Product Change Notification - SYST-02RNJR611

Date:

03 Oct 2019

Product Category:

Microprocessors

Affected CPNs:

Notification subject:

ERRATA - SAM9X60 Device Silicon Errata and Data Sheet Clarification

Notification text:

SYST-02RNJR611

Microchip has released a new Product Documents for the SAM9X60 Device Silicon Errata and Data Sheet Clarification of devices. If you are using one of these devices please read the document located at SAM9X60 Device Silicon Errata and Data Sheet Clarification.

Notification Status: Final

Description of Change: First issue.

Impacts to Data Sheet: None

Reason for Change: To Improve Productivity

Change Implementation Status: Complete

Date Document Changes Effective: 03 Oct 2019

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

Markings to Distinguish Revised from Unrevised Devices: N/A

Attachment(s):

SAM9X60 Device Silicon Errata and Data Sheet Clarification

Please contact your local Microchip sales office with questions or concerns regarding this notification.

Terms and Conditions:

If you wish to receive Microchip PCNs via email please register for our PCN email service at our PCN home page select register then fill in the required fields. You will find instructions about registering for Microchips PCN email service in the PCN FAQ section.
If you wish to change your PCN profile, including opt out, please go to the PCN home page select login and sign into your myMicrochip account. Select a profile option from the left navigation bar and make the applicable selections.

Affected Catalog Part Numbers (CPN)

SAM9X60-V/DWB
SAM9X60T-V/DWB

SAM9X60 Device

SAM9X60 Device Silicon Errata and Data Sheet Clarification

SAM9X60 Device

The SAM9X60 device that you have received conforms functionally to the current Device Data Sheet (DS60001579), 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 table. The silicon issues are summarized in 1. Silicon Issue Summary.

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 6. Data Sheet Clarifications, following the discussion of silicon issues.

The Device and Revision ID values for the SAM9X60 silicon device are shown in the following table.

Table 1. SAM9X60 Silicon Device Identification

Part Number	Device Identification	
	CHIPID_CIDR[31:0]	CHIPID_EXID[31:0]
SAM9X60-V/DWB	0x819B35A1	0x00000000

Note: Refer to the “Chip Identifier” and "Product Identification System" sections in the current device data sheet (DS60001579) for detailed information on chip identification and version for your specific device.

Table of Contents

1. Silicon Issue Summary

Table 1-1. Silicon Issue Summary

Module	Item/Feature	Summary	Affected Silicon Revisions		
			A		
System Controller	System Controller Write Protection Status Register (SYSC_WPSR) Limitation	Write access violation is not reported by SYSC_WPSR.	X		
OTPC	OTPC Limited Number of Packets	The number of packets is limited to 2.	X		
	OTPC Restricted Operating Range in Write Mode	Write operations cannot be performed over the full temperature and VDDANA ranges.	X		
	OTPC Wrong Default Configuration	The default configuration cannot be used to access the OTP memory in Write mode.	X		
PMC	ULP1 Mode Entry Procedure	Spurious exit from ULP1 mode	X		
Static Memory Controller	Register Write Protection Not Effective on SMC_OCMS Register	The register write protection is not effective on the SMC_OCMS register.	X		

2. System Controller Write Protection (SYSCWP)

2.1 System Controller Write Protection Status Register (SYSC_WPSR) Limitation

The status register SYSC_WPSR does not set the write access violation status flag for write-protected registers of RTC, RTT and WDT peripherals when the bit WPEN is set in SYSC_WPMR for these peripherals. However, the write protection mechanism is active.

Work Around
None

Affected Silicon Revisions

A							
X							

3. OTP Controller (OTPC)

3.1 OTPC Limited Number of Packets

The number of packets allowed to be written in the user area is limited to 2. The maximum size of the payload for each packet is 8192 bits.

Work Around
None

Affected Silicon Revisions

A							
X							

3.2 OTPC Restricted Operating Range in Write Mode

The write operations in the OTPC cannot be performed over the full temperature and VDDANA power supply ranges specified.

Work Around
The write operations in the OTPC are restricted to the following ambient temperature and VDDANA power supply ranges:

- T_A = [0°C to 50°C]
- VDDANA = [3.15V to 3.45V]

Affected Silicon Revisions

A							
X							

3.3 OTPC Wrong Default Configuration

The default configuration of the OTPC cannot be used to access the OTP memory in Write mode.

Work Around
Prior to any write operation in the OTPC, the OTPC must be configured using the following code. This operation needs to be performed only once before the first write operation and whenever the peripheral reset (signal periph_nreset) is asserted.

```
#define ARRAY_SIZE(a) (sizeof(a) / sizeof((a)[0]))

/*
* writing one word lasts 350us
* the timeout was chosen to be enough for writing 10 words  **/ #define TIMEOUT 500000

#define OTPC_0    (0x1u << 0)
#define OTPC_1    16
#define OTPC_2    (0xffffu << OTPC_1)
#define OTPC_3    (0x4391u << OTPC_1)

static void otp_sam9x60_fixup(void)
{
       static const uint32_t fixup0[4] = {0x04194801, 0x01000000, 0x00000008, 0x00000000};
       static const uint32_t fixup1[4] = {0xfb164801, 0x4c017d12, 0x02120e01, 0x00004000};
```

```
__IO uint32_t *OTPC_4   = (__IO uint32_t *)((uint8_t *)OTPC + 0x090);
__IO uint32_t *OTPC_5 = (__IO uint32_t *)((uint8_t *)OTPC + 0x0A0);
__IO uint32_t *OTPC_6 = (__IO uint32_t *)((uint8_t *)OTPC + 0x0B0);
uint32_t timeout;
int i;

timeout = TIMEOUT;
*OTPC_4 = OTPC_0 | OTPC_3;
while (!(OTPC->OTPC_SR & OTPC_SR_UNLOCK) && --timeout > 0);

for (i = 0; i < ARRAY_SIZE(fixup0); i++)
       OTPC_5[i] = fixup0[i];

for (i = 0; i < ARRAY_SIZE(fixup1); i++)
       OTPC_6[i] = fixup1[i];

timeout = TIMEOUT;
*OTPC_4 = OTPC_3;
while ((OTPC->OTPC_SR & OTPC_SR_UNLOCK) && --timeout > 0); }
```

Affected Silicon Revisions

A							
X							

4. Power Management Controller (PMC)

4.1 ULP1 Mode Entry Procedure

If one or more read or write accesses to the PMC user interface follow the last instruction to enter ULP1 mode (set CKGR_MOR.ULP1), the ULP1 mode may be exited immediately after the entry.

Work Around

Add two dummy read accesses outside of the PMC user interface just after setting the CKGR_MOR.ULP1 bit.

Affected Silicon Revisions

A							
X							

5. Static Memory Controller (SMC)

5.1 Register Write Protection Not Effective on SMC_OCMS Register

The register SMC_OCMS is not write-protected when the bit WPEN is set in SMC_WPMR.

Work Around

None

Affected Silicon Revisions

A							
X							

6. Data Sheet Clarifications

6.1 EBI Controls in Special Function Registers (SFR)

6.1.1 Use of DDR_MP_EN and NFD0_ON_D16 bits in SFR_CCFG_EBICSA

When:

- a NAND Flash memory is connected to D16-D23 and
- a DDR2-SDRAM or LPDDR-SDRAM is connected to D0-D15,

the bits SFR_CCFG_EBICSA.DDR_MP_EN and SFR_CCFG_EBICSA.NFD0_ON_D16 must both be set before performing the SDRAM initialization.

7. Revision History

7.1 DS80000846A - 10/2019

First issue.

The Microchip Website

Microchip provides online support via our website at http://www.microchip.com/. This website is used to make files and information easily available to customers. Some of the content available includes:

- **Product Support** – Data sheets and errata, application notes and sample programs, design resources, user's guides and hardware support documents, latest software releases and archived software
- **General Technical Support** – Frequently Asked Questions (FAQs), technical support requests, online discussion groups, Microchip design partner program member listing
- **Business of Microchip** – Product selector and ordering guides, latest Microchip press releases, listing of seminars and events, listings of Microchip sales offices, distributors and factory representatives

Product Change Notification Service

Microchip's product change notification service helps keep customers current on Microchip products. Subscribers will receive email notification whenever there are changes, updates, revisions or errata related to a specified product family or development tool of interest.

To register, go to http://www.microchip.com/pcn and follow the registration instructions.

Customer Support

Users of Microchip products can receive assistance through several channels:

- Distributor or Representative
- Local Sales Office
- Embedded Solutions Engineer (ESE)
- Technical Support

Customers should contact their distributor, representative or ESE for support. Local sales offices are also available to help customers. A listing of sales offices and locations is included in this document.

Technical support is available through the website at: http://www.microchip.com/support

Microchip Devices Code Protection Feature

Note the following details of the code protection feature on Microchip devices:

- Microchip products meet the specification contained in their particular Microchip Data Sheet.
- Microchip believes that its family of products is one of the most secure families of its kind on the market today, when used in the intended manner and under normal conditions.
- There are dishonest and possibly illegal methods used to breach the code protection feature. All of these methods, to our knowledge, require using the Microchip products in a manner outside the operating specifications contained in Microchip's Data Sheets. Most likely, the person doing so is engaged in theft of intellectual property.
- Microchip is willing to work with the customer who is concerned about the integrity of their code.
- Neither Microchip nor any other semiconductor manufacturer can guarantee the security of their code. Code protection does not mean that we are guaranteeing the product as "unbreakable."

Code protection is constantly evolving. We at Microchip are committed to continuously improving the code protection features of our products. Attempts to break Microchip's code protection feature may be a violation of the Digital Millennium Copyright Act. If such acts allow unauthorized access to your software or other copyrighted work, you may have a right to sue for relief under that Act.

Legal Notice

Information contained in this publication regarding device applications and the like is provided only for your convenience and may be superseded by updates. It is your responsibility to ensure that your application meets with

your specifications. MICROCHIP MAKES NO REPRESENTATIONS OR WARRANTIES OF ANY KIND WHETHER EXPRESS OR IMPLIED, WRITTEN OR ORAL, STATUTORY OR OTHERWISE, RELATED TO THE INFORMATION, INCLUDING BUT NOT LIMITED TO ITS CONDITION, QUALITY, PERFORMANCE, MERCHANTABILITY OR FITNESS FOR PURPOSE. Microchip disclaims all liability arising from this information and its use. Use of Microchip devices in life support and/or safety applications is entirely at the buyer's risk, and the buyer agrees to defend, indemnify and hold harmless Microchip from any and all damages, claims, suits, or expenses resulting from such use. No licenses are conveyed, implicitly or otherwise, under any Microchip intellectual property rights unless otherwise stated.

Trademarks

The Microchip name and logo, the Microchip logo, Adaptec, AnyRate, AVR, AVR logo, AVR Freaks, BesTime, BitCloud, chipKIT, chipKIT logo, CryptoMemory, CryptoRF, dsPIC, FlashFlex, flexPWR, HELDO, IGLOO, JukeBlox, KeeLoq, Kleer, LANCheck, LinkMD, maXStylus, maXTouch, MediaLB, megaAVR, Microsemi, Microsemi logo, MOST, MOST logo, MPLAB, OptoLyzer, PackeTime, PIC, picoPower, PICSTART, PIC32 logo, PolarFire, Prochip Designer, QTouch, SAM-BA, SenGenuity, SpyNIC, SST, SST Logo, SuperFlash, Symmetricom, SyncServer, Tachyon, TempTrackr, TimeSource, tinyAVR, UNI/O, Vectron, and XMEGA are registered trademarks of Microchip Technology Incorporated in the U.S.A. and other countries.

APT, ClockWorks, The Embedded Control Solutions Company, EtherSynch, FlashTec, Hyper Speed Control, HyperLight Load, IntelliMOS, Libero, motorBench, mTouch, Powermite 3, Precision Edge, ProASIC, ProASIC Plus, ProASIC Plus logo, Quiet-Wire, SmartFusion, SyncWorld, Temux, TimeCesium, TimeHub, TimePictra, TimeProvider, Vite, WinPath, and ZL are registered trademarks of Microchip Technology Incorporated in the U.S.A.

Adjacent Key Suppression, AKS, Analog-for-the-Digital Age, Any Capacitor, AnyIn, AnyOut, BlueSky, BodyCom, CodeGuard, CryptoAuthentication, CryptoAutomotive, CryptoCompanion, CryptoController, dsPICDEM, dsPICDEM.net, Dynamic Average Matching, DAM, ECAN, EtherGREEN, In-Circuit Serial Programming, ICSP, INICnet, Inter-Chip Connectivity, JitterBlocker, KleerNet, KleerNet logo, memBrain, Mindi, MiWi, MPASM, MPF, MPLAB Certified logo, MPLIB, MPLINK, MultiTRAK, NetDetach, Omniscient Code Generation, PICDEM, PICDEM.net, PICkit, PICtail, PowerSmart, PureSilicon, QMatrix, REAL ICE, Ripple Blocker, SAM-ICE, Serial Quad I/O, SMART-I.S., SQI, SuperSwitcher, SuperSwitcher II, Total Endurance, TSHARC, USBCheck, VariSense, ViewSpan, WiperLock, Wireless DNA, and ZENA are trademarks of Microchip Technology Incorporated in the U.S.A. and other countries.

SQTP is a service mark of Microchip Technology Incorporated in the U.S.A.

The Adaptec logo, Frequency on Demand, Silicon Storage Technology, and Symmcom are registered trademarks of Microchip Technology Inc. in other countries.

GestIC is a registered trademark of Microchip Technology Germany II GmbH & Co. KG, a subsidiary of Microchip Technology Inc., in other countries.

All other trademarks mentioned herein are property of their respective companies.

ISBN: 978-1-5224-4877-8

Quality Management System

For information regarding Microchip's Quality Management Systems, please visit http://www.microchip.com/quality.

Worldwide Sales and Service

AMERICAS	ASIA/PACIFIC	ASIA/PACIFIC	EUROPE
Corporate Office 2355 West Chandler Blvd. Chandler, AZ 85224-6199 Tel: 480-792-7200 Fax: 480-792-7277 Technical Support: http://www.microchip.com/support Web Address: http://www.microchip.com **Atlanta** Duluth, GA Tel: 678-957-9614 Fax: 678-957-1455 **Austin, TX** Tel: 512-257-3370 **Boston** Westborough, MA Tel: 774-760-0087 Fax: 774-760-0088 **Chicago** Itasca, IL Tel: 630-285-0071 Fax: 630-285-0075 **Dallas** Addison, TX Tel: 972-818-7423 Fax: 972-818-2924 **Detroit** Novi, MI Tel: 248-848-4000 **Houston, TX** Tel: 281-894-5983 **Indianapolis** Noblesville, IN Tel: 317-773-8323 Fax: 317-773-5453 Tel: 317-536-2380 **Los Angeles** Mission Viejo, CA Tel: 949-462-9523 Fax: 949-462-9608 Tel: 951-273-7800 **Raleigh, NC** Tel: 919-844-7510 **New York, NY** Tel: 631-435-6000 **San Jose, CA** Tel: 408-735-9110 Tel: 408-436-4270 **Canada - Toronto** Tel: 905-695-1980 Fax: 905-695-2078	**Australia - Sydney** Tel: 61-2-9868-6733 **China - Beijing** Tel: 86-10-8569-7000 **China - Chengdu** Tel: 86-28-8665-5511 **China - Chongqing** Tel: 86-23-8980-9588 **China - Dongguan** Tel: 86-769-8702-9880 **China - Guangzhou** Tel: 86-20-8755-8029 **China - Hangzhou** Tel: 86-571-8792-8115 **China - Hong Kong SAR** Tel: 852-2943-5100 **China - Nanjing** Tel: 86-25-8473-2460 **China - Qingdao** Tel: 86-532-8502-7355 **China - Shanghai** Tel: 86-21-3326-8000 **China - Shenyang** Tel: 86-24-2334-2829 **China - Shenzhen** Tel: 86-755-8864-2200 **China - Suzhou** Tel: 86-186-6233-1526 **China - Wuhan** Tel: 86-27-5980-5300 **China - Xian** Tel: 86-29-8833-7252 **China - Xiamen** Tel: 86-592-2388138 **China - Zhuhai** Tel: 86-756-3210040	**India - Bangalore** Tel: 91-80-3090-4444 **India - New Delhi** Tel: 91-11-4160-8631 **India - Pune** Tel: 91-20-4121-0141 **Japan - Osaka** Tel: 81-6-6152-7160 **Japan - Tokyo** Tel: 81-3-6880- 3770 **Korea - Daegu** Tel: 82-53-744-4301 **Korea - Seoul** Tel: 82-2-554-7200 **Malaysia - Kuala Lumpur** Tel: 60-3-7651-7906 **Malaysia - Penang** Tel: 60-4-227-8870 **Philippines - Manila** Tel: 63-2-634-9065 **Singapore** Tel: 65-6334-8870 **Taiwan - Hsin Chu** Tel: 886-3-577-8366 **Taiwan - Kaohsiung** Tel: 886-7-213-7830 **Taiwan - Taipei** Tel: 886-2-2508-8600 **Thailand - Bangkok** Tel: 66-2-694-1351 **Vietnam - Ho Chi Minh** Tel: 84-28-5448-2100	**Austria - Wels** Tel: 43-7242-2244-39 Fax: 43-7242-2244-393 **Denmark - Copenhagen** Tel: 45-4450-2828 Fax: 45-4485-2829 **Finland - Espoo** Tel: 358-9-4520-820 **France - Paris** Tel: 33-1-69-53-63-20 Fax: 33-1-69-30-90-79 **Germany - Garching** Tel: 49-8931-9700 **Germany - Haan** Tel: 49-2129-3766400 **Germany - Heilbronn** Tel: 49-7131-72400 **Germany - Karlsruhe** Tel: 49-721-625370 **Germany - Munich** Tel: 49-89-627-144-0 Fax: 49-89-627-144-44 **Germany - Rosenheim** Tel: 49-8031-354-560 **Israel - Ra'anana** Tel: 972-9-744-7705 **Italy - Milan** Tel: 39-0331-742611 Fax: 39-0331-466781 **Italy - Padova** Tel: 39-049-7625286 **Netherlands - Drunen** Tel: 31-416-690399 Fax: 31-416-690340 **Norway - Trondheim** Tel: 47-72884388 **Poland - Warsaw** Tel: 48-22-3325737 **Romania - Bucharest** Tel: 40-21-407-87-50 **Spain - Madrid** Tel: 34-91-708-08-90 Fax: 34-91-708-08-91 **Sweden - Gothenberg** Tel: 46-31-704-60-40 **Sweden - Stockholm** Tel: 46-8-5090-4654 **UK - Wokingham** Tel: 44-118-921-5800 Fax: 44-118-921-5820