



ABSTRACT

This document describes the known exceptions to the functional specifications (advisories).

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1 Functional Advisories

Advisories that affect the device's operation, function, or parametrics.

✓ The check mark indicates that the issue is present in the specified revision.

Errata Number	Rev G
FLL3	✓
MPY2	✓
PORT3	✓
TA12	✓
TA16	✓
TA21	✓
TAB22	✓
TB2	✓
TB14	✓
TB16	✓
TB24	✓
US13	✓
US14	✓
US15	✓
WDG2	✓
XOSC9	✓

2 Preprogrammed Software Advisories

Advisories that affect factory-programmed software.

✓ The check mark indicates that the issue is present in the specified revision.

The device does not have any errata for this category.

3 Debug Only Advisories

Advisories that affect only debug operation.

✓ The check mark indicates that the issue is present in the specified revision.

The device does not have any errata for this category.

4 Fixed by Compiler Advisories

Advisories that are resolved by compiler workaround. Refer to each advisory for the IDE and compiler versions with a workaround.

✓ The check mark indicates that the issue is present in the specified revision.

Errata Number	Rev G
CPU4	✓

Refer to the following MSP430 compiler documentation for more details about the CPU bugs workarounds.

TI MSP430 Compiler Tools (Code Composer Studio IDE)

- [MSP430 Optimizing C/C++ Compiler](#): Check the `--silicon_errata` option
- [MSP430 Assembly Language Tools](#)

MSP430 GNU Compiler (MSP430-GCC)

- [MSP430 GCC Options](#): Check -msilicon-errata= and -msilicon-errata-warn= options
- [MSP430 GCC User's Guide](#)

IAR Embedded Workbench

- [IAR workarounds for msp430 hardware issues](#)

5 Nomenclature, Package Symbolization, and Revision Identification

The revision of the device can be identified by the revision letter on the [Package Markings](#) or by the [HW_ID](#) located inside the TLV structure of the device.

5.1 Device Nomenclature

To designate the stages in the product development cycle, TI assigns prefixes to the part numbers of all MSP MCU devices. Each MSP MCU commercial family member has one of two prefixes: MSP or XMS. These prefixes represent evolutionary stages of product development from engineering prototypes (XMS) through fully qualified production devices (MSP).

XMS – Experimental device that is not necessarily representative of the final device's electrical specifications

MSP – Fully qualified production device

Support tool naming prefixes:

X: Development-support product that has not yet completed Texas Instruments internal qualification testing.

null: Fully-qualified development-support product.

XMS devices and X development-support tools are shipped against the following disclaimer:

"Developmental product is intended for internal evaluation purposes."

MSP devices have been characterized fully, and the quality and reliability of the device have been demonstrated fully. TI's standard warranty applies.




Predictions show that prototype devices (XMS) have a greater failure rate than the standard production devices. TI recommends that these devices not be used in any production system because their expected end-use failure rate still is undefined. Only qualified production devices are to be used.

TI device nomenclature also includes a suffix with the device family name. This suffix indicates the temperature range, package type, and distribution format.

5.2 Package Markings

PZ100

LQFP (PZ) 100 Pin

 NNNNNNNN M430Fxxxx REV # ○	# = Die revision ○ = Pin 1 location N = Lot trace code
 NNNNNNNG4 M430Fxxxx Rev # ○	# = Die revision ○ = Pin 1 location N = Lot trace code
 NNNNNNNG4 MSP430™ Fxxxx Rev # ○	# = Die revision ○ = Pin 1 location N = Lot trace code

NOTE: Package marking with "TM" applies only to devices released after 2011.

5.3 Memory-Mapped Hardware Revision (TLV Structure)

This device does not support reading the hardware revision from memory.

Further guidance on how to locate the TLV structure and read out the HW_ID can be found in the device User's Guide.

6 Advisory Descriptions

CPU4

CPU Module

Category

Compiler-Fixed

Function

PUSH #4, PUSH #8

Description

The single operand instruction PUSH cannot use the internal constants (CG) 4 and 8. The other internal constants (0, 1, 2, -1) can be used. The number of clock cycles is different:

PUSH #CG uses address mode 00, requiring 3 cycles, 1 word instruction

PUSH #4/#8 uses address mode 11, requiring 5 cycles, 2 word instruction

Workaround

Refer to the table below for compiler-specific fix implementation information.

IDE/Compiler	Version Number	Notes
IAR Embedded Workbench	IAR EW430 v2.x until v6.20	User is required to add the compiler flag option below. --hw_workaround=CPU4
IAR Embedded Workbench	IAR EW430 v6.20 or later	Workaround is automatically enabled
TI MSP430 Compiler Tools (Code Composer Studio)	v1.1 or later	
MSP430 GNU Compiler (MSP430-GCC)	MSP430-GCC 4.9 build 167 or later	

FLL3

FLL Module

Category

Functional

Function

FLLDx = 11 for /8 may generate an unstable MCLK frequency

Description

When setting the FLL to higher frequencies using FLLDx = 11 (/8) the output frequency of the FLL may have a larger frequency variation (e.g. averaged over 2sec) as well as a lower average output frequency than expected when compared to the other FLLDx bit settings.

Workaround

None

MPY2

MPY Module

Category

Functional

Function

Multiplier Result register corruption

Description

Depending on the address of the write instruction, writing to the multiplier result registers (RESHI, RESLO, or SUMEXT) may corrupt the result registers. The address dependency varies between a 2-word and a 3-word instructions.

Workaround

Ensure that a write instruction to an MPY result register (for example, mov.w #200, &RESHI) is not located at an address with the four least significant bits shown in Table 1:

Table 1. Sensitive Addresses for Write Access to MPY Result Registers MAB[3:0]

RESLOW 013Ah		RESHI 013Ch		SUMEXT 013Eh	
3 Word	2 Word	3 Word	2 Word	3 Word	2 Word
2	4	2	4	2	4
6	8	4	6	6	8
A	C	A	C	A	C
E	0	C	E	-	-

PORT3

PORT Module

Category

Functional

Function

Port interrupts can get lost

Description

Port interrupts can get lost if they occur during CPU access of the P1IFG and P2IFG registers.

Workaround

None

TA12

TA Module

Category

Functional

Function

Interrupt is lost (slow ACLK)

Description

Timer_A counter is running with slow clock (external TACLK or ACLK) compared to MCLK. The compare mode is selected for the capture/compare channel and the CCRx register is incremented by one with the occurring compare interrupt (if TAR = CCRx). Due to the fast MCLK the CCRx register increment (CCRx = CCRx+1) happens before the Timer_A counter has incremented again. Therefore the next compare interrupt should happen at once with the next Timer_A counter increment (if TAR = CCRx + 1). This interrupt gets lost.

Workaround

Switch capture/compare mode to capture mode before the CCRx register increment. Switch back to compare mode afterwards.

TA16

TA Module

Category

Functional

Function

First increment of TAR erroneous when IDx > 00

Description

The first increment of TAR after any timer clear event (POR/TACLR) happens immediately following the first positive edge of the selected clock source (INCLK, SMCLK, ACLK or TACLK). This is independent of the clock input divider settings (ID0, ID1). All following TAR increments are performed correctly with the selected IDx settings.

Workaround

None

TA21

TA Module

Category

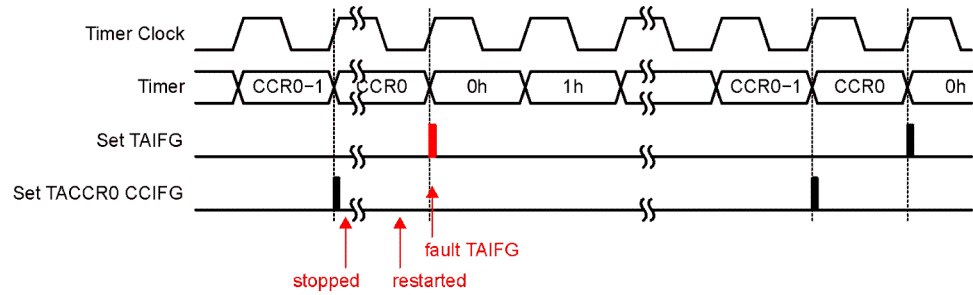
Functional

Function

TAIFG Flag is erroneously set after Timer A restarts in Up Mode

Description

In Up Mode, the TAIFG flag should only be set when the timer counts from TACCR0 to zero. However, if the Timer A is stopped at TAR = TACCR0, then cleared (TAR=0) by setting the TACLR bit, and finally restarted in Up Mode, the next rising edge of the TACLK will erroneously set the TAIFG flag.



Workaround None.

TAB22 *TAB Module*

Category Functional

Function Timer_A/Timer_B register modification after Watchdog Timer PUC

Description Unwanted modification of the Timer_A/Timer_B registers TACTL/TBCTL and TAIV/TBIV can occur when a PUC is generated by the Watchdog Timer(WDT) in Watchdog mode and any Timer_A/Timer_B counter register TACCRx/TBCCRx is incremented/decremented (Timer_A/Timer_B does not need to be running).

Workaround Initialize TACTL/TBCTL register after the reset occurs using a MOV instruction (BIS/BIC may not fully initialize the register). TAIV/TBIV is automatically cleared following this initialization.

Example code:

```
MOV.W #VAL, &TACTL
or
MOV.W #VAL, &TBCTL
```

Where, VAL=0, if Timer is not used in application otherwise, user defined per desired function.

TB2 *TB Module*

Category Functional

Function Interrupt is lost (slow ACLK)

Description Timer_B counter is running with slow clock (external TBCLK or ACLK) compared to MCLK. The compare mode is selected for the capture/compare channel and the CCRx register is incremented by 1 with the occurring compare interrupt (if TBR = CCRx). Due to the fast MCLK, the CCRx register increment (CCRx = CCRx + 1) happens before the Timer_B counter has incremented again. Therefore, the next compare interrupt should happen at once with the next Timer_B counter increment (if TBR = CCRx + 1). This interrupt is lost.

Workaround Switch capture/compare mode to capture mode before the CCRx register increment. Switch back to compare mode afterward.

TB14 *TB Module*

Category Functional

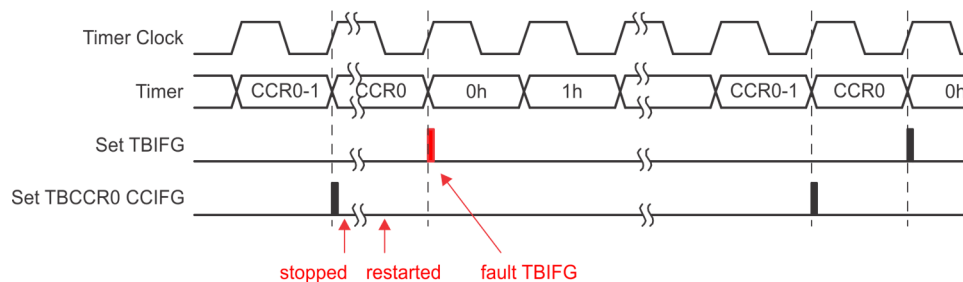
Function	PWM output
Description	<p>The PWM output unit may behave erroneously if the condition for changing the PWM output (EQUx or EQU0) and the condition for loading the shadow register TBCLx happen at the same time. Depending on the load condition for the shadow registers (CLLD bits in TBCCTLx), there are four possible error conditions:</p> <ol style="list-style-type: none"> 1. Change CCRx register from any value to CCRx = 0 (for example, sequence for CCRx = 4 3 2 0 0 0) 2. Change CCRx register from CCRx = 0 to any value (for example, sequence for CCRx = 0 0 0 2 3 4) 3. Change CCRx register from any value to current SHD0 (CCR0) value (for example, sequence for CCRx = 4 2 5 SHD0 3 8) 4. Change CCRx register from current SHD0 (CCR0) value to any value (for example, sequence for CCRx = 4 2 SHD0 5 3 8)
Workaround	No general workaround available.

TB16 *TB Module*

Category	Functional
Function	First increment of TBR erroneous when IDx > 00
Description	<p>The first increment of TBR after any timer clear event (POR/TBCLR) happens immediately following the first positive edge of the selected clock source (INCLK, SMCLK, ACLK, or TBCLK). This is independent of the clock input divider settings (ID0, ID1). All following TBR increments are performed correctly with the selected IDx settings.</p>
Workaround	None

TB24 *TB Module*

Category	Functional
Function	TBIFG Flag is erroneously set after Timer B restarts in Up Mode
Description	<p>In Up Mode, the TBIFG flag should only be set when the timer resets from TBCCR0 to zero. However, if the Timer B is stopped at TBR = TBCCR0, then cleared (TBR=0) by setting the TBCLR bit, and finally restarted in Up Mode, the next rising edge of the TBCLK will erroneously set the TBIFG flag.</p>



Workaround	None.
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US13 *USART Module*

Category	Functional
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Function	Unpredictable program execution
Description	USART interrupts requested by URXS can result in unpredictable program execution if this request is not served within two bit times of the received data.
Workaround	Ensure that the interrupt service routine is entered within two bit times of the received data.

US14 ***USART Module***

Category	Functional
Function	Start edge of received characters may be ignored
Description	When using the USART in UART mode with UxBR0 = 0x03 and UxBR1 = 0x00, the start edge of received characters may be ignored due to internal timing conflicts within the UART state machine. This condition does not apply when UxBR0 is > 0x03.
Workaround	None

US15 ***USART Module***

Category	Functional
Function	UART receive with two stop bits
Description	USART hardware does not detect a missing second stop bit when SPB = 1. The Framing Error Flag (FE) will not be set under this condition and erroneous data reception may occur.
Workaround	None (Configure USART for a single stop bit, SPB = 0)

WDG2 ***WDG Module***

Category	Functional
Function	Incorrectly accessing a flash control register
Description	If a key violation is caused by incorrectly accessing a flash control register, the watchdog interrupt flag is set in addition to the expected PUC.
Workaround	None

XOSC9 ***XOSC Module***

Category	Functional
Function	XT1 Oscillator may not function as expected in HF mode
Description	XT1 oscillator does not work correctly in high frequency mode at supply voltages below 2.0V with crystal frequency > 4MHz.
Workaround	None. When XT1 oscillator is used in HF mode with crystal frequency > 4MHz ensure a supply voltage > 2.2V.

7 Revision History

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

Changes from October 9, 2019 to May 11, 2021

Page

- Changed the document format and structure; updated the numbering format for tables, figures, and cross references throughout the document.....6

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