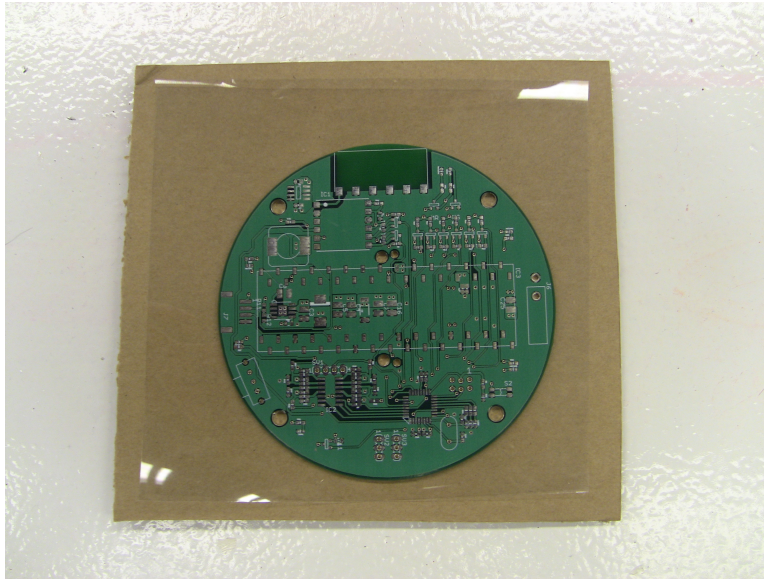


## Preparing Custom Solder Paste Stencils for a Laser Cutter

Sam DeBruin • March 19, 2012

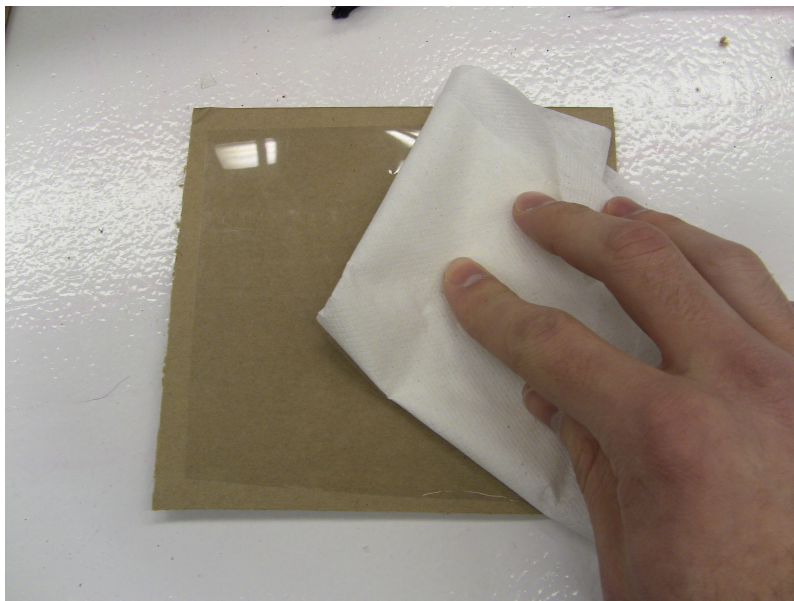
The following tutorial is based on a 0.5W laser cutter and 3mil mylar.

1. Cut pieces of mylar and cardboard large enough to accommodate the entire board.



It is very important for the following steps that the mylar be as strongly adhered to the cardboard as absolutely possible. To accomplish this, we will use tape but also the naturally adhesive properties of static electricity in mylar.

2. Place the mylar on the cardboard so the edges are curling up (assuming the mylar came from a rolled sheet). Use a paper towel to aggressively brush the mylar several times. This will remove dirt and debris as well as accumulate charge on the sheet.



3. Turn the mylar over (now with the edges curling down) and repeat the brushing process. At this stage, the mylar should be absolutely flat and well-stuck to the cardboard. If it is not, repeat steps 2 and 3.

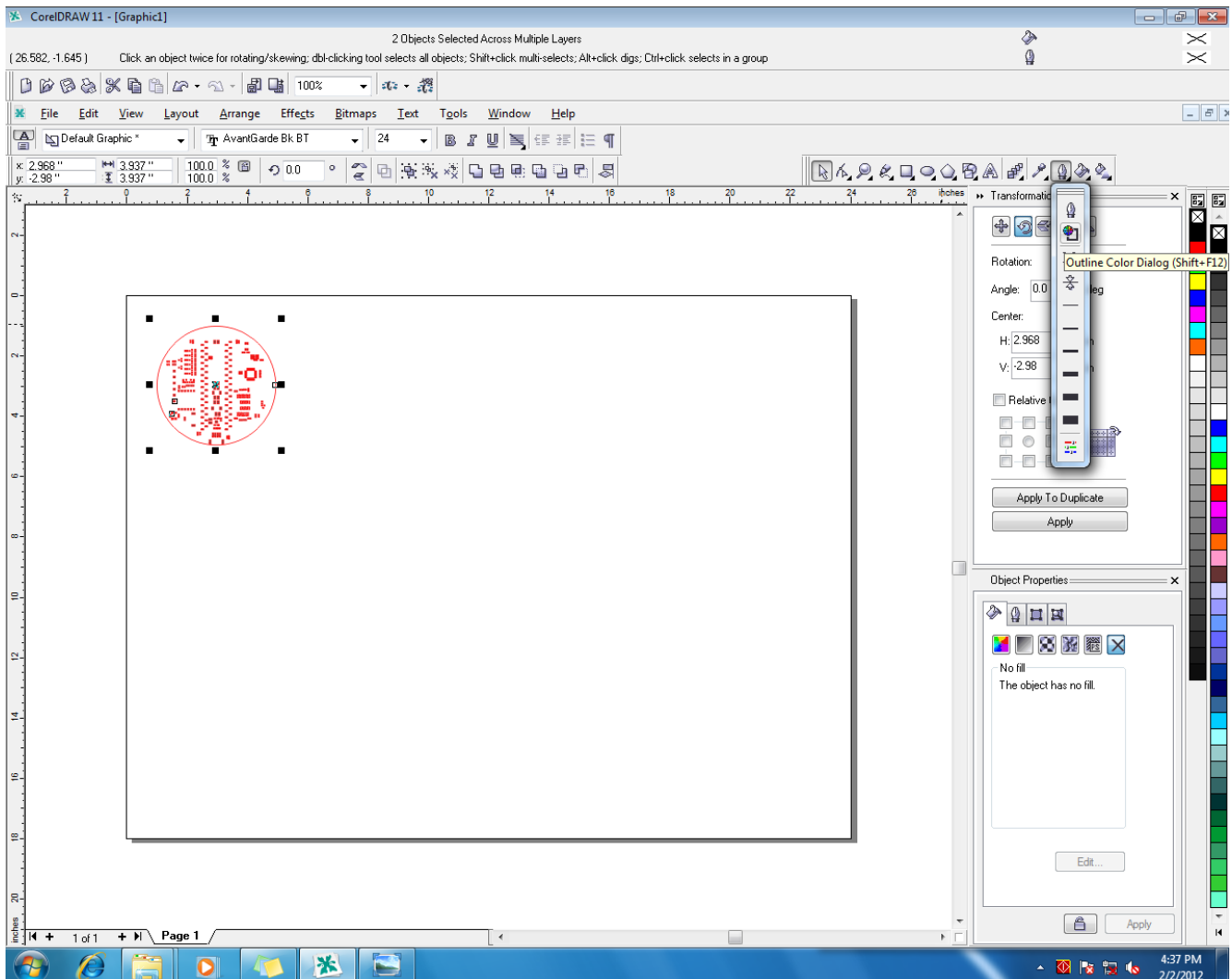
4. Apply a small amount of tape at the edges to ensure the mylar is stuck to the backing.

Do this for as many stencils as you want cut. Alternatively, if you produce mylar well large than your board, place several copies of your dxf file into Corel to cut multiple shapes.

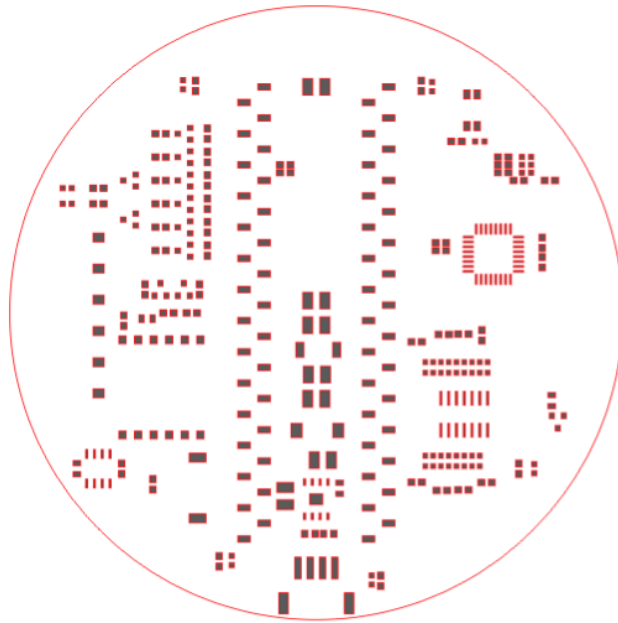
5. At the laser cutter, open your printing software. This tutorial assumes Corel Draw.

6. Go to File -> Insert... and navigate to your DXF (see tutorial 1 for information on how to produce a dxf of your stencil file).

7. Using the "Outline Color Dialog" box, change the outlines of all your shapes to red. Red, in this case, will be used for vector cutting. We also want only the outline, not the shape interiors to be red.



The stencil file should now look like this. Notice how only the edges, not the interiors, of shapes are filled.



**ONLY USE THE LASER CUTTER IF YOU ARE AUTHORIZED TO DO SO. FAILURE TO ADHERE TO PROPER GUIDELINES CAN RESULT IN DAMAGE TO THE EQUIPMENT OR RELEASE OF HARMFUL GASSES INTO THE AIR. MAKE SURE PROPER VENTILATION EQUIPMENT IS IN PLACE BEFORE USING.**

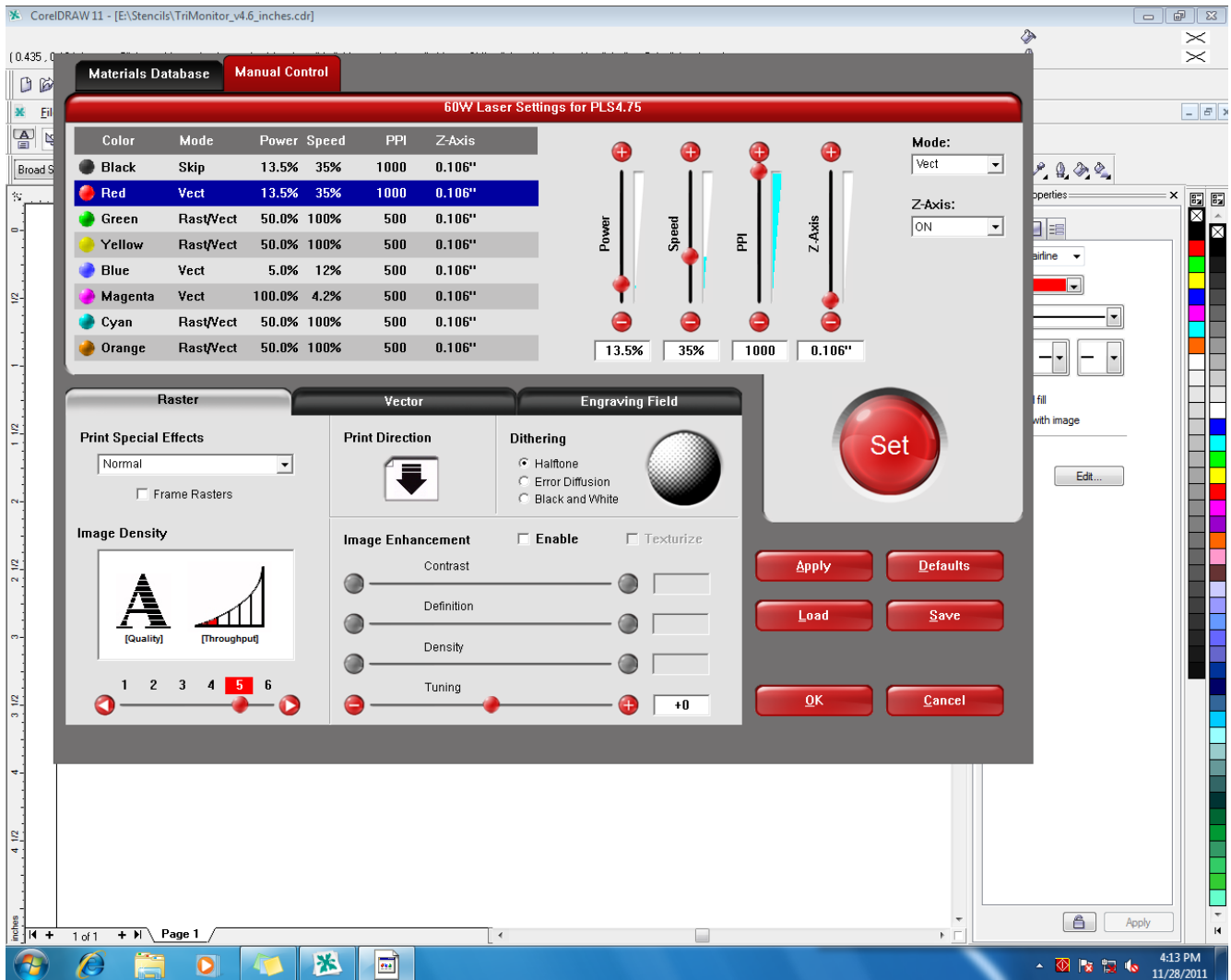
8. Activate the laser cutter by going to File -> Print.

9. In the dialog box that opens, go to manual control and apply the following settings:

Color	Mode	Power	Speed	PPI	Z-axis
Black	Skip	Doesn't matter...			
Red	Vect	13.5%	35%	1000	Height of cardboard
Other Colors	Doesn't matter...				

These settings are extremely important and have been fine tuned over multiple tries. Make sure black (shape interiors) are set to skip, red is set to vector cut with the above settings, and all other colors (which don't appear in the image) don't matter.

Compare to the image below to confirm.



10. When you are ready, press Set, followed by OK.

11. Press print

12. Press the green arrow on the laser cutter to get started. Make sure to leave the cover closed for a few moments after the job is complete to allow the fume extractor to work.

This is perhaps the crux of the argument here. Notice that as you pull the excess mylar off from around the edges, the form and the negatives stay adhered to the cardboard. This is because the settings are finely tuned to melt the mylar just enough to make it stick to the cardboard. This makes it much easier to produce stencils as manual removal of the negatives is not necessary.

Adjust your settings for your particular cutter if this affect is not achieved.