



# Kinetis K Series MCUs

## Selector Guide

A Performance and Integration Series  
Based on ARM® Cortex®-M4 Cores

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# Kinetis K Series MCUs

Our Kinetis K series MCU portfolio includes more than 600 compatible low-power, high-performance 32-bit MCUs built on the ARM® Cortex®-M4 core. This series is designed for scalable performance, integration, connectivity, communications, HMI and security, offering additional features for exceptional integration in a variety of package options.

**Ultra Scalable** – Preserve your engineering investments with hundreds of Kinetis MCUs providing unsurpassed availability and scalability of up to 2 MB flash and 256 KB SRAM, while offering software and hardware compatibility.

**Optimized Integration** – Reduce overall BOM cost with options for smart-on-chip integration including HMI, security, mixed-signal capabilities, and connectivity options such as USB with crystal-less functionality.

**Performance and Power Efficiency** – Experience the best in performance, up to 120 MHz with floating point unit, and take advantage of extended battery life with multiple low-power modes and enhanced power-conscious peripherals.

**Comprehensive Enablement** – Speed application development with an extensive suite of software and tools from our company and other ARM ecosystem providers.

## Package Your Way for Kinetis MCUs

Our Package Your Way program, specific for Kinetis MCUs, takes Kinetis MCU package options to the next level – now offering alternative package options in addition to the existing packages. Alternative packages are additional package options for select Kinetis MCU families, where pin out and pricing information is readily available. These devices are then committed for sampling and production based on customer demand. Learn more at [www.nxp.com/KPYW](http://www.nxp.com/KPYW).

## COMPREHENSIVE ENABLEMENT SOLUTIONS

Find the information you need to get started at [www.nxp.com/Kinetis](http://www.nxp.com/Kinetis).

### Getting Started

- ▶ Software and tools for Kinetis MCUs
- ▶ Solution Advisor
- ▶ Kinetis MCU Community

### Development Hardware

- ▶ Freedom development platforms
- ▶ Tower System development platforms

### Kinetis Software Development Kit (SDK)

- ▶ Extensive suite of robust peripheral drivers, stacks and middleware
- ▶ Includes software examples demonstrating the usage of the HAL, peripheral drivers, middleware and RTOS
- ▶ Operating system abstraction (OSA) for our proprietary MQX™ RTOS, FreeRTOS, and Micrium μC/OS kernels and baremetal (no RTOS) applications

### Processor Expert Software and Embedded Components

- ▶ Complimentary software configuration tool providing I/O allocation and pin initialization and configuration of hardware abstraction and peripheral drivers

### Integrated Development Environments (IDE)

- ▶ Atollic® TrueSTUDIO®
- ▶ Green Hills Software MULTI
- ▶ IAR Embedded Workbench®
- ▶ ARM Keil® MCU Development Kit
- ▶ Kinetis Design Studio IDE – No-cost, Eclipse and GCC-based IDE for C/C++ editing, compiling and debugging
- ▶ Broad ARM ecosystem support through the Connect Partner Program

### Online Enablement with ARM mbed™ Development Platform

- ▶ Rapid and easy prototyping and development for Kinetis MCUs
- ▶ Online mbed SDK, Developer Community
- ▶ Free software libraries

### Proprietary MQX RTOS

- ▶ Commercial-grade MCU software platform at no cost with optional add-on software and support packages

### Kinetis Bootloader

- ▶ Common bootloader for Kinetis MCUs
- ▶ In-system flash programming over a serial connection: erase, program, verify
- ▶ ROM or flash-based bootloader with open source software and host-side programming utilities

# Kinetis K0x Family of Entry-Level MCUs

## OVERVIEW

The Kinetis K0x MCU family, based on the ARM Cortex-M4 core, is the new entry point into the Kinetis K series MCU portfolio and provides a bridge from the Kinetis L series MCU family. Devices start from 64 KB of flash and are offered in several small-footprint package options. The Kinetis K0x MCU family provides the perfect balance of performance and power consumption, running at 100 MHz with floating point unit, while offering low dynamic power consumption and best-in-class static current consumption with more than 10 flexible low-power modes. Each family member combines the ultra-low-power performance with a streamlined level of integration optimized to meet the needs of a broad number of applications. For more information about the Kinetis K0x MCU family, [click here](#).

## TARGET APPLICATIONS:

Consumer devices, health and wellness monitors, home and building automation, industrial/commercial sensor nodes, sports and activity wearables

## SUB-FAMILY K02: OPTIMIZED ENTRY-LEVEL MCUS

Footnotes	Part Number	CPU Frequency	Pin Count	Package	Total Flash Memory	Flash	SRAM	UART (Total)	High Baudrate UART	PIT (32-bit)	SPI + Chip Selects	I <sup>2</sup> C	Motor Control General Purpose PWM	Quad Decoder General Purpose PWM	FTM External Clk	Low Power Timer	PDB	Software Watchdog	Hardware Watchdog	Total 16-bit ADC DP	Total 16-bit ADC SE	12-bit DAC	Analog Comparator	Analog Comparator Inputs	Vref	SPPFU	DMA	GPIO (w interrupt)	Evaluation Board (See Page 24)
	MK02FN128VFM10	100 MHz	32	QFN	128 KB	128 KB	16 KB	2	2	1x4ch	4/0/0	1	1x6ch	2x2ch	2	1	1	Y	Y	-	13-ch	1	2	2/3/0/0	Y	Y	4ch	26	T5, F2
	MK02FN128VLF10	100 MHz	48	LQFP	128 KB	128 KB	16 KB	2	2	1x4ch	5/0/0	1	1x6ch	2x2ch	2	1	1	Y	Y	1ch	21ch	1	2	3/4/0/0	Y	Y	4ch	35	T5, F2
	MK02FN128VLH10	100 MHz	64	LQFP	128 KB	128 KB	16 KB	2	2	1x4ch	5/0/0	1	1x6ch	2x2ch	2	1	1	Y	Y	2ch	24ch	1	2	6/4/0/0	Y	Y	4ch	46	T5, F2
	MK02FN64VFM10	100 MHz	32	QFN	64 KB	64 KB	16 KB	2	2	1x4ch	4/0/0	1	1x6ch	2x2ch	2	1	1	Y	Y	-	13ch	1	2	2/3/0/0	Y	Y	4ch	26	T5, F2
	MK02FN64VLF10	100 MHz	48	LQFP	64 KB	64 KB	16 KB	2	2	1x4ch	5/0/0	1	1x6ch	2x2ch	2	1	1	Y	Y	1ch	21ch	1	2	3/4/0/0	Y	Y	4ch	35	T5, F2
	MK02FN64VLH10	100 MHz	64	LQFP	64 KB	64 KB	16 KB	2	2	1x4ch	5/0/0	1	1x6ch	2x2ch	2	1	1	Y	Y	2ch	24ch	1	2	6/4/0/0	Y	Y	4ch	46	T5, F2

### Common Features

Temp Range: -40° C to 105° C

Voltage Range: 1.71–3.6 V, Flash Write Voltage: 1.71

Main OSC (Oscillator Crystal/Resonator): 32–40 KHz/8–32 MHz

48 MHz IRC, High Drive GPIOs (18 mA): 8

Debug: JTAG, cJTAG, SWD, PMC, MCG, NMI, CRC, DSP

Trace: TPIU, FPB, DWT, ITM



# Kinetis K1x Family of Baseline MCUs

## OVERVIEW

The Kinetis K1x MCU family, based on ARM® Cortex®-M4 core, consists of general-purpose MCUs with a variety of memory and integration options. Devices start from 32 KB of flash in a small footprint of 5 x 5 mm 32-pin QFN package extending up to 1 MB in a 144-pin MAPBGA package with an optional rich suite of analog, communication, timing and control peripherals. Additionally, its pin compatibility, flexible low-power capabilities and innovative flex memory help to solve many of the major pain points for embedded designers. Next-generation Kinetis K1x MCUs are further optimized for performance and power consumption, offering more streamlined integration for further BOM cost reductions. For more information about the Kinetis K1x MCU family, [click here](#).

## TARGET APPLICATIONS:

Barcode scanners, electronic point-of-sales (EPoS) terminals, flow meters, gaming controllers, HVAC systems, home and building automation, remote sensors

## SUB-FAMILY K10: BASIC MCU WITH MIXED-SIGNAL INTEGRATION

Footnotes	Part Number	CPU Frequency	Pin Count	Package	Total Flash Memory		Flash	FlexNVM	EEPROM/FlexRAM	SRAM	UART (Total)	High Baudrate UART w/ISO7816	High Baudrate UART	Enhanced SDHC (bit)	SPI + Chip Selects	I <sup>2</sup> C	I <sup>2</sup> S	CAN	Motor Control General Purpose PWM	Quad Decoder General Purpose PWM	FTM External Clk	Low Power Timer	PDB	Total 16-bit ADC DP	Total 16-bit ADC SE	PGA	12-bit DAC	Analog Comparator	Analog Comparator Inputs		Vref	Cache	MPU	SFPFU	DMA	5 V Tolerant	GPIO (w interrupt)	Evaluation Board (See Page 24)
	MK10DN128VFM5	50 MHz	32	QFN	128 KB	128 KB	-	-	16 KB	3	1	1	-	4/0/0	1	1	-	1 x 8ch	1 x 2ch	2	1	1	-	10ch	-	-	2	2/2/0/0	-	-	-	-	4ch	-	24	T1		
	MK10DN128VFT5	50 MHz	48	QFN	128 KB	128 KB	-	-	16 KB	3	1	1	-	5/0/0	1	1	-	1 x 8ch	1 x 2ch	2	1	1	1ch	16ch	-	-	2	3/3/0/0	Y	-	-	-	4ch	-	33	T1		
	MK10DN128VLF5	50 MHz	48	LQFP	128 KB	128 KB	-	-	16 KB	3	1	1	-	5/0/0	1	1	-	1 x 8ch	1 x 2ch	2	1	1	1ch	16ch	-	-	2	3/3/0/0	Y	-	-	-	4ch	-	33	T1		
	MK10DN128VLH5	50 MHz	64	LQFP	128 KB	128 KB	-	-	16 KB	3	1	1	-	5/0/0	1	1	-	1 x 8ch	1 x 2ch	2	1	1	2ch	19ch	-	-	2	6/4/0/0	Y	-	-	-	4ch	-	44	T1		
	MK10DN128VMP5	50 MHz	64	MAPBGA	128 KB	128 KB	-	-	16 KB	3	1	1	-	5/0/0	1	1	-	1 x 8ch	1 x 2ch	2	1	1	2ch	19ch	-	-	2	6/4/0/0	Y	-	-	-	4ch	-	44	T1		
	MK10DN32VFM5	50 MHz	32	QFN	32 KB	32 KB	-	-	8 KB	3	1	1	-	4/0/0	1	1	-	1 x 8ch	1 x 2ch	2	1	1	-	10ch	-	-	2	2/2/0/0	-	-	-	-	4ch	-	24	T1		
	MK10DN32VFT5	50 MHz	48	QFN	32 KB	32 KB	-	-	8 KB	3	1	1	-	5/0/0	1	1	-	1 x 8ch	1 x 2ch	2	1	1	1ch	16ch	-	-	2	3/3/0/0	Y	-	-	-	4ch	-	33	T1		
	MK10DN32VLF5	50 MHz	48	LQFP	32 KB	32 KB	-	-	8 KB	3	1	1	-	5/0/0	1	1	-	1 x 8ch	1 x 2ch	2	1	1	1ch	16ch	-	-	2	3/3/0/0	Y	-	-	-	4ch	-	33	T1		
	MK10DN32VLH5	50 MHz	64	LQFP	32 KB	32 KB	-	-	8 KB	3	1	1	-	5/0/0	1	1	-	1 x 8ch	1 x 2ch	2	1	1	2ch	19ch	-	-	2	6/4/0/0	Y	-	-	-	4ch	-	44	T1		
	MK10DN32VMP5	50 MHz	64	MAPBGA	32 KB	32 KB	-	-	8 KB	3	1	1	-	5/0/0	1	1	-	1 x 8ch	1 x 2ch	2	1	1	2ch	19ch	-	-	2	6/4/0/0	Y	-	-	-	4ch	-	44	T1		

Footnotes	Part Number	CPU Frequency	Pin Count	Package	Total Flash Memory	Flash	FlexNVM	EEPROM/FlexRAM	SRAM	UART (Total)	High Baudrate UART w/ISO7816	High Baudrate UART	Enhanced SDHC (bit)	SPI + Chip Selects	I <sup>2</sup> C	I <sup>2</sup> S	CAN	Motor Control General Purpose PWM	Quad Decoder General Purpose PWM	FTM External Clk	Low Power Timer	PDB	Total 16-bit ADC DP	Total 16-bit ADC SE	PGA	12-bit DAC	Analog Comparator	Analog Comparator Inputs	Vref	Cache	MPU	SPFPU	DMA	5 V Tolerant	GPIO (w interrupt)	Evaluation Board (See Page 24)
	MK10DN64VFM5	50 MHz	32	QFN	64 KB	64 KB	-	-	16 KB	3	1	1	-	4/0/0	1	1	-	1 x 8ch	1 x 2ch	2	1	1	-	10ch	-	-	2	2/2/0/0	-	-	-	-	4ch	-	24	T1
	MK10DN64VFT5	50 MHz	48	QFN	64 KB	64 KB	-	-	16 KB	3	1	1	-	5/0/0	1	1	-	1 x 8ch	1 x 2ch	2	1	1	1ch	16ch	-	-	2	3/3/0/0	Y	-	-	-	4ch	-	33	T1
	MK10DN64VLF5	50 MHz	48	LQFP	64 KB	64 KB	-	-	16 KB	3	1	1	-	5/0/0	1	1	-	1 x 8ch	1 x 2ch	2	1	1	1ch	16ch	-	-	2	3/3/0/0	Y	-	-	-	4ch	-	33	T1
	MK10DN64VLH5	50 MHz	64	LQFP	64 KB	64 KB	-	-	16 KB	3	1	1	-	5/0/0	1	1	-	1 x 8ch	1 x 2ch	2	1	1	2ch	19ch	-	-	2	6/4/0/0	Y	-	-	-	4ch	-	44	T1
	MK10DN64VMP5	50 MHz	64	MAPBGA	64 KB	64 KB	-	-	16 KB	3	1	1	-	5/0/0	1	1	-	1 x 8ch	1 x 2ch	2	1	1	2ch	19ch	-	-	2	6/4/0/0	Y	-	-	-	4ch	-	44	T1
	MK10DX128VFM5	50 MHz	32	QFN	160 KB	128 KB	32 KB	2 KB	16 KB	3	1	1	-	4/0/0	1	1	-	1 x 8ch	1 x 2ch	2	1	1	-	10ch	-	-	2	2/2/0/0	-	-	-	-	4ch	-	24	T1
	MK10DX128VFT5	50 MHz	48	QFN	160 KB	128 KB	32 KB	2 KB	16 KB	3	1	1	-	5/0/0	1	1	-	1 x 8ch	1 x 2ch	2	1	1	1ch	16ch	-	-	2	3/3/0/0	Y	-	-	-	4ch	-	33	T1
	MK10DX128VLF5	50 MHz	48	LQFP	160 KB	128 KB	32 KB	2 KB	16 KB	3	1	1	-	5/0/0	1	1	-	1 x 8ch	1 x 2ch	2	1	1	1ch	16ch	-	-	2	3/3/0/0	Y	-	-	-	4ch	-	33	T1
	MK10DX128VLH5	50 MHz	64	LQFP	160 KB	128 KB	32 KB	2 KB	16 KB	3	1	1	-	5/0/0	1	1	-	1 x 8ch	1 x 2ch	2	1	1	2ch	19ch	-	-	2	6/4/0/0	Y	-	-	-	4ch	-	44	T1
	MK10DX128VMP5	50 MHz	64	MAPBGA	160 KB	128 KB	32 KB	2 KB	16 KB	3	1	1	-	5/0/0	1	1	-	1 x 8ch	1 x 2ch	2	1	1	2ch	19ch	-	-	2	6/4/0/0	Y	-	-	-	4ch	-	44	T1
	MK10DX32VFM5	50 MHz	32	QFN	64 KB	32 KB	32 KB	2 KB	8 KB	3	1	1	-	4/0/0	1	1	-	1 x 8ch	1 x 2ch	2	1	1	-	10ch	-	-	2	2/2/0/0	-	-	-	-	4ch	-	24	T1
	MK10DX32VFT5	50 MHz	48	QFN	64 KB	32 KB	32 KB	2 KB	8 KB	3	1	1	-	5/0/0	1	1	-	1 x 8ch	1 x 2ch	2	1	1	1ch	16ch	-	-	2	3/3/0/0	Y	-	-	-	4ch	-	33	T1
	MK10DX32VLF5	50 MHz	48	LQFP	64 KB	32 KB	32 KB	2 KB	8 KB	3	1	1	-	5/0/0	1	1	-	1 x 8ch	1 x 2ch	2	1	1	1ch	16ch	-	-	2	3/3/0/0	Y	-	-	-	4ch	-	33	T1
	MK10DX32VLH5	50 MHz	64	LQFP	64 KB	32 KB	32 KB	2 KB	8 KB	3	1	1	-	5/0/0	1	1	-	1 x 8ch	1 x 2ch	2	1	1	2ch	19ch	-	-	2	6/4/0/0	Y	-	-	-	4ch	-	44	T1
	MK10DX32VMP5	50 MHz	64	MAPBGA	64 KB	32 KB	32 KB	2 KB	8 KB	3	1	1	-	5/0/0	1	1	-	1 x 8ch	1 x 2ch	2	1	1	2ch	19ch	-	-	2	6/4/0/0	Y	-	-	-	4ch	-	44	T1
	MK10DX64VFM5	50 MHz	32	QFN	96 KB	64 KB	32 KB	2 KB	16 KB	3	1	1	-	4/0/0	1	1	-	1 x 8ch	1 x 2ch	2	1	1	-	10ch	-	-	2	2/2/0/0	-	-	-	-	4ch	-	24	T1
	MK10DX64VFT5	50 MHz	48	QFN	96 KB	64 KB	32 KB	2 KB	16 KB	3	1	1	-	5/0/0	1	1	-	1 x 8ch	1 x 2ch	2	1	1	1ch	16ch	-	-	2	3/3/0/0	Y	-	-	-	4ch	-	33	T1
	MK10DX64VLF5	50 MHz	48	LQFP	96 KB	64 KB	32 KB	2 KB	16 KB	3	1	1	-	5/0/0	1	1	-	1 x 8ch	1 x 2ch	2	1	1	1ch	16ch	-	-	2	3/3/0/0	Y	-	-	-	4ch	-	33	T1
	MK10DX64VLH5	50 MHz	64	LQFP	96 KB	64 KB	32 KB	2 KB	16 KB	3	1	1	-	5/0/0	1	1	-	1 x 8ch	1 x 2ch	2	1	1	2ch	19ch	-	-	2	6/4/0/0	Y	-	-	-	4ch	-	44	T1
	MK10DX64VMP5	50 MHz	64	MAPBGA	96 KB	64 KB	32 KB	2 KB	16 KB	3	1	1	-	5/0/0	1	1	-	1 x 8ch	1 x 2ch	2	1	1	2ch	19ch	-	-	2	6/4/0/0	Y	-	-	-	4ch	-	44	T1
	MK10DX128VLH7	72 MHz	64	LQFP	160 KB	128 KB	32 KB	2 KB	32 KB	3	1	1	-	5/0/0	2	1	1	1 x 8ch	2 x 2ch	2	1	1	2ch	26ch	2	1	3	6/4/2/0	Y	-	-	-	16ch	Y	44	T2
	MK10DX128VLK7	72 MHz	80	LQFP	160 KB	128 KB	32 KB	2 KB	32 KB	4	1	1	-	5/3/0	2	1	1	1 x 8ch	2 x 2ch	2	1	1	2ch	31ch	2	1	3	6/4/2/0	Y	-	-	-	16ch	Y	56	T2
	MK10DX128VLL7	72 MHz	100	LQFP	160 KB	128 KB	32 KB	2 KB	32 KB	5	1	1	-	6/4/0	2	1	1	1 x 8ch	2 x 2ch	2	1	1	4ch	37ch	2	1	3	6/4/2/0	Y	-	-	-	16ch	Y	70	T2
	MK10DX128VMC7	72 MHz	121	MAPBGA	160 KB	128 KB	32 KB	2 KB	32 KB	5	1	1	-	6/4/0	2	1	1	1 x 8ch	2 x 2ch	2	1	1	4ch	39ch	2	1	3	6/4/3/0	Y	-	-	-	16ch	Y	74	T2
	MK10DX256VLH7	72 MHz	64	LQFP	288 KB	256 KB	32 KB	2 KB	64 KB	3	1	1	-	5/0/0	2	1	1	1 x 8ch	2 x 2ch	2	1	1	2ch	26ch	2	1	3	6/4/2/0	Y	-	-	-	16ch	Y	44	T2
	MK10DX256VLK7	72 MHz	80	LQFP	288 KB	256 KB	32 KB	2 KB	64 KB	4	1	1	-	5/3/0	2	1	1	1 x 8ch	2 x 2ch	2	1	1	2ch	31ch	2	1	3	6/4/2/0	Y	-	-	-	16ch	Y	56	T2
	MK10DX256VLL7	72 MHz	100	LQFP	288 KB	256 KB	32 KB	2 KB	64 KB	5	1	1	-	6/4/0	2	1	1	1 x 8ch	2 x 2ch	2	1	1	4ch	37ch	2	1	3	6/4/2/0	Y	-	-	-	16ch	Y	70	T2
	MK10DX256VMC7	72 MHz	121	MAPBGA	288 KB	256 KB	32 KB	2 KB	64 KB	5	1	1	-	6/4/0	2	1	1	1 x 8ch	2 x 2ch	2	1	1	4ch	39ch	2	1	3	6/4/3/0	Y	-	-	-	16ch	Y	74	T2

Footnotes	Part Number	CPU Frequency	Pin Count	Package	Total Flash Memory		Flash	FlexNVM	EEPROM/FlexRAM	SRAM	UART (Total)	High Baudrate UART w/ISO7816	High Baudrate UART	Enhanced SDHC (bit)	SPI + Chip Selects	I <sup>2</sup> C	I <sup>2</sup> S	CAN	Motor Control General Purpose PWM	Quad Decoder General Purpose PWM	FTM External Clk	Low Power Timer	PDB	Total 16-bit ADC DP	Total 16-bit ADC SE	PGA	12-bit DAC	Analog Comparator	Analog Comparator Inputs			Vref	Cache	MPU	SPFPU	DMA	5 V Tolerant	GPIO (w interrupt)	Evaluation Board (See Page 24)
	MK10DX64VLH7	72 MHz	64	LQFP	96 KB	64 KB	32 KB	2 KB	16 KB	3	1	1	-	5/0/0	2	1	1	1 x 8ch	2 x 2ch	2	1	1	2ch	26ch	2	1	3	6/4/2/0	Y	-	-	-	16ch	Y	44	T2			
	MK10DX64VLK7	72 MHz	80	LQFP	96 KB	64 KB	32 KB	2 KB	16 KB	4	1	1	-	5/3/0	2	1	1	1 x 8ch	2 x 2ch	2	1	1	2ch	31ch	2	1	3	6/4/2/0	Y	-	-	-	16ch	Y	56	T2			
	MK10DX64VMC7	72 MHz	121	MAPBGA	96 KB	64 KB	32 KB	2 KB	16 KB	5	1	1	-	6/4/0	2	1	1	1 x 8ch	2 x 2ch	2	1	1	4ch	39ch	2	1	3	6/4/2/0	Y	-	-	-	16ch	Y	74	T2			
[1]	MK10DN512VLK10	100 MHz	80	LQFP	512 KB	512 KB	-	-	128 KB	4	1	1	4	5/3/0	2	1	2	1 x 8ch	2 x 2ch	2	1	1	2ch	31ch	2	1	3	6/4/2/0	Y	-	Y	-	16ch	Y	56	T9			
[1]	MK10DN512VLL10	100 MHz	100	LQFP	512 KB	512 KB	-	-	128 KB	5	1	1	4	6/4/1	2	1	2	1 x 8ch	2 x 2ch	2	1	1	4ch	37ch	2	1	3	6/4/2/0	Y	-	Y	-	16ch	Y	70	T9			
[1]	MK10DN512VLQ10	100 MHz	144	LQFP	512 KB	512 KB	-	-	128 KB	6	1	1	8	6/4/2	2	1	2	1 x 8ch	2 x 2ch	2	1	1	4ch	46ch	2	2	3	6/5/4/0	Y	-	Y	-	16ch	Y	104	T9			
[1]	MK10DN512VMC10	100 MHz	121	MAPBGA	512 KB	512 KB	-	-	128 KB	6	1	1	8	6/4/2	2	1	2	1 x 8ch	2 x 2ch	2	1	1	4ch	42ch	2	2	3	6/4/3/0	Y	-	Y	-	16ch	Y	90	T9			
[1]	MK10DN512VMD10	100 MHz	144	MAPBGA	512 KB	512 KB	-	-	128 KB	6	1	1	8	6/4/2	2	1	2	1 x 8ch	2 x 2ch	2	1	1	4ch	46ch	2	2	3	6/5/4/0	Y	-	Y	-	16ch	Y	104	T9			
[1]	MK10DX128VLQ10	100 MHz	144	LQFP	256 KB	128 KB	128 KB	4 KB	32 KB	6	1	1	8	6/4/2	2	1	2	1 x 8ch	2 x 2ch	2	1	1	4ch	46ch	2	2	3	6/5/4/0	Y	-	Y	-	16ch	Y	104	T9			
[1]	MK10DX128VMD10	100 MHz	144	MAPBGA	256 KB	128 KB	128 KB	4 KB	32 KB	6	1	1	8	6/4/2	2	1	2	1 x 8ch	2 x 2ch	2	1	1	4ch	46ch	2	2	3	6/5/4/0	Y	-	Y	-	16ch	Y	104	T9			
[1]	MK10DX256VLQ10	100 MHz	144	LQFP	512 KB	256 KB	256 KB	4 KB	64 KB	6	1	1	8	6/4/2	2	1	2	1 x 8ch	2 x 2ch	2	1	1	4ch	46ch	2	2	3	6/5/4/0	Y	-	Y	-	16ch	Y	104	T9			
[1]	MK10DX256VMD10	100 MHz	144	MAPBGA	512 KB	256 KB	256 KB	4 KB	64 KB	6	1	1	8	6/4/2	2	1	2	1 x 8ch	2 x 2ch	2	1	1	4ch	46ch	2	2	3	6/5/4/0	Y	-	Y	-	16ch	Y	104	T9			
[1,2]	MK10FN1M0VLQ12	120 MHz	144	LQFP	1 MB	1 MB	-	-	128 KB	6	2	0	8	6/4/2	2	2	2	2 x 8ch	2 x 2ch	2	1	1	4ch	62ch	4	2	4	5/2/2/5	Y	16 KB	Y	Y	Y	32ch	Y	104	T10		
[1,2]	MK10FN1M0VMD12	120 MHz	144	MAPBGA	1 MB	1 MB	-	-	128 KB	6	2	0	8	6/4/2	2	2	2	2 x 8ch	2 x 2ch	2	1	1	4ch	62ch	4	2	4	5/2/2/5	Y	16 KB	Y	Y	Y	32ch	Y	104	T10		
[1,2]	MK10FX512VLQ12	120 MHz	144	LQFP	1 MB	512 KB	512 KB	16 KB	128 KB	6	2	0	8	6/4/2	2	2	2	2 x 8ch	2 x 2ch	2	1	1	4ch	62ch	4	2	4	5/2/2/5	Y	16 KB	Y	Y	Y	32ch	Y	104	T10		
[1,2]	MK10FX512VMD12	120 MHz	144	MAPBGA	1 MB	512 KB	512 KB	16 KB	128 KB	6	2	0	8	6/4/2	2	2	2	2 x 8ch	2 x 2ch	2	1	1	4ch	62ch	4	2	4	5/2/2/5	Y	16 KB	Y	Y	Y	32ch	Y	104	T10		

**Common Features**

Temp Range: -40° C to 105° C  
 Voltage Range: 1.71–3.6 V  
 Flash Write Voltage: 1.71 V  
 Main OSC: 32–40 KHz/8–32 MHz  
 Debug: JTAG, cJTAG, SWD  
 RTC (32 KHz OSC, Vbat)

PIT (32 bit): 1x4ch, TSI (Capacitive Touch): 16ch  
 Hardware Watchdog, Software Watchdog, PMC, MCG, NMI, CRC, DSP  
 Serial Programming Interface, CMT (Carrier Module Transmitter)

**Footnotes**

[1] Trace: TPIU, FPB, DWT, ITM,ETM, ETB  
 [2] Secondary OSC: 32–40 KHz/8–32 MHz,  
 [2] NAND Flash Controller

Footnotes	Part Number	CPU Frequency	Pin Count	Package	Total Flash Memory	Flash	FlexNVM	EEPROM/FlexRAM	SRAM	UART (Total)	High Baudrate UART w/ISO7816	High Baudrate UART	SPI + Chip Selects	I <sup>2</sup> C	I <sup>2</sup> S	CAN	Motor Control General Purpose PWM	Quad Decoder General Purpose PWM	FTM External Clk	Low Power Timer	PDB	Total 16-bit ADC DP	Total 16-bit ADC SE	PGA	12-bit DAC	Analog Comparator	Analog Comparator Inputs	Vref	Cache	MPU	SPFPU	DMA	GPIO (w interrupt)	Evaluation Board (See Page 24)
	MK11DN512AVLK5	50 MHz	80	LQFP	512 KB	512 KB	-	-	64 KB	4	1	1	5/3/0	2	1	-	1x8ch + 1x2ch	1x2ch	2	1	1	3ch	24ch	-	-	2	5/4/0/0	-	-	-	-	16ch	60	T3
	MK11DN512AVMCS	50 MHz	121	MAPBGA	512 KB	512 KB	-	-	64 KB	4	1	1	5/3/0	2	1	-	1x8ch + 1x2ch	1x2ch	2	1	1	3ch	24ch	-	1	2	5/4/0/0	Y	-	-	-	16ch	64	T3
	MK11DX128AVLK5	50 MHz	80	LQFP	192 KB	128 KB	64 KB	4 KB	32 KB	4	1	1	5/3/0	2	1	-	1x8ch + 1x2ch	1x2ch	2	1	1	3ch	24ch	-	-	2	5/4/0/0	-	-	-	-	16ch	60	T3
	MK11DX128AVMCS	50 MHz	121	MAPBGA	192 KB	128 KB	64 KB	4 KB	32 KB	4	1	1	5/3/0	2	1	-	1x8ch + 1x2ch	1x2ch	2	1	1	3ch	24ch	-	1	2	5/4/0/0	Y	-	-	-	16ch	64	T3
	MK11DX256AVLK5	50 MHz	80	LQFP	320 KB	256 KB	64 KB	4 KB	32 KB	4	1	1	5/3/0	2	1	-	1x8ch + 1x2ch	1x2ch	2	1	1	3ch	24ch	-	-	2	5/4/0/0	-	-	-	-	16ch	60	T3
	MK11DX256AVMCS	50 MHz	121	MAPBGA	320 KB	256 KB	64 KB	4 KB	32 KB	4	1	1	5/3/0	2	1	-	1x8ch + 1x2ch	1x2ch	2	1	1	3ch	24ch	-	1	2	5/4/0/0	Y	-	-	-	16ch	64	T3

**Common Features**

Temp Range: -40° C to 105° C

Voltage Range: 1.71–3.6 V, Flash Write Voltage: 1.71

Main OSC (Oscillator Crystal/Resonator): 32–40 KHz/8–32 MHz

Debug: JTAG, cJTAG, SWD, RTC (32 KHz OSC, Vbat)

PIT (32 bit): 1x4ch Hardware Watchdog, Software Watchdog, PMC, MCG, NMI, CRC, DSP

Serial Programming Interface, CMT (Carrier Module Transmitter)

Hardware Encryption and Tamper Detect

Trace: TPIU, FPB, DWT, ITM, ETM

**SUB-FAMILY K12: OPTIMIZED BASELINE MCU**

Footnotes	Part Number	CPU Frequency	Pin Count	Package	Total Flash Memory	Flash	FlexNVM	EEPROM/FlexRAM	SRAM	UART (Total)	High Baudrate UART w/ISO7816	High Baudrate UART	SPI + Chip Selects	I <sup>2</sup> C	I <sup>2</sup> S	CAN	Motor Control General Purpose PWM	Quad Decoder General Purpose PWM	FTM External Clk	Low Power Timer	PDB	Total 16-bit ADC DP	Total 16-bit ADC SE	PGA	12-bit DAC	Analog Comparator	Analog Comparator Inputs	Vref	Cache	MPU	SPFPU	DMA	GPIO (w interrupt)	Evaluation Board (See Page 24)
	MK12DN512VLH5	50 MHz	64	LQFP	512 KB	512 KB	-	-	64 KB	3	1	1	5/0/0	2	1	-	1x8ch + 1x2ch	1x2ch	2	1	1	2ch	22ch	-	1	2	4/ 2/0/0	Y	-	-	-	16ch	44	T3
	MK12DN512VLK5	50 MHz	80	LQFP	512 KB	512 KB	-	-	64 KB	4	1	1	5/3/0	2	1	-	1x8ch + 1x2ch	1x2ch	2	1	1	3ch	24ch	-	1	2	4/2/0/0	Y	-	-	-	16ch	60	T3
	MK12DN512VMCS	50 MHz	121	MAPBGA	512 KB	512 KB	-	-	64 KB	4	1	1	5/3/0	2	1	-	1x8ch + 1x2ch	1x2ch	2	1	1	3ch	24ch	-	1	2	4/2/0/0	Y	-	-	-	16ch	60	T3
	MK12DX128VLF5	50 MHz	48	LQFP	192 KB	128 KB	64 KB	4 KB	32 KB	3	1	1	5/0/0	1	1	-	1x8ch	1x2ch	2	1	1	1ch	18ch	-	-	2	2/2/0/0	Y	-	-	-	16ch	33	T3
	MK12DX128VLH5	50 MHz	64	LQFP	192 KB	128 KB	64 KB	4 KB	32 KB	3	1	1	5/0/0	2	1	-	1x8ch + 1x2ch	1x2ch	2	1	1	2ch	22ch	-	1	2	4/2/0/0	Y	-	-	-	16ch	44	T3
	MK12DX128VLK5	50 MHz	80	LQFP	192 KB	128 KB	64 KB	4 KB	32 KB	4	1	1	5/3/0	2	1	-	1x8ch + 1x2ch	1x2ch	2	1	1	3ch	24ch	-	1	2	4/2/0/0	Y	-	-	-	16ch	60	T3
	MK12DX128VMCS	50 MHz	121	MAPBGA	192 KB	128 KB	64 KB	4 KB	32 KB	4	1	1	5/3/0	2	1	-	1x8ch + 1x2ch	1x2ch	2	1	1	3ch	24ch	-	1	2	4/2/0/0	Y	-	-	-	16ch	60	T3
	MK12DX256VLF5	50 MHz	48	LQFP	320 KB	256 KB	64 KB	4 KB	32 KB	3	1	1	5/0/0	1	1	-	1x8ch	1x2ch	2	1	1	1ch	18ch	-	-	2	2/2/0/0	Y	-	-	-	16ch	33	T3
	MK12DX256VLH5	50 MHz	64	LQFP	320 KB	256 KB	64 KB	4 KB	32 KB	3	1	1	5/0/0	2	1	-	1x8ch + 1x2ch	1x2ch	2	1	1	2ch	22ch	-	1	2	4/2/0/0	Y	-	-	-	16ch	44	T3
	MK12DX256VLK5	50 MHz	80	LQFP	320 KB	256 KB	64 KB	4 KB	32 KB	4	1	1	5/3/0	2	1	-	1x8ch + 1x2ch	1x2ch	2	1	1	3ch	24ch	-	1	2	4/2/0/0	Y	-	-	-	16ch	60	T3
	MK12DX256VMCS	50 MHz	121	MAPBGA	320 KB	256 KB	64 KB	4 KB	32 KB	4	1	1	5/3/0	2	1	-	1x8ch + 1x2ch	1x2ch	2	1	1	3ch	24ch	-	1	2	4/2/0/0	Y	-	-	-	16ch	60	T3

**Common Features**

Temp Range: -40° C to 105° C

Voltage Range: 1.71–3.6 V, Flash Write Voltage: 1.71

Main OSC (Oscillator Crystal/Resonator): 32–40 KHz/8–32 MHz

Debug: JTAG, cJTAG, SWD, RTC (32 KHz OSC, Vbat)

PIT (32 bit): 1x4ch Hardware Watchdog, Software Watchdog, PMC, MCG, NMI, CRC, DSP

Serial Programming Interface, CMT (Carrier Module Transmitter)

Trace: TPIU, FPB, DWT, ITM, ETM



# Kinetis K2x Family of USB MCUs

## OVERVIEW

The Kinetis K2x MCU family, based on the ARM® Cortex®-M4 core, is pin, peripheral and software compatible with many of the Kinetis K series MCU families, offering full and high-speed USB 2.0 On-The-Go options, in addition to other features like device charge detect capability and USB crystal-less functionality. This family starts from 32 KB of flash in a 5 x 5 mm 32-pin QFN package extending up to 1 MB in a 144-pin MAPBGA package with up to 256 KB of SRAM. Next-generation Kinetis K2x MCUs are further optimized for performance with industry-leading power consumption, offering more streamlined integration for further BOM cost reductions. For more information about the Kinetis K2x MCU family, [click here](#).

## TARGET APPLICATIONS:

Barcode scanners, electronic point-of-sales (EPoS) terminals, gaming accessories, health and wellness monitors, home and building automation, industrial/commercial sensor nodes, IoT data concentrators, multi-functional printers, smart grid data concentrators, sports and activity wearables

## SUB-FAMILY K20: USB MCU WITH MIXED-SIGNAL INTEGRATION

Footnotes	Part Number	CPU Frequency	Pin Count	Package	Total Flash Memory	Flash	FlexNVM	EEPROM/FlexRAM	SRAM	UART (Total)	High Baudrate UART w/ ISO7816	High Baudrate UART	Enhanced SDHC (bit)	Touch Sensing Inputs (TSI)	SPI + Chip Selects	I <sup>2</sup> C	I <sup>2</sup> S	CAN	Motor Control General Purpose PWM	Quad Decoder General Purpose PWM	FTM External Clk	Low Power Timer	PDB	Total 16-bit ADC DP	Total 16-bit ADC SE	PGA	12-bit DAC	Analog Comparator	Analog Comparator Inputs	Vref	MPU	DMA	5 V Tolerant	GPIO (w interrupt)	Evaluation Board (See Page 24)
	MK20DN128VFM5	50 MHz	32	QFN	128 KB	128 KB	-	-	16 KB	2	1	1	-	16	4/0/0	1	1	-	1x8ch	1x2ch	2	1	1	-	6ch	-	-	2	2/2/0/0	-	-	4ch	-	20	T1
	MK20DN128VFT5	50 MHz	48	QFN	128 KB	128 KB	-	-	16 KB	3	1	1	-	14	5/0/0	1	1	-	1x8ch	1x2ch	2	1	1	1ch	12ch	-	-	2	3/3/0/0	Y	-	4ch	-	29	T1
	MK20DN128VLF5	50 MHz	48	LQFP	128 KB	128 KB	-	-	16 KB	3	1	1	-	14	5/0/0	1	1	-	1x8ch	1x2ch	2	1	1	1ch	12ch	-	-	2	3/3/0/0	Y	-	4ch	-	29	T1
	MK20DN128VLH5	50 MHz	64	LQFP	128 KB	128 KB	-	-	16 KB	3	1	1	-	16	5/0/0	1	1	-	1x8ch	1x2ch	2	1	1	2ch	15ch	-	-	2	6/4/0/0	Y	-	4ch	-	40	T1
	MK20DN128VMP5	50 MHz	64	MAPBGA	128 KB	128 KB	-	-	16 KB	3	1	1	-	16	5/0/0	1	1	-	1x8ch	1x2ch	2	1	1	2ch	15ch	-	-	2	6/4/0/0	Y	-	4ch	-	40	T1
	MK20DN32VFM5	50 MHz	32	QFN	32 KB	32 KB	-	-	8 KB	2	1	1	-	16	4/0/0	1	1	-	1x8ch	1x2ch	2	1	1	-	6ch	-	-	2	2/2/0/0	-	-	4ch	-	20	T1
	MK20DN32VFT5	50 MHz	48	QFN	32 KB	32 KB	-	-	8 KB	3	1	1	-	14	5/0/0	1	1	-	1x8ch	1x2ch	2	1	1	1ch	12ch	-	-	2	3/3/0/0	Y	-	4ch	-	29	T1
	MK20DN32VLF5	50 MHz	48	LQFP	32 KB	32 KB	-	-	8 KB	3	1	1	-	14	5/0/0	1	1	-	1x8ch	1x2ch	2	1	1	1ch	12ch	-	-	2	3/3/0/0	Y	-	4ch	-	29	T1
	MK20DN32VLH5	50 MHz	64	LQFP	32 KB	32 KB	-	-	8 KB	3	1	1	-	16	5/0/0	1	1	-	1x8ch	1x2ch	2	1	1	2ch	15ch	-	-	2	6/4/0/0	Y	-	4ch	-	40	T1
	MK20DN32VMP5	50 MHz	64	MAPBGA	32 KB	32 KB	-	-	8 KB	3	1	1	-	16	5/0/0	1	1	-	1x8ch	1x2ch	2	1	1	2ch	15ch	-	-	2	6/4/0/0	Y	-	4ch	-	40	T1
	MK20DN64VFM5	50 MHz	32	QFN	64 KB	64 KB	-	-	16 KB	2	1	1	-	16	4/0/0	1	1	-	1x8ch	1x2ch	2	1	1	-	6ch	-	-	2	2/2/0/0	-	-	4ch	-	20	T1
	MK20DN64VFT5	50 MHz	48	QFN	64 KB	64 KB	-	-	16 KB	3	1	1	-	14	5/0/0	1	1	-	1x8ch	1x2ch	2	1	1	1ch	12ch	-	-	2	3/3/0/0	Y	-	4ch	-	29	T1
	MK20DN64VLF5	50 MHz	48	LQFP	64 KB	64 KB	-	-	16 KB	3	1	1	-	14	5/0/0	1	1	-	1x8ch	1x2ch	2	1	1	1ch	12ch	-	-	2	3/3/0/0	Y	-	4ch	-	29	T1
	MK20DN64VLH5	50 MHz	64	LQFP	64 KB	64 KB	-	-	16 KB	3	1	1	-	16	5/0/0	1	1	-	1x8ch	1x2ch	2	1	1	2ch	15ch	-	-	2	6/4/0/0	Y	-	4ch	-	40	T1
	MK20DN64VMP5	50 MHz	64	MAPBGA	64 KB	64 KB	-	-	16 KB	3	1	1	-	16	5/0/0	1	1	-	1x8ch	1x2ch	2	1	1	2ch	15ch	-	-	2	6/4/0/0	Y	-	4ch	-	40	T1
	MK20DX128VFM5	50 MHz	32	QFN	160 KB	128 KB	32 KB	2 KB	16 KB	2	1	1	-	16	4/0/0	1	1	-	1x8ch	1x2ch	2	1	1	-	6ch	-	-	2	2/2/0/0	-	-	4ch	-	20	T1
	MK20DX128VFT5	50 MHz	48	QFN	160 KB	128 KB	32 KB	2 KB	16 KB	3	1	1	-	14	5/0/0	1	1	-	1x8ch	1x2ch	2	1	1	1ch	12ch	-	-	2	3/3/0/0	Y	-	4ch	-	29	T1
	MK20DX128VLF5	50 MHz	48	LQFP	160 KB	128 KB	32 KB	2 KB	16 KB	3	1	1	-	14	5/0/0	1	1	-	1x8ch	1x2ch	2	1	1	1ch	12ch	-	-	2	3/3/0/0	Y	-	4ch	-	29	T1
	MK20DX128VLH5	50 MHz	64	LQFP	160 KB	128 KB	32 KB	2 KB	16 KB	3	1	1	-	16	5/0/0	1	1	-	1x8ch	1x2ch	2	1	1	2ch	15ch	-	-	2	6/4/0/0	Y	-	4ch	-	40	T1
	MK20DX128VMP5	50 MHz	64	MAPBGA	160 KB	128 KB	32 KB	2 KB	16 KB	3	1	1	-	16	5/0/0	1	1	-	1x8ch	1x2ch	2	1	1	2ch	15ch	-	-	2	6/4/0/0	Y	-	4ch	-	40	T1



Footnotes	Part Number	CPU Frequency	Pin Count	Package	Total Flash Memory		Flash	FlexNVM	EEPROM/FlexRAM	SRAM	UART (Total)	High Baudrate UART w/ISO7816	High Baudrate UART	Enhanced SDHC (bit)	SPI + Chip Selects	I <sup>2</sup> C	I <sup>2</sup> S	CAN	Motor Control General Purpose PWM	Quad Decoder General Purpose PWM	FTM External Clk	Low Power Timer	PDB	Total 16-bit ADC DP	Total 16-bit ADC SE	12-bit DAC	Analog Comparator	Analog Comparator Inputs	Vref	MPU	SPEPU	DMA	5 V Tolerant	GPIO (w interrupt)	Evaluation Board (See Page 24)
	MK21DN512AVLK5	50 MHz	80	LQFP	512 KB	512 KB	-	-	64 KB	4	1	1	-	5/3/0	2	1	-	1x8ch + 1x2ch	1x2ch	2	1	1	3ch	20ch	-	2	5/4/0/0	-	-	-	16ch	-	56	T3	
	MK21DN512AVMC5	50 MHz	121	MAPBGA	512 KB	512 KB	-	-	64 KB	4	1	1	-	5/3/0	2	1	-	1x8ch + 1x2ch	1x2ch	2	1	1	3ch	20ch	1	2	5/4/0/0	-	-	-	16ch	-	64	T3	
	MK21DN512VLK5	50 MHz	80	LQFP	512 KB	512 KB	-	-	64 KB	4	1	1	-	5/3/0	2	1	-	1x8ch + 1x2ch	1x2ch	2	1	1	3ch	20ch	-	2	5/4/0/0	-	-	-	16ch	-	56	T3	
	MK21DN512VMC5	50 MHz	121	MAPBGA	512 KB	512 KB	-	-	64 KB	4	1	1	-	5/3/0	2	1	-	1x8ch + 1x2ch	1x2ch	2	1	1	3ch	20ch	1	2	5/4/0/0	-	-	-	16ch	-	64	T3	
	MK21DX128AVLK5	50 MHz	80	LQFP	192 KB	128 KB	64 KB	4 KB	32 KB	4	1	1	-	5/3/0	2	1	-	1x8ch + 1x2ch	1x2ch	2	1	1	3ch	20ch	-	2	5/4/0/0	-	-	-	16ch	-	56	T3	
	MK21DX128AVMC5	50 MHz	121	MAPBGA	192 KB	128 KB	64 KB	4 KB	32 KB	4	1	1	-	5/3/0	2	1	-	1x8ch + 1x2ch	1x2ch	2	1	1	3ch	20ch	1	2	5/4/0/0	-	-	-	16ch	-	64	T3	
	MK21DX128VLK5	50 MHz	80	LQFP	192 KB	128 KB	64 KB	4 KB	32 KB	4	1	1	-	5/3/0	2	1	-	1x8ch + 1x2ch	1x2ch	2	1	1	3ch	20ch	-	2	5/4/0/0	-	-	-	16ch	-	56	T3	
	MK21DX128VMC5	50 MHz	121	MAPBGA	192 KB	128 KB	64 KB	4 KB	32 KB	4	1	1	-	5/3/0	2	1	-	1x8ch + 1x2ch	1x2ch	2	1	1	3ch	20ch	1	2	5/4/0/0	-	-	-	16ch	-	64	T3	
	MK21DX256AVLK5	50 MHz	80	LQFP	320 KB	256 KB	64 KB	4 KB	32 KB	4	1	1	-	5/3/0	2	1	-	1x8ch + 1x2ch	1x2ch	2	1	1	3ch	20ch	-	2	5/4/0/0	-	-	-	16ch	-	56	T3	
	MK21DX256AVMC5	50 MHz	121	MAPBGA	320 KB	256 KB	64 KB	4 KB	32 KB	4	1	1	-	5/3/0	2	1	-	1x8ch + 1x2ch	1x2ch	2	1	1	3ch	20ch	1	2	5/4/0/0	-	-	-	16ch	-	64	T3	
	MK21DX256VLK5	50 MHz	80	LQFP	320 KB	256 KB	64 KB	4 KB	32 KB	4	1	1	-	5/3/0	2	1	-	1x8ch + 1x2ch	1x2ch	2	1	1	3ch	20ch	-	2	5/4/0/0	-	-	-	16ch	-	56	T3	
	MK21DX256VMC5	50 MHz	121	MAPBGA	320 KB	256 KB	64 KB	4 KB	32 KB	4	1	1	-	5/3/0	2	1	-	1x8ch + 1x2ch	1x2ch	2	1	1	3ch	20ch	1	2	5/4/0/0	-	-	-	16ch	-	64	T3	
[1]	MK21FN1M0AVLQ12	120 MHz	144	LQFP	1MB	1MB	-	-	128 KB	6	1	1	8	6/4/2	3	1	1	1x8ch	2x2ch	2	1	1	4ch	42ch	2	3	6/5/4/0	Y	Y	Y	16ch	Y	100	T4	
[1]	MK21FN1M0AVMC12	120 MHz	121	MAPBGA	1MB	1MB	-	-	128 KB	5	1	1	8	6/4/2	3	1	1	1x8ch	2x2ch	2	1	1	4ch	40ch	2	3	6/4/3/0	Y	Y	Y	16ch	Y	81	T4	
[1]	MK21FN1M0AVMD12	120 MHz	144	MAPBGA	1MB	1MB	-	-	128 KB	6	1	1	8	6/4/2	3	1	1	1x8ch	2x2ch	2	1	1	4ch	42ch	2	3	6/5/4/0	-	Y	Y	16ch	Y	95	T4	
[1]	MK21FN1M0VLQ12	120 MHz	144	LQFP	1MB	1MB	-	-	128 KB	6	1	1	8	6/4/2	3	1	1	1x8ch	2x2ch	2	1	1	4ch	42ch	2	3	6/5/4/0	-	Y	Y	16ch	Y	104	T4	
[1]	MK21FN1M0VMC12	120 MHz	121	MAPBGA	1MB	1MB	-	-	128 KB	5	1	1	8	6/4/2	3	1	1	1x8ch	2x2ch	2	1	1	4ch	40ch	2	3	6/4/3/0	Y	Y	Y	16ch	Y	81	T4	
[1]	MK21FN1M0VMD12	120 MHz	144	MAPBGA	1MB	1MB	-	-	128 KB	6	1	1	8	6/4/2	3	1	1	1x8ch	2x2ch	2	1	1	4ch	42ch	2	3	6/5/4/0	Y	Y	Y	16ch	Y	104	T4	
[1]	MK21FX512AVLQ12	120 MHz	144	LQFP	640 KB	512 KB	128 KB	4 KB	128 KB	6	1	1	8	6/4/2	3	1	1	1x8ch	2x2ch	2	1	1	4ch	42ch	2	3	6/5/4/0	Y	Y	Y	16ch	Y	100	T4	
[1]	MK21FX512AVMC12	120 MHz	121	MAPBGA	640 KB	512 KB	128 KB	4 KB	128 KB	5	1	1	8	6/4/2	3	1	1	1x8ch	2x2ch	2	1	1	4ch	40ch	2	3	6/4/3/0	Y	Y	Y	16ch	Y	81	T4	
[1]	MK21FX512AVMD12	120 MHz	144	MAPBGA	640 KB	512 KB	128 KB	4 KB	128 KB	6	1	1	8	6/4/2	3	1	1	1x8ch	2x2ch	2	1	1	4ch	42ch	2	3	6/5/4/0	-	Y	Y	16ch	Y	95	T4	
[1]	MK21FX512VLQ12	120 MHz	144	LQFP	640 KB	512 KB	128 KB	4 KB	128 KB	6	1	1	8	6/4/2	3	1	1	1x8ch	2x2ch	2	1	1	4ch	42ch	2	3	6/5/4/0	-	Y	Y	16ch	Y	104	T4	
[1]	MK21FX512VMC12	120 MHz	121	MAPBGA	640 KB	512 KB	128 KB	4 KB	128 KB	5	1	1	8	6/4/2	3	1	1	1x8ch	2x2ch	2	1	1	4ch	40ch	2	3	6/4/3/0	Y	Y	Y	16ch	Y	81	T4	
[1]	MK21FX512VMD12	120 MHz	144	MAPBGA	640 KB	512 KB	128 KB	4 KB	128 KB	6	1	1	8	6/4/2	3	1	1	1x8ch	2x2ch	2	1	1	4ch	42ch	2	3	6/5/4/0	Y	Y	Y	16ch	Y	104	T4	

**Common Features**

Temp Range: -40 C to 105 C  
Voltage Range: 1.71-3.6 V  
Flash Write Voltage: 1.71 V  
Main OSC: 32-40 KHz/8-32 MHz

Debug: JTAG, cJTAG, SWD  
RTC (32 KHz OSC, Vbat)  
Trace: TPIU, FPB, DWT, ITM, ETM  
PIT (32 bit): 1x4ch

**Footnotes**

Hardware Watchdog, Software Watchdog, PMC, MCG, NMI, CRC, DSP  
Serial Programming Interface, CMT (Carrier Module Transmitter)  
USB OTG LS/FS (1), USB Device Charge Detect, USB 120 mAReg

[1] Trace: TPIU, FPB, DWT, ITM, ETM, ETB



Footnotes	Part Number	CPU Frequency	Pin Count	Package	Total Flash Memory	Flash	FlexNVM	EEPROM/FlexRAM	SRAM	UART (Total)	High Baudrate UART w/ISO7816	High Baudrate UART	Enhanced SDHC (bit)	SPI + Chip Selects	I <sup>2</sup> C	I <sup>2</sup> S	CAN	Motor Control General Purpose PWM	Quad Decoder General Purpose PWM	FTM External Clk	Low Power Timer	PDB	Total 16-bit ADC DP	Total 16-bit ADC SE	12-bit DAC	Analog Comparator	Analog Comparator Inputs	Vref	MPU	SPFPU	DMA	5 V Tolerant	GPIO (w interrupt)	Evaluation Board (See Page 24)
	MK24FN1M0CAJ12R	120 MHz	142	WLCSP	1024	1024	-	-	256 KB	6	1	1	8	6/4/2	3	3	1	2x8ch	2x2ch	2	1	1	5ch	34ch	2	3	6/5/4	Y	Y	Y	16ch	Y	100	T11,F3
	MK24FN1M0VDC12	120 MHz	121	XFBGA	1 MB	1 MB	-	-	256 KB	6	1	1	8	6/4/2	3	1	1	2x8ch	2x2ch	2	1	1	4ch	37ch	2	3	6/5/4/0	Y	Y	Y	16ch	Y	83	T11,F3
	MK24FN1M0VLL12	120 MHz	100	LQFP	1 MB	1 MB	-	-	256 KB	5	1	1	4	6/4/1	3	1	1	2x8ch	2x2ch	2	1	1	4ch	32ch	1	3	5/4/2/0	Y	Y	Y	16ch	Y	66	T11,F3
	MK24FN1M0VLQ12	120 MHz	144	LQFP	1 MB	1 MB	-	-	256 KB	5	1	1	8	6/4/2	3	1	1	2x8ch	2x2ch	2	1	1	4ch	41ch	2	3	6/5/4/0	Y	Y	Y	16ch	Y	100	T11,F3
	MK24FN256VDC12	120 MHz	121	XFBGA	256	256	-	-	256 KB	6	1	1	-	6/4/2	3	1	-	2x8ch	2x2ch	2	1	1	4ch	37ch	1	2	-	Y	-	Y	16ch	Y	83	T14

**Common Features**

Temp Range: -40° C to 105° C  
Voltage Range: 1.71–3.6 V  
Flash Write Voltage: 1.71 V  
Main OSC: 32–40 KHz/8–32 MHz  
Debug: JTAG, cJTAG, SWD  
RTC (32 KHz OSC, Vbat), 48 MHZ IRC

PIT (32 bit): 1x4ch, Crystal-less USB Enabled (FS Mode ON)  
Hardware Watchdog, Software Watchdog, PMC, MCG, NMI, CRC, DSP  
Serial Programming Interface, CMT (Carrier Module Transmitter)  
Hardware Encryption, USB OTG LS/FS (1), USB Device Charge Detect, USB 120 mAReg  
Trace: TPIU, FPB, DWT, ITM,ETM, ETB

**SUB-FAMILY K26: USB MCU WITH 2 MB FLASH AND 256 KB SRAM**

Footnotes	Part Number	CPU Frequency	Pin Count	Package	Total Flash Memory	Flash	FlexNVM	EEPROM/FlexRAM	SRAM	UART (Total)	High Baudrate UART w/ISO7816	High Baudrate UART	Enhanced SDHC (bit)	SPI + Chip Selects	I <sup>2</sup> C	I <sup>2</sup> S	CAN	Motor Control General Purpose PWM	Quad Decoder General Purpose PWM	FTM External Clk	Low Power Timer	PDB	Total 16-bit ADC DP	Total 16-bit ADC SE	12-bit DAC	Analog Comparator	Analog Comparator Inputs	Vref	MPU	SPFPU	DMA	5 V Tolerant	GPIO (w interrupt)	Evaluation Board (See Page 24)
	MK26FN2M0CAC18R	180	169	WLCSP	2048	2048	-	-	256	6	1	1	8	6/4/2	4	1	2	2x8ch	2x2ch	2	1	1	3	45	2	4	6/6/4/4	Y	Y	Y	32 ch	-	116	T15
	MK26FN2M0VLQ18	180	144	LQFP	2048	2048	-	-	256	6	1	1	8	6/4/2	4	1	2	2x8ch	2x2ch	2	1	1	1	39	2	4	6/6/4/4	Y	Y	Y	32 ch	-	100	T15
	MK26FN2M0VMD18	180	144	MAPBGA	2048	2048	-	-	256	6	1	1	8	6/4/2	4	1	2	2x8ch	2x2ch	2	1	1	1	39	2	4	6/6/4/4	Y	Y	Y	32 ch	-	100	T15
	MK26FN2M0VMI18	180	169	MAPBGA	2048	2048	-	-	256	6	1	1	8	6/4/2	4	1	2	2x8ch	2x2ch	2	1	1	3	45	2	4	6/6/4/4	Y	Y	Y	32 ch	-	116	T15

**Common Features**

Temp Range: -40° C to 85° C  
Voltage voltage:1.71 to 3.6 V  
Flash Write Voltage: 1.71 V  
Main OSC:32-40 kHz/3–32 MHz  
Debug: JTAG,cJTAG,SWD

RTC(32KHz OSC,Vbat), 48 MHZ IRC  
PIT (32 bit): 1x4ch, Hardware Watchdog, Software Watchdog,  
PMC, MCG, NMI, CRC, DSP  
Serial Programming Interface, CMT (Carrier Module Transmitter)  
Hardware Encryption, USB Device Charge Detect, Crystal-less FS USB, USB LS/FS and USB HS with integrated HS PHY

# Kinetis K3x Family of Segment LCD MCUs

## OVERVIEW

The Kinetis K3x MCU family, based on the ARM® Cortex®-M4 core, is pin, peripheral and software compatible with the K10 MCU family and adds a flexible low-power segment LCD controller with support for up to 320 segments. Devices start from 64 KB of flash in a 64-pin LQFN package extending up to 512 KB in a 144-pin MAPBGA package with a rich suite of analog, communication, timing and control peripherals. For more information about the Kinetis K3x MCU family, [click here](#).

## TARGET APPLICATIONS:

Thermostats, smart meters, heart rate monitors, blood gas analyzers

## SUB-FAMILY K30: SEGMENT LCD MCU

Footnotes	Part Number	CPU Frequency	Pin Count	Package	Total Flash Memory	Flash	FlexNVM	EEPROM/FlexRAM	SRAM	UART (Total)	High Baudrate UART w/ISO7816	High Baudrate UART Enhanced SDHC (bit)	Segment LCD	SPI + Chip Selects	I <sup>2</sup> C	I <sup>2</sup> S	CAN	Motor Control General Purpose PWM	Quad Decoder General Purpose PWM	FTM External Clk	Low Power Timer	PDB	Total 16-bit ADC DP	Total 16-bit ADC SE	PGA	12-bit DAC	Analog Comparator	Analog Comparator Inputs	MPU	DMA	GPIO (w interrupt)	Evaluation Board (See Page 24)
	MK30DX128VLH7	72 MHz	64	LQFP	160 KB	128 KB	32 KB	2 KB	32 KB	3	1	1	16x8/20x4	5/0/0	2	1	1	1x8ch	2x2ch	2	1	1	2ch	22ch	2	1	3	3/4/2/0	-	16ch	40	T7
	MK30DX128VLK7	72 MHz	80	LQFP	160 KB	128 KB	32 KB	2 KB	32 KB	4	1	1	24x8/28x4	5/3/0	2	1	1	1x8ch	2x2ch	2	1	1	2ch	31ch	2	1	3	6/4/2/0	-	16ch	56	T7
	MK30DX128VLL7	72 MHz	100	LQFP	160 KB	128 KB	32 KB	2 KB	32 KB	5	1	1	32x8/36x4	6/4/0	2	1	1	1x8ch	2x2ch	2	1	1	4ch	38ch	2	1	3	6/4/2/0	-	16ch	68	T7
	MK30DX128VMC7	72 MHz	121	MAPBGA	160 KB	128 KB	32 KB	2 KB	32 KB	5	1	1	36x8/40x4	6/4/0	2	1	1	1x8ch	2x2ch	2	1	1	4ch	38ch	2	1	3	6/4/3/0	-	16ch	72	T7
	MK30DX256VLH7	72 MHz	64	LQFP	288 KB	256 KB	32 KB	2 KB	64 KB	3	1	1	16x8/20x4	5/0/0	2	1	1	1x8ch	2x2ch	2	1	1	2ch	22ch	2	1	3	3/4/2/0	-	16ch	40	T7
	MK30DX256VLK7	72 MHz	80	LQFP	288 KB	256 KB	32 KB	2 KB	64 KB	4	1	1	24x8/28x4	5/3/0	2	1	1	1x8ch	2x2ch	2	1	1	2ch	31ch	2	1	3	6/4/2/0	-	16ch	56	T7
	MK30DX256VLL7	72 MHz	100	LQFP	288 KB	256 KB	32 KB	2 KB	64 KB	5	1	1	32x8/36x4	6/4/0	2	1	1	1x8ch	2x2ch	2	1	1	4ch	38ch	2	1	3	6/4/2/0	-	16ch	68	T7
	MK30DX256VMC7	72 MHz	121	MAPBGA	288 KB	256 KB	32 KB	2 KB	64 KB	5	1	1	36x8/40x4	6/4/0	2	1	1	1x8ch	2x2ch	2	1	1	4ch	38ch	2	1	3	6/4/3/0	-	16ch	72	T7
	MK30DX64VLH7	72 MHz	64	LQFP	96 KB	64 KB	32 KB	2 KB	16 KB	3	1	1	16x8/20x4	5/0/0	2	1	1	1x8ch	2x2ch	2	1	1	2ch	22ch	2	1	3	3/4/2/0	-	16ch	40	T7
	MK30DX64VLK7	72 MHz	80	LQFP	96 KB	64 KB	32 KB	2 KB	16 KB	4	1	1	24x8/28x4	5/3/0	2	1	1	1x8ch	2x2ch	2	1	1	2ch	31ch	2	1	3	6/4/2/0	-	16ch	56	T7
	MK30DX64VMC7	72 MHz	121	MAPBGA	96 KB	64 KB	32 KB	2 KB	16 KB	5	1	1	36x8/40x4	6/4/0	2	1	1	1x8ch	2x2ch	2	1	1	4ch	38ch	2	1	3	6/4/3/0	-	16ch	72	T7
[1]	MK30DN512VLK10	100 MHz	80	LQFP	512 KB	512 KB	-	-	128 KB	4	1	1	24x8/28x4	5/3/0	2	1	1	1x8ch	2x2ch	2	1	1	2ch	31ch	2	1	3	6/4/2/0	Y	16ch	56	T7
[1]	MK30DN512VLL10	100 MHz	100	LQFP	512 KB	512 KB	-	-	128 KB	5	1	1	32x8/36x4	6/4/1	2	1	2	1x8ch	2x2ch	2	1	1	4ch	38ch	2	1	3	6/4/2/0	Y	16ch	68	T7
[1]	MK30DN512VLLQ10	100 MHz	144	LQFP	512 KB	512 KB	-	-	128 KB	6	1	1	40x8/44x4	6/4/2	2	1	2	1x8ch	2x2ch	2	1	1	4ch	46ch	2	2	3	6/5/4/0	Y	16ch	102	T7
[1]	MK30DN512VMC10	100 MHz	121	MAPBGA	512 KB	512 KB	-	-	128 KB	6	1	1	38x8/42x4	6/4/2	2	1	2	1x8ch	2x2ch	2	1	1	4ch	42ch	2	2	3	6/4/3/0	Y	16ch	90	T7
[1]	MK30DN512VMD10	100 MHz	144	MAPBGA	512 KB	512 KB	-	-	128 KB	6	1	1	40x8/44x4	6/4/2	2	1	2	1x8ch	2x2ch	2	1	1	4ch	46ch	2	2	3	6/5/4/0	Y	16ch	102	T7
[1]	MK30DX128VLQ10	100 MHz	144	LQFP	256 KB	128 KB	128 KB	4 KB	32 KB	6	1	1	40x8/44x4	6/4/2	2	1	2	1x8ch	2x2ch	2	1	1	4ch	46ch	2	2	3	6/5/4/0	Y	16ch	102	T7
[1]	MK30DX128VMD10	100 MHz	144	MAPBGA	256 KB	128 KB	128 KB	4 KB	32 KB	6	1	1	40x8/44x4	6/4/2	2	1	2	1x8ch	2x2ch	2	1	1	4ch	46ch	2	2	3	6/5/4/0	Y	16ch	102	T7
[1]	MK30DX256VLQ10	100 MHz	144	LQFP	512 KB	256 KB	256 KB	4 KB	64 KB	6	1	1	40x8/44x4	6/4/2	2	1	2	1x8ch	2x2ch	2	1	1	4ch	46ch	2	2	3	6/5/4/0	Y	16ch	102	T7
[1]	MK30DX256VMD10	100 MHz	144	MAPBGA	512 KB	256 KB	256 KB	4 KB	64 KB	6	1	1	40x8/44x4	6/4/2	2	1	2	1x8ch	2x2ch	2	1	1	4ch	46ch	2	2	3	6/5/4/0	Y	16ch	102	T7

### Common Features

Temp Range: -40° C to 105° C  
 Voltage Range: 1.71–3.6 V  
 Flash Write Voltage: 1.71 V  
 Main OSC: 32–40 KHz 3–32 MHz  
 Debug: JTAG, cJTAG, SWD

RTC (32 KHz OSC, Vbat)  
 PIT (32 bit): 1x4ch, TSI (Capacitive Touch): 16 input  
 Hardware Watchdog, Software Watchdog, PMC, MCG, NMI, CRC, DSP  
 Serial Programming Interface, CMT (Carrier Module Transmitter)  
 5 V Tolerant, V ref, Trace: TPIU, FPB, DWT, ITM

### Footnotes

[1] Trace: TPIU, FPB, DWT, ITM, ETM, ETB

# Kinetis K4x Family of USB and Segment LCD MCUs

## OVERVIEW

The Kinetis K4x MCU family, based on the ARM® Cortex®-M4 core, adds full-speed USB 2.0 On-The-Go with device charger detect capability and a flexible, low-power segment LCD controller with support for up to 320 segments. Devices start from 64 KB of flash in a 64-pin LQFN package extending up to 512 KB in a 144-pin MAPBGA package with a rich suite of analog, communication, timing and control peripherals. For more information about the Kinetis K4x MCU family, [click here](#).

## TARGET APPLICATIONS:

GPS receivers, blood glucose meters, bike computers, currency counters

## SUB-FAMILY K40: SEGMENT LCD MCU WITH USB

Footnotes	Part Number	CPU Frequency	Pin Count	Package	Total Flash Memory	Flash	FlexNVM	EEPROM/FlexRAM	SRAM	UART (Total)	High Baudrate UART w/ISO7816	High Baudrate UART	Enhanced SDHC (bit)	Segment LCD	SPI + Chip Selects	I <sup>2</sup> C	I <sup>2</sup> S	CAN	Motor Control General Purpose PWM	Quad Decoder General Purpose PWM	FTM External Clk	Low Power Timer	PDB	Total 16-bit ADC DP	Total 16-bit ADC SE	PGA	12-bit DAC	Analog Comparator	Analog Comparator Inputs	MPU	DMA	GPIO (w interrupt)	Evaluation Board (See Page 24)
	MK40DX128VLH7	72 MHz	64	LQFP	160 KB	128 KB	32 KB	2 KB	32 KB	3	1	1	-	16x8/20x4	5/0/0	2	1	1	1x8ch	2x2ch	2	1	1	2ch	18ch	2	1	3	3/4/2/0	-	16ch	36	T7
	MK40DX128VLK7	72 MHz	80	LQFP	160 KB	128 KB	32 KB	2 KB	32 KB	4	1	1	-	24x8/28x4	5/3/0	2	1	1	1x8ch	2x2ch	2	1	1	2ch	27ch	2	1	3	6/4/2/0	-	16ch	52	T7
	MK40DX128VLL7	72 MHz	100	LQFP	160 KB	128 KB	32 KB	2 KB	32 KB	5	1	1	-	32x8/36x4	6/4/0	2	1	1	1x8ch	2x2ch	2	1	1	4ch	34ch	2	1	3	6/4/2/0	-	16ch	64	T7
	MK40DX128VMC7	72 MHz	121	MAPBGA	160 KB	128 KB	32 KB	2 KB	32 KB	5	1	1	-	36x8/40x4	6/4/0	2	1	1	1x8ch	2x2ch	2	1	1	4ch	34ch	2	1	3	6/4/3/0	-	16ch	68	T7
	MK40DX256VLH7	72 MHz	64	LQFP	288 KB	256 KB	32 KB	2 KB	64 KB	3	1	1	-	16x8/20x4	5/0/0	2	1	1	1x8ch	2x2ch	2	1	1	2ch	18ch	2	1	3	3/4/2/0	-	16ch	36	T7
	MK40DX256VLK7	72 MHz	80	LQFP	288 KB	256 KB	32 KB	2 KB	64 KB	4	1	1	-	24x8/28x4	5/3/0	2	1	1	1x8ch	2x2ch	2	1	1	2ch	27ch	2	1	3	6/4/2/0	-	16ch	52	T7
	MK40DX256VLL7	72 MHz	100	LQFP	288 KB	256 KB	32 KB	2 KB	64 KB	5	1	1	-	32x8/36x4	6/4/0	2	1	1	1x8ch	2x2ch	2	1	1	4ch	34ch	2	1	3	6/4/2/0	-	16ch	64	T7
	MK40DX256VMC7	72 MHz	121	MAPBGA	288 KB	256 KB	32 KB	2 KB	64 KB	5	1	1	-	36x8/40x4	6/4/0	2	1	1	1x8ch	2x2ch	2	1	1	4ch	34ch	2	1	3	6/4/3/0	-	16ch	68	T7
	MK40DX64VLH7	72 MHz	64	LQFP	96 KB	64 KB	32 KB	2 KB	16 KB	3	1	1	-	16x8/20x4	5/0/0	2	1	1	1x8ch	1x2ch	2	1	1	2ch	18ch	2	1	3	3/4/2/0	-	16ch	36	T7
	MK40DX64VLK7	72 MHz	80	LQFP	96 KB	64 KB	32 KB	2 KB	16 KB	4	1	1	-	24x8/28x4	5/3/0	2	1	1	1x8ch	2x2ch	2	1	1	2ch	27ch	2	1	3	6/4/2/0	-	16ch	52	T7
	MK40DX64VLL7	72 MHz	121	MAPBGA	96 KB	64 KB	32 KB	2 KB	16 KB	5	1	1	-	36x8/40x4	6/4/0	2	1	1	1x8ch	2x2ch	2	1	1	4ch	34ch	2	1	3	6/4/3/0	-	16ch	68	T7
[1]	MK40DN512VLK10	100 MHz	80	LQFP	512 KB	512 KB	-	-	128 KB	4	1	1	4	24x8/28x4	5/3/0	2	1	1	1x8ch	2x2ch	2	1	1	2ch	27ch	2	1	3	6/4/2/0	Y	16ch	52	T7
[1]	MK40DN512VLL10	100 MHz	100	LQFP	512 KB	512 KB	-	-	128 KB	5	1	1	4	32x8/36x4	6/4/1	2	1	2	1x8ch	2x2ch	2	1	1	4ch	34ch	2	1	3	6/4/2/0	Y	16ch	64	T7
[1]	MK40DN512VLQ10	100 MHz	144	LQFP	512 KB	512 KB	-	-	128 KB	6	1	1	8	40x8/44x4	6/4/2	2	1	2	1x8ch	2x2ch	2	1	1	4ch	42ch	2	2	3	6/5/4/0	Y	16ch	98	T7
[1]	MK40DN512VMC10	100 MHz	121	MAPBGA	512 KB	512 KB	-	-	128 KB	6	1	1	8	38x8/42x4	6/4/2	2	1	2	1x8ch	2x2ch	2	1	1	4ch	38ch	2	2	3	6/4/3/0	Y	16ch	86	T7
[1]	MK40DN512VMD10	100 MHz	144	MAPBGA	512 KB	512 KB	-	-	128 KB	6	1	1	8	40x8/44x4	6/4/2	2	1	2	1x8ch	2x2ch	2	1	1	4ch	42ch	2	2	3	6/5/4/0	Y	16ch	98	T7
[1]	MK40DX128VLQ10	100 MHz	144	LQFP	256 KB	128 KB	128 KB	4 KB	32 KB	6	1	1	8	40x8/44x4	6/4/2	2	1	2	1x8ch	2x2ch	2	1	1	4ch	42ch	2	2	3	6/5/4/0	Y	16ch	98	T7
[1]	MK40DX128VMD10	100 MHz	144	MAPBGA	256 KB	128 KB	128 KB	4 KB	32 KB	6	1	1	8	40x8/44x4	6/4/2	2	1	2	1x8ch	2x2ch	2	1	1	4ch	42ch	2	2	3	6/5/4/0	Y	16ch	98	T7
[1]	MK40DX256VLQ10	100 MHz	144	LQFP	512 KB	256 KB	256 KB	4 KB	64 KB	6	1	1	8	40x8/44x4	6/4/2	2	1	2	1x8ch	2x2ch	2	1	1	4ch	42ch	2	2	3	6/5/4/0	Y	16ch	98	T7
[1]	MK40DX256VMD10	100 MHz	144	MAPBGA	512 KB	256 KB	256 KB	4 KB	64 KB	6	1	1	8	40x8/44x4	6/4/2	2	1	2	1x8ch	2x2ch	2	1	1	4ch	42ch	2	2	3	6/5/4/0	Y	16ch	98	T7

### Common Features

Temp Range: -40° C to 105° C  
 Voltage Range: 1.71-3.6 V  
 Flash Write Voltage: 1.71 V  
 Main OSC: 32-40 KHz/3-32 MHz  
 Debug: JTAG, cJTAG, SWD

RTC (32 KHz OSC, Vbat)  
 Trace: TPIU, FPB, DWT, ITM  
 PIT (32 bit): 1x4ch, TSI (Capacitive Touch): 16 input  
 Hardware Watchdog, Software Watchdog, PMC, MCG, NMI, CRC, DSP  
 Serial Programming Interface, CMT (Carrier Module Transmitter)  
 USB OTG LS/FS (1), USB Device Charge Detect, USB 120 mAReg

### Footnotes

[1] Trace: TPIU, FPB, DWT, ITM, ETM, ETB

# Kinetis K5x Family of Measurement MCUs

## OVERVIEW

The Kinetis K5x MCU family, based on the ARM® Cortex®-M4 core, provides designers with an analog measurement engine consisting of integrated operational and trans-impedance amplifiers as well as high-resolution ADC and DAC modules. The family also features IEEE® 1588 Ethernet and hardware encryption, full-speed USB 2.0 On-The-Go with device charger detect capability and a flexible low-power segment LCD controller with support for up to 320 segments. Devices start from 128 KB of flash in a 64-pin QFN package extending up to 512 KB in a 144-pin MAPBGA package. For more information about the Kinetis K5x MCU family, [click here](#).

## TARGET APPLICATIONS:

Low-power portable medical devices, clinical and lab equipment, test/measurement equipment, instrumentation applications, monitor and tele-health applications

## SUB-FAMILY K50: HIGH-PRECISION ANALOG MCU WITH USB

Footnotes	Part Number	CPU Frequency	Pin Count	Package	Total Flash Memory	Flash	FlexNVM	EEPROM/FlexRAM	SRAM	UART (Total)	High Baudrate UART w/ ISO7816	High Baudrate UART	Enhanced SDHC (bit)	Segment LCD	SPI + Chip Selects	I <sup>2</sup> C	I <sup>2</sup> S	CAN	Motor Control General Purpose PWM	Quad Decoder General Purpose PWM	FTM External Clk	Low Power Timer	PDB	Total 16-bit ADC DP	Total 16-bit ADC SE	PGA	12-bit DAC	Analog Comparator	Analog Comparator Inputs	OPAMP	TRIAMP	MPU	DMA	GPIO (w interrupt)	Evaluation Board (See Page 24)
	MK50DX128CLH7	72 MHz	64	LQFP	160 KB	128 KB	32 KB	2 KB	32 KB	3	1	1	–	–	5/0/0	2	1	–	1x8ch	2x2ch	2	1	1	2ch	22ch	1	1	2	6/4/1/0	2	1	–	16ch	35	T8
	MK50DX128CLK7	72 MHz	80	LQFP	160 KB	128 KB	32 KB	2 KB	32 KB	4	1	1	–	–	5/1/0	2	1	–	1x8ch	2x2ch	2	1	1	4ch	30ch	2	1	3	6/5/3/0	2	1	–	16ch	39	T8
	MK50DX128CMC7	72 MHz	121	MAPBGA	160 KB	128 KB	32 KB	2 KB	32 KB	5	1	1	–	–	6/4/0	2	1	–	1x8ch	2x2ch	2	1	1	4ch	36ch	2	1	3	6/5/5/0	2	1	–	16ch	63	T8
	MK50DX256CLK7	72 MHz	80	LQFP	288 KB	256 KB	32 KB	2 KB	64 KB	4	1	1	–	–	5/1/0	2	1	–	1x8ch	2x2ch	2	1	1	4ch	30ch	2	1	3	6/5/3/0	2	1	–	16ch	39	T8
	MK50DX256CLL7	72 MHz	100	LQFP	288 KB	256 KB	32 KB	2 KB	64 KB	5	1	1	–	–	6/3/0	2	1	–	1x8ch	2x2ch	2	1	1	4ch	34ch	2	1	3	6/5/5/0	2	1	–	16ch	59	T8
	MK50DX256CMC7	72 MHz	121	MAPBGA	288 KB	256 KB	32 KB	2 KB	64 KB	5	1	1	–	–	6/4/0	2	1	–	1x8ch	2x2ch	2	1	1	4ch	36ch	2	1	3	6/5/5/0	2	1	–	16ch	63	T8
[1]	MK50DN512CLL10	100 MHz	100	LQFP	512 KB	512 KB	–	–	128 KB	5	1	1	4	–	6/3/1	2	1	–	1x8ch	2x2ch	2	1	1	4ch	34ch	2	2	3	6/5/5/0	2	2	Y	16ch	59	T8
[1]	MK50DN512CLQ10	100 MHz	144	LQFP	512 KB	512 KB	–	–	128 KB	6	1	1	8	–	6/4/2	2	1	–	1x8ch	2x2ch	2	1	1	4ch	41ch	2	2	3	6/5/5/0	2	2	Y	16ch	96	T8
[1]	MK50DN512CMC10	100 MHz	121	MAPBGA	512 KB	512 KB	–	–	128 KB	6	1	1	8	–	6/4/2	2	1	–	1x8ch	2x2ch	2	1	1	4ch	37ch	2	2	3	6/5/5/0	2	2	Y	16ch	78	T8
[1]	MK50DN512CMD10	100 MHz	144	MAPBGA	512 KB	512 KB	–	–	128 KB	6	1	1	8	–	6/4/2	2	1	–	1x8ch	2x2ch	2	1	1	4ch	41ch	2	2	3	6/5/5/0	2	2	Y	16ch	96	T8
[1]	MK50DX256CLK10	100 MHz	80	LQFP	512 KB	256 KB	256 KB	4 KB	64 KB	4	1	1	–	–	5/1/0	2	1	–	1x8ch	2x2ch	2	1	1	4ch	30ch	2	2	3	6/5/3/0	2	2	Y	16ch	39	T8
[1]	MK50DX256CLL10	100 MHz	100	LQFP	512 KB	256 KB	256 KB	4 KB	64 KB	5	1	1	4	–	6/3/1	2	1	–	1x8ch	2x2ch	2	1	1	4ch	34ch	2	2	3	6/5/5/0	2	2	Y	16ch	59	T8
[1]	MK50DX256CMC10	100 MHz	121	MAPBGA	512 KB	256 KB	256 KB	4 KB	64 KB	6	1	1	8	–	6/4/2	2	1	–	1x8ch	2x2ch	2	1	1	4ch	37ch	2	2	3	6/5/5/0	2	2	Y	16ch	78	T8
[1]	MK50DX256CMD10	100 MHz	144	MAPBGA	512 KB	256 KB	256 KB	4 KB	64 KB	6	1	1	8	–	6/4/2	2	1	–	1x8ch	2x2ch	2	1	1	4ch	41ch	2	2	3	6/5/5/0	2	2	Y	16ch	96	T8

### Common Features

Temp Range: -40° C to 85° C  
 Voltage Range: 1.71–3.6 V  
 Flash Write Voltage: 1.71 V  
 Main OSC: 32–40 KHz/3–32 MHz  
 Debug: JTAG, cJTAG, SWD  
 RTC (32 KHz OSC, Vbat), V ref, 5 V Tolerant

Trace: TPIU, FPB, DWT, ITM  
 PIT (32 bit): 1x4ch, TSI (Capacitive Touch): 16 input  
 Hardware Watchdog, Software Watchdog, PMC, MCG, NMI, CRC, DSP  
 Serial Programming Interface, CMT (Carrier Module Transmitter)  
 USB OTG LS/FS (1), USB Device Charge Detect, USB 120 mAReg

### Footnotes

[1] Trace: TPIU, FPB, DWT, ITM, ETM, ETB



Footnotes	Part Number	CPU Frequency	Pin Count	Package	Total Flash Memory	Flash	FlexNVM	EEPROM/FlexRAM	SRAM	UART (Total)	High Baudrate UART w/ISO7816	High Baudrate UART	Enhanced SDHC (bit)	Segment LCD	SPI + Chip Selects	I <sup>2</sup> C	I <sup>2</sup> S	Motor Control General Purpose PWM	Quad Decoder General Purpose PWM	FTM External Clk	Low Power Timer	PDB	Total 16-bit ADC DP	Total 16-bit ADC SE	PGA	12-bit DAC	Analog Comparator	Analog Comparator Inputs	OPAMP	TRIAMP	MPU	DMA	GPIO (w interrupt)	Evaluation Board (See Page 24)
	MK51DX128CLH7	72 MHz	64	LQFP	160 KB	128 KB	32 KB	2 KB	32 KB	3	1	1	-	16x8/20x4	5/0/0	1	1	1x8ch	2x2ch	2	1	1	2ch	18ch	1	1	2	3/4/1/0	2	1	-	16ch	31	T8
	MK51DX128CLK7	72 MHz	80	LQFP	160 KB	128 KB	32 KB	2 KB	32 KB	4	1	1	-	24x8/28x4	5/2/0	2	1	1x8ch	2x2ch	2	1	1	4ch	30ch	2	1	3	6/5/3/0	2	1	-	16ch	39	T8
	MK51DX128CMC7	72 MHz	121	MAPBGA	160 KB	128 KB	32 KB	2 KB	32 KB	5	1	1	-	36x8/40x4	6/4/0	2	1	1x8ch	2x2ch	2	1	1	4ch	35ch	2	1	3	6/5/5/0	2	1	-	16ch	61	T8
	MK51DX256CLK7	72 MHz	80	LQFP	288 KB	256 KB	32 KB	2 KB	64 KB	4	1	1	-	24x8/28x4	5/2/0	2	1	1x8ch	2x2ch	2	1	1	4ch	30ch	2	1	3	6/5/3/0	2	1	-	16ch	39	T8
	MK51DX256CLL7	72 MHz	100	LQFP	288 KB	256 KB	32 KB	2 KB	64 KB	4	1	1	-	32x8/36x4	6/3/0	2	1	1x8ch	2x2ch	2	1	1	4ch	35ch	2	1	3	6/5/5/0	2	1	-	16ch	57	T8
	MK51DX256CMC7	72 MHz	121	MAPBGA	288 KB	256 KB	32 KB	2 KB	64 KB	5	1	1	-	36x8/40x4	6/4/0	2	1	1x8ch	2x2ch	2	1	1	4ch	35ch	2	1	3	6/5/5/0	2	1	-	16ch	61	T8
[1]	MK51DN256CLQ10	100 MHz	144	LQFP	256 KB	256 KB	-	-	64 KB	6	1	1	8	40x8/44x4	6/4/2	2	1	1x8ch	2x2ch	2	1	1	4ch	41ch	2	2	3	6/5/5/0	2	2	Y	16ch	94	T8
[1]	MK51DN256CMD10	100 MHz	144	MAPBGA	256 KB	256 KB	-	-	64 KB	6	1	1	8	40x8/44x4	6/4/2	2	1	1x8ch	2x2ch	2	1	1	4ch	41ch	2	2	3	6/5/5/0	2	2	Y	16ch	94	T8
[1]	MK51DN512CLL10	100 MHz	100	LQFP	512 KB	512 KB	-	-	128 KB	4	1	1	4	32x8/36x4	6/3/1	2	1	1x8ch	2x2ch	2	1	1	4ch	35ch	2	2	3	6/5/5/0	2	2	Y	16ch	57	T8
[1]	MK51DN512CLQ10	100 MHz	144	LQFP	512 KB	512 KB	-	-	128 KB	6	1	1	8	40x8/44x4	6/4/2	2	1	1x8ch	2x2ch	2	1	1	4ch	41ch	2	2	3	6/5/5/0	2	2	Y	16ch	94	T8
[1]	MK51DN512CMD10	100 MHz	121	MAPBGA	512 KB	512 KB	-	-	128 KB	6	1	1	8	38x8/42x4	6/4/2	2	1	1x8ch	2x2ch	2	1	1	4ch	37ch	2	2	3	6/5/5/0	2	2	Y	16ch	78	T8
[1]	MK51DN512CMD10	100 MHz	144	MAPBGA	512 KB	512 KB	-	-	128 KB	6	1	1	8	40x8/44x4	6/4/2	2	1	1x8ch	2x2ch	2	1	1	4ch	41ch	2	2	3	6/5/5/0	2	2	Y	16ch	94	T8
[1]	MK51DX256CLK10	100 MHz	80	LQFP	512 KB	256 KB	256 KB	4 KB	64 KB	4	1	1	-	24x8/28x4	5/2/0	2	1	1x8ch	2x2ch	2	1	1	4ch	30ch	2	2	3	6/5/3/0	2	2	Y	16ch	39	T8
[1]	MK51DX256CLL10	100 MHz	100	LQFP	512 KB	256 KB	256 KB	4 KB	64 KB	4	1	1	4	32x8/36x4	6/3/1	2	1	1x8ch	2x2ch	2	1	1	4ch	35ch	2	2	3	6/5/5/0	2	2	Y	16ch	57	T8
[1]	MK51DX256CMC10	100 MHz	121	MAPBGA	512 KB	256 KB	256 KB	4 KB	64 KB	6	1	1	8	38x8/42x4	6/4/2	2	1	1x8ch	2x2ch	2	1	1	4ch	37ch	2	2	3	6/5/5/0	2	2	Y	16ch	78	T8

**Common Features**

Temp Range: -40° C to 85° C  
 Voltage Range: 1.71-3.6 V  
 Flash Write Voltage: 1.71 V  
 Main OSC: 32-40 KHz/3-32 MHz  
 Debug: JTAG, cJTAG, SWD  
 RTC (32 KHz OSC, Vbat), V ref, 5 V Tolerant

Trace: TPIU, FPB, DWT, ITM  
 PIT (32 bit): 1x4ch, TSI (Capacitive Touch): 16 input  
 Hardware Watchdog, Software Watchdog, PMC, MCG, NMI, CRC, DSP  
 Serial Programming Interface, CMT (Carrier Module Transmitter)  
 USB OTG LS/FS (1), USB Device Charge Detect, USB 120 mAReg

**Footnotes**

[1] Trace: TPIU, FPB, DWT, ITM, ETM, ETB

**SUB-FAMILY K52: HIGH-PRECISION ANALOG MCU WITH USB AND ETHERNET**

Footnotes	Part Number	CPU Frequency	Pin Count	Package	Total Flash Memory	Flash	FlexNVM	EEPROM/FlexRAM	SRAM	UART (Total)	High Baudrate UART w/ISO7816	High Baudrate UART	Enhanced SDHC (bit)	SPI + Chip Selects	I <sup>2</sup> C	I <sup>2</sup> S	Ethernet w/1588	IEEE 1588 Timer (CLKIN)	Motor Control General Purpose PWM	Quad Decoder General Purpose PWM	FTM External Clk	Low Power Timer	PDB	Total 16-bit ADC DP	Total 16-bit ADC SE	PGA	12-bit DAC	Analog Comparator	Analog Comparator Inputs	OPAMP	TRIAMP	MPU	DMA	GPIO (w interrupt)	Evaluation Board (See Page 24)
	MK52DN512CLQ10	100 MHz	144	LQFP	512 KB	512 KB	-	-	128 KB	6	1	1	8	6/4/2	2	1	MII/RMII	1x4ch	1x8ch	2x2ch	2	1	1	4ch	41ch	2	2	3	6/5/5/0	2	2	Y	16ch	96	T8
	MK52DN512CMD10	100 MHz	144	MAPBGA	512 KB	512 KB	-	-	128 KB	6	1	1	8	6/4/2	2	1	MII/RMII	1x4ch	1x8ch	2x2ch	2	1	1	4ch	41ch	2	2	3	6/5/5/0	2	2	Y	16ch	96	T8

**Common Features**

Temp Range: -40° C to 85° C  
 Voltage Range: 1.71-3.6 V  
 Flash Write Voltage: 1.71 V  
 Main OSC: 32-40 KHz/3-32 MHz  
 Debug: JTAG, cJTAG, SWD  
 RTC (32 KHz OSC, Vbat), V ref, 5 V Tolerant

PIT (32 bit): 1x4ch, TSI (Capacitive Touch): 16 input  
 Hardware Watchdog, Software Watchdog, PMC, MCG, NMI, CRC, DSP  
 Serial Programming Interface, CMT (Carrier Module Transmitter)

Hardware Encryption  
 USB OTG LS/FS (1), USB Device Charge Detect, USB 120 mAReg  
 Trace: TPIU, FPB, DWT, ITM, ETM, ETB

**SUB-FAMILY K53: HIGH-PRECISION ANALOG MCU WITH USB, SEGMENT LCD AND ETHERNET**

Footnotes	Part Number	CPU Frequency	Pin Count	Package	Total Flash Memory	Flash	FlexNVM	EEPROM/FlexRAM	SRAM	UART (Total)	High Baudrate UART w/ISO7816	High Baudrate UART	Enhanced SDHC (bit)	Ethernet w/1588	SPI + Chip Selects	I <sup>2</sup> C	I <sup>2</sup> S	Ethernet w/1588	IEEE 1588 Timer (CLKIN)	Motor Control General Purpose PWM	Quad Decoder General Purpose PWM	FTM External Clk	Low Power Timer	PDB	Total 16-bit ADC DP	Total 16-bit ADC SE	PGA	12-bit DAC	Analog Comparator	Analog Comparator Inputs	OPAMP	TRIAMP	MPU	DMA	GPIO (w interrupt)	Evaluation Board (See Page 24)
	MK53DN512CLQ10	100 MHz	144	LQFP	512 KB	512 KB	-	-	128 KB	6	1	1	8	40x8/44x4	6/4/2	2	1	MII/RMII	1x4ch	1x8ch	2x2ch	2	1	1	4ch	41ch	2	2	3	6/5/5/0	2	2	16ch	94	T8	
	MK53DN512CMD10	100 MHz	144	MAPBGA	512 KB	512 KB	-	-	128 KB	6	1	1	8	40x8/44x4	6/4/2	2	1	MII/RMII	1x4ch	1x8ch	2x2ch	2	1	1	4ch	41ch	2	2	3	6/5/5/0	2	2	16ch	94	T8	
	MK53DX256CLQ10	100 MHz	144	LQFP	512 KB	256 KB	256 KB	4 KB	64 KB	6	1	1	8	40x8/44x4	6/4/2	2	1	MII/RMII	1x4ch	1x8ch	2x2ch	2	1	1	4ch	41ch	2	2	3	6/5/5/0	2	2	16ch	94	T8	
	MK53DX256CMD10	100 MHz	144	MAPBGA	512 KB	256 KB	256 KB	4 KB	64 KB	6	1	1	8	40x8/44x4	6/4/2	2	1	MII/RMII	1x4ch	1x8ch	2x2ch	2	1	1	4ch	41ch	2	2	3	6/5/5/0	2	2	16ch	94	T8	

**Common Features**

Temp Range: -40° C to 85° C  
 Voltage Range: 1.71-3.6 V  
 Flash Write Voltage: 1.71 V  
 Main OSC: 32-40 KHz/3-32 MHz  
 Debug: JTAG, cJTAG, SWD  
 RTC (32 KHz OSC, Vbat), V ref, 5 V Tolerant

PIT (32 bit): 1x4ch, TSI (Capacitive Touch): 16 input  
 Hardware Watchdog, Software Watchdog, PMC, MCG, NMI, CRC, DSP  
 Serial Programming Interface, CMT (Carrier Module Transmitter)

Ethernet w/1588:  
 Hardware Encryption, MPU  
 USB OTG LS/FS (1), USB Device Charge Detect, USB 120 mAReg  
 Trace: TPIU, FPB, DWT, ITM, ETM, ETB

# Kinetis K6x Family of Ethernet MCUs

## OVERVIEW

The Kinetis K6x MCU family, based on the ARM® Cortex®-M4 core, are pin, peripheral and software compatible with many of the Kinetis K series MCU families, offering IEEE 1588 Ethernet and full- and optional high-speed USB 2.0 On-The-Go, including options with USB crystal-less functionality. Devices start from 256 KB of flash in a 100-pin QFP package extending up to 1 MB of flash and 256 KB of SRAM in a 256-pin MAPBGA package. These devices offer various levels of integration, with a rich suite of analog, communication, timing and

control peripherals. Next-generation Kinetis K6x MCUs are further optimized for performance and power consumption, offering more streamlined integration for further BOM cost reductions. For more information about the Kinetis K6x MCU family, [click here](#).

## TARGET APPLICATIONS:

Building control, factory automation, industrial drivers, IoT data concentrators, medical monitoring

## SUB-FAMILY K60: ETHERNET MCU WITH MIXED-SIGNAL INTEGRATION

Footnotes	Part Number	CPU Frequency	Pin Count	Package	Total Flash Memory	Flash	FlexNVM	EEPROM/FlexSRAM	SRAM	UART (Total)	High Baudrate UART w/ISO7816	High Baudrate UART	Enhanced SDHC (bit)	SPI + Chip Selects	I <sup>2</sup> C	I <sup>2</sup> S	CAN	Ethernet w/1588	IEEE 1588 Timer (CLKIN)	Motor Control General Purpose PWM	Quad Decoder General Purpose PWM	FTM External Clk	Low Power Timer	PDB	Total 16-bit ADC DP	Total 16-bit ADC SE	PGA	12-bit DAC	Analog Comparator	Analog Comparator Inputs	Cache	DMA	GPIO (w interrupt)	Evaluation Board (See Page 24)
	MK60DN256VLL10	100 MHz	100	LQFP	256 KB	256 KB	-	-	64 KB	5	1	1	4	6/4/1	2	1	2	RMII	1x3ch	1x8ch	2x2ch	2	1	1	4ch	33ch	2	1	3	6/5/5/0	-	16ch	66	T9
	MK60DN256VLQ10	100 MHz	144	LQFP	256 KB	256 KB	-	-	64 KB	6	1	1	8	6/4/2	2	1	2	MII/RMII	1x4ch	1x8ch	2x2ch	2	1	1	4ch	42ch	2	2	3	6/5/4/0	-	16ch	100	T9
	MK60DN256VMC10	100 MHz	121	MAPBGA	256 KB	256 KB	-	-	64 KB	6	1	1	8	6/4/2	2	1	2	RMII	1x4ch	1x8ch	2x2ch	2	1	1	4ch	38ch	2	2	3	6/4/3/0	-	16ch	86	T9
	MK60DN256VMD10	100 MHz	144	MAPBGA	256 KB	256 KB	-	-	64 KB	6	1	1	8	6/4/2	2	1	2	MII/RMII	1x4ch	1x8ch	2x2ch	2	1	1	4ch	42ch	2	2	3	6/5/4/0	-	16ch	100	T9
	MK60DN512VLL10	100 MHz	100	LQFP	512 KB	512 KB	-	-	128 KB	5	1	1	4	6/4/1	2	1	2	RMII	1x3ch	1x8ch	2x2ch	2	1	1	4ch	33ch	2	1	3	6/5/5/0	-	16ch	66	T9
	MK60DN512VLQ10	100 MHz	144	LQFP	512 KB	512 KB	-	-	128 KB	6	1	1	8	6/4/2	2	1	2	MII/RMII	1x4ch	1x8ch	2x2ch	2	1	1	4ch	42ch	2	2	3	6/5/4/0	-	16ch	100	T9
	MK60DN512VMC10	100 MHz	121	MAPBGA	512 KB	512 KB	-	-	128 KB	6	1	1	8	6/4/2	2	1	2	RMII	1x4ch	1x8ch	2x2ch	2	1	1	4ch	38ch	2	2	3	6/4/3/0	-	16ch	86	T9
	MK60DN512VMD10	100 MHz	144	MAPBGA	512 KB	512 KB	-	-	128 KB	6	1	1	8	6/4/2	2	1	2	MII/RMII	1x4ch	1x8ch	2x2ch	2	1	1	4ch	42ch	2	2	3	6/5/4/0	-	16ch	100	T9
[1]	MK60DN512ZCAB10R	100 MHz	120	WLCSP	512 KB	512 KB	-	-	128 KB	6	1	1	4	6/4/1	2	1	2	RMII	1x4ch	1x8ch	2x2ch	2	1	1	4ch	38ch	2	2	3	6/5/3/0	-	16ch	79	T9
	MK60DX256VLL10	100 MHz	100	LQFP	512 KB	256 KB	256 KB	4 KB	64 KB	5	1	1	4	6/4/1	2	1	2	RMII	1x3ch	1x8ch	2x2ch	2	1	1	4ch	33ch	2	1	3	6/5/5/0	-	16ch	66	T9
	MK60DX256VLQ10	100 MHz	144	LQFP	512 KB	256 KB	256 KB	4 KB	64 KB	6	1	1	8	6/4/2	2	1	2	MII/RMII	1x4ch	1x8ch	2x2ch	2	1	1	4ch	42ch	2	2	3	6/5/4/0	-	16ch	100	T9
	MK60DX256VMC10	100 MHz	121	MAPBGA	512 KB	256 KB	256 KB	4 KB	64 KB	6	1	1	8	6/4/2	2	1	2	RMII	1x4ch	1x8ch	2x2ch	2	1	1	4ch	38ch	2	2	3	6/4/3/0	-	16ch	86	T9
	MK60DX256VMD10	100 MHz	144	MAPBGA	512 KB	256 KB	256 KB	4 KB	64 KB	6	1	1	8	6/4/2	2	1	2	MII/RMII	1x4ch	1x8ch	2x2ch	2	1	1	4ch	42ch	2	2	3	6/5/4/0	-	16ch	100	T9
[2]	MK60FN1M0VQLQ12	120 MHz	144	LQFP	1 MB	1 MB	-	-	128 KB	6	2	0	8	6/4/2	2	2	2	MII/RMII	1x4ch	2x8ch	2x2ch	2	1	1	4ch	58ch	4	2	4	5/2/2/5	16 KB	32ch	100	T10
[2]	MK60FN1M0VMD12	120 MHz	144	MAPBGA	1 MB	1 MB	-	-	128 KB	6	2	0	8	6/4/2	2	2	2	MII/RMII	1x4ch	2x8ch	2x2ch	2	1	1	4ch	58ch	4	2	4	5/2/2/5	16 KB	32ch	100	T10
[2]	MK60FX512VLQ12	120 MHz	144	LQFP	1 MB	512 KB	512 KB	16 KB	128 KB	6	2	0	8	6/4/2	2	2	2	MII/RMII	1x4ch	2x8ch	2x2ch	2	1	1	4ch	58ch	4	2	4	5/2/2/5	16 KB	32ch	100	T10
[2]	MK60FX512VMD12	120 MHz	144	MAPBGA	1 MB	512 KB	512 KB	16 KB	128 KB	6	2	0	8	6/4/2	2	2	2	MII/RMII	1x4ch	2x8ch	2x2ch	2	1	1	4ch	58ch	4	2	4	5/2/2/5	16 KB	32ch	100	T10
[2]	MK60FN1M0VQLQ15	150 MHz	144	LQFP	1 MB	1 MB	-	-	128 KB	6	2	0	8	6/4/2	2	2	2	MII/RMII	1x4ch	2x8ch	2x2ch	2	1	1	4ch	58ch	4	2	4	5/2/2/5	16 KB	32ch	100	T10
[2]	MK60FN1M0VMD15	150 MHz	144	MAPBGA	1 MB	1 MB	-	-	128 KB	6	2	0	8	6/4/2	2	2	2	MII/RMII	1x4ch	2x8ch	2x2ch	2	1	1	4ch	58ch	4	2	4	5/2/2/5	16 KB	32ch	100	T10
[2]	MK60FX512VLQ15	150 MHz	144	LQFP	1 MB	512 KB	512 KB	16 KB	128 KB	6	2	0	8	6/4/2	2	2	2	MII/RMII	1x4ch	2x8ch	2x2ch	2	1	1	4ch	58ch	4	2	4	5/2/2/5	16 KB	32ch	100	T10
[2]	MK60FX512VMD15	150 MHz	144	MAPBGA	1 MB	512 KB	512 KB	16 KB	128 KB	6	2	0	8	6/4/2	2	2	2	MII/RMII	1x4ch	2x8ch	2x2ch	2	1	1	4ch	58ch	4	2	4	5/2/2/5	16 KB	32ch	100	T10

### Common Features

Temp Range: -40° C to 105° C  
Voltage Range: 1.71–3.6 V  
Flash Write Voltage: 1.71 V  
Trace: TPIU, FPB, DWT, ITM, ETM, ETB

Main OSC: 32–40 KHz/3–32 MHz  
Debug: JTAG, cJTAG, SWD  
RTC (32 KHz OSC, Vbat), V ref, MPU  
Hardware Encryption, 5 V Tolerant

PIT (32 bit): 1x4ch, TSI (Capacitive Touch): 16 input  
Hardware Watchdog, Software Watchdog, PMC, MCG, NMI, CRC, DSP  
Serial Programming Interface, CMT (Carrier Module Transmitter)  
USB Device Charge Detect, USB 120 mAReg, USB OTG LS/FS (1)

### Footnotes

[1] Temp Range: -40° C to 85° C  
[2] Secondary OSC: 32–40 KHz/8–32 MHz, [2]SPFPU  
[2] NAND Flash Controller, [2]USB OTG LS/FS/HS (1)  
[2] Main OSC: 32–40 KHz/8–32 MHz

Footnotes	Part Number	CPU Frequency	Pin Count	Package	Total Flash Memory	Flash	FlexNVM	EEPROM/FlexRAM	SRAM	UART (Total)	High Baudrate UART w/ISO7816	High Baudrate UART	Enhanced SDHC (bit)	SPI + Chip Selects	I <sup>2</sup> C	I <sup>2</sup> S	CAN	Ethernet w/1588	IEEE 1588 Timer (CLKIN)	Motor Control General Purpose PWM	Quad Decoder General Purpose PWM	FTM External Clk	Low Power Timer	PDB	Total 16-bit ADC DP	Total 16-bit ADC SE	PGA	12-bit DAC	Analog Comparator	Analog Comparator Inputs	Cache	DMA	GPIO (w interrupt)	Evaluation Board (See Page 24)
[1]	MK61FN1M0CAA12R	120 MHz	143	WLCSP	1 MB	1 MB	-	-	128 KB	6	2	-	4	6/4/1	2	2	2	RMI	1x4ch	2x8ch	2x2ch	2	1	1	4ch	45ch	4	2	4	5/1/2/5	16 KB	32ch	79	T10
[2]	MK61FN1M0VMD12	120 MHz	144	MAPBGA	1 MB	1 MB	-	-	128 KB	6	2	-	8	6/4/2	2	2	2	MII/RMII	1x4ch	2x8ch	2x2ch	2	1	1	4ch	53ch	4	2	4	5/2/2/5	16 KB	32ch	95	T10
[2]	MK61FN1M0VMJ12	120 MHz	256	MAPBGA	1 MB	1 MB	-	-	128 KB	6	2	Y	8	6/4/2	2	2	2	MII/RMII	1x4ch	2x8ch	2x2ch	2	1	1	4ch	77ch	4	2	4	5/2/2/5	16 KB	32ch	128	T10
[2]	MK61FX512VMD12	120 MHz	144	MAPBGA	1 MB	512 KB	512 KB	16 KB	128 KB	6	2	-	8	6/4/2	2	2	2	MII/RMII	1x4ch	2x8ch	2x2ch	2	1	1	4ch	53ch	4	2	4	5/2/2/5	16 KB	32ch	95	T10
[2]	MK61FX512VMJ12	120 MHz	256	MAPBGA	1 MB	512 KB	512 KB	16 KB	128 KB	6	2	Y	8	6/4/2	2	2	2	MII/RMII	1x4ch	2x8ch	2x2ch	2	1	1	4ch	77ch	4	2	4	5/2/2/5	16 KB	32ch	128	T10
[2]	MK61FN1M0VMD15	150 MHz	144	MAPBGA	1 MB	1 MB	-	-	128 KB	6	2	-	8	6/4/2	2	2	2	MII/RMII	1x4ch	2x8ch	2x2ch	2	1	1	4ch	53ch	4	2	4	5/2/2/5	16 KB	32ch	95	T10
[2]	MK61FN1M0VMJ15	150 MHz	256	MAPBGA	1 MB	1 MB	-	-	128 KB	6	2	Y	8	6/4/2	2	2	2	MII/RMII	1x4ch	2x8ch	2x2ch	2	1	1	4ch	77ch	4	2	4	5/2/2/5	16 KB	32ch	128	T10
[2]	MK61FX512VMD15	150 MHz	144	MAPBGA	1 MB	512 KB	512 KB	16 KB	128 KB	6	2	-	8	6/4/2	2	2	2	MII/RMII	1x4ch	2x8ch	2x2ch	2	1	1	4ch	53ch	4	2	4	5/2/2/5	16 KB	32ch	95	T10
[2]	MK61FX512VMJ15	150 MHz	256	MAPBGA	1 MB	512 KB	512 KB	16 KB	128 KB	6	2	Y	8	6/4/2	2	2	2	MII/RMII	1x4ch	2x8ch	2x2ch	2	1	1	4ch	77ch	4	2	4	5/2/2/5	16 KB	32ch	128	T10

**Common Features**

Temp Range: -40° C to 105° C  
 Voltage Range: 1.71–3.6 V  
 Flash Write Voltage: 1.71 V  
 Debug: JTAG, cJTAG, SWD; Trace: TPIU, FPB, DWT, ITM, ETM, ETB

Main OSC: 32–40 KHz/8–32 MHz  
 Secondary OSC: 32–40 KHz/8–32 MHz  
 Debug: JTAG, cJTAG, SWD  
 RTC (32 KHz OSC, Vbat), V ref, SPFFU, MPU  
 USB Device Charge Detect, USB 120 mAReg, USB OTG LS/FS (1)

PIT (32 bit): 1x4ch, TSI (Capacitive Touch): 16 input  
 Hardware Watchdog, Software Watchdog, PMC, MCG, NMI, CRC, DSP  
 Serial Programming Interface, CMT (Carrier Module Transmitter)  
 Hardware Encryption, Tamper Detect, 5 V Tolerant

**Footnotes**

[1] Temp Range: -40° C to 85° C  
 [2] NAND Flash Controller, [2] USB OTG LS/FS/HS (1)

**SUB-FAMILY K63: ETHERNET MCU WITH 256 KB SRAM AND TAMPER DETECTION**

Footnotes	Part Number	CPU Frequency	Pin Count	Package	Total Flash Memory	Flash	FlexNVM	EEPROM/FlexRAM	SRAM	UART (Total)	High Baudrate UART w/ISO7816	High Baudrate UART	Enhanced SDHC (bit)	SPI + Chip Selects	I <sup>2</sup> C	I <sup>2</sup> S	CAN	Ethernet w/1588	IEEE 1588 Timer (CLKIN)	Motor Control General Purpose PWM	Quad Decoder General Purpose PWM	FTM External Clk	Low Power Timer	PDB	Total 16-bit ADC DP	Total 16-bit ADC SE	PGA	12-bit DAC	Analog Comparator	Analog Comparator Inputs	Cache	DMA	GPIO (w interrupt)	Evaluation Board (See Page 24)
	MK63FN1M0VLQ12	120 MHz	144	LQFP	1 MB	1 MB	-	-	256 KB	6	1	1	8	6/4/2	3	1	1	MII/RMII	1x4ch	2x8ch	2x2ch	2	1	1	4ch	41ch	-	2	3	4/3/3/0	Y	16ch	100	T11
	MK63FN1M0VMD12	120 MHz	144	MAPBGA	1 MB	1 MB	-	-	256 KB	6	1	1	8	6/4/2	3	1	1	MII/RMII	1x4ch	2x8ch	2x2ch	2	1	1	4ch	41ch	-	2	3	6/5/4/0	-	16ch	95	T11

**Common Features**

Temp Range: -40° C to 105° C  
 Voltage Range: 1.71–3.6 V  
 Flash Write Voltage: 1.71 V

Main OSC: 32–40 KHz/8–32 MHz  
 Debug: JTAG, cJTAG, SWD, 48 MHz IRC  
 RTC (32 KHz OSC, Vbat), 5 V Tolerant

PIT (32 bit): 1x4ch, Crystal-less USB Enabled (FS Mode only)  
 Hardware Watchdog, Software Watchdog, PMC, MCG, NMI, CRC, DSP  
 Serial Programming Interface, CMT (Carrier Module Transmitter)

Hardware Encryption, Tamper Detect  
 USB Device Charge Detect, USB 120 mAReg,  
 USB OTG LS/FS (1), SPFFU, MPU  
 Trace: TPIU, FPB, DWT, ITM, ETM, ETB

Footnotes	Part Number	CPU Frequency	Pin Count	Package	Total Flash Memory	Flash	FlexNVM	EEPROM/FlexRAM	SRAM	UART (Total)	High Baudrate UART w/ISO7816	High Baudrate UART	Enhanced SDHC (bit)	SPI + Chip Selects	I <sup>2</sup> C	I <sup>2</sup> S	CAN	Ethernet w/1588	IEEE 1588 Timer (CLKIN)	Motor Control General Purpose PWM	Quad Decoder General Purpose PWM	FTM External Clk	Low Power Timer	PDB	Total 16-bit ADC DP	Total 16-bit ADC SE	PGA	12-bit DAC	Analog Comparator	Analog Comparator Inputs	DMA	GPIO (w interrupt)	Evaluation Board (See Page 24)
	MK64FN1M0VDC12	120 MHz	121	XFPGA	1 MB	1 MB	-	-	256 KB	6	1	1	8	6/4/2	3	1	1	RMII	1x3ch	2x8ch	2x2ch	2	1	1	4ch	37ch	-	2	3	6/5/4/0	16ch	83	T11/F3
	MK64FN1M0VLL12	120 MHz	100	LQFP	1 MB	1 MB	-	-	256 KB	5	1	1	4	6/4/1	3	1	1	RMII	1x2ch	2x8ch	2x2ch	2	1	1	4ch	32ch	-	1	3	5/4/2/0	16ch	66	T11/F3
	MK64FN1M0VLQ12	120 MHz	144	LQFP	1 MB	1 MB	-	-	256 KB	6	1	1	8	6/4/2	3	1	1	MII/RMII	1x4ch	2x8ch	2x2ch	2	1	1	4ch	41ch	-	2	3	6/5/4/0	16ch	100	T11/F3
	MK64FN1M0VMD12	120 MHz	144	MAPBGA	1 MB	1 MB	-	-	256 KB	6	1	1	8	6/4/2	3	1	1	MII/RMII	1x4ch	2x8ch	2x2ch	2	1	1	4ch	41ch	-	2	3	6/5/4/0	16ch	100	T11/F3
	MK64FX512VDC12	120 MHz	121	XFPGA	640 KB	512 KB	128 KB	4 KB	256 KB	6	1	1	8	6/4/2	3	1	1	RMII	1x3ch	2x8ch	2x2ch	2	1	1	4ch	37ch	-	2	3	6/5/4/0	16ch	86	T11/F3
	MK64FX512VLL12	120 MHz	100	LQFP	640 KB	512 KB	128 KB	4 KB	256 KB	5	1	1	4	6/4/1	3	1	1	RMII	1x2ch	2x8ch	2x2ch	2	1	1	4ch	32ch	-	1	3	5/4/2/0	16ch	66	T11/F3
	MK64FX512VLLQ12	120 MHz	144	LQFP	640 KB	512 KB	128 KB	4 KB	256 KB	6	1	1	8	6/4/2	3	1	1	MII/RMII	1x4ch	2x8ch	2x2ch	2	1	1	4ch	41ch	-	2	3	6/5/4/0	16ch	100	T11/F3
	MK64FX512VMD12	120 MHz	144	MAPBGA	640 KB	512 KB	128 KB	4 KB	256 KB	6	1	1	8	6/4/2	3	1	1	MII/RMII	1x4ch	2x8ch	2x2ch	2	1	1	4ch	41ch	-	2	3	6/5/4/0	16ch	100	T11/F3

**Common Features**

 Temp Range: -40° C to 105° C  
 Voltage Range: 1.71-3.6 V

 Main OSC: 32-40 KHz/8-32 MHz  
 Debug: JTAG, cJTAG, SWD, 48 MHz IRC

 PIT (32 bit): 1x4ch, Crystal-less USB Enabled (FS Mode only)  
 Hardware Watchdog, Software Watchdog, PMC, MCG, NMI, CRC, DSP

 Hardware Encryption, Tamper Detect  
 USB Device Charge Detect, USB 120 mAReg, USB OTG LS/FS (1)

**SUB-FAMILY K65: ETHERNET MCU WITH 2 MB FLASH, 256 KB SRAM AND TAMPER DETECTION**

Footnotes	Part Number	CPU Frequency	Pin Count	Package	Total Flash Memory	Flash	FlexNVM	EEPROM/FlexRAM	SRAM	UART (Total)	High Baudrate UART w/ISO7816	High Baudrate UART	Enhanced SDHC (bit)	SPI + Chip Selects	I <sup>2</sup> C	I <sup>2</sup> S	CAN	Motor Control General Purpose PWM	Quad Decoder General Purpose PWM	FTM External Clk	Low Power Timer	PDB	Total 16-bit ADC DP	Total 16-bit ADC SE	12-bit DAC	Analog Comparator	Analog Comparator Inputs	Vref	MPU	SPFPU	DMA	5 V Tolerant	GPIO (w interrupt)	Evaluation Board (See Page 24)	Memory mapped Crypto Acceleration unit	Tamper Detect (DryIce)	Number of External Tamper Pins	CRC
	MK65FN2M0CAC18R	180	169	WLCSP	2048	2048	-	-	256	6	Y	Y	8	6/4/2	4	1	2	2x8ch	2x2ch	2	1	1	3	45	0/2	4	6/6/4/4	Y	Y	Y	32ch	-	116	T15	Y	Y	8	Y
	MK65FX1M0CAC18R	180	169	WLCSP	1280	1024	256	4	256	6	Y	Y	8	6/4/2	4	1	2	2x8ch	2x2ch	2	1	1	3	45	0/2	4	6/6/4/4	Y	Y	Y	32ch	-	116	T15	Y	Y	8	Y
	MK65FN2M0VM118	180	169	MAPBGA	2048	2048	-	-	256	6	Y	Y	8	6/4/2	4	1	2	2x8ch	2x2ch	2	1	1	3	45	0/2	4	6/6/4/4	Y	Y	Y	32ch	-	116	T15	Y	Y	8	Y
	MK65FX1M0VM118	180	169	MAPBGA	1280	1024	256	4	256	6	Y	Y	8	6/4/2	4	1	2	2x8ch	2x2ch	2	1	1	3	45	0/2	4	6/6/4/4	Y	Y	Y	32ch	-	116	T15	Y	Y	8	Y

**Common Features**

 Temperature range: -40° C to 105° C  
 Voltage range: 1.71 to 3.6 V  
 Flash write voltage: 1.71

 Main OSC: 32-40 kHz/3-32 MHz  
 Debug: JTAG, cJTAG, SWD, 48 MHz IRC  
 RTC (32 KHz OSC, Vbat)

 PPIT (32 bit): 1x4ch, Hardware Watchdog, Software Watchdog,  
 PMC, MCG, NMI, CRC, DSP  
 Tamper Detect, Hardware Encryption, USB

 Device Charge Detect, Crystal-less FS USB, USB  
 LS/FS and USB HS with integrated HS PHY

**SUB-FAMILY K66: ETHERNET MCU WITH 2 MB FLASH AND 256 KB SRAM**

Footnotes	Part Number	CPU Frequency	Pin Count	Package	Total Flash Memory	Flash	FlexNVM	EEPROM/FlexRAM	SRAM	UART (Total)	High Baudrate UART w/ISO7816	High Baudrate UART	Enhanced SDHC (bit)	SPI + Chip Selects	I <sup>2</sup> C	I <sup>2</sup> S	CAN	Motor Control General Purpose PWM	Quad Decoder General Purpose PWM	FTM External Clk	Low Power Timer	PDB	Total 16-bit ADC DP	Total 16-bit ADC SE	12-bit DAC	Analog Comparator	Analog Comparator Inputs	Vref	MPU	SPFPU	DMA	5 V Tolerant	GPIO (w interrupt)	Evaluation Board (See Page 24)	Memory mapped Crypto Acceleration unit	CRC
	MK66FN2M0VLQ18	180	144	LQFP	2048	2048	-	-	256	6	Y	Y	8	6/4/2	4	1	2	2x8ch	2x2ch	2	1	1	1	39	0/2	4	6/6/4/4	Y	Y	Y	32 ch	-	100	T15	Y	Y
	MK66FN2M0VMD18	180	144	MAPBGA	2048	2048	-	-	256	6	Y	Y	8	6/4/2	4	1	2	2x8ch	2x2ch	2	1	1	1	39	0/2	4	6/6/4/4	Y	Y	Y	32 ch	-	100	T15	Y	Y
	MK66FX1M0VLQ18	180	144	LQFP	1280	1024	256	4	256	6	Y	Y	8	6/4/2	4	1	2	2x8ch	2x2ch	2	1	1	1	39	0/2	4	6/6/4/4	Y	Y	Y	32 ch	-	100	T15	Y	Y
	MK66FX1M0VMD18	180	144	MAPBGA	1280	1024	256	4	256	6	Y	Y	8	6/4/2	4	1	2	2x8ch	2x2ch	2	1	1	1	39	0/2	4	6/6/4/4	Y	Y	Y	32 ch	-	100	T15	Y	Y

**Common Features**

 Temperature range: -40° C to 105° C  
 Voltage range: 1.71 to 3.6 V  
 Flash write voltage: 1.71

 Main OSC: 32-40 kHz/8-32 MHz  
 Debug: JTAG, cJTAG, SWD, 48 MHz IRC  
 RTC (32 KHz OSC, Vbat)

 PIT (32 bit): 1x4ch, Hardware Watchdog,  
 Software Watchdog  
 PMC, MCG, NMI, CRC, DSP

 Hardware Encryption, USB Device Charge Detect,  
 Crystal-less FS USB, USB LS/FS and USB HS with  
 integrated HS PHY

Trace: TPIU, FPB, DWT, ITM, ETM, ETB



# Kinetis K7x Family of Graphic LCD MCUs

## OVERVIEW

The Kinetis K7x MCU family, based on the ARM® Cortex®-M4 core, includes an integrated graphics LCD controller, IEEE 1588 Ethernet MAC, full- and high-speed USB 2.0 On-The-Go with device charger detect capability, hardware encryption and tamper detection capabilities. The K70 MCU is available with 512 KB or 1 MB of flash in a 256-pin MBGA package. Each MCU includes a rich suite of analog, communication, timing and control peripherals. All K70 MCUs include a single precision floating point unit and NAND flash controller. 256-pin versions include an on-chip DRAM controller for system expansion. For more information about the Kinetis K7x MCU family, [click here](#).

## TARGET APPLICATIONS:

Industrial control panels, navigational displays, electronic point-of-sales (EPOS) terminals, medical monitoring equipment

## SUB-FAMILY K70: GRAPHICS MCU WITH HS USB, ETHERNET, DDR CONTROLLER AND TAMPER DETECTION

Footnotes	Part Number	CPU Frequency	Pin Count	Package	Total Flash Memory	Flash	FlexNVM	EEPROM/FlexRAM	SRAM	UART (Total)	High Baudrate UART w/ISO7816	Enhanced SDHC (bit)	Graphic LCD	SPI + Chip Selects	I <sup>2</sup> C	I <sup>2</sup> S	CAN	Ethernet w/1588	IEEE 1588 Timer (CLKIN)	Motor Control General Purpose PWM	Quad Decoder General Purpose PWM	FTM External Clk	Low Power Timer	PDB	Total 16-bit ADC DP	Total 16-bit ADC SE	PGA	12-bit DAC	Analog Comparator	Analog Comparator Inputs	Cache	DMA	GPIO (w interrupt)	Evaluation Board (See Page 24)
	MK70FN1M0VMJ12	120 MHz	256	MAPBGA	1 MB	1 MB	-	-	128 KB	6	2	8	800x600	6/4/2	2	2	2	MII/RMII	1x4ch	2x8ch	2x2ch	2	1	1	4ch	77ch	4	2	4	5/2/2/5	16 KB	32ch	128	T13
	MK70FX512VMJ12	120 MHz	256	MAPBGA	1 MB	512 KB	512 KB	16 KB	128 KB	6	2	8	800x600	6/4/2	2	2	2	MII/RMII	1x4ch	2x8ch	2x2ch	2	1	1	4ch	77ch	4	2	4	5/2/2/5	16 KB	32ch	128	T13
	MK70FN1M0VMJ15	150 MHz	256	MAPBGA	1 MB	1 MB	-	-	128 KB	6	2	8	800x600	6/4/2	2	2	2	MII/RMII	1x4ch	2x8ch	2x2ch	2	1	1	4ch	77ch	4	2	4	5/2/2/5	16 KB	32ch	128	T13
	MK70FX512VMJ15	150 MHz	256	MAPBGA	1 MB	512 KB	512 KB	16 KB	128 KB	6	2	8	800x600	6/4/2	2	2	2	MII/RMII	1x4ch	2x8ch	2x2ch	2	1	1	4ch	77ch	4	2	4	5/2/2/5	16 KB	32ch	128	T13

### Common Features

Temp Range: -40° C to 105° C  
 Voltage Range: 1.71–3.6 V  
 Flash Write Voltage: 1.71 V  
 Trace: TPIU, FPB, DWT, ITM, ETM, ETB

Main OSC: 32–40 KHz/8–32 MHz  
 Debug: JTAG, cJTAG, SWD  
 RTC (32 KHz OSC, Vbat), 5 V Tolerant  
 Secondary OSC: 32–40 KHz/8–32 MHz

PIT (32 bit): 1x4ch, TSI (Capacitive Touch): 16 input  
 Hardware Watchdog, Software Watchdog, PMC, MCG, NMI, CRC, DSP  
 Serial Programming Interface, CMT (Carrier Module Transmitter)  
 SPFFPU, V ref, MPU

Hardware Encryption, Tamper Detect  
 DDR Controller, NAND Flash Controller  
 USB Device Charge Detect, USB 120 mAReg  
 USB OTG LS/FS (1), USB OTG LS/FS/HS (1)

# Kinetis K8x Family of Scalable and Secure MCUs

## OVERVIEW

The Kinetis K8x MCU family extends the Kinetis MCU portfolio with advanced security capabilities while maintaining a high level of compatibility with previous Kinetis MCU devices. Additional security capabilities found within the Kinetis K8x MCU family include:

- ▶ Boot ROM to support encrypted firmware updates
- ▶ Hardware AES acceleration with sideband attack protection
- ▶ Automatic decryption and execution from external NOR flash memory
- ▶ Support for public key cryptography

As part of the Kinetis K series, Kinetis K8x MCUs are performance efficient and offer industry-leading low power while providing significant BOM savings through smart on-chip integration. The Kinetis K series is supported by a comprehensive set of development tools, software and enablement. To learn more about this breakthrough MCU visit [www.nxp.com/Kinetis/K8x](http://www.nxp.com/Kinetis/K8x).

## SUB-FAMILY K80: SCALABLE MEMORY, ADVANCED SECURITY MCUS

Footnotes	Part Number	CPU Frequency (MHz)	Total Flash Memory (KB)	Flash (KB)	SRAM (KB)	Boot ROM (KB)	Cache (Bytes)	Total GPIOs	Independent VDD_IO	QSPI (Serial NOR)	Dynamic RAM Controller	External Bus Interface (Flexbus)	Enhanced SDHC	SPI (chip selects)	I <sup>2</sup> C	I <sup>2</sup> S	FlexIO	USB OTG LS/FS	TSI(Capacitive Touch) channels	Total 16-bit PWM Channels	Total 16-bit timer channels	Low Power Timer	32-bit Periodic Interrupt Timer (PIT)	RTC (32KHz Osc, Vbat)	RTC_CLKOUT/RTC_WAKEUP	Watchdog (SW/HW)	Power Management Controller (PMC)	Multi Clock Generator (MCG)	Total 16-bit ADC (SE/DP)	DAC (6bit/12bit)	Analog Comparator	Analog Comparator Inputs
	MK80FN256VLL15	150	256	256	256	32	16384	87	YES (12 pins)	YES (Octal, DTR)	YES (SDRAM)	YES	8-bit, CLKIN	6/3/2	4	1	YES	YES	16	24	25	2	1x4ch	YES	YES/YES	1/1	YES	YES	18/3	2/1	2	5/4
	MK80FN256VDC15	150	256	256	256	32	16384	87	YES (12 pins)	YES (Octal, DTR)	YES (SDRAM)	YES	8-bit, CLKIN	6/3/2	4	1	YES	YES	16	24	25	2	1x4ch	YES	YES/YES	1/1	YES	YES	18/3	2/1	2	5/4
[1]	MK80FN256CAx15R	150	256	256	256	32	16384	66	YES (12 pins)	YES (Octal, DTR)	YES (SDRAM)	YES	4-bit, CLKIN	6/3/2	4	1	YES	YES	16	24	25	2	1x4ch	YES	YES/YES	1/1	YES	YES	14/1	2/1	2	5/4
[2]	MK80FN256VLQ15	150	256	256	256	32	16384	102	YES (18 pins)	YES (Octal, DTR)	YES (SDRAM)	YES	8-bit, CLKIN	6/3/2	4	1	YES	YES	16	24	25	2	1x4ch	YES	YES/YES	1/1	YES	YES	24/3	2/1	2	5/4

### Common Features

Voltage Range: 1.71–3.6 V, Flash Write Voltage: 1.71V  
Main OSC (Oscillator Crystal/Resonator): 32–40 KHz/8–32 MHz

48 MHz IRC, High Drive GPIOs (18 mA): 8 True Random number generator and hardware crypto acceleration  
Debug: JTAG, cJTAG, SWD, PMC, MCG, NMI, CRC, DSP

Trace: TPIU, FPB, DWT, ITM, ETM  
1.2 V voltage reference generator  
PMC, MCG, NMI, CRC, DSP

### Footnotes

- [1] The 121-pin WLCSP package for this product is not yet available, however it is included in a Package Your Way program for Kinetis MCUs. Visit [www.nxp.com/KPYW](http://www.nxp.com/KPYW) for more details.
- [2] The 144-pin LQFP package for this product is not yet available, however it is included in a Package Your Way program for Kinetis MCUs. Visit [www.nxp.com/KPYW](http://www.nxp.com/KPYW) for more details.

Footnotes	Part Number	CPU Frequency (MHz)	Total Flash Memory (KB)	Flash (KB)	SRAM (KB)	Boot ROM (KB)	Cache (Bytes)	Total GPIOs	Independent VDD_IO	Anti Tamper pins (Active pairs/Static Pins)	Dynamic RAM Controller	External Bus Interface (Flexbus)	Enhanced SDHC	SPI (chip selects)	I <sup>2</sup> C	I <sup>2</sup> S	FlexIO	USB OTG LS/FS	TSI(Capacitive Touch) channels	Total 16-bit PWM Channels	Total 16-bit timer channels	Low Power Timer	32-bit Periodic Interrupt Timer (PIT)	RTC (32KHz Osc, Vbat)	RTC_CLKOUT/RTC_WAKEUP	Watchdog (SW/HW)	Power Management Controller (PMC)	Multi Clock Generator (MCG)	Total 16-bit ADC (SE/DP)	DAC (6bit/12bit)	Analog Comparator Inputs
	MK81FN256VLL15	150	256	256	256	32	16384	66	YES (12 pins)	2/4	YES (SDRAM)	YES	8-bit, CLKIN	6/3/2	4	1	YES	YES	16	24	25	2	1x4ch	YES	YES/YES	1/1	YES	YES	12	2/1	5/4
	MK81FN256VDC15	150	256	256	256	32	16384	85	YES (12 pins)	4/8	YES (SDRAM)	YES	8-bit, CLKIN	6/3/2	4	1	YES	YES	16	24	25	2	1x4ch	YES	YES/YES	1/1	YES	YES	17/2	2/1	5/4
[1]	MK81FN256CAX15R	150	256	256	256	32	16384	85	YES (12 pins)	2/4	YES (SDRAM)	YES	4-bit, CLKIN	6/3/2	4	1	YES	YES	16	24	25	2	1x4ch	YES	YES/YES	1/1	YES	YES	17/2	2/1	5/4
[2]	MK81FN256VLQ15	150	256	256	256	32	16384	100	YES (18 pins)	4/8	YES (SDRAM)	YES	8-bit, CLKIN	6/3/2	4	1	YES	YES	16	24	25	2	1x4ch	YES	YES/YES	1/1	YES	YES	23/2	2/1	5/4

**Common Features**

Voltage Range: 1.71–3.6 V, Flash Write Voltage: 1.71

Main OSC (Oscillator Crystal/Resonator): 32–40 KHz/8–32 MHz

48 MHz IRC, High Drive GPIOs (15 mA): 8

On-the-fly AES decryption from external Serial NOR Flash

Hardware Crypto accelerator for AES, DES and public key cryptography (RSA, ECDH, ECDSA)

True Random number generator and hardware crypto acceleration

Debug: JTAG, cJTAG, SWD, PMC, MCG, NMI, CRC, DSP

Trace: TPIU, FPB, DWT, ITM, ETM

1.2V voltage reference generator

PMC, MCG, NMI, CRC, DSP

**Footnotes**

 [1] The 121-pin WLCSP package for this product is not yet available, however it is included in a Package Your Way program for Kinetis MCUs. Visit [www.nxp.com/KPYW](http://www.nxp.com/KPYW) for more details.

 [2] The 144-pin LQFP package for this product is not yet available, however it is included in a Package Your Way program for Kinetis MCUs. Visit [www.nxp.com/KPYW](http://www.nxp.com/KPYW) for more details.

**SUB-FAMILY K82: SCALABLE MEMORY, ADVANCED SECURITY MCUS WITH CRYPTOGRAPHIC CO-PROCESSOR**

Footnotes	Part Number	CPU Frequency (MHz)	Total Flash Memory (KB)	Flash (KB)	SRAM (KB)	Boot ROM (KB)	Cache (Bytes)	Total GPIOs	Independent VDD_IO	OSPI (Serial NOR)	Dynamic RAM Controller	External Bus Interface (Flexbus)	Enhanced SDHC	SPI (chip selects)	I <sup>2</sup> C	I <sup>2</sup> S	FlexIO	USB OTG LS/FS	TSI(Capacitive Touch) channels	Total 16-bit PWM Channels	Total 16-bit timer channels	Low Power Timer	32-bit Periodic Interrupt Timer (PIT)	RTC (32KHz Osc, Vbat)	RTC_CLKOUT/RTC_WAKEUP	Watchdog (SW/HW)	Power Management Controller (PMC)	Multi Clock Generator (MCG)	Total 16-bit ADC (SE/DP)	DAC (6bit/12bit)	Analog Comparator	Analog Comparator Inputs
	MK82FN256VLL15	150	256	256	256	32	16384	87	YES (12 pins)	YES (Octal, DTR)	YES (SDRAM)	YES	8-bit, CLKIN	6/3/2	4	1	YES	YES	16	24	25	2	1x4ch	YES	YES/YES	1/1	YES	YES	18/3	2/1	2	5/4
	MK82FN256VDC15	150	256	256	256	32	16384	87	YES (12 pins)	YES (Octal, DTR)	YES (SDRAM)	YES	8-bit, CLKIN	6/3/2	4	1	YES	YES	16	24	25	2	1x4ch	YES	YES/YES	1/1	YES	YES	18/3	2/1	2	5/4
[1]	MK82FN256CAX15R	150	256	256	256	32	16384	66	YES (12 pins)	YES (Octal, DTR)	YES (SDRAM)	YES	4-bit, CLKIN	6/3/2	4	1	YES	YES	16	24	25	2	1x4ch	YES	YES/YES	1/1	YES	YES	14/1	2/1	2	5/4
[2]	MK82FN256VLQ15	150	256	256	256	32	16384	102	YES (18 pins)	YES (Octal, DTR)	YES (SDRAM)	YES	8-bit, CLKIN	6/3/2	4	1	YES	YES	16	24	25	2	1x4ch	YES	YES/YES	1/1	YES	YES	24/3	2/1	2	5/4

**Common Features**

Voltage Range: 1.71–3.6 V, Flash Write Voltage: 1.71

Main OSC (Oscillator Crystal/Resonator): 32–40 KHz/8–32 MHz

48 MHz IRC, High Drive GPIOs (18 mA): 8

True Random number generator and hardware crypto acceleration

Debug: JTAG, cJTAG, SWD, PMC, MCG, NMI, CRC, DSP

On-the-fly AES decryption from external Serial NOR Flash

Hardware Crypto accelerator for AES, DES and public key cryptography (RSA, ECDH, ECDSA)

Trace: TPIU, FPB, DWT, ITM, ETM

1.2 V voltage reference generator

PMC, MCG, NMI, CRC, DSP

**Footnotes**

 [1] The 121-pin WLCSP package for this product is not yet available, however it is included in a Package Your Way program for Kinetis MCUs. Visit [www.nxp.com/KPYW](http://www.nxp.com/KPYW) for more details.

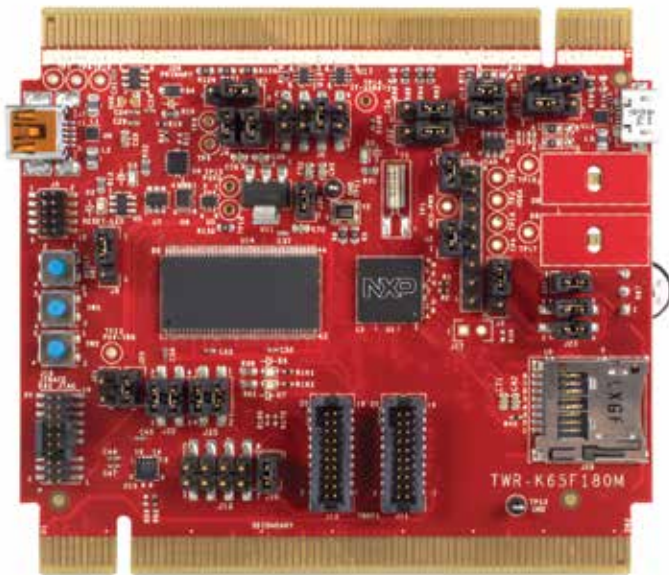
 [2] The 144-pin LQFP package for this product is not yet available, however it is included in a Package Your Way program for Kinetis MCUs. Visit [www.nxp.com/KPYW](http://www.nxp.com/KPYW) for more details.

# Evaluation Hardware Support for Kinetis MCUs

Take your design to the next level with the Tower System platform. Our modular development platform offers interchangeable and reusable modules along with open source design files that offer a quick start for your customer designs.

The Freedom development platform is a small, low-power, cost-effective evaluation and development system perfect for quick application prototyping and demonstration. The Freedom platform is compatible with the Arduino™ standard enabling usage of a rich-set of third-party expansion boards. Many Freedom development platforms are also mbed™ enabled. Learn more at [www.nxp.com/Kinetis/SW](http://www.nxp.com/Kinetis/SW).

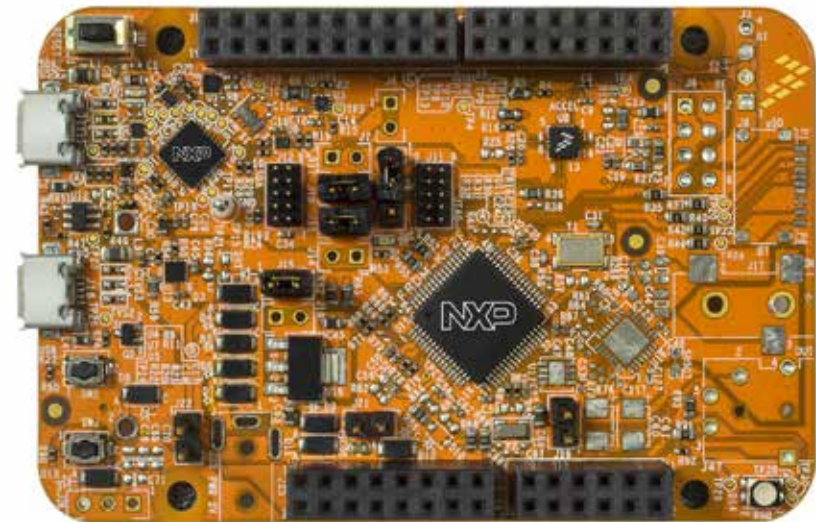
## TOWER SYSTEM DEVELOPMENT BOARD



**TWR-K65F180M**

- T1 **TWR-K20D50M** Kinetis K20 50 MHz Tower System Module
- T2 **TWR-K20D72M** Kinetis K20 72 MHz MCU Tower System Module
- T3 **TWR-K21D50M** Kinetis K21 50 MHz MCU Tower System Module
- T4 **TWR-K21F120M** Kinetis K21 120 MHz Tower System Module
- T5 **TWR-K22F120M** Kinetis K22 120 MHz Tower System Module
- T7 **TWR-K40D100M** Kinetis K40 100 MHz Tower System Module
- T8 **TWR-K53N512** Kinetis K53 Tower System Module
- T9 **TWR-K60D100M** Kinetis K60 100 MHz MCU Tower System Module
- T10 **TWR-K60F120M** Kinetis K60 120 MHz Tower System Module
- T11 **TWR-K64F120M** Kinetis K64 120 MHz Tower System Module
- T13 **TWR-K70F120M** Kinetis K70 120 MHz Tower System Module
- T14 **TWR-K24F120M** Kinetis K24 120 MHz MCU Tower System Module
- T15 **TWR-K65F180M** Kinetis K65 MCU Tower System Module
- T16 **TWR-K80F150M** Kinetis K80 MCU Tower System Module
- T17 **TWR-POS-K81** Kinetis K81 Point-of-Sale Tower System Module

## FREEDOM DEVELOPMENT PLATFORM



**FRDM-K22F**

- F2 **FRDM-K22F** Kinetis K22 Freedom Development Platform
- F3 **FRDM-K64F** Kinetis K64 Freedom Development Platform
- F4 **FRDM-K82F** Kinetis K82 Freedom Development Platform







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