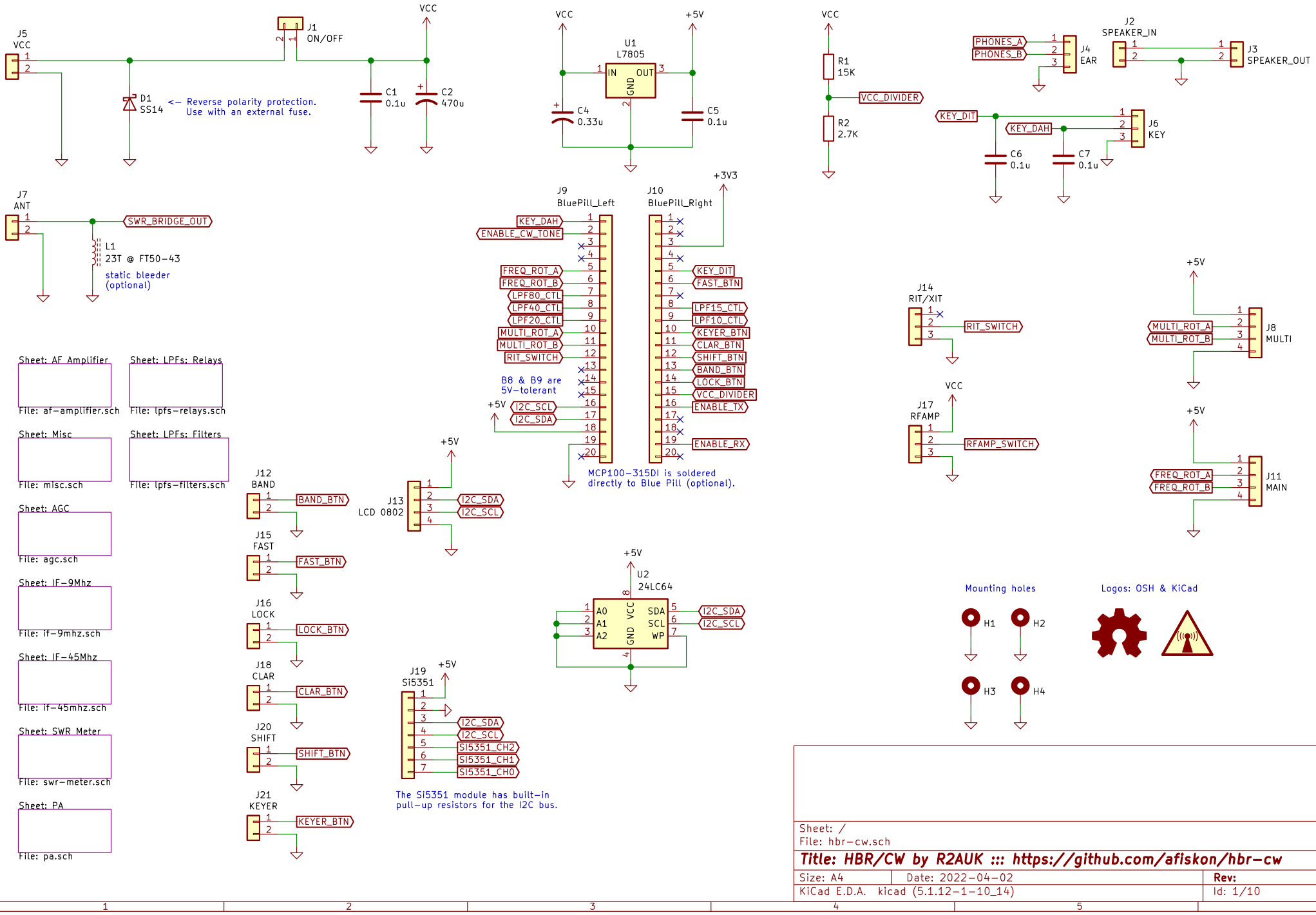
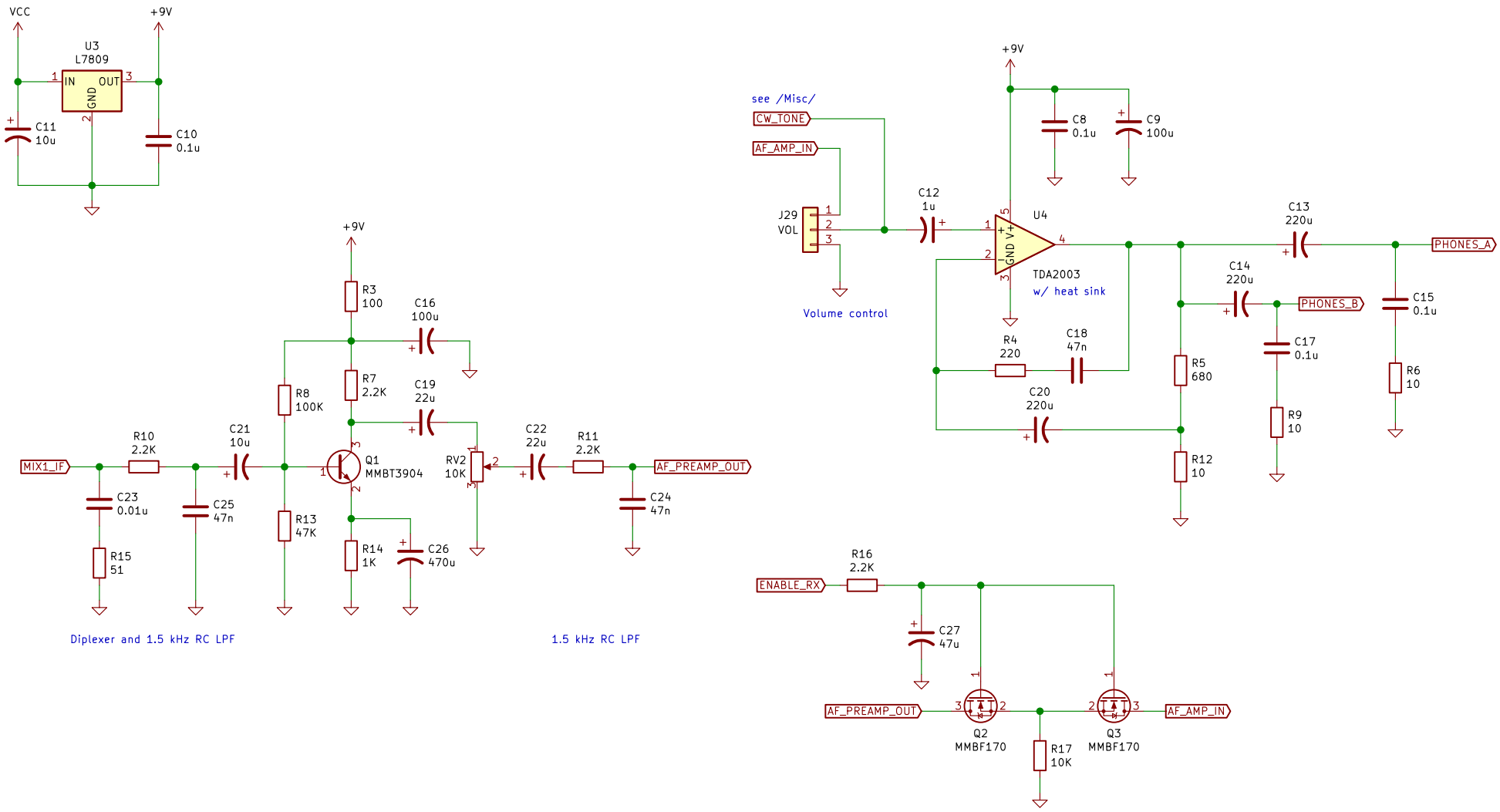
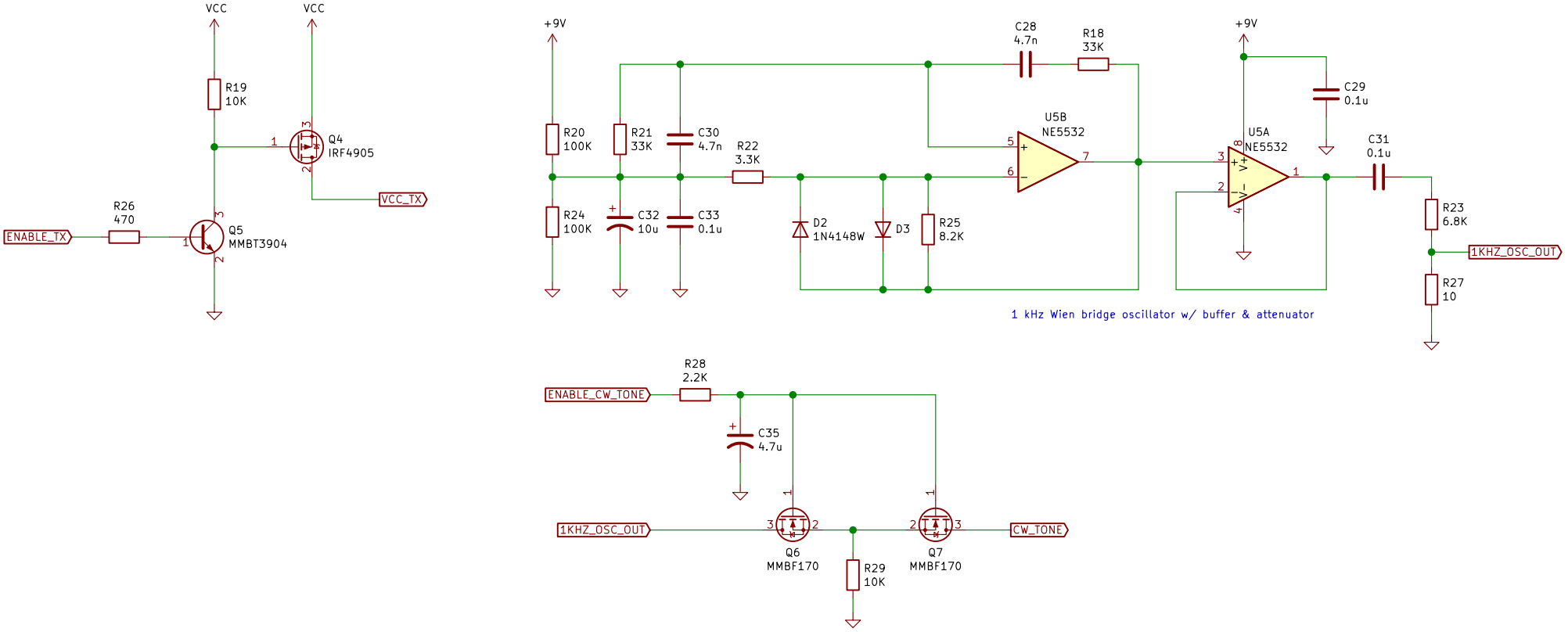
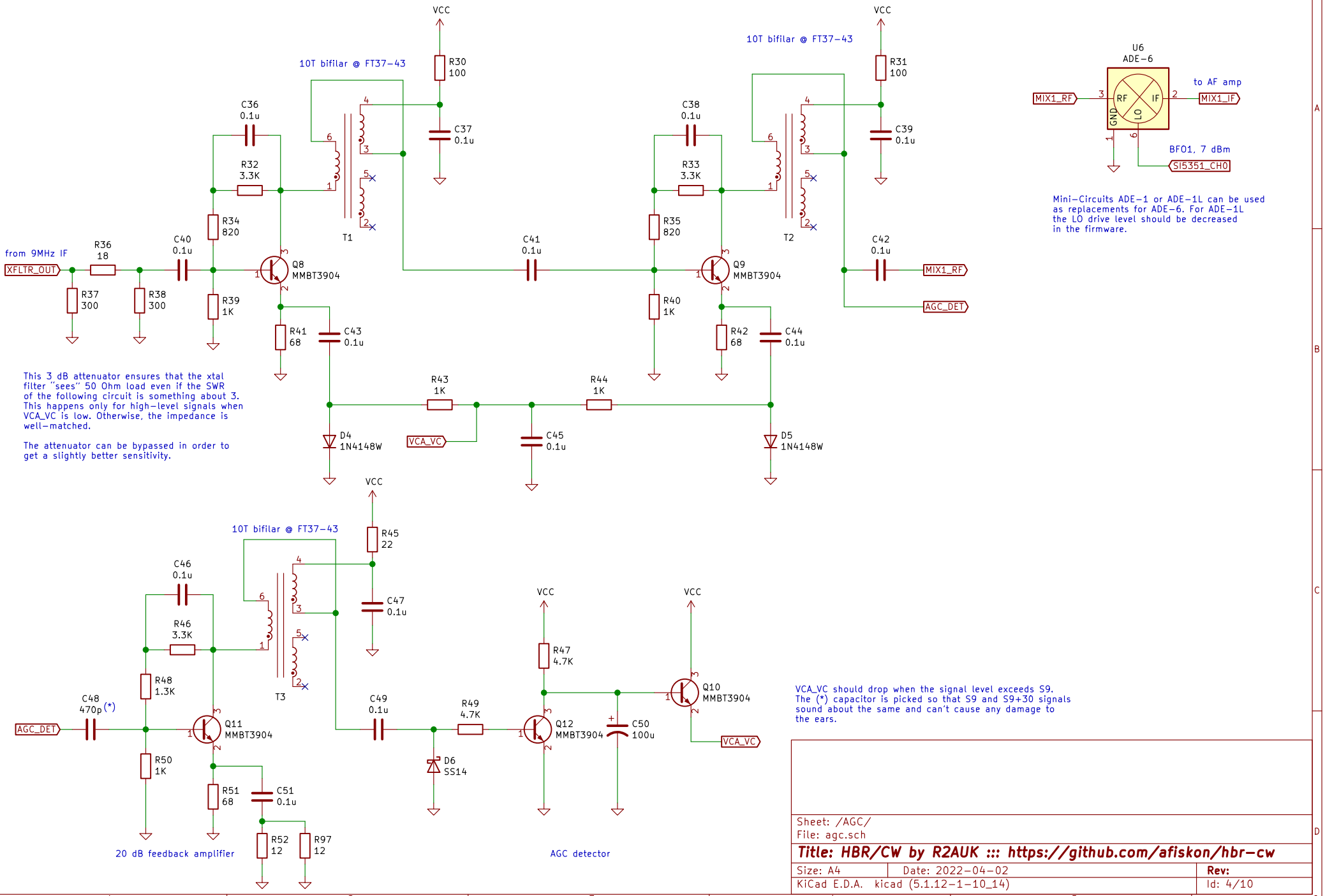

J5
VCC
J1
ON/OFF
VCC
D1
SS14
<– Reverse polarity protection.
Use with an external fuse.
C1
0.1u
C2
470u
VCC
+5V
U1
L7805
IN
OUT
GND
C4
0.33u
C5
0.1u
VCC
R1
15K
VCC_DIVIDER
R2
2.7K
PHONES_A
PHONES_B
J4
EAR
J2
SPEAKER_IN
J3
SPEAKER_OUT
KEY_DIT
KEY_DAH
J6
KEY
C6
0.1u
C7
0.1u
J7
ANT
SWR_BRIDGE_OUT
L1
23T @ FT50-43
static bleeder
(optional)
J9
BluePill_Left
J10
BluePill_Right
+3V3
KEY_DAH
ENABLE_CW_TONE
FREQ_ROT_A
FREQ_ROT_B
LPF80_CTL
LPF40_CTL
LPF20_CTL
MULTI_ROT_A
MULTI_ROT_B
RIT_SWITCH
KEY_DIT
FAST_BTN
LPF15_CTL
LPF10_CTL
KEYER_BTN
CLAR_BTN
SHIFT_BTN
BAND_BTN
LOCK_BTN
VCC_DIVIDER
ENABLE_TX
ENABLE_RX
B8 & B9 are
5V-tolerant
+5V
I2C_SCL
I2C_SDA
MCP100-315DI is soldered
directly to Blue Pill (optional).
J14
RIT/XIT
RIT_SWITCH
J17
RFAMP
VCC
RFAMP_SWITCH
+5V
MULTI_ROT_A
MULTI_ROT_B
J8
MULTI
+5V
FREQ_ROT_A
FREQ_ROT_B
J11
MAIN
Sheet: AF Amplifier
File: af-amplifier.sch
Sheet: LPFs: Relays
File: lpfs-relays.sch
Sheet: Misc
File: misc.sch
Sheet: LPFs: Filters
File: lpfs-filters.sch
Sheet: AGC
File: agc.sch
Sheet: IF-9Mhz
File: if-9mhz.sch
Sheet: IF-45Mhz
File: if-45mhz.sch
Sheet: SWR Meter
File: swr-meter.sch
Sheet: PA
File: pa.sch
J12
BAND
BAND_BTN
J15
FAST
FAST_BTN
J16
LOCK
LOCK_BTN
J18
CLAR
CLAR_BTN
J20
SHIFT
SHIFT_BTN
J21
KEYER
KEYER_BTN
+5V
J13
LCD 0802
I2C_SDA
I2C_SCL
+5V
U2
24LC64
A0
A1
A2
VCC
GND
SDA
SCL
WP
I2C_SDA
I2C_SCL
+5V
J19
Si5351
I2C_SDA
I2C_SCL
SI5351_CH2
SI5351_CH1
SI5351_CH0
The Si5351 module has built-in
pull-up resistors for the I2C bus.
Mounting holes
H1
H2
H3
H4
Logos: OSH & KiCad
Sheet: /
File: hbr-cw.sch
Title: HBR/CW by R2AUK ::: https://github.com/afiskon/hbr-cw
Size: A4
Date: 2022-04-02
Rev:
KiCad E.D.A. kicad (5.1.12-1-10_14)
Id: 1/10

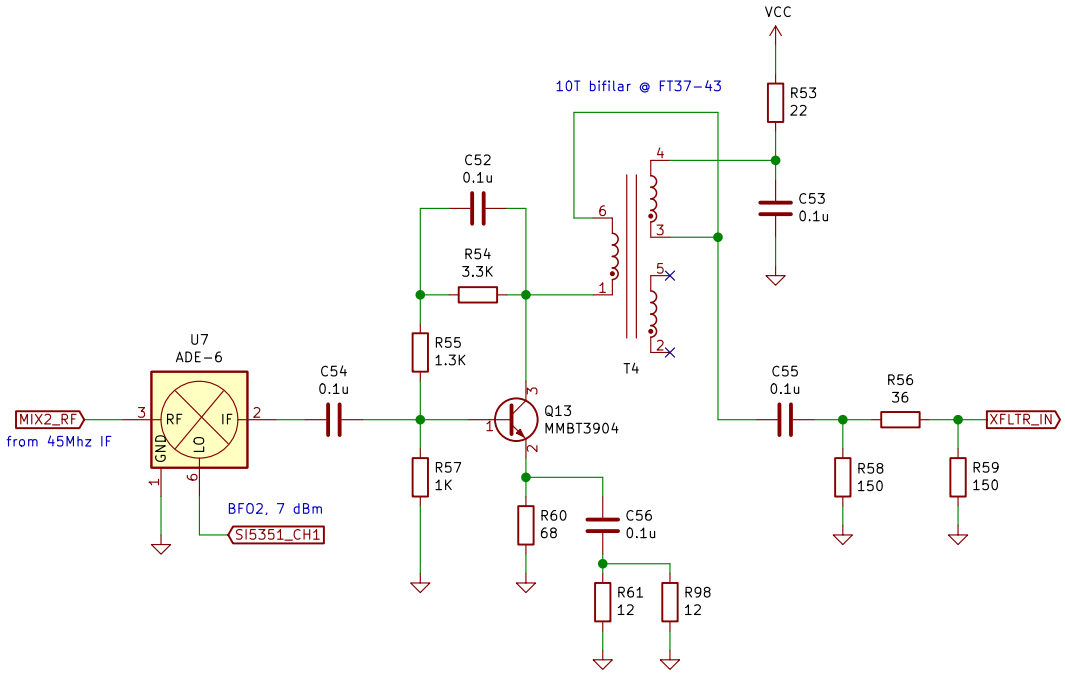


Sheet: /AF Amplifier/		
File: af-amplifier.sch		
Title: HBR/CW by R2AUK ::: https://github.com/afiskon/hbr-cw		
Size: A4	Date: 2022-04-02	**Rev:**
KiCad E.D.A. kicad (5.1.12-1-10_14)		Id: 2/10

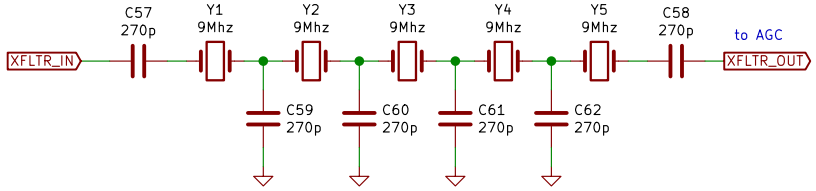


Sheet: /Misc/ File: misc.sch		
Title: HBR/CW by R2AUK ::: https://github.com/afiskon/hbr-cw		
Size: A4	Date: 2022-04-02	**Rev:**
KiCad E.D.A. kicad (5.1.12-1-10_14)		Id: 3/10


VCC
10T bifilar @ FT37-43
R30
100
C36
0.1u
R32
3.3K
R34
820
R36
18
C40
0.1u
from 9MHz IF
XFLTR_OUT
R37
300
R38
300
R39
1K
Q8
MMBT3904
T1
R41
68
C43
0.1u
C41
0.1u
C37
0.1u
R31
100
C38
0.1u
R33
3.3K
R35
820
R40
1K
Q9
MMBT3904
T2
R42
68
C44
0.1u
C42
0.1u
MIX1_RF
AGC_DET
R43
1K
R44
1K
VCA_VC
C45
0.1u
D4
1N4148W
D5
1N4148W
This 3 dB attenuator ensures that the xtal filter "sees" 50 Ohm load even if the SWR of the following circuit is something about 3. This happens only for high-level signals when VCA_VC is low. Otherwise, the impedance is well-matched.
The attenuator can be bypassed in order to get a slightly better sensitivity.
U6
ADE-6
RF
IF
LO
GND
MIX1_RF
to AF amp
MIX1_IF
BFO1, 7 dBm
SI5351_CH0
Mini-Circuits ADE-1 or ADE-1L can be used as replacements for ADE-6. For ADE-1L the LO drive level should be decreased in the firmware.
VCC
10T bifilar @ FT37-43
R45
22
C46
0.1u
R46
3.3K
R48
1.3K
C48
470p (*)
AGC_DET
Q11
MMBT3904
T3
R50
1K
R51
68
C51
0.1u
R52
12
R97
12
C47
0.1u
C49
0.1u
R49
4.7K
D6
SS14
R47
4.7K
Q12
MMBT3904
C50
100u
Q10
MMBT3904
VCA_VC
20 dB feedback amplifier
AGC detector
VCA_VC should drop when the signal level exceeds S9. The (*) capacitor is picked so that S9 and S9+30 signals sound about the same and can't cause any damage to the ears.
Sheet: /AGC/
File: agc.sch
Title: HBR/CW by R2AUK ::: https://github.com/afiskon/hbr-cw
Size: A4
Date: 2022-04-02
Rev:
KiCad E.D.A. kicad (5.1.12-1-10_14)
Id: 4/10



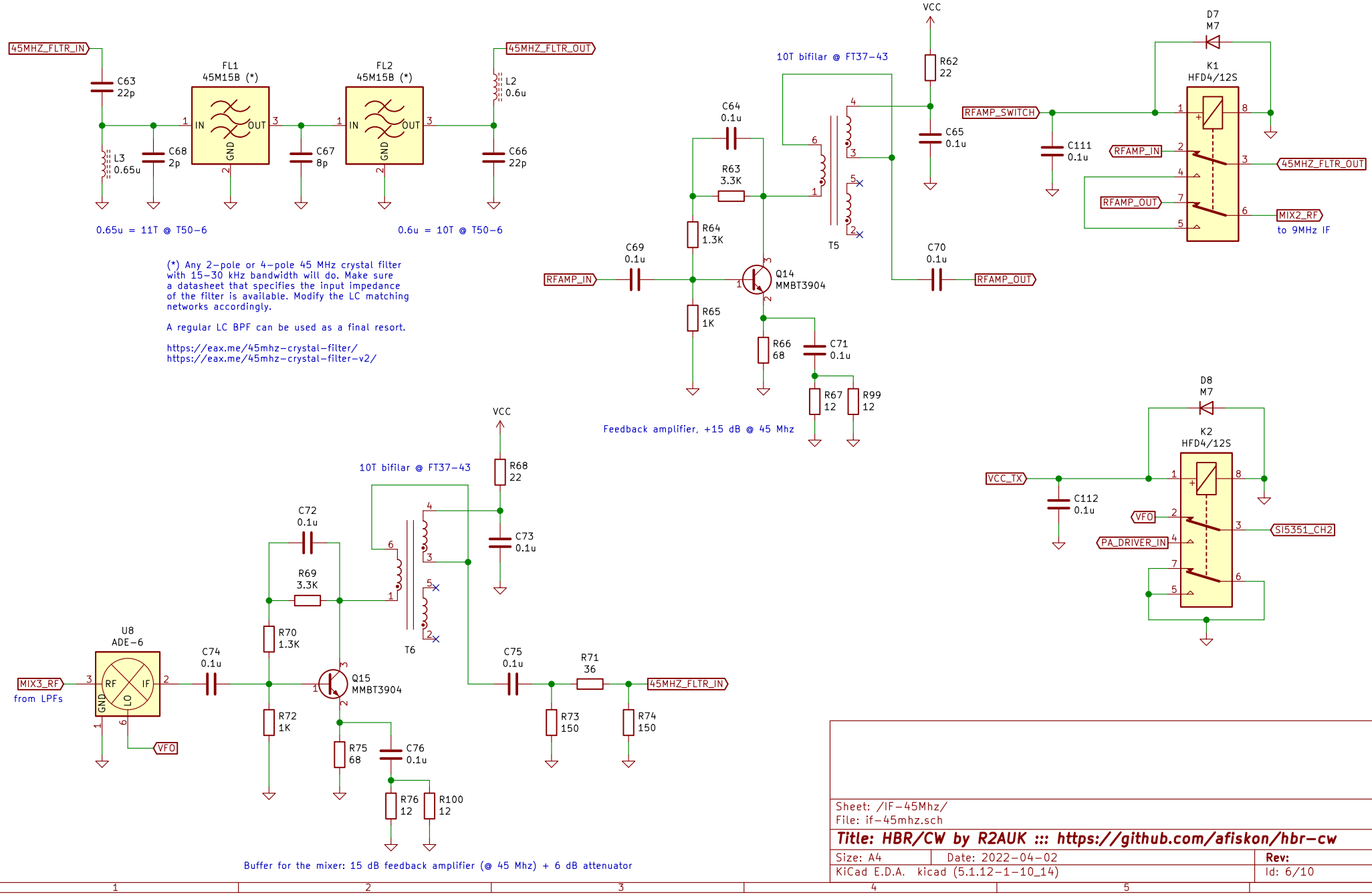
Buffer for the mixer: 20 dB feedback amplifier + 6 dB attenuator

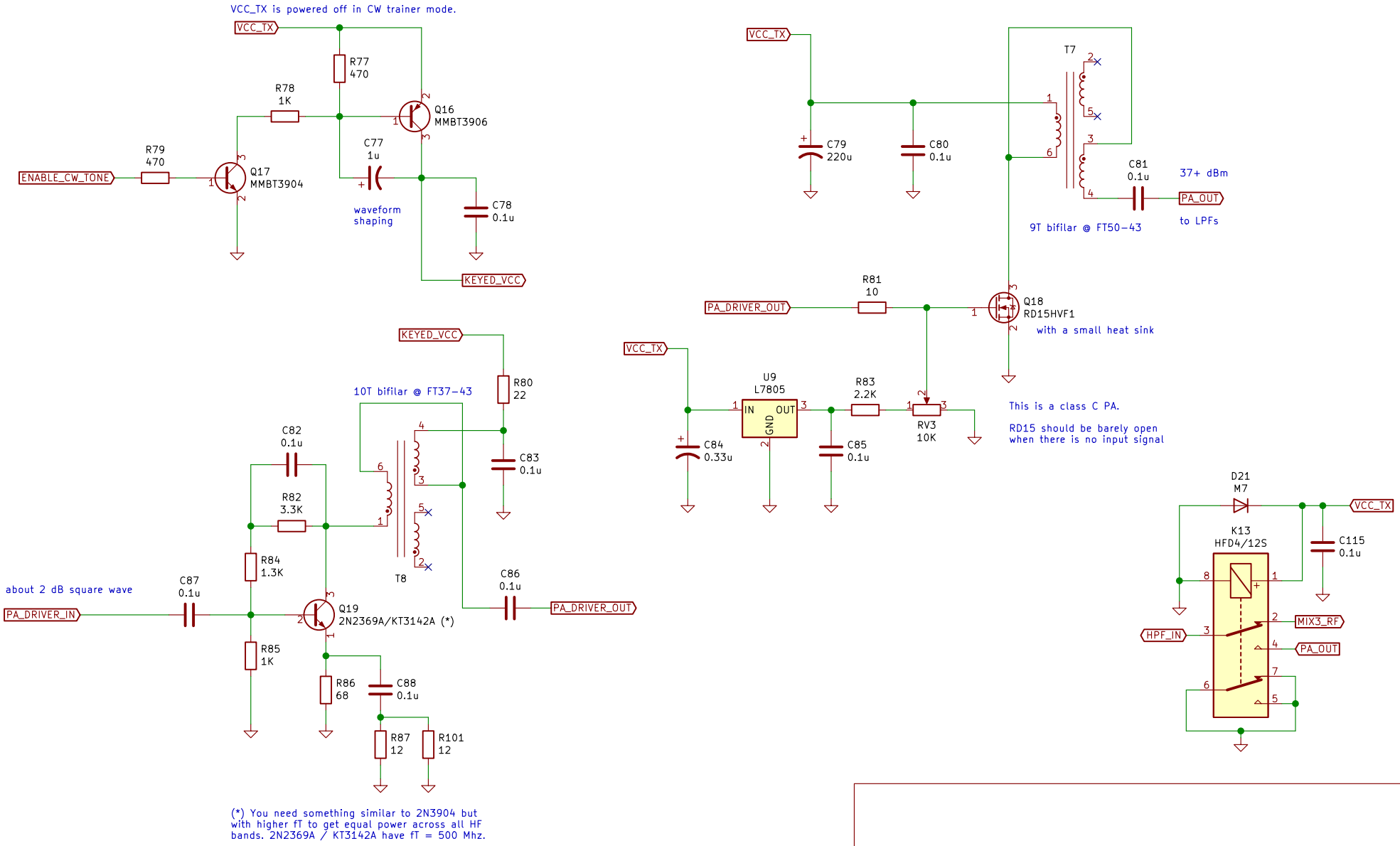


Xtals should be measured using G3UUR method,
and suitable capacitors should be picked in LTspice.
Xtals should be matched by the resonant frequency.

https://eax.me/crystal-measurements/
https://eax.me/crystal-filters-part-4/

Sheet: /IF-9Mhz/		
File: if-9mhz.sch		
Title: HBR/CW by R2AUK ::: https://github.com/afiskon/hbr-cw		
Size: A4	Date: 2022-04-02	**Rev:**
KiCad E.D.A. kicad (5.1.12-1-10_14)		Id: 5/10

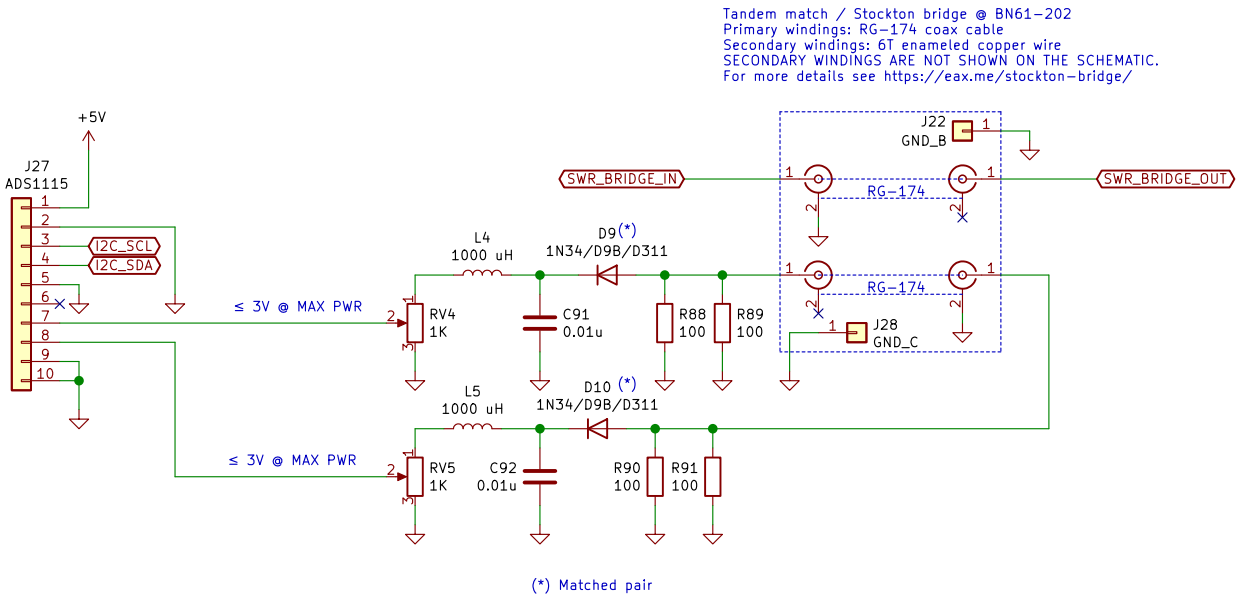

45MHZ_FLTR_IN
C63
22p
L3
0.65u
C68
2p
FL1
45M15B (*)
IN
OUT
GND
C67
8p
FL2
45M15B (*)
L2
0.6u
C66
22p
45MHZ_FLTR_OUT
0.65u = 11T @ T50-6
0.6u = 10T @ T50-6
(*) Any 2-pole or 4-pole 45 MHz crystal filter with 15-30 kHz bandwidth will do. Make sure a datasheet that specifies the input impedance of the filter is available. Modify the LC matching networks accordingly.
A regular LC BPF can be used as a final resort.
https://eax.me/45mhz-crystal-filter/
https://eax.me/45mhz-crystal-filter-v2/
VCC
10T bifilar @ FT37-43
R62
22
C64
0.1u
R63
3.3K
T5
C65
0.1u
R64
1.3K
C69
0.1u
RFAMP_IN
Q14
MMBT3904
R65
1K
R66
68
C71
0.1u
R67
12
R99
12
C70
0.1u
RFAMP_OUT
Feedback amplifier, +15 dB @ 45 Mhz
D7
M7
K1
HFD4/12S
RFAMP_SWITCH
C111
0.1u
RFAMP_IN
RFAMP_OUT
45MHZ_FLTR_OUT
MIX2_RF
to 9MHz IF
D8
M7
K2
HFD4/12S
VCC_TX
C112
0.1u
VFO
PA_DRIVER_IN
SI5351_CH2
VCC
10T bifilar @ FT37-43
R68
22
C72
0.1u
R69
3.3K
T6
C73
0.1u
U8
ADE-6
RF
IF
LO
GND
MIX3_RF
from LPFs
C74
0.1u
R70
1.3K
Q15
MMBT3904
C75
0.1u
R71
36
45MHZ_FLTR_IN
R72
1K
R73
150
R74
150
R75
68
C76
0.1u
R76
12
R100
12
VFO
Buffer for the mixer: 15 dB feedback amplifier (@ 45 Mhz) + 6 dB attenuator
Sheet: /IF-45Mhz/
File: if-45mhz.sch
Title: HBR/CW by R2AUK ::: https://github.com/afiskon/hbr-cw
Size: A4
Date: 2022-04-02
Rev:
KiCad E.D.A. kicad (5.1.12-1-10_14)
Id: 6/10



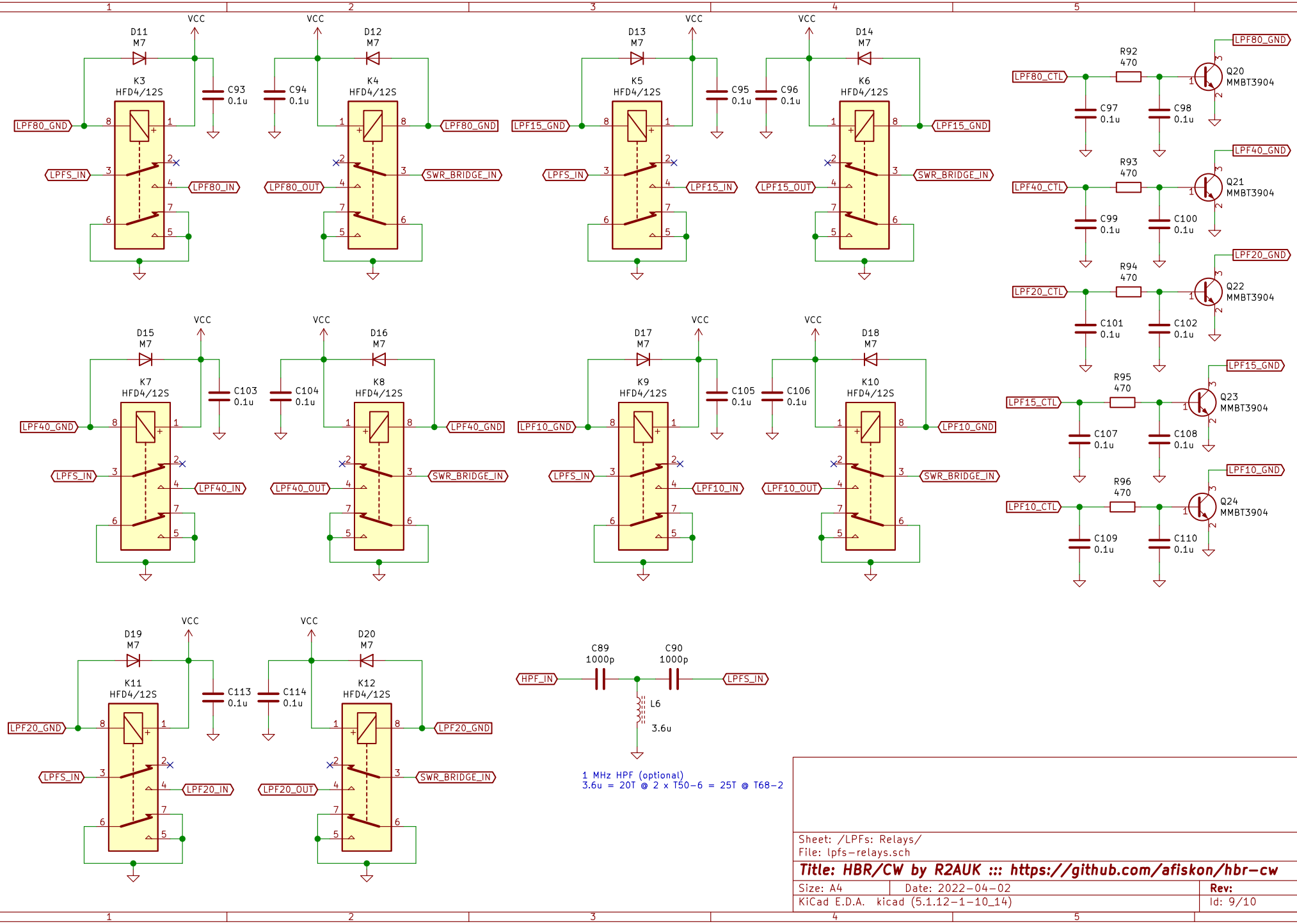
Sheet: /PA/
File: pa.sch

Title: HBR/CW by R2AUK ::: https://github.com/afiskon/hbr-cw

Size: A4	Date: 2022-04-02	Rev:
KiCad E.D.A. kicad (5.1.12-1-10_14)		Id: 7/10



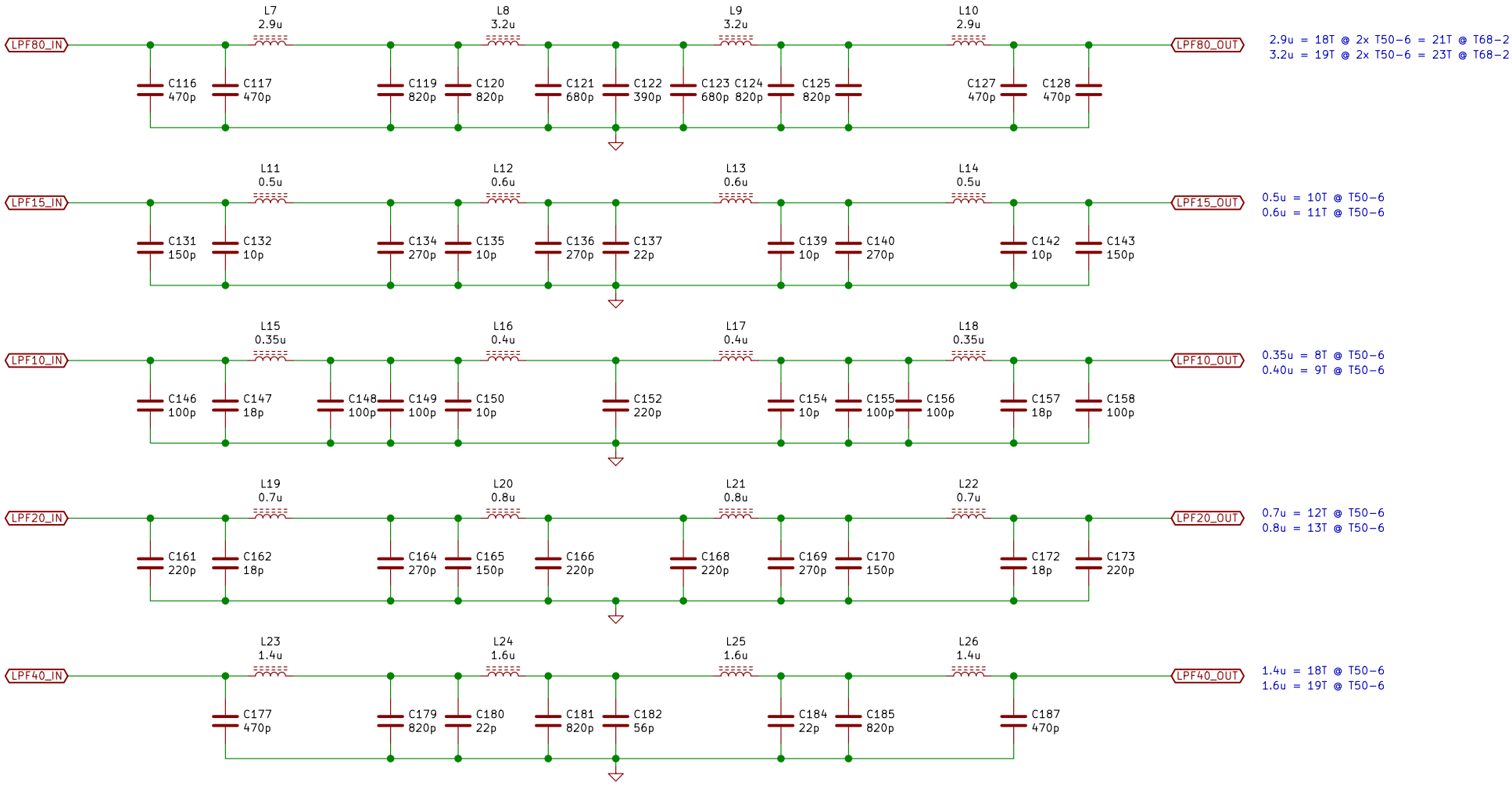
Sheet: /SWR Meter/		
File: swr-meter.sch		
Title: HBR/CW by R2AUK ::: https://github.com/afiskon/hbr-cw		
Size: A4	Date: 2022-04-02	**Rev:**
KiCad E.D.A. kicad (5.1.12-1-10_14)		Id: 8/10



Sheet: /LPFs: Relays/
File: lpfs-relays.sch

Title: HBR/CW by R2AUK ::: https://github.com/afiskon/hbr-cw

Size: A4	Date: 2022-04-02	Rev:
KiCad E.D.A. kicad (5.1.12-1-10_14)		Id: 9/10



Sheet: /LPFs: Filters/
File: lpfs-filters.sch

Title: HBR/CW by R2AUK ::: https://github.com/afiskon/hbr-cw

Size: A4	Date: 2022-04-02	**Rev:**
KiCad E.D.A. kicad (5.1.12-1-10_14)		Id: 10/10