

QE for BLE: A Dedicated Tool for Bluetooth® low energy

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Rev.1.00

Usage Guide

Jan 20, 2017

Introduction

The Renesas Solution Kit QE for BLE V1.0.0 (technical preview edition) is among the QE (Quick and Effective Tool Solution) development assistance products for various applications. QE for BLE makes it easy to test the communications features of the RL78/G1D (Bluetooth® low energy MCU), thus reducing development periods up to the point where a product reaches the market.

This document describes the usage of this tool with examples. Refer to the help system of QE for BLE and the related documents for detailed information on individual functions. Note that “QE for Bluetooth Smart” may be mentioned in some places. This is the former product name, and should be read as “QE for BLE”.

Target Device

RL78 Family: RL78/G1D

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1. Configuration of a System

The configuration of a system where QE for BLE is in use is shown below.

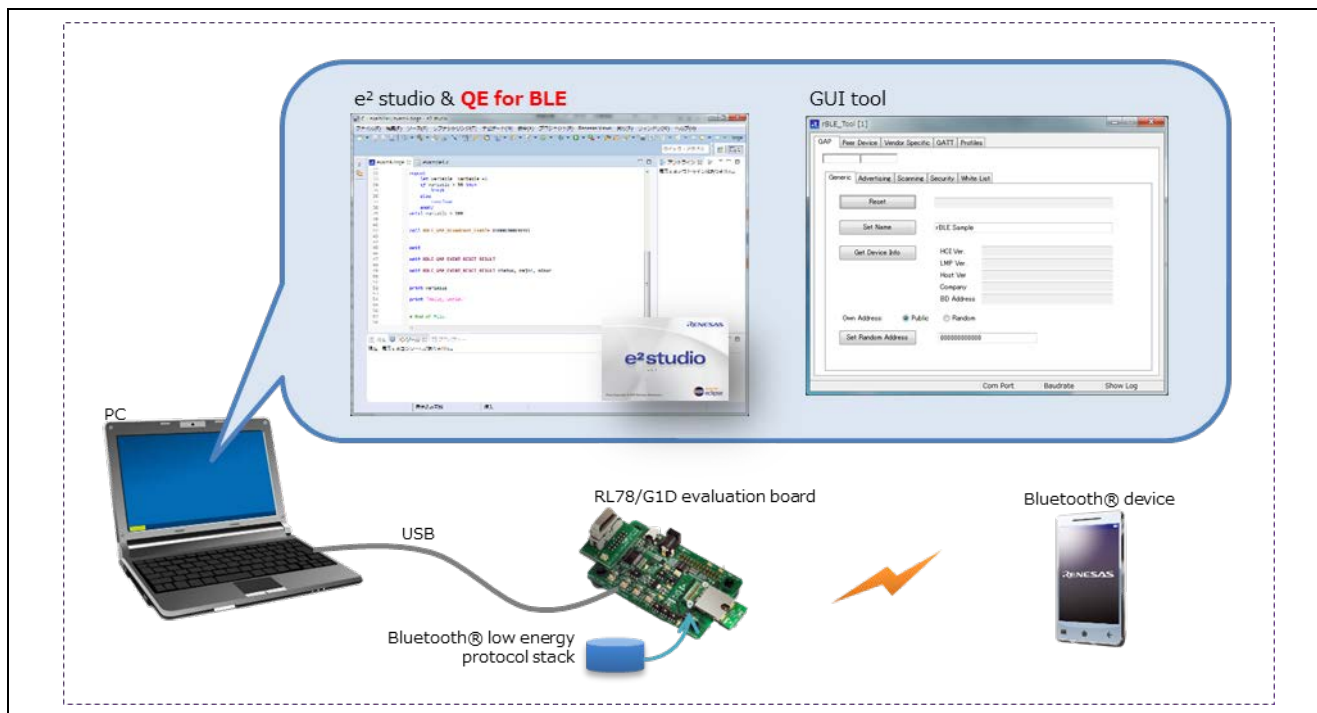


Figure 1-1 Configuration of a System

Operating Environment

- Host OS
Windows 7, 8.1, 10 (Japanese or English, 32-/64-bit)
- Environment for execution
V4.1.0 or a later version of the e² studio integrated development environment
V1.0.0 of QE for BLE (development assistance tool for Bluetooth® low energy)
V1.10 or a later version of the Bluetooth® low energy protocol stack GUI tool
- Library
Bluetooth® low energy protocol stack V1.11
- Applicable board
RL78/G1D evaluation board
- Others (Bluetooth® devices for checking operation at the other party)
Smartphones or tablets which support V4.0 or a later version of the Bluetooth specification

Note: V3 of the RFP (Renesas Flash Programmer) flash programming tool and E1 emulator are needed separately if the RL78/G1D evaluation board is to be programmed.

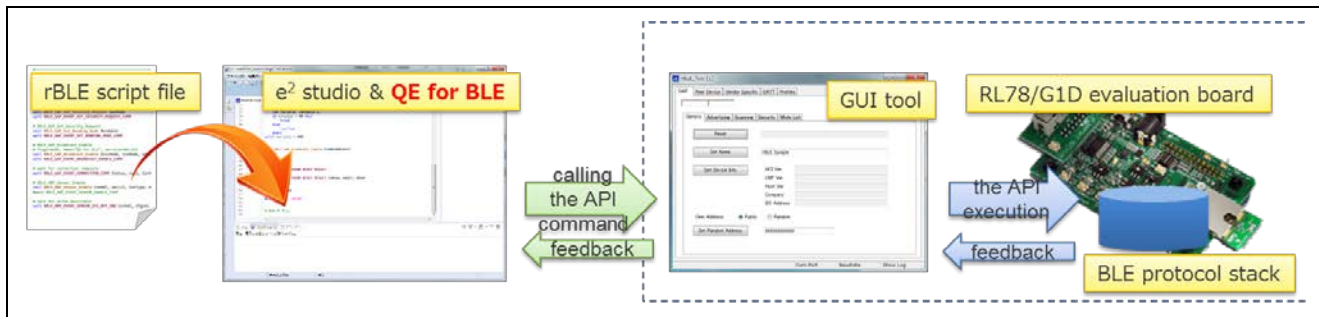


Figure 1-2 Configuration of Software

The Bluetooth® low energy protocol stack GUI tool controls the Bluetooth® low energy protocol stack on the RL78/G1D evaluation board through a modem configuration, manually from a PC. That is, this tool transmits or receives rBLE commands and events by serial communications.

QE for BLE is plug-in software for the e² studio IDE. This software provides assistance in creating and executing rBLE script files. By executing rBLE scripts, the Bluetooth® low energy protocol stack can be controlled automatically through the GUI.

You can try the script function of issuing API commands to the Bluetooth® low energy protocol stack, and immediately check the state of the responses in a log of communications. Hence, you can concentrate on learning the basic functions of communications via Bluetooth®, without having the need to create complicated embedded programs involving work such as making the initial settings of the MCU.

2. Advance Preparation

2.1 Downloading

This section describes how to obtain the software required to use the QE for BLE.

Table 2-1 List of the Required Software and URLs of the Download Pages

Software	URL
e ² studio	https://www.renesas.com/e2studio
QE for BLE	https://www.renesas.com/qe-ble
Bluetooth® low energy protocol stack	https://www.renesas.com/solutions/key-technology/connectivity/bluetooth-smart/protocol-stack.html
Bluetooth® low energy protocol stack GUI tool	https://www.renesas.com/solutions/bluetooth
Microsoft Visual C++ Redistributable	https://www.microsoft.com/en-us/download/details.aspx?id=30679
Related documents	https://www.renesas.com/products/microcontrollers-microprocessors/rl78/rl78g1x/rl78g1d.html

2.1.1 Downloading the e² studio

Access the below URL from your Internet browser and download the installer for the e² studio.

- Download page: <https://www.renesas.com/e2studio>

Note: You also need to download and install a compiler (such as the CC-RL C compiler package for the RL78 Family) when you build programs in the e² studio, since they are separate products. You can download them from the above URL.

2.1.2 Downloading the QE for BLE

Access the below URL from your Internet browser and download the QE for Bluetooth Smart V1.0.0 (technical preview edition; filename: RenesasQE_ble_V100.zip).

If you already have the e² studio, select this document from the Smart Browser of the e² studio, and download [Sample code (Download)] from the menu displayed by right-clicking on the window.

- Download page: <https://www.renesas.com/qe-ble>

2.1.3 Downloading the Bluetooth® low energy protocol stack

Access the following URL from your internet browser, and download “Bluetooth® low energy protocol stack” (file name: RTM5F11A00NBLE0F10RZ-V0120.zip).

- Download page: <https://www.renesas.com/solutions/key-technology/connectivity/bluetooth-smart/protocol-stack.html>

2.1.4 Downloading the GUI tool

Access the following URL from your internet browser, and download “Bluetooth® low energy protocol stack GUI tool” (file name: an-r01an2469ej0112-g1dguitol-apl.zip).

- Download page: <https://www.renesas.com/solutions/bluetooth>

The GUI tool is a C++ application built by using Microsoft Visual Studio 2012. To execute the GUI tool, you need to obtain Visual C++ Redistributable and install the runtime components.

2.1.5 Downloading Visual C++ Redistributable

Access the following URL from your internet browser, and download “Visual C++ Redistributable for Visual Studio 2012, Update 4”.

- Download page: <https://www.microsoft.com/en-us/download/details.aspx?id=30679>

Note: The GUI tool is a 32-bit application. Download Visual C++ Redistributable (VSU4\vc redistrib_x86.exe) for 32-bit versions (x86) even if you are using a 64-bit version of Windows.

2.1.6 Obtaining related documents

The following is a list of documents that will be helpful when you use QE for BLE. Access to the below URL from your internet browser and download them.

Table 2-2 Related Documents

Document name	Document number
Bluetooth® Low Energy Protocol Stack User's Manual	R01UW0095
Bluetooth® Low Energy Protocol Stack Quick Start Guide	R01AN2767
Bluetooth® Low Energy Protocol Stack Sample Program Application Note	R01AN1375
Bluetooth® Low Energy Protocol Stack rBLE Command Specification	R01AN1376
Bluetooth® Low Energy Protocol Stack GUI tool	R01AN2469
QE for Bluetooth Smart Sample Script for the RenesasBLE	R01AN3154
Bluetooth® Low Energy Protocol Stack RenesasBLE (for Android) Application	R01AN3015
Bluetooth® Low Energy Protocol Stack RenesasBLE (for iOS) Application	R01AN3016

- Download page: <https://www.renesas.com/products/microcontrollers-microprocessors/r178/r178g1x/r178g1d.html>

2.2 Installing

This section describes how to install the software obtained by following the directions in the previous section.

2.2.1 Installing the e² studio

Execute the installer for the e² studio integrated development environment, and install it (the e² studio main unit and individual components) by following the directions on the screen.

Checking on “Renesas Smart Help” on the selection screen of components for the e² studio during setup before installation selects inclusion of the Smart Browser. This allows you to download documents (User’s Manuals and so on) for Renesas products directly from the e² studio window.

- Refer to: <https://www.renesas.com/su>

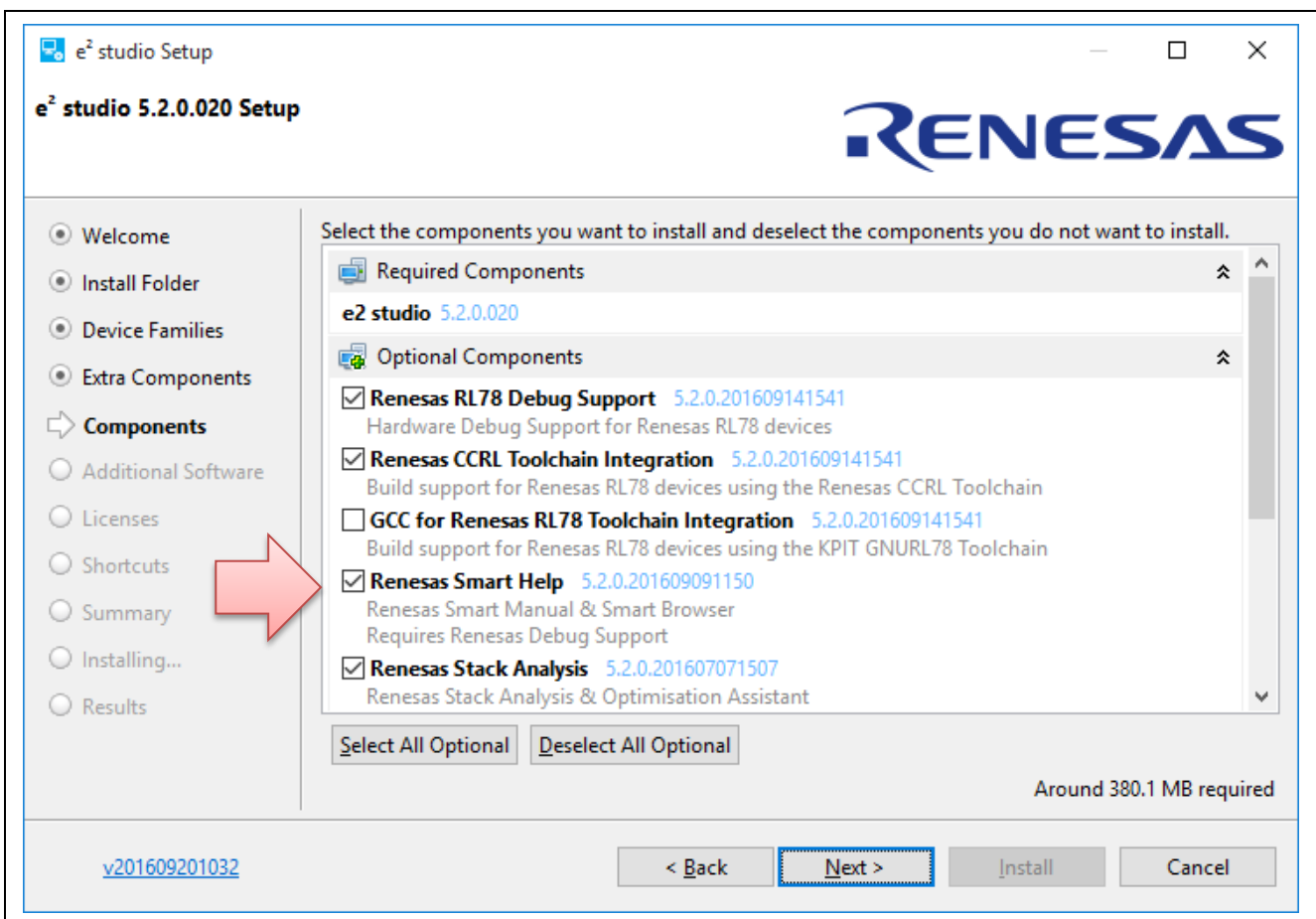
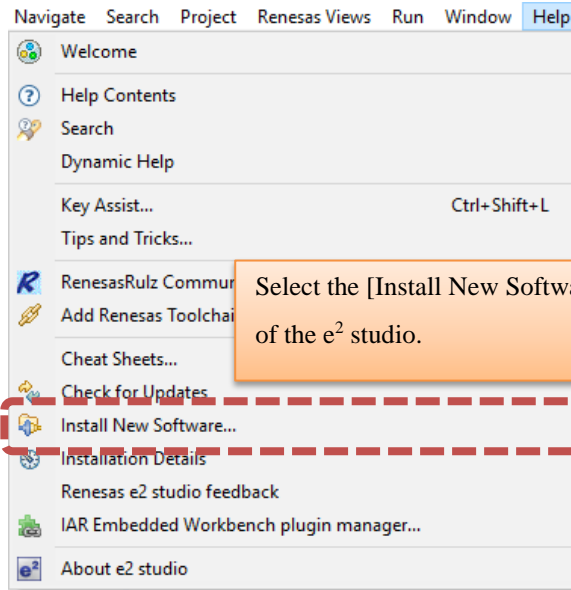


Figure 2-1 e² studio Setup: Selection Screen of Components

2.2.2 Installing the QE for BLE

Install the QE for BLE with the following directions.

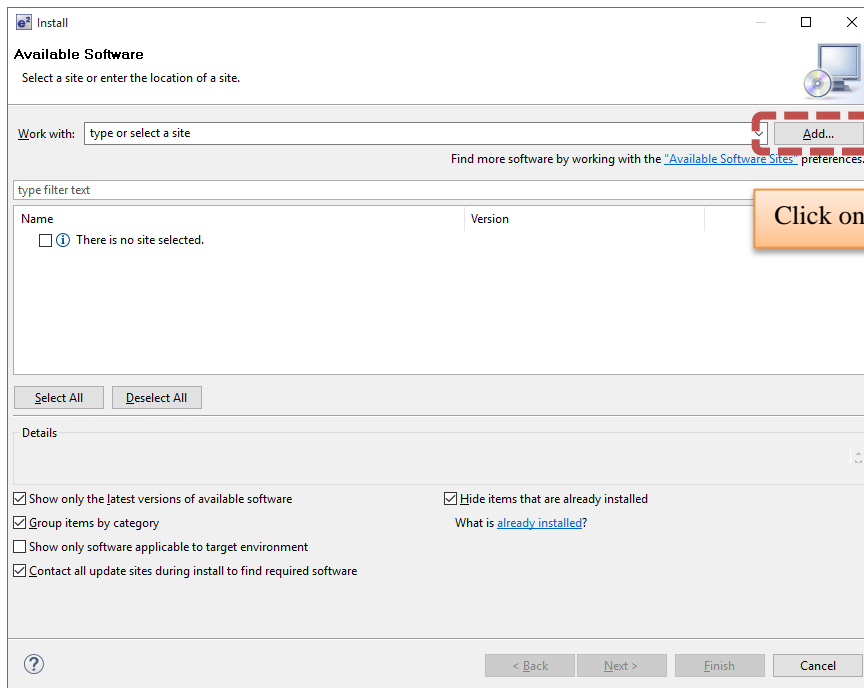
Step 1



Select the [Install New Software] item from the [Help] menu of the e² studio.



Step 2



Click on the [Add] button.



Step 3

Step 4

Name	Version
<input checked="" type="checkbox"/> Renesas QE	
<input checked="" type="checkbox"/> Renesas QE common	1.0.0.201602011351
<input checked="" type="checkbox"/> Renesas QE for Bluetooth Smart	1.0.0.201602251158

Continue through the procedures of the security warning message and trust certificate, then restart the e² studio.

Figure 2-2 Installing QE for BLE (Outline)

Installation (detailed description)

1. Start e² studio V4.1.0 (or a later version).
2. From the [Help] menu, select [Install New Software...] to open the [Install] dialog box.
3. Click on the [Add...] button to open the [Add Repository] dialog box.
4. Click on the [Archive] button, select the zip file for installation in the opened dialog box, and click on the [Open] button.
5. Click on the [OK] button in the [Add Repository] dialog box.
6. Select the [Renesas QE for Bluetooth Smart] check box displayed in the [Install] dialog box and click on the [Next] button.
7. Check that [Renesas QE for Bluetooth Smart] is selected as the target of installation, and click on the [Next] button.
8. After confirming the license agreement, select the [I accept the terms of the license agreement] radio button, and click on the [Finish] button.
9. A security warning message will appear; click on the [OK] button to continue installation.
10. If the dialog box for the trust certificate is displayed, check that certificate and click on the [OK] button to continue installation.
11. When prompted to restart the e² studio, restart it.

2.2.3 Installing the GUI tool

Decompress the package of the GUI tool and copy it to a folder of your choice. The configuration of files and folders after installation is shown below. Compare your installation against this to see if any files are missing.

```
an-r01an2469jj0112-gldguitool-apl
├r01an2469jj0112-gldguitool.pdf  Application Note: GUI Tool
├rBLE_Tool                      Executable files
│  └rBLE_Tool.exe              GUI tool executable program for Windows PCs
│  └rBLE_Tool.ini              INI file for the GUI tool
└rBLE_Tool_Err_Msg.tbl         Definition file for error messages
```

2.2.4 Installation of Visual C++ Redistributable

Execute the installer you have downloaded for Visual C++ Redistributable for Visual Studio 2012, Update 4, by following the directions on the screen.

Note: The GUI tool is a 32-bit application. Download Visual C++ Redistributable (VSU4\vc redistrib_x86.exe) for 32-bit versions (x86) even if you are using a 64-bit version of Windows.

3. Using the Tool

3.1 Connecting the RL78/G1D evaluation board

Connect the RL78/G1D evaluation board and your Windows PC with a USB cable. Write the Bluetooth® low energy protocol stack (hereafter, it is referred to as BLE software in this section), which has a modem configuration, to the RL78/G1D evaluation board in advance.

Connecting the RL78/G1D evaluation board to your PC may require a device driver for the FT232RL, which is a UART-USB conversion IC. Obtain the driver from the site of Future Technology Devices International Ltd if you need it.

- Download page: <http://www.ftdichip.com/Drivers/D2XX.htm>

Note: Download the x86 (32-bit) or x64 (64-bit) device driver depending on your version of Windows.

To check whether the RL78/G1D evaluation board is properly connected, display the Device Manager of your Windows, and check that USB Serial Port (COM**) is displayed under [Ports (COM & LPT)]. Take a note of the port number of “COM**” for that serial port. While it is shown as “COM3” in the following example, it will not always be shown as COM3 on your PC since the number depends on the environment.

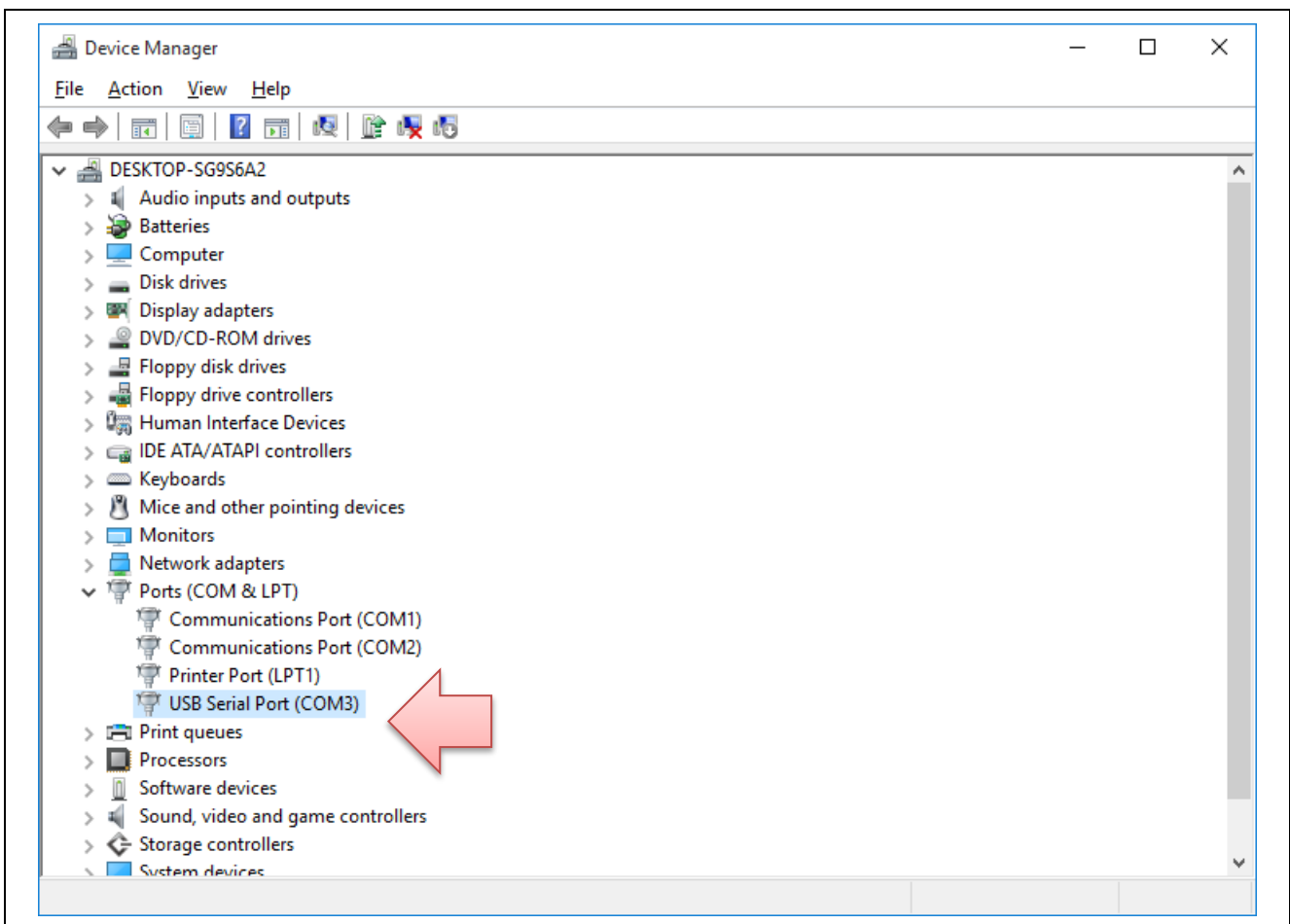


Figure 3-1 Screen of Windows Device Manager

3.2 Activating the tool

3.2.1 Launch the GUI tool

Activate “rBLE_Tool.exe” which is in the folder where the executable file is stored. The files listed below are essential to run this GUI application. Thus, make sure all of these files are in the same folder.

Table 3-1 GUI Tool Files

File name	Description
rBLE_Tool.exe	GUI tool executable program for Windows PC
rBLE_Tool.ini	INI file for the GUI tool
rBLE_Tool_Err_Msg.tbl	Definition file for error messages

Note: If the INI file is not present, the GUI tool will automatically create it after you close the tool.

Once the GUI tool application is open, the [Serial port settings] dialog box window shown below pops up. Select the appropriate serial com port that is connected with the RL78/G1D evaluation board and set the baud rate. Next, click on the [OK] button to confirm the setting. The dialog box will then close. If you are using a UART 2-wire branch connection, check the [UART 2-wire with Branch Connection] check box.

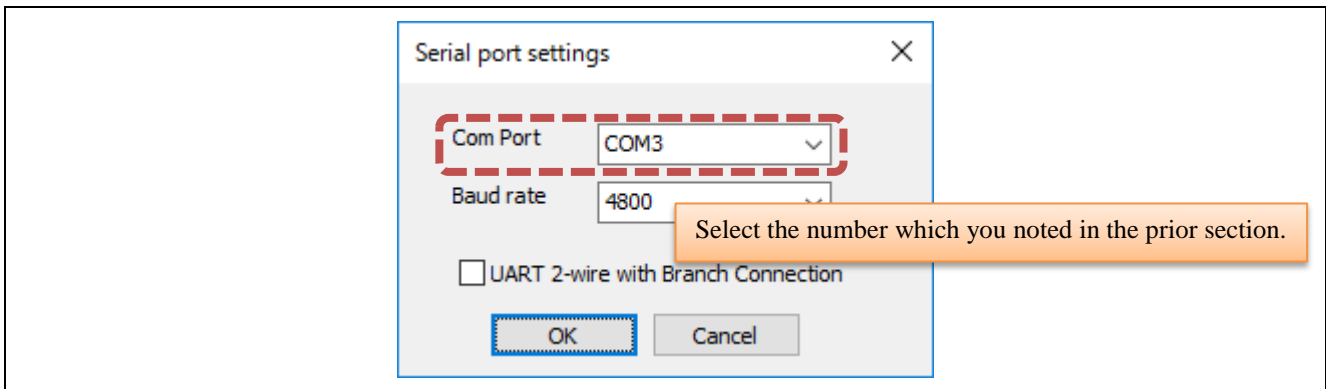


Figure 3-2 Serial Port Setting

Note: Specify the correct baud rate in the GUI to match the BLE software baud rate. In the modem configuration, the default baud rate is 4800 bps.

After making the correct baud rate and serial port settings, the GUI tool will initiate communications with the BLE software that runs on the RL78/G1D. The GUI tool has two dialog boxes: the main [rBLE_Tool] pane and the [Log] pane. They are shown below.

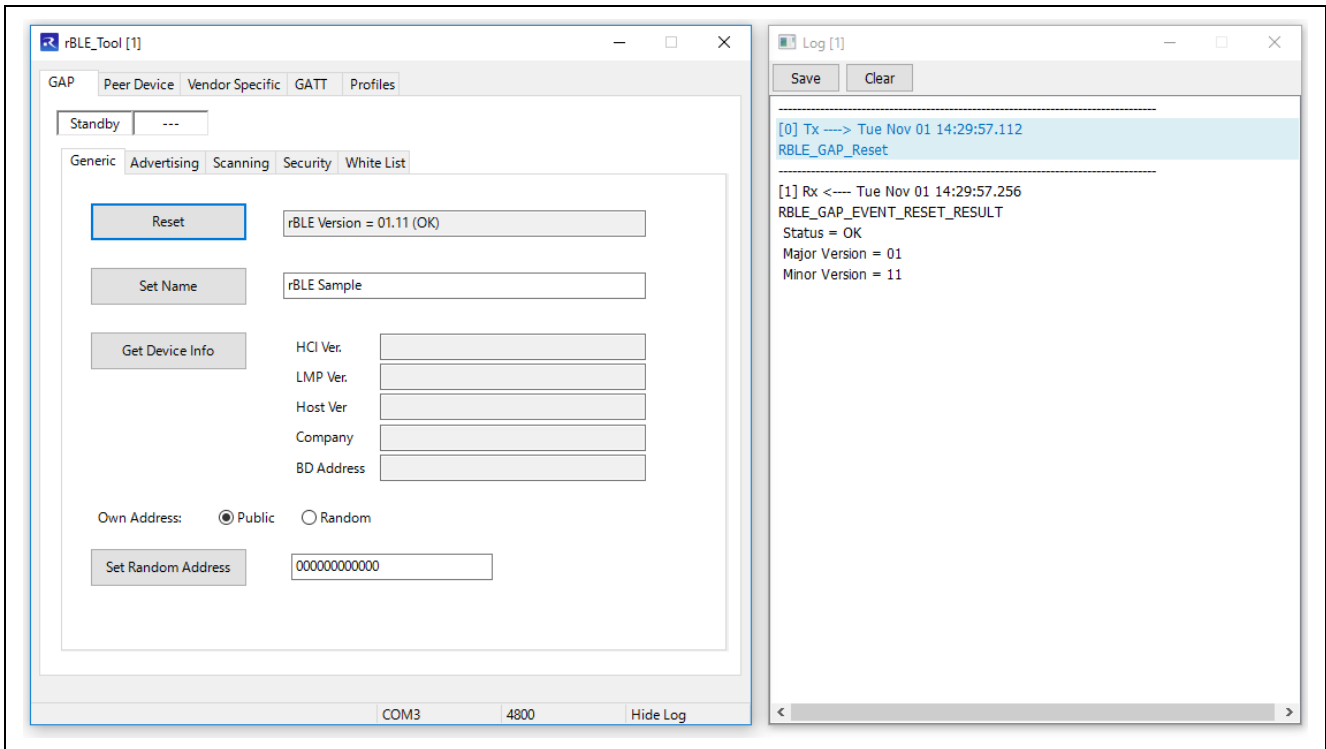


Figure 3-3 Main and Log Panes

3.2.2 Activating the e² studio

Select e² studio from the shortcut menu in the start menu of Windows, or activate “e2 studio.exe” which is in the folder where it was installed (or under “C:\Renesas\e2_studio\eclipse” by default).

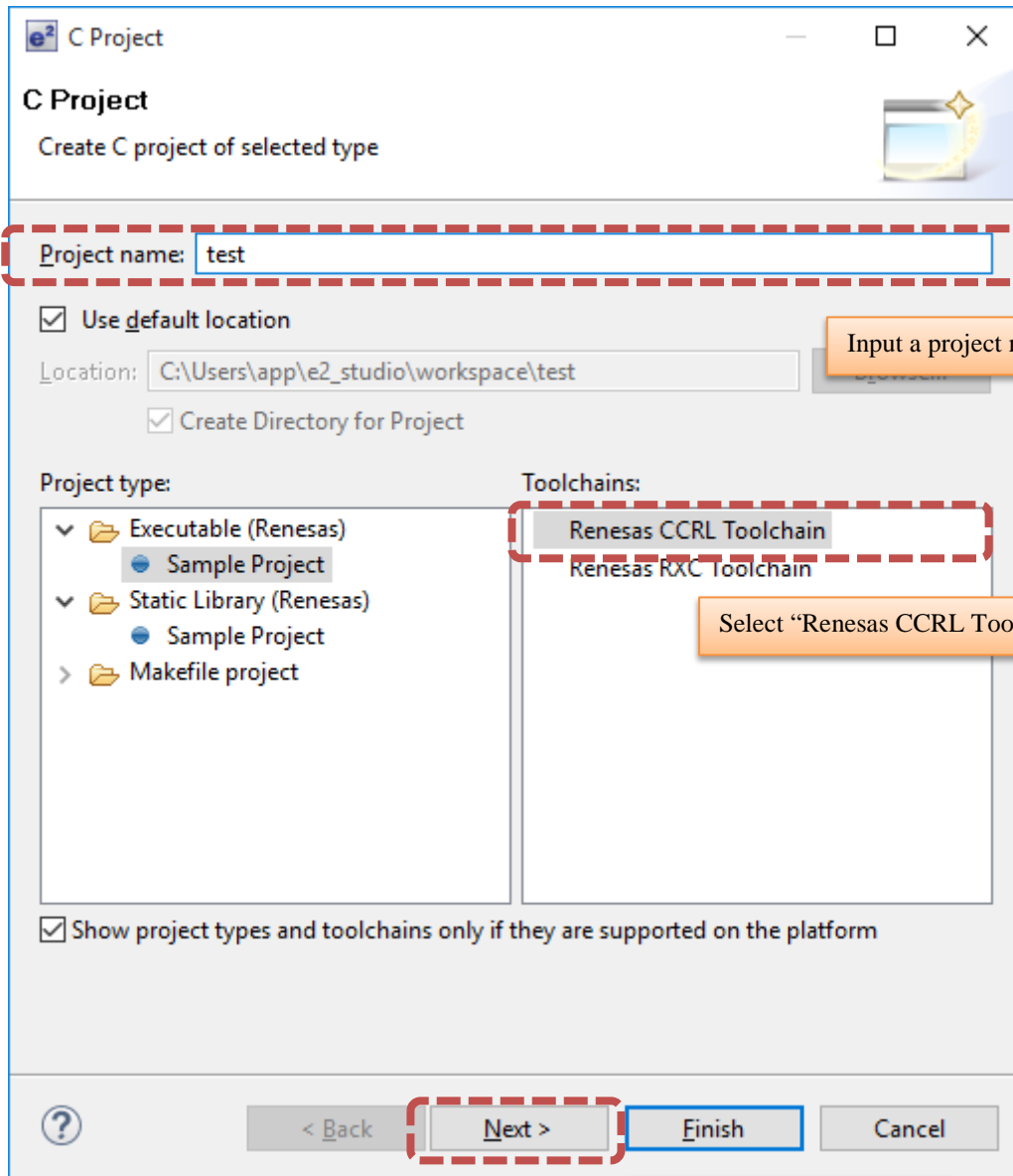
3.3 Creating a project

To create a project with the e² studio, open the wizard to do so by either of the following methods.

- Select the [C Project] menu item from [New] in the [File] menu in the menu bar at the top of the e² studio.
- Select the [C Project] menu item from [New] in the pop-up menu of the [Project Explorer] view.

Operate as follows in the displayed wizard dialog.

Step 1



Input a project name

Select "Renesas CCRL Toolchain"

Click on the [Next>] button



Step 2

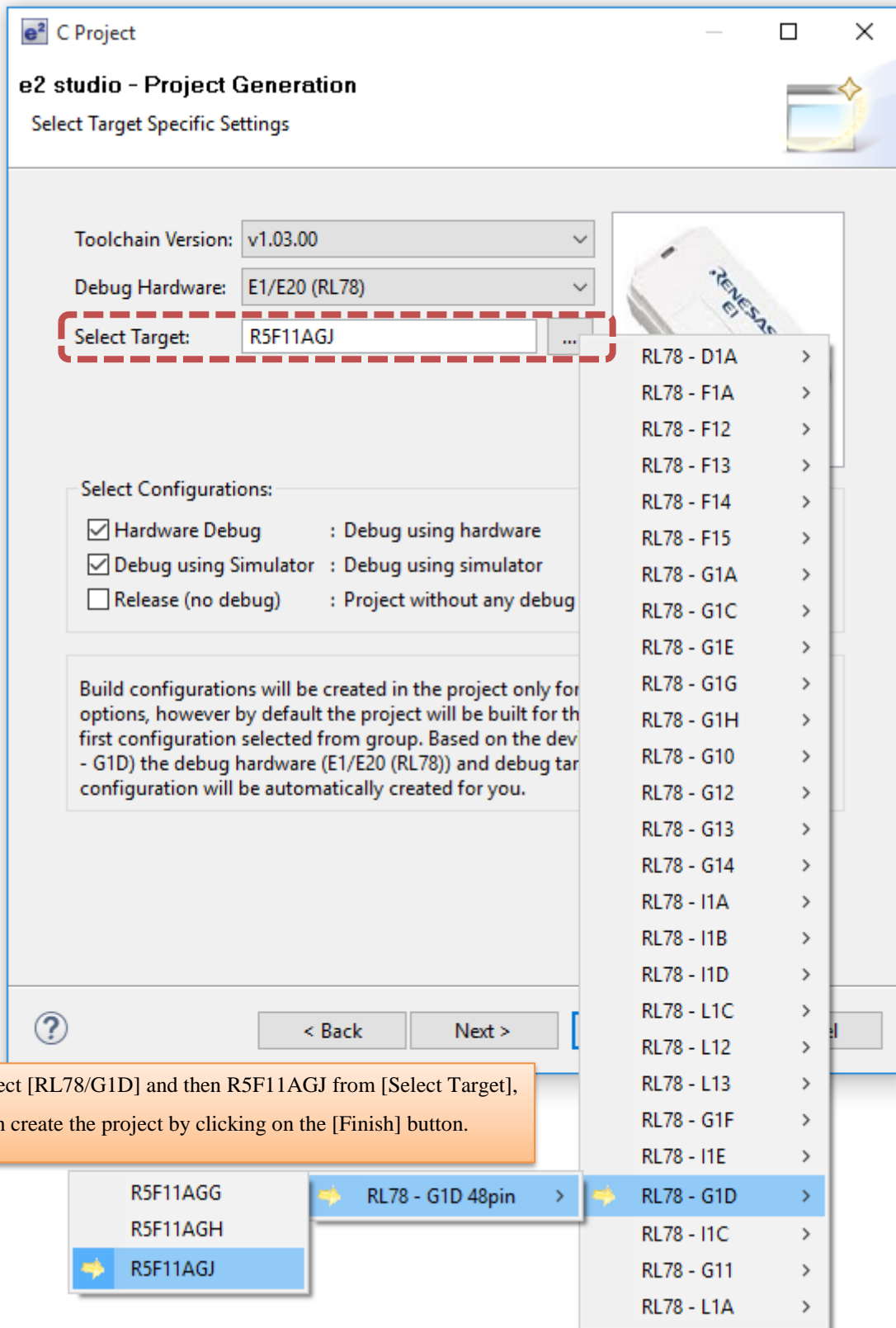


Figure 3-4 C Project Creation Wizard

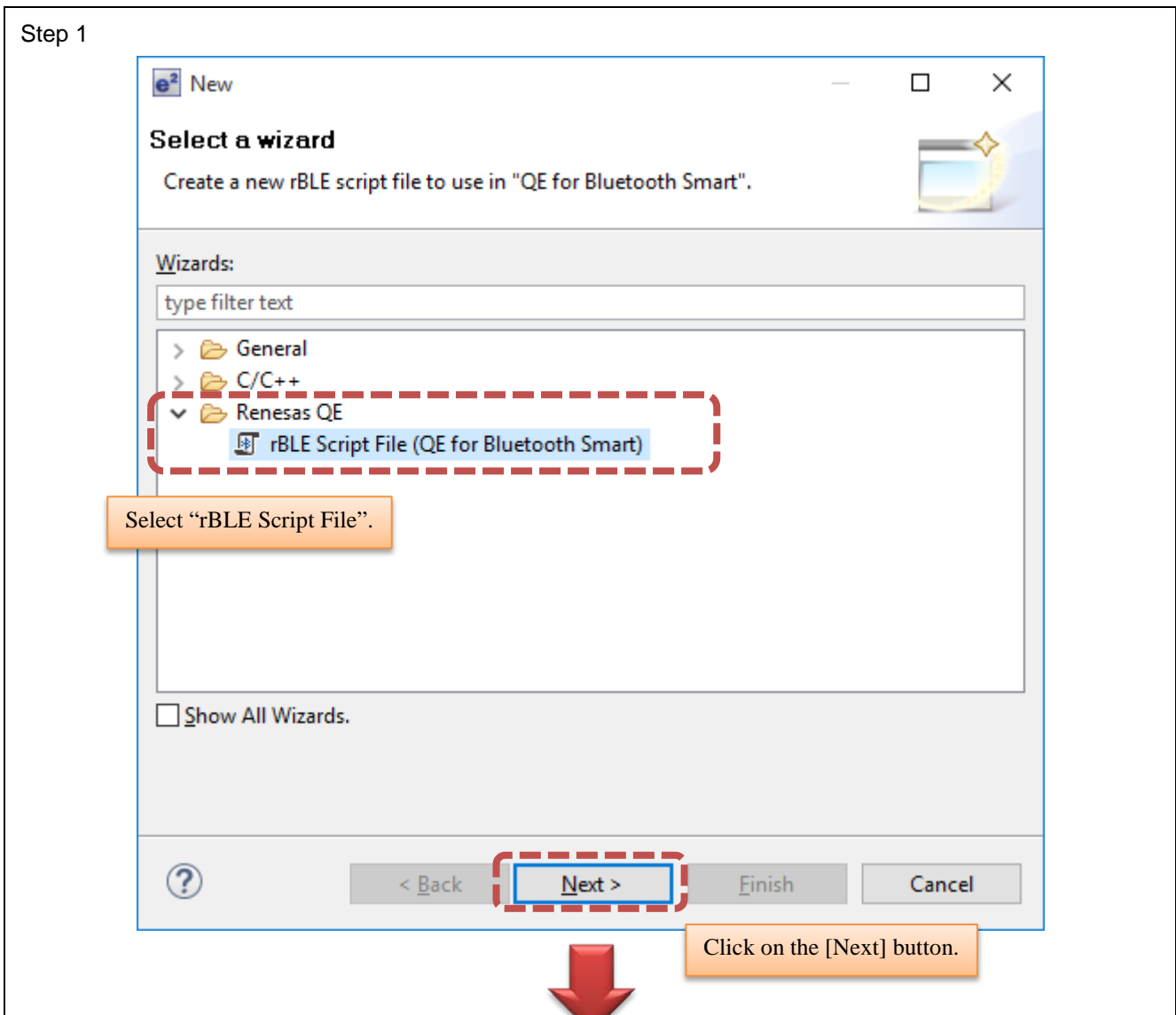
3.4 How to use rBLE script files

3.4.1 Creating a new file

To create a new rBLE script file, open the wizard through either of the following methods.

- Select the [Other] menu item from [New] in the [File] menu in the menu bar at the top of the e² studio.
- Select the [Other] menu item from [New] in the pop-up menu of the [Project Explorer] view.

Operate as follows in the displayed wizard dialog.



Step 2

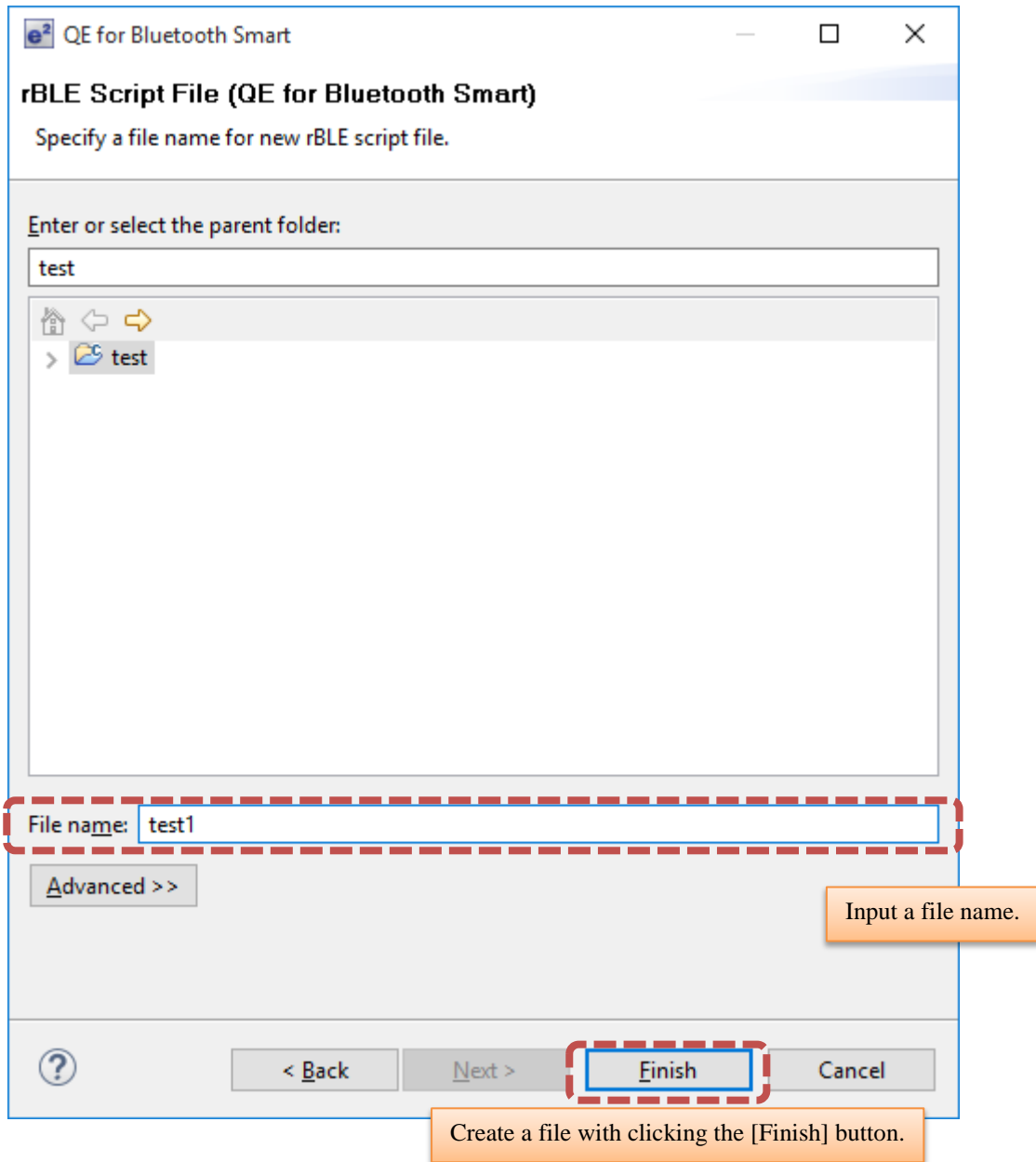


Figure 3-5 File Creation Wizard

Creating a new file (detailed description)

1. Select the [Other] menu item from [New] in the [File] menu of the e² studio, and open a [New] dialog.
2. Select [rBLE Script File (QE for Bluetooth Smart)] under [Renesas QE], and click on the [Next>] button.
3. After selecting the parent folder as the destination for the file, input the file name and click on the [Finish] button.

3.4.2 Importing an existing file

You can import an existing rBLE script file to a project through either of the following methods.

- Dragging and dropping the file
- Using a wizard

Dragging and dropping the file

Drag the target file from Windows Explorer to the e² studio window, and drop it under the node which shows projects in the [Project Explorer] view of the e² studio.

After the file is dropped, the [File Operation] dialog box is displayed. Select [Copy files].

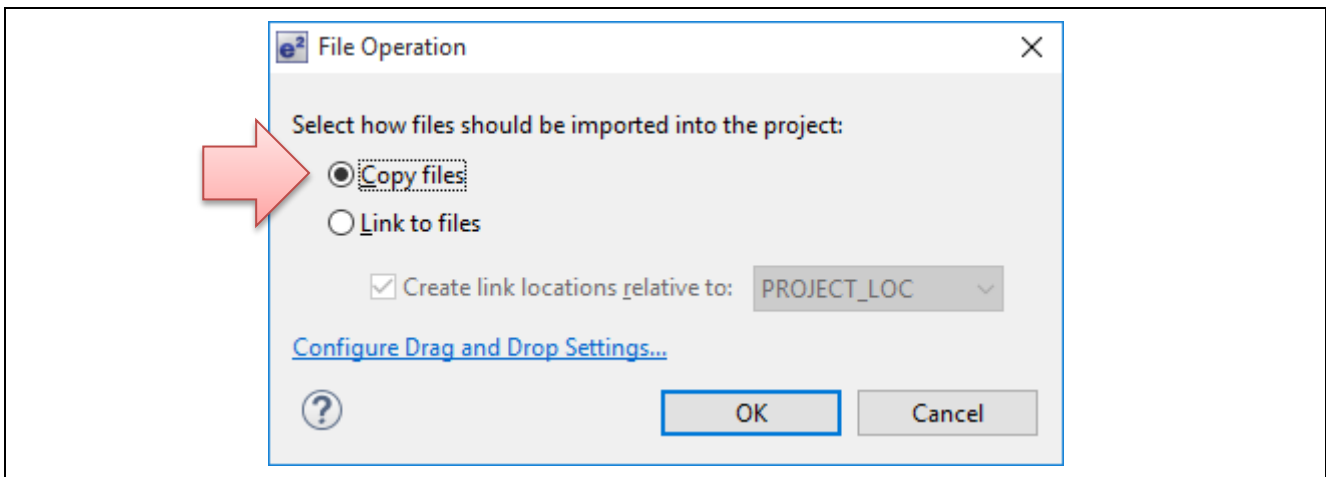


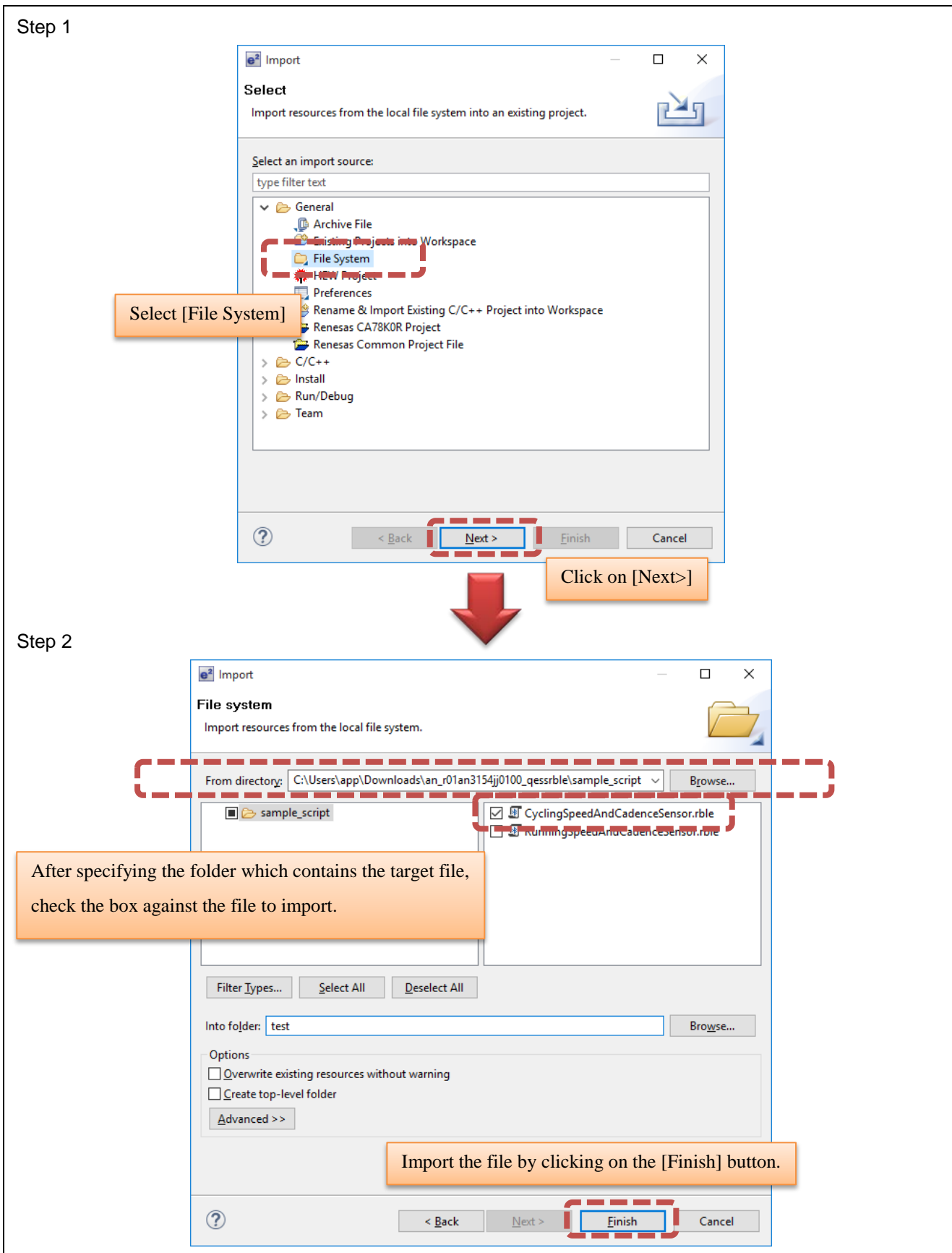
Figure 3-6 [File Operation] Dialog Box after Dropping a File

Using the wizard

Open the wizard through either of the following methods.


- Select [Import] from the [File] menu of the main menu bar at the top of the e² studio.
- Select [Import] from the pop-up menu of the [Project Explorer] view.


Operate as follows in the displayed wizard dialog.



3.5 Using the rBLE script editor

3.5.1 Opening the editor window

To open the editor, double-click on an rBLE script file in the [Project Explorer] view. An rBLE script file has “.rble” as the filename extension, and is displayed with the icon  in the [Project Explorer] view.

To check whether the editor which was opened by double-clicking on the filename is the rBLE script editor or not, refer to the tabbed page of the editor. The description on the tab being “ filename (QE)” means that the rBLE script editor has been opened. Since the e² studio’s general text editor may have been opened if this is not the case, try reopening the target file through the following method.

1. In the [Project Explorer] view, select the rBLE script file which is the target.
2. Select the [rBLE script editor] menu item from [Open from the Application] from the pop-up menu.

The rBLE script editor provides functions which are optimized for editing rBLE script files. The following sections describe those functions.

3.5.2 Highlighting

In the rBLE script editor, scripts are colored and highlighted by category depending on the input token (words and phrases: the minimum unit is one word).

Table 3-2 List of the Highlighted Categories

Category	Description
Default	Letters are not highlighted.
#comment	From # in single-byte character coding to the end of the line.
<i>Reserved word</i>	The word functions as a script instruction.
rBLE command	The word is a command supported by the API of the BLE protocol stack.
rBLE event	The word indicates the notification of an event by the BLE protocol stack.
“character string”	A section enclosed by “ ” in single-byte character coding.

Refer to the help system that accompanies QE for BLE for rBLE script specifications such as a list of the reserved words that can be entered in the rBLE script editor. To produce the help system, click on the [F1] key while the rBLE script editor is active.


3.5.3 Autocompletion

The rBLE script editor provides an autocomplete window, which lists predicted rBLE commands or events in alphabetical order. Display the autocomplete window in the following way.

- Press [Ctrl] and [Space] in the editor.
- Input “rble” in the editor (not case-sensitive).

The predictions are displayed after filtering out the rBLE command or event names starting with the character string that has already been in place up to the position of the cursor (the position to which the word has been inserted).

Table 3-3 Autocomplete Window: Type of Prediction

Icon	Type of prediction
	rBLE command
	rBLE event

In the autocomplete window, use the up and down cursor keys to select a word from among the predictions, and select one by pressing the [Enter] key. The rBLE command or event will then be added to the given line in the editor. You can also narrow down the list of predictions by inputting letters as desired while the autocomplete window is being displayed.

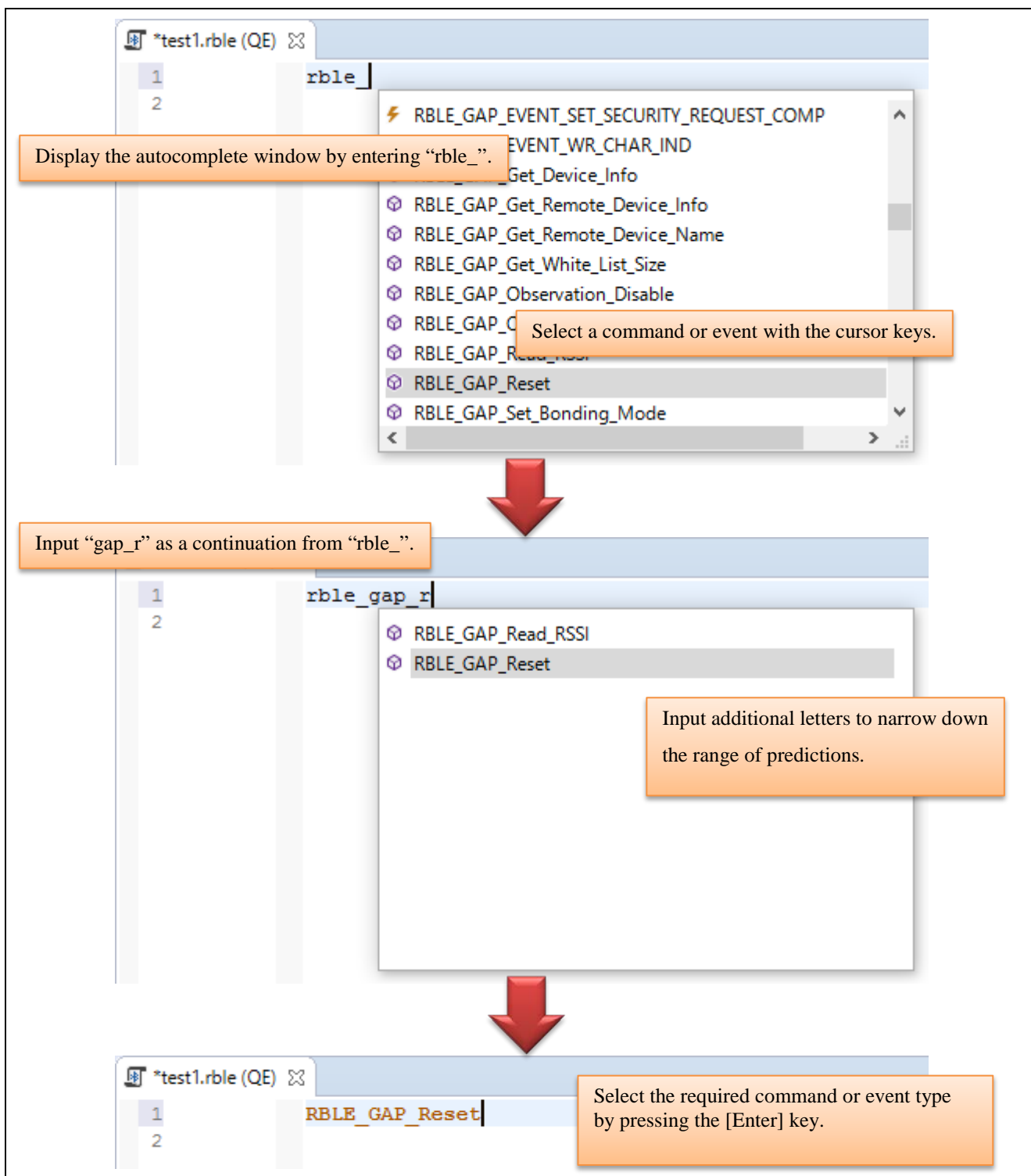


Figure 3-8 Autocomplete Window

For the list of rBLE commands or event types and arguments, refer to section 6 “rBLE Commands” or 7 “rBLE Events” in the *Bluetooth® low energy Protocol Stack rBLE Command Specification* (document no: R01AN1376). Note that the interpreter for rBLE commands and event types written in rBLE scripts is case-sensitive.

3.5.4 Outline of the rBLE script specification

An rBLE script controls (in a modem configuration) the BLE software from Renesas that has been written to the RL78/G1D evaluation board. Along with issuing rBLE commands and reception of rBLE events, scripts support the four basic arithmetic operations and control over execution (recursion and conditional branching).

Refer to the help system that accompanies QE for BLE for details of the rBLE script specifications. To produce the help system, press the [F1] key while the rBLE script editor is in scope. The issuing of rBLE commands and reception of rBLE events are described below and on the next page.

Issuing rBLE commands

An rBLE command is issued (called) by a call instruction. For example, to reset the GAP (Generic Access Profile) enter the RBLE_GAP_Reset rBLE command in the way shown below. Since nothing is specified as the data format for RBLE_GAP_Reset in the rBLE Command Specification, the statement does not take any arguments.

```
call RBLE_GAP_Reset
```

To issue an rBLE command, you need to write the rBLE command and arguments following a call instruction. Neither can be omitted. For example, the rBLE command RBLE_GAP_Set_Bonding_Mode is used to set a bonding mode. In the data format of the rBLE Command Specification, since the mode is written in both octet0 and octet1, it means there is one 16-bit wide argument. Hence, this command will be entered in the following way in an rBLE script.

```
call RBLE_GAP_Set_Bonding_Mode 0x0200
```

Reception of rBLE event notifications

An rBLE event notification is received (waited) by placing a wait instruction before the event type. For example, to receive notification of the event of the GAP having been reset, use RBLE_GAP_EVENT_RESET_RESULT as an rBLE event. Write waits for event notifications in rBLE scripts as follows.

```
wait RBLE_GAP_EVENT_RESET_RESULT status, major, minor  
  
# If you do not use the return values from the event.  
wait RBLE_GAP_EVENT_RESET_RESULT
```


You need to write the wait instruction followed by the name of the rBLE event and the return value of the rBLE event. If you do not use the return value or values of an rBLE event, you can omit the statement of the return values, as in the example above. When both the name and return values of an rBLE are omitted, the type of rBLE event does not matter, and this function causes the script to continue to wait until any rBLE event is received.

Note: Omitting only the name or only one or some return values of an rBLE event is not acceptable for a wait instruction.

3.6 Running and stopping rBLE scripts

3.6.1 Running a script

Run an rBLE script through either of the following methods.

- Click on the [] button in the toolbar at the top of the e² studio.
- Select [Run rBLE script (QE)] from [Run] on the e² studio's main menu.

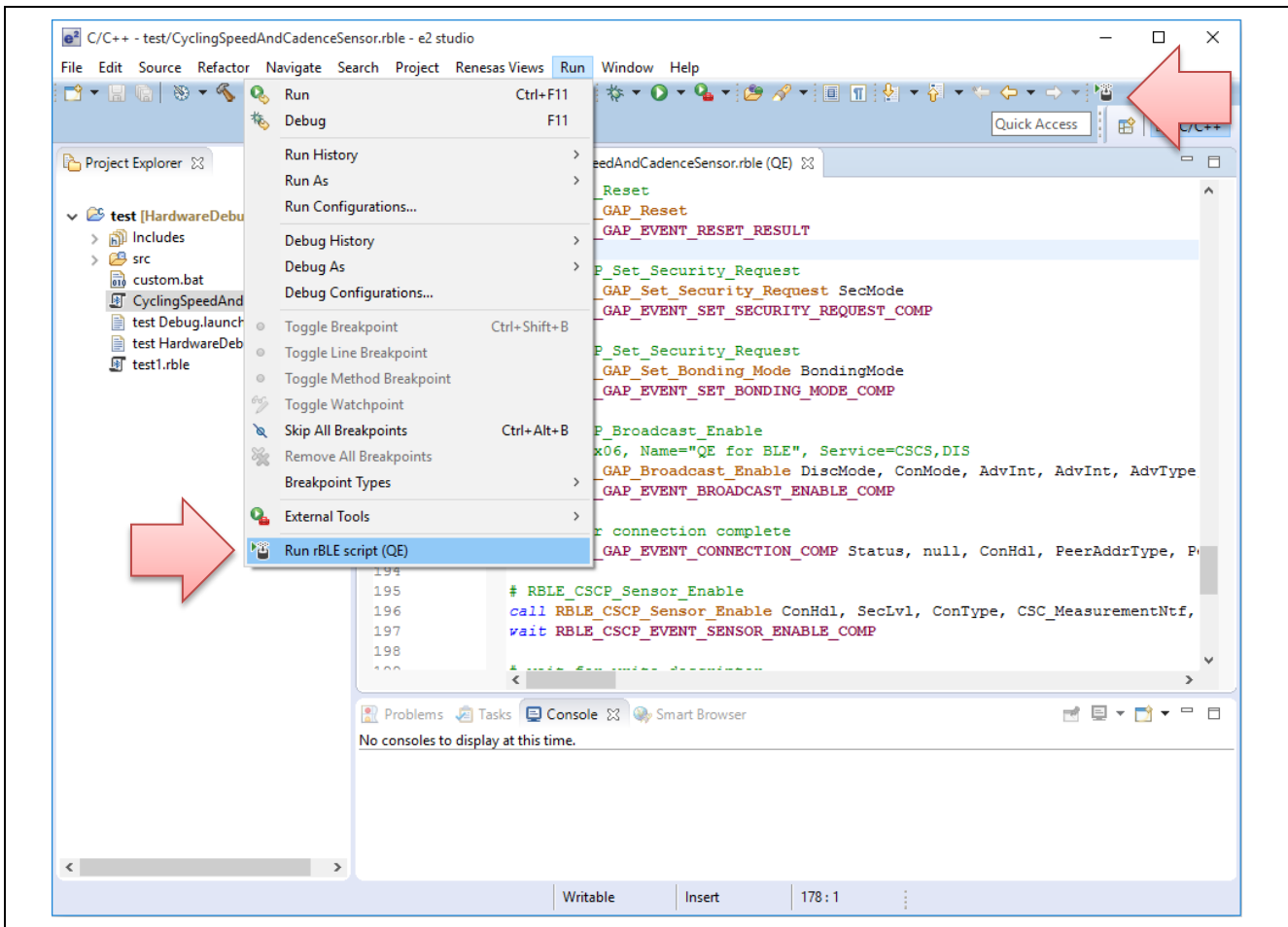




Figure 3-9 Running an rBLE Script

Running an rBLE script does not require storage of the statements in the rBLE script editor in a file. Running an rBLE script while it is being edited still processes the contents (the contents immediately before execution) of the editor. The file is not saved at this time.

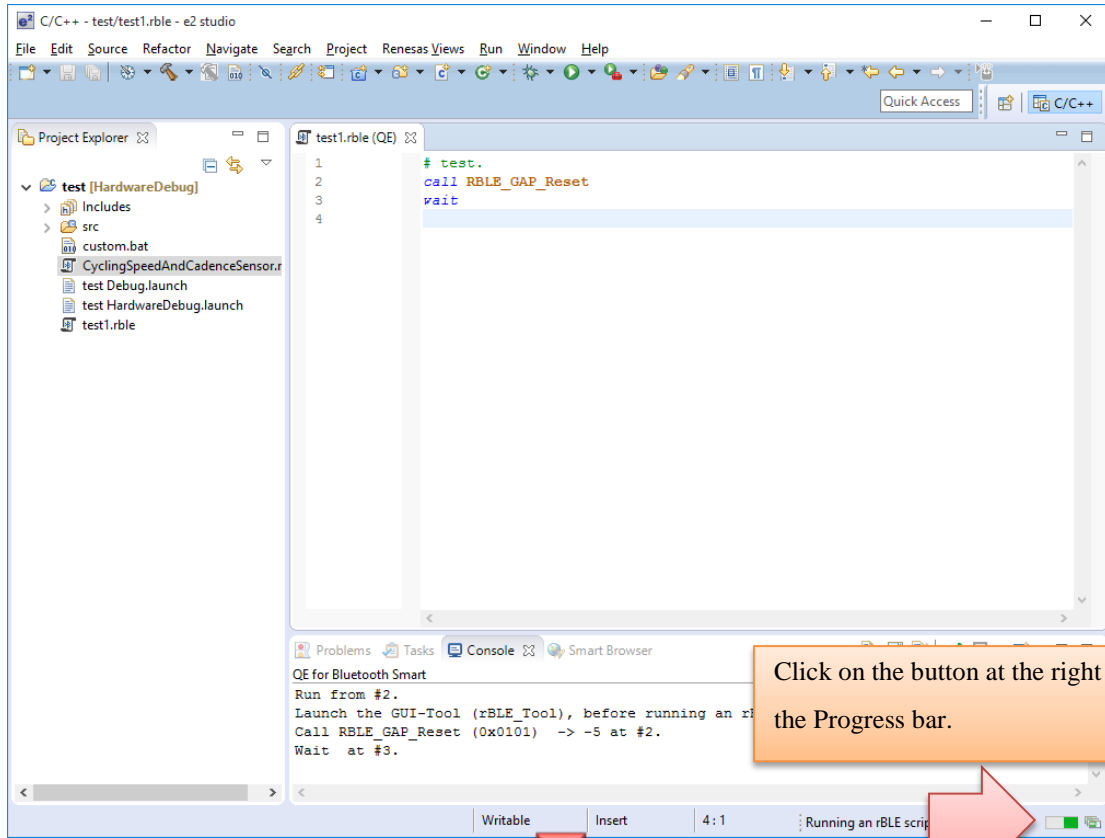
An RL78/G1D evaluation board to which the BLE software and Bluetooth® low energy protocol stack GUI tool have been written is required for Bluetooth®-specification communications by this tool. You need to activate the GUI tool (rBLE_Tool.exe) before executing an rBLE script.

3.6.2 Stopping a script

Stop the rBLE script with following method.

1. Click on the [] button near the right end of the status bar at the bottom of the e² studio window to open the [Progress] view.
2. Click on the [] button across from the message “Running an rBLE script” in the [Progress] view.

Step 1



Step 2

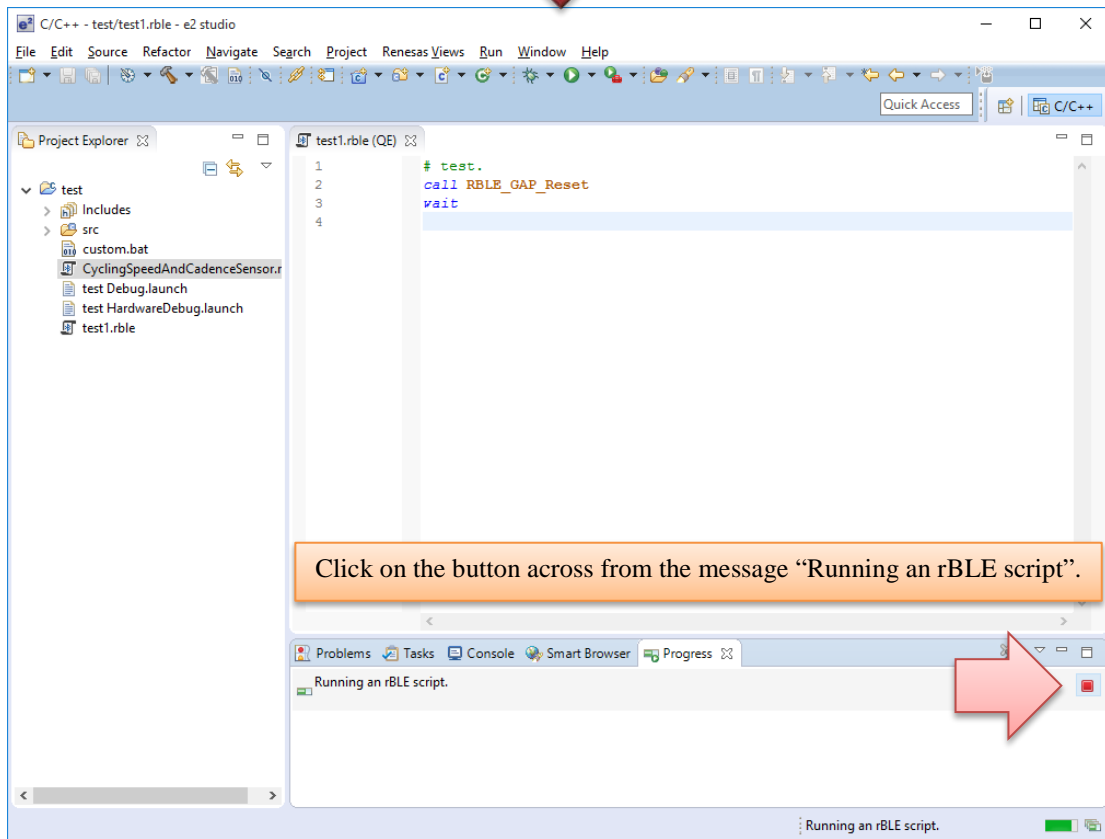


Figure 3-10 Stopping an rBLE Script

3.6.3 Sample scripts and the RenesasBLE application

Sample scripts that are executable with the rBLE script function of this tool is available on the Renesas Web site.

Table 3-4 List of the Documents Related to Sample Script

Document name	Document number
QE for Bluetooth Smart Sample Script for RenesasBLE	R01AN3154
Bluetooth® low energy Protocol Stack RenesasBLE (for Android) Application	R01AN3015
Bluetooth® low energy Protocol Stack RenesasBLE (for iOS) Application	R01AN3016

The following rBLE script files are included in the downloadable file of sample scripts. To use the files with this tool, import them to an e² studio project after decompressing the zip file which you have downloaded.

- RunningSpeedAndCadenceSensor.rble : RSCP (Running Speed and Cadence Profile) – Sensor Role
- CyclingSpeedAndCadenceSensor.rble : CSCP (Cycling Speed and Cadence Profile) – Sensor Role

You can easily check the operation of the connection between your smartphone or tablet and the RL78/G1D evaluation board by running these sample scripts. Since the RenesasBLE application is made available, you can use these sample scripts to check its coordination with applications on smartphones.

- RenesasBLE
 - For Android: <https://play.google.com/store/apps/details?id=com.renesas.ble&hl=en>
 - For iOS: <https://itunes.apple.com/us/app/renesasble/id1073878076?mt=8>

Notes 1. Refer to the related documents for installation and how to run the applications with smartphones.
2. Use Bluetooth®-equipped smartphones or tablets which support v4.0 or a later version of the Bluetooth specification.

The relations between the RL78/G1D evaluation board on which the sample script is run and the smartphone on which RenesasBLE is run are as follows. RSCP is taken as the profile, but the roles are the same for CSCP.

Table 3-5 Relations between Devices

	GAP role	Profile role
RL78/G1D evaluation board	Peripheral	RSCP – Sensor
Smartphone	Central	RSCP – Collector

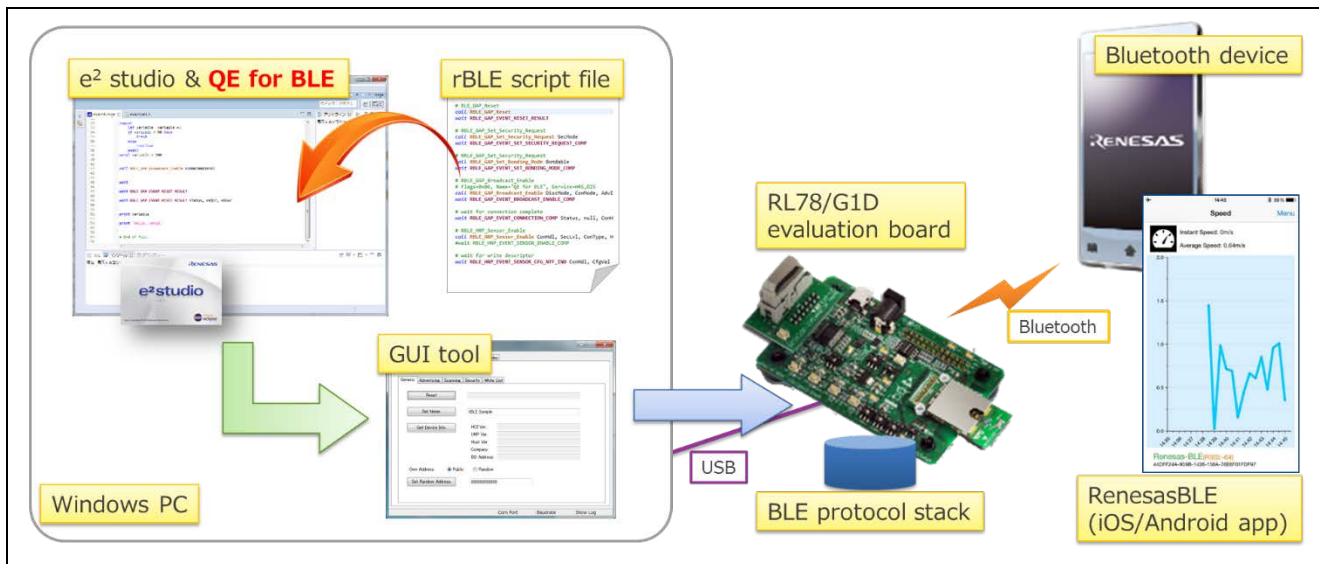


Figure 3-11 Configuration of the Overall Setup (for Running the Sample Scripts)

4. Notes on Usage

4.1 Programming the RL78/G1D evaluation board

To write a program to the RL78/G1D evaluation board, you will need an E1 emulator and V3 of the RFP (Renesas Flash Programmer), a flash programming tool. The system configuration for programming is as follows.

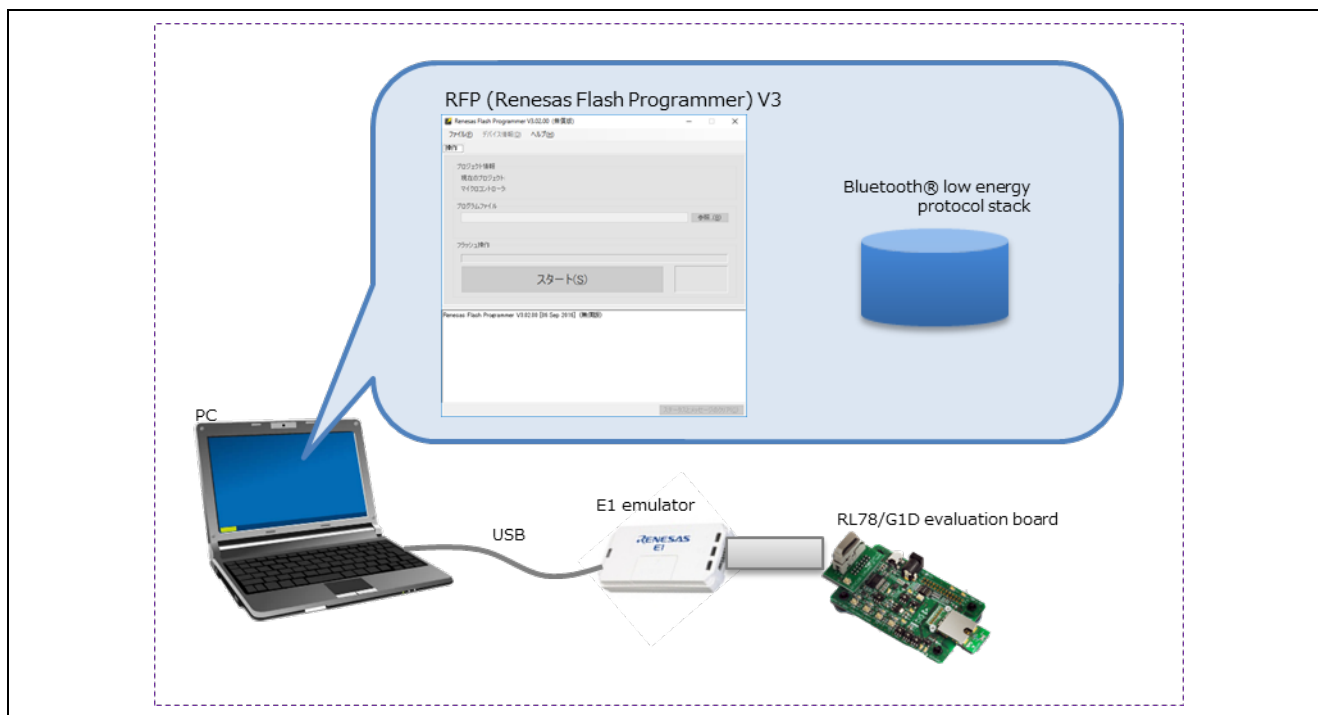


Figure 4-1 System Configuration for Programming

There are several ways to provide power to the RL78/G1D evaluation board. The above configuration is an example of the case where the E1 emulator provides 3.3-V power. There are other ways to provide power; e.g., providing USB VBUS 5-V power through a separate USB cable from a PC to the RL78/G1D evaluation board.

You can change the way power is supplied by setting the slide switch on the top surface of the RL78/G1D evaluation board. Refer to the *RL78/G1D Preliminary User's Manual: Evaluation Board* (document no: R30UZ0048) for the details.

Using this tool requires that you write the Bluetooth® low energy protocol stack for operation in a modem configuration (referred to as “BLE software” in the remainder of this section) to the RL78/G1D evaluation board.

We have included programs for use in evaluation in the installation file for the BLE software, although you can, of course, write your own code. Select a program file which is suitable for the purposes of your evaluation from the folder indicated below and use the RFP for programming.

- <Install folder>\Renesas\BLE_Software_Ver_X_XX\RL78_G1D\ROM_File\ccr1\Modem\

For example, if you want to try a sample script file for the RSCP (Running Speed and Cadence Profile), write `RL78_G1D_CCM(LNP,RSCP).hex`, which is stored in the above folder as a built program for evaluation, to the RL78/G1D evaluation board. Refer to the *Bluetooth® low energy Protocol Stack Quick Start Guide* (document no: R01AN2767) or the *Bluetooth® low energy Protocol Stack User's Manual* (document no: R01UW0095) for details.

4.2 Non-supported rBLE commands and events

The following are rBLE commands and rBLE events that QE for BLE V1.0.0 does not support under certain conditions.

- When using Bluetooth® low energy protocol stack V1.10 or a later version prior to V1.20:
 - rBLE commands
 - RBLE_TIP_Server_Write_Data
 - RBLE_VS_Flash_Access
 - RBLE_VS_Set_Params
 - rBLE events
 - BLE_GAP_EVENT_WR_CHAR_IND
 - RBLE_GATT_EVENT_DISC_SVC_INCL_CMP
- When using Bluetooth® low energy protocol stack V1.20:
 - rBLE commands
 - RBLE_GATT_Write_Char_Request
 - RBLE_GATT_Set_Data
 - rBLE event
 - RBLE_SM_LTK_REQ_FOR_ENC_IND

Including an RBLE_SM_LTK_REQ_FOR_ENC_IND rBLE event in an rBLE script produces a syntax error. While including other non-supported rBLE commands or events does not produce a syntax error, the operation is not guaranteed.

5. Troubleshooting

5.1 Tool/board

5.1.1 GUI tool does not boot up

Bluetooth® low energy protocol stack GUI tool is a C++ application which is built with Microsoft Visual Studio 2012. To run it, you need to obtain Visual C++ Redistributable for Visual Studio 2012, Update 4, and install the runtime components.

- Download page: <http://www.microsoft.com/en-us/download/details.aspx?id=30679>

Note: The GUI tool is a 32-bit application. Download Visual C++ Redistributable (VSU4\vc redistrib_x86.exe) for 32-bit versions (x86) even if you are using a 64-bit version of Windows.

5.1.2 The RL78/G1D evaluation board does not respond [1]

Open the Device Manager of Windows, and check if the connection of the RL78/G1D evaluation board with your PC is normal.

If “USB Serial Port (COM**)” is not displayed under the node “Port (COM and LPT)” in the Device Manager, obtain and install the device driver for the FT232RL USB-to-UART IC from the site of Future Technology Devices International Ltd.

- Download page: <http://www.ftdichip.com/Drivers/D2XX.htm>

Note: Download the x86 (32-bit) or x64 (64-bit) device driver depending on your version of Windows.

5.1.3 The RL78/G1D evaluation board does not respond [2]

Check the setting of the slide switch on the top surface of the RL78/G1D evaluation board.

Check how power is being provided and that the setting for USB connection has been made with reference to the *RL78/G1D Preliminary User's Manual: Evaluation Board* (document no: R30UZ0048).

Note: When executing the rBLE script function of this tool, disconnect the RL78/G1D evaluation board and E1 emulator.

5.1.4 No response to an rBLE command or event [1]

Check that the Bluetooth® low energy protocol stack GUI tool is active if the response to an rBLE command or event is not as expected even though the rBLE script runs without problems.

Activate V1.10 or a later version of the GUI tool (rBLE_Tool.exe) if it is not active.

Check the version of the GUI tool if it is active. If the version number is 1.09 or lower, download the latest version from the below URL.

- Download page: <https://www.renesas.com/solutions/bluetooth>

5.1.5 No response to an rBLE command or event [2]

Check that the program written to the RL78/G1D evaluation board is the Bluetooth® low energy protocol stack (BLE software), which has a modem configuration, and matches the profile used in the rBLE script (communications protocol as defined for Bluetooth®) in cases of response to an rBLE command or event not being as expected even though the rBLE script runs.

We have programs for evaluation which have been included in the data for the BLE installation. Select a program file which is suitable for the purposes of your evaluation from the below folder, and use V3 of the RFP (Renesas Flash Programmer) flash programming tool to write it to the board.

- <Install folder>\Renesas\BLE_Software_Ver_X_XX\RL78_G1D\ROM_File\ccrl\Modem\

5.2 rBLE scripts

5.2.1 File not created

If you are unable to create new rBLE script files, check if the tool is installed in the e² studio in the following way.

1. Select [Installation Details] from the [Help] menu in the main menu bar at the top of the e² studio, then open the [e² studio Installation Details] dialog box.
2. Check if the item [Renesas QE for Bluetooth Smart] is displayed on the [Installed Software] tabbed page of the [e² studio Installation Details] dialog box.

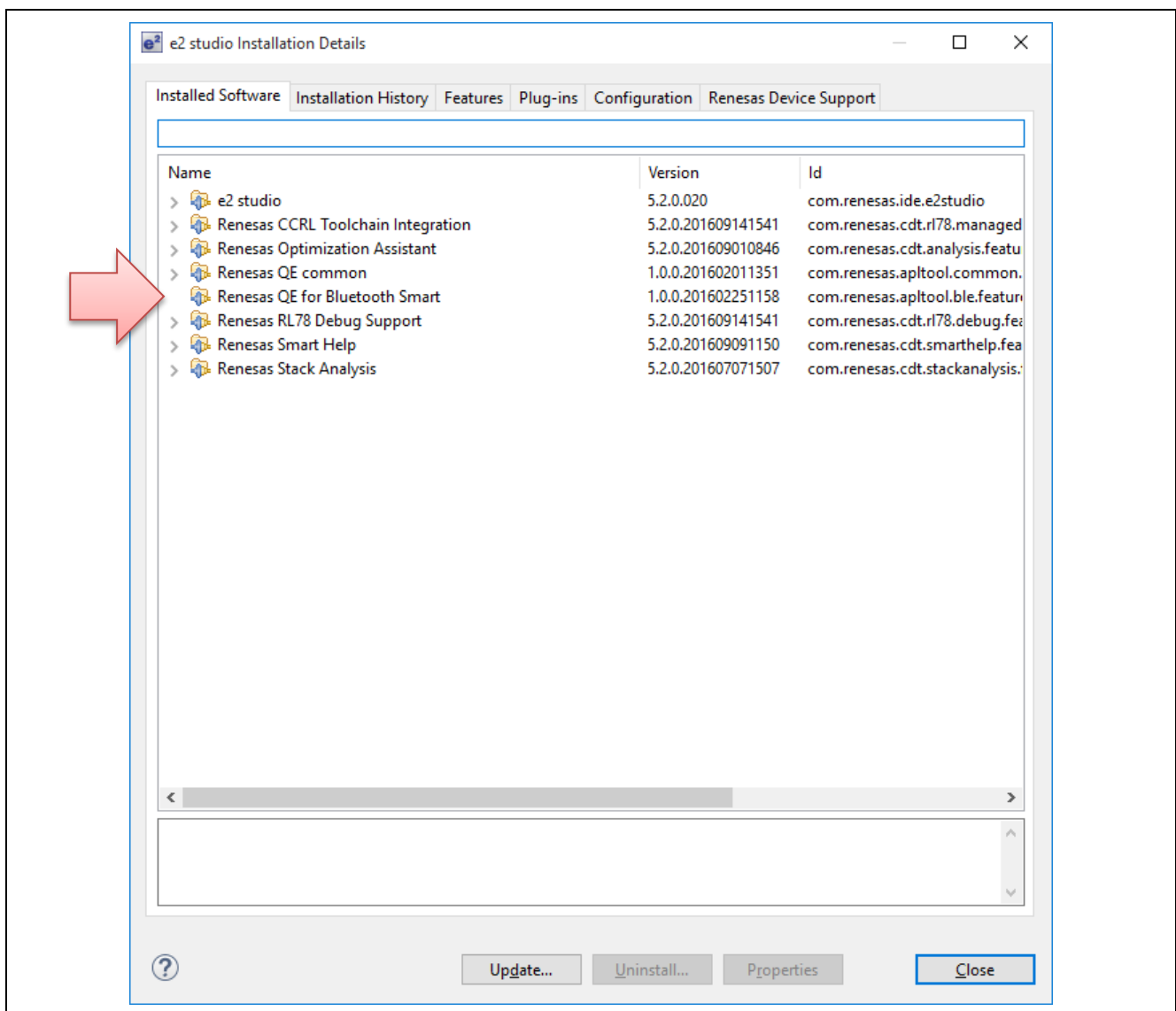


Figure 5-1 [e2 studio Installation Details] Dialog Box

If [Renesas QE for Bluetooth Smart] does not appear in the [e2 studio Installation Details] dialog box, obtain QE for BLE from the URL below and install it.

- Download page: <https://www.renesas.com/qe-ble>

5.2.2 Files cannot be opened [1]

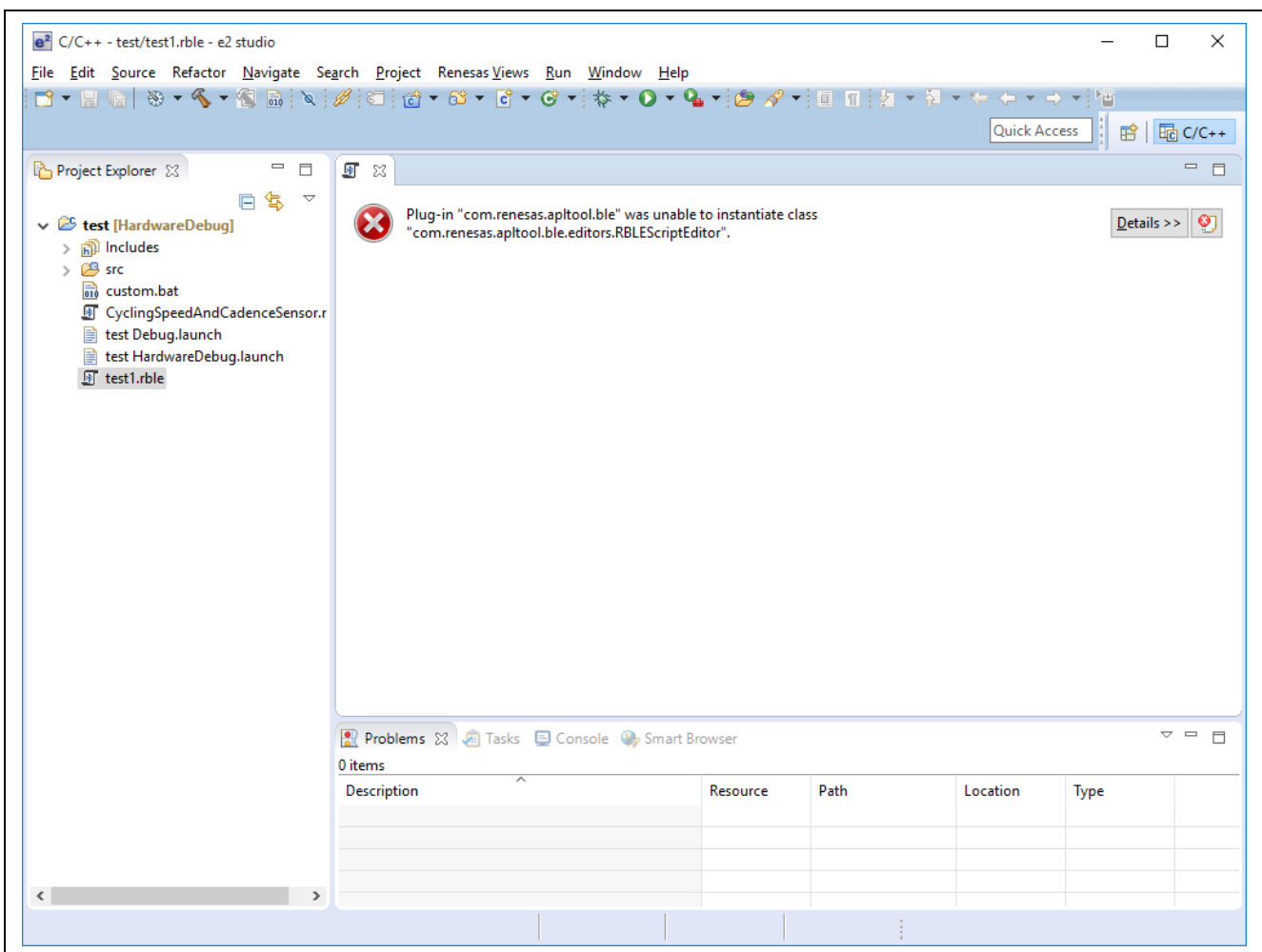
If you are unable to open an rBLE script file in the rBLE script editor, check whether the tool is installed in the e² studio.

Obtain QE for BLE from the URL below and install it, if [Renesas QE for Bluetooth Smart] does not appear in the [e2 studio Installation Details] dialog box.

- Download page: <https://www.renesas.com/qe-ble>

5.2.3 Files cannot be opened [2]

If you get the following error message when trying to open an rBLE script file, follow the instructions below the screenshot.



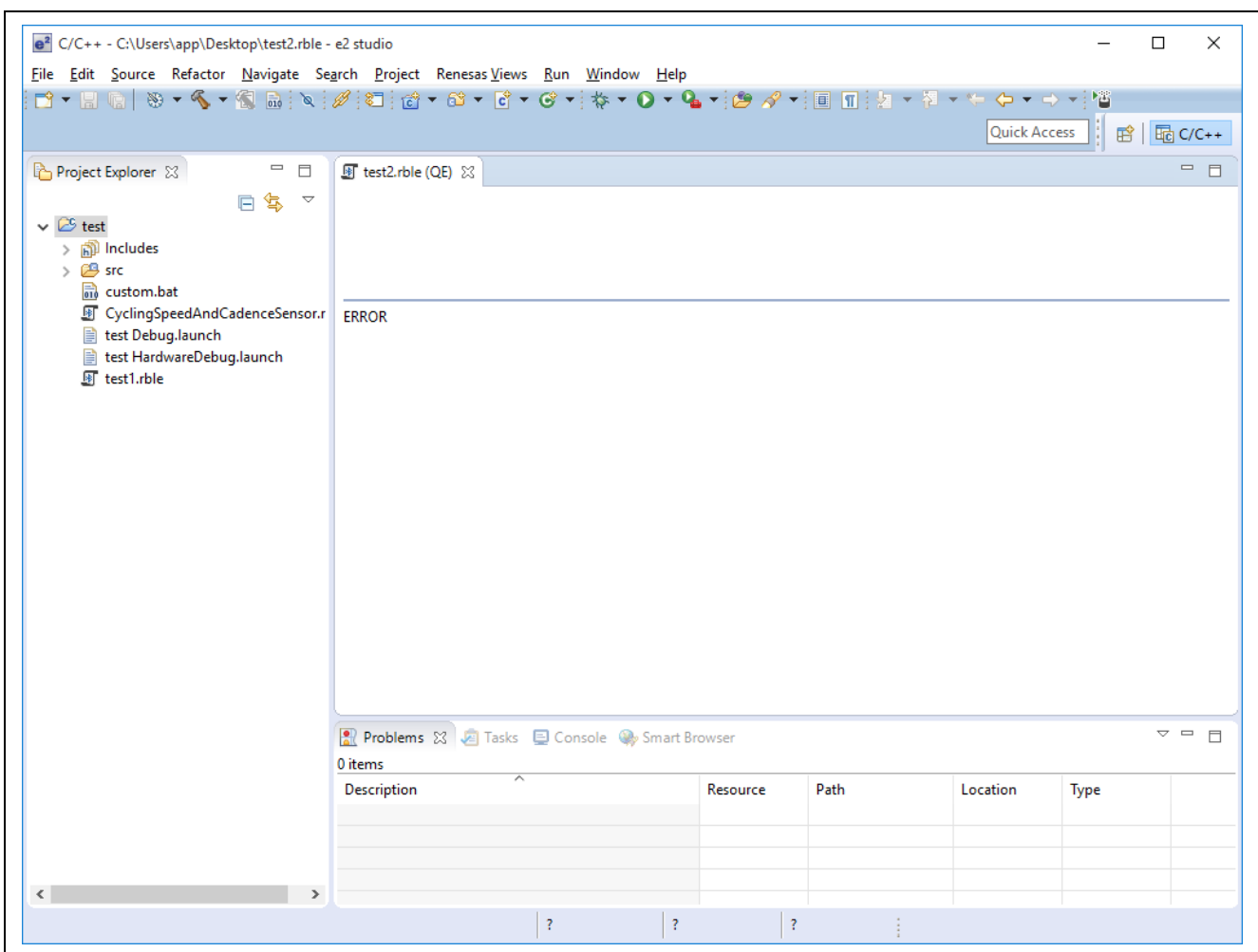
Access the following URL and obtain Visual C++ Redistributable for Visual Studio 2012, Update 4. QE for BLE uses a library built by Microsoft Visual Studio 2012 as a part of the configuration of modules.

- Download page: <http://www.microsoft.com/en-us/download/details.aspx?id=30679>

Note: The library used for QE for BLE is a 32-bit DLL. Download Visual C++ Redistributable (VSU4\vcredist_x86.exe) for 32-bit versions (x86) even if you are using a 64-bit version of Windows.

5.2.4 Files cannot be opened [3]


If you get the following error message when trying to open an rBLE script file, follow the instructions below the screenshot.




Display the [Project Explorer] view of the e² studio, and check whether the rBLE script file to be opened is registered with the open project.

If the file has not been registered, import the target file to the project.

5.2.5 Script will not run [1]

When the  button on the tool bar at the top of the e² studio or the menu item [Run rBLE script (QE)] of the [Run] menu on the main menu bar indicates that this is invalid (by being grayed out), display the [Progress] view of the e² studio and check if an rBLE script is already running.

If a script is running, click on the  button across from “Running an rBLE script” in the [Progress] view. The running rBLE script will then stop.

If a script is not running, click on the rBLE script editor to bring the editor into scope.

5.2.6 Script will not run [2]

In some cases, an unknown syntax error occurs immediately after the execution of an rBLE script starts. For example, when a syntax error occurs in the first line, even though the first line of the rBLE script file is only a comment, check the encoding (character code) in the target file with your text editor.

The only valid character codes for the rBLE script editor are ASCII and UTF-8 without BOM. If another encoding (including UTF-8 with BOM) has been used, save the rBLE script file again in either of the above types of coding.

5.3 Others

5.3.1 Not communicable with RenesasBLE

Check if the Bluetooth® function on your smartphone or tablet supports the specification of Bluetooth v4.0 or a later version.

If it does, activate the Bluetooth® function in the settings of your smartphone or tablet.

If it does not, you cannot use RenesasBLE.

Website and Support

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

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Revision History

Rev.	Date	Description	
		Page	Summary
1.00	Jan 20, 2017	-	First edition issued.

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1. 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 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. Unused pins should be handled as described under Handling of Unused Pins in the manual.

2. Processing at Power-on

The state of the product is undefined at the moment 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 moment 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 moment 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 moment when power is supplied until the power reaches the level at which resetting has been specified.

3. Prohibition of Access to Reserved Addresses

Access to reserved addresses is prohibited.

- The reserved addresses are provided for the possible future expansion of functions. Do not access these addresses; the correct operation of LSI is not guaranteed if they are accessed.

4. Clock Signals

After applying a reset, only release the reset line after the operating clock signal has become stable. When switching the clock signal during program execution, wait until the target clock signal has stabilized.

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Before changing from one product to another, i.e. to a product with a different part number, confirm that the change will not lead to problems.

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