# Welcome to the JCZN Workshop!

## ················Table of contents·················

# Getting Started

## Introduction

The objective of this post is to explain how to upload an Arduino program to the ESP32-2432S032 module, from JCZN .

http://www.jczn1688.com/zlxz

The ESP32 WiFi and Bluetooth chip is the latest generation of Espressif products. It has a dual-core 32-bit MCU, which integrates WiFi HT40 and Bluetooth/BLE 4.2 technology inside.
ESP wroom 32 has a significant performance improvement. It is equipped with a high-performance dual-core Tensilica LX6 MCU. One core handles high speed connection and the other for standalone application development. The dual-core MCU has a 240 MHz frequency and a computing power of 600 DMIPS.
In addition, it supports Wi-Fi HT40, Classic Bluetooth/BLE 4.2, and more GPIO resources.

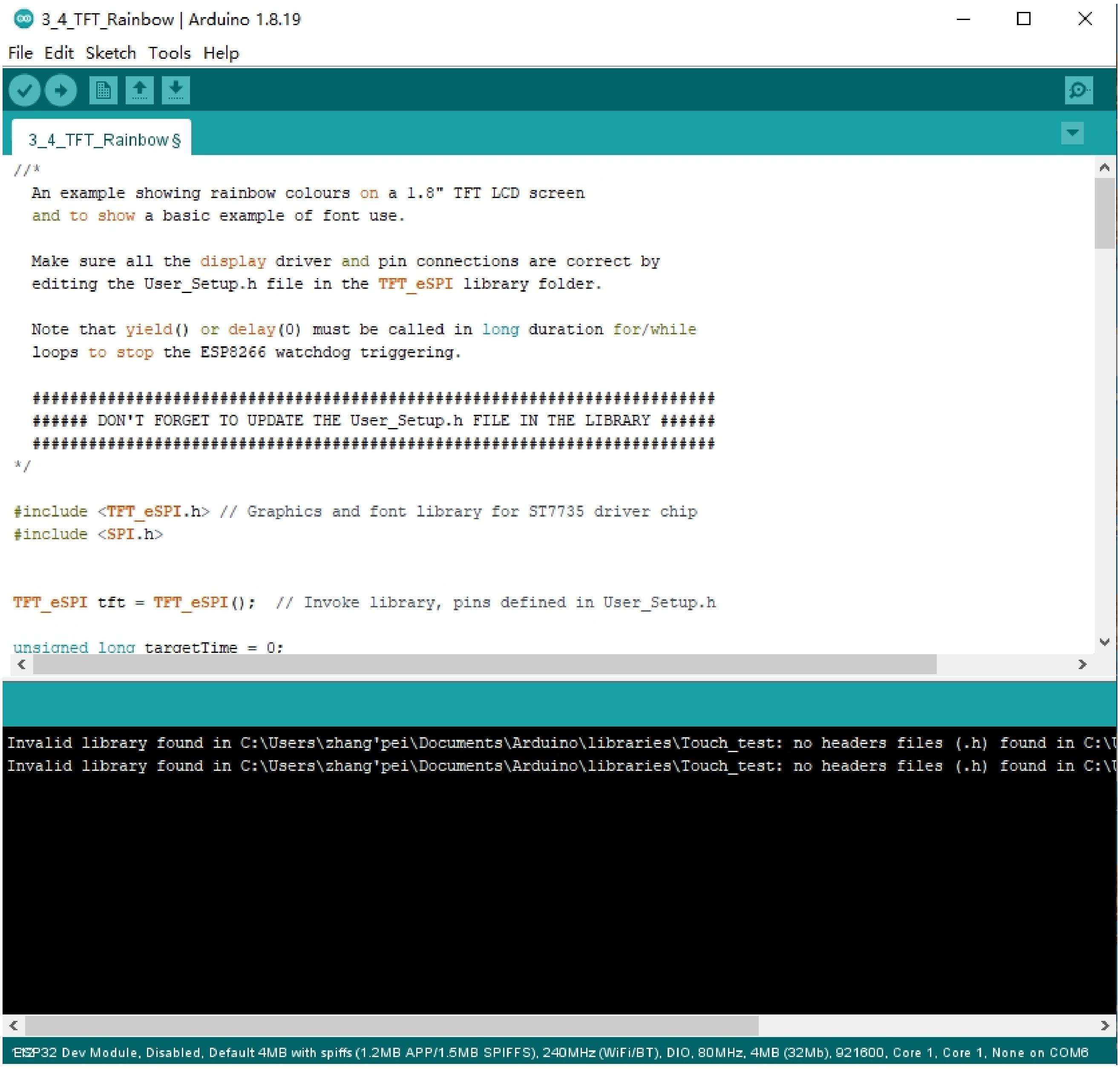
## Installing using Arduino IDE

Programming the ESP32
An easy way to get started is by using the familiar Arduino IDE. While this is not necessarily the best environment for working with the ESP32, it has the advantage of being a familiar application, so the learning curve is flattened.
We will be using the Arduino IDE for our experiments.

1，Installing using Arduino IDE
we first need to install version 1.8.19 of the Arduino IDE (or greater),for example, the Arduino installation was in “C/Programs(x86)/Arduino”.
download release link:
https://downloads.arduino.cc/arduino-1.8.19-windows.exe

2，This is the way to install Arduino-ESP32 directly from the Arduino IDE.

Add Boards Manager Entry
Here is what you need to do to install the ESP32 boards into the Arduino IDE:
（1） Open the Arduino IDE.



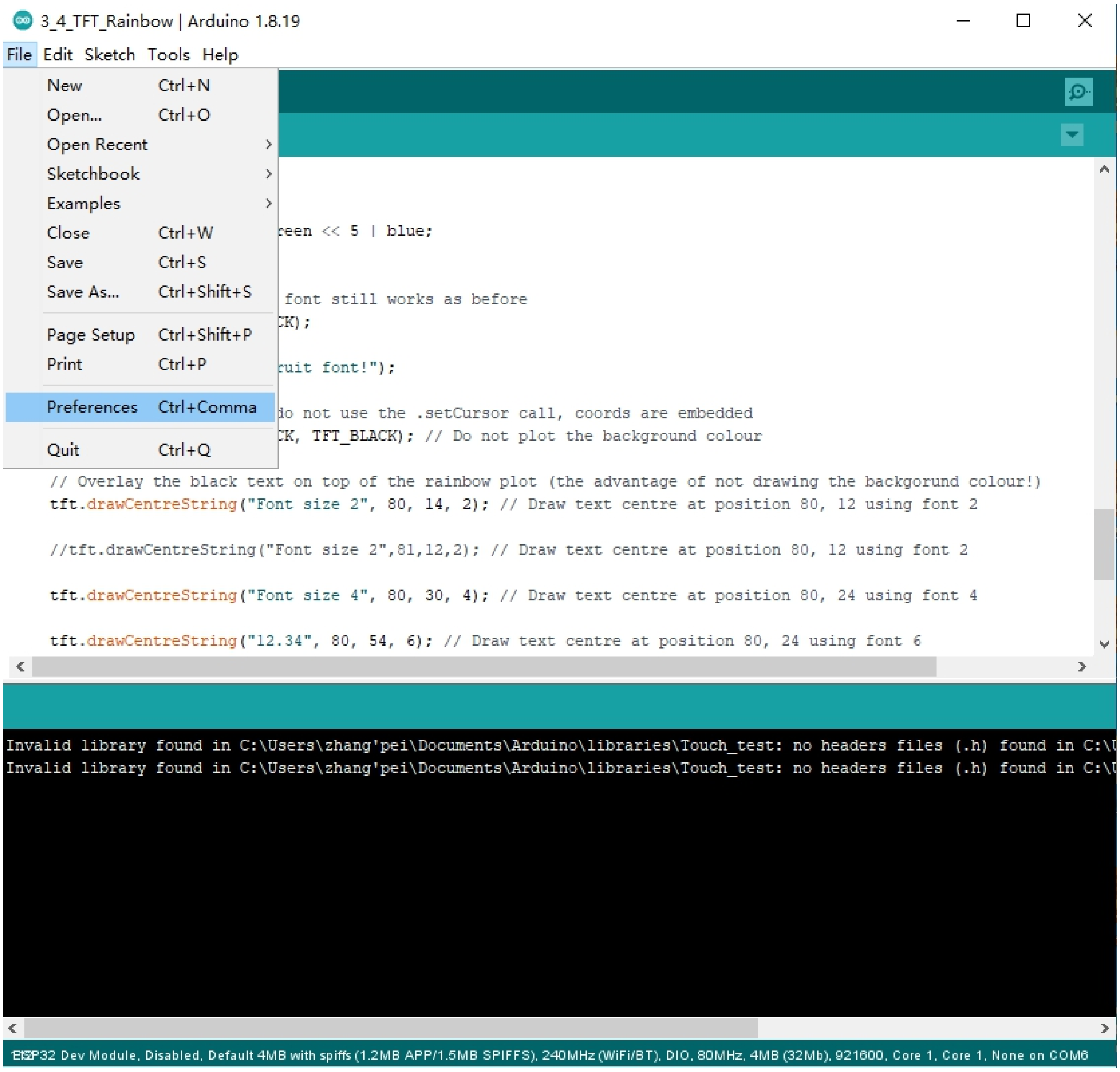
```
//*
  An example showing rainbow colours on a 1.8" TFT LCD screen
  and to show a basic example of font use.

  Make sure all the display driver and pin connections are correct by
  editing the User_Setup.h file in the TFT_eSPI library folder.

  Note that yield() or delay(0) must be called in long duration for/while
  loops to stop the ESP8266 watchdog triggering.

  #########################################################################
  ###### DON'T FORGET TO UPDATE THE User_Setup.h FILE IN THE LIBRARY ######
  #########################################################################
*/

#include <TFT_eSPI.h> // Graphics and font library for ST7735 driver chip
#include <SPI.h>


TFT_eSPI tft = TFT_eSPI();  // Invoke library, pins defined in User_Setup.h

unsigned long targetTime = 0;
```

```
Invalid library found in C:\Users\zhang'pei\Documents\Arduino\libraries\Touch_test: no headers files (.h) found in C:\U
Invalid library found in C:\Users\zhang'pei\Documents\Arduino\libraries\Touch_test: no headers files (.h) found in C:\U
```

ESP32 Dev Module, Disabled, Default 4MB with spiffs (1.2MB APP/1.5MB SPIFFS), 240MHz (WiFi/BT), DIO, 80MHz, 4MB (32Mb), 921600, Core 1, Core 1, None on COM6

(2) Click on the File menu on the top menu bar.

(3) Click on the Preferences menu item. This will open a Preferences dialog box.



```
reen << 5 | blue;


 font still works as before
CK);

ruit font!");

do not use the .setCursor call, coords are embedded
CK, TFT_BLACK); // Do not plot the background colour

  // Overlay the black text on top of the rainbow plot (the advantage of not drawing the backgorund colour!)
  tft.drawCentreString("Font size 2", 80, 14, 2); // Draw text centre at position 80, 12 using font 2

  //tft.drawCentreString("Font size 2",81,12,2); // Draw text centre at position 80, 12 using font 2

  tft.drawCentreString("Font size 4", 80, 30, 4); // Draw text centre at position 80, 24 using font 4

  tft.drawCentreString("12.34", 80, 54, 6); // Draw text centre at position 80, 24 using font 6
```

```
Invalid library found in C:\Users\zhang'pei\Documents\Arduino\libraries\Touch_test: no headers files (.h) found in C:\U
Invalid library found in C:\Users\zhang'pei\Documents\Arduino\libraries\Touch_test: no headers files (.h) found in C:\U
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ESP32 Dev Module, Disabled, Default 4MB with spiffs (1.2MB APP/1.5MB SPIFFS), 240MHz (WiFi/BT), DIO, 80MHz, 4MB (32Mb), 921600, Core 1, Core 1, None on COM6

(4) You should be on the Settings tab in the Preferences dialog box by default.

(5) Look for the textbox labeled “Additional Boards Manager URLs”.

(6) If there is already text in this box add a coma at the end of it, then follow the next step.

(7) Paste the following link into the text box ：

Stable release link:

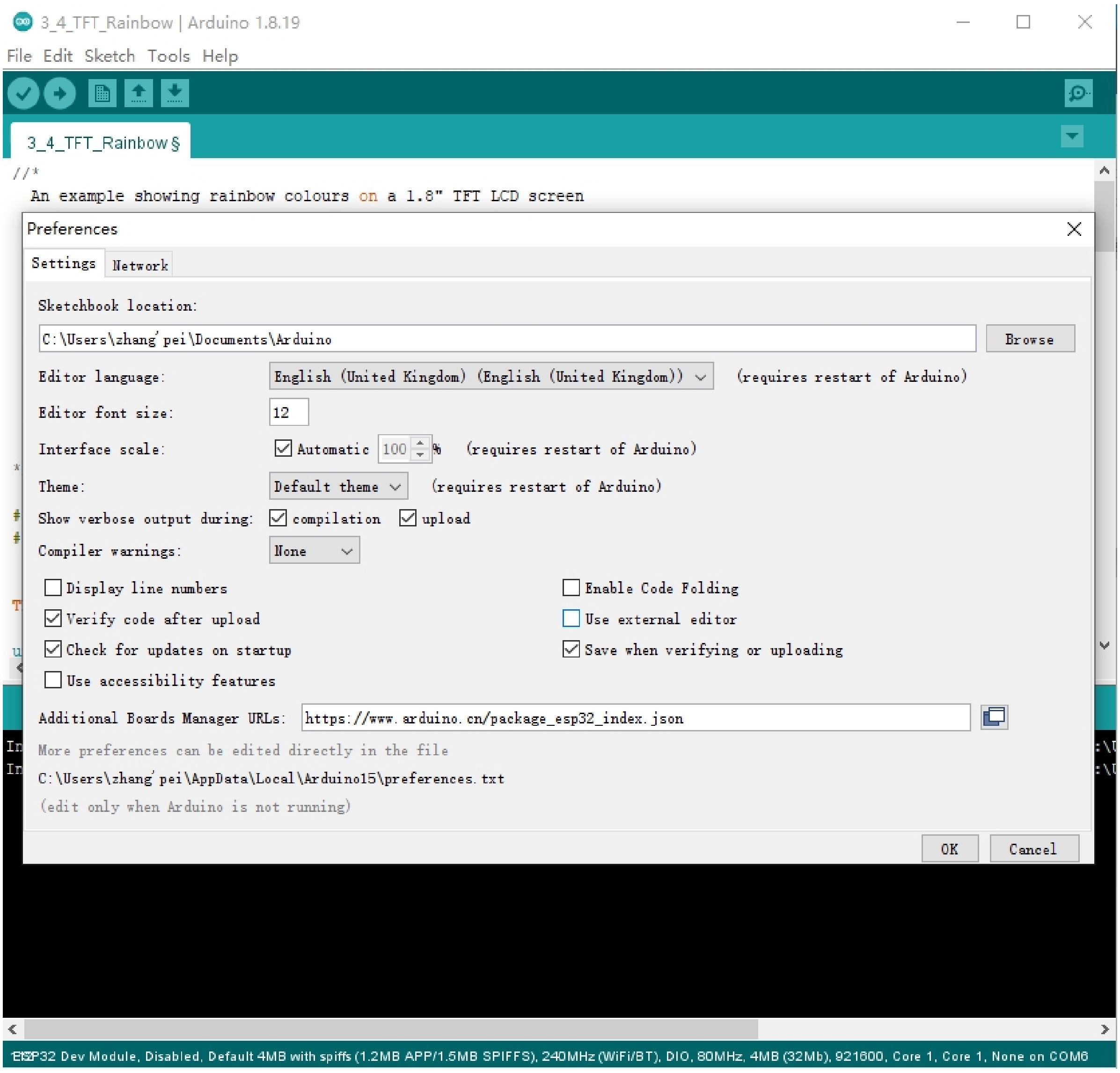
https://raw.githubusercontent.com/espressif/arduino-esp32/gh-pages/package_esp32_index.json

Development release link:

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

(8) Click the OK button to save the setting.

The textbox with the JSON link in it is illustrated here:



```
//*
  An example showing rainbow colours on a 1.8" TFT LCD screen
```

Preferences

Settings | Network

Sketchbook location:
C:\Users\zhang'pei\Documents\Arduino [Browse]

Editor language: English (United Kingdom) (English (United Kingdom)) (requires restart of Arduino)

Editor font size: 12

Interface scale: ☑ Automatic 100 % (requires restart of Arduino)

Theme: Default theme (requires restart of Arduino)

Show verbose output during: ☑ compilation ☑ upload

Compiler warnings: None

□ Display line numbers | □ Enable Code Folding
☑ Verify code after upload | □ Use external editor
☑ Check for updates on startup | ☑ Save when verifying or uploading
□ Use accessibility features

Additional Boards Manager URLs: https://www.arduino.cn/package_esp32_index.json

More preferences can be edited directly in the file
C:\Users\zhang'pei\AppData\Local\Arduino15\preferences.txt
(edit only when Arduino is not running)

[OK] [Cancel]

ESP32 Dev Module, Disabled, Default 4MB with spiffs (1.2MB APP/1.5MB SPIFFS), 240MHz (WiFi/BT), DIO, 80MHz, 4MB (32Mb), 921600, Core 1, Core 1, None on COM6

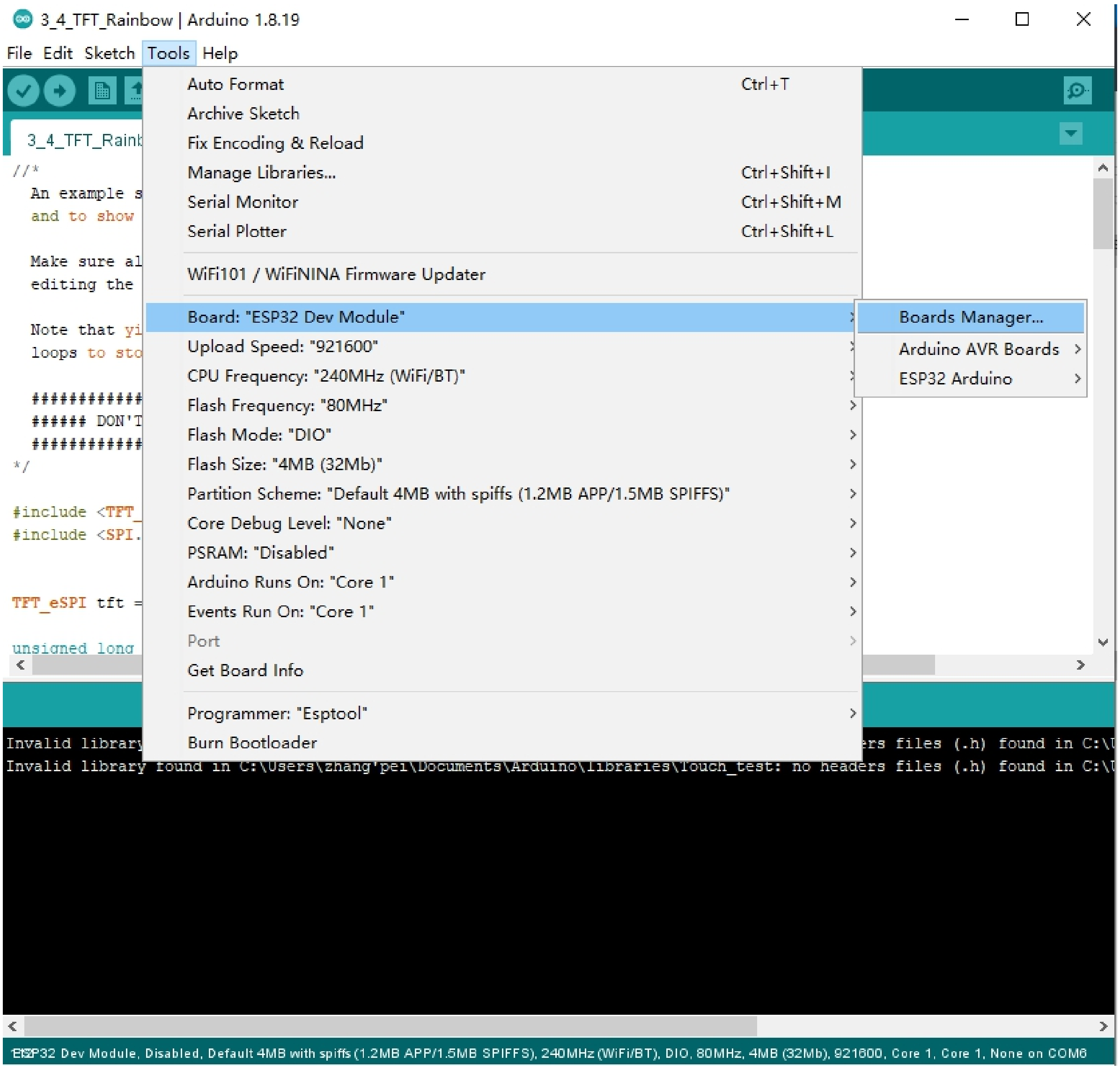
(9) In the Arduino IDE click on the Tools menu on the top menu bar.

(10) Scroll down to the Board: entry

(11) A submenu will open when you highlight the Board: entry.

(12) At the top of the submenu is Boards Manager. Click on it to open the Boards Manager dialog box.

(13)I n the search box in the Boards Manager enter “esp32”.


3_4_TFT_Rainbow | Arduino 1.8.19
File Edit Sketch Tools Help
Auto Format Ctrl+T
Archive Sketch
Fix Encoding & Reload
Manage Libraries... Ctrl+Shift+I
Serial Monitor Ctrl+Shift+M
Serial Plotter Ctrl+Shift+L
WiFi101 / WiFiNINA Firmware Updater
Board: "ESP32 Dev Module"
Upload Speed: "921600"
CPU Frequency: "240MHz (WiFi/BT)"
Flash Frequency: "80MHz"
Flash Mode: "DIO"
Flash Size: "4MB (32Mb)"
Partition Scheme: "Default 4MB with spiffs (1.2MB APP/1.5MB SPIFFS)"
Core Debug Level: "None"
PSRAM: "Disabled"
Arduino Runs On: "Core 1"
Events Run On: "Core 1"
Port
Get Board Info
Programmer: "Esptool"
Burn Bootloader
Boards Manager...
Arduino AVR Boards
ESP32 Arduino
3_4_TFT_Rainb

```
//*
  An example s
  and to show

  Make sure al
  editing the

  Note that yi
  loops to sto

  ############
  ###### DON'T
  ############
*/

#include <TFT_
#include <SPI.

TFT_eSPI tft =

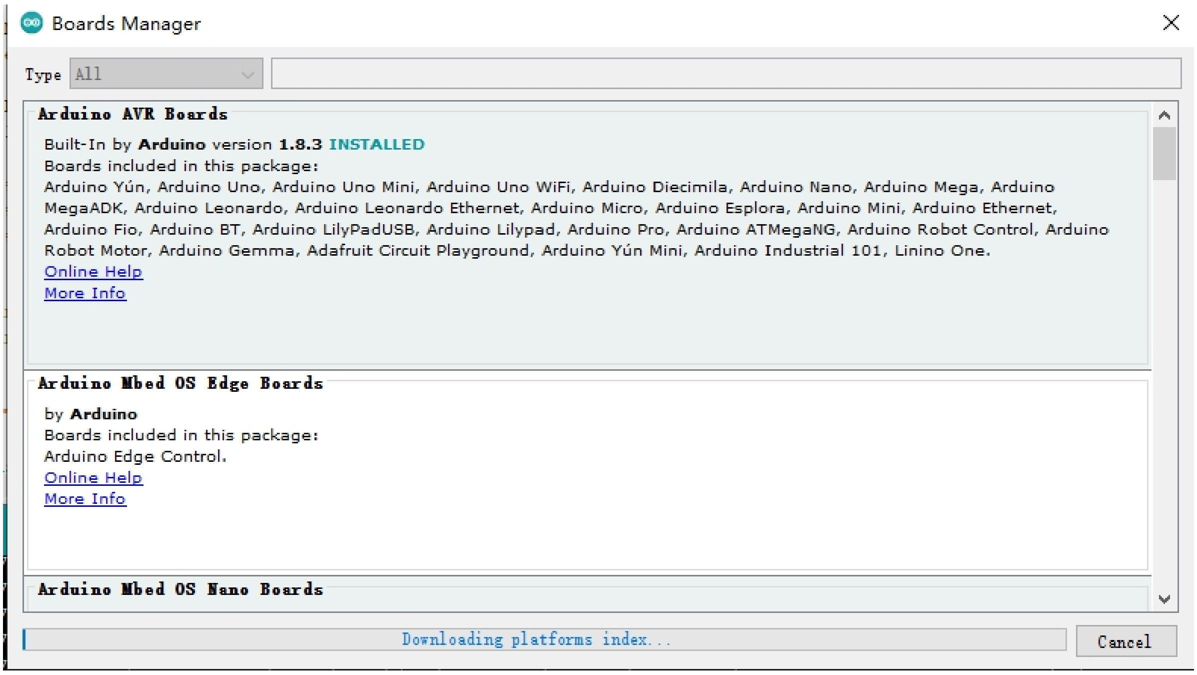
unsigned long
```

```
Invalid library                                                             ers files (.h) found in C:\U
Invalid library found in C:\Users\zhang'pei\Documents\Arduino\libraries\Touch_test: no headers files (.h) found in C:\U
```

ESP32 Dev Module, Disabled, Default 4MB with spiffs (1.2MB APP/1.5MB SPIFFS), 240MHz (WiFi/BT), DIO, 80MHz, 4MB (32Mb), 921600, Core 1, Core 1, None on COM6

(14) You should see an entry for “esp32 by Espressif Systems”. Highlight this entry and click on the Install button.

This will install the ESP32 boards into your Arduino IDE



**Arduino AVR Boards**

Built-In by **Arduino** version **1.8.3** INSTALLED
Boards included in this package:
Arduino Yún, Arduino Uno, Arduino Uno Mini, Arduino Uno WiFi, Arduino Diecimila, Arduino Nano, Arduino Mega, Arduino MegaADK, Arduino Leonardo, Arduino Leonardo Ethernet, Arduino Micro, Arduino Esplora, Arduino Mini, Arduino Ethernet, Arduino Fio, Arduino BT, Arduino LilyPadUSB, Arduino Lilypad, Arduino Pro, Arduino ATMegaNG, Arduino Robot Control, Arduino Robot Motor, Arduino Gemma, Adafruit Circuit Playground, Arduino Yún Mini, Arduino Industrial 101, Linino One.
Online Help
More Info

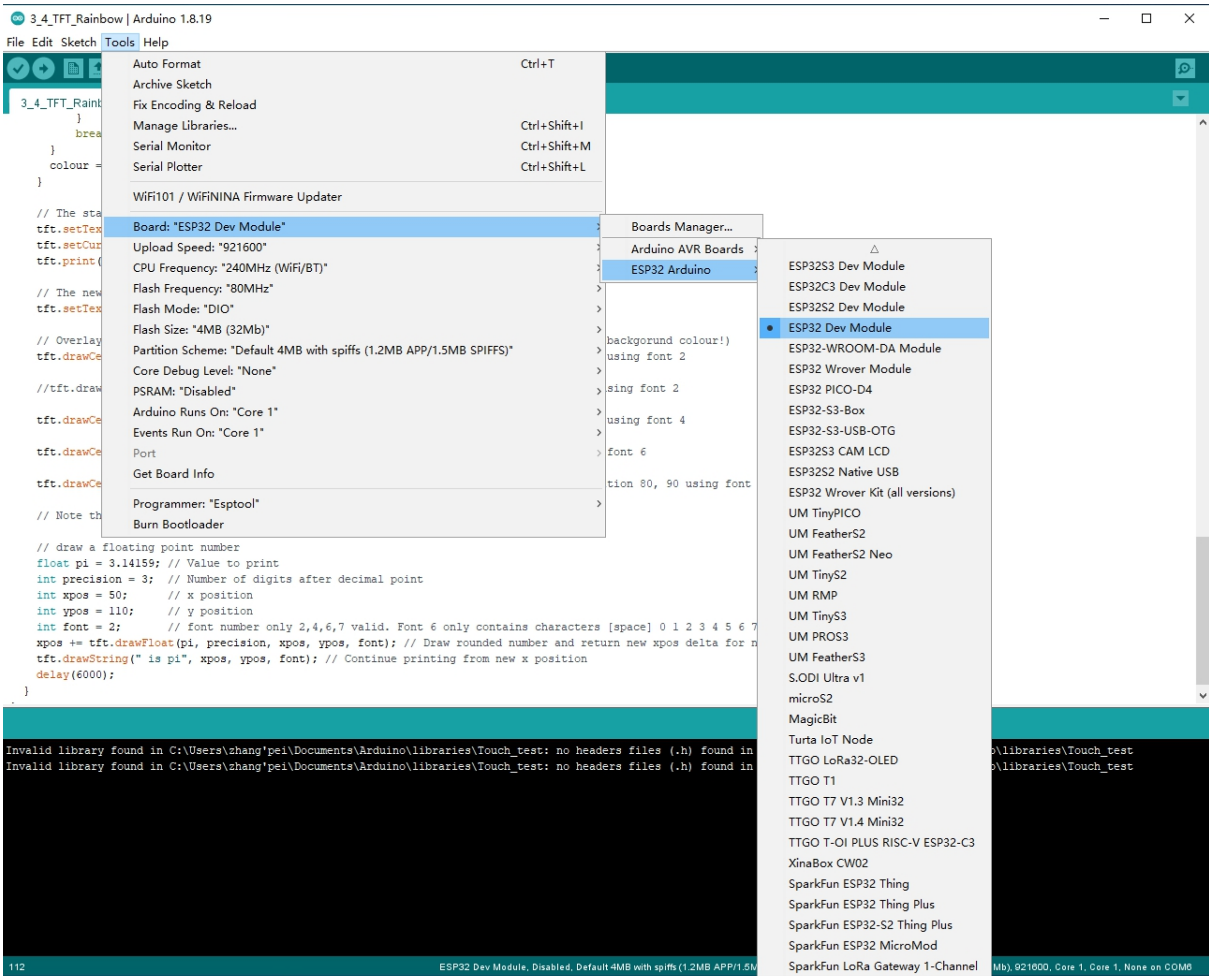
**Arduino Mbed OS Edge Boards**

by **Arduino**
Boards included in this package:
Arduino Edge Control.
Online Help
More Info

**Arduino Mbed OS Nano Boards**

Downloading platforms index...

Once the installation completes, we need to select the correct board options for the "ESP32 Arduino" board. In the board type, in the tools tab, we choose “ESP32 Dev Module”.



Board: "ESP32 Dev Module"
Upload Speed: "921600"
CPU Frequency: "240MHz (WiFi/BT)"
Flash Frequency: "80MHz"
Flash Mode: "DIO"
Flash Size: "4MB (32Mb)"
Partition Scheme: "Default 4MB with spiffs (1.2MB APP/1.5MB SPIFFS)"
Core Debug Level: "None"
PSRAM: "Disabled"
Arduino Runs On: "Core 1"
Events Run On: "Core 1"
Programmer: "Esptool"

```
        }
        brea
    }
    colour =
  }

  // The sta
  tft.setTex
  tft.setCur
  tft.print(

  // The new
  tft.setTex

  // Overlay                                            backgorund colour!)
  tft.drawCe                                            using font 2

  //tft.draw                                            sing font 2

  tft.drawCe                                            using font 4

  tft.drawCe                                            font 6

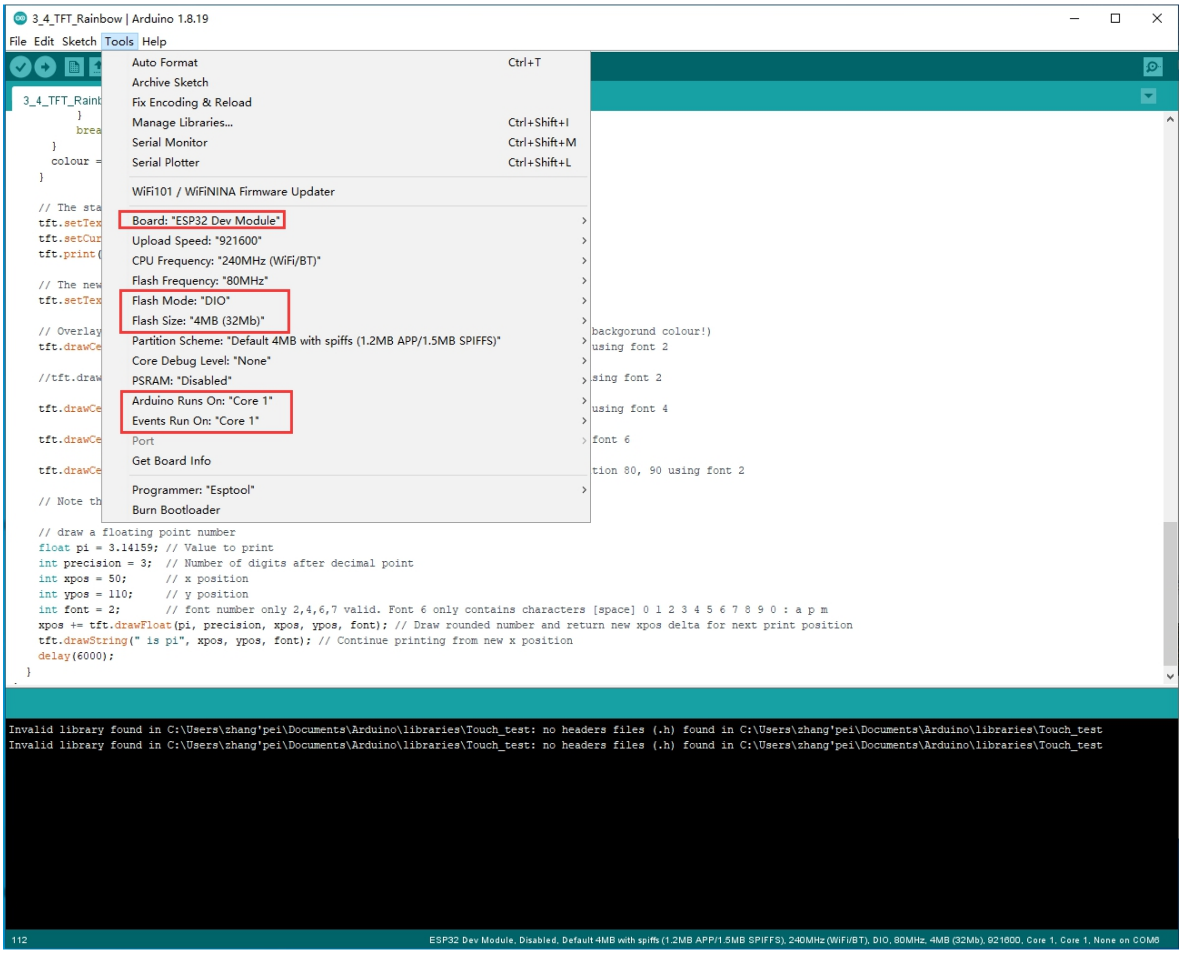
  tft.drawCe                                            tion 80, 90 using font

  // Note th

  // draw a floating point number
  float pi = 3.14159; // Value to print
  int precision = 3;  // Number of digits after decimal point
  int xpos = 50;      // x position
  int ypos = 110;     // y position
  int font = 2;       // font number only 2,4,6,7 valid. Font 6 only contains characters [space] 0 1 2 3 4 5 6 7
  xpos += tft.drawFloat(pi, precision, xpos, ypos, font); // Draw rounded number and return new xpos delta for n
  tft.drawString(" is pi", xpos, ypos, font); // Continue printing from new x position
  delay(6000);
}
```

```
Invalid library found in C:\Users\zhang'pei\Documents\Arduino\libraries\Touch_test: no headers files (.h) found in                          o\libraries\Touch_test
Invalid library found in C:\Users\zhang'pei\Documents\Arduino\libraries\Touch_test: no headers files (.h) found in                          o\libraries\Touch_test
```

```
112                         ESP32 Dev Module, Disabled, Default 4MB with spiffs (1.2MB APP/1.5M                    Mb), 921600, Core 1, Core 1, None on COM6
```


3_4_TFT_Rainbow | Arduino 1.8.19
File Edit Sketch Tools Help
3_4_TFT_Rainb
Auto Format Ctrl+T
Archive Sketch
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    xpos += tft.drawFloat(pi, precision, xpos, ypos, font); // Draw rounded number and return new xpos delta for next print position
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    delay(6000);
  }
```

```
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Invalid library found in C:\Users\zhang'pei\Documents\Arduino\libraries\Touch_test: no headers files (.h) found in C:\Users\zhang'pei\Documents\Arduino\libraries\Touch_test
```
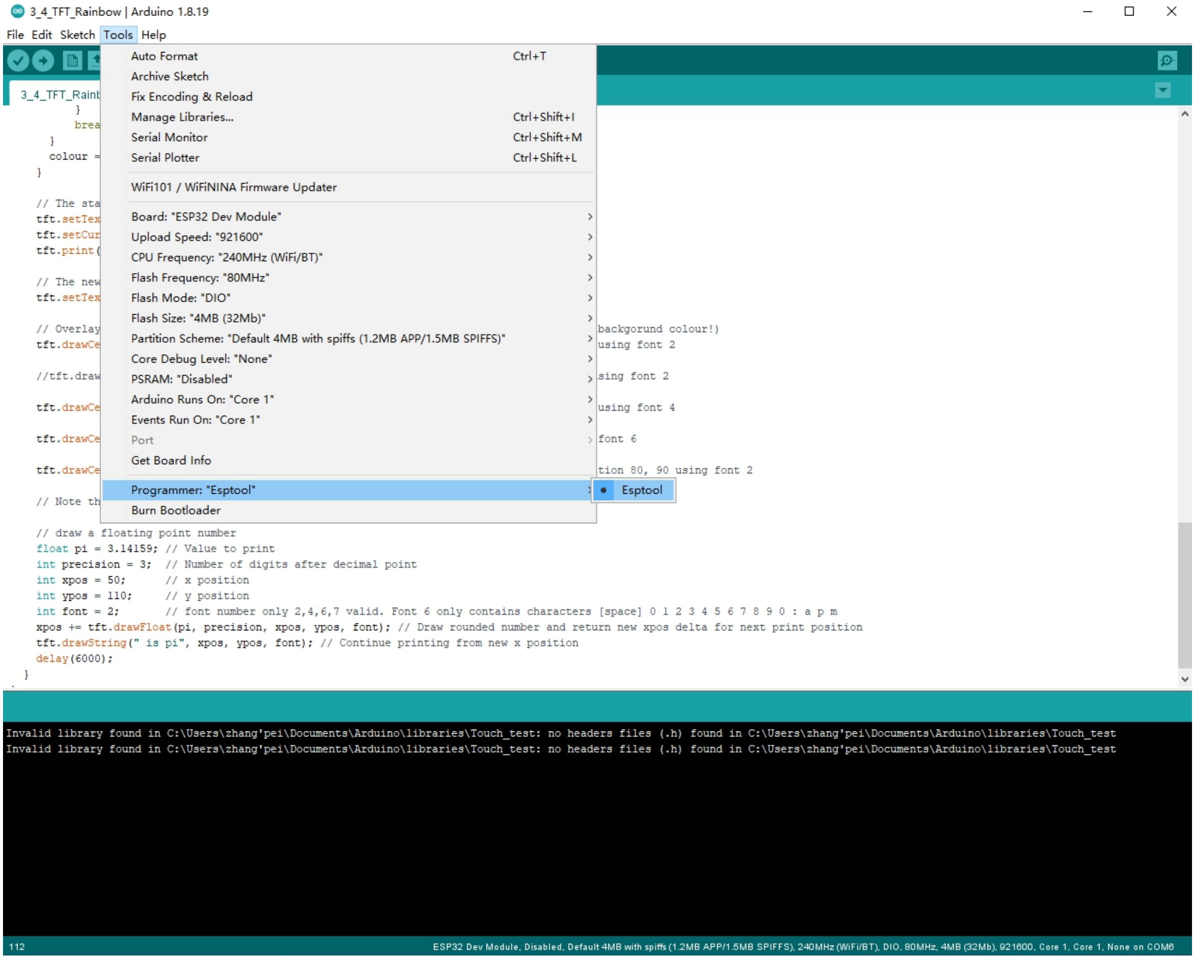

112    ESP32 Dev Module, Disabled, Default 4MB with spiffs (1.2MB APP/1.5MB SPIFFS), 240MHz (WiFi/BT), DIO, 80MHz, 4MB (32Mb), 921600, Core 1, Core 1, None on COM6

Set and In the programmer entry of the same tab, we choose “esptool”.


3_4_TFT_Rainbow | Arduino 1.8.19
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● Esptool

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      delay(6000);
    }
```

```
Invalid library found in C:\Users\zhang'pei\Documents\Arduino\libraries\Touch_test: no headers files (.h) found in C:\Users\zhang'pei\Documents\Arduino\libraries\Touch_test
Invalid library found in C:\Users\zhang'pei\Documents\Arduino\libraries\Touch_test: no headers files (.h) found in C:\Users\zhang'pei\Documents\Arduino\libraries\Touch_test
```

112 ESP32 Dev Module, Disabled, Default 4MB with spiffs (1.2MB APP/1.5MB SPIFFS), 240MHz (WiFi/BT), DIO, 80MHz, 4MB (32Mb), 921600, Core 1, Core 1, None on COM6

It’s important to note that after the code is uploaded, the device will start to run it. So, if we want to upload a new program, wee need to reset the power of the device, in order to guarantee that it enters flashing mode again.

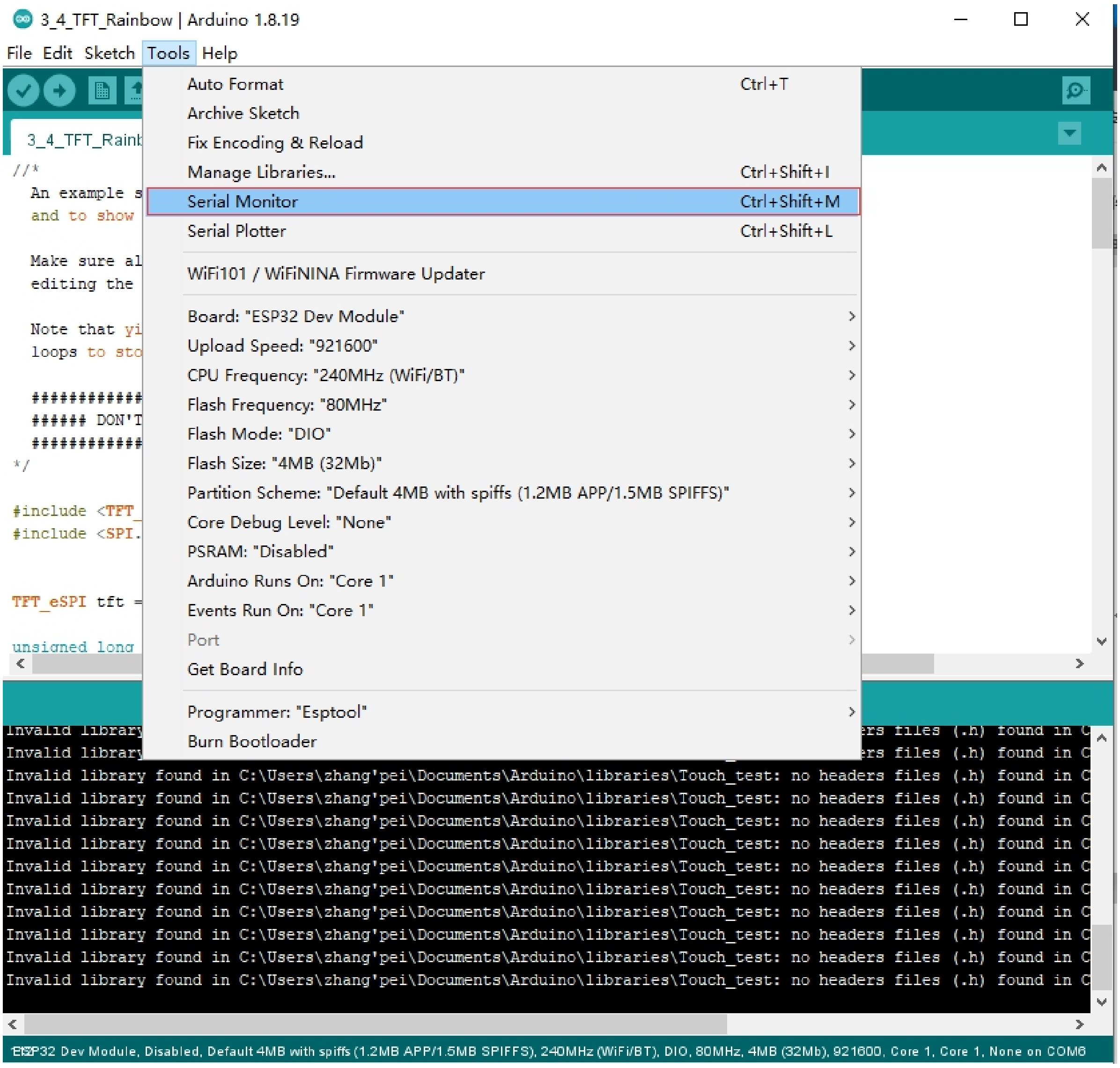
First program

Since this platform is based on Arduino, we can use many of the usual functions. As an example for the first program, the code bellow starts the Serial port and prints “hello from ESP32” every second.

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

void loop() {
  Serial.println("hello from ESP32");
  delay(1000);
}
```

If everything is working fine, we will see the output in the serial console shown.



```
Board: "ESP32 Dev Module"
Upload Speed: "921600"
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Flash Frequency: "80MHz"
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Events Run On: "Core 1"
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```
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```

```
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```
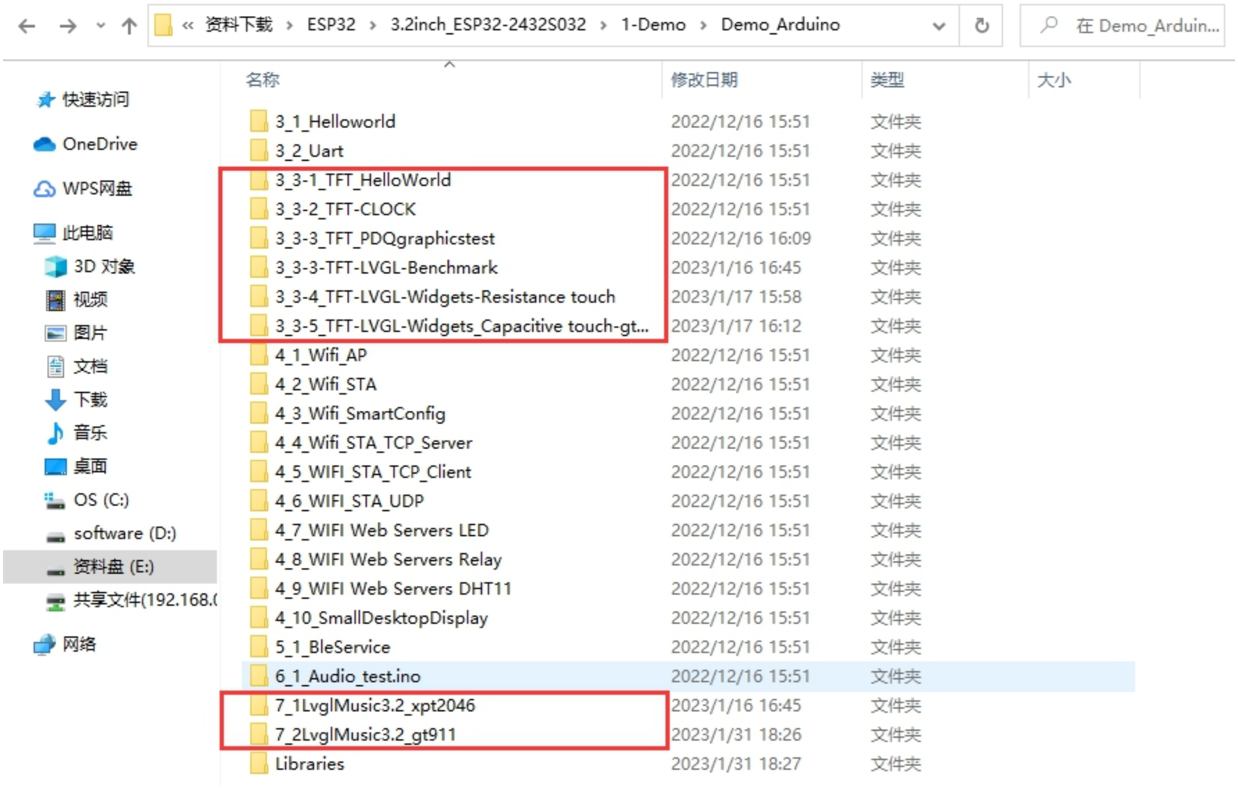

Again thank you for so much concern.. Hopefully, it's the beginning of a wonderful relationship!

## Sample program usage

At present, only a preliminary explanation and introductory use are given to the samples displayed on the screen, and the corresponding examples in the data center are found, as shown in the figure:



« 资料下载 › ESP32 › 3.2inch_ESP32-2432S032 › 1-Demo › Demo_Arduino

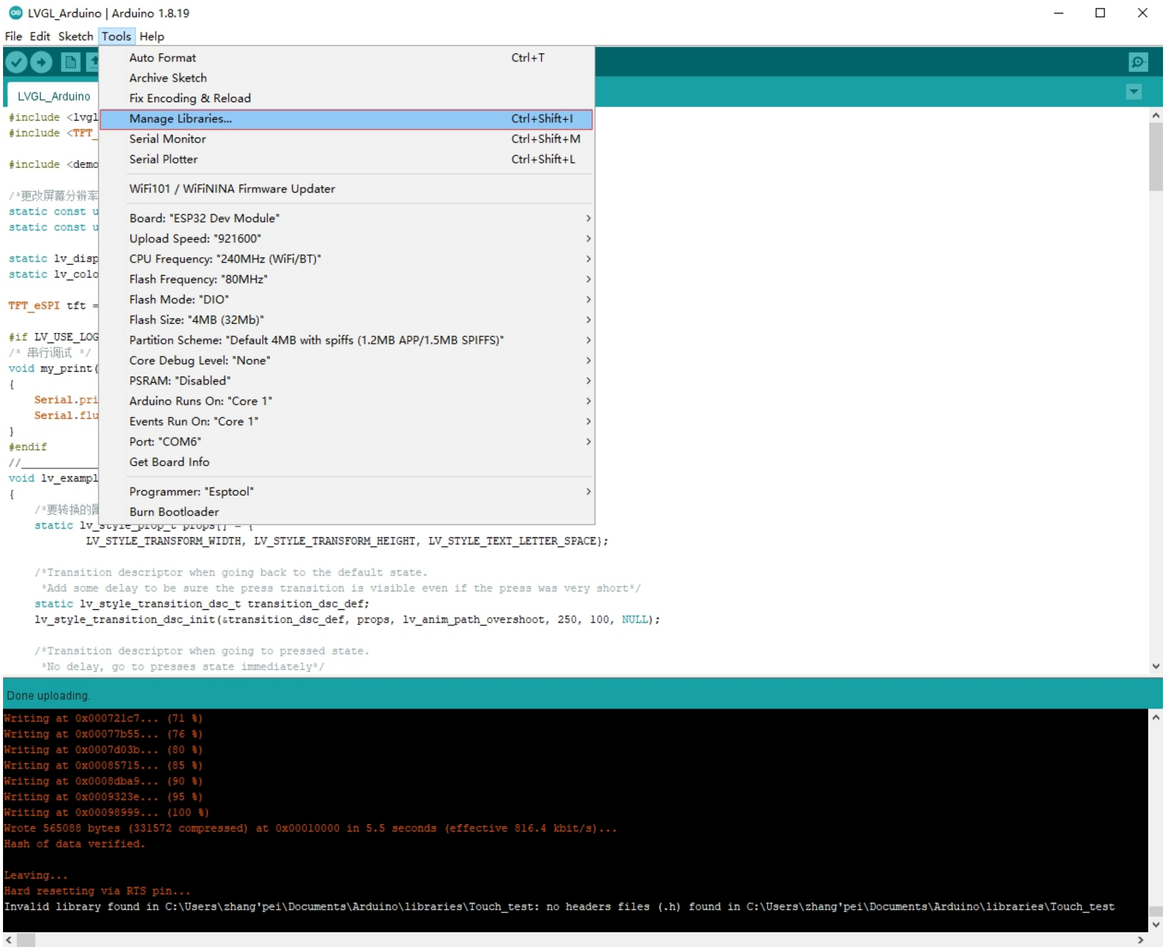
在 Demo_Arduin...

快速访问
OneDrive
WPS网盘
此电脑
3D 对象
视频
图片
文档
下载
音乐
桌面
OS (C:)
software (D:)
资料盘 (E:)
共享文件(192.168.(
网络

| 名称 | 修改日期 | 类型 | 大小 |
|---|---|---|---|
| 3_1_Helloworld | 2022/12/16 15:51 | 文件夹 | |
| 3_2_Uart | 2022/12/16 15:51 | 文件夹 | |
| 3_3-1_TFT_HelloWorld | 2022/12/16 15:51 | 文件夹 | |
| 3_3-2_TFT-CLOCK | 2022/12/16 15:51 | 文件夹 | |
| 3_3-3_TFT_PDQgraphicstest | 2022/12/16 16:09 | 文件夹 | |
| 3_3-3-TFT-LVGL-Benchmark | 2023/1/16 16:45 | 文件夹 | |
| 3_3-4_TFT-LVGL-Widgets-Resistance touch | 2023/1/17 15:58 | 文件夹 | |
| 3_3-5_TFT-LVGL-Widgets_Capacitive touch-gt... | 2023/1/17 16:12 | 文件夹 | |
| 4_1_Wifi_AP | 2022/12/16 15:51 | 文件夹 | |
| 4_2_Wifi_STA | 2022/12/16 15:51 | 文件夹 | |
| 4_3_Wifi_SmartConfig | 2022/12/16 15:51 | 文件夹 | |
| 4_4_Wifi_STA_TCP_Server | 2022/12/16 15:51 | 文件夹 | |
| 4_5_WIFI_STA_TCP_Client | 2022/12/16 15:51 | 文件夹 | |
| 4_6_WIFI_STA_UDP | 2022/12/16 15:51 | 文件夹 | |
| 4_7_WIFI Web Servers LED | 2022/12/16 15:51 | 文件夹 | |
| 4_8_WIFI Web Servers Relay | 2022/12/16 15:51 | 文件夹 | |
| 4_9_WIFI Web Servers DHT11 | 2022/12/16 15:51 | 文件夹 | |
| 4_10_SmallDesktopDisplay | 2022/12/16 15:51 | 文件夹 | |
| 5_1_BleService | 2022/12/16 15:51 | 文件夹 | |
| 6_1_Audio_test.ino | 2022/12/16 15:51 | 文件夹 | |
| 7_1LvglMusic3.2_xpt2046 | 2023/1/16 16:45 | 文件夹 | |
| 7_2LvglMusic3.2_gt911 | 2023/1/31 18:26 | 文件夹 | |
| Libraries | 2023/1/31 18:27 | 文件夹 | |

The examples in the red circle are all based on the Arduino_GFX library as the basic application. This library supports various commonly used driver chips, such as ST7735, ST7789, ILI9341, etc., and has good compatibility.

Arduino_GFX library file installation:
Open the library manager in Arduino, search for Arduino_GFX, and click instal .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LVGL_Arduino
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Serial Plotter Ctrl+Shift+L
WiFi101 / WiFiNINA Firmware Updater
Get Board Info
Burn Bootloader

Board: "ESP32 Dev Module"
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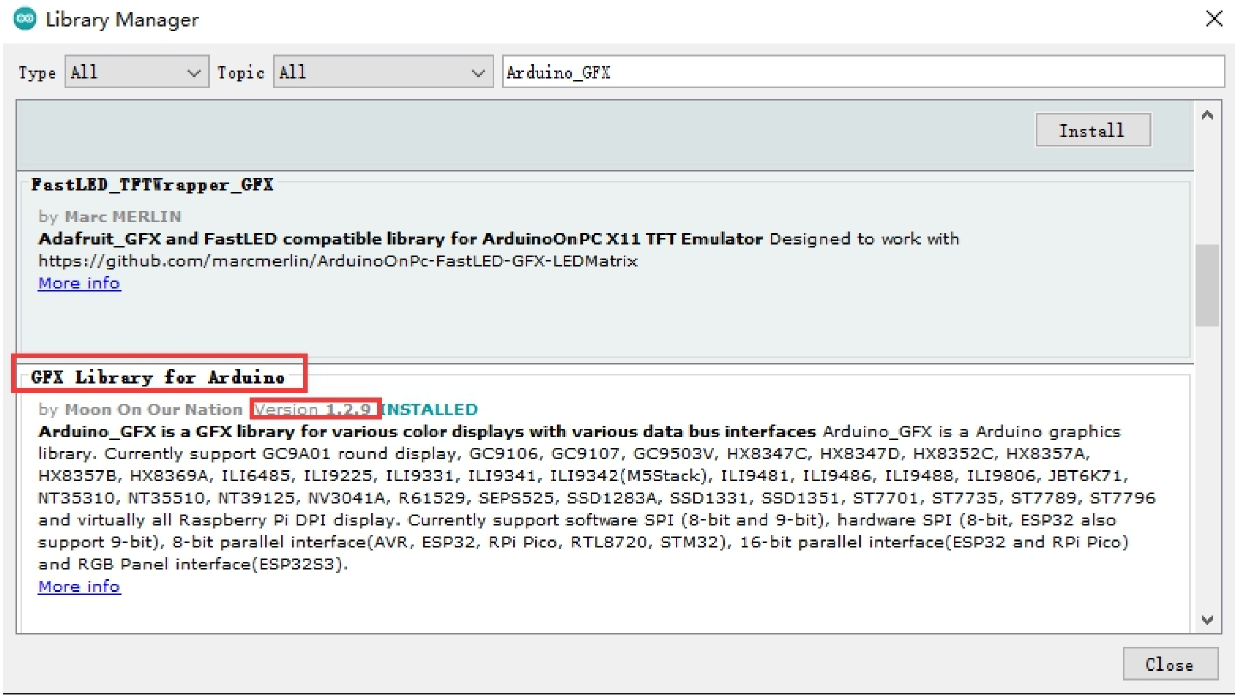
Flash Frequency: "80MHz"
Flash Mode: "DIO"
Flash Size: "4MB (32Mb)"
Partition Scheme: "Default 4MB with spiffs (1.2MB APP/1.5MB SPIFFS)"
Core Debug Level: "None"
PSRAM: "Disabled"
Arduino Runs On: "Core 1"
Events Run On: "Core 1"
Port: "COM6"
Programmer: "Esptool"

```
#include <lvgl
#include <TFT_

#include <demo

/*更改屏幕分辨率
static const u
static const u

static lv_disp
static lv_colo

TFT_eSPI tft =

#if LV_USE_LOG
/* 串行调试 */
void my_print(
{
    Serial.pri
    Serial.flu
}
#endif
//
void lv_exampl
{
    /*要转换的属
    static lv_style_prop_t props[] = {
            LV_STYLE_TRANSFORM_WIDTH, LV_STYLE_TRANSFORM_HEIGHT, LV_STYLE_TEXT_LETTER_SPACE};

    /*Transition descriptor when going back to the default state.
     *Add some delay to be sure the press transition is visible even if the press was very short*/
    static lv_style_transition_dsc_t transition_dsc_def;
    lv_style_transition_dsc_init(&transition_dsc_def, props, lv_anim_path_overshoot, 250, 100, NULL);

    /*Transition descriptor when going to pressed state.
     *No delay, go to presses state immediately*/
```

Done uploading.

```
Writing at 0x000721c7... (71 %)
Writing at 0x00077b55... (76 %)
Writing at 0x0007d03b... (80 %)
Writing at 0x00085715... (85 %)
Writing at 0x0008dba9... (90 %)
Writing at 0x0009323e... (95 %)
Writing at 0x00098999... (100 %)
Wrote 565088 bytes (331572 compressed) at 0x00010000 in 5.5 seconds (effective 816.4 kbit/s)...
Hash of data verified.

Leaving...
Hard resetting via RTS pin...
Invalid library found in C:\Users\zhang'pei\Documents\Arduino\libraries\Touch_test: no headers files (.h) found in C:\Users\zhang'pei\Documents\Arduino\libraries\Touch_test
```



Type All Topic All Arduino_GFX

**FastLED_TFTWrapper_GFX**

by Marc MERLIN
**Adafruit_GFX and FastLED compatible library for ArduinoOnPC X11 TFT Emulator** Designed to work with https://github.com/marcmerlin/ArduinoOnPc-FastLED-GFX-LEDMatrix

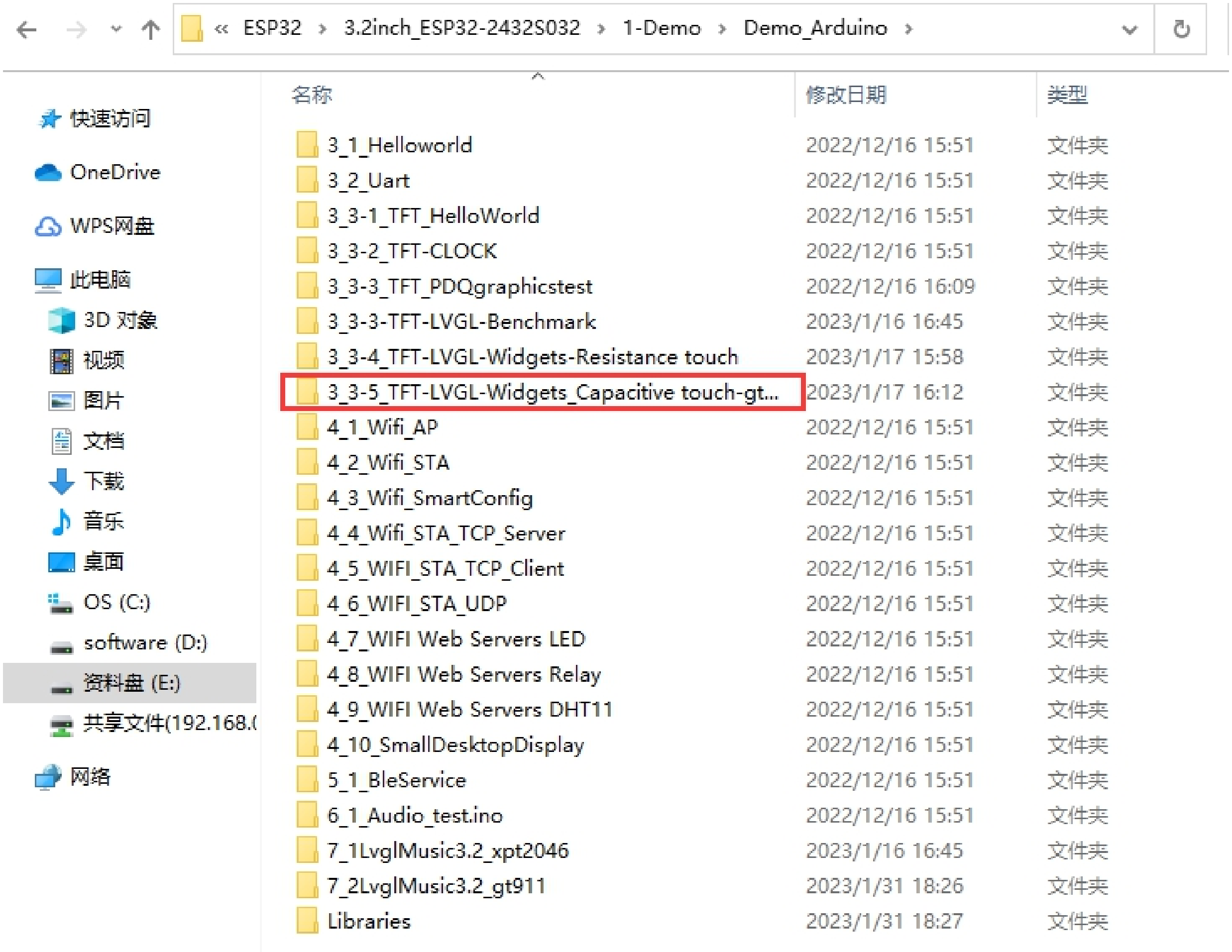
**GFX Library for Arduino**

by **Moon On Our Nation** Version **1.2.9** **INSTALLED**
**Arduino_GFX is a GFX library for various color displays with various data bus interfaces** Arduino_GFX is a Arduino graphics library. Currently support GC9A01 round display, GC9106, GC9107, GC9503V, HX8347C, HX8347D, HX8352C, HX8357A, HX8357B, HX8369A, ILI6485, ILI9225, ILI9331, ILI9341, ILI9342(M5Stack), ILI9481, ILI9486, ILI9488, ILI9806, JBT6K71, NT35310, NT35510, NT39125, NV3041A, R61529, SEPS525, SSD1283A, SSD1331, SSD1351, ST7701, ST7735, ST7789, ST7796 and virtually all Raspberry Pi DPI display. Currently support software SPI (8-bit and 9-bit), hardware SPI (8-bit, ESP32 also support 9-bit), 8-bit parallel interface(AVR, ESP32, RPi Pico, RTL8720, STM32), 16-bit parallel interface(ESP32 and RPi Pico) and RGB Panel interface(ESP32S3).

Although the Arduino_GFXI library has many advantages, it may also have a troublesome place for ordinary users, that is, after the installation

**About the use of touch and LVGL:**

Find the data center 3_3-5_TFT-LVGL-Widgets_Capacitive touch-gt911As shown:

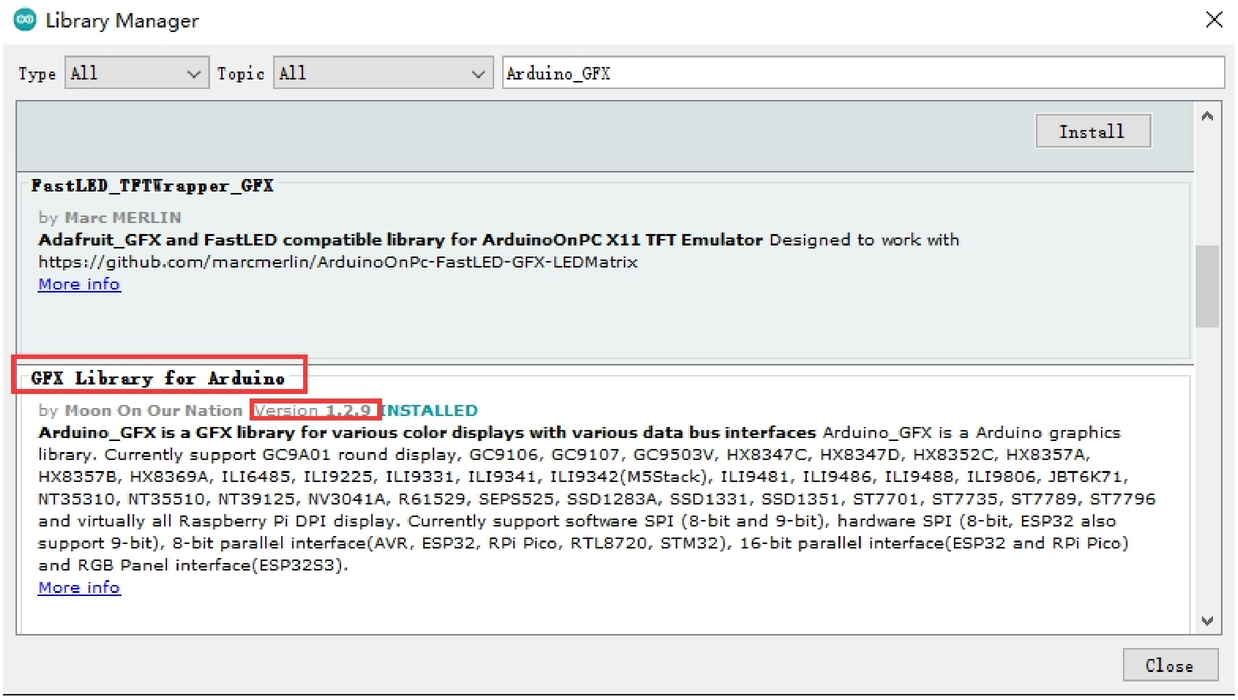


« ESP32 › 3.2inch_ESP32-2432S032 › 1-Demo › Demo_Arduino ›

| 名称 | 修改日期 | 类型 |
|---|---|---|
| 3_1_Helloworld | 2022/12/16 15:51 | 文件夹 |
| 3_2_Uart | 2022/12/16 15:51 | 文件夹 |
| 3_3-1_TFT_HelloWorld | 2022/12/16 15:51 | 文件夹 |
| 3_3-2_TFT-CLOCK | 2022/12/16 15:51 | 文件夹 |
| 3_3-3_TFT_PDQgraphicstest | 2022/12/16 16:09 | 文件夹 |
| 3_3-3-TFT-LVGL-Benchmark | 2023/1/16 16:45 | 文件夹 |
| 3_3-4_TFT-LVGL-Widgets-Resistance touch | 2023/1/17 15:58 | 文件夹 |
| 3_3-5_TFT-LVGL-Widgets_Capacitive touch-gt... | 2023/1/17 16:12 | 文件夹 |
| 4_1_Wifi_AP | 2022/12/16 15:51 | 文件夹 |
| 4_2_Wifi_STA | 2022/12/16 15:51 | 文件夹 |
| 4_3_Wifi_SmartConfig | 2022/12/16 15:51 | 文件夹 |
| 4_4_Wifi_STA_TCP_Server | 2022/12/16 15:51 | 文件夹 |
| 4_5_WIFI_STA_TCP_Client | 2022/12/16 15:51 | 文件夹 |
| 4_6_WIFI_STA_UDP | 2022/12/16 15:51 | 文件夹 |
| 4_7_WIFI Web Servers LED | 2022/12/16 15:51 | 文件夹 |
| 4_8_WIFI Web Servers Relay | 2022/12/16 15:51 | 文件夹 |
| 4_9_WIFI Web Servers DHT11 | 2022/12/16 15:51 | 文件夹 |
| 4_10_SmallDesktopDisplay | 2022/12/16 15:51 | 文件夹 |
| 5_1_BleService | 2022/12/16 15:51 | 文件夹 |
| 6_1_Audio_test.ino | 2022/12/16 15:51 | 文件夹 |
| 7_1LvglMusic3.2_xpt2046 | 2023/1/16 16:45 | 文件夹 |
| 7_2LvglMusic3.2_gt911 | 2023/1/31 18:26 | 文件夹 |
| Libraries | 2023/1/31 18:27 | 文件夹 |

Download two library files .

One -Arduino_GFX



Arduino_GFX

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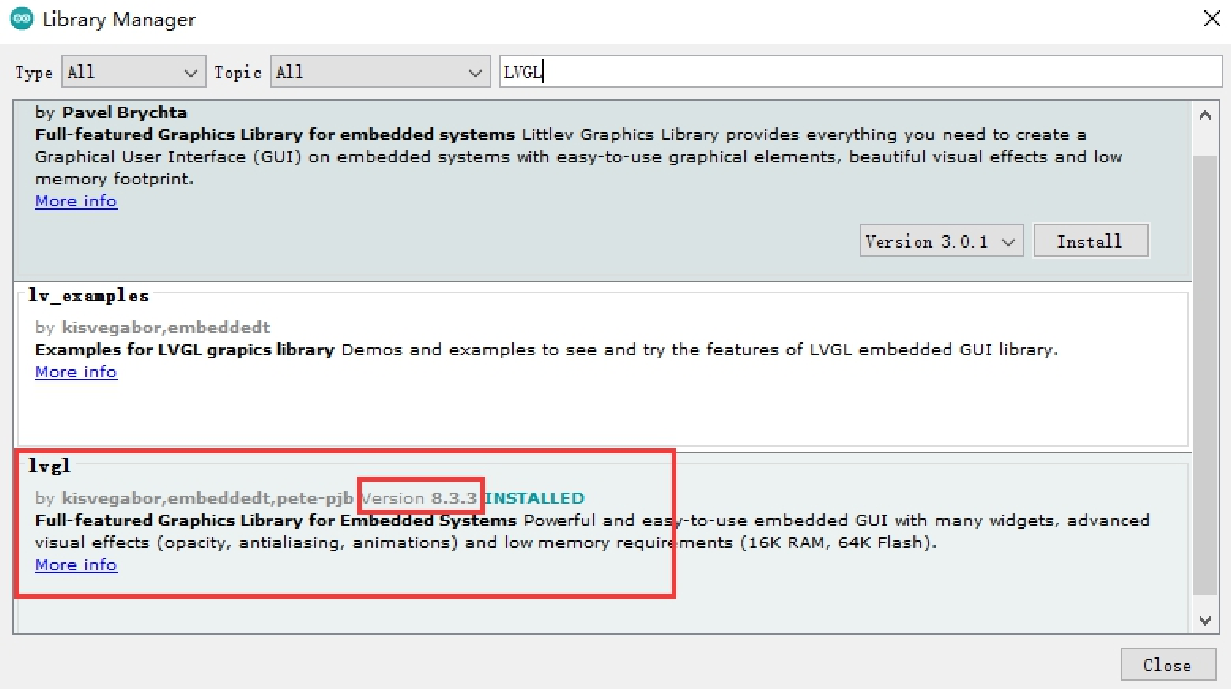
Two -Lvgl



LVGL

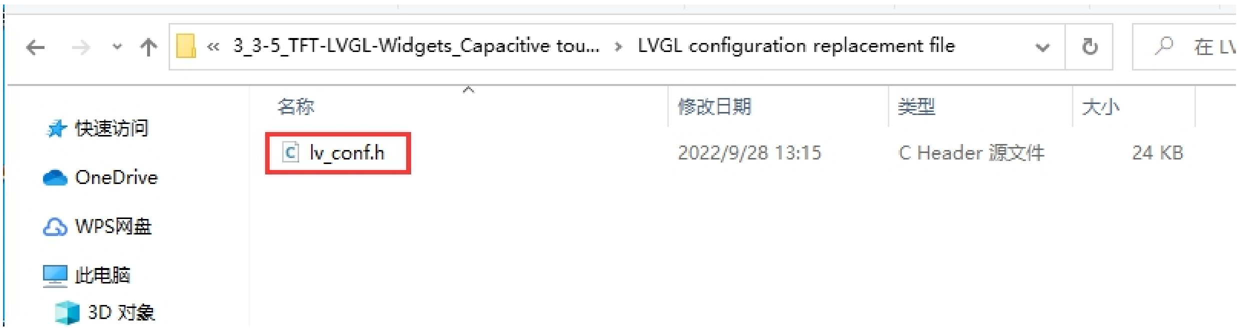
by **Pavel Brychta**
**Full-featured Graphics Library for embedded systems** Littlev Graphics Library provides everything you need to create a Graphical User Interface (GUI) on embedded systems with easy-to-use graphical elements, beautiful visual effects and low memory footprint.
Version 3.0.1

**lv_examples**
by kisvegabor,embeddedt
**Examples for LVGL grapics library** Demos and examples to see and try the features of LVGL embedded GUI library.

**lvgl**
by kisvegabor,embeddedt,pete-pjb Version 8.3.3 INSTALLED
**Full-featured Graphics Library for Embedded Systems** Powerful and easy-to-use embedded GUI with many widgets, advanced visual effects (opacity, antialiasing, animations) and low memory requirements (16K RAM, 64K Flash).

Copy the User_Setup.h of the data center .

As-shown

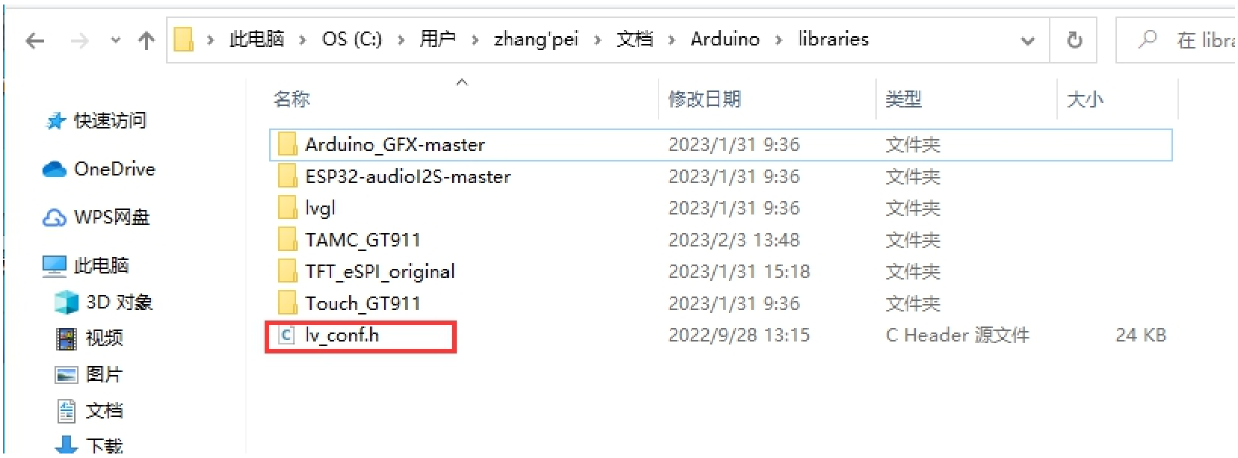


« 3_3-5_TFT-LVGL-Widgets_Capacitive tou... › LVGL configuration replacement file

| 名称 | 修改日期 | 类型 | 大小 |
|---|---|---|---|
| lv_conf.h | 2022/9/28 13:15 | C Header 源文件 | 24 KB |

Put this file under the arduino library file, it must be in the same root directory as the library TFT_eSPI .

As shown:



› 此电脑 › OS (C:) › 用户 › zhang'pei › 文档 › Arduino › libraries

| 名称 | 修改日期 | 类型 | 大小 |
|---|---|---|---|
| Arduino_GFX-master | 2023/1/31 9:36 | 文件夹 | |
| ESP32-audioI2S-master | 2023/1/31 9:36 | 文件夹 | |
| lvgl | 2023/1/31 9:36 | 文件夹 | |
| TAMC_GT911 | 2023/2/3 13:48 | 文件夹 | |
| TFT_eSPI_original | 2023/1/31 15:18 | 文件夹 | |
| Touch_GT911 | 2023/1/31 9:36 | 文件夹 | |
| lv_conf.h | 2022/9/28 13:15 | C Header 源文件 | 24 KB |

After compiling, you can run LVGL and touch normally.

## Function introduction

## Description: (The following basic functions are based on the TFT_ESPI library)

### 一、Basic settings

1. tft.init(); //Initialization

Initialize the screen, if it is ST7735, you can pass a parameter to it, and see when it is used .

2. tft.fillScreen(TFT_BLACK); //fill full screen fill full screen, followed by color values.

tft.fillScreen(uint32_t color);

3. Screen rotation

// Set the rotation angle of the screen display, the parameters are: 0, 1, 2, 3

// Represent 0°, 90°, 180°, 270°

void setRotation(uint8_t r);

4. Screen inversion

//Invert display colors i = 1 invert, i = 0 normal

tft.invertDisplay(bool i);

## 二、Text related API

1. tft.setCursor(20, 10, 4); //Set the starting coordinate position and font size of typing

// Set the text display coordinates. By default, the upper left corner of the text is used as the reference point. The reference point can be changed.

void setCursor(int16_t x, int16_t y);

// Set the text display coordinates, and the font of the text

void setCursor(int16_t x, int16_t y, uint8_t font);

2. tft.setTextColor(2); //Set font color

// Set text color

void setTextColor(uint16_t color);

// Set text color and background color

void setTextColor(uint16_t fgcolor, uint16_t bgcolor);

//Setting the background color can effectively prevent numbers from overlapping

3. tft.setTextSize(2); //Set font size

Setting the text size can enlarge the display of the font, but the "resolution" of the font will not change

// Set the text size, the text size range is an integer from 1 to 7

void setTextSize(uint8_t size);

4. tft.print("Hello World!");

// Display font

tft.print("Hello World!");

5. tft.printf, tft.println //Display font

Special Note: Font 7 is an imitation of a 7-segment digital screen

## 三、APIs related to drawing text

1. Draw the string (left)

int16_t drawString(const String &string, int32_t x, int32_t y)

int16_t drawString(const char *string, int32_t x, int32_t y)

int16_t drawString(const String &string, int32_t x, int32_t y, uint8_t font)

int16_t drawString(const char *string, int32_t x, int32_t y, uint8_t font)

2. Draw the string (centered)

int16_t drawCentreString(const char *string, int32_t x, int32_t y, uint8_t font)

int16_t drawCentreString(const String &string, int32_t x, int32_t y, uint8_t font)

3. Draw the string (right)

int16_t drawRightString(const char *string, int32_t x, int32_t y, uint8_t font)

int16_t drawRightString(const String &string, int32_t x, int32_t y, uint8_t font)

4. Drawing characters

int16_t drawChar(uint16_t uniCode, int32_t x, int32_t y)

int16_t drawChar(uint16_t uniCode, int32_t x, int32_t y, uint8_t font)

void drawChar(int32_t x, int32_t y, uint16_t c, uint32_t color, uint32_t bg, uint8_t size)

5. Plot floating point numbers

int16_t TFT_eSPI::drawFloat(float floatNumber, uint8_t decimal, int32_t x, int32_t y)

int16_t TFT_eSPI::drawFloat(float floatNumber, uint8_t decimal, int32_t x, int32_t y, uint8_t font)

tft.drawFloat(3.124, 4, 0,0,4);

6. Draw the numbers

int16_t drawNumber(long intNumber, int32_t x, int32_t y)

int16_t drawNumber(long intNumber, int32_t x, int32_t y, uint8_t font)

## 四、Drawing geometric figures

1. Draw the dots

void drawPixel(int32_t x, int32_t y, uint32_t color)

2. Draw lines

void drawLine(int32_t xs, int32_t ys, int32_t xe, int32_t ye, uint32_t color)

3. Draw a horizontal line (quick)

void drawFastHLine(int32_t x, int32_t y, int32_t w, uint32_t color)

4. Draw a vertical line (quick)

void drawFastVLine(int32_t x, int32_t y, int32_t h, uint32_t color)

5. Draw the hollow circle

tft.drawCircle(100, 100,50,TFT_RED);

6. Draw a filled circle

void fillCircle(int32_t x, int32_t y, int32_t r, uint32_t color)

7. Draw a hollow ellipse

tft.drawEllipse(100, 100, 100,60,TFT_GREENYELLOW);

8. Draw a solid ellipse

void drawRect(int32_t x, int32_t y, int32_t w, int32_t h, uint32_t color)

9. Draw a hollow rectangle

void drawRect(int32_t x, int32_t y, int32_t w, int32_t h, uint32_t color)

10. Draw a solid rectangle

void fillRect(int32_t x, int32_t y, int32_t w, int32_t h, uint32_t color)

11. Draw a hollow rounded rectangle

void drawRoundRect(int32_t x, int32_t y, int32_t w, int32_t h, int32_t radius, uint32_t color)

12. Draw a solid rounded rectangle

void fillRoundRect(int32_t x, int32_t y, int32_t w, int32_t h, int32_t radius, uint32_t color)

13. Draw Hollow Triangles

void drawTriangle(int32_t x1, int32_t y1, int32_t x2, int32_t y2, int32_t x3, int32_t y3, uint32_t color)

14. Draw Solid Triangles

void fillTriangle(int32_t x1, int32_t y1, int32_t x2, int32_t y2, int32_t x3, int32_t y3, uint32_t color)

## 五、Image display related

1. Display BMP picture

void drawBitmap(int16_t x, int16_t y, const uint8_t *bitmap, int16_t w, int16_t h, uint16_t fgcolor)

void drawBitmap(int16_t x, int16_t y, const uint8_t *bitmap, int16_t w, int16_t h, uint16_t fgcolor, uint16_t bgcolor)

2. XBM

xbm is a simple two-color image bitmap format, which was widely used in early cgi and is currently used in counters. Here TFT_eSPI recommends an online XBM production toolxbm is a simple two-color image bitmap format, which was widely used in early cgi and is currently used in counters. Here TFT_eSPI recommends an online XBM production tool

https://www.online-utility.org/image/convert/to/XBM

3. Test is very useful

void drawXBitmap(int16_t x, int16_t y, const uint8_t *bitmap, int16_t w, int16_t h, uint16_t fgcolor)

void drawXBitmap(int16_t x, int16_t y, const uint8_t *bitmap, int16_t w, int16_t h, uint16_t fgcolor, uint16_t bgcolor)

Display pictures

void pushImage(int32_t x, int32_t y, int32_t w, int32_t h, const uint16_t *data) void pushImage(int32_t x, int32_t y, int32_t w, int32_t h, uint16_t *data)

void pushImage(int32_t x, int32_t y, int32_t w, int32_t h, const uint16_t *data, uint16_t transparent)

void pushImage(int32_t x, int32_t y, int32_t w, int32_t h, uint16_t *data, uint16_t transparent) void pushImage(int32_t x, int32_t y, int32_t w, int32_t h, uint8_t *data, bool bpp8 = true, uint16_t *cmap = (uint16_t *)nullptr)

void pushImage(int32_t x, int32_t y, int32_t w, int32_t h, uint8_t *data, uint8_t transparent, bool bpp8 = true, uint16_t *cmap = (uint16_t *)nullptr)