

Raspberry Pi 2 and 3 Software Installation

Download latest Raspian image from <https://www.raspberrypi.org/downloads/raspbian/>

Unzip image

Copy image to memory card

Boot the RPi with it attached to your network, it will use DHCP to get an IP address.

Note that the display will work but will not be the correct size and the touch screen will not be working.

Connect to the RPi using ssh from another system. You can do all this on the RPi with a keyboard and mouse attached, but I find it is easier to ssh. (ssh [pi@](#)<IP address>).

Expand the root file system by running the command and selecting the option to expand the root-fs:

```
sudo raspi-config
```

select option to reboot the system and when rebooted connect using ssh again.

Update the system:

```
sudo apt-get update && sudo apt-get dist-upgrade && sudo apt-get install -f
```

If you are using the Raspberry Pi LCD touch screen, it should be fully working at this point.

Run the following commands to install FFTW:

```
sudo apt-get install libfftw3-dev
```

Run the following commands to download and install the GPIO package:

```
wget abyz.co.uk/rpi/pigpio/pigpio.zip
unzip pigpio.zip
cd PIGPIO
make
sudo make install
cd
```

If you are using the 5 inch Waveshare LCD touch screen the following instructions will install the required software otherwise skip to “To disable screen blanking”.

```
wget www.waveshare.com/w/upload/9/9d/LCD-show-151020.tar.gz
tar xvf LCD-show-151020.tar.gz
cd LCD-show
sudo dpkg -i xinput-calibrator_0.7.5-1_armhf.deb
sudo ./LCD5-show
```

The system will reboot when the above command has completed and the 5 inch display and touch screen should be working.

On the 5 display select Menu ->Preferences->Calibrate Touchscreen

follow the instructions and when completed a terminal will be displayed showing the configuration settings. Just X out of the terminal.

ssh into the Rpi again.

To disable screen blanking

```
sudo nano /etc/X11/xinit/xserverrc
```

find the line that contains:

```
exec /usr/bin/X -nolisten tcp "$@"
```

add "-s 0 -dpms" to the line

```
exec /usr/bin/X -s 0 -dpms -nolisten tcp "$@"
```

save the file and restart the Rpi.

To over clock the processor on the RPi 2 (not needed on Rpi 3) :

as root, edit the file /boot/config.txt:

```
sudo nano /boot/config.txt
```

find the lines that define the clock speeds and change them to:

```
arm_freq=1000  
core_freq=500  
sdram_freq=500  
over_voltage=2
```

save the file (Ctrl-X and then Y).

reboot the Rpi:

```
sudo reboot now
```

The system is now ready to install wdps and pihpsdr.

Now ssh into the Rpi again, or open a terminal window on the RPi.

In the home directory (/home/pi) download the binary package:

```
wget https://github.com/g0orx/pihpsdr/raw/master/release/pihpsdr.tar
```

The /home/pi directory should now contain the pihpsdr.tar file.

Extract the files (will create directory pihpsdr):

```
tar xvf pihpsdr.tar
```

Copy libwdsp.so to /usr/local/lib:

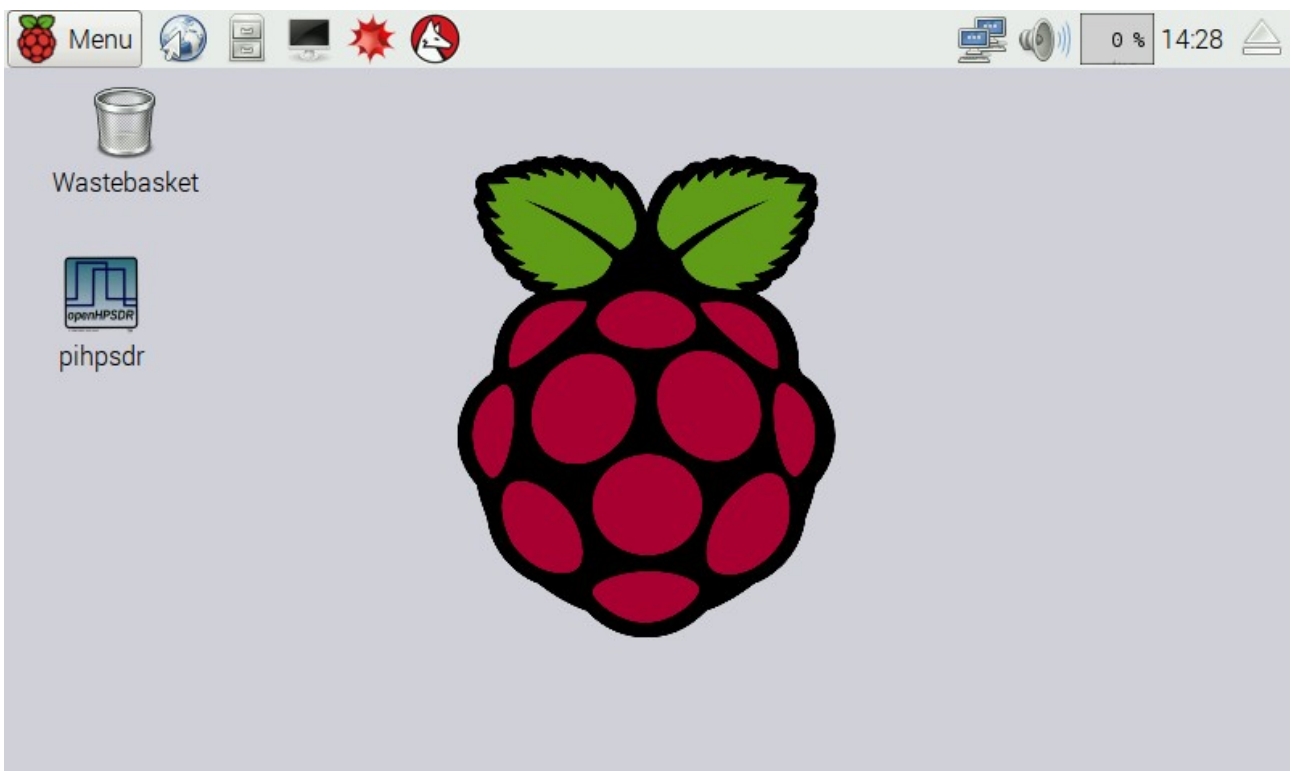
```
cd pihpsdr  
sudo mv libwdsp.so /usr/local/lib
```

Rebuild the library cache:

```
sudo ldconfig
```

Copy desktop shortcut:

```
cp pihpsdr.desktop /home/pi/Desktop
```



You are now ready to run the application by double tapping (clicking) on the desktop icon.

If you want to set up the system so that pihpsdr starts automatically when the system is booted do the following:

```
nano ~/.config/lxsession/LXDE-pi/autostart
```

add the following line to the end of the file:

```
@/home/pi/pihpsdr/start_pihpsdr.sh
```

and save the file.

Next time you boot the system it will start pihpsdr.

For Development:

```
sudo apt-get install libgtk-3-dev
```

Raspberry Pi 2 Rotary Encoders

Currently pihpsdr supports a high resolution optical rotary encoder for tuning and 2 low resolution encoders with a built in push switch for AF Gain/AGC Gain and RF Drive/RF Tune Drive.

The high resolution encoder is a 600 ppr optical encoder, and the low resolution encoders are 24 ppr (KY-040) with built in push switch.

Connection to the Raspberry Pi 2:

VFO: 600 ppr optical encoder.

Green – GPIO-17 (pin 11)
White – GPIO-18 (pin 12)
Black - Ground
Red - +3.3v

AF Gain/Mic Gain: 24 ppr encoder (KY-040):

CLK – GPIO-20 (pin 38)
DAT – GPIO-26 (pin 37)
SW – GPIO-25 (pin 22) (LOCK)
+ - +3.3v
GND - Ground

RF Drive/Tune Drive: 24 ppr encoder (KY-040):

CLK – GPIO-16 (pin 36)
DAT – GPIO-19 (pin 35)
SW – GPIO-08 (pin 24)
+ - +3.3v
GND - Ground

AGC: 24 ppr encoder (KY-040):

CLK – GPIO-04 (pin 7)
DAT – GPIO-21 (pin 40)
SW – GPIO-07 (pin 26)
+ - +3.3v
GND - Ground

All the following SPST momentary push to make buttons have one side connected to ground:

Band Up/Down - GPIO-13 (pin 33)
Band Stack Up/Down - GPIO-12 (pin 32)
Mode Up/Down - GPIO-06 (pin 31)
Filter Up/Down - GPIO-05 (pin 29)
Noise Up/Down - GPIO-24 (pin 18)
AGC Up/Down - GPIO-23 (pin 16)

MOX/Tune	- GPIO-27 (pin 13)
Function	- GPIO-22 (pin 15)