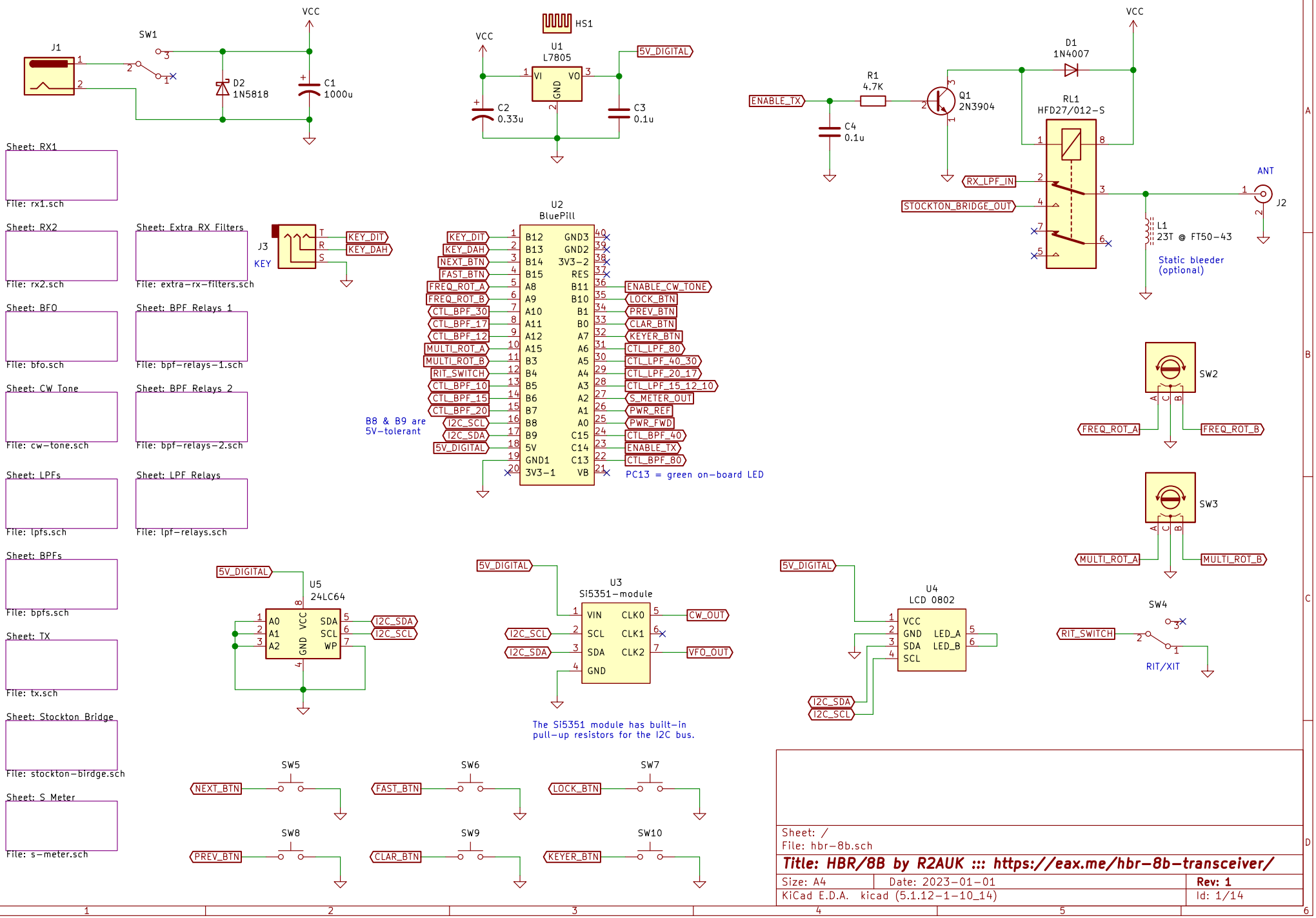
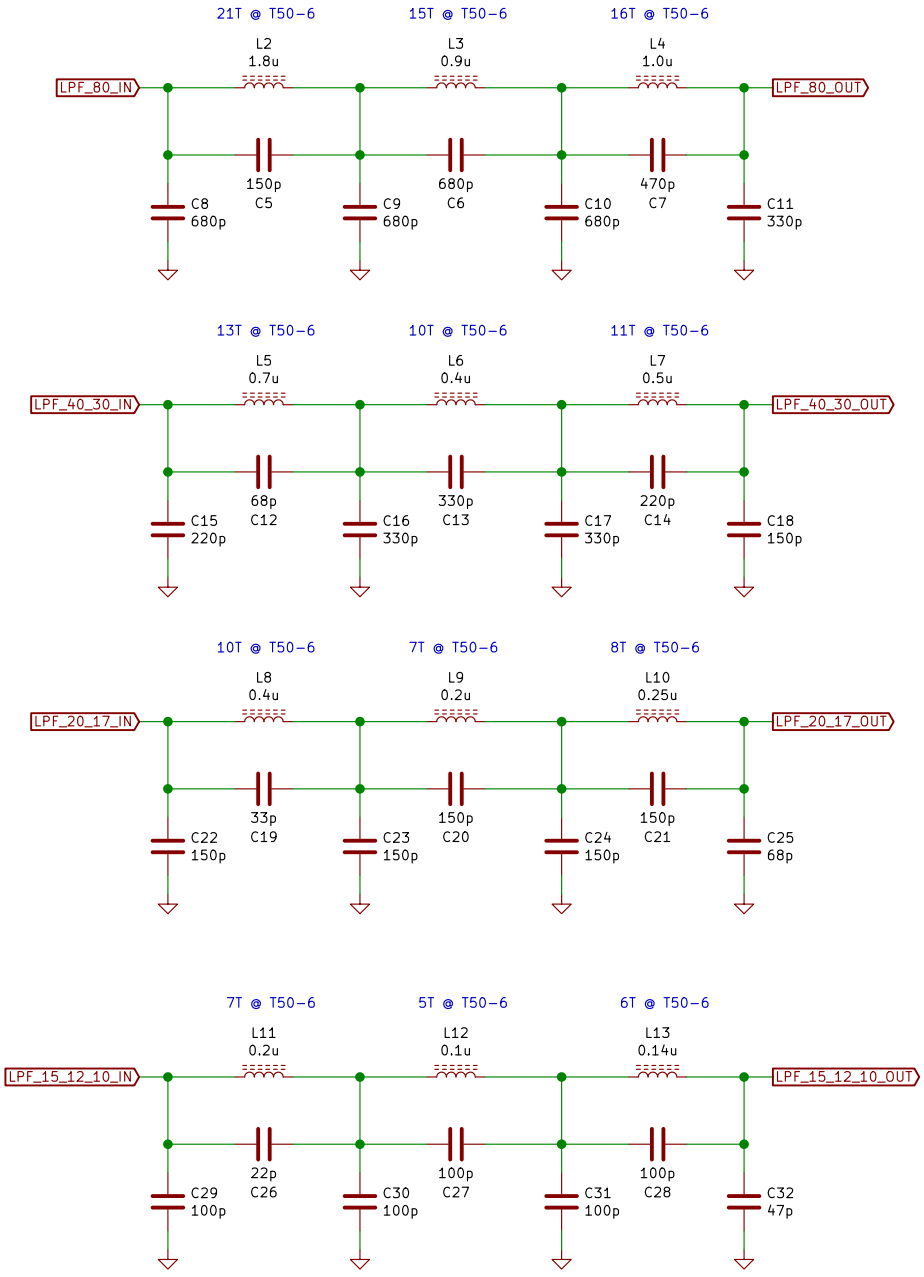
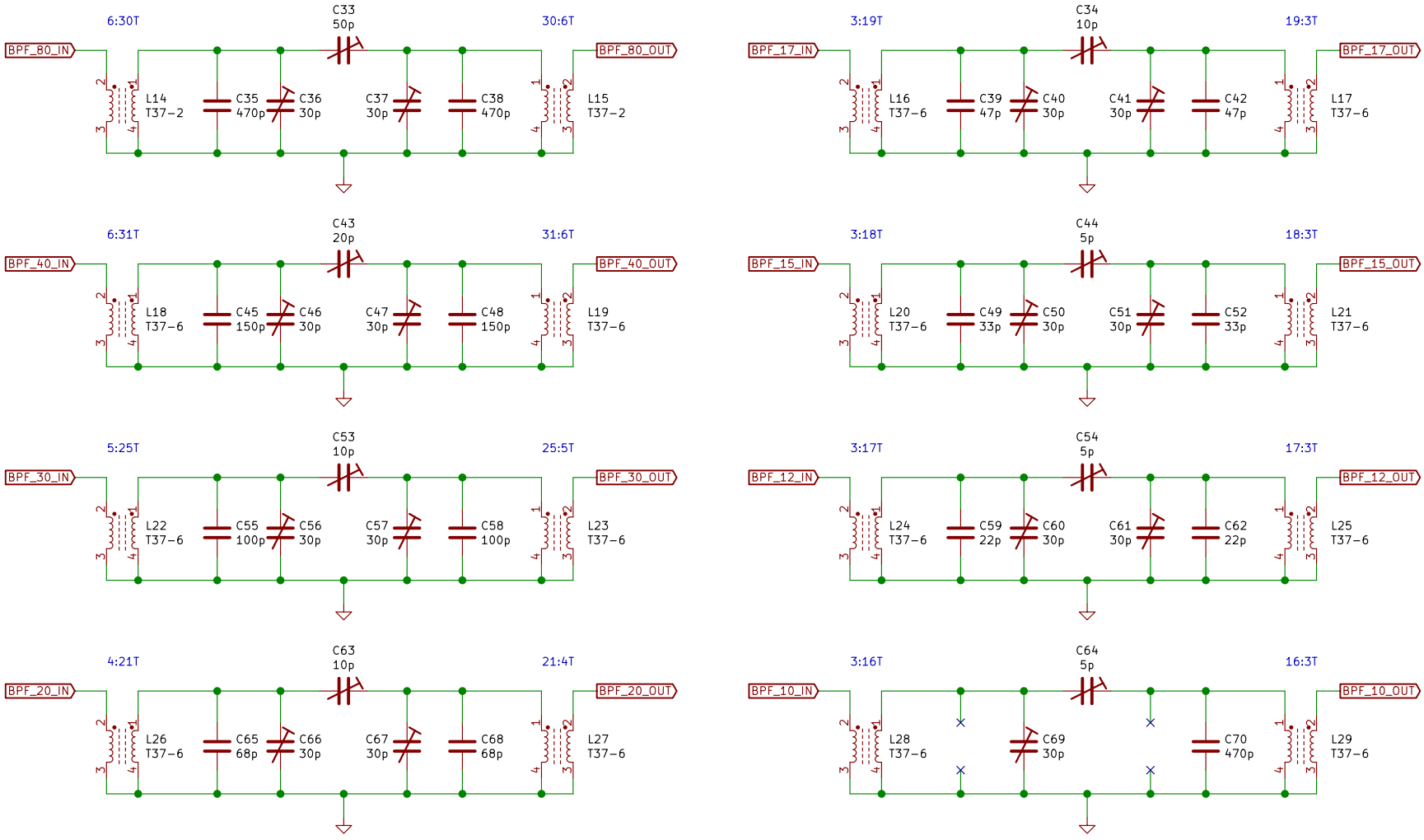

J1
SW1
D2
1N5818
C1
1000u
VCC
HS1
U1
L7805
VI
GND
VO
C2
0.33u
C3
0.1u
5V_DIGITAL
D1
1N4007
R1
4.7K
ENABLE_TX
Q1
2N3904
C4
0.1u
RL1
HFD27/012-S
RX_LPF_IN
STOCKTON_BRIDGE_OUT
ANT
J2
L1
23T @ FT50-43
Static bleeder
(optional)
Sheet: RX1
File: rx1.sch
Sheet: RX2
File: rx2.sch
Sheet: Extra RX Filters
File: extra-rx-filters.sch
J3
KEY
KEY_DIT
KEY_DAH
Sheet: BFO
File: bfo.sch
Sheet: BPF Relays 1
File: bpf-relays-1.sch
Sheet: CW Tone
File: cw-tone.sch
Sheet: BPF Relays 2
File: bpf-relays-2.sch
Sheet: LPFs
File: lpfs.sch
Sheet: LPF Relays
File: lpf-relays.sch
Sheet: BPFs
File: bpfs.sch
Sheet: TX
File: tx.sch
Sheet: Stockton Bridge
File: stockton-birdge.sch
Sheet: S Meter
File: s-meter.sch
U2
BluePill
B8 & B9 are
5V-tolerant
PC13 = green on-board LED
ENABLE_CW_TONE
LOCK_BTN
PREV_BTN
CLAR_BTN
KEYER_BTN
CTL_LPF_80
CTL_LPF_40_30
CTL_LPF_20_17
CTL_LPF_15_12_10
S_METER_OUT
PWR_REF
PWR_FWD
CTL_BPF_40
CTL_BPF_80
SW2
FREQ_ROT_A
FREQ_ROT_B
SW3
MULTI_ROT_A
MULTI_ROT_B
SW4
RIT_SWITCH
RIT/XIT
U5
24LC64
I2C_SDA
I2C_SCL
U3
Si5351-module
CW_OUT
VFO_OUT
The Si5351 module has built-in
pull-up resistors for the I2C bus.
U4
LCD 0802
SW5
NEXT_BTN
SW6
FAST_BTN
SW7
SW8
PREV_BTN
SW9
CLAR_BTN
SW10
KEYER_BTN
Sheet: /
File: hbr-8b.sch
Title: HBR/8B by R2AUK ::: https://eax.me/hbr-8b-transceiver/
Size: A4
Date: 2023-01-01
Rev: 1
KiCad E.D.A. kicad (5.1.12-1-10_14)
Id: 1/14



Sheet: /LPFs/
File: lpfs.sch

Title: HBR/8B by R2AUK ::: https://eax.me/hbr-8b-transceiver/

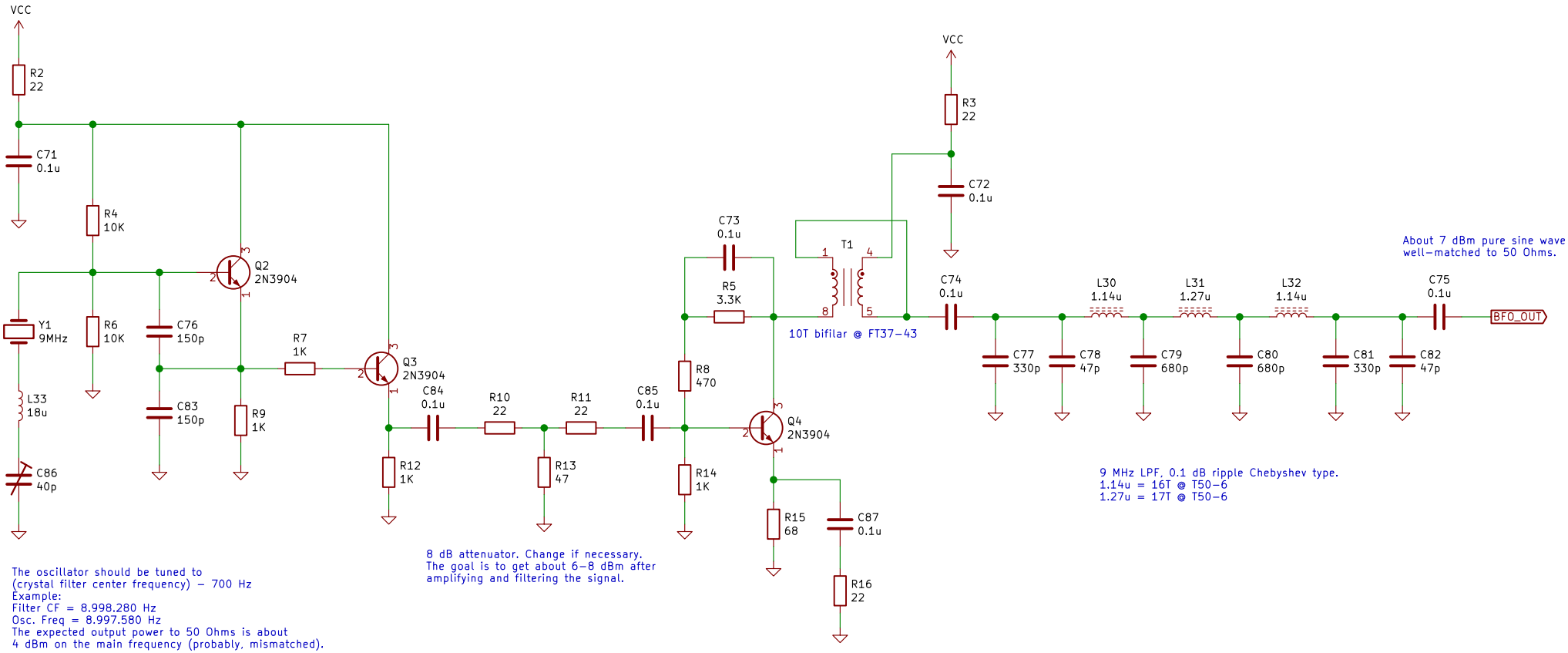
Size: A4	Date: 2023-01-01	**Rev: 1**
KiCad E.D.A. kicad (5.1.12-1-10_14)		Id: 2/14



Sheet: /BPFs/		
File: bpfs.sch		
Title: HBR/8B by R2AUK ::: https://eax.me/hbr-8b-transceiver/		
Size: A4	Date: 2023-01-01	**Rev: 1**
KiCad E.D.A. kicad (5.1.12-1-10_14)		Id: 3/14

The secret of a superheterodyne receiver free of spurious signals is a clean BFO. The signal of Si5351 is way too dirty and can't be used as a BFO. Trust me, I've tried many times.

For this project I wanted a clean, well-matched to 50 Ohm, 7 dBm BFO. However, if space is limited, try removing the attenuator and the amplifier, and then - the filter. Chances are everything will work adequately without them.



About 7 dBm pure sine wave well-matched to 50 Ohms.

9 MHz LPF, 0.1 dB ripple Chebyshev type.
1.14u = 16T @ T50-6
1.27u = 17T @ T50-6

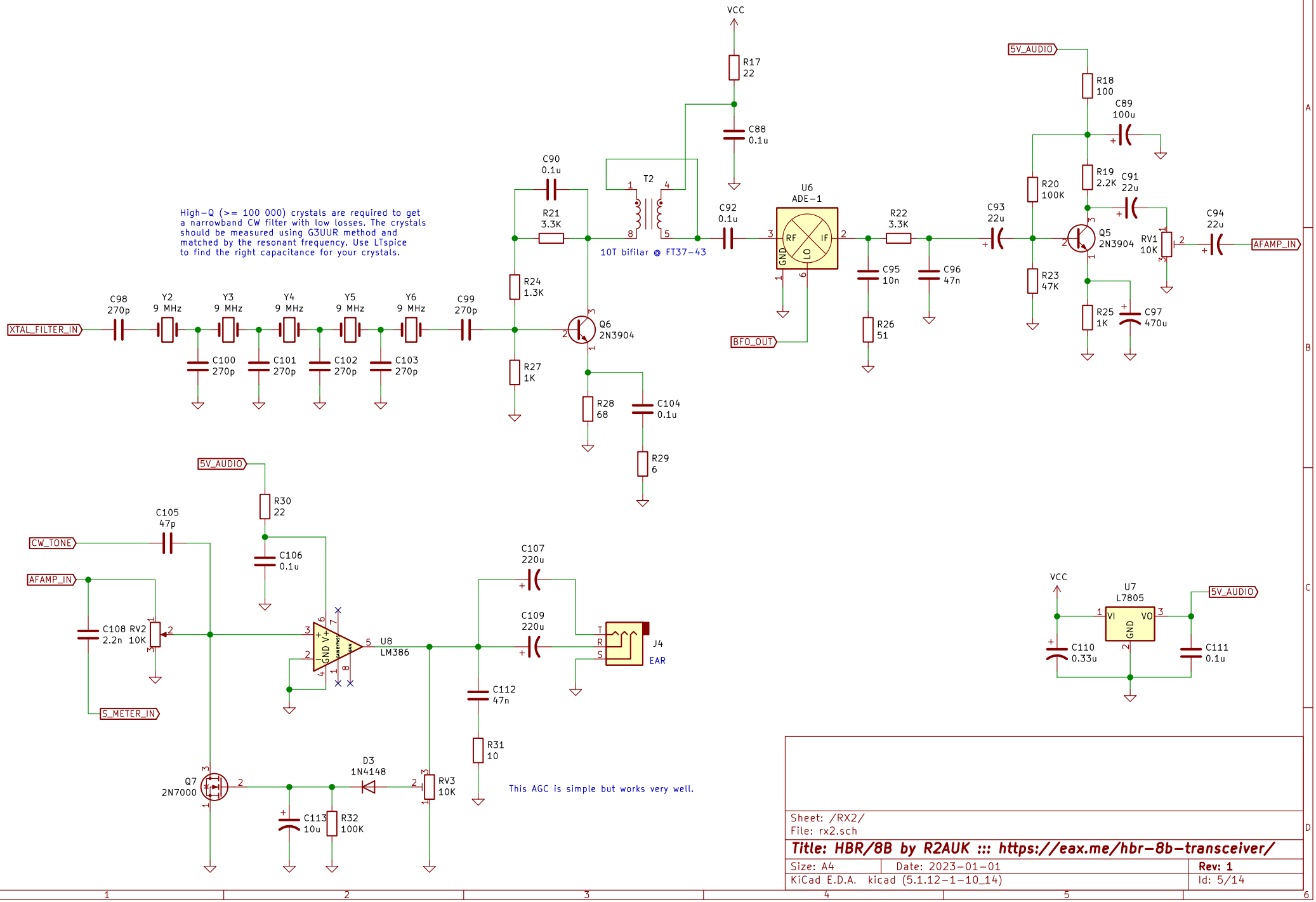
8 dB attenuator. Change if necessary. The goal is to get about 6-8 dBm after amplifying and filtering the signal.

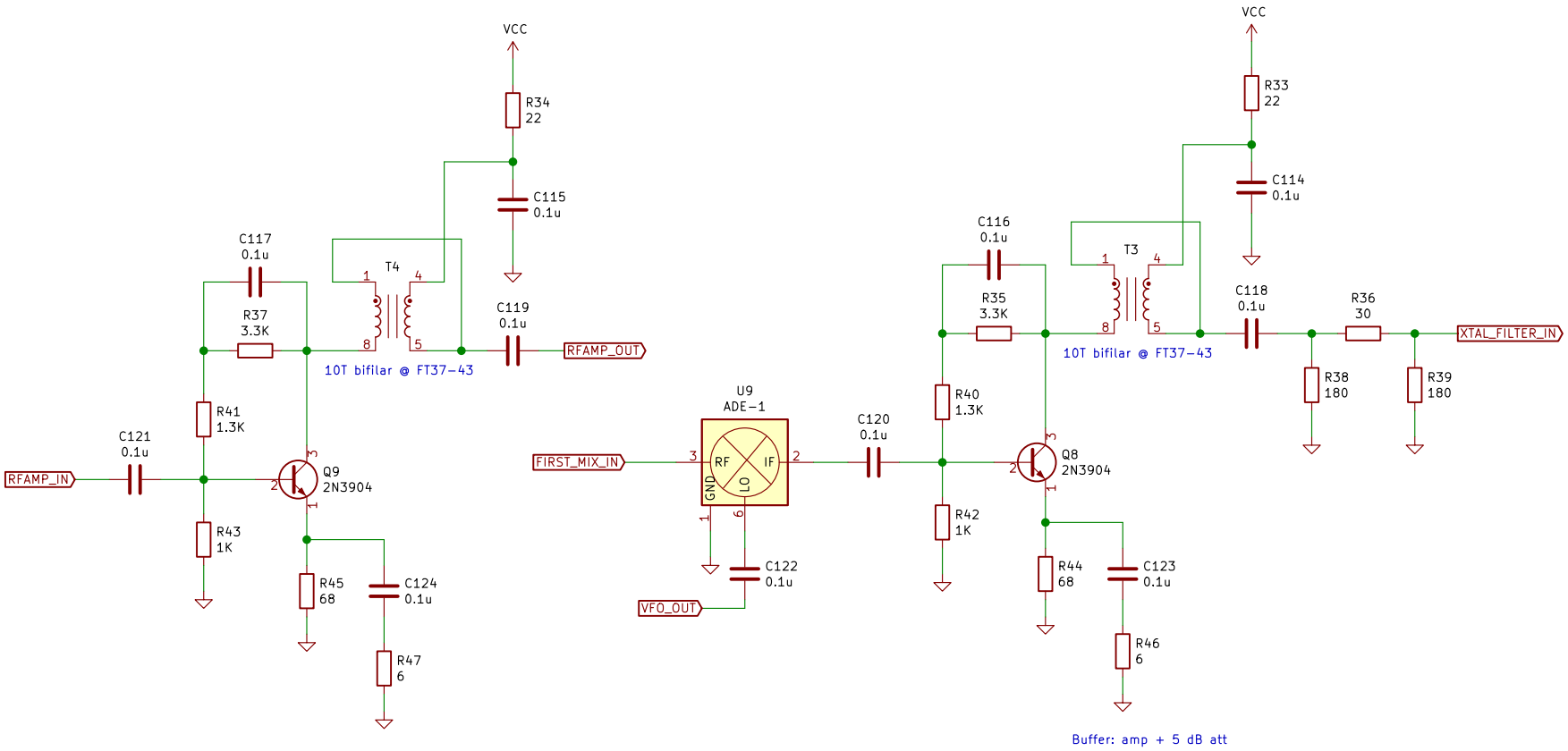
This feedback amplifier gives 10..12 dB of gain at 9 Mhz depending on the specific transistor.

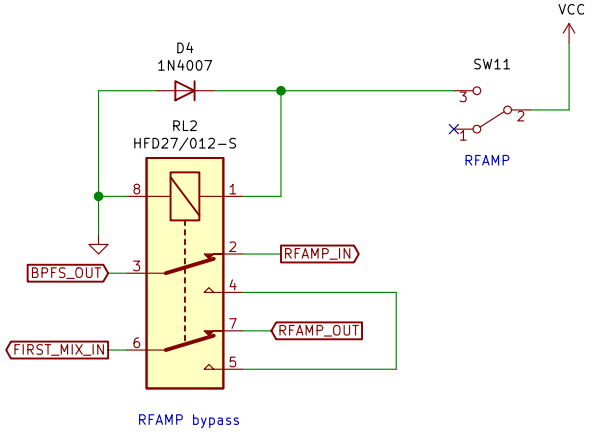
The oscillator should be tuned to (crystal filter center frequency) - 700 Hz
Example:
Filter CF = 8.998.280 Hz
Osc. Freq = 8.997.580 Hz
The expected output power to 50 Ohms is about 4 dBm on the main frequency (probably, mismatched).

Some experimentation may be required.
Try different coils and crystals if the oscillator doesn't tune to the required frequency.
Low Q crystals are preferable in this circuit.

Sheet: /BFO/		
File: bfo.sch		
Title: HBR/8B by R2AUK ::: https://eax.me/hbr-8b-transceiver/		
Size: A4	Date: 2023-01-01	**Rev: 1**
KiCad E.D.A. kicad (5.1.12-1-10_14)		Id: 4/14


VCC
R17
22
C88
0.1u
C90
0.1u
T2
R21
3.3K
10T bifilar @ FT37-43
C92
0.1u
U6
ADE-1
RF
IF
LO
GND
R22
3.3K
C93
22u
5V_AUDIO
R18
100
C89
100u
R19
2.2K
C91
22u
R20
100K
Q5
2N3904
RV1
10K
C94
22u
AFAMP_IN
R23
47K
R25
1K
C97
470u
BFO_OUT
C95
10n
R26
51
C96
47n
High-Q (>= 100 000) crystals are required to get
a narrowband CW filter with low losses. The crystals
should be measured using G3UUR method and
matched by the resonant frequency. Use LTspice
to find the right capacitance for your crystals.
XTAL_FILTER_IN
C98
270p
Y2
9 MHz
Y3
9 MHz
Y4
9 MHz
Y5
9 MHz
Y6
9 MHz
C99
270p
C100
270p
C101
270p
C102
270p
C103
270p
R24
1.3K
R27
1K
Q6
2N3904
R28
68
C104
0.1u
R29
6
5V_AUDIO
R30
22
C105
47p
CW_TONE
C106
0.1u
AFAMP_IN
C108 RV2
2.2n 10K
S_METER_IN
U8
LM386
C107
220u
C109
220u
J4
EAR
C112
47n
R31
10
Q7
2N7000
D3
1N4148
RV3
10K
C113
10u
R32
100K
This AGC is simple but works very well.
VCC
U7
L7805
VI
VO
GND
5V_AUDIO
C110
0.33u
C111
0.1u
Sheet: /RX2/
File: rx2.sch
Title: HBR/8B by R2AUK ::: https://eax.me/hbr-8b-transceiver/
Size: A4
Date: 2023-01-01
Rev: 1
KiCad E.D.A. kicad (5.1.12-1-10_14)
Id: 5/14



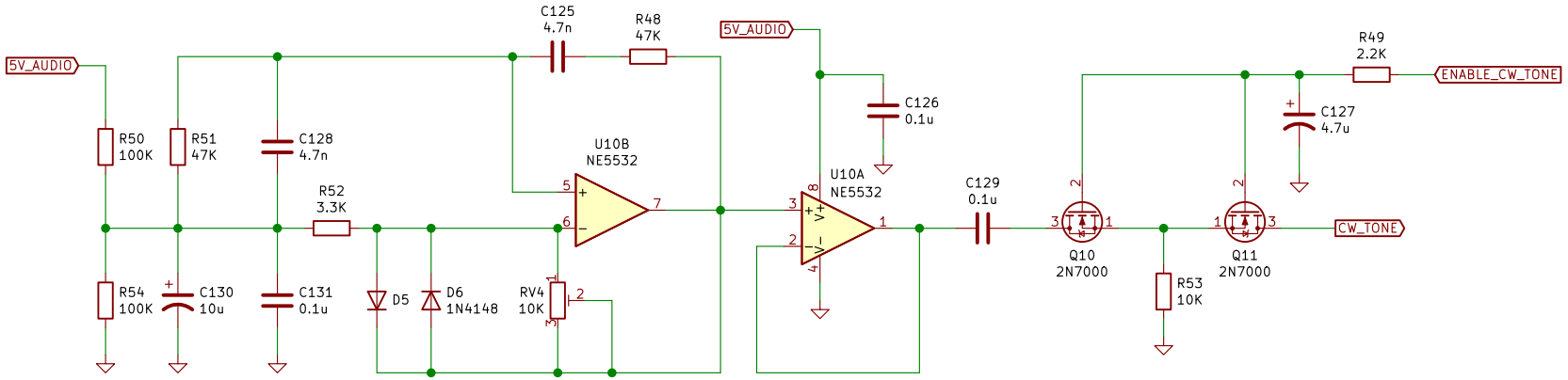


Sheet: /RX1/
File: rx1.sch

Title: HBR/8B by R2AUK ::: https://eax.me/hbr-8b-transceiver/

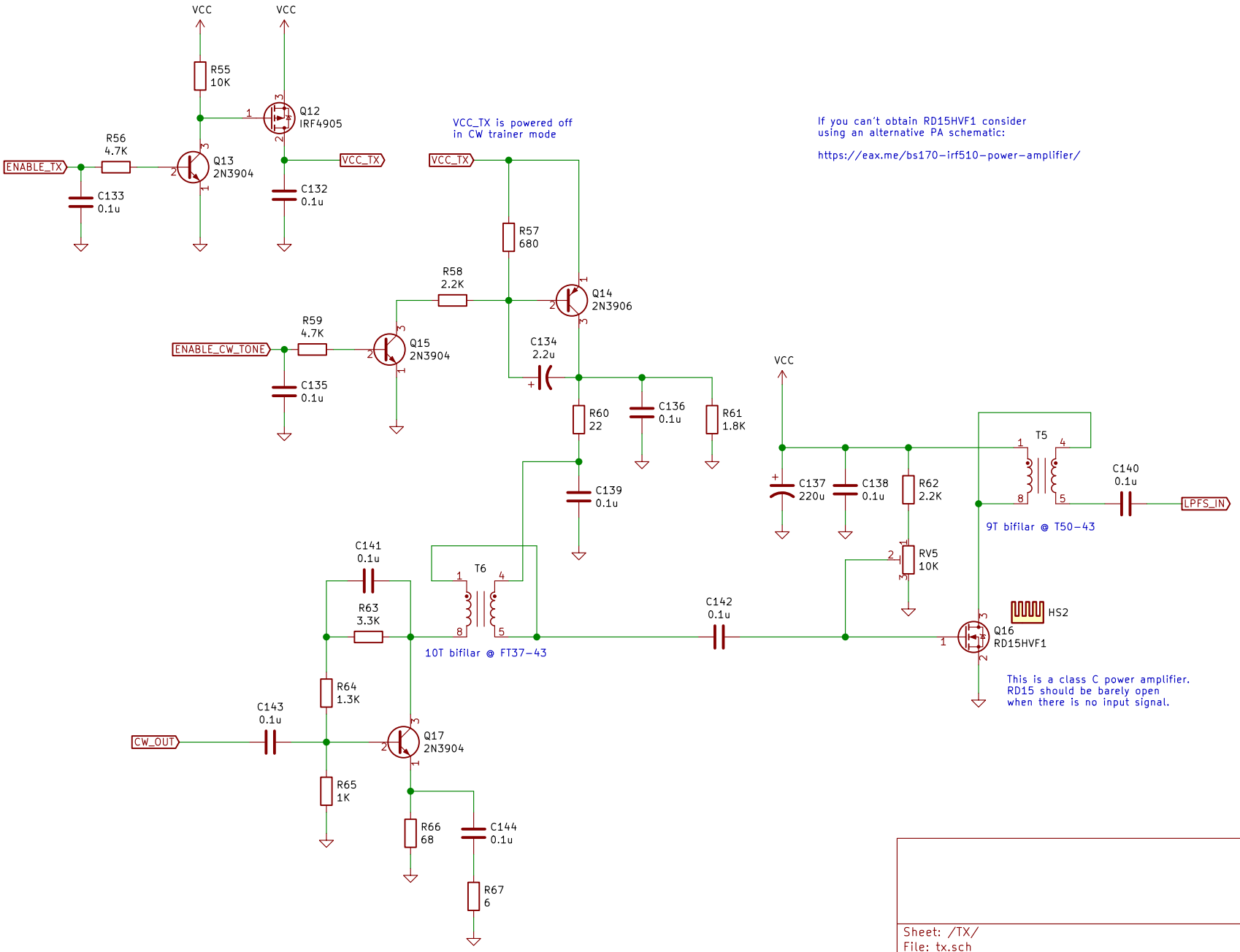
Size: A4	Date: 2023-01-01	**Rev: 1**
KiCad E.D.A. kicad (5.1.12-1-10_14)		Id: 6/14

700 Hz Wien bridge oscillator + buffer

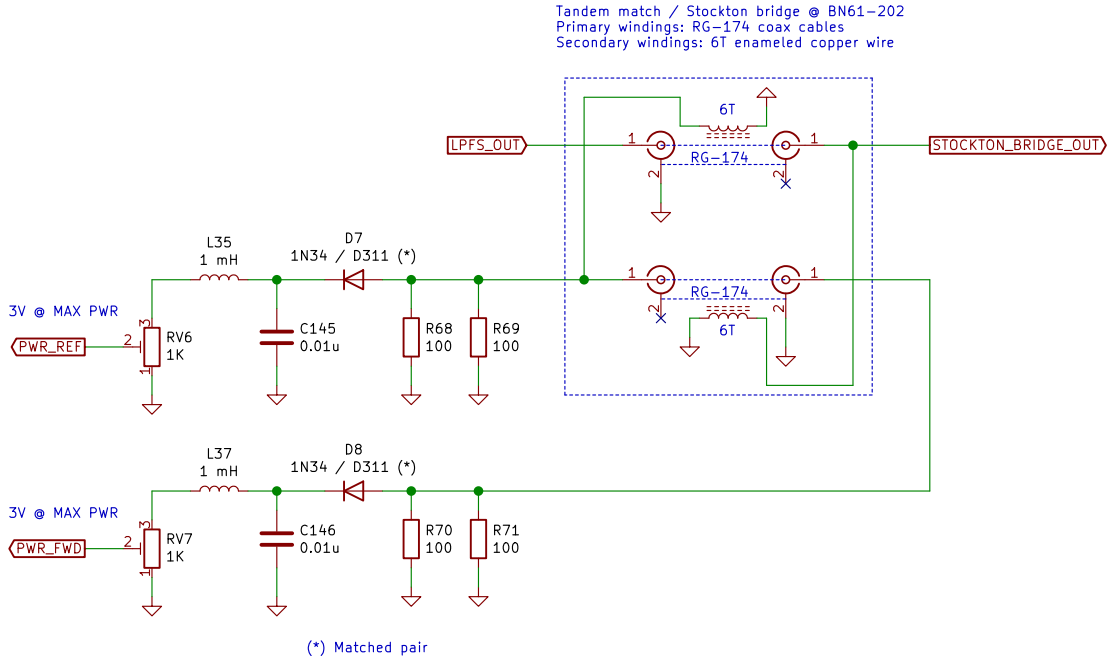


Adjust to get a pure sine wave

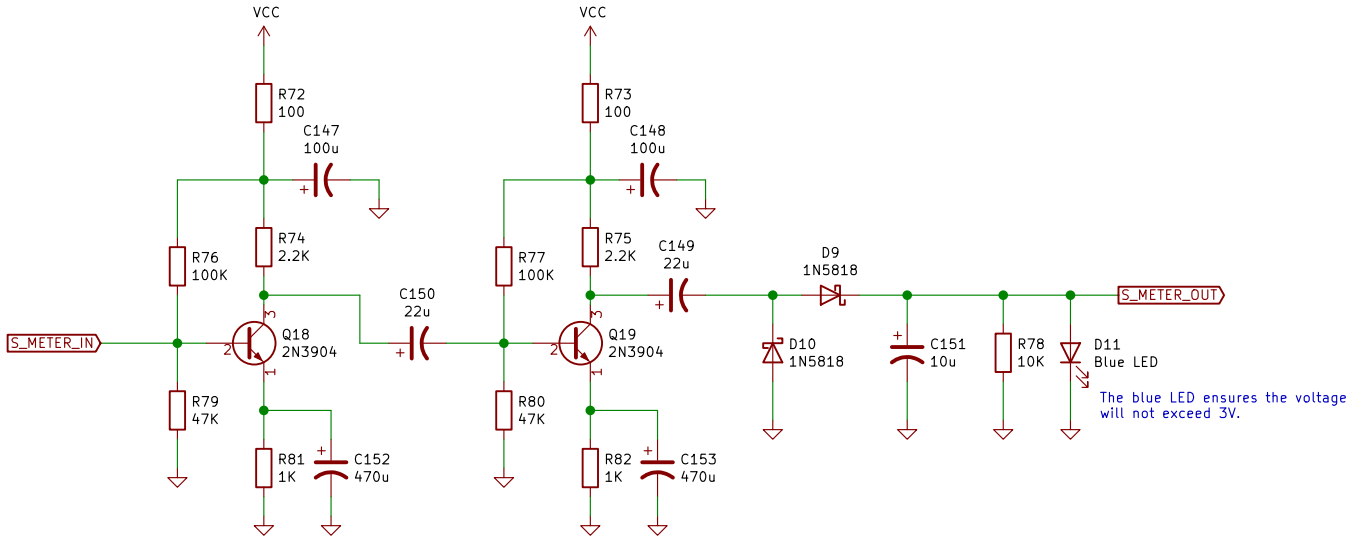
Sheet: /CW Tone/		
File: cw-tone.sch		
Title: HBR/8B by R2AUK ::: https://eax.me/hbr-8b-transceiver/		
Size: A4	Date: 2023-01-01	**Rev: 1**
KiCad E.D.A. kicad (5.1.12-1-10_14)		Id: 7/14



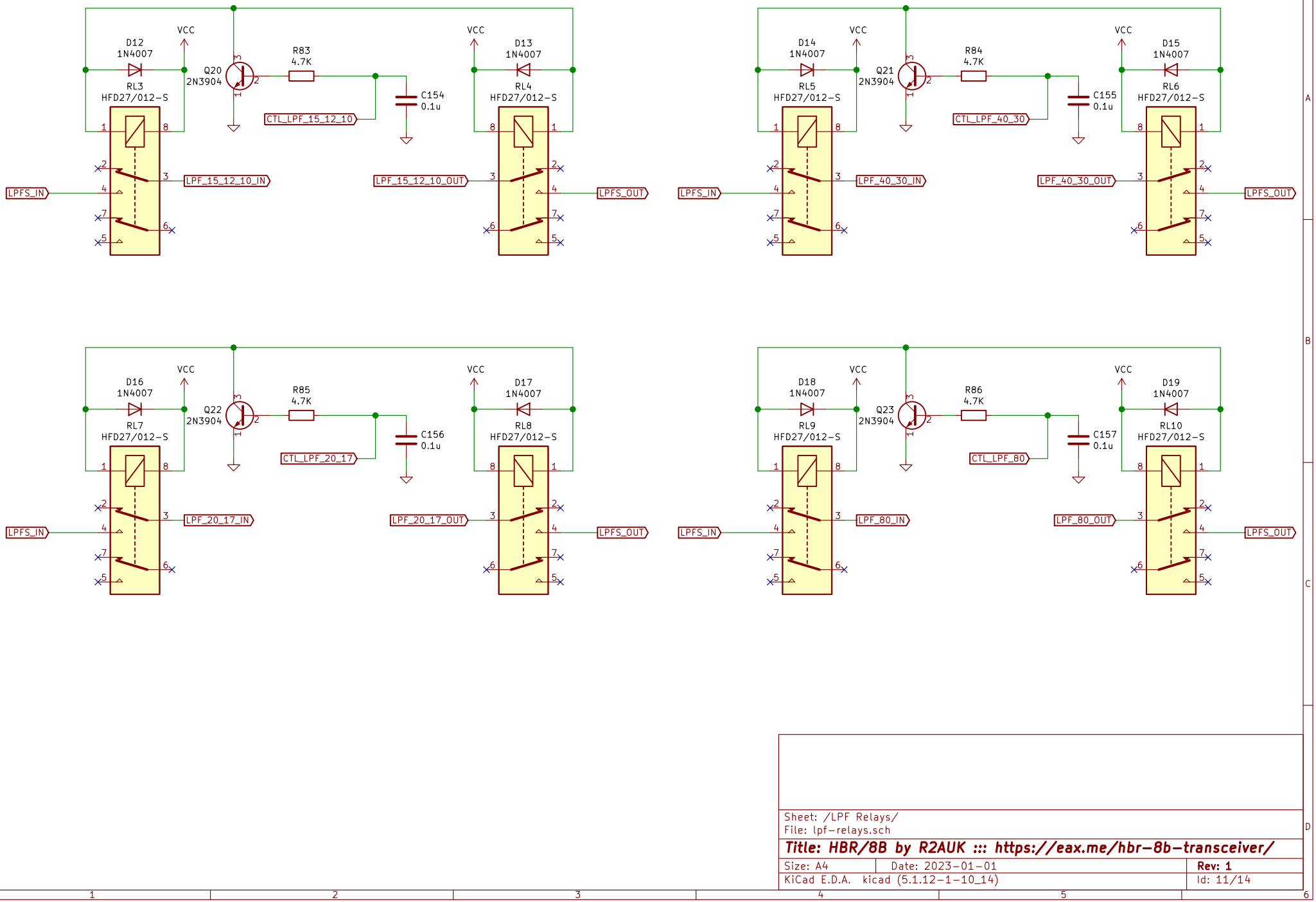
Sheet: /TX/		
File: tx.sch		
Title: HBR/8B by R2AUK ::: https://eax.me/hbr-8b-transceiver/		
Size: A4	Date: 2023-01-01	**Rev: 1**
KiCad E.D.A. kicad (5.1.12-1-10_14)		Id: 8/14



Sheet: /Stockton Bridge/		
File: stockton-birdge.sch		
Title: HBR/8B by R2AUK ::: https://eax.me/hbr-8b-transceiver/		
Size: A4	Date: 2023-01-01	**Rev: 1**
KiCad E.D.A. kicad (5.1.12-1-10_14)		Id: 9/14



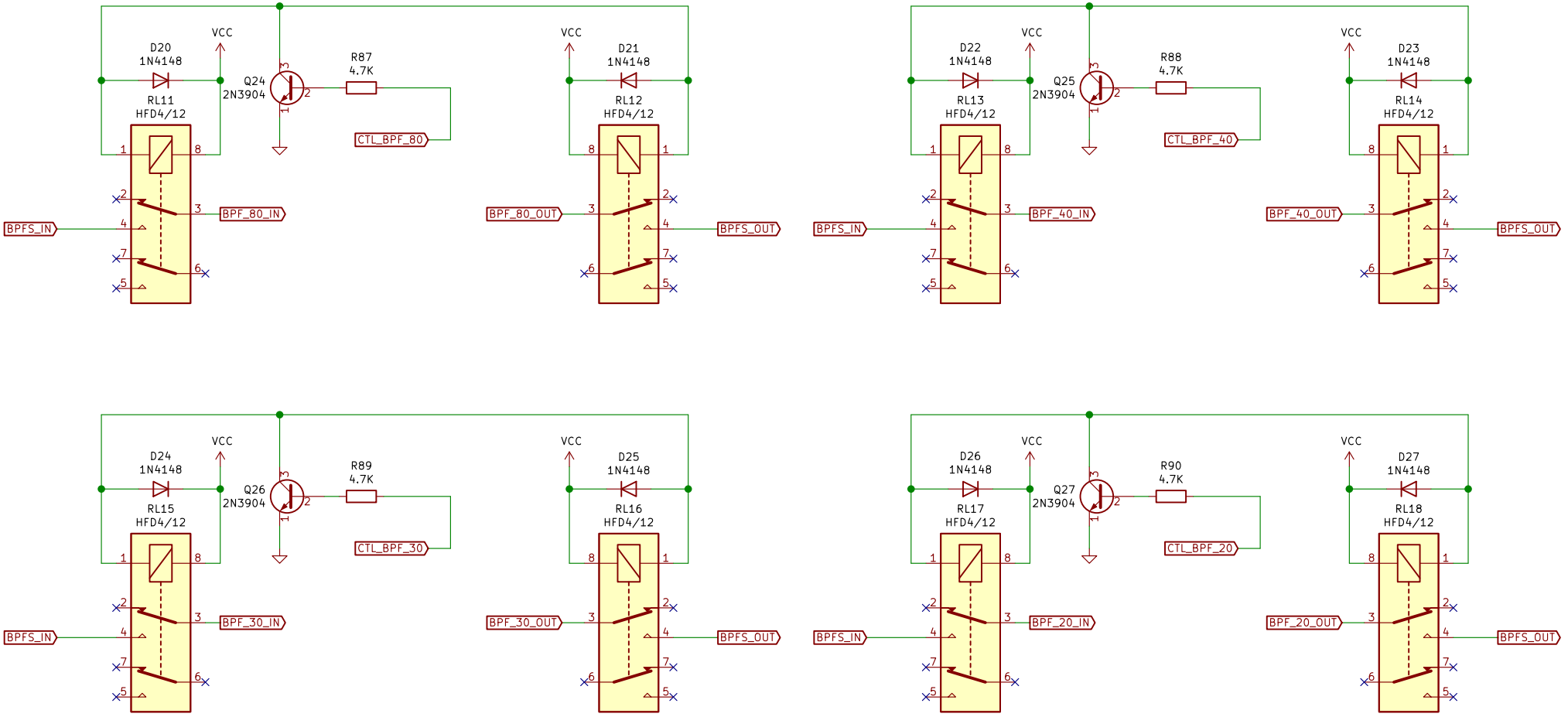
Sheet: /S Meter/		
File: s-meter.sch		
Title: HBR/8B by R2AUK ::: https://eax.me/hbr-8b-transceiver/		
Size: A4	Date: 2023-01-01	**Rev: 1**
KiCad E.D.A. kicad (5.1.12-1-10_14)		Id: 10/14



Sheet: /LPF Relays/
File: lpf-relays.sch

Title: HBR/8B by R2AUK ::: https://eax.me/hbr-8b-transceiver/

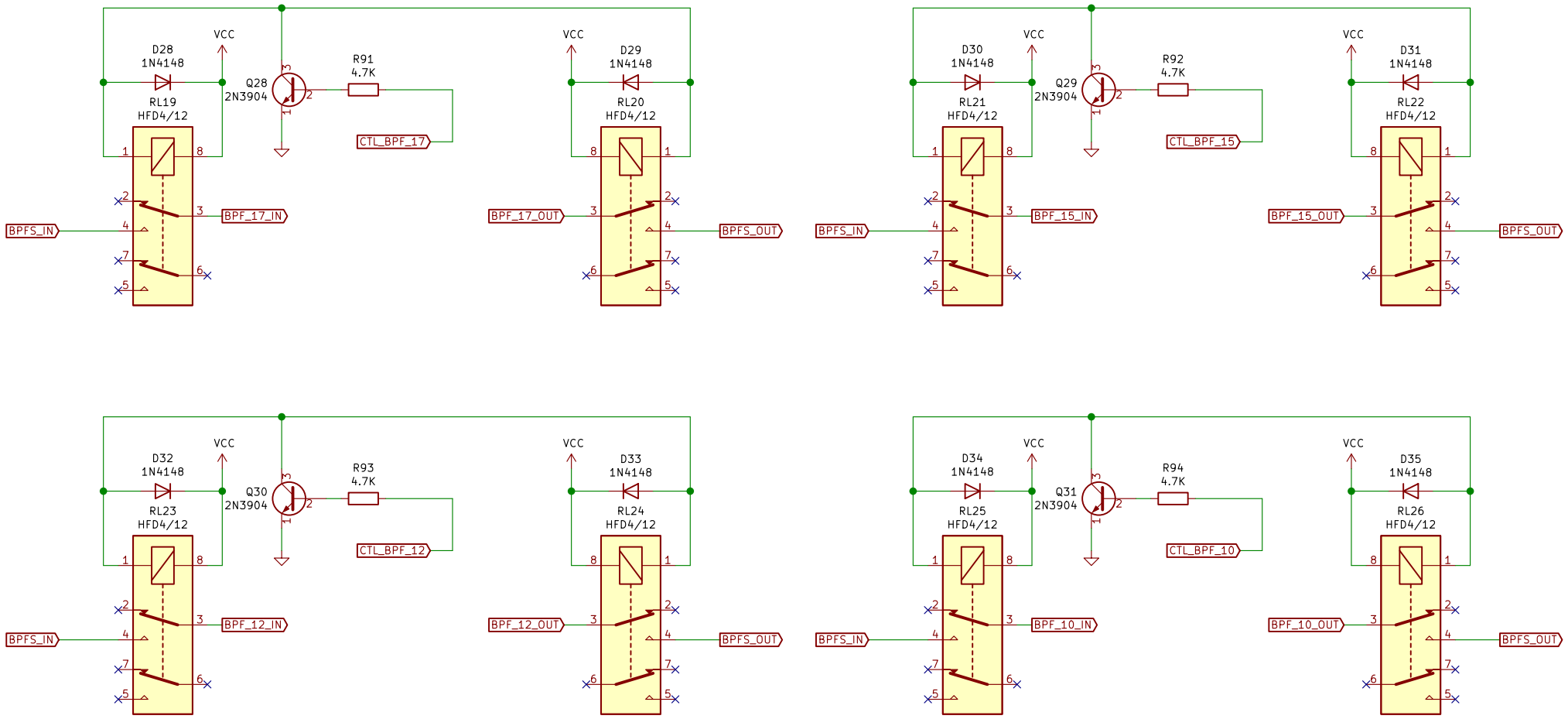
Size: A4	Date: 2023-01-01	**Rev: 1**
KiCad E.D.A. kicad (5.1.12-1-10_14)		Id: 11/14



Sheet: /BPF Relays 1/
File: bpf-relays-1.sch

Title: HBR/8B by R2AUK ::: https://eax.me/hbr-8b-transceiver/

Size: A4	Date: 2023-01-01	**Rev: 1**
KiCad E.D.A. kicad (5.1.12-1-10_14)		Id: 12/14



Sheet: /BPF Relays 2/
File: bpf-relays-2.sch

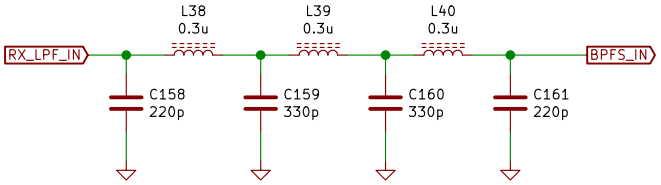
Title: HBR/8B by R2AUK ::: https://eax.me/hbr-8b-transceiver/

Size: A4	Date: 2023-01-01	**Rev: 1**
KiCad E.D.A. kicad (5.1.12-1-10_14)		Id: 13/14

These filters are not 100% mandatory
but they improve IMRR significantly.

31 MHz Chebyshev LPF, 1 dB ripple

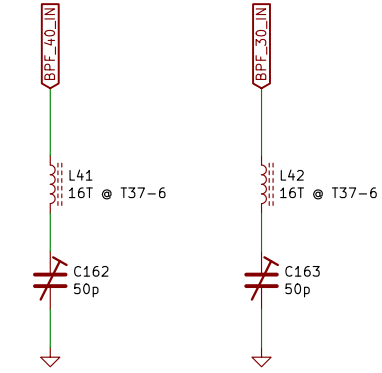
0.3u = 9T @ T37-6



Some extra notch filters are recommended as well.

For 80 meters one is not needed becasue the BPF has
a very good suppression of potentially problematic
frequencies (21.5 MHz, 28.5 MHz)

For 20-10 meters the RX LPF will do the trick.



Tune to 25 MHz

Tune to 28 MHz

Sheet: /Extra RX Filters/
File: extra-rx-filters.sch

Title: HBR/8B by R2AUK ::: https://eax.me/hbr-8b-transceiver/

Size: A4	Date: 2023-01-01	**Rev: 1**
KiCad E.D.A. kicad (5.1.12-1-10_14)		Id: 14/14