



32-bit Microcontrollers

# Kinetis K2x MCU Family

## Low-power MCUs with USB On-The-Go

### Target Applications

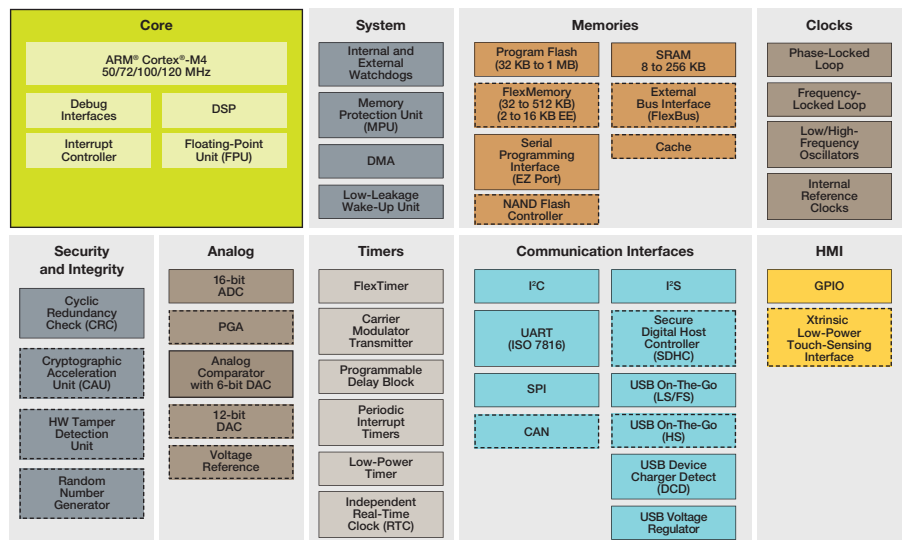
- Barcode scanners
- Electronic point of sales (EPOS)
- Gaming accessories
- Health and wellness monitors
- Home and building automation
- Industrial/commercial sensor nodes
- IoT data concentrators
- Multi-functional printers
- Smart grid data concentrators
- Sports and activity wearables

### Overview

The Kinetis K series MCU portfolio offers the broadest selection of pin, peripheral- and software-compatible MCU families based on the ARM® Cortex®-M4 core. These families are performance efficient and offer industry-leading low power while providing significant BOM savings through smart on-chip integration. The Kinetis K series MCU portfolio is supported by the most-comprehensive set of development tools and software.

The Kinetis K2x MCU family is pin-peripheral and software-compatible with many of the Kinetis K series MCU families, offering full and high-speed USB 2.0 On-The-Go options, in addition to other features like device charge detect capability and USB crystal-less functionality present in the latest devices. This family starts from 32 KB of flash in 5 x 5 mm 32-pin QFN packages extending up to 1 MB in a 144-pin MAPBGA package with up to 256 KB of SRAM. These devices offer various levels of integration, with a rich suite of analog, communication, timing and control peripherals. Next-generation Kinetis K2x MCUs are further optimized for performance with industry-leading power consumption and offer more streamlined integration for further BOM cost reductions.

### Kinetis K2x MCU Family



□ Standard Feature   □ Optional Feature



## Comprehensive Enablement Solutions

### Kinetis Software Development Kit (SDK)

- Extensive suite of robust peripheral drivers, stacks and middleware
- Includes software examples demonstrating the usage of the HAL, peripheral drivers, middleware and RTOSes
- Operating system abstraction (OSA) for Freescale MQX™ RTOS, FreeRTOS, and Micrium uC/OS kernels and baremetal (no RTOS) applications

### Processor Expert Software Configuration Tool

- Complimentary software configuration tool providing IO allocation and pin initialization and configuration of hardware abstraction and peripheral drivers

### Integrated Development Environments (IDE)

- Atollic® TrueSTUDIO®  
atollic.com/index.php/partnerfreescale
- Green Hills® Software MULTI  
ghs.com/products/freescale\_kinetis.html
- IAR Embedded Workbench®  
iar.com/kinetis
- ARM Keil® Microcontroller Development Kit  
keil.com/freescale

## Kinetis K2x MCU Benefits

- Cortex-M4 core featuring digital signal processing capability with floating point unit offering outstanding computational power for control algorithms, sensor data processing, audio processing, among others, while increasing math accuracy and reducing code size
- Industry-leading low-power consumption specifications to help extend battery life and reduce overall board power supply requirement with run currents down to 138 uA/MHz
- Low leakage stop mode with full state retention down to 2.6 uA while maintaining a fast wake-up time of 6 uS
- Ultra-low-power shelf mode, down to 150 nA, allowing multiple years of real-time clock retention without compromising battery power
- Smart integration supporting applications that require higher performance, low power and reduction of BOM cost
- Highly reliable, fast access Flash memory with four levels of protection for code security/protection
- Faster time to market with comprehensive enablement solutions, including SDK (drivers, libraries, stacks), IDE, bootloader, RTOS, online community and more

- Freescale Kinetis Design Studio IDE
  - No-cost integrated development environment (IDE) for Kinetis MCUs
  - Eclipse and GCC-based IDE for C/C++ editing, compiling and debugging
- Broad ARM ecosystem support through Freescale Connect partners

### Online enablement with ARM mbed™ development platform



- Rapid and easy Kinetis MCU prototyping and development
- Online mbed SDK, Developer Community
- Free software libraries

### Freescale MQX RTOS

- Commercial-grade MCU software platform at no cost with optional add-on software and support packages

### Bootloader

- Common bootloader for all Kinetis MCUs
- In-system flash programming over a serial connection: erase, program, verify
- ROM or flash-based bootloader with open source software and host-side programming utilities.

### Development Hardware

- Tower System modular development platform
  - Rapid prototyping and evaluation
  - Low cost, interchangeable modules
- Freescale Freedom development platforms
  - Low cost (<\$30 USD)
  - Arduino R3 compatible
  - mbed-enabled on select boards

## Kinetis K2x MCUs

Kinetis K2x MCU Sub-Family	Kinetis K22 MCUs Baseline				Kinetis K21 MCUs Security Rich		Kinetis K20 MCUs High Mixed Signal Integration				Kinetis K24 MCUs High SRAM
<b>CPU Performance</b>	50MHz	100MHz w/FPU	120MHz w/FPU	120MHz w/FPU	50MHz	120MHz w/FPU	50MHz	72MHz	100MHz	120MHz w/FPU	120MHz w/FPU
<b>Embedded Memory (Flash, SRAM)</b>	192-512KB, 32-64KB	128KB, 24KB	640-1024KB, 128KB	256-512KB, 48-128KB	192-512KB, 32-64KB	640-1024KB, 128KB	32-160KB, 8-16KB	96-288KB, 16-64KB	256-512KB, 32-128KB	1024KB, 128KB	1024KB, 256KB
<b>Analog</b>	1x 16-bit ADC, 1x 12-bit DAC	2x 16-bit ADC, 1x 12-bit DAC	2x 16-bit ADC, 2x 12-bit DAC	2x 16-bit ADC, 2x 12-bit DAC	1x 16-bit ADC, 1x 12-bit DAC	2x 16-bit ADC, 2x 12-bit DAC	1x 16-bit ADC	PGA 2x 16-bit ADC, 1x 12-bit DAC	PGA 2x 16-bit ADC, 2x 12-bit DAC	PGA 4x 16-bit ADC, 2x 12-bit DAC	PGA 2x 16-bit ADC, 2x 12-bit DAC
<b>Security</b>	-				Hardware Encryption and Tamper		-				Hardware Encryption
<b>Other Features</b>	-	-	CAN, FlexBus	FlexBus	-	CAN, FlexBus	-	CAN, FlexBus	CAN, FlexBus	HS USB, CAN, NAND Flash Controller, FlexBus	CAN, FlexBus
<b>Package Options</b>	LQFP48, LQFP80, MAP121, LQFP64	XFPGA121, LQFP100, MAP64, LQFP64	MAP144, MAP121, LQFP144, LQFP64, LQFP100, LQFP80	XFPGA121, LQFP64	MAP121, LQFP80	MAP144, MAP121, LQFP144	LQFP48, MAP64, QFN48, LQFP64, QFN32	LQFP80, LQFP64, MAP121, LQFP100	LQFP100, LQFP144, LQFP80, MAP144, MAP121	MAP144, LQFP144	LQFP144, LQFP100, MAP121
<b>Development Hardware</b>	TWR-K21D50M, TWR-K21F120M				TWR-K21D50M, TWR-K21F120M		FRDM-K20D50M, TWR-K20D50M, TWR-K20D72M, TWR-K60D100M, TWR-K60F120M				FRDM-K64F, TWR-K64F120M

For current information about Kinetis products, software, tools and documentation, please visit [freescale.com/Kinetis](http://freescale.com/Kinetis)

Freescale, the Freescale logo, the Energy Efficient Solutions logo, Kinetis and Processor Expert are trademarks of Freescale Semiconductor, Inc., Reg. U.S. Pat. & Tm. Off. Tower is a trademark of Freescale Semiconductor, Inc. All other product or service names are the property of their respective owners. ARM, Cortex and Keil are registered trademarks of ARM Limited (or its subsidiaries) in the EU and/or elsewhere. mbed is a trademark of ARM Limited (or its subsidiaries) in the EU and/or elsewhere. All rights reserved. © 2014 Freescale Semiconductor, Inc.

Doc Number: KINK2XFS REV 4

