28-Nm cross-domain flash MCU with virtualization features CAN FD

Renesas Electronics has announced a micro-controller (MCU) with embedded flash that integrates a hardware-based virtualization-assisted function. It enables the integration of software with different levels of functional safety in a single chip.

Featuring a combination of high performance, on-chip security, and network connectivity, the cross-domain MCU is designed for the rigorous workloads of multiple automotive control applications including body, chassis/safety, domain control, and low-/mid-range gateways (Photo: Renesas)

This hardware-based virtualization assist technology can support up to Asil D level (automotive safety integrity level) of functional safety, providing greater levels of system integration. The RH850/U2A MCU is the first member of the company's cross-domain MCUs, designed to address the growing need to integrate multiple applications into a single chip to realize a unified electronic control units (ECUs) for the evolving electrical-electronic architecture (E/E architecture).

The MCU is also equipped with a set of networking interfaces, including a Classical CAN and CAN FD interface with up to 16 channels. This enables the MCU to process the large amounts of sensor data being generated by multiple types of sensors in ADAS and autonomous driving functions. This allows customers to support future high-speed network functions and advanced communications throughput requirements.

Based on 28 Nm process technology, the 32-bit MCU builds on key functions from the RH850/Px series for chassis control and RH850/Fx series for body control to deliver improved performance and implement a virtualization-assisted function to support operation in chassis/safety, body, domain control and low-end/mid-range gateway applications. To support the Asil D level required for chassis/safety applications, the hardware-based virtualization assist technology allows customers to implement multiple software with different functional safety levels on the RH850/U2A MCU and run concurrently without interference, while maintaining the real-time performance required to control the vehicles.

"The evolution of new E/E architecture is driving the trend toward single ECUs that support multiple ECU functions for high-performance devices that can operate across multiple application areas," said Naoki Yoshida, Vice President, Renesas' Automotive Technical Customer Engagement Business Division. "Starting with the RH850/U2A, Renesas' new series of cross-domain MCUs increases development efficiency and reduces development time to accelerate connected and autonomous vehicle development strategies, and we are excited to lead the charge with virtualization and Asil D support."

The automotive-control MCU is equipped with up to four 400-MHz CPU cores in a dual core lock-step structure. Each CPU core integrates a hardware-based virtualization-assisted function, while maintaining the same fast real-time performance provided by the RH850. To support Asil D, the MCU includes self-diagnostic SR-Bist (Standby-Resume Bist) functions with minimized current fluctuation rate. The hardware-based virtualization-assisted function allows multiple software systems with varying ISO 26262 functional safety levels to operate independently without interference during high performance. It also reduces the virtualization overhead to maintain real-time execution. This enables users to integrate multiple ECU functions into a single ECU while maintaining safety, security, and real-time operation requirements.

The demand continues to grow for MCUs with built-in large capacity flash memory to support over-the-air (OTA) functionality that automatically and wirelessly updates ECU software to control programs without interrupting vehicle operations. The RH850/U2A MCU is equipped with up to 16 MiB of built-in flash ROM and 3,6 MiB of SRAM, offering users the flexibility for future function expansion. The MCU includes security functions that support Evita Light up through Evita Full for enhanced protection against cyber-attacks, enabling the device to support safe and rapid Full No-Wait OTA software updates as security requirements evolve.

Renesas will demonstrate the MCU at theEmbedded World 2019 exhibition from 26 to 28 February in Nuremberg, Germany at booth 310, hall 1.

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