

Sheet: Filters

File: filters.sch

Sheet: Amplifiers

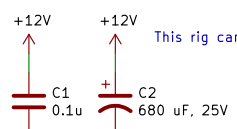
File: amplifiers.sch

Sheet: AF Amplifier

File: af-amplifier.sch

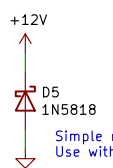
Sheet: Power Amplifier

File: power-amplifier.sch

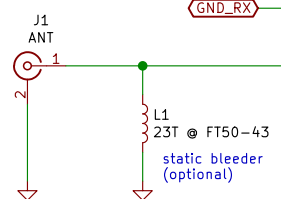


This rig can be powered from 9-17V

Some power supplies go into short circuit protection when the rig switches from RX to TX, which reboots the MCU. This capacitor prevents this from happening.

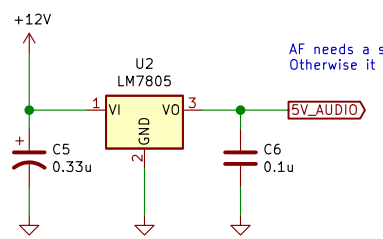
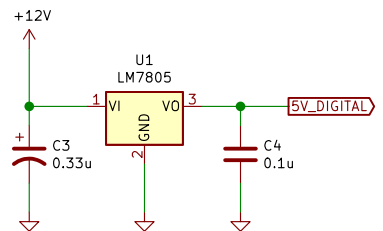


Simple reverse-polarity protection. Use with an external 2A fuse.

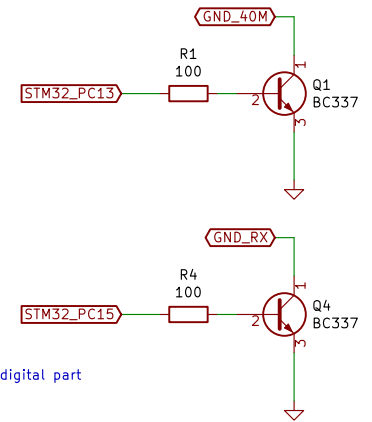


static bleeder (optional)

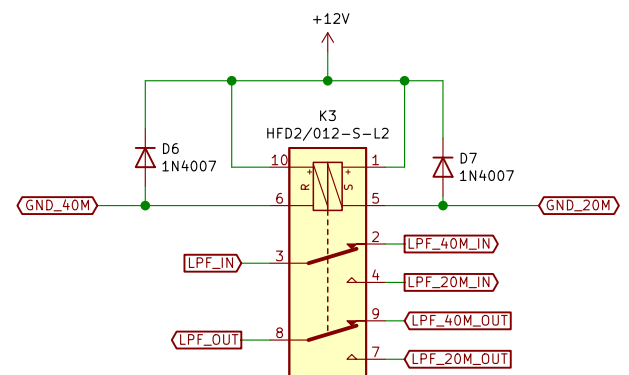
This arrangement gives 6 dB better isolation on TX than when using a single contact group.



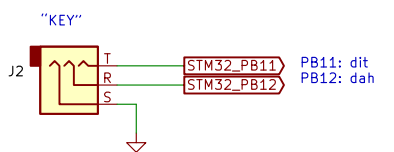
AF needs a separate power regulator. Otherwise it catches noise from the digital part



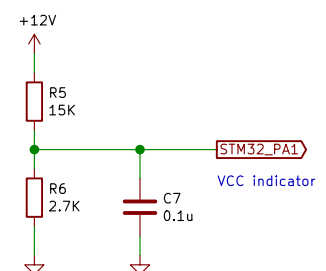
BC337 transistors in this transceiver can be replaced with 2N3904, 2N2222, KT315, etc. basically with any NPN-transistors.



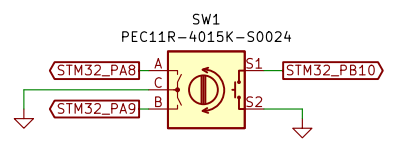
The transceiver was optimized by the size and power consumption, this is why the latching relays were chosen. The relays can be replaced with common 12V relays for stationary-only use. The firmware will require some adjustment in this case.



PB11: dit
PB12: dah



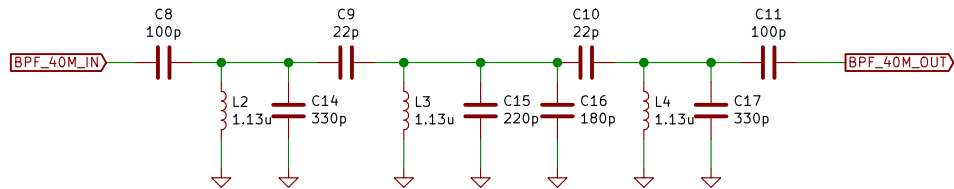
VCC indicator



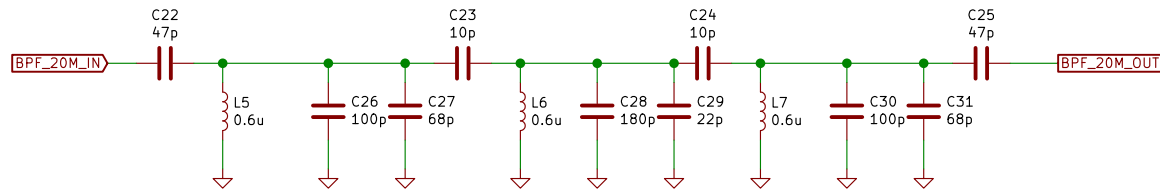
Use a high quality rotary encoder! I recommend Bourns PEC11R series.

STM32_PB8: I2C_SCL
STM32_PB9: I2C_SDA

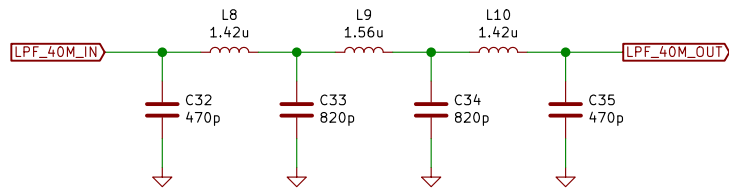
Sheet: /		File: alpha-yankee-november.sch	
Title: AYN/P by R2AUK ::: https://eax.me/ayn-p-transceiver/			
Size: A4	Date: 2021-10-23	Rev:	
KiCad E.D.A. kicad (5.1.6-0-10_14)	Id: 1/5		



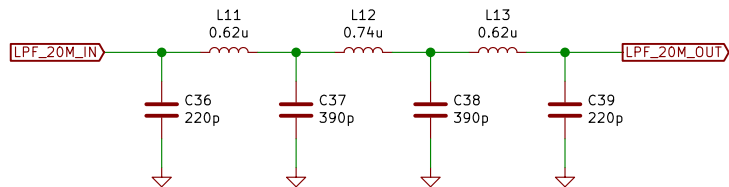
1.13u = 15T @ T50-6



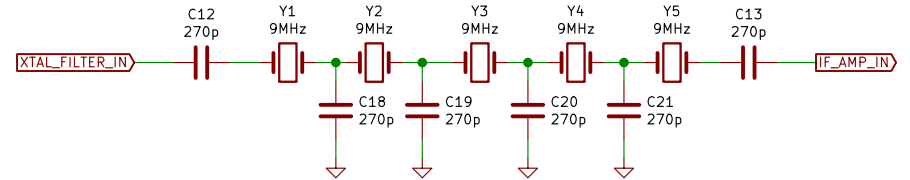
0.6u = 10T @ T50-6



1.42u = 17T @ T50-6
1.56u = 18T @ T50-6



0.62u = 11T @ T50-6
0.74u = 12T @ T50-6



Adjust the firmware for the xtal filter center frequency.
Feel free to use different IF - 12 Mhz, 11.059 Mhz, etc.
Use G3UUR method to measure the crystals and LTSpice
to determine the values of the capacitors for optimal impedance
match and bandwidth. Make sure the xtals are matched and
have Q >= 100 000.

This schematic shows a 20/40M version of the transceiver,
but it can be modified for any other two bands from 160 to 10M.
The firmware will require a little adjustment in this case.
It's also possible to build a transceiver for more than two bands.

I used ELSIE to calculate LPFs and the following online calculator:
http://leleivre.com/rf_coupled_resonator_cheb.html
... to calculate BPFs. <https://toroids.info/> allows to determine
the approximate number of turns on a given core to get the
required inductance.

T50-6 cores can be replaced with T37-6, T37-2, T50-2, or similar.
Personally, I use 0.3mm thick solid copper wire for *37 cores and 0.6mm
wire for *50 cores. However, the thickness of the wire doesn't affect the
inductance much and doesn't really matter on QRP power levels.

Sheet: /Filters/
File: filters.sch

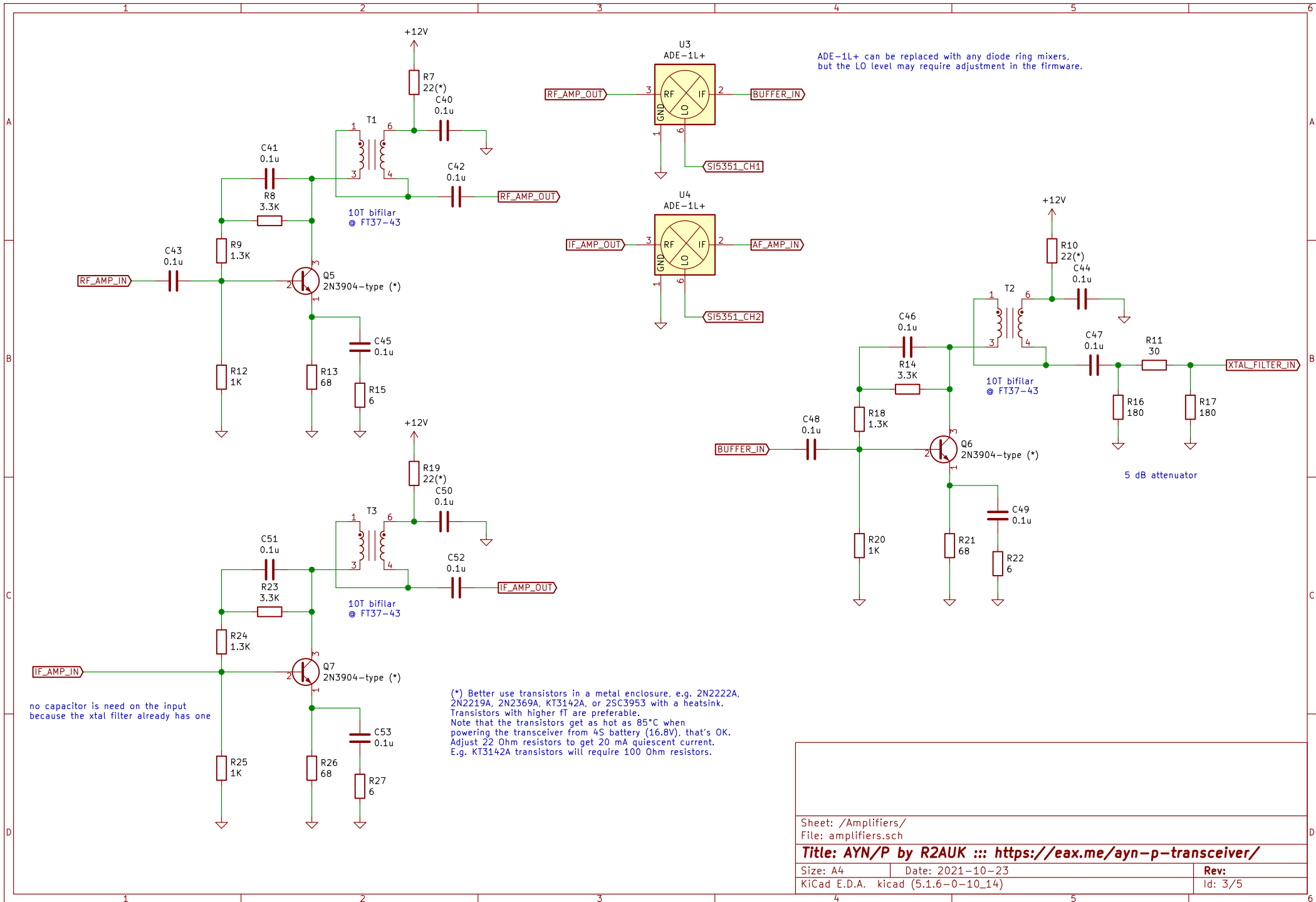
Title: AYN/P by R2AUK ::: <https://eax.me/ayn-p-transceiver/>

Size: A4 Date: 2021-10-23

KiCad E.D.A. kicad (5.1.6-0-10_14)

Rev:

Id: 2/5

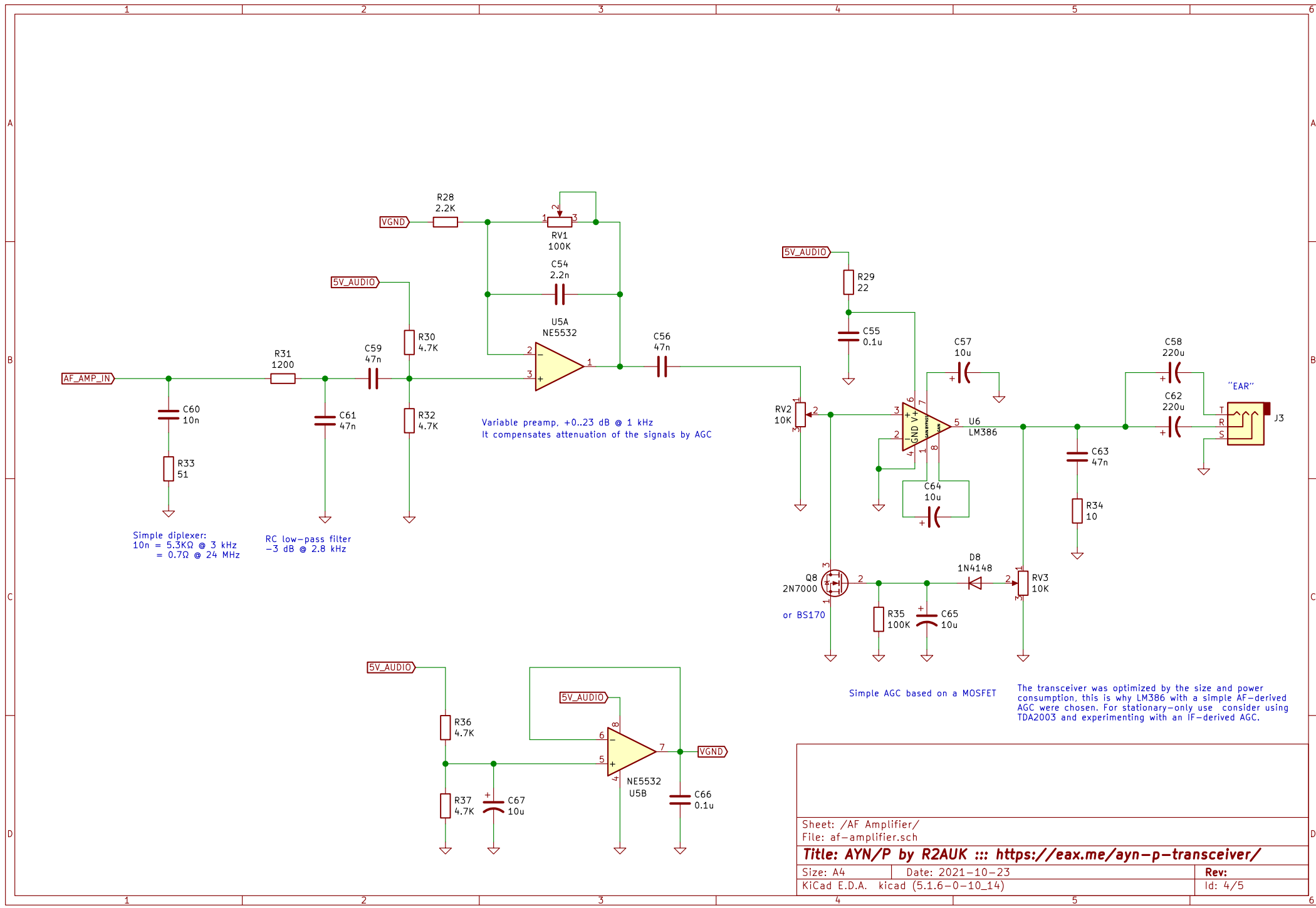


ADE-1L+ can be replaced with any diode ring mixers, but the LO level may require adjustment in the firmware.

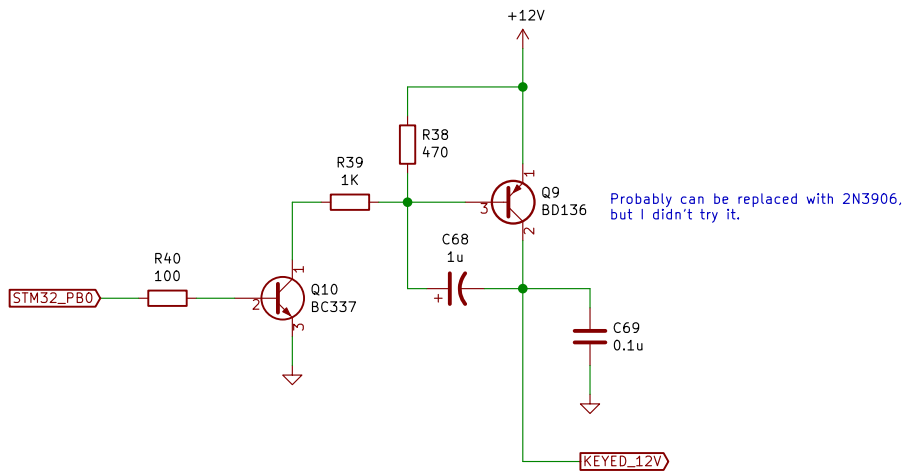
(*) Better use transistors in a metal enclosure, e.g. 2N2222A, 2N2219A, 2N2369A, KT3142A, or 2SC3953 with a heatsink. Transistors with higher fT are preferable. Note that the transistors get as hot as 85°C when powering the transceiver from 4S battery (16.8V), that's OK. Adjust 22 Ohm resistors to get 20 mA quiescent current. E.g. KT3142A transistors will require 100 Ohm resistors.

no capacitor is needed on the input because the xtal filter already has one

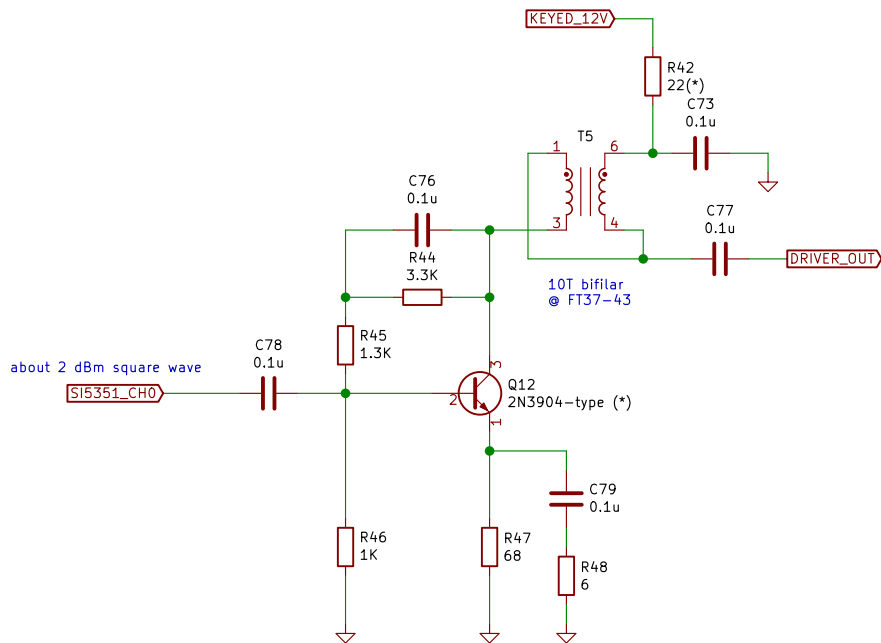
Sheet: /Amplifiers/		
File: amplifiers.sch		
Title: AYN/P by R2AUK ::: https://eax.me/ayn-p-transceiver/		
Size: A4	Date: 2021-10-23	Rev:
KiCad E.D.A. kicad (5.1.6-0-10_14)		Id: 3/5



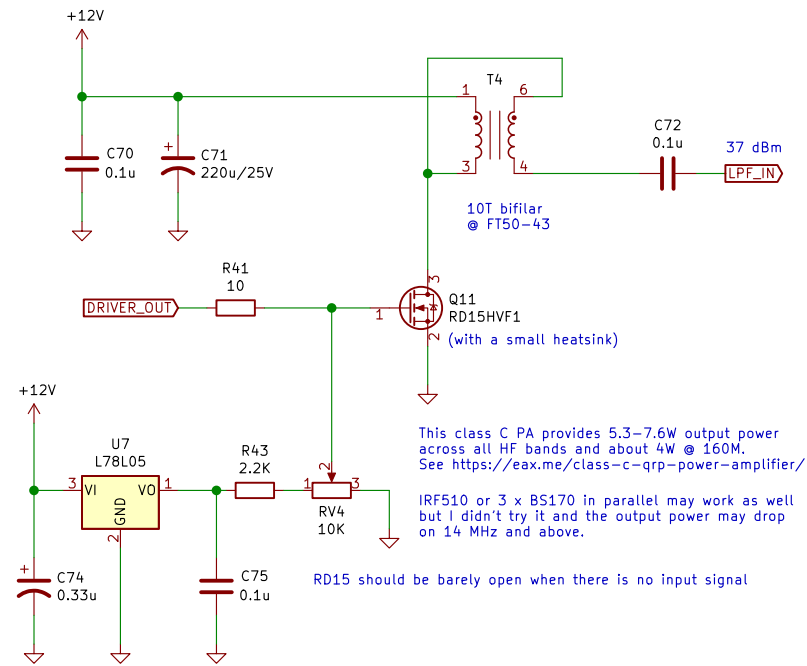
Sheet: /AF Amplifier/ File: af-amplifier.sch	
Title: AYN/P by R2AUK ::: https://eax.me/ayn-p-transceiver/	
Size: A4	Date: 2021-10-23
KiCad E.D.A. kicad (5.1.6-0-10_14)	Rev: Id: 4/5



Probably can be replaced with 2N3906, but I didn't try it.



10T bifilar @ FT37-43



This class C PA provides 5.3-7.6W output power across all HF bands and about 4W @ 160M. See <https://eax.me/class-c-qrp-power-amplifier/>

IRF510 or 3 x BS170 in parallel may work as well but I didn't try it and the output power may drop on 14 MHz and above.

RD15 should be barely open when there is no input signal

Sheet: /Power Amplifier/		File: power-amplifier.sch	
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Size: A4	Date: 2021-10-23	Rev:	
KiCad E.D.A. kicad (5.1.6-0-10_14)	Id: 5/5		