



TECNOLOGIX

ENGINEERING AND AUTOMATION



**DEVELOPMENT
TOOLS,
DEBUGGERS**



**GRAPHICS
AND
MIDDLEWARE**



**FUNCTIONAL
SAFETY**



**INDUSTRIAL
COMMUNICATION**



**INDUSTRIAL
AUTOMATION**



History

- TECNOLOGIX is an Engineering company
- Since 1996 Service Provider for Industrial Electronics
 - Design and engineering services
 - Electronic Production
 - Training and Coaching
- Since 2000 Distributor of Industrial Electronics and Tools
 - Not a box mover, adding value to products sold
 - Deep technical competence and direct knowledge in technologies
- Strong partnerships with main market actors
 - Market Leading Technology Providers
 - Silicon Vendors and Distributors
- Figures
 - 5 Developers (4 Engineers, 1 Computer Science Doctor)
 - 2 Sales assistants
 - 1 Marketing assistant
 - 1 Accountant
- QUALITY ISO 9001:2015
- >3 MEUR Revenue

Acknowledgements



Partners and products



Partners and products



- ▶ Development Tool and Debugger
 - ▶ KEIL Microcontroller Development Kit
 - ▶ uVision IDE
 - ▶ Fully optimizing ISO C/C++, Compiler for ARM7, ARM9, Cortex-M, Cortex-R
 - ▶ RTOS aware JTAG Target debug
 - ▶ Performance analysis tool, identification of performance bottlenecks and inefficient resource usage
 - ▶ Power consumption measurements related to software execution
- ▶ Graphics and Middleware
 - ▶ Realtime Operating System
 - ▶ TCP/IP
 - ▶ USB Host and Device
 - ▶ CAN bus
 - ▶ FAT Filesystem
 - ▶ Graphic Library
- ▶ Hardware Debuggers
 - ▶ ULINK debug probes for microcontroller debug
- ▶ Tools and Libs for Functional Safety
 - ▶ Arm FuSa RTS Run-time system for functional safety
 - ▶ Arm Compiler 6 has been certified by TÜV SÜD as fulfilling the requirements for development tools classified as T3 according to safety standard IEC 61508-3
 - ▶ Arm Compiler 6 can be applied in the development of safety-related applications
 - ▶ ISO 26262 (automotive)
 - ▶ IEC 61508 (industrial)
 - ▶ IEC 62304 (medical devices)
 - ▶ EN 50128 (railway)

Partners and products



▶ Development Tool and Debugger

- ▶ Arm DS Development Studio
- ▶ Eclipse IDE
- ▶ Fully optimizing ISO C/C++ Compiler for any Arm architecture
- ▶ Full RTOS aware JTAG Target debug, with individual run control and complex breakpoints for specific tasks or threads. Cycle accurate, non-intrusive instruction and data trace
- ▶ Performance analysis tools. Process, thread, function call and line by line granularity of CPU time
- ▶ Per core visualization of performance metrics and thread activity for optimal code parallelization
- ▶ Power consumption measurements related to software execution

▶ Tools and Libraries for Functional Safety

- ▶ Arm Compiler 6 has been certified by TÜV SÜD as fulfilling the requirements for development tools classified as T3 according to safety standard IEC 61508-3Eclipse IDE
- ▶ Arm Compiler 6 can be applied in the development of ISO 26262 (automotive), IEC 61508 (industrial), IEC 62304 (medical devices) and EN 50128 (railway) safety-related applications
- ▶ It is certified as satisfying tool qualification requirements for any Safety Integrity Level

▶ Hardware Debuggers

- ▶ ULINK debug probes for microcontroller debug
- ▶ DSTREAM debug probes, high-speed stream and trace for complex multi-core debugging

Partners and products



- ▶ Hardware for Industrial Communication
 - ▶ CAN bus PC Interfaces
 - ▶ Protocol Gateways
 - ▶ Repeaters, Bridges, Network Topology components
- ▶ Firmware Libraries for Industrial Communication
 - ▶ CANopen Protocol stack
 - ▶ J1939 Protocol Stack
- ▶ Diagnostic Tool
 - ▶ canAnalyser
 - ▶ CANcheck
 - ▶ CAN-Bus Tester 2
 - ▶ Diagnostic Tools for CAN bus
- ▶ Hardware for Functional Safety
 - ▶ Ixxat Safe T100 IO module
- ▶ Firmware Libraries for Functional Safety
 - ▶ Ixxat Safety protocol stacks
 - ▶ CIP Safety Stack
 - ▶ FSoE Stack

Partners and products



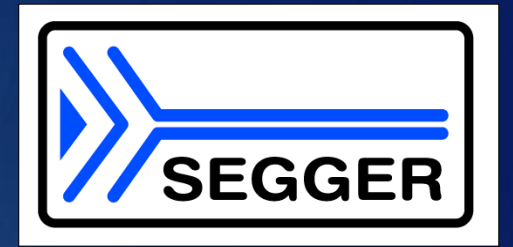
► EtherCAT Master Stack

- Leading product in EtherCAT Industrial Communications
- High quality and rich amount of functionality, full compliance with the EtherCAT standards and inter-operability with all available EtherCAT slave devices
- EC-Engineer: EtherCAT configuration and diagnosis tool, which also can be integrated into customer's application

► Windows Realtime Hypervisor

- LxWin Hypervisor to run Windows and a hard real-time Linux in parallel
- Plenty of Linux drivers, e.g. for fieldbus controllers or GigE camera systems
- Communication stacks (EtherCAT, Profinet, OPC, OPC UA, TSN, ...) or complex software solutions like CNC controller or software PLCs can be used without any change under LxWin
- Seamless Microsoft Visual Studio integration

Partners and products



▶ Development Tool and Debugger

- ▶ Segger Embedded Studio
- ▶ Streamlined and powerful C/C++ (Integrated Development Environment) for ARM & RISC-V microcontrollers
- ▶ Cross platform—Windows, macOS and Linux support
- ▶ Pre-built C/C++ Compiler, GCC and LLVM included for an immediate start
- ▶ ANSI/ISO C compliant C library for embedded systems
- ▶ Feature-packed Debugger with seamless J-Link integration

▶ Graphics and Middleware

- ▶ emWin - ANSI C GUI Universal graphic library
- ▶ embOS - Small and efficient real-time kernel with TCP/IP extensions
- ▶ emFile - FAT12, FAT16, FAT32 File System
- ▶ emNet - high performance, CPU independent TCP/IP stack
- ▶ emLoad - Software for Program Updates in Embedded Applications
- ▶ emUSB - USB Device stack
- ▶ emSecure - secure digital assets authentication
- ▶ emCrypt - state-of-the-art cryptographic algorithm library that scales from constrained devices to workstations

▶ Hardware Debuggers

- ▶ J-Link/ J-Trace- J-Tag USB emulators

▶ Safety

- ▶ embOS – Safe – Certified real-time operating system (RTOS) embOS according to IEC 61508 SIL 3 and IEC 62304 Class C

Partners and products



▶ Firmware Libraries for Industrial Communication

- ▶ CANopen
- ▶ J1939
- ▶ PROFINET
- ▶ EtherNet/IP
- ▶ EtherCAT
- ▶ Ethernet Powerlink
- ▶ Embedded ANSI C libraries
- ▶ Provide all required services for a compliant communication according to the Standards
- ▶ Facilitate easy and fast development of connected devices
- ▶ Scalable protocol functionalities: functional range can be extended by additional modules

▶ Object Dictionary Design Tool

- ▶ For rapid and cost saving development of devices
- ▶ Administers device databases, produces Object Dictionary and initialization function C-source code, Electronic Data Sheet and documentation
- ▶ Simplifies configuration of Protocol Stacks and Driver Package

Partners and products

▶ Powerful GUI for Embedded Development

▶ Lean

- ▶ Low memory footprint
- ▶ High-efficient ANSI-C source code generation
- ▶ Object-oriented programming
- ▶ One code base for multiple platform

▶ Versatile

- ▶ Suitable for various markets
- ▶ Professional services from our experts
- ▶ Simple handling of themes, layout, resolutions
- ▶ User testing with PC, web or native mobile apps

▶ Scalable

- ▶ Any platform (MCU to MPU)
- ▶ Variety of color formats
- ▶ Bare metal or any (RT)OS
- ▶ Any graphics API

▶ Fast

- ▶ WYSIWYG Editor
- ▶ Instant prototyping and debugging
- ▶ Ready-2-use and fully customizable widgets
- ▶ Best utilization of HW graphics acceleration

Partners and products



- ▶ CPU Embedded Modules
 - ▶ OS Level programmable modules
 - ▶ IEC 61131-3 programmable modules
 - ▶ VHDL programmable modules
- ▶ Automation Components
 - ▶ CANopen IEC 61131-3 Controllers
 - ▶ CANopen I/O Modules
 - ▶ Development and Configuration Tools
- ▶ Firmware Libraries for Industrial Communication
 - ▶ CANopen ANSI C protocol stack
 - ▶ CANopen Tools
 - ▶ Ethernet POWERLINK
 - ▶ Open POWERLINK
 - ▶ Open POWERLINK Linux Starter Kit
 - ▶ Open POWERLINK Workshop

Partners and products



- ▶ Developer's Kits
 - ▶ Quick start with evaluation and prototyping work
- ▶ OEM Boards
 - ▶ High quality multilayer boards for volume production
- ▶ LPCXpresso & mbed
 - ▶ Low cost Evaluation Boards for Microcontrollers

Partners and products



- ▶ ARM CPU Embedded Modules
 - ▶ NXP i.MX257 (ARM9) DIMM module
 - ▶ NXP i.MX53 (ARM Cortex-A8) DIMM module
 - ▶ NXP i.MX6 (ARM Cortex-A9 Single, Dual & Quad Core) DIMM module
 - ▶ NXP Vybrid (ARM Cortex-A5 + Cortex-M4) DIMM module
 - ▶ Renesas EMEV2 (ARM Cortex-A9 Dual Core) DIMM module
 - ▶ TI AM3354, AM3352 (Cortex-A8) DIMM module
- ▶ Baseboards – Carrier Boards for DIMM modules
 - ▶ DIMM-Eco-Base Verno - Base Board for DIMM modules
 - ▶ DIMM-Base Lothron - Multimedia Base board for DIMM modules
- ▶ Development kits for ARM Linux & Windows CE

Partners and products



- ▶ CSS Electronics is committed to delivering simple-to-use, pro specs and low cost CAN bus data loggers
- ▶ It delivers solutions for OEM development, diagnostics, testing & analysis
- ▶ It designs, tests and supports all products from Denmark but it operates globally for:
 - ▶ Automotive
 - ▶ Heavy duty
 - ▶ Motorsports and production sectors

Partners and products



- ▶ Warwick Control Technologies is a leader in Controller Area Network (CAN) and related technology
- ▶ It specialises in:
 - ▶ CAN
 - ▶ CANopen
 - ▶ J1939, NMEA2000
 - ▶ LIN and FlexRay network technologies
- ▶ Warwick Control Technologies can also help you on the new fast CAN protocol (CAN-FD)

Our Competence

- ▶ Embedded Systems
 - ▶ Industrial Automation
 - ▶ Drives, Motion Control
 - ▶ Distributed Automation Systems
 - ▶ Medical Engineering
 - ▶ RTOS in Embedded Applications
 - ▶ Linux in Embedded Applications
 - ▶ Linux
 - ▶ Embedded Linux
 - ▶ Linux on ARM
- ▶ Fieldbuses
 - ▶ Protocol integration into Customer application

TCP/IP



DeviceNet™

SAE J1939

CANopen

EtherCAT®

ETHERNET POWERLINK

EtherNet/IP™



What we can do for you

▶ Development - Hardware

- ▶ Circuit design
 - ▶ Digital and Analog
 - ▶ ARM7/, ARM9, ARM11
 - ▶ Cortex- M, Cortex-A
 - ▶ 8051 and derivatives
 - ▶ C166, XC166, XE166
- ▶ PCB Layout
- ▶ Prototyping
- ▶ Production

▶ Development - Software

- ▶ Architecture and Design
 - ▶ Software Design with modern approaches
 - ▶ OOP Object Oriented Programming
 - ▶ Definition of Design Pattern
- ▶ Implementation
 - ▶ Use of state of the art Toolchains
 - ▶ C-Compiler, RTOS, Debugger
- ▶ Testing
 - ▶ Test specification/ Choice of test tools
 - ▶ Reviews
 - ▶ Function test/ module test

Training and coaching

- ▶ Basics and practice proven know-how, for beginners and advanced developers
 - ▶ Partnership teamwork and integration with your development team
 - ▶ Coaching customized to your project by means of a situation analysis
 - ▶ Optimal transfer of knowledge at team level
- ▶ Embedded Systems
 - ▶ ARM, Cortex-M, Cortex-A Basics
 - ▶ Keil Tools Basics
 - ▶ Embedded Realtime Systems - Basics
 - ▶ Embedded Programming
 - ▶ C/C++, Assembler
 - ▶ Debugging
 - ▶ Definition of Design Pattern
 - ▶ Embedded Operating Systems (RTOS)
 - ▶ Embedded Linux
- ▶ Fieldbuses
 - ▶ CAN - Basics
 - ▶ CANopen
 - ▶ DeviceNet
 - ▶ J1939
 - ▶ Profibus – Profinet
 - ▶ Modbus – Modbus/TCP
 - ▶ EtherCAT
 - ▶ TCP/IP

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