PI Juice - Uninterruptible power supply board for any Raspberry Pi

https://uk.pi-supply.com/
https://uk.pi-supply.com/products/pijuice-standard

Li-ion Battery HAT for Raspberry Pi, 5V Output, Quick Charge

https://www.buyapi.ca/product/li-ion-battery-hat-for-raspberry-pi-5v-output-quick-charge/

Raspberry pi 4B

https://www.raspberrypi.org/documentation/

https://www.raspberrypi.org/documentation/faqs/

What is its operating temperature? Does it need a heatsink?

The Raspberry Pi is built from commercial chips which are qualified to different temperature ranges; the LAN9514 (LAN9512 on older models with 2 USB ports) is specified by the manufacturers as being qualified from 0°C to 70°C, while the SoC is qualified from -40°C to 85°C. You may well find that the board will work outside those temperatures, but we're not qualifying the board itself to these extremes.

You should not need to use a heatsink, as the chip used in the Raspberry Pi is equivalent to one used in a mobile phone, and should not become hot enough to require any special cooling. However, depending on the case you are using and the overclocking settings, you might find a heatsink to be advantageous. We do recommend the use of a heatsink if you are overclocking the Raspberry Pi 3 Model B. Of course, if you just like the look of one, you will not hurt the Raspberry Pi by placing an appropriately-sized heatsink on it.

The Raspberry Pi 400 uses a large heat spreader inside the case, and does not need any extra cooling.

- Gives near real-time operation. (for object detection; more frames per second; faster speed of detection)
- BCM2711B0 (ARM Cortex-A72)
    - 64-bit 1.5GHz quad-core
- Choice of RAM
    - PI4B-1GB: 1GB
    - PI4B-2GB: 2GB
    - PI4B-4GB: 4GB
- Gigabit Ethernet
- 802.11ac 2.4GHz/5GHz dual-band NIC
- Bluetooth 5.0, BLE
- USB 3.0 x 2, USB 2.0 x 2
- micro HDMI x 2 (supports 4Kp60)
- PoE header (supports PoE HAT)
- MicroSD slot
- 3.5 mm audio jack
- 40PIN GPIO header
- CSI camera interface
- DSI display interface
- USB Type C power supply (5V/3A or above)

Comparing 3B+ and 4B

Features :
https://www.youtube.com/watch?v=D_sXMSe1bpo

https://magpi.raspberrypi.org/articles/raspberry-pi-4-vs-raspberry-pi-3b-plus

Frames per second in object detection applications:

https://www.youtube.com/watch?v=aimSGOAUI8Y

Object detection applications

https://www.hackster.io/BnBe_Club/basic-object-motion-detection-using-a-raspberry-pi-265887

https://www.youtube.com/watch?v=VF8M9DdZ_Aw

https://www.pyimagesearch.com/

Similar applications

https://medium.com/initial-state/how-to-build-a-raspberry-pi-refrigerator-freezer-monitor-f7a91075c2fd

Microphone

Adafruit SPH0645

https://forum.pjrc.com/threads/60599?p=238070&viewfull=1#post238070

https://forum.pjrc.com/threads/66404-Teensy-interfacing-with-ADAFRUIT-I2S-MEMS-MICROPHONE-BREAKOUT-SPH0645LM-4H?p=271820#post271820

https://forum.pjrc.com/threads/60599?p=238070&viewfull=1#post238070

Door Sensor

https://www.digikey.ca/en/products/detail/adafruit-industries-llc/375/6691113?s=N4IgjCBcoLQdIDGUBmBDANgZwKYBoQB7KAbXAFYAmADhAF0CAHAFyhBAF8ODLSQATQoQBOAAlwA7LCPocgA

https://arduinogetstarted.com/tutorials/arduino-door-sensor

https://medium.com/conectric-networks/playing-with-raspberry-pi-door-sensor-fun-ab89ad499964

https://www.hackster.io/thingsquare/no-programming-wireless-door-sensor-with-push-notifications-5375d0

Bluetooth

http://www.uugear.com/portfolio/bluetooth-communication-between-raspberry-pi-and-arduino/

https://pimylifeup.com/raspberry-pi-bluetooth/

Temperature sensor

Teensy

Relay

https://www.sparkfun.com/videos#all/mmgrxLLx89U/254

Battery + Booster

Mini booster
https://www.adafruit.com/product/4654#description