

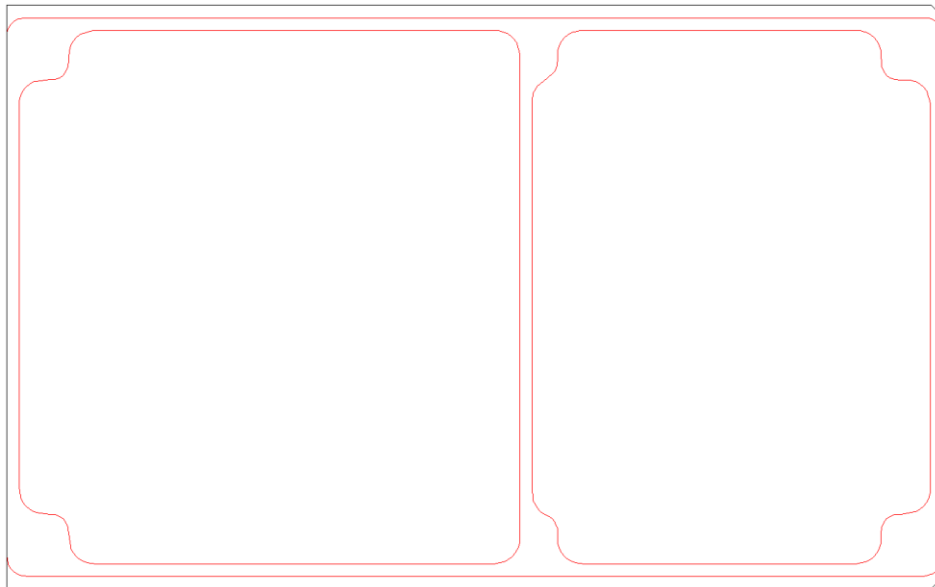


Introduction

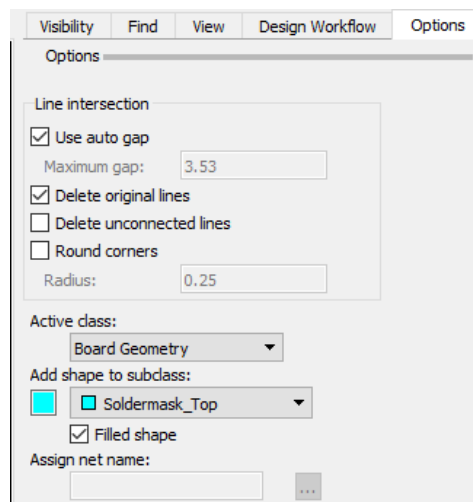
This technical note describes a process of creating a soldermask shape. Many modern PCB's that use die cast areas of metalwork on the PCB require that the PCB be free from soldermask to ensure a good ground connection. You can either import the metalwork outline using a DXF import directly into PCB Editor or you can draw the shapes manually.

How to Create a Soldermask shape from an imported DXF File.

Take the example below. The red outline shows the metalwork areas. The black outline shows the board profile. These are normally imported via the DXF import at the beginning of a design. For instructions on DXF Import please see technical note on [dxf_import_output.pdf](#).

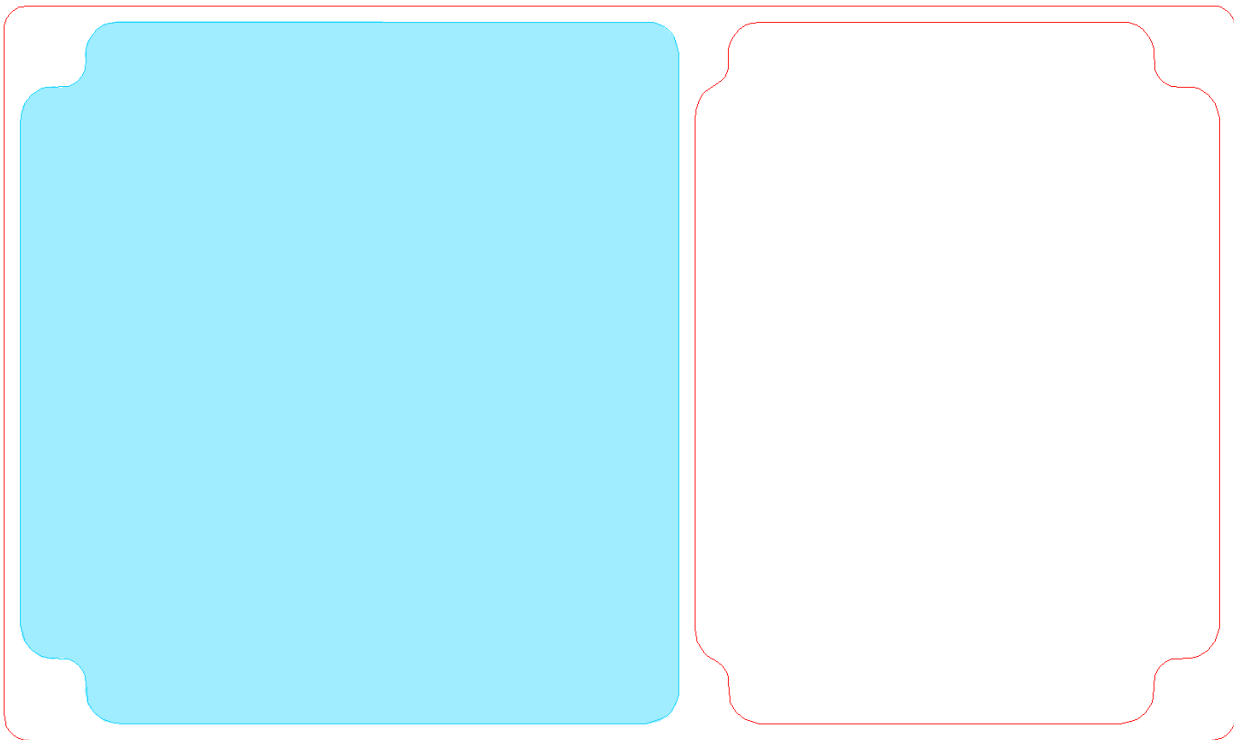


To create a soldermask clearance area we need to use the compose shape command. Shape > Compose Shape (In Allegro) or Shape > Create Shape From Lines (in OrCAD), in the Options menu select Board Geometry / Soldermask_Top as the Active class / subclass.

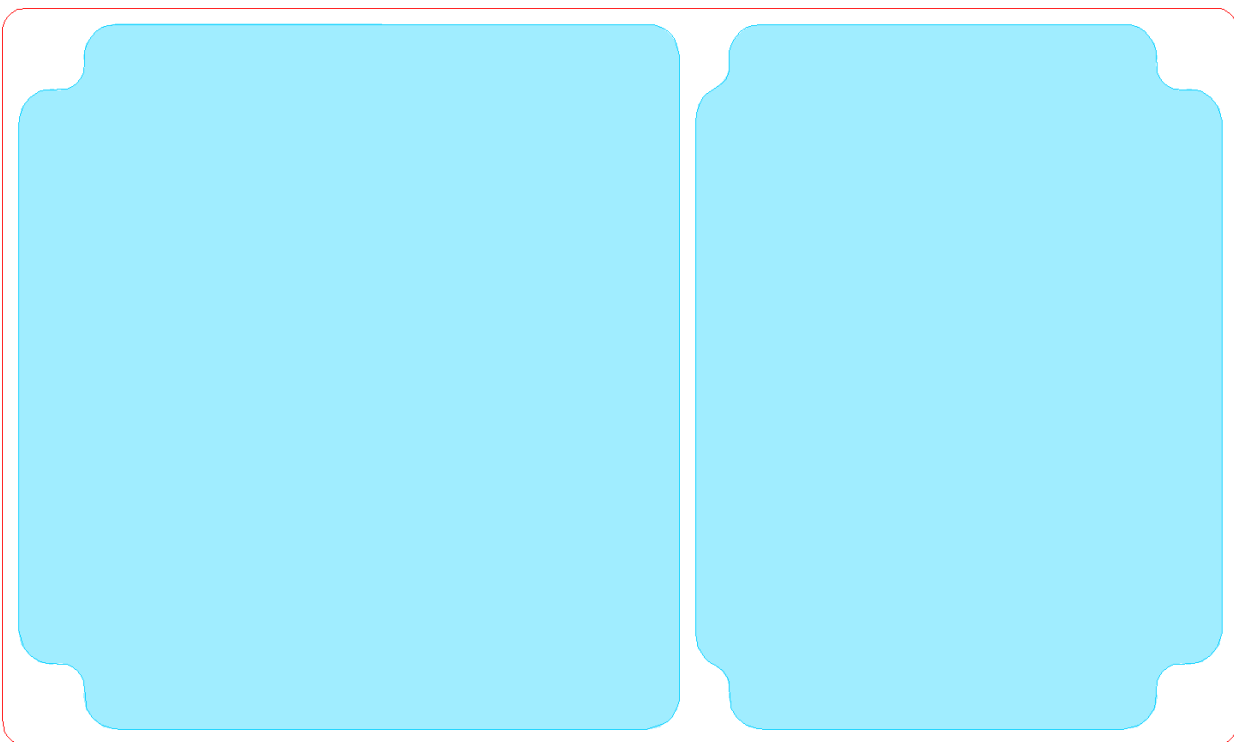


How to Define a Soldermask Shape

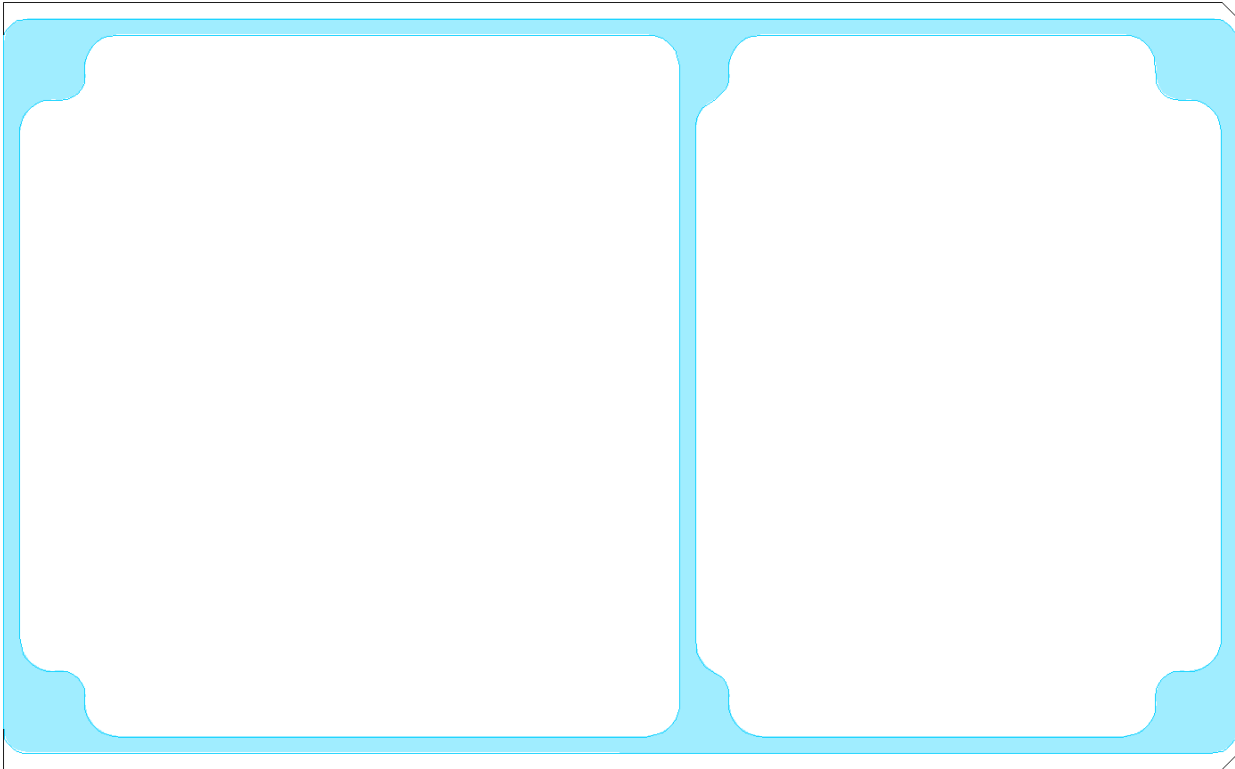
Draw a box around the inner shape and the shape will be created as shown below.



Repeat for the next inner shape.



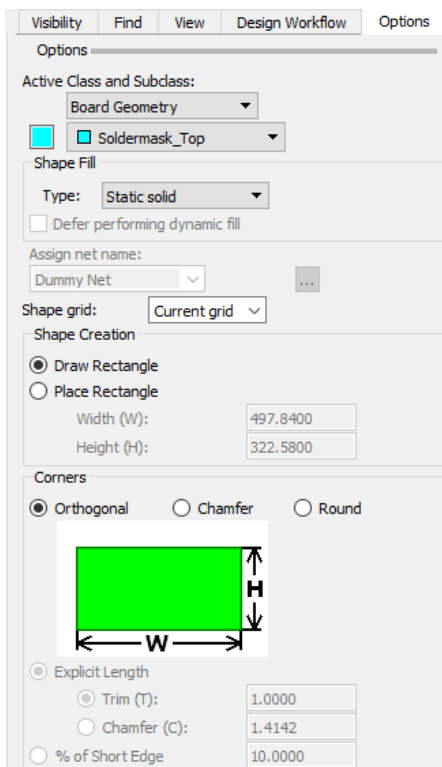
Finally draw a box around all items (The two inner shapes and the surrounding profile. PCB Editor will use the outer outline as the master shape and will subtract the two inner shapes, leaving you with the resulting figure.



You can use the Edit > Z-copy command (Allegro) or Shape > Z-Copy (OrCAD) to copy this to the Soldermask_Bottom layer or Etch layers to match the metalwork profile layers. If you use Z-copy to create etch shapes, ensure that you generate dynamic shapes so that any voids required are generated.

How to Create a Soldermask shape by drawing it manually.

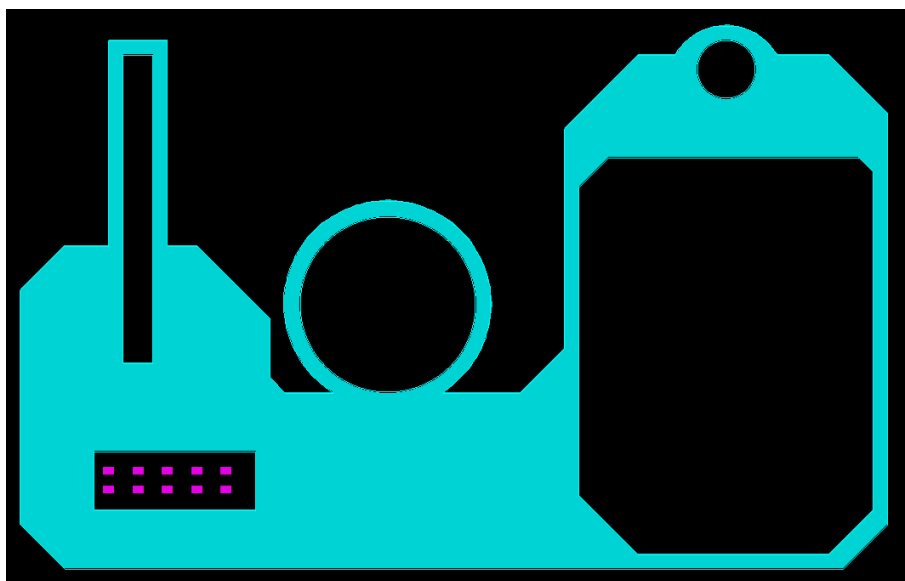
To draw a shape on the soldermask layer use Shape > Rectangular / Polygon / Circular. Set the Active class / subclass to Board_Geometry / Soldermask_Top and for this layer you will need to define a static shape.



Then you can either start drawing the shape where you need it or use the command line to enter the co-ordinates e.g. start point x 0 0 then x 100 0 which draws a line 100 in the x axis. You can also use the ix / iy commands which give an incremental addition e.g. start at x 0 0 then iy 100 which draws a line 100 in the y axis. You can also change the Line Type whilst drawing the required shape varying from orthogonal lines to Arcs.

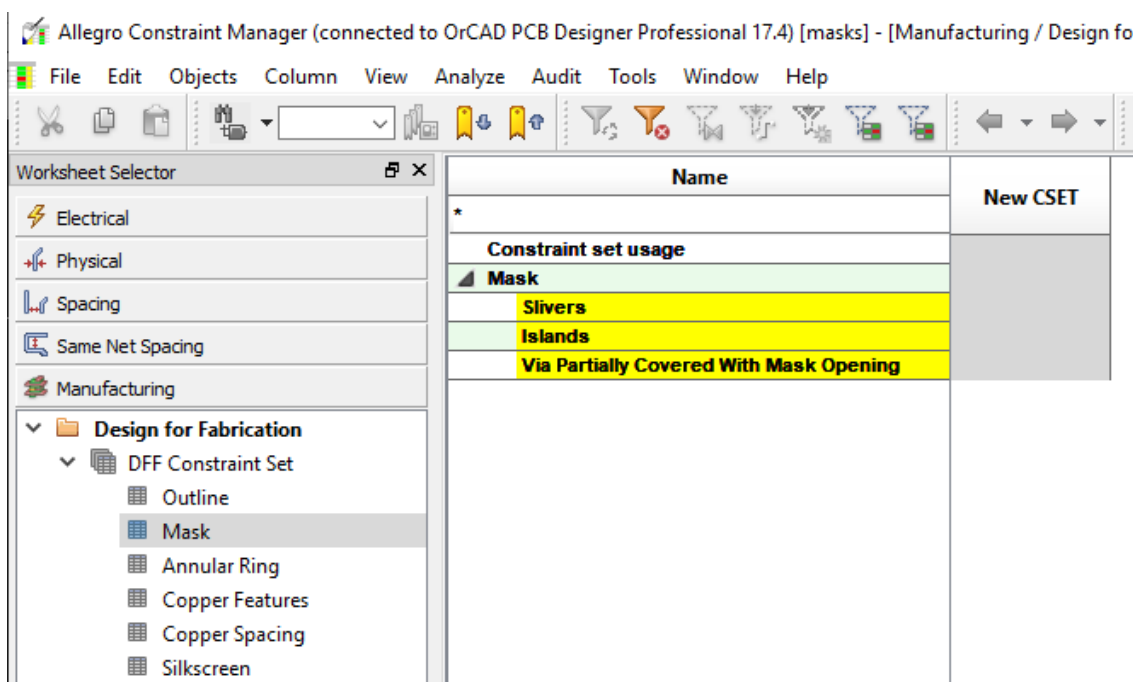
Alternative options can include using the Shape > Merge Shapes giving you the ability to merge shapes of the same class / subclass together to create the final shape required. You can also use Shape > Manual Void/Cavity > Rectangular / Polygon / Circular (in Allegro) or Shape > Manual isolation/Cavity > Rectangular / Polygon / Circular (in OrCAD) to create holes in the shape.

Using the above methods draw the soldermask shape required. An example of the methods is shown on the next page.



If you use the soldermask to soldermask DRC checks found under Setup > Constraints > Modes (in Allegro) or Setup > Constraint Modes (in OrCAD) then you will need to clear areas where component padstacks are using the Shape > Manual Void (in Allegro) or Shape > Manual Isolation/Cavity (in OrCAD) functions as described earlier. An example of this is shown above where the purple pads represent five 1206 resistors.

There are also options in Constraint Manager > Manufacturing tab to define DFF (Design For Fabrication) rules for Soldermask checks. These include Mask Slivers, Mask Islands and Vias partially covered by soldermask.



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