RENESAS RA

32-BIT MCU FAMILY
RENESAS RA4W1 GROUP

48MHz BLE 5.0 Single Chip MCU from RA4 Series

The Renesas RA4W1 is the first BLE 5.0 fully compliant with 2Mbit High-Throughput (HT) and Long Range support in a single chip MCU of Renesas RA4 product series for IoT applications that require a high-performance Arm® Cortex®-M4 core at a very attractive price point. The RA4W1 is built on a highly efficient 40nm process and is supported by an open and flexible ecosystem concept, called Flexible Software Package (FSP), using FreeRTOS as base. RA4W1 is geared towards IoT application requiring Security, large embedded RAM and low power consumption.

Renesas RA4 Series

RA4W1 — 48MHz, Arm® Cortex®-M4 512kB Flash, 96kB RAM QFN56, Bluetooth 5.0 USB, CAN, Security LCD Controller and Touch

RA4M1 — 48MHz, Arm® Cortex®-M4 256kB Flash, 32kB RAM 40-100pin, USB, CAN, Security LCD Controller and Touch
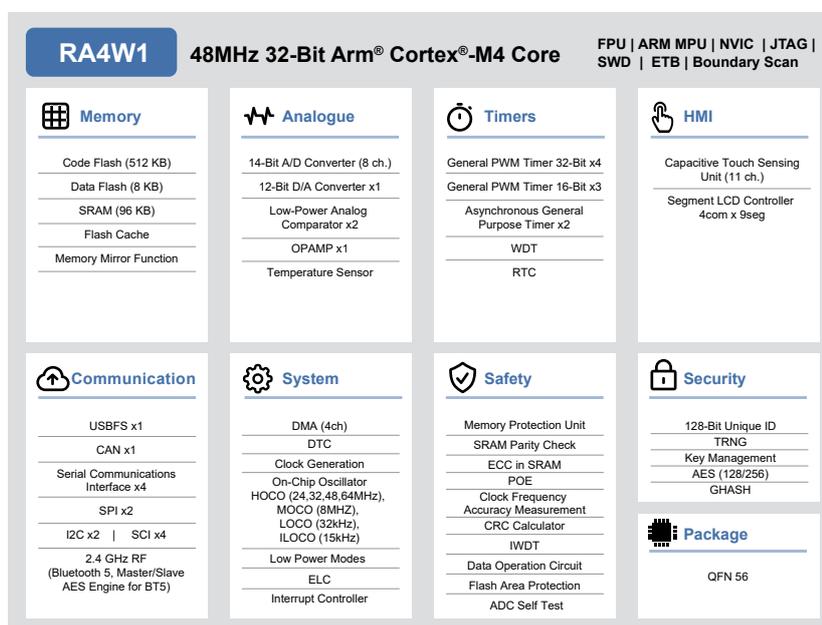
Target Applications

- Security (Fire Detection, Burglar Detection, Panel control)
- Metering (Electricity, Automated Meter Reading)
- Industry (Robotics, Door Openers, Sewing Machines, Vending machines, UPS)
- Health and Wearables Body Sensors
- Smart Home and Remote Control Toys

Key Features

- 48MHz Arm® Cortex®-M4
- 512kB Flash Memory and 96kB SRAM
- 8kB DataFlash to store data as in EEPROM
- 7x7 mm QFN 56 pin package.
- Capacitive Touch Sensing Unit
- Segment LCD Controller
- USBFS 2.0 Full Speed
- CAN 2.0B
- SCI (UART, Simple SPI, Simple I2C)
- SPI/ I2C Multimaster Interface
- 2.4 GHz Radio with BLE 5.0 and BLE Mesh
- LE 1M, 2M, Coded PHY, and LE Advertising Extension

Block Diagram

RA4W1 — 48MHz 32-Bit Arm® Cortex®-M4 Core — FPU | ARM MPU | NVIC | JTAG | SWD | ETB | Boundary Scan

Memory
- Code Flash (512 KB)
- Data Flash (8 KB)
- SRAM (96 KB)
- Flash Cache
- Memory Mirror Function

Analogue
- 14-Bit A/D Converter (8 ch.)
- 12-Bit D/A Converter x1
- Low-Power Analog Comparator x2
- OPAMP x1
- Temperature Sensor

Timers
- General PWM Timer 32-Bit x4
- General PWM Timer 16-Bit x3
- Asynchronous General Purpose Timer x2
- WDT
- RTC

HMI
- Capacitive Touch Sensing Unit (11 ch.)
- Segment LCD Controller 4com x 9seg

Communication
- USBFS x1
- CAN x1
- Serial Communications Interface x4
- SPI x2
- I2C x2 | SCI x4
- 2.4 GHz RF (Bluetooth 5, Master/Slave AES Engine for BT5)

System
- DMA (4ch)
- DTC
- Clock Generation
- On-Chip Oscillator HOCO (24,32,48,64MHz), MOCO (8MHZ), LOCO (32kHz), ILOCO (15kHz)
- Low Power Modes
- ELC
- Interrupt Controller

Safety
- Memory Protection Unit
- SRAM Parity Check
- ECC in SRAM
- POE
- Clock Frequency Accuracy Measurement
- CRC Calculator
- IWDT
- Data Operation Circuit
- Flash Area Protection
- ADC Self Test

Security
- 128-Bit Unique ID
- TRNG
- Key Management
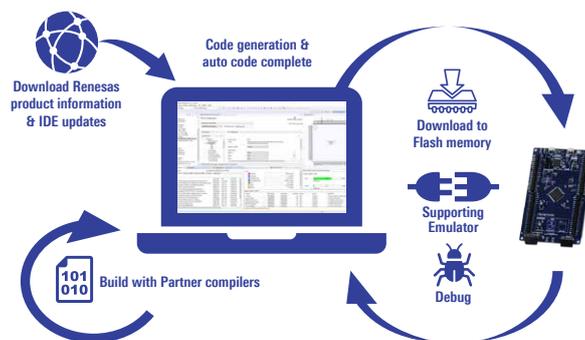- AES (128/256)
- GHASH

Package
- QFN 56

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Benefits

- Full functionality of BT5 along with the high-performance processing and superior power efficiency.
  - High Throughput and Long Range support
- Integrated Secure Crypto Engine with several cryptography accelerators and Key management.
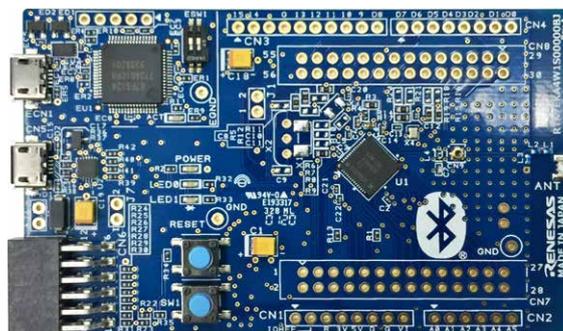- Large 96kB embedded SRAM suitable for handling communication stacks.

Tools and Support

IDE	Renesas e²studio	Keil MDK	IAR EWARM
Compiler	■ GCC ■ Arm Compiler	■ Arm Compiler	■ IAR Arm Compiler
Debugger	■ Renesas E2/E2 Lite ■ SEGGER J-Link	■ SEGGER J-Link	■ IAR I-Jet ■ SEGGER J-Link
Programmer	■ Renesas PG-FP6 ■ SEGGER J-Flash ■ Third party solutions		

Evaluation Kit

- Full MCU evaluation including On-Chip debugger
- Part name: RTK7EKA4W1S00000BJ

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Ordering References

Part name	Flash	RAM	DataFlash	Operating Temperature	Package	Package dimensions	Pin Pitch
R7FA4W1AD2CNG	512kB	96kB	8kB	-40 to +85°C	QFN 56pin	7x7mm	0.5mm

For more details, please visit www.renesas.com/RA

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