[Featured Tools]
Solutions and Development Tools for 32-bit RX23W Module That Implement Bluetooth® 5 Wireless Communication and System Control

R20TS0743EJ0100
Rev.1.00
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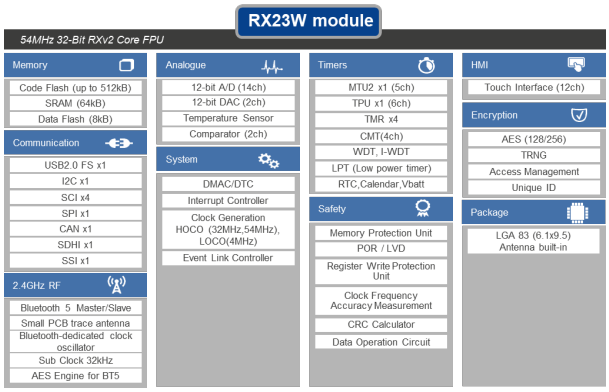
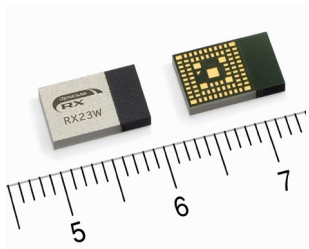
Outline

This news introduces our solutions and development tools for the 32-bit RX23W module designed for IoT endpoint devices. In this module, an antenna, an oscillator, and a matching circuit are all incorporated in a single chip to implement Bluetooth® 5.0 Low Energy wireless communication and system control.

1. Bluetooth 5.0 Low Energy MCU RX23W Module

This module product incorporates the antenna, the oscillator, and a matching circuit in RX23W, which is an RX MCU for Bluetooth 5.0 Low Energy. We achieved an industry-leading compact package by integrating system control and wireless communication features into a single package. We are already certified by the radio laws of each country (MIC in Japan, CE in Europe, FCC in the U.S.A, and ISED in Canada) and have obtained Bluetooth SIG certification. This contributes to reducing the turn-around-time for the market release of products that incorporate the module.





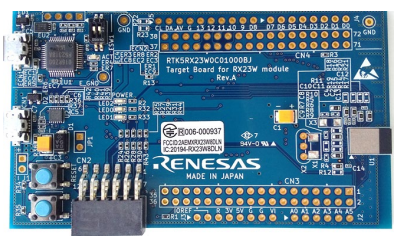
Package size:
6.1 x 9.5 mm, 83-pin LGA

Part No.
R5F523W8CDLN (no encryption)
R5F523W8DDLN (with encryption)

URL: https://www.renesas.com/RX23W

2. Target Board for RX23W Module

The Target Board for RX23W Module (RTK5RX23W0C01000BJ) provides an entry point to evaluation, prototyping and developing for the RX23W module. Designers can start prototyping and developing an application by simply connecting to the debug PC via a USB cable. In addition, the RX23W module has pin header through holes that allow access to all MCU signal pins. This enables the RX23W module to be used for prototypes connected to peripheral devices such as sensors and switches.



URL:
https://www.renesas.com/RTK5RX23W0C01000BJ/

3. Renesas Supporting Development Products Incorporating the RX23W Module

Renesas Electronics Corporation provides a variety of solutions and development tools for RX23W that support Bluetooth Low Energy technology. We recommend using Renesas solutions and development tools to help with operation in a range situations from evaluation of wireless characteristics and initial evaluation of communication behavior to product development. Information about the RX23W module is provided for hardware designs, software development tools, software designs, evaluation board documents, and Bluetooth Low Energy evaluation tools/qualification.

Renesas supports development of products incorporating Bluetooth Low Energy which are becoming increasingly common as a result of IoT market expansion and increased needs for wireless connectivity

Refer to the following tables for the information on the RX23W module. Hardware designs: Table 1. Software development tools: Table 2. Software designs: Table 3. Evaluation board documents: Table 4. Bluetooth low energy evaluation tools/qualification: Table 5.

Table 1: Hardware designs (free of charge)

Solution/Development Tool	Summary
RX23W Group Guidelines for Bluetooth Board Design (R01AN4534)	The board design guidelines for the RX23W module RF transceiver.
RX23W Group Tuning procedure of Bluetooth dedicated clock frequency (R01AN4762)	The tuning procedure of a clock frequency for RX23W Bluetooth 5.0.
RX Family Hardware Design Guide (R01AN1411)	Notes on board design using the RX Family.

Table 2: Software development tools

Solution/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.
e^2 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 products are available to download on the Renesas website.

C/C++ Compiler Package for RX Family

https://www.renesas.com/rx_c

e^2 studio IDE

https://www.renesas.com/e2studio

Renesas Flash Programmer

https://www.renesas.com/rfp

Table 3: Software designs (free of charge)

Solution/Development Tool	Summary
Stack	
RX23W Group BLE Module Firmware Integration Technology (R01AN4860)	Bluetooth Low Energy's stack module uses Firmware Integration Technology (FIT).
Profile	
RX23W Group BLE QE Utility Module Firmware Integration Technology (R01AN4907)	A Firmware Integration Technology (FIT) module that supports the automatic program generation function of QE (Quick and Effective tool solution) for Bluetooth Low Energy.
RX23W Group Bluetooth Low Energy Profile Developer's Guide (R01AN4553)	For developers of Bluetooth Low Energy profiles, the guide shows how to create profiles by using Bluetooth Low Energy software and how to use the profiles.
QE for BLE[RX] (R20TS0726)	A dedicated tool for developing Bluetooth Low Energy-based embedded systems. This solution tool kit runs in the e^2 studio integrated development environment. The combination of e^2 studio and QE for BLE[RX] makes it easy to test the communication features of RX23W, thus reducing the time required in developing a product prior to its market release.
RX Family QE for BLE[RX] R_BLE Script sample and dedicated program (R01AN4872)	Describes how to use the R_BLE script function of QE for BLE[RX] by using example diagrams.
Mesh	
RX23W Group Bluetooth Mesh Stack Package Startup Guide (R01AN4874)	The guide shows how to introduce the Bluetooth mesh stack package. The Bluetooth mesh stack is a software library that configures a network conforming to Bluetooth Mesh Networking specifications to perform wireless communication between devices in a many-to-many relationship.
RX23W Group Bluetooth Mesh Stack Development Guide (R01AN4875)	The guide describes the software configuration of the Bluetooth mesh stack package, provides an overview of each layer, and shows how to develop mesh applications.
RX23W Group Bluetooth Mesh Module Firmware Integration Technology (R01AN4930)	The module uses Firmware Integration Technology (FIT).
Application development	
RX23W Group Bluetooth Low Energy Application Developer's Guide (R01AN5504)	The guide shows how to develop Bluetooth Low Energy applications.
RX23W Group Sample Program for Highspeed Communication (R01AN5437)	A sample program for implementing high-speed communication by using Bluetooth Low Energy. Implementing high-speed communication requires appropriate GAP parameter settings and continuous transmission of data. Two program examples and their mechanisms are provided.
RX23W Group Smartphone Application TryBT for Android (R01AN5700)	TryBT is a sample Android application that connects the Target Board for RX23W module via Bluetooth Low Energy wireless communication to demonstrate the operation. This application includes a sample project containing the source code.
RX23W Group Firmware update over the air sample program (R01AN5910)	A sample program that runs on RX23W to implement OTA (Over The Air) firmware updates by using the Bluetooth Low Energy wireless communication function.

Table 4: Evaluation board documents (free of charge)

Solution/Development Tool	Summary
RX23W Group Target Board for RX23W module Quick Start Guide (R20QS0022)	The quick start guide for Target Board for RX23W module.
RX23W Group Target Board for RX23W Module User's Manual (R20UT4890)	The manual shows the hardware specifications of Target Board for RX23W module as well as basic settings including switches.
Target Board for RX23W module circuit diagram (R01AN4889)	The circuit diagram of the Target Board for RX23W module.
Target Board for RX23W module BOM list (R12TU0114)	The parts of the Target Board for RX23W module.

Table 5: Bluetooth low energy evaluation tool/qualification (free of charge)

Solution (Evaluation Tool/Qualification)	Summary
BTTS (Bluetooth Test Tool Suite) (R01AN4554)	The GUI software that is controlled from a Windows PC. This tool can be used to evaluate the three functions of RF, beacon and data communication in Bluetooth Low Energy.
GATTBrowser for iOS Smartphone Application Instruction Manual (R21AN0017)	"GATTBrowser" is the application for iOS smartphones that is used for checking the behavior of Bluetooth Low Energy (BLE) during the development of BLE products.
GATTBrowser for Android Smartphone Application Instruction Manual (R01AN3802)	"GATTBrowser" is the application for Android smartphones that is used for checking behavior of Bluetooth Low Energy (BLE) during the development of BLE products.
Bluetooth LE microcomputer / module Bluetooth qualification acquisition (R01AN3177)	The document describes how to acquire the Bluetooth qualification for a product equipped with the RX23W module.

4. Purchasing the Product

The Target Board for RX23W module (RTK5RX23W0C01000BJ) can be purchased from online distributors.

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

C/C++ Compiler Package for RX Family

https://www.renesas.com/rx_c

The following products are available to download on the Renesas website.

Bluetooth® Low Energy for RX Family

https://www.renesas.com/application/technologies/bluetooth-low-energy-rx

Bluetooth® Low Energy Protocol Stack for RX family

https://www.renesas.com/software-tool/bluetooth-low-energy-protocol-stack-rx-family

QE for BLE: Development Assistance Tool for Bluetooth® Low Energy

https://www.renesas.com/qe-ble

Revision History

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

Corporate Headquarters

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Contact information

For further information on a product, technology, the most up-to-date version of a document, or your nearest sales office, please visit:
www.renesas.com/contact/

TS Colophon 4.2