XMC4800 Microcontrollers with integrated EtherCAT®

Joint Press Briefing with EtherCAT® Technology Group
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XMC4800 Microcontrollers with EtherCAT® Agenda

- General
- XMC4800 Target Markets and Feature Set
- Summary

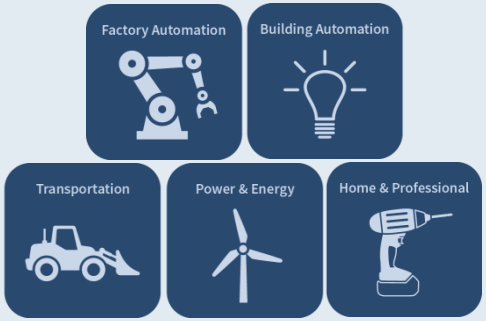
Infineon and International Rectifier: A Powerful Combination

- Infineon provides semiconductor and system solutions, focusing on three central needs of modern society: Energy Efficiency, Mobility and Security
- As of **January 2015**, International Rectifier is an Infineon Technologies company
- Combined **pro-forma revenue of ~€5,150m*** (~6,950m USD) in Infineon 2014 fiscal year
- About **34,000 employees worldwide***
- Strong technology portfolio with more than **22,800 patents and patent applications** (as of September 2014)
- **32 R&D locations; 20 manufacturing locations**

*non-audited figures

Infineon has more than 30 Years of Experience in the Microcontroller Development

Our Expertise



- Motor Control
- Power Conversion
- Lighting
- Communication

Our Excellence

Wide and scalable MCU portfolio offering leading-edge, smart and fast peripherals powered by 32-bit ARM® Cortex®-M

Our Enablement

DAVE™
Digital
Application
Virtual
Engineer

Innovated and free of charge code development platform goes hand-in-hand with a wide ARM® ecosystem

XMC4800 with EtherCAT® Target Markets

Factory Automation

- Fast execution
- Powerful sense and control
- Industrial connectivity
- Memory interfaces
- Flash with ECC
- -40 to 125°C

Building Automation

- Flicker-free LED dimming
- Robust sensor-less motor control
- Flexible serial communication

Trans-portation

- Flash with ECC
- -40 to 125°C
- Fast execution
- Scalability
- Shipping till 2027 or longer

Power & Energy

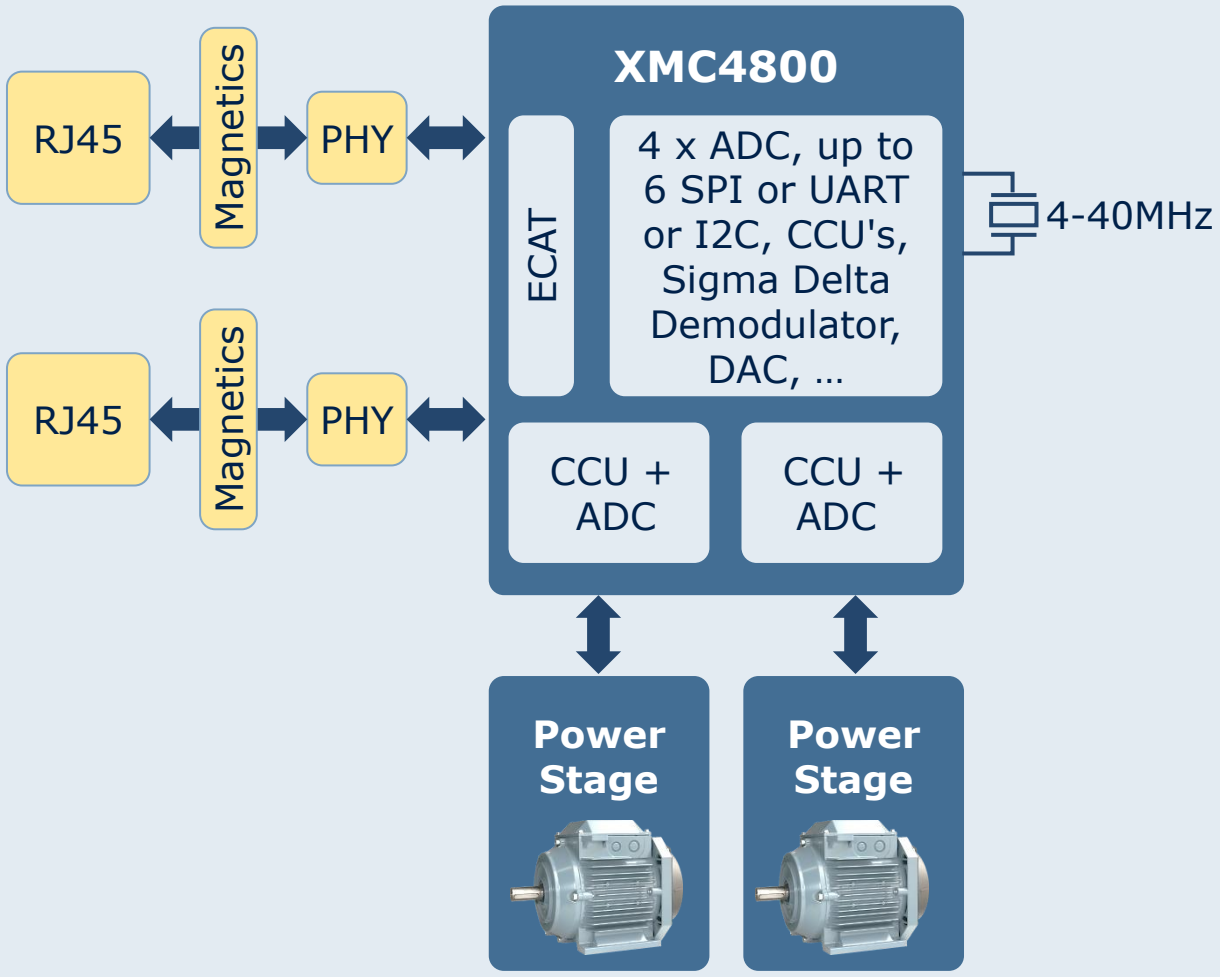
- High-Resolution PWM
- Powerful sense and control
- Industrial connectivity
- Flash with ECC
- -40 to 125°C

Home & Professional

- Low pin count packages
- Software IP protection
- Software compatibility
- DAVE™ Apps shorten development time

XMC™ Family / DAVE™

XMC4800 Application Example
Dual Motor Control and EtherCAT®



up to 2 motors with resolver or encoder in parallel

- XMC4800 combines EtherCAT® communication and actuator/ sensor control into one microcontroller
- XMC4800 has the sytem performance and memory integration to run EtherCAT® and up to two industrial drives in parallel

XMC4800 with EtherCAT®
Core Benefits

- First EtherCAT® node integrated on a standard ARM® Cortex®-M controller with on-chip Flash and Analog/Mixed Signal
- Most compact design without need for a dedicated EtherCAT® ASIC, external memory and crystal resulting in cost saving on BOM and PCB space
- Pin and code compatibility with the established XMC4000 microcontroller family offers existing XMC microcontroller customers a seamless upgrade path to EtherCAT®
- Top notch in RAM and Flash size integration for Cortex®-M microcontrollers
- First EtherCAT® node running at 125°C ambient temperature
- Guaranteed availability through 2027 or longer

XMC4000 powered by ARM® Cortex®-M4
One Microcontroller Platform. Countless Solutions

ARM® Cortex®-M4 (with FPU)

- CPU frequency up to 120MHz
- Timers CCU4, CCU8, POSIF
- USB / up to 3 CAN nodes / up to 6 serial channels
- **High resolution PWM**
- **Interconnect Matrix**
- up to 4x 12Bit ADC / 2x DAC
- **-40 to 125°C**

XMC4100/4200
up to 256kB Flash / 40kB RAM
QFN-48, TQFP-64

XMC4400
up to 512kB Flash / 80kB RAM
TQFP-64 / LQFP-100

+ 120MHz core
+ Ethernet
+ ΔΣ Demodulator

XMC4500
up to 1MB Flash / 160kB RAM
LQFP-100 / LQFP-144 / LFBGA-144

+ EBU (External Bus Unit)
+ SD Card

High-Volume Production

XMC4700
up to 2MB Flash / 352kB RAM
LQFP-100 / LQFP144 / **LFBGA-196**

+ 144MHz core
+ 6 CAN nodes

XMC4800
up to 2MB Flash / 352kB RAM
LQFP-100 / LQFP-144 / **LFBGA-196**

+ EtherCAT®

Samples in August 2015
High-Volume Production in Q1/2016

PRODUCT DIFFERENTIATORS

125°C ambient temperature

for highest robustness in harsh environments

Event Request Unit (ERU)

enables interconnection between analog, PWM and sensor interface peripherals

Flexible Timers / ADCs and Position Interfaces

enable deterministic behavior and full application control

Delta Sigma Demodulator

with integrated filters for **cost- and size-efficient** galvanic isolated current measurement

Extended Technology Life Time

allows continuous operation of 20 years with guaranteed data retention in flash memory

XMC4800 with EtherCAT®

System Performance

ARM® Cortex®-M4 @144MHz	FPU	Programmable Interconnect Matrix	RTC
	DMA 12ch	SysTick	CRC Engine
	FLASH (ECC) up to 2MB	RAM up to 352kB	CACHE 8kB

Timers / PWM

4x PWM Timers (CCU4) 16-64Bit 4ch	2x PWM Timers (CCU8) 16-64Bit 8ch + Dead-Time	2x POSIF (Position Interface)

Communication

6x CAN 256 MO	USIC 6ch [SPI/Dual SPI/Quad SPI, SCI/UART, I²C, I²S]	EtherCAT®
10/100 Ethernet MAC (/w IEEE 1588)	USB (FS OTG)	SDIO/SD/MMC Interface
External Memory Interface (EBU)		

Analog

4x 8ch-12bit ADC / 4Msps	2x 12Bit DAC	4x ΔΣ Demodulator

Application / Target Markets

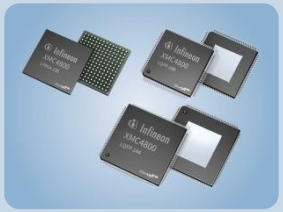
- Medium to higher-end industrial control
- Industrial communication
- Transportation

Key Features

- ARM® Cortex®-M4 at 144MHz
- EtherCAT®
- Large on-chip memories 2MB Flash, 352kB RAM
- 6 CAN nodes with 256 message objects
- Rich industrial and external media connectivity
- Safety package supporting SIL-2/3
- 125°C extended temperature range
- Long-term availability with >15 years
- IEC 60730 class B compliant LIB
- Free DAVE™ IDE and DAVE Apps

Packages

- LQFP-100, LQFP-144, LFBGA-196



XMC4800 with EtherCAT®
Software Support

DAVE™ Example Code for basic EtherCAT® Physical Layer evaluation

Free of Charge

BECKHOFF

+

DAVE™ integrated BECKHOFF Slave Stack Tool for full EtherCAT® application support

Free of Charge

esitas™ Your embedded solution partner.

port

MicroControl Systemhaus für Automatisierung

3rd Party Tools for full EtherCAT® application support

Commercial Tools

XMC4800 with EtherCAT® Schedule and Portfolio

- XMC4800 series with at least 18 products
- Engineering samples available in August 2015
- Start of production in Q1/2016

Product Name	Feature Set	Compatibility
XMC4800-F100F1024; LQFP-100 -40°C – 85°C XMC4800-F100K1024; LQFP-100 -40°C – 125°C	EtherCAT®, 1MB Flash/200kB RAM, 6xCAN nodes	Pin compatible with all XMC4000 devices in LQFP-100. Code compatible with all XMC4000 devices.
XMC4800-F100F1536; LQFP-100 -40°C – 85°C XMC4800-F100K1536; LQFP-100 -40°C – 125°C	EtherCAT®, 1.5MB Flash/276kB RAM, 6xCAN nodes	
XMC4800-F100F2048; LQFP-100 -40°C – 85°C XMC4800-F100K2048; LQFP-100 -40°C – 125°C	EtherCAT®, 2MB Flash/352kB RAM, 6xCAN nodes	
XMC4800-F144F1024; LQFP-144 -40°C – 85°C XMC4800-F144K1024; LQFP-144 -40°C – 125°C	EtherCAT®, 1MB Flash/200kB RAM, 6xCAN nodes	Pin compatible with all XMC4000 devices in LQFP-144. Code compatible with all XMC4000 devices.
XMC4800-F144F1536; LQFP-144 -40°C – 85°C XMC4800-F144K1536; LQFP-144 -40°C – 125°C	EtherCAT®, 1.5MB Flash/276kB RAM, 6xCAN nodes	
XMC4800-F144F2048; LQFP-144 -40°C – 85°C XMC4800-F144K2048; LQFP-144 -40°C – 125°C	EtherCAT®, 2MB Flash/352kB RAM, 6xCAN nodes	
XMC4800-E196F1024; LFBGA-196 -40°C – 85°C XMC4800-E196K1024; LFBGA-196 -40°C – 125°C	EtherCAT®, 1MB Flash/200kB RAM, 6xCAN nodes	Upwards pin compatible with all XMC4000 devices in LFBGA-144. Code compatible with all XMC4000 devices.
XMC4800-E196F1536; LFBGA-196 -40°C – 85°C XMC4800-E196K1536; LFBGA-196 -40°C – 125°C	EtherCAT®, 1.5MB Flash/276kB RAM, 6xCAN nodes	
XMC4800-E196F2048; LFBGA-196 -40°C – 85°C XMC4800-E196K2048; LFBGA-196 -40°C – 125°C	EtherCAT®, 2MB Flash/352kB RAM, 6xCAN nodes	

XMC4800 with EtherCAT®
Summary

XMC4800 is the first-ever EtherCAT® node on an ARM® Cortex®-M 32-bit microcontroller with on-chip flash and analog/mixed signal capabilities

XMC4800 enables the most compact designs, eliminating the need for a dedicated EtherCAT® ASIC, external memory and crystal. Designers benefit from BOM cost and PCB space savings

XMC4800 is pin and code compatible with the established XMC4000 microcontroller family

XMC4800 enables EtherCAT® even under harsh conditions with 125°C ambient temperature

ENERGY EFFICIENCY
MOBILITY
SECURITY

Innovative semiconductor solutions for energy efficiency, mobility and security.