

Meter - AppNote #1

Updated 21 August 2020



This document was written to illustrate the mechanics of changing a meterscale (using, of course, **Meter** as the scale design aid). It does not cover the design of a particular scale but rather focuses on "how to finish it off" in some practical detail.

We are assuming that you have designed a scale to your specifications using the program **Meter**. For our example we have a two-scale plate, 0-30 volts and 0-4 amperes. And now it is time to mount the scale on the underlying metal plate.

Figure 1 shows a meter that we are going to modify by giving it a new scaleplate. The meter is facedown, let's get started.



Figure 1

Open the case to access the plate on which the scale is printed. Here we see that perhaps some glue is used to seal the case. Carefully break the seal or otherwise open the case. For those cases that are held together with screws simply unscrew them.



Figure 2

Figure 2 shows that we are to remove the face (front) of the assembly and set it aside.

It is very important to keep the entire work area very clean.



Figure 3

Next we have to remove the plate; don't let it touch the pointer.

In this meter the plate was held in place by two small "dimples." To remove the plate without touching the pointer it was rotated to the left.

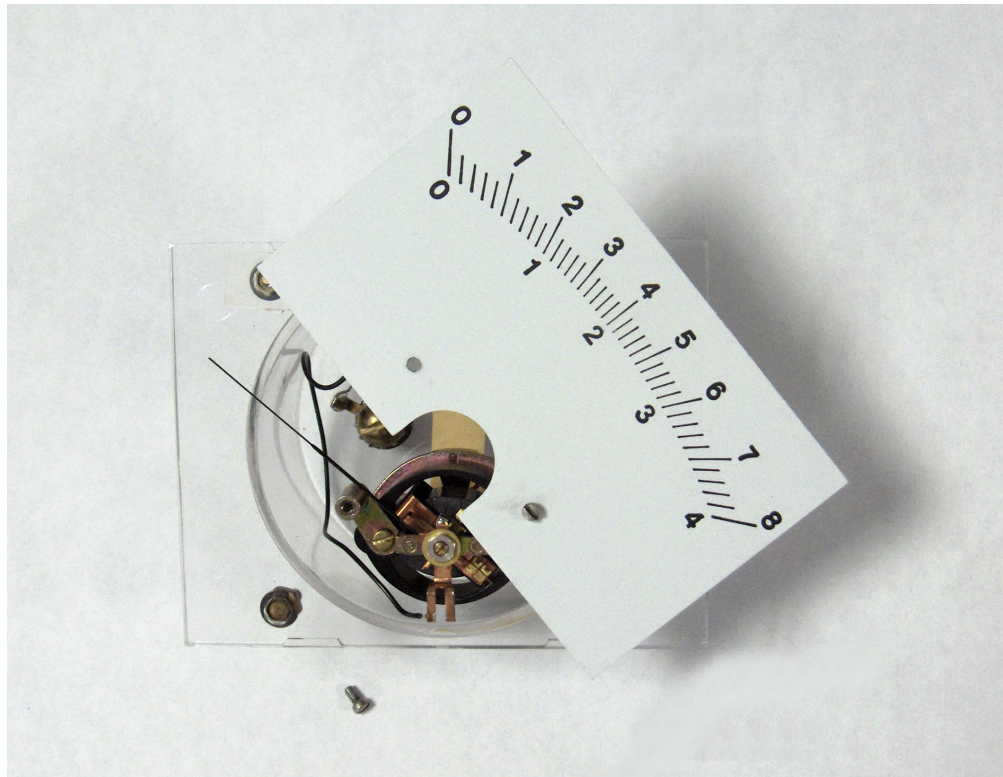


Figure 4

Figure 4 shows a different plate; it was held in place by two screws. To remove the plate it was rotated to the right.

In any case, don't let the plate touch the pointer.

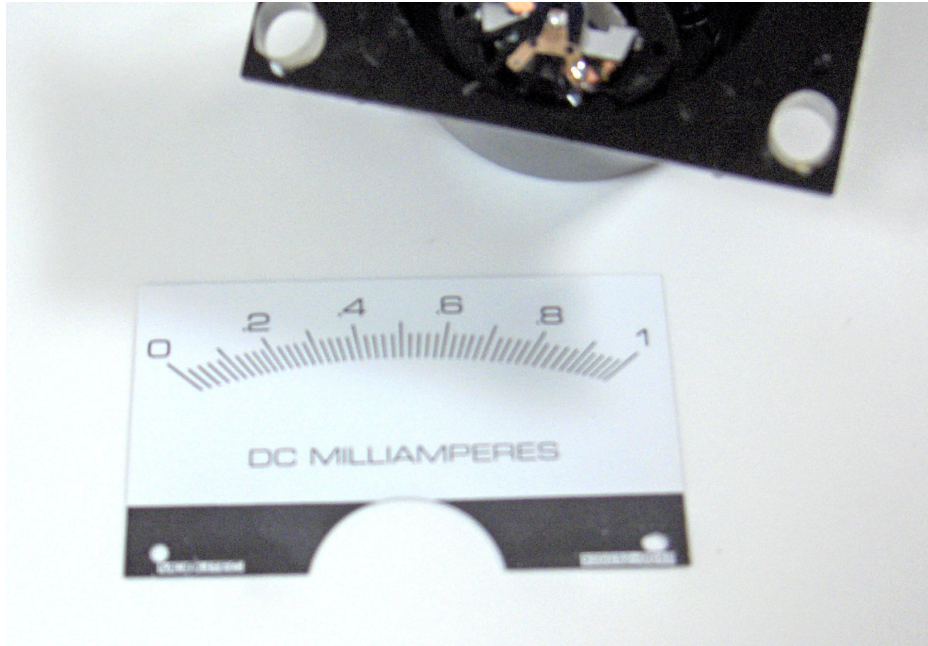


Figure 5

Figure 5 shows the plate separated from the meter case.



Figure 6

Now place the front cover back on the case so that the interior portion of the meter will be kept clean.

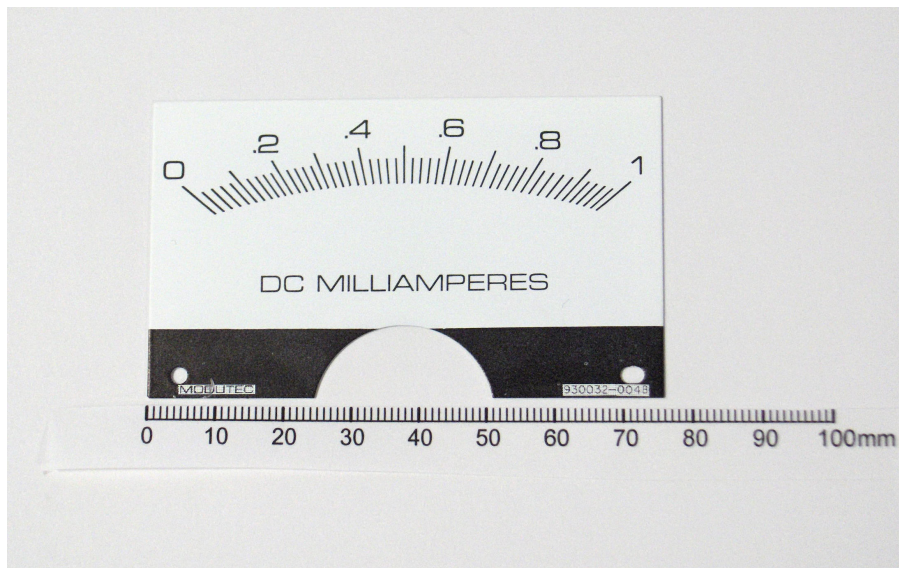


Figure 8

For design purposes, some measurements are to be made. At this point in this discussion it should be pointed out that the printer should first be calibrated. Go to the Plate screen in **Meter** and click on the **Meter Calibration** icon. Follow the instructions.

After the calibration has been done, we can then continue.

Now we can make various measurements and put them into the program **Meter**. Measure the plate width (76 mm here).

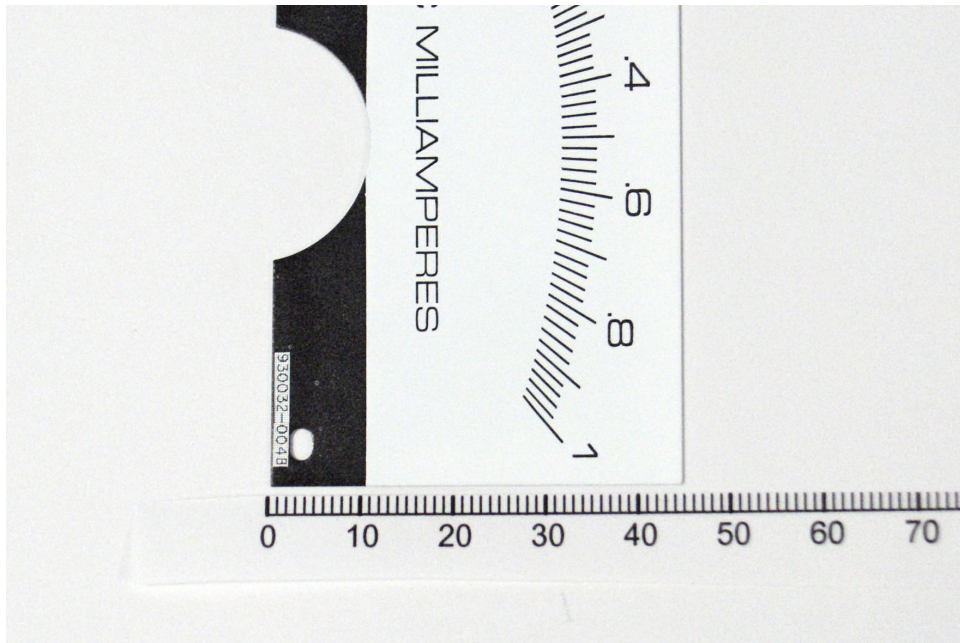


Figure 9

Measure the plate height (45 mm here).

The measurement of width and height are not critical. If you wish, round them up to the next higher millimeter or more.

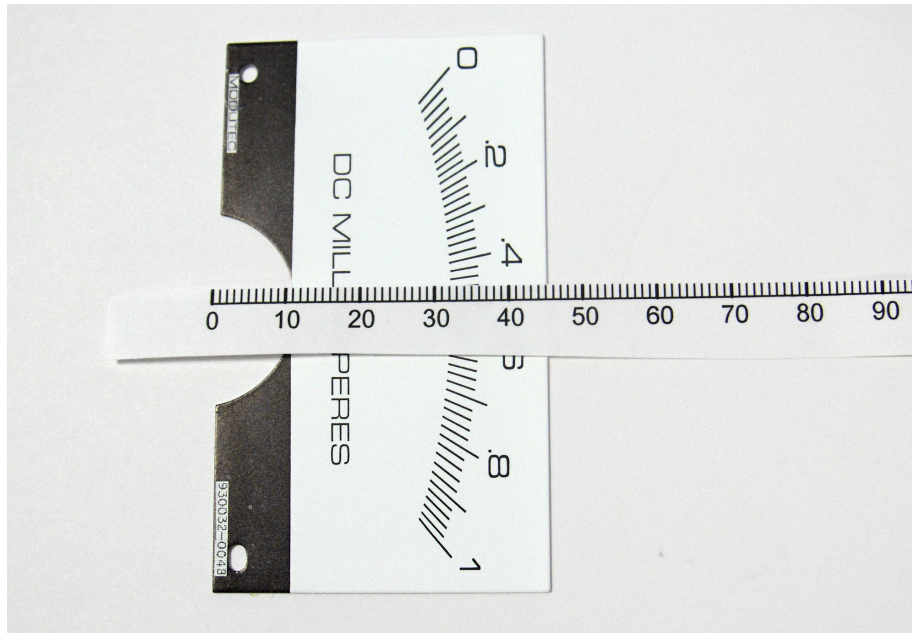


Figure 10

Measure the distance from the plate bottom to the bottom of the arc (32 mm here). In the program **Meter** this item is called "Bottom to scale ceiling."

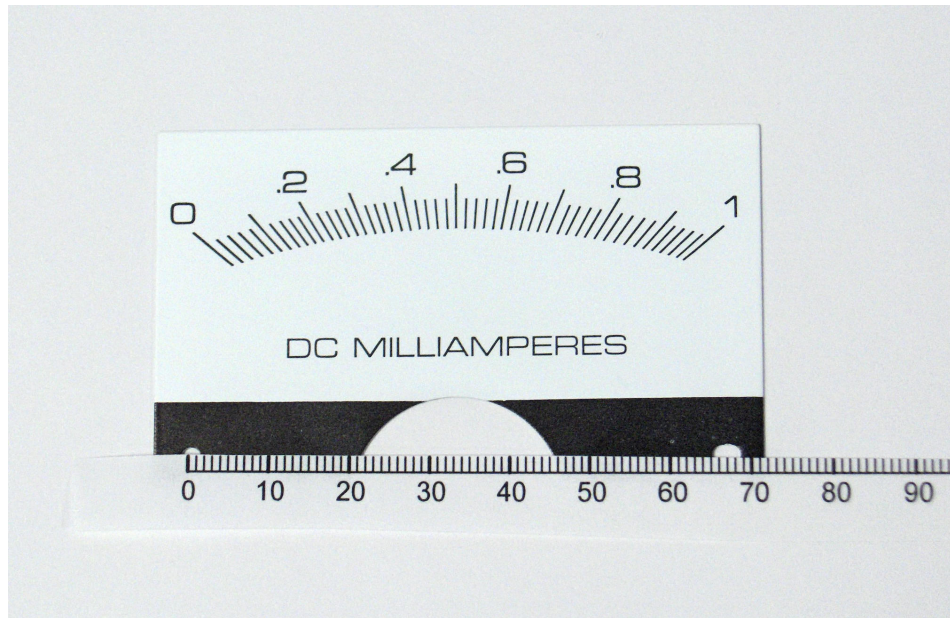


Figure 11

Now measure the separation between the mounting holes (67 mm here). **This must be an accurate measurement.**

After these measurements are done you can do the actual design work and then continue on with the task of placing the printout on the metal plate.



Figure 12

Print a scale and confirm that the mounting hole separation is correct, as shown in Figure 12 by laying the plate on top of the printout.

See in this image that the printout mounting holes match the actual plate.



Figure 14

Now place the **reverse side** of the metal plate against the **non-printed side** of the newly-printed scale. (By doing this, the original lettering will not show through the new paper scale.)

If there is some kind of printing on the back side of the original plate, it must be removed using an appropriate solvent. We need a clean surface, without any lettering or marking, onto which we will attach our new scale.

Place the metal plate on the printout with the original scale facing toward you; the plain metal side of the plate will be facing back toward the paper.

Line up the mounting holes on the paper with those on the plate. If the paper is thick enough or opaque enough that the mounting holes cannot be seen, then use a pin to make a small hole ("pinhole") in the middle of each of the printed mounting holes. Center the holes on the metal plate over the pinholes on the paper.

Use plastic tape to form a "hinge" at the top of the plate.

(In this photo the hinge cannot be seen. The mounting holes on the plate not appear to be lined up with those on the printout but this is because the plate is displaced from the printout.)

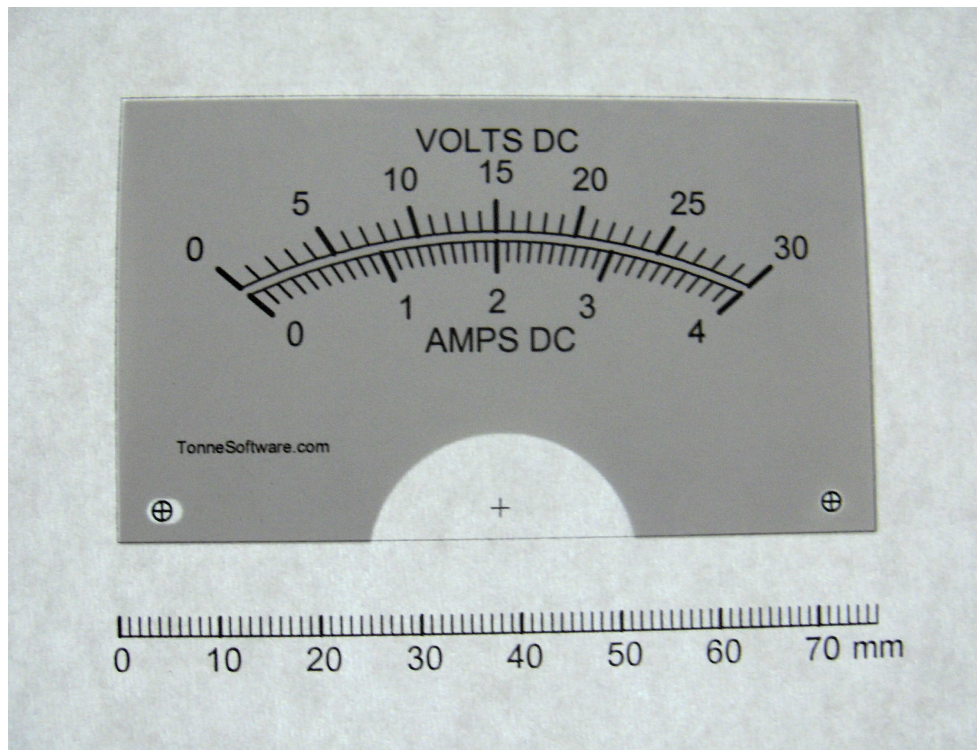


Figure 15

Figure 15 shows the assembly when it is placed against the window (or light table) and turned over to view it from the front side, with the newly-printed scale facing you.

If necessary, reposition the plate on the printout so that the mounting holes on the plate line up precisely with those on the printout.



Figure 16

Figure 16 shows the assembly when it is placed on a worktable **with the printing side down** (away from you). In this photo the plastic tape "hinge" can be seen.

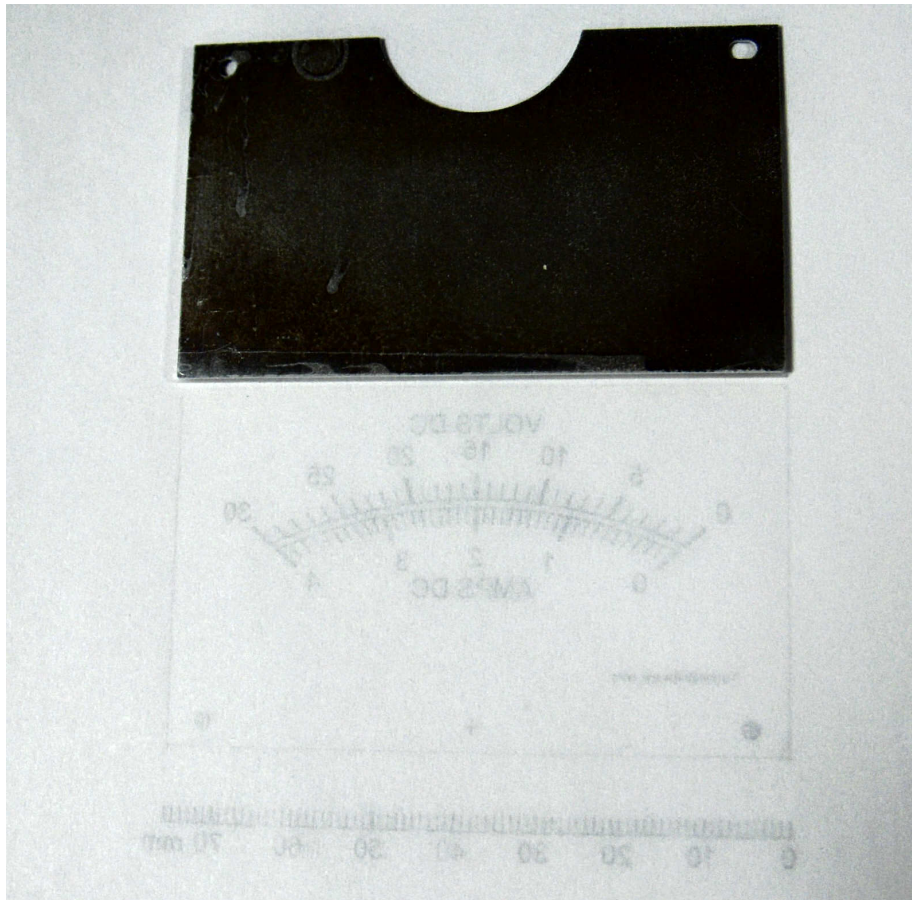


Figure 17

Lift up the plate by that "hinge" as shown in Figure 17.

Use a light application of a spray adhesive on the back side of the plate and optionally on the paper. Spray adhesives work much better than adhesives that are applied using a brush.

Do not use "rubber cement" because the scale will become discolored over time.

Ye scribe uses 3-M "Spray Mount" Artist's Adhesive. Surely other adhesives may be used.

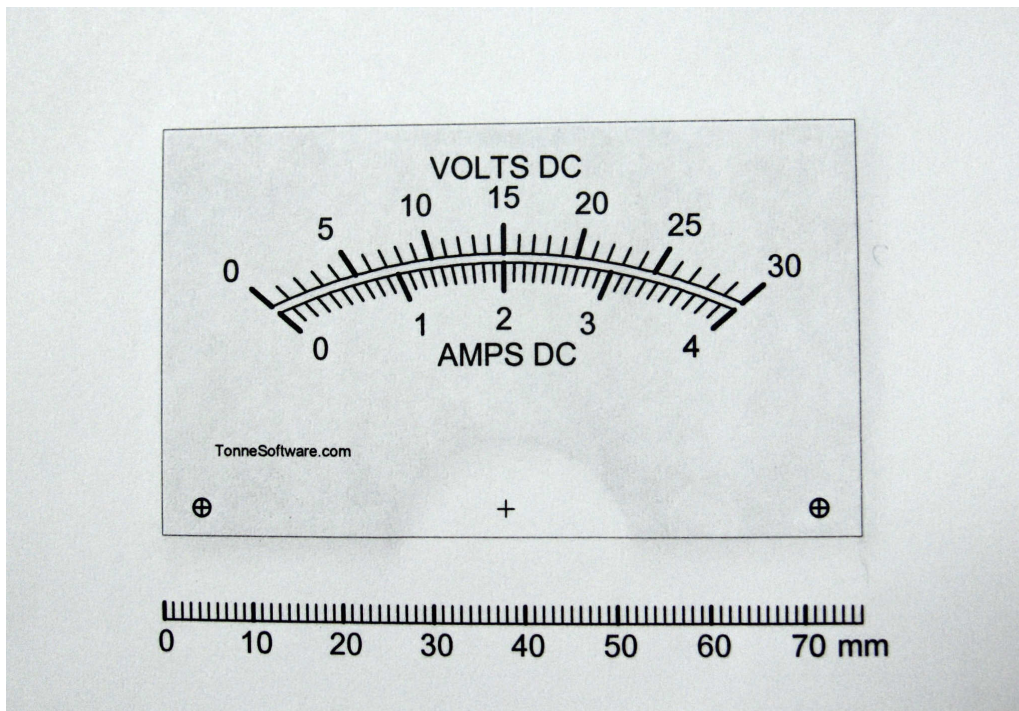


Figure 18

Lower the plate back down onto the printout, turn the assembly over and carefully press the paper against the plate.

Figure 18 shows what the assembly looks like after you do those things and look at the front. We are seeing the printed scale and behind it is the metal plate.

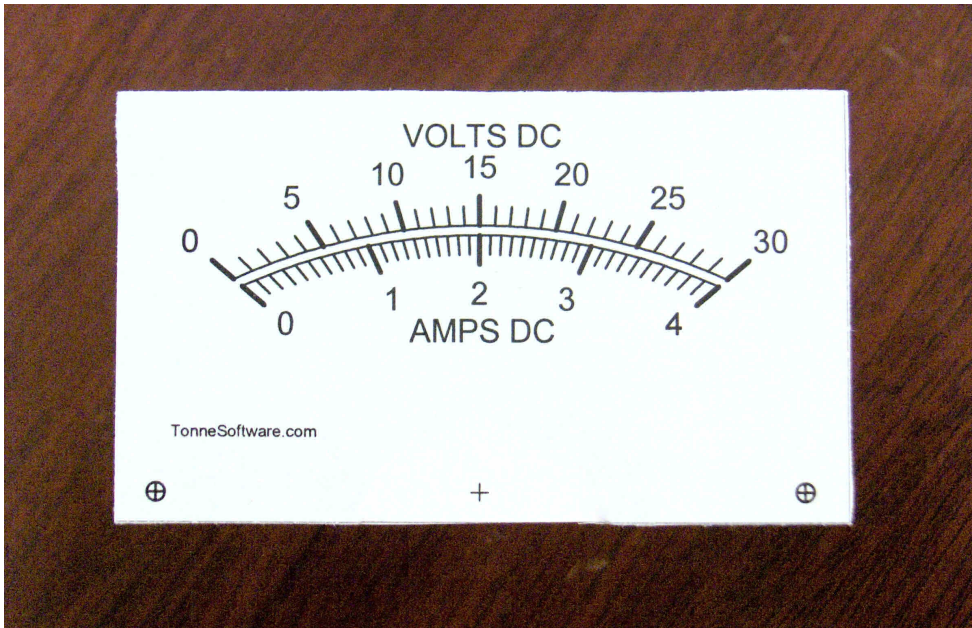


Figure 19

Use scissors or a "hobby" knife to trim the outside edges of the printout.

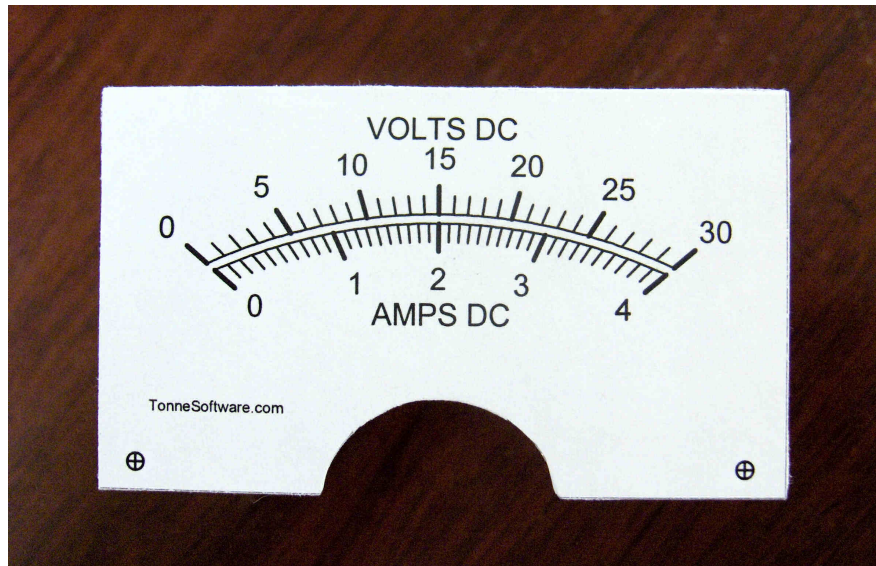


Figure 20

After the four sides are trimmed then use the hobby knife to trim the area around the pointer bearing as shown in Figure 20.

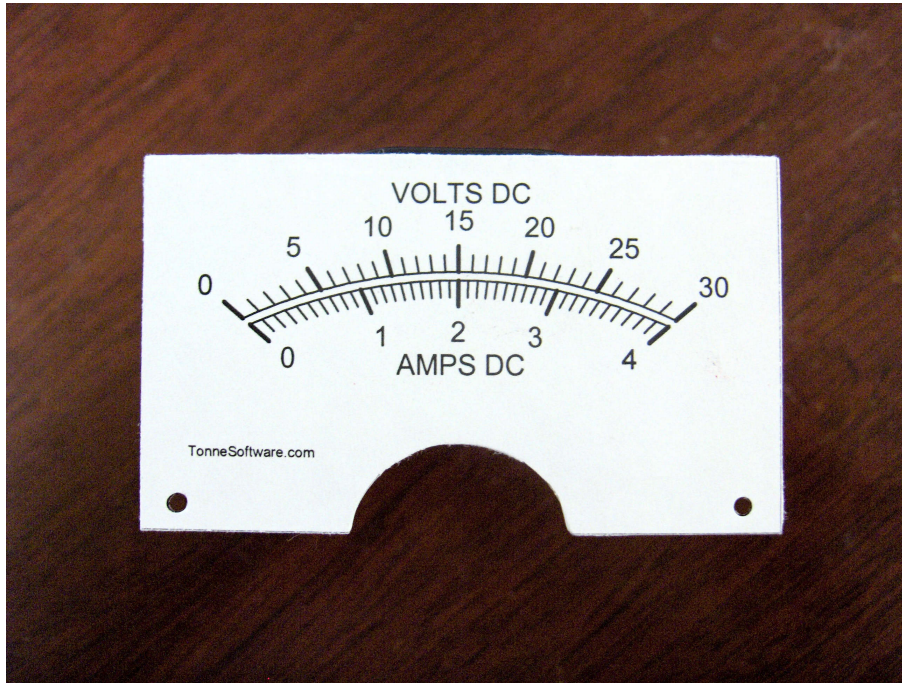


Figure 21

Use a small pen, pencil or other pointed object to clear out the mounting holes as shown in Figure 21.

You are now finished with the plate !

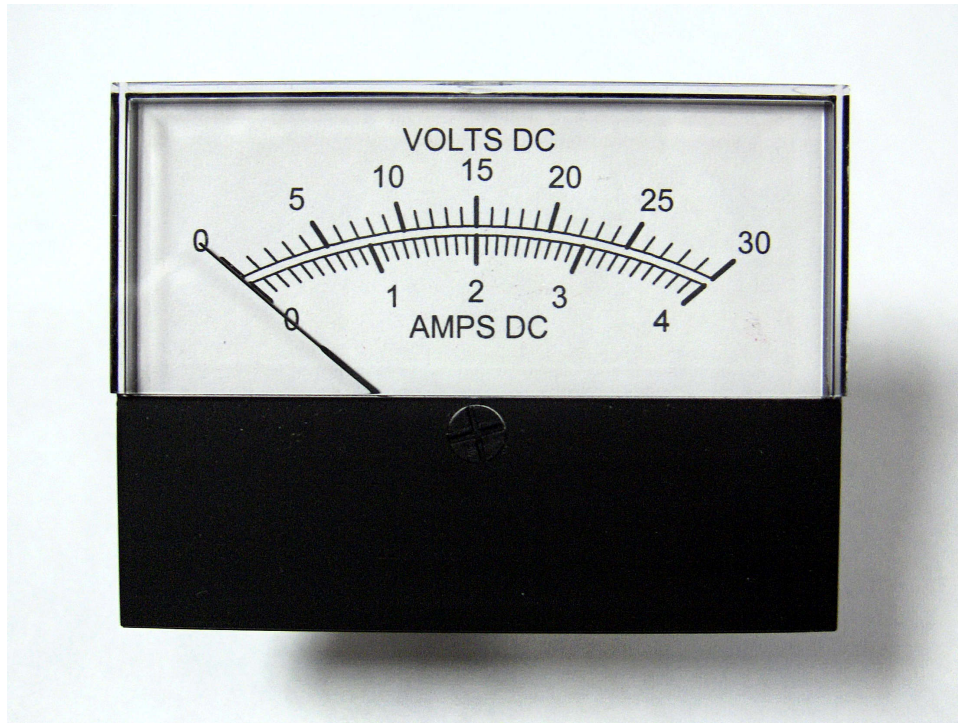


Figure 22

Open the meter case, replace the plate, close the case, admire your work.

Fin !

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