

3.2inch RPi LCD (C)

Introduction

3.2 inch Touch Screen TFT LCD Designed for Raspberry Pi, High-Speed SPI transmission

Features

- 320×240 hardware resolution, support touch function.
- Resistive touch control
- It is compatible and can be directly inserted in any version of Raspberry Pi.
- Support 125MHz high-speed SPI signal transmission, which makes the screen display clear and stable.
- Drivers provided (works with your own Raspbian/Ubuntu/Kali and RetroPie system directly)
- Support FBCP software driver, can set the software resolution and dual screen display.
- Gold sinking process, fine carving.

Getting Started

Hardware Connection

- There are 40 pins on Raspberry Pi but only 26 pins on the LCD, so you should pay attention to connecting the pins to your Pi accordingly.

Install the touch driver

The RPi LCD can be driven in two ways: Method 1. install driver to your Raspbian OS. Method 2. use the Ready-to-use image file of which LCD driver was pre-installed.

Method 1. Driver installation

Please download the latest version of the image on the [Raspberry Pi official website](#). (Raspbian/Ubuntu Mate/Kali or RetroPie)

- 1) Download the compressed image file to the PC, and unzip it to get the .img file.
- 2) Connect the TF card to the PC, open the [Win32DiskImager](#) software, select the system image downloaded in step 1 and click 'Write' to write the system image. (How to write an image to a micro SD card for your Pi? See [RPi Image Installation Guides](#) for more details)
- 3) Connect the TF card to the Raspberry Pi, start the Raspberry Pi. The LCD will display after booting up, and then log in to the Raspberry Pi terminal.(You may need to connect a keyboard and HDMI LCD to Pi for driver installing, or log in remotely with SSH)
- 4) Then open the terminal of Raspberry Pi to install the touch driver.

```
git clone https://github.com/waveshare/LCD-show.git
cd LCD-show/
```

Note: The Raspberry Pi must be connected to the network, or else the touch driver won't be successfully installed.

```
chmod +x LCD32C-show
```

```
./LCD32C-show
```

The touch function will work after restart. For ease of use, you can set the screen orientation, see: [#Screen orientation settings](#).

Notes:

- 1. Executing apt-get upgrade will cause the LCD to fail to work properly. In this case, you need to edit the config.txt file in the SD card and delete this sentence: dtoverlay=ads7846.
- 2. Using with Raspbian-lite, the command of the touch driver installation should be:

```
./LCD32C-show lite
```

Method 2. Using Ready-to-use image

The image file with pre-installed driver is located in the IMAGE directory of the CD, or you can download it from [#Image](#). Extract the .7z file and you will get an .img file. Write the image to your micro SD card (How to write an image to a micro SD card for your Pi? See [RPI Image Installation Guides](#) for more details). Then insert the card to your Pi, power up and enjoy it.

Toggle between LCD and HDMI display

Once this LCD is enabled, meanwhile the default settings for HDMI are changed. If you want to use another HDMI monitor, please run the following command:

```
cd LCD-show/  
./LCD-hdmi
```

This toggles the mode to LCD display:

```
./LCD32C-show
```

Screen orientation settings

After touch driver installed, the screen orientation can be set by these commands:

- 0 degree rotation

```
cd LCD-show/  
./LCD32C-show 0
```

- 90 degree rotation

```
cd LCD-show/  
./LCD32C-show 90
```

- 180 degree rotation

```
cd LCD-show/  
./LCD32C-show 180
```

- 270 degree rotation

```
cd LCD-show/  
./LCD32C-show 270
```

Touch screen calibration

This LCD can be calibrated through the xinput-calibrator program. **Note: The Raspberry Pi must be connected to the network, or else the program won't be successfully installed.**

- Run the following command to install:

```
sudo apt-get install xinput-calibrator
```

- Click the "Menu" button on the taskbar, choose "Preference" -> "Calibrate Touchscreen".
- Finish the touch calibration following the prompts. Maybe rebooting is required to make calibration active.
- You can create a 99-calibration.conf file to save the touch parameters (not necessary if file exists).

```
sudo mkdir /etc/X11/xorg.conf.d  
sudo nano /etc/X11/xorg.conf.d/99-calibration.conf
```

- Save the touch parameters (may differ depending on LCD) to 99-calibration.conf, as shown in the picture:

```
Section "InputClass"  
    Identifier      "calibration"  
    MatchProduct   "ADS7846 Touchscreen"  
    Option "Calibration" "208 3905 288 3910"  
    Option "SwapAxes" "0"  
EndSection
```

- Press the keys Ctrl+X, and select option Y to save the modification.
- The modification will be valid after rebooting the system. Enter the following command for system reboot:

```
sudo reboot
```

Notices: In case of inaccurate touch, please perform screen calibration again and reboot the system.

Install Virtual Keyboard

1. Install matchbox-keyboard

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

```
sudo nano /usr/bin/toggle-matchbox-keyboard.sh
```

2. Copy the statements below to toggle-matchbox-keyboard.sh and save.

```
#!/bin/bash
#This script toggle the virtual keyboard
PID=`pidof matchbox-keyboard`
if [ ! -e $PID ]; then
killall matchbox-keyboard
else
matchbox-keyboard -s 50 extended&
fi
```

3. Execute the commands:

```
sudo chmod +x /usr/bin/toggle-matchbox-keyboard.sh
sudo mkdir /usr/local/share/applications
sudo nano /usr/local/share/applications/toggle-matchbox-keyboard.desktop
```

4. Copy the statements to toggle-matchbox-keyboard.desktop and save.

```
[Desktop Entry]
Name=Toggle Matchbox Keyboard
Comment=Toggle Matchbox Keyboard`
Exec=toggle-matchbox-keyboard.sh
Type=Application
Icon=matchbox-keyboard.png
Categories=Panel;Utility;MB
X-MB-INPUT-MECHANSIM=True
```

5. Execute commands as below. **Note that you need to use "Pi " user permission instead of root to execute this command**

```
nano ~/.config/lxpanel/LXDE-pi/panels/panel
```

6. Find the statement which is similar to below: (It maybe different in different version)

```
Plugin {
type = launchbar
Config {
Button {
id=lxde-screenlock.desktop
}
Button {
id=lxde-logout.desktop
}
```

```
}
```

7. Append these statements to add an button option:

```
Button {  
id=/usr/local/share/applications/toggle-matchbox-keyboard.desktop  
}
```

```
Plugin {  
  type=space  
  Config {  
    Size=8  
  }  
}  
Plugin {  
  type=launcher  
  Config {  
    Button {  
      id=/usr/local/share/applications/toggle-matchbox-keyboard.desktop  
    }  
    Button {  
      id=/usr/share/applications/lxde-x-www-browser.desktop  
    }  
    Button {  
      id=/usr/share/raspi-ui-overrides/applications/pcmanfm.desktop  
    }  
    Button {  
      id=/usr/share/raspi-ui-overrides/applications/lxterminal.desktop  
    }  
    Button {  
      id=/usr/share/applications/wolfram-mathematica.desktop  
    }  
    Button {  
      id=/usr/share/applications/wolfram-language.desktop  
    }  
  }  
}  
Plugin {  
  type=space  
  Config {  
    Size=8  
  }  
}
```

8. reboot your Raspberry Pi. If the virtual keyboard is installed correctly, you can find that there is a keyboard icon on the left of the bar

```
sudo reboot
```

How to work with a camera

1. Select "Enable Camera" -> "<YES>"

```
sudo raspi-config
```

2. Copy the [Camera driver](#) to the OS of Pi then:

```
unzip camera.zip  
cd camera  
sudo chmod 777 Camera  
sudo cp update\ camera/95-stmpe.rules /etc/udev/rules.d/
```

3. Create a file called wheezy.list.

```
sudo nano /etc/apt/sources.list.d/wheezy.list
```

Append:

```
deb http://archive.raspbian.org/raspbian wheezy main
```

Exit with save.

4. Create a file called 10defaultRelease.

```
sudo nano /etc/apt/apt.conf.d/10defaultRelease
```

Append:

```
APT::Default-release \"stable\";
```

Exit with save.

5. Create a file called libSDL.

```
sudo nano /etc/apt/preferences.d/libSDL
```

Append:

```
Package: libSDL1.2debian  
Pin: release n=jessie  
Pin-Priority: -10  
Package: libSDL1.2debian  
Pin: release n=wheezy  
Pin-Priority: 900
```

Exit with save.

6. Last, execute the commands:

```
sudo apt-get update  
sudo apt-get -y --force-yes install libSDL1.2debian/wheezy  
sudo apt-get install evtest tslib libts-bin xinput  
sudo apt-get install python-pip  
sudo apt-get install python2.7-dev  
sudo pip install picamera==1.10  
sudo reboot  
sudo TS_LIB_FBDEVICE=/dev/fb1 TS_LIB_TSDEVICE=/dev/input/touchscreen ts_calibrate
```

Camera will be enabled by the steps above.

Interface

PIN NO.	SYMBOL	DESCRIPTION
1, 17	3.3V	Power positive (3.3V power input)
2, 4	5V	Power positive (5V power input)
3, 5, 7, 8, 10, 22	NC	NC
6, 9, 14, 20, 25	GND	Ground
11	TP_IRQ	Touch Panel interrupt, low level while the Touch Panel detects touching
12	KEY1	button
13	RST	Reset
15	LCD_RS	Command/data register selection, low level select command, high level select data.
16	KEY2	button
18	KEY3	button
19	LCD_SI / TP_SI	LCD display/SPI data input of Touch Panel
21	TP_SO	SPI data output of Touch Panel
23	LCD_SCK / TP_SCK	LCD display/SPI clock of Touch Panel
24	LCD_CS	LCD chip selection, low active
26	TP_CS	Touch Panel chip selection, low active