

32-bit MCUs

Kinetis K30 Family

Low-power MCUs with segment LCD

Target Applications

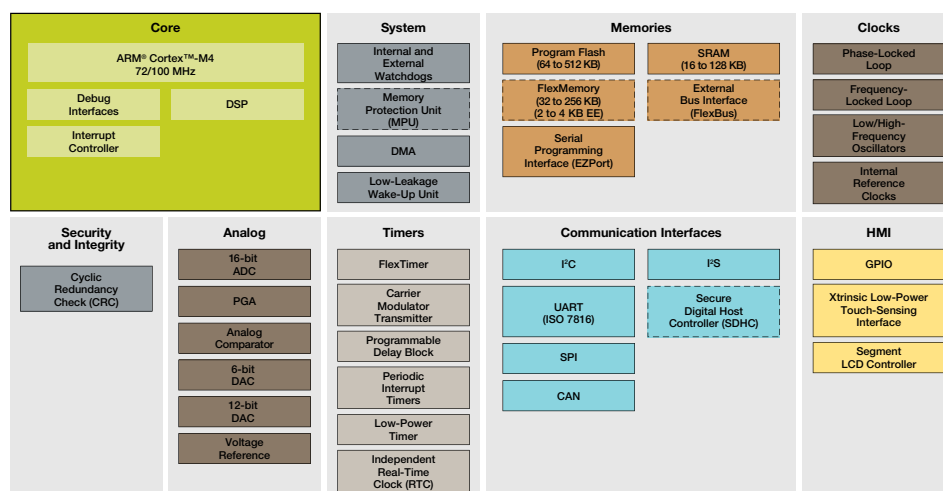
- Thermostats
- Smart meters
- Heart rate monitors
- Blood gas analyzers

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 K30 MCU family is pin, peripheral and software compatible with the K10 MCU family and adds a flexible low-power segment LCD controller with support for up to 320 segments. Devices start from 64 KB of flash in 64 LQFN packages extending up to 512 KB in a 144 MAPBGA package with a rich suite of analog, communication, timing and control peripherals.

Kinetis K30 Family



Standard Optional



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 |
|---|---|
| <ul style="list-style-type: none"> • ARM® Cortex™-M4 core with DSP instruction support • Up to 16-channel DMA. Crossbar switch | <ul style="list-style-type: none"> • 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 |
| <ul style="list-style-type: none"> • Flexible, low-power LCD controller with support for up to 320 segments (40 x 8 or 44 x 4) | <ul style="list-style-type: none"> • 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 |
| <ul style="list-style-type: none"> • Low-power capacitive touch-sensing interface | <ul style="list-style-type: none"> • Provide 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 |
| <ul style="list-style-type: none"> • 10 ultra-low-power modes with flash programming and analog operation down to 1.71 V • Low-power timer, low-power RTC, low-leakage wake-up unit | <ul style="list-style-type: none"> • 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 |
| <ul style="list-style-type: none"> • Memory protection unit • Hardware cyclic redundancy check engine • Independent-clocked COP. External watchdog monitor | <ul style="list-style-type: none"> • Provides memory protection for all cross bar switch masters, increasing software reliability • Validates memory contents and communication data, increasing system reliability • Prevents code runaway in fail-safe applications. Drives output pin to safe state external components if watchdog event occurs |
| <ul style="list-style-type: none"> • 64–512 KB flash. Up to 128 KB of SRAM • 32–256 KB FlexMemory | <ul style="list-style-type: none"> • High reliability, fast access program memory with 4-level security protection. Independent flash banks allow concurrent code execution and firmware updating • FlexMemory provides 32 bytes–4 KB of user-segmentable byte write/erase EEPROM. In addition, FlexNVM 32–256 KB for extra program code, data or EEPROM backup |

K30 Family Options

| Part Number | Memory | | | | Features | | | | | | | Other | Packages | | | | | |
|----------------|-----------|------------|---------------|-----------|------------------------|-----|--------------------------------|------------------------|------------|----------------------|------------------|-------|-------------------|-------------------|--------------------|-----------------|--------------------|-------------------|
| | CPU (MHz) | Flash (KB) | Flex NVM (KB) | SRAM (KB) | Memory Protection Unit | CAN | Secure Digital Host Controller | External Bus Interface | 12-bit DAC | Prog. Gain Amplifier | 5 V Tolerant I/O | | LH | LK | LL | MC | LQ | MD |
| | | | | | | | | | | | | | 64 LQFP (10 X 10) | 80 LQFP (12 X 12) | 100 LQFP (14 X 14) | 121 BGA (8 x 8) | 144 LQFP (20 x 20) | 144 BGA (13 x 13) |
| MK30DN512Vyy10 | 100 | 512 | | 128 | ✓ | ✓ | ✓ | * | ✓ | ✓ | ✓ | | | ✓ | ✓ | ✓ | ✓ | ✓ |
| MK30DX64Vyy7 | 72 | 64 | 32 | 16 | | ✓ | | | ✓ | ✓ | ✓ | ✓ | ✓ | | | ✓ | | |
| MK30DX128Vyy7 | 72 | 128 | 32 | 32 | | ✓ | | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | |
| MK30DX256Vyy7 | 72 | 256 | 32 | 64 | | ✓ | | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | |
| MK30DX128yy10 | 100 | 128 | 128 | 32 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | ✓ | ✓ | |
| MK30DX256yy10 | 100 | 256 | 256 | 64 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | ✓ | ✓ | |

yy = package designator

*144-pin only

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



Freescale, the Freescale logo, CodeWarrior, the Energy Efficient Solutions logo, Kinetis and Processor Expert are trademarks of Freescale Semiconductor, Inc., Reg. U.S. Pat. & Tm. Off. Xtrinsic is a trademark of Freescale Semiconductor, Inc. ARM is the registered trademark of ARM Limited. ARM Cortex-M4 is the trademark of ARM Limited. All other product or service names are the property of their respective owners. © 2011, 2012 Freescale Semiconductor, Inc.

Doc Number: KNTSK30FMLYFS REV 7