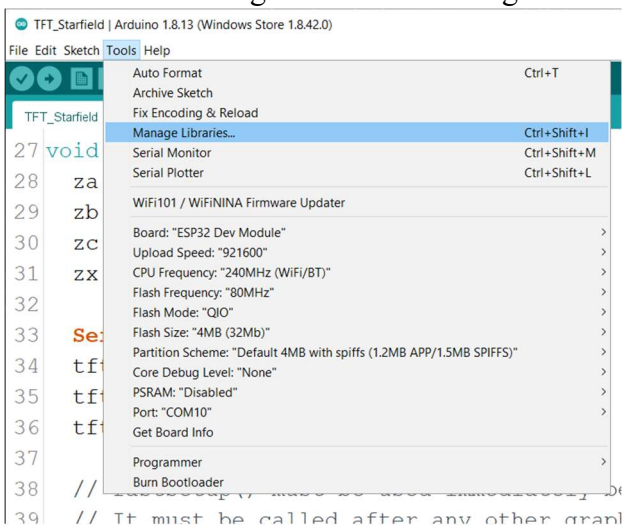
WaveShare 2inch LCD Module w/ ESP32

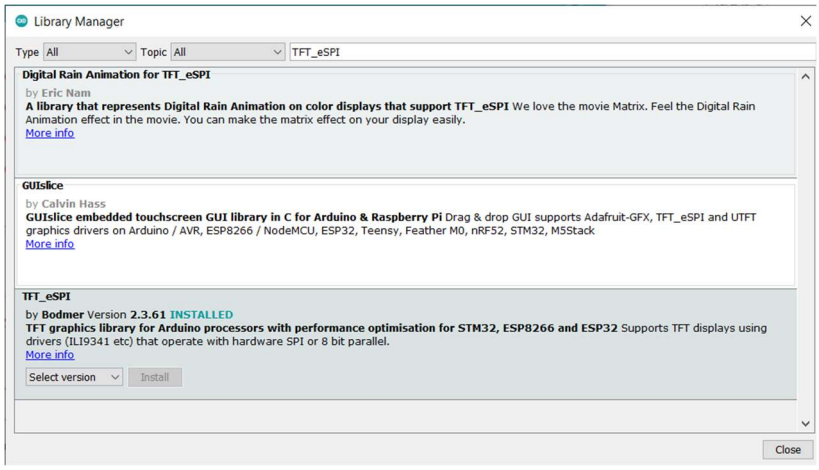
To work with the WaveShare 2inch LCD Module you are going to need to get its library through the Arduino IDE. This can be done with the steps below.

Library Setup Steps:

Open the Arduino IDE and in the menu go to Tools > Manage Libraries



Then once in the pop up. Search for "TFT_eSPI". Then install.



These library files can be found in your Documents > Arduino > libraries directory.

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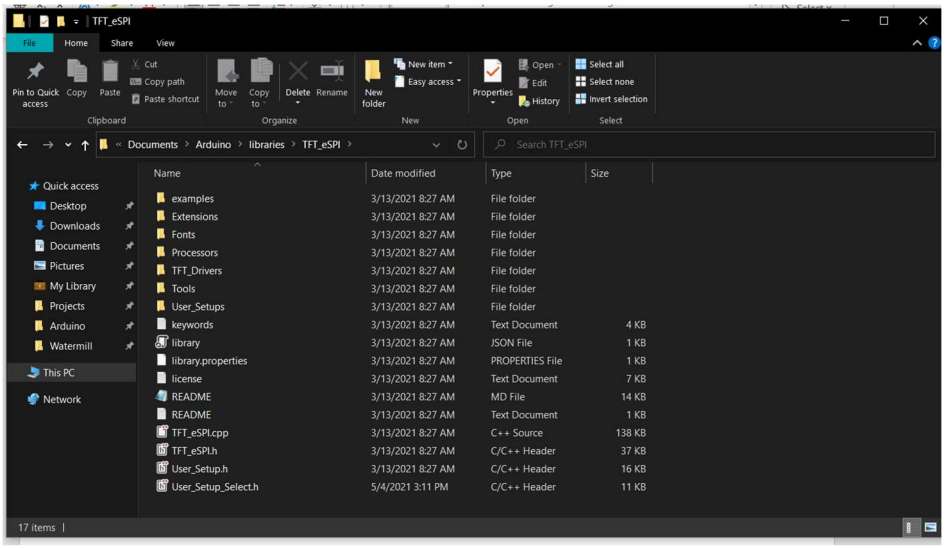
Now you will need to edit a few files in the library so the LCD Module can work with an ESP32. This can be done with the steps below.

Code Editing Steps:

Find your way to the TFT_eSPI directory. Unless specified it should be located in Documents/Arduino/libraries/TFT_eSPI (windows).



The first thing that we will need to do is change which setup file is being used. Open "User_Setup_Select.h" in any text editor.

Find the line that says ***#include <User_Setup.h>*** and comment it out by placing to forward slashes before the #. Below you can see an example of what it originally looked like and what it should look like once you are done. (Colors may change depending on your text editor)

Original:

```
21
22   #include <User_Setup.h>           // Default setup is root library folder
23
```

Modified:

```
21
22   //#include <User_Setup.h>           // Default setup is root library folder
23
```

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Next find the line that says ***//#include <User_Setups/Setup24_ST7789.h>***. Uncomment this line by removing the two forward slashes. Below you can see what the snippet of code originally looked like and what it should look like once you are done. (Colors may change depending on your text editor)

Original:

```
51  //#include <User_Setups/Setup23_TTGO_TM.h>          // Setup file for ESP32 and TTGO TM ST7789 SPI bus TFT
52  //#include <User_Setups/Setup24_ST7789.h>           // Setup file configured for ST7789 240 x 240
53  //#include <User_Setups/Setup25_TTGO_T_Display.h>   // Setup file for ESP32 and TTGO T-Display ST7789V SPI bus TFT
```

Modified:

```
51  //#include <User_Setups/Setup23_TTGO_TM.h>          // Setup file for ESP32 and TTGO TM ST7789 SPI bus TFT
52  #include <User_Setups/Setup24_ST7789.h>           // Setup file configured for ST7789 240 x 240
53  //#include <User_Setups/Setup25_TTGO_T_Display.h>   // Setup file for ESP32 and TTGO T-Display ST7789V SPI bus TFT
```

You are done this with this file. Make sure to save before you close.

Now back at the TFT_eSPI directory you will want to enter the **User_Setups** directory and open the file **Setup24_ST7789.h** in a text editor.

The first change will be the width and the height. Find the lines that say ***#define TFT_WIDTH*** and ***#define TFT_HEIGHT***. You will need to change these values. Below you can see the original and modified versions of the code. (Colors may change depending on your text editor)

Original:

```
4
5   #define TFT_WIDTH  240
6   #define TFT_HEIGHT 240
7
```

Modified:

```
4
5   #define TFT_WIDTH  240
6   #define TFT_HEIGHT 320
7
```

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Then you will want to find this section of the code and comment out the lines that aren't commented.

Original:

```
27
28  // For NodeMCU - use pin numbers in the form PIN_Dx where Dx is the NodeMCU pin designation
29  #define TFT_CS   -1      // Define as not used
30  #define TFT_DC   PIN_D1  // Data Command control pin
31  #define TFT_RST  PIN_D4  // TFT reset pin (could connect to NodeMCU RST, see next line)
32  //#define TFT_RST  -1    // TFT reset pin connect to NodeMCU RST, must also then add 10K pull down to TFT SCK
33
```

Modified:

```
27
28  // // For NodeMCU - use pin numbers in the form PIN_Dx where Dx is the NodeMCU pin designation
29  // #define TFT_CS   -1      // Define as not used
30  // #define TFT_DC   PIN_D1  // Data Command control pin
31  // #define TFT_RST  PIN_D4  // TFT reset pin (could connect to NodeMCU RST, see next line)
32  // //#define TFT_RST  -1    // TFT reset pin connect to NodeMCU RST, must also then add 10K pull down to TFT SCK
33
```

After that you will want to find the snippet above the previous. It should look like this.

```
20  // Generic ESP32 setup
21  //#define TFT_MISO 19
22  //#define TFT_MOSI 23
23  //#define TFT_SCLK 18
24  //#define TFT_CS    -1 // Not connected
25  //#define TFT_DC    2
26  //#define TFT_RST   4  // Connect reset to ensure display initialises
```

You want to uncomment everything under the line that says ***// Generic ESP32 setup***. Then you will need to change the line ***#define TFT_CS -1*** to ***#define TFT_CS 0***. Below you can see what the code snippet should look like once you are done.

```
20  // Generic ESP32 setup
21  #define TFT_MISO 19
22  #define TFT_MOSI 23
23  #define TFT_SCLK 18
24  #define TFT_CS    0 // Not connected
25  #define TFT_DC    2
26  #define TFT_RST   4  // Connect reset to ensure display initialises
```

You are now done with this file. Make sure to save before you close.

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After completing those steps, you will be done with editing code. Now you need to connect the LCD Module to the ESP32.

The connections are as follows

LCD Module → ESP32

VCC → 5V

GND → GND

DIN → 23

CLK → 18

CS → 0

DC → 2

RST → 4

BL → No Connection

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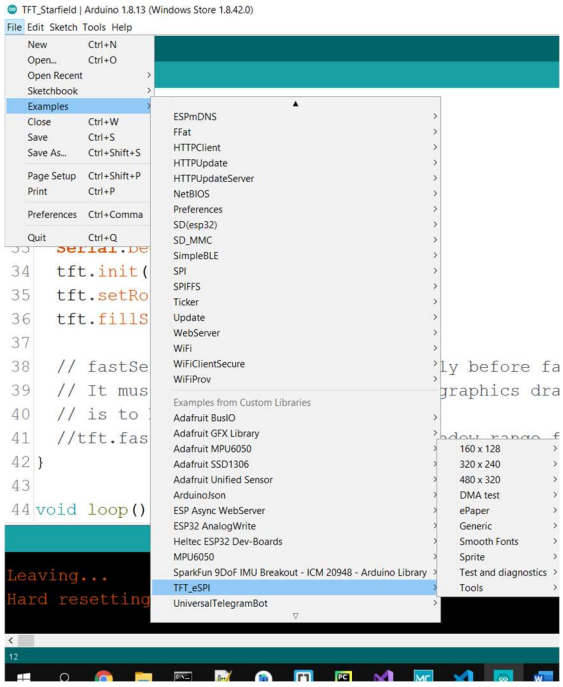
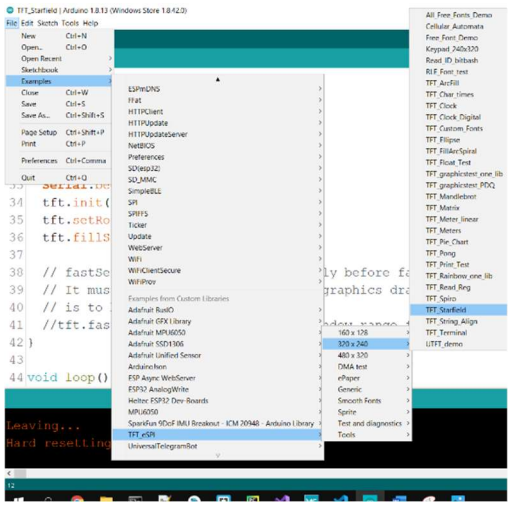
Now you can upload an example sketch to see the screen in action. Open up your Arduino IDE and follow these steps.

Upload Steps:

Find the TFT_eSPI example sketches in File > Examples > TFT_eSPI



Then choose the Starfield example sketch from the 320 x 240 option.



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Before you upload make sure that the IDE is set up for an ESP32. Once you upload the screen should look something like this.