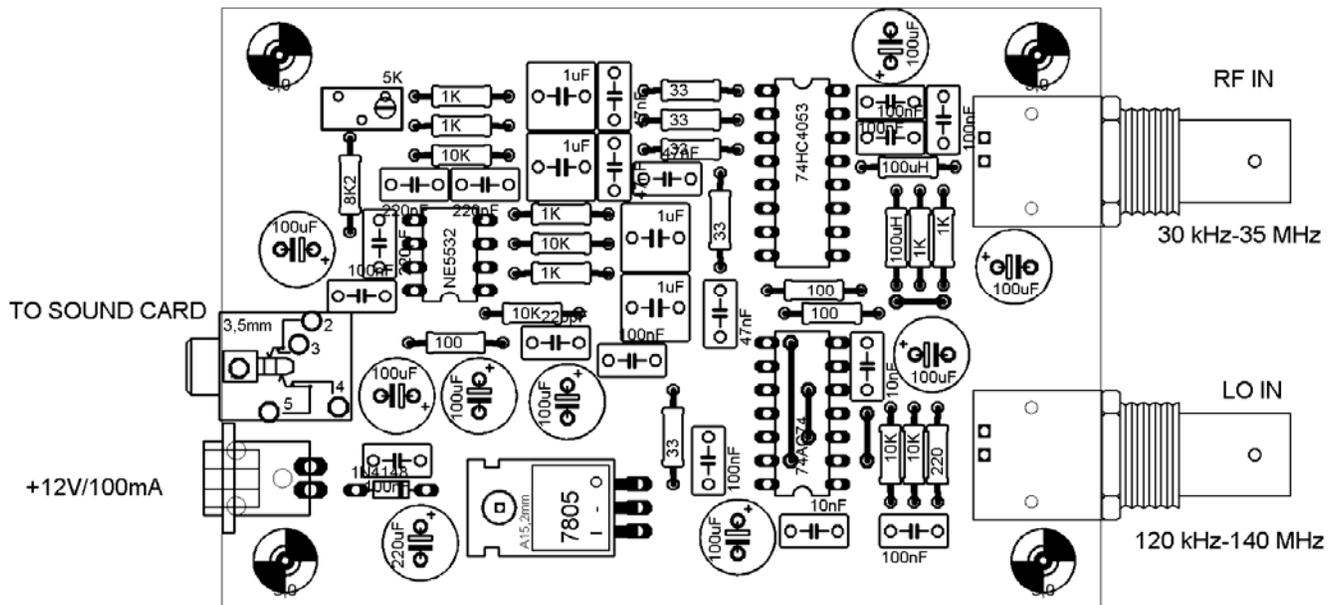


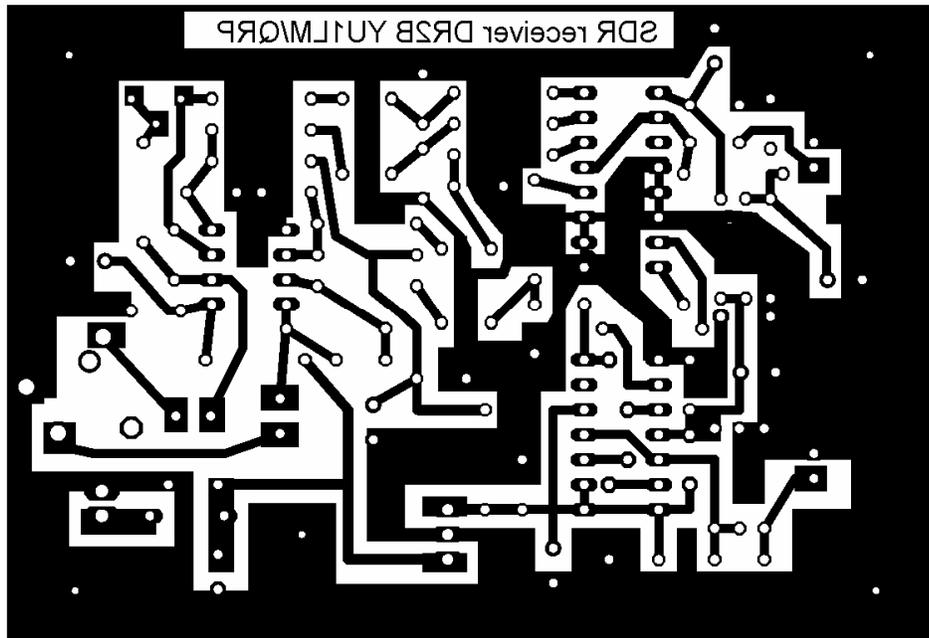
HF SDR S/H Sample and Hold Receiver DR2B from 30 KHz to 35 MHz-Make it Simple as Possible with Outstanding Performances

Dipl. Ing . Tasić Siniša –Tasa YU1LM/QRP

All rights reserved, project is free for personal use only

Many HAMs all over the world built my SDR S/H receivers DR1, DR2, DR2A, DR1A.... you can see some photos on my sites and I can noticed that they are all mainly satisfied with results . Simple constructions with cheap classic components working really very well. Also I find at INTERNET that some solutions from my receivers/transmitters are used in some new SDR projects. I made DR2B PCB as product from DR3X receiver .Here is one of 3 possible connection for DR3X for external local oscillator with new PCB very small compare to DR3X PCB .This receiver is similar very much to DR2 but even simpler. All data, measurements and adjustment are the same. I shall repeat it here. I am giving schematics, part placement and PCB.





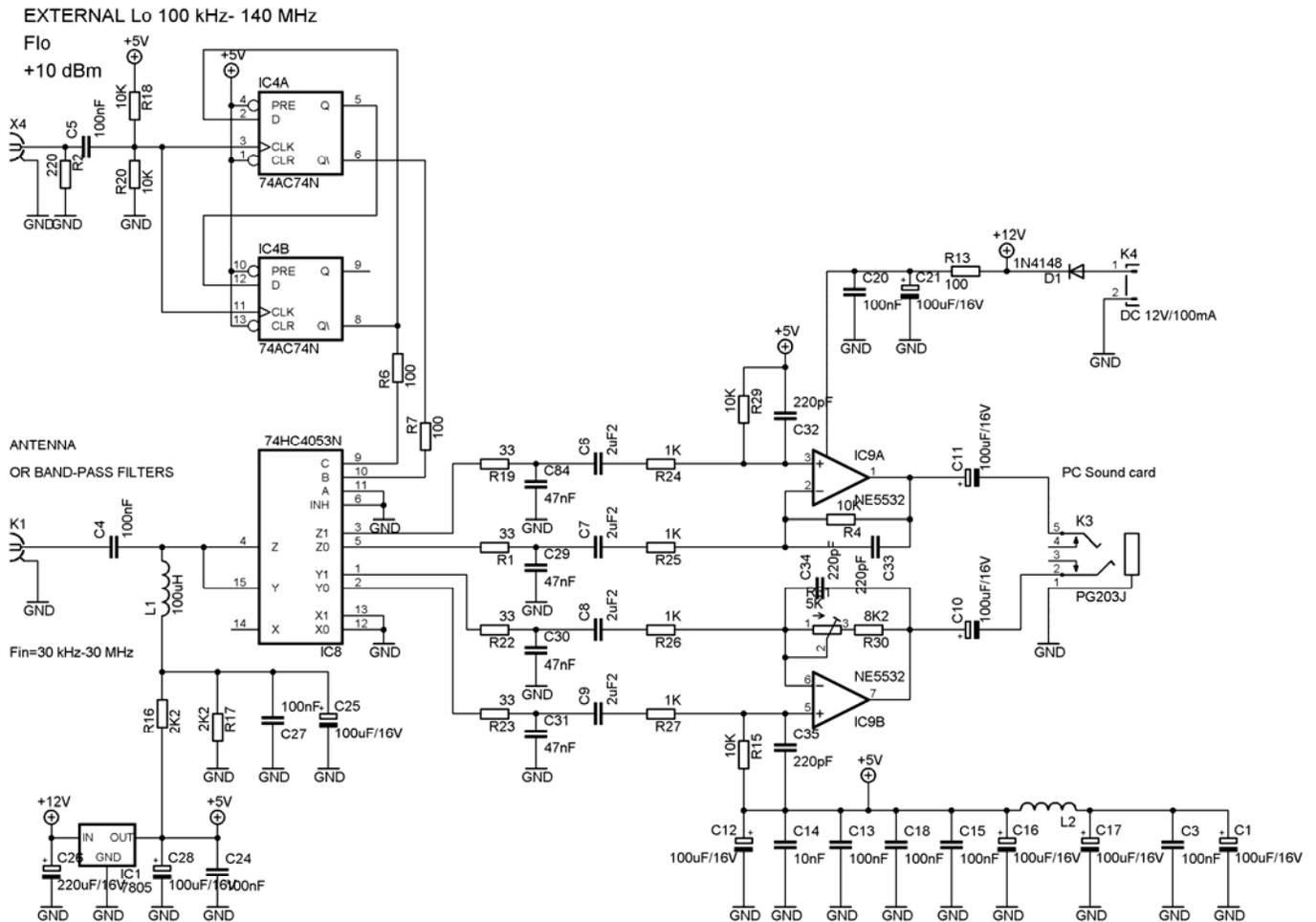
DR2B Single side PCB size is 95 x 65 mm

Measuring results which I made with HF S/H SDR receiver DR2B

1. Receiving range from 30 kHz to 35 MHz with external LO and $V_{cc}=+6$ V for digital ICs.
2. IIP3 27-29 dBm and it depends from setting and used programs (all with 16 bit sound cards).
3. MDS -102-105 dBm also with 16 bit SB card Realtek AC97
4. Image rejection is possible adjust to 35-60 dB 12 kHz from center frequency.
5. Sensitivity 3-5 μ V for 10 dB S/N ratio, max S/N ratio I measured was 70 dB. This sensitivity is more than enough for frequency near to 20 MHz with adequate antenna system, for higher frequency it is recommend increasing AF gain (10 Kohms increase to increase to max 100 Kohms R4,R29,R30 and R15) or putting some RF preamplifier in front of DR2B to lower F (noise figure) of receiver.
6. SFDR (Spurious free dynamic range) is 86-92 dB, this results are with signals spaced 5 kHz and more. Results are not changing very much if we spaced two signals to classical 20 kHz or more.

HF I/Q SDR Receiver DR2B - YU1LM/QRP

30 kHz-35 MHz



CONNECTION FOR EXTERNAL LOCAL OSCILLATOR

Some excellent performances with 3 IC are not without other side:

1. First and very big disadvantage is 4 times higher LO
2. Image rejection is changing through receiving bands and results are done for frequencies 12 kHz from central frequency
3. For external LO it is necessary input level around 1 Vp-p min for safe operation (for lower LO drive operations are not sure especially for higher LO frequencies)!!! Simple test that 74HC4053 is working is to measure with DMM (digital multi meter) $V_{cc}/2$ or 2.5 V ± 0.5 V at control pins 9 or 10. If it is not true we have a problem with input LO level or input ICs 74AC74 or 74AC02.

DR2B adjustments are simple and done in two steps:

1. Adjust with universal instruments DMM (digital multi meter) that is resistance in feedback potentiometer $5k + 8K2 = 10 K$.
2. Find some strong signal in the air 12 kHz away from zero or put signal from signal generator to the input of DR2B and with 5 kOhm potentiometer adjust min unwanted image signal in some SDR program. Additional image rejection adjusts in SDR programs if this possibility exists function such as skew in Alberto I2PHD programs.

I wish you successful DR2B realization and I apologize for some possible mistakes. I made great effort to make SDR projects and share them with all who are interesting for. Anyway send me your comments positive or negative, results or photos of your realization please.

VY 73/72 and GL in SDR homebrew Tasa YU1LM/QRP
tasa@intel-mikrotalasi.co.yu

References:

1. www.qsl.net/yu1lm/homebrew
 2. <http://forum.cqham.ru/viewforum.php?f=28>
 3. Skidan@mail.ints.net T03DSP UR3IQO <http://users.ints.net/skidan/T03DSP>
 4. <http://www.nitehawk.com/sm5bsz> Leif LINARD
 5. <http://www.flex-radio.com> SDR1000 Gerald AC5OG
 6. <http://www.njgrp.org/mbrproj/9850dds.html>
www.analog.com/en/prod/0,,770_843_AD9850,00.html
- <http://www.qsl.net/pa3ckr/signalgenerator/>
- http://www.k6ese.com/DDS_Project.htm
- http://ham.kiev.ua/pic/dds_ham2.html
- <http://www.qsl.net/om3cph/dds/rx.html>
- <http://www.seboldt.net/k0jd/othervfo.html>
- <http://perso.wanadoo.fr/f6itv/p2063001.htm>
- <http://koti.netplaza.fi/~jonverro/ad9854.htm>
- <http://www.labyrinth.net.au/~steve/freq/>
- <http://members.aol.com/D14JAL/DDS.html>
- <http://hem.passagen.se/communication/dds.html>
7. *Recent Advances in Shortwave Receiver Design* Dr. Ulrich Rohde *QST* Nov 1992 page 53
 6. *RF Design* 6/1995

Software LINK for SDR radio receiving and transmitting

1. <http://digilander.libero.it/i2phd/> SDRadio software ver 0.99
www.qsl.net/i2phd Alberto I2PHD <http://gpsdo.i2phd.com/>
2. ik2czl@weaksignals.com <ik2czl@weaksignals.com>ik2czl@weaksignals.com
<ik2czl@weaksignals.com>Vittorio
3. www.weaksignals.com WINRAD
4. www.ciaoradio.com
5. www.m0kgk.co.uk/sdr
6. www.g8jcf.dyndns.org Peter G8JCF
7. <http://www.nitehawk.com/sm5bsz> Leif LINARD
8. <http://www.flex-radio.com> SDR1000 Gerald AC5OG
9. dl6iak.ba-karlsruhe.de