

# 32-BIT MCU FAMILY RENESAS RA4M2 GROUP

## 100MHz High Integration Arm® Cortex®-M33 with TrustZone®

The Renesas RA4M2 group uses the high-performance Arm® Cortex®-M33 core with TrustZone®. In concert with the Secure Crypto Engine, it offers Secure Element functionality. It offers rich connectivity with USB 2.0 Full-Speed, SDHI, QSPI, and advanced analog.

The RA4M2 is built on a highly efficient 40nm process and is supported by an open and flexible ecosystem concept—the Flexible Software Package (FSP), built on FreeRTOS—and is expandable to use other RTOSes and middleware. The RA4M2 is suitable for IoT applications requiring Ethernet, future proof security, large embedded RAM, and low active power consumption down to 81µA/MHz running the CoreMark® algorithm from Flash.

	RA4W1	RA4M1	RA4M2	RA4M3
Performance Range	48MHz, Arm® Cortex®-M4	48MHz, Arm® Cortex®-M4	100MHz, Arm® Cortex®-M33	100MHz, Arm® Cortex®-M33
Memory Range	512kB Flash, 96kB RAM	256kB Flash, 32kB RAM	256-512kB Flash, 128kB RAM	512kB-1MB Flash, 128kB RAM
Package	56pin QFN	40-100pin QFN/LQFP	48-100pin QFN/LQFP	64-144pin LQFP
USB, CAN	●	●	●	●
Security	●	●	With TrustZone®	With TrustZone®
HMI	LCD Controller and Touch	LCD Controller and Touch	Cap Touch	Cap Touch
Other Features	Bluetooth 5.0			

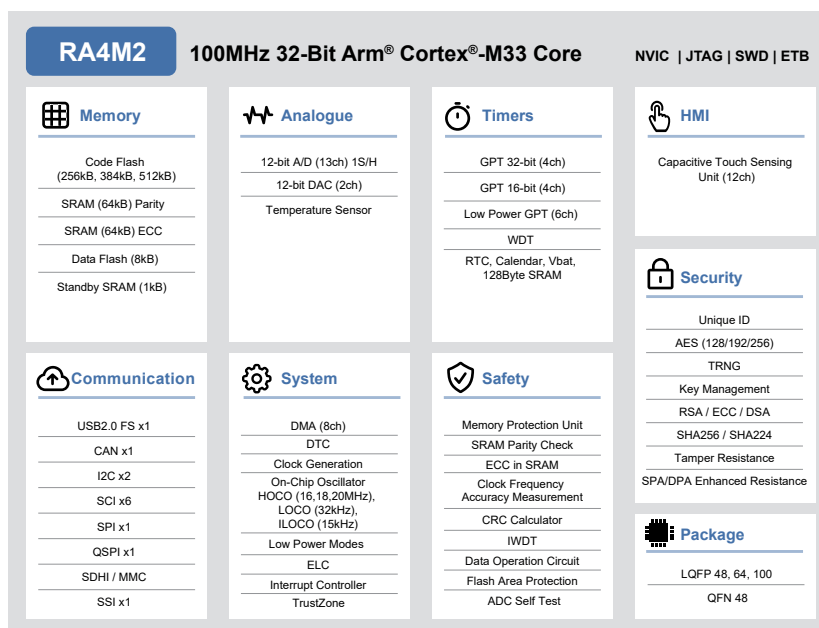
## Target Applications

- Enhanced Security (fire detection, burglar detection, panel control)
- Metering (electricity, automated meter reading)
- Industry (robotics, door openers, sewing machines, vending machines, UPS)
- HVAC (heating, air conditioning, boiler control)
- General purpose

## Key Features

- 100MHz Arm® Cortex®-M33 with TrustZone®
- Secure element functionality
- 256kB - 512kB Flash memory and 64kB SRAM with Parity and 64kB SRAM with ECC
- 8kB Data Flash to store data as in EEPROM
- 1kB Stand-by SRAM
- Scalable from 48-pin to 100-pin packages
- Capacitive touch sensing unit
- USB 2.0 Full Speed
- CAN 2.0B
- QuadSPI
- SCI (UART, Simple SPI, Simple I²C)
- SPI/ I²C multimaster interface
- SDHI and MMC

## Block Diagram



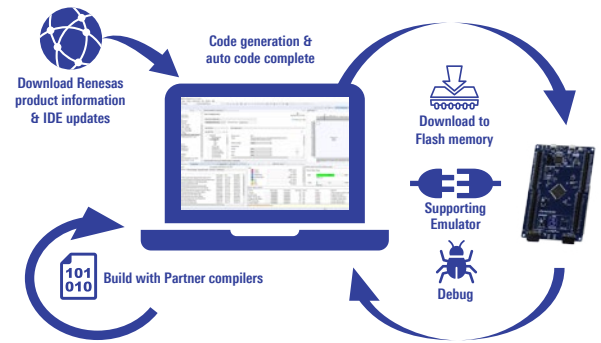
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## Benefits

- Secure element functionality providing better performance, unlimited secure key storage, key management, and lower BOM cost
- High-performance and low-power with 81μA/MHz while running CoreMark from flash at 100 MHz
- High-integration up to 512 kB code flash memory with background operation and SWAP operation, 8 kB Data flash memory, and 128 kB SRAM with Parity/ECC
- Rich connectivity with USB 2.0 Full-Speed, SDHI, QSPI, and advanced analog

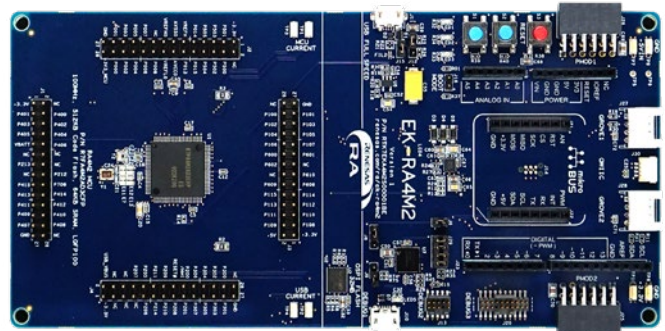
## Tools and Support

IDE	Renesas e²studio	Keil MDK	IAR EWARM
Compiler	<ul style="list-style-type: none"> <li>■ GCC</li> <li>■ Arm Compiler</li> </ul>	<ul style="list-style-type: none"> <li>■ Arm Compiler</li> </ul>	<ul style="list-style-type: none"> <li>■ IAR Arm Compiler</li> </ul>
Debugger	<ul style="list-style-type: none"> <li>■ Renesas E2/E2 Lite</li> <li>■ SEGGER J-Link</li> </ul>	<ul style="list-style-type: none"> <li>■ SEGGER J-Link</li> </ul>	<ul style="list-style-type: none"> <li>■ IAR I-Jet</li> <li>■ SEGGER J-Link</li> </ul>
Programmer		<ul style="list-style-type: none"> <li>■ Renesas PG-FP6</li> <li>■ SEGGER J-Flash</li> <li>■ Third party solutions</li> </ul>	



## Evaluation Kit

- Full MCU evaluation including On-Chip debugger
- Part name: RTK7EKA4M2S00001BE



Evaluation Kit: RTK7EKA4M2S00001BE

## Ordering References

Part Name	Flash	512KB	R7FA4M2AD3CFP	R7FA4M2AD3CFM	R7FA4M2AD3CFL	R7FA4M2AD3CNE
		384KB	R7FA4M2AC3CFP	R7FA4M2AC3CFM	R7FA4M2AC3CFL	R7FA4M2AC3CNE
		256KB	R7FA4M2AB3CFP	R7FA4M2AB3CFM	R7FA4M2AB3CFL	R7FA4M2AB3CNE
RAM		128KB	128KB	128KB	128KB	128KB
DataFlash		8KB	8KB	8KB	8KB	8KB
Operating Temperature		-40/+105°C	-40/+105°C	-40/+105°C	-40/+105°C	-40/+105°C
Package		LQFP100 pin	LQFP64 pin	LQFP48 pin	QFN48 pin	QFN48 pin
Package Dimensions		14x14mm body; (16x16mm)	10x10mm body; (12x12mm)	7x7mm body; (9x9mm)	7x7mm	7x7mm
Pin Pitch		0.5mm	0.5mm	0.5mm	0.5mm	0.5mm

For more details, please visit [www.renesas.com/RA](http://www.renesas.com/RA)

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Document No.: R01PF0209EU0100

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