120MHz Optimized entry point to RA6 Series

The Renesas RA6M1 is the entry point to the Renesas RA6 product series for applications that require a high-performance Arm® Cortex®-M4 core at a very attractive price point. The RA6M1 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 RA6M1 is suitable for IoT application requiring security, large embedded RAM and low power consumption.

Target Applications
- 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
- 120MHz Arm® Cortex®-M4
- 512kB Flash Memory and 256kB SRAM
- 8kB DataFlash to store data as in EEPROM
- Scalable from 64pin to 100pin Packages
- Capacitive Touch Sensing Unit
- USB2.0 Full Speed
- CAN 2.0B
- SCI (UART, Simple SPI, Simple I²C)
- SPI/ I²C Multimaster Interface
- SDHI
- SSI/Serial Sound Interface

Block Diagram

RA6M1 120MHz 32-Bit Arm® Cortex®-M4 Core

- Memory
  - Code Flash (512kB)
  - SRAM (96kB) Parity
  - SRAMHS (128kB) Parity
  - SRAM (32kB) ECC
  - Data Flash (8kB)
  - Standby SRAM (8kB)

- Analogue
  - 12-bit A/D (11ch) 3S/H
  - 12-bit A/D (8ch) 3S/H
  - 3ch PGA for each ADC
  - High Speed Comparator (6ch)
  - Temperature Sensor

- Timers
  - GPT Enh. 32-bit (4ch)
  - GPT 32-bit (5ch)
  - Low Power GPT (2ch)
  - WDT

- HMI
  - Capacitive Touch Sensing Unit (12ch)

- Communication
  - USB2.0 FS x1
  - CAN x2
  - SCI x2
  - SPI x2
  - QSPI x1

- System
  - DMA (8ch)
  - GCC
  - Clock Generation
  - On-Chip Oscillator
  - Low Power Modes
  - ELC

- Safety
  - Memory Protection Unit
  - SRAM Parity Check
  - ECC in SRAM
  - POE
  - Check Frequency Accuracy Measurement
  - CRC Calculator
  - Fault Detection
  - Data Operation Circuit

- Package
  - LQFP 64, 100

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Benefits

- Integrated Crypto Module with several cryptography accelerators and key management support
- Highly power efficient with 100µA/MHz in active mode, 1.3µA in software standby mode and 900nA in VBAT mode with RTC running
- Large 256kB embedded SRAM suitable for handling communication stacks

Tools and Support

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<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>
<td>GCC, Arm Compiler</td>
<td>Arm Compiler</td>
<td>IAR Arm 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-FP6</td>
<td>SEGGER J-Flash</td>
<td>Third party solutions</td>
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Evaluation Kit

- Full MCU evaluation including On-Chip debugger
  - Part name: RTK7EKA6M1S00018U

Ordering References

<table>
<thead>
<tr>
<th>Part name</th>
<th>Flash</th>
<th>RAM</th>
<th>DataFlash</th>
<th>Operating Temperature</th>
<th>Package</th>
<th>Package Dimensions</th>
<th>Pin Pitch</th>
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<tbody>
<tr>
<td>R7FA6M1AD2CLJ</td>
<td>512kB</td>
<td>256kB</td>
<td>8kB</td>
<td>-40/+85°C</td>
<td>LGA 100pin</td>
<td>7x7mm body</td>
<td>0.65mm</td>
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<td>256kB</td>
<td>8kB</td>
<td>-40/+105°C</td>
<td>LQFP 64pin</td>
<td>10x10mm body; (12x12mm)</td>
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<td>8kB</td>
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<td>LQFP 100pin</td>
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<td>0.5mm</td>
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<tr>
<td>R7FA6M1AD3CNB</td>
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<td>256kB</td>
<td>8kB</td>
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<td>QFN 64pin</td>
<td>8x8mm</td>
<td>0.4mm</td>
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For more details, please visit [www.renesas.com/RA](http://www.renesas.com/RA)