

Bug Advisory

Title	Bug Advisory Concerning Data Corruption in RTC Memory of ESP32-C3 / ESP32-S3
Issue Date	2024/08/15
Advisory Number	AR2024-005
Serial Number	NA
Version	v1.0

Issue Summary

Issue 1: Data Corruption in RTC Memory during High Load Operation on ESP32-S3

During high load operation (Flash SPI frequency greater than or equal to 80 MHz or CPU frequency of 240 MHz), due to improper power configuration in the RTC power domain, data or instructions stored in the RTC memory of ESP32-S3 may be corrupted during operation.

Issue 2: Data Corruption in RTC Memory during Sleep on ESP32-C3 / ESP32-S3

Due to improper low-power mode configuration in RTC memory during sleep, data or instructions stored in the RTC memory of ESP32-C3 / ESP32-S3 may be corrupted in both light-sleep and deep-sleep modes.

Impact Analysis

Affected Product Series:

Issues 1 and 2 are both related to the manufacturing process and affect a small percentage of the produced chips. The affected ESP-IDF versions did not configure the power management correctly to accommodate these particular chips. After implementing the fixes in ESP-IDF, the same chips can operate correctly in sleep mode.

ESP-IDF Affected Versions:

Issue 1:

ESP-IDF Branch	Affected Commit IDs	Affected ESP-IDF Versions
master after v5.0-dev	Commits before 5f8ead1b (excluded)	NA
release/v4.4	Commits before 653cddf0 (excluded)	v4.4 - v4.4.1

Issue 2:

ESP-IDF Branch	Affected Commit IDs	Affected ESP-IDF Versions
master after v5.3-dev	Commits before 4ee54026 (excluded)	NA
release/v5.2	Commits before 80cfe30b (excluded)	v5.2 - v5.2.1
release/v5.1	Commits before 9eb22e68 (excluded)	v5.1 - v5.1.3
release/v5.0	Commits before 155eb116 (excluded)	v5.0 - v5.0.6
release/v4.4	Commits before 8df220e6 (excluded)	v4.4 - v4.4.7

Mitigation

ESP-IDF Patched Versions:

Issue 1:

ESP-IDF Branch	Fixed Commit IDs	Fixed ESP-IDF Versions
master after v5.0-dev	5f8ead1b	v5.0
release/v4.4	653cddf0	v4.4.2

Issue 2:

ESP-IDF Branch	Fixed Commit IDs	Fixed ESP-IDF Versions
master after v5.3-dev	4ee54026	v5.3
release/v5.2	80cfe30b	v5.2.2
release/v5.1	9eb22e68	v5.1.4
release/v5.0	155eb116	v5.0.7
release/v4.4	8df220e6	v4.4.8

Recommendations for Application Developers

If your application stores critical data in the RTC memory and runs in the scenarios that may trigger the above issues, and you are using an affected ESP-IDF version, it is recommended to use fixed ESP-IDF versions mentioned above or versions after the fixed commit. If you encounter problems during the upgrade process, please provide the ESP-IDF version or Commit ID to [Espressif](#). We will confirm and handle related matters as soon as possible.