E1/E20/E2 Emulator for the RH850 Family and the RH850 Pod for IE850

R20UT3695EJ0300
Rev.3.00
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Release Note (Restrictions on the Emulator and the Pod when Used with CS+)

This document contains information you will require before using the following emulator and pod products.

E1 emulator:

- R0E000010KCE00

E20 emulator:

- R0E000200KCT00

E2 emulator:

- RTE00020KCE00000R

RH850 pod for IE850:

- RTE7701202EPA00000J
- RTE7701206EPA00000R
- RTE7701412EPA00000R
- RTE7701427EPA00000R
- RTE7701460EPA00000R

This document describes the items listed below.

- Descriptions of restrictions applicable to the emulator debugger but not to the target device
- Descriptions of restrictions applicable to both the target device and emulator debugger but for which correction is only planned in the case of the emulator debugger

Refer to the E1/E20/E2 Emulator Additional Document for the RH850 family for cautionary notes on using the emulator. Also refer to the user's manual for the pod you are using for cautionary notes on using the RH850 pod for IE850. For restrictions on the target devices, refer to the following documents.

- User’s manual for the target device
- Document regarding restrictions on the target device

Contents

1. List of Restrictions and Added Specifications

No.	Restrictions or Changes/Additions to Specifications	CS+ Ver.		
		V2.01.00	V2.02.00 V3.00.00	V3.01.00 V3.02.00 V3.03.00 V4.00.00 V4.01.00 V5.00.00 V6.00.00
1	Connection/disconnection	√	—	—
2	Downloading to and uploading from external flash memory(*1)	√	√	√
3	Display of download/upload status (progress dialog box)	√	√	√
4	Memory mapping(*1)	√	√	—
5	Memory function (CPU reset)	√	√	√
6	Display of memory in dedicated RAM areas used by peripheral modules	√	√	√
7	Display of I/O registers	√	√	√
8	Effective number of hardware breaks(*2)	√	√	√
9	Control of execution (snooze instruction)	√	—	—
10	Control of execution (interrupt, exception, and CALLT instructions)	√	—	—
11	Time measurement	√	√	—
12	Trace data on branch origins(*3)	√	√	√
13	Out-of-range trace events (1)(*3)	√	√	√
14	Out-of-range trace events (2)(*3)	√	√	√
15	Abnormal exit when out-of-range trace events are set(*3)	√	√	√
16	Using two trace modes at the same time(*3)	√	√	√
17	Data having priority (non-realtime) in tracing(*3)	√	√	√
18	Debug console	√	√	√
19	Boot loader projects for multi-core devices(*2)	√	√	—
20	Use of static variables	√	—	—
21	Division of load modules	√	√	√
22	Trace function (trace settings)(*3)	√	√	√
23	State when the size of the main window is maximized(*2)	√	√	√
24	Execution of Python scripts	√	√	√
25	Debugging information	√	√	√
26	Source files with the same name	√	√	√
27	Breakpoint settings for “for” statements and inline functions	√	√	√

√: Applicable, —: Not applicable

Notes: 1. When using a device which can be connected to external memory.
2. When using a device with multiple cores (multi-core device).
3. When using a device with the trace function, a debugging MCU board, or the RH850 pod for IE850.

2. CS+ Versions and Supported Groups

(1) E1/E20/E2* Emulator

CS+ Ver.	Device Group								
	F1L	E1L E1M-S	C1M C1H F1M F1H	P1M	D1L D1M P1M-C P1H-C	F1K E1M-S2	P1M-E	P1L-C	F1KM V1R-M
V2.01.00	√	—	—	—	—	—	—	—	—
V2.02.00	√	√	—	—	—	—	—	—	—
V3.00.00	√	√	√	—	—	—	—	—	—
V3.01.00	√	√	√	√	—	—	—	—	—
V3.02.00	√	√	√	√	√	—	—	—	—
V3.03.00	√	√	√	√	√	—	—	—	—
V4.00.00	√	√	√	√	√	√	—	—	—
V4.01.00	√	√	√	√	√	√	√	—	—
V5.00.00	√	√	√	√	√	√	√	√	—
V6.00.00	√	√	√	√	√	√	√	√	√

√: Supported, —: Not supported

Note: The E2 emulator is to be supported by CS+ from version 5.00.00.

(2) RH850 Pod for IE850

CS+ Ver.	RTE7701202EPA00000J	RTE7701412EPA00000R RTE7701427EPA00000R	RTE7701216EPA00000R	RTE7701460EPA00000R
V2.01.00	—	—	—	—
V2.02.00	—	—	—	—
V3.00.00	√	—	—	—
V3.01.00	√	—	—	—
V3.02.00	√	√	—	—
V3.03.00	√	√	—	—
V4.00.00	√	√	√	—
V4.01.00	√	√	√	—
V5.00.00 V6.00.00	√	√	√	√

√: Supported, —: Not supported

3. Details of Restrictions and Added Specifications

No.1 Connection/disconnection

[Description] When operation of the emulator is abnormally terminated due, for example, to disconnection of the USB, attempting reconnection will not cause the emulator to be connected and the message [Undefined error] is returned.

[Resolution] Turn power to the target board and emulator off and then on again to restart both.

No.2 Downloading to and uploading from external flash memory

[Description] This emulator does not support downloading to external flash memory.

[Resolution] None

No.3 Display of download/upload status (progress dialog box)

[Description] If you click on the [Cancel] button on the [Progress Status] dialog box that appears during downloading, closing the dialog box takes some time because so does the cancellation of downloading. Wait until the dialog box is closed.

[Resolution] None

No.4 Memory mapping

[Description] This emulator does not support mapping to external memory.

[Resolution] None

No.5 Memory function (CPU reset)

[Description] When [CPU Reset after download] and [Execute to the specified symbol after CPU Reset] are set to [Yes], execution proceeds up to the position of the specified symbol after downloading. However, if the [Download] menu item is selected so that connection to the debugging tool and downloading proceed at the same time, memory values up to the position of the symbol after the reset are not displayed in pink (which indicates realtime RAM monitoring) in the [Memory] panel.

[Resolution] Execute [Connect] and [Download] separately. After execution is stopped and then resumed, memory values up to the position of the symbol are displayed in pink.

No.6 Display of memory in dedicated RAM areas used by peripheral modules

[Description] The emulator does not support the display of memory in dedicated RAM areas used by peripheral modules.

[Resolution] Access can be gained by directly specifying an address in the watch panel.

Example: *((int*)0xFFC62230)

No.7 Display of I/O registers

[Description] While display of the contents of I/O registers is supported, the display of individual bits is not.

[Resolution] The values of individual bits in I/O registers can be monitored by registering the bits in the watch panel.

No.8 Effective number of hardware breaks

[Description] Only a total of up to 12 hardware breaks can be set for all cores.

[Resolution] None

No.9 Control of execution (snooze instruction)

[Description] When a snooze instruction is executed during single-step (SS) execution and an interrupt is input while execution is stopped due to the snooze instruction, an SS exception occurs after executing the top instruction of an interrupt handler instead of on completion of the snooze instruction. Thus, it seems that execution slipped past the snooze instruction.

[Resolution] None

No.10 Control of execution (interrupt, exception, and CALLT instructions)

[Description] When the next instruction following stepped execution of an interrupt, exception, or CALLT instruction is LDSR or STSR with the PSW, EIIC, FEIC, EIPSW, or FEPSW as its operand, the value read from the register may not correspond to the actual value or the value may not be correctly reflected in the register.

[Resolution] None

No.11 Time measurement

[Description] Point-to-point time measurement is not possible.

[Resolution] Measure execution time up to the point of stopping the program.

No.12 Trace data on branch origins

[Description] Branch trace information being displayed consists of trace data on the branch origins and destinations, complemented by the source code between the origins and destinations. When you use trace start and trace end events, trace data may not be acquired because branch information that is necessary for complementing the source code is not acquired. This depends on the locations of the trace start and trace end events.

[Resolution] None. Trace start and trace end events must be set on lines that include branch instructions.

No.13 Out-of-range trace events (1)

[Description] For an out-of-range trace event, be sure to specify the start and end addresses.

[Resolution] None

No.14 Out-of-range trace events (2)

[Description] Only one section is specifiable for an out-of-range trace event.

[Resolution] None

No.15 Abnormal exit when out-of-range trace events are set

[Description] If connection to the debugging tool is lost for some reason (e.g. by disconnecting the USB) when an out-of-range trace event is set, re-connecting the emulator does not restore that out-of-range trace event. It is also not possible to set new out-of-range trace events in this state.

[Resolution] After connection to the debugging tool has been lost, close the project and open it again, then reconnect the debugging tool and download the program. You can now set new out-of-range trace events.

No.16 Using two trace modes at the same time

[Description] "Section trace" and "Range Out trace" cannot be used at the same time.

[Resolution] None

No.17 Data having priority (non-realtime) in tracing

[Description] When priority in tracing is given to data, the function to stop tracing when the trace memory becomes full (trace-full stop function) is not usable.

[Resolution] To use the trace-full stop function, give priority in tracing to speed (realtime).

No.18 Debug console

[Description] This emulator does not support the debug console.

[Resolution] None

No.19 Boot loader projects for multi-core devices

[Description] Boot loader projects are not supported for multi-core devices.

[Resolution] None

No.20 Use of static variables

[Description] The functions listed below cannot be used in the address range of a variable that was declared static in the source file. The error message "Symbol not found" is displayed.

Applicable functions:

a. Setting of a hardware or software break
b. Setting of events (break, trace, time measurement)
c. Setting of action events
d. Jumping to a memory location

[Resolution] None

No.21 Division of load modules

[Description] The restrictions below apply when the CC-RH compiler is used to generate split load modules from a program.

a. Source-level debugging becomes impossible.
b. The second and subsequent output files are not automatically registered with the debugging tool.

[Resolution] Do not divide the program up into separate load modules.

No.22 Trace function (trace settings)

[Description] Even though trace settings are displayed in the properties area under the tabbed page for debug tool settings, the trace function cannot be used if the device does not include its own trace function. Do not change the related items in the properties area.

[Resolution] None

No.23 State when the size of the main window is maximized

[Description] When the list in the combo box used for switching between cores on the status bar is being displayed while the size of the main window is maximized, part of the list is hidden behind the task bar and thus cannot be selected.

[Resolution] Set the task bar to “Hide automatically” or set the location of the task bar as [Right], [Left], or [Upper].

No.24 Execution of Python scripts

[Description] Commands other than those listed below cannot be used when a Python script is executed with a hook process setting.

debugger.Register.GetValue
debugger.Register.SetValue
debugger.Memory.GetValue
debugger.Memory.SetValue

[Resolution] Use a hook facility that can be registered by the hook function in the Python console.

No.25 Debugging information

Some restrictions apply to the debugging information generated by the CC-RH compiler.
Problems that arise due to these restrictions are listed below.
Note, however, that the reason for these problems is a difference between the debugging information generated by the compiler and the actual code. The result of executing the code generated by the CC-RH compiler is correct.

No. 25-1 Source-level stepping

[Description 1] During source-level stepping, the debugger may appear to be executing instructions that are not supposed to be executed.

[Example 1-1] In the example below, execution stops at the position marked (*2) after completing the for loop starting at (*1) and branches to the next line depending on the value of "i".
Under some conditions, however, the PC (indicated by an arrow) will appear to have moved to the position marked (*3) regardless of the value of "i" at (*2).

```
void main()
{
        int i = 0;
        int j = 0;
        for (j = 0; j < 10; j++) {  <-(*1)
                i = atoi("100");
        }
if (i != 100) {           <-(*2)
                i = atoi("100");       <-(*3)
        }
        return;
}
```

Conditions:

a. There is a conditional or loop control statement (e.g. if, for, switch) at the position marked (*2).
b. The statement immediately before (*2) is any of the following.
   - A conditional or loop control statement
   - A label, goto, or return statement
   - A statement including a ternary, logical, or NOT operator

[Resolution] None

[Description 2] During source-level stepping, the debugger may appear to be executing instructions that are not supposed to be executed.

[Example 1-2] In the example below, execution branches to the assignment for the third case statement (*2) from the position marked (*1) when function GetCount() is called for the first time. Under some conditions, however, the PC (indicated by an arrow) will appear to have moved to the position marked (*3), the statement for the case immediately before (*2).

```
enum Count { ZERO, ONE, TWO };

enum Count GetCount()
{
       static enum Count value = ZERO;

       switch (value) {      <-(*1)
       case TWO:
              value = ZERO;
              break;
       case ONE:
              value = TWO;   <-(*3)
              break;
       case ZERO:
       default:
              value = ONE;   <-(*2)
              break;
       }
       return value;
}
```

Conditions:

The instruction at the branch destination

a. acquires the value of a constant, or
b. determines the address of a variable.

[Resolution] None

No. 25-2 Display of information on variables

[Description] If two or more variables defined in a function have the same name, the values of variables that can be viewed when the program has stopped may differ from the expected values.
Whether this phenomenon arises depends on the optimization level* selected during the process of compilation.

Note: The optimization level can be set via [Build Tool] – [Common Options] – [Frequently Used Options (Link)].

[Example] In the example below, char-type variable "a" is in the innermost scope at (*1) and int-type variable "a" is in the innermost scope at (*2). Under some conditions, however, only the value of one of the variables will be visible at (*1) and (*2).

```
void main()
{
        int a = 100;
        {
                char a = 'A';
                a++;          <-(*1)
        }
        a++;             <-(*2)
}
```

- Display of (*1) in the [Watch] panel

```
      "a"       'A' (0x41)   "signed char"  "0xfefb1004" // Expected value
  or  "a"  100 (0x00000064)  "int"          "0xfefb1000"
```

- Display of (*2) in the [Watch] panel

```
      "a"       'B' (0x42)   "signed char"  "0xfefb1004"
  or  "a"  100 (0x00000064)  "int"          "0xfefb1000" // Expected value
```

Condition:

Optimization other than for debugging at the time of compilation.

[Resolution] Select [Optimize for Debugging] as the optimization level before compilation.

No.26 Source files with the same name

[Description] When two or more files with the same name exist in a load module being debugged, line addresses are not displayed correctly in the editor. Setting of events also does not work correctly.

Example:

C:¥Work¥CS+¥ProjA¥ProjA.mtpj¥Src¥main.c -> A.abs
C:¥Work¥CS+¥ProjB¥ProjB.mtpj¥Src¥main.c -> B.abs
This is a case where the above two load modules are being debugged simultaneously.

Note: Although multiple load modules are used in the above example, this restriction is also applicable to cases where a single load module is in use.

Condition: The relative paths to the files from the compilation directory are the same (including the filenames).

Building by CS+
Project file directory (*.mtpj) = compilation directory
Note: The filename extension for files in subprojects is not *.mtpj but *.mtsp.
Building by using a makefile
Current directory = compilation directory

[Resolution] Source files with the same name can be distinguished in either of the following ways.

a. Change the configuration of the folders so that the relative paths to the files from the compilation directory differ.

Before: ProjA¥Src¥main.c
ProjB¥Src¥main.c
After: ProjA¥SrcA¥main.c
ProjB¥SrcB¥main.c
With this change, the relative paths will be as follows.
“SrcA¥main.c”
“SrcB¥main.c”

b. Change the names of the source files so that all of the files to be debugged have unique names.

Before: ProjA¥Src¥main.c
ProjB¥Src¥main.c
After: ProjA¥Src¥mainA.c
ProjB¥Src¥mainB.c

No.27 Breakpoint settings for “for” statements and inline functions

[Description] When the C source code for a program includes statements of the types listed below, the instructions corresponding to a single line of the source code will be at multiple points. However, the editor only indicates the address of one of the instructions. When a breakpoint is set for a line of a listed type, the break will only be generated at the address indicated by the editor.

a. Inline functions (*)
b. Template functions
c. The first lines of for and do-while statements

Note: This includes functions which are inline-expanded by optimization.

[Resolution] None

REVISION HISTORY	E1/E20/E2 Emulator for the RH850 Family and the RH850 Pod for IE850 Release Note (Restrictions on the Emulator and the Pod when Used with CS+)

Rev.	Date	Description	
		Page	Summary
1.00	Apr. 04, 2016	-	The first edition was issued by merging the following documents. R20ut2743ej0600 r20ut3055ej0400 r20ut3115ej0300 r20ut3117ej0400 r20ut3119ej0200 r20ut3121ej0200 r20ut3291ej0100 r20ut3545ej0100
		2, 3	CS+ V3.03.00 and V4.00.00 were added.
1.10	Oct. 05, 2016	2, 3	CS+ V4.01.00 was added.
		2	Statements No. 2, No. 3, No. 9, No. 15, No. 16, and No. 25 in Rev. 1.00 were deleted. Detailed descriptions of these restrictions were also deleted on page 4 and subsequent pages. Descriptions of these items were shifted to the E1 or E20 Emulator Additional Document for User's Manual for individual MCU groups or to the user's manual for the RH850 pod for the IE850.
		3	• New support for the following groups by the E1 and E20 emulators was stated. F1K E1M-S2 P1M-E • The RTE7701216EPA00000R was added as the RH850 pod for IE850.
2.00	Jan. 20, 2017	1	Statement regarding support for the E2 emulator was added.
		2, 3	CS+ V5.00.00 was added.
		3	• New support for the P1L-C group by the E1 and E20 emulators was stated. • The RTE7701460EPA00000R was added as the RH850 pod for IE850.
3.00	Jul.01.2017	2, 3	CS+ V6.00.00 was added.
		3	• New support for the F1KM and V1R-M groups by the E1/E20/E2 emulators was stated.

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