

# 3.5inch HDMI LCD

## Getting Started

### Hardware Connection



1. Plug the LCD to your Raspberry Pi:
  - There are 40 pins on Raspberry Pi Model A+/B+/2 B/3 B but only 26 pins on the LCD, so you should pay attention to connecting the pins to your Pi accordingly.
2. Connect the HDMI Connector to both the HDMI interfaces on the LCD and the Pi.
  - You should connect the LCD to Raspberry Pi Model B or Raspberry Pi Zero with an HDMI cable rather than an HDMI Connector.

### Install the touch driver

You can enable the touch in two ways: Method 1. install driver to your Raspbian/Ubuntu Mate OS. Method 2. use the Ready-to-use image file of which LCD driver was pre-installed.

#### Method 1. Driver installation

- 1) Download the Raspbian / Ubuntu Mate image from [Raspberry Pi website](#) and extract it on a PC.
- 2) Connect your micro SD card to the PC and write the image to the card using [Win32DiskImager](#). How to write an image to a micro SD card for your Pi? See [RPi Image Installation Guides](#) for more details)
- 3) After the image has finished writing, open the config.txt file in the root directory of the TF card. Add the following code at the end of config.txt, then save and quit the TF card safely.

```
max_usb_current=1
hdmi_group=2
hdmi_mode=87
hdmi_cvt 800 480 60 6 0 0 0
```

```
hdmi_drive=1
```

4) Connect the TF card to the Raspberry Pi, start the Raspberry Pi, and then log in to the Raspberry Pi terminal (you can connect the Raspberry Pi to the HDMI display or log in remotely with SSH).

5) Then open a terminal to install the touch driver which can be found in the /boot/ directory. **Note: Please make sure your Pi is connecting to the internet.**

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

# There are two LCD resolution modes, choose one of the two to execute.
./LCD35-HDMI-480x320-show
./LCD35-HDMI-800x480-show
```

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

**If the Raspbian you use is Lite version. You should use commands below to install driver**

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

# There are two LCD resolution modes, choose one of the two to execute.
./LCD35-HDMI-480x320-show lite
./LCD35-HDMI-800x480-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.

## Audio out from HDMI

There is a 3.5mm jack on the LCD, which is used to play HDMI audio. Steps to use this jack:

```
sudo nano /boot/config.txt          # edit the configuration file
```

Modify this line:

```
hdmi_drive=1
```

to

```
hdmi_drive=2
```

Exit with save: Hit ctrl + x -> Y

```
reboot                # system reboot
apt-get install mplayer # install mplayer
mplayer music.mp3     # play music
```

## Custom resolution

The hardware resolution of this LCD is 480x320 but you can change the resolution by software. In Raspbian, these resolution settings can work properly

**480×320 800×480 800×600 1024×768 1152×864 1280×720 1280×768 1280×800**

**1280×960 1280×1024 1360×768 1366×768 1440×900 1600×900 1600×1024 1680×1050**

The resolution can be configured by editing the `/boot/config.txt` file. Modify the line where `hdmi_cvt` is located, e.g. to change the resolution from 480x320 to 800x480, modify:

```
hdmi_cvt 480 320 60 6 0 0 0
```

to

```
hdmi_cvt 800 480 60 6 0 0 0
```

Note: Due to its own hardware resolution limitation, we recommend to use 480×320 800×480 800×600 resolution. Although other resolutions are supported, the display effect is not good due to the small screen size.

## Screen orientation settings

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

- 0 degree rotation

```
cd LCD-show/
# Choose one of the two to execute
./LCD35-HDMI-480x320-show 0
./LCD35-HDMI-800x480-show 0
```

- 90 degree rotation

```
cd LCD-show/
# Choose one of the two to execute
./LCD35-HDMI-480x320-show 90
./LCD35-HDMI-800x480-show 90
```

- 180 degree rotation

```
cd LCD-show/
```

```
# Choose one of the two to execute
./LCD35-HDMI-480x320-show 180
./LCD35-HDMI-800x480-show 180
```

- 270 degree rotation

```
cd LCD-show/
# Choose one of the two to execute
./LCD35-HDMI-480x320-show 270
./LCD35-HDMI-800x480-show 270
```

### if you use Raspbian-lite version

- 0 degree rotation

```
cd LCD-show/
# Choose one of the two to execute
./LCD35-HDMI-480x320-show lite 0
./LCD35-HDMI-800x480-show lite 0
```

- 90 degree rotation

```
cd LCD-show/
# Choose one of the two to execute
./LCD35-HDMI-480x320-show lite 90
./LCD35-HDMI-800x480-show lite 90
```

- 180 degree rotation

```
cd LCD-show/
# Choose one of the two to execute
./LCD35-HDMI-480x320-show lite 180
./LCD35-HDMI-800x480-show lite 180
```

- 270 degree rotation

```
cd LCD-show/
# Choose one of the two to execute
./LCD35-HDMI-480x320-show lite 270
./LCD35-HDMI-800x480-show lite 270
```

## Touch screen calibration

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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
```

## Install virtual keyboard

1. Execute the following code to install the corresponding software.

```
sudo apt-get update
sudo apt-get install matchbox-keyboard
sudo nano /usr/bin/toggle-matchbox-keyboard.sh
```

2. Copy the following content to toggle-matchbox-keyboard.sh, save and exit.

```
#!/bin/bash
#This script toggle the virtual keyboard
PID=`pidof matchbox-keyboard`
```

```
if [ ! -e $PID ]; then
killall matchbox-keyboard
else
matchbox-keyboard &
fi
```

3. Execute the following code.

```
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 following content to toggle-matchbox-keyboard.desktop, save and exit.

```
[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 the following code, this step must use the "pi" user authority, if you use the administrator authority, the file will not be found.

```
sudo nano /etc/xdg/lxpanel/LXDE-pi/panels/panel
```

6. Find the code similar to the following. (the icon of different versions may be different)

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

7. Add the following code to add a Button item, as shown below.

```
Button {
```

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

```
}
```

```
Plugin {
  type=space
  Config {
    Size=8
  }
}
Plugin {
  type=launchbar
  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. Execute the following code to restart the system, you can see a virtual keyboard icon in the upper left corner of the LCD.

```
sudo reboot
```

## 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, 11, 12, 13, 15, 16, 18, 24	NC	NC
6, 9, 14, 20, 25	GND	Ground

19	TP_SI	SPI data input of Touch Panel
21	TP_SO	SPI data output of Touch Panel
22	TP_IRQ	Touch Panel interrupt, low level while the Touch Panel detects touching
23	TP_SCK	SPI clock of Touch Panel
26	TP_CS	Touch Panel chip selection, low active

## Resource

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### User Manual

- [3.5inch HDMI LCD User Manual](#)

### Driver

The driver can be downloaded from github

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

### Image

- [3.5inch-HDMI-LCD-Raspbian-180326.7z](#)

### 3D Drawing

- [3.5inch HDMI LCD 3D Drawing](#)

### Demo video

- [Demo video](#)

### Software

- [Panasonic SDFormatter](#)
- [Win32DiskImager](#)
- [PuTTY](#)

### General Tutorial Series

- [Raspberry Pi Tutorial Series](#)



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