# ESP32

## Що е то и как се пуска?

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ESPRESSIF

ESPRESSIF

**Espressif Systems Founded**

**2008**

**2013**
Espressif Releases Its First Product - ESP8089
(Wi-Fi Direct (P2P), Miracast, SoftAP)

**2016**
Espressif Releases its Flagship Chip ESP32

**2017**
100-Million Target for IoT Chip Shipments

**2020**
ESP32-C3 Launched

**2024**

Announcing ESP32-H4: Low-power SoC with 802.15.4 + Bluetooth 5.4 (LE) Connectivity

32 ESP32

## S - series

S2 ESP32-S2

S3 ESP32-S3

## C - series

C2 ESP32-C2

C3 ESP32-C3

C5 ESP32-C5

C61 ESP32-C61

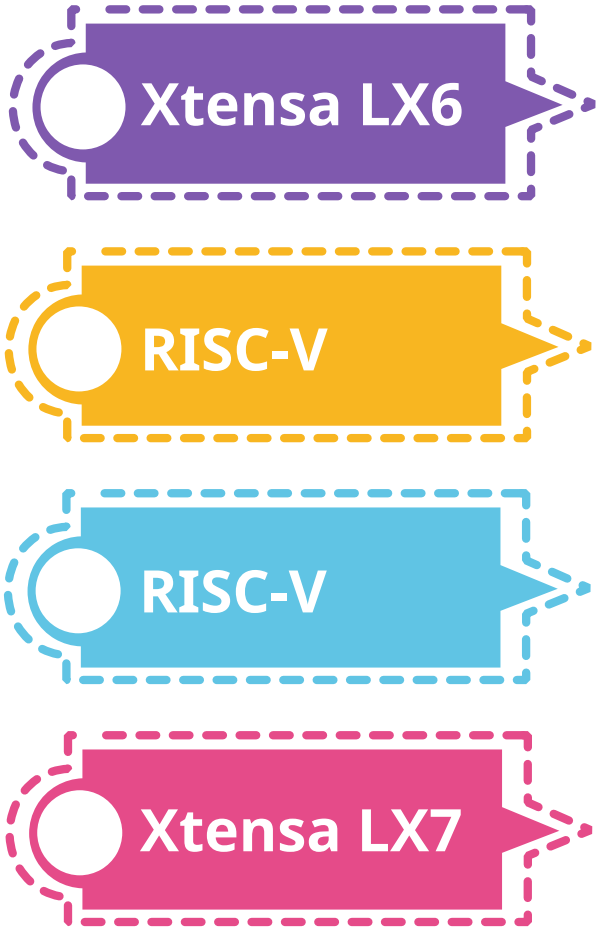
C6 ESP32-C6

## H - series

H2 ESP32-H2

## P - series

P4 ESP32-P4




## ESP32

Xtensa® single-/dual-core 32-bit LX6 microprocessor(s) (up to 240Mhz)
Wi-Fi, Bluetooth 4.2

## ESP32-C3

32-bit RISC-V single-core processor, (up to 160 MHz)
Wi-Fi, Bluetooth 5

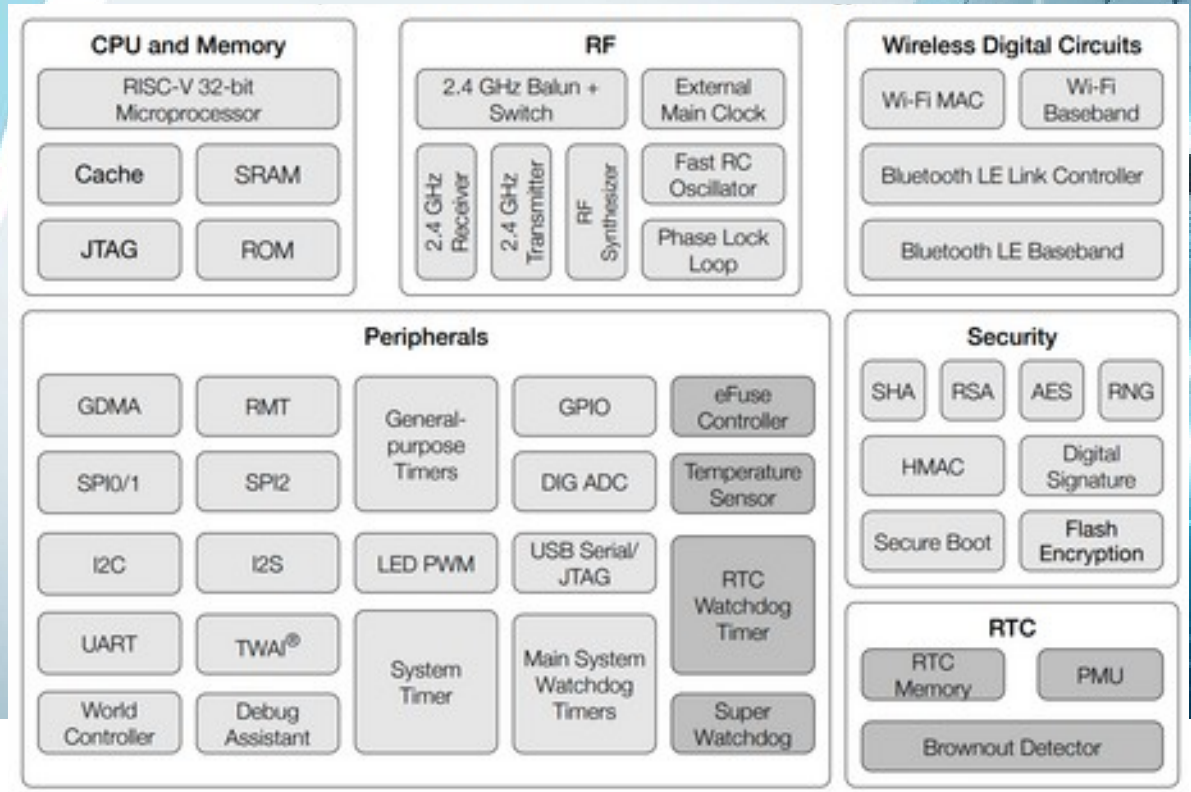
## ESP32-C6

32-bit RISC-V single-core processor, (up to 160 MHz) + LP 32-bit RISC-V (up to 20 MHz)
Wi-Fi, Bluetooth 5.3, IEEE 802.15.4

## ESP32-S3

Xtensa® dual-core 32-bit LX7 microprocessor (up to 240Mhz)
Wi-Fi, Bluetooth 5

# ESP32-C3




**32-bit RISC-V single-core**

**(up to 160 MHz)**

**400 KB SRAM**

**Internal / External FLASH**

**(SPI, Dual SPI, Quad SPI, and QPI)**

**22 or 16 GPIOs**

**Cryptographic**

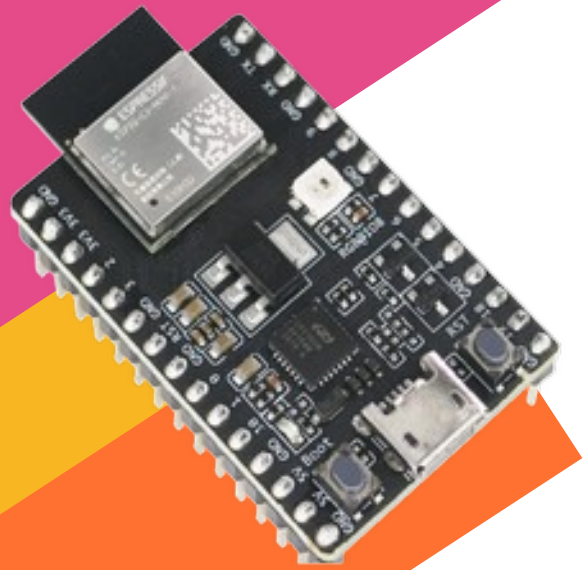
**AES 128/256, SHA, RSA, RNG, HMAC**

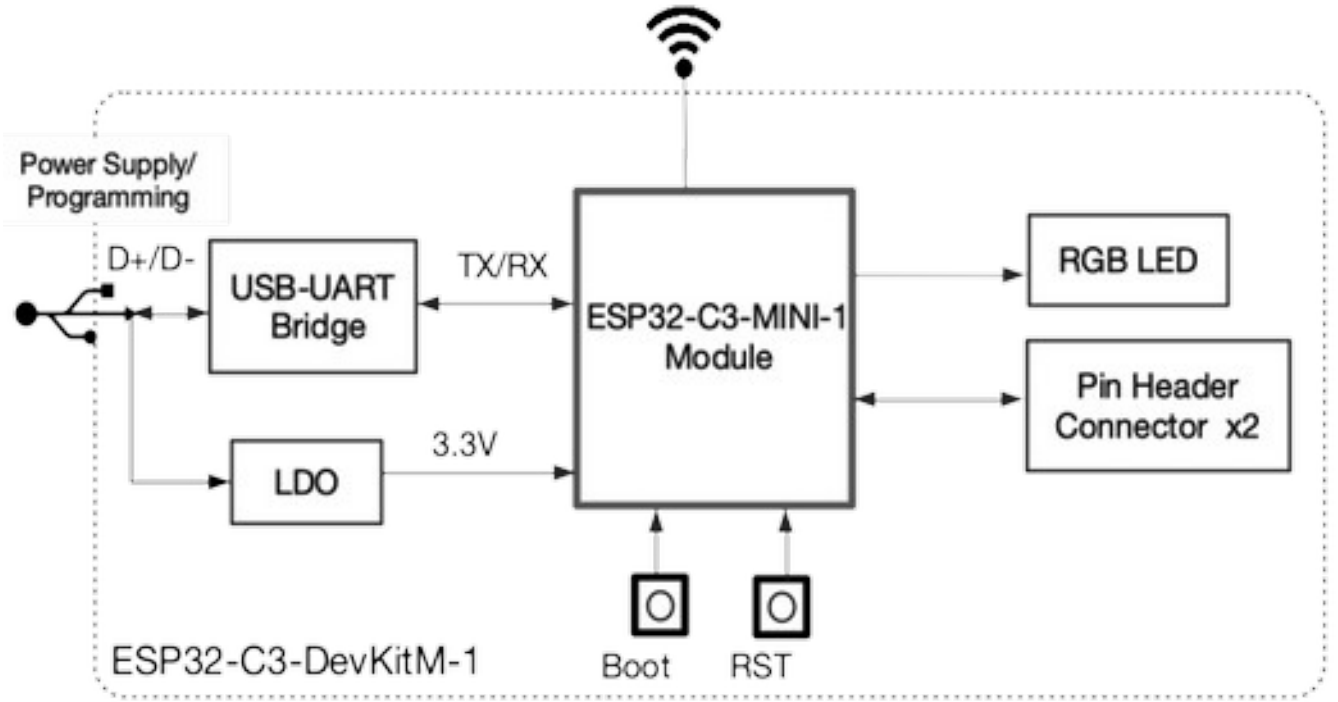
# ESP32-C3

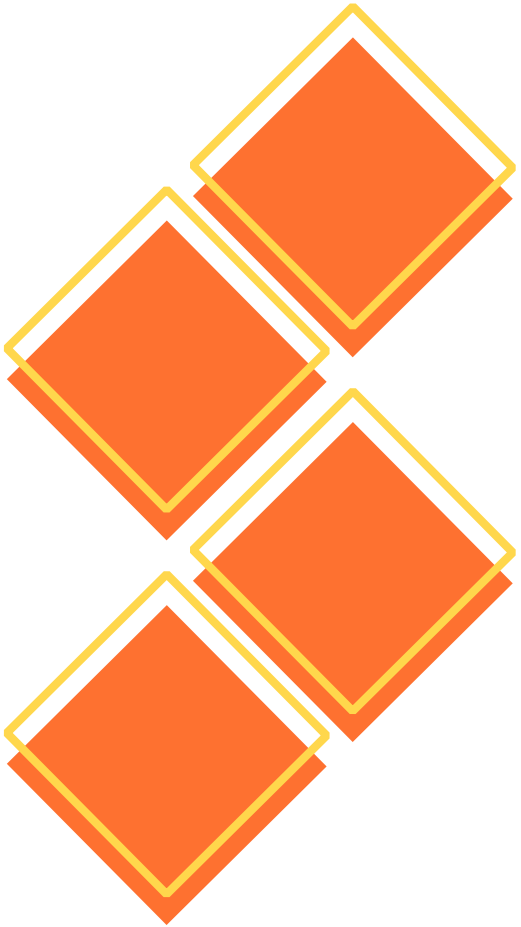
- UART (x2)
- SPI (x3)
- I2C
- I2S
- RMT (4 channels)
- LED PWM (16 channels)
- USB Serial/JTAG Controller
- DMA (6 channels)
- TWAI (CAN 2.0)
- ADC 12bit (x2)
- Temp sensor
- Timers (x 7)

# ESP32-C3-DevKitM-1

https://docs.espressif.com/projects/esp-dev-kits/







# Development tools

PlatformIO

Arduino

ESP-IDF

# Arduino setup

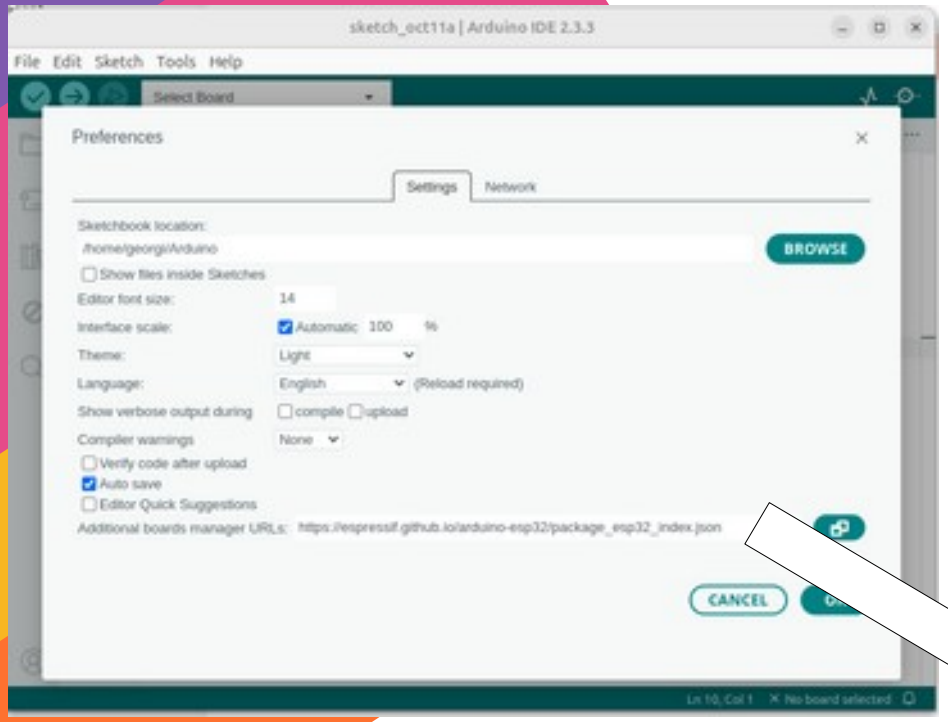
https://docs.espressif.com/projects/arduino-esp32/

## 1 Download Arduino IDE


**https://www.arduino.cc/en/software**

# Arduino setup

https://docs.espressif.com/projects/arduino-esp32/




## 2 Add ESP32 package json

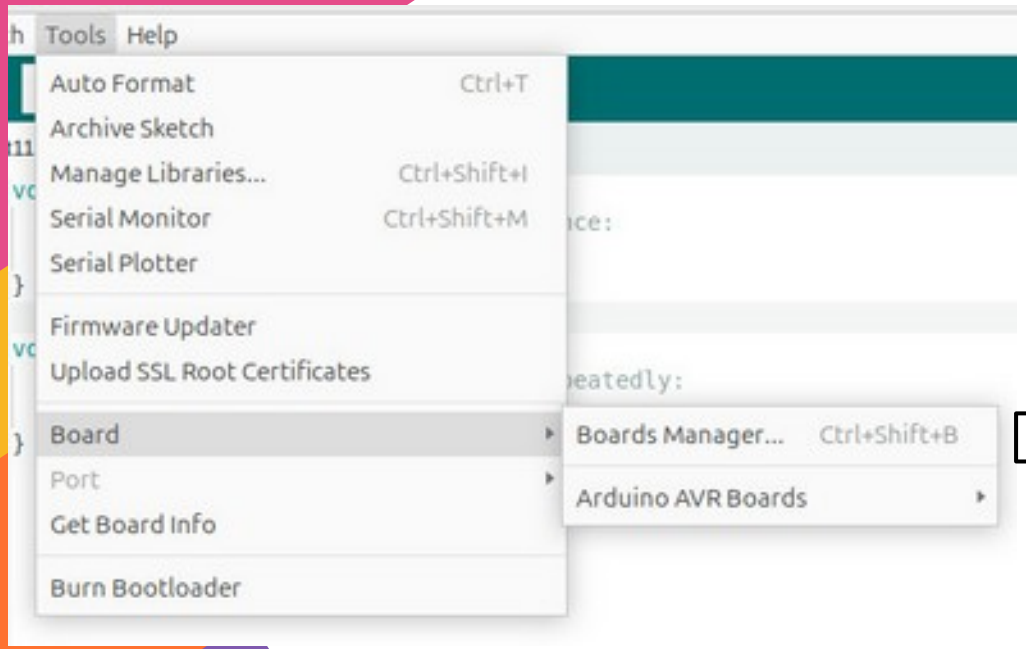
Additional board manager URLs:

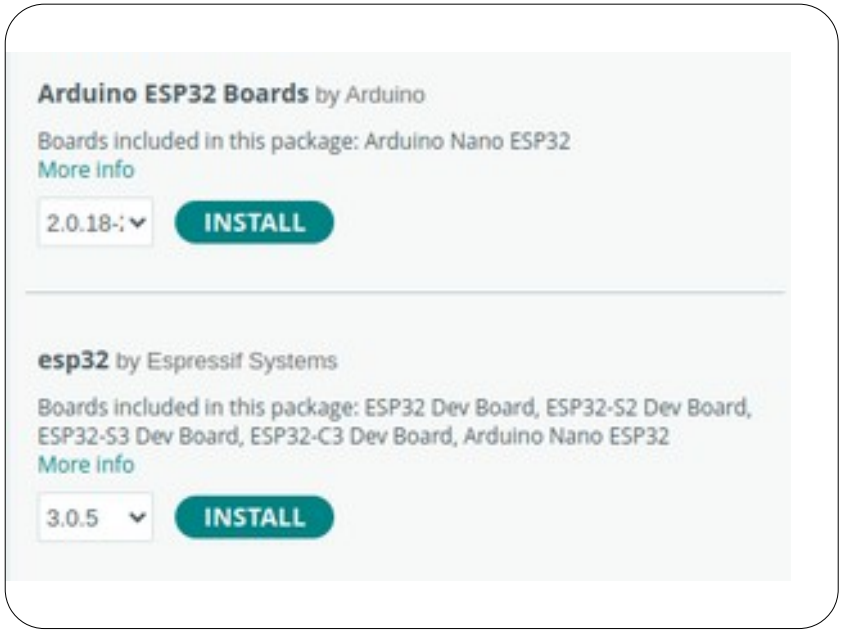
**https://espressif.github.io/arduino-esp32/package_esp32_index.json**

# Arduino setup

https://docs.espressif.com/projects/arduino-esp32/

## 3 Install ESP32 boards

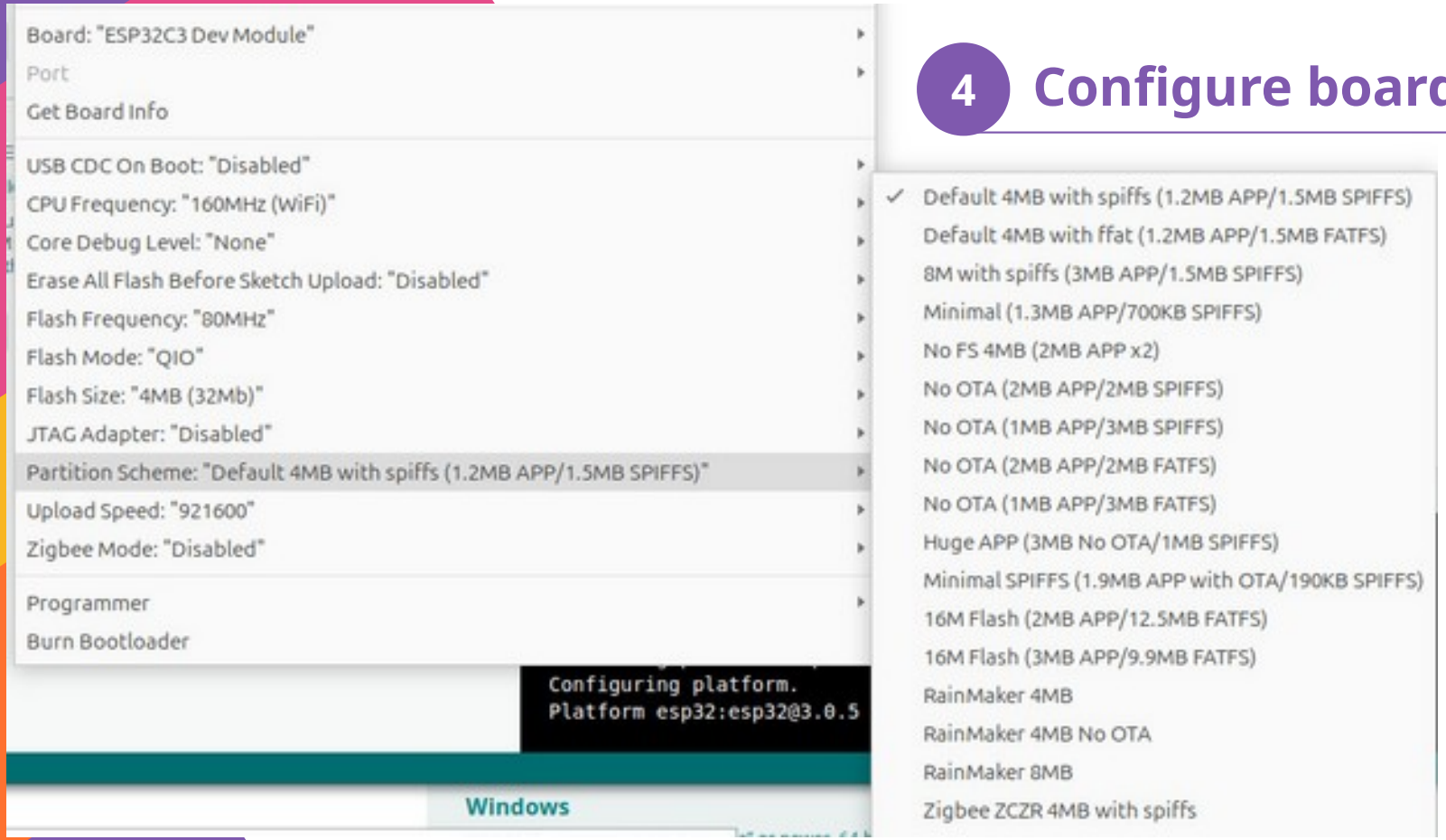


# Arduino setup

https://docs.espressif.com/projects/arduino-esp32/

## 4 Configure board



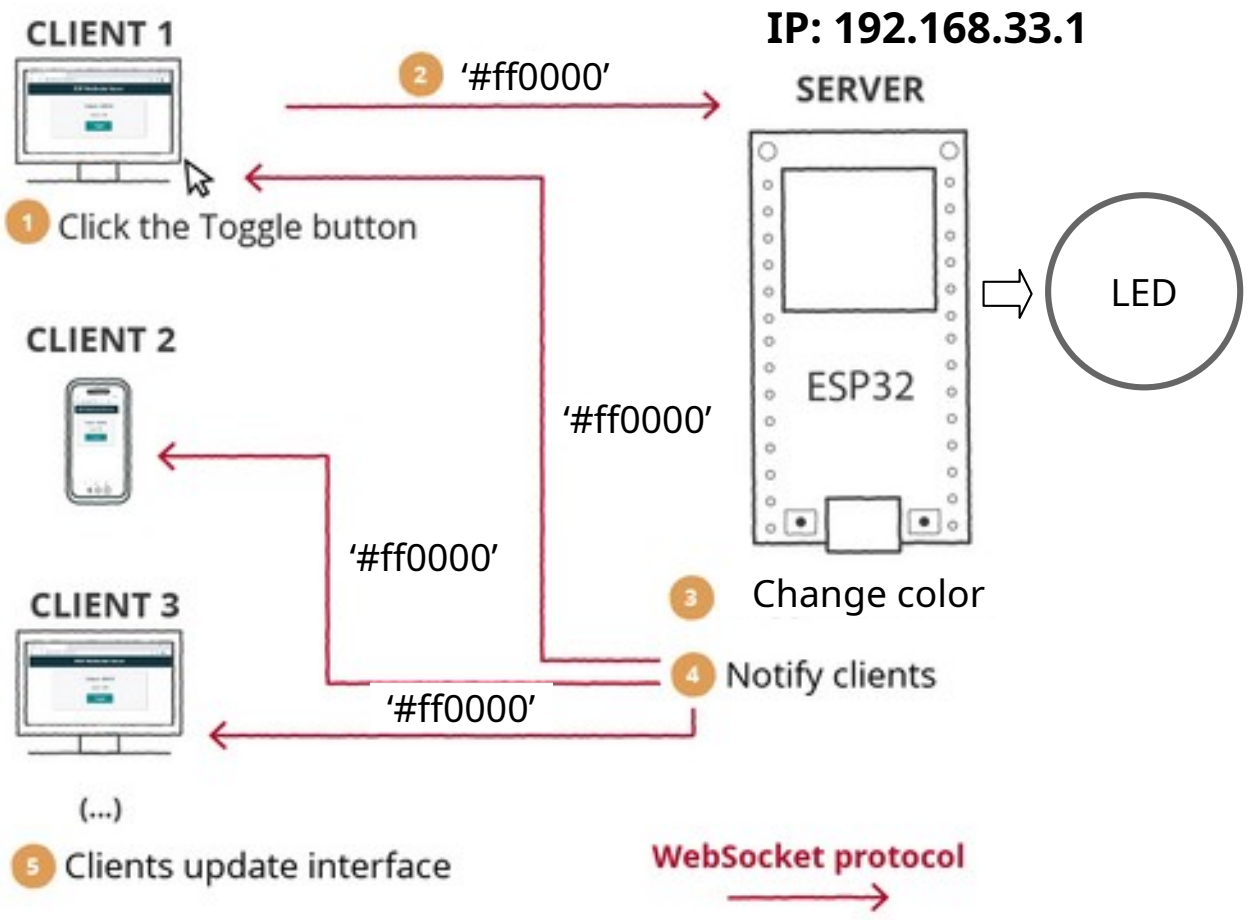
ESPAsyncTCP

AsyncTCP

ESPAsyncWebServer

Freenove WS2812 Lib

# Application



# Application

```
IPAddress AP_LOCAL_IP(192, 168, 33, 1);
IPAddress AP_GATEWAY_IP(192, 168, 33, 254);
IPAddress AP_NETWORK_MASK(255, 255, 255, 0);
```

```
WiFi.softAPConfig(AP_LOCAL_IP, AP_GATEWAY_IP, AP_NETWORK_MASK);
WiFi.softAPsetHostname("espdemo");

// To initiate the Soft AP, pause the program if the initializat
if (!WiFi.softAP(ssid, password))
{
    Serial.println("Soft AP creation failed.");
    while (1);
}
```

# Application

```
struct LedState {
  uint8_t red = 0;
  uint8_t green = 0;
  uint8_t blue = 0;
} led_state;
```

```
// Led
Freenove_ESP32_WS2812 strip =
Freenove_ESP32_WS2812(LEDS_COUNT, LEDS_PIN, CHANNEL);
```

```
// LED strip start
strip.begin();
strip.setLedColor(0, led_state.red, led_state.green, led_state.blue);
```

# Application

```
// Web server
AsyncWebServer server(80);
AsyncWebSocket ws("/ws");
```

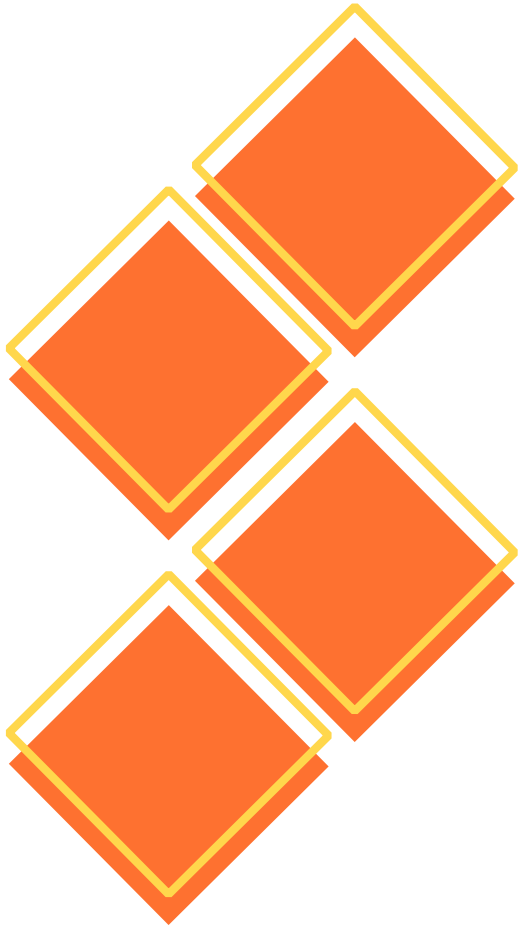
```
void initWebSocket() {
  ws.onEvent(onEvent);
  server.addHandler(&ws);
}
```

```
initWebSocket();

server.on("/", HTTP_GET, [](AsyncWebServerRequest *request){
  request->send(200, "text/html", index_html);
});

server.on("/led", HTTP_GET, LedHandler);
server.onNotFound(notFound);

server.begin();
```



# Благодаря за вниманието

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