

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.

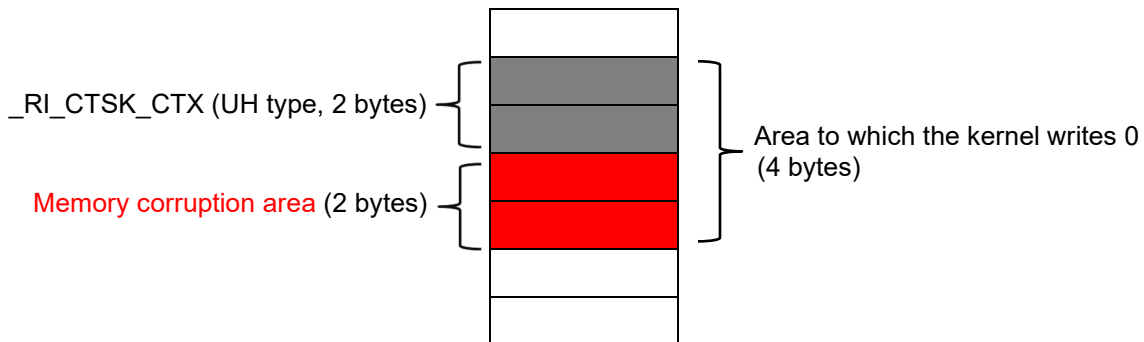
1.2 Applicable Devices

All devices of the RX family

1.3 Details

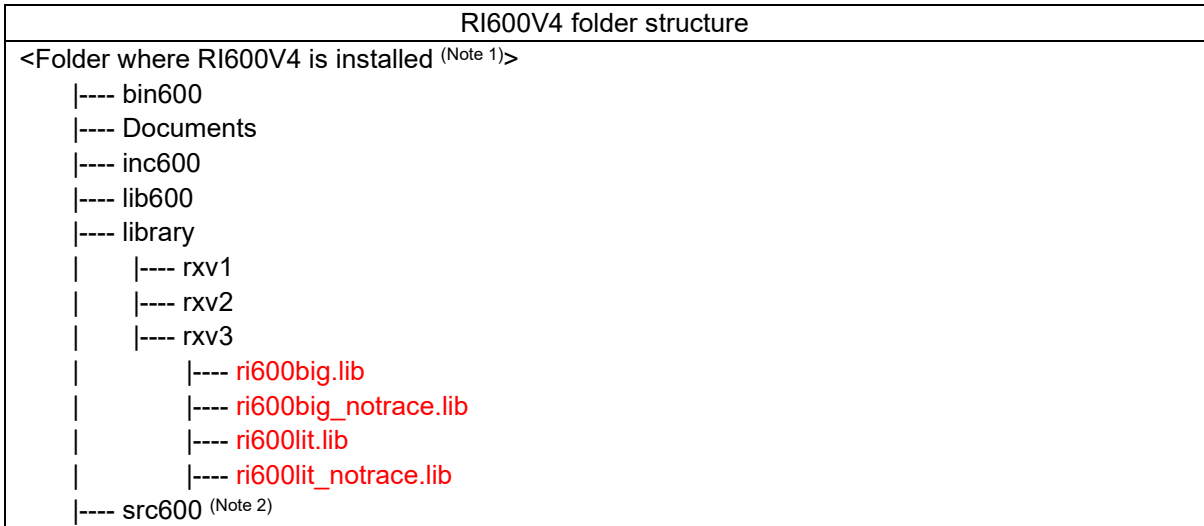
A 32-bit transfer instruction that exceeds the data size (16 bit) was sometimes used during access to the kernel management data `_RI_CTSK_CTX` that was added in RI600V4 V1.06.00. As a result, the first two bytes of the data immediately after `_RI_CTSK_CTX` are corrupted with zero during kernel initialization 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 <sup>2</sup> 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 e<sup>2</sup> 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) e<sup>2</sup> 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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