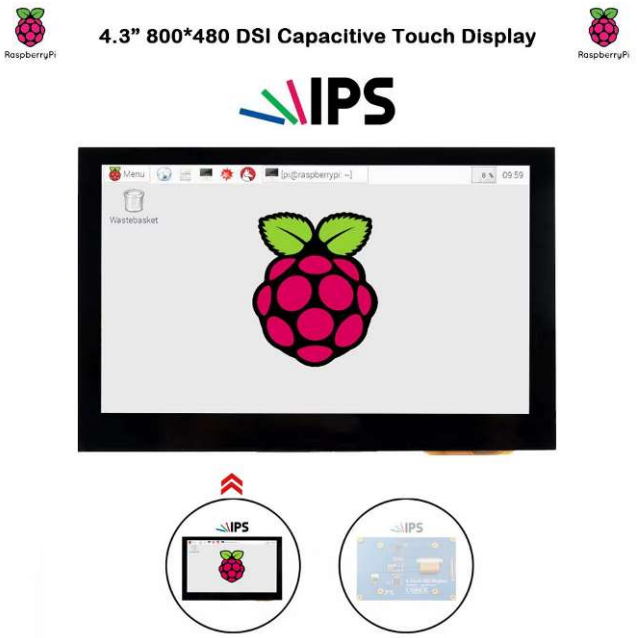
SURENOO DSI DISPLAY for RaspBerry Pi

SDSR043A_800480

LCD MODULE USER MANUAL

Please click the following image to buy the sample



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Surenoo DSI Display Selection Guide

1. Overview

- 800*480 resolution capacitive touch **IPS** screens
- Raspberry Pi **MIPI DSI** interface direct output, plug and play, no need to install driver
- Support for official system **Raspbian**, 2 points to zoom the page
- Support **Ubuntu/Kali/Win10 IoT**, single touch
- Support **Retropie**
- Backlight brightness adjustment button
- Support **PWM** backlight brightness adjustment, adapt to different use environment

2. Parameter

Name	Descriptions
LCD Type	IPS TFT
LCD Size	4.3inch
LCD Resolution	800*480
LCD Interface type	RGB888
Module Interface Type	MIPI DSI
Touch screen type	Capacitive touch screen
Viewing Angle	IPS：Whole perspective
Active Area	95.04*53.86 (mm)
Working Voltage	3.3V
Maximum Operating Current	220mA
Operating Temperature	-20℃-70℃
Module Size	106.00*68.00 (mm)
Module Weight (net weight)	97g
Package Size	134*98*52(mm)
Package Weight	140g

3. Hardware Description

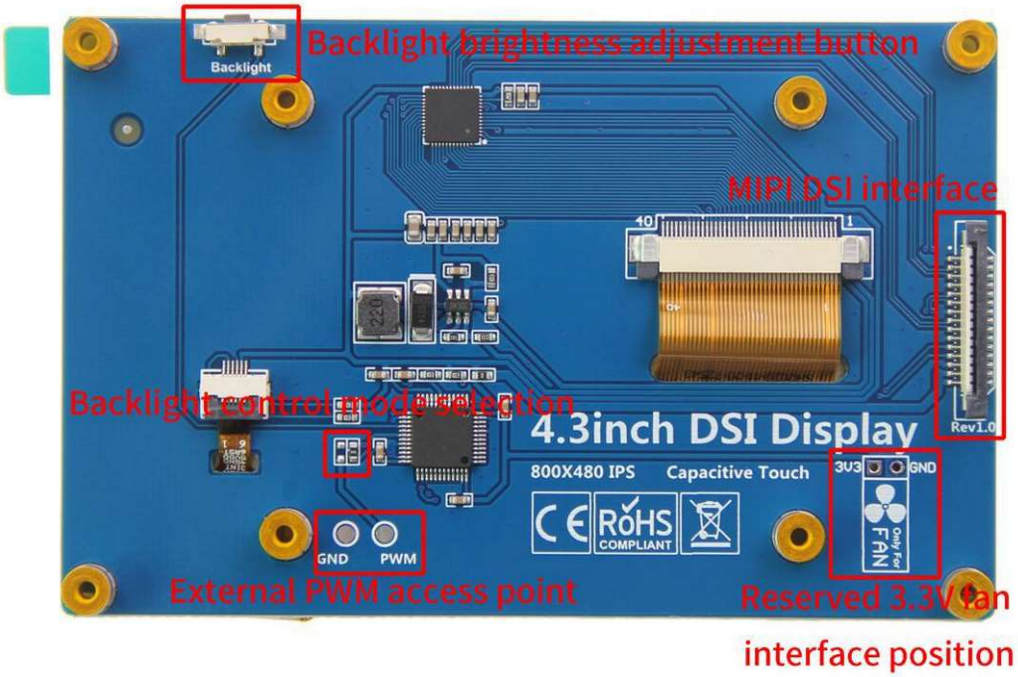


Figure 1

1）Backlight brightness adjustment button

2）MIPI DSI interface

MIPI DSI interface for connecting Raspberry Pi via FPC flexible cable

3）Backlight control mode selection

The circuit is used to choose the mode of fixed maximum brightness value or the mode of adjusting brightness value through PWM:

- The 0R resistor is soldered to the right, then the maximum brightness value is fixed to control the backlight;
- The 0R resistor is welded to the left, then the backlight is controlled by adjusting the brightness value through PWM.

Note: The default option is to set the maximum brightness value to control the backlight

4）External PWM access point

Used for external PWM control signal input, you can control the screen backlight brightness through the PWM signal. Where the PWM point is connected to the GPIO (such as GPIO18) that outputs the PWM signal, and the GND point is connected to the GND pin.

4. Module Size

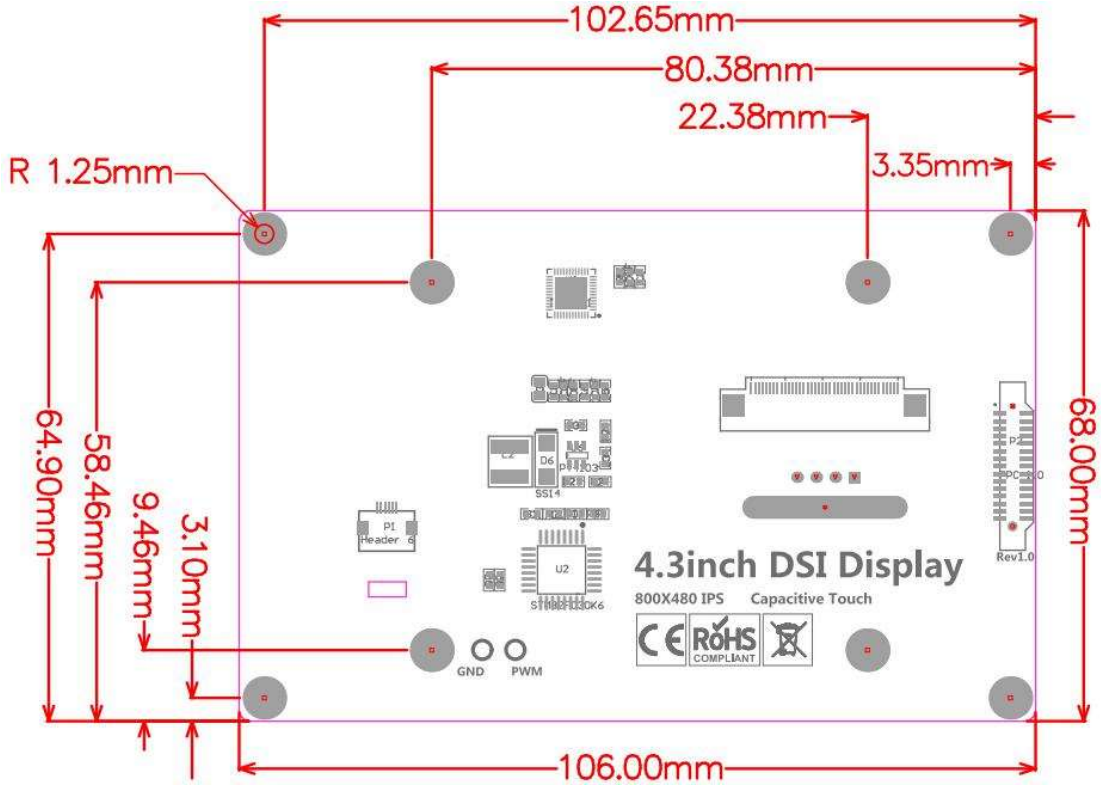


Figure 2

R is the radius of the mounting hole of the positioning column

5. How to use

The module can be driven directly using the official original image without any modifications.

Here are the steps to use the module on Raspberry Pi:

1) Download the latest system image from the official website of Raspberry Pi to the PC, and then extract the file to get **.img** file;
(https://www.raspberrypi.org/downloads/)

2) Prepare a Micro SD card (at least 8GB), insert it into PC with the card reader, open **SDFormatter** software, select the target SD card, and then click the Format button to Format the SD card;

3) After the formatting is completed, open Win32DiskImager software, first select

Device (Micro SD card inserted on PC), then select Image File (decompressed. IMG Image File), and finally click Write for burning;

4) Pop out the SD card on the PC and insert it into the SD card slot of Raspberry Pi;

5) Install Raspberry Pi into the display module. First, install 4 copper columns to the positioning column (as shown in **Figure 3**), then use 4 screws (M2.5) to fix the Raspberry Pi to the copper column, then connect the DISPLAY module to the Raspberry Pi Display interface (J4 interface) through FPC flexible cable (5cm) (as shown in **Figure 4**), and finally connect the power cord to the Raspberry Pi;

6) Power up the Raspberry Pi, and you can see that the program runs normally. The module has display screen output, and the touch function is normal.

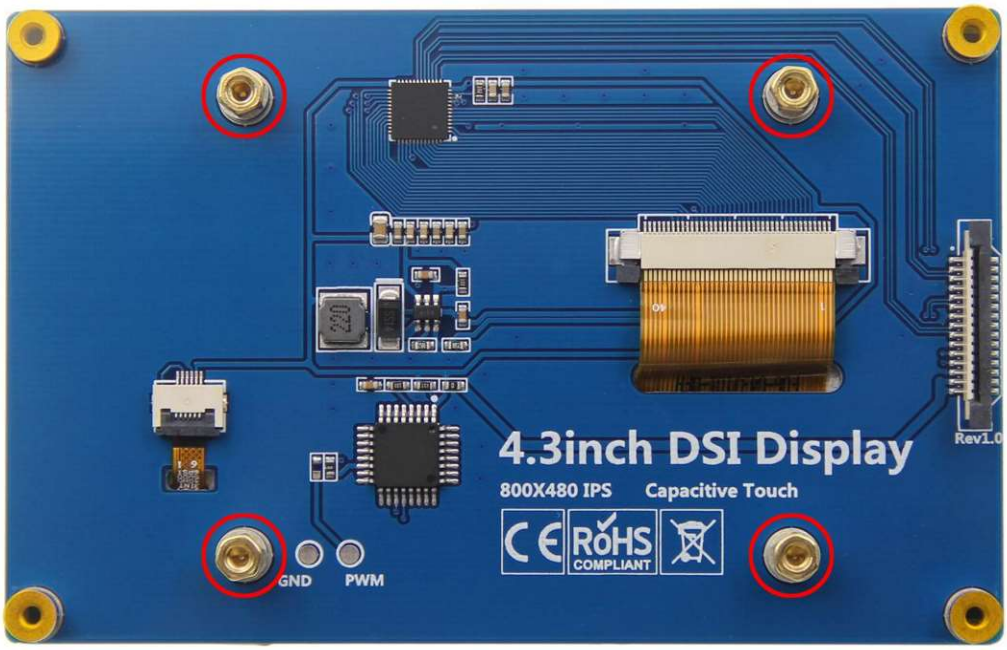


Figure 3

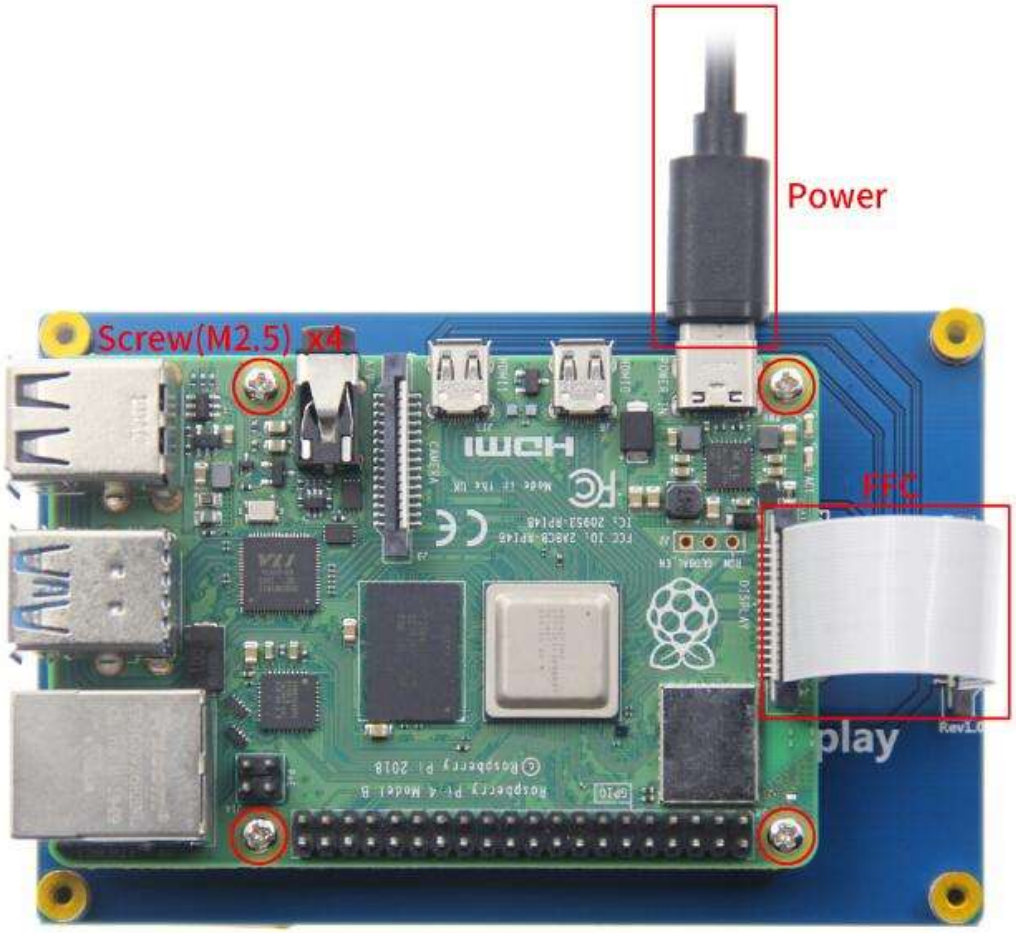


Figure 4

Note:

1) The copper column, screws and 15PIN FPC wiring are included in the product accessories.

2) Figure 4 shows the installation of Raspberry Pi 4. The installation method of Raspberry Pi 3 is basically the same as that of Raspberry Pi 4. The only difference is that the power cord connected is different. The Raspberry Pi 4 uses a Type-C cable and the Raspberry Pi 3 uses a Micro USB cable.

6. How to use PWM to control backlight brightness

1) Make the hardware connection first. Adjusting mode according to the hardware specifications, backlit by PWM adjust brightness value way, so to backlight control mode selection circuit of resistance welding to the PWM control circuit, the next on

the PWM & GND access points respectively welding dubond thread (as shown in **Figure 5**), finally will PWM access points connected to the output PWM signals of Raspberry Pi GPIO (select GPIO18), connect GND access points to Raspberry Pi GND pin.

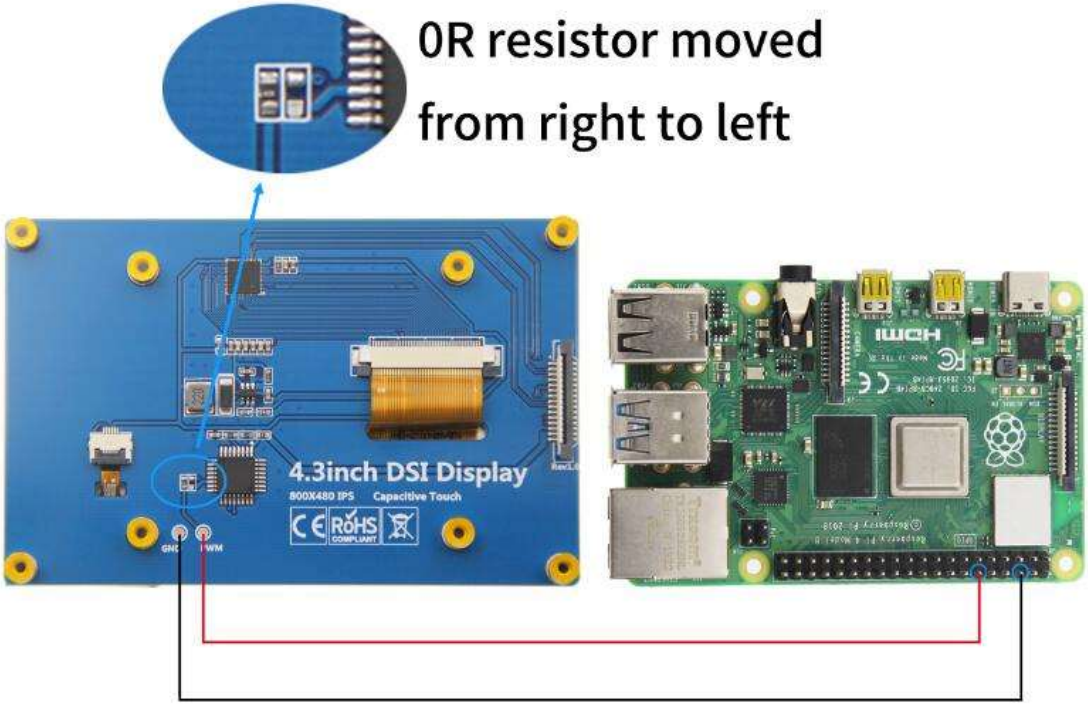


Figure 5

2) Software adjustment. The first step (which you can ignore if you have already done it) is to connect the SD with the official image to your PC, then create a new SSH file in the root directory of the SD card, pop the SD card out, and insert it into the Raspberry Pi. The above steps are to prepare for an SSH connection. Next, open the PC terminal software (such as PuTTY, Securecrt, etc.), select the SSH protocol, enter the Raspberry Pi IP address and log in the Raspberry Pi terminal (the IP address can be viewed through the router's web page or viewed on the Raspberry Pi through the module).

3) On the Raspberry Pi terminal, enter the following command to adjust the PWM backlight brightness (select GPIO18 here, and other idle GPIO can also be selected) :

```
gpio -g pwm 18 1024
gpio -g mode 18 pwm
gpio pwmc 1000
gpio -g pwm 18 X （Control the brightness, X value between 0 and 1024）
```

In addition, add the following content at the end of **/boot/config.txt** file to make the display module boot, PWM will reach the maximum (the brightness of the display screen)

```
gpio=18=op,pu
```

Note:

Backlight control on Raspberry Pi 4 will fail, you need to update the WiringPi GPIO library by typing the following command (Raspberry Pi requires Internet connection)

```
cd /tmp
wget https://project-downloads.drogon.net/wiringpi-latest.deb
sudo dpkg -i -B wiringpi-latest.deb
```

7. Display direction rotation

There are two kinds of display direction rotation: FKMS mode direction rotation and traditional graphics mode direction rotation.

Method 1: FKMS mode direction rotation

FKMS mode is used by default on Raspberry Pi 4B.When using this mode, make sure that **“dtoverlay =vc4-fkms-v3d”** under pi4 in **/boot/config.txt** file is not commented out. In this mode, the display direction can only be rotated by menu options (**Figure 6**, **Figure 7**).Note that when setting the display direction in the menu, it is recommended to use the mouse for operation.

```
[pi4]
# Enable DRM VC4 V3D driver on top of the dispmanx display stack
dtoverlay=vc4-fkms-v3d
max_framebuffers=2
```

Figure 6

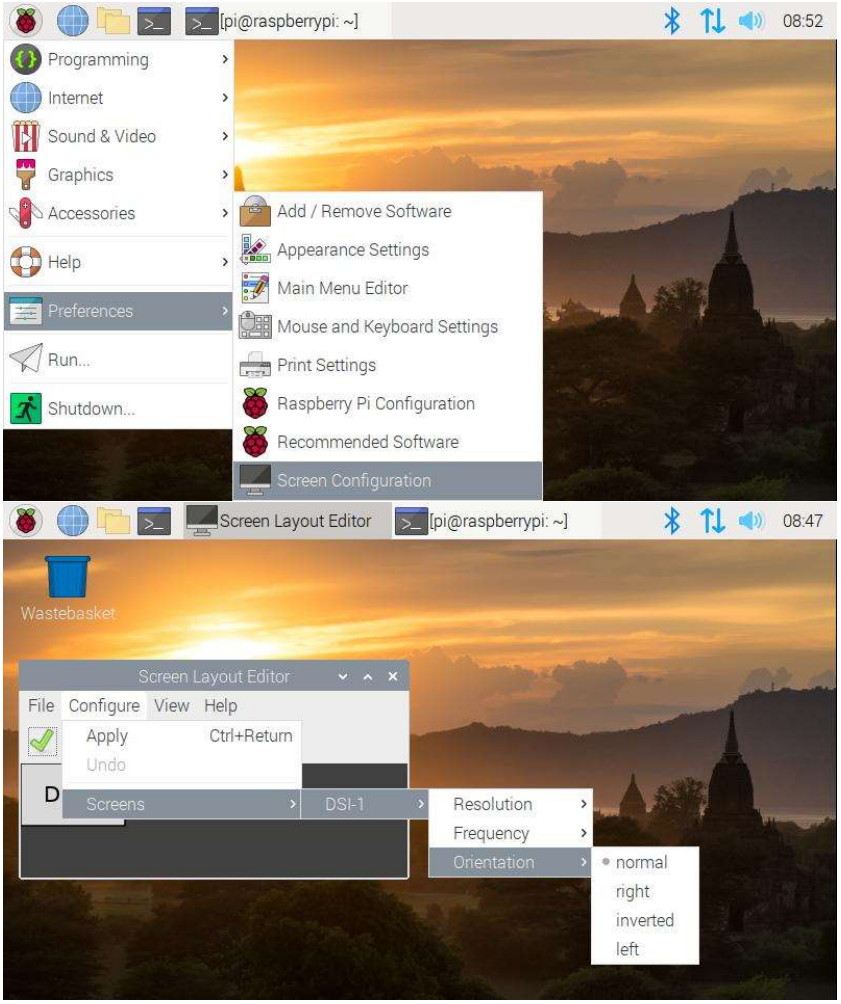


Figure 7

Method 2: Traditional graphics mode

By default, the Raspberry Pi 3, 2, and 1 series use traditional graphics mode. Raspberry Pi 4B can also use traditional graphics mode, just in /boot/config.txt file under the Pi 4:

```
dtoverlay=vc4-fkms-v3d
```

Comment out, as shown in Figure 8 (Traditional graphics mode is generally not recommended on Raspberry Pi 4B). In traditional graphics mode, this can be done by adding it at the end of the /boot/config.txt file:

```
display_lcd_rotate=x（x=0,1,2,3,0x10000,0x20000）
```

To set the display orientation, reboot is required to take effect (Figure 9).

```
[pi4]
# Enable DRM VC4 V3D driver on top of the dispmanx display stack
#dtoverlay=vc4-fkms-v3d
max_framebuffers=2
```

Figure 8

```
[all]
#dtoverlay=vc4-fkms-v3d
display_lcd_rotate=0
```

Figure 9

display_lcd_rotate=0, The default normal display direction (no rotation);

display_lcd_rotate=1, Rotate 90° clockwise;

display_lcd_rotate=2, Rotate 180° clockwise;

display_lcd_rotate=3, Rotate 270° clockwise;

display_lcd_rotate=0x10000, Flip horizontal;

display_lcd_rotate=0x20000, Flip vertical;

8. Touch direction rotation

The display direction is set, and the touch direction should be set accordingly. It needs to correspond with the display direction, otherwise the touch operation is not accurate. Touch direction setting need to be in the **/usr/share/X11/xorg.conf.d/40-libinput.conf** file add **"Option" CalibrationMatrix " " XXX"** "content, including XXX for touch direction set parameters, the following will show (as shown in **Figure 10**)

Open the **40-libinput.conf** file:

sudo nano **/usr/share/X11/xorg.conf.d/40-libinput.conf**

```
Section "InputClass"
        Identifier "libinput touchscreen catchall"
        MatchIsTouchscreen "on"
        Option "CalibrationMatrix" "1 0 0 0 1 0 0 0 1"
        MatchDevicePath "/dev/input/event*"
        Driver "libinput"
EndSection
```

Figure 10

After the modification, press **Ctrl** +**X**, **Y**, and **Enter** to save and exit.

Corresponding relation table of display direction and touch direction:

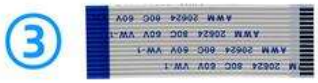
Display Rotation	FKMS mode	Traditional graphics mode Settings	Touch orientation setting
no rotation	normal	display_lcd_rotate=0	Option "CalibrationMatrix" "1 0 0 0 1 0 0 0 1"
Rotate 90° clockwise	right	display_lcd_rotate=1	Option "CalibrationMatrix" "0 1 0 -1 0 1 0 0 1"
Rotate 180° clockwise	inverted	display_lcd_rotate=2	Option "CalibrationMatrix" "-1 0 1 0 -1 1 0 0 1"
Rotate 270° clockwise	left	display_lcd_rotate=3	Option "CalibrationMatrix" "0 -1 1 1 0 0 0 0 1"
Flip horizontal	NO	display_lcd_rotate=0x10000	Option "CalibrationMatrix" "-1 0 1 0 1 0 0 0 1"
Flip vertical	NO	display_lcd_rotate=0x20000	Option "CalibrationMatrix" "1 0 0 0 -1 1 0 0 1"

9. How to install the virtual keyboard

Execute the following command:

```
sudo apt-get install matchbox-keyboard
```

10. Packing list



① 4.3inch DSI Display x1

② FFC-1.0-15P-10cm-(Reverse) x1

③ FFC-1.0-15P-5cm-(Reverse) x1

④ Screw(M2.5) x4

⑤ Copper Pillar(M2.5) x4