The Kinetis KL2x family of MCUs based on ARM® Cortex®-M0+ cores combines ultra-low-power performance with a rich suite of analog, communication, timing and control peripherals, including a USB 2.0 On-The-Go controller.

**TARGET APPLICATIONS**
- Battery-operated applications
- Consumer applications
- Low-power applications
- USB peripherals

Family members start from 32 KB of flash in a small 3.5 x 3.5 mm² XFBGA package, extending up to 512 KB in a 121 MAPBGA package. The KL2x MCU family is compatible with the Cortex-M4-core-based Kinetis K20 MCU family, offering a migration path to higher performance and feature integration.

**FEATURES**

**Ultra-Low-Power**
- Next-generation 32-bit Cortex-M0+ core with 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 new compute mode which reduces 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 512 KB flash with 64-byte flash cache, up to 128 KB RAM
- 16 to 32 KB ROM with integrated bootloader
- Security circuitry to prevent unauthorized access to RAM and flash contents

**Performance**
- Cortex-M0+ core running at up to 72 MHz (up to 96 MHz for high-speed run) 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
- 4–8 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 six-channel and two 2-channel, 16-bit low-power timer PWM modules with DMA support
- Two-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 five-volt input
- Three I²C with DMA support, up to 1 Mbit/s and compatible with SMBus V2 features
- Three UART with up to three LPUART, and DMA support
- I²S module for audio applications
- Flex-IO with capability of emulating multiple serial interface, such as IrDA, UART, SPI, I²C, etc.

Software and Tools
- Freedom Development Platforms and Tower® System board
- Kinetis software development kit (SDK)
- Integrated development environment (IDE)
  - Kinetis design studio IDE
  - CodeWarrior® for microcontrollers V10.x (Eclipse) IDE with Processor Expert® software modeling tool
  - IAR® Embedded Workbench, ARM® Keil® MDK, Atollic
- Runtime software and RTOS
  - FreeRTOS™
- Full ARM ecosystem support
- Online enablement with ARM mbed™ development platform

KINETIS KL2x MCU FAMILY BLOCK DIAGRAM

- ARM® Cortex®-M0+ core up to 72 MHz (up to 96 MHz for high-speed run)
- Single Wire Debug
- Interrupt Controller
- Micro Trace Buffer
- Power Management Controller
- DMA
- Internal Watchdogs
- Bit Manipulation Engine
- Low-Leakage Wakeup
- Program Flash 32–512 KB
- SRAM 4–128 KB
- 32-Byte Register File
- BOOTROM 16–32 KB
- High Accuracy 60 MHz/48 MHz IRC
- Low-Speed IRC 8 M/2 MHz or 4 M/32 kHz
- PLL/PLL
- Low-High-Frequency Oscillators
- 1 kHz LPO
- Optional
- Crystal-less USB FS Device/OTG
- USB Voltage Regulator
- Serial Audio Interface/S
- Flex™ I/O
- Crystal-less USB FS Device/OTG
- ISO7816-E VMSIM
- GPIOs with Interrupts
- 16-ch. Touch Sensor Interface
## KINETIS KL2x MCU FAMILY OPTIONS

<table>
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<tr>
<th>Sub-Family</th>
<th>Part Number</th>
<th>CPU (MHz)</th>
<th>Flash (KB)</th>
<th>SRAM (KB)</th>
<th>Low-Power UART</th>
<th>UART</th>
<th>ISO7816-3</th>
<th>SPI</th>
<th>I2C</th>
<th>JTAG</th>
<th>Timers</th>
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* This package is included in a Package Your Way program for Kinetis MCUs. Please visit [www.nxp.com/KPYW](http://www.nxp.com/KPYW) for more detail.