2.8inch DPI LCD

Introduction

480x640, 2.8inch IPS Display for Raspberry Pi, DPI interface, 5-points capacitive touch control.

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480x640, 2.8inch IPS Display for Raspberry Pi, DPI interface, 5-points Touch.

- 2.8 inch IPS Display , 480x640 hardware resolution.
- Designed for Raspberry Pi, based on Raspberry Pi 40pin GPIO interface.
- Using DPI666 interface of Raspberry Pi to drive LCD, refresh rate up to 60Hz.
- Other capacitive touch through I2C interface of Raspberry Pi, 5-points touch, toughened glass panel, hardness up to 6H.
- Supports Raspberry Pi OS and Kali systems.

How to use

Hardware connection

Please follow the steps below to slowly install the DPI LCD to the 40PIN GPIO interface of the Raspberry Pi.

Software setting

If you don't know the difference between the two branches of Raspberry Pi OS, you can check the following introduction: #Introducing the Raspberry Pi OS fork

For Raspberry Pi OS Bullseye branch

Please download the latest version of the image from the Raspberry Pi official website**.**

1. Download the compressed file to the PC, and extract the img file.
2. Connect the TF card to the PC and use SDFormatter to format the TF card.
3. Open the Win32DiskImager-**.**exe software, select the system image prepared in step 1, and click write to burn the system image.
4. After the programming is completed, open the config.txt file in the root directory of the TF card, add the following code at the end of config.txt and save it

```
dtoverlay=vc4-kms-v3d
gpio=2-27=a2
gpio=28-45=a2
dtoverlay=gpio-ir
dtoverlay=gpio-key,gpio=4,keycode=116
display_auto_detect=0
extra_transpose_buffer=2
dpi_group=2
dpi_mode=87
dpi_output_format=0x7F216
hdmi_timings=480 0 24 16 10 640 0 25 15 15 0 0 0 60 0 32000000 1
dtoverlay=ads7846,cs=1,penirq=17,penirqpull=2,speed=2000000,keep_vref_on=1,swapxy=1,pmax=255,xohms=150,pressure-scale=10,debounce-tolerance=65535,debounce-interval=10,pen-diameter=200
dtoverlay=i2c-gpio,bus=10,i2c_gpio_sda=2,i2c_gpio_scl=3
```

5. Download the 2.8inch DPI LCD DTB0 **.**dtbo file and extract the dtbo files. Copy these files to the overlays directory (/boot/overlays/).
6. Turn on the LCD backlight switch.
7. Insert the TF card into the Raspberry Pi, power on the Raspberry Pi, and wait for more than 30 seconds to display normally.

For Raspberry Pi OS Buster branch and Ubuntu system

1. Open the config.txt file in the root directory of the TF card, add the following code at the end of config.txt, save and safely eject the TF card.

```
gpio=2-27=a2
gpio=28-45=a2
dtoverlay=gpio-ir
dtoverlay=gpio-key,gpio=4,keycode=116
display_auto_detect=0
extra_transpose_buffer=2
dpi_group=2
dpi_mode=87
dpi_output_format=0x7F216
hdmi_timings=480 0 24 16 10 640 0 25 15 15 0 0 0 60 0 32000000 1
dtoverlay=ads7846,cs=1,penirq=17,penirqpull=2,speed=2000000,keep_vref_on=1,swapxy=1,pmax=255,xohms=150,pressure-scale=10,debounce-tolerance=65535,debounce-interval=10,pen-diameter=200
dtoverlay=i2c-gpio,bus=10,i2c_gpio_sda=2,i2c_gpio_scl=3
```

2. Download the 2.8inch DPI LCD DTB0 **.**dtbo file and extract the dtbo files. Copy these files to the overlays directory (/boot/overlays/).
3. Save and quit the TF card safely, and insert the TF card into the Raspberry Pi.
4. Insert the 2.8inch DPI LCD into the 40PIN GPIO interface of the Raspberry Pi, power on the Raspberry Pi, and wait for about 30 seconds to display normally.

Introducing the Raspberry Pi OS fork

On December 2, 2021, the Raspberry Pi OS for Raspberry Pi split into two branches, the Buster branch and the Bullseye branch.

The Buster branch is a continuation of the old system, which is more stable and uses sysvinit as the default process subsystem.

The Bullseye branch adds some new features, including KMS as the default display driver and libcamera as the default camera subsystem.

Image download address**:**

Operating system images

Many operating systems are available for Raspberry Pi, including Raspberry Pi OS, our official supported operating system, and third-party systems from other organizations.

Raspberry Pi Imager is the quick and easy way to install an operating system to your Raspberry Pi. Imager comes with a wide range of alternatives, chosen from the operating systems below, available to download and install manually.

Download
Raspberry Pi OS
Raspberry Pi OS (64-bit)
Raspberry Pi OS (Legacy)
Raspberry Pi Desktop
Third-party software

More detailed information can be found at:

Raspberry Pi Branch Details**#**

Buster Release Notes**#**

Bullseye Release Notes**#**

Notes:The above information was updated on January 24, 2022. Due to the frequent update of the Raspberry Pi system, when you see this information, the relevant information may be out of date. The actual performance of the image shall prevail. This is for reference only.

Rotation(Working with Raspberry Pi)

Raspberry Pi OS and Kali display rotation

First check whether the KMS or FKMS driver is loaded on the system you are using.

Check method: In Terminal(Ctrl+Alt+T), check whether the line dtoverlay=vc4-kms-v3d or dtoverlay=vc4-fkms-v3d is turned on.

With KMS or FKMS driver loaded

Use the following command to display rotation:

```
sudo nano /etc/xdg/lxsession/LXDE-pi/autostart
#Enter the command corresponding to the display rotation angle at the end of the autostart file, yes it will take effect after rebooting the system.
@lxpanelctl restart 1> rotate 270 degrees; 2> rotate 180 degrees; 3> rotate 90 degrees
@lxpanelctl restart
```

No KMS or FKMS driver loaded

Use the following command to display rotation:

```
sudo nano /boot/config.txt
#Enter the command corresponding to the display rotation angle at the end of the config.txt file, yes it will take effect after rebooting the system.
display_rotate=1 rotate 90 degrees; 2 rotate 180 degrees; 3 rotate 270 degrees
display_rotate=3
```

Touch to Rotate

After the display is rotated, the position of touch is incorrect because the touch doesn't change with the display angle. So the touch also needs to be modified.

1.Install libinput.

```
sudo apt-get install xserver-xorg-input-libinput
```

If the system you installed is Ubuntu or Jetson Nano. The installation code is:

```
sudo apt install xserver-xorg-input-synaptics
```

2.Create the *xorg.conf.d* directory under */etc/X11/* if the directory already exists, proceed directly to step 3).

```
sudo mkdir /etc/X11/xorg.conf.d
```

3).Copy the 40-libinput.conf file to the directory you created just now.

```
sudo cp /usr/share/X11/xorg.conf.d/40-libinput.conf /etc/X11/xorg.conf.d/
```

4.Edit this file.

```
sudo nano /etc/X11/xorg.conf.d/40-libinput.conf
```

Find the part of the touchscreen, add the following statement inside, and then save the file.

```
Option "CalibrationMatrix" "0 1 0 -1 1 0 0 0 1"
```

Similar to the picture below:

5. save and reboot your Pi

```
sudo reboot
```

After completing these steps. The LCD could rotate 90 degrees both display and touch function.

Note:

90 degree: Option "CalibrationMatrix" "0 1 0 -1 0 1 0 0 1"

180 degree: Option "CalibrationMatrix" "-1 0 1 0 -1 1 0 0 1"

270 degree: Option "CalibrationMatrix" "0 -1 1 1 0 0 0 0 1"

Others

Disable power saving.

If you want to keep the display turning on all the time, you can disable the power saving function.

Modify file *lightdm.conf*

```
sudo nano /etc/lightdm/lightdm.conf
```

Find the [SeatDefaults] option and uncomment the line"xserver-command", modify it as below:

```
#xserver-command=X
```

Modify this code to

```
xserver-command=X -s 0 -dpms
```

- -s 0 --Disable the display protecting.
- -dpms Disable power saving.

Reboot

```
sudo reboot
```

Control brightness by PWM

If you use the LCD, you need to update wiringX first:

```
wget https://project-downloads.drogon.net/wiringx/latest.deb
sudo dpkg -i wiringx-latest.deb
gpio -v
# Check if it is 2.52 version
```

Control the brightness by PWM

```
gpio -g mode 18 pwm          #Configure the PWM pin
gpio pwm 100
gpio -g pwm 18 1023          #Set it brightest
gpio -g pwm 18 850           # (For 854, 850 is darkest) for P13, 690 is dark
exit
gpio -g mode 18 out          #Free the pin and set it as output
```

Turn on/off the LCD

You can turn on/off the LCD with the following command.

Note: The command can only work when the PWM pin is free and in output mode.

```
sudo echo 1 | sudo tee /sys/class/backlight/pi_backlight/bl_power
sudo echo 0 | sudo tee /sys/class/backlight/pi_backlight/bl_power
```

Interface

- The pin of "NC" means that the touch screen does not occupy this pin, and the user can use it for other applications.

PIN NO.	SYMBOL	DESCRIPTION
1	NC	Not connected
2	5V	5V power
3	VSYNC	Vertical synchronization
4	5V	5V Power
5	HSYNC	Horizontal synchronization
6	GND	Ground
7	B2	RGB signal lines
8	G4	RGB signal lines
9	GND	Ground
10	G5	RGB signal lines
11	G7	RGB signal lines
12	PWM	Backlight control (PM can only turn on/off the backlight, Only the enlarger versions support brightness adjustment with PWM)
13	TP_INT	Interrupt pin of touch panel
14	GND	Ground
15	B4	RGB signal lines
16	R5	RGB signal lines
17	NC	Not connected
18	R6	RGB signal lines
19	TP_SDA	The I2C SDA of touch panel
20	GND	Ground
21	B7	RGB signal lines
22	R7	RGB signal lines
23	TP_SCL	The I2C SCL of touch panel
24	B6	RGB signal lines
25	GND	Ground
26	G3	RGB signal lines
27	LCD_CLK	Clock pin of LCD panel
28	D0	Data enable of LCD panel
29	B3	RGB signal lines
30	GND	Ground
31	B4	RGB signal lines
32	G2	RGB signal lines
33	G3	RGB signal lines
34	GND	Ground
35	B2	RGB signal lines
36	R2	RGB signal lines
37	NC	Not connected
38	R3	RGB signal lines
39	GND	Ground
40	R3	RGB signal lines

Resource

3D Drawing

- 2.8inch DPI LCD 3D Drawing**#**

Software

- Panasonic SDFormatter**#**
- Win32DiskImager**#**
- PuTTY**#**