

## ESP32-S2: The new Secure ESP8266 for battery powered devices

ESP32-S2 is the new WiFi module by Espressif, which in a few years has become the industry standard for IoT applications. The first Espressif WiFi module, the ESP8266 has been used in countless connected devices and has proven its robustness and ease of use. But the ESP8266 comes without physical cryptographic security and accelerators.

The new ESP32-S2 delivers state of the art AES, ECC, SHA, HMAC and RSA-4096 cryptographic accelerators, transparent RAM and Flash encryption and secure boot with hardware supported root of trust.



The automatic power on and off of the RF transceiver, which is activated only when needed, the ultra low power coprocessor and fine-resolution power-control makes the ESP32-S2 the perfect choice for battery powered IoT devices. High quality HMI can be obtained thanks to the ESP32-S2 support for LCD interface (8bit RGB/8080/6800), touch keys and USB-OTG.

The development of the ESP32-S2 is simplified by several frameworks, which help you devising easily voice controlled devices, face recognition and IoT nodes with cloud and app based services.

### Features

- ◆ Transparent external flash and ram encryption (AES-XTS)
- ◆ Secure boot with hardware root of trust (RSA-PPS signature)
- ◆ HMAC module can use software inaccessible MAC keys for SHA-HMAC identity verification
- ◆ AES (ECB,CBC,OFB,CTR,GMC) NIST SP-800 38A accelerators
- ◆ SHA, RSA 4096 bit, ECC accelerators
- ◆ Low power idle mode 5uA
- ◆ Automatic RF power management (24uA @1% duty cycle)
- ◆ USB-OTG
- ◆ LCD 8bit parallel RGB/8080/6800 interface
- ◆ Camera interface



### Applications

- ◆ Any WiFi connected device from consumer to industrial applications, e.g.
- ◆ Smart home connectivity
- ◆ Battery operated devices: Wearable, WiFi connected toys...
- ◆ Industrial controllers: Wireless robotic control, HVAC
- ◆ POS machine and service robot

# ESP32-S2: The new Secure ESP8266 for battery powered devices

	ESP-8266	ESP32-S2
Core Xtensa	L106	LX7
Clock freq	80 MHz	240 MHz
Co-processor	x	ULP (RISC-V)
SRAM (kb)	160	320
External SPIRAM	16 Mb	128 Mb
Time of flight	no	yes
ADC	1 @ 10bit	20 @ 12bit
DAC	no	2 @ 8bit
USB-OTG	no	yes
LCD interface	no	8bit RGB/8080
Camera interface	no	yes
Temperature sensor	no	yes
Low power mode	24 $\mu$ A	5 $\mu$ A

