

32-BIT MCUS

## Safe and secure communication

**Renesas offers the 32-bit RX65N and RX651 groups of micro-controllers. Besides other networks, they use CAN for communication.**



CAN is part of the MCUs (Photo: Renesas)

Renesas Electronics' RX65N and RX651 groups of 32-bit micro-controllers (MCUs) can be used in various application fields such as networked industrial machinery, building automation, and so forth. According to the company, system manufacturers can increase the basic performance of their systems while also adding the ability to safely reprogram the MCUs' built-in memory over a network such as WLAN or Ethernet.

The RX65N and RX651 retain legacy communication functions, such as CAN, Ethernet, USB, UART, SPI, and I2C. Additionally, the MCUs provide a WLAN module connection through an SD host interface capable of 4-bit data communication, as well as Quad SPI with support for connections to serial flash memory. To manage all required communication stacks, a 256 KiB embedded RAM can be used to handle the buffers.

The expansion of the Industrial Internet of Things (IIoT) and Industry 4.0 has increased the need for secure network connectivity devices in manufacturing environments. Network connectivity makes it possible to

monitor the operating state of machinery from both inside and outside the factory. It also enables exchanging data and making changes to production instructions, and to reprogram the MCUs' memory to update equipment settings.

The MCUs are manufactured with an RXv2 CPU core that adopts the 40 Nm process, delivering [a core mark score](#) of 516. With an operating current of 15 mA, power performance is 34,4 mA - up to five times higher than that of comparable 32-bit MCUs in the 120 MHz operating frequency class (based on Renesas research). With 1 MiB of flash memory and 256 KiB of RAM, software can be developed to run in internal memory. The built-in memory alone can accommodate software for communication middleware processing of network connection, as well as buffer areas. This eliminates the need to access external memory, which results in a reduced power consumption and therefore contributes to further extend the battery operation time.

The AES (advanced encryption standard, created by the National Institute of Standards and Technology, is the standard encryption method used in the United States) and TRNG (true random number generator) hardware modules can be used to encrypt and decrypt communication data, assuring safe data transfer over networks. The area protection function makes it possible to apply protection against overwriting to specified areas when programs in the on-chip flash memory are updated. This prevents the flash memory from being reprogrammed erroneously.

In addition to supplying MCUs, Renesas provides an integrated development environment (IDE). Software examples and drivers are also provided, including the firmware integration technology (FIT) drivers. FIT is a concept that emphasizes the simplification of embedding peripheral function module drivers and provides portability between RX MCUs by offering common API functions to ensure migration to and from existing products that support FIT. The device drivers and middleware can be combined and utilized in the development process with sample source code for peripheral functions supported by a code generation tool. Documentation on incorporating FIT modules, manuals, technical updates, etc., can be updated and referenced using tools linked to an IDE.

[CW](#)