

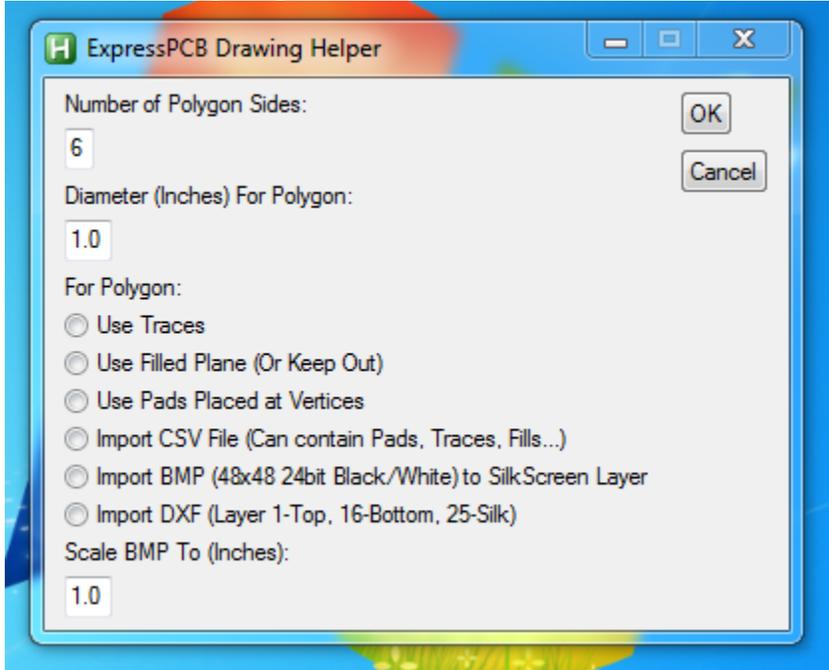
Jun 20, 2013

Release 1.1

## ExpressPCB Drawing Helper

ExPCBHelper is a key macro program designed to help a circuit board designer create interesting shapes and logos on a pc board design.

The ExPCB Helper operator interface is shown below:

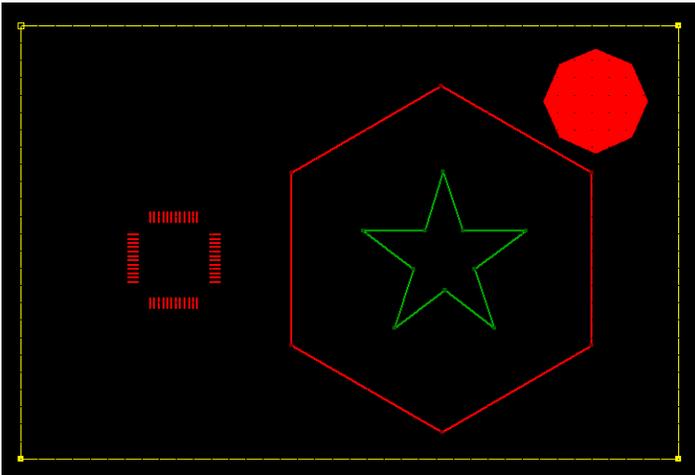


### Functional Highlights:

- Draw a N sided Polygon (up to 20 sides)
- Draw a Star (if 5 sides are chosen)
- Use Traces, Filled planes or Pads to create the desired shape.
- Shapes can be on the Silk , Bottom or Top layer.
- Import a CSV file that has all the location data for pads, traces and filled planes.
- Automate new component design.
- Import a small Bit Map (.BMP) file. The file must be 48 pixels by 48 pixels, saved as a 24 bit BMP file and only have Black and White pixels. The Black pixels will be drawn on the Silk Screen layer only.
- Import a DXF file. Only LINE and CIRCLE entities are imported. Only layers 1,16,21 and 25 are imported. This does not support altering the perimeter of the board but will give you lines and the perimeter can be moved to these lines.

The program will prevent user input while the image is being drawn to the screen. There are limits built in so ExPCB Helper will not continue if movement is going to pass off screen to another application or the desktop. Every drawing tool will first draw a line to the pc board and take measurements of the line to understand the pixel to inches ratio. Once this is known, the shapes and pads can be placed fairly accurately. It is recommended you verify each pads placement for better accuracy.

An example board is shown below. All these shapes were created in seconds with minimal user input required. The component pads were laid out using a CSV import file.



For a complete demonstration, visit:  
[https://www.youtube.com/watch?v=8B6HGO\\_1pss](https://www.youtube.com/watch?v=8B6HGO_1pss)

The file format for creating a CSV import file is shown below.

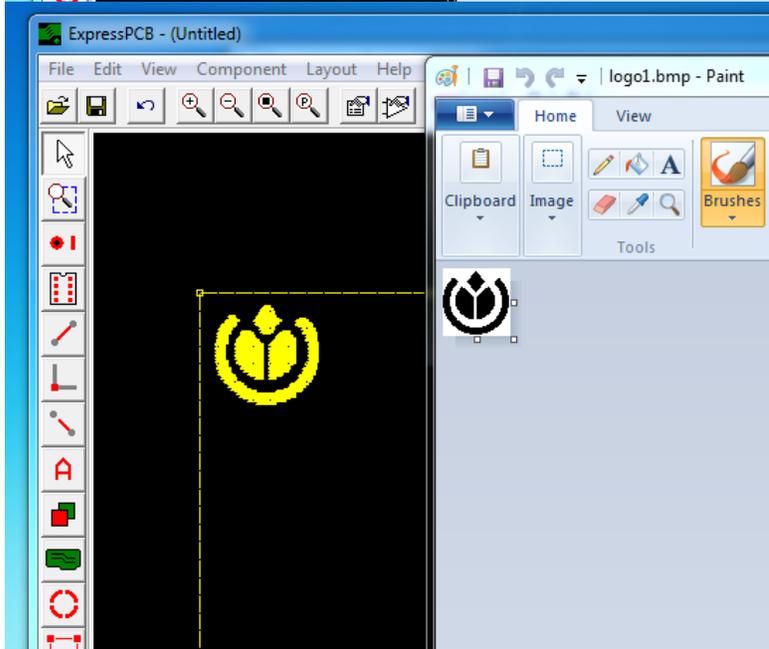
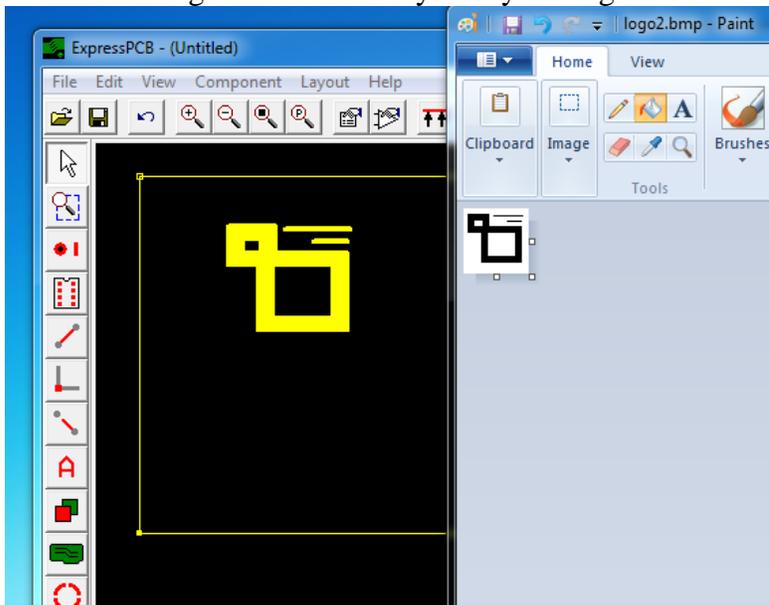
Tool, Rotation/Layer, X, Y,[Xend], [Yend]

Pad	R0	2	2		
pad	R0	2	1		
trace	Bottom	2	2	2	1
trace	Bottom	2	1	3	2.5
fill	Top	0	0		
fill	top	1	0		
fill	top	1	2		
fill	top	0	2		
pad	R90	3.3	2.4		
pad	R90	3.3	1.4		
trace	Silk	3.3	2.4	3.3	1.4
trace	Silk	3.3	1.4	2.4	1.1
fill	Bottom	2	2		
fill	Bottom	2.5	2		
fill	Bottom	2.5	2.5		
fill	Bottom	2	2.5		

The Pad will be the currently selected Pad inside ExpressPCB. The same is true for the Trace. ExPCB Helper does not select a pad or trace width for you. It only uses the last one selected. ExPCB Helper does select layers. Next to the Pad column is a Rotate Column. With round pads, this column can be left blank. With SMT pads, however, the rotation can be changed by including R0 or R90. Only Traces can be drawn to all 3 layers (Silk, Top or Bottom). Fills can be either Top or Bottom.

When using ExPCB Helper, it is recommended you start a new blank project, maximize the screen and zoom to extents. This will assure no other interferences with other windows on the desktop.

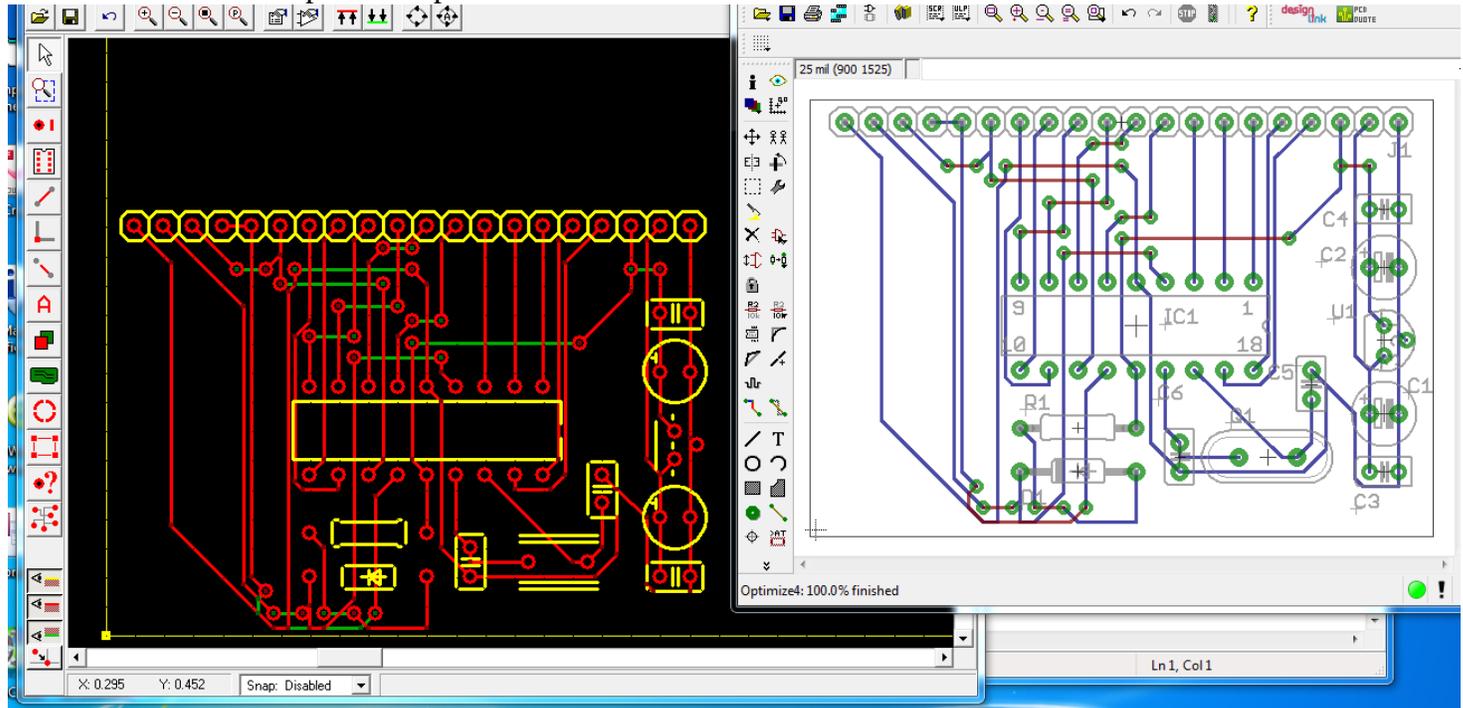
To Import a BMP, first use a Paint type editor to make your logo. Size the Bitmap image to 48 pixels wide and 48 pixels high. Use only BLACK and WHITE in the logo image. You can scale the image up or down once you start importing. The black part of the image will be drawn on the silk screen layer only using horizontal line segments. It will not match the BMP image perfectly but it is a very good likeness and allow you to later smooth the edges using the ExpressPCB software tools. As you can see by the examples below, horizontal and vertical line logos are drawn very nicely but logos with curves start to get a little distorted.



## Importing a DXF file:

The format for the DXF import is taken from the Eagle pcb software DXF export. Layer 1 is the Top copper layer. Layer 2 is the bottom copper layer and Layers 21 and 25 are silkscreen layers. Only LINE and CIRCLE entities are imported. Eagle uses ROUNDP and ROUNDP to label pads in the DXF file and these will be interpreted as the currently selected pad in ExpressPCB. Every pad will be the same and you must manually change pad sizes in the ExpressPCB software.

Below is a DXF file import example.



On the right is Eagle and the left is the finished DXF import. Only ARCS were not imported.

Please watch this video for a live example:

<https://www.youtube.com/watch?v=iFc79ucBdxc>