FOR IOT PRODUCT DEVELOPMENT
TRONSHOW IEEE2050-2018 STANDARD

2018/12/12
ATSUSHI HASEGAWA
INDUSTRIAL SOLUTION BUSINESS UNIT
RENESAS ELECTRONICS CORPORATION
SOLUTION OFFERINGS FOR FOCUS DOMAINS

To develop a safer, healthier, greener, and smarter world, Renesas offers three layers of solutions to provide optimal services with added value for customers in our three focus domains: Automotive, Industrial and Broad-based.

<table>
<thead>
<tr>
<th>Platform Value</th>
<th>Kit Value</th>
<th>Device Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ecosystem</td>
<td>Kit device</td>
<td>Performance function</td>
</tr>
<tr>
<td>Software</td>
<td>System know-how</td>
<td></td>
</tr>
<tr>
<td>Application</td>
<td></td>
<td>MCU, analog, PMIC, power semi for Automotive</td>
</tr>
</tbody>
</table>

**AUTOMOTIVE**
- Autonomous driving, Integrated cockpit (Car navigation + ADAS)
- Eco system
- +VSP (Display network & Camera interface)

**INDUSTRIAL**
- Industrial ethernet
- Industry-standard platform for Smart Factory
- + PMIC
- + e-AI

**BROAD-BASED**
- Renesas Synergy™
- IoT platform
- Qualified software package
- + PMIC

- EV motor ECU
- MCU + IGBT
- Battery for xEV
- + PMIC

- MCU + power + PMIC for Smart Home
- Metering MCU + Comm. ASSP
- SoC + PMIC
- Network memory + PMIC
- for Smart Infrastructure

- Battery for xEV
- BMIC

- MCU + ASSP + PMIC for broad-based applications
- (Battery)
- (OIS)

- General-purpose MCU, analog, PMIC, power semi for broad-based applications

LDD: Laser Diode Driver
VSP: Video Signal Processor
MCU: Microcontroller Unit
BMIC: Battery Management IC
PMIC: Power Management IC
e-AI: embedded Artificial Intelligence
POL: Point of Load
OIS: Optical Image Stabilizer

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IOT OPEN SOURCE ENVIRONMENT FOR EMBEDDED SYSTEMS

Open Realtime OS μT-Kernel 2.0
Open IoT Platform
IoT Engine
Common hardware specification for edge node
μT-Kernel 2.0 APIs absorbs difference of hardware

Software
Hardware
MT-KERNEL 2.0 RUN ON TWO RENESAS MCU ARCHITECTURE: RL78 AND RX

Customer Application

Customer Middleware, Stacks, Drivers

µT-Kernel, uITRON

- Smart Low Power
  - 45.5µA/MHz ultra low current operation
  - 0.2µA standby current
  - 1000+ devices

- One Core Countless options
  - 1000+ device family
  - To 4MB Flash/512kB RAM
  - >4.25 Coremark/MHz

- Simply Performance
  - To 400MHz Cortex A9
  - Up to 10MB SRAM
  - HMI & Drive Applications

ARM EcoSystem

- Scalable MCU & Software
- Product quality Software
- RTOS & Comms stacks
- Warranted & supported

Renesas Qualified SW & EcoSystem

Silicon – Kit solution

Platform Solution

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RX FAMILY USED IN VARIOUS FIELD

A wide range of performance from 32MHz to 240MHz, RX Family with extensive peripheral functions for various purposes are used in many applications.
RL78 – LOWEST POWER, INTELLIGENT, BROAD OFFERING

System
- DTC 24ch
- DOC
- Interrupt Controller 4 Levels
- POR, LVD
- Clock Generation Internal, External
- ELC 26 events
- Debug w/trace Single-Wire
- RTC Calendar

Timers
- 2 x Timer Array 16-bit, 8ch
- Timer RD 16-bit with MC function
- Timer RG 16-bit
- Timer RJ 16-bit encoder
- Low power Interval Timer 12-bit, 8-16bit
- WDT 17-bit

Safety
- RAM Parity Check
- ADC Self-diagnostic
- Clock Monitoring
- Memory CRC
- I/O Port Read back

Communication
- I2C Master & Multi Master
- 8 x CSI/SPI 7-, 8-bit
- 4 x UART 7-, 8-, 9-bit
- 1 x LIN 1ch
- Wireless BLE, Sub-GHz

Analog
- ADC 10-bit, 12bit, 24bit
- Internal Vref.
- Temp Sensor
- D/A 8-bit, 10bit
- Comparator Low power & fast type
- PGA /OPAMP

Power Management
- HALT RTC, DTC Enabled
- SNOOZE Serial, ADC Enabled
- STOP with SRAM On

Power
- HALT RTC, DTC Enabled
- SNOOZE Serial, ADC Enabled
- STOP with SRAM On

HMI

Comprehensive toolchain for easy development
Solution Kits accelerating time to market