ESP32-S3 Series SoC

Errata

Introduction

This document describes known errata in ESP32-S3 series of SoCs.

Version 1.1

Espressif Systems

Note:

Check the link or the QR code to make sure that you use the latest version of this document:
https://espressif.com/sites/default/files/documentation/esp32-s3_errata_en.pdf

Contents

Chip Revision Identification

Espressif is introducing **vM.X** numbering scheme to indicate chip revisions.

M – Major number, indicating the major revision of the chip product. If this number changes, it means the software used for the previous version of the product is incompatible with the new product, and the software version shall be upgraded for the use of the new product.

X – Minor number, indicating the minor revision of the chip product. If this number changes, it means the software used for the previous version of the product is compatible with the new product, and there is no need to upgrade the software.

The vM.X scheme replaces previously used chip revision schemes, including ECOx numbers, Vxxx, and other formats if any.

The chip revision of ESP32-S3 is identified by:

- eFuse fields EFUSE_RD_MAC_SPI_SYS_5_REG[25:23] and EFUSE_RD_MAC_SPI_SYS_3_REG[20:18]

Table 1: Chip Revision Identification by eFuse Bits

	eFuse Bit	Chip Revision		
		v0.0	v0.1	v0.2
Major Number	EFUSE_RD_MAC_SPI_SYS_5_REG[25]	0	0	0
	EFUSE_RD_MAC_SPI_SYS_5_REG[24]	0	0	0
Minor Number	EFUSE_RD_MAC_SPI_SYS_5_REG[23]	0	0	0
	EFUSE_RD_MAC_SPI_SYS_3_REG[20]	0	0	0
	EFUSE_RD_MAC_SPI_SYS_3_REG[19]	0	0	1
	EFUSE_RD_MAC_SPI_SYS_3_REG[18]	0	1	0

- **Main Die** line in chip marking

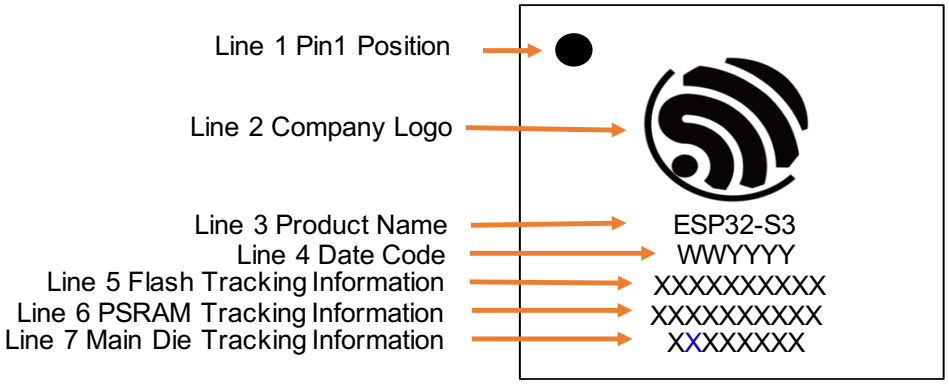

Figure 1: Chip Marking Diagram

Table 2: Chip Revision Identification by Silk Print

Chip Revision	Main Die
v0.0	xAxxxxxx
v0.1	xBxxxxxx
v0.2	xCxxxxxx

Note:

- Information about ESP-IDF release that supports a specific chip revision is provided in ESP Product Selector.
- For more information about the chip revision upgrade and their identification of ESP32-S3 series products, please refer to ESP32-S3 Product/Process Change Notifications (PCN).
- For more information about the chip revision numbering scheme, see Compatibility Advisory for Chip Revision Numbering Scheme.

Errata Description

Table 3: Errata Summary

Category	Description	Affected Revisions		
		v0.0	v0.1	v0.2
SAR ADC	1.1 *The Digital Controller (DMA) of SAR ADC2 cannot work*	Y	Y	Y
Analog Power	2.1 *Chip will be damaged when BIAS_SLEEP = 0 and PD_CUR = 1*	Y	Y	Y
USB-OTG	3 *The USB-OTG Download function is unavailable*	Y	Y	Y

1 SAR ADC

1.1 The Digital Controller (DMA) of SAR ADC2 cannot work

Description

The Digital Controller of SAR ADC2 may receive a false sampling enable signal. In such case, the controller will enter an inoperative state.

Workarounds

Users are suggested to use RTC controller to control SAR ADC2.

Projected Solution

No fix scheduled.

2 Analog Power

2.1 Chip will be damaged when BIAS_SLEEP = 0 and PD_CUR = 1

Description

If the analog power is configured as BIAS_SLEEP = 0 and PD_CUR = 1, the chip will be permanently damaged. This issue might be triggered when ULP and/or touch sensor is used during sleep mode (Light-sleep or Deep-sleep).

Workarounds

This problem can be bypassed by disabling such analog power configuration in sleep mode through software.

Projected Solution

Customers are suggested to upgrade their ESP-IDF version to v4.4.2 (release/v4.4) or v5.0 and above. Users are prevented from enabling the above configuration in these versions.

3 USB-OTG

3.1 The USB-OTG Download function is unavailable

Description

For ESP32-S3 series chips manufactured before the Date Code 2219 and ESP32-S3 series of modules and development boards with the PW Number before PW-2022-06-XXXX, the EFUSE_DIS_USB_OTG_DOWNLOAD_MODE (BLK0 B19[7]) bit of eFuse is set by default and cannot be modified. Therefore, the USB-OTG Download function is unavailable for these products.

> **Note:**
> For detailed information about the Date Code and the PW Number, please refer to Espressif Chip Packaging Information and Espressif Module Packaging Information respectively.

Workarounds

ESP32-S3 also supports downloading firmware through USB-Serial-JTAG. Please refer to USB Serial/JTAG Controller Console.

Projected Solution

This issue has been fixed.

For ESP32-S3 series chips manufactured on and after the Date Code 2219 and ESP32-S3 series modules and development boards with the PW Number of and after PW-2022-06-XXXX, the bit (BLK0 B19[7]) will not be programmed by default and thus is open for users to program. This will enable the USB-OTG Download function.

For more details and recommendations for users, please refer to Security Advisory for USB_OTG & USB_Serial_JTAG Download Functions of ESP32-S3 Series Products.

Related Documentation and Resources

Related Documentation

- ESP32-S3 Series Datasheet – Specifications of the ESP32-S3 hardware.
- ESP32-S3 Technical Reference Manual – Detailed information on how to use the ESP32-S3 memory and peripherals.
- ESP32-S3 Hardware Design Guidelines – Guidelines on how to integrate the ESP32-S3 into your hardware product.
- *Certificates*
  https://espressif.com/en/support/documents/certificates
- *ESP32-S3 Product/Process Change Notifications (PCN)*
  https://espressif.com/en/support/documents/pcns?keys=ESP32-S3
- *ESP32-S3 Advisories* – Information on security, bugs, compatibility, component reliability.
  https://espressif.com/en/support/documents/advisories?keys=ESP32-S3
- *Documentation Updates and Update Notification Subscription*
  https://espressif.com/en/support/download/documents

Developer Zone

- ESP-IDF Programming Guide for ESP32-S3 – Extensive documentation for the ESP-IDF development framework.
- *ESP-IDF* and other development frameworks on GitHub.
  https://github.com/espressif
- *ESP32 BBS Forum* – Engineer-to-Engineer (E2E) Community for Espressif products where you can post questions, share knowledge, explore ideas, and help solve problems with fellow engineers.
  https://esp32.com/
- *The ESP Journal* – Best Practices, Articles, and Notes from Espressif folks.
  https://blog.espressif.com/
- See the tabs *SDKs and Demos*, *Apps*, *Tools*, *AT Firmware*.
  https://espressif.com/en/support/download/sdks-demos

Products

- *ESP32-S3 Series SoCs* – Browse through all ESP32-S3 SoCs.
  https://espressif.com/en/products/socs?id=ESP32-S3
- *ESP32-S3 Series Modules* – Browse through all ESP32-S3-based modules.
  https://espressif.com/en/products/modules?id=ESP32-S3
- *ESP32-S3 Series DevKits* – Browse through all ESP32-S3-based devkits.
  https://espressif.com/en/products/devkits?id=ESP32-S3
- *ESP Product Selector* – Find an Espressif hardware product suitable for your needs by comparing or applying filters.
  https://products.espressif.com/#/product-selector?language=en

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Revision History

Date	Version	Release Notes
2023-01-20	v1.1	Added Section 3
2022-10-14	v1.0	First release

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