freescale™
Kinetis

32-bit Kinetis L Series MCUs

Kinetis KL2x MCU Family

Ultra-low-power MCUs with USB OTG

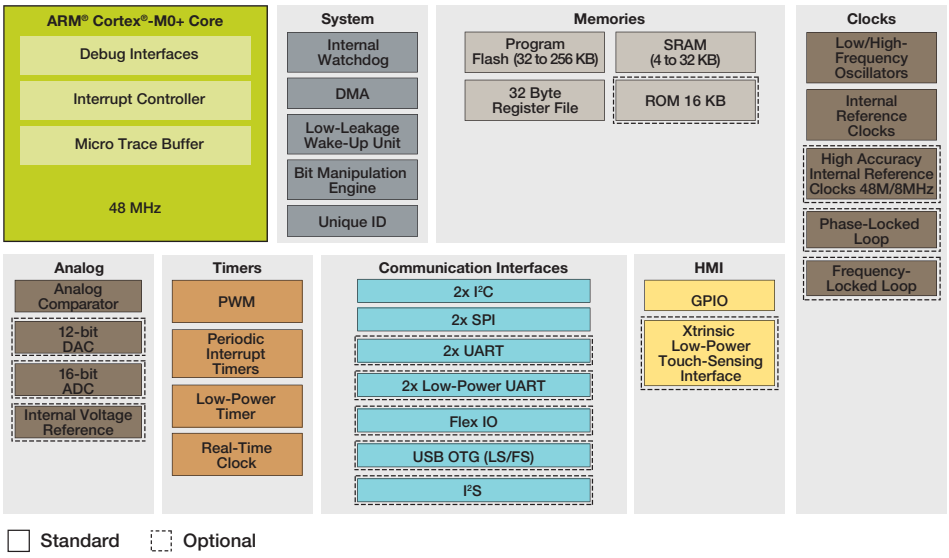
Overview

The Kinetis KL2x family of ARM® Cortex®-M0+ MCUs combine ultra-low-power performance with a rich suite of analog, communication, timing and control peripherals, including a USB 2.0 On-the-Go controller. Family members start from 32 KB of flash in a small 5 x 5 mm 32 QFN package, extending up to 256 KB in a 121 MBGA package. The KL2x MCU family is compatible with the ARM Cortex-M4 based Kinetis K20 MCU family, offering a migration path to higher performance and feature integration.

Target Applications

- Battery-operated applications
- Consumer applications
- Low-power applications
- USB peripherals

Kinetis KL2x MCU Family Block Diagram



Energy Efficient Solutions™
optimized for low power

Kinetis KL2x MCU Family Options

Sub-Family	Part Number	CPU (MHz)	Memory		Features																√ Package						
			Flash (KB)	SRAM (KB)	DMA	Low-Power UART	UART	ISO7 816-3	SPI	I²C	TSI	I²S	Flex IO	RTC	12-bit DAC	16-bit ADC w/ DP Ch.	12-bit ADC	Total I/Os	Other	FM	FT	LH	LK	LL	MC	MP
																				32 QFN (5 x 5, 0.5 mm)	48 QFN (7 x 7, 0.5 mm)	64 LQFP (10 x 10, 0.5 mm)	80 LQFP (12 x 12, 0.5 mm)	100 LQFP (14 x 14, 0.5 mm)	121 MAPBGA (8 x 8, 0.65 mm)	64 MAPBGA (5 x 5, 0.5 mm)
KL24	MKL24Z32xxx4	48 MHz	32	4	√	1	2		2	2				√			√	23~66	USB 2.0 FS OTG/Host/Device	√	√	√	√			
	MKL24Z64xxx4	48 MHz	64	8	√	1	2		2	2				√			√	23~66	USB 2.0 FS OTG/Host/Device	√	√	√	√			
KL25	MKL25Z32xxx4	48 MHz	32	4	√	1	2		2	2	√			√	√	√		23~66	USB 2.0 FS OTG/Host/Device	√	√	√	√			
	MKL25Z64xxx4	48 MHz	64	8	√	1	2		2	2	√			√	√	√		23~66	USB 2.0 FS OTG/Host/Device	√	√	√	√			
	MKL25Z128xxx4	48 MHz	128	16	√	1	2		2	2	√			√	√	√		23~66	USB 2.0 FS OTG/Host/Device	√	√	√	√			
KL26	MKL26Z32xxx4	48 MHz	32	4	√	1	2		2	2	√	√		√	√	√		23~50	USB 2.0 FS OTG/Host/Device	√	√	√				
	MKL26Z64xxx4	48 MHz	64	8	√	1	2		2	2	√	√		√	√	√		23~50	USB 2.0 FS OTG/Host/Device	√	√	√				
	MKL26Z128xxx4	48 MHz	128	16	√	1	2		2	2	√	√		√	√	√		23~80	USB 2.0 FS OTG/Host/Device	√	√	√		√	√	√
	MKL26Z256xxx4	48 MHz	256	32	√	1	2		2	2	√	√		√	√	√		50~80	USB 2.0 FS OTG/Host/Device			√		√	√	√
KL27	MKL27Z128xxx4	48 MHz	128	32	√	2	1	1	2x 16b	2		√	√	√	√	√		23~50	USB 2.0 FS Device, with embedded OSC	√	√	√				√
	MKL27Z256xxx4	48 MHz	256	32	√	2	1	1	2x 16b	2		√	√	√	√	√		23~50	USB 2.0 FS Device, with embedded OSC	√	√	√				√

Features

Ultra-Low-Power

- Next-generation 32-bit ARM Cortex-M0+ core. Two times 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 which reduces dynamic power by placing peripherals in an asynchronous stop mode
- LPUART, SPI, I²C, 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
- Thumb instruction set combines high code density with 32-bit performance
- Up to 4-channel DMA for peripheral and memory servicing with reduced CPU loading and faster system throughput
- Independent-clocked COP guards against clock skew or code runaway for fail-safe applications

Mixed Signal

- Up to 16-bit ADC with configurable resolution, sample time and conversion speed/power. Integrated temperature sensor. Single or differential input mode operation in order to achieve improved noise rejection
- 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 with DMA support
- 2-channel 32-bit periodic interrupt timer provides time base for RTOS task schedule or trigger source for ADC conversion
- Low-power timer allows operation in all power modes except for VLLS0
- Real-time clock

HMI

- Capacitive touch sense interface supports up to 16 external electrodes and DMA data transfer
- GPIO with pin interrupt support, DMA request capability and other pin control options

Connectivity and Communications

- USB 2.0 On-The-Go (full-speed). Integrated USB low-voltage regulator supplies up to 120 mA off chip at 3.3 volts to power external components from 5-volt input
- Two I²C with DMA support, up to 1Mb/s and compatible with SMBus V2 features
- Three UART with up to two LPUART, and DMA support
- Two SPI with DMA support
- I²S module for audio applications

Software and Tools

- Freescale Tower System modules
- Integrated development environment (IDE)
  - CodeWarrior for Microcontrollers V10.x (Eclipse) IDE with Processor Expert software modeling tool
  - IAR Embedded Workbench, Keil MDK, Atollic
  - Kinetis Design Studio IDE
- Runtime software and RTOS
  - MQX™ Lite, FreeRTOS, CodeSourcery G++ (GNU)
- Full ARM ecosystem support

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

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