

Stellaris® LM3S9B90 RevB1 Errata

This document contains known errata at the time of publication for the Stellaris LM3S9B90 microcontroller. The table below summarizes the errata and lists the affected revisions. See the data sheet for more details.

See also the ARM® Cortex™-M3 errata, ARM publication number PR326-PRDC-009450 v2.0.

Table 1. Revision History

Date	Revision	Description
October 2013	4.3	<ul style="list-style-type: none"> Added issue "Chip select operation is not correct when using dual chip selects in Host Bus Continuous Read mode" on page 16. Removed issue "Flash Write Buffer does not function above 50 MHz" and added issue "Flash memory may be corrupted if programmed at system clock speeds above 50 MHz" on page 28. Added issue "iRDY timing in General-Purpose mode is not as specified in the data sheet" on page 34. Added issue "Simultaneous sampling on both ADC modules yields incorrect samples" on page 44. Added issue "Phase offset does not delay as expected if sample sequencers are not triggered at the same time" on page 44.
October 2012	4.2	<ul style="list-style-type: none"> Added issue "Non-word-aligned write to SRAM can cause incorrect value to be loaded" on page 11. Added issue "Internal reset supervisors may not prevent incorrect device operation during power transitions" on page 13. Added issue "Watchdog clear mechanism described in the data sheet does not work for the Watchdog Timer 1 module" on page 39. Added issue "Watchdog Timer 1 module asserts reset signal even if not programmed to reset" on page 40. Added issue "WDTLOAD yields an incorrect value when read back" on page 40. Added issue "Digital comparator in last step of sequence does not trigger or interrupt" on page 42. Added issue "Digital comparator interrupts do not trigger or interrupt as expected" on page 43. Added issue "Missing trigger or interrupt when multiple sequences configured for processor trigger and different trigger" on page 43. Added issue "ADC sample sequencers priorities are different than expected" on page 43. Added issue "When UART LIN or SIR mode is enabled, μDMA burst transfer does not occur" on page 47. Added issue "UART transfers fail at certain system clock frequency and baud rate combinations" on page 47. Added issue "Freescale SPI Mode at low SSIClk frequencies can yield data corruption" on page 48. Added issue "First two ADC samples from the internal temperature sensor must be ignored" on page 59.
June 2012	4.1	<ul style="list-style-type: none"> Clarified how to read the date code on Stellaris devices.

Date	Revision	Description
March 2011	4.0	<ul style="list-style-type: none"> Added issue "In Host-Bus 16 mode, only one byte select is asserted if only 8 bits are read" on page 32. Added issue "When non-blocking reads are pending, EPI accesses can cause the NBRFIFO counter to be incorrectly decremented" on page 32. Added issue "In General-Purpose mode, the framing signal is output regardless of the state of the FRMPIN bit" on page 33. Added issue "In General-Purpose mode, the maximum time to wait for the iRDY signal is derived from the system clock, not the EPI clock" on page 33.
September 2011	3.9	<ul style="list-style-type: none"> Added issue "Boundary scan is not functional" on page 9. Added issue "At EPI clock speeds over 15 MHz, SDRAM initialization delay is not long enough" on page 32. Added issue "LIN mode Sync Break does not have the correct length" on page 46.
August 2011	3.8	<ul style="list-style-type: none"> Clarified issue "PB1 has permanent internal pull-up resistance" on page 30. Added additional details to issue "MCU may fail USB certification if the EPI module is operating" on page 53. Clarified issue "Special considerations for PB1" on page 55. Added issue "Cannot communicate with a low-speed Device through a hub" on page 55.
July 2011	3.7	<ul style="list-style-type: none"> Corrected the read portion of the diagram in issue "Clock signal in EPI General-Purpose mode is inverted" on page 31. Added issue "Writes to Hibernation module registers may change the value of the RTC" on page 22. Added issue "Hibernation Module 4.194304-MHz oscillator supports a limited range of crystal load capacitance values" on page 22. Added issue "Retriggering a sample sequencer before it has completed the current sequence results in continuous sampling" on page 42. Added issue "MCU may fail USB certification if the EPI module is operating" on page 53. Added issue "Special considerations for PB1" on page 55.
March 2011	3.6	<ul style="list-style-type: none"> Clarified which registers are affected by issue "Writes to certain Hibernation module registers sometimes fail" on page 21. Changed title of issue "GPTM 2A and 2B are not usable with μDMA" to "The μDMA does not generate a completion interrupt when transferring to and from GPTM 2A and 2B" on page 28 and reworded description. Removed Appendix A since information is now in the data sheet.
February 2011	3.5	<ul style="list-style-type: none"> Clarified issue "The PIOSC is not trimmed by the factory" on page 11. Added issue "Flash memory endurance cycle specification is 100 cycles" on page 27. Added issue "The μDMA does not generate a completion interrupt when transferring to and from GPTM 2A and 2B" on page 28. Added issue "PB1 has permanent internal pull-up resistance" on page 30. Added issue "Differential pair encodings are incorrect" on page 41. Added Appendix A.
January 2011	3.4	<ul style="list-style-type: none"> Added issue "PB1 has permanent internal pull-up resistance" on page 30.

Date	Revision	Description
November 2010	3.2	<ul style="list-style-type: none"> Added clarification to issue "Flash Write Buffer does not function above 50 MHz".
October 2010	3.0	<ul style="list-style-type: none"> Added issue "The WRC bit in the Hibernation Control register is R/W" on page 21. Added issue "ROM_USBHostMode function is incorrect". Added issue "ROM_CANBitRateSet function is incorrect". Added issue "USB compliance test issue: USB full-speed, far-end signal compliance tests fail with 5 m cable" on page 52. Added issue "USB compliance test issue: USB embedded host low-speed, far-end signal compliance tests fail" on page 52.
September 2010	2.9	<ul style="list-style-type: none"> Removed the "Hibernation Module 4.194304-MHz oscillator supports a limited range of crystal load capacitance values" because this information has been added to the data sheet. Removed the "ROM_I2CMasterErr function is incorrect" issue because the data sheet has been changed such that the <code>ERROR</code> bit no longer is set when the <code>ARBLST</code> bit is set. Additional minor clarifications and corrections.
July 2010	2.8	<ul style="list-style-type: none"> Added issue "The RTRIS bit in the UARTRIS register is only set when the interrupt is enabled" on page 46.
June 2010	2.7	<ul style="list-style-type: none"> Added issue "Wake-up time from Hibernation may exceed specifications" on page 20. Minor edits.
April 2010	2.6	<ul style="list-style-type: none"> The description of "VDD3ON mode may not be used" on page 19 was reworded. The description of "Writes to certain Hibernation module registers sometimes fail" on page 21 was reworded. Added issue "Hibernation Module 4.194304-MHz oscillator supports a limited range of crystal load capacitance values". Based on further examination of the "I²C arbitration may be lost when operating as a master" issue, this issue has been moved to the GPIO section and renamed as "Schmitt input feature does not function correctly" on page 29. Added issue "Encoding error in the Ethernet MAC LED Encoding (MACLED) register" on page 51. Added information about items fixed on Rev C3.
March 2010	2.5	<ul style="list-style-type: none"> Added issue "The prescaler does not work correctly when counting up in periodic or one-shot mode" on page 38. Added issue "Snapshot must be enabled in both Timer A and B when in 32-bit snapshot mode" on page 39. Added issue "Phantom interrupts occur in Smart Card mode" on page 45. Added issue "I²C arbitration may be lost when operating as a master".

Date	Revision	Description
Mar 2010	2.4	<ul style="list-style-type: none"> Added issue "The option to force the ROM boot loader to execute at reset with an external pin does not function" on page 26. Amended the workaround for issue "A spurious DMA request is generated when the timer rolls over in Input-Edge Time mode" on page 36. Reworded description of issue "The value of the prescaler register is not readable in Edge-Count mode" on page 36. Removed "Prescaler register must have a non-zero value in 16-bit Edge-Time mode" as it has been determined this item was included erroneously. Added issue "ADC trigger and Wait-on-Trigger may assert when the timer is disabled" on page 37. Added issue "Wait-on-Trigger does not assert unless the TnOTE bit is set" on page 37 . Added issue "Do not enable match and timeout interrupts in 16-bit PWM mode" on page 37. Added issue "Do not use μDMA with 16-bit PWM mode" on page 38. Added issue "Writing the GPTMTnV register does not change the timer value when counting up" on page 38.
Feb 2010	2.3	<ul style="list-style-type: none"> Added issue "A spurious DMA request is generated when the timer rolls over the 16-bit boundary" on page 36. Added issue "The value of the prescaler register is not readable in Edge-Count mode" on page 36. Added issue "Prescaler register must have a non-zero value in 16-bit Edge-Time mode." Added issue "The ADCSPC register does not function" on page 41.
Jan 2010	2.2	<ul style="list-style-type: none"> Modified description for "The General-Purpose Timer match register does not function correctly in 32-bit mode" on page 35 to include DMA operation. Added issue "A spurious DMA request is generated when the timer rolls over in Input-Edge Time mode" on page 36. Changed workaround for "Latch-up may occur if power is applied to the VBUS pin but not to VDD" on page 51 and changed status to "Fixed in Rev C."
Dec 2009	2.1	<ul style="list-style-type: none"> The status of "The Recover Locked Device sequence does not work as expected" on page 9 has been changed to "Fixed in Rev C." "Hard Fault possible when waking from Sleep or Deep-Sleep modes and Cortex-M3 Debug Access Port (DAP) is enabled" has been removed and the content added to the LM3S9B90 data sheet. The status of "VDD3ON mode may not be used" on page 19 has been changed to "Not fixed in Rev C." Added additional APIs to "Some ROM functions are unsupported" on page 23. "The μDMA controller fails to generate capture mode DMA requests from Timer A in the Timer modules" on page 28 has been added. "Ethernet packet count decremented before the FCS is read" has been removed and the content added to the LM3S9B90 data sheet. The status of "Latch-up may occur if power is applied to the VBUS pin but not to VDD" on page 51 has been changed to "Not fixed in Rev C."
Nov 2009	2.0	Started tracking revision history.

Table 2. List of Errata

Erratum Number	Erratum Title	Module Affected	Revision(s) Affected
1.1	JTAG INTEST instruction does not work	JTAG	B1
1.2	The Recover Locked Device sequence does not work as expected	JTAG	B1
1.3	Boundary scan is not functional	JTAG	B1, C3, C5
2.1	Sleep and Deep-Sleep mode not usable at higher speeds when ISRs reside in Flash memory	System Control	B1
2.2	Device Capabilities registers may not accurately reflect available signals	System Control	B1
2.3	The PIOSC is not trimmed by the factory	System Control	B1
2.4	Non-word-aligned write to SRAM can cause incorrect value to be loaded	System Control	B1, C3, C5
2.5	Internal reset supervisors may not prevent incorrect device operation during power transitions	System Control	B1, C3, C5
2.6	Chip select operation is not correct when using dual chip selects in Host Bus Continuous Read mode	System Control	B1, C3, C5
3.1	Hibernation module may have higher current draw than specified in data sheet under certain conditions	Hibernation Module	B1
3.2	Hibernate POR may not reset the Hibernation module until V_{DD} is applied	Hibernation Module	B1
3.3	Power consumption increases if V_{DD} is not restored after wake from Hibernation mode	Hibernation Module	B1
3.4	ESD protection on the V_{BAT} pin does not meet specifications	Hibernation Module	B1
3.5	VDD3ON mode may not be used	Hibernation Module	B1, C3, C5
3.6	Hibernate module power consumption higher than expected in event wakeup configuration	Hibernation Module	B1
3.7	The Real-Time Clock gains or loses time going in and out of hibernation when using a crystal	Hibernation Module	B1
3.8	Wake-up time from Hibernation may exceed specifications	Hibernation Module	B1
3.9	Low-battery detect circuit is powered down during hibernate	Hibernation Module	B1
3.10	Writes to certain Hibernation module registers sometimes fail	Hibernation Module	B1, C3, C5
3.11	The WRC bit in the Hibernation Control register is R/W	Hibernation Module	B1, C3, C5
3.12	Writes to Hibernation module registers may change the value of the RTC	Hibernation Module	B1, C3, C5
3.13	Hibernation Module 4.194304-MHz oscillator supports a limited range of crystal load capacitance values	Hibernation Module	B1, C3, C5
4.1	Ethernet fails to connect when using the Boot Loader software in ROM	ROM	B1
4.2	Some ROM functions are unsupported	ROM	B1
4.3	ROM mapping check for the Boot loader does not function properly	ROM	B1

Erratum Number	Erratum Title	Module Affected	Revision(s) Affected
4.4	ROM_SSISConfigSetExpClk function is incorrect	ROM	B1
4.5	ROM_USBFIFOFlush function is incorrect	ROM	B1
4.6	The option to force the ROM boot loader to execute at reset with an external pin does not function	ROM	B1
5.1	Cumulative page erases may introduce bit errors in Flash memory	Flash Memory	B1
5.2	Flash memory endurance cycle specification is 100 cycles	Flash Memory	B1, C3, C5
5.3	Flash memory may be corrupted if programmed at system clock speeds above 50 MHz	Flash Memory	B1, C3, C5
6.1	The μ DMA controller fails to generate capture mode DMA requests from Timer A in the Timer modules	μ DMA	B1, C3, C5
6.2	The μ DMA does not generate a completion interrupt when transferring to and from GPTM 2A and 2B	μ DMA	B1, C3, C5
7.1	Port B [1:0] pins require external pull-up resistors	GPIO	B1
7.2	Schmitt input feature does not function correctly	GPIO	B1
7.3	PB1 has permanent internal pull-up resistance	GPIO	B1, C3, C5
8.1	EPI dual-chip select function does not work	EPI	B1
8.2	EPI Host-Bus 16 mode does not work	EPI	B1
8.3	Clock signal in EPI General-Purpose mode is inverted	EPI	B1
8.4	At EPI clock speeds over 15 MHz, SDRAM initialization delay is not long enough	EPI	B1, C3, C5
8.5	In Host-Bus 16 mode, only one byte select is asserted if only 8 bits are read	EPI	B1, C3, C5
8.6	When non-blocking reads are pending, EPI accesses can cause the NBRFIFO counter to be incorrectly decremented	EPI	B1, C3, C5
8.7	In General-Purpose mode, the framing signal is output regardless of the state of the FRMPIN bit	EPI	B1, C3, C5
8.8	In General-Purpose mode, the read and write strobes are output regardless of the state of the RW bit	EPI	B1, C3, C5
8.9	In General-Purpose mode, the maximum time to wait for the iRDY signal is derived from the system clock, not the EPI clock	EPI	B1, C3, C5
8.10	iRDY timing in General-Purpose mode is not as specified in the data sheet	EPI	B1, C3, C5
9.1	The General-Purpose Timer match register does not function correctly in 32-bit mode	General-Purpose Timers	B1, C3, C5
9.2	A spurious DMA request is generated when the timer rolls over in Input-Edge Time mode	General-Purpose Timers	B1, C3, C5
9.3	A spurious DMA request is generated when the timer rolls over the 16-bit boundary	General-Purpose Timers	B1, C3, C5
9.4	The value of the prescaler register is not readable in Edge-Count mode	General-Purpose Timers	B1, C3, C5

Erratum Number	Erratum Title	Module Affected	Revision(s) Affected
9.5	ADC trigger and Wait-on-Trigger may assert when the timer is disabled	General-Purpose Timers	B1, C3, C5
9.6	Wait-on-Trigger does not assert unless the TnOTE bit is set	General-Purpose Timers	B1, C3, C5
9.7	Do not enable match and timeout interrupts in 16-bit PWM mode	General-Purpose Timers	B1, C3, C5
9.8	Do not use μ DMA with 16-bit PWM mode	General-Purpose Timers	B1, C3, C5
9.9	Writing the GPTMTnV register does not change the timer value when counting up	General-Purpose Timers	B1, C3, C5
9.10	The prescaler does not work correctly when counting up in periodic or one-shot mode	General-Purpose Timers	B1, C3, C5
9.11	Snapshot must be enabled in both Timer A and B when in 32-bit snapshot mode	General-Purpose Timers	B1, C3, C5
10.1	Writes to Watchdog Timer 1 module WDTLOAD register sometimes fail	Watchdog Timers	B1, C3, C5
10.2	Watchdog clear mechanism described in the data sheet does not work for the Watchdog Timer 1 module	Watchdog Timers	B1, C3, C5
10.3	Watchdog Timer 1 module asserts reset signal even if not programmed to reset	Watchdog Timers	B1, C3, C5
10.4	WDTLOAD yields an incorrect value when read back	Watchdog Timers	B1, C3, C5
11.1	ADC hardware averaging produces erroneous results in differential mode	ADC	B1, C3, C5
11.2	The ADCSPC register does not function	ADC	B1
11.3	Differential pair encodings are incorrect	ADC	B1, C3, C5
11.4	Retriggering a sample sequencer before it has completed the current sequence results in continuous sampling	ADC	B1, C3, C5
11.5	Digital comparator in last step of sequence does not trigger or interrupt	ADC	B1, C3, C5
11.6	Digital comparator interrupts do not trigger or interrupt as expected	ADC	B1, C3, C5
11.7	Missing trigger or interrupt when multiple sequences configured for processor trigger and different trigger	ADC	B1, C3, C5
11.8	ADC sample sequencers priorities are different than expected	ADC	B1, C3, C5
11.9	Simultaneous sampling on both ADC modules yields incorrect samples	ADC	B1, C3, C5
11.10	Phase offset does not delay as expected if sample sequencers are not triggered at the same time	ADC	B1, C3, C5
12.1	UART Smart Card (ISO 7816) mode does not function	UART	B1
12.2	When in IrDA mode, the UnRx signal requires configuration even if not used	UART	B1
12.3	Phantom interrupts occur in Smart Card mode	UART	B1
12.4	The RTRIS bit in the UARTRIS register is only set when the interrupt is enabled	UART	B1, C3, C5

Erratum Number	Erratum Title	Module Affected	Revision(s) Affected
12.5	LIN mode Sync Break does not have the correct length	UART	B1, C3, C5
12.6	When UART LIN or SIR mode is enabled, μ DMA burst transfer does not occur	UART	B1, C3, C5
12.7	UART transfers fail at certain system clock frequency and baud rate combinations	UART	B1, C3, C5
13.1	An interrupt is not generated when using μ DMA with the SSI module if the EOT bit is set	SSI	B1
13.2	Freescale SPI Mode at low SSIClk frequencies can yield data corruption	SSI	B1, C3, C5
14.1	Some bits in the I2SMCLKCFG register do not function	I2S	B1
14.2	I ² S SCLK signal is inverted in certain modes	I2S	B1
15.1	Ethernet receive packet corruption may occur when using optional auto-clock gating	Ethernet Controller	B1
15.2	Ethernet packet loss with cables longer than 50 meters	Ethernet Controller	B1
15.3	Ethernet PHY interrupts do not function correctly	Ethernet Controller	B1
15.4	Encoding error in the Ethernet MAC LED Encoding (MACLED) register	Ethernet Controller	B1, C3, C5
16.1	USB0ID and USB0VBUS signals are required to be connected regardless of mode	USB	B1
16.2	Latch-up may occur if power is applied to the VBUS pin but not to VDD	USB	B1
16.3	USB compliance test issue: USB full-speed, far-end signal compliance tests fail with 5 m cable	USB	B1, C3
16.4	USB compliance test issue: USB embedded host low-speed, far-end signal compliance tests fail	USB	B1, C3
16.5	MCU may fail USB certification if the EPI module is operating	USB	B1, C3, C5
16.6	Special considerations for PB1	USB	B1, C3, C5
16.7	Cannot communicate with a low-speed Device through a hub	USB	B1, C3, C5
16.8	USB0DM may be driven after reset	USB	
17.1	Momentarily exceeding V_{IN} ratings on any pin can cause latch-up	Electrical Characteristics	B1
17.2	Power-on event may disrupt operation	Electrical Characteristics	B1
17.3	First two ADC samples from the internal temperature sensor must be ignored	Electrical Characteristics	B1, C3, C5

1 JTAG

1.1 JTAG INTEST instruction does not work

Description:

The JTAG INTEST (Boundary Scan) instruction does not properly capture data.

Workaround:

None.

Silicon Revision Affected:

B1

Fixed:

Fixed in Rev C.

1.2 The Recover Locked Device sequence does not work as expected

Description:

If software configures any of the JTAG/SWD pins as GPIO or loses the ability to communicate with the debugger, there is a debug sequence that can be used to recover the microcontroller, called the Recover Locked Device sequence. After reconfiguring the JTAG/SWD pins, using the Recover Locked Device sequence does not recover the device.

Workaround:

To get the device unlocked, follow these steps:

1. Power cycle the board and run the debug port unlock procedure in LM Flash Programmer. DO NOT power cycle when LM Flash Programmer tells you to.
2. Go to the Flash Utilities tab in LM Flash Programmer and do a mass erase operation (check "Entire Flash" and then click the Erase button). This erase appears to have failed, but that is okay.
3. Power cycle the board.
4. Go to the Flash Utilities tab in LM Flash Programmer and do another mass erase operation (check "Entire Flash" and then click the Erase button).

Silicon Revision Affected:

B1

Fixed:

Fixed in Rev C.

1.3 Boundary scan is not functional

Description:

The boundary scan is not functional on this device.

Workaround:

None.

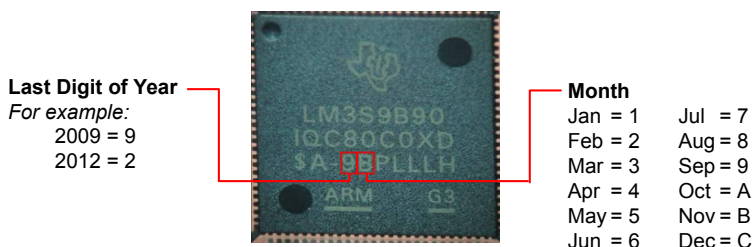
Silicon Revision Affected:

B1, C3, C5

Fixed:

Fixed on devices with date codes of 1A (October, 2011) or later.

Note: To determine the date code of your part, look at the first two characters following the dash on the third line of the part markings (highlighted in red in the following figure). The first number after the dash indicates the last decimal digit of the year. The second character indicates the month. Therefore, the following example shows a date code of 9B which indicates November 2009.



2 System Control

2.1 Sleep and Deep-Sleep mode not usable at higher speeds when ISRs reside in Flash memory

Description:

Sleep and Deep-Sleep modes cannot be used when running the processor at 66 or 80 MHz when the Interrupt Service Routines (ISRs) and vector table reside in Flash memory. If Sleep or Deep-Sleep mode is used at those speeds, an invalid PC is sometimes returned for the interrupt vector address when exiting sleep mode.

Workaround:

There are two possible workarounds for this issue:

1. Store the ISRs and vector table in the on-chip SRAM when running the processor at 66 or 80 MHz.
2. Run the processor at 50 MHz.

Silicon Revision Affected:

B1

Fixed:

Fixed in Rev C.

2.2 Device Capabilities registers may not accurately reflect available signals

Description:

Some of the Device Capabilities register bits reflect the presence of specific pins on the microcontroller. These bits do not always properly reflect the available signals. Bits affected include **DC3** [31:0], **DC4** [15:14], **DC5** [27:24] and [7:0], and **DC8** [31:0]. Do not rely on the value of these bits in system design.

Workaround:

None.

Silicon Revision Affected:

B1

Fixed:

Fixed in Rev C.

2.3 The PIOSC is not trimmed by the factory

Description:

The PIOSC is not trimmed by the factory prior to shipment. When the PIOSC is not trimmed, its accuracy is $\pm 18.75\%$.

Workaround:

For parts that have a Hibernation module, the PIOSC can be user calibrated. The PIOSC cannot be calibrated on parts without a Hibernation module. For more information, see the section entitled, "Precision Internal Oscillator Operation (PIOSC)" in the System Control chapter in the data sheet.

Silicon Revision Affected:

B1

Fixed:

Not fixed.

2.4 Non-word-aligned write to SRAM can cause incorrect value to be loaded

Description:

If a word-aligned value is loaded from an SRAM location into a core register, then altered by storing a byte or halfword at an unaligned offset, the altered word-aligned value is not correctly indicated when loaded into a core register. The loaded value from the SRAM location into a core register reflects the original value, not the modified value.

The following assembly sequence causes the altered value loaded into a core register to not load the correct value, even though the correct value is visible in the SRAM memory location.

```
//
// Load a word-aligned value from an SRAM location into a
// core register (such as R0)
//
LDR      R0, [SP, #+0];

//
// Store byte or halfword from the core register to
// the SRAM location at a non-word-aligned offset
//
STRB     R0, [SP, #+1];
OR
STRB     R0, [SP, #+2];
```

```
        OR
STRB     R0, [SP, #+3];
        OR
STRH     R0, [SP, #+1];

//
// Load the same word-aligned value of the same SRAM location
// into a core register (such as R0)
//
LDR      R0, [SP, #+0];
```

This assembly sequence causes erroneous values only if these three instructions are executed in this order. However, the three instructions do not have to be consecutive, which means that other instructions can be placed in between the first and the second instructions, or the second and the third instructions, and the false value still occurs. Other instructions include, but are not limited to, branches in Flash, accesses to non-SRAM locations such as peripherals, and writes to other SRAM locations.

Pointers, structures, and unions are common C code methods that can be found in user code that may generate this assembly sequence and, therefore, result in incorrect values for variables. If using interrupts, it is possible to continue the assembly sequence in the interrupt handler, which could also return incorrect data.

For more information about this erratum as well as C code examples that may generate this assembly sequence, refer to the document, *Non-Word-Aligned Write to SRAM Additional Information* (SPMA047).

Workaround:

The type of compiler and optimization settings used in your application affects whether the problematic assembly code is generated from your user code. Each compiler behaves a little differently with respect to this erratum. The behavior for each compiler is not guaranteed due to the large number of compiler and tool version combinations.

At the assembly level, loading a volatile 32-bit-aligned word value from a different address in SRAM after storing and before loading in the assembly instruction sequence yields a correct value. A dummy SRAM load of a volatile 32-bit-aligned word from a different SRAM memory location should be inserted after the second assembly instruction (storing a byte or halfword from the core register to the desired SRAM location at a non-word-aligned offset) and before the third assembly instruction (loading the same word-aligned value of the desired SRAM location into a core register). This also means that a dummy SRAM load of a volatile 32-bit-aligned word from a different SRAM memory location should also be placed at the beginning of any interrupt routine, in case the third assembly instruction is executed before leaving the handler.

For more information about this erratum as well as C code examples that may generate this assembly sequence, refer to the document, *Non-Word-Aligned Write to SRAM Additional Information* (SPMA047).

Silicon Revision Affected:

B1, C3, C5

Fixed:

Not yet fixed.

2.5 Internal reset supervisors may not prevent incorrect device operation during power transitions

Description:

This microcontroller incorporates internal Power-On Reset (POR) and Brown-Out Reset (BOR) supervisors to ensure that code only executes when power to the device is within specification. However, gaps in the voltage and timing thresholds of the internal supervisors result in a risk of incorrect operation during VDD power transitions.

Unexpected operation may occur that can include brief execution of random sections of user code including ROM functions and random instructions, as well as incorrect power-up initialization. The uncontrolled brief execution of random instructions may result in the undesired erasing or writing of non-volatile memories and GPIO state changes. There is also the possibility that the device may be left in a state where it does not operate correctly until a clean power cycle has been completed.

The Power-On Reset gap occurs because the supervisor can release internal state machine operation as soon as 6.0 ms after the VDD supply reaches 1.9 V. If VDD is still below the minimum operating voltage of 3.0 V after 6.0 ms, the power-up state machine may not function correctly, resulting in the effects described above. The $\overline{\text{RST}}$ pin of the device has no effect on the initialization state machine, therefore, a complete power-cycle is required to restore the initialization state machine.

The Brown-Out Reset threshold (V_{BTH}) gap occurs because the brown-out supervisor has a threshold as low as 2.85 V, which is less than the minimum operating voltage on VDD, and also because it can take several microseconds to respond. BOR gaps can be encountered after power up, during steady state operation power-on, if the VDD rail has glitches, and also during power-down.

Workaround:

After initial power-up, any processor operation with VDD below 3.0 V may result in unexpected code execution resulting in the effects described above. The processor must be halted or the $\overline{\text{RST}}$ signal must be driven Low prior to VDD dropping below 3.0 V and stay in that state until VDD is above 3.0 V.

If VDD falls below 2.1 V, it must continue to fall until it reaches 1.5 V. VDD must stay below 1.5 V for at least 36 μs to ensure that a POR is triggered correctly. Additionally, the VDD power-up time between 1.9 V and 3.0 V must be at most 6.0 ms. If VDD falls below 3.0 V but stays above 2.1 V, it is not necessary for the voltage to continue falling below 2.1 V. VDD can come back up to 3.0 V without any additional timing requirements.

The system designer must ensure they meet the requirements listed below for power-up, steady state, and power-down:

1. The VDD power-up, steady state, and power-down waveform meets the timing requirements shown in Figure 1 on page 14.
2. The power-up transition of VDD between 1.9 V and 3.0 V must not have any points where it decreases in voltage (must be monotonic).
3. The power-down transition of VDD between 3.0 V and 1.5 V must not have any points where it increases in voltage (must be monotonic).
4. Once steady-state operation between 3.0 V and 3.6 V is achieved, $\overline{\text{RST}}$ must go Low or the CPU execution must be halted prior to VDD falling below 3.0 V.
5. The **Brown-Out Reset Control (PBORCTL)** register must be set so that a brown-out event causes a reset.

Depending on the system environment requirement, items 3, 4, and 5 in the above list may be met by using a voltage supervisor, such as the TLV803M, to monitor a higher voltage rail from which the VDD supply is regulated. Figure 2 on page 15 shows this implementation with a voltage supervisor monitoring the 5-V rail and a voltage trip point of 4.38 V. A voltage supervisor with a lower voltage trip point can be used to monitor the VDD (3.3-V) rail, however this supervisor must assert reset before VDD reaches 3.0 V. Regardless of the implemented voltage supervisor circuit, the system designer must ensure that there is enough time to assert $\overline{\text{RST}}$ Low prior to VDD falling below 3.0 V. Figure 3 on page 15 shows the resulting waveform of the circuit shown in Figure 2 on page 15.

Figure 1. VDD Waveform Signature Limits

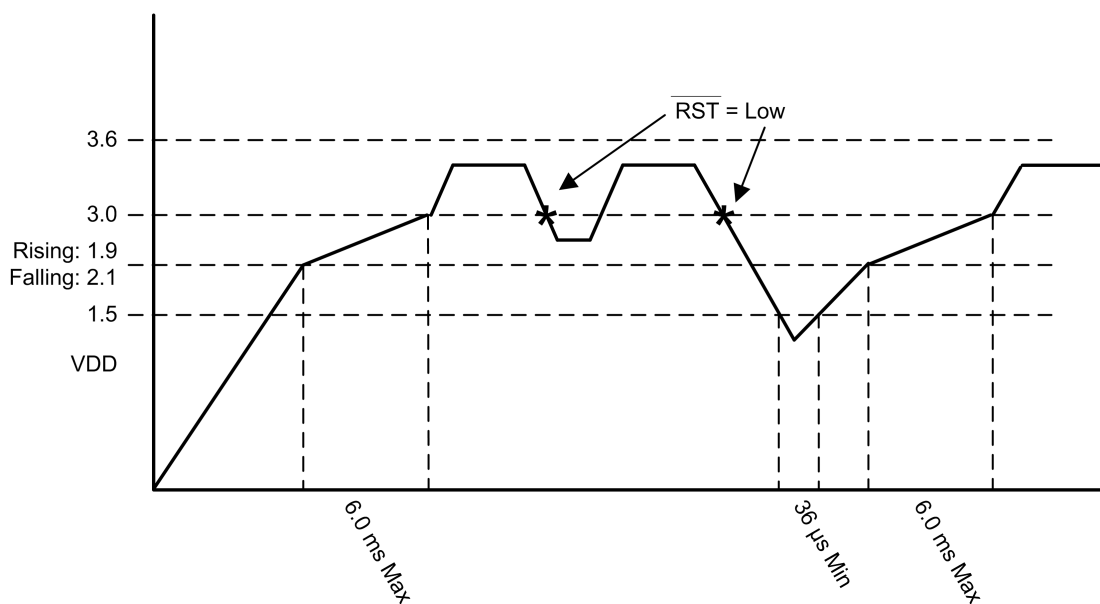


Figure 2. Using a Voltage Supervisor to Monitor the Voltage Rail

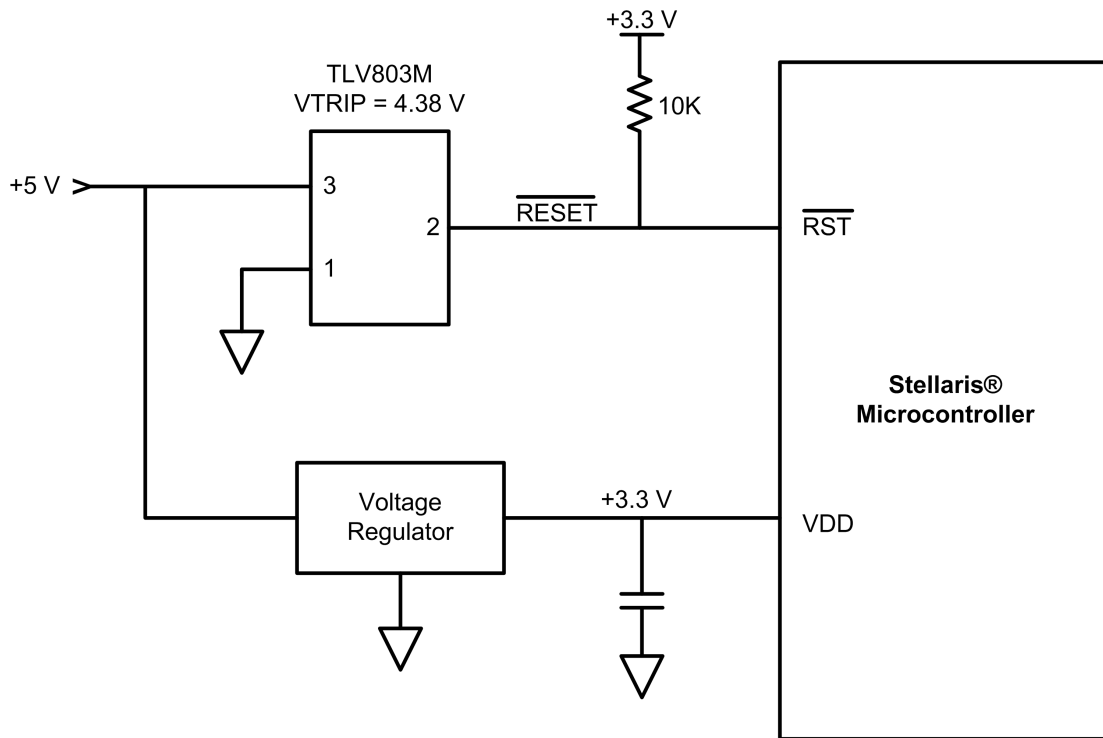
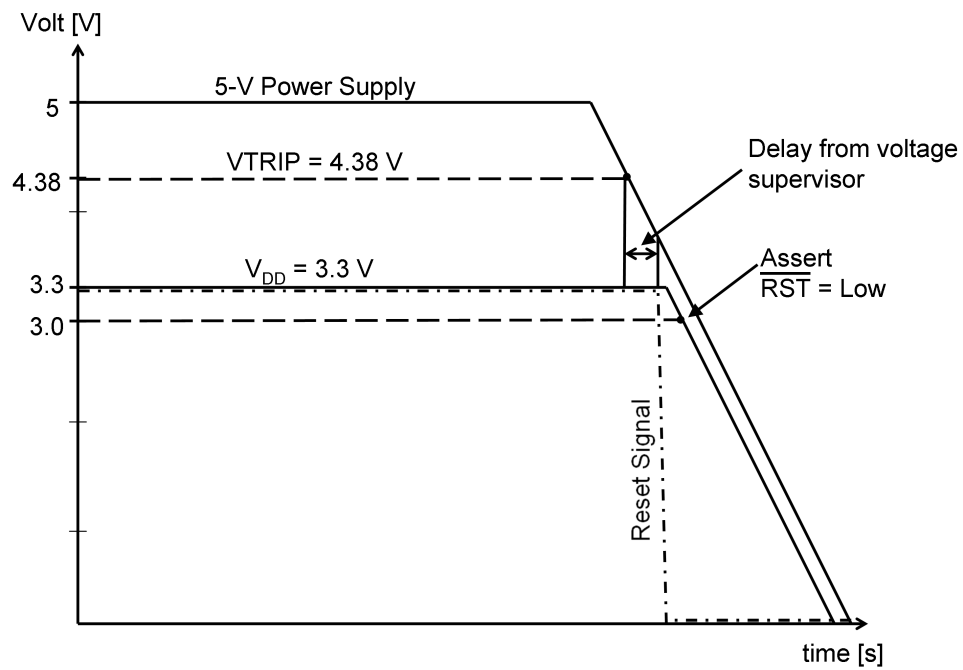


Figure 3. Resulting Waveform Using the Voltage Supervisor Circuit



Silicon Revision Affected:

B1, C3, C5

Fixed:

Not yet fixed.

2.6 Chip select operation is not correct when using dual chip selects in Host Bus Continuous Read mode

Description:

Chip select operation for the first read is not correct when the EPI module is in Host Bus mode and is configured to use dual chip selects (the `CSCFG` field in the **EPIHBnCFG2** register is 0x2) and Continuous Read mode (the `MODE` field in the **EPIHBnCFG** register is 0x2). When accessing a memory region assigned to one chip select, the other chip select is asserted first along with the RD strobe. This incorrect chip select is de-asserted before the next EPI clock edge and the correct chip select is asserted on that EPI clock edge. The RD strobe remains asserted, but the number of cycles that it is asserted includes the time that it is asserted with the incorrect chip select.

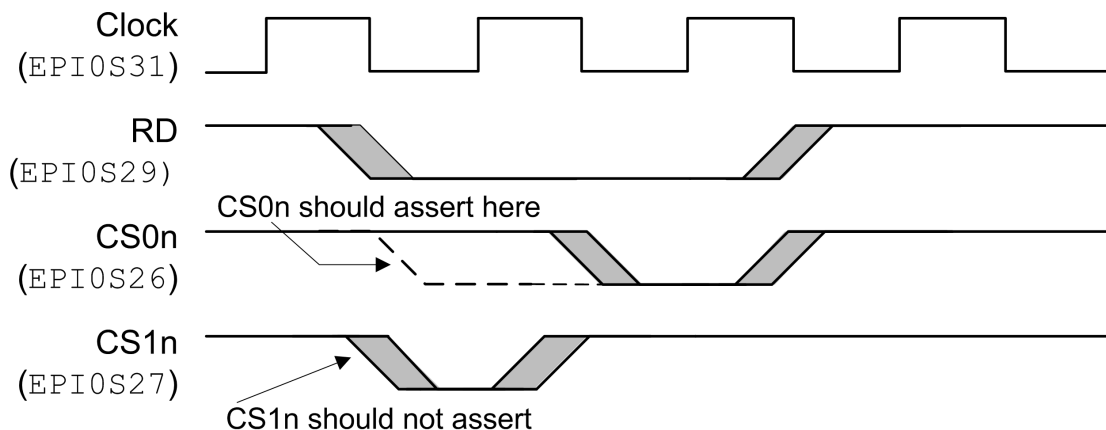
For example, if the RD strobe is programmed to be asserted for two clocks (the `RDWS` field in the **EPIHBnCFG** register is 0x0), the signal is asserted for one clock cycle with the incorrect chip select and one clock cycle with the correct chip select. As long as the width of the RD strobe is adjusted for this one clock difference, data is read correctly in this mode. Figure 4 on page 16 shows the read and chip select timing of this example when accessing a memory region assigned to CS0n.

Subsequent reads while the OE signal is asserted operate as expected.

Workaround:

Use a value in the `RDWS` field in the **EPIHBnCFG** register that is 1 more than required for the peripheral in the system.

For example, if the peripheral requires a read strobe that is 4 EPI clocks wide, set the `MODE` field to be 0x2 (6 clocks) to account for the 1 clock difference in the strobe width.

Figure 4. Chip Selects**Silicon Revision Affected:**

B1, C3, C5

Fixed:

Not yet fixed.

3 Hibernation Module

3.1 Hibernation module may have higher current draw than specified in data sheet under certain conditions

Description:

If a battery voltage is applied to the V_{BAT} power pin prior to power being applied to the V_{DD} power pins of the device, the current draw from the V_{BAT} pin is greater than expected. The current may be as high as 1.6 mA instead of the data sheet specified 17 μ A. The condition exists until power is applied to the V_{DD} pin. Once the V_{DD} pin has been powered, the V_{BAT} current draw functions as expected. The V_{DD} pin can then be powered up and down as required and the V_{BAT} pin current specification is maintained.

Workaround:

The V_{BAT} pin higher-than-specified current draw condition can be avoided if the microcontroller's V_{DD} power pins are powered on prior to the time a battery voltage is initially applied to the V_{BAT} pin.

Silicon Revision Affected:

B1

Fixed:

Fixed in Rev C.

3.2 Hibernate POR may not reset the Hibernation module until V_{DD} is applied

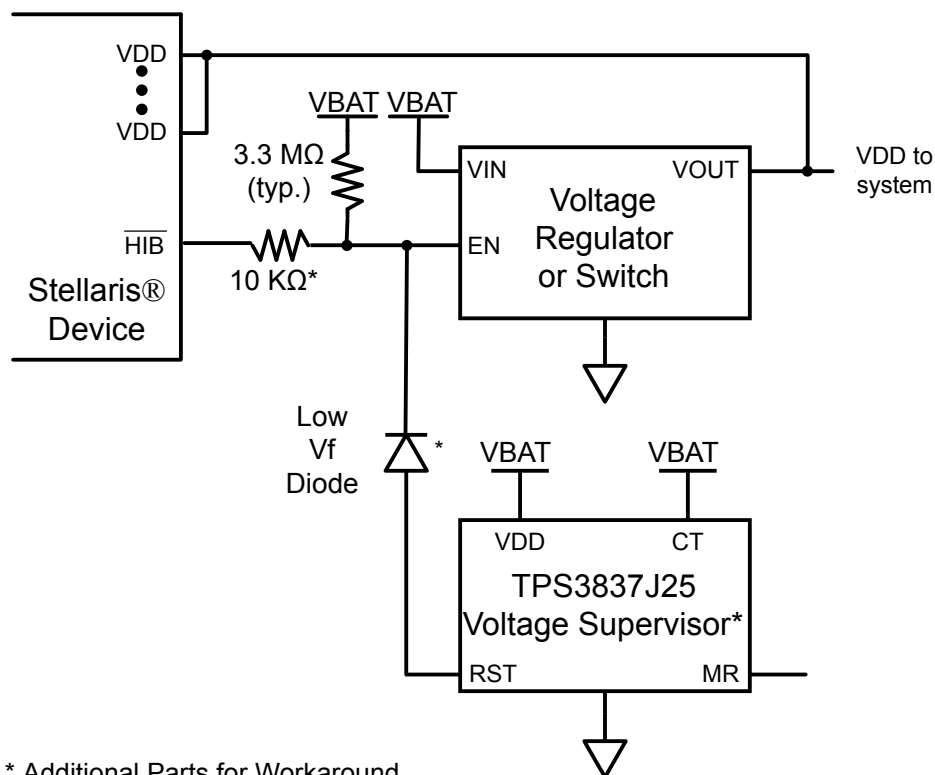
Description:

If V_{DD} is not powered when voltage is first applied to V_{BAT} , the state of the Hibernation module is indeterminate and the \overline{HIB} signal may be asserted. In this indeterminate state, a lock condition can occur in which the Hibernation module waits for a power-on-reset, but that reset cannot occur until the module deasserts \overline{HIB} . This issue is related to the errata "Hibernation module may have higher current draw than specified in data sheet under certain conditions" on page 17.

Workaround:

The workaround implementation depends on the system-level power supply configuration. For systems that use a battery as the primary power source, an external voltage supervisor (TPS383J25DBV or similar) circuit can be added to force the V_{DD} power supply to start when the battery voltage is first applied (see Figure 5). The voltage supervisor requires only 220 nA and generates a 200-ms positive pulse to turn on the V_{DD} regulator and activate the microcontroller's internal POR circuit.

Figure 5. Workaround Circuit to Ensure Initial Power Up

**Silicon Revision Affected:**

B1

Fixed:

Fixed in Rev C.

3.3 Power consumption increases if V_{DD} is not restored after wake from Hibernation mode

Description:

If a wake event occurs and V_{DD} does not rise to specified levels, then the wake event is held off until V_{DD} is within specified levels. If a large delay occurs between the wake event and V_{DD} reaching specified levels, the V_{BAT} current increases substantially to a typical value of 255 μA until V_{DD} reaches the specified levels, at which point the microcontroller comes out of hibernation and power consumption returns to expected levels.

Workaround:

Ensure that V_{DD} reaches specified levels within 250 μs after the wake event occurs.

Silicon Revision Affected:

B1

Fixed:

Fixed in Rev C.

3.4 ESD protection on the V_{BAT} pin does not meet specifications

Description:

The ESD protection on the V_{BAT} pin fails when tested at 2 kV.

Workaround:

Extra precaution should be taken to protect the part from ESD events. Some applications may require system-level ESD protection on this pin.

Silicon Revision Affected:

B1

Fixed:

Fixed in Rev C.

3.5 VDD3ON mode may not be used

Description:

The VDD3ON mode may not be used.

Workaround:

None. Do not use the VDD3ON mode to enter hibernation.

Silicon Revision Affected:

B1, C3, C5

Fixed:

Not yet fixed.

3.6 Hibernate module power consumption higher than expected in event wakeup configuration

Description:

With the Hibernation module configured for an external event wakeup, the current consumption of the device is higher than expected. The Hibernation module clock does not shut down properly during the hibernate asynchronous external wake mode resulting in extra current consumption. Some devices properly shut down the clock the first time entering this mode and others do not. When waking from a hibernate event, the Hibernation module clock is always enabled. In subsequent hibernate cycles, the oscillator is not shut down properly and remains active. Hibernation module current consumption averages 21µA with the clock disabled. The current consumption averages 31µA with the Hibernation module clock enabled.

Workaround:

When the Hibernation module clock is not required during hibernation, software can disable it by clearing the CLK32EN bit in the **Hibernation Control (HIBCTL)** register before going into Hibernation mode.

Silicon Revision Affected:

B1

Fixed:

Fixed in Rev C.

3.7 The Real-Time Clock gains or loses time going in and out of hibernation when using a crystal

Description:

When using a 4.194304-MHz crystal, the Real-Time clock in the Hibernation module gains or loses a small amount of time (on the order of one second over a 24-hour period when cycling hibernate mode 4 times a minute) when going in and out of hibernation.

Workaround:

Use an external 32.768-kHz oscillator as the source for the Hibernation module clock.

Silicon Revision Affected:

B1

Fixed:

Fixed in Rev C.

3.8 Wake-up time from Hibernation may exceed specifications

Description:

The Hibernation module is specified to resume operation after the $\overline{\text{WAKE}}$ signal is asserted within 124 μs , however operation may not resume for 30 ms in some cases. (The "Hibernation Module AC Characteristics" table in the DS indicates 10 ms.)

Workaround:

None.

Silicon Revision Affected:

B1

Fixed:

Fixed in Rev C3.

3.9 Low-battery detect circuit is powered down during hibernate

Description:

The low-battery detect feature on the V_{BAT} input is only valid when V_{DD} power is present. As a result:

- Because the battery is not electrically loaded when V_{DD} is present, the low-battery detect circuit may not reflect the actual battery status.
- In Hibernate mode, a low-battery condition may prevent wake until the battery is completely depleted.

Workaround:

None.

Silicon Revision Affected:

B1

Fixed:

Fixed in Rev C.

3.10 Writes to certain Hibernation module registers sometimes fail

Description:

Due to a synchronization issue with the independent clock domain of the Hibernation module, writes to certain registers may sometimes fail, even though the `WRC` bit in the **HIBCTL** register is set after the write occurs. Registers affected include **HIBRTCC**, **HIBRTCM0**, **HIBRTCM1**, **HIBRTCLD**, **HIBRTCT**, and **HIBDATA**.

Workaround:

After performing a write to the listed Hibernation module registers or non-volatile memory, read the contents back and verify that they are correct. If they are incorrect, perform the write operation again.

Silicon Revision Affected:

B1, C3, C5

Fixed:

Not yet fixed.

3.11 The `WRC` bit in the Hibernation Control register is R/W

Description:

The `WRC` bit in the **Hibernation Control (HIBCTL)** register can be written. This bit should be a read-only bit.

Workaround:

Wait until the `WRC` bit is set before writing to the **HIBCTL** register. Always use a read-modify-write sequence when writing to the register to avoid changing the state of the `WRC` bit. Changing the value of the `WRC` bit can cause improper operation.

Silicon Revision Affected:

B1, C3, C5

Fixed:

Not yet fixed.

3.12 Writes to Hibernation module registers may change the value of the RTC

Description:

If the Hibernation module's RTC counter is active, any write to certain Hibernation module registers that occurs while the RTC counter is changing from the current value to the next can cause corruption of the RTC counter stored in the **HIBRTCC** register. Registers affected are: **HIBRTCC**, **HIBRTCM0**, **HIBRTCM1**, **HIBRTCLD**, **HIBRTCT**, and **HIBDATA**.

Workaround:

The user application must guarantee that writes to the affected Hibernation module registers cannot occur on the RTC counter boundary. Any initial configuration of the affected Hibernation module registers must be done before enabling the RTC counter.

There are two ways to update affected Hibernation Module registers after initial configuration:

1. Use the Hibernation RTC match interrupt to perform writes to the affected Hibernation module registers. Assuming the interrupt is guaranteed to be serviced within 1 second, this technique provides a mechanism for the application to know that the RTC update event has occurred and that it is safe to write data to the affected Hibernation module registers. This method is useful for applications that don't require many writes to Hibernation module registers.
2. Set up a secondary time-keeping resource to indicate when it is safe to perform writes to the affected Hibernation module registers. For example, use a general purpose timer in combination with the Hibernation RTC match interrupt. In this scenario, the RTC match interrupt is used to both update the match register value and enable the general purpose timer in one-shot mode. The timer must be configured to have a maximum time-out period of less than 1 second. In this configuration, a global variable is used to indicate that it is safe to perform writes to the affected Hibernation module registers. When the one-shot timer times out, the timer interrupt updates the global variable to indicate that writes are no longer safe. This procedure is repeated on every RTC match interrupt.

Silicon Revision Affected:

B1, C3, C5

Fixed:

Not yet fixed.

3.13 Hibernation Module 4.194304-MHz oscillator supports a limited range of crystal load capacitance values

Description:

For some 4.194304-MHz crystals, the manufacturer-recommended crystal value may be outside of the capabilities of the Hiberate module oscillator. If the crystal manufacturer's recommended load capacitance is used, the hiberate oscillator may fail to start.

For a parallel-resonant oscillator circuit, the total load capacitance C_L (as specified by the manufacturer) is calculated as follows:

$$C_L = (C_1 * C_2) / (C_1 + C_2) + C_S$$

Due to the workaround, C_1 and C_2 are limited to 20 pF. Using 3 pF for stray capacitance (C_S), the formula above shows that a crystal with C_L of 13 pF is the highest value supported due to this errata.

Refer to the crystal datasheet to determine which crystals have an acceptable load capacitance (Cl) range.

Workaround:

Use load capacitors of 20 pF or less (18 pF is typical). Note that for some crystals, this value may pull the oscillator frequency slightly away from the crystal manufacturer's specified accuracy. Your crystal manufacturer can provide this information.

Alternatively, use an external 32.768-kHz oscillator as the source for the Hibernation module clock.

Silicon Revision Affected:

B1, C3, C5

Fixed:

Not yet fixed.

4 ROM

4.1 Ethernet fails to connect when using the Boot Loader software in ROM

Description:

The Ethernet controller takes longer to connect than the Boot Loader software in ROM allows.

Workaround:

Download the Boot loader software in the on-chip Flash memory and ensure that the Ethernet connection uses MDI mode only.

Silicon Revision Affected:

B1

Fixed:

Fixed in Rev C.

4.2 Some ROM functions are unsupported

Description:

The following functions are unsupported in ROM:

- ADCComparatorConfigure
- ADCComparatorRegionSet
- ADCComparatorReset
- ADCComparatorIntDisable
- ADCComparatorIntEnable
- ADCComparatorIntStatus
- ADCComparatorIntClear
- CANBitRateSet
- EPIntStatus
- EPIModeSet
- EPIDividerSet
- EPIConfigSDRAMSet

- EPIConfigGPModeSet
- EPIConfigHB8Set
- EPIConfigHB16Set
- EPIAddressMapSet
- EPINonBlockingReadConfigure
- EPINonBlockingReadStart
- EPINonBlockingReadStop
- EPINonBlockingReadCount
- EPINonBlockingReadAvail
- EPINonBlockingReadGet32
- EPINonBlockingReadGet16
- EPINonBlockingReadGet8
- EPIFIFOConfig
- EPIWriteFIFOCountGet
- EPIIntEnable
- EPIIntDisable
- EPIIntErrorStatus
- EPIIntErrorClear
- GPIOPinConfigure
- GPIOPinTypeI2S
- GPIOPinTypeEthernetLED
- GPIOPinTypeUSBAnalog
- I2CSlaveIntClearEx
- I2CSlaveIntDisableEx
- I2CSlaveIntEnableEx
- I2CSlaveIntStatusEx
- I2SIntClear
- I2SIntDisable
- I2SIntEnable
- I2SIntStatus
- I2SMasterClockSelect
- I2SRxConfigSet
- I2SRxDataGet
- I2SRxDataGetNonBlocking
- I2SRxDisable
- I2SRxEnable
- I2SRxFIFOLevelGet
- I2SRxFIFOLimitGet
- I2SRxFIFOLimitSet
- I2STxConfigSet
- I2STxDataPut
- I2STxDataPutNonBlocking
- I2STxDisable
- I2STxEnable
- I2STxFIFOLevelGet
- I2STxFIFOLimitGet
- I2STxFIFOLimitSet
- I2STxRxConfigSet
- I2STxRxDisable
- I2STxRxEnable
- IntPendSet
- IntPendClear
- SSIBusy
- SysCtlDelay

- SysCtlI2SMClkSet
- UARTBusy
- UARTFIFODisable
- UARTFIFOEnable
- UARTRxErrorClear
- UARTRxErrorGet
- UARTTxIntModeGet
- UARTTxIntModeSet
- uDMAChannelSelectDefault
- uDMAChannelSelectSecondary
- USBDevEndpointConfigGet
- USBEndpointDataAvail
- USBEndpointDMAChannel
- USBEndpointDMADisable
- USBEndpointDMAEnable
- USBModeGet
- USBOTGHostRequest
- USBIntDisableControl
- USBIntEnableControl
- USBIntStatusControl
- USBIntDisableEndpoint
- USBIntEnableEndpoint
- USBIntStatusEndpoint
- USBHostMode

Workaround:

Code for these functions is included in the current version of StellarisWare, which can be downloaded from the website at http://www.ti.com/software_updates.

Silicon Revision Affected:

B1

Fixed:

Fixed in Rev C.

4.3 ROM mapping check for the Boot loader does not function properly

Description:

Before the processor is released from the reset state, the System Control module is supposed to check offset 0x0000.0004 of Flash memory looking for a reset vector that is not 0xFFFF.FFFF. If an initialized reset vector is found, Flash memory is mapped to address 0x0000.0000, otherwise ROM is mapped to address 0x0000.0000. Currently, the System Control module errantly checks offset 0x0000.0008, which is the NMI vector. So, in situations where a valid reset vector (offset 0x0000.0004) has been programmed, but the NMI vector has not been programmed, the ROM is errantly mapped to zero preventing the application that is stored in Flash memory from being executed out of reset.

Workaround:

Ensure that the NMI vector is always programmed.

Silicon Revision Affected:

B1

Fixed:

Rev C3 implements the boot loader process outlined in the data sheet.

4.4 ROM_SSISetExpClk function is incorrect

Description:

If a non-Motorola format was specified in a call to the ROM_SSISetExpClk function, two lower bits of a clock divisor register could be corrupted. This corruption results in a small error in the actual clock rate.

Workaround:

Use the StellarisWare SSISetExpClk function in Flash memory.

Silicon Revision Affected:

B1

Fixed:

Fixed in Rev C.

4.5 ROM_USBFIFOFlush function is incorrect

Description:

The ROM_USBFIFOFlush function improperly checks the state of the FIFO and does not allow the endpoint's FIFO to be flushed. This error affects all endpoints other than endpoint zero.

Workaround:

Use the StellarisWare USBFIFOFlush function in Flash memory.

Silicon Revision Affected:

B1

Fixed:

Fixed in Rev C.

4.6 The option to force the ROM boot loader to execute at reset with an external pin does not function

Description:

The option to force the ROM boot loader to execute at reset with an external pin does not function. Changing the `PORT` and `PIN` fields of the **Boot Configuration (BOOTCFG)** register has no effect.

Workaround:

The ROM boot loader still executes if address 0x0000.0004 contains 0xFFFF.FFFF, indicating that the Flash memory has not been programmed.

Silicon Revision Affected:

B1

Fixed:

Fixed in Rev C3.

5 Flash Memory

5.1 Cumulative page erases may introduce bit errors in Flash memory

Description:

Cumulative page erases anywhere in the Flash memory array may introduce bit errors. The bit error is not confined to the page being erased or the 4-KB block but could be in any page in the Flash memory. A page erase is used to erase a 1-KB page so it can be rewritten. A mass erase erases the entire Flash memory array (all pages). A bit error means that a bit may change from 0 to 1 or 1 to 0.

Workaround:

There are two possible workarounds for this issue:

1. Minimize total page erases to less than 3000 between mass erases for the lifetime of the product. After each mass erase, an additional 3000 page erase operations are allowed before bit errors may be introduced. At the rate of one page erase per week, this issue would not be seen over at least 17 years.
2. Perform CRC checks on all Flash memory after page erases to increase the chances of detecting the issue. The two CRC functions built into ROM can assist in this.

Silicon Revision Affected:

B1

Fixed:

Fixed in Rev C.

5.2 Flash memory endurance cycle specification is 100 cycles

Description:

The Flash memory endurance cycle specification (maximum program/erase cycles) is 100 cycles. Failure to adhere to the maximum number of program/erase cycles could result in corruption of the Flash memory contents and/or permanent damage to the device.

Workaround:

None. Because the failure mechanism is a function of the third-party Flash memory technology used in this device, there is no workaround. This third-party Flash memory technology is used only in the affected 130-nm Stellaris products and will not be used in any future devices. All other Stellaris products use Flash memory technology that exceeds industry quality and endurance cycle standards.

Silicon Revision Affected:

B1, C3, C5

Fixed:

Not yet fixed.

5.3 Flash memory may be corrupted if programmed at system clock speeds above 50 MHz

Description:

Flash memory may occasionally be corrupted during programming if the system clock speed is above 50 MHz.

Workaround:

Always program Flash memory with system clock speeds of 50 MHz and below. In addition, it is always a good practice to verify that programming was successful by comparing the Flash memory contents with the expected contents.

Silicon Revision Affected:

B1, C3, C5

Fixed:

Not yet fixed.

6 μ DMA

6.1 The μ DMA controller fails to generate capture mode DMA requests from Timer A in the Timer modules

Description:

The μ DMA controller fails to generate DMA requests from Timer A in the General-Purpose Timer modules when in the Event Count and Event Time modes.

Workaround:

Use Timer B.

Silicon Revision Affected:

B1, C3, C5

Fixed:

Not yet fixed.

6.2 The μ DMA does not generate a completion interrupt when transferring to and from GPTM 2A and 2B

Description:

The μ DMA module does not generate a completion interrupt on the Timer 2 interrupt vector when transferring data to and from Timers 2A and 2B. The μ DMA can successfully transfer data to and from Timers 2A and 2B; however, there is no interrupt to indicate that the transfer is complete.

Workaround:

If a completion interrupt is required, use an alternate GPTM.

Silicon Revision Affected:

B1, C3, C5

Fixed:

Not yet fixed.

7 GPIO

7.1 Port B [1:0] pins require external pull-up resistors

Description:

The internal pull-up resistors are not effective for the Port B0 and B1 pins.

Workaround:

External pull-up resistors must be used on these two pins when they are used as GPIOs.

Silicon Revision Affected:

B1

Fixed:

Fixed in Rev C.

7.2 Schmitt input feature does not function correctly

Description:

The Schmitt input on digital inputs may generate spurious transitions when connected to low slew-rate signal sources. If the input signal has a slew rate of less than $1\text{V}/\mu\text{s}$, a negative edge can generate several additional transitions into the microcontroller even though the input signal is still within the hysteresis band. Positive edges are not affected.

The additional transitions can cause anomalous operation in any peripherals or GPIOs that use digital inputs. Most at risk are peripherals that use pull-up resistors (I²C, GPIOs) or that typically involve slower signals (sensor inputs). This behavior can affect the noise immunity of digital inputs. As a result, arbitration may be lost during communication when the I²C module is the master.

Workaround:

Ensure that all signals connected to digital inputs have a slew rate of at least $1\text{V}/\mu\text{s}$. In some applications, reducing the resistance value of pull-up and pull-down resistors may be necessary. Note that R-C filters, such as low pass, on digital input signals should only be used if the slew-rate is still above $1\text{V}/\mu\text{s}$, or if additional transitions on the falling edge can be tolerated. Adding an external Schmitt-trigger circuit is a requirement for circuits where slow transitions are unavoidable and system noise levels are high.

Silicon Revision Affected:

B1

Fixed:

Fixed in Rev C3.

7.3 PB1 has permanent internal pull-up resistance

Description:

Regardless of its configuration (GPIO or alternate digital function), PB1 has a maximum internal pull-up resistance of 800 ohms that turns on when the voltage on the pin is approximately 1.2 V. Due to this internal resistance, up to 3 mA of current may be sourced during the transition from 1.2 V to 3.3 V.

Workaround:

When this pin is configured as an input, the external circuit must drive with an impedance less than or equal to 300 Ω to provide enough drive strength to over-drive the internal pull-up and achieve the necessary V_{IL} voltage level. Ensure that the driver can sink the temporary current. In addition, do not use PB1 in open-drain mode.

if this pin is configured as an output, be aware that if the output was driven high and a non-POR reset occurs, the output may be driven high after reset unless it has a 300- Ω resistor on it. Once the pin is configured as an output, the pin drives the programmed level.

Silicon Revision Affected:

B1, C3, C5

Fixed:

Not yet fixed.

8 EPI

8.1 EPI dual-chip select function does not work

Description:

The Dual CSn Configuration mode ($CSCFG=0x2$) and the ALE with Dual CSn Configuration mode ($CSCFG=-x3$) controlled by the **EPI Host-Bus 8 Configuration 2 (EPIHB8CFG2)** register do not function. System designs should use ALE Configuration mode ($CSCFG=0x0$) or CSn Configuration mode ($CSCFG=0x1$).

Workaround:

None.

Silicon Revision Affected:

B1

Fixed:

Fixed in Rev C.

8.2 EPI Host-Bus 16 mode does not work

Description:

The Host-Bus 16 mode ($MODE=0x3$) controlled by the **EPI Configuration (EPICFG)** register do not function.

Workaround:

None.

Silicon Revision Affected:

B1

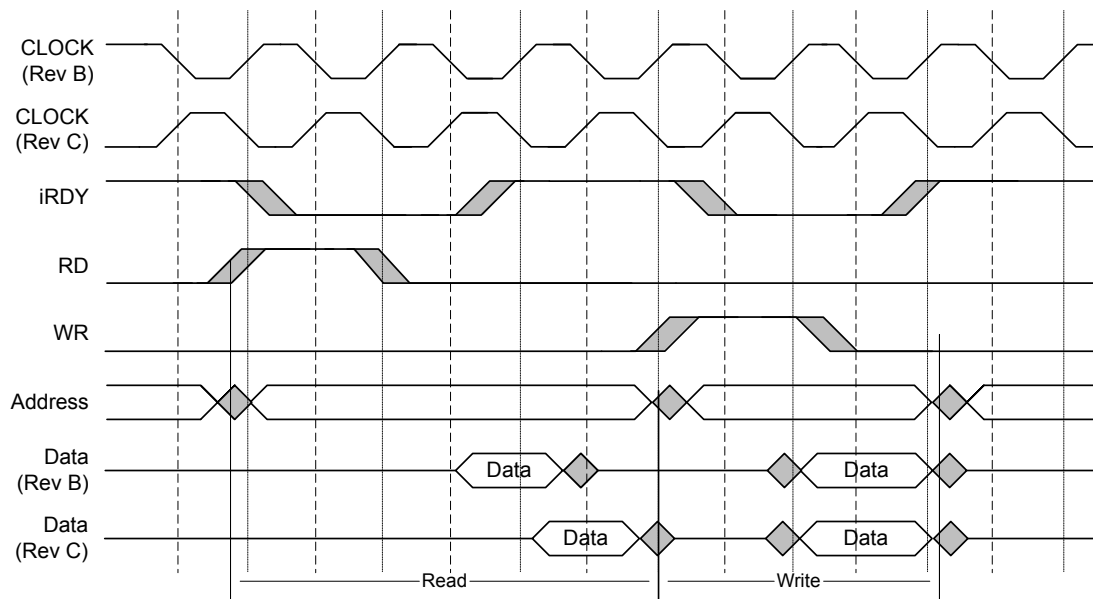
Fixed:

Fixed in Rev C.

8.3 Clock signal in EPI General-Purpose mode is inverted

Description:

The clock signal that is output on the EPI0S31 signal in General-Purpose mode is inverted. Figure 6 on page 31 shows the timing differences between Rev B parts and Rev C parts.

Figure 6. Timing Differences Between Rev B and Rev C Devices**Workaround:**

Use the opposite edge for timing when designing with this interface. During read cycles, ensure that the data meets set up and hold times for the appropriate edge as shown in the diagram above.

Silicon Revision Affected:

B1

Fixed:

Fixed in Rev C.

8.4 At EPI clock speeds over 15 MHz, SDRAM initialization delay is not long enough

Description:

After enabling the EPI SDRAM interface via the **EPISDRAMCFG** register, the EPI SDRAM controller should hold off any SDRAM accesses for 100 μ s. When an EPI clock speed greater than 15 MHz is used, it is possible for an access to start before the 100 μ s has elapsed.

Workaround:

After enabling the EPI SDRAM interface in the **EPISDRAMCFG** register, wait 100 μ s before performing any accesses to SDRAM.

Silicon Revision Affected:

B1, C3, C5

Fixed:

Not yet fixed.

8.5 In Host-Bus 16 mode, only one byte select is asserted if only 8 bits are read

Description:

When reading from most 16-bit memories in Host-Bus 16 mode, both byte selects should be asserted for every access, even if only 8 bits are being read. The EPI controller only asserts the byte select for the required 8 bits, violating this specification.

Workaround:

For standard memory configurations, the memory operation proceeds normally. Although this behavior violates the memory specifications, the EPI reads the proper data from memory.

Silicon Revision Affected:

B1, C3, C5

Fixed:

Not yet fixed.

8.6 When non-blocking reads are pending, EPI accesses can cause the NBRFIFO counter to be incorrectly decremented

Description:

When non-blocking reads are pending and the MCU performs a blocking read or a write from any EPI address with bits [11:4] equal to 0x07 or 0x08, the NBRFIFO counter is incorrectly decremented.

Workaround:

When a non-blocking read operation has been initiated, wait for the completion interrupt before performing any additional CPU or μ DMA accesses to or from the EPI registers or the EPI memory space.

Silicon Revision Affected:

B1, C3, C5

Fixed:

Not yet fixed.

8.7 In General-Purpose mode, the framing signal is output regardless of the state of the FRMPIN bit

Description:

In General-Purpose mode, the `FRMPIN` bit in the **EPI General-Purpose Configuration (EPIGPCFG)** register should control whether or not the framing signal, `FRAME`, is output on `EPIS030`. However, the `FRAME` signal is output regardless of the state of the `FRMPIN` bit.

Workaround:

If the `FRMPIN` signal is not required, configure the port pin to an alternate function or a GPIO.

Silicon Revision Affected:

B1, C3, C5

Fixed:

Not yet fixed.

8.8 In General-Purpose mode, the read and write strobes are output regardless of the state of the RW bit

Description:

In General-Purpose mode, the `RW` bit in the **EPI General-Purpose Configuration (EPIGPCFG)** register should control whether or not the read and write strobes, `RD` and `WR`, are output on `EPIS029` and `EPIS028`. However, the `RD` and `WR` signals are output regardless of the state of the `RW` bit.

Workaround:

If the read and write strobes are not required, configure the port pins to an alternate function or GPIOs.

Silicon Revision Affected:

B1, C3, C5

Fixed:

Not yet fixed.

8.9 In General-Purpose mode, the maximum time to wait for the iRDY signal is derived from the system clock, not the EPI clock

Description:

In General-Purpose mode, the `MAXWAIT` field in the **EPI General-Purpose Configuration (EPIGPCFG)** register specifies the number of EPI clocks to wait for the `iRDY` signal to be deasserted.

However, the hardware counts system clocks and not EPI clocks, so the wait may be shorter than expected.

Workaround:

Adjust the `MAXWAIT` configuration to account for the difference in frequency between the system clock and the EPI clock.

Silicon Revision Affected:

B1, C3, C5

Fixed:

Not yet fixed.

8.10 iRDY timing in General-Purpose mode is not as specified in the data sheet

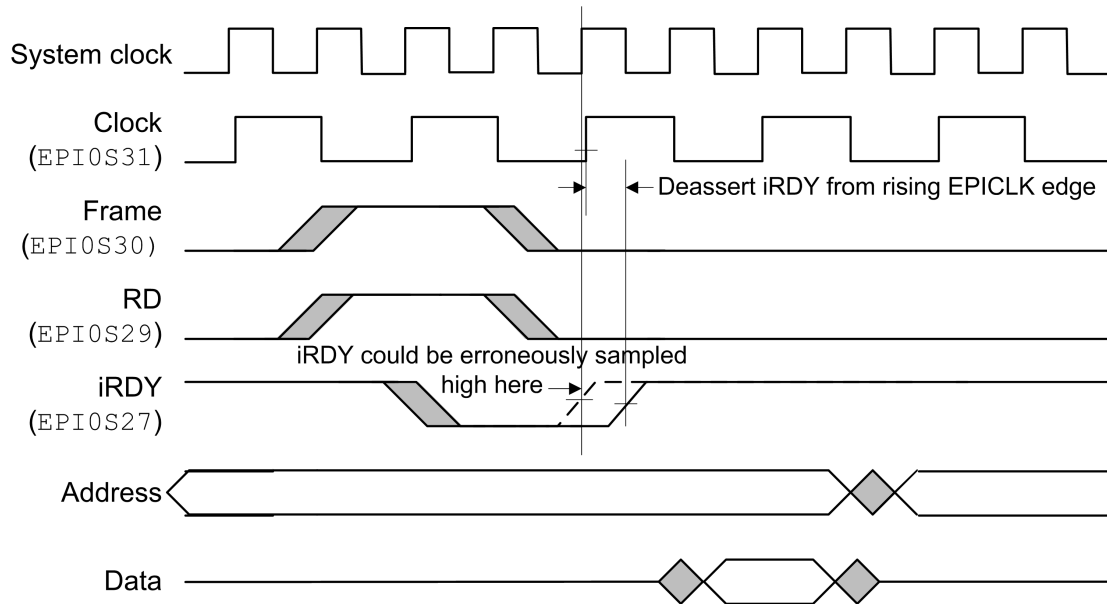
Description:

The data sheet specifies that ready input (iRDY) is sampled on the falling edge of the EPI clock, when it is actually sampled on the rising edge of system clock when configured for General-Purpose mode. The iRDY signal may be seen earlier than expected.

Workaround:

If trying to stall the address phase, this is not an issue. When trying to stall the data phase, you must ensure that iRDY is not deasserted until after the next rising edge of EPICLK. If iRDY misses the set up for the next rising system clock edge, it will be captured on the subsequent rising system clock edge.

For example, if the system clock frequency is configured for 80 MHz (12.5 ns period) and the EPI clock frequency is configured for 40 MHz (25 ns period), there is a 2.5 ns window $((25\text{ ns} - 12.5\text{ ns}) - 10\text{ ns})$, where 10 ns is the iRDY assertion or deassertion set up time (TRDYSU) where the iRDY signal may be asserted. Figure 7 on page 35 shows where iRDY is actually sampled when trying to stall the data phase. iRDY should be deasserted after the next falling edge of EPICLK. iRDY could be erroneously sampled high if it is deasserted at the dotted line.

Figure 7. iRDY Timing**Silicon Revision Affected:**

B1, C3, C5

Fixed:

Not yet fixed.

9 General-Purpose Timers

9.1 The General-Purpose Timer match register does not function correctly in 32-bit mode

Description:

The **GPTM Timer A Match (GPTMTAMATCHR)** register triggers a match interrupt and a DMA request, if enabled, when the lower 16 bits match, regardless of the value of the upper 16 bits.

Workaround:

None.

Silicon Revision Affected:

B1, C3, C5

Fixed:

Not yet fixed.

9.2 A spurious DMA request is generated when the timer rolls over in Input-Edge Time mode

Description:

When the timer is in Input-Edge Time mode and rolls over after the terminal count, a spurious DMA request is generated.

Workaround:

Either ignore the spurious interrupt, or capture the edge time into a buffer via DMA, then the spurious interrupt can be detected by noting that the captured value is the same as the previous capture value.

Silicon Revision Affected:

B1, C3, C5

Fixed:

Not yet fixed.

9.3 A spurious DMA request is generated when the timer rolls over the 16-bit boundary

Description:

When the timer is in 32-bit periodic or one-shot mode and is enabled to generate periodic DMA requests, a spurious DMA request is generated when the timer rolls past 0x0000FFFF.

Workaround:

Only use DMA with a 16-bit periodic timer.

Silicon Revision Affected:

B1, C3, C5

Fixed:

Not yet fixed.

9.4 The value of the prescaler register is not readable in Edge-Count mode

Description:

In Edge-Count mode, the prescaler is used as an 8-bit high order extension to the 16-bit counter. When reading the **GPTM Timer n (GPTMTnR)** register as a 32-bit value, the bits [23:16] always contain the initial value of the **GPTM Timer n Prescale (GPTMTnPR)** register, that is, the "load" value of the 8-bit extension.

Workaround:

None.

Silicon Revision Affected:

B1, C3, C5

Fixed:

Not yet fixed.

9.5 ADC trigger and Wait-on-Trigger may assert when the timer is disabled

Description:

If the value in the **GPTM Timer n Match (GPTMTnMATCHR)** register is equal to the value of the timer counter and the **TnOTE** bit in the **GPTM Control (GPTMCTL)** register is set, enabling the ADC trigger, the trigger fires even when the timer is disabled (the **TnEN** bit in the **GPTMCTL** register is clear). Similarly, if the value in the **GPTMTnMATCHR** register is equal to the value of the timer counter and the **TnWOT** bit in the **GPTM Timer n Mode (GPTMTnMR)** register is set, enabling the Wait-on-Trigger mode, the trigger fires even when the timer is disabled.

Workaround:

Enable the timer before setting the **TnOTE** bit. Also, for the Wait-on-Trigger mode, ensure that the timers are configured in the order in which they will be triggered.

Silicon Revision Affected:

B1, C3, C5

Fixed:

Not yet fixed.

9.6 Wait-on-Trigger does not assert unless the TnOTE bit is set

Description:

Wait-on-Trigger does not assert unless the **TnOTE** bit is set in the **GPTMCTL** register.

Workaround:

If the **TnWOT** bit in the **GPTM Timer n Mode (GPTMTnMR)** register is set, enabling the Wait-on-Trigger mode, the **TnOTE** bit must also be set in the **GPTMCTL** register in order for the Wait-on-Trigger to fire. Note that when the **TnOTE** bit is set, the ADC trigger is also enabled.

Silicon Revision Affected:

B1, C3, C5

Fixed:

Not yet fixed.

9.7 Do not enable match and timeout interrupts in 16-bit PWM mode

Description:

16-bit PWM mode generates match and timeout interrupts in the same manner as periodic mode.

Workaround:

Ensure that any unwanted interrupts are masked in the **GPTMTnMR** and **GPTMIMR** registers.

Silicon Revision Affected:

B1, C3, C5

Fixed:

Not yet fixed.

9.8 Do not use μ DMA with 16-bit PWM mode

Description:

16-bit PWM mode generates match and timeout μ DMA triggers in the same manner as periodic mode.

Workaround:

Do not use μ DMA to transfer data when the timer is in 16-bit PWM mode.

Silicon Revision Affected:

B1, C3, C5

Fixed:

Not yet fixed.

9.9 Writing the GPTMTnV register does not change the timer value when counting up

Description:

When counting up, writes to the **GPTM Timer n Value (GPTMTnV)** register do not change the timer value.

Workaround:

None.

Silicon Revision Affected:

B1, C3, C5

Fixed:

Not yet fixed.

9.10 The prescaler does not work correctly when counting up in periodic or one-shot mode

Description:

When counting up, the prescaler does not work correctly in 16-bit periodic or snap-shot mode.

Workaround:

Do not use the prescaler when counting up in 16-bit periodic or snap-shot mode.

Silicon Revision Affected:

B1, C3, C5

Fixed:

Not yet fixed.

9.11 Snapshot must be enabled in both Timer A and B when in 32-bit snapshot mode

Description:

When a periodic snapshot occurs in 32-bit periodic mode, only the lower 16-bit are stored into the **GPTM Timer A (GPTMTAR)** register.

Workaround:

If both the **TASNAPS** and **TBSNAPS** bits are set in the **GPTM Timer A Mode (GPTMTAMR)** register, the entire 32-bit snapshot value is stored in the **GPTMTAR** register.

Silicon Revision Affected:

B1, C3, C5

Fixed:

Not yet fixed.

10 Watchdog Timers

10.1 Writes to Watchdog Timer 1 module WDTLOAD register sometimes fail

Description:

Due to the independent clock domain of the Watchdog Timer 1 module, writes to the **Watchdog Load (WDTLOAD)** register may sometimes fail, even though the **WRC** bit in the **WDTCTL1** register is set after the write occurs.

Workaround:

After performing a write to the **WDTLOAD** register, read the contents back and verify that they are correct. If they are incorrect, perform the write operation again.

Silicon Revision Affected:

B1, C3, C5

Fixed:

Not yet fixed.

10.2 Watchdog clear mechanism described in the data sheet does not work for the Watchdog Timer 1 module

Description:

Periodically reloading the count value into the **Watchdog Timer Load (WDTLOAD)** register of the Watchdog Timer 1 module will not restart the count, as specified in the data sheet.

Workaround:

Disable the Watchdog Timer 1 module before reprogramming the counter. Alternatively, clear the watchdog interrupt status periodically outside of the interrupt handler by writing any value to the **Watchdog Interrupt Clear (WDTICR)** register.

Silicon Revision Affected:

B1, C3, C5

Fixed:

Not yet fixed.

10.3 Watchdog Timer 1 module asserts reset signal even if not programmed to reset

Description:

Even if the reset signal is not enabled (the `RESEN` bit of the **Watchdog Control (WDTCTL)** register is clear), the Watchdog Timer 1 module will assert a reset signal to the system when the time-out value is reached for a second time.

Workaround:

Clear the Watchdog Timer 1 interrupt once the time-out value is reached for the first time by writing any value to the **Watchdog Interrupt Clear (WDTICR)** register.

Silicon Revision Affected:

B1, C3, C5

Fixed:

Not yet fixed.

10.4 WDTLOAD yields an incorrect value when read back

Description:

If the Watchdog Timer 1 module is enabled and configured to run off the PIOSC, writes to the **Watchdog Load (WDTLOAD)** register yield an incorrect value when read back.

Workaround:

None.

Silicon Revision Affected:

B1, C3, C5

Fixed:

Not yet fixed.

11 ADC

11.1 ADC hardware averaging produces erroneous results in differential mode

Description:

The implementation of the ADC averaging circuit does not work correctly when the ADC is sampling in differential mode and the difference between the voltages is approximately 0.0V.

Workaround:

Do not use hardware averaging in differential mode. Instead, use the FIFO to store results and average them in software.

Silicon Revision Affected:

B1, C3, C5

Fixed:

Not yet fixed.

11.2 The ADCSPC register does not function

Description:

The **ADC Sample Phase Control (ADCSPC)** register does not function and cannot be used.

Workaround:

None.

Silicon Revision Affected:

B1

Fixed:

Fixed in Rev C.

11.3 Differential pair encodings are incorrect

Description:

When using differential mode, the **MUX_n** fields in the **ADCSSMUX_n** registers should be configured to be "i" where the paired inputs are "2i" and "2i + 1". This encoding does not work for AIN8 - AIN15.

Workaround:

Use the encodings shown in the following table:

Adjacent Channels	i	MUX _n Encoding
AIN0 and AIN1	0	0x0
AIN2 and AIN3	1	0x1
AIN4 and AIN5	2	0x2
AIN6 and AIN7	3	0x3
AIN8 and AIN9	4	0x8

Adjacent Channels	i	MUXn Encoding
AIN10 and AIN11	5	0x9
AIN12 and AIN13	6	0xA
AIN14 and AIN15	7	0xB

Silicon Revision Affected:

B1, C3, C5

Fixed:

Not yet fixed.

11.4 Retriggering a sample sequencer before it has completed the current sequence results in continuous sampling

Description:

Re-triggering a sample sequencer before it has completed its programmed conversion sequence causes the sample sequencer to continuously sample. If interrupts have been enabled, interrupts are generated at the appropriate place in the sample sequence. This problem only occurs when the new trigger is the same type as the current trigger.

Workaround:

Ensure that a sample sequence has completed before triggering a new sequence using the same type of trigger.

Silicon Revision Affected:

B1, C3, C5

Fixed:

Not yet fixed.

11.5 Digital comparator in last step of sequence does not trigger or interrupt

Description:

If a digital comparator that is expected to trigger or interrupt is configured for the last step of a sample sequence with sequence trigger TRIGGER_PROCESSOR, TRIGGER_COMPn, TRIGGER_EXTERNAL, TRIGGER_TIMER, or TRIGGER_PWMn, the trigger or interrupt does not occur. These sequence trigger parameters should not be used when using a sample sequencer configured with only one step and a digital comparator that is expected to trigger or interrupt.

Note: Sample Sequencer 3 can only be configured for a total of one step.

Workaround:

If an extra sequence step is available in a sample sequencer, a dummy sequence step and a dummy digital comparator can be configured as the last step in the sample sequencer.

Silicon Revision Affected:

B1, C3, C5

Fixed:

Not yet fixed.

11.6 Digital comparator interrupts do not trigger or interrupt as expected

Description:

The digital comparator configured for the ADC sample sequence step (n+1) is triggered if the voltage on the AINx input specified for step (n) meets the conditions that trigger the digital comparator for step (n+1). In this case, the conversion results are sent to the digital comparator specified by step (n+1).

Workaround:

Adjust user code or hardware to account for the fact that the voltage seen at the AINx input specified for sequence step (n) will be handled by sequence step (n+1)'s digital comparator using sequence step (n+1)'s configurations.

Silicon Revision Affected:

B1, C3, C5

Fixed:

Not yet fixed.

11.7 Missing trigger or interrupt when multiple sequences configured for processor trigger and different trigger

Description:

If a sample sequence is configured to trigger or interrupt using a processor event and a different, consecutive sample sequence is configured to trigger or interrupt using any other event, the interrupt or trigger for the processor-triggered sample sequence will occasionally not occur, even if the processor-triggered sample sequence is configured with a higher priority.

Workaround:

None.

Silicon Revision Affected:

B1, C3, C5

Fixed:

Not yet fixed.

11.8 ADC sample sequencers priorities are different than expected

Description:

If sample sequencer 2 (SS2) and sample sequencer 3 (SS3) have been triggered, and sample sequencer 0 (SS0) and sample sequencer 1 (SS1) have not been triggered or have already been triggered, the priority control logic compares the priorities of SS1 and SS2 rather than SS2 and SS3. For example, if SS1's priority is the highest (such as 0) and SS3's priority is higher than SS2's priority (such as SS3 = 1, SS2 = 2), SS2 is incorrectly selected to initiate the sampling conversion after

SS1. If SS1's priority is the lowest (such as 3) and SS3's priority is lower than SS2's (such as SS3 = 2, SS2 = 1), SS3 is incorrectly selected as the next sample sequencer, then SS2, then SS1.

Workaround:

If only three of the four ADC sample sequencers are needed, SS0 and SS1 can be used with either SS2 or SS3. This ensures that the execution order is as expected. If all four ADC sample sequencers are needed, the highest priority conversions should be programmed into SS0 and SS1. The sequences programmed into SS2 and SS3 occur, but not necessarily in the programmed priority order.

Silicon Revision Affected:

B1, C3, C5

Fixed:

Not yet fixed.

11.9 Simultaneous sampling on both ADC modules yields incorrect samples

Description:

The input impedance of the analog input channel is altered if both ADC modules are used to sample the same pin at the same time. The altered input impedance results in incorrect samples.

Workaround:

Avoid incorrect samples by performing one of the following:

- Configure the ADC modules to sample at different times.
- Wait twice as long for the sample to settle.
- Halve the input impedance.

Silicon Revision Affected:

B1, C3, C5

Fixed:

Not yet fixed.

11.10 Phase offset does not delay as expected if sample sequencers are not triggered at the same time

Description:

The phase difference set in the **ADC Sample Phase Control (ADCSPC)** register does not reference the same starting point in time if the sequencers are configured for a phase offset and are not triggered at the same time.

Workaround:

Use the same trigger to ensure that the sample sequencers will trigger at the same time. If using processor trigger and both ADC modules with phase offset, use the `GSYNC` and `SYNCWAIT` bits in

the **ADC Processor Sample Sequence Initiate (ADCPSSI)** register to ensure that the trigger occurs simultaneously. The phase offsets will not align if triggering using Trigger Always mode.

Silicon Revision Affected:

B1, C3, C5

Fixed:

Not yet fixed.

12 UART

12.1 UART Smart Card (ISO 7816) mode does not function

Description:

The `UnTX` signal does not function correctly as the bit clock in Smart Card mode.

Workaround:

None.

Silicon Revision Affected:

B1

Fixed:

Fixed in Rev C.

12.2 When in IrDA mode, the UnRx signal requires configuration even if not used

Description:

When in IrDA mode, the transmitter may not function correctly if the `UnRx` signal is not used.

Workaround:

When in IrDA mode, if the application does not require the use of the `UnRx` signal, the GPIO pin that has the `UnRx` signal as an alternate function must be configured as the `UnRx` signal and pulmac High.

Silicon Revision Affected:

B1

Fixed:

Fixed in Rev C.

12.3 Phantom interrupts occur in Smart Card mode

Description:

In Smart Card mode, after receiving a valid TX interrupt, phantom parity error interrupts occur, even though all **UARTRIS** and **UARTMIS** bits are clear.

Workaround:

Make sure to always clear the parity error interrupt in the interrupt handler, even when the `PERIS` and `PEMIS` bits are clear.

Silicon Revision Affected:

B1

Fixed:

Fixed in Rev C3.

12.4 The RTRIS bit in the UARTRIS register is only set when the interrupt is enabled

Description:

The `RTRIS` (UART Receive Time-Out Raw Interrupt Status) bit in the **UART Raw Interrupt Status (UARTRIS)** register should be set when a receive time out occurs, regardless of the state of the `RTIM` enable bit in the **UART Interrupt Mask (UARTIM)** register. However, currently the `RTIM` bit must be set in order for the `RTRIS` bit to be set when a receive time out occurs.

Workaround:

For applications that require polled operation, the `RTIM` bit can be set while the UART interrupt is disabled in the NVIC using the `IntDisable(n)` function in the StellarisWare Peripheral Driver Library, where `n` is 21, 22, or 49 depending on whether UART0, UART1 or UART2 is used. With this configuration, software can poll the `RTRIS` bit, but the interrupt is not reported to the NVIC.

Silicon Revision Affected:

B1, C3, C5

Fixed:

Not yet fixed.

12.5 LIN mode Sync Break does not have the correct length

Description:

When operating as a LIN master, the microcontroller provides a Sync Break of the length that is programmed in the `BLEN` field in the **UART LIN Control (UARTLCTL)** register. However, the actual Sync Break length is 1 less than what is programmed in the `BLEN` field as shown in Table 3 on page 46.

Table 3. SyncBreak Length

<code>BLEN</code> Encoding	Data Sheet Value	Actual Value
0x0	13T bits	12T bits
0x1	14T bits	13T bits
0x2	15T bits	14T bits
0x3	16T bits	15T bits

Workaround:

Adjust the `BLEN` encoding to correspond to the actual Sync Break required.

Silicon Revision Affected:

B1, C3, C5

Fixed:

Not yet fixed.

12.6 When UART LIN or SIR mode is enabled, μ DMA burst transfer does not occur**Description:**

If the LIN or the IrDA Serial Infrared (SIR) mode is enabled in the UART peripheral and the μ DMA UARTn RX or UARTn TX channel is configured to do a burst transfer, the burst data transfer does not occur.

Workaround:

Clear the `SETn` bit in the **DMA Channel Useburst Set (DMAUSEBURSTSET)** register to have the μ DMA UART channel respond to single or burst requests to ensure that the data transfer occurs.

Silicon Revision Affected:

B1, C3, C5

Fixed:

Not yet fixed.

12.7 UART transfers fail at certain system clock frequency and baud rate combinations**Description:**

UART data transfers using the `TXRIS` and `RXRIS` interrupt bits and FIFOs fail for certain combinations of the system clock frequency and baud rate.

System Clock Freq [MHz]	32	24	16	10	8	5	4	2	1
Failing Baud Rate [bps]	<460800	<460800	<230400	<460800	<115200	<230400	<57600	<38400	<19200

Workaround:

Use a system clock frequency above 32MHz if using the UART with the raw interrupt status bits or use μ DMA UART data transfers instead of the `TXRIS` and `RXRIS` bits. When using μ DMA UART data transfers, there are no system clock frequency and baud rate conflicts.

Silicon Revision Affected:

B1, C3, C5

Fixed:

Not yet fixed.

13 SSI

13.1 An interrupt is not generated when using μ DMA with the SSI module if the EOT bit is set

Description:

When using the primary μ DMA channels with the SSI module, an interrupt is not generated on transmit μ DMA completion if the EOT bit (bit 4 of the **SSICR1** register) is enabled.

Workaround:

Use the alternate μ DMA channels for the SSI module.

Silicon Revision Affected:

B1

Fixed:

Fixed in Rev C.

13.2 Freescale SPI Mode at low SSIClk frequencies can yield data corruption

Description:

Data transmitted by the SPI slave may be corrupted when using Freescale SPI Mode 0 at an SSIClk frequency between 0.5 MHz to 1.1 MHz and a system clock frequency of 33 MHz or lower.

Workaround:

Operate the Freescale SPI Mode 0 at an SSIClk frequency above 1.1 MHz and use a system clock frequency above 33 MHz or use a different mode.

Silicon Revision Affected:

B1, C3, C5

Fixed:

Not yet fixed.

14 I2S

14.1 Some bits in the I2SMCLKCFG register do not function

Description:

The top 2 bits of the RXI and TXI bit fields in the **I2SMCLKCFG** register do not function (bits [29:28] of RXI and bits [13:12] of TXI). The RXI and TXI fields contain the 10-bit integer input for the receive and transmit clock generator, respectively. The remaining 8 bits in each field function correctly, so most of the possible integer input choices can be used in system design.

Workaround:

None.

Silicon Revision Affected:

B1

Fixed:

Fixed in Rev C.

14.2 I²S SCLK signal is inverted in certain modes

Description:

When the I²S controller is operating as a receiver in SCLK Master mode, the WS signal is latched on the rising edge of SCLK, not the falling edge. In addition, when the controller is operating as a transmitter in SCLK Slave mode, the data is launched on the rising edge of SCLK, not the falling edge.

Workaround:

For the transmitter, there are two possible workarounds for this issue:

1. Ensure that the `I2S0TXSCK` signal leads the `I2S0TXWS` signal by at least 4 ns.
2. Configure as I²S mode with DAC in Left-Justified audio format.

For the receiver, ensure that the CODEC is configured as the SCLK master, and the I²S receive module is configured as the SCLK slave.

Silicon Revision Affected:

B1

Fixed:

Fixed in Rev C.

15 Ethernet Controller

15.1 Ethernet receive packet corruption may occur when using optional auto-clock gating

Description:

Ethernet receive packets may be corrupted if the `ACG` bit in the **Run-Mode Clock Configuration (RCC)** register is set.

Workaround:

Do not set the `ACG` bit in the **RCC** register.

Silicon Revision Affected:

B1

Fixed:

Fixed in Rev C.

15.2 Ethernet packet loss with cables longer than 50 meters

Description:

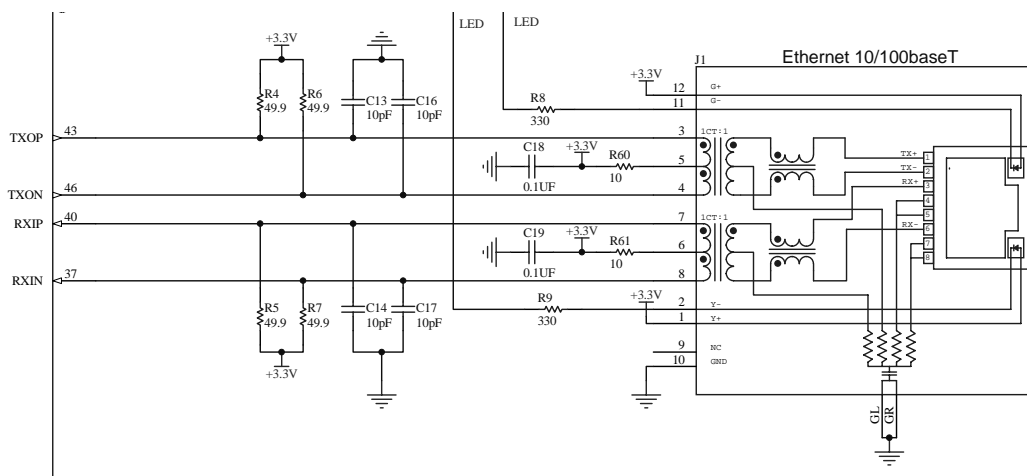
The microcontroller experiences some packet loss with Ethernet cables longer than 50 meters in normal operating conditions.

Workaround:

There are two possible workarounds for this issue:

1. Add 10 Ω resistor to the center-tap of the transformer as shown in the figure. These resistors should be replaced by a direct connection for silicon that has this item fixed.
2. Continue using the recommended circuit, but limit cable lengths to 50 meters.

Figure 8. Recommended Center-Tap Connections



Silicon Revision Affected:

B1

Fixed:

Fixed in Rev C.

15.3 Ethernet PHY interrupts do not function correctly

Description:

The Ethernet PHY interrupts are not functional. Ethernet PHY interrupts are not necessary for normal Ethernet operation. MAC interrupts are all functional and provide necessary operation.

Workaround:

None.

Silicon Revision Affected:

B1

Fixed:

Fixed in Rev C.

15.4 Encoding error in the Ethernet MAC LED Encoding (MACLED) register

Description:

Configuring the LED0 or LED1 field of the **Ethernet MAC LED Encoding (MACLED)** register to 0x8 should cause the corresponding LED to report a combined link + activity status. However, it instead only reports activity status (i.e. exactly the same as encoding 0x1).

Workaround:

None.

Silicon Revision Affected:

B1, C3, C5

Fixed:

Not yet fixed.

16 USB

16.1 USB0ID and USB0VBUS signals are required to be connected regardless of mode

Description:

The DEVMODOTG bit in the **USB General-Purpose Control and Status (USBGPCS)** register does not function correctly.

Workaround:

Connect the USB0VBUS input to VBUS in all modes. In addition, connect the USB0ID pin to ground for Host mode operation and to VDD for Device mode operation using the DEVMOD bit in the **USB General-Purpose Control and Status (USBGPCS)** register.

Silicon Revision Affected:

B1

Fixed:

Fixed in Rev C.

16.2 Latch-up may occur if power is applied to the VBUS pin but not to VDD

Description:

If power is applied to the VBUS pin but not to VDD, the microcontroller may latch up and or draw excessive current. This condition can occur if the microcontroller is unpowered and is connected as a USB device or OTG B.

Workaround:

Add a 100 Ω resistor (the tolerance is not critical) in series with the microcontroller's USB0VBUS signal. This resistor changes the USB VBUS signalling thresholds by approximately 8 mV which addresses the latch-up issue with no impact on USB performance.

Silicon Revision Affected:

B1

Fixed:

Fixed in Rev C.

16.3 USB compliance test issue: USB full-speed, far-end signal compliance tests fail with 5 m cable

Description:

While USB packet loss has not been observed, the device is unable to pass the following USB compliance tests:

- USB Host Test B.3.3.2 Full-speed Downstream Signal Quality Test
- USB Device Test B.6.3.1 Signal Integrity Test – Upstream Signal test (full speed)

Compliance testing is based on the “USB Implementers Forum Full and Low Speed Electrical and Interoperability Compliance Test Procedure” Revision 1.3 available from usb.org website. The compliance testing is performed using a 5 m USB certified cable between the host or device under test and the test SQiDD which is then connected to a USB compliant hub chain to the root hub. Under compliance test conditions, the rising edges of the USB D+/D- signals begin to violate the lower right corner of the full-speed eye diagram defined by the USB specification. USB certification cannot be obtained because of this erratum.

A full report on this issue, "USB Far End Signal Integrity Test Results," is available from your local TI FAE.

Workaround:

If a cable with a length of 1 m is used instead of a 5 m cable, the Eye diagram compliance tests all pass with adequate margin across the voltage and temperature range of the part. Under nominal voltage and temperature conditions, a cable of up to 3 m can be used and passes the eye diagram compliance tests.

Silicon Revision Affected:

B1, C3

Fixed:

Fixed in Rev C5.

16.4 USB compliance test issue: USB embedded host low-speed, far-end signal compliance tests fail

Description:

While USB packet loss has not been observed, the device is unable to pass the following USB compliance test:

■ USB Host Test B.3.3.1 Low-Speed Downstream Signal Quality Test

USB Compliance testing is based on the “USB Implementers Forum Full and Low Speed Electrical and Interoperability Compliance Test Procedure” Revision 1.3 available from usb.org website. The rising and falling edges of the USB D+/D- signals violate the lower half of the low-speed eye diagram defined by the USB specification. This erratum applies only to systems defined as a USB embedded host that support low-speed devices. USB embedded host and OTG systems that support full-speed devices only are not affected by this erratum. USB device systems are full-speed only and thus are not affected by this erratum.

A full report on this issue, "USB Far End Signal Integrity Test Results," is available from your local TI FAE.

Workaround:

None.

Silicon Revision Affected:

B1, C3

Fixed:

Fixed in Rev C5.

16.5 MCU may fail USB certification if the EPI module is operating

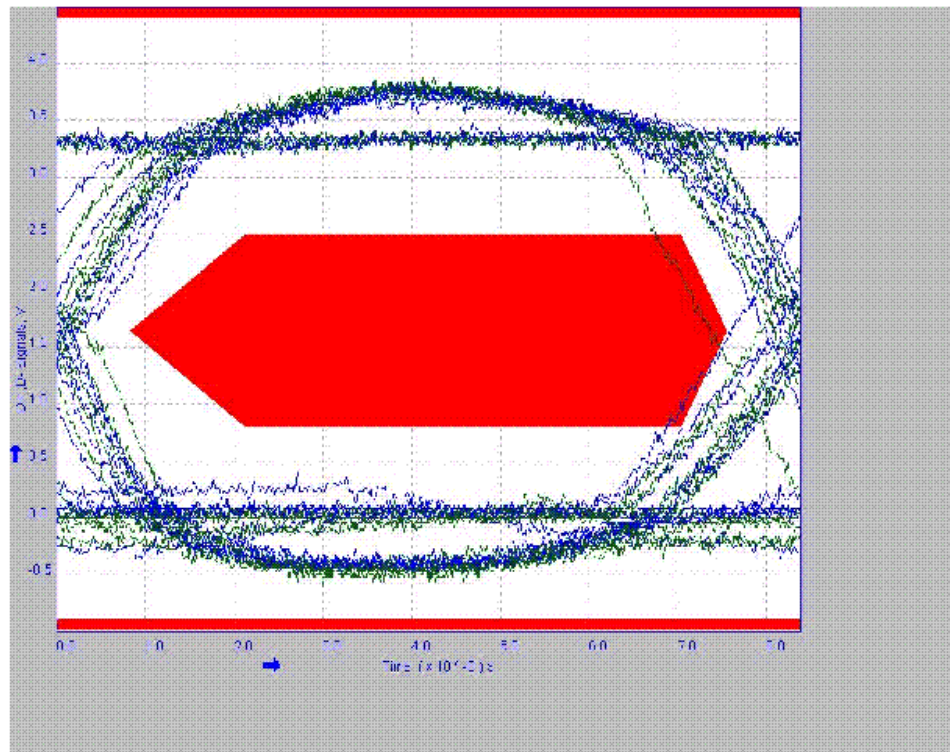
Description:

If the EPI module is operating, the USB interface may fail USB certification. Failures have been seen for the eye diagram and jitter (see Figure 9 on page 54). Because of these issues, there is a potential for data corruption on the USB interface when using the USB and EPI at the same time. The risk of data corruption is small, but is dependent on the system design.

The USB hardware senses bit errors in the CRC check for control, interrupt, and bulk transfers. If an error occurs, the host hardware requests a resend of the packet up to three times. The application software could be written to address this error further if needed.

Figure 9. Example of USB Certification Failure

- Signal eye:
Eye Diagram Test fails



- EOP width: 169.0995ns
EOP width passes
- Receivers: reliable operation on tier Tier 6
Receivers pass
- Measured Signalling Rate: 11.92707Mbps
signal rate conditionally passes
- Crossover voltage range: 1.546667 V to 1.680000 V
Mean crossover = 1.615889 V
First crossover at 1.660000 V(11 other differential crossovers checked)
crossover voltages pass
- Consecutive jitter range: -165.1885ns to 1.811468ns, RMS jitter 52.27256ns
Paired JK jitter range: 752.3810ps to 2.871429ns, RMS jitter 1.821542ns
Paired KJ jitter range: 1.185714ns to 2.168571ns, RMS jitter 1.695397ns
jitter fails

USB certification can be attained if an application does not require the USB and the EPI to be operating simultaneously. Customers who do not intend to pursue USB certification should determine if their application can handle the resulting small amount of error.

Workaround:

None.

Silicon Revision Affected:

B1, C3, C5

Fixed:

Not yet fixed.

16.6 Special considerations for PB1

Description:

When using PB1 as a GPIO or digital alternate function, special considerations are required due to issue "PB1 has permanent internal pull-up resistance" on page 30.

Workaround:

The `DEVMODOTG` and `DEVMOD` bits in the **USB General-Purpose Control and Status (USBGPCS)** register can be used to configure the USB controller to operate only in Host mode or Device mode and allowing `PB0` and `PB1` to be used as GPIOs or digital alternate functions. If both the `DEVMODOTG` and `DEVMOD` bits are set, indicating Device mode, the `USB0VBUS` signal is not driven, therefore the USB VBUS signal must be monitored using a GPIO as an input to detect connect and disconnect. This monitoring must be done with a GPIO other than `PB1`, because `PB1` is not 5-V tolerant. Note that this erratum does not affect devices operating in OTG mode. The `USB0VBUS` signal operates as specified.

In addition, if the USB functionality is not used on the device, in order to be able to use `PB1` as a GPIO or digital alternate function, the user application must enable the USB module in the **RCGC2** register, set the `DEVMODOTG` bit, and then disable the USB module again. The restrictions detailed in issue "PB1 has permanent internal pull-up resistance" on page 30 still apply.

Silicon Revision Affected:

B1, C3, C5

Fixed:

Not yet fixed.

16.7 Cannot communicate with a low-speed Device through a hub

Description:

When the USB controller is operating as a Host and a low-speed packet is sent to a Device through a hub, the subsequent Start-of-Frame is corrupted. After a period of time, this corruption causes the USB controller to lose synchronization with the hub, resulting in data corruption.

Workaround:

None.

Silicon Revision Affected:

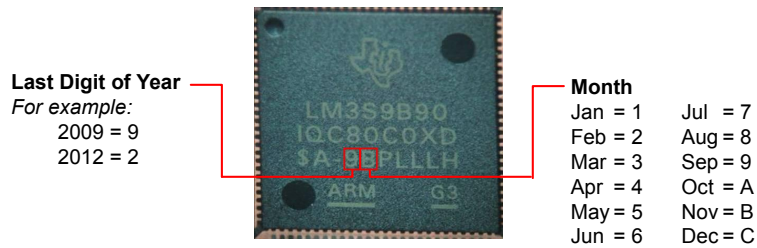
B1, C3, C5

Fixed:

Fixed on devices with date codes of 1A (October 2011) or later. In addition, the system clock on the MCU must be at least 30 MHz.

Note: To determine the date code of your part, look at the first two characters following the dash on the third line of the part markings (highlighted in red in the following figure). The first number after the dash indicates the last decimal digit of the year. The second character

indicates the month. Therefore, the following example shows a date code of 9B which indicates November 2009.



16.8 USB0DM may be driven after reset

Description:

If the microcontroller is reset while the USB device is connected to an upstream port with the `SOFTCONN` bit set in the **USB Power (USBPOWER)** register, the USB0DM signal is driven to 2 V for 66 μ s after the microcontroller comes out of reset. This activity can appear to be unsolicited traffic to the upstream port. This traffic is generally ignored, but may cause unexpected behavior from the upstream host controller.

Workaround:

If the system can determine that a reset is about to occur, disconnect the USB peripheral by clearing the `SOFTCONN` bit in the **USB Power (USBPOWER)** register prior to resetting the device. If the microcontroller reset is asynchronous, there is no workaround.

Silicon Revision Affected:

Fixed:

Not yet fixed.

17 Electrical Characteristics

17.1 Momentarily exceeding V_{IN} ratings on any pin can cause latch-up

Description:

To avoid latch-up, the maximum DC ratings of the part must be strictly enforced. The most common violation of the V_{IN} electrical specification can occur when a mechanical switch or contact is connected directly to a GPIO or special function (`RST`, `WAKE`, ...) pin. The circuit shown in Figure 10 on page 56 typically has stray inductance and capacitance that can cause a voltage glitch when the switch transitions, as shown in Figure 11 on page 57. The magnitude of the glitch may exceed the V_{IN} in the maximum DC ratings table in the Electrical Characteristics chapter. Figure 12 on page 57 shows an improved circuit that eliminates the glitch.

Figure 10. Incorrect Reset Circuitry

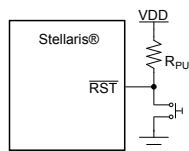
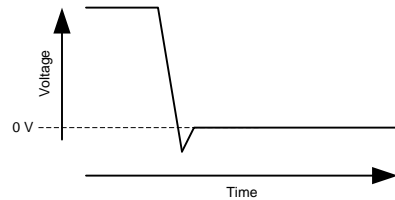
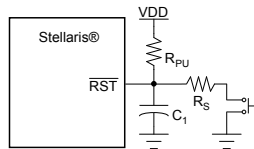


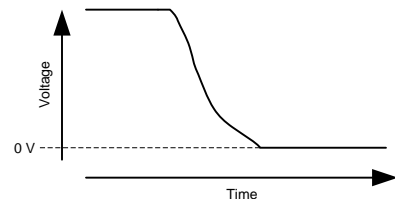
Figure 11. Excessive Undershoot Voltage on Reset**Workaround:**

Use a circuit as shown in Figure 12 on page 57. In this circuit, R_S should be less than or equal to $R_{PU}/10$. C_1 should be matched to R_{PU} to achieve a suitable t_{RC} for the application. Typical values are:

- $R_{PU} = 10\text{ k}\Omega$
- $R_S = 470\text{ }\Omega$
- $C_1 = 0.01\text{ }\mu\text{F}$

Figure 12. Recommended Reset Circuitry

After implementing the circuit shown in Figure 12 on page 57, confirm that the voltage on the $\overline{\text{RST}}$ input has a curve similar to the one in Figure 13 on page 57, and that the V_{IN} specification is not exceeded.

Figure 13. Recommended Voltage on Reset**Silicon Revision Affected:**

B1

Fixed:

Fixed in Rev C.

17.2 Power-on event may disrupt operation

Description:

Incorrect power sequencing during power up can disrupt operation and potentially cause device failure.

Workaround:

V_{DDC} must be applied approximately 50 μ s before V_{DD} . Normally V_{DDC} is controlled by the part's internal LDO voltage regulator. The workaround requires the addition of an external regulator (see Figure 14) to ensure that V_{DDC} sequencing requirements are met (see Figure 15). A recommended regulator is the TI TPS73101DBVR.

This fix mitigates the on-chip power issue, but does not solve it completely. During development, the Flash memory should also be reprogrammed (using LMFlash or another programming tool) at least once a week.

Figure 14. Configuration of External Regulator

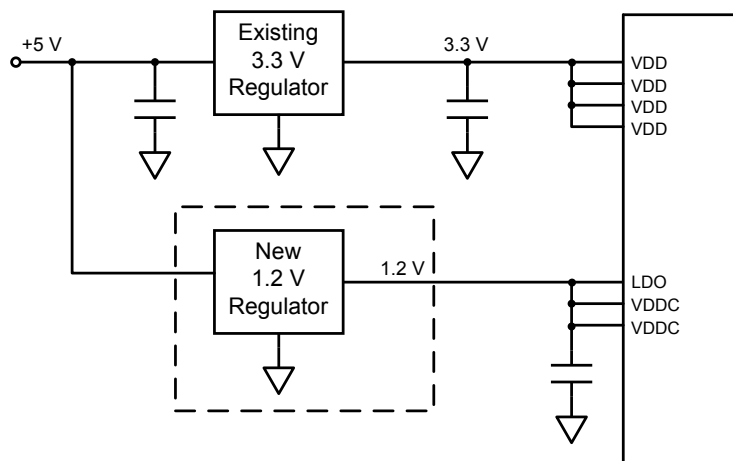
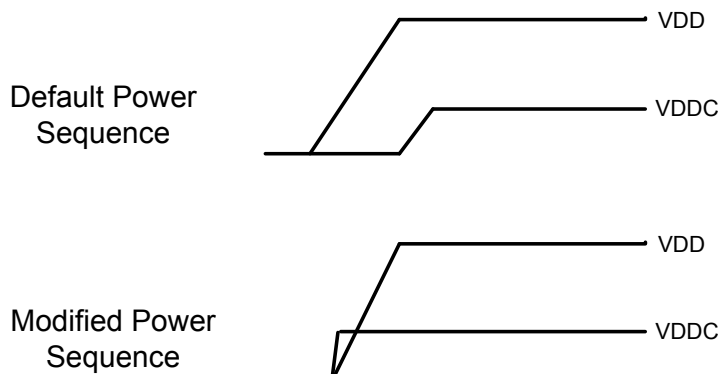


Figure 15. VDDC Sequencing Requirements



Detailed characterization is ongoing. Contact the Applications Support Team for the latest information.

Silicon Revision Affected:

B1

Fixed:

Fixed in Rev C.

17.3 First two ADC samples from the internal temperature sensor must be ignored

Description:

The analog source resistance (R_s) to the ADC from the internal temperature sensor exceeds the specified amount of 500 Ω . This causes a settling time requirement that is longer than the sampling interval to the converter.

Workaround:

Three consecutive samples from the same channel must be taken to accurately sample the internal temperature sensor using the ADC. The first two consecutive samples should be discarded and the third sample can be kept. These consecutive samples cannot be interrupted by sampling another channel.

Silicon Revision Affected:

B1, C3, C5

Fixed:

Not yet fixed.

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