

QE for OTA V2.0.0

Release Note

Thank you very much for your using the QE for OTA V2.0.0.

This release documentation, we have indicated this product installation, restrictions and so on.

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1. About QE for OTA

1.1 Summary

QE for OTA is one of the solution toolkits that operate on the e² studio integrated development environment.

This development assistance tool helps you easily try OTA (Over the Air) using AWS/Azure, which is a cloud service. By performing operations according to the workflow diagram, you can obtain cloud-related information, register the information necessary for performing OTA to the cloud system, embed security information into the MCU, and then perform OTA.

1.2 New Functions

- FreeRTOS v202210.01-LTS-rx-1.1.3, 1.2.1 (LTS #2) support
FreeRTOS v202210.01-LTS-rx-1.1.3 (LTS #2) and FreeRTOS v202210.01-LTS-rx-1.2.1 (LTS #2) are now supported.
- RL78/G23 support
This product can now be used in a project for an RL78/G23 device.
- Fleet provisioning method support
Fleet provisioning method, which automates provisioning when IoT devices are initially used, is now supported.

1.3 Workflow Diagram

➤ Setup for Cloud

Specify the settings to sign in to the cloud and set the cloud resources.

➤ Prepare OTA projects

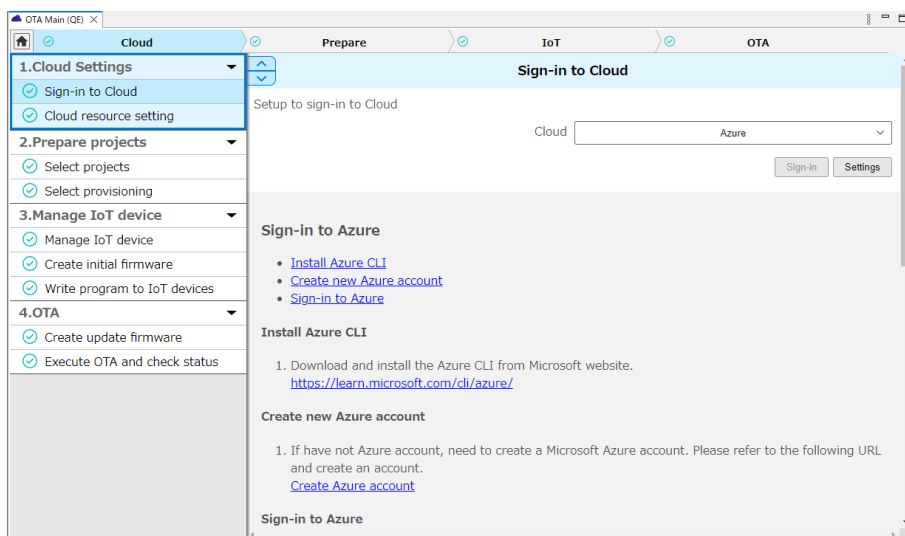
Import or create OTA projects.

➤ Manage IoT devices

You can add and delete IoT devices and view the IoT device information. You can also create initial firmware and write it into an IoT device.

➤ OTA

Create update firmware and execute OTA.



1.4 OTA Manage IoT Device (QE) View

This view displays a list of IoT devices registered on the cloud. You can also add and delete IoT devices.

This view has five features: IoT Device, Initial Firmware, Update Firmware, OTA, and Firmware Log.

➤ IoT Device

You can view IoT device information including the device certificate and security key set during creation of an IoT device.

➤ Initial Firmware

You can create initial firmware by embedding information for each IoT device into the source code.

➤ Update firmware

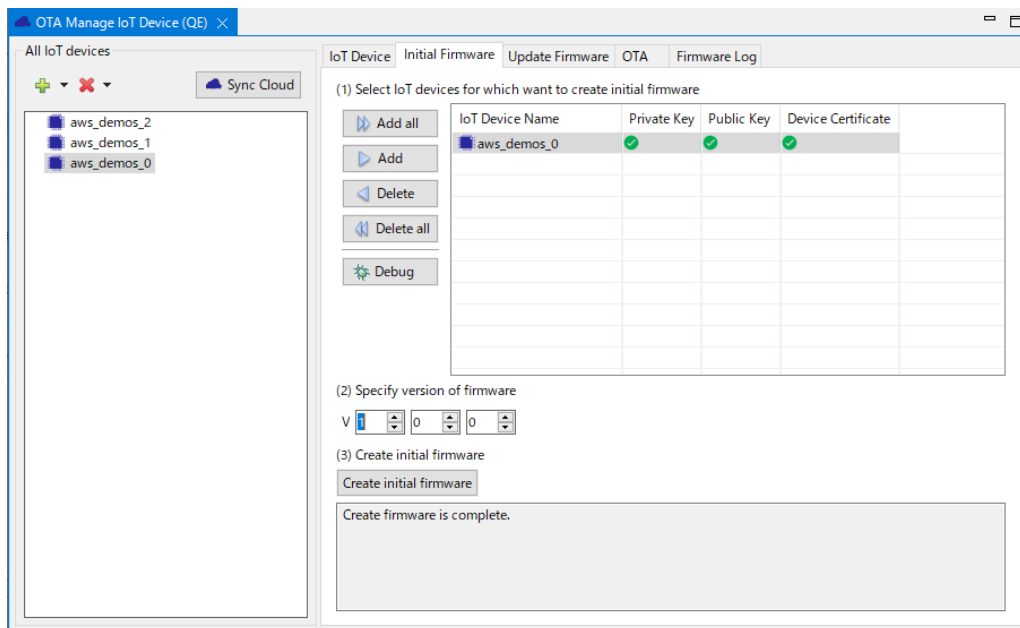
You can create update firmware by embedding information for each IoT device into the source code.

➤ OTA

Execute OTA.

➤ Firmware Log

You can view the operation log of the target board.



1.5 Supported Environment

- Windows 10, Windows 11
- Renesas e² studio 2024-01 (or later)
- Renesas Flash Programmer V3.09 (or later)
- OpenSSL: Win64 OpenSSL v3.0.4 Light (or later)

An AWS account or Azure account is required to use QE for OTA.

1.6 Supported Microcontroller

- RX65N
- RX72N (only AWS)
- RX671 (only AWS)
- RL78/G23 (only AWS)

1.7 Supported Board and RTOS

The combinations of the confirmed board and OTA sample program (including RTOS) are as follows.

Table 1. Sample projects that tested operation

Board or Kit	OTA sample projects(including RTOS)
CK-RX65N v1 (Recommended)	<ul style="list-style-type: none"> • FreeRTOS v202107.00-rx-1.0.1 • FreeRTOS v202210.01-LTS-rx-1.1.3 (LTS #2) • FreeRTOS v202210.01-LTS-rx-1.2.1 (LTS #2) • AzureRTOS 6.2.1_rel-rx-1.0.1 • AzureRTOS 6.2.1_rel-rx-1.0.0
CK-RX65N v2 (Wi-Fi) (Recommended)	<ul style="list-style-type: none"> • FreeRTOS v202210.01-LTS-rx-1.2.1 (LTS #2)
RX65N-Cloud-Kit ^{*1}	<ul style="list-style-type: none"> • FreeRTOS v202107.00-rx-1.0.1 • FreeRTOS v202107.00-rx-1.0.0 • FreeRTOS v202012.00-rx-1.0.2 • FreeRTOS v202012.00-rx-1.0.1 • FreeRTOS v202012.00-rx-1.0.0
RX65N-2MB-Starter-Kit-Plus ^{*1}	<ul style="list-style-type: none"> • FreeRTOS v202107.00-rx-1.0.1 • FreeRTOS v202107.00-rx-1.0.0 • FreeRTOS v202012.00-rx-1.0.2 • FreeRTOS v202012.00-rx-1.0.1 • FreeRTOS v202012.00-rx-1.0.0
RX72N-ENVISION-KIT ^{*1}	<ul style="list-style-type: none"> • FreeRTOS v202012.00-rx-1.0.2
RX671-Starter-Kit-Plus ^{*1}	<ul style="list-style-type: none"> • FreeRTOS v202012.00-rx-1.0.2
RL78/G23-128p Fast Prototyping Board	<ul style="list-style-type: none"> • FreeRTOS v202210.01-LTS-rl78-1.0.0

Note 1. Although the operation has been confirmed, it is recommended to use the CK-RX65N.

1.8 Supplement to Project Preparation for OTA Main view.

1.8.1 CK-RX65N v2 (Wi-Fi) Demo Project

For FreeRTOS v202210.01-LTS-rx-1.2.1(LTS #2), follow the same steps to prepare the project as for FreeRTOS v2022.10.01-LTS-rx-1.1.3(LTS #2). After that, edit the source code below to set the SSID and password for Wi-Fi.

<Firmware project>/src/application_code/include/aws_clientcredential.h

```
#define clientcredentialWIFI_SSID          "<SSID>"
#define clientcredentialWIFI_PASSWORD    "<Password>"
```

- When using the CK-RX65N v2 board, the [Select board] dialog is opened when the initial firmware is created, update firmware is created, and the program is written. At that time, select CK-RX65N.
- By default, the firmware project has Wi-Fi debug log output enabled in the firmware log. As a result, a large amount of firmware logs may be output, and logs related to OTA may not be output. In that case, open the Smart Configurator and change the "Debug log output level" property of the r_wifi_da16xxx module.

1.8.2 Import FreeRTOS v202210.01-LTS-rl78-1.0.0

FreeRTOS v202210.01-LTS-rl78-1.0.0 can now be imported in versions later than e² studio 2024-04.

1. Open [2. Prepare projects] – [Select projects] in the [OTA Main(QE)] view and click the [Import] button.
2. In the dialog that opens, click [Manage RTOS Versions...], select "FreeRTOS (with IoT libraries) for RL78" in the [Download Confirmation] dialog, and click the [OK] button.
3. Check the box for item with the revision "v202210.01-LTS-rl78-1.0.0" and click the [Download] button.
4. Set [Folder] to an arbitrary folder, select "v202210.01-LTS-rl78-1.0.0" in the [RTOS version setting] combo box, and click the [Next >] button.
5. Check the boxes for "aws_ryz024a_rl78g23-fpb" and "boot_loader" from the list of projects, and click the [Finish] button.
6. Open [2. Prepare projects] – [Select projects] in the [OTA Main(QE)] view, and specify "boot_loader" and "aws_ryz024a_rl78g23-fpb" for the Boot Loader and Firmware projects.

1.8.3 Bank Mode selection in e² studio 2024-04 and later

Since e² studio 2024-04, an item to select the Bank Mode has been added to the device settings when creating a new project. When using QE for OTA, select "Dual Bank". This eliminates the need for post-device-changes. For more information, see README.md file in the created project.

2. Installation and Uninstallation

2.1 Installing This Product

Use either of the following procedure to install this product.

2.1.1 Install from the "Renesas Software Installer" menu of e² studio

1. Start e² studio.
2. Select the [Renesas Views] – [Renesas Software Installer] menu of e² studio to open the [Renesas Software Installer] dialog box.
3. Select the [Renesas QE] and click the [Next>] button
4. Select the [QE for OTA (v2.0.0)] check box, and click the [Finish] button.
5. Check that the [Renesas QE for OTA] check box is selected in the [Install] dialog box, and click the [Next>] button.
6. Check that the [Renesas QE for OTA] check box is selected as the target of installation, and click the [Finish] button.
7. If the dialog of the Security Warning is displayed, click the [Install anyway] button to continue installation.
8. When prompted to restart e² studio, restart it.
9. Start this product from the [Renesas Views] - [Renesas QE] menu of e² studio. For details about how to use this product, see the [Help] menu of e² studio.

2.1.2 Install using QE (zip file) downloaded from the Renesas website

1. Start e² studio.
2. From the [Help] menu, select [Install New Software...] to open the [Install] dialog box.
3. Click the [Add...] button to open the [Add Repository] dialog box.
4. Click the [Archive...] button, select the installation file (zip file) in the opened file selection dialog box, and then click the [Open] button.
5. Click the [OK] button in the [Add Repository] dialog box.
6. Expand the [Renesas QE] item shown in the [Install] dialog box, select the [Renesas QE common] check box and the [Renesas QE for OTA] check box, and then click the [Next>] button.
* If you check off the [Contact all update sites during install to find required software] checkbox, you can shorten the installation time.
7. Check that the [Renesas QE common] and the [Renesas QE for OTA] are selected as the target of installation, and click the [Finish] button.
8. If the dialog of the trust certificate is displayed, check that "Unsigned" checkbox, and click the [Trust Selected] button to continue installation.
9. When prompted to restart e² studio, restart it.
10. Start this product from the [Renesas Views] - [Renesas QE] menu of e² studio. For details about how to use this product, see the [Help] menu of e² studio.

2.2 Uninstalling This Product

Use the following procedure to uninstall this product.

1. Start e² studio.
2. Select [Help -> About e² studio] to open the [About e² studio] dialog box.
3. Click the [Installation Details] button to open the [e² studio Installation Details] dialog box.
4. Select [Renesas QE for OTA] displayed on the [Installed Software] tabbed page and click the [Uninstall...] button to open the [Uninstall] dialog box.
5. Check the displayed information and click the [Finish] button.
6. When prompted to restart e² studio, restart it.

3. Notes / Restrictions

3.1 Usage Considerations

Please pay attention to the following items.

3.1.1 Notes of FreeRTOS v202107-rx-1.0.x

1. If you use FreeRTOS v202107-rx-1.0.x, follow the guide in OTA Main(QE) view to change the project settings to run OTA.

3.1.2 Notes of Installation

1. When installing QE for OTA V2.0.0, the "Trust Artifacts" dialog box displays the QE for OTA plug-in as unsigned.

Workaround:

Check "Unsigned" and click the "Trust Selected" button to continue the installation.

3.2 About Azure RTOS contributions to Open Source

Important Notice:

On November 21, 2023, Microsoft announced that they have decided to contribute Azure RTOS to Open Source

under the stewardship of the Eclipse foundation and Azure RTOS becomes Eclipse ThreadX.

For detailed information, please refer to the announcement titled at Microsoft Contributes Azure RTOS to Open Source.

The support strategy scheme for Eclipse ThreadX will be determined and communicated at a later date.

Microsoft will discontinue the Azure RTOS and Azure RTOS Middleware under the existing agreement LICENSED-HARDWARE.txt.

It's important to note that updates for Azure RTOS on these hardware will no longer be provided.

Revision History

Rev.	Date	Description	
		Page	Summary
1.00	Feb.29.24	-	First edition issued.
1.10	Apr.25.24	Page 2	● Section 1.2: Added support for FreeRTOS v202210.01-LTS-rx-1.2.1 (LTS #2)
		Page 4	● Section 1.7: Added the following to Supported Board and RTOS - FreeRTOS v202210.01-LTS-rx-1.2.1 (LTS #2) - CK-RX65N v2 (Wi-Fi) The following RTOS has been removed the description of being under development. - FreeRTOS v202210.01-LTS-rl78-1.0.0
		Page 5	● Section 1.7: Added a note that CK-RX65N is recommended.
		Page 8	● Added Section 1.8 Supplement to Project Preparation for OTA Main view ● Added Section 3.1.2 Notes of Installation

General Precautions in the Handling of Microprocessing Unit and Microcontroller Unit Products

The following usage notes are applicable to all Microprocessing unit and Microcontroller unit products from Renesas. For detailed usage notes on the products covered by this document, refer to the relevant sections of the document as well as any technical updates that have been issued for the products.

1. Precaution against Electrostatic Discharge (ESD)

A strong electrical field, when exposed to a CMOS device, can cause destruction of the gate oxide and ultimately degrade the device operation. Steps must be taken to stop the generation of static electricity as much as possible, and quickly dissipate it when it occurs. Environmental control must be adequate. When it is dry, a humidifier should be used. This is recommended to avoid using insulators that can easily build up static electricity.

Semiconductor devices must be stored and transported in an anti-static container, static shielding bag or conductive material. All test and measurement tools including work benches and floors must be grounded. The operator must also be grounded using a wrist strap. Semiconductor devices must not be touched with bare hands. Similar precautions must be taken for printed circuit boards with mounted semiconductor devices.

2. Processing at power-on

The state of the product is undefined at the time when power is supplied. The states of internal circuits in the LSI are indeterminate and the states of register settings and pins are undefined at the time when power is supplied. In a finished product where the reset signal is applied to the external reset pin, the states of pins are not guaranteed from the time when power is supplied until the reset process is completed. In a similar way, the states of pins in a product that is reset by an on-chip power-on reset function are not guaranteed from the time when power is supplied until the power reaches the level at which resetting is specified.

3. Input of signal during power-off state

Do not input signals or an I/O pull-up power supply while the device is powered off. The current injection that results from input of such a signal or I/O pull-up power supply may cause malfunction and the abnormal current that passes in the device at this time may cause degradation of internal elements. Follow the guideline for input signal during power-off state as described in your product documentation.

4. Handling of unused pins

Handle unused pins in accordance with the directions given under handling of unused pins in the manual. The input pins of CMOS products are generally in the high-impedance state. In operation with an unused pin in the open-circuit state, extra electromagnetic noise is induced in the vicinity of the LSI, an associated shoot-through current flows internally, and malfunctions occur due to the false recognition of the pin state as an input signal become possible.

5. Clock signals

After applying a reset, only release the reset line after the operating clock signal becomes stable. When switching the clock signal during program execution, wait until the target clock signal is stabilized. When the clock signal is generated with an external resonator or from an external oscillator during a reset, ensure that the reset line is only released after full stabilization of the clock signal. Additionally, when switching to a clock signal produced with an external resonator or by an external oscillator while program execution is in progress, wait until the target clock signal is stable.

6. Voltage application waveform at input pin

Waveform distortion due to input noise or a reflected wave may cause malfunction. If the input of the CMOS device stays in the area between V_{IL} (Max.) and V_{IH} (Min.) due to noise, for example, the device may malfunction. Take care to prevent chattering noise from entering the device when the input level is fixed, and also in the transition period when the input level passes through the area between V_{IL} (Max.) and V_{IH} (Min.).

7. Prohibition of access to reserved addresses

Access to reserved addresses is prohibited. The reserved addresses are provided for possible future expansion of functions. Do not access these addresses as the correct operation of the LSI is not guaranteed.

8. Differences between products

Before changing from one product to another, for example to a product with a different part number, confirm that the change will not lead to problems. The characteristics of a microprocessing unit or microcontroller unit products in the same group but having a different part number might differ in terms of internal memory capacity, layout pattern, and other factors, which can affect the ranges of electrical characteristics, such as characteristic values, operating margins, immunity to noise, and amount of radiated noise. When changing to a product with a different part number, implement a system-evaluation test for the given product.

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