



Low-power MCUs
with USB and LCD

Kinetis[®] K40 Family

Based on the ARM[®] Cortex[®]-M4 core, the K40 MCU family features a variety of add-ons including USB 2.0 On-The-Go, a low-power segment LCD controller and enablement offerings.

TARGET APPLICATIONS

- ▶ GPS receivers
- ▶ Blood glucose meters
- ▶ Bike computers
- ▶ Currency counters

Kinetis K series MCU families are built from innovative 90 nm thin-film storage (TPS) flash technology with unique FlexMemory (EEPROM) capability, and offer industry-leading low power and mixed signal analog integration.

The K40 MCU family 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 64 LQFN packages extending up to 512 KB in a 144 MAPBGA package with a rich suite of analog, communication, timing and control peripherals.

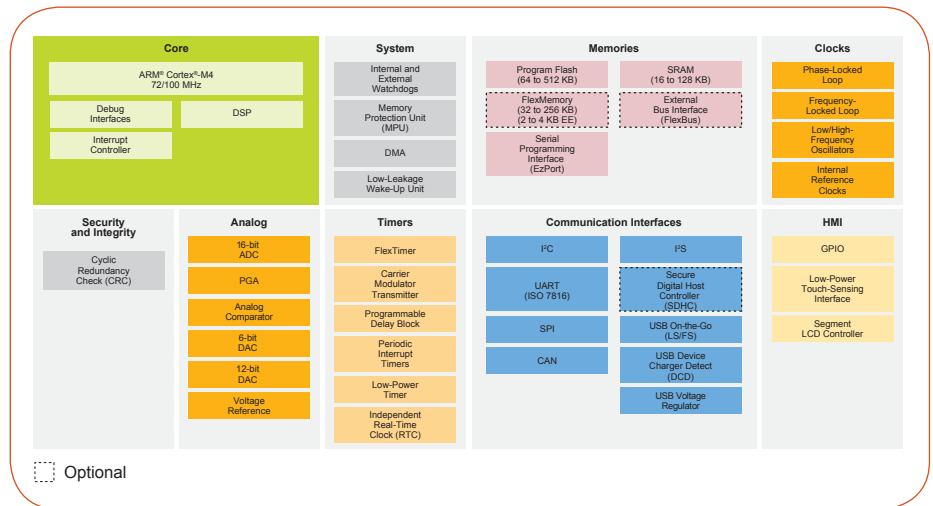
ONE-STOP ENABLEMENT OFFERING—MCU + IDE + RTOS

- ▶ Tower[®] System and Freedom development board platforms
- ▶ Integrated development environments
 - Eclipse-based CodeWarrior[®] V10.x IDE and Processor Expert[®]
 - IAR Embedded Workbench[®]
 - ARM Keil[®] MDK
 - Kinetis Design Studio IDE
 - SOMNIUM[®] DRT Cortex-M IDE



- ▶ Runtime software and RTOS
 - Math, DSP and encryption libraries
 - Motor control libraries
 - Complimentary bootloaders (USB, Ethernet, RF, serial)
 - Complimentary embedded GUI
 - NXP MQX™ software solutions
 - Micrium® µC/OS-III
 - Express Logic ThreadX®
 - SEGGER embOS
 - FreeRTOS
- ▶ Full ARM technology ecosystem

KINETIS K40 FAMILY



Features	Benefits
<ul style="list-style-type: none"> • ARM® Cortex®-M4 core with DSP instruction support • Up to 16-channel DMA; crossbar switch 	<ul style="list-style-type: none"> • Up to 100 MHz core supporting a broad range of processing bandwidth needs • Peripheral and memory servicing with reduced CPU loading; concurrent multi-master bus accesses for increased bus bandwidth
<ul style="list-style-type: none"> • USB On-The-Go (Full Speed) with device charger detect 	<ul style="list-style-type: none"> • Optimized charging current/time for portable USB devices, enabling longer battery life • USB low-voltage regulator supplies up to 120 mA off chip at 3.3 V to power external components from 5 V input
<ul style="list-style-type: none"> • Flexible, low-power LCD controller with support for up to 320 segments (40 x 8 or 44 x 4) 	<ul style="list-style-type: none"> • LCD blink mode enables low average power while remaining in low-power mode • Segment fail detect guards against erroneous readouts and reduces LCD test costs • Frontplane/backplane reassignment provides pin-out flexibility, easing PCB design and allows LCD configuration changes via firmware with no hardware re-work • Supports multiple 3 V and 5 V LCD panel sizes with fewer segments (pins) than competitive controllers and no external components • Unused LCD pins can be configured as other GPIO functions
<ul style="list-style-type: none"> • FlexBus external bus interface secure digital host controller 	<ul style="list-style-type: none"> • Enables the connection of external memories and peripherals (e.g., graphics displays) • Connection to SD, SDIO, MMC or CE-ATA cards for in-application software upgrades, file systems or adding Wi-Fi® or Bluetooth® support
<ul style="list-style-type: none"> • Up to three FlexTimers with up to 12 channels • Carrier modulator transmitter • Four-channel, 32-bit interrupt 	<ul style="list-style-type: none"> • General-purpose timers with hardware dead-time insertion and quadrature decoding for motor control • Infrared waveform generation for remote control applications • Time base generation for RTOS task scheduler or trigger source for ADC conversion and programmable delay block
<ul style="list-style-type: none"> • 64–512 KB flash; up to 128 KB of SRAM • 32–256 KB FlexMemory 	<ul style="list-style-type: none"> • High reliability, fast access program memory with four-level security protection • Independent flash banks allow concurrent code execution and firmware updating • FlexMemory provides 32 byte–4 KB of user-segmentable byte write/erase EEPROM. • Flex NVM 32–256 KB for extra program code, data or EEPROM backup

K40 FAMILY OPTIONS

Part Number	Memory				Feature Options							Other	Packages					
	CPU (MHz)	Flash (KB)	Flex NVM (KB)	SRAM (KB)	Memory Protection Unit	CAN	Secure Digital Host Controller	External Bus Interface	12-bit DAC	Prog. Gain Amplifier	5 V Tolerant I/O		LH	LK	LL	MC	LQ	MD
													64 LQFP (10 x 10)	80 LQFP (12 x 12)	100 LQFP (14 x 14)	121 BGA (8 x 8)	144 LQFP (20 x 20)	144 BGA (13 x 13)
MK40DN512Vyy10	100	512		128	✓	✓	✓	*	✓	✓	✓	USB OTG (FS), SEGMENT LCD (UP TO 40 X 8/44 X 4)		✓	✓	✓	✓	✓
MK40DX64Vyy7	72	64	32	16		✓			✓	✓	✓	USB OTG (FS), SEGMENT LCD (UP TO 24 X 8/28 X 4)	✓	✓		✓		
MK40DX128Vyy7	72	128	32	32		✓			✓	✓	✓	USB OTG (FS), SEGMENT LCD (UP TO 38 X 8/42 X 4)	✓	✓	✓	✓		
MK40DX256Vyy7	72	256	32	64		✓			✓	✓	✓	USB OTG (FS), SEGMENT LCD (UP TO 38 X 8/42 X 4)		✓	✓	✓		
MK40DX128yy10	100	128	128	32	✓	✓	✓	✓	✓	✓	✓	USB OTG (FS), SEGMENT LCD (UP TO 40 X 8/44 X 4)					✓	✓
MK40DX256yy10	100	256	256	64	✓	✓	✓	✓	✓	✓	✓	USB OTG (FS), SEGMENT LCD (UP TO 40 X 8/44 X 4)					✓	✓

yy = Package designator

*144pin only