Waveshare EPaper and a RaspberryPi

By mariosis (/member/mariosis/) in Technology (/technology/) > Raspberry-pi (/technology/raspberry-pi/) 8.639 5 15

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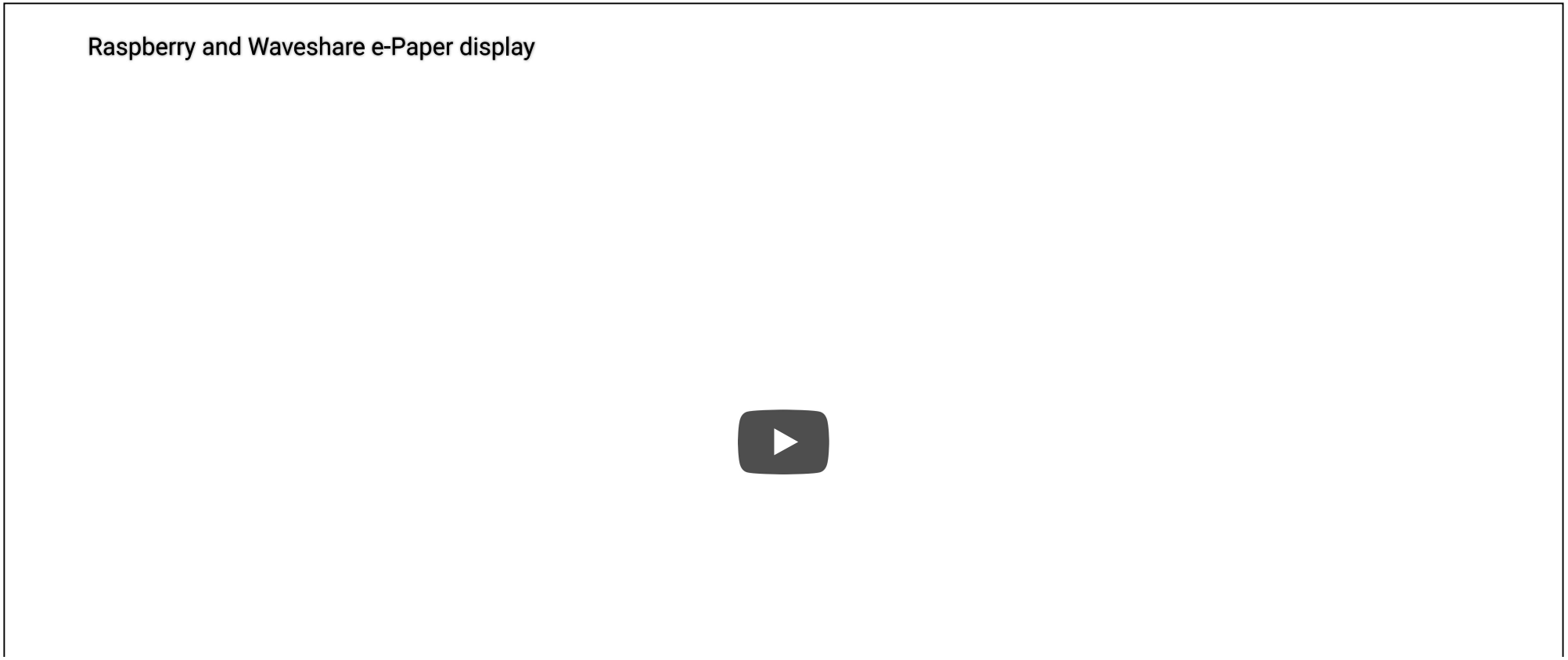

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By **mariosis (/member/mariosis/)**
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I'm a display nerd, I know. So I got this Waveshare ePaper 2.9" display from ama...n and it was a little nasty to adopt the software, so here is how it went for me.

What to expect:
Some python code for the raspberry to run this display.

- uses good old PythonImagingLibrary
  - can load any Image
  - allows image manipulation and drawing
- can fetch images from the internet
- demo code shows some search results from duckduckgo.com

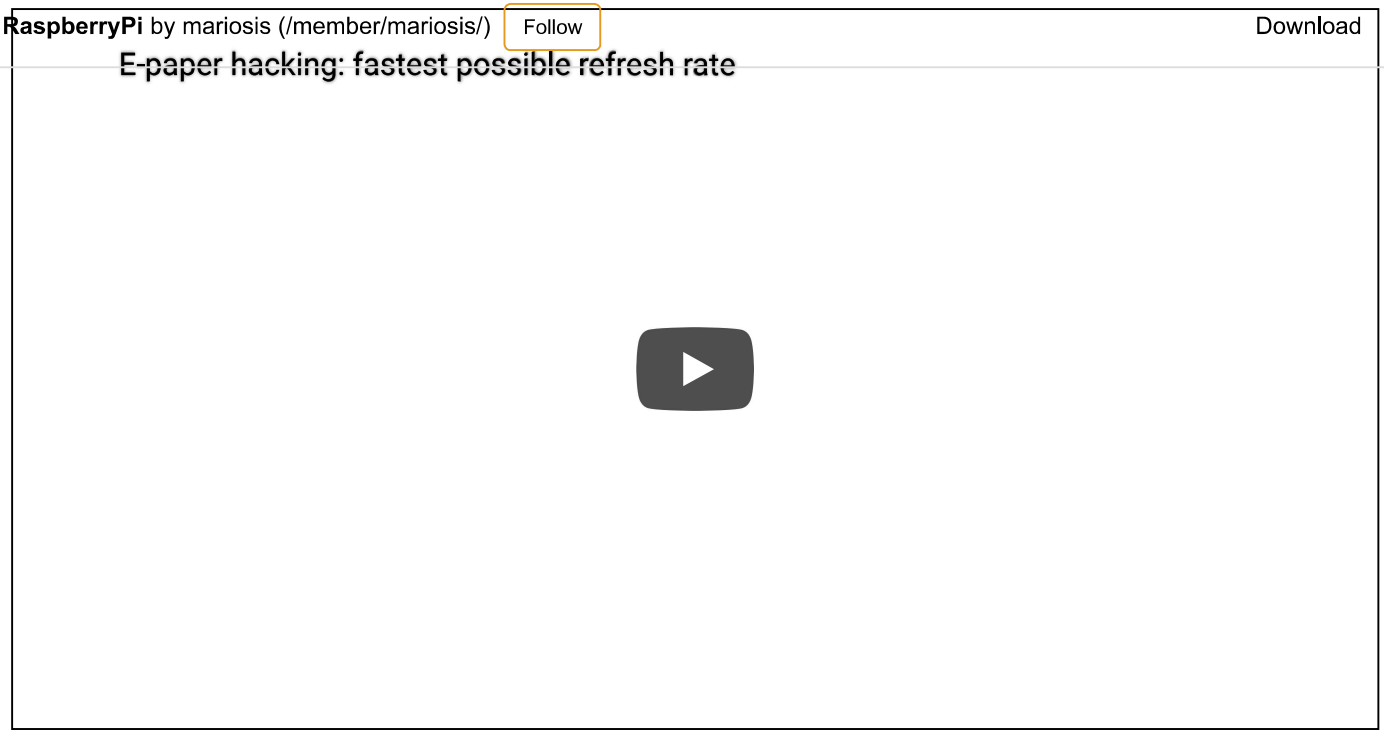
References

Here is the waveshare Wiki page (http://www.waveshare.com/wiki/2.9inch_e-Paper_Module) with the somewhat useful infos you may need. Unfortunately I am missing info about the memory layout just to know where I can expect to write a bit for a certain pixel. It also lacks timing infos, the code does a lot of delay's and there is a busy pin to read from but when and how I use which ??? The code also contains initialisation code that is copied to the display and you will get no glue what it is. And no the PDF document about the display does not reveal this either.

After some experimentation, I can get a refresh rate of about 2fps for a complete image refresh, with the partial update function. The pixels do not completely reset, I guess you need to do the long refresh cycle which inverts everything a view times to get completely clean display back.

Update:

Extesive explanation of the Waveshare example code...



Connections to Raspberry

I used a Pi3 but it should work with any.

Search the web for "Raspberry pinout" e.g. this one (https://pinout.xyz) and match with the waveshare doc, or simply use this table..

```
e-Paper  RaspberryPi<br>3.3V     3.3V (pin1)<br>GND      GND  (pin6)<br>DIN      MOSI (pin19)<br>CLK      SC
LK (pin23)<br>CS       CE0  (pin24)<br>DC       BCM25(pin22)<br>RST      BCM17(pin11)<br>BUSY     BCM24(pin1
8)
```

The Code

There is the **main.py** which runs the fancy stuff and there is **EPD_driver.py** which is a stripped down version of the interfacing code provided py waveshare. I thrown out almost everything which did not just copy an image to the display - it.. eh.. well they tried, but

putting the frame together is much easier done on the Pi and the copied over with a single command.

Just download the attached paperDisp.zip. Then run the code with "python main.py". You will need to install at least PIL and GPIO phyton libs like this.

```
sudo apt-get install python-requests python-pil python-rpi.gpio
```

Also make sure the SPI is enabled, edit /boot/config.txt and uncomment the line

```
dtparam=spi=on
```

main.py - this does init the display, gets some data from a duckduckgo search and displays that along with the current time. (instructables messed up the code, use the attached zip file)

```
#!/usr/bin/python<br>import spidev as SPI  # where the display connects

import Image, ImageDraw, ImageFont  # PIL - PythonImageLibrary

import time, datetime, sys, signal, urllib, requests
from EPD_driver import EPD_driver
def handler(signum, frame):
    print 'SIGTERM'
    sys.exit(0)
signal.signal(signal.SIGTERM, handler)
bus = 0
device = 0
disp = EPD_driver(spi = SPI.SpiDev(bus, device))
print "disp size : %dx%d"%(disp.xDot, disp.yDot)
print '------------init and Clear full screen------------'
disp.Dis_Clear_full()
disp.delay()
# display part
disp.EPD_init_Part()
disp.delay()
imagenames = []
search = "http://api.duckduckgo.com/?q=Cat&format=json&pretty=1"
if search:
    req = requests.get(search)
    if req.status_code == 200:
        for topic in req.json()["RelatedTopics"]:
```

Credits

I used the free font "Amiga Forever" by Freaky Fonts http://www.dafont.com/amiga-forever.font (http://www.dafont.com/amiga-forever.font) .

Images shown on the disp are search results from duckduckgo "cat" search, no preferences for whatever comes up there.

paperDisp2.zip Download (https://cdn.instructables.com/ORIG/FLH/3UI1/J7GGP0KY/FLH3UI1J7GGP0KY.zip)
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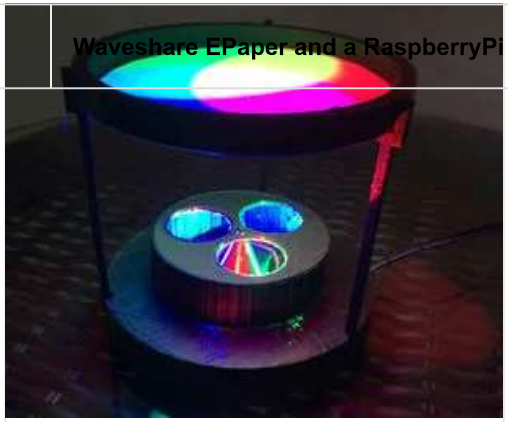

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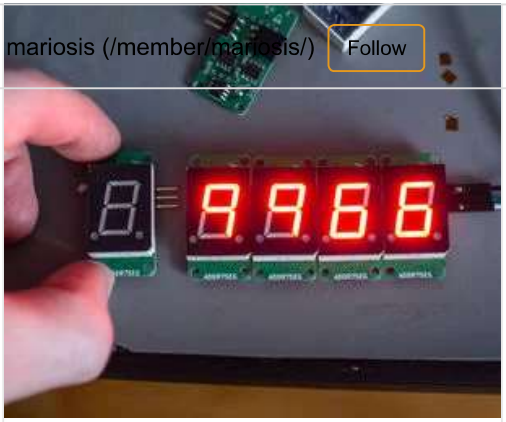

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(/member/MaciejE2/) MaciejE2 (/member/MaciejE2/) 7 weeks ago on

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Ok I got this working with RPI Zero W without many modification, only PIL import line that was already mentioned. Thank you very much. A thing to note is that my screen has a bit of ghosting around the contrasting elements after some updates. Two flashes one white one brack clear the problem so it is not persistent.

One issue I see is that we could have solved is that it works with python 2.7 and not 3.x when some off new helper libraries I'd love to use in my sensor project are 3.x exclusive

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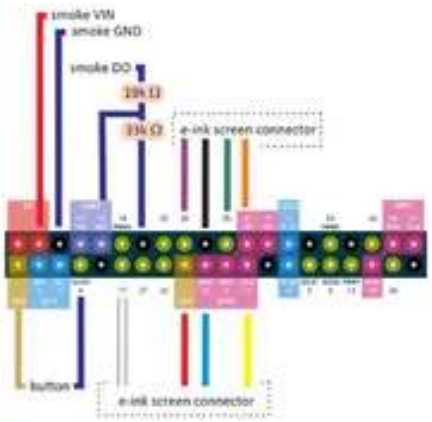
Added a wiring diagram for my project, as the table on the main page is hard to read. Waveshare screen comes with the colorful leads. Valid until they change colors :) (uses other ground connector for better packing)



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StevanY41 (/member/StevanY41/) 2 months

StevenY41 (/member/StevenY41/) Question 2 months ago on

Answer Upvote

I received a pdf file that may be of some help to you, but it's over my head (sadly that doesn't take much anymore). If you would like a copy please tell me how to get it to you.

(/member/KyleD113/) KyleD113 (/member/KyleD113/) Question 11 months ago on

Answer Upvote

In the EPD_driver.py file, where did you get the values for LUTDefault_full and LUTDefault_part? I'm trying to modify your code to drive the 7.5" Waveshare display, but I'm not seeing anything equivalent to that data in the original Waveshare code. I see that same data in a few different Github repos, but no explanation as to where it comes from. Thanks.

2 answers

(/member/JohnD662/) JohnD662 (/member/JohnD662/) Question 10 months ago on

Answer Upvote

Hey there, nice tutorial! I got myself a 2,7" waveshare HAT and wonder at which location you got the original EPD_Driver.py? My display seems to be not supported... that's not what I expected when buying a HAT for my Raspberry Pi3

1 answer

(/member/mthemartian/) mthemartian (/member/mthemartian/) Question 11 months ago

Answer Upvote

I'm having a python issue with the waveshare and this example.
I followed the instructions using the latest raspbian stretch, and installed python-pil

Traceback (most recent call last):
File "main.py (http://main.py)", line 3, in <module>

import Image, ImageDraw, ImageFont # PIL - PythonImageLibrary

ImportError: No module named Image
Also tried to install pil and then pillow with pip, but no luck.
Anyone have the same issue?

1 answer

(/member/Veesp/) Veesp (/member/Veesp/) Question 11 months ago on Answer Upvote

do you have full command list what i need to install etc. I have clean raspberry pi zero w with rasbian lite. i try earlier and error is no module named EPD_driver

1 answer

(/member/mariosis/) mariosis (author) a year ago Reply Upvote

Hi, it's difficult to "fix" the software without the hardware for testing it, It took me a some iterations to get mine running.
However, the docu of the 2.13 HAT says something about a "virtual width" of 128 instead of 122, meaning the display memory is 128 pixel width to keep the lines byte aligned.
Maybe a width setting of 128 does the trick.
Cheers.

(/member/MauroC52/) MauroC52 (/member/MauroC52/) a year ago Reply Upvote

Hi, can I try with the 2.13 RPI HAT b/w version? Demo on waveshare wiki for that one don't work, I'm quite lost!!!
Tnks

2 replies

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