

[Note]

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RX Family SCI Module Firmware Integration Technology, RX Driver Package

Outline

When using the products in the title, note the following point.

1. Incorrect transmit data of the "R_SCI_Send" and "R_SCI_SendReceive" functions when Synchronous mode or Simple SPI mode is selected
2. Initialization of the SCI in the RX63N and RX631 groups

1. Incorrect Transmit Data of the "R_SCI_Send" and "R_SCI_SendReceive" Functions When Synchronous Mode or Simple SPI Mode Is Selected

1.1 Applicable Products

- (1) SCI module Firmware Integration Technology (SCI FIT module)

The applicable revision number is Rev.3.20 (Document number: R01AN1815EJ0320) or earlier.

(2) RX Driver Package

The SCI FIT module in (1) is also included in the RX Driver Package listed below.
The product names and revision numbers of the applicable RX Driver Package and the revision numbers of the included SCI FIT modules are as follows.

Table 1.1 Products that include the SCI FIT module

RX Driver Package Product name	RX Driver Package Revision number	Document number	Revision number of the included SCI FIT module
RX110, RX111, RX113, RX231 Group RX Driver Package Ver1.01	Rev.1.01	R01AN2670EJ0101	Rev.1.70
RX110, RX111, RX113, RX130, RX231, RX23T Group RX Driver Package Ver1.02	Rev.1.02	R01AN3159EJ0102	Rev.1.70
RX110, RX111, RX113, RX130, RX230, RX231, RX23T, RX24T Group RX Driver Package Ver1.03	Rev.1.03	R01AN3233EJ0103	Rev.1.70
RX64M, RX71M Group RX Driver Package Ver1.02	Rev.1.02	R01AN2606EJ0102	Rev.1.70
RX Family RX Driver Package Ver.1.10	Rev.1.10	R01AN3345EJ0110	Rev.1.70
RX Family RX Driver Package Ver.1.11	Rev.1.11	R01AN3467EJ0111	Rev.1.80
RX Family RX Driver Package Ver.1.12	Rev.1.12	R01AN3651EJ0112	Rev.1.90
RX Family RX Driver Package Ver.1.13	Rev.1.13	R01AN3859EJ0113	Rev.2.00
RX Family RX Driver Package Ver.1.14	Rev.1.14	R01AN4191EJ0114	Rev.2.01
RX Family RX Driver Package Ver.1.16	Rev.1.16	R01AN4471EJ0116	Rev.2.10
RX Family RX Driver Package Ver.1.17	Rev.1.17	R01AN4572EJ0117	Rev.2.11
RX Family RX Driver Package Ver.1.18	Rev.1.18	R01AN4659JJ0118	Rev.2.11
RX Family RX Driver Package Ver.1.19	Rev.1.19	R01AN4677EJ0119	Rev.2.20
RX Family RX Driver Package Ver.1.20	Rev.1.20	R01AN4794EJ0120	Rev.3.00
RX Family RX Driver Package Ver.1.22	Rev.1.22	R01AN4873EJ0122	Rev.3.20

1.2 Applicable Devices

- RX110, RX111, RX113, and RX130 groups
- RX210, RX230, RX231, RX23T, RX23W, RX24T, and RX24U groups
- RX63N, RX631, RX64M, RX65N, RX651, and RX66T groups
- RX71M, RX72T, and RX72M groups

1.3 Details and Conditions

If an interrupt other than a receive interrupt (RXI) occurs when executing the SCI_TDR macro^(Note) in one of the following functions in synchronous mode or simple SPI mode, the transmit data may be incorrect because the transmit data buffer counter cannot be incremented properly.

- "sci_send_sync_data" function called within the "R_SCI_Send" function or the "R_SCI_SendReceive" function
- "sci_receive" function called within the receive interrupt (RXI) handler

Note: The source code of the SCI_TDR macro is as follows:

```
SCI_TDR(*hdl->u_tx_data.buf++);
```

1.4 Detailed Description about Incrementation of the Transmit Data Buffer Counter

The transmission processing of the SCI FIT module is realized by the step in which the transmission processing API (first byte) or RXI handler (second and following bytes) calls the SCI_TDR macro to enable the CPU to perform the following processing:

- Writing of the transmit data to the transmit data register (TDR)
- Incrementation of the transmit data buffer counter

Two cases of CPU processing are described below: one that results in correct transmit data and the other that results in incorrect transmit data.

➤ CPU processing that results in correct transmit data

The processes enclosed in a red frame show the steps involved in incrementation of the transmit data buffer counter.

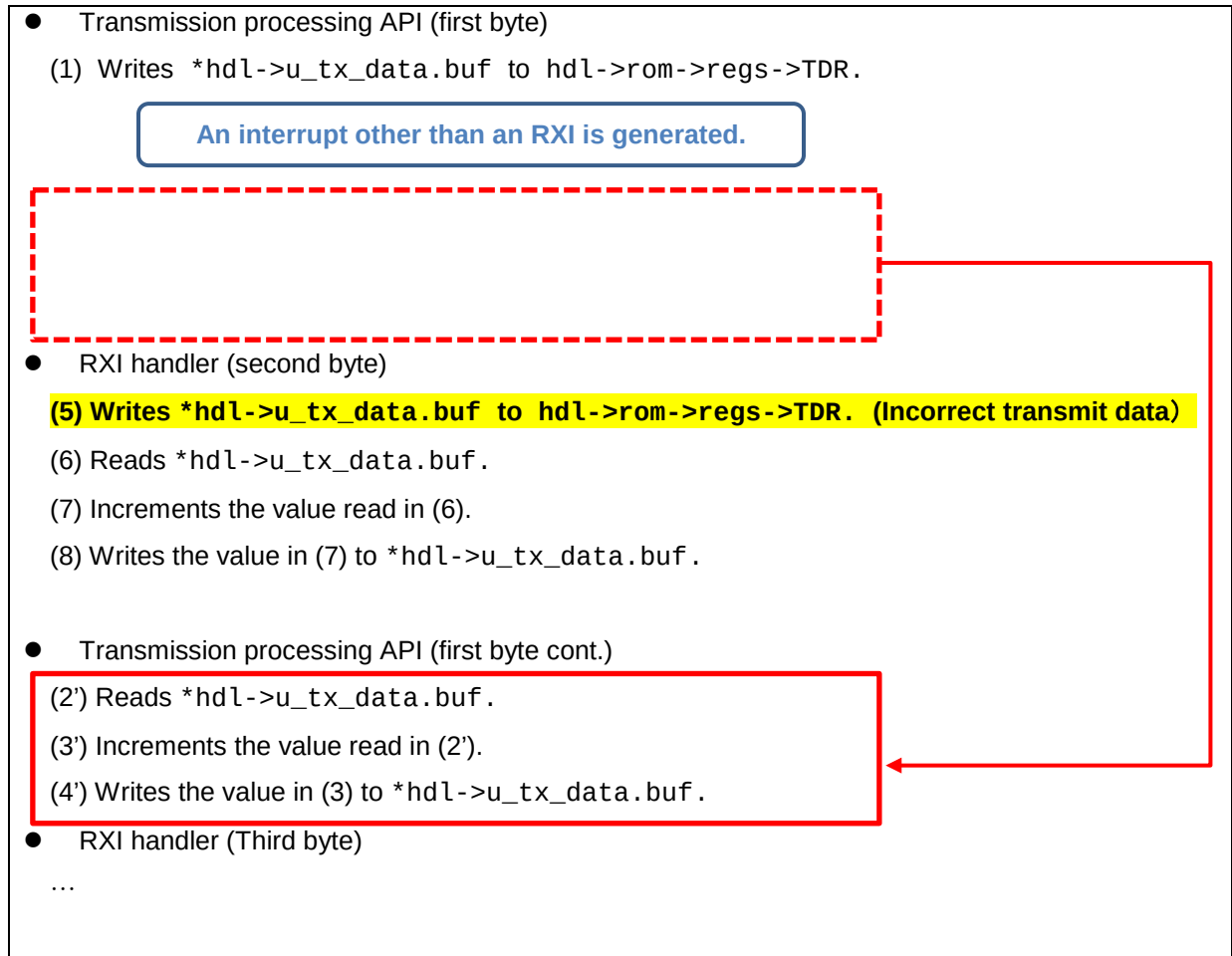
After data is written to the TDR, both processes are performed before the next data is sent (RXI handler).

- Transmission processing API (first byte)
 - (1) Writes *hdl->u_tx_data.buf to hdl->rom->regs->TDR.
 - (2) Reads *hdl->u_tx_data.buf.
 - (3) Increments the value read in (2).
 - (4) Writes the value in (3) to *hdl->u_tx_data.buf.
- RXI handler (second byte)
 - (5) Writes *hdl->u_tx_data.buf to hdl->rom->regs->TDR.
 - (6) Reads *hdl->u_tx_data.buf.
 - (7) Increments the value read in (6).
 - (8) Writes the value in (7) to *hdl->u_tx_data.buf.
- RXI handler (third byte)

...

➤ CPU processing that results in incorrect transmit data

When an interrupt other than an RXI is generated between (1) and (2) in "CPU processing that results in correct transmit data"



If transmission processing (1) is completed while processing an interrupt other than an RXI, RXI handler processing (second byte) is performed without incrementing the transmit buffer counter in (2) to (4).

For this reason, a wrong value is written to the TDR, resulting in incorrect transmit data.

1.5 Workaround

You can avoid this problem by one of the following methods. Correction is shown in red.

- Before correction

```
SCI_TDR(*hdl->u_tx_data.buf++);
```

- After correction

- (1) Disable interrupts before the “SCI_TDR” processing.

```
R_BSP_InterruptsDisable(); /* Disable interrupts */
SCI_TDR(*hdl->u_tx_data.buf++);
R_BSP_InterruptsEable(); /* Enable interrupts */
```

- (2) Increment “*hdl->u_tx_data.buf” before the “SCI_TDR” processing.

Replace the line in “Before correction” with the following four lines in red.

```
uint8_t *buf_copy;
buf_copy = *hdl->u_tx_data.buf;
*hdl->u_tx_data.buf++;
SCI_TDR(buf_copy);
```

1.6 Schedule for Fixing the Problem

This problem will be fixed in a later version.

2. Initialization of the SCI in the RX63N and RX631 Groups

2.1 Applicable Products

(1) SCI module Firmware Integration Technology (SCI FIT module)

The applicable revision numbers and document numbers are as follows.

Table 2.1 SCI FIT module applicable products

SCI FIT module revision number	Document number
Rev.3.20	R01AN1815EJ0320

(2) RX Driver Package

The SCI FIT module in (1) is also included in the RX Driver Package listed below.

The product names and revision numbers of the applicable RX Driver Package and the revision numbers of the included SCI FIT modules are as follows.

Table 2.2 Products that include the SCI FIT module

RX Driver Package Product name	RX Driver Package Revision number	Document number	Revision number of the included SCI FIT module
RX Family RX Driver Package Ver.1.22	Rev.1.22	R01AN4873EJ0122	Rev.3.20

2.2 Applicable Devices

- RX63N and RX631 groups

2.3 Details and Conditions

There is an incorrect line of code in the interrupt-enable processing source code of the "sci_initialize_ints" function in the "r_sci_rx631.c" or "r_sci_rx63n.c" file called by the "R_SCI_Open" function. For this reason, a build error occurs when "r_sci_rx631.c" or "r_sci_rx63n.c" is built.

2.4 Workaround

Correct the source code for "r_sci_rx631.c" and "r_sci_rx63n.c" as follows.

- Before correction

```
/* ENABLE INTERRUPTS IN ICU */
R_BSP_InterruptRequestEnable(ICU, GROUP12) = 1;
```

- After correction

```
/* ENABLE INTERRUPTS IN ICU */
R_BSP_InterruptRequestEnable(VECT(ICU, GROUP12));
```

2.5 Schedule for Fixing the Problem

This problem will be fixed in a later version.

Revision History

Rev.	Date	Description	
		Page	Summary
1.00	Oct.01.19	-	First edition issued

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