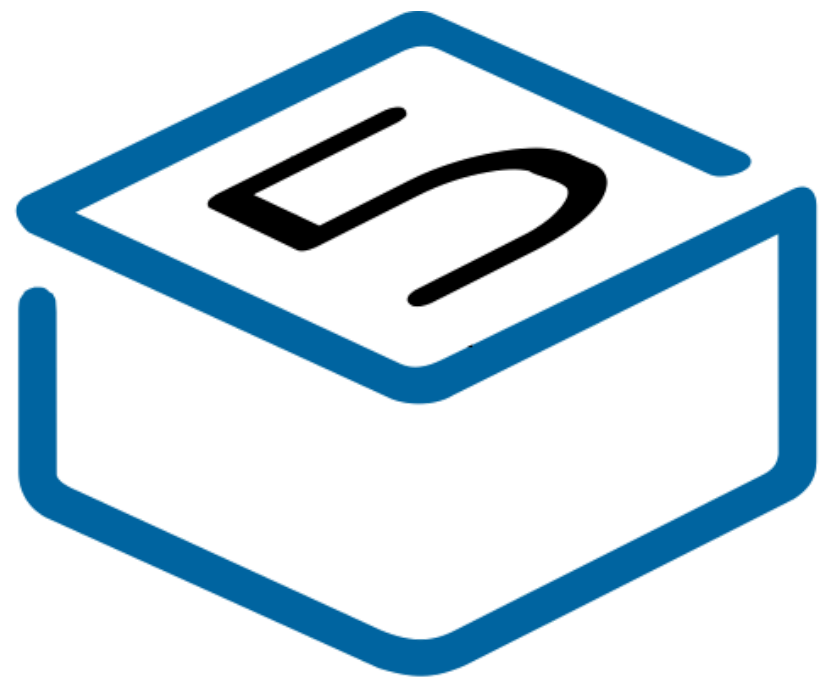
M5STACK

Dial



M5STACK

2024

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1. OUTLINE

As a versatile embedded development board, M5Dial integrates the necessary features and sensors for various smart home control applications. It features a 1.28-inch round TFT touchscreen, a rotary encoder, an RTC circuit, a buzzer, and under-screen buttons,
enabling users to easily implement a wide range of creative projects.

The main controller of M5Dial is M5StampS3, a micro module based on the ESP32-S3 chip known for its high performance and low power consumption. It supports Wi-Fi, as well as various peripheral interfaces such as SPI, I2C, UART, ADC, and more. M5StampS3 also comes with 8MB of built-in Flash, providing sufficient storage space for users.

The standout feature of M5Dial is its rotary encoder, which accurately records the position and direction of the knob, delivering a better interactive experience. Users can adjust settings such as volume, brightness, and menu options using the knob, or control home applications like lights, air conditioning, and curtains. The device's built-in display screen allows for displaying different interaction colors and effects.

With its compact size and lightweight design, M5Dial is suitable for various embedded applications. Whether it's controlling home devices in the smart home domain or monitoring and controlling systems in industrial automation, M5Dial can be easily integrated to provide intelligent control and interaction capabilities.
M5Dial also features Users can utilize this function for applications such as access control, identity verification,and payments.Furthermore,
M5Dial is equipped with an RTC circuit to maintain accurate time and
date. Additionally, it includes an onboard buzzer and a physical button for device sound prompts and wake-up operations.

M5Dial provides versatile power supply options to cater to various needs. It accommodates a wide range of input voltages, accepting 6-36V DC input. Additionally, it features a battery port with a built-in charging circuit, enabling seamless connection to external Lithium batteries. This adaptability allows users to power M5Dial via USB-C, the DC interface, or an external battery for on-the-go convenience. M5Dial also reserves two PORTA and PORTB interfaces, supporting the expansion of I2C and GPIO devices. Users can connect various sensors, actuators, displays, and other peripherals through these interfaces, adding more functionality and possibilities.

1.1. M5STACK Dial

1. Communication Capabilities:
   - Main Controller: ESP32-S3FN8
   - Wireless Communication: WiFi (WIFI), OTG\CDC functionality
   - Expansion Interface: HY2.0-4P interface, can connect and expand I2C sensors
2. Processor and Performance:
   - Processor Model: Xtensa LX7 (ESP32-S3FN8)
   - Processor Clock Speed: Xtensa® dual-core 32-bit LX7 microprocessor, up to 240 MHz
3. Memory:
   - 8M-FLASH
4. GPIO Pins and Programmable Interfaces:
   - Grove Port: Can connect and expand I2C sensors

2. SPECIFICATIONS

Parameters & Specifications	Values
MCU	ESP32-S3FN8@Xtensa® dual-core 32-bit LX7, 240MHz
Communication Abilities	WiFi, OTG\CDC, I2C sensor expansion
Flash Storage Capacity	8MB-FLASH
Power Supply	USB/DC power/Lithium battery
Sensors	rotary encoder
Screen	1.28 Inch TFT Screen (with touch), 240×240px
Audio	Passive onboard speaker
Expansion Ports	Grove port for I2C sensor expansion
Dimensions	45 * 45 * 32.3mm
Operating Temperature	0℃ to 40℃

3. QUICK START

3.1. Print WiFi information

1. Open the Arduino IDE
(refer to https://docs.m5stack.com/en/arduino/arduino_ide View the installation development board and software tutorial)
2. Select the **M5Dial** board and upload the code
3. The screen displays the scanned WiFi and the intensity information

dial_wifi | Arduino 1.8.19

File Edit Sketch Tools Help

dial_wifi

```ino
#include "M5Dial.h"
#include <WiFi.h>

void setup() {
    auto cfg = M5.config();
    M5Dial.begin(cfg, false, true);
    M5Dial.Display.setTextSize(1);
    int startX = 10;
    int startY = 10;
    scanAndDisplayWiFiNetworks();
}

void loop() {

}

void scanAndDisplayWiFiNetworks() {
    int networksFound = WiFi.scanNetworks();

        for (int i = 1; i < 12; ++i) {
            M5Dial.Display.setCursor((-110 * sin(i*10 / 80.0) + 120), i*10);
            M5Dial.Display.print("SSID: ");
            M5Dial.Display.print(WiFi.SSID(i));
            M5Dial.Display.print("(");
            M5Dial.Display.print(WiFi.RSSI(i));
            M5Dial.Display.println(")");

    }
}
```

3. QUICK START

3.1. Print BLE information

1. Open the Arduino IDE
(refer to https://docs.m5stack.com/en/arduino/arduino_ide View the installation development board and software tutorial)
2. Select the **M5Dial** board and upload the code
3. The screen displays the scanned BLE device

dial_ble | Arduino 1.8.19

File Edit Sketch Tools Help

dial_ble §

```ino
#include "M5Dial.h"
#include <BLEDevice.h>
#include <BLEUtils.h>
#include <BLEScan.h>

void setup() {
    auto cfg = M5.config();
    M5Dial.begin(cfg, false, true);
    M5Dial.Display.setTextSize(1);
    BLEDevice::init("");
    scanAndDisplayBluetoothDevices();
}

void loop() {

}

void scanAndDisplayBluetoothDevices() {
    BLEScan* pBLEScan = BLEDevice::getScan();
    BLEScanResults foundDevices = pBLEScan->start(5);

    for (int i = 1; i <= foundDevices.getCount() && i < 12; ++i) {
        BLEAdvertisedDevice device = foundDevices.getDevice(i - 1);
        M5Dial.Display.setCursor((-120 * sin(i * 10 / 80.0) + 120), i * 10);
        M5Dial.Display.print("Name: ");
        String deviceName = device.getName().length() > 0 ? device.getName().c_str() : "Unknown";
        M5Dial.Display.print(deviceName);
        M5Dial.Display.print("(");
        M5Dial.Display.print(device.getAddress().toString().c_str());
        M5Dial.Display.println(")");
    }

    pBLEScan->clearResults();
}
```

FCC Warning

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.

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

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.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.