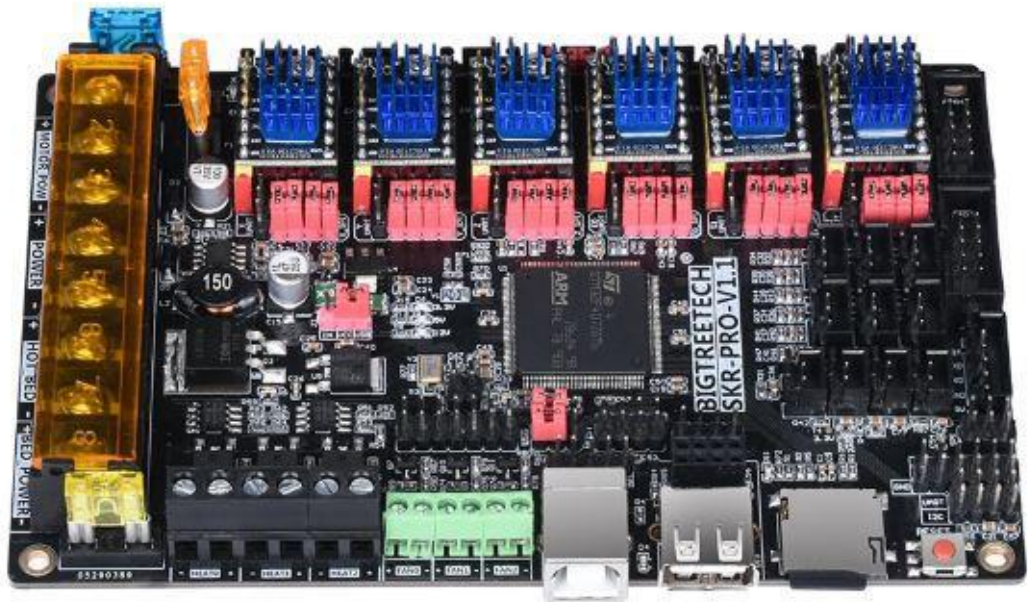# SKR PRO V1.1

User Manual

SHENZHEN BIGTREE TECHNOLOGY CO., LTD.

BIGTREE-TECH.COM

VERSION 1.0

Product introduction

BigTree Technology Co., Ltd. developed this board to provide a high performance customizable 3D printer controller board to the 3D printing community . It also stimulates further development of high speed and high quality 3D printing.

Main Features

1) The board is controlled by a STMicroelectronics ARM Cortex M4 32-bit STM32F407ZGT6 MCU. This chip has a Maximum Clock Frequency of 168 MHZ and feautures 114 I/O pins. Supported interface types are: CAN, I2C, SDIO, I2S / SPI, UART / USART, USB. As many as 20 expansion ports can be inverted, and extended ports can be used to add more features to the printer without worrying about the shortage of I/O pins.

2) 6 stepper motor driver ports make it possible to have up to 3 extruders or dual axis. Supported drivers are TMC 5160, TMC 2208, TMC 2209, LV8729, ST820, A4988, etc. There are also three dedicated fan ports with direct connection to the power supply.

3) Dedicated power input ports for the main power, stepper motors and the heated bed, allows the user to have different input voltages. The heated bed current draw can be reduced to 1/4, without power loss.

4) Supports serial WIFI printing. To make use of this, a ESP8266 ESP-01S WIFI module is needed.

5) Supports open source firmware Marlin2.0. This means it is convenient for users to customize their firmware and develop it. The firmware is upgraded with a SD card, which is very convenient and efficient!

6) Dedicated ports for BL Touch, PWM, ADC, UART, I2C and SPI. Supports TMC2130 SPI, TMC5160 SPI, TMC2208 UART.

7) Data can be saved when the power to the board is cut off and the printer can automatically shutdown after a print is finished. To make use of this, a BIGTREETECH MINI UPS V1.0 and a BIGTREETECH Relay V1.0 are needed.

8) The high performance heated bed MOSFET provides good heat dissipation.

9) Supported screens: BIGTREETECH 2.8 inch TFT and BIGTREETECH 3.5 inch TFT color touch screens, LCD2004 and LCD12864. These are just a few compatible screens, there are more options.

10) Multi language support, for example: English, Chinese, Simplified Chinese.

11) Using removable automotive fuses makes the replacement process easier.

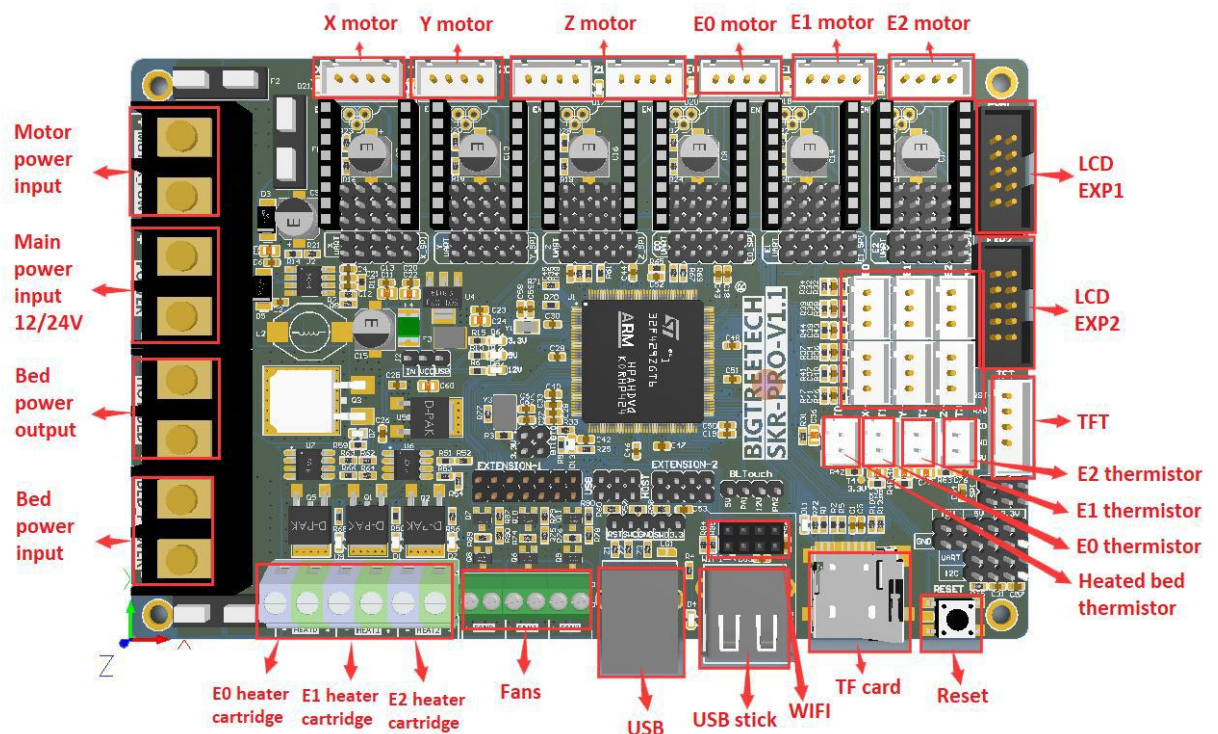12) The layout of the PCB is optimized for heat dissipation.

Board specifications

1) Size: 147x95mm

2) Input voltage: 12V-24V DC

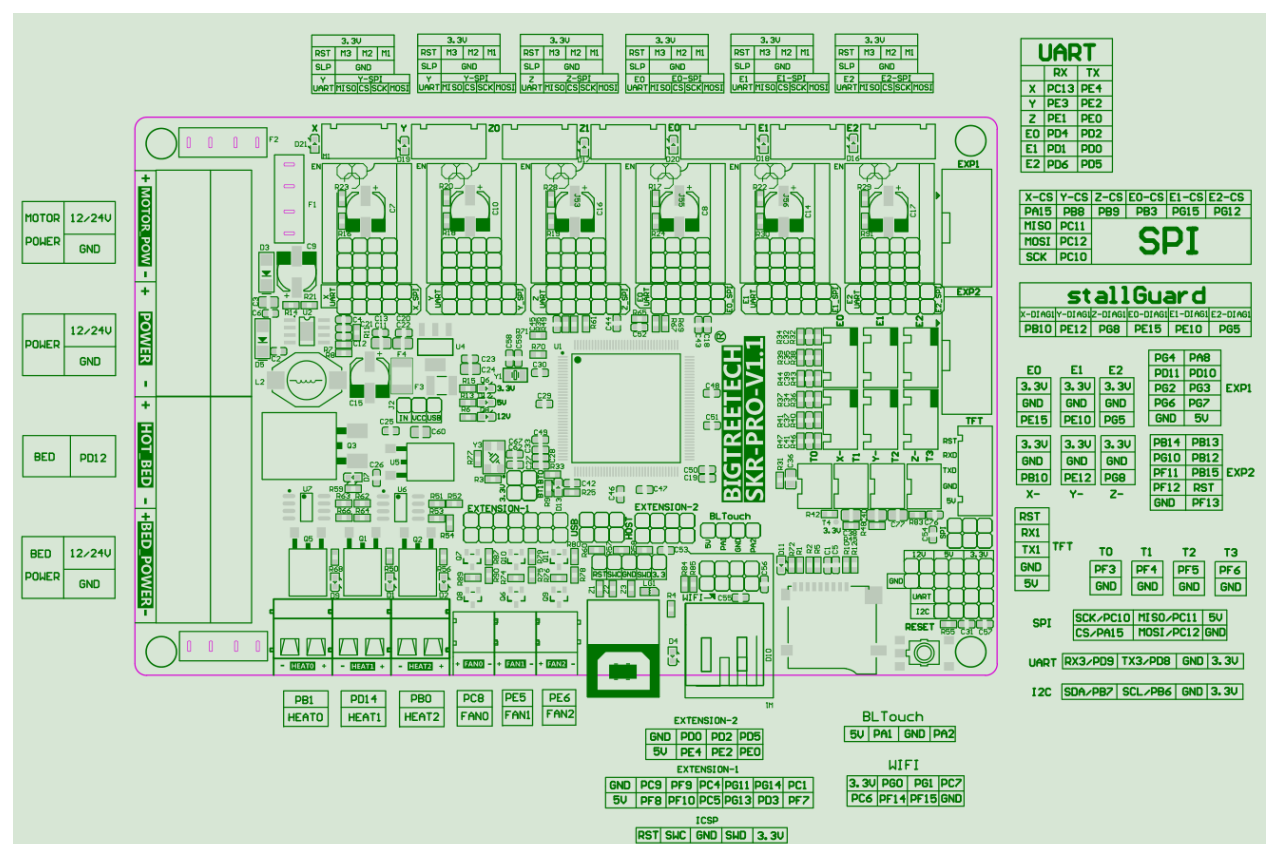3) Installation size:138 * 86.5 mm

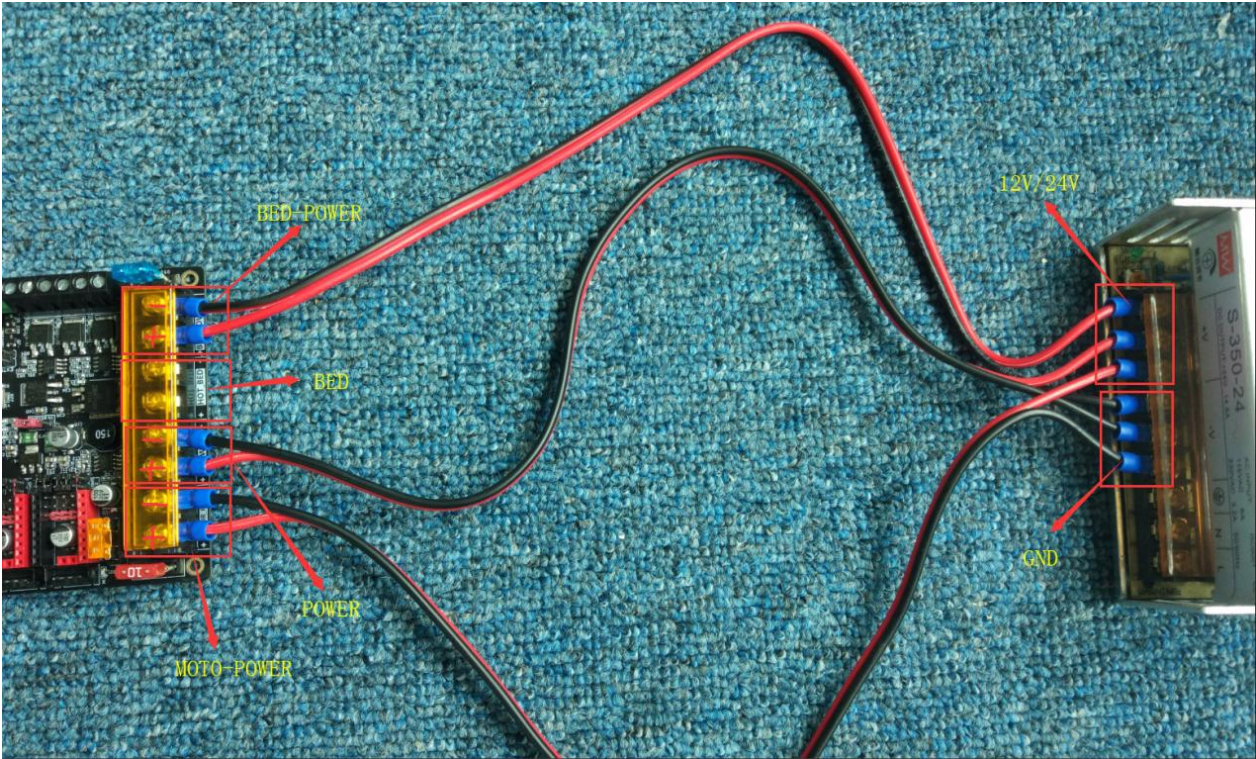4) Max. heated bed power: 180W

Dimensions diagram
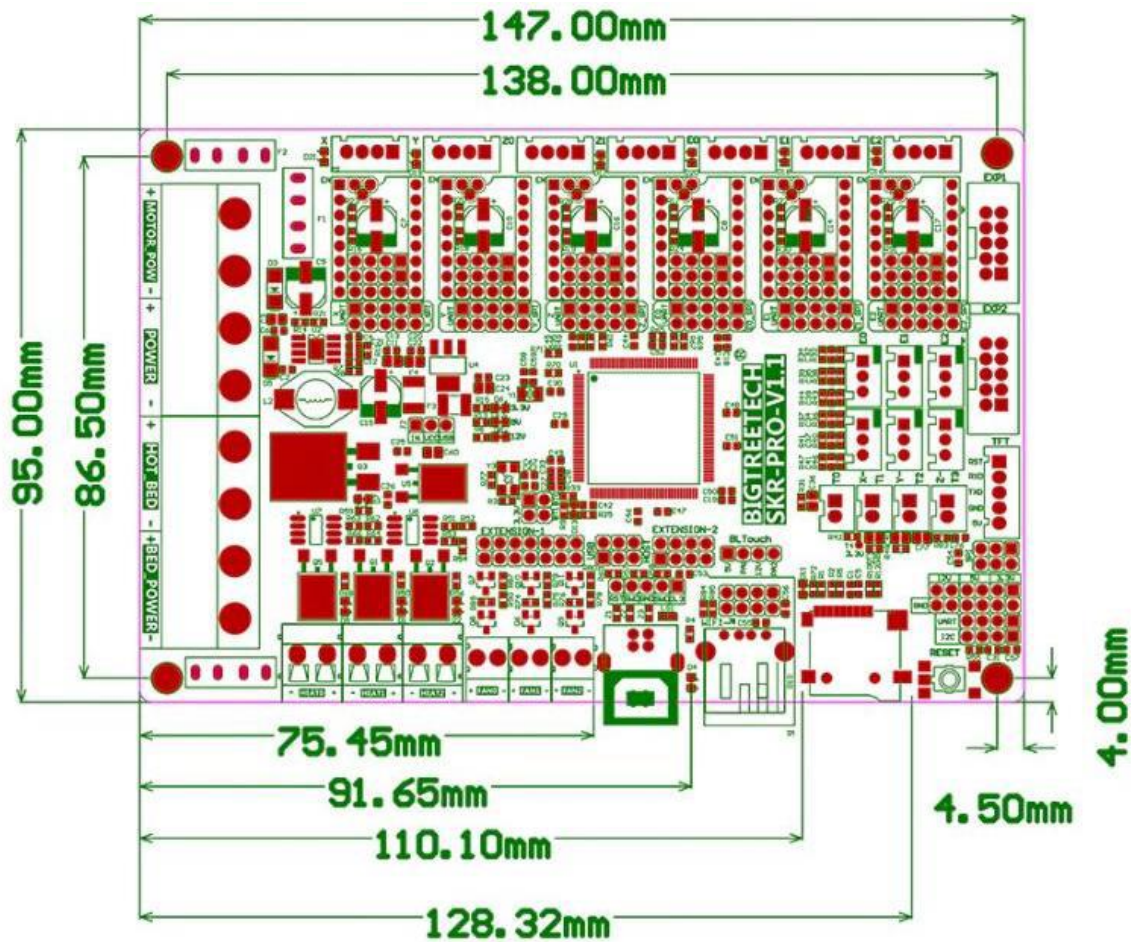
# General wiring diagram

Pin diagram

Power wiring

As shown above, three sets of power lines need to be connected to the board, namely, main power supply, motor power supply and heated bed power supply. The fourth connector on the board is for the heated bed output wires. When connecting, be sure to disconnect the mains voltage power supply and distinguish the positive and negative electrodes so as not to burn out the board.

Power selection

Use the provided jumper to set the correct power input source. As shown in the pictures below, when the jumper is connected to USB and VCC, the USB power source is selected. When the jumper is connected to IN and VCC, the 12V/24V power source is selected. If you have selected the USB power source, the 5V and 3.3V indicators will light up.If you have selected the 12/24V power source, the 5V, 3.3V and 12V indicators will light up.
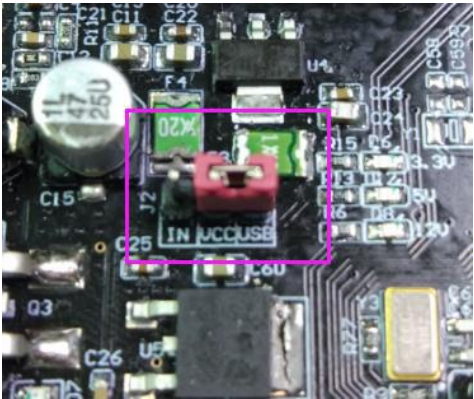

①USB power
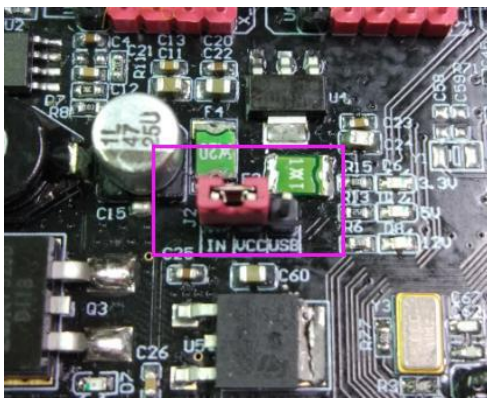
②12/24V power

Communication between board and computer

After the board is connected to the computer through the USB cable, the computer will automatically install the needed driver. After the driver installation is completed, the board can be identified for data transmission. If the installation fails, you can download the needed driver from here: http://github.com/bigtreetech?tab=repositories

After the driver installation is completed, open the "Device Manager" to see the port to which the board is connected. If you see the same as in the picture below, then the board is succesfully connected.
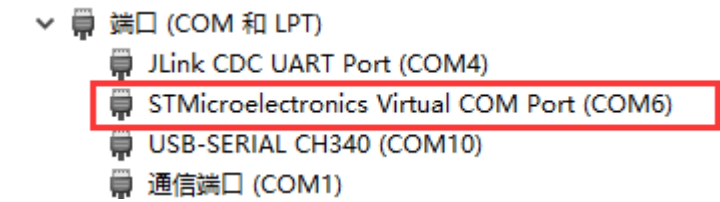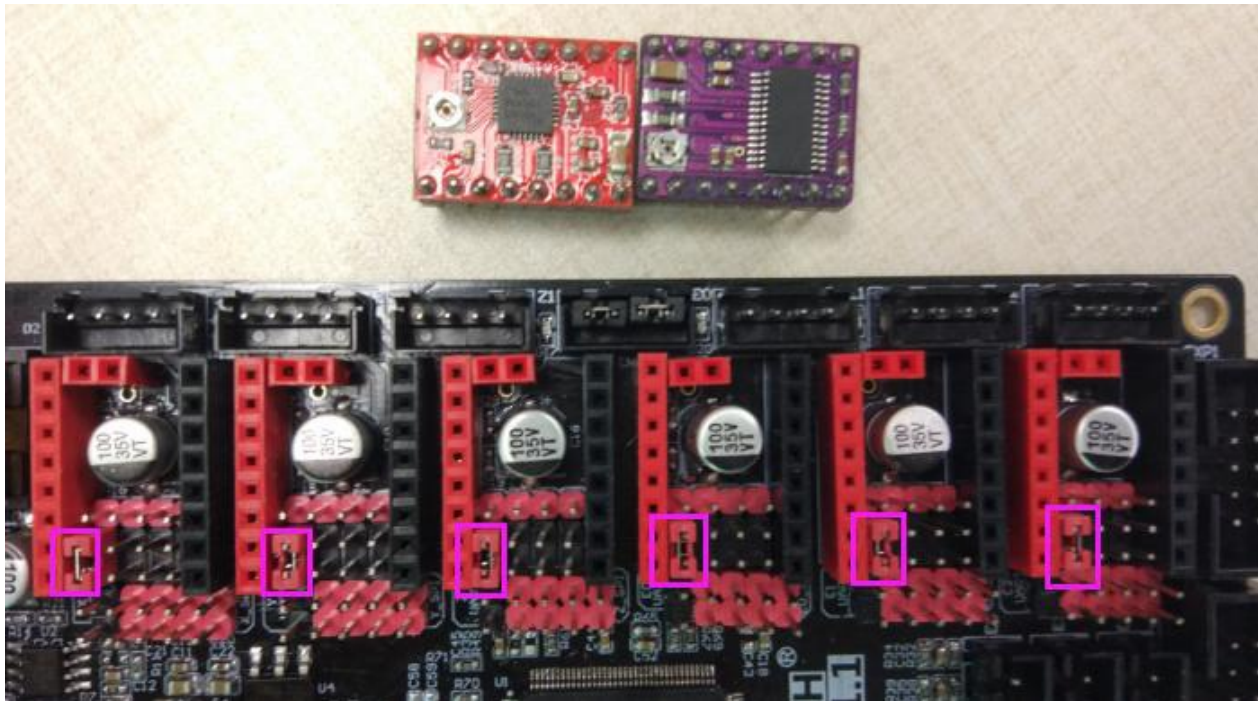

Stepper driver and peripherals configuration

1) STEP/DIR mode
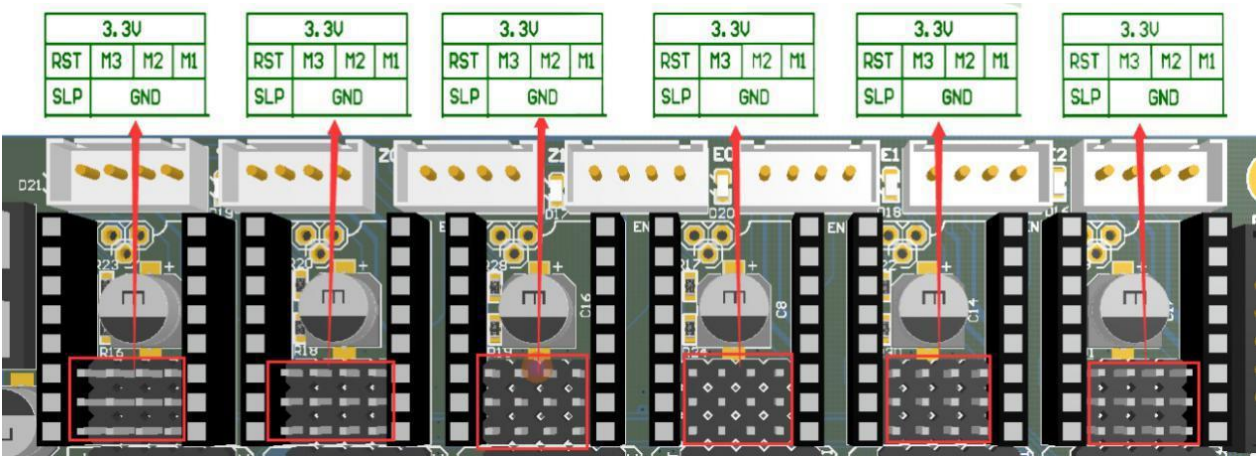
Set the jumpers according to your microstepping settings.

Note: the high level is connected to the above two row pins, and the low level is connected to the following two rows of pins.

2) A4988 and DRV8825 driver

If you want to use a A4988 or 8825 driver, it is necessary to short the two pins shown in the pink square with a jumper. If you are not using A4988 or 8825, the jumper needs to be removed.
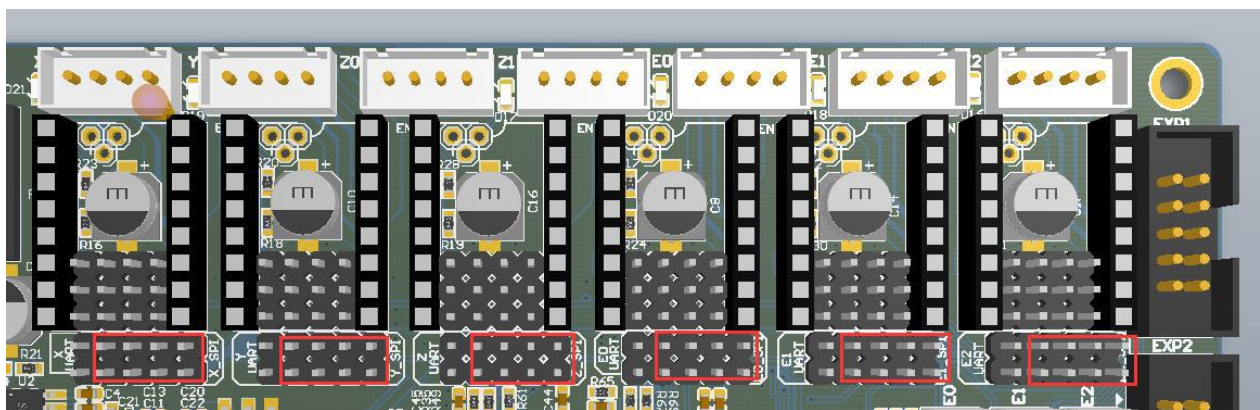
3) UART mode

When using UART mode, you need to short the pins shown in the red square using a jumper.
As shown in the figure below, the UART pin for TMC2208 is indicated by the red box. It is the 4th pin from the top.
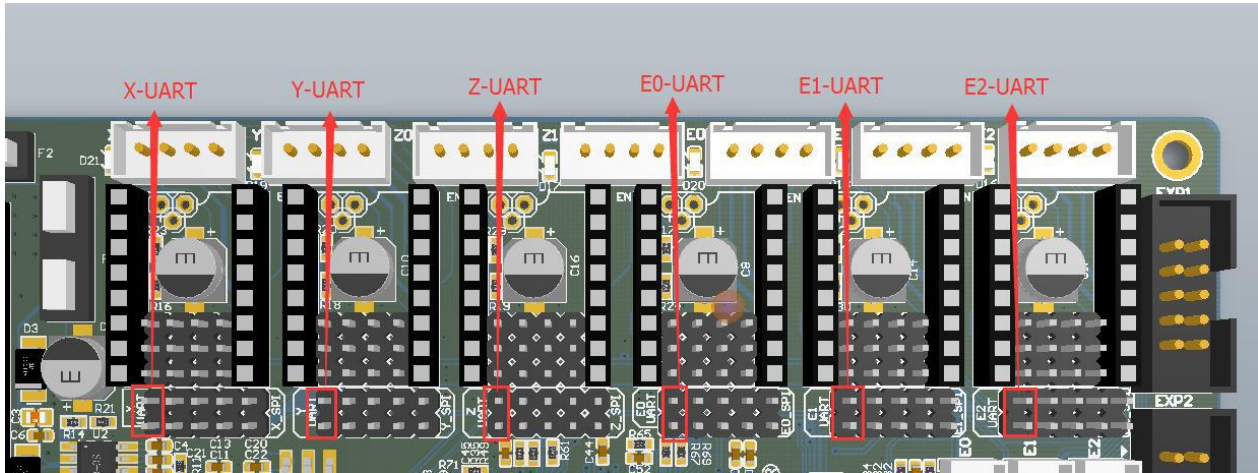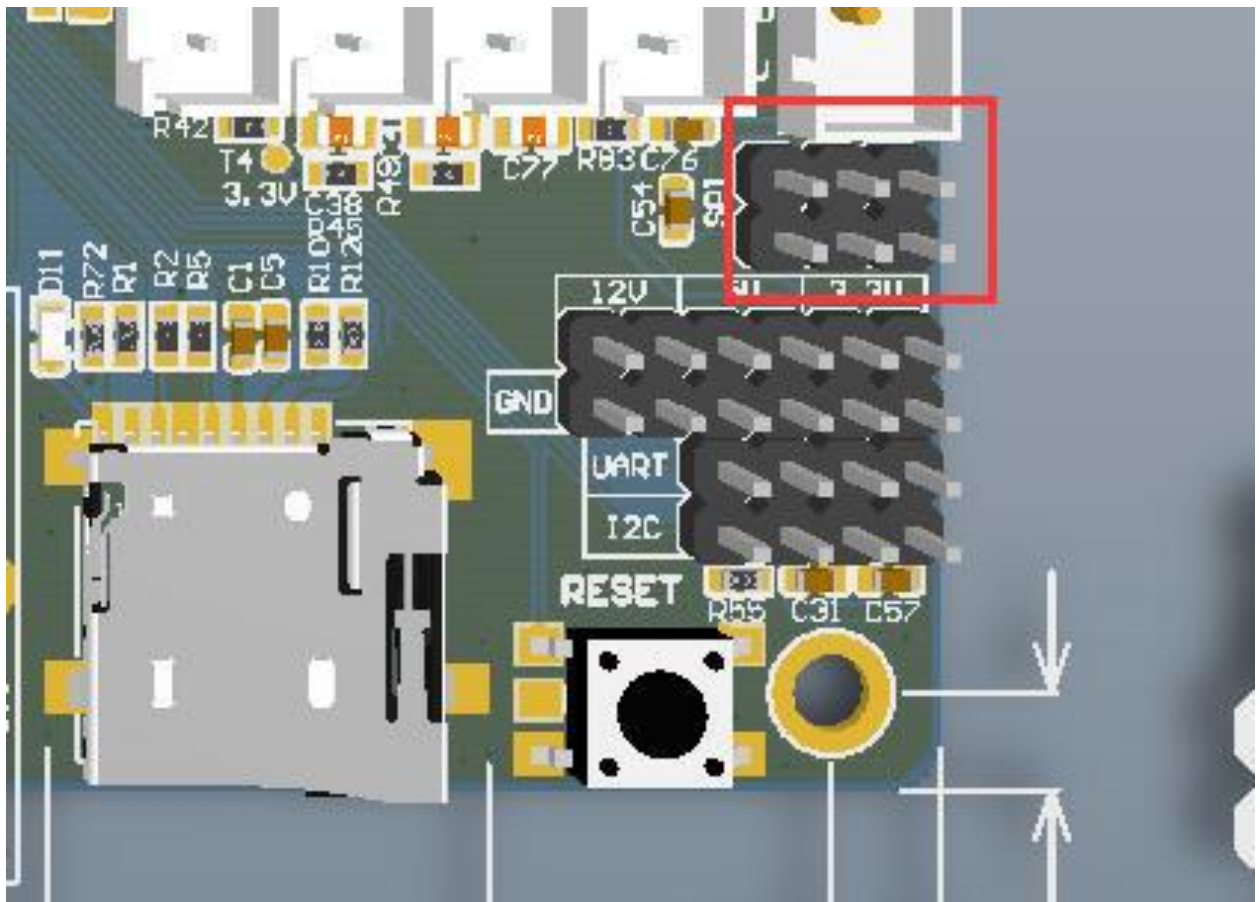
4) SPI Mode

When using SPI mode, you need to short the pins shown in the red square using a jumper.

5) SPI expansion port.

The SPI expansion port shares its I/O pins with the SPI pins of the stepper motor drivers. It can only be used if you are not using a stepper motor driver in SPI mode.

6) USB host and USB flash drive selection

As shown in the picture, the jumper is connected to the left, the USB host function is turned on, and the USB flash drive function is turned off. When the jumper cap is connected to the right, the USB flash drive function is turned on, and the USB function is turned off.

Note: the firmware does not support the USB flash drive function for the time being.
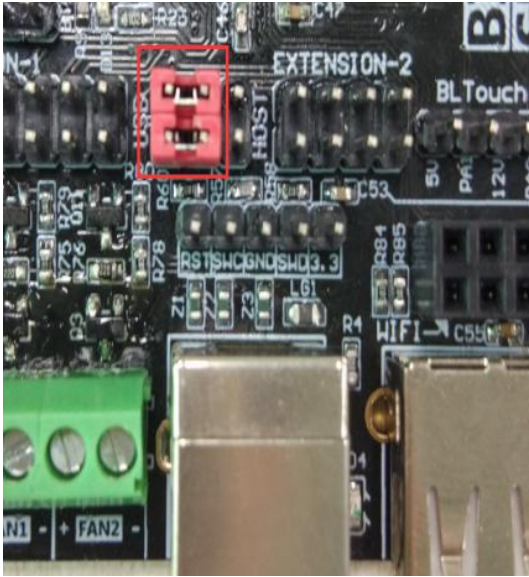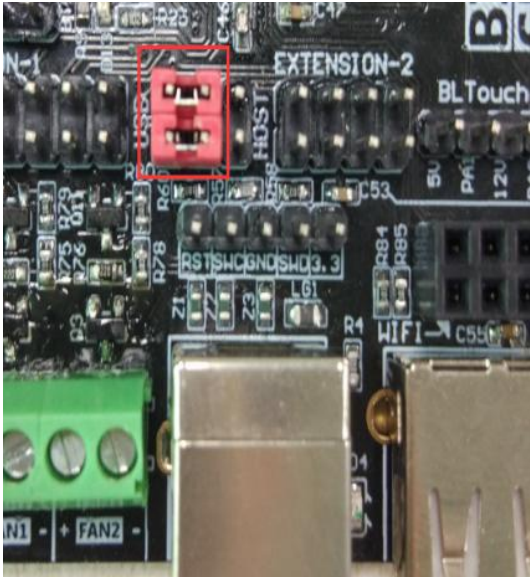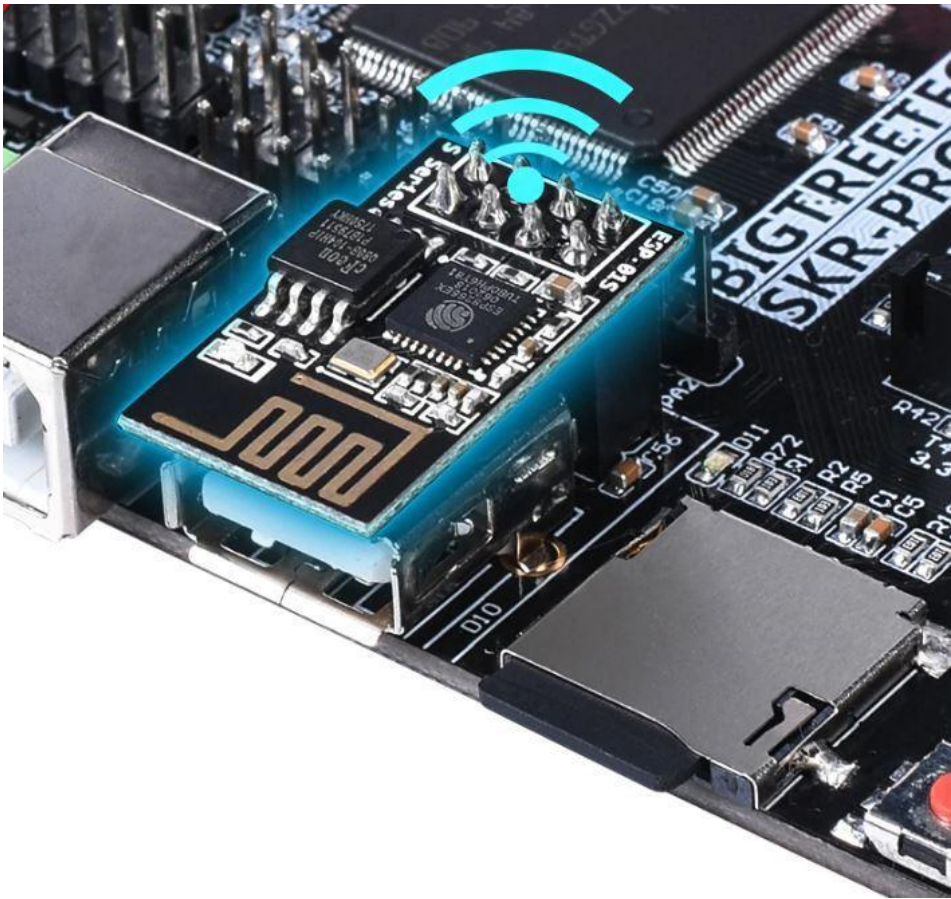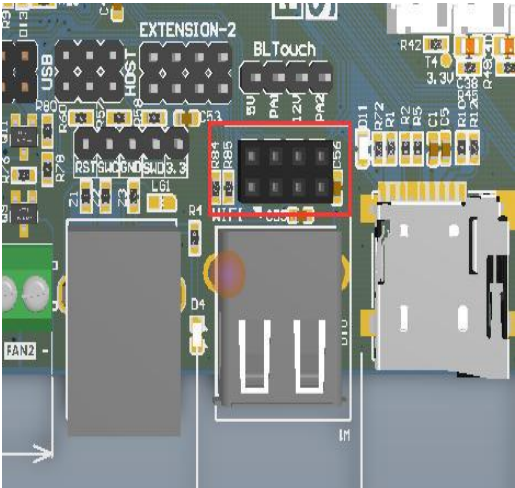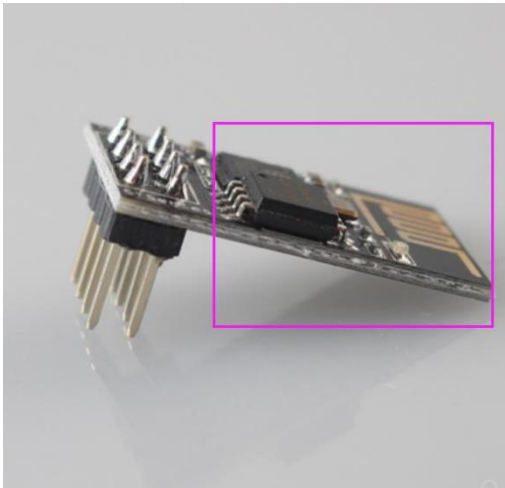

① USB host   ② USB flash drive

7) WIFI interface

The WIFI interface is as shown in the picture below. When the WIFI module is inserted, the edge of the board shown by the pink rectangle should face to the side of the board. See the pictures below.
Note: To make use of WIFI function, a ESP8266 ESP-01S WIFI module is needed.
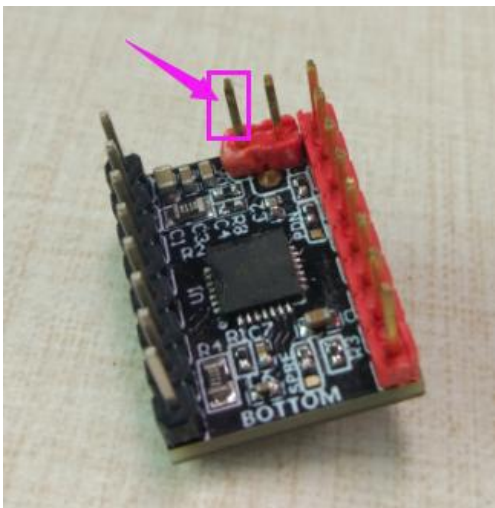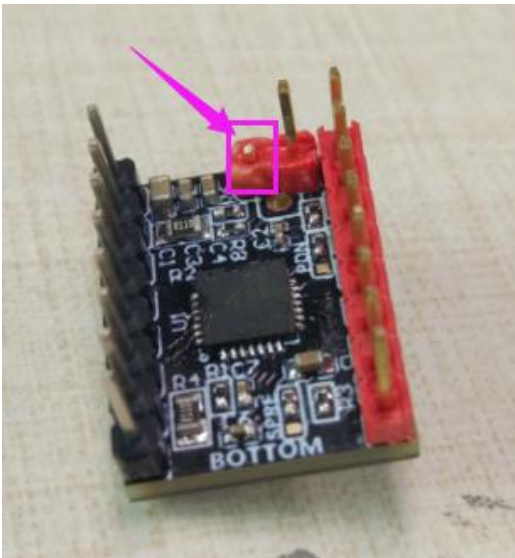
8) Stallguard pin

As shown in the picture below, the pink squares indicate the pin corresponding to the stall detection.
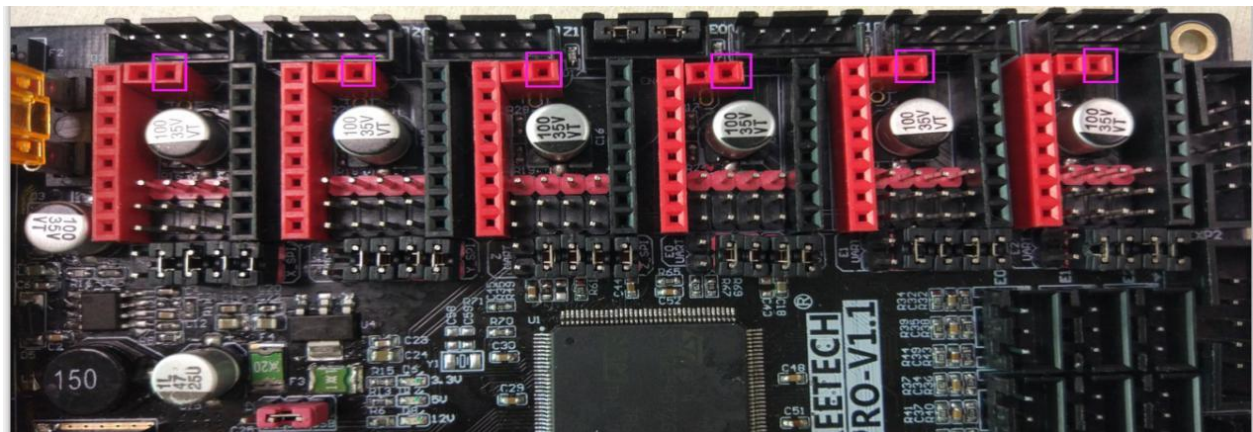
Take the TMC2209 as an example. When the stallguard function is not used, the stallguard pin of the TMC2209 needs to be removed by desoldering or cut off so that the mechanical switch can work normally.
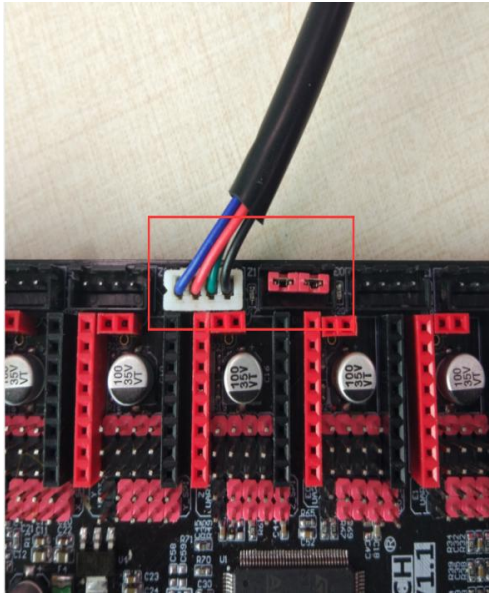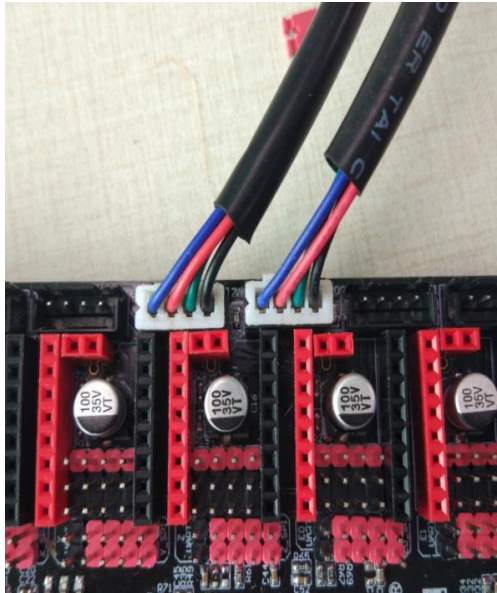

①**Before modifying**

②**After modifying**

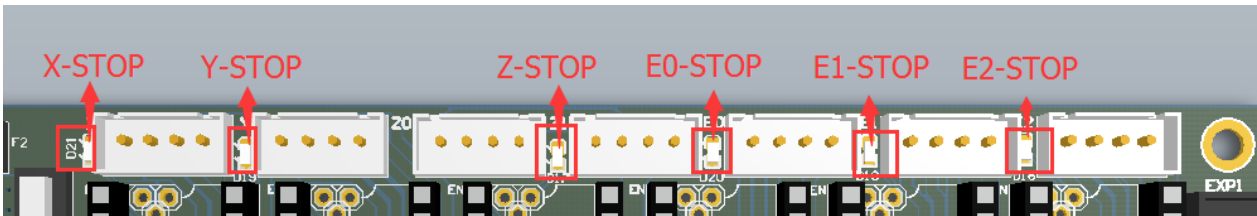## 9) Double Z-axis connection description

① **Single Z connection**

② **Double Z-axis connection**

10) Limit switch indicator light

The LEDs next to the limit switch connectors show the status of the limit switches.

Normally Closed
When a normally closed limit switch is connected, the indicator light is off, and when it is triggered, the indicator LED turns on.

Normally Open
When a normally open limit switch is connected, the indicator light is always on, and when it is triggered, the indicator light turns off.

Note: The indicator light is always on when the limit switch is not connected.

Firmware

You can find the needed firmware files on our Github page.

BigTreeTech firmware: http://github.com/bigtreetech?tab=repositories

Marlin2.0 firmware update method:
After downloading the files, use Visual Studio Code to open the project for compilation. Customize the firmware and compile it. Check for errors. If there are no errors, find the firmware.bin file. Copy it to the SD card and plug the SD card in the board. Reboot the board, wait for about 10 seconds before doing anything else with the board.

For detailed steps, please check this document:
http://www.dropbox.com/s/ppjfflhf3j5yzh2/MarlinV2.0%20SKRV1.1%20instruction.docx?dl=0

Notes

1) The firmware file name in the SD card cannot be changed, including capitalization.

2) Ensure that all wires, jumper and drivers are correctly plugged in before power-on.

3) To avoid damage, do not plug or unplug the stepper drivers when the board is powered.

4) Double check all your connections before powering up the board.

5) At the moment printing from a USB flash drive is not supported.