THE FUN CUBE DOGLE HF CONVERTER

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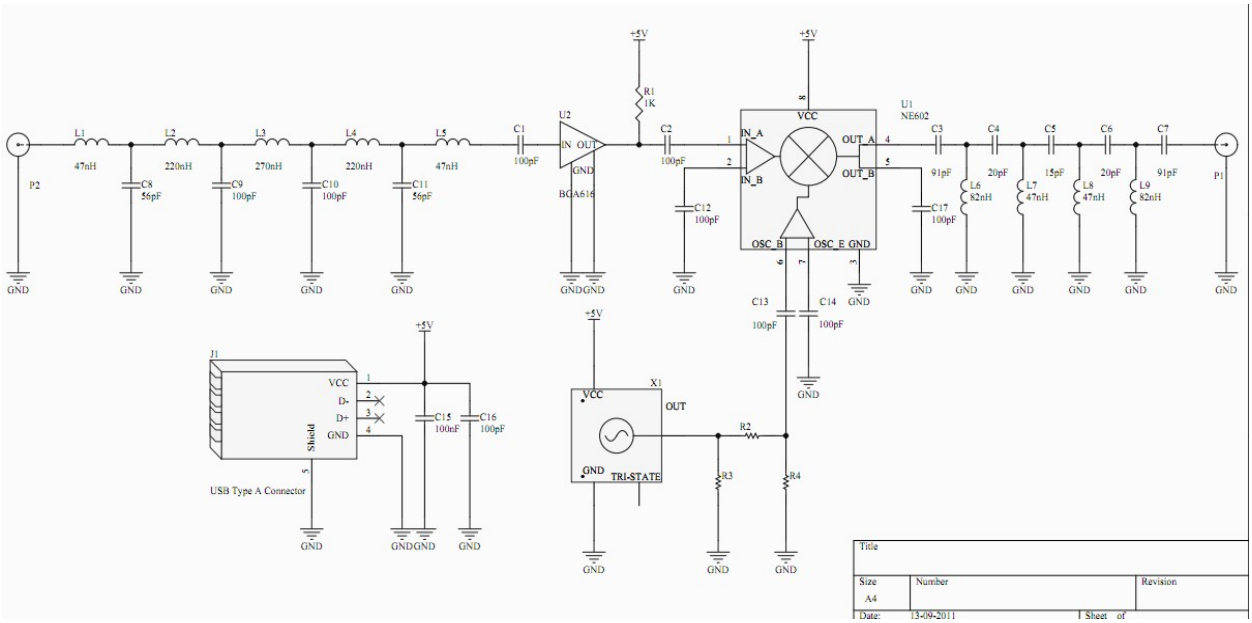
If you are a FCD owner I am sure you are a very satisfied with the quality and performance receiving satellites and all sorts of communications in VHF and UHF.
However, the FCD only starts receiving properly from 64Mhz up, and misses all the good fun that is receiving HF and 6m on a SDR.

That is why we decided to make a simple HF converter to the FCD, and get access on all the bands, extending the RX now from DC to 1700Mhz.

The HF converter is very simple, as you can see in diagram, any person with some soldering experience in kit build, will have no problems to get it work properly.

Circuit description:



The Filter on the Input is a Low Pass Filter.
Designed the aloud only frequencies from DC to 52Mhz travel into the mixer.

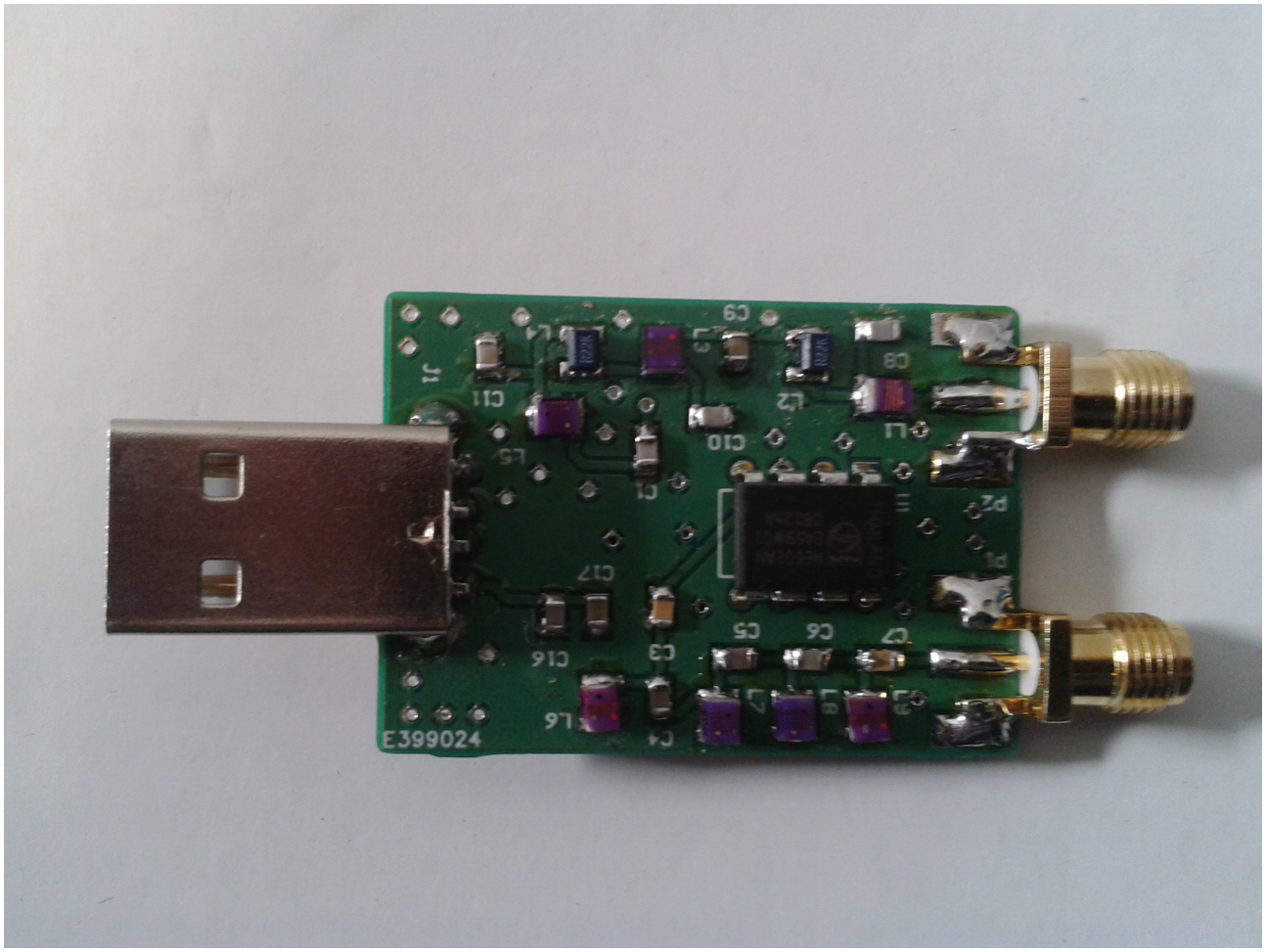
The U2 is a optional pre-amplifier, however we are bypassing this stage due the circuit have enough gain to receive any HF Signal.

The Local Oscillator is a crystal clock and runs on 106.250Mhz. (this is our IF)

The mixer NE602AN, (same as Elecraft) making the conversion of signals.

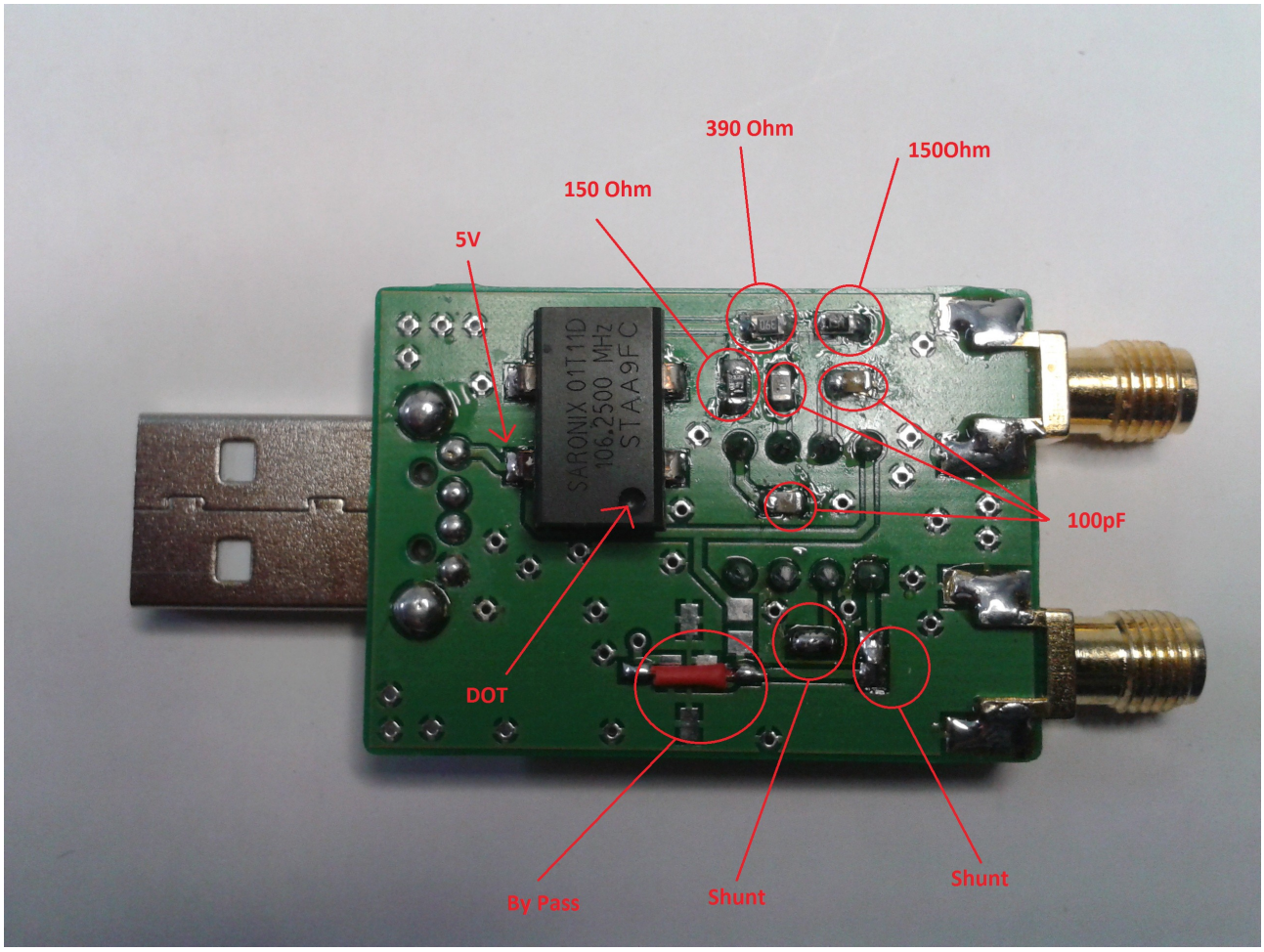
In the output we have another filter, Hi Pass Filter, preventing image frequencies and aloud only the signals up 100Mhz be received by the FCD

VCC, 5V are supplied from a USB connector.



Aspect of the Converter ready build.

By the FCD.



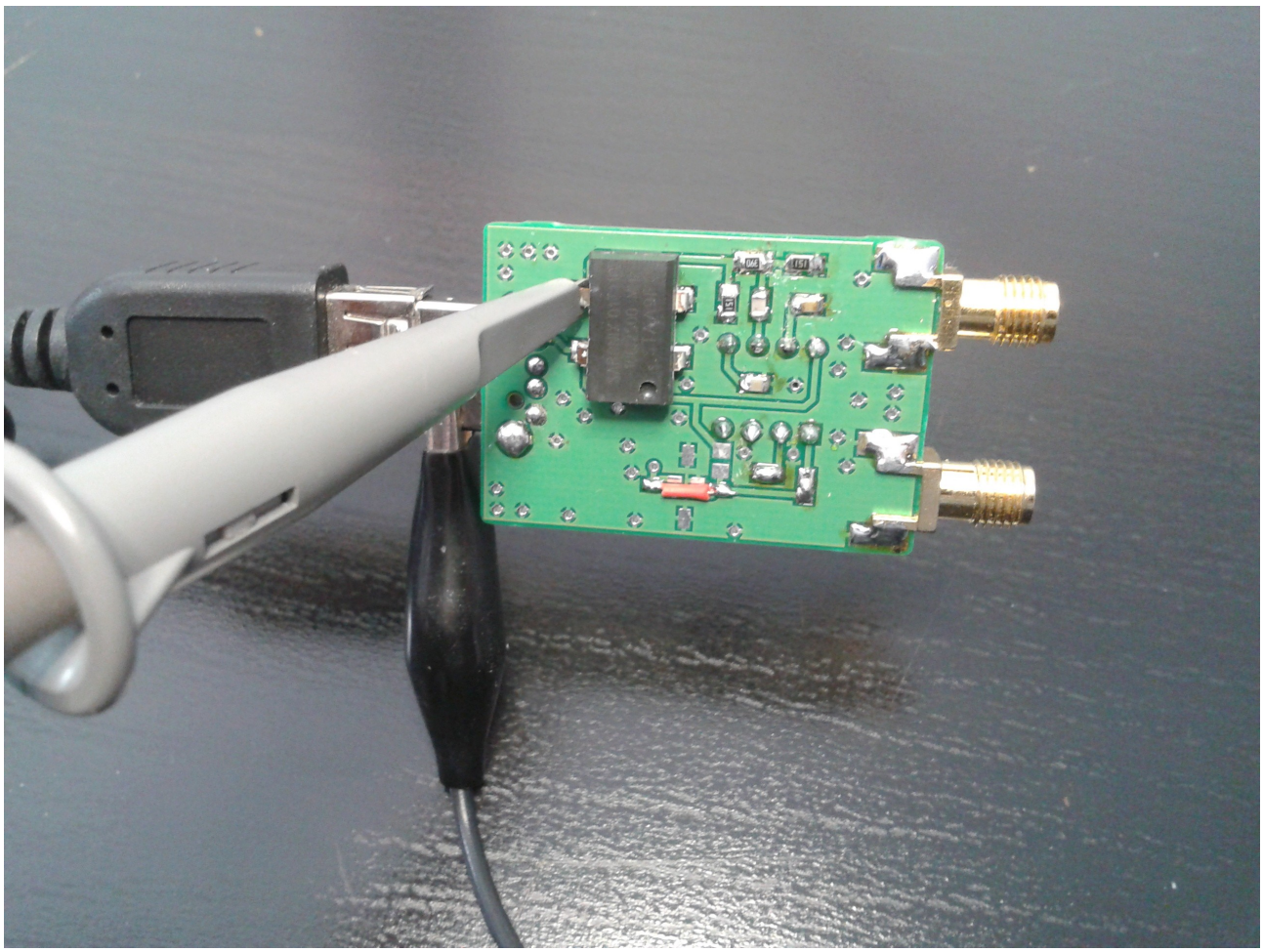
On the under side of the Kit board.
There are a few things you need some attention.

The 3 capacitors you see together are 100pF
The resistors 150 Ohm x2 and 39 Ohm making a PI attenuator of 6dB in the LO carrier .
Careful wen soldering the Clock STAA9FC, the dot mark stays as the picture shows.
Bypass the pre-amp with a simple coated wire.
Make the shuts with solder as show on picture.

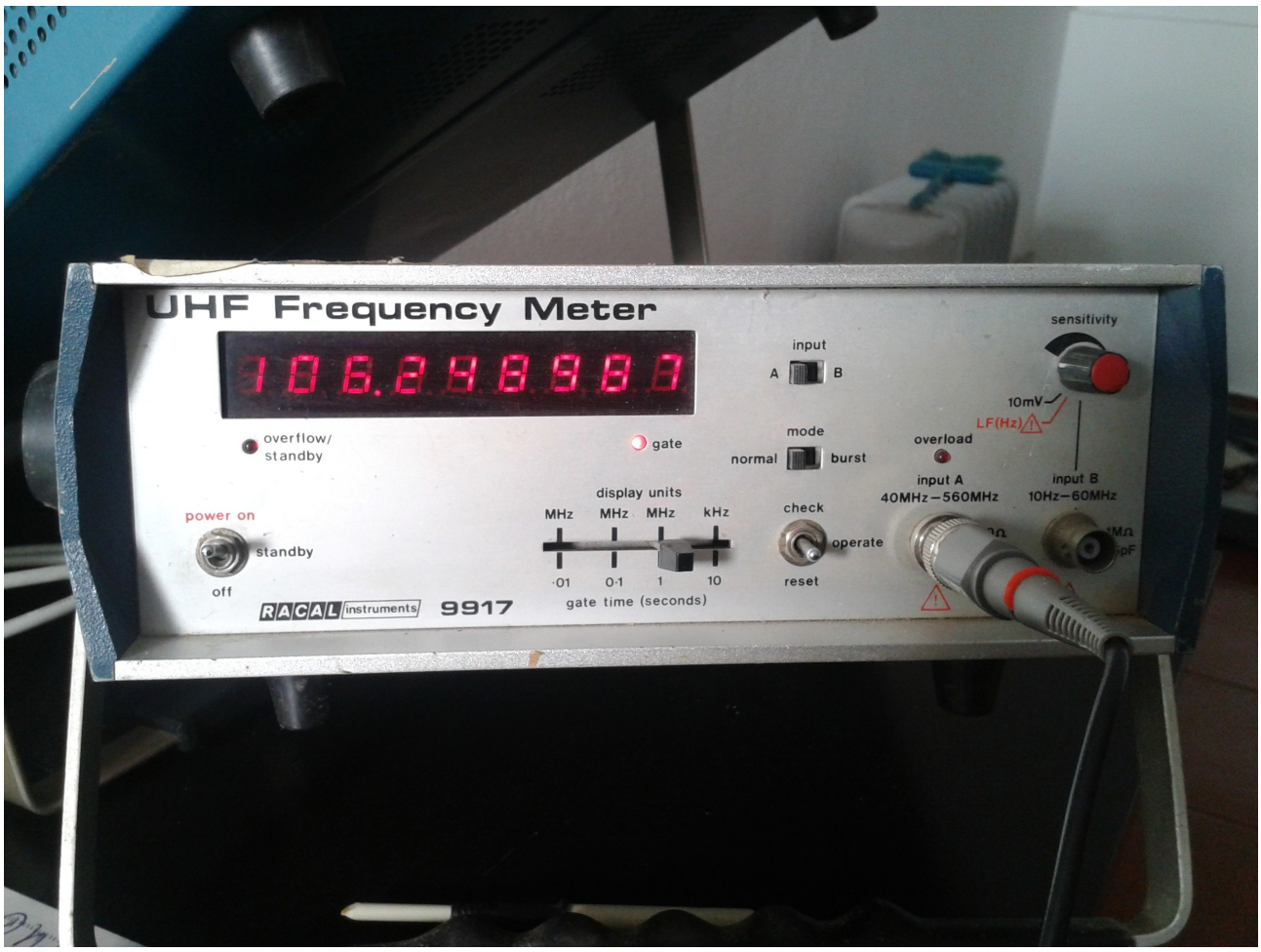
Testing:

Wen plug the converter to a USB, check with a multimeter for 5V on Clock Oscillator VCC pin.
And on Mixer Pin 8.

If you have a Frequency counter or Oscilloscope you can now check for 106.250 Mhz carrier on the output of clock.



Test point.

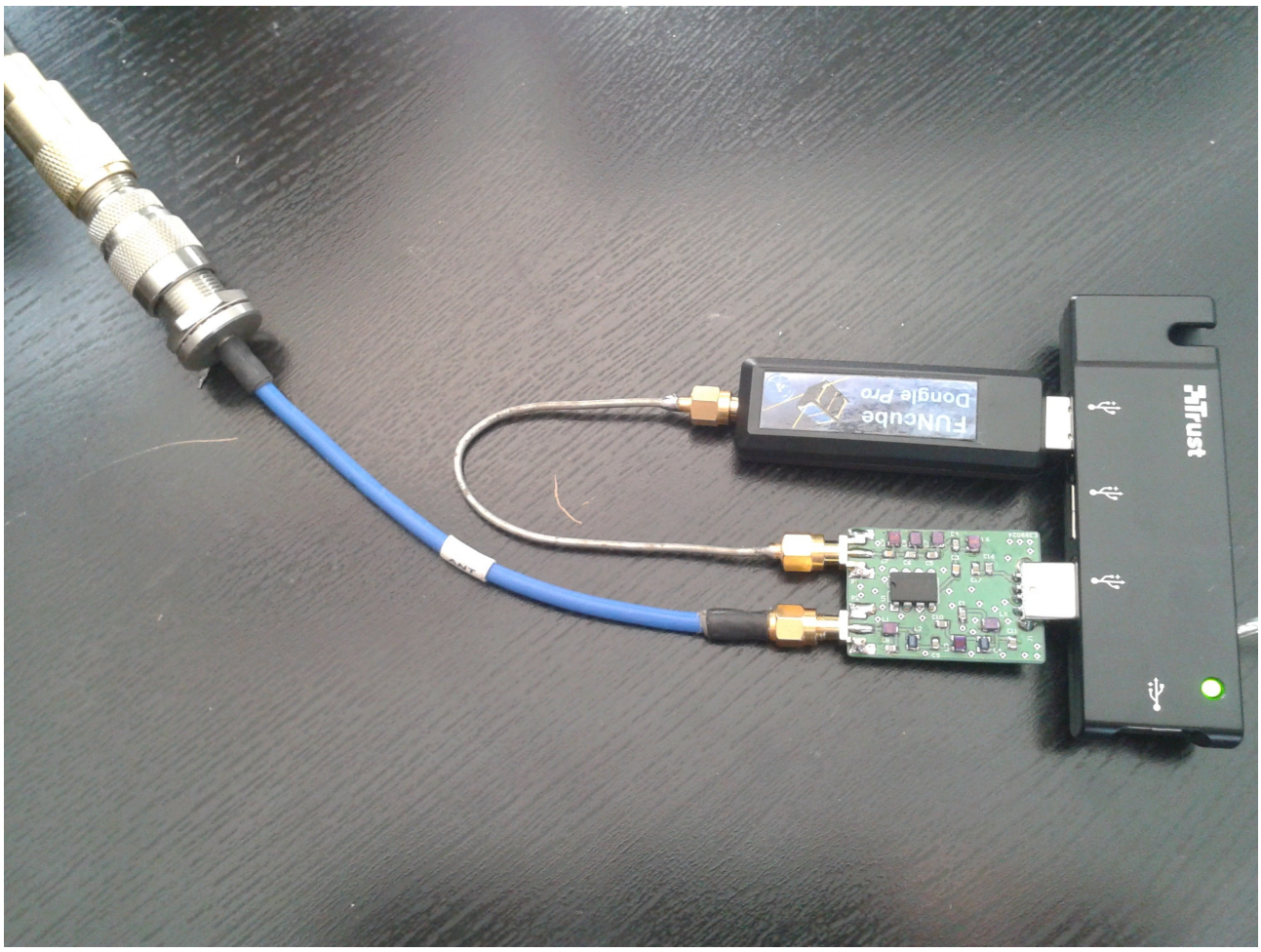


Read 106.250Mhz or neer.

You will use this frequency on LO, the more accurate reading, the better

Nice sin wave from clock.
(in fact, the LO is not sin wave, it is more like square wave, but on a 100Mhz oscilloscope this is how is looks.You will need a higher frequency oscilloscope to see the real wave shape)
However, if you see a wave like this, it means you have LO running!

You can connect now the converter into your FCD with a SMA-SMA cable.
Connect your HF antenna to the Input of the Converter.
Turn on your favourite SDR program and start enjoy receive HF on the FCD.



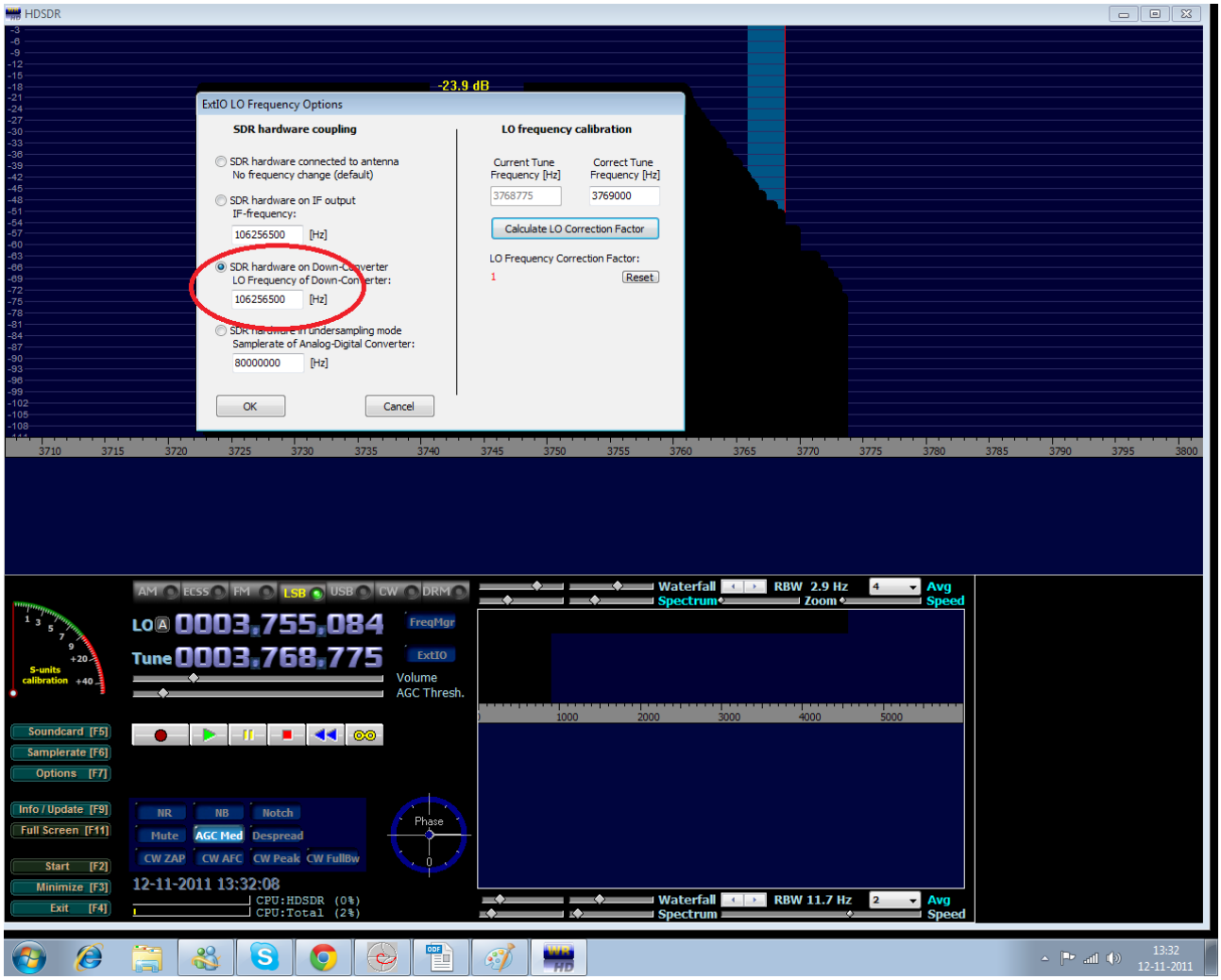
FCD and HF Converter together.

To tune the bands on HF.
You just need to sum 106.250 Mhz with the frequency you want to receive.
Ex: if you want to receive 20m, Calculate 106.250 + 14.250 = 120.500
120.500 is the frequency you will tune your FCD

The easy way, use HDSDR.
HDSDR software haves the converter option.

To work with the HDSDR:
 go to Options> Extio LO Options
and insert the LO frequency: 106250000Hz (read from your frequency counter, must be in HZ)

Now you can tune you HF band with the correct frequency on screen .



Many tnx.
Enjoy you new possibilities of SDR radio.

Best 73 from CT1FFU and CT2IRW

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