[Featured Tools]

Solutions and development tools for 32-bit RX671 that realizes high-speed real-time control and contactless HMI

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Outline

This news introduces the features and development tool for the 32-bit RX671 microcontroller that realizes real-time control, contactless HMI control, and cloud connectivity on a single chip, making it ideal for real-time applications such as HVAC and smart meters.

1. RX671 product overview

This product is a 32-bit microcontroller ideal for real-time applications such as HVAC and smart meters. The RXv3 core running at 120MHz and the on-chip flash memory with 60MHz high-speed read access provide outstanding real-time performance. In addition, serial sound I/F and capacitive touch sensing unit contribute to realizing HMI control on a single chip. By implementing RTOS and connecting to a wireless module, it is possible to link up with cloud computing services.

CPU
120MHz RXv3 core
Double-precision FPU
Register bank save function

Memory
2MB code flash memory
8KB data flash memory
384KB SRAM

Package
64/100/144-pin LFQFP
48-pin HWQFN, 64-pin TFBGA
100/145-pin TFLGA

HMI
Serial sound I/F
17ch capacitive touch sensing unit

Advanced communication I/F
SD host I/F
2ch USB 2.0 full-speed
3ch CAN
QSPI with XIP mode

Motor control
PWM timers
2-phase encoder pulse inputs
20ch 12-bit A/D converter

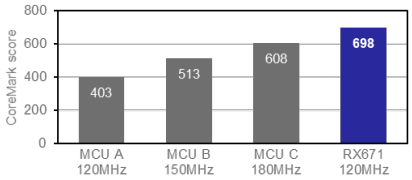
Security
Cryptographic engine (AES, RSA, ECC, SHA, TRNG)
Key management
Access management
Flash memory protection

URL: https://www.renesas.com/RX671

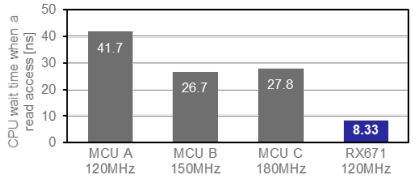
2. RX671 Features

Outstanding real-time performance

Realize 200MHz class performance of competitive products at only 120MHz

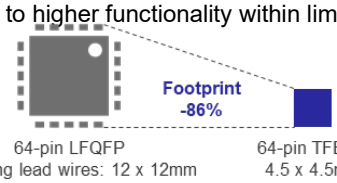


Outperform competitive products' response thanks to the high-speed flash memory even if a cache miss occurs



High functionality & small footprint

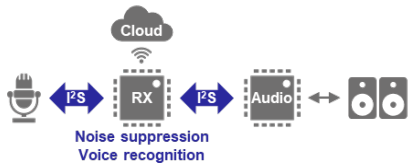
Highest integration of 2MB flash memory at the smallest footprint for a 64 pin device using TFBGA package *1.
Contribute to higher functionality within limited footprint



*1: TFBGA package is under developing

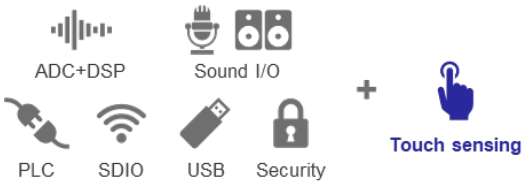
Remote control by voice

Realize voice recognition without network connection and external memories by partner's middleware
Suitable for the control by predetermined voice command



Advanced system control & touch sensing

Realize the advanced single-chip system requiring large memory for RTOS, high performance for processing protocol stacks, capacitive touch sensing unit, and etc.



Robust security

Cryptographic engine and Renesas' original key/access management function by Trusted Secure IP

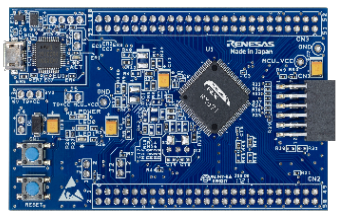
Feature	MCU A	MCU B	RX671
Prevent the dead copy of keys	-	-	✓
Prevent the unauthorized usage of security IP	-	-	✓
AES engine	✓	✓	✓
RSA engine	-	✓	✓
ECC engine	-	✓	✓
SHA engine	✓	✓	✓
True random number generator	✓	✓	✓

*Competing products

3. Evaluation Boards

Target Board for RX671

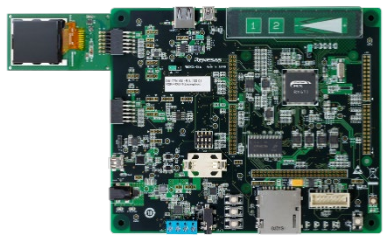
Enable easy and quick evaluation for fast and outstanding real-time performance of RX671. On-board Pmod connector allows Wi-Fi module or sensing module to be connected, contributing to easy and quick evaluation of cloud connectivity and PoC of IoT devices.



URL:
https://www.renesas.com/RTK5RX6710C00000BJ/

Renesas Starter Kit+ for RX671

Implement components such as touch keys, mems microphones, and various communication connectors, which enable total evaluation of RX671, such as touch sensing and voice recognition.



URL: https://www.renesas.com/RX671-Starter-Kit-Plus/

4. RX671 Development Tools and Solutions

Renesas Electronics Corporation provides a variety of solutions and development tools for RX671. We recommend using Renesas solutions and development tools to help with operation in range situations from initial evaluation to product development.

Renesas website "Getting Started with the RX Family Development Environment" provides" provides a tutorial video about how to install the IDE (Integrated Development Environment). Please refer it for building the development environment.

Table 1 Software development tools

Development Tool	Summary
C/C++ Compiler Package for RX Family (Changeable, trial period provided)	In development of embedded systems, C/C++ Compilers for the RX Family offer powerful optimizations for enhancing execution speed and code efficiency, and the utilities to increase productivity
e2 studio IDE (Free of charge)	e² studio is an Eclipse-based integrated development environment (IDE) for Renesas MCUs. In addition to Eclipse's own powerful code editor, the e² studio offers a rich range of extended functions. e² studio covers all development processes from the downloading of sample code to debugging.
Flash memory programming software Renesas Flash Programmer (Chargeable, evaluation edition provided)	This software can write data to the flash memory of applicable Renesas MCUs. Even if a program is divided into multiple sets of data, data to be written can be selected and written in a single operation

*The above products are available to download on the Renesas website "Getting Started with the RX Family Development Environment" provides"

Table 2 Solutions

Solution	Summary
Cloud Connectivity	Renesas has obtained the device certification with the included real-time OSs (FreeRTOS, AzureRTOS) for IoT application and various libraries (SSL/TLS, OTA, MQTT, TCP/IP, etc.) for IoT devices which are provided by major cloud vendors such as Amazon Web Services (AWS) and Microsoft. Along with the evaluation kit and convenient development environment (e2 studio), making it ideal for IoT device development with ease and confidence.
Capacitive Touch Sensor	With a development support tool (QE for Capacitive Touch), it is easy to adjust the sensitivity of the touch buttons, shortening the time to market.
Voice Recognition	Provides the evaluation kit with MEMS microphones and demo software for reference, making it possible tostart development immediately.
Security	Trusted Secure IP and memory protection function protect devices against threats of IoT devices, such as leakage of encryption keys and program tampering.

5. Purchasing the Product

Target Board for RX671 (RTK5RX6710C00000BJ) and Renesas Starter Kit+ for RX671 (RTK55671EHS10000BE) can be purchased from online distributors.

Product Availability Results | Renesas Electronics Corporation

Contact your local Renesas Electronics sales office or distributor for the ordering of C/C++ Compiler Package for RX Family or Renesas Flash Programmer. Regarding the product names, refer to the following web page.

C/C++ Compiler Package for RX Family

https://www.renesas.com/rx_c

Renesas Flash Programmer

https://www.renesas.com/software-tool/renesas-flash-programmer-programming-gui

Revision History

Rev.	Date	Description	
		Page	Summary
1.00	Nov.16.21	-	First edition issued

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Contact information

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www.renesas.com/contact/

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