[Notification]
RX72T System Development Can Begin Immediately!
Introducing Development Software and Tools
Designed to Maximize RXv3 Core Features

R20TS0427EJ0101
Rev.1.01
May. 16, 2019

Outline

This tool news introduces our development environment for the RXv3 core-based RX72T MCUs.

We offer high-quality software that helps accelerate development, boards and kits to improve system designing efficiency, and advanced tools that are also easy-to-use to deliver efficient system development to our users.

1. Features

1.1 RX Family Software and Tools to Support Efficient RXv3 Core-based System Development

The innovative RXv3 core boosts the proven Renesas RX CPU core architecture with up to 5.8 CoreMark®/MH, as measured by EEMBC® Benchmarks, to deliver industry-leading performance, power efficiency, and responsiveness.

Renesas RX development environment offers tools such as integrated development environment, real-time OS, middleware and programming tools, supporting the end-to-end development processes for RX applications enabling efficient system development. Furthermore, our IDEs facilitate each process in development cycle from code generation, building to debugging to help accelerate your development.

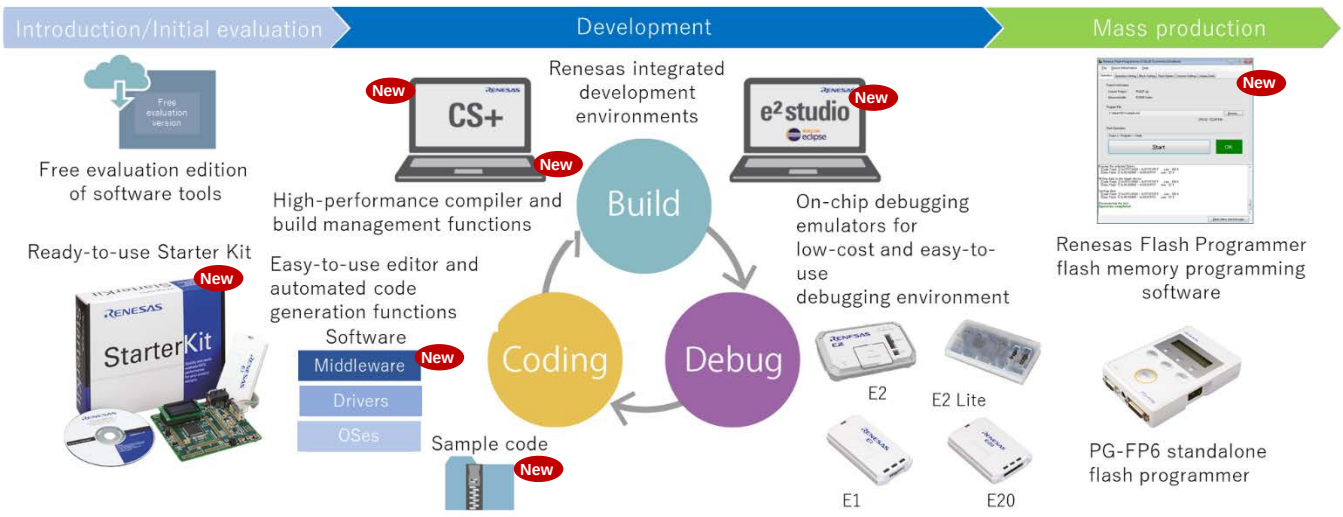


Figure 1-1 RX Family Development Environment

Existing RXv1 or RXv2 core users can start working with the RXv3 core-based MCU by using familiar RX software and tools. “New” in figure 1-1 above indicates new or upgraded products for the RX72T group.

Using the same CPU core instruction sets, the RXv3 core is compatible with the RXv2 and RXv1 cores of the RX family. Binary compatibility ensures that applications written for the previous-generation RXv2 and RXv1 cores can carry forward to the RXv3-based MCUs. Developers can also take advantage of design assets and focus on developing new features.

1.2 C/C++ Compiler Package for RX Family CC-RX V3 to Maximize Performance of RXv3 CPU Core

CC-RX V3 is a compiler that newly supports the RXv3 core-based MCU. It supports the RXv3 core instruction sets, and pipeline, and generates optimized codes for execution performance and ROM size.

Measured in combination with RXv3, the CC-RX V3 has achieved industry-leading performance of 5.8 CoreMark/MHz.

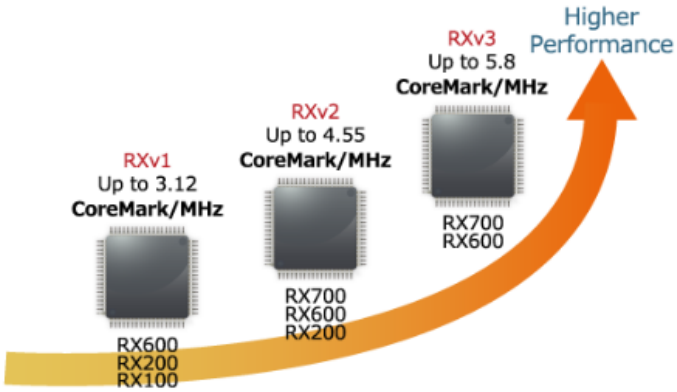


Figure 1-2 Comparison of RXv1 Core, RXv2, Core and RXv3 Core

CC-RX V3 maintains compatibility with the previous-versions CC-RX V1 and CC-RX V2 to support functions and operations for RXv1/RXv2 core based-MCUs. Furthermore, it has extended features to enable more efficient and effective code generation.

For details about the C/C++ Compiler Package for RX Family CC-RX, see the URL below.

https://www.renesas.com/rx_c

We offer a free evaluation edition of CC-RX for you to quickly evaluate the features of the RXv3 core.

For purchasing the CC-RX V3 or upgrading (version) from CC-RX V2 compiler at a lower price, refer to the product lineup in the above web page for CC-RX.

2. Software and Tools to Quickly Start RXv3 Core-based MCU System Development

2.1 IDEs with Advanced Features Customizable for Your Use

- e² studio integrated development environment – Eclipse-based IDE -

e² studio is an integrated development environment tool for Renesas MCU family based on the open source IDE “Eclipse” and CDT (C/C++ Development Tooling) plug-in which supports C/C++ project creation. You can select from multiple compilers and debuggers from Renesas as well as GNU and our partners. In addition to the robust editor and project management tool of the Eclipse CDT standard, e² studio is also equipped with extension functions of Renesas tools.

In e² studio V7.4.0, you can now create a project, build and debug for the RX72T group.

For details about e² studio V7.4.0, refer to the tool news below.

https://www.renesas.com/search/keyword-search.html#genre=document&q=r20ts0414

For product information and downloading of e² studio, see the URL below.

https://www.renesas.com/e2studio

- CS+ integrated development environment – Renesas Original IDE -

CS+ is an integrated development environment tool designed to deliver “simplicity”, “security”, and “ease of use” to repetitive work of software development from edit, build, and debug. The basic software tools you need for Renesas MCU software development are ready to be used right after installation. CS+ also supports more advanced debugging when used in combination with hardware tools (sold separately) such as on-chip debuggers E2 emulator (E2) or E2 Lite emulator (E2 Lite). Many extension functions and user support functions are also available.

CS+ V8.01.00, in combination with device information for RX family V3.01.01, now supports creating a project, building and debugging for RX72T group. For details about CS+ V8.01.00 and device information, see the following information.

For details about CS+ V8.01.00, refer to the tool news below.

https://www.renesas.com/search/keyword-search.html#genre=document&q=r20ts0384

Device Information

The following devices are supported by Device Information for RX family V3.01.01.

RX72T group:

R5F572TFAxFP, R5F572TFBxFP, R5F572TFCxFB, R5F572TFCxFP,

R5F572TFExFP, R5F572TFFxFP, R5F572TFGxFB, R5F572TFGxFP,

R5F572TKAxFP, R5F572TKBxFP, R5F572TKCxFB, R5F572TKCxFP,

R5F572TKExFP, R5F572TKFxFP, R5F572TKGxFB, R5F572TKGxFP

For downloading the product, see the URL below.

https://www.renesas.com/cs+_download

2.2 Easy Start Up with Ready-to-Use Starter Kit

We have released the Renesas Starter Kit for RX72, a perfect starter kit for developers who are new to the RX72 group.

The Renesas Starter Kit for RX72T includes a CPU board with a build-in RX72T MCU, Pmod™ compatible LCD board, and E2 emulator Lite. You can also download the Renesas Starter Kit for RX72T Installer form the website to use the IDE and sample code for code generation and debugging. This enables you to start evaluating the RX72T immediately after purchase.

For details about the Renesas Starter Kit for RX72T, refer to the tool news below.

https://www.renesas.com/search/keyword-search.html#genre=document&q=r20ts0411

For more information, see the URL below.

https://www.renesas.com/rskrx72t

2.3 CC-RX V3.01.00 to Maximize RX72T Performance

You can now generate code to use the trigonometric function calculator of RX72T. This feature is supported by CC-RX V3.01.00 and later versions.

For details about CC-RX V3.01.00, refer to the tool news below.

https://www.renesas.com/search/keyword-search.html#genre=document&q=r20ts0391

Before using the trigonometric function calculator, you will need to initialize it by calling the embedded function __init_tfu(). For details about using the trigonometric function calculator, refer to the descriptions of the __init_tfu() function in the User's Manual for the compiler listed below.

CC-RX Compiler User's Manual R20UT3248EJ0108 Rev.1.08

https://www.renesas.com/search/keyword-search.html#genre=document&q=r20ut3248

(The update is available on May 16, 2019.)

2.4 Smart Configurator to Accelerate Program Designing Process

Smart Configurator is a tool that can combine software as desired. For faster system development, three functions of Smart Configurator are available: import of middleware for MCU peripheral functions (FIT module), automatic driver code generation of peripherals, and pin configuration.

The RX72T group is now supported by Smart Configurator for RX V2.1.0.

For details about Smart Configurator for RX V2.1.0, refer to the tool news below.

https://www.renesas.com/search/keyword-search.html#genre=document&q=r20ts0424

Smart Configurator User's Guide is also available on the web. For details, see the URL below

https://www.renesas.com/smart-configurator

2.5 RX Driver Package to Reduce System Development Time

RX Driver Package is a software package for using basic functions such as initializing MCU, self-programming of flash memory, timer control, UART communication, and A/D conversion, as well as application functions such as USB and Ethernet. This software platform can help developers to reduce system development time.

We have released the RX Driver Package Ver1.19 which supports the RX72T group.

For details about RX Driver Package, see the URL below.

https://www.renesas.com/search/keyword-search.html#genre=document&q=r20ts0423

For details about RX Driver Package, see the URL below.

https://www.renesas.com/rdp

Before using the trigonometric function calculator of the RX72T group in either one of the following environments (1) or (2), you will first need to initialize it.

(1) RX Family Board Support Package Module Firmware Integration Technology (BSP FIT module) Rev.4.01 Document number: R01AN1685EJ0401

(2) RX Driver Package Rev.1.19 Document number: R01AN4677EJ0119

BSP FIT module is included as r_bsp_v4.01.zip in the package.

- Initializing the trigonometric function calculator

  Before calling the main function in the startup routine for using the BSP FIT module, call the embedded function __init_tfu() to initialize the trigonometric function calculator.

  Code example is shown below.

```
void PowerON_Reset_PC(void)
{
----------------------------(Omitted) ----------------------------
   set_fpsw(FPSW_init | FPU_ROUND | FPU_DENOM);

   __init_tfu();    // Initialize trigonometric function calculator

   /* Switch to high-speed operation */
   operating_frequency_set();
----------------------------(Omitted) ----------------------------
   /* Call the main program function (should not return) */
   main();
----------------------------(Omitted) ----------------------------
 }
```

For details about the embedded function __init_tfu(), refer to the CC-RX Compiler User's Manual.

https://www.renesas.com/search/keyword-search.html#genre=document&q=r20ut3248

2.6 High-Speed and Compact µITRON4.0 OS for High-Quality Product Development

We provide a real-time embedded OS that conforms to µITRON4.0 specifications for industry-leading performance. A compact design and excellent real-time functionality and many service calls provide a high-quality real-time multitasking environment for the embedded system.

For details, see the followings.

- RI600V4 µITRON4.0 Real-time OS for RX Family

  https://www.renesas.com/ri600v4

- RI600PX Real-time OS for RX Family
  Developed based on the "RI600V4" with additional memory protection function of the “µITRON4.0 protection extension.”

  https://www.renesas.com/ri600px

2.7 On-chip Debugging Emulators to Fit Your Development Pattern and Scale

There are four types of on-chip debugging emulators supporting the RX72T group: a high-functionality E2 emulator designed for more efficient development, a low-cost E2 Lite, E20 emulator (E20) with a high-volume trace capacity, and the standard E1 emulator (E1). You can choose the best tool that suits your development pattern and scale.

For details, see the URL below.

https://www.renesas.com/ocd

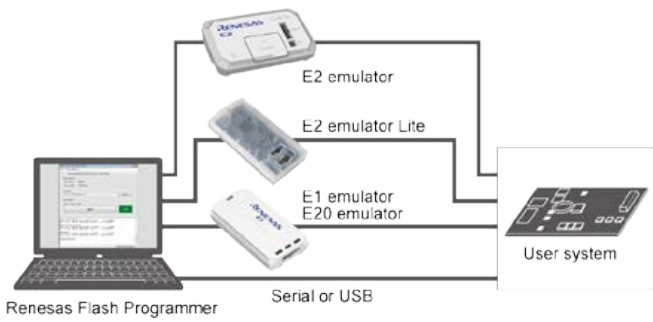
2.8 Flash Programming Tools for Different Usage Scenes

- Renesas Flash Programmer on-board programming software - for developing, prototyping and small-scale programming

Renesas Flash Programmer is on-board programming software which write a program by using the on-chip debugging emulator (E2, E2 Lite, E1 and E20) and a serial or USB interface of the RX family It is the best flash programming tool for prototyping, developing or for programming in a small-scale.

See the following for details.

https://www.renesas.com/rfp



The RX72T group is now supported by Renesas Flash Programmer V3.05.03

For details about Renesas Flash Programmer V3.05.03, refer to the tool news below.

https://www.renesas.com/search/keyword-search.html#genre=document&q=r20ut0419

- PG-FP6 Flash Memory Programmer - Programing without using PC -

The PG-FP6 is a high-speed flash programming tool which supports standalone programming without the need for a PC. It is the perfect programming tool to use for mass production or field updates.

See the following URL for details.

https://www.renesas.com/pg-fp6

The RX72T group is now supported by Programming GUI for PG-FP6 (FP6 Terminal) V1.03.01.

For details, refer to the tool news below

https://www.renesas.com/search/keyword-search.html#genre=document&q=r20ut0418

3. Development Software and Tools from Renesas Partners

RX72T group development software and tools are also supported by Renesas partners. We will be working with our partners to further extend support for the RX72T group.

■ Integrated development environment

Company	IAR Systems	URL	http://www.iar.com/
Product/Service	IAR Embedded Workbench® for RX		
Message from the partner	IAR Embedded Workbench provides full support for devices in the RX family. The sophisticated optimization technology of IAR Embedded Workbench for RX generates very compact and fast code.		

■ Flash Programmer

Company	iForcom Kyoei Inc.	URL	http://www.k-kyoei.jp/
Product/Service	I.S.P-310		
Message from the partner	On-board programmer I.S.P-310 is a handy on-board programming tool which supports Renesas products (RX, RL78, R8C and more) as well as devices from many other manufacturers. Supported devices are continually added and version upgrades are available with no fees (exception may apply). For details about the supported product types, please see our website. ・ Power supply: AA batteries, AC adapter or USB ・ Ability to program via PC or offline (standalone) ・ Save up to 20 files (30 files for devices with SD card slot) ・ Equipped with remote command function ・ Remote control via RS232 communication. Also ideal for mass production. ・ Devices with SD card slot available Save programming results or log updates of saved data in SD card. Useful in line management.		
Company name	Minato Advanced Technologies Inc.	URL	http://www.minatoat.co.jp/en/
Product/Service	Gang Programmer and Conversion Adapter		
Message from the partner	Our programmers have added support for the newly released RX72T of RX series. You can program from 4 to 16 devices simultaneously, depending on usage, from evaluation to production. Supported programmers are MODEL500 series, MODEL400 series, MODEL308, MODEL1950, and MODEL1896. For mass production, we also offer an automatic programming tool.		

■ Multi-measurement and calibration tool

Company	DTS Insight Corp.	URL	https://www.dts-insight.co.jp/en/index.html
Product/Service	RAMScope-EXG GT170 series		
Message from the partner	"RAMScope-EXG GT170 series" is a multi-measurement and calibration tool for the verification of control algorithm. It extracts MCU variables (RAM value) in real-time with minimum cycle time of 5µs. You can measure, collect and analyze CAN or analog signal synchronously. Motor testing in the real target enables measurement variables and parameter calibration without placing loads on control programs. RAMScope-EXG is an all-round tool to solve issues of function analyses or characteristic verification in control system development.		

4. Obtaining the Product

For downloading the free evaluation edition or commercial edition and for purchasing the product, see the following tables.

To order a product, contact your local Renesas Electronics sales office or distributor with a product name and orderable part number.
For product pricing, contact us in the same manner.

(1/2)

Product/Service	Obtaining the product	Notes Adding support for RX72T to your product/service
Renesas Starter Kit for RX72T	Purchase Refer to “Purchasing the Product” in the tool news. https://www.renesas.com/search/keyword-search.html#genre=document&q=r20ts0411	
e^2 studio integrated development environment	Download from the Web. *1 https://www.renesas.com/e2studio_download See the tool news below for details. https://www.renesas.com/search/keyword-search.html#genre=document&q=r20ts0414	Update available. See the tool news (left) for details.
CS+ integrated development environment	Purchase [Free evaluation edition available*2, *3] Refer to “How to Purchase a Product” in the tool news. https://www.renesas.com/search/keyword-search.html#genre=document&q=r20ts0384	Update available. See the tool news (left) for details.
C/C++ Compiler Package for RX Family (CC-RX V3)	Purchase [Free evaluation edition available] Refer to “How to Purchase a Product” in the tool news. https://www.renesas.com/search/keyword-search.html#genre=document&q=r20ts0391	If you have CC-RX V2 license, you will need to purchase CC-RX V3 license. See the tool news (left) for details.
Smart Configurator	Download from the Web. *1 https://www.renesas.com/smart-configurator#downloads Refer to “Updating Your Product” in the tool news. https://www.renesas.com/search/keyword-search.html#genre=document&q=r20ts0424	Update available. See the tool news (left) for details.
RX Family RX Driver Package Ver.1.19	Obtain using Smart Configurator. *1 See the tool news below for details. https://www.renesas.com/search/keyword-search.html#genre=document&q=r20ts0423	Update available. See the tool news (left) for details.
RI600V4 Real-time OS for RX Family (for CS+)	Purchase [Trial edition available] Refer to “How to Purchase New Software” in the tool news. https://www.renesas.com/search/keyword-search.html#genre=document&q=r20ts0361 Trial edition is available for download at the URL below. https://www.renesas.com/ri600v4_download	Update available. See the tool news (left) for details.
RI600PX Real-time OS for RX Family	Purchase Refer to “How to Purchase New Software” in the tool news. https://www.renesas.com/search/keyword-search.html#genre=document&q=r20ts0362	Update available. See the tool news (left) for details.

(2/2)

Product/Service	Obtaining the Product	Notes Using Your Product for RX72T
E2 emulator	Purchase See the URL below for details. https://www.renesas.com/e2#orders	No update required.
E2 emulator Lite	Purchase See the URL below for details. https://www.renesas.com/e2_lite#orders	No update required.
E20 emulator	Purchase See the URL below for details. https://www.renesas.com/e20#orders	No update required.
E1 emulator	Purchase See the URL below for details. https://www.renesas.com/e1#orders	No update required.
Renesas Flash Programmer (Programming GUI)	Purchase [Free evaluation edition available *4] Refer to “Purchasing the Product” in the tool news. https://www.renesas.com/search/keyword-search.html#genre=document&q=r20ts0419 This evaluation edition is available for download at the URL below. https://www.renesas.com/rfp_download	Update available. See the tool news (left) for details.
PG-FP6	Purchase For details, refer to the following URL and the tool news. https://www.renesas.com/pg-fp6#orders https://www.renesas.com/search/keyword-search.html#genre=document&q=r20ts0418	Update for Programming GUI (FP6 Terminal) available. See the tool news (left) for details.

*1: Although the product is available free of charge, it is not the evaluation edition, and can be used as part of a product development process.

*2: The evaluation edition is intended only for testing product performance and functionality. Do not use it for product development. For product development, please consider purchasing the product.

You can also download the free evaluation edition from the following URL.
https://www.renesas.com/tool_evaluation

*3: By registering a license key, the product can be used as a commercial edition.

*4: For details about the free evaluation edition, refer to the following URL.
https://www.renesas.com/rfp

Revision History

Rev.	Date	Description	
		Page	Summary
1.00	May.16.19	-	First edition issued
1.01	May.24.19	6	Corrected the product name of real-time OS.

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Contact information

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www.renesas.com/contact/

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