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

Overview
When using the RX Driver Package and RX Family RSPI Module Using Firmware Integration Technology (referred to as RSPI FIT module hereafter), note the following point.

1. Notes on Calling the R_RSPI_Write, R_RSPI_Read, or R_RSPI_WriteRead Function

1. Notes on Calling the R_RSPI_Write, R_RSPI_Read, or R_RSPI_WriteRead Function

1.1 Applicable Products
(1) RX Family RSPI Module Using Firmware Integration Technology

The relevant revisions and documents are as shown in "Table 1.1, RSPI FIT Module Applicable Products".

<table>
<thead>
<tr>
<th>Revision of the RSPI FIT module</th>
<th>Document number</th>
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<tbody>
<tr>
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These notes also apply to the following RX Driver Package products that include the above RSPI FIT module*1.

*1: The RSPI FIT module is included as r_rspi_rx_v*.**.zip (*.** is the revision number).
(2) RX Driver Package

The product name and revision of the relevant RX Driver Package products and the revision of the included RSPI FIT module are as shown in "Table 1.2 Products Which Include the RSPI FIT Module".

<table>
<thead>
<tr>
<th>Product name of the RX Driver Package</th>
<th>Revision of the RX Driver Package</th>
<th>Document number</th>
<th>Revision of the included RSPI FIT module</th>
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<tr>
<td>RX110, RX111, RX113, and RX231 Group RX Driver Package Ver.1.01</td>
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<td>Revision of the included RSPI FIT module</td>
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1.2 Applicable Devices
RX110, RX111, RX113, RX130, RX231, RX23E-A, RX23W, RX23T, RX24T, RX24U, RX64M, RX65N, RX651, RX66T, RX66N, RX71M, RX72T, RX72M, RX72N, RX210*1, RX62N*1, RX62T*1, RX63N*1, and RX631*1 Group

*1: RSPI FIT module Rev.2.01 or later does not support RX210, RX62N, RX62T, RX63N and RX631 groups.

1.3 Details
When the R_RSPI_Write, R_RSPI_Read, or R_RSPI_WriteRead function is called with the RSPI FIT module set to master mode operation, the RSPI function stops after the final data is received from a serial transfer without waiting for the SSL negation delay or next-access delay.

1.4 Conditions
This phenomenon occurs when the R_RSPI_Write, R_RSPI_Read, or R_RSPI_WriteRead function is called when the module is set to master mode operation.
### 1.5 Workaround

For RSPI FIT module versions earlier than Rev.2.00, modify the processing of the `rspi_tx_rx_common` function in the `r_rspi_rx.c` source code. For RSPI FIT module Rev.2.00 or later, modify the processing of the `rspi_rx_common` function in the `r_rspi_rx.c` source code.

The details of the modification are as follows. Add the codes in red.

**Before modification (versions earlier than Rev.2.00)**

```c
/* Check for last data. */
if(rx_count == g_rspi_tcb[channel].xfr_length)
{   /* Last data was transferred. */
    (*g_rspi_channels[channel]).SPCR.BIT.SPRIE = 0; /* Disable SPRI interrupt. */
    (*g_rspi_channels[channel]).SPCR.BIT.SPE   = 0; /* Disable RSPI. */
    if (0 == (*g_rspi_channels[channel]).SPCR.BIT.SPE)
    {
        nop();
    }

#if RSPI_CFG_REQUIRE_LOCK == 1
    /* Release lock for this channel. */
    R_BSP_HardwareUnlock((mcu_lock_t)(BSP_LOCK_RSPI0 + channel));
#endif

/* Transfer complete. Call the user callback function passing pointer to the result structure. */
if((FIT_NO_FUNC != g_rspi_handles[channel].pcallback) && (NULL !=
    g_rspi_handles[channel].pcallback))
{
    g_rspi_cb_data[channel].handle = &(g_rspi_handles[channel]);
    g_rspi_cb_data[channel].event_code = RSPI_EVT_TRANSFER_COMPLETE;
    g_rspi_handles[channel].pcallback((void*)&(g_rspi_cb_data[channel]));
}
```
After modification (versions earlier than Rev.2.00)

```c
/* Check for last data. */
if(rx_count == g_rspi_tcb[channel].xfr_length)
{
    /* Last data was transferred. */
    (*g_rspi_channels[channel]).SPCR.BIT.SPRIE = 0; /* Disable SPRI interrupt. */
    while(1==(*g_rspi_channels[channel]).SPSR.BIT.IDLNF)
    {
        nop();
    }

    (*g_rspi_channels[channel]).SPCR.BIT.SPE = 0; /* Disable RSPI. */
    if (0 == (*g_rspi_channels[channel]).SPCR.BIT.SPE)
    {
        nop();
    }

#if RSPI_CFG_REQUIRE_LOCK == 1
    /* Release lock for this channel. */
    R_BSP_HardwareUnlock((mcu_lock_t)(BSP_LOCK_RSPI0 + channel));
#endif

    /* Transfer complete. Call the user callback function passing pointer to the result structure. */
    if((FIT_NO_FUNC != g_rspi_handles[channel].pcallback) && (NULL != g_rspi_handles[channel].pcallback))
    {
        g_rspi_cb_data[channel].handle = &(g_rspi_handles[channel]);
        g_rspi_cb_data[channel].event_code = RSPI_EVT_TRANSFER_COMPLETE;
        g_rspi_handles[channel].pcallback((void*)&(g_rspi_cb_data[channel]));
    }
}
```
Before modification (Rev.2.00 or later)

```c
/* Check for last data. */
if (rx_count == g_rspi_tcb[channel].xfr_length)
    /* Last data was transferred. */
#endif
/* Check for last data. */
if (rx_count == g_rspi_tcb[channel].xfr_length)
    /* Last data was transferred. */
#if RSPI_CFG_HIGH_SPEED_READ == 1
    (*g_rspi_channels[channel]).SPCR.BIT.SPTIE = 0; // Disable SPTI
    #endif
    (*g_rspi_channels[channel]).SPCR.BIT.SPRIE = 0; // Disable SPRI
    #endif
    (*g_rspi_channels[channel]).SPCR.BIT.SPE   = 0; // Disable RSPI.
    if (0 == (*g_rspi_channels[channel]).SPCR.BIT.SPE)
    {
        nop();
    }
    #if RSPI_CFG_REQUIRE_LOCK == 1
    /* Release lock for this channel. */
    R_BSP_HardwareUnlock((mcu_lock_t)(BSP_LOCK_RSPI0 + channel));
    #endif
    /* Transfer complete. Call the user callback function passing
     * pointer to the result structure. */
    if ((FIT_NOFUNC != g_rspi_handles[channel].pcallback) && (NULL !=
        g_rspi_handles[channel].pcallback))
    {
        g_rspi_cb_data[channel].handle = &g_rspi_handles[channel];
        g_rspi_cb_data[channel].event_code = RSPI_EVT_TRANSFER_COMPLETE;
        g_rspi_handles[channel].pcallback((void*)&(g_rspi_cb_data[channel]));
    }
```
After modification (Rev.2.00 or later)

```c
/* Check for last data. */
if (rx_count == g_rspi_tcb[channel].xfr_length)
    /* Last data was transferred. */
#endif
if (RSPI_CFG_HIGH_SPEED_READ == 1)
    (*g_rspi_channels[channel]).SPCR.BIT.SPTIE = 0; // Disable SPTI interrupt.
#endif
(*g_rspi_channels[channel]).SPCR.BIT.SPRIE = 0; // Disable SPRI interrupt.
while(1==(*g_rspi_channels[channel]).SPSR.BIT.IDLNF)
{
    nop();
}
(*g_rspi_channels[channel]).SPCR.BIT.SPE = 0; // Disable RSPI.
if (0 == (*g_rspi_channels[channel]).SPCR.BIT.SPE)
{
    nop();
}
#endif
/* Release lock for this channel. */
R_BSP_HardwareUnlock((mcu_lock_t)(BSP_LOCK_RSPI0 + channel));
#endif

/* Transfer complete. Call the user callback function passing
pointer to the result structure. */
if ((FIT_NO_FUNC != g_rspi_handles[channel].pcallback) && (NULL !=
g_rspi_handles[channel].pcallback))
{
    g_rspi_cb_data[channel].handle = &(g_rspi_handles[channel].pcallback);
    g_rspi_cb_data[channel].event_code = RSPI_EVT_TRANSFER_COMPLETE;
g_rspi_handles[channel].pcallback((void*)&(g_rspi_cb_data[channel]));
}
```
1.6 Schedule for fixing the problem

(1) RSPI FIT module
This problem will be fixed in a later version.

(2) RX Driver Package
The upcoming release of the RX Family RX Driver Package will include an RSPI FIT module modified in accord with this note.
Revision History

<table>
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<tr>
<th>Rev.</th>
<th>Date</th>
<th>Description</th>
<th>Summary</th>
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<tbody>
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<td>1.00</td>
<td>Jul.01.21</td>
<td>-</td>
<td>First edition issued</td>
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