Kinetis EA

Ultra-Reliable Microcontrollers

Automotive and Industrial Applications

Agenda

- Introducing Kinetis EA
- Proposition Value
- Features Overview
- Application Examples
- Enablement
- Useful Links

Kinetis EA: Ultra-Reliable MCUs for Automotive and Industrial

Designed with reliability and safety in mind when systems need to operate in electrically harsh environments.

- ARM® Cortex®-M0+ up to 125 ˚C ambient temperature designed for operation in harsh environments (AEC-Q100)
- Robust 5 V operating voltage and I/O for immunity against noise and EMI
- Enhanced ESD/EMC compatibility, fully compliant with IEC 61000-4 standards
- Hardware fault detect and comparators provide voltage and current protection
- Safety and security with IEC 60730 compliant Watchdog and CRC

Kinetis EA: ARM Cortex-M0+ Performance and Low Power

Cortex-M0+ 48 MHz, 125 ˚C ambient temperature

Robust 5 V IPs, AEC-Q100 reliability

No Compromise

Built on Cortex-M0+, best in class energy efficiency, 3x better CoreMark/MHz, and 15% better code density than 8/16-bit

Fast processing with single cycle 32x32, fast response with BME, single cycle GPIO and dual ACMP

Motor Control capabilities with 16-bit FlexTimer optimized for sync with ADC

High Drive pins supporting up to 20 mA

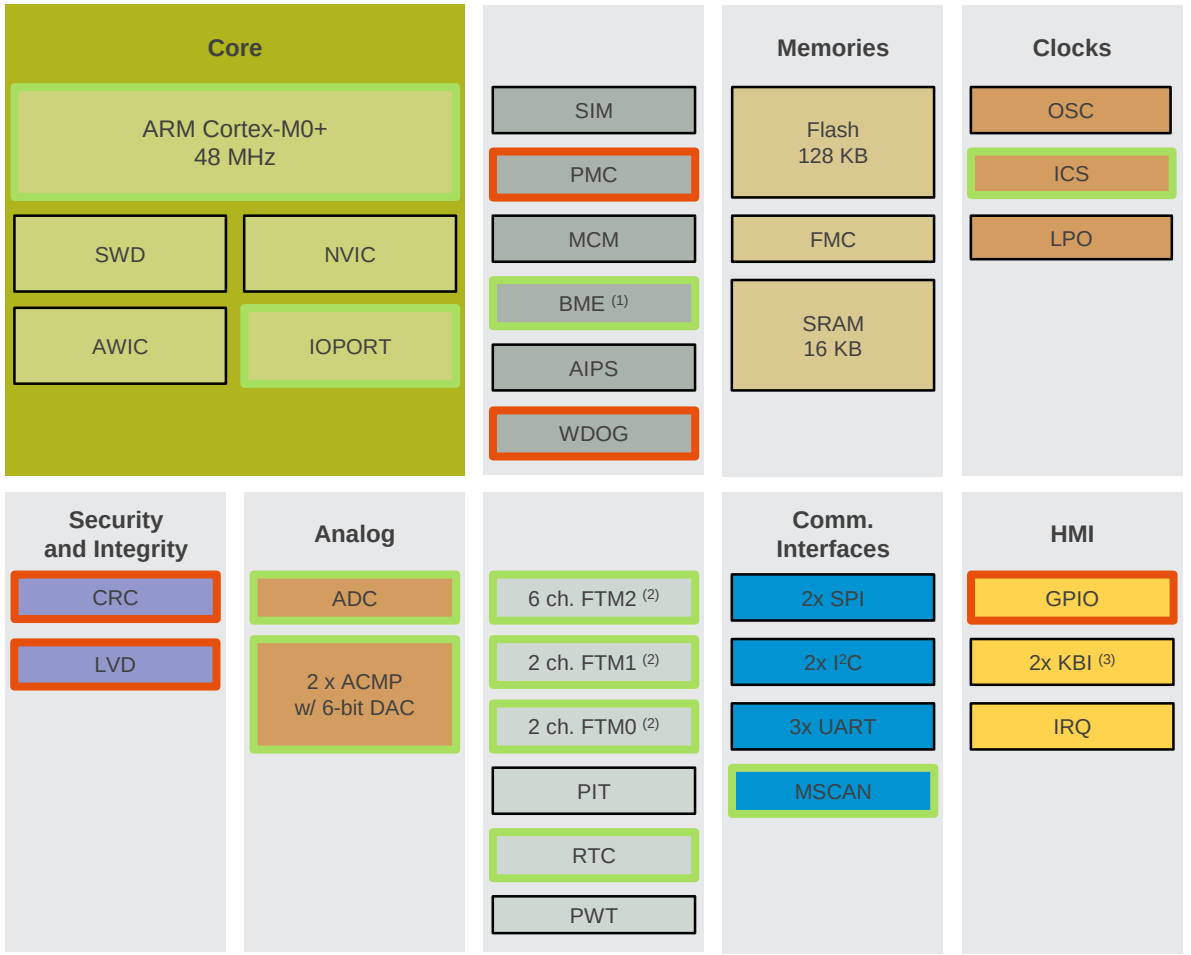
Kinetis EA: KEA128 Features Overview

Performance

Operating Characteristics:
- Voltage range: 2.7 to 5.5 V
- Temperature range: -40 to 125 °C

Key Features:
- Core: Cortex-M0+ core 48MHz
- Memory: 128 K Flash, 16 K RAM, 256B EE.
- Communication: SPIx2, SCI(LIN)x3, IICx2, CAN
- Analog: 12-bit ADC, ACMPx2
- Timers: 16-bit FlexTimersx3, PWT, RTC, 32-bit PIT
- System functions: LVD, WDG, CRC, LP modes
- Clock: External OSC and internal ICS

Packages:
- 16TSSOP, 24 QFN, 32/ 64 and 80 LQFP
- Pin compatible within KEA family



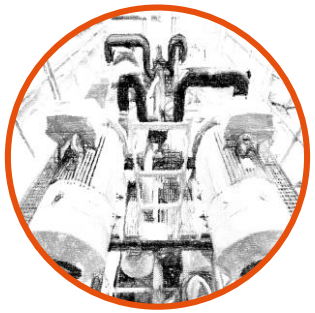
Robustness

(1) Support bit operation in RAM

(2) Faster timer running 2 x core clock

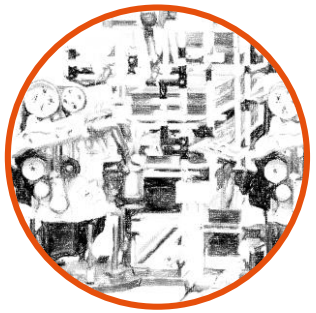
(3) 32 ch. KBI module

Kinetis EA: Application Example



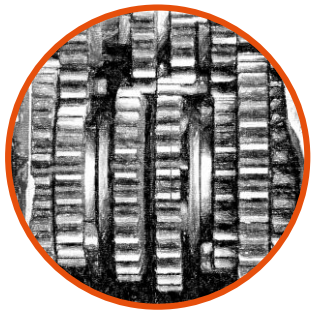
Industrial Appliances

Convection chamber, washer, refrigeration chamber, induction module, HVAC



Industrial Metering

Electric and fluid meters, programmable logic controller



Motor Control

E-Bikes, AC motor, DC / BLDC motor, sensorless motor, HVAC, fluid pumps

Building Automation

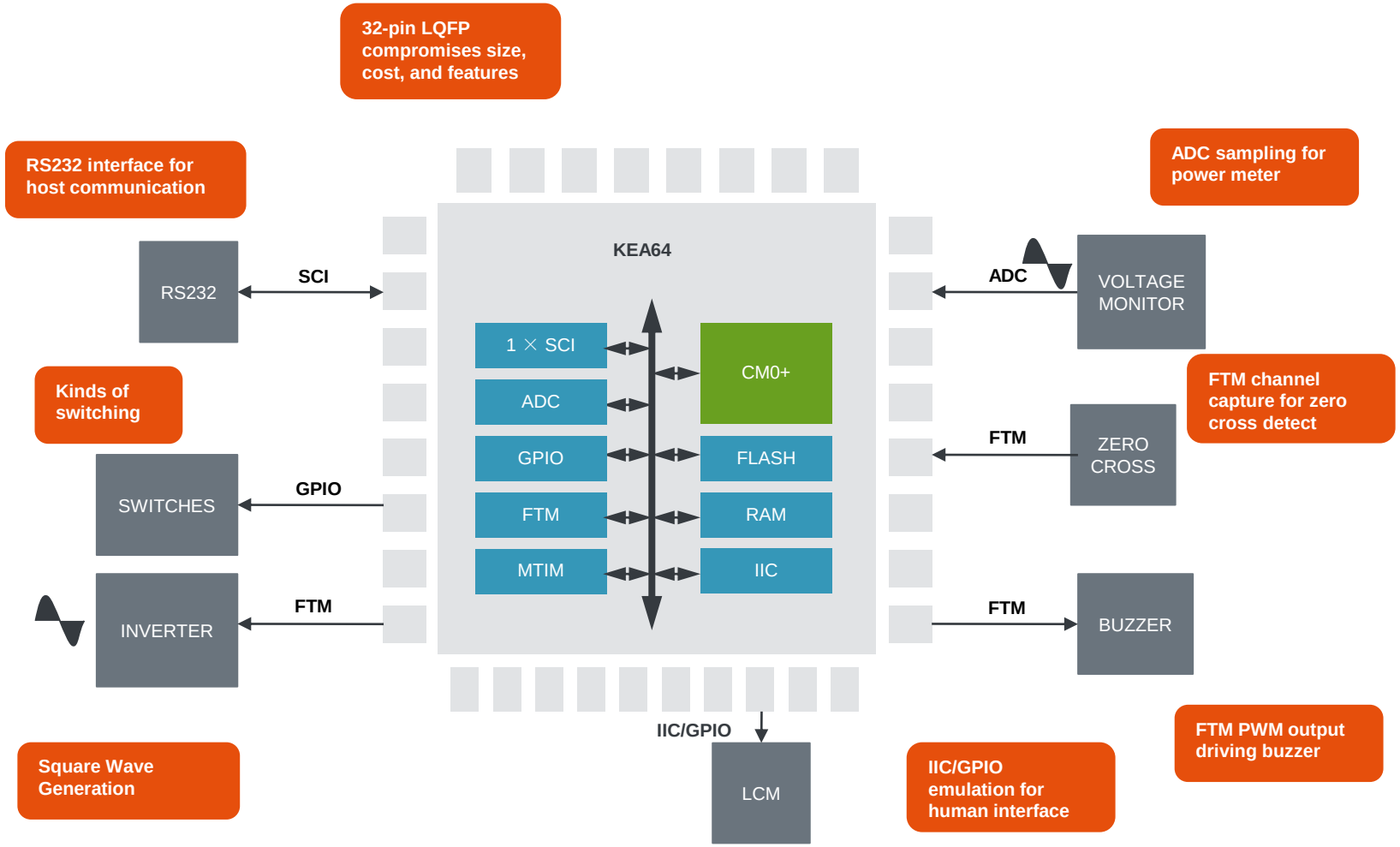
Circuit breakers, intelligent MCCB, safety alarms, fire alarms, safety lights, robot arm

General Purpose

Power supply, power management, HVAC, industrial HMI, lighting, DC/DC

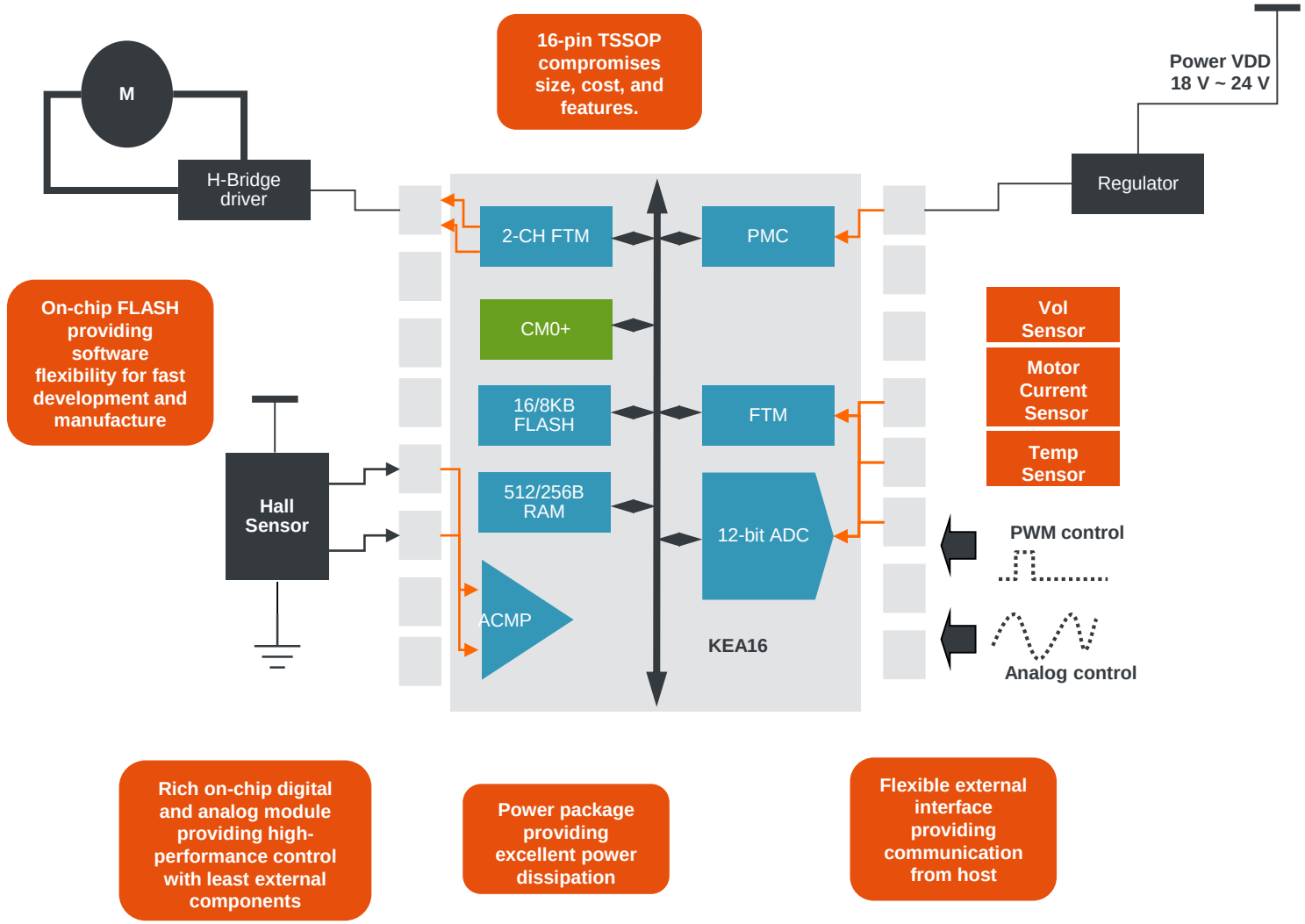
Kinetis EA Industrial Reliable Power Supply

- **Key Features Required**
  - 8-64 K flash
  - 12-bit ADC
  - Timers
  - SCI/ SPI/ I2C/ CAN
  - 64/ 32 LQFP



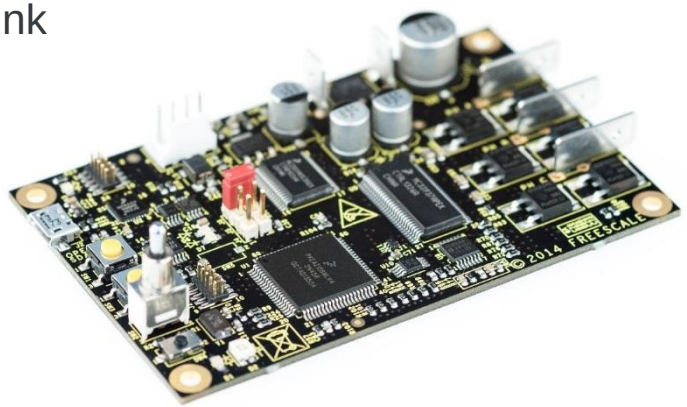
Kinetis EA Industrial Reliable DC Fan

- **Key Features Required:**
  - 8-16 K flash
  - 12-bit ADC, ACMP
  - Timer/ PWM
  - SCI/ SPI/ I2C
  - 32 LQFP, 20SOIC, 16TSSOP



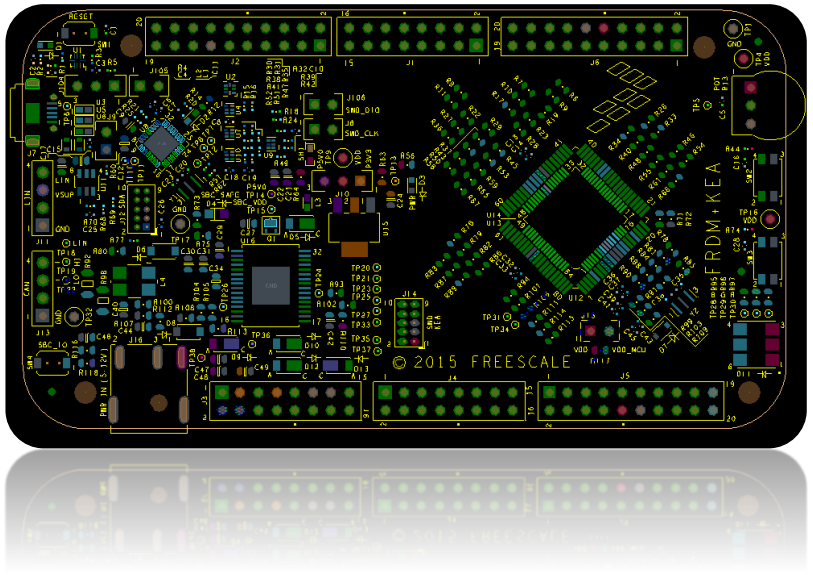
Kinetis EA: Start Developing with Best-in-Class Enablement

- **Freescale Library and Tools:**
  - Math and Motor Control Library for Cortex-M0+
  - Motor Control Application Tuning (MCAT) tool
  - FreeMASTER
- **IDE Debugger/Compiler**
  - CodeWarrior 10.6 with Processor Expert integrated
  - Kinetis Design Studio
  - IAR, Keil, Cosmic IDE for Kinetis ARM MCUs
- **Debugger Interface**
  - P&E Micro: U-Multilink



- **Operating Systems:**
  - MQX Lite
- **Drivers**
  - Flash Drivers including EEPROM emulation
  - LIN and CAN drivers
  - Other peripherals and IO drivers in SDK
- **Evaluation Board (Start at $49)**
  - StarterTRAK 128, 64 and 8 K with OpenSDA
- **Reference design (Starts at $49)**
  - 3 phase sensorless BLDC motor control
  - Interior/exterior lighting
  - Low power entry level gateway

New Freescale Freedom+ Hardware Platform



ARDUINO™

AVAILABLE by END of Q2

Feature Rich

Starting from $19 USD
I/O headers high pin count
12 V supply, *5 V and 3.3 V operation*
OpenSDA USB interface
CAN/LIN, SBC - *Vreg, CAN/LIN PHY*
RGB LED, accelerometer

Ease of Use

Plug & Play Arduino shields
LCD, motor control, Wi-Fi®, Bluetooth®, sensor, communication
Quick Starter Guide Video
Examples embedded into MCU
Demo example code with phone

Low Cost

60% lower than StarterTRAK
1 BLDC Shield → many FRDM+ MC kits

freescale™

Kinetis EA: Useful links

- More Info at freescale.com/KEA
- Evaluation Boards:
  - freescale.com/TRK-KEA128
  - freescale.com/TRK-KEA64
- Reference Designs:
  - Motor Control reference design: freescale.com/KEA128BLDC
  - Lighting: freescale.com/KEA128LEDLIGHTRD
  - Low Power Gateway: freescale.com/KEA128AUTONETRD
- Community:
  - freescale.com/community - Kinetis EA

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