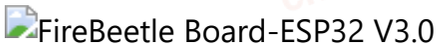
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Introduction

DFRobot FireBeetle series is the low-power consumption micro-controller intentionally designed for Internet of Things (IoT) projects. FireBeetle Board - ESP32 integrates a Dual-Core **ESP-WROOM-32 module** (https://www.dfrobot.com/product-1559.html), which supports MCU and Wi-Fi & Bluetooth dual-mode communication. The electric current is just 10μA in the deep-sleep mode. The main controller supports two power supply methods: USB and 3.7V external lithium battery. And both USB and external DC can charge the Lipo battery directly.

We have made a special hardware design for FireBeetle Board-ESP32 to make it compatible with Arduino IDE. You can make a download without switching boot-mode manually. It supports Arduino, IDF (linux), micropython etc. Moreover, FireBeetle made a pin mapping for Arduino IDE. So its GPIO ports can be configured just through Dx transport. The board is also compatible with UNO, which greatly reduced the entry barrier.

The small size and high performance makes FireBeetle become ideal solution for IOT low power consumption projects.

Please kindly note that developers are the most common users of **FireBeetle Board-ESP32** (https://www.dfrobot.com/product-1590.html) and not all of the peripherals have examples for reference, and there are still some bugs being found and fixed. For Arduino IDE, all GPIO function, I2C/SPI communication has been working. But the other functions are still under development. We recommend this board to experienced engineers.

Feature

- Compatible with products in the DFRobot FireBeetle series
- Low-power consumption(the electricity current under ultra-low power is 10μA)
- Quick Response(the top frequency is 400KHz)
- Cost-effective
- Small size, convenient to install

Specification

- Operating voltage: 3.3V
- Input voltage: 3.3V~5.5V

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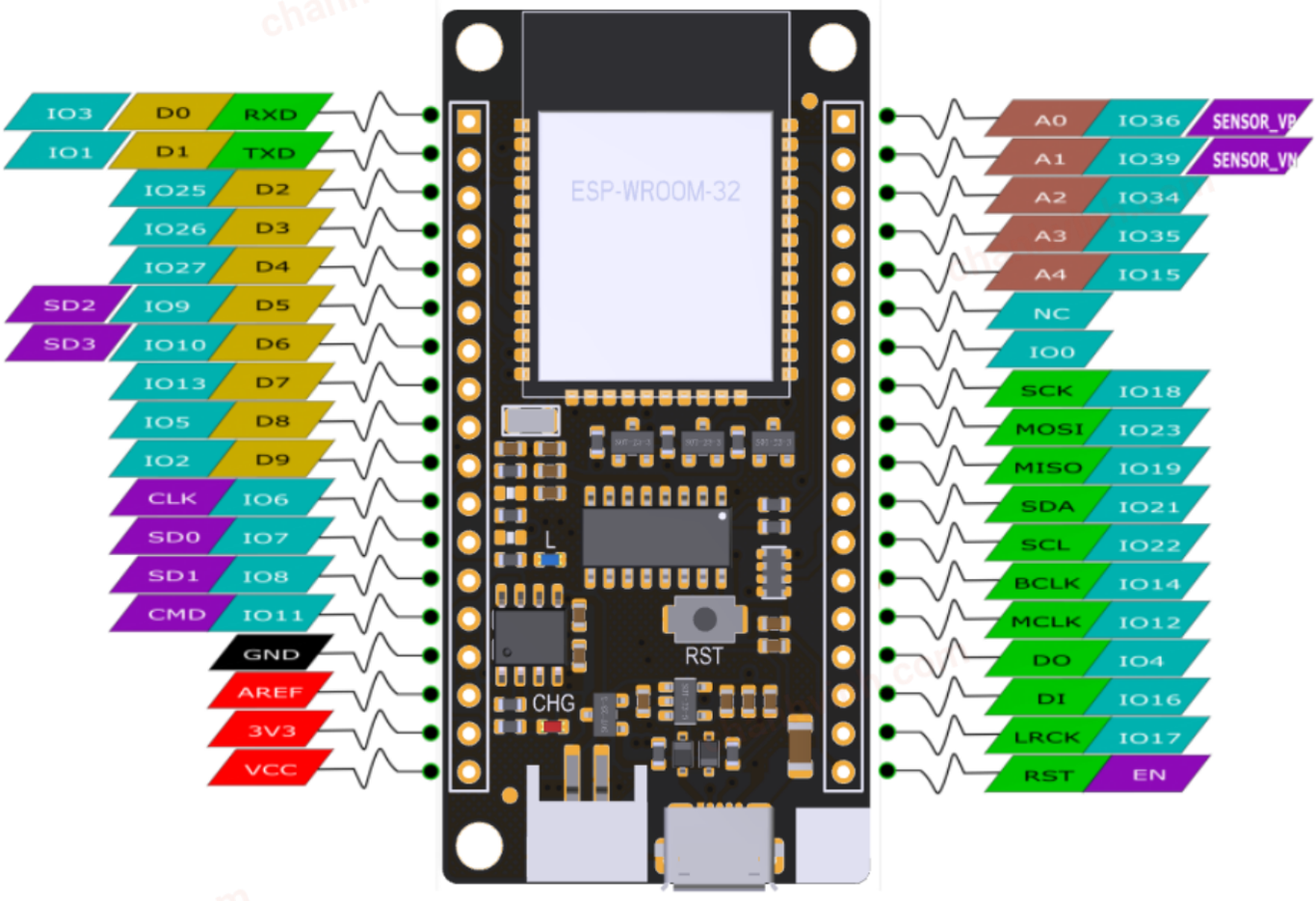
- Support electric current of low power consumption: 10 μA
- Support maximum discharge current: 600mA@3.3V (mailto:600mA@3.3V) LDO
- Support maximum charge current: 500mA

- Support USB charging.
- Processer: Tensilica LX6 dual core processer (One for high speed connection; one for independent programing).
- Frequency: 240MHz
- SRAM：520KB
- Flash：16Mbit
- Wi-Fi standard：FCC/CE/TELEC/KCC
- Wi-Fi protocol: 802.11 b/g/n/d/e/I/k/r (802.11n, high speed can reach to 150 Mbps), converge A-MPDU and A-MSDU, supporting 0.4us protecting interval.
- Frequency range: 2.4~2.5 GHz
- Bluetooth protocol: Comply with BR/EDR/BLE standard of Bluetooth v4.2.
- Bluetooth audio: the current under low power consumption of CVSD and SBC is 10μA
- Operating current: 80mA in average
- Frequency range: 2.4~2.5GHz
- Support one-key downloading.
- Support micropython.
- On-chip clock: 40MHz crystal and 32.768 KHz crystal.
- Digital I/O: 10 (default setting of arduino)
- Analog input: 5(default setting of arduino)
- SPI: 1 (default setting of arduino)
- I2C: 1 (default setting of arduino)
- I2S: 1 (default setting of arduino)
- LED_BUILTIN：D9
- Interface: FireBeetle series compatible
- Operating temperature: -40℃~+85℃
- Dimension: 29 × 58(mm)/1.142 x 2.283(inches)
- The dimension of mounting hole: inner diameter 3.1mm; outer diameter 6mm.

Board Overview

FireBeetle Board - ESP32 is not only compatible with ESP32 Pinout, but also compatible with Arduino IDE PinMap. Users can directly use Dx(x=0,1,2,3...9) to control the corresponding GPIO port when programming on Arduino IDE.

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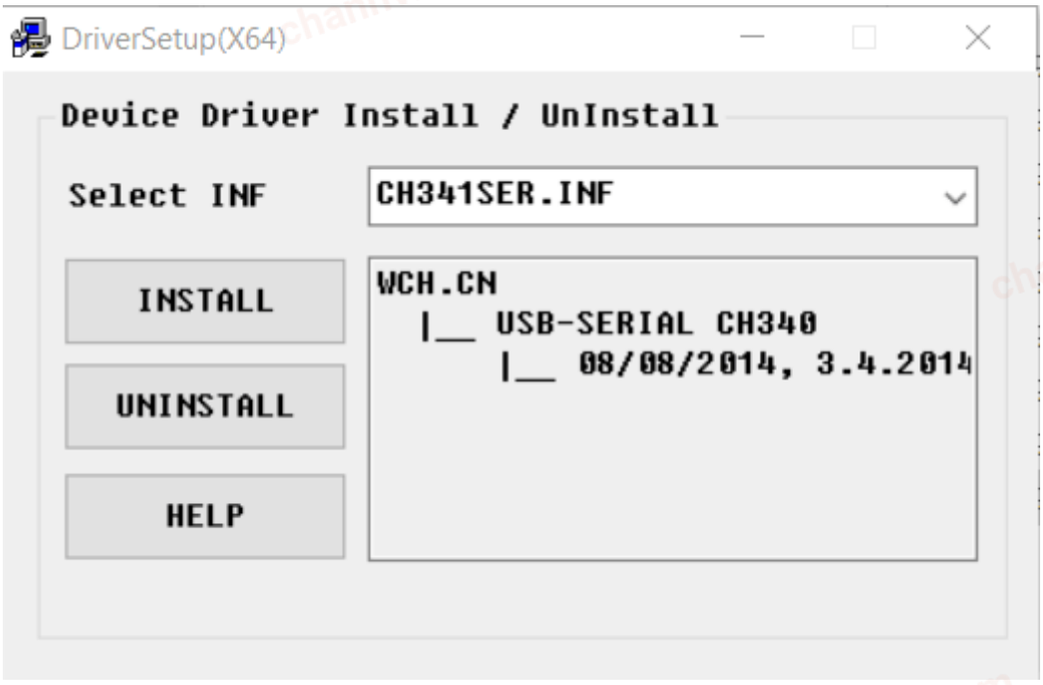


⚠ **NOTE**: NC = Empty; VCC = VCC (5V under USB power supply, Around 3.7V under 3.7V lipo battery.power supply)

Tutorial

FireBeetle-ESP32 adopts CH340 serial chip that can be used without driver among most devices. If you find the driver is not installed automatically after plugging into the device, you can install it manually: click to download the CH340 driver program. (https://github.com/Frances9/DFR0478/commit/d224535de39a000fbbf704fdd2e4162b87ea1636#diff-5da8c39ca1b6d3c5d75f09f13962cd70)

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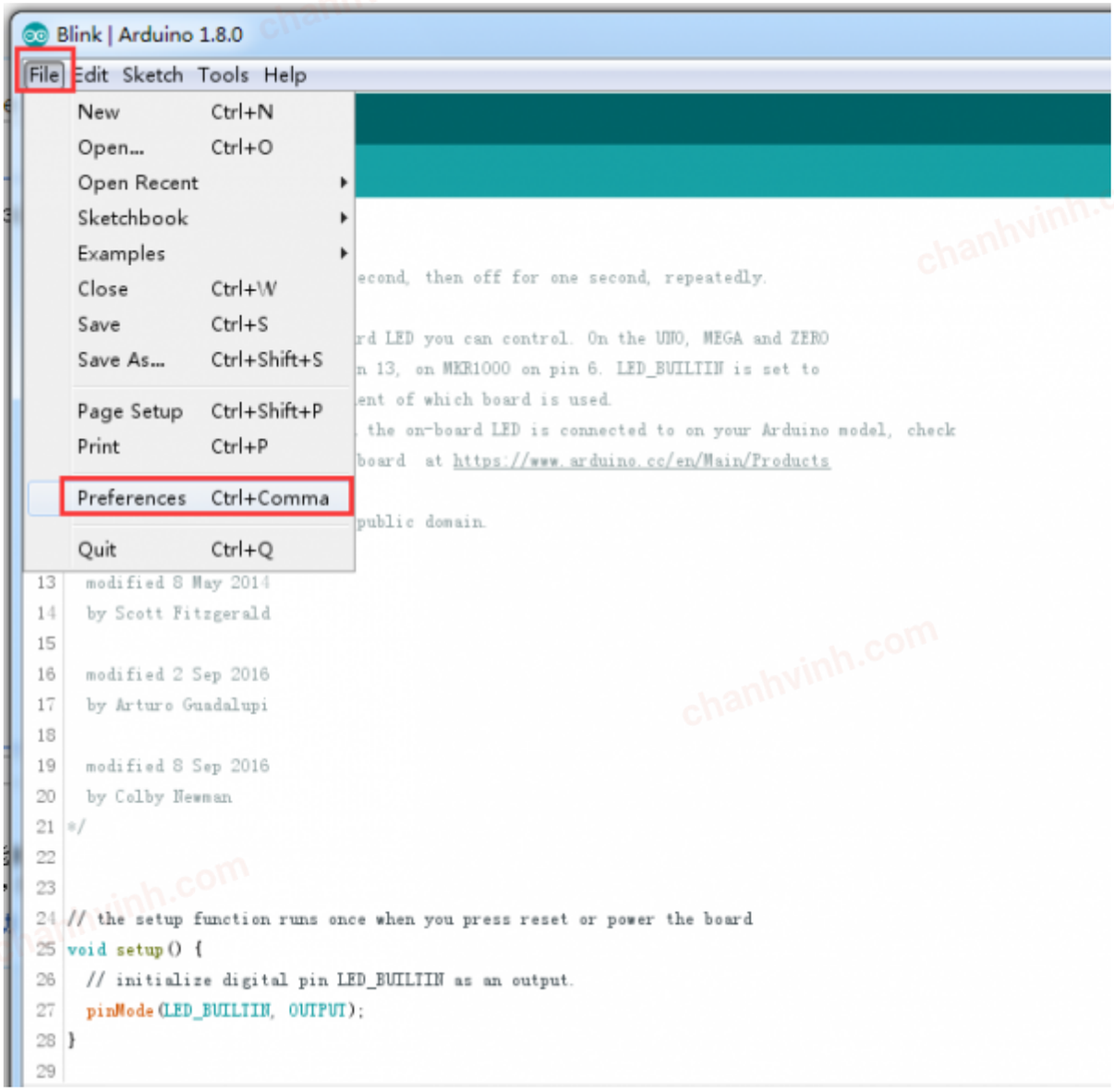
Requirements

- **Hardware**
  - FireBeetle ESP32 IOT Microcontroller (https://www.dfrobot.com/product-1590.html) x 1
  - Micro USB Cable (https://www.dfrobot.com/product-770.html) x1
- **Software**
  - Arduino IDE (newest), Click to Download Arduino IDE from Arduino® (https://www.arduino.cc/en/Main/Software)
  - Download FireBeetle ESP32 Window Driver (https://git.oschina.net/dfrobot/FireBeetle-ESP32/raw/master/FireBeetle-ESP32.inf) **Note: Win8 + need disable the digital signature**

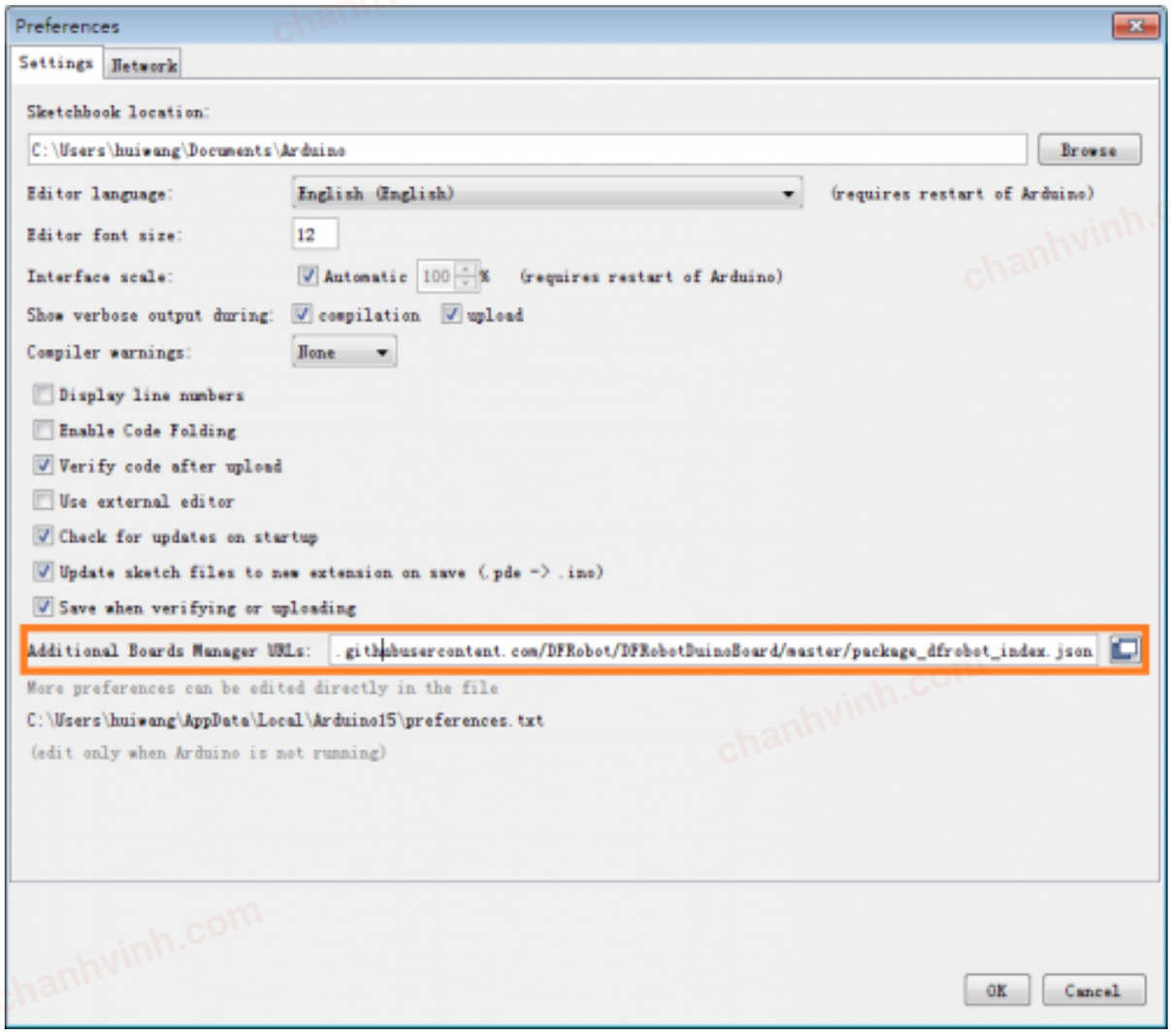
Arduino IDE Development Environment Setup

- Plug FireBeetle to your computer, install the driver manually.
- Add FireBeetle Board URL to Arduino IDE
- Open Arduino IDE, **File->Preferences**, find **Additional Boards Manager URLs**, copy the below link, and paste in the blank.

http://download.dfrobot.top/FireBeetle/package_esp32_index.json
(http://download.dfrobot.top/FireBeetle/package_esp32_index.json)

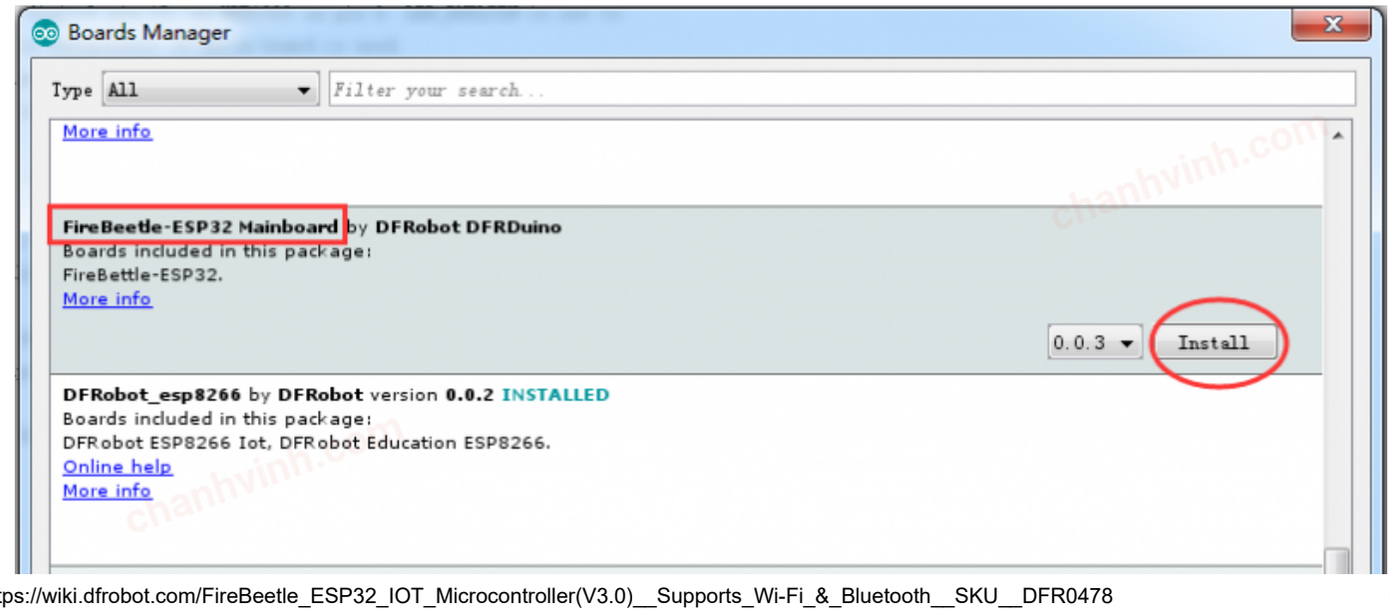


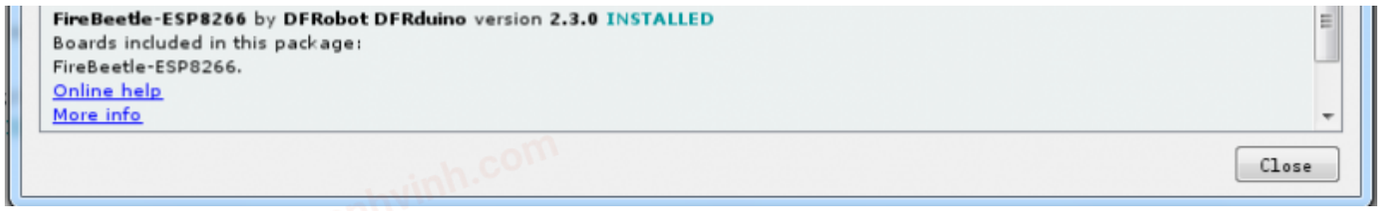
File->Preferences



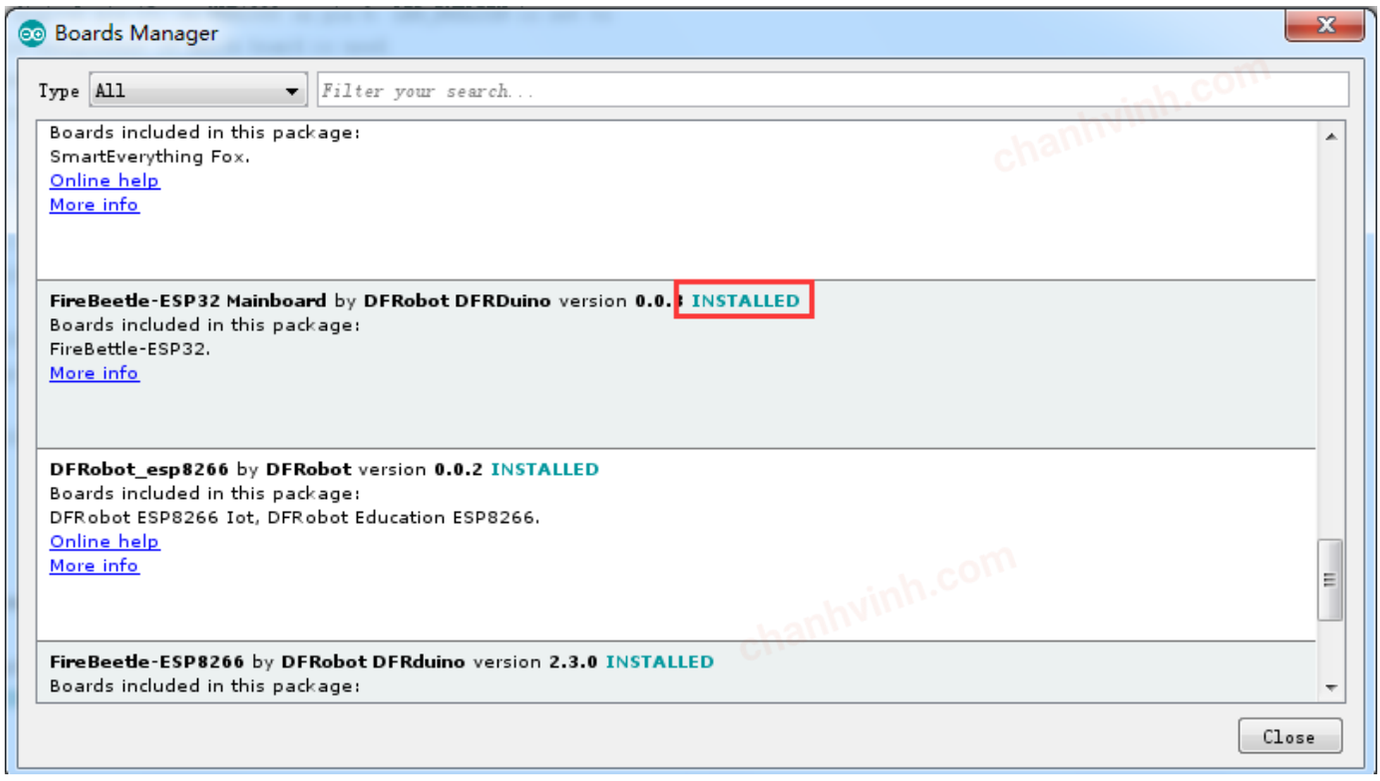
paste url here

- Click **OK**
- Open **Tools->Board->Boards Manager**, waiting automatic update. You'll find **FireBeetle-ESP32**





Now, the development environment has been installed, you can use it like a normal Arduino board.



NOTE: when the main board have been installed under the Linux or MAC environment, you need to install the pyserial module onto the terminal. (Install it by using command sudo easy_install pyserial)

Sample Code - Blink

The default LED for FireBeetle Board-ESP32 is D9, input following code:

```
// the setup function runs once when you press reset or power the board
void setup() {
  // initialize digital pin LED_BUILTIN as an output.
  pinMode(LED_BUILTIN, OUTPUT);
}

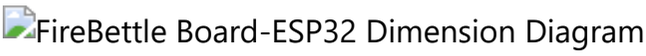
// the loop function runs over and over again forever
void loop() {
  digitalWrite(LED_BUILTIN, HIGH);   // turn the LED on (HIGH is the voltage level)
  delay(1000);                       // wait for a second
  digitalWrite(LED_BUILTIN, LOW);    // turn the LED off by making the voltage LOW
  delay(1000);                       // wait for a second
}
```

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For more code and instructions, please refer to FireBeetle User Manual (https://github.com/Robert-MARKII/Document/raw/master/FireBeetle%20Board-ESP32%20User%20Manual%20update.pdf)

Dimension

- Pin Spacing: 2.54mm
- Mounting Hole Space: 24mm/53mm
- Mounting Hole Size: 29.00mm×58.00mm
- Thickness: 1.6mm


FireBettle Board-ESP32 Dimension Diagram

FAQ

Q&A	Some general Arduino Problems/FAQ/Tips
Q	Some general Arduino Problems/FAQ/Tips
A	Click the topic link (https://www.dfrobot.com/forum/viewtopic.php?f=8&t=1869&p=8624#p8624) on DFRobot Forum.

For any questions, advice or cool ideas to share, please visit the **DFRobot Forum** (https://www.dfrobot.com/forum/).

FireBeetle Board-ESP32 Projects - Let your cigarette lighter wearable (https://www.dfrobot.com/blog-645.html)

More Documents

- User Manual (https://github.com/Robert-MARKII/Document/raw/master/FireBeetle%20Board-ESP32%20User%20Manual%20update.pdf)
- Arduino Course Library Files (https://github.com/DFRobot/Arduino-Course-Library-Files/raw/ba6d68d3e17088a9648186237965636479040f93/201705251608388bxa1v.rar)
- FireBeetle Driver (https://git.oschina.net/dfrobot/FireBeetle-ESP32/raw/master/FireBeetle-ESP32.inf)
- FireBeetle Arduino Bluetooth Examples (https://github.com/Chocho2017/DFRobot_ESP32_WiFiBLE)
- FireBeetle Schematic (https://github.com/Frances9/DFR0478/raw/master/%5BDFR0478%5D(V3.0)-SCH.PDF)


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(https://www.dfrobot.com/product-1590.html) from DFRobot Store or **DFRobot Distributor**. (https://www.dfrobot.com/index.php?route=information/distributorslogo)

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