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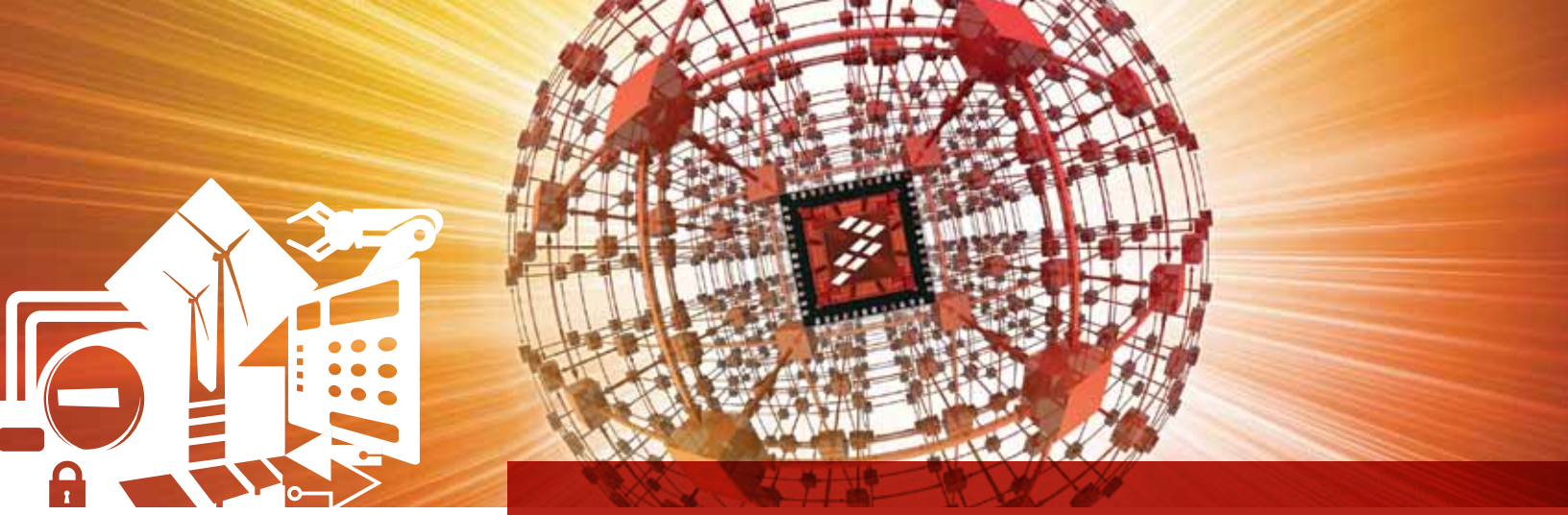
What is "Embedded - Microcontrollers"?

"Embedded - Microcontrollers" refer to small, integrated circuits designed to perform specific tasks within larger systems. These microcontrollers are essentially compact computers on a single chip, containing a processor core, memory, and programmable input/output peripherals. They are called "embedded" because they are embedded within electronic devices to control various functions, rather than serving as standalone computers. Microcontrollers are crucial in modern electronics, providing the intelligence and control needed for a wide range of applications.

Applications of "Embedded - Microcontrollers"

Details	
Product Status	Not For New Designs
Core Processor	ARM® Cortex®-M4
Core Size	32-Bit Single-Core
Speed	100MHz
Connectivity	CANbus, EBI/EMI, I²C, IrDA, SD, SPI, UART/USART
Peripherals	DMA, I²S, LVD, POR, PWM, WDT
Number of I/O	56
Program Memory Size	512KB (512K x 8)
Program Memory Type	FLASH
EEPROM Size	-
RAM Size	128K x 8
Voltage - Supply (Vcc/Vdd)	1.71V ~ 3.6V
Data Converters	A/D 37x16b; D/A 1x12b
Oscillator Type	Internal
Operating Temperature	-40°C ~ 105°C (TA)
Mounting Type	Surface Mount
Package / Case	80-LQFP
Supplier Device Package	80-FQFP (12x12)
Purchase URL	https://www.e-xfl.com/product-detail/nxp-semiconductors/mk10dn512zvlk10



Energy Efficient Solutions optimized for low power

32-bit Microcontrollers

Kinetis K10 Family

Low-power, mixed-signal MCUs

Target Applications

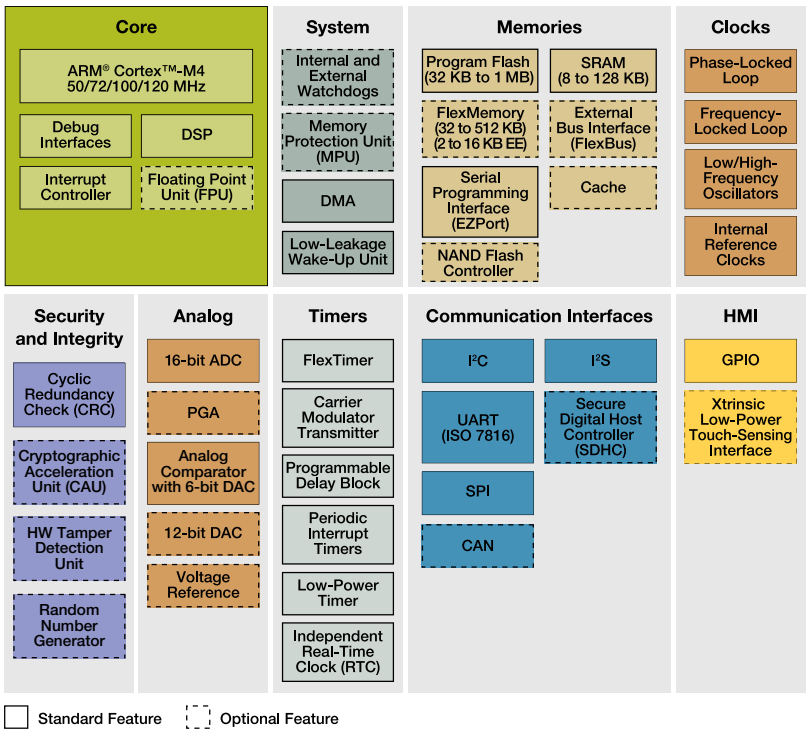
- Remote sensors
- HVAC systems
- Gaming controllers
- Flow meters

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



freescale™ Kinetis

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	Benefits
• 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	• 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
• 32 KB–1 MB flash. Up to 128 KB of SRAM • 32–512 KB FlexMemory	• 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
• 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	• 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
• 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	• 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
• Low-power capacitive touch-sensing interface	• 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
• 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	• 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 32 QFN (5x5)	FT 48QFN (7X7)	LF 48LQFP (7X7)	MP 64MAPBGA (5X5)	LH 64LQFP (10X10)	LK 80LQFP (12X12)	LL 100LQFP (14X14)	MC 121BGA (8x8)	LQ 144LQFP (20x20)	MD 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								√			Encryption and Tamper Detect						√		√		
MK11DX256Vyy5(R)	50	256	64	32								√			Encryption and Tamper Detect						√		√		
MK11DN512Vyy5(R)	50	512		64								√			Encryption and Tamper Detect						√		√		
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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