

文件编号 Document No.	ESP-07-2-007-03	文件名称 Document Name	产品/工艺变更通知 Product/Process Change Notice (PCN)
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乐鑫 ESP32-C2（ESP8684）系列产品升级 Upgrade of ESP32-C2 (ESP8684) Series Products					
PCN 编号 PCN No.	PCN20250101(v2)	提出日期 Issue Date of PCN	2025/01/24		
变更日期 Proposed Date of Change	2025/03/24	预计变更后产品首次 出货日期 Proposed Date of First Shipment After Change	2025/04/24		
PCN 类型 / PCN Category	☒ 客户需要批准/ Customer Approval Required ☐ 客户通知/ Customer Notification				
1. 影响产品/ Affected Products					
受影响产品包括 ESP32-C2（ESP8684）系列芯片、模组、开发板，具体型号清单如下： The affected products include the ESP32-C2 (ESP8684) series chips, modules, and development boards. The specific model list is as follows:					
1) 芯片产品/ Chip Products					
变更前订购代码/ Ordering Code Before Change		变更后订购代码/ Ordering Code After Change	变更项目/ Change Item		
ESP8684H2		ESP8684H2X	Chip revision from v1.2 to v2.0		
ESP8684H4		ESP8684H4X	Chip revision from v1.2 to v2.0 + In-package flash update		
2) 模组产品/ Module Products					
Module Product Name	Ordering Code Before Change	Ordering Code After Change	Chip on Board Before Change	Chip on Board After Change	Change Detail
ESP8684-WROOM-01C	ESP8684-WROOM-01C-H2	ESP8684-WROOM-01C-H2X	ESP8684H2	ESP8684H2X	Chip revision from v1.2 to v2.0
ESP8684-WROOM-01C	ESP8684-WROOM-01C-H4	ESP8684-WROOM-01C-H4X	ESP8684H4	ESP8684H4X	Chip revision from v1.2 to v2.0 + In-package flash update
ESP8684-WROOM-02C	ESP8684-WROOM-02C-N2	ESP8684-WROOM-02C-H2X	ESP8684H2	ESP8684H2X	Chip revision from v1.2 to v2.0
ESP8684-WROOM-02C	ESP8684-WROOM-02C-N4	ESP8684-WROOM-02C-H4X	ESP8684H4	ESP8684H4X	Chip revision from v1.2 to v2.0 + In-package flash update
ESP8684-WROOM-02C	ESP8684-WROOM-02C-H2	ESP8684-WROOM-02C-H2X	ESP8684H2	ESP8684H2X	Chip revision from v1.2 to v2.0
ESP8684-WROOM-02C	ESP8684-WROOM-02C-H4	ESP8684-WROOM-02C-H4X	ESP8684H4	ESP8684H4X	Chip revision from v1.2 to v2.0 + In-package flash update
ESP8684-WROOM-02UC	ESP8684-WROOM-02UC-N2	ESP8684-WROOM-02UC-H2X	ESP8684H2	ESP8684H2X	Chip revision from v1.2 to v2.0

ESP8684-WROOM-02UC	ESP8684-WROOM-02UC-N4	ESP8684-WROOM-02UC-H4X	ESP8684H4	ESP8684H4X	Chip revision from v1.2 to v2.0 + In-package flash update
ESP8684-WROOM-02UC	ESP8684-WROOM-02UC-H2	ESP8684-WROOM-02UC-H2X	ESP8684H2	ESP8684H2X	Chip revision from v1.2 to v2.0
ESP8684-WROOM-02UC	ESP8684-WROOM-02UC-H4	ESP8684-WROOM-02UC-H4X	ESP8684H4	ESP8684H4X	Chip revision from v1.2 to v2.0 + In-package flash update
ESP8684-WROOM-03	ESP8684-WROOM-03-H2	ESP8684-WROOM-03-H2X	ESP8684H2	ESP8684H2X	Chip revision from v1.2 to v2.0
ESP8684-WROOM-03	ESP8684-WROOM-03-H4	ESP8684-WROOM-03-H4X	ESP8684H4	ESP8684H4X	Chip revision from v1.2 to v2.0 + In-package flash update
ESP8684-WROOM-04C	ESP8684-WROOM-04C-H2	ESP8684-WROOM-04C-H2X	ESP8684H2	ESP8684H2X	Chip revision from v1.2 to v2.0
ESP8684-WROOM-04C	ESP8684-WROOM-04C-H4	ESP8684-WROOM-04C-H4X	ESP8684H4	ESP8684H4X	Chip revision from v1.2 to v2.0 + In-package flash update
ESP8684-WROOM-05	ESP8684-WROOM-05-H2	ESP8684-WROOM-05-H2X	ESP8684H2	ESP8684H2X	Chip revision from v1.2 to v2.0
ESP8684-WROOM-05	ESP8684-WROOM-05-H4	ESP8684-WROOM-05-H4X	ESP8684H4	ESP8684H4X	Chip revision from v1.2 to v2.0 + In-package flash update
ESP8684-WROOM-06C	ESP8684-WROOM-06C-H2	ESP8684-WROOM-06C-H2X	ESP8684H2	ESP8684H2X	Chip revision from v1.2 to v2.0
ESP8684-WROOM-06C	ESP8684-WROOM-06C-H4	ESP8684-WROOM-06C-H4X	ESP8684H4	ESP8684H4X	Chip revision from v1.2 to v2.0 + In-package flash update
ESP8684-WROOM-07	ESP8684-WROOM-07-H2	ESP8684-WROOM-07-H2X	ESP8684H2	ESP8684H2X	Chip revision from v1.2 to v2.0
ESP8684-WROOM-07	ESP8684-WROOM-07-H4	ESP8684-WROOM-07-H4X	ESP8684H4	ESP8684H4X	Chip revision from v1.2 to v2.0 + In-package flash update
ESP8684-MINI-1	ESP8684-MINI-1-H2	ESP8684-MINI-1-H2X	ESP8684H2	ESP8684H2X	Chip revision from v1.2 to v2.0
ESP8684-MINI-1	ESP8684-MINI-1-H4	ESP8684-MINI-1-H4X	ESP8684H4	ESP8684H4X	Chip revision from v1.2 to v2.0 + In-package flash update
ESP8684-MINI-1U	ESP8684-MINI-1U-H2	ESP8684-MINI-1U-H2X	ESP8684H2	ESP8684H2X	Chip revision from v1.2 to v2.0
ESP8684-MINI-1U	ESP8684-MINI-1U-H4	ESP8684-MINI-1U-H4X	ESP8684H4	ESP8684H4X	Chip revision from v1.2 to v2.0 + In-package flash update

3) 开发板产品/ Development Board Products

Development Board Product Name	Ordering Code Before Change	Ordering Code After Change	Chip on Board Before Change	Chip on Board After Change	Change Detail
ESP8684-DevKitC-02	ESP8684-DevKitC-02C-N4	ESP8684-DevKitC-02C-N4X	ESP8684H4	ESP8684H4X	Chip revision from v1.2 to v2.0 + In-package flash update
ESP8684-DevKitM-1	ESP8684-DevKitM-1-H4	ESP8684-DevKitM-1-H4X	ESP8684H4	ESP8684H4X	Chip revision from v1.2 to v2.0 + In-package flash update
ESP8684-DevKitM-1	ESP8684-DevKitM-1U-H4	ESP8684-DevKitM-1U-H4X	ESP8684H4	ESP8684H4X	Chip revision from v1.2 to v2.0 + In-package flash update

2. 变更原因/ Reason for Change

- 为增加客户可用的 SRAM 和 flash 空间，对 ESP32-C2 芯片进行了升级。
- 乐鑫已在 ESP32-C2 (ESP8684) 系列芯片平台上完成了一款新增封装内 Flash 的验证测试，测试结果显示符合要求。公司决定在 ESP8684H4 及 ESP8684H4X 芯片的生产中使用该 Flash，以提高供应稳定性。
- 由于升级前后的产品在软件方面不兼容，为区分变更前后的产品，公司更新了订购代码。

- To increase the available SRAM and flash memory for customers, the ESP32-C2 chip has been upgraded from v1.2 to v2.0.

- 2) Espressif has completed the qualification testing of a newly introduced in-package flash on the ESP32-C2 (ESP8684) series chip, with results meeting the required standards. The company has decided to use this flash in the production of the ESP8684H4 and ESP8684H4X chips to enhance supply stability.
- 3) Since chip revision v2.0 and previous chip revisions are not software-compatible, Espressif has updated the ordering codes to distinguish between them.

3. 变更描述/ Description of Change

- 1) 段落 1 中 ESP32-C2 系列产品的芯片硬件金属层变更，芯片版本将由 v1.2 升级为 v2.0，最新的 ESP32-C2 芯片版本 v2.0 与升级后的 ESP-IDF 搭配使用，可以额外获得约 20 KB SRAM 空间和约 100 KB flash 空间供项目开发使用（以实际应用为准）。段落 1 中列出的模组和开发板产品中使用的主芯片为 ESP32-C2 系列芯片，因此也进行相应变更。
 - 2) 段落 1 中的 ESP8684H4 和 ESP8684H4X 芯片产品增加一款封装内 flash 为备选物料，因此段落 1 中对应的模组和开发板产品也进行相应变更。
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- 1) The modification to the ESP32-C2 series chip described in Para 1 involves a hardware metal layer change, with the chip version being upgraded from v1.2 to v2.0. The latest ESP32-C2 v2.0 chip, when used with the updated ESP-IDF, provides approximately 20 KB of additional SRAM and around 100 KB of extra flash memory for project development (actual gains may vary depending on the specific application). Since the modules and development boards listed in Para 1 use the ESP32-C2 series chip, they have also been updated accordingly.
 - 2) The ESP8684H4 and ESP8684H4X chip mentioned in Para 1 has introduced a new in-package flash as an alternative source to improve supply stability. As a result, the corresponding modules and development boards listed in Para 1 have also been updated accordingly.

4. 变更对比/ Change Comparison

请见附录 I：变更对比。

Please refer to Appendix I: Change Comparison.

识别方式/ Identification Method:

芯片产品：通过产品型号，eFuse 及产品丝印。

模组和开发板产品：通过产品型号，主芯片的 eFuse，模组屏蔽盖丝印的产品规格标识位，或产品外箱标签中的 PW 号。

Chip products: Identified by part number, eFuse bits and chip marking.

Module and Development Board products: Identified by the part number, chip eFuse, specification identifier on the module shield marking, or PW No. on carton box.

5. 变更影响/ Impact of Change

1) 品质和性能/ Quality & Performance:

ESP32-C2 芯片版本 v2.0 必须搭配指定版本的 ESP-IDF 使用，具体版本请参见下面段落 5-5) 中的表格“ESP32-C2 v2.0 所需 ESP-IDF 版本”。使用该版本可额外获得约 20 KB 的 SRAM 和约 100 KB 的 flash 空间供项目开发使用（以实际应用为准）。

新增封装内 flash 在 ESP32-C2 系列产品上已经通过了物料验证测试，乐鑫确认该 flash 的品质和性能满足乐鑫的要求。

The ESP32-C2 chip revision v2.0 must be used with a specified version of ESP-IDF. For details, refer to the table "Required ESP-IDF Version for ESP32-C2 v2.0" in Para 5-5) below. ESP32-C2 v2.0 provides approximately 20 KB of additional SRAM and around 100 KB of extra flash memory for project development (actual gains may vary depending on the specific application).

The newly in-package flash has passed material qualification tests for the ESP32-C2 series product. Espressif confirms that the quality and performance of this flash meet its standards.

2) 交期/ Delivery:

对于变更后的新版本，乐鑫将保持产品标准交货周期（Standard Lead Time）不变。

对于变更前的旧版本，乐鑫未来无供应计划；若您有订单需求，请务必尽快联系乐鑫商务人员。

为保障供应，请您及时确认版本变更并完成软件升级。

The upgraded products will maintain the standard lead time.

For products with ESP32-C2 chips prior to revision v2.0, Espressif has no future supply plans. If you have order requirements, please contact Espressif's sales team as soon as possible.

To ensure the smooth delivery of future orders, customers are advised to promptly complete software upgrades and verify the updated product.

3) 订购代码/ Ordering Code:

芯片，模组和开发板产品：请使用新的订购代码下单，变更后订购代码参见段落 1。

Chips, modules, and development boards: Please place orders using the new ordering code. Refer to Para 1 for the updated ordering code.

4) 认证/ Certification: 不影响/ No impact

5) 软件/ Software:

- a) 随着 ESP32-C2 系列升级为 v2.0 版本芯片，如果您当前使用的是早于 v2.0 的芯片版本，则现有的 ESP-IDF 版本可能无法兼容 v2.0 芯片。为确保兼容性，请将 ESP-IDF 升级至需求版本或更高版本（参见下表“ESP32-C2 v2.0 所需 ESP-IDF 版本”）。[将 ESP-IDF 升级至需求版本或更高版本后](#)，请保持 Kconfig 中 `ESP32C2\_REV\_MIN` 的配置不变，然后重新编译二进制文件。编译后的二进制文件可在之前的芯片版本以及 v2.0 上运行。如已使用上述 ESP-IDF 需求版本或更高版本编译了二进制文件，则无需再更新软件。更多软件配置信息，可参考[关于 ESP32-C2 芯片版本 v2.0 的兼容性公告](#)。

需要注意的是，ESP-IDF v5.1.5 和 v5.3.2 与 ESP32-C2 v2.0 芯片兼容但芯片版本检查在两个发布中未去除芯片兼容，但芯片版本检查在两个发布中未去除。使能 `ESP32C2\_REV2\_DEVELOPMENT` 选项来跳过这些过时的检查。

As the ESP32-C2 chip series upgrades to the v2.0 chip revision, if you are currently using a pre-v2.0 chip version, your existing ESP-IDF version may not be compatible with the v2.0 chip. [To ensure compatibility and to have the same binary supporting ESP32-C2 v2.0 and the older version of the chip you are using, please make sure the binary is built with ESP-IDF version equal to or higher than the required version \(see Table *Required ESP-IDF Version for ESP32-C2 v2.0*\). If not, please upgrade ESP-IDF to the required version or higher and rebuild your binary with Kconfig option `ESP32C2\\_REV\\_MIN` unchanged. The built binary is able to run on all existing chips and on ESP32-C2 v2.0 as well. If your binary is already built with these versions, there is no need to upgrade your software. For more ESP-IDF configuration information, please refer to \[Compatibility Advisory for ESP32-C2 Chip Revision v2.0\]\(#\).](#)

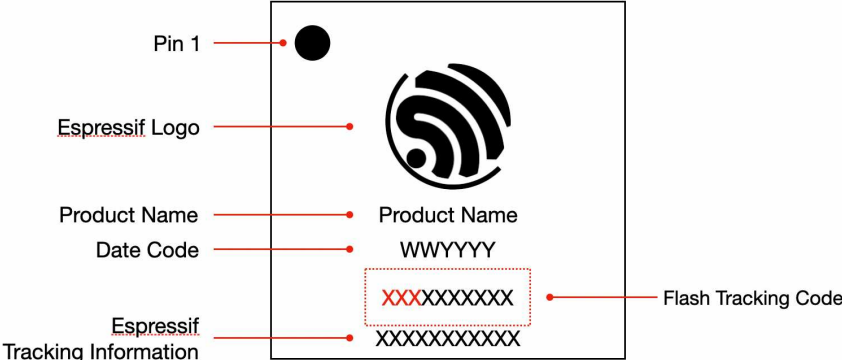
It is important to note that ESP-IDF v5.1.5 and v5.3.2 are compatible with ESP32-C2 v2.0 chip. However, chip version checks have not been removed in these two releases. To bypass these outdated checks, enable the `ESP32C2\_REV2\_DEVELOPMENT` option.

ESP32-C2 v2.0 所需 ESP-IDF 版本/ Required ESP-IDF Version for ESP32-C2 v2.0:

发布版本 Release Branch	推荐版本 Recommended	使用 ESP32-C2 v2.0 版本产品的需求 ESP-IDF 版本 Required ESP-IDF version with ESP32-C2 v2.0
release/v5.4	5.4 及其以上版本 v5.4 or above	5.4
release/v5.3	5.3.2 及其以上版本 v5.3.2 or above	5.3.2
release/v5.2	5.2.4 及其以上版本 v5.2.4 or above	5.2.4
release/v5.1	5.1.5 及其以上版本 v 5.1.5 or above	5.1.5
release/v5.0	5.0.8 及其以上版本	5.0.8

	v5.0.8 or above	
b) 默认情况下，ESP32-C2（ESP8684）系列产品中 SPI flash 不支持自动暂停功能。如需要 flash 自动暂停功能，请联系我们。 By default, the SPI flash in the ESP32-C2 (ESP8684) series products does not support the auto-suspend feature. If you require the flash auto-suspend functionality, please contact us.		
6) 技术规格书/ Datasheet: ESP8684 系列芯片规格书: 更新芯片订购代码 ESP8684 所有模组规格书: 更新模组的内置芯片以及模组订购代码 ESP32-C2 系列芯片勘误表: 添加芯片版本 v2.0 的识别方式 ESP8684 Series Datasheet: Update the chip ordering code All ESP8684 module datasheets: Update the embedded chip in the module and module ordering code ESP32-C2 Series SoC Errata: Add identification methods for chip revision v2.0		
6. 变更前后产品处理/ How to Deal with Products FIFO		
7. 相关报告/ Related Report(s): ☒ RF Performance Test Report Pass		
8. 给使用者的验证建议/ Verification Suggestion To Users 请确认您是否使用 flash 自动暂停功能，如有，请联系乐鑫。 在使用变更后产品前，请确保您的软件已升级至符合要求版本或更高版本的 ESP-IDF。 Please contact Espressif if you need the flash auto-suspend feature. Before using the updated product, ensure that your software has been updated to the required version or above of ESP-IDF.		

Appendix I 变更对比/ Change Comparison

1 产品基本信息/ Product Basic Information			
No.	项目/ Item	变更前/ Before Change	变更后/ After Change
1.1	Chip Revision	v1.2	v2.0
1.2	eFuse 标识位/ eFuse identification bit		
	EFUSE_BLK2_DATA1_REG[21]	0	1
	EFUSE_BLK2_DATA1_REG[20]	1	0
	EFUSE_BLK2_DATA1_REG[19]	0	0
	EFUSE_BLK2_DATA1_REG[18]	0	0
	EFUSE_BLK2_DATA1_REG[17]	1	0
	EFUSE_BLK2_DATA1_REG[16]	0	0
1.3	Product Ordering Code	有变更, 请参见段落 1。 Changed and can refer to Para 1	
1.4	Chip Marking (Espressif Tracking Information)		
		xCXXXXXXXXX	xXXXXXXXXX
1.5	Module Marking (Specification Marking Line)		
		MCXXXX	MDXXXX

2	ESP8684H4 和 ESP8684H4X 内置 flash 信息/ In-package Flash Update of ESP8684H4 & ESP8684H4X		
No.	项目/ Item	变更前/ Before Change	变更后/ After Change
2.1	In-package Flash	Flash A	Add Flash B
2.2	Flash Operating Voltage (No Change)	2.7V~3.6V	2.7V~3.6V
2.3	Flash Capacity (No Changes)	4 MB	4 MB
2.4	Flash Temperature Range (No Changes)	-40℃ ~ 105 ℃	-40℃ ~ 105 ℃
2.5	Flash Page Program Time (Typ. / Max)	0.5 ms/ 4 ms	0.25 ms/ 2 ms
2.6	Flash Sector Erase Time (4KB) (Typ. / Max)	45 ms / 500 ms	25 ms / 300 ms
2.7	Flash Block Erase Time (32KB) (Typ. / Max)	0.15 s / 1.6 s	0.1 s / 0.8 s
2.8	Flash Block Erase Time (64KB) (Typ. / Max)	0.25 s / 3.0 s	0.15 s / 1.0 s
2.9	Flash Chip Erase Time (Typ. / Max)	12 s / 60 s	5 s / 50 s

邮件订阅**Espressif Email Notifications**

乐鑫为注册用户提供电子邮件通知服务，用户可通过[乐鑫订阅系统](#)接收技术文档更新、新闻通讯、PCN 等邮件通知。

Espressif sends email notifications of technical documentation changes, along with newsletters, PCNs and other valuable information, to subscribed customers only. If you wish to stay updated on our products and services, please subscribe [here](#).

客户响应要求**Customer Response Requirements****需客户批准的变更/ Change Requiring Customer Approval:**

- a) 客户须在乐鑫发出 PCN 后的 30 天内告知乐鑫已收到 PCN。如客户未在接收到 PCN 后的 30 天内告知已收到，则视为客户收到变更。

Customers are requested to acknowledge receipt of the PCN within 30 calendar days from the date of issue of the PCN. Customers would be considered as notified 30 calendar days after issue of the PCN if no acknowledgement is received.

- b) 自发布 PCN 之日起 90 天内，客户没有任何其他反馈，则表示客户接受该 PCN。

The lack of any additional responses from customers within 90 calendar days from the date of issue of the PCN constitutes acceptance of the proposed changes.

客户通知/ Customer Notification:

- a) 客户需在乐鑫发出 PCN 后 14 天内通知乐鑫收到该 PCN。如客户未在接收到 PCN 14 日反馈乐鑫，则视为客户确认该 PCN。

Customers are requested to acknowledge receipt of the PCN within 14 calendar days from the date of issue of the PCN. Customers would be considered as having acknowledged the PCN if no response is received after 14 calendar days.

客户批准/确认信息**Customer Approval/Acknowledgement and Remarks**

客户公司全称:

Customer' s Company Name:

PCN 评审结果/ PCN Review Result:

- ☐ 批准/确认 Accepted/Acknowledged
☐ 不批准/ Rejected
☐ 需要分析/ Further Analysis Required

客户意见/Comment:

公司代表人姓名
Representative' s Name:

公司代表人职责
Representative' s Job
Title:

公司代表人签名
Representative' s
Signature:

日期
Date: