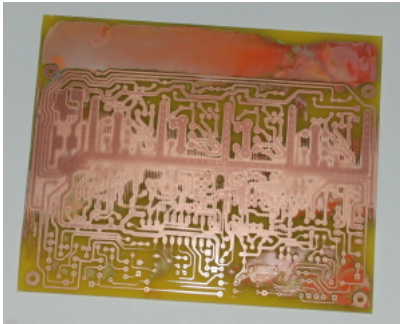


Bromograph. Trial failed, but...

Written by PaoloGabriele

Tuesday, 11 November 2008 21:12 - Last Updated Friday, 14 November 2008 00:25



Today I tested the **bromograph** I built in the last days.

If I were a trendy politician in Italy, I should say: "Everithing was good!". In fact results were worst. The device works, but not well. However it's all right (again the politician...).

Lucky to be in Italy, I'm not a politician neither a trendy one.

Let's start from the end... in short:

- the **lamps** are **too near to the glass** (and to the circuit to develop). As a consequence, in front of them the photoresist film develop before and more than on the "far" areas (where light arrives obliquely) where hardens in a bad way and develop in fuzzy way.
- **Two lamps are not enough**, another one in the middle is required and the exposition time are to adjust considering this new element.

Now let's fly back to the beginning: hoping it would work well at the first shot I took some pictures, aiming to report all in those pages. The process is right, so I "**unroll**" it the same...

The aim: find the the sensitized base's best exposition time to the UVA rays to have a good develop. It depends from many factors: the fluorescence tubes (or any other light source) int, lthe distance from themselves, lthe photorsist thickness and its composition.

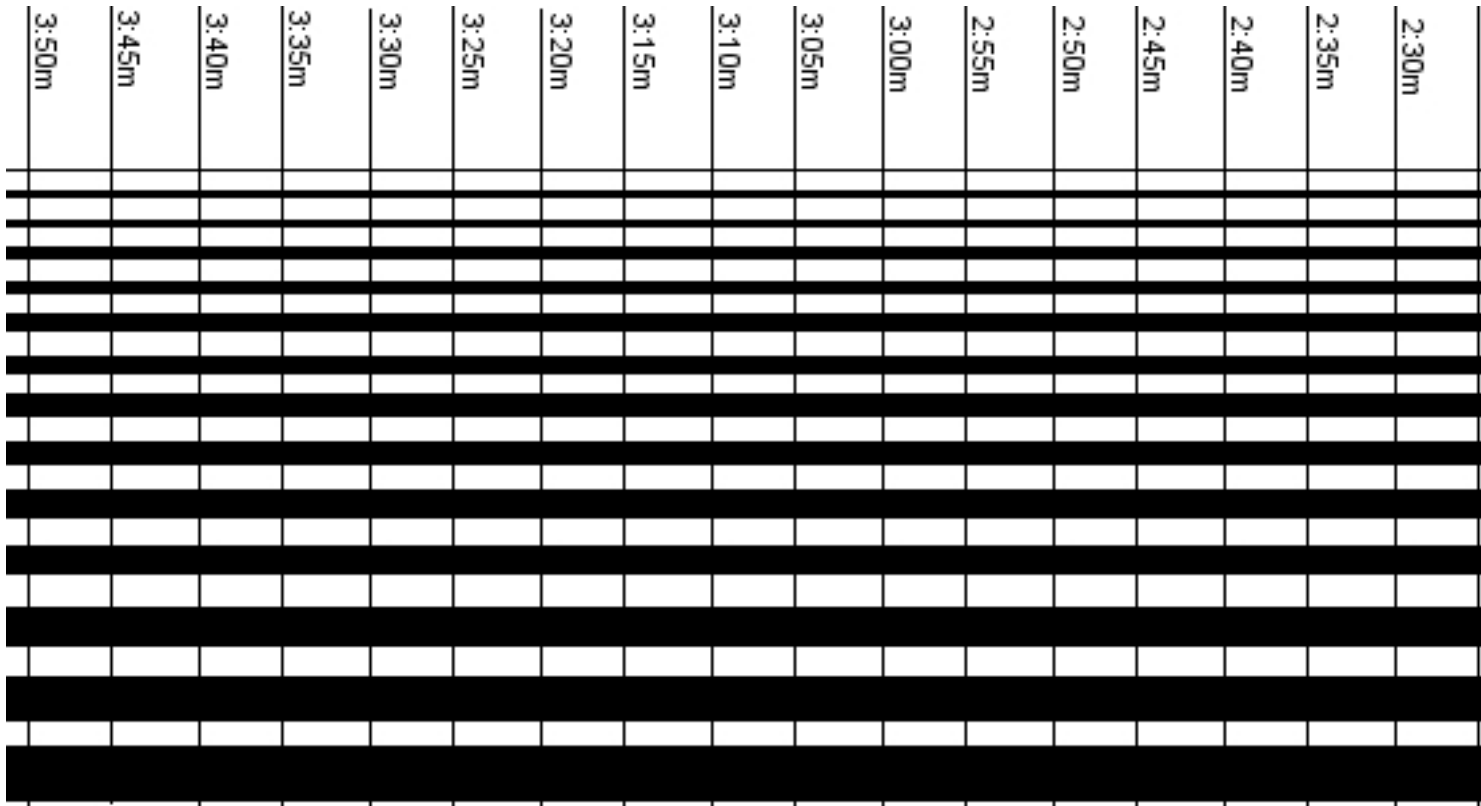
The process: use a test, i.e. a grid made by lines of different thickness crossed with other ones

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acting as time markers, to expose in a progressive mode to the UVA rays. One can draw this patch by himself or search for a ready one in the net. The one I used ¹ is the following:



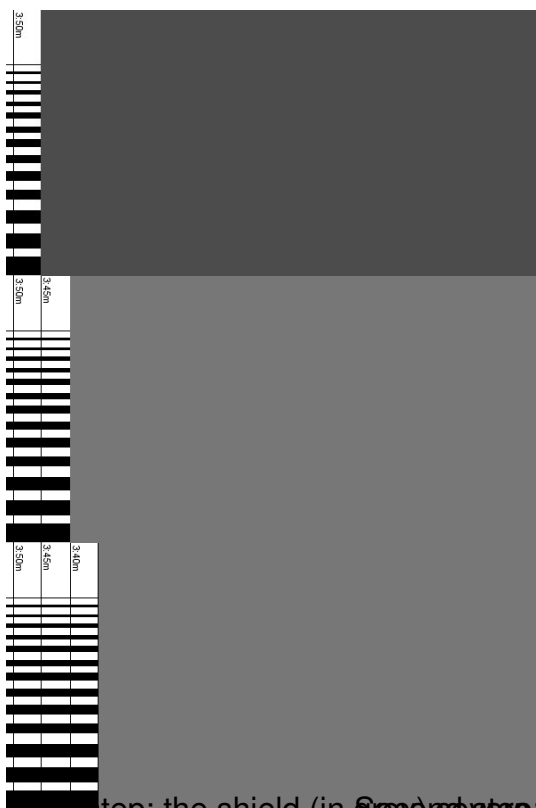
In its markers there are also seconds indicated: in this case the shortest exposition is considered 2 minutes and 20 seconds (on the right) while the longest is 3 minutes and 50 seconds (on the left) with intermediate steps. What is the meaning? I try to explain. The whole base is exposed to the ultra violet light for 2 minutes and 20 seconds, that is the minimal time considered in this case.

From here the process continues with an stepped exposition using an opaque shield (like aluminium film), uncovering a new sector from left to right at each exposition and re exposing the base to the UVA for a defined time interval. In this way each sector is exposed for a total time that is the sum of the shortest one (2' and 20") and all the other time intervals since when it was uncovered (see the sequence below).

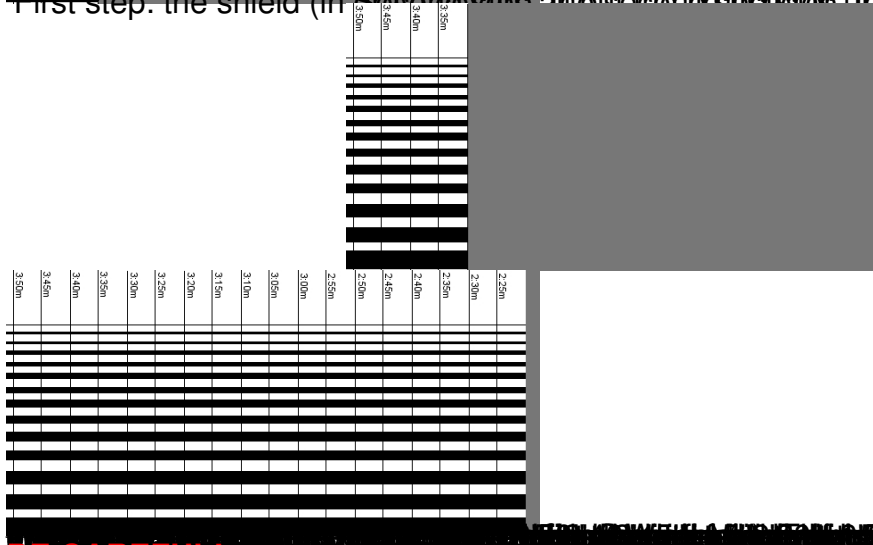
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First step: the shield (in **Grey**) is placed, but the **Fluorobor** the third sector is uncovered too



BE CAREFUL! The solvents I solvent used in this process (caustic soda and ferric chloride) are ☐ **HAZARDOUS** to human health, so much attention and right protective devices (gloves, glasses, work clothing) are needed to handle them, keeping in mind that they stain what they touch **IN A PERMANENT** and therefore corrode metal objects. Also their gases are harmful, so be careful and avoid to breath them. At least, since they are **POLLUTING** substancies, after the use you should dispose them as prescribed (don't pour them in the wc or in other sink because - besides - they corrode the pipes. Don't dispose them in the environment. I refuse every liability fort he damages ☐ coming from the use - right or wrong - of those products by anyone who would follow the process described below. ☐

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The equipment: newspaper's sheet to cover furnitures, scanner/bromograph, "tough" plastic trays (cwill contain acids), pre-sensitized base (white rectangle), A4 sheet with circuits print test, transparent sheet for inkjet printers with the circuits printout, small bag with granular caustic soda, ex coke bottle to contain soda (soda-cola, eh eh), permnent black marker, ferric chloride, adesive tape, scissors and rubber gloves (rulers, cutter, sawed knife and work clothing not present in the picture).



Some procedures, like cutting the base, have been omitted because I considered them simple or not relevant.

Before the trial, I prepared the circuits I should print after and I adapted them with the test on an A4 sheet trying to occupy all the surface of the base: I printed them on an A4 sheet and cut the pieces moving and rotating them to assume the best disposition. Then I printed a transparent A4 sheet (it has a sticky side to retain ink). Other ways print the layout on a transparent sheet with a laser printer (more contrast, less transparency on black areas) or on specil sheet to 'iron' on the base. There are also markers to write directly on the base (not sensibilzed) , good for simple circuits or one can draw the layout on the transparent sheet with china ink pens (by hand, it requires a month...).

The transparent sheet for inkjet suffer the reduced opacity of the black areas: to solve I printed two times the circuit, one normal and one mirrored horizontally, and then I superimposed and aligned these parts and blocked with adhesive tape. It's not THE ONLY¹ way neither, maybe, the most efficient, but is the one I chose.

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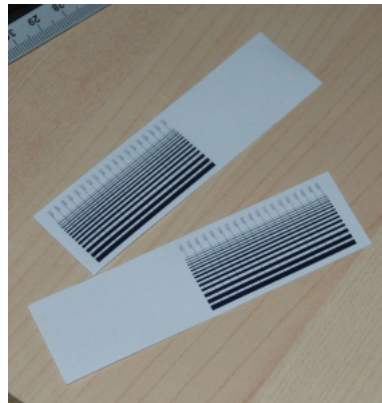
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The steps to do are the following:

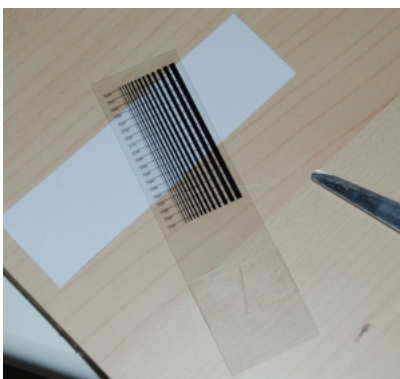


We start preparing the caustic soda: in the plastic bottle we drop the content of the small bag and 1 liter



The test dimensions (the drawing used to make the trial, someone calls it 'master') are very small (in the

We cut the two pieces that will form the test once superimposed and aligned.



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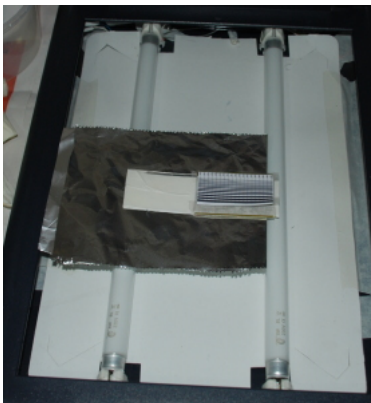
Tuesday, 11 November 2008 21:12 - Last Updated Friday, 14 November 2008 00:25

We align these parts and we block with adhesive tape. We superimpose this master to the base and we



We prepare to the trial. We need:

- a little sheet of aluminium film (or any other opaque matter) functioning as shield for the UVA rays
- A timer to count the seconds of exposition for each step.
- A table with those time intervals written onto.



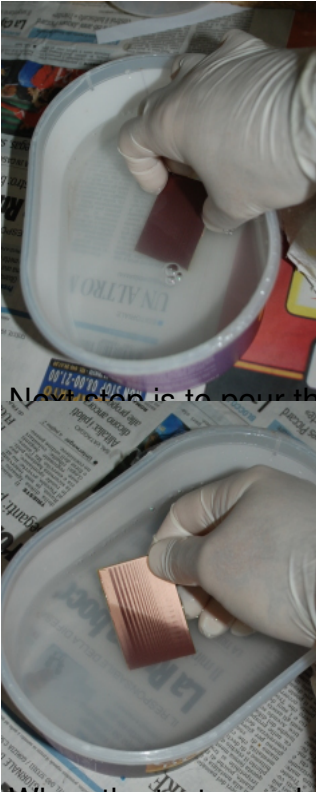
We lean the test and the shield on the bromograph glass. We expose the sector in the way and with the

NOTE: in this case the test's orientation oesn't matters, but when you develop electronic circuits you sho

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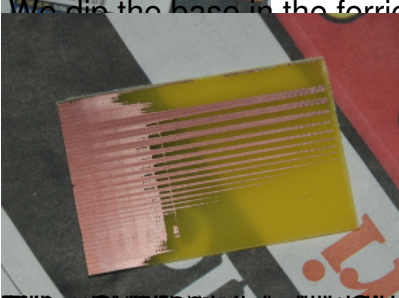


Next step is to pour the soda in a plastic tray and dipping the base into it, waving the solution or moving the

When the test reveals (the copper "comes out") we can put out the base from the tray (one can wash it)



We dip the base in the ferric chloride, always waving the solution or moving the base to accelerate the p

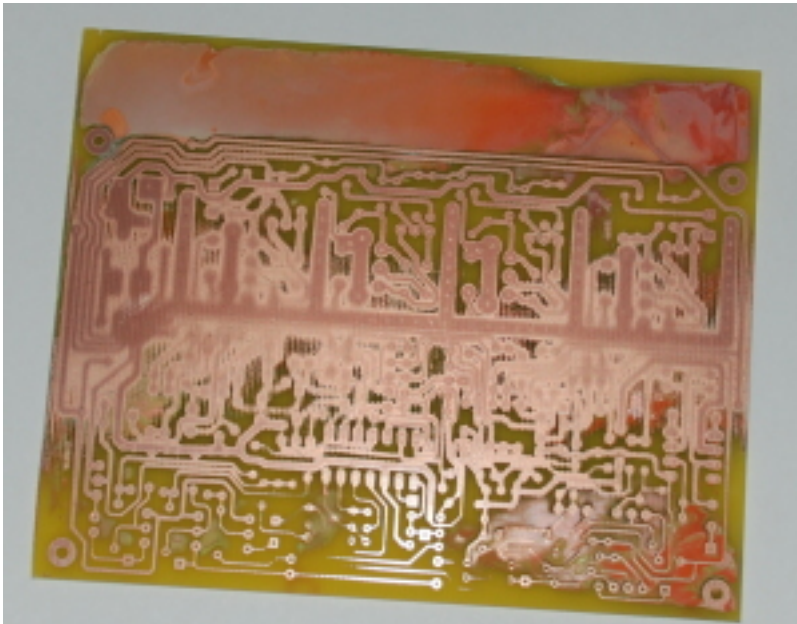


When the test is finished. If it

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(If you find the realization of the circuit (standard) is on [Vasfinz Vill](#) post we sink.