

# ADALM Pluto SDR

## SDR Active Learning Module



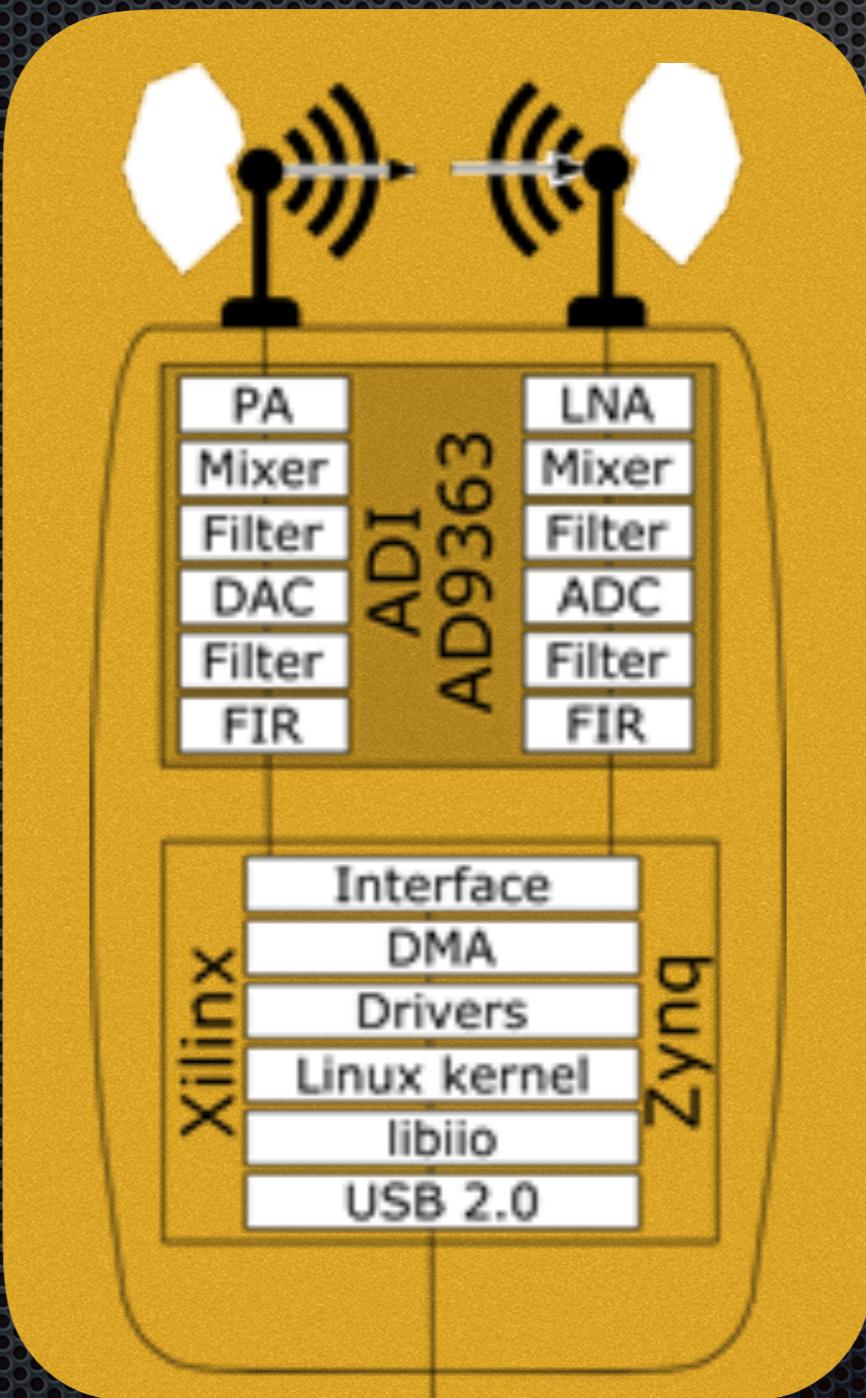
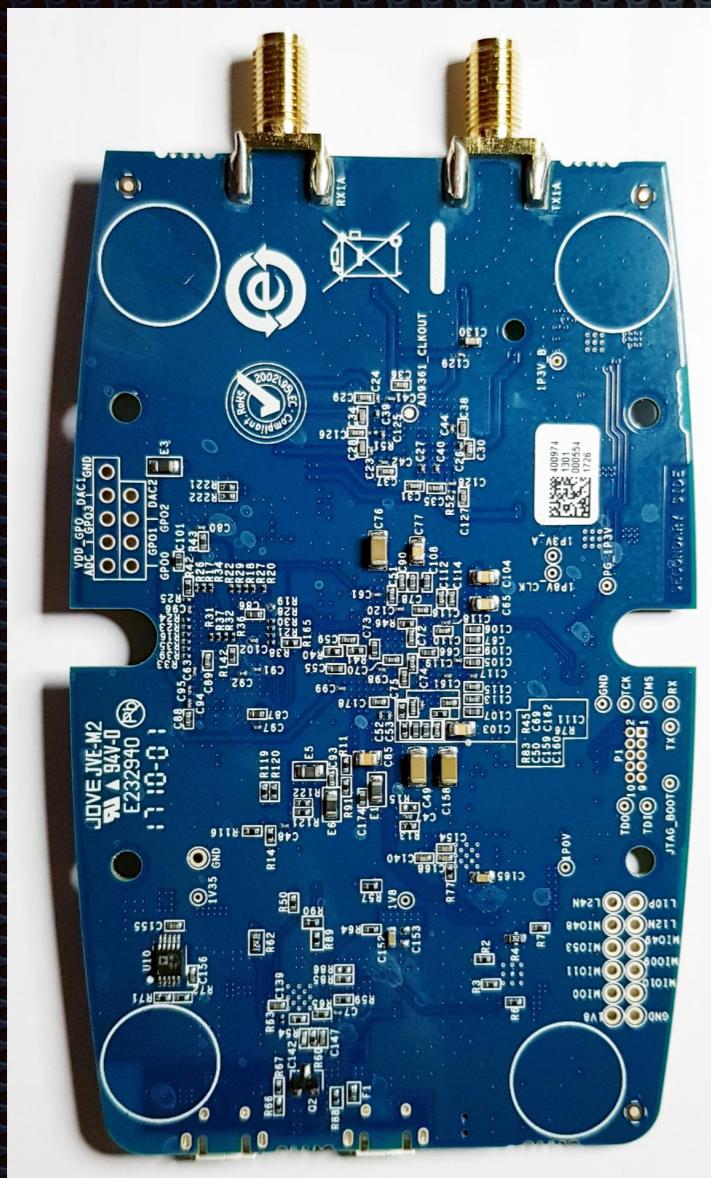
Graham Cottew  
[github.com/zendata/SDR](https://github.com/zendata/SDR)

@zenmountainman

# the essential features

- Full Duplex
- 325 - 3800 MHz (more about this later)
- 12 bit ADC
- 61.44 MSPS sampling rate
- 20MHz bandwidth
- US\$99 if you are lucky

# Block functionality



AD9363  
2 x 2 TXCR

ZYNQ XC7Z010  
FPGA, CPU, ADC

# Let's hack it :)

- The AD9363 can be convinced it is an AD9364

From your favourite serial application, just open a serial connection to the PlutoSDR.  
The username is root and the password is analog.

This will be the default (based on the AD9363):

```
# fw_printenv attr_name  
## Error: "attr_name" not defined  
# fw_printenv attr_val  
## Error: "attr_val" not defined  
#
```

To change things to the AD9364 configuration:

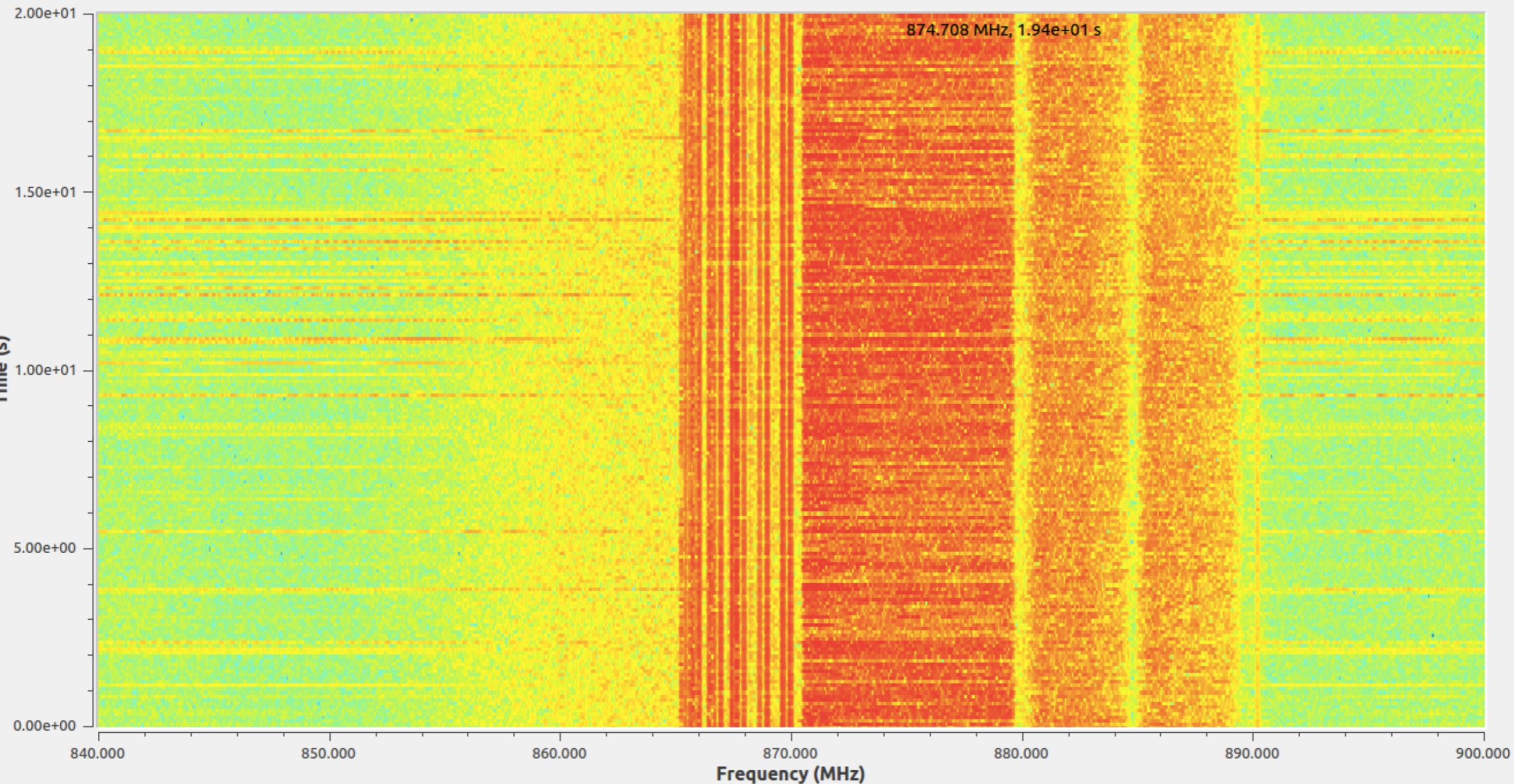
```
# fw_setenv attr_name compatible  
# fw_setenv attr_val "ad9364"  
# pluto_reboot reset
```

- Coverage now 70MHz to 6GHz and max bandwidth about 60 MHz

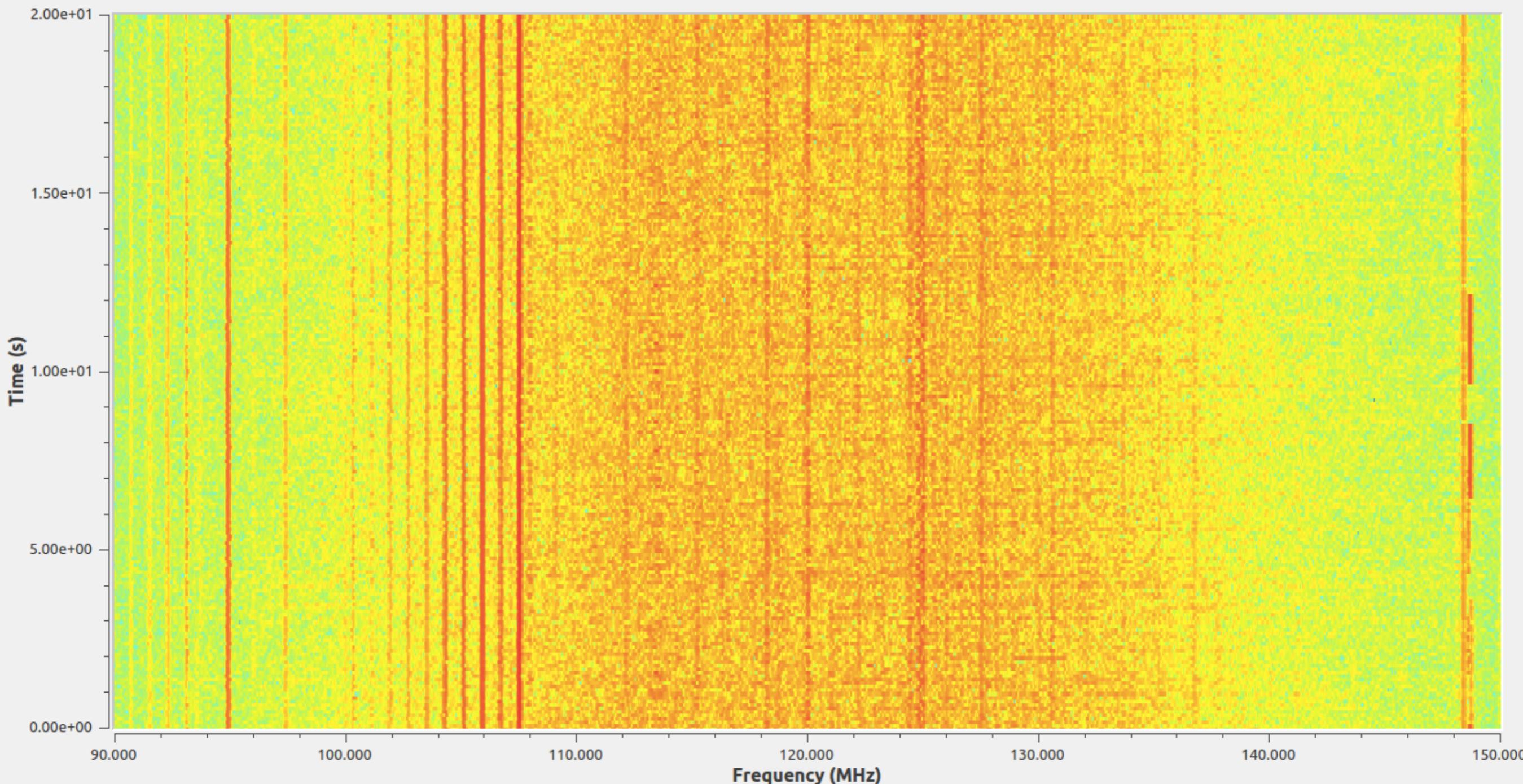
# The downsides

- Plastic case and no shielding
- No TXCO so expect about +/- 25 ppm
- Limited filtering and selectivity
- Primarily a learning device
- Documentation is early days - like LimeSDR

# 60MHz bandwidth



# 60MHz bandwidth



# Software

- GNURadio & Matlab supported
- GQRX, SDR#, and others now available
- Only PYBOMBS GNURadio works for me
- Nothing working for me on Mac OS X yet
- Windows has an Software ADI IIO Oscilloscope program

# Performance

- Good sensitivity
- Wide bandwidth and Full Duplex TX/RX
- Poor out of band imaging (lack of filtering)
- IIP3 spec on AD9363 chip is only -18dDm at max gain

# Relevant links

- [https://wiki.analog.com/university/tools/pluto?force\\_rev=1](https://wiki.analog.com/university/tools/pluto?force_rev=1)
- <https://au.mathworks.com/hardware-support/adalm-pluto-radio.html>
- <https://www.gnuradio.org/blog/pybombs-the-what-the-how-and-the-why/>
- <https://wiki.analog.com/university/tools/pluto/drivers/osx>
- [https://wiki.analog.com/resources/tools-software/linux-software/iio\\_oscilloscope](https://wiki.analog.com/resources/tools-software/linux-software/iio_oscilloscope)

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