

## The Spartan ( Spartano ) by Ari Polisois

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This compact and efficient amplifier was described in the Italian Magazine *Costruire HI FI* and has the following characters :-

- a) Compactness ( you will later see why this is important to my new project ).
- b) Efficiency, as it delivers more or less 5W with very few valves and components
- c) User friendly feature, based on a simple circuitry.

All the standard looking amplifiers I had built before with the intention of settling them in the living room had been “eased out” or better “rejected”, and sent back to my laboratory, because they were found “ugly” .

Of course, we, do-it-yourself people, do not agree with this drastic statement, but are we absolutely right ? We usually do not pay much attention to the aesthetics, at least not in the same ways a woman does. All that matters to us is power, distortion, frequency range, reliability, damping factor, etc. etc. and when it comes to aesthetics, this means, to us, that the amp should look solid and shining.

Thinking about it, I finally succeeded in finding a solution, consisting in a hybrid creature, as I will explain. The clue was to disguise the amp into something familiar and already accepted as normal, right ? Then, all I had to do was to disguise the “ugly” amplifier in a dress that would give him a familiar look to allow him to share the warmth of the living room with the furniture and other stable accessories.

### The solution.

Most boxes of a magnetic tape recording cassette measure : 21 cm high x 12,5 wide and are about 3 cm thick. I settled 13 of them in a row and took a photo, that I printed, duly enlarged, on two sheets of full size labels adhesive paper. Then I prepared a support, using a thin aluminium perforated sheet, having the dimensions of the row of the above 13 cassette boxes, increased by about half a centimeter clearance. I then fixed the two sheets on the support and got a cover that looked (more than less) as the row of 13 cassettes!

Dressed like that, the amplifier could not be accused to spoil the overall view of the living room.

The more I looked at it, the more I was convinced that “the thing” had a much better appearance than a bare and cold electronic device (\*)

### The core.

To be honest, the above solution was also mentioned in the article of the Spartano printed by *Costruire*, but I had not paid too much attention to it.

After this effortless choice, I checked the dimensions of the Spartano and find them suitable. I then examined carefully the original schematics and, at the same time, read the remarks made by Pierre Touzelet in his article “Modelizing the Spartano amplifier” (\*\*)

I found some of his conclusions fully justified, so I made the corresponding changes, that I included in the revised schematics below ( **Figure 1** – amplifier section and **Figure 2** – Power supplies).

The whole amplifier ( except the inverter, that must be kept outside, due to its sensitivity to stray magnetic fields – unless fitted in a much larger chassis, in the right place) stays comfortably underneath the cover. Here-below the dimensions of the chassis:-

- a) the base: 13 x 37 cm.
- b) the height : 8 cm. To which you must add abt. 10 cm representing the height of the 6080 valves, therefore leaving a 2cm clearance from the top of the cover.

This chassis is strong enough to support the two transformers ( Power and Output ) each fixed at the opposed side, on the top.

### **Going to the solid.**

Some readers will find superficial to start with such “unimportant” details, but, in my case, as explained, this was compulsory, or I had to keep my “awful thing” in the garage.

The choices that contribute to the success of the Spartan, a real good amplifier in a small space are:-

- a) a compact “all in one” power supply transformer ( size 8 x 12 x 10 cm high – weighing 2.8 kg )
- b) a compact “twin channel” (\*\*\*) output transformer (size 10.5 x 12.5 x 6 cm overall – weight : 1.9 kg
- c) the simple but efficient circuitry
- d) the low anode voltage output valves, requiring lighter filtering capacitors.

The schematics in Fig. 1 shows the extremely simple circuit, a DCMB (\*\*\*\*) layout using very few components, stable, easy to assemble and to adjust.

The valves are one ECC82/12AU7 and one 6080 per channel.

The first triode of the ECC82 amplifies the input signal by 12-13 times. The second triode contributes with an additional gain of about 4. Therefore, a standard input signal of 1V peak (such as supplied by most CDP units) would benefit of a gain between 48 and 52. This is more than what is required to drive the 6080 to full power, with a bias setting between –40 and – 45 V (depending on the valves characteristics).

The original load of the driver valve ( 8k2 ) as well as the 4k7 resistor at the cathode, are the same as in the initial version, meaning that they have not been changed, as suggested by Pierre, considering that the results of the tests ( instruments and listening ) were OK.

On the other hand, the anode load of the first triode was reduced to 220k-ohms and the cathode resistor replaced by a set that can be varied from 1k7 to 2.3 k-ohms. The pot included in this set has the property to adjust the anode current of the power valves ( more explanations can be found in the DCMB articles in this site), so that the magnetisation due to the DC idle current in the two branches ( channels) of the output transformer, is reduced to almost zero, leaving the full magnetic headroom for the AC signal ( kindly read the lecture on this subject in the Information section of the site – part 2 – SC-SCC ).

As mentioned, you can find Pierre’s analysis in his article’s box (Information ) and you may decide to use the values he suggested. Feel free.

With regard to the power supplies, these are shown in Fig. 2 and they are quite standard.

The operating DC voltage, as well as the bias, have been set so that the 6080s are not overstressed. In fact, the voltage between anode and cathode of the 6080s is about 120V. The anode current being set at 80mA, the plate dissipation is below 10W.

The output power of about 5 watts ( enough to drive high sensitivity speakers in a medium sized listening room) can be obtained at an acceptable rate of distortion with a frequency range rich in bass and smoothly extended in the kilohertz side.

A kit will soon be available to the audiophiles, involved in a demanding professional career, to save them a lot of time looking for the suitable parts, etc.

The assembly of the Spartano would take then from one to two week ends, at the utmost.

Said kit is supplied with a CD illustrating all the assembly steps, one by one, with the support of detailed photos.

The price stated concerns a promotional offer, whose validity lasts till end year.

Few words on paragraph c) . The Spartano can be steadily connected to the loudspeakers, as well as the input cables, but, using it forces the operator to remove the cover, in order to connect the cable with the mains voltage source.

This is a deliberate precaution, so that the heat generated by the valves can be dispersed by a free air flow.

The amplifier is integrated with two separate volume controls, one per channel, thus enabling the balance of the left and right channels' sound levels.

As mentioned, the Spartano requires inverted signals at its RCA input sockets. The recommended solution is to use a 3B – BassBoostBox that not only provides for the inversion, but also insulates the amplifier from the source, with a high impedance load in between that preserves the frequency range ( the BassBoostBox –3dB limits are: 10 Hz to 200 kHz ).

More details in the second part ( within end March ).

Keep in touch.

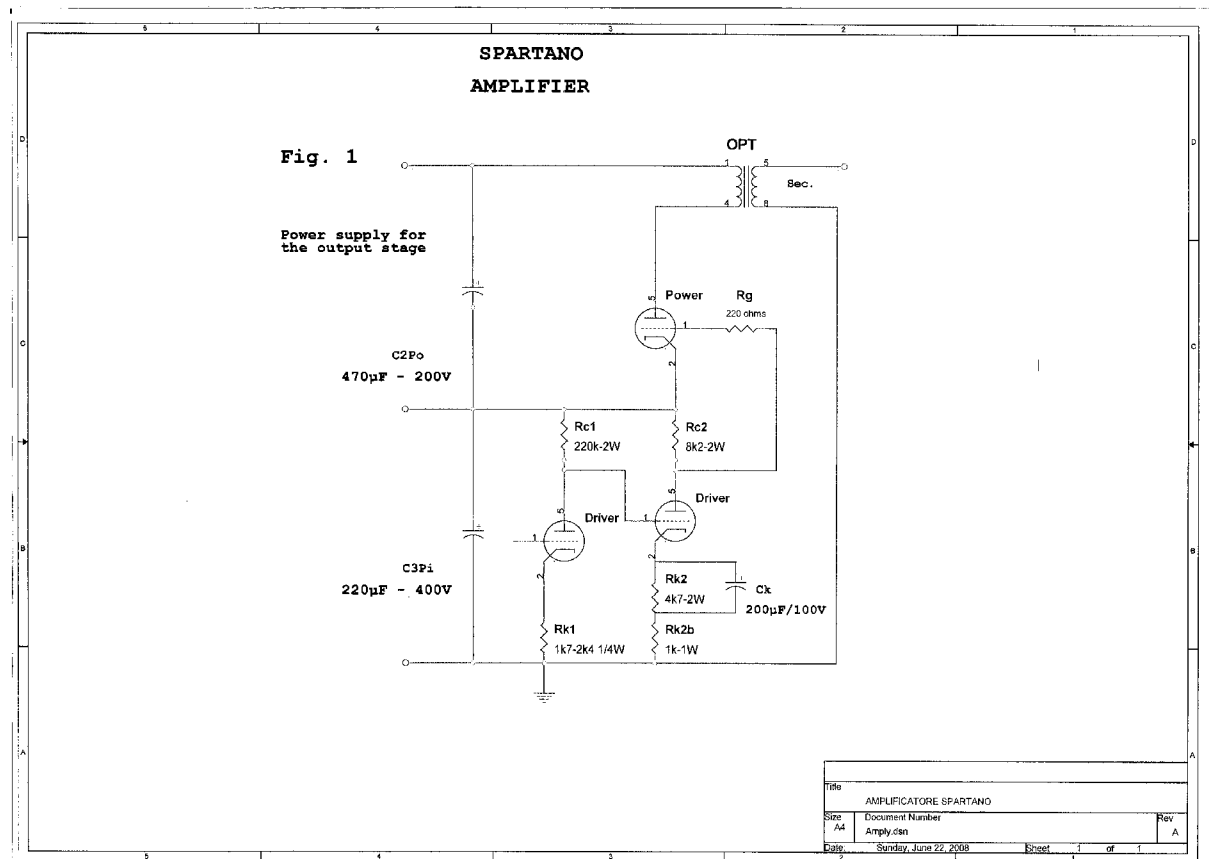
Ari Polisois

(\* ) You will find a photo of the cover I prepared in the second part of this article, that will be published before end March; but you can already imagine how it looks like.

(\*\* ) published in this site (see Information section ).

(\*\*\* ) an SC-SCC “Double ended” OPT ( see more in the Site literature )

(\*\*\*\* ) info can be found in this site, in different locations.



# POWER SUPPLIES

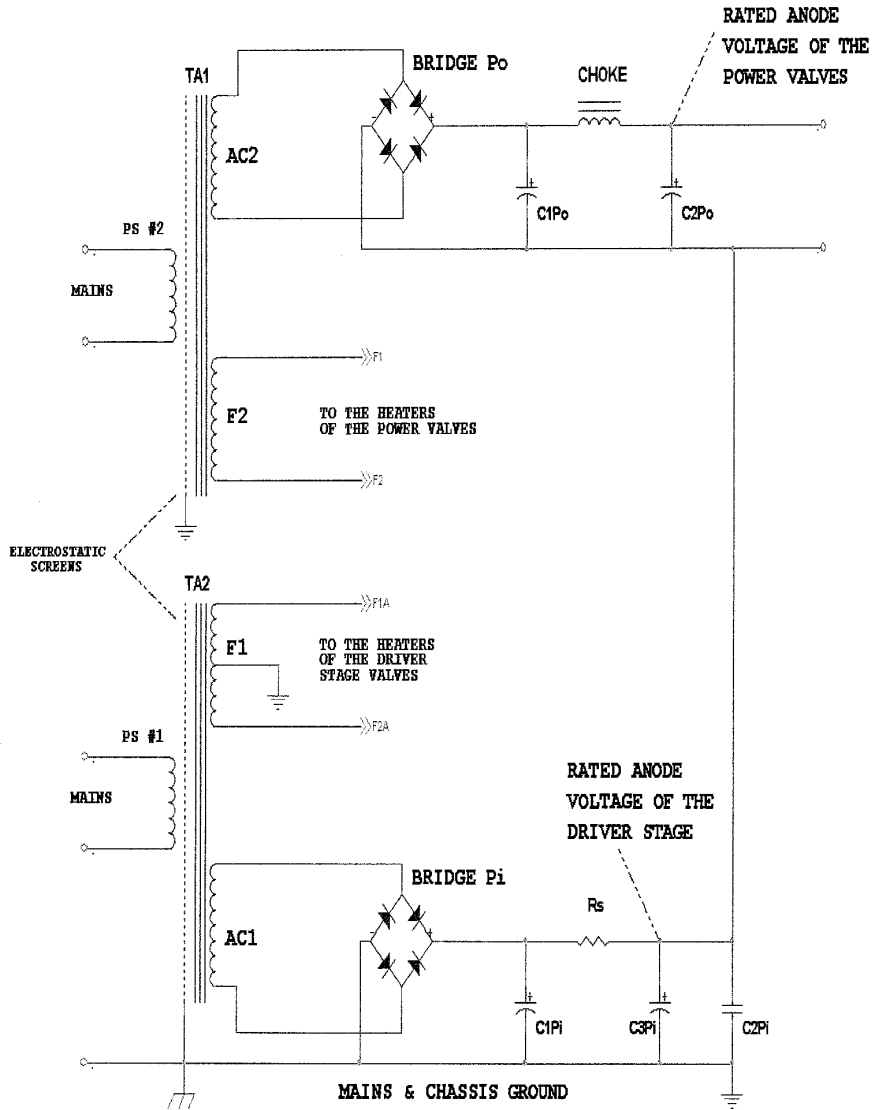


Fig. # 2