

EFM32HG Errata



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

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

The device data sheet explains how to identify the chip revision, either from package marking or electronically.

Errata effective date: March 2021.

1. Errata Summary

The table below lists all known errata for the EFM32HG and all unresolved errata in revision C of the EFM32HG.

Table 1.1. Errata Overview

Designator	Title/Problem	Workaround Exists	Exists on Revision:		
			A	B	C
ADC_E118	Requirements for ADC_CLK > 7 MHz	Yes	X	X	—
BOOT_E102	Bootloader Requires a Crystal	Yes	X	X	—
CMU_E115	HFRCO 1 MHz Band Switching	Yes	X	X	X
EMU_E107	Interrupts During EM2 Entry	Yes	X	X	X
EMU_E108	High Current Consumption on EM4 Entry	Yes	X	—	—
EMU_E109	Potential Brown Out in EM2	Yes	X	X	—
EMU_E110	Potential Hard Fault when Exiting EM2 or EM3	Yes	X	X	—
GPIO_E102	Strong Pulldown on PC4 in EM4 and During Reset	No	X	—	—
IDAC_E101	IDAC Output Current Degradation	Yes	X	X	X
PCNT_E102	PCNT Pulse Width Filtering Does Not Work	No	X	X	X
PKG_E101	Device Package Marking Error	No	X	—	—
RMU_E101	POR Calibration Initialization Issue	Yes	X	—	—
RMU_E102	Regulator Output May Be 0 V After Supply Falls to Intermediate Voltage and Recovers	Yes	X	X	—
RMU_E103	Reset May Fail to Trigger During Supply Voltage Brownouts	Yes	X	X	—
USART_E113	IrDA Modulation and Transmission of PRS Input Data	Yes	X	X	X
USB_E111	Using EM2 with System Running on USHFRCO	Yes	X	X	X
USB_E112	SUSPEND in LEMOSCCTRL	Yes	X	X	X

2. Current Errata Descriptions

2.1 CMU_E115 — HFRCO 1 MHz Band Switching

Description of Errata
Switching to or from the 1 MHz band of the HFRCO or AUXHFRCO may cause a hard fault even at the maximum supported number of wait states.
Affected Conditions / Impacts
When the HFRCO or AUXHFRCO is selected as a clock source (e.g., the HFRCO has been selected as the HFCLK source) and the device is running with the maximum supported number of wait states, switching to or from the 1 MHz band can possibly cause a clock glitch that results in unexpected behavior or a hard fault.
Workaround
<p>Before switching to or from the 1 MHz band when the HFRCO or AUXHFRCO is selected as the clock source, first switch to another stable clock source (such as the LFRCO). For example, when switching from the 21 MHz band to the 1 MHz band, the following procedure needs to be followed:</p> <ol style="list-style-type: none"> 1. Select another stable clock source by writing to the HFCLKSEL field of the CMU_CMD register. 2. Wait until the clock source shows that it has been selected in the CMU_STATUS register, (e.g., CMU_STATUS_LFRCOSEL = 1). 3. Program the CMU_HFRCOCTRL register to select the 1 MHz band and tuning value. 4. Wait until the HFRCO has stabilized at the new frequency by waiting for the HFRCORDY bit in the CMU_STATUS register to change for 0 to 1. 5. Select the HFRCO as the clock source by writing to the HFCLKSEL field of the CMU_CMD register.
Resolution
There is currently no resolution for this issue.

2.2 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.

2.3 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.

2.4 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 <code>FILT = 0</code> in <code>PCNTn_CTRL</code> .
Resolution
There is currently no resolution for this issue.

2.5 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 <code>USART_IRCTRL_IRPRSEN</code> 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 (<code>USART_INPUT_RXPRS = 1</code>), 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.

2.6 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.

2.7 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. Resolved Errata Descriptions

This section contains previous errata 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 ADC_E118 — Requirements for ADC_CLK > 7 MHz

Description of Errata
If operating the ADC_CLK at frequencies greater than 7 MHz, the ADC_BIASPROG register must be set to a value of 0xF4B in order to meet specified performance. Operating the ADC_CLK at frequencies of 7 MHz or lower can use the default ADC_BIASPROG value of 0x747.
Affected Conditions / Impacts
Devices operating the ADC_CLK at frequencies greater than 7 MHz while using the default ADC_BIASPROG value of 0x747 may experience performance outside data sheet limits.
Workaround
For systems requiring an ADC_CLK rate > 7 MHz, set the ADC_BIASPROG register to 0xF4B. For systems requiring an ADC_CLK rate ≤ 7 MHz, set the ADC_BIASPROG register to 0x747.
Resolution
The revision 2.10 data sheet will be updated to reflect the new recommendations.

3.2 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.

3.3 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.

3.4 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.

3.5 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
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: https://www.silabs.com/community/mcu/32-bit/knowledge-base.entry.html/2017/05/09/emu_e110_-_potential-i2Pn
Resolution
This issue has been resolved. Devices with a date code greater than or equal to 1801 will not have this issue.

3.6 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.

3.7 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.

3.8 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.

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

Description of Errata
Output of the on-chip regulator (DECOUPLE pin) may be approximately 0 V, and the device will not respond to a pin reset.
Affected Conditions / Impacts
<p>The device supply voltage is specified as 1.98 V minimum. For certain supply waveforms, similar to disconnecting a battery, allowing the supply to decay to approximately 0.9 V (and stopping the decay at approximately 0.9 V), then reconnecting the battery, the output of the regulator (DECOUPLE pin) may be approximately 0 V. 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 0 V, power cycle the supplies by pulling them all the way to 0 V before connecting supplies again.
Resolution
This issue is resolved in revision C devices.

3.10 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 1.25 - 1.45 V range.
Affected Conditions / Impacts
If the device supplies (AVDD_0, AVDD_2, VDD_DREG) fall to a voltage in the 1.25 - 1.45 V range, the device may fail to reset, allowing code execution while the supply voltage remains in the 1.25 - 1.45 V 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 1.6 V, 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 1.6

March, 2021

- Added [ADC_E118](#).
- Resolved [ADC_E118](#).
- Added [CMU_E115](#)
- Migrated to new errata document format.

Revision 1.5

August, 2019

- Changed current device revision to revision C.
- Resolved [BOOT_E102](#), [EMU_E109](#), [EMU_E110](#), [RMU_E102](#), and [RMU_E103](#).

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.

Simplicity Studio

One-click access to MCU and wireless tools, documentation, software, source code libraries & more. Available for Windows, Mac and Linux!



IoT Portfolio
www.silabs.com/IoT



SW/HW
www.silabs.com/simplicity



Quality
www.silabs.com/quality



Support & Community
www.silabs.com/community

Disclaimer

Silicon Labs intends to provide customers with the latest, accurate, and in-depth documentation of all peripherals and modules available for system and software implementers using or intending to use the Silicon Labs products. Characterization data, available modules and peripherals, memory sizes and memory addresses refer to each specific device, and "Typical" parameters provided can and do vary in different applications. Application examples described herein are for illustrative purposes only. Silicon Labs reserves the right to make changes without further notice to the product information, specifications, and descriptions herein, and does not give warranties as to the accuracy or completeness of the included information. Without prior notification, Silicon Labs may update product firmware during the manufacturing process for security or reliability reasons. Such changes will not alter the specifications or the performance of the product. Silicon Labs shall have no liability for the consequences of use of the information supplied in this document. This document does not imply or expressly grant any license to design or fabricate any integrated circuits. The products are not designed or authorized to be used within any FDA Class III devices, applications for which FDA premarket approval is required or Life Support Systems without the specific written consent of Silicon Labs. A "Life Support System" is any product or system intended to support or sustain life and/or health, which, if it fails, can be reasonably expected to result in significant personal injury or death. Silicon Labs products are not designed or authorized for military applications. Silicon Labs products shall under no circumstances be used in weapons of mass destruction including (but not limited to) nuclear, biological or chemical weapons, or missiles capable of delivering such weapons. Silicon Labs disclaims all express and implied warranties and shall not be responsible or liable for any injuries or damages related to use of a Silicon Labs product in such unauthorized applications.

Note: This content may contain offensive terminology that is now obsolete. Silicon Labs is replacing these terms with inclusive language wherever possible. For more information, visit www.silabs.com/about-us/inclusive-lexicon-project

Trademark Information

Silicon Laboratories Inc., Silicon Laboratories®, Silicon Labs®, SiLabs® and the Silicon Labs logo®, Bluegiga®, Bluegiga Logo®, Clockbuilder®, CMEMS®, DSPLL®, EFM®, EFM32®, EFR®, Ember®, Energy Micro, Energy Micro logo and combinations thereof, "the world's most energy friendly microcontrollers", Ember®, EZLink®, EZRadio®, EZRadioPRO®, Gecko®, Gecko OS, Gecko OS Studio, ISOModem®, Precision32®, ProSLIC®, Simplicity Studio®, SiPHY®, Telegesis, the Telegesis Logo®, USBXpress®, Zentri, the Zentri logo and Zentri DMS, Z-Wave®, and others are trademarks or registered trademarks of Silicon Labs. ARM, CORTEX, Cortex-M3 and THUMB are trademarks or registered trademarks of ARM Holdings. Keil is a registered trademark of ARM Limited. Wi-Fi is a registered trademark of the Wi-Fi Alliance. All other products or brand names mentioned herein are trademarks of their respective holders.



Silicon Laboratories Inc.
400 West Cesar Chavez
Austin, TX 78701
USA

www.silabs.com