SURENOO DSI DISPLAY for RaspBerry Pi

SDSR101A_8001280
LCD MODULE USER MANUAL

Please click the following image to buy the sample

Business Card | WhatsAPP | 카카오톡 | LINE (ライン) | WeChat

Shenzhen Surenoo Technology Co.,Ltd.
www.surenoo.com

Surenoo DSI Display Selection Guide

1. Features

- 10.1inch DSI touch screen, ten-point capacitive touch control
- IPS display panel with hardware resolution of 1280×800
- Optical bonding toughened glass panel, clearer picture quality
- Toughened glass capacitive touch panel, hardness up to 6H
- Drive the LCD through the DSI interface, with a refresh rate of up to 60Hz
- Supports software control of backlight brightness
- Aluminum alloy back cover design, pure passive cooling design

2. Electrical Specifications

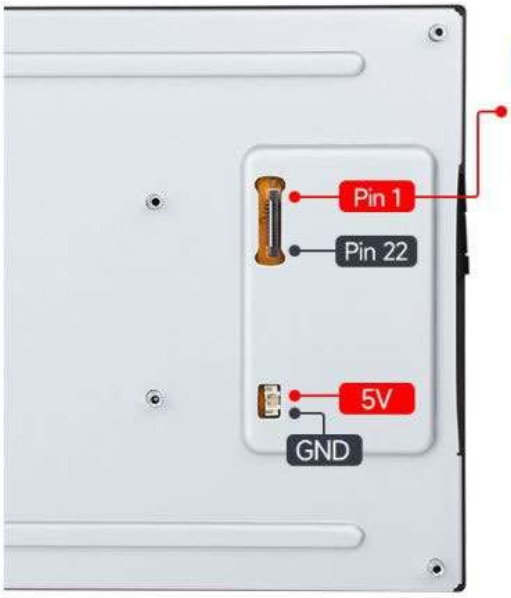
Parameters	Minimum Value	Standard Value	Maximum Value	Unit	Note
Input voltage	4.75	5.00	5.30	V	Note 1
Input current	-	0.8	TBD	A	Note 2
Operating temperature	0	25	60	℃	Note 3
Storage temperature	-10	25	70	℃	Note 3

• **Note 1:** Input voltages exceeding the maximum or improper operation may cause permanent damage to the device.

• **Note 2:** The input current needs to be ≥ 2A, otherwise it will cause the startup failure or display abnormality, and staying in an abnormal state for a long time may cause permanent damage to the device.

• **Note 3:** Please do not store the display panel in a high-temperature and high-humidity environment for a long time. The display panel should operate within its limits, otherwise it may be damaged.

3. Interfaces



Pin	Symbol	Pin	Symbol
1	3V3	12	MIPI_D2_N
2	I2C_SDA	13	GND
3	I2C_SCL	14	MIPI_CLK_P
4	GND	15	MIPI_CLK_N
5	RESERVE	16	GND
6	RESERVE	17	MIPI_D1_P
7	GND	18	MIPI_D1_N
8	MIPI_D3_P	19	GND
9	MIPI_D3_N	20	MIPI_D0_P
10	GND	21	MIPI_D0_N
11	MIPI_D2_P	22	GND

4. Usage Instructions

4.1 Raspberry

4.1.1 Raspberry Pi 5 Hardware Connection

1. Use the "FFC Cable 22PIN 200mm (opposite direction)" to connect the DSI port of the display to the 22PIN DSI port of the Raspberry Pi motherboard.
2. Use the "GPIO cable" to connect the power connector of the display to the 5V GND pin header of the Raspberry Pi motherboard.
3. Secure the Raspberry Pi to the display with M2.5 screws.

The installation effect is as follows:

Note: Make sure that the DSI cable is connected in correct direction and 5V power is supplied through the GPIO pins.

4.1.2 Raspberry Pi Pi4B/3B+/3B/3A+ Hardware Connection

1. Use the "DSI-Cable-12cm" cable to connect the DSI port of the display to the 15PIN DSI port of the Raspberry Pi motherboard.
2. Use the "GPIO cable" to connect the power connector of the display to the 5V GND pin header of the Raspberry Pi motherboard.
3. Secure the Raspberry Pi to the display with M2.5 screws.

The installation effect is as follows:

Note: Make sure that the DSI cable is connected in correct direction and 5V power is supplied through the GPIO pins.

4.1.3 Software Settings

Method 1: Flash the Pre-installed Image (recommended)

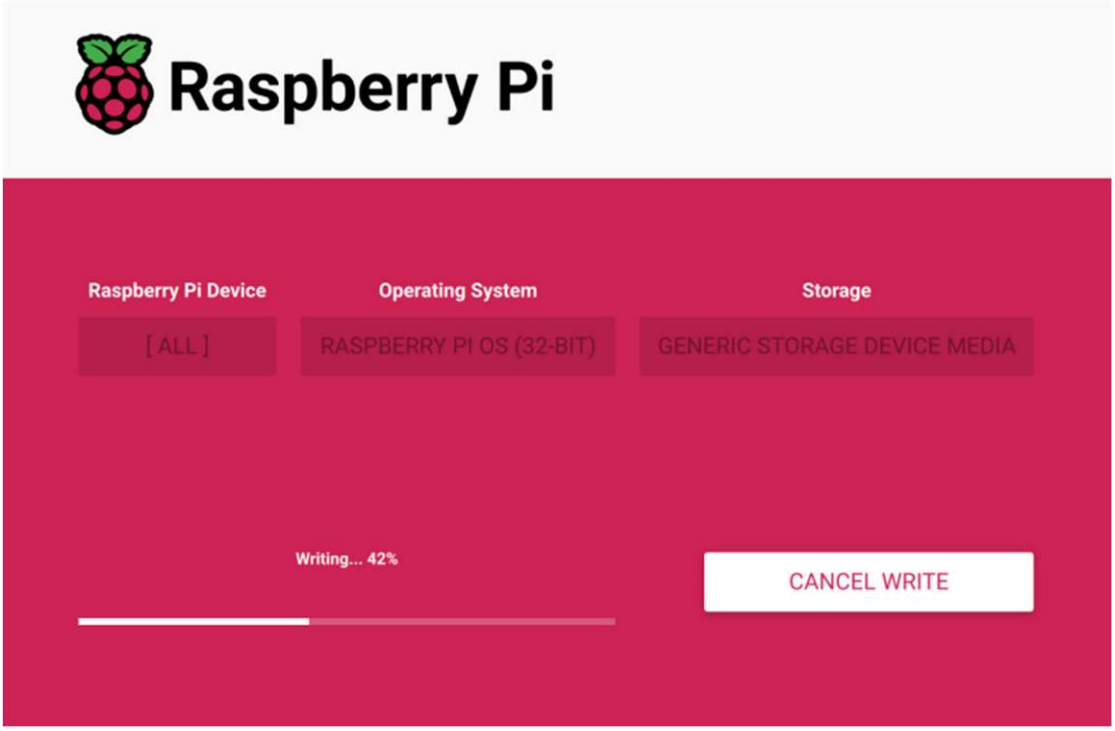
1. Select pre-installed image, download and unzip it as .img file

10.1-DSI-TOUCH-A pre-installed image

2. After the image flashing is completed, connect the TF card to the Raspberry Pi, start the Raspberry Pi, and wait for about 30 seconds for it to be displayed and touched normally.

Method 2: Install the Driver Manually

1. Connect the TF card to the PC, download and use Raspberry Pi Imager to flash the corresponding system image.



2. After the burning is completed, connect the TF card to the Raspberry Pi, start the Raspberry Pi, and log in to the terminal of the Raspberry Pi (you can connect the Raspberry Pi to the HDMI display or use ssh to log in remotely).

3. Run the following command on the terminal to install the driver:

(This method is only suitable for 64-bit systems)

```
wget https://files.waveshare.com/wiki/common/Panel-waveshare-dsi2-driver.zip
 unzip Panel-waveshare-dsi2-driver.zip
 cd panel-waveshare-dsi2-driver
 make
 sudo cp ./waveshare-panel-regulator.ko /lib/modules/$(uname -r)
 sudo cp ./panel-waveshare-dsi-v2.ko /lib/modules/$(uname -r)
 sudo depmod
 sudo modprobe waveshare-panel-regulator
 sudo modprobe panel-waveshare-dsi-v2
 sudo dtc -I dts -O dtb -o vc4-kms-dsi-waveshare-panel-v2.dtbo vc4-kms-dsi-waveshare-panel-v2.dts
 sudo cp vc4-kms-dsi-waveshare-panel-v2.dtbo /boot/overlays/
```

Edit config.txt file

```
sudo nano /boot/firmware/config.txt
```

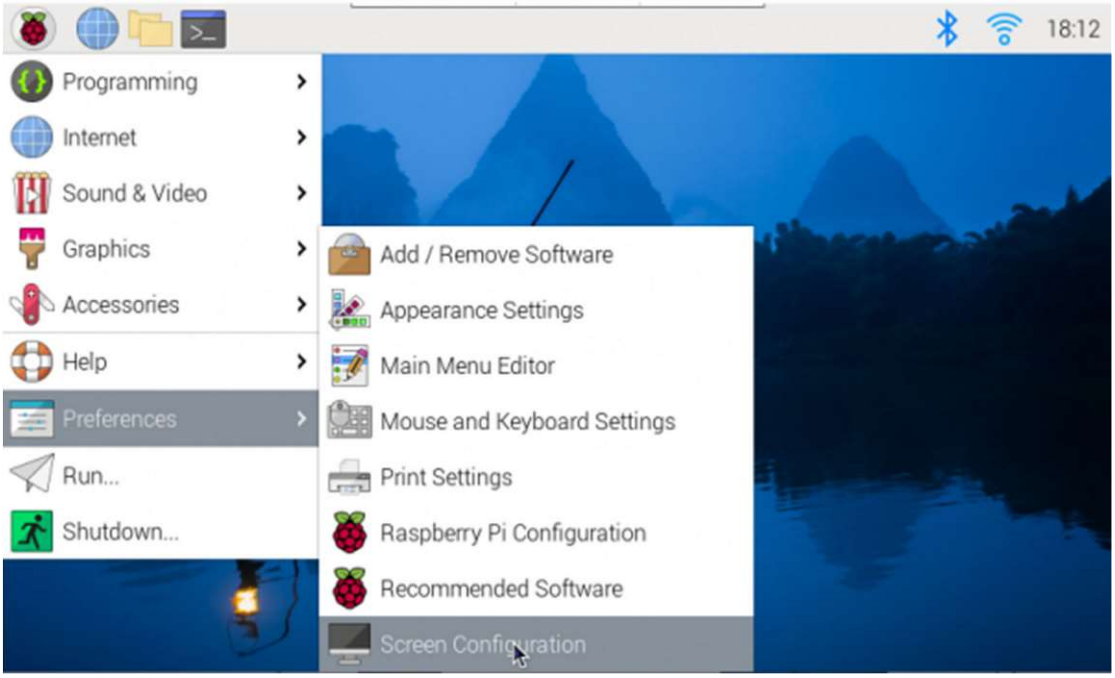
Add the following code at the end of the file

```
dtoverlay=vc4-kms-dsi-waveshare-panel-v2,10_1_inch_a
```

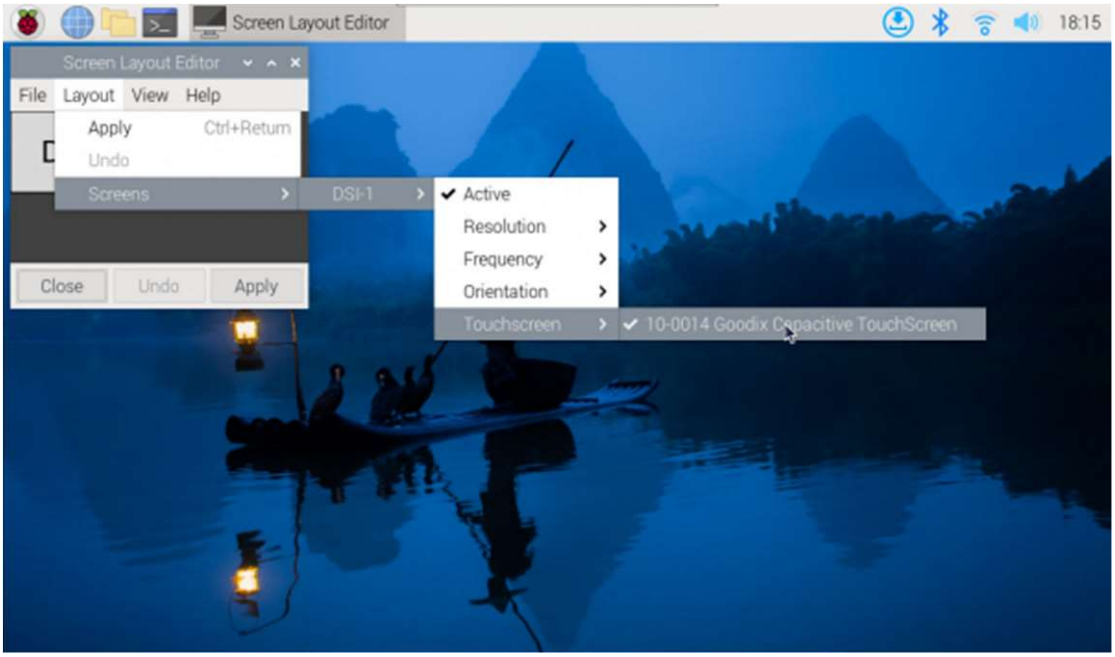
Save and exit, restart and wait for about 30 seconds for normal display and touch to work.

4.1.4 Bookworm Touch Screen Rotation

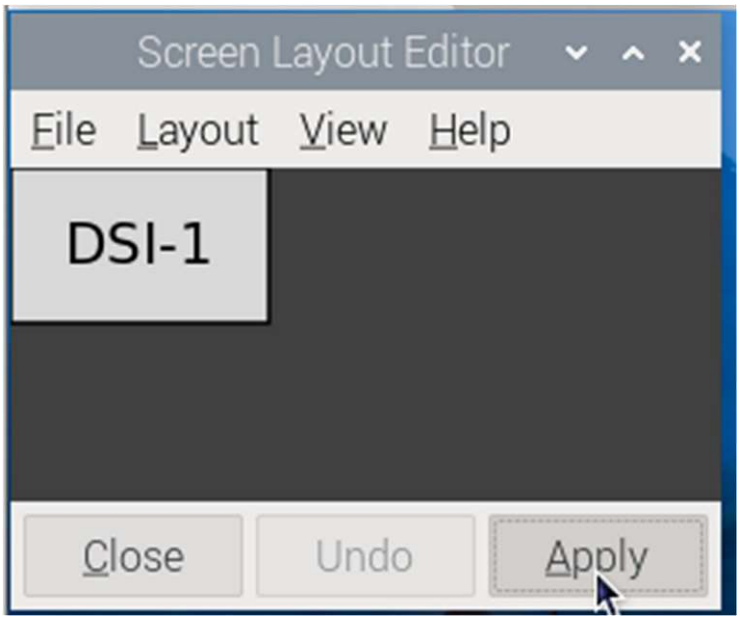
1. Open the "Screen Configuration" application;

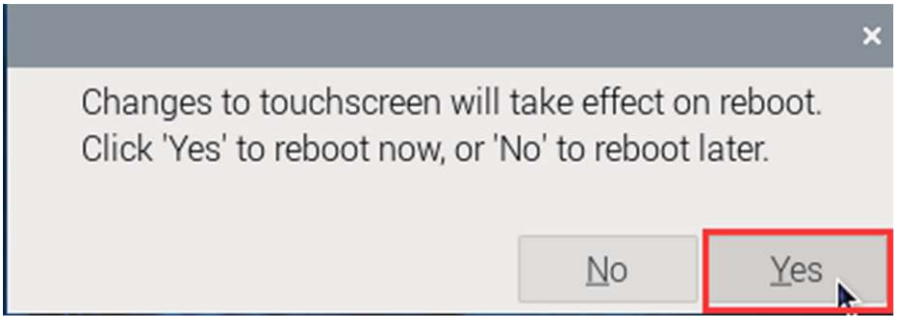


2. Go to Screen - > DSI-1 - > Touchscreen and check 10-0014 Goodix Capacitive TouchScreen;

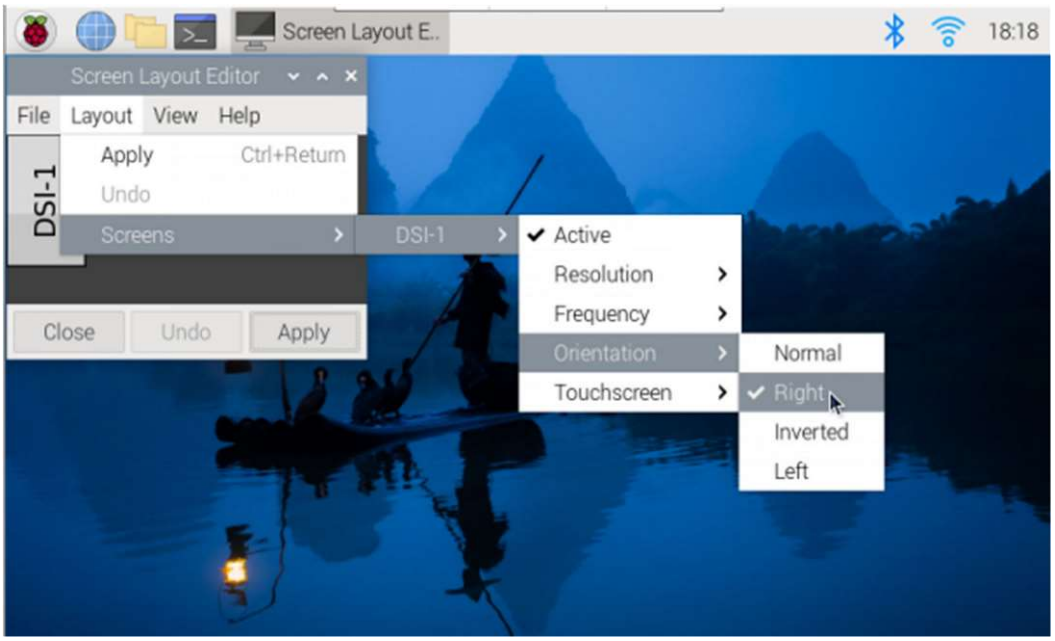


3. Click Apply, then close the current window, and reboot according to the pop-up prompts to complete the specified touch screen;





4. Go to Screen > DSI-1 - - > Orientation, check the direction you need to rotate, and finally click Apply to complete the display and touch synchronous rotation.



Note: Only the Bookworm system supports the above synchronization rotation method.

For the Bullseye and Butser systems, manual separate settings for touch rotation are required after displaying the rotation.

4.1.5 Lite Version Display Rotation

```
sudo nano /boot/firmware/cmdline.txt
#Add a command to display the rotation angle at the beginning of the cmdline.txt file, and save it to take effect after restarting
#Display rotation 90 degrees
video=DSI-1:800x1280M@60,rotate=90
#Display rotation 180 degrees
video=DSI-1:800x1280M@60,rotate=180
#Display rotation 270 degrees
video=DSI-1:800x1280M@60,rotate=270
```

Note: If you are using Pi5/CM4, the actual recognized DSI display number will prevail, for example DSi-2.

4.1.6 Touch Rotation

```
sudo nano /etc/udev/rules.d/99-waveshare-touch.rules


#Set the command of touch rotation angle within the file, and it will take effect after the restart
#90°:
ENV{ID_INPUT_TOUCHSCREEN}=="1", ENV{LIBINPUT_CALIBRATION_MATRIX}="0 -1 1 1 0 0"


#180°:
#ENV{ID_INPUT_TOUCHSCREEN}=="1", ENV{LIBINPUT_CALIBRATION_MATRIX}="-1 0 1 0 -1 1"


#270°:
#ENV{ID_INPUT_TOUCHSCREEN}=="1", ENV{LIBINPUT_CALIBRATION_MATRIX}="0 1 0 -1 0 1"


#Save, exit, and reboot
sudo reboot
```

4.2 Luckfox-Omni3576

4.2.1 Hardware Connection

1. Use a 22PIN FPC cable to connect the DSI interface of the display to the DSI interface of the Omni3576 motherboard.
2. Use a 2PIN power cable to connect the power interface of the display to the 40PIN GPIO interface on the Omni3576 motherboard. As shown in the figure below:

4.2.2 Software Settings

1. Download and use the mirror file from the Luckfox official website to flash the corresponding system image.
2. Connect the Omni3576 motherboard to a 5V power supply, and the screen will light up after the system starts

4.2.3 View Screen Information

The screen ID available in the current system can be viewed using the following command:

```
sudo cat /sys/kernel/debug/dri/0/summary
```

Under normal circumstances, the following output will be obtained:

```
Video Port0: DISABLED
Video Port1: ACTIVE
    Connector:DSI-1         Encoder: DSI-203
        bus_format[100a]: RGB888_1X24
        overlay_mode[0] output_mode[0] SDR[0] color-encoding[BT.709] color-range[Full]
    Display mode: 800x1280p60
        clk[70000] real_clk[69883] type[48] flag[a]
        H: 800 840 860 880
        V: 1280 1300 1304 1324
        Fixed H: 800 840 860 880
        Fixed V: 1280 1300 1304 1324
    Esmart1-win0: ACTIVE
        win_id: 1
        format: XR24 little-endian (0x34325258) pixel_blend_mode[0] glb_alpha[0xff]
        color: SDR[0] color-encoding[BT.601] color-range[Limited]
        rotate: xmirror: 0 ymirror: 0 rotate_90: 0 rotate_270: 0
        csc: y2r[0] r2y[0] csc mode[0]
        zpos: 1
        src: pos[0, 0] rect[800 x 1280]
        dst: pos[0, 0] rect[800 x 1280]
        buf[0]: addr: 0x00000000fe44e000 pitch: 3200 offset: 0
Video Port2: DISABLED
```

4.2.4 Display Rotation

Rotation command

```
#Rotate 90 degrees
xrandr -o left
#Rotate 270 degrees
xrandr -o right
#Rotate 180 degrees
xrandr -o inverted
#Rotate 0 degrees
xrandr -o normal
```

The effect of using xrandr rotation is a one-time and the screen orientation is restored after the system restarts. If you want the device to rotate automatically upon startup, you need to modify the configuration file:

```
sudo vim    /etc/X11/xorg.conf.d/10-monitor.conf
```

Add the following statement:

```
### Valid values for rotation are "normal", "left", "right"
Section "Monitor"
#       Identifier "Default Monitor"
        Identifier    "DSI-1"
        Option          "Rotate" "left"
EndSection
```

4.2.5 Touch Rotation

After the system displays rotation, the touch direction is inconsistent, and you need to perform the following operations to touch and rotate:

```
sudo vim    /etc/udev/rules.d/99-luckfox-touch.rules
```

Add the corresponding configuration according to your rotation direction, save it, and restart the development board.

90 degrees:

```
ENV{ID_INPUT_TOUCHSCREEN}=="1", ENV{LIBINPUT_CALIBRATION_MATRIX}="0 -1 1 1 0 0"
```

180 degrees:

```
ENV{ID_INPUT_TOUCHSCREEN}=="1", ENV{LIBINPUT_CALIBRATION_MATRIX}="-1 0 1 0 -1 1"
```

270 degrees:

```
ENV{ID_INPUT_TOUCHSCREEN}=="1", ENV{LIBINPUT_CALIBRATION_MATRIX}="0 1 0 -1 0 1"
```

4.3 Luckfox-Lyra

4.3.1 Hardware Connection

1. Use a 22PIN FPC cable to connect the DSI interface of the display to the DSI interface of Luckfox-Lyra board.
2. Use a MX1.25 2PIN to 4PIN cable to connect the power interface of the display to the USB MX1.25 4P interface on Luckfox-Lyra board.

As shown in the figure below:

4.3.2 Software Settings

1. Download and use the mirror file from the Luckfox official website to flash the corresponding system image.
2. Connect the Luckfox-Lyra board to a 5V power supply, and the screen will light up after the system starts

4.3.3 View Screen Information

The screen ID available in the current system can be viewed using the following command:

```
cat /sys/kernel/debug/dri/0/summary
```

Under normal circumstances, the following output will be obtained:

```
VOP [ff600000.vop]: ACTIVE
    Connector: DSI-1
        bus_format[100a]: RGB888_1X24
        overlay_mode[0] output_mode[0]color-encoding[1] color-range[1]
    Display mode: 800x1280p60
        dclk[70000 kHz] real_dclk[69475 kHz] aclk[294912 kHz] type[48] flag[a]
        H: 800 840 860 880
        V: 1280 1310 1314 1324
    win1-0: ACTIVE
```

```
        format: XR24 little-endian (0x34325258) SDR[0] color-encoding[0] color-range[0]
        csc: y2r[0] r2r[0] r2y[0] csc mode[0]
        zpos: 0
        src: pos[0x0] rect[800x1280]
        dst: pos[0x0] rect[800x1280]
        buf[0]: addr: 0x06100000 pitch: 3200 offset: 0
    post: sdr2hdr[0] hdr2sdr[0]
    pre : sdr2hdr[0]
    post CSC: r2y[0] y2r[0] CSC mode[2]
```

4.3.4 Display Test

Color bar test command

```
#Vertical bar test
modetest -M rockchip -s 74@71:800x1280
#Slant bar test
modetest -M rockchip -s 74@71:800x1280 -Ftiles
```

4.3.5 Touch Test

Touch test command

```
evtest
```

Under normal circumstances, the following output will be obtained:

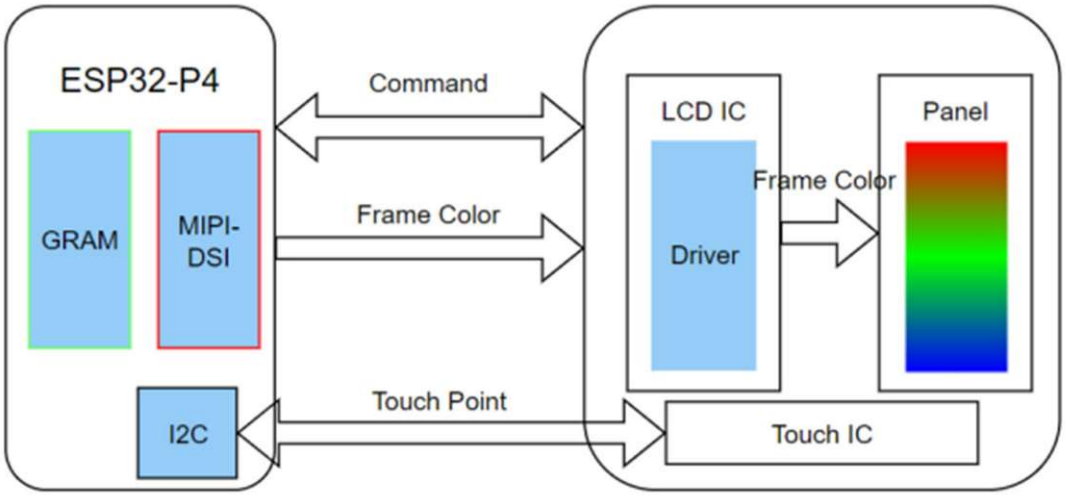
```
No device specified, trying to scan all of /dev/input/event*
Available devices:
/dev/input/event0:          2-005d Goodix Capacitive TouchScreen
Select the device event number [0-0]:
```

After entering "0" and pressing enter, touch the screen to start testing, and the terminal will print the event values triggered by the touch operation.

4.4 ESP32-P4

4.4.1 Screen Driver

The ESP32-P4-NANO drives the screen via **MIPI 2-lane**



1. The screen driver has been packaged as a component, with the component located at [ESP Component Registry]

Use idf.py add-dependency "waveshare/esp_lcd_jd9365_10_1"

to add components to your ESP-IDF project

2. You can also directly view the ESP32-P4-NANO driver for this screen on the Wiki: [ESP32-P4-NANO_MIPI-DSI]

4.4.2 Backlight Control

After connecting the ESP32-P4-NANO with the matching FPC cable and power cable, the backlight can be controlled by writing 0x00~0xFF (full brightness) to the **0x45** device and **0x86** register on the screen through the ESP32-P4-NANO I2C

If you use the ESP32-P4-NANO BSP component, you can control it directly by the following functions

```
bsp_display_brightness_init();     // Initialize the backlight

bsp_display_backlight_on();        // Turn on the backlight, default full brightness

Bsp_display_backlight_off();       // Turn off the backlight

bsp_display_brightness_set(95); // Set the specific backlight brightness, 0~100
```