Low-power, baseline MCUs

Kinetis® K1x MCU Family

> Just like other members of the Kinetis K series portfolio, the Kinetis K1x series MCU family offers a broad 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

Kinetis K series MCU 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 µA/MHz, state retention stop mode down to 3.2 µA with 6µS 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® µC/OS kernels and BareMetal (no RTOS) applications
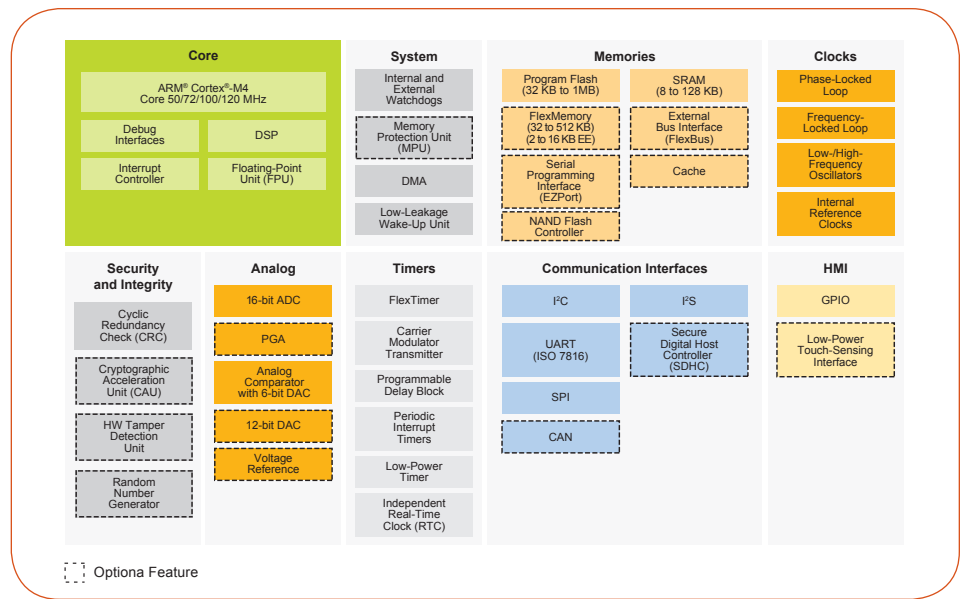
Processor Expert® software configuration tool

‣ 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®
  www.atollic.com/index.php/partnerfreescale

‣ Green Hills® Software MULTI
  www.ghs.com/products/freescale_kinetis.html

‣ IAR Embedded Workbench®
  www.iar.com/kinetis

‣ ARM Keil® Microcontroller Development Kit
  www.keil.com/freescale

‣ Kinetis Design Studio IDE

  – No-cost integrated development environment for Kinetis MCUs

  – Eclipse and GCC-based IDE for C/C++ editing, compiling and debugging

KINETIS K1x MCU FAMILY

Core
ARM® Cortex®-M4 Core 50/72/100/120 MHz
Debug Interfaces | DSP
Interrupt Controller | Floating-Point Unit (FPU)

System
Internal and External Watchdogs
Memory Protection Unit (MPU)
DMA
Low-Leakage Wake-Up Unit

Memories
Program Flash (32 KB to 1MB) | SRAM (8 to 128 KB)
FlexMemory (32 to 512 KB) (2 to 16 KB EE) | External Bus Interface (FlexBus)
Serial Programming Interface (EZPort) | Cache
NAND Flash Controller

Clocks
Phase-Locked Loop
Frequency-Locked Loop
Low-/High-Frequency Oscillators
Internal Reference Clocks

Security and Integrity
Cyclic Redundancy Check (CRC)
Cryptographic Acceleration Unit (CAU)
HW Tamper Detection Unit
Random Number Generator

Analog
16-bit ADC
PGA
Analog Comparator with 6-bit DAC
12-bit DAC
Voltage Reference

Timers
FlexTimer
Carrier Modulator Transmitter
Programmable Delay Block
Periodic Interrupt Timers
Low-Power Timer
Independent Real-Time Clock (RTC)

Communication Interfaces
I²C | I²S
UART (ISO 7816) | Secure Digital Host Controller (SDHC)
SPI
CAN

HMI
GPIO
Low-Power Touch-Sensing Interface

⌐ ¬ Optiona Feature

‣ Broad ARM technology ecosystem support through NXP Partner Program

Online enablement with ARM mbed™ development platform   [mbed Enabled]

‣ Rapid and easy Kinetis MCU prototyping and development

‣ Online mbed™ SDK, developer community

‣ Free software libraries

Proprietary MQX RTOS

‣ Full-feature RTOS kernel, TCP/IP and USB stacks, file system, shell utility, peripheral drivers, board support packages and more at **www.nxp.com/mqx**

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 development board platform

  – Rapid prototyping and evaluation

  – Low cost, interchangeable modules

‣ Freedom development boards

  – Low cost (<$30 USD)

  – Arduino® R3 compatible

  – mbed-enabled on select boards

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

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