

32-BIT MCU FAMILY

RENESAS RA4E1 GROUP

100MHz Arm® Cortex®-M33, Entry-Line with Balanced Low Power Consumption & Optimized Feature Integration

The Renesas RA4E1 group uses the high-performance Arm® Cortex®-M33 core with TrustZone. The RA4E1 is built on a highly efficient 40nm process and is supported by an open and flexible ecosystem concept—the Flexible Software Package (FSP) —and is the perfect entry point into the RA Family of microcontrollers.

The RA4E1 is suitable for entry IoT applications requiring value optimized feature and connectivity integration, total system cost reduction and an optimized mixture of high performance with 100 MHz Cortex-M33 Core in combination with lowest active power consumption down to 81µA/MHz running the CoreMark® algorithm from Flash.

	RA4W1	RA4M1	RA4M2	RA4M3	RA4E1
Performance Range	48MHz, Arm® Cortex®-M4	48MHz, Arm® Cortex®-M4	100MHz, Arm® Cortex®-M33	100MHz, Arm® Cortex®-M33	100MHz, Arm® Cortex®-M33
Memory Range	512kB Flash, 96kB RAM	256kB Flash, 32kB RAM	256-512kB Flash, 128kB RAM	512kB-1MB Flash, 128kB RAM	256-512kB Flash, 128kB RAM
Package	56pin QFN	40-100pin QFN/LQFP	48-100pin QFN/LQFP	64-144pin LQFP	48-64pin QFN/LQFP
USB, CAN	•	•	•	•	•
Security	•	•	TrustZone	TrustZone	TrustZone
HMI	LCD Controller and Touch	LCD Controller and Touch	Cap Touch	Cap Touch	-
Other Features	Bluetooth 5.0				

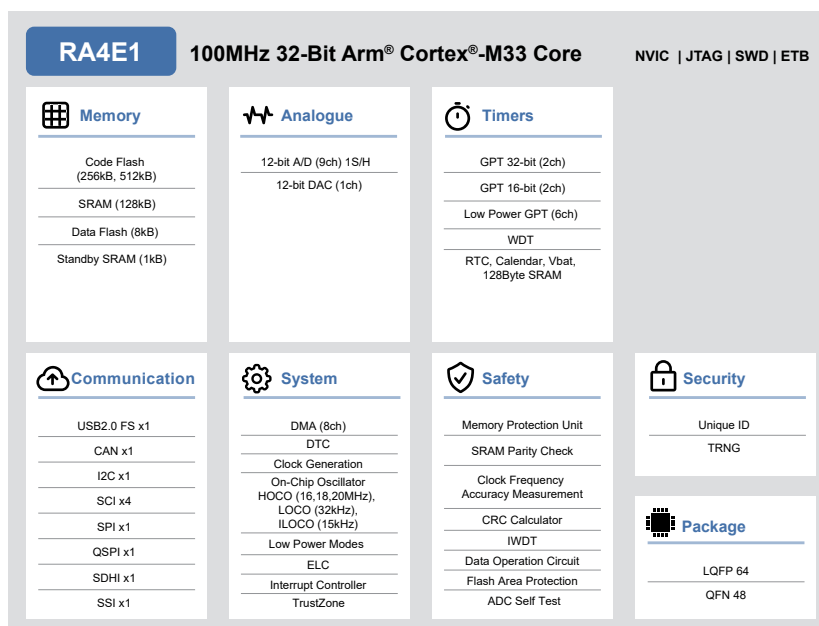
Target Applications

- General purpose
- Home Appliances (Smart Coffee Machine)
- Smart home and Building Automation (Voice command, Smart IoT Air Filter)
- Industrial sensor hub with for flow, humidity, temperature, etc.
- Home entertainment (housekeeping MCU)

Key Features

- 100MHz Arm Cortex-M33 with TrustZone
- 256kB - 512kB Flash memory and 128kB SRAM
- 8kB Data Flash to store data as in EEPROM
- 1kB Stand-by SRAM
- Scalable from 48-pin to 64-pin packages
- USB 2.0 Full Speed
- CAN 2.0B
- Quad SPI
- SCI (UART, Simple SPI, Simple I2C)
- SPI/I2C multi-master interface

Block Diagram



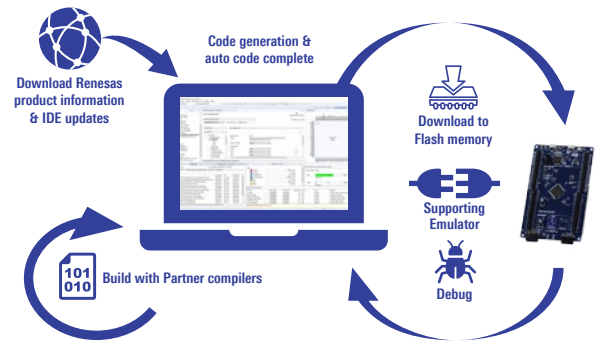
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Benefits

- Entry-Line with value optimized feature and connectivity integration with USB 2.0 Full-Speed Device, serial communication, CAN, QSPI, wide temperature range, and advanced analog
- System cost reduction with more available GPIOs, lower PCB cost by High-Speed On-Chip Oscillator with $\pm 0.25\%$ precision using FLL, DataFlash, Low-Voltage detection, Internal Reset Function, and many more
- Hardware and Software compatibility and scalability from the RA family Entry-Line to the Mainstream-line and ASSP-products

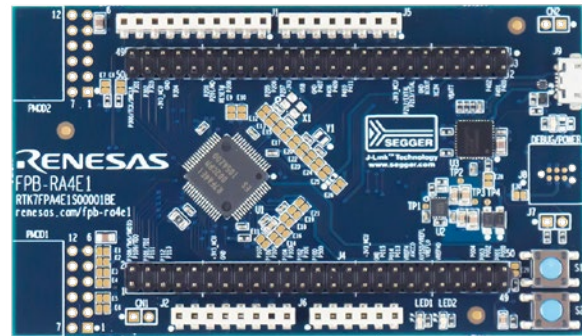
Tools and Support

IDE	Renesas e ² studio	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 ■ SEGGER J-Flash ■ Third party solutions 	



Evaluation Kit

- Flexible Prototyping Board including On-Chip debugger
- Part name: **RTK7FPA4E1S00001BE**



Evaluation Kit: RTK7FPA4E1S00001BE

Ordering References

Part Name	Flash	512KB	R7FA4E10D2CNE	R7FA4E10D2CFM
		256KB	R7FA4E10B2CNE	R7FA4E10B2CFM
RAM			128KB	128KB
DataFlash			8KB	8KB
Operating Temperature			-40/+105°C	-40/+105°C
Package			QFN48 pin	LQFP64 pin
Package Dimensions			7x7mm body; (9x9mm)	10x10mm body; (12x12mm)
Pin Pitch			0.5mm	0.5mm

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

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