Design with multi-mode (BLE/802.15.4) radio solutions

Kinetis KW40Z/30Z/20Z Wireless MCUs

The Kinetis KW40Z/30Z/20Z (KW40Z) wireless MCU family is the first multi-mode radio in the Kinetis portfolio. Integrating a Bluetooth® Low Energy (BLE) v4.1 and IEEE® 802.15.4-2011 compliant modem, it can support both standards and run in concurrent mode.

TARGET APPLICATIONS

▶ Home automation
  – Access control
  – Lighting control
  – Smart thermostats
  – Water heater control
  – Curtain/window blind control
  – Intruder alarms
  – Remote control

▶ Building automation
  – Building control and monitoring
  – Building HVAC control
  – Fire/security
  – Retail pricing management
  – Security and access control
  – Usage data collection

▶ Healthcare
  – Fitness monitoring
  – Home healthcare
  – Institutional care
  – Medication asset
  – Patient monitoring

The KW40Z MCU integrates a buck-boost DC/DC converter, supporting a wide range of operating voltages from 0.9 V to 4.2 V, which significantly reduces the peak current in receive mode down to 6.5 mA and transmit down to 8.4 mA. At the same time it delivers excellent link budget that ensures the longest range of communication and high immunity to interference.

The KW40Z MCU offers Dual PAN support which allows the system to concurrently participate in two 802.15.4 networks, such as Thread® and ZigBee® or an 802.15.4 based network and BLE, eliminating the need for multiple radios, reducing system complexity and ultimately cost.
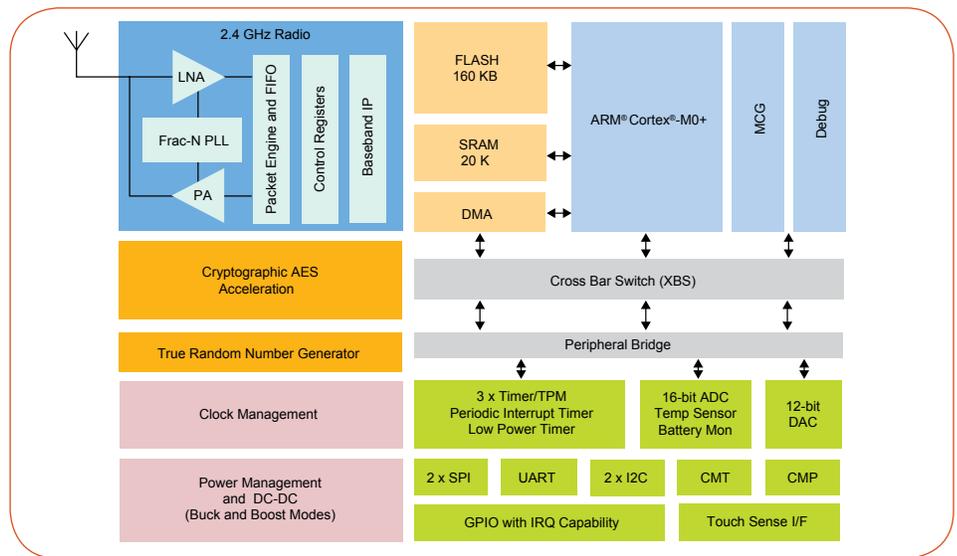
Take advantage of the robust enablement package that includes the BLE Host Stack, Thread, ZigBee, 802.15.4 MAC and Simple MAC (SMAC) software protocol stacks, RTOS, development tools and IDE that are designed for use with Kinetis KW40Z MCUs and fully integrated in the Kinetis Software Development Kit (KSDK).

ENABLEMENT

▸ Freedom development board platform

▸ USB dongle for sniffer applications or connection to PC

▸ Bluetooth Low Energy v4.1 host stack and application profiles

▸ 802.15.4 PHY/MAC support

▸ Thread network stack (end node only)

▸ ZigBee PRO stack and application profiles

▸ Full integration with Kinetis SDK

▸ Multiple reference designs

▸ Support for multiple RTOS's including our proprietary MQX™ and FreeRTOS

▸ Supports IAR IDE

KINETIS KW40Z/30Z/20Z WIRELESS MCUs BLOCK DIAGRAM

KINETIS KW40Z/30Z/20Z MCU FAMILY

Features	Benefits
6.5 mA typical Rx current and 8.4 mA typical Tx current with DC/DC activated	Significantly reduces the power consumption and extends battery life
• -91 dBm typical BLE sensitivity • -102 dBm typical 802.15.4 sensitivity • +5dBm maximum output power	High link budget improves range and lowers cost by reducing the need for external power amplifiers
Excellent selectivity and blocking	Significantly improves operation in harsh 2.4 GHz environments such as condominiums and apartments
Dual-mode concurrent BLE and 802.15.4 radio capability	Supports concurrent operations between an 802.15.4 and BLE network lowering system cost and complexity
Dual PAN 802.15.4 support	System can concurrently participate in two 802.15.4 based networks, eliminating the need for multiple radios
• 48 MHz ARM® Cortex®-M0+ core • On-chip 160 KB Flash memory • On-chip 20 KB SRAM	High performance, low power core with adequate memory to run BLE, Thread (end node) and ZigBee PRO protocol stacks and application
AES-128 Accelerator True Random Number Generator	Fast encryption/decryption utilizing hardware security algorithms for network commissioning and transmissions of supported protocols
Buck and Boost DC/DC working from 0.9 V to 4.2 V	Supports a wide range of batteries from single alkaline or coin-cell to Lithium-Ion
• 16-bit Analog-to-Digital Converter (ADC) • 12-bit Digital-to-Analog Converter (DAC) • 6-bit High Speed Analog Comparator (CMP)	Supports high performance on-chip analog at the MCU level for sensor aggregation and other sophisticated applications
Small 7x7 and 5x5 packages	Smaller size and low component count reduces cost
–40 ˚C to +105 ˚C operational temperature range	Ideal for industrial applications that need extended temperature range
Compatible with Kinetis MCU Family	Software protocol stacks, tools and IDE are compatible with the Kinetis MCUs, and integrated in the Kinetis software development kit (SDK)

DEVELOPMENT TOOLS

Kit Number	Description
FRDM-KW40Z	Freedom Development Board, KW40Z, 2.4 GHz BLE and 802.15.4 wireless connectivity solutions
USB-KW40Z	USB dongle for sniffer operations. KW40Z, 2.4 GHz BLE and 802.15.4 wireless connectivity solutions

ORDERABLE PART-NUMBERS

Part Number	Sensitivity (dBm)	Feature	Package
MKW40Z160VHT4	-91 dBm (BLE)/ -102 dBm (802.15.4)	Very low-power, concurrent BLE and 802.15.4 operation	7 x 7 Laminate QFN 48-pin
MKW30Z160VHM4	-91 dBm	Very low-power, BLE only	5 x 5 Laminate QFN 32-pin
MKW20Z160VHT4	-102 dBm	Very low-power, 802.15.4 only	7 x 7 Laminate QFN 48-pin