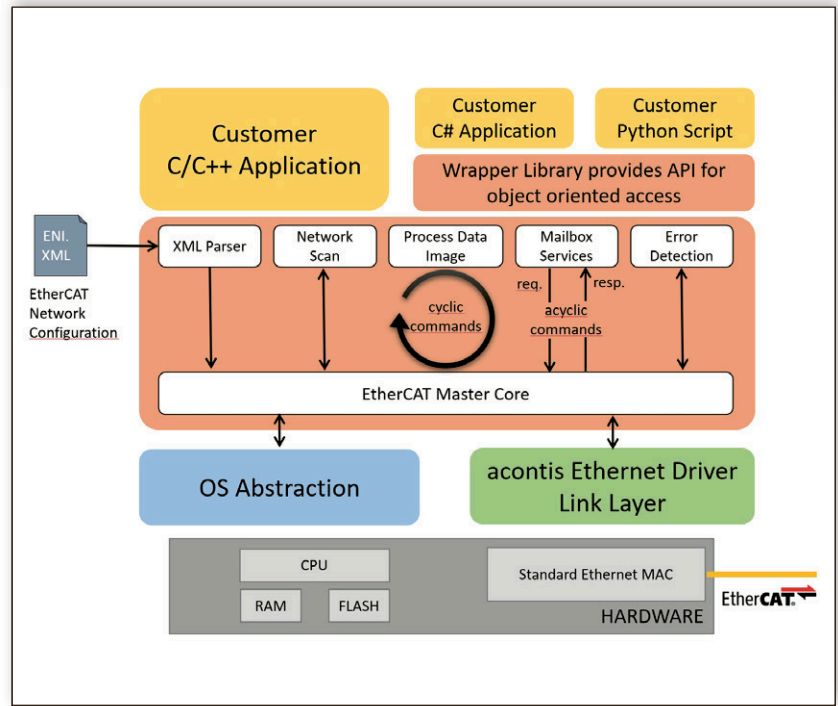# EC ⟷ Master

EtherCAT® Master Stack
Software Development Kit

Overview

The EC-Master software development kit is a full-featured EtherCAT® Master implementation, specifically optimized to run on embedded (real-time) operating systems:

- Compliant to EtherCAT® Master Classes Directive (ETG.1500)
- Configuration with ENI (ETG.2100) file
- Ready-to-run implementations for many operating systems and compilers
- High performance, minimum CPU load
- CPU architectures: x86, ARM, PowerPC
- Optimized for symmetric multiprocessing (SMP) systems
- Comprehensive application programming interface in C/C++
- Precise error diagnostics functions
- Reliable and well proven in many customer applications worldwide. Market leading companies in the Semiconductor, Robotics, PLC/Motion, Measurement, and other industries rely on this software.

Modular Software Architecture

- **Master Core:**
  The main master functionality is implemented in this module. All protocol handling, e.g. process data transfer and mailbox protocols are executed here.
- **OS Abstraction:**
  The operating system calls are encapsulated here. To achieve best performance the most functions are implemented using simple „C"-language macros.
- **acontis Ethernet Driver:**
  Ethernet MAC specific high performance Real-time Ethernet driver (Link Layer) for fast transport of EtherCAT® frames
- **Wrapper Library:**
  Enables object oriented access to master functions for C# or Python applications

Features Class B Edition

- Support of EtherCAT® network information (ENI) configuration file
- Topology check: Comparison of configured and actual network during boot-up
- Cyclic process data exchange, multiple update rates
- CANopen over EtherCAT® (CoE) protocol: SDO upload and download, SDO information services, emergency request
- Servo Profile over EtherCAT® (SoE) protocol
- Ethernet over EtherCAT® (EoE) protocol (virtual switch)
- ADS over EtherCAT® (AoE) mailbox protocol
- File Transfer over EtherCAT® (FoE) mailbox protocol
- Vendor over EtherCAT® (VoE) mailbox protocol
- Slave to Slave Communication
- Support of Failsafe Safety over EtherCAT® (FSoE) slaves
- Access to slave EEPROM and registers
- Sophisticated error detection and diagnosis functions

Features Class A Edition

- All Class B features
- Synchronization with Distributed Clocks (DC) including various master synchronization modes

EtherCAT ® Master Stack Software Development Kit

EC ➡ Master

Feature Packs (Options)

- **FP Hot Connect:**
  This functionality allows preconfigured sections of the network to be removed from or added to the network before the start or during operation of the system.
- **FP Cable Redundancy:**
  Is designed to compensate for failures of a cable break of slave breakdown.
- **FP Master Redundancy:**
  Second fully redundant master system to immediate takeover control in case the primary system fails.
- **FP Remote Access API:**
  TCP/IP remote interface with identical API for remote and local operation. Useful feature for diagnostic and configuration tools.
- **FP External synchronization:**
  DC Synchronization of multiple networks segments operated by multiple controllers.
- Operating System network drivers for TCP/IP communication between tools and slaves via Ethernet-over-EtherCAT®.

OS Abstraction

- Linux, RT-Linux
- Windows®
- QNX
- Xenomai
- Wind River VxWorks
- On Time RTOS-32
- Zephyr
- IntervalZero RTX64
- TenAsys INtime®
- FreeRTOS
- CMSIS-RTOS
- eSOL eT-Kernel
- eForce uC3
- TI-RTOS
- Green Hills INTEGRITY®
- MicroC/OS-II
- Sylixos

acontis Ethernet Drivers

- Intel Pro/1000
- Intel Atom "Elkhart Lake"
- Realtek Gigabit
- Renesas RZ Family
- Beckhoff CCAT
- Xilinx GEM
- NXP FEC (i.MX)
- NXP eTSEC
- TI Sitara: CPSW, ICSS-PRU
- Intel FPGA Cyclone V
- STM32 Synopsis DW3504
- Windows® NDIS filter
- Linux SockRaw
- More on request

Advantages and Benefits

- High performance and low CPU load to achieve fast update rates
- Ready-to-run for many operating systems.
- Supporting the CPU architectures x86 (32 Bit and 64 Bit), ARM (32 Bit and 64 Bit) and PowerPC (PPC)
- Available for many processors from Intel, Texas Instruments, ST, Broadcom, Nvidia, Renesas, NXP, Xilinx and Infineon
- Workshops and Consulting
- Analysis and optimization of system performance
- Customer specific development including porting the EtherCAT® master to other embedded operating systems
- On request acontis handles the complete system integration
- Reliable and robust implementation
- Close partnerships with many CPU and board manufacturers
- Acontis subsidiary in the United States
- Distribution partners in Japan, China, South Korea, France, Italy

acontis – Leading and Reliable EtherCAT® Supplier

Many market leading companies worldwide rely on our EtherCAT® expertise to get optimum and competitive solutions.

Automation Controllers | Semiconductor Tool Makers | Energy

Machine/CNC Builders | Test & Measurement | Aerospace & Defense

Industrial Robots | Medical | Other

acontis technologies