M5AtomS3R

Model:
AtomS3R Lite
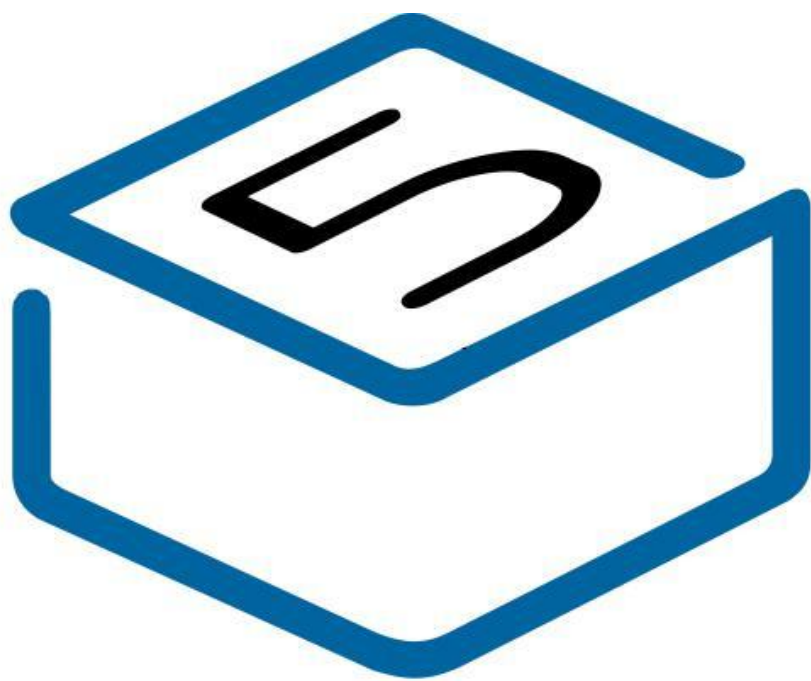
M5STACK

2024

CONTENTS

1. OUTLINE

The **ATOMS3R Lite** is a programmable controller from the M5Stack development kit series, featuring an ESP32 as the main controller. It measures only 24 * 24 * 9.6 mm and utilizes the **ESP32-S3-PICO-1-N8R8** solution, which includes 8MB of PSRAM and 8MB of SPI flash memory. It integrates Wi-Fi and Bluetooth 5.0 (LE) functionality and has a built-in 3D antenna, a 5V to 3.3V power circuit, an infrared transmitter, RGB status indicator lights, a button, and a GROVE/HY2.0-4P interface. The bottom of the product is equipped with power and 6 GPIO pin headers for expansion purposes. The onboard Type-C interface allows for program downloading and serial communication. The back provides an M2 screw hole for mounting. It is suitable for various embedded smart device applications.

1.1. ATOMS3R Lite

1.Communication Capabilities:
- Main Control: ESP32-S3-PICO-1-N8R8
- Wireless Communication: Wi-Fi (WIFI), BLE function
- Infrared Transmission: Infrared transmitter for infrared control interaction
- Expansion Port: HY2.0-4P interface, for connecting and expanding I2C sensors

2.Processor and Performance:
- Processor Model: Xtensa LX7 (ESP32-S3-PICO-1-N8R8)
- Storage Capacity: 8MB Flash, 8MB PSRAM
- Processor Operating Frequency: Xtensa® dual-core 32-bit LX7 microprocessor, up to 240 MHz

3.GPIO Pins and Programmable Interfaces:
- Grove Interface: For connecting and expanding I2C sensors
- Bottom Pin Headers: Power and 6 GPIO pin headers for expansion

4.Others:
- Board Interface: Type-C interface for program download and serial
- communication Physical Dimensions: 24 * 24 * 9.6 mm, with an M2 screw hole on the back for mounting

2. SPECIFICATIONS

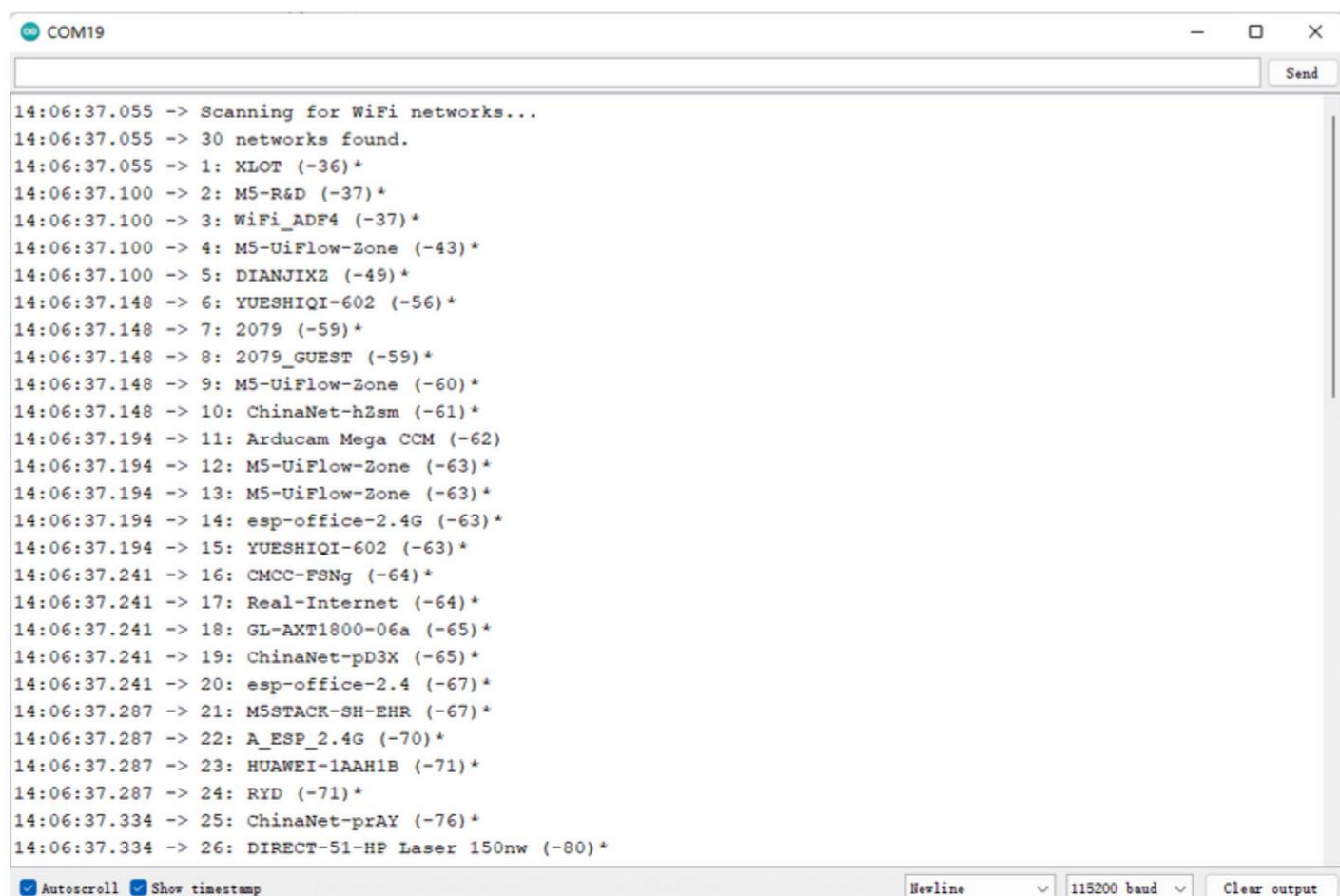| Specification		Details
MCU		ESP32-S3-PICO-1-N8R8 @ Xtensa dual-core 32-bit LX7, 240MHz
Communication Capabilities		Wi-Fi,BLE I2C sensor expansion, Infrared emitter, OTG/CDC functionality
Flash Storage Capacity		8MB FLASH
PSRAM Storage Capacity		8MB PSRAM
Expansion Port		HY2.0-4P interface, for connecting and expanding I2C sensors
Button		1 user button
Power Supply Voltage		4.5-5.5V DC
Dimensions		24 * 24 * 9.6 mm
Operating Temperature		-10°C to 40°C
MIC	Wi-Fi Working Frequency	802.11b/g/n20:2412 MHz-2472 MHz
		802.11n40:2422 MHz-2462 MHz
		802.11b:2484 MHz
	BLE Working Frenquency	2402MHz-2480MHz
CE	Wi-Fi Working Frequency	802.11b:2412 MHz-2472 MHz
		802.11g:2412 MHz-2472 MHz
		802.11n-HT20:2412 MHz-2472 MHz
		802.11n-H40:2422 MHz-2462 MHz
	Wi-Fi Transmit Power	802.11b:17.27dBm
		802.11g:16.82dBm
		802.11n-HT20:16.17dBm
		802.11n-H40:16.22dBm
	BLE Working Frenquency	2402MHz-2480MHz
	BLE Maximum EIRP	5.52dBm
FCC	Wi-Fi Working Frequency	2412 MHz-2472 MHz (802.11b,g,n-HT20)
		2422 MHz-2462 MHz(802.11n-H40)
	Wi-Fi Maximum Conducted Peak Output Power	21.76dBm
	BLE Working Frenquency	2402MHz-2480MHz(BLE 1M/2M)
	BLE Maximum Conducted Peak Output Power	8.71dBm
Rated Current		0.5A
Manufacturer		M5Stack Technology Co., Ltd
Manufacturer address		501, Tangwei Business Building, Tangwei Community, Fuhai Street,
		Bao'an District, Shenzhen, China

2.1 Product Size
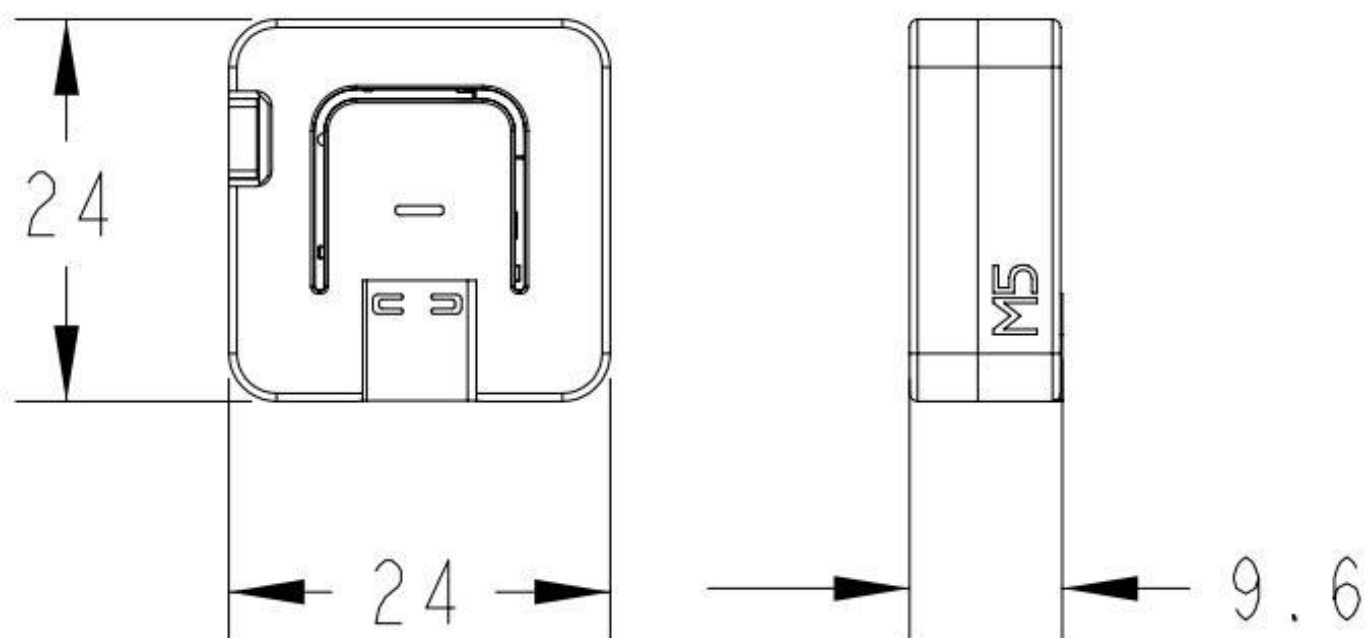
UNIT: MM

3. QUICK START

3.1. Print WiFi information

1. Open Arduino IDE (Refer to https://docs.m5stack.com/en/arduino/arduino_ide for the installation guide for the development board and software)
2. Press and hold the reset button for 2 seconds until the green light turns on
3. Select the ESP32S3 DEV Module board and the corresponding port, then upload the code
4. Open the serial monitor to display the scanned WiFi and signal strength information

```
ESP32S3R_LITE_WIFI | Arduino 1.8.19
File  Edit  Sketch  Tools  Help

ESP32S3R_LITE_WIFI

1  #include "WiFi.h"
2
3  void setup() {
4    Serial.begin(115200);
5    WiFi.mode(WIFI_STA);
6    WiFi.disconnect();
7    delay(100);
8
9    Serial.println("Scanning for WiFi networks...");
10   int n = WiFi.scanNetworks();
11   if (n == 0) {
12     Serial.println("No networks found.");
13   } else {
14     Serial.print(n);
15     Serial.println(" networks found.");
16     for (int i = 0; i < n; ++i) {
17       Serial.print(i + 1);
18       Serial.print(": ");
19       Serial.print(WiFi.SSID(i));
20       Serial.print(" (");
21       Serial.print(WiFi.RSSI(i));
22       Serial.print(")");
23       Serial.println((WiFi.encryptionType(i) == WIFI_AUTH_OPEN) ? " " : "*");
24       delay(10);
25     }
26   }
27   Serial.println("");
28  }
29
30  void loop() {
31    // put your main code here, to run repeatedly:
32  }
33
```
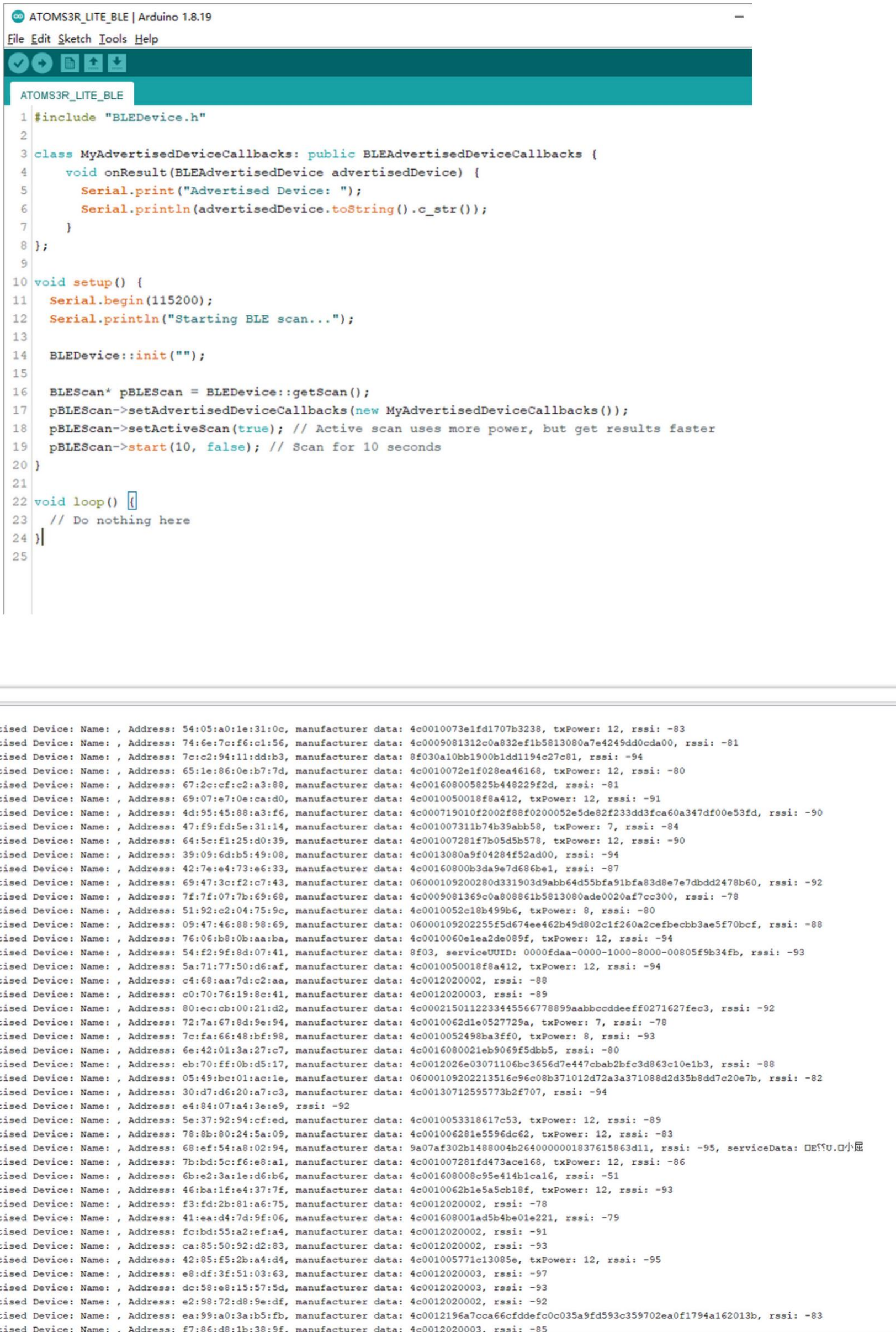
```
COM19                                                              —  □  ×
                                                                    Send

14:06:37.055 -> Scanning for WiFi networks...
14:06:37.055 -> 30 networks found.
14:06:37.055 -> 1: XLOT (-36)*
14:06:37.100 -> 2: M5-R&D (-37)*
14:06:37.100 -> 3: WiFi_ADF4 (-37)*
14:06:37.100 -> 4: M5-UiFlow-Zone (-43)*
14:06:37.100 -> 5: DIANJIXZ (-49)*
14:06:37.148 -> 6: YUESHIQI-602 (-56)*
14:06:37.148 -> 7: 2079 (-59)*
14:06:37.148 -> 8: 2079_GUEST (-59)*
14:06:37.148 -> 9: M5-UiFlow-Zone (-60)*
14:06:37.148 -> 10: ChinaNet-hZsm (-61)*
14:06:37.194 -> 11: Arducam Mega CCM (-62)
14:06:37.194 -> 12: M5-UiFlow-Zone (-63)*
14:06:37.194 -> 13: M5-UiFlow-Zone (-63)*
14:06:37.194 -> 14: esp-office-2.4G (-63)*
14:06:37.194 -> 15: YUESHIQI-602 (-63)*
14:06:37.241 -> 16: CMCC-FSNg (-64)*
14:06:37.241 -> 17: Real-Internet (-64)*
14:06:37.241 -> 18: GL-AXT1800-06a (-65)*
14:06:37.241 -> 19: ChinaNet-pD3X (-65)*
14:06:37.241 -> 20: esp-office-2.4 (-67)*
14:06:37.287 -> 21: M5STACK-SH-EHR (-67)*
14:06:37.287 -> 22: A_ESP_2.4G (-70)*
14:06:37.287 -> 23: HUAWEI-1AAH1B (-71)*
14:06:37.287 -> 24: RYD (-71)*
14:06:37.334 -> 25: ChinaNet-prAY (-76)*
14:06:37.334 -> 26: DIRECT-51-HP Laser 150nw (-80)*

☑ Autoscroll  ☑ Show timestamp        Newline  ∨  115200 baud  ∨  Clear output
```

3. QUICK START

3.1. Print BLE information

1. Open Arduino IDE (Refer to https://docs.m5stack.com/en/arduino/arduino_ide for the installation guide for the development board and software)
2. 2. Press and hold the reset button for 2 seconds until the green light turns on
3. 3. Select the ESP32S3 DEV Module board and the corresponding port, then upload the code
4. 4. Open the serial monitor to display the scanned BLE and signal strength information

```
ATOMS3R_LITE_BLE | Arduino 1.8.19

File Edit Sketch Tools Help

ATOMS3R_LITE_BLE

1  #include "BLEDevice.h"
2
3  class MyAdvertisedDeviceCallbacks: public BLEAdvertisedDeviceCallbacks {
4      void onResult(BLEAdvertisedDevice advertisedDevice) {
5          Serial.print("Advertised Device: ");
6          Serial.println(advertisedDevice.toString().c_str());
7      }
8  };
9
10 void setup() {
11     Serial.begin(115200);
12     Serial.println("Starting BLE scan...");
13
14     BLEDevice::init("");
15
16     BLEScan* pBLEScan = BLEDevice::getScan();
17     pBLEScan->setAdvertisedDeviceCallbacks(new MyAdvertisedDeviceCallbacks());
18     pBLEScan->setActiveScan(true); // Active scan uses more power, but get results faster
19     pBLEScan->start(10, false); // Scan for 10 seconds
20 }
21
22 void loop() {
23     // Do nothing here
24 }
25
```

```
OM19

15:12.708 ->
15:12.708 -> Advertised Device: Name: , Address: 54:05:a0:1e:31:0c, manufacturer data: 4c0010073e1fd1707b3238, txPower: 12, rssi: -83
15:12.708 -> Advertised Device: Name: , Address: 74:6e:7c:f6:c1:56, manufacturer data: 4c0009081312c0a832ef1b5813080a7e4249dd0cda00, rssi: -81
15:12.708 -> Advertised Device: Name: , Address: 7c:c2:94:11:dd:b3, manufacturer data: 8f030a10bb1900b1dd1194c27c81, rssi: -94
15:12.792 -> Advertised Device: Name: , Address: 65:1e:86:0e:b7:7d, manufacturer data: 4c0010072e1f028ea46168, txPower: 12, rssi: -80
15:12.792 -> Advertised Device: Name: , Address: 67:2c:cf:c2:a3:88, manufacturer data: 4c001608005825b448229f2d, rssi: -81
15:12.792 -> Advertised Device: Name: , Address: 69:07:e7:0e:ca:d0, manufacturer data: 4c0010050018f8a412, txPower: 12, rssi: -91
15:12.930 -> Advertised Device: Name: , Address: 4d:95:45:88:a3:f6, manufacturer data: 4c000719010f2002f88f0200052e5de82f233dd3fca60a347df00e53fd, rssi: -90
15:12.930 -> Advertised Device: Name: , Address: 47:f9:fd:5e:31:14, manufacturer data: 4c0010073111b74b39abb58, txPower: 7, rssi: -84
15:12.976 -> Advertised Device: Name: , Address: 64:5c:f1:25:d0:39, manufacturer data: 4c0010072812f7b05d5b578, txPower: 12, rssi: -90
15:12.976 -> Advertised Device: Name: , Address: 39:09:6d:b5:49:08, manufacturer data: 4c0013080a9f04284f52ad00, rssi: -94
15:12.976 -> Advertised Device: Name: , Address: 42:7e:e4:73:e6:33, manufacturer data: 4c00160800b3da9e7d686be1, rssi: -87
15:13.023 -> Advertised Device: Name: , Address: 69:47:3c:f2:c7:43, manufacturer data: 06000109200280d331903d5abb64d55bfa51bfa83d8e7e7dbdd2478b60, rssi: -92
15:13.023 -> Advertised Device: Name: , Address: 7f:7f:07:7b:69:68, manufacturer data: 4c0009081369c0a808861b5813080ade0020af7cc300, rssi: -78
15:13.117 -> Advertised Device: Name: , Address: 51:92:c2:04:75:9c, manufacturer data: 4c0010052c18b499b6, txPower: 8, rssi: -80
15:13.163 -> Advertised Device: Name: , Address: 09:47:46:88:98:69, manufacturer data: 06000109202255f5d674ee462b49d802c1f260a2cefbecbb3ae5f70bcf, rssi: -88
15:13.163 -> Advertised Device: Name: , Address: 76:06:b8:0b:aa:ba, manufacturer data: 4c0010060e1ea2de089f, txPower: 12, rssi: -94
15:13.163 -> Advertised Device: Name: , Address: 54:f2:9f:8d:07:41, manufacturer data: 8f03, serviceUUID: 0000fdaa-0000-1000-8000-00805f9b34fb, rssi: -93
15:13.163 -> Advertised Device: Name: , Address: 5a:71:77:50:d6:af, manufacturer data: 4c0010050018f8a412, txPower: 12, rssi: -94
15:13.257 -> Advertised Device: Name: , Address: c4:68:aa:7d:c2:aa, manufacturer data: 4c0012020002, rssi: -88
15:13.303 -> Advertised Device: Name: , Address: c0:70:76:19:8c:41, manufacturer data: 4c0012020003, rssi: -89
15:13.395 -> Advertised Device: Name: , Address: 80:ec:cb:00:21:d2, manufacturer data: 4c00021501122334455667788959aabbccddeeff0271627fec3, rssi: -92
15:13.395 -> Advertised Device: Name: , Address: 72:7a:67:8d:5e:94, manufacturer data: 4c0010062d1e0527729a, txPower: 7, rssi: -78
15:13.585 -> Advertised Device: Name: , Address: 7c:fa:66:48:bf:98, manufacturer data: 4c0010052498ba3ff0, txPower: 8, rssi: -93
15:13.773 -> Advertised Device: Name: , Address: 6e:42:01:3a:27:c7, manufacturer data: 4c0016080021eb9069f5dbb5, rssi: -80
15:13.820 -> Advertised Device: Name: , Address: eb:70:ff:0b:d5:17, manufacturer data: 4c0012026e03071106bc3656d7e447cbab2bfc3d863c10e1b3, rssi: -88
15:13.820 -> Advertised Device: Name: , Address: 05:49:bc:01:ac:1e, manufacturer data: 06000109202213516c96c08b371012d72a3a371088d2d35b8dd7c20e7b, rssi: -82
15:13.866 -> Advertised Device: Name: , Address: 30:d7:d6:20:a7:c3, manufacturer data: 4c00130712595773b2f707, rssi: -94
15:13.866 -> Advertised Device: Name: , Address: e4:84:07:a4:3e:e9, rssi: -92
15:13.958 -> Advertised Device: Name: , Address: 5e:37:92:94:cf:ed, manufacturer data: 4c0010053318617c53, txPower: 12, rssi: -89
15:14.194 -> Advertised Device: Name: , Address: 78:8b:80:24:5a:09, manufacturer data: 4c001006281e5596dc62, txPower: 12, rssi: -83
15:14.194 -> Advertised Device: Name: , Address: 68:ef:54:a8:02:94, manufacturer data: 9a07af302b1488004b2640000001837615863d11, rssi: -95, serviceData: □E??U.□小屉
15:14.194 -> Advertised Device: Name: , Address: 7b:bd:5c:f6:e8:a1, manufacturer data: 4c0010072812fd473ace168, txPower: 12, rssi: -86
15:14.240 -> Advertised Device: Name: , Address: 6b:e2:3a:1e:d6:b6, manufacturer data: 4c001608008c95e414b1ca16, rssi: -51
15:14.285 -> Advertised Device: Name: , Address: 46:ba:1f:e4:37:7f, manufacturer data: 4c0010062b1e5a5cb18f, txPower: 12, rssi: -93
15:14.705 -> Advertised Device: Name: , Address: f3:fd:2b:81:a6:75, manufacturer data: 4c0012020002, rssi: -78
15:14.753 -> Advertised Device: Name: , Address: 41:ea:d4:7d:9f:06, manufacturer data: 4c001608001ad5b4be01e221, rssi: -79
15:14.800 -> Advertised Device: Name: , Address: fc:bd:55:a2:ef:a4, manufacturer data: 4c0012020002, rssi: -91
15:14.845 -> Advertised Device: Name: , Address: ca:85:50:92:d2:83, manufacturer data: 4c0012020002, rssi: -93
15:14.892 -> Advertised Device: Name: , Address: 42:85:f5:2b:a4:d4, manufacturer data: 4c001005771c13085e, txPower: 12, rssi: -95
15:14.939 -> Advertised Device: Name: , Address: e8:df:3f:51:03:63, manufacturer data: 4c0012020003, rssi: -97
15:15.035 -> Advertised Device: Name: , Address: dc:58:e8:15:57:5d, manufacturer data: 4c0012020002, rssi: -93
15:15.130 -> Advertised Device: Name: , Address: e2:98:72:d8:9e:df, manufacturer data: 4c0012020002, rssi: -92
15:15.224 -> Advertised Device: Name: , Address: ea:99:a0:3a:b5:fb, manufacturer data: 4c0012196a7cca66cfddefc0c035a9fd593c359702ea0f1794a162013b, rssi: -83
15:15.360 -> Advertised Device: Name: , Address: f7:86:d8:1b:38:9f, manufacturer data: 4c0012020003, rssi: -85
```

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.

FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. The SAR was tested for the device in the body worn mode, and it can meet the SAR limit of FCC.