



dsPIC33FJ12MC201/202 Rev. A2/A3/A4 Silicon Errata

The dsPIC33FJ12MC201/202 (Rev. A2/A3/A4) devices that you received were found to conform to the specifications and functionality described in the following documents:

- “dsPIC33FJ12MC201/202 Data Sheet” (DS70265)
- “dsPIC30F/33F Programmer’s Reference Manual” (DS70157)

The exceptions to the specifications in the documents listed above are described in this section. The specific devices for which these exceptions are described are listed below:

- dsPIC33FJ12MC201
- dsPIC33FJ12MC202

dsPIC33FJ12MC201/202 Rev. A2/A3/A4 silicon is identified by performing a “Reset and Connect” operation to the device using MPLAB® ICD 2 or MPLAB REAL ICE™ in-circuit emulator, with MPLAB IDE v7.60 or later. The output window will show a successful connection to the device specified in Configure>Select Device. The resulting DEVREV register values for Rev. A2/A3/A4 silicon are 0x3001, 0x3002, and 0x3003, respectively.

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

Silicon Errata Summary

The following list summarizes the errata described in this document:

1. JTAG Programming
JTAG programming does not work.
2. UART
UART receptions may be corrupted if the Baud Rate Generator (BRG) is set up for 4x mode.
3. UART
The auto-baud feature may not calculate the correct baud rate when the BRG is set up for 4x mode.
4. UART
With the auto-baud feature selected, the Sync Break character (0x55) may be loaded into the FIFO as data.
5. UART
The auto-baud feature measures baud rate inaccurately for certain baud rate and clock speed combinations.
6. Traps and Idle Mode
If a clock failure occurs when the device is in Idle mode, the oscillator failure trap does not vector to the Trap Service Routine.
7. Quadrature Encoder Interface (QEI) Module
The QEI module does not generate an interrupt in a particular overflow condition.
8. UART
When the UART is in 4x mode (BRGH = 1) and using two Stop bits (STSEL = 1), it may sample the first Stop bit instead of the second one.
9. UART
When an auto-baud is detected, the receive interrupt may occur twice.
10. Motor Control PWM – PWM Counter Register
PTMR does not keep counting down after halting code execution in Debug mode.
11. UART Module
The 16x baud clock signal on the BCLK pin is present only when the module is transmitting.

dsPIC33FJ12MC201/202

12. SPI Module

The SPIxCON1 DISSCK bit does not influence port functionality.

13. I²C™ Module

The BCL bit in I2CSTAT can only be cleared with a 16-bit operation, and can be corrupted with 1-bit or 8-bit operations on I2CSTAT.

14. I²C Module

The ACKSTAT bit is cleared shortly after being set following a slave transmit.

15. I²C Module: 10-bit Addressing Mode

When the I²C module is configured for 10-bit addressing using the same address bits (A10 and A9) as other I²C devices, the A10 and A9 bits may not work as expected.

16. Product Identification

Revision A2 devices marked as extended temperature range (E) devices only support industrial temperature range (I).

17. UART (Ux_E Interrupt)

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

18. UART Module

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

19. Internal Voltage Regulator

When the VREGS (RCON<8>) bit is set to a logic '0', higher sleep current may be observed.

20. PSV Operations

An address error trap occurs in certain addressing modes when accessing the first four bytes of any PSV page.

21. I²C Module: 10-bit Addressing Mode

When the I²C module is configured as a 10-bit slave with an address of 0x102, the I2CxRCV register content for the lower address byte is 0x01 rather than 0x02.

22. I²C Module

With the I²C module enabled, the port bits and external interrupt input functions (if any) associated with SCL and SDA pins do not reflect the actual digital logic levels on the pins.

23. I²C Module: 10-bit Addressing Mode

The 10-bit slave does not set the RBF flag or load the I2CxRCV register on address match if the Least Significant bits of the address are the same as the 7-bit reserved addresses.

24. Motor Control PWM – Operation in DOZE Mode

The Motor Control PWM module generates more interrupts than expected when DOZE mode is used and the output postscaler value is different than 1:1.

The following sections describe the errata and work around to these errata, where they may apply.

1. Module: JTAG Programming

JTAG programming does not work.

Work around

None.

2. Module: UART

UART receptions may be corrupted if the Baud Rate Generator is set up for 4x mode (BRGH = 1).

Work around

Use the 16x baud rate option (BRGH = 0) and adjust the baud rate accordingly.

3. Module: UART

The auto-baud feature may not calculate the correct baud rate when the High Baud Rate Enable bit, BRGH, is set. With the BRGH bit set, the baud rate calculation used is the same as BRG = 0.

Work around

If the auto-baud feature is needed, use the Low Baud Rate mode by clearing the BRGH bit.

4. Module: UART

With the auto-baud feature selected, the Sync Break character (0x55) may be loaded into the FIFO as data.

Work around

To prevent the Sync Break character from being loaded into the FIFO, load the UxBRG register with either 0x0000 or 0xFFFF prior to enabling the auto-baud feature (ABAUD = 1).

5. Module: UART

The auto-baud feature may miscalculate certain baud rate and clock speed combinations, resulting in a BRG value that is greater than or less than the expected value by 1. This may result in reception or transmission failures.

Work around

Test the auto-baud rate at various clock speed and baud rate combinations that would be used in an application. If an inaccurate BRG value is generated, manually correct the baud rate in user software.

6. Module: Traps and Idle Mode

If a clock failure occurs when the device is in Idle mode, the oscillator failure trap does not vector to the Trap Service Routine. Instead, the device will simply wake-up from Idle mode and continue code execution if the Fail-Safe Clock Monitor (FSCM) is enabled.

Work around

Whenever the device wakes up from Idle (assuming the FSCM is enabled), the user software should check the state of the OSCFAIL bit (INTCON1<1>) to determine whether a clock failure occurred, and then perform the appropriate clock switch operation. Regardless, the Trap Service Routine must be included in the user application.

dsPIC33FJ12MC201/202

7. Module: QEI Interrupt Generation

The Quadrature Encoder Interface (QEI) module does not generate an interrupt when MAXCNT is set to 0xFFFF and the following events occur:

1. POSCNT underflows from 0x0000 to 0xFFFF.
2. POSCNT stops.
3. POSCNT overflows from 0xFFFF to 0x0000.

This sequence of events occurs when the motor is running in one direction, which causes POSCNT to underflow to 0xFFFF. Once this happens, the motor stops and starts to run in the opposite direction, which generates an overflow from 0xFFFF to 0x0000. The QEI module does not generate an interrupt when this condition occurs.

Work around

To prevent this condition from occurring, set MAXCNT to 0x7FFF, which will cause an interrupt to be generated by the QEI module.

In addition, a global variable could be used to monitor bit 15, so that when an overflow or underflow condition is present on POSCNT, the variable will toggle bit 15. Example 1 shows the code required for this global variable.

EXAMPLE 1:

```
unsigned int POSCNT_b15 = 0;
unsigned int Motor_Position = 0;

int main(void)
{
    // ... User's code

    MAXCNT = 0x7FFF;      // Instead of 0xFFFF

    Motor_Position = POSCNT_b15 + POSCNT;

    // ... User's code
}

void __attribute__((__interrupt__)) _QEInterrupt(void)
{
    IFSxbits.QEIIF = 0;  // Clear QEI interrupt flag
                        // x=2 for dsPIC30F
                        // x=3 for dsPIC33F
    POSCNT_b15 ^= 0x8000; // Overflow or Underflow
}

```

8. Module: UART

When the UART is in 4x mode (BRGH = 1) and using two Stop bits (STSEL = 1), it may sample the first Stop bit instead of the second one.

This issue does not affect the other UART configurations.

Work around

Use the 16x baud rate option (BRGH = 0) and adjust the baud rate accordingly.

9. Module: UART

When an auto-baud is detected, the receive interrupt may occur twice. The first interrupt occurs at the beginning of the Start bit, and the second interrupt occurs after reception of the Sync field character.

Work around

If an extra interrupt is detected, ignore the additional interrupt.

10. Module: Motor Control PWM – PWM Counter Register

If the PTDIR bit is set (when PTMR is counting down), and the CPU execution is halted (after a breakpoint is reached), PTMR will start counting up as if PTDIR was zero.

Work around

None.

11. Module: UART

When the UART is configured for IR interface operations (UxMODE<9:8> = 11), the 16x baud clock signal on the BCLK pin is present only when the module is transmitting. The pin is idle at all other times.

Work around

Configure one of the output compare modules to generate the required baud clock signal when the UART is receiving data or in an Idle state.

12. Module: SPI

Setting the DISSCK bit in the SPIxCON1 register does not allow the user application to use the SCK pin as a general purpose I/O pin.

Work around

None.

13. Module: I²C

The BCL bit in I2CSTAT can only be cleared with a 16-bit operation, and can be corrupted with 1-bit or 8-bit operations on I2CSTAT.

Work around

Use 16-bit operations to clear BCL.

14. Module: I²C

During I²C communication, after a device operating in Slave mode transmits data to the master, the ACKSTAT bit in the I2CxSTAT register is set or cleared depending on whether the master sent an ACK or NACK after the byte of data. If the ACKSTAT bit is set, it will be cleared again after some delay.

Work around

Store the value of the ACKSTAT bit immediately after an I²C interrupt occurs.

15. Module: I²C

If there are two I²C devices on the bus, one of them is acting as the Master receiver and the other as the Slave transmitter. If both devices are configured for 10-bit addressing mode, and have the same value in the A10 and A9 bits of their addresses, then when the Slave select address is sent from the Master, both the Master and Slave acknowledge it. When the Master sends out the read operation, both the Master and the Slave enter into Read mode and both of them transmit the data. The resultant data will be the ANDing of the two transmissions.

Work around

In all I²C devices, the addresses as well as bits A10 and A9 should be different.

16. Module: Product Identification

Revision A2 devices marked as extended temperature range (E) devices only support industrial temperature range (I).

Work around

Use Revision A3 or newer devices marked as extended temperature range (E) devices.

17. Module: UART (UxE Interrupt)

The UART error interrupt may not occur, or may 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.

18. Module: UART (IrDA[®])

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

Work around

None.

19. Module: Internal Voltage Regulator

When the VREGS (RCON<8>) bit is set to a logic '0', higher sleep current may be observed.

Work around

Ensure VREGS (RCON<8>) bit is set to a logic '1' for device Sleep mode operation.

20. Module: PSV Operations

An address error trap occurs in certain addressing modes when accessing the first four bytes of an PSV page. This only occurs when using the following addressing modes:

- MOV.D
- Register indirect addressing (word or byte mode) with pre/post-decrement

Work around

Do not perform PSV accesses to any of the first four bytes using the above addressing modes. For applications using the C language, MPLAB C30 version 3.11 or higher, provides the following command-line switch that implements a work around for the erratum.

```
-merrata=psv_trap
```

Refer to the `readme.txt` file in the MPLAB C30 v3.11 tool suite for further details.

21. Module: I²C

When the I²C module is configured as a 10-bit slave with an address of 0x102, the I2CxRCV register content for the lower address byte is 0x01 rather than 0x02; however, the module acknowledges both address bytes.

Work around

None.

22. Module: I²C

With the I²C module enabled, the port bits and external interrupt input functions (if any) associated with the SCL and SDA pins do not reflect the actual digital logic levels on the pins.

Work around

If the SDA and/or SCL pins need to be polled, these pins should be connected to other port pins in order to be read correctly. This issue *does not* affect the operation of the I²C module.

23. Module: I²C

In 10-bit Addressing mode, some address matches don't set the RBF flag or load the receive register, I2CxRCV, if the lower address byte matches the reserved addresses. In particular, these include all addresses with the form XX0000XXXX and XX1111XXXX, with the following exceptions:

- 001111000X
- 011111001X
- 101111010X
- 111111011X

Work around

Ensure that the lower address byte in 10-bit Addressing mode does not match any 7-bit reserved addresses.

24. Module: Motor Control PWM

When the device is operated in DOZE mode and the Motor Control PWM module has a postscaler set to any value different than 1:1 (PTOPS > 0 in PxTCON register), the Motor Control PWM module generates more interrupts than expected.

Work around

Do not use DOZE mode with the Motor Control PWM if the time base output postscaler is different than 1:1 (PTOPS > 0 in PxTCON register).

APPENDIX A: REVISION HISTORY

Revision A (5/2007)

Initial release of this document, which includes silicon issues 1 (JTAG Programming), 2 (UART) through 5 (UART), 6 (Traps and Idle Mode) and 7 (QEI Interrupt Generation).

Revision B (10/2007)

Added silicon issues 8 (UART), 9 (UART) and 10 (Motor Control PWM – PWM Counter Register).

Revision C (4/2008)

Added silicon issues 11 (UART), 12 (SPI), 13-15 (I²C) and 16 (Product Identification).

Revision D (9/2008)

Added reference to silicon revision A4. Updated silicon issue 16 (Product Identification). Added silicon issues 17 (UART (UxE Interrupt), 18 (UART (IrDA[®])), 19 (Internal Voltage Regulator), 20 (PSV Operations), 21-23 (I²C), and 24 (Motor Control PWM).

dsPIC33FJ12MC201/202

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.

Trademarks

The Microchip name and logo, the Microchip logo, Accuron, dsPIC, KEELOQ, KEELOQ logo, MPLAB, PIC, PICmicro, PICSTART, rfPIC, SmartShunt and UNI/O are registered trademarks of Microchip Technology Incorporated in the U.S.A. and other countries.

FilterLab, Linear Active Thermistor, MXDEV, MXLAB, SEEVAL, SmartSensor and The Embedded Control Solutions Company are registered trademarks of Microchip Technology Incorporated in the U.S.A.

Analog-for-the-Digital Age, Application Maestro, CodeGuard, dsPICDEM, dsPICDEM.net, dsPICworks, dsSPEAK, ECAN, ECONOMONITOR, FanSense, In-Circuit Serial Programming, ICSP, ICEPIC, Mindi, MiWi, MPASM, MPLAB Certified logo, MPLIB, MPLINK, mTouch, PICkit, PICDEM, PICDEM.net, PICtail, PIC³² logo, PowerCal, PowerInfo, PowerMate, PowerTool, REAL ICE, rfLAB, Select Mode, Total Endurance, WiperLock 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.

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

© 2008, Microchip Technology Incorporated, Printed in the U.S.A., All Rights Reserved.

 Printed on recycled paper.

**QUALITY MANAGEMENT SYSTEM
CERTIFIED BY DNV
== ISO/TS 16949:2002 ==**

Microchip received ISO/TS-16949:2002 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.



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://support.microchip.com>
Web Address:
www.microchip.com

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

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
Farmington Hills, MI
Tel: 248-538-2250
Fax: 248-538-2260

Kokomo
Kokomo, IN
Tel: 765-864-8360
Fax: 765-864-8387

Los Angeles
Mission Viejo, CA
Tel: 949-462-9523
Fax: 949-462-9608

Santa Clara
Santa Clara, CA
Tel: 408-961-6444
Fax: 408-961-6445

Toronto
Mississauga, Ontario,
Canada
Tel: 905-673-0699
Fax: 905-673-6509

ASIA/PACIFIC

Asia Pacific Office
Suites 3707-14, 37th Floor
Tower 6, The Gateway
Harbour City, Kowloon
Hong Kong
Tel: 852-2401-1200
Fax: 852-2401-3431

Australia - Sydney
Tel: 61-2-9868-6733
Fax: 61-2-9868-6755

China - Beijing
Tel: 86-10-8528-2100
Fax: 86-10-8528-2104

China - Chengdu
Tel: 86-28-8665-5511
Fax: 86-28-8665-7889

China - Hong Kong SAR
Tel: 852-2401-1200
Fax: 852-2401-3431

China - Nanjing
Tel: 86-25-8473-2460
Fax: 86-25-8473-2470

China - Qingdao
Tel: 86-532-8502-7355
Fax: 86-532-8502-7205

China - Shanghai
Tel: 86-21-5407-5533
Fax: 86-21-5407-5066

China - Shenyang
Tel: 86-24-2334-2829
Fax: 86-24-2334-2393

China - Shenzhen
Tel: 86-755-8203-2660
Fax: 86-755-8203-1760

China - Wuhan
Tel: 86-27-5980-5300
Fax: 86-27-5980-5118

China - Xiamen
Tel: 86-592-2388138
Fax: 86-592-2388130

China - Xian
Tel: 86-29-8833-7252
Fax: 86-29-8833-7256

China - Zhuhai
Tel: 86-756-3210040
Fax: 86-756-3210049

ASIA/PACIFIC

India - Bangalore
Tel: 91-80-4182-8400
Fax: 91-80-4182-8422

India - New Delhi
Tel: 91-11-4160-8631
Fax: 91-11-4160-8632

India - Pune
Tel: 91-20-2566-1512
Fax: 91-20-2566-1513

Japan - Yokohama
Tel: 81-45-471- 6166
Fax: 81-45-471-6122

Korea - Daegu
Tel: 82-53-744-4301
Fax: 82-53-744-4302

Korea - Seoul
Tel: 82-2-554-7200
Fax: 82-2-558-5932 or
82-2-558-5934

Malaysia - Kuala Lumpur
Tel: 60-3-6201-9857
Fax: 60-3-6201-9859

Malaysia - Penang
Tel: 60-4-227-8870
Fax: 60-4-227-4068

Philippines - Manila
Tel: 63-2-634-9065
Fax: 63-2-634-9069

Singapore
Tel: 65-6334-8870
Fax: 65-6334-8850

Taiwan - Hsin Chu
Tel: 886-3-572-9526
Fax: 886-3-572-6459

Taiwan - Kaohsiung
Tel: 886-7-536-4818
Fax: 886-7-536-4803

Taiwan - Taipei
Tel: 886-2-2500-6610
Fax: 886-2-2508-0102

Thailand - Bangkok
Tel: 66-2-694-1351
Fax: 66-2-694-1350

EUROPE

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

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

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

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

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

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

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

UK - Wokingham
Tel: 44-118-921-5869
Fax: 44-118-921-5820