



Large flash
memory with
segment LCD

Kinetis KL3x MCU Family

The Kinetis KL3x family of MCUs based on the ARM® Cortex®-M0+ core combine ultra-low power performance with a rich suite of analog, communication, timing and control peripherals, including a low-power segment LCD controller with support for up to 376 segments.

TARGET APPLICATIONS

- ▶ Blood glucose meters
- ▶ Electronic scales
- ▶ Flow meters
- ▶ Smart meters
- ▶ Thermostats

Family members start from 32 KB of flash in a 48 QFN package, extending up to 256 KB in a 121 MBGA package. The KL3x MCU family is compatible with the ARM Cortex-M4-based Kinetis K30 MCU family, offering a migration path to higher performance and feature integration.

FEATURES

Ultra-Low-Power

- ▶ Next-generation 32-bit ARM Cortex-M0+ core. 2x more CoreMark®/mA than the closest 8/16-bit architecture. Single-cycle fast I/O access port facilitates bit banging and software protocol emulation, maintaining an 8-bit 'look and feel'.
- ▶ Multiple, flexible low power modes including new compute mode that reduce dynamic power by placing peripherals in an asynchronous stop mode
- ▶ LPUART, SPI, I²C, FlexIO, ADC, DAC, LP timer and DMA support low power mode operation without waking up the core

Memory

- ▶ Up to 256 KB flash with 64 byte flash cache, up to 32 KB RAM
- ▶ 16 KB ROM with integrated bootloader
- ▶ Security circuitry to prevent unauthorized access to RAM and flash contents

Performance

- ▶ ARM Cortex-M0+ core, 48 MHz core frequency over full voltage and temperature range (-40° C +105° C)
- ▶ Bit manipulation engine for improved bit handling of peripheral modules
- ▶ Up to 4-channel DMA for peripheral and memory servicing with reduced CPU loading and faster system throughput

Mixed Signal

- ▶ Up to 16-bit ADC
- ▶ High-speed comparator with internal 6-bit DAC
- ▶ 12-bit DAC with DMA support
- ▶ 1.2 V high-accuracy internal voltage reference





Timing and Control

- ▶ One 6-channel and two 2-channel, 16-bit low-power timer PWM modules
- ▶ 2-channel, 32-bit periodic interrupt timer
- ▶ Low-power timer allows operation in all power modes except VLLS0
- ▶ Real-time clock

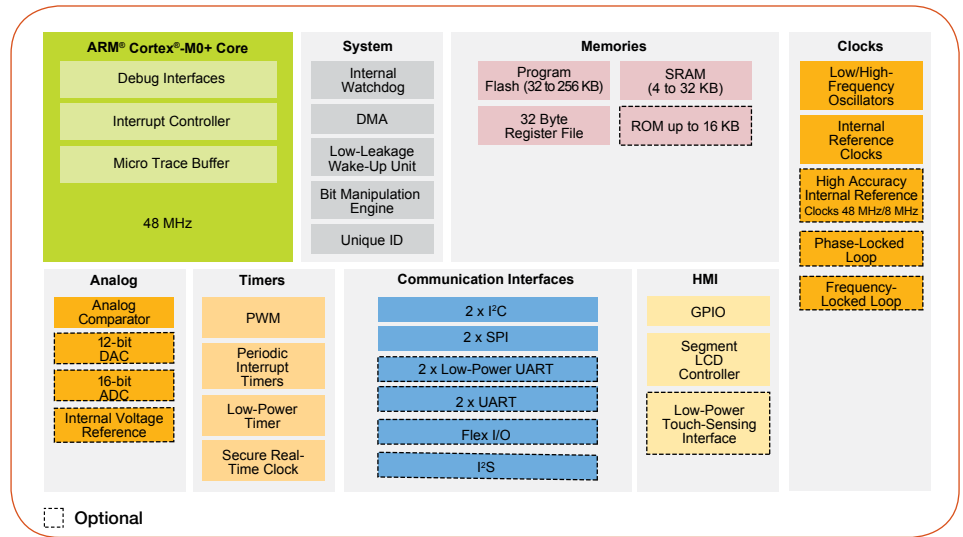
HMI

- ▶ Flexible, low-power LCD controller with up to 376 segments (51 x 8/55 x 4). LCD blink mode enables low average power while remaining in low-power mode. Segment fail detect alerts the user to failures in the display, which helps avoid the possibility of an erroneous readout in medical applications. Front plane/backplane reassignment provides pin-out flexibility to ease PCB design and allow LCD configuration changes via firmware with no hardware re-work. Unused LCD pins can be configured as other GPIO functions.
- ▶ Capacitive touch-sensing inputs

Connectivity and Communications

- ▶ Two I²C with DMA support, up to 1 Mb/s and compatible with SMBus V2 features

KINETIS KL3x MCU FAMILY BLOCK DIAGRAM



- ▶ Three UART with up to two LPUART, and DMA support
- ▶ Two SPI with DMA support
- ▶ IAR Embedded Workbench, ARM Keil® MDK, and Rowley Crossworks
- ▶ CodeWarrior for Microcontrollers v10.x (Eclipse) IDE with Processor Expert
- ▶ Tower® System modules
- ▶ RTOS support including our MQX®-Lite, and FreeRTOS
- ▶ Freedom development platforms
- ▶ Processor Expert software
- ▶ Kinetis software development kit (SDK)
- ▶ Integrated development environments (IDE)
 - Kinetis Design Studio IDE

KINETIS KL3x MCU FAMILY OPTIONS

Sub-Family	Part Number	CPU (MHz)	Memory		Features													√ Package						Development Hardware		
			Flash (KB)	SRAM (KB)	DMA	UART w/ ISO7816	UART	Low-Power UART	SPI	I ² C	TSI	I ² S	Flex IO	RTC	12-bit DAC	16-bit ADC w/DP Ch.	12-bit ADC	Total I/Os	Other	FT 48 QFN (7 x 7, 0.5 mm)	LH 64 LQFP (10 x 10, 0.5 mm)	LK 80 LQFP (12 x 12, 0.5 mm)	LL 100 LQFP (14 x 14, 0.5 mm)		MC 121 MAPBGA (8 x 8, 0.65 mm)	MP 64 MAPBGA (5 x 5, 0.5 mm)
KL33	MKL33Z32xxx4	48 MHz	32	4	√	1	2	2	2		√	√	√	√			40~70	SLCD	*	√	√				*	FRDM-KL43Z: Freedom Development Platform TWR-KL43Z48M: Tower System module
	MKL33Z64xxx4	48 MHz	64	8	√	1	2	2	2		√	√	√	√			40~70	SLCD	*	√	√				*	
	MKL33Z128xxx4	48 MHz	128	16	√	1	2	2	2		√	√	√	√	√		54	SLCD		√				√		
	MKL33Z256xxx4	48 MHz	256	32	√	1	2	2	2		√	√	√	√	√		54	SLCD		√				√		
KL34	MKL34Z64xxx4	48 MHz	64	8	√		2	1	2	2				√			36~80	SLCD		√		√		√	FRDM-KL46Z: Freedom Development Platform	
KL36	MKL36Z64xxx4	48 MHz	64	8	√		2	1	2	2	√	√		√	√	√	36~80	SLCD		√		√		√	TWR-KL46Z48M: Tower System module	
	MKL36Z128xxx4	48 MHz	128	16	√		2	1	2	2	√	√		√	√	√	36~80	SLCD		√		√	√	√		
	MKL36Z256xxx4	48 MHz	256	32	√		2	1	2	2	√	√		√	√	√	36~80	SLCD		√		√	√	√		

* This package is included in a Package Your Way program for Kinetis MCUs. Please visit www.nxp.com/KPYW for more detail.

