Smart Configurator for RH850 V1.7.0

Release Note

Introduction

Thank you for using the Smart Configurator for RH850.
This document describes the restrictions and points for caution. Read this document before using the product.

Contents

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.

1.1 System Requirements

The operating environment is as follows.

1.1.1 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 500 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 Development Environments

- Renesas electronics Compiler for RH850 [CC-RH] V2.04.00 or later
- GHS Multi V7.1.6 or later
- IAR Embedded Workbench for RH850 V3.10.1 Note or later

- Note:
- IAR Embedded Workbench for RH850 V3.10.1 doesn't support RH850U/2B yet, so please don't use Smart Configurator to create RH850/U2B IAR project and generate code.

2. Support List

2.1 Support Devices List

Below is a list of devices supported by the Smart Configurator for RH850 V1.7.0.

Table 2-1 Support Devices

Group (HW Manual number)	PIN	Device name (Device file version)
RH850/F1KM-S1 Group (R01UH0684EJ0100)	48pin	R7F701693, R7F701694, R7F701695
	64pin	R7F701690, R7F701691, R7F701692
	80pin	R7F701687, R7F701688, R7F701689
	100pin	R7F701684, R7F701685, R7F701686
RH850/F1KM-S4 Group (R01UH0684EJ0100)	100pin	R7F701644, R7F701645
	144pin	R7F701646, R7F701647
	176pin	R7F701648, R7F701649
	232pin	R7F701650, R7F701651
RH850/U2A16 Group (R01UH0864EJ0061)	292pin	R7F702300(V1.10)
	516pin	R7F702300(V1.10)
RH850/U2A8 Group (R01UH0864EJ0061)	292pin	R7F702301(V1.00)
RH850/F1KH-D8 Group (R01UH0684EJ0111)	176pin	R7F701708, R7F701709 (V1.20)
	233pin	R7F701710, R7F701711 (V1.20)
	324pin	R7F701714, R7F701715 (V1.20)
RH850/C1M-A2 Group (R01UH0607EJ0120)	252pin	R7F701275(V1.10)
RH850/U2B6 Group (R01UH0923EJ0050)	292pin	R7F70255(V1.00)

2.2 Support Components List

Below is a list of Components supported by the Smart Configurator for RH850 V1.7.0.

Table 2-2 Support Components

✓: Support, -: Non-support

No	Components	Mode	RH850 F1KM	RH850 U2A	RH850 F1KH	RH850 C1M	RH850 U2B6	Remarks
1	A/D Converter	-	✓	✓	✓	✓	✓	
2	CSI Master	Master Transmit	✓	-	✓	✓	-	
		Master Receive	✓	-	✓	✓	-	
		Master Transmit/Receive	✓	-	✓	✓	-	
3	CSI Slave	Slave Transmit	✓	-	✓	✓	-	
		Slave Receive	✓	-	✓	✓	-	
		Slave Transmit/Receive	✓	-	✓	✓	-	
4	Data CRC	-	✓	✓	✓	✓	-	
5	DMA Controller	-	✓	✓	✓	✓	✓	
6	DTS Controller	-	-	✓	-	✓	-	
7	Error Control Module	-	-	✓	-	✓	-	
8	ATOM Signal Output Mode Compare	-	-	✓	-	-	-	
9	ATOM Signal Output Mode Immediate	-	-	✓	-	-	-	
10	ATOM Signal Output Mode PWM	-	-	✓	-	-	-	
11	ATOM Signal Output Mode Serial	-	-	✓	-	-	-	
12	Dead Time Module	-	-	✓	-	-	-	
13	GTM Clock	-	-	✓	-	-	-	
14	TIM Bit Compression Mode	-	-	✓	-	-	-	

Table 2-3 Support Components

✓: Support, -: Non-support

No	Components	Mode	RH850 F1KM	RH850 U2A	RH850 F1KH	RH850 C1M	RH850 U2B6	Remarks
15	TIM Gated Periodic Sampling Mode	-	-	✓	-	-	-	
16	TIM Input Event Mode	-	-	✓	-	-	-	
17	TIM Input Prescaler Mode	-	-	✓	-	-	-	
18	TIM Pulse Integration Mode	-	-	✓	-	-	-	
19	TIM PWM Measurement Mode	-	-	✓	-	-	-	
20	TIM Serial Shift Mode	-	-	✓	-	-	-	
21	Time Base Unit	-	-	✓	-	-	-	
22	Interrupt Controller	-	✓	✓	✓	✓	✓	Only table reference method
23	Key Return	-	✓	-	✓	-	-	
24	MSPI Master	Transmit	-	✓	-	-	✓	No support LVDS mode
		Receive	-	✓	-	-	✓	
		Transmit/Receive	-	✓	-	-	✓	
25	MSPI Slave	Transmit	-	✓	-	-	✓	
		Receive	-	✓	-	-	✓	
		Transmit/Receive	-	✓	-	-	✓	
26	OS Timer	-	✓	✓	✓	✓	-	
27	Ports	-	✓	✓	✓	✓	✓	
28	Real-Time Clock	-	✓	✓	✓	-	-	
29	RIIC Master	-	✓	✓	✓	✓	-	
30	RIIC Slave	-	✓	✓	✓	✓	-	

Table 2-4 Support Component

✓: Support, -: Non-support

No	Components	Mode	RH850F1KM	RH850U2A	RH850F1KH	RH850C1M	RH850U2B6	Remarks
31	SCI3 Asynchronous Mode	Transmission	-	✓	-	✓	-	
		Reception	-	✓	-	✓	-	
		Transmission / Reception	-	✓	-	✓	-	
		Multi-processor Transmission	-	✓	-	✓	-	
		Multi-processor Reception	-	✓	-	✓	-	
		Multi-processor Transmission / Reception	-	✓	-	✓	-	
32	SCI3 Clock Synchronous Mode	Transmission	-	✓	-	✓	-	
		Reception	-	✓	-	✓	-	
		Transmission / Reception	-	✓	-	✓	-	
33	Stand-by Controller	-	✓	✓	✓	-	-	Only Stop and DeepStop mode
34	Clock Divider	-	✓	✓	✓	✓	✓	
35	Delay Count	-	✓	✓	✓	✓	✓	
36	External Event Count	-	✓	✓	✓	✓	✓	
37	Input Interval Timer	-	✓	✓	✓	✓	✓	
38	Input Period Count Detection	-	✓	✓	✓	✓	✓	
39	Input Position Detection	-	✓	✓	✓	✓	✓	
40	Input Pulse Interval Judgment	-	✓	✓	✓	✓	✓	
41	Input Pulse Interval Measurement	-	✓	✓	✓	✓	✓	
42	Input Signal Width Judgement	-	✓	✓	✓	✓	-	
43	Input Signal Width Measurement	-	✓	✓	✓	✓	-	
44	Interval Timer	-	✓	✓	✓	✓	✓	
45	One-Pulse Output	-	✓	✓	✓	✓	✓	

Table 2-5 Support Components

✓: Support, -: Non-support

No	Components	Mode	RH850 F1KM	RH850 U2A	RH850 F1KH	RH850 C1M	RH850 U2B6	Remarks
46	One-Shot Pulse output	-	✓	✓	✓	✓	✓	
47	Overflow Interrupt Output (Input Period Count Detection)	-	✓	✓	✓	-	-	
48	Overflow Interrupt Output (Width Measurement)	-	✓	✓	✓	-	✓	
49	PWM Output	-	✓	✓	✓	✓	✓	
50	Triangle PWM Output	-	✓	✓	✓	✓	-	
51	Triangle PWM Output with Dead Time	-	-	✓	✓	✓	✓	
52	UART Interface	Transmission	✓	✓	✓	✓	✓	
		Reception	✓	✓	✓	✓	✓	
		Transmission / Reception	✓	✓	✓	✓	✓	
53	Window Watchdog Timer	-	✓	✓	✓	✓	-	
54	ADC Boundary Flag Generator	-	-	-	-	-	✓	

2.3 New Support

2.3.1 User-defined interrupt handler is supported in Interrupt table for RH850/U2B device.

From Smart Configurator for RH850 V1.7.0, columns “Interrupt Handler” and “Generate Entity” are added into interrupt table when using RH850/U2B device.
User can modify the name of interrupt handler by editing the name listed in column “Interrupt Handler”.
When user checks the checkbox for “Generate Entity”, the code for the interrupt handler will be generated when generating code by Smart Configurator. The default setting is always checked. When you change the setting to unchecked, the interrupt handler code won’t be generated by Smart Configurator, then user can use his own handler code.

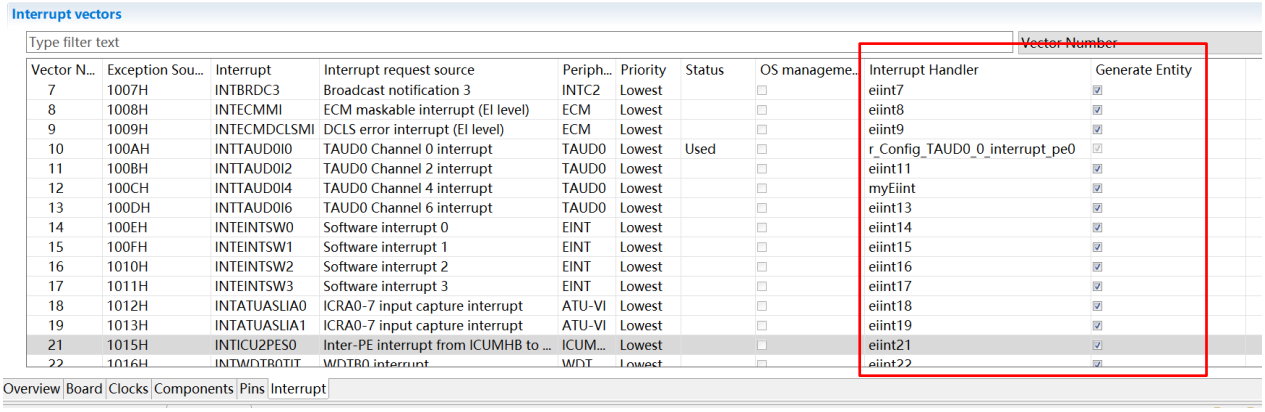

Figure 2-1. Add Column “Interrupt Handler” and “Generate Entity”

2.3.2 Information file including device information and clock information is generated for RH850/U2B

From Smart Configurator for RH850 V1.7.0, when using RH850/U2B, “r_smc_clock_info.h" is generated under “src\smc_gen\general\” folder. This header file contains device information and all clocks frequency. User can know such information from this header file without opening Smart Configurator GUI.

2.3.3 IAR Embedded Workbench project filles are generated

From Smart Configurator for RH850 V1.7.0, when using IAR RH850 Toolchain, IAR Embedded Workbench project files (.eww/.ewp/.ewd) will be generated when generating code for the first time.
When launching the IAR project, all component relative files generated by Smart Configurator are loaded into the IAR Embedded Workbench.
For more details about how to use it, please refer to *RH850 Smart Configurator User’s Guide: IAREW, MULTI.*

3. Changes

This chapter describes changes to the Smart Configurator for RH850 V1.7.0.

3.1 Correction of Issues/Limitations

Table 3-1 List of Correction of Issues/Limitations

✓: Applicable, -: Not Applicable

No	Description	RH850 F1KM	RH850 U2A	RH850 F1KH	RH850 C1M	Remarks
1	Fixed the issue of loading A/D Converter Physical channel select	-	✓	-	-	
2	Fixed the issue of A/D Converter Addition count select	-	✓	-	-	

3.1.1 Fixed the issue of loading A/D Converter Physical channel select

When selecting ADCJnI0S~ADCJnI9S as Physical channel in Smart Configurator for RH850 V1.6.0, after reloading the project, Physical channel will be changed to “ADCJnI0” which is default setting.
This issue has been fixed from Smart Configurator for RH850 V1.7.0.

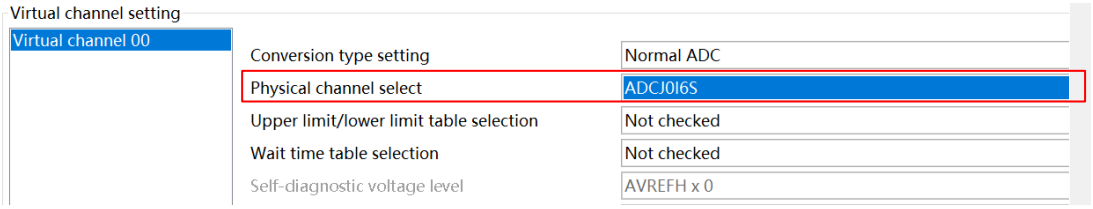

Figure 3-1. A/D Converter Physical channel select

3.1.2 Fixed the issue of A/D Converter Addition count select

“Addition count select” in “Common operation setting” of A/D Converter is not supported in Smart Configurator for RH850 V1.6.0, however, it should be supported.
This issue has been fixed from Smart Configurator for RH850 V1.7.0.

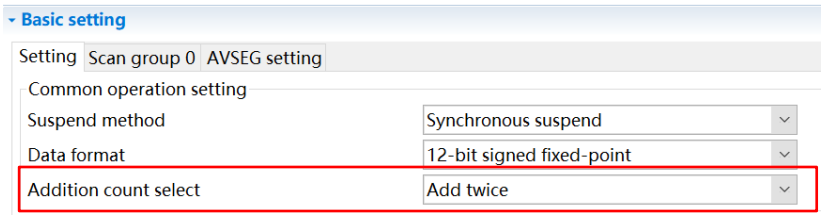

Figure 3-2. Support Addition count select

3.2 Specification Changes

Table 3-2 List of Specification Changes

✓: Applicable, -: Not Applicable

No	Description	RH850 F1KM	RH850 U2A	RH850 F1KH	RH850 C1M	RH850 U2B	Remarks
1	Improved CSIG APIs to support transmission/reception communication function.	✓	-	✓	–	-	
2	Improved Scatter-gather transfer setting GUI of DMA Controller.	-	✓	-	-	-	
3	Improved R_CGC_Create() to support clock gear-up function.	✓	✓	✓	✓	✓	

3.2.1 Improved CSIG APIs to support transmission/reception communication function.

From Smart Configurator for RH850 V1.7.0, when using CSIG Master transmit/receive or CSIG Slave transmit/receive function, Smart Configurator provides new API *"<R_Config_CSIGn>*_Send_Receive()" to support transmission/reception communication function.

3.2.2 Improved Scatter-gather transfer setting GUI of DMA Controller

From Smart Configurator for RH850 V1.7.0, Scatter-gather transfer setting GUI is improved that user can only enable one function: Scatter function or Gather function. These 2 functions can`t be enabled at the same time.

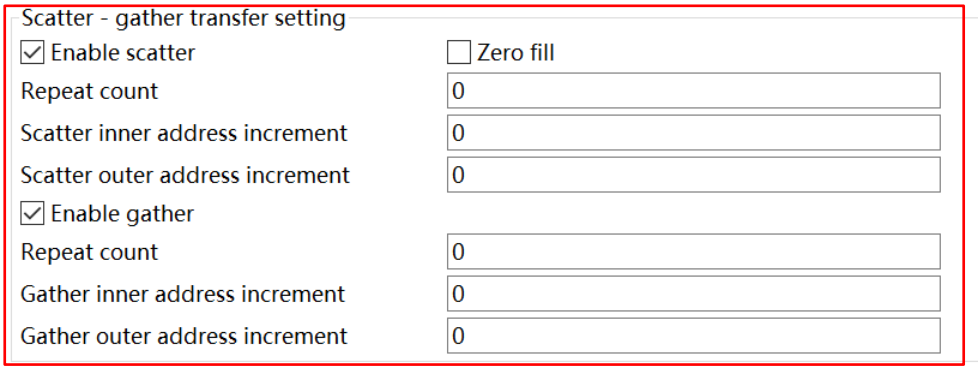

Figure 3-3. Scatter-gather transfer setting in Smart Configurator for RH850V1.6 and before

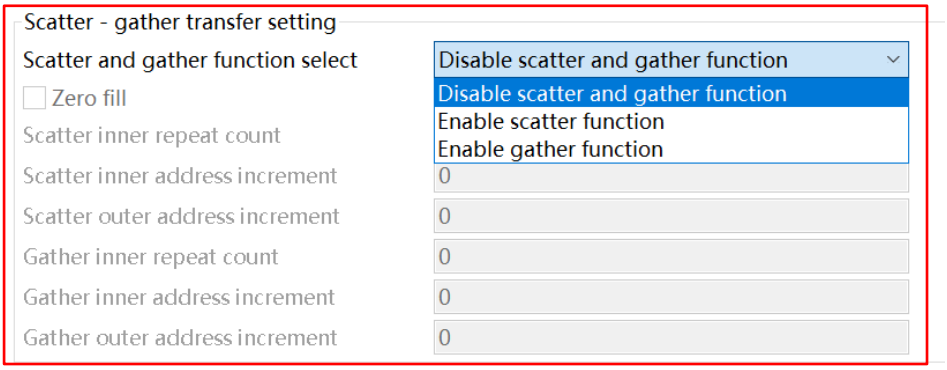

Figure 3-4. Scatter-gather transfer setting in Smart Configurator for RH850V1.7

3.2.3 Improved R_CGC_Create() to support Clock Gear-up function

From Smart Configurator for RH850 V1.7.0, CPU System Clock Gear Up function is supported in API R_CGC_Create(), so that the clock can work well when the clock source of System clock is changed from CLK_IOSC to CLK_PLLO.

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
Mar.16, 2019	R20TS0407	1. Build error occurs when setting not to generate clocks 2. RAM size display error https://www.renesas.com/document/tnn/notes-rh850-smart-configurator	RH850F1KM	V1.2.0
Jun. 01, 2016	R20TS0431	When using PLL0 Clock https://www.renesas.com/document/tnn/notes-rh850-smart-configurator-0	RH850F1KM	V1.2.0
Jul.01, 2019	R20TS0441	1. When using PWM output and triangle PWM output slave setting 2. Port input buffer setting error 3. Port drive strength control setting error 4. Port register setting error https://www.renesas.com/document/tnn/notes-smart-configurator-rh850	RH850F1KM	V1.2.0
Aug.01, 2019	R20TS0463	1. When using the input pulse interval measurement function 2. When using the Clocked Serial Interface in Master mode https://www.renesas.com/document/tnn/notes-smart-configurator-rh850-0	RH850F1KM	V1.2.0
Oct.16, 2019	R20TS0500	1. When using data CRC 2. When using one-pulse outputs https://www.renesas.com/document/tnn/notes-smart-configurator-rh850-1	RH850F1KM	V1.2.0
Apr.16, 2020	R20TS0569	When using CSI master and CSI slave https://www.renesas.com/document/tnn/notes-smart-configurator-rh850-2	RH850F1KM	V1.3.0
May.16, 2020	R20TS0576	When using CSI master and CSI slave https://www.renesas.com/document/tnn/notes-smart-configurator-rh850-3	RH850F1KM	V1.3.0
Feb. 16, 2021	R20TS0668	When using CSI master https://www.renesas.com/document/tnn/notes-smart-configurator-rh850-4	RH850F1KM	V1.4.0

Issue date	Document No.	Description	Applicable MCUs	Fixed version
Apr. 05, 2021	R20TS0679	1. When using CSI Master and CSI Slave with CSIG 2. When using CSI Master with CSIH 3. When using Data CRC 4. When using One-Pulse Output and One-Shot Pulse Output 5. When using PWM Output and Triangle PWM Output https://www.renesas.com/document/tnn/notes-smart-configurator-rh850-5	RH850F1KM RH850U2A	V1.4.0
Jun.16, 2021	R20TS0717	1. When using A/D converter with ADCJ2 https://www.renesas.com/document/tnn/notes-smart-configurator-rh850-6	RH850U2A	V1.5.0
Jul. 01, 2021	R20TS0723	1.Notes on using One-Shot Pulse Output, PWM Output, Triangle PWM Output, Triangle PWM Output with Dead Time functions with TAUD1, TAUD2 https://www.renesas.com/document/tnn/notes-smart-configurator-rh850-7	RH850U2A	V1.5.0
Sep. 16, 2021	R20TS0744	1.Notes on selecting PLL0 clock CPLL0OUT as source of CPU Subsystem clock 2.Notes on using CSIH Master receive and Master transmit/receive operation mode https://www.renesas.com/document/tnn/notes-smart-configurator-rh850-8	RH850F1KM RH850F1KH	V1.5.0
Feb. 01, 2022	R20TS0806	1.Notes on using T&H path self-diagnosis function of A/D Converter 2.Notes on redundant macros and wrong comments in A/D Converter header file https://www.renesas.com/document/tnn/notes-smart-configurator-rh850-9	RH850U2A	V1.6.0

5. Points for Limitation

This section describes points for limitation regarding the Smart Configurator for RH850 V1.7.0.

5.1 List of Limitation

Table 5-1 List of Limitation

✓: Applicable, -: Not Applicable

No	Description	RH850F1KM	RH850U2A	RH850F1KH	RH850C1M	RH850U2B	Remarks
1	Note on using RIIC	✓	✓	✓	✓	✓	

5.2 Details of Limitation

5.2.1 Note on using RIIC

When using RIIC master or RIIC Slave to send or receive data, error interrupt priority must be higher than any other interrupt priority.

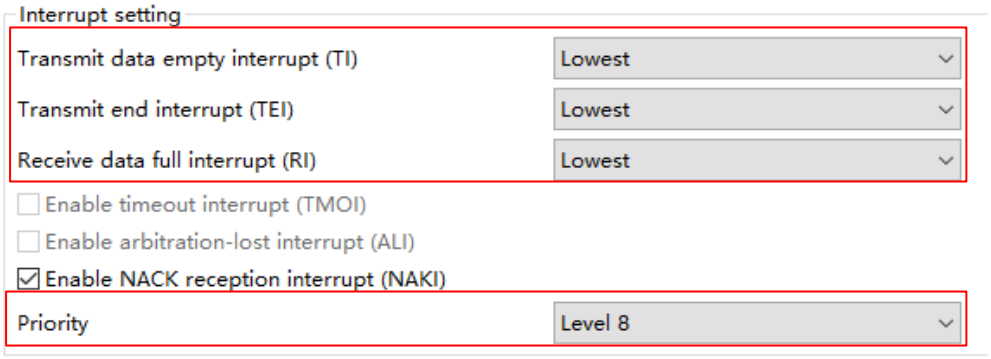

Figure 5-1. RIIC interrupt priority setting

6. Points for Caution

This section describes points for caution regarding the Smart Configurator for RH850 V1.7.0.

6.1 List of Caution

Table 6-1 List of Caution

✓: Applicable, -: Not Applicable

No	Description	RH850F1KM	RH850U2A	RH850F1KH	RH850C1M	RH850U2B	Remarks
1	About the I/O define header file	✓	✓	✓	✓	✓	
2	About loading the project on CS+	✓	✓	✓	✓	✓	
3	About the sample projects	✓	✓	✓	✓	-	
4	About the decimal point	✓	✓	✓	✓	✓	
5	Note on pins sharing functions.	✓	✓	✓	✓	✓	
6	Note on Interrupt Controller resource name	✓	-	-	-	-	
7	Note on DMA/DTS trigger generator setting of MSPI Master	-	✓	-	-	✓	
8	Note on CPU Operating mode of DTS Controller	-	✓	-	-	-	
9	Note on using Smart Configurator when the OS language is Japanese	-	✓	-	-	✓	

6.2 Details of Caution

6.2.1 About the I/O define header file

Please use Renesas iodefine.h for the header file that defines the register. Because RH850 Smart Configurator outputs code conforming to the definition in Renesas iodefine.h, a build error occurs when using the register definition file provided by other environments

6.2.2 About loading the project on CS+

When launching RH850 Smart Configurator from CS+, please set 'RH850 Build tool CC-RH plugin' and 'RH850 Build tool GHS CCRH850 plugin' to enable. If these plugins are disable, the error occurs when CS+ project that includes the setting of RH850 Smart Configurator is loaded.

6.2.3 About the sample project

The RH850 Smart Configurator does not output the processing after resetting the microcontroller (including the startup routine).
Therefore, we provide sample projects that include sample startup routines and other necessary processing so that user applications can be built immediately after peripheral modules are set up using the RH850 Smart Configurator.
Please refer to the user guide for sample projects under installation path.
Default installation path:
C:\Program Files (x86)\Renesas Electronics\SmartConfigurator\RH850\

6.2.4 About the decimal point

For error-free operation of the RH850 Smart Configurator, use a period (".") as the decimal point and a comma (",") as the digit grouping separator. Which of "." (period), "," (comma) or ", " (space) is used as the decimal point or digit grouping separator differs depending on the language setting of the Windows OS that is used. For example, if you use a comma (",") as the decimal point, the RH850 Smart Configurator may not work correctly. This will occur when you are using Windows OS with language set to other than Japanese or English. If you are using the RH850 Smart Configurator on Windows OS with language set to other than Japanese or English, change the language setting to Japanese or English.

6.2.5 Note on pins sharing functions

When function shared pin selects a shared pin, shared pin displays an error.
But the shared pin can be selected correctly and work correctly.
Example) For RH850/U2A RSENT0
Assign RSENT0RX and RSENT0SPCO to the T24 pin
When assigned: T24 pin displays an error

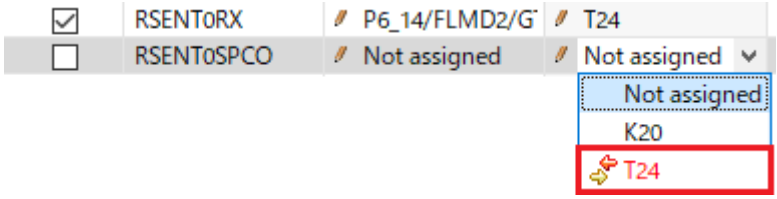

Figure 6-1. pins sharing function sample when assigned

After assignment

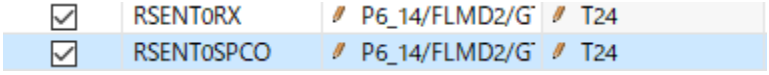

Figure 6-2. pins sharing function sample after assigned

6.2.6 Note on Interrupt Controller resource name

In RH850 Smart Configurator V1.2.0, the resource name of the interrupt controller has been changed to “INTC”. The resource name of the interrupt controller of the previous version is automatically changed from "ICU" to “INTC”.
Therefore, the following file name and macro name are changed.

Table 6-2 File name change

Before change	After change
r_cg_icu.h	r_cg_intc.h

Table 6-3 Macro name change

File name	Before change	After change
r_smc_interrupt.h	ICU_xxx_PRIORITY	INTC_xxx_PRIORITY

6.2.7 Note on DMA/DTS trigger generator setting of MSPI Master

If alternative trigger is selected in Smart Configurator for RH850 V1.5.0, when reloading the project file (.scfg file) into Smart Configurator for RH850 V1.7.0, the alternative trigger signal “Use alternative trigger” can`t be reloaded and the default trigger signal
“Trigger1(DTSMSPI12)/Trigger2(DTSMSPI13)” will be used.
There isn`t this cautions when reloading project between Smart Configurator for RH850 V1.5.0 and before, or between Smart Configurator for RH850 V1.7.0 and later.

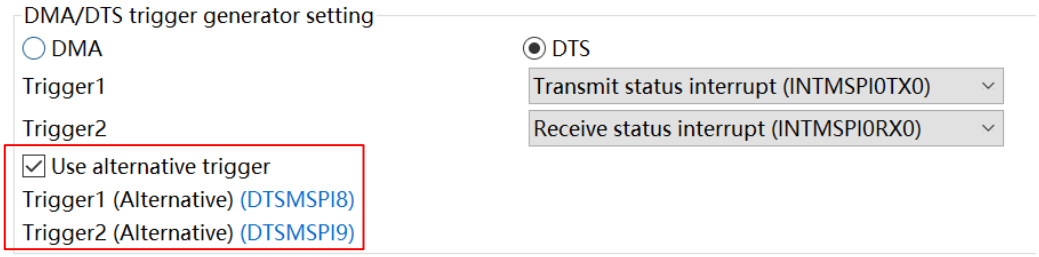

Figure 6-3. “Use alternative trigger” checked in Smart Configurator for RH850 V1.5.0

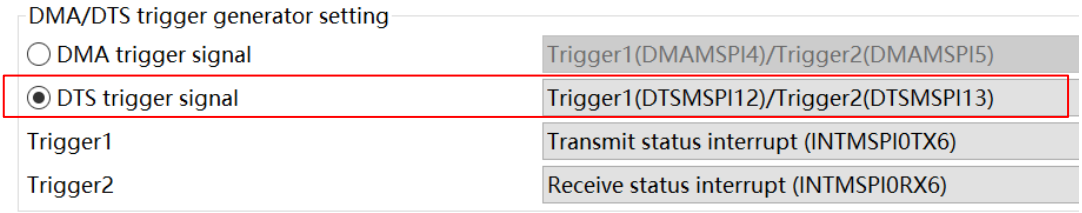

Figure 6-4. “Trigger1(DTSMSPI12/Trigger2(DTSMSPI13)” selected after reloading in Smart Configurator for RH850 V1.6.0

6.2.8 Note on CPU Operating mode of DTS Controller

If CPU operating mode selects “User mode” in Smart Configurator for RH850 V1.5.0, after reloading the project in Smart Configurator for RH850 V1.7.0, CPU operating mode will be changed to “Supervisor mode” which is default setting.
There isn`t this cautions when reloading project between Smart Configurator for RH850 V1.5.0 and before, or between Smart Configurator for RH850 V1.7.0 and later.

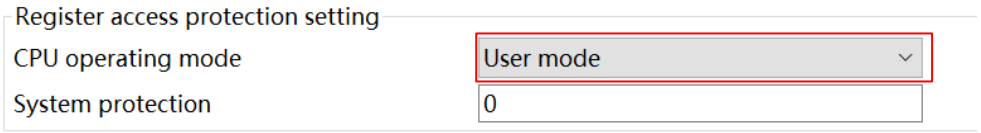

Figure 6-5. CPU operating mode in Smart Configurator for RH850 V1.5.0

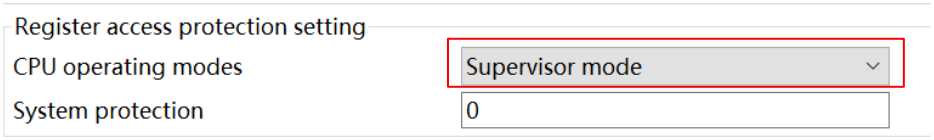

Figure 6-6. CPU operating mode after reloading in Smart Configurator for RH850 V1.6.0

6.2.9 Note on using Smart Configurator when the OS language is Japanese

For RH850/U2x users, we recommend using Smart Configurator on English OS. If your OS is Japanese, you also can add “-Duser.language=en” to “<install directory>\SmartConfigurator\RH850\eclipse\SmartConfigurator.ini” file , then you can see English GUI in Smart Configurator. For RH850/U2x, Smart Configurator Japanese UI is just for your reference, and we do not recommend that you use it.

Revision History

Rev.	Date	Description	
		Page	**Summary**
1.00	July.20.19	-	Create new
1.20	Jan.16.20	-	Update to Rev.1.2.0
1.30	Jan.20.21	All	Update to Rev.1.3.0: 1. update format 2. update all changes 3. Page 3, GHS Multi V7.6.1 is changed to GHS Multi V7.1.6
1.40	May.20.21	All	Update to Rev 1.4.0: 1. Support RH850F1KH-D8 2. Add new feature support 3. Update changes including issues and improvements.
1.41	Jun.20.21	4	Update “Table 2-1 Support Devices” and add RH850/F1KH-D8, RH850/U2A16 and RH850/U2A8 device file version.
1.50	Sep.16.21	All	Update to Rev 1.5.0: 1. Support RH850C1M-A2 2. Add new feature support 3. Update changes including issues and improvements. 4. Update limitation 5. Update cautions for 6.2.3
1.60	Jul.20.22	All	Update to Smart Configurator for RH850 V1.6.0: 1. Support new components for RH850C1M-A2 2. Update changes including issues and improvements. 3. Update List of RENESAS TOOL NEWS AND TECHNICAL UPDATE 4. Update cautions
1.70	Oct.20.22	All	Update to Smart Configurator for RH850 V1.7.0: 1. Support new device RH850/U2B 2. Support new components for RH850F1KH 3. Add three new features support 4. Update changes including issues and improvements. 5. Add new caution No.9

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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