



M5STACK

Atom EchoS3R

# 1. Description

Atom EchoS3R is a highly integrated IoT voice interaction controller specially designed for intelligent voice control and human-computer interaction scenarios. At its core is the ESP32-S3-PICO-1-N8R8 main control chip, which supports Wi-Fi wireless communication and comes with built-in 8MB Flash and 8MB PSRAM, meeting the diverse application development needs and providing excellent performance and scalability. The audio system employs the ES8311 monaural codec, combined with a high-sensitivity MEMS microphone and NS4150B power amplifier, to achieve clear sound pickup and high-fidelity audio output, enhancing the voice recognition and interaction experience. It is suitable for voice interaction scenarios such as AI voice assistants and smart home control.



## 2. Specifications

Specification	Parameters
SoC	Specification
PSRAM	ESP32-S3-PICO-1-N8R8 @ Dual-core Xtensa LX7 processor, up to 240MHz main frequency
Flash	8MB
Input Power	8MB
Audio CodeC	USB: DC 5V
MEMS Microphone	ES8311: 24-bit resolution, using I2S protocol
Power Amplifier	MSM381A3729H9BPC, Signal-to-Noise Ratio (SNR): $\geq 65$ dB
Speaker	1318 cavity speaker: 1W@8 $\Omega$
Operating Temperature	0 ~ 40°C
Product Size	24.0 x 24.0 x 16.8mm

# 3. Quick Start

## 3.1 Preparation

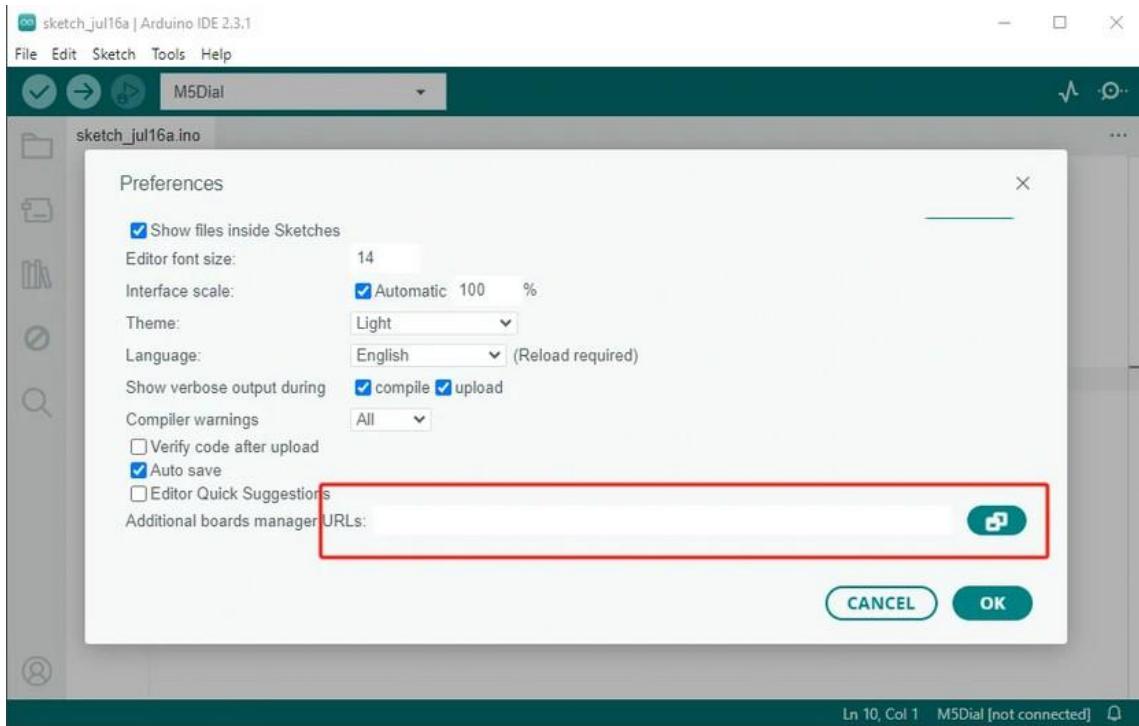
1. Visit the official Arduino website and install the Arduino IDE

<https://www.arduino.cc/en/Main/Software>

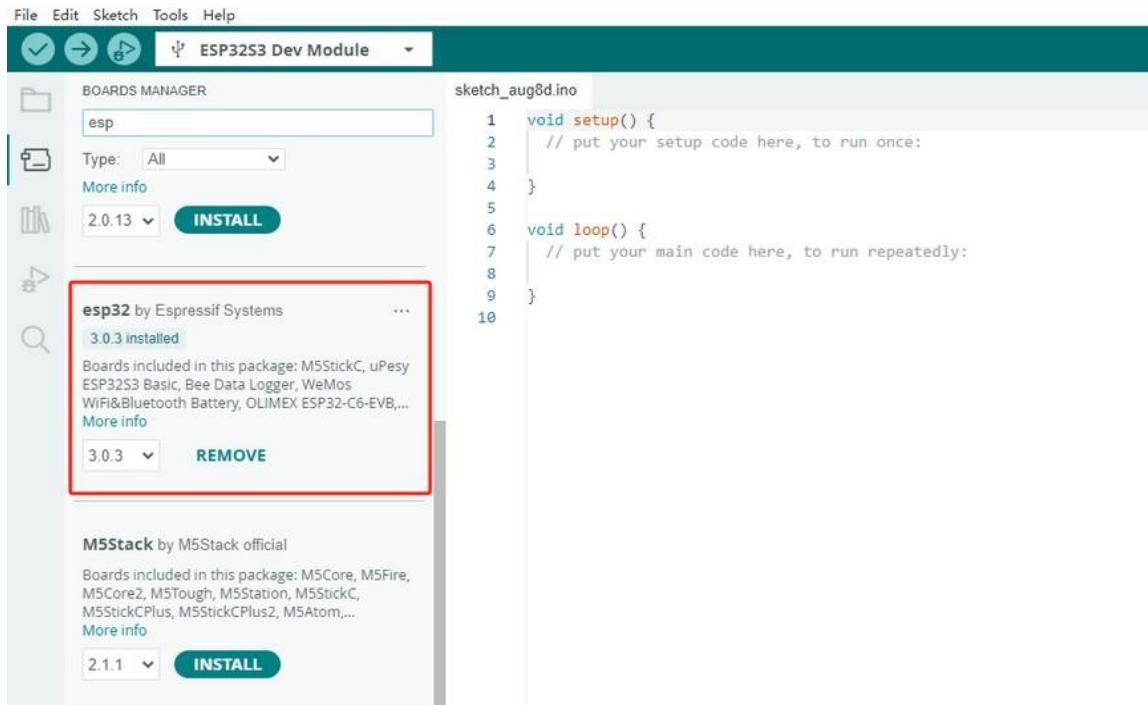
2. Add the following Board Manager URL to File → Preferences → Additional Boards Manager URLs:

[https://espressif.github.io/arduino-esp32/package\\_esp32\\_dev\\_index.json](https://espressif.github.io/arduino-esp32/package_esp32_dev_index.json)

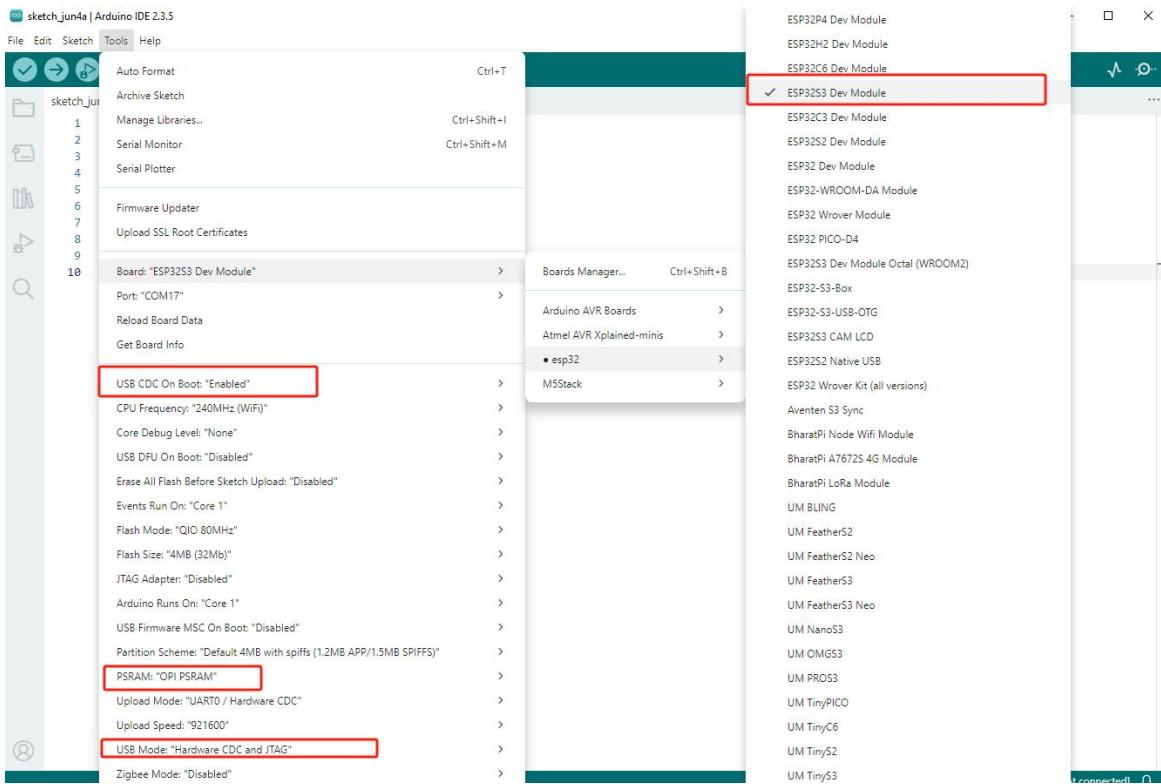




3. Open the Boards Manager, search for "ESP32", and click install.

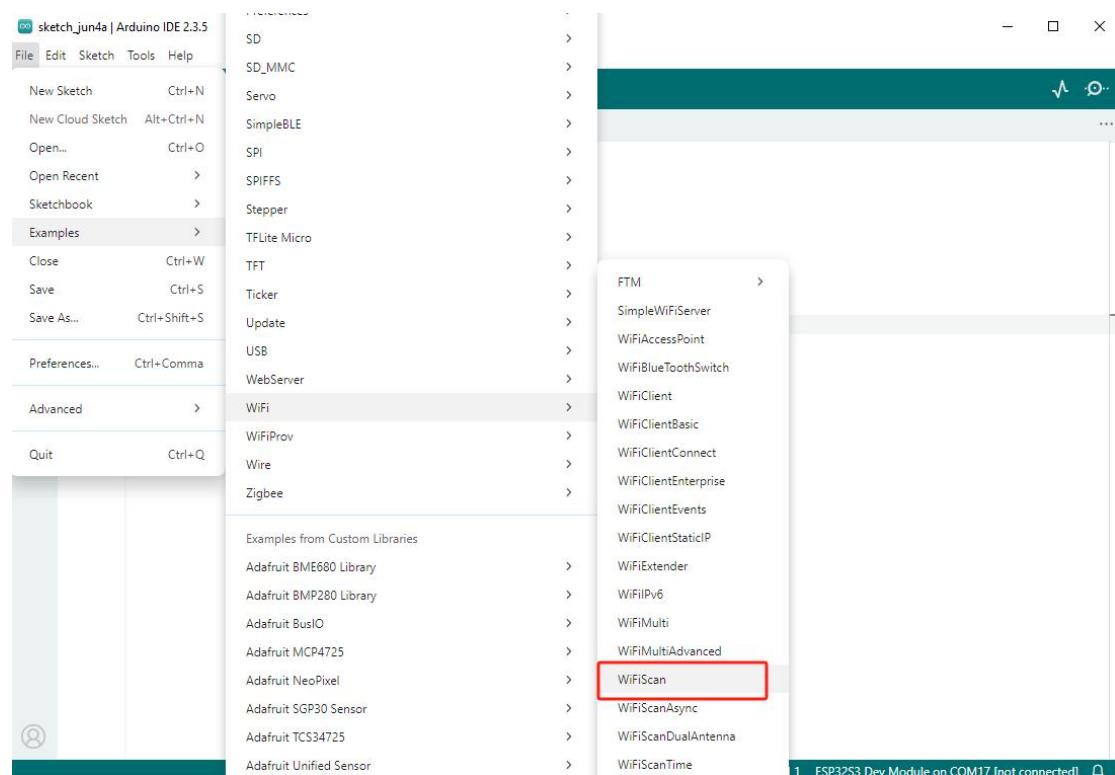


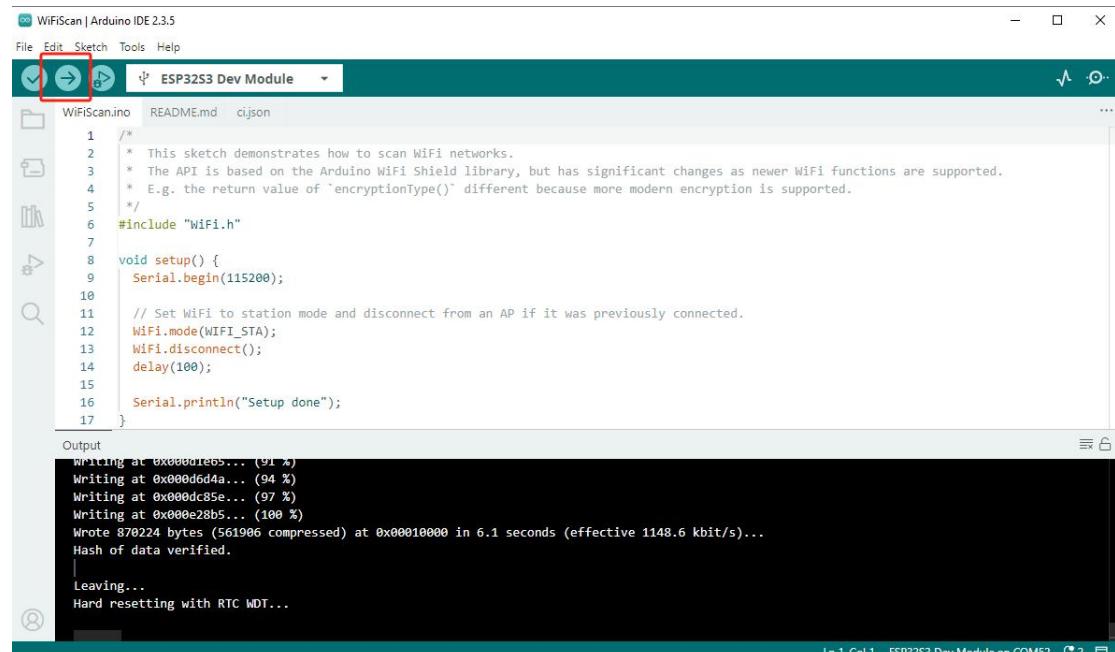
4. After installation, select the board "ESP32S3 Dev Module"
5. Configure the following options. USB CDC On Boot: "Enabled", PSRAM: "OPI PSRAM", USB Mode: "Hardware CDC and JTAG"



## 3.2 Wi-Fi Scan

Select the example program "Examples" → "WiFi" → "WiFiScan", choose the port corresponding to your device, and click the compile and upload button in the top-left corner. After uploading is complete, open the Serial Monitor to view Wi-Fi scan information.





WiFiScan | Arduino IDE 2.3.5

File Edit Sketch Tools Help

ESP32S3 Dev Module

WiFiScan.ino README.md cJSON

```

1  /*
2   * This sketch demonstrates how to scan WiFi networks.
3   * The API is based on the Arduino WiFi Shield library, but has significant changes as newer WiFi functions are supported.
4   * E.g. the return value of `encryptionType()` different because more modern encryption is supported.
5   */
6 #include "WiFi.h"
7
8 void setup() {
9   Serial.begin(115200);
10
11 // Set WiFi to station mode and disconnect from an AP if it was previously connected.
12 WiFi.mode(WIFI_STA);
13 WiFi.disconnect();
14 delay(100);
15
16 Serial.println("Setup done");
17 }

```

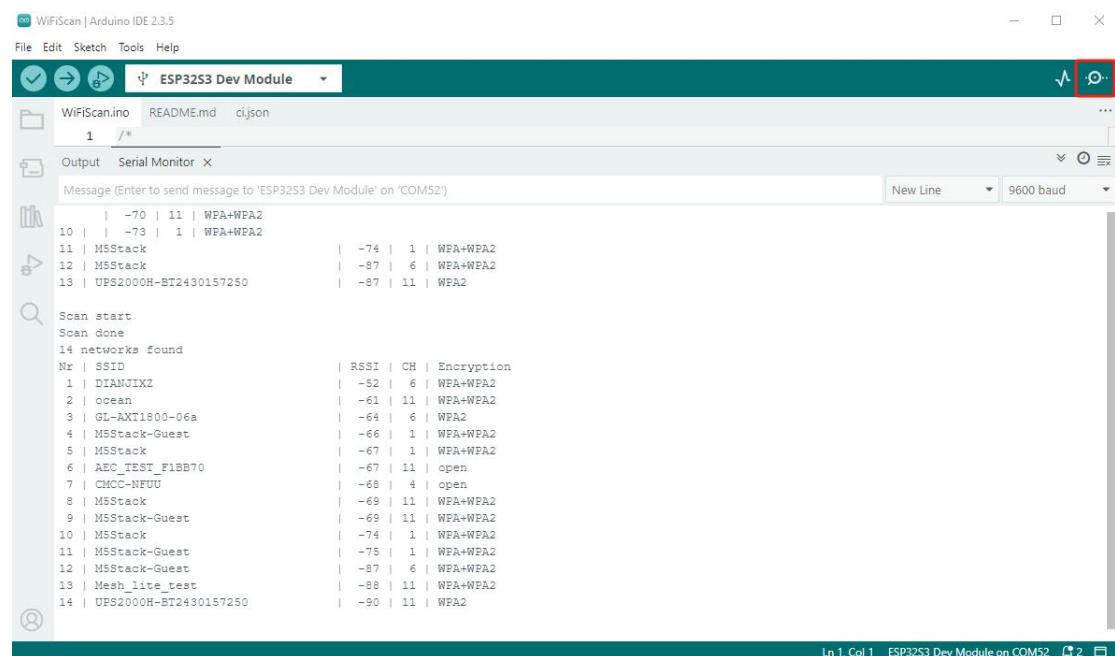
Output

```

Writing at 0x00001e65... (91 %)
Writing at 0x000d6d4a... (94 %)
Writing at 0x000dc85e... (97 %)
Writing at 0x000e28b5... (100 %)
Wrote 870224 bytes (561906 compressed) at 0x00010000 in 6.1 seconds (effective 1148.6 kbit/s)...
Hash of data verified.
|
Leaving...
Hard resetting with RTC WDT...

```

Ln 1, Col 1 ESP32S3 Dev Module on COM52 □ 2

WiFiScan | Arduino IDE 2.3.5

File Edit Sketch Tools Help

ESP32S3 Dev Module

WiFiScan.ino README.md cJSON

Output Serial Monitor X

Message (Enter to send message to 'ESP32S3 Dev Module' on 'COM52')

```

| -70 | 11 | WPA+WPA2
10 | -73 | 1 | WPA+WPA2
11 | MSStack | -74 | 1 | WPA+WPA2
12 | MSStack | -87 | 6 | WPA+WPA2
13 | UBS2000H-BT2430157250 | -87 | 11 | WPA2

Scan start
Scan done
14 networks found
Nr | SSID | RSSI | CH | Encryption
1 | DIANJIXZ | -52 | 6 | WPA+WPA2
2 | ocean | -61 | 11 | WPA+WPA2
3 | GI-AXT1800-06a | -64 | 6 | WPA2
4 | MSStack-Guest | -66 | 1 | WPA+WPA2
5 | MSStack | -67 | 1 | WPA+WPA2
6 | AEC_TEST_F1BB70 | -67 | 11 | open
7 | CMCC-NFUU | -68 | 4 | open
8 | MSStack | -69 | 11 | WPA+WPA2
9 | MSStack-Guest | -69 | 11 | WPA+WPA2
10 | MSStack | -74 | 1 | WPA+WPA2
11 | MSStack-Guest | -75 | 1 | WPA+WPA2
12 | MSStack-Guest | -87 | 6 | WPA+WPA2
13 | Mesh_lite_test | -88 | 11 | WPA+WPA2
14 | UBS2000H-BT2430157250 | -90 | 11 | WPA2

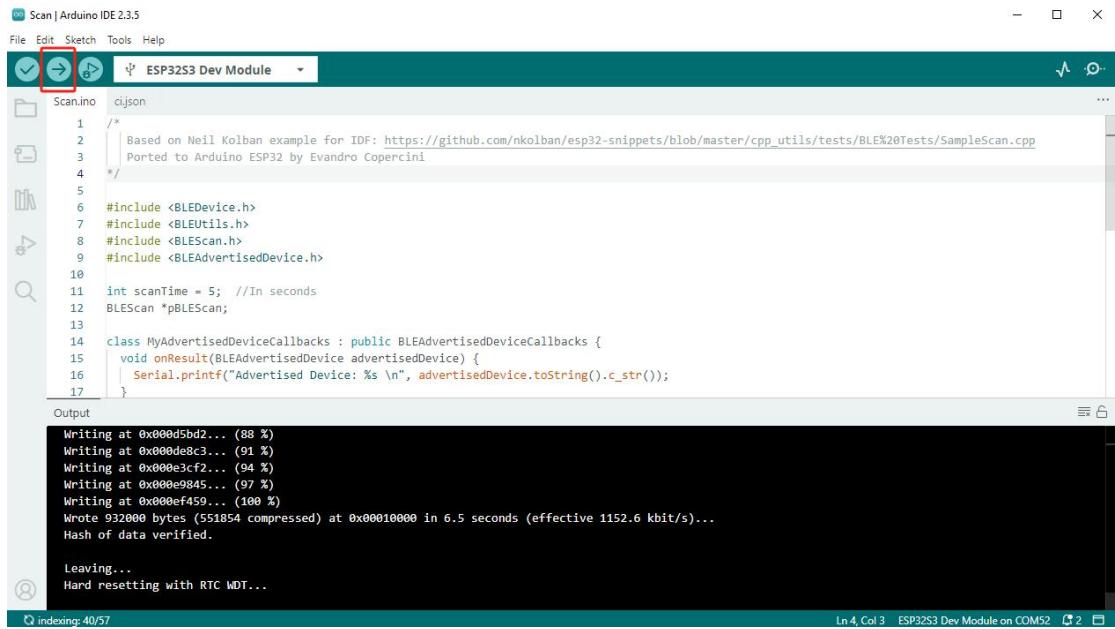
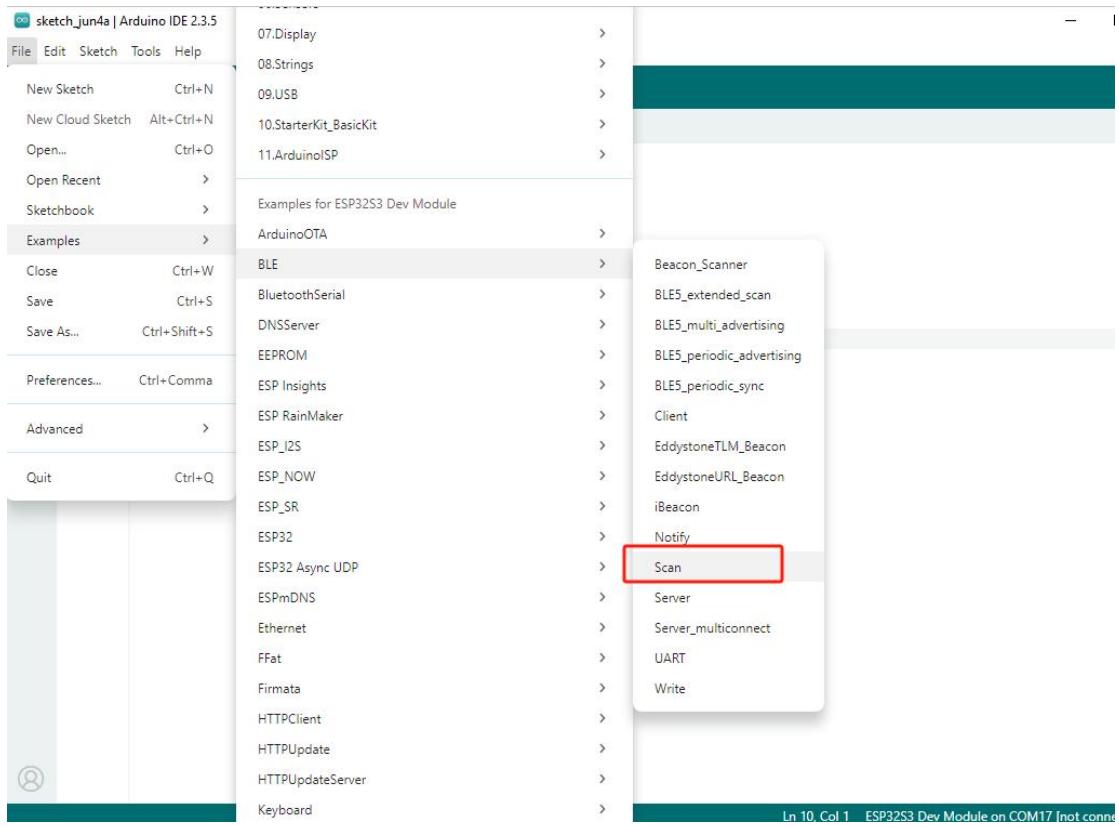
```

Ln 1, Col 1 ESP32S3 Dev Module on COM52 □ 2

### 3.3 BLE Scan

Select the example program "Examples" → "BLE" → "Scan", choose the port corresponding to your device, and click the compile and upload button in the top-left corner.

After uploading is complete, open the Serial Monitor to view BLE scan information.



```

Scan | Arduino IDE 2.3.5
File Edit Sketch Tools Help
ESP32S3 Dev Module
Scan.ino c.json
1 /*
2 | Based on Neil Kolban example for IDF: https://github.com/nkolban/esp32-snippets/blob/master/cpp\_utils/tests/BLE%20Tests/SampleScan.cpp
3 | Ported to Arduino ESP32 by Evandro Copercini
4 */

Output Serial Monitor X
Message (Enter to send message to 'ESP32S3 Dev Module' on 'COM52')
Advertiser Device: Name: , Address: 6b:93:91:29:15:10, manufacturer data: 4c00160800beb/6b/c5b2643, rssi: -96
Advertiser Device: Name: , Address: f7:93:96:51:c5:e6, manufacturer data: 4c0012020002, rssi: -80
Advertiser Device: Name: , Address: 71:1e:21:f3:1b:0f:6a, manufacturer data: 4c0010064a1d69e1a518, txPower: 12, rssi: -79
Advertiser Device: Name: , Address: da:1b:32:1a:12:20:ee, manufacturer data: 4c0012020000, rssi: -76
Advertiser Device: Name: , Address: f9:cd:18:c4:0f:e6, manufacturer data: 4c0012020000, rssi: -90
Advertiser Device: Name: , Address: e5:14:6d:5e:a6:c4, manufacturer data: 4c0012020003, rssi: -92
Advertiser Device: Name: , Address: c0:5e:67:a0:8d:45, manufacturer data: 4c0012027500, rssi: -89
Advertiser Device: Name: , Address: 78:3b:f6:81:95:0c, manufacturer data: 4c000908131ec0e814a01b58160800cae5c3bca66d0c, rssi: -96
Advertiser Device: Name: , Address: 64:13:81:30:ad:9b:aa, manufacturer data: 4c0010073ff1fe9fec3338, txPower: 8, rssi: -87
Advertiser Device: Name: , Address: f6:17:fd:5c:45:02, manufacturer data: 4c0012020000, rssi: -82
Advertiser Device: Name: , Address: 63:9c:39:28:c4:cb, manufacturer data: 4c0016080042b2824991a1613, rssi: -90
Advertiser Device: Name: , Address: cc:83:a7:48:9d:7d, manufacturer data: 4c0012020001, rssi: -74
Advertiser Device: Name: , Address: c9:5a:ae:64:30:ed, manufacturer data: 4c0012020003, rssi: -88
Advertiser Device: Name: , Address: ea:d5:8f:e0:fa:0d, manufacturer data: 4c0012020000, rssi: -78
Advertiser Device: Name: , Address: de:27:77:32:e9:a9, manufacturer data: 4c0012020002, rssi: -79
Advertiser Device: Name: , Address: ch:00:1d:96:2c:24, manufacturer data: 4c0012020003, rssi: -87
Advertiser Device: Name: , Address: da:5d:38:1d:1e:ff, manufacturer data: 4c0012020001, rssi: -95
Advertiser Device: Name: , Address: 0c:19:8c:0e:0:02:45, manufacturer data: 0600010920229a8745eb11457cdbe9a082643dfac48939ecda7bc5d905, rssi: -93
Advertiser Device: Name: , Address: ea:08:d5:52:cc:37, manufacturer data: 4c0012020002, rssi: -93
Advertiser Device: Name: , Address: f8:59:bb:58:87:4b, manufacturer data: 4c0012022c03, rssi: -88
Advertiser Device: Name: , Address: 70:05:af:21:d1:e6:01, manufacturer data: 4c001608004be2fe3f0828c2, rssi: -84
Advertiser Device: Name: , Address: d5:ef:f6:ac:35:41, manufacturer data: 4c0012020003, rssi: -93
Advertiser Device: Name: , Address: ff:1e:5b:94:05:26, manufacturer data: 4c0012020000, rssi: -91

```

## 4. FCC Warning

### FCC Caution:

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

### IMPORTANT NOTE:

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna. — Increase the separation between the equipment and receiver. — Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

The device has been evaluated to meet general RF exposure requirement. The device can be used in portable exposure condition without restriction.