RASPBERRY PI

SINGLE BOARD COMPUTER

HTTPS://WWW.RASPBERRYPI.ORG/

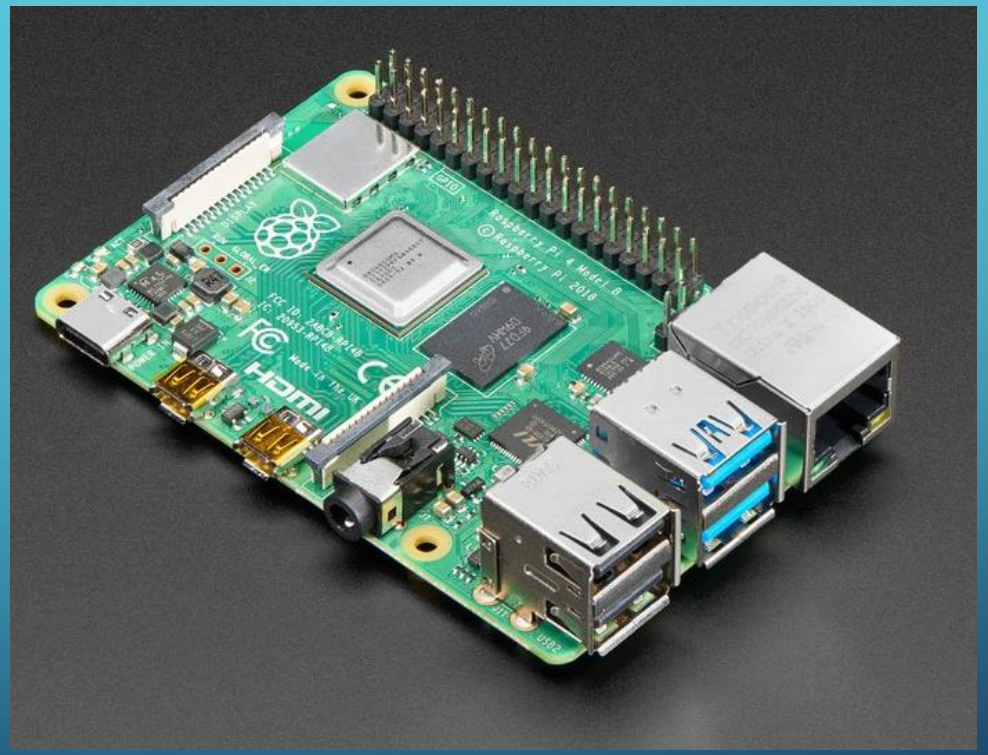
MICROCONTROLLER / SINGLE BOARD COMPUTER

- The Arduino's are Microcontrollers, designed to run a single application.
- Raspberry Pi's (except for the new Pico which is a microcontroller) are single board computers. They can be just like your laptop or desktop with additional I/O opportunities.

OTHER SINGLE BOARD COMPUTERS

- Beagle Bone
- NVidia Jetson
- Asus Tinkerboard

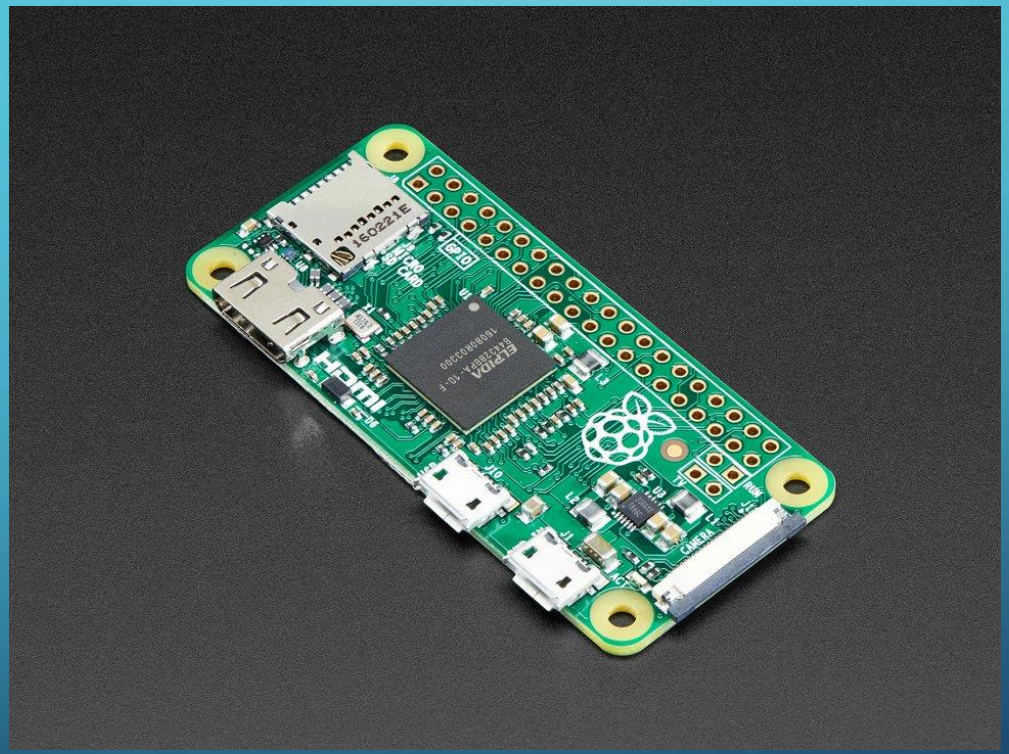
MODEL 4B - $75



MODEL 4B

- 64-bit 1.5 GHz quad core processor
- 1 / 2 /4 / 8 GB RAM
- 4 USB ports (2 - 3.0)
- Wired / wireless LAN
- Dual HDMI output (one at 4K)
- MicroSD card storage (32 GB+)
- Camera interface
- GPIO bus

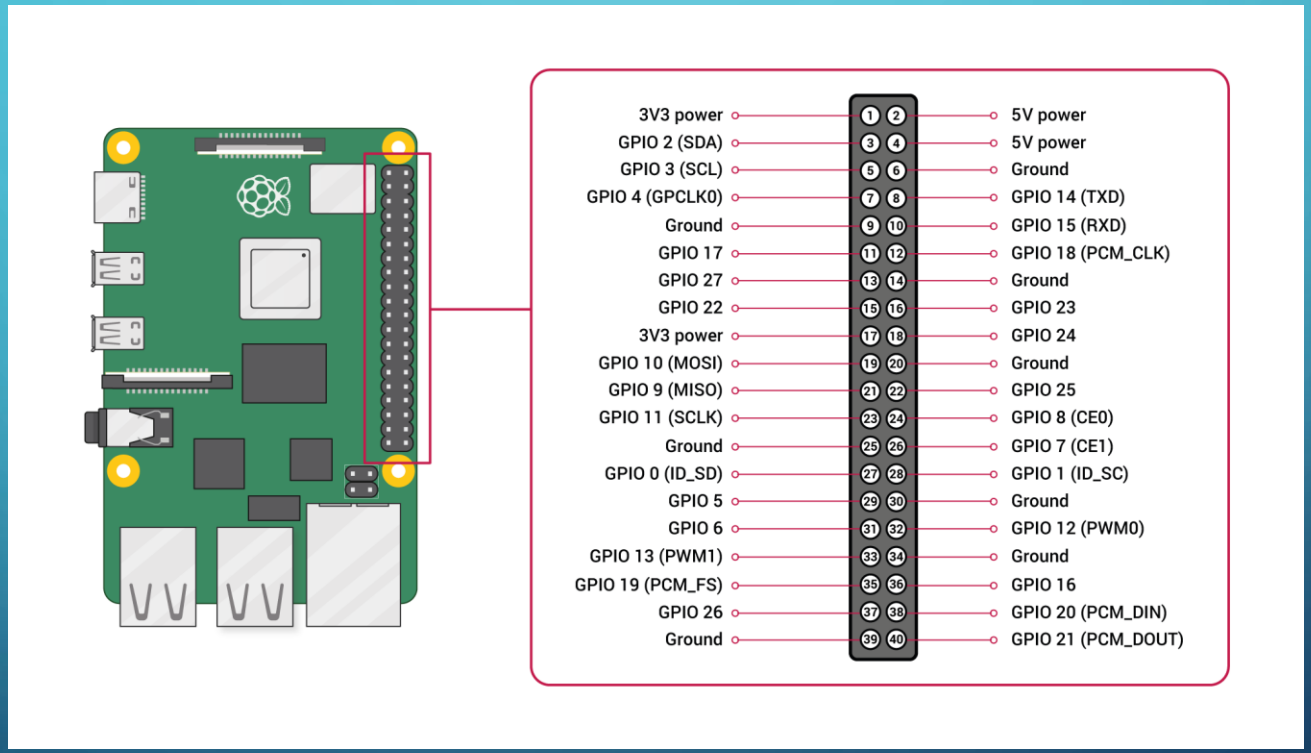
ZERO - $5



ZERO

- Single core 1 GHz
- 512 MB RAM
- Mini HDMI
- Micro SD Card
- 2 USB (one for power)
- GPIO bus

RASPBERRY PI GPIO PINOUT



SIMPLE SETUP

- USB Keyboard / Mouse
- HDMI Display
- Alternatively can access remotely via SSH (command line) or RealVNC (graphical). RaspiOS includes the RealVNC server. The client is free for home use.
- The Pi Zero can create a network over a USB connections.
- The other Pi's connect to your router over Ethernet.

RASPBERRY PI 400

RASPBERRY PI 400

4 GB Model 4B built into a keyboard

MAIN OPERATING SYSTEM LINUX

- RaspiOS (DEBIAN)

SETTING UP

The Operating System, user programs and data are stored on a MicroSD card.

To set things up, download a SD card image to another computer, use some software to flash the image to the SD card (don't just copy it).

DESKTOP COMPUTER REPLACEMENT?

You can run a desktop GUI on even the $5 Pi Zero, but expect to spend a lot of time waiting.

The 4B (and even the 3B) have acceptable response times to use as a low-end desktop

SERVER

- VPN
- NAS
- Video Server
- Web Server
- DVSwitch (DStar – Fusion – DMR)
- Build-a-Pi (KM4ACK)

GPIO BUS

- Pins for external interfacing similar to Arduino
- Digital I/O
- PWM
- SPI
- I2C
- Serial

SOFTWARE INSTALLATION

Download a SD Card image and flash a SD card

- Bare bones Linux install with or without a GUI
- You can add additional Linux software to do what you need. There are lots of tutorials online.
- Alternatively, you can download and install a pre-made image that has all the needed software for a particular purpose installed and configured. A drawback is that the configuration may break the Linux automatic update process

HATS

Similar to Arduino Shields. They provide prebuilt interface hardware.

MFJ-1234 RIGPI

RIGPI KEYER BOARD

RIGPI AUDIO BOARD

RIGPI REMOTE SOFTWARE (WEB BASED)

KM4ACK BUILD-A-PI

Pre configured with Ham Radio Software

- WSJT-X
- FLDigi
- PAT Winlink
- ARDOP
- Direwolf
- Chirp
- GPS
- and more

PROGRAMMING

As a Linux computer, Pi's can be programmed using other languages available on Linux:

- Python
- C/C++
- Perl
- and others

PROGRAMMING

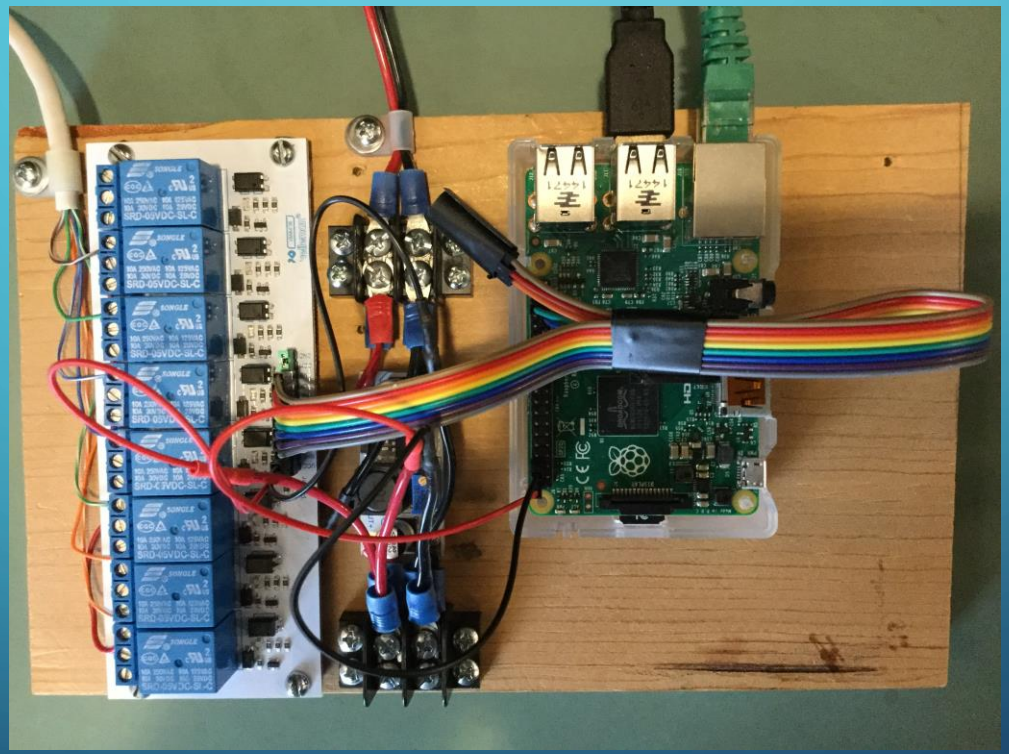
Libraries are available to access the lower level hardware interfaces.

REMOTE USB SERVER

Allows access to USB devices over a network

See my article in the July 2020 QST

REMOTE ANTENNA SWITCH CONTROLLER USB SERVER



LEARNING / EXPERIMENTATION

- Great platform for learning Linux
- When you screw things up, just reflash

GPIO PINS CAN ONLY SOURCE OR SINK A FEW MILLIAMPS

- Need external relays or transistors