

# Platform adds low power MCU with security for IIoT endpoint devices

**Renesas Electronics has extended its high integration Synergy S5 micro-controller (MCU) series with the introduction of the entry-level S5D3 MCU. It provides a CAN interface.**

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Renesas Synergy S5D3 MCUs (Photo: Renesas)

The four new S5D3 MCUs join the mid-range S5D5 and high-end S5D9 MCU groups with similar S5 series features – integrated 120 MHz Arm Cortex-M4 core and advanced security – as well as general-purpose features that simplify designing Internet of Things (IoT) endpoint devices. The entry-level S5D3 MCUs target a range of industrial, building automation, and office equipment, as well as smart metering, and home appliances employing a capacitive touch human-machine interface (HMI).

The Renesas Synergy Software Package (SSP) supports the S5D3 MCUs with HAL drivers, application frameworks and real-time operating system. Embedded system designers can use either of the Renesas Synergy development environments e<sup>2</sup> studio or IAR Embedded Workbench to build and customize their designs. Based on a 40-nm process, the S5D3 MCUs integrate a secure cryptographic engine (SCE7) with key protection that safeguards the MCU boot code and IoT endpoint device communication with a root of trust. This capability eliminates the need for external security functions and reduces BOM cost. The SCE7 features encryption hardware accelerators like RSA, DSA, AES, ECC, SHA and true random number generator (TRNG) to provide a secure system connection to the cloud. Each S5D3 MCU offers superior power consumption of 100 µA/MHz in active mode, 1,3 µA in standby mode, and 900 nA for a VBATT supply that keeps the integrated real-time clock running, making these devices ideal for applications that require low power and high performance.

The S5D3 MCUs offer 512 KiB flash memory and a 256 KiB SRAM memory. This 2:1 ratio of embedded flash to SRAM supports communication stacks utilization for robust IoT connectivity, and the 8 KiB data flash enables more read/write cycles than the competition. Each MCU integrates several analog components including two 12-bit analog-to-digital converters (ADCs), a 2-channel 12-bit digital-to-analog converter (DAC), high-speed 6-channel comparator, temperature sensor, and a 6-channel programmable gain amplifier (PGA). The MCUs also offer a scalable set of 13 independent 32-bit general-purpose timers, and communications interfaces as CAN.

The CAN module provides functionality to receive and transmit data using a message-based protocol between multiple slaves and masters in electromagnetically-noisy applications. The CAN module complies with the ISO 11898-1 standard and supports up to 32 mailboxes, which can be configured for transmission or reception in normal mailbox and FIFO modes. Both standard (11-bit) and extended (29-bit) messaging formats are supported.

“The S5D3 MCUs beat the competition with superior security, memory performance, MCU scalability, and Synergy Platform support,” said Daryl Khoo, Vice President, Product Marketing, IoT Platform Business Division, Renesas Electronics. “The cost-optimized and pin-compatible S5D3 MCUs are scalable up through the S5D5, S5D9 and S7G2 MCU groups if customers later require additional features, more memory, or higher performance.”

The Renesas Synergy Platform is a fully supported software/hardware platform that accelerates time to market and removes the obstacles engineers face designing IoT products. By enabling development to begin at the application programming interface (API) level, the company reduces the complexity with designing security-aware connected devices and HMI systems with graphical user interfaces and capacitive touch. The Synergy Platform is accessible from the Renesas Solutions Gallery, and consists of integrated software, development tools, and scalable Arm Cortex-M-based Synergy MCUs fully accessible through the software APIs. There are no upfront licensing fees or back-end royalties – everything is included in the purchase price of the MCU.

The company is part of the [Embedded World](#) 2019 exhibition from February 26 to 28 in Nuremberg, Germany. Visit them in hall 1, booth 310.

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