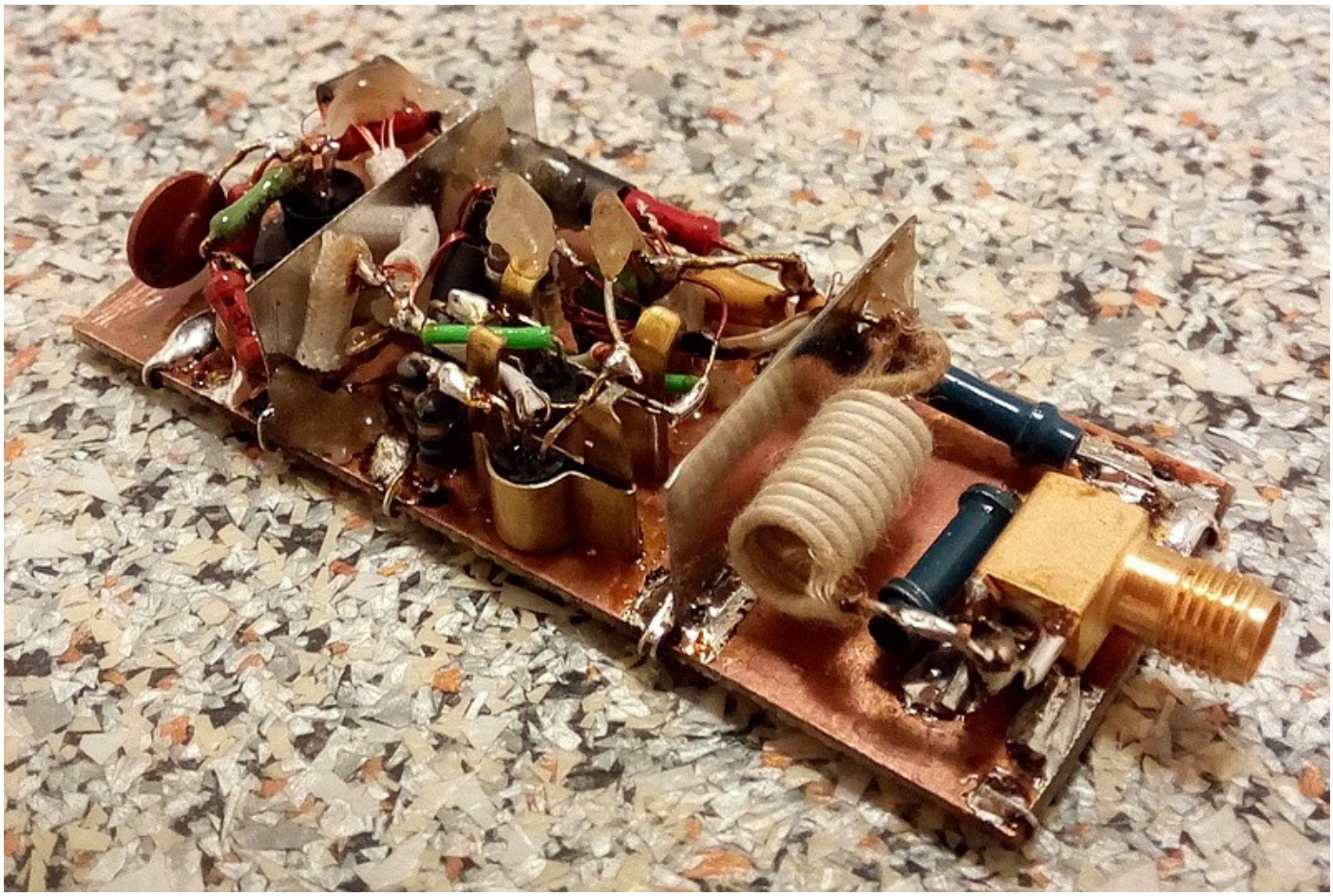
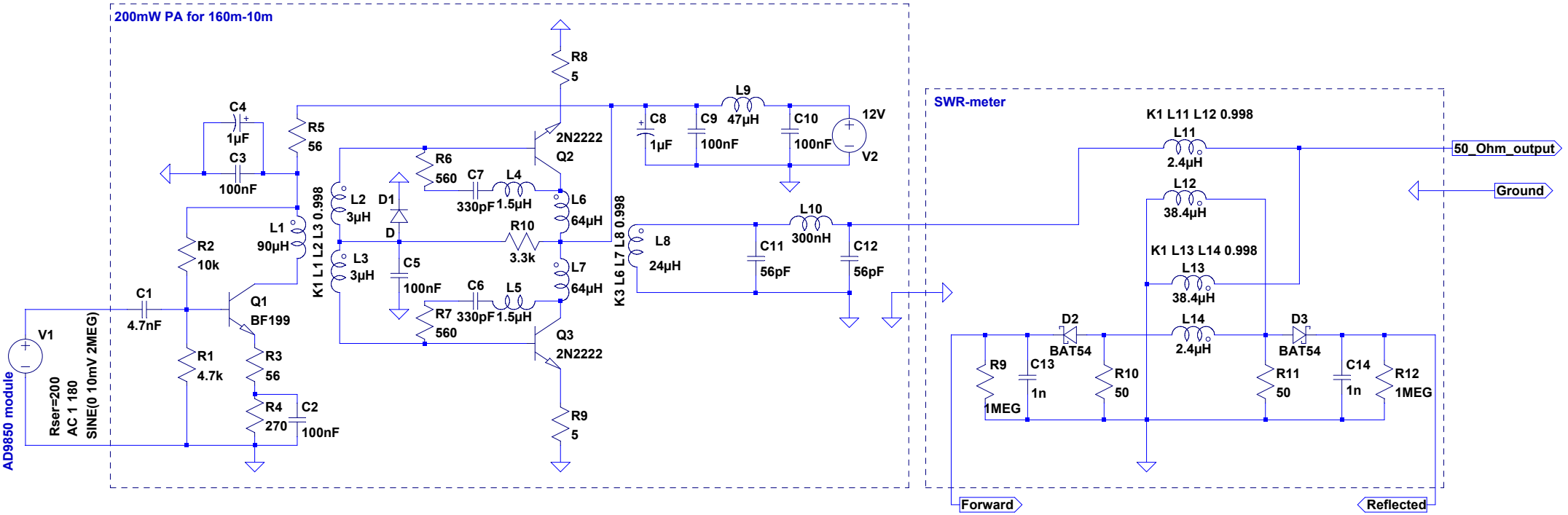
200mW PA for 160m-10m / by DL1DUZ



For me the aim of setting up a WSPR beacon was mainly to generate reliable data reflecting the current propagation conditions at my QTH rather that DXing. So I decided for a maximum output of 200mW and a simple, discrete setup. The design procedure was split up in three parts, first working out the general concept and doing some basic math, second simulating the design using LTSpice as a simulation software and third building a prototype, performing measurements and doing on-the-fly optimization. The results can be seen in the schematic at the end of this document. You may use it as a reference and draft to create your own design or simply it as-is.

The first stage of the PA is tailor-made to match the output of the AD9850 module that was used. It is run it A-mode and is therefore quite linear but not very power-efficient. It turned out that for this stage any additional rf-compensation or setpoint stabilization isn't really necessary. The second stage has a push-pull design. It is coupled to the first one by a transformer and operates in B-mode with a slightly elevated base voltage to minimize distortion. Actually spectral cleanliness turned out to be so good that a simple 3. order output filter was sufficient to reduce harmonics to a very acceptable level. Because all parts of the PA had been liberated from used components I happened to have at hand, some of them get to their limits at frequencies close to 30MHz. That is particularly true for the 2N2222 (f-transit = 300MHz!) as well as the transformer cores and made it necessary to provide some compensation (R6/C7/L4 and R7/C6/L5).



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