Low-power MCUs with segment LCD

Kinetis® K30 Family

The Kinetis Based on the ARM® Cortex®-M4 core, the K30 MCU family offers high-precision analog integration, flexible low-power and peripheral options.

TARGET APPLICATIONS

▸ Thermostats

▸ Smart meters

▸ Heart rate monitors

▸ Blood gas analyzers

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.

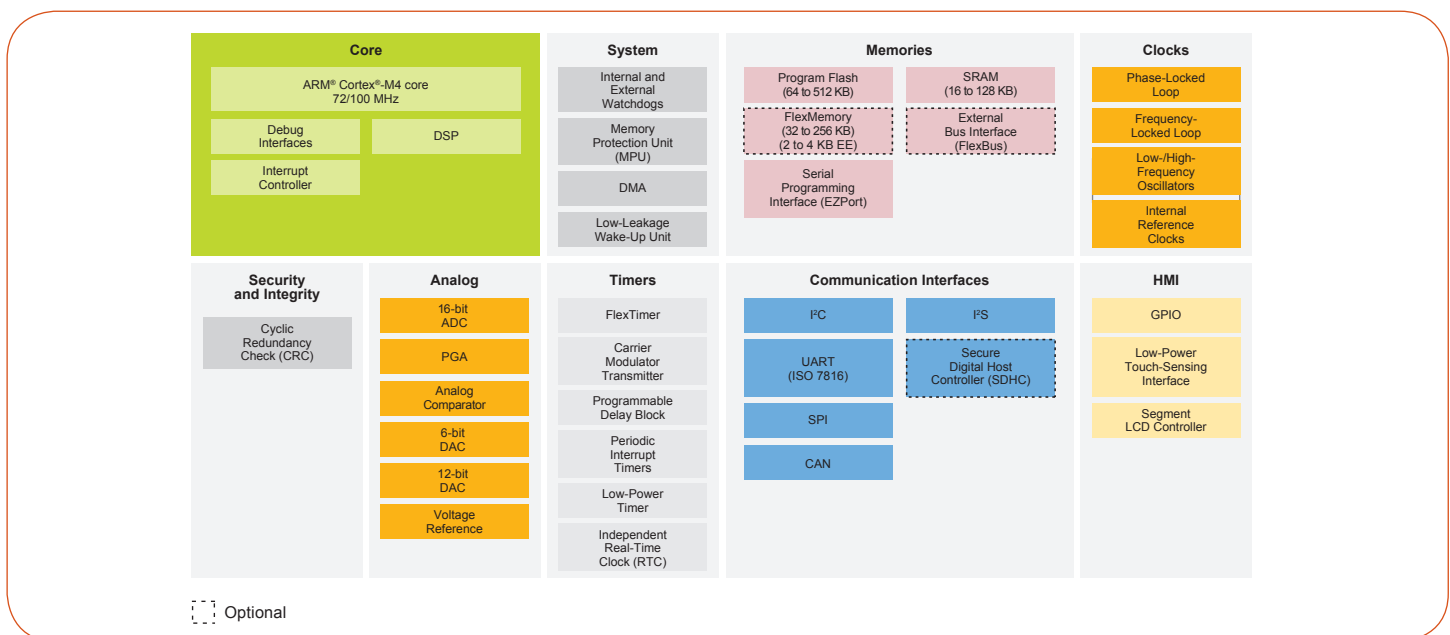### ONE-STOP ENABLEMENT OFFERING—MCU + IDE + RTOS

▸ Tower® System development board platform

▸ Integrated development environments

  – Eclipse-based CodeWarrior® V10.x IDE and Processor Expert®

  – IAR Embedded Workbench®

  – ARM® Keil® MDK

  – Kinetis Design Studio IDE

▸ Runtime software and RTOS

  – Math, DSP and encryption libraries

  – Motor control libraries

  – Complimentary bootloaders (USB, Ethernet, RF, serial)

  – Complimentary embedded GUI

  – MQX™ RTOS

  – Micrium® µC/OS-III

  – Express Logic ThreadX

  – SEGGER embOS

  – FreeRTOS

▸ Full ARM® ecosystem

Features	Benefits
• ARM® Cortex®-M4 core with DSP instruction support • Up to 16-channel DMA; 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
• 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
• 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
• 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	• 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
• Memory protection unit • Hardware cyclic redundancy check engine • Independent-clocked COP; external watchdog monitor	• 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
• 64–512 KB flash; up to to 128 KB of SRAM • 32–256 KB FlexMemory	• High reliability, fast access program memory with four levels of 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 • FlexNVM 32–256 KB for extra program code, data or EEPROM backup

KINETIS K30 FAMILY

KINETIS K30 FAMILY OPTIONS

Part Number	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	Other	LH 64 LQFP (10 x 10)	LK 80 LQFP (12 x 12)	LL 100 LQFP (14 x 14)	MC 121 BGA (8 x 8)	LQ 144 LQFP (20 x 20)	MD 144 BGA (13 x 13)
MK30DN512Vyy10	100	512		128	√	√	√	*	√	√	√	Segment LCD (up to 40 x 8/44 x 4)		√	√	√	√	√
MK30DX64Vyy7	72	64	32	16		√			√	√	√	Segment LCD (up to 24 x 8/28 x 4)	√	√		√		
MK30DX128Vyy7	72	128	32	32		√			√	√	√	Segment LCD (up to 38 x 8/42 x 4)	√	√	√	√		
MK30DX256Vyy7	72	256	32	64		√			√	√	√	Segment LCD (up to 38 x 8/42 x 4)		√	√	√		
MK30DX128yy10	100	128	128	32	√	√	√	√	√	√	√	Segment LCD (up to 40 x 8/44 x 4)					√	√
MK30DX256yy10	100	256	256	64	√	√	√	√	√	√	√	Segment LCD (up to 40 x 8/44 x 4)					√	√

yy = Package designator
*144pin only

Energy Efficient Solutions
by Freescale