Dual-core, highly secure, multi-protocol wireless MCU

K32W0x MCUs for Wireless IoT Applications

The K32W0x platform, representing the next-generation of Kinetis MCUs, is the second multi-protocol offering in NXP's connectivity portfolio. This platform bridges its predecessor parts by providing a scalable path with higher performance, added functionality and increased security to address the evolving IoT landscape.

TARGET APPLICATIONS

▸ Smart home
  – Door locks
  – Smart thermostats
  – Lighting control
  – Security systems
▸ Building automation
  – Security and access control
  – Building control and monitoring
  – Building HVAC control
  – Fire/security
▸ Healthcare
  – Wearables
  – Fitness monitoring
  – Home healthcare

OVERVIEW

The K32W0x wireless MCU platform includes a high performance Arm® Cortex®-M4 processor and a low power Cortex-M0+ processor, ideal for applications that require a host MCU and a multi-protocol MCU. With 1.25 MB Flash and 384 kB SRAM, the K32W0x offers ample memory to fit both application firmware and wireless connectivity stacks in a small-form factor, low power, highly secure design.

Integrating a Bluetooth 5 radio, supporting up to 8 simultaneous connections, and an IEEE® 802.15.4 radio, capable of running Thread and Zigbee mesh networking protocols, the K32W0x can support standalone protocols or multiple protocols running concurrently on a single chip. Multi-protocol running on a single chip eliminates the need for multiple radios, reducing system complexity and cost.

The success or failure of the next wave of IoT devices will depend on the trust and security inherently built into those devices. Addressing those IoT device security needs is a primary focus of the K32W0x platform and its security features will assure confidentiality, integrity, and authenticity of the IoT device and its data.

Take advantage of the robust enablement package that includes the Bluetooth 5 host stack, Generic FSK, Thread and Zigbee protocol stacks, drivers, RTOS, development tools and support both complementary and professional IDEs.

ENABLEMENT

▸ FRDM-K32W042 Freedom development board

▸ Bluetooth 5 host stack and application profiles

▸ Generic FSK at 250, 500, 1000 and 2000 kbit/s

▸ Thread IP-based network stack

▸ Zigbee 3.0 mesh network stack

▸ Support for NXP's MCUXpresso and IAR Embedded Workbench® IDEs

▸ Full integration with NXP's MCUXpresso SDK

▸ Support for multiple RTOSes including FreeRTOS™

K32W0x WIRELESS MCU PLATFORM BLOCK DIAGRAM
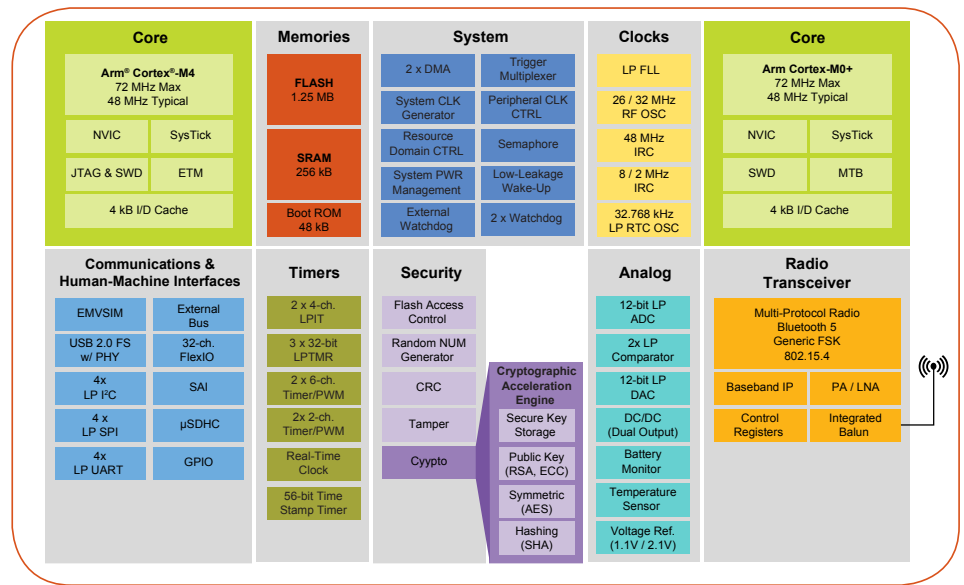
ORDERABLE PART NUMBERS

Product		Memory		Radio			Package	
Part Number	Marking	Flash (MB)	SRAM (kB)	BLE	GENFSK	802.15.4	Pin Count	Package
K32W042S1M2VPJAT	K32W042S1M2VPJA	1.25	384	✓	✓	✓	176	VFBGA
K32W032S1M2VPJAT	K32W032S1M2VPJA			✓	✓			
K32W022S1M2VPJAT	K32W022S1M2VPJA					✓		
K32W042S1M2CAVAR	K32W042S1M2CAVA	1.25	384	✓	✓	✓	191	WLCSP
K32W032S1M2CAVAR	K32W032S1M2CAVA			✓	✓			

K32W0x MCU PLATFORM

Features	Benefits
Dual-core architecture with 72 MHz Cortex-M4F and Cortex-M0+ cores	Ideal for applications that require a high performance host process to run the application and a low-power processor for radio and sensor operations.
Large on-chip memory with 1.25 MB flash, 384 kB SRAM and 48 kB ROM (Bootloader)	Fit both custom application code and wireless connectivity protocol stack(s) reducing complex two-chip solutions to a single device.
High security	• Resource Domain Controller for access control, system memory protection and peripheral isolation • Cryptographic sub-system that includes a dedicated core, dedicated instruction memory (IRAM and IROM) and dedicated data RAM for autonomous implementation of encryption, signing, and hashing algorithms including AES, DES, SHA, RSA and ECC. • Secure Key Management for storing and protecting sensitive security keys • Wiping of the crypto sub-system memory including security keys upon sensing a security breach or physical tamper event
Secure Boot	Built in secure boot and secure over-the-air programming to assure only authorized and authenticated code runs in the device
Multi-protocol radio	On-chip radio supporting Bluetooth 5, generic FSK (up to 2 Mbps) and 802.15.4 for running Thread and Zigbee 2.0. Device supports concurrent (time slice) operations reducing costs of having to procure separate devices, reducing BOM and form-factor.
-96 dBm typical BLE sensitivity -100 dBm typical 802.15.4 sensitivity +3.5 dBm maximum output power	• High link budget improves range and lowers cost by reducing the need for external power amplifiers • Integrated balun enables smaller design and reduces system costs
DC-DC converter	• Supports a wide-range of battery technologies. • Reduces the effective current consumption over standard bypass mode.
Analog	High-performance on-chip analog (ADC, DAC, CMP) for sensor aggregation and other sophisticated applications
Small, high pin-count packages	Large IO capability in two small form-factor BGA and WLCSP packages
Complete enablement	Full suite of standalone and multi-protocol connectivity stacks (complementary and royalty free), hardware development tools, drivers, RTOS, IDEs, integrated into NXPs MCUXpresso SDK.

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