



# 32-BIT MCU FAMILY RENESAS RA4E2 GROUP

# Entry-Line 100MHz Arm<sup>®</sup> Cortex<sup>®</sup>-M33 General Purpose Microcontroller

The RA4E2 entry-line microcontroller is based on the 100 MHz Arm<sup>®</sup> Cortex<sup>®</sup>-M33 core with TrustZone.

RA4E2 MCUs offer high-performance and optimized peripheral functions along with the smallest package options including space saving 36-pin BGA and 32-pin QFN packages. These satisfy the needs of both cost-sensitive and space-constrained applications.

The RA4E2 provides an entry point to the wider RA family due to its wellbalanced performance, advanced peripheral functions, and scalability.

### Target Applications

- General purpose
- Sensor applications (Healthcare, Industrial, Wearable)
- Home appliances
- Entertainment systems
- Gaming, Headset control



- **Key Features**
- 100MHz Arm Cortex-M33 with TrustZone
- 128KB Flash memory and 40KB SRAM
- 4KB Data Flash to store data as in EEPROM
- 1KB Standby SRAM
- Scalable from 32-pin to 64-pin packages
- USB 2.0 Full Speed
- CAN FD, 13C
- HDMI CEC, SSI
- 12-bit A/D Converter
- 12-bit D/A Converter
- General PWM Timer

# Block Diagram

RA4E2	100MHz 32-Bit Arm® Co	ortex <sup>®</sup> -M33 Core	NVIC   SWD   ETB
Memory	<b>≁</b> ≁ Analogue	<b>Ö</b> Timers	
Code Flash (128KB)	12-bit ADC (12ch) 12-bit DAC (1ch)	GPT16E (4ch) Low-power GPT (2ch)	
SRAM 32KB Parity	Temperature Sensor	WDT	
SRAM 8KB ECC	-	RTC, Calendar	
Data Flash (4KB)	-		
Standby SRAM (1KB)			
Communicatio	n 🐼 System	Safety	Security
USB2.0 FS Device x 1 *	DMA (8ch), DTC, ELC	Memory Protection Unit	128-bit Unique ID
CAN FD x1	Clock Generation	SRAM Parity Check	TRNG
I3C x1	On-Chip Oscillator	ECC SRAM	
SCI x2	HOCO (16/18/20MHz) MOCO (8MHz)	Clock Frequency	
SPI x2	LOCO (32KHz)	Accuracy Measurement	Package
HDMI CEC x1	ILOCO (15KHz)	CRC Calculator	- I donage
SSI x1	Low-power Modes	Data Operation Circuit	LQFP 64
	Interrupt Controller	Flash Area Protection	
	TrustZone	ADC Self Test	BGA 36, 64
* Excluding 32-pin pac	kage	ADO SEIL TESL	QFN 32, 48

# **RENESAS RA4E2 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<sup>®</sup> RTOS, FreeRTOS<sup>™</sup> 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.

	ARM TrustZone							
	Azure RTOS		FreeRTOS			Capacitive		
	Connectivity	USB	Connectivity	USB	Storage	Touch		
	Security	File System	Security	File System		Controls & Sensors		
	Graphics	Trace	Graphics		Security			
ÌÌ	Real Time OS				Hardware Abstraction Layer			
	Azure RTOS ThreadX		FreeRTOS		(HAL) Drivers			
	Board Support Package (BSP)							

IDE	Renesas e²studio	Keil MDK	IAR EWARM	
Compiler	<ul> <li>GCC</li> <li>Arm Compiler</li> <li>IAR Arm Compiler</li> </ul>	• Arm Compiler	• IAR Arm Compiler	
Debug Probe	<ul> <li>Renesas E2/E2 Lite</li> <li>SEGGER J-Link</li> </ul>	• SEGGER J-Link • Keil ULINK	• IAR I-Jet • SEGGER J-Link	
Production Programmer	Renesas PG-FP6      SEGGER J-Flash      Partner solutions			

### Tools and Support

The e<sup>2</sup> studio IDE provides support with intuitive configurators and intelligent code generation to make programming and debugging easier and faster.

### **Evaluation Kit**

- Evaluation Kit for RA4E2 MCU Group EK-RA4E2 enables users to evaluate the features of RA4E2 MCU group by utilizing rich on-board features along with popular ecosystem expansion connectors.
- Order the kit and download documentation, design package, development tools and software at: <u>renesas.com/ek-ra4e2</u>
- Orderable part number: RTK7EKA4E2S00001BE



■ Fast Prototyping Board for RA4E2 MCU Group FPB-RA4E2 enables users a fast prototype development using Arduino Uno and Pmod<sup>™</sup> interfaces included



standard and through-hole access to all pins of RA4E2.

- Order the kit and download documentation, design package and development tools at: <u>renesas.com/fpb-ra4e2</u>
- Orderable part number: RTK7FPA4E2S00001BE

## **Ordering References**

Flash	128KB							
RAM	40KB	R7FA4E2B93CNH	R7FA4E2B92CBC	R7FA4E2B93CBC	R7FA4E2B93CNE	R7FA4E2B93CFM	R7FA4E2B92CBB	R7FA4E2B93CBB
DataFlash	4KB							
Pin Co	ount	32pin	36pin	36pin	48pin	64pin	64pin	64pin
Pack	age	QFN	BGA	BGA	QFN	LQFP	BGA	BGA
Size (b	oody)	5x5mm	4x4mm	4x4mm	7x7mm	10x10mm	5x5mm	5x5mm
Pito	ch	0.5mm						
Operating Temperature		-40 to +105°C	-40 to +85°C	-40 to +105°C	-40 to +105°C	-40 to +105°C	-40 to +85°C	-40 to +105°C

For more details, please visit: renesas.com/ra4e2



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