

ENTRY-LEVEL MCUS

Performance meets low power

Renesas expanded its 32-bit RA MCU (micro-controller unit) family with the RA4E1 and RA6E1 entry-line groups. It also added the 32-bit RX140 MCUs to its entry-level RX100 series. The chips offer a CAN interface.



RA4E1 and RA6E1 entry-line MCUs combine low-power consumption with the 100-MHz and 200-MHz performance, respectively (Source: Renesas)

The RA4E1 and RA6E1 groups are based on the 100-MHz/200-MHz Arm Cortex-M33 processor core. RA4E1 comprises four different parts, spanning from 48-pin to 64-pin packages, and from 256 KiB to 512 KiB of flash memory along with 128 KiB of SRAM. RA6E1 includes six parts, spanning from 48-pin to 100-pin packages, and from 512 KiB to 1 MiB of flash memory along with 256 KiB of SRAM. The active power consumption is 60µA/MHz while executing from Flash at 100 MHz/200 MHz. The already available MCUs are suited for cost-sensitive, entry IoT applications such as home appliances and entertainment, building automation, industrial sensor hubs, etc. RA6E1 group is additionally dedicated for metering, robotics, vending machines, and wired Ethernet applications. To get started, the FPB-RA4E1/ FPB-RA6E1 prototype boards with an on-chip debugger are offered.

Connectivity options include CAN, USB 2.0, Ethernet (only RA6E1), and different serial interfaces. The used Classical CAN module supports up to 32 mailboxes. The latter can be configured for transmission or reception in normal mailbox mode and FIFO mode. 11-bit and 29-bit CAN-Identifiers are supported. The CAN module requires an additional external CAN transceiver. Further features include an on-chip oscillator, several GPIOs (general purpose inputs/outputs), low-voltage detection, and internal reset function. Supported operating environment temperature ranges from -40 °C to +85 °C.

Integrated security options include the Arm Trustzone technology. The MCUs are supported by the Renesas Flexible Software Program (FSP) that includes drivers and middleware for implementation of communications and security. The FSP's GUI (graphical user interface) enables flexible use of legacy code as well as compatibility and scalability with other RA family members. Designers using FSP also have access to the Arm ecosystem, offering tools that help to speed time-to-market.

For touch-sensitive applications

Renesas also added the 32-bit RX140 MCUs for home, building, and industrial applications to its entry-level RX100 series. Built around the 48-MHz RXv2 CPU (central processing unit), the units offer the twice processing performance and a 30-% better power efficiency compared with the previous RX130 group. The implemented capacitive touch sensing units fulfill electromagnetic noise immunity requirements according to IEC EN 61000-4-3/-6. Built-in multi-scan functionality and automated sensing allow to realize human machine interfaces (HMIs) utilizing touchless operation or proximity sensing.

The peripheral functions offer an increased number of I/O ports for sensors or external components. The CAN communication support for real-time operation has been added. The CAN module supports bit-rates up to 1 Mbit/s, 11-bit and 29-bit CAN-Identifier, and offers 16 configurable mailboxes. A built-in AES encryption accelerator and true random number generator reduce the risks of security threats such as data leakage or manipulation.

The RX140 MCUs maintain pin compatibility with the RX130, enabling customers to upgrade and use the existing design resources. The RX140 target board for initial evaluation work, an integrated development environment, and dedicated tools are available. The group is available in 32-pin to 64-pin packages with 64 KiB (128 KiB in future) of flash memory.



RX140 usage fields include home appliances (microwave ovens, refrigerators, induction heat cooking stoves), manufacturing equipment, building control panels, consumer electronics, etc. (Source: Renesas)

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