



Low-power,
baseline MCUs

Kinetis K1x MCU Family

The Kinetis K series microcontroller (MCU) portfolio offers the broadest selection of pin-, peripheral- and software-compatible MCU families based on the ARM® Cortex®-M4 core.

TARGET APPLICATIONS

- ▶ Barcode scanners
- ▶ Electronic point of sales (EPOS)
- ▶ Flow meters
- ▶ Gaming controllers
- ▶ HVAC systems
- ▶ Home and building automation
- ▶ Remote sensors

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 K1x MCU family consists of general-purpose MCUs with a variety of memory and integration options. Devices start from 32 KB of flash in a small footprint of 5 x 5 mm 32 QFN package extending up to 1 MB in a 144 MAPBGA package with an optional rich suite of analog, communication, timing and control peripherals. Additionally, its pin compatibility, flexible low-power capabilities and innovative FlexMemory technology help to solve many of the major pain points for embedded designers. Next-generation

Kinetis K1x MCUs are further optimized for performance and power consumption and offer more streamlined integration for further BOM cost reductions.

KINETIS K1x MCU BENEFITS

- ▶ Up to 120 MHz Cortex-M4 core supporting a broad range of processing bandwidth requirement while maintaining excellent cost effectiveness in easy-to-use packages
- ▶ Smart integration supporting applications requiring higher performance, lower power and reduction of BOM cost such as: Communication peripherals with FIFOs, SPIs with multiple chip selects, UARTs with hardware flow Control, multiple internal clock sources (1 kHz, 32 kHz and 4 MHz internal oscillators), superb analog integration with 16-bit ADCs with 12-bit DAC, high-speed comparators, high precision internal voltage reference and multiple timers with PWM generation capability or very low power operation
- ▶ Highly reliable, fast access flash memory with four levels of protection for code security/protection



- ▶ Outstanding low-power operation with dynamic currents down to 190 $\mu\text{A}/\text{MHz}$, state retention stop mode down to 3.2 μA with 6 μs wake-up time and lowest power mode down to 340 nA
- ▶ Faster time to market with comprehensive enablement solutions, including SDK (drivers, libraries, stacks), IDE, bootloader, RTOS, online community and more

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 MQX™ RTOS, FreeRTOS, and Micrium $\mu\text{C}/\text{OS}$ kernels and baremetal (no RTOS) applications

Processor Expert Software Configuration Tool

- ▶ Complimentary software configuration tool providing I/O allocation and pin initialization and configuration of hardware abstraction and peripheral drivers

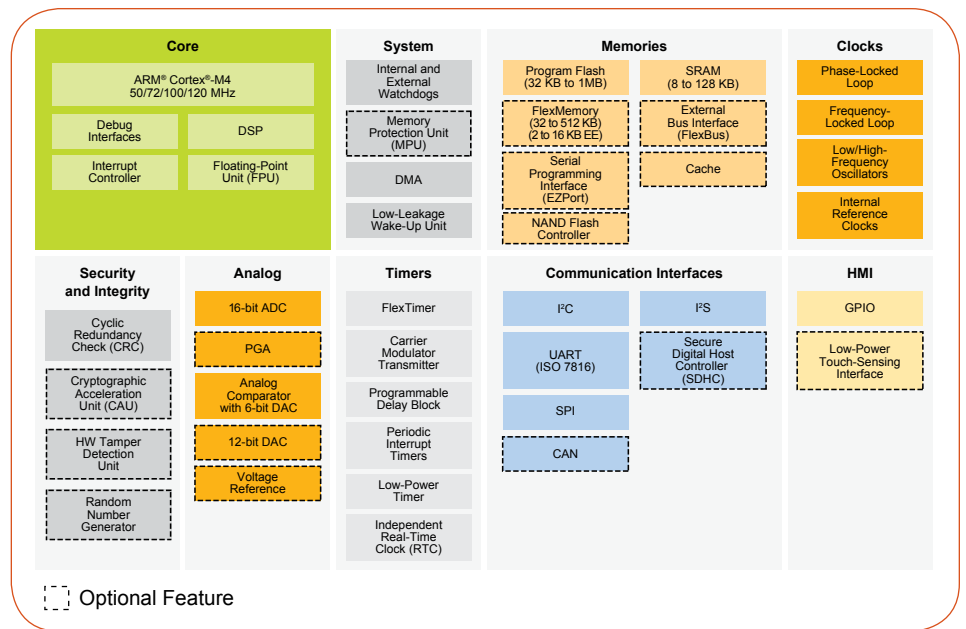
Integrated Development Environments (IDE)

- ▶ 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 K1x MCUs

Kinetis K1x MCU Sub-Family	Kinetis K12 MCUs Baseline	Kinetis K11 MCUs Security Rich	Kinetis K10 MCUs High Mixed Signal Integration			
CPU Performance	50 MHz	50 MHz with FPU	50 MHz	72 MHz	100 MHz	120 MHz with FPU
Embedded Memory (Flash, SRAM)	192–512 KB, 32–64 KB	192–512 KB, 32–64 KB	32–160 KB, 8–16 KB	96–288 KB, 16–64 KB	256–512 KB, 32–128 KB	1 MB, 128 KB
Analog	1 x 16-bit ADC, 1 x 12-bit DAC	1 x 16-bit ADC, 1 x 12-bit DAC	1 x 16-bit ADC	PGA, 2x 16-bit ADC, 1 x 12-bit DAC	PGA, 2 x 16-bit ADC, 2 x 12-bit DAC	PGA, 4 x 16-bit ADC, 2 x 12-bit DAC
Security	–	Hardware encryption and tamper	–	–	–	–
Other Features	–	–	–	CAN, FlexBus	CAN, FlexBus	CAN, FlexBus, NAND Flash Controller
Package Options	LQFP48, LQFP64, LQFP80, MAP121	LQFP80, MAP121	LQFP48, LQFP64, MAP64, QFN32, QFN48	LQFP64, LQFP80, LQFP100, MAP121	LQFP80, LQFP100, LQFP144, MAP121, MAP144	LQFP144, MAP144

KINETIS K1x MCU FAMILY



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

Proprietary 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
- ▶ Freedom development platforms
 - Low cost (<\$30 USD)
 - Arduino R3 compatible
 - mbed-enabled on select boards

www.nxp.com/Kinetis

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Document Number:
KNTSK1xFMLYFS REV 2

