

PRECISION AT NANO-VOLT LEVEL

## Evaluation board for analog measurement equipment

Renesas Electronics (Japan) introduced the RX23E-A MCU starter kit for analog evaluation of automation and measurement equipment. Driver IC (integrated circuit) for CAN is mounted on the evaluation board.



RX23E-A MCU starter kit (Source: Renesas Electronics)

The starter kit is dedicated for developers working with the CAN-capable 32-bit RX23E-A MCU (micro-controller unit), which features the analog front-end (AFE). The kit integrates hardware, software, and tools for evaluating the MCU's 24-bit A/D converter. The evaluation board is equipped with a plug-in terminal block to connect e.g. temperature sensors, load cells, etc. Application software for thermocouple and weight measurement is available from the company's website.

The GUI (graphical user interface) tool allows to enter and to change settings of AFE and A/D converter parameters. It is also possible to display graphs and histograms of A/D conversion results. Thus, A/D conversion results are monitored in real-time in the same manner as using an oscilloscope. To develop user applications, the board can be connected to an emulator. Power is supplied via the USB connection enabling evaluation and software

development using a PC. Driver ICs for CAN and EIA-485 are mounted on the board, allowing development of applications for industrial networks.

The 32-bit RX23E-A MCU family is designed for measurements of analog signals. The precision is better than 0,1 percent without calibration. Introduced in May 2019, the units with the integrated analog front-end (AFE) unit, comprise high-precision sensor measurement, computation, control, and CAN communication on a single chip. This allows system manufactures to reduce the number of required components, save space, and simplify device design.

The MCUs are based on the RXv2 core, which features operating speeds of 32 MHz, a digital signal processor (DSP), and a floating point unit (FPU). The AFE unit comprises two 24-bit delta-sigma A/D converters. There are up to six differential analog input channels and up to eleven pseudo-differential input channels. All channels can be used as inputs to the two A/D converters. Besides the CAN interface, there are one SPI, four UARTs, and one I<sup>2</sup>C. The micro-controller supports functional safety by means of software-based self-diagnostic and disconnection-detection assistance functions. The chip requires a 5V power supply and operates at -40 °C to +105 °C.

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