

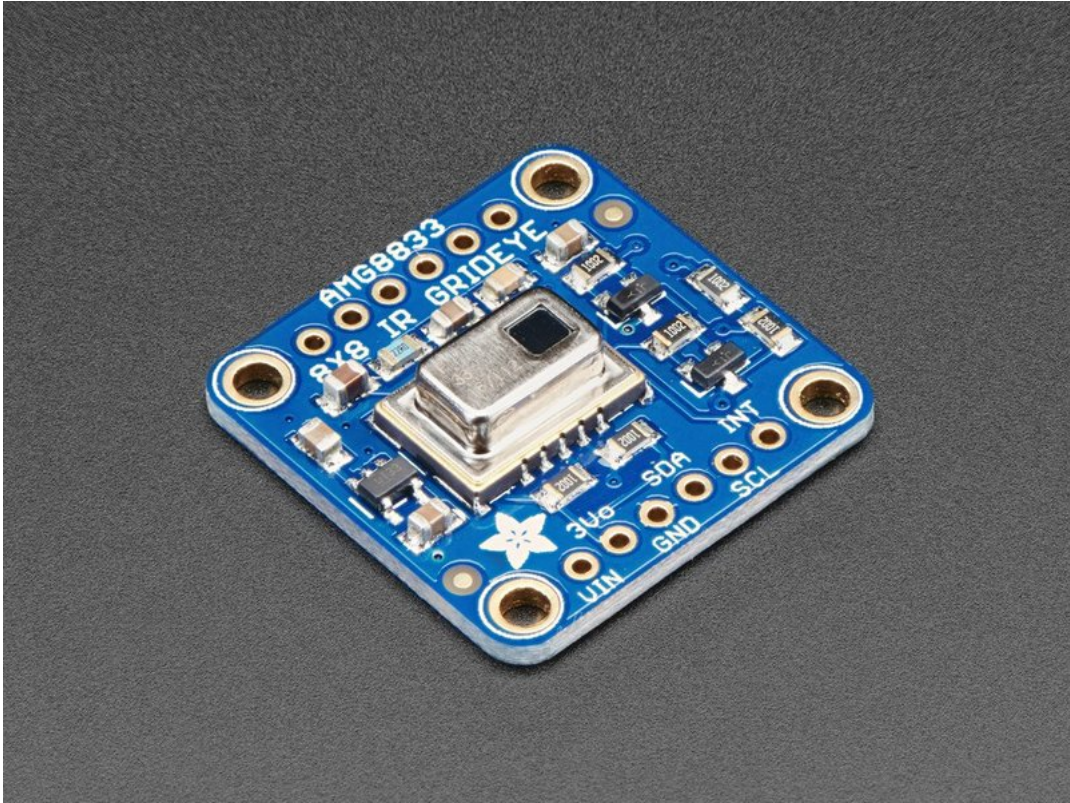
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Adafruit AMG8833 8x8 Thermal Camera Sensor

[Build your own mini thermal camera](#)

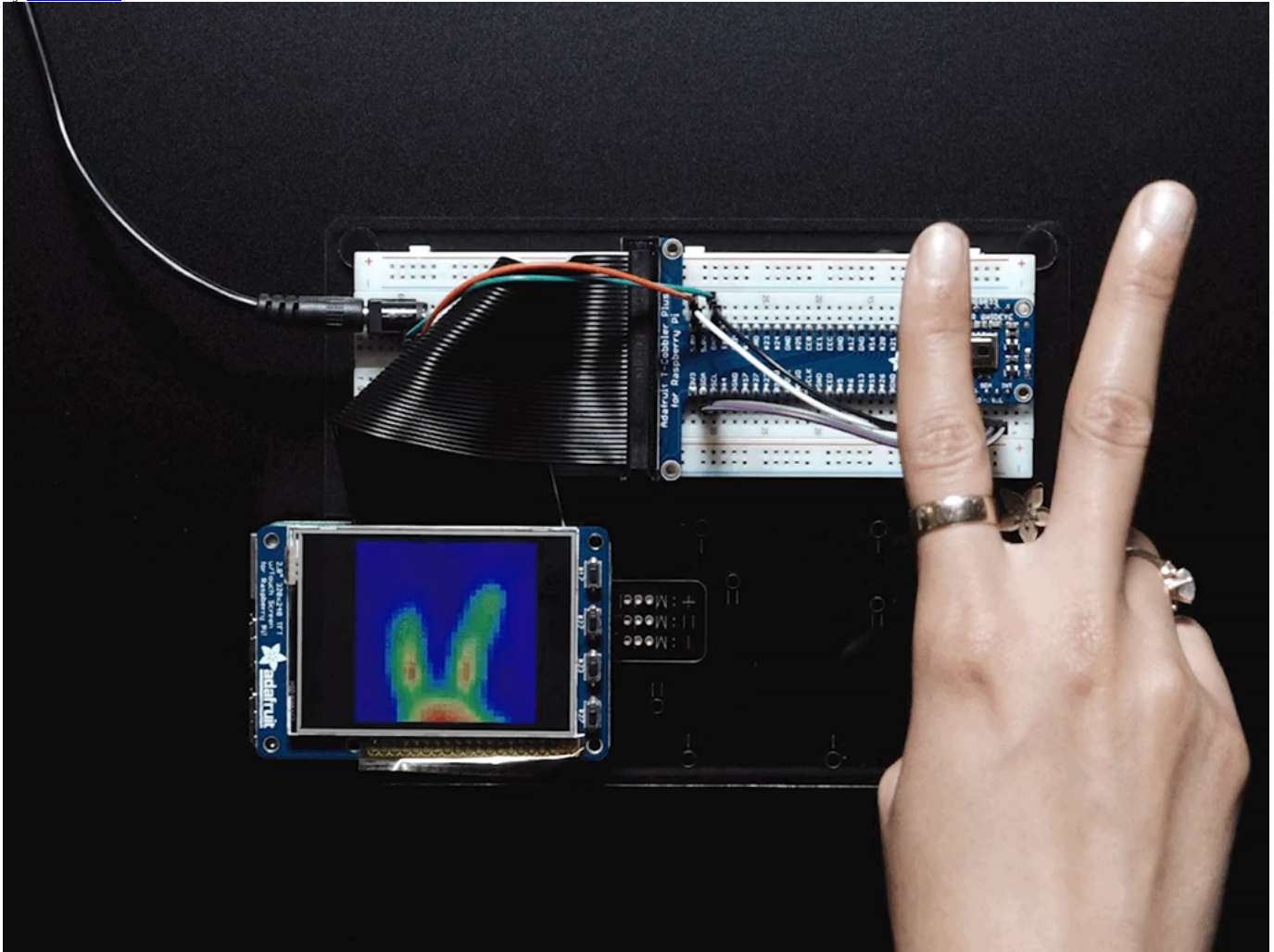
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[Dean Miller](#)
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Raspberry Pi Thermal Camera

by [Dean Miller](#)



The Raspberry Pi also has an i2c interface, and even better has processing capability to interpolate and filter the sensor output. By adding processing power, you can 'turn' the 8x8 output into what appears to be a higher-resolution display.

We're using a PiTFT 2.8" and a Pi Cobbler but the code can be adapted to output to the HDMI display - we're using pygame to draw to the framebuffer.

You can use any Raspberry Pi computer, from Pi A+ to Pi 3 or even a Pi Zero, but we happen to have a Pi 3 on our desk set up already so we're using that.



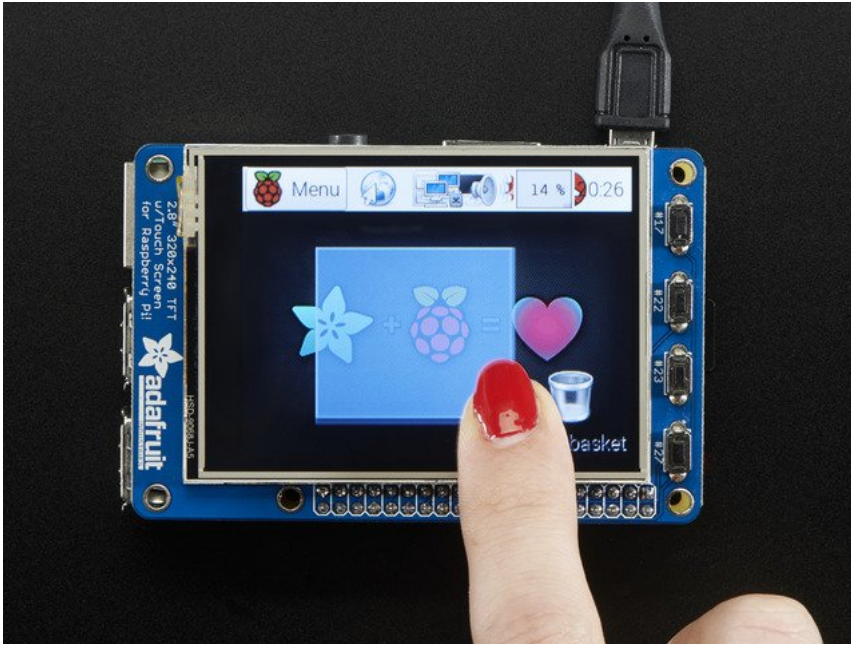
[Raspberry Pi 3 - Model B - ARMv8 with 1G RAM](#)

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Did you really think the Raspberry Pi would stop getting better? At this point, we sound like a broken record, extolling on the new Pi's myriad improvements like we're...

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[Assembled Pi T-Cobbler Plus - GPIO Breakout](#)

PRODUCT ID: 2028

This is the assembled version of the Pi T-Cobbler Plus. It only works with the Raspberry Pi Model Zero, A+, B+, Pi 2, Pi 3! (Any Pi with 2x20 connector)

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Setup PiTFT

If you have not done so already, the first thing you will need to do is setup your PiTFT. Instructions on how to do so can be found in [this guide](#).

Install Python Software

Once your PiTFT is all set up, and you have Internet access set up, lets install some software we will need. First make sure your Pi package manager is up to date.

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1. `sudo apt-get update`

Next, we will install the Raspberry Pi library and Adafruit_GPIO which is our hardware interfacing layer

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1. `sudo apt-get install -y build-essential python-pip python-dev python-smbus git`
2. `git clone https://github.com/adafruit/Adafruit_Python_GPIO.git`
3. `cd Adafruit_Python_GPIO`
4. `sudo python setup.py install`

Finally, install both pygame and scipy. Pygame lets us draw easily to a screen using python, we'll use that to make the display work. Scipy is a powerful scientific/data processing library that we can use to magically turn the 8x8 = 64 pixel array into something that looks more like a 32x32 = 1024 pixel array. Wow, isn't digital signal processing cool?

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1. `sudo apt-get install -y python-scipy python-pygame`
2. `sudo pip install colour Adafruit_AMG88xx`

Enable I2C

We need to enable the I2C bus so we can communicate with the sensor.

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1. `sudo raspi-config`

select Advanced options, enable I2C, and then finish.



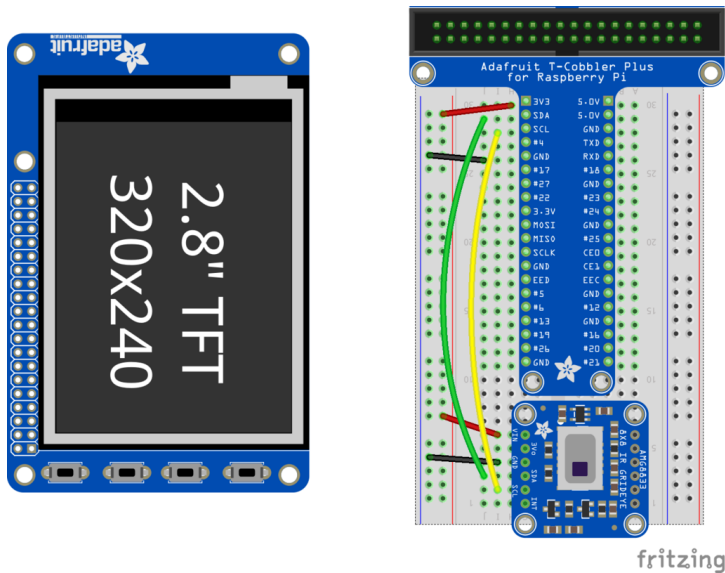
Once I2C is enabled, run **sudo shutdown -h now** to turn off the Pi and prepare for wiring

Wiring Up Sensor

With the Pi powered off, we can wire up the sensor to the Pi Cobbler like this:

- Connect **Vin** to the 3V or 5V power supply (either is fine)
- Connect **GND** to the ground pin on the Cobbler
- Connect **SDA** to **SDA** on the Cobbler
- Connect **SCL** to **SCL** on the Cobbler

You can also use direct wires, we happen to have a Cobbler ready. remember you can plug the cobbler into the bottom of the PiTFT to get access to all the pins!



Now you should be able to verify that the sensor is wired up correctly by asking the Pi to detect what addresses it can see on the I2C bus:

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```
1. sudo i2cdetect -y 1
```

```
pi@raspberrypi:~$ sudo i2cdetect -y 1
0 1 2 3 4 5 6 7 8 9 a b c d e f
00: -- -- -- -- -- -- -- -- -- -- -- -- -- --
01: -- -- -- -- -- -- -- -- -- -- -- -- -- --
02: -- -- -- -- -- -- -- -- -- -- -- -- -- --
03: -- -- -- -- -- -- -- -- -- -- -- -- -- --
04: -- -- -- -- -- -- -- -- -- -- -- -- -- --
05: -- -- -- -- -- -- -- -- -- -- -- -- -- --
06: -- -- -- -- -- -- -- -- -- -- -- -- -- --
07: -- -- -- -- -- -- -- -- -- -- -- -- -- --
08: -- -- -- -- -- -- -- -- -- -- -- -- -- --
09: -- -- -- -- -- -- -- -- -- -- -- -- -- --
0a: -- -- -- -- -- -- -- -- -- -- -- -- -- --
0b: -- -- -- -- -- -- -- -- -- -- -- -- -- --
0c: -- -- -- -- -- -- -- -- -- -- -- -- -- --
0d: -- -- -- -- -- -- -- -- -- -- -- -- -- --
0e: -- -- -- -- -- -- -- -- -- -- -- -- -- --
0f: -- -- -- -- -- -- -- -- -- -- -- -- -- --
69: -- -- -- -- -- -- -- -- -- -- -- -- -- --
-- -- -- -- -- -- -- -- -- -- -- -- -- --
pi@raspberrypi:~$
```

It should show up under it's default address (**0x69**). If you don't see 69, check your wiring, did you install I2C support, etc?

Run example code

At long last, we are finally ready to run our example code

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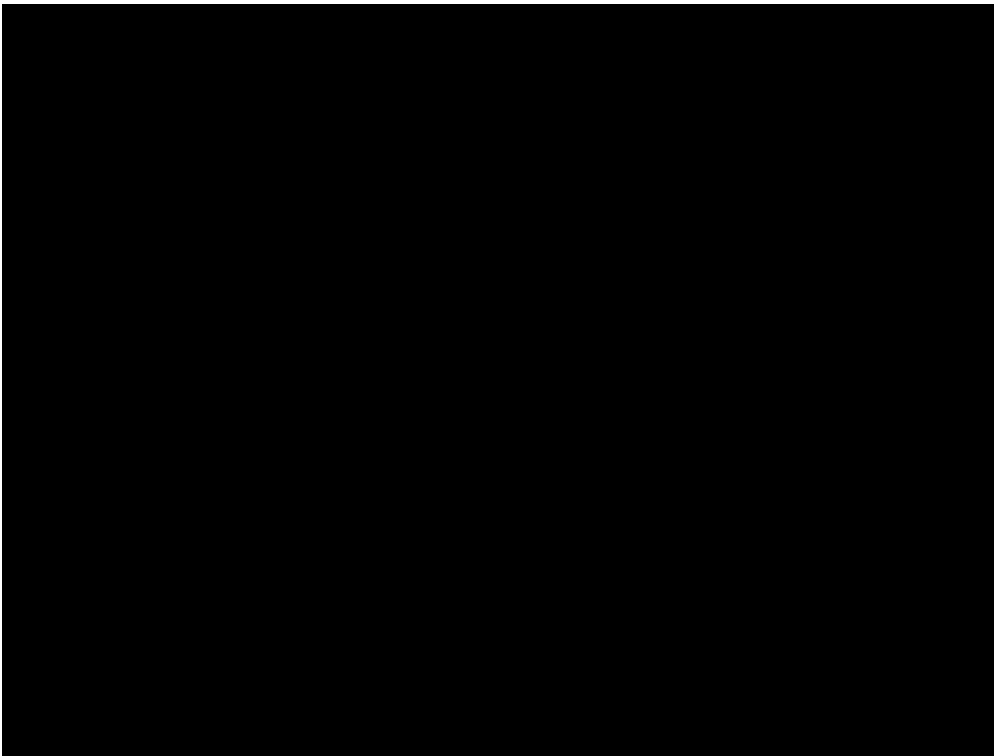
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```
1. cd ~/
2. git clone https://github.com/adafruit/Adafruit_AMG88xx_python.git
3. cd Adafruit_AMG88xx_python/examples
4. sudo python thermal_cam.py
```

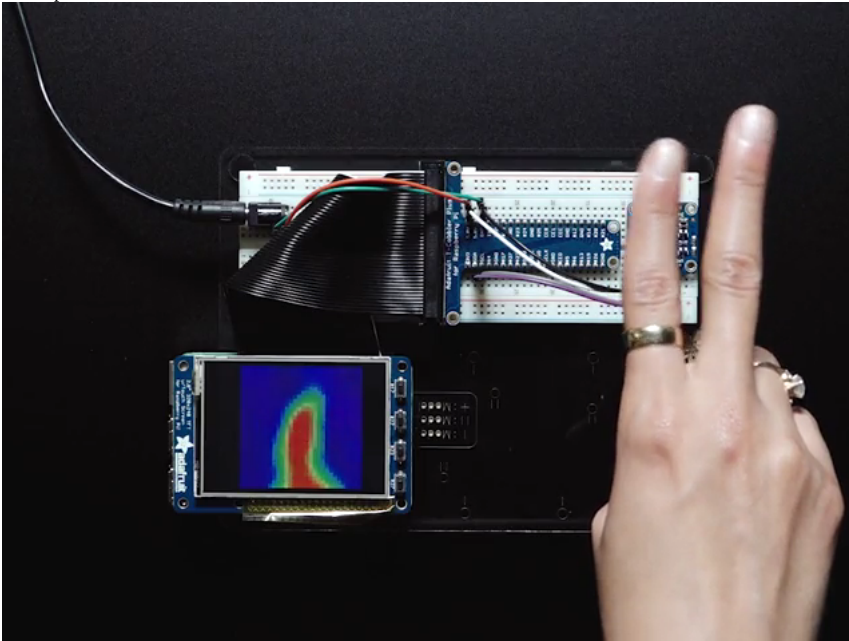
If you have everything installed and wired up correctly, you should see a nice thermal camera image. Cool tones (blue and purple) are cooler temperatures, and warmer tones (yellow, red) are warmer temperatures.

If your image seems to be flipped on the screen, try changing the orientation of the AMG8833 breakout on the breadboard.

If you're interested in the details, and want to know more about how we made 64 pixels look like many more, it's called [bicubic interpolation](#) ([hat tip to OSHpark for the idea!](#))

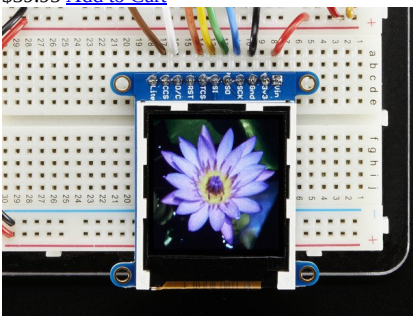
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Last updated on Jan 15, 2018 Published on Jun 28, 2017



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Adafruit 1.44" Color TFT LCD Display with MicroSD Card breakout

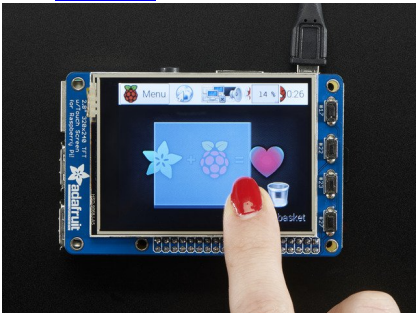
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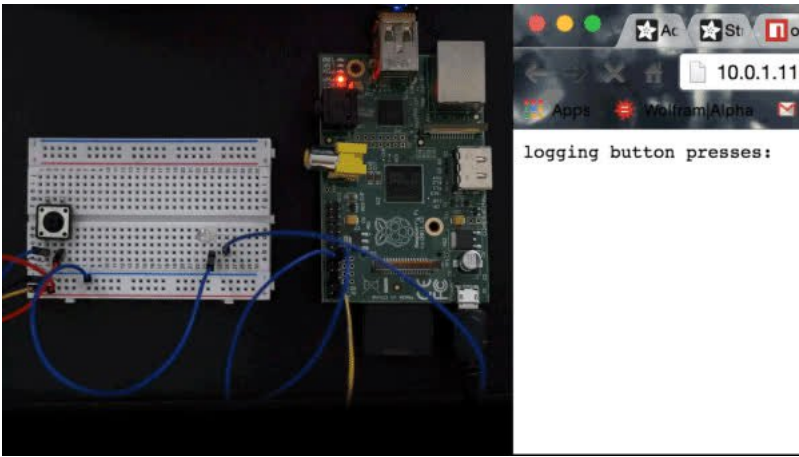
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