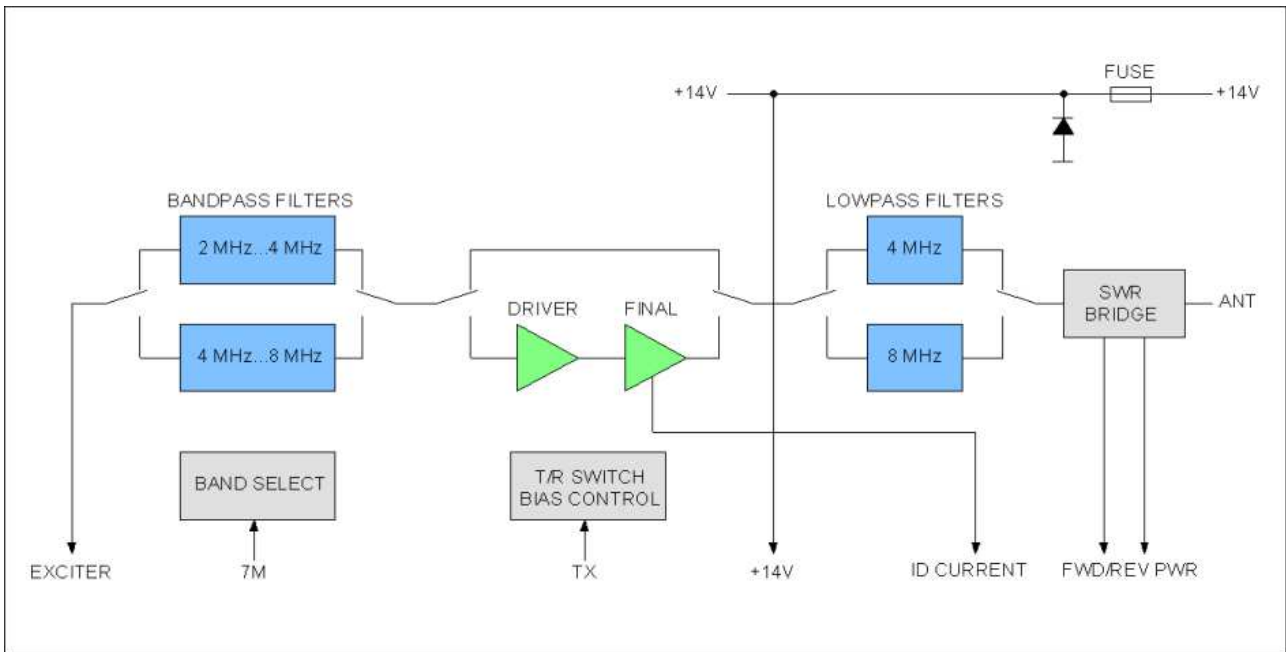


General

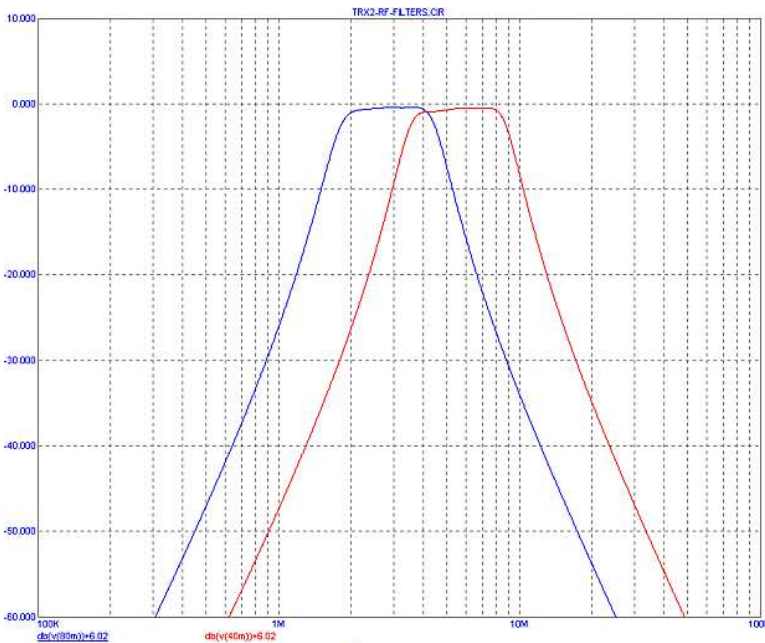
The JUMA TRX2 two band PA board is a 10 W linear amplifier for 80 m and 40 m ham bands. The board includes also the band pass RF filters, PA lowpass filters and SWR bridge.



JUMA TRX2 two band PA board block diagram

The bandpass filters

The band pass filters are used both in transmission and reception. The filters are implemented using SMD inductors and capacitors and switched by the SMD relay RL3. The band switching crossover frequency is 4 MHz and it is controlled with the MOSFET TR7 with "7M" signal coming from the DDS board. See the circuit diagram "BPF FILTERS".



Simulated response of the bandpass filters. Blue for 80 m, red for 40 m

The driver and the final amplifier

The input of the driver MOSFET TR1 is terminated with a 51 ohm resistor R1. The single ended driver operates in class A with the nominal bias current 130 mA which is regulated with NPN transistor TR6. The resistor R3 and the capacitor C3 in the source of the driver MOSFET are used to equalize the RF gain in both of the bands. The RF transformer T1 converts the driver output to the balanced signal which is feeding the final amplifier MOSFETs TR2 and TR3 in push-pull configuration. The nominal output power is 10 watts. The final stage bias current, nominal 100 mA per MOSFET, is adjusted by the trimmers R4 and R7. The resistors R17 and R21 in the sources of the final MOSFETs are used to sense the drain current. The voltage is across the sense resistor is proportional to the drain current. The sense voltage is amplified with the DC

amplifier A2-A and fed to the AD converter in the DDS board, thus the drain current can be monitored with the LCD.

The lowpass filters

The final stage is followed by the lowpass filters for 80 m and 40 m. The corner frequencies are 4 MHz and 8 MHz correspondingly. These lowpass filters are also in the signal path during reception to provide additional filtering. The 80 m lowpass filter is implemented by using SMD inductors L1 and L2 and the 40 m filter is using two small iron powder toroids L3 and L4. The switching crossover frequency is 4 MHz.

The SWR bridge

The SWR bridge is between the lowpass filter and the antenna. The transformer T3 senses the output RF current and the transformer T4 senses the output RF voltage. These signals are combined and rectified for relative forward and reverse voltages. The DDS board calculates the forward RF power and the SWR which can be seen in LCD. The SWR indication is calculated and displayed regardless of the transmit mode, thus the SWR can be indicated also during SSB transmission.

T/R switching and the bias supply

The small MOSFETs TR4 and TR5 are driving the antenna relay RL1 and the bias supply. The bias supply voltage is regulated with the shunt regulator consisting of the reference diode Z1 and the diodes D2 and D3. The purpose of the diodes is to achieve a negative temperature compensation for the bias voltage.

DC supply input

The DC supply for the TRX2 is coming via the PA board. The supply input is protected with the fuse F1 and with the diode D10 against over current and reverse polarity.

Adjustments

See the separate two band PA board adjustment instruction document, it includes **important notes** to avoid excessive MOSFET drain current and the fuse blow.