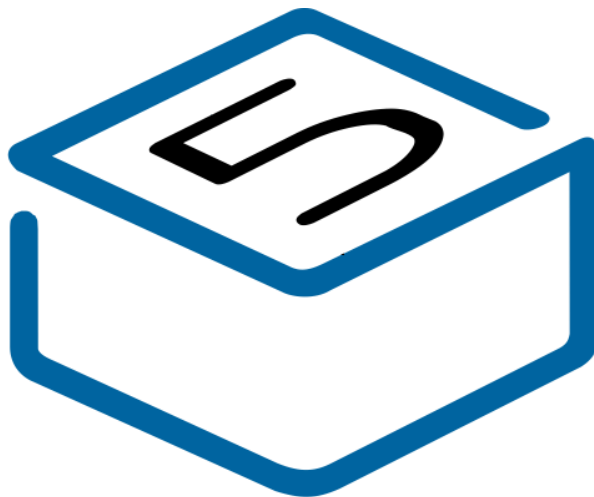


AtomU



M5STACK

2021

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1.OUTLINE

AtomU is a very small and flexible IoT speech recognition development board, using Espressif's `ESP32` main control chip, equipped with two low-power `Xtensa®` 32-bit LX6` microprocessors, main frequency Up to `240MHz`. It has the characteristics of compact size, strong performance and low power consumption. Integrated USB-A interface, plug and play, easy to upload, download and debug the program. Integrated `Wi-Fi` and `Bluetooth` modules, with built-in digital microphone SPM1423 (I2S), can achieve clear audio recording, suitable for various IoT human-computer interaction, voice input recognition scenarios (STT)



1.1.ESP32 PICO

- The ESP32-PICO-D4 is a System-in-Package (SiP) module that is based on ESP32, providing complete Wi-Fi and Bluetooth functionalities. The module has a size as small as (7.000 ± 0.100) mm \times (7.000 ± 0.100) mm \times (0.940 ± 0.100) mm, thus requiring minimal PCB area. The module integrates a 4-MB SPI flash. At the core of this module is the ESP32 chip*, which is a single 2.4 GHz Wi-Fi and Bluetooth combo chip designed with TSMC's 40 nm ultra-low power

technology. ESP32-PICO-D4 integrates all peripheral components seamlessly, including a crystal oscillator, flash, filter capacitors and RF matching links in one single package. Given that no other peripheral components are involved, module welding and testing is not required either. As such, ESP32-PICO-D4 reduces the complexity of supply chain and improves control efficiency. With its ultra-small size, robust performance and low-energy consumption, ESP32-PICO-D4 is well suited for any space-limited or battery-operated applications, such as wearable electronics, medical equipment, sensors and other IoT products.

2. SPECIFICATIONS

Resources	Parameter
ESP32-PICO-D4	240MHz dual core, 600 DMIPS, 520KB SRAM, 2.4GHz Wi-Fi, dual mode Bluetooth
Flash	4MB
Input voltage	5V @ 500mA
button	Programmable buttons x 1
Programmable RGB LED	SK6812 x 1
Antenna	2.4GHz 3D Antenna
Operating temperature	32°F to 104°F (0°C to 40°C)

3. QUICK START

3.1. ARDUINO IDE

Visit Arduino's official website(<https://www.arduino.cc/en/Main/Software>), Select the installation package for your own operating system to download.

>1. Open up Arduino IDE, navigate to `File` -> `Preferences` -> `Settings`

>2. Copy the following M5Stack Boards Manager url to `Additional Boards Manager URLs`:

https://raw.githubusercontent.com/espressif/arduino-esp32/gh-pages/package_esp32_dev_index.json

>3. Navigate to `Tools` -> `Board:` -> `Boards Manager...`

>4. Search `ESP32` in the pop-up window, find it and click `Install`

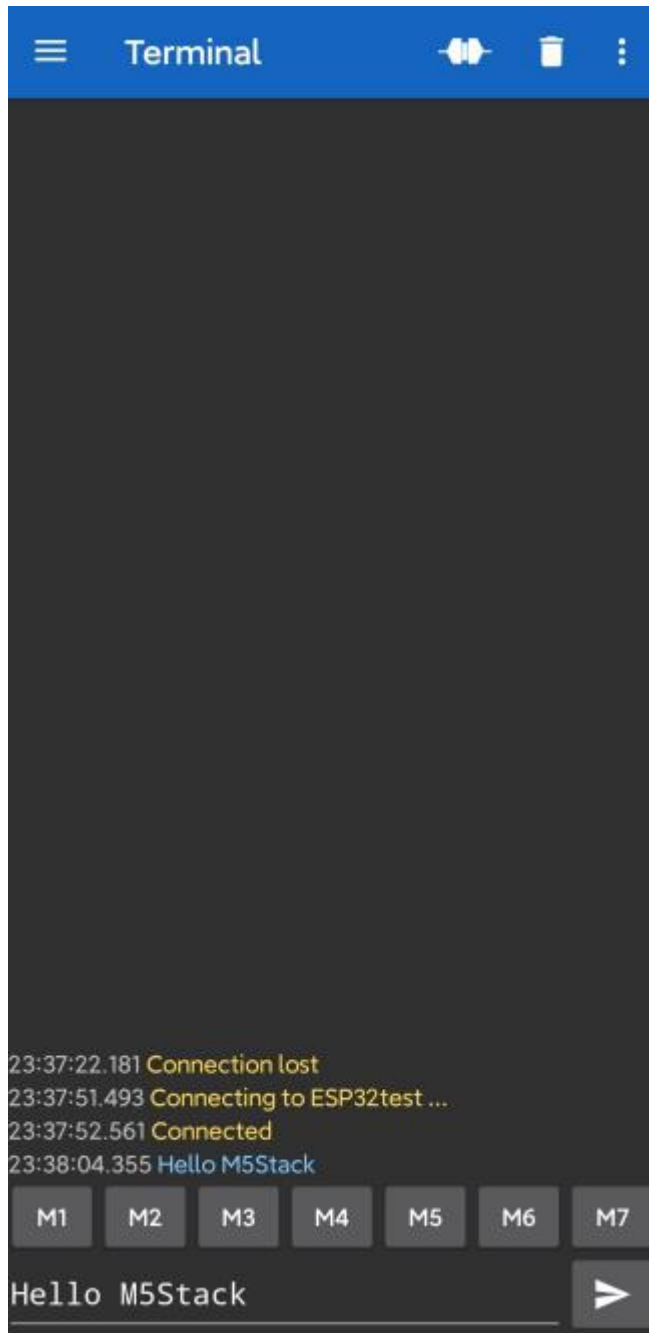
>5. select `Tools` -> `Board:` -> `ESP32-Arduino-ESP32 DEV Module`

>6 Please install FTDI driver before use: <https://docs.m5stack.com/en/download>

3.2. BLUETOOTH SERIAL

Open the Arduino IDE and open the example program

`File` -> `Examples` -> `BluetoothSerial` -> `SerialToSerialBT`. Connect the device to the computer and select the corresponding port to burn. After completion, the device will automatically run Bluetooth, and the device name is `ESP32test`. At this time, use the Bluetooth serial port sending tool on the PC to realize the transparent transmission of Bluetooth serial data.



```
#include "BluetoothSerial.h"

#if !defined(CONFIG_BT_ENABLED) || !defined(CONFIG_BLUEDROID_ENABLED)
#error Bluetooth is not enabled! Please run `make menuconfig` to and enable it
#endif

BluetoothSerial SerialBT;

void setup() {
  Serial.begin(115200);
```

```

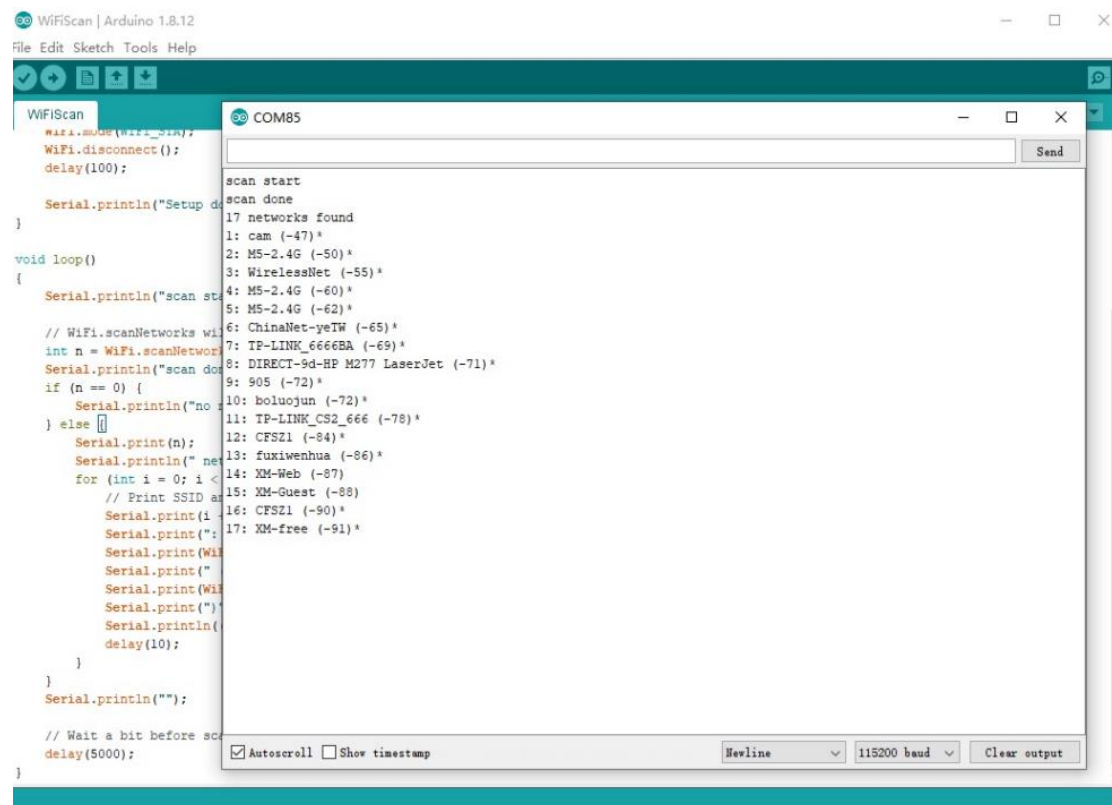
SerialBT.begin("ESP32test"); //Bluetooth device name
Serial.println("The device started, now you can pair it with bluetooth!");
}

void loop() {
  if (Serial.available()) {
    SerialBT.write(Serial.read());
  }
  if (SerialBT.available()) {
    Serial.write(SerialBT.read());
  }
  delay(20);
}

```

3.3. WIFI SCANNING

Open the Arduino IDE and open the example program `File`->`Examples`->`WiFi`->`WiFiScan`. Connect the device to the computer and select the corresponding port to burn. After completion, the device will automatically run the WiFi scan, and the current WiFi scan result can be obtained through the serial port monitor that comes with the Arduino.




```

#include "WiFi.h"

void setup()
{
  Serial.begin(115200);
  // Set WiFi to station mode and disconnect from an AP if it was pre
  viously connected
  WiFi.mode(WIFI_STA);
  WiFi.disconnect();
  delay(100);

  Serial.println("Setup done");
}

void loop()
{
  Serial.println("scan start");

  // WiFi.scanNetworks will return the number of networks found
  int n = WiFi.scanNetworks();
  Serial.println("scan done");
  if (n == 0) {
    Serial.println("no networks found");
  } else {
    Serial.print(n);
    Serial.println(" networks found");
    for (int i = 0; i < n; ++i) {
      // Print SSID and RSSI for each network found
      Serial.print(i + 1);
      Serial.print(": ");
      Serial.print(WiFi.SSID(i));
      Serial.print(" (");
      Serial.print(WiFi.RSSI(i));
      Serial.print(")");
      Serial.println((WiFi.encryptionType(i) == WIFI_AUTH_OPEN)?"
":"*");
      delay(10);
    }
  }
  Serial.println("");

  // Wait a bit before scanning again
  delay(5000);
}

```

Federal Communications Commission (FCC) Statement

You are cautioned that changes or modifications not expressly approved by the part responsible for compliance could void the user's authority to operate the equipment.

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.

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 of the device.

FCC RF Radiation Exposure Statement:

The product comply with the FCC portable RF exposure limit set forth for an uncontrolled environment and are safe for intended operation as described in this manual. The further RF exposure reduction can be achieved if the product can be kept as far as possible from the user body.