

32-BIT MCU FAMILY

RENESAS RA2E1 GROUP

Entry Line 32-bit Arm® Cortex®-M23 General Purpose Microcontroller

The RA2E1 group is RA Family's entry line single-chip microcontroller based on the 48MHz Arm® Cortex®-M23 core and up to 128-KB code flash and 16-KB SRAM memory. The optimized processing and Renesas' low power process technology make it the industry's most energy-efficient, ultra-low power MCU. The RA2E1 group supports a wide operating voltage range of 1.6V to 5.5V and a large selection of packages such as LQFP, QFN, LGA, BGA and WLCSP. The RA2E1 provides pin and peripheral compatibility with RA2L1 group, and is ideal for battery-operated applications and other systems requiring high performance and low-energy consumption in space constrained applications.

Performance Range	RA2A1	RA2L1	RA2E1	RA2E2
Performance Range	48MHz, Arm® Cortex®-M23	48MHz, Arm® Cortex®-M23	48MHz, Arm® Cortex®-M23	48MHz, Arm® Cortex®-M23
Memory Range	256kB Flash, 32kB RAM	128-256kB Flash, 32kB RAM	Up to 128kB Flash, 16kB RAM	Up to 64kB Flash, 8kB RAM
Package	32-64pin	48-100pin	25-64pin	16-24pin
USB, CAN	•	CAN	-	-
Security	•	•	•	•
HMI	-	32ch Cap Touch	30ch Cap Touch	-
Other Features	24bit Sigma Delta ADC, 16bit ADC			I3C Interface

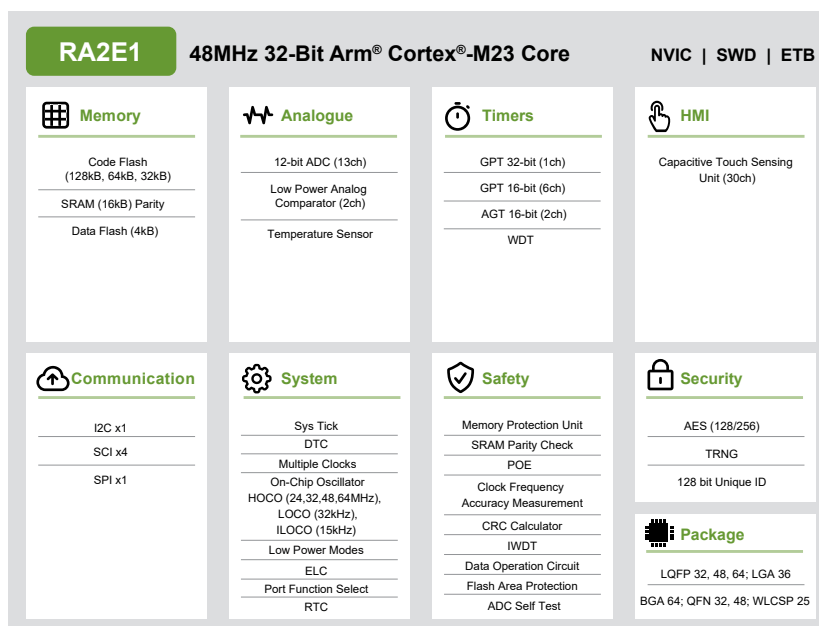
Target Applications

- General Purpose
- Consumer Applications
- Home Appliances
- Industrial Automation
- Building Automation
- Medical & Healthcare

Key Features

- 48MHz Arm® Cortex®-M23
- Up to 128kB Flash Memory and 16kB SRAM
- 4kB Data Flash to store data as in EEPROM
- A scalable selection of 25pin to 64pin packages (LQFP, QFN, LGA, BGA, WLCSP)
- Wide operating voltage range of 1.6V to 5.5V
- Enhanced Capacitive Touch Sensing Unit (CTSU)
- 12-bit ADC, LPACMP, Temperature Sensor
- 32-bit General PWM Timer, 16-bit General PWM Timer, Low power Asynchronous General Purpose Timer
- RTC
- SCI (UART, Simple SPI, Simple I2C)
- SPI/ I2C multi-master interface
- Safety
- Security and Encryption

Block Diagram



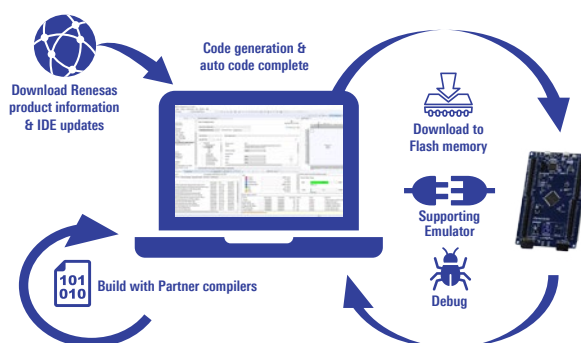
RENESAS RA2E1 GROUP

Benefits

- Entry line single chip 32-bit microcontroller enables to build energy-efficient systems at lower cost
- Pin and peripheral compatibility with RA2L1 group
- Wide operating voltage range of 1.6V to 5.5V
- Best-in class Active/Standby power consumption in Arm Cortex®-M23 microcontroller
- Reduce system BOM by eliminating external components
- Single chip solutions for system and robust touch functions
- IEC60730 safety standard for household appliances class B (Fail-safe)
- A large selection of packages such as LQFP, QFN, LGA, BGA and WLCSP
- Easy to be used for any customer doing transition from an original 8/16-bit MCU design

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 ■ Renesas Flash Programmer 	<ul style="list-style-type: none"> ■ SEGGER J-Flash ■ Third party solutions 	



Evaluation Kit

- EK-RA2E1 (Full MCU evaluation including on-chip debugger)
 - Part name: RTK7EKA2E1S00001BE
- Fast Prototyping Board including On-Chip debugger (FPB-RA2E1)
 - Part name: RTK7FPA2E1S00001BE



EK-RA2E1



FPB-RA2E1

Ordering References

Part name	Flash	128kb	R7FA2E1A9xxFM	R7FA2E1A9xxFK	R7FA2E1A9xxFL	R7FA2E1A9xxNE	R7FA2E1A9xxFJ	R7FA2E1A9xxNH	R7FA2E1A9xxBU	R7FA2E1A9xxLM	R7FA2E1A9xxBV
		64kb	R7FA2E1A7xxFM	R7FA2E1A7xxFK	R7FA2E1A7xxFL	R7FA2E1A7xxNE	R7FA2E1A7xxFJ	R7FA2E1A7xxNH	R7FA2E1A7xxBU	R7FA2E1A7xxLM	R7FA2E1A7xxBV
	32kb	-	-	R7FA2E1A5xxFL	R7FA2E1A5xxNE	R7FA2E1A5xxFJ	R7FA2E1A5xxNH	-	R7FA2E1A5xxLM	R7FA2E1A5xxBV	
RAM		16kB	16kB	16kB	16kB	16kB	16kB	16kB	16kB	16kB	16kB
DataFlash		4kB	4kB	4kB	4kB	4kB	4kB	4kB	4kB	4kB	4kB
Package		64 LQFP	64 LQFP	48 LQFP	48 QFN	32 LQFP	32 QFN	64 BGA	36 LGA	25 WLCSP	
Package dimensions		10x10mm	14x14mm	7x7mm	7x7mm	7x7mm	5x5mm	4x4mm	4x4mm	2.14 x2.27mm	
Pin pitch		0.5	0.8	0.5	0.5	0.8	0.5	0.4	0.5	0.4	

- xx = 3C for -40 to 105°C
- xx = 2D for -40 to 85°C

For more details, please visit www.renesas.com/ra2e1

renesas.com

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

Document No.: R01PF0208EU0200

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