

Outline

When using the RI600V4 real-time OS for the RX family, note the following point.

1. Memory Corruption by a Kernel

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1.1 Applicable Products

- (1) RI600V4 real-time OS for the RX family, V1.06.00

The Object Release, Source Release, and Trial of RI600V4 are applicable.

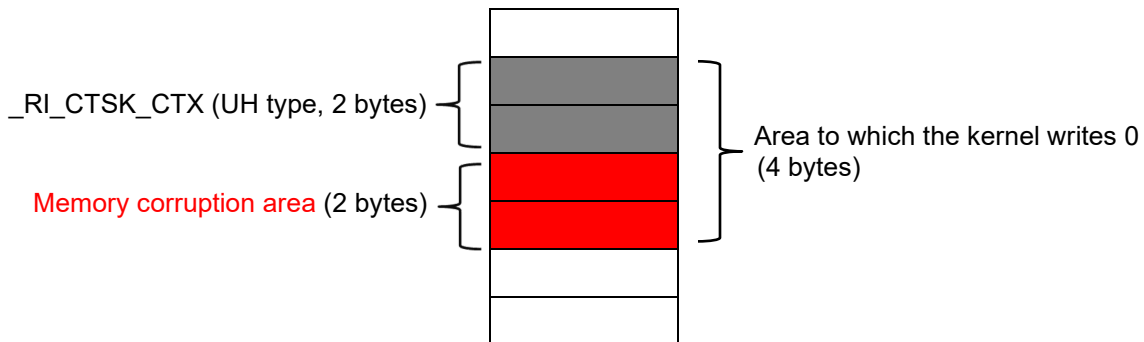
1.2 Applicable Devices

All devices of the RX family

1.3 Details

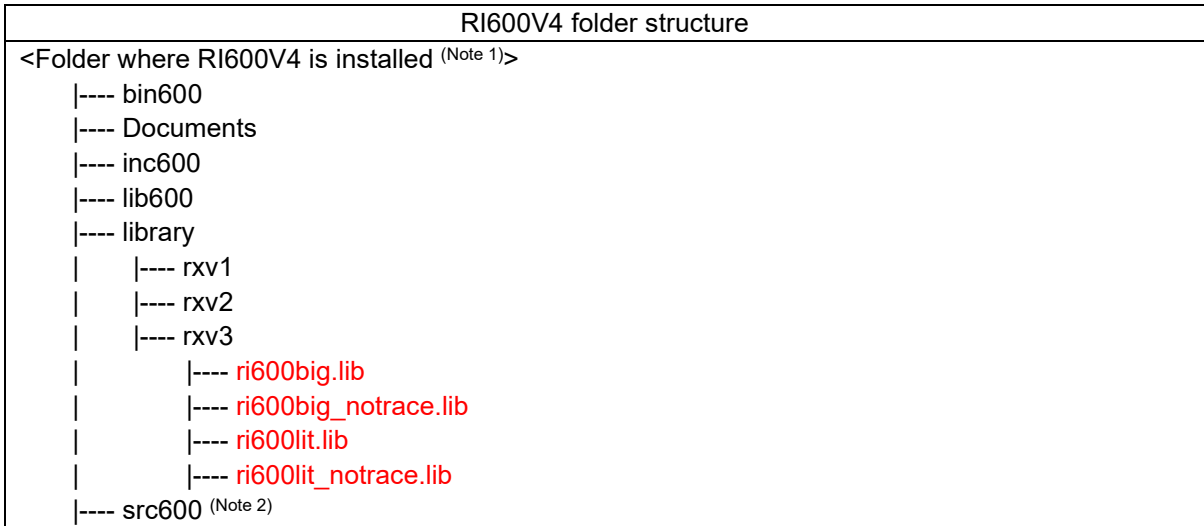
A 32-bit transfer instruction that exceeds the data size (16 bit) was sometimes used during access to the kernel management data `_RI_CTSK_CTX` that was added in RI600V4 V1.06.00. As a result, the first two bytes of the data immediately after `_RI_CTSK_CTX` are corrupted with zero during kernel initialization or program execution.

Figure 1.1 How the problem occurs



1.4 Conditions

This problem occurs when a kernel library in any of the rxv3 folders indicated in red is linked.



When a new project is created, the condition for linking a kernel library in an rxv3 folder depends on the integrated development environment to be used.

Table 1.1 Condition for Integrated Development Environment

Integrated Development Environment	Condition for linking a kernel library in an rxv3 folder when a new project is created
CS+	CC-RX V3.01.00 or later is selected.
e ² studio	The target device is a CPU core of the RXv3 architecture.

Note 1:

For the Windows10 64-bit edition, the default installation folder is as follows.

For CS+: C:\Program Files(x86)\Renesas Electronics\CS+\CC\RI600V4

For e² studio: C:\Program Files (x86)\Renesas\RTOS\RI600V4

Note 2:

This folder exists only in the Source Release of RI600V4.

1.5 Example

An example of the problem is shown below.

— A fixed-sized memory pool is used.

Data for managing whether to use fixed-sized memory blocks might be placed immediately after `__RI_CTSK_CTX`. In this case, the data is initialized to a memory block unused state (0) during kernel initialization and program execution.

If the number of memory blocks is less than 8, the management data for the fixed-sized memory blocks is 1 byte. As a result, the next 1 byte after the management data is also cleared to zero.

1.6 Workaround

Follow the action described in (1) or (2).

(1) Change the installation destination file

Change `_RI_CTSK_CTX` in the following file to an array with two elements.

- `<Folder where RI600V4 is installed>\lib600\kernel_ram.h` (Note 3)

Specifically, modify the setting as follows.

Before modification

```
UH          _RI_CTSK_CTX;          /* Current task context */
```

After modification

```
UH          _RI_CTSK_CTX[2];      /* Current task context */
```

Note 3:

This file is an input file of the configurator for RI600V4 (`cfg600.exe`). On the other hand, `kernel_ram.h` registered in the project is an output file.

If the workaround is applied only to the output file, the workaround might not be applied in the next build.

(2) Change the kernel library to be linked

Change the kernel library to a kernel library in the `rxv1` or `rxv2` folder (see 1.4 Conditions). How to change the kernel library depends on the integrated development environment you are using.

(2-1) CS+

Change the CC-RX version.

In the Project Tree pane, select [CC-RX (Build Tool)]. Then, change the version in [Using compiler package version] under [Version Select] on the [Common Options] tabbed page.

- Kernel library in the `rxv1` folder: V2.01.00 or earlier
- Kernel library in the `rxv2` folder: V2.02.00 or later and V3.00.00 or earlier

(2-2) e² studio

Change the file path to the kernel library.

In the project properties window, select [C/C++ Build] and then [Settings]. In the [Tool Settings] tab, select [Linker], [Input], [Relocatable files, object files, and library files to be linked (-input/-library/-binary)].

- Kernel library in the `rxv1` folder:
 - `<Folder where RI600V4 is installed>\library\rxv1\ri600big.lib` or
 - `<Folder where RI600V4 is installed>\library\rxv1\ri600lit.lib`
- Kernel library in the `rxv2` folder:
 - `<Folder where RI600V4 is installed>\library\rxv2\ri600big.lib` or
 - `<Folder where RI600V4 is installed>\library\rxv2\ri600lit.lib`

1.7 Note

The symbols placed after `__RI_CTSK_CTX` can be viewed in the map file by specifying `-show=symbol` in the link options.

1.8 Schedule for Fixing the Problem

This problem will be fixed in the next version.

Revision History

Rev.	Date	Description	
		Page	Summary
1.00	Sep.16.21	-	First edition issued

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