Large flash memory with segment LCD

Kinetis® KL3x MCU Family

The Kinetis KL3x family of MCUs based on the ARM® Cortex®-M0+ core combines 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 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
  - Two times more CoreMarks®/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 a new compute mode) that reduce dynamic power by placing peripherals in an asynchronous stop mode
- LPUART, SPI, I²C, Flex™ I/O, 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

- 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 four-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

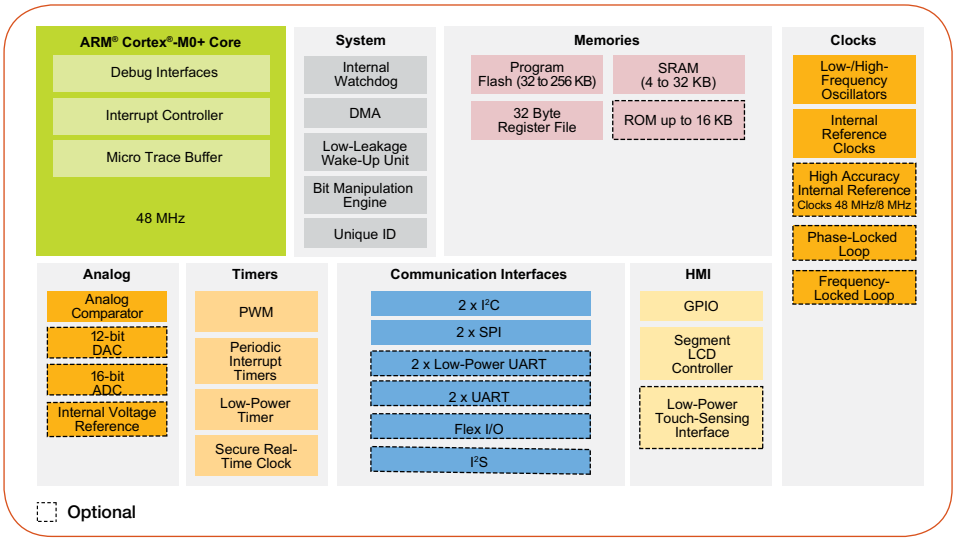
Timing and control

- One six-channel and two 2-channel, 16-bit low-power timer PWM modules
- Two-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

KINETIS KL3x MCU FAMILY BLOCK DIAGRAM



Connectivity and communications

- Two I²C with DMA support, up to 1 Mbit/s and compatible with SMBus V2 features
- Three UART with up to two LPUART, and DMA support
- Two SPI with DMA support

Development tools and software

- Tower® System boards
- Freedom development platforms
- Kinetis software development kit (SDK)
- Integrated development environments (IDE)
  - Kinetis Design Studio IDEs
  - IAR® Embedded Workbench, ARM Keil® MDK, and Rowley Crossworks
  - CodeWarrior® for Microcontrollers v10.x (Eclipse) IDE with Processor Expert
- FreeRTOS™
- Processor Expert® software

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	I²C	TSI	I²S	Flex™ I/O	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 TWR-KL46Z48M: Tower System module
KL36	MKL36Z64xxx4	48 MHz	64	8	√		2	1	2	2	√	√		√	√	√		36~80	SLCD		√		√		√	
	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/KPYW** for more details.

www.nxp/Kinetis/Lseries

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