bigtreetech / docs

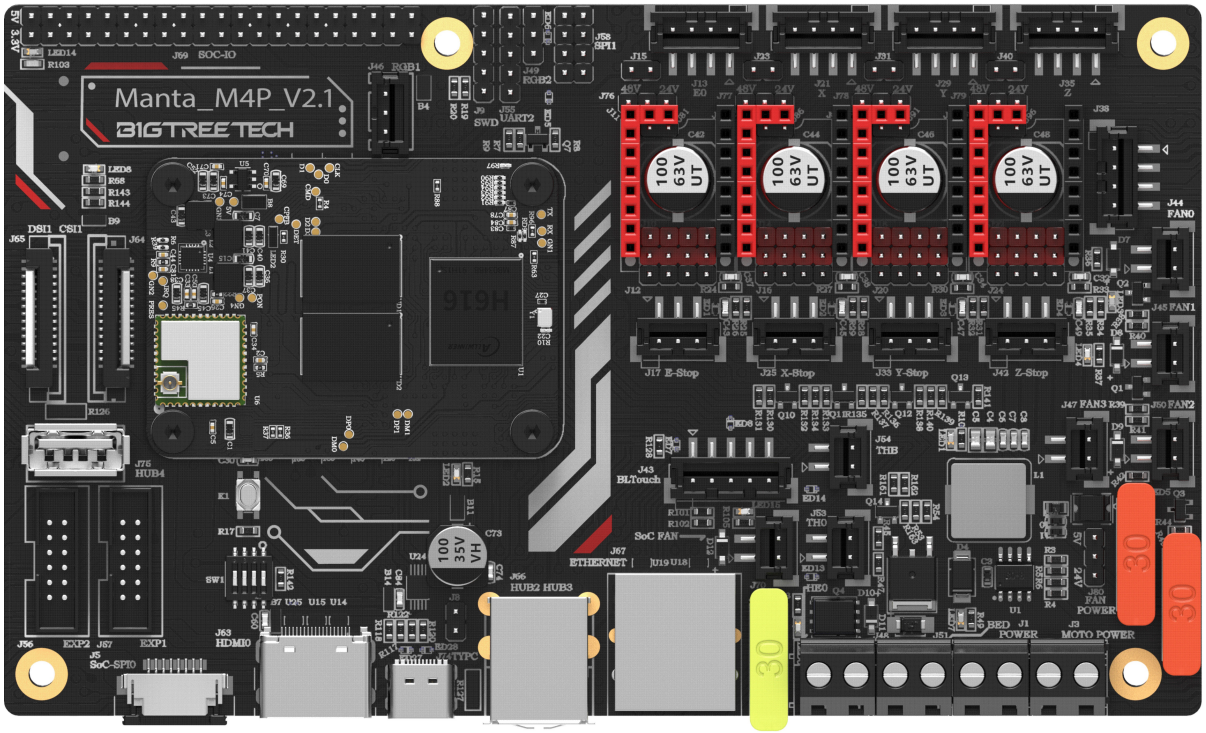
Code Issues Pull requests Discussions Actions Projects Security and quality Insights

master docs / docs / M4P.md

bigtreetech docs(manta): clarify SD card slots and bootloader requirements e938798 · 3 weeks ago History

Preview Code Blame 265 lines (143 loc) · 10.3 KB Raw

M4P



Product Profile

BIGTREETECH CB1 is an alternative to Raspberry Pi CM4, which is currently out of stock.
BIGTREETECH M4P is a 4-axis motherboard using a CM4 BTB header, which can work with CB1 or CM4 perfectly.

Product Link: BIGTREETECH Official Website

Features Highlights

- DSI1, CSI1 interface (for CM4)
- Gigabit Ethernet interface (1000M for CM4, 100M for CB1)

- 3 USB 2.0 ports
- Equipping the ESD protection chip on the USB and Ethernet ports to prevent being broken down by the static electricity
- When working with Raspberry Pi CM4, its 40pin pin header has the same function as that of Raspberry Pi(Custom IO for CB1)
- Using a BTB board-to-board connection, which can be further reinforced with screws, perfectly compatible with CB1 or Raspberry Pi CM4
- The MCU adopts STM32G0B0RE 32-bit ARM Cortex-M0+ @64MHz chip
- 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 the core board
- The protection circuit of the thermistor part prevents the main control chip from burning due to leakage of the heated bed or heater cartridge
- In CNC fan ports: FAN0, FAN1, and FAN2, a 24V (DCIN) or 5V power supply can be selected with a jumper cap (Note: the voltage of the three CNC fans should be the same, and cannot be set to different voltages individually)
- MCU firmware can be upgraded through SD card, or through DFU with Klipper's

make flash command

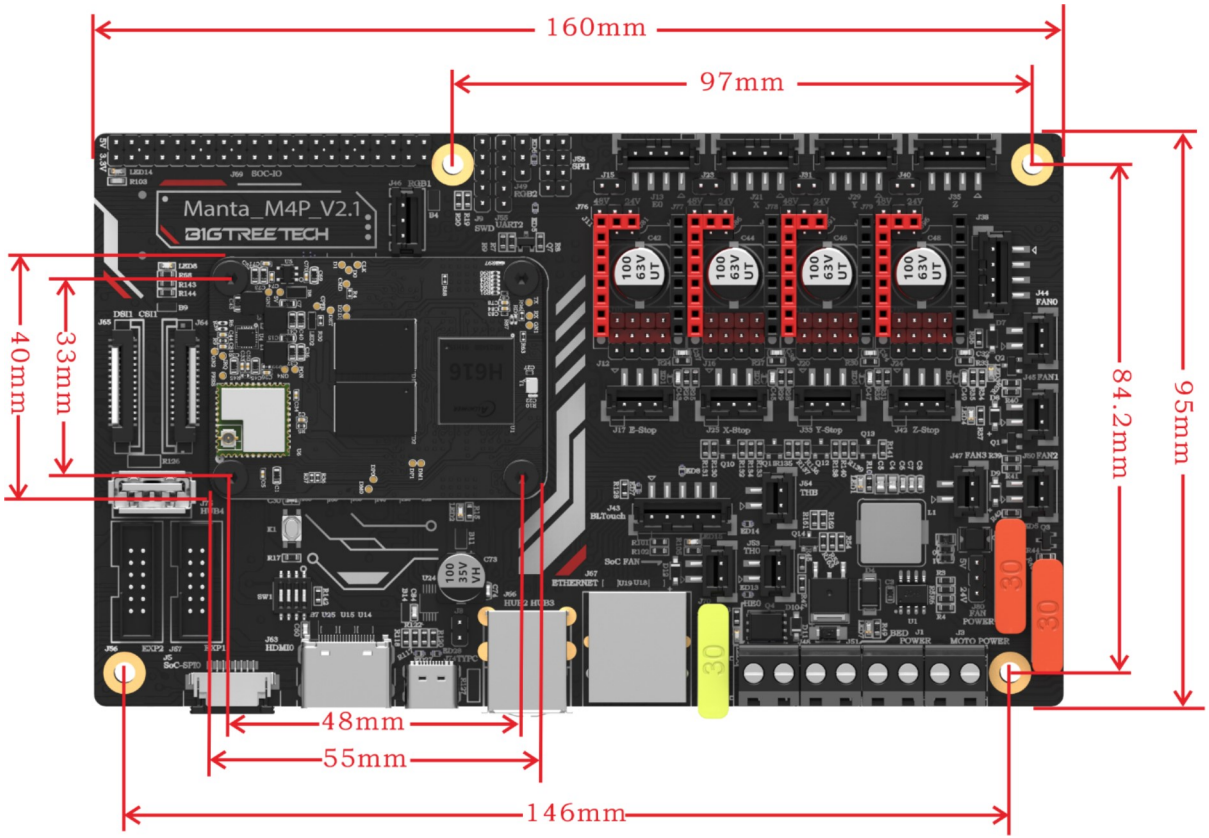
- On-board TMC-driven SPI and UART working modes, on-board DIAG function pins, can be used by simply plugging and unplugging the jumper cap
- Support filament runout detection, BLTouch, RGB lights...
- Adopt replaceable fuse for easy replacement

Specifications

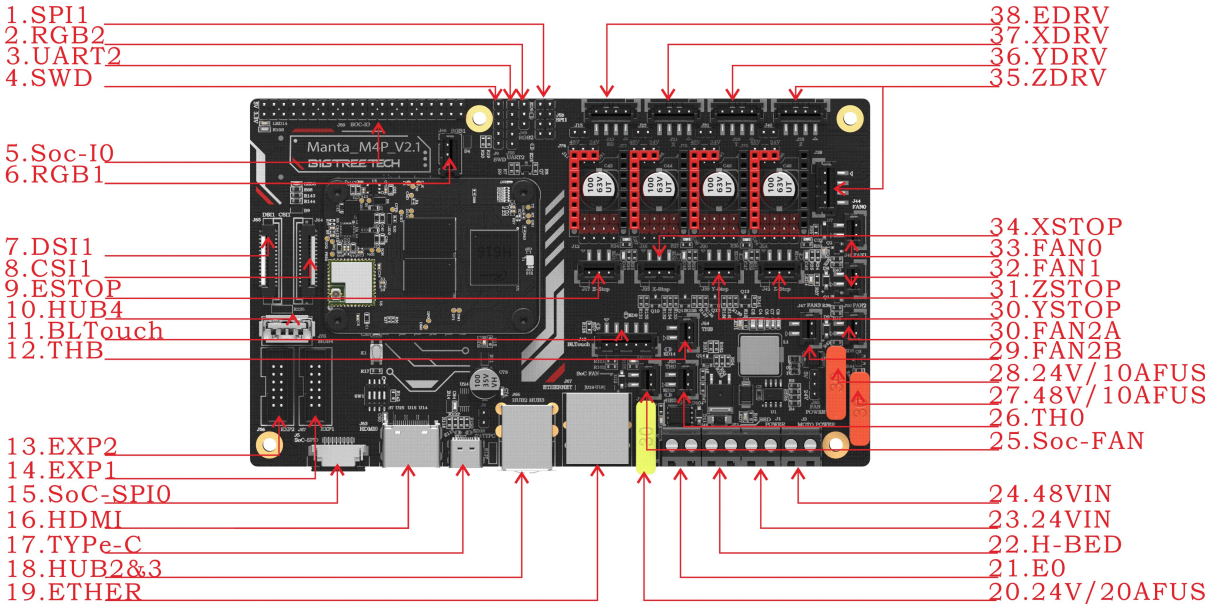
Product Size	160 x 95mm
Installation Size	146 x 84.2mm; 97 x 84.2mm
Core Board Installation Size	33 x 48mm
The maximum output current of the heated bed port	10A
The maximum output current of the heater cartridge port	6A
Fan Port	Three for CNC Fan(24V/5V Voltage Selectable), One SoC Fan(Voltage not Selectable)
The maximum output current of the fan port	1A
Total current for heater cartridge + driver + fan	< 20A
Extended Interface	BLTouch(Servos, Probe), Fil-DET, 2 * RGB

Product Size	160 x 95mm
Motor Driver	Support TMC5160, TMC2209, TMC2225, TMC2226, TMC2208, TMC2130, ST820, LV8729, DRV8825, A4988...
Driver Working Mode Support	SPI, UART, STEP/DIR
Motor Drive Interface	X, Y, Z(Dual Z-axis), E0, a total of four
Temperature Sensor Interface	2-way 100K NTC
Display Screen	RepRapDiscount EXP-1 + EXP-2

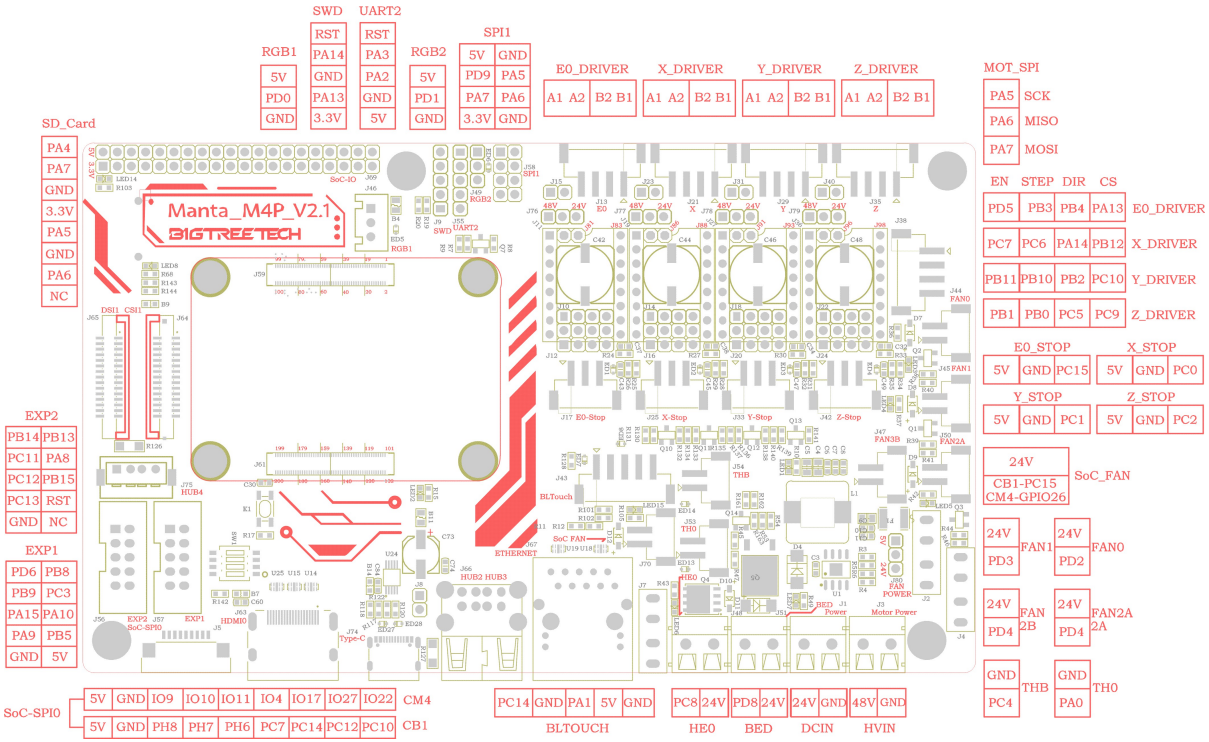
Dimensions



Interface Diagram


1.SPI1
2.RGB2
3.UART2
4.SWD
5.Soc-I0
6.RGB1
7.DSI1
8.CSI1
9.ESTOP
10.HUB4
11.BLTouch
12.THB
13.EXP2
14.EXP1
15.SoC-SPI0
16.HDMI
17.TYPe-C
18.HUB2&3
19.ETHER
38.EDRV
37.XDRV
36.YDRV
35.ZDRV
34.XSTOP
33.FAN0
32.FAN1
31.ZSTOP
30.YSTOP
30.FAN2A
29.FAN2B
28.24V/10AFUS
27.48V/10AFUS
26.TH0
25.Soc-FAN
24.48VIN
23.24VIN
22.H-BED
21.E0
20.24V/20AFUS
Manta_M4P_V2.1
BIGTREETECH

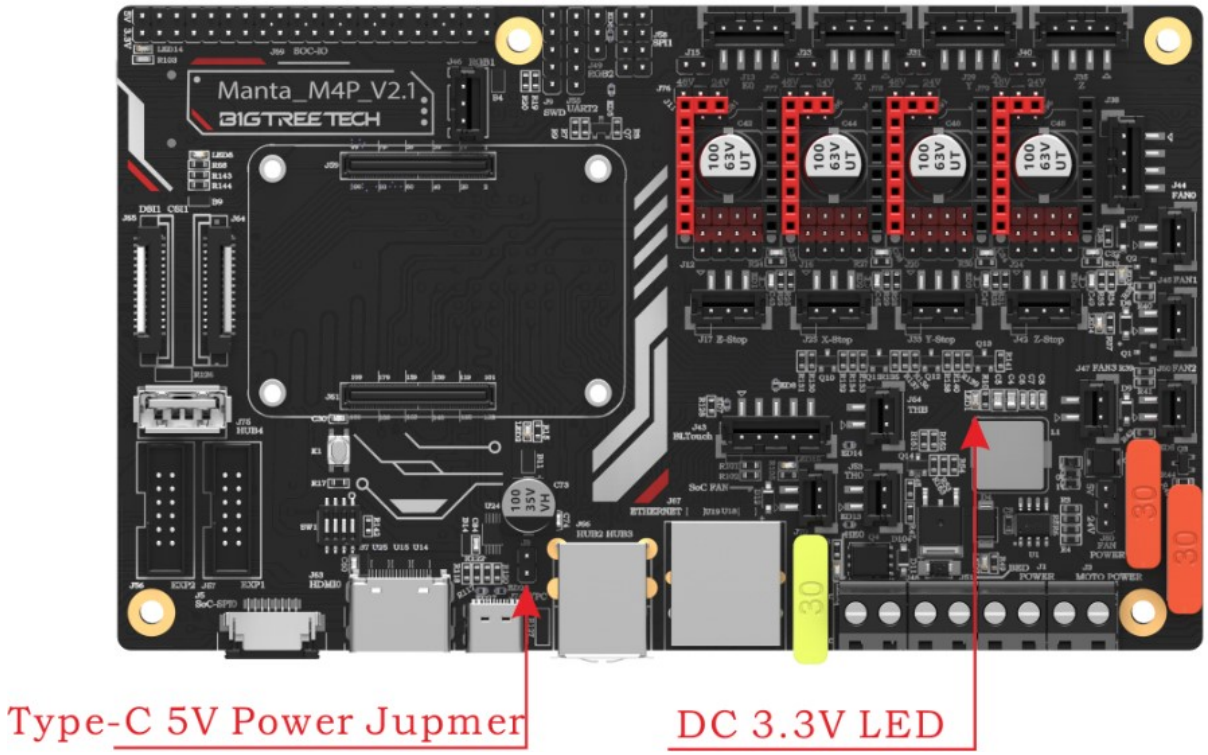
Pinout



Hardware Configuration

TYPE-C

After the M4P is powered on, the red LED1 on the lower right side of the motherboard will light up, indicating that the power supply is normal. The J8 on the middle of the board is the power selection terminal, it needs to be short circuited only when the type-C USB is used to supply power to the
motherboard or the USB is used to supply power externally. The signal of type-C is connected to the SoC, Only used when writing OS image for CM4 eMMC version.

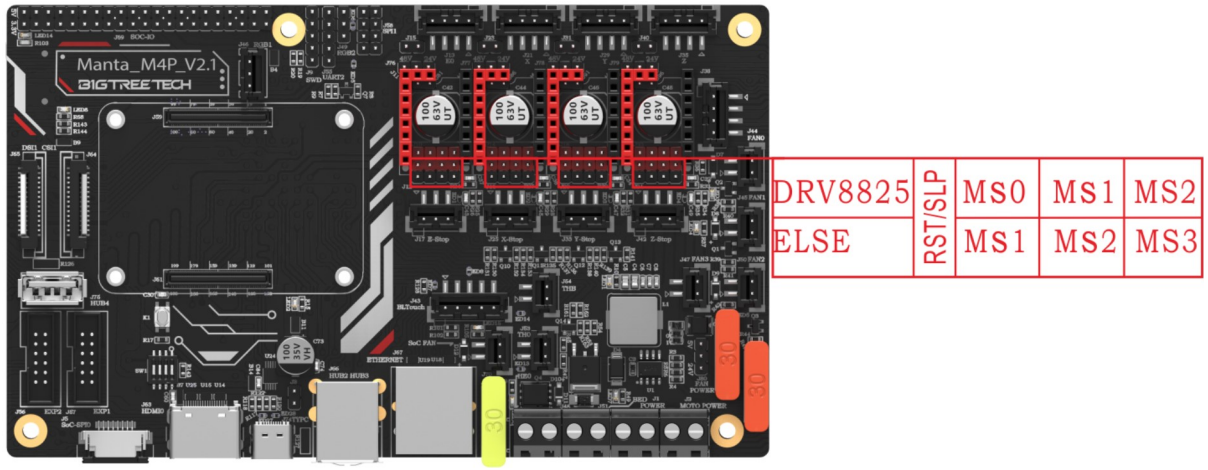


Hardware Installation

Stepper Driver

Normal STEP/DIR(STANDALONE) Mode

For example, A4988, DRV8825, LV8729, ST820...use the jumper cap to short MS0-MS2 according to the driver subdivision table.

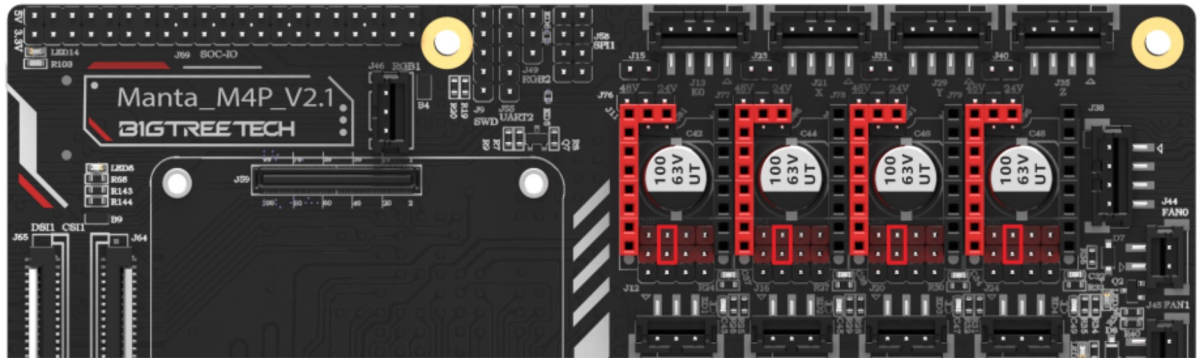


Note: If using A4988or DRV8825, RST and SLP must be shorted with jumper caps for normal operation.

For details, please click: https://bigtreetech.github.io/docs/Tutorials.html

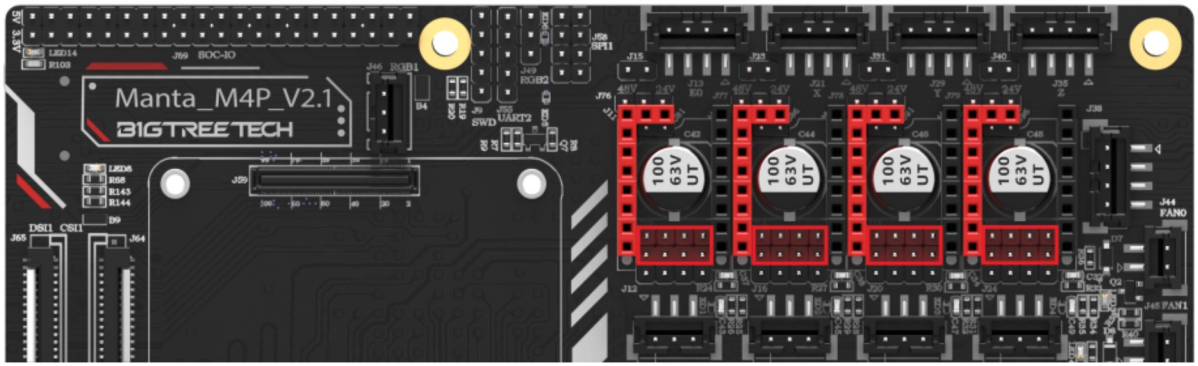
UART Mode of TMC Driver

For example, TMC2208, TMC2209, TMC2225... Use a jumper cap for each to connect the position of the red box in the figure, and the subdivision and driver current is set by firmware.



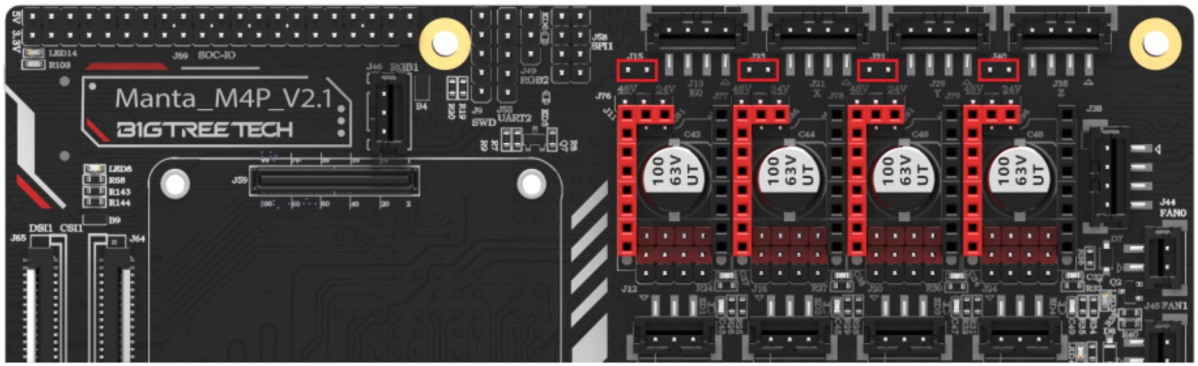
SPI Mode of TMC Driver

For example, TMC2130, TMC5160, TMC5161... Use 4 jumper caps for each to connect the position of the red box in the figure, and the subdivision and driver current is set by firmware.



DIAG(Sensorless Homing) of TMC Driver

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

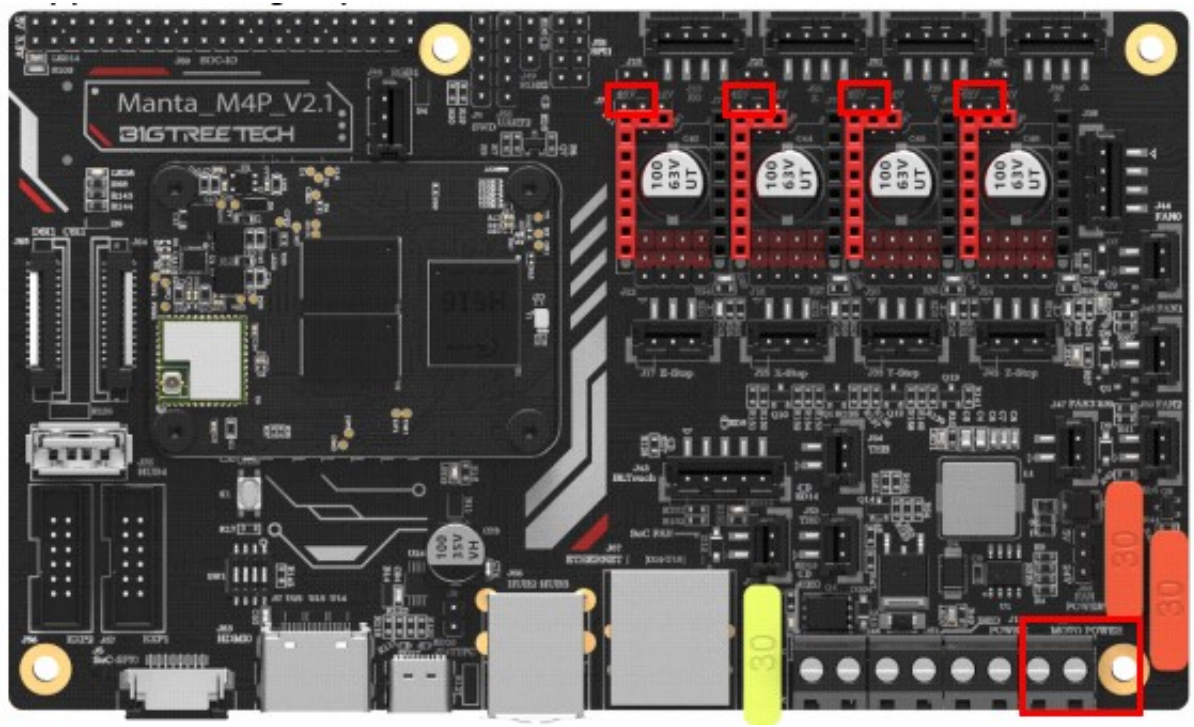


Driver Voltage Selection

The power supply of each driver can be set by the jumper. When the jumper is inserted into the left side, the independent MOTOR POWER port is used for driver power, and the supported voltage up to 56V. When the jumper is inserted into the right side, the main POWER port is used for driver power, and the 12/24v voltage is supported.

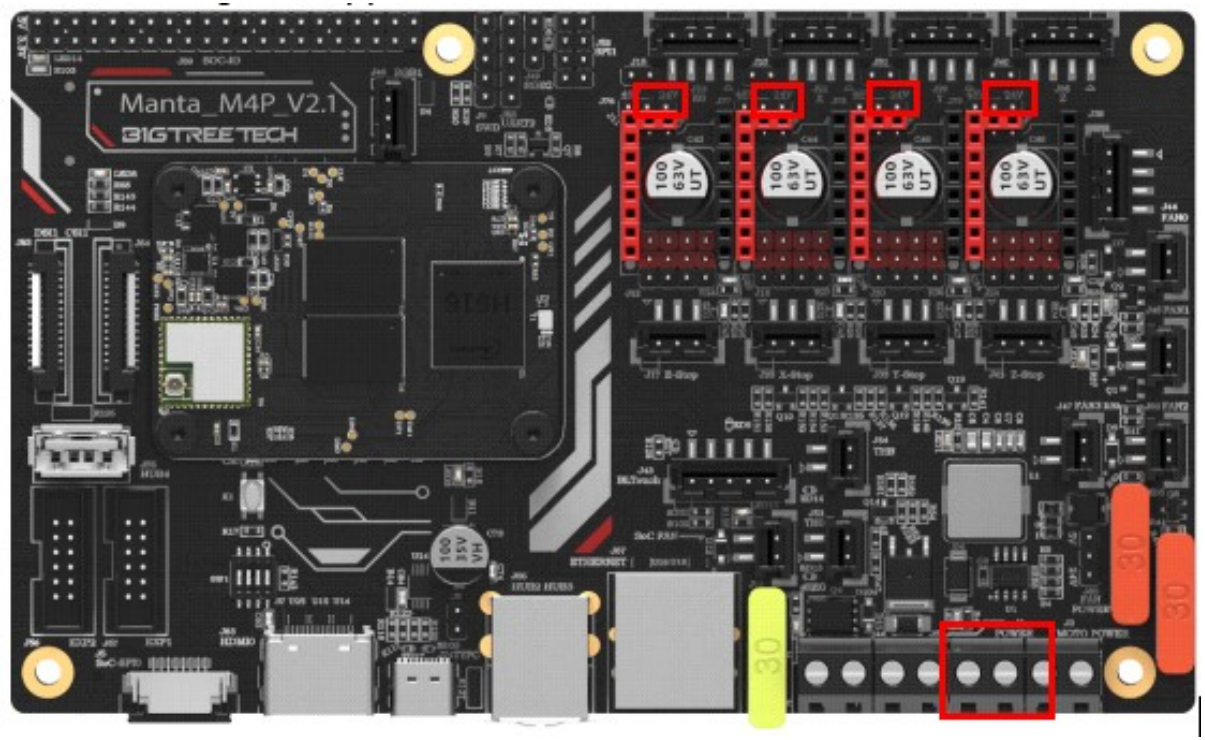
Driver independent power supply

The jumper is inserted into the left side and powered by the MOTOR POWER port. the supported voltage up to 56V.



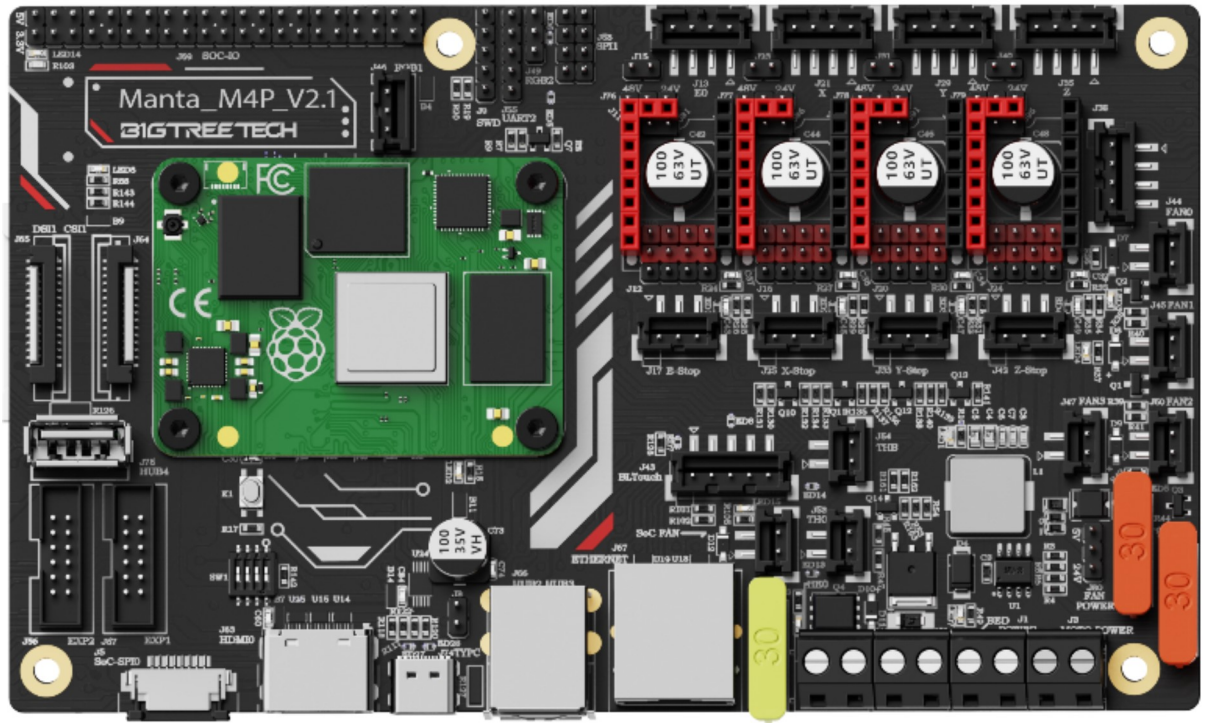
Main power supply

The jumper is inserted into the right side and powered by the main POWER port. the 12/24v voltage is supported.

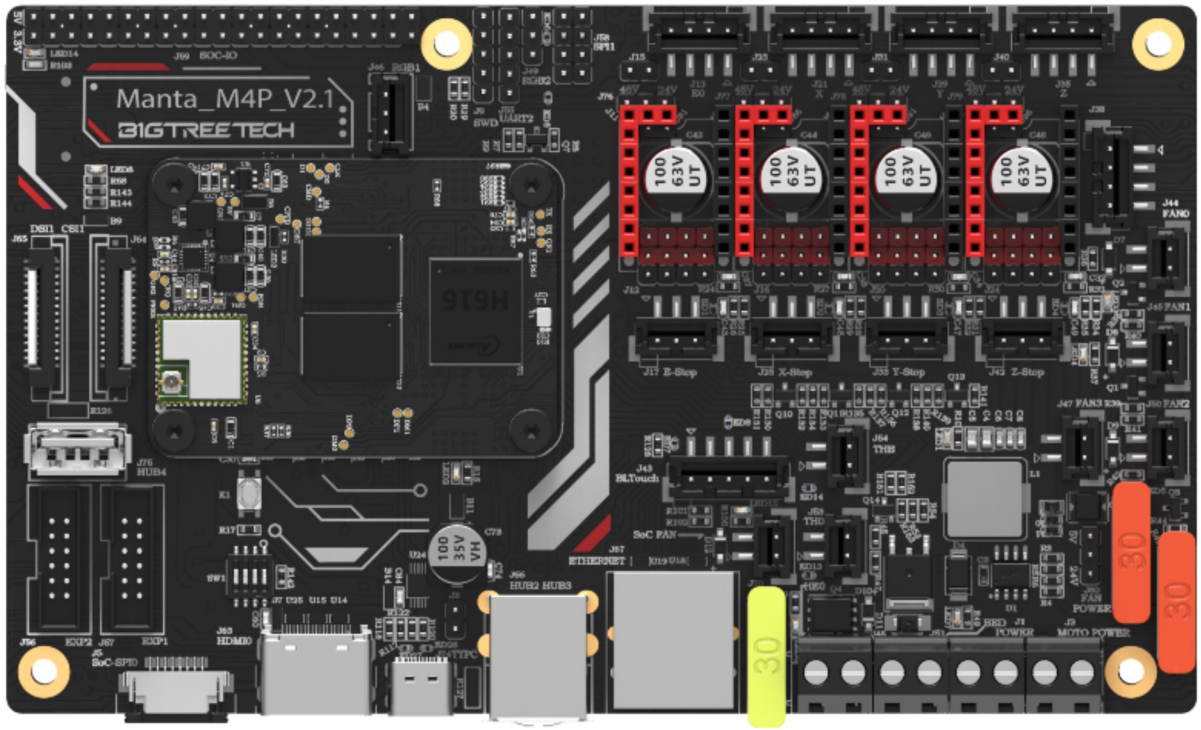


Install the Core Board via BTB Connection

M4P+CM4：Pay attention to the direction, as shown below.

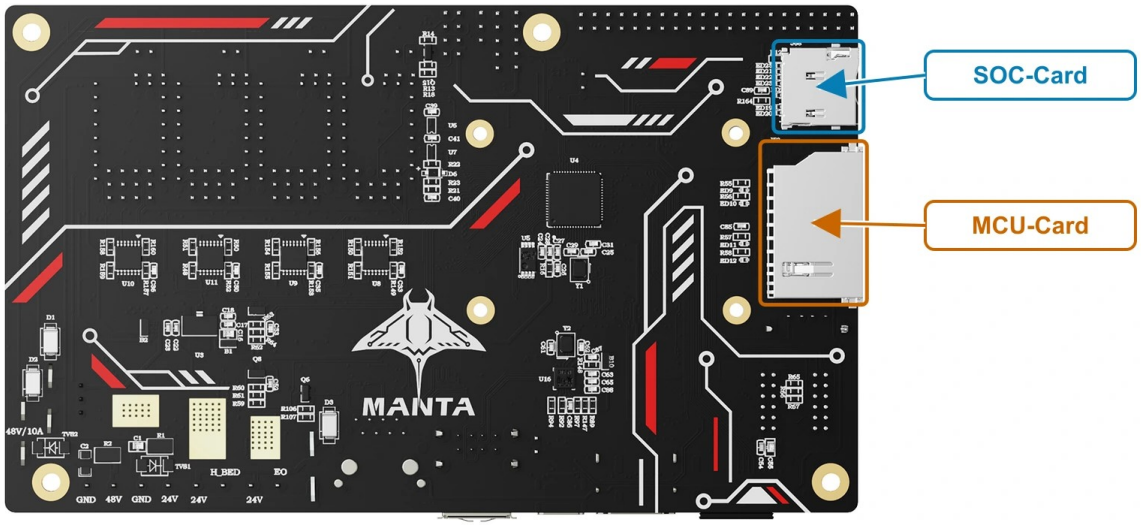


M4P+CB1：Pay attention to the direction, as shown below.



SD Card Slots

The M4P has two SD card slots with different purposes. The image below marks their locations on the back of the motherboard: SOC-Card is next to MCU-Card. Check the markings on your board for differences between hardware revisions.

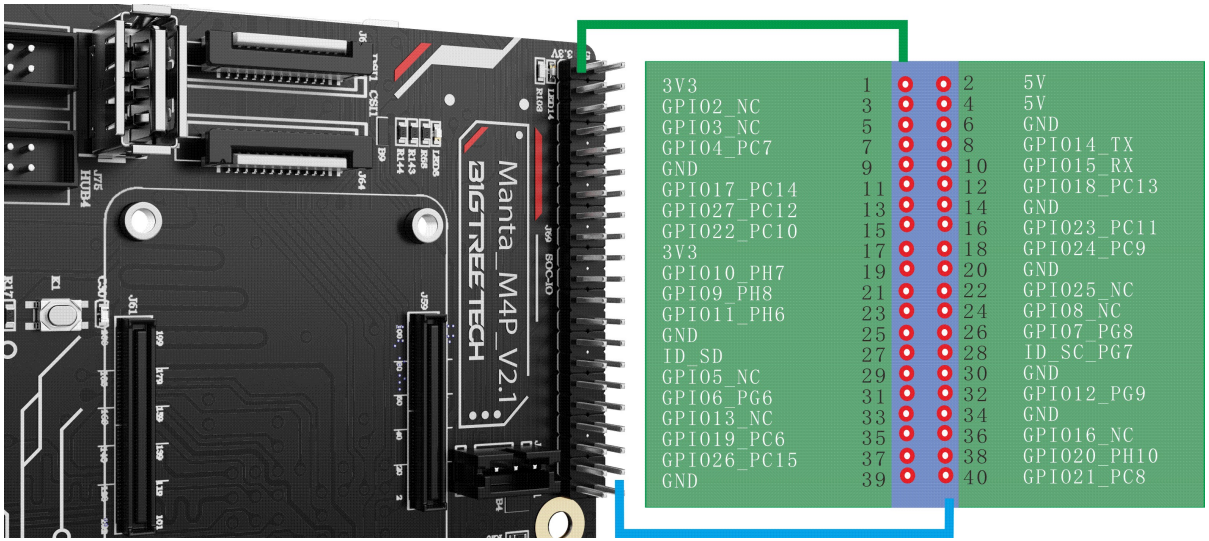


Slot	Purpose
SOC-Card	Holds the OS image for a core board that uses a microSD card; it does not update the motherboard MCU firmware.
MCU-Card	Updates the motherboard MCU firmware; it is not the core board's system card slot.

!!! warning "MCU-Card requirement" Updating firmware through the MCU-Card requires the factory-installed bootloader to remain on the motherboard. If the bootloader is erased or overwritten, this slot cannot perform firmware updates. First restore the factory bootloader for this board model and hardware revision by another flashing method.

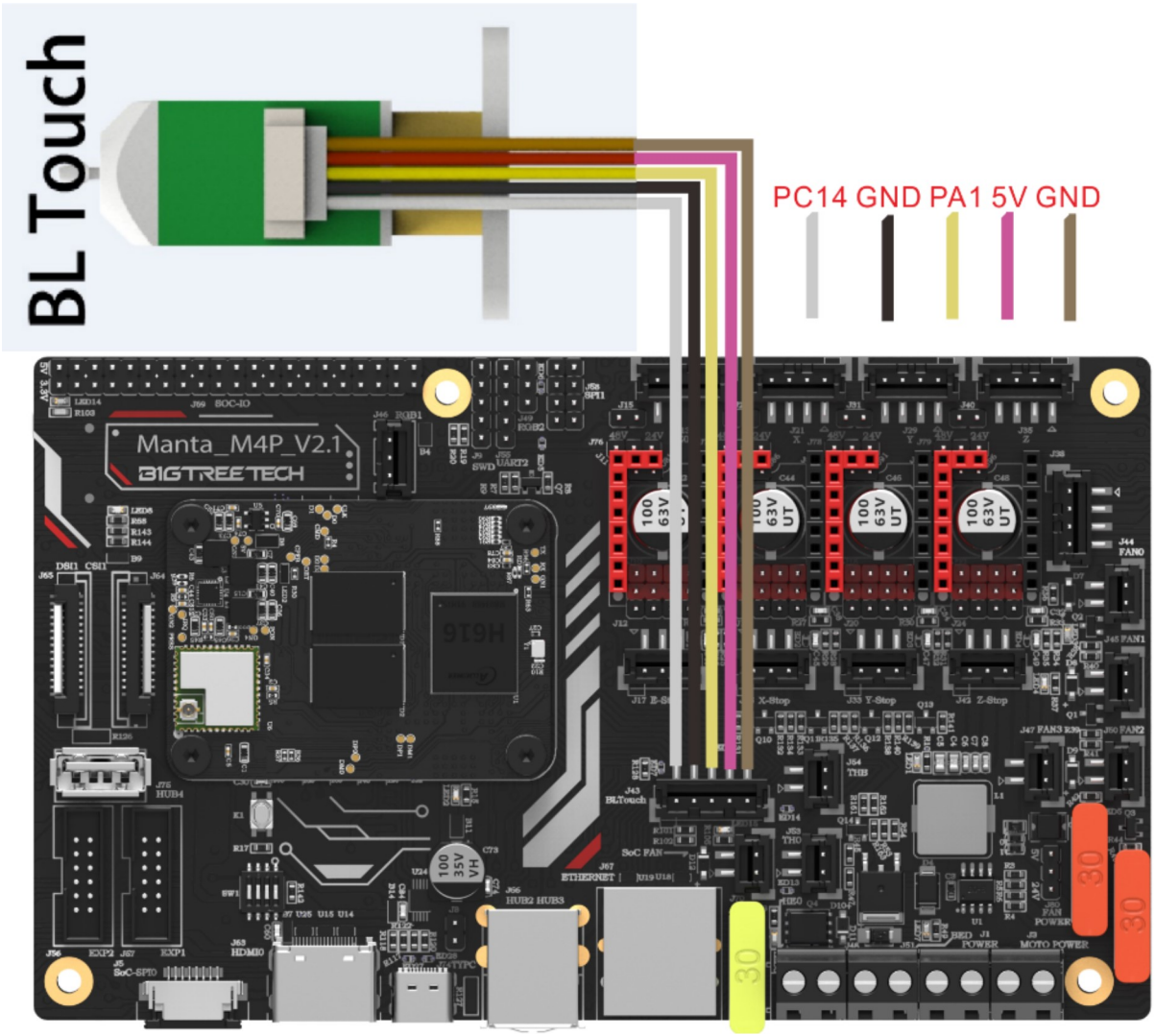
40 pin GPIO

When working with CM4, the pin arrangement of 40 Pin GPIO is exactly the same as that of Raspberry Pi. When working with CB1, it is a custom IO arrangement, as shown in the figure below, the 'GPIO4' in front of '_' is the IO of CM4, and the latter 'PC7' is the IO of CB1.



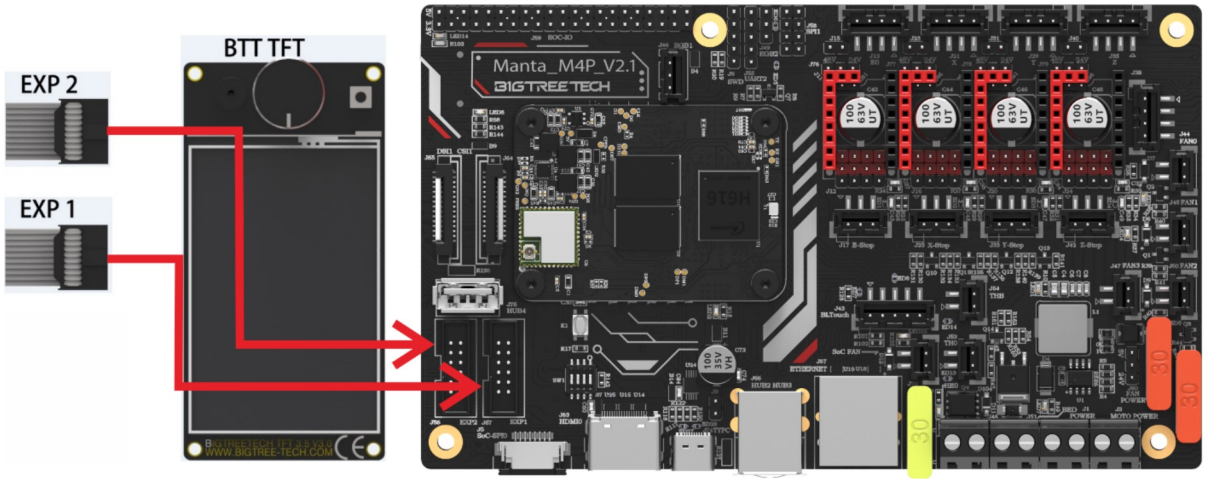
BLTouch Wiring

M4P_BLTouch_Wiring

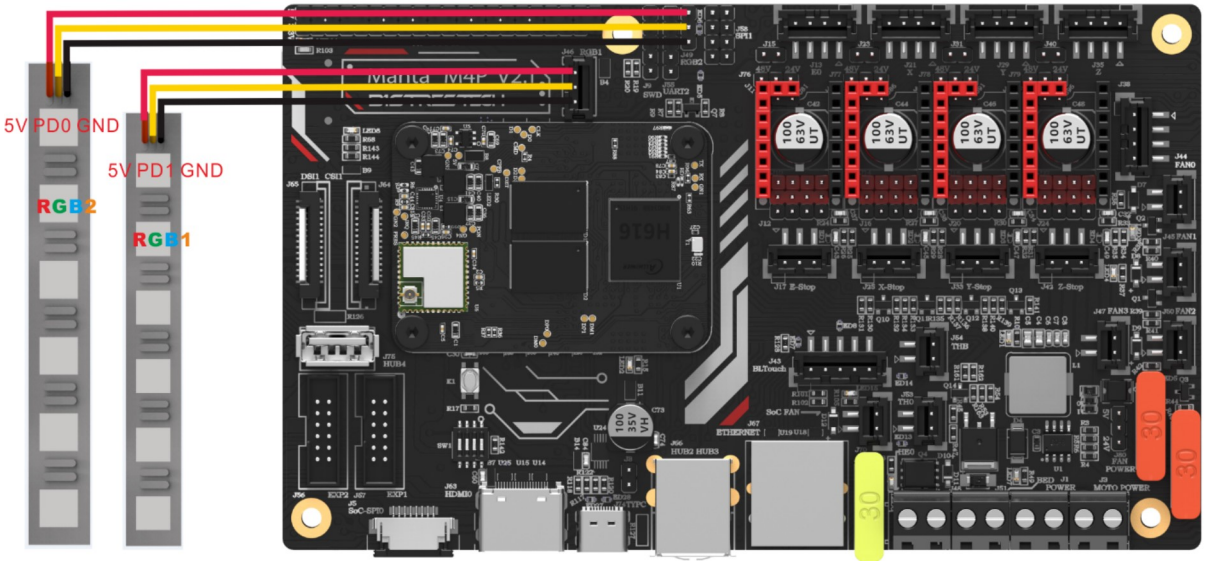


EXP1+EXP2 and LCD Screen Wiring

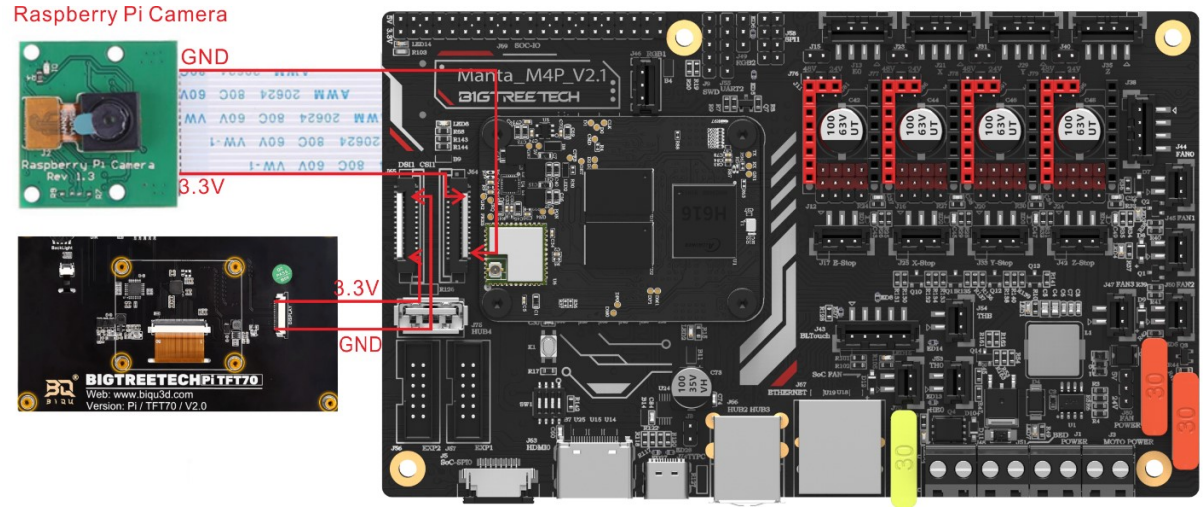
M4P_E1_E2_LCD



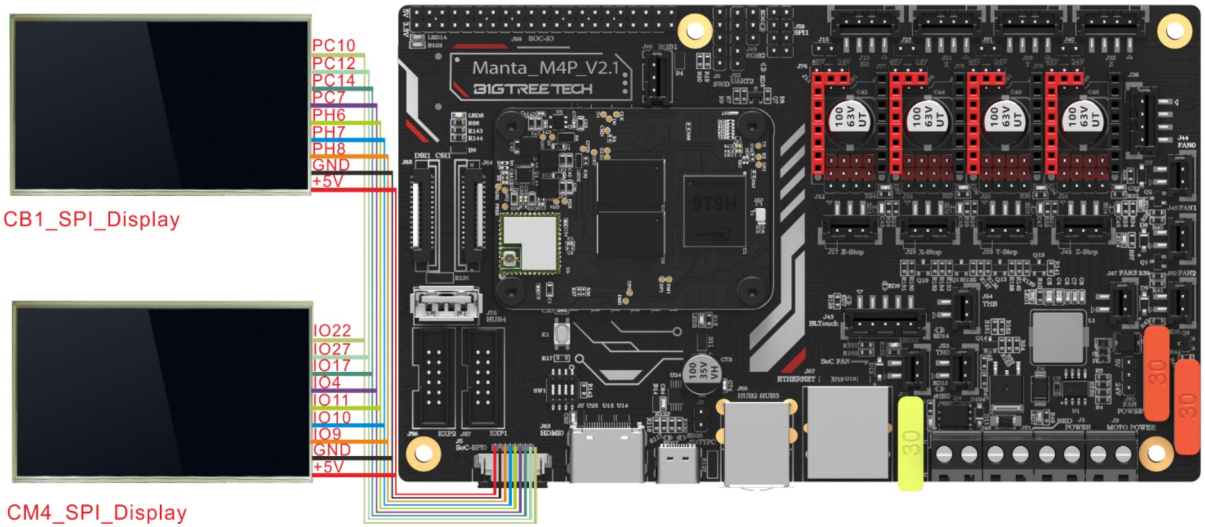
RGB Wiring



DSI/CSI Wiring

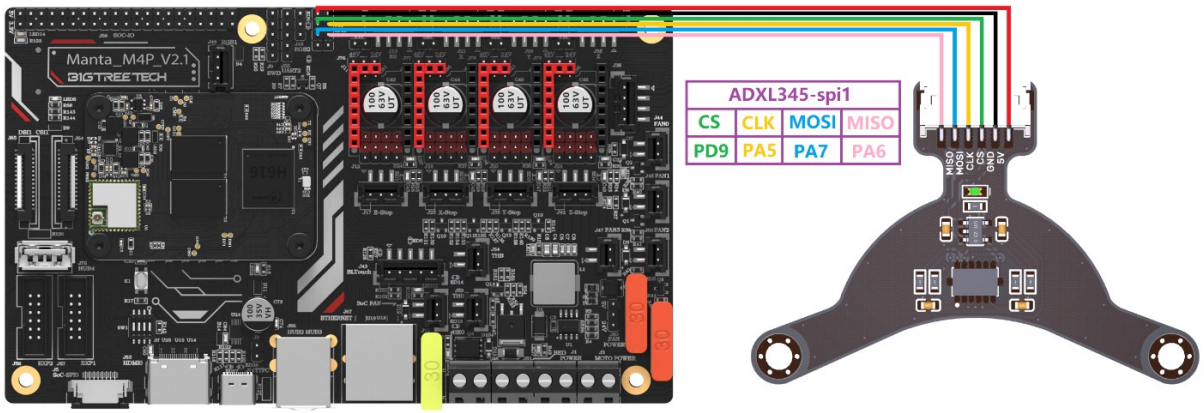


SPI Display Wiring



ADXL345 Accelerometer

Refer to here: https://www.klipper3d.org/Measuring_Resonances.html, We can refer to the following wiring and configuration when connecting to the M4P motherboard



[adxl345]

```
cs_pin: PD9
spi_bus: spi1
#spi_software_sclk_pin: PA5
#spi_software_mosi_pin: PA7
#spi_software_miso_pin: PA6
```

Software Configuration

For details, please click:

https://bigtreetech.github.io/docs/Software%20Configuration.html

Software Installation

For details, please click:

https://bigtreetech.github.io/docs/Software%20Installation.html

FAQs

- All unplugging and plugging operations should be performed under the condition of power off, including enabling the eMMC writing.
- Pay attention to the heat dissipation of CM4 and CB1. If the running application consumes too many system resources, the CM4/CB1 will get hot quite seriously.

Product Purchase Link

Purchase Link:

https://biqu.equipment/products/manta-m4p-m8p

If you have any issues with the product, please submit a support ticket.

https://biqu3d.com/pages/submit-a-ticket

M4P Guide Videos

*** Unboxing/Wiring/Firmware Installation of CB1&M4P(Voron V0 as an example)***

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