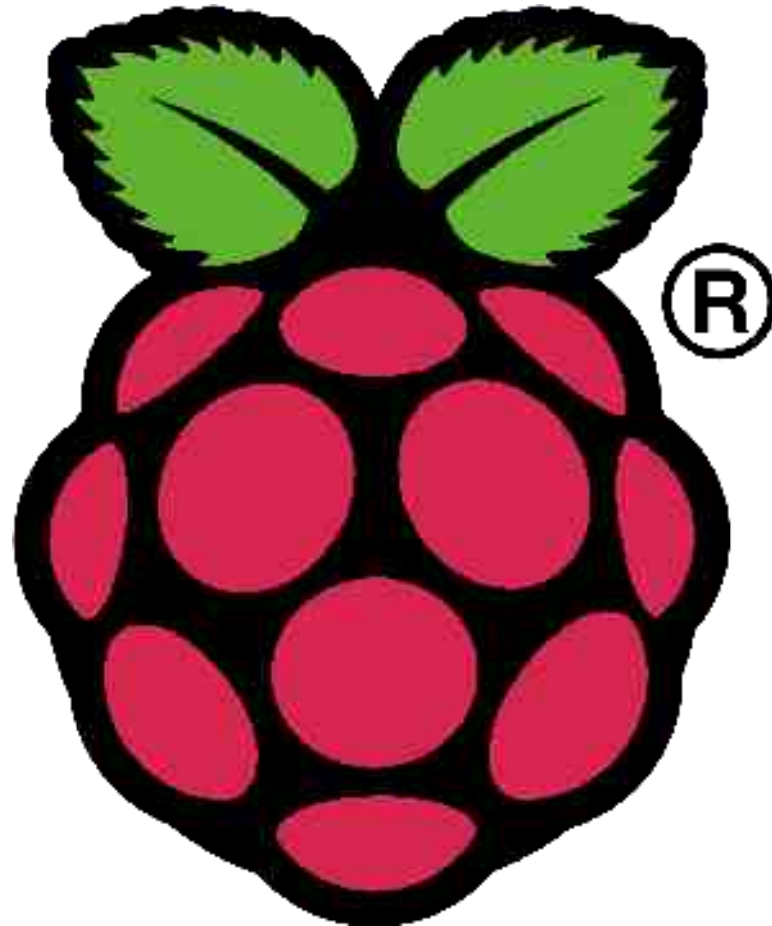


Raspberry Pi OARC Presentation



What is a Raspberry Pi?

- Single-board computer
- Uses a 32-bit ARM processor
- Developed as an educational tool
- Runs various flavors of Linux (and others)
- “Pi” name comes from Python language

Versions

Model A



- 1 USB Port
- No Ethernet
- 256 MB RAM
- \$25

Model B



- 2 USB Ports
- 10/100 Ethernet
- 512 MB RAM
- \$35

Common Specifications

- 700 MHz ARM processor
- 250 MHz GPU
- HDMI and composite video out
- 3.5mm stereo audio out
- Card slot for SD, SDHC, SDXC storage
- 5V power input via micro USB or hub
- GPIO, UART, I²C, SPI

Where does it fit in?

**Microcontrollers,
etc.**

PIC



Image courtesy David Henry

**Single board
computers**

Raspberry Pi



Image courtesy Wikimedia Commons
user cowjuice

**Mobile phones,
tablets**



Image © User:Mono / Wikimedia
Commons, a sister project of Wikipedia

**Conventional
computers**



Image courtesy Jeremy Banks

Arduino, Atmel



BeagleBone Black



Image courtesy elinux.org

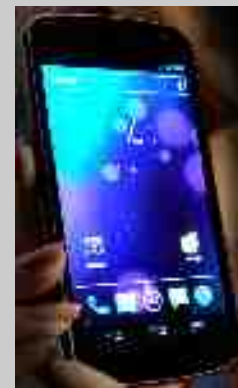


Image courtesy Wikimedia Commons
user Laihiu

Getting Started

Required Hardware

- Raspberry Pi
- SD card (4GB or larger recommended)
- Power supply (5V Micro USB)
- Monitor (composite supported, HDMI recommended)
- USB keyboard
- USB mouse

Getting Started

Optional Hardware

- *Powered* USB hub
- USB sound device
- USB wireless network adapter
- HDMI to DVI adapter
or
HDMI to VGA adapter
- Camera module
- Case

Getting Started Software

- raspberrypi.org/downloads
- New Out of Box Software (NOOBS)
 - Install: Copy files to FAT-formatted card
- Raspbian, Pidora, Arch Linux, etc.
 - Install: Write disk image to card bit-for-bit

Linux Basics 1

- Available in many flavors (called “distributions”)
- Primarily licensed under GNU GPL
- Similar to Unix
- Both for-pay and free distributions exist
- Multi-user environment

Linux Basics 2

- No drive letters
- Filesystem root is `/`.
- Users' files are in `/home/username`.
- Drives are usually in `/media` or `/mnt`.
- Administrator user is called “root”
- Root user is usually disabled.
- Root privileges are accessible through “sudo” command.

Linux Basics 3

- Optional software is stored online in repositories.
- Install software with command
`sudo apt-get install packagename`
(This varies by distribution.)
- Enable Windows file and printer sharing with Samba (SMB) and CIFS.

My Project

Simple HF signal generator
using an AD9850 DDS board
controlled by a Raspberry Pi

Credit:

“A Slice of Raspberry Pi” (asliceofraspberrypi.blogspot.com)

“m0xpd's 'Shack Nasties'” (m0xpd.blogspot.com)

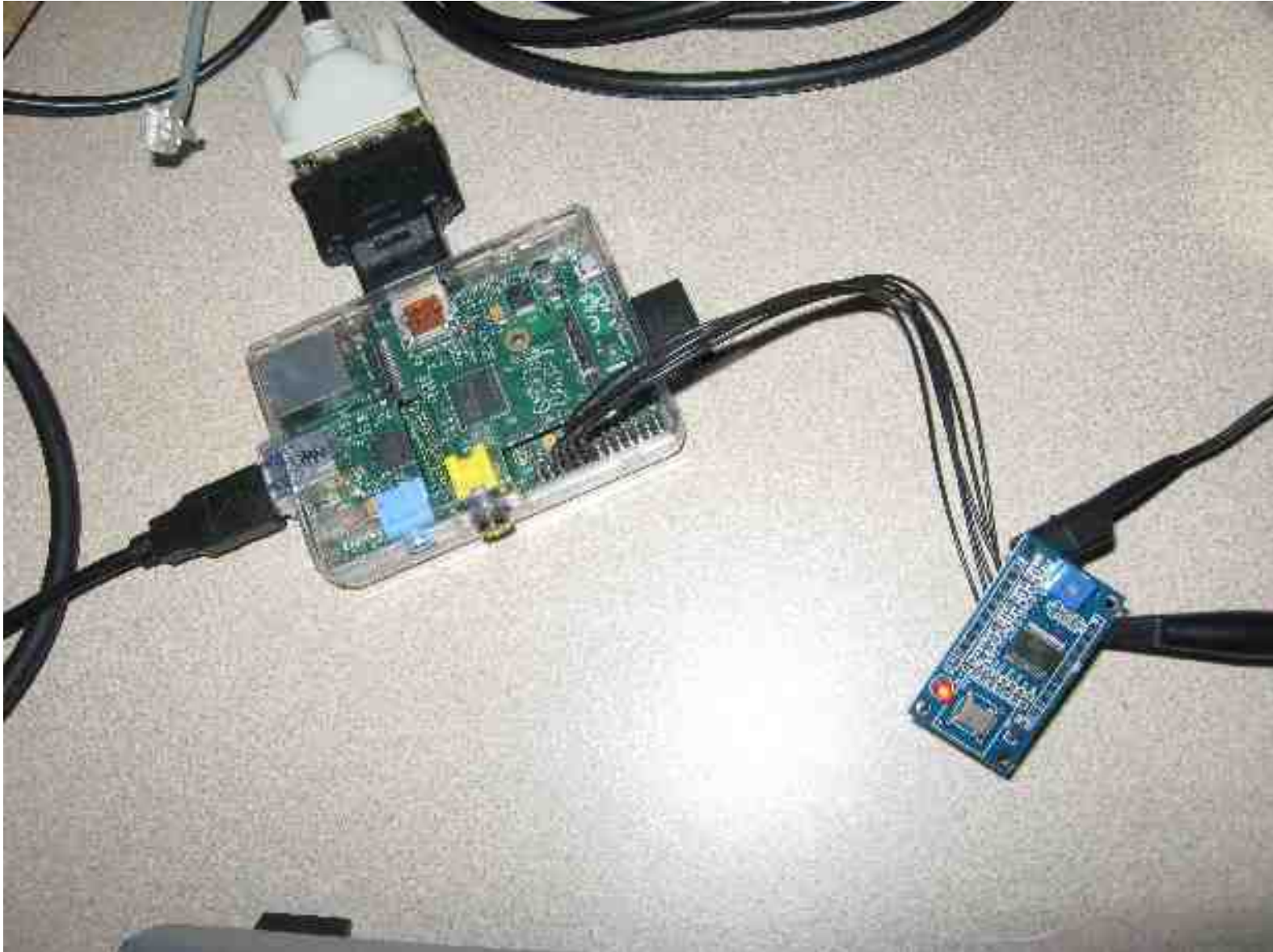
Necessary Hardware

- Raspberry Pi and accessories
- AD9850 HF DDS
(available at low cost on eBay)
- Female jumper wires

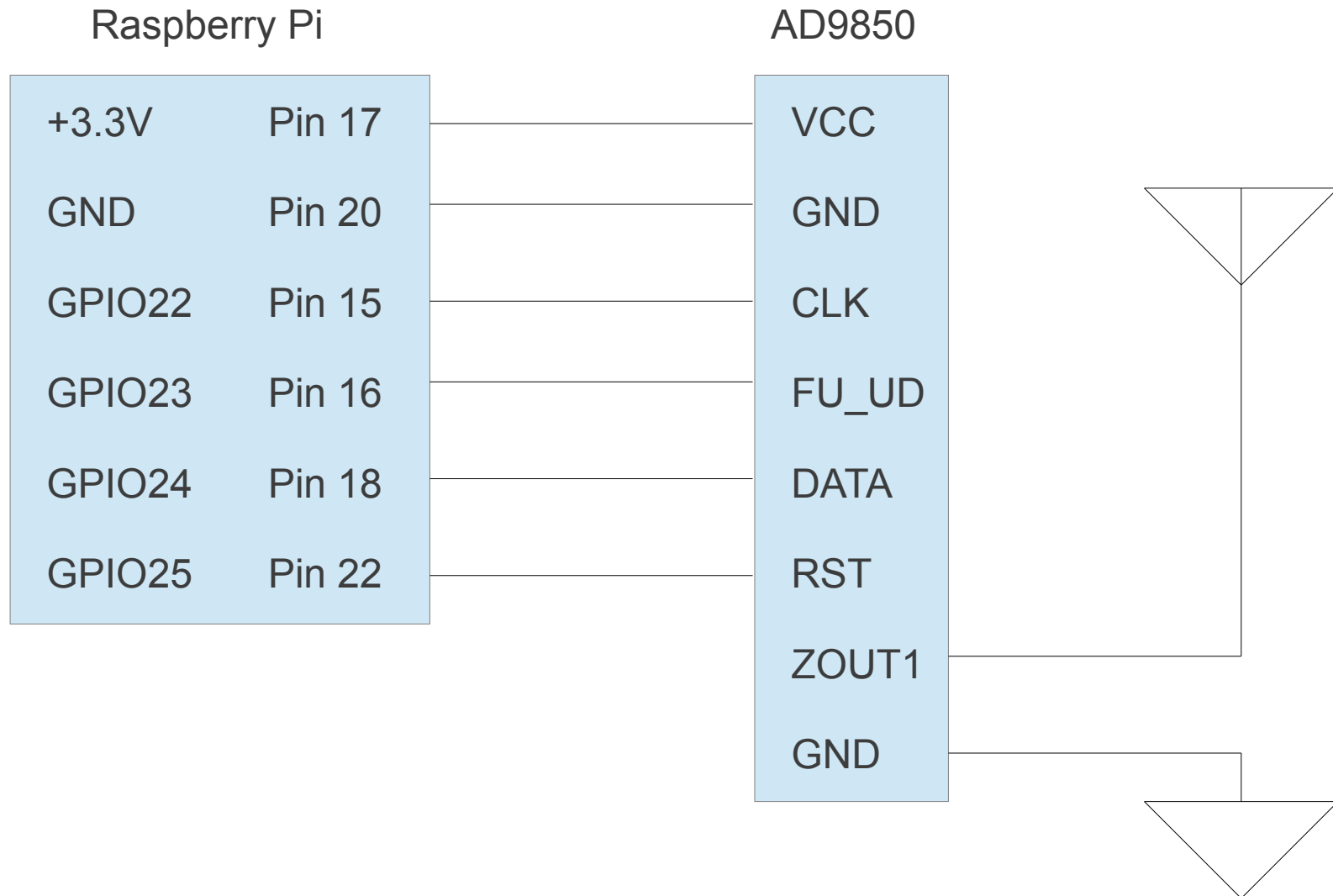
AD9850 DDS

- Available for \$5 to \$10 (shipped) on eBay
- Accepts 5V or 3.3V
- Accepts the frequency on serial or parallel pins
- Produces two sine-wave and two square-wave outputs

Hardware Setup



Wiring



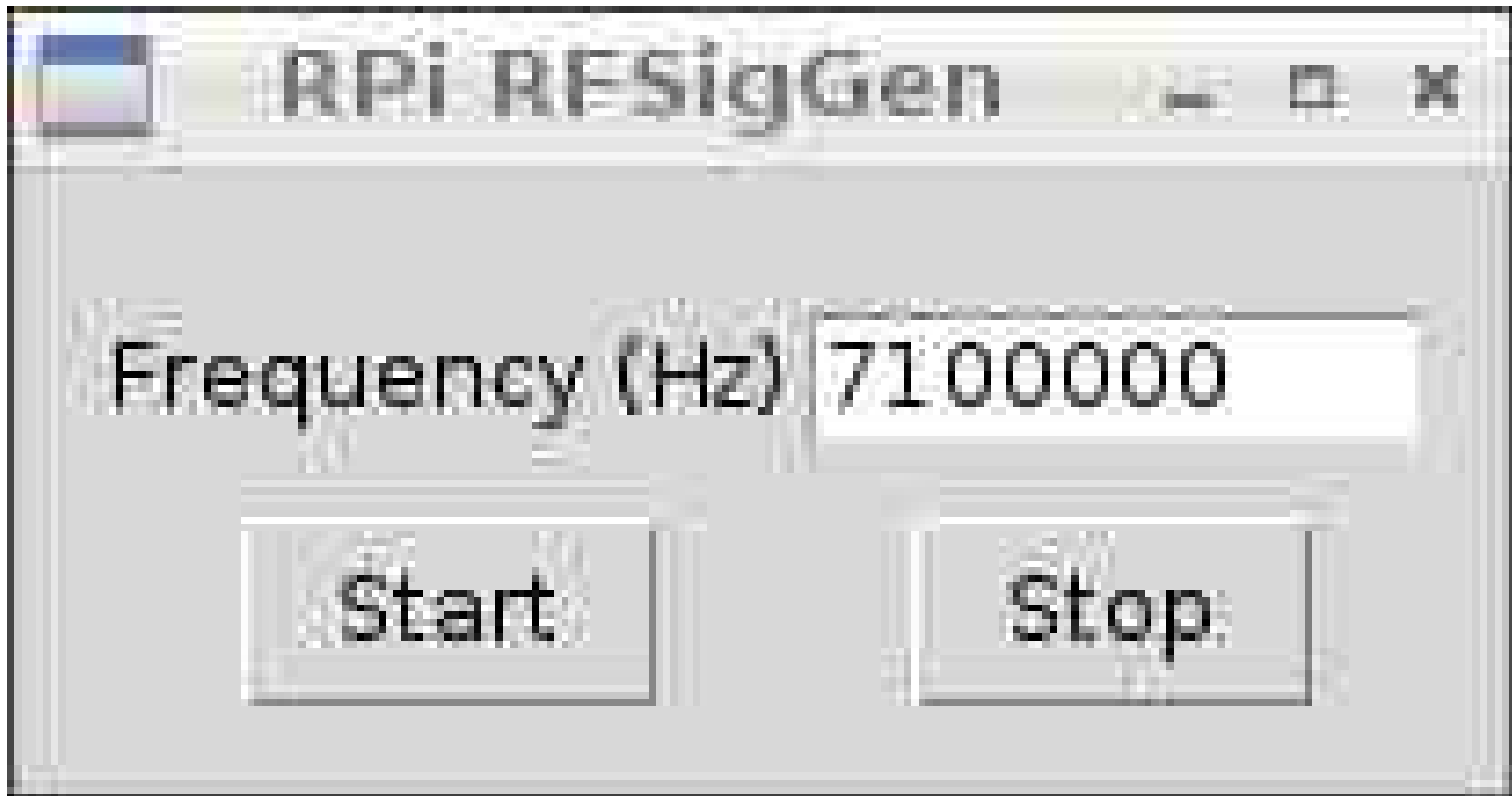
Software Setup

- Rpi_RFSigGen project on github.com/mi0iou/
- Unzip to location on drive
- Issue commands:

```
cd /home/user/your_location
```

```
sudo python3 rpi_rfsiggen.py
```

User Interface



Frequency Counter



Future Projects

- Buffer amplifier to drive tube transmitter from AD9850
- PIC-based control of the AD9850
- 2m FM transmitter
- WSPR transmitter
- Asterisk-based PBX

Other Resources

- Raspberry Pi (raspberrypi.org)
- Amateur Logic Podcast (amateurlogic.tv)
- Adafruit Industries (adafruit.com)
- Element 14 (element14.com)
- SparkFun Electronics (sparkfun.com)
- The MagPi Magazine (themagpi.com)