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

Kinetis® KW41Z/31Z/21Z MCUs for Wireless Applications

The Kinetis KW41Z/31Z/21Z MCU family for wireless applications is the second multi-mode family in the Kinetis W series portfolio. Primarily used for automation and healthcare purposes, these MCUs enable low-energy and long-range connectivity.

TARGET APPLICATIONS

- Home automation
  - Access control
  - Appliances
  - Lighting control
  - Smart thermostats
  - Water heater control
  - Curtain/window blind control
  - Security systems
- 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

OVERVIEW

Integrating a Bluetooth® low energy (BLE) v4.2, Generic FSK (at 250, 500 and 1000 kbit/s) and IEEE® 802.15.4 compliant modem, Kinetis KW41Z/31Z/21Z MCUs can support multiple protocols running concurrently (time slice) in a single chip. These MCUs also integrate a buck-boost DC-DC converter, supporting a wide range of operating voltages from 0.9 V to 4.2 V, significantly reducing the peak current in receive and transmit modes. At the same time, this MCU family delivers an excellent link budget that ensures a long range of communication and high immunity to interference.

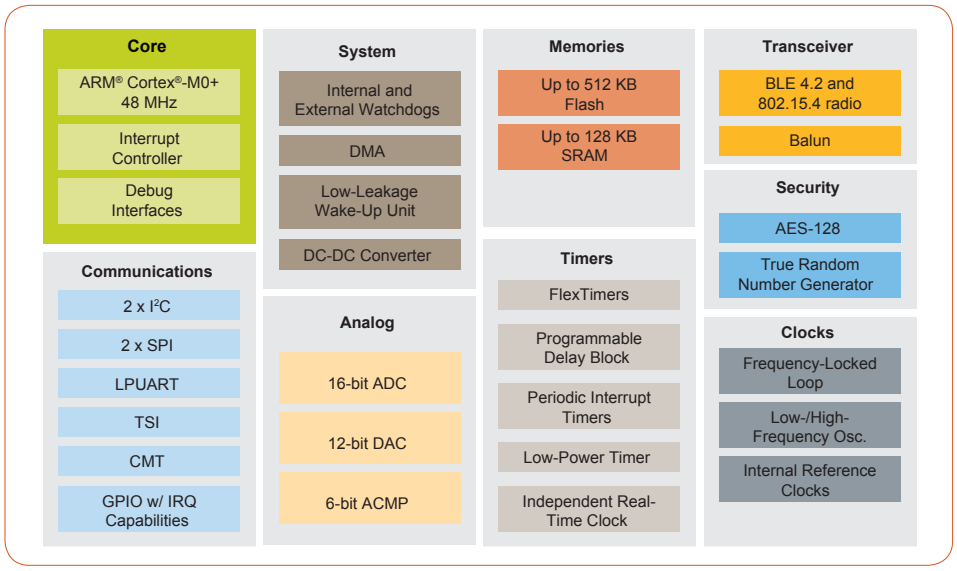
KW41Z/31Z/21Z MCUs offer multi-protocol support which allow the system to concurrently operate in an 802.15.4 based network, like Thread, and a BLE network, eliminating the need for multiple radios, reducing system complexity and cost. With up to 512 KB of flash and up to 128 KB of SRAM on chip, KW41Z/31Z/21Z MCUs provide an option for running all your connectivity needs in a single device.

Take advantage of the robust enablement package that includes the BLE host stack, generic FSK, Thread® stack, 802.15.4 MAC and Simple MAC (SMAC) software protocol stacks, RTOS, development tools and IDEs. These tools are designed for use with Kinetis KW41Z/31Z/21Z MCUs and are fully integrated in the Kinetis software development kit (KSDK).

ENABLEMENT

- Freedom development board
- USB dongle for sniffer applications or connection to PC
- BLE v4.2 host stack and application profiles
- Generic FSK at 250, 500 and 1000 kbit/s
- 802.15.4 MAC/PHY support
- Thread® network stack
- Support for host MCU and MPU (Linux®) processors
- Support for IAR Embedded Workbench® and NXP's MCUXpresso IDEs
- Full integration with NXP's MCUXpresso SDK
- Multiple reference designs
- Support for multiple RTOSes including FreeRTOS™

KINETIS KW41Z/31Z/21Z WIRELESS MCU FAMILY BLOCK DIAGRAM



KINETIS KW41Z/31Z/21Z FAMILY

Features	Benefits
Dual-mode concurrent BLE and 802.15.4 radio capability with Kinetis® KW41Z MCUs	Supports concurrent operations in a single chip between an 802.15.4 and BLE network lowering system cost and complexity
6.8 mA typical Rx and 6.1 mA Tx current with DC-DC activated	Significantly reduces power consumption and extends battery life
-95 dBm typical BLE sensitivity -100 dBm typical generic FSK (at 250 kbit/s) 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
Excellent selectivity and blocking	Significantly improves operation in harsh 2.4 GHz environments such as condominiums and apartments
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, generic FSK and Thread® 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-boost DC-DC converter 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
7 x 7 QFN 3.9 x 3.8 WLCSP	Smaller size and low component count reduces cost
Fast antenna diversity for 802.15.4	Allows the hardware to automatically select between two antennas, improving reliability in high-interference environments
Compatible with NXP MCU family	Software protocol stacks, tools and IDE are compatible with Kinetis MCUs, and integrated in the Kinetis software development kit (KSDK)

DEVELOPMENT TOOLS

Board Name	Description
FRDM-KW41Z	Freedom development board for Kinetis® KW41Z MCUs with 2.4 GHz BLE, generic FSK and 802.15.4 wireless connectivity solutions
USB-KW41Z	USB dongle for sniffer operations for Kinetis KW41Z MCUs with 2.4 GHz BLE, generic FSK and 802.15.4 wireless connectivity solutions

ORDERABLE PART NUMBERS

Part Number	2.4 GHz RF Compatibility	Flash/RAM	Package
MKW41Z512VHT4 MKW41Z256VHT4 MKW41Z512CAT4R	BLE/Generic FSK/802.15.4 (Supports concurrent operation)	512 KB/128 KB 256 KB/64 KB	7 x 7 laminate QFN 3.893 x 3.797 WLCSP
MKW31Z512VHT4 MKW31Z256VHT4 MKW31Z512VHT4R	BLE/Generic FSK	512 KB/128 KB 256 KB/64 KB	7 x 7 laminate QFN 3.893 x 3.797 WLCSP
MKW21Z512VHT4 MKW21Z256VHT4	802.15.4	512 KB/128 KB 256 KB/64 KB	7 x 7 laminate QFN

www.nxp.com/wireless

Document Number: KNTSKW41Z31Z21ZFS REV 5 cc

Mouser Electronics

Authorized Distributor

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

NXP:

USB-KW41Z FRDM-KW41Z