



32-bit MCUs

Kinetis KW41Z/31Z/21Z Wireless MCUs

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



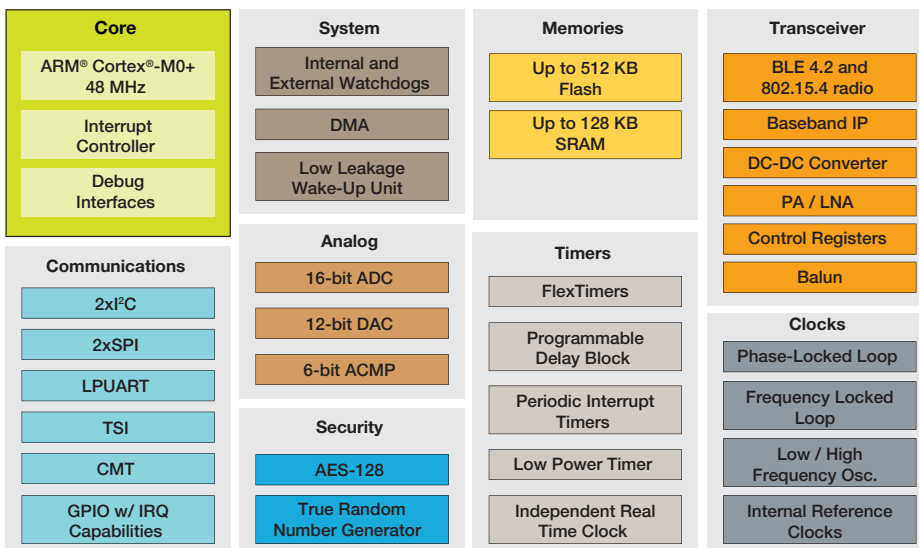
Overview

The Kinetis KW41Z/31Z/21Z wireless MCU family is the second multi-mode radio in the Kinetis portfolio. Integrating a Bluetooth® Low Energy v4.2 and IEEE® 802.15.4-2011 compliant modem, it can support both standards and run in concurrent mode in a single chip. KW41Z/31Z/21Z MCUs integrate 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 6.2 mA and transmit down to 6.0 mA. At the same time it delivers excellent link budget that ensures the longest range of communication and high immunity to interference.

KW41Z/31Z/21Z MCUs offer 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. With up to 512 KB of Flash and up to 128 KB of SRAM on chip, the KW41Z/31Z/21Z is the ultimate family for running all your connectivity needs in a single device.

Take advantage of the robust enablement package that includes the Freescale Bluetooth Low Energy 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 KW41Z/31Z/21Z MCUs and fully integrated in the Kinetis Software Development Kit (KSDK).

Kinetis KW41Z/31Z/21Z Wireless MCUs Block Diagram



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

Enablement

- Freedom development board platform
- USB dongle for sniffer applications or connection to PC
- Bluetooth Low Energy v4.2 host stack and application profiles
- 802.15.4 MAC/PHY support
- Thread network stack and application profiles
- ZigBee PRO stack and application profiles
- Full integration with Kinetis SDK
- Multiple reference designs
- Support for multiple RTOS's including including FreeRTOS and Freescale MQX™

Kinetis KW41Z/31Z/21Z Family

Features	Benefits
6.2 mA typical Rx current and 6.0 mA typical Tx current with DC/DC activated	Significantly reduces the power consumption and extends battery life
-96 dBm typical BLE sensitivity -102 dBm typical 802.15.4 sensitivity +4dBm 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
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 in a single chip 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 Up to 512 KB Flash memory Up to 128 KB SRAM	High performance low power core with adequate memory to run BLE, Thread 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 Laminate QFN and WLCSP packages	Smaller size and low component count reduces cost
Fast antenna diversity for 802.15.4	Allows the hardware to automatically select between 2 antennas, improving reliability in high interference environments
Compatible with Freescale 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-KW41Z	Freescale Freedom Development Board, KW41Z, 2.4 GHz BLE and 802.15.4 wireless connectivity solutions
USB-KW41Z	USB dongle for sniffer operations. KW41Z, 2.4 GHz BLE and 802.15.4 wireless connectivity solutions

Orderable part-numbers

Part Number	Sensitivity (dBm)	2.4 GHz RF Compatibility	Flash/RAM	Package
MKW41Z512VHT4 MKW41Z256VHT4	-96 dBm (BLE)/ -102 dBm (802.15.4)	Very low-power, concurrent BLE and 802.15.4 operation	Up to 512 KB/128 KB	7x7 Laminate QFN 48-pin WLCSP (Package Your Way*)
MKW31Z512VHT4 MKW31Z256VHT4	-96 dBm	Very low-power, BLE only	Up to 512 KB/128 KB	7x7 Laminate QFN 48-pin WLCSP (Package Your Way*)
MKW21Z512VHT4 MKW21Z256VHT4	-102 dBm	Very low-power, 802.15.4 only	Up to 512 KB/128 KB	7x7 Laminate QFN 48-pin WLCSP (Package Your Way*)

* Details at freescale.com/KPYW

For more information about wireless connectivity products, software and documentation, please visit freescale.com/wireless



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