



# Precision Analog Microcontroller, 12-Bit Analog I/O, Large Memory, ARM7TDMI MCU with Enhanced IRQ Handler

Silicon Anomaly

**ADuC7124/ADuC7126**

This anomaly list describes the known bugs, anomalies, and workarounds for the [ADuC7124/ADuC7126](#) MicroConverter® Revision B silicon. The anomalies listed apply to all [ADuC7124/ADuC7126](#) packaged material branded as follows:

First Line [ADuC7124](#) or [ADuC7126](#)

Third Line B30

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## [ADuC7124/ADuC7126](#) FUNCTIONALITY ISSUES

Silicon Revision Identifier	Kernel Revision Identifier	Chip Marking	Silicon Status	Anomaly Sheet	No. of Reported Anomalies
B	30	All silicon branded B30	Released	Rev. B	7

## [ADuC7124/ADuC7126](#) PERFORMANCE ISSUES

Silicon Revision Identifier	Kernel Revision Identifier	Chip Marking	Silicon Status	Anomaly Sheet	No. of Reported Anomalies
B	30	All silicon branded B30	Released	Rev. B	2

Rev. B

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## FUNCTIONALITY ISSUES

Table 1. ADC Conversion— $\overline{\text{CONV}}_{\text{START}}$  Edge Trigger Mode [er001]

<b>Background</b>	ADC conversion can be set as $\overline{\text{CONV}}_{\text{START}}$ falling edge trigger mode by setting ADCCON Bit 13 and with ADCCON[2:0] = 000. Clearing ADCCON Bit 13 enables $\overline{\text{CONV}}_{\text{START}}$ high level trigger mode.
<b>Issue</b>	ADC conversion by $\overline{\text{CONV}}_{\text{START}}$ edge trigger mode is not reliable.
<b>Workaround</b>	Configure $\overline{\text{CONV}}_{\text{START}}$ through one PLA flip-flop with ULCK as its clock. This ensures that the ADC is triggered by $\overline{\text{CONV}}_{\text{START}}$ when its pulse width is more than 25 ns. This will be fixed in the next revision.
<b>Related Issues</b>	None.

Table 2. ADC Conversion—PLA Edge Trigger Mode [er002]

<b>Background</b>	The ADC conversion can be set as PLA rising edge trigger mode by setting ADCCON Bit 13 and with ADCCON[2:0] = 101. Clearing ADCCON Bit 13 enables PLA low level trigger mode.
<b>Issue</b>	ADC conversion by PLA edge trigger mode is not reliable.
<b>Workaround</b>	Configure the PLA element output through another PLA flip-flop with ULCK as its clock. This ensures that the ADC is triggered by the PLA edge when CD is less than 5. This will be fixed in the next revision.
<b>Related Issues</b>	None.

Table 3. Disabling I<sup>2</sup>C Interface in Slave Mode When a Transfer Is in Progress [er003]

<b>Background</b>	The I2CSEN bit (Bit 0 in the I2CxSCON register) enables/disables the I <sup>2</sup> C slave interface. The I2CSBUSY bit (Bit 6 in the I2CxSSTA register) indicates whether the I <sup>2</sup> C slave interface is busy.
<b>Issue</b>	If I <sup>2</sup> C slave mode is enabled (I2CxSCON Bit 0 = 1) and a transfer is in progress with the master, do not clear I2CxSCON Bit 0 to 0 to disable the I <sup>2</sup> C slave interface until the I <sup>2</sup> C busy bit, I2CSBUSY (Bit 6 of I2CxSSTA), is cleared. When I2CxSCON Bit 0 is cleared to 0 and I2CSBUSY is still set, the ADuC7124/ADuC7126 may drive the SDAx pins low indefinitely. When this condition occurs, the ADuC7124/ADuC7126 do not release the SDAx pins unless a hardware reset condition occurs.
<b>Workaround</b>	When disabling I <sup>2</sup> C slave mode by writing to the I2CSEN bit (Bit 0 in the I2CxSCON register), first set the I2CMEN bit (Bit 0 in the I2CxMCON register) = 1 to enable master mode. Then disable the slave mode by clearing the I2CSEN bit. Finally, clear the I2CMEN bit.
<b>Related Issues</b>	None.

Table 4. Operation of SPI in Slave Mode [er004]

<b>Background</b>	When in SPI slave mode, the ADuC7124/ADuC7126 expect the number of clock pulses from the master to be divisible by 8 when the chip select ( $\overline{\text{CS}}$ ) pin is low. The internal bit shift counter within the ADuC7124/ADuC7126 is not reset when the chip select pin is deasserted.
<b>Issue</b>	If the number of clocks from the master is not divisible by 8 when the chip select is active, incorrect data may be received or transmitted by the ADuC7124/ADuC7126 because the bit shift counter will not be at 0 for future transfers. The internal bit shift counter for the transmit or receive buffers can only be reset by a hardware, software, or watchdog reset.
<b>Workaround</b>	Always ensure that the number of SPI clocks is divisible by 8 when the ADuC7124/ADuC7126 chip select is active.
<b>Related Issues</b>	None.

Table 5. Timer0 in Periodic Mode with Internal 32 kHz Clock [er005]

<b>Background</b>	In periodic mode, the internal counter decrements/increments from the value in the load register (TOLD MMR) until zero/full scale and starts again at the value stored in the load register. The value of a counter can be read at any time by accessing its value register (TOVAL).
<b>Issue</b>	The first timer interrupt occurs only after a full 16-bit countdown. After the countdown, the TOLD value is copied into TOVAL as expected. This issue occurs only when the 32 kHz oscillator is serving as the timer source.
<b>Workaround</b>	None.
<b>Related Issues</b>	None.

Table 6. I<sup>2</sup>C Slave Not Releasing the Bus [er006]

<b>Background</b>	When an I <sup>2</sup> C read request happens, if the slave's Tx FIFO is empty, the slave should NACK the masters' request. Then it should release the bus, allowing the master to generate a stop condition.
<b>Issue</b>	If the slave's Tx FIFO is loaded with a byte who's MSB is 0 just on the rising edge of SCL for the ACK/NACK, the slave will pull the SDA low and hold the line until the device is reset.
<b>Workaround</b>	Make sure the Tx FIFO is always loaded on time by preloading Tx FIFO in the preceding RX interrupt.
<b>Related Issues</b>	None.

Table 7. I<sup>2</sup>C Clock Stretch Issue [er007]

<b>Background</b>	Clock stretching is a feature that allows a device to halt the I <sup>2</sup> C bus temporarily by holding SCL low. Bit 6 of the I2CxSCON register enables clock stretching in slave mode. Bit 3 of the I2CxMCON register enables clock stretching in master mode.
<b>Issue</b>	Writing to I2CxSCON Bit 6 or to I2CxMCON Bit 3 on the rising edge of SCL can cause a glitch that may be interpreted by other devices as a real clock edge and might hang the bus.
<b>Workaround</b>	Do not enable clock stretching.
<b>Related Issues</b>	None.

**PERFORMANCE ISSUES**

Table 8. ADC and DAC Reference Selection Limitation [pr001]

<b>Background</b>	The ADuC7124/ADuC7126 provide an on-chip band gap reference of 2.5 V, which can be used for the ADC and DACs. This internal reference also appears on the V <sub>REF</sub> pin. When using the internal reference, a 0.47 μF capacitor must be connected from the external V <sub>REF</sub> pin to AGND to ensure stability and fast response during ADC conversions.
<b>Issue</b>	When REFCON = 0x00 is set, the internal 2.5 V reference is unstable; that is, when the ADC uses the external reference (REFCON = 0x00) and the DACs use the internal 2.5 V reference (DACxCON[1:0] = 10), the DAC output is unstable.
<b>Workaround</b>	Set REFCON = 0x00 for the ADC to use the external reference, and set DACxCON[1:0] = 01 for the DACs to use a different external reference from DAC <sub>REF</sub> .
<b>Related Issues</b>	None.

Table 9. JTAG Clock Limitation [pr002]

<b>Background</b>	The JTAG clock speed is limited.
<b>Issue</b>	JTAG speed requires $TCK < UCLK / (2^{CD} \times 6)$ ; that is, TCK should be changed according to how the CD (CPU clock divider) bits are set. If TCK is greater than the limitation, the JTAG cannot download until the power-on reset (POR) is at the correct TCK speed.
<b>Workaround</b>	The JTAG clock speed must be set up manually. The default kernel setting for the CPU clock is CD = 3 (5.22 MHz). Therefore, a JTAG clock speed limitation of 800 kHz or less must be maintained.
<b>Related Issues</b>	None.

**SECTION 1. ADuC7124/ADuC7126 FUNCTIONALITY ISSUES**

Reference Number	Description	Status
er001	ADC conversion— $\overline{\text{CONV}}_{\text{START}}$ edge trigger mode	Open
er002	ADC conversion—PLA edge trigger mode	Open
er003	Disabling I <sup>2</sup> C interface in slave mode when a transfer in progress	Open
er004	Operation of SPI in slave mode	Open
er005	Timer0 in periodic mode with an internal 32 kHz clock	Open
er006	I <sup>2</sup> C slave not releasing the bus	Open
er007	I <sup>2</sup> C clock stretch issue	Open

**SECTION 2. ADuC7124/ADuC7126 PERFORMANCE ISSUES**

Reference Number	Description	Status
pr001	ADC and DAC reference selection limitation	Open
pr002	JTAG clock limitation	Open

I<sup>2</sup>C refers to a communications protocol originally developed by Philips Semiconductors (now NXP Semiconductors).