

32-BIT MCU FAMILY

RENESAS RA6M4 GROUP

200MHz High Integration ARM® Cortex®-M33 with TrustZone®

The Renesas RA6M4 group uses the high-performance Arm® Cortex®-M33 core with TrustZone®. In concert with the Secure Crypto Engine, it offers secure element functionality. The integrated Ethernet MAC with individual DMA ensures high data throughput.

The RA6M4 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 RTOS and middleware. The RA6M4 is suitable for IoT applications requiring Ethernet, future proof security, large embedded RAM, and low active power consumption down to 99uA/MHz running the CoreMark® algorithm from Flash.

200MHz, Arm® Cortex®-M33
512kB-1MB Flash, 256kB RAM
 64-144pin, USB, CAN, Ethernet, Security and TrustZone

RA6M4

120MHz, Arm® Cortex®-M4
512kB-2MB Flash, 256kB-640kB RAM
 64-176pin, USB, CAN, Ethernet, TFT, Security

**RA6M1
RA6M2
RA6M3**

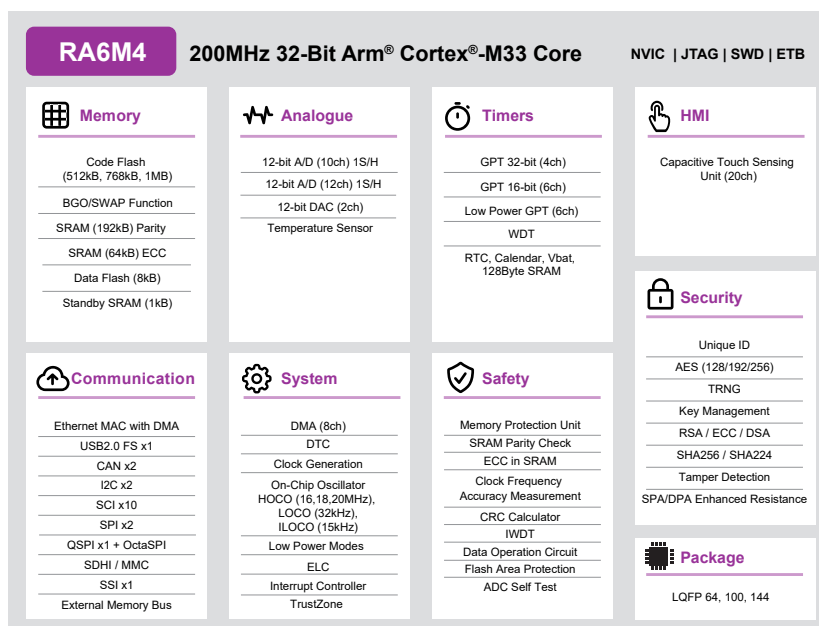
Target Applications

- Wired Ethernet 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

- 200MHz Arm® Cortex®-M33 with TrustZone®
- Secure element functionality
- 512kB - 1MB Flash memory and 192kB SRAM with Parity and 64kB SRAM with ECC
- Dual-bank-Flash with background operation
- 8kB Data Flash to store data as in EEPROM
- Scalable from 64-pin to 144-pin packages
- Ethernet controller with DMA
- Capacitive touch sensing unit
- USB 2.0 Full Speed
- CAN 2.0B
- QuadSPI and OctaSPI
- SCI (UART, Simple SPI, Simple I²C)
- SPI/ I²C multimaster interface
- SDHI and MMC

Block Diagram



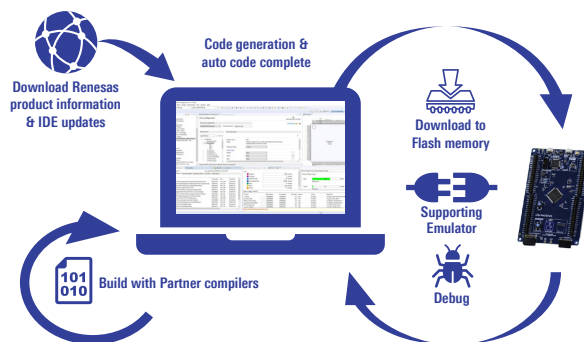
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Benefits

- Secure element functionality providing better performance, unlimited secure key storage, key management, and lower BOM cost.
- High-performance and low-power with 99µA/MHz while running CoreMark from flash at 200 MHz.
- High-integration up to 1 MB code flash memory with Dual-bank, background and SWAP operation, 8 kB Data flash memory, and 256 kB SRAM with Parity/ECC.
- Rich connectivity with Ethernet MAC controller, USB 2.0 Full-Speed, SDHI, Quad and Octa SPI, and advanced analogue.

Tools and Support

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



Evaluation Kit

- Full MCU evaluation including On-Chip debugger
 - Part name: **RTK7EKA6M4S00001BE**



Evaluation Kit: EK-RA6M4

Ordering References

Part name	Flash	RAM	DataFlash	Operating Temperature	Package	Package dimensions	Pin pitch
R7FA6M4AF3CFB	1MB	256KB	8KB	-40/+105°C	LQFP 144pin	20x20mm body; (22x22mm)	0.5mm
R7FA6M4AF3CFP	1MB	256KB	8KB	-40/+105°C	LQFP 100pin	14x14mm body; (16x16mm)	0.5mm
R7FA6M4AF3CFM	1MB	256KB	8KB	-40/+105°C	LQFP 64pin	10x10mm body; (12x12mm)	0.5mm
R7FA6M4AE3CFB	768KB	256KB	8KB	-40/+105°C	LQFP 144pin	20x20mm body; (22x22mm)	0.5mm
R7FA6M4AE3CFP	768KB	256KB	8KB	-40/+105°C	LQFP 100pin	14x14mm body; (16x16mm)	0.5mm
R7FA6M4AE3CFM	768KB	256KB	8KB	-40/+105°C	LQFP 64pin	10x10mm body; (12x12mm)	0.5mm
R7FA6M4AD3CFB	512KB	256KB	8KB	-40/+105°C	LQFP 144pin	20x20mm body; (22x22mm)	0.5mm
R7FA6M4AD3CFP	512KB	256KB	8KB	-40/+105°C	LQFP 100pin	14x14mm body; (16x16mm)	0.5mm
R7FA6M4AD3CFM	512KB	256KB	8KB	-40/+105°C	LQFP 64pin	10x10mm body; (12x12mm)	0.5mm

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

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Corporate Headquarters
TOYOSU FORESIA, 3-2-24 Toyosu, Koto-ku, Tokyo 135-0061, Japan
www.renesas.com

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