



EFM32 Happy Gecko

EFM32HG Errata



This document contains information on the EFM32HG errata. The latest available revision of this device is revision C.

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: August 2019.

1. Active Errata Summary

These tables list all known errata for the EFM32HG and all unresolved errata in revision C of the EFM32HG.

Table 1.1. Errata History Overview

Designator	Title/Problem	Exists on Revision:		
		A	B	C
BOOT_E102	Bootloader Requires a Crystal	X	X	—
EMU_E107	Interrupts During EM2 Entry	X	X	X
EMU_E108	High Current Consumption on EM4 Entry	X	—	—
EMU_E109	Potential Brown Out in EM2	X	X	—
EMU_E110	Potential Hard Fault when Exiting EM2 or EM3	X	X	—
GPIO_E102	Strong Pulldown on PC4 in EM4 and During Reset	X	—	—
IDAC_E101	IDAC Output Current Degradation	X	X	X
PCNT_E102	PCNT Pulse Width Filtering Does Not Work	X	X	X
PKG_E101	Device Package Marking Error	X	—	—
RMU_E101	POR Calibration Initialization Issue	X	—	—
RMU_E102	Regulator Output May Be 0V After Supply Falls to Intermediate Voltage and Recovers	X	X	—
RMU_E103	Reset May Fail to Trigger During Supply Voltage Brownouts	X	X	—
USART_E113	IrDA Modulation and Transmission of PRS Input Data	X	X	X
USB_E111	Using EM2 with System Running on USHFRCO	X	X	X
USB_E112	SUSPEND in LEMOSCCTRL	X	X	X

Table 1.2. Active Errata Status Summary

Errata #	Designator	Title/Problem	Workaround Exists	Affected Revision	Resolution
1	EMU_E107	Interrupts During EM2 Entry	Yes	C	—
2	IDAC_E101	IDAC Output Current Degradation	Yes	C	—
3	PCNT_E102	PCNT Pulse Width Filtering Does Not Work	No	C	—
4	USART_E113	IrDA Modulation and Transmission of PRS Input Data	Yes	C	—
5	USB_E111	Using EM2 with System Running on USHFRCO	Yes	C	—
6	USB_E112	SUSPEND in LEMOSCCTRL	Yes	C	—

2. Detailed Errata Descriptions

2.1 EMU_E107 — Interrupts During EM2 Entry

Description of Errata
An interrupt from a peripheral running from the high frequency clock that is received during EM2 entry will cause the EMU to ignore the SLEEPDEEP flag.
Affected Conditions / Impacts
During EM2 entry, the high frequency clocks that are disabled during EM2 will run for some clock cycles after WFI is issued to allow safe shutdown of the peripherals. If an enabled interrupt is requested from one of these non-EM2 peripherals during this shutdown period, the attempt to enter EM2 will fail, and the device will enter EM1 instead. As a result, the pending interrupt will immediately wake the device to EM0.
Workaround
Before entering EM2, disable all high frequency peripheral interrupts in the core.
Resolution
There is currently no resolution for this issue.

2.2 IDAC_E101 — IDAC Output Current Degradation

Description of Errata
The current output of the IDAC might degrade over time.
Affected Conditions / Impacts
Due to an undefined shut-down state of the IDAC, powered devices that do not use the IDAC continuously might experience some degradation in the current output over the lifetime of the device. The degradation is very small when the device is used at room temperature, but the output current will fall well outside specs if the device is exposed to higher temperatures for longer periods of time.
Workaround
If the IDAC output current stability is crucial to the application, the IDAC should never be completely disabled while the device is powered. Leaving the IDAC enabled in the lowest output code setting with duty-cycling enabled consumes ~50 nA extra current and eliminates the problem.
Resolution
There is currently no resolution for this issue.

2.3 PCNT_E102 — PCNT Pulse Width Filtering Does Not Work

Description of Errata
PCNT pulse width filtering does not work.
Affected Conditions / Impacts
The PCNT pulse width filter does not work as intended.
Workaround
Do not use the pulse width filter, i.e. ensure FILT = 0 in PCNTn_CTRL.
Resolution
There is currently no resolution for this issue.

2.4 USART_E113 — IrDA Modulation and Transmission of PRS Input Data

Description of Errata
If the USART IrDA modulator is configured to accept input from a PRS channel, the incoming data stream will not be transmitted because the required clock from the baud rate generator is never enabled.
Affected Conditions / Impacts
It is not possible for the USART IrDA modulator to directly transmit data from a source other than the USART's own transmitter. The USART_IRCTRL_IRPRSEN bit should remain at its reset state of 0.
Workaround
Assuming the data to be sent via the PRS is also data that could be received by the EFM32/EFR32 USART, then the data can be received using the USART's PRS RX feature (USART_INPUT_RXPRS = 1), stored in RAM (e.g. using DMA), and then transmitted with IrDA mode enabled. In cases where IrDA operation is transmit-only, the PRS RX data can be received on the same USART doing the transmission. If IrDA operation is bidirectional, then another USART must be used to receive the PRS data. If the data to be sent is in some other format (e.g. pulses from a timer output), then there is no direct way to transmit it using the IrDA modulator. It would be necessary to capture the data in some other way and reformat it as serial data timed according to the clock generated by the USART.
Resolution
There is currently no resolution for this issue.

2.5 USB_E111 — Using EM2 with System Running on USHFRCO

Description of Errata
Running the system on USHFRCO will not work with EM2 in USB applications.
Affected Conditions / Impacts
Entering EM2 when both the system clock (HFCLK) and the USB core clock (USBCCLK) are running on USHFRCO will result in a lock-up.
Workaround
Use either HFRCO or HFXO for the system clock (HFCLK) if EM2 is employed in USB applications. Alternatively, the EMVREG bit in EMU_CTRL can be set. This allows EM2 to be used at the cost of extra current consumption in EM2.
Resolution
There is currently no resolution for this issue.

2.6 USB_E112 — SUSPEND in LEMOSCCTRL

Description of Errata
Do not use the SUSPEND mode of LEMOSCCTRL in USB_CTRL.
Affected Conditions / Impacts
In rare cases with high data throughput, a transmission can fail when this mode is enabled.
Workaround
Use the GATED mode of LEMOSCCTRL for the best energy efficiency. The NONE mode can be used to disable energy savings.
Resolution
There is currently no resolution for this issue.

3. Errata History

This section contains the errata history for EFM32HG devices.

For errata on the 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 EFM32HG.

Table 3.1. Errata History Status Summary

Errata #	Designator	Title/Problem	Workaround Exists	Affected Revision	Resolution
1	BOOT_E102	Bootloader Requires a Crystal	Yes	B	B devices (date code \geq 1801)
2	EMU_E108	High Current Consumption on EM4 Entry	Yes	A	B
3	EMU_E109	Potential Brown Out in EM2	Yes	B	B devices (date code 1625 and PROD_REV \geq 0x89)
4	EMU_E110	Potential Hard Fault when Exiting EM2 or EM3	Yes	B	B devices (date code \geq 1801)
5	GPIO_E102	Strong Pulldown on PC4 in EM4 and During Reset	No	A	B
6	PKG_E101	Device Package Marking Error	No	A	B
7	RMU_E101	POR Calibration Initialization Issue	Yes	A	A devices (date code \geq 1539 and PROD_REV \geq 0x84), B
8	RMU_E102	Regulator Output May Be 0V After Supply Falls to Intermediate Voltage and Recovers	Yes	B	C
9	RMU_E103	Reset May Fail to Trigger During Supply Voltage Brownouts	Yes	B	C

3.2 Detailed Errata Descriptions

3.2.1 BOOT_E102 — Bootloader Requires a Crystal

Description of Errata
Versions of the production bootloader prior to v2.06 require a crystal. All devices with the affected date codes use a version of the bootloader prior to v2.06 and will require a crystal to use the production bootloader. Version 2.06 of the bootloader will be updated to no longer require a crystal, since one is not needed on these products.
Affected Conditions / Impacts
Systems intending to use versions older than v2.06 of the production bootloader that do not include a crystal will not be able to run the bootloader on affected devices.
Workaround
For systems intending to use the production bootloader on affected devices, add a temporary crystal to the design that can later be removed when it's no longer needed.
Resolution
This issue has been resolved. Devices with a date code greater than or equal to 1801 will not have this issue.

3.2.2 EMU_E108 — High Current Consumption on EM4 Entry

Description of Errata
A higher than expected current consumption will be experienced when entering EM4 if the register at address 0x400C80E4 is not cleared.
Affected Conditions / Impacts
A higher than expected current consumption will be experienced when entering EM4 if the register at address 0x400C80E4 is not cleared.
Workaround
Clear the register at address 0x400C80E4 before entering EM4. If the EM4 sequence is aborted, this register needs to be restored to its original value.
Resolution
This issue is resolved in revision B devices.

3.2.3 EMU_E109 — Potential Brown Out in EM2

Description of Errata
There is an error with the calibration algorithm for a voltage regulator that is active during EM2 mode.
Affected Conditions / Impacts
There is an error with the calibration algorithm for a voltage regulator that is active during EM2 mode. This error can, in rare instances, cause the device to brown out and reset while operating in EM2 mode.
Workaround
<p>The issue has been corrected with an updated and validated test program. Devices with a date code greater than or equal to 1625 have been tested with the corrected test program.</p> <p>Firmware can also work around this issue by writing the calibration value for the low current regulator active in EM2 to 0x6 after any reset or wakeup from EM4. More information on this firmware workaround including example code can be found at the following KB article URL:</p> <p>https://www.silabs.com/community/mcu/32-bit/knowledge-base.entry.html/2016/11/04/emu_e109_-_potential-gBa3</p>
Resolution
The issue has been corrected with an updated and validated test program. Devices with a date code and PROD_REV greater than or equal to 1625 and 0x89 respectively have been tested with the corrected test program.

3.2.4 EMU_E110 — Potential Hard Fault when Exiting EM2 or EM3

Description of Errata
The flash is powered down in EM2 and EM3 to save power. Some control registers in the flash can rarely enter an invalid state upon power-on, causing the first read of flash to be incorrect. If this occurs after exiting EM2 or EM3, the core attempts to fetch the interrupt address, but the value will be incorrect and may be invalid. In the case of an invalid value, the core will then jump to the hard fault handler for attempting to execute code from an invalid address. All subsequent reads from the flash are unaffected, and it is only the first flash read after exit from EM2 or EM3 that is potentially erroneous.
Affected Conditions / Impacts
When exiting EM2 or EM3, some devices may intermittently execute code incorrectly or enter the hard fault handler instead of entering the expected ISR associated with the wake source.
Workaround
<p>To workaround this issue, move the interrupt vector table and interrupt service routines for EM2 or EM3 wake sources to RAM and perform a dummy read of the flash in the ISR. Additional information on the workaround and examples provided is available from the following Knowledge Base article URL:</p> <p>https://www.silabs.com/community/mcu/32-bit/knowledge-base.entry.html/2017/05/09/emu_e110_-_potential-i2Pn</p>
Resolution
This issue has been resolved. Devices with a date code greater than or equal to 1801 will not have this issue.

3.2.5 GPIO_E102 — Strong Pulldown on PC4 in EM4 and During Reset

Description of Errata
The GPIO pin PC4 has a strong pull-down in EM4 and during reset.
Affected Conditions / Impacts
In EM4 and during reset, the GPIO pin PC4 has a strong pull-down. If a high input is connected to this pin or the GPIO is driven high in EM4 by setting EM4RET in GPIO_CTRL, it will draw considerable current.
Workaround
Do not use PC4 as an EM4 wakeup pin. Make sure to disable output to this pin before entering EM4. Do not drive this pin high externally in EM4.
Resolution
This issue is resolved in revision B devices.

3.2.6 PKG_E101 — Device Package Marking Error

Description of Errata
Some packages may contain an incorrect top mark.
Affected Conditions / Impacts
In some instances, the device identification marked on the package on line 2 contains an "E" instead of "64" for the flash size field. In addition, the product revision letter ("A") may appear erroneously at the end of line 2 in addition to the end of line 4. For example, a line 2 correct mark is: "HG322F64G". An incorrect line 2 mark is: "HG322FEG A".
Workaround
This is corrected for all packages with date code 1519 and later.
Resolution
This issue is resolved in revision B devices.

3.2.7 RMU_E101 — POR Calibration Initialization Issue

Description of Errata
Upon initial power-on, some devices may not be able to access flash memory above the 4 kB boundary, or some calibration registers on some devices may not be set to their factory calibration values.
Affected Conditions / Impacts
<p>The list of affected devices can be found in the Knowledge Base (KB) article listed under Fix/Workaround.</p> <p>Some devices are sensitive to the power supply ramp during initial power-on. Specific ramp profiles on these devices can cause an intermittent issue resulting in one of two failure modes (A) or (B):</p> <p>A. Flash memory above the 4 kB boundary is inaccessible. Reads of the flash will return zeros. Write attempts will return an invalid address error code in the MSC_STATUS register. Code execution will behave as though the memory above 4 kB was filled with zeros until the device resets itself.</p> <p>B. Some parts of the calibration initialization process do not complete successfully. On USB devices, the USB voltage regulator does not get calibrated. Specific peripheral registers that may not be calibrated are as follows (not all registers apply to all devices): ADC0_CAL, IDAC_CAL, DAC0_CAL, DAC0_BIASPROG, DAC0_OPACTRL, and DAC0_OPAOFFSET.</p> <p>A SYSRESETREQ reset will clear either failure mode, and the device will behave normally until the next power-on event.</p>
Workaround
<p>Additional information including a software workaround is available from the following KB article URL:</p> <p>https://www.silabs.com/community/mcu/32-bit/knowledge-base.entry.html/2015/10/09/rmu_e101_-_por_calib-cEpZ</p>
Resolution
Revision A devices with a date code and PROD_REV greater than or equal to 1539 and 0x84 respectively will not have this issue. Revision B devices do not have this issue.

3.2.8 RMU_E102 — Regulator Output May Be 0V After Supply Falls to Intermediate Voltage and Recovers

Description of Errata
Output of the on-chip regulator (DECOUPLE pin) may be approximately 0V, and the device will not respond to a pin reset.
Affected Conditions / Impacts
<p>The device supply voltage is specified as 1.98V minimum. For certain supply waveforms, similar to disconnecting a battery, allowing the supply to decay to approximately 0.9V (and stopping the decay at approximately 0.9V), then reconnecting the battery, the output of the regulator (DECOUPLE pin) may be approximately 0V. In this state, code will not execute, and the device will not respond to a pin reset. More information on this issue can be found at the following KB article URL:</p> <p>https://www.silabs.com/community/mcu/32-bit/knowledge-base.entry.html/2019/01/09/rmu_e102_por_bodres-AQh7</p>
Workaround
Hold the RESETn pin logic low, starting before the supply is disconnected, and keep RESETn pin logic low until the supply reaches a valid voltage. If the DECOUPLE pin measures approximately 0V, power cycle the supplies by pulling them all the way to 0V before connecting supplies again.
Resolution
This issue is resolved in revision C devices.

3.2.9 RMU_E103 — Reset May Fail to Trigger During Supply Voltage Brownouts

Description of Errata
Reset may fail to trigger when the device supplies (AVDD_0, AVDD_2, VDD_DREG) fall to a voltage in the 1.25V - 1.45V range.
Affected Conditions / Impacts
If the device supplies (AVDD_0, AVDD_2, VDD_DREG) fall to a voltage in the 1.25V - 1.45V range, the device may fail to reset, allowing code execution while the supply voltage remains in the 1.25V - 1.45V range. More information on this issue can be found at the following KB article URL: https://www.silabs.com/community/mcu/32-bit/knowledge-base.entry.html/2019/01/09/rmu_e103_por_bodres-N3MD
Workaround
Hold the RESETn pin in logic low, starting before the device supplies fall below 1.6V, and keep the RESETn pin logic low until the device supplies reach a valid voltage again.
Resolution
This issue is resolved in revision C devices.

4. Revision History

Revision 1.5

August, 2019

- Changed current device revision to revision C.
- [BOOT_E102](#), [EMU_E109](#), [EMU_E110](#), [RMU_E102](#), and [RMU_E103](#) resolved and moved to [3. Errata History](#).

Revision 1.4

January 2019

- Added [EMU_E107](#), [RMU_E102](#), [RMU_E103](#), and [USART_E113](#).
- Resolved [BOOT_E102](#) and [EMU_E110](#).
- [EMU_E109](#) and [RMU_E101](#) workaround URLs updated.

Revision 1.31

January 2018

- Updated [BOOT_E102](#) and [EMU_E110](#) resolution text.
- Updated revision history format.

Revision 1.30

October 2017

- Updated [EMU_E110](#) to refer to both EM2 and EM3.
- Added [BOOT_E102](#).

Revision 1.20

April 2017

- Added [EMU_E110](#).
- Updated errata formatting.
- Merged all errata documents for EFM32HG devices into one document.
- Merged errata history and errata into one document.

Revision 1.10

August 2016

- Added [EMU_E109](#).

Revision 1.00

January 2016

- Moved to revision B.
- Removed preliminary.

Revision 0.93

October 2015

- Added [RMU_E101](#).

Revision 0.92

May 2015

- Added [PKG_E101](#).

Revision 0.91

May 2015

- Added [USB_E112](#).

Revision 0.90

March 2015

- Added [USB_E111](#).

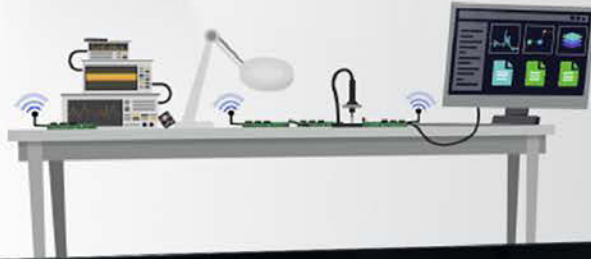
Revision 0.1

November 2014

- Initial preliminary release.

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