

FREESCALE CONTINUUM



Kinetis Microcontrollers

Based on the ARM[®] Cortex[™]-M4 Core

*The first broad-market mixed-signal MCU family based on the new ARM Cortex-M4 core
The most scalable portfolio of mixed-signal ARM Cortex-M4 MCUs in the industry*



Kinetis Microcontrollers Software-enabled MCU platforms ▶▶▶

Overview

The Kinetis MCU portfolio consists of multiple pin-, peripheral- and software-compatible MCU families based on the ARM® Cortex™-M4 core. Families are built from innovative 90nm thin-film storage (TFS) flash technology with unique FlexMemory (EEPROM) capability, and offer industry-leading low power and mixed signal analog integration. All families include a rich suite of analog, communication, timing and control peripherals. Kinetis MCUs offer exceptional value, with 10K pricing starting at less than \$1 for some 32K flash parts, in a 32-pin package.

K10

The K10 MCU family is the entry point into the Kinetis portfolio. Devices start from 32 KB of flash in a small-footprint 5 x 5 mm 32QFN package extending up to 1 MB in a 144MAPBGA package with a rich suite of analog, communication, timing and control peripherals. Additionally, pin compatibility, flexible low-power capabilities and innovative FlexMemory help to solve many of the major pain points for system implementation.

K20

The K20 MCU family builds upon the K10 MCU family and adds full- and high-speed USB 2.0 On-The-Go with device charger detect capability. High memory density K20 family devices include a single precision floating point unit and NAND flash controller.

K30

The K30 MCU family builds upon the K10 MCU family and adds a flexible low-power segment LCD controller with support for up to 320 segments.

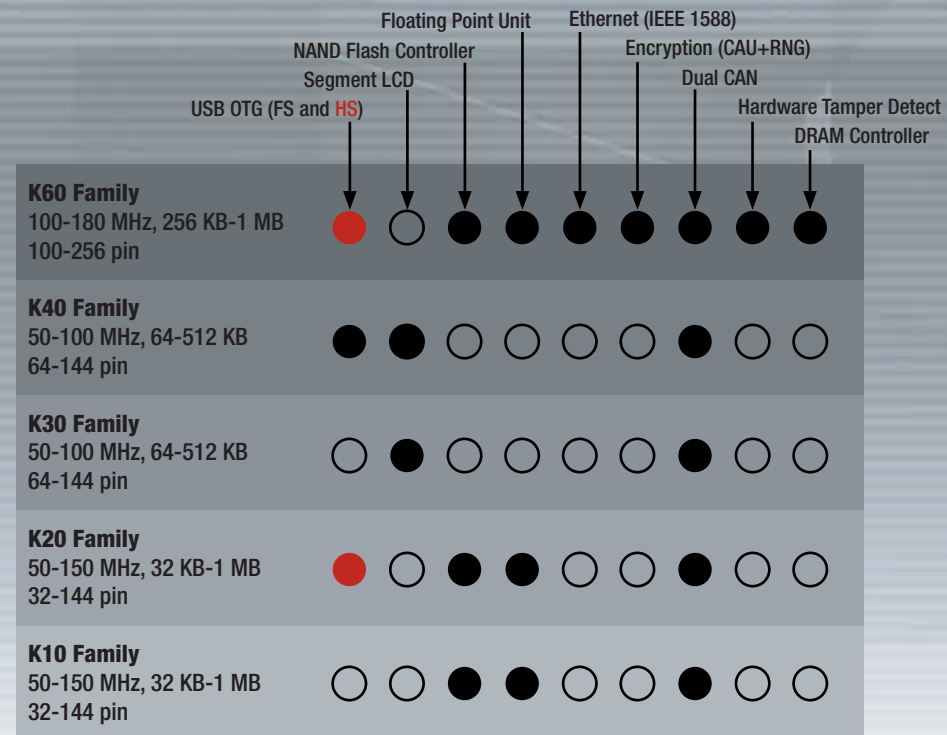
K40

The K40 MCU family takes the K30 MCU family and adds full-speed USB 2.0 On-The-Go with device charger detect capability in addition to the segment LCD controller.

K60

The K60 MCU family includes IEEE® 1588 Ethernet, full- and high-speed USB 2.0 On-The-Go with device charger detect capability, hardware encryption and tamper detection capabilities. High memory density K60 family devices include an optional single precision floating point unit, NAND flash controller and DRAM controller.

Kinetis MCU Families



Meeting the Needs of the Embedded Designer ▶▶▶

Performance Features

- ARM Cortex-M4 + DSP
- Single Instruction MAC, SIMD with optional Floating Point
- 32 Channel DMA
- Crossbar switch with Multi-Master Bus
- 16K instruction/data Cache
- Independent Flash Banks for code update while running
- Optional NAND Flash and DDR Controller

Ultra-Low-Power Performance for Extended Battery Life

- Stop and Run currents of <500 nA and <200 μ A/MHz respectively
- Ten flexible low-power operating modes for power profile optimization
- 4 μ S wake-up time
- Full memory and analog operation down to 1.71V
- Touch Sense Interface enabling wake-up via user touch
- Special power saving modes enabled via integrated Segment LCD Controller

FlexMemory

- FlexMemory provides EEPROM and/or Data Flash, or additional Program Flash
- EEPROM functionality
 - requires no user code
 - single byte write/erase capable
 - endurance of over 10M cycles
 - with magnitude better write/erase speeds than traditional EEPROM providing a solution for brown out conditions

Flash and FlexMemory using 90nm Thin Film Storage (TFS)

- Significantly reduced standby current and operation down to 1.71V
- Fast 30nsec Flash, 30% to 50% faster than many competing technologies
- Split Gate bit Cell allows scalability to High Densities
- Increased robustness and reliability due to Silicon nanocrystal charge storage

Mixed-Signal Capability for Signal Conditioning, Conversion and Analysis

- Multiple high-speed, high-precision 16-bit ADCs
- Multiple 12-bit DACs
- High-speed comparators, and programmable gain amplifiers
- Reduced system cost and integration effort

Compatibility

To simplify your application's hardware and software design, all the Kinetis microcontroller families share common characteristics:

- Pin compatibility options within and across MCU family
- Identical peripherals and memory maps across family
- ColdFire+ software compatibility

Scalability

- 1.71V to 3.6V flash and analog operation and programming with 5V tolerant I/O
- 50 Mhz to 180 MHz Max CPU frequencies
- 32 KB to 1 MB flash
- 8K to 128K of SRAM
- 32-pin (5x5mm) QFN to 256 MAPGBA packages
- -40 to 105°C operation

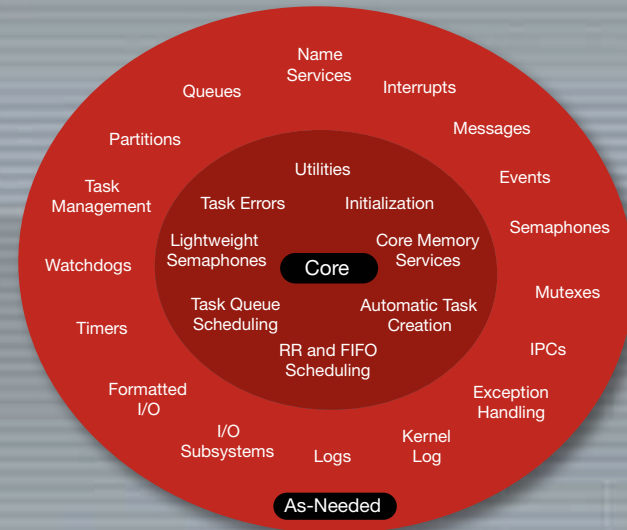
What else you can expect from the Kinetis family

- Wide selection of scalable MCUs from one supplier
- One stop enablement offering
- Powerful processing capability
- Multiple timers for advanced motor control
- Connectivity & communication interfaces
- Sophisticated HMI including Touch Sense and Integrated LCD Controllers
- Reliability, safety & security
- Support for external peripherals & memory
- Exceptional value

One-Stop Enablement Offering — MCU + IDE + RTOS ▶▶▶

- Freescale Tower System hardware development environment
- Integrated development environments
 - Eclipse-based CodeWarrior 10.0 IDE and Processor Expert
 - IAR Embedded Workbench
 - Keil MDK
 - CodeSourcery Sourcery G++ (GNU)
- Runtime software and RTOS
 - Math, DSP and encryption libraries
 - Motor control libraries
 - Complimentary bootloaders and stacks
 - USB, Ethernet, RF, serial
 - Complimentary Freescale embedded GUI
 - Complimentary Freescale MQX™
 - Cost-effective Nano™ SSL/Nano™ SSH for Freescale MQX RTOS
 - Micrium uC/OS-III
 - Express Logic ThreadX
 - SEGGER embOS
 - freeRTOS
 - Mocana (security)
- Plus full ARM ecosystem

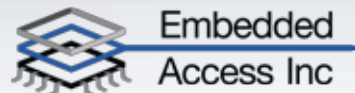
Freescale MQX Software Solutions



Complimentary High Value Freescale MQX RTOS

- Full Featured RTOS with Small Modular Footprint
- Complete USB Stack: Device, Host, Hub, Filesystem, Audio, Personal Healthcare, HID, Mass Storage, CDC
- Complete Ethernet Stack
- Hardware accelerated Security Stack available
- Complete project examples

CodeWarrior



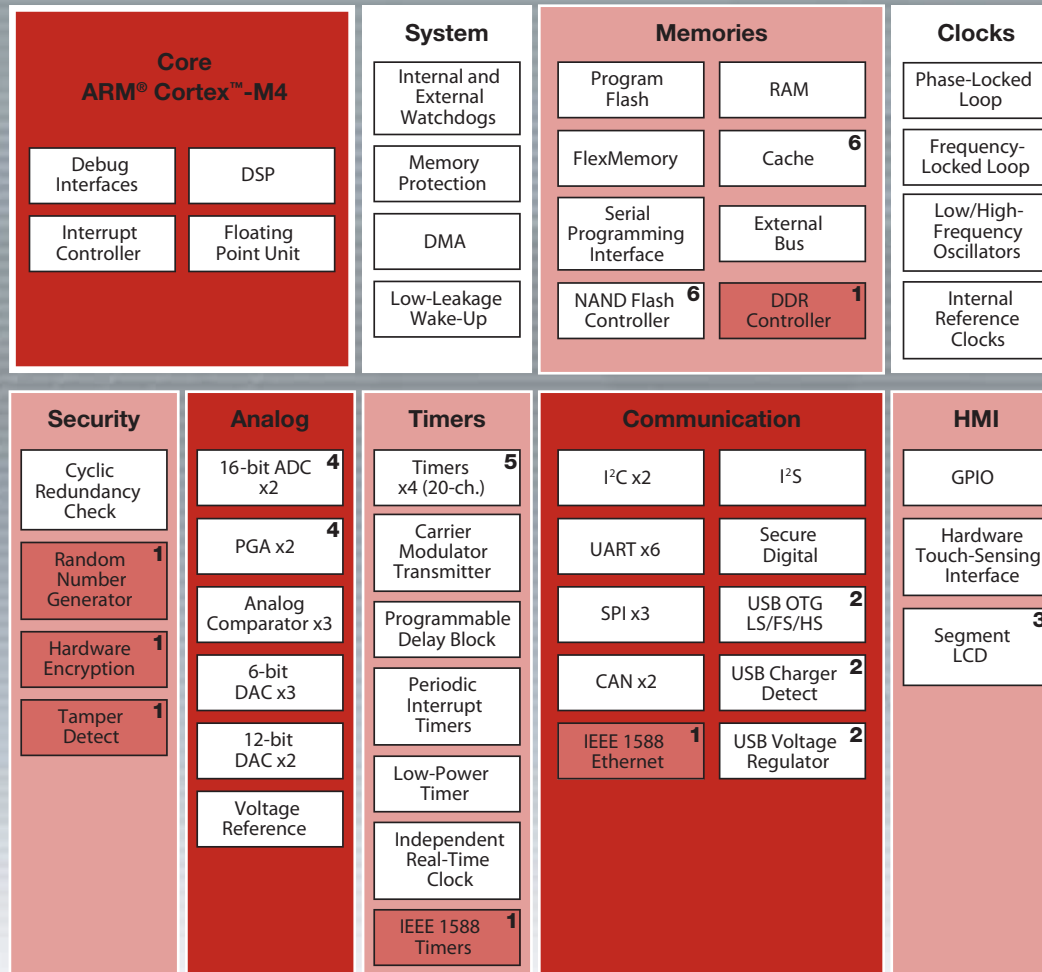
IAR
SYSTEMS

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www.FutureElectronics.com/Kinetis



Block diagram showing superset of current Kinetis family features.



- 1.** available on K60 only
- 2.** available on K20, K40, K60 only
- 3.** available on K30 and K40
- 4.** x4 on K60
- 5.** K10, K20, K60 only. K30, K40 are x3 (12-ch.)
- 6.** K10, K20, K60 only

Freescale's revolutionary Cortex™-M4

Get connected! ▶▶▶

REGISTER NOW!

at www.FutureElectronics.com/Kinetis

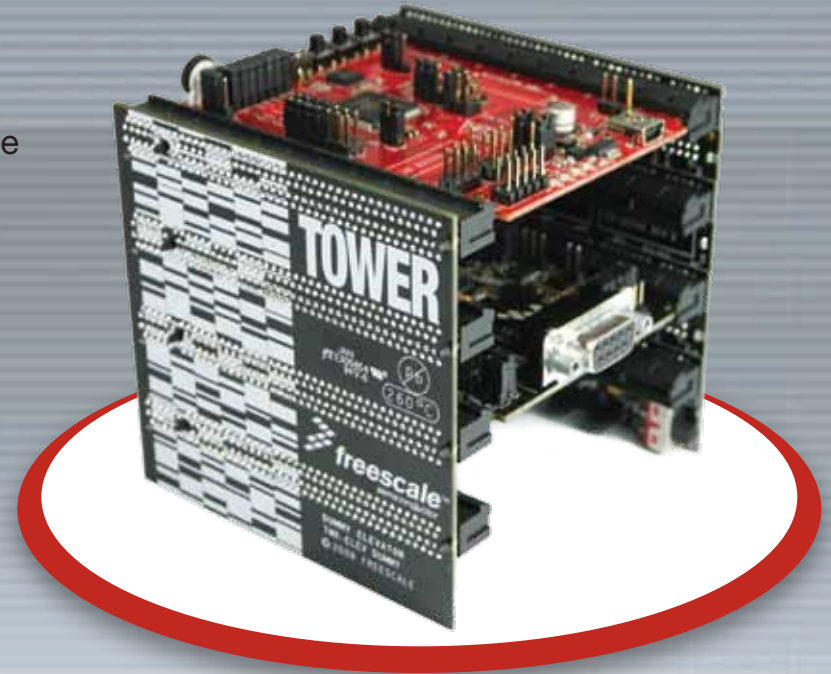
- ▶ Be one of the first to receive the new Kinetis Tower Module – **FREE** – when it's released later this year.

Quantities will be limited!

- ▶ Be the first to get access to:

- Sample availability
- Development tools
- Online training
- Technical seminars
- Product availability
- Future Electronics' certified engineering team to support your design

- ▶ And when you register, we'll send you a **complimentary Kinetis water bottle!**



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