100MHz High Integration Arm® Cortex®-M33 with TrustZone®

The Renesas RA4M2 group uses the high-performance Arm® Cortex®-M33 core with TrustZone®. In concert with the Secure Crypto Engine, it offers Secure Element functionality. It offers rich connectivity with USB 2.0 Full-Speed, SDHI, QSPI, and advanced analog.

The RA4M2 is built on a highly efficient 40nm process and is supported by an open and flexible ecosystem concept—the Flexible Software Package (FSP), built on FreeRTOS—and is expandable to use other RTOSes and middleware. The RA4M2 is suitable for IoT applications requiring Ethernet, future proof security, large embedded RAM, and low active power consumption down to 81µA/MHz running the CoreMark® algorithm from Flash.

Target Applications

- Enhanced Security (fire detection, burglar detection, panel control)
- Metering (electricity, automated meter reading)
- Industry (robotics, door openers, sewing machines, vending machines, UPS)
- HVAC (heating, air conditioning, boiler control)
- General purpose

Key Features

- 100MHz Arm® Cortex®-M33 with TrustZone®
- Secure element functionality
- 256kB - 512kB Flash memory and 64kB SRAM with Parity and 64kB SRAM with ECC
- 8kB Data Flash to store data as in EEPROM
- 1kB Stand-by SRAM
- Scalable from 48-pin to 100-pin packages
- Capacitive touch sensing unit

USB 2.0 Full Speed
- CAN 2.0B
- QuadSPI
- SCI (UART, Simple SPI, Simple I2C)
- SPI / I2C multimaster interface
- SDHI and MMC

Block Diagram
RENASAS RA4M2 GROUP

Benefits
- Secure element functionality providing better performance, unlimited secure key storage, key management, and lower BOM cost
- High-performance and low-power with 81μA/MHz while running CoreMark from flash at 100 MHz
- High-integration up to 512 kB code flash memory with background operation and SWAP operation, 8 kB Data flash memory, and 128 kB SRAM with Parity/ECC
- Rich connectivity with USB 2.0 Full-Speed, SDHI, QSPI, and advanced analog

Tools and Support

<table>
<thead>
<tr>
<th>IDE</th>
<th>Renesas e-studio</th>
<th>Keil MDK</th>
<th>IAR EWARM</th>
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<tr>
<td>Compiler</td>
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<td>Debugger</td>
<td>Renesas E2/E2 Lite SEGGER J-Link</td>
<td>SEGGER J-Link</td>
<td>IAR I-Jet SEGGER J-Link</td>
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<td>Programmer</td>
<td>Renesas PG-FPS SEGGER J-Flash Third party solutions</td>
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Evaluation Kit
- Full MCU evaluation including On-Chip debugger
- Part name: RTK7EKA4M2S0001BE

Evaluation Kit: RTK7EKA4M2S0001BE

Ordering References

<table>
<thead>
<tr>
<th>Part Name</th>
<th>Flash</th>
<th>R7FA4M2AD3CFP</th>
<th>R7FA4M2AD3CFM</th>
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