

# 32-BIT MCU FAMILY

# RENESAS RA2A1 GROUP

## 48MHz ARM Cortex M23 with Integration of 24-bit Sigma Delta ADC

The RA2A1 group uses the high-performance Arm® Cortex®-M23 core and offers highly integrated, high-accuracy analog capabilities and therefore offers complete MCU with analog solution for signal conditioning and measurement. The RA2A1 Group supports a wide operating voltage range of 1.6V to 5.5V. It includes 16-bit SAR ADC, 24-bit Sigma Delta ADC, comparators, operational amplifiers, and DACs. The RA2A1 MCU targets cost sensitive and low power Industrial sensor applications where high resolution analog will become a cost benefit.

**RA2**  
Series

**RA2A1**

48MHz, Arm® Cortex®-M23  
 256kB Flash, 32kB RAM  
 32-64pin, USB, CAN, 24bit  
 Sigma Delta ADC, 16bit ADC,  
 Security

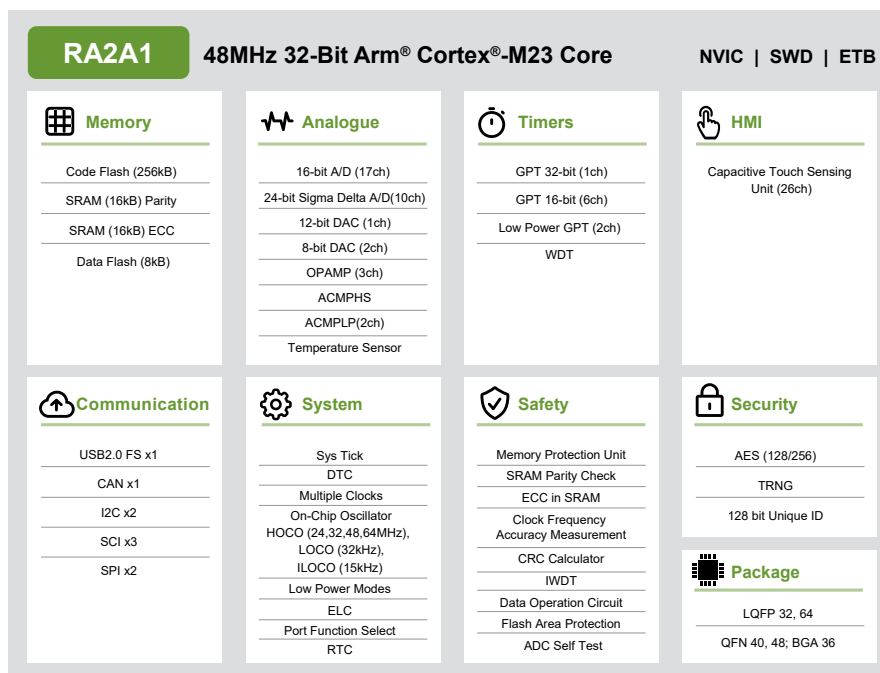
### Target Applications

- Industrial Automation (Photoelectric Sensor, Fiber Sensor, Temperature Sensor)
- Process Automation (Pressure Sensor, Flow control meter, Single Phase Meter)
- Building Automation/Home Appliance (Smoke Detector)
- Healthcare (Pulse Oximeters, Body Composition Measurement)
- General Purpose

### Key Features

- 48MHz Arm® Cortex®-M23
- 256kB Flash Memory and 32kB SRAM
- 8kB DataFlash to store data as in EEPROM
- Scalable from 32pin to 64pin Packages
- Capacitive Touch Sensing Unit
- 16bit-SAR A/D, 24bit-SD A/D
- 12bit-D/A, 8bit-D/A
- OPAMP (3ch), ACMP-HS/LP
- USB2.0 Full Speed
- CAN 2.0
- SCI (UART, Simple SPI, Simple I²C)

### Block Diagram



# RENESAS RA2A1 GROUP

## Benefits

- Integrated best-in-class programmable analog for high-accuracy sensor signal acquisition and conditioning.
- Reduce BOM cost and PCB size by eliminating several external analog components.
- Ultra-low power extends battery life for battery-operated portable and battery backup applications.

## Tools and Support

### Integrated Development Environment (IDE)

- Renesas e<sup>2</sup> studio
- Keil MDK

### Compiler

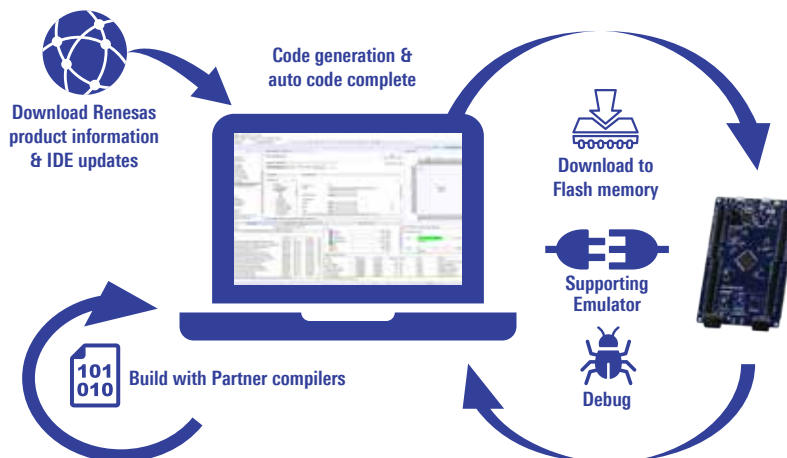
- GNU, Arm Compiler version 6

### Emulator

- Segger J-Link
- Renesas E2 emulator, E2 Lite emulator

### Flash Memory Programmer

- Renesas PG-FP6
- Third party solutions



### Evaluation Kit

- Full MCU evaluation including On-Chip debugger
  - Part name: RTK7EKA2A1S00001BU



Evaluation Kit: EK-RA2A1

## Ordering References

Part name	Flash	RAM	DataFlash	Operating Temperature	Package	Package Dimensions	Pin Pitch
R7FA2A1AB3CFM	256kB	32kB	8kB	-40/+105°C	LQFP 64pin	10x10mm body	0.5mm
R7FA2A1AB3CNE	256kB	32kB	8kB	-40/+105°C	QFN 48pin	7x7mm body	0.5mm
R7FA2A1AB3CNF	256kB	32kB	8kB	-40/+105°C	QFN 40pin	6x6mm body	0.5mm
R7FA2A1AB2CBT	256kB	32kB	8kB	-40/+85°C	BGA 36pin	5x5mm body	0.8mm
R7FA2A1AB3CFJ	256kB	32kB	8kB	-40/+105°C	LQFP 32pin	7x7mm body	0.8mm

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

## renesas.com

### Corporate Headquarters

TOYOSU FORESIA, 3-2-24 Toyosu, Koto-ku, Tokyo 135-0061, Japan  
[www.renesas.com](http://www.renesas.com)

### Trademarks

Arm® and Cortex® are registered trademarks of Arm Limited. Renesas and the Renesas logo are trademarks of Renesas Electronics Corporation. All trademarks and registered trademarks are the property of their respective owners.

### Contact information

For further information on a product, technology, the most up-to-date version of a document, or your nearest sales office, please visit:  
[www.renesas.com/contact/](http://www.renesas.com/contact/)