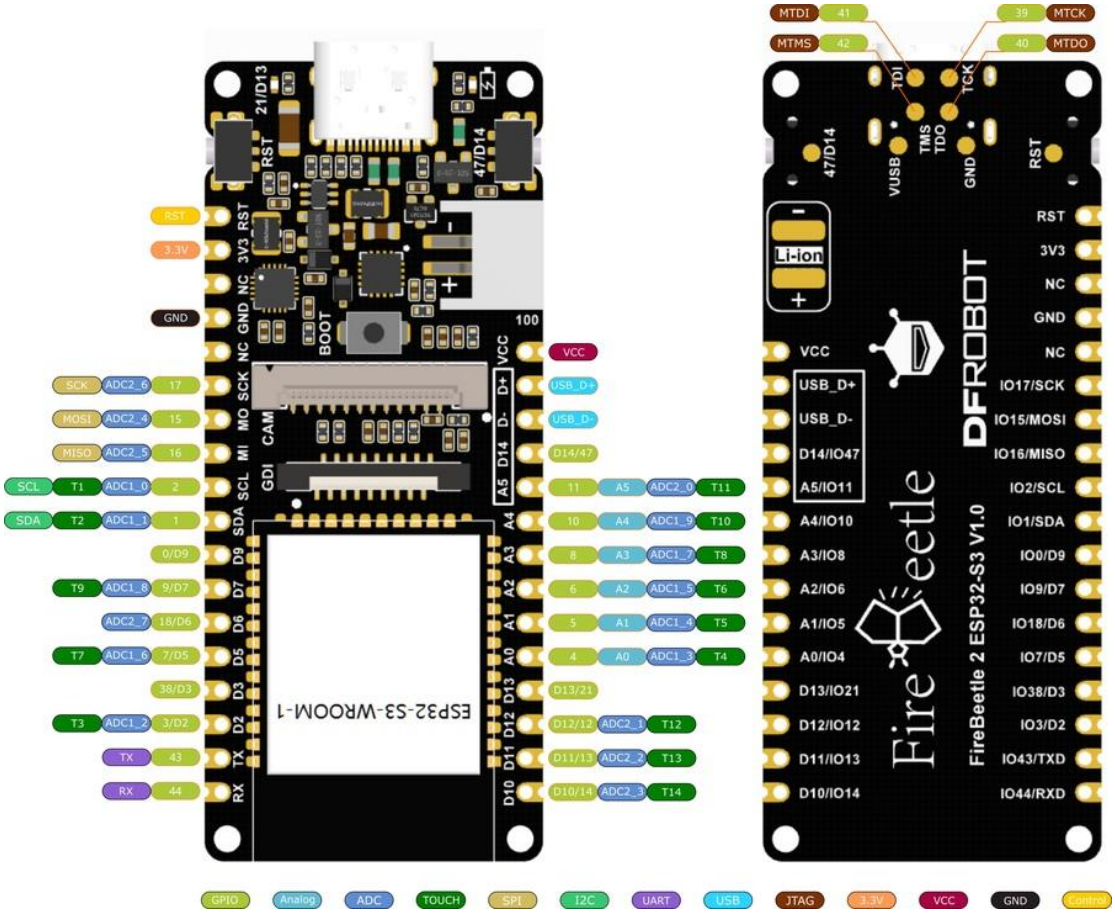
Introduction

The FireBeetle 2 ESP32-S3 (N4) is a main control board based on the Espressif ESP32-S3-WROOM-1-N4 module. It features a 32-bit dual-core processor, 4M FLASH memory, and **supports WiFi and Bluetooth 5.0 communication**. The board is equipped with **AI acceleration** capability, making it suitable for low-computational AI edge computing tasks. It offers rich peripheral interfaces, dual power supply modes, and supports various programming methods. With its compact design, it is ideal for IoT and AIoT projects.

Rich peripheral interfaces

It includes 26 digital pins, 20 ADC channels, 3 UART interfaces, 2 SPI interfaces, 2 I2C interfaces, 2 I2S interfaces, 10 infrared transceivers, and 10 DMA controller channels. Additionally, it provides an onboard GDI display interface to meet various hardware connection requirements.



Board Overview

Dual power supply modes

It supports both USB and external lithium battery power supply and can automatically switch between power sources in dual power supply mode. Furthermore, it supports both USB and external DC charging modes and allows hardware to control power on/off settings.

Support for multiple programming methods

Including Arduino IDE, ESP-IDF, MicroPython, C language, and Python, catering to the programming preferences of different developers.

Compact design, convenient for embedding

With dimensions of only 25.4mm × 60mm, it has onboard WIFI and Bluetooth antennas and adopts a stamp hole design, making it easy to embed or integrate into PCB prototypes.

Wide range of application scenarios

It is suitable for various scenarios such as home automation renovation, IoT device prototyping, IoT remote monitoring, and remote robot control. Additionally, it is also applicable to low-computational AI edge computing, voice command recognition, text recognition, and sensor data recognition applications.

Furthermore, this product is one of the low-power IoT development boards in the FireBeetle series. If it does not meet your requirements, you can refer to the FireBeetle Series Selection Guide to choose a more suitable model.

Note: This product does not come with a camera interface.

Features

- Equipped with ESP32-S3-WROOM-1-N4 dual-core module, supporting AI acceleration.
- Clock frequency up to 240MHz, with built-in 512KB SRAM and 4M Flash.
- Supports dual-mode communication of Wi-Fi and Bluetooth 5 (LE).
- Integrated power management, supporting lithium battery charging and hardware power on/off.
- Onboard independent GDI display interface, enabling quick connection to display screens.

- Supports various programming methods such as Arduino IDE, ESP-IDF, and MicroPython.
- Compact design with small size, suitable for IoT and AIoT projects with limited space and embedded systems.

Specification

Basic Parameters

- Input Voltage
  USB-C interface: 5V DC
  PH2.0 interface: 3.7V Li-ion
  VCC pin: 5V DC
- Interface: FireBeetle V2 series compatible
- Module Size: 25.4mm × 60mm
- Weight: 23.4g

Hardware Information

- Processor: Xtensa® dual-core 32-bit LX7 microprocessor
- Clock Frequency: 240 MHz
- SRAM: 512KB
- ROM: 384KB
- Flash: 4MB
- RTC SRAM: 16KB
- USB: USB 2.0 OTG full-speed interface

WIFI

- WIFI Protocol: IEEE 802.11b/g/n
- WIFI Bandwidth: 2.4 GHz band supports 20 MHz and 40 MHz bandwidth
- WIFI Modes: Station mode, SoftAP mode, SoftAP+Station mode, and mixed 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

Interface Pins

- Digital I/O x26
- SPI x2
- UART x3
- I2C x2
- I2S x2
- LED PWM controller with 8 channels
- Infrared transceiver: 5 transmission channels, 5 reception channels
- 2 × 12-bit SAR ADC, 20 channels
- DMA controller, 5 reception channels, and 5 transmission channels

Documents

- Product wiki
- Tutorial - First Time Use
- LED Blink
- Basic Tutorials
- Advanced Tutorials
- Tutorial for MicroPython
- Build Environment for MicroPython
- MicroPython Interpreter
- MicroPython Tutorial

- ESP32-S3-WROOM-1 Datasheet
- ESP32-S3 Chip Datasheet
- Schematics
- Dimension
- FireBeetle2 Shell stl

Shipping List

- FireBeetle 2 ESP32-S3 (N4) IoT Microcontroller x1
- 18-pin 2.54mm pitch male header x1
- 18-pin 2.54mm pitch female header x1
- 14-pin 2.54mm pitch male header x1
- 14-pin 2.54mm pitch female header x1