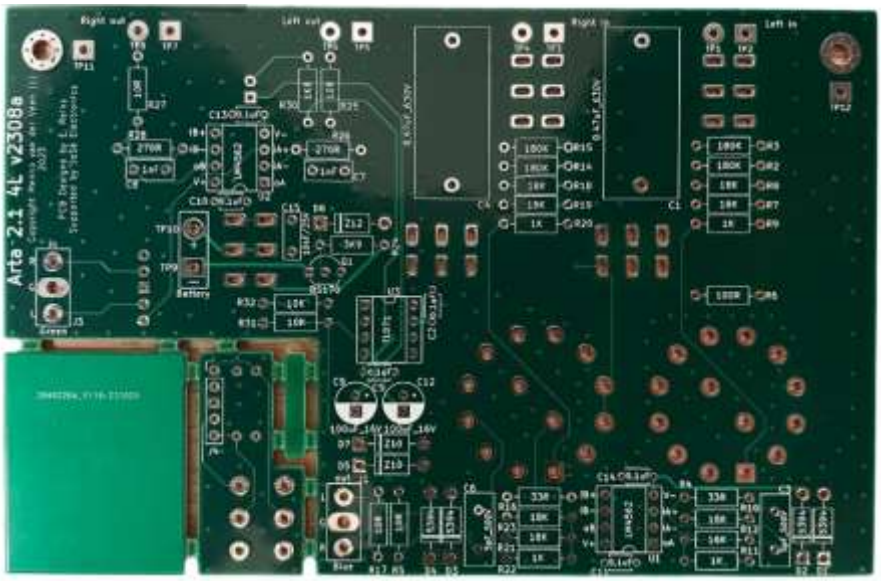
Construction description Arta2-measuring unit.

For those who are just starting to build tube amplifiers, will need measuring equipment at some point. Usually the first thing you buy is an oscilloscope and/or a function generator. But when it comes to measuring distortions in the sound signal and, for example, doing spectrum analyses, you soon end up with programs such as ARTA.

ARTA uses the sound card of a PC (internal or external) to perform measurements. It is therefore important to choose a good quality sound card for this. To measure an output signal from an amplifier, the signal must be attenuated, because a sound card from a PC usually cannot tolerate more than 1 Volt at the input. And for that, we need the ARTA2 measuring unit. In fact, it's a luxury signal attenuator. This unit can attenuate up to 20 times, but also amplify the signal 10 times, e.g. to measure phono preamplifiers. So it's a versatile device. But we have to build it. Hence this short construction description with tips and tricks.



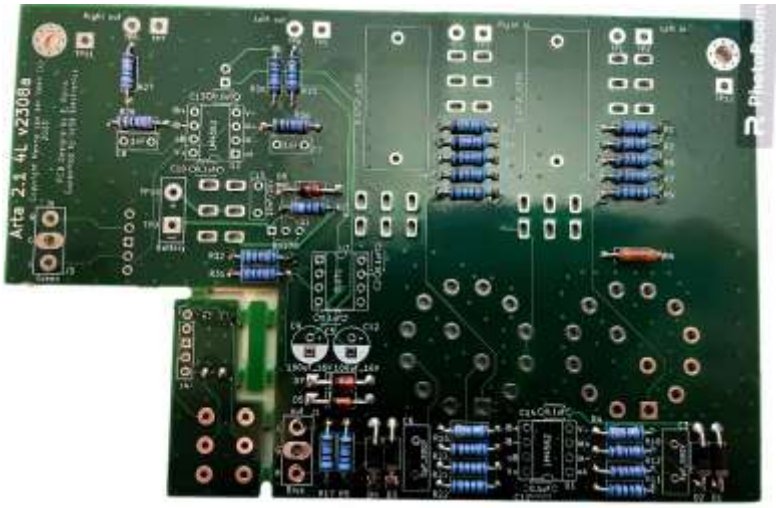
Above is the print in question. This print needs to be assembled. That's not hard to do. We assume that we use a good soldering iron and of course good solder tin. The soldering islands on this PCB are suitable for 60/40 solder. That is, 60% tin and 40% lead. That's the easiest way to solder. Use soldering wire of up to 1mm in diameter. It is better to take 2 sizes, e.g. 0.6mm and 1mm. It is better to use 0.6mm for these PCBs, because then the amount of solder is more controllable. Furthermore, the soldering wire must contain a resin core. Pure tin does not solder.

Soldering wire from Stannol. Below is an example of good quality solder.

Tips for soldering

- As far as possible, use a soldering tip that suits the work. Use a soldering tip with a flat side. So not with a full round tip. They don't have enough contact surface. As a result, it takes a long time before the component to be soldered is warm enough to solder. As a result, the component becomes too hot, with all the consequences that entails. Remember, it's not the temperature of the soldering iron that causes components to overheat, it's the length of time of heating that causes that. So it's also better, if you have an adjustable soldering station, to set the temperature a bit higher. Usually around 350 degrees Celcius is recommended, but try it at 400 degrees. That solder a lot faster.

- Always solder as much as possible from smallest to largest. Then the big parts won't get in the way later.



- As far as possible, measure the components with a multimeter before placing them on the circuit board. That may take a little more time, but nothing is more frustrating when the ARTA2 unit turns out not to work properly, because there is a component somewhere with an incorrect value. The manufacturer can also make a mistake.

- The capacitors, IC sockets with the ICs and the diodes on this circuit board are polarized. That is, they can only be placed in one direction. So make sure they are mounted in the right direction.

- The toggle switches on this PCB have 6 poles. So don't solder the 6 poles per switch in a row first, because the heat build-up inside the switch will then be very large. Alternate it with the other switches. This also applies to the selector switches.

- It is also very useful to use a bending jig to bend the legs of the resistors and diodes to the desired size. A small investment, but you will get a lot of convenience from it. Below is an example of a bending jig.

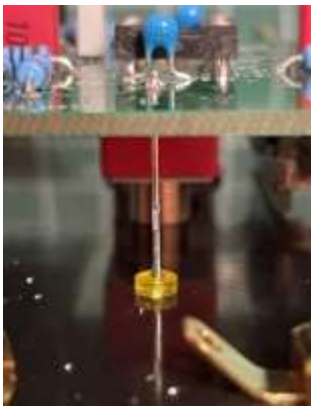
- The toggle switches, the selector switches, the LED and the two resistors (R33,R34) are mounted on the underside. Make sure that all switches are soldered straight or you will have problems with the hole pattern on the front panel later on. One method is to place the switches loosely on the front panel, and then place the circuit board on top. The switches do not have **a** specific direction.

- Pay attention to the selector switches. There are numbers on the circuit board where the selector switches should be, and they should correspond to the numbers on the white bottom of the switch. See photo below.

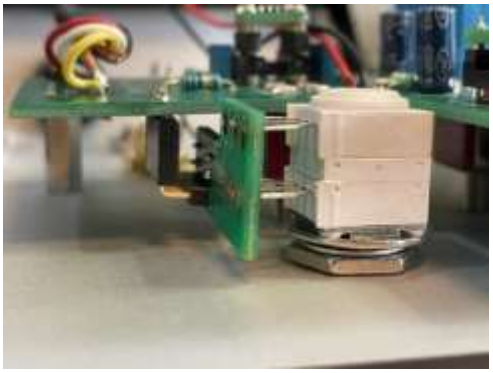
- The two selector switches have a locking ring supplied. These must be adjusted to the number (4) of positions required. First, turn the axis of the switch all the way to the left. Assemble the ring with the tooth in hole 4 (as shown in the photo on the right). It should now only switch 4 positions instead of 6 positions.

The connections of the BNC and RCA connectors can simply be made with bare wire. This doesn't have to be shielded either. The connectors are **not mounted in isolation** on the front panel. As a result, you only have to connect the ground to the circuit board in one place. See yellow circle in the photo. With this, the front panel is also connected to ground.
The two front panels must be stacked on top of each other (see red circle). Otherwise, there will be an unsightly seam in the transition from the front panel to the two top panels.
Fix both panels with the PCB spacers and the supplied black screws.

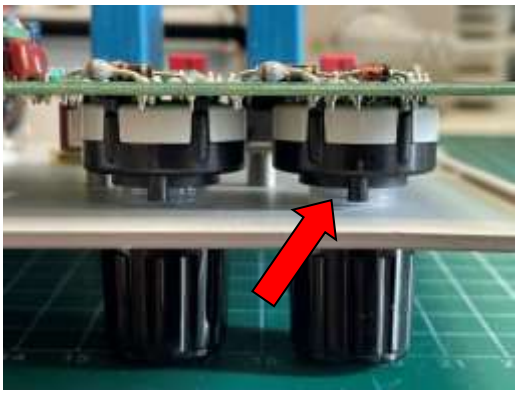
- Don't forget the LED. The LED must be placed before the PCB is soldered to the connectors. The square solder island for the LED on the PCB is the negative (cathode) side. There should be the short leg of the LED. And if not, try using a multimeter in diode mode. Determine the position of the LED in the work.



- Mounting the potentiometer. This will not fit exactly, because the original potentiometer is no longer available. A little improvisation is in order here.



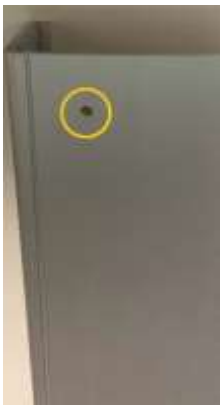
Due to the neck length of the toggle switches, the rotary switches may need to be fitted with a number of shims. These are not included in the BOM. You can use the black or red rings of the RCA connectors. You don't need it. Just drill out to 10mm. Adjust the rotary switches so that the neck of the toggle switches is flush with the top of the faceplate. See photo below. Finally, mount the supplied nuts of the selector switches and the volume knob on the top of the front panel.



- The RCA connectors that are mounted on the top side do not need to **be isolated** from the cabinet. The DC connector for the power supply must be **isolated** from the cabinet. There are also solder surfaces on the head and faceplates. The plates must be ground together with the cabinet itself. Use only the soldering faces of the slotted edge plate. Drill a hole in the cabinet for a good connection to the ground. All sides must be connected to ground of the circuit board. Connect the cabling to the RCA connectors. Out to Out and In to In. If you are using shielded cable, connect the cable to ground on the source side on one side. So:

Soundcard out (green) → RCA jacks - from soundcard → ARTA pcb – in green.

Soundcard in (blue) → RCA jacks – to soundcard → ARTA pcb – out blue.



- We use a 12V lead-acid battery for the power supply. A capacity of 2 or 3 Ah is large enough. The Arta unit consumes about 25 mA. So you can take measurements for hours. Don't forget that the lead-acid battery also needs to be charged, so a suitable battery charger must also be purchased.

- The Arta measuring unit is equipped with a fault connection protection.

This is the end result.