

To our customers,

Old Company Name in Catalogs and Other Documents

On April 1st, 2010, NEC Electronics Corporation merged with Renesas Technology Corporation, and Renesas Electronics Corporation took over all the business of both companies. Therefore, although the old company name remains in this document, it is a valid Renesas Electronics document. We appreciate your understanding.

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RENESAS TECHNICAL NEWS

No. ASSP-12-0309

M66591GP: Usage Precautions for DTLN and PIPE Switching

Classification

Corrections and supplementary explanation of document

√ Notes

Knowhow

Others

Concerned Products

USB ASSP M66591GP

1. Phenomena

This precaution concerns FIFO read-access of the OUT-PIPE.

When the conditions described in [2. Occurring Conditions] below are met, the following phenomena may occur with M66591:

[1] The DTLN value that is decremented with each read cycle may be incorrect.

[2] If the read-access is stopped to switch the Current_PIPE to a different number or change the FIFO port, the DTLN value immediately after recovery may be incorrect (recovery means switching back to the Current_PIPE number after switching to a different number and performing the required process). In addition, the data that has already been read may be read again.

Note: This precaution applies for both the CPU_FIFO port and the DMA_FIFO port.

2. Occurring Conditions

[1] Phenomenon [1] described above may occur when condition 1 is present at the same time as condition 2 or 3.

Condition 1: RCNT bit is set to "1".

Condition 2: The received data length is 16 bytes or less and a read is started.

Condition 3: PIPE is switched or FIFO port is changed after the read is started, triggering a recovery to the original PIPE. Then, the data of recovered OUT-PIPE is 16 bytes or less, and the read is re-started.

Example:

Start OUT-PIPE read

↓

Stop read, access FIFO of different PIPE or,
Stop read, change FIFO port.

↓

Recover to stopped OUT-PIPE

16 bytes or less remain in OUT-PIPE

↓

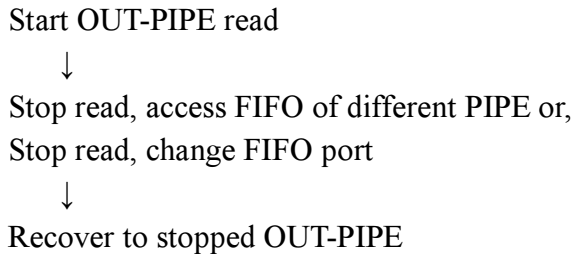
Re-start read

[2] Phenomenon [2] described above may occur when condition 4 is present at the same time as condition 5 or 6, or when only condition 5 or 6 is present.

Condition 4: RCNT bit is set to “1”.

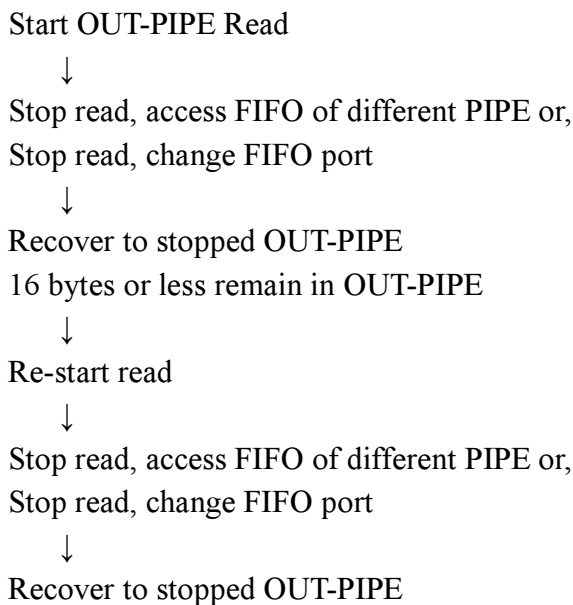
Condition 5: The received data length is 16 bytes or less, PIPE is switched or FIFO port is changed after read is started, and triggering recovery to the original PIPE.

Example:



Condition 6: The data of recovered OUT-PIPE is 16 bytes or less after PIPE switching or FIFO port changing after a read is started. PIPE is switched or FIFO port is changed after the re-read is started, triggering a recovery to the original PIPE.

Example:



- * If the same value is written to the Current_PIPE, the event is not considered a PIPE switch.
- * The same conditions apply when the ISEL bit is re-written as when the Current_PIPE is switched.

3. Details of occurring phenomena

[1] When condition 1 is present with condition 2 or 3

The DTLN value that is decremented with each read cycle may be incorrect. However, even in this case,

- The DTLN value is correct if there is no FIFO read-access after data is received.
- FIFO read data value is correct.
- When the same amount of data as the number of received bytes is read, DTLN = 0.

[2] When condition 4 is present with condition 5 or 6

- DTLN value after recovery may be incorrect.

- Data that has already been read may be re-read.

When only condition 5 or 6 is present,

- Data that has already been read may be re-read.

4. Solutions

These phenomena can be avoided by using the following solutions.

These solutions should be applied when the received data is 16 bytes or less, or the received data remaining after recovery due to PIPE switch or FIFO port change is 16 bytes or less.

i: Handle the remaining number of read bytes with software because the number of bytes remaining in DTLN cannot be confirmed when RCNT = 1.

- * DTLN value is correct before read-access is started.

ii: After a read-access has been started, do not switch the Current_PIPE or change the FIFO port until the read is completed.

- * Current_PIPE can be switched and FIFO port can be changed before read-access is started.

- * If the same value is written to the Current_PIPE, the event is not considered a PIPE switch.

- * The same conditions apply when the ISEL bit is re-written as when the Current_PIPE is switched.