PIC18F2450/4450

PIC18F2450/4450 Rev. A1 Silicon Errata

The PIC18F2450/4450 (Rev. A1) parts you have received conform functionally to the Device Data Sheet (DS39760**D**), except for the anomalies described below. Any data sheet clarification issues related to this device will be reported in a separate data sheet errata. Please check the Microchip web site for any existing issues.

The following silicon errata apply only to PIC18F2450/4450 devices with these Device/Revision IDs:

Part Number	Device ID	Revision ID
PIC18F2450	01 0100 001	00001
PIC18F4450	01 0100 000	00001

The Device IDs (DEVID1 and DEVID2) are located at addresses 3FFFFEh:3FFFFFh in the device's configuration space. They are shown in hexadecimal in the format "DEVID2 DEVID1".

1. Module: EUSART

In Asynchronous mode, the reception can get corrupted if any bit of the TXSTA register is modified during a reception.

Work around

Maintain CSRC (TXSTA<7>) and SYNC (TXSTA<4>) bits as '0'. Though the CSRC (TXSTA<7>) bit is a don't care in Asynchronous mode, make sure that this bit is not set.

2. Module: A/D (Offset)

The A/D offset is greater than the specified limit in Table 21-17 of the Device Data Sheet. The updated conditions and limits are shown in **bold** text in Table 1.

Work around

There are three work arounds:

1. Configure the A/D to use the VREF+ and VREF- pins for the voltage references. This is done by setting the VCFG<1:0> bits (ADCON1<5:4>).
2. Perform a conversion on a known voltage reference voltage and adjust the A/D result in software.
3. Increase system clock speed and adjust A/D settings accordingly. Higher system clock frequencies decrease offset error.

TABLE 1: A/D CONVERTER CHARACTERISTICS (PIC18F2450/4450)

Param No.	Symbol	Characteristic	Min.	Typ.	Max.	Units	Conditions
A06A	**EOFF**	**Offset Error**	—	—	**<±1.5**	**LSb**	**VREF = VREF+ and VREF-**
A06	EOFF	Offset Error	—	—	**<±3.5**	LSb	**VREF = VSS and VDD**

3. Module: A/D (Channels)

In **Section 16.0 "10-Bit Analog-to-Digital Converter (A/D) Module"** of the Device Data Sheet, it mentions the Analog-to-Digital (A/D) converter module has 10 inputs for the 28-pin devices and 13 for the 40/44-pin devices.

Actually, the PIC18F2450 (28-pin) devices have only 7 channels available instead of 10. The ADC channels, AN10, AN11 and AN12 (RB1, RB4, RB0 pins, respectively) are not available.

4. Module: DC Characteristics (BOR)

The values for parameter D005 (V_{BOR}) in **Section 21.1 "DC Characteristics: Supply Voltage"** of the Device Data Sheet are not applicable when the trip point for BORV1:BORV0 = 11, as the device may reset below the minimum operating voltage for the device.

Work around

None.

5. Module: Timer1

When Timer1 is operated in Asynchronous External Input mode, unexpected interrupt flag generation may occur if an external clock edge arrives too soon following a firmware write to the TMRxH:TMRxL registers. An unexpected interrupt flag event may also occur when enabling the module or switching from Synchronous to Asynchronous mode.

Work around

This issue only applies when operating the timer in Asynchronous mode. Whenever possible, operate the timer module in Synchronous mode to avoid spurious timer interrupts.

If Asynchronous mode must be used in the application, potential strategies to mitigate the issue may include any of the following:

- Design the firmware so it does not rely on the TMRxIF flag or keep the respective interrupt disabled. The timer still counts normally and does not reset to 0x0000 when the spurious interrupt flag event is generated.
- Design the firmware so that it does not write to the TMRxH:TMRxL registers or does not periodically disable/enable the timer, or switch modes. Reading from the timer does not trigger the spurious interrupt flag events.
- If the firmware must use the timer interrupts and must write to the timer (or disable/enable, or mode switch the timer), implement code to suppress the spurious interrupt event, should it occur. This can be achieved by following the process shown in Example 1.

EXAMPLE 1: ASYNCHRONOUS TIMER MODE WORK AROUND TO AVOID SPURIOUS INTERRUPT

```
//Timer1 update procedure in asynchronous mode
//The code below uses Timer1 as example

T1CONbits.TMR1ON = 0;         //Stop timer from incrementing
PIE1bits.TMR1IE = 0;          //Temporarily disable Timer1 interrupt vectoring
TMR1H = 0x00;                 //Update timer value
TMR1L = 0x00;
T1CONbits.TMR1ON = 1;         //Turn on timer

//Now wait at least two full T1CKI periods + 2TCY before re-enabling Timer1 interrupts.
//Depending upon clock edge timing relative to TMR1H/TMR1L firmware write operation,
//a spurious TMR1IF flag event may sometimes assert. If this happens, to suppress
//the actual interrupt vectoring, the TMR1IE bit should be kept clear until
//after the "window of opportunity" (for the spurious interrupt flag event has passed).
//After the window is passed, no further spurious interrupts occur, at least
//until the next timer write (or mode switch/enable event).

while(TMR1L < 0x02);          //Wait for 2 timer increments more than the Updated Timer
                              //value (indicating more than 2 full T1CKI clock periods elapsed)
NOP();                        //Wait two more instruction cycles
NOP();
PIR1bits.TMR1IF = 0;          //Clear TMR1IF flag, in case it was spuriously set
PIE1bits.TMR1IE = 1;          //Now re-enable interrupt vectoring for timer 1
```

APPENDIX A: REVISION HISTORY

Rev A Document (03/2006)

Original version of this document. Includes silicon issues 1 (EUSART), 2 (A/D – Offset), 3 (A/D – Channels) and 4 (DC Characteristics – BOR).

Rev B Document (01/2015)

Added Module 5 (Timer1).

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