MCU GROUP

For design of secure IoT systems

Renesas completes the RA6 series of the Arm Cortex M33-based micro-controllers (MCUs) with the RA6M5 group. Each MCU supports two CAN (FD) interfaces.

The group is dedicated for IoT, security, metering, and industrial applications (Source: Renesas)

The chips employ the 200-MHz Arm Cortex-M33 processor and feature the Arm Trustzone technology. The implemented Renesas' Secure Crypto Engine incorporates symmetric and asymmetric cryptography accelerators, key management, security lifecycle management, power analysis resistance, and tamper detection. The introduced group offers the same security features and software support as the RA6M4 MCUs, which recently achieved the PSA certified level 2 and Sesip1 certification. These features enable designers to realize secure and safe IoT (Internet of Things) systems, said the company.

The MCUs integrate an up to 2-MiB on-chip flash and a 512-KiB RAM on-chip, which can be extended. The error correction code (ECC) is supported in the RAM. The memory block swap feature in conjunction with the intrinsic security, makes the group suitable for applications where in-field firmware updates are required. After a new firmware was written to the flash using the background operation (BGO), a selectable amount of 32-KiB flash blocks can be swapped to the new firmware.

RA6M5 — 200MHz 32-Bit Arm® Cortex®-M33 Core

NVIC | JTAG | SWD | ETB

Memory
- Code Flash (1MB, 1.5MB, 2MB)
- BGO/SWAP Function
- SRAM (448kB) Parity
- SRAM (64kB) ECC
- Data Flash (8kB)
- Standby SRAM (1kB)

Analogue
- 12-bit A/D (10ch) 1S/H
- 12-bit A/D (16ch) 1S/H
- 12-bit DAC (2ch)
- Temperature Sensor

Timers
- GPT 32-bit (4ch)
- GPT 16-bit (6ch)
- Low Power GPT (6ch)
- WDT
- RTC, Calendar, Vbat, 128Byte SRAM

HMI
- Capacitive Touch Sensing Unit (20ch)

Security
- Unique ID
- AES (128/192/256)
- TRNG
- Key Management
- RSA / ECC / DSA
- SHA256 / SHA224
- Tamper Resistance
- SPA/DPA Enhanced Resistance

Communication
- Ethernet MAC with DMA
- USB2.0 FS x1
- USB2.0 HS x1
- CAN FD x2
- I2C x2
- SCI x10
- SPI x2
- QSPI x1 + OctaSPI x 1
- SDHI / MMC / HDMI-CEC
- SSI x1
- External Memory Bus

System
- DMA (8ch)
- DTC
- Clock Generation
- On-Chip Oscillator HOCO (16,18,20MHz), LOCO (32kHz), ILOCO (15kHz)
- Low Power Modes
- ELC
- Interrupt Controller
- TrustZone

Safety
- Memory Protection Unit
- SRAM Parity Check
- ECC in SRAM
- Clock Frequency Accuracy Measurement
- CRC Calculator
- IWDT
- Data Operation Circuit
- Flash Area Protection
- ADC Self Test

Package
- LQFP 100, 144, 176
- BGA 176

RA6M5 MCU block diagram (Source: Renesas)

The communication interfaces include two CAN (FD), Ethernet, USB, etc. A capacitive touch sensing unit and two ADCs (analog-to-digital converter) are provided. The power consumption in the active mode is 107 µA/MHz. A 30-µs wakeup time is supported. The MCU group is supported by the Flexible Software Package (FSP) with a graphical user interface (GUI). The Arm ecosystem tools are offered as well. The components can be deployed in wired IoT applications, security solutions, metering applications, robotics, vending machines, heating, and air conditioning, etc. The chips packaged in 100-pin to 176-pin LQFP or in 176-ball BGAs as well as the EK-RA6M5 evaluation kit are now available.

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