Ich bin das Sonnenlicht, auf reifem Feld.
Ich bin der Regen, der vom Himmel fällt.
Weine nicht an meinem Grab.
Ich bin nicht dort.
Ich bin nicht tot.
Ich bin nicht fort.

Impressum
Datenschutz

Your recently visited pages: dwarf

Zwerg

The reason for this DIY-project 2 was. Forum competition of yogis tube bude. The invitation to tender for 2004 had the Motto

"Who builds the smallest Stereo tube amplifier?"

After I had taken part in the first competition, it was now finally have the opportunity to be self-active. You can also build tube devices are quite small-proven in the hearing aid about 50 years ago, so it should work with today's components only. It is amazing what has happened in the last few years, with volume and efficiency in the case of passive components so.
So the first Considerations began, what size is it feasible to drive how much effort one is willing and what their views are regarding the usability are also for later use.
It is supposed to be a disposable device, but for a long time will give joy (and later, perhaps on one occasion, memories, how to skillfully with the hands).

Circuit design
due To the poor efficiency of the single-ended power amplifiers arbitration of this concept from the outset that each case had to do it against the clock. If possible - or D-operation for a better tube exploitation. Likewise, it is assumed that the comparison Triode-Pentode, triode, have a ratio of poorer efficiency, Pentodes, the better power/volume. ---> so Pentodes

Selection of the tubes
Here was the selection is quite fast, small size and space-saving contacting only offer Nuvistoren and subminatur tubes. Nuvistoren are, however, due to availability and price in a unfavorable basis for "tinkering", a much better selection, and availability of Russian Subminis for the use of these tubes. A look at the various data sheets brings amazing results. So there it is small transmitting pentode with 2.5 watts Anode dissipation and high allowable anode voltages. Thus, the question of the power tubes was clarified, the 1P24B is suitable. As an input, and phase reversal level such subminiature tubes should work,but it seems to be in this design, no triodes. A recording of Characteristics of a 1Scha18B in a triode circuit brought forth good, and the recoverable approximately 17-fold amplification appeared to be useful.

Housing issues
, According to some Reflections on the case I came again and again to the result that the usual constructions with the Chassis as an open structure, and also allumschließende housing is simply too much space, if everything is mechanically stable (for mailing suitable) should be. How to get the smallest possible design..? The solution is the inclusion of components in the housing construction. Somehow you would have to create it, the largest components in the design to incorporate that these determine the dimensions, the Rest is then fit already.

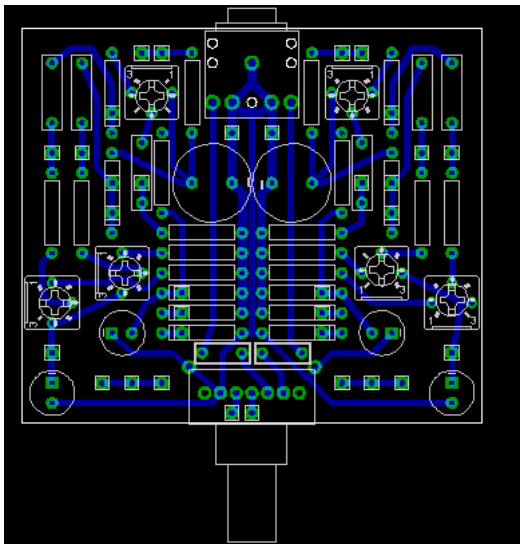
After the concept of the rough set was los
scrap of paper with circuit design, against the clock, according to a tried and tested pattern.

Problem! Off to a good start...how to build with directly heated tubes, the phase reversal ? Differential amplifier and kathodyn stage of a divorce, with a signal voltage to the cathode, too. Transformer coupling?..doesn't have to be, the place is already too tight...so really primitive, with a Triode-connected 1Scha18B. The gain is 1 bring ' em down? Is not so readily. So working resistance of the input stage to tap, adjustable to Adjust the symmetry of the driving voltages.

Problem! How do I create the necessary bias voltage of the Grid of the first two stages? The power amplifier receives its power supply, but in a completely different order of magnitude. Let's see.... the output tubes can be used for either 1.2 or 2.4 V heating, the input tubes with 1.2 V.... aha, heating, therefore, 2.4 V, the input tubes to get a series resistor in the negative line of the heater, are thus in the middle to 3/4 of the heater voltage. The Ug about -1,8 V, the fit.
Now it was time for the sample design, breadboard in the Euro-Format was fitted quickly, easily, available AÜ off, the batteries connected. It's music from the part actually came. Now it went to the fairs.... 2 Watt, distortion in the bass register below 40 Hz. Not so great, the performance is also AÜ was not satisfactory for the more is probably too small. So I took a larger AÜ, and for the first time for a variety of Raa, the benefits are determined. With a proper AÜ, and slightly higher voltages was immediately there, up to about 8 watts, the power consumption is proportional to the modulation, in addition to increased power disproportionately high, 9.6 Watt were the highest measured performance, but for sure too much for the poor tubes!
After some thought, and I decided to go for less performance, so that a M55-transformer is not sufficient. The

measurements showed 8k as a reasonable value for Raa. So right AÜ had to fill the gap first, M55-push-pull transformer with Raa 8 KOhm.

The sample have put together the transformer, it occurred to me that with a 2mm wall thickness and 55mm outer dimension is enough space for the transverse installation of the tubes is available. From this,the requirements for the enclosure: limitation of the power by 2 x 5 Watt, using the M55-AÜ were then. Thus 2 housing dimensions were determined: 55 x 55 mm. The third dimension was quickly determined, 4 tubes, side by side, in addition, AÜ... total length 160mm, the volume of just under 0.5 liters.



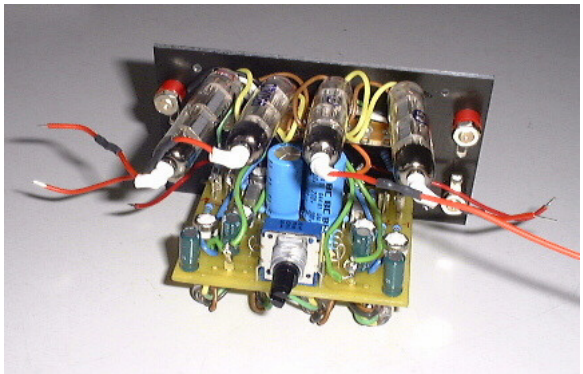
The requirements in such a small housing are especially good accessibility of the circuit, all the parts must be individually removable. To this end, I built me a small frame, which can be screwed in from all sides, the walls of the housing attached. is held in place with 4 threaded rods, so that the cohesion of all the parts.
From the transverse installation of the tubes, the arrangement 2 x 4 tubes showed side-by-side, in between, enough space for the wiring was, I thought at least. But somehow it didn't fit with free wired components, a printed circuit Board had to be found. So circuit in EAGLE and layout. Create symbols for the ALPS Potentiometer and from a 1-EURO-Radio-developed mini-Jack for audio input. The tubes I only solder points provided, the had more freedom for the placement of the components. The following came out:

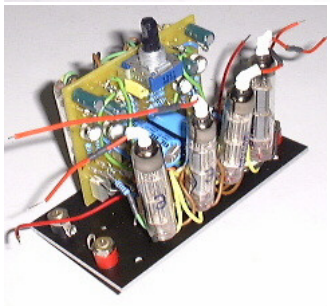
The resulting printed circuit Board is approximately 50 x 50mm tall and wears all of the components, in addition to the output tubes, there is still a small Lötleiste, which is associated with the ground connections on the rear panel and power supply terminal and the output tubes is wearing. The entire electronics is a part of the back wall and can be grown with this together.

The backplane carries the complete electronics and needs only about 5 wires with the AÜ connected.

Mechanically, the circuit Board is not torsion, then by the screw of the potentiometer in the Front kept safe, additional fixtures are required.

The power supply is a self-made cable with 9-pin Sub-D connectors. As the only common wire for both amplifiers, the screen of a piece of RG58 is responsible, which was pulled over the 8 individual wires.

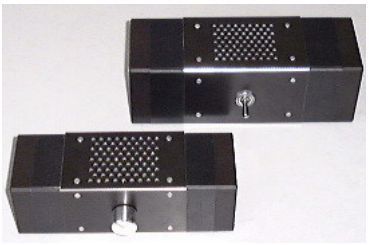




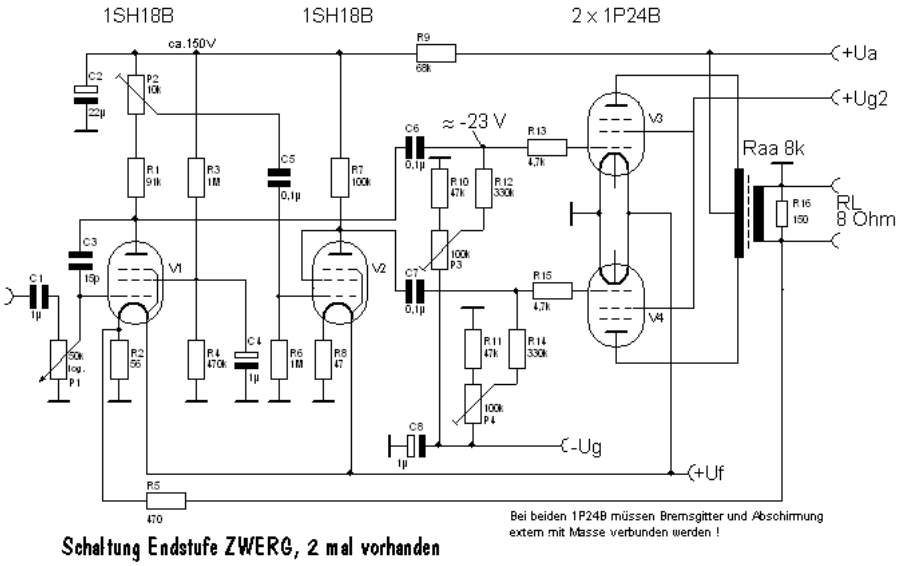
The housing parts are made of 2mm aluminium with dark brown anodized surface, the sub-frame made of plastic. As the lateral completion of a cover H55SW sits on the AÜ, respectively. 4 threaded rods everything is held together, the walls of the housing are bolted to the subframe. Before the final machining of the housing parts is a sample build-up to avoid any inconsistencies were noted, it has, however, fit all.

The power supply was made according to the same concept, but with M65-transformers, and therefore slightly larger dimensions.

Here is the sample structure of the multi-day endurance test to use.

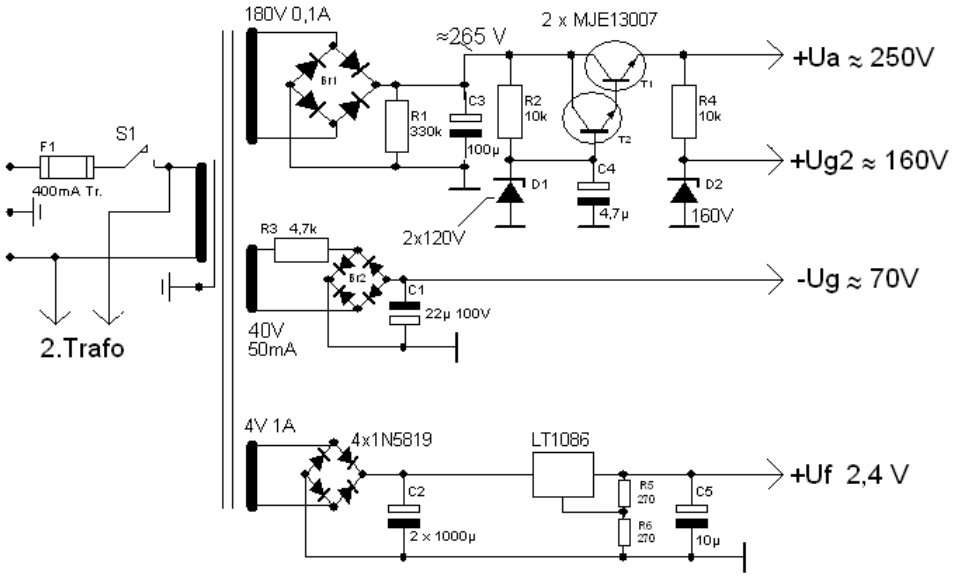


The Circuits of the power amplifier and the power supply:



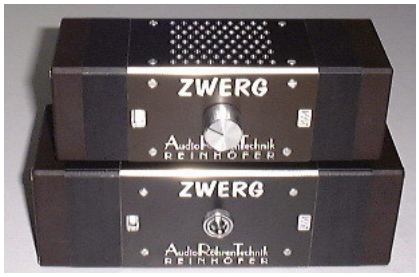
(Click to enlarge the diagram)

The circuit of the amplifier largely corresponds to the classical approach. In the entrance there is a 1Scha18B in Pentode circuit works, as it turned out, that in a triode circuit, the required input sensitivity check. The anode resistance was extended with an adjustment knob, the voltage for the phase reversal is tapped. With this, the AC voltage symmetry is set. The 15p-C of the grid to the Anode ensures stable operation of the feedback amplifier. The reversed-Phase self-done 2. 1Scha18B in a triode circuit. The two anti-phase signals then pass through the 4.7 k-protection resistors to the grids of the output tubes. The working point can be set with the 100k pots separately. A special feature is the generation of the grid bias of the pre-amp tubes, here is the series Resistors on the 2.4 V-heating circuit adapted, this results in approx. -1,8 V Ug. The resistance of the Vorröhre was slightly greater because the current is negative feedback evenly in parallel.



The power supply is aufbebaut channel separately. The M65 transformers are oversized, originally, one should get away with it for us the housing should be built. As the then it was clear I for the sake of simplicity only a second NT've built instead of 2 new in the desig the voltage for a power amplifier. The anode voltage of a transistor screening stabilized and filtered, the stabilized voltage is the Ug2-v front of the 160V-Z-Diode provides for a limitation of the screen grid current, from 9mA the Ug2 breaks down and prevents excessive grid bias voltage has as a special feature, a 4.7 K resistor in the transformer supply. This limits the charging current of the charging ca acts as a backup, since only about 9mA can flow. The heating is rectified by Schottky diodes and a LDR to nearly 2.5 V stabilized, the due to the Cable resistance.

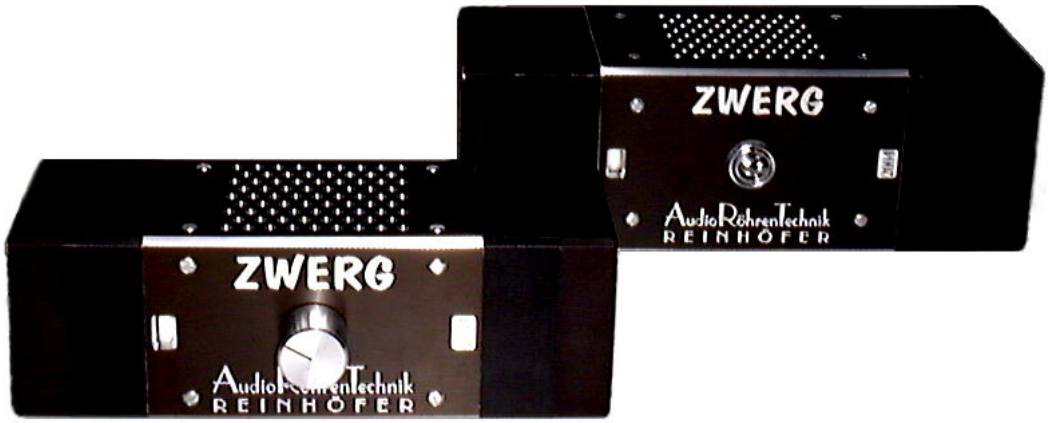
After the brilliantly successful long-term test (even the operation on top of each other without disturbing hum possible) were decomposed both devices again to the final appearance set.



In the design of the Front, I have dispensed with the labeling of the controls, consciously, actually you can make as little what is wrong. Major problems in the naming prepared, briefly and concisely, the Name should be, nothing lofty, unattainable properties suggerier such as, for example Gigantissimo-Hyper-Ultra-Super-Amp, etc. Like there is probably enough.

Well, a DWARF says it all and fits.

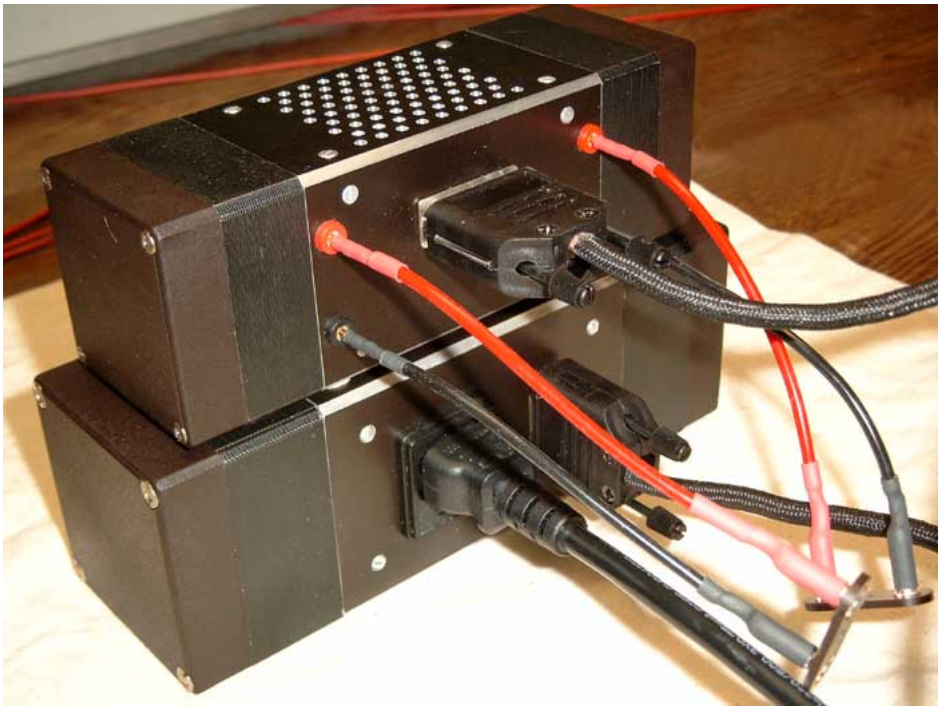
As a treat, in the last second, so to speak, I added in two Parts,a glowing green Neon glow lamp from a slaughtered suitcase television, where it served to display the channel switch.



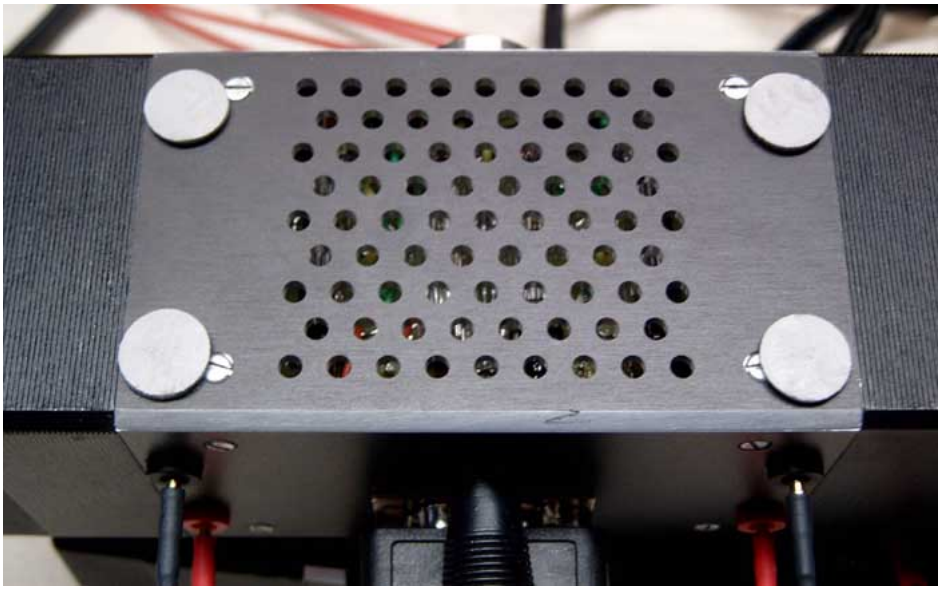
It from me (Jogi) created photos to follow :


ZWERG
ZWERG


ZWERG
2004
AudioRöhrenTechnik
REINHÖFER
ZWERG
2004
AudioRöhrenTechnik
REINHÖFER

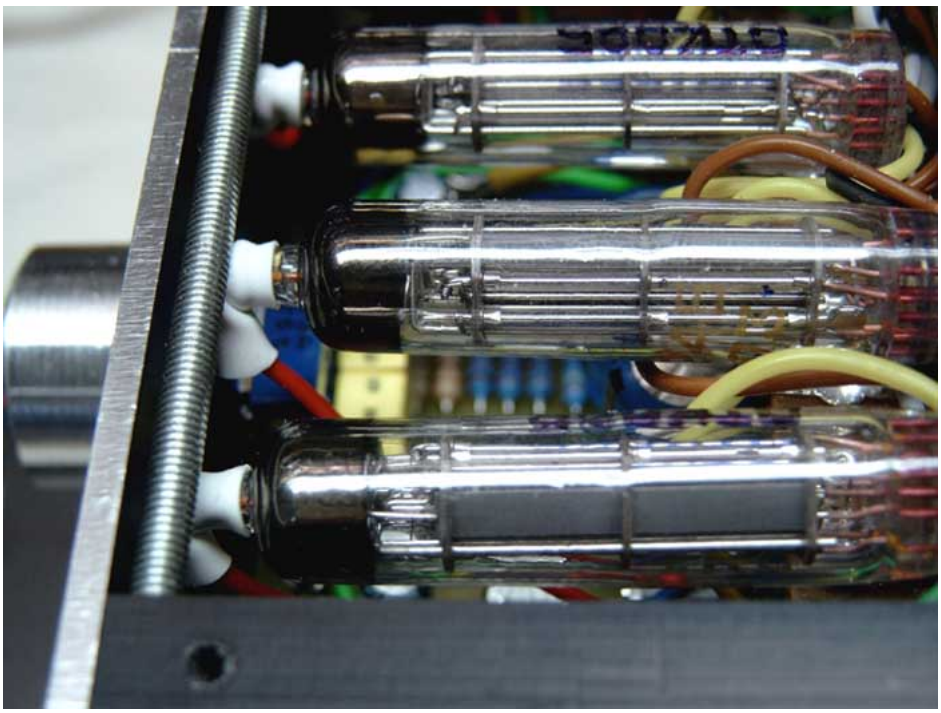


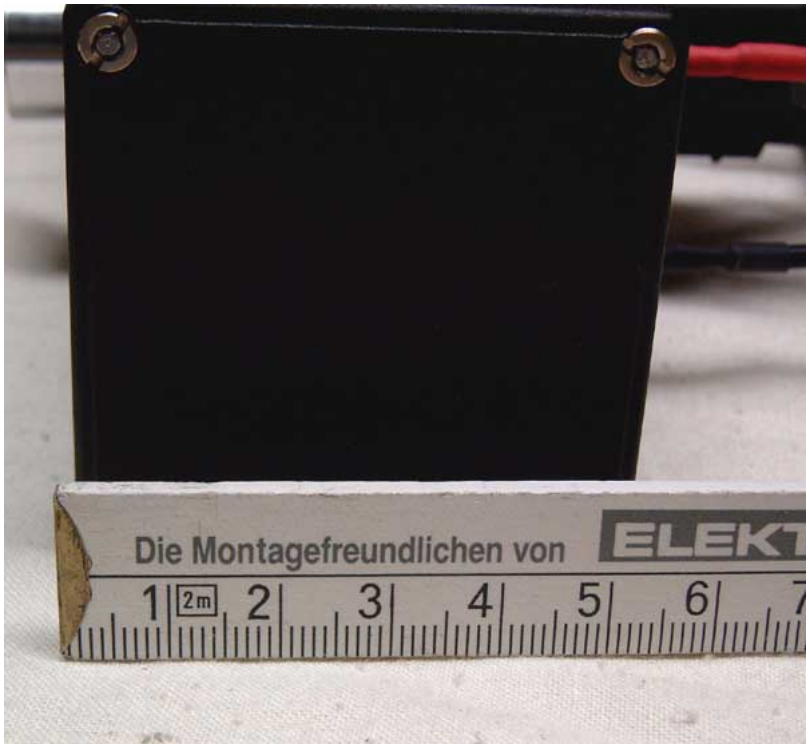

ZWERG
2004
AudioRöhrenTechnik
REINHÖFER
ZWERG
2004
AudioRöhrenTechnik
REINHÖFER



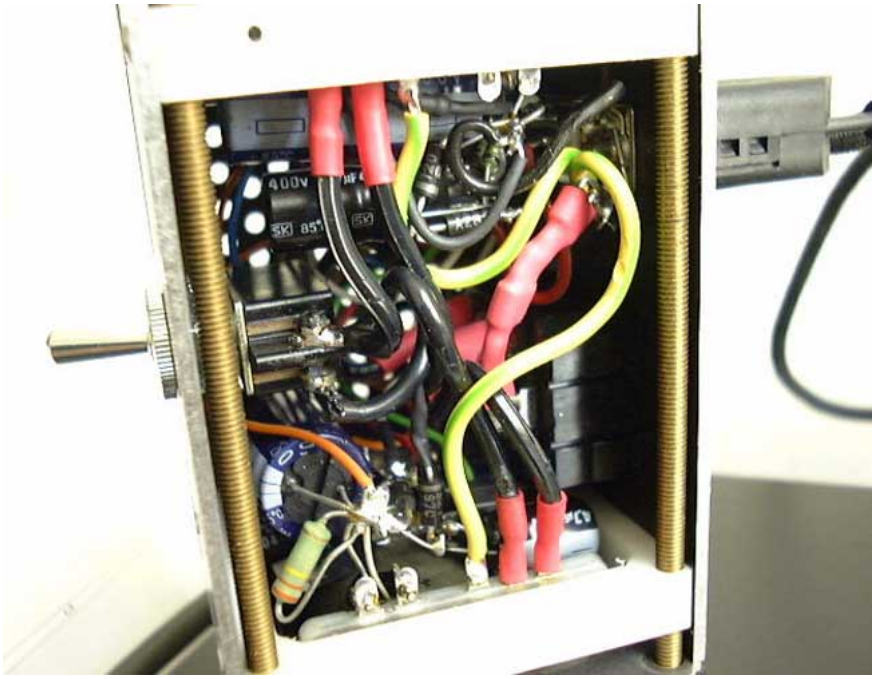

ZWERG


ZWERG





The following photos of the power supply-Internal sent me Gerd at a later date to :



Due to the power / volume calculation in the evaluation for this amplifier, the Pmax, Pmax 6.2 watts-Pmax (undistorted) = 5.7 Watt had, in the **first place**.

Return to main page