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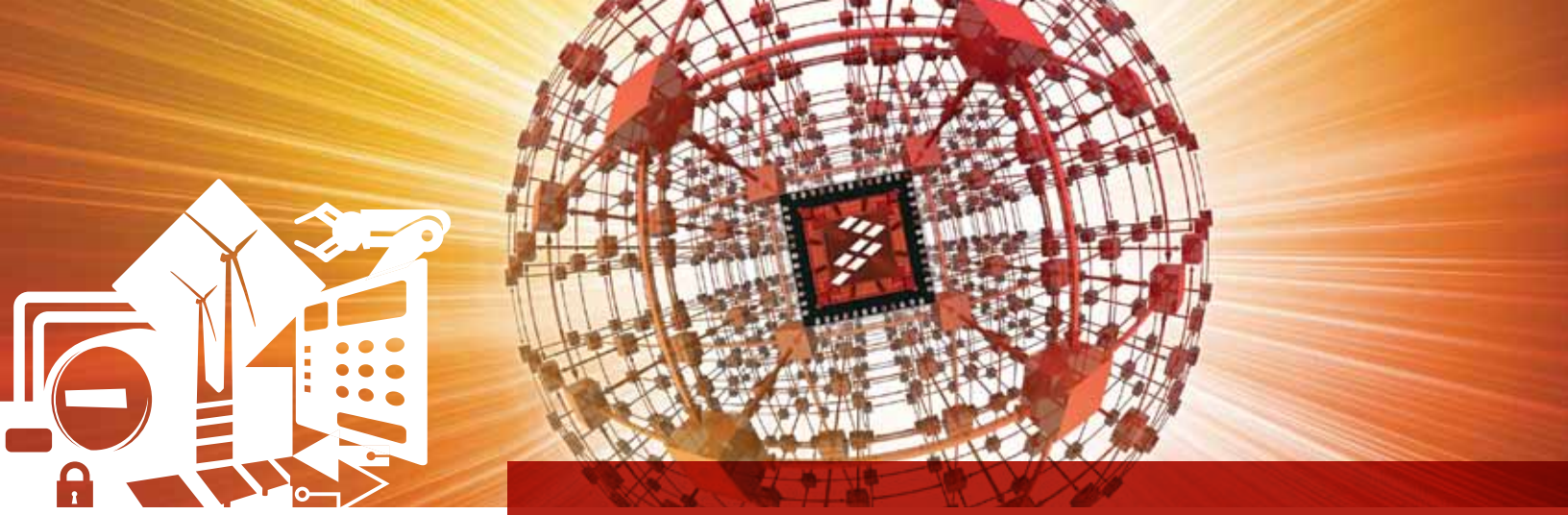
What is "Embedded - Microcontrollers"?

"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	Active
Core Processor	-
Core Size	-
Speed	-
Connectivity	-
Peripherals	-
Number of I/O	-
Program Memory Size	-
Program Memory Type	-
EEPROM Size	-
RAM Size	-
Voltage - Supply (Vcc/Vdd)	-
Data Converters	-
Oscillator Type	-
Operating Temperature	-
Mounting Type	-
Package / Case	-
Supplier Device Package	-
Purchase URL	https://www.e-xfl.com/product-detail/nxp-semiconductors/mk50dn512zcll10



Energy Efficient Solutions optimized for low power

32-bit MCUs

Kinetis K50 Family

Integrated measurement engine, Ethernet and LCD

Target Applications

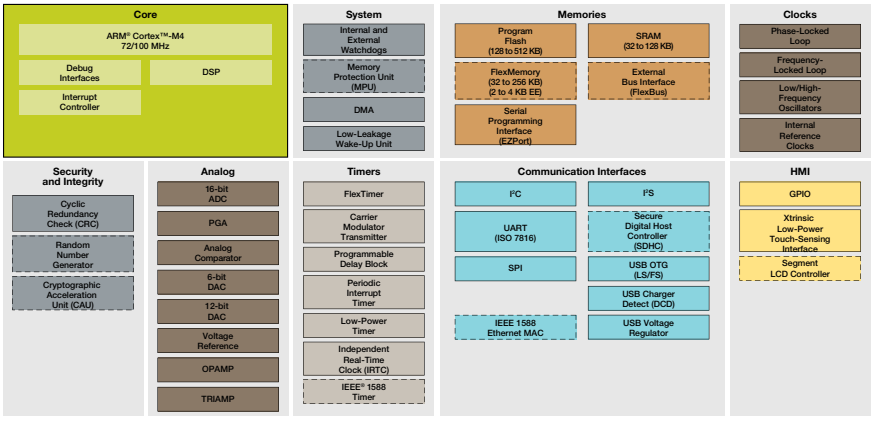
- Low-power portable medical devices
- Clinical and lab equipment
- Test/measurement equipment
- Instrumentation applications
- Monitor and telehealth applications

Overview

The Kinetis MCU portfolio consists of multiple pin-, peripheral and software-compatible MCU families based on the ARM® Cortex™-M4 core. Kinetis MCU 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 K50 MCU family provides designers with an analog measurement engine consisting of integrated operational and transimpedance amplifiers as well as high-resolution ADC and DAC modules. The family also features IEEE® 1588 Ethernet and hardware encryption, Full-Speed USB 2.0 On-The-Go with device charger detect capability and a flexible low-power segment LCD controller with support for up to 320 segments. Devices start from 128 KB of flash in 64 QFN packages extending up to 512 KB in a 144 MAPBGA package.

Kinetis K50 Family



☐ Standard ⬚ Optional

freescale™ Kinetis

One-Stop Enablement Offering: MCU + IDE + RTOS

Freescale Tower System hardware development environment:

- TWR-K53N512-KIT ($179)
  - Includes TWR-SER, TWR-ELEV and TWR-K53N512 modules
- TWR-K53N512 ($109)
  - Includes TWR-K53N512 and TWRPI-SLCD daughter card
- Integrated development environments
  - Eclipse-based CodeWarrior IDE and Processor Expert
  - IAR Embedded Workbench
  - Keil MDK
  - CodeSourcery Sourcery G++ (GNU)
- Portable medical applications demo software: EKG, pulse oximeter, blood pressure monitor, spirometer
- Math, DSP and encryption libraries
- Motor control libraries
- Complimentary bootloaders (USB, Ethernet, RF, serial)
- Complimentary Freescale embedded GUI
- Complimentary Freescale MQX™ RTOS
- Cost-effective Nano™ SSL/Nano™ SSH for Freescale MQX RTOS
- Micrium uC/OS-III
- Express Logic ThreadX
- SEGGER embOS
- FreeRTOS
- Green Hills µ-velOSity
- Mocana (security)
- Full ARM ecosystem

- Reduces core interruption, increasing performance
- Design flexibility and system cost reduction
- Increases system safety by restricting access to key memory locations
- Provides scalability needed for key digital power and motor control applications

Features	Benefits
• ARM® Cortex™-M4 core with DSP instruction support • Up to 16-channel DMA and crossbar switch	• Up to 100 MHz core supporting a broad range of processing bandwidth needs • Peripheral and memory servicing with reduced CPU loading. Concurrent multi-master bus accesses for increased bus bandwidth
• Up to 2 x 16-bit ADC with PGA • Up to 2 x 12-bit DAC • Programmable delay block • Operational and transimpedance amplifiers • Voltage reference (VREF)	• High-resolution and high-accuracy ADC provides accurate signal acquisition • Digital-to-analog converter with clock gating optimized for low-power usage • PDB precisely triggers ADC and DAC blocks to complete sensor biasing and measurement (i.e. glucometry strips) • OPAMPS allow signal filtering and amplification, TRIAMPS are optimized for converting current inputs into voltages that can be read by the ADC • VREF allows enhanced accuracy by supplying analog peripherals with fixed reference
• IEEE® 1588 Ethernet MAC with hardware time stamping • Hardware encryption coprocessor	• Precision clock synchronization for real-time networked industrial automation and control • Secure data transfer and storage. Faster than software implementations and with minimal CPU loading. Supports a wide variety of algorithms
• USB On-The-Go (Full-Speed) with device charger detect	• Optimized charging current/time for portable USB devices enabling longer battery life USB low-voltage regulator supplies up to 120 mA off chip at 3.3 V to power external components from 5 V input
• Flexible, low-power LCD controller with support for up to 320 segments (40 x 8 or 44 x 4)	• LCD blink mode enables low average power while remaining in low-power mode • Segment fail detect guards against erroneous readouts and reduces LCD test costs • Frontplane/backplane reassignment provides pin-out flexibility easing PCB design and allows LCD configuration changes via firmware with no hardware re-work • Supports multiple 3 V and 5 V LCD panel sizes with fewer segments (pins) than competitive controllers and no external components • Unused LCD pins can be configured as other GPIO functions
• FlexBus external bus interface and secure digital host controller	• Enables the connection of external memories and peripherals (e.g., graphics displays) • Connection to SD, SDIO, MMC or CE-ATA cards for in-application software upgrades, file systems or adding Wi-Fi® or Bluetooth® support
• 128–512 KB flash. Up to 128 KB of SRAM • 32–256 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 2–4 KB of user-segmentable byte write/erase EEPROM In addition, Flex NVM from 32–256 KB for extra program code, data or EEPROM backup

K50 Family Options

Part Number	CPU (MHz)	Memory				Feature Options						Packages					
		Flash (KB)	FlexMemory(KB)	SRAM(KB)	EEPROM/ FlexRAM (KB)	TRIAMP	Opamp	DAC	Ethernet	LCD	ADC	64 LQFP (10 x 10 mm) LH	80 LQFP (12 x 12 mm) LK	100 LQFP (14 x 14 mm) LL	121 BGA (8 x 8 mm) MC	144 LQFP (20 x 20 mm) LQ	144 BGA (13 x 13 mm) MD
MK50DX128Cyy7	72	128	32	32	2	√	√	√			√	√	√		√		
MK51DX128Cyy7	72	128	32	32	2	√	√	√		√	√	√	√		√		
MK50DX256Cyy7	72	256	32	64	2	√	√	√			√		√	√	√		
MK51DX256Cyy7	72	256	32	64	2	√	√	√		√	√		√	√	√		
MK51DN256ZCyy10	100	256	-	64		√	√	√		√	√					√	√
MK50DX256ZCyy10	100	256	256	64	4	√	√	√			√		√	√	√		
MK51DX256ZCyy10	100	256	256	64	4	√	√	√		√	√		√	√	√		
MK53DX256ZCyy10	100	256	256	128	4	√	√	√	√	√	√					√	√
MK50DN512ZCyy10	100	512	-	128		√	√	√			√			√	√	√	√
MK51DN512ZCyy10	100	512	-	128		√	√	√		√	√			√	√	√	√
MK52DN512ZCyy10	100	512	-	128		√	√	√	√		√					√	√
MK53DN512ZCyy10	100	512	-	128		√	√	√	√	√	√					√	√

yy = Package designator

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

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