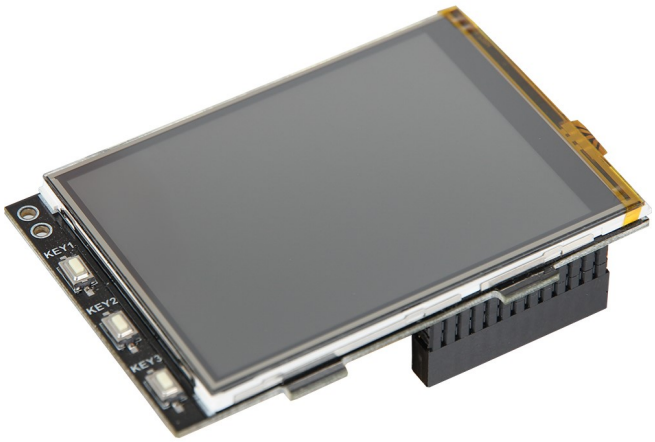


3.2“ / 3.5“ Touch-Display

for Raspberry Pi

TABLE OF CONTENTS

1. Overview

2. Connection

3. Installing the software

4. Using the buttons

5. Touchscreen calibration

6. Simultaneous use of LCD and HDMI

7. Information- and take-back obligations

8. Support

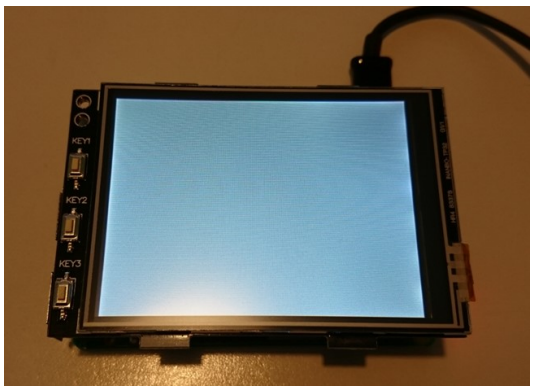
1. OVERVIEW

Dear customer,
Thank you very much for choosing our product.
In the following we will show you what has to be observed during commissioning and use. Should you encounter any unexpected problems during use, please feel free to contact us.

	3.2“ Display	3.5“ Display
Controller	XPT2046	
Resolution	320x240	480x320
Colors	65.536	

2. CONNECTION

Plug the 3.2"/3.5" TFT display onto the Raspberry Pi so that it is plugged onto the first 26 pins of the GPIO connector. After that the backlight of the display should already light up.

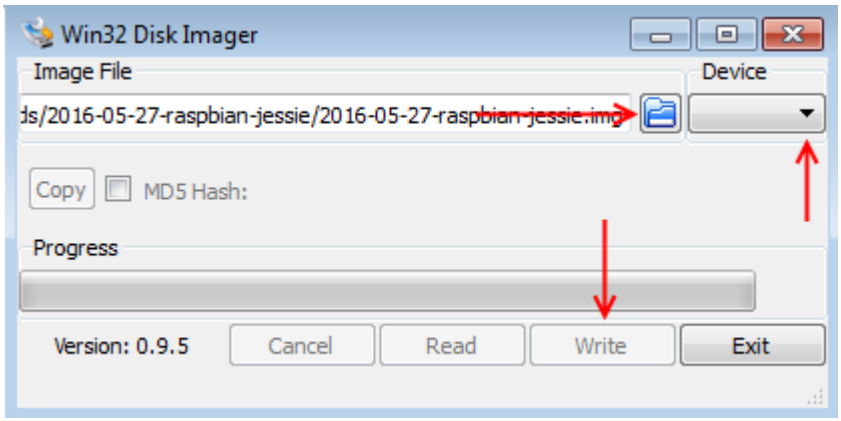


3. INSTALLING THE SOFTWARE

Install the FBTFT image on your SD card using the "Win32 Disk Imager" program, which you can download from the following links:

For RB-TFT3,2 ": Downloads 3,2" display

For RB-TFT 3.5 ": Downloads 3.5" display



Manuelle Installation

Do you already use another Raspbian Jessie Image and want this with the 3.2 "/3.5"
Extend touchscreen TFT, then you can install the FBTFT modules later on your system. For this the file "config.txt" has to be edited first.
Open a terminal window on your Raspberry Pi and follow the instructions:

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

Depending on your display, add the following lines at the beginning of the opened file:

For the 3.2 "TFT:

```
dtparam=spi=on
dtoverlay=joy-IT-Display-Driver32b-overlay:rotate=270,swapxy=1
dtparam=audio=on
max_usb_current=1
hdmi_force_hotplug=1
config_hdmi_boost=7
hdmi_drive=1
hdmi_ignore_edid=0xa5000080
```

For the 3.5 "TFT:

```
dtparam=spi=on
dtoverlay=joy-IT-Display_Driver35a-overlay:rotate=270,swapxy=1
dtparam=audio=on
max_usb_current=1
hdmi_force_hotplug=1
config_hdmi_boost=7
hdmi_drive=1
hdmi_ignore_edid=0xa5000080
```

For the **Raspberry Pi4** an extra adjustment has to be done. To do this, the command dtoverlay = vc4-fkms-v3d has to be commented out in the config.txt under the point [pi4], this should look like this:

```
[pi4]
# Enable DRM VC4 V3D driver on top of the dispmanx display stack
#
#dtoverlay=vc4-fkms-v3d <---- This setting must be commented out with a #
max_framebuffers=2
```

Now save the file with the key combination CTRL + O, confirm with Enter and leave the editor with the combination CTRL + X. Now the file "cmdline.txt" has to be edited:

```
sudo nano /boot/cmdline.txt
```

In this case, the following command must be added at the end of the already existing first line:

```
fbcon=map:10
```

Save the file, exit the editor and create the file "99-calibration.conf":

```
sudo nano /usr/share/X11/xorg.conf.d/99-calibration.conf
```

The following lines must be added to the file:

```
Section "InputClass"
        Identifier      "calibration"
        MatchProduct    "ADS7846 Touchscreen"
        Option  "Calibration"   "160 3723 3896 181"
        Option  "SwapAxes"      "0"
EndSection
```

This file is also terminated and saved with "Ctrl + X" followed by "Y" and "Enter". Finally, the file "/usr/share/X11/xorg.conf.d/99-fbturbo.conf" has to be edited. To do this, enter the following command:

```
sudo nano /usr/share/X11/xorg.conf.d/99-fbturbo.conf
```

And change the following line there ...

```
Option          "fbdev" "/dev/fb0"
```

... so that you change "fb0" to "fb1" and the line looks like this:

```
Option          "fbdev" "/dev/fb1"
```

This file is also terminated and saved with "Ctrl + X" followed by "Y" and "Enter".

Copyright by Joy-IT

Now the required "drivers" are downloaded and installed. Here, the Raspberry Pi must be connected to the Internet. Enter each of the following three commands in the console and confirm each with "Enter".

Commands for the 3.2 "LCD:

```
cd /tmp
wget anleitung.joy-it.net/upload/joy-IT-Display-Driver-32b-overlay.dtb
sudo cp joy-IT-Display-Driver-32b-overlay.dtb /boot/overlays/joy-IT-Display-Driver-32b-overlay.dtbo
```

Commands for the 3.5 "LCD:

```
cd /tmp
wget anleitung.joy-it.net/upload/joy-IT-Display_Driver-35a-overlay.dtb
sudo cp joy-IT-Display_Driver-35a-overlay.dtb /boot/overlays/joy-IT-Display_Driver-35a-overlay.dtbo
```

Now you have to install a package for the touch function and copy a file:

```
sudo apt-get install xserver-xorg-input-evdev
sudo cp -rf /usr/share/X11/xorg.conf.d/10-evdev.conf /usr/share/X11/xorg.conf.d/45-evdev.conf
```

Restart your Raspberry Pi now:

```
sudo reboot
```

4. VERWENDUNG DER KNÖPFE

At the edge of the 3.2 "display are also three buttons.

These can be controlled and used via the GPIO.
When pressing a button, the applied signal is pulled to ground (Active_LOW).
The buttons are connected as follows:

TFT	Raspberry Pi
Key 1	GPIO12
Key 2	GPIO16
Key 3	GPIO18

5. TOUCHSCREEN KALIBRIERUNG

Calibration for the 3.2 "display:

If calibration of the touchscreen is necessary, this can be done with the following
Steps are performed. First, the calibration tool needs to be downloaded.
To do this, open a terminal window and enter the following command:

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

Now restart your Raspberry Pi so that the touch display is recognized correctly:

```
sudo reboot
```

Now the calibration can be started with the following command:

```
DISPLAY=:0.0 xinput_calibrator
```

There are now four consecutive points lit, which must be pressed to calibrate the display. Subsequently, four calibration values are output in the terminal. To save the calibration, the setting must be saved to a file.

Create a new folder:

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

Now create the file in which the settings must be saved:

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

The entry should look like the following example (the values after "Calibration" may differ from your values):

```
Section "InputClass"
        Identifier      "calibration"
        MatchProduct    "ADS7846 Touchscreen"
        Option  "Calibration"   "171 3720 3899 196"
        Option  "SwapAxes"      "0"
EndSection
```

5. TOUCHSCREEN KALIBRIERUNG

Calibration for the 3.5 "display:

If calibration of the touchscreen is necessary, this can be done with the following
Steps are performed. First, the calibration tool needs to be downloaded.
To do this, open a terminal window and enter the following command:

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

Now restart your Raspberry Pi so that the touch display is recognized correctly:

```
sudo reboot
```

Now the calibration can be started with the following command:

```
DISPLAY=:0.0 xinput_calibrator
```

There are now four consecutive points lit, which must be pressed to calibrate the display. Subsequently, four calibration values are output in the terminal, which are stored in the file "99-calibration.conf" must be entered.

Open the file:

```
sudo nano /usr/share/X11/xorg.conf.d/99-calibration.conf
```

Enter the values in the following line here:

```
“Option  "Calibration"   "215 3947 3901 244"
```

"MinX" corresponds to the first value, "MaxX" to the second value, "MinY" to the third value, and "MaxY" to the fourth value. After saving the file and rebooting, the new calibration data will be applied.

6. GLEICHZEITIGE VERWENDUNG VON LCD UND HDMI

In order to be able to output the image signal simultaneously on the TFT display and on the HDMI output, additional steps must be carried out. The first step is to compile and install the Framebuffer-Copy program using the following commands.

```
cd /tmp
sudo apt-get install -y cmake
git clone https://github.com/tasanakorn/rpi-fbcp
mkdir -p rpi-fbcp/build
cd rpi-fbcp/build
cmake ..
make
sudo install fbcp /usr/local/bin/fbcp
```

For the program to start when booting up the Raspberry Pi, this must be in the file "/Etc/rc.local" will be added.

```
sudo nano /etc/rc.local
```

Add here before statement "exit 0" a new line with the following content:

```
fbcp &
```

Now, in the "/boot/config.txt" following text block under the previously added settings, starting on the following page, must be added.

In this, the resolution, which is output from HDMI and Display, can be adjusted by commenting out the respective triple block of "hmdi_group", "hdmi_mode" and "hdmi_cvt":
(In the following example, the resolution is 800x600 default)

For 4: 3 resolutions:

```
hdmi_ignore_edid=0xa5000080
hdmi_force_hotplug=1

###############################################################################

#### Resolution settings - relevant group must be commented on ####
##### 4:3 ######

## Settings for 320x240 (native resolution of the 3.2"TFT-Displays) ##
#hdmi_group=2
#hdmi_mode=87
#hdmi_cvt=320 240 60 1 0 0 0

## Settings for 640x480 ##
#hdmi_group=2
#hdmi_mode=87
#hdmi_cvt=640 480 60 1 0 0 0

## Settings for 720x540 ##
#hdmi_group=2
#hdmi_mode=87
#hdmi_cvt=720 540 60 1 0 0 0

## Settings for 800x600 ##
hdmi_group=2
hdmi_mode=87
hdmi_cvt=800 600 60 1 0 0 0

## Settings for 1024x768 ##
#hdmi_group=2
#hdmi_mode=87
#hdmi_cvt=1024 768 60 1 0 0 0

################################
```

For 16: 9 resolutions:

```
hdmi_ignore_edid=0xa5000080
hdmi_force_hotplug=1

###############################################################################
#### Resolution settings - relevant group must be commented on ####
##### 16:9 #####

## Settings for 1280x720 ##
#hdmi_group=2
#hdmi_mode=87
#hdmi_cvt=1280 720 60 3 0 0 0

## Settings for 1600x900 ##
#hdmi_group=2
#hdmi_mode=87
#hdmi_cvt=1600 900 60 3 0 0 0

## Settings for 1920x1080 ##
#hdmi_group=2
#hdmi_mode=87
#hdmi_cvt=1920 1080 60 3 0 0 0

################################
```

In the last step, the file "/usr/share/X11/xorg.conf.d/99-calibration.conf" has to be edited again. Open the file with the following command:
And change the following line there ...

... so that you change "fb1" back to "fb0" as in the original state (this is absolutely necessary in framebuffer copy mode):

7. INFORMATION- AND TAKE-BACK OBLIGATIONS

Symbol on electrical and electronic equipment

This crossed-out dustbin means that electrical and electronic appliances do not belong in the household waste. You must return the old appliances to a collection point. Before handing over waste batteries and accumulators that are not enclosed by waste equipment must be separated from it.

Return options
As an end user, when you purchase a new device, you can return your old device (which essentially fulfils the same function as the new one purchased from us) free of charge for disposal. Small appliances with no external dimensions greater than 25 cm can be disposed of in normal household quantities independently of the purchase of a new appliance.

Possibility of return at our company location during opening hours
Simac GmbH, Pascalstr. 8, D-47506 Neukirchen-Vluyn

Possibility of return near you
We will send you a parcel stamp with which you can return the device to us free of charge. Please contact us by e-mail at Service@joy-it.net or by telephone.

Information on packaging
If you do not have suitable packaging material or do not wish to use your own, please contact us and we will send you suitable packaging.

8. SUPPORT

We are also there for you after the purchase. If you still have questions or problems, we are also available by e-mail, telephone and ticket support system.

E-Mail: service@joy-it.net
Ticket-System: http://support.joy-it.net
Phone: +49 (0)2845 98469 – 66 (9:30 - 17:00 o‘clock)

For further information please visit our website:

www.joy-it.net