so called "armed mode" for development and testing purposes.

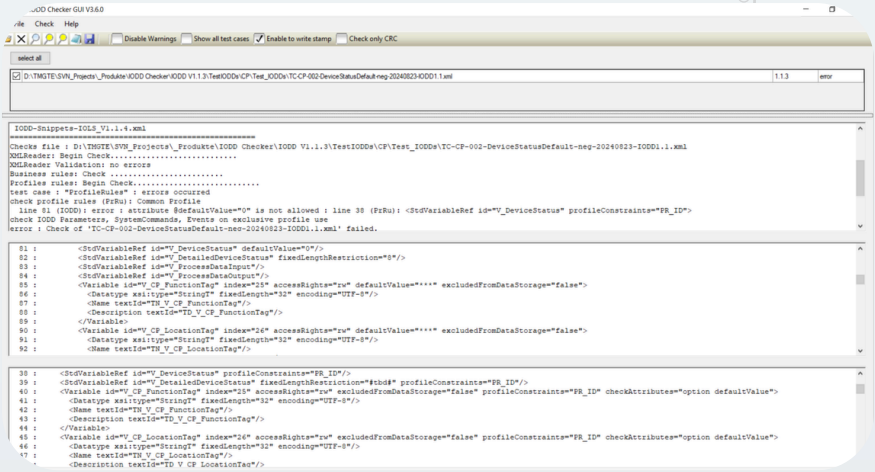
TMG USB IO-Link Master V2 - EMC Test Master

- This version is foreseen for testing the IO-Link specific EMC robustness tests.
- The test runs independent from a PC
- Powered from 5V USB + 24V external Power Supply
- Test configuration by Application Specific Tag



TMG IODD Checker GUI

The TMG IODD Checker GUI is a Windows interface for the IODD checkers of the IO-Link community.



- Contains all valid IODD Checkers
- Automatically selects the correct IODD Checker
- If you double-click on the error line, the Checker GUI automatically opens the IODD and, from IODD-V1.1.3-Checker-V1.1.12 on, also the corresponding IODD snippets at the specified line
- The IODD window is not an XML editor but easy changes like deleting superfluous texts can be made here
- The Light Edition is available for free for our customers
- The Development Edition which supports additional test and code generation (like Profile IODDs) is in preparation and will have work station licenses

TMG IO-Link Device Tool V6 - MT
IO-Link Master Test System



This edition is foreseen for conformance testing of IO-Link Masters and approved from the IO-Link Community for manufacturer declaration.

- Execution of test cases for IO-Link Masters according to the latest IO-Link Package
- Creates test report for manufacturer declaration
- Easy to use
- Includes TMG USB IO-Link Master Tester Unit

Supports multiple communication interfaces for test

- STCS as test protocol from the test specification
- SMI-TCP for much more comfortable testing
- Others like PROFINET are in preparation

The Master Test System is based on the IO-Link Device Tool V6 for masters and devices, which is the most widespread.

Any of the protocols used for testing except STCS can also be used with the IO-Link Device Tool V6 as an IO-Link engineering tool. STCS is designed for testing only and does not have the necessary functions for engineering.

TMG IO-Link Master Test Device

The TMG IO-Link Master Test Device is intended for the system test of IO-Link masters. Especially for borderline cases there are no, only few or sometimes expensive IO-Link devices. Therefore TMG TE has developed the IO-Link Master Test Device. This provides a selection of different IO-Link configurations, which should simplify the system test and realize a good test depth.

We always recommend to perform the protocol test first with the specified test system and after passing the test to perform the system test with TMG IO-Link Master Test Devices on all ports.

Set test configurations

Test Device realizes the different test configurations by device compatibility or by parameterization. So there is no need to load a new firmware to set a new test configuration.

Test Configurations

Various test suites are available that canbe loaded onto the TMG IO-Link Master Test Device via the firmware update profile:

- Test Suite according to IO-Link Package 2025
- Test Suite according to IO-Link specification V1.1.3
- Test Suite according to IO-Link specification V1.1.2
- Test Suite for EMC tests
    - is used to support the IO-Link-specific electromagnetic compatibility (EMC) tests.





IO-Link	V1.1 compatible with V1.0 V1.1 not compatible with V1.0 V1.0	**Pre Operate– On-Request Data**	1, 2, 8, 32
ISDU	with and without	**Operate – On-Request Data**	1, 2 ,8, 32
Bitrate	COM1, COM2, COM3	**Events**	enable/disable
MinCycleTime	400 µs to 132.8 ms	**Parameter**	
Process Inputdata	0 to 32 Bytes	**DirectParameters_2**	DirectParameterOverlay
Process Outputdata	0 to 32 Bytes	**ISDU**	Commands Simple Data Types RecordT ArrayT
Process data simulation	cyclic or static		

TMG IO-Link Safety Test Device

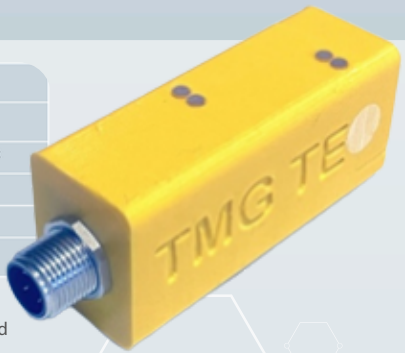
The TMG IO-Link Safety Test Device is a powerful and flexible solution designed specifically for comprehensive system testing of IO-Link Safety Masters and engineering tools. It enables efficient validation by providing predefined IO-Link Safety configurations, helping users achieve high test coverage with minimal setup effort.

While the device is ideal for system-level testing, it is not a substitute for the dedicated IO-Link Safety Master Test System used for protocol compliance testing. For best results, it is recommended to first perform protocol validation using the specified test system, followed by comprehensive system testing with the TMG IO-Link Safety Test Device.

For thorough system validation, IO-Link Safety Masters should be tested across all ports simultaneously, each configured with varying response times, protocol modes, and process data lengths. To achieve this, multiple test devices can be deployed—matching the number of master ports. Built-in error injection capabilities allow users to simulate critical fault scenarios and verify system robustness.

With support for the IO-Link Firmware Update Profile, the device is future-ready—allowing new configurations and enhanced test functions to be added as they become available. This ensures long-term usability and adaptability to evolving testing requirements.

IO-Link	V1.1.4 V.1.1.5	**Pre Operate– On-Request Data**	8
ISDU	Standard and FS parameters	**Operate – On-Request Data**	2
Bitrate	COM3	**SIO Mode (OSSDe)**	With and without
MinCycleTime	900, 1600 ms		
Process Inputdata	6, 10 Bytes		
Process Outputdata	6, 10 Bytes		



Important Note

The TMG IO-Link Safety Test Device is intended for evaluation and testing purposes only. It must not be used in functional safety applications.

Competence and Test Center

We are approved as a Competence Center for PROFINET and PROFIBUS by PROFIBUS & PROFINET International (PI) and as a Competence and Test Center for IO-Link by the IO-Link Community.

We provide technology consulting, certification and testing support, and clarify organizational topics relating to user organizations.

Our involvement in user organizations ensures that we remain at the forefront of knowledge, enabling us to influence the development of technologies in the interests of our customers. Even if other organisations do not have a Competence Centre, we can provide this support for other systems. We are also a member of the EtherCAT Technology Group (ETG) and the Open DeviceNet Vendors Association (ODVA).



IO-Link Device and Master Conformance Test

As an approved test center, we perform all the necessary tests for you. You would like to have a competent partner in advance who advises you and accompanies you up to the actual test? Then take advantage of our many years of experience and benefit from our knowledge as the market leader in the field of IO-Link stacks.

IO-Link Device and Master Physical Layer Test

The physical layer test is also mandatory for member companies. This is quite complex and requires a lot of training. TMG TE has largely automated this in its test center and the test personnel is appropriately qualified. Therefore we offer the Physical Layer Test as a separate service.

TMG TE Team:

Our team consists of young dynamic as well as longtime experienced engineers. In addition to many years of experience in industrial communication technology and embedded software development, the team is characterized by a strong identification with our customers and our technologies.



Dipl.-Ing. Klaus-Peter Willems
Managing Partner
Responsible for strategy and long-term clients relationship



Dipl.-Inform. Dirk Brauner
Managing Partner
Ensuring project success from development to deployment



Kevin Wiktor
Head of Sales
Your primary contact for custom technical solutions



Alina Lenga
Sales & Marketing
Supporting customers and ensuring smooth order processing from quotation to delivery.

Get in touch with our team

Ihre Notizen

Ihre Notizen



TMG TE

TMG TECHNOLOGIE MANAGEMENT GRUPPE
Technologie und Engineering GmbH (TMG TE)
Zur Gießerei 10
76227 Karlsruhe
Germany

+49 721-82806 0
info@tmgte.de
sales@tmgte.de
www.tmgte.com

Copyright© 2026
TMG TE GmbH

September 2026