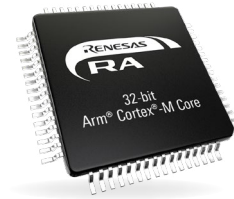# RENESAS

RA

32-bit MCU with Arm® Cortex®-M Core
RENESAS RA FAMILY

Delivering the Ultimate Promise of IoT with Software Flexibility

The Renesas RA family of 32-bit MCUs are built on the Arm® Cortex®-M core architecture. Offering a wide range of performance and features, the Renesas RA family meets the scalability, power consumption and performance needs of nearly any embedded systems end-product.

Strong Security

- Leading-edge, integrated Renesas Security IP
- An extra layer of embedded hardware security providing tamper detection and resistance to side-channel attacks
- Integrated Arm v8-M TrustZone®

Arm Core

- Arm Cortex-M23 core for the most cost/power sensitive applications
- Arm Cortex-M4/M33 cores to deliver the best balance of performance and power
- Arm Cortex-M85 core with Helium™ technology for unprecedented performance

Flexible Software Solution

- Supported by an open and flexible ecosystem concept, the Flexible Software Package (FSP)
- Can be replaced and expanded by any other RTOS or middleware

Best-in-Class Peripheral IP

- Excellent HMI capacitive touch technology
- The industry's highest code flash memory capacity
- Wide range of connectivity solutions

Renesas RA Product Series

The five Renesas RA Family MCU series are based on 32-bit Arm Cortex-M cores. All five have been designed on common DNA, making these products feature- and pin-compatible. This allows easy scalability and code reuse from one device to another.

High Performance / Power Savings	Performance Range	Feature	Series Memory Ranges	ASSP Extensions
RA8	Over 240 MHz 1.68-3.6V	Highest Performance, HMI, Connectivity, Security, Analog	Highest memory integration: up to 2MB Flash, 2MB SRAM	Motor/Inverter AI/ML, HMI
RA6	Up to 240 MHz 2.7-3.6V	Advanced Performance, Connectivity, Security	High memory integration: up to 2MB Flash, 640kB SRAM	Motor/Inverter AI/ML, HMI
RA4	Up to 100 MHz 1.6V-5.5V	Excellent Power, High Performance Mix Paired with Security	Medium memory integration: up to 1MB Flash, 128kB SRAM	Motor/Inverter Sensor, Wireless
RA2	Up to 64 MHz 1.6V-5.5V	Low Power	Medium memory integration: up to 512kB Flash, 48kB SRAM	Rich Analog
RA0	32 MHz 1.6V-5.5V	Optimized functionalities Ultra Low power	Small memory integration: up to 64kB Flash, 12kB SRAM	Sensor

RENESAS RA FAMILY

Target Markets and Benefits

Industrial Automation
- Long product life
- Temperature up to 105°C
- Industrial quality grade
- Strongest robustness
- 24-bit $\sum\Delta$ ADC for sensors

Security
- Isolated crypto subsystem
- Symmetric/asymmetric hardware acceleration
- True Random Number Generator (TRNG)
- NIST-certified algorithms
- Key isolation and management

Connectivity
- Large on-chip RAM suitable for stacks
- CAN/USB/Ethernet
- Large amount on serial interfaces
- QSPI interfaces
- Integrated crypto module

Building Automation
- High Flash/RAM ratio
- Wide range of connectivity
- Rich analog features
- Small packages

Metering
- Scalable lineup
- Industrial quality grade
- Long product life
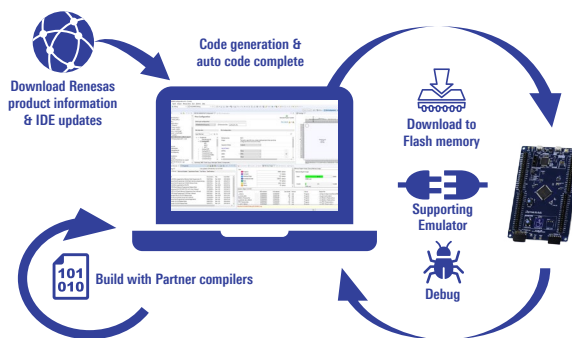- Integrated crypto module

White Goods
- Temperature up to 105°C
- Scalable lineup
- Motor control solutions
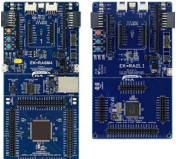- Capacitive touch interface
- LCD control

Tools and Support

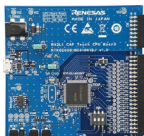| IDE	Renesas e² studio	Keil MDK	IAR EWArm
Compiler	• GCC • LLVM • Arm Compiler* • IAR Arm Compiler*	• Arm Compiler*	• IAR Arm Compiler*
Debug Probe	• Renesas E2/E2 Lite • SEGGER J-Link	• SEGGER J-Link • Keil ULINK / CMSIS-DAP**	• IAR I-jet • SEGGER J-Link • Renesas E2/E2 Lite • CMSIS-DAP**
Production Programmer	• Renesas PG-FP6	• SEGGER J-Flash	• Partner solutions

* Compiler must be purchased and licensed directly from third party
** Limited support

Download Renesas product information & IDE updates

Code generation & auto code complete

Download to Flash memory

Supporting Emulator

Debug

101 010 Build with Partner compilers

Evaluation Kits

General-purpose Kits		Application-specific Kits	3rd Party/Partner Kits
MCU evaluation including on-board debugger (EK-RAxxx, FPB-RAxxx)	Individual kits for several products of each Renesas RA series (EK-RAxxx)	Motor, Voice, AI, Touch, Cloud, etc.	Access to partner's ecosystem and tools

Learn more: renesas.com/ra/kits

For more information about the Renesas RA MCU family, visit: renesas.com/RA