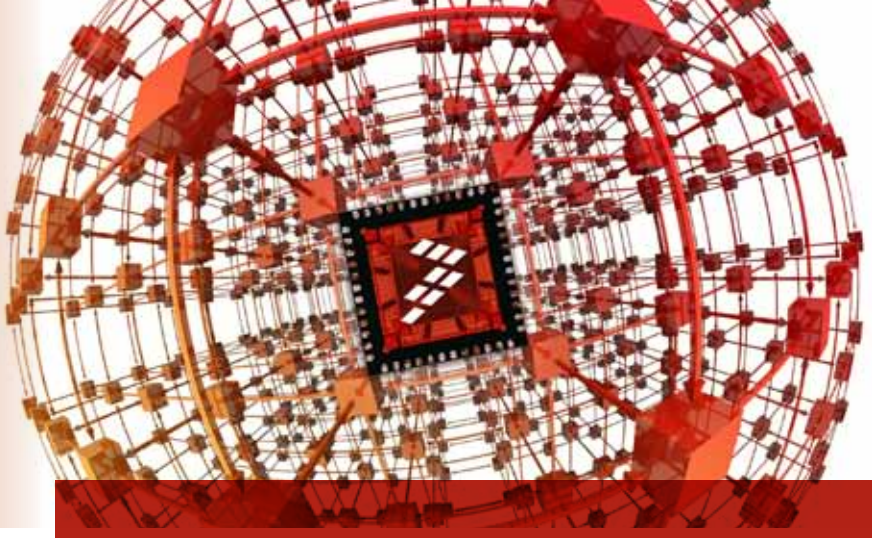




Energy Efficient Solutions optimized for low power

32-bit ARM® Cortex™-M0+ Core

Kinetis KL0 Family

Ultra-low-power MCUs with 8-bit S08 compatibility

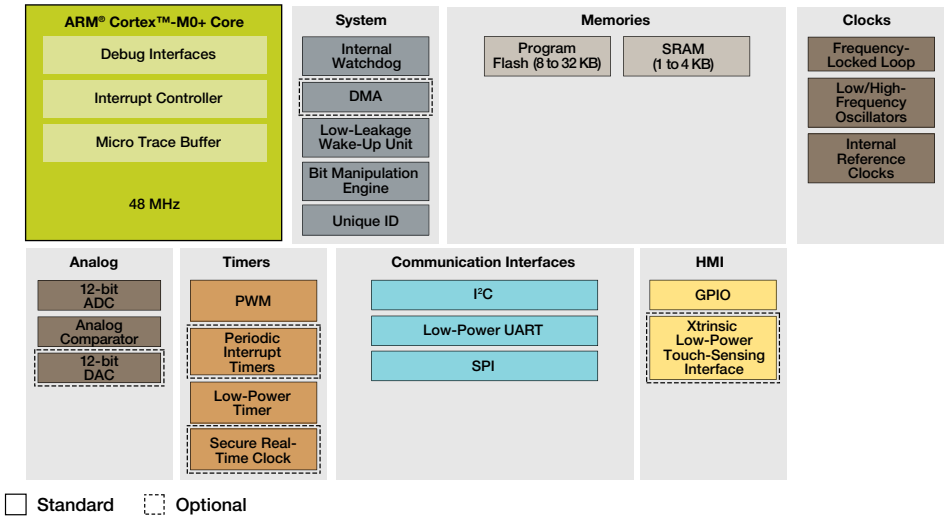
Target Applications

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

Overview

The Kinetis KL0 MCU family is the entry point into the Kinetis L series of MCUs built on the ARM® Cortex™-M0+ core. Pin compatible with the new 8-bit S08P family, the Kinetis KL0 MCU family provides a bridge for 8-bit customers migrating into the Kinetis portfolio and is software and tool compatible with all other Kinetis L series families. Devices start from 8 KB of flash in a small-footprint 4 x 4 mm 24 QFN package, extending up to 32 KB in a 48 LQFP package. Each family member combines ultra-low-power performance with a rich suite of analog, communication, timing and control peripherals.

Kinetis KL0 MCU Family: Block Diagram



freescale™ Kinetis

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 32 KB flash with 64 byte flash cache, up to 4 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 to +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

- 12-bit ADC with configurable resolution, sample time and conversion speed/power. Integrated temperature sensor
- High-speed comparator with internal 6-bit DAC
- 12-bit DAC with DMA support

Timing and Control

- One 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 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

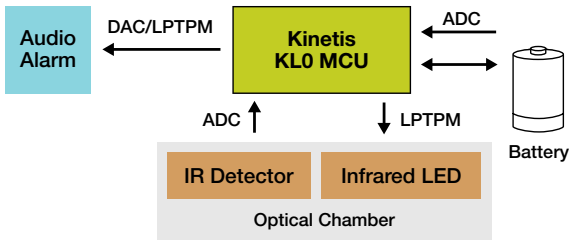
Connectivity and Communications

- I²C with DMA support, up to 100 Kb/s and compatible with SMBus V2 features
- LPUART and SPI with DMA support

Software and Tools

- 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 KL0 MCU Family: Smoke Detector



Low Power
- Deep sleep wake up controller
- Low leakage and run power

ADC
- Monitor battery voltage

LPTPM
- Configure PWM to generate 38.4 kHz carrier to drive infrared LED

Kinetis KL0 MCU Family

Sub-Family	Part Number	Memory			Features										Packages												
		CPU (MHz)	Flash (KB)	SRAM (KB)	DMA	UART	SPI	I²C	TSI	I²S	12-bit DAC	16-bit ADC w/DP Ch.	12-bit ADC	Total I/Os	16 QFN (3 x 3, 0.5 mm)	20WLCSP	24 QFN (4 x 4, 0.5 mm)	25 WLCSP	32 LQFP (7 x 7, 0.8 mm)	32 QFN (5 x 5, 0.5 mm)	35 WLCSP	48 LQFP (7 x 7, 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)
KL02	MKL02Z8xxx4	48	8	1		1	1	2					√	14~28	FG												
	MKL02Z16xxx4	48	16	2		1	1	2					√	14~28	FG		FK			FM							
	MKL02Z32xxx4	48	32	4		1	1	2					√	14~28	FG	AF	FK			FM							
KL04	MKL04Z8Vxx4	48	8	1	√	1	1	1					√	22~28			FK		LC	FM							
	MKL04Z16Vxx4	48	16	2	√	1	1	1					√	22~41			FK		LC	FM		LF					
	MKL04Z32Vxx4	48	32	4	√	1	1	1					√	22~41			FK		LC	FM		LF					
KL05	MKL05Z8Vxx4	48	8	1	√	1	1	1	√		√		√	22~28			FK		LC	FM							
	MKL05Z16Vxx4	48	16	2	√	1	1	1	√		√		√	22~41			FK		LC	FM		LF					
	MKL05Z32Vxx4	48	32	4	√	1	1	1	√		√		√	22~41			FK		LC	FM		LF					

Note: Additional KL0 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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