Freescale Communicator
Introducing Freescale's K1xD/K2xD, 50 MHz MCUs

Expanding the Kinetis Universe

Communicator Finalization Date: June 12 2012

freescale™

Product Summary

On June 13th 2012 Freescale announces further expansion of the Kinetis K families with low pin count, mid embedded memory densities MCUs, with **availability starting Aug 3rd 2012**. K1xD and K2xD MCUs will offer:

- 50 MHz ARM Cortex-M4 with DSP and MAC
- Mid/high embedded memory densities
    - Up to 512 KB Flash on non FlexMemory devices
    - Up to 64 KB FkexNVM and 4 KB FlexRAM with up to 4KB enhance EEPROM capability
    - 64 KB SRAM
- Security and Integrity Modules
    - Hardware Cryptographic Acceleration Unit
    - Hardware Random Number Generator
    - Hardware Tamper Detection Unit

Targeted Applications

- **Industrial**
    - Lighting
    - Access control
    - Electricity meter
    - Water meter
    - Gas meter
    - Smart grid
    - Small appliance household
    - Test and measurement
    - ePOS_EFT

- **Consumer**
    - Electronic games
    - Remote controls
    - PC peripherals
    - PND personal navigation
    - Mobile accesories

Development Tools Summary

- Support from worldwide ARM ecosystem
- Tower modules for rapid prototyping
- Freescale complimentary CodeWarrior and Processor Expert
- Freescale complimentary MQX RTOS

Product Overview

34 new Cortex-M4 based microcontrollers that offer mid/high embedded memory densities ranging from 192 KB to 512 KB of flash and optional 64 KB of FlexNVM in low pin count with reduced package sizes, from 48-pin LQFP to 81-pin MAPBGA. These MCUs are further optimized for cost-sensitive applications requiring low-power and processing efficiency with optional Tamper Detect and Security features, and expand the most scalable portfolio of low power devices while keeping full software, hardware and development tools compatibility.

Product Specifications of the K1xD/K2xD

Part Number	Memory					Feature Options										Packages					
	CPU (MHz)	Flash (KB)	FlexNVM (KB)	SRAM (KB)	CACHE (KB)	FPU	MPU	CAN	sDHC	Nand Flash controller	External Bus Interface	12-bit DAC	PGA	5V tolerant I/O	Other	32 QFN (FM)	48 QFN (FT)	48 LQFP (LF)	64 LQFP (LH)	80 LQFP (LK)	121 MAPBGA (MC)
MK11DX128Vyy5(R)	50 MHz	128KB	64KB	32KB	-	-	-	-	-	-	-	1	-	-	HW encryption and tamper detect					√	√
MK11DX256Vyy5(R)	50 MHz	256KB	64KB	32KB	-	-	-	-	-	-	-	1	-	-	HW encryption and tamper detect					√	√
MK11DN512Vyy5(R)	50 MHz	512KB	-	64KB	-	-	-	-	-	-	-	1	-	-	HW encryption and tamper detect					√	√
MK12DX128Vyy5(R)	50 MHz	128KB	64KB	32KB	-	-	-	-	-	-	-	1	-	-	-			√	√	√	√
MK12DX256Vyy5(R)	50 MHz	256KB	64KB	32KB	-	-	-	-	-	-	-	1	-	-	-			√	√	√	√
MK12DN512Vyy5(R)	50 MHz	512KB	-	64KB	-	-	-	-	-	-	-	1	-	-	-				√	√	√
MK21DX128Vyy5(R)	50	128KB	64KB	32KB								1			HW encryption and Tamper Detec					√	√
MK21DX256Vyy5(R)	50	256KB	64KB	32KB								1			HW encryption and Tamper Detec					√	√
MK21DN512VLK5(R)	50	512KB	-	64KB								1			HW encryption and Tamper Detec					√	√
MK22DX128Vyy5(R)	50	128KB	64KB	32KB								1			USB OTG (FS)	√	√			√	√
MK22DX256Vyy5(R)	50	256KB	64KB	32KB								1			USB OTG (FS)	√	√			√	√
MK22DN512VLH5(R)	50	512KB	-	64KB								1			USB OTG (FS)				√	√	√

*48 LQFP packages do not have 12-bit DAC

Key Features and Benefits of K1xD/K2xD MCUs

	Feature	Application Benefit
Performance	ARM Cortex-M4 with DSP instructions	Up to 50 MHz core supporting a broad range of processing bandwidth needs
	Up to 16-channel DMA	Peripheral and memory servicing with reduced CPU loading
Memory and memory interfaces	Up to 512 KB Flash in non-FlexMemory devices	High reliability, fast access program memory. Independent flash banks allow concurrent code and firmware execution
	64 KB FlexMemory	FlexMem provides 4 KB of user-segmentable byte write/erase EEPROM. In addition, up to 64 KB can be used for extra program code.
Low-power	10 low-power modes with flash programming and analog operation	Peripheral activity and wakeup times can be optimized to suite application requirements

	down to 1.71V	enabling extended battery life
	Low-power timer, low-power RTC, low-leakage wakeup unit	Continual device operation in reduced power states with flexible wakeup options
Analog	High-speed 16-bit ADCs	Fast, accurate signal conditioning capability with support for single or differential operation for improved noise rejection
	12-bit DAC, high-speed comparators	Analog signal generation for audio applications
	On-chip voltage reference	Eliminates need for external voltage reference reducing overall system cost
Communications Interface	Up to 4 UARTs with IrDA support	Variety of data size, format and transmission/reception settings supported for multiple industrial communication protocols
	IIS, up to 2 SPI and up to 2 IIC interfaces	Multiple communication interfaces for simple and efficient data exchange, industrial network bridging and audio system interfacing
Security and Reliability	Cryptographic Acceleration Unit (CAU)	Secure data transfer and storage. Faster than software implementations and with minimal CPU loading. Supports a wide variety of algorithms: DES, 3DES, AES, MD5, SHA-1, SHA-256
	Tamper Detection Unit	Secure key storage with internal/external tamper detect for unsecure flash, temperature/clock/supply voltage variations and physical attack
	Random Number Generator	Facilitates generation of FIPS 140 certifiable random numbers. Reduces CPU loading for cryptographic functions

Freescale Support Ecosystem

Development Tools

- **TWR-K21D50M**
  - K21DN512in 81 MAPBGA
  - Integrated, Open-Source JTAG
  - Standalone USB 2.0 On-The-Go (full speed)
  - MMA8451Q 3-axis accelerometer
  - Tamper pin header
  - Tower Plug-In (TWRPI)
  - Tower connectivity for access to UART, SPI, I²C
  - Plus: Potentiometer, 4 LEDs, pushbuttons, and battery holder
  - **Available August 2012**

- **Software**
  - Complimentary Codewarrior IDE and Processor Expert
    - CW 10.2 for Kinetis K1xD/K2xD 50 MHz Service pack: alpha version now, **production version end July 2012.**
    - Processor expert for Kinetis K1xD/K2xD 50 MHz: **available October 2012**
  - USB PDHC Stack **available July 2012**
  - Kinetis bootloaders: **Available Now**
    - AN4367, AN4368, AN4370, and AN4379.

Operating Systems

- **Software**
o Complimentary MQX RTOS
    - MQX v3.8 support for Kinetis K1xD/K2xD
    - **Available end July 2012**

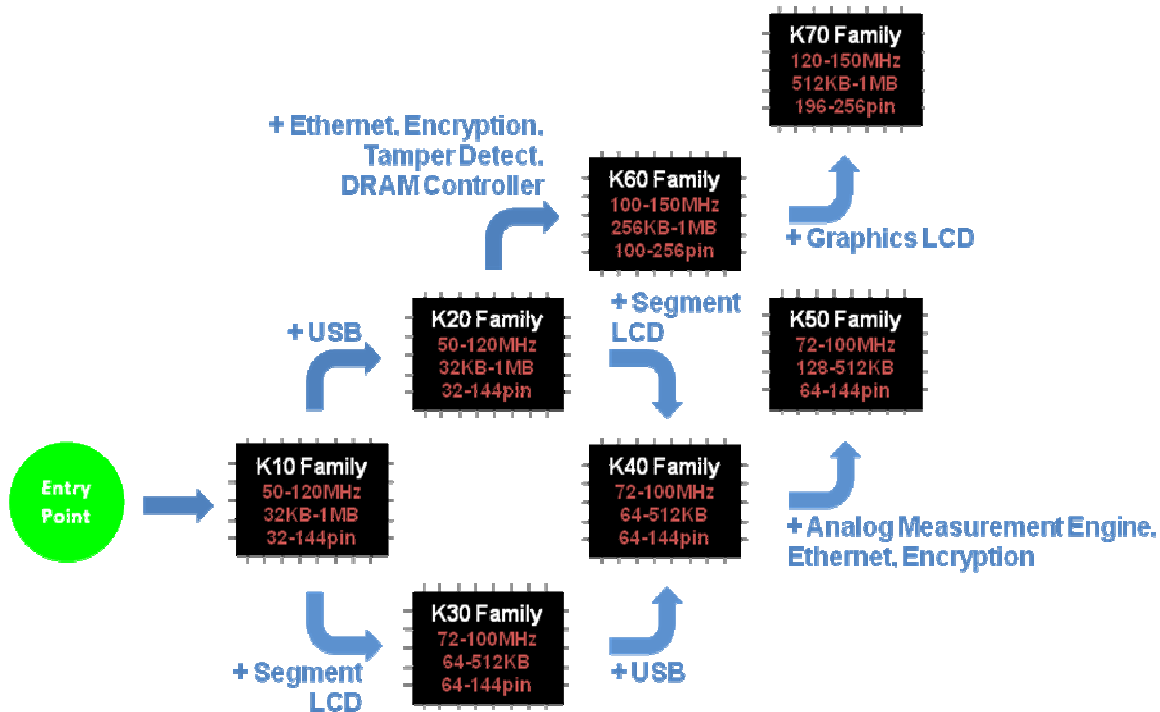# Third-Party Vendors Support Ecosystem

Development Tools

- **Software**

o IAR

o Segger

o Keil/ARM

- **Tools/Probes/STAGs/JTAGs**

o P&E

Operating Systems

- **Software**

o Micrium

o FreeRTOS

o Express Logic

Migration Information

The following graphic illustrates the migration path between all Kinetis families.

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[Freescale Semiconductor](#):
  [PK21DN512VMC5](#) [PK21DX256VMC5](#)