MSP430F123 Device Erratasheet

1 Functional Errata Revision History

Errata impacting device's operation, function or parametrics.

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

Errata Number	Rev A
BCL5	✓
PORT3	✓
RES4	✓
TA12	✓
TA16	✓
TA21	✓
TAB22	✓
US13	✓
US15	✓
WDG2	✓

2 Preprogrammed Software Errata Revision History

Errata impacting pre-programmed software into the silicon by Texas Instruments.

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

The device doesn't have Software in ROM errata.

3 Debug only Errata Revision History

Errata only impacting debug operation.

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

Errata Number	Rev A
EEM20	✓
JTAG11	✓

4 Fixed by Compiler Errata Revision History

Errata completely resolved by compiler workaround. Refer to specific erratum for IDE and compiler versions with workaround.

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

Errata Number	Rev A
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

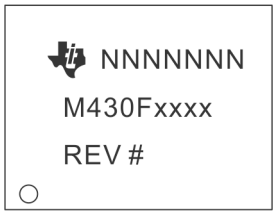
IAR Embedded Workbench

- IAR workarounds for msp430 hardware issues

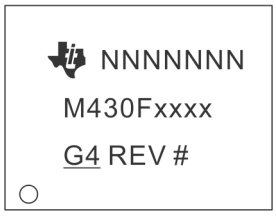
5 Package Markings

DW28

SOP (DW), 28 Pin



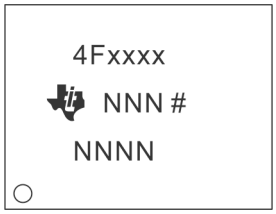
\# = Die revision
○ = Pin 1 location
N = Lot trace code



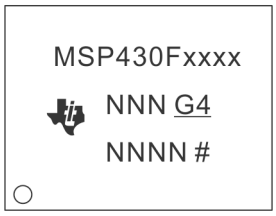
\# = Die revision
○ = Pin 1 location
N = Lot trace code

PW28

TSSOP (PW), 28 Pin



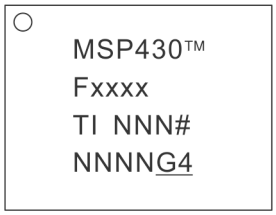
\# = Die revision
○ = Pin 1 location
N = Lot trace code



\# = Die revision
○ = Pin 1 location
N = Lot trace code

RHB32

QFN (RHB), 32 Pin



\# = Die revision
○ = Pin 1 location
N = Lot trace code

6 Detailed Bug Description

BCL5 *BCS Module*

Category Functional

Function RSELx bit modifications can generate high frequency spikes on MCLK

Description When DIVMx = 00 or 01 the RSELx bits of the Basic Clock Module are incremented or decremented in steps of 2 or greater, the DCO output may momentarily generate high frequency spikes on MCLK, which may corrupt CPU operation. This is not an issue when DIVMx = 10 or 11.

Workaround Set DIVMx = 10 or 11 to divide the MCLK input prior to modifying RSELx. After the RSELx bits are configured as desired, the DIVMx setting can be changed back to the original selection.

CPU4 *CPU Module*

Category Compiler-Fixed

Function PUSH #4, PUSH #8CPU4 - Bug

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	

EEM20 *EEM Module*

Category Debug

Function Debugger might clear interrupt flags

Description During debugging read-sensitive interrupt flags might be cleared as soon as the debugger stops. This is valid in both single-stepping and free run modes.

Workaround None.

JTAG11 *JTAG Module*

Category	Debug
Function	Debug with JTAG interface
Description	The debug operation using the JTAG interface of a program executed in the RAM is not possible. The RAM content gets corrupted.
Workaround	None

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

RES4 *RESET Module*

Category	Functional
Function	No reset if external resistor exceeds certain value
Description	No reset of the device is performed if the external pull down resistor on RST/NMI pin is above a certain limit. The limits are: Vcc = 1.8V: maximum pull down resistor = 12 kohm Vcc = 3.0V: maximum pull down resistor = 5 kohm Vcc = 3.6V: maximum pull down resistor = 2.5 kohm In addition, a higher current consumption occurs during high/low RST/NMI signal transition when using improper resistors.
Workaround	Use external pulldown resistors below the listed values or directly drive RST/NMI low to generate a reset.

TA12 *TIMER_A 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 *TIMER_A 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.

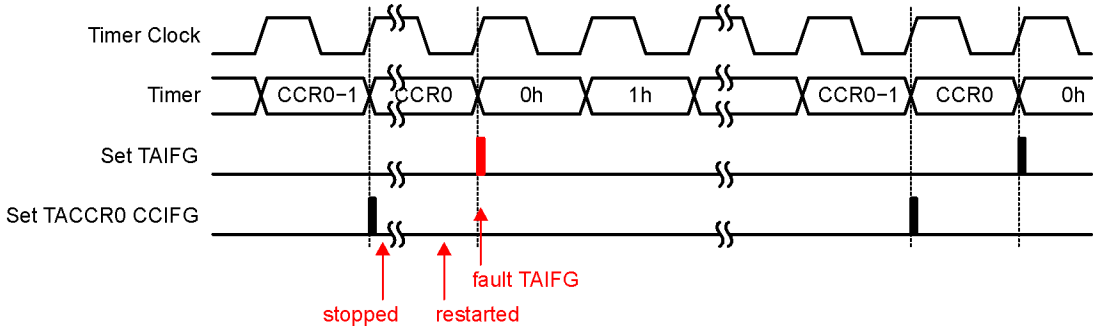
Workaround None

TA21 *TIMER_A 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 *TIMER_A/TIMER_B 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.

US13 *USART Module*

Category Functional

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.

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 *WDT 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

7 Document Revision History

Changes from family erratasheet to device specific erratasheet.

1. Errata TA22 was renamed to TAB22
2. Description for TAB22 was updated

Changes from device specific erratasheet to document Revision A.

1. Errata EEM20 was added to the errata documentation.

Changes from document Revision A to Revision B.

1. Errata TA21 was added to the errata documentation.

Changes from document Revision B to Revision C.

1. Package Markings section was updated.

Changes from document Revision C to Revision D.

1. TA21 Description was updated.

Changes from document Revision D to Revision E.

1. Function for CPU4 was updated.
2. Workaround for CPU4 was updated.

Changes from document Revision E to Revision F.

1. Erratasheet format update.
2. Added errata category field to "Detailed bug description" section

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