4.02 Embossing and Scoring

4.02.1 General Info on Embossing

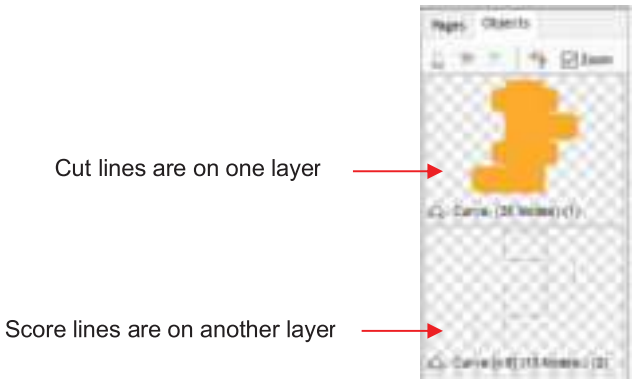
- The Skycut embossing tool has two different sized embossing heads. The smaller one is recommended when scoring cardstock for fold-up projects, such as pop-up cards, gift bags, and small boxes. Either head can be used for embossing shapes.

- When embossing cardstock, it is recommended that a soft material be place beneath the paper or cardstock to allow a deeper impression to be made. One excellent material to use is non-slip shelf liner. Other materials which can be used include rhinestone rubber, craft foam, and felt. Make sure the material is well adhered to the mat (tape it down, if necessary). Then tape your paper or cardstock to the top of this material.
- When using the embossing tool for scoring fold-up projects, the paper or cardstock can be applied directly to the mat, just as you do for cutting. This makes it much simpler when you need to score and then immediately cut. Because the scoring may not be as deep on the underside of the paper or cardstock as the top side, fold all score lines (valley and mountain) forward to establish the fold on both sides. Then flip over and fold any mountain folds the opposite way. This especially works well on pop-up cards.
- Make sure you do some tests first to get the best settings for the scoring or embossing you need. For scoring cardstock, this typically involves a higher force (~75). If you have a soft material beneath your paper/cardstock, then a lower force will be used. As with the test pen, use the 35 Post-It note method presented in *Section 2.01.3* to install the embosser into the Skycut.

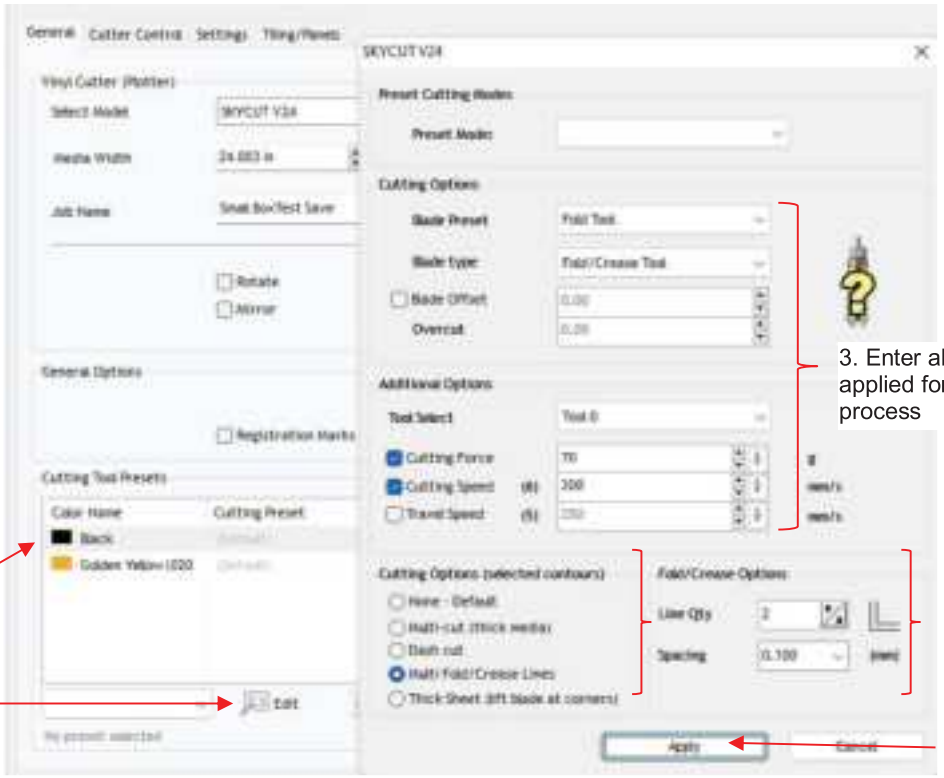
4.02.2 Score and Cut Project

- When a project involves both scoring and cutting, a process similar to what was used in *Section 4.01.1* will be followed. Because scoring normally requires multiple passes in order to get acceptable folds an additional setting is required. There are other settings of interest that can also apply.
- In this tutorial, a fold up box project will be used as a typical example. This small box file is provided in the zip file available here.

- Always make sure the project is organized so that you can easily select the score lines and the cut lines separately. Click on the **Objects** tab on the **Page Thumbnail Viewer** and verify that the project is organized as such. In this example, the score lines have been grouped together and the cut layer is just a single object:



- After following the instructions from *Section 4.01.1* to arrange the layers so that the score layer will be conducted first, select that layer and click on the **Edit** option to open the following:



- Note that if you will be performing score and cut projects regularly, setting up a **Preset** for your material will make the selection of the settings much faster. Refer to *Section 2.04.2.*
- Load the material into the Skycut and load the creasing tool with the small end downwards into the Skycut. Move the tool to an appropriate origin. Click on **Cut Now** and you will be prompted to insert the tool:

- Click on **OK** and the scoring process will occur. A second prompt will advise you to insert the blade holder which should done after the scoring is completed:

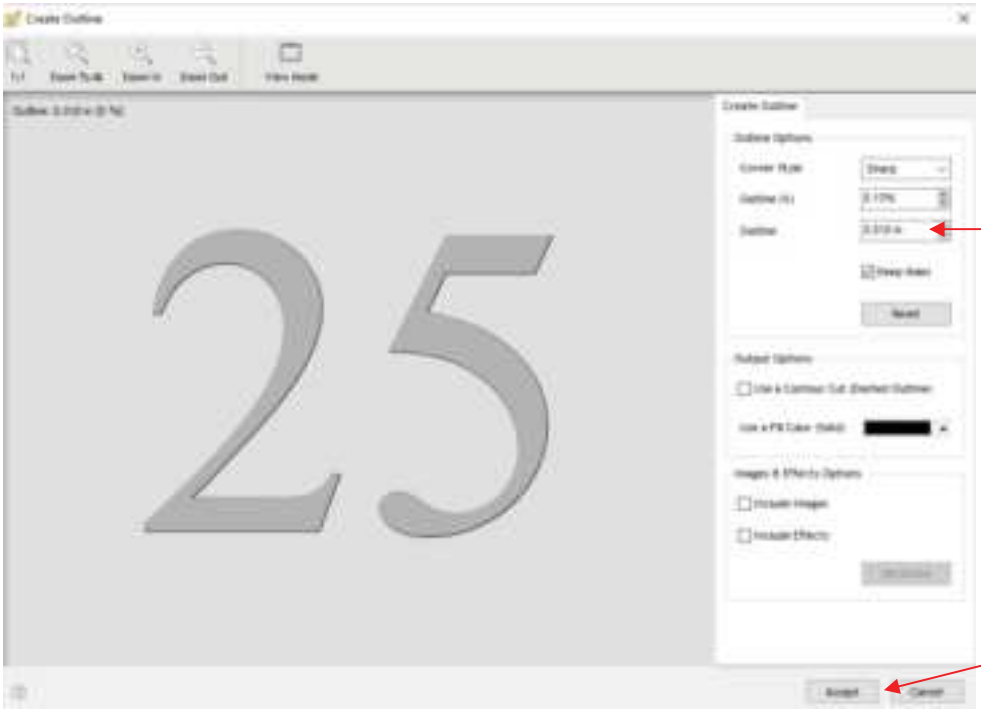
- Click on OK and the cut lines will be made.

4.02.3 Embossing Paper or Cardstock

- When embossing paper or cardstock, it is recommended that you use an **Outline** effect to create several very small outlines at a thickness of, say, 0.01" (0.25 mm). These tiny offset lines will then produce a slightly thicker overall outline of your shapes. This works better than line-filled embossing which can stress the cardstock and cause wrinkling. Here are the steps:

  ◊ Create the shape you wish to emboss. In this example, the number 25 is used:

  ◊ Select the shape and click on the **Plugins** icon  and select **Outlining Module.** The following window opens:



- ◊ After clicking on **Accept**, use the **Objects** panel to select the new outline layer and repeat the process to add a second outline. Now you have three versions of the shape, each one slightly outset from the other. Thus, when using the embossing tool, this will result in a thicker outline made of this shape.
- ◊ **Important:** don’t forget to mark the **Mirror** option in the **Send to be Cut** window (or apply **Arrange>Mirror & Rotate>Mirror Horizontally**) so that when you flip over the cardstock after embossing, the design will “read correctly.”

4.03 Scratch Engraving

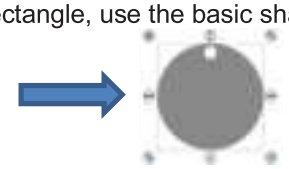
- The Skycut engraving tool can be used to engrave vellum, foils, acrylic, and most metals, including trophy labels, dog tags, and jewelry charms.

- On softer metals, you may not want the engraving tip too far above the metal as it can leave pock marks when it drops to start engraving. If possible, test on scraps first.
- To design an engraving fill pattern, use the **Engraving Module**. Refer to *Section 5.03*

4.03.1 Engraving a Metal Tag

- When engraving items that are already cut (such as metal tags, trophy plates, charms, etc.), it’s very important to have precise alignment before proceeding. Therefore, the camera on the Skycut will be used to set the origin for engraving. If you haven’t already calibrated the camera, go to *Section 3.03.*
- The following is a list of the items you’ll need for this kind of an application:
  - ◊ The item to be engraved
  - ◊ The Skycut engraving tool
  - ◊ Double sided tape to secure the item to the cutting mat. Thermo-web is perfect for this.

- Create a replica of the item to be engraved:
  - ◊ If it's something simple, like a square or a rectangle, use the basic shapes available in SignMaster:

Photo of actual tag   Replica of tag created using two circles

  - ◊ If it's not a shape that can easily be recreated in SignMaster, then trace it onto paper:

  - ◊ Scan or photograph the trace and use the instructions in *Section 5.01* to import the scan and create a contour of the heart:

Imported scan

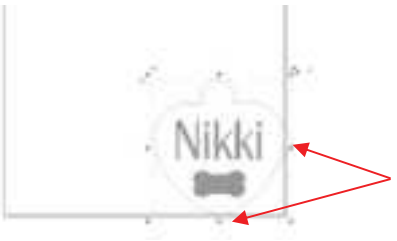
Tracing from **Create Contour Cut** window

- ***IMPORTANT:*** Carefully measure the actual tag and compare it to the dimensions of the contour. Adjust the size of the contour if needed.
- Create the design. In this case both text and a vector shape of a bone are added:

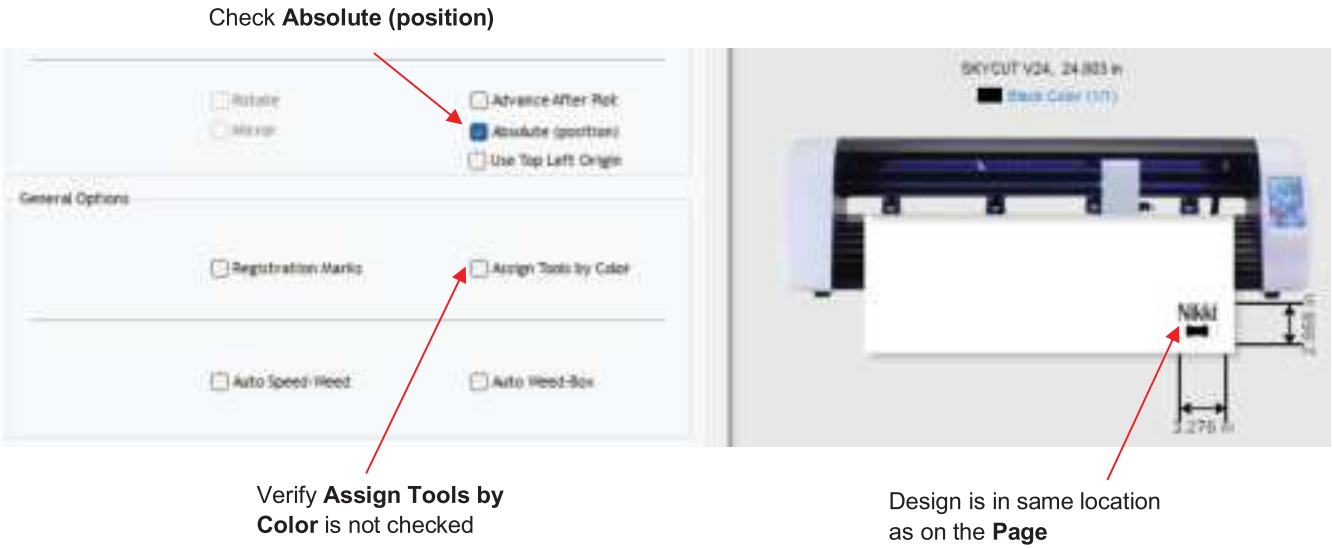
- Because a filled engraving is desired, select the text and the bone shape and use the **Engraving Module** to fill the design with lines. Details on this function are presented in *Section 5.03.*

- To arrange the design in the bottom corner of the **Page**, click on **Snap** in the middle taskbar and select **Page**:

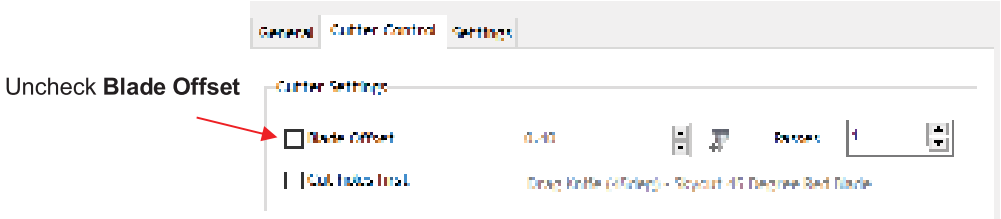
- With both the heart and the design selected, drag to the lower right corner until it snaps to the right and bottom sides of the **Page / Drawing Area** (Note: to better illustrate placement on the page and later in the **Preview**, the design has been made much larger. In reality the design is only about an inch in size):



- Select only the design and not the heart tag shape. In the **Send to be Cut** window, mark the option for **Absolute (position)** so that the design will be positioned the same distance from the origin as it is from the corner of the **Page / Drawing Area.** Also, verify that **Assign Tools by Color** is not marked:

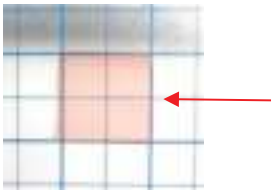


- On the **Cutter Control** tab, uncheck **Blade Offset** as it's not needed when using the engraving tool:



- On the control panel, click on the **Speed/Force** icon and enter a **Speed** of 10 and a **Force** of 40 for the engraving. Note that with your own testing, you may need to alter these settings.

- The metal tag needs to be very firmly attached to the cutting mat. Place strips of double-sided tape onto the mat, where the tag will be mounted:



Double sided tape is placed on the mat to cover the size of the tag (note: the pink liner hasn't yet been removed from the top of the tape)

- When placing the tag onto the mat, align the rightmost side of the tag with a vertical grid line and the bottommost side of the tag with a horizontal grid line. The intersection of the two gridlines will be the origin for the engraving process:

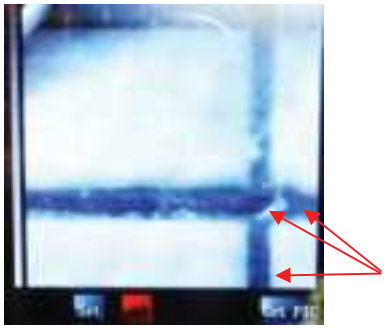
Align the tag with the grid lines on the mat

The origin will be set at this intersection

- Load the mat into the Skycut and be very precise in alignment by using the ruler to make sure the mat is perfectly straight:

Align the mat with the ruler

- Load the engraver into the Skycut using ~30 Post-It notes (or sheets of copy paper), making sure the notes are on top of the tag.
- Move the cutting head so that the engraver tip is over the intersection of the two grid lines bounding the tag. Then use the camera instructions in *Section 2.05.1* to set the origin even more precisely by getting the blue dashed + in the middle of the grid intersection:



Blue dashed lines cross at grid intersection

- After clicking on **Home**, press down on the engraver and verify, once more, that the correct grid intersection was used. Back in SignMaster, click on **Cut Now** and the engraving process will be carried out.:

4.04 Settings Form for Accessory Tools

Application/Material	Tool	Force	Speed (Cut/Up)	# Passes	Surface	Other Comments

5. SignMaster Functions of Interest

5.00 Quick Reference for Chapter 5

- How to add a contour cut: *Section 5.01*
- How to node edit a contour: *Section 5.01.2*
- How to add a contour cut to a vector image: *Section 5.02*
- How to fill a design with engraving lines: *Section 5.03*

5.01 Adding a Contour Cut Line to an Imported Raster Image

- Graphics such as JPG, PNG, and BMP files are often used for print and cut (contour cut) applications. Because these types of files are raster images (versus vector images), the images must be traced. This is done through a process called vectorization.

5.01.1 Step-by-Step Tracing Process

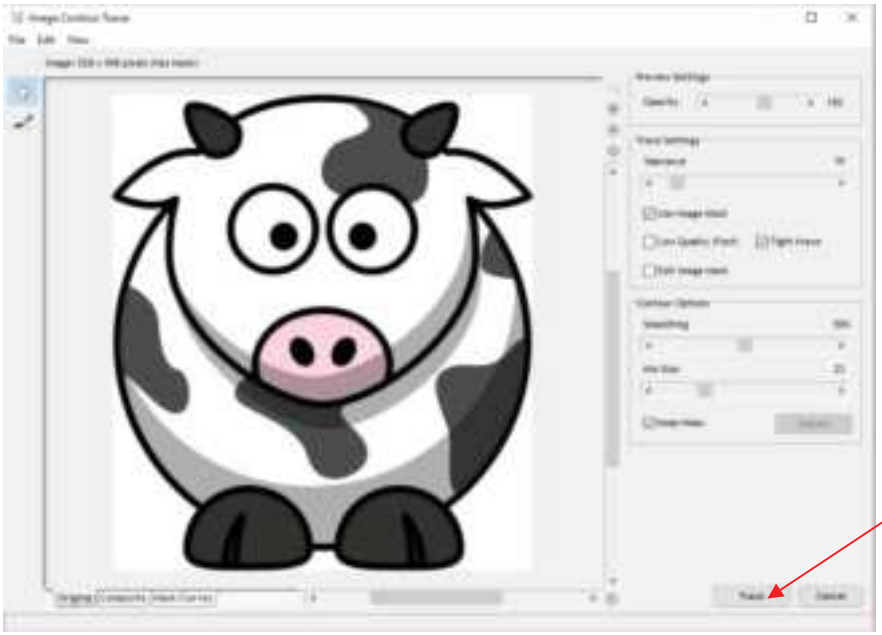
- The following steps are a sample tutorial using the **Create Contour Cut** feature in SignMaster:

  (1) For this project, go to this link. After extracting, you will find several images that can be used as easy samples for tracing.

  (2) To import a graphic file, go to **File>Import>File** and select the graphic to be traced. Left click anywhere in the **Drawing Area** to place the image:

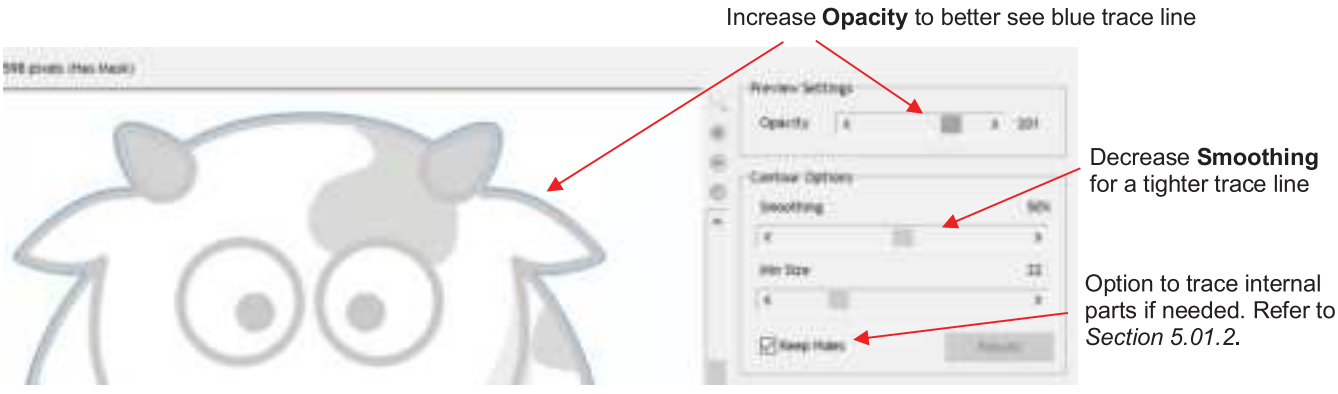
  (3) With the graphic selected, click on the **Contour Cutting** icon  and select **Create Cut Contour**. A popup window will open and you will respond **Yes:**

  (4) The **Image Contour Tracer** window displays the various settings available for adding a cut line to the graphic:



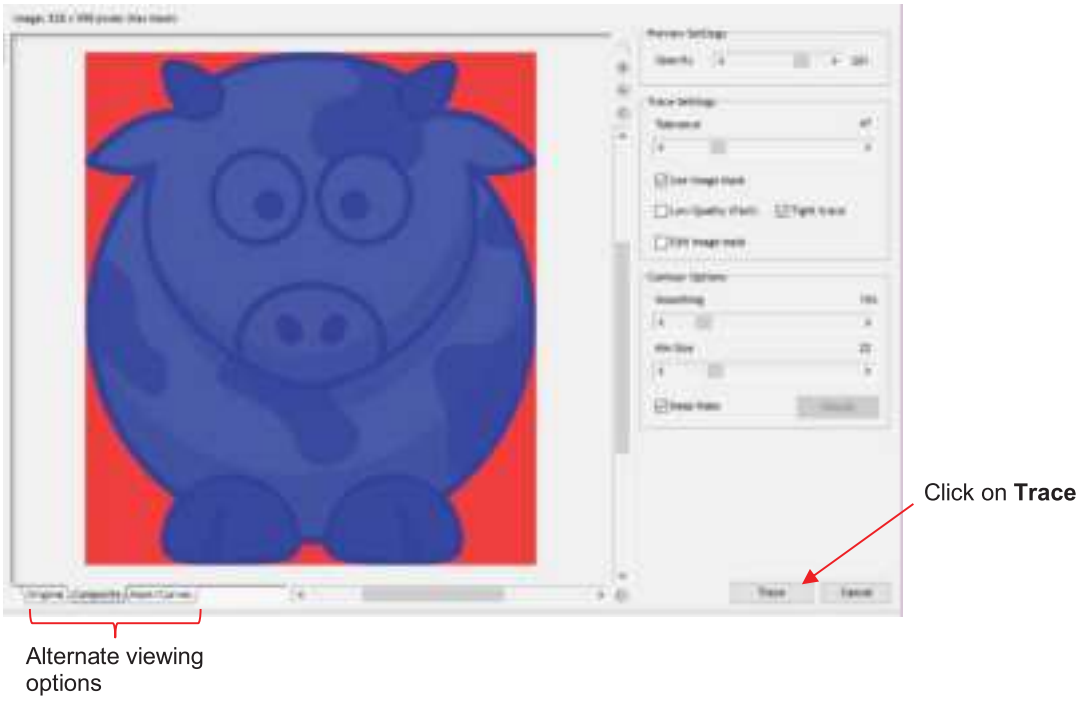
(5) Without making any changes, click on the **Trace** button to get a preliminary trace which will indicate which settings, if any, need adjustment. The blue line indicates what will cut based on the default settings shown:

(6) To see the trace line a little more clearly, adjust the **Opacity** setting at the top. If the "fit" isn't tight enough, decrease the **Smoothing** setting. After making changes, click **Retrace** to return to the original tracing window and then click on **Trace** again:



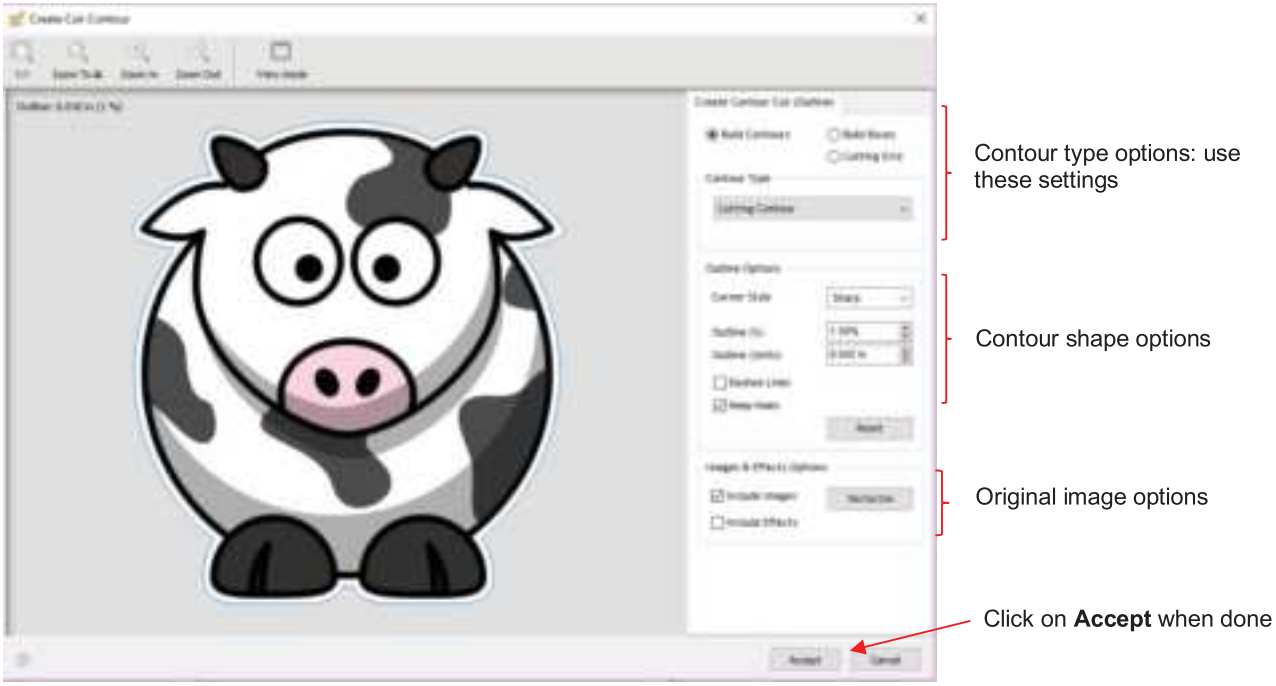
(7) After making any changes, click on **Retrace** at the bottom of the screen. On the other hand, if you are happy with the trace results, click on **Apply**:

(8) If you selected **Retrace**, a **Composite** view of the results will appear where blue indicates the part that will be cut out and red indicates the waste material. You can go back to seeing the prior view by clicking on the **Original** tab at the bottom. Click on **Trace** to apply the new settings.



(9) After clicking on **Apply**, a new group of settings appear, giving you additional options such as:

- ◊ Whether the cut line is continuous or perforated
- ◊ Whether the cut line fits the image tightly, or is offset a distance or inset a distance
- ◊ Whether internal cut paths should be removed
- ◊ The cornering shape of the contour cut (rounded, beveled, mitered, etc.)



◊ Choose a **Corner Style**, as desired. For the **Outline %** or **Outline Units** (size), note the following:

- Set to 0 if the cut line should align with the edges of the printed image
- Set to a positive number for a contour cut around the outside of the printed image
- Set to a negative number (normally very small) to cut slightly inside the printed image

(10) Click on **Accept** after making any changes and you will be returned to the **Drawing Area**. If you click on the **Objects** tab on the **Page Thumbnail Viewer**, you will now see both the original image and the contour cutline:

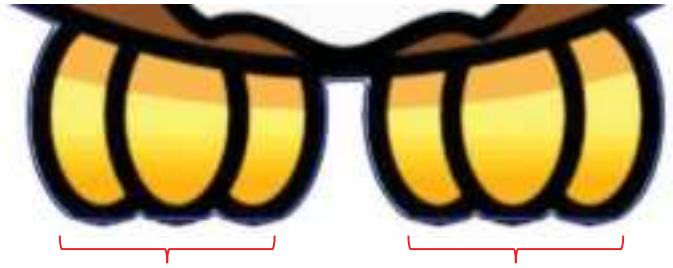
- To print and cut this type of design, refer back to *Sections 3.03* and *3.04*.

5.01.2 Editing a Trace

- Occasionally you may find a need to edit the tracing/contour cut created. This section presents two examples.
- Contour cut doesn't fit the original graphic in certain spots

  ◊ In the following example, the *Cartoon Owl* image will be used:

  ◊ During the process of tracing, it was found that the bottoms of the owl's feet weren't rounded like in the original image. Even trying different adjustments to **Smoothing** didn't result in the desired fit. Note that a slight inline was applied to improve the accuracy of the fit but the bottom of the feet still need tweaking:



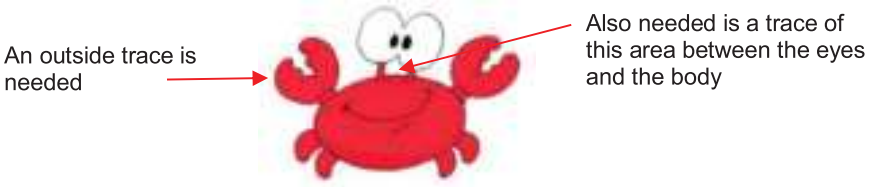
Trace line is flat along the bottom of owl's feet

  ◊ With the trace line selected, click on the **Node Edit Tools** icon  and the nodes making up the path of the cut will appear. Drag nodes, as needed, so that curves are formed:

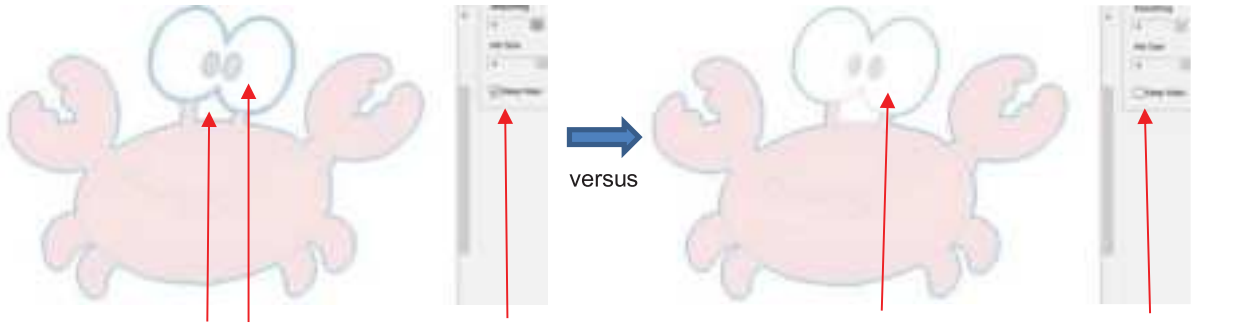
Drag nodes to create curves

- Contour cut contains paths you want deleted

  ◊ In the following example, a crab cartoon from *Doodle Dragon Studios* is traced:



  ◊ The issue in this example is that the space below the eyes should be cut out but not other internal shapes, such as the pupils of the eyes. Note the difference in what will be cut between marking and not marking the **Keep Holes** option in the **Create Cut-Contour** window:



Area below eyes is traced but so are the inner parts of the eyes

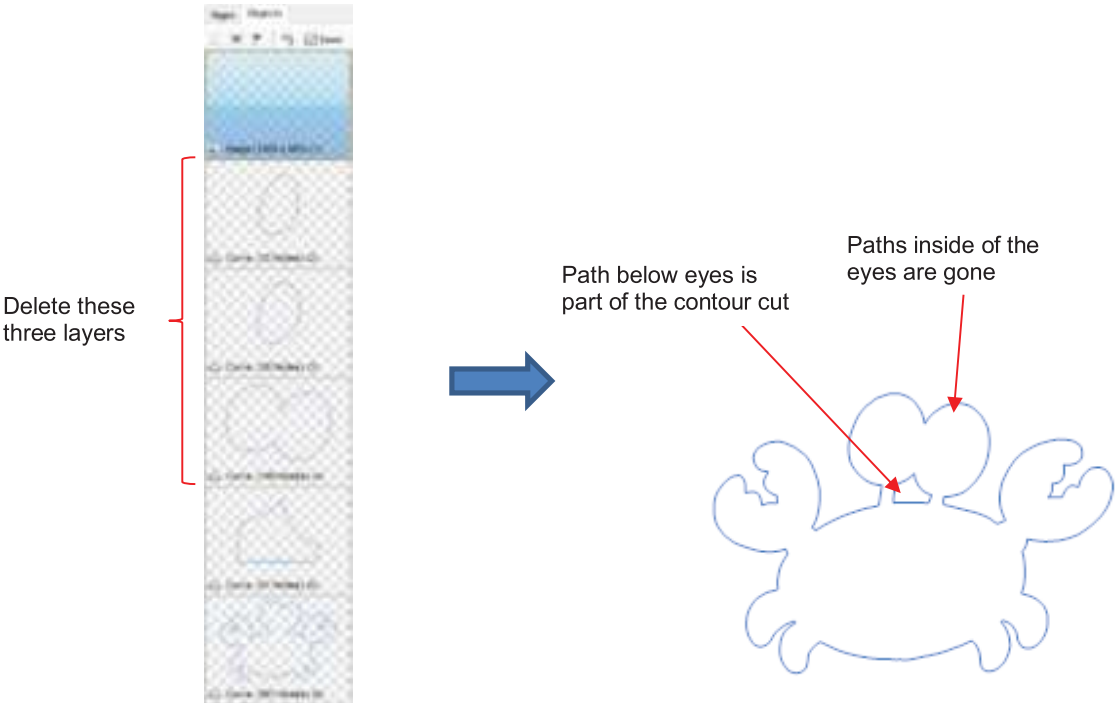
Keep Holes checked

No inner paths at all

Keep Holes not checked

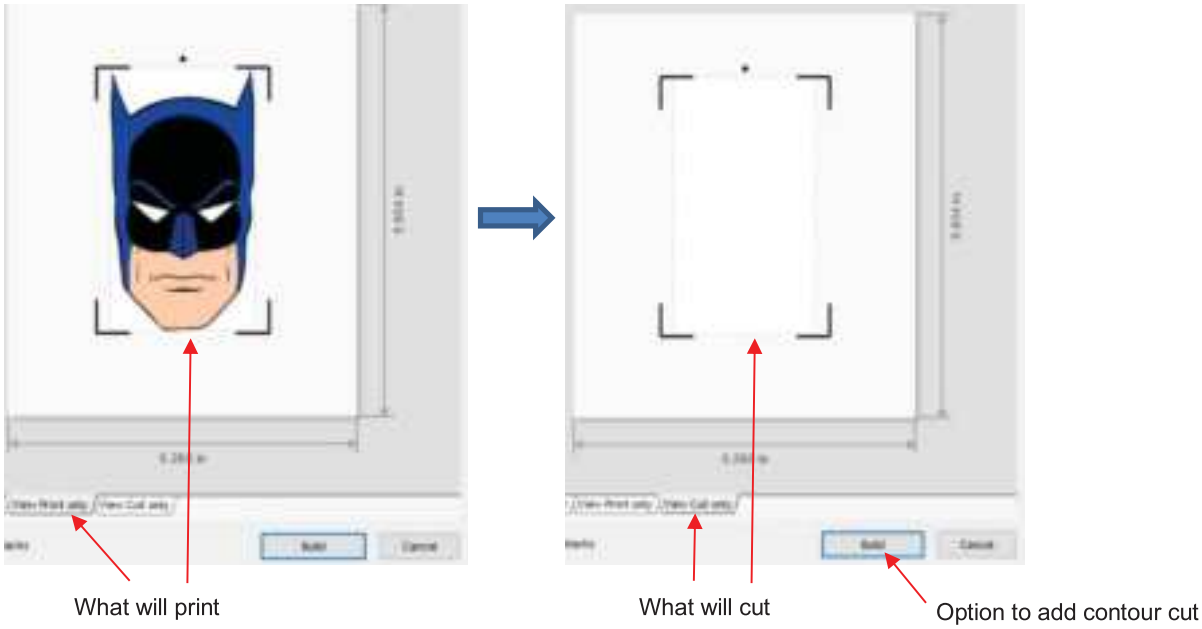
◊ The first option, **Keep Holes**, needs to be selected so that the area beneath the eyes is traced. After accepting the trace, click on the **Objects** tab on the **Page Thumbnail Viewer** and hide the original graphic. You will now only see the contour in the **Drawing Area**:

◊ Select the contour and go to **Curves>Break Apart**. The individual paths will now be separate layers on the **Objects tab** and you can delete each one that is not needed:



5.02 Adding a Contour Cut to a Vector Image

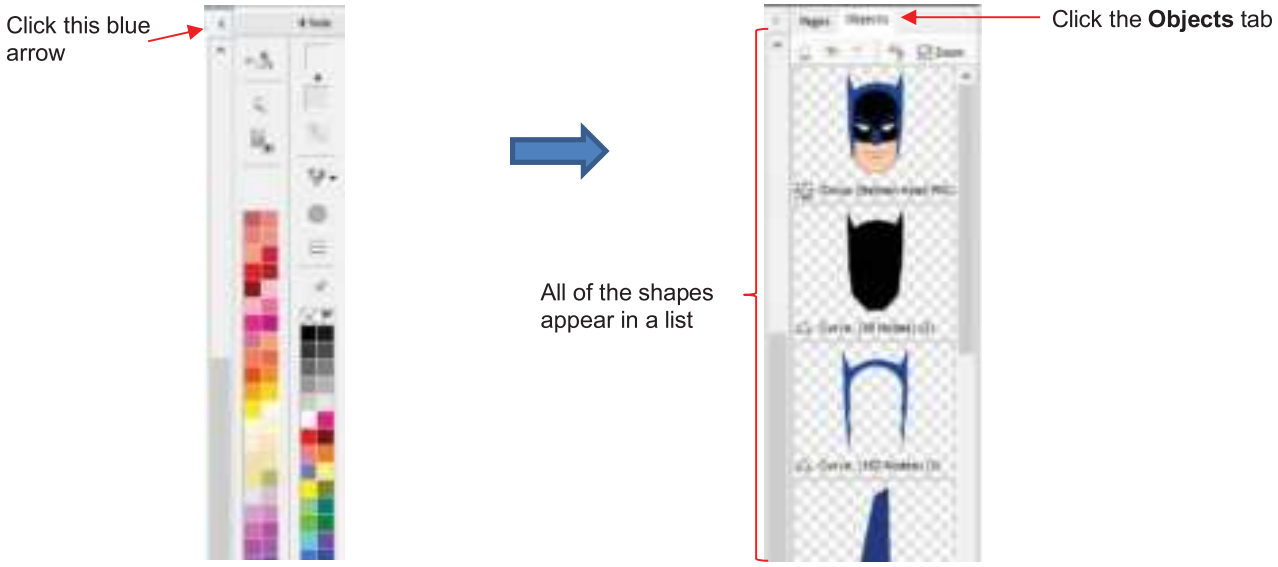
- As mentioned in *Section 3.05.2*, vector images require a contour cut assignment in print and cut applications. For example, the following Batman SVG file is imported into SignMaster and then the **Contour Cut Wizard** window is opened. Note that comparing the **View Print only** preview with the **View Cut only** preview indicates that the vector file is ready to print but there's no cut line for the design:



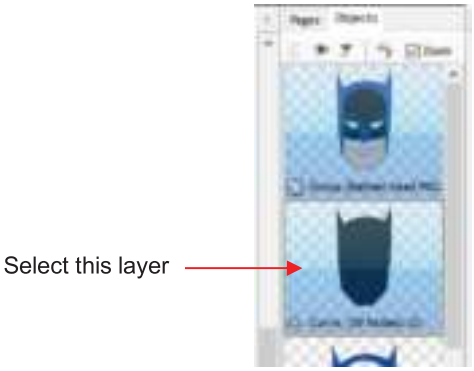
- There are two situations to consider:
  - ◊ A contour cut will be added to follow the printed design (*Section 5.02.1*)
  - ◊ A contour cut will be added and it will be offset from the printed design (*Section 5.02.2*)

5.02.1 Contour Cut Which Follows the Printed Design

- Upon importing the SVG file, open the **Objects** tab of the **Page Thumbnail Viewer** to display the various shapes in the file:

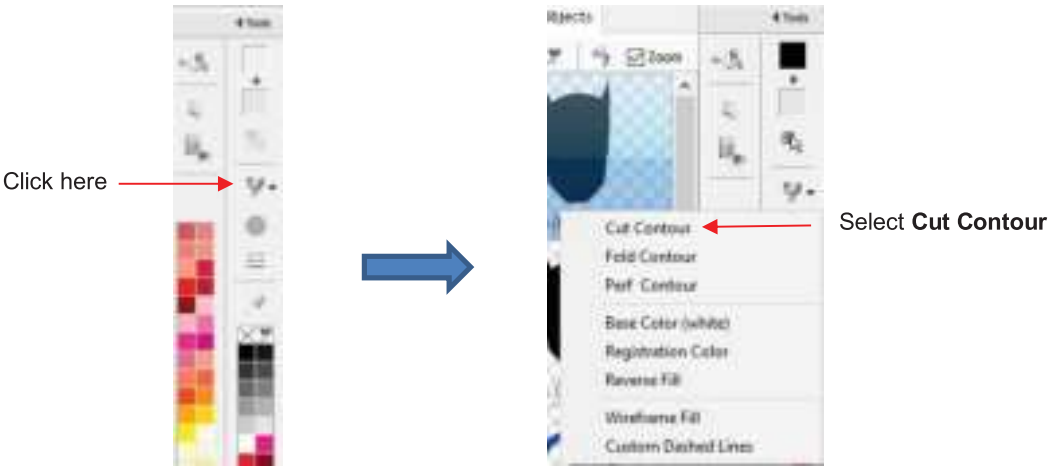


- From the **Objects** list, click on the shape which represents the contour cut line you wish to use. In this example, it is the black shadow layer:

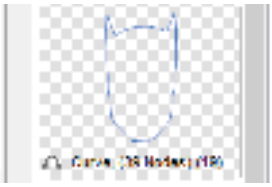


- With that layer selected, go to **Edit>Duplicate**. A new layer will appear at the bottom at the **Objects** list and, thus, will now be arranged on top of the project:

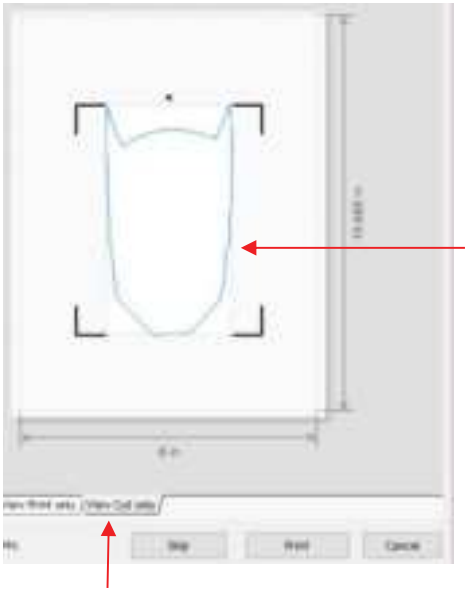
- This new layer will also be selected. To assign it as the contour cut, click on the **Custom Fill** icon  that is located on the **Palette** and select **Cut Contour** from the drop-down menu:



- This newly assigned contour cut layer is given an invisible fill color and will no longer appear on top of the imported project.

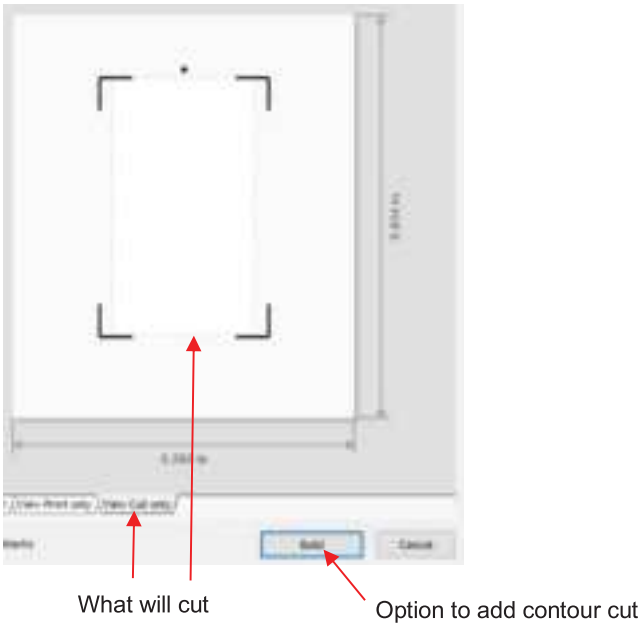


- If you now go to the **Contour Cut Wizard**, you can verify that this new cut layer exists on the **View Cut Only** tab:

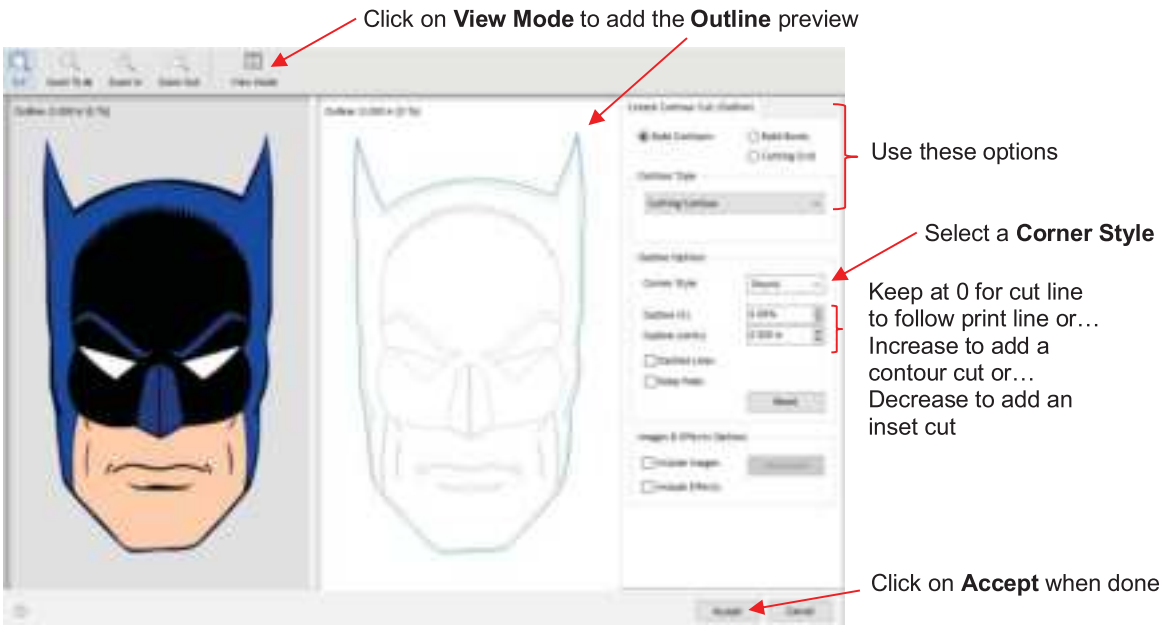


5.02.2 Contour Cut Which Is Offset from the Printed Design

- This section presents the method to be used when the contour cut is not one of the existing vector shapes. While this section accesses the **Create Cut-Contour** window from within the **Contour Cut Wizard** window, note that the same process can be applied by adding the contour from the main screen as was done in *Section 5.01* (i.e. select shape and go to **Contour Cutting>Create Cut Contour**).
- In the earlier screenshot, SignMaster recognizes there is no contour to cut on the **View Cut only** tab and offers the option to add one using the **Build** button below the preview.

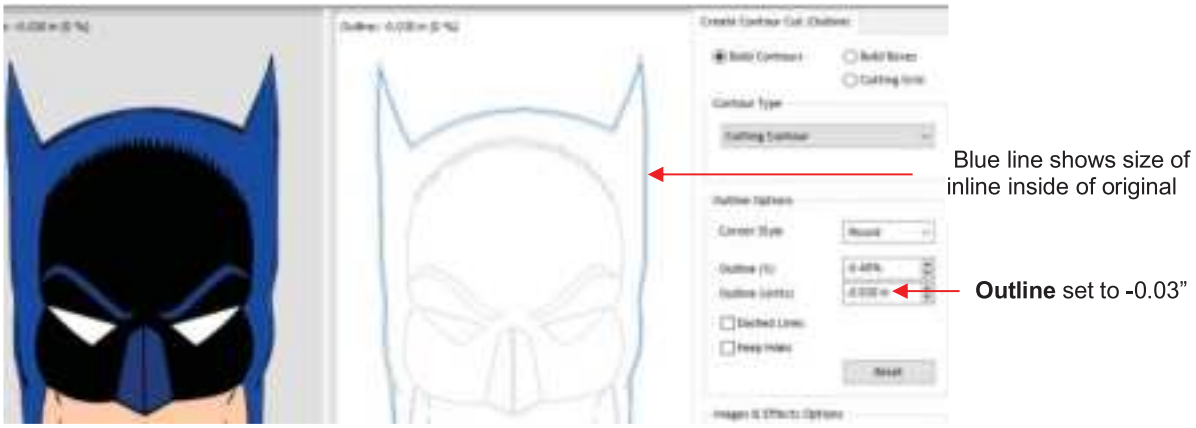


◊ Clicking on **Build** opens the **Create Cut–Contour** window:

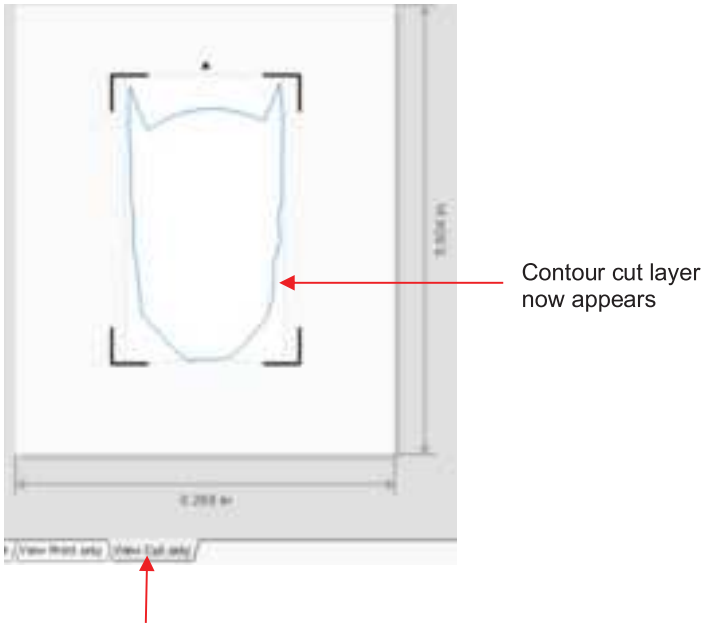


- **Corner Style:** Usually select either **Round** or **Sharp** depending on the nature of the original vector and your desired contour
- **Outline (%)** or **Outline (Units):** Enter either a percentage or the actual size for the outline. In the prior screenshot, leaving the **Outline** at 0 results in the contour being the same as the original outside vector line. This would result in the same contour cut as was created in the prior *Section 5.02.1*. For an outset cut around the printed image, increase **Outline** to the desired size. For in inset or inline cut, decrease **Outline** slightly so that it's a negative number:
  - **Outline** is set to 1/8 (0.125) inch:

  - **Inline** is set to -1/32 (0.03) inch:



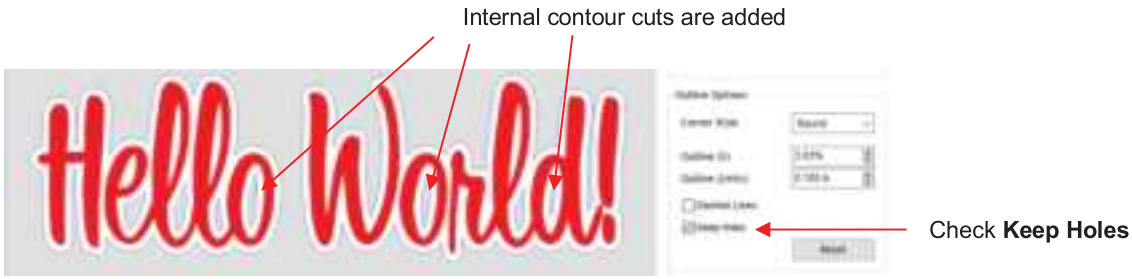
◊ After clicking on **Accept**, the **View Cut only** preview now indicates a cut path exists and you’re ready to proceed:



- Note that text is also a vector shape, thus the contour cut on a text object would be created the same way.
- Also note that there is a **Keep Holes** option in the **Create Cut-Contour** window which controls whether or not the contour is a solid outside cut or contains internal cuts following the shape of the vector:

◊ **Keep Holes** not marked:

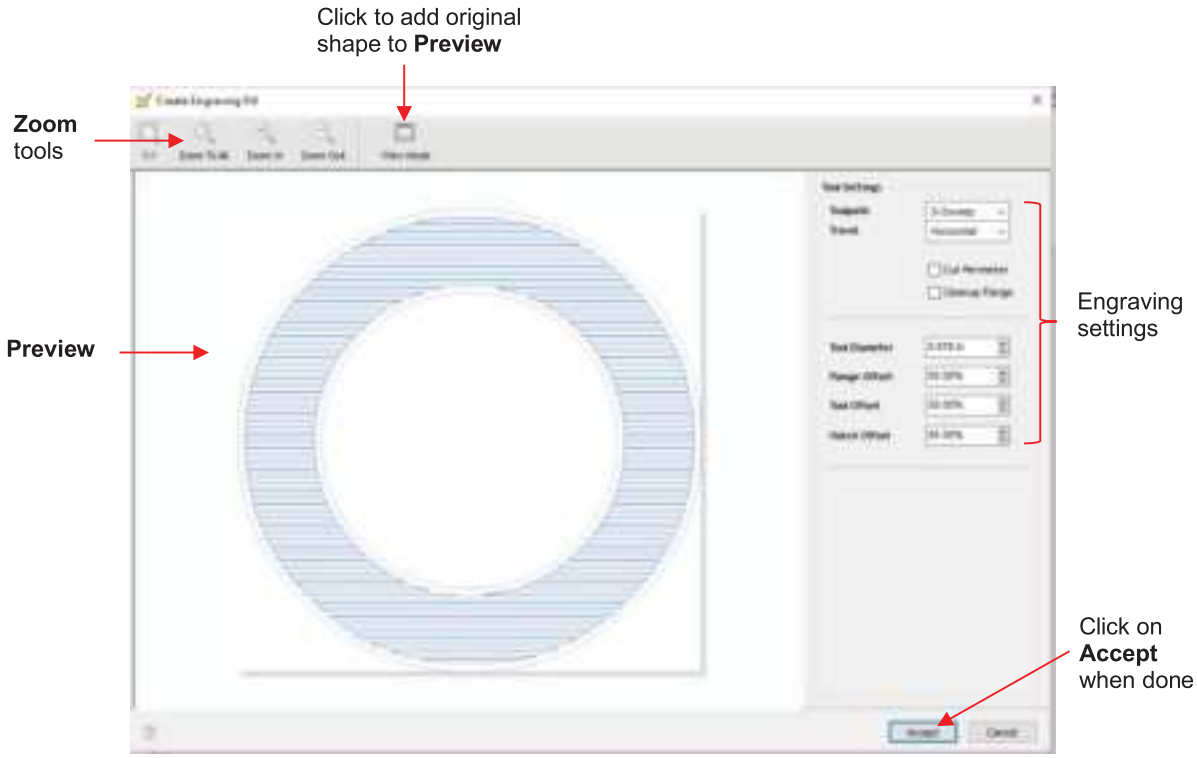
◊ **Keep Holes** marked:



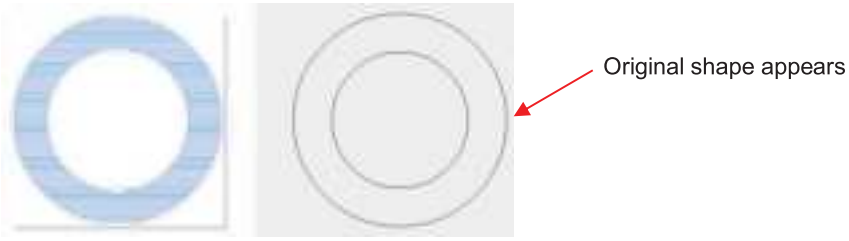
5.03 Engraving Fill

5.03.1 Engraving File Module and Settings

- If you wish to fill in a shape with a line pattern, SignMaster offers an **Engraving Module** which can be opened by clicking on the **Plugins** icon  and selecting **Engraving Module**.
- The following window opens and you will see your selected shape has already filled with lines:

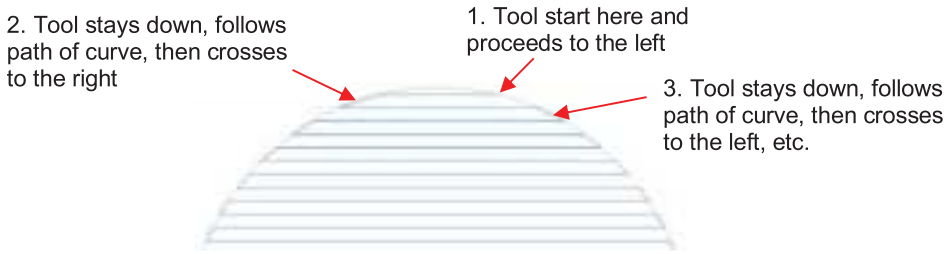


◊ In the top left corner are zooming tools. The **View Mode** icon can be toggled to add the original selected shape to the **Preview** window, if desired:

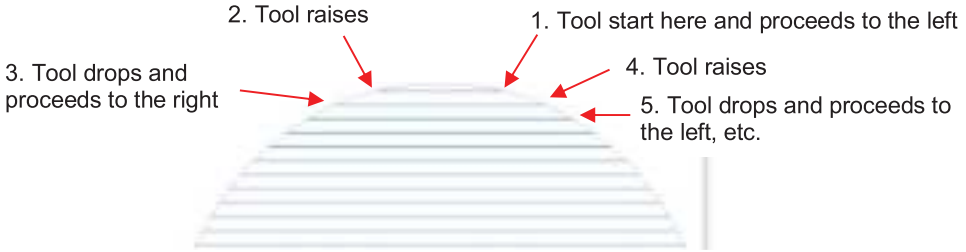


◊ **Toolpath:** There are four options in this menu:

- **None:** no fill pattern is created
- **S-Sweep:** a line fill pattern in which the tool stays down while filling the entire shape:



- **Line Fill:** a line fill pattern in which the tool raises at each side, moves a "row" down, and then proceeds to the other side:



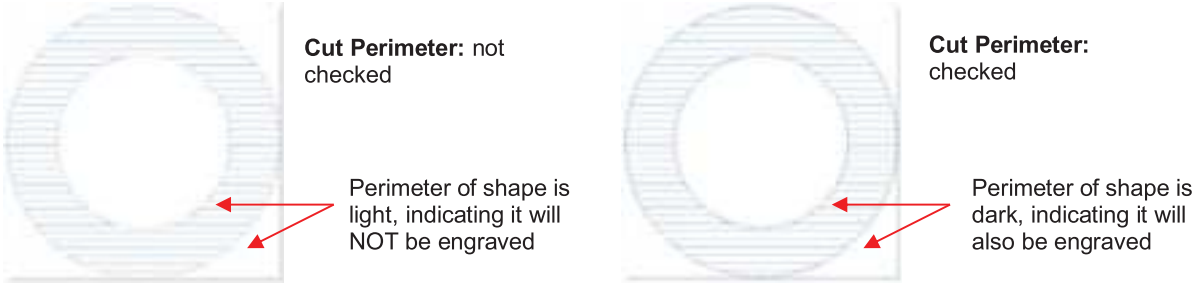
- **Island Fill**: a progressive inset pattern based on the original shape; the tool drops to complete a path, raises, moves to the next path, drops to complete that path, etc. Some shapes work better than others with an **Island Fill**:

◊ **Travel:** four angles from which to choose, applying only to **S-Sweep** or **Line Fill** patterns:

Horizontal **Diagonal - Up**

Vertical **Diagonal - Down**

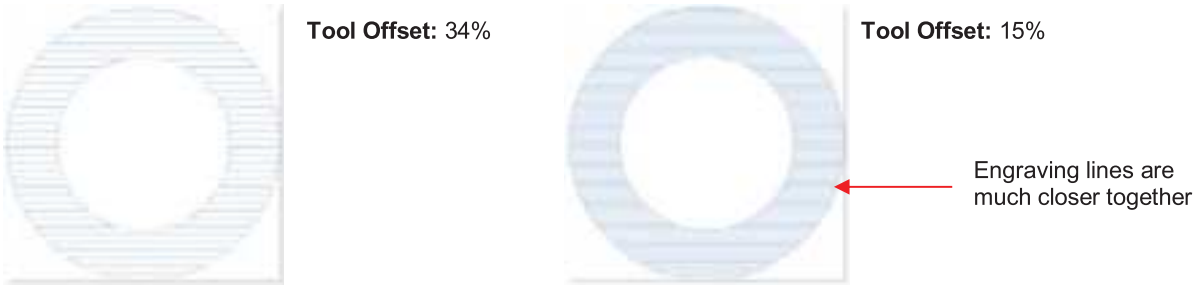
◊ **Cut Perimeter:** turn on this option if you want the original shape to be engraved as well:



◊ **Cleanup Flange:** turn on this option to have an engraving of the original shape, but along the edges of the engraving lines. Note that there is also a **Flange Offset** setting which is a percentage distance from the original shape to the engraving lines. These settings are typically not needed with small diameter tools, like the Skycut engraver, so you most likely won't have a need to activate **Cleanup Flange.**

◊ **Tool Diameter:** The size of the engraving tip, pen nib, embossing tip, or other tool. For the Skycut engraver, use 0.004 inch or 0.1 mm.

◊ **Tool Offset:** This setting is the distance between the engraving lines as a percentage of the **Tool Diameter.** Lowering this setting will decrease the spacing between the lines:



◊ **Hatch Offset:** This setting controls the distance from the engraving fill to the outside perimeter of the original shape, again as a percentage of the tool diameter. A setting of 0% will extend the pattern all the way to the perimeter:

Hatch Offset: 35% **Hatch Offset:** 25% **Hatch Offset:** 0%

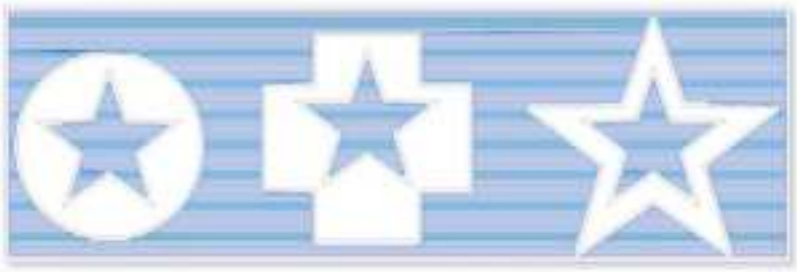
5.03.2 Inside Fills Versus Outside Fills

- In certain situations, you might want to reverse the parts of a design that are filled. To do this, add any outside shape to the design, such as a rectangle, an oval, a heart, etc. The engraving fill automatically fills the space between this new outside shape and the original design.

    ◊ For example, if three stars are sent to the **Engraving Module**, then they will immediately fill with lines such as this:

    ◊ If shapes are added around these stars, then the fill pattern reverses to fill the space between the original shapes and the new outside shapes:

    ◊ If another shape is added to the outside of these shapes (a large rectangle is added to encompass the three shapes), then the fill will revert back to the original stars and a line fill is added between the rectangle and the outside shapes that were added:



- If, for some reason, you want the outside shape present but NOT have the area between the two shapes filled, then only select the initial shapes (i.e., the stars) to send to the **Engraving Module.**

Appendix A Troubleshooting FAQ's

A1 Communication Issues

I cannot get the Skycut to power on.

- Make sure the power cable is securely plugged into the Skycut's port on the left side and securely plugged into a wall socket or a power strip.
- If it still fails, check the wall socket or power strip with another device, such as a table lamp.
- If you still cannot get the Skycut powered on, contact your dealer.

I cannot get Wi-Fi to work with my Skycut.

- Set the Skycut close to the router when performing the initial setup presented in *Section 1.12.2*. After establishing communication, you can test how far the Skycut can be located from your router.
- In SignMaster's **Vinyl Spooler** window, under the **Connection** tab, make sure you have selected **TCP** and entered the same **IP address** you selected during setup on the Skycut's control panel:
- 

- Make sure your computer is connected to the same router as your Skycut.
- Verify that SignMaster is the selected software on the control panel under **Set>Sys Information**.
- If the number you see on the control panel orange strip reads 192.168.16.254, you have NOT connected to your router. That is the default **IP address** for a stand-alone connection. You need to repeat the scan procedure and make sure you see the correct **IP Address** appear.
- Some routers will not accept 200 or higher as an **IP Address** assignment. Try 151 instead.
- Some routers assign the same name to both the 2.4G and 5G networks and because the Skycut's Wi-Fi chip only works on 2.4G, you might need to rename your 2.4G network to a different name.

I cannot get USB to work with my Skycut.

- Unplug/replug the USB cable at both the computer and at the Skycut.
- In SignMaster's **Vinyl Spooler** window, under the **Connection** tab, make sure you have **Direct USB Port** selected under **Port Type** and the **Status** says **Device Connected.** If not, repeat the instructions in *Section 1.12.1*.