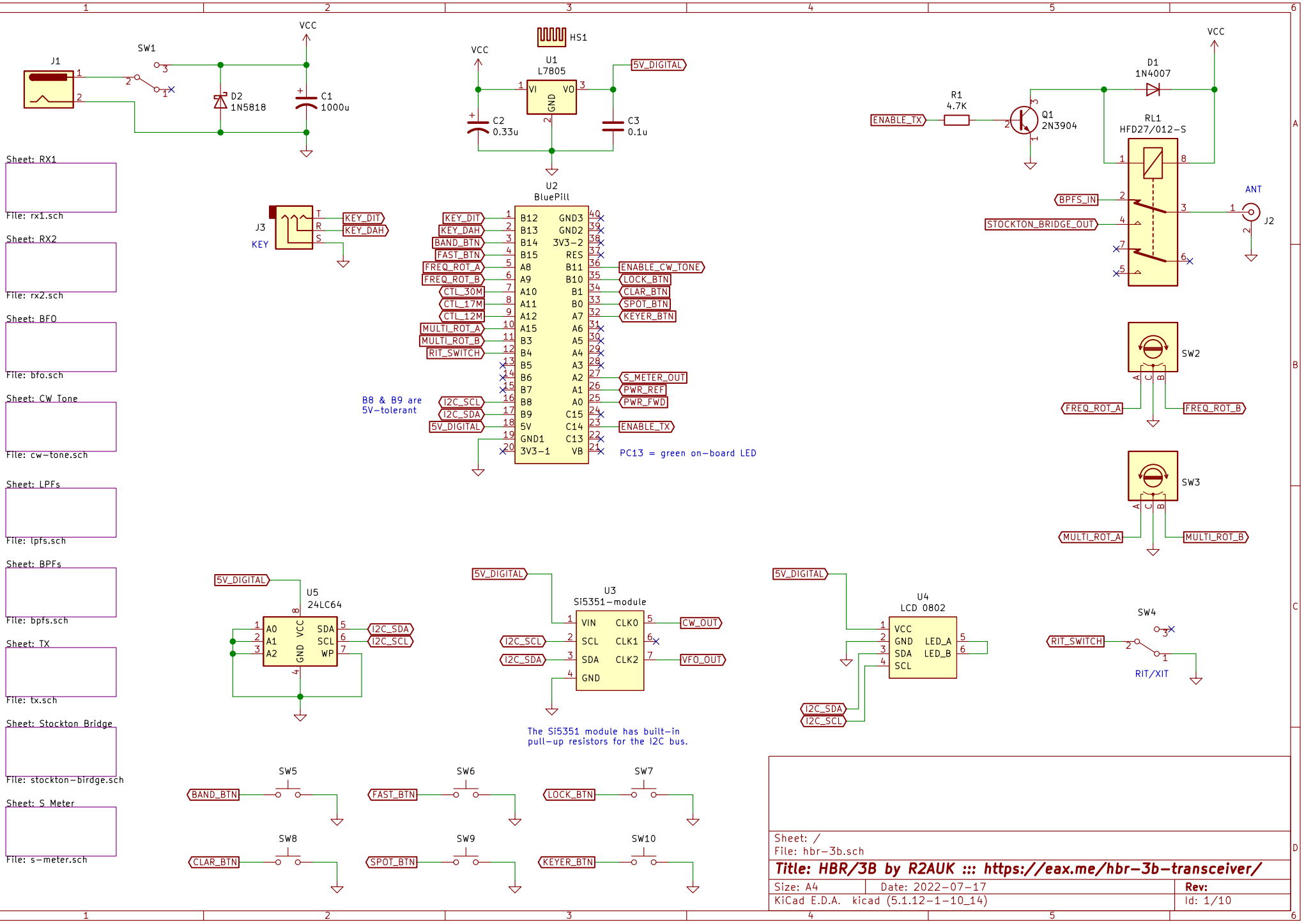
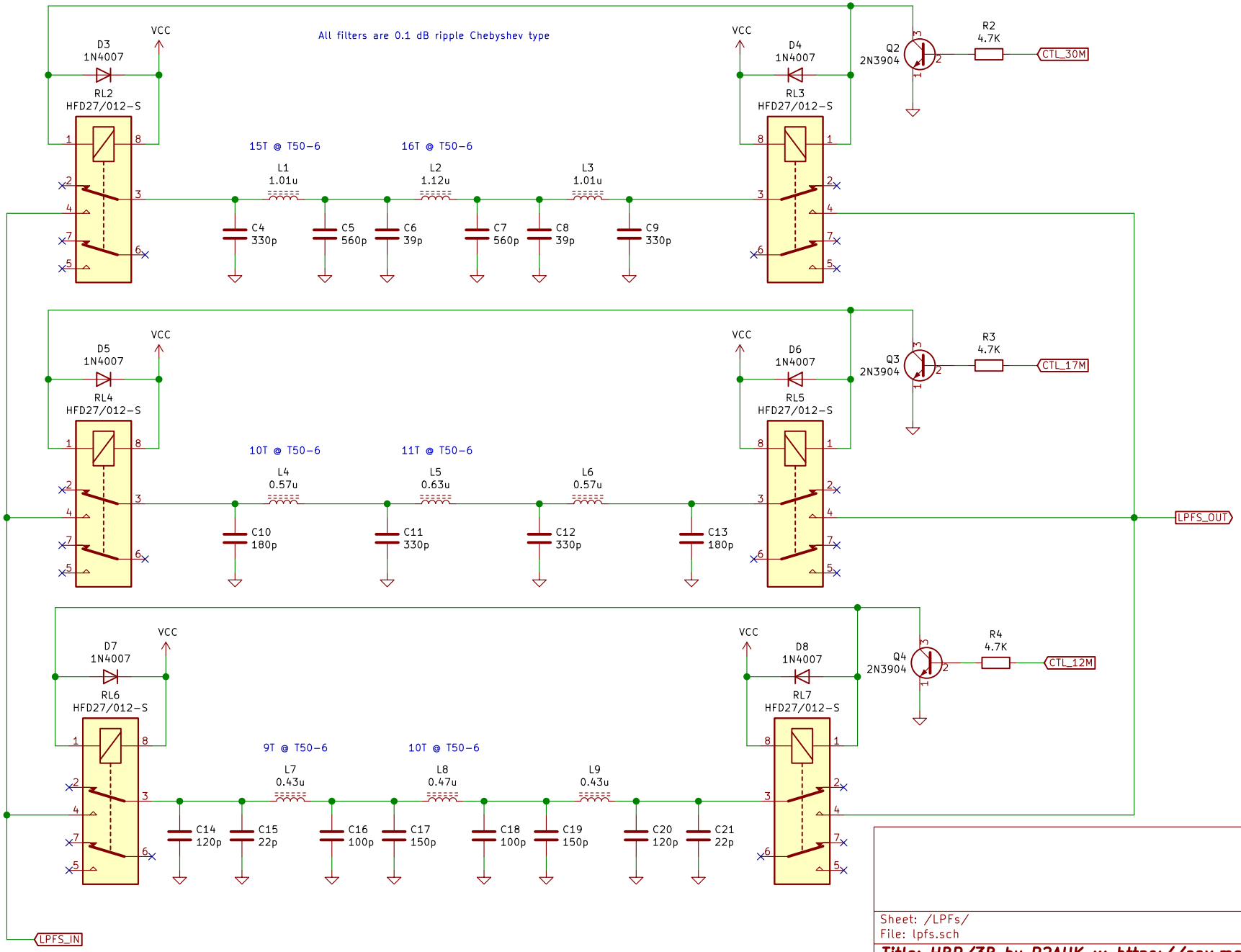


Sheet: /
File: hbr-3b.sch

Title: HBR/3B by R2AUK ::: https://eax.me/hbr-3b-transceiver/

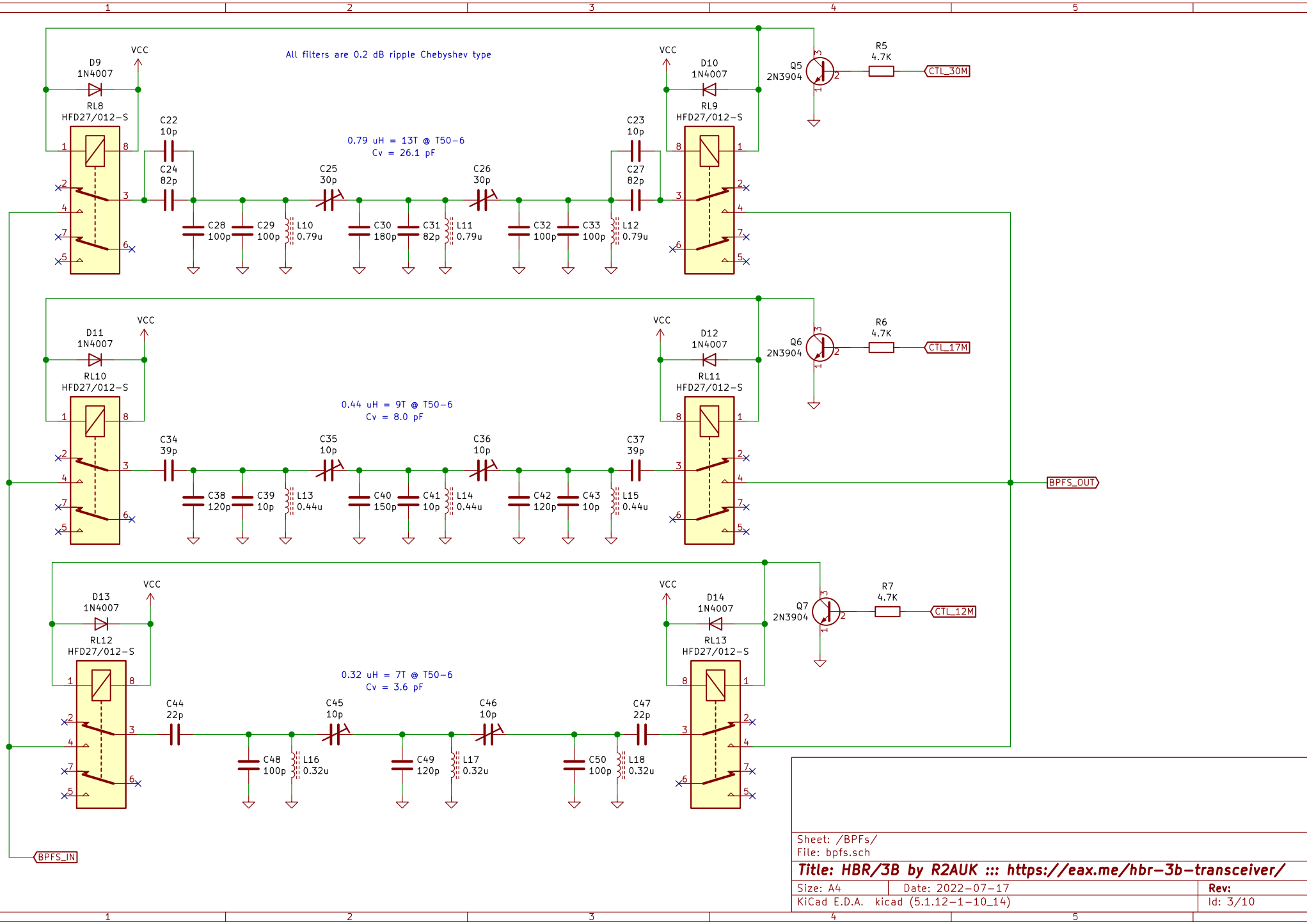
Size: A4	Date: 2022-07-17	Rev:
KiCad E.D.A. kicad (5.1.12-1-10_14)		Id: 1/10



Sheet: /LPFs/
File: lpfs.sch

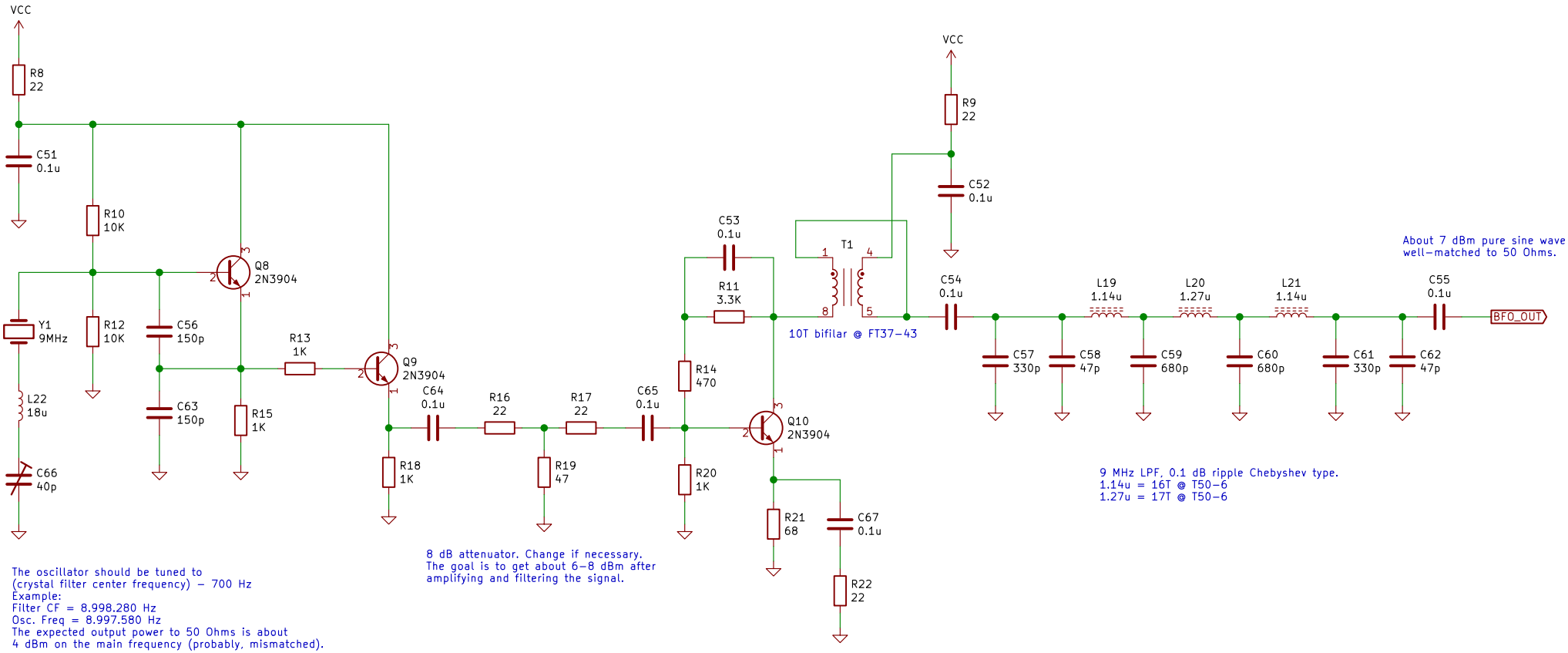
Title: HBR/3B by R2AUK ::: https://eax.me/hbr-3b-transceiver/

Size: A4	Date: 2022-07-17	Rev:
KiCad E.D.A. kicad (5.1.12-1-10_14)		Id: 2/10


All filters are 0.2 dB ripple Chebyshev type
VCC
D9
1N4007
RL8
HFD27/012-S
C22
10p
C24
82p
0.79 uH = 13T @ T50-6
Cv = 26.1 pF
C25
30p
C26
30p
C23
10p
C27
82p
C28
100p
C29
100p
L10
0.79u
C30
180p
C31
82p
L11
0.79u
C32
100p
C33
100p
L12
0.79u
D10
1N4007
RL9
HFD27/012-S
Q5
2N3904
R5
4.7K
CTL_30M
D11
1N4007
RL10
HFD27/012-S
0.44 uH = 9T @ T50-6
Cv = 8.0 pF
C34
39p
C35
10p
C36
10p
C37
39p
C38
120p
C39
10p
L13
0.44u
C40
150p
C41
10p
L14
0.44u
C42
120p
C43
10p
L15
0.44u
D12
1N4007
RL11
HFD27/012-S
Q6
2N3904
R6
4.7K
CTL_17M
BPFS_OUT
D13
1N4007
RL12
HFD27/012-S
0.32 uH = 7T @ T50-6
Cv = 3.6 pF
C44
22p
C45
10p
C46
10p
C47
22p
C48
100p
L16
0.32u
C49
120p
L17
0.32u
C50
100p
L18
0.32u
D14
1N4007
RL13
HFD27/012-S
Q7
2N3904
R7
4.7K
CTL_12M
BPFS_IN
Sheet: /BPFs/
File: bpfs.sch
Title: HBR/3B by R2AUK ::: https://eax.me/hbr-3b-transceiver/
Size: A4
Date: 2022-07-17
Rev:
KiCad E.D.A. kicad (5.1.12-1-10_14)
Id: 3/10

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

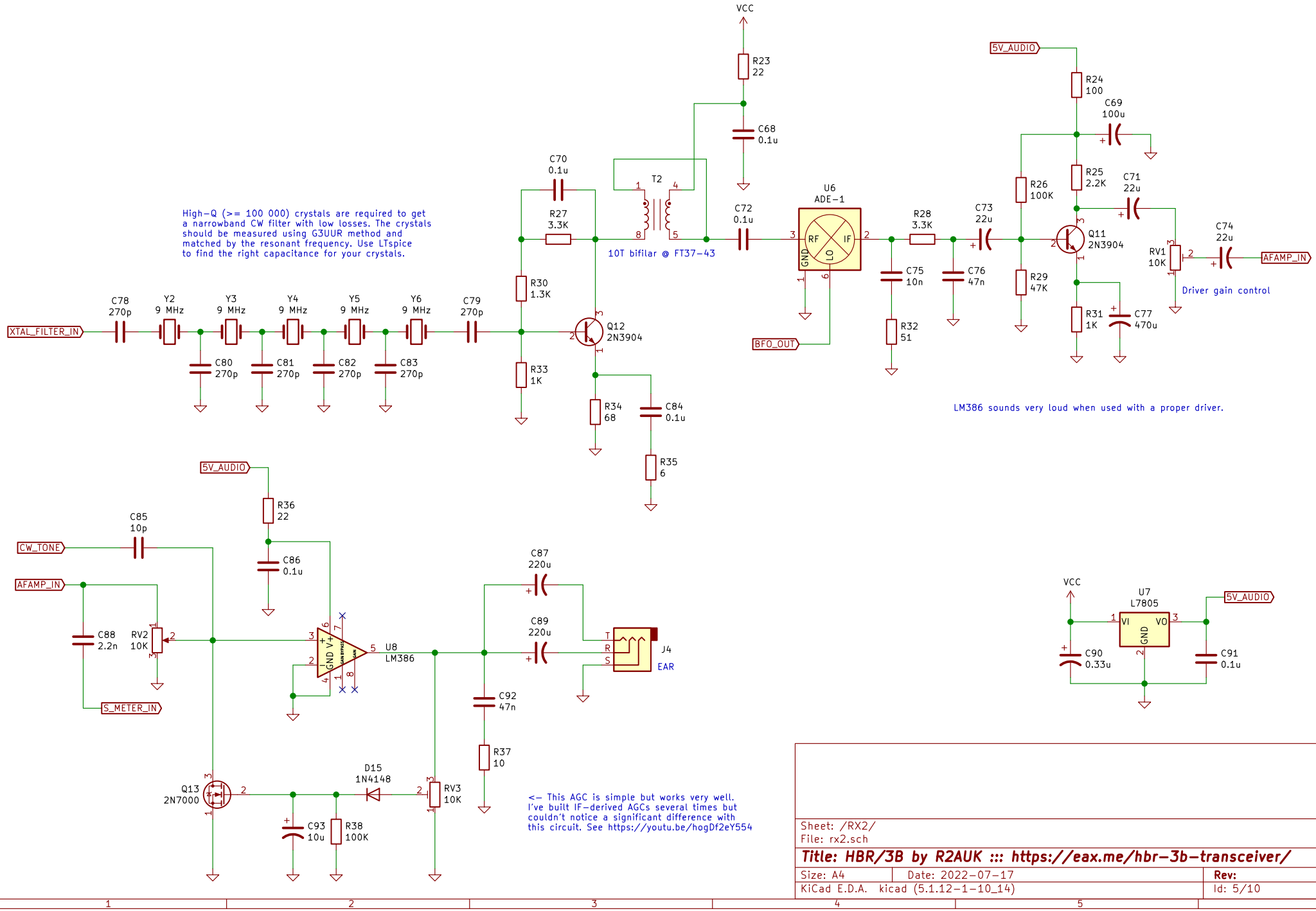
8 dB attenuator. Change if necessary. The goal is to get about 6-8 dBm after amplifying and filtering the signal.

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

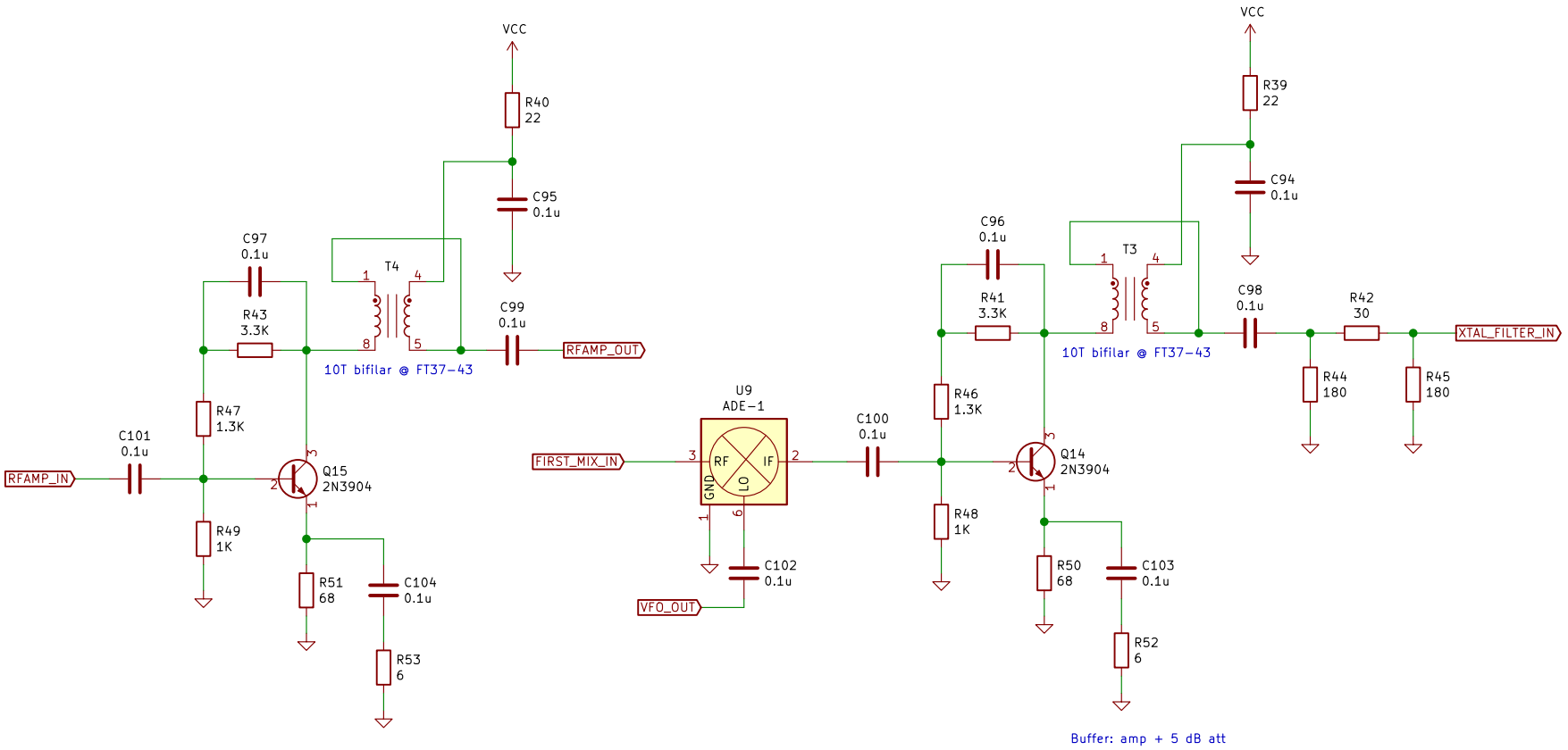
The oscillator should be tuned to (crystal filter center frequency) - 700 Hz
Example:
Filter CF = 8.998.280 Hz
Osc. Freq = 8.997.580 Hz
The expected output power to 50 Ohms is about 4 dBm on the main frequency (probably, mismatched).

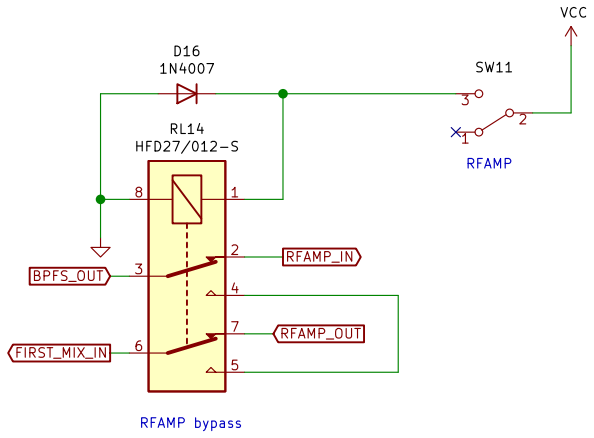
Some experimentation may be required.
Try different coils and crystals if the oscillator doesn't tune to the required frequency.
Low Q crystals are preferable in this circuit.

Sheet: /BFO/		
File: bfo.sch		
Title: HBR/3B by R2AUK ::: https://eax.me/hbr-3b-transceiver/		
Size: A4	Date: 2022-07-17	**Rev:**
KiCad E.D.A. kicad (5.1.12-1-10_14)		Id: 4/10



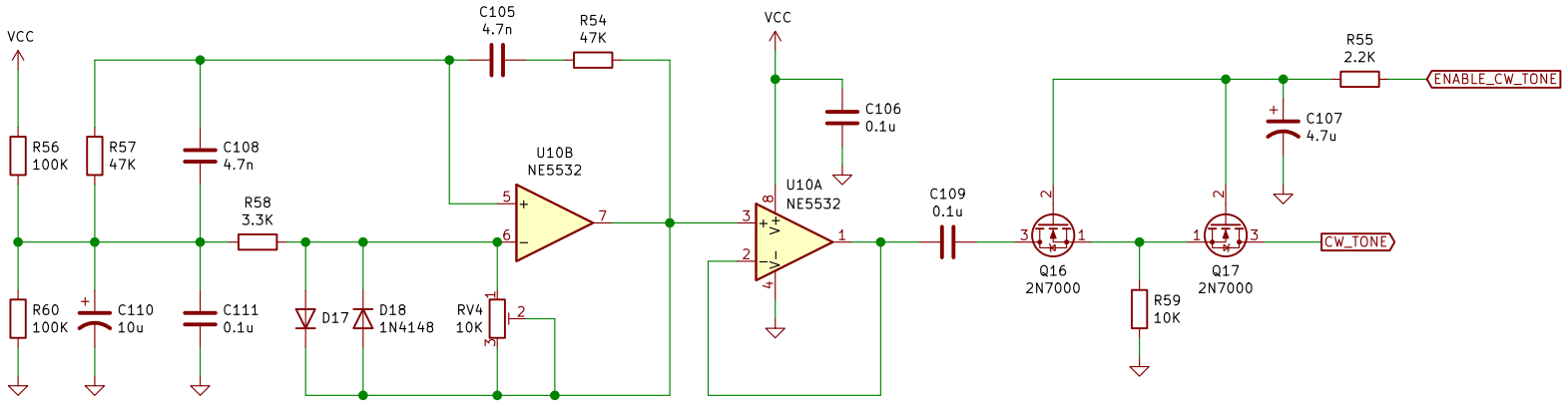
Sheet: /RX2/		
File: rx2.sch		
Title: HBR/3B by R2AUK ::: https://eax.me/hbr-3b-transceiver/		
Size: A4	Date: 2022-07-17	**Rev:**
KiCad E.D.A. kicad (5.1.12-1-10_14)		Id: 5/10





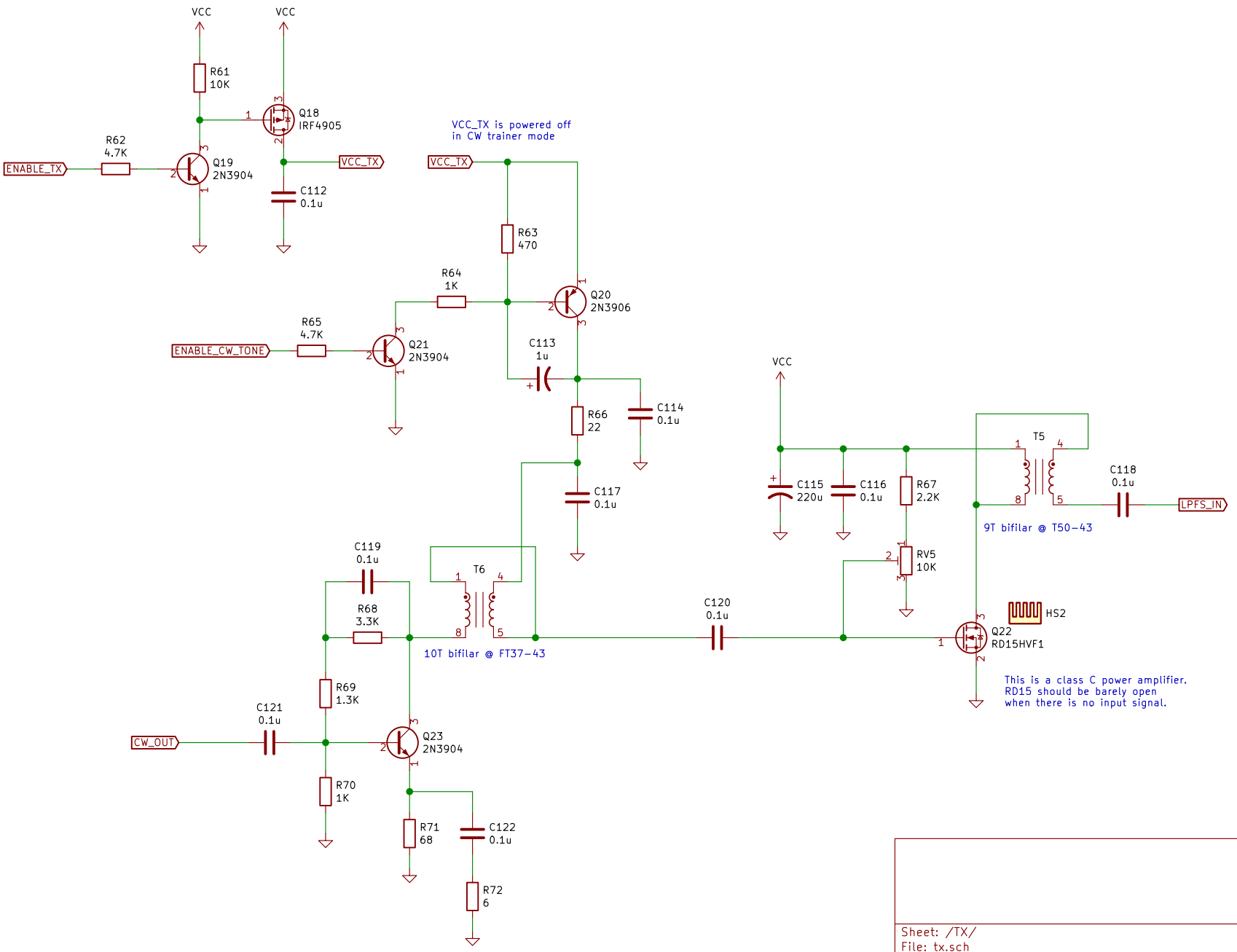
Sheet: /RX1/		
File: rx1.sch		
Title: HBR/3B by R2AUK ::: https://eax.me/hbr-3b-transceiver/		
Size: A4	Date: 2022-07-17	**Rev:**
KiCad E.D.A. kicad (5.1.12-1-10_14)		Id: 6/10

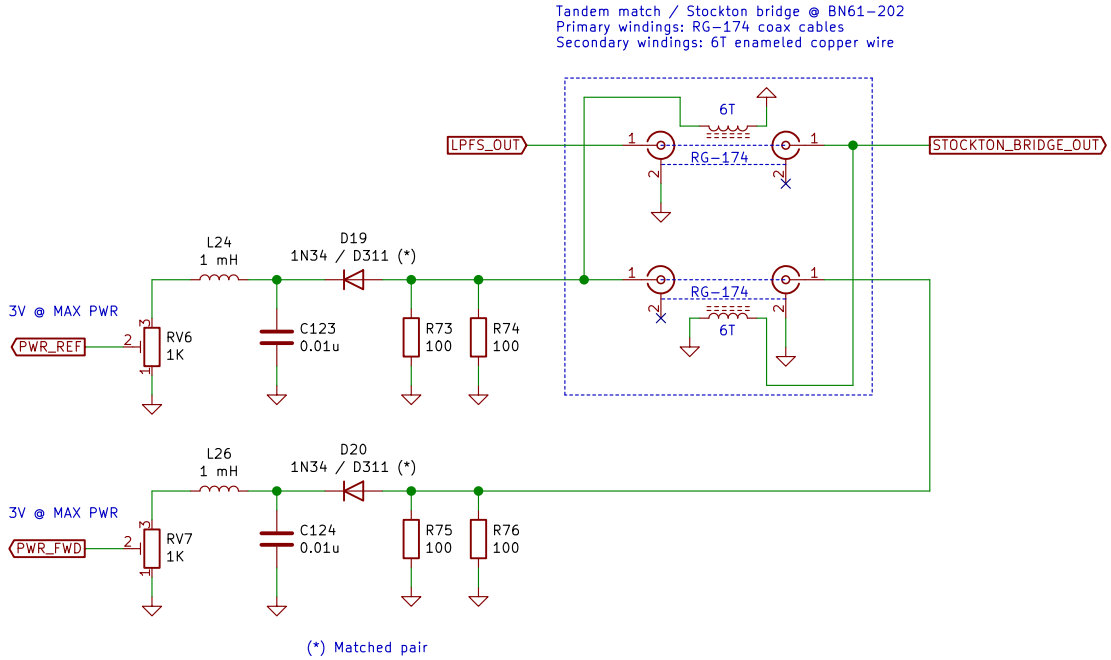
700 Hz Wien bridge oscillator + buffer



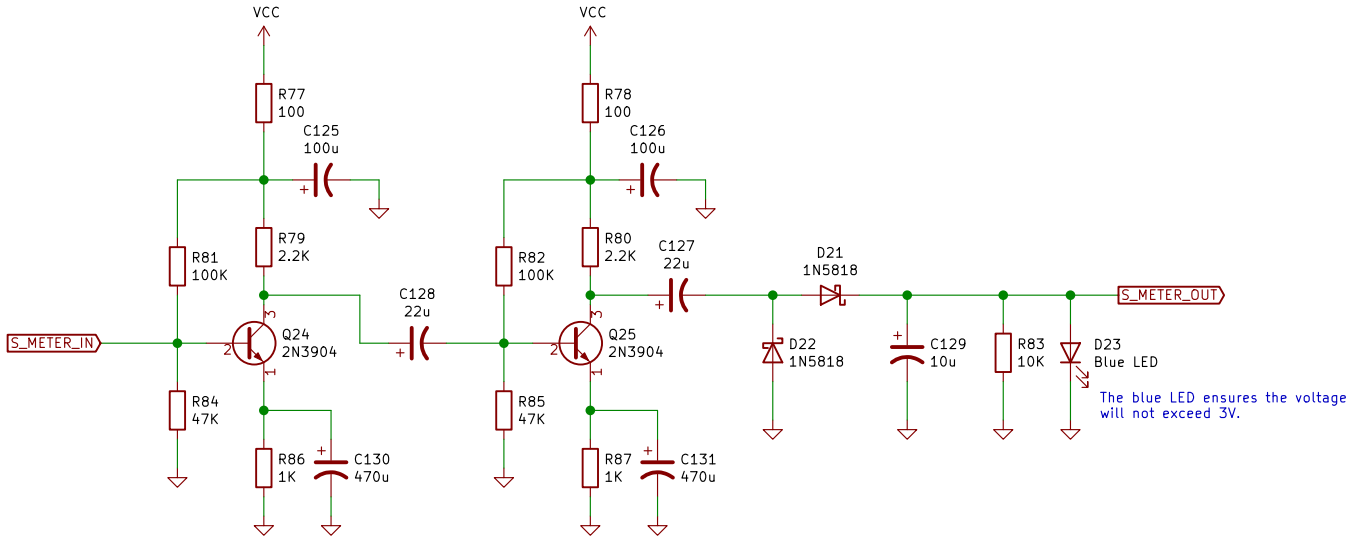
Adjust to get a pure sine wave

Sheet: /CW Tone/		
File: cw-tone.sch		
Title: HBR/3B by R2AUK ::: https://eax.me/hbr-3b-transceiver/		
Size: A4	Date: 2022-07-17	**Rev:**
KiCad E.D.A. kicad (5.1.12-1-10_14)		Id: 7/10


VCC
VCC
R61
10K
Q18
IRF4905
R62
4.7K
ENABLE_TX
Q19
2N3904
VCC_TX
C112
0.1u
VCC_TX is powered off
in CW trainer mode
VCC_TX
R63
470
R64
1K
Q20
2N3906
R65
4.7K
ENABLE_CW_TONE
Q21
2N3904
C113
1u
R66
22
C114
0.1u
C117
0.1u
VCC
C115
220u
C116
0.1u
R67
2.2K
T5
C118
0.1u
LPFS_IN
9T bifilar @ T50-43
RV5
10K
C119
0.1u
T6
R68
3.3K
10T bifilar @ FT37-43
C120
0.1u
HS2
Q22
RD15HVF1
This is a class C power amplifier.
RD15 should be barely open
when there is no input signal.
R69
1.3K
C121
0.1u
CW_OUT
Q23
2N3904
R70
1K
R71
68
C122
0.1u
R72
6
Sheet: /TX/
File: tx.sch
Title: HBR/3B by R2AUK ::: https://eax.me/hbr-3b-transceiver/
Size: A4
Date: 2022-07-17
Rev:
KiCad E.D.A. kicad (5.1.12-1-10_14)
Id: 8/10



Sheet: /Stockton Bridge/		
File: stockton-birdge.sch		
Title: HBR/3B by R2AUK ::: https://eax.me/hbr-3b-transceiver/		
Size: A4	Date: 2022-07-17	**Rev:**
KiCad E.D.A. kicad (5.1.12-1-10_14)		Id: 9/10



Sheet: /S Meter/		
File: s-meter.sch		
Title: HBR/3B by R2AUK ::: https://eax.me/hbr-3b-transceiver/		
Size: A4	Date: 2022-07-17	**Rev:**
KiCad E.D.A. kicad (5.1.12-1-10_14)		Id: 10/10