

32-bit ARM® Cortex™-M0+ MCUs

Kinetis KL2 Family

Ultra-low-power MCUs with USB OTG

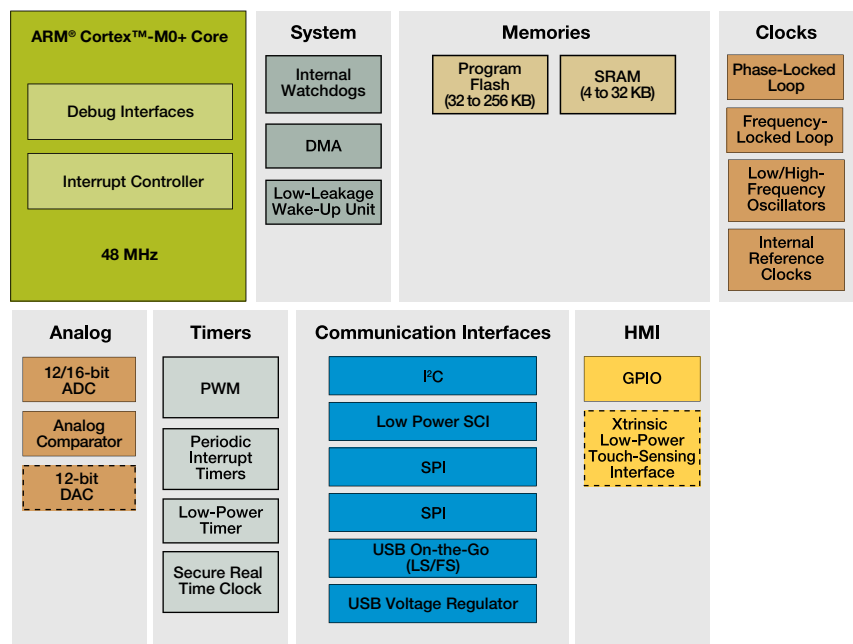
Target Applications

- Cash counters
- PC peripherals
- GPS watches
- Portable medical equipment

Overview

The Kinetis KL2 MCU family is pin, software and tool compatible with all other Kinetis L families and adds a Full-Speed USB 2.0 On-The-Go controller with an integrated low-voltage regulator. The Kinetis KL2 MCU family is also compatible with the Kinetis K20 MCU (ARM® Cortex™-M4) family, providing a migration path to higher performance and feature integration. Devices start from 32 KB of flash in a small-footprint 5 x 5 mm 32 QFN package, extending up to 256 KB in a 100 LQFP /100 MBGA package. Each family member combines ultra-low-power performance with a with a rich suite of analog, communication, timing and control peripherals.

Kinetis KL2 MCU Family: Block Diagram



□ Standard Feature □ Optional Feature



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 which reduces dynamic power by placing peripherals in an asynchronous stop mode
- LPSCI, SPI, I²C, ADC, DAC, LP timer and DMA support low power mode operation without waking up the core

Flash and SRAM

- Up to 256 KB flash with 64 byte flash cache, up to 32 KB RAM
- 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-ch. 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 output mode operation in order to achieve improved noise rejection
- High-speed comparator with internal 6-bit DAC
- 12-bit DAC with DMA support

Timing and Control

- Two 6-ch. and one 2-ch., 16-bit low-power timer PWM modules with DMA support
- 2-ch. 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 with calendar

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

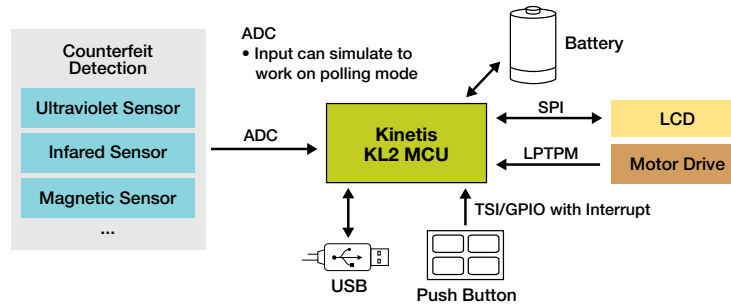
Connectivity and Communications

- 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 100 Kb/s and compatible with SMBus V2 features
- One LPUART and two UART with DMA support
- Two SPI with DMA support

Software and Tool

- Freescale Tower System hardware development environment and low-cost demo board
- Integrated development environments
 - CodeWarrior for Microcontrollers V10.x (Eclipse) IDE with Processor Expert
 - IAR Embedded Workbench, Keil MDK, Atollic, CodeRed
- Runtime software and RTOS
 - MQX-Lite, FreeRTOS, CodeSourcery G++ (GNU)
- Full ARM ecosystem support

Kinetis KL2 MCU Family: Cash Counter



Kinetis KL2 MCU Family

Sub-Family	Part Number	Memory			Features								Other (Key Features)	Packages																				
		CPU (MHz)	Flash (KB)	SRAM (KB)	DMA	UART	SPI	I ² C	TSI	12-bit DAC	16-bit ADC w/DP Ch.	12-bit ADC		Total I/Os	24 QFN (4 x 4, 0.5 mm)	25 WLCSP	32 LQFP (7 x 7, 0.8 mm)	32 QFN (5 x 5, 0.5mm)	35 WLCSP	48 LQFP (7 x 7, 0.5 mm)	48 LQFN (7 x 7, 0.5 mm)	64 LQFP (10 x 10, 0.5 mm)	80 LQFP (14 x 14, 0.5 mm)	100 LQFP (14 x 14, 0.5 mm)	121 MAPBGA (8 x 8, 0.65 mm)									
KL24	MKL24Z32Vxx4	48	32	4	✓	✓	✓	✓			✓	23-66	USB 2.0 FS OTG/Host/Device				✓		✓	✓	✓													
	MKL24Z64Vxx4	48	64	8	✓	✓	✓	✓			✓	23-66	USB 2.0 FS OTG/Host/Device				✓		✓	✓	✓													
KL25	MKL25Z32Vxx4	48	32	4	✓	✓	✓	✓	✓	✓	✓	23-66	USB 2.0 FS OTG/Host/Device				✓	*	✓	✓	✓													
	MKL25Z64Vxx4	48	64	8	✓	✓	✓	✓	✓	✓	✓	23-66	USB 2.0 FS OTG/Host/Device				✓	*	✓	✓	✓													
	MKL25Z128Vxx4	48	128	16	✓	✓	✓	✓	✓	✓	✓	23-80	USB 2.0 FS OTG/Host/Device				✓	*	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	MKL26Z256Vxx4	48	256	32	✓	✓	✓	✓	✓	✓	✓	23-80	USB 2.0 FS OTG/Host/Device						✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Note: Additional KL2 family members are currently under development. Visit freescale.com for the latest information.

* Proposed

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

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