



# MICROCHIP PIC18F2410/2510/4410/4510

## PIC18F2410/2510/4410/4510 Rev. B3 Silicon Errata

The PIC18F2410/2510/4410/4510 Rev. B3 parts you have received conform functionally to the Device Data Sheet (DS39636C), except for the anomalies described below. Any Data Sheet Clarification issues related to the PIC18F2410/2510/4410/4510 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 PIC18F2410/2510/4410/4510 devices with these Device/Revision IDs:

Part Number	Device ID	Revision ID
PIC18F2410	0001 0001 011	0 0110
PIC18F2510	0001 0001 001	0 0110
PIC18F4410	0001 0000 111	0 0110
PIC18F4510	0001 0000 101	0 0110

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".

All of the issues listed here will be addressed in future revisions of the PIC18F2410/2510/4410/4510 silicon.

### 1. Module: MSSP

In SPI Slave mode with slave select enabled (SSPM<3:0> = 0100), the minimum time between the falling edge of the SS pin and first SCK edge is greater than specified in parameter 70 in Table 25-16 and Table 25-17 of the above referenced data sheet.

The updated specification is shown in bold in Table 1.

#### Work around

None.

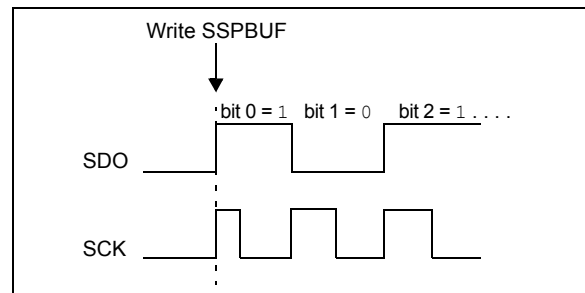
#### Date Codes that pertain to this issue:

All engineering and production devices.

### 2. Module: MSSP (SPI Mode)

When the SPI is using Timer2/2 as the clock source, a shorter than expected SCK pulse may occur on the first bit of the transmitted/received data (Figure 1).

FIGURE 1: SCK PULSE VARIATION USING TIMER2/2



#### Work around

To avoid producing the short pulse, turn off Timer2 and clear the TMR2 register, load the SSPBUF with the data to transmit and then turn Timer2 back on. Refer to Example 1 for sample code.

EXAMPLE 1: AVOIDING THE INITIAL SHORT SCK PULSE

```

LOOP BTFSS SSPSTAT, BF ;Data received?
      ;(Xmit complete?)
      BRA LOOP ;No
      MOVF SSPBUF, W ;W = SSPBUF
      MOVWF RXDATA ;Save in user RAM
      MOVF TXDATA, W ;W = TXDATA
      BCF T2CON, TMR2ON ;Timer2 off
      CLRF TMR2 ;Clear Timer2
      MOVWF SSPBUF ;Xmit New data
      BSF T2CON, TMR2ON ;Timer2 on

```

#### Date Codes that pertain to this issue:

All engineering and production devices.

TABLE 1: EXAMPLE SPI MODE REQUIREMENTS (SLAVE MODE TIMING)

Param No.	Symbol	Characteristic	Min	Max	Units	Conditions
70	TssL2sch, TssL2scl	SS ↓ to SCK ↓ or SCK ↑ Input	<b>3 Tcy</b>	—	ns	

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## 3. Module: Enhanced Universal Synchronous Receiver Transmitter (EUSART)

One bit has been added to the BAUDCON register and one bit has been renamed. The added bit is RXDTP and is in the location, BAUDCON<5>. The renamed bit is the TXCKP bit (BAUDCON<4>), which had been named SCKP.

The TXCKP (BAUDCON<4>) and RXDTP (BAUDCON<5>) bits enable the TX and RX signals to be inverted (polarity reversed).

Register 17-3, on page 194, will be changed as shown on page 3.

### **Work around**

None required.

### **Date Codes that pertain to this issue:**

All engineering and production devices.

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## REGISTER 17-3: BAUDCON: BAUD RATE CONTROL REGISTER

R/W-0	R-1	R/W-0	R/W-0	R/W-0	U-0	R/W-0	R/W-0
ABDOVF	RCIDL	RXDTP	TXCKP	BRG16	—	WUE	ABDEN
bit 7							bit 0

### Legend:

R = Readable bit	W = Writable bit	U = Unimplemented bit, read as '0'
-n = Value at POR	'1' = Bit is set	'0' = Bit is cleared
		x = Bit is unknown

- bit 7      **ABDOVF**: Auto-Baud Acquisition Rollover Status bit  
 1 = A BRG rollover has occurred during Auto-Baud Rate Detect mode (must be cleared in software)  
 0 = No BRG rollover has occurred
- bit 6      **RCIDL**: Receive Operation Idle Status bit  
 1 = Receive operation is Idle  
 0 = Receive operation is Active
- bit 5      **RXDTP**: Receive Data Polarity Select bit  
Asynchronous mode:  
 1 = Receive data (RX) is inverted. Idle state is a low level.  
 0 = No inversion of receive data (RX). Idle state is a high level.  
Synchronous mode:  
 1 = Data (DT) is inverted. Idle state is a low level.  
 0 = No inversion of data (DT). Idle state is a high level.
- bit 4      **TXCKP**: Transmit/Clock Polarity Select bit  
Asynchronous mode:  
 1 = Transmit data (TX) is inverted. Idle state is a low level.  
 0 = No inversion of transmit data (TX). Idle state is a high level.  
Synchronous mode:  
 1 = Idle state for clock (CK) is a high level  
 0 = Idle state for clock (CK) is a low level
- bit 3      **BRG16**: 16-bit Baud Rate Register Enable bit  
 1 = 16-bit Baud Rate Generator – SPBRGH and SPBRG  
 0 = 8-bit Baud Rate Generator – SPBRG only (Compatible mode); SPBRGH value ignored
- bit 2      **Unimplemented**: Read as '0'
- bit 1      **WUE**: Wake-up Enable bit  
Asynchronous mode:  
 1 = EUSART will continue to sample the RX pin with the interrupt generated on the falling edge; bit cleared in hardware on following rising edge  
 0 = RX pin is not monitored or rising edge detected  
Synchronous mode:  
 Unused in this mode.
- bit 0      **ABDEN**: Auto-Baud Detect Enable bit  
Asynchronous mode:  
 1 = Enable baud rate measurement on the next character. Requires reception of a Sync field (55h); cleared in hardware upon completion.  
 0 = Baud rate measurement disabled or completed  
Synchronous mode:  
 Unused in this mode.

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## 4. Module: 10-Bit Analog-to-Digital (A/D) Converter

When the A/D clock source is selected as 2 TOSC or RC (when AD<sub>CS2</sub>:AD<sub>CS0</sub> = 000 or x11), in extremely rare cases, the EIL (Integral Linearity Error) and EDL (Differential Linearity Error) may exceed the data sheet specification at codes 511 and 512 only.

### **Work around**

Select a different A/D clock source (4 TOSC, 8 TOSC, 16 TOSC, 32 TOSC, 64 TOSC) and avoid selecting the 2 TOSC or RC modes.

### **Date Codes that pertain to this issue:**

All engineering and production devices.

## REVISION HISTORY

### Rev A Document (4/2007)

Initial revision of this document. Silicon issue 1 (MSSP), 2 (MSSP – SPI Mode) and 3 (Enhanced Universal Synchronous Receiver Transmitter – EUSART).

### Rev B Document (8/2007)

Added silicon issue 4 (10-Bit A/D Converter).

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