BUNGARD Presensitized Base Material

Manual

In order to obtain best results when processing BUNGARD Presensitized Boards, please consider the following instructions.

Equipment

As lighting in the work space yellow light or dimmed daylight is recommended.

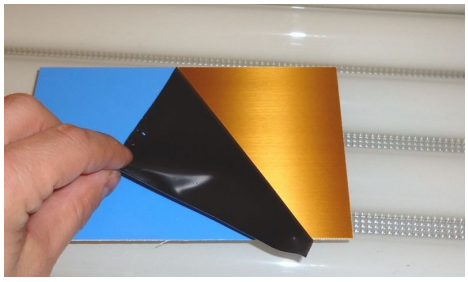
You will also need:

- an imaging device, such as BUNGARD HELLAS®
- a developing tray
- an etching machine / Ätzküvette, eg BUNGARD Jet® 34d
- a well-covering, high-contrast positive film, such as BUNGARD FR4 or BUNGARD Cotherm®
- 1 liter of water (approx. 20° C)
- 1 bag of special developer, like BUNGARD ALUCOREX®
- Water for rinsing
- Paper towels for drying the plate

Exposure

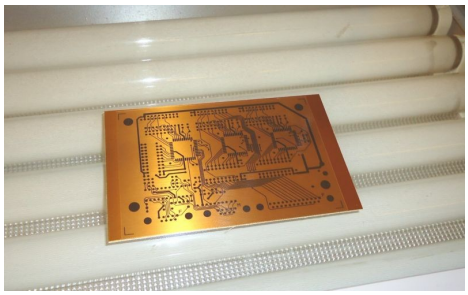
Remove protective foil and align the layout. It should ideally lay snug and free of bubbles (ideally pressed on by vacuum). The color-coated side of the film template should come to lie on the circuit board in order to minimize undercutting.
The exposure is carried out layer by layer. The exposure time with BUNGARD HELLAS® is about 120 seconds.
With other devices we recommend to find best exposure time with a step test. to determine the best exposure time in a step test.

Note: The photoresist reproduced positive, with a maximum spectral sensitivity of about 400 nm



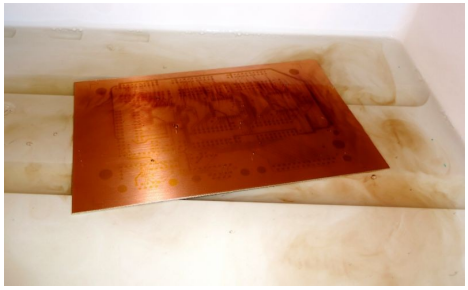
Step test for optimum exposure time

Remove a narrow strip of the protective foil from the pcb and expose 20 seconds. Remove another strip of foil and repeat **n**-times. This way you get a board, whose final stage is 20 seconds exposed and the first stage, however, was exposed **n** x 20 seconds.
If now for example the 5th stage properly develops in less than 1 minute, the minimum exposure time is on your device 5 x 20 = 100 seconds. Add a safety margin of 1 stage, you have the optimum exposure at 120 seconds.

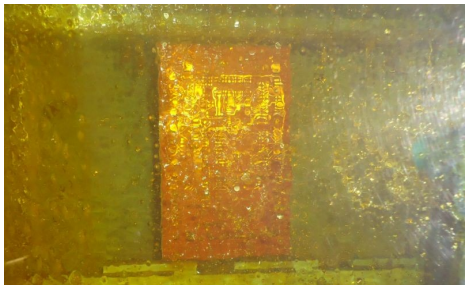
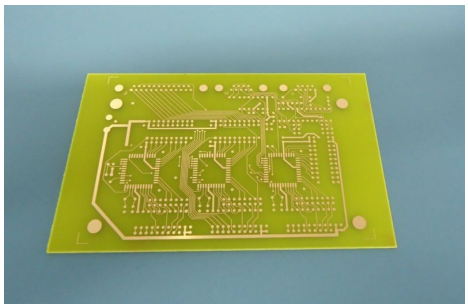
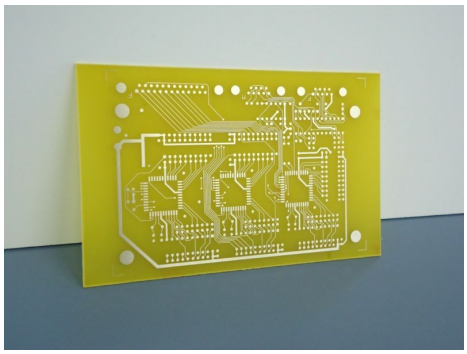


Development

Completely dissolve by stirring a bag of BUNGARD special developer in 1 liter of water (approx. 20° C).
Pour developer in cuvette, so that the pcb will just be covered.
Slide pcb softly into the cuvette. The colour of the resist should directly change colour at the exposed areas. Carefully rock the liquid, do not rub the resist. After 60 seconds rinse pcb with tab water.



Bungard Elektronik GmbH & Co. KG, Rilkestraße 1, 51570 Windeck – Germany
Tel.: +49 2292 / 9 28 28-0, Fax: +49 2292 / 9 28 28-29, E-mail: support@bungard.de

Etching Enter pcb into the etching machine (recommended etchant: ferric chloride). With the BUNGARD JET® etching time is approx. 90 seconds for 35µm copper in fresh, warm etchant. With a good layout a line resolution better than 100 microns is easily achieved. After etching, rinse pcb and dry thoroughly with paper towels or air.	
Stripping After etching, the resist may stay on the copper. You can solder through the resist. If you want to chemically tin the board, or apply solder mask, you need to remove the photoresist, though. Use acetone or alcohol for that. Another, very gentle and economical way is to expose the pcb again completely and develop one more time (in the already used developer). The fact that the photoresist can be exposed and developed several times, can also be used for selectively removing the resist from solder pads. This way you combine perfect solderability on the pads with protection of the copper by the remaining photoresist on the conductor tracks.	
BUNGARD photoresist as soldermask **Step 1:** Etch your original BUNGARD pcb as usual. **Step 2:** Expose and develop the positive photoresist after etching again, this time using a negative film leaving only your solder pads free. **Step 3:** Now tin the open solder pads with BUNGARD SUR-TIN (chemical tin). The photoresist remains on all conductor tracks and protects them. It also serves as a thin solder mask. This approach is not widely known, but also leads to excellent results at no extra cost!	

Safety Regulations

When handling chemicals please always wear protective equipment such as gloves and eye protection. Avoid contact of chemicals with skin, eyes and mucous membranes. Change polluted clothing immediately. Keep chemicals out of reach of children. If developer solution was swallowed, immediately consult a doctor recalling 1% lye.

You will receive our special developer in sealed bags with tear notch. Always solve the entire contents of one bag in 1 liter of water. Never leave opened bags unattended.

The setup solution may be stored in a sealed, clearly marked container of glass, PE or PVC.

For handling precautions of etchant please contact the relevant supplier. Upon request we will send you safety data sheets for all chemicals that you purchased from us.

Disposal

With time and progressive saturation the developer solution loses effect. Spent solution impedes the development process significantly.

Do not pour previously used developer back into fresh solution. You should therefore use only so much developer as you need for the job, and replace the developer in the cuvette at the latest, if you cannot see the pcb in the liquid any more.

The developer for the BUNGARD presensitized boards is not a photographic developer. It contains no heavy or precious metals. Characteristic for this developer, as well as the comparable waste water from dishwashers, is the content of lye.

The disposal policies differ from country to country. Please contact your local authorities for further information. They are also obliged to provide information to you, who is approved for the disposal of used etchant.

Trouble Shooting

Exposure

If you expose too short the photo resist cannot be fully developed. This can be seen in a reddish-brown colour change of the exposed areas of the image, when it is put into the developer. These residues can be very difficult to remove and make etching hard or impossible.

If you expose too much and your layout is not completely light proof, you will see interrupts on the tracks or complete loss of fine lines. Nevertheless, it is better to expose rather too long than too short.

If your layout is not completely light proof you can try to expose less and use stronger developer, e.g. twice as concentrated as usual.

With some experience, you can even manage to get proper pcbs from photocopies on white paper.

If you make your layout with a laser printer, it is better to use tracing paper instead of polyester film. The picture is less distorted and the toner will be more black.

A complete loss of images can occur, if the pcb was not exposed resist layer upon printed side of the layout or insufficient contact between film and pcb.

Development

Decisive influence on development have the right concentration and temperature of the developer. However, the processing latitude at our photoresist is so high that development is rather a less common sources of errors/problems.

Low temperature, low concentration and used up developer will delay the development process. Too high temperature or concentration will lead to interrupts and holes in the conductor tracks.

A bad result you will get with double-sided boards, when air bubbles are trapped underneath the bottom side of the pcb.

Etching

When etching with acid etching media most errors have their cause in the previous processes. A diamond-shaped pattern of remaining copper on the free surfaces of the pcb for example, is usually caused by too short exposure.

The photo layer is resistant to all conventional acid etching media. Alkaline etching is also possible, provided that a pH value of 9.5 is not exceeded, and the pcb was not exposed to daylight before.

The resolution of the photo resist is in the range of a few micrometers. However due to the inevitable etching undercut, a structure width of less than 70 microns is rarely exceeded with a copper layer of 35 microns.

Special influence on the etching results have of course the etchant agent and the kind of etching machine. Rapid etching gives always a better result with a finer line resolution. Spray etching with its fast media exchange and energy of the spray beam perpendicular to the surface increases both the speed and the precision of the result. For example, our JET 34d achieves with fresh, warm ferric(III) chloride an etching time of 90 seconds for 35 microns copper and a structure resolution better than 100µm.

The use of sodium or ammonium persulfate, however, is not state of art any more and with regards to special waste prevention even inadmissible. For further details please contact the manufacturer of your etching machine.

Disclaimer of Warranty

This instruction was carefully edited. Nevertheless we cannot give any warranty.

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