

High-performance Kinetis K MCU Series based on ARM® Cortex-M4® core

NXP Communicator

Introducing Newest Members of the Kinetis K Series: Kinetis K27/K28 MCU Families based on ARM Cortex-M4 core
Power-efficient, dual-USB MCUs with extra-large embedded memory

Offering 2 MB Flash, 1 MB SRAM and two USB controllers, the Kinetis K27/K28 MCU Families provide a power efficient solution for next-generation Internet of Things (IoT) application

Kinetis K Series Microcontrollers

NXP's Kinetis K Microcontroller Series includes more than 600 compatible MCUs emphasizing on low power, high performance and tight integration. Designed for general purpose, Kinetis K series offers powerful ARM Cortex-M4 CPUs with 50-180 MHz of operating frequency, flash memory size ranging from 32 KB to up to 2 MB, which is perfect for multiple IoT based applications.

- **Ultra-Scalable** – Preserve your engineering investments with hundreds of Kinetis MCUs providing unsurpassed availability and scalability of up to 2 MB flash and 1 MB 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 180 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-up application development with an extensive suite of software and tools from our company and other ARM ecosystem providers.

Kinetis K27/K28 MCU Families Product Summary

The Kinetis [K27](#) and [K28](#) USB ARM Cortex-M4 MCUs expand NXP's Kinetis K MCU portfolio with extra-large embedded memory of 2 MB Flash and 1 MB SRAM, targeting applications which requires processing efficiency as well as tight integration.

Highly integrated with two I²S interfaces, two USB Controllers (High-Speed with integrated High-Speed PHY and Full-Speed crystal-less) and mainstream analog peripherals, the Kinetis K27 and K28 are also expandable through a 32-bit SDRAM memory controller and QuadSPI interface supporting eXecution-In-Place (XiP).

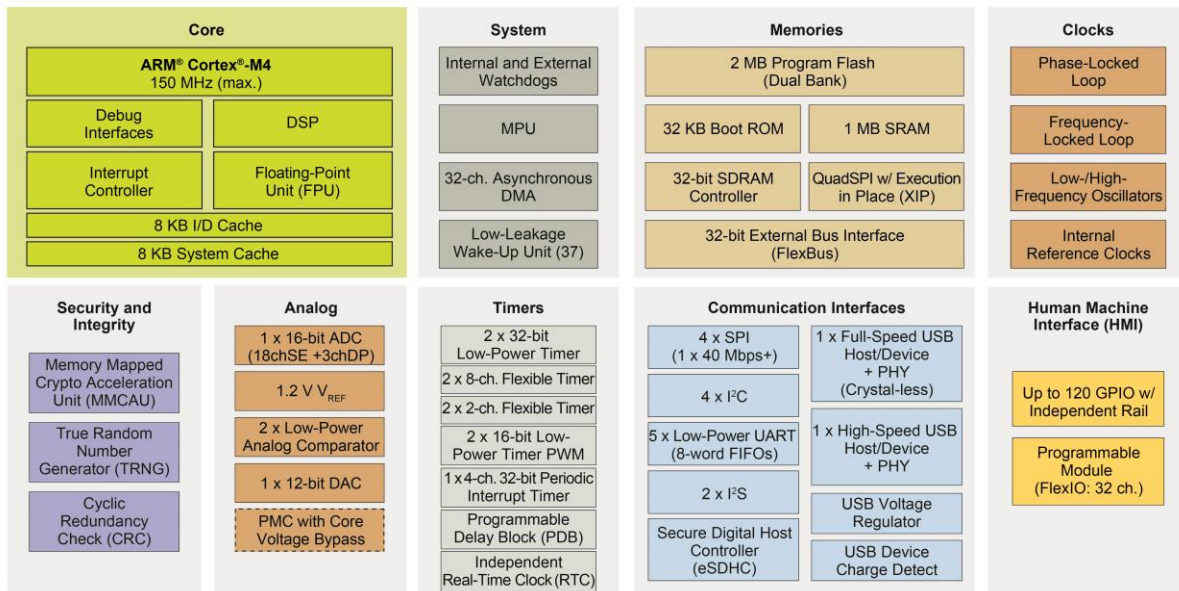
Kinetis K27 and K28 MCUs enable secure content using a True Random Number Generator, Cyclic Redundancy Check, Memory Mapped Cryptographic Acceleration Unit and, thus, provide a strong foundation to support requirements for the next generation of Internet of Things (IoT) applications.

Target Applications

- Wearable devices
- Mobile applications, Internet of Things
- Low-end graphic display system
- Cost-optimized multi-standard wireless smart home hubs
- Home Automation devices
- Consumer accessories

Product Overview

Block Diagram



Available on K28F MCUs only

Key Features and Advantages

Performance

- 150 MHz (max) ARM Cortex-M4 with DSP instructions and Single Precision Floating Point unit (FPU)
- 32-channel DMA with asynchronous support in Stop mode.
- Cross bar switch enables concurrent multi-master bus accesses, increasing bus bandwidth

Ultra-Low-Power

- Active run core power consumption @120Mhz: <258 μ A/MHz (TYP @25C) for K28
- Static power consumption down to <14 μ A (TYP) with full 1MB SRAM retention and <6 μ S wakeup.
- Lowest static mode down to 454 nA (VLLS0) for K28

Memory

- 2 MB dual bank embedded program flash.
- 1 MB of SRAM
- 8 KB I/D Cache + 8 KB System Cache
- 32-bit SDRAM controller

- QuadSPI interface with eXecution-In-Place (XiP)

Mixed-Signal Capability

- 16-bit SAR ADC: Up to 18ch Single-Ended / 3ch Differential
- 12-bit DAC
- Two analog comparators (CMP) containing a 6-bit DAC and programmable reference input
- 1.2V Analog voltage reference
- PMC with Core Voltage Bypass (Only K28)

Timing and Control

- One 4-ch Periodic interrupt timer
- Two 16-bit low-power timer PWM modules
- Two 8-ch motor control/general purpose/PWM timers
- Two 2-ch quadrature decoder/general purpose timers
- Real-time clock with independent 3.6V power domain
- Programmable delay block

Human-Machine Interface (HMI)

- 32-ch Programmable module (FlexIO) to emulate various serial, parallel or custom interfaces

Connectivity and Communications

- Dual USB Controllers: High-Speed (HS) w/ integrated HS PHY + crystal-less Full-Speed (FS) operations
- Five Low Power UART (LPUART) modules
- Two I²S modules for audio system interfacing and four I²C modules
- Four SPI modules (One supports up to 40 Mbps)
- 32-ch Programmable module (FlexIO) to emulate various serial, parallel or custom interfaces
- Secure Digital Host Controller (SDHC)

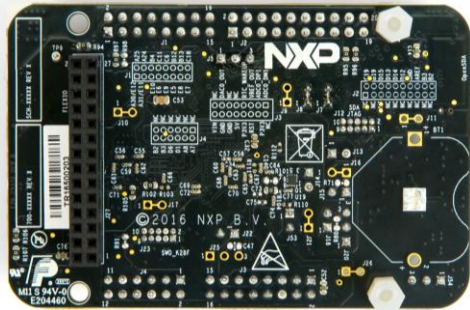
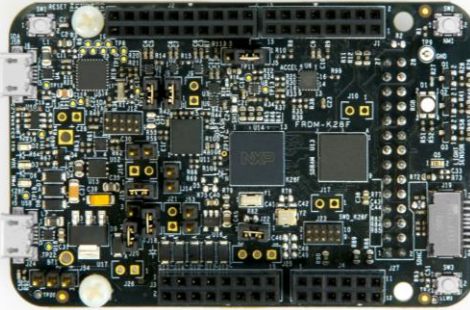
Reliability, Safety and Security

- Cyclic redundancy check (CRC) engine validates memory contents and communication data, increasing system reliability
- True random number generator (TRNG)
- Memory Mapped Crypto Acceleration Unit (MMCAU): Support DES, 3DES, AES, MD5, SHA-1 and SHA-256 algorithms

Development tools and Ecosystem

FRDM-K28F

The [FRDM-K28F](#) is a low-cost development board for Kinetis K27 and K28 high-performance microcontrollers based on ARM Cortex-M4.



- Enable rapid prototyping, including a 6-axis digital accelerometer and magnetometer to create full eCompass capabilities, dual role high-speed and full-speed USB interface with Micro-B USB connector, a microSD card slot a tri-colored LED and two user push-buttons for direct interaction, 1x32Mb QuadSPI external flash, Low-power SDRAM, FlexIO-based LCD header, and light sensor
- Form-factor compatible with the Arduino™ R3 pin layout
- FlexIO-based header compatible to connect an [optional 5" TFT LCD display board with Capacitive Touch IC](#) from MikroElektronika. Part number is **Mikroe-2406**.
- Feature Core Voltage Bypass (Available on K28 only)
- Include NXP open source hardware embedded serial and debug adapter (OpenSDAv2.1) running an open source bootloader, which offers options for serial communication, flash programming, and run-control debugging

The FRDM-K28F is enabled using NXP MCUXpresso Config Tools, MCUXpresso SDK, Power Estimation Tool, and MCUXpresso IDE and a large software partner ecosystem.

Suggested Stocking, Timing, and Attach Products

The parts are part of Distributor PriceBook now as well as the board. Kinetis K27 MCU and FRDM-K28F development board can start shipping for distributors to stock immediately after ordering. Kinetis K28 MCU would be available in 1-2 months. Export compliance and additional pricing information can be found in the Excel stocking files attached.

The below tables represents the suggested parts to stock for the launch.

Part Numbers

PN	Flash / RAM	Package
MK27FN2M0VMI15	2 MB/ 1 MB	169 MAPBGA
MK28FN2M0VMI15	2 MB/ 1 MB	169 MAPBGA
MK28FN2M0CAU15R	2 MB/ 1 MB	210 WLCSP

Development Tools

Supported Families	Board Part Number
Kinetis K27 and K28 MCUs	FRDM-K28F

The below table listed some attach products related to Kinetis K27 and K28, more detailed information can be found in the Excel file attached to this communicator.

Attach Products

Attach Product Name	PN
ARROW GT202 to add Wi-Fi Wireless Connectivity (using Qualcomm QCA4002/4)	QCA4002 / QCA4004
KW30Z to add BLE 4.1 wireless Connectivity (external board needed)	MKW30Z160VHM4
KW41Z to add Thread and/BLE 4.2 Wireless connectivity (external board needed)	MKW41Z512VHT4
PTN5150 to add USB Type C support (external board needed) - small thin low power CC Logic chip supporting the USB Type-C connector application with Configuration Channel (CC) control logic detection and indication functions	PTN5150HX
USB PD and type C current-limited power switch	NX5P3090UK
FXOS8700CQ: Accelerometer and magnetometer (included into the FRDM-K28F development board)	FXOS8700CQ
±2g/±4g/±8g, Low g, 14-bit Digital Accelerometer	MMA8451Q
±2g/±4g/±8g, Low g, 14-Bit Digital Accelerometer	FXLS8471Q
±2g/±4g/±8g, Low g, 12-Bit Digital Accelerometer	MMA8652FC
3-Axis Digital Gyroscope	FXAS21002C

Software Enablement

- [MCUXpresso SDK](#)
 - Extensive suite of robust peripheral drivers, stacks, and middleware
 - Includes software examples demonstrating use of peripheral drivers and middleware
- [Integrated Development Environments \(IDE\)](#)
 - MCUXpresso IDE
 - IAR® Embedded Workbench
 - ARM KEIL