

MCP25625 Silicon Errata

The MCP25625 is a dual-die product. It contains the MCP2515 Revision B4 die and the MCP2562 die.

The functionality of the MCP25625 device is described in the Device Data Sheet (DS20005282B), except for the anomalies described below.

1. Module: CAN Module

Under one specific condition, a transmit buffer can become corrupted.

1. A lower priority buffer (as configured via TXBnCTRL.TXP<1:0>) is “pending” transmission (not actually transmitting).
2. A higher priority buffer becomes “pending” during the trigger pulse ($1t_{OSC}$ wide), which starts the transmission of the lower-priority buffer.
3. The buffers attempt to re-prioritize because the message has not actually started transmission. There is a small window ($1t_{OSC}$ wide) where the buffer has been committed to transmit, but is still viewed as “pending” by the logic. If the higher priority buffer becomes “pending” during this window, the buffers will not re-prioritize successfully and corruption will occur.

Workaround

There are a few possible workarounds:

- Request-To-Send (RTS) the higher-priority buffer first to avoid the possibility of re-prioritization errors.

This could be implemented as follows:

Configure Transmit Buffer 2 (TXB2), TXB1, and TXB0 with the same priority. Since all buffers are configured with the same priority, TXB2 will be transmitted first, followed by TXB1 and TXB0.

Now follow the sequence:

- 1) Load the first message to transmit in TXB2 and RTS TXB2.
- 2) Load the second message to transmit in TXB1 and RTS TXB1.
- 3) Load the third message to transmit in TXB0 and RTS TXB0.
- 4) Now wait until TXB0 has transmitted its message, before reloading TXB2. This ensures that all three messages are transmitted in the correct order and the highest priority buffer is always requested first.

Afterwards, restart the sequence from Step 1.

- RTS of all full buffers at the same time. The internal buffer priority will determine the transmission sequence.
- Send messages one at a time (i.e., check TXnIF before sending the next message).

2. Module: SPI Module

Holding $\overline{CS}$ low for a long time after an SPI command which initiates a CAN message may keep the CAN transmit request “pending”, causing the CAN message to be repeated.

Two Scenarios:

1. Generating an “SPI RTS” command while in SPI Mode 11 (Mode 00 is not affected): If an “SPI RTS” command is generated and $\overline{CS}$ is held low for longer than it takes for the CAN message to transmit, the message will be transmitted again. This occurs because the SPI module will keep the message “pending” either until it detects a final rising edge on SCK (Mode 11 does not provide this edge) or until $\overline{CS}$ goes high.
2. Generating an “SPI Byte Write” to set the transmit request (TXREQ) bit directly while in either SPI mode. This scenario is the same as the previous, except that the condition will occur in either mode (Mode 00 or Mode 11). This occurs because, for byte writes, the SPI module will release the pending status to the CAN module when $\overline{CS}$ is high.

Workaround

There are a few possible solutions:

- Raise $\overline{CS}$ before the CAN message has “completed” transmission, which is an absolute minimum of 47 μs .
- If $\overline{CS}$ cannot be raised in a timely manner (rare), use the “SPI RTS” command on Mode 00.
- Use hardware pins ($\overline{TXnRTS}$) to request transmission.

Clarifications/Corrections to the Data Sheet:

In the MCP25625 Data Sheet (DS20005282B), the following clarifications and corrections should be noted.

None.

APPENDIX A: DOCUMENT REVISION HISTORY

Rev. A Document (01/2018)

- Initial Release of this Document.

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