

## PIC24FJ256GA110 Family Silicon Errata and Data Sheet Clarification

The PIC24FJ256GA110 family devices that you have received conform functionally to the current Device Data Sheet (DS30009905F), except for the anomalies described in this document.

The silicon issues discussed in the following pages are for silicon revisions with the Device and Revision IDs listed in [Table 1](#). The silicon issues are summarized in [Table 2](#).

The errata described in this document will be addressed in future revisions of the PIC24FJ256GA110 family silicon.

**Note:** This document summarizes all silicon errata issues from all revisions of silicon, previous as well as current. Only the issues indicated in the last column of [Table 2](#) apply to the current silicon revision (**A6**).

Data Sheet clarifications and corrections start on [page 12](#), following the discussion of silicon issues.

The silicon revision level can be identified using the current version of MPLAB® IDE and Microchip's programmers, debuggers, and emulation tools, which are available at the Microchip corporate website ([www.microchip.com](http://www.microchip.com)).

For example, to identify the silicon revision level using MPLAB IDE in conjunction with MPLAB ICD 2 or PICKit™ 3:

1. Using the appropriate interface, connect the device to the MPLAB ICD 2 programmer/debugger or PICKit™ 3.
2. From the main menu in MPLAB IDE, select *Configure>Select Device*, and then select the target part number in the dialog box.
3. Select the MPLAB hardware tool (*Debugger>Select Tool*).
4. Perform a "Connect" operation to the device (*Debugger>Connect*). Depending on the development tool used, the part number *and* Device Revision ID value appear in the **Output** window.

**Note:** If you are unable to extract the silicon revision level, please contact your local Microchip sales office for assistance.

The DEVREV values for the various PIC24FJ256GA110 family silicon revisions are shown in [Table 1](#).

**TABLE 1: SILICON DEVREV VALUES**

Part Number	Device ID <sup>(1)</sup>	Revision ID for Silicon Revision <sup>(2)</sup>			Part Number	Device ID <sup>(1)</sup>	Revision ID for Silicon Revision <sup>(2)</sup>		
		A3	A5	A6			A3	A5	A6
PIC24FJ256GA110	101Eh	01h	03h	04h	PIC24FJ128GA108	100Ah	01h	03h	04h
PIC24FJ192GA110	1016h				PIC24FJ64GA108	1002h			
PIC24FJ128GA110	100Eh				PIC24FJ256GA106	1018h			
PIC24FJ64GA110	1006h				PIC24FJ192GA106	1010h			
PIC24FJ256GA108	101Ah				PIC24FJ128GA106	1008h			
PIC24FJ192GA108	1012h				PIC24FJ64GA106	1000h			

- Note 1:** The Device IDs (DEVID and DEVREV) are located at the last two implemented addresses of configuration memory space. They are shown in hexadecimal in the format "DEVID DEVREV".
- 2:** Refer to the "PIC24FJXXXGA0XX Flash Programming Specification" (DS39768) for detailed information on Device and Revision IDs for your specific device.

# PIC24FJ256GA110 FAMILY

**TABLE 2: SILICON ISSUE SUMMARY**

Module	Feature	Item Number	Issue Summary	Affected Revisions <sup>(1)</sup>		
				A3	A5	A6
Core	RAM Operation	1.	RAM issues in Doze mode.	X	X	X
Core	BOR	2.	BOR issues in enabled on-chip regulator.	X		
JTAG	Device Programming	3.	JTAG issues in device programming.	X	X	X
UART	—	4.	Framing errors in UART.	X		
I/O	PORTB	5.	RB5 issues in open-drain operation.	X		
SPI	Master mode	6.	Early one-half clock cycles.	X		
CTMU	—	7.	CTMU issues as a trigger source.	X		
UART	UERIF Interrupt	8.	UART error interrupt issue.	X		
UART	FIFO Error Flags	9.	Error bits settings for receive FIFO.	X		
SPI	Enhanced Buffer modes	10.	Errors in enhanced buffer interrupts.	X		
UART	IrDA <sup>®</sup>	11.	Issues in 8-bit mode using IrDA <sup>®</sup> endec.	X		
UART	IrDA	12.	Framing errors in 8-bit mode using IrDA endec.	X		
UART	IrDA	13.	Transmission errors in 9-bit mode using IrDA endec.	X		
Core	Instruction Set	14.	Read-After-Write Stall conditions inside a REPEAT loop.	X	X	X
Memory	Program Space Visibility	15.	False error trap conditions when accessing data in the PSV.	X		
ICSP <sup>™</sup>	—	16.	Inability of the ICSP/ICD port pair to read or program.	X		
RTCC	—	17.	Unexpected decrementing of the Alarm Repeat Counter.	X		
I <sup>2</sup> C Module	Master mode	18.	Acknowledgement issues in addressing slave device.	X		
I <sup>2</sup> C Module	Slave mode	19.	Acknowledgement issues in Slave mode.	X		
A/D Converter	—	20.	Debugging issues on 64-pin devices.	X		
SPI	Enhanced Buffer mode	21.	FIFO transfer issues in Enhanced Master mode.	X		
Core	Code Protection	22.	Applications unable to write when General Segment Code Protection has been enabled.	X		
SPI/PPS	—	23.	ALTRP/ASCK1 functionality is not supported.	X		
Oscillator	LPRC	24.	Issues with LPRC automatic restart following BOR.	X		
CTMU	A/D Trigger	25.	Issues in the CTMU in triggering automatic A/D conversion.	X		
Output Compare	—	26.	Single missed compare events under certain conditions.	X		
Interrupts	INTx	27.	External interrupts missed when writing to INTCON2.	X	X	X
A/D Converter	—	28.	Module continues to draw current when disabled.	X	X	X

**Note 1:** Only those issues indicated in the last column apply to the current silicon revision.

# PIC24FJ256GA110 FAMILY

**TABLE 2: SILICON ISSUE SUMMARY (CONTINUED)**

Module	Feature	Item Number	Issue Summary	Affected Revisions <sup>(1)</sup>		
				A3	A5	A6
CTMU	—	29.	Disabling module affects band gap.	X	X	X
Oscillator	—	30.	POSCEN bit does not work with Primary + PLL modes.	X	X	X
Output Compare	Interrupt	31.	Interrupt flag may precede the output pin change under certain circumstances.	X	X	X
UART	Transmit	32.	A TX interrupt may occur before the data transmission is complete.	X	X	X
Oscillator	Two-Speed Start-up	33.	This feature is not functional.	X	X	X

**Note 1:** Only those issues indicated in the last column apply to the current silicon revision.

# PIC24FJ256GA110 FAMILY

## Silicon Errata Issues

**Note:** This document summarizes all silicon errata issues from all revisions of silicon, previous as well as current. Only the issues indicated by the shaded column in the following tables apply to the current silicon revision (**A6**).

### 1. Module: Core (RAM Operation)

If a RAM read is performed on the instruction immediately prior to enabling Doze mode, an extra read event may occur when Doze mode is enabled. This has no effect on most SFRs and on user RAM space. However, this could cause registers which also perform some action on a read (such as auto-incrementing a pointer or removing data from a FIFO buffer) to repeat that action, possibly resulting in lost data or unexpected operation.

#### Work around

Avoid reading registers which perform a secondary action (e.g., UART and SPI FIFO buffers, and the RTCVAL registers) immediately prior to entering Doze mode.

If this cannot be avoided, execute a NOP instruction before entering Doze mode.

#### Affected Silicon Revisions

A3	A5	A6					
X	X	X					

### 2. Module: Core (BOR)

When the on-chip regulator is enabled (ENVREG tied to VDD), a BOR event may spontaneously occur under the following circumstances:

- VDD is less than 2.5V, and either:
- The internal band gap reference is being used as a reference with the A/D Converter (AD1PCFGH[1] or [0] = 0) or comparators (CMxCON[1:0] = 11); or
- The CTMU module is enabled

#### Work around

Limit the following activities to only those times when the on-chip regulator is not in Tracking mode (LVDIF (IFS4[8]) = 0):

- Enabling the CTMU module
- Selecting the internal band gap as a reference for the A/D Converter or the comparators

#### Affected Silicon Revisions

A3	A5	A6					
X							

### 3. Module: JTAG (Device Programming)

The JTAGEN Configuration bit can be programmed to '0' while using the JTAG interface for device programming. This may cause a situation where JTAG programming can lock itself out of being able to program the device.

#### Work around

None.

#### Affected Silicon Revisions

A3	A5	A6					
X	X	X					

### 4. Module: UART

When the UART is operating using two Stop bits (STSEL = 1), it may sample the first Stop bit instead of the second one. If the device being communicated with is one using one Stop bit in its communications, this may lead to framing errors.

#### Work around

None.

#### Affected Silicon Revisions

A3	A5	A6					
X							

### 5. Module: I/O (PORTB)

When RB5 is configured as an open-drain output, it remains in a high-impedance state. The settings of LATB5 and TRISB5 have no effect on the pin's state.

#### Work around

If open-drain operation is not required, configure RB5 as a regular I/O (ODCB[5] = 0).

If open-drain operation is required, there are two options:

- Select a different I/O pin for the open-drain function; or
- Place an external transistor on the pin and configure the pin as a regular I/O

#### Affected Silicon Revisions

A3	A5	A6					
X							

# PIC24FJ256GA110 FAMILY

## 6. Module: SPIx (Master Mode)

In Master mode, both the SPIx Interrupt Flag (SPIxIF) and the SPIRBF bit (SPIxSTAT[0]) may become set one-half clock cycle early, instead of on the clock edge. This occurs only under the following circumstances:

- Enhanced Buffer mode is disabled (SPIBEN = 0); and
- The module is configured for serial data output changes on transition from clock active to clock Idle state (CKE = 1)

If the application is using the interrupt flag to determine when data to be transmitted is written to the transmit buffer, the data currently in the buffer may be overwritten.

### **Work around**

Before writing to the SPIx buffer, check the SCKx pin to determine if the last clock edge has passed. [Example 1](#) (below) demonstrates a method for doing this. In this example, pin RD1 functions as the SPIx clock, SCKx, which is configured as Idle low.

### **Affected Silicon Revisions**

A3	A5	A6					
X							

## 7. Module: CTMU

When the CTMU module is selected as the trigger source (SYNCSEL[4:0] = 11000), the input capture and/or output compare trigger may not work.

### **Work around**

Manually trigger the input capture and/or output compare module(s) after a CTMU event is received. Be certain to compensate for any time latency that results from manually triggering the module.

### **Affected Silicon Revisions**

A3	A5	A6					
X							

## EXAMPLE 1: CHECKING THE STATE OF SPIxIF AGAINST THE SPIx CLOCK

```
while(IFS0bits.SPI1IF == 0){} //wait for the transmission to complete
while(PORTDbits.RD1 == 1){} //wait for the last clock to finish
SPI1BUF = 0xFF; //write new data to the buffer
```

# PIC24FJ256GA110 FAMILY

## 8. Module: UART (UxERIF Interrupt)

The UART error interrupt may not occur, or occur at an incorrect time, if multiple errors occur during a short period of time.

### Work around

Read the error flags in the UxSTA register whenever a byte is received to verify the error status. In most cases, these bits will be correct, even if the UART error interrupt fails to occur. For possible exceptions, refer to Errata # 9.

### Affected Silicon Revisions

A3	A5	A6					
X							

## 9. Module: UART (FIFO Error Flags)

Under certain circumstances, the PERR and FERR error bits may not be correct for all bytes in the receive FIFO. This has only been observed when both of the following conditions are met:

- The UART receive interrupt is set to occur when the FIFO is full or  $\frac{3}{4}$  full (UxSTA[7:6] = 1x), and
- More than two bytes with an error are received

In these cases, only the first two bytes with a parity or framing error will have the corresponding bits indicate correctly. The error bits will not be set after this.

### Work around

None.

### Affected Silicon Revisions

A3	A5	A6					
X							

## 10. Module: SPIx (Enhanced Buffer Modes)

If the SPIx event interrupt is configured to occur when the enhanced FIFO buffer is full (SISEL[2:0] = 111), the interrupt may actually occur when the 7th byte is written to the buffer, instead of the 8th byte. The other enhanced buffer interrupts function as previously described.

### Work around

Do not use the Full Buffer Interrupt mode. The SPITBF bit (SPIxSTAT[1]) reliably indicates when the enhanced FIFO buffer is full, and can be polled instead of using the Full Buffer Interrupt mode.

### Affected Silicon Revisions

A3	A5	A6					
X							

## 11. Module: UART (IrDA®)

When the UART is operating in 8-bit mode (PDSEL[1:0] = 0x) and using the IrDA endec (IREN = 1), the module incorrectly transmits a data payload of 80h as 00h.

### Work around:

None.

### Affected Silicon Revisions

A3	A5	A6					
X							

## 12. Module: UART (IrDA)

When the UART is operating in 8-bit mode (PDSEL[1:0] = 0x) and using the IrDA endec (IREN = 1), a framing error may occur when transmitting a data payload of 00h.

### Work around:

None.

### Affected Silicon Revisions

A3	A5	A6					
X							

## 13. Module: UART (IrDA)

When the UART is operating in 9-bit mode (PDSEL[1:0] = 1x) and using the IrDA endec (IREN = 1), the module will incorrectly transmit ten bits when transmitting data payloads of 00h or 80h.

### Work around:

None.

### Affected Silicon Revisions

A3	A5	A6					
X							

# PIC24FJ256GA110 FAMILY

## 14. Module: Core (Instruction Set)

If an instruction producing a Read-After-Write Stall condition is executed inside a REPEAT loop, the instruction will be executed fewer times than was intended. For example, this loop:

```
repeat #0xf
inc     [w1],[++w1]
```

will execute less than 15 times.

### Work around

Avoid using REPEAT to repetitively execute instructions that create a Stall condition. Instead, use a software loop using conditional branches. The MPLAB® C Compiler will not generate REPEAT loops that cause this erratum.

### Affected Silicon Revisions

A3	A5	A6					
X	X	X					

## 15. Module: Memory (Program Space Visibility)

When accessing data in the PSV area of data RAM, it is possible to generate a false address error trap condition by reading data located precisely at the lower address boundary (8000h). If data is read using an instruction with an auto-decrement, the resulting RAM address will be below the PSV boundary (i.e., at 7FFEh); this will result in an address error trap.

This false address error can also occur if a 32-bit MOV instruction is used to read the data at location 8000h.

### Work around

Do not use the first location of a PSV page (address 8000h). The MPLAB® C Compiler (v3.11 or later) supports the option, “-merrata=psv\_trap”, to prevent it from generating code that would cause this erratum.

### Affected Silicon Revisions

A3	A5	A6					
X							

## 16. Module: ICSP™

The ICSP/ICD port pair, PGEC3/PGED3 (RB5/RB4), cannot be used to read or program the device.

### Work around

Use either PGEC2/PGED2 or PGEC1/PGED1.

### Affected Silicon Revisions

A3	A5	A6					
X							

## 17. Module: RTCC

Under certain circumstances, the value of the Alarm Repeat Counter register (ALCFGRPT[7:0]) may be unexpectedly decremented. This happens only when a byte write to the upper byte of ALCFGRPT is performed in the interval between a device POR/BOR and the first edge from the RTCC clock source.

### Work around

Do not perform byte writes on ALCFGRPT, particularly the upper byte.

Alternatively, wait until one period of the SOSC has completed before performing byte writes to ALCFGRPT.

### Affected Silicon Revisions

A3	A5	A6					
X							

# PIC24FJ256GA110 FAMILY

## 18. Module: I<sup>2</sup>C Module (Master Mode)

Under certain circumstances, a module operating in Master mode may Acknowledge its own command addressed to a slave device. This happens when the following occurs:

- 10-Bit Addressing mode is used (A10M = 1) and
- The I<sup>2</sup>C master has the same two upper address bits (I2CADD[9:8]) as the addressed slave module

In these cases, the master also Acknowledges the address command and generates an erroneous I<sup>2</sup>C slave interrupt, as well as the I<sup>2</sup>C master interrupt.

### Work around

Several options are available:

- When using 10-Bit Addressing mode, make certain that the master and slave devices do not share the same 2 MSBs of their addresses.

If this cannot be avoided:

- Clear the A10M bit (I2CxCON[10] = 0) prior to performing a Master mode transmit.
- Read the ADD10 bit (I2CxSTAT[8]) to check for a full 10-bit match whenever a slave I<sup>2</sup>C interrupt occurs on the master module.

### Affected Silicon Revisions

A3	A5	A6					
X							

## 19. Module: I<sup>2</sup>C Module (Slave Mode)

Under certain circumstances, a module operating in Slave mode may not respond correctly to some of the special addresses reserved by the I<sup>2</sup>C protocol. This happens when the following occurs:

- 10-Bit Addressing mode is used (A10M = 1) and
- Bits A[7:1] of the Slave address (I2CADD[7:1]) fall into the range of the reserved 7-bit address ranges, '1111xxx' or '0000xxx'.

In these cases, the Slave module Acknowledges the command and triggers an I<sup>2</sup>C slave interrupt; it does not copy the data into the I2CxRCV register or set the RBF bit.

### Work around

Do not set bits, A[7:1], of the module's slave address equal to '1111xxx' or '0000xxx'.

### Affected Silicon Revisions

A3	A5	A6					
X							

## 20. Module: A/D Converter

When using PGEC1 and PGED1 to debug an application on any 64-pin devices in this family, all voltage references will be disabled. This includes VREF+, VREF-, AVDD and AVSS. Any A/D conversion will always equal 3FFh.

**Note:** This issue applies only to 64-pin devices in this family (PIC24FJ256GA106, PIC24FJ192GA106 and PIC24FJ128GA106).

### Work around

Use PGEC2 and PGED2 to debug any A/D functionality.

### Affected Silicon Revisions

A3	A5	A6					
X							

## 21. Module: SPIx (Enhanced Buffer Mode)

In Enhanced Master mode, the SRMPT bit (SPIxSTAT[7]) may erroneously become set for several clock cycles in the middle of a FIFO transfer, indicating that the shift register is empty when it is not. This happens when both SPIx clock prescalers are set to values other than their maximum (SPIxCON[4:2] ≠ 000 and SPIxCON[1:0] ≠ 00).

### Work around

Configure the module to generate an SPIx event interrupt whenever the last bit is shifted out of the shift register (SPIxSTAT[4:2] = 101). When the SPIxIF flag becomes set, the shift register is empty.

### Affected Silicon Revisions

A3	A5	A6					
X							

# PIC24FJ256GA110 FAMILY

## 22. Module: Core (Code Protection)

When General Segment code protection has been enabled (GCP Configuration bit is programmed), applications are unable to write to the first 512 bytes of the program memory space (0000h through 0200h). In applications that may require the interrupt vectors to be changed during run time, such as bootloaders, modifications to the interrupt vector tables will not be possible.

### Work around

Create two new interrupt vector tables, one each for the IVT and AIVT, in an area of program space beyond the affected region. Map the addresses in the old vector tables to the new tables. These new tables can then be modified as needed to the actual addresses of the ISRs.

### Affected Silicon Revisions

A3	A5	A6					
X							

## 23. Module: SPI/PPS

The ALTRP/ASCK1 functionality is not supported by the A3 revision of this part family.

### Work around

None.

### Affected Silicon Revisions

A3	A5	A6					
X							

## 24. Module: Oscillator (LPRC)

The LPRC may not automatically restart following BOR events (i.e., when supply voltage sags to between the BOR and POR thresholds, then returns to above the BOR level). When this happens, systems that use the LPRC clock may not work. This includes the PLL, Two-Speed Start-up, Fail-Safe Clock Monitor and the WDT.

### Work around

For PLL issues: Select a non-PLL Clock mode as the initial start-up mode, using the FNOSC Configuration bits (CW2[10:8]). After the application has initialized, switch to a PLL Clock mode in software using the NOSCx bits (OSCCON[10:8]). Allow 10 microseconds to elapse between application start-up and a software clock switch.

For WDT issues: Disable the WDT by programming the FWDTEN bit (CW1[7]). After the application has initialized, enable the WDT in software by setting the SWDTEN bit (RCON[5]). Allow 10 microseconds to elapse between application start-up and setting SWDTEN.

### Affected Silicon Revisions

A3	A5	A6					
X							

## 25. Module: CTMU (A/D Trigger)

The CTMU may not trigger an automatic A/D conversion after the current source is turned off. This happens even when the A/D trigger control bit, CTRIG (CTMUCON[8]), has been set.

### Work around

Perform a manual A/D conversion by clearing the SAMP bit (AD1CON1[1]) immediately after the CTMU current source has been stopped.

### Affected Silicon Revisions

A3	A5	A6					
X							

## 26. Module: Output Compare

In PWM mode, the output compare module may miss a compare event when the current duty cycle register (OCxRS) value is 0000h (0% duty cycle) and the OCxRS register is updated with a value of 0001h. The compare event is only missed the first time a value of 0001h is written to OCxRS and the PWM output remains low for one PWM period. Subsequent PWM high and low times occur as expected.

### Work around

If the current OCxRS register value is 0000h, avoid writing a value of 0001h to OCxRS. Instead, write a value of 0002h. In this case, however, the duty cycle will be slightly different from the desired value.

### Affected Silicon Revisions

A3	A5	A6					
X							

# PIC24FJ256GA110 FAMILY

## 27. Module: Interrupts (INTx)

Writing to the INTCON2 register may cause an external interrupt event (inputs on INT0 through INT4) to be missed. This only happens when the interrupt event and the write event occur during the same clock cycle.

### Work around

If possible, do not write to INTCON2 while any of the external interrupts are enabled.

If this cannot be avoided, write the data intended for INTCON2 to any other register in the interrupt block of the SFR (addresses, 0080h to 00E0h); then write the data to INTCON2.

Be certain to write the data to a register not being actively used by the application, or to any of the interrupt flag registers, in order to avoid spurious interrupts. For example, if the interrupts controlled by IEC5 are not being used in the application, the code sequence would be:

```
IEC5 = 0x1E;  
INTCON2 = 0x1E;  
IEC5 = 0;
```

It is the user's responsibility to determine an appropriate register for the particular application.

### Affected Silicon Revisions

A3	A5	A6					
X	X	X					

## 28. Module: A/D Converter

Once the A/D module is enabled (AD1CON1[15] = 1), it may continue to draw extra current even if the module is later disabled (AD1CON1[15] = 0).

### Work around

In addition to disabling the module through the ADON bit, set the corresponding PMD bit (ADC1MD, PMD1[0]) to power it down completely.

Disabling the A/D module through the PMD register also disables the AD1PCFG registers, which in turn, affects the state of any port pins with analog inputs. Users should consider the effect on I/O ports and other digital peripherals on those ports when ADC1MD is used for power conservation.

### Affected Silicon Revisions

A3	A5	A6					
X	X	X					

## 29. Module: CTMU

Using the CTMUMD bit (PMD4[2]) to selectively power down the module may reduce the accuracy of the internal band gap reference (V<sub>BG</sub>). In those cases where V<sub>BG</sub> is used as a reference for other analog modules, the accuracy of measurements or comparisons may be affected.

### Work around

If the A/D Converter or comparators are being used with V<sub>BG</sub> selected as a reference, do not set the CTMUMD bit.

### Affected Silicon Revisions

A3	A5	A6					
X	X	X					

## 30. Module: Oscillator

The POSCEN bit (OSCCON[2]) has no effect when a Primary Oscillator with PLL mode is selected (COSC[2:0] = 011). If XTPLL, HSPLL or ECPLL Oscillator mode is selected, and the device enters Sleep mode, the Primary Oscillator will be disabled, regardless of the state of the POSCEN bit.

XT, HS and EC Oscillator modes (without the PLL) will continue to operate as expected.

### Work around

None.

### Affected Silicon Revisions

A3	A5	A6					
X	X	X					

# PIC24FJ256GA110 FAMILY

## 31. Module: Output Compare (Interrupt)

Under certain circumstances, an output compare match may cause the interrupt flag (OCxIF) to become set prior to the Change-of-State (COS) of the OCx pin. This has been observed when all of the following are true:

- The module is in One-Shot mode (OCM[2:0] = 001, 010 or 100);
- One of the timer modules is being used as the time base; and
- A timer prescaler other than 1:1 is selected

If the module is re-initialized by clearing OCM[2:0] after the One-Shot compare, the OCx pin may not be driven as expected.

### Work around

After OCxIF is set, allow an interval (in CPU cycles) of at least twice the prescaler factor to elapse before clearing OCM[2:0]. For example, for a prescaler value of 1:8, allow 16 CPU cycles to elapse after the interrupt.

### Affected Silicon Revisions

A3	A5	A6					
X	X	X					

## 32. Module: UART

When using UTXISEL[1:0] = 01 (interrupt when last character is shifted out of the Transmit Shift Register), and the final character is being shifted out through the Transmit Shift Register, the TX interrupt may occur before the final bit is shifted out.

### Work around

If it is critical that the interrupt processing occurs only when all transmit operations are complete, after which, the following work around can be implemented:

Hold off the interrupt routine processing by adding a loop at the beginning of the routine that polls the Transmit Shift Register empty bit, as shown in [Example 2](#).

### Affected Silicon Revisions

A3	A5	A6					
X	X	X					

## EXAMPLE 2: DELAYING THE ISR BY POLLING THE TRMT BIT

```
// in UART2 initialization code
...
U2STAbits.UTXISEL0 = 1;           // Set to generate TX interrupt when all
U2STAbits.UTXISEL1 = 0;           // transmit operations are complete.
...

U2TXInterrupt(void)
{
    while(U2STAbits.TRMT==0);     // wait for the transmit buffer to be empty
    ...                           // process interrupt
}
```

## 33. Module: Oscillator (Two-Speed Start-up)

Two-Speed Start-up is not functional. Leaving the IESO Configuration bit in its default state (Two-Speed Start-up enabled) may result in unpredictable operation.

### Work around

None. Always program the IESO Configuration bit to disable this feature (CW2[15] = 0).

### Affected Silicon Revisions

A3	A5	A6					
X	X	X					

# PIC24FJ256GA110 FAMILY

---

## Data Sheet Clarifications

The following typographic corrections and clarifications are to be noted for the latest version of the device data sheet (DS30009905F):

<b>Note:</b> Corrections are shown in <b>bold</b> . Where possible, the original bold text formatting has been removed for clarity.
-------------------------------------------------------------------------------------------------------------------------------------

None.

# PIC24FJ256GA110 FAMILY

---

## APPENDIX A: DOCUMENT REVISION HISTORY

### Rev A Document (2/2008)

First revision of this document. Includes silicon issues 1 (Core, RAM Operation), 2 (Core, BOR), 3 (JTAG, Programming), 4 (UART), 5 (I/O, PORTB), 6 (SPI) and 7 (Input Capture).

### Rev B Document (4/2008)

Revised silicon issues 7 to clarify the requirement for latency compensation. Added silicon issues 8 (UART – Interrupt), 9 (UART – FIFO Error Flags) and 10 (SPI – Enhanced Buffer Modes).

### Rev C Document (7/2008)

Revised silicon issues 4 (UART) and 6 (SPI, Master Mode) to reflect updated definition of issues. Added silicon issues 11 through 13 (UART, IrDA), 14 (Core, Instruction Set), 15 (Memory, Program Space Visibility), 16 (ICSP), 17 (RTCC), 18 (I<sup>2</sup>C, Master Mode), 19 (I<sup>2</sup>C Module (Slave Mode) and 20 (A/D Converter).

### Rev D Document (10/2008)

Added silicon issue 21 (SPI – Enhanced Buffer Mode).

### Rev E Document (04/2009)

Added silicon issue 22 (Core – Code Protection), 23 (SPI/PPS), 24 (Oscillator – LPRC) and 25 (CTMU – A/D Trigger).

### Rev F Document (07/2009)

Added silicon revision A5 to document. Includes existing silicon issues 1 (Core, RAM Operation), 3 (JTAG, Programming), 8 (UART – UERIF Interrupt) and 14 (Core – Instruction Set). No additional new issues added.

### Rev G Document (06/2010)

Added silicon issues 26 (Output Compare) and 27 (Interrupts – INTx) to silicon revisions A3 and A5.

### Rev H Document (07/2010)

Added silicon issue 28 (A/D Converter) to silicon revisions A3 and A5.

### Rev J Document (09/2010)

Revised silicon issue 28 (A/D Converter) to reflect updated definition of issues. Added data sheet clarification issue 1 (Guidelines For Getting Started with 16-Bit Microcontrollers).

### Rev K Document (6/2011)

Added silicon revision A6 to document. Includes all silicon issues currently in revision A5 (1, 3, 14, 27 and 28). No additional new issues added.

### Rev L Document (11/2011)

Added silicon issues 29 (CTMU), 30 (Oscillator), 31 (Output Compare – Interrupt) and 32 (UART) to all current silicon revisions.

Added data sheet clarifications 2, 3 and 4 (Electrical Specifications).

### Rev M Document (10/2012)

Added recently introduced 64 Kbyte devices to the document. Applicable silicon issues are for other members of this device family, as indicated in [Table 2](#).

Added silicon issue 33 (Oscillator – Two-Speed Start-up) to all existing silicon revisions.

Added data sheet clarifications 5, 6, 7 and 8 (Electrical Specifications) and 9 (Product Identification System).

### Rev N Document (1/2013)

Revised data sheet clarification 2 to show minimum value for BO10 (Brown-out Reset Voltage) as 1.80V instead of 1.90V.

### Rev P Document (5/2019)

All data sheet clarifications have been removed since they were addressed in the latest data sheet revision (DS30009905F).

# PIC24FJ256GA110 FAMILY

---

NOTES:

---

**Note the following details of the code protection feature on Microchip devices:**

- Microchip products meet the specification contained in their particular Microchip Data Sheet.
- Microchip believes that its family of products is one of the most secure families of its kind on the market today, when used in the intended manner and under normal conditions.
- There are dishonest and possibly illegal methods used to breach the code protection feature. All of these methods, to our knowledge, require using the Microchip products in a manner outside the operating specifications contained in Microchip's Data Sheets. Most likely, the person doing so is engaged in theft of intellectual property.
- Microchip is willing to work with the customer who is concerned about the integrity of their code.
- Neither Microchip nor any other semiconductor manufacturer can guarantee the security of their code. Code protection does not mean that we are guaranteeing the product as “unbreakable.”

Code protection is constantly evolving. We at Microchip are committed to continuously improving the code protection features of our products. Attempts to break Microchip's code protection feature may be a violation of the Digital Millennium Copyright Act. If such acts allow unauthorized access to your software or other copyrighted work, you may have a right to sue for relief under that Act.

---

Information contained in this publication regarding device applications and the like is provided only for your convenience and may be superseded by updates. It is your responsibility to ensure that your application meets with your specifications. MICROCHIP MAKES NO REPRESENTATIONS OR WARRANTIES OF ANY KIND WHETHER EXPRESS OR IMPLIED, WRITTEN OR ORAL, STATUTORY OR OTHERWISE, RELATED TO THE INFORMATION, INCLUDING BUT NOT LIMITED TO ITS CONDITION, QUALITY, PERFORMANCE, MERCHANTABILITY OR FITNESS FOR PURPOSE. Microchip disclaims all liability arising from this information and its use. Use of Microchip devices in life support and/or safety applications is entirely at the buyer's risk, and the buyer agrees to defend, indemnify and hold harmless Microchip from any and all damages, claims, suits, or expenses resulting from such use. No licenses are conveyed, implicitly or otherwise, under any Microchip intellectual property rights unless otherwise stated.

*Microchip received ISO/TS-16949:2009 certification for its worldwide headquarters, design and wafer fabrication facilities in Chandler and Tempe, Arizona; Gresham, Oregon and design centers in California and India. The Company's quality system processes and procedures are for its PIC® MCUs and dsPIC® DSCs, KEELOQ® code hopping devices, Serial EEPROMs, microperipherals, nonvolatile memory and analog products. In addition, Microchip's quality system for the design and manufacture of development systems is ISO 9001:2000 certified.*

**QUALITY MANAGEMENT SYSTEM  
CERTIFIED BY DNV  
= ISO/TS 16949 =**

**Trademarks**

The Microchip name and logo, the Microchip logo, AnyRate, AVR, AVR logo, AVR Freaks, BitCloud, chipKIT, chipKIT logo, CryptoMemory, CryptoRF, dsPIC, FlashFlex, flexPWR, Helder, JukeBlox, KeeLoq, Kleer, LANCheck, LINK MD, maXStylus, maXTouch, MediaLB, megaAVR, MOST, MOST logo, MPLAB, OptoLyzer, PIC, picoPower, PICSTART, PIC32 logo, Prochip Designer, QTouch, SAM-BA, SpyNIC, SST, SST Logo, SuperFlash, tinyAVR, UNI/O, and XMEGA are registered trademarks of Microchip Technology Incorporated in the U.S.A. and other countries.

ClockWorks, The Embedded Control Solutions Company, EtherSynch, Hyper Speed Control, HyperLight Load, IntelliMOS, mTouch, Precision Edge, and Quiet-Wire are registered trademarks of Microchip Technology Incorporated in the U.S.A.

Adjacent Key Suppression, AKS, Analog-for-the-Digital Age, Any Capacitor, AnyIn, AnyOut, BodyCom, CodeGuard, CryptoAuthentication, CryptoAutomotive, CryptoCompanion, CryptoController, dsPICDEM, dsPICDEM.net, Dynamic Average Matching, DAM, ECAN, EtherGREEN, In-Circuit Serial Programming, ICSP, INICnet, Inter-Chip Connectivity, JitterBlocker, KleerNet, KleerNet logo, memBrain, Mindi, MiWi, motorBench, MPASM, MPF, MPLAB Certified logo, MPLIB, MPLINK, MultiTRAK, NetDetach, Omniscient Code Generation, PICDEM, PICDEM.net, PICKit, PICtail, PowerSmart, PureSilicon, QMatrix, REAL ICE, Ripple Blocker, SAM-ICE, Serial Quad I/O, SMART-I.S., SQI, SuperSwitcher, SuperSwitcher II, Total Endurance, TSHARC, USBCheck, VariSense, ViewSpan, WiperLock, Wireless DNA, and ZENA are trademarks of Microchip Technology Incorporated in the U.S.A. and other countries.

SQTP is a service mark of Microchip Technology Incorporated in the U.S.A.

Silicon Storage Technology is a registered trademark of Microchip Technology Inc. in other countries.

GestIC is a registered trademark of Microchip Technology Germany II GmbH & Co. KG, a subsidiary of Microchip Technology Inc., in other countries.

All other trademarks mentioned herein are property of their respective companies.

© 2019, Microchip Technology Incorporated, All Rights Reserved.  
ISBN: 978-1-5224-4490-9



# MICROCHIP

## Worldwide Sales and Service

### AMERICAS

**Corporate Office**  
2355 West Chandler Blvd.  
Chandler, AZ 85224-6199  
Tel: 480-792-7200  
Fax: 480-792-7277  
Technical Support:  
<http://www.microchip.com/support>  
Web Address:  
[www.microchip.com](http://www.microchip.com)

#### Atlanta

Duluth, GA  
Tel: 678-957-9614  
Fax: 678-957-1455

#### Austin, TX

Tel: 512-257-3370

#### Boston

Westborough, MA  
Tel: 774-760-0087  
Fax: 774-760-0088

#### Chicago

Itasca, IL  
Tel: 630-285-0071  
Fax: 630-285-0075

#### Dallas

Addison, TX  
Tel: 972-818-7423  
Fax: 972-818-2924

#### Detroit

Novi, MI  
Tel: 248-848-4000

#### Houston, TX

Tel: 281-894-5983

#### Indianapolis

Noblesville, IN  
Tel: 317-773-8323  
Fax: 317-773-5453  
Tel: 317-536-2380

#### Los Angeles

Mission Viejo, CA  
Tel: 949-462-9523  
Fax: 949-462-9608  
Tel: 951-273-7800

#### Raleigh, NC

Tel: 919-844-7510

#### New York, NY

Tel: 631-435-6000

#### San Jose, CA

Tel: 408-735-9110  
Tel: 408-436-4270

#### Canada - Toronto

Tel: 905-695-1980  
Fax: 905-695-2078

### ASIA/PACIFIC

**Australia - Sydney**  
Tel: 61-2-9868-6733

**China - Beijing**  
Tel: 86-10-8569-7000

**China - Chengdu**  
Tel: 86-28-8665-5511

**China - Chongqing**  
Tel: 86-23-8980-9588

**China - Dongguan**  
Tel: 86-769-8702-9880

**China - Guangzhou**  
Tel: 86-20-8755-8029

**China - Hangzhou**  
Tel: 86-571-8792-8115

**China - Hong Kong SAR**  
Tel: 852-2943-5100

**China - Nanjing**  
Tel: 86-25-8473-2460

**China - Qingdao**  
Tel: 86-532-8502-7355

**China - Shanghai**  
Tel: 86-21-3326-8000

**China - Shenyang**  
Tel: 86-24-2334-2829

**China - Shenzhen**  
Tel: 86-755-8864-2200

**China - Suzhou**  
Tel: 86-186-6233-1526

**China - Wuhan**  
Tel: 86-27-5980-5300

**China - Xian**  
Tel: 86-29-8833-7252

**China - Xiamen**  
Tel: 86-592-2388138

**China - Zhuhai**  
Tel: 86-756-3210040

### ASIA/PACIFIC

**India - Bangalore**  
Tel: 91-80-3090-4444

**India - New Delhi**  
Tel: 91-11-4160-8631

**India - Pune**  
Tel: 91-20-4121-0141

**Japan - Osaka**  
Tel: 81-6-6152-7160

**Japan - Tokyo**  
Tel: 81-3-6880-3770

**Korea - Daegu**  
Tel: 82-53-744-4301

**Korea - Seoul**  
Tel: 82-2-554-7200

**Malaysia - Kuala Lumpur**  
Tel: 60-3-7651-7906

**Malaysia - Penang**  
Tel: 60-4-227-8870

**Philippines - Manila**  
Tel: 63-2-634-9065

**Singapore**  
Tel: 65-6334-8870

**Taiwan - Hsin Chu**  
Tel: 886-3-577-8366

**Taiwan - Kaohsiung**  
Tel: 886-7-213-7830

**Taiwan - Taipei**  
Tel: 886-2-2508-8600

**Thailand - Bangkok**  
Tel: 66-2-694-1351

**Vietnam - Ho Chi Minh**  
Tel: 84-28-5448-2100

### EUROPE

**Austria - Wels**  
Tel: 43-7242-2244-39  
Fax: 43-7242-2244-393

**Denmark - Copenhagen**  
Tel: 45-4450-2828  
Fax: 45-4485-2829

**Finland - Espoo**  
Tel: 358-9-4520-820

**France - Paris**  
Tel: 33-1-69-53-63-20  
Fax: 33-1-69-30-90-79

**Germany - Garching**  
Tel: 49-8931-9700

**Germany - Haan**  
Tel: 49-2129-3766400

**Germany - Heilbronn**  
Tel: 49-7131-67-3636

**Germany - Karlsruhe**  
Tel: 49-721-625370

**Germany - Munich**  
Tel: 49-89-627-144-0  
Fax: 49-89-627-144-44

**Germany - Rosenheim**  
Tel: 49-8031-354-560

**Israel - Ra'anana**  
Tel: 972-9-744-7705

**Italy - Milan**  
Tel: 39-0331-742611  
Fax: 39-0331-466781

**Italy - Padova**  
Tel: 39-049-7625286

**Netherlands - Drunen**  
Tel: 31-416-690399  
Fax: 31-416-690340

**Norway - Trondheim**  
Tel: 47-7288-4388

**Poland - Warsaw**  
Tel: 48-22-3325737

**Romania - Bucharest**  
Tel: 40-21-407-87-50

**Spain - Madrid**  
Tel: 34-91-708-08-90  
Fax: 34-91-708-08-91



**Sweden - Gothenberg**  
Tel: 46-31-704-60-40

**Sweden - Stockholm**  
Tel: 46-8-5090-4654

**UK - Wokingham**  
Tel: 44-118-921-5800  
Fax: 44-118-921-5820

## Looking for pricing, stock, or lifecycle information?

Click below to explore more details on WIN SOURCE:

-  [View PIC24FJ256GA106-I/MR on WIN SOURCE](#)
-  [Microchip Technology](#) Information

## Optimize Your Supply Chain with WIN SOURCE Solutions

-  Global Sourcing Solution
-  Obsolete Management
-  Cost Control Management
-  Shortage Management
-  Alternative Solution
-  Excess Inventory Management