

Smart Configurator for RL78 Plug-in in e² studio 2022-07

Smart Configurator for RL78 V1.3.0

Release Note

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.

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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 Plug-in in e² studio 2022-07 Smart Configurator for RL78 V1.3.0 is equivalent to Smart Configurator for RL78 plugin in e² studio 2022-07.

1.1 System requirements

Smart Configurator for RL78 Plug-in in e² studio 2022-07 Smart Configurator for RL78 V1.3.0 operating environment is as follows.

1.1.1 PC

- IBM PC/AT compatibles (Windows® 11 64-bit version, Windows® 10 64-bit versions, Windows® 8.1 64-bit versions)
- Processor: 1 GHz or higher (must support hyper-threading, multi-core CPUs)
- Memory capacity: 4 GB or more recommended.
- Hard disk capacity: 300 MB or more spare capacity
- Display: 1024 x 768 or higher resolution, 65,536 or more colors

1.1.2 Development Environments

- Renesas Electronics Compiler for RL78 [CC-RL] V1.11 or later
- LLVM for Renesas RL78 10.0.0.202203 or later
- IAR Embedded Workbench for Renesas RL78 V4.21.3 or later
- SMS Assembler ^{Note} V1.00.00 or later

Note:

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. Support List

2.1 Support Devices List

Below is a list of devices supported by the Smart Configurator for RL78 Plug-in in e² studio 2022-07 Smart Configurator for RL78 V1.3.0.

Table 2-1 Support Devices

Group (HW Manual number)	PIN	Device name
RL78/G23 Group (R01UH0896EJ0100)	30pin	R7F100GAFxSP, R7F100GAGxSP, R7F100GAHxSP, R7F100GAJxSP
	32pin	R7F100GBFxNP, R7F100GBGxNP, R7F100GBHxNP, R7F100GBJxNP, R7F100GBFxFP, R7F100GBGxFP, R7F100GBHxFP, R7F100GBJxFP
	36pin	R7F100GCFxLA, R7F100GCGxLA, R7F100GCHxLA, R7F100GCJxLA
	40pin	R7F100GEFxNP, R7F100GEGxNP, R7F100GEHxNP, R7F100GEJxNP
	44pin	R7F100GFFxFP, R7F100GFGxFP, R7F100GFHxFP, R7F100GFJxFP, R7F100GFKxFP, R7F100GFLxFP, R7F100GFNxFP
	48pin	R7F100GGFxFB, R7F100GGGxFB, R7F100GGHxFB, R7F100GGJxFB, R7F100GGKxFB, R7F100GGLxFB, R7F100GGNxFB, R7F100GGFxNP, R7F100GGGxNP, R7F100GGHxNP, R7F100GGJxNP, R7F100GGKxNP, R7F100GGLxNP, R7F100GGNxNP
	52pin	R7F100GJFxFA, R7F100GJGxFA, R7F100GJHxFA, R7F100GJJxFA, R7F100GJKxFA, R7F100GJLxFA, R7F100GJNxFA
	64pin	R7F100GLFxFA, R7F100GLGxFA, R7F100GLHxFA, R7F100GLJxFA, R7F100GLKxFA, R7F100GLLxFA, R7F100GLNxFA, R7F100GLFxFB, R7F100GLGxFB, R7F100GLHxFB, R7F100GLJxFB, R7F100GLKxFB, R7F100GLLxFB, R7F100GLNxFB, R7F100GLFxLA, R7F100GLGxLA, R7F100GLHxLA, R7F100GLJxLA, R7F100GLKxLA, R7F100GLLxLA, R7F100GLNxLA
	80pin	R7F100GMGxFA, R7F100GMHxFA, R7F100GMJxFA, R7F100GMKxFA, R7F100GMLxFA, R7F100GMNxFA, R7F100GMGxFB, R7F100GMHxFB, R7F100GMJxFB, R7F100GMKxFB, R7F100GMLxFB, R7F100GMNxFB
	100pin	R7F100GPGxFB, R7F100GPHxFB, R7F100GPJxFB, R7F100GPKxFB, R7F100GPLxFB, R7F100GPNxFB, R7F100GPGxFA, R7F100GPHxFA, R7F100GPJxFA, R7F100GPKxFA, R7F100GPLxFA, R7F100GPNxFA
	128pin	R7F100GSJxFB, R7F100GSKxFB, R7F100GSLxFB, R7F100GSNxFB
RL78/F24 Group (R01UH0944EJ0050)	32pin	R7F124FBJ3xNP, R7F124FBJ4xNP, R7F124FBJ5xNP
	48pin	R7F124FGJ3xFB, R7F124FGJ4xFB, R7F124FGJ5xFB
	64pin	R7F124FLJ3xFB, R7F124FLJ4xFB, R7F124FLJ5xFB
	80pin	R7F124FMJ3xFB, R7F124FMJ4xFB, R7F124FMJ5xFB
	100pin	R7F124FPJ3xFB, R7F124FPJ4xFB, R7F124FPJ5xFB

2.2 Support Components List

Below is a list of Components supported by the Smart Configurator for RL78 Plug-in in e² studio 2022-07 Smart Configurator for RL78 V1.3.0.

Table 2-2 Support Components (1/2)

✓ : Support, -: Non-support

No	Components	Mode	RL78/G23	RL78/F24	Remarks
1	12 Bit A/D Single Scan	-	-	✓	
2	12 Bit A/D Continuous Scan	-	-	✓	
3	12 Bit A/D Group Scan	-	-	✓	
4	A/D Converter	-	✓	-	
5	Clock Output/Buzzer Output Controller	-	✓	✓	
6	Comparator	-	✓	✓	
7	D/A Converter	-	✓	✓	
8	Data Transfer Controller	-	✓	✓	
9	Delay Counter	-	✓	✓	
10	Divider Function	-	✓	✓	
11	Event Link Controller	-	-	✓	
12	External Event Counter	-	✓	✓	
13	IIC Communication (Master mode)	-	✓	✓	
14	IIC Communication (Slave mode)	-	✓	✓	
15	Input Capture Function	-	-	✓	
16	Input Pulse Interval/Period Measurement	-	✓	✓	
17	Input Signal High-/Low-Level Width Measurement	-	✓	✓	
18	Interrupt Controller	-	✓	✓	
19	Interval Timer	8 bit count mode	✓	✓	
		16 bit count mode	✓	✓	
		16 bit capture mode	✓	-	
		32 bit count mode	✓	-	
20	Key Interrupt	-	✓	✓	
21	One-Shot Pulse Output	-	✓	✓	
22	Output Compare Function	-	-	✓	
23	Ports	-	✓	✓	

Table 2-3 Support Components (2/2)

✓ : Support, -: Non-support

No	Components	Mode	RL78/G23	RL78/F24	Remarks
24	PWM Option Unit A	-	-	✓	
25	PWM Output	PWM mode	✓	✓	
		PWM3 mode	-	✓	
		Extended PWM mode	-	✓	
26	Real-Time Clock	-	✓	✓	
27	Remote Control Signal Receiver	-	✓	-	
28	SNOOZE Mode Sequencer	-	✓	-	
29	SPI (CSI) Communication	Transmission	✓	✓	
		Reception	✓	✓	
		Transmission/reception	✓	✓	
30	Square Wave Output	-	✓	✓	
31	Three-phase PWM Output	Reset Synchronous PWM Mode	-	✓	
		Complementary PWM Mode	-	✓	
		Extended Complementary PWM Mode	-	✓	
32	UART Communication	Transmission	✓	✓	
		Reception	✓	✓	
		Transmission/reception	✓	✓	
33	Voltage Detector	-	✓	✓	
34	Watchdog Timer	-	✓	✓	
35	Logic & Event Link Controller	-	✓	-	Need download in Smart Configurator RL78

2.3 New support

2.3.1 Support RL78/F24 devices

See 2.1 Support Devices List for details on supported packages.

2.3.2 BSP (Board Support Package) revision update

BSP rev1.20 is supported and will be added as default BSP when creating Smart Configurator project.

2.3.3 Developer Assistance function is supported

Developer Assistance function provide a virtual tree with root node named "Developer Assistance" in project tree. By this function, user can search API information, call API by drag-drop operation and copy/paste usage example code easily. Detailed use guide, please refer to "User's Guide: e² studio" R20AN0579EC0101.

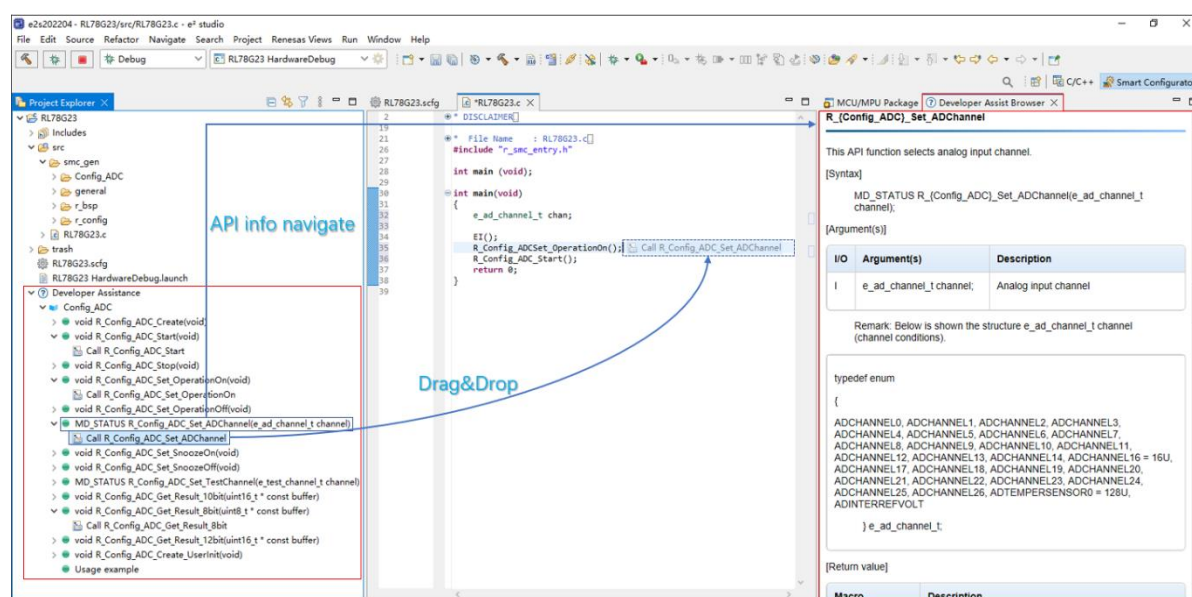


Figure 2-1 Developer assistance function

2.3.4 Support to output only initialization API function for individual configuration

From Smart Configurator for RL78 Plug-in in e² studio 2022-07, output only initialization API function can be applied for individual configuration (Only for the component type is Code Generator component). A context menu item named "Output only initialization API" has been added for each configuration. This context menu can be selected when Smart Configurator component preference setting "API function output" is set to "Output all API functions according to the setting". And when the context menu is selected, this configuration will only generate the initialization API in its generated files after clicking the "Generate Code" button.

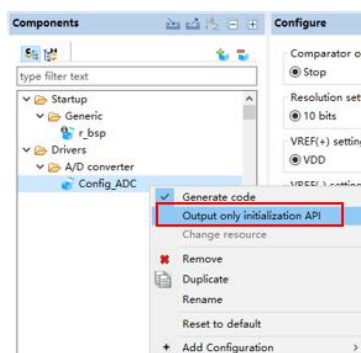


Figure 2-2 Output only initialization API function for individual configuration

3. Changes

This chapter describes changes to the Smart Configurator for RL78 Plug-in in e² studio 2022-07 Smart Configurator for RL78 V1.3.0.

3.1 Correction of issues/limitations

Table 3-1 List of Correction of issues/limitations

✓ : Applicable, -: Not Applicable

No	Description	RL78/G23	RL78/F24	Remarks
1	Fixed the issue of Smart Configurator Component setting in e ² studio "Preferences" dialogue	✓	-	
2	Fixed the issue of "Download ELCL modules" function	✓	-	
3	Fixed the wrong macros in voltage detector (LVD) header file	✓	-	

3.1.1 Fixed the issue of Smart Configurator Component setting in e² studio "Preferences" dialogue

If user didn't select RX family for e² studio 2022-01 installation, the Smart Configurator's Component setting menu in e² studio Preference dialog will not be shown. This issue has been fixed from Smart Configurator for RL78 Plug-in in e² studio 2022-07 Smart Configurator for RL78 V1.3.0

3.1.2 Fixed the issue of "Download ELCL modules" function

The ELCL download function is available. User can download ELCL modules through entry link: [Download ELCL modules](#) in New Component dialog.

3.1.3 Fixed the wrong macros in voltage detector (LVD) header file

When using LVD1 reset mode, the reset mode can't be set correctly because the macro value in header file (r_cg_lvd.h) is wrong. This issue has been fixed from Smart Configurator for RL78 Plug-in in e² studio 2022-07 Smart Configurator for RL78 V1.3.0.

```

/* Operation mode of voltage detection (LVD1SEL) */
#define _00_LVD_MODE_INT          (0x00U)    /* interrupt mode */
#define _40_LVD_MODE_RESET        (0x40U)    /* reset mode */

/* Voltage detection flag (LVD0F) */
#define _00_LVD0_FLAG_OVER        (0x00U)    /* supply voltage (VDD) >= detection
voltage (VLVD0), or LVD is off */
#define _01_LVD0_FLAG_LESS        (0x01U)    /* supply voltage (VDD) < detection
voltage (VLVD0) */

```

3.2 Specification changes

Table 3-2 List of Specification changes

✓: Applicable, -: Not Applicable

No	Description	RL78/G23	RL78/F24	Remarks
1	Improvement for the clock setting in UART transmission/reception function	✓	-	
2	Improvement for using communication components simultaneously	✓	-	
3	Improvement for opening Smart Configurator in CS+	✓	-	
4	Improvement for TAU TDRnm input range more accurately when fCLK (not divided) is selecting as the operation clock	✓	✓	
5	Removing CCD03 is from RL78/G23 44 pin package.	✓	-	
6	Improvement for "Input Pulse Interval Measurement" component name	✓	✓	

3.2.1 Improvement for the clock setting in UART transmission/reception function

When use UART transmission/reception functions, the clock setting on "Transmission" and "Reception" should be set as the same value. Otherwise, an error mark will be shown on the component node of "Component View" tree and the "Setting" error will be shown in "Configuration Problems" view.

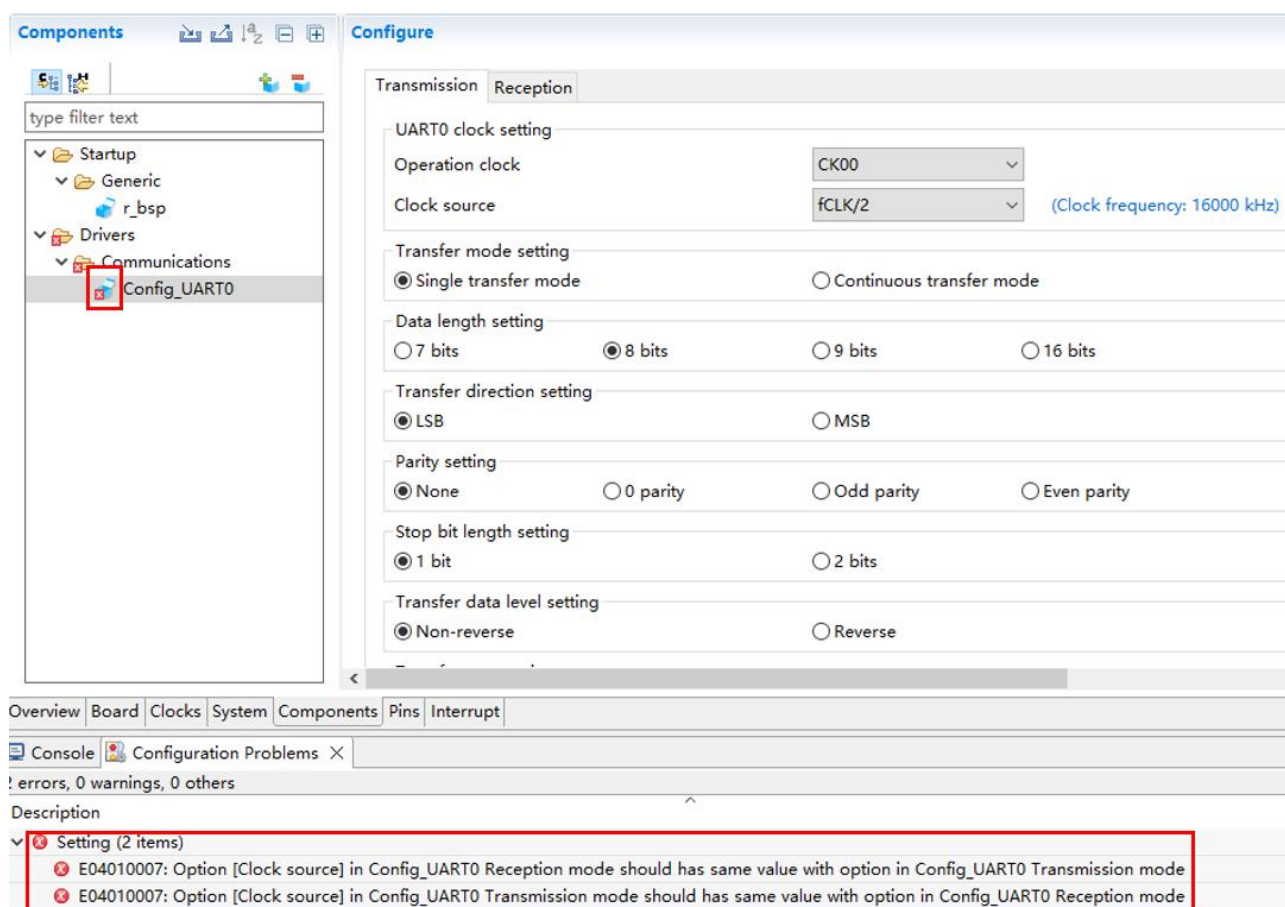


Figure 3-1 The error of clock setting nonsynchronous in transmission/reception of UART

3.2.2 Improvement for using communication components simultaneously

When use UARTn reception function, please note to avoid using CSIn1 and IICn1 functions of odd channels at the same time. Otherwise, an error mark will be shown on the component node of “Component View” tree and the “Peripheral” error will be shown in “Configuration Problems” view.

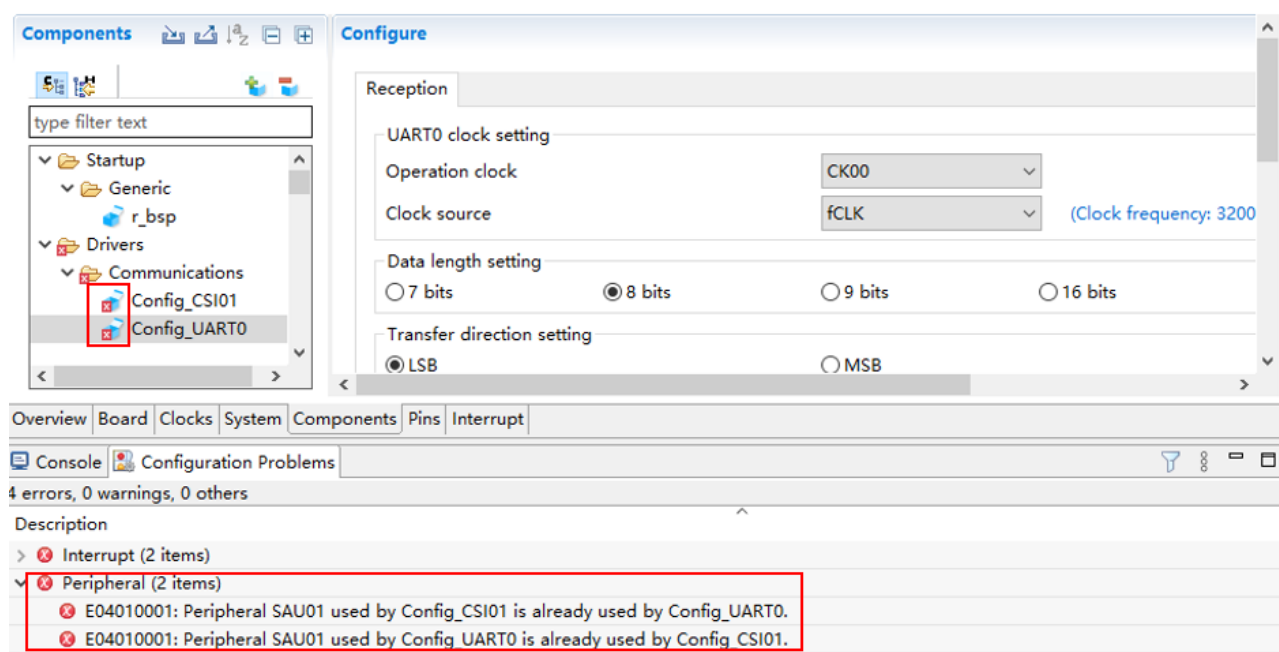


Figure 3-2 The error of using communication components simultaneously

3.2.3 Improvement for opening Smart Configurator in CS+

In CS+, Smart Configurator can open the *.scfg file which is under CS+ project folder successfully without restrictions of file name and the number of files. If there are more than one .scfg file under this folder, you will see the [File selection] dialogue when open Smart Configurator. User can select one *.scfg file to open.

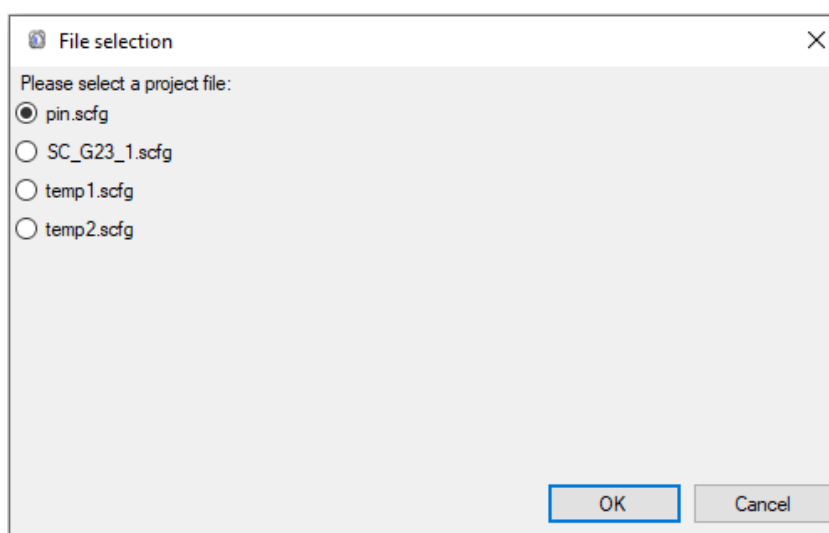


Figure 3-3 [File selection] dialogue

3.2.4 Improvement for TAU TDRnm input range more accurately when fCLK (not divided) is selecting as the operation clock

When use Interval Timer (8 bit count mode and 16 bit count mode), Square Wave Output component and PWM Output component, to avoid setting TDRnm to 0000H the TDRnm input minimum value is from 0001H. Use Interval Timer (8 bit count mode) as example, when select fCLK (40MHz) as clock source, the Interval value minimum value is 2 count.

Figure 3-4 TAU TDRnm input setting

In Config_TAU0_1.h

```

/*****
Macro definitions
*****/
#define _01_TAU_TDR01H_VALUE      (0x01U) /* 8-bit timer data register 01 (TDR01H) */

```

3.2.5 Removing CCD03 from RL78/G23 44 pin package.

From Smart Configurator for RL78 Plug-in in e² studio 2022-07 Smart Configurator for RL78 V1.3.0, CCD03 is not supported in RL78/G23 44 pin package.

3.2.6 Improvement for "Input Pulse Interval Measurement" component name

"Input Pulse Interval Measurement" component name is changed to "Input Pulse Interval/Period Measurement".

4. List of RENESAS TOOL NEWS AND TECHNICAL UPDATE

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

Issue date	Document No.	Description	Applicable MCUs	Fixed version
Oct. 01, 2021	R20TS0757	1. Notes on creating LLVM for Renesas RL78 C/C++ Executable Project 2. Notes on using Port Input buffer function https://www.renesas.com/document/tnn/notes-e-studio-smart-configurator-plug-smart-configurator-rl78	RL78/G23	V1.2.0
Mar. 16, 2022	R20TS0822	1. Notes when build or clean e ² studio Smart Configurator project https://www.renesas.com/document/tnn/notes-e-studio-smart-configurator-plug-smart-configurator-rl78-0	RL78/G23	V1.3.0

5. Points for Limitation

This section describes points for limitation regarding the Smart Configurator for RL78 Plug-in in e² studio 2022-07 Smart Configurator for RL78 V1.3.0.

5.1 List of Limitation

Table 5-1 List of Limitation

✓: Applicable, -: Not Applicable

No	Description	RL78/G23	RL78/F24	Remarks
1	Note on extra help document issue	✓	✓	
2	Note on redundant code to be generated in ELCL component Create() function	✓	-	
3	Note on ELCL D flip flop component GUI warning display incorrectly	✓	-	
4	Note on the unsupported setting items for some ELCL components	✓	-	
5	Note on selecting "Event input from ELC" clock source of TRJ0 Interval timer component	-	✓	

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.

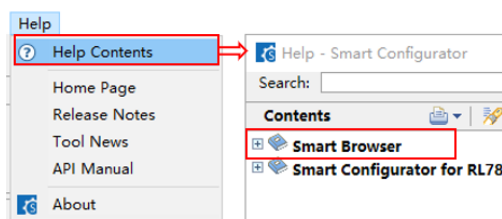


Figure 5-1 Extra help issue

5.2.2 Note on redundant code to be generated in ELCL components Create() function

In the Create () function of following ELCL components, redundant code is generated via local variables assignment when setting a value to a register.

- ELCL edge detection thinning function
- ELCL chattering prevention
- ELCL manchester decoder
- ELCL multiple parameter monitor
- ELCL AND
- ELCL D flip flop
- ELCL EXOR
- ELCL selector
- ELCL Through

The following example is the used the logic cell 0 of ELCL logic cell block L1 for the ELCL AND component.

```
void R_Config_AND_Create(void)
{
    uint8_t p_isel0;
    uint8_t p_isel1;
    uint8_t p_osel0;
    /* L1L0 Start */
    PM1|=0x01U;
    ELISEL0=0x0FU;
    p_isel0=0x01U;
    PM1|=0x02U;
    ELISEL1=0x04U;
    p_isel1=0x02U;
    ELL1SEL0=p_isel0;
    ELL1SEL1=p_isel1;
    ELL1LNK0=0x01U;
    ELL1LNK1=0x02U;
    ELL1CTL|=0x01U;
    p_osel0=0x01U;
    p_osel0|=0x00U;
    PMCA0&=0xFDU;
    PM0&=0xFDU;
    PMCF0|=0x02U;
    ELOSEL0=p_osel0;
    /* L1L0 End */
    R_Config_AND_Create_UserInit();
}
```

Figure 5-2 Redundant code in R_Config_AND_Create()

5.2.3 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 consist 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.

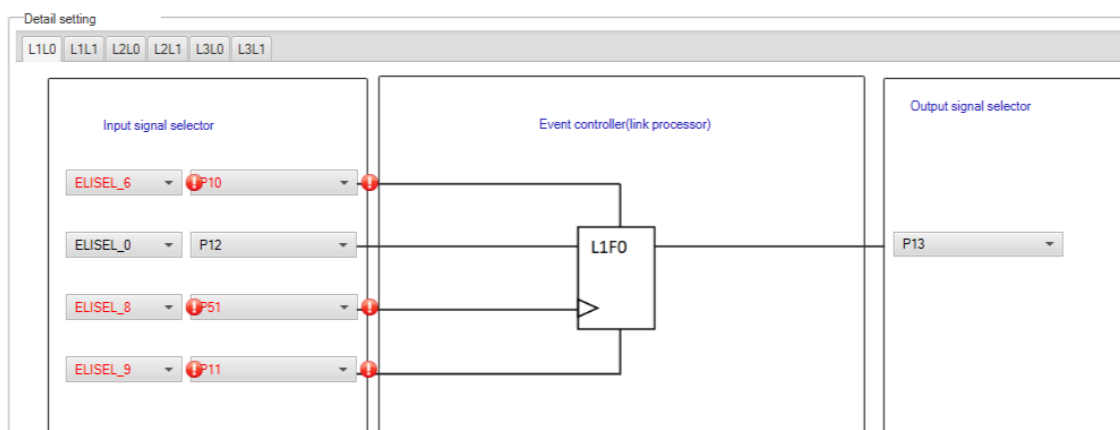


Figure 5-3 The flip-flop 0 in ELCL logic cell block L1 usage example

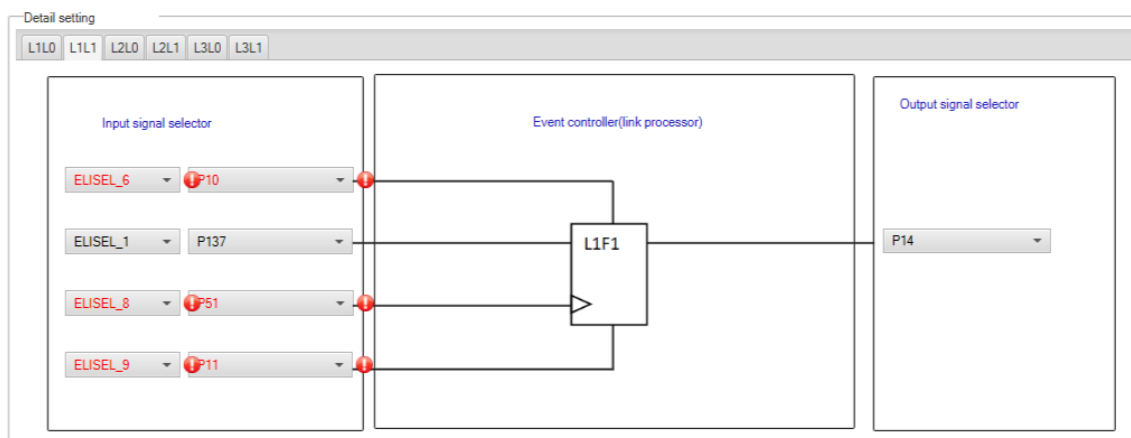


Figure 5-4 The flip-flop 1 in ELCL logic cell block L1 usage example

5.2.4 Note on the unsupported setting items for some ELCL components

In the following ELCL components, the input signal of logic cell block is no option and always fixed as 0, additionally the output level of the event signal cannot be set as "Negative logic output (inverted level)".

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

[Avoidance measure] None

5.2.5 Note on selecting “Event input from ELC” clock source of TRJ0 Interval timer component

In TRJ0 interval timer component, when select “Event input from ELC” as clock source, please select “count” as Timer value unit. "ms", "us" and "ns" are redundant items, they will be removed form next version.

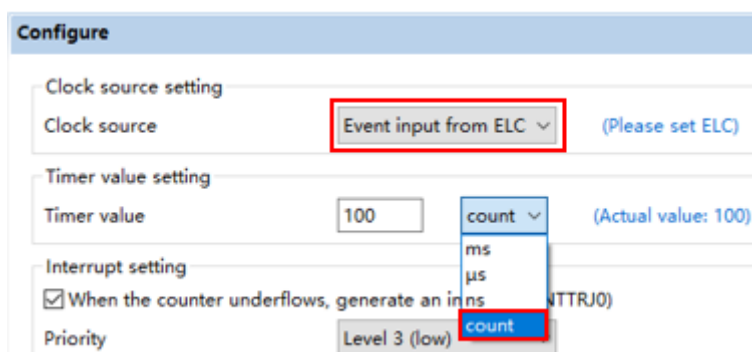


Figure 5-5 “count” selection for “Event input from ELC” clock source

6. Points for Caution

This section describes points for caution regarding the Smart Configurator for RL78 Plug-in in e² studio 2022-07 Smart Configurator for RL78 V1.3.0.

6.1 List of Caution

Table 6-1 List of Caution

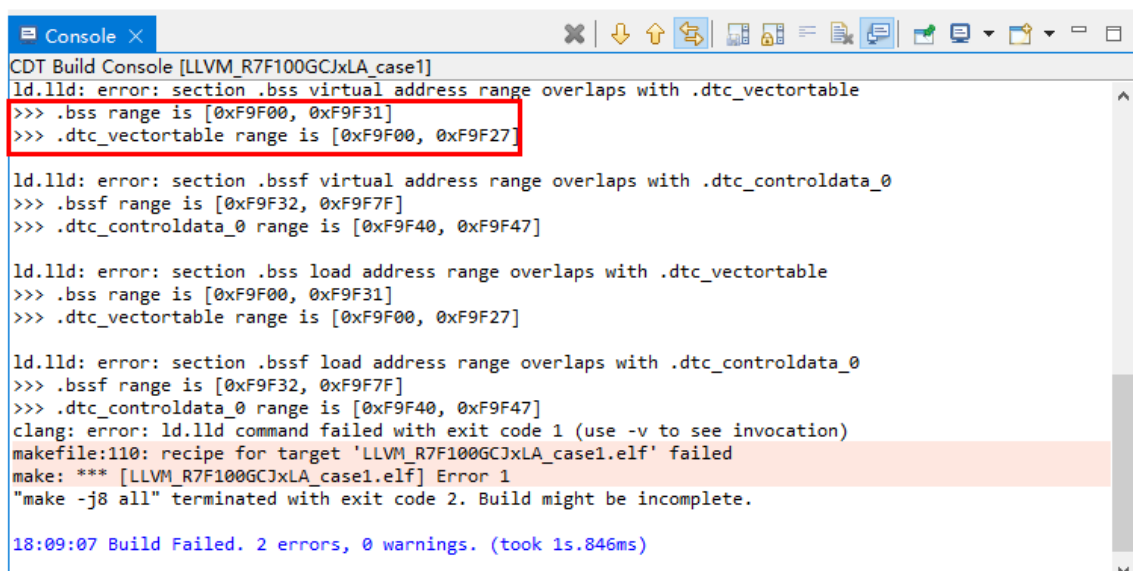
✓ : Applicable, -: Not Applicable

No	Description	RL78/G23	RL78/F24	Remarks
1	About the build error message such as "section .bss virtual address range overlaps with .dtc_vectortable".	✓	✓	
2	About the installation of the Smart Configurator.	✓	✓	
3	Note on using TRDIOA0 for Input capture and TRDIOB0 for Output compare at same time.	-	✓	
4	Note on pulse width calculation of Timer RD input capture function		✓	
5	Note on using Touch middleware and UART communication components.	✓	-	
6	Note on running R_Config_RTC_Set_CounterValue() always returns MD_BUSY1.	✓	✓	

6.2 Details of Caution

6.2.1 About 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.



```
CDT Build Console [LLVM_R7F100GCJxLA_case1]
ld.lld: error: section .bss virtual address range overlaps with .dtc_vectortable
>>> .bss range is [0xF9F00, 0xF9F31]
>>> .dtc_vectortable range is [0xF9F00, 0xF9F27]

ld.lld: error: section .bssf virtual address range overlaps with .dtc_controldata_0
>>> .bssf range is [0xF9F32, 0xF9F7F]
>>> .dtc_controldata_0 range is [0xF9F40, 0xF9F47]

ld.lld: error: section .bss load address range overlaps with .dtc_vectortable
>>> .bss range is [0xF9F00, 0xF9F31]
>>> .dtc_vectortable range is [0xF9F00, 0xF9F27]

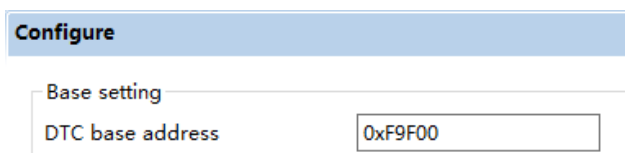
ld.lld: error: section .bssf load address range overlaps with .dtc_controldata_0
>>> .bssf range is [0xF9F32, 0xF9F7F]
>>> .dtc_controldata_0 range is [0xF9F40, 0xF9F47]
clang: error: ld.lld command failed with exit code 1 (use -v to see invocation)
makefile:110: recipe for target 'LLVM_R7F100GCJxLA_case1.elf' failed
make: *** [LLVM_R7F100GCJxLA_case1.elf] Error 1
"make -j8 all" terminated with exit code 2. Build might be incomplete.

18:09:07 Build Failed. 2 errors, 0 warnings. (took 1s.846ms)
```

Figure 6-1 Build error message

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.



Configure	
Base setting	
DTC base address	0xF9F00

Figure 6-2 DTC base address setting

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 TRDGRA0 input capture" is selected, only TRDIOA0 pulse width calculation handle counter clear, other input 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.

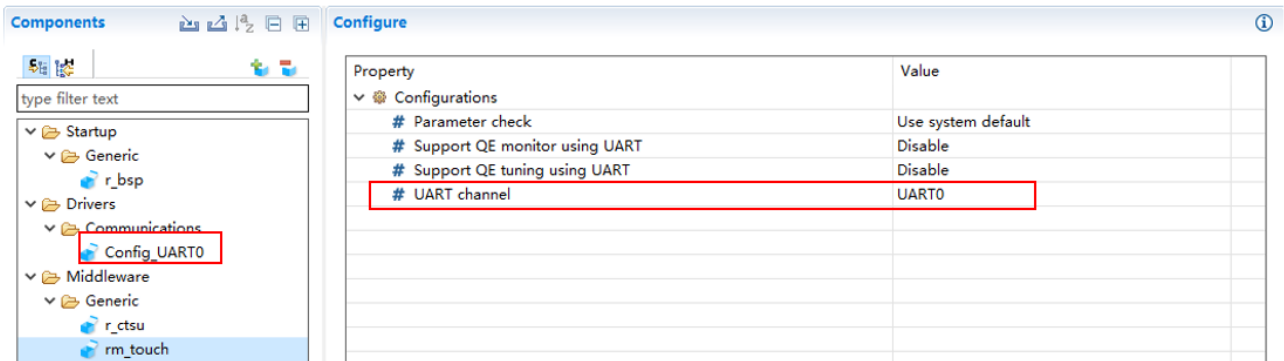


Figure 6-4 Touch middleware and UART communication components

6.2.6 Note on running R_Config_RTC_Set_CounterValue() always returns MD_BUSY1

For this case, user should manually increase macro "RTC_WAITTIME_2CYCLE" define value in file "Config_RTC.h".

```

/*****
*****
Macro definitions
*****
*****/

...
#define RTC_WAITTIME_2CYCLE (163U)

```

To avoid loss of user's code when e² studio build, as a workaround, user should turn off builder manually by the following steps:

- (1) Right click the project on the project tree and click "Properties" from the popup menu.

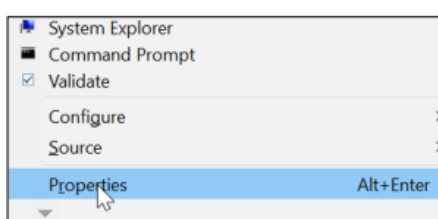


Figure 6-5 Context menu of properties

- (2) Choose the "Builders" item on the left of the property window, then select the "SC Code Generation Builder" on the right, click "Edit..." button.

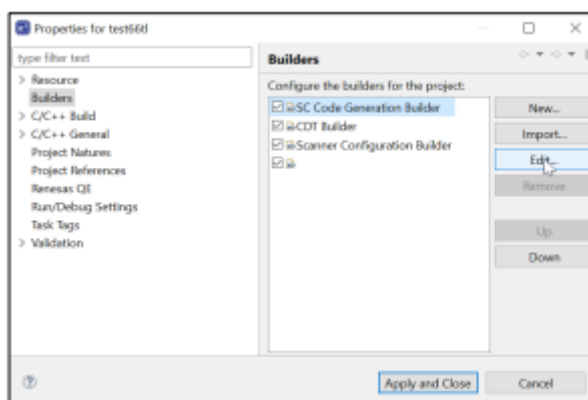


Figure 6-6 Properties dialog window

- (3) Deselect all the checkbox selections on the popup configure window and then click "OK"

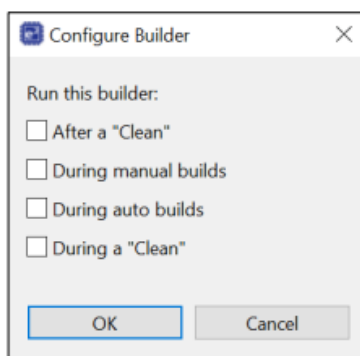


Figure 6-7 Configure builder dialog window

Revision History

Rev.	Date	Description	
		Page	Summary
1.01	Apr 13, 2021	-	First edition issued
1.02	Jul 20, 2021	3	Update 1.1.2 Development Environments
		4	Update HW manual number in table "Table 2 1 Support Devices"
		7 - 8	Update "2.3 New support"
		9 - 13	Update "3. Changes"
		14-15	Update "4. Points for Limitation"
1.03	Nov 30, 2021	2	Update 1.1.2 Development Environments
		3	Update 1.1.3 Operation Environment.
		5-6	Update support level in table "Table 2-2 Support Devices" and "Table 2-3 Support Devices"
		7	Update "2.3 New support"
		9-11	Update "4. Points for Limitation"
		11-12	Add "Points for Caution"
1.04	Apr 20, 2022	3	Update "1.1.1 PC" and "1.1.2 Development Environments"
		4	Update "2.1 Support Devices List"
		5	Update "2.2 Support Components List"
		7	Update "2.3 New support"
		8	Update "3. Changes"
		12	Update "4. List of RENESAS TOOL NEWS AND TECHNICAL UPDATE"
		13	Update "5. Points for Limitation"
		17	Update "6. Points for Caution"
1.05	Jul 20, 2022	7	Add "2.3.4 Output only initialization API function has been improved for individual configuration"
		-	Remove "6.2.7 Note on CCRL build error E0562351 (in CS+) and E0562352 (in e ² studio)"

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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