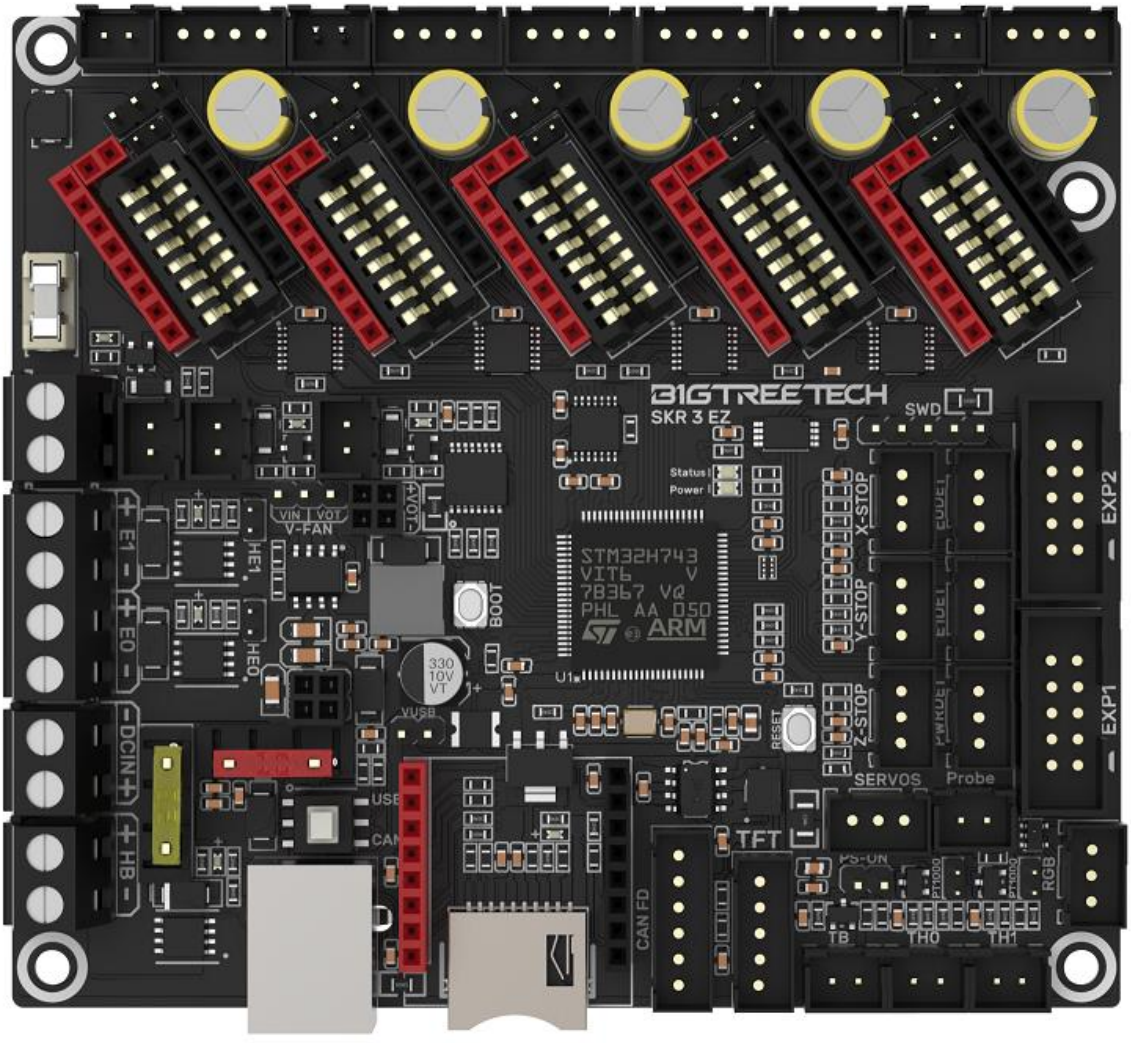
BIGTREETECH SKR 3 EZ

User Manual



Content

Revised History

Version	Note	Date
01.00	1st Draft	2022/04/15
01.01	Add support for RRF	2022/05/21
01.02	Add description of IO of Heater cartridge	2022/08/27

1. Product Introduction

BIGTREETECH SKR 3 EZ V1.0 motherboard is a 32-bit 3D printer motherboard updated by the team of Shenzhen Biqu Technology Co., Ltd. for our EZ series drivers on the basis of SKR 3. It is compatible with both the EZ series driver and the series of TMC drivers.

1.1 Product Features

1. Using 32-bit ARM Cortex-M7 series STM32H743VI main control chip with a main frequency of 480MHz, the performance has greatly improved.

2. The power chip adopts TPS5450-5A, which supports DC12/24V power input. The output current of the chip is up to 5A, and the peak value can reach 6A, which perfectly supports the power supply of Raspberry Pi.

3. The motherboard reserves the BOOT button, users can update the motherboard boot program through DFU.

4. Increase the protection circuit of the thermistor part to avoid the burning of the main control chip due to leakage of the heated bed or heater cartridge.

5. The numerical control fan realizes 24V, 12V, 5V voltage selection through the external power supply module, eliminating the need for the operation of the customer's external transformer module, thereby reducing the probability of damage to the motherboard.

6. The thermistor can select the pull-up resistance value through the jumper, and support PT1000 in this way without the need for external modules, which is convenient for customers to use DIY.

7. Support all versions of our company's serial screen, SPI screen and LCD screen.

8. Upgrade the configuration firmware through an SD card, the operation is simple, convenient and efficient.

9. On-board DIAG function pins can be used by simply plugging and unplugging the jumper cap.

10. Supports functions such as resume printing, Filament Runout Detection, Completed Shutdown, BLTouch, RGB Lights, etc.

11. High-performance MOSFETs are used to reduce heat generation.

12. Adopt a replaceable fuse for easy replacement.

13. WIFI module (ESP-12S, ESP-07, ESP32) general interface.

14. The on-board non-self-elastic Micro SD card slot, and is SDIO working mode, which greatly speeds up the transfer rate.

15. Onboard EEPROM, which is convenient for users to save parameter information.

16. Two types of CAN interfaces are reserved, USB port and XH2.54 6Pin terminal interface. The USB port is used to select CAN and USB through the double-pole double-throw switch, which is convenient for customers to use other accessories of the CAN interface.

17. The temperature sensor interface adopts a high-precision pull-up resistor.

18. Two types of drive sockets are used, which are compatible with our EZ series drive modules and TMC series drive modules.

19. Each motor drive module can select the corresponding motor voltage through the jumper cap.

20. The motor power supply supports up to 48V, and for the larger voltage when using TMC5160 and EZ5160, an isolation chip is used to protect the mainboard from burning IO.

1.2 Product Parameters

1. Product Size: 109.7 x 98mm, for details, please refer to **BIGTREETECH SKR 3 EZ V1.0-SIZE.pdf**

2. Installation Size: 102 x 76mm

3. Microprocessor: ARM Cortex-M7 STM32H743VI

4. EEPROM: 24C32 32Kbit

5. Input Voltage: DC12V-DC24V

6. Motor Voltage: DC12V-DC48V

7. Logic Voltage: DC 3.3V

8. Heating Interface: Heated bed (HB), Heater cartridge (E0, E1)

9. Maximum Output Current of Heated Bed Port: 10A, Peak Current 11A

10. Maximum Output Current of Heater cartridge Port: 5.5A, Peak Current 6A

11. Fan Interface: Three CNC fans, three normally open fans, the voltage of the CNC fans is optional.

12. Maximum Output Current of Fan Interface: 1A, Peak Current 1.5A

13. The Total Current of Heater cartridge + Driver + Fan: less than 10A

14. WIFI Interface: ESP-12S, ESP-07S, ESP32

15. Expansion Interface: BLTouch (Servos, Probe), PS-ON, PWR-DET, Fil-DET, RGB, CAN FD

16. Motor Drive: Support EZ5160, EZ2209, EZ2208, EZ2225, EZ2226, EZ2130, EZ6609, TMC5160, TMC2209, TMC2225, TMC2226, TMC2208, TMC2130, etc.

17. Driver Working Mode Support: SPI, UART, STEP/DIR

18. Motor Drive Interface: X, Y, Z (dual Z-axis), E0, E1 Five Channels

19. Temperature Sensor Interface: 1 100K NTC, 2 100K NTC and PT1000 optional

20. Display: Serial Touch Screen, SPI Touch Screen, LCD

21. PC Communication Interface: Square USB A, easy to plug and unplug.

22. Supported File Format: G-code

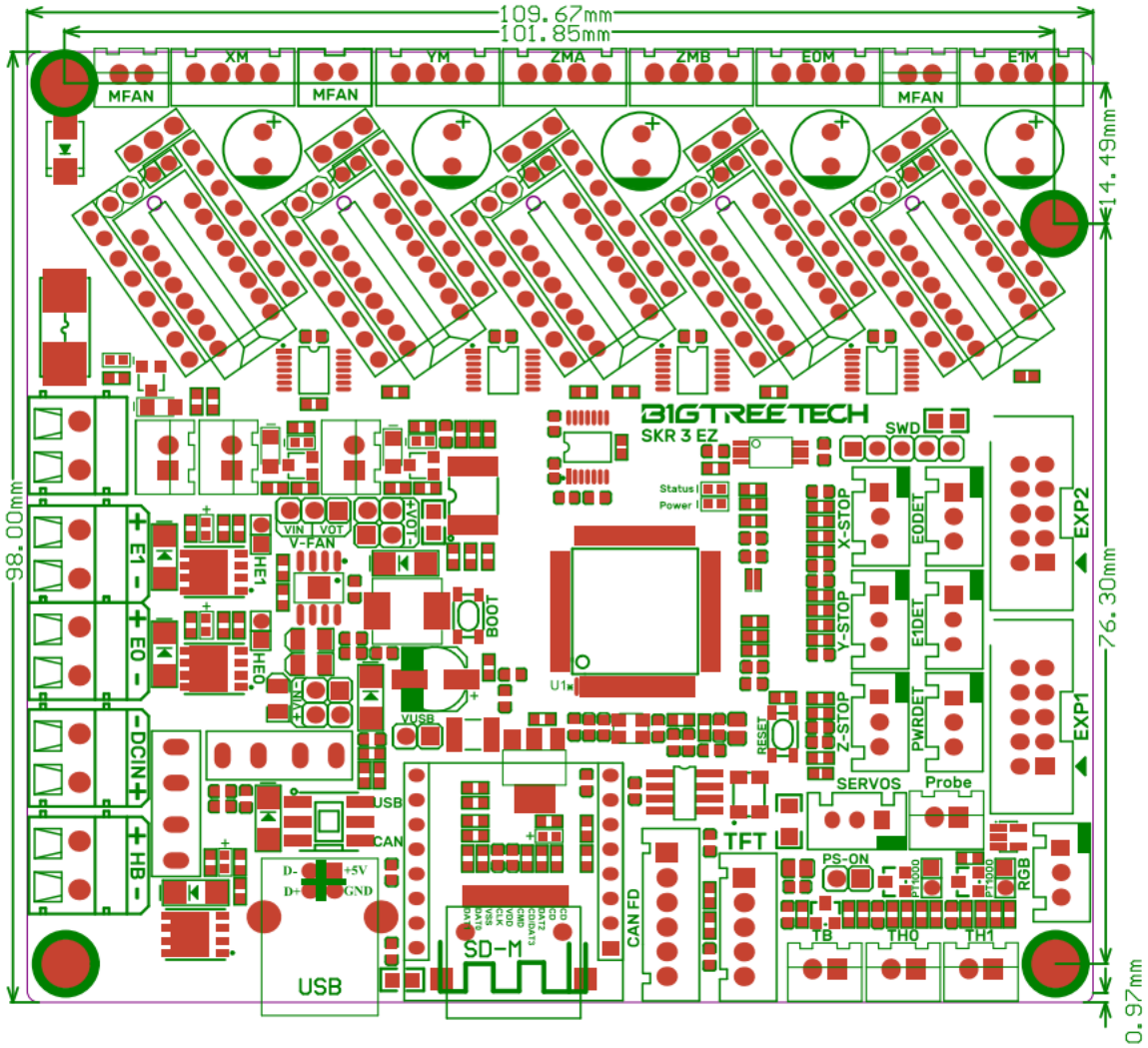
23. Support Machine Structure: Cartesian, Delta, Kossel, Ultimaker, CoreXY

24. Recommended software: Cura, Simplify3D, Pronterface, Repetier-host, Makerware.

1.3 Firmware Support

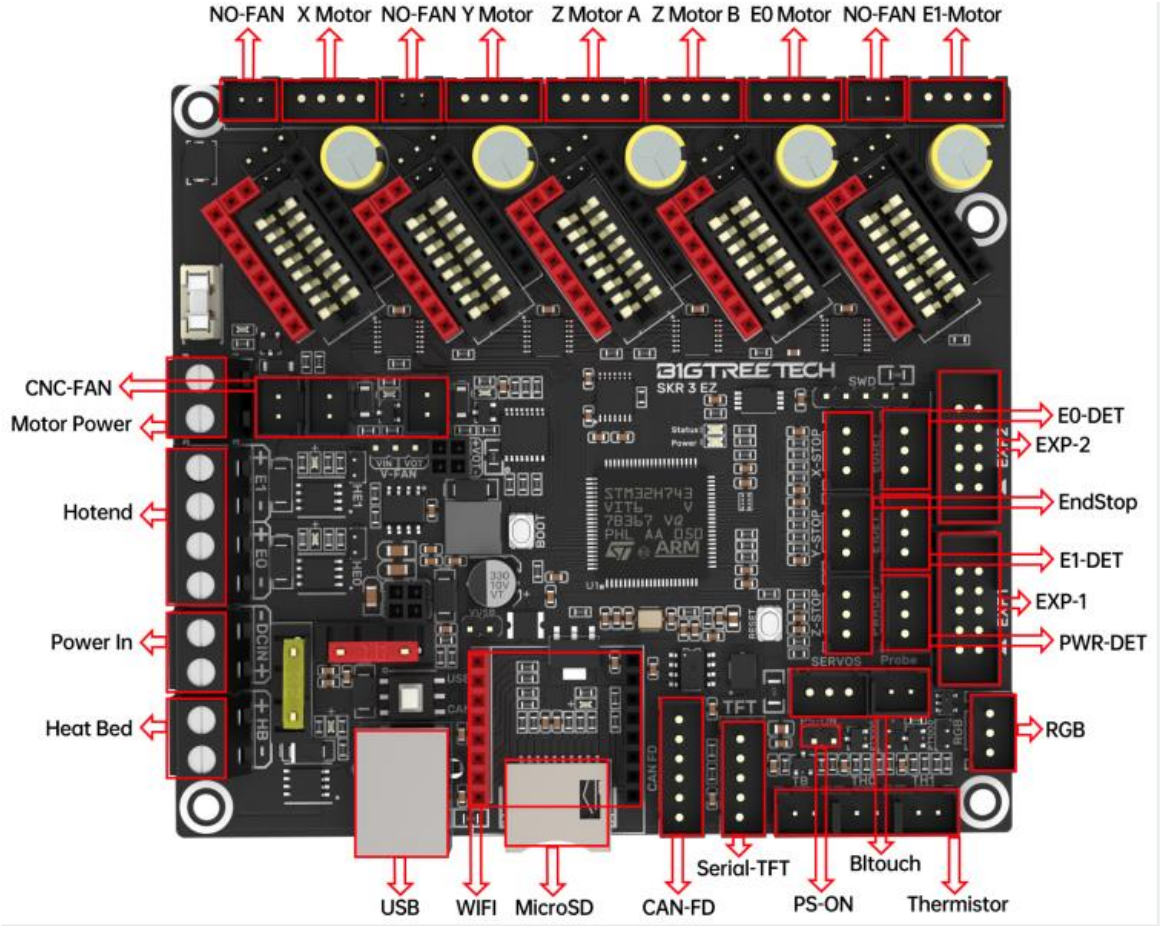
Supported Firmware: Marlin, Klipper, RRF.

1.4 Product Size

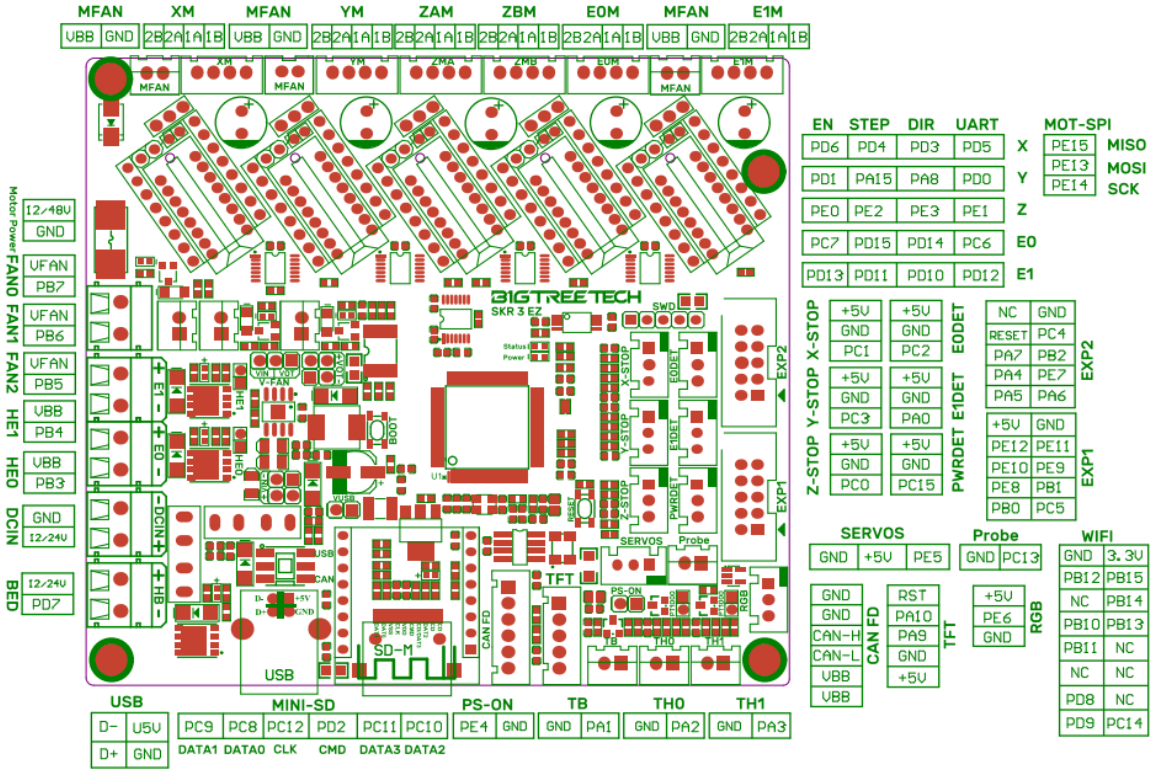


2. Peripheral Interface

2.1 Interface Diagram



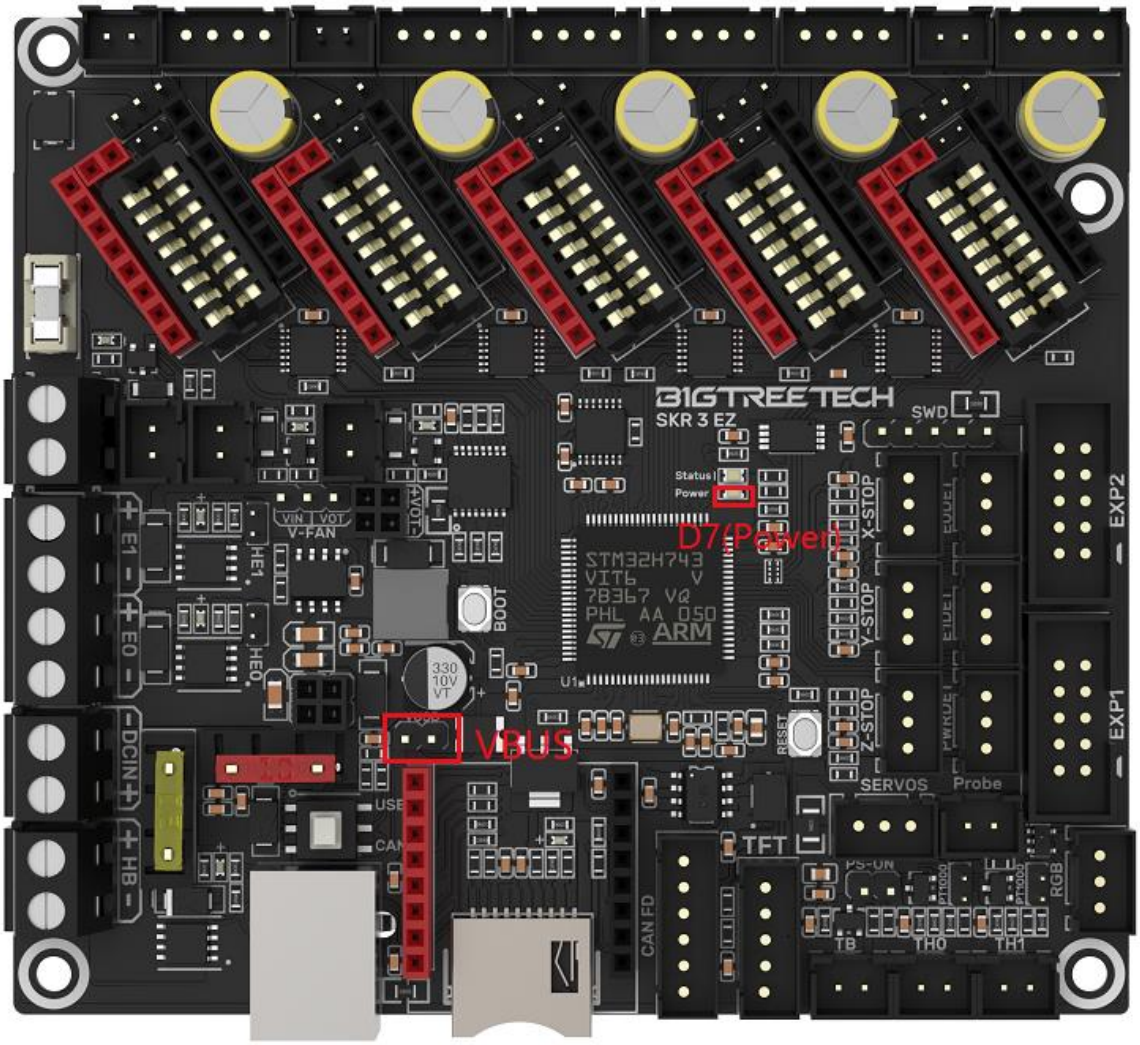
2.2 Pins Description



3. Interface Introduction

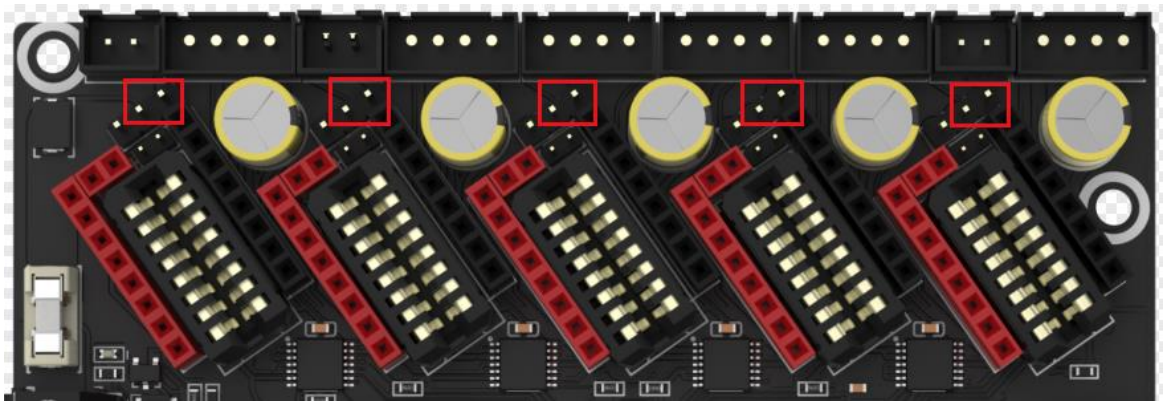
3.1 USB Powered

After the SKR 3 EZ V1.0 motherboard is powered on, the red light of D7 (Power) in the upper right corner of the MCU will light up, indicating that the power supply is normal. The VUSB in the middle of the board is the power selection terminal. Only when using USB to supply power to the motherboard or need to supply power through USB, you need to use the jumper to make the VUSB short circuit.

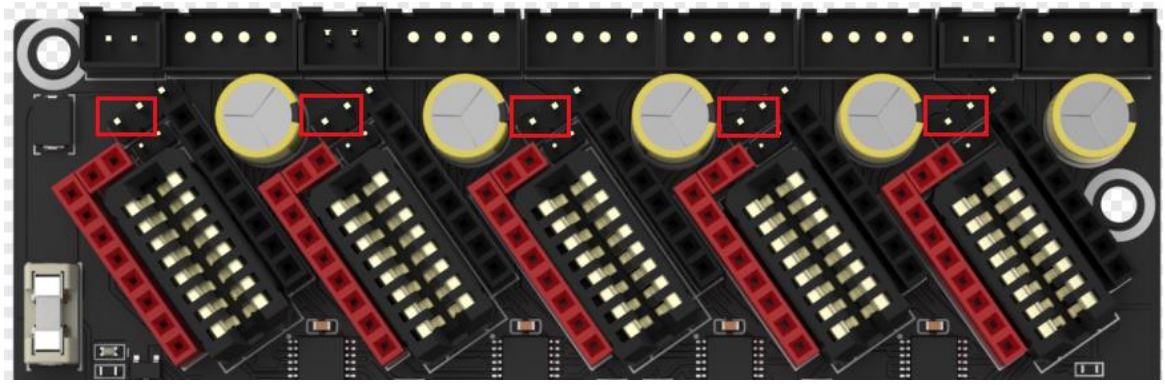


3.2 Motor Voltage Selection

3.2.1 Motherboard Power Voltage for Motor Voltage Selection



3.2.2 Motor Supply Voltage for Motor Voltage Selection



3.3 Step Motor Drivers

3.3.1 TMC-driven Mode

The number of subdivisions needs to be set high or low by firmware to the corresponding subdivision configuration pins.

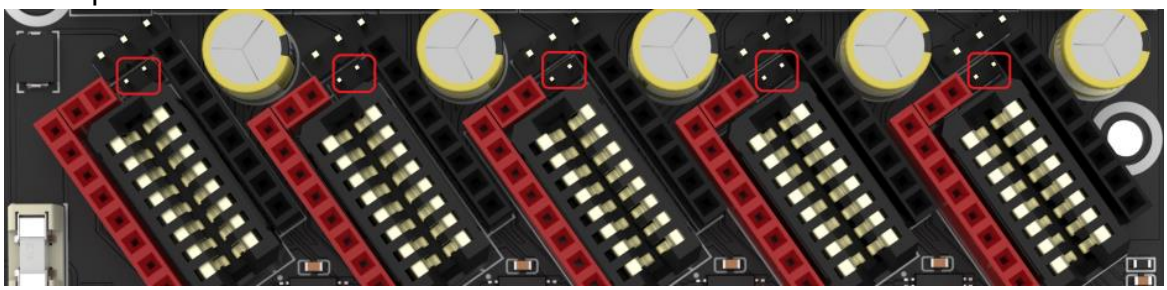
3.3.2 TMC/EZ-driven UART/SPI Mode

TMC series drivers do not support the use of both UART and SPI drivers at the same time, for example: X, Y-axis use TMC/EZ2209 (UART), Z, E0 axis use TMC/EZ5160 (SPI).

The EZ series drivers support the simultaneous use of both UART and SPI drivers.

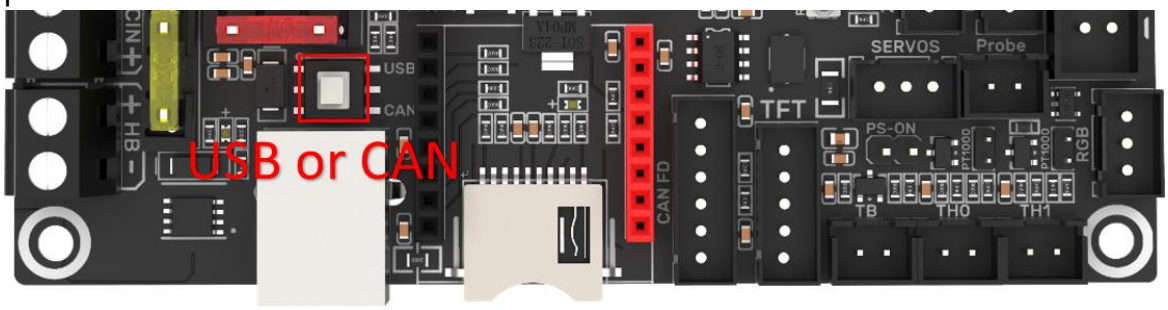
3.3.3 TMC-driven DIAG mode(Sensorless Homing)

As shown in the pictures, plug the jumper cap when using the Sensorless Homing function, and leave it unplugged when not in use. There is no need to cut the DIAG pin of the driver.



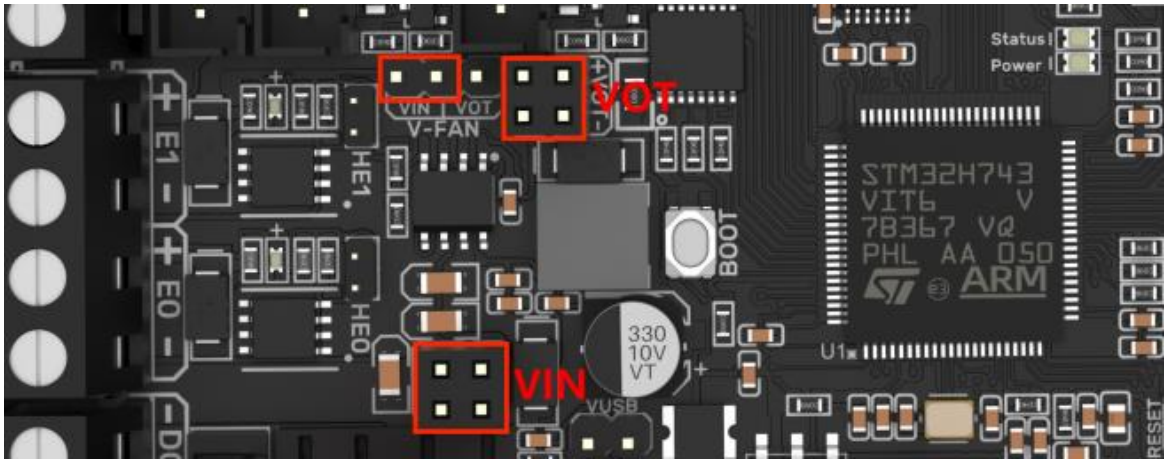
3.4 USB and CAN Mode

As shown in the figure below, the double-pole double-throw switch is in USB mode when it is in the pop-up state, and in CAN FD mode when it is in the pressed state.

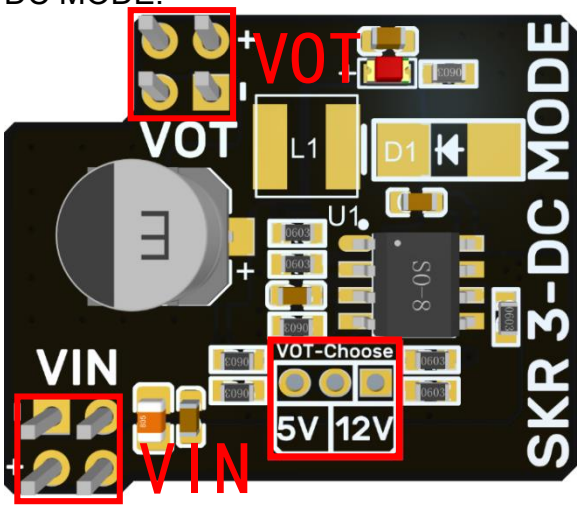


3.5 Voltage selection for NC fans

If DCIN is used as the power supply of the numerical control fan, a jumper cap should be used to short-circuit the two pins within the VIN range. If you want to use 12V or 5V as the NC fan power supply, you need to make a jumper cap short-circuit two pins within the VOT range, and insert the SKR 3-DC MODE into the 2*4Pin VOT and VIN headers.

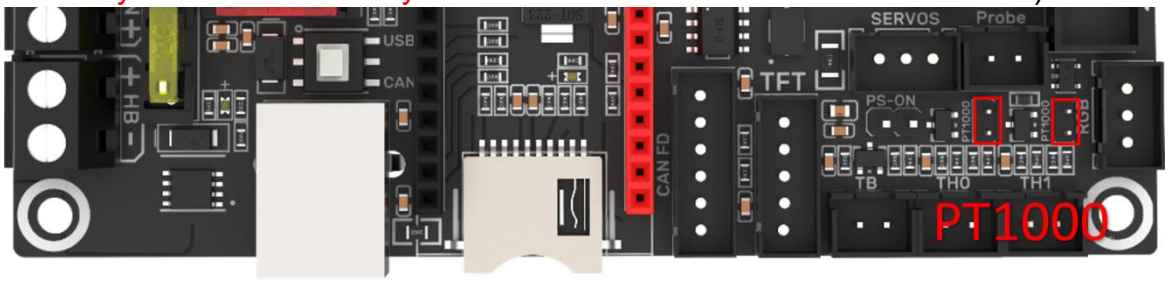


Set the VOT output voltage to 5V or 12V by setting the jumper cap on the SKR 3-DC MODE.

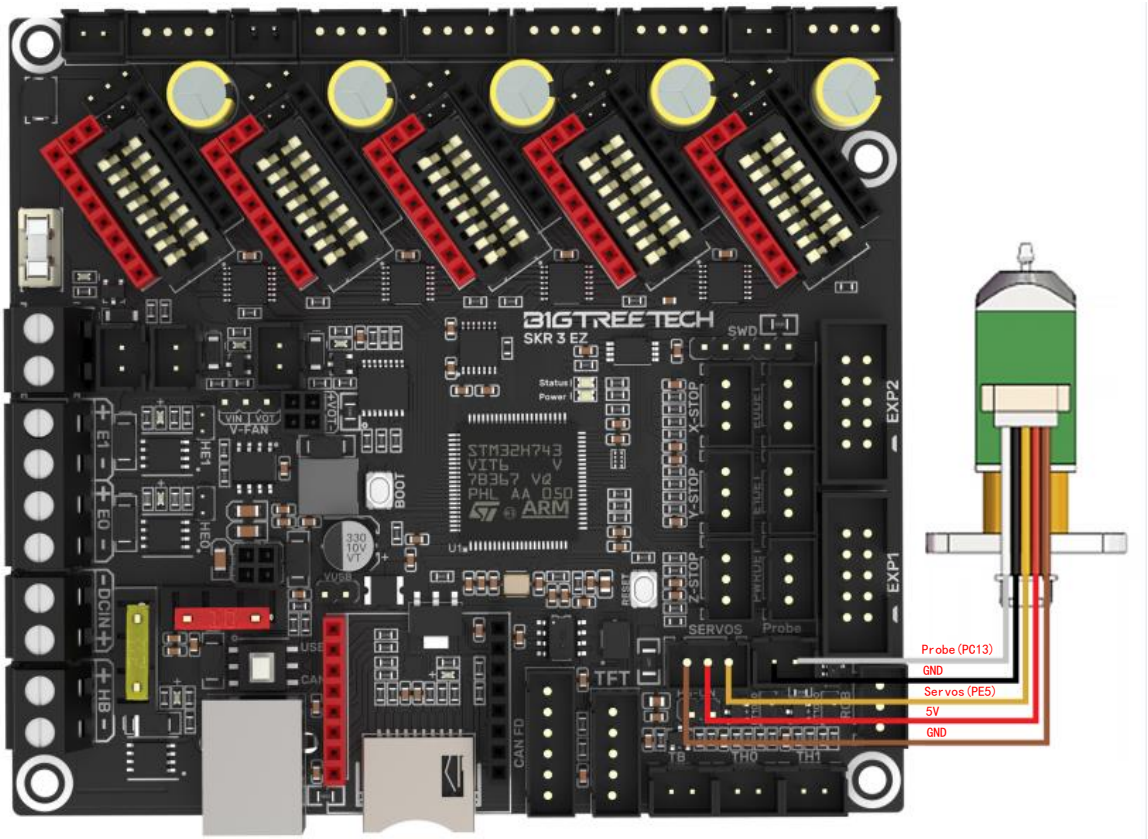


3.6 100K NTC or PT1000 Setup

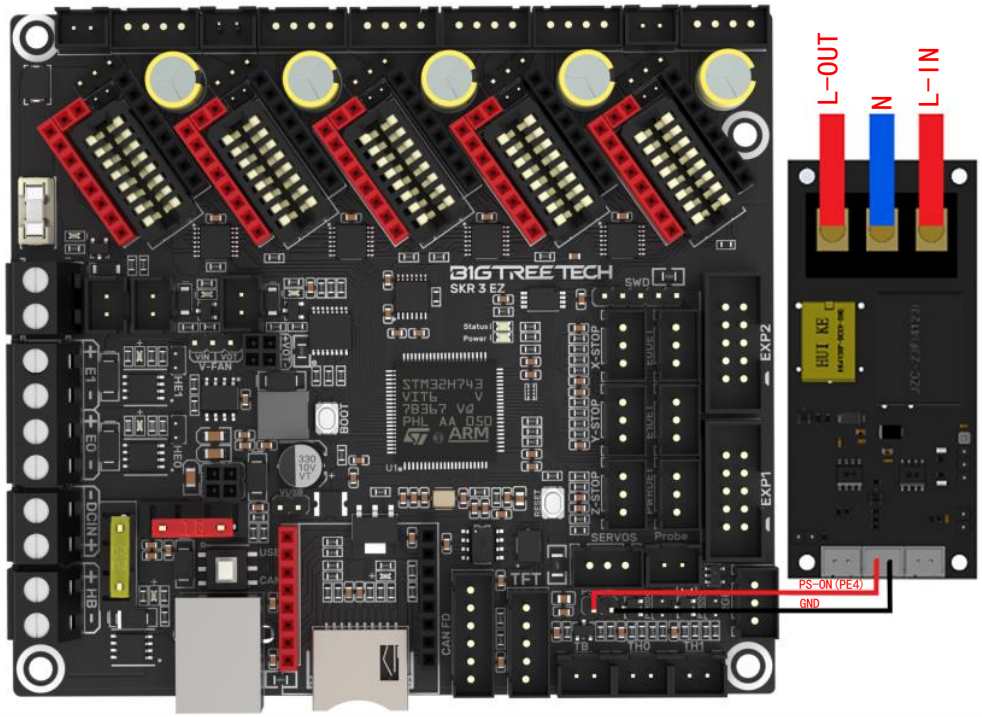
When using a 100K NTC thermistor, no need to insert a jumper cap. At this time, the pull-up resistors of TH0 and TH1 are 4.7K. When using PT1000, you need to use jump caps to short-circuit the two pins in the red box in the picture below. At this time, the pull-up resistors of TH0 and TH1 are 2.2K (Note: the temperature accuracy read out in this way will be much worse than that of MAX31865).



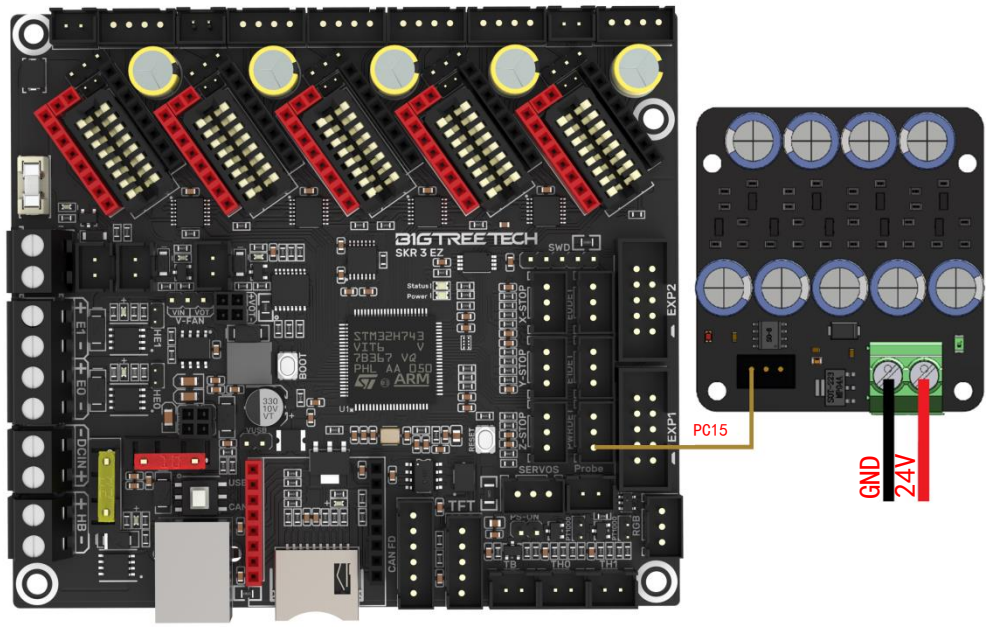
3.7 BLTouch Connection



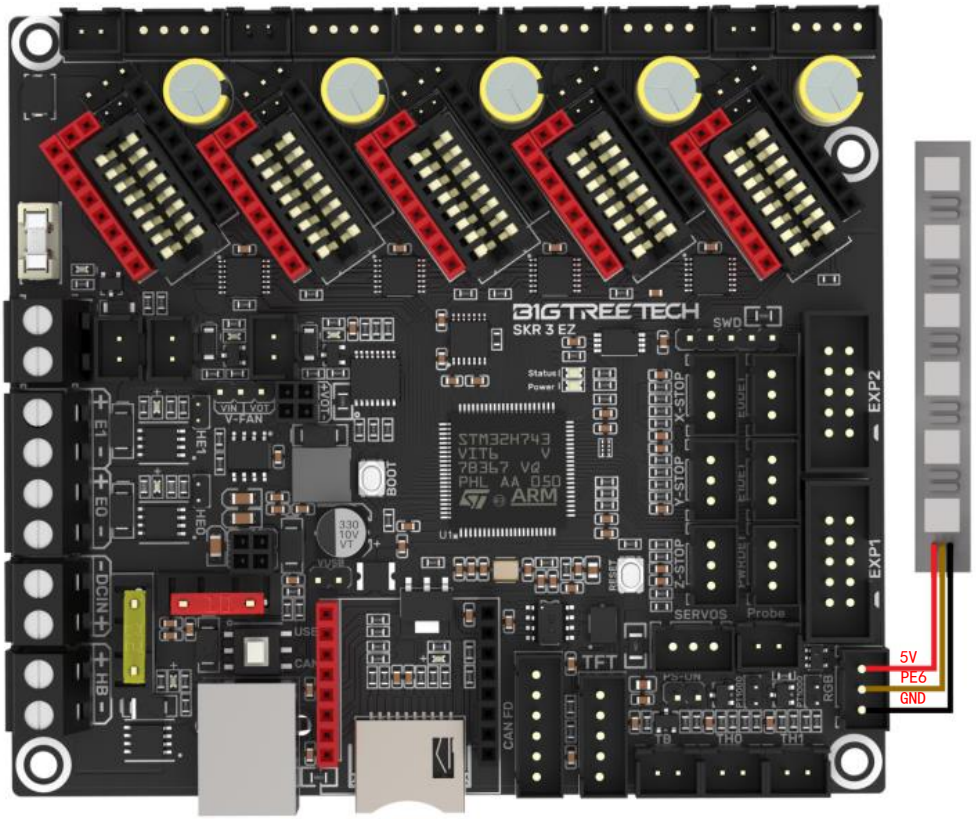
3.8 Completed Shut-down Module(Relay V1.2) Connection



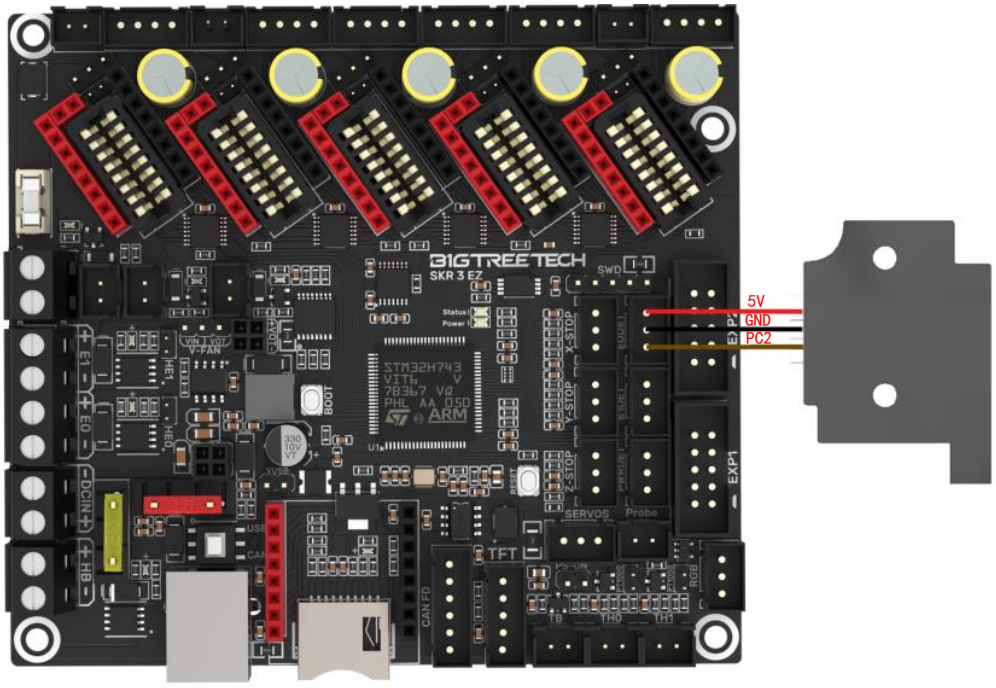
3.9 Resume Printing(UPS 24V V1.0) Connection



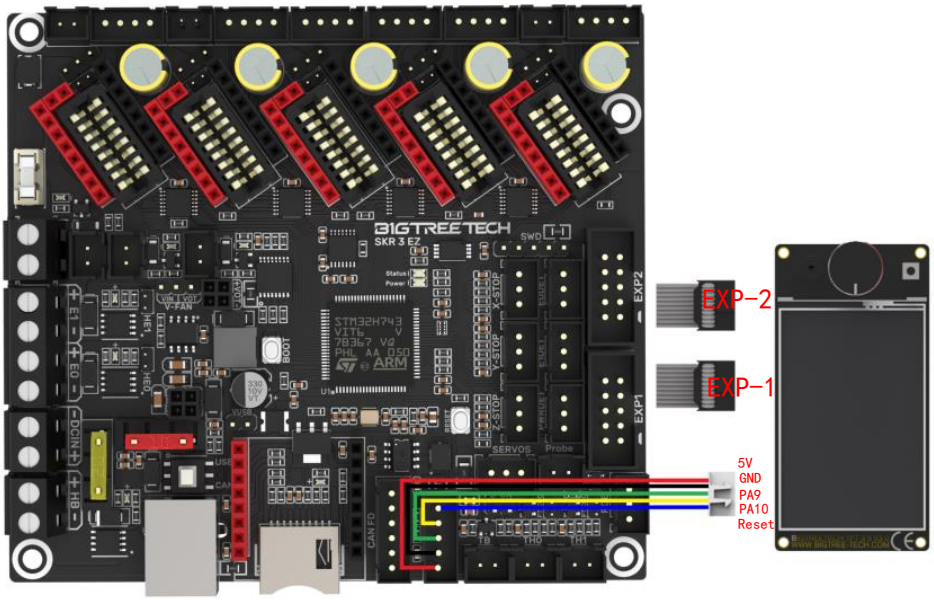
3.10 RGB Connection



3.11 Break Detection Connection

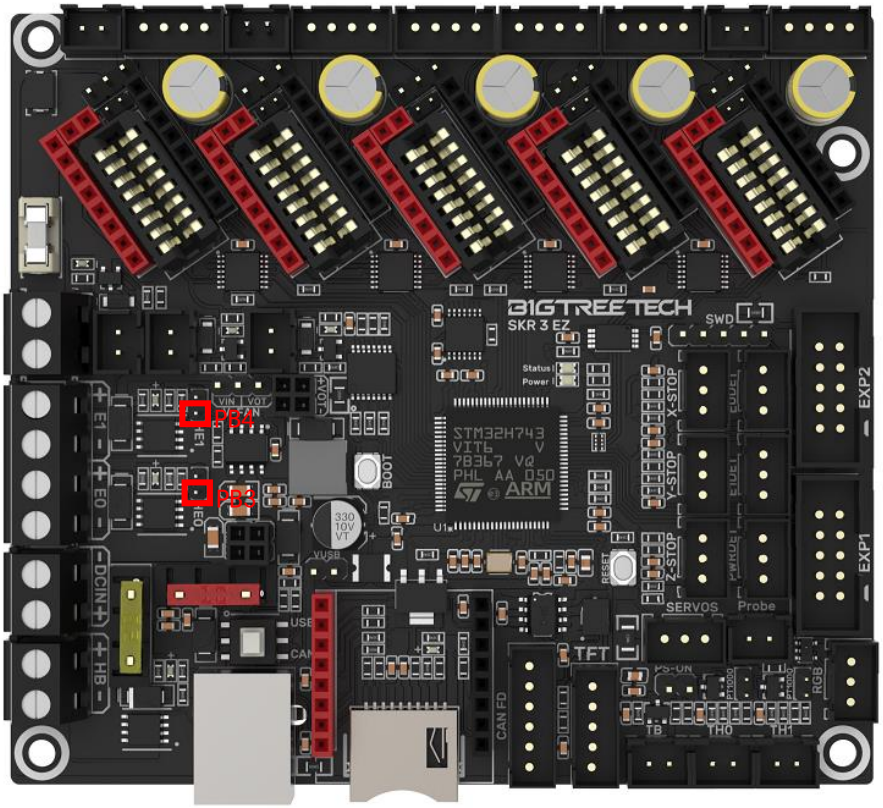


3.12 Touch Screen Connection



3.13 Heater cartridge IO

The IO of the SKR 3 heater cartridge is wired to the MOS by the jumper. You can remove the jumper and connect the IO to device directly if you need to use the laser or other device that need PWM. (Note: The IO passes through logic conversion chip, the output high level is 5V, and cannot be used as an input)



4. Marlin

4.1 Compiler Environment Installation

https://github.com/bigtreetech/Document/blob/master/How%20to%20install%20VScode%2BPlatformio.md
https://marlinfw.org/docs/basics/install_platformio_vscode.html
Refer to the instructions in these two links to install VSCode and PlatformIO plugins (domestic users may be slow to install PlatformIO plugins online).

4.2 Download of Marlin Firmware

1. Download the latest version of the bugfix firmware from the Marlin official website:

   https://github.com/MarlinFirmware/Marlin/tree/bugfix-2.0.x

2. Download pre-configured firmware of Compiler Environment and board type from our GitHub:
   https://github.com/bigtreetech/SKR-3

4.3 Firmware Configuration

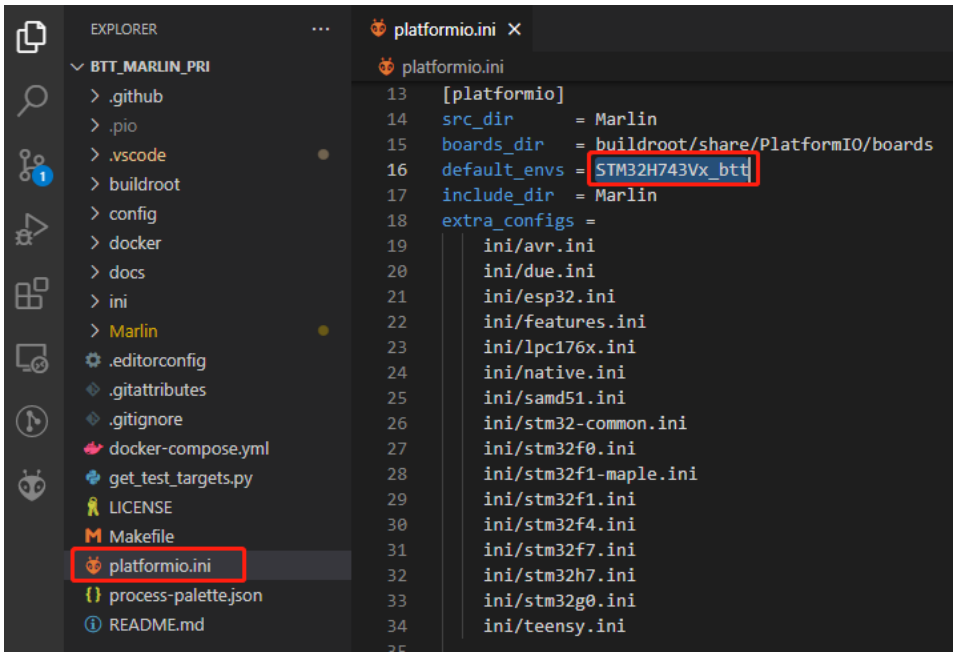
4.3.1 Open the Marlin Project

You can open Marlin in VSCode in one of the following ways:

- Drag the downloaded Marlin Firmware folder onto the VSCode application icon.
- Use the **Open...** command from the VSCode **File** menu.
- Open the PIO Home tab and click the "**Open Project**" button.

4.3.2 Compiler Environment Configuration

Open **platformio.ini** file and modify **default_envs** to **STM32H743Vx_btt.**



4.3.3 Motherboard type and Serial port number Configuration

Set Motherboard type **MOTHERBOARD** to **BOARD_BTT_SKR_3**

#define MOTHERBOARD BOARD_BTT_SKR_3

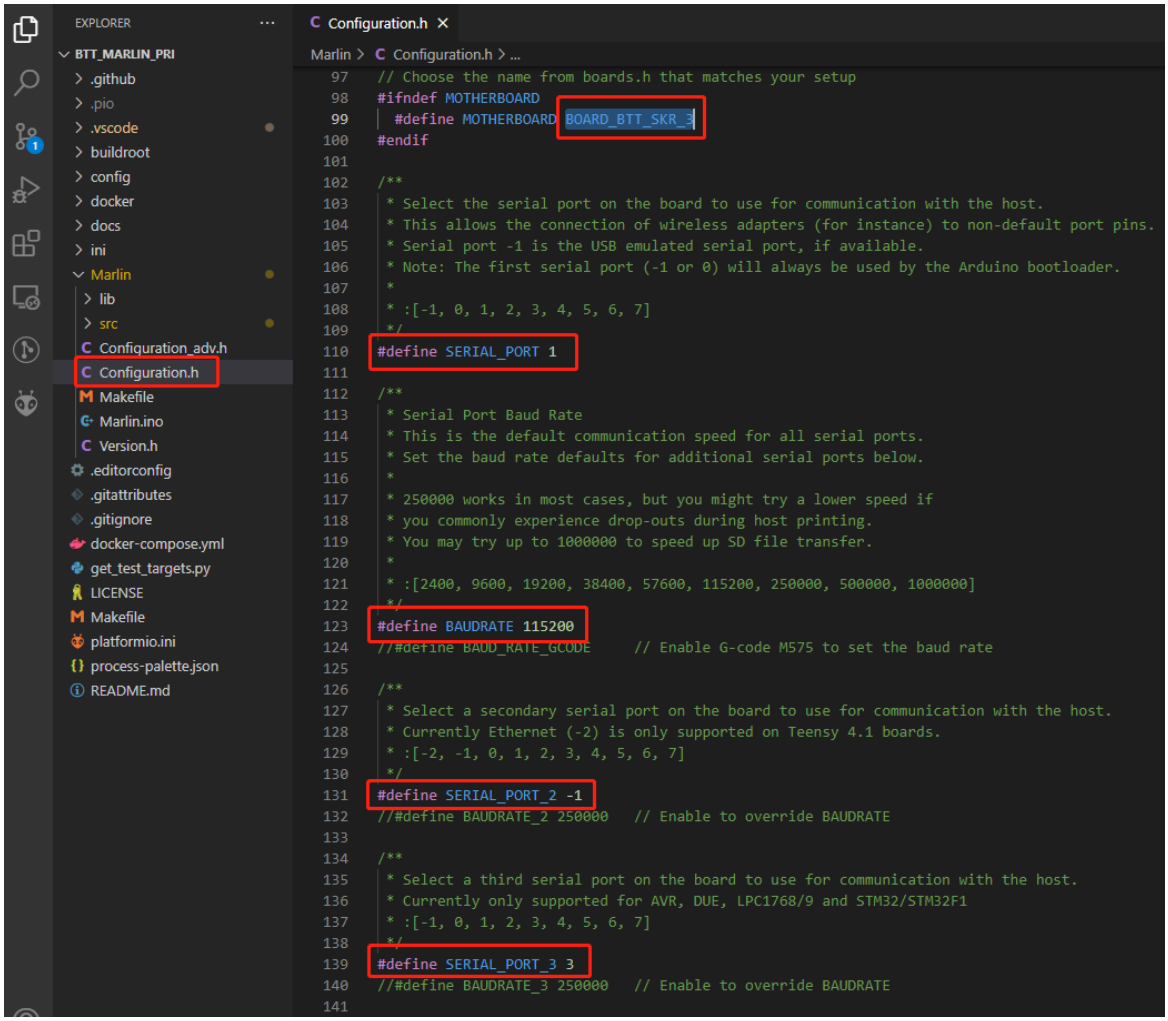
#define SERIAL_PORT 1 (Enable TFT serial port)

#define BAUDRATE 115200 （Set the baud rate, pay attention to the same as the communication device）

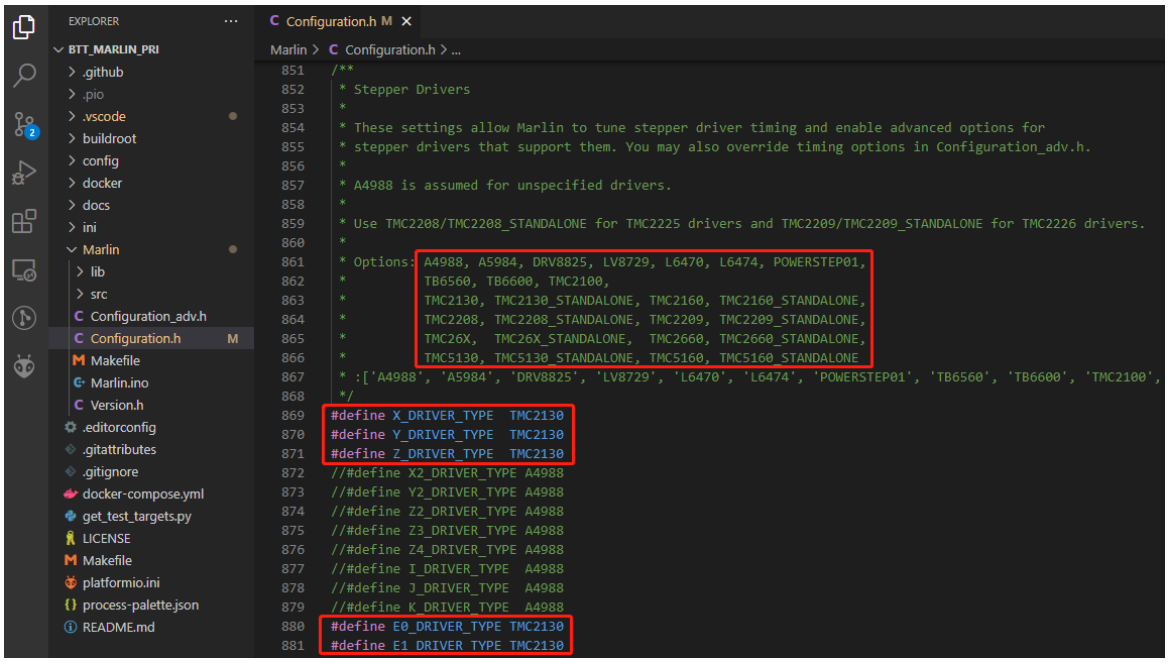
#define SERIAL_PORT_2 -1 （Enable USB emulated serial port）

#define SERIAL_PORT_3 3 （Enable WIFI serial port）

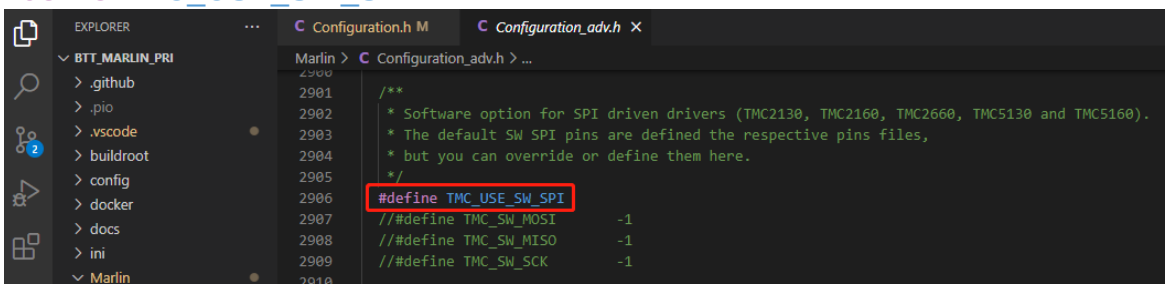
The above settings can be enabled according to the needs.



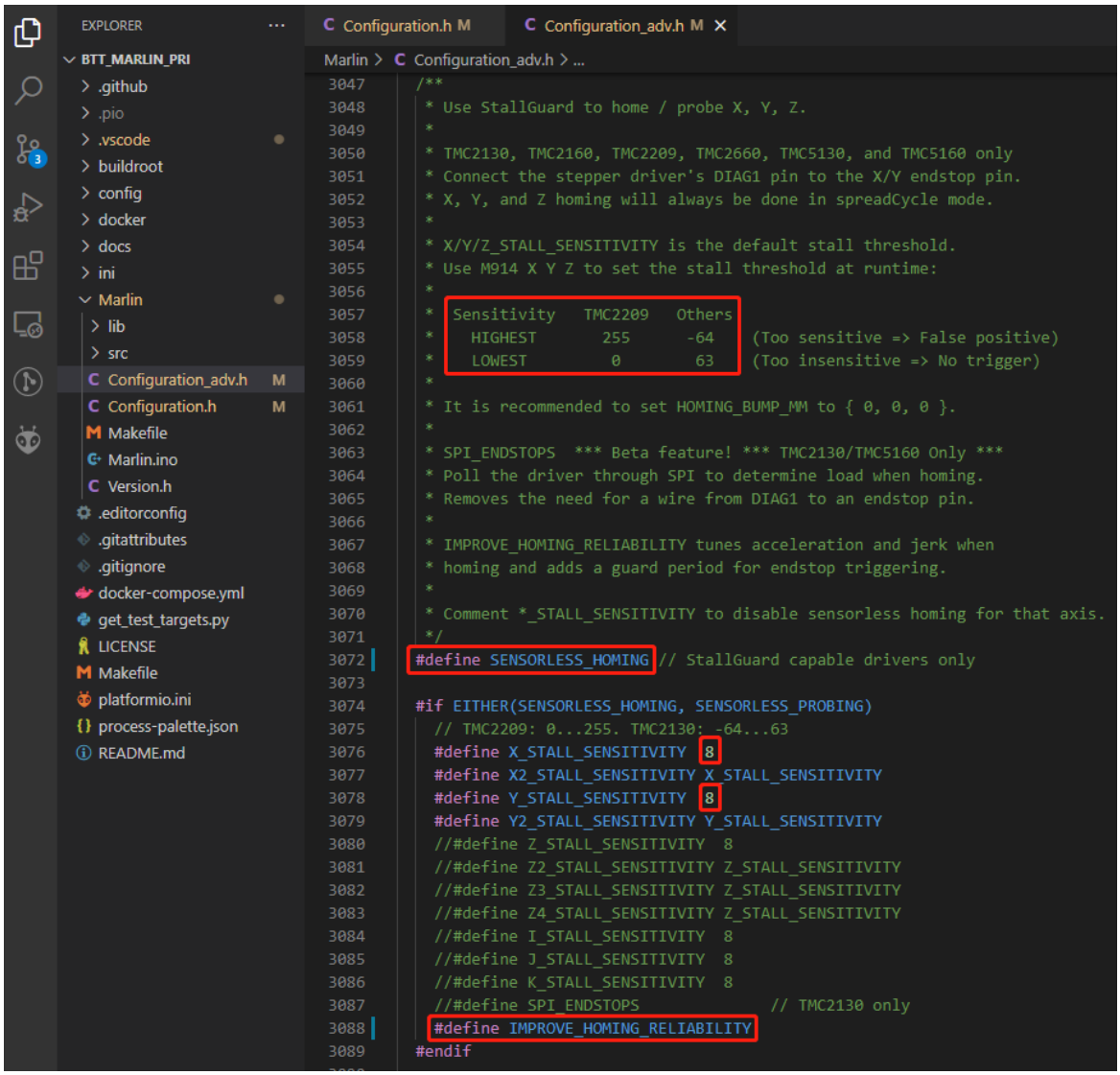
4.3.4 Motor Driver Configuration



If the driver used is SPI mode, you also need to enable TMC_USE_SW_SPI
#define TMC_USE_SW_SPI



4.3.5 Sensorless Homing



#define SENSORLESS_HOMING //Turn on drive stall detection as a function of the Home limit switch.

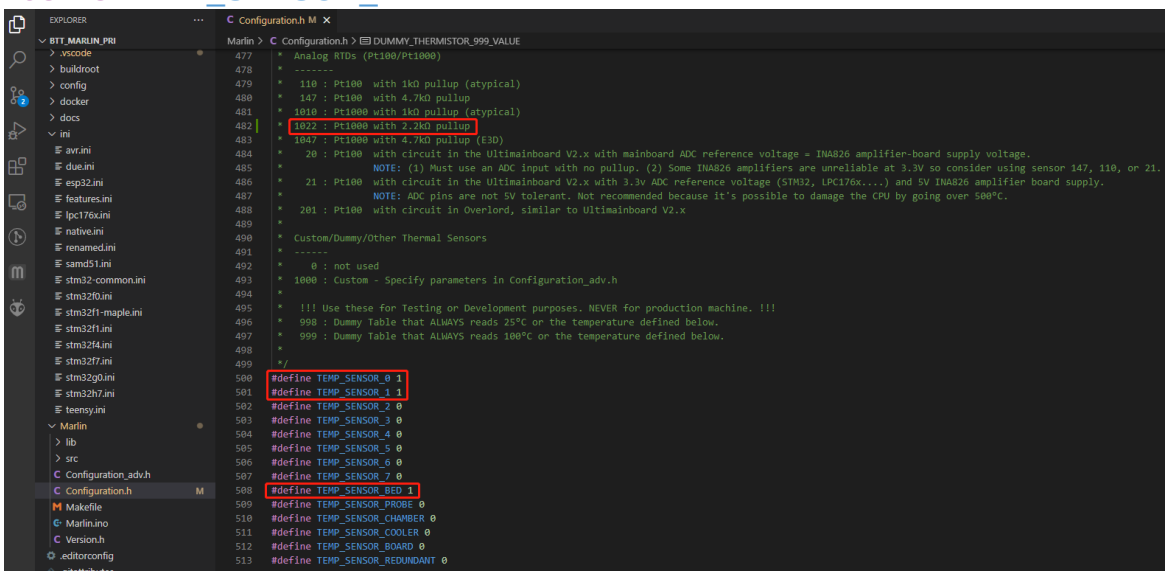
#define xx_STALL_SENSITIVITY 8 // Set the sensitivity of stall detection. The range of TMC2209 is 0~255. The larger the value, the more sensitive it is, and it is easy to trigger falsely. When the phenomenon is Home, the axis stops before returning to the origin. The smaller the value, the less sensitive it is, and the easier it is not to trigger. Make a "Deng Deng Deng" sound. Other driving ranges are 63~-64, the smaller the value, the more sensitive. #define IMPROVE_HOMING_RELIABILITY // Set the current parameter above(X_CURRENT_HOME) when returning to zero separately , so as to get the best zeroing effect

#define IMPROVE_HOMING_RELIABILITY // The current parameter (xx_CURRENT_HOME) during zeroing can be set separately above to get the best zeroing effect

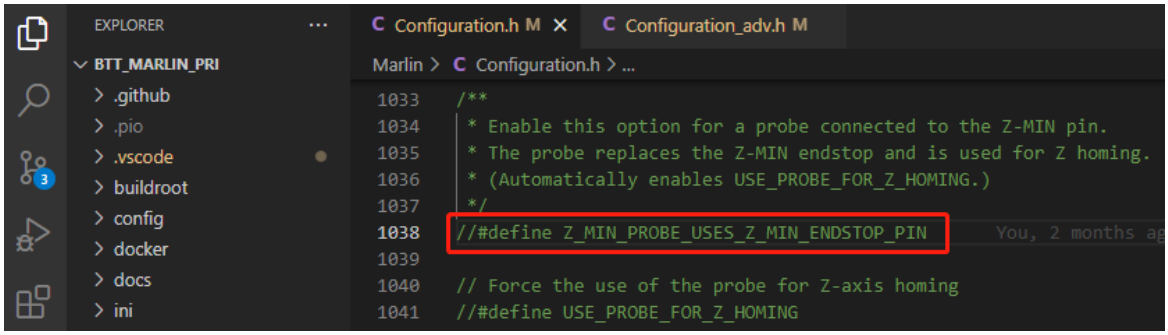
4.3.6 100K NTC or PT1000

Set the pull-up resistor of the thermistor to 4.7K (with 100K NTC) or 2.2K (with PT1000) through the jumper cap, 1 in Marlin firmware means 100K NTC + 4.7K pull-up resistor, 1022 means PT1000 + 2.2K pull-up Resistance (Note: The temperature accuracy read in this way will be much worse than the MAX31865).

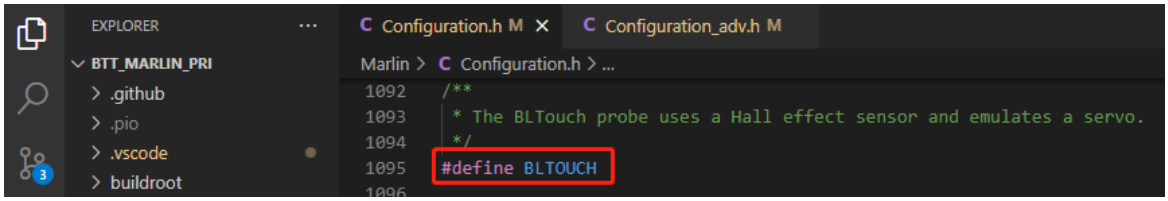
#define TEMP_SENSOR_0 1
#define TEMP_SENSOR_1 1
#define TEMP_SENSOR_BED 1



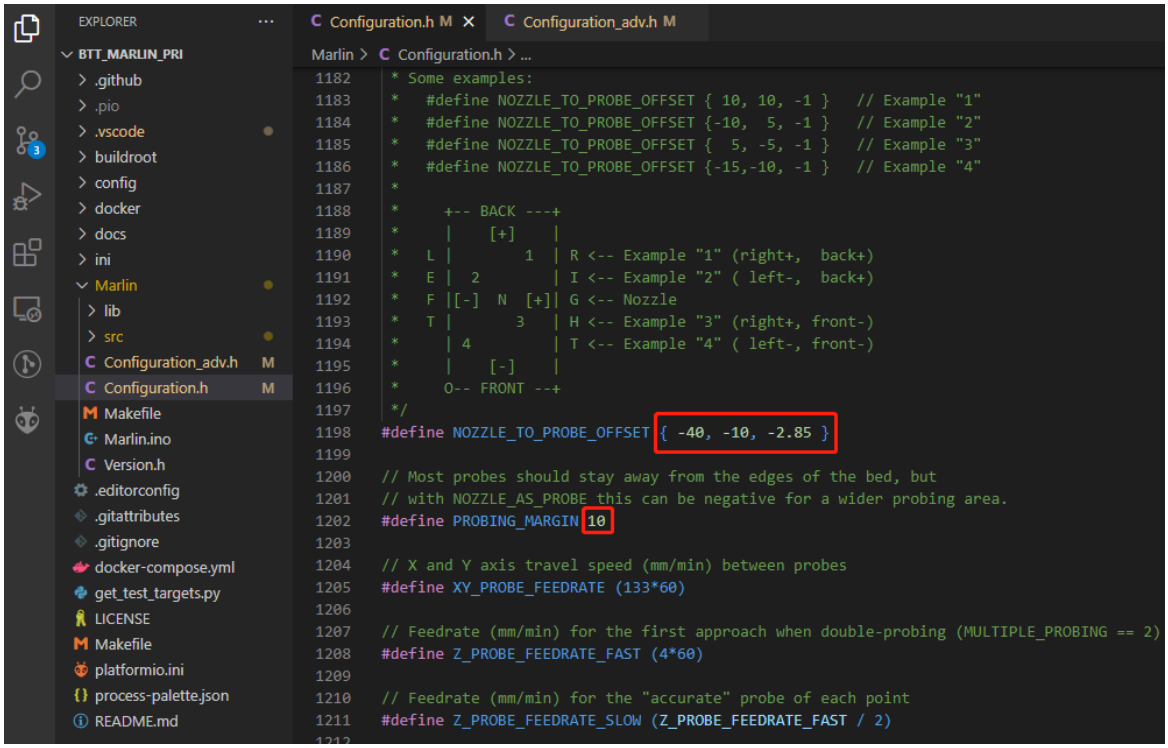
4.3.7 BL Touch



//#define Z_MIN_PROBE_USES_Z_MIN_ENDSTOP_PIN // Do not remap Z_PROBE_PIN to Z_MIN port

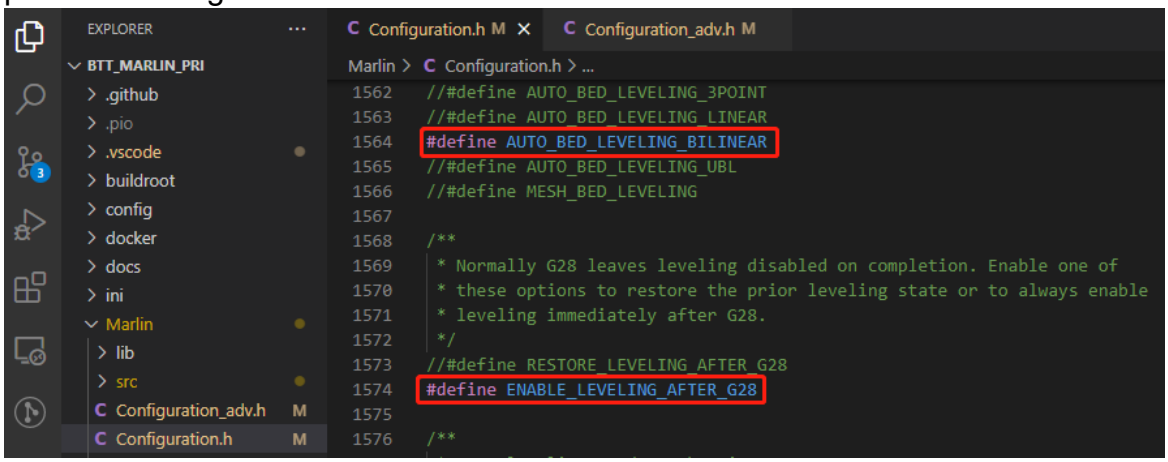


#define BLTOUCH // Enable BL Touch function



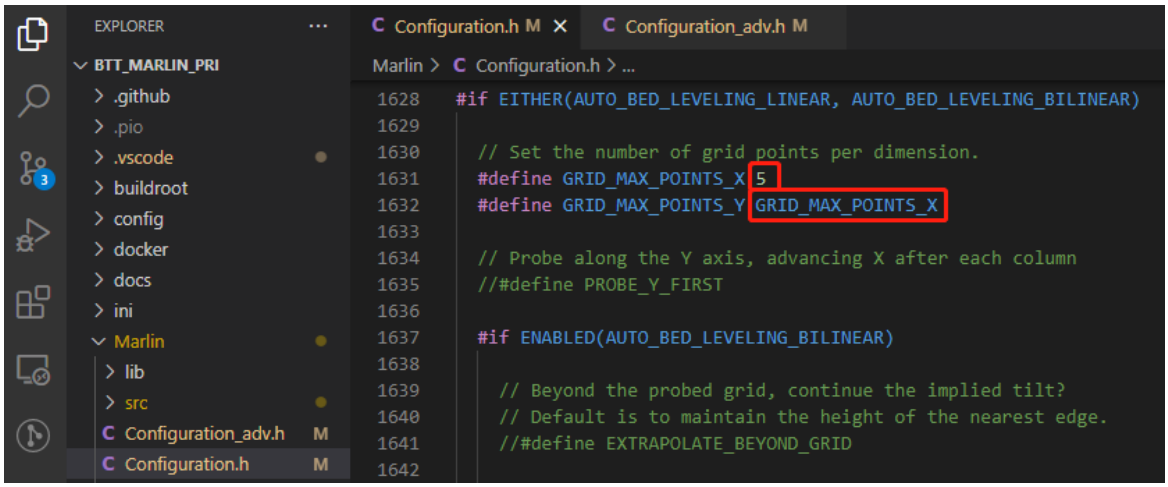
#define NOZZLE_TO_PROBE_OFFSET { -40, -10, -2.85 } // Set up the offset of the BL Touch probe relative to the nozzle

#define PROBING_MARGIN 10 // Set up the distance from the leveling detection point to the edge



#define AUTO_BED_LEVELING_BILINEAR // Set up leveling strategy

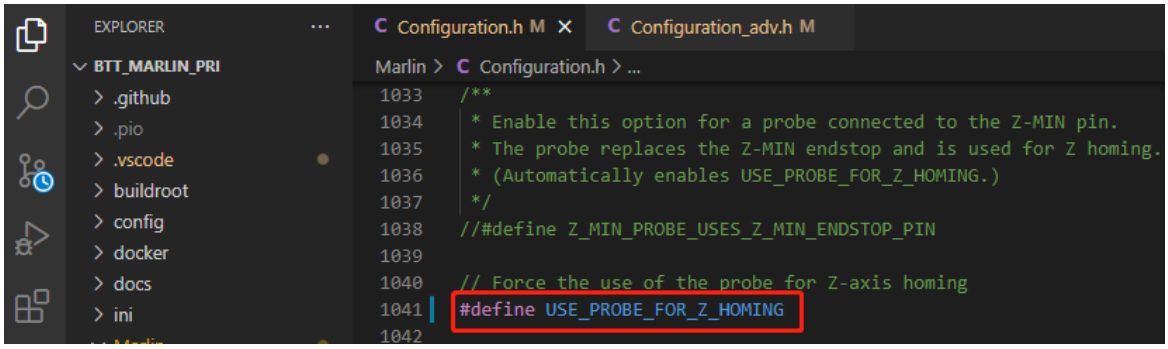
#define RESTORE_LEVELING_AFTER_G28 // Auto reload level compensation after Home



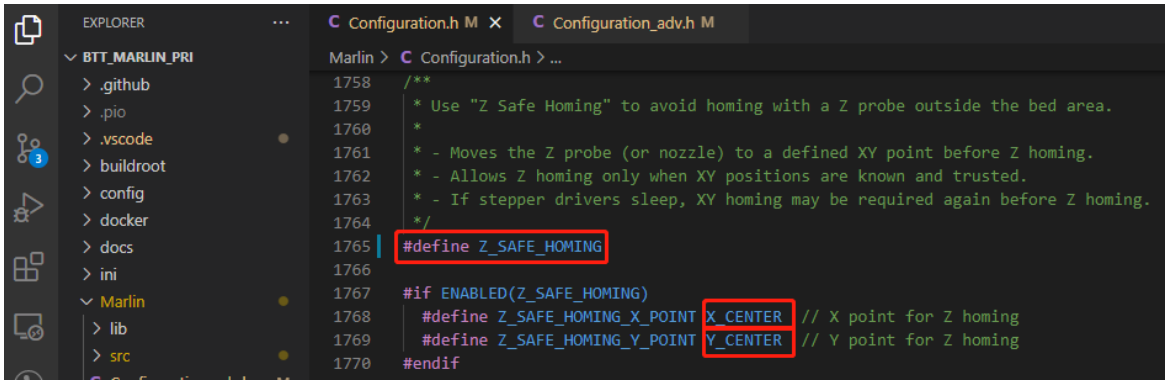
#define GRID_MAX_POINTS_X 5 // Set up the number of points for leveling detection, 5 points for X-axis detection

#define GRID_MAX_POINTS_Y GRID_MAX_POINTS_X // Y-axis probes 5 points

If you want to use BL Touch as the Z-axis limit switch, you don't need to change the connection just need to modify the firmware settings.



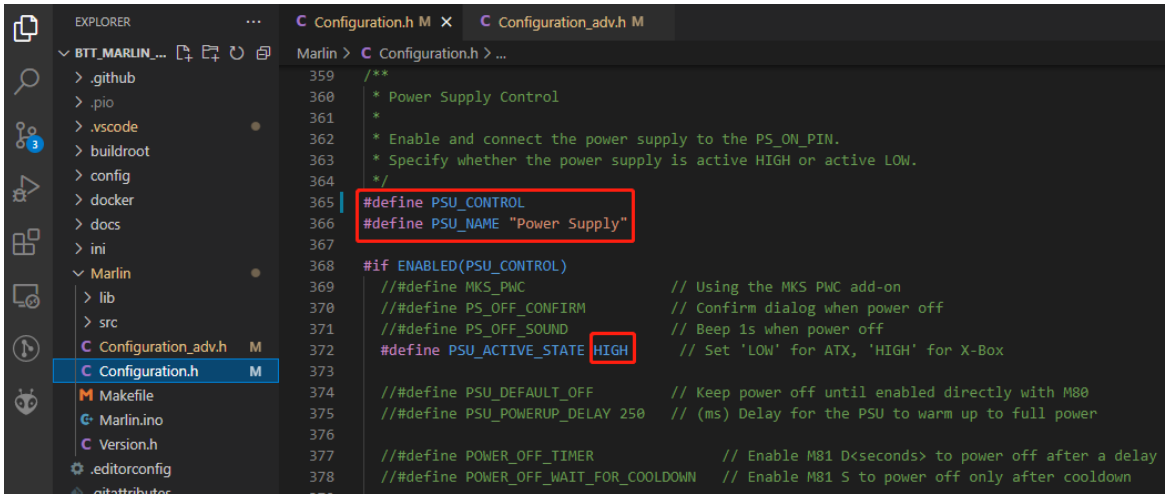
#define USE_PROBE_FOR_Z_HOMING // Use Z Probe(BL Touch) as Z-axis Home Limit Switch



#define Z_SAFE_HOMING //When the Z-axis is Home, move X and Y to the specified coordinates (usually the center of the platform) to ensure that when the

Z-axis is Home, the probe of the Z Probe (BL Touch) is within the scope of the platform.

4.3.8 Completed Shutdown Module (Relay V1.2)

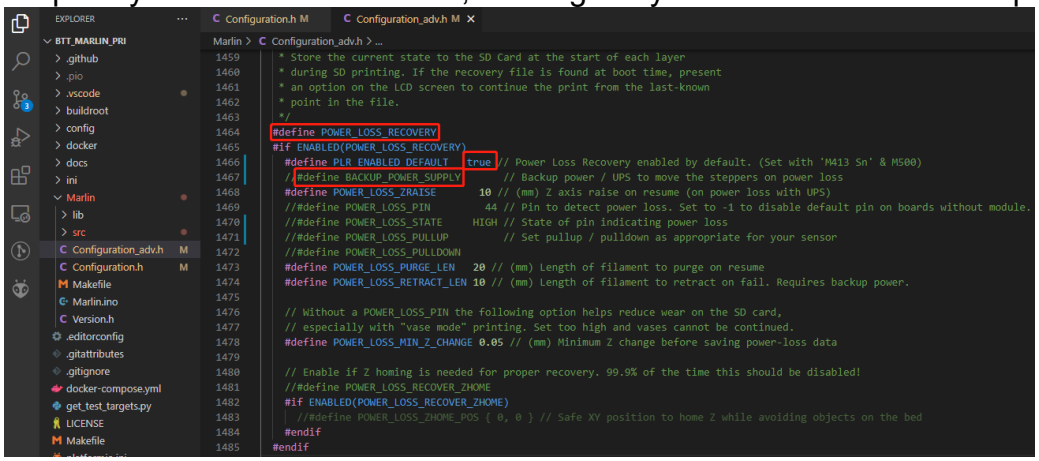


#define PSU_CONTROL // Turn on the control power function, you can turn on through the M80 and turn off through the M81

#define PSU_ACTIVE_STATE HIGH // Set up the power-on level. The Relay V1.2 module is powered on at a high level and powered off at a low level, so it needs to be set to HIGH

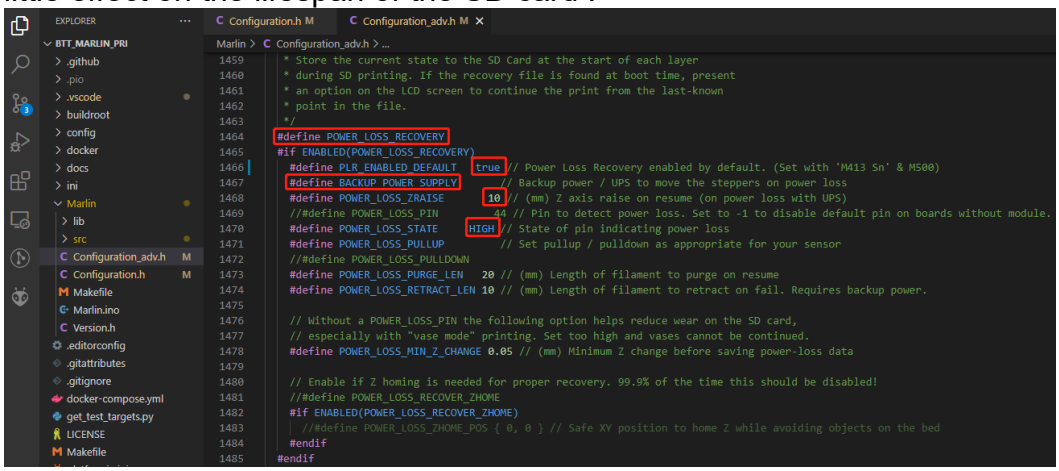
4.3.9 Resume Printing

There are currently two ways to realize the resume printing:
1.No external module is required, the firmware regularly saves the printing status to the SD card, and continues to print from the point saved in the SD card after a power failure and restart. The disadvantage of this method is that data is frequently written to the SD card, which greatly affects the SD card lifespan.



#define POWER_LOSS_RECOVERY // Enable resume printing function
#define PLR_ENABLED_DEFAULT true // true default to use open resume printing

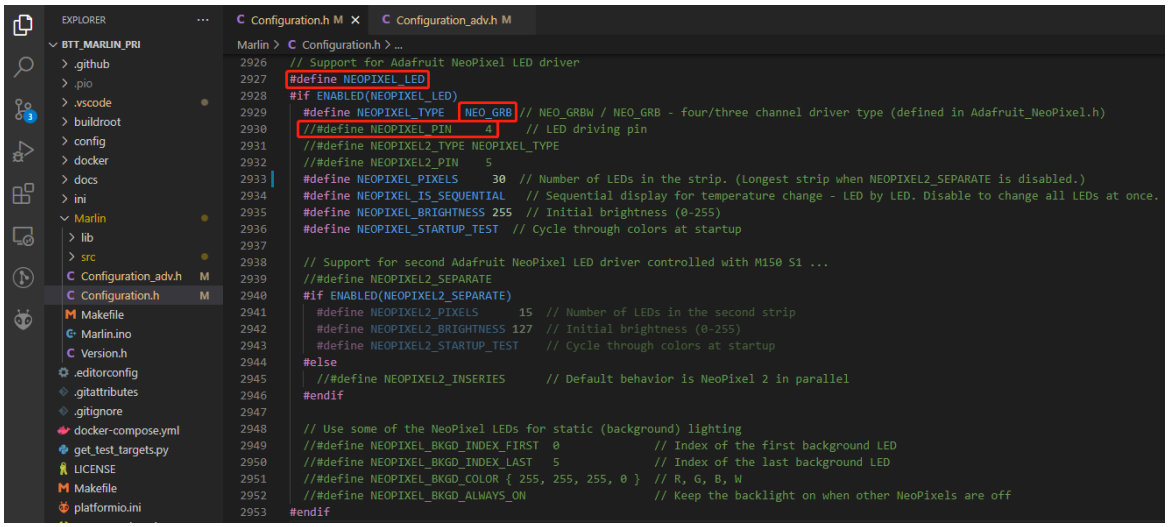
2.The external module UPS 24V V1.0 provides power and sends a signal to the mainboard when it is power-off, reminding the mainboard to save the printing state. This method only writes data to the SD card when the power is off, and has little effect on the lifespan of the SD card .



#define POWER_LOSS_RECOVERY // Enable resume printing function

#define PLR_ENABLED_DEFAULT true // true default to use open resume printing
#define POWER_LOSS_ZRAISE 10 // When the power is off, the nozzle is raised by 10mm to prevent the nozzle from scalding the model
#define POWER_LOSS_STATE HIGH // When the UPS 24V V1.0 is working normally, the module feedback a low level, and when the power is off, the feedback is a high level, so it is set to HIGH

4.3.10 RGB Light

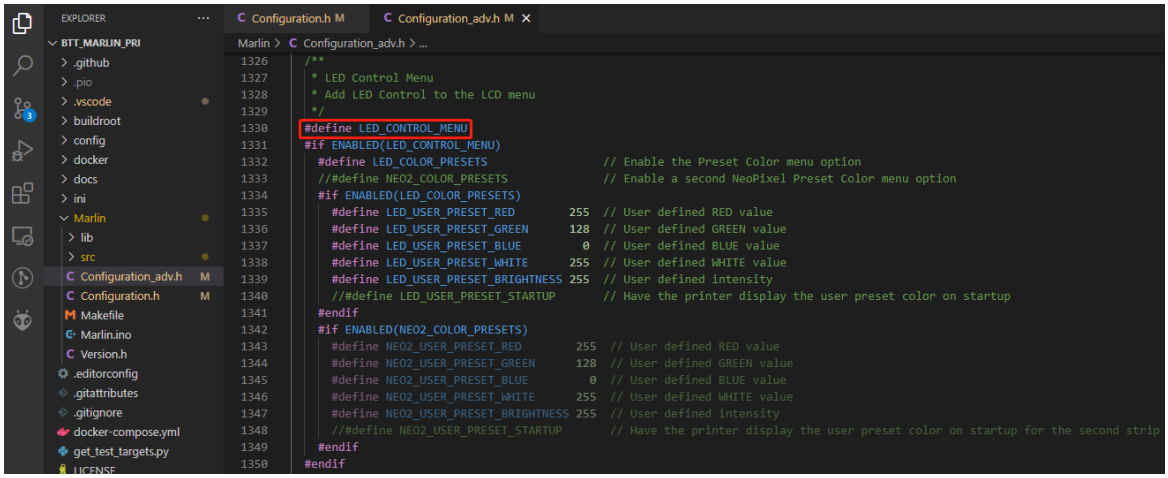


#define NEOPIXEL_LED // Enable Neopixel function
#define NEOPIXEL_TYPE NEO_GRB // Set up the type of lights
//#define NEOPIXEL_PIN 4 // Mask the PIN setting, use the correct signal line in the motherboard pin file

#define NEOPIXEL_PIXELS 30 // Quantity of lights

#define NEOPIXEL_STARTUP_TEST // When the machine is turned on, it will display three colors of red, green and blue in sequence, which is convenient for testing.

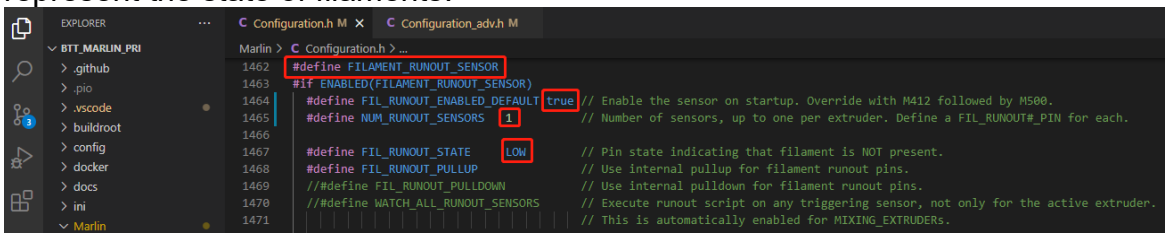
If you enable LCD2004, 12864, mini12864 and other monitors, you can also enable the RGB control menu on the interface



#define LED_CONTROL_MENU // Add a menu to control the LED color on the screen

4.3.11 Filament Break Detection

Ordinary material break detection module is generally designed by a mechanical switch, the module gives the motherboard a constant high and low level to represent the state of filaments.

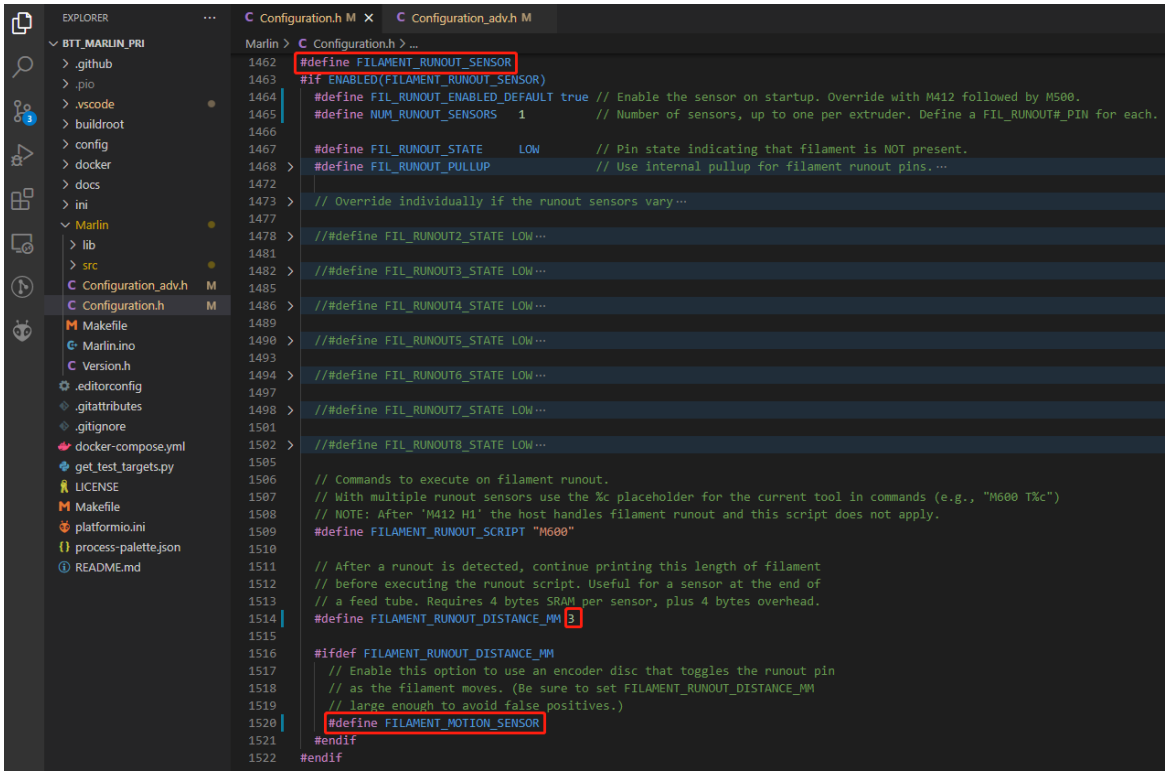


#define FILAMENT_RUNOUT_SENSOR // Enable filament detection function
#define FIL_RUNOUT_ENABLED_DEFAULT true // true is on by default
#define NUM_RUNOUT_SENSORS 1 // Quantity of filaments detection sensors
#define FIL_RUNOUT_STATE LOW // The level state when the filaments are

abnormal, set up according to the actual situation of the module. If the module sends a low level when the consumables are abnormal, set it to LOW.

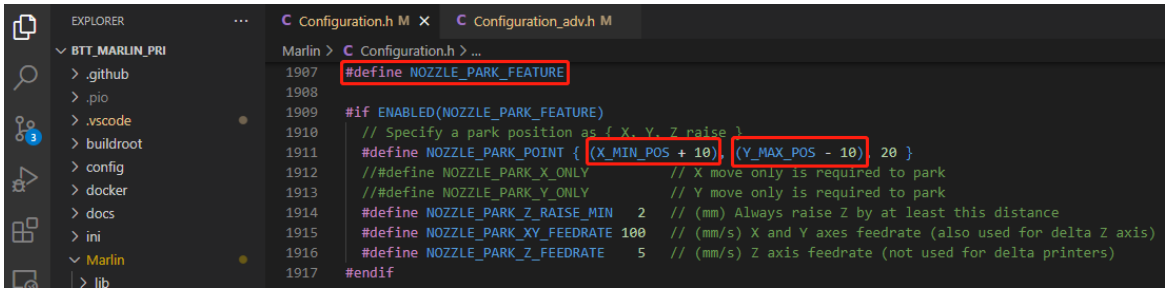
4.3.12 Smart Filament Sensor(SFS V1.0)

The Smart Filament Sensor will continuously send a jumping level signal when the filaments pass normally. When abnormal conditions such as material blockage/disconnection occur, the filaments cannot pass through the SFS normally, and the module cannot send a jumping signal to the mainboard, which thus knows that the filaments are abnormal.

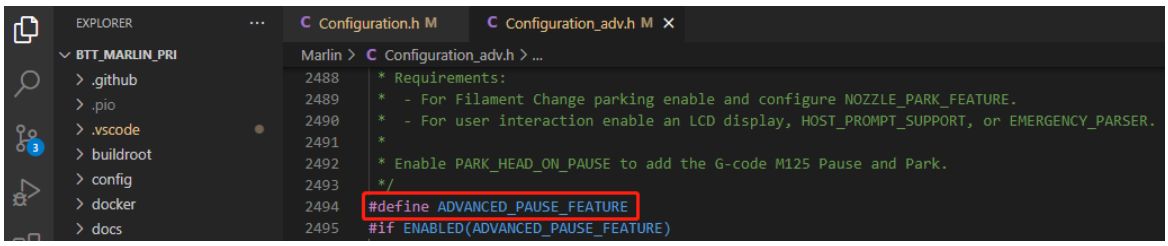


#define FILAMENT_MOTION_SENSOR // Set filament sensor to encoder type
#define FILAMENT_RUNOUT_DISTANCE_MM 7 // Set up the detection sensitivity. The recommended setting for SFS V1.0 is 7mm. If there is no level jump within 7mm of the filaments, it means that the filaments are abnormal.

Filaments detection also needs to set up the action after the abnormal suspension of the filaments through the following two places.



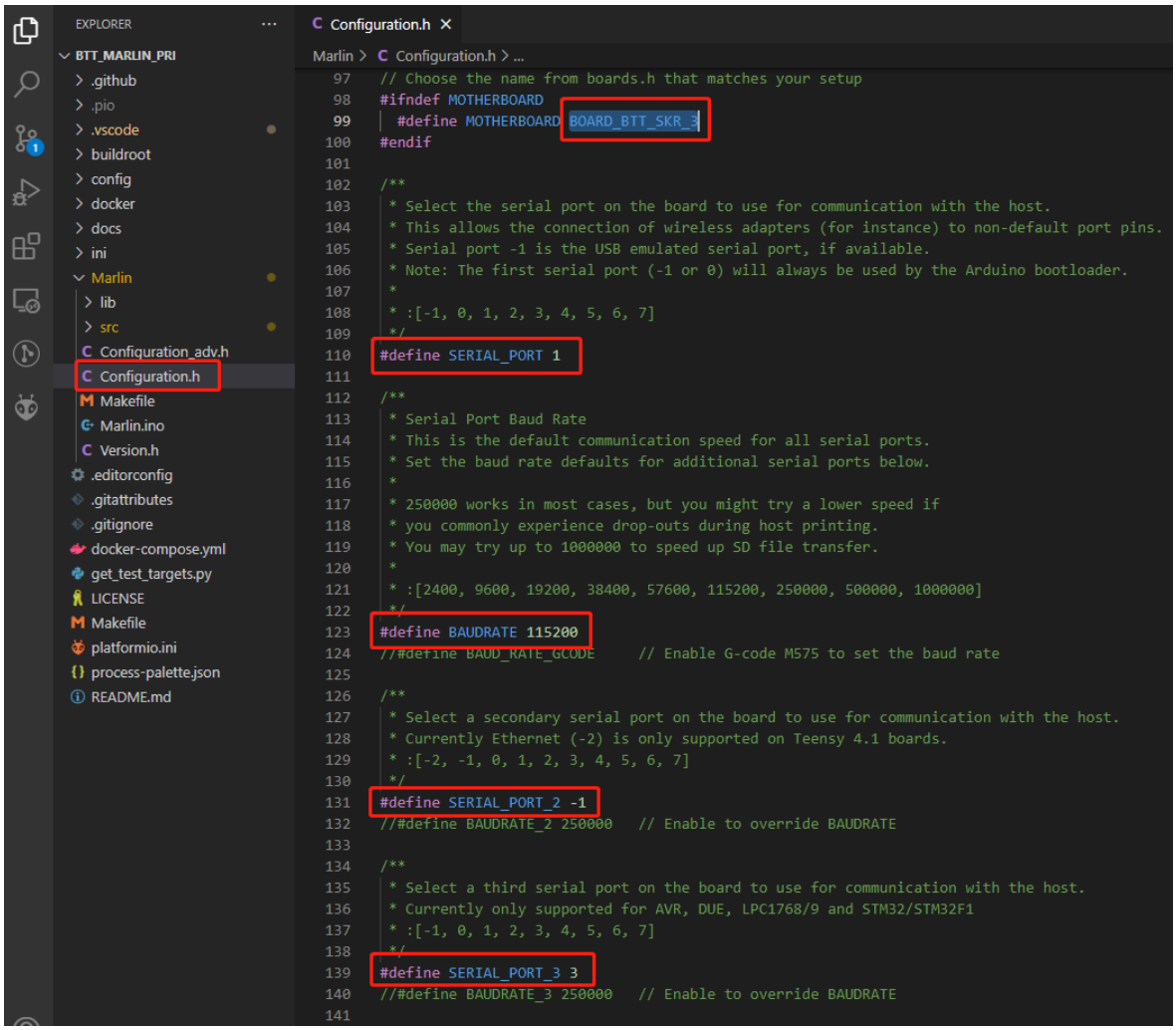
#define NOZZLE_PARK_FEATURE // Nozzle Pause Function
#define NOZZLE_PARK_POINT { (X_MIN_POS + 10), (Y_MAX_POS - 10), 20 }
//Set the X, Y coordinates and the height of the Z axis when the nozzle is paused



#define ADVANCED_PAUSE_FEATURE // You can set parameters such as the length and speed of filament retraction during pause, and the length and speed of filament extrusion after continuing to print.

4.3.13 ESP3D

Just set the correct "SERIAL_PORT" and "BAUDRATE" in Marlin. The serial port for communication between ESP8266 and Marlin on the motherboard is UART3, so set SERIAL_PORT to 3.

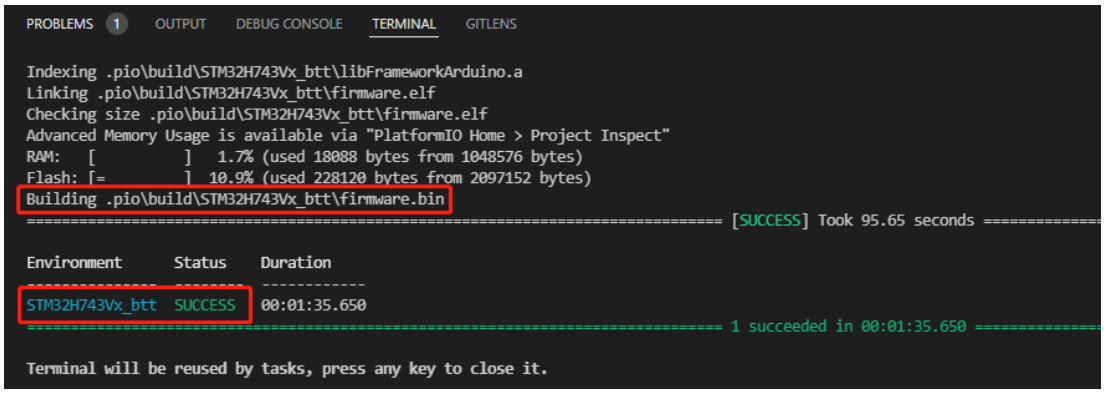


You can get the latest ESP3D firmware at https://github.com/luc-github/ESP3D, compile your own binary, rename it to "esp3d.bin" and copy it to the root directory of the SD card, plug it into the motherboard and then Reset, the bootloader in the motherboard will automatically update the esp3d.bin to the ESP8266, and the file will be renamed to "ESP3D.CUR" after the update is completed.

4.4 Compile the Firmware

1. Click "√" in the status bar at the bottom to compile the firmware.

2. After the compilation is completed, the "firmware.bin" file will be generated, copy it to the SD card to update the firmware.



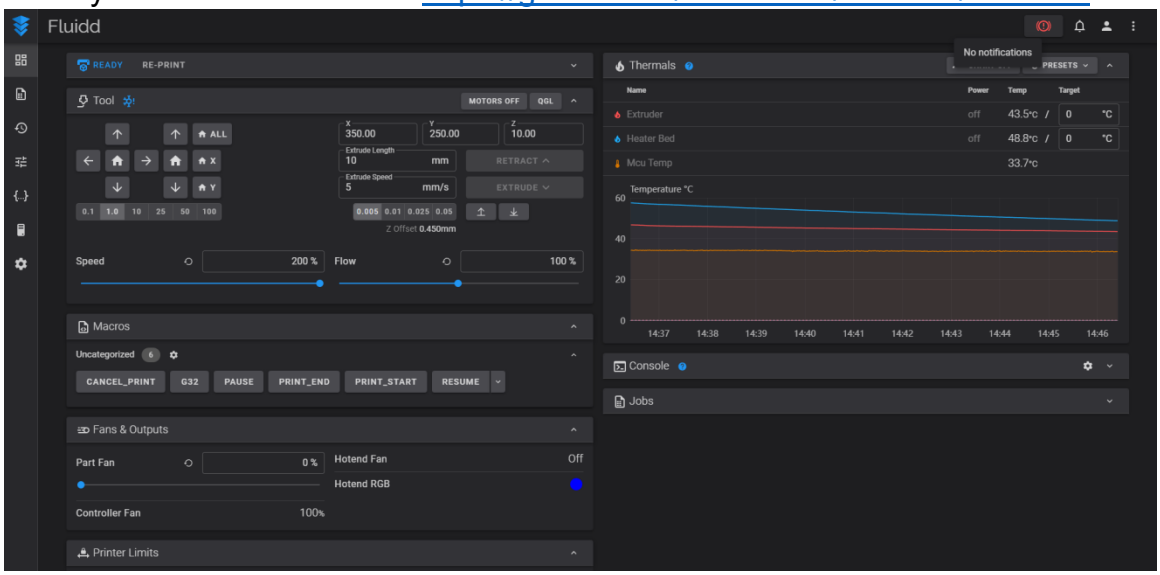
5. Klipper

5.1 Preparation

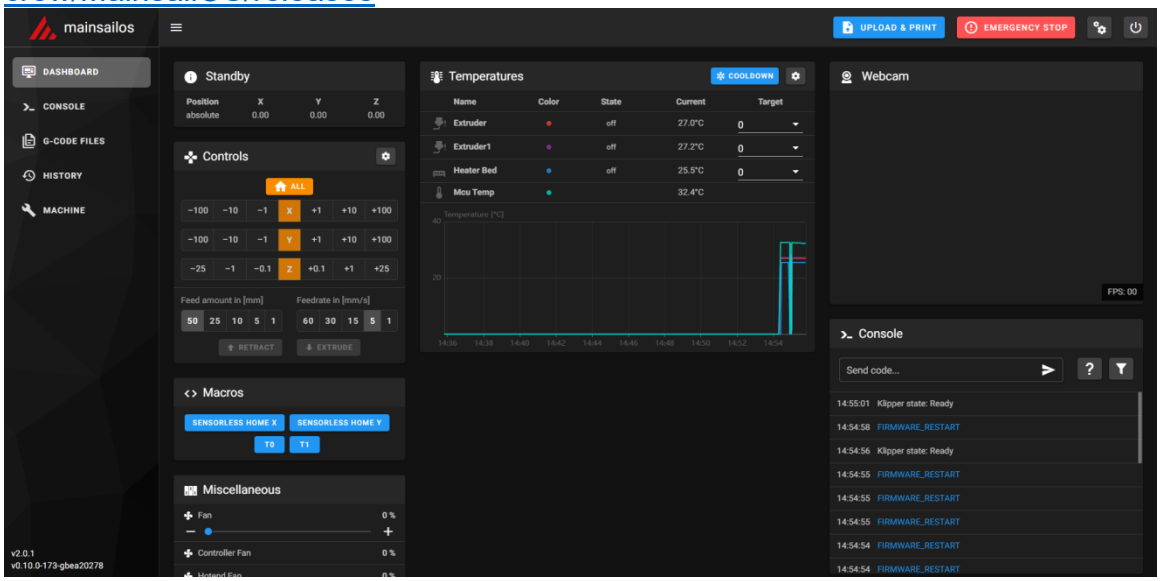
5.1.1 Download System Image

Download the system image with your favorite WebUI built-in, currently, the mainstream ones are Fluidd, Mainsail, etc.

The System of Built-in Fluidd:https://github.com/fluidd-core/FluiddPI/releases



The System of Built-in Mainsail:https://github.com/mainsail-crew/MainsailOS/releases



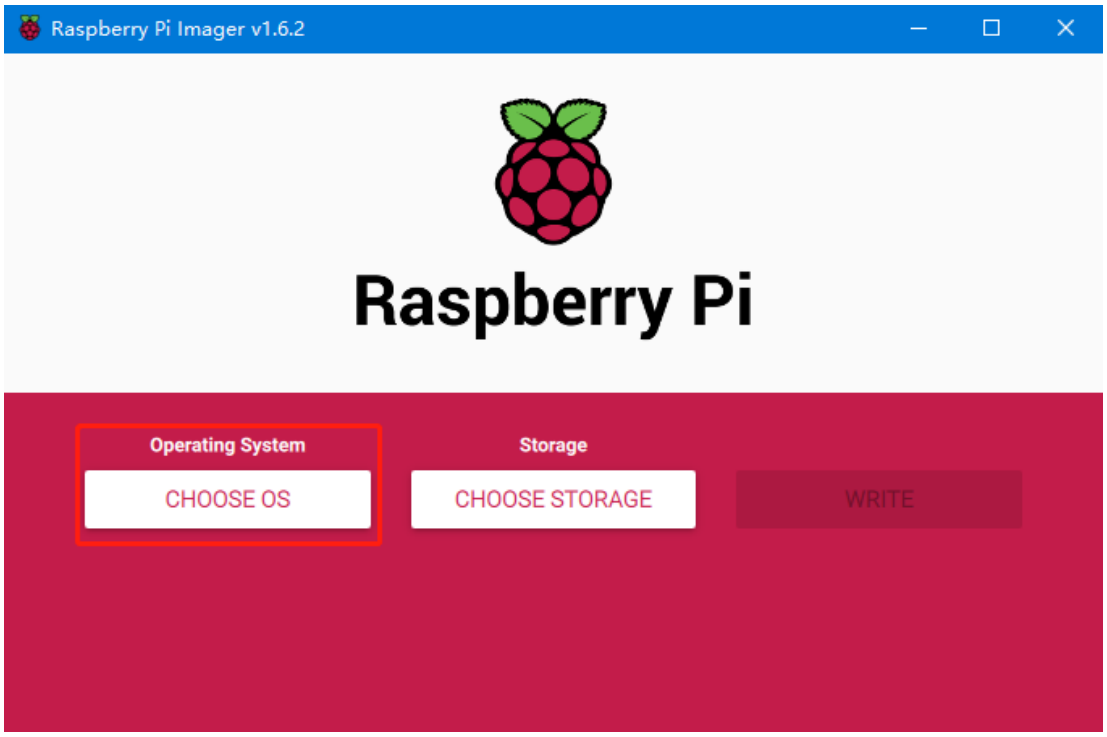
or refer to Klipper official installation instructions Use Octoprint

5.1.2 Download and Install Raspberry Pi Imager

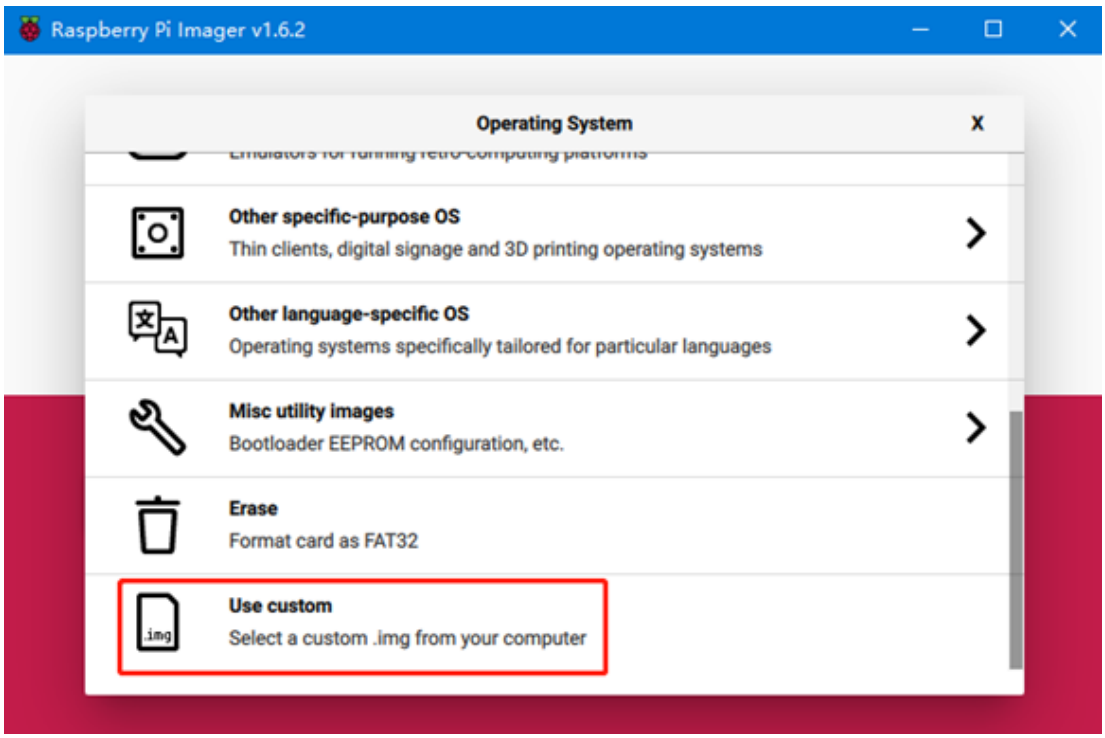
Download and install the official burning software for Raspberry Pi:
https://www.raspberrypi.com/software/

5.2 Burn Image

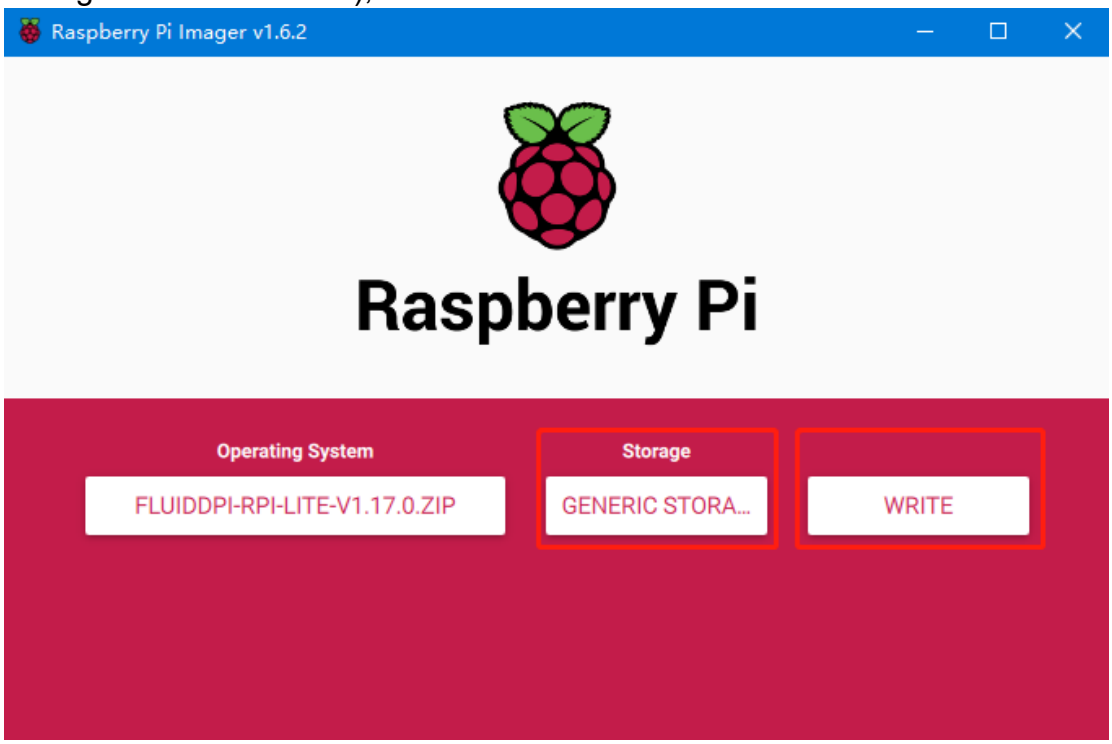
1. Insert the Micro SD card into the computer through the card reader.
2. Select System.



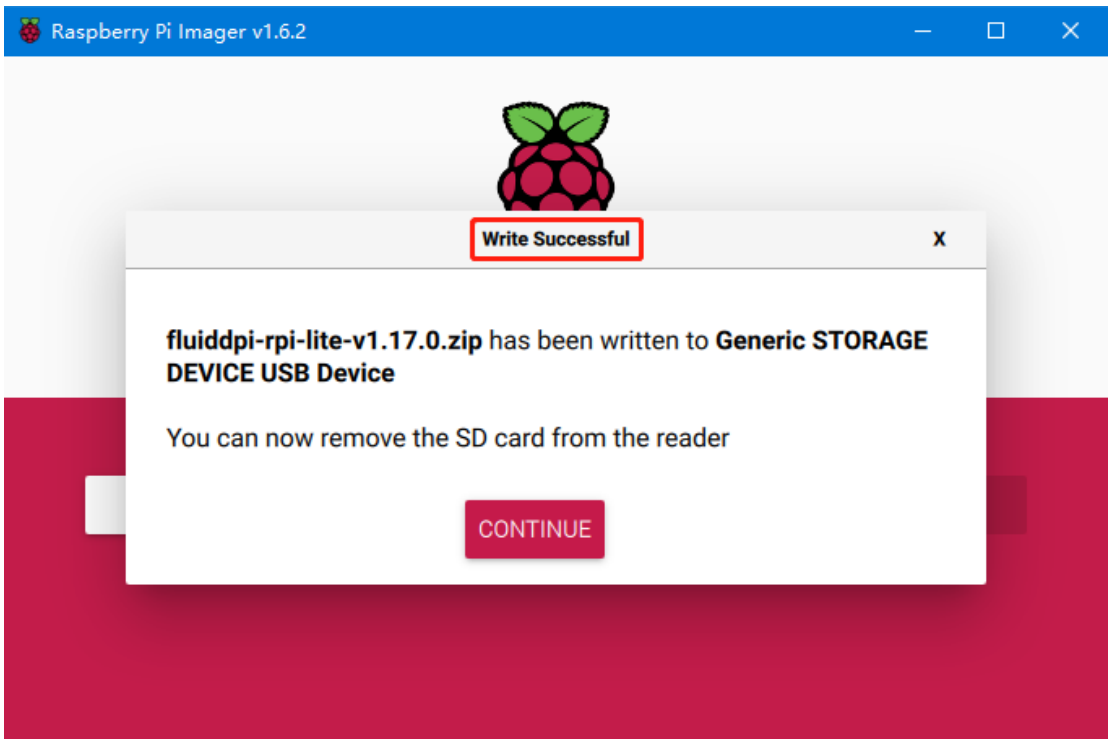
3. Select User Defined, and then select the image downloaded to your computer.



4. Select the SD card to be burned (burning the image will format the SD card, be careful not to select the wrong drive letter, otherwise the data on other storage will be formatted), and click "burn".



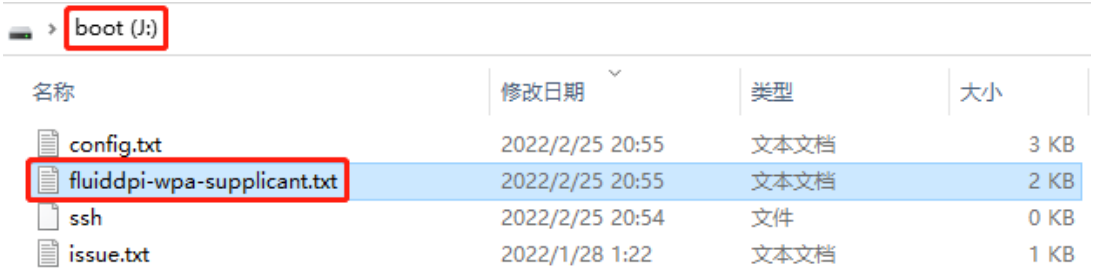
5. Wait for the burn to complete.



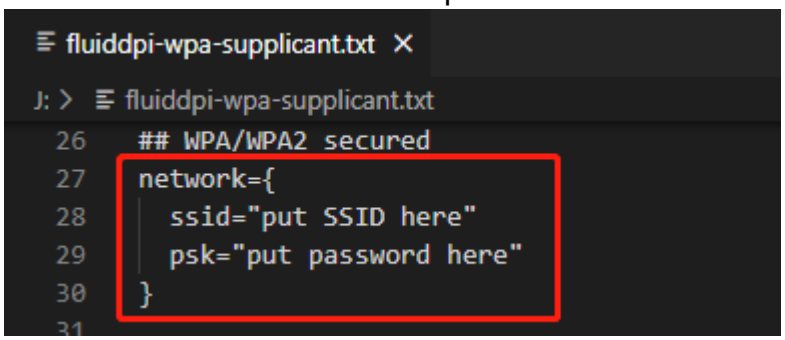
5.3 Set up WIFI

Note: You can skip this step if using a cable port instead of WIFI

1. Re-plug the card reader
2. Find the "fluiddpi-wpa-supplicant.txt" or "mainsail-wpa-supplicant.txt" file in the boot disk of the SD card and open it with VSCode (do not open it with the Notepad that comes with Windows)



3. Delete the '#' character at the beginning of the four lines in the red box, then set the correct WIFI name and password and save it



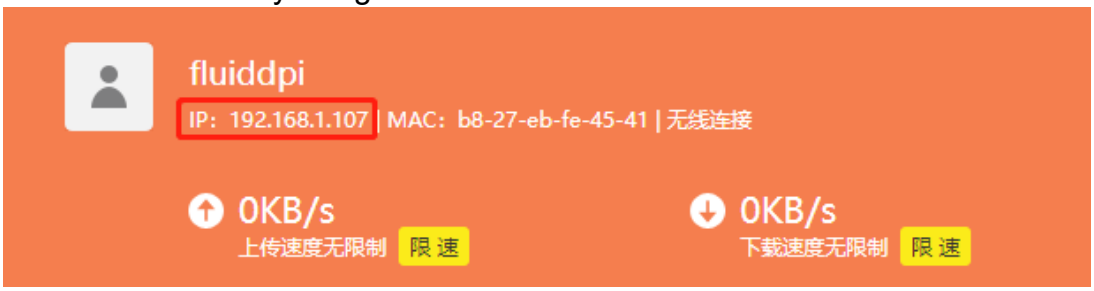
5.4 Connection of ssh software with Raspberry Pi

1. Install the ssh software Mobaxterm:https://mobaxterm.mobatek.net/download-home-edition.html

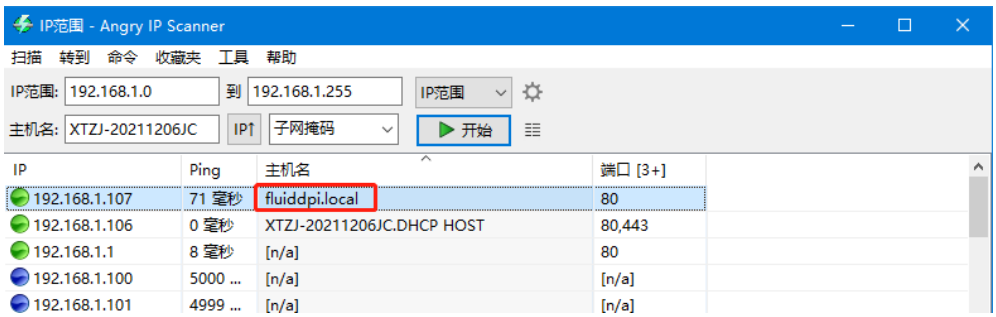
2. Insert the SD card into the Raspberry Pi, power on and wait for the system to start, about 1~2 minutes

3. After the Raspberry Pi is connected to WIFI or plugged in the Internet cable, it will be automatically assigned an IP

4. After the Raspberry Pi is connected to WIFI or plugged in the Internet cable, it will be automatically assigned an IP

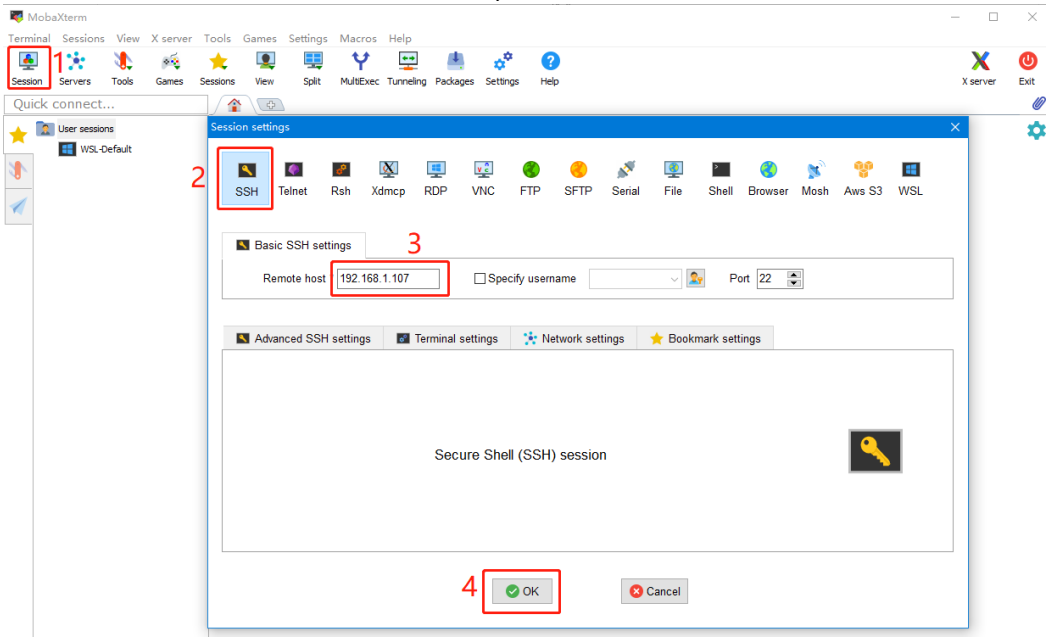


5. Or use [the https://angryip.org/](https://angryip.org/) tool to scan all IP addresses under the current local area network, and use the hostname to reorder to find the device with the hostname Fluidd or Mainsail, as shown in the following figure.

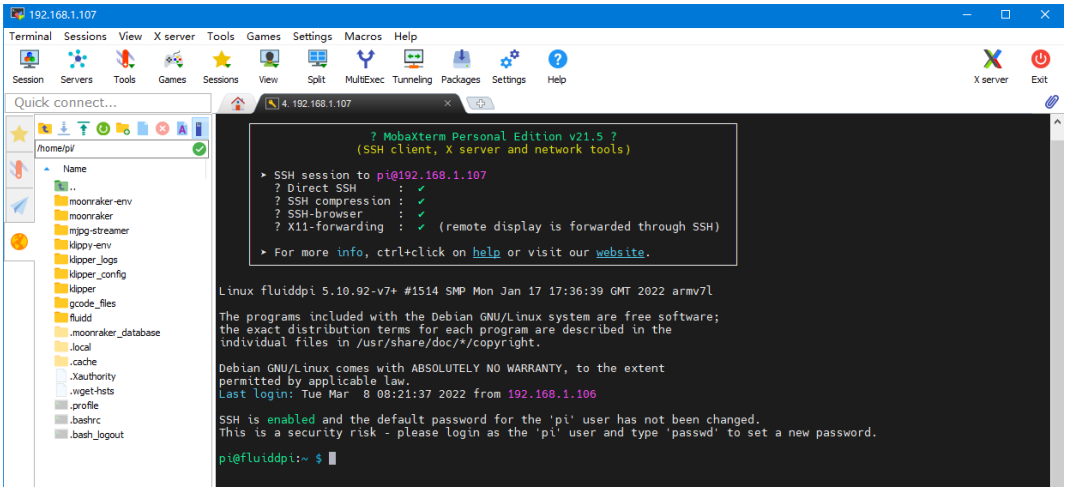


6. Open the installed Mobaxterm software, click "Session", click "SSH" in the pop-up window, enter the IP address of the Raspberry Pi in the Remote host

column, and click "OK" (Note: the computer and the Raspberry Pi must be under the same local area network).



7. Enter the login name login as: pi, login password: raspberry, to enter the SSH terminal interface.



5.5 Compile the Firmware

1. After connecting to the Raspberry Pi via ssh, enter at the command line:

   cd ~/klipper/

   make menuconfig

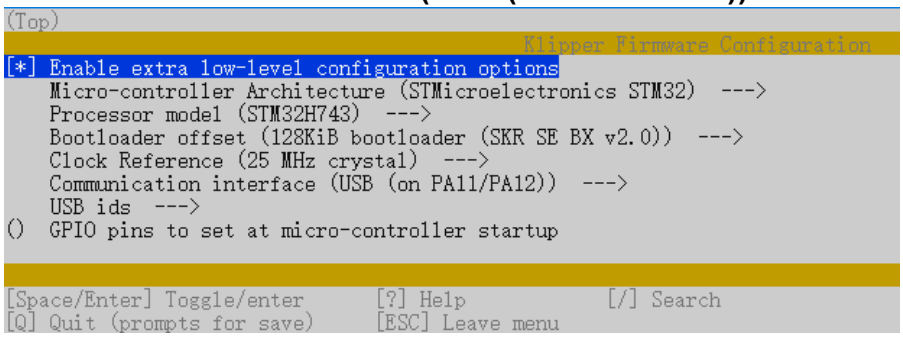
   Compile the firmware with the following configuration (if the following options are not available, please update the Klipper firmware source to the latest version).

   *** [*] Enable extra low-level configuration options**

   *** Micro-controller Architecture (STMicroelectronics STM32) --->**

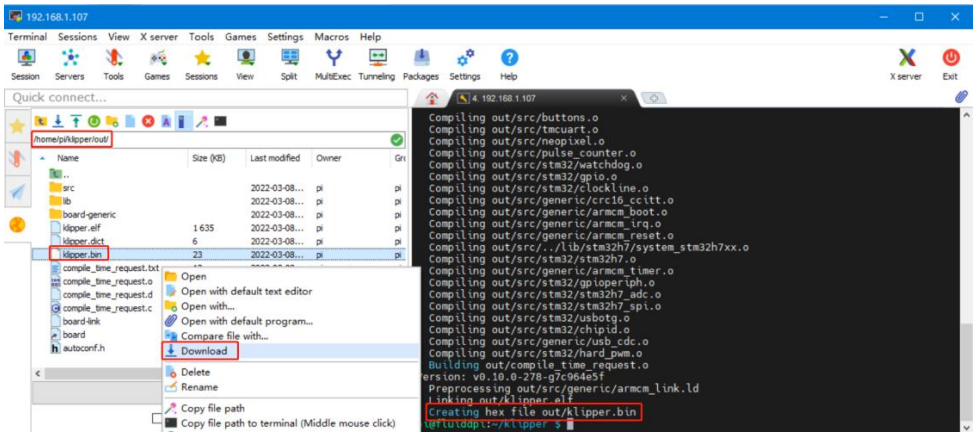
   *** Processor model (STM32H743) --->**

*** Bootloader offset (128KiB bootloader (SKR SE BX v2.0)) --->**
*** Clock Reference (25 MHz crystal) --->**
*** Communication interface (USB (on PA11/PA12)) --->**



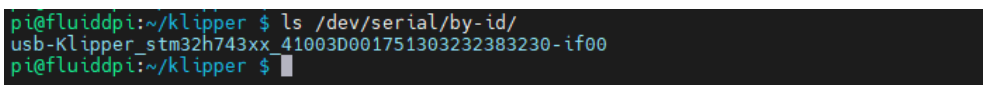
2. After the configuration selection is completed, enter 'q' to exit the configuration interface, when asked whether to save the configuration, select "Yes"

3. Enter make to compile the firmware. When make is completed, the `klipper.bin` firmware we need will be generated in the home/pi/kliiper/out folder of the Raspberry Pi, which can be downloaded directly to the computer on the left side of the ssh software.



4. Rename klipper.bin to "firmware.bin" and copy it to the SD card to update the firmware

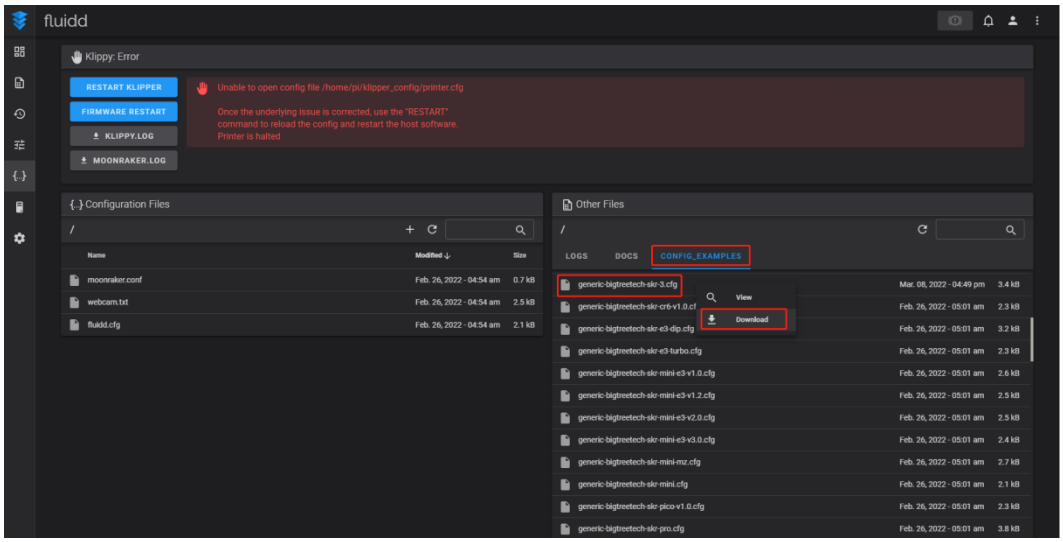
5. Enter at the command line: **ls /dev/serial/by-id/** to query the ID of the motherboard to confirm whether the firmware is successfully burned. If the burning is successful, it will return a klipper device ID, as shown in the following figure



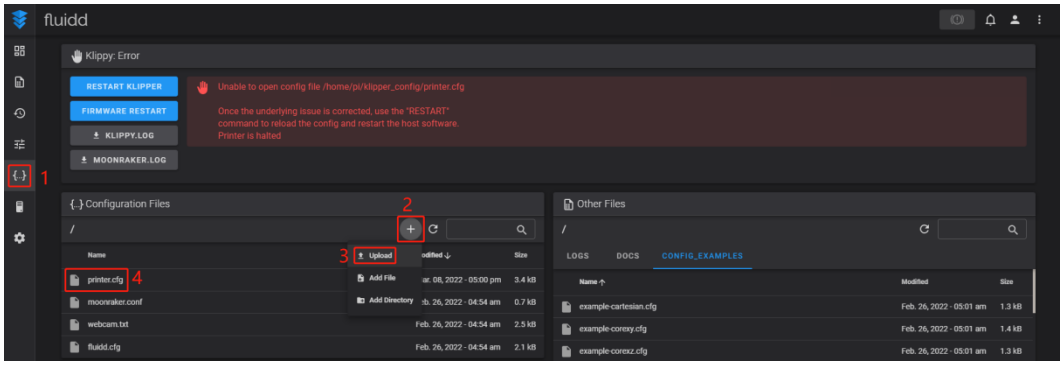
Copy and save this ID, this ID needs to be set in the configuration file.

5.6 Configure Klipper

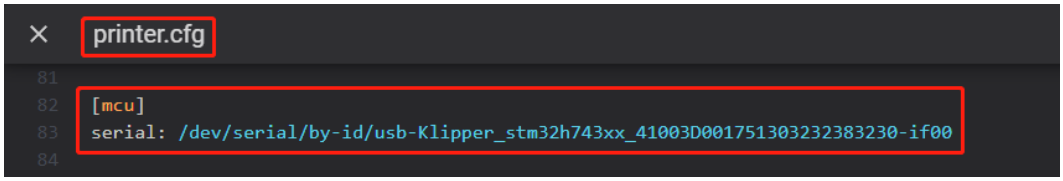
1.Enter the IP address of the Raspberry Pi in the computer's browser, and download the reference configuration of the motherboard from the path shown in the figure below. If you cannot find this file, please update the Klipepr firmware source code to the latest version, or download it from GitHub https://github.com/bigtreetech/SKR-3



2.Upload the motherboard configuration file to Configuration Files and rename it to "printer.cfg".



3.Modify the ID number in the configuration file to the actual ID of the motherboard



4.Follow the instructions at https://www.klipper3d.org/Overview.html to configure the specific features of the machine.

6. Firmware Update

Micro SD card update

1. Make sure the Micro SD card has been formatted as FAT32 file system.

2. Rename the firmware compiled by yourself or downloaded from GitHub to "firmware.bin" (note: clarify the extension settings of the computer system, some users hide the extension, "firmware.bin" actually shows "firmware")

3. Copy "firmware.bin" to the root directory of the Micro SD card.

4. Insert the Micro SD card into the card slot of the motherboard, power on the motherboard again, and the motherboard's bootloader will automatically update the firmware.

5. During the firmware update process, the status indicator on the upper right corner of the motherboard will start to flash.

6. When the status indicator stops flashing and the file name in the Micro SD card is renamed to "FIRMWARE.CUR", it means the firmware update is successful.

7. Cautions

1. When the PT1000 is not used, the jumper cap cannot be inserted on it, otherwise the 100K NTC cannot be used normally.

2. The current of the hotbed connected to the mainboard must be less than or equal to 10A. If you want to use a high-power hotbed, it is recommended to choose a hotbed powered by 24V, and use 24V to power the mainboard.

3. Pay attention to the power supply selection of the NC fan, the jump cap must be set, so that the fan can work normally.

4. Pay attention to the setting of the USB port switch. When there is no response when plugged into the computer, make sure that the double-pole double-throw switch is in the USB mode of the pop-up state.

5. The mainboard adopts a non-elastic card slot, and the stroke is much less than that of the self-elastic card slot. When the user inserts the card, the action must be light and slow. Do not insert the card vigorously, and the damage caused will not be accepted by our company.

8. FAQ

Q: The maximum current of the hotbed, heater cartridge, and fan ports:

A: The maximum output current of the heated bed port: 10A, the peak value is 11A.

Heater cartridge port maximum output current: 5.5A, peak 6A.

The maximum output current of fan interface: 1A, peak 1.5A.

The total current of the heater cartridge + driver + fan needs to be less than 10A.

Q: SD card cannot update firmware:

A: Make sure that the SD card has been formatted as a FAT32 file system, and make sure the firmware name is "firmware.bin". Some users' computers have set "Hide known extensions", and "firmware.bin" is displayed. The file The name is actually "firmware.bin.bin".