



# 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



CANopen



# What we can do for you

## ▶ Development - Hardware

- ▶ Circuit design
  - ▶ Digital and Analog
  - ▶ ARM7/, ARM9, ARM11
  - ▶ Cortex- M, Cortex-A
  - ▶ 8051 and derivates
  - ▶ 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

# Contact us

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