

# RW612: Introducing world's first secure Wi-Fi 6 Tri-Radio wireless MCU

The RW612 is a highly integrated, low-power tri-radio wireless MCU with an integrated MCU and Wi-Fi® 6 + Bluetooth® Low Energy / 802.15.4 radios designed for a broad array of applications, including connected smart appliances, smart home devices and hubs, healthcare and medical, enterprise and industrial automation, smart accessories and smart energy.

The RW612 MCU subsystem includes a 260 MHz Arm® Cortex®-M33 core with Trustzone™-M, 1.2 MB on-chip SRAM and a high-bandwidth Quad SPI interface with an on-the-fly decryption engine for securely accessing off-chip execute-in-place (XIP) flash and PSRAM expansion.

The RW612 includes a full-featured 1x1 dual-band (2.4 GHz/5 GHz) 20 MHz Wi-Fi 6 (802.11ax) subsystem bringing higher throughput, better network efficiency, lower latency and improved range over previous generation Wi-Fi standards. The Bluetooth LE radio supports 2 Mbit/s high-speed data rate, long range and extended advertising. The on-chip 802.15.4 radio can support the latest Thread and Zigbee mesh networking protocol. The RW612 is an ideal device for Matter applications running over Wi-Fi, Ethernet and Thread. The RW612 can operate as a Matter Controller, Thread Border Router as well as a Matter Bridge. This capability enables full Matter functionality for local and cloud-based control, and for monitoring of IoT products seamlessly across major ecosystems.

EdgeLock® security technology is fully incorporated, offering secure boot, secure debug, secure firmware updates and secure life cycle management as well as hardware cryptography and physically unclonable function (PUF) for secure key management.



The advanced design of the RW612 delivers tight integration, low power and highly secure operation in a space- and cost-efficient wireless MCU requiring only a single 3.3 V power supply.

## Feature overview

### MCU

- 260 MHz Arm Cortex-M33 with TrustZone-M
- On-chip 1.2 MB PSRAM
- Quad FlexSPI encrypted XIP Flash and external PSRAM expansion
- Up to 5 Flexcomm (configurable as SPI/I<sup>2</sup>C/I<sup>2</sup>S/UART)
- IEEE 1588 RMI/ Fast Ethernet interface
- LCD interface
- Advanced analog peripherals

### Wi-Fi 6 radio

- 1 x 1, 20 MHz, IEEE 802.11ax (MCS9), 2.4 GHz/5 GHz
- Target wake time, dual carrier modulation and extended range
- Integrated Wi-Fi PA, LNA, and T/R switch, up to +21 dBm Tx power
- WPA 3 personal and enterprise security
- Matter over Wi-Fi

## Bluetooth low energy / 802.15.4 radio

- Supports Bluetooth 5.2 features
- Bluetooth LE 2 Mbps high-speed mode, long range and advertising extensions
- 802.15.4 supporting Thread and Zigbee
- Matter over Thread
- Integrated PA / LNA with up to +15 dBm Tx output

## EdgeLock® security

- NXP EdgeLock Assurance program
- SESIP L3, PSA L3, CAVP certified
- Hardware root of trust
- Trusted Execution Environment based on Arm TrustZone-M
- Secure boot, debug and software update
- Hardware cryptography
- Physical unclonable function (PUF) for secure key management
- NXP EdgeLock 2GO Trust Provisioning

## SDK, tool-kits and middleware

- MCUXpresso SDK toolchain (IDE, config tools, debug tools)
- FreeRTOS-based MCUXpresso SDK and associated middleware layers
- Zephyr ecosystem support

## Power management

- Ability to power the entire RW612 using a single 3.3 V external supply
- Integrated Buck regulators and LDOs supplying internal power domains

- Independent power modes across applications and radio subsystems
- Individual subsystem wake-up through dedicated GPIO, IRQ and RTC
- Low-leakage always-on power domain enabling fast wake-up

## Packages/operating temperatures

- 8 mm x 8 mm, 0.5p 145-pin TFBGA
- 9 mm x 9 mm, 0.5p 116-pin HVQFN
- 4.68 mm x 5.165 mm, 0.3p 151-pin WLCSP
- Industrial: -40 to +85°C

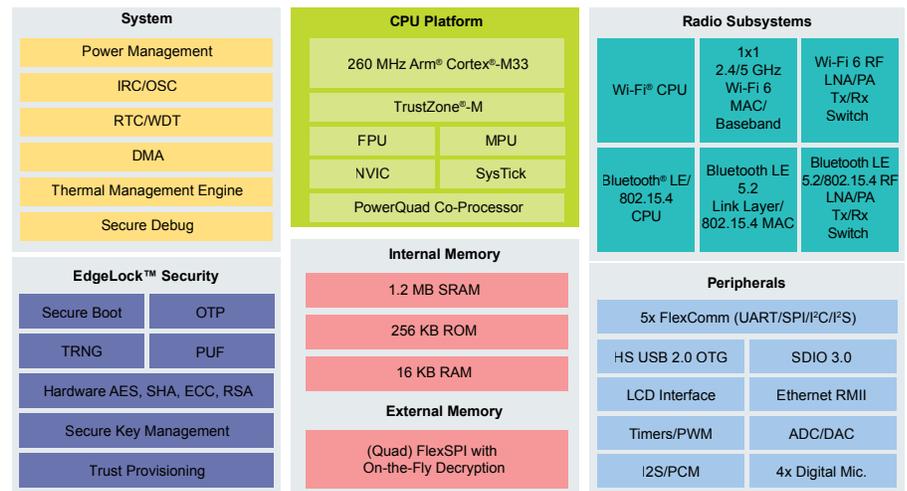
## Modules

- Broad array of module offering from industry leading global suppliers

## Target applications

- Smart Appliances
- Smart Home
- Gateways/Hubs
- Industrial Automation
- Electric Charging Stations
- Medical/Healthcare

## RW612 block diagram



## Versions

<b>RW612</b>	Wireless MCU with Integrated Tri-radio: 1x1 Wi-Fi® 6 + Bluetooth® Low Energy / 802.15.4
<b>RW610</b>	Wireless MCU with Integrated Radio: 1x1 Wi-Fi® 6 + Bluetooth® Low Energy 5.4 Radios

## RW612



## RW610



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