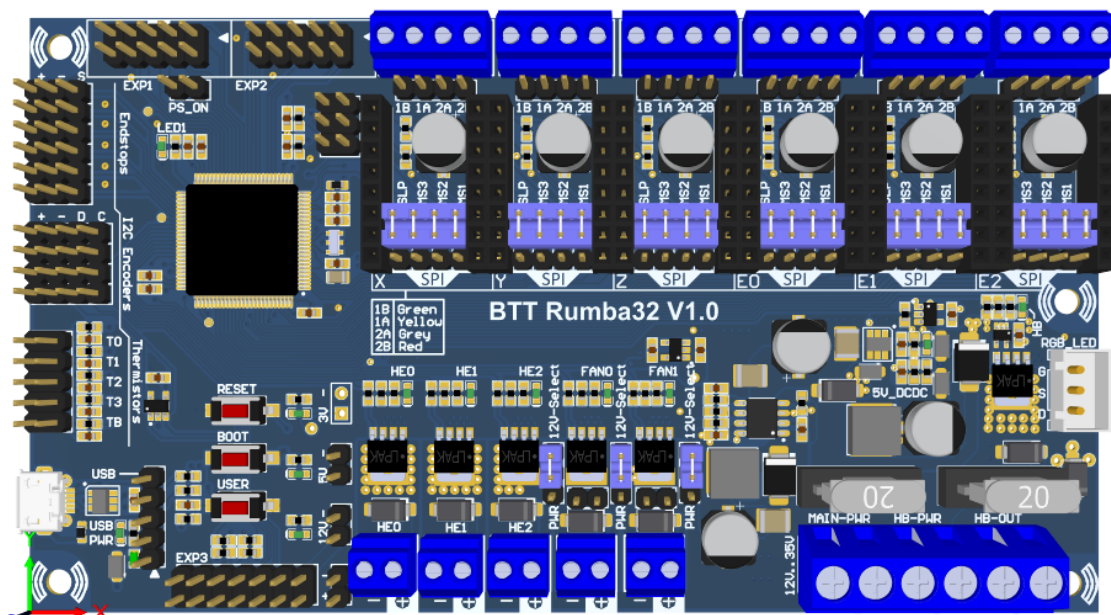SHENZHEN BIGTREE TECHNOLOGY CO., LTD.
BIG TREE TECH

# BIGTREETECH
# Rumba32 V1.0

## User's Instruction

# 1. Product Introduction

BTT Rumba32 V1.0 motherboard is a high-performance 3D printer main control board with STM32F446VET6 as the core controller by the 3D printing team of Shenzhen Biqu Technology Co., Ltd. aim at to some problems in the motherboards on the market.

# 2. Features

1）The main control adopts the 32-bit ARM-level Cortex-M4 series STM32F446VET6 chip with a frequency of 180MHz, which greatly improves the performance;

2）Equipped with highly modular open source firmware Marlin2.0, which is convenient for users to DIY and reopen,to avoid the worries of not being able to master the core code;

3）Marlin2.0 uses powerful development tools， Visual Studio Code Integrated Development Environment：Support online debugging， More helpful for product development and performance optimization，Developed in C language，Low development threshold;

4）The PCB board wiring is rigorous and beautiful, and has been specially optimized for heat dissipation;

5）Use dedicated power chip, Support 12-30V power input;

6）Accepts 24V input, and can reduce the hot-bed current to 1/4 under the same power, effectively solving the hot-bed MOS tube heating problem;

7）Support BIGTREETECH-3.5 inch screen (12864 mode, or use DuPont line to connect EPX3 corresponding serial port pin, TFT mode can also be realized), LCD2004 screen, LCD12864 screen;

8）The system supports simplified Chinese, English and other languages, which can be switched by itself;

9）Upgrade the configuration firmware via USB, the operation is simple, convenient and efficient;

10）Onboard EEPROM, model 24LC32AT-I/OT

11）6 motor drives，Two fixed voltage extruders (power supply

voltage）, An optional voltage extruder (power supply voltage or 12V), Two CNC fans;

12）Support shut down after printing;

13 ） Using high-performance MOSFET tube, better heat dissipation effect;

14）The use of plug gable fuses makes the replacement process easier;

15）Reserve I2C expansion ports, up to 10 expansion IOs for user definition;

16）Double limit switches are reserved for X, Y, and Z axes;

17）Reserve 5 channels for NTC detection

18）Support RGB light bar

19）Support offline printing and online printing;

20）Reserve a user button、Onboard LED working indicator，Can be configured by users

21）Motor connection reserved 2.54MM pin header and 3.5MM pitch wiring screw terminal two ways

## 3.Mainboard Parameters

1）Physical dimension： 135*75mm

2）Installation size： 127.25*64.45mm

3）Microprocessor： ARM 32-bit Cortex™-M4 CPU

4）Input voltage： DC12V—DC30V

5）Motor driver：Support TMC5160、TMC2208、TMC2209、TMC2130、A4988 and so on

6）Drive working mode support： TMC2130SPI、TMC5160SPI、TMC2209 UART

7）Motor drive interface： X、Y、Z、E0、E1、E2,6 routes

8）Temperature sensor interface：T0、T1、T2、T3、TB, 4 routes 100K NTC（Thermal resistance）

9）Display screen： BIGTREETECH-3.5inch TFT、LCD2004、LCD12864

10）PC communication interface：Micro USB, Easy to plug, Communication baud rate 115200

11）Extended interface function support: Shut down after printing、PWM 、ADC、UART、I2C and so on

12）Support file format： G-code

13）Recommended software:Cura、 Simplify3D、 pronterface、
    Repetier-host、 Makerware

14)Multi-power supply, share the pressure of the single power
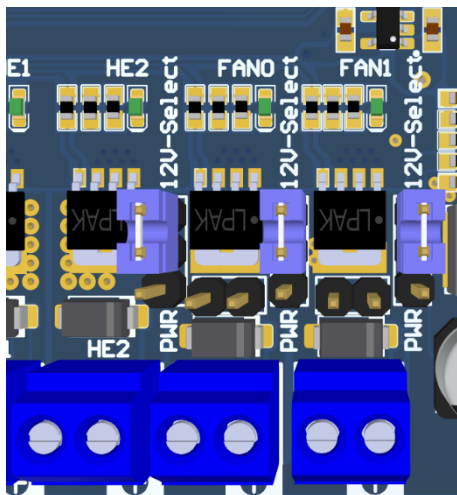
    line withstand current。

# 4. Mainboard power selection

1、 Selection of heating rod 3 and controllable fan power

jumper cap

①Power supply voltage uses heating rods and fans
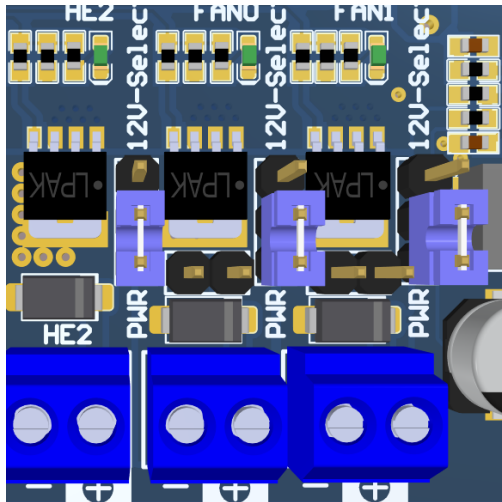


②12V using heating rod and fan↓



    1）As shown in the figure, when the jumper cap is shorted
between the middle and the side close to the terminal, the

main fan or heating rod 3 selects the current power supply voltage. On the contrary, when the jumper cap is shorted between the middle and one side of the principle terminal ,the selected voltage is 12V.

2）Do not short-circuit both sides of the 3Pin header

# 5. Mainboard power wiring method

1. Switching power supply dual power supply method
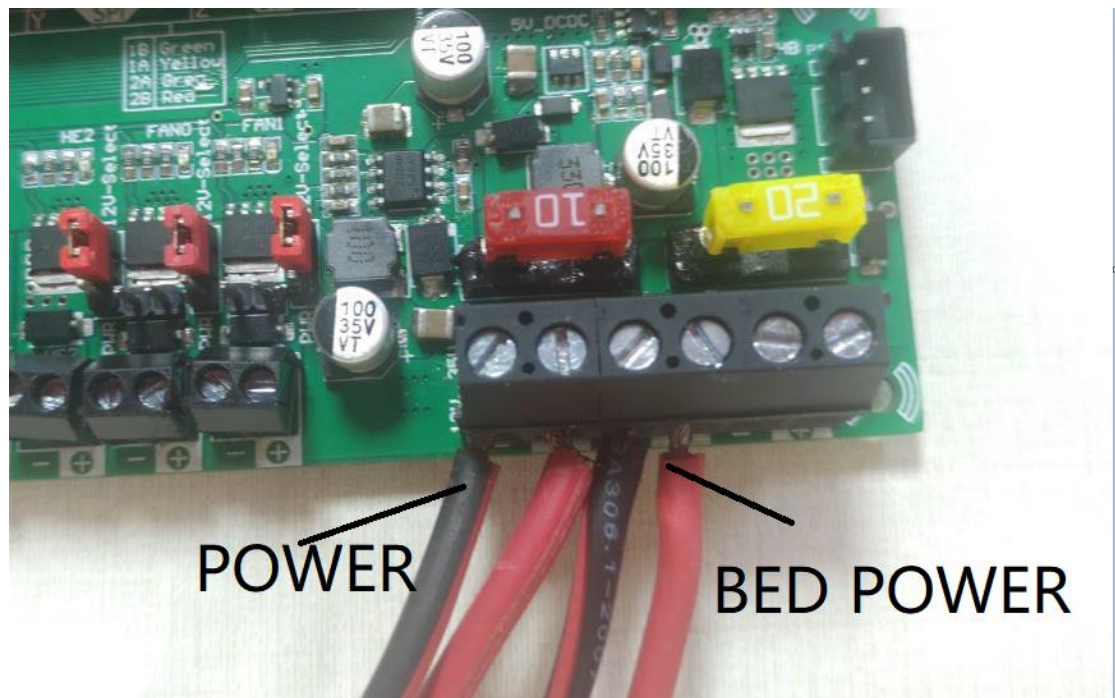


As shown in the figure above, you need to connect two sets of power cords to supply power to the motherboard. They are the motherboard power supply and the hot bed power supply. The extra one is the hot bed interface (the wiring in the picture is red positive and black negative)

Be sure to disconnect the 220V power supply when wiring, and distinguish the positive and negative poles to avoid

<span style="color:red">burning the motherboard.</span>

# 6.Mainboard and computer communication

After the motherboard is connected to the computer via the USB cable, the computer will automatically install the driver. After the driver is installed, the motherboard can be recognized for data transmission. If the installation fails, you can go to our open source website：
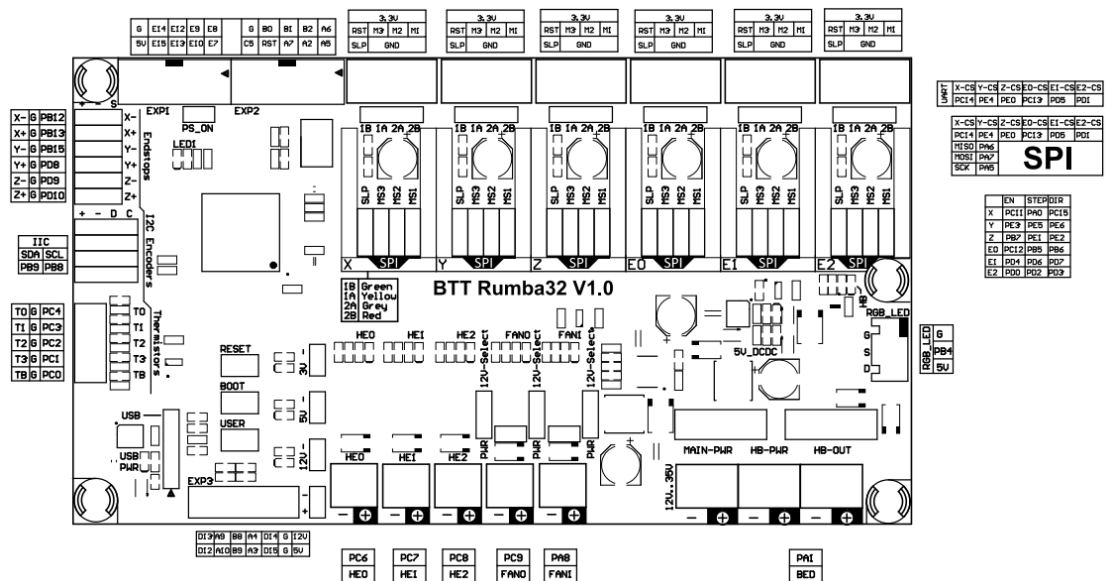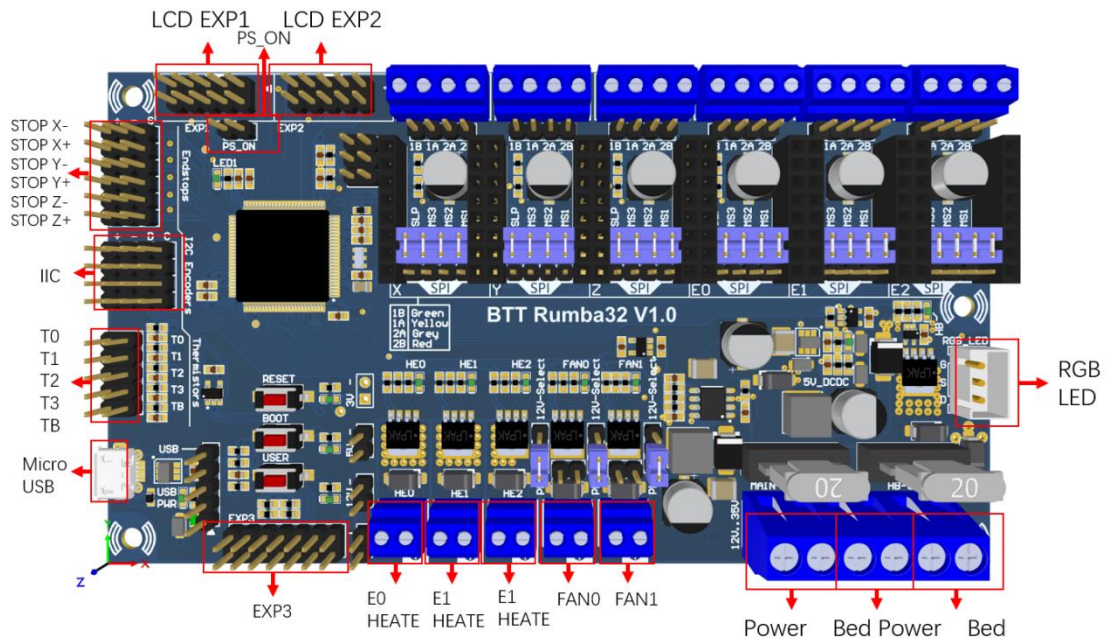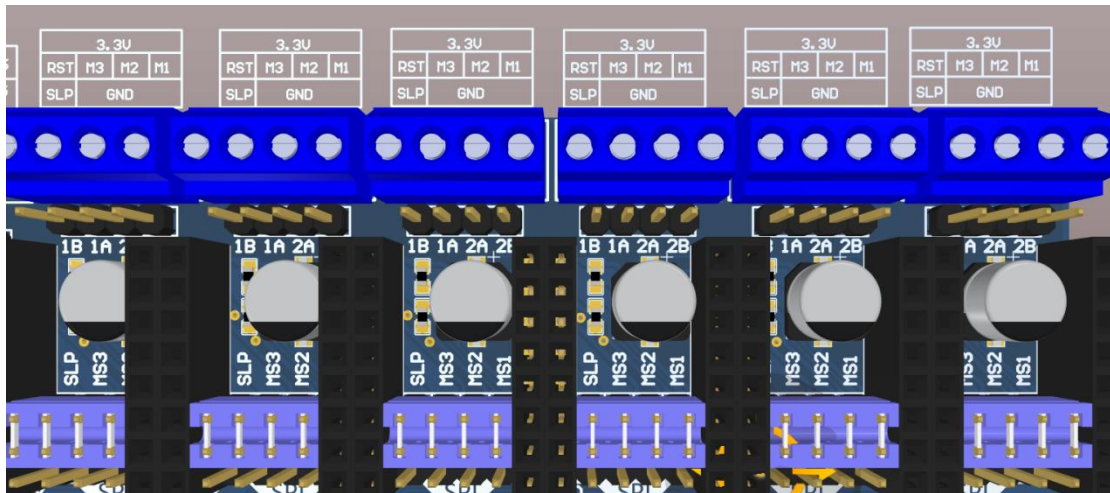
https://github.com/bigtreetech?tab=repositories

Find the corresponding motherboard to download the driver. After the driver is installed, open the "Device Manager" and you can see the ports as shown in the figure below, indicating that the motherboard is connected to the computer normally.

# 7.Mainboard interface description

## 1、Mianboard size Diagram

## 2、Mianboard wiring Diagram



## 3、、Mainboard Pin Diagram



For details,please refer to Pin file information.

# 8.Mode and interface description

## 1、STEP/DIR mode

According to the driver used,corresponding to the subdivision table,use the jumper cap to select the subdivision.
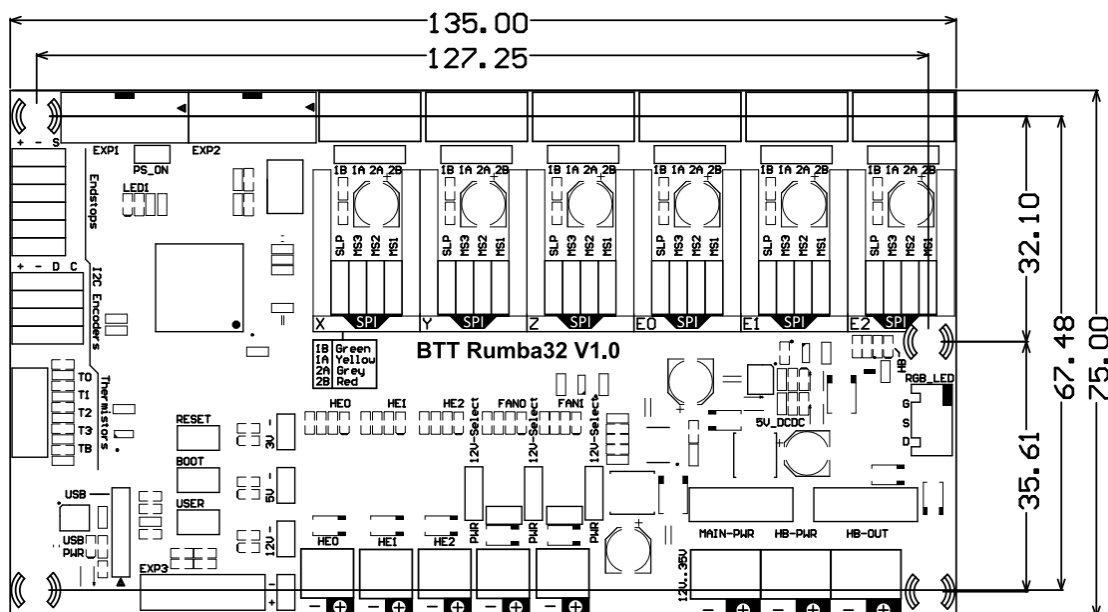
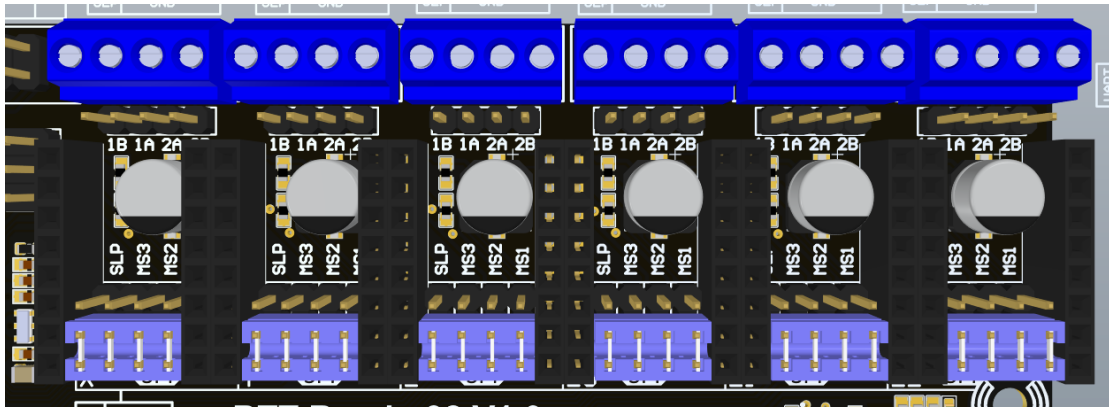Note:The high level is connected to the upper two pins,and the low level is connected to the lower two pins.

## 2、UART mode

When using UART mode,you need to connect the header pins with jumper caps as shown in the figure.
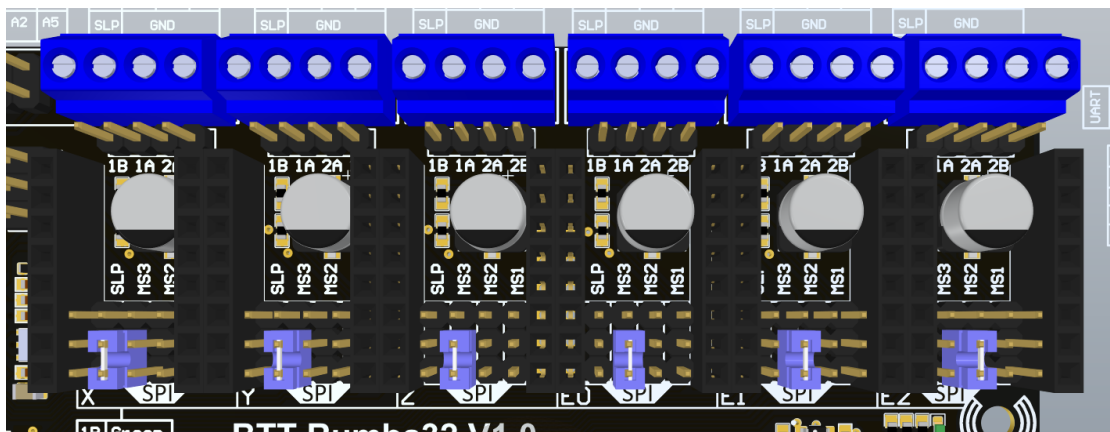


## 3、SPI mode

When using SPI mode,you need to connect the header pins with jumper caps as shown in the figure.

# 9. Mainboard firmware description

1、Only support our open source Marlin2.0 firmware,you can find the corresponding motherboard to download from our open source website:

https://github.com/bigtreetech?tab=repositories

2、1）Firmware update method

Connect the motherboard to the PC,as shown in the figure:
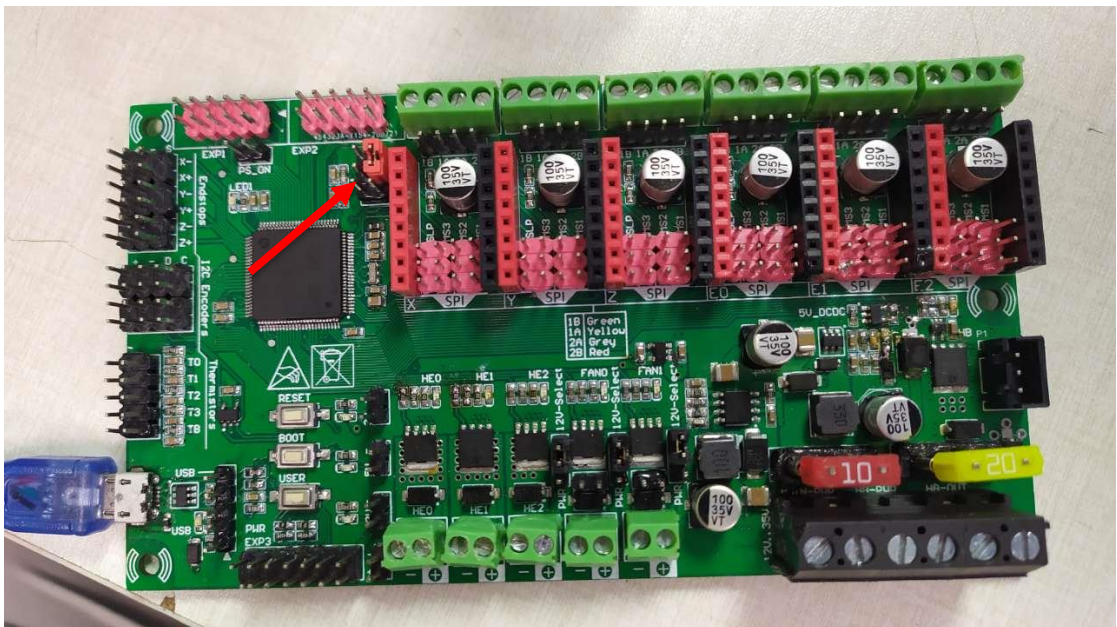


1.After getting the motherboard,follow the picture above,insert the jumper cap (as shown in the picture)and connect the usb to the computer,and then open "Computer->Management->Device Manager".As shownbelow:
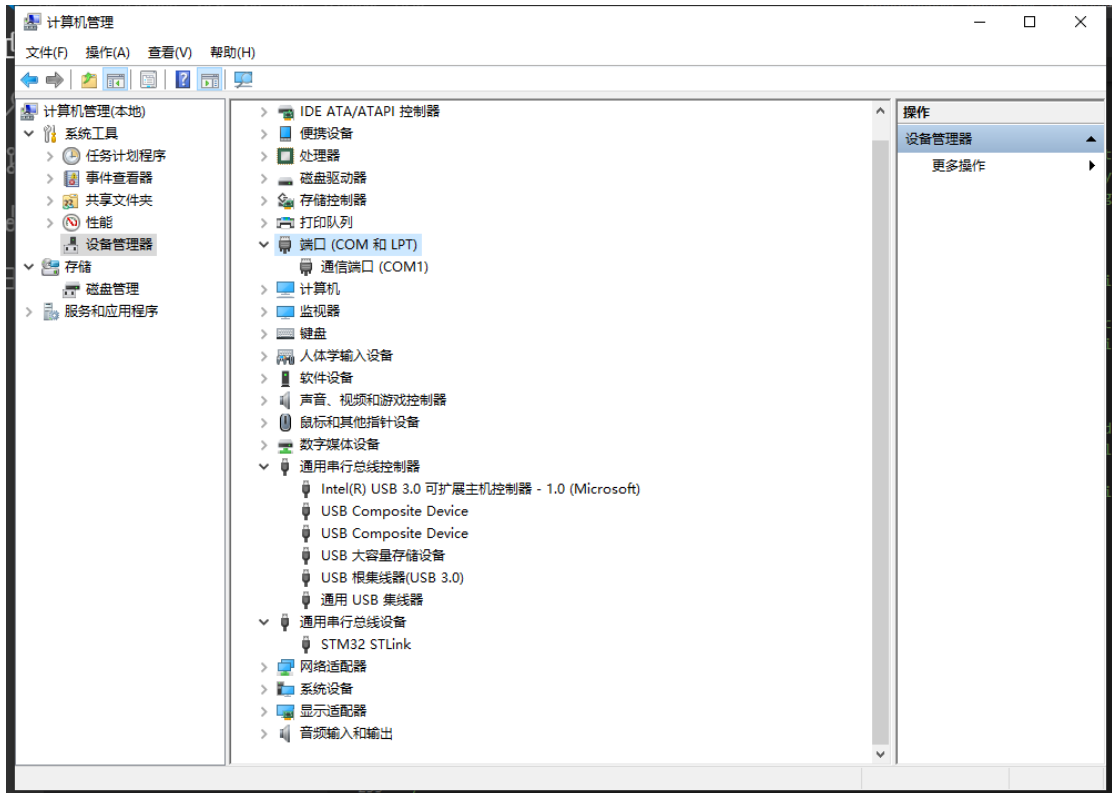
We can see that there is no"STM32BOOTLOADER"device under"Universal Serial Bus Devices".At this time we need DFU driver installation.

2）DFU Driver Installation

1.You can go to the ST official website to get the open source driver.

2.It can also be downloaded directly on bigtree's github.

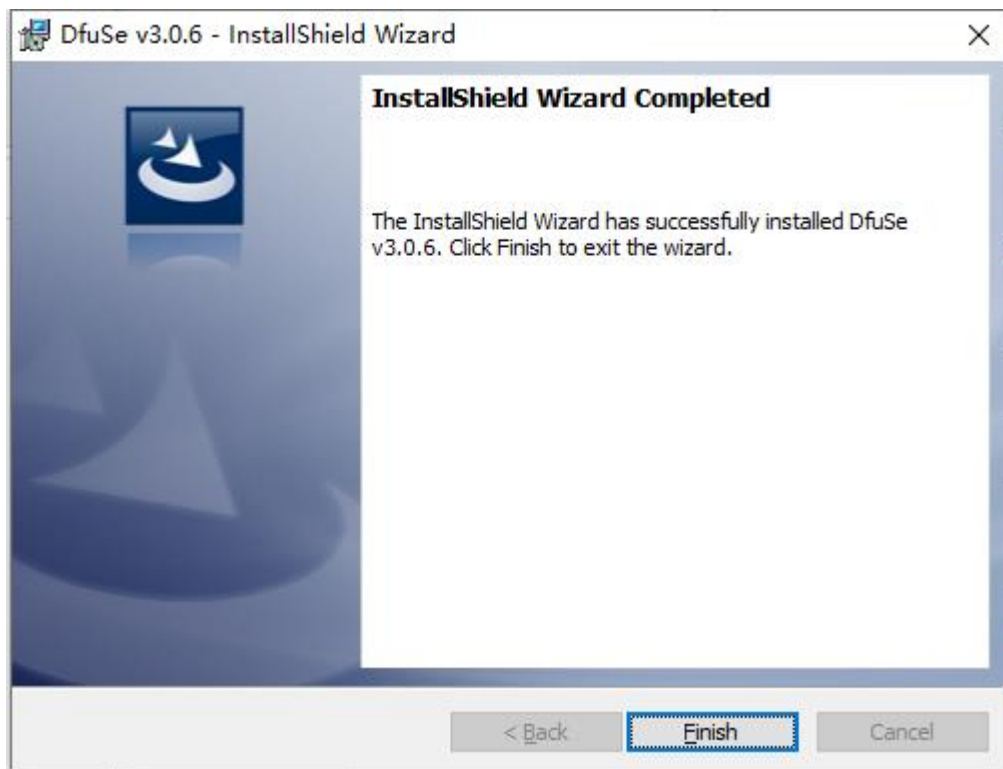3.Open the downloaded driver.Install,as shown in the figure:



Double click DfuSe_Demo_V3.0.6_Setup.exe。
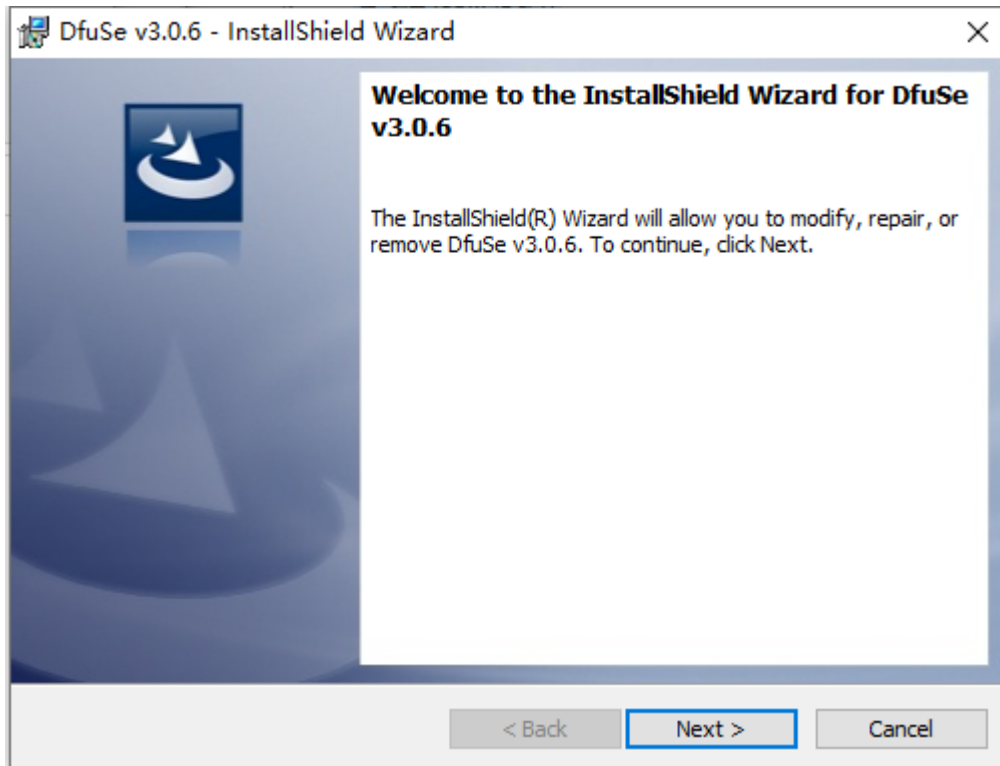
Click"Next"
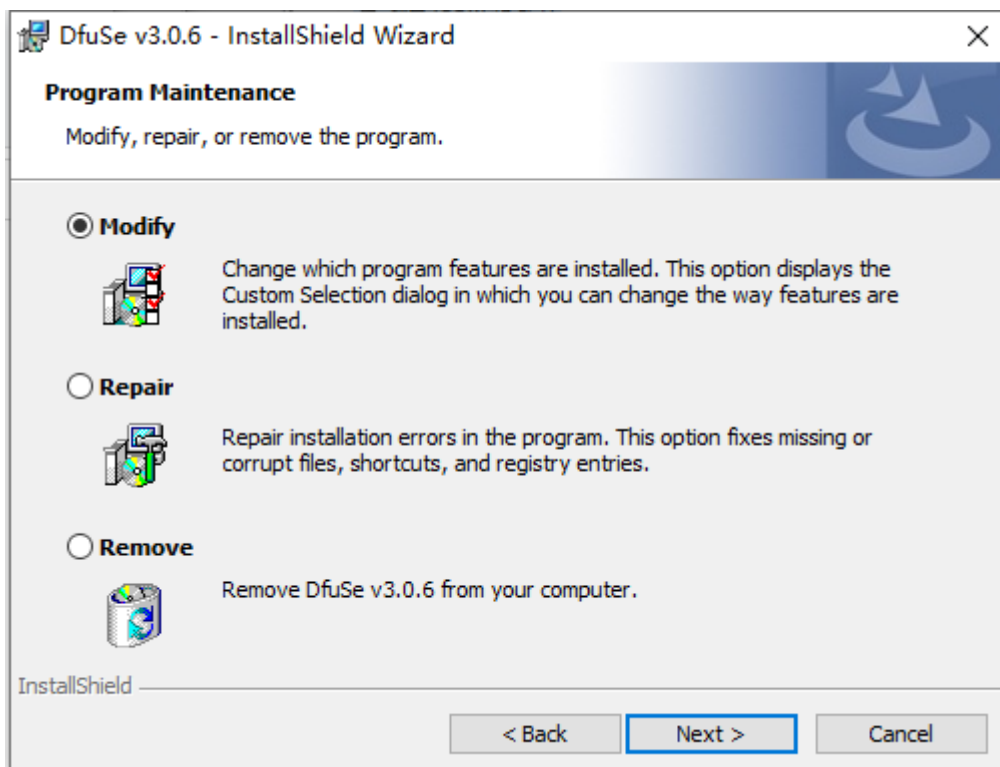


Click"Next",the driver file is not big,generally choose the default installation path,you can click"Next"all the way

At this point,click"Finish"to complete the installation.

After the installation is complete,we can check again under"Computer->Management->Device Manager""Universal Serial Bus Controller"will appear"STM Device in DFU Mode".AtthistimeyoucanuseDfuprogrammingsoftwareforofflineburningWrite,but the steps are cumbersome.Our purpose is to perform online programming in the Vs code Platform IO environment.In principle,it can be burned online in the Vs code Platform IO environment at this time,but an error occurred during the burn,and the driver may be abnormal after Consulting the data.At this time,we need to install the following software to repair the Driver problem.As shown:



Double-click to run this software
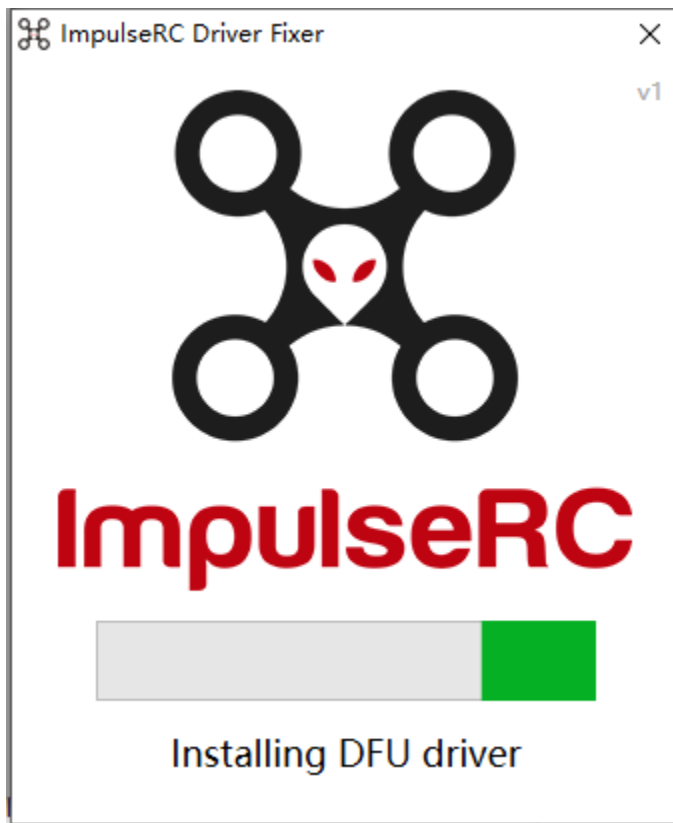
Wait for the installation to complete...

After the installation is complete,check again"Computer->Management->Device
Manager->Universal Serial Bus Devices"
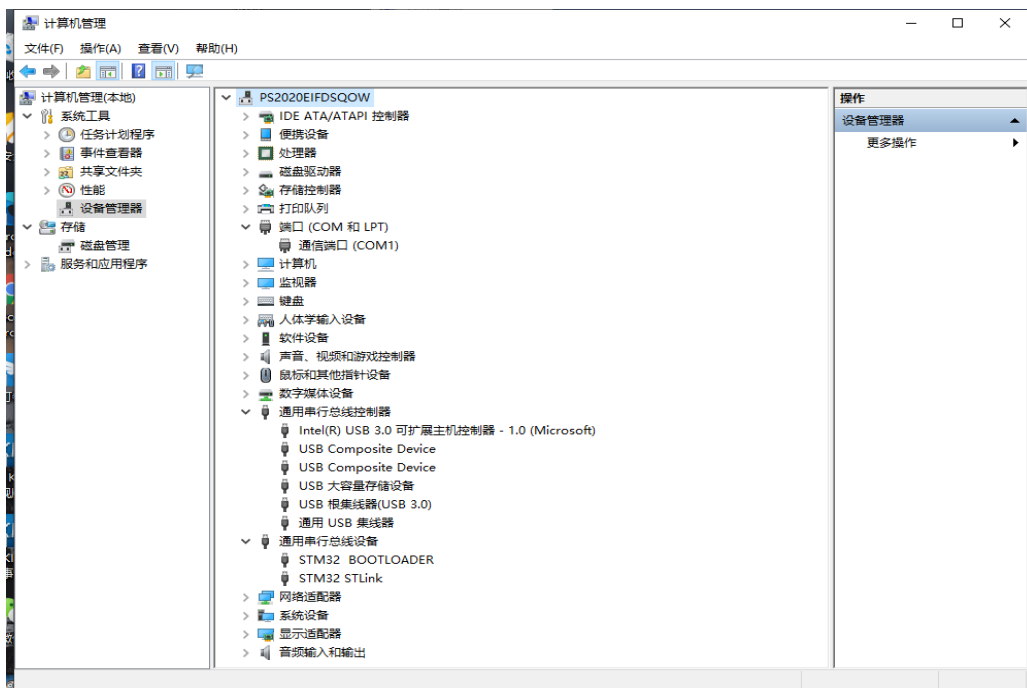


We can see that there is a"STM32BOOTLOADER"device,indicating that we have
successfully installedit.

3. Firmware burning

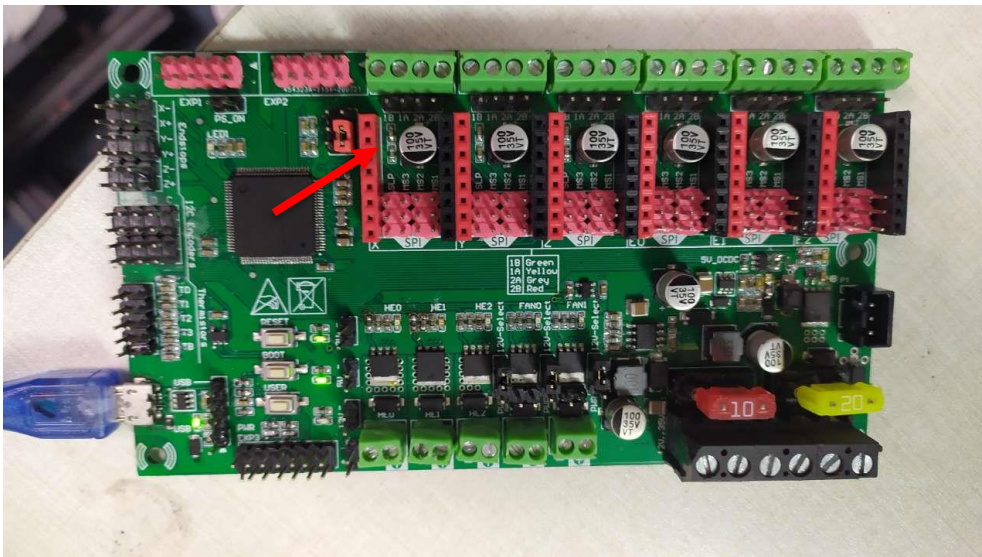    1、 After configuring the firmware under Vs code PlatForm IO ,click directly

2、 Waiting to compile and flash the firmware



3、 As shown in the figure above,the firmware is successfully burned!



Pull and insert the jumper cap to the position shown in the figure,and then press reset to restart the motherboard.

# 10.Notes

1、The firmware currently only support sour open source

Marlin2.0 firmware.

2、U disk function is temporarily not supported,so stay tuned!

3、The power of the hot bed connected to the motherboard must be less than or equalto180W(that is,the resistance value of the hotbed is greater than 0.8Ω),if a high-power heating be disused,an external heating bed power expansion board must be connected;

4、When supplying 12V/24V power to the motherboard,be sure to pay attention to the positive and negative poles of the power supply.

5、Before powering on,ensure that all wires,jumpers,and

Drivers are plugged incorrectly and completely.

6、Do not plug or unplug the drive module with power to

7、When wiring the motherboard,be sure to pay attention to the correctness of the positive and negative poles of the power supply,drive direction,and power supply selection before powering on.avoid damage.