Blue Gecko *Bluetooth*® Low Energy Module
BGM13P Errata

This document contains information on the BGM13P errata. The latest available revision of this device is revision V2.

For errata on older revisions, refer to the errata history section for the device. The revision information is typically specified in or near the trace code on the device. Refer to the package marking information in the data sheet for more information.

Errata effective date: September, 2018.

1. Active Errata Summary

These tables list all known errata for the BGM13P and all unresolved errata in revision V2 of the BGM13P.

Table 1.1. Errata History Overview

Designator	Title/Problem	Exists on Revision:
		V2
ADC_E213	ADC KEEPINSLOWACC Mode	X
ADC_E228	Limited ADC Sampling Frequency in EM2	X
CSEN_E201	CSEN_DATA in Debug Mode	X
CSEN_E202	CSEN Baseline DMA Transfers	X
CUR_E203	Occasional Extra EM0/1 Current	X
DBG_E204	Debug Recovery with JTAG Does Not Work	X
EMU_E214	Device Erase Cannot Occur if Voltage Scaling Level is Too Low	X
I2C_E202	Race Condition Between Start Detection and Timeout	X
I2C_E203	I2C Received Data Can be Shifted	X
I2C_E204	I2C0 Does Not Meet Fast Mode Plus (Fm+) Timing at Voltage Scale Level 0	X
I2C_E205	Go Idle Bus Idle Timeout Does Not Bring Device to Idle State	X
I2C_E206	Slave Holds SCL Low After Losing Arbitration	X
RMU_E202	External Debug Access Not Available After Watchdog or Lockup Full Reset	X
RTCC_E203	Potential Stability Issue with RTCC Registers	X
RTCC_E205	Wrap Event Can Be Missed	X
USART_E203	DMA Can Miss USART Receive Data in Synchronous Mode	X

Table 1.2. Active Errata Status Summary

Errata #	Designator	Title/Problem	Workaround Exists	Affected Revision	Resolution
1	ADC_E213	ADC KEEPINSLOWACC Mode	No	V2	—
2	ADC_E228	Limited ADC Sampling Frequency in EM2	No	V2	—
3	CSEN_E201	CSEN_DATA in Debug Mode	Yes	V2	—
4	CSEN_E202	CSEN Baseline DMA Transfers	Yes	V2	—
5	CUR_E203	Occasional Extra EM0/1 Current	No	V2	—
6	DBG_E204	Debug Recovery with JTAG Does Not Work	Yes	V2	—
7	EMU_E214	Device Erase Cannot Occur if Voltage Scaling Level is Too Low	Yes	V2	—
8	I2C_E202	Race Condition Between Start Detection and Timeout	Yes	V2	—
9	I2C_E203	I2C Received Data Can be Shifted	Yes	V2	—

Errata #	Designator	Title/Problem	Workaround Exists	Affected Revision	Resolution
10	I2C_E204	I2C0 Does Not Meet Fast Mode Plus (Fm+) Timing at Voltage Scale Level 0	No	V2	—
11	I2C_E205	Go Idle Bus Idle Timeout Does Not Bring Device to Idle State	Yes	V2	—
12	I2C_E206	Slave Holds SCL Low After Losing Arbitration	Yes	V2	—
13	RMU_E202	External Debug Access Not Available After Watchdog or Lockup Full Reset	Yes	V2	—
14	RTCC_E203	Potential Stability Issue with RTCC Registers	Yes	V2	—
15	RTCC_E205	Wrap Event Can Be Missed	Yes	V2	—
16	USART_E203	DMA Can Miss USART Receive Data in Synchronous Mode	Yes	V2	—

2. Detailed Errata Descriptions

2.1 ADC_E213 – ADC KEEPINSLOWACC Mode

Description of Errata
When WARMUP-MODE in ADCn_CTRL is set to KEEPINSLOWACC, the ADC does not track the input voltage. Also, the ADC keeps the input muxes closed even during channel switching, making it not recommended to operate the ADC in KEEPINSLOWACC mode.
Affected Conditions / Impacts
KEEPINSLOWACC warmup mode does not function properly.
Workaround
There is currently no workaround for this issue.
Resolution
There is currently no resolution for this issue.

2.2 ADC_E228 – Limited ADC Sampling Frequency in EM2

Description of Errata
ADC FIFO overflows occur at frequencies that are much lower than the ADC's maximum theoretical sampling rate.
Affected Conditions / Impacts
ADC sampling frequency is reduced in EM2.
Workaround
There is currently no workaround for this issue.
Resolution
There is currently no resolution for this issue.

2.3 CSEN_E201 – CSEN_DATA in Debug Mode

Description of Errata
Reading CSEN_DATA in debug mode inadvertently clears pending CSEN data DMA requests.
Affected Conditions / Impacts
Reads of CSEN_DATA clear pending receive data DMA requests. This would be expected in normal operation as the DMA reads CSEN_DATA to transfer newly acquired results. These reads are intentional, but any read of CSEN_DATA, including while in debug mode, has the same effect. Thus, viewing the CSEN module registers in a debugger, such as in Simplicity Studio, can, inadvertently, clear pending CSEN DMA requests resulting in subsequent data being received out of order and with insertions of random data.
Workaround
Do not use a debugger to read the CSEN registers while DMA is enabled.
Resolution
There is currently no resolution for this issue.

2.4 CSEN_E202 – CSEN Baseline DMA Transfers

Description of Errata
DMA transfers to CSEN_DMBASELINE do not occur in the expected order.
Affected Conditions / Impacts
When using delta modulation, a baseline value must be written to CSEN_DMBASELINE before each conversion. However, when DMA is used to do this, these writes occur after the desired conversion instead of before the conversion as is required. This means that in a given sequence of conversions serviced by DMA, the write to CSEN_DMBASELINE that should happen before conversion N is actually written in advance of conversion N + 1, leading to potentially erroneous results.
Workaround
Manually write the first value to CSEN_DMBASELINE and then use the DMA to perform subsequent baseline writes. Thus, in the case of a sequence consisting of four conversions, the first baseline value would be written to CSEN_DMBASELINE under software control (e.g. before the conversion trigger occurs). The next three values can be written by the DMA after the first and each subsequent conversion occurs. After the final conversion, which would be the fourth in this example, the DMA will service a final write request to CSEN_DMBASELINE. This final transfer can be (1) a dummy value if no further conversions are required, (2) the initial baseline value in the case where conversions are repeated in a loop, or (3) the initial baseline value for a new, yet-to-be-triggered series of conversions.
Resolution
There is currently no resolution for this issue.

2.5 CUR_E203 – Occasional Extra EM0/1 Current

Description of Errata
Occasionally when exiting EM2, a low voltage oscillator sometimes continues to run and causes the device to draw an extra ~10 µA when in EM0 or EM1. This oscillator automatically resets when entering EM2 or EM3, so the extra current draw is not present in these modes.
Affected Conditions / Impacts
Systems using EM2 may occasionally see an extra ~10 µA of current draw in EM0 or EM1.
Workaround
There is currently no workaround for this issue.
Resolution
There is currently no resolution for this issue.

2.6 DBG_E204 – Debug Recovery with JTAG Does Not Work

Description of Errata
The debug recovery algorithm of holding down pin reset, issuing a System Bus Stall AAP instruction, and releasing the reset pin does not work when using the JTAG debug interface. When using the JTAG debug interface, the core will continue to execute code as soon as the reset pin is released.
Affected Conditions / Impacts
The debug recovery sequence will not work when using the JTAG debug interface.
Workaround
Use the Serial Wire debug interface to implement the debug recovery sequence.
Resolution
There is currently no resolution for this issue.

2.7 EMU_E214 – Device Erase Cannot Occur if Voltage Scaling Level is Too Low

Description of Errata
The device erase logic does not check the Voltage Scale Level prior to attempting a device erase. If using Voltage Scale Level 0 (1 V), the device may not be able to erase the flash. This results in a potentially unlockable device if operating at Voltage Scale Level 0 (1 V).
Affected Conditions / Impacts
It is possible that the flash is only partially erased when performing the operation at Voltage Scale Level 0 (1 V). If this results in the debug lock bit not clearing, a locked part doesn't unlock after the partial erasure (which it is intended to do), and the part remains locked. If subsequent erasures continue to fail, the part would remained locked.
Workaround
The voltage should be set to Voltage Scale Level 2 (1.2 V) before executing the device erase. For systems that don't lock the debug interface, the user can follow the debug recovery procedure to halt the CPU before it has a chance to execute code in software to avoid the code scaling the voltage. The device erase can then be executed at Voltage Scale Level 2 (1.2 V) (the power-on default voltage of the device). For systems that do lock the debug interface, firmware can implement a mechanism whereby it can voltage scale or unlock debug access if its defined authentication method is passed.
Resolution
There is currently no resolution for this issue.

2.8 I2C_E202 – Race Condition Between Start Detection and Timeout

Description of Errata
There is a race condition where the Bus Idle Timeout counter may clear the busy status of the I2C bus after a start condition.
Affected Conditions / Impacts
Software may attempt another I2C start if it thinks the bus is idle, this may disrupt the I2C bus. After the Bus Idle Timeout feature has triggered, it will not detect another idle condition.
Workaround
Software can wait for any of the following conditions before starting an I2C transaction: • The received address match interrupt indicates that the I2C bus is busy. Software should serve this transaction and proceed accordingly. Software can ignore the wrong busy status. • The SSTOPIF interrupt flag indicates that the I2C bus has returned to the idle state. • A defined, system-dependent amount of time to wait after bus activity to ensure that the bus is in idle state.
Resolution
There is currently no resolution for this issue.

2.9 I2C_E203 – I2C Received Data Can be Shifted

Description of Errata
If SDA falls between detection of the start condition and the first rising edge of SCL, the I2C state machine clears the start condition that was just detected, causing the state machine counter to count the rising edge of SCL earlier than it was detected. This causes the received data to be out of sync and the acknowledge phase to occur one SCL clock cycle earlier than expected, thus corrupting the integrity of the I2C bus. There are two ways in which the falling condition on SDA can potentially happen: • In multi-master systems, one master initiates a start condition and then drives SDA high shortly before another master drives SDA low to indicate a start condition. • In a single master system, if SDA is high from the last bit of the previous transaction, the master initiates a start condition and then drives SDA low because the MSB of the new address is low.
Affected Conditions / Impacts
I2C operation in slave mode or multi-master mode.
Workaround
This depends on whether the system is multi- or single-master. There is no workaround for multi-master cases. In a single master system, the state of SDA may not change unless a new address is being sent, such that the falling condition on SDA would not be observed. Whether or not this is the case is dependent on the implementation of the particular I2C master.
Resolution
There is currently no resolution for this issue.

2.10 I2C_E204 – I2C0 Does Not Meet Fast Mode Plus (Fm+) Timing at Voltage Scale Level 0

Description of Errata
I2C0 cannot meet Fast Mode Plus (Fm+) timing specifications when the device is operating at Voltage Scale Level 0 (`EMU_STATUS_VSCALE = VSCALE0`). Attempting to do so can result in false NACK/START/STOP conditions during communication.
Affected Conditions / Impacts
I2C0 is unable to support Fm+ timing at Voltage Scale Level 0 (`EMU_STATUS_VSCALE = VSCALE0`).
Workaround
There is no workaround for I2C0, and this erratum affects only I2C0 on a given device.
Resolution
There is currently no resolution for this issue.

2.11 I2C_E205 – Go Idle Bus Idle Timeout Does Not Bring Device to Idle State

Description of Errata
When the I2C is operating as a slave, if the bus idle timeout is active (`I2Cn_CTRL_BITO != 0`) and the go idle on bus timeout feature is enabled (`I2Cn_CTRL_GIBITO = 1`), the bus idle interrupt flag (`I2Cn_IF_BITO`) sets upon timeout, but the receiver does not enter the idle state.
Affected Conditions / Impacts
The I2C receiver needs to detect a START condition to recover from the bus idle timeout state. If there is other, undefined activity on the bus after the timeout, the receiver will not recover as expected.
Workaround
The `I2Cn_CTRL_EN` bit can be toggled from 1 to 0 and back to 1 again in order to resume normal operation. Alternatively, a START condition issued by any other master on the bus (including the EFM32/EFR32 device) will reset the receiver and return it to normal operation.
Resolution
There is currently no resolution for this issue.

2.12 I2C_E206 – Slave Holds SCL Low After Losing Arbitration

Description of Errata
If, while transmitting data as a slave, arbitration is lost, SCL is unintentionally held low for an indefinite period of time.
Affected Conditions / Impacts
The winner of arbitration cannot use the bus because SCL is never released.
Workaround
If the I^2C arbitration lost flag is asserted (I2C_IF_ARBLOST = 1) in slave mode (I2C_STATE_MASTER = 0), application software needs to wait for at least one SCL high time and then issue the transmission abort command (set I2C_CMD_ABORT = 1), thus releasing SCL.
Resolution
There is currently no resolution for this issue.

2.13 RMU_E202 – External Debug Access Not Available After Watchdog or Lockup Full Reset

Description of Errata
When a reset is triggered in full-reset mode, a debugger will not be able to read AHB-AP or ARM core registers.
Affected Conditions / Impacts
Systems using the full reset mode for watchdog or lockup resets will see limited debugging capability after one of these resets triggers.
Workaround
There are three possible workarounds: • Software should configure peripherals to either LIMITED or EXTENDED mode if full debugger functionality is needed after a watchdog or lockup reset. • When using FULL reset mode, appending at least 9 idle clock cycles to the last debug command will allow the transaction to complete. • A power cycle or hard pin reset will restore normal operation.
Resolution
There is currently no resolution for this issue.

2.14 RTCC_E203 – Potential Stability Issue with RTCC Registers

Description of Errata
RTCC_LOCK and RTCC_POWERDOWN have the potential to be momentarily unstable under some PCLK, Low Energy Peripheral Clock, and APB write scenarios. This stability issue resolves in approximately 160 ns as the write completes with the assertion of the APB clock pulse.
Affected Conditions / Impacts
A write to RTCC_LOCK or RTCC_POWERDOWN may have unintended effects if the write is completed with the Low Energy Peripheral clock enabled (RTCC in the CMU_LFECLKEN0 register is set to 1).
Workaround
To avoid this stability issue, configure the RTCC_LOCK and RTCC_POWERDOWN registers with the Low Energy Peripheral clock disabled (RTCC in the CMU_LFECLKEN0 register is cleared to 0). This workaround is included in v5.1.0 or later of the Gecko SDK.
Resolution
There is currently no resolution for this issue.

2.15 RTCC_E205 – Wrap Event Can Be Missed

Description of Errata
The RTCC main counter can miss a CC1 wrap event (CCV1TOP bitfield in the RTCC_CTRL register set to 1) if one of the following registers are written in the same cycle as the wrap event: RTCC_CTRL, RTCC_CNT, RTCC_TIME, RTCC_DATE, RTCC_PRECNT, RTCC_IFC, RTCC_IFS, RTCC_CCx_CCV, RTCC_CCx_CTRL, RTCC_CCx_TIME, RTCC_CCx_DATE, RTCC_CMD, RTCC_RETx_REG.
Affected Conditions / Impacts
Systems using the CC1 wrap event feature may miss events if an affected register is written immediately before a wrap occurs.
Workaround
There are two workarounds to this issue: • Do not use the CC1 wrap event feature (CCV1TOP in RTCC_CTRL should be cleared to 0). • Alternatively, do not write to any of the affected registers when the counter is about to wrap. This means that firmware must check that RTCC_CNT is not close to RTCC_CC1_CCV before writing the register.
Resolution
There is currently no resolution for this issue.

2.16 USART_E203 — DMA Can Miss USART Receive Data in Synchronous Mode

Description of Errata
If the USART is operating in synchronous mode, it can drop received data before the DMA has a chance to read it under the following conditions: • Synchronous master sample delay is enabled (USARTn_CTRL_SMSDELAY = 1) in order to improve timing at higher clock rates. • The receive FIFO is already full, and the receive data DMA request (USARTnRXDATAV) is asserted. • The transmit shift register is clocking out the last frame to be sent, the transmit FIFO is empty, and the transmit data DMA request (USARTnTXBL) is asserted. • The transmit data DMA request arrives before the receive data DMA request (the transmit FIFO empties before the receive data DMA request is asserted). • A higher priority peripheral DMA request arrives while processing the transmit data DMA request but before the receive data DMA request is processed. Because the incoming peripheral DMA request has higher priority than the USART DMA requests but cannot interrupt a DMA request that is already in progress (the transmit data DMA request), it will be processed before the receive data DMA request, thus causing the USART to drop an incoming frame (or frames) since the receive FIFO is already full.
Affected Conditions / Impacts
In systems that use the USART in synchronous mode with the master sample delay feature (USARTn_CTRL_SMSDELAY = 1) and that use the DMA to manage both the USART transmitter and receiver, as well as other peripherals with higher request priorities, the USART can drop an incoming frame (or frames) if the DMA is not able to process the receive data requests to empty the receive FIFO when it is full.
Workaround
Assign a higher priority to the DMA channel servicing the receive data DMA requests such that it is processed before the channel servicing transmit data DMA requests and any channels servicing requests associated with any other peripherals that could potentially stall a USART synchronous transfer that is already in progress. Set LDMA_CHx_CTRL_IGNORESREQ = 1 for the transmit data channel so that the LDMA accumulates multiple requests from the transmitter and services them with a single transfer cycle. This causes the LDMA to fill the USART transmitter's FIFO only when it is empty instead of each and every time space becomes available.
Resolution
There is currently no resolution for this issue.

3. Errata History

This section contains the errata history for BGM13P devices.

For errata on latest revision, refer to the beginning of this document. The device data sheet explains how to identify chip revision, either from package marking or electronically.

3.1 Errata History Summary

This table lists all resolved errata for the BGM13P.

Table 3.1. Errata History Status Summary

Errata #	Designator	Title/Problem	Workaround Exists	Affected Revision	Resolution
There are no errata in the errata history for this device.					

4. Revision History

Revision 0.2

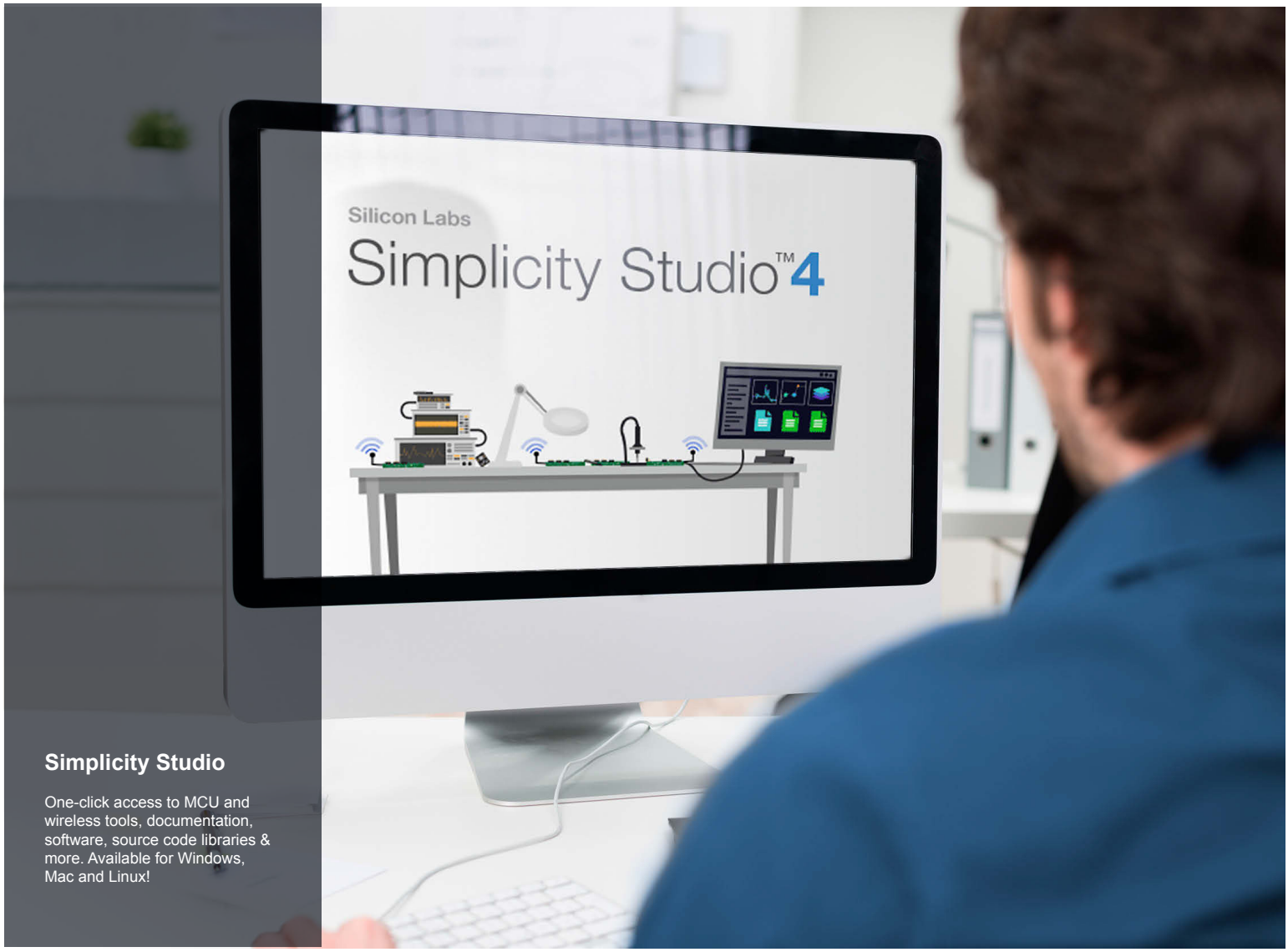
September 2018

- Updated the workaround in RMU_E202.
- Added ADC_E228, CSEN_E201, CSEN_E202, EMU_E214, I2C_E202, I2C_E203, I2C_E204, I2C_E205, I2C_E206, and USART_E203.

Revision 0.1

January 2018

- Initial release.



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Silicon Laboratories Inc.
400 West Cesar Chavez
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