

ENABLING ST7920 EMULATOR ON TFT35V2

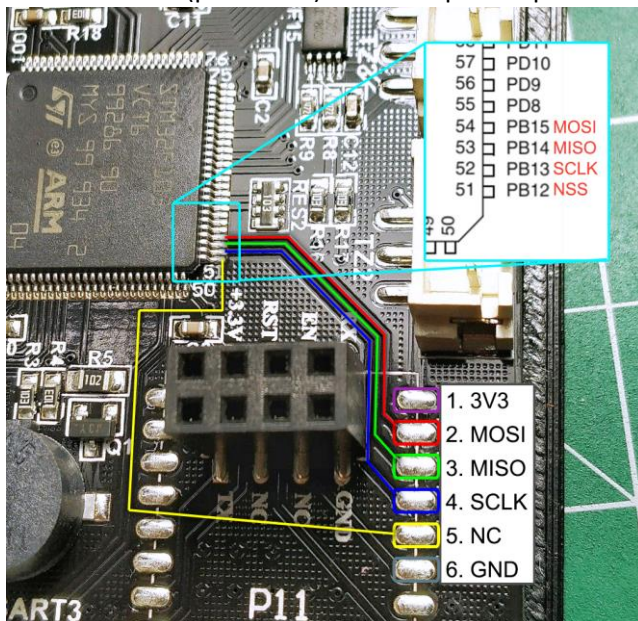
These instructions are for TFT35v2 only.

The TFT35v2 has the required SPI pins to enable ST7920 emulator. However in order to use these pins, they need to be soldered to a pin header. Below are the instructions to do the same.

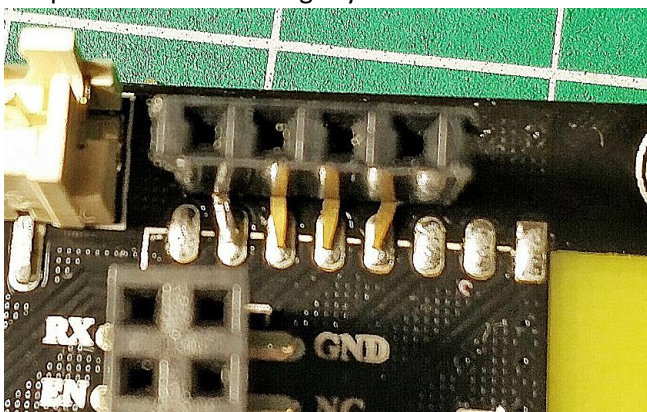
Before you begin, you must note that you are doing this at your own risk and I will not be responsible for any damage or loss during or after the process. These instructions are not perfect and may contain incorrect information, due to this these instructions may change in future.

A. Hardware

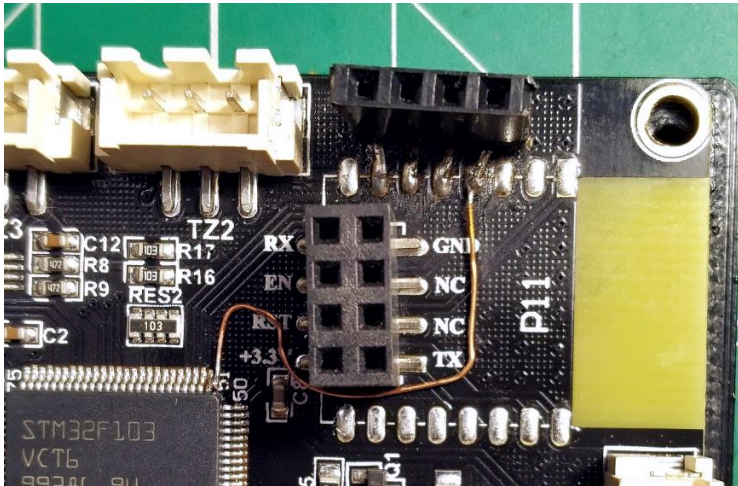
1. The V2 have the **SPI2** pins connected to the **ESP12** connection pads. But the **PB12/NSS** (Slave Select) is not connected to any of the pads. So we need to carefully solder a thin insulated wire from the **PB12** (pin no. 50) to the 5th pin as specified:



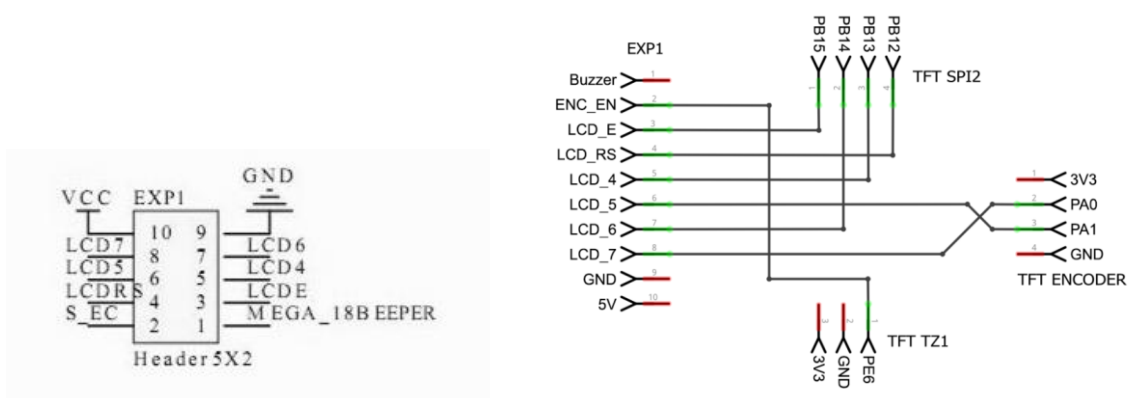
2. The pin no. 5 is not connected to any other pin. This can be used to solder the wire from the **NSS** pin. A 4pin female header is also needed to be solders to the pins 2 to 5. The spacing between the pads is smaller than the pin spacing between the female headers, to match the spacing bend the pins of the header slightly inwards.



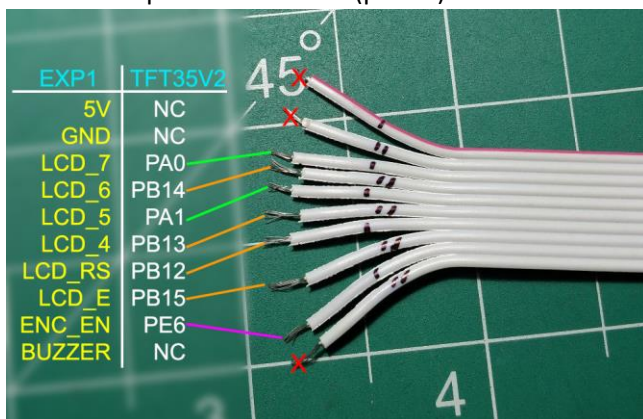
- After soldering it should look like this. Use some hot glue to secure the header in place and prevent damage:



- Now the **EXP1** connector need to be modified to connect the TFT. A total of 7 pins will be connected (4 SPI pins and 3 encoders). No need to connect the **5v** and **GND** as they are already connected through Serial wire. Carefully check and match the wires of your **EXP1** with the diagram. Note that the Pins of your boards may have different setup. Cross check the below schematic with your boards schematic.



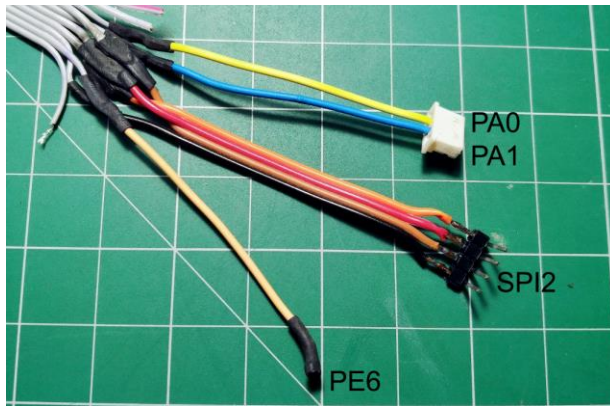
In the example below the 5V (pin 10) is the red wire.



The wire marked with green are to be coupled together and connected to the **ENCODER** port on the TFT. The wires marked with orange are to be coupled together to be able to connect to **SPI2** Pins on the TFT. The **ENC_EN** pin is to be connected to the **PE6** pin on the **TZO1** port on the TFT.

The wires for **SPI2** need to be reshuffled so they are aligned with the SPI pin on the TFT.

Solder an 'L' shaped pin to the SPI wires. To connect the Encoder pins a female JST connector is used. For the **ENC_EN** a female DUPONT connector can be used. Use heat shrink tubes to secure the wire joints and prevent them from shorting to each other. The final cable should look like this:



5. Connect the wires to the TFT35V2:



B. Software / Firmware:

The next step is to change some pin numbers in Marlin Firmware and TFT firmware.

1. Marlin Firmware:

- Open your Board specific **pin_XXXXXXX.h** file.
- Search for **HAS_SPI_LCD**
- Under **HAS_SPI_LCD** find the lines that define pins for **BTN_EN1** & **BTN_EN2**
- Change the pin no. for **BTN_EN1** to pin no. defined for **LCD_D7** & pin no. for **BTN_EN2** to pin no. defined for **LCD_D5**.
- Compile and flash the firmware to the Mainboard.

Below is the screenshot of the changes for **BTT SKR V1.4**

```
Marlin > src > pins > lpc1768 > C pins_BTT_SKR_V1_4.h > ...
228
229 /**
230 *
231 *          NC | . . | GND
232 *          RESET | . . | 1.31(SD_DETECT)
233 * (MOSI)0.18 | . . | 3.25(BTN_EN2)
234 * (SD_SS)0.16 | . . | 3.26(BTN_EN1)
235 * (SCK)0.15 | . . | 0.17(MISO)
236 *
237 *          EXP2
238 */
239 #if HAS_SPI_LCD
240 #if ENABLED(ANET_FULL_GRAPHICS_LCD)
241
242 #define LCD_PINS_RS P1_23
243
244 #define BTN_EN1 P1_20
245 #define BTN_EN2 P1_22
246 #define BTN_ENC P1_18
247
248 #define LCD_PINS_ENABLE P1_21
249 #define LCD_PINS_D4 P1_19
250
251 #elif ENABLED(CR10_STOCKDISPLAY)
252 #define BTN_ENC P0_28 // (58) open-drain
253 #define LCD_PINS_RS P1_22
254
255 #define BTN_EN1 P1_18
256 #define BTN_EN2 P1_20
257
258 #define LCD_PINS_ENABLE P1_23
259 #define LCD_PINS_D4 P1_21
260
261 #else
262 #define BTN_ENC P0_28 // (58) open-drain
263 #define LCD_PINS_RS P1_19
264
265 #define BTN_EN1 P1_23 // (31) J3-2 & AUX-4
266 #define BTN_EN2 P1_21 // (33) J3-4 & AUX-4
267
268 #define LCD_PINS_ENABLE P1_18
```

2. TFT Firmware:

Use the firmware at from this Link:

https://github.com/guruathwal/BIGTRETECH-TouchScreenFirmware/tree/TFT35v2_ST7920

Compile the firmware for TFTv2 and flash the firmware to the TFT.

C. FINISH

Switch to ST7920 Emulator by pressing and holding on the touch screen for 2 seconds.

To switch back to Touchscreen mode press and hold the display area other than the buttons for 2 seconds.



D. Troubleshooting

1. No Mode change option.

- Make sure you have successfully compiled and flashed the firmware only from the link above.
- Do not use the precompiled files.

2. Blank screen and only buttons in ST7920 mode.

- Re-check the wiring.
- Make sure you have enabled **REPRAP_DISCOUNT_FULL_GRAPHIC_SMART_CONTROLLER** in Marlin firmware.
- Re-check the pin number in Marlin firmware with the schematic of your board.

3. Wrong Button direction

- Swap the pin no. for **BTN_EN1** & **BTN_EN2** in marlin firmware.