



Product Change Notification - SYST-23IRS0834

Date:

25 Sep 2019

Product Category:

16-Bit - Microcontrollers and Digital Signal Controllers

Affected CPNs:



Notification subject:

ERRATA - dsPIC33CH512MP508 Family Silicon Errata and Data Sheet Clarification

Notification text:

SYST-23IRS0834

Microchip has released a new Product Documents for the dsPIC33CH512MP508 Family Silicon Errata and Data Sheet Clarification of devices. If you are using one of these devices please read the document located at [dsPIC33CH512MP508 Family Silicon Errata and Data Sheet Clarification](#).

Notification Status: Final

Description of Change: Updated device data sheet reference to the current revision D.

Impacts to Data Sheet: None

Reason for Change: To Improve Productivity

Change Implementation Status: Complete

Date Document Changes Effective: 25 Sep 2019

NOTE: Please be advised that this is a change to the document only the product has not been changed.

Markings to Distinguish Revised from Unrevised Devices: N/A

Attachment(s):

[dsPIC33CH512MP508 Family Silicon Errata and Data Sheet Clarification](#)

Please contact your local [Microchip sales office](#) with questions or concerns regarding this notification.

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Affected Catalog Part Numbers (CPN)

DSPIC33CH256MP205-E/PT
DSPIC33CH256MP205-I/PT
DSPIC33CH256MP205T-I/PT
DSPIC33CH256MP206-E/MR
DSPIC33CH256MP206-E/PT
DSPIC33CH256MP206-E/PTVAO
DSPIC33CH256MP206-I/MR
DSPIC33CH256MP206-I/PT
DSPIC33CH256MP206T-E/PTV01
DSPIC33CH256MP206T-I/MR
DSPIC33CH256MP206T-I/PT
DSPIC33CH256MP208-E/PT
DSPIC33CH256MP208-I/PT
DSPIC33CH256MP208T-I/PT
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DSPIC33CH256MP505-I/PT
DSPIC33CH256MP505T-I/PT
DSPIC33CH256MP506-E/MR
DSPIC33CH256MP506-E/PT
DSPIC33CH256MP506-I/MR
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DSPIC33CH256MP506T-I/MR
DSPIC33CH256MP506T-I/PT
DSPIC33CH256MP508-E/PT
DSPIC33CH256MP508-E/PTVAO
DSPIC33CH256MP508-I/PT
DSPIC33CH256MP508T-E/PTVAO
DSPIC33CH256MP508T-I/PT
DSPIC33CH512MP205-E/PT
DSPIC33CH512MP205-I/PT
DSPIC33CH512MP205T-I/PT
DSPIC33CH512MP206-E/MR
DSPIC33CH512MP206-E/PT
DSPIC33CH512MP206-I/MR
DSPIC33CH512MP206-I/PT
DSPIC33CH512MP206T-I/MR
DSPIC33CH512MP206T-I/PT
DSPIC33CH512MP208-E/PT
DSPIC33CH512MP208-I/PT
DSPIC33CH512MP208T-I/PT
DSPIC33CH512MP505-E/PT
DSPIC33CH512MP505-I/PT
DSPIC33CH512MP505T-I/PT
DSPIC33CH512MP506-E/MR
DSPIC33CH512MP506-E/MRC01
DSPIC33CH512MP506-E/PT

DSPIC33CH512MP506-I/MR

DSPIC33CH512MP506-I/PT

DSPIC33CH512MP506T-I/MR

DSPIC33CH512MP506T-I/PT

DSPIC33CH512MP508-E/PT

DSPIC33CH512MP508-E/PTC01

DSPIC33CH512MP508-E/PTVAO

DSPIC33CH512MP508-I/PT

DSPIC33CH512MP508T-E/PTVAO

DSPIC33CH512MP508T-I/PT

dsPIC33CH512MP508 Family Silicon Errata and Data Sheet Clarification

The dsPIC33CH512MP508 family devices that you have received conform functionally to the current Device Data Sheet (DS70005371D), 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 dsPIC33CH512MP508 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 (A0).

Data Sheet clarifications and corrections start on [Page 7](#), 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).

For example, to identify the silicon revision level using MPLAB IDE in conjunction with a hardware debugger:

1. Using the appropriate interface, connect the device to the hardware debugger.
2. Open an MPLAB IDE project.
3. Configure the MPLAB IDE project for the appropriate device and hardware debugger.
4. Based on the version of MPLAB IDE you are using, do one of the following:
 - a) For MPLAB IDE 8, select *Programmer > Reconnect*.
 - b) For MPLAB X IDE, select *Window > Dashboard* and click the **Refresh Debug Tool Status** icon ().
5. 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 dsPIC33CH512MP508 silicon revisions are shown in [Table 1](#).

TABLE 1: SILICON DEVREV VALUES

| Part Number | Device ID ⁽¹⁾ | Revision ID for Silicon Revision |
|-------------------------------|--------------------------|----------------------------------|
| | | A0 |
| Devices with CAN FD | | |
| dsPIC33CH256MP505 | 0x7D42 | 0x0000 |
| dsPIC33CH512MP505 | 0x7D52 | |
| dsPIC33CH256MP506 | 0x7D43 | |
| dsPIC33CH512MP506 | 0x7D53 | |
| dsPIC33CH256MP508 | 0x7D44 | |
| dsPIC33CH512MP508 | 0x7D54 | |
| Devices with No CAN FD | | |
| dsPIC33CH256MP205 | 0x7D02 | 0x0000 |
| dsPIC33CH512MP205 | 0x7D12 | |
| dsPIC33CH256MP206 | 0x7D03 | |
| dsPIC33CH512MP206 | 0x7D13 | |
| dsPIC33CH256MP208 | 0x7D04 | |
| dsPIC33CH512MP208 | 0x7D14 | |

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".

dsPIC33CH512MP508

TABLE 2: SILICON ISSUE SUMMARY

| Module | Feature | Item Number | Issue Summary | Affected Revisions |
|------------------|--------------------------|-------------|---|--------------------|
| | | | | A0 |
| I ² C | Interrupt | 1. | In Slave mode, incorrect interrupt generated with DHEN = 1. | X |
| I ² C | Error | 2. | False bus collision error generated. | X |
| I ² C | Idle | 3. | SFRs are reset in Idle mode. | X |
| I ² C | SMBus 3.0 | 4. | When Configuration bit, SMBEN (FDEVOPT<10>) = 1, the SMBus 3.0 V _{IH} minimum specification may not be met. | X |
| Oscillator | HS, XT | 5. | The Primary Oscillator Start-up Timer (OST) may indicate the oscillator is ready for use too early. | X |
| UART | FERR | 6. | The FERR bit will not get set if one Stop bit is received. | X |
| UART | OERR | 7. | The 9th byte received will not be available to be read. | X |
| UART | TXWRE | 8. | TXWRE bit (UxSTAH<7>) cannot be cleared once it gets set. | X |
| UART | Address Detect | 9. | When writing to UxP1 with UTXBRK = 1, content of P1 will not get transmitted. | X |
| UART | Address Detect | 10. | In Address Detect mode, content of P1 is not transmitted on writing to P1 with UTXBRK = 1. | X |
| UART | Sleep | 11. | When waking from Sleep with a UART reception, SLPEN needs to be set in addition to WAKE = 1. | X |
| UART | Smart Card | 12. | Wait time interrupt flag is set when the last character transmitted has the bit, LAST = 0. | X |
| MBIST | MBISTDONE | 13. | After executing a Reset, the MBISTDONE bit will always be set. | X |
| CPU | FLIM Instruction | 14. | When the operands are of different signs, the FLIM instruction may not force the correct data limit. | X |
| CPU | MAXAB/MINAB Instructions | 15. | When the operands are of different signs, the MAXAB, MINAB and MINZAB instructions may not output the correct value. | X |
| CPU | div.sd Instruction | 16. | When using the signed 32-by-16-bit division instruction, div.sd, the Overflow bit is not getting set when an overflow occurs. | X |
| SCCP/ MCCP | Clock Source | 17. | Using Fosc as the clock source may cause synchronization issues. | X |
| I/O | POR | 18. | Spike on I/O at POR. | X |
| DMA | ADC Triggers | 19. | DMA is triggered continuously from ADC. | X |
| PWM | Time Base Capture | 20. | PWM Capture Status (CAP) flag will not set again under certain conditions. | X |

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 (**A0**).

1. Module: I²C

In Slave mode with DHEN = 1 (Data Hold Enable), if software sends a NACK, a Slave interrupt is asserted at the 9th falling edge of the clock.

Work around

Software should ignore the Slave interrupt that is asserted after sending a NACK.

Affected Silicon Revisions

| | | | | | | | | |
|-----------|--|--|--|--|--|--|--|--|
| A0 | | | | | | | | |
| X | | | | | | | | |

2. Module: I²C

In Slave mode, a false bus collision event is generated when the bus collision is enabled (SBCDE = 1) and a Stop bit is received.

Work around

None.

Affected Silicon Revisions

| | | | | | | | | |
|-----------|--|--|--|--|--|--|--|--|
| A0 | | | | | | | | |
| X | | | | | | | | |

3. Module: I²C

In Slave mode, the SFRs are reset when the device is in Idle and the module is set for discontinue in Idle (I2CSIDL = 1).

Work around

None.

Affected Silicon Revisions

| | | | | | | | | |
|-----------|--|--|--|--|--|--|--|--|
| A0 | | | | | | | | |
| X | | | | | | | | |

4. Module: I²C

When selecting SMBus 3.0 operation using Configuration bit, SMBEN (FDEVOP<10>), the Voltage Input High (V_{IH}) of the SMBus 3.0 specification minimum may not be met.

Work around

None.

Affected Silicon Revisions

| | | | | | | | | |
|-----------|--|--|--|--|--|--|--|--|
| A0 | | | | | | | | |
| X | | | | | | | | |

5. Module: Oscillator

The Primary Oscillator Start-up Timer (OST) may indicate the oscillator is ready for use too early. Clocking the device before the oscillator is ready may result in incorrect execution and exceptions. This issue exists when the POSC is requested at power-on, during clock switching, when waking from Sleep or when a peripheral module requests the POSC directly. This issue affects XT and HS modes only.

Work around

Make sure that the Primary Oscillator clock is ready before using it by following these steps:

1. Running on a non-POSC source, request the POSC clock using a peripheral such as REFO.
2. Provide a delay to stabilize the POSC.
3. Then switch to the POSC source.

Affected Silicon Revisions

| | | | | | | | | |
|-----------|--|--|--|--|--|--|--|--|
| A0 | | | | | | | | |
| X | | | | | | | | |

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6. Module: UART

When the UART is operating with STSEL<1:0> = 2 (two Stop bits sent, two checked at receive) and STPMD = 0, the FERR bit will not get set if one Stop bit is received.

Work around

Use STPSEL = 3 instead of STSEL = 2. When operating with STSEL = 3 mode, the UART will be configured to send two Stop bits, but check one at receive.

Affected Silicon Revisions

| | | | | | | | | |
|----|--|--|--|--|--|--|--|--|
| A0 | | | | | | | | |
| X | | | | | | | | |

7. Module: UART

When the receive buffer overflows, the 9th byte received will get lost and cannot be read.

Work around

Do not allow the OERR bit to get set by reading the received data byte on each byte reception.

Affected Silicon Revisions

| | | | | | | | | |
|----|--|--|--|--|--|--|--|--|
| A0 | | | | | | | | |
| X | | | | | | | | |

8. Module: UART

Once the TX Write Transmit Error Status bit (TXWRE, UxSTAH<7>) gets set, the TXWRE bit cannot be cleared by a single clear instruction.

Work around

Use multiple clear instructions in a loop until the TXWRE bit gets cleared.

Affected Silicon Revisions

| | | | | | | | | |
|----|--|--|--|--|--|--|--|--|
| A0 | | | | | | | | |
| X | | | | | | | | |

9. Module: UART

In UART Address Detect mode, writing to UxP1 with UTXBRK = 1 should cause a Break to be transmitted, followed by the content in P1, but the content of P1 will not get transmitted.

Work around

After writing to P1, wait for UTXBRK to get clear and then rewrite to P1.

Affected Silicon Revisions

| | | | | | | | | |
|----|--|--|--|--|--|--|--|--|
| A0 | | | | | | | | |
| X | | | | | | | | |

10. Module: UART

In Address Detect mode, the content of P1 is not transmitted on writing to P1 with UTXBRK = 1.

Work around

Write P1 a second time after waiting for the Break transmission to start.

Affected Silicon Revisions

| | | | | | | | | |
|----|--|--|--|--|--|--|--|--|
| A0 | | | | | | | | |
| X | | | | | | | | |

11. Module: UART

When waking from Sleep with a UART reception, SLPEN needs to be set in addition to WAKE = 1.

Work around

Set SLPEN bit in addition to WAKE before entering Sleep.

Affected Silicon Revisions

| | | | | | | | | |
|----|--|--|--|--|--|--|--|--|
| A0 | | | | | | | | |
| X | | | | | | | | |

12. Module: UART

In Smart Card T = 1 mode, the Wait time interrupt flag is set when the last character transmitted has the bit, LAST = 0.

Work around

Ignore WTC interrupt events on non-last bytes.

Affected Silicon Revisions

| | | | | | | | | |
|----|--|--|--|--|--|--|--|--|
| A0 | | | | | | | | |
| X | | | | | | | | |

13. Module: MBIST

After a Reset, the MBISTDONE status bit will be set regardless of a BIST test being executed. If a BIST is requested and executed, the MBISTDONE bit will set as expected.

Work around

None.

Affected Silicon Revisions

| | | | | | | | | |
|----|--|--|--|--|--|--|--|--|
| A0 | | | | | | | | |
| X | | | | | | | | |

14. Module: CPU

The FLIM instruction may incorrectly limit the data range when operating on signed operands of different sign values. If the operands are either all negative or all positive, the limit is correct.

Work around

None.

Affected Silicon Revisions

| | | | | | | | | |
|----|--|--|--|--|--|--|--|--|
| A0 | | | | | | | | |
| X | | | | | | | | |

15. Module: CPU

When operating on signed operands of different sign values, the output for MAXAB, MINAB and MINZAB instructions may be incorrect. If the operands are either all negative or all positive, the output is correct.

Work around

None.

Affected Silicon Revisions

| | | | | | | | | |
|----|--|--|--|--|--|--|--|--|
| A0 | | | | | | | | |
| X | | | | | | | | |

16. Module: CPU

When using the Signed 32-by-16-Bit Division instruction, `div.sd`, the Overflow bit may not always get set when an overflow occurs. This erratum only affects operations in which at least one of the following conditions is true:

- Dividend and divisor differ in sign,
- Dividend > 0x3FFFFFFF or
- Dividend < 0xC0000000

Work around

The application software must perform both the following actions to handle possible undetected overflow conditions:

- The value of the dividend must always be constrained to be in the following range: $0xC0000000 \leq \text{Dividend} \leq 0x3FFFFFFF$.
- If the dividend and divisor differ in sign (e.g., dividend is negative and divisor is positive), then after executing the `div.sd` instruction or the compiler built-in function, `__builtin_divsd()`, inspect the sign of the resultant quotient. If the quotient is found to be a positive number, then treat it as an overflow condition.

Affected Silicon Revisions

| | | | | | | | | |
|----|--|--|--|--|--|--|--|--|
| A0 | | | | | | | | |
| X | | | | | | | | |

17. Module: SCCP/MCCP

When FOSC is selected as the clock source using the CLKSEL<2:0> bits (CCPxCON1L<10:8>), unexpected operation may occur. For proper SCCP/MCCP input clock synchronization, do not use FOSC as the CCP clock source.

Work around

Use any of the other available clock sources in CLKSEL<2:0>.

Affected Silicon Revisions

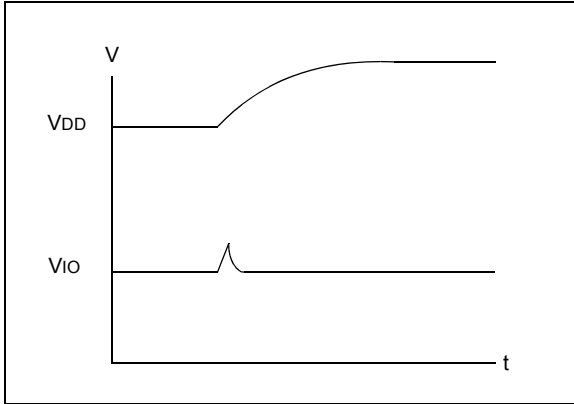
| | | | | | | | | |
|----|--|--|--|--|--|--|--|--|
| A0 | | | | | | | | |
| X | | | | | | | | |

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18. Module: I/O

During a fast device power-up, when the VDD ramp is less than 4 mS, the I/O pins may drive up to 100 μ A current for a duration of up to 10 μ S (Figure 1-1).

FIGURE 1-1: I/O RAMP



Work around

1. Slow down the VDD ramp time (greater than 4 mS for VDD to ramp 0V to 3.3V).
2. Ensure the circuitry that is connected to the pins can endure this pulse.

Example applications affected may include complementary power switches, where a transient current shoot-through might occur. High-voltage applications with complementary switches should power the high-voltage 200 μ Sec later than powering the dsPIC[®] device to avoid the current shoot-through. This behavior is specific to each device and not affected by aging.

Affected Silicon Revisions

| | | | | | | | |
|-----------|--|--|--|--|--|--|--|
| A0 | | | | | | | |
| X | | | | | | | |

19. Module: DMA

The DMA receives multiple continuous triggers from the ADC until the trigger event from ADC is cleared. The OVRUNIF flag (DMAINTn[3]) will be set. When the OVRUNIF bit changes state, from '0' to '1', a DMA interrupt is generated.

Work around

Ignore the OVRUNIF bit and the first DMA interrupt. Clear the ADC trigger source, ANxRDY, with a DMA read of the ADC buffer, ADCBUFx, for the corresponding ADC channel.

Affected Silicon Revisions

| | | | | | | | |
|-----------|--|--|--|--|--|--|--|
| A0 | | | | | | | |
| X | | | | | | | |

20. Module: PWM

When using a PWM Control Input (PCI) to trigger a time base capture, the Capture Status flag, CAP (PGxSTAT[5]), may not set again under certain conditions. When a subsequent PWM capture event occurs while, or just after, reading the current capture value from the PGxCAP register, the Capture Status Flag, CAP, will not set again.

Work around

Read the PWM Generator x Capture (PGxCAP) register as soon as possible to avoid the condition. Poll the CAP bit and read the PGxCAP value within the associated PWM Generator (1-8) interrupt or any of the six PWM Event (A-F) interrupts corresponding to the PCI event which triggered the time base capture.

Affected Silicon Revisions

| | | | | | | | |
|-----------|--|--|--|--|--|--|--|
| A0 | | | | | | | |
| X | | | | | | | |

Data Sheet Clarifications

The following typographic corrections and clarifications are to be noted for the latest version of the device data sheet (DS70005371D):

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

None.

dsPIC33CH512MP508

APPENDIX A: DOCUMENT REVISION HISTORY

Rev A Document (10/2018)

Initial version of this document; issued for revision A0.

Rev B Document (7/2019)

Removes original silicon errata issues 6 (PWM) and 18 (CPU). The issues are no longer relevant and were removed.

Updates silicon errata issue 18 ([I/O](#))

Adds silicon errata issues 19 ([DMA](#)) and 20 ([PWM](#)).

Rev C Document (9/2019)

Updates device data sheet reference to the current revision D.

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.
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