ATmega3208/3209 Silicon Errata and Data Sheet Clarification

ATmega3208/3209 Silicon Errata and Data Sheet Clarification

The ATmega3208/3209 devices of the megaAVR® 0-series you have received conform functionally to the current device data sheet (www.microchip.com/DS40002174), except for the anomalies described in this document. The errata described in this document will likely be addressed in future revisions of the ATmega3208/3209 devices.

Note: This document summarizes all the silicon errata issues from all revisions of silicon, previous as well as current.

Note: Refer to the Device/Revision ID section in the current device data sheet (www.microchip.com/DS40002174) for more detailed information on Device Identification and Revision IDs for your specific device, or contact your local Microchip sales office for assistance.

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1. Silicon Issue Summary

Legend

- **-** Erratum is not applicable.
- **X** Erratum is applicable.
- ***** This silicon revision was never released to production.

Errata Overview

Peripheral	Short Description	Valid for Silicon Revision			
		Rev. A	Rev. B	Rev. C	Rev. D
PORTMUX	2.2.1 SPI SS Pin is Connected to Pin Even if SPI is Configured to Have No Port Connection	*	X	*	-
ADC	2.3.1 One Extra Measurement Performed After Disabling ADC Free-Running Mode	*	X	*	X
	2.3.2 ADC Functionality Cannot be Ensured with CLKADC Above 1.5 MHz and a Setting of 25% Duty Cycle	*	X	*	X
	2.3.3 Pending Event Stuck When Disabling the ADC	*	X	*	-
	2.3.4 ADC Performance Degrades with CLKADC Above 1.5 MHz and VDD < 2.7V	*	X	*	X
CCL	2.4.1 D-Latch is Not Functional	*	X	*	-
RTC	2.5.1 Any Write to the RTC.CTRLA Register Resets the RTC and PIT Prescaler	*	X	*	-
TCB	2.6.1 TCA Restart Command Does Not Force a Restart of TCB	*	X	*	X
	2.6.2 Minimum Event Duration Must Exceed Selected Clock Period	*	X	*	X
USART	2.7.1 TXD Pin Override Not Released When Disabling the Transmitter	*	X	*	X

2. Silicon Errata

2.1 Errata Details

- **-** Erratum is not applicable.
- **X** Erratum is applicable.
- ***** This silicon revision was never released to production.

2.2 PORTMUX

2.2.1 SPI $\overline{SS}$ Pin is Connected to Pin Even if SPI is Configured to Have No Port Connection

The SPIn $\overline{SS}$ pin is connected even if NONE is selected in the SPIn field in PORTMUX.TWISPIROUTE. If SPIn is operating in Master mode and the $\overline{SS}$ pin goes low, or input is disabled, the SPIn will exit Master mode.

Work around
Write the SSD bit in SPIn.CTRLB to '1' to ignore the $\overline{SS}$ signal.

Affected Silicon Revisions

Rev. A	Rev. B	Rev. C	Rev. D				
*	X	*	-				

2.3 ADC

2.3.1 One Extra Measurement Performed After Disabling ADC Free-Running Mode

The ADC may perform one additional measurement after clearing ADCn.CTRLA.FREERUN.

Work around
Write ADCn.CTRLA.ENABLE to '0' to stop the free-running mode immediately.

Affected Silicon Revisions

Rev. A	Rev. B	Rev. C	Rev. D				
*	X	*	X				

2.3.2 ADC Functionality Cannot be Ensured with CLK_{ADC} Above 1.5 MHz and a Setting of 25% Duty Cycle

The ADC functionality cannot be ensured if CLK_{ADC} > 1.5 MHz with ADCn.CALIB.DUTYCYC set to '1'.

Work around
If ADC is operated with CLK_{ADC} > 1.5 MHz, ADCn.CALIB.DUTYCYC must be set to '0' (50% duty cycle).

Affected Silicon Revisions

Rev. A	Rev. B	Rev. C	Rev. D				

*	X	*	X				

2.3.3 Pending Event Stuck When Disabling the ADC

If the ADC is disabled during an event-triggered conversion, the event will not be cleared.

Work around
Clear ADC.EVCTRL.STARTEI and wait for the conversion to complete before disabling the ADC.

Affected Silicon Revisions

Rev. A	Rev. B	Rev. C	Rev. D				
*	X	*	-				

2.3.4 ADC Performance Degrades with CLK_{ADC} Above 1.5 MHz and V_{DD} < 2.7V

The ADC INL performance degrades if CLK_{ADC} > 1.5 MHz and ADCn.CALIB.DUTYCYC set to '0' for V_{DD} < 2.7V.

Work around
None.

Affected Silicon Revisions

Rev. A	Rev. B	Rev. C	Rev. D				
*	X	*	X				

2.4 CCL

2.4.1 D-Latch is Not Functional

The CCL D-latch is not functional.

Work around
None.

Affected Silicon Revisions

Rev. A	Rev. B	Rev. C	Rev. D				
*	X	*	-				

2.5 RTC

2.5.1 Any Write to the RTC.CTRLA Register Resets the RTC and PIT Prescaler

Any write to the RTC.CTRLA register resets the RTC and PIT prescaler.

Work around
None.

Affected Silicon Revisions

Rev. A	Rev. B	Rev. C	Rev. D				

*	X	*	-				

2.6 TCB

2.6.1 TCA Restart Command Does Not Force a Restart of TCB

The TCA restart command does not force a restart of the TCB when TCB is running in SYNCUPD mode. TCB is only restarted after a TCA OVF.

Work around
None.

Affected Silicon Revisions

Rev. A	Rev. B	Rev. C	Rev. D				
*	X	*	X				

2.6.2 Minimum Event Duration Must Exceed Selected Clock Period

Event detection will fail if TCBn receives an input event with a high/low period shorter than the period of the selected clock source (CLKSEL in TCBn.CTRLA).

This applies to the TCB modes (CNTMODE in TCBn.CTRLB) *Time-out check* and *Input Capture Frequency and Pulse-Width Measurement* mode.

Work around
Ensure that the high/low period of the input events is equal to or longer than the period of the selected clock source (CLKSEL in TCBn.CTRLA).

Affected Silicon Revisions

Rev. A	Rev. B	Rev. C	Rev. D				
*	X	*	X				

2.7 USART

2.7.1 TXD Pin Override Not Released When Disabling the Transmitter

Event detection will fail if TCBn receives an input event with a high/low period shorter than the period of the selected clock source (CLKSEL in TCBn.CTRLA).

The USART will not release the TXD pin override if:

1. The USART transmitter is disabled by writing the TXEN bit in USART.CTRLB to '0' while the USART receiver is disabled (RXEN in USART.CTRLB is '0').
2. Both the USART transmitter and receiver are disabled at the same time by writing the TXEN and RXEN bits in USART.CTRLB to '0'.

Work around
There are two possible workarounds:

- Make sure the receiver is enabled (RXEN in USART.CTRLB is '1') while disabling the transmitter (writing TXEN in USART.CTRLB to '0')
- Write to any register in the USART after disabling the transmitter. This will start the USART for long enough to release the pin override of the TXD pin

Affected Silicon Revisions

Rev. A	Rev. B	Rev. C	Rev. D				
*	X	*	X				

3. Data Sheet Clarifications

None.

4. Document Revision History

Note: The data sheet clarification document revision is independent of the die revision and the device variant (last letter of the ordering number).

4.1 Revision History

Doc Rev.	Date	Comments
A	01/2020	• Document – Change document structure from one document for the entire megaAVR 0-series to one document per data sheet: • from: megaAVR-0-series-Errata-and-Clarification-80000777C.pdf • to: ATmega3208_3209-Errata-and-Clarification-DS80000869A.pdf – Updated document template • Errata – Update tables with device Rev. D – The ADC errata, ADC Functionality Cannot be Ensured with ADCCLK Above 1.5 MHz for All Conditions, has been split into two separate erratas and rewritten

4.2 Appendix - Obsolete Revision History

Note: Due to document structure change from a single megaAVR 0-series to one document per data sheet, the following history from www.microchip.com/DS80000777 is provided as reference.

Doc Rev.	Date	Comments
C	08/2019	• New Errata: – CPUINT: Interrupt Level 1 Does Not Work **Note:** Only applicable to ATmega4808/4809 for specific date codes.
B	07/2019	• Document – Adding variants with 16 KB and 8 KB Flash – Adding 40-pin variant of ATmega4809 – Changing document title – Adding section "Data Sheet Clarifications" • New Errata: – PORTMUX: SPI SS is Connected to Pin Even if SPI is Configured to Have No Port Connection – TCB: Minimum Event Duration Must Exceed Selected Clock Period – USART: TXD Pin Override Not Released When Disabling the Transmitter • Erratum for TCA removed: Issuing a restart will clear the direction bit - the data sheet is describing this correctly.
A	02/2018	• Initial document release.

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