QE for OTA V1.0.0 [Technical Preview Edition]

Release Note

Thank you very much for your using the QE for OTA V1.0.0 [Technical Preview Edition].

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

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1. About QE for OTA [Technical Preview Edition]

1.1 Summary

QE for OTA (technical preview version) is one of the solution toolkits that operate on the e^2 studio integrated development environment.

This development assistance tool helps you easily try OTA (Over the Air) using AWS, 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 Workflow Diagram

- Setup for Cloud

  Specify the settings to sign in to the cloud and set the device authentication information.

- Prepare OTA project

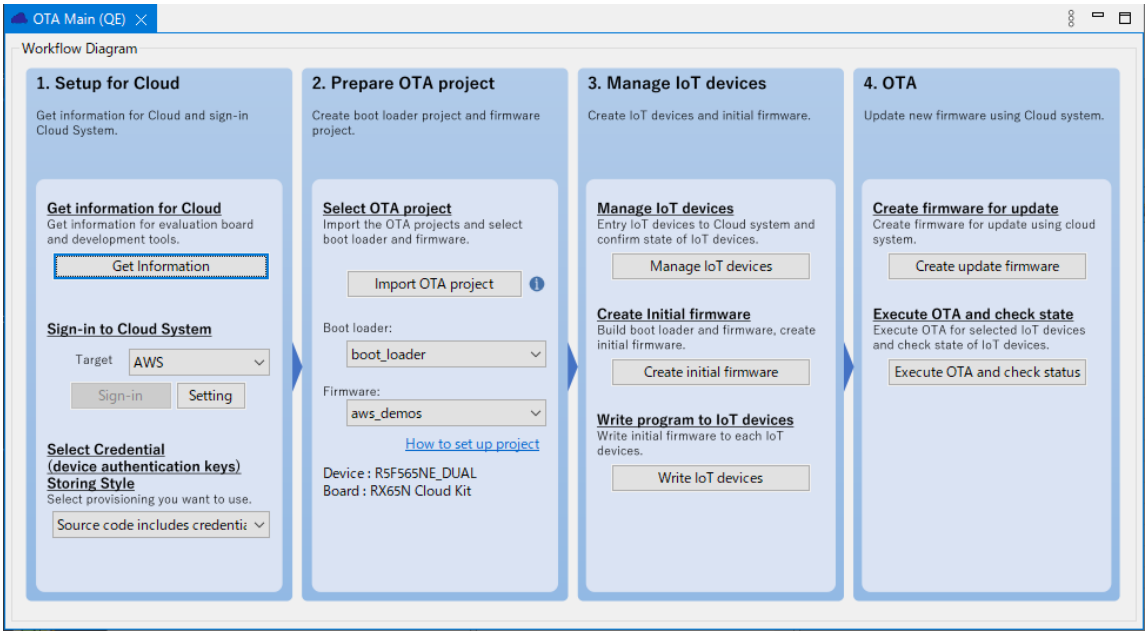
  Import an OTA project.

- 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.



1.3 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

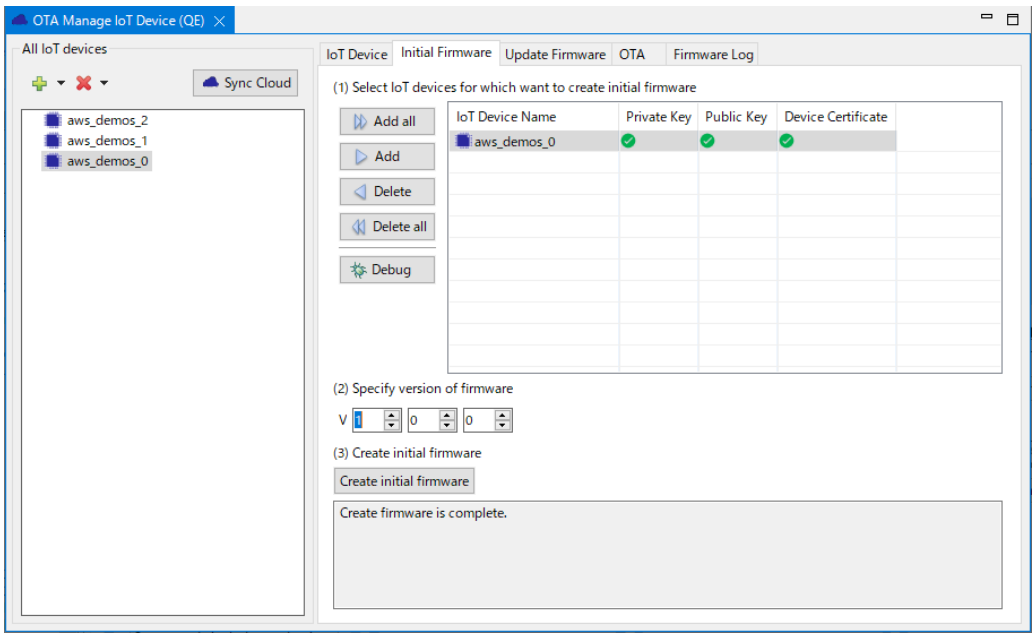
  You can create update firmware by embedding information for each IoT device into the source code.

- OTA

  Execute OTA.

- Firmware Log

  You can view the operation log of the target board.



1.4 Supported Environment

- Microsoft Windows 8.1, Windows 10, Windows 11
- Renesas e^2 studio 2022-04 (or later)
- Renesas Flash Programmer V3.09 (or later)
- OpenSSL: Win64 OpenSSL v3.0.4 Light (or later)

An AWS account is required to use QE for OTA (technical preview version).

1.5 Supported Microcontroller

- RX65N

1.6 Supported Board

- RX65N-2MB-Starter-Kit-Plus
- RX65N-Cloud-Kit
- CK-RX65N (refer to 1.8 How to use the CK-RX65N)

1.7 Supported FreeRTOS Version

- AmazonFreeRTOS v202012.00-rx-1.0.x (x : 0 or 1)
- AmazonFreeRTOS v202107.00-rx-1.0.x (x : 0 or 1)

1.8 How to use the CK-RX65N

QE for OTA V1.0.0 does not officially support the CK-RX65N, but you can try it using the same procedure as the Renesas RX65N Cloud Kit (Wi-Fi).

Operation confirmed environment:

FreeRTOS: v202107.00-rx-1.0.1

e^2 studio: v2022-10

1.8.1 Reference

CK-RX65N

https://www.renesas.com/ck-rx65n

Tutorial Videos: FreeRTOS Tutorial CK-RX65N

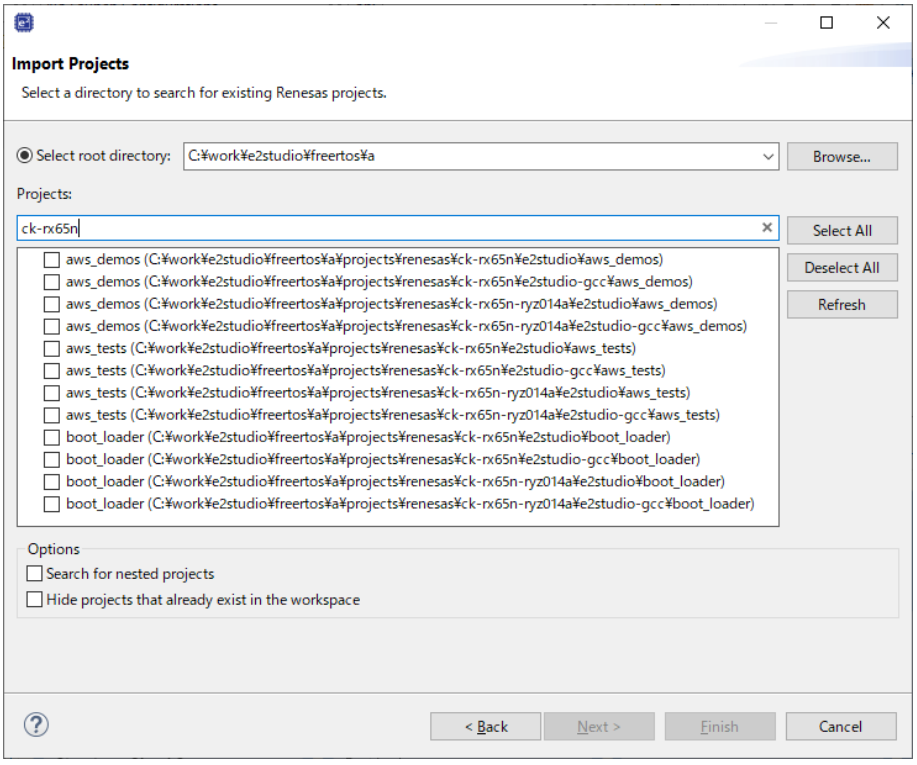
- FreeRTOS Tutorial (1/3) CK-RX65N: Development Environment Setup
- FreeRTOS Tutorial (2/3) CK-RX65N: Setting up the Program
- FreeRTOS Tutorial (3/3) CK-RX65N: Operate AWS Cloud

1.8.2 Procedure using the CK-RX65N

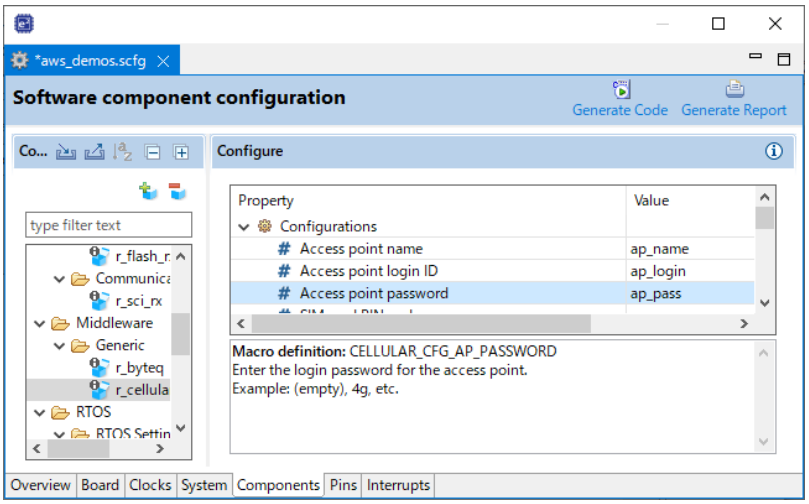
Select the [Help] – [Help Contents] menu of e^2 studio to open the Help and select the [Renesas QE for OTA] node. Use the instructions in the displayed help and the following for reference:

1. Import OTA project
   Select the following projects to import.

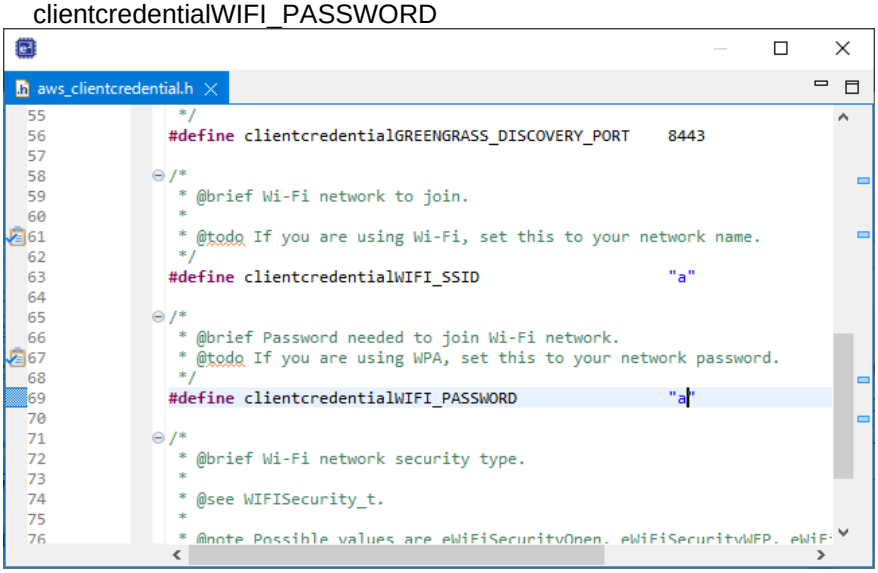
   Using RYZ014A, CC-RX Compiler:
   aws_demos (<FreeRTOS Copy Directory>\projects\renesas\ck-rx65n-ryz014a\e2studio\aws_demos)
   boot_loader (<FreeRTOS Copy Directory>\projects\renesas\ck-rx65n-ryz014a\e2studio\boot_loader)
   Using RYZ014A, GCC Compiler:
   aws_demos (<FreeRTOS Copy Directory>\projects\renesas\ck-rx65n-ryz014a\e2studio-gcc\aws_demos)
   boot_loader (<FreeRTOS Copy Directory>\projects\renesas\ck-rx65n-ryz014a\e2studio-gcc\boot_loader)
   Using Ethernet, CC-RX Compiler:
   aws_demos (<FreeRTOS Copy Directory>\projects\renesas\ck-rx65n\e2studio\aws_demos)
   boot_loader (<FreeRTOS Copy Directory>\projects\renesas\ck-rx65n\e2studio\boot_loader)
   Using Ethernet, GCC Compiler:
   aws_demos (<FreeRTOS Copy Directory>\projects\renesas\ck-rx65n\e2studio-gcc\aws_demos)
   boot_loader (<FreeRTOS Copy Directory>\projects\renesas\ck-rx65n\e2studio-gcc\boot_loader)



2. Settings for RYZ014A (Using RYZ014A)
Double-click aws_demos/aws_demos.scfg in Project Explorer to open Smart Configurator.
Select [Components] tab and select Middleware/Generic/r_cellular node.
Enter the following values in the Configure area. For the value to be entered, refer to the instruction manual of the SIM.
 - Access point name
 - Access point login ID
 - Access point password

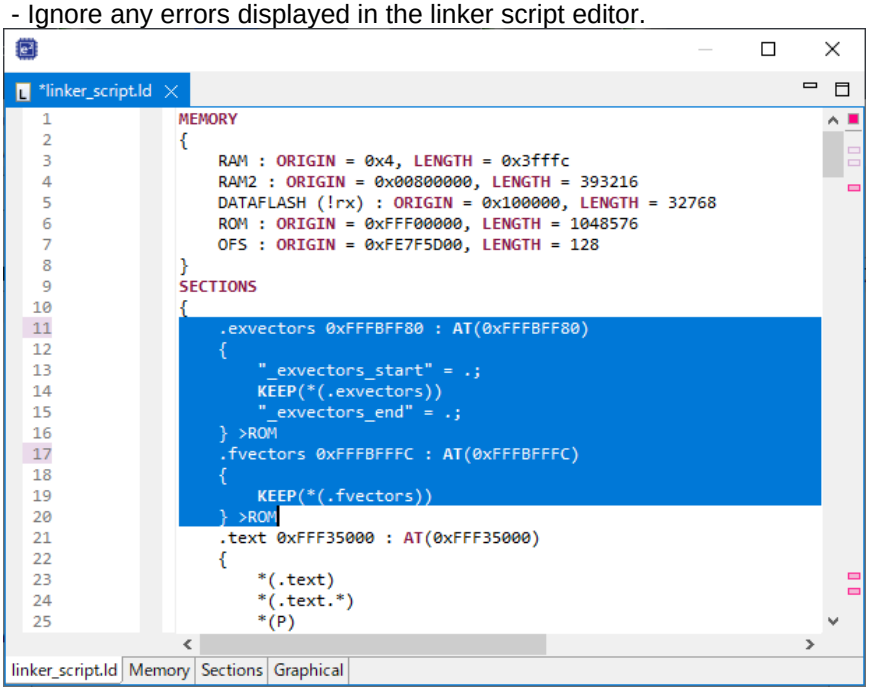


3. Network settings
The CK-RX65N does not use Wi-Fi, but when using RYZ014A, set a dummy string for the Wi-Fi-SSID and PASSWORD to avoid runtime errors(network setting failure).
 - Open aws_demos\demos\include\aws_clientcredential.h.
 - Set the dummy string (example:“a”) to following macros.
   clientcredentialWIFI_SSID
   clientcredentialWIFI_PASSWORD

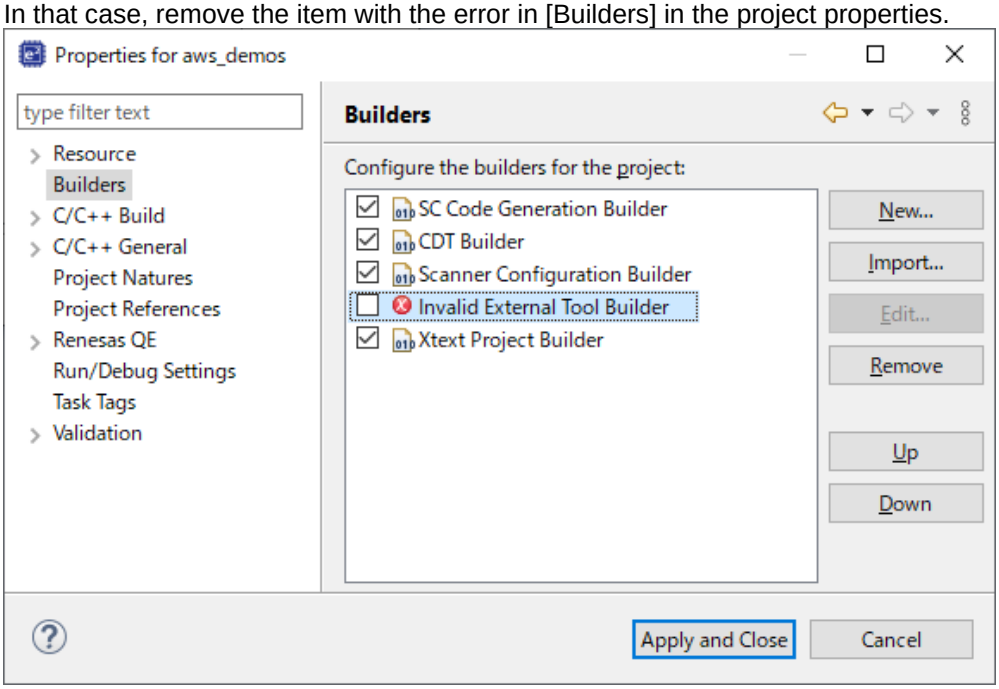


4. Change the device
Change the device from R5F565NEDxFB to R5F565NEDxFB_DUAL refer to “When use FreeRTOS v202107.00-rx-1.0.x” in the Help.

5. Change the section settings (when using GCC compiler)
Use the “linker_script.ld” tab of the linker script editor or a text editor. If you use e2 studio 2022-10 or later, you may encounter a build error when editing in the [Sections] tab.
- Change the following line:
.exvectors 0xFFFFFF80 : AT(0xFFFFFF80) -> .exvectors 0xFFFBFF80 : AT(0xFFFBFF80)
- Change the following line:
.fvectors 0xFFFFFFFC : AT(0xFFFFFFFC) -> .fvectors 0xFFFBFFFC : AT(0xFFFBFFFC)
- Ignore any errors displayed in the linker script editor.



6. Resolve build error (when using GCC compiler)
When using <FreeRTOS Copy Directory>\projects\renesas\ck-rx65n\e2studio-gcc\aws_demos, the build may fail.
In that case, remove the item with the error in [Builders] in the project properties.



7. Initial firmware writing
In the [Flash Programming] dialog, select “Renesas RX65N Cloud Kit” in the combo-box to select the board.

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(Technical Preview Edition)(v1.0.0)] 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 Security Warning is displayed, click the [Install anyway] 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 e^2 studio.
2. Select [Help -> About e^2 studio] to open the [About e^2 studio] dialog box.
3. Click the [Installation Details] button to open the [e^2 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 e^2 studio, restart it.

3. Notes / Restrictions

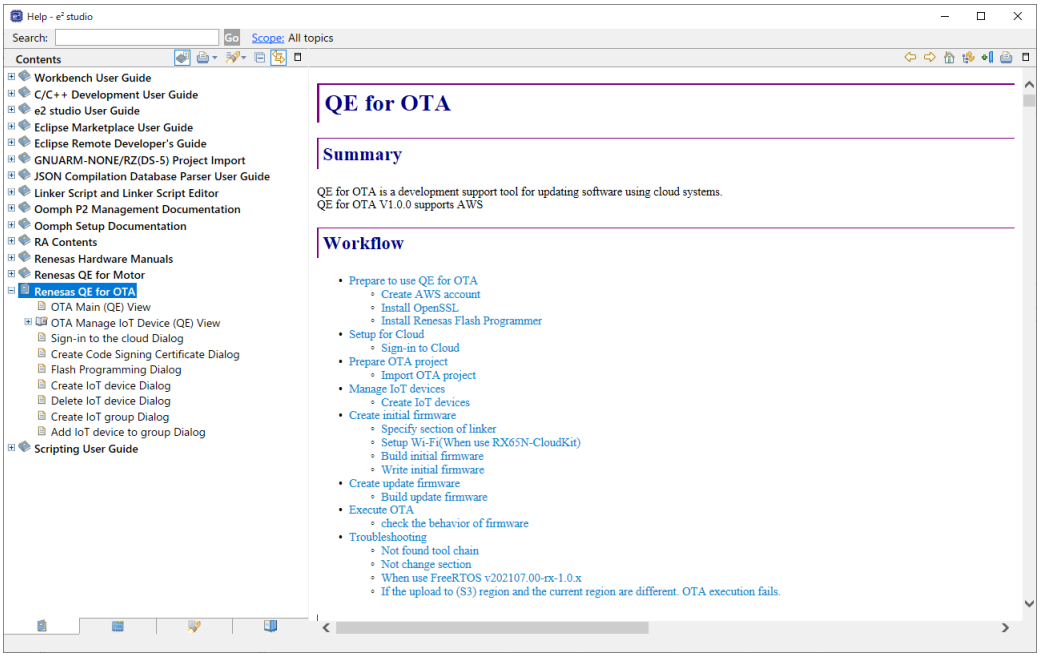
3.1 Usage Considerations

Please pay attention to the following items.

3.1.1 Notes of Using QE for OTA

1. To perform a firmware update using QE for OTA, follow the instructions in the Help.

   Help opens from the [Help] – [Help Contents] menu in e² studio. See Renesas QE for OTA.



3.1.2 Notes of FreeRTOS v202107.-rx-1.0.x

1. If you use FreeRTOS v202107.-rx-1.0.x, change your project settings to run OTA by following the troubleshooting in Help.

3.1.3 Notes of Writing Initial Firmware

1. In the Flash Programming dialog, the initial firmware may not work because the initial firmware is written correctly. In that case, it will work by writing again.

3.2 Functional Restrictions

There are no functional restrictions for this product.

Revision History

Rev.	Date	Description	
		Page	Summary
1.00	Jun.29.22	-	First edition issued.
1.10	Mar.28.23	-	Added a note about the CK-RX65N.

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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