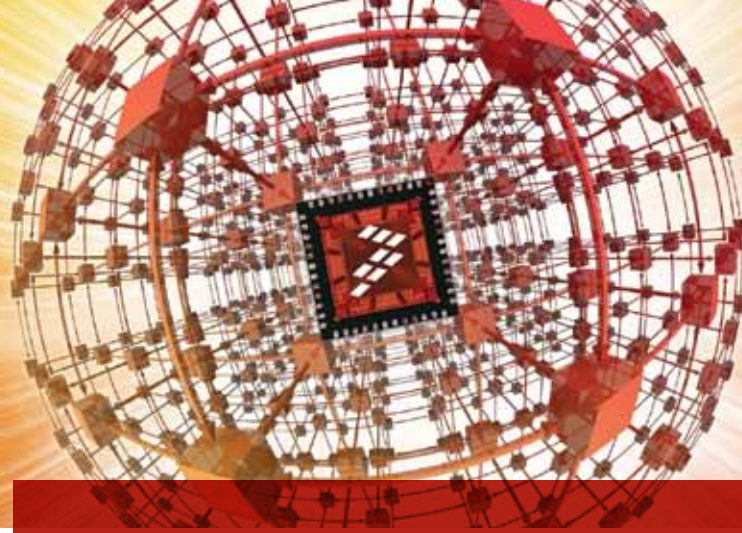




32-bit Microcontrollers

Kinetis K10 Family

Low-power, mixed-signal MCUs

Target Applications

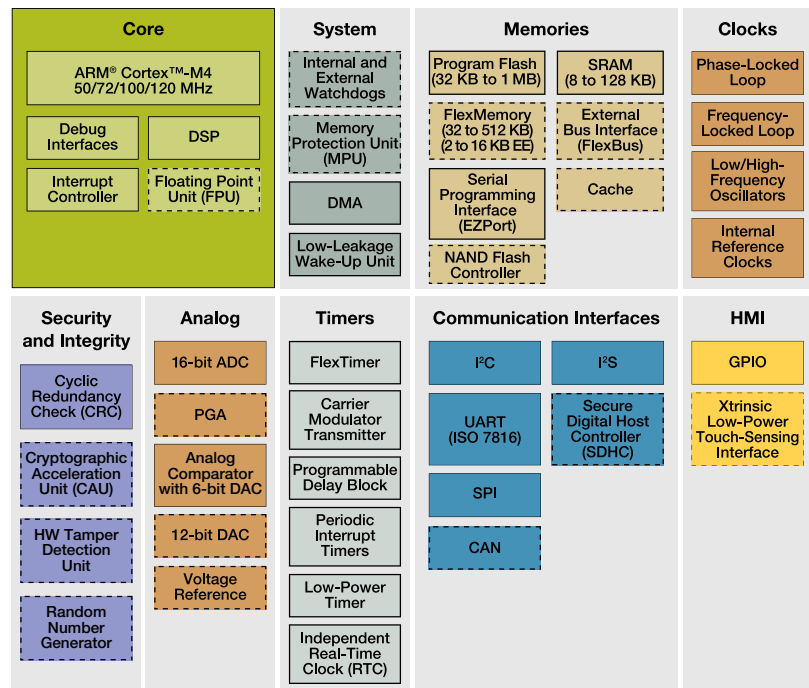
- Remote sensors
- HVAC systems
- Gaming controllers
- Flow meters

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 90 nm thin-film storage (TFS) flash technology with unique FlexMemory (EEPROM) capability, and offer industry-leading low power and mixed signal analog integration.

The K10 MCU family is the entry point into the Kinetis portfolio. Devices start from 32 KB of flash in a small-footprint 5x5 mm 32 QFN package extending up to 1 MB in a 144 MAPBGA 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.

Kinetis K10 Family



□ Standard Feature □ Optional Feature

One-Stop Enablement Offering—MCU + IDE + RTOS

Freescale Tower System hardware development environment:

- Integrated development environments
 - Eclipse-based CodeWarrior V10.x 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 (USB, Ethernet, RF, serial)
 - Complimentary Freescale embedded GUI
 - Complimentary Freescale MQX™
 - Cost-effective Nano™ SSL/Nano™ SSH for Freescale MQX RTOS
 - Micrium µC/OS-III
 - Express Logic ThreadX
 - SEGGER embOS
 - freeRTOS
 - Mocana (security)
- Full ARM ecosystem

Features

- ARM® Cortex™-M4 core with DSP instruction support and optional single precision floating point unit
- Up to 32-channel DMA. Up to 16 KB of cache. Cross bar switch
- 32 KB–1 MB flash. Up to 128 KB of SRAM
- 32–512 KB FlexMemory
- 10 ultra-low-power modes with flash programming and analog operation down to 1.71V
- Low-power timer, low-power RTC, low-leakage wake-up unit
- High-speed 16-bit ADCs. Programmable gain amplifiers
- 12-bit DAC. High-speed comparators
- On-chip voltage reference
- Cryptographic acceleration unit (CAU)
- HW tamper detection unit
- Random number generator
- Low-power capacitive touch-sensing interface
- Up to six UARTs with IrDA support. One UART with ISO 7816 support
- I²S interface, up to two CAN modules, up to three DSPI interfaces, up to two I²C interfaces

Benefits

- Up to 120 MHz core supporting a broad range of processing bandwidth needs
- Peripheral and memory servicing with reduced CPU loading. Optimized bus bandwidth and flash execution performance. Concurrent multi-master bus accesses for increased bus bandwidth
- High reliability, fast access program memory with 4-level security protection. Independent flash banks allow concurrent code execution and firmware updating
- FlexMemory provides 32 byte–16 KB of user-segmentable byte write/erase EEPROM. In addition, FlexNVM from 32–512 KB for extra program code, data or EEPROM backup
- Peripheral activity and wake-up times can be optimized to suit application requirements enabling extended battery life (Stop currents of <500 nA, run currents of <200 µA/MHz, 4 µs wake-up from Stop)
- Continual device operation in reduced power states with flexible wake-up options
- Fast, accurate signal conditioning capability with support for single or differential operation for improved noise rejection
- Support for small amplitude signal processing
- Analog signal generation for audio applications
- Fast, accurate motor over-current protection
- Eliminates need for external voltage reference reducing overall system cost
- Secure data transfer and storage. Faster than software implementations and with minimal CPU loading. Supports a wide variety of algorithms: DES, 3DES, AES, MD5, SHA-1, SHA-256
- Secure key storage with internal/external tamper detect for unsecured flash, temperature/clock/supply voltage variations and physical attack
- Provides a modern upgrade from mechanical to touch keypad, rotary and slider user interfaces and operates in all low-power modes with minimal current added. Supports up to 16 inputs
- Variety of data size, format and transmission/reception settings supported for multiple industrial communication protocols
- Multiple communication interfaces for simple and efficient data exchange, industrial network bridging and audio system interfacing

K10 Family Options

Part Number	Memory					Features										Other	√ Packages									
	CPU (MHz)	Flash (KB)	Flex NVM (KB)	SRAM (KB)	Cache (KB)	Single Precision Floating Point Unit	Memory Protection	CAN	Secure Digital Host	NAND Flash Controller	External Bus Interface	12-bit DAC	Prog. Gain Amplifier	5V Tolerant I/O	FM		FT	LF	MP	LH	LK	LL	MC	LQ	MD	
															32 QFN (5x5)		48QFN (7X7)	48LQFP (7X7)	64MAPBGA (5X5)	64LQFP (10X10)	80LQFP (12X12)	100LQFP (14X14)	121BGA (8x8)	144LQFP (20x20)	144BGA (13x13)	
MK10DN32Vyy5	50	32		8													√	√	√	√						
MK10DN64Vyy5	50	64		16													√	√	√	√						
MK10DN128Vyy5	50	128		16													√	√	√	√						
MK10DN512Vyy10	100	512		128			√	√	√			√	√	√	√	√					√	√	√	√	√	
MK10FN1M0Vyy12	120	1 MB		128	16	√	√	√	√	√	√	√	√	√	√	√						√	√	√	√	
MK10DX32Vyy5	50	32v	32	8													√	√	√	√						
MK10DX64Vyy5	50	64	32	16													√	√	√	√						
MK10DX128Vyy5	50	128	32	16													√	√	√	√						
MK10DX64Vyy7	72	64	32	16				√				√	√	√	√	√					√		√			
MK10DX128Vyy7	72	128	32	32				√				√	√	√	√	√					√	√	√			
MK10DX256Vyy7	72	256	32	64								√	√	√	√	√					√	√	√			
MK10DX128Vyy10	100	128	128	32			√	√	√	√		√	√	√	√	√					√	√	√		√	
MK10DX256Vyy10	100	256	256	64			√	√	√	√		√	√	√	√	√								√	√	
MK10FX512Vyy12	120	512	512	128	16	√	√	√	√	√	√	√	√	√	√	√								√	√	
MK11DX128Vyy5(R)	50	128	64	32									√								√		√			
MK11DX256Vyy5(R)	50	256	64	32									√								√		√			
MK11DN512Vyy5(R)	50	512		64									√								√		√			
MK12DX128Vyy5(R)	50	128	64	32									√						√	√		√				
MK12DX256Vyy5(R)	50	256	64	32									√					√	√			√				
MK12DN512Vyy5	50	512		64									√					√	√			√				

yy = package designator

For current information about Kinetis products and documentation, please visit freescale.com/Kinetis

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