

# QE for BLE[RA,RE,RX] V1.4.0

## Release Note

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Thank you very much for your using the QE for BLE[RA,RE,RX] V1.4.0.

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

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## 1. About QE for BLE[RA,RE,RX]

### 1.1 Summary

QE for BLE[RA,RE,RX] is a dedicated tool for developing Bluetooth® low energy-based embedded systems. This solution tool kit runs in the e<sup>2</sup> studio integrated development environment. The combination of e<sup>2</sup> studio and QE for BLE[RA,RE,RX] makes it easy to test the communications features of RA4W1 group of RA family, RE01B group of RE family, RX23W group of RX family that supports BLE5, thus reducing the time required in developing a product prior to its release on the market.

In addition, QE for BLE[RA,RE,RX] supports RYZ012 Bluetooth Low Energy Module.

### 1.2 Functions

Adding Bluetooth functions to a product requires the addition and customization of complex Bluetooth profiles. The QE for BLE[RA,RE,RX] supports Bluetooth development for RA family devices with the following functions.

1. Designation of a profile provided by Bluetooth SIG

Using R\_BLE Custom Profile RA,RE,RX (QE) View, you can generate code by designating a Bluetooth profile provided by Bluetooth SIG Inc. (<https://www.bluetooth.com/>).

2. Definition of a proprietary profile

If you want to perform unique data communication (not through profiles provided by Bluetooth SIG), you must define a profile. Using R\_BLE Custom Profile RA,RE,RX (QE) View, you can modify a profile easily and generate code.

3. Configuration of advertising and scanning

Supports the configuration of advertising and scanning, a feature of the BLE. Using R\_BLE Custom Profile RA,RE,RX (QE) View, you can easily configure the timing and frequency of advertising and scanning communication with the GUI.

4. Communication check by using a profile

The QE for BLE[RA,RE,RX] allows you to check profile-based communication by creating and executing a script using the API for the Bluetooth protocol stack

Note: Systems that use RYZ012 do not support this function.

### 1.3 New Functions

1. RYZ012 Bluetooth Low Energy Module is now supported

Supported RA family systems using the RYZ012 module. You can now add and customize Bluetooth profiles using the Firmware Integration Technology (FIT) of the Renesas RX family and QE for BLE [RA,RE,RX].

2. Unified a plug-in for RA family, RE family and RX family

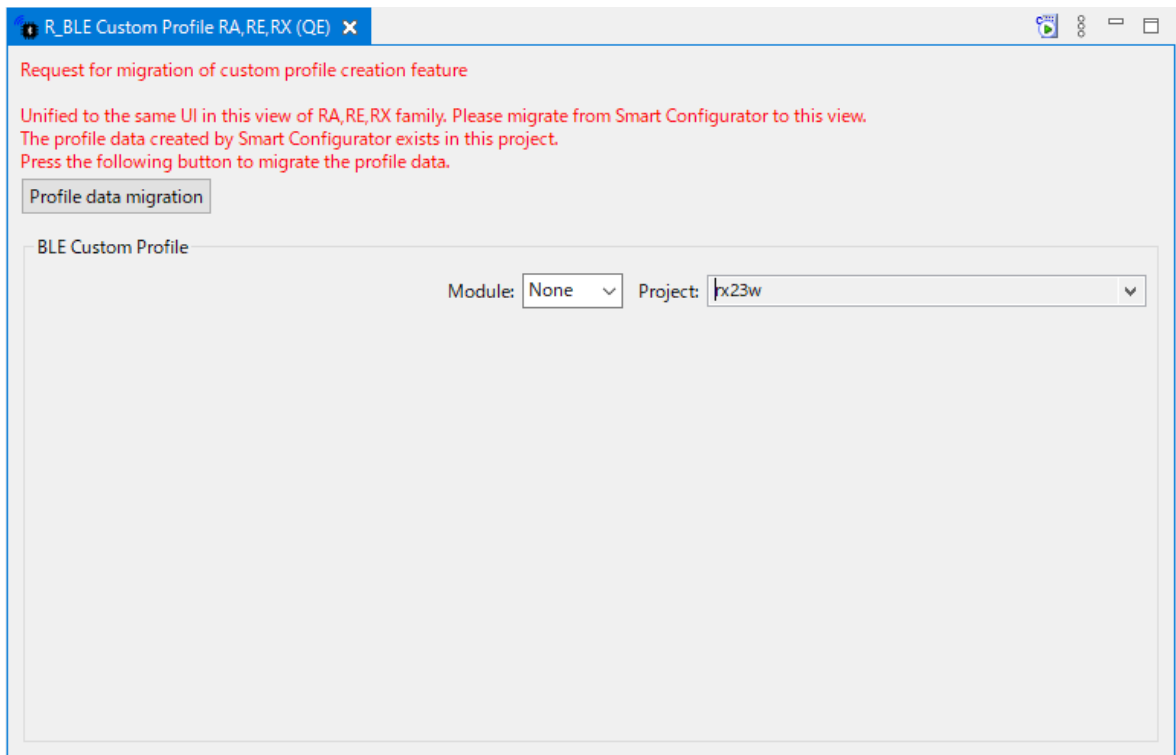
Until previous version, RA family, RE family and RX family were provided as separate plug-in, however from this version, unified into one plug-in and improve convenience.

If you are using QE for BLE[RX] V1.0.0 or V1.1.0 for RX family, please follow the steps below to migrate profile data.

a. Open R\_BLE Custom Profile RA,RE,RX (QE) View

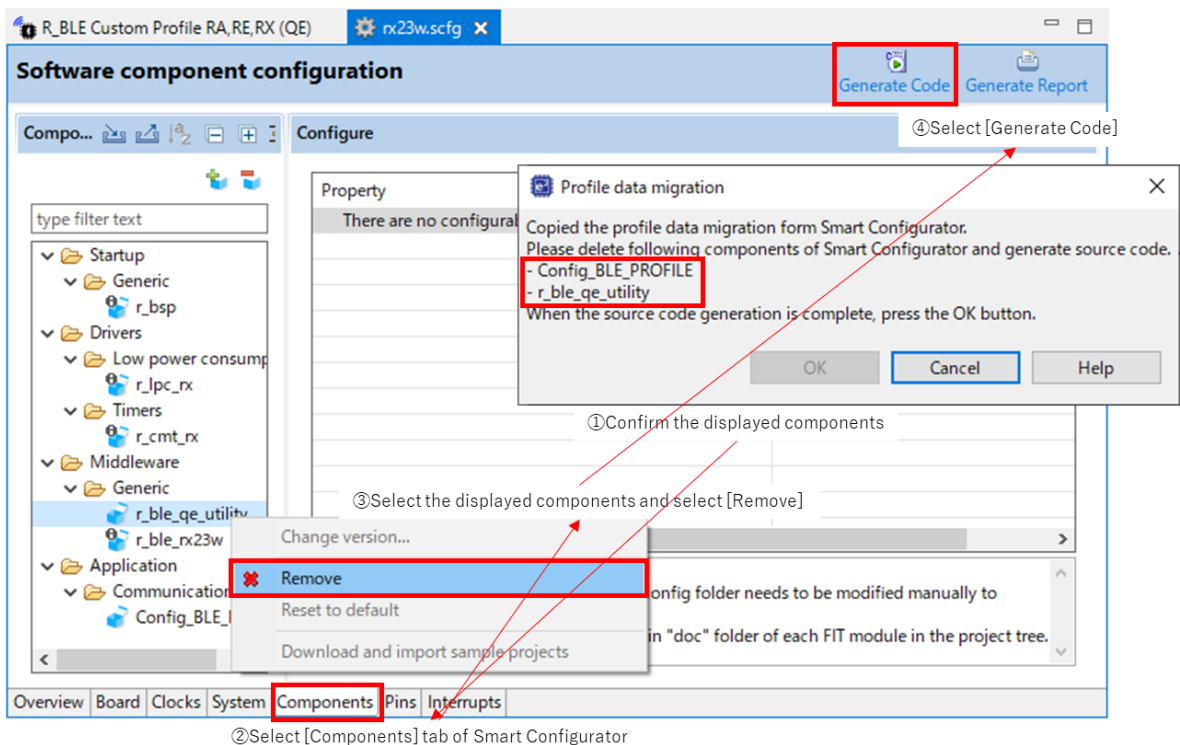
Select [Renesas Views]>[Renesas QE]>[R\_BLE Custom Profile RA,RE,RX (QE)]

The following message in this view is displayed, please press [Profile data migration] button. (if it not displayed, there is no need for data migration.)



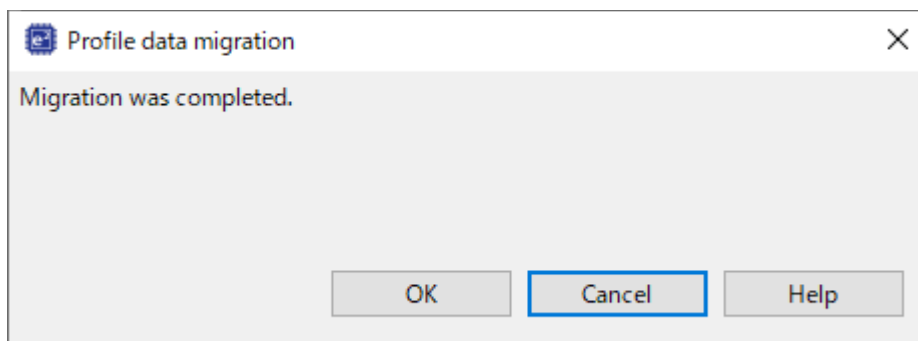
- b. Migrate the profile data, remove components and generate code in Smart Configurator

The profile data migration is automatic. To remove components, follow the instructions in the pop-up [Profile data migration] dialog.



- c. Completion of the profile data migration

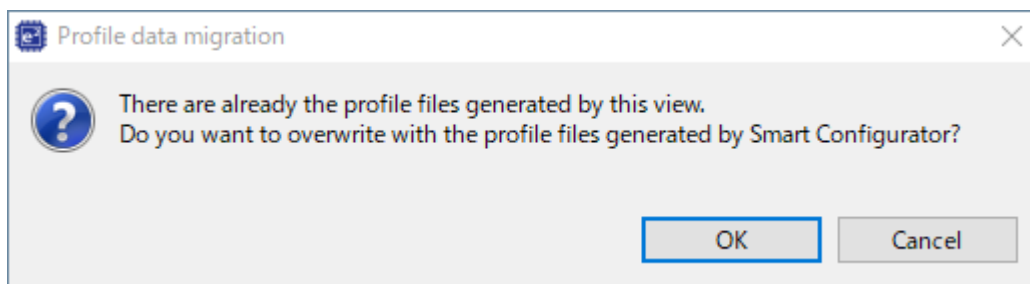
When the following message display, the profile data migration is complete.



- d. Uninstall of plug-ins for RX family
- QE for BLE[RX] V1.0.0 or V1.1.0 is not used, so please uninstall it.
- Select [Help -> About e2 studio] to open the [About e2 studio] dialog box.
  - Click the [Installation Details] button to open the [e2 studio Installation Details] dialog box.
  - Select [Renesas QE for BLE[RX]] displayed on the [Installed Software] tabbed page and click the [Uninstall...] button to open the [Uninstall] dialog box.
  - Check the displayed information and click the [Finish] button.
  - When prompted to restart e2 studio, restart it.

#### Notes

- Do not add the component deleted by Smart Configurator again.
- If the following dialog is displayed when migrate the profile data, overwrite the profile data code-generated by [R\_BLE Custom Profile RA,RE,RX (QE)] with the profile data code-generated by Smart Configurator.



## 1.4 About QE for BLE[RA,RE,RX] Utility

The latest version of QE for BLE[RA,RE,RX] Utility is available on the update site. For information on how to update, please refer to the following URL:

<https://www.renesas.com/software-tool/qe-ble-development-assistance-tool-bluetooth-low-energy-information-users>

### 1.4.1 Changes of V1.4.0

#### 1. For RA users

The changes in V1.4.0 to the previous version are as follows:

##### Skeleton Program (app\_main.c)

- Fixed an issue where Central could not connect to Peripheral when using Balance or Compact types in the BLE protocol stack library.
- Improved to be able to disable Prepare Write Queue configuration process.
- Added GAP and GATT services to service discovery.

##### Profile Common (qe\_gen/ble/profile\_cmn/)

- Added error checking for dynamic memory allocation.
- Added error checking for incorrect connection handles.
- Fixed an issue where the Characteristic and Descriptor attribute handles found in Service Discovery were not retained correctly.

##### Discovery Library (qe\_gen/ble/discovery/)

- Fixed an issue where Service Discovery could not run when reconnecting if an error occurred or was disconnected while Service Discovery was running.
- Fixed an issue that caused events to occur to services that were removed from the GATT database when service discovery was rerun.

##### Service API Program

- Added Apple Notification Center Service (ANCS)
- Added Read/Write event definition for CCCD for Service Changed Characteristic on GATT Service server.

##### QE for BLE Profile Settings

- GAP Server's Device Name Characteristic supports variable length.

##### Overall

- Improved comments.

#### 2. For RE users

The changes in V1.4.0 to the previous version are as follows:

##### Skeleton Program (app\_main.c)

- Improved to be able to disable Prepare Write Queue configuration process.

- Added GAP and GATT services to service discovery.

#### Service API Program

- Added Apple Notification Center Service (ANCS)
- Added Read/Write event definition for CCCD for Service Changed Characteristic on GATT Service server.

#### QE for BLE Profile Settings

- GAP Server's Device Name Characteristic supports variable length.

#### Overall

- Improved comments.

### 3. For RX users

The changes in V1.4.0 to the previous version are as follows:

#### Skeleton Program (app\_main.c)

- Improved to be able to disable Prepare Write Queue configuration process.
- Added GAP and GATT services to service discovery.

#### Service API Program

- Added Apple Notification Center Service (ANCS)
- Added Read/Write event definition for CCCD for Service Changed Characteristic on GATT Service server.

#### QE for BLE Profile Settings

- Fixed additional omissions in the Device Information Service when selecting Profile Glucose.
- Fixed additional battery service leaks and removed unnecessary Scan Parameters Service additions when HID over GATT Profile was selected.
- Fixed the “format” of the Intermediate Cuff Pressure Characteristic in the Blood Pressure Service.
- Fixed object type, Object Action Control Point, and Object List Filter 0/1/2 Characteristic “format” in the Object Transfer Server.
- GAP Server's Device Name Characteristic supports variable length.

#### Overall

- Improved comments.

## 1.4.2 Changes of V1.4.1

### 1. For RA users

The changes from V1.4.0 to the V1.4.1 are as follows:

#### Skeleton Program (app\_main.c)

- Added support for Azure RTOS environment available in FSP 3.6.0 or later.
- Fixed an issue where a skeleton program generated by selecting a Central as the GAP role would send a connection request to an unintended device address when the scan stopped without detecting the device set in the scan filter.

#### Service API Program

- (r\_ble\_cpc.h/r\_ble\_cpc.c) Changed the type definition of manufacturer\_data in Cycling Power Control Point Characteristic of Cycling Power Service from uint8\_t \* type to uint8\_t array type with 18 elements, and changed to allocate memory statically in the decode function.

#### QE for BLE Profile Settings

- Added Write Without Response Property to Report Characteristic of Human Interface Device Service.

#### Overall

- Other minor corrections such as comment corrections.

### 2. For RE users

The changes from V1.4.0 to the V1.4.1 are as follows:

#### Skeleton Program (app\_main.c)

- Fixed an issue where a skeleton program generated by selecting a Central as the GAP role would send a connection request to an unintended device address when the scan stopped without detecting the device set in the scan filter.

#### Service API Program

- (r\_ble\_cpc.h/r\_ble\_cpc.c) Changed the type definition of manufacturer\_data in Cycling Power Control Point Characteristic of Cycling Power Service from uint8\_t \* type to uint8\_t array type with 18 elements, and changed to allocate memory statically in the decode function.

#### QE for BLE Profile Settings

- Added Write Without Response Property to Report Characteristic of Human Interface Device Service.

### 3. For RX users

The changes from V1.4.0 to the V1.4.1 are as follows:

#### Skeleton Program (app\_main.c)

- Fixed an issue where a skeleton program generated by selecting a Central as the GAP role would send a connection request to an unintended device address when the scan stopped without detecting the device set in the scan filter.

#### Service API Program

- (r\_ble\_cpc.h/r\_ble\_cpc.c) Changed the type definition of manufacturer\_data in Cycling Power Control Point Characteristic of Cycling Power Service from uint8\_t \* type to uint8\_t array type with 18 elements, and changed to allocate memory statically in the decode function.

#### QE for BLE Profile Settings

- Added Write Without Response Property to Report Characteristic of Human Interface Device Service.

## 1.5 Supported Environment

Microsoft Windows 8.1, Windows 10

Renesas e<sup>2</sup> studio 2021-10 (or later)

## 1.6 Supported Microcontroller and Bluetooth Module

- RA4W1
- RE01B
- RX23W
- RYZ012

## 1.7 Supported FSP Version

- RA4W1  
FSP V2.0.0 (or later)
- RE01B  
RE01B Group Bluetooth Low Energy Sample code (using CMSIS Driver Package) (R01AN5606)
- RX23W  
BLE Driver : r\_ble\_rx23w V2.30 (or later)
- RYZ012  
RA : FSP V3.4.0 (or later)  
RX : r\_ryz012\_rx V1.0.0 (or later)



## 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 e<sup>2</sup> studio

1. Start e<sup>2</sup> studio.
2. Select the [Renesas Views] – [Renesas Software Installer] menu of e<sup>2</sup> studio to open the [Renesas Software Installer] dialog box.
3. Select the [Renesas QE] and click the [Next>] button
4. Select the [QE for BLE[RA,RE,RX] (v1.4.0)] check box, and click the [Finish] button.
5. Check that the [Renesas QE for BLE[RA,RE,RX]] check box and the [Renesas QE for BLE[RA,RE,RX] Utility] check box are selected in the [Install] dialog box, and click the [Next>] button.
6. Check that the [Renesas QE for BLE[RA,RE,RX]] check box and the [Renesas QE for BLE[RA,RE,RX] Utility] check box are selected as the target of installation, and click the [Next>] button.
7. After confirming the license agreements, if you agree to the license, select the [I accept the terms of the license agreements] radio button, and click the [Finish] button.
8. If the dialog of the trust certificate is displayed, check that certificate, and click the [OK] button to continue installation.
9. When prompted to restart e<sup>2</sup> studio, restart it.
10. Start this product from the [Renesas Views] - [Renesas QE] menu of e<sup>2</sup> studio. For details about how to use this product, see the [Help] menu of e<sup>2</sup> studio.

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

1. Start e<sup>2</sup> 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 for BLE[RA,RE,RX]] check box and the [Renesas QE for BLE[RA,RE,RX] Utility] 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 for BLE[RA,RE,RX]] and the [Renesas QE for BLE[RA,RE,RX] Utility] are selected as the target of installation, and click the [Next>] button.
8. After confirming the license agreements, if you agree to the license, select the [I accept the terms of the license agreements] radio button, and click the [Finish] button.
9. If the dialog of the trust certificate is displayed, check that certificate, and click the [OK] button to continue installation.
10. When prompted to restart e<sup>2</sup> studio, restart it.
11. Start this product from the [Renesas Views] - [Renesas QE] menu of e<sup>2</sup> studio. For details about how to use this product, see the [Help] menu of e<sup>2</sup> studio.

### 2.2 Updating This Product

If you have already installed this product, you can update it in the same way as the procedure for installation.

## 2.3 Uninstalling This Product

Use the following procedure to uninstall this product.

1. Start e<sup>2</sup> studio.
2. Select [Help -> About e<sup>2</sup> studio] to open the [About e<sup>2</sup> studio] dialog box.
3. Click the [Installation Details] button to open the [e<sup>2</sup> studio Installation Details] dialog box.
4. Select [Renesas QE for BLE[RA,RE,RX]] and [Renesas QE for BLE[RA,RE,RX] Utility] 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<sup>2</sup> studio, restart it.

## 2.4 Updating QE for BLE[RA,RE,RX] Utility

Use the following procedure to update QE for BLE[RA,RE,RX] Utility included in this product.

1. Start e<sup>2</sup> studio.
2. Click [Renesas Views], and then click the [Renesas QE], and then click [R\_BLE Custom Profile RA,RE,RX (QE)] menu of e<sup>2</sup> studio to open the [R\_BLE Custom Profile RA,RE,RX (QE)] view.  
\* By opening the view, the QE for BLE[RA,RE,RX] Utility's update site is registered in e<sup>2</sup> studio.
3. Click [Help], and then click the [Install New Software...] menu to open the [Install] dialog box.
4. Select following item from the [Work With:] drop-down list.  
[Renesas QE BLE[RA,RE,RX] Utility – [http://tool-support.renesas.com/e2studio/qe/blera\\_util](http://tool-support.renesas.com/e2studio/qe/blera_util)]
5. Select the [Renesas QE for BLE[RA,RE,RX] Utility] check box, and then click [Next>] button.
6. Confirm that the installation target is correct, and then click the [Next>] button.
7. After checking the license, select the [I accept the terms of the license agreements] radio button, and then click the [Finish] button.
8. When a dialog box for selecting a trusted certificate appears, check the displayed certificate, and then click the [OK] button to continue installation.
9. When prompted to restart e<sup>2</sup> studio, restart it.

### 3. Notes / Restrictions

#### 3.1 Usage Considerations

Please pay attention to the following items.

##### 3.1.1 Notes of [Working with views]

1. Floating an R\_BLE Main RA,RE,RX (QE) view may not display the contents of the floating view.

Workaround:

Do not float the R\_BLE Main RA,RE,RX (QE) view.

##### 3.1.2 Notes of RYZ012 module

1. Some code-generated setting with the custom profile generation feature do not work in combination with FSP or FIT for the RYZ012 module.

Workaround:

Please refer to FSP or FIT documents about details of functional restriction.

#### 3.2 Functional Restrictions

QE for BLE[RA,RE,RX] V1.4.0 has the following functional restrictions.

##### 3.2.1 Restrictions for creating a custom profile

1. In the setting of Advertising Interval in the following three items of the [Peripheral] and [Central] tabs of the R\_BLE Custom Profile RA,RE,RX (QE) View, the error icon does not appear even if the value that exceeds the input limit is entered.
  - [Peripheral] tab → Advertising Data → Advertising Interval
  - [Peripheral] tab → Scan Response Data → Advertising Interval
  - [Central] tab → Scan Filter Data → Advertising Interval

Workaround:

When setting the Advertising Interval, make sure it is entered correctly in the range of 20 to 10240ms.

**Revision History**

Rev.	Date	Description	
		Page	Summary
1.00	Jan.28.22	-	First edition issued.
1.10	Feb.25.22	Page 7,8 Page 10	Added about QE for BLE[RA,RE,RX] Utility V1.4.1 Added about updating QE for BLE[RA,RE,RX] Utility

# 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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## Corporate Headquarters

TOYOSU FORESIA, 3-2-24 Toyosu,  
Koto-ku, Tokyo 135-0061, Japan  
[www.renesas.com](http://www.renesas.com)

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