



# SAM E70/S70/V70/V71 Family

## SAM E70/S70/V70/V71 Family Silicon Errata and Data Sheet Clarification

### SAM E70/S70/V70/V71 Family

The SAM E70/S70/V70/V71 family of devices that you have received conform functionally to the current Device Data Sheet (DS60001527C), 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 the following tables. The silicon issues are summarized in [1. Silicon Issue Summary](#).

The errata described in this document will be addressed in future revisions of the SAM E70/S70/V70/V71 family silicon.

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

Data Sheet clarifications and corrections (if applicable) are located in [23. Data Sheet Clarifications](#), following the discussion of silicon issues.

The Device and Revision ID values for the various SAM E70/S70/V70/V71 family silicon revisions are shown in the following tables.

**Table 1. SAM V71 Silicon Device Identification**

| Part Number | Device Identification |                   | Revision<br>(CHIPID_CIDR.VERSION[4:0]) |     |
|-------------|-----------------------|-------------------|----------------------------------------|-----|
|             | CHIPID_CIDR[31:0]     | CHIPID_EXID[31:0] | A                                      | B   |
| SAMV71Q19   | 0xA12D_0A0x           | 0x00000002        | 0x0                                    | 0x1 |
| SAMV71Q20   | 0xA122_0C0x           | 0x00000002        |                                        |     |
| SAMV71Q21   | 0xA122_0E0x           | 0x00000002        |                                        |     |
| SAMV71N19   | 0xA12D_0A0x           | 0x00000001        |                                        |     |
| SAMV71N20   | 0xA122_0C0x           | 0x00000001        |                                        |     |
| SAMV71N21   | 0xA122_0E0x           | 0x00000001        |                                        |     |
| SAMV71J19   | 0xA12D_0A0x           | 0x00000000        |                                        |     |
| SAMV71J20   | 0xA122_0C0x           | 0x00000000        |                                        |     |
| SAMV71J21   | 0xA122_0E0x           | 0x00000000        |                                        |     |

**Table 2. SAM V70 Silicon Device Identification**

| Part Number | Device Identification |                   | Revision<br>(CHIPID_CIDR.VERSION[4:0]) |     |
|-------------|-----------------------|-------------------|----------------------------------------|-----|
|             | CHIPID_CIDR[31:0]     | CHIPID_EXID[31:0] | A                                      | B   |
| SAMV70Q19   | 0xA13D_0A0x           | 0x00000002        | 0x0                                    | 0x1 |
| SAMV70Q20   | 0xA132_0C0x           | 0x00000002        |                                        |     |
| SAMV70N19   | 0xA13D_0A0x           | 0x00000001        |                                        |     |
| SAMV70N20   | 0xA132_0C0x           | 0x00000001        |                                        |     |
| SAMV70J19   | 0xA13D_0A0x           | 0x00000000        |                                        |     |
| SAMV70J20   | 0xA132_0C0x           | 0x00000000        |                                        |     |

**Table 3. SAM S70 Silicon Device Identification**

| Part Number | Device Identification |                   | Revision<br>(CHIPID_CIDR.VERSION[4:0]) |     |
|-------------|-----------------------|-------------------|----------------------------------------|-----|
|             | CHIPID_CIDR[31:0]     | CHIPID_EXID[31:0] | A                                      | B   |
| SAMS70Q19   | 0xA11D_0A0x           | 0x00000002        | 0x0                                    | 0x1 |
| SAMS70Q20   | 0xA112_0C0x           | 0x00000002        |                                        |     |
| SAMS70Q21   | 0xA112_0E0x           | 0x00000002        |                                        |     |
| SAMS70N19   | 0xA11D_0A0x           | 0x00000001        |                                        |     |
| SAMS70N20   | 0xA112_0C0x           | 0x00000001        |                                        |     |
| SAMS70N21   | 0xA112_0E0x           | 0x00000001        |                                        |     |
| SAMS70J19   | 0xA11D_0A0x           | 0x00000000        |                                        |     |
| SAMS70J20   | 0xA112_0C0x           | 0x00000000        |                                        |     |
| SAMS70J21   | 0xA112_0E0x           | 0x00000000        |                                        |     |

**Table 4. SAM E70 Silicon Device Identification**

| Part Number | Device Identification |                   | Revision<br>(CHIPID_CIDR.VERSION[4:0]) |     |
|-------------|-----------------------|-------------------|----------------------------------------|-----|
|             | CHIPID_CIDR[31:0]     | CHIPID_EXID[31:0] | A                                      | B   |
| SAME70Q19   | 0xA10D_0A0x           | 0x00000002        | 0x0                                    | 0x1 |
| SAME70Q20   | 0xA102_0C0x           | 0x00000002        |                                        |     |
| SAME70Q21   | 0xA102_0E0x           | 0x00000002        |                                        |     |
| SAME70N19   | 0xA10D_0A0x           | 0x00000001        |                                        |     |
| SAME70N20   | 0xA102_0C0x           | 0x00000001        |                                        |     |
| SAME70N21   | 0xA102_0E0x           | 0x00000001        |                                        |     |
| SAME70J19   | 0xA10D_0A0x           | 0x00000000        |                                        |     |
| SAME70J20   | 0xA102_0C0x           | 0x00000000        |                                        |     |
| SAME70J21   | 0xA102_0E0x           | 0x00000000        |                                        |     |

**Note:**

1. Refer to the “Chip Identifier (CHIPID)” section in the current Device Data Sheet (DS60001527C) for detailed information on Chip Identification and Revision IDs for your specific device.

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# SAM E70/S70/V70/V71 Family

## Silicon Issue Summary

## 1. Silicon Issue Summary

Table 1-1. Silicon Issue Summary

| Module             | Feature                                          | Errata Number | Summary                                                                                                                                                                                                                                 | Affected Silicon Revisions |   |
|--------------------|--------------------------------------------------|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|---|
|                    |                                                  |               |                                                                                                                                                                                                                                         | A                          | B |
| AFEC               | Write Protection                                 | 2.1           | The AFEC_CSELR register is not write-protected.                                                                                                                                                                                         | X                          | X |
| AFEC               | Performance                                      | 2.2           | The AFEC is sensitive to noise. Too much noise may lead to reduced AFEC performance, especially INL, DNL and SNR.                                                                                                                       | X                          | X |
| AFEC               | AOFF bit                                         | 2.3           | Changing the AOFF bit in the AFEC_COCR register during conversions is not safe.                                                                                                                                                         | X                          | X |
| ARM Cortex-M7      | ARM® Cortex®-M7                                  | 3.1           | All issues related to the ARM r0p1 (for MRLA) and r1p1 (and MRLB) cores are described on the ARM site.                                                                                                                                  | X                          | X |
| Boundary Scan Mode | Internal Regulator                               | 4.1           | The internal regulator is OFF in Boundary Scan mode.                                                                                                                                                                                    | X                          |   |
| Device             | AHB Peripheral (AHBP)                            | 5.1           | Peripheral accesses done through the AHBP with a Core/Bus ratio of 1/3 and 1/4 may lead to unpredictable results.                                                                                                                       | X                          | X |
| Device             | AHB Slave (AHBS) Port Latency Access             | 5.2           | DMA accesses done through the AHBS to the TCM with a Core/Bus ratio of 1/2, 1/3, and 1/4 may lead to latency due to one Wait state added to the access from the bus to AHBS.                                                            | X                          | X |
| Device             | System Performance                               | 5.3           | Uncorrelated Noise and/or clock Jitter                                                                                                                                                                                                  | X                          | X |
| XDMAC              | TCM Accesses                                     | 6.1           | If TCM accesses are generated through the AHBS port of the core, only 32-bit accesses are supported.                                                                                                                                    | X                          |   |
| XDMAC              | Byte and Half-Word Accesses                      | 6.2           | If XDMAC is used to transfer 8-bit or 16-bit data in Fixed Source Address mode or Fixed Destination Address mode, source and destination addresses are incremented by 8-bit or 16-bit.                                                  | X                          | X |
| XDMAC              | Request Overflow Error                           | 6.3           | When a DMA memory-to-memory transfer is performed, if the hardware request line selected by the field PERID bit in the XDMAC_CCx register toggles when the copy is enabled, the ROIS bit in the XDMAC_CISx register is set incorrectly. | X                          | X |
| FFPI               | Flash Programming                                | 7.1           | The FFPI programs only 1 MB of Flash memory.                                                                                                                                                                                            | X                          |   |
| GMAC               | Priority Queues                                  | 8.1           | On Revision A silicon, only three priority queues are available.                                                                                                                                                                        | X                          |   |
| I2SC               | Module Availability                              | 9.1           | The Inter-IC Sound Controller (I2SC) is not available.                                                                                                                                                                                  | X                          |   |
| I2SC               | Corrupted First Sent Data                        | 9.2           | Immediately after the I2SC module is reset, the first data sent by the controller on the I2SDO line is corrupted.                                                                                                                       |                            | X |
| MCAN               | Non-ISO Operation                                | 10.1          | The default frame format on Revision A silicon does not match the default format specified in the current device data sheet.                                                                                                            | X                          |   |
| MCAN               | MCANN_CCCR Register                              | 10.2          | In Revision A silicon, the MCAN CC Control register content does not match the content of the current device data sheet.                                                                                                                | X                          |   |
| MCAN               | Transmitter Delay Compensation Value (TDCV) Bits | 10.3          | In Revision A silicon, the Transmitter Delay Compensation Value (TDCV) bit field does not match the content in the current device data sheet.                                                                                           | X                          |   |
| MCAN               | MCAN_PSR Register                                | 10.4          | In Revision A silicon, the content of the MCAN Protocol Status register differs from the content in the current device data sheet.                                                                                                      | X                          |   |
| MCAN               | MCAN_IR Register                                 | 10.5          | In Revision A silicon, the content of the MCAN Interrupt register differs from the content in the current device data sheet.                                                                                                            | X                          |   |
| MCAN               | MCAN_IE Register                                 | 10.6          | On Revision A silicon, the content in the MCAN Interrupt Enable register does not match the content in the current device data sheet.                                                                                                   | X                          |   |
| MCAN               | MCAN_ILS Register                                | 10.7          | On Revision A silicon, the content in the MCAN Interrupt Line Support Register does not match the content in the current device data sheet.                                                                                             | X                          |   |
| MCAN               | MCAN Data Bit Timing and Prescaler Register      | 10.8          | On Revision A silicon, the MCAN Data Bit Timing and Prescaler register (MCAN_DBTP) is named MCAN Fast Bit Timing and Prescaler register (MCAN_FBTTP).                                                                                   | X                          |   |

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## Silicon Issue Summary

.....continued

| Module | Feature                                                | Errata Number | Summary                                                                                                                                                                                                                                                                | Affected Silicon Revisions |   |
|--------|--------------------------------------------------------|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|---|
|        |                                                        |               |                                                                                                                                                                                                                                                                        | A                          | B |
| MCAN   | MCAN Nominal Bit Timing and Prescaler Register         | 10.9          | On Revision A silicon, the MCAN Nominal Bit Timing and Prescaler register (MCAN_NBTP) is named MCAN Bit Timing and Prescaler register (MCAN_BTP).                                                                                                                      | X                          |   |
| MCAN   | MCAN Transmitter Delay Compensation Register           | 10.10         | In Revision A silicon, the MCAN Transmitter Delay Compensation Register (MCAN_TDCR) does not exist.                                                                                                                                                                    | X                          |   |
| MCAN   | Timestamping Function                                  | 10.11         | On Revision A silicon, TC Counter 0 is not connected to PCK6 and PCK7; therefore, the timestamping functionality does not exist.                                                                                                                                       | X                          |   |
| PIO    | PIO Line Configuration for AFEC and DACC Analog Inputs | 111           | To enable the analog inputs, AFE_ADx or DACx, the pull-up resistors on the I/O lines must be disabled in the PIO user interface prior to writing registers AFEC_CHER or DACC_CHER.                                                                                     | X                          | X |
| PMC    | Wait Mode Exit Fail from Flash                         | 12.1          | The delay to exit from Wait mode is too short to respect the Flash wake-up time from Stand-by mode and Deep Power-down mode. This delay may lead to bad opcode fetching.                                                                                               | X                          | X |
| PMC    | PMC_OCR Register Calibration Reporting                 | 12.2          | When reading the PMC_OCR register with the SEL8 and SEL12 bits cleared, the CAL8 and CAL12 bits are not updated with the manufacturing calibration bits of the Main RC Oscillator. However, the Main RC Oscillator is loaded with this manufacturing calibration data. | X                          | X |
| QSPI   | Module Hangs with Long DLYCS                           | 13.1          | The QSPI module hangs if a command is written to any QSPI register during the delay defined in the DLYCS bit. There is no status bit to flag the end of the delay.                                                                                                     | X                          | X |
| QSPI   | WDRBT                                                  | 13.2          | When the QSPI is in SPI mode, the WDRBT feature is not functional.                                                                                                                                                                                                     | X                          | X |
| RTC    | RTC_CALR Reset Value                                   | 14.1          | On Revision A silicon, the reset value of the RTC_CALR register is 0x01E11220.                                                                                                                                                                                         | X                          |   |
| SDRAMC | SDRAM Controller Scrambling Use Limitation             | 15.1          | The scrambling/unscrambling feature of the SDRAM Controller (SDRAMC) has a use limitation.                                                                                                                                                                             | X                          |   |
| SDRAMC | USB and SDRAM Concurrent Access Issue                  | 15.2          | USB module functionality is adversely affected with concurrent SDRAM access.                                                                                                                                                                                           | X                          | X |
| SDRAMC | Operational Voltage                                    | 15.3          | SDRAM operation not supported at 1.8Vdc.                                                                                                                                                                                                                               | X                          | X |
| SMC    | SMC_WPSR Register Write Protection                     | 16.1          | When the write protection feature is enabled and a write attempt into a protected register is performed, the Write Protection Violation Source (WPVSR) bit field in the SMC_WPSR register does not report the right violation source.                                  | X                          | X |
| SSC    | Inverted Left/Right Channels                           | 17.1          | When the SSC is in Slave mode, the TF signal is derived from the codec and not controlled by the SSC.                                                                                                                                                                  | X                          |   |
| SSC    | Unexpected TD Output Delay                             | 17.2          | An unexpected delay on TD output may occur when the SSC is configured under certain conditions.                                                                                                                                                                        | X                          | X |
| SUPC   | Write-Protection                                       | 18.1          | The SUPC_WUIR register is not write-protected.                                                                                                                                                                                                                         | X                          | X |
| SUPC   | Programmable Clock Controller Reference                | 18.2          | Programmable Clock Outputs, PCK0–PCK2, selected from the clock generator outputs to drive the device PCK pins are not supported and should not be used.                                                                                                                | X                          | X |
| TWIHS  | I <sup>2</sup> C Hold Timing Incompatibility           | 19.1          | The TWIHS module is not compatible with I <sup>2</sup> C hold timing.                                                                                                                                                                                                  | X                          |   |
| TWIHS  | Clear Command                                          | 19.2          | A bus reset using the CLEAR bit of the TWIHS Control register does not work correctly during a bus busy state.                                                                                                                                                         | X                          |   |
| USART  | Flow Control with DMA Reference                        | 20.1          | The RTS signal is not connected to the DMA. Therefore, when DMA is used, Flow Control is not supported.                                                                                                                                                                | X                          | X |
| USART  | Bad Frame Detection                                    | 20.2          | If a bad frame is received (i.e., incorrect baud rate) with the last data bit being sampled at 1, frame error detection does not occur.                                                                                                                                | X                          | X |
| USBHS  | USBHS Host                                             | 21.1          | The USB Host does not function in Low-Speed mode.                                                                                                                                                                                                                      | X                          |   |
| USBHS  | 64-pin LQFP Package                                    | 21.2          | The USBHS module does not function in 64-pin LQFP package devices.                                                                                                                                                                                                     | X                          | X |
| USBHS  | NO DMA for Endpoint 7                                  | 21.3          | The DMA feature is not available for Pipe/Endpoint 7.                                                                                                                                                                                                                  | X                          | X |
| DACC   | Interpolation Mode                                     | 22.1          | Interpolation Mode is not functional                                                                                                                                                                                                                                   | X                          | X |

## 2. Analog Front-End Controller (AFEC)

### 2.1 Write Protection

The AFEC\_CSELR register is not write-protected.

#### Workaround

None.

#### Affected Silicon Revisions

| A | B |  |  |  |  |  |  |
|---|---|--|--|--|--|--|--|
| X | X |  |  |  |  |  |  |

### 2.2 Performance

The AFEC is sensitive to noise. Too much noise may lead to reduced AFEC performance, especially INL, DNL and SNR. The following situations generate noise:

- Using a 64-pin QFP package option (it does not have the VREFN pin)
- Device activity (that is, clock tree)
- External components (that is, missing on-board supply decoupling capacitors)

#### Workaround

Adapt the environment to the expected level of performances.

#### Affected Silicon Revisions

| A | B |  |  |  |  |  |  |
|---|---|--|--|--|--|--|--|
| X | X |  |  |  |  |  |  |

### 2.3 AOFF bit

Changing the AOFF bit in the AFEC\_COCCR register during conversions is not safe.

The recommended value of the AOFF bit is 512 (the default value is zero). Different values are possible for each channel. The AOFF bit is read and updated during the AFE start-up sequence and at the end of each conversion. If during AFE idle time (no conversion is on-going) the user updates the AOFF bit for the next channel to be converted, the next conversion will be incorrect.

#### Workaround

The value of the AOFF bit can be updated only if the AFEC module is restarted, or if two conversions are run; the second one will have the correct AOFF bit setting.

#### Affected Silicon Revisions

| A | B |  |  |  |  |  |  |
|---|---|--|--|--|--|--|--|
| X | X |  |  |  |  |  |  |

### 3. ARM Cortex-M7

#### 3.1 ARM® Cortex®-M7

All issues related to the ARM r0p1 (for MRLA) and r1p1 (and MRLB) cores are described on the ARM website.

##### Workaround

Refer to the following ARM documentation:

- For ARM Cortex-M7 r0p1 core (MRLA device): <https://silver.arm.com/download/download.tm?pv=2004343>
- For ARM Cortex-M7 r1p1 core (MRLB device): <https://silver.arm.com/download/download.tm?pv=3257391&p=1929427>
- ARM Embedded Trace Macrocell CoreSight ETM-M7 (TM975) Software Developers Errata Notice: <https://silver.arm.com/download/download.tm?pv=1998309>

##### Affected Silicon Revisions

| A | B |  |  |  |  |  |  |
|---|---|--|--|--|--|--|--|
| X | X |  |  |  |  |  |  |

## 4. Boundary Scan Mode

### 4.1 Internal Regulator

The internal regulator is OFF in Boundary Scan mode.

#### Workaround

The user must provide external VDDCORE (1.2V) to perform Boundary Scan mode.

#### Affected Silicon Revisions

| A | B |  |  |  |  |  |  |
|---|---|--|--|--|--|--|--|
| X |   |  |  |  |  |  |  |

## 5. Device

### 5.1 AHB Peripheral (AHBP) Port Frequency Ratio

Peripheral accesses done through the AHBP with a Core/Bus ratio of 1/3 and 1/4 may lead to unpredictable results.

#### Workaround

The user must use a Core/Bus frequency ratio of 1 or 1/2.

#### Affected Silicon Revisions

| A | B |  |  |  |  |  |  |
|---|---|--|--|--|--|--|--|
| X | X |  |  |  |  |  |  |

### 5.2 AHB Slave (AHBS) Port Latency Access

DMA accesses done through the AHBS to the TCM with a Core/Bus ratio of 1/2, 1/3, and 1/4 may lead to latency due to one Wait state added to the access from the bus to AHBS.

#### Workaround

The user must use only the Core/Bus frequency ratio of 1 to guarantee the length of the access.

#### Affected Silicon Revisions

| A | B |  |  |  |  |  |  |
|---|---|--|--|--|--|--|--|
| X | X |  |  |  |  |  |  |

### 5.3 System Performance

Very few applications have experienced uncorrelated system noise and clock jitter during SDRAM R/W access or PCK-based external clock operations. Inadequate power supply, decoupling, and less than robust PCB layout and manufacture process can further worsen this issue. These failures can occur across the full voltage and temperature range.

#### Workaround

Solid PCB power supply layout and decoupling can help mitigate such issues. It is recommended to use a 0.1μF decoupling capacitor with each power pin pair. The decoupling capacitors must be placed close to power pins. Careful attention to SDRAM board layout and line termination will significantly improve the performance. Refer to the "SAM E70/S70/V70/V71 Data Sheet", (DS60001527), Section 60. "Schematic Checklist" for system recommendations, including SDRAM and line termination circuits implemented on the SAM E70 XULT board.

If devices still showing these behaviors or failure after following the above guidance, submit a technical support request. To submit a technical support request in Microchip's technical support system, an active myMicrochip account is required. For additional information on how to submit a request, follow the link: <https://microchipsupport.force.com/s/article/How-to-submit-a-case>.

#### Affected Silicon Revisions

| A | B |  |  |  |  |  |  |
|---|---|--|--|--|--|--|--|
| X | X |  |  |  |  |  |  |

## 6. Extended DMA Controller (XDMAC)

### 6.1 TCM Accesses

If TCM accesses are generated through the AHBS port of the core, only 32-bit accesses are supported. Accesses that are not 32-bit aligned may overwrite bytes at the beginning and at the end of 32-bit words.

#### Workaround

The user application must use 32-bit aligned buffers and buffers with a size of a multiple of 4 bytes when transferring data to or from the TCM through the AHBS port of the core.

#### Affected Silicon Revisions

| A | B |  |  |  |  |  |  |
|---|---|--|--|--|--|--|--|
| X |   |  |  |  |  |  |  |

### 6.2 Byte and Half-Word Accesses

If XDMAC is used to transfer 8-bit or 16-bit data in Fixed Source Address mode or Fixed Destination Address mode, source and destination addresses are incremented by 8-bit or 16-bit.

#### Workaround

The user can resolve this issue by setting the source and destination addressing mode to use microblock and data striding with microblock stride set to 0 and data stride set to -1.

#### Affected Silicon Revisions

| A | B |  |  |  |  |  |  |
|---|---|--|--|--|--|--|--|
| X | X |  |  |  |  |  |  |

### 6.3 Request Overflow Error

When a DMA memory-to-memory transfer is performed, if the hardware request line selected by the field PERID bit in the XDMAC\_CCx register toggles when the copy is enabled, the ROIS bit in the XDMAC\_CISx register is set incorrectly. The memory transfer proceeds normally and the data area is correctly transferred.

#### Workaround

Configure the PERID bit to an unused peripheral ID.

#### Affected Silicon Revisions

| A | B |  |  |  |  |  |  |
|---|---|--|--|--|--|--|--|
| X | X |  |  |  |  |  |  |

## **7. Fast Flash Programming Interface (FFPI)**

### **7.1 Flash Programming**

The FFPI programs only 1 MB of Flash memory.

**Workaround**

None.

**Affected Silicon Revisions**

| A | B |  |  |  |  |  |  |
|---|---|--|--|--|--|--|--|
| X |   |  |  |  |  |  |  |

## 8. Ethernet MAC (GMAC)

### 8.1 Priority Queues

On Revision A silicon, only three priority queues are available with the following sizes:

| Queue Number         | Queue Size |
|----------------------|------------|
| 2 (highest priority) | 4 KB       |
| 1                    | 2 KB       |
| 0 (lowest priority)  | 2 KB       |

#### Workaround

None.

#### Affected Silicon Revisions

| A | B |  |  |  |  |  |  |
|---|---|--|--|--|--|--|--|
| X |   |  |  |  |  |  |  |

## **9. Inter-IC Sound Controller (I2SC)**

### **9.1 Module Availability**

The Inter-IC Sound Controller (I2SC) is not available.

**Workaround**

None.

**Affected Silicon Revisions**

| A | B |  |  |  |  |  |  |
|---|---|--|--|--|--|--|--|
| X |   |  |  |  |  |  |  |

### **9.2 Corrupted First Sent Data**

Immediately after the I2SC module is reset, the first data sent by the controller on the I2SDO line is corrupted. Any data that follows is not affected.

**Workaround**

None.

**Affected Silicon Revisions**

| A | B |  |  |  |  |  |  |
|---|---|--|--|--|--|--|--|
|   | X |  |  |  |  |  |  |

## 10. Controller Area Network (MCAN)

### 10.1 Non-ISO Operation

The default frame format on Revision A silicon does not match the default format specified in the current device data sheet.

#### Workaround

To retain Revision A behavior, set the MCAN\_CCCR.NISO bit to '1'.

#### Affected Silicon Revisions

| A | B |  |  |  |  |  |  |
|---|---|--|--|--|--|--|--|
| X |   |  |  |  |  |  |  |

### 10.2 MCAN\_CCCR Register

In Revision A silicon, the MCAN CC Control register content does not match the content of the current device data sheet.

- NISO bit is missing
- EFBI bit is named FDBS
- PXHD bit is named FDO
- BRSE bit and FDOE bit are named CME[1:0]
- CMR[1:0] bits are present

#### Workaround

None.

#### Affected Silicon Revisions

| A | B |  |  |  |  |  |  |
|---|---|--|--|--|--|--|--|
| X |   |  |  |  |  |  |  |

### 10.3 Transmitter Delay Compensation Value (TDCV) Bits

In Revision A silicon, the Transmitter Delay Compensation Value (TDCV) bit field does not match the content in the current device data sheet.

In Revision A silicon, the TDCV bits are located in the MCAN\_TEST register.

In the current device data sheet, the TDCV bits are located in the MCAN\_PSR register.

#### Workaround

None.

#### Affected Silicon Revisions

| A | B |  |  |  |  |  |  |
|---|---|--|--|--|--|--|--|
| X |   |  |  |  |  |  |  |

### 10.4 MCAN\_PSR Register

In Revision A silicon, the content of the MCAN Protocol Status register differs from the content in the current device data sheet.

- PXE bit is not available
- RFDF bit is named REDL
- DLEC[2:0] bits are named FLEC[2:0]

#### Workaround

None.

#### Affected Silicon Revisions

| A | B |  |  |  |  |  |  |
|---|---|--|--|--|--|--|--|
| X |   |  |  |  |  |  |  |

### 10.5 MCAN\_IR Register

In Revision A silicon, the content of the MCAN Interrupt register differs from the content in the current device data sheet.

- STE and FOE bits are present
- ARA bit is replaced by the ACKE bit
- PED bit is replaced by the BE bit
- PEA bit is replaced by the CRCE bit

#### Workaround

None.

#### Affected Silicon Revisions

| A | B |  |  |  |  |  |  |
|---|---|--|--|--|--|--|--|
| X |   |  |  |  |  |  |  |

### 10.6 MCAN\_IE Register

On Revision A silicon, the content in the MCAN Interrupt Enable register does not match the content in the current device data sheet.

- STEE and FOEE bits are present
- ARAE bit is replaced by the ACKEE bit
- PEDE bit is replaced by the BEE bit
- PEAE bit is replaced by the CRCEE bit

#### Workaround

None.

#### Affected Silicon Revisions

| A | B |  |  |  |  |  |  |
|---|---|--|--|--|--|--|--|
| X |   |  |  |  |  |  |  |

### 10.7 MCAN\_ILS Register

On Revision A silicon, the content in the MCAN Interrupt Line Support Register does not match the content in the current device data sheet.

- STEL and FOEL bits are present
- ARAL bit is replaced by the ACKEL bit
- PEDL bit is replaced by the BEL bit
- PEAL bit is replaced by the CRCEL bit

#### Workaround

None.

#### Affected Silicon Revisions

| A | B |  |  |  |  |  |  |
|---|---|--|--|--|--|--|--|
| X |   |  |  |  |  |  |  |

### 10.8 MCAN Data Bit Timing and Prescaler Register

On Revision A silicon, the MCAN Data Bit Timing and Prescaler (MCAN\_DBTP) register is named MCAN Fast Bit Timing and Prescaler (MCAN\_FBTP) register. The MCAN\_DBTP and MCAN\_FBTP registers do not share the same bit fields.

#### Workaround

When using Revision A silicon, ensure that the name MCAN\_FBTP and the MCAN\_FBTP settings are used.

#### Affected Silicon Revisions

| A | B |  |  |  |  |  |  |
|---|---|--|--|--|--|--|--|
| X |   |  |  |  |  |  |  |

### 10.9 MCAN Nominal Bit Timing and Prescaler Register

On Revision A silicon, the MCAN Nominal Bit Timing and Prescaler (MCAN\_NBTP) register is named MCAN Bit Timing and Prescaler (MCAN\_BTP) register.

#### Workaround

When using Revision A silicon, ensure that the name MCAN\_BTP is used.

#### Affected Silicon Revisions

| A | B |  |  |  |  |  |  |
|---|---|--|--|--|--|--|--|
| X |   |  |  |  |  |  |  |

### 10.10 MCAN Transmitter Delay Compensation Register

In Revision A silicon, the MCAN Transmitter Delay Compensation Register (MCAN\_TDCR) does not exist.

#### Workaround

The transmit delay compensation offset is configured in the TDCO field of the MCAN\_FBTP register.

# SAM E70/S70/V70/V71 Family

## Controller Area Network (MCAN)

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**Affected Silicon Revisions**

| A | B |  |  |  |  |  |  |
|---|---|--|--|--|--|--|--|
| X |   |  |  |  |  |  |  |

### 10.11 Timestamping Function

On Revision A silicon, TC Counter 0 is not connected to PCK6 and PCK7; therefore, the timestamping functionality does not exist.

**Workaround**

None.

**Affected Silicon Revisions**

| A | B |  |  |  |  |  |  |
|---|---|--|--|--|--|--|--|
| X |   |  |  |  |  |  |  |

## **11. Parallel Input/Output (PIO)**

### **11.1 PIO Line Configuration for AFEC and DACC Analog Inputs**

Analog inputs, AFE\_ADx or AFE\_DACx, may not properly enable when internal pull-up or pull-down resistors are enabled.

#### **Workaround**

Disable the internal pull-up or pull-down resistors by writing a '1' to the PIO\_PUDR or PIO\_PPDDR for the port pins where analog inputs are needed.

#### **Affected Silicon Revisions**

| <b>A</b> | <b>B</b> |  |  |  |  |  |  |
|----------|----------|--|--|--|--|--|--|
| X        | X        |  |  |  |  |  |  |

## **12. Power Management Controller (PMC)**

### **12.1 Wait Mode Exit Fail from Flash**

The delay to exit from Wait mode is too short to respect the Flash wake-up time from Stand-by mode and Deep Power-Down mode. This delay may lead to bad opcode fetching.

#### **Workaround 1**

Use the Flash in Idle mode (FLPM = 2).

#### **Workaround 2**

If Flash in Stand-by mode (FLPM = 0) or in Deep Power-Down mode (FLPM = 1) is used, run the wake-up routine from SRAM. This option provides a slight improvement in power consumption.

#### **Affected Silicon Revisions**

| A | B |  |  |  |  |  |  |
|---|---|--|--|--|--|--|--|
| X | X |  |  |  |  |  |  |

### **12.2 PMC\_OCR Register Calibration Reporting**

When reading the PMC\_OCR register with the SEL8 and SEL12 bits cleared, the CAL8 and CAL12 bits are not updated with the manufacturing calibration bits of the Main RC Oscillator. However, the Main RC Oscillator is loaded with this manufacturing calibration data.

#### **Workaround**

To recover the manufacturing calibration bits of the Main RC oscillator, use the following steps:

1. Execute the 'Get CALIB Bit' command by writing the FCMD bit in the EEFC\_FCR register with the GCALB command.
2. Read the EEFC\_FRR register. The 8 MHz RC calibration bits are EEFC\_FRR bits [17-11] and the 12 MHz RC calibration bits are EEFC\_FRR bits [25-19].

#### **Affected Silicon Revisions**

| A | B |  |  |  |  |  |  |
|---|---|--|--|--|--|--|--|
| X | X |  |  |  |  |  |  |

## **13. Quad Serial Peripheral Interface (QSPI)**

### **13.1 Module Hangs with Long DLYCS**

The QSPI module hangs if a command is written to any QSPI register during the delay defined in the DLYCS bit. There is no status bit to flag the end of the delay.

#### **Workaround**

The DLYCS bit defines a minimum period over which the Chip Select is deasserted, which is required by some memories. This delay is generally less than 60 ns and comprises internal execution time, arbitration, and latencies. Therefore, the DLYCS bit must be configured to be slightly higher than the value specified for the slave device. The software must wait for at least this same period of time before a command can be written to the QSPI module.

#### **Affected Silicon Revisions**

| A | B |  |  |  |  |  |  |
|---|---|--|--|--|--|--|--|
| X | X |  |  |  |  |  |  |

### **13.2 WDRBT**

When the QSPI is configured in SPI mode, the Wait Data Read Before Transfer (WDRBT) feature does not work.

#### **Workaround**

None.

#### **Affected Silicon Revisions**

| A | B |  |  |  |  |  |  |
|---|---|--|--|--|--|--|--|
| X | X |  |  |  |  |  |  |

## **14. Real-Time Clock (RTC)**

### **14.1 RTC\_CALR Reset Value**

On Revision A silicon, the reset value of the RTC\_CALR register is 0x01E11220.

**Workaround**

None.

**Affected Silicon Revisions**

| A | B |  |  |  |  |  |  |
|---|---|--|--|--|--|--|--|
| X |   |  |  |  |  |  |  |

## 15. SDRAM Controller (SDRAMC)

### 15.1 SDRAM Controller Scrambling Use Limitation

The scrambling or unscrambling feature of the SDRAM Controller (SDRAMC) has a use limitation.

#### Workaround

The read of a scrambled area must be performed with the same type of access done during the write of this area. It is recommended to read and write using 32-bit words.

#### Affected Silicon Revisions

| A | B |  |  |  |  |  |  |
|---|---|--|--|--|--|--|--|
| X |   |  |  |  |  |  |  |

### 15.2 USB and SDRAM Concurrent Access Issue

USB module functionality is adversely affected with concurrent SDRAM access.

#### Workaround

Ensure that no concurrent module operations when using both SDRAM and USB.

#### Affected Silicon Revisions

| A | B |  |  |  |  |  |  |
|---|---|--|--|--|--|--|--|
| X | X |  |  |  |  |  |  |

### 15.3 Operational Voltage

The SDRAM operation at 1.8 Vdc is not supported. The recommended operational voltage is 3.3 Vdc +/-10%.

#### Workaround

None.

#### Affected Silicon Revisions

| A | B |  |  |  |  |  |  |
|---|---|--|--|--|--|--|--|
| X | X |  |  |  |  |  |  |

## **16. Static Memory Controller (SMC)**

### **16.1 SMC\_WPSR Register Write Protection**

When the write protection feature is enabled and a write attempt into a protected register is performed, the Write Protection Violation Source (WPVSRC) bit field in the SMC\_WPSR register does not report the right violation source. As a consequence, the value in the WPVSRC bit field is incorrect. This issue does not affect the write protection feature itself, which is fully functional.

#### **Workaround**

None.

#### **Affected Silicon Revisions**

| A | B |  |  |  |  |  |  |
|---|---|--|--|--|--|--|--|
| X | X |  |  |  |  |  |  |

## 17. Serial Synchronous Controller (SSC)

### 17.1 Inverted Left/Right Channels

When the SSC is in Slave mode, the TF signal is derived from the codec and not controlled by the SSC. The SSC transmits the data when detecting the falling edge on the TF signal after the SSC transmission is enabled. In some cases of overflow, a left/right channel inversion may occur. When this occurs, the SSC must be reinitialized.

#### Workaround

Using the SSC in Master mode will ensure that TF is controlled by the SSC and no error occurs. If the SSC must be used in TF Slave mode, the SSC must be started by writing TXEN and RXEN synchronously with the TXSYN flag rising in the SSC\_SR.

#### Affected Silicon Revisions

| A | B |  |  |  |  |  |  |
|---|---|--|--|--|--|--|--|
| X |   |  |  |  |  |  |  |

### 17.2 Unexpected TD Output Delay

An unexpected delay on TD output may occur when the SSC is configured with the following conditions:

- The START bit in the RCMR register = Start on falling edge/Start on Rising edge/Start on any edge
- The FSOS bit in the RFMR register = None (input)
- The START bit in the TCMR register = Receive Start

Under these conditions, an unexpected delay of two or three system clock cycles is added to the TD output.

#### Workaround

None.

#### Affected Silicon Revisions

| A | B |  |  |  |  |  |  |
|---|---|--|--|--|--|--|--|
| X | X |  |  |  |  |  |  |

## **18. Supply Controller (SUPC)**

### **18.1 Write-Protection**

The SUPC\_WUIR register is not write-protected.

**Workaround**

None.

**Affected Silicon Revisions**

| A | B |  |  |  |  |  |  |
|---|---|--|--|--|--|--|--|
| X | X |  |  |  |  |  |  |

### **18.2 Programmable Clock Controller**

Programmable Clock Outputs, PCK0 and PCK2, selected from the clock generator outputs to drive the device PCK pins are not supported and should not be used.

**Workaround**

Use PCK1.

**Table 18-1. Affected Silicon Revisions**

| A | B |  |  |  |  |  |  |
|---|---|--|--|--|--|--|--|
| X | X |  |  |  |  |  |  |

## 19. TWI High-Speed (TWIHS)

### 19.1 I<sup>2</sup>C Hold Timing Incompatibility

The TWIHS module is not compatible with I<sup>2</sup>C hold timing. The divider to program the hold time is too short to achieve the expected hold time at high frequency. The achieved time is 227 ns maximum at 150 MHz, instead of the required 300 ns.

**Workaround**

None.

**Affected Silicon Revisions**

| A | B |  |  |  |  |  |  |
|---|---|--|--|--|--|--|--|
| X |   |  |  |  |  |  |  |

### 19.2 Clear Command

A bus reset using the CLEAR bit of the TWIHS Control register does not work correctly during a bus busy state.

**Workaround**

Reconfigure the TWCK line in GPIO output and generate nine clock pulses through software to unlock the I<sup>2</sup>C device. After that the TWCK line can be reconfigured as a peripheral line.

**Affected Silicon Revisions**

| A | B |  |  |  |  |  |  |
|---|---|--|--|--|--|--|--|
| X |   |  |  |  |  |  |  |

## 20. Universal Synchronous Asynchronous Receiver Transmitter (USART)

### 20.1 Flow Control with DMA

The CTS and RTS signals are not connected to DMA. Therefore, when DMA is used, Flow Control is not supported.

**Workaround**

None.

**Affected Silicon Revisions**

| A | B |  |  |  |  |  |  |
|---|---|--|--|--|--|--|--|
| X | X |  |  |  |  |  |  |

### 20.2 Bad Frame Detection

If a bad frame is received (i.e., incorrect baud rate) with the last data bit being sampled at 1, frame error detection does not occur.

**Workaround**

There is no general workaround. When performing baud rate detection with receive part, the transmit frame must be sent with a parity bit set to '0'.

**Affected Silicon Revisions**

| A | B |  |  |  |  |  |  |
|---|---|--|--|--|--|--|--|
| X | X |  |  |  |  |  |  |

## 21. USB High-Speed (USBHS)

### 21.1 USBHS Host Does Not Function in Low-Speed Mode

The USB Host does not function in Low-Speed mode.

**Workaround**

None.

**Affected Silicon Revisions**

| A | B |  |  |  |  |  |  |
|---|---|--|--|--|--|--|--|
| X |   |  |  |  |  |  |  |

### 21.2 64-pin LQFP Package

The USBHS module does not function in 64-pin LQFP package devices.

**Workaround**

None.

**Affected Silicon Revisions**

| A | B |  |  |  |  |  |  |
|---|---|--|--|--|--|--|--|
| X | X |  |  |  |  |  |  |

### 21.3 NO DMA for Endpoint 7

The DMA feature is not available for Pipe/Endpoint 7.

**Workaround**

None.

**Affected Silicon Revisions**

| A | B |  |  |  |  |  |  |
|---|---|--|--|--|--|--|--|
| X | X |  |  |  |  |  |  |

## 22. Digital to Analog Converter Controller (DACC)

### 22.1 Interpolation Mode

The Interpolation mode that allows Oversampling Ratio (OSR) of 2x, 4x, 8x, 16x, or 32x is not functional.

**Workaround**

None.

**Affected Silicon Revisions**

| A | B |  |  |  |  |  |  |
|---|---|--|--|--|--|--|--|
| X | X |  |  |  |  |  |  |

### 23. Data Sheet Clarifications

The following typographic corrections and clarifications are to be noted for the latest version of the device data sheet (DS60001527C):

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

#### 23.1 Controller Area Network (MCAN)

The MCAN\_CREL register reset value documented in the data sheet is applicable to devices with silicon revision B. The MCAN\_CREL register reset value for devices with silicon revision A is 0x30130506.

#### 23.2 Quad Serial Peripheral Interface (QSPI)

The QSPI in SPI mode does not support the *Wait Data Read Before Transfer* feature, the WDRBT bit in the SPI Mode Register (SPI\_MR) must be ignored.

## 24. Appendix A: Revision History

### Revision E (09/2019)

The following silicon issues were updated with new verbiage:

- [10.8 MCAN Data Bit Timing and Prescaler Register](#)
- [11.1 PIO Line Configuration for AFEC and DACC Analog Inputs](#)

### Revision D (5/2019)

Updated the [Silicon Issue Summary](#) table to be more readable.

The following Silicon Issues were updated:

- [Boundary Scan Mode: Internal Regulator](#)
- [XDMAC: TCM Accesses](#)
- [FFPI: Flash Programming](#)
- [PMC: Wait Mode Exit Fail from Flash](#)
- [SDRAMC: SDRAM Controller Scrambling Use Limitation](#)
- [SMC: SMC\\_WPSR Register Write Protection](#)
- [TWIHS: I<sup>2</sup>C Hold Timing Incompatibility](#)
- [TWIHS: Clear Command](#)

The following Silicon Issues were added:

- [DEVICE: System Performance](#)
- [SDRAMC: Operational Voltage](#)

### Revision C (11/2018)

The following Silicon Issues were added:

- [18.2 Programmable Clock Controller](#)
- [22.1 Interpolation Mode](#)

The following Data Sheet Clarifications were added:

- [Controller Area Network \(MCAN\)](#)
- [Quad Serial Peripheral Interface \(QSPI\)](#)

### Revision B (8/2018)

This revision was updated for Revision B silicon.

The following Silicon Issue was added:

- [13.2 WDRBT](#)

### Revision A (11/2017)

Initial release of this document.

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