

RENESAS TECHNICAL UPDATE

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Product Category	MPU/MCU		Document No.	TN-RX*-A138A/E	Rev.	1.00
Title	Disclosing the Specifications of Status Flags of the Serial Communications Interface (SCI) and Serial Peripheral Interface (RSPI) in RX Family Products		Information Category	Technical Notification		
Applicable Products	RX110 Group RX111 Group RX113 Group RX210 Group RX220 Group RX21A Group RX230 Group , RX231 Group RX23T Group RX630 Group RX63N Group , RX631 Group RX63T Group	Lot No.	Reference Document	User's Manual: Hardware for applicable products (see the last page)		
		All lots				

In this note we disclose the presence of the receive data full flag and the transmit data empty flag of the SCI, and of the transmit buffer empty flag and the receive buffer full flag of the RSPI, in the RX Family products listed above.

The details are described below using the page and section numbers of the RX113 Group manual as an example. For those of other products, see the list on the last page.

1. Disclosing the receive data full flag (SSR.RDRF) and the transmit data empty flag (SSR.TDRE) of the SCI

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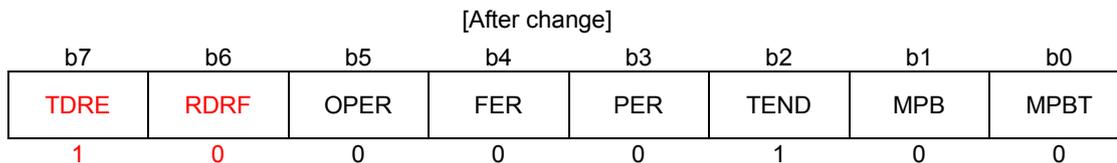
27.2.7 Serial Status Register (SSR)

Bits 6 and 7 of the serial status register (SSR) are disclosed as the receive data full flag (RDRF) and the transmit data empty flag (TDRE), respectively.

[Before change]

b7	b6	b5	b4	b3	b2	b1	b0
-	-	OPER	FER	PER	TEND	MPB	MPBT
X	X	0	0	0	1	0	0

Bit	Symbol	Bit Name	Description	R/W
Other bits omitted				
b7, b6	-	Reserved	The read value is undefined. The write value should be 1.	R/W



Bit	Symbol	Bit Name	Description	R/W
Other bits omitted				
b6	RDRF	Receive Data Full Flag	0: No valid data is held in the RDR register 1: Received data is held in the RDR register	R/(W)*2
b7	TDRE	Transmit Data Empty Flag	0: Data to be transmitted is held in the TDR register 1: No data is held in the TDR register	R/(W)*2

Note 2. Write 1 when writing is necessary.

RDRF Flag (Receive Data Full Flag)

Indicates whether the RDR register has received data.

[Setting condition]

- When data has been received normally, and transferred from RSR to RDR.

[Clearing condition]

- When data is read from RDR

TDRE Flag (Transmit Data Empty Flag)

Indicates whether the TDR register has data to be transmitted.

[Setting condition]

- When data is transferred from TDR to TSR

[Clearing condition]

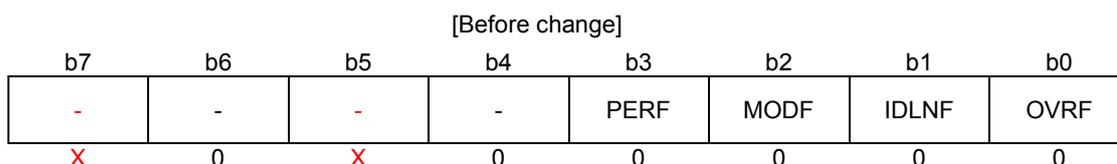
- When data is written to TDR

2. Disclosing the transmit buffer empty flag (SPSR.SPTEF) and the receive buffer full flag (SPSR.SPRF) of the RSPI

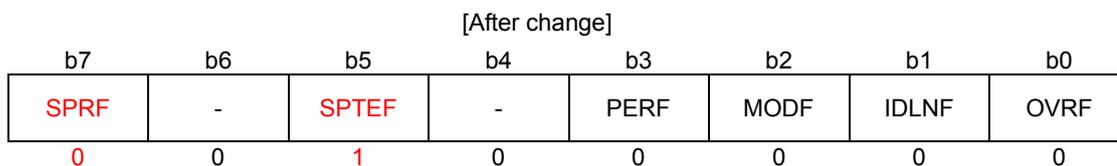
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31.2.4 RSPI Status Register (SPSR)

Bits 5 and 7 of the RSPI status register (SPSR) are disclosed as the receive buffer full flag (SPRF) and the transmit buffer empty flag (SPTEF), respectively.



Bit	Symbol	Bit Name	Description	R/W
Other bits omitted				
b5	-	Reserved	The read value is undefined. The write value should be 1.	R/W
b6	-	Reserved	This bit is read as 0. The write value should be 0.	R/W
b7	-	Reserved	The read value is undefined. The write value should be 1.	R/W



Bit	Symbol	Bit Name	Description	R/W
Other bits omitted				
b5	SPTEF	Transmit Buffer Empty Flag	0: Transmit buffer has valid data 1: Transmit buffer has no valid data	R/W*3
b6	-	Reserved	This bit is read as 0. The write value should be 0.	R/W
b7	SPRF	Receive Buffer Full Flag	0: Receive buffer has no valid data 1: Receive buffer has valid data	R/W*3

Note 3. Write 1 when writing is necessary.

SPTEF Flag (Transmit Buffer Empty Flag)

Indicates whether the transmit buffer (SPTX) in the RSPI data register has valid data.

[Setting conditions]

- When the SPCR.SPE bit is 0 (disables the RSPI function)
- When data is transferred from the transmit buffer to the shift register

[Clearing condition]

- When the number of frames of transmit data specified by the SPDCR.SPFC[1:0] bits is written to the SPDR register.

The SPDR register can be set only when the SPTEF flag is 1. The data in the transmit buffer is not updated when the SPDR register is set while the SPTEF flag is 0.

SPRF Flag (Receive Buffer Full Flag)

Indicates whether the receive buffer (SPRX) in the RSPI data register has valid data.

[Setting condition]

- When the number of frames of receive data specified by the SPDCR.SPFC[1:0] bits is transferred from shift register to the receive buffer (SPRX) while the SPCR.TXMD bit is 0 (full duplex) and the SPRF flag is 0.

Note that the SPRF flag does not become 1 when the OVRF flag is 1.

[Clearing condition]

- When all of the received data are read from the SPDR register

[Documents for reference]

1. SCI status register

Document Title, Revision, Document Number	Page	Section
RX110 Group User's Manual: Hardware Rev.1.10 (R01UH0421EJ0110)	514 of 971	23.2.7
RX111 Group User's Manual: Hardware Rev.1.20 (R01UH0365EJ0120)	761 of 1256	26.2.7
RX113 Group User's Manual: Hardware Rev.1.02 (R01UH0448EJ0102)	822 of 1458	27.2.7
RX210 Group User's Manual: Hardware Rev.1.50 (R01UH0037EJ0150)	977 of 1630	29.2.7
RX220 Group User's Manual: Hardware Rev.1.10 (R01UH0292EJ0110)	729 of 1252	27.2.7
RX21A Group User's Manual: Hardware Rev.1.10 (R01UH0251EJ0110)	823 of 1390	29.2.7
RX230 Group, RX231 Group User's Manual: Hardware Rev.1.00 (R01UH0496EJ0100)	1122 of 1967	33.2.9
RX23T Group User's Manual: Hardware Rev.1.00 (R01UH0520EJ0100)	644 of 1108	25.2.9
RX630 Group User's Manual: Hardware Rev.1.60 (R01UH0040EJ0160)	1058 of 1681	32.2.7
RX63N Group, RX631 Group User's Manual: Hardware Rev.1.80 (R01UH0041EJ0180)	1334 of 2029	35.2.7
RX63T Group User's Manual: Hardware Rev.2.10 (R01UH0238EJ0210)	1148 of 1851	29.2.7

2. RSPI status register

Document Title, Revision, Document Number	Page	Section
RX110 Group User's Manual: Hardware Rev.1.10 (R01UH0421EJ0110)	714 of 971	25.2.4
RX111 Group User's Manual: Hardware Rev.1.20 (R01UH0365EJ0120)	963 of 1256	28.2.4
RX113 Group User's Manual: Hardware Rev.1.02 (R01UH0448EJ0102)	1059 of 1458	31.2.4
RX210 Group User's Manual: Hardware Rev.1.50 (R01UH0037EJ0150)	1180 of 1630	31.2.4
RX220 Group User's Manual: Hardware Rev.1.10 (R01UH0292EJ0110)	937 of 1252	30.2.4
RX21A Group User's Manual: Hardware Rev.1.10 (R01UH0251EJ0110)	1000 of 1390	32.2.4
RX230 Group, RX231 Group User's Manual: Hardware Rev.1.00 (R01UH0496EJ0100)	1473 of 1967	38.2.4
RX23T Group User's Manual: Hardware Rev.1.00 (R01UH0520EJ0100)	818 of 1108	27.2.4
RX630 Group User's Manual: Hardware Rev.1.60 (R01UH0040EJ0160)	1294 of 1681	35.2.4
RX63N Group, RX631 Group User's Manual: Hardware Rev.1.80 (R01UH0041EJ0180)	1571 of 2029	38.2.4
RX63T Group User's Manual: Hardware Rev.2.10 (R01UH0238EJ0210)	1384 of 1851	32.2.4