PIC32MX575/675/695/775/795 Family Silicon Errata and Data Sheet Clarification

The PIC32MX575/675/695/775/795 family devices that you have received conform functionally to the current Device Data Sheet (DS60001156**H**), 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 PIC32MX575/675/695/775/795 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 (**A5**).

Data Sheet clarifications and corrections start on page 15, 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 web site (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 then click the **Refresh Debug Tool Status** icon ( ).
5. Depending on the development tool used, the part number and the Device and Revision ID values 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 Device and Revision ID values for the various PIC32MX575/675/695/775/795 silicon revisions are shown in Table 1.

TABLE 1: SILICON DEVREV VALUES

Part Number	Device ID(1)	Revision ID for Silicon Revision(1)				
		A0	A1	A3	A4	A5
PIC32MX575F256H	0x4317053	0x0	0x1	0x3	0x4	0x5
PIC32MX675F256H	0x430B053					
PIC32MX775F256H	0x4303053					
PIC32MX575F512H	0x4309053					
PIC32MX675F512H	0x430C053					
PIC32MX695F512H	0x4325053					
PIC32MX775F512H	0x430D053					
PIC32MX795F512H	0x430E053					
PIC32MX575F256L	0x4333053					
PIC32MX675F256L	0x4305053					

Note 1: Refer to the **"Memory Organization"** and **"Special Features"** chapters in the current Device Data Sheet (DS60001156**H**) for detailed information on Device and Revision IDs for your specific device.

TABLE 1: SILICON DEVREV VALUES (CONTINUED)

Part Number	Device ID(1)	Revision ID for Silicon Revision(1)				
		A0	A1	A3	A4	A5
PIC32MX775F256L	0x4312053	0x0	0x1	0x3	0x4	0x5
PIC32MX575F512L	0x430F053					
PIC32MX675F512L	0x4311053					
PIC32MX695F512L	0x4341053					
PIC32MX775F512L	0x4307053					
PIC32MX795F512L	0x4307053					

Note 1: Refer to the **"Memory Organization"** and **"Special Features"** chapters in the current Device Data Sheet (DS60001156**H**) for detailed information on Device and Revision IDs for your specific device.

TABLE 2: SILICON ISSUE SUMMARY

Module	Feature	Item #	Issue Summary	Affected Revisions(1)				
				A0	A1	A3	A4	A5
I^2C™	—	1.	The SDA line state may not be detected correctly.	X	X			
Ethernet	RMII 10 MB	2.	Pause frames are sent at 10 times the normal rate.	X	X	X	X	X
ADC	Interrupt Generation	3.	The interrupt generated by the module cannot be cleared when the module is disabled.	X	X	X	X	X
Parallel Master Port	Slave Mode	4.	A PMP interrupt used to wake the device will not be reflected in the interrupt flag until the end of the write strobe.	X	X	X	X	X
Output Compare	Electrical Specification	5.	Output Compare Fault detection is not asynchronous.	X	X	X	X	X
SPI	—	6.	The SPIBUSY and SRMT bits assert 1 bit time before the end of the transaction.	X	X	X	X	X
UART	—	7.	The UTXBF bit deasserts one Peripheral Bus (PB) clock after the interrupt is generated.	X	X	X	X	X
USB	USB PLL	8.	The USBPLL does not automatically suspend in Idle mode.	X	X	X	X	X
Output Compare	PWM	9.	In PWM mode, the output waveform is one PB clock longer than the expected value.	X	X	X	X	X
Output Compare	PWM Fault Input Mode	10.	A Fault interrupt will not be generated if firmware clears the Fault while the Fault is still asserted.	X	X	X	X	X
DMA	Pattern Match	11.	In Pattern Match mode, the DMA module may not append all of the CRC results to the result buffer.	X	X	X	X	X
Timers	External Clock	12.	In Synchronized External Clock mode, the first period of the count is short.	X	X	X	X	X
SPI	Frame Slave Mode	13.	Outgoing data corruption occurs when the frame signal is coincident with the clock.	X	X	X	X	X
CAN	—	14.	TXABAT, TXLARB, and TXERR bits may erroneously be cleared by an aborted read of the CxFIFOCONn register.	X	X	X	X	X
CAN	—	15.	Requested aborts to a TX message via setting the ABAT (CxCON<27>) bit or clearing the TXREQ (CxFIFOCON<3>) bit may not complete.	X	X	X	X	X

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

2: This issue has been corrected for this revision of silicon. Refer to the specific issue for details regarding the correction.

TABLE 2: SILICON ISSUE SUMMARY (CONTINUED)

Module	Feature	Item #	Issue Summary	Affected Revisions(1)				
				A0	A1	A3	A4	A5
CAN	—	16.	The FRESET (CxFIFOCONn<14>) and UINC (CxFIFOCONn<13>) bits are not settable via a normal SFR write.	X	X	X	X	X
CAN	DeviceNet™	17.	DeviceNet™ filtering does not function.	X	X	X	X	X
Output Compare	PWM Fault Input Mode	18.	A Fault may be erroneously cleared due to an aborted read.	X	X	X	X	X
SPI	Slave Mode	19.	In Slave mode with the STXISEL (SPIxCON<3:2>) bits = 00, a TX buffer underrun condition will not assert the TX interrupt flag.	X	X	X	X	X
USB	—	20.	The TOKBUSY bit does not correctly indicate status when a transfer completes within the Start of Frame (SOF) threshold.	X	X	X	X	X
USB	Host Mode	21.	In Host mode, the interval between the first two SOF packets may be less than what is specified by the USB specification.	X	X	X	X	X
Watchdog Timer	—	22.	When code-protect is enabled, the WDT is not held in Reset during the POR RAM Clear Sequence (RCS).	X	X	X	X	X
Oscillator	Clock Switch and Two -Speed Start-Up	23.	Clock switching and Two-Speed Start-up may cause a general exception when the reserved bit 8 of the DDPCON register is '0'.	X	X	X	X	X
Oscillator	Clock Switch	24.	Clock source switching may cause a general exception or POR when switching from a slow clock to a fast clock.	X	X	X	X	X
SPI	Slave Mode	25.	A wake-up interrupt may not be clearable.	X	X	X	X	X
PORTS	—	26.	I/O pins do not tri-state immediately, if previously driven high.	X	X	X	X	X
SPI	—	27.	Byte writes to the SPIxSTAT register are not decoded correctly.	X	X	X	X	X
SPI	Frame Mode	28.	Recovery from an underrun requires multiple SPI clock periods.	X	X	X	X	X
CAN	—	29.	The TXABAT bit status may be incorrect after an abort.	X	X	X	X	X
UART	IrDA®	30.	The IrDA minimum bit time is not detected at all baud rates.	X	X	X	X	X
UART	IrDA	31.	Transmit (TX) data is corrupted when BRG values greater than 0x200 are used.	X	X	X	X	X
JTAG	—	32.	On 64-pin devices, the TMS pin requires an external pull-up.	X	X	X	X	X
UART	—	33.	The TRMT (UxSTA<8>) bit is asserted before the transmission is complete.	X	X	X	X	X
UART	UART Receive Buffer Overrun Error Status	34.	The OERR (UxSTA<1>) bit does not get cleared on a module Reset. The OERR bit retains its value even after the UART module is reinitialized.	X	X	X	X	X
ADC	Conversion Trigger from INT0 Interrupt	35.	The ADC module conversion triggers occur on the rising edge of the INT0 signal even when INT0 is configured to generate an interrupt on the falling edge.	X	X	X	X	X

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

2: This issue has been corrected for this revision of silicon. Refer to the specific issue for details regarding the correction.

TABLE 2: SILICON ISSUE SUMMARY (CONTINUED)

Module	Feature	Item #	Issue Summary	Affected Revisions(1)				
				A0	A1	A3	A4	A5
JTAG	Boundary Scan	36.	Pin 100 on 100-pin packages and pin A1 on 121-pin packages do not respond to boundary scan commands.	X	X	X	X	X
DMA	Suspend Status	37.	The DMABUSY status bit (DMACON<11>) may not reflect the correct status if the DMA module is suspended.	X	X	X	X	X
Voltage Regulator	BOR	38.	Device may not exit BOR state if a BOR event occurs.	X	X			
Output Compare	PWM Mode	39.	If the Output Compare module is configured for a 0% duty cycle (OCxRS = 0), a glitch may occur on the next cycle.	X	X	X	X	X
Oscillator	Clock Switch	40.	If a Fail-Safe Clock Monitor (FSCM) event occurs when Primary Oscillator (POSC) mode is used, firmware clock switch requests to switch from FRC mode will fail.	X	X	X	X	X
I^2C	Slave Mode	41.	The I^2C module does not respond to address 0x78 when the STRICT and A10M bits are cleared in the I2CxCON register.	X	X	X	X	X
USB	Idle Interrupt	42.	Idle interrupts cease if the IDLEIF interrupt flag is cleared.	X	X	X	X	X
CPU	Constant Data Access from Flash	43.	A Data Bus Exception (DBE) may occur if an interrupt is encountered by the CPU while it is accessing constant data from Flash memory.	X	X	X	See **Note 2**	See **Note 2**
CPU	Data Write to a Peripheral	44.	A data write operation by the CPU to a peripheral may be repeated if an interrupt occurs during initial write operation.	X	X	X	See **Note 2**	See **Note 2**
Oscillator	Clock Out	45.	A clock signal is present on the CLKO pin, regardless of the clock source and setting of the CLKO Enable Configuration bit, during a Power-on Reset (POR) condition.	X	X	X	X	X
Input Capture	Idle Mode and Sleep Mode	46.	All input capture modes selectable by the ICM<2:0> (ICxCON<2:0>) bits, with the exception of Interrupt-only mode, will not work when the CPU enters Idle mode or Sleep mode.	X	X	X	X	X
USB	Host	47.	The USB bus might not be returned to the J-state following an acknowledgment packet when running low-speed through a hub.	X	X	X	X	X
Non-5V Tolerant Pins	Pull-ups	48.	Internal pull-up resistors may not guarantee a logical ‘1’ on non-5V tolerant pins when they are configured as digital inputs.	X	X	X	X	X
5V Tolerant Pins	Pull-ups	49.	Internal pull-up resistors may not guarantee a logical ‘1’ on 5V tolerant pins when they are configured as digital inputs.	X	X	X	X	X

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

2: This issue has been corrected for this revision of silicon. Refer to the specific issue for details regarding the correction.

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 (**A5**).

1. Module: I²C™

The I²C modules, with the exception of I2C1 and I2C2, may not detect state of SDA line correctly:

- In Master mode, module may encounter a bus collision when performing a Start condition.
- In Slave mode, module may not Acknowledge the first packet sent after enabling the I²C module. In this case, it will return a NACK instead of an ACK.

Work around

Master Mode:

1. Use another I²C node on the bus to sequence I²C bus transactions such as the Start event.
2. Connect an unused general-purpose I/O pin to the SDAx pin of the I²C module to be used.
   The user software must perform the following sequence of operations in order to execute a Start condition on the I²C bus:
   a) With the I²C module disabled, clear the LAT bit of the general-purpose I/O pin that is connected to the SDAx pin. Then, clear the corresponding TRIS bit to make sure the I/O pin is pulled low.
   b) Enable the I²C module by setting the ON (I2CxCON<15>) bit; but do not configure the I2CxBRG register at this time.
   c) Execute a software delay loop of at least 10 µs.
   d) Set the TRIS bit of the I/O pin connected to the SDAx pin. This will make it an input pin, thereby ensuring that it goes to a high logic state.
   e) Execute a software delay loop of at least 10 µs.
   f) Configure the I2CxBRG register with the value required by the application.
   g) Issue a Start condition by setting the SEN (I2CxCON<0>) bit as needed. I²C communications can now proceed normally.

Slave Mode:

The I²C master device on the bus must either pull the SDA line low, and then high again, prior to sending the first packet to the device, or must resend the first packet.

Affected Silicon Revisions

A0	A1	A3	A4	A5			
X	X						

2. Module: Ethernet

In 10 MB RMII mode only, pause frames are sent at 10 times the normal rate. This reduces the available network bandwidth if the device is connected to the network via a hub. This does not reduce functionality or violate specifications.

Work around

If bandwidth is a concern, connect the PIC32 device to a network using an Ethernet switch.

Affected Silicon Revisions

A0	A1	A3	A4	A5			
X	X	X	X	X			

3. Module: ADC

The interrupt generated by the ADC module cannot be cleared when the ADC module is disabled.

Work around

Ensure the interrupt is serviced and the interrupt flag is cleared before turning off the ADC module.

Affected Silicon Revisions

A0	A1	A3	A4	A5			
X	X	X	X	X			

4. Module: Parallel Master Port

In Slave mode, a PMP interrupt will wake the device; however, the interrupt source will not be reflected in the interrupt flag until the end of the write strobe.

Work arounds

There are two possible solutions to this issue:

1. If multiple wake-up sources are to be used, firmware can poll all of the configured wake-up source interrupt flags. If none are set, assume the source was the PMP.
2. Firmware can wait for a period exceeding the write strobe length, and then poll the PMP interrupt flag.

Affected Silicon Revisions

A0	A1	A3	A4	A5			
X	X	X	X	X			

5. Module: Output Compare

The Fault input detection is not asynchronous. There is a one to two Peripheral Bus (PB) clock delay between the Fault input assertion and the shutdown of the appropriate Output Compare output pin.

Work around

Ensure that the device driven by the Output Compare module can tolerate this shutdown delay.

Affected Silicon Revisions

A0	A1	A3	A4	A5			
X	X	X	X	X			

6. Module: SPI

The SPIBUSY (SPIxCOn<11>) and SRMT (SPIxCON<7>) bits assert one bit time before the end of the transaction.

Note:	SPI operation with the DMA module is not affected by this issue.

Work arounds

There are two possible solutions to this issue:

1. Firmware must provide a one bit time delay between the assertion of these bits and performing any operation that requires the transaction to be complete.
2. Use DMA module to transfer data to/from SPI module.

Affected Silicon Revisions

A0	A1	A3	A4	A5			
X	X	X	X	X			

7. Module: UART

The UTXBF (UxSTA<9>) bit clears one PB clock cycle after the interrupt is generated. When using a PB bus divisor other than 1:1 and polling the UART transmit interrupt flag with the next instruction reading the UTXBF bit, the result may not reflect the actual UTXBF status.

Work arounds

There are two possible solutions to this issue:

1. Only use a PB bus divisor of 1:1.
2. If firmware is polling the transmit interrupt flag and the UTXBF flag, insert a read of the UxSTA register between these operations and discard the result. This read will ensure the status of the UTXBF flag is correct when the next read of this register occurs.

Affected Silicon Revisions

A0	A1	A3	A4	A5			
X	X	X	X	X			

8. Module: USB

When the USBSIDL (UxCNFG1<4>) bit is set, the USBPLL does not automatically suspend in Idle mode.

Work around

Use firmware to manually suspend the USB clock before entering Sleep mode.

Affected Silicon Revisions

A0	A1	A3	A4	A5			
X	X	X	X	X			

9. Module: Output Compare

In PWM mode, the output waveform is one Peripheral Bus (PB) clock longer than the expected value.

Work around

Load OCxRS with a value one less than the number expected to achieve the desired output.

Affected Silicon Revisions

A0	A1	A3	A4	A5			
X	X	X	X	X			

10. Module: Output Compare

In PWM mode, if firmware attempts to clear the OCFLT (OCxCON<4>) bit while the Fault still exists, a second interrupt will not be generated for this Fault when firmware exits the Interrupt Service Routine (ISR). The OCFLT bit will remain set while a Fault is detected.

Work around

In the ISR, clear the OCFLT bit, and test the OCFLT bit before exiting the ISR. If the bit is set, set the OCx interrupt to generate a second interrupt.

Affected Silicon Revisions

A0	A1	A3	A4	A5			
X	X	X	X	X			

11. Module: DMA

In Pattern Match mode, the DMA module may not append all of the CRC results to the result buffer.

Work around

Use firmware to read the CRC result and append it to the result buffer.

Affected Silicon Revisions

A0	A1	A3	A4	A5			
X	X	X	X	X			

12. Module: Timers

When the Timer module is first enabled and the prescaler value is greater than one, the number of input clocks required to increment the timer from zero to one is one input clock, not the value stated by the prescaler.

Work around

None.

Affected Silicon Revisions

A0	A1	A3	A4	A5			
X	X	X	X	X			

13. Module: SPI

Outgoing data will be corrupted when in Frame Slave mode with the FRMCNT<2:0> (SPIxCON<26:24>) bits greater than zero and the Frame pulse is coincident with the clock.

Work around

1. There is no work around for operation when the Frame pulse is coincident with the clock.
2. Provide a frame signal that precedes the clock signal.

Affected Silicon Revisions

A0	A1	A3	A4	A5			
X	X	X	X	X			

14. Module: CAN

The TXABAT, TXLARB, and TXERR bits may erroneously be cleared by an aborted read of the CxFIFOCONn register. An aborted read occurs when a load instruction in the CPU pipeline has started execution, but is aborted due to an interrupt.

Work around

Disable interrupts before reading the contents of the CxFIFOCONn register, and then re-enable interrupts after reading the register.

Affected Silicon Revisions

A0	A1	A3	A4	A5			
X	X	X	X	X			

15. Module: CAN

Requested aborts to a TX message via setting the ABAT (CxCON<27>) bit or clearing the TXREQ (CxFIFOCON<3>) bit may not complete. The CAN bus protocol is not violated.

Work around

1. After a general abort request, firmware should poll until the BUSY (CxCON<7>) bit = 0, or wait two message times. If the ABAT bit remains high, the message was successfully aborted and the module must be reset by clearing and setting the ON (CxCON<15>) bit.
2. After a FIFO specific abort request, firmware should poll until the BUSY bit = 0, or wait two message times. If the TXREQ bit remains high, the message was successfully aborted and the FIFO must be reset by setting the FRESET (CxFIFOCONn<14>) bit and polling until FRESET = 0.

Affected Silicon Revisions

A0	A1	A3	A4	A5			
X	X	X	X	X			

16. Module: CAN

The FRESET (CxFIFOCONn<14>) bit and the UINC (CxFIFOCONn<13>) bit are not settable via a normal Special Function Register (SFR) write.

Work around

Use the SET register operations to change the state of these bits.

Affected Silicon Revisions

A0	A1	A3	A4	A5			
X	X	X	X	X			

17. Module: CAN

The DeviceNet™ message filtering does not function.

Work around

Use hardware to filter the Standard Identifier (SID) and use firmware to decode the DeviceNet™ identifier.

Affected Silicon Revisions

A0	A1	A3	A4	A5			
X	X	X	X	X			

18. Module: Output Compare

The Output Compare module may reinitialize or clear a Fault on an aborted read of the OCxCON register. An aborted read occurs when a read instruction in the CPU pipeline has started execution, but is aborted due to an interrupt.

Work around

Disable interrupts before reading the contents of the OCxCON register, and then re-enable interrupts after reading the register.

Affected Silicon Revisions

A0	A1	A3	A4	A5			
X	X	X	X	X			

19. Module: SPI

In Slave mode with the STXISEL<1:0> (SPIxCON<3:2>) bits = 00, a TX buffer underrun condition will not assert the TX interrupt flag.

Work around

Use any other legal value of STXISEL<1:0> (i.e., '01', '10', or '11').

Affected Silicon Revisions

A0	A1	A3	A4	A5			
X	X	X	X	X			

20. Module: USB

The TOKBUSY (UxCON<5>) bit does not correctly indicate status when a transfer completes within the Start of Frame (SOF) threshold.

Work around

Use a firmware semaphore to track when a token is written to the UxTOK register. Firmware then clears the semaphore when the transfer is complete.

Affected Silicon Revisions

A0	A1	A3	A4	A5			
X	X	X	X	X			

21. Module: USB

In Host mode, the interval between the first two SOF packets may be less than what is specified by the USB specification.

Work around

None.

Affected Silicon Revisions

A0	A1	A3	A4	A5			
X	X	X	X	X			

22. Module: Watchdog Timer

When code-protect is enabled, the Watchdog Timer (WDT) is not held in Reset during the POR RAM Clear Sequence (RCS). If the WDT period does not exceed the RCS period, the WDT will reset the device and the RCS sequence will restart.

Work around

Use WDT periods equal to or longer than 128 ms. Since the RCS and WDT run concurrently, firmware will have a reduced period in which to service the WDT for the first time.

Affected Silicon Revisions

A0	A1	A3	A4	A5			
X	X	X	X	X			

23. Module: Oscillator

Clock switching and Two-Speed Start-up may cause a general exception when the reserved bit 8 of the DDPCON register is '0'.

Work around

Ensure that the reserved bit 8 of the DDPCON register to set to '1'. For example,

```
DDPCON |= 0x100;
```

Affected Silicon Revisions

A0	A1	A3	A4	A5			
X	X	X	X	X			

24. Module: Oscillator

Clock source switching may cause a general exception or POR when switching from a slow clock to a fast clock.

Work around

Clock source switches should be performed by first switching to the FRC, and then switching to the target clock source.

Note:	If the peripheral library is being used, clock switching is performed automatically through the FRC.

Affected Silicon Revisions

A0	A1	A3	A4	A5			
X	X	X	X	X			

25. Module: SPI

In Slave mode, when entering Sleep mode after a SPI transfer with SPI interrupts enabled, a false interrupt may be generated that wakes the device. This interrupt can be cleared; however, entering Sleep may cause the condition to occur again.

Work around

Do not use SPI in Slave mode as a wake-up source from Sleep mode.

Affected Silicon Revisions

A0	A1	A3	A4	A5			
X	X	X	X	X			

26. Module: PORTS

When an I/O pin is set to output a logic high signal, and is then changed to an input using the TRISx registers, the I/O pin should immediately tri-state and let the pin float. Instead, the pin will continue to partially drive a logic high signal out for a period of time.

Work around

The pin should be driven low, prior to being tri-stated, if it is desirable for the pin to tri-state quickly.

Affected Silicon Revisions

A0	A1	A3	A4	A5			
X	X	X	X	X			

27. Module: SPI

Byte writes to the SPIxSTAT register are not decoded correctly. A byte write to byte zero of SPIxSTAT is actually performed on both byte zero and byte one. A byte write to byte one of SPIxSTAT is ignored.

Work around

Only perform word operations on the SPIxSTAT register.

Affected Silicon Revisions

A0	A1	A3	A4	A5			
X	X	X	X	X			

28. Module: SPI

In Frame mode, the SPI module is not immediately ready for further transfers after clearing the SPITUR (SPIxSTAT<8>) bit. The SPITUR bit will be cleared by hardware before the SPI state machine is prepared for the next operation.

Work around

Firmware must wait at least four bit times before writing to the SPI registers after clearing the SPITUR bit.

Affected Silicon Revisions

A0	A1	A3	A4	A5			
X	X	X	X	X			

29. Module: CAN

When an abort request occurs concurrently with a successful message transmission, and additional messages remain in the FIFO, these remaining messages are not transmitted and the TXABAT (CxFIFOCONn<6>) bit does not reflect the abort.

Work around

The actual FIFO status can be determined by the FIFO pointers, CxFIFOCIn and CxFIFOUAn.

Affected Silicon Revisions

A0	A1	A3	A4	A5			
X	X	X	X	X			

30. Module: UART

The UART module is not fully IrDA® compliant. The module does not detect the 1.6 µs minimum bit width at all baud rates as defined in the IrDA® specification. The module does detect the 3-/16-bit width at all baud rates.

Work around

None.

Affected Silicon Revisions

A0	A1	A3	A4	A5			
X	X	X	X	X			

31. Module: UART

In IrDA® mode with baud clock output enabled, the UART transmit (TX) data is corrupted when the Baud Rate Generator (BRG) value is greater than 0x200.

Work around

Use the Peripheral Bus (PB) divisor to lower the PB frequency such that the required UART BRG value is less than 0x201.

Affected Silicon Revisions

A0	A1	A3	A4	A5			
X	X	X	X	X			

32. Module: JTAG

On 64-pin devices an external pull-up resistor is required on the TMS pin for proper JTAG.

Work around

Connect a 100k to 200k pull-up to the TMS pin.

Affected Silicon Revisions

A0	A1	A3	A4	A5			
X	X	X	X	X			

33. Module: UART

The TRMT (UxSTA<8>) bit is asserted during the Stop bit generation, not after the Stop bit has been sent.

Work around

If firmware needs to be aware when the transmission is complete, firmware should add a half bit time delay after the TRMT bit is asserted.

Affected Silicon Revisions

A0	A1	A3	A4	A5			
X	X	X	X	X			

34. Module: UART

The OERR (UxSTA<1>) bit does not get cleared on a module Reset. If the OERR bit is set and the module is disabled, the OERR bit retains its status even after the UART module is reinitialized.

Work around

The user software must check this bit in the UART module initialization routine and clear it if it is set.

Affected Silicon Revisions

A0	A1	A3	A4	A5			
X	X	X	X	X			

35. Module: ADC

When the ADC module is configured to start conversion on an external interrupt (SSRC<2:0> (ADxCON1<7:5> bits) = 001), the start of conversion always occurs on a rising edge detected at the INT0 pin, even when the INT0 pin has been configured to generate an interrupt on a falling edge (INT0EP (INTCON<0>) bit = 0).

Work around

Generate ADC conversion triggers on the rising edge of the INT0 signal.

Alternatively, use external circuitry to invert the signal appearing at the INT0 pin, so that a falling edge of the input signal is detected as a rising edge by the INT0 pin.

Affected Silicon Revisions

A0	A1	A3	A4	A5			
X	X	X	X	X			

36. Module: JTAG

Pin 100 on 100-pin packages and pin A1 on 121-pin packages do not respond to boundary scan commands.

Work around

None.

Affected Silicon Revisions

A0	A1	A3	A4	A5			
X	X	X	X	X			

37. Module: DMA

If the DMA module is suspended by setting the DMA Suspend bit, SUSPEND (DMACON<12>), the DMA Module Busy bit, DMABUSY (DMACON<11>), may continue to show a Busy status, when the DMA module completes transaction.

Work around

Use the Channel Busy bit, CHBUSY (DCHxCON<15>), to check the status of the DMA channel.

Affected Silicon Revisions

A0	A1	A3	A4	A5			
X	X	X	X	X			

38. Module: Voltage Regulator

Device may not exit BOR state if a BOR event occurs.

Work arounds

1. V_{DD} must remain within the published specification (see parameter DC10 of the device data sheet).
2. Reset the device by providing a POR condition.

Affected Silicon Revisions

A0	A1	A3	A4	A5			
X	X						

39. Module: Output Compare

If the Output Compare module is configured for a 0% duty cycle (OCxRS register = 0), a glitch may occur on the next cycle.

Work around

The Output Compare module should be disabled and then re-enabled to achieve a 0% duty cycle.

Affected Silicon Revisions

A0	A1	A3	A4	A5			
X	X	X	X	X			

40. Module: Oscillator

If the Primary Oscillator (POSC) mode is implemented and a Fail-Safe Clock Monitor (FSCM) event occurs (failure of the external primary clock), the internal clock source will switch to the FRC oscillator. Subsequent firmware clock switch requests from the FRC oscillator to other clock sources will fail and the device will continue to execute on the FRC oscillator. Upon repair of the external clock source and a power-on state, the device will resume operation with the primary oscillator clock source.

Work around

None.

Affected Silicon Revisions

A0	A1	A3	A4	A5			
X	X	X	X	X			

41. Module: I^2C

The slave address, 0x78, is one of a group of reserved addresses. It is used as the upper byte of a 10-bit address when 10-bit addressing is enabled. The I^2C module control register allows the programmer to enable both 10-bit addressing and strict enforcement of reserved addressing, with the A10M (I2CxCON<10>) and STRICT (I2CxCON<11>) bits, respectively. When both bits are cleared, the device should respond to the reserved address 0x78, but does not.

Work around

None.

Affected Silicon Revisions

A0	A1	A3	A4	A5			
X	X	X	X	X			

42. Module: USB

If the bus has been idle for more than 3 ms, the IDLEIF interrupt flag is set. If software clears the interrupt flag, and the bus remains idle, the IDLEIF interrupt flag will not be set again.

Work around

Software can leave the IDLEIF bit set until it has received some indication of bus resumption. (Resume, Reset, SOF, or Error).

Note: Resume and Reset are the only interrupts that should be following IDLEIF assertion. If the IDLEIF bit is set, it should be okay to suspend the USB module. This will require software to clear the IDLEIE interrupt enable bit to exit the USB Interrupt Service Routine (ISR) (if using interrupt driven code).

Affected Silicon Revisions

A0	A1	A3	A4	A5			
X	X	X	X	X			

43. Module: CPU

When both Prefetch and Instruction Cache are enabled, a Data Bus Exception (DBE) may occur if an interrupt is encountered by the CPU while it is accessing constant data (not instructions) from Flash memory.

Work arounds

To avoid a DBE, use one of the following two solutions:

1. Structure application code, such that interrupts are not used while the CPU is accessing data from Flash memory.
2. Disable either the Prefetch module or CPU cache functionality as follows (by default both are disabled on a Power-on Reset (POR)):
   a) To disable the Prefetch module, set the Predictive Prefetch Enable bits, PREFEN<1:0>, in the Cache Control Register, CHECON<6:5>, to '00'.
   b) To disable CPU cache, set the Kseg0 bits, K0<2:0>, in the CP0 Configuration Register, Config<2:0>, to '010'.

Note: Disabling either the cache or Prefetch module will have minimum performance degradation, with a typical application realizing 10 percent or less performance impact.

Corrected Revisions

On corrected revisions, an interrupt occurring during CPU access of constant data (not instructions) from Flash memory will be delayed for up to two System Clock (SYSCLK) cycles.

Affected Silicon Revisions

A0	A1	A3	A4	A5			
X	X	X					

44. Module: CPU

During normal operation, if a CPU write operation to a peripheral is interrupted by an incoming interrupt, it should be aborted (not completed) and resumed after the interrupt is serviced. However, some of these write operations may not be aborted, resulting in a double write to peripherals by the CPU (the first write during the interrupt and the second write after the interrupt is serviced).

Work around

Most peripherals are not affected by this issue, as a double write will not have a negative impact. However, the following communication peripherals will double-send data if their respective transmit buffers are written twice: SPI, I^2C, UART, and PMP. To avoid double transmission of data, utilize DMA to transfer data to these peripherals or disable interrupts while writing to these peripherals.

Corrected Revisions

On corrected revisions, an interrupt occurring during CPU write operation to a peripheral will be delayed for up to two Peripheral Bus Clock (PBCLK) cycles.

Affected Silicon Revisions

A0	A1	A3	A4	A5			
X	X	X					

45. Module: Oscillator

A clock signal is present on the CLKO pin, regardless of the clock source and setting of the CLKO Enable Configuration bit, OSCIOFNC (DEVCFG1<10>), during a Power-on Reset (POR) condition.

Work around

Do not connect the CLKO pin to a device that would be adversely affected by rapid pin toggling or a frequency other than that defined by the oscillator configuration. Do not use the CLKO pin as an input if the device connected to the CLKO pin would be adversely affected by the pin driving a signal out.

Affected Silicon Revisions

A0	A1	A3	A4	A5			
X	X	X	X	X			

46. Module: Input Capture

All input capture modes selectable by the ICM<2:0> (ICxCON<2:0>) bits, with the exception of Interrupt-only mode, will not work when the CPU enters Idle mode or Sleep mode.

Work around

Configure the Input Capture module for Interrupt-only mode (ICM<2:0> = 111) when the CPU is in Sleep mode or Idle mode.

Affected Silicon Revisions

A0	A1	A3	A4	A5			
X	X	X	X	X			

47. Module: USB

While operating in Host mode and attached to a low-speed device through a full-speed USB hub, the Host may persistently drive the bus to an SE0 state (both D+/D- as '0'), which would be interpreted as a bus Reset condition by the hub; or the host may persistently drive the bus to a J-state, which would make the hub detach condition undetectable by the host.

Work around

Connect low-speed devices directly to the Host USB port and not through a USB hub.

Affected Silicon Revisions

A0	A1	A3	A4	A5			
X	X	X	X	X			

48. Module: Non-5V Tolerant Pins

When internal pull-ups are enabled on non-5V tolerant pins, the level as measured on the pin and available to external device inputs, may not exceed the minimum value of VIH, and therefore, qualify as a logic "high". However, with respect to PIC32 devices, so long as the load does not exceed -50 µA, the internal pull-ups are guaranteed to be recognized as a logic "high" internally to the PIC32 device.

Work around

It is recommend to only use external pull-ups:

- To guarantee a logic "high" for external logic input circuits outside of the PIC32 device
- For PIC32 device inputs, if the external load exceeds -50 µA

Affected Silicon Revisions

A0	A1	A3	A4	A5			
X	X	X	X	X			

49. Module: 5V Tolerant Pins

When internal pull-ups are enabled on 5V tolerant pins, the level as measured on the pin and available to external device inputs, may not exceed the minimum value of VIH, and therefore, qualify as a logic "high". However, with respect to PIC32 devices, so long as the load does not exceed -50 µA, the internal pull-ups are guaranteed to be recognized as a logic "high" internally to the PIC32 device.

Work around

It is recommend to only use external pull-ups:

- To guarantee a logic "high" for external logic input circuits outside of the PIC32 device
- For PIC32 device inputs, if the external load exceeds -50 µA

Affected Silicon Revisions

A0	A1	A3	A4	A5			
X	X	X	X	X			

Data Sheet Clarifications

The following typographic corrections and clarifications are to be noted for the latest version of the device data sheet (DS60001156**H**):

Note:	Corrections are shown in **bold**. Where possible, the original bold text formatting has been removed for clarity.

1. Module: DC Characteristics: I/O Pin Input Specifications

In the current version of the data sheet, the revision history for changes to **Table 31-8: DC Characteristics: I/O Pin Input Specifications** was omitted.

The text in **bold** in the following table shows the updates that were made.

TABLE 31-8: DC CHARACTERISTICS: I/O PIN INPUT SPECIFICATIONS

DC CHARACTERISTICS			Standard Operating Conditions: 2.3V to 3.6V (unless otherwise stated) Operating temperature -40°C ≤ TA ≤ +85°C for Industrial -40°C ≤ TA ≤ +105°C for V-Temp				
Param. No.	Symbol	Characteristics	Min.	Typical(1)	Max.	Units	Conditions
	VIH	Input High Voltage					
DI20		I/O Pins not 5V-tolerant(5)	**0.65 VDD**	—	VDD	V	(Note 4,**6**)
		I/O Pins 5V-tolerant with PMP(5)	0.25 VDD + 0.8V	—	5.5	V	(Note 4,**6**)
		I/O Pins 5V-tolerant(5)	**0.65 VDD**	—	5.5	V	
DI28		SDAx, SCLx	**0.65 VDD**	—	5.5	V	SMBus disabled (Note 4**,6**)
DI29		SDAx, SCLx	2.1	—	5.5	V	SMBus enabled, 2.3V ≤ VPIN ≤ 5.5 (Note 4**,6**)
DI30	ICNPU	Change Notification Pull-up Current	—	—	**-50**	μA	VDD = 3.3V, VPIN = VSS (Note 3,6)

Note 1: Data in "Typical" column is at 3.3V, 25°C unless otherwise stated. Parameters are for design guidance only and are not tested.

2: The leakage current on the $\overline{MCLR}$ pin is strongly dependent on the applied voltage level. The specified levels represent normal operating conditions. Higher leakage current may be measured at different input voltages.

3: Negative current is defined as current sourced by the pin.

4: This parameter is characterized, but not tested in manufacturing.

5: See the "Pin Diagrams" section for the 5V-tolerant pins.

6: The VIH specification is only in relation to externally applied inputs and not with respect to the user-selectable pull-ups. Externally applied high impedance or open drain input signals utilizing the PIC32 internal pull-ups are guaranteed to be recognized as a logic "high" internally to the PIC32 device, provided that the external load does not exceed the maximum value of ICNPU.

7: VIL source < (VSS - 0.3). Characterized but not tested.

8: VIH source > (VDD + 0.3) for non-5V tolerant pins only.

9: Digital 5V tolerant pins do not have an internal high side diode to VDD, and therefore, cannot tolerate any "positive" input injection current.

10: Injection currents > | 0 | can affect the ADC results by approximately 4 to 6 counts (i.e., VIH Source > (VDD + 0.3) or VIL source < (VSS - 0.3)).

11: Any number and/or combination of I/O pins not excluded under IICL or IICH conditions are permitted provided the "absolute instantaneous" sum of the input injection currents from all pins do not exceed the specified limit. If Note 7, IICL = (((Vss - 0.3) - VIL source) / Rs). If Note 8, IICH = ((IICH source - (VDD + 0.3)) / RS). RS = Resistance between input source voltage and device pin. If (VSS - 0.3) ≤ VSOURCE ≤ (VDD + 0.3), injection current = 0.

TABLE 31-8: DC CHARACTERISTICS: I/O PIN INPUT SPECIFICATIONS (CONTINUED)

DC CHARACTERISTICS			Standard Operating Conditions: 2.3V to 3.6V (unless otherwise stated) Operating temperature -40°C ≤ TA ≤ +85°C for Industrial -40°C ≤ TA ≤ +105°C for V-Temp				
Param. No.	Symbol	Characteristics	Min.	Typical(1)	Max.	Units	Conditions
DI60a	IICL	Input Low Injection Current	0	—	-5(7,10)	mA	This parameter applies to all pins, with the exception of RB10. Maximum IICH current for this exception is 0 mA.
DI60b	IICH	Input High Injection Current	0	—	+5(8,9,10)	mA	This parameter applies to all pins, with the exception of all 5V tolerant pins, SOSCI, and RB10. Maximum IICH current for these exceptions is 0 mA.
DI60c	∑IICT	Total Input Injection Current (sum of all I/O and control pins)	-20(11)	—	+20(11)	mA	Absolute instantaneous sum of all ± input injection currents from all I/O pins (| IICL + | IICH |) ≤ ∑IICT

Note 1: Data in "Typical" column is at 3.3V, 25°C unless otherwise stated. Parameters are for design guidance only and are not tested.

2: The leakage current on the $\overline{MCLR}$ pin is strongly dependent on the applied voltage level. The specified levels represent normal operating conditions. Higher leakage current may be measured at different input voltages.

3: Negative current is defined as current sourced by the pin.

4: This parameter is characterized, but not tested in manufacturing.

5: See the "Pin Diagrams" section for the 5V-tolerant pins.

6: The VIH specification is only in relation to externally applied inputs and not with respect to the user-selectable pull-ups. Externally applied high impedance or open drain input signals utilizing the PIC32 internal pull-ups are guaranteed to be recognized as a logic "high" internally to the PIC32 device, provided that the external load does not exceed the maximum value of ICNPU.

7: VIL source < (VSS - 0.3). Characterized but not tested.

8: VIH source > (VDD + 0.3) for non-5V tolerant pins only.

9: Digital 5V tolerant pins do not have an internal high side diode to VDD, and therefore, cannot tolerate any "positive" input injection current.

10: Injection currents > | 0 | can affect the ADC results by approximately 4 to 6 counts (i.e., VIH Source > (VDD + 0.3) or VIL source < (VSS - 0.3)).

11: Any number and/or combination of I/O pins not excluded under IICL or IICH conditions are permitted provided the "absolute instantaneous" sum of the input injection currents from all pins do not exceed the specified limit. If Note 7, IICL = (((Vss - 0.3) - VIL source) / Rs). If Note 8, IICH = ((IICH source - (VDD + 0.3)) / RS). RS = Resistance between input source voltage and device pin. If (VSS - 0.3) ≤ VSOURCE ≤ (VDD + 0.3), injection current = 0.

2. Module: DC Characteristics: Program Memory

Certain specifications in Table 31-11 were stated incorrectly in the data sheet. The correct values are shown in **bold** type in the following table.

TABLE 31-11: DC CHARACTERISTICS: PROGRAM MEMORY

DC CHARACTERISTICS			Standard Operating Conditions: 2.3V to 3.6V (unless otherwise stated) Operating temperature -40°C ≤ TA ≤ +85°C for Industrial -40°C ≤ TA ≤ +105°C for V-Temp				
Param. No.	Symbol	Characteristics	Min.	Typical(1)	Max.	Units	Conditions
		Program Flash Memory(3)					
D130	EP	Cell Endurance	1000	—	—	E/W	—
D130a	EP	Cell Endurance	20,000	—	—	E/W	See Note 4
D131	VPR	VDD for Read	2.3	—	3.6	V	—
D132	VPEW	VDD for Erase or Write	3.0	—	3.6	V	—
D132a	VPEW	VDD for Erase or Write	2.3	—	3.6	V	See Note 4
D134	TRETD	Characteristic Retention	20	—	—	Year	Provided no other specifications are violated
D135	IDDP	Supply Current during Programming	—	10	—	mA	—
	TWW	Word Write Cycle Time	**—**	**411**	**—**	**FRC Cycles**	**See Note 4**
D136	TRW	Row Write Cycle Time(2)	**—**	**26067**	**—**	**FRC Cycles**	**See Note 4**
D137	TPE	Page Erase Cycle Time	**—**	**201060**	**—**	**FRC Cycles**	**See Note 4**
	TCE	Chip Erase Cycle Time	**—**	**804652**	**—**	**FRC Cycles**	**See Note 4**

Note 1: Data in "Typical" column is at 3.3V, 25°C unless otherwise stated.

2: The minimum SYSCLK for row programming is 4 MHz. Care should be taken to minimize bus activities during row programming, such as suspending any memory-to-memory DMA operations. If heavy bus loads are expected, selecting Bus Matrix Arbitration mode 2 (rotating priority) may be necessary. The default Arbitration mode is mode 1 (CPU has lowest priority).

3: Refer to *"PIC32 Flash Programming Specification"* (DS60001145) for operating conditions during programming and erase cycles.

4: This parameter depends on the FRC accuracy (see Table 31-19) and the FRC tuning values (see Register 8-2).

3. Module: DC Characteristics: Operating Current (IDD)

Note 4 in Table 31-5 was stated incorrectly in the data sheet. The correct information is shown in **bold** type in the following table.

Note:	All previous **(Note 4)** references listed in the Conditions column were removed.

TABLE 31-5: DC CHARACTERISTICS: OPERATING CURRENT (IDD)

DC CHARACTERISTICS			Standard Operating Conditions: 2.3V to 3.6V (unless otherwise stated) Operating temperature -40°C ≤ TA ≤ +85°C for Industrial -40°C ≤ TA ≤ +105°C for V-Temp				
Param. No.	Typical(3)	Max.	Units	Conditions			
Operating Current (IDD)(1,2,4) for PIC32MX575/675/695/775/795 Family Devices							
DC20	6	9	mA	Code executing from Flash	-40ºC, +25ºC, +85ºC	—	4 MHz
DC20b	7	10			+105ºC		
DC20a	4	—		Code executing from SRAM	—		
DC21	37	40	mA	Code executing from Flash	—	—	25 MHz
DC21a	25	—		Code executing from SRAM			
DC22	64	70	mA	Code executing from Flash	—	—	60 MHz
DC22a	61	—		Code executing from SRAM			
DC23	85	98	mA	Code executing from Flash	-40ºC, +25ºC, +85ºC	—	80 MHz
DC23b	90	120			+105ºC		
DC23a	85	—		Code executing from SRAM	—		
DC25a	125	150	µA	—	+25°C	3.3V	LPRC (31 kHz)

Note 1: A device's IDD supply current is mainly a function of the operating voltage and frequency. Other factors, such as PBCLK (Peripheral Bus Clock) frequency, number of peripheral modules enabled, internal code execution pattern, execution from Program Flash memory vs. SRAM, I/O pin loading and switching rate, oscillator type, as well as temperature, can have an impact on the current consumption.

2: The test conditions for IDD measurements are as follows:

- Oscillator mode is EC (for 8 MHz and below) and EC+PLL (for above 8 MHz) with OSC1 driven by external square wave from rail-to-rail, (OSC1 input clock input over/undershoot < 100 mV required)
- OSC2/CLKO is configured as an I/O input pin
- USB PLL oscillator is disabled if the USB module is implemented, PBCLK divisor = 1:8
- CPU, program Flash, and SRAM data memory are operational, program Flash memory Wait states = 111, Program Cache and Prefetch are disabled and SRAM data memory Wait states = 1
- No peripheral modules are operating, (ON bit = 0)
- WDT, Clock Switching, Fail-Safe Clock Monitor, and Secondary Oscillator are disabled
- All I/O pins are configured as inputs and pulled to VSS
- $\overline{MCLR}$ = VDD
- CPU executing while(1) statement from Flash
- RTCC and JTAG are disabled

3: Data in "Typical" column is at 3.3V, 25°C at specified operating frequency unless otherwise stated. Parameters are for design guidance only and are not tested.

4: All parameters are characterized, but only those parameters listed for 4 MHz and 80 MHz are tested at 3.3V in manufacturing.

TABLE 31-5: DC CHARACTERISTICS: OPERATING CURRENT (IDD) (CONTINUED)

DC CHARACTERISTICS			Standard Operating Conditions: 2.3V to 3.6V (unless otherwise stated) Operating temperature -40°C ≤ TA ≤ +85°C for Industrial -40°C ≤ TA ≤ +105°C for V-Temp				
Param. No.	Typical(3)	Max.	Units	Conditions			
Operating Current (IDD)(1,2,4) for PIC32MX534/564/664/764 Family Devices							
DC20c	6	9	mA	Code executing from Flash	-40ºC, +25ºC, +85ºC	—	4 MHz
DC20d	7	10			+105ºC		
DC20e	2	—		Code executing from SRAM	—		
DC21b	19	32	mA	Code executing from Flash	—	—	25 MHz
DC21c	14	—		Code executing from SRAM			
DC22b	31	50	mA	Code executing from Flash	—	—	60 MHz
DC22c	29	—		Code executing from SRAM			
DC23c	39	65	mA	Code executing from Flash	-40ºC, +25ºC, +85ºC	—	80 MHz
DC23d	49	70			+105ºC		
DC23e	39	—		Code executing from SRAM	—		
DC25b	100	150	µA	—	+25°C	3.3V	LPRC (31 kHz)

Note 1: A device's IDD supply current is mainly a function of the operating voltage and frequency. Other factors, such as PBCLK (Peripheral Bus Clock) frequency, number of peripheral modules enabled, internal code execution pattern, execution from Program Flash memory vs. SRAM, I/O pin loading and switching rate, oscillator type, as well as temperature, can have an impact on the current consumption.

2: The test conditions for IDD measurements are as follows:

- Oscillator mode is EC (for 8 MHz and below) and EC+PLL (for above 8 MHz) with OSC1 driven by external square wave from rail-to-rail, (OSC1 input clock input over/undershoot < 100 mV required)
- OSC2/CLKO is configured as an I/O input pin
- USB PLL oscillator is disabled if the USB module is implemented, PBCLK divisor = 1:8
- CPU, program Flash, and SRAM data memory are operational, program Flash memory Wait states = 111, Program Cache and Prefetch are disabled and SRAM data memory Wait states = 1
- No peripheral modules are operating, (ON bit = 0)
- WDT, Clock Switching, Fail-Safe Clock Monitor, and Secondary Oscillator are disabled
- All I/O pins are configured as inputs and pulled to VSS
- $\overline{MCLR}$ = VDD
- CPU executing `while(1)` statement from Flash
- RTCC and JTAG are disabled

3: Data in "Typical" column is at 3.3V, 25°C at specified operating frequency unless otherwise stated. Parameters are for design guidance only and are not tested.

4: All parameters are characterized, but only those parameters listed for 4 MHz and 80 MHz are tested at 3.3V in manufacturing.

4. Module: DC Characteristics: Operating Current (I_{IDLE})

Note 3 in Table 31-6 was stated incorrectly in the data sheet. The correct references are shown in **bold** type in the following table.

Note:	All previous **(Note 3)** references listed in the Conditions column were removed.

TABLE 31-6: DC CHARACTERISTICS: IDLE CURRENT (I_{IDLE})

DC CHARACTERISTICS			Standard Operating Conditions: 2.3V to 3.6V (unless otherwise stated) Operating temperature -40°C ≤ TA ≤ +85°C for Industrial -40°C ≤ TA ≤ +105°C for V-Temp			
Parameter No.	Typical(2)	Max.	Units	Conditions		
Idle Current (I_{IDLE})(1,3) for PIC32MX575/675/695/775/795 Family Devices						
DC30	4.5	6.5	mA	-40ºC, +25ºC, +85ºC	—	4 MHz
DC30b	5	7		+105°C		
DC31	13	15	mA	-40ºC, +25ºC, +85ºC	—	25 MHz
DC32	28	30	mA	-40ºC, +25ºC, +85ºC	—	60 MHz
DC33	36	42	mA	-40ºC, +25ºC, +85ºC	—	80 MHz
DC33b	39	45	mA	+105°C		
DC34	—	40	µA	-40°C	2.3V	LPRC (31 kHz)
DC34a		75		+25°C		
DC34b		800		+85°C		
DC34c		1000		+105°C		
DC35	35	—	µA	-40°C	3.3V	
DC35a	65			+25°C		
DC35b	600			+85°C		
DC35c	800			+105°C		
DC36	—	43	µA	-40°C	3.6V	
DC36a		106		+25°C		
DC36b		800		+85°C		
DC36c		1000		+105°C		

Note 1: The test conditions for I_{IDLE} current measurements are as follows:

- Oscillator mode is EC (for 8 MHz and below) and EC+PLL (for above 8 MHz) with OSC1 driven by external square wave from rail-to-rail, (OSC1 input clock input over/undershoot < 100 mV required)
- OSC2/CLKO is configured as an I/O input pin
- USB PLL oscillator is disabled if the USB module is implemented, PBCLK divisor = 1:8
- CPU is in Idle mode, program Flash memory Wait states = 111, Program Cache and Prefetch are disabled and SRAM data memory Wait states = 1
- No peripheral modules are operating, (ON bit = 0)
- WDT, Clock Switching, Fail-Safe Clock Monitor, and Secondary Oscillator are disabled
- All I/O pins are configured as inputs and pulled to VSS
- $\overline{MCLR}$ = VDD
- RTCC and JTAG are disabled

2: Data in "Typical" column is at 3.3V, 25°C unless otherwise stated. Parameters are for design guidance only and are not tested.

3: All parameters are characterized, but only those parameters listed for 4 MHz and 80 MHz are tested at 3.3V in manufacturing.

TABLE 31-6: DC CHARACTERISTICS: IDLE CURRENT (IIDLE) (CONTINUED)

DC CHARACTERISTICS			Standard Operating Conditions: 2.3V to 3.6V (unless otherwise stated) Operating temperature -40°C ≤ TA ≤ +85°C for Industrial -40°C ≤ TA ≤ +105°C for V-Temp			
Parameter No.	Typical(2)	Max.	Units	Conditions		
Idle Current (IIDLE)(1,3) for PIC32MX534/564/664/764 Family Devices						
DC30a	1.5	5	mA	-40ºC, +25ºC, +85ºC	—	4 MHz
DC30c	3.5	6		+105ºC		
DC31a	7	11		-40ºC, +25ºC, +85ºC	—	25 MHz
DC32a	13	20	mA	-40ºC, +25ºC, +85ºC	—	60 MHz
DC33a	17	25	mA	-40ºC, +25ºC, +85ºC	—	80 MHz
DC33c	20	27		+105ºC		
DC34c	—	40	µA	-40°C	2.3V	LPRC (31 kHz)
DC34d		75		+25°C		
DC34e		800		+85°C		
DC34f		1000		+105ºC		
DC35c	30	—	µA	-40°C	3.3V	
DC35d	55			+25°C		
DC35e	230			+85°C		
DC35f	800			+105ºC		
DC36c	—	43	µA	-40°C	3.6V	
DC36d		106		+25°C		
DC36e		800		+85°C		
DC36f		1000		+105ºC		

Note 1: The test conditions for IIDLE current measurements are as follows:

- Oscillator mode is EC (for 8 MHz and below) and EC+PLL (for above 8 MHz) with OSC1 driven by external square wave from rail-to-rail, (OSC1 input clock input over/undershoot < 100 mV required)
- OSC2/CLKO is configured as an I/O input pin
- USB PLL oscillator is disabled if the USB module is implemented, PBCLK divisor = 1:8
- CPU is in Idle mode, program Flash memory Wait states = 111, Program Cache and Prefetch are disabled and SRAM data memory Wait states = 1
- No peripheral modules are operating, (ON bit = 0)
- WDT, Clock Switching, Fail-Safe Clock Monitor, and Secondary Oscillator are disabled
- All I/O pins are configured as inputs and pulled to VSS
- $\overline{MCLR}$ = VDD
- RTCC and JTAG are disabled

2: Data in "Typical" column is at 3.3V, 25°C unless otherwise stated. Parameters are for design guidance only and are not tested.

3: All parameters are characterized, but only those parameters listed for 4 MHz and 80 MHz are tested at 3.3V in manufacturing.

5. Module: DC Characteristics: Operating Current (I_{PD})

Certain references to Note 6 in Table 31-7 were omitted in the data sheet. These references are shown in **bold** type in the following table.

TABLE 31-7: DC CHARACTERISTICS: POWER-DOWN CURRENT (I_{PD})

DC CHARACTERISTICS			Standard Operating Conditions: 2.3V to 3.6V (unless otherwise stated) Operating temperature -40°C ≤ TA ≤ +85°C for Industrial -40°C ≤ TA ≤ +105°C for V-Temp			
Param. No.	Typical(2)	Max.	Units	Conditions		
Power-Down Current (I_{PD})(1) for PIC32MX575/675/695/775/795 Family Devices						
DC40	10	40	μA	-40°C	2.3V	Base Power-Down Current (Note 6)
DC40a	36	100		+25°C		
DC40b	400	720		+85°C		
DC40h	900	1800		+105°C		
DC40c	41	120		+25°C	3.3V	Base Power-Down Current
DC40d	22	80		-40°C	3.6V	Base Power-Down Current **(Note 6)**
DC40e	42	120		+25°C		
DC40g	315	400(5)		+70°C		
DC40f	410	800		+85°C		
DC40i	1000	2000		+105°C		
Module Differential Current for PIC32MX575/675/695/775/795 Family Devices						
DC41	—	10	μA	—	2.3V	Watchdog Timer Current: ΔIWDT (Notes 3,6)
DC41a	5	—			3.3V	Watchdog Timer Current: ΔIWDT (Note 3)
DC41b	—	20			3.6V	Watchdog Timer Current: ΔIWDT (Note 3,**6**)
DC42	—	40	μA	—	2.3V	RTCC + Timer1 w/32 kHz Crystal: ΔIRTCC (Notes 3,6)
DC42a	23	—			3.3V	RTCC + Timer1 w/32 kHz Crystal: ΔIRTCC (Note 3)
DC42b	—	50			3.6V	RTCC + Timer1 w/32 kHz Crystal: ΔIRTCC (Note 3,**6**)
DC43	—	1300	μA	—	2.5V	ADC: ΔIADC (Notes 3,4,6)
DC43a	1100	—			3.3V	ADC: ΔIADC (Notes 3,4)
DC43b	—	1300			3.6V	ADC: ΔIADC (Notes 3,4,**6**)

Note 1: The test conditions for IPD current measurements are as follows:

- Oscillator mode is EC (for 8 MHz and below) and EC+PLL (for above 8 MHz) with OSC1 driven by external square wave from rail-to-rail, (OSC1 input clock input over/undershoot < 100 mV required)
- OSC2/CLKO is configured as an I/O input pin
- USB PLL oscillator is disabled if the USB module is implemented, PBCLK divisor = 1:8
- CPU is in Sleep mode, program Flash memory Wait states = 111, Program Cache and Prefetch are disabled and SRAM data memory Wait states = 1
- No peripheral modules are operating, (ON bit = 0)
- WDT, Clock Switching, Fail-Safe Clock Monitor, and Secondary Oscillator are disabled
- All I/O pins are configured as inputs and pulled to VSS
- $\overline{MCLR}$ = VDD
- RTCC and JTAG are disabled

2: Data in the "Typical" column is at 3.3V, 25°C unless otherwise stated. Parameters are for design guidance only and are not tested.

3: The Δ current is the additional current consumed when the module is enabled. This current should be added to the base IPD current.

4: Test conditions for ADC module differential current are as follows: Internal ADC RC oscillator enabled.

5: Data is characterized at +70°C and not tested. Parameter is for design guidance only.

6: This parameter is characterized, but not tested in manufacturing.

TABLE 31-7: DC CHARACTERISTICS: POWER-DOWN CURRENT (IPD) (CONTINUED)

DC CHARACTERISTICS			Standard Operating Conditions: 2.3V to 3.6V (unless otherwise stated) Operating temperature -40°C ≤ TA ≤ +85°C for Industrial -40°C ≤ TA ≤ +105°C for V-Temp			
Param. No.	Typical(2)	Max.	Units	Conditions		
Power-Down Current (IPD)(1) for PIC32MX534/564/664/764 Family Devices						
DC40g	12	40	μA	-40°C	2.3V	Base Power-Down Current (Note 6)
DC40h	20	120		+25°C		
DC40i	210	600		+85°C		
DC40o	400	1000		+105°C		
DC40j	20	120		+25°C	3.3V	Base Power-Down Current
DC40k	15	80		-40°C	3.6V	Base Power-Down Current **(Note 6)**
DC40l	20	120		+25°C		
DC40m	113	350(5)		+70°C		
DC40n	220	650		+85°C		
DC40p	500	1000		+105°C		
Module Differential Current for PIC32MX534/564/664/764 Family Devices						
DC41c	—	10	μA	—	2.5V	Watchdog Timer Current: ΔIWDT (Notes 3,6)
DC41d	5	—			3.3V	Watchdog Timer Current: ΔIWDT (Note 3)
DC41e	—	20			3.6V	Watchdog Timer Current: ΔIWDT (Note 3,**6**)
DC42c	—	40	μA	—	2.5V	RTCC + Timer1 w/32 kHz Crystal: ΔIRTCC (Notes 3,6)
DC42d	23	—			3.3V	RTCC + Timer1 w/32 kHz Crystal: ΔIRTCC (Note 3)
DC42e	—	50			3.6V	RTCC + Timer1 w/32 kHz Crystal: ΔIRTCC (Note 3,**6**)
DC43c	—	1300	μA	—	2.5V	ADC: ΔIADC (Notes 3,4,6)
DC43d	1100	—			3.3V	ADC: ΔIADC (Notes 3,4)
DC43e	—	1300			3.6V	ADC: ΔIADC (Notes 3,4,**6**)

Note 1: The test conditions for IPD current measurements are as follows:

- Oscillator mode is EC (for 8 MHz and below) and EC+PLL (for above 8 MHz) with OSC1 driven by external square wave from rail-to-rail, (OSC1 input clock input over/undershoot < 100 mV required)
- OSC2/CLKO is configured as an I/O input pin
- USB PLL oscillator is disabled if the USB module is implemented, PBCLK divisor = 1:8
- CPU is in Sleep mode, program Flash memory Wait states = 111, Program Cache and Prefetch are disabled and SRAM data memory Wait states = 1
- No peripheral modules are operating, (ON bit = 0)
- WDT, Clock Switching, Fail-Safe Clock Monitor, and Secondary Oscillator are disabled
- All I/O pins are configured as inputs and pulled to VSS
- $\overline{MCLR}$ = VDD
- RTCC and JTAG are disabled

2: Data in the "Typical" column is at 3.3V, 25°C unless otherwise stated. Parameters are for design guidance only and are not tested.

3: The Δ current is the additional current consumed when the module is enabled. This current should be added to the base IPD current.

4: Test conditions for ADC module differential current are as follows: Internal ADC RC oscillator enabled.

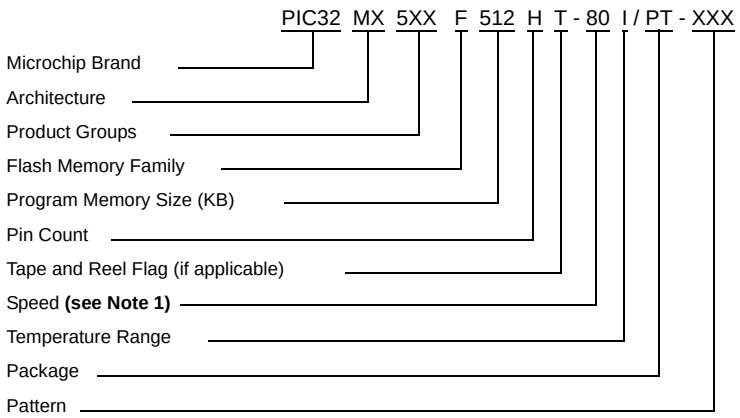
5: Data is characterized at +70°C and not tested. Parameter is for design guidance only.

6: This parameter is characterized, but not tested in manufacturing.

6. Module: Product Identification System

The Product Identification System information was incorrectly specified in the current version of the data sheet. The corrected information is shown in **bold** type.

To order or obtain information, e.g., on pricing or delivery, refer to the factory or the listed sales office.



Example:

PIC32MX575F256H-80I/PT:
General purpose PIC32,
32-bit RISC MCU,
256 KB program memory,
64-pin, Industrial temperature,
TQFP package.

Flash Memory Family

Architecture	MX	= 32-bit RISC MCU core
Product Groups	5XX	= General purpose microcontroller family
	6XX	= General purpose microcontroller family
	7XX	= General purpose microcontroller family
Flash Memory Family	F	= Flash program memory
Program Memory Size	**64**	**= 64K**
	128	**= 128K**
	256	= 256K
	512	= 512K
Pin Count	H	= 64-pin
	L	= 100-pin, **121-pin, 124-pin**
Speed **(see Note 1)**	80	= 80 MHz
Temperature Range	I	= -40°C to +85°C (Industrial)
	V	= -40°C to +105°C (V-Temp)
Package	PT	= 64-Lead (10x10x1 mm) TQFP (Thin Quad Flatpack)
	PT	= 100-Lead (12x12x1 mm) TQFP (Thin Quad Flatpack)
	PF	= 100-Lead (14x14x1 mm) TQFP (Thin Quad Flatpack)
	MR	= 64-Lead (9x9x0.9 mm) QFN (Plastic Quad Flat)
	BG	= 121-Lead (10x10x1.1 mm) TFBGA (Plastic Thin Profile Ball Grid Array)
	TL	= 124-Lead (9x9x0.9 mm) VTLA (Very Thin Leadless Array)
Pattern		Three-digit QTP, SQTP, Code or Special Requirements (blank otherwise)
	ES	= Engineering Sample

Note 1: This option is not available for PIC32MX534/564/664/774 devices.

APPENDIX A: REVISION HISTORY

Rev A Document (8/2009)

Initial release of this document; issued for revision A0 silicon.

Includes silicon issues 1 (I^2C™), 2 (Ethernet), 3 (ADC), 4 (Parallel Master Port), 5 (Output Compare), 6 (SPI) and 7 (UART).

Rev B Document (11/2009)

Added silicon issues 8 (USB), 9-10 (Output Compare), 11 (DMA), 12 (Timers), 13 (SPI), 14-17 (CAN), 18 (Output Compare), 19 (SPI), 20-21 (USB), 22 (Watchdog Timer), 23 (Oscillator) and 24 (Oscillator).

Rev C Document (9/2010)

The document title was changed to PIC32MX575/675/ /695/775/795 Family Silicon Errata and Data Sheet Clarification.

Added devices to Table 1: Silicon DEVREV Values.

Modified silicon issue 1 (I^2C™).

Added silicon issues 25 (SPI), 26 (PORTS), 27-28 (SPI), 29 (CAN), 30-31 (UART), 32 (JTAG), 33 (UART) and 34 (UART), and added data sheet clarification issue 1 (DC Characteristics: I/O Pin Input Specifications).

Rev D Document (11/2010)

Removed data sheet clarification 1.

Added silicon issues 35 (ADC), 36 (JTAG) and 37 (DMA).

Rev E Document (12/2010)

Added silicon issue 38 (Voltage Regulator).

Rev F Document (3/2011)

Updated the current silicon revision to A1 throughout the document. Added silicon issue 39 (Output Compare) and data sheet clarification 1 (DC Characteristics: I/O Pin Input Specifications).

Rev G Document (10/2011)

Updated issue 19 (SPI).

Added silicon issues 40 (Oscillator), 41 (I^2C), and 42 (USB).

Added data sheet clarification 2 (AC Characteristics: Standard Operating Conditions).

Rev H Document (10/2011)

Updated the current silicon revision to A3 throughout the document.

Rev J Document (2/2012)

Added silicon issues 43 (CPU), 44 (CPU), and 45 (Oscillator).

Rev K Document (3/2012)

Updated silicon issue 43 (CPU) and 44 (CPU).

Added silicon issue 46 (Input Capture) and 47 (USB).

Rev L Document (9/2012)

Updated the current silicon revision to A4 throughout the document.

Updated silicon issue 6 (SPI), 43 (CPU), and 44 (CPU).

Updated the note in the Silicon DEVREV Values table (see Table 1).

Rev M Document (2/2013)

Updated the current silicon revision to A5 throughout the document.

The Note in silicon issue 42 (USB) was updated.

Rev N Document (5/2013)

Added silicon issues 48 (Non-5V Tolerant Pins) and 49 (5V Tolerant Pins).

Removed data sheet clarifications 1 and 2.

Added data sheet clarifications 1 (DC Characteristics: I/O Pin Input Specifications), 2 (DC Characteristics: Program Memory), 3 (DC Characteristics: Operating Current (I_{DD})), 4 (DC Characteristics: Operating Current (I_{IDLE})), 5 (DC Characteristics: Operating Current (I_{PD})) and 6 (Product Identification System).

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