

# Software to maximize RX Family performance

## RX Family Software

<https://www.renesas.com/rx-software>

### Introduction to RX Family Development Environments - Software

The RX Family development environments provide all-in-one software packages containing everything you need to get started on development right away. Packages include board-specific programs, peripheral function drivers, middleware, and documents illustrating usage procedures. A wealth of sample code is also available, illustrating example applications of these packages and examples of device control, along with extensive documentation.

#### Software Package

|  |   |  |  |
|--|---|--|--|
| <b>Connectivity</b><br>Ethernet, BLE (RX23W)<br>Wi-Fi(SX-ULPGN)<br>Cat.M1(RYZ014A) | <b>Sensor</b><br>HS300x, HS400x<br>FS2012, FS3000<br>FS1015, OB1203<br>ZMOD4410, ZMOD4510 | <b>Storage</b><br>EEPROM, USB,<br>SDHI, SPI      | <b>Security</b><br>TSIP<br>AES,DES,SHA,RNG<br>RSA, TLS                                     |
| <b>File System</b><br>FAT File System<br>(M3S-TFAT-Tiny)                           | <b>USB</b><br>CDC, MSC, HID<br>Host & Peripheral  | <b>Graphics</b><br>Segger emWin<br>CRI Aeropoint | <b>Capacitive Touch</b><br>Button/Wheel/Slider,<br>self-capacitance,<br>mutual-capacitance |

**Device Driver**

|       |         |       |       |       |        |              |           |           |
|-------|---------|-------|-------|-------|--------|--------------|-----------|-----------|
| LVD   | LPC     | VBATT | IRQ   | DTC   | DMAC   | ELC          | GPIO      | MPC       |
| CMT   | CMTW    | RTC   | LPT   | MTU   | GPT    | TPU          | TMR       | PPG       |
| POE   | POEG    | IWDT  | WDT   | SCI   | SCIF   | RIIC         | RIIHS     | RI3C      |
| RSPI  | QSPI    | QSPIX | USB   | EPTPC | ETHERC | ETHERC Light | Ether CAT | IrDA      |
| PDC   | CAN     | CANFD | RSCAN | SDHI  | SDSI   | MMCIF        | SRC       | SSI       |
| S12AD | 24-ΔΣAD | DAC   | DSMIF | AFE   | TSIP   | SEG-LCDC     | TFT-LCDC  | DRW2D     |
| CTSU  | BLE     | REMC  | BUS   | CAC   | Flash  | DOC          | TFU       | Unique ID |

**Board Support Package (BSP)**

**RX Family**

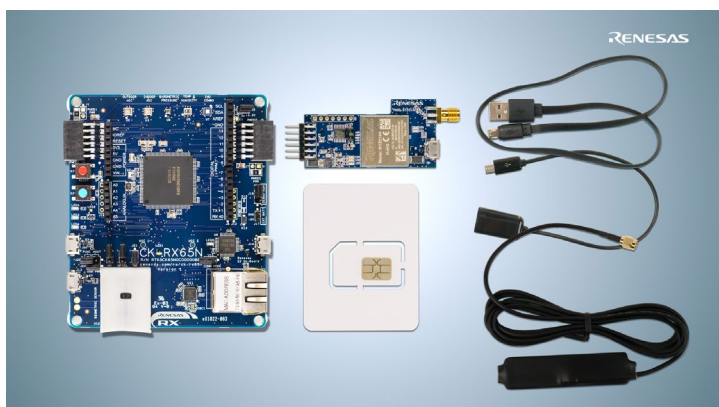
#### freeRTOS AWS FreeRTOS

|                             |                 |
|-----------------------------|-----------------|
| MQTT                        | Device Defender |
| Greengrass Discovery        | Device Shadow   |
| OTA Updates                 | PKCS #11        |
| Secure Sockets              | Wi-Fi           |
| +TCP                        | TLS             |
| FreeRTOS Kernels            |                 |
| FreeRTOS Internal Libraries |                 |

#### Microsoft Azure Microsoft AzureRTOS

|                      |                 |
|----------------------|-----------------|
| NetX                 | NetXDuo         |
| FileX                | TraceX          |
| USBX Device, CDC-ACM | GUIX/GUI Studio |
| ADU                  | Leaf Update     |
| ThreadX              |                 |

Details <https://www.renesas.com/us/en/software-tool/fit-modules-list>



[CK-RX65N](#)

For example, RX Family development environments can generate code for FreeRTOS™ or AzureRTOS running on boards such as CK-RX65N.

Options are not limited to FreeRTOS™ and AzureRTOS. Code can also be generated for connectivity and security.

This means that RX Family can connect easily to AWS and Azure.

## Complete your program configuration in 4 steps.

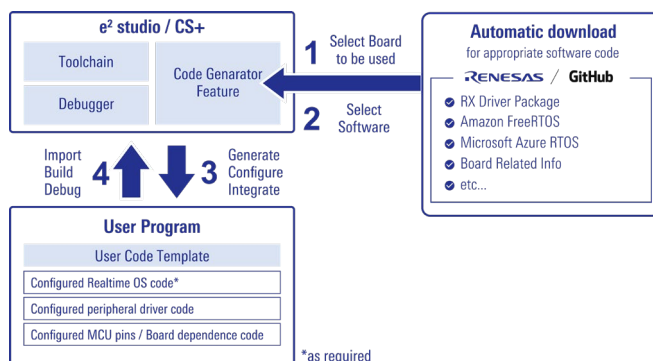
In a Renesas IDE (either e<sup>2</sup> studio or CS+), select the board you are using and the software you need. The appropriate software, including a real-time OS, peripheral function drivers, middleware, and board-specific programs, will be downloaded automatically from GitHub.

Then, all you have to do is specify the software settings, download the software to RX, and start debugging. User programs can be configured in an extremely short time.

Our IDEs come complete with functions to help you port projects from evaluation boards to user-system boards. This means you can start evaluating a user-system board immediately after the initial evaluation.

### 4-step program configuration

- 1 Select your board.
- 2 Select the software you need.
- 3 Specify the software settings.
- 4 Download the software to RX and start debugging.



## Software packages

RX Family offers two types of software packages for peripheral function drivers and middleware: the Code Generator and FIT software modules.

The Code Generator allows you to automatically generate drivers just by setting parameters in the GUI. The FIT software modules are a collection of modules built for compliance with the Firmware Integration Technology (FIT) specifications. These modules have been pre-packaged as RX Driver Packages, making it easy to maintain consistency across modules.

Both the Code Generator and FIT software modules can be used with the Smart Configurator included in the IDE. Each package has its advantages, and both packages can be used together.

|                                     | Code Generator  | FIT software modules  |
|-------------------------------------|---|---|
| <b>Features</b>                     | Generated code is simple and compact, resulting in high readability and efficient memory usage. The generated code is customizable to suit the upper layers of user applications.   | The interfaces with user programs provided by the FIT software modules are the same across all RX Family products, making it easy for users to port microcontroller programs to other RX Family products.<br>Note: Porting can be performed simply by switching out FIT modules, without changing the user program. |
| <b>Examples of suitable systems</b> | Systems consisting only of functions that can be implemented on standalone devices, such as A/D conversion and timer control<br><br>Systems developed by individuals or small teams | Systems requiring integration of multiple software modules such as the real-time OS or middleware<br><br>Systems developed by larger teams  |

[Details](#) [www.renesas.com/fit](http://www.renesas.com/fit)

### Videos

We provide numerous videos for RX Family development environments, ranging from beginner-friendly primers to tips and tutorials.

[www.renesas.com/rx-how-to-video](http://www.renesas.com/rx-how-to-video)

### FAQ

<https://en-support.renesas.com/knowledgeBase>

### Community

<https://community.renesas.com/>

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