Ham 74 – Raspberry Pi OS & RTL-SDR Dongle
Dr. Marc © 221118

1. *Introduction.* These instructions are for building a Software Defined Radio (SDR) with the RTL dongle.

    a. The instructions are for the Raspberry Pi micro-computer board. A similar project can be built on a PC.

    b. What a cool way to learn Pi & ham skills. The instructions were appropriate at the time. However, Raspberry Pi is constantly upgrading the hardware, firmware, and software. Make appropriate changes as necessary.

    c. Shortages have made the Pi very expensive. The same models I paid $35 are now $170. Knock-offs may work.

    d. Remaining parts are about $50, depending on model.

2. *Parts Required*:

    a. Raspberry Pi version 2B or newer.

    b. Power adapter, 5.1 V, 2.5 A

    c. SanDisk µSD card, class 10, 16 GB is minimum.

    d. RTL-SDR Dongle with antenna. https://www.rtl-sdr.com/

    e. HDMI monitor, TV, or Pi display

    f. PC to program Pi initially.

3. *Initialize and install Raspberry OS*.

    a. Download Raspberry Pi Imager to PC. https://www.raspberrypi.org/downloads/.

    b. Insert micro-SD card into programming slot of PC.

    c. Run imager. Select OS: Raspberry Pi OS Desktop Full

    d. Select SD Card to overwrite. Write takes about 11 minutes. Verify takes equal time.

    e. Connect display to Raspberry Pi. Connect power wires to display.

    f. Connect mouse and keyboard.

    g. Remove SD card from PC. Then insert SD card on Raspberry.

    h. Apply 5.1 V, 2.5 A power adapter.

    i. Follow Yellow Brick Road start up requirements.
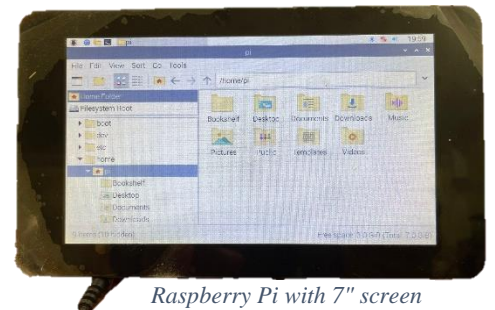
Raspberry Pi with 7" screen

4. *Now to RTL-SDR configuration*.

    a. sudo apt-get update

    b. sudo apt-get install rtl-sdr

    c. Does it work? ~$rtl_test . Returns messages that dongle is there. ^c to exit

    d. sudo apt-get install gnuradio

    e. Raspberry > Programming > GNU Radio companion

    f. sudo apt-get install gqrx-sdr

    g. Raspberry > Internet > Gqrx

    h. In configuration, select RealTek RTL2838. Other options do not play.

    i. Select frequency, mode. Push start button on upper left of window. Make gain positive.

    j. Screen is too large for the Pi 7" screen, at this time.

    k. The processor is really loaded, causing overheating. Use heatsink, which gets hot enough to burn if touched.

5. *Other projects and instructions.*
   Kenn Ranous guide: https://ranous.files.wordpress.com/2016/03/rtl-sdr4linux_quickstartv10-16.pdf.

6. This is a clever receiver that, depending on model, covers almost 0 to daylight frequencies with a waterfall display.

    a. Several low power transmitters can be built to use with this device.

    b. Numerous spin-off projects can be built on this foundation.

7. Life is good. Enjoy!