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)
文件版本 Document Version	1.3	保存期限 Retention Period	5 年 5 years

ESP32-U4WDH 升级为双核处理器产品

Upgrade ESP32-U4WDH to a Dual-Core Processor Product

PCN 编号 PCN No.	PCN-2021-021	提出日期 Issue Date of PCN	2021/09/02
变更日期 Proposed Date of Change	2021/12/02	首次出货日期 Proposed Date of First Shipment	2021/12/02
PCN 类型/ PCN Category	☑客户需要批准/Customer Approval Required ☐客户通知/Customer Notification		

1. 影响产品名称/Affected Product Name

芯片产品：ESP32-U4WDH

Chip Product: ESP32-U4WDH

模组产品：ESP32-MINI-1、ESP32-MINI-1U

Module Products: ESP32-MINI-1, ESP32-MINI-1U

2. 变更原因/Reason for Change

ESP32-U4WDH 为 ESP32 ECO V3 单核芯片，最高支持 160 MHz 的 CPU 时钟频率；芯片内部集成 4 MB flash，可以为客户有效节约设计空间和成本，得到众多客户青睐。

随着终端产品应用日益广泛，乐鑫决定升级该芯片规格，以优化产品配置，满足客户对更多使用场景的需求，给客户提供具有更高性价比的产品。段落 1 列出的模组产品的主芯片为 ESP32-U4WDH，因此相应地发生变更。

ESP32-U4WDH is a single-core chip based on ESP32 ECO V3 and supports CPU clock frequency of up to 160 MHz. The chip embeds a 4 MB flash, which reduces design space and lowers cost for customer, and is thus favored by customers.

With the increasing application of terminal products, Espressif decides to upgrade this chip specification to optimize the product configuration, to meet customer's needs for more application scenarios, and to provide customers with more cost-effective products. The main chip used in the modules listed in para 1 is ESP32-U4WDH, which is upgraded accordingly.

3. 变更描述/Description of Change

ESP32-U4WDH 由单核处理器升级为双核处理器，可支持的最高 CPU 时钟频率由 160 MHz 升级为 240 MHz。

段落 1 列出模组产品的主芯片 ESP32-U4WDH 升级，如上所述。

Upgrade ESP32-U4WDH from a single-core processor to a dual-core processor; upgrade the supported maximum CPU clock frequency from 160 MHz to 240 MHz.

Upgrade the main chip ESP32-U4WDH for the modules listed in para 1 as described above.

4. 变更对比/Change Comparison

请见附录 I：变更信息

Please refer to Appendix I: Change Information

5. 变更影响/Impact of Change

1) 品质和性能/ Quality & Performance:

处理器升级为双核处理器，支持高达 240 MHz 的 CPU 时钟频率。

The processor is upgraded to a dual-core processor and supports CPU clock frequency of up to 240 MHz.

2) 交期/Delivery:

无影响

No impact

3) 生产料号/Material Part Numbers (MPN):

客户可以继续使用原有的芯片产品名称下单；

Customers can continue using the existing chip product name to place orders.

段落 1 中列出的模组的 MPN 不变更，客户可以继续使用原有的模组 MPN 进行下单。

There is no change to the MPN of the affected Espressif modules listed in para 1. Customers can continue using the existing MPN to place orders.

4) 认证/Certification:

该变更对射频性能没有影响，因此对已有射频的认证的有效性没有影响。

The change does not affect the RF performance of the modules and does not affect the validity of their existing RF certifications.

5) 其他/Others:

如客户需求为使用单、双核处理器产品同时用于同一客户端产品中，为兼容变更前版本的产品，客户应保持软件上为变更前配置，即使用单核处理器和 CPU 最高频率为 160 MHz。

If the customer needs to use single- and dual-core processor products for the same client product, for compatibility with the previous client products before this change, the customer should keep using the same software configuration before this change, i.e., using a single-core processor and a maximum CPU frequency of 160 MHz.

6. 变更前后产品处理/How to Deal with Products

FIFO

7. 变更验证结果/ Test Verification Result:

1) Related ECN No. ECN-2021-027

2) 芯片试产验证/Pilot Lot Verification: Pass

3) 射频性能验证/ RF Performance Verification: Pass

射频性能验证合格。

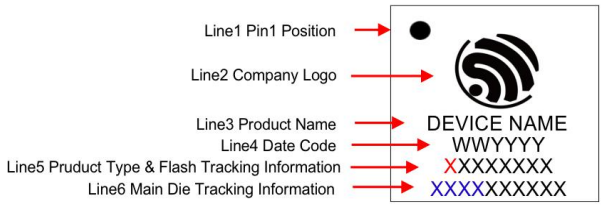
RF performance verification passed.

4) 软件验证/Software Verification: Pass

使用 ESP-IDF v4.3，示例 examples/wifi/getting_started/station，通过 menuconfig 设置 Component config → ESP32-specific → CPU frequency 为 160 MHz，设置 Component config → FreeRTOS → Run FreeRTOS only on first core，编译生成的固件可正常运行于单核和双核版本芯片。

Use ESP-IDF v4.3, find examples in examples/wifi/getting_started/station, configure the following two options via menuconfig: Component config → ESP32-specific → CPU frequency →160 MHz; Component config → FreeRTOS → Run FreeRTOS only on first core; the compiled firmware will run normally on both single-core and dual-core versions of the chip.

Appendix I 变更信息/Change Information

项目 Item	变更前 Before Change	变更后 After Change
处理器 Processor	单核 Single-core	双核 Dual-core
CPU 最大时钟频率 Maximum CPU Clock Frequency	160 MHz	240 MHz
ESP32 Datasheet	v3.7	v3.8
ESP32-MINI-1 & ESP32-MINI-1U Datasheet	v1.0	v1.1
ESP32-U4WDH Marking Spec	 Line 5 Product Type & Flash Tracking Information changes. Remark: 1) Line 5 共 8 位, Total 8 characters on Line 5; 2) X（第 1 位）：固定为 H。 X (1st character): Show H.	 Remark: 1) Line 5 共 9 位, Total 9 characters on Line 5, 2) X（第 1 位）：固定显示 D, X (1st character): Show “D”, 3) X（第 2 位）：固定显示 H, X (2nd character): Show “H”
ESP32-MINI-1 Marking spec	 单核模组屏蔽盖底部产品规格代码显示 XXXXXX。 Single-core module show XXXXXX.	 双核模组屏蔽盖底部产品规格代码显示 DXXXXX。 Dual-core module show DXXXXX.
ESP32-MINI-1U Marking spec	 单核模组屏蔽盖底部产品规格代码显示 XXXXXX。 Single-core module show XXXXXX.	 双核模组屏蔽盖底部产品规格代码显示 DXXXXX。 Dual-core module show DXXXXX.

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 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.

请反馈至 pcn@espressif.com。
Please send feedback to pcn@espressif.com.

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:	