

## Designing and Fabricating Board Games

Piecepack board games are based on a set of open-source parts that can be used to design and play a wide variety of games. Anyone may design and publish a Piecepack rule set. Anyone may produce Piecepack game components. Currently more than 200 games have been developed based on the Piecepack system.

The Silhouette die cutter is well suited to the fabrication of Piecepack components. Many game sets are published in the form of a PDF file.

### Importing a Graphic File

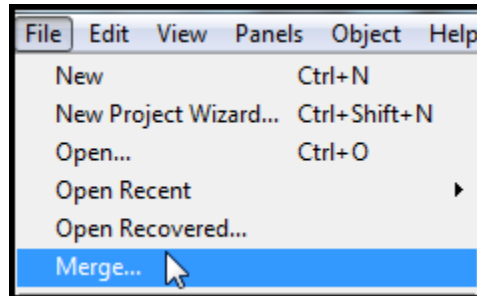
PDF files with Piecepack tiles and game tokens can be downloaded directly from the Piecepack wiki at:

<http://www.piecepack.org/Printable.html>

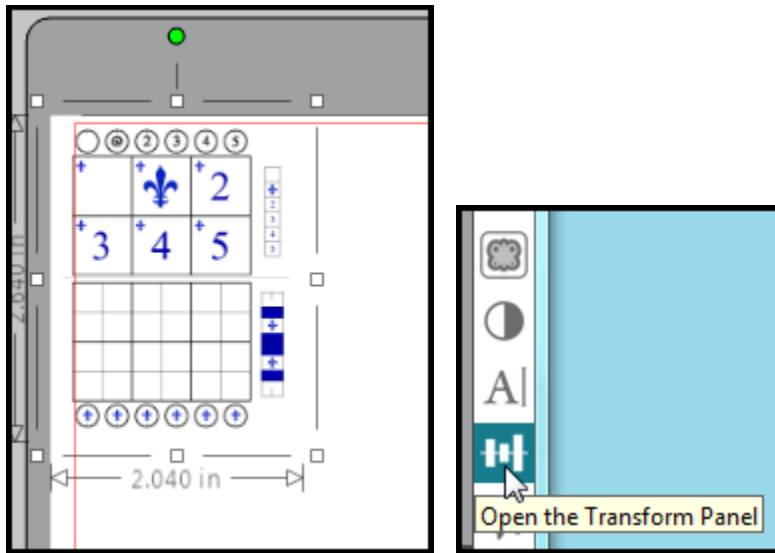
There are four Piecepack PDF files on this wiki page. The explanation below uses the Piecepack Arms PDF file to illustrate the process of converting the PDF file and using it to fabricate the game pieces with a Silhouette die cutter.

The Business Edition of Silhouette Studio, available in the Curry Maker Studio, can import a PDF file directly. The free version of Silhouette Studio cannot import a PDF directly, but it can import a PNG file. If you are not in the Curry Maker Studio, and are using the free version, first use a PDF to PNG converter (available online) to convert the PDF to a PNG file. (Alternatively, use a screen capture tool to capture a screen image of the PDF file.)

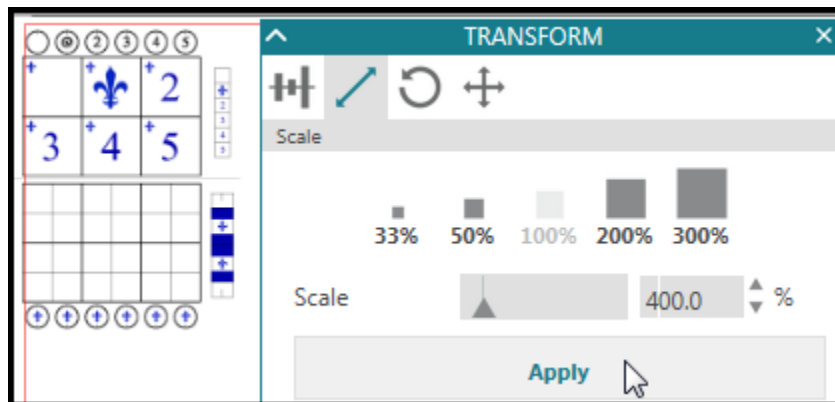
Use the *Merge* tool to import the file.



It may be necessary to resize the imported image. The imported image can be resized with the Transform tool.

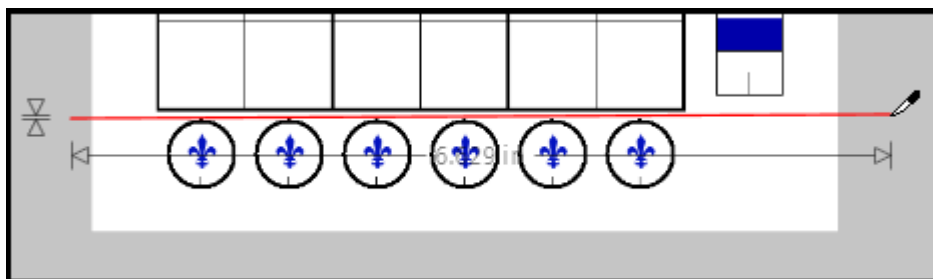


Use the Transform tool to adjust the image so that it is about six inches wide. Increase the scale by using a percentage (such as 400%) to make the size of the image larger. Use of a percentage will ensure the four pages are resized to the same scale.

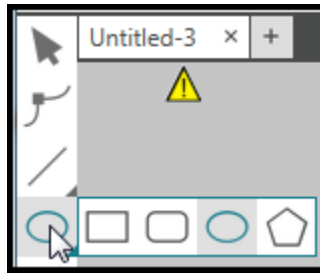


### Create Game Tokens and Tiles

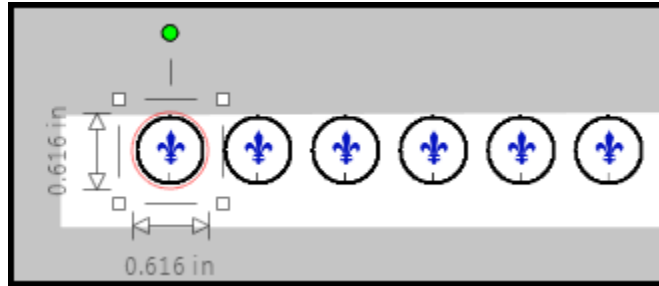
Then use the *Knife* tool to separate the tokens on the bottom of the screen from the other parts of the imported image.



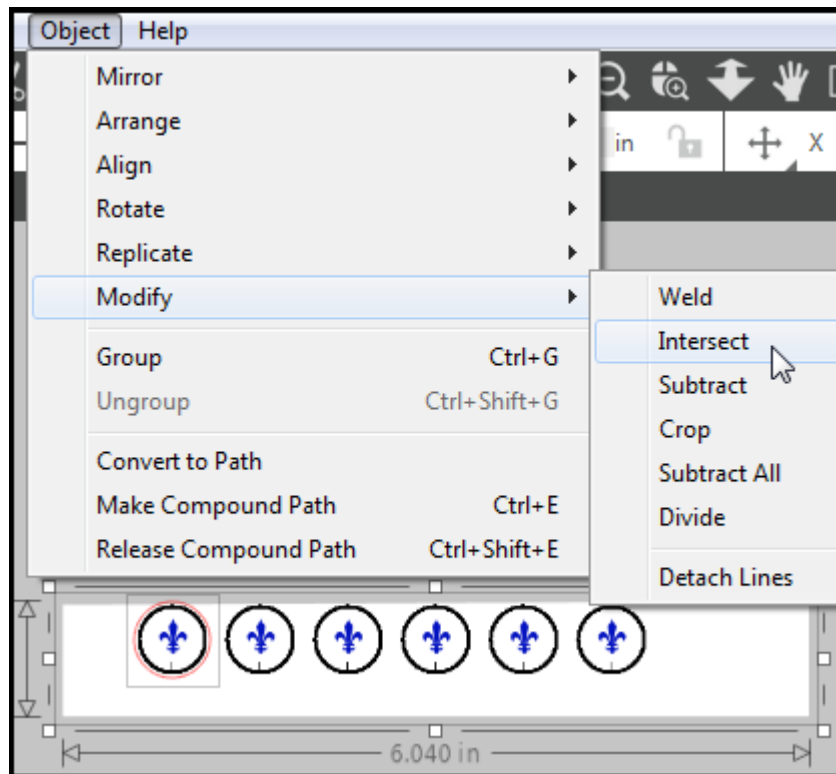
Select the Circle tool.



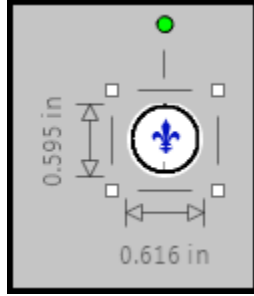
Then use the Circle tool to draw a red circle around one of the game tokens.



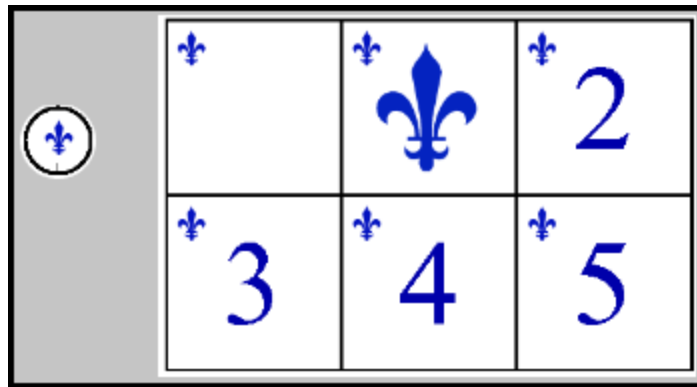
Select both the row of tokens and the red circle, and choose the *Intersect* option under the *Modify* menu.



This action will remove all of the material except for the single game token that was surrounded by the red circle.

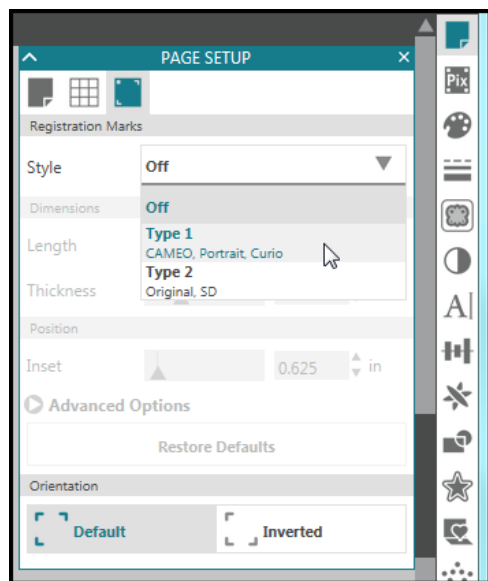


Repeat the action with the rectangle tool to remove all of the material around the game tiles.



### Page Layout

Now that the desired game elements have been isolated, use the *Page Setup* tool to turn on the registration marks. Select *Type 1* registration marks for a *Silhouette Portrait* die cutter. Also turn on the red outline border if it is not already displayed. This option is also found in the *Page Setup* menu.



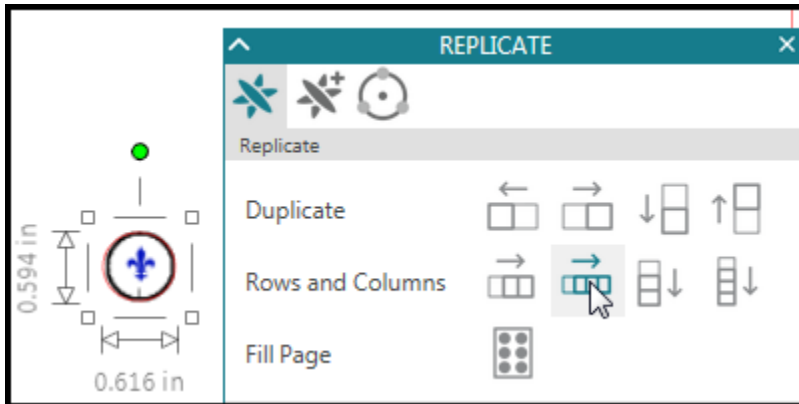
The registration marks allow the Silhouette's optical scanner to determine where the images are located on the page, so that the die cutter can accurately cut out the designated elements of the image.

Position the two elements – the tiles and the game token – on the page. Be sure to keep the images within the border designated by the red rectangle on the outside of the page. Also be sure that the images do not overlap the gray cross-hatched area at the top of the page.

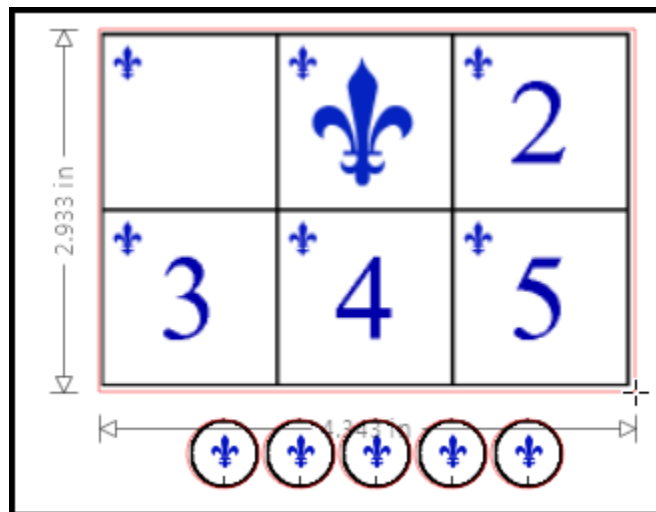
### Drawing Cut Lines around the Images

Use the *Circle* tool to draw a red circle around the game token. The red circle is known as a *cut line*. The die cutter will cut out the elements designated by the red cut line.

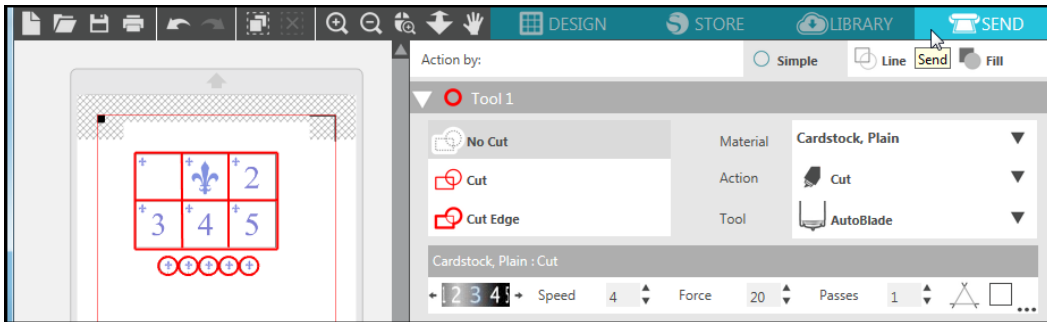
Select the image of the game token and the red cut line. Then use the *Group* tool to group these two elements together. A total of six game tokens will be needed. The replicate tool can be used to replicate the game tokens.



Once the game tokens (surrounded by cut lines) have been replicated, use the *Rectangle* tool to draw a red line around the game tiles. Then use the line tool to draw red cut lines through the interior lines of the game tiles.



Now that red cut lines have been placed around the game tokens and tiles, select the *Send* tab in the top right-hand corner of the screen to view the location of the cut lines.



## Printing the Images and Cutting out the Game Pieces

If the red cut lines are in the correct location, the file is ready to print. Select the *Print* option (found under the *File* menu on the top left-hand corner) to print the image on a color ink-jet printer.

After the file has been printed, the printed cardstock sheet can be placed on a Silhouette carrier sheet. Insert the carrier sheet into the Silhouette die cutter. Be sure to cover the top and left outer gridlines on the carrier sheet with the printed cardstock page.

Press the carrier sheet lightly against the white rollers on the Silhouette, centered between the paper guides, and press “Load Cut Mat”. The machine will pull the mat into position. If the mat does not enter the die cutter smoothly because it is crooked, just push *Unload* on the control panel of the Silhouette machine and try it again.

In the software’s *Send* window, check that the appropriate media type is chosen. This will most likely be “Cardstock, plain” for Piecepack elements.

The lower left part of the *Send* window should indicate that the Silhouette Portrait is connected with a status of *Ready*. If not, check the Silhouettes power and data connections to the computer (via a USB cable).

When you are ready to cut out the game components, select the *Send* button at the bottom of the window. The Silhouette Portrait will search for the registration marks and then tap the blade several times to set the cut profile. It will then cut out the shapes. When the knife returns to the home position, select *Unload* on the Silhouette control panel to eject the carrier sheet.

Then slowly pull the mat from the paper (rather than peeling the cardstock from the mat). This will minimize curling. Finally, separate the game tokens and tiles from the cardstock using the score lines created by the die cutter to pull them apart.

## Appendix

### *Trouble-shooting Suggestions*

If there is a problem with registration, first turn the carrier sheet over and check to make sure that the outer grid lines are obscured by the cardstock. If the cardstock position needs adjustment, slowly pull the mat from the paper (rather than peeling the paper from the mat). This will minimize curl on the media. Then reposition the paper and refeed the mat. Select *Register* in the Silhouette Studio software so that the machine can attempt to find the registration marks again.

If the gridlines are obscured but there is still a problem, try shifting the position of the mat slightly to the right of the paper guides on your next attempt.

Another problem could be that the paper has not been positioned with the top edge in the expected orientation. The software display will show what it expects, so check that.