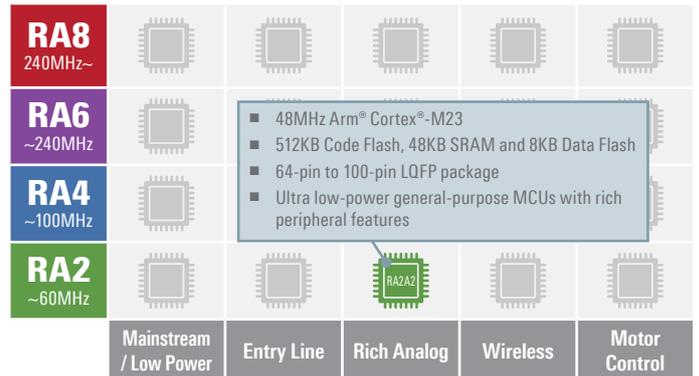# 32-BIT MCU FAMILY
RENESAS RA2A2 GROUP

48 MHz Arm® Cortex®-M23 Ultra-Low Power General-Purpose Microcontroller with Rich Peripherals

The RA2A2 group has an Arm Cortex-M23 core with rich peripheral features to deliver a better design experience that allows high level analog sensing while reducing power consumption, system cost and overall footprint by using dual bank flash, segment LCD and low-power operation.

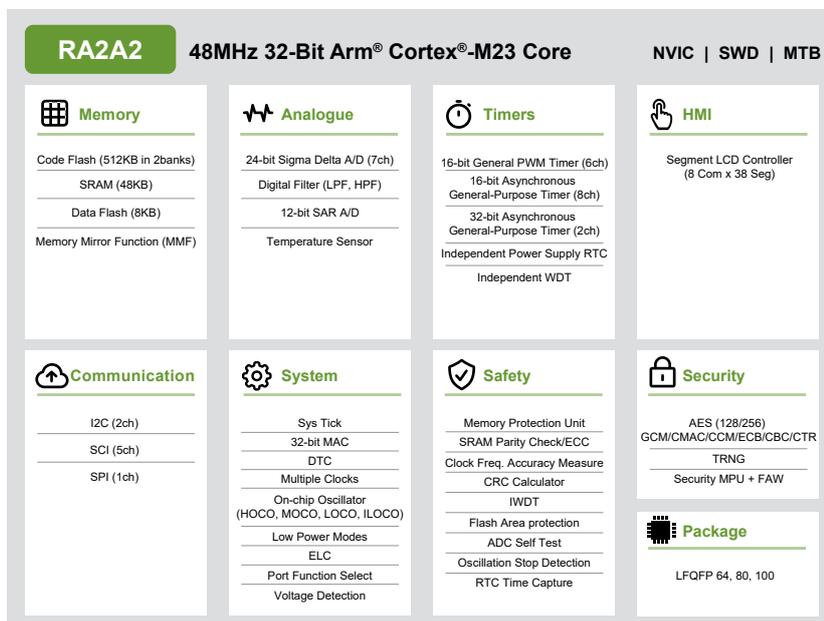|					
RA8 240MHz~					
RA6 ~240MHz		■ 48MHz Arm® Cortex®-M23 ■ 512KB Code Flash, 48KB SRAM and 8KB Data Flash ■ 64-pin to 100-pin LQFP package ■ Ultra low-power general-purpose MCUs with rich peripheral features			
RA4 ~100MHz					
RA2 ~60MHz		RA2A2			
	Mainstream / Low Power	**Entry Line**	**Rich Analog**	**Wireless**	**Motor Control**

Target Applications

- Energy management devices
- Industrial automation
- Building automation
- Home appliances
- Medical and healthcare
- Consumer electronics

Key Features

- 48 MHz Arm Cortex-M23 core
- 512KB Flash (dual bank) and 48KB SRAM
- 8KB data flash memory (100,000 program/erase (P/E) cycles)
- 64-pin, 80-pin and 100-pin LFQFP package options
- Up to 7ch 24-bit Sigma-Delta A/D converter with digital filter, 12-bit A/D converter and temp sensor
- 16-bit general purpose timers, 32-bit and 16-bit low power AGT timers and independent power supply RTC
- Segment LCD controller
- SCI (UART, Simple SPI, Simple I²C), SPI and I²C bus
- Security functions including AES, Secure MPU, Flash Access Window and TRNG
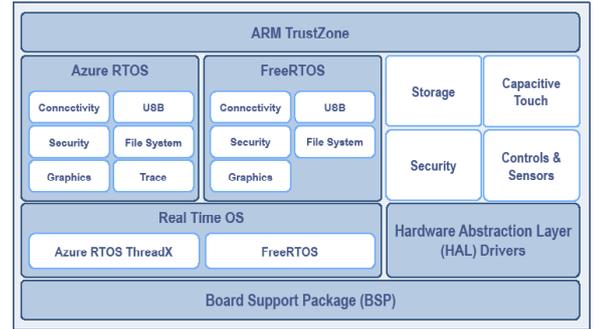
Block Diagram

RA2A2 — 48MHz 32-Bit Arm® Cortex®-M23 Core — NVIC | SWD | MTB

Memory
Code Flash (512KB in 2banks)
SRAM (48KB)
Data Flash (8KB)
Memory Mirror Function (MMF)

Analogue
24-bit Sigma Delta A/D (7ch)
Digital Filter (LPF, HPF)
12-bit SAR A/D
Temperature Sensor

Timers
16-bit General PWM Timer (6ch)
16-bit Asynchronous General-Purpose Timer (8ch)
32-bit Asynchronous General-Purpose Timer (2ch)
Independent Power Supply RTC
Independent WDT

HMI
Segment LCD Controller (8 Com x 38 Seg)

Communication
I2C (2ch)
SCI (5ch)
SPI (1ch)

System
Sys Tick
32-bit MAC
DTC
Multiple Clocks
On-chip Oscillator (HOCO, MOCO, LOCO, ILOCO)
Low Power Modes
ELC
Port Function Select
Voltage Detection

Safety
Memory Protection Unit
SRAM Parity Check/ECC
Clock Freq. Accuracy Measure
CRC Calculator
IWDT
Flash Area protection
ADC Self Test
Oscillation Stop Detection
RTC Time Capture

Security
AES (128/256) GCM/CMAC/CCM/ECB/CBC/CTR
TRNG
Security MPU + FAW

Package
LFQFP 64, 80, 100

RENESAS RA2A2 GROUP

Software Package

The Renesas Flexible Software Package (FSP) is designed to provide easy-to-use, scalable, high-quality software for embedded system designs using the Renesas RA family. The FSP is based on an open software ecosystem of production-ready drivers, supporting Azure® RTOS, FreeRTOS™ or bare-metal programming. It also includes a selection of other middleware stacks, providing great flexibility for migrating code from older systems or developing new applications from scratch.

Tools and Support

The e² studio IDE provides support with intuitive configurators and intelligent code generation to make programming and debugging easier and faster.

IDE	Renesas e²studio	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 (limited support)	• IAR I-jet • SEGGER J-Link • Renesas E2/E2 Lite • CMSIS-DAP (limited support)
Production Programmer	• Renesas PG-FP6 • SEGGER J-Flash • Partner solutions		

* Compiler must be purchased and licensed directly from third party

Evaluation Kit

- The RA2A2 MCU Group evaluation board enables users to seamlessly evaluate the MCU features and develop embedded systems applications using the FSP and example projects
- Onboard debugging using SEGGER-J-Link®
- Orderable part number: **RTK7EKA2A2S00001BJ**
- Order the kit and download documentation, design package, development tools and software at: renesas.com/ek-ra2a2

Ordering References

FLASH/RAM	Ta (°C)	SDADC			
512KB/48KB	-40 to +105	7ch			R7FA2A2AD3CFP
		4ch	R7FA2A2BD3CFM	R7FA2A2BD3CFN	R7FA2A2BD3CFP
Pin Count			64-pin	80-pin	100-pin
Package			LFQFP	LFQFP	LFQFP
Size (body)			10 x 10 mm	12 x 12 mm	14 x 14 mm
Pitch			0.5 mm	0.5 mm	0.5 mm

For more details, please visit: **renesas.com/ra2a2**

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/