



# Welcome to the JCZN Workshop!

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# Getting Started

## Introduction

The objective of this post is to explain how to upload an Arduino program to the ESP32-4848S040 module, from JCZN .

<http://www.jczn1688.com>

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.

ESP32-S3-wroom-1 has a significant performance improvement. It is equipped with a high-performance dual-core Tensilica LX7 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.



The screenshot shows the Arduino IDE interface with the following details:

- Title Bar:** 3\_4\_TFT\_Rainbow | Arduino 1.8.19
- Menu Bar:** File Edit Sketch Tools Help
- Toolbar:** Standard icons for file operations.
- Sketch Name:** 3\_4\_TFT\_Rainbow
- Code Content:**

```
/*
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;
```
- Serial Monitor:** Shows two error messages:  
Invalid library found in C:\Users\zhang\Documents\Arduino\libraries\Touch\_test: no headers files (.h) found in C:\U  
Invalid library found in C:\Users\zhang\Documents\Arduino\libraries\Touch\_test: no headers files (.h) found in C:\U
- Bottom Status Bar:** 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.



The screenshot shows the Arduino IDE interface with the title bar "3\_4\_TFT\_Rainbow | Arduino 1.8.19". The menu bar includes File, Edit, Sketch, Tools, and Help. A context menu is open over some code, with options like New, Open..., Open Recent, Sketchbook, Examples, Close, Save, Save As..., Page Setup, Print, Preferences (which is highlighted in blue), and Quit. The main code area contains C++ code for an ESP32 TFT display, including calls to tft.setTextColor() and tft.setTextSize(). Below the code, two error messages are displayed: "Invalid library found in C:\Users\zhang'pei\Documents\Arduino\libraries\Touch\_test: no headers files (.h) found in C:\U" repeated twice. At the bottom of the IDE window, the status bar shows "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".

```
3_4_TFT_Rainbow | Arduino 1.8.19
File Edit Sketch Tools Help
New Ctrl+N
Open... Ctrl+O
Open Recent >
Sketchbook >
Examples >
Close Ctrl+W
Save Ctrl+S
Save As... Ctrl+Shift+S
Page Setup Ctrl+Shift+P
Print Ctrl+P
Preferences Ctrl+Comma
Quit Ctrl+Q



```

    seen << 5 | blue;
    font still works as before
    CK);
    suit 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.drawString("Font size 2", 80, 14, 2); // Draw text centre at position 80, 12 using font 2

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

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

tft.drawString("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

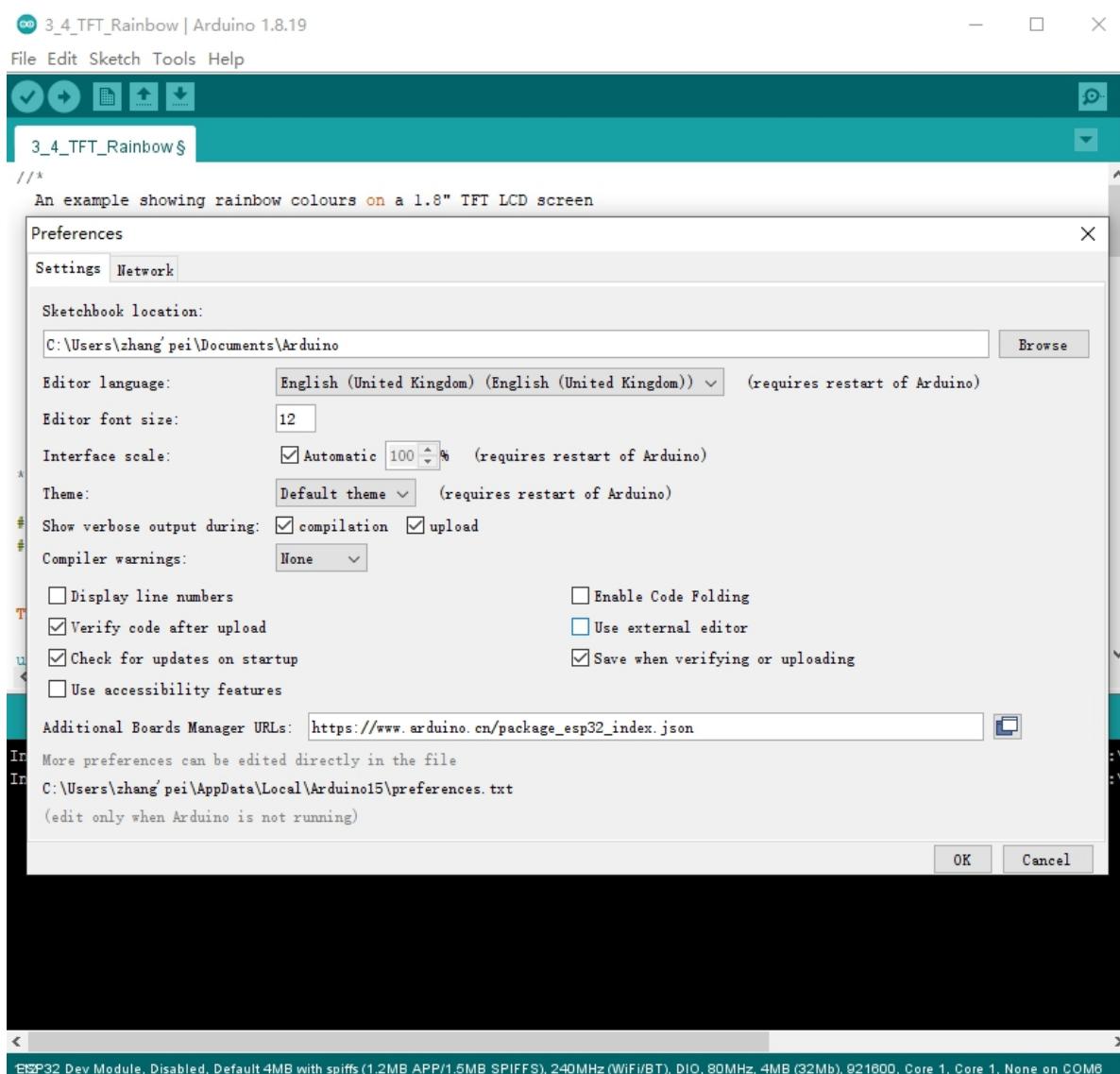
ESP32 Dev Module, Disabled, Default 4MB with spiffs (1.2MB APP/1.5MB SPIFFS), 240MHz (WiFi/BT), DIO, 80MHz, 4MB (32Mb), 921600, Core 1, Core 1, None on COM6
```

- (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](https://raw.githubusercontent.com/espressif/arduino-esp32/gh-pages/package_esp32_index.json)  
Development release link:

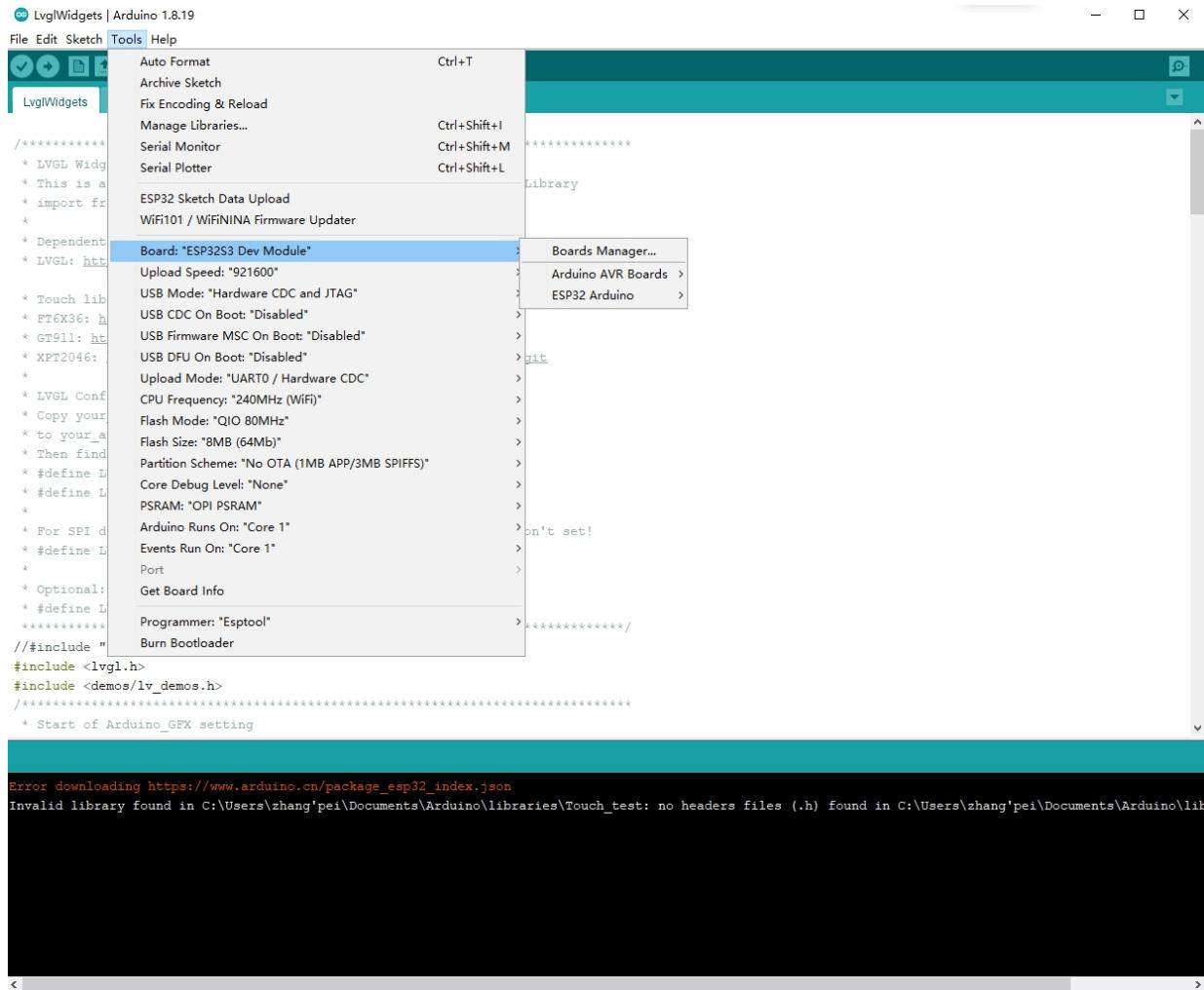
[https://raw.githubusercontent.com/espressif/arduino-esp32/gh-pages/package\\_esp32\\_dev\\_index.json](https://raw.githubusercontent.com/espressif/arduino-esp32/gh-pages/package_esp32_dev_index.json)

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

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

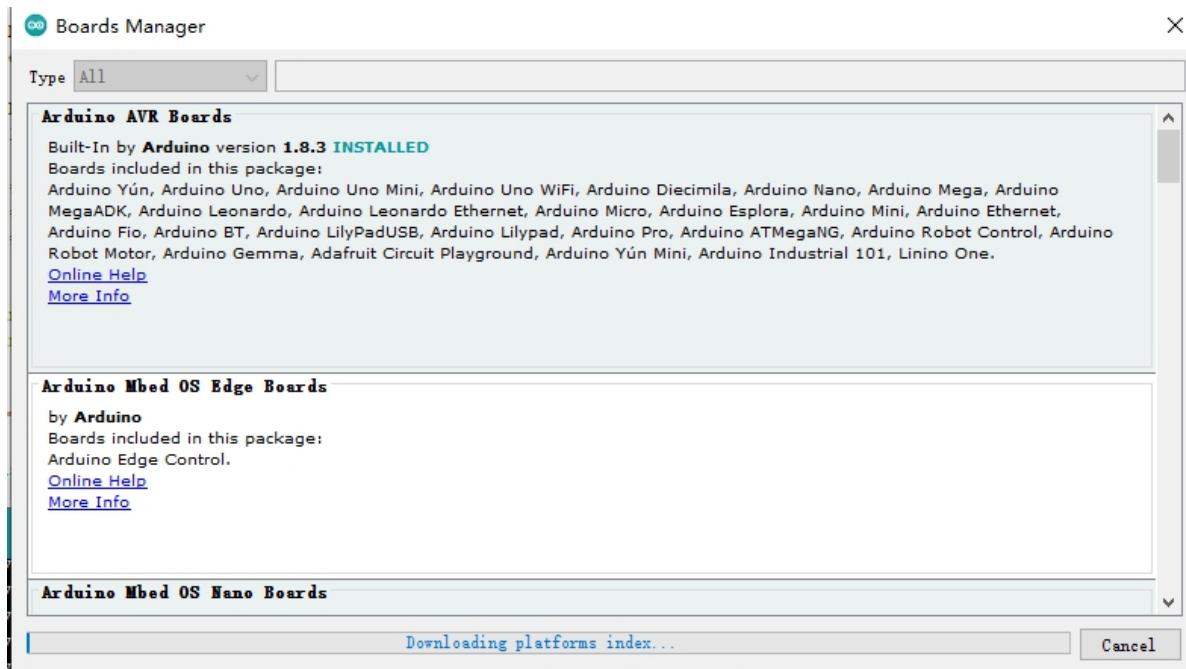


- (9) In the Arduino IDE click on the Tools menu on the top menu bar.
- (10) Scroll down to the Board: entry
- (11) A submenu will open when you highlight the Board: entry.
- (12) At the top of the submenu is Boards Manager. Click on it to open the Boards Manager dialog box.
- (13) In the search box in the Boards Manager enter "esp32".

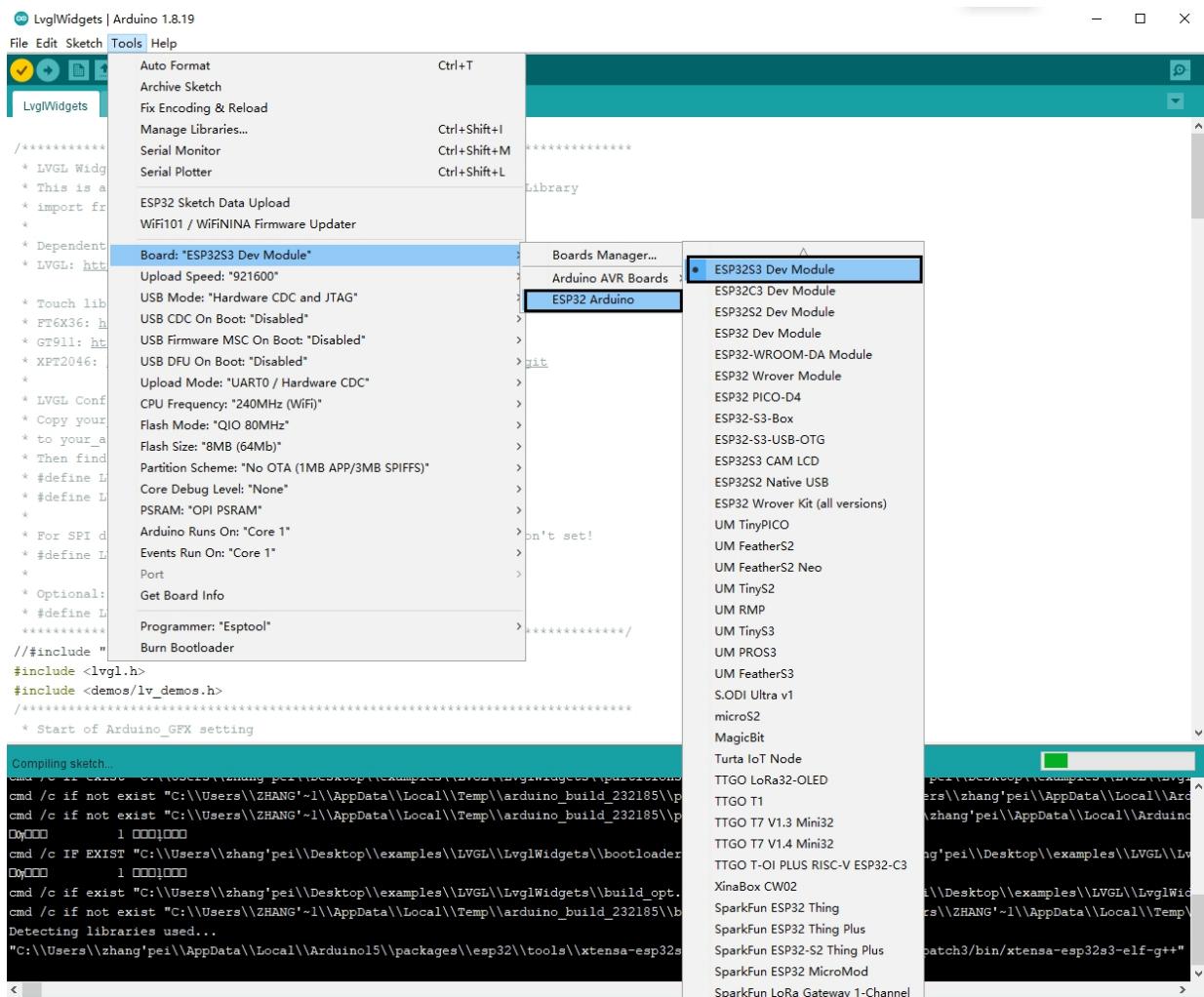


(14) You should see an entry for “esp32 by Espressif Systems”. Highlight this entry and click on the Install button.

This will install the ESP32 boards into your Arduino IDE



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 "ESP32S3 Dev Module".





86switch\_onoff | 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 / WiFi/NINA Firmware Updater

Board: "ESP32S3 Dev Module" >

Upload Speed: "921600" >

USB Mode: "Hardware CDC and JTAG" >

USB CDC On Boot: "Disabled" >

USB Firmware MSC On Boot: "Disabled" > n.git

USB DFU On Boot: "Disabled" >

Upload Mode: "UART0 / Hardware CDC" >

CPU Frequency: "240MHz (WiFi)" >

Flash Mode: "QIO 80MHz" >

Flash Size: "16MB (128Mb)" >

Partition Scheme: "Max APP (8MB)" >

Core Debug Level: "None" > don't set!

PSRAM: "OPI PSRAM" >

Arduino Runs On: "Core 1" >

Events Run On: "Core 1" >

Erase All Flash Before Sketch Upload: "Disabled" >

JTAG Adapter: "Disabled" >

Port: "COM5" >

Get Board Info

Programmer

Burn Bootloader

Start of Arduino\_GFX setting

\*\*\*\*\*

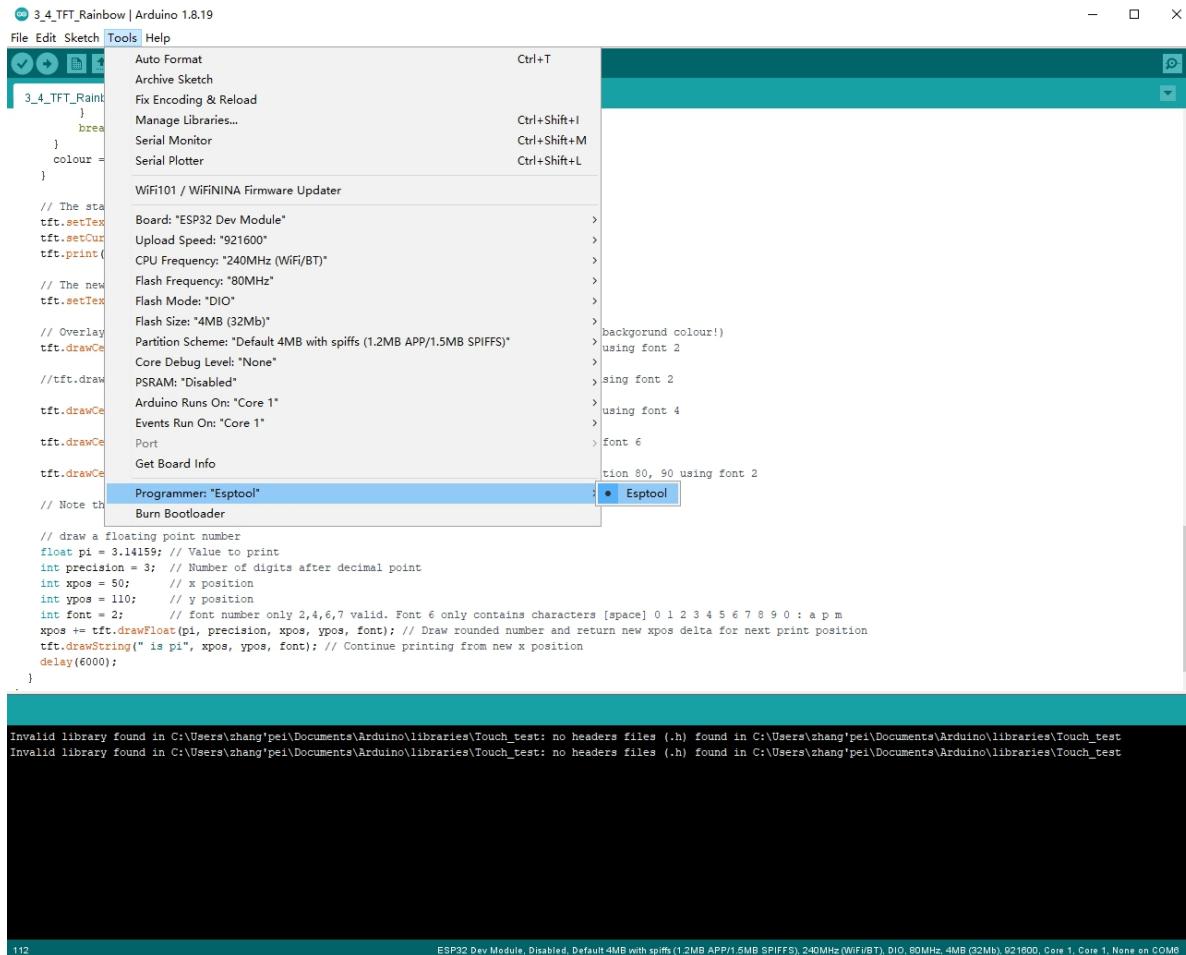
Arduino\_GFX try to find the settings depends on selected board in Arduino IDE  
Or you can define the display dev kit not in the board list  
Defalult pin list for non display dev kit:

Error downloading https://raw.githubusercontent.com/espressif/arduino-esp32/gh-pages/package\_esp32\_dev\_index.json

\*\*\*\*\*

\*\*\*\*\*

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



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, we need to reset the power of the device, in order to guarantee that it enters flashing mode again.

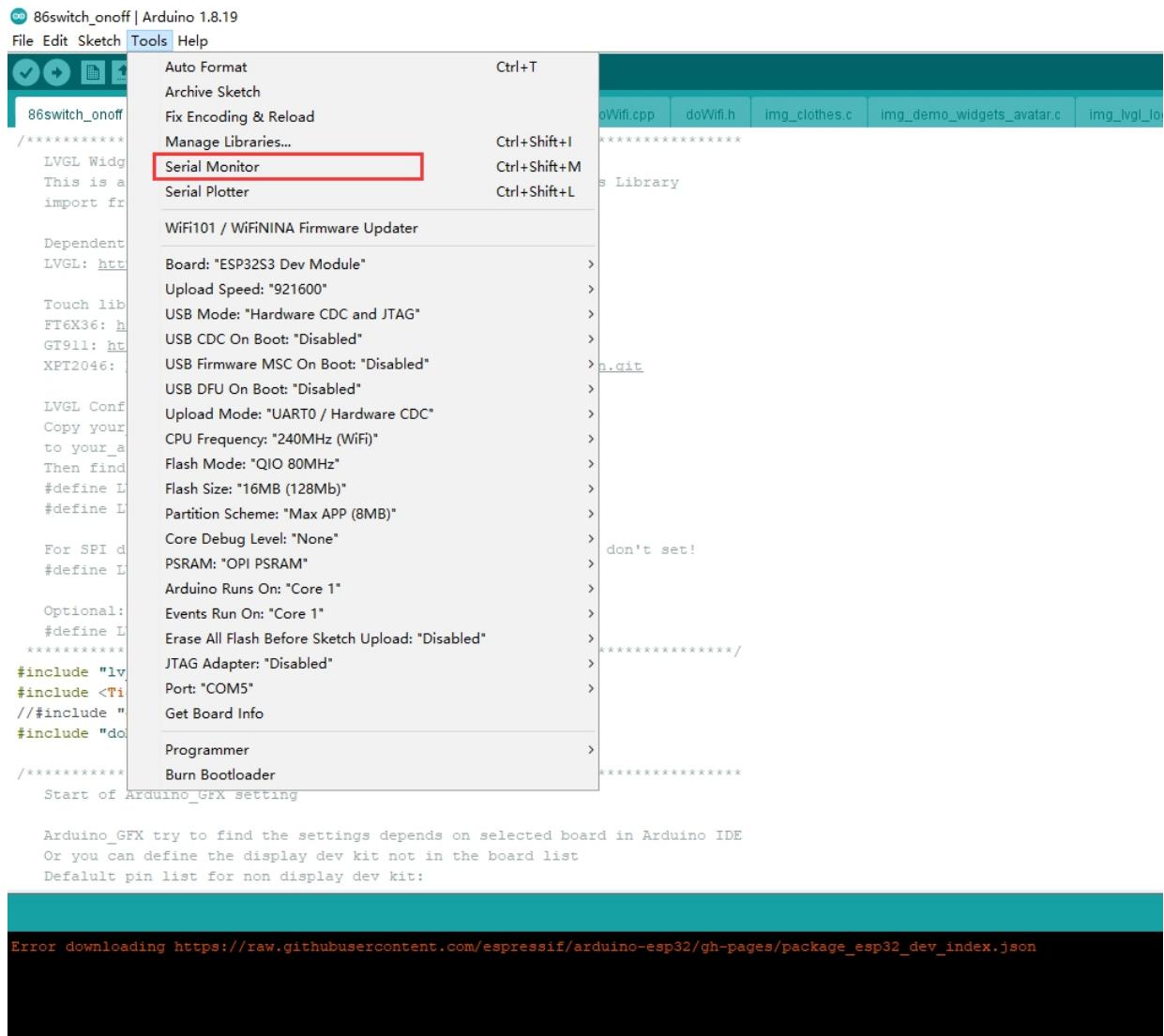
### First program

Since this platform is based on Arduino, we can use many of the usual functions. As an example for the first program, the code below 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);
}
```

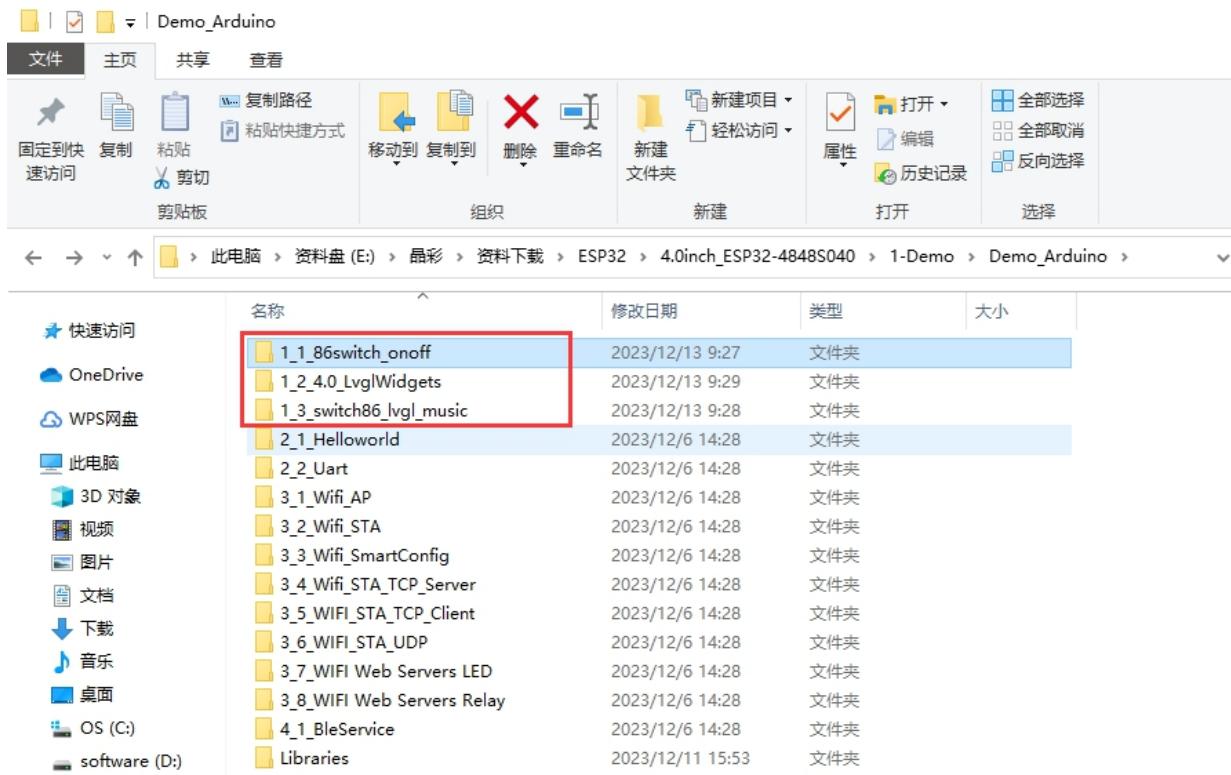
If everything is working fine, we will see the output in the serial console shown.



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:



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 .



```
LVGL_Arduino | Arduino 1.8.19
File Edit Sketch Tools Help
LVGL_Arduino
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: "COM6" ...
Get Board Info ...
Programmer: "Esptool" ...
Burn Bootloader ...
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 0x0007a03b... (80 %)
Writing at 0x00085715... (85 %)
Writing at 0x0008d8a9... (90 %)
Writing at 0x0009323e... (95 %)
Writing at 0x00099999... (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
```



The screenshot shows the Arduino IDE interface. The top menu bar includes File, Edit, Sketch, Tools, Help, and a toolbar with standard icons. The sketch name is 86switch\_onoff | Arduino 1.8.19. The code editor contains the following code:

```
86switch_onoff | Arduino 1.8.19
File Edit Sketch Tools Help
86switch_onoff WeatherNow.cpp WeatherNow.h doMain.cpp doMain.h doWifi.cpp doWifi.h img_clothes.c img_demo_widgets_avatar.c img_lvgl_logo.c lv_demo_wid
/*
LVGL Widgets
This is a widgets demo for LVGL - Light and Versatile Graphics Library
import from: https://github.com/lvgl/lv_demos.git

Dependent libraries:
LVGL: https://github.com/lvgl/lvgl.git

Touch libraries:
FT6X36: https://github.com/strange-v/R
GT911: https://github.com/TAMCTec/gr91
XPT2046: https://github.com/PaulStoffx

LVGL Configuration file:
Copy your_arduino_path/libraries/lvgl/
to your_arduino_path/libraries/lv_conf
Then find and set:
#define LV_COLOR_DEPTH      16
#define LV_TICK_CUSTOM       1

For SPI display set color swap can be
#define LV_COLOR_16_SWAP     1

Optional: Show CPU usage and FPS count
#define LV_USE_PERF_MONITOR 1
*****
#include "lv_demo_widgets.h"
#include <Ticker.h>
//#include "demos/lv_demos.h"
#include "doMain.h"

Start of Arduino_GFX setting

Arduino_GFX try to find the settings depends on selected board in Arduino IDE
Or you can define the display dev kit not in the board list
Default pin list for non display dev kit:
```

The Library Manager window is open, showing the search results for "Arduino\_GFX". The first result is "Arduino\_GFX" by Marc MERLIN, which is highlighted with a red box and has the status "Version 1.2.9 INSTALLED". The "Install" button is visible. Below it is another entry for "GFX4d" by 4D Systems Pty Ltd.

Error downloading https://raw.githubusercontent.com/espressif/arduino-esp32/gh-pages/package\_esp32\_dev\_index.json

Although the Arduino\_GFX 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 1\_2\_4.0\_LvglWidgets

As shown:



Demo\_Arduino

文件 主页 共享 查看

固定到快速访问 复制 粘贴 复制路径 粘贴快捷方式 移动到 复制到 删除 重命名 新建文件夹 新建项目 轻松访问 属性 打开 编辑 历史记录 全部选择 全部取消 反向选择

剪贴板 组织 新建 打开 选择

此电脑 > 资料盘 (E:) > 晶彩 > 资料下载 > ESP32 > 4.0inch\_ESP32-4848S040 > 1-Demo > Demo\_Arduino

名称	修改日期	类型	大小
1_1_86switch_onoff	2023/12/13 9:27	文件夹	
1_2_4.0_Lvgl\Widgets	2023/12/13 9:29	文件夹	
1_3_switch86_lvgl_music	2023/12/13 9:28	文件夹	
2_1_Helloworld	2023/12/6 14:28	文件夹	
2_2_Uart	2023/12/6 14:28	文件夹	
3_1_Wifi_AP	2023/12/6 14:28	文件夹	
3_2_Wifi_STA	2023/12/6 14:28	文件夹	
3_3_Wifi_SmartConfig	2023/12/6 14:28	文件夹	
3_4_Wifi_STA_TCP_Server	2023/12/6 14:28	文件夹	
3_5_WIFI_STA_TCP_Client	2023/12/6 14:28	文件夹	
3_6_WIFI_STA_UDP	2023/12/6 14:28	文件夹	
3_7_WIFI Web Servers LED	2023/12/6 14:28	文件夹	
3_8_WIFI Web Servers Relay	2023/12/6 14:28	文件夹	
4_1_BleService	2023/12/6 14:28	文件夹	
Libraries	2023/12/11 15:53	文件夹	

Download two library files .

One -Arduino\_GFX library

Library Manager

Type All Topic All Arduino\_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

More info Install

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, HX8347C, HX8347D, HX8352C, HX8357A, HX8357B, HX8369A, ILI6122, ILI9225, ILI9331, ILI9341, ILI9342(M5Stack, ESP32-S3-BOX), ILI9481, ILI9486, ILI9488, ILI9806, JBT6K71, NT35310, NT35510, NT39125, NV3041A, OTM8009A, R61529, RM67162, SEPS525, SSD1283A, SSD1331, SSD1351, ST7735, ST7789, ST7796 and virtually all Raspberry Pi SPI (RGB) display. Tested RGB display: GC9503V, ILI6485, ST7262, ST7701. 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

GFX4d

by 4D Systems Pty Ltd Graphics Library for the gen4-IoD by 4D Systems This is a library which enables graphics to be easily added to the gen4-IoD modules using the Arduino IDE or Workshop4 IDE. gen4-IoD is powered by the ESP8266.

Close

Two -Lvgl



Library Manager

Type: All Topic: All LVGL

**lv\_arduino**  
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.  
[More info](#)

**lv\_examples**  
by kisvegabor,embeddeddt  
**Examples for LVGL graphics library** Demos and examples to see and try the features of LVGL embedded GUI library.  
[More info](#)

**lvgl**  
by kisvegabor,embeddeddt,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).  
[More info](#)

**Close**

Copy the lv\_conf.h of the data center .

As shown:

LVGL configuration replacement file

文件 主页 共享 查看

固定到快速访问 复制 粘贴 移动到 复制到 删除 重命名 新建文件夹 新建 打开 属性 全部选择  
剪切 剪贴板 组织 新建项目 轻松访问 历史记录  
速度访问 复制路径 粘贴的快捷方式 移动到的快捷方式 重命名  
剪贴板

1-Demo > Demo\_Arduino > 1\_2\_4.0\_LvglWidgets > LVGL configuration replacement file

名称	修改日期	类型	大小
lv_conf.h	2023/11/28 16:11	C Header 源文件	26 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
Adafruit_CCS3501_CDS	2022/6/27 12:06	文件夹	
Adafruit_Unified_Sensor	2022/7/6 9:23	文件夹	
ArduinoJson	2022/6/27 12:06	文件夹	
AsyncTCP	2022/6/27 12:06	文件夹	
Audio	2022/6/28 17:44	文件夹	
DallasTemperature	2022/6/27 12:06	文件夹	
DHT_sensor_library	2022/6/27 12:06	文件夹	
DHT_sensor_library_for_ESPx	2022/6/25 10:23	文件夹	
ESP32Servo	2022/6/27 12:06	文件夹	
ESPAsyncWebServer	2022/6/27 12:06	文件夹	
FastLED	2022/7/6 9:23	文件夹	
GFX_Library_for_Arduino	2022/8/9 18:08	文件夹	
gt911-arduino-main	2022/8/17 10:21	文件夹	
GT911-master	2022/8/15 15:10	文件夹	
IRremote	2022/6/27 12:06	文件夹	
JPEGDecoder	2022/6/28 13:49	文件夹	
LiquidCrystal_I2C	2022/6/27 12:06	文件夹	
LovyanGFX	2022/7/31 14:05	文件夹	
lvgl	2022/3/4 10:31	文件夹	
MFRC522	2022/6/27 12:06	文件夹	
OneWire	2022/6/27 12:06	文件夹	
PNGdec	2022/6/28 10:48	文件夹	
Rtc_by_Makuna	2022/6/27 12:06	文件夹	
TFT_eSPI	2022/8/16 12:46	文件夹	
TFT_Touch-master	2022/8/1 12:16	文件夹	
Time	2022/7/6 9:23	文件夹	
TJpg_Decoder	2022/8/3 14:25	文件夹	
Touch_test	2022/8/1 12:12	文件夹	
TP_Arduino_DigitalRain_Anim-main	2022/7/31 13:13	文件夹	
XPT2046_Touchscreen	2022/7/17 18:09	文件夹	
XT_DAC_Audio	2022/7/2 17:12	文件夹	
lv_arduino.rar	2022/7/21 14:20	360压缩 RAR 文件	6,740 KB
lv_conf.h	2022/8/19 17:01	C Header 源文件	24 KB
readme.txt	2022/6/15 15:12	文本文档	1 KB

After compiling, you can run LVGL and touch normally.