Introduction
Thank you for using the Smart Configurator for RL78.
This document describes the restrictions and points for caution. Read this document before using the product.

Contents

1. Introduction ............................................................................................................................................. 3
   1.1 System Requirements .......................................................................................................................... 3
       1.1.1 Windows PC .................................................................................................................................. 3
       1.1.2 Linux PC ...................................................................................................................................... 3
       1.1.3 Development Environments ......................................................................................................... 3
   2. Support List ........................................................................................................................................... 4
       2.1 Support Devices List .......................................................................................................................... 4
       2.2 Support Components List .................................................................................................................. 6
       2.3 New support ....................................................................................................................................... 8
           2.3.1 Support RL78/G24 new components and modes .............................................................................. 8
           2.3.2 Support target board selection when creating Smart Configurator project in e² studio .................. 8
           2.3.3 Support blinky project generation .................................................................................................. 9
           2.3.4 Support compare view for the user to resolve code confliction ....................................................... 9
           2.3.5 Support symbolic name in Pin configuration ................................................................................. 10
   3. Changes ................................................................................................................................................ 11
       3.1 Correction of issues/limitations ........................................................................................................... 11
           3.1.1 Fixed the issue of build warning about security option byte in CC-RL V1.12 ......................... 11
           3.2 Specification changes ...................................................................................................................... 12
               3.2.1 Improvement for adding the user code area at the end of the interrupt function of input capture function .............................................................................................................. 12
               3.2.2 Improvement for Internal reference voltage can be used when VDD ≥ 2.4V in Comparator ........ 13
               3.2.3 Improvement for Internal reference voltage can be used when VDD ≥ 2.4V in A/D converter ...... 13
               3.2.4 Improvement for adding PMC setting for INTP and TAU pins’ setting ..................................... 13
               3.2.5 Improvement for the specification according to RL78G16 UM from V0.9 to V1.0 ...................... 13
               3.2.6 Improvement for the specification according to RL78G24 UM from V0.8 to V1.0 ...................... 13
               3.2.7 Improvement for adding include path to build setting by default after code generation........... 14
   4. List of RENESAS TOOL NEWS AND TECHNICAL UPDATE ........................................................... 15
   5. Points for Limitation .............................................................................................................................. 16
5.1 List of Limitation .............................................................................................................................. 16
5.2 Details of Limitation .......................................................................................................................... 16
5.2.1 Note on extra help document issue .............................................................................................. 16
5.2.2 Note on ELCL D flip flop component GUI warning display incorrectly ........................................ 17
5.2.3 Note on the unsupported setting items for some ELCL components ............................................. 18
5.2.4 Note on the extra “Run” menu on toolbar .................................................................................... 18
5.2.5 Note on clock mode setting error in IICA ..................................................................................... 19

6. Points for Caution ................................................................................................................................. 20
6.1 List of Caution ........................................................................................................................................ 20
6.2 Details of Caution .................................................................................................................................. 21
6.2.1 Note on the build error message such as “section .bss virtual address range overlaps
with .dtc_vector_table” .......................................................................................................................... 21
6.2.2 Note on the installation of the Smart Configurator ........................................................................... 22
6.2.3 Note on using TRDIOA0 for Input capture and TRDIOB0 for Output compare at same time .......... 22
6.2.4 Note on pulse width calculation of Timer RD input capture function ............................................. 22
6.2.5 Note on using Touch middleware and UART communication components ................................. 23
6.2.6 Note on the include path update issue when renaming the component’s configuration name ...... 23
6.2.7 Note on TAU Input Signal High/Low level Measurement component ........................................... 25
6.2.8 Note on CC-RL V1.12 C++ project ............................................................................................... 25
6.2.9 Note on browsing “Release Notes” and “Tool News” URL from the help menu ............................ 25
6.2.10 Note on using user code protection feature .................................................................................. 26
6.2.11 Note on IAR build error when using SMS component ................................................................. 26
6.2.12 Note on A/D conversion time setting after performing [Change device] or [Change resource] .... 27
6.2.13 Note on changing Hardware Debug Configuration on project generation wizard .................... 28
6.2.14 Note on FAA Configurator component does not support LLVM project ..................................... 28

Revision History ........................................................................................................................................ 29
1. Introduction

Smart Configurator is a utility for combining software to meet your needs. It supports the following three functions related to the embedding of Renesas drivers in your systems: importing middleware, generating driver code, and setting pins.

Smart Configurator for RL78 V1.7.0 is equivalent to Smart Configurator for RL78 Plug-in in e² studio 2023-07.

1.1 System Requirements

The operating environment is as follows.

1.1.1 Windows PC

- System: x64/x86 based processor
  - Windows® 11
  - Windows® 10 (64-bit version)
  - Windows® 8.1 (64-bit version)
- Memory capacity: We recommend 4 GB or more.
- Capacity of hard disk: At least 300 MB of free space.
- Display: Graphics resolution should be at least 1024 x 768, and the mode should display at least 65,536 colors.
- Processor: 1 GHz or higher (must support hyper-threading, multi-core CPUs)

1.1.2 Linux PC

Smart Configurator for RL78 plug-in in e² studio 2023-01 or later is supported on Linux OS.

- System: x64 based processor, 2 GHz or faster (with multicore CPUs)
  - Ubuntu 22.04 LTS Desktop (64-bit version)
  - Ubuntu 20.04 LTS Desktop (64-bit version)
- Memory capacity: We recommend 2 GB or more.
- Capacity of hard disk: At least 2 GB of free space.

1.1.3 Development Environments

- Renesas Electronics Compiler for RL78 [CC-RL] V1.12 or later
- LLVM for Renesas RL78 10.0.0.202209 or later
- IAR Embedded Workbench for Renesas RL78 V5.10.1 or later
- SMS Assembler Note1 V1.00.00 or later
- FAA Assembler Note2 V1.04.02 or later

Note:

1. If you want to add SMS Assembler to e² studio, install it from the integrated installer of e² studio 21-04 or later. (e² studio)
   As with other compilers, select and install from the [Additional Software] - [Renesas Toolchains & Utilities] tab of the e² studio setup wizard.

2. If you want to add FAA Assembler to e² studio, install it from the integrated installer of e² studio 23-04 or later. (e² studio)
   As with other compilers, select and install from the [Additional Software] - [Renesas Toolchains & Utilities] tab of the e² studio setup wizard.
2. Support List

2.1 Support Devices List

Below is a list of devices supported by the Smart Configurator for RL78 V1.7.0.

<table>
<thead>
<tr>
<th>Group (HW Manual number)</th>
<th>PIN</th>
<th>Device name</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RL78/G23 Group</strong> (R01UH0896EJ0120)</td>
<td>30pin</td>
<td>R7F100GAFxSP, R7F100GAGxSP, R7F100GAHxSP, R7F100GAJxSP</td>
</tr>
<tr>
<td></td>
<td>32pin</td>
<td>R7F100GBFxNP, R7F100GBGxNP, R7F100GBHxNP, R7F100GBJxNP, R7F100GBFxFP, R7F100GBGxFP, R7F100GBHxFP, R7F100GBJxFP</td>
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<tr>
<td></td>
<td>36pin</td>
<td>R7F100GCFxLA, R7F100GCGxLA, R7F100GChxLA, R7F100GClxLA</td>
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<tr>
<td></td>
<td>40pin</td>
<td>R7F100GEFxFP, R7F100GEGxFP, R7F100GEHxFP, R7F100GEJxFP</td>
</tr>
<tr>
<td></td>
<td>44pin</td>
<td>R7F100GFxFxSP, R7F100GFFxFP, R7F100GFHxFP, R7F100GFJxFP, R7F100GFxFxFP, R7F100GFFxFP, R7F100GFHxFP, R7F100GFJxFP</td>
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<tr>
<td></td>
<td>48pin</td>
<td>R7F100GGFxPB, R7F100GGFxFP, R7F100GGHxFP, R7F100GGJxFP, R7F100GGFxSP, R7F100GGFxFP, R7F100GGHxFP, R7F100GGJxFP</td>
</tr>
<tr>
<td></td>
<td>52pin</td>
<td>R7F100GJxFxNP, R7F100GJHxFxNP, R7F100GJxSP, R7F100GJxFP</td>
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<tr>
<td></td>
<td>64pin</td>
<td>R7F100HGFxFP, R7F100HFFxFP, R7F100HGGxFP, R7F100HGGxFP</td>
</tr>
<tr>
<td></td>
<td>80pin</td>
<td>R7F100JGFxFP, R7F100JFFxFP, R7F100JGGxFP, R7F100JGGxFP</td>
</tr>
<tr>
<td></td>
<td>128pin</td>
<td>R7F100KFxFP, R7F100KFFxFP, R7F100KGGxFP, R7F100KGGxFP</td>
</tr>
<tr>
<td><strong>RL78/G24 Group</strong> (R01UH0896EJ0120)</td>
<td>32pin</td>
<td>R7F100GAFxNP, R7F100GAGxNP, R7F100GAHxNP, R7F100GAJxNP</td>
</tr>
<tr>
<td></td>
<td>48pin</td>
<td>R7F100GBFxNP, R7F100GBGxNP, R7F100GBHxNP, R7F100GBJxNP</td>
</tr>
<tr>
<td></td>
<td>64pin</td>
<td>R7F100GCFxLA, R7F100GCGxLA, R7F100GChxLA, R7F100GClxLA</td>
</tr>
<tr>
<td></td>
<td>80pin</td>
<td>R7F100GEFxFP, R7F100GEGxFP, R7F100GEHxFP, R7F100GEJxFP</td>
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<tr>
<td></td>
<td>100pin</td>
<td>R7F100GFxFxSP, R7F100GFFxFP, R7F100GFHxFP, R7F100GFJxFP</td>
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<tr>
<td><strong>RL78/G25 Group</strong> (R01UH0896EJ0120)</td>
<td>32pin</td>
<td>R7F100GBFxNP, R7F100GBGxNP, R7F100GBHxNP, R7F100GBJxNP</td>
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<tr>
<td></td>
<td>48pin</td>
<td>R7F100GCFxLA, R7F100GCGxLA, R7F100GChxLA, R7F100GClxLA</td>
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<tr>
<td></td>
<td>64pin</td>
<td>R7F100GEFxFP, R7F100GEGxFP, R7F100GEHxFP, R7F100GEJxFP</td>
</tr>
<tr>
<td></td>
<td>80pin</td>
<td>R7F100GFxFxSP, R7F100GFFxFP, R7F100GFHxFP, R7F100GFJxFP</td>
</tr>
<tr>
<td><strong>RL78/G26 Group</strong> (R01UH0896EJ0120)</td>
<td>32pin</td>
<td>R7F100GBFxNP, R7F100GBGxNP, R7F100GBHxNP, R7F100GBJxNP</td>
</tr>
<tr>
<td></td>
<td>48pin</td>
<td>R7F100GCFxLA, R7F100GCGxLA, R7F100GChxLA, R7F100GClxLA</td>
</tr>
<tr>
<td></td>
<td>64pin</td>
<td>R7F100GEFxFP, R7F100GEGxFP, R7F100GEHxFP, R7F100GEJxFP</td>
</tr>
<tr>
<td></td>
<td>80pin</td>
<td>R7F100GFxFxSP, R7F100GFFxFP, R7F100GFHxFP, R7F100GFJxFP</td>
</tr>
<tr>
<td>Group (HW Manual number)</td>
<td>PIN</td>
<td>Device name</td>
</tr>
<tr>
<td>--------------------------</td>
<td>------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>RL78/G24 Group (R01UH0961EJ0100)</td>
<td>20pin</td>
<td>R7F101G6GxSP, R7F101G6ExSP</td>
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<tr>
<td></td>
<td>24pin</td>
<td>R7F101G7GxNP, R7F101G7ExNP</td>
</tr>
<tr>
<td></td>
<td>25pin</td>
<td>R7F101G8GxLA, R7F101G8ExLA</td>
</tr>
<tr>
<td></td>
<td>30pin</td>
<td>R7F101GAGxSP, R7F101GAExSP</td>
</tr>
<tr>
<td></td>
<td>32pin</td>
<td>R7F101GBGxNP, R7F101GBexNP, R7F101GbxFP, R7F101GBeFxP</td>
</tr>
<tr>
<td></td>
<td>40pin</td>
<td>R7F101GEGxNP, R7F101GExxNP</td>
</tr>
<tr>
<td></td>
<td>44pin</td>
<td>R7F101GGxFP, R7F101GExFP</td>
</tr>
<tr>
<td></td>
<td>48pin</td>
<td>R7F101GGxFB, R7F101GExFB, R7F101GExxNP, R7F101GExxNP</td>
</tr>
<tr>
<td></td>
<td>52pin</td>
<td>R7F101GJGxFFA, R7F101GJxExFA</td>
</tr>
<tr>
<td></td>
<td>64pin</td>
<td>R7F101GLGxFFA, R7F101GLGxFB, R7F101GLExFA, R7F101GLExFB</td>
</tr>
<tr>
<td>RL78/G16 Group (R01UH0980EJ0100)</td>
<td>10pin</td>
<td>R5F1211AxSP, R5F1211CxSP</td>
</tr>
<tr>
<td></td>
<td>16pin</td>
<td>R5F1214AxNA, R5F1214AxSP, R5F1214CxNA, R5F1214CxSP</td>
</tr>
<tr>
<td></td>
<td>20pin</td>
<td>R5F1216AxSP, R5F1216CxSP</td>
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<td></td>
<td>24pin</td>
<td>R5F1217AxNA, R5F1217CxNA</td>
</tr>
<tr>
<td></td>
<td>32pin</td>
<td>R5F121BxFP, R5F121BxNA, R5F121BCxFP, R5F121BCxNA</td>
</tr>
</tbody>
</table>
### 2.2 Support Components List

Below is a list of Components supported by the Smart Configurator for RL78 V1.7.0.

**Table 2-3 Support Components (1/2)**

<table>
<thead>
<tr>
<th>No</th>
<th>Components</th>
<th>Mode</th>
<th>RL78/G24</th>
<th>RL78/G15</th>
<th>RL78/F23</th>
<th>RL78/G22</th>
<th>RL78/G16</th>
<th>RL78/G24</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>12 Bit A/D Single Scan</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Only RL78/G24 A/D converter has mode selection GUI. For other devices, the default mode is “Normal mode” and no GUI is provided for mode selection.</td>
</tr>
<tr>
<td>2</td>
<td>12 Bit A/D Continuous Scan</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>12 Bit A/D Group Scan</td>
<td></td>
<td>-</td>
<td>✓</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>A/D Converter</td>
<td>Normal mode</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Advanced mode</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Clock Output/Buzzer Output Controller</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Comparator</td>
<td></td>
<td>✓</td>
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<td>-</td>
<td>-</td>
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<td>7</td>
<td>D/A Converter</td>
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<td>✓</td>
<td>✓</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Data Transfer Controller</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>-</td>
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<td>-</td>
<td>-</td>
<td></td>
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<tr>
<td>9</td>
<td>Delay Counter</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>-</td>
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<tr>
<td>10</td>
<td>Divider Function</td>
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<td>11</td>
<td>Event Link Controller</td>
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<td>External Event Counter</td>
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<td>✓</td>
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<tr>
<td>13</td>
<td>IIC Communication (Master mode)</td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<td>14</td>
<td>IIC Communication (Slave mode)</td>
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<td>15</td>
<td>Input Capture Function</td>
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<td>16</td>
<td>Input Pulse Interval/Period Measurement</td>
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<td>17</td>
<td>Input Signal High-/Low-Level Width Measurement</td>
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<td>Interrupt Controller</td>
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<td>Interval Timer</td>
<td>8 bit count mode</td>
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<tr>
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<td>12 bit count mode</td>
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<td>20</td>
<td>Key Interrupt</td>
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<td>21</td>
<td>One-Shot Pulse Output</td>
<td>One-Shot Pulse Output</td>
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<td>✓</td>
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<td>Two-Channel Input with One-Shot Pulse Output</td>
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<td>PWM Option Unit A</td>
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<td>DALI Communication (Control devices)</td>
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<td>26</td>
<td>DALI Communication (Control gear)</td>
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</table>
2.3  New support

2.3.1  Support RL78/G24 new components and modes
Support new components and modes about A/D Converter (Advanced mode), Digital Addressable Lighting Interface (DALI), 16-bit Timers KB30, KB31, and KB32 and Timer RD2. Please see Table 2-3 Support Components (1/2)
Support Components (2/2)

Details.

2.3.2  Support target board selection when creating Smart Configurator project in $e^2$ studio
From Smart Configurator for RL78 V1.7.0, the user can select more target boards except “Custom” in project generation wizard when creating Smart Configurator project in $e^2$ studio.

![Support target board selection](image)

Figure 2-1 Support target board selection
2.3.3 Support blinky project generation

From Smart Configurator for RL78 V1.7.0, blinky project generation feature is supported. When the user selects target board file other than Custom in project generation wizard, Bare Metal - Blinky project template will be available and can be selected. After the user selected Bare Metal – Blinky project template, the generated project will implement blink LED resource for the selected target board.

![Figure 2-2 Bare Metal - Blinky project template selection](image)

2.3.4 Support compare view for the user to resolve code confliction

If the merge conflict occurs, conflict message in red will be displayed in the Smart Configurator console, as shown in Error! Reference source not found. Figure 2-3 The conflict message and file compare view. The user can click the conflicted file in the console message to open the File Compare view as shown in Figure 2-3 The conflict message and file compare view and then can resolve the conflict.

![Figure 2-3 The conflict message and file compare view](image)

There are two methods to resolve the conflict:
1) Click button “Copy Current Change from Left to Right” and then delete unused code to resolve conflict.
2) Resolve the conflict manually by copying the code in the left panel to the right panel or editing the code in the right panel directly.

Note: After confliction resolved, if click the conflict message, it still opens compare view.
2.3.5 Support symbolic name in Pin configuration

From Smart Configurator for RL78 V1.7.0, new feature to define symbolic name is supported in [Pin number] view. By defining the user’s own symbol for multiplex pin, user can maintain same software even if the MCU is changed. The symbolic name can be migrated when changing device only on condition that the pin with symbolic name is assigned. The symbolic name macro is generated in file pin.h when generating code.

![Symbolic name setting](image1)

**Figure 2-4 Symbolic name setting**

```
#define Sw1 14,2
#define Sw2 14,6

/* Symbolic name */
#define Symbolic_name_1 14,2
#define Symbolic_name_2 14,6

/* PIN write helper */
#define PIN_WRITE_HELPER(x,y) (!_PIN_READ(x,y))
#define PIN_READ_HELPER(x,y) (!_PIN_WRITE(x,y))
```

**Figure 2-5 Code in pin.h**
3. Changes
This chapter describes changes to the Smart Configurator for RL78 V1.7.0.

3.1 Correction of issues/limitations

Table 3-1 List of Correction of issues/limitations

<table>
<thead>
<tr>
<th>No</th>
<th>Description</th>
<th>RL78/G24</th>
<th>RL78G15</th>
<th>RL78/F24</th>
<th>RL78/F23</th>
<th>RL78/G22</th>
<th>RL78/G16</th>
<th>Remarks</th>
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<tbody>
<tr>
<td>1</td>
<td>Fixed the issue of build warning about security option byte in CC-RL V1.12</td>
<td>-</td>
<td>✓</td>
<td>-</td>
<td>✓</td>
<td>-</td>
<td>-</td>
<td>✓</td>
</tr>
</tbody>
</table>

3.1.1 Fixed the issue of build warning about security option byte in CC-RL V1.12
In CS+, when the CC-RL compiler version is V1.12, there is a build warning W0561520 about security option byte. This issue has been fixed from Smart Configurator for RL78 V1.7.0.

![Figure 3-1 CC-RL V1.12 build warning](image1)

[On-chip debug and flash serial programming security ID reading setting] is added on System page. After generating code, the property of CC-RL (Build tool) will change according to the user’s setting. When “Unuse” is selected, “Security option byte value” is FA. When “Use” is selected, “Security option byte value” is FE.

![Figure 3-2 On-chip debug and flash serial programming security ID reading setting](image2)

![Figure 3-3 Set CS+ property about security option byte](image3)
### Table 3-2 List of Specification changes

<table>
<thead>
<tr>
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<th>Description</th>
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<th>RL78/G15</th>
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<th>RL78/G22</th>
<th>RL78/G24</th>
<th>Remarks</th>
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<tr>
<td>1</td>
<td>Improvement for adding the user code area at the end of the interrupt function of input capture function</td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<td>2</td>
<td>Improvement for Internal reference voltage can be used when VDD ≥ 2.4V in Comparator</td>
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<td>-</td>
<td>✓</td>
<td>-</td>
<td>✓</td>
<td>-</td>
<td>-</td>
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<td>Improvement for Internal reference voltage can be used when VDD ≥ 2.4V in A/D converter</td>
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<td>✓</td>
<td>-</td>
<td>✓</td>
<td>-</td>
<td>✓</td>
<td>-</td>
<td>-</td>
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<tr>
<td>4</td>
<td>Improvement for adding PMC setting for INTP and TAU pins' setting</td>
<td>-</td>
<td>-</td>
<td>✓</td>
<td>-</td>
<td>-</td>
<td>✓</td>
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<tr>
<td>5</td>
<td>Improvement for the specification according to RL78G16 UM from V0.9 to V1.0</td>
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<td>-</td>
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<tr>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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### 3.2.1 Improvement for adding the user code area at the end of the interrupt function of input capture function

When using the input capture function of timer (the function to measure the input signal), in most cases, the user adds the code to set the flag to know the capture completion. So, Smart Configurator adds the user code area in the interrupt function. The following is an example by using TRG input capture function.

```c
void r_TRO_input_interrupt(void)
{
    uint32_t trigger_temp = TROIERO;
    uint32_t temp;
    TROIERO = 0x0000;

    if ((TROERO & __08_TRO_FLAG_OVERFLOW_SET) == __08_TRO_FLAG_OVERFLOW_SET)
    {
        TROERO = __08_TRO_FLAG_OVERFLOW_SET;
        g_targ Overflow_count_a = 0x0;
        g_targ Overflow_count_b = 0x0;
    }

    if ((TROGER & __02_TRO_FLAG_CAPTURE_COMPARE_B_SET) == __02_TRO_FLAG_CAPTURE_COMPARE_B_SET)
    {
        TROGER = __02_TRO_FLAG_CAPTURE_COMPARE_B_SET;
        if (0UL == g_targ overflow_count)
        {
            temp = g_targ old_value_b;
            g_targ active_width_b = (uint32_t)(TRGEM - temp);
        }
        else
        {
            temp = 0x1000000 + g_targ overflow_count_b;
            g_targ overflow_count_b = 0x0;
            temp = g_targ old_value_b;
            g_targ active_width_b = (uint32_t)(temp + TROROB);
        }
        g_targ inactive_width_b = 0UL;
        g_targ_old_value_b = (uint32_t)TROROB;
    }
    TROIERO = trigger_temp;
    
    /* Start user code for r_TRO_input_interrupt. Do not edit comment generated here */
    /* End user code. Do not edit comment generated here */
```

*Figure 3-4 Add the user code area*
3.2.2 Improvement for Internal reference voltage can be used when VDD ≥ 2.4V in Comparator
When VDD ≥ 2.4 V which includes 2.4 V ≤ VDD ≤ 5.5 V, 2.7 V ≤ VDD ≤ 5.5 V, 4.0 V ≤ VDD ≤ 5.5 V, Internal reference voltage can be selected as reference voltage.

Figure 3-5 VDD setting on [Clocks] page

3.2.3 Improvement for Internal reference voltage can be used when VDD ≥ 2.4V in A/D converter
When VDD ≥ 2.4 V which includes 2.4 V ≤ VDD ≤ 5.5 V, 2.7 V ≤ VDD ≤ 5.5 V, 4.0 V ≤ VDD ≤ 5.5 V, Internal reference voltage can be selected as A/D channel selection.

Figure 3-6 Internal reference voltage can be selected

Figure 3-7 VDD setting on [Clocks] page

Figure 3-8 Internal reference voltage can be selected

Note: CTSU TSCAP voltage, Temperature sensor output voltage should have same spec as Internal reference voltage output in RL78/G16.

3.2.4 Improvement for adding PMC setting for INTP and TAU pins’ setting
When using INTP5(P01), INTP7(P21), INTP7(P02) or TO00(P21) pin, the related PMC should be set 0. Smart Configurator adds related PMC setting code in API R_\_{Configuration Name}\_Create().

3.2.5 Improvement for the specification according to RL78G16 UM from V0.9 to V1.0

3.2.6 Improvement for the specification according to RL78G24 UM from V0.8 to V1.0
3.2.7 Improvement for adding include path to build setting by default after code generation

From Smart Configurator for RL78 V1.7.0, Smart Configurator can add include path “${workspace_loc:/$[Pro]Name/src/smcf_gen}” in default project e² studio. If the user changes the code generation path, Smart Configurator can add new include path and remove old include path into build setting by default after code generation.

![Image](image1)

**Figure 3-9 The user changes code generation path**

![Image](image2)

**Figure 3-10 Add include path after code generation automatically**
4. List of RENESAS TOOL NEWS AND TECHNICAL UPDATE

Below is a list of notifications delivered by RENESAS TOOL NEWS and TECHNICAL UPDATE.

<table>
<thead>
<tr>
<th>Issue date</th>
<th>Document No.</th>
<th>Description</th>
<th>Applicable MCUs</th>
<th>Fixed version</th>
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| Oct. 01, 2021 | R20TS0757 | 1. Notes on creating LLVM for Renesas RL78 C/C++ Executable Project  
| Mar. 16, 2022 | R20TS0822 | 1. Notes when build or clean e² studio Smart Configurator project [Link](https://www.renesas.com/document/tnn/notes-e-studio-smart-configurator-plug-smart-configurator-rl78) | RL78/G23 | V1.3.0 |
5. Points for Limitation

This section describes points for limitation regarding the Smart Configurator for RL78 V1.7.0.

5.1 List of Limitation

Table 5-1 List of Limitation

<table>
<thead>
<tr>
<th>No</th>
<th>Description</th>
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<th>RL78/G15</th>
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<th>RL78/G22</th>
<th>RL78/G16</th>
<th>RL78/G24</th>
<th>Remarks</th>
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<tbody>
<tr>
<td>1</td>
<td>Note on extra help document issue</td>
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<td>✓</td>
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<td>-</td>
<td>-</td>
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</table>

5.2 Details of Limitation

5.2.1 Note on extra help document issue

For Smart Configurator, there is an extra help "Smart Browser" under "[Help] > [Help Contents]". Please ignore it.

![Figure 5-1 Extra help issue](image-url)
5.2.2 Note on ELCL D flip flop component GUI warning display incorrectly

When selecting the event signal in ELCL D flip flop component, even if the selected signal consists with the hardware specification, there still displays the warning on the GUI.

[Avoidance measure]
Make reference to the hardware manual and set the selectable event signal though warning appeared in GUI, the waring is no impact for the code generation.

The following is example of using flip-flop 0 and flip-flop 1 in ELCL logic cell block L1.

![Figure 5-2 The flip-flop 0 in ELCL logic cell block L1 usage example](image1)

![Figure 5-3 The flip-flop 1 in ELCL logic cell block L1 usage example](image2)
5.2.3 Note on the unsupported setting items for some ELCL components

In the following ELCL modules, it is not possible to set “no selection (fixed to 0)” as the input signal of the logic cell block and “negative logic output (inverted)” as the output level of the event signal.

- ELCL AND
- ELCL D flip flop
- ELCL EXOR
- ELCL selector
- ELCL Through

[Avoidance measure] None

5.2.4 Note on the extra “Run” menu on toolbar

After launching Smart Configurator, an extra menu “Run” will appear on the toolbar if user has launched the Smart Configurator for RL78 V1.6.0 or earlier version. Please ignore this menu.

![Menu “Run” on the toolbar](image)

Figure 5-4 Menu “Run” on the toolbar

To remove it, user can reset the perspective according to below steps:

1) Right-click Smart Configurator icon, select “Reset”. 
2) Select “Reset Perspective”.

Menu “Run” is removed.

5.2.5 Note on clock mode setting error in IICA
When user selects fCLK as 48MHz in [Clock] page, if user selects fCLK/2 as IICA operation clock, there are a “!” on GUI.

[Avoidance measure]
The generation code is correct, so please ignore this error message.
6. Points for Caution

This section describes points for caution regarding the Smart Configurator for RL78 V1.7.0.

6.1 List of Caution

<table>
<thead>
<tr>
<th>No</th>
<th>Description</th>
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<th>RL78/G15</th>
<th>RL78/G23</th>
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6.2 Details of Caution

6.2.1 Note on the build error message such as “section .bss virtual address range overlaps with .dtc_vectortable”

When user use many components and DTC component together, the generated code build might fail due to some section address overlaps.

![Figure 6-1 Build error message](image)

[Workaround]

The Smart Configurator cannot set “.bss” and “.bssf” section address. So user should consider to modify “.bss” and “.bssf” section address manually in “linker_script.ld” file or change the DTC base address to avoid such section overlap error.

![Figure 6-2 DTC base address setting](image)
6.2.2 Note on the installation of the Smart Configurator
Do not set more than 64 characters for the installation directory.
You might see an error message “The specified path is too long” and will not be able to install Smart Configurator.

6.2.3 Note on using TRDIOA0 for Input capture and TRDIOB0 for Output compare at same time
If user sets up TRDIOA0 for Input capture and TRDIOB0 for Output compare at the same time. Smart Configurator will output a Peripheral conflict error.
User can ignore this Smart Configurator error message and use these two functions at the same time.

6.2.4 Note on pulse width calculation of Timer RD input capture function
The pulse width calculation code is with the assumption that the counter is not cleared between two interrupts occurrence, except the input pulse width which is selected as counter clear trigger on GUI.
For example, when “Clear by TRDGRA input capture” is selected, only TRDIOA0 pulse width calculation handle counter clear, other input pulse width calculation doesn’t handle counter clear.

```c
static void __near r_Config_TRDO_tcc0_interrupt(void)
{
    uint8_t tcmd_pul_a_cus = TRDIOA0;
    uint8_t tcmd_pul_b_cus = TRDIOB0;
    uint8_t tcmd_pul_c_cus = TRDIOC0;
    uint8_t tcmd_pul_d_cus = TRDIOC1;
    if (TRDIOE == TRDIOE)
    {
        TRDIOE = TRDIOE;
    }
    /* check forces */
    if (TIE & 0x10_TRD_INT0生成_ERROR_FLAG == _01_TRD_INT0生成_ERROR_FLAG)
    {
        TIE ^= (1<<0) & 0x10_TRD_INT0生成_ERROR_FLAG;
        if (0)
        {
            q_tcmd activates_cus_s = (input&0x01)cmd_pul_a_cus;
        }  
        else
        {
            q_tcmd activates_cus_s = (input&0x02)cmd_pul_a_cus;
        }
    }
}
```

The pulse width calculation handle counter clear.

```c
if (TIE & 0x10_TRD_INT1生成_ERROR_FLAG == _01_TRD_INT1生成_ERROR_FLAG)
{
    TIE ^= (1<<0) & 0x10_TRD_INT1生成_ERROR_FLAG;
    if (0)
    {
        q_tcmd activates_cus_s = (input&0x02)cmd_pul_a_cus;
    }  
    else
    {
        q_tcmd activates_cus_s = (input&0x02)cmd_pul_a_cus;
    }
}
```

The pulse width calculation doesn’t handle counter clear.

**Figure 6-3 Counter clear setting in Input capture function**
6.2.5  **Note on using Touch middleware and UART communication components**

When use Touch middleware, please do not change the name of UART components. Otherwise, due the file name mismatch will bring build error.

For example, in touch middleware select UART0 as UART channel, for UART0 component please use Config_UART0.

![Figure 6-4 Touch middleware and UART communication components](image)

6.2.6  **Note on the include path update issue when renaming the component’s configuration name**

When renaming the added component’s configuration in e² studio Smart Configurator project that has self-defined include path setting for any folder or file, include path setting for that folder or file will keep the old name setting after code generation. This will cause build error when compiling the newly generated codes so please manually update the include path.

The folder or file which has self-defined include path setting can be recognized by checking the overlay icon (Ξ) on that folder or file. Below is an example on how to handle the include path update after renaming Compare Match Timer component configuration.

![Figure 6-5 Interval Timer component configuration before renaming](image)
Figure 6-6 The Interval Timer component configuration after renaming

Figure 6-7 Include path setting for the “Config_ADC” configuration

Include path for renamed configuration is not updated after code re-generation. To avoid build error, please manually update the “Config_TAU0_1” to “My_Config_TAU0_1”
6.2.7 Note on TAU Input Signal High/Low level Measurement component

When using TAU Input Signal High/Low level Measurement component, after used noise filter function for TImn input pulse, please make sure the High/Low level width min value needs to be greater than two times the minimum value prompted on the UI.

For example, the High/Low level width min value is 0.032us (min value), when use noise filter function, the width min value should be 0.064us.

![Figure 6-8 High/Low level width min value](image)

6.2.8 Note on CC-RL V1.12 C++ project

In CC-RL V1.12 C++ project, there are some dummy issues such as “EI()” in editor. However this is editor specification and does not affect the program operation. Please ignore it.

![Figure 6-9 CODAN issue in CC-RL V1.12 C++ project](image)

6.2.9 Note on browsing “Release Notes” and “Tool News” URL from the help menu

For Smart Configurator for RL78 V1.4.0 or before version, “Release Notes” and “Tools News” in the help menu cannot access the correct URL. This issue has been fixed from this version.

Please access the URL below directly for Smart Configurator for RL78 V1.4.0 or before version.


Tool News: [https://www.renesas.com/rl78-smart-configurator-tn-notes](https://www.renesas.com/rl78-smart-configurator-tn-notes)

![Figure 6-10 Release Notes and Tool News in Smart Configurators](image)
6.2.10 Note on using user code protection feature

From Smart Configurator for RL78 V1.5.0 onwards, user code protection feature will be supported for all Code Generation components. Please use the following specific tags to add user code when using the user code protection feature. If the specific tags do not match exactly, inserted user code will not be protected after the code generation.

```c
/* Start user code */
User code can be added between the specific tags
/* End user code */
```

The user code protection feature will only be supported on the files that are generated by the Code Generation component. Hence, the user code protection feature is not available for non-Code Generation components.

6.2.11 Note on IAR build error when using SMS component

When using SMS component, if the following build error is met in IAR Embedded workbench, please check the build order setting in project [Options…] -> [Custom Build] page.

1) When using IAR Embedded workbench V5.10, select “Run before compiling/assembling” (refer to Figure 6-12)

2) When using IAR Embedded workbench V4.21, make “Run this tool before all other tools” checked (refer to Figure 6-13)

The above setting can eliminate this build error.

**Figure 6-11 IAR build error**

![IAR build error](image)

**Figure 6-12 "Build order" setting of IAR Embedded workbench V5.10**

![Build order setting](image)
6.2.12 Note on A/D conversion time setting after performing [Change device] or [Change resource]

After performing [Change device] (for example, change from RL78/G23 to RL78/G24), the A/D conversion time setting can’t be kept. The user should take note to reconfirm the conversion time setting as he wants.

When changing resource, for example from RL78/G24 normal A/D and RL78/G24 advanced A/D, the A/D conversion time can’t be kept.
6.2.13 Note on changing Hardware Debug Configuration on project generation wizard

When a target board (except custom) is selected during creating a new project, please don't change the Hardware Debug Configuration manually. The reason is that the Hardware Debug Configuration has be decided by target board automatically. The user setting can't be reflected into Smart Configurator.

![Image of selecting a target board](image)

Figure 6-17 Select a target board when creating a project in e² studio

6.2.14 Note on FAA Configurator component does not support LLVM project

In Smart Configurator for RL78 V1.7.0, FAA Configurator component was not supported for LLVM project. Though the user can add FAA Configurator component under LLVM project, but the generated FAA source code can't be built successfully and works for running and debugging.
### Revision History

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Jul.20.23
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 \( V_L \) (Max.) and \( V_H \) (Min.).

7. Prohibition of access to reserved addresses

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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