[Notes]
RX Family
Flash Module Using Firmware Integration Technology
RX Driver Package

R20TS0963EJ0101
Rev.1.01
Oct. 01, 2023

Outline

When using the product in the title, note the following points.

1. Note on response when the flash sequencer reset command (FLASH_CMD_RESET)* is executed while the "R_FLASH_Erase" or "R_FLASH_BlankCheck" function is being executed in non-blocking mode for flash type 1
2. Note on response when the flash sequencer reset command (FLASH_CMD_RESET)* is executed while the "R_FLASH_Write" function, access window setup command (FLASH_CMD_ACCESSWINDOW_SET)*, or startup area switching command (FLASH_CMD_SWAPFLAG_TOGGLE)* is being executed in non-blocking mode for flash type 1
3. Note on response when the flash sequencer reset command (FLASH_CMD_RESET)* is executed while the "R_FLASH_Erase", "R_FLASH_BlankCheck", or "R_FLASH_Write" function is being executed in non-blocking mode for flash type 3, 4, or 5

* This command is issued by using the "R_FLASH_Control" function.

1. Note on response when the flash sequencer reset command (FLASH_CMD_RESET) is executed while the "R_FLASH_Erase" or "R_FLASH_BlankCheck" function is being executed in non-blocking mode for flash type 1

1.1 Applicable Products

(1) RX Family Flash Module Using Firmware Integration Technology (Flash Module) Rev.5.10 (document no. R01AN2184EJ0510) and earlier

(2) RX Driver Package Rev.1.41 (document no. R01AN6907EJ0141) and earlier include the Flash Modules in (1).

(3) FIT Modules used in combination with the Flash Modules and their application notes

The problem may occur when certain FIT Modules are used with the Flash Modules in (1).

Examples:

- RX Family Firmware Update Module Using Firmware Integration Technology (R01AN5824EJ) https://www.renesas.com/us/en/search?keywords=R01AN5824
- RX Family TSIP (Trusted Secure IP) Module Firmware Integration Technology (R20AN0548EJ) https://www.renesas.com/us/en/search?keywords=R20AN0548

1.2 Applicable Device Groups

(1) Flash type 1:
RX110, RX111, RX113, RX130, RX13T, RX140, RX230, RX231, RX23E-A, RX23T, RX23W, RX24T, and RX24U groups

1.3 Details and Conditions

If the flash sequencer reset command (FLASH_CMD_RESET) is executed while the "R_FLASH_Erase" or "R_FLASH_BlankCheck" function is being executed in non-blocking mode for flash type 1, processing might not return from the "R_FLASH_Control" function.

1.4 Workaround

Refer to the following and change r_flash_rx¥src¥r_flash_nofcu.c as shown in red.

Before modification (E.g., Flash Module Rev.5.10: Line 337 to 346)

```
void flash_stop(void)
{
    FLASH.FCR.BIT.STOP = 1;
    while (FLASH.FSTATR1.BIT.FRDY == 0)     // wait for FRDY
        ;

    FLASH.FCR.BYTE = 0;
    while (FLASH.FSTATR1.BIT.FRDY == 1)     // wait for FRDY
        ;
}
```

After modification

```
void flash_stop(void)
{
    if ((g_current_parameters.bgo_enabled_cf == true)
     || (g_current_parameters.bgo_enabled_df == true))
    {
        /* Disable FRDYI interrupt request */
        flash_InterruptRequestDisable(VECT(FCU,FRDYI));
    }

    if ((FLASH.FENTRYR.WORD == 0x0080) || (FLASH.FENTRYR.WORD == 0x0001))
    {
        FLASH.FCR.BIT.STOP = 1;
        while (FLASH.FSTATR1.BIT.FRDY == 0)     // wait for FRDY
            ;

        FLASH.FCR.BYTE = 0;
        while (FLASH.FSTATR1.BIT.FRDY == 1)     // wait for FRDY
            ;
    }

    if ((g_current_parameters.bgo_enabled_cf == true)
     || (g_current_parameters.bgo_enabled_df == true))
    {
        /* Clear FRDYI interrupt request */
        IR(FCU,FRDYI) = 0;

        /* Exit program/erase mode */
        flash_pe_mode_exit();

        /* Release lock and Set current state to Idle */
        flash_release_state();
    }
}
```

1.5 Schedule for Fixing the Problem

This problem will be fixed in December 2023.

2. Note on response when the flash sequencer reset command (FLASH_CMD_RESET) is executed while the "R_FLASH_Write" function, access window setup command (FLASH_CMD_ACCESSWINDOW_SET), or startup area switching command (FLASH_CMD_SWAPFLAG_TOGGLE) is being executed in non-blocking mode for flash type 1

2.1 Applicable Products

(1) RX Family Flash Module Using Firmware Integration Technology (Flash Module) Rev.5.10 (document no. R01AN2184EJ0510) and earlier

(2) RX Driver Package Rev.1.41 (document no. R01AN6907EJ0141) and earlier include the Flash Modules in (1).

(3) FIT Modules used in combination with the Flash Modules and their application notes

The problem may occur when certain FIT Modules are used with the Flash Modules in (1).

Examples:

- RX Family Firmware Update Module Using Firmware Integration Technology (R01AN5824EJ) https://www.renesas.com/us/en/search?keywords=R01AN5824
- RX Family TSIP (Trusted Secure IP) Module Firmware Integration Technology (R20AN0548EJ) https://www.renesas.com/us/en/search?keywords=R20AN0548

2.2 Applicable Device Groups

(1) Flash type 1:
RX110, RX111, RX113, RX130, RX13T, RX140, RX230, RX231, RX23E-A, RX23T, RX23W, RX24T, and RX24U groups

2.3 Details and Conditions

If the flash sequencer reset command (FLASH_CMD_RESET) is executed while the "R_FLASH_Write" function, access window setup command (FLASH_CMD_ACCESSWINDOW_SET), or startup area switching command (FLASH_CMD_SWAPFLAG_TOGGLE) is being executed in non-blocking mode for flash type 1, processing might not return from the "R_FLASH_Control" function.

2.4 Workaround

Refer to the following and change r_flash_rx¥src¥r_flash_rx.c as shown in red.

Before modification (E.g., Flash Module Rev.5.10: Line 66)

```
flash_states_t g_flash_state = FLASH_UNINITIALIZED;
```

After modification

```
volatile flash_states_t g_flash_state = FLASH_UNINITIALIZED;
```

Refer to the following and change r_flash_rx¥src¥r_flash_rx.h as shown in red.

Before modification (E.g., Flash Module Rev.5.10: Line 200)

```
extern flash_states_t g_flash_state;
```

After modification

```
extern volatile flash_states_t g_flash_state;
```

2.5 Schedule for Fixing the Problem

This problem will be fixed in December 2023.

3. Note on response when the flash sequencer reset command (FLASH_CMD_RESET) is executed while the "R_FLASH_Erase", "R_FLASH_BlankCheck", or "R_FLASH_Write" function is being executed in non-blocking mode for flash type 3, 4, or 5

3.1 Applicable Products

(1) RX Family Flash Module Using Firmware Integration Technology (Flash Module) Rev.5.10 (document no. R01AN2184EJ0510) and earlier

(2) RX Driver Package Rev.1.41 (document no. R01AN6907EJ0141) and earlier include the Flash Modules in (1).

(3) FIT Modules used in combination with the Flash Modules and their application notes

The problem may occur when certain FIT Modules are used with the Flash Modules in (1).

Examples:

- RX Family Firmware Update Module Using Firmware Integration Technology (R01AN5824EJ) https://www.renesas.com/us/en/search?keywords=R01AN5824
- RX Family TSIP (Trusted Secure IP) Module Firmware Integration Technology (R20AN0548EJ) https://www.renesas.com/us/en/search?keywords=R20AN0548

3.2 Applicable Device Groups

(1) Flash type 3: RX64M, RX660, RX66T, RX71M, and RX72T groups

(2) Flash type 4: RX651, RX65N, RX66N, RX671, RX72M, and RX72N groups

(3) Flash type 5: RX26T group

3.3 Details and Conditions

If the flash sequencer reset command (FLASH_CMD_RESET) is executed while the "R_FLASH_Erase", "R_FLASH_BlankCheck", or "R_FLASH_Write" function is being executed in non-blocking mode for flash type 3, 4, or 5, an error (FLASH_INT_EVENT_ERR_CMD_LOCKED or FLASH_INT_EVENT_ERR_CF_ACCESS) might be reported by the argument of the callback function.

3.4 Workaround

Refer to the following and change r_flash_rx¥src¥r_flash_fcu.c as shown in red.

Before modification (E.g., Flash Module Rev.5.10: Line 191 to 228)

```
flash_err_t flash_reset(void)
{

    /* Cannot release sequencer from the command-locked state with status clear
     * or forced-stop commands if CFAE or DFAE is set. Must read those bits
     * before can set to 0.
     */
    if (FLASH.FASTAT.BIT.CFAE == 1)
    {
        FLASH.FASTAT.BIT.CFAE = 0;
    }
#ifndef FLASH_NO_DATA_FLASH
    if (FLASH.FASTAT.BIT.DFAE == 1)
    {
        FLASH.FASTAT.BIT.DFAE = 0;
    }
#endif

    /* Possible FLASH_CMD_RESET is called when no outstanding command is in
progress.
     * In that case, enter pe mode so flash_stop() can write to the sequencer.
     */
    if (g_flash_state == FLASH_READY)
    {
        flash_pe_mode_enter(FLASH_TYPE_CODE_FLASH);
    }

    /*Issue a forced stop */
    flash_stop();

    /*Transition to Read mode*/
    FLASH.FENTRYR.WORD = 0xAA00;
    while (FLASH.FENTRYR.WORD != 0x0000)
        ;

    FLASH.FWEPROR.BYTE = 0x00; /* FLWE bit is disabled */

    return FLASH_SUCCESS;
}
```

After modification

```
flash_err_t flash_reset(void)
{
    if ((g_current_parameters.bgo_enabled_cf == true)
     || (g_current_parameters.bgo_enabled_df == true))
    {
        /* Disable FRDYI & FIFERR interrupt request */
        flash_InterruptRequestDisable(VECT(FCU,FRDYI));
        flash_InterruptRequestDisable(VECT(FCU,FIFERR));
    }

    /* Cannot release sequencer from the command-locked state with status clear
     * or forced-stop commands if CFAE or DFAE is set. Must read those bits
     * before can set to 0.
     */
    if (FLASH.FASTAT.BIT.CFAE == 1)
    {
        FLASH.FASTAT.BIT.CFAE = 0;
    }
#ifndef FLASH_NO_DATA_FLASH
    if (FLASH.FASTAT.BIT.DFAE == 1)
    {
        FLASH.FASTAT.BIT.DFAE = 0;
    }
#endif

    /* Possible FLASH_CMD_RESET is called when no outstanding command is in
progress.
     * In that case, enter pe mode so flash_stop() can write to the sequencer.
     */
    if (g_flash_state == FLASH_READY)
    {
        flash_pe_mode_enter(FLASH_TYPE_CODE_FLASH);
    }

    /*Issue a forced stop */
    flash_stop();

    if ((g_current_parameters.bgo_enabled_cf == true)
     || (g_current_parameters.bgo_enabled_df == true))
    {
        /* Clear FRDYI interrupt request */
        IR(FCU,FRDYI) = 0;

        /* Enable FRDYI & FIFERR interrupt request */
        flash_InterruptRequestEnable(VECT(FCU,FRDYI));
        flash_InterruptRequestEnable(VECT(FCU,FIFERR));
    }

    /*Transition to Read mode*/
    FLASH.FENTRYR.WORD = 0xAA00;
    while (FLASH.FENTRYR.WORD != 0x0000)
        ;

    FLASH.FWEPROR.BYTE = 0x00; /* FLWE bit is disabled */

    return FLASH_SUCCESS;
}
```

3.5 Schedule for Fixing the Problem

This problem will be fixed in December 2023.

Revision History

Rev.	Date	Description	
		Page	Summary
1.00	Oct.01.23	-	First edition issued
1.01	Oct.13.23	3	Modified content of "After modification" of "1.4 Workaround" section.

Corporate Headquarters

TOYOSU FORESIA, 3-2-24 Toyosu,
Koto-ku, Tokyo 135-0061, Japan
www.renesas.com

Contact Information

For further information on a product, technology, the most up-to-date version of a document, or your nearest sales office, please visit:
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