



Wireless Gecko Multi-Protocol Module MGM220P Errata



This document contains information on the MGM220P errata. The latest available revision of this device is revision 2.

Errata that have been resolved remain documented and can be referenced for previous revisions of this device.

Errata effective date: September, 2020.

1. Errata Summary

The table below lists all known errata for the MGM220P and all unresolved errata in revision 2 of the MGM220P.

Table 1.1. Errata Overview

Designator	Title/Problem	Workaround Exists	Exists on Revision:	
			1	2
EMU_E303	Watchdog Reset Hangs System Entering EM2 or EM3	Yes	X	X
I2C_E303	I2C Fails to Indicate New Incoming Data	Yes	X	X
TIMER_E301	Continuous Overflow and Underflow Interrupts in Quadrature Counting Mode	Yes	X	X
USART_E301	Possible Data Transmission on Wrong Edge in Synchronous Mode	Yes	X	X
USART_E302	Additional SCLK Pulses Can Be Generated in USART Synchronous Mode	Yes	X	X
USART_E304	PRS Transmit Unavailable in Synchronous Slave Mode	No	X	X

2. Current Errata Descriptions

2.1 EMU_E303 – Watchdog Reset Hangs System Entering EM2 or EM3

Description of Errata
<p>The chip can hang and require a hard reset (pin or power-on) to recover if:</p> <ol style="list-style-type: none"> 1. The system is operating with VSCALE1 core voltage scaling (software has previously written a 1 to the EMU_CMD_EM01VSCALE1 bit), 2. The system is in the process or entering EM2 or EM3 (software has just executed the WFE or WFI instruction with the SLEEP-DEEP bit in the System Control Register set), and 3. A Watchdog timeout reset is triggered.
Affected Conditions / Impacts
Systems operating with core voltage scaling can hang if a Watchdog reset occurs immediately upon EM2 or EM3 entry.
Workaround
Systems that keep the Watchdog enabled in low energy modes should, as a matter of good programming practice, service the Watchdog before entering EM2 or EM3. Calling the <code>emlib_WDOGn_Feed()</code> function followed by the <code>WDOGn_SyncWait()</code> function (to ensure that the servicing write to the WDOG_CMD register completes execution) immediately before entering EM2 or EM3 will prevent a Watchdog reset that could possibly hang the system under the specified circumstances.
Resolution
There is currently no resolution for this issue.

2.2 I2C_E303 – I²C Fails to Indicate New Incoming Data

Description of Errata
A race condition exists in which the I ² C fails to indicate reception of new data when both user software attempts to read data from and the I ² C hardware attempts to write data to the I2C_RXFIFO in the same cycle.
Affected Conditions / Impacts
When this race condition occurs, the RXFIFO enters an invalid state in which both <code>I2C_STATUS_RXDATAV = 0</code> and <code>I2C_STATUS_RXFULL = 1</code> . This causes the I ² C to discard new incoming data bytes because <code>RXFULL = 1</code> and would otherwise prevent user software from reading last byte written by the I ² C hardware to RXFIFO because <code>RXDATAV = 0</code> .
Workaround
User software can recognize and clear this invalid <code>RXDATAV = 0</code> and <code>RXFULL = 1</code> condition by performing a dummy read of the RXFIFO (<code>I2C_RXDATA</code>). This restores the expected <code>RXDATAV = 1</code> and <code>RXFULL = 0</code> condition. The data from this read can be discarded, and user software can now read the last byte written by the I ² C hardware to the RXFIFO (the byte which caused the invalid <code>RXDATAV = 0</code> and <code>RXFULL = 1</code> condition).
No data will be lost as long as user software completes this recovery procedure (performing the dummy read and then reading the remaining valid byte in the RXFIFO) before the I ² C hardware receives the next incoming data byte.
Resolution
There is currently no resolution for this issue.

2.3 TIMER_E301 — Continuous Overflow and Underflow Interrupts in Quadrature Counting Mode

Description of Errata
<p>When the TIMER is configured to operate in quadrature decoder mode with the overflow interrupt enabled and the counter value (TIMER_CNT) reaches the top value (TIMER_TOP), the overflow interrupt is requested continuously even if the interrupt flag (TIMER_IF_OF) is cleared. Similarly, if the underflow interrupt is enabled and the counter value reaches zero, the underflow interrupt is requested continuously even if the interrupt flag (TIMER_IF_UF) is cleared. Only after the counter value has incremented or decremented so that the overflow or underflow condition no longer applies can the interrupt be cleared.</p>
Affected Conditions / Impacts
<p>Because the counter is clocked by its CC0 and CC1 inputs in quadrature decoder mode and not the prescaled HPPERCLK, overflow and underflow events remain latched as long TIMER_CNT remains at the value that triggered the overflow or underflow condition. Until the counter is no longer in the overflow or underflow condition, it is not possible to clear the associated interrupt flag.</p>
Workaround
<p>Short of disabling the relevant interrupts, the simplest workaround is to manually increment or decrement TIMER_CNT so that the overflow or underflow condition no longer exists. Insert the following or similar code in the interrupt handler for the timer in question (TIMER0 in this case) to do this:</p>
<pre>uint32 intFlags = TIMER_IntGet(TIMER0); if (intFlags & TIMER_IEN_OF) TIMER0->CNT += 1; if (intFlags & TIMER_IEN_UF) TIMER0->CNT -= 1;</pre>
<p>It may be necessary for firmware to account for this adjustment in calculations that include the counter value.</p>
Resolution
<p>There is currently no resolution for this issue.</p>

2.4 USART_E301 — Possible Data Transmission on Wrong Edge in Synchronous Mode

Description of Errata
<p>The first bit of the new data word is incorrectly transmitted on the leading clock edge of the subsequent data bit and not the trailing clock edge of the current data bit if the USART is configured to operate in synchronous mode with</p> <ol style="list-style-type: none"> 1. USART_CLKDIV_DIV = 0 (clock = $f_{HPPERCLK} \div 2$), 2. USART_CTRL_CLKPHA = 0, 3. USART_TIMING_CSHOLD = 1 and 4. Data is loaded into the transmit FIFO (say, by the LDMA) at the exact same time as the USART state machine begins to insert the requested one bit time extension of the chip select hold time (USART_TIMING_CSHOLD = 1).
Affected Conditions / Impacts
<p>Reception of each data bit by the slave is tied to a specific clock edge. Therefore, the late transmission by the master of the first bit of a word may cause the slave to receive the incorrect data, especially if the data setup time for the slave approaches or exceeds one half the shift clock period.</p>
Workaround
<p>Because there is no way to specifically time a write to the transmit FIFO such that it does not occur when the USART state machine changes state, use one of the following workarounds to avoid the risk for data corruption described above:</p> <ul style="list-style-type: none"> • Set USART_CLK_DIV > 0. • Use USART_TIMING_CSHOLD = 0 or USART_TIMING_CSHOLD > 1. • Use USART_CTRL_CLKPHA = 1. This option is particularly useful with SPI flash memories as many support operation in both the CLKPOL = CLKPHA = 0 and CLKPOL = CLKPHA = 1 modes.
Resolution
<p>There is currently no resolution for this issue.</p>

2.5 USART_E302 — Additional SCLK Pulses Can Be Generated in USART Synchronous Mode

Description of Errata
<p>When inter-character spacing is enabled (USART_TIMING_ICS > 0) and USART_CTRL_CLKPHA = 1 in synchronous master mode, an extra clock pulse is generated after each frame transmitted except the last (that frame which when sent results in both the transmit FIFO and transmit shift register being empty).</p>
Affected Conditions / Impacts
<p>The extra clock pulse generated at the end of the first frame would cause a slave device to clock in the first bit of the next frame it expects to receive even though the USART is not yet driving that data. The slave would lose synchronization with the master and erroneously receive all frames after the first.</p>
Workaround
<p>Do not enable inter-character spacing when CLKPHA = 1. If a delay between frames is necessary, insert one manually with a software delay loop. Data cannot be transmitted using DMA in this case.</p>
Resolution
<p>There is currently no resolution for this issue.</p>

2.6 USART_E304 — PRS Transmit Unavailable in Synchronous Slave Mode

Description of Errata
When the USART is configured for synchronous slave operation, the transmit output (MISO) is not driven if the signal is routed to a pin using the PRS producer (e.g., SOURCESEL = 0x20 and SIGSEL = 0x4 for USART0).
Affected Conditions / Impacts
Systems cannot operate the USART in synchronous slave mode if the PRS is used to route the transmit output to the RX (MISO) pin. Operation is not affected in master mode when the transmit output is routed to the TX (MOSI) pin using the PRS producer nor is operation affected in any mode when the GPIO_USARTn_RXROUTE and GPIO_USARTn_TXROUTE registers are used.
Workaround
There is currently no workaround for this issue.
Resolution
There is currently no resolution for this issue.

3. Revision History

Revision 0.1

September, 2020

- Initial release.

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