

MSP430FW427 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 E	Rev C
FLL3	✓	✓
PORT4		✓
PORT5		✓
PORT7		✓
SIF1	✓	✓
SIF2	✓	✓
SIF3	✓	✓
SIF4	✓	✓
TA12	✓	✓
TA16	✓	✓
TA21	✓	✓
TAB22	✓	✓
WDG2	✓	✓
XOSC9	✓	✓

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 E	Rev C
EEM20	✓	✓

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 E	Rev C
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](#)

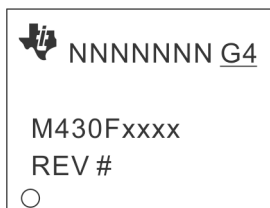
IAR Embedded Workbench

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

5 Package Markings

PM64

LQFP (PM), 64 Pin



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

6 Detailed Bug Description

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.

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

PORT4

PORT Module

Category	Functional
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Function	SIF clock output depends on P2.7 AND P3.0
Description	The SIF - clock output is not available at port P2.7 when setting P2.7 as secondary function and output as described in data sheet
Workaround	Also set P3.0 to alternate function and output. The SIF clock signal is then available at P2.7.

PORT5 ***PORT Module***

Category	Functional
Function	SIF comparator output is not available at P6.3
Description	The SIF comparator output is not available at port P6.3 when setting P6.3 as secondary function and output as described in data sheet
Workaround	None

PORT7 ***PORT Module***

Category	Functional
Function	SIFDAC output function not available at P6.6
Description	The SIFDAC output is not available at port P6.6 when setting P6.6 as secondary function and output as described in data sheet
Workaround	None

SIF1 ***SCANIF Module***

Category	Functional
Function	SIFCLK and MCLK dependency
Description	When the CPU clock source MCLK is faster than the SIF clock source SIFCLK, the PSM processing state-machine output register can become corrupted and result in incorrect SIFCNT operation.
Workaround	None. Ensure that the MCLK frequency is slower than or equal to the frequency of SIFCLK.

SIF2 ***SCANIF Module***

Category	Functional
Function	SIFACLK and TSM0 dependency
Description	When the SIFACLK bit for the TSM0 state is set, the behavior of the TSM state machine can be unpredictable.
Workaround	Don't set SIFACLK in TSM0. This shortens the duration of the TSM0 state only. If the duration of TSM0 is of concern for an application, insert a dummy state at TSM0 with a

cleared SIFACLK bit and use TSM1 as the first valid user state.

SIF3

SCANIF Module

Category

Functional

Function

Bit SIFCACI3 cleared results in unexpected signal value if SIFCI is configured as input

Description

When SIFCI is configured as input for Scan IF by setting SIFCISEL bit, SIFCACI3 bit should be a don't care. However, clearing it will cause wrong scanned signal value.

Workaround

Set SIFCACI3 Bit (in SIFCTL2 register) if SIFCI is configured as input for Scan IF.

SIF4

SCANIF Module

Category

Functional

Function

Unpredictable CPU behavior if SMCLK (DCO) is used by SCAN IF and interrupts are enabled

Description

If the SCAN module is configured using the SMCLK (DCO) while CPU is in LPMx and any interrupt is enabled, unexpected short pulses of DCO clock (visible on MCLK) might occur. This rare scenario is triggered if an interrupt is fired during a small time window (hundreds of ps) after the Timing State Machine (TSM) of SCAN IF is releasing its clock request. Because of unexpected short pulses on MCLK, the behavior of CPU is unpredictable potentially leading to a non-responding device.

Workaround

Use the SCAN IF internal oscillator instead of SMCLK as the clock source for SCAN IF.

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.

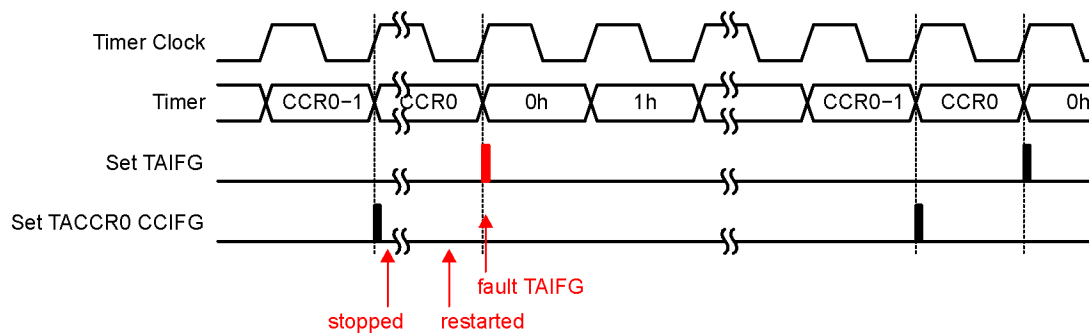
Workaround None

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 TACLRL bit, and finally restarted in Up Mode, the next rising edge of the TACLRL 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.

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

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 Document Revision History

Changes from family erratasheet to device specific erratasheet.

1. Revision D was removed

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. Errata SIF4 was added to the errata documentation.

Changes from document Revision C to Revision D.

1. Package Markings section was updated.

Changes from document Revision D to Revision E.

1. TA21 Description was updated.

Changes from document Revision E to Revision F.

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

Changes from document Revision F to Revision G.

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

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