The RA2L1 group is based on the Arm® Cortex®-M23 core, the most energy-efficient CPU among Arm® Cortex-M today. The optimized processing and Renesas’ low power process technology make it the industry’s most energy-efficient Ultra-Low Power. The RA2L1 group supports a wide operating voltage range of 1.6V to 5.5V, and a maximum CPU clock frequency of 48MHz. Lower active mode current and standby mode current. The RA2L1 group also features an enhanced Capacitive touch Sensing Unit (CTSU), a set of serial communications, high accurate Analogs and Timers. The products are available with pin counts ranging from 48 to 100.

**Key Features**

- 48MHz Arm® Cortex®-M23
- 128kB/ 256kB Flash Memory and 32kB SRAM with ECC
- 8kB Data Flash to store data as in EEPROM
- Scalable from 48pin to 100pin packages
- Internal voltage regulators
- Enhanced Capacitive Touch Sensing Unit (CTSU)
- 12-bit ADC, 12-bit DAC, LPACMP

**Target Applications**

- Consumer Applications
- Home Appliances
- Industrial Automation
- Building Automation
- Medical & Healthcare
- General Purpose

**Block Diagram**

**RA2L1**

- Memory
  - Code Flash (256kB, 128kB)
  - SRAM (16kB) Parity
  - SRAM (16kB) ECC
  - Data Flash (8kB)
- Analogue
  - 12-bit ADC (1ch)
  - Low Power Analog Comparator (2ch)
  - Temperature Sensor
- Communication
  - CAN x1
  - SCI x2
  - SPI x2
- System
  - Sys Tick
  - DTC
  - Multiple Clocks
  - On-Chip Oscillator
  - OSC (24.32-MHz, 32k, 48k, 64kHz), LOCO (12MHz), ILOCO (15kHz)
  - Low Power Modes
  - PLL
  - Port Function Select
- Timers
  - GPT 32-bit (4ch)
  - GPT 16-bit (6ch)
  - ADT, I2C
  - WDT
- HMI
  - Capacitive Touch Sensing Unit (32ch)
  - LCD 128x32
- Security
  - AES (128/256)
  - TRNG
  - 128-bit Unique ID
- Package
  - LQFP 48, 64, 80, 100

**48MHz 32-Bit Arm® Cortex®-M23 Core**

**NVIC | SWD | MTB**

**RA2E**

- Performance Range
  - 48MHz, Arm® Cortex®-M23
  - 48MHz, Arm® Cortex®-M33
- Memory Range
  - 256kB Flash, 32kB RAM
  - 128-256kB Flash, 22kB RAM
- Package
  - 32-64pin
- Security
  - 32-bit General PWM Timer, 16-bit General PWM Timer, Low power Asynchronous General Purpose Timer
- Communication
  - SCI (UART, Simple SPI, Simple I2C)
  - SPI/I2C multi-master interface
- Safety
  - Security and Encryption
RENESAS RA2L1 GROUP

Benefits

- Low power single chip 32-bit Microcontroller with best balance of price, power and performance
- Excellent Active/Standby power consumption in Arm Cortex®-M23 microcontroller
- Reduce system BOM by eliminating external components
- Single chip solutions for system and robust touch functions (CTSU)
- IEC60730 safety standard for household appliances class B (Fail-safe)
- Easy to be used for any customer doing transition from an original 8/16-bit MCU design

Tools and Support

<table>
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<th>Keil MDK</th>
<th>IAR EWARM</th>
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Evaluation Kit

- **EK-RA2L1** (Full MCU evaluation including on-chip debugger)
  - Part name: RTK7EKA2L1S0001BE

- **RA2L1 Touch RSSK** (Capacitive touch evaluation system)
  - Part name: RTK0EG0022S01001BJ

Ordering References

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- For more details, please visit [www.renesas.com/RA](http://www.renesas.com/RA)

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**Contact information**

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