

CONCEPT

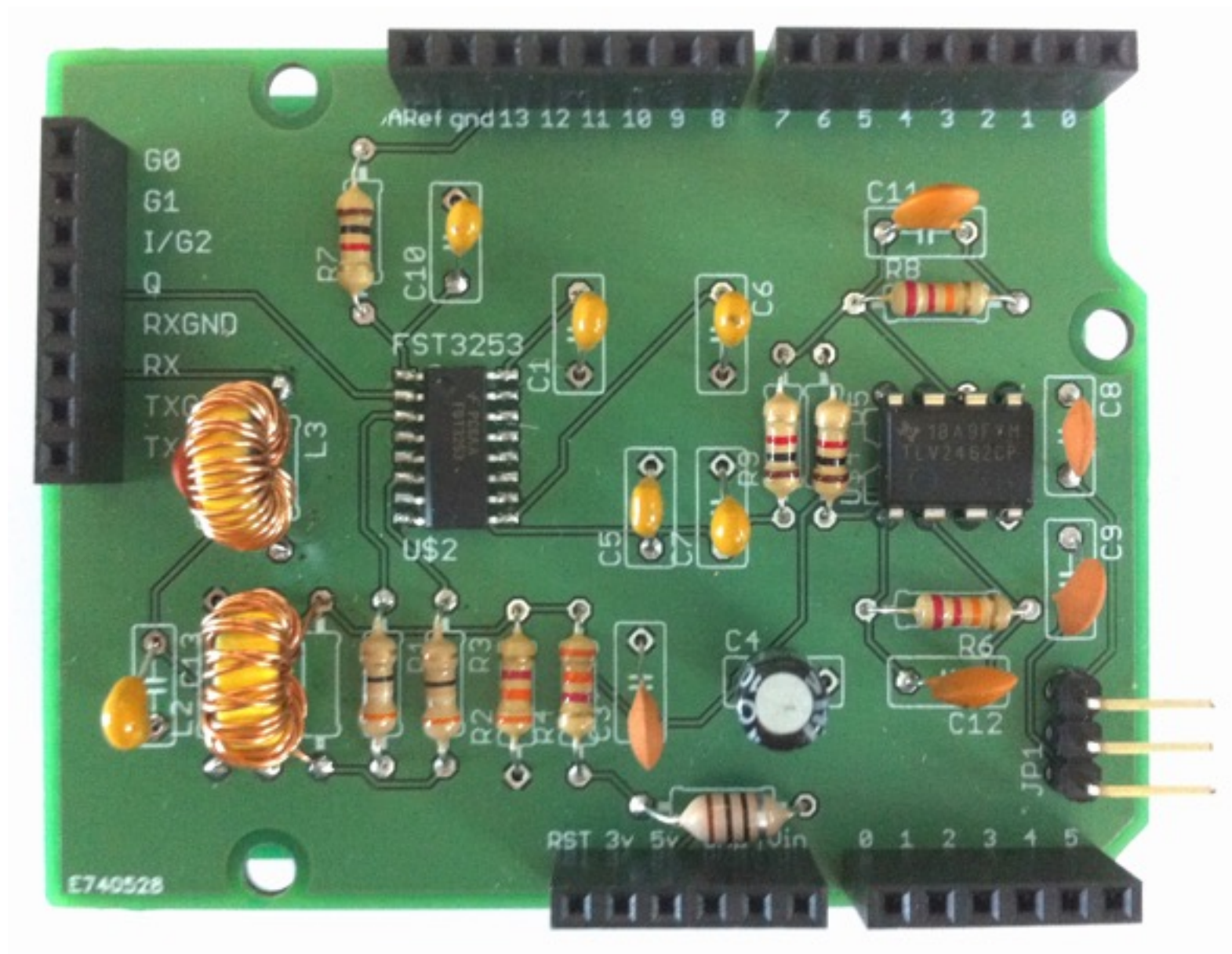
The SDRX



Last time

- We learned about the VFO_RTC_IQ kit
- We went through the assembly stages
- We tested the finished kit
- Hopefully you have made your own already?
- Any problems?



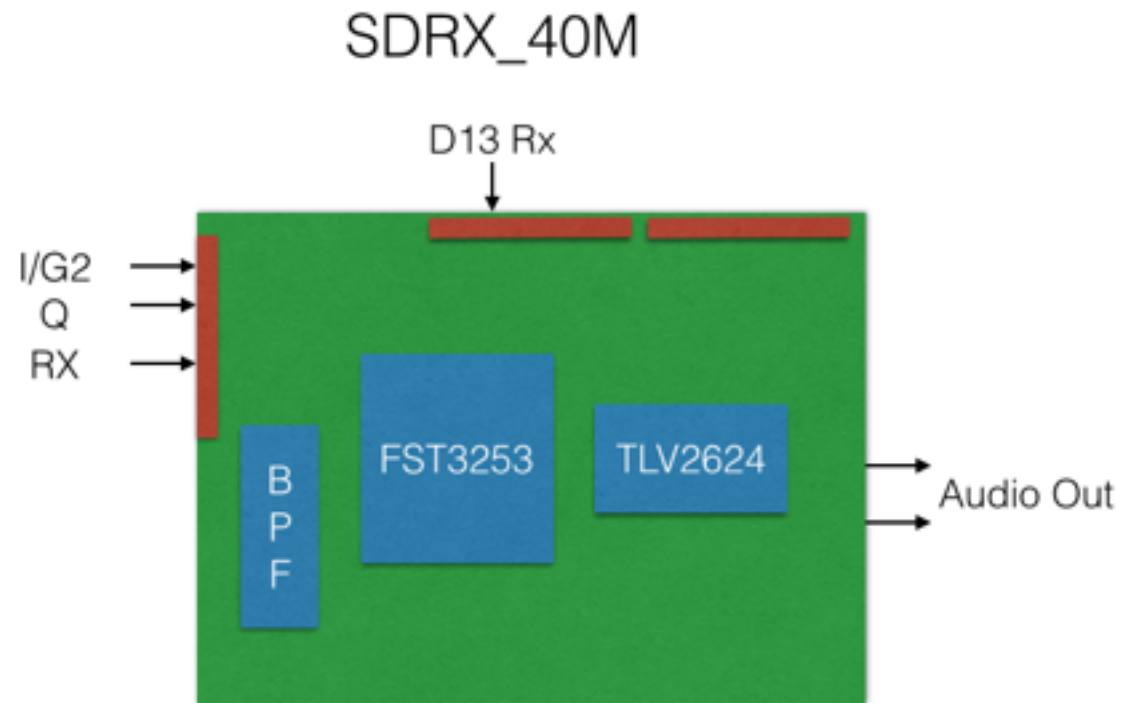


The SDRX_40M

Receiver for 40m

SDRX

- Input bandpass filter for 40m
- Filter design checked using LTSpice
- “Tayloe” N7VE, Baseband filter using FST3251 2x4 CMOS switch
- Quadrature inputs I & Q
- Dual audio amplifier outputs 0 - 96Khz “audio” signals to your PC/Mac



- Mac or PC software for
 - LSB/USB, CW, AM, FM
 - Bandwidth control
 - Notch filters
 - Waterfall display

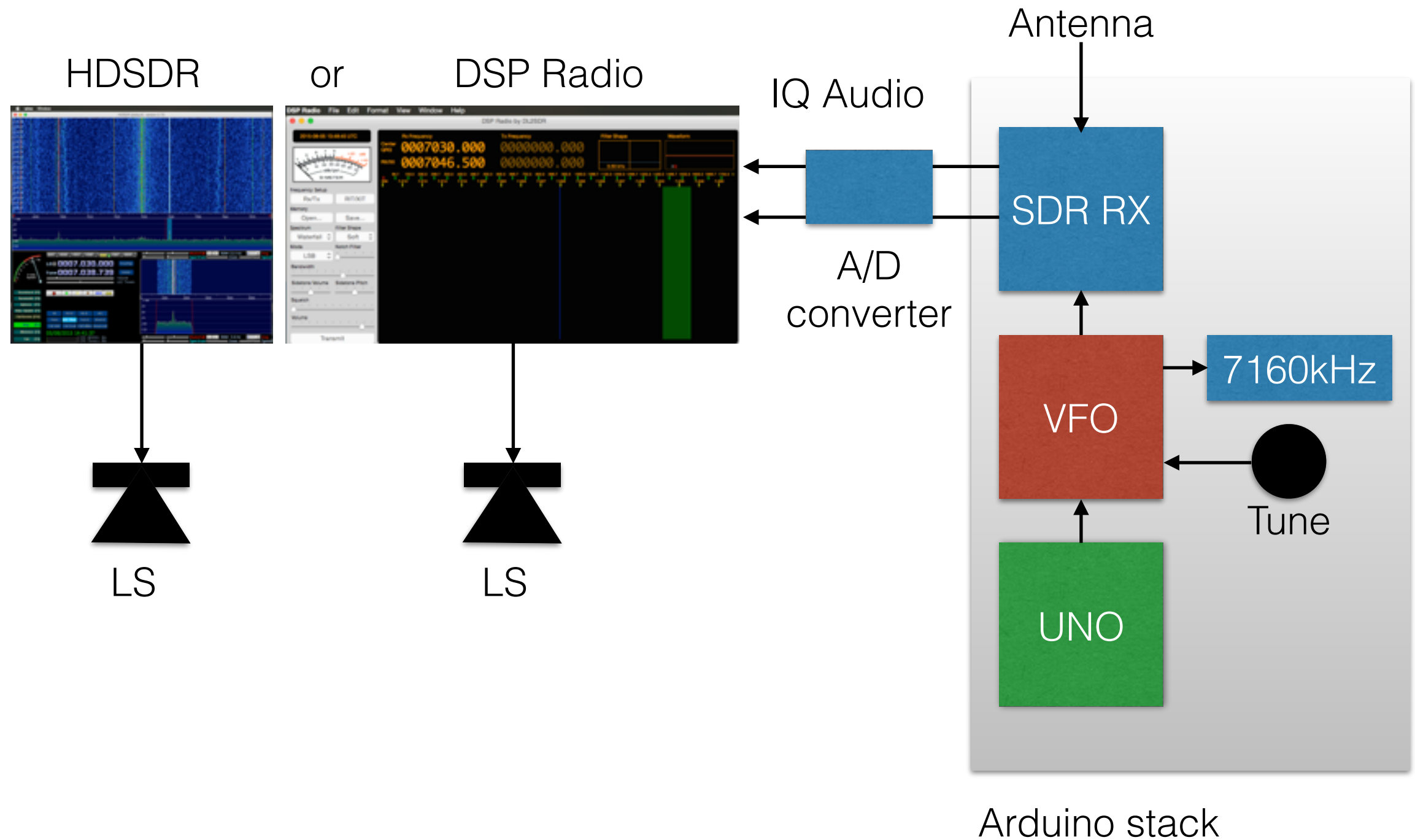


Good “sound card”

- A sound card is a D-to-A and A-to-D converter
- The best are 96kHz/16 - 24bit devices ($\pm 48\text{kHz}$ RX BW)
- If your PC does not have a good sound card, use an external USB one
- Like this product from StarTech.
Available on Amazon
- Can also be used for TX



SDR System



Install software

HDSDR



www.hdsdr.de

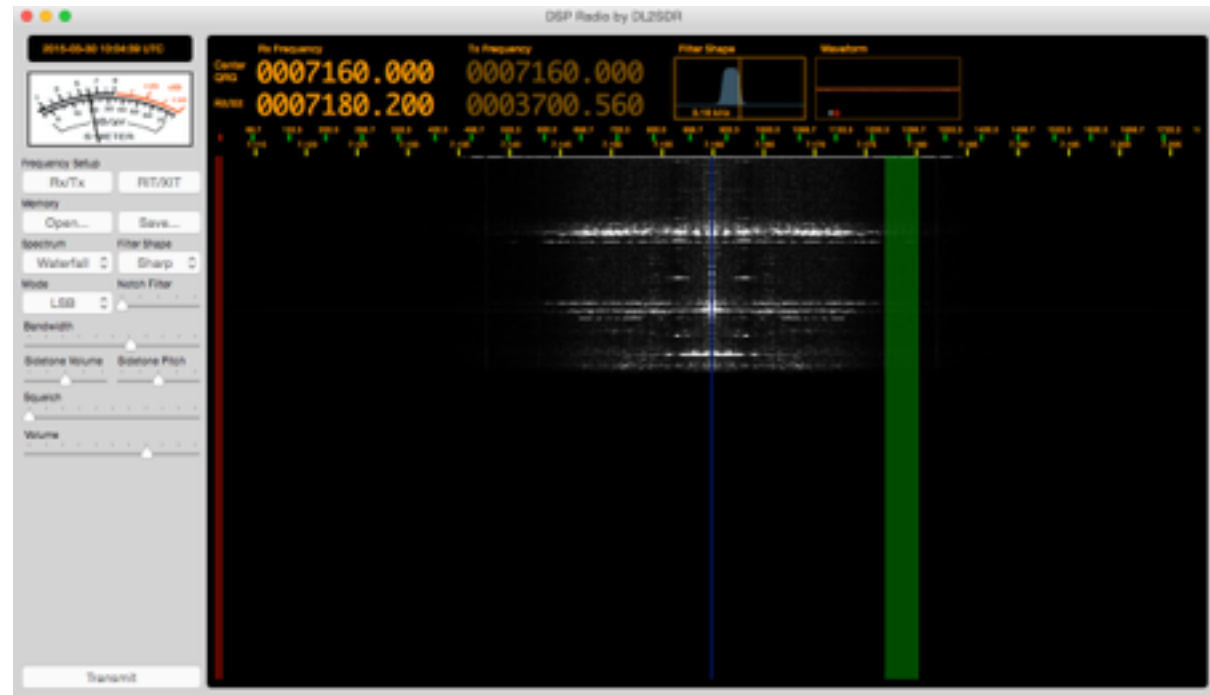
For setup help go to:

[sites.google.com/site/g4zfqradio/
installing-and-using-hdsdr](http://sites.google.com/site/g4zfqradio/installing-and-using-hdsdr)



www.telepostinc.com/hdsdr.html

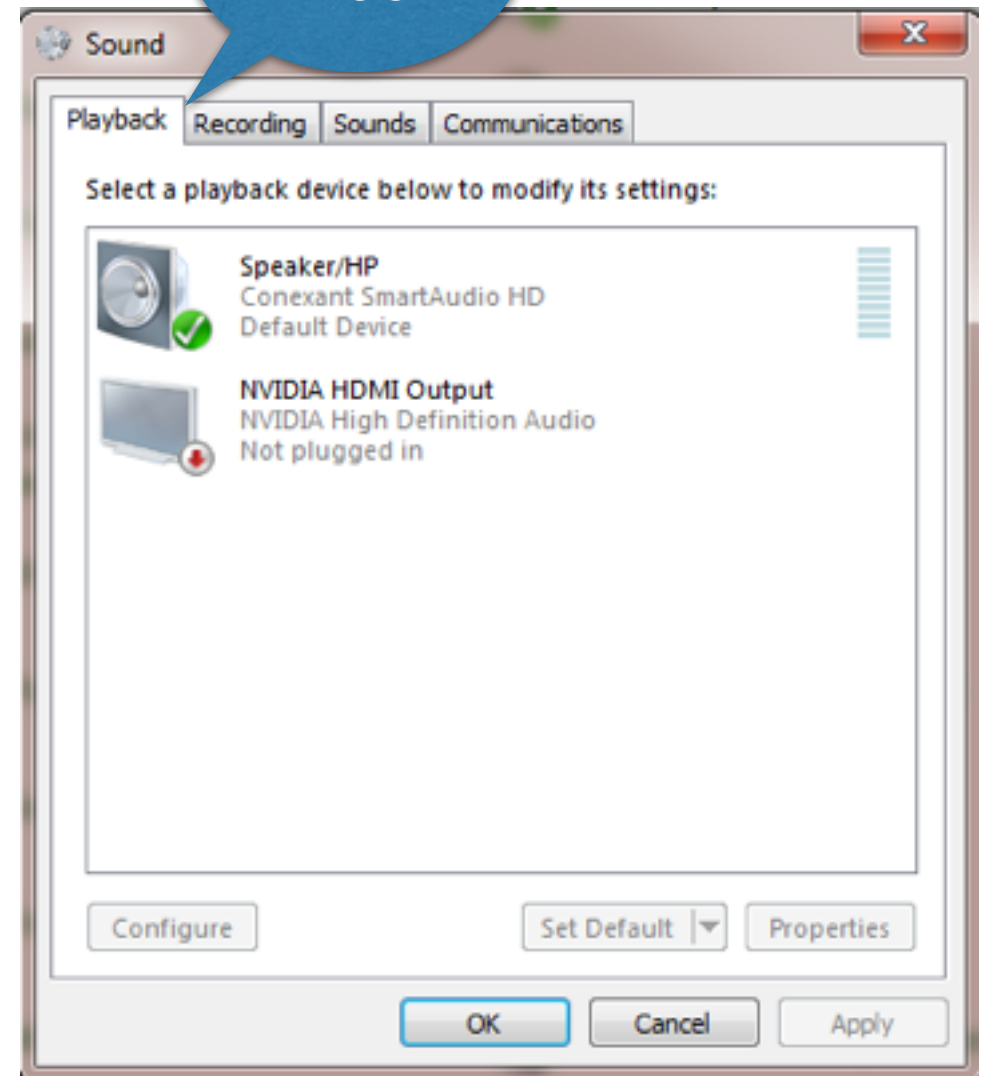
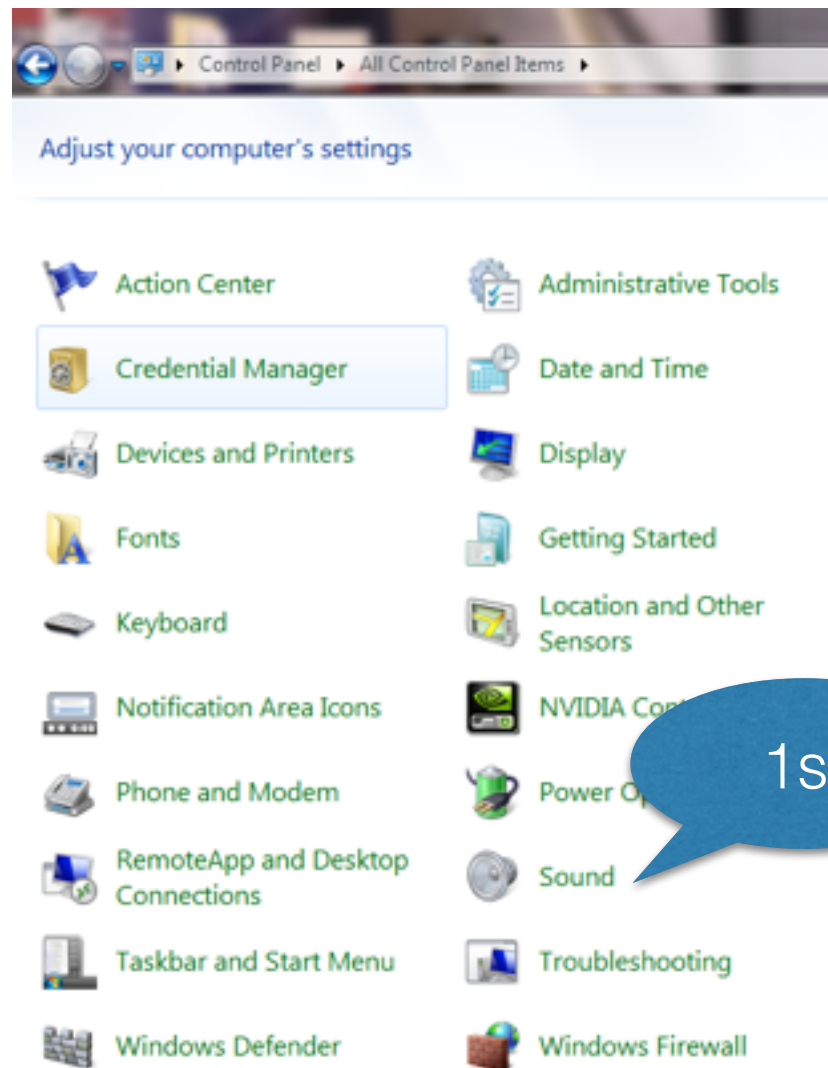
DSP Radio (Mac only)



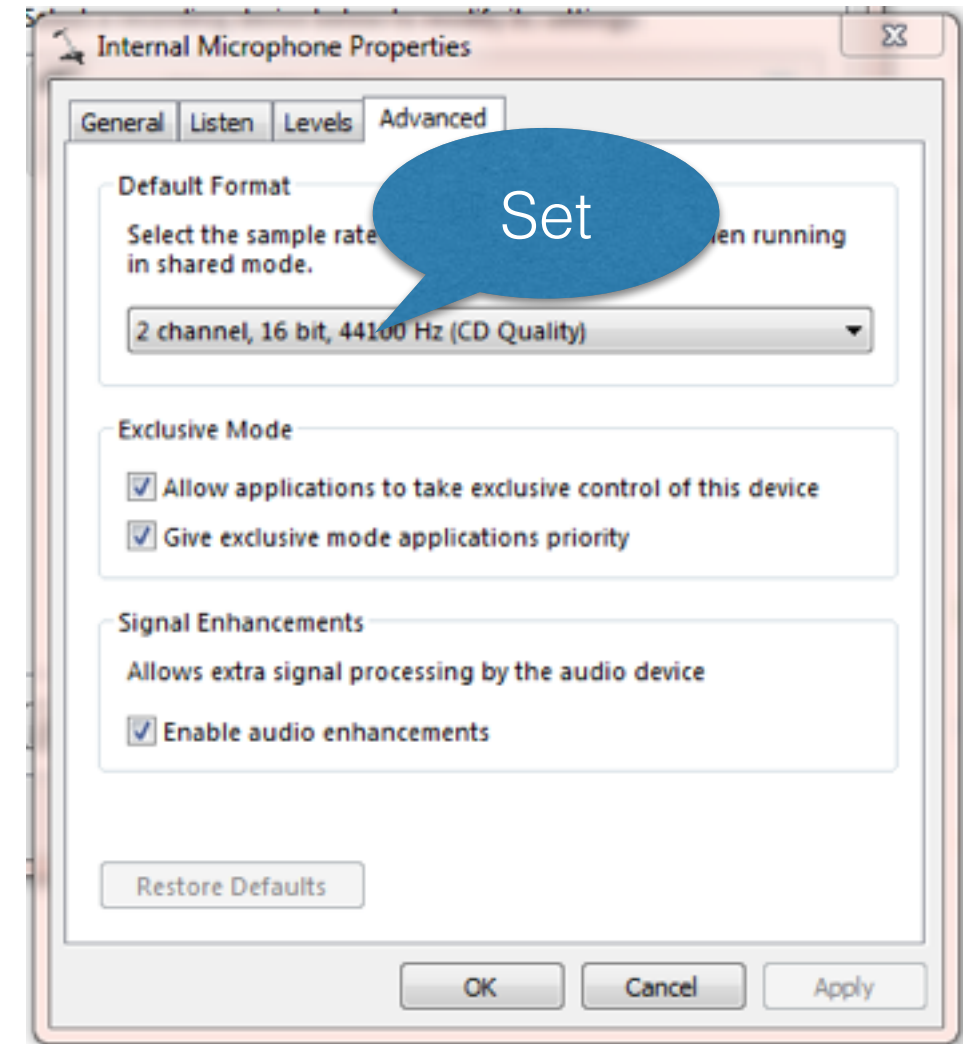
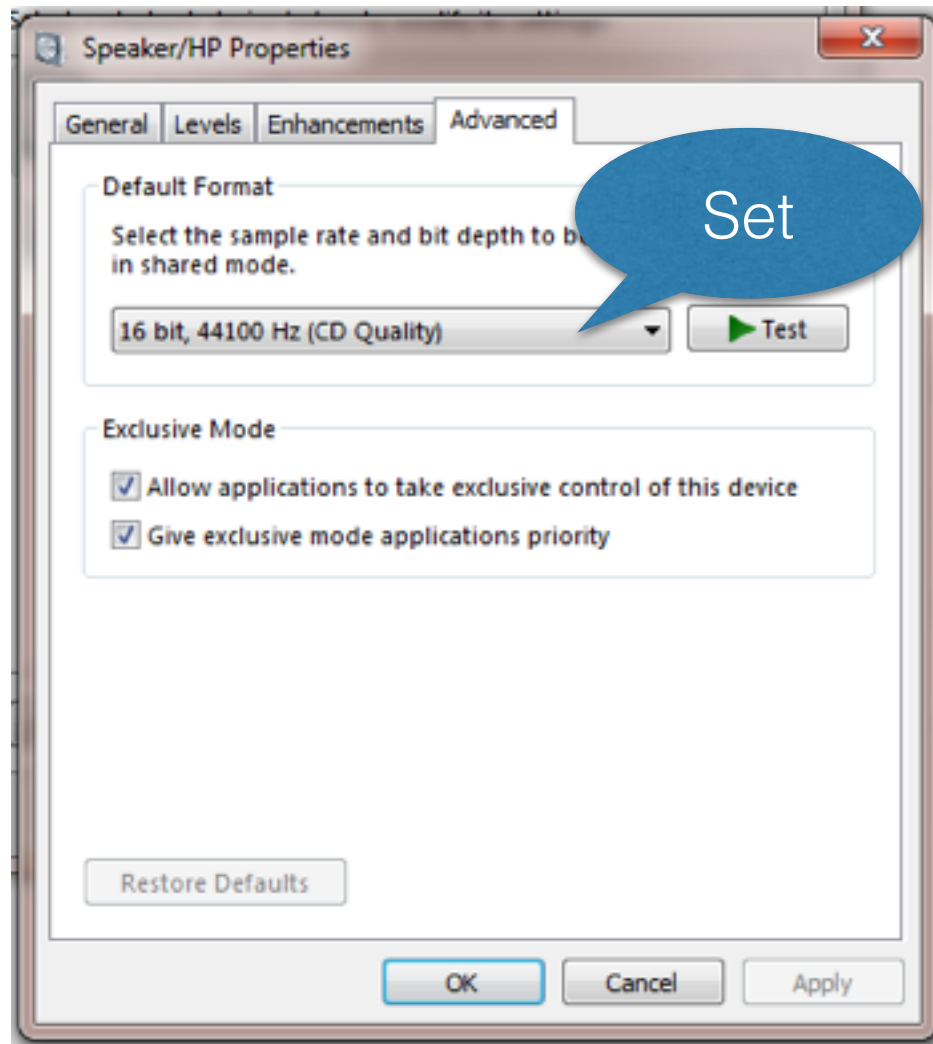
dl2sdr.homepage.t-online.de

For setup help see the same page

PC setup



PC setup



Best is both at 96kHz = +/- 48 kHz tuning range

HDSDR Setup

Starting HDSDR will show this screen.
Chose your sound card for RX input



IQ gain and phase must be equal,
not all sound inputs have this.

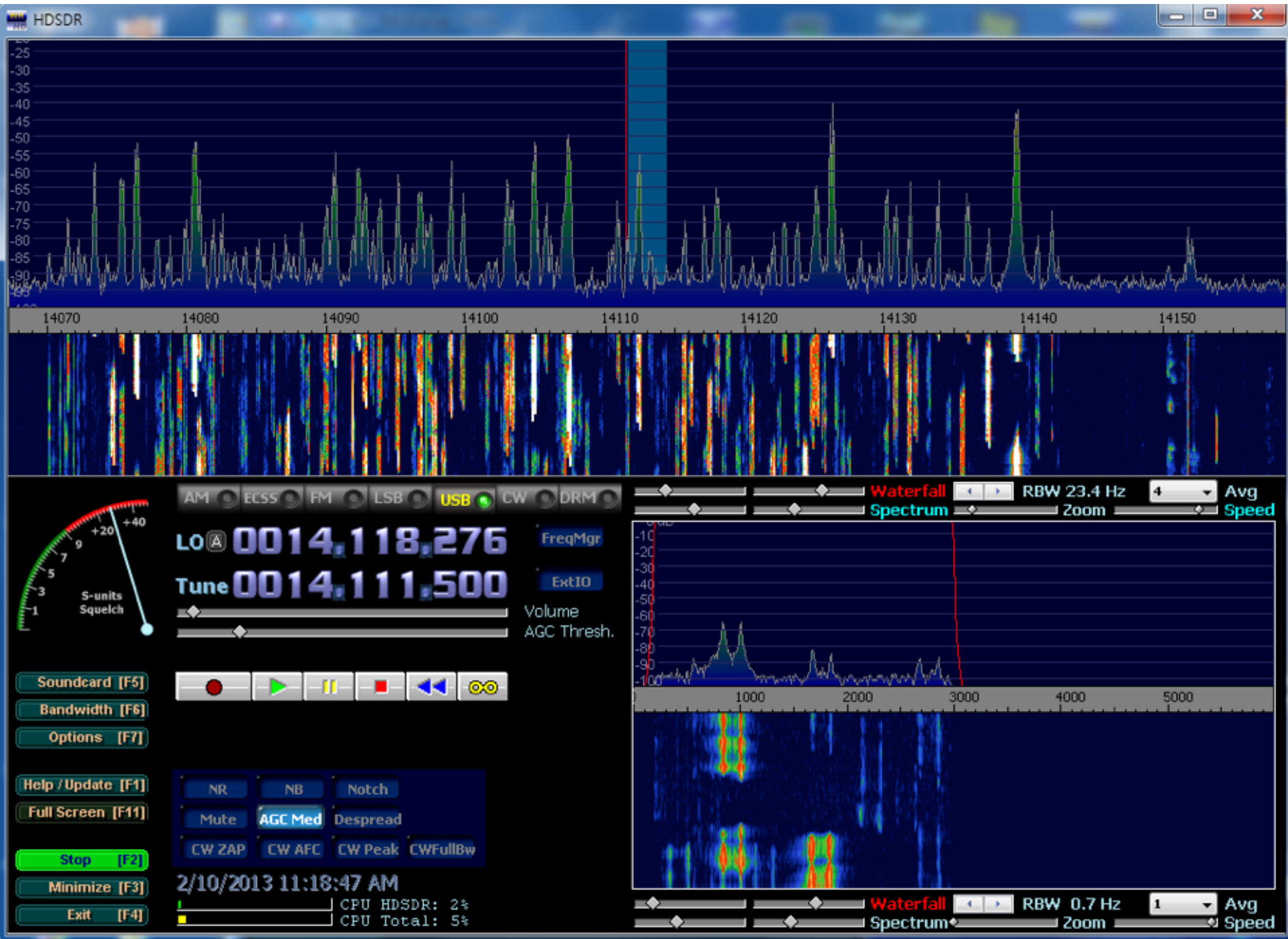
Place a carrier to the right,
reflection will show to left

Option - I Q Swap is correct?

Option - Input Cannel Adjustment"

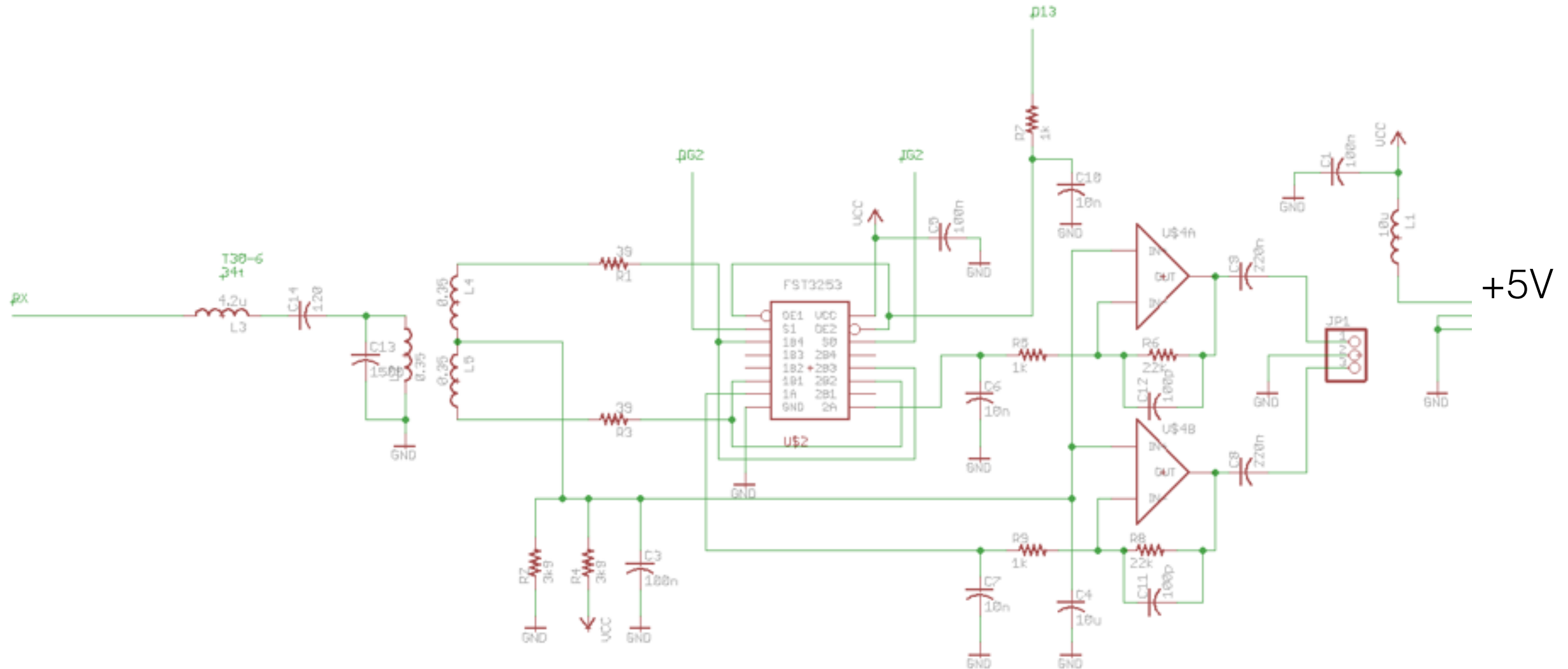
- sliders just gain & phase,
null out the wrong signal
- use RX DC removal to minimise centre peak





SDRX Hardware

SDRX Schematic



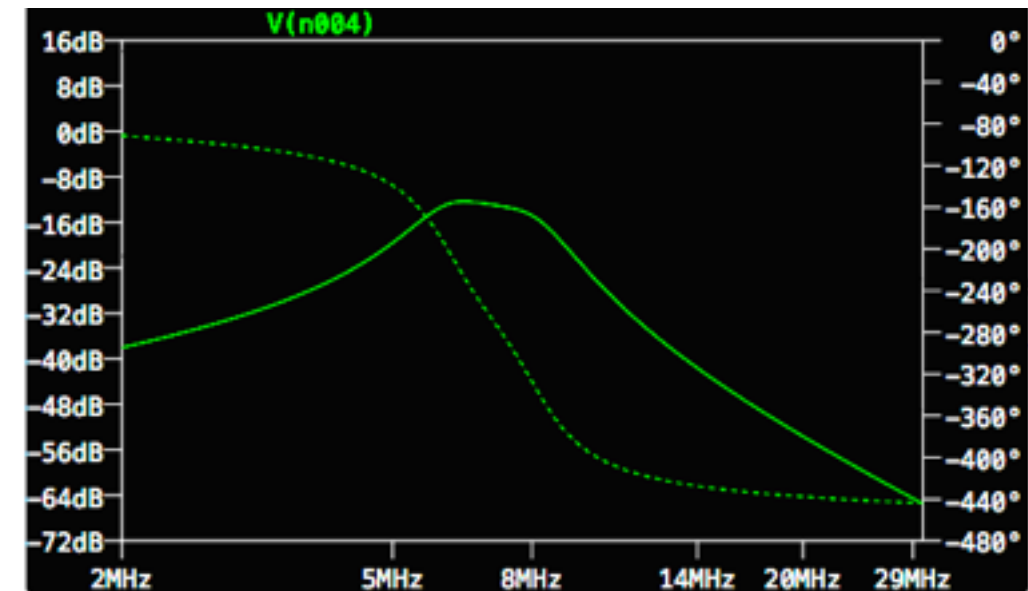
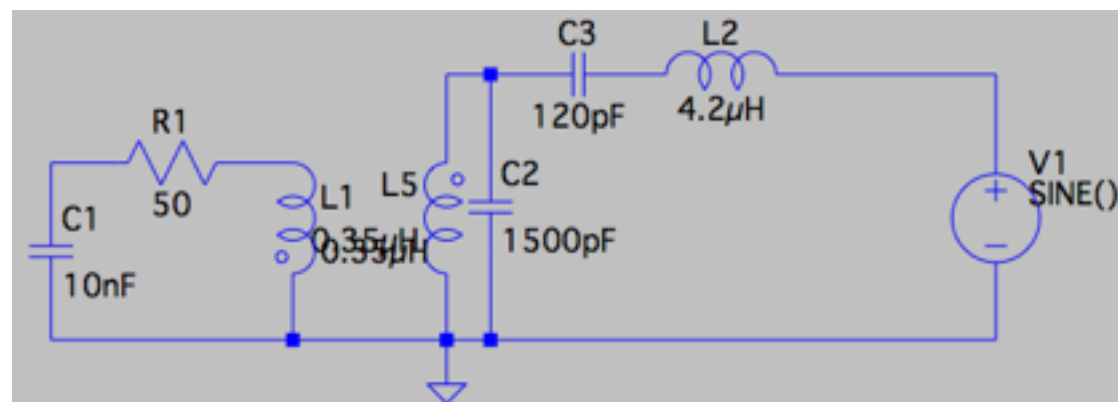
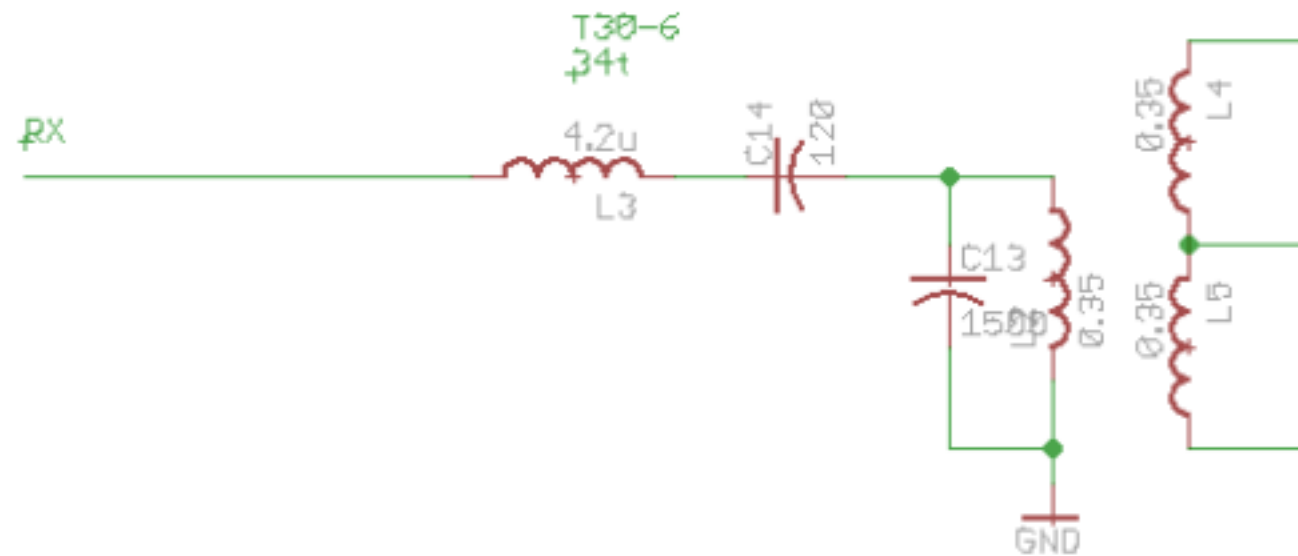
Band Pass Filter

Baseband filter

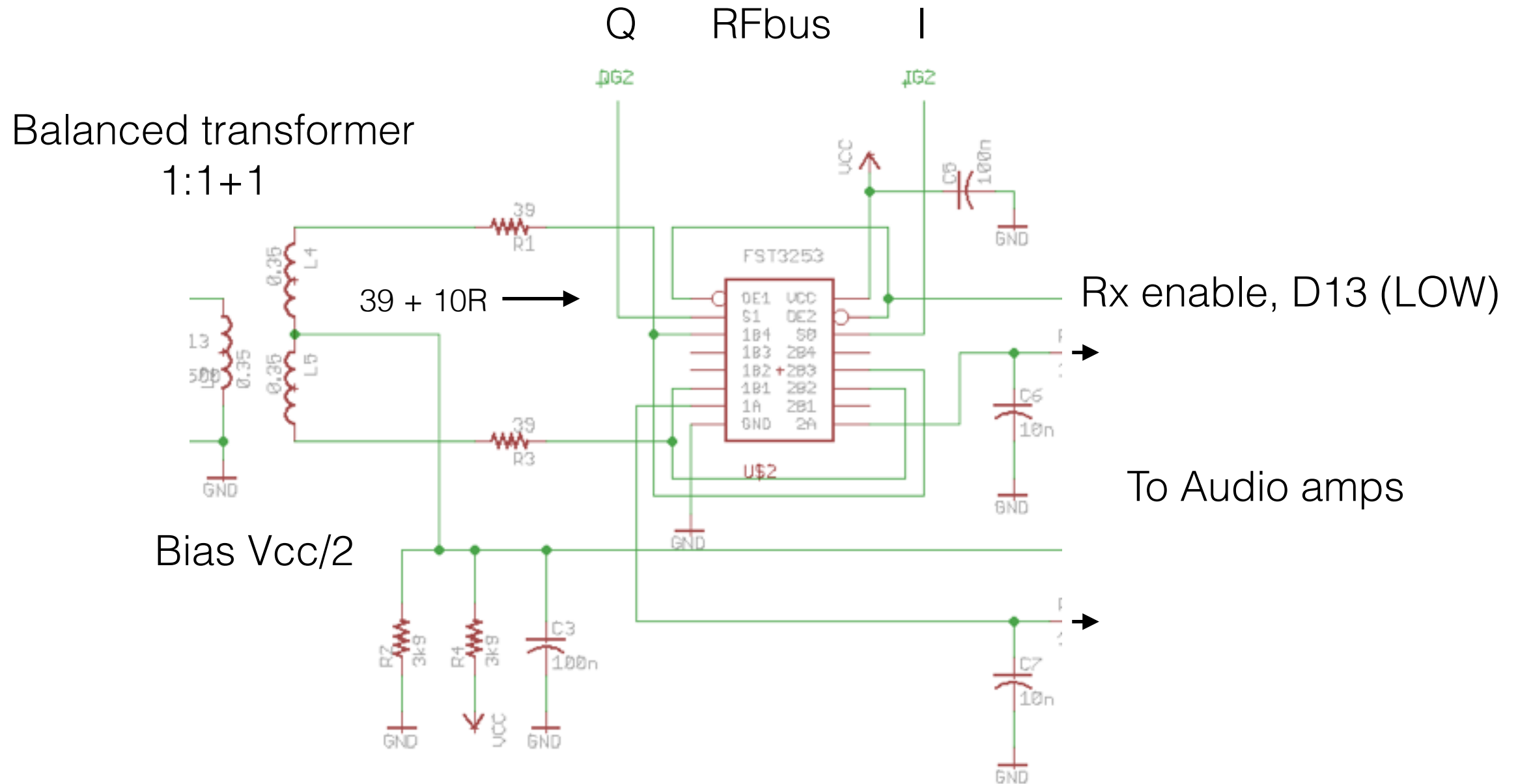
Audio amplifiers



Bandpass filter



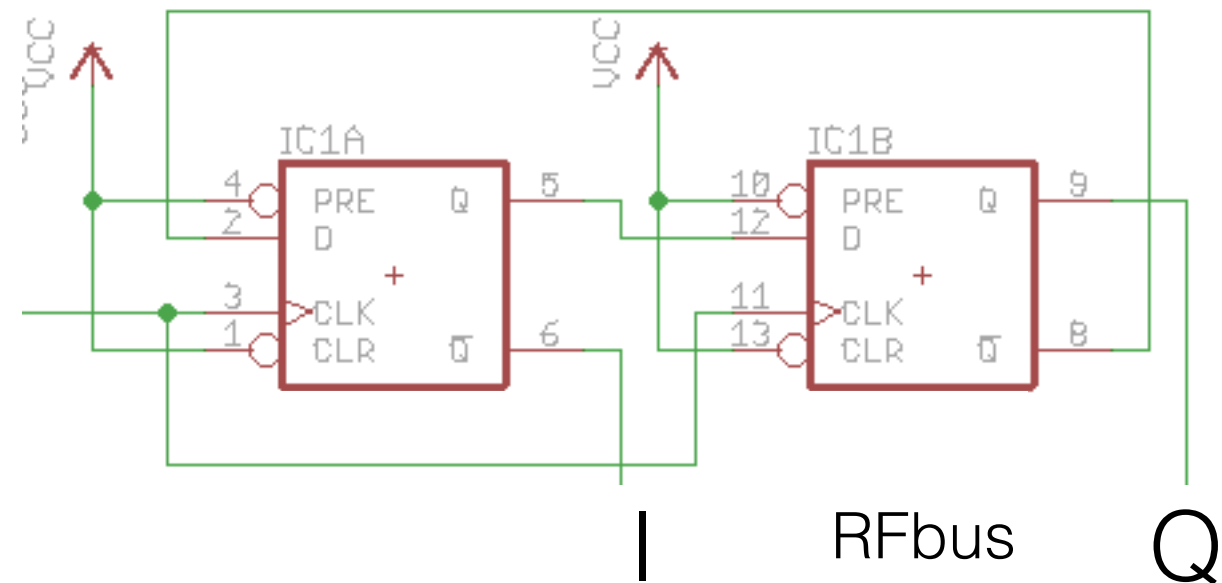
Baseband filter



VFO_IQ Johnson counter

SN74AC74D generates quadrature outputs

Si5351 input $f \times 4 \rightarrow$



Input

I

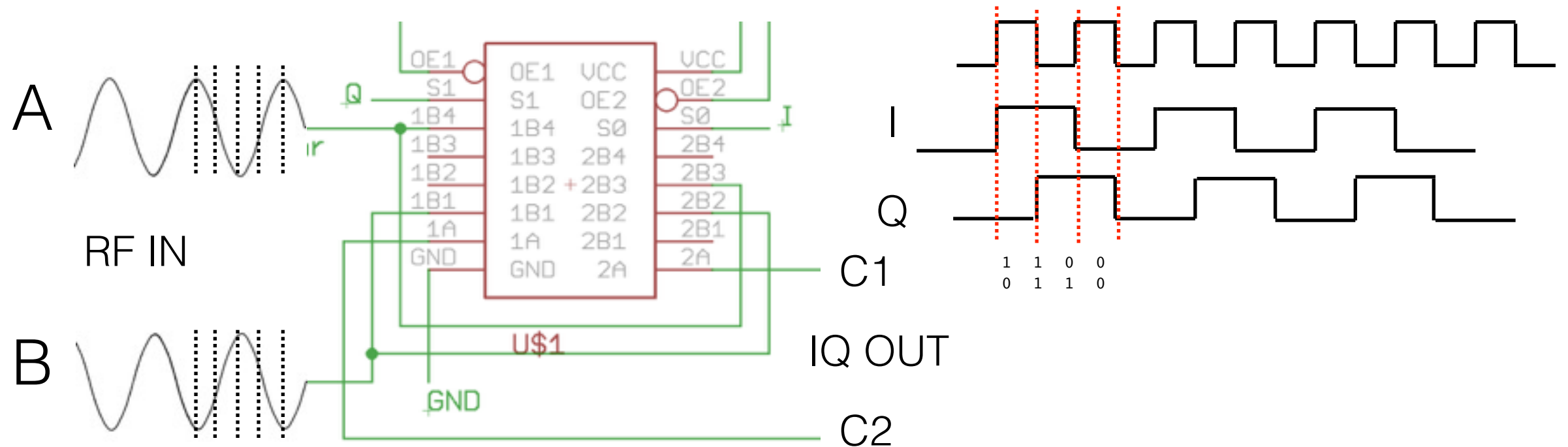
Q

$f / 4$

1	1	0	0
0	1	1	0



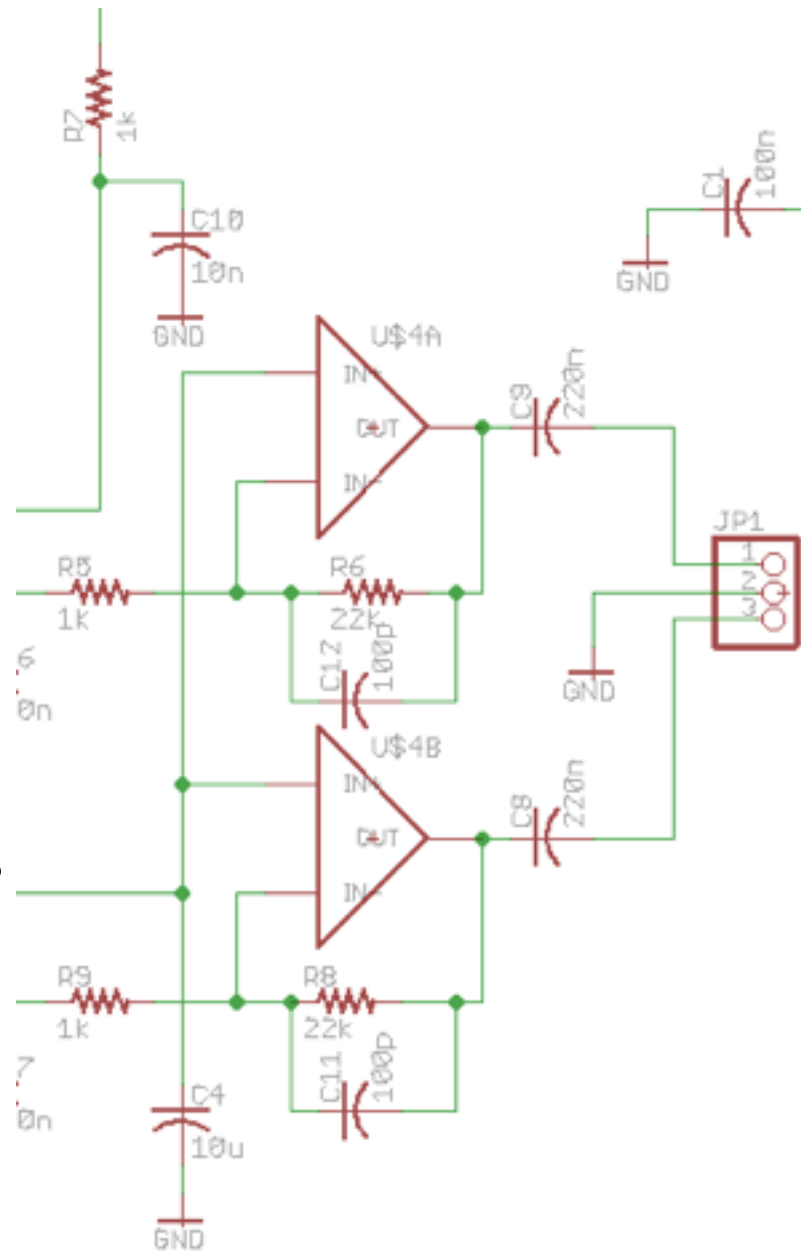
Baseband filter



A & B switched
onto C1 & C2

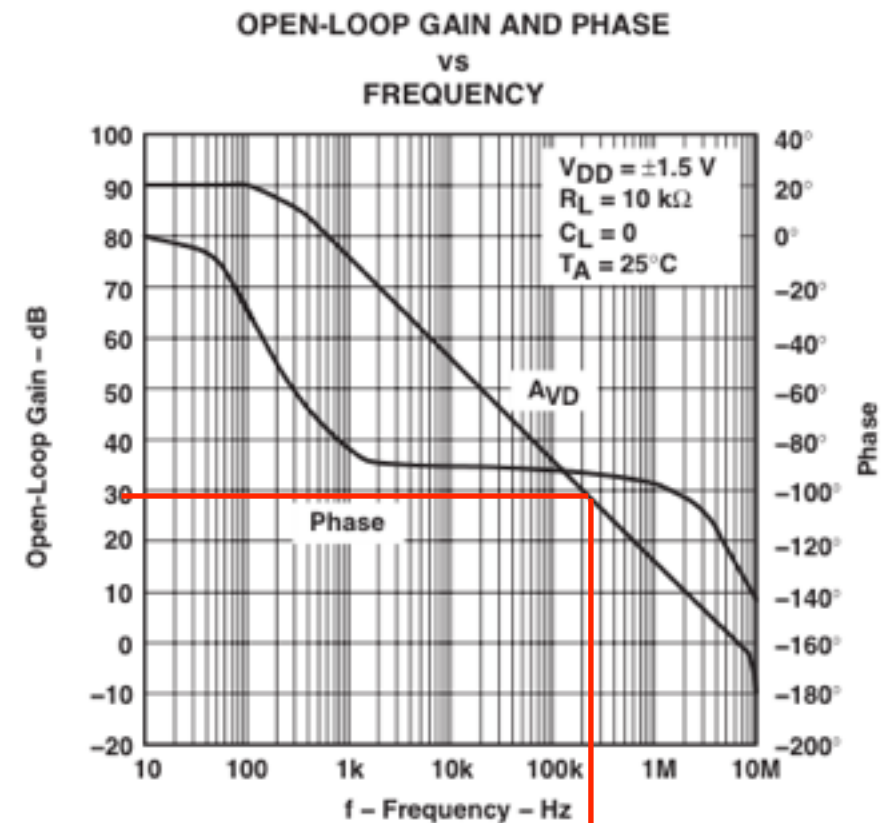


IQ Audio Amp



2.5V bias

$$\text{Gain} = 22/1 = 27\text{dB}$$



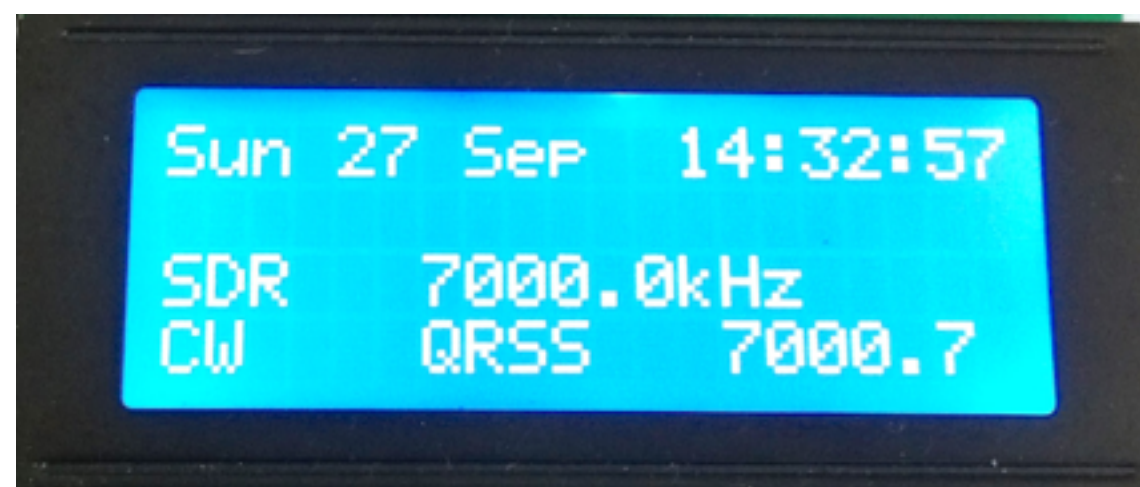
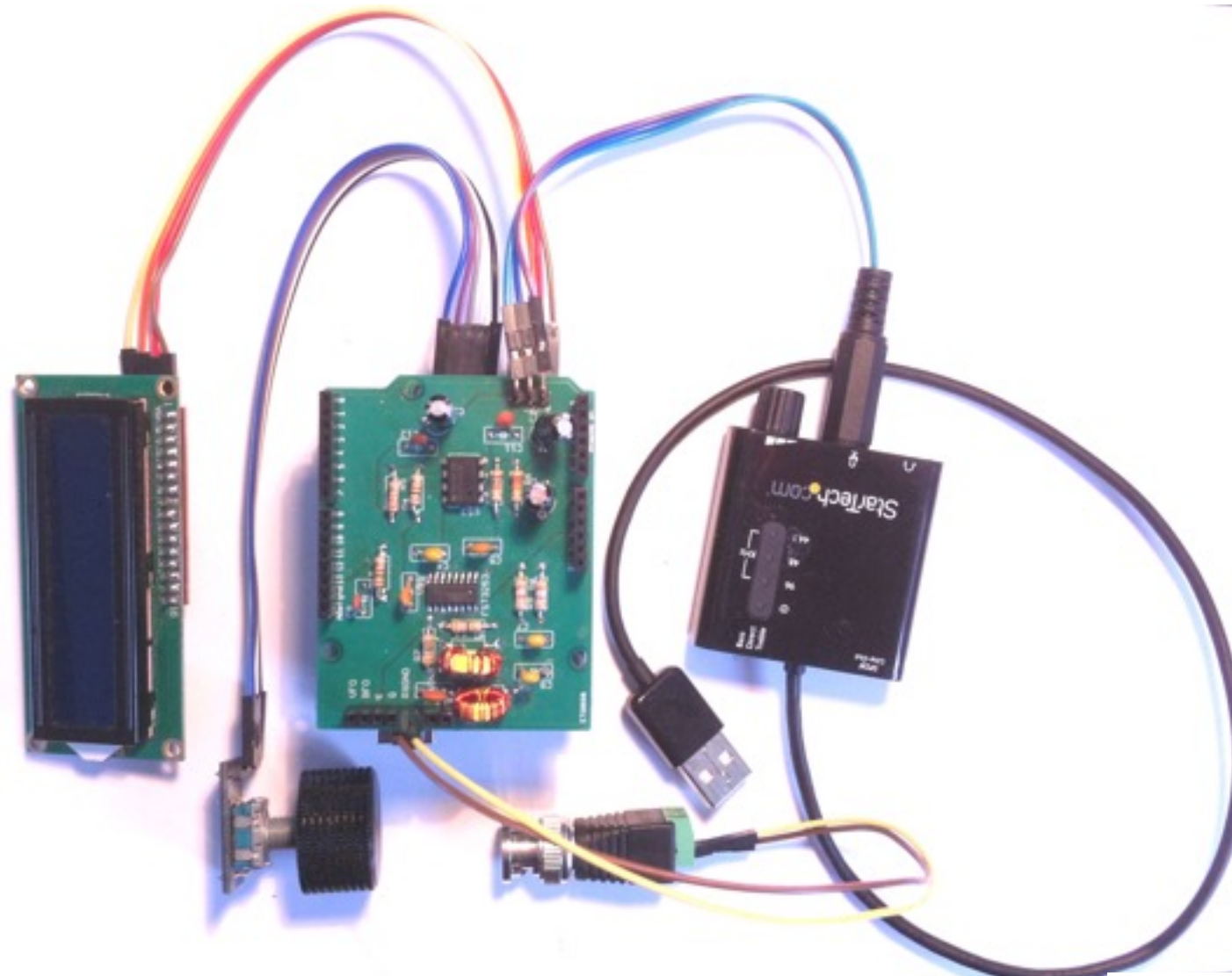
BW ~ 220kHz

So 96kHz easily covered

BW ~ 100kHz by C11, C12 = 100pF



Demo of SDRX

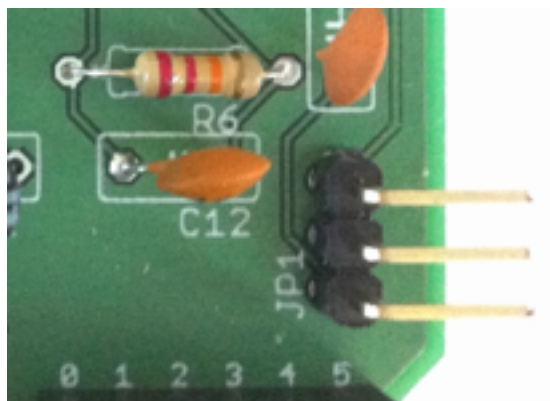
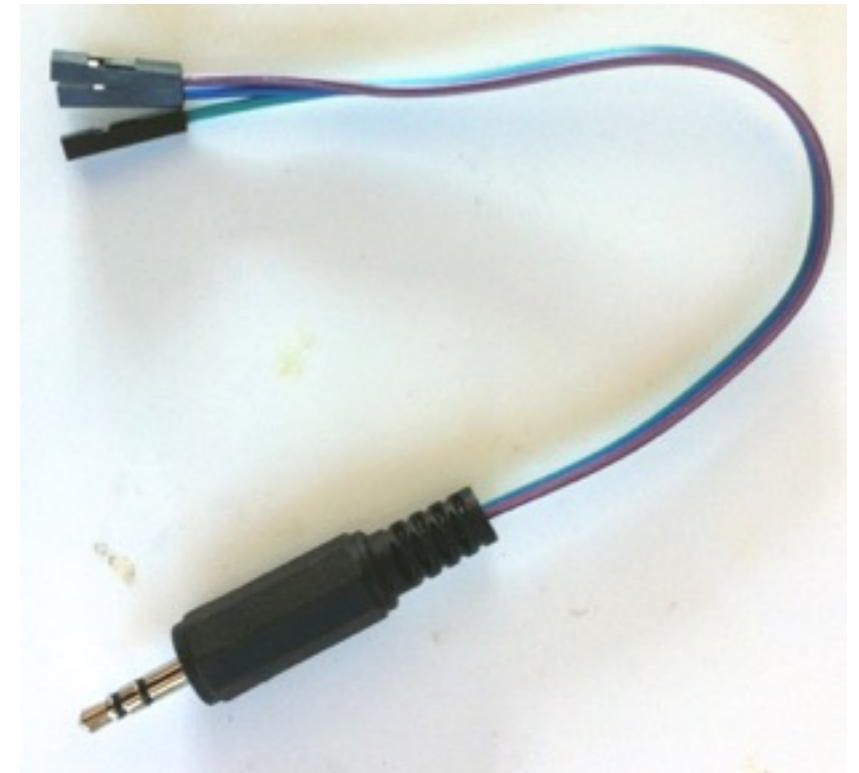


Builder

Consider buying a 24/96kHz DAC
e.g. StarTech from Amazon



You must make an audio cable:
3 pin Female to 3.5mm jack



I
GND
Q

Kit 4

PCB	x
2 x 100pF	x
1 x 120pF	x
1 x 1500pF	x
3 x 10nF	x
3 x 100nF	x
2 x 220nF	x
1 x 10uF	x
2 x 100pF	x
1 x 10uH	x
2 x T30-6 Toroids	x
Wire 28swg 50 & 60 cm	x
2 x 39R	x
3 x 1k	x
2 x 3k9	x
2 x 22k	x
Right Angle header 3 pin	x
2x6 & 3x8 pin header kit	x
FST3253	x
TLV2462	x



Also uses Rotary Encoder and LCD from Kit 2

Home work

- The build of the SDR requires winding some toroids
- There are two, wound with 28swg
 - T30-6, 4.9uH, 37 turns, 50cm
 - T30-6, 0.35uH, trifilar (3 wires twisted together), 10 turns, 60cm



- Collect your wire, >110cm
- Wind these before next week, then identify all the other components, active and passive



Next you build your SDR

Look through the slides for Session 7
and be ready.

Or start your build now?