RIGADO R41Z Series

Thread + Bluetooth 4.2 Low Energy

Overview

Rigado's R41Z series is an ultra-low-power, highly-integrated single-chip device that enables Thread with IEEE 802.15.4 and Bluetooth Low Energy (BLE) RF connectivity for portable, extremely low power embedded systems. With an ARM® Cortex®-M0+ CPU, integrated 2.4GHz transceiver, and an integrated antenna, the R41Z provides a complete RF solution allowing faster time to market with reduced development costs.

Providing full use of the NXP's KW41Z's capabilities and peripherals, the R41Z Series can power the most demanding applications, all while simplifying designs and reducing BOM costs. The R41Z is an ideal solution for designs that require concurrent communication on both an 802.15.4 based network such as Thread and a Bluetooth Low Energy network. This multi-mode capability enables participating in a mesh network for local and remote control/monitoring and direct communication using Bluetooth Low Energy via a mobile device.

THREAD

Bluetooth®

Key Features

- Complete Thread (802.15.4) and Bluetooth Low Energy v4.2 solution
- Powerful & ultra-efficient 48MHz 32-bit ARM® Cortex™ M0+ CPU with 512kB Flash & 128kB SRAM
- Secure Bootloader (encrypted over-the-air updates)
- Transmitter certifications: FCC (USA), IC (Canada), MIC (Japan)
- Transmitter compliance: CE (Europe), RCM (Australia / New Zealand)
- Bluetooth & Thread certifications: (pending)

Quick Specifications

- Supply: 0.9V – 4.2V
- TX Power: 0 dBm @ 6.5mA
- Rx Sensitivity: -95 dBm @ 6.5mA
- Pins: 25 GPIO, 2 dedicated analog
- Interfaces: UART / I2C / SPI / PWM / TSI / PDM / ADC
- Memory: 512kB Flash / 128kB RAM
- Dimensions: 10.6 x 16.2 x 2.1mm
- Operating Temp: -40°C to +105°C

Applications

- Climate Control
- Lighting
- Safety and Security
- Home Appliances
- Access Control
- Internet of Things
- Home Health Care
- AV Remote Controls
- Smart Energy Management
- Low-Power Sensor Networks
- Key Fobs
- Interactive Entertainment Devices
- Environmental Monitoring
- Hotel Automation
- Office Automation

LEAD FREE RoHS COMPLIANT

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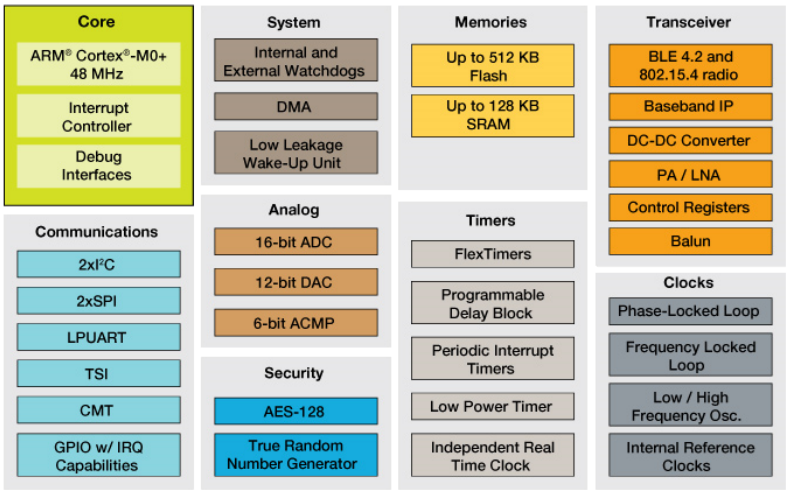
R41Z Series
Thread + Bluetooth 4.2 Low Energy Modules

Block Diagram



Secure Bootloader (Pending)

Encrypted Over-The-Air (OTA) and UART firmware updates add a layer of security to your application. The R41Z Series bootloader uses AES-128 encryption allowing for secure updates of your application firmware, bootloader, and Bluetooth / Thread stacks over Bluetooth low energy

Evaluation Kit

The R41Z Series evaluation kit (R41Z-EVAL) provides a great starting point for Thread and Bluetooth 4.2 Low Energy projects. It is designed for ease of use while still providing full access to the features of the R41Z. The built-in USB programmer allows for easy programming and configuration. All of the I/O is accessible through an Arduino R3 form factor and the evaluation kit supports plug-and-play accessory shields.

Specifications

General	
Operating Temperature	-40°C to +105°C
Storage Temperature	-40°C to +125°C
Physical Dimensions	10.6 x 16.2 x 2.1 mm
Operating Supply	0.9V to 4.2V
Material	RoHS compliant
MAC Address	Unique MAC address provided (in flash & on label)
2.4 GHz Transceiver	
Frequency (ISM)	2.400GHz to 2.4835GHz
Frequency (MBAN)	2.360GHz to 2.4000GHz
IEEE Standard 802.15.4 Modulation	OQPSK @ 250kbps
Bluetooth Low Energy 4.2 Modulation	GFSK @ 1 Mbps
IEEE Standard 802.15.4 Receiver sensitivity	-100 dBm
Bluetooth Low Energy 4.2 Receiver sensitivity	-95 dBm
Transmit power	-30 dBm to +3.5 dBm
RSSI	-95 dBm, 1 dB resolution
Antenna	Integrated antenna
Approvals (All Pending – Estimated Q4 2016)	
FCC	FCC part 15 modular qualification – FCC ID: 2AA9B07
IC	Industry Canada RSS-210 modular qualification – IC: 12208A-07
CE	EN 60950-1: 2011-01 3.1 (a) : Health and Safety of the User
	EN 301 489-17 V2.2.1 3.1 (b) : Electromagnetic Compatibility
	EN 300 328 V1.8.1 3.2 : Effective use of spectrum allocated
Thread	Applying to be Thread Certified Component
Bluetooth	Applying to be RF-PHY Component - DID: TBD

Power Consumption	
Radio - Tx	6.5mA @ 0dBm
Radio - Rx	6.7mA @ 1Mbps (BLE mode)
CPU - running	6.4mA @ 48MHZ core / 24MHz flash / bus clock disabled
	5.9mA @ 48MHZ core / 24MHz flash / all peripheral clocks disabled
CPU - off/idle	1.8µA Very-Low-Leakage Stop 3 (RAM retained, DC-DC enabled)
	182nA Very-Low-Leakage Stop 0 (bypass mode)

Peripherals	
LPUART	1 block. 1200 baud to 1M baud, parity, CTS & RTS support
SPI Master	2 blocks. 125kHz to 12Mhz clock rates, double-buffered transmit/receive
SPI Slave	2 blocks. 125kHz to 12Mhz clock rates, double-buffered transmit/receive
TWI (I2C) Master	2 blocks. 100kHz to 400kHz clock rates
TWI (I2C) Slave	2 blocks. 100kHz to 400kHz clock rates
TSI	16 external electrodes, internal reference oscillator for high-accuracy
ADC	16-bit @ 500ksps
PWM	3 blocks, 1x 4 channel and 2x 2 channel
DAC	12-bit @ 1µs high-speed, 2µs low-speed
CMP	8 selectable comparator inputs, 6-bit programmable reference generator input
GPIO	Input High: 0.7 x VDD, Input Low: 0.3 x VDD, 20-50kΩ pull-up/pull-down
Timers	16-bit low-power timer, 1x 4-channel TPM
PIT	32-bit resolution, 2 interrupt timers
CMT	Time, baseband, FSK
VREF	0.5mV steps, 1.2V output at room temp
RTC	32-bit seconds counter with 32-bit alarm, 16-bit prescaler

Ordering Information

- Order a Development Kit
- Contact Us for pricing and ordering info

Part Number	*Description*
R41Z-TA-R	R41Z module, KW41Z512, integrated antenna
R41Z-TA-EVAL	R41Z Evaluation Kit with OpenSDA programmer

Availability Information

- Current Status: Production
- Shipping December 2016
- Modules will be available through Digi-Key and Arrow.

Design Services

Rigado has an experienced team of software, electrical, and mechanical engineers that provide solutions to today's technological challenges. Whether you need a network of industrial sensors, or a complete product ready for mass production; Rigado can turn your ideas into reality.

Our expertise

- Electrical, software, mechanical and industrial design
- Bluetooth Low Energy and Low-Power Wireless
- iOS and Android mobile application design
- Turnkey products
- Product Management

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