E1/E20 Emulator for the RH850/D1L and RH850/D1M Groups

Release Note (Restrictions on the Emulator when Used with CS+)

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This document describes the items listed below. Also refer to E1/E20 Emulator Additional Document for the RH850/D1L and RH850/D1M groups for cautionary notes on using the emulator.

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

For restrictions on the target device, refer to the following document.

- User's manual for the target MCU
- Document on restrictions for the target MCU

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		V3.02.00
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√: Applicable, —: Not applicable

2. Details of Restrictions and Added Specifications

No. 1 Rewriting of on-chip flash memory (clock monitor)

[Description] The debugger changes the PLL multipliers as shown below when the flash memory is rewritten*. Thus, rewriting the flash memory raises a possibility of the frequency becoming higher than that currently in use. If the frequency surpasses the upper limit which was set by the clock monitor (CLMA), this prevents rewriting of the flash memory.

[Changes in the PLL multiplier]

D1M2(H):
When MainOSC=8 MHz, frequencies are multiplied by 30 (CPU clock at 240 MHz).
When MainOSC=10 MHz, frequencies are multiplied by 24 (CPU clock at 240 MHz).
When MainOSC=12 MHz, frequencies are multiplied by 20 (CPU clock at 240 MHz).
When MainOSC=16 MHz, frequencies are multiplied by 15 (CPU clock at 240 MHz).

D1M1H:
When MainOSC=8 MHz, frequencies are multiplied by 25 (CPU clock at 200 MHz).
When MainOSC=10 MHz, frequencies are multiplied by 20 (CPU clock at 200 MHz).
When MainOSC=16 MHz, frequencies are multiplied by 12.5 (CPU clock at 200 MHz).

D1M1:
When MainOSC=8 MHz, frequencies are multiplied by 20 (CPU clock at 160 MHz).
When MainOSC=10 MHz, frequencies are multiplied by 16 (CPU clock at 160 MHz).
When MainOSC=16 MHz, frequencies are multiplied by 10 (CPU clock at 160 MHz).

D1L1, D1L2(H):
When MainOSC=8 MHz, frequencies are multiplied by 15 (CPU clock at 120 MHz).
When MainOSC=10 MHz, frequencies are multiplied by 12 (CPU clock at 120 MHz).
When MainOSC=12 MHz, frequencies are multiplied by 10 (CPU clock at 120 MHz).
When MainOSC=16 MHz, frequencies are multiplied by 7.5 (CPU clock at 120 MHz).

Note: Rewriting of flash memory proceeds in response to any of the operations below.
a. Downloading to on-chip flash memory
b. Changes in on-chip flash memory due to operations in the memory panel
c. Setting or cancellation of software breaks
d. Re-execution after a software break is encountered (including stepped execution)

[Resolution] If the change in the clock frequency due to the debugger is a problem, set [Change the clock to flash writing] in the property panel to [No].

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 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. 5 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. 6 Access to memory by using the DMM facility

[Description] The DMM facility (to modify data during a short break) can only be used for access to the local RAM.

[Resolution] None

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 Control of execution (power-saving modes)

[Description] Release from the DEEPSTOP mode follows any of the following operations or conditions while the user program is being executed.

a. Break
b. Memory access
c. Setting an event

[Resolution] None

No. 9 Write-access and read/write-access break conditions

[Description] In cases where a write-access or read/write-access break condition is set, the write cycle of read-modify-write (RMW) generated by a bit-manipulation instruction does not lead to a break.

[Resolution] None

No. 10 Breaks while clock settings are being made

[Description] The flash memory cannot be programmed if a break occurs while clock settings are being made.

[Resolution] When performing operations below in a break state while the clock was being set, set [Change the clock to flash writing] in the property panel to [No].

a. Any operation that involves programming of the flash memory (e.g. re-downloading)
b. Setting or deleting software breakpoints

Also, do not set software breakpoints within the clock-setting routine.

No. 11 Break triggered by reading data

[Description] Read-access break conditions cannot be set for SYSCALL instructions.

[Resolution] None

No. 12 Debug console

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

[Resolution] None

No. 13 Using the [IOR] panel while the peripheral guard facility is enabled

[Description] Opening the [IOR] panel while the peripheral guard facility is enabled leads to an error because the [IOR] panel also displays registers that have been protected by the peripheral guard facility. Do not open the [IOR] panel while the peripheral guard facility is enabled.

[Resolution] To view data on registers other than those protected by the peripheral guard facility, use the [Watch] panel after adding the registers to the panel.

No. 14 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. 15 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. 16 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. 16-1 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. 16-2 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. 17 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 *.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. 18 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

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