

Introduction

FireBeetle 2 ESP32-S3-U is a high-performance main controller built around the ESP32-S3-U-WROOM-1-N16R8 module. In addition, this microcontroller is equipped with an OV2640 camera, enabling it to excel in applications such as image recognition. The ESP32-S3-U module also boasts ample storage capacity and a rich set of communication interfaces, catering to a wide range of application requirements. With its enhanced capabilities, the FireBeetle 2 ESP32-S3-U opens up endless possibilities for various projects and functionalities.

Image Recognition

FireBeetle 2 ESP32-S3-U offers an onboard camera interface for easy connection with a camera. Also, an independent camera power supply circuit is designed, which helps reduce interference from other signals to the camera. The board comes with an OV2640 camera that offers 2 megapixels, a 68°FOV, and up to 1600*1200 resolution.

For instance, in a smart home scenario, the board's camera can be utilized to monitor the situation at home. When someone enters, it can automatically send notifications and store the captured image data for reporting purposes.

Image recognition

Video picture transmission

Powerful Chips and More Storage Space

The acceleration for neural network computing and signal processing workloads provided by the ESP32-S3-U chip makes the module an ideal choice for a wide variety of applications, such as speech recognition, image recognition, and so on.

For instance, when training for facial recognition, it is possible to store a greater number of facial models. This allows for faster results when conducting data comparisons.



Powerful Chip

Dual-Mode Communication

In addition, FireBeetle 2 ESP32-S3-U supports WiFi and Bluetooth 5 (LE) dual-mode communication, which reduces the difficulty of networking. Meanwhile, both Bluetooth Mesh protocol and Espressif WiFi Mesh are supported for more stable communication and a larger coverage area. With the support of Matter protocol, the microcontroller can be used to develop industrial standard smart home devices for a wider range of IoT and AIoT (Artificial Intelligence of Things) scenarios.

User-Friendly

This development board is designed to be user-friendly, addressing the complexity of screen wiring through its onboard GDI screen interface. Additionally, it integrates power management features, supporting battery charging and hardware power control. The FireBeetle 2 ESP32-S3-U can be programmed using the Arduino IDE, ESP-IDF, and MicroPython, allowing developers to utilize both C and Python to interact with the hardware.

Features

Image Recognition: Onboard camera interface & independent camera power supply, easy to connect and strong anti-interference

Powerful Chip: ESP32-S3 module with AI Acceleration

More storage space: 16MB Flash & 8MB PSRAM

Power management integrated, support Li-ion battery charging and hardware On/OFF controlling

Onboard GDI for easy connection with screens

Wi-Fi and Bluetooth 5 dual-mode communication

Applications

AIoT-related projects

Speech recognition

Image recognition

Specification

Basic Parameters

Operating Voltage: 3.3V

Type-C Input Voltage: 5V DC

VCC Input Voltage: 5V DC

Max Charging Current: 1A

Operating Temperature: -20 to 70°C

Dimension: 25.4x60mm/1x2.36"

Hardware Information

Processor: Xtensa® dual-core 32-bit LX7 microprocessor

Main Frequency: 240 MHz

SRAM: 512KB

ROM: 384KB

Flash: 16MB

PSRAM: 8MB

RTC SRAM: 16KB

USB: USB 2.0 OTG full-speed

WIFI

WIFI Protocol: IEEE 802.11b/g/n

Bandwidth: Support 20 MHz and 40 MHz at 2.4 GHz band

WIFI Mode: Station, SoftAP, SoftAP+Station combined mode

WIFI Frequency: 2.4GHz

Frame Aggregation: TX/RX A-MPDU, TX/RX A-MSDU

Bluetooth

Bluetooth Protocol: Bluetooth 5, Bluetooth mesh

Bluetooth Frequency: 125 Kbps, 500 Kbps, 1 Mbps, 2 Mbps

Ports

Digital I/O x26

LED PWM Controller 8 Channels

SPI x2

UART x3

I2C x2

I2S x2

IR Transceiver: transmit channel x5, receive channel x5

2×12-bit SAR ADC, 20 Channels

DMA Controller: transmit channel x5, receive channel x5

Documents

[Product wiki](#)

[ESP32-S3-WROOM-1 Datasheet](#)

[ESP32-S3 Chip Datasheet](#)

[Schematics](#)

[Dimension](#)

Shipping List

FireBeetle 2 Board ESP32-S3-U (N16R8) x1

OV2640 Camera x1

2.4GHz WIFI&BLE Antenna x1

18pin-2.54mm Pin Header x1

18pin-2.54mm Female Header x1

14pin-2.54mm Pin Header x1

14pin-2.54mm Female Header x1