Glass PCBs

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# Using UV-curable adhesive

This chapter is a text adaptation of video instruction created by youtuber [CNLohr](https://www.youtube.com/c/CNLohr). In comment to his videos author says that makes it just because the way the final PBC looks like.

## Precautions

* Use protective equipment (gloves + googles + lab coat)
* Prefer to use overflow oven or heat-gun, not soldering iron (but also possible)
* Prefer to use Bismuth-based solder paste to avoid need of high temperatures
* So far usable for single-side / single layer boards only

## List of materials

* Glass[[1]](#footnote-1) and (optionally) glass-cutting tools
* Copper foil (1.0 or 1.4 mil)
* UV curable glue

## Manufacturing

### Prepare the piece of glass:

* Cut in size
* Remove sharp edges
* Clean and degrease (with either acetone / ethanol / another degreaser)

### Prepare the copper foil:

* Cut a piece a bit larger than the final glass size
* Flat it
* Steel-wool it on the one side only!

### Gluing copper to glass:

* Apply the UV curable glue[[2]](#footnote-2) to the steel-wooled side of copper foil
* Cover with piece of glass
* Remove all air between glass and copper[[3]](#footnote-3)
* Wipe excessive glue from glass
* Cure[[4]](#footnote-4) with UV-light
* Clean and wipe

Now it should behave as almost normal single-sided PCB laminate.

### Applying the photoresist

* Apply the photoresist[[5]](#footnote-5) to the clad with wet method[[6]](#footnote-6)
* Put the clad to the paper sleeve[[7]](#footnote-7)
* Run the clad through the laminator a few times (on both sides)
* Remove the paper
* Cut the leftover in size

Now it should behave like photo-sensitized PCB laminate.

### The actual PCB making

Like a normal work with photoresist. A few comments about further actions by CNLohr:

* Uses 3-in-1 oil to prevent the stickiness of transparency to photoresist, but refers to other people using the olive oil.
* Doesn’t press template (on transparency) to the clad with glass plate as is usually done.
* Uses ferric chloride for etching
* Uses Na₂CO₃ or NaOH as developing solution for photoresist (concentration is not specified)

## Populating the PCB

Author applies the bismuth solder paste with a toothpick and places the components with tweezers. Soldering is done with either:

* Hot plate
* Backing oven

After finishing soldering: spray with polyurethane spray.

## References

* Glass PCB playlist (restarted in 2016):
  + Part 1 : <https://www.youtube.com/watch?v=vlrccFVsQXA>
  + Part 2 : <https://www.youtube.com/watch?v=rj4qe6bdu7k>
  + Part 3 : <https://www.youtube.com/watch?v=s_r8QfjhWlo>
* Glass PCB playlist (from 2011):
  + Making : <https://www.youtube.com/watch?v=Rf5HBLzDGQA>  
    This also demonstrates the application for touch keyboards, however uses heat toner transfer method.
  + Oven reflow soldering: <https://www.youtube.com/watch?v=K11rOOcilaY>
* PCB making by CNLohr:
  + <https://www.youtube.com/watch?v=2eRdbvGXkio>
  + <https://www.youtube.com/watch?v=pbYDQuALOeY>
  + <https://www.youtube.com/watch?v=CnIKviw3szM>
  + Examples of projects, where he shows even capacitive touch sensors made with glass PCB  
    <https://www.youtube.com/watch?v=cJF5Q9F8tm0>
* Projects:
  + Clock : <https://www.youtube.com/watch?v=-9TS1OC-yqw>
  + Touch sensor: <https://www.youtube.com/watch?v=5ZH1-eScY0M>

# With self-adhesive copper foil

These examples demonstrates making a pcb on glass or plastic with either self-adhesive copper film or applying an adhesive layer and further transfer of copper to glass or plastic with Oracal. This process may require the vinyl cutter.

* + Making the board (in French): <https://www.youtube.com/watch?v=jvw5OCUHaqc>
    - Uses vinyl cutter
    - Solders parts directly with soldering iron (no info on used solder)
    - Uses normal glass
  + Stylophone : <https://www.youtube.com/watch?v=0kv17-3VGlc>
    - Uses vinyl cutter
    - Solders directly on glass with soldering iron (no info on used solder)
  + ElectroGUitar Art (just demo) : <https://www.youtube.com/watch?v=SQmhh2Lg5SQ>

1. For small size: the microscope slides can be used (normally, approx. size is 75 mm x 25 mm x 1 mm). They are made of tempered glass, thus not so sensitive to a heat-shock [↑](#footnote-ref-1)
2. CNLohr demonstrates use of LOCTITE 3301 due to “low viscosity” and resistance to KOH (photoresist developing solution). In comments he also suggested Martronics UV Glass Glue, but says it is harder to work with (“a few trick on the final steps”). Also in another video he says that Martronics UV Glass Glue is degraded after contact with alcohol. [↑](#footnote-ref-2)
3. Author simply presses and wabble the glass over the copper film. The datasheet for that glue simply says expose to 220-260nm light range when exposed to air, but all graphs refer to illumination f 365 nm [↑](#footnote-ref-3)
4. CNLohr uses grow-light instead of UV light, but also refers to other people who just let it stay on the sun light [↑](#footnote-ref-4)
5. CNLohr mentions “DuPont Riston” photoresist film [↑](#footnote-ref-5)
6. Use COLD water [↑](#footnote-ref-6)
7. Can be just a folded sheet of paper [↑](#footnote-ref-7)