Artificial Mains Network with isolating variable ratio transformer

v1.0
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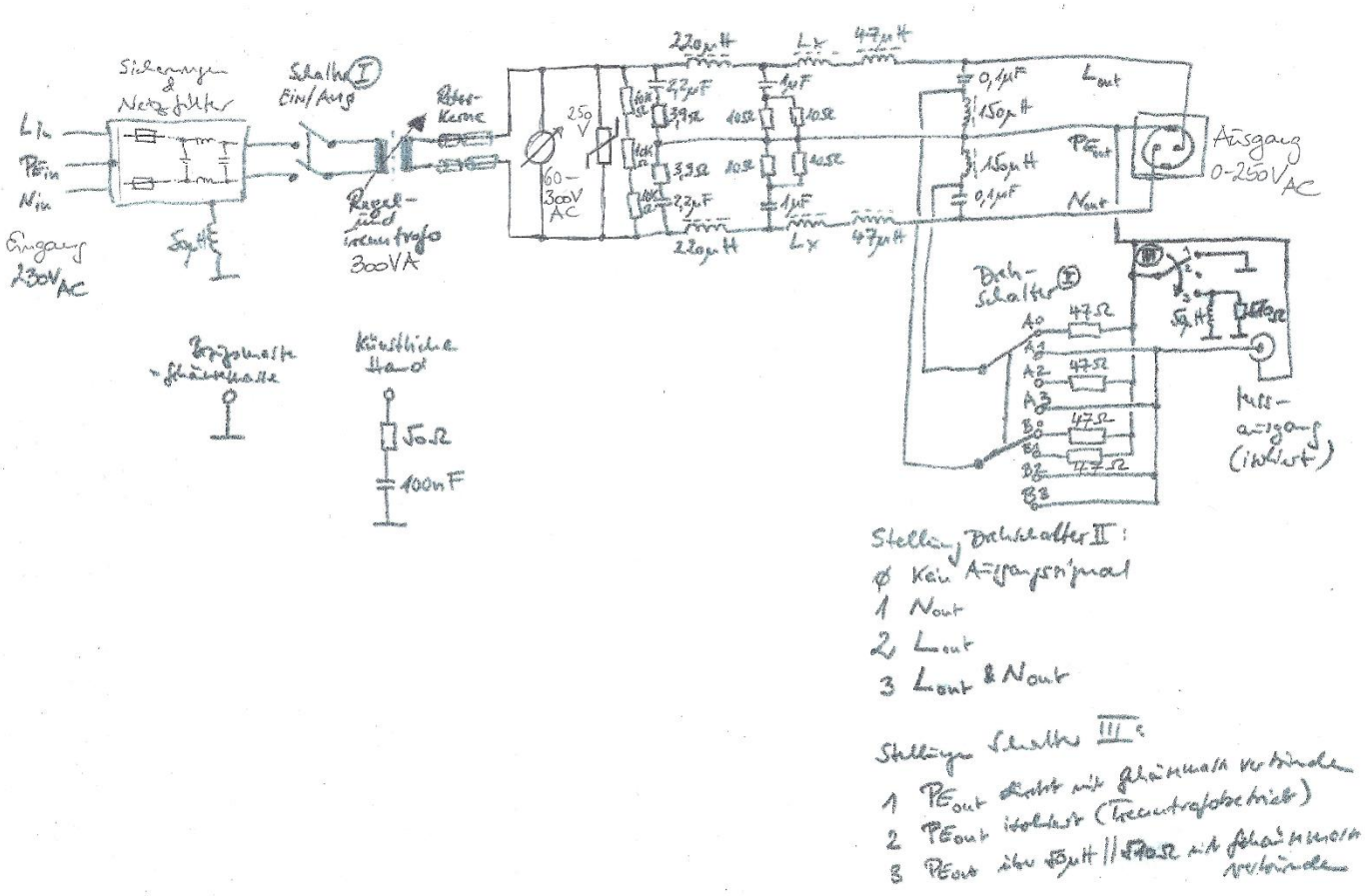
Hazard warning: The circuits/devices described in this report may only be set up and commissioned by competent persons. There is a risk of life-threatening electric shock or burns if you come into contact with DC and AC voltages and high-frequency fields. These can also lead to permanent physical and psychological damage. The author assumes no liability!

I had been looking for an Artificial Mains Network (AMN) or sometimes also called Line Impedance Stabilization Network (LISN) for some time in order to be able to measure interference from various electronic devices such as switching power supplies and LED lamps. Unfortunately, commercial models are very highly traded even on the used market. When I had the opportunity to buy a used isolating variable ratio transformer with an output of 300VA, I decided to build an artificial mains network myself on this basis.

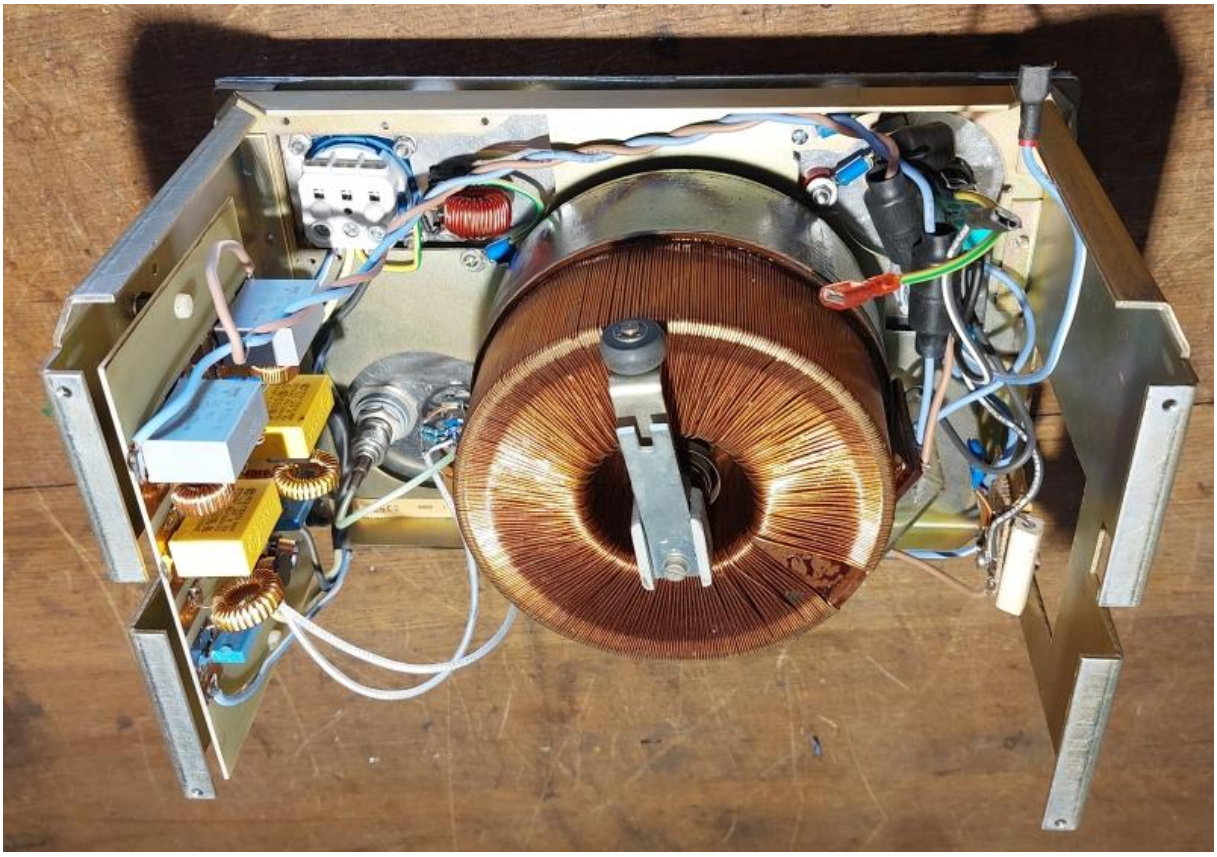
There was still enough space in the transformer's stable steel encasing to accommodate the additional components. The front panel was redesigned and my friend Wilhelm DL6DCA, who was also building a network at the same time, kindly contributed a circuit board and the components for the filter components. Thanks again to William. Wilhelm's structure is described here:
https://www.darc.de/fileadmin/filemounts/districte/o/ortsverbaende/38/Downloads/Aufbau_eines_Artificial_Mains_Network_Endf.pdf

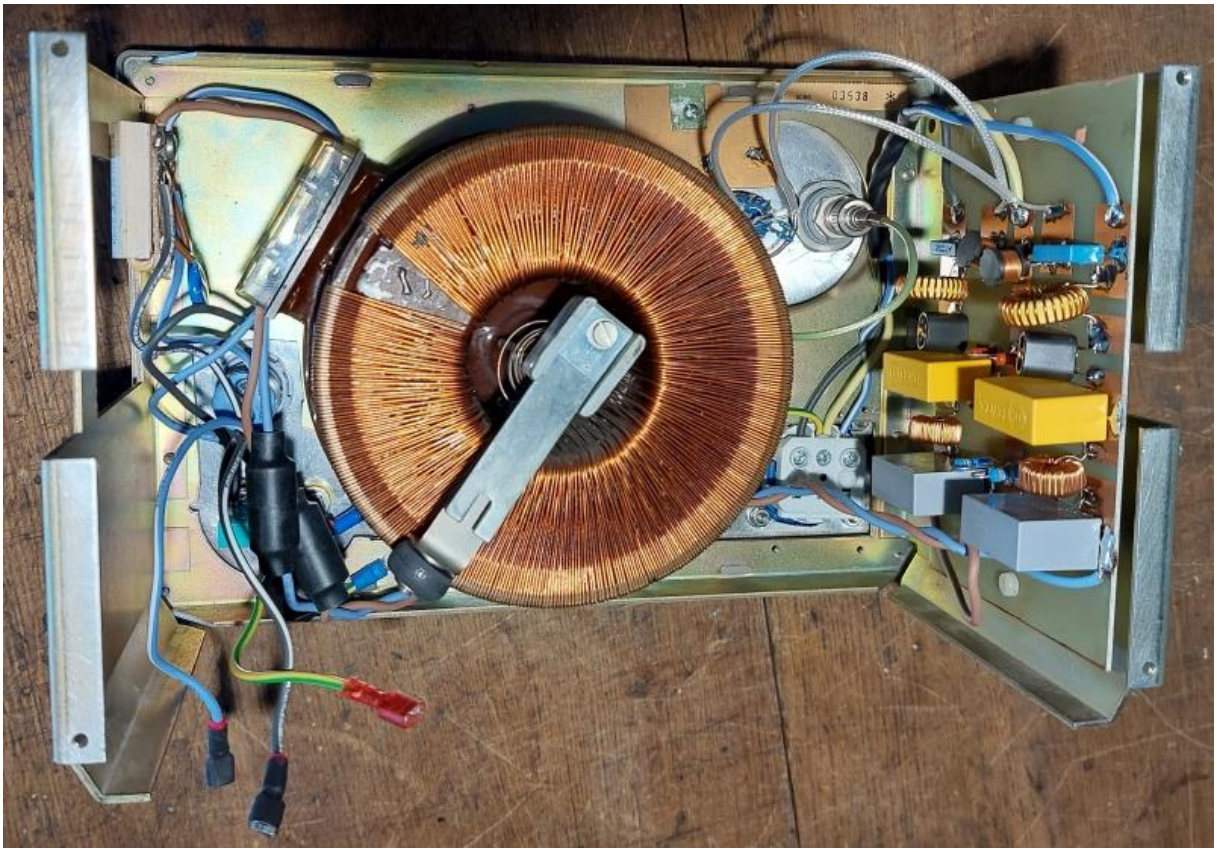
The artificial mains network constructed here is based on a description by Dr. Jochen Jirmann DB1NV, which he published in Funkamateur in 2018 in issues 2 and 3. A few changes have been made, in particular the possibility of switching the protective conductor circuit at the output and the possibility of being able to adjust the output voltage variably in the 0-250V range using a combined isolating and variable ratio transformer. Here are pictures of my setup:

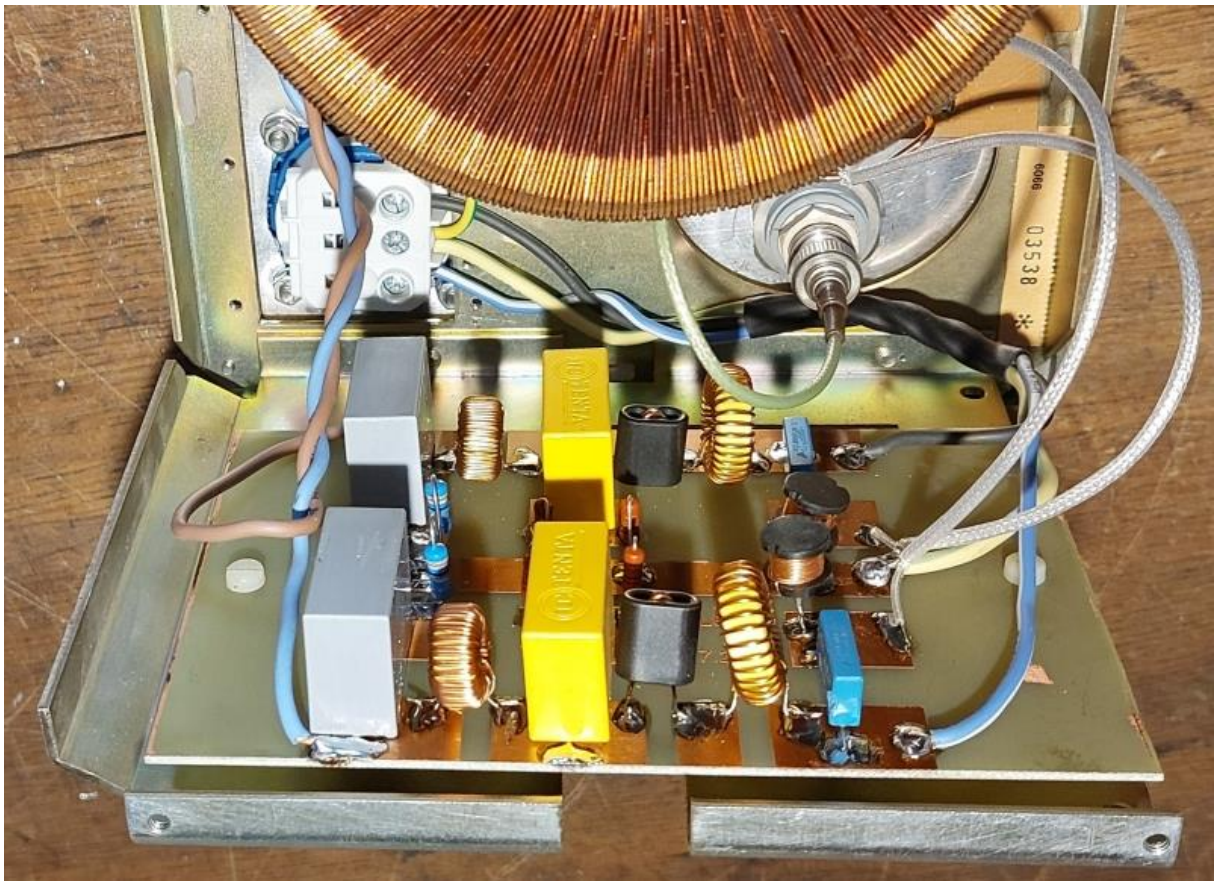
Here is a schematic of my setup:

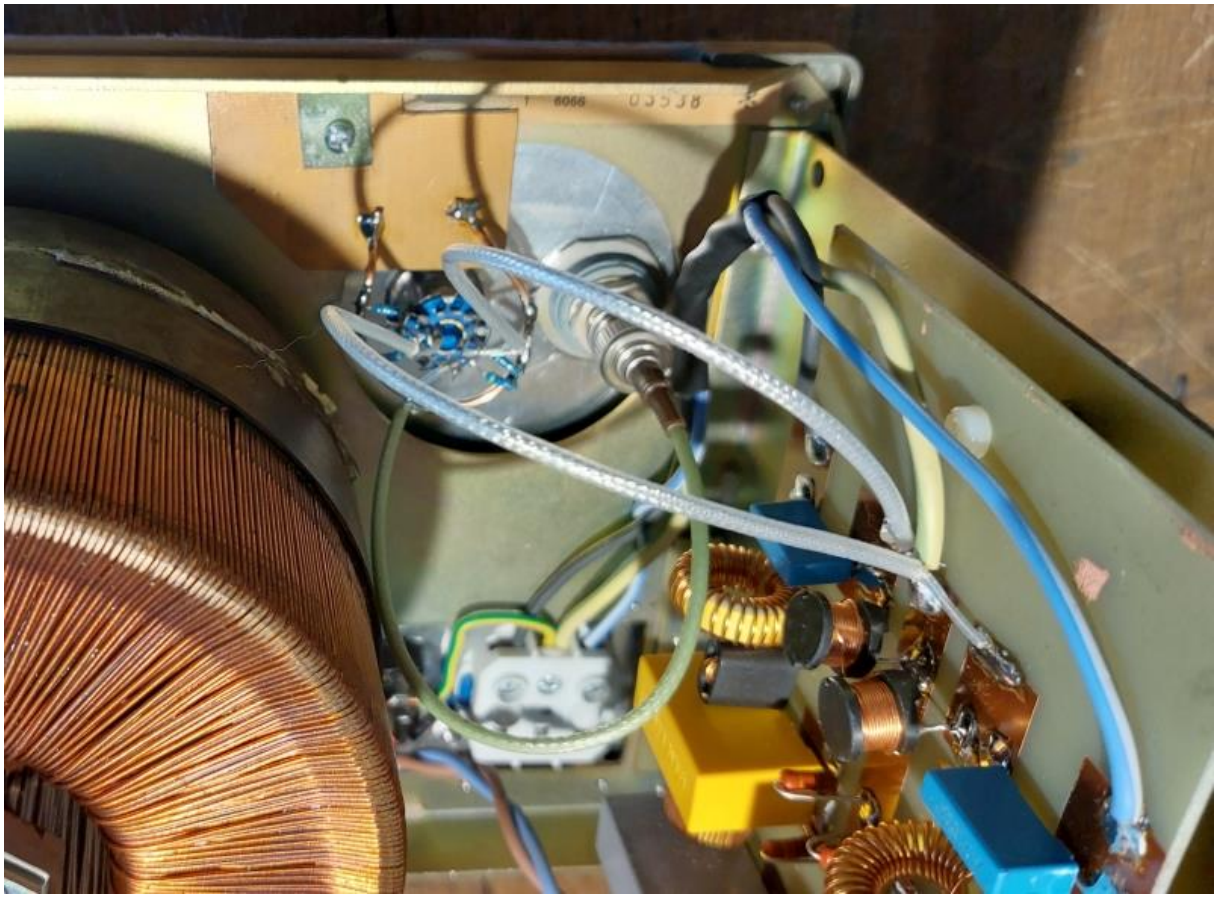


Here are some pictures of the inner workings of my setup:









I am always happy to receive feedback and I am happy to answer questions, preferably to the email address given below.

Thank you in advance and best regards

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