

# Sure Cuts A Lot 5 User Manual

May 6, 2023

## Video Support

- The video links **Video** are for [Scrappy Dew's Classroom](#) which is highly recommended, especially if you prefer learning by video versus reading a manual. It is a one-time cost and you'll receive unlimited access to over 150 videos (over 10 hours) covering many of the functions and features of Sure Cuts A Lot 5.

## Do I Have to Read All of this Manual?

- Not unless you need it as a sleeping aid! :P Here are the recommended sections for a new SCAL user:
  - ◇ Chapter 1 Installation, Preferences and Workspace
  - ◇ Chapter 2 Handling Files and Organizing Layers: 2.01 - 2.04, 2.06.1, 2.07.1
  - ◇ Chapter 3 Manipulating and Coloring Shapes: 3.01 - 3.06, 3.08 - 3.15, 3.17
  - ◇ Chapter 4 Working with Text: 4.01 - 4.07
  - ◇ Chapter 5 Tracing and Drawing: 5.01, 5.02, 5.03.1, 5.03.2, 5.03.3, 5.03.6, 5.03.7, 5.03.10
  - ◇ Chapter 6 Editing: 6.01, 6.06
  - ◇ Chapter 7 Designing: 7.01, 7.05, 7.06.1, 7.07.1
  - ◇ Chapter 8 Output: 8.01, 8.02, 8.06, 8.07

## Also Note

- Chapter 8 covers functions related to output, both printing and cutting. Some sections show screenshots or functions that may only be present in Klic-N-Kut models. Thus you may need to determine on your own how that function works with your cutter.
- Because print and cut (PNC) applications differ depending on the cutter brand and model you own, those procedures are not covered in this user manual. Owners of Klic-N-Kut cutters will find detailed instructions, including calibration, in Chapter 11 of their respective SCAL4 User Manuals. For owners of other cutters, try following the instructions provided within SCAL. If you need additional help with PNC, contact your cutter's tech support staff or post at the SCAL forum.

## Is This Manual for PC Users Only?

- While a PC was used for taking screenshots to include in this manual, most if not all of the windows are virtually identical in the Mac version.
- An attempt has been made to include shortcut keys for both PC and Mac users. Where I may have failed to include the Mac equivalent, note that **Ctrl** on a PC is replaced with **Command** on a Mac and **Alt** on a PC is replaced with **Option** on a Mac.
- If you do not have a right click button on your mouse, use **Control + left click** or use a two-finger tap on the trackpad.

## Feedback

- I strive to provide well-written and accurate information on all functions within this superb program. If you find any typos, incorrect information, or parts needing clarification, feel free to email me at [smccauley45@cox.net](mailto:smccauley45@cox.net).

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# 1. SCAL: Installation, Preferences, and Workspace

## 1.01 Installing SCAL

### 1.01.1 Selecting and Downloading the Software

- *Sure Cuts A Lot 5* (SCAL) can be downloaded from the following link. Note that there are four choices - Mac or PC and then regular or PRO:

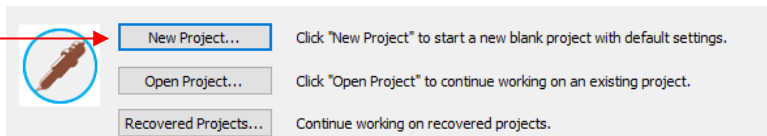
<http://www.craftededge.com/download/download.html>

- The additional features in the PRO version are listed below. You can also find out more details about these features at the following link:

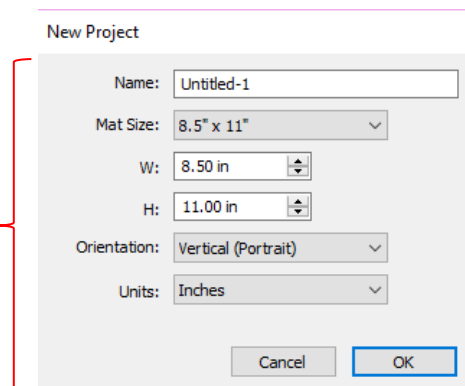
[http://www.iloveknk.com/wp-content/uploads/Info/SCAL5\\_Pro\\_Features.pdf](http://www.iloveknk.com/wp-content/uploads/Info/SCAL5_Pro_Features.pdf)

- ◇ Ability to cut longer than 72 inches
  - ◇ Weeding – add weeding boxes and internal lines
  - ◇ Tiling – splitting large designs into sections for cutting
  - ◇ Duplicate cutting – setting up a grid of repeats in the cutting window
  - ◇ Cut by color
  - ◇ Cut by layer – use different settings, as needed
  - ◇ Cut order control
  - ◇ End action options – where cutting head moves at the end of a cut
  - ◇ Color layer alignment
  - ◇ 3D extrude
  - ◇ Importing DXF, PLT
- Install the downloaded file and open SCAL. An initial window will open where you can choose if you are starting a new project, opening an existing project, or recovering a project after a software crash. Because this is the first time you are opening SCAL5, choose **New Project** and accept the defaults shown:

Click on **New Project**



Accept whatever settings are shown. Later in this chapter, details about these settings will be covered.

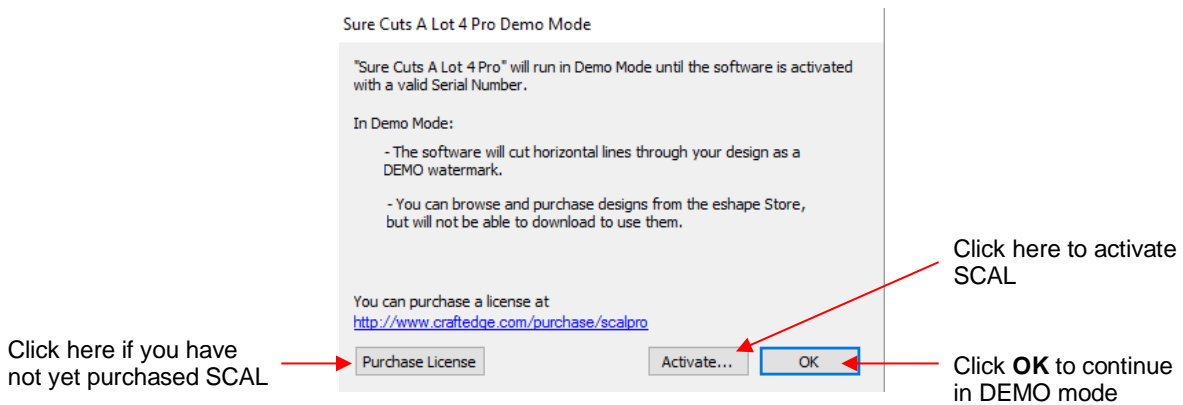




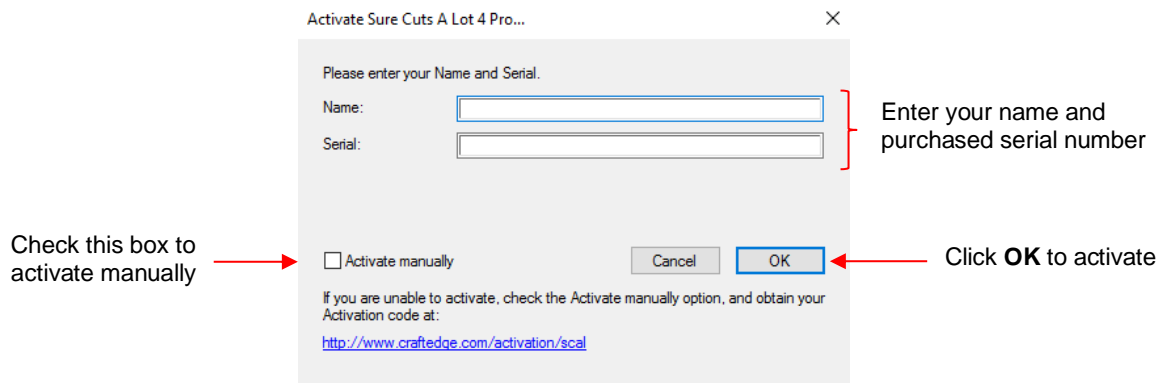
- The software will run in DEMO mode until a registration is purchased. This mode will have the following limitations:
  - ◊ When cutting, horizontal lines will be added across the design
  - ◊ Digital shapes from the **eshape Store** cannot be downloaded
  - ◊ Exporting will add a DEMO watermark
- Note that the demo version of SCAL5 will expire after 15 days.

### 1.01.2 Activating the Software Video

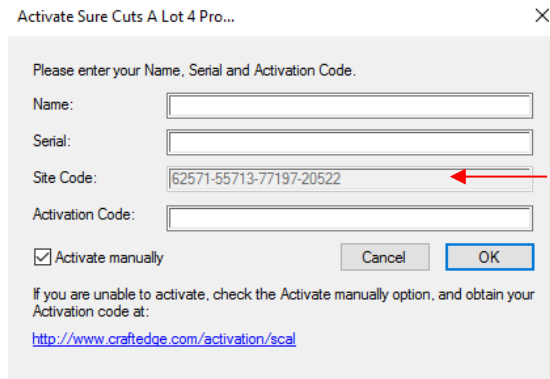
- To convert the DEMO version into a registered version, click on **Activate** when opening the software and seeing this popup screen:



- **IMPORTANT:** Make sure the version of SCAL you installed matches the registration you purchased. You can verify this by going to **Help>About Sure Cuts a Lot**. If the wrong version is installed, uninstall this current version and download the correct one.
- After clicking on **Activate**, enter your name and the **Serial Number** you received after purchasing SCAL:



- If you do not have an Internet connection on this computer or the automatic activation fails, use the **Activate manually** option in the prior screenshot.
  - ◊ The window will then pop up a **Site Code**:



◇ Next, go to the following link:

<http://www.craftedge.com/activation/scal/>

- Enter your **Name**, **Serial Number** and the **Site Code**. Then click on **Generate Activation Code**:

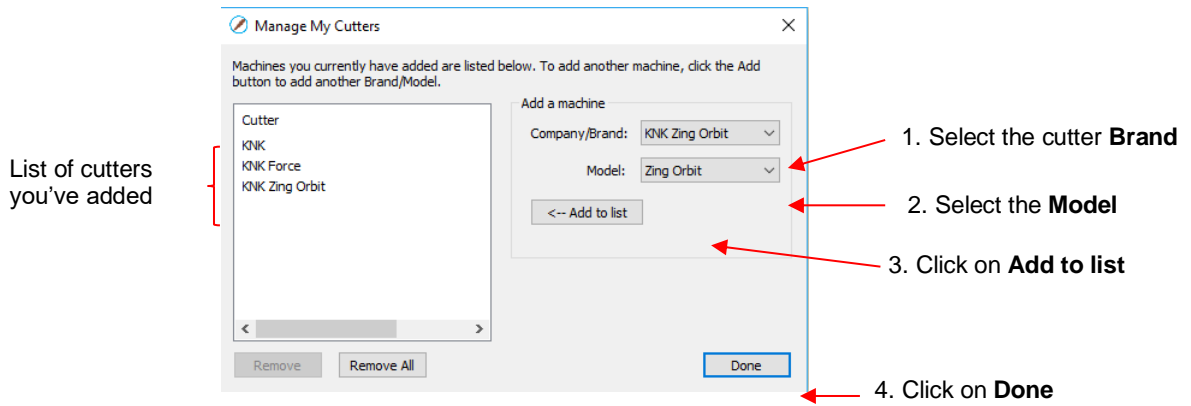


- An **Activation Code** will be generated and it can be copied and pasted into the **Activate manually** screen.
- The purchased **Serial Number** can be registered on any two computers you own. If you want to register **SCAL** on a new computer:
  - ◇ Go to **Help>Deactivate** on the computer no longer needing SCAL and confirm you wish to deactivate.
  - ◇ Go to the new computer and activate SCAL.
- If you need to activate your **Serial Number** on both a PC and a Mac, go to **Help>Support>Technical Support** and click on **Contact Support Team**.

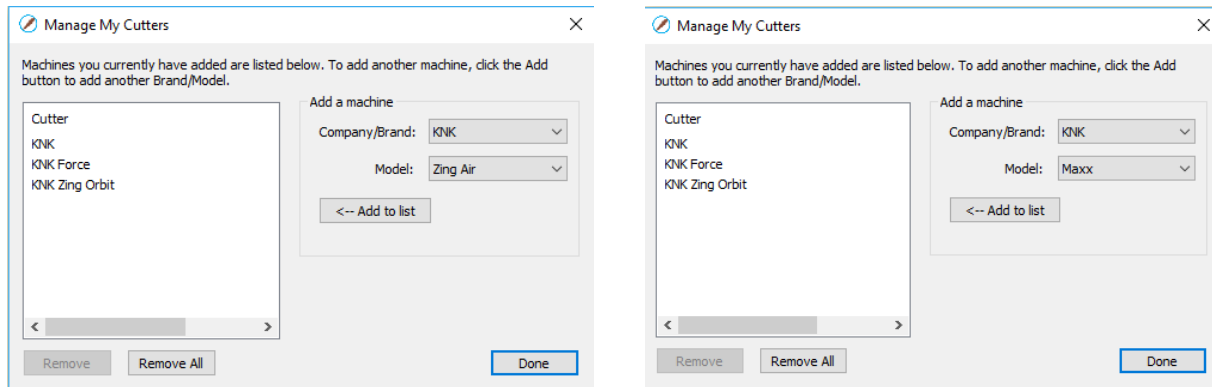
### 1.01.3 Installing Your Cutter **Video**

**NOTE:** SCAL is not legally permitted to cut directly to Cricut or Scan N Cut machines. Cricut owners will need to export files as SVG (*Section 2.07.1*) while SNC owners will need to export files as either SVG (*Section 2.07.1*) or as FCM (*Section 2.07.3*)

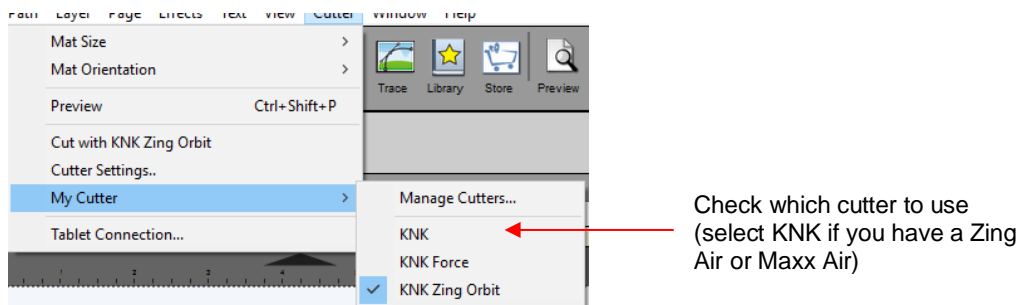
- Go to **Cutter>My Cutter>Manage Cutters** and the following window will open:



- As shown in the prior screenshot, select your cutter **Brand** and **Model** from the drop-down menus. Then click on **Add to list**. The cutter will then be added to the menu on the left side. Add all cutters you plan to use with SCAL.
- Note that with some brands, such as KNK, adding multiple models may not give separate listings. While KNK Force and the KNK Zing Orbit show up separately, selecting both Maxx and Zing Air from the model menu only displays once as KNK. Some models will need to be separately selected later in the **Cut Settings** window.



- Click on **Done** to save and close the window. Now, when you are ready to cut, the cutter you use will be selected by going to **Cutter>My Cutter** and picking which cutter you wish to use:



## 1.02 Main SCAL Screen Video

- Below is a screen shot of the main screen in SCAL identifying various elements. Note the names of the items shown as they will be referenced throughout this user manual:

Menu Bar

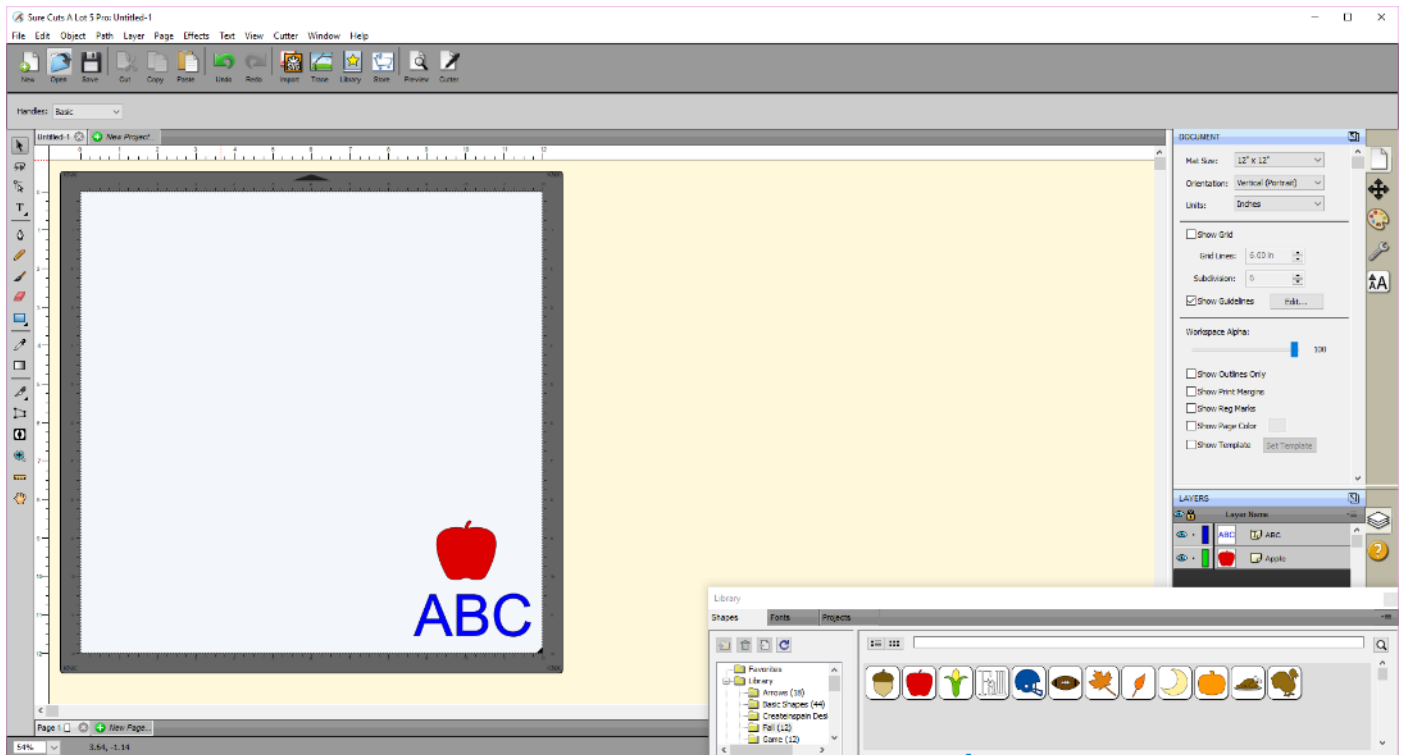


Toolbar



Properties Panel

← Tool Options



- Hovering your mouse over most of the screen icons will pop up the icon's name and, in some cases, details about usage.
- In order to better remember where major elements are located, note that the term “bar” is used when components are laid out horizontally (such as the **Toolbar**) and the term “panel” is used when components are laid out vertically (such as the **Tools Panel**).
- The **Toolbar** and the **Status Bar** can be hidden, when desired, by going to **View>Hide Toolbar** and **View>Hide Status Bar**. On a Mac, there's also an option to **Enter Full Screen** in the **View** menu.
- Throughout this manual, **Cutting Mat** (capitalized and in bold type) refers to the on-screen simulation of the physical cutting mat, which will be written with lower case, normal type.
- The **Rulers** can be toggled on and off by right-clicking on the screen and selecting **Show Rulers**. Note that when hiding the rulers, click again on the screen for it to take effect. To change the units displayed on the **Rulers**, refer to *Section 1.06.3*.
- **Shapes** are the objects or images that you will be adding to your projects. They can be created from scratch or imported from other sources, such as the **Library**, your computer, or the **eshape Store**. As you will see throughout sections of this user manual, you have many options and resources available to you.
- This manual also presents information by topics versus location on the screen. If you need to look up all of the functions on one particular element, for example the **Tool Panel**, refer to **Appendix C**.

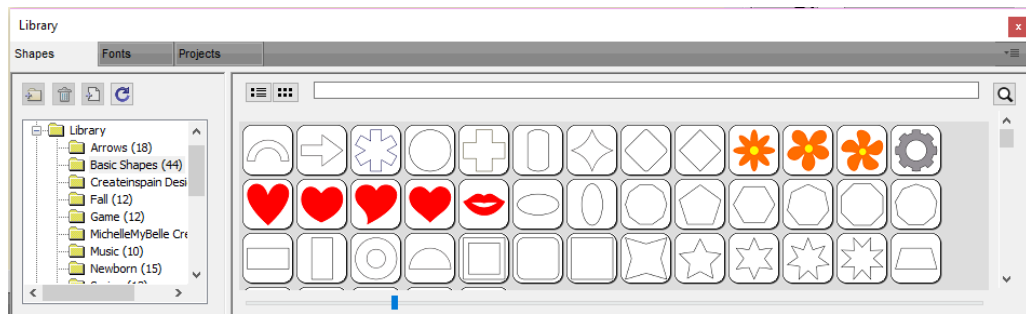
### 1.03 Library Video


Drag the top or bottom of the window to expand



Shapes tab →


Library subfolders





- The **SCAL Library** provides a number of useful functions:
  - ◇ It contains a collection of over 300 pre-installed shapes, organized into 16 subfolders
  - ◇ It displays complete character sets for all fonts currently installed
  - ◇ You can organize your own shapes and projects into separate folders and view thumbnails for selecting
  - ◇ You can assign commonly-used shapes and projects to a **Favorites** folder for quicker access
  - ◇ It provides access to designs and projects downloaded from the **eshape Store**
- The **Library** automatically opens every time you open SCAL. If you've closed it, the **Library** can be reopened by using one of the following:
  - ◇ Click on **Library** icon on the upper **Toolbar** 
  - ◇ Press **Ctrl+1**
  - ◇ Go to **Window>Library**
- To add a shape from the **Library** to the **Cutting Mat**, click on the thumbnail for that shape or drag the shape onto the **Cutting Mat**. Note there are other categories within the **Library** listed on the left side. Check out the various subfolders of shapes as they are a great resource while learning SCAL and testing out your cutter.
- Further details on organizing and fully utilizing the **Library** is covered in *Section 2.03*.





## 1.04 Properties Panel Video

- The **Properties Panel** is located on the right side of the screen. Seven large icons represent seven different panels that you will frequently switch between:

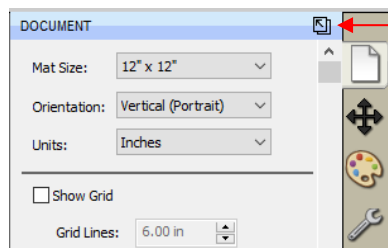
◇ **Document Panel**  : contains the properties related to the **Cutting Mat**. Refer to *Section 1.06*.

◇ **Position & Size Panel**  : contains properties and manipulation functions related to any currently-selected shapes in the project. Refer to *Sections 3.04, 3.05.1, 3.06, 3.08, 3.18*.

◇ **Fill & Stroke Panel**  : contains properties for the fill and for the stroke on any currently-selected shapes in the project. Refer to *Sections 3.14 and 3.15*.

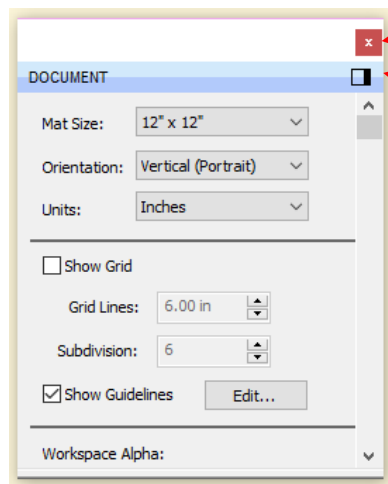
- ◇ **Style Panel** : contains properties pertaining to how selected shapes will be cut or printed. Refer to *Section 8.01*.
- ◇ **Text Panel** : contains properties pertaining to how text will appear. Refer to *Section 4.05*.
- ◇ **Layers Panel** : lists all shapes in the current project with options to organize, hide/show, lock/unlock and more. Refer to *Section 2.04*.
- ◇ **Help Panel** : opens a user guide to a section based on the currently selected tool. More tips and instructions can be found under **Help>Help**.

- Clicking on the icon for any the seven panels will open that panel. To expand a panel for easier viewing, click on the small icon to the right of the panel name. This will open the panel in the area to the left of the **Properties Panel**:



Click here to relocate a panel away from the **Properties Panel**

- To return a panel to the **Properties Panel** or close a panel, click on the following:



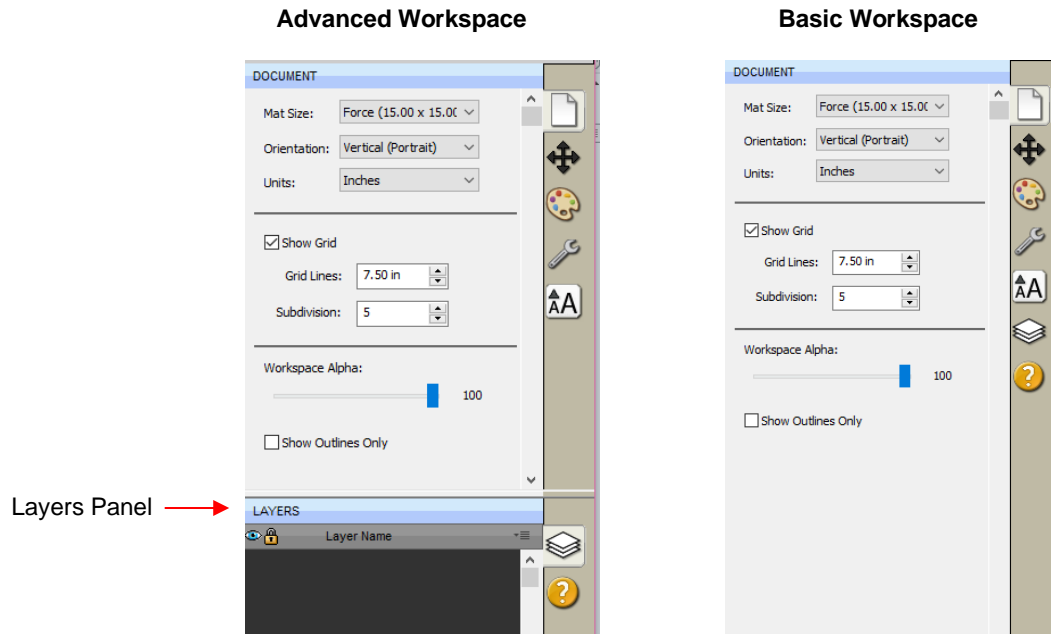
Click here to close a panel

Click here to return a panel to the **Properties Panel**

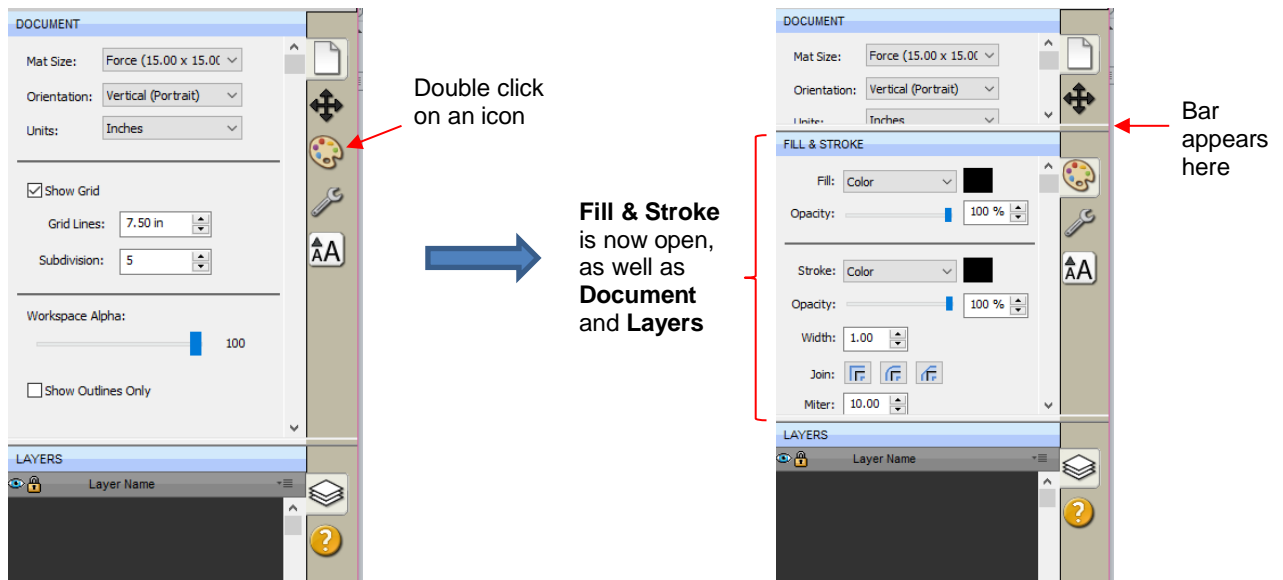
- A panel which has been moved out, can be dragged from either the top or the bottom in order to view more properties and settings.

## 1.05 Customizing the Properties Panel / Workspace Video

- In SCAL, the **Workspace** refers to the arrangement of panels and whether or not you want the **Library** to be open or closed by default. There are two versions already set up: **Basic** and **Advanced**. You can then make changes and name and save others, as desired.
- By default, the **Advanced Workspace** opens. To switch to **Basic**, go to **Window>Workspace>Basic**. The only difference between **Advanced** and **Basic** is the former has the **Layers Panel** open:



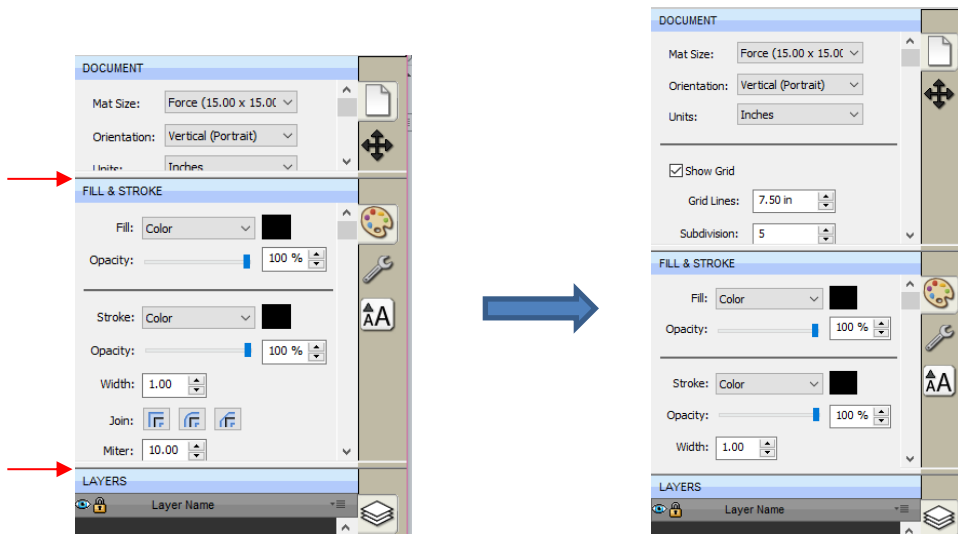
- To switch to other panels, click on the icons along the right side. If there's a particular panel you access often, then you can create a custom workspace. For example, let say you want the **Fill & Stroke Settings** panel to always be open. Double-click that icon and the **Properties Panel** will now have that panel open and separated:



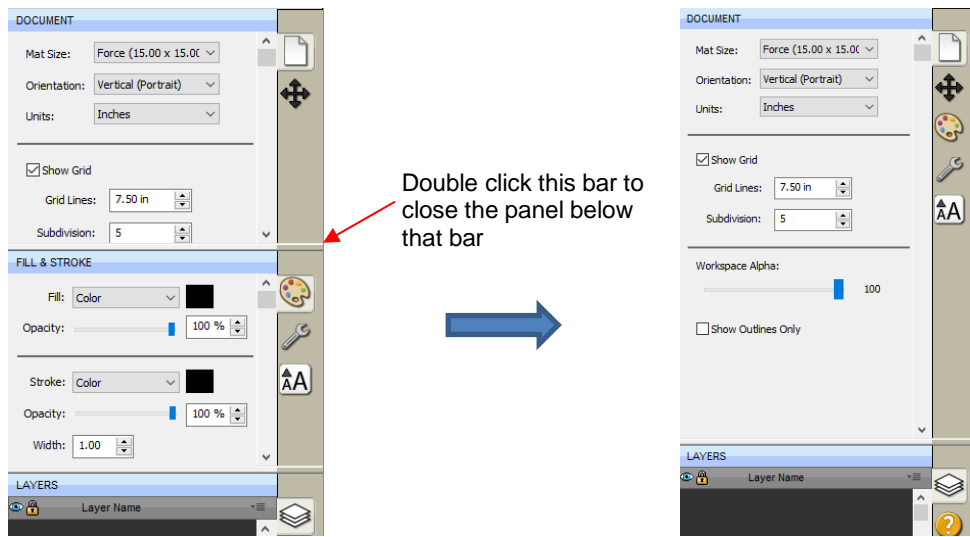
- These separate panels can also be resized by dragging them up or down:

Drag up/down on the line between the two panels

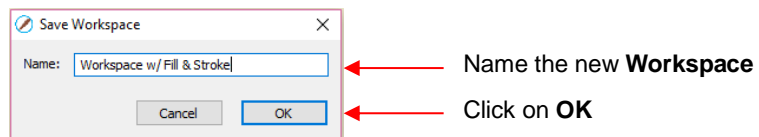
Do the same here



- To close a panel, double-click on the bar on the right side:



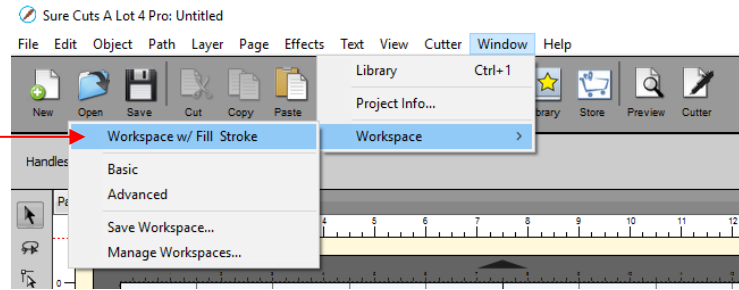
- By default, the **SCAL Library** opens every time you open the software, start a new project, or open an existing project. You might prefer to have the **Library** closed and only open it when needed. This can be accomplished by having it either opened or closed and then saving it along with your preferred **Properties Panel** layout.
- To save workspace changes, go to **Window>Workspace>Save Workspace**. A window will open and you can name this new configuration:



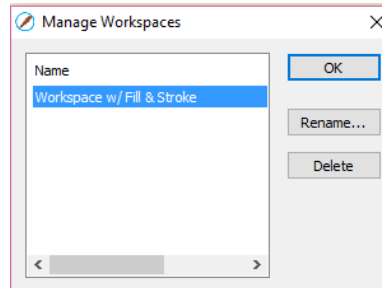
- When you now go to **Window>Workspace**, the new workspace will appear at the top:



Custom workspaces will appear here




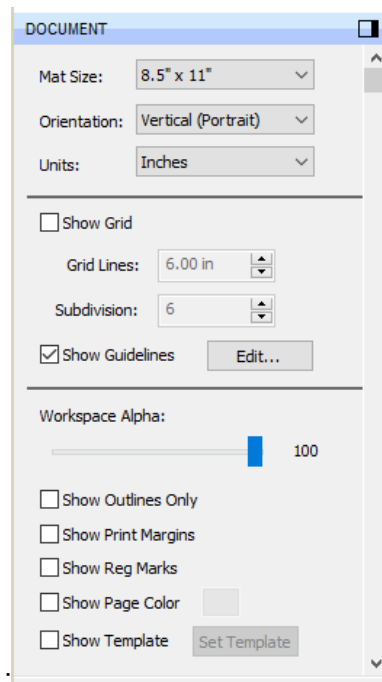
- To rename or delete a custom workspace, go to **Window>Workspace>Manage Workspaces** and a window will open with **Delete** and **Rename** options:



Options to **Rename** or **Delete** selected **Workspace**

## 1.06 Document Panel **Video**

- The **Document Panel**  contains settings for the **Cutting Mat** which serves as a design area for the software as well as to indicate, in some cutting modes, where the shapes will be cut.

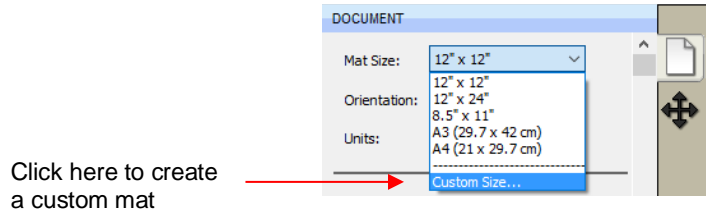


### 1.06.1 Mat Size **Video**

- There are three ways to access the **Mat Size** menu:

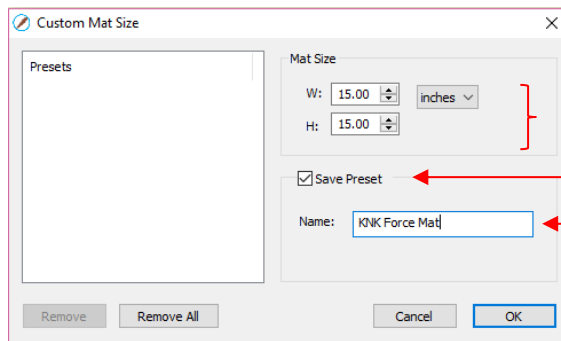
- ◇ Click on the drop-down menu next to **Mat Size** on the **Documents Panel**
- ◇ Right-click on the screen and select **Mat Size**
- ◇ Go to **Cutter>Mat Size**

- There are five options for setting **Cutting Mat** dimensions under **Mat Size**. There is also the option to create a **Custom Size** for a mat:



Click here to create a custom mat

- The following window will open where you can enter the dimensions of the mat and provide a name, if you wish to store it for future use:



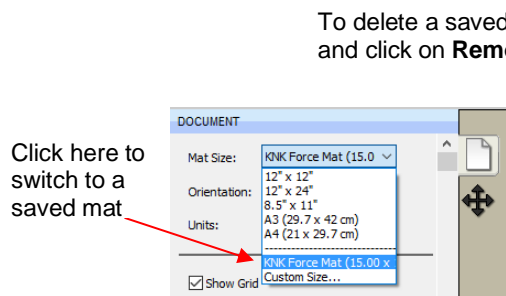
Enter dimensions for the mat

Check this box, if you want to save it

Enter a name for the new mat

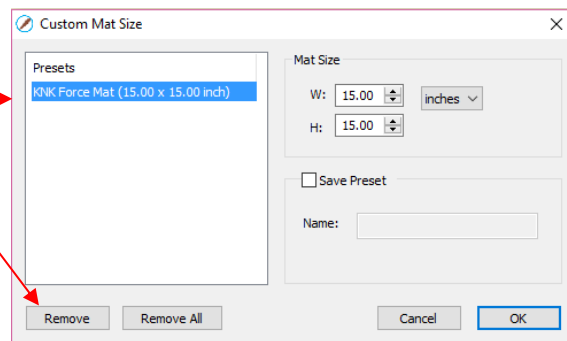
Click **OK**.

- A saved mat will now appear at the bottom in the **Mat Size** menu and will be listed under **Presets** when you return to the **Custom Mat Size** window:



Click here to switch to a saved mat

To delete a saved mat, select it and click on **Remove**

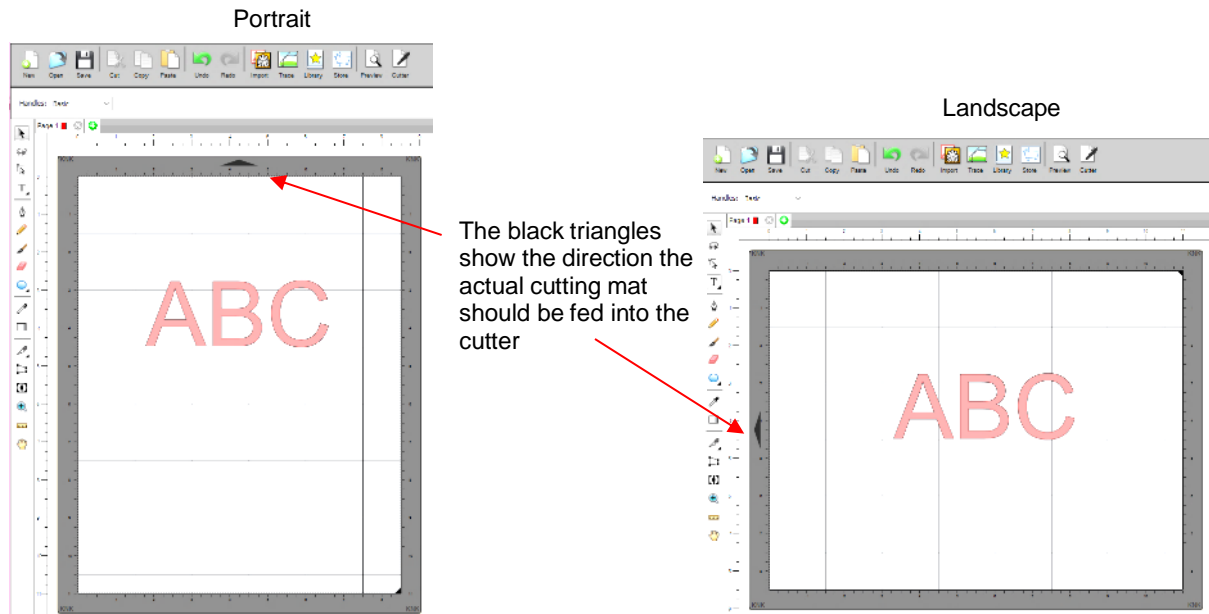


- To remove a custom **Cutting Mat** from the menu, go back to the **Custom Mat Size** window and select the mat under **Presets**. Click on **Remove**.

## 1.06.2 Orientation



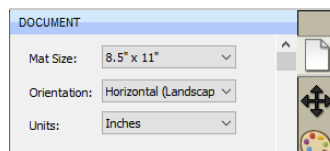
- A **Cutting Mat** can appear in either **Portrait** mode or **Landscape** mode with a triangle indicating the direction the mat will be fed into the cutter. To better illustrate this, a letter-size **Cutting Mat** is selected:



- There are three ways to change the mat orientation:

- ◊ On the **Documents Panel** under **Mat Size**:

Select **Portrait** or **Landscape** here



- ◊ Right-click on the screen and select **Mat Orientation**
- ◊ Go to **Cutter>Mat Orientation**

### 1.06.3 Units *Video*

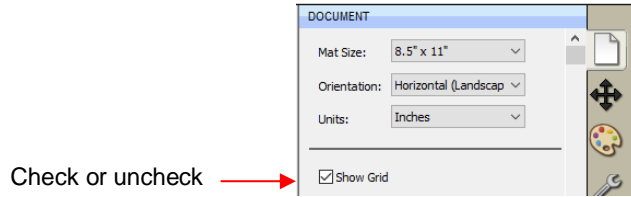
- By default, the unit setting is in inches. To switch to mm or cm, click on the drop-down menu next to **Units** on the **Documents Panel**:



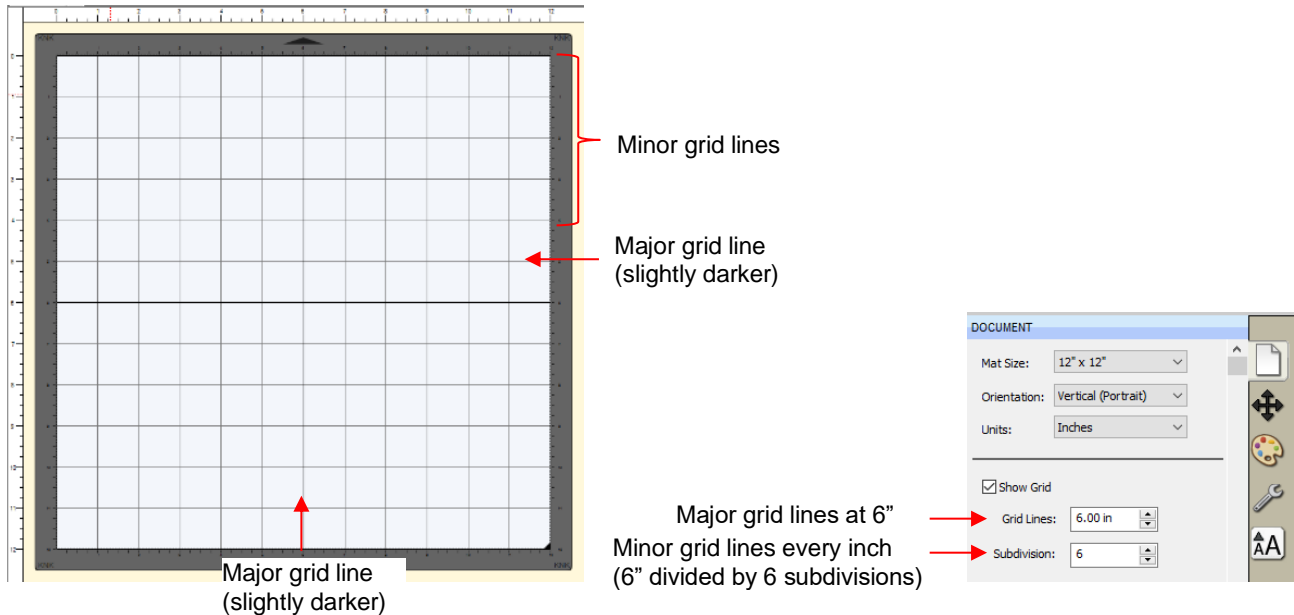
- The units can also be changed in either of the following locations:
  - ◊ Go to **View>Ruler Units**
  - ◊ Right-click on the screen and select **Ruler Units**

### 1.06.4 Show Grid *Video*

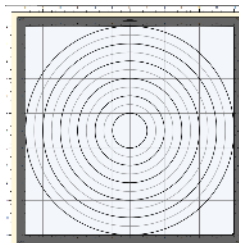
- The mat grid can be toggled on or off by either of these two ways:
  - ◊ Go to **View>Show Grid**
  - ◊ Check or uncheck the **Show Grid** box on the **Documents Panel**:



- The grid lines can also be customized. For example, with this 12" x 12" mat, major grid lines are set at 6" and then minor grid lines are set at 1" (by specifying 6 **Subdivisions** be used):

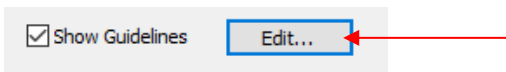


- A final grid option involves circular grid lines which can, as an example, be used for cake design. Go to **View>Show Mat Cake Circles**:



### 1.06.5 Show Guidelines

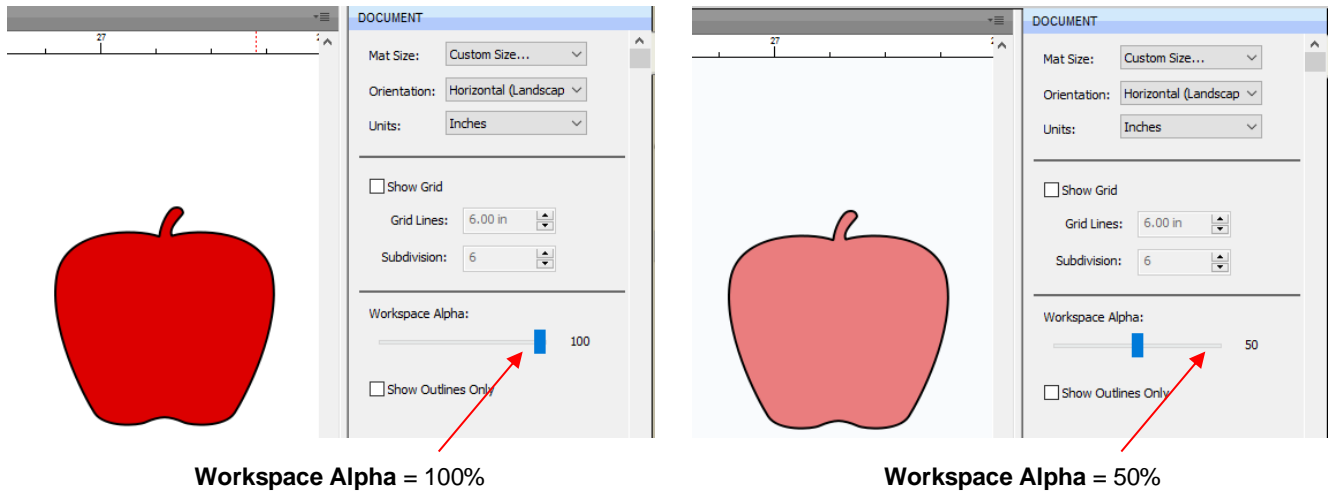
- Guidelines are very useful when designing projects, such as boxes or pop-up cards, from scratch. They can be added to the **Cutting Mat** in two ways:
  - ◇ By dragging your mouse from the horizontal or vertical rulers on the screen
  - ◇ By manually adding in the **Guidelines Edit** window
- You can toggle guidelines on and off by clicking on the box next to **Show Guidelines** on the **Document Panel**. To open the **Guidelines** window, either go to **View>Guidelines>Edit Guidelines** or click on the **Edit** button next to **Show Guidelines**:



- Details on adding, changing, and deleting guidelines is covered in [Section 7.03](#).

### 1.06.6 Workspace Alpha Video

- The **Workspace Alpha** setting on the **Document Panel** affects the opacity of filled shapes on the **Cutting Mat**:



- You can also change the opacity of individual shapes versus all shapes. Refer to [Section 3.14.5](#).

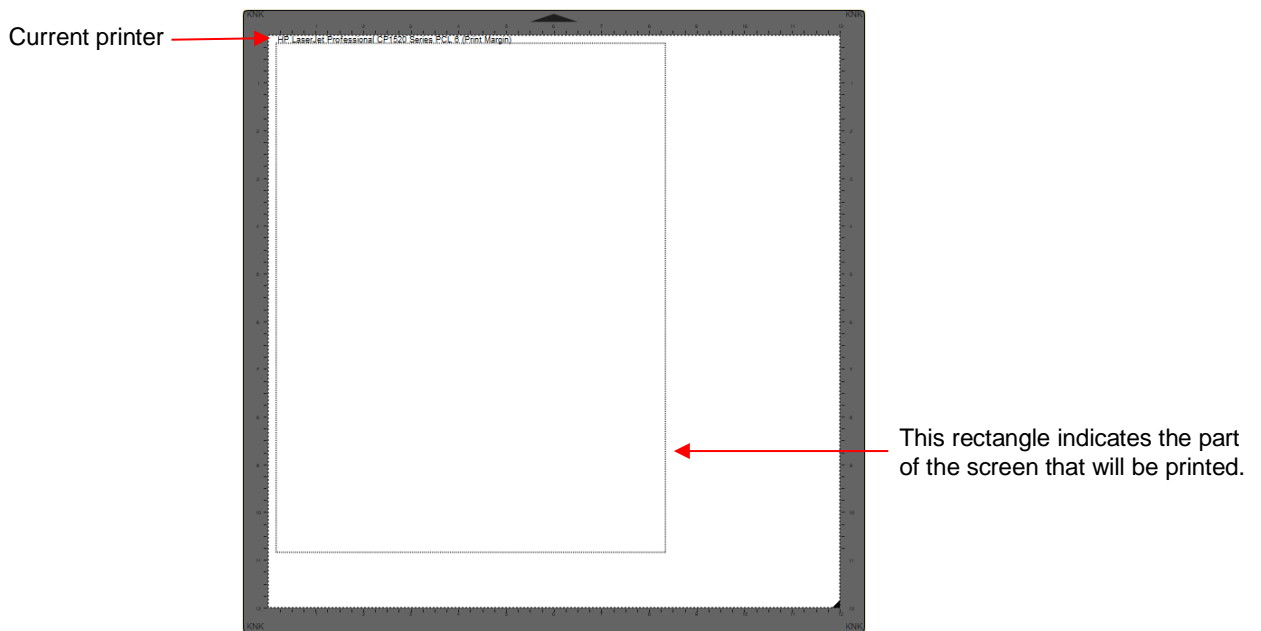
### 1.06.7 Show Outlines Only Video

- This option determines whether shapes are displayed with a fill or not:



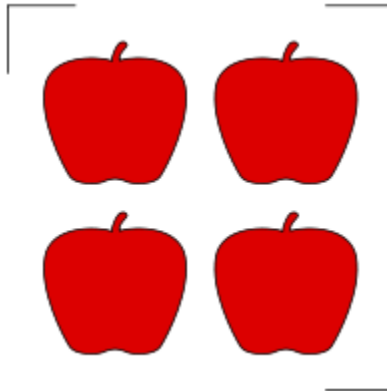
### 1.06.8 Show Print Margins Video

- This option shows the boundaries of a printout if you send a file to your printer:



### 1.06.9 Show Reg Marks **Video**

- This option will show the registration marks that will be printed and used in a print and cut application:



- The number of reg marks, their location, type, length, thickness, etc. will vary depending on the selected cutter in use, as well as properties that can be changed under **Cutter>Cutter Settings**. Refer to *Section 8.06.1*.

### 1.06.10 Show Page Color **Video**

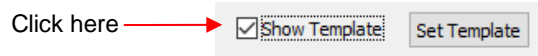
- The default color of the **Cutting Mat** is a grayish white. To change the color to any other desired color, mark the option for **Show Page Color** and then click on the box next to it and select.



- Note that the color can be different for each page in a project, if desired.

### 1.06.11 Show Template

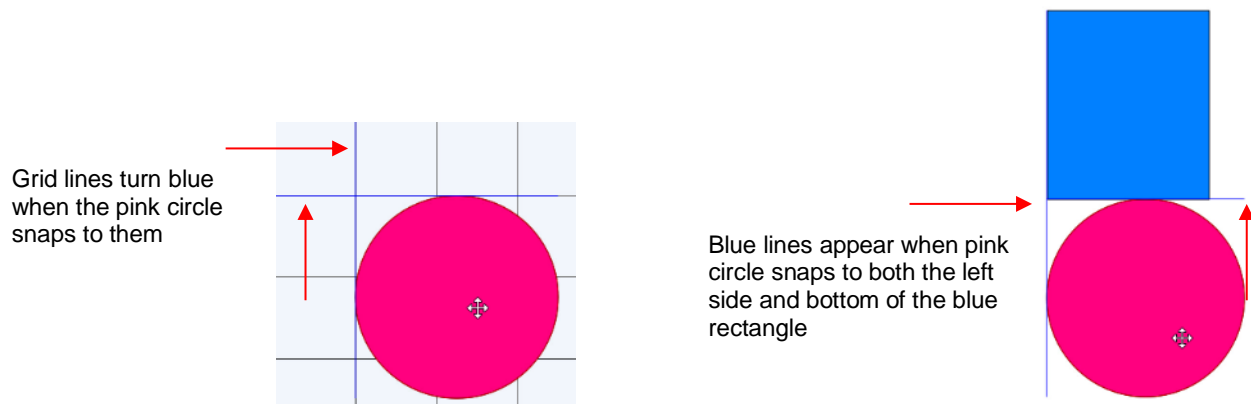
- SCAL5 has the ability to add templates to the **Cutting Mat** that are non-selectable shapes to aid in designing. Typically, these templates are representations of actual objects onto which cut shapes will be applied. Here are several examples:
  - ◇ Designing an etching stencil for a champagne glass
  - ◇ Designing a decoration for a light switch
  - ◇ Designing a rhinestone template or HTV pattern for a T-Shirt
- To show or hide a template, mark the box next to **Show Template**:



- Details on customizing and organizing templates is covered in *Section 7.04*.

### 1.07 Snap To **Video**

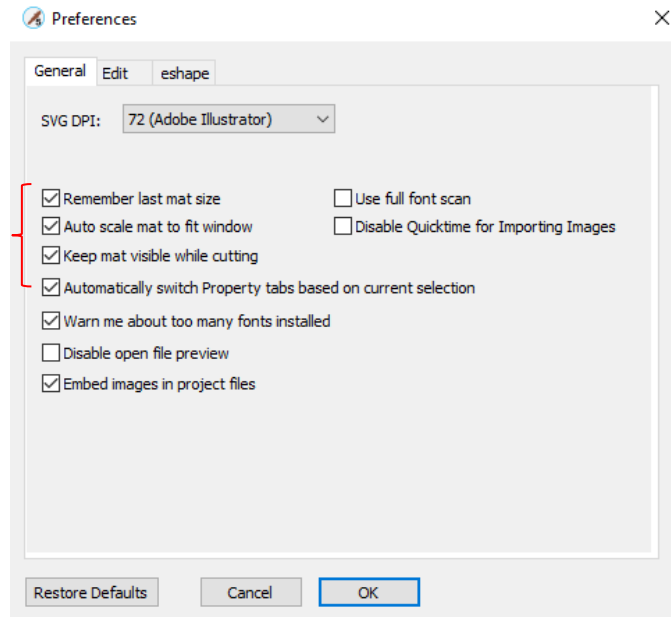
- The **Snap To** option allows you to choose how shapes behave as they are being moved. Being able to snap to other objects, to guidelines or to the grid can help align shapes more easily when designing or editing a project.
- To access the **Snap To** options, go to **View>Snap To** and mark your preferences based on the following options:
  - ◇ **Grid**: selected shape will snap to the grid lines
  - ◇ **Guidelines**: selected shape will snap to guidelines (refer to *Section 7.03*)
  - ◇ **Objects (Bounds)**: selected shape will snap to other shapes' boundaries
  - ◇ **Objects (Centers)**: selected shape will snap to other shapes' centers
  - ◇ **Object (Sublayers)**: selected shape will also snap to shapes inside other shapes (child shapes)
- When you first access the **Snap To** menu, you will most likely see the last two grayed out. In order to access those options, make sure **Objects (Bounds)** is checked. Then you will be able to go back to the menu and change any of the options.
- When snapping to the grid, the grid can be showing or hidden.
- When a shape snaps to the grid, a guideline, or to another shape, blue lines appear indicating the shape is aligned at that point. Here are two examples:



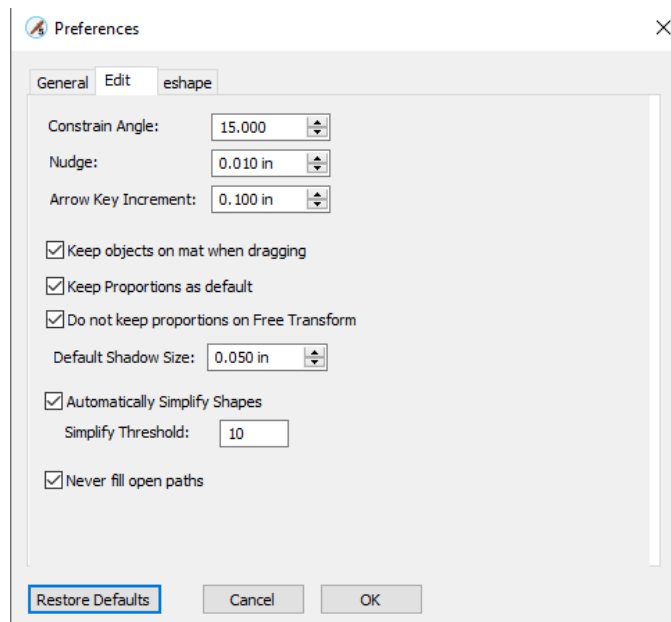
## 1.08 Other Preferences Video

- Under **Edit>Preferences**, you will find a number of other options, some of which you will probably never need to change. Others will be covered in later sections, as they pertain to the function involved.
- For now, note the following preferences that do relate to the material covered so far. These should be self-explanatory based on their names:

Note these options related to the **Cutting Mat** and the **Properties Panel**



- If you click on the **Edit** tab, more preferences are listed. As with the preferences on the **General** tab, most will be covered in later sections of the manual:

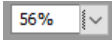



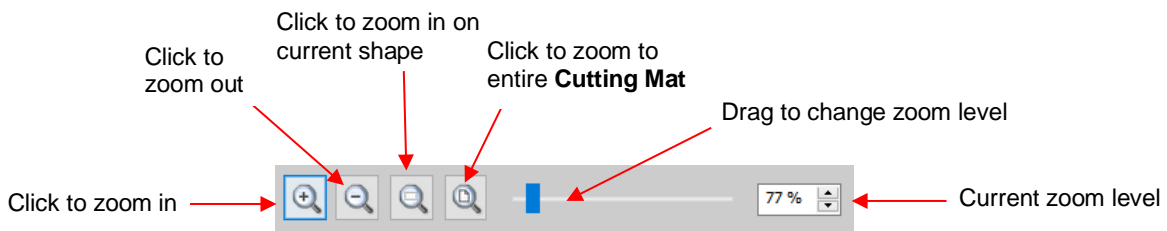
- For more details on these settings, go to *Appendix C4*.





## 1.09 Zooming and Panning


### 1.09.1 Zooming Video

- To zoom in and zoom out, use any of the following methods:
  - ◇ Hold down the **Alt** key (**Option** key on a Mac) while rolling the mouse wheel
  - ◇ Access the **Zoom** menu on the **Status Bar** in the lower left corner of the screen 
  - ◇ Go to **View>Zoom In** or **View>Zoom Out**
  - ◇ Use the following shortcut keys:
    - **Ctrl+ ++...** (hold **Ctrl** key (**Command** key on a Mac) and repeatedly click on **+** key): Zoom in
    - **Ctrl+ --...** (hold **Ctrl** key (**Command** key on a Mac) and repeatedly click on **-** key): Zoom out
    - Right-click on the screen and select **Zoom In** or **Zoom Out**
    - Click the **Zoom in Tool** icon on the **Tools Panel**  (shortcut **Z**). Then use the icons in the **Tool Options** at the top:



- Note that while the **Zoom in Tool** is activated, you can also marquee-select an area of the screen to zoom to that location.
- To zoom in on a selected shape or shapes, use one of the following:
  - ◇ Click on the icon  while the **Zoom in Tool** is activated (see prior screenshot)
  - ◇ Use the shortcut **Ctrl+ Shift+ =** (on a Mac: **Control+ Shift+ =**)
  - ◇ Go to **View>Zoom Selection**
- To zoom to the **Cutting Mat**, use one of the following:
  - ◇ Click on the icon  while the **Zoom in Tool** is activated (see prior screenshot)
  - ◇ Use the shortcut **Ctrl+ F** (**Command + F** on a Mac)
  - ◇ Right click on the screen and select **Fit to Window**
  - ◇ Select **Fit to Window** from the **Zoom** menu on the **Status Bar**
- To change the zoom level so that a selected shape will be the same size on the screen as its actual size, go to **View>Actual Size**.

### 1.09.2 Panning Video

- To move the workspace up and down, roll the mouse wheel.
- To pan the workspace, use either of these methods:
  - ◇ Press and hold the **Spacebar** while dragging the left mouse button
  - ◇ Click the **Hand tool** icon on the **Tools Panel**  (shortcut **H**). Then drag the left mouse button.

## 1.10 Undo/Redo Video

### 1.10.1 Undo

- As with most Windows applications, there is an **Undo** function to reverse the most recent steps performed. You can use any of the following to execute the **Undo** function:

- ◇ Click on the **Undo** icon on the upper **Toolbar**
- ◇ Press **Ctrl+Z**
- ◇ Go to **Edit>Undo**



### 1.10.2 Redo

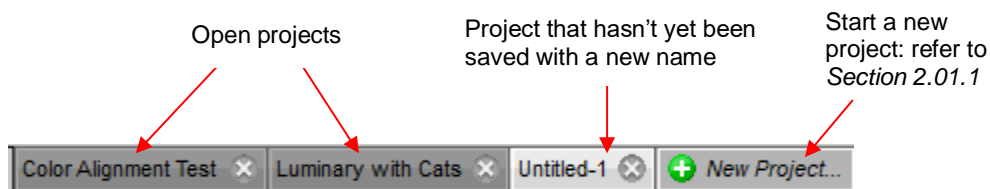
- As with most applications, there is also a **Redo** function in case you **Undo** too many steps or simply change your mind. You can use any of the following to execute the **Redo** function:

- ◇ Click on the **Redo** icon on the upper **Toolbar**
- ◇ Press **Ctrl+Shift+Z**
- ◇ Go to **Edit>Redo**

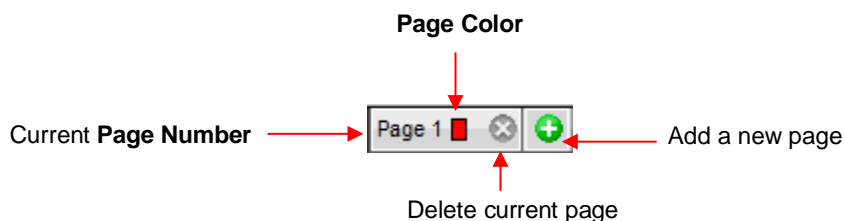



## 1.11 Projects and Pages Video

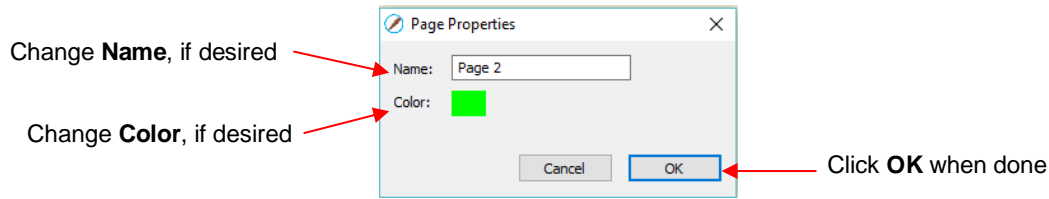
- The **Project Bar** is located right above the **Ruler** and shows what projects (files) are open and have been named, new projects that have been started but not named, and an option to open a new project:



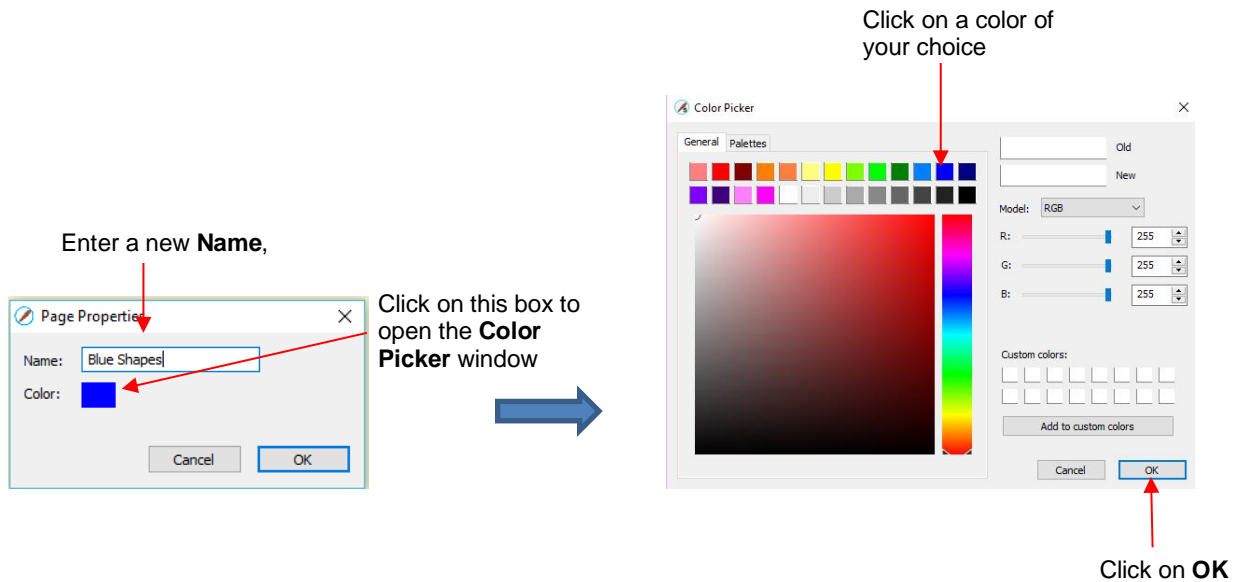
- Clicking on any **Project Tab** on the **Project Bar** will then access that project. Note that you can copy/paste and cut/paste between open projects. Refer to *Section 3.17*.
- Projects can contain one page or many pages. The option to add multiple pages can be convenient for organizing projects with many shapes and or layers.
- The **Page Bar** is located just below the **Cutting Mat** and displays the current page, a color for quickly identifying pages, and icons for adding and deleting pages:



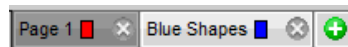
- To add a page, either go to **Page>Add Page** or click the green icon  on the **Pages Bar** itself and the following window will open:




- ◇ Either accept the default **Page** number as the new **Name** or provide your own. The same with color – you can click on the default color provided and select a new color from the **Color Picker** window that opens. For example, you might want to have all of the blue shapes on their own page:



- ◇ Note: You can create your own custom colors within the **Color Picker** window. This will be covered in *Section 3.14.2*.
- ◇ After clicking on **OK**, the new page appears on the **Page Bar**:




- ◇ Note: The color selected for the page tab will also be the color of the **Cutting Mat** if you mark the **Show Page Color** option on the **Document Panel**.
- ◇ If you change your mind and want to edit the **Name** and/or **Color**, either go to **Page>Page Properties** or double-click on the **Page Name** and the same **Page Properties** window will open, allowing you to make changes.

- To switch between pages, click on the **Page** name or go to **Page** on the **Menu Bar** and the menu will have all pages listed.
- To delete a page, make sure it's selected and then either go to **Page>Delete Page** or click on the **Delete Page** icon . A window will open asking for confirmation.

## 1.12 Help Resources

- The following steps within SCAL will take you to help resources (note that some of these will require an Internet connection):
  - ◇ Go to **Help>Help** for access to a user guide

- ◇ Click on the **Help Panel** icon  on the **Properties Panel** to open the user guide to a section based on the currently selected tool
- ◇ Go to **Help>Forums** to access the SCAL user forum
- ◇ Go to **Help>Online Video Tutorials** to access a page with links to both videos and written tutorials
- ◇ Go to **Help>Support>Technical Support** for the following:
  - Contact the SCAL team
  - Retrieve your serial code
  - Download latest updates
  - Access the forum
  - Access tutorials
- Other online support groups for SCAL include:
  - ◇ [Let's Learn Cricut, SCAL, & MTC Facebook Group](#)
  - ◇ [MTC and SCAL Facebook Group](#)
  - ◇ [SCAL Users Yahoo Group](#)
- An online training program, with over 8 hours of videos which can be viewed as often as you need, is available at this link: [Sure Cuts a Lot 5 Beginner Class](#).

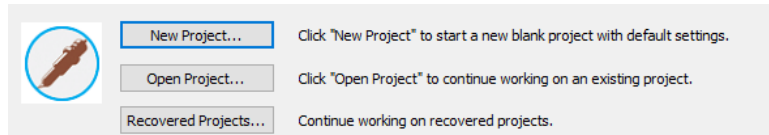
## 2. SCAL: Handling Files and Organizing Layers

### 2.01 Opening Files

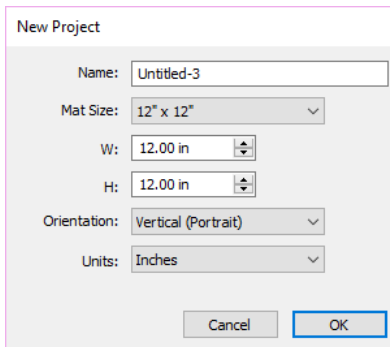
Video

#### 2.01.1 Opening a New File/Project

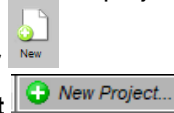
- When you launch SCAL, a popup window appears where you can choose if you are starting a new project, opening an existing project, or recovering a project after a software crash:



- If you choose **New Project**, the following window opens where you can specify the following settings. These settings can be modified later, if needed, using the **Document Panel**:

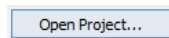


- If SCAL is already open, then you can start a new file (aka a new project), using any of the following:
  - Click on the **New Project** icon on the upper **Toolbar**
  - Click on the **New Project** tab above the **Cutting Mat**
  - Press **Ctrl+N**
  - Go to **File>New Project**
- The same **New Project** window shown above will open where you can specify the same preferred settings.
- Note that as of SCAL5, you can have more than one project open at a time.



#### 2.01.2 Opening an Existing .SCUT File

- An existing .SCUTx file (where x is blank, 2, 3, 4, or 5 indicating which SCAL version created it) can be opened in SCAL5 using any of the following:
  - Click on **Open Project** when you first open SCAL
  - Click on the thumbnail, if it appears, when you first open SCAL.
  - Click on the **Open Project** icon on the upper **Toolbar**
  - Press **Ctrl+O**



- ◇ Go to **File>Open Project**
- ◇ Go to **File>Recent Projects**, if the file is one of the last five you had open in SCAL
- ◇ Double-click a .SCUTx file in Windows Explorer or attached to an email
- ◇ Drag and drop a .SCUTx file onto the main screen of SCAL
- ◇ Import from the **Library** (refer to *Section 2.03.3*)

- In the first three options above, a window will open where you can browse to locate the file you wish to open:


The screenshot shows a Windows 'Open' dialog box with the following annotations:

- Browse to locate folder:** An arrow points to the 'Look in:' field which contains 'SCAL'.
- Click on the file and it will appear under File name:** An arrow points to the file 'Bell Pepper Near Origin.scut4' in the list, which is highlighted. Below the list, the 'File name:' field contains the same file name.
- Mark this box to display a preview:** An arrow points to the 'Preview' checkbox, which is checked.
- A preview of the file shape(s) will appear:** An arrow points to the preview window on the right, which displays a green bell pepper.
- Click on Open and the saved file will open as a new project:** An arrow points to the 'Open' button at the bottom right of the dialog.

- In the case of opening a file from Windows Explorer, an email, or using a drag and drop method, the file will automatically open.
- In the opening window of SCAL, you also have the option of opening a **Recovered Project** Recovered Projects... which will be an auto-saved project or projects that were open before a software crash.
- Note that other file formats, besides .SCUT can be imported into SCAL5. Refer to *Section 2.06*.

## 2.02 Saving SCAL Files Video

- A file can be saved in .SCUT5 format using any of the following:

- ◇ Click on the **Save Project** icon on the upper **Toolbar** 
- ◇ Press **Ctrl+S** (for save) or **Ctrl+Shift+S** (for save as)
- ◇ Go to **File>Save Project** or **File>Save Project As**

***IMPORTANT!*** When saving files, especially any with imported JPG, PNG, BMP or other raster images, allow plenty of time for the save before closing SCAL. Closing too soon can corrupt a file!!!

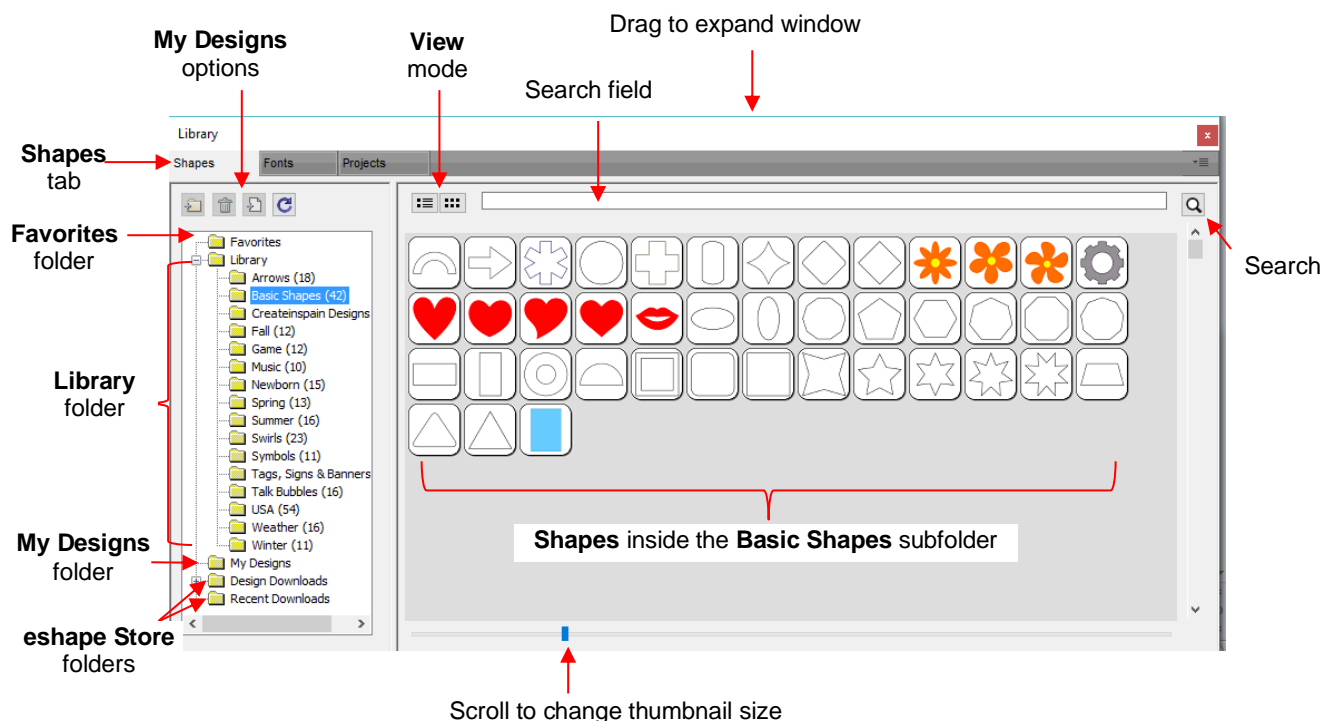
- If you've made changes and wish to save under a different file name, choose **File>Save As**. Name the file, choose a location, and click on **Save**.
- You can include notes about your file by going to **Window>Project Info**. This can be handy for your own future reference or for others using your files. Refer to *Section 7.02*.
- You can also export files in a host of other formats. Refer to *Section 2.07*.

## 2.03 Customizing the Library Video

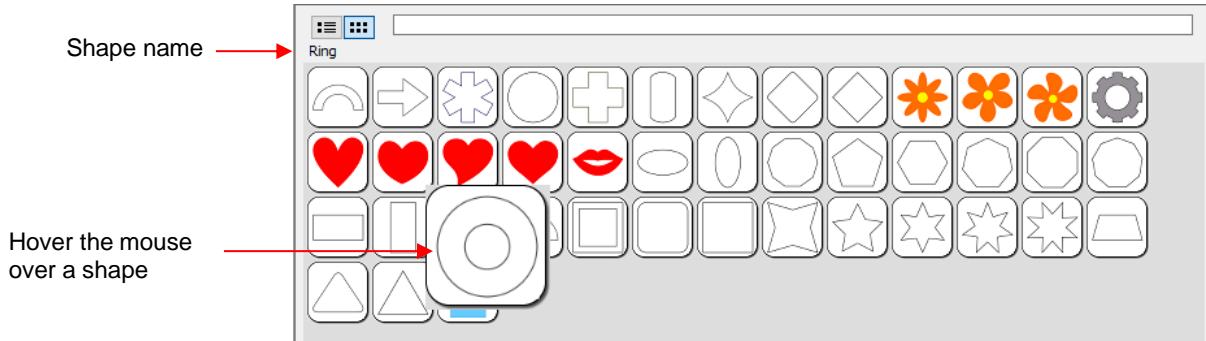
- The **Library** was briefly introduced in *Section 1.03*. The purpose of this section is to expand on how to fully utilize it.
- The **Library** consists of three tabs: **Shapes**, **Fonts**, and **Projects**. Each is covered in the following subsections:

### 2.03.1 Shapes Tab Video

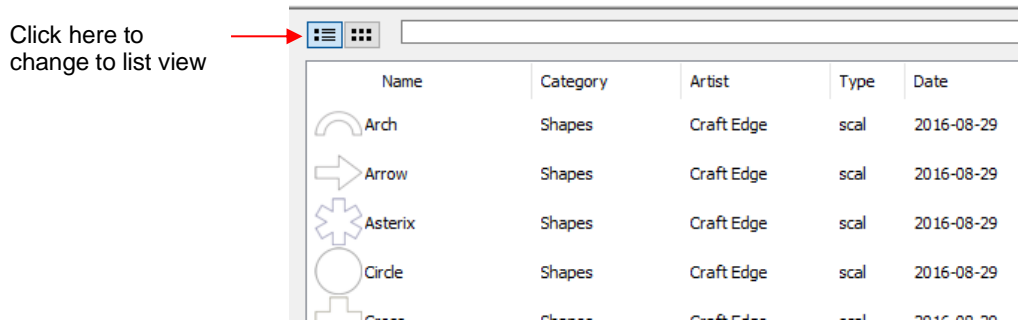
- When you first open the **Library**, the **Shapes** tab will be selected.
- In order to see all of the contents under this tab, drag the top of the window upwards until you see the following screenshot. Note the various parts of this window:



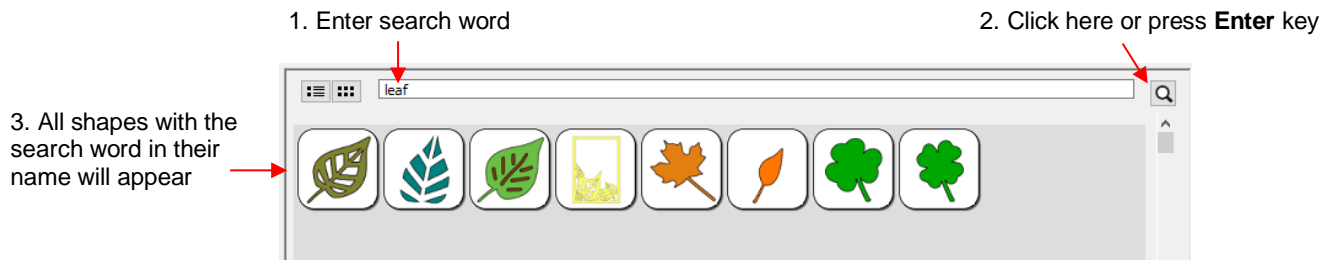
- On the left side you will see the **Library** folder which contains the included 300 shapes. The number in parentheses, after each subfolder, indicates how many shapes are assigned to that subfolder. **Basic Shapes**, as an example, has 42 assigned to it.
- Because the **Basic Shapes** subfolder is currently selected, thumbnails for all shapes contained in that subfolder are shown in the larger area on the right side. To add one of these shapes to the **Cutting Mat** either:
  - ◇ Click on the shape and it will be placed in a certain location on the **Cutting Mat**
  - ◇ Drag the shape to a desired location on the **Cutting Mat**
- To change subfolders or folders, click on the folder name on the left side and its contents will then appear on the right.
- A scroll bar at the bottom of the **Library** window can be used to make the thumbnails larger or smaller.
- As you hover over a shape, its thumbnail will get larger and its name will appear near the top:



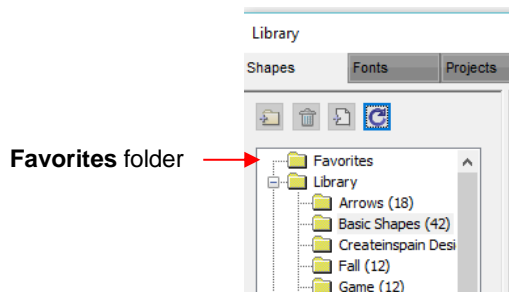
- You can toggle between the thumbnail view and a list view using these icons at the top   :



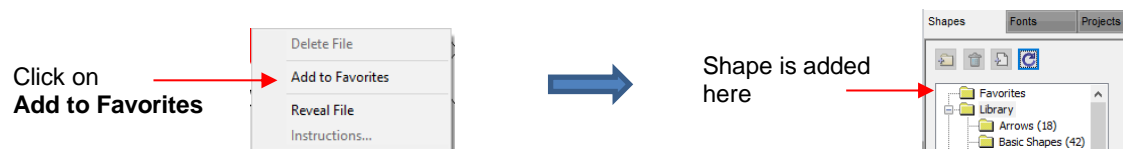
- A search function enables you to see all of the shapes with a particular word in the name. For example, enter the word leaf and click on the search button:



- Favorites:** Above the **Library** folder is a folder called **Favorites**:



- ◇ The **Favorites** folder is for storing the shapes you access often. Locate the shape you want to add, right-click, and select **Add to Favorites** from the popup menu.

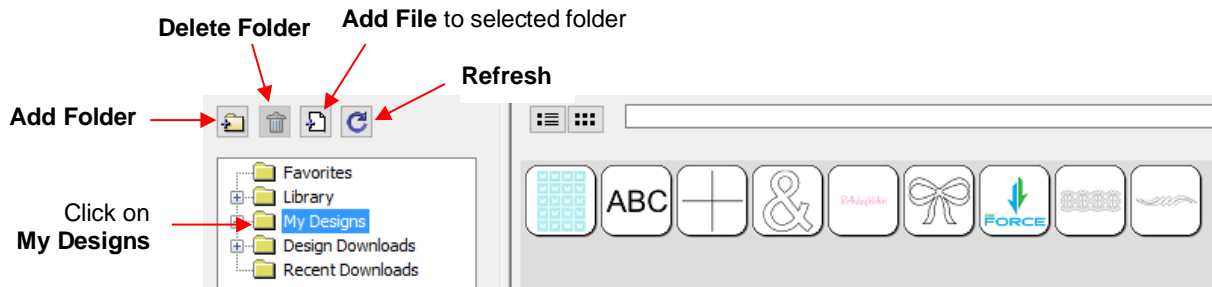





- ◇ This popup menu also has these options:
  - **Delete File** (only active in the **My Designs** folder)
  - **Reveal File** – opens the location on your computer where file is stored
  - **Instructions** – some files from the **eshape Store** may include instructions for the user

- **My Designs:** This folder is for storing your own SVG files for easy access.

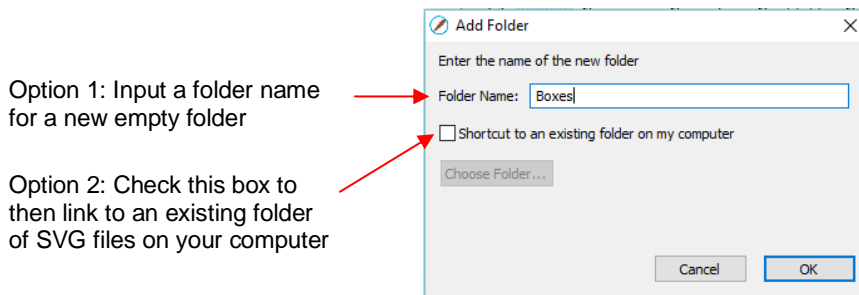
- ◇ Once you click on **My Designs**, the icons above the folder menu will become active:



- ◇ **Add subfolders:** The shapes in the above screenshot have been added to **My Designs** but not into subfolders. To create subfolders for additional organizing:

- Click on the **Add Folder** icon 
- Right-click on **My Designs** and select **Add Folder** from the popup menu

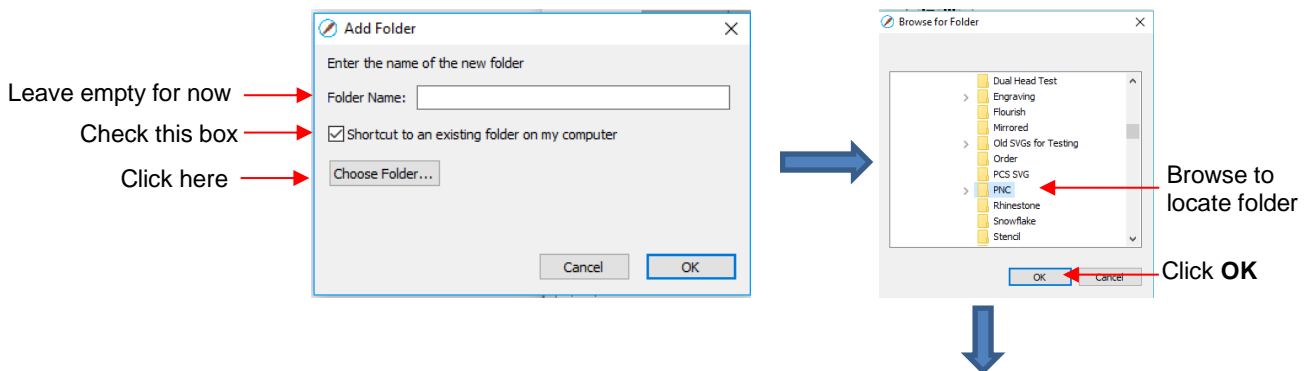
- ◇ After choosing to add a folder, the following window opens where you have two options:



Option 1: Input a folder name for a new empty folder

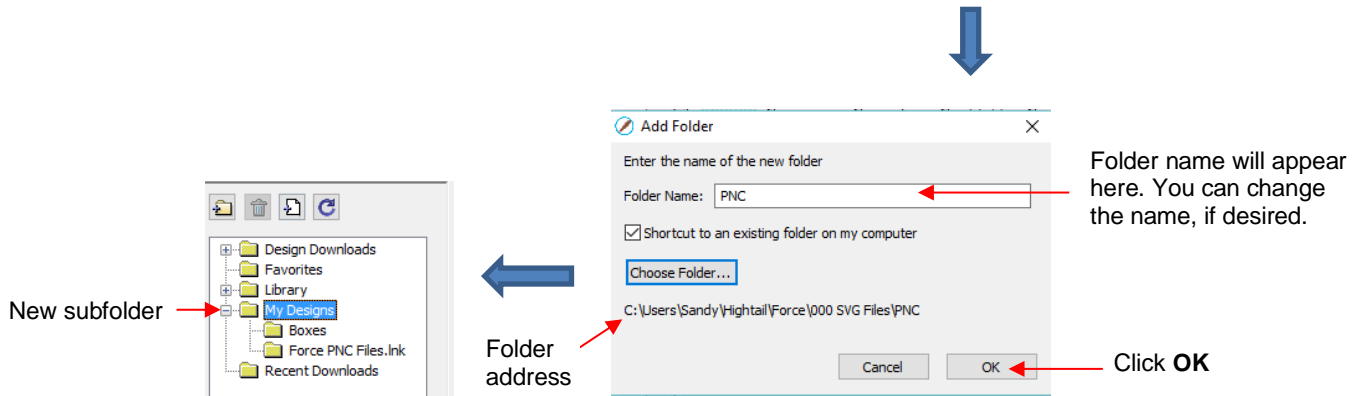
Option 2: Check this box to then link to an existing folder of SVG files on your computer

- ◇ If you select Option 2, the **Choose Folder** button will activate and clicking it will bring up this window where you can browse your computer to locate an existing folder of SVG files:



Continued on next page


Continued from prior page



◇ Note that the **Folder Name** was changed to *Force PNC Files* before clicking on **OK**. The name will have a .lnk extension added indicating that it is linked to another folder on your computer.

◇ To add files to a folder inside **My Designs**:

○ Select the folder and do either of the following:

- Click on the **Add File** icon 
- Right-click and select **Add File** from the popup menu


○ A window will open where you can then browse to find the SVG file to be added. You also have the option of selecting multiple files at once to import into that folder.

◇ To delete a file from a folder, right-click and select **Delete File** from the popup menu.

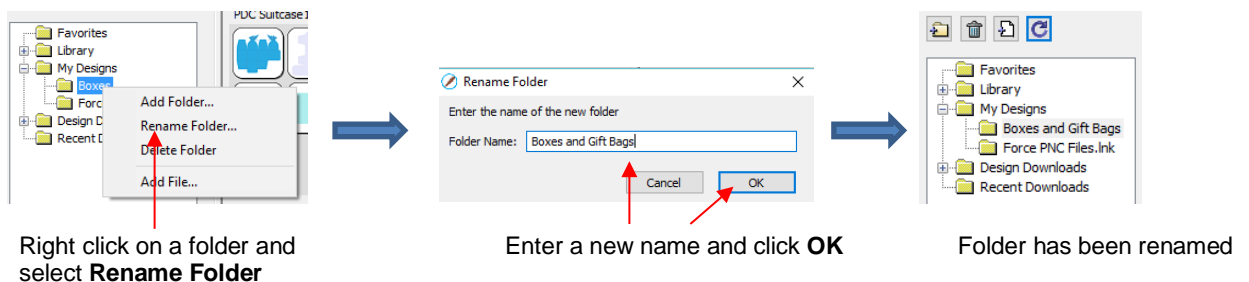
○ **IMPORTANT:** Note that deleting the file could also delete it from your computer unless it has been backed up elsewhere.


○ After deleting files, you will need to click on the **Refresh** icon  to update the thumbnail images.

◇ To delete a folder, select it and then do one of the following:

- Click on the **Delete Folder** icon 
- Right-click and select **Delete Folder** from the popup menu

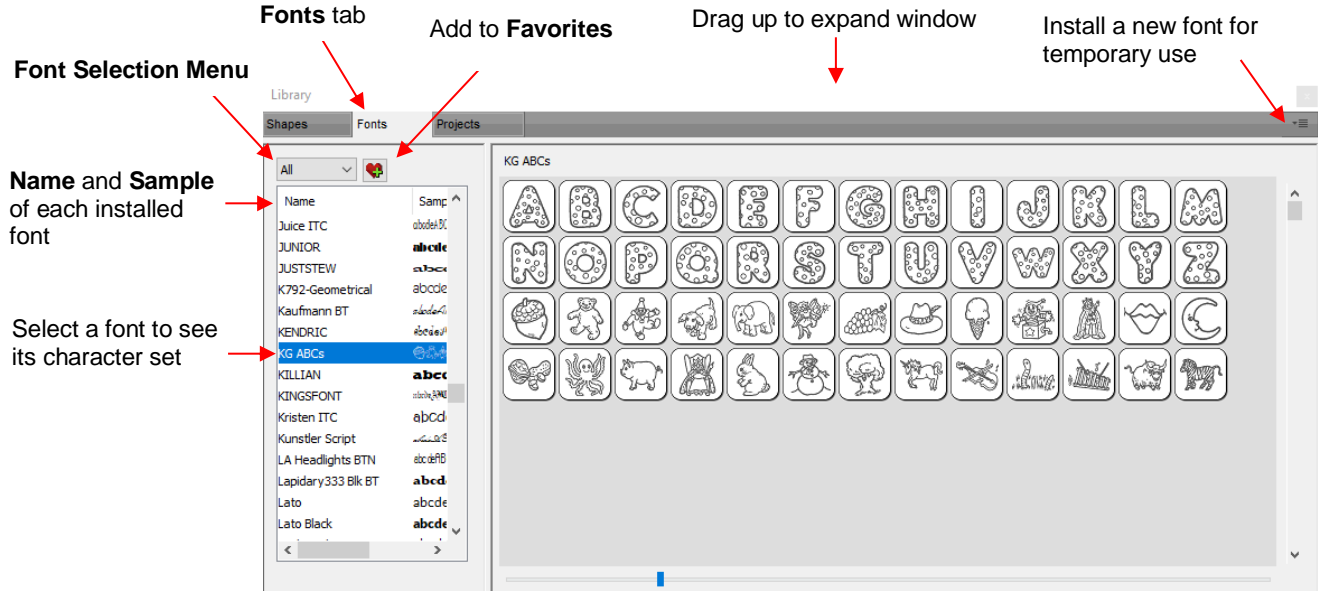
◇ To rename a folder, right-click and select **Rename Folder** from the popup menu:




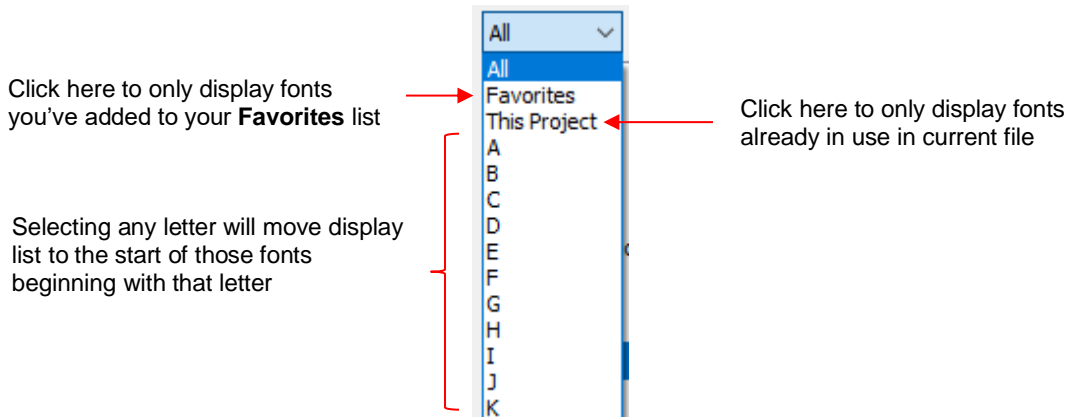
- **Design Downloads** and **Recent Downloads**: These two folders, along with the menu icon at the top right  are part of the **eshape Store** functions. Refer to *Section 2.05*.


## 2.03.2 Fonts Tab Video

- The **Fonts** tab lists all of the currently installed fonts on your computer. Selecting any font in the list will show the entire character set on the right side of the window. It will also then make it the default font that will be used when adding text with any of the methods available in SCAL. Refer to *Section 4.02*.





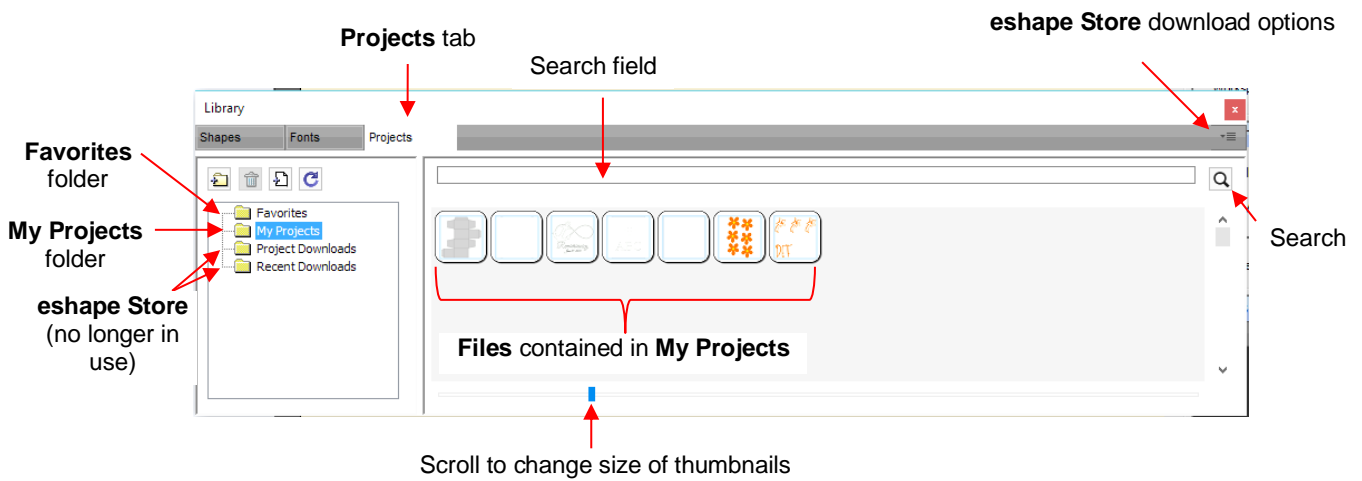
- Scroll the bar at the bottom to change the size of the lettering. To add a character to the **Cutting Mat**, left-click on it. While it is far quicker to type out text using the **Type** tool (refer to *Section 4.04.1*), this window is the best way to add special characters within a font or when using dingbat fonts.
- The menu icon  in the upper right corner can be used to temporarily add a font that's not installed on your computer. Click on it and then browse to the folder containing the font you wish to add. Refer to *Section 4.02.3* regarding temporary font usage.
- Font Selection Menu:** Clicking on the down arrow next to **All** will open the following menu:



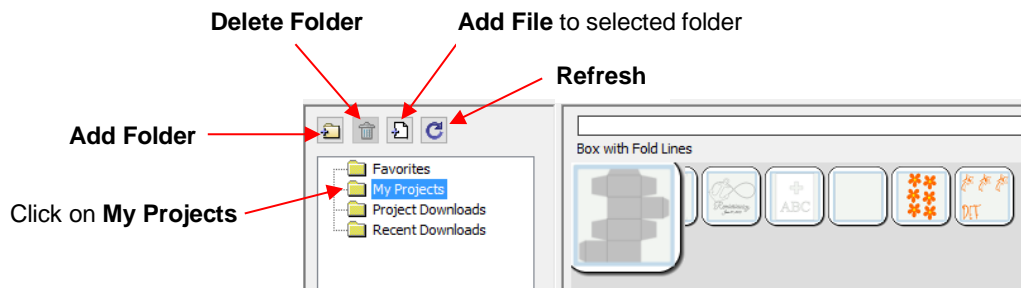
- Favorites:** With a font selected, you can click on the  icon to add that font to your **Favorites** folder.
- For alternative methods for selecting fonts, refer to *Section 4.02*.


### 2.03.3 Projects Tab Video

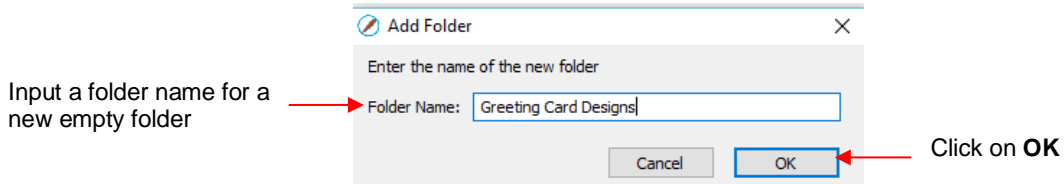
- The **Projects** tab is similar to the **Shapes** tab. Instead of .SVG files, however, it helps you organize and access your .SCUT files, also referred to as projects.
- As with the **Shapes** tab, there are no default categories or pre-added files. However, you will notice these other similar features:
  - ◇ **Favorites** folder – select any project, right-click, and select **Add to Favorites** from the popup menu
  - ◇ **My Projects** folder – virtually identical to **My Designs** folder (more information follows)
  - ◇ **Search** field and search icon  – for locating files with a particular word in the file name
  - ◇ **Project Downloads** and **Recent Downloads** folders and top right icon  : these pertain to **eshape Store**. Refer to *Section 2.05*.
  - ◇ Scroll bar to change the size of the thumbnails.
  - ◇ Hover over a thumbnail and it will get larger. The project name will appear below the **Search** field.




- **My Projects:** This is the main folder where you can organize your own projects for easy access.
  - ◇ Once you click on **My Projects**, the icons above the folder menu will become active:

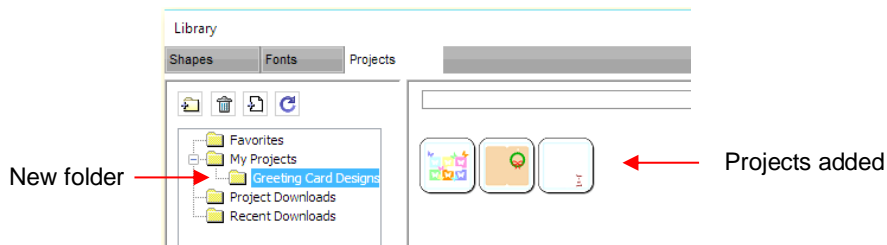


- ◇ **Add subfolders:** The projects in the above screenshot have been added to **My Projects** but are not in subfolders. To create subfolders for additional organizing:
  - ◇ Click on the **Add Folder** icon 
  - ◇ Right-click on **My Projects** and select **Add Folder** from the popup menu
  - ◇ After choosing to add a folder, the following window opens and you can name this folder:




◇ To add files to a folder inside **My Projects**:


- Select the folder and do either of the following:
  - Click on the **Add File** icon 
  - Right-click and select **Add File** from the popup menu
- A window will open where you can then browse to find the SCUT file to be added. You also have the option of selecting multiple files at once to import into that folder.
- After adding the files, the thumbnails for those projects will appear when the folder is selected:



◇ To delete a file from a folder, right-click and select **Delete File** from the popup menu.

- **IMPORTANT:** Note that deleting the file could also delete it from your computer unless it has been backed up elsewhere.
- After deleting files, you will need to click on the **Refresh** icon  to update the thumbnail images.

◇ To delete a folder, select it and then do one of the following:

- Click on the **Delete Folder** icon 
- Right-click and select **Delete Folder** from the popup menu

◇ To rename a folder, right-click and select **Rename Folder** from the popup menu.

## 2.04 Layers Panel Video

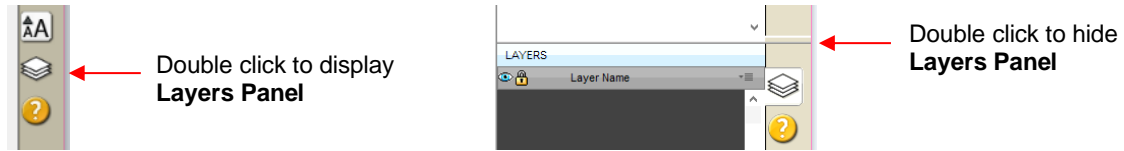
Because of the importance of the **Layers Panel** in successfully using SCAL, it is being presented before the other file handling sections.

### 2.04.1 Introduction to the Layers Panel Video

- The **Layers Panel** is used for the following:
  - ◇ Assigning or grouping shapes into separate layers to better organize a project
  - ◇ More easily applying changes to a group of shapes
  - ◇ Selecting one shape or a layer of shapes on the screen

◇ Controlling what is sent to the cutter or printer

- The **Layers Panel** can be displayed by double-clicking its icon and hidden by double-clicking the small bar just above its icon:



Note that single clicking the icon will hide other panels, allowing the **Layers Panel** to fill the right column.

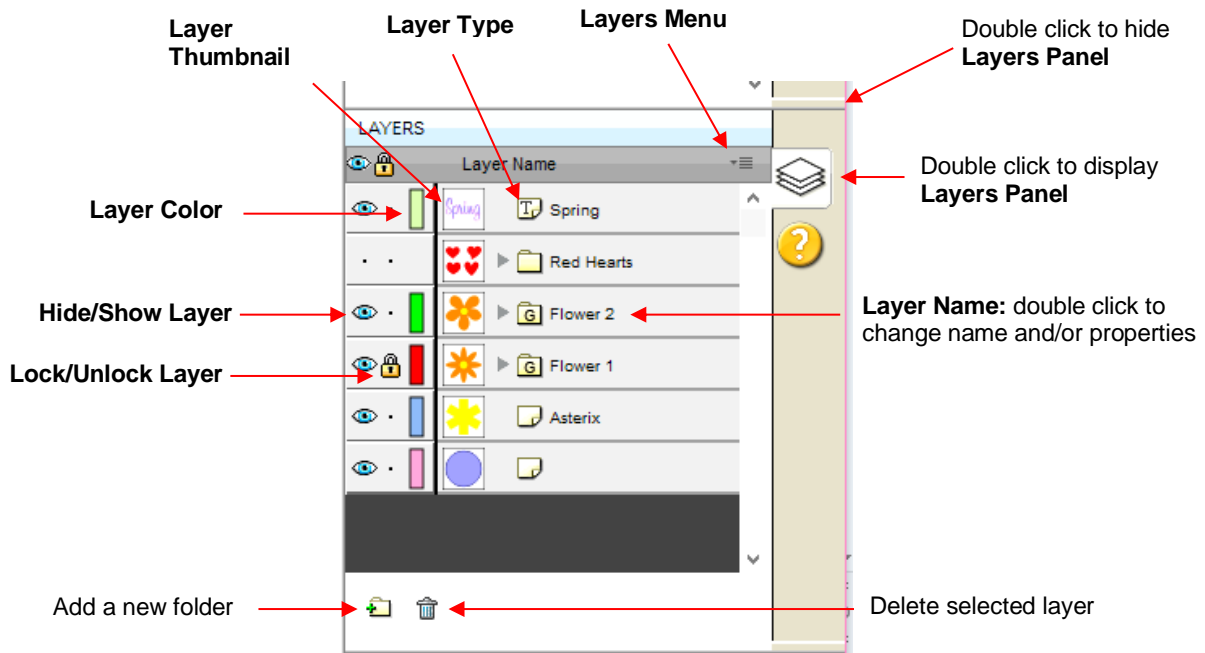
- You do not have to worry about adding shapes to the **Layers Panel**. They will automatically be assigned to new layers as you add them. You will want to learn how to move shapes to new layers or combine shapes into the same layer, depending on the circumstances. This is covered in *Section 2.04*.
- Here are a few examples of when shapes need to be on different layers:
  - ◇ Paper piecing or shadowed shape projects where some shapes will be cut from one color and other shapes from another color (or a number of other colors).
  - ◇ Fold-up projects (boxes, envelopes, popup cards, etc.) where the fold lines will need to have different settings and/or different tools used than your cut lines.
  - ◇ Rhinestone template projects where you need to cut two different templates, such as a fill that will be done in one color of rhinestones and an outline in another color.
- Other benefits of assigning shapes to specific layers include:
  - ◇ Ability to select, with one click of the mouse, all shapes assigned to a layer
  - ◇ Ability to hide or lock layers so that the shapes on that layer are not inadvertently selected, moved, resized, etc.
  - ◇ Ability to change the color, line style, and tool choice on all of the shapes assigned to a particular layer.







### 2.04.2 Parts of the Layers Panel Video

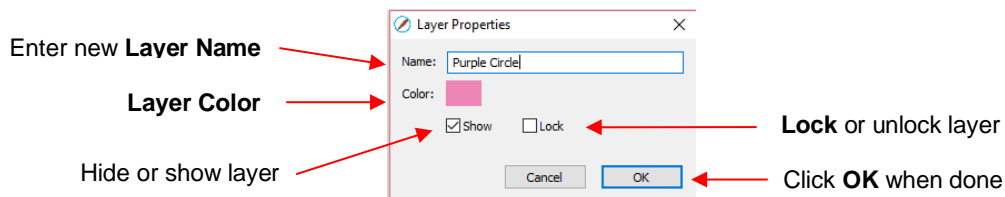
- The next few sections will use the following simple project to illustrate the **Layers Panel**:





- The following screenshot identifies the various icons on the **Layers Panel**:



- **Layer Thumbnail:** Each layer has a thumbnail showing the shapes assigned to that layer. Click on that thumbnail and all shapes on that layer will be selected. If you wish to add the shapes from another layer to the section, hold the **Shift** key and click on the other thumbnail.
- **Layer Type:** To the right of the **Layer Thumbnail** is the **Layer Type**, represented by one of four different icons:
  - ◇  Regular shape
  - ◇  Text shape which is still able to be edited as text, such as changing the font
  - ◇  Regular folder of individual shapes: When the folder is opened, by clicking the gray triangle, the icon changes  and all layers or subfolders within are displayed.
  - ◇  Group folder where one or more of the shapes have been grouped together: When the folder is opened, by clicking the gray triangle, the icon changes  and all layers or subfolders within are displayed.
- **Layer Name:** In the prior **Layers Panel** screenshot, the last layer has no name. To add one, double-click that layer to open the **Layer Properties** window. Here you can change the name of that layer as well as some other settings. Note that the color assignment is for use on the Layers Panels only. It doesn't change the color of the shape assigned to that layer:





- Hiding layers, locking layers, and assigning layer colors can also be done on the **Layers Panel**:

- ◇ **Hide/Show Layer:** Click on the eye icon  to hide that layer. The icon will be replaced with a dot  as shown for the *Red Hearts* layer and the shapes on that layer will no longer be seen on the **Cutting**

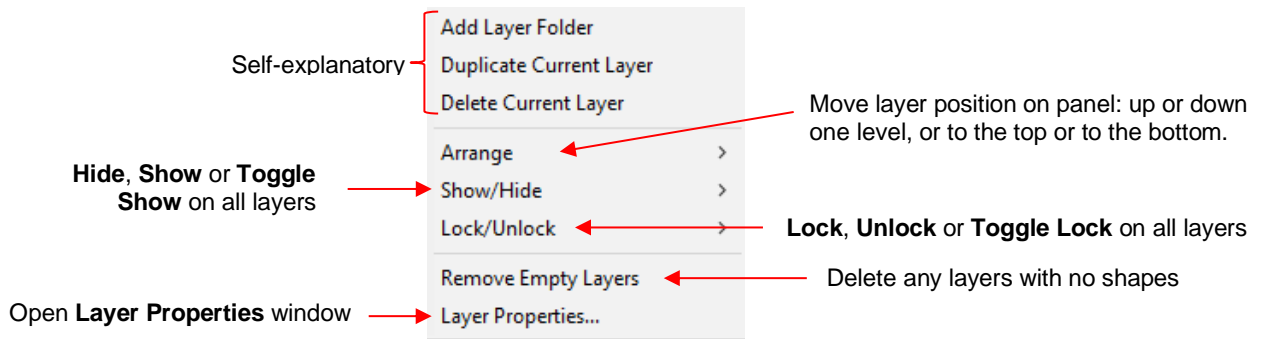
**Mat** and will not be included when printing or cutting the project. Clicking on the dot icon will restore the layer to the **Cutting Mat**:



◇ **Lock/Unlock Layer:** Click on the dot to the right of the eye icon and the layer will become locked , such as shown for the *Flower 1* layer. The shapes on that layer will still be included in printing and in cutting, however cannot be selected on the **Cutting Mat**. This can be useful when shapes should not be inadvertently moved or if you are having problems selecting shapes nearby.

◇ **Layer Color:** Click on the current layer color icon  and a **Color** window will open where a different color can be assigned. Again, this is only for making layers easier to distinguish on the **Layers Panel** and doesn't change the **Fill** or **Stroke** color of the shapes themselves.

- **Layers Menu:** At the top of the **Layers Panel** is an icon for the **Layers Menu** . This menu is also available by clicking on **Layer** on the **Menu Bar** at the top of the screen. The following functions are available in this menu:



Self-explanatory { Add Layer Folder, Duplicate Current Layer, Delete Current Layer



Hide, Show or Toggle Show on all layers → Show/Hide >

Arrange > → Move layer position on panel: up or down one level, or to the top or to the bottom.

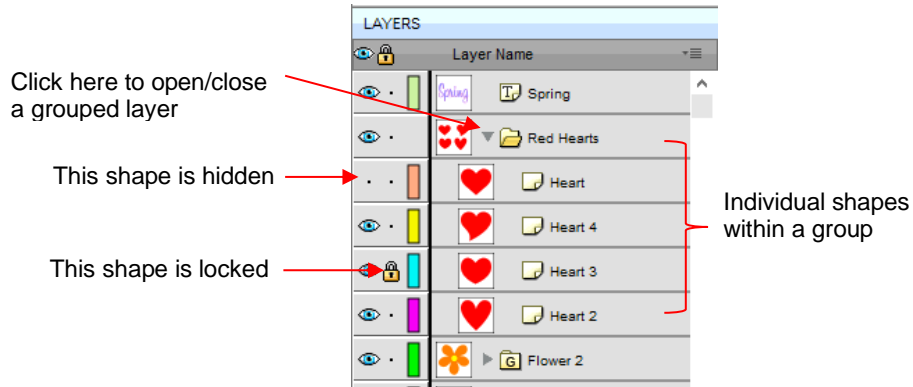
Lock/Unlock <-> → Lock, Unlock or Toggle Lock on all layers

Remove Empty Layers <-> → Delete any layers with no shapes

Open Layer Properties window → Layer Properties...



- Icons for adding a new layer  and deleting a selected layer  are also available at the bottom of the **Layers Panel**.
- Individual shapes within a group folder can also have individual properties changed. For example, let's say you have various shapes grouped together and you want to keep some locked and you want to hide others. Opening the grouped layer displays each thumbnail and the **Show/Hide** and **Lock/Unlock** icons can be individually changed. In this example, some basic shapes have been used for a clearer understanding:



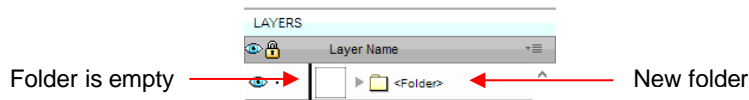


### 2.04.3 Creating Folders and Moving Layers Video

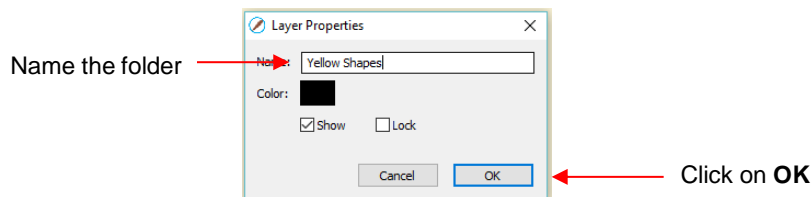
- As mentioned in *Section 2.04.1*, each new shape added to the **Cutting Mat** will initially be assigned to a new layer. This can quickly clutter the **Layers Panel**. The ability to combine shapes into folders and subfolders helps organize a project and make things easier for printing and/or cutting.
- There are three ways to create a new folder:

- ◇ Click on the **Add layer folder** icon  at the bottom of the **Layers Panel**
- ◇ Click on the **Layers Menu** icon  and select **Add Layer Folder**
- ◇ Go to **Layer>Add Layer Folder**

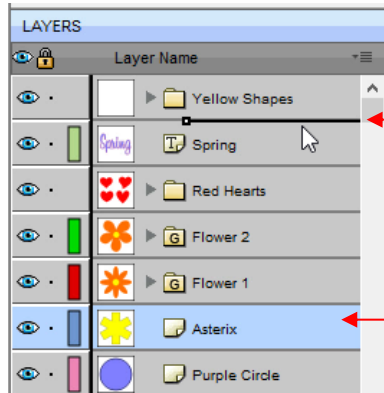
- When a new folder is added, it will appear at the top and look like this:



- Just as covered in the prior section, if you double-click on this new folder, you can rename it:



- In the prior section, it was also noted that layers can be re-ordered using the **Arrange** option in the **Layers Panel Options** menu. Alternatively, layers and folders can also be moved directly on the **Layers Panel** by dragging them up or down.
- There are two possible outcomes when dragging layers:
  - ◇ The layer is moved to a new location
  - ◇ The layer is moved into an existing folder
- The way to control where the layer “lands” is by moving it straight up and down or by dragging a little to the left while moving it up and down.
  - ◇ If you drag a layer without moving to the left, you will see a short line with an open square. This means it will be added to the folder directly above it:

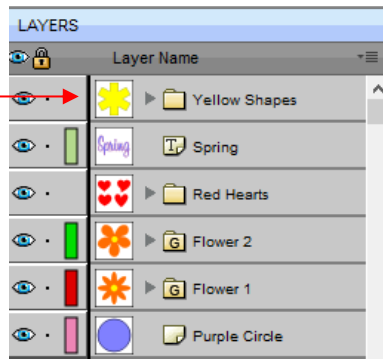


Short line with open square: *Asterisk* layer will be dropped into the *Yellow Shapes* folder

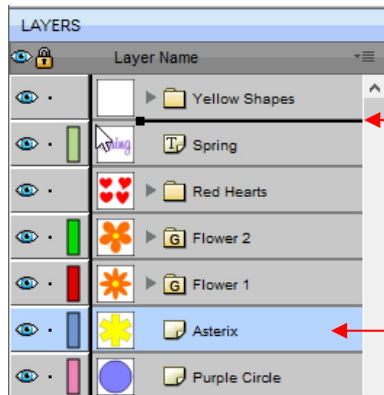
Layer being dragged upwards

- ◇ Now the *Asterisk* layer is inside of the *Yellow Shapes* folder and can be seen in the thumbnail for that folder:

Note new thumbnail image



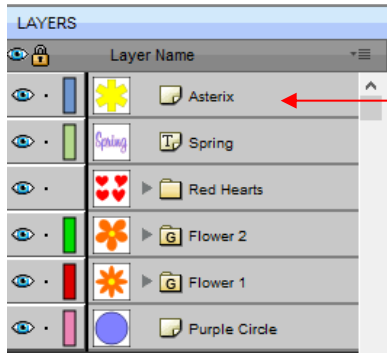
- ◇ If you drag a layer while moving it to the left, you will see a longer line with a closed black square. This means it will be added directly above that line:



Long line with closed square: *Asterisk* layer will be relocated just above the *Spring* layer

Layer being dragged upwards

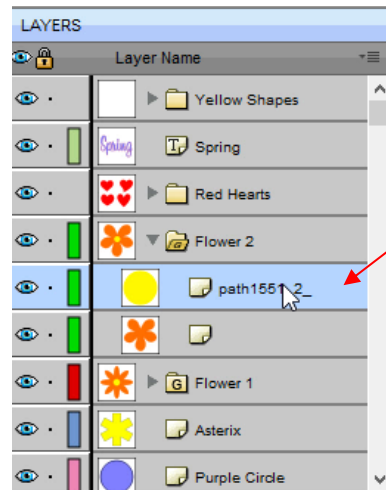
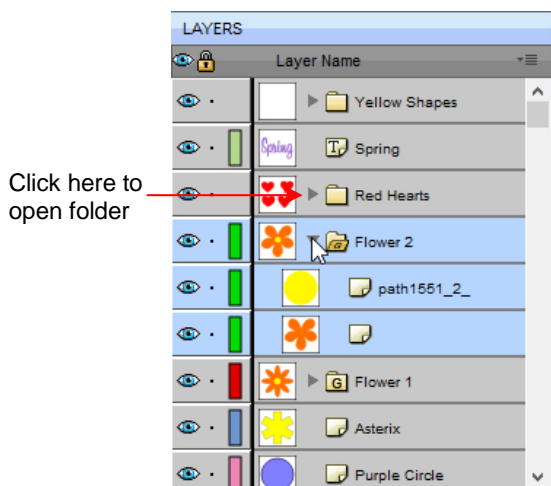
- ◇ **IMPORTANT:** Once you've created a new empty folder, like the *Yellow Shapes* folder, you cannot move that layer or other layers without the empty folder being deleted. So, in the case above, if the *Asterisk* layer had been simply relocated, the *Yellow Shapes* folder would then be gone:



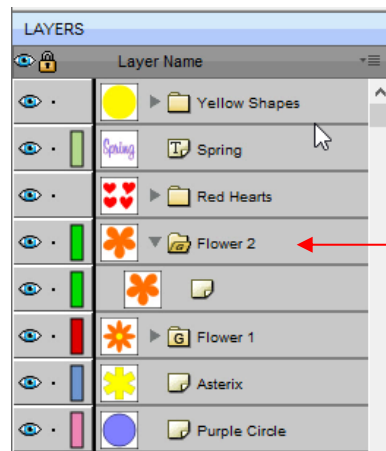
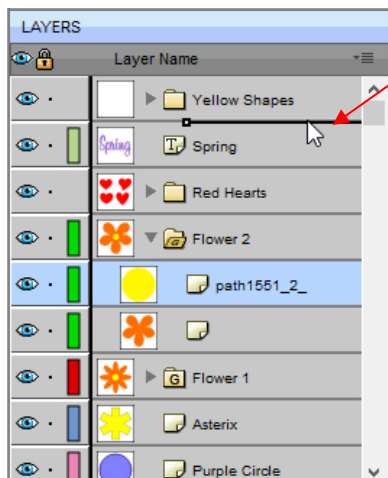
Asterisk layer is moved; Yellow Shapes folder is gone

- Layers can also be moved out of an existing folder into other folders. In this example, the yellow centers of the flowers in the layers named *Flower 1* and *Flower 2*, can be similarly dragged and dropped into the *Yellow Shapes* folder:

- ◇ Open the *Flower 2* group folder and then make sure only the yellow layer is selected:

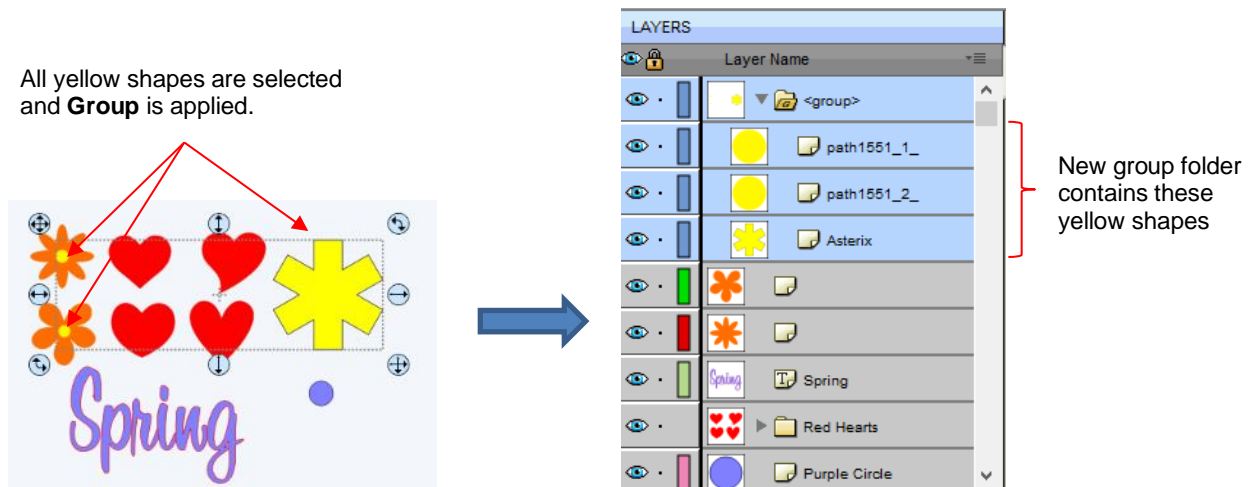


- ◇ Then drag the yellow layer up to the *Yellow Shapes*, again making sure only a short line is present. The yellow layer is then moved out of the *Flower 2* group:




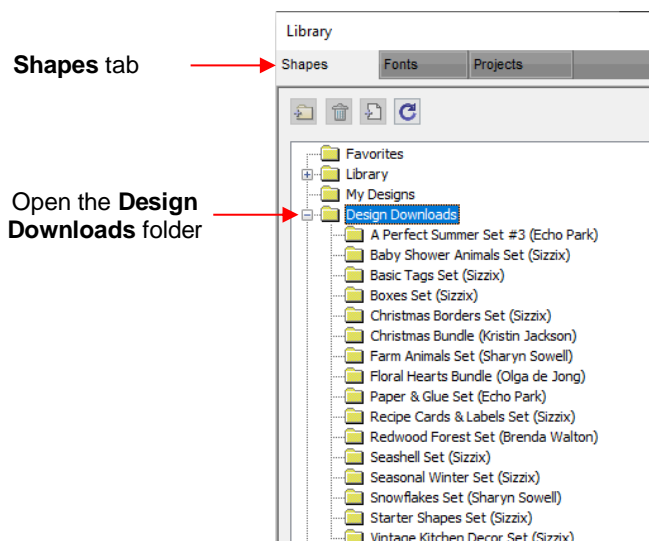
- ◇ Repeat for the yellow shape inside the *Flower1* folder.

- Note: This was just one way to achieve this goal. Another way would have been to ungroup the *Flower 1* and *Flower 2* layers. Then to select all of the yellow shapes on the **Cutting Mat** and go to **Object>Group**. A new group folder would be added to the **Layers Panel** with those shapes moved to it. Specific instructions on **Grouping** and **Ungrouping** are covered in *Section 3.11*.

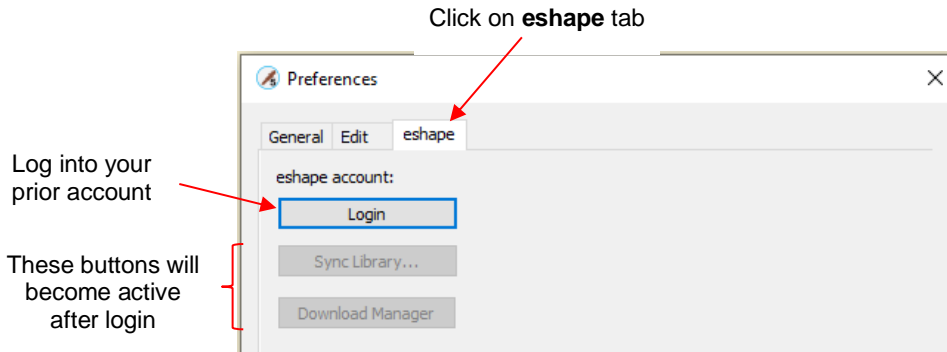


## 2.05 Cutter's Market (formerly the eshape Store)

- The former **eshape Store** has been replaced with **Cutter's Market**, an online store with an abundance of cutting files from popular designers. While most of the files require purchasing, there are some free files, as well!
- To access the **Cutter's Market**, click on the **Store** icon  on the **Toolbar** or go to **File>Share and Get Shapes>Get Shapes**.
- After creating an account, you can pre-purchase credits to use when buying cutting files. After purchasing the files, you will immediately see a green **Download Order** button. Clicking that button will open the **Download Manager** window and your files will be downloaded to your **SCAL5 Library**. You can then locate these downloaded files on the **Shapes** tab under the **Design Downloads** folder:




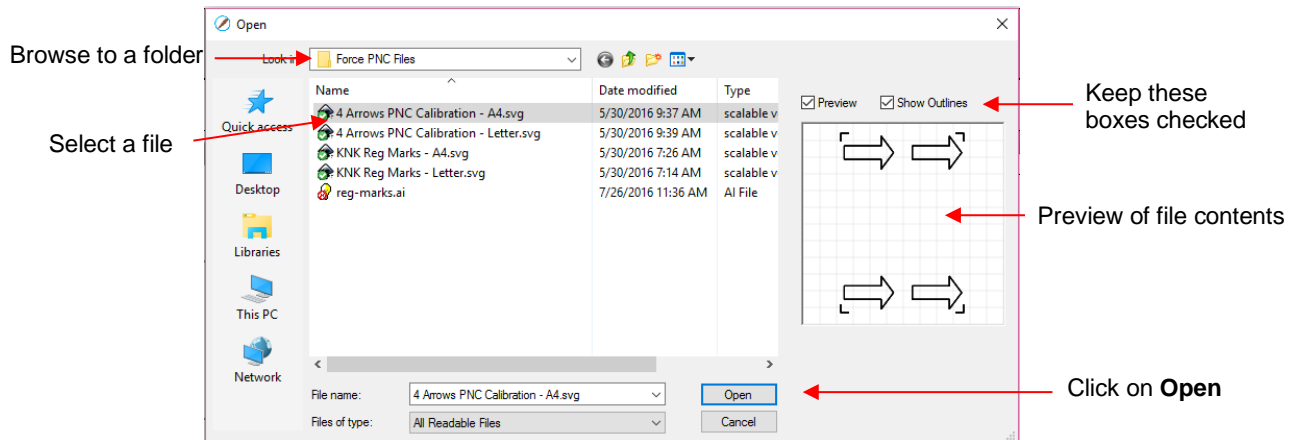
- If you previously bought cutting files from the **eshape Store**, you can obtain these past purchases by going to **Edit>Preferences**, clicking on the **eshape** tab and logging into your account. You can then use **Sync Library** to download your purchased files on the **Library>Shapes** tab>**Design Downloads** folder:



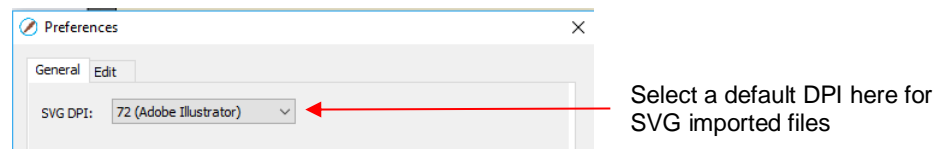
## 2.06 Importing Other File Formats

### 2.06.1 Importing Vector Files Video

- The following vector formats can be imported into SCAL:
  - ◇ SVG: common export format for vector programs, thus popular format used for sharing files on blogs and selling files in online design sites
  - ◇ SCUT5: format used to save projects in SCAL5
  - ◇ SCAL: format used by **eshape Store**
  - ◇ PDF: While a PDF can be created from a raster image, a vector image, or both, only the vector parts of a PDF will import into SCAL.
  - ◇ AI (Adobe Illustrator): common format due to the popularity of Adobe Illustrator
  - ◇ EPS: another common export format for many vector programs
  - ◇ Nine embroidery file formats: .DST, .EXP, .HUS, .YEF, .PEC, .PES, .SEW, .VIP, .XXX
  - ◇ FCM: format used by the Brother ScanNCut machines
  - ◇ GSD: format created by RoboMaster, RoboMaster Pro and Wishblade Advance. This format was used with the Craft Robos, Wishblade, and original Silhouette cutter.
  - ◇ MTC: format created by Make The Cut for cutting to a wide range of hobby and semi-professional cutters. Refer to the special notes about MTC import later in this section.
  - ◇ PLT (SCAL PRO version only): developed by HP for their plotters, the PLT file evolved into a standard format used by early vinyl cutters
  - ◇ DXF (SCAL PRO version only): common format exported by CAD programs
  - ◇ WPC: format used in programs developed by Sign Max, which include WinPC Sign, Funtime, Pazzles Inspiration, and Gazelle.
- There are two ways to open the import window:
  - ◇ Click on the **Import** icon on the upper **Toolbar** 
  - ◇ Go to **File>Import**
- Either choice will open the following window where you can browse to locate the file you need. Note there are options to see a **Preview** and **Show Outlines**:



- You can also drag and drop any of the file formats directly onto the SCAL screen to import that file.
- If the file is in **SVG** format, it can also be imported via the **Library**. Refer to *Section 2.03.1*. Also, SVG files vary in size depending on the program which exported them. Thus, always check the imported size before cutting your project. If you are regularly importing SVG files from one of the following programs: Adobe Illustrator, Inkscape, Corel Draw, or you know the DPI used by the exporting program, you can set it under **Edit>Preferences** (on a Mac, press **Command + ,**) so that you will not need rescale the file:



- **PDF** files can contain multiple pages. If this is the case with a PDF file you wish to import, note the following:
  - ◇ Use Adobe Reader or some other PDF browser to locate which page you wish to import
  - ◇ After selecting the PDF file to import, a second window will open where you can select which page you want to import. Note that if there are many pages, there will be a delay in opening the **Preview** window and you may wish to uncheck that box.
  - ◇ Only vector shapes in a PDF will be imported. Raster shapes will be ignored.
- **MTC** files will import in a similar fashion as PDF if they contain multiple pages. If the MTC file originally contained a raster image (such as for a print-and-cut application), the raster should import correctly. However, if you attempt to resize the design, the raster will become distorted. The work-around is to reimport this raster image and trace it. While that MTC file is opened in SCAL, you will be able to access it in the following folder: **Documents>Craft Edge>Assets**. Tracing an image is covered in *Section 5.03*.
- **IMPORTANT:** Depending on the original source of the vector file, double lines may exist which will result in cutting a design twice. This is usually due to the source program having a **Stroke** width applied to the lines. Therefore, any time you import a vector file, you should test cut it using scrap materials before using "the good stuff." If you find that the file is double cutting, first try applying **Ungroup** to the design so that you can delete one of the duplicates. If **Ungroup** does not separate the duplicates, apply **Break** instead. Refer to *Sections 3.11.2* and *3.12.1*.

## 2.06.2 Importing Raster Files

**Video**

- There are several ways to import a raster file (JPG, BMP, GIF, PNG) depending on the intended purpose for that file:
  - ◇ **File>Import:** will import PNG files with a transparent background, simultaneously adding a vector cut line along the transparent border. It will also crop out any excess transparent space around the image

as long as the *Print* layer and *Cut* layer remain grouped. This is very useful for PNC applications. Note: this is the only raster format that will work using this method.

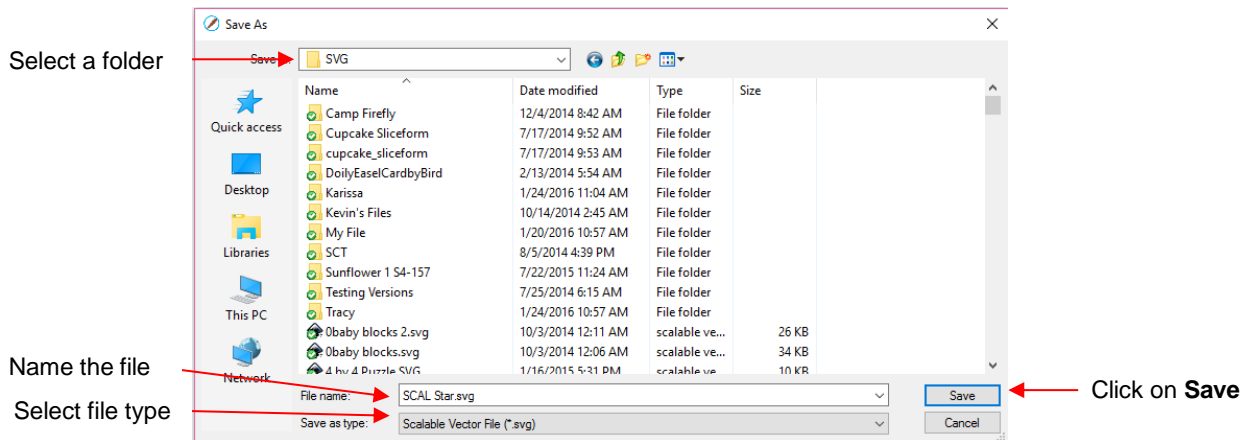
- ◇ **File>Place Image:** will import JPG, BMP, GIF, and PNG files for the purpose of printing or manually tracing in the event the auto-tracing function doesn't adequately perform due to the image quality. It's also another way to load an image for the **Trace Image** window. Refer to *Section 5.03*.
- ◇ **File>Trace Image** (or click the **Trace** icon on the **Toolbar**): will import and auto-trace JPG, BMP, GIF and PNG files. Various options and settings can be applied to obtain the desired results. Refer to *Section 5.03*.
- ◇ Drag and drop files into SCAL: will import PNG files as if **File>Import** is used. The other raster formats will import as if **File>Place Image** is used. Note that you can select multiple raster files at one time using the method.

### 2.06.3 Importing Fonts

- SCAL will display and utilize all fonts currently installed on your computer. You can also open non-installed fonts for temporary use. The formats supported include TTF, OTF, and OPF (open path / single line fonts). For more details, refer to *Section 4.02.3*.

### 2.07 Exporting in Other File Formats

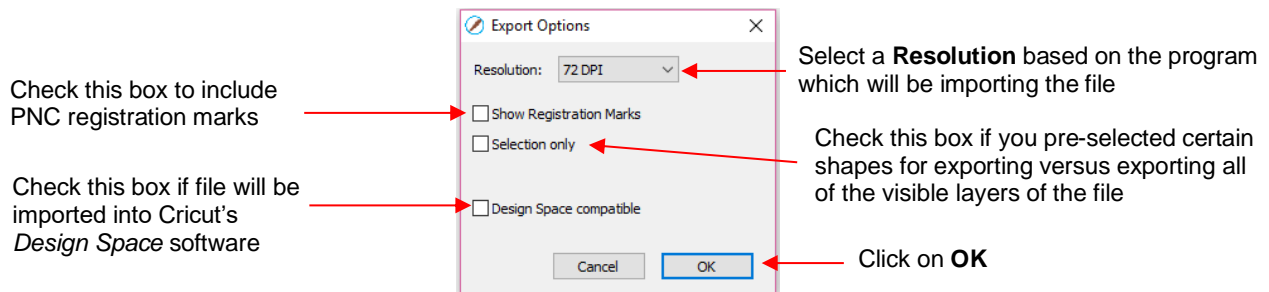
- Besides saving as a .SCUT5 file, you can also export in the following formats: SVG, JPG, BMP, PNG, PDF, TIFF, FCM, and PLT. Only SVG, FCM, PDF, and PLT are vector formats. The others are raster.
- If there are only certain shapes in the file that you want to export, you have two options:
  - ◇ Select those particular shapes before exporting and then mark a box called **Selection only** in the export window.
  - ◇ Place those shapes on one or more separate layers and hide them on the **Layers Panel**. Refer to *Sections 2.04.2* and *3.10*.
- To export a file, use either of the following options:
  - ◇ Go to **File>Export**
  - ◇ Press **Ctrl+Shift+E**
- The following window will open where you can name the file, select the file format, and the location for saving:



- Depending on the type of file selected, an export window will open. The following subsections will cover these types in more detail.

### 2.07.1 Exporting in SVG Format Video

- The **SVG Export Options** are shown in the following screenshot:

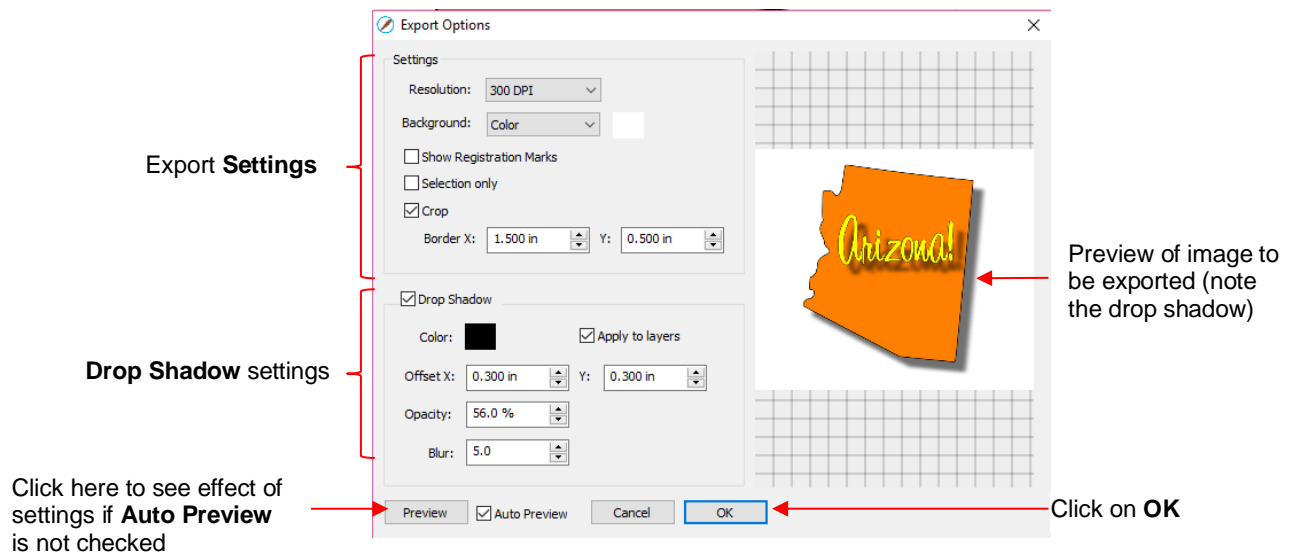


- The **Resolution** setting affects the dimensions of the shapes upon importing into another program:
  - For example, Adobe Illustrator uses 72, Inkscape uses 90, and Corel Draw uses 96. Unless you know the intended program's **DPI**, leave it at 72.
  - If the project is designed with specific dimensions affecting the final result, such as an envelope for a card, include a separate *Read Me* text file noting the dimensions of the project in SCAL so that the imported SVG can be resized accordingly.
- The **Selection Only** setting was mentioned earlier as the option to mark when specific shapes have been selected for export versus exporting all of the shapes in the file.

### 2.07.2 Exporting in JPG, PNG, BMP and TIFF Formats Video

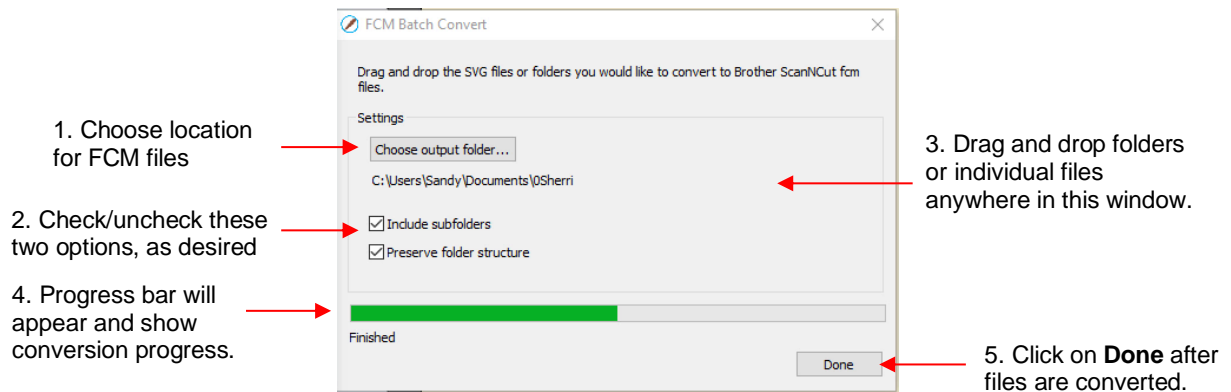
- There are various reasons why you might want to export your file as a raster. For example:
  - The image is going to be posted on a web site or blog
  - The image will be shared with a friend or a customer
  - You wish to use the image in a digital scrapbooking program
  - You want to print a PNC project from a printer without SCAL installed
- If you choose any of the raster export formats, the same window will open offering options for:
  - Resolution:** if the image will be printed, you usually choose 200 or 300
  - Background:** choose a color or, with PNG export, you can also choose transparent
  - Show Registration Marks:** option to print with the registration marks that will be used for a PNC application
  - Selection only:** when specific shapes have been selected for export versus exporting all of the shapes in the file
  - Crop:** increase or decrease the background border around the exported image
  - Drop Shadow:** add a shadow effect to the image
- The following screenshot shows an example of an export in a raster format:





### 2.07.3 Exporting in FCM Format

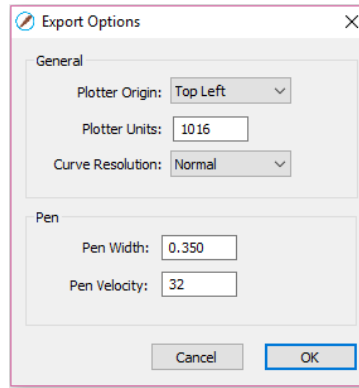
- The FCM format is used by the Brother ScanNCut models. To export a project, go to **File>Export** and, in the drop down menu, change from **SVG (\*.svg)** to **ScanNCut (\*.fcm)**. After clicking on **Save**, the FCM file will be located in the folder you chose in the **Save As** window.
- There is also a batch SVG-to-FCM converter available in SCAL. Go to **File>FCM Batch Convert** and the following window will open. Note that you have the option to convert entire folders of SVG files at one time:



### 2.07.4 Exporting in PLT Format

- PLT files were originally developed for HP plotters. They are also used by some of the cutters outside of the hobby world. The **Export Options** for PLT are as follows:

Because PLT files are usually sent directly to the plotter or cutter, the settings are specific to the device. Thus, these settings will need to be determined based on that intended device.




### **2.07.5 Exporting to SCAL2**

- If you still use SCAL2, you can send a file from SCAL5 to SCAL2 by going to **File>Send to> Sure Cuts A Lot 2**. You will need both versions of SCAL open at the time.


## 3. SCAL: Manipulating and Coloring Shapes

This chapter covers all of the ways to modify shapes. Note that while the singular term “shape” will be repeatedly used when describing various functions, it also refers to a selection of shapes. For example, resizing a selection of three shapes uses the same menu functions or mouse movement as a single shape.

### 3.01 Basic Shapes [Video](#)

- Besides the shapes included in the **Library**, SCAL also offers the ability to add various geometric shapes to the **Cutting Mat: Rectangle, Rounded Rectangle, Circle, Triangle, Polygon, Star, and Spiral**. Some of these have customizing functions which will appear on the **Tool Options** bar and will be detailed in the following subsections.
- To access these various shapes, hold down the left mouse button on the **Rectangle** icon  on the **Tools Panel** and then select the desired shape from the popup menu.
- Once a different shape is selected, that shape’s icon will then replace the **Rectangle** icon on the **Tools Panel**.

#### 3.01.1 Rectangle

- After selecting the **Rectangle** shape , drag the left mouse button to form a rectangle.
- Holding the **Shift** key while dragging the mouse will constrict the proportions, resulting in a square:




Freely dragging mouse



Holding **Shift** key

#### 3.01.2 Rounded Rectangle

- After selecting the **Rounded Rectangle** shape , drag the left mouse button to form a rectangle with rounded corners.
- Holding the **Shift** key while dragging the mouse will constrict the proportions, resulting in a rounded square:

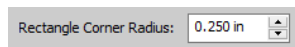


Freely dragging mouse



Holding **Shift** key

- ◇ In the **Tool Options**, a setting will appear. This can be used to control the roundness of the corners:



Radius: 0.10




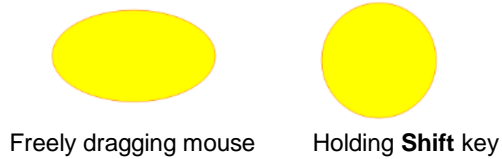
Radius: 0.25




Radius: 0.75

### 3.01.3 Circle and Oval

- After selecting the **Circle** shape , drag the left mouse button to form an oval.
- Holding the **Shift** key while dragging the mouse will constrict the proportions, resulting in a circle:




### 3.01.4 Triangle

- After selecting the **Triangle** shape , drag the left mouse button to form a triangle.
- Holding the **Shift** key while dragging the mouse will constrict the proportions, resulting in a triangle in which the height will equal the width:

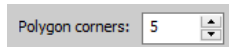


### 3.01.5 Polygon

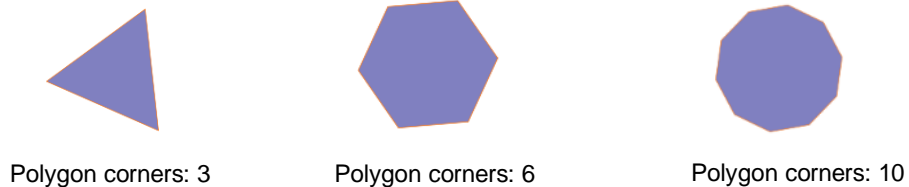
- After selecting the **Polygon** shape , drag the left mouse button to form a polygon:




- In the **Tool Options**, a **Polygon corners** setting will appear:



- ◇ This setting can be used to change the number of sides on the polygon. For example:

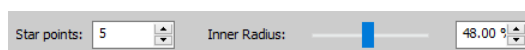


### 3.01.6 Star

- After selecting the **Star** shape , drag the left mouse button to form a star:



- In the **Tool Options**, two settings will appear:



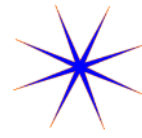
- ◇ The **Star points** setting can be used to change the number of points on the star. The **Inner radius** setting can be used to change the angle of the inner points:



5 Points  
Radius: 38%




4 Points,  
Radius: 47%



8 Points  
Radius: 10%

### 3.01.7 Spiral

- After selecting the **Spiral** shape , drag the left mouse button to form a spiral:



- In the **Tool Options**, four settings will appear:



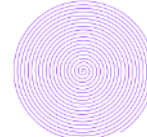
- ◇ **Turns:** Number of rotations around the center:



Turns: 3



Turns: 6



Turns: 20

- ◇ **Divergence:** Tightness of the spiral: larger = looser; smaller = tighter:



Divergence: 1



Divergence: 3



Divergence: 0.5

- ◇ **Inner Radius:** Starting point of the spiral



Inner Radius: 0



Inner Radius: 0.2



Inner Radius: 0.5

- ◇ **Clockwise:** Whether spiral rotates clockwise or counter-clockwise from center:




Clockwise: checked

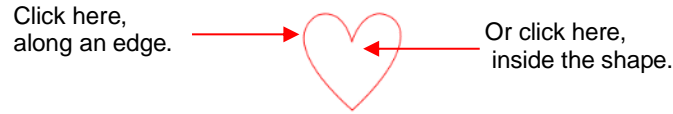


Clockwise: not checked

## 3.02 Selecting Video

- To select a shape, make sure the **Selection Tool** is indented on the **Tools Panel**  (shortcut **V**). Then:

- ◇ Click anywhere on the shape (along an edge or inside a closed shape):



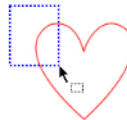
- ◇ Note that the cursor will change once the shape can be selected. For example, when selecting a line, wait for the cursor to change before clicking:



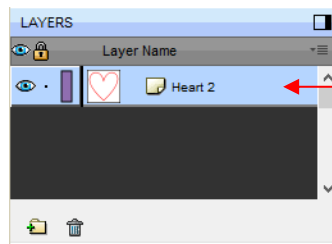
- ◇ Another way to select: drag the mouse to enclose the entire shape (aka marquee-select).



- ◇ A third way: hold the **Shift** key and marquee-select just a portion of the shape.



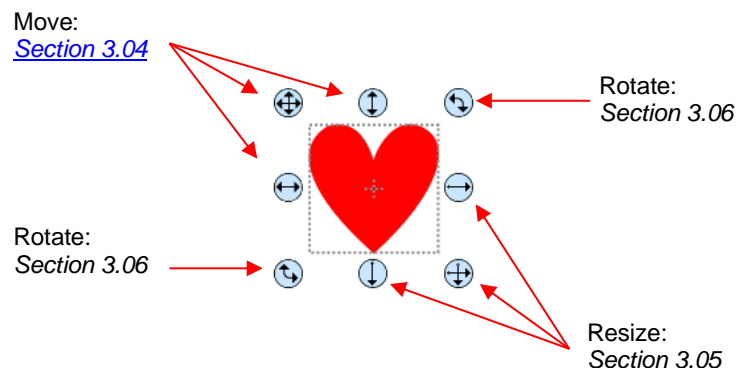
- ◇ A fourth way: click on the layer which contains this shape:



Click on thumbnail image or anywhere to the right of that image

### 3.02.1 Basic Selection Handles Video

- Once selected, a shape will have 8 handles surrounding it. The functions of these handles are covered in other sections as indicated:

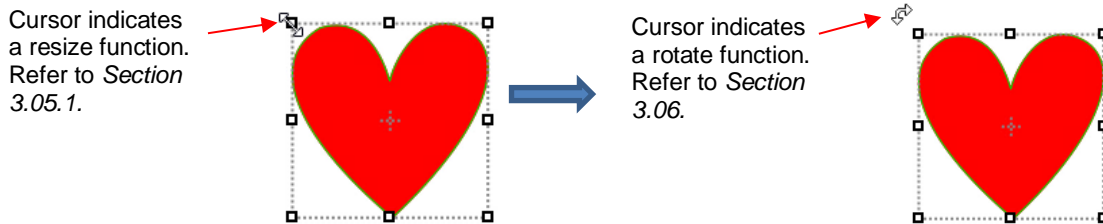


### 3.02.2 Advanced Selection Handles

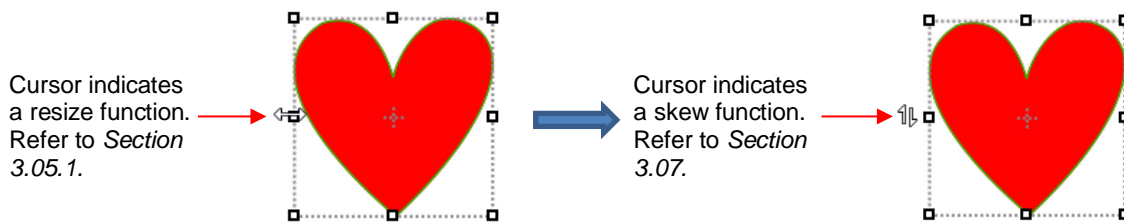
- While in the **Selection Tool** mode, the **Tool Options** bar indicates a setting called **Handles**. The drop-down menu offers another option called **Advanced**:




- In **Advanced** mode, a selected shape will appear with six identical handles. However, each handle now has two functions, depending on whether the mouse hovers directly over the handle or is moved slightly away from the handle:

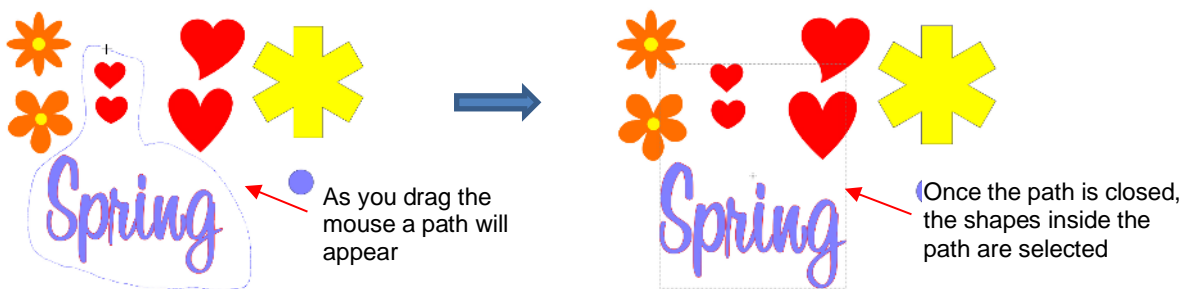


- All four corner handles offer the same resizing and rotating functions. The middle handles along the four sides offer resizing and skewing:



- There are several ways to select more than one shape:

- ◇ Select the first shape and hold down the **Shift** key while clicking on additional shapes.
- ◇ Drag the mouse (marquee-select) to encompass the shapes. Always make sure you start clearly outside the boundaries of the images you want to select.
- ◇ If all of the shapes are on the same layer, click on the thumbnail for that layer or hold the **Shift** key while clicking on more than one layer. Refer to *Section 2.04*.
- ◇ Use the **Lasso Selection** tool on the **Tools Panel** . Freely drag the mouse around the shapes you want to include in the selection:




- If you wish to select all of the shapes on the screen, there are several options:


- ◇ Press **Ctrl+A**

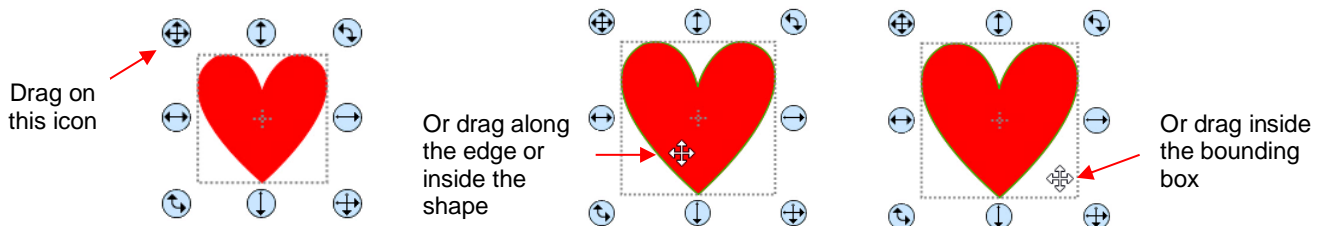
- ◇ Right-click on the screen and choose **Select All** from the menu
- ◇ Go to **Edit>Select All**
- To unselect all shapes, use one of the following ways:
  - ◇ “Click away” – click anywhere else on the screen and the shapes will be de-selected
  - ◇ Press **Ctrl+Shift+A**
  - ◇ Go to **Edit>Deselect All**

### 3.03 Deleting Video

- To delete a selected shape, use any of the following options:
  - ◇ Press the **Delete** key on the keyboard
  - ◇ Right-click on the screen and choose **Delete** from the menu
  - ◇ If the shape is on its own layer, click on the **Delete Layer** icon: 
- To delete all of the shapes in the current project:
  - ◇ Use one of the methods from *Section 3.02* to select all shapes
  - ◇ Then delete using any of the prior options listed for deleting a selected shape
- You can also delete a layer of shapes at one time from the **Layers Panel**. Refer to *Section 2.04.2*.

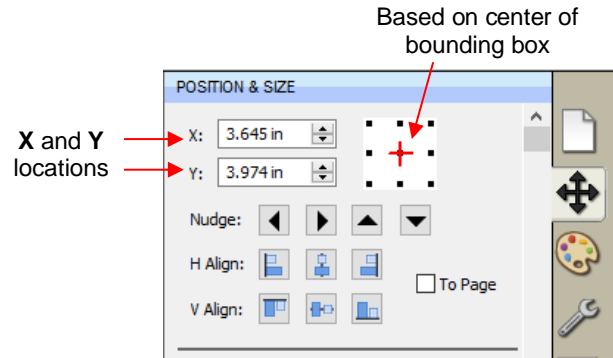
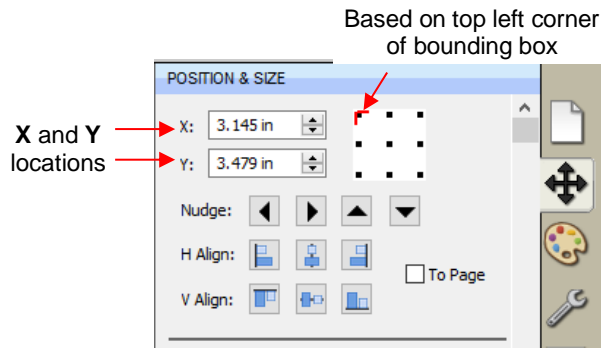
### 3.04 Moving Video

- To move a selected shape, hold down the left mouse button on the upper left corner icon or anywhere within the shape and drag to another location. Note that if you see this cursor , the shape can be moved:

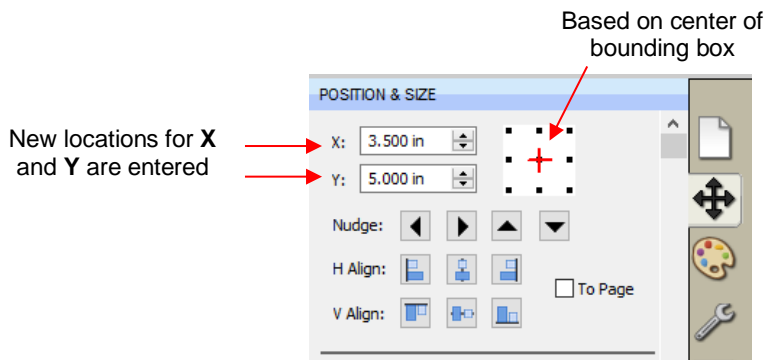


- To move a shape and maintain horizontal or vertical alignment, hold the **Shift** key while dragging or use the arrow keys on your keyboard.
- With a shape selected, the **Position & Size Settings on the Properties Panel** indicate the exact location of the bounding box around a selected shape. Note that this location is how far the shape is from the top left corner of the grid on the mat and the red mark indicates which part of the bounding box is being referenced. For example:





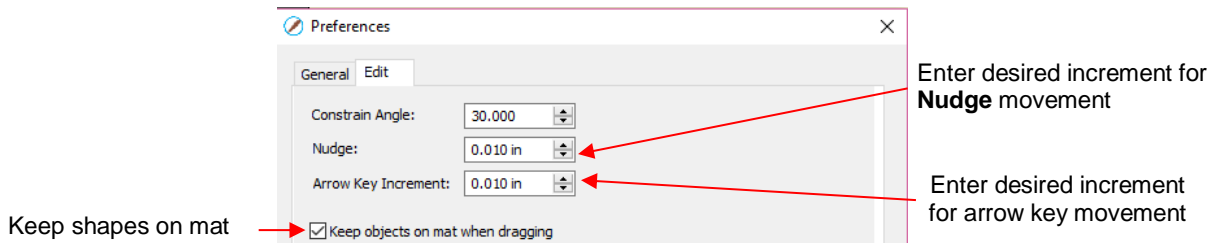
- You can enter new values into either or both of the **X**: and **Y**: windows to move the shape to a new location:



- The **Nudge** icons, which are just below the **X** and **Y** entries, can also be used to move a selected shape. These move in the same increments as the keyboard arrows:



- The increment size for both the keyboard moves and the **Nudge** moves can be changed by going to **Edit>Preferences** and then selecting the **Edit** tab. This window also offers the option to force shapes to remain within the boundaries of the **Cutting Mat** while being moved with the mouse:



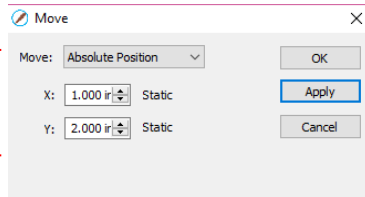
- There is also a **Move** function available which can be accessed these two ways:

- ◇ Right-click on a selected shape and go to **Transform>Move**
- ◇ Go to **Object>Transform>Move**

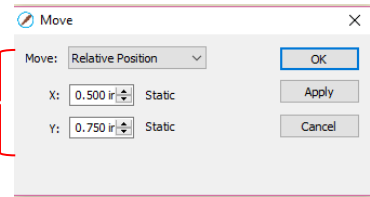
- This **Move** windows provides two moving options:

- ◇ Move the shape to a specific position on the **Cutting Mat** (called **Absolute Position**)
- ◇ Move the shape a certain distance from its current location (called **Relative Position**)
- ◇

**Absolution Position:**  
where to place the  
shape on the mat

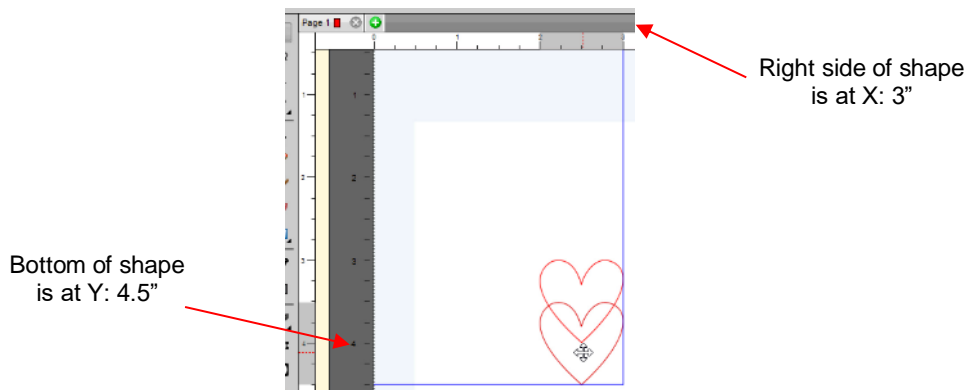


**Relative Position:**  
how far to move the  
shape in both an X  
and Y direction



◇ **Important:** After applying a move in the **Move** window, click on **OK** and then re-enter the window if you need to make subsequent move.

- You can also use the **Rulers** to estimate a new location for moving shapes. Blue lines will appear when the shape is aligned with a major marking, such as shown below:

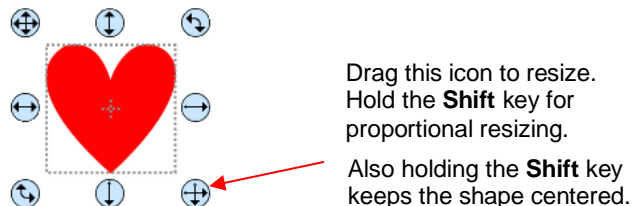


- Finally, you can add guidelines to the **Cutting Mat** at specific locations and then turn on **Snap To** in order to move shapes to snap to those guidelines. Refer to *Section 7.03*.

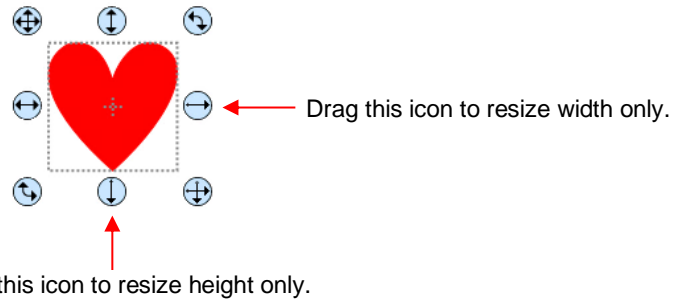
### 3.05 Resizing, Scaling, Auto fit

#### 3.05.1 Resizing Video

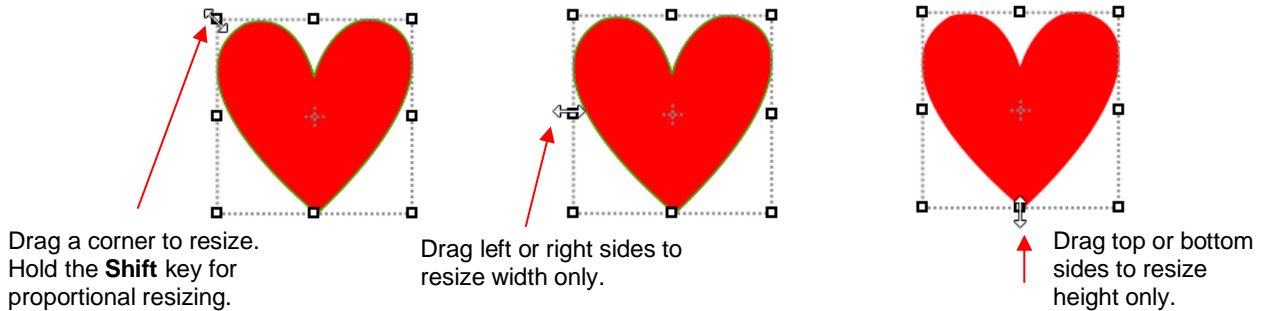
- With the shape selected, use your mouse to drag the lower right corner of the shape to freely resize. If you want to keep the width and height proportional, hold the **Shift** key down before dragging that icon. If you want the resize to occur with the shape remaining in the same spot, hold the **Alt** key:



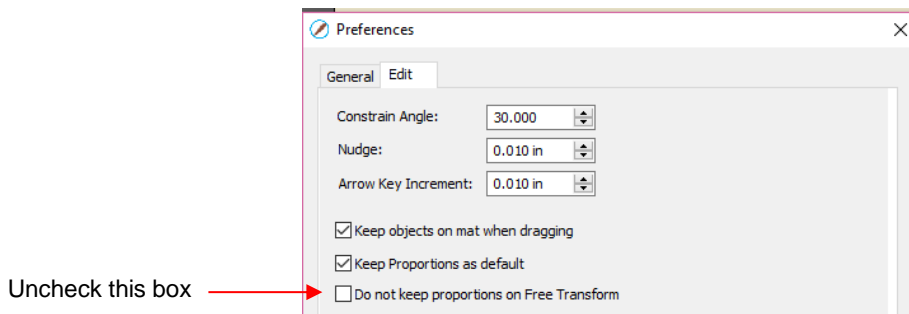
- To resize only the width or the height, drag the middle right or the middle bottom icons, respectively:



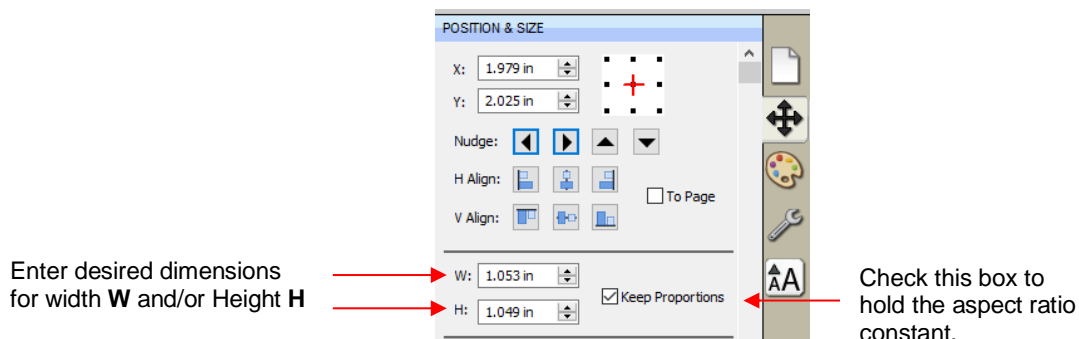
- If the **Handles** are in **Advance** mode, then drag a corner or a side when the cursor is directly over the handle. Again, holding the **Shift** key will resize height and width proportionately:



- If you prefer that proportional sizing be the default, thus not requiring the pressing of the **Shift** key, go to **Edit>Preferences** and click on the **Edit** tab. Uncheck the box shown below:



- **Important:** Unchecking this box does not then affect shapes created using the **Shapes** tool on the **Tools Panel**. You will need to hold the **Shift** key to maintain proportions when resizing by dragging the lower right corner.
- If you need to make the shape an exact size, then enter the dimension in the **W** or **H** box on the **Position & Size Panel**. Check the **Keep Proportions** option if you want to hold the aspect ratio constant:

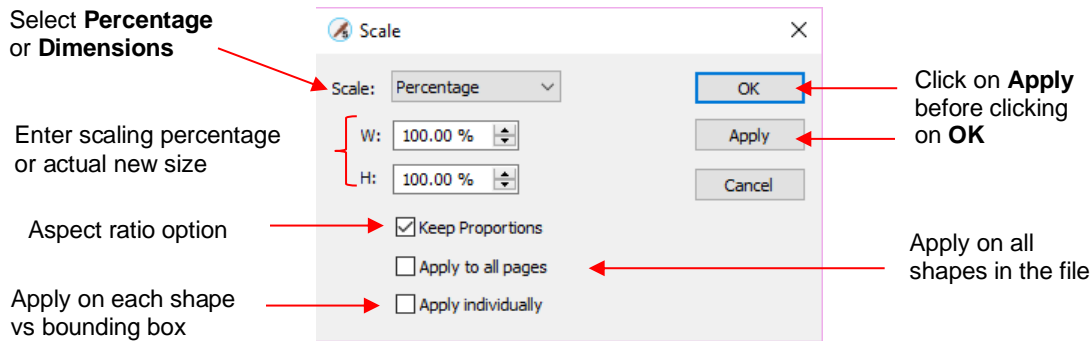


### 3.05.2 Scaling

- To access the **Scale** function, select one or more shapes and then use either of the following:

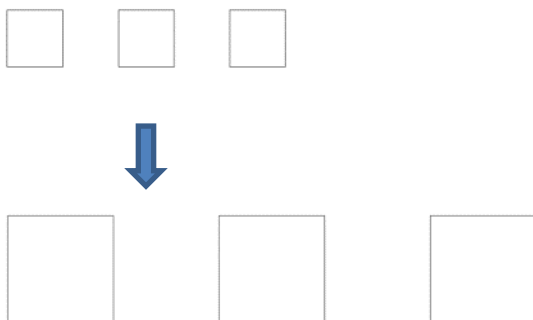
- ◇ Right-click the selected shape and go to **Transform>Scale**
- ◇ Go to **Object>Transform>Scale**

- The following window opens:



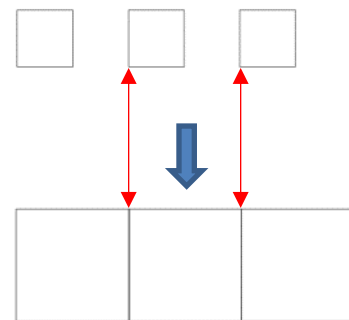
- ◇ **Scale:** Select **Dimensions** if you wish to specify the exact width and height for your selection or select **Percentage** if prefer to resize that way.
- ◇ **W:** and **H:** Enter the new dimensions or scaling percentage
- ◇ **Keep Proportions:** Leave the option checked if you want to enter into either **W** or **H** and have the other automatically calculated so that the aspect ratio remains the same.
- ◇ **Apply to all page:** Mark this option and the dimension change or percentage will be applied to every shape in the project that is showing and not locked.
- ◇ **Apply Individually:** Mark this option and the dimension change or percentage will be applied as if there were no bounding box around the shapes.
  - For example, take three 1-inch squares that are 1 inch apart from one another. Select all three and apply a 200% scale.
  - Here are the results depending on whether or not **Apply Individually** is marked:

**Apply Individually** not checked:



The space between the shapes is also scaled 200%

**Apply Individually** checked:

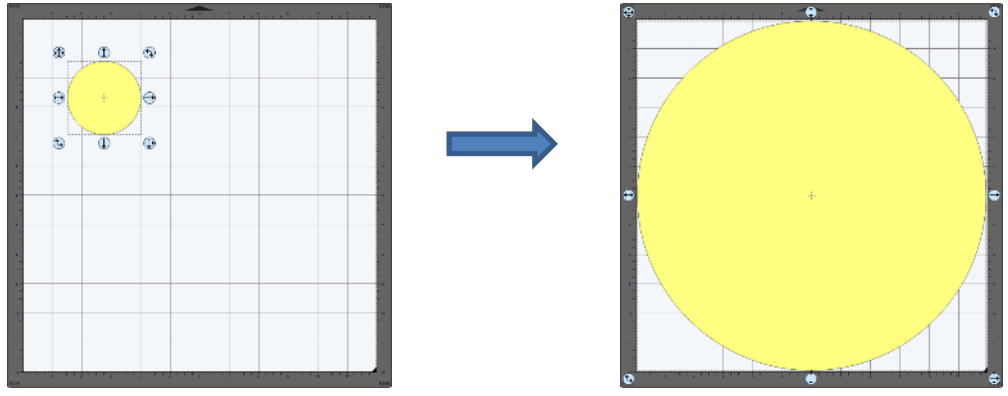


The shapes do not change locations

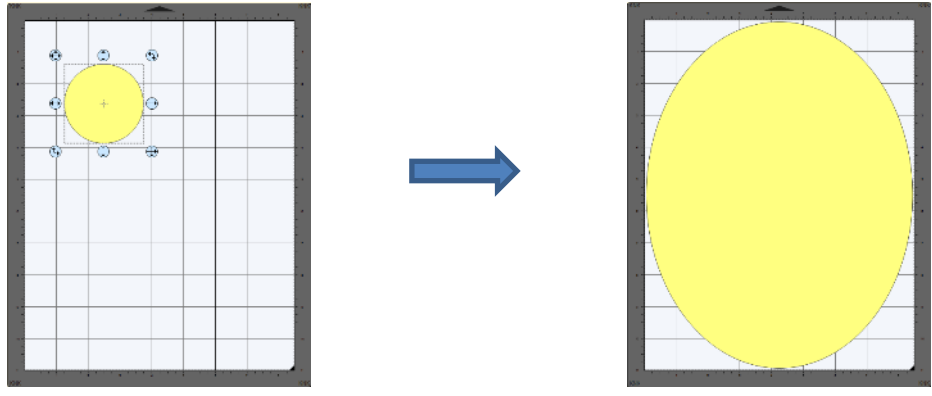
- When **Apply Individually** is not checked, the spacing between the shapes is also scaled and the squares end up 2 inches apart.
- When **Apply Individually** is checked, the spacing ends up filled by the expanding size of each square. Another way to look at it - the position of the shapes (the upper left corner) of each square does not change, as shown by the red arrows.

### 3.05.3 Auto Fit Video

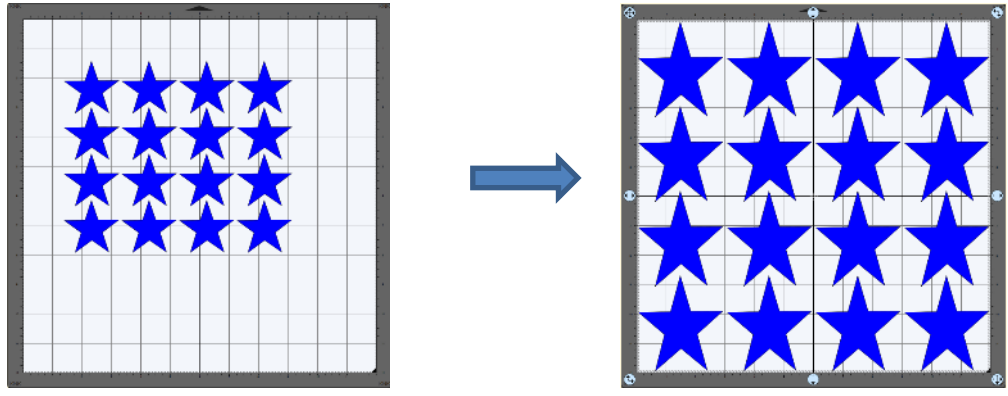
- The **Auto Fit** function will resize a shape or selection of shapes to fit the boundaries of the **Cutting Mat** with a slight (1/16") margin. It is accessed by going to **Object>Transform>Auto Fit**.
- Example: Select a circle on a 12" x 12" **Cutting Mat** and go to **Object>Transform>Auto Fit**:



- ◇ The new size of the circle is 11.875" x 11.875".
- ◇ If the circle is placed on a 15" x 15" mat, then it resizes to 14.85" x 14.875". However, if the circle is placed on letter size mat (8.5" x 11"), then it becomes an oval:



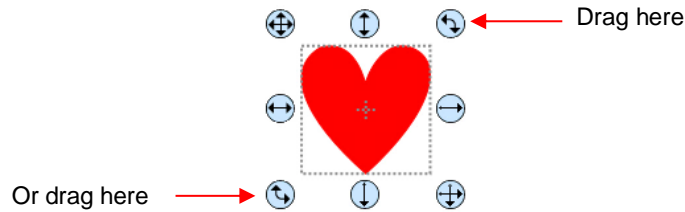
- A practical example might be something like this: You have one 12 x 12 sheet of cardstock and you want to cut out 16 stars for a party decoration and you want those stars as large as possible. Rather than having to "do the math", you can create a grid of stars (refer to *Section 3.17.4*) and then use the **Auto Fit** function to resize them for the cut:



### 3.06 Rotating



- With the **Handles** set to **Basic** mode and the shape selected, dragging the top right icon will freely rotate the shape:



- ◇ Holding the **Shift** key, while rotating, will rotate the shape in 15° increments. However, if you need to rotate in increments other than 15°, go to **Edit>Preferences**, click on the **Edit** tab, and change the **Constrain Angle** to the desired increment (from 1 to 180°). Click on **OK** to save the change:

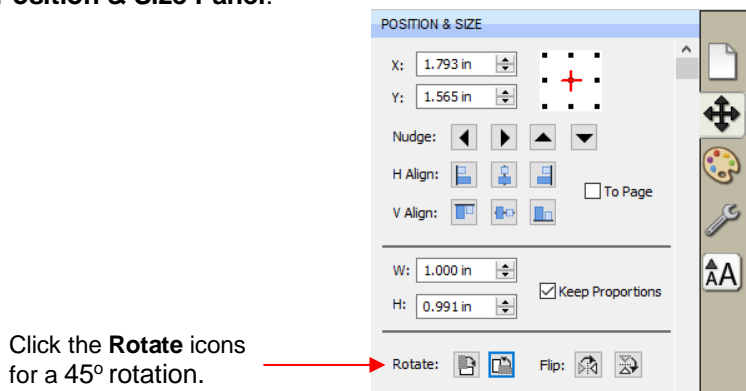


- ◇ The **Status Bar** at the bottom of the screen will indicate the current degree of rotation:



- ◇ Note: the **Status Bar** will continue to show the last degree of rotation until another shape is selected and rotated.

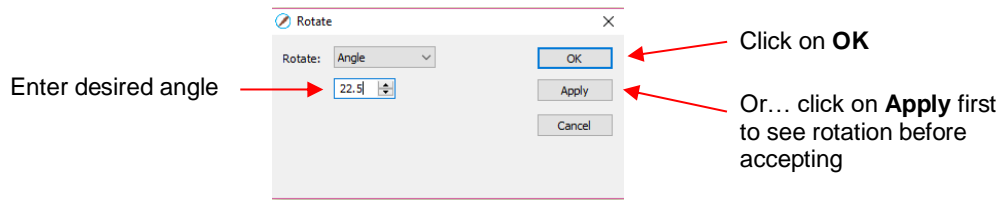
- A selected shape can be rotated exactly 45° clockwise or counter-clockwise, by clicking the **Rotate** icons on the **Position & Size Panel**:



- To rotate a specific angle, open the **Rotate** window in either of two ways:

- ◇ Right-click on a selected shape and go to **Transform>Rotate**
- ◇ Go to **Object>Transform>Rotate**

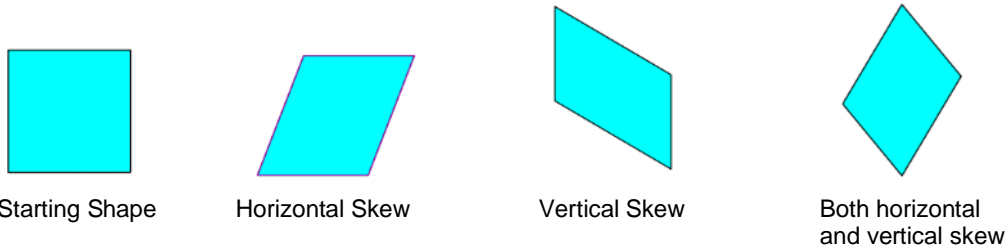
- Enter the desired angle:



### 3.07 Skewing and Distorting

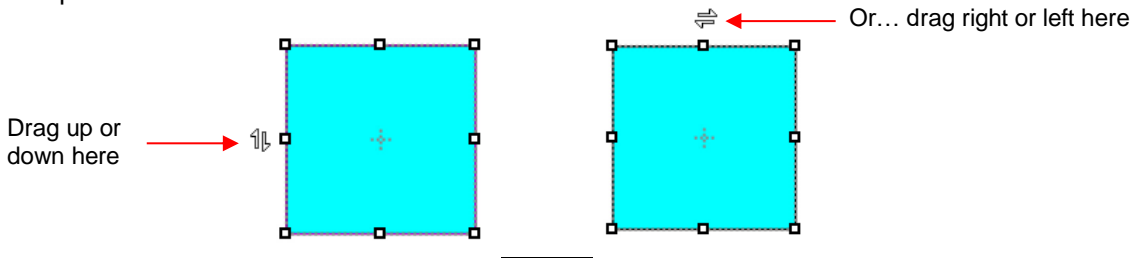
#### 3.07.1 Skewing Video

- Shapes can be skewed either horizontally or vertically:



- There are two ways to skew a shape:

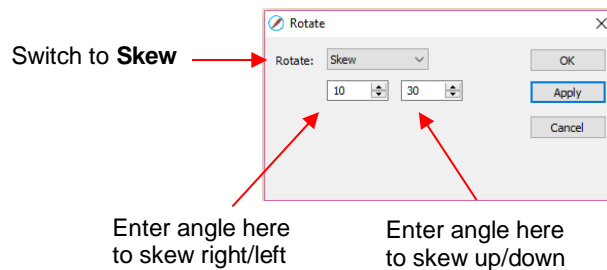
- ◇ With the shape selected and **Advanced** selected on the **Tool Options**, rest your mouse slightly outside of a handle in the middle of a side. The skew mode cursor will appear and it can be dragged to skew the shape:



- ◇ With the shape selected, open the **Rotate** window by using one of these two methods:


- Right-click and select **Transform>Rotate**
- Go to **Object>Transform>Rotate**

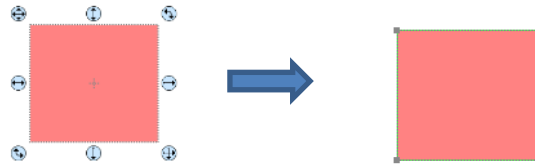
- ◇ Then switch from **Angle** to **Skew** and enter a skew angle:



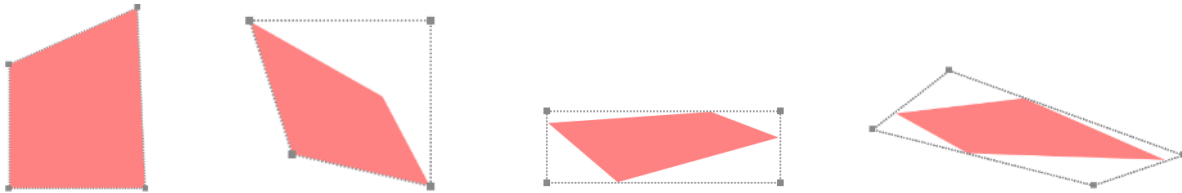
### 3.07.2 Distorting

Video

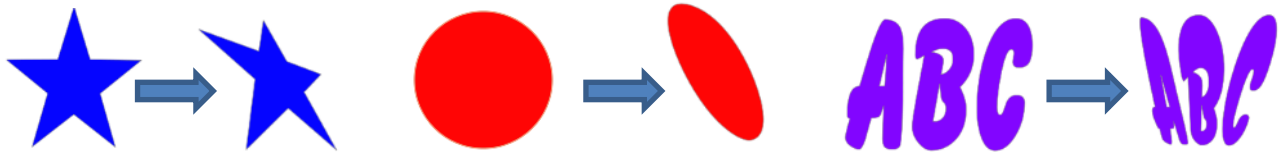
- The **Distort** tool is the 5<sup>th</sup> icon  from the bottom on the **Tools Panel**. Select a shape and then click on the icon. The four corners of the bounding box will display small boxes:



- The shape can now be distorted in countless ways by dragging any of the corners:



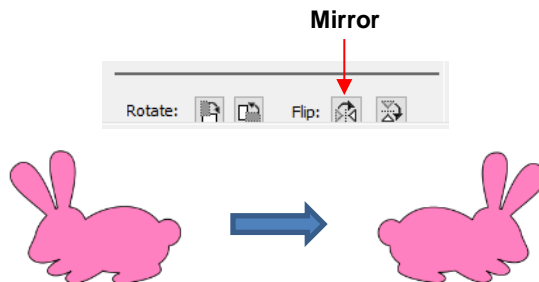
- Of course, the shape doesn't have to be rectangular. The **Distort** tool can be applied to anything:



### 3.08 Mirroring and Flipping

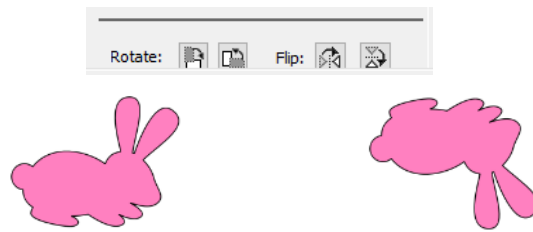
Video

- To horizontally mirror a shape, select it and then use one of the following:
  - ◇ Right-click on the screen and select **Transform> Flip Horizontal (Mirror)**
  - ◇ Go to **Object>Transform> Flip Horizontal (Mirror)**
  - ◇ Click on the **Mirror** icon, next to **Flip**, on the **Position & Size Panel**:








- To vertically flip a shape, select it and then use one of the following:
  - ◇ Right-click on the screen and select **Transform> Flip Vertical**
  - ◇ Go to **Object>Transform>Flip Vertical**
  - ◇ Click on the **Flip** icon on the **Position & Size Panel**:










### 3.09 Locking and Unlocking Video

- Locking a shape is normally done to prevent accidental selection and movement of that shape.
- To lock a selected shape, use any of the following options:
  - ◇ Right-click and select **Lock** from the menu
  - ◇ Go to **Object>Lock**
  - ◇ Press **Ctrl+Alt+L**
  - ◇ Locate the shape on the **Layers Panel** and click on the unlock icon  or double-click and check the **Lock** option.
- To lock all shapes:
  - ◇ Right-click and choose **Select All**, then right-click and choose **Lock**
  - ◇ Click on the **Layers Menu** icon  and select **Lock/Unlock>Lock All Layers**
- To unlock a single shape or a folder of shapes, locate the shape or folder on the **Layers Panel** and click on the **Lock** icon  or double-click and uncheck the **Lock** option.
- To unlock all locked shapes, use any of the following options:
  - ◇ Right-click on a selected unlocked shape and select **Unlock All** from the menu
  - ◇ Go to **Object>Unlock All**
  - ◇ Press **Ctrl+Shift+Alt+L**
  - ◇ Click on the **Layers Menu** icon  and select **Lock/Unlock>Unlock All Layers**
- To toggle the lock/unlock status of all layers on the **Layers Panel**, click on the **Layers Menu** icon  and select **Lock/Unlock>Toggle All Layers**

### 3.10 Hiding and Showing Video

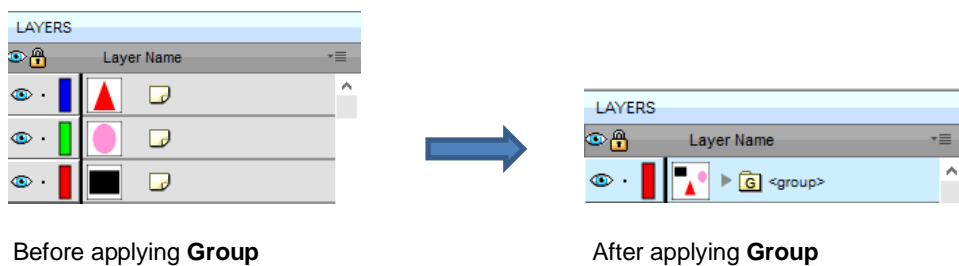
- To hide a selected shape, use either of the following options:
  - ◇ Right-click and select **Hide** from the menu
  - ◇ Go to **Object>Hide**
  - ◇ Locate the shape on the **Layers Panel** and click on the hide icon  or double-click and uncheck the **Show** option.
- To hide all shapes:

- ◇ Right-click and choose **Select All**, then right-click and choose **Hide**
- ◇ Click on the **Layers Menu** icon  and select **Show/Hide>Hide All Layers**
- To unhide a single shape or a folder of shapes, locate the shape or folder on the **Layers Panel** and click on the unhide icon  or double-click and check the **Show** option.
- To unhide all hidden shapes, use any of the following options:
  - ◇ Right-click on a selected unhidden shape and select **Show All** from the menu
  - ◇ Go to **Object>Show All**
  - ◇ Select any shape (including a hidden one) on the **Layers Panel**, right-click and select **Show All** from the menu.
  - ◇ Click on the **Layers Menu** icon  and select **Show/Hide>Show All Layers**
- To toggle the hide/unhide status of all layers on the **Layers Panel**, click on the **Layers Menu** icon  and select **Show/Hide>Toggle All Layers**

## 3.11 Grouping and Ungrouping Video

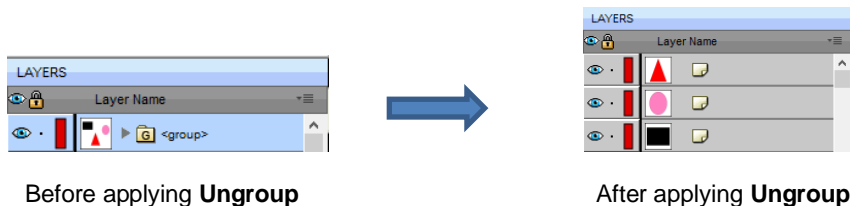
### 3.11.1 Group

- The **Group** function is used to combine shapes into a new folder on the **Layers Panel** so that they can be more easily moved, resized, rotated, etc.
- After selecting two or more shapes, the **Group** function can be applied in any of the following ways:
  - ◇ Right-click and select **Group** from the popup menu
  - ◇ Go to **Object>Group**
  - ◇ Press **Ctrl+G**
- The following example shows three shapes before and after grouping.



### 3.11.2 Ungroup

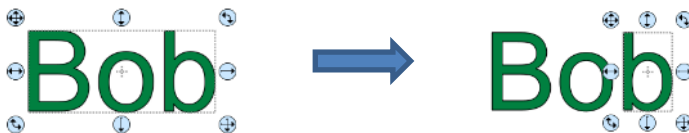
- The **Ungroup** function is used to separate a grouped layer of shapes into individual layers.
- After selecting a group, the **Ungroup** function can be applied in any of the following ways:
  - ◇ Right-click and select **Ungroup** from the popup menu
  - ◇ Go to **Object>Ungroup**
  - ◇ Press **Ctrl+Shift+G**
- The following screenshot shows the same grouped folder from the prior example both before and after ungrouping:



Before applying **Ungroup**

After applying **Ungroup**

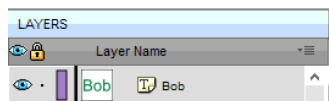
- Another example shows what happens when you ungroup a word. The individual letters of the word can now be selected:



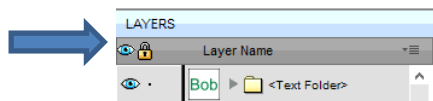
Before applying **Ungroup**:  
clicking on any letter selects  
the entire word

After applying **Ungroup**:  
clicking on any letter  
selects only that letter

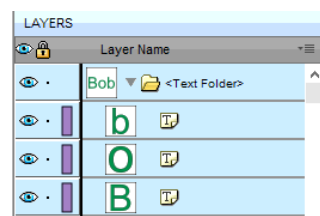
◇ On the **Layers Panel**:



Before applying **Ungroup**:  
Layer has **Text** icon  
indicating a single text shape



After applying **Ungroup**:  
Layer now indicates a folder  
with more than one shape



Opening folder shows the three  
letters as individual text shapes

## 3.12 Breaking and Merging Video

### 3.12.1 Break Apart

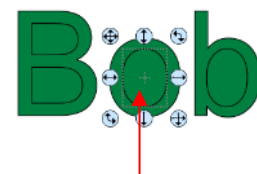
- The **Break Apart** function goes one step further than **Ungrouping**. It is used to separate a combined shape into the individual parts that make up that shape.
- After selecting a combined shape, the **Break Apart** function can be applied in any of the following ways:
  - ◇ Right-click and select **Break Apart** from the popup menu
  - ◇ Go to **Object>Break Apart**
  - ◇ Press **Ctrl+B**
- The following screenshot shows **Break Apart** being applied to the same word “Bob” to separate the internal closed paths (also called child shapes) from the external paths (also called parent shapes):



Before applying **Break Apart**:  
clicking on any letter selects  
the entire word

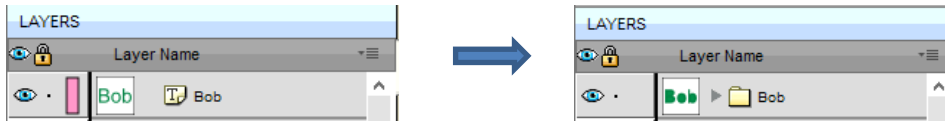


After applying **Break Apart**: child  
shapes fill with color, rather than  
being “holes” inside the letters



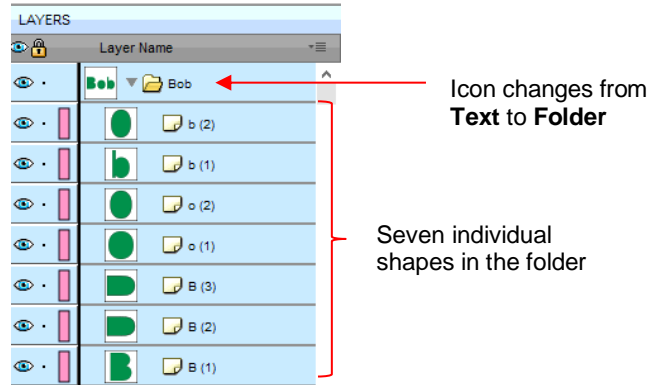
The child shapes can now  
be individually selected

◇ On the **Layers Panel**:



Before applying **Break Apart**

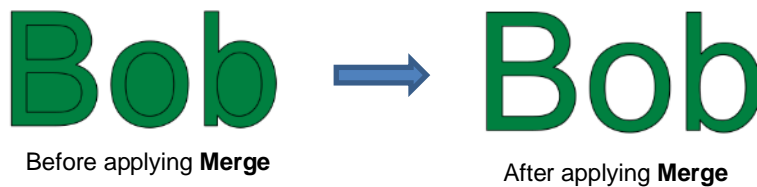
After applying **Break Apart**



- Once you apply **Break Apart**, you have complete editing control over each individual shape within a design. But be careful! It's also easy to inadvertently move an individual shape (especially the tiny ones) and you can risk messing up the design. Thus, only use **Break Apart** when needed and then, more importantly, know how to rejoin your shapes, which is covered in the next section.

### 3.12.2 Merge

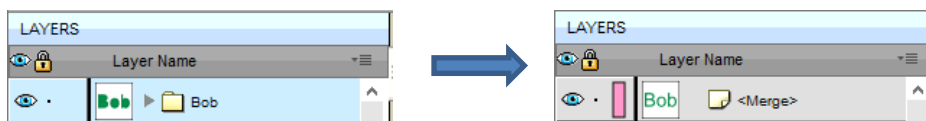
- The **Merge** function is used to combine individual paths, curves, and lines into a single shape. This is basically the opposite function to **Break Apart**.
- After selecting two or more shapes, the **Merge** function can be accessed in either of the following ways:
  - ◇ Go to **Object>Merge**
  - ◇ Press **Ctrl+Shift+B**
- If the **Merge** function is applied to the prior "Bob" example, after having **Break Apart** applied, the word will now become all one shape again. Separated child paths no longer exist and even the individual letters can no longer be selected:



Before applying **Merge**

After applying **Merge**

On the **Layers Panel**, this is what will appear:



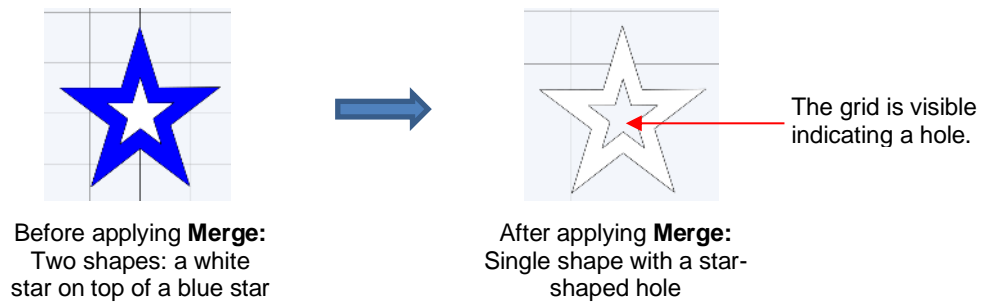
Before applying **Merge**

After applying **Merge**

- Note that if you apply **Merge** to shapes of different colors, they will all become one color because a merged shape is regarded as a single shape, even if the parts being merged do not touch:

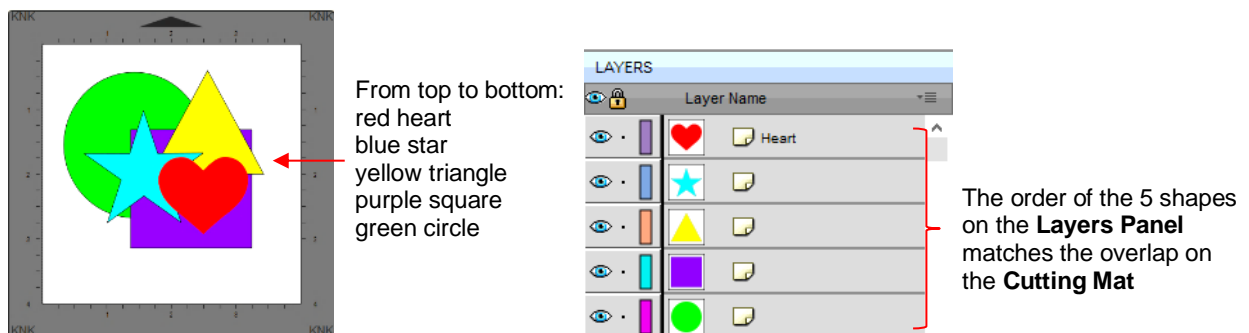



- ◇ A child shape that is merged with a parent shape essentially becomes a hole in that shape. This can be proven by having the grid showing when merging:



### 3.13 Arranging (Ordering) Shapes Video

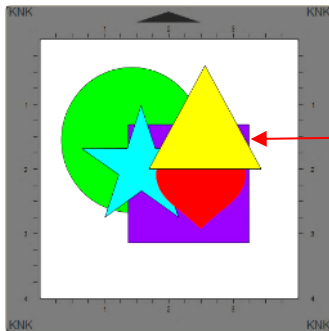
- The shape order affects the visual appearance on the **Cutting Mat**. A shape that is above or on top of another shape will appear above it on the **Layers Panel**.
- The following example shows five overlapping shapes and how they appear on the **Layers Panel**:



- In *Section 2.04.3*, moving layers was presented and could be used here to change the order of the shapes. However, another way to reorder these shapes is to select one and then access the **Arrange** functions using one of the following:
  - ◇ Go to **Object>Arrange**
  - ◇ Right-click and select **Arrange** from the popup menu
  - ◇ Click on the **Layers Menu** icon  and select **Arrange**
- Four options will then appear:
  - ◇ **Bring to Front** (or **Layer to Top**): Move selection to the very top
  - ◇ **Bring Forward** (or **Raise Layer**): Move selection up one level

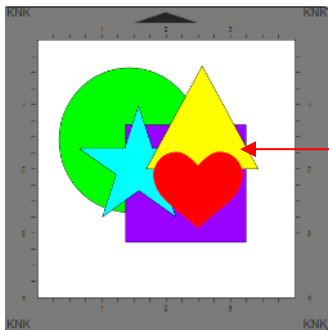
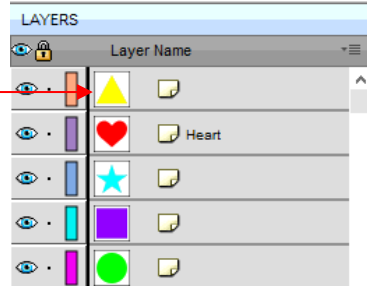
- ◇ **Send Backward (or Lower Layer):** Move selection down one level
- ◇ **Send to Back (or Layer to Bottom):** Move selection to the very bottom

- In the above example, the yellow triangle is selected and each option shows what would have changed if it had been applied:



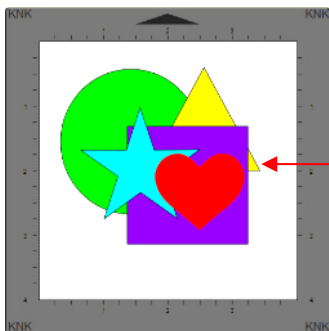
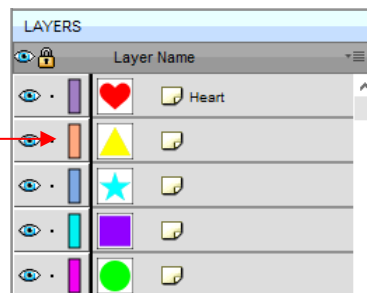
**Bring to Front**

Triangle moves to the top



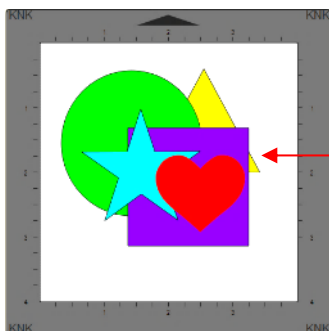
**Bring Forward**

Triangle moves above blue star but is still below red heart



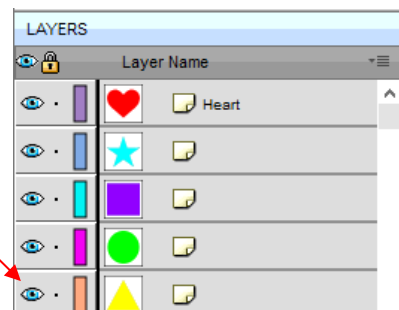
**Send Backward**

Triangle moves below purple square but is still above green circle



**Send to Back**

Triangle moves to the bottom

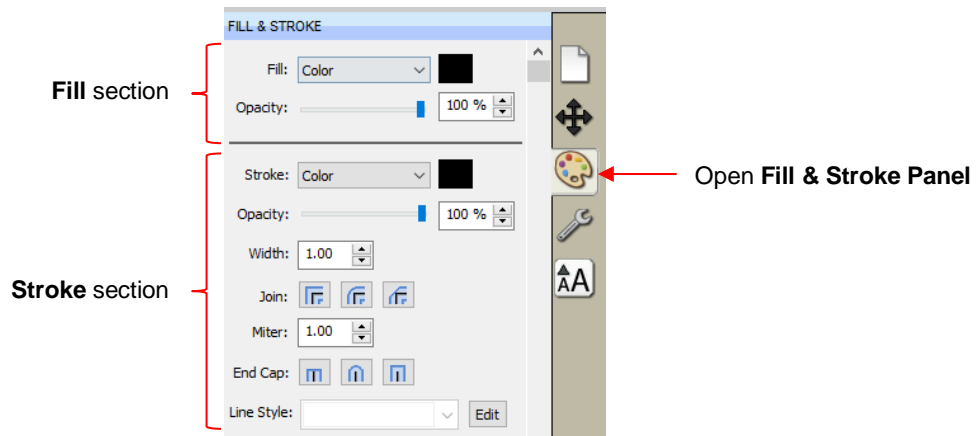


- It is worth noting that if any of the other layers had been locked or hidden, the movement of the triangle would have been the same. In other words, if the red heart had been hidden and/or locked, the triangle would still have ended up above it using **Bring to Front**.

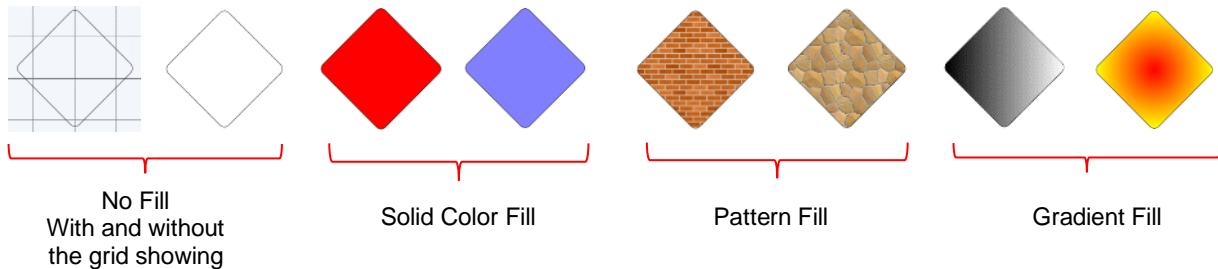
- There are also shortcut keys (Windows version only) for these four **Arrange** functions:
  - ◊ Bring to Front - **Ctrl+Shift+Up**
  - ◊ Bring Forward - **Ctrl+Up**
  - ◊ Send Backward - **Ctrl+Shift+Down**
  - ◊ Send to Back - **Ctrl+Shift+Down**

### 3.14 Fill & Stroke: Fill Video

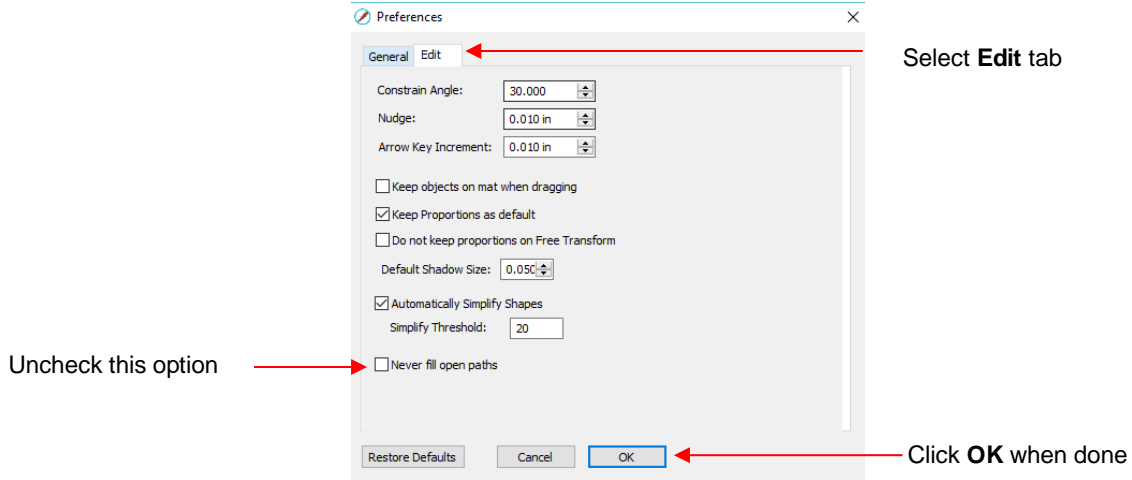
- The **Fill & Stroke Panel** provides options for changing how a shape or open path appears on the screen and, in the case of **Line Style** (solid versus dashed), how it cuts. This can be helpful in designing a project and also in print and cut applications.
- To open this panel, click on the **Fill & Stroke** icon on the **Properties Panel**:



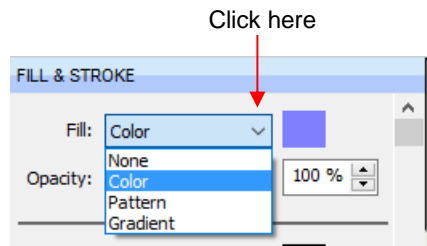
- Shapes can be filled with nothing, a solid color, a pattern or a gradient:



- By default, only closed shapes can display a fill. However, you can opt to have open shapes filled by going to **Edit>Preferences**, clicking on the **Edit** tab, and then unchecking the box next to **Never fill open paths**.

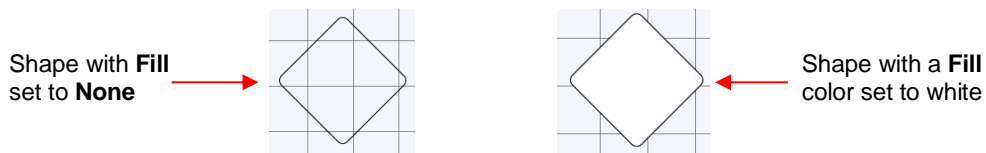


- To select a type of **Fill**, click on the drop-down menu and select from the four options:



### 3.14.1 No Fill

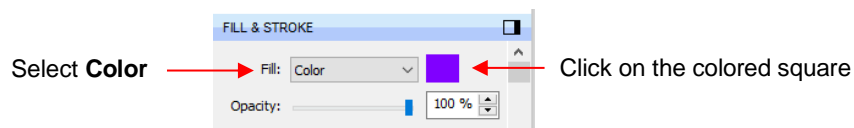
- From the **Fill** menu, select **None** and shape will be empty. Note that this is not the same as having a white fill. When **None** is selected, the grid will show through the shape if the **Show Grid** option (on the **Document Panel**) is turned on:



### 3.14.2 Color Fill

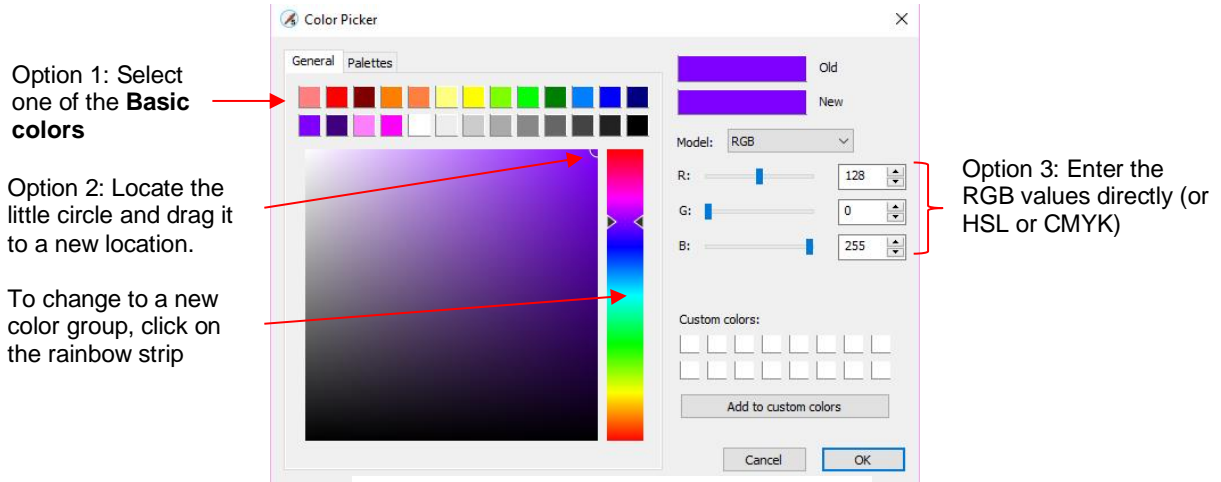
**Video**

- From the **Fill** menu, select **Color** and then click on the color box to the right:



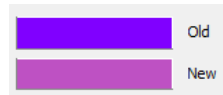
- The following **Color Picker** window opens where you have the option to select a basic color or create a custom color:



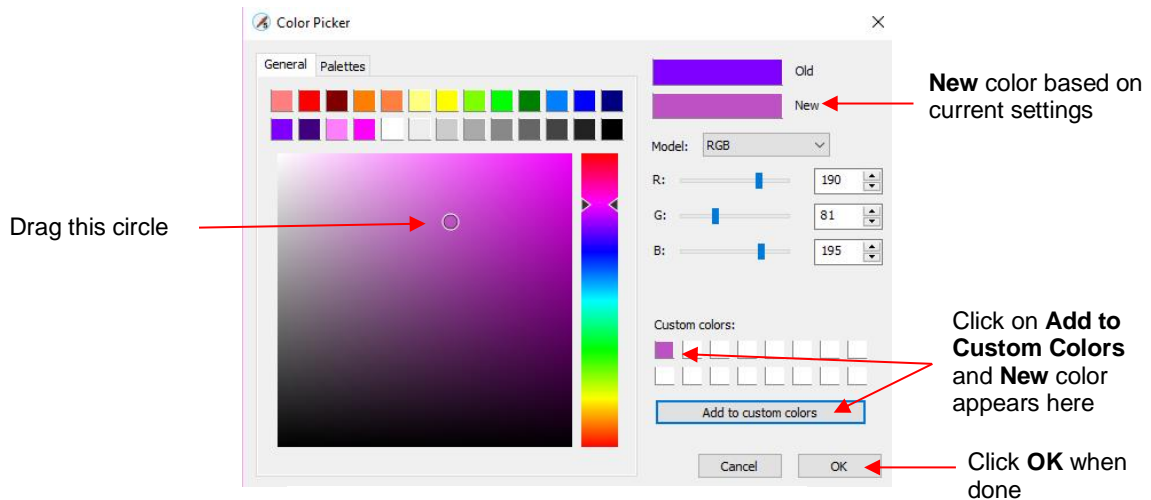


Note that a new **Custom Color** will only be saved and available in the current project.

- ◇ Option 1: Select any of the 13 colored squares. You can then adjust that new color, if desired, using Option 2 or Option 3.
- ◇ Option 2: Locate the tiny circle in one of the corners and drag it to change the tone and brightness for that color. Alternatively, you can click anywhere along the rainbow strip to change to a completely different color and then drag the smaller circle to refine that color.
- ◇ Option 3: From the **Model** menu, select **RGB**, **HSL**, or **CMYK** and enter the color values for the color you want to use.
- ◇ As you make changes, the **New** color box will change so you can immediately see the effects:



- ◇ Once you have the color you wish to use, click on **OK**. However, if you want that same color available to select again within this same file, click on **Add to custom colors** before clicking on **OK**.

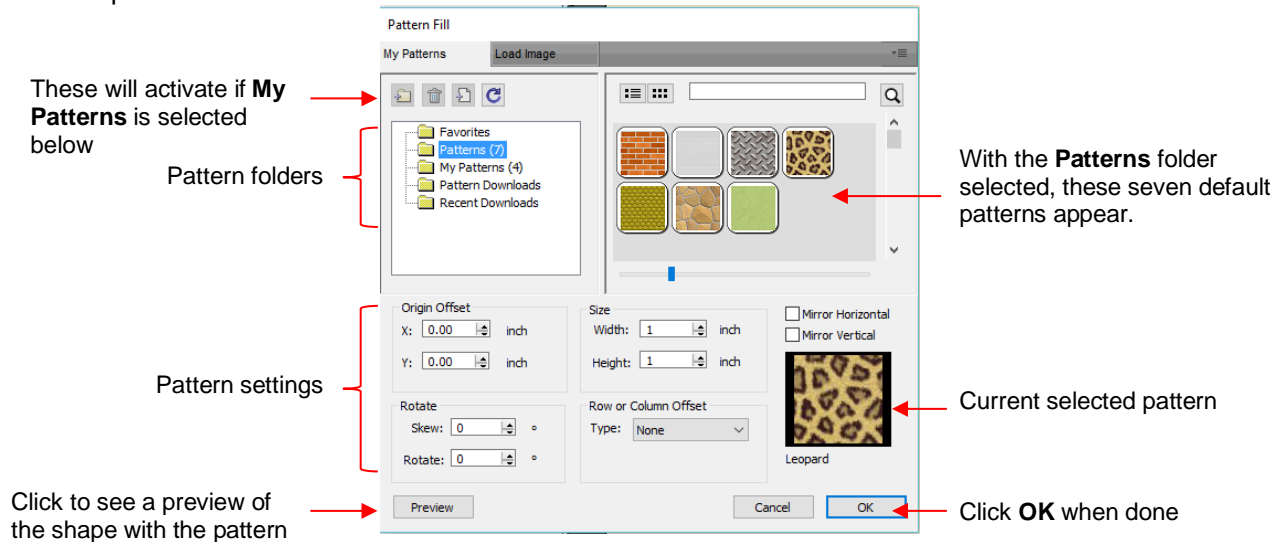


Note that a new **Custom Color** will only be saved and available in the current project.

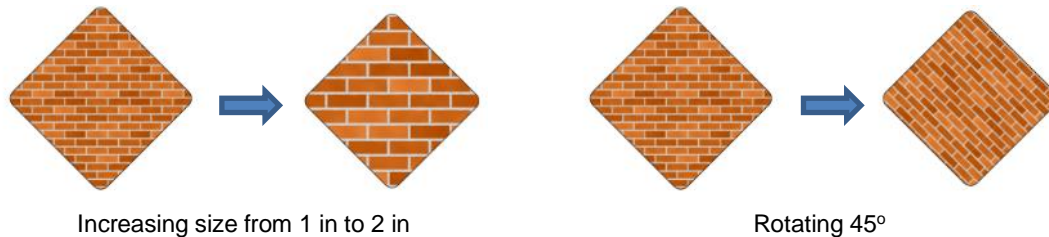
### 3.14.3 Pattern Fill

Video

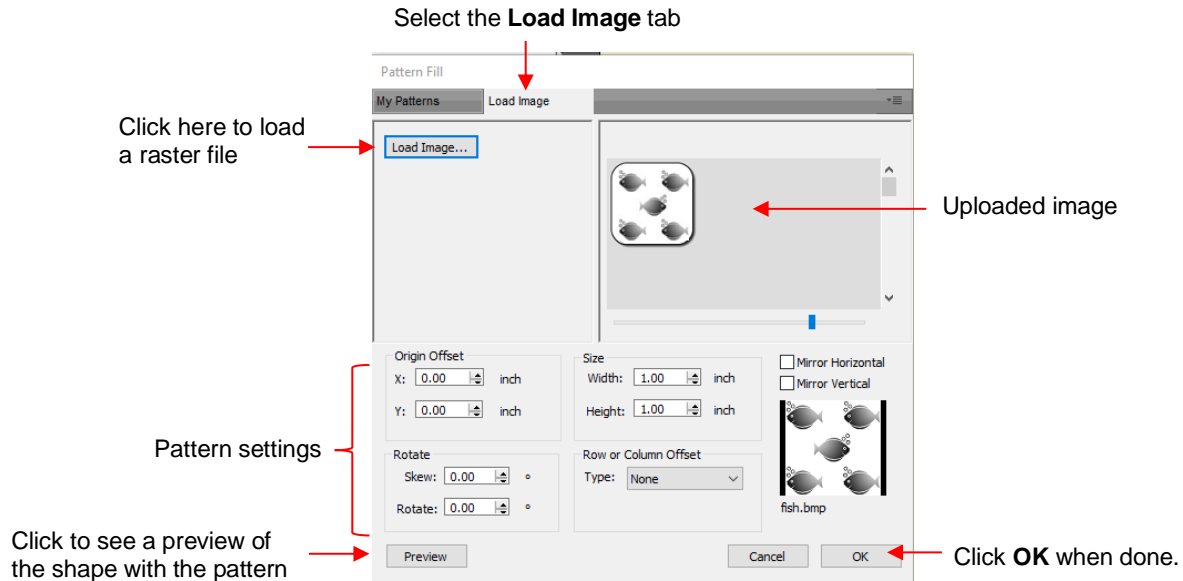
- From the **Fill** menu, select **Pattern** and then click on the color box to the right to open the following window where a pattern can be selected:



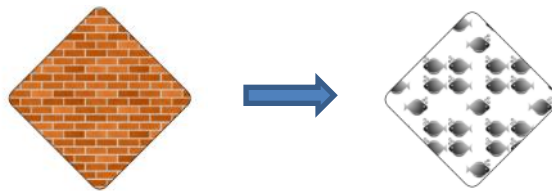
- Many of the functions in the **Pattern Fill** window are identical to those under the **Shapes** tab in the **Library**. Refer to *Section 2.03.1* for directions on searching, adding new folders, adding new files, adding to **Favorites**, etc.
- When adding your own patterns under **My Patterns**, select common raster file formats (e.g. BMP, PNG, JPG). Allow sufficient time for the pattern to load as raster files can be quite large.
- The pattern settings can be used to modify how the pattern appears in the filled shape, for example:



- The other tab, **Load image**, can be used to load a raster file to use as a pattern, if you do not wish to save it under **My Patterns**. It has pattern settings, as well:



◇ The selected shape now fills with the uploaded image:

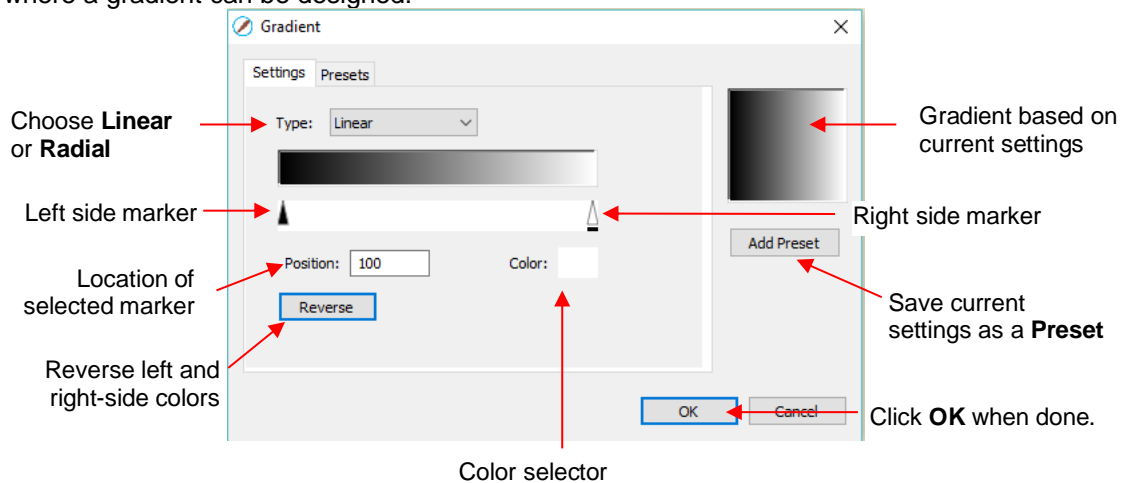


- If you need to fill a shape with a raster image, such as a photo, using the **Clip Path** and **Clip Mask** functions are easier alternatives. Refer to *Section 7.07*.

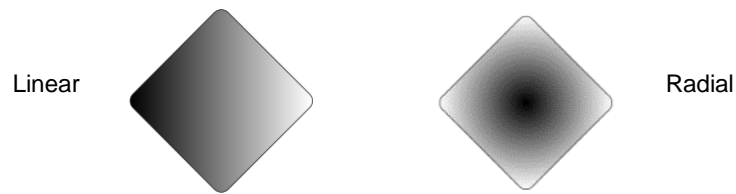
### 3.14.4 Gradient Fill

*Video*

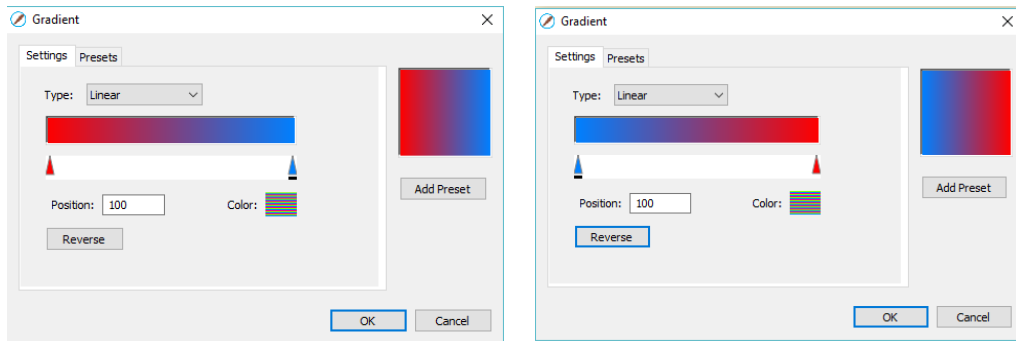
- From the **Fill** menu, select **Gradient** and then click on the color box to the right to open the following window where a gradient can be designed:



- **Type:** Choose **Linear** for a left-to-right gradient. Choose **Radial** for a center outwards gradient:



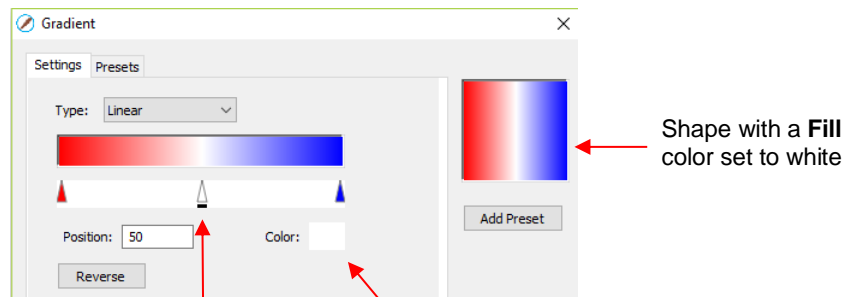
- ◇ To change colors, click on one of the markers, then click on the color selector box and choose a color from the **Color Picker** window. Repeat for the other marker. As with other color selections, you can choose a base color or create a custom color. Refer to *Section 3.14.2* for details on using the **Color Picker** window.
- ◇ After selecting new colors, the thumbnail image will update. Note that clicking on **Reverse** will switch the two chosen colors:



After selecting new colors

After applying **Reverse**

- ◇ More markers can be added by clicking on the **Position Bar** and then clicking on the **Color** selector. For example, white could have been added to the middle:

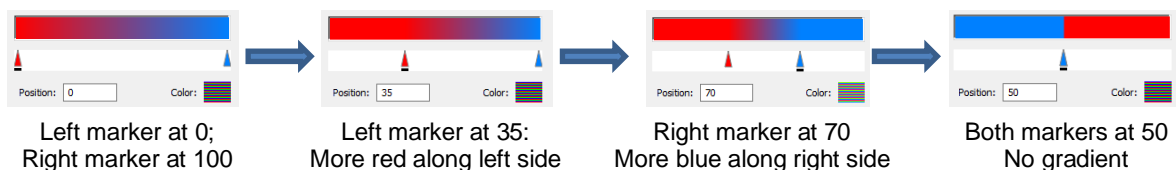


Click once to add a marker      Then click here to select color

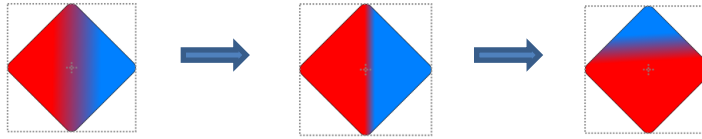
- ◇ If you inadvertently add a marker or decide you don't want one or more of the new ones, drag the marker downward and it will be removed.
- ◇ **Position:** The **Position** value is a location from 0 to 100 and applies to whichever marker is selected.

Note the little black line under a selected marker

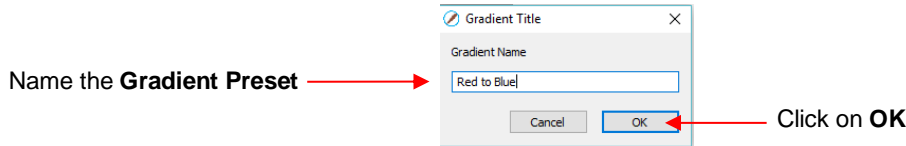
- ◇ Changing the **Position** moves the marker and resets where the gradient begins on that side. You can also manually slide the markers to change the **Position**, as well. Returning to the two-color example:



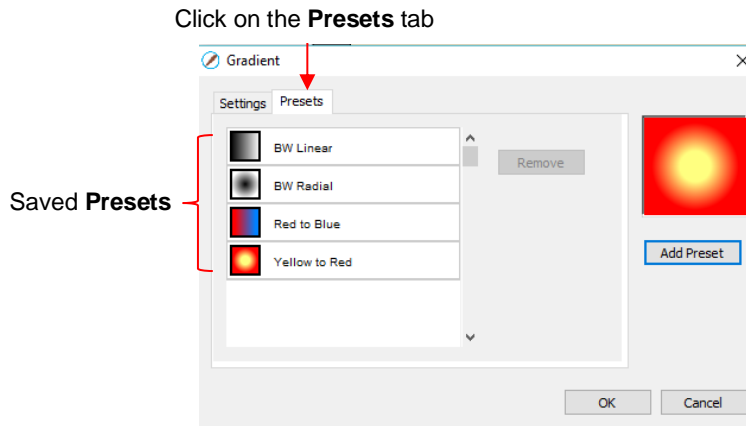
- ◇ The **Position** can also be changed after the shape is filled and the **Gradient** window is closed. On the **Tools Panel** is a **Gradient** tool. After selecting the shape, click on the **Gradient** icon and then drag the mouse across the shape to change the **Positions** and even rotate the gradient:



- ◇ If you want to save a particular gradient for future applications, click on **Add Preset** and a window will open where you can name this **Preset**:

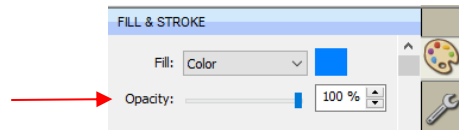


- ◇ To access your saved **Gradient Presets**, click on the **Presets** tab and the menu will appear:



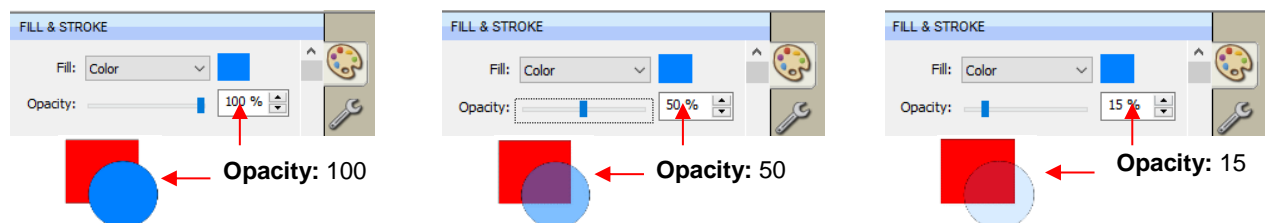
### 3.14.5 Opacity Video

- Just below the **Fill** setting is **Opacity**:



- Decreasing the **Opacity** setting will make a shape more transparent. This can be used for changing the appearance for printing or for revealing shapes that are completely or just partially hidden by other shapes.

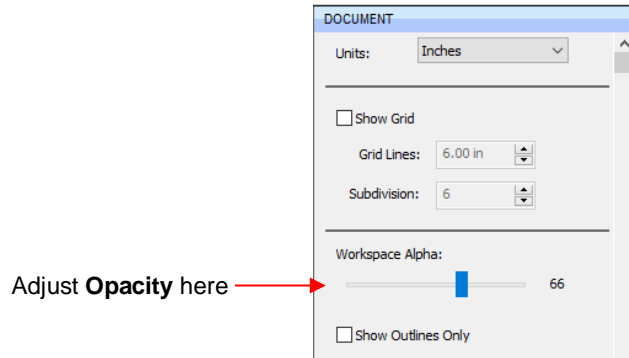
- ◇ In the following example, the **Opacity** is decreased on the blue circle, allowing the blocked portion of the red square to be seen:



- ◇ Lowering the **Opacity** can be applied to shapes filled with **Patterns** and **Gradients**, as well:



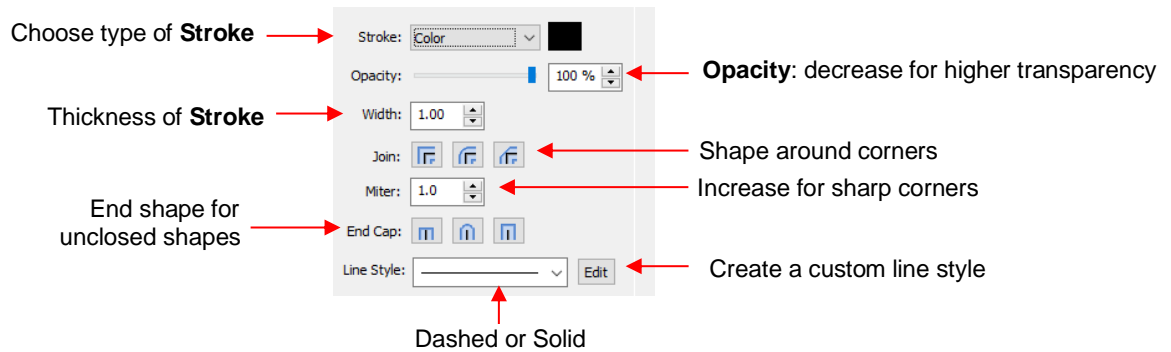
- ◇ If you want to decrease the **Opacity** for all shapes, the **Workspace Alpha** setting on the **Documents Panel** can be reduced from 100% to the desired level:



### 3.15 Fill & Stroke: Stroke

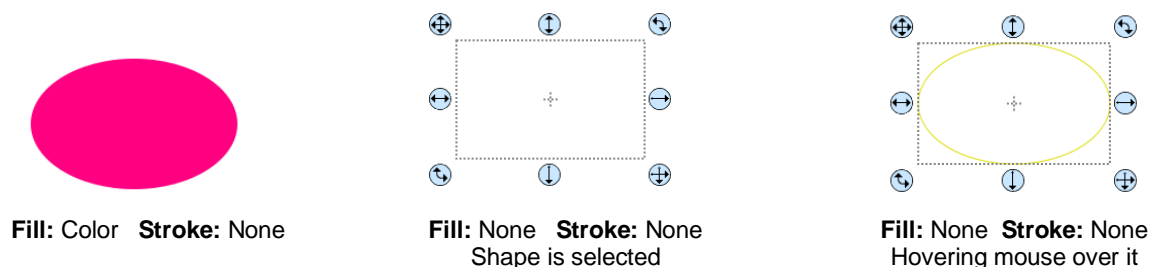
#### 3.15.1 Stroke Settings Video

- The **Stroke** settings are located below the **Fill** settings on the **File & Stroke Panel**. Note the following:

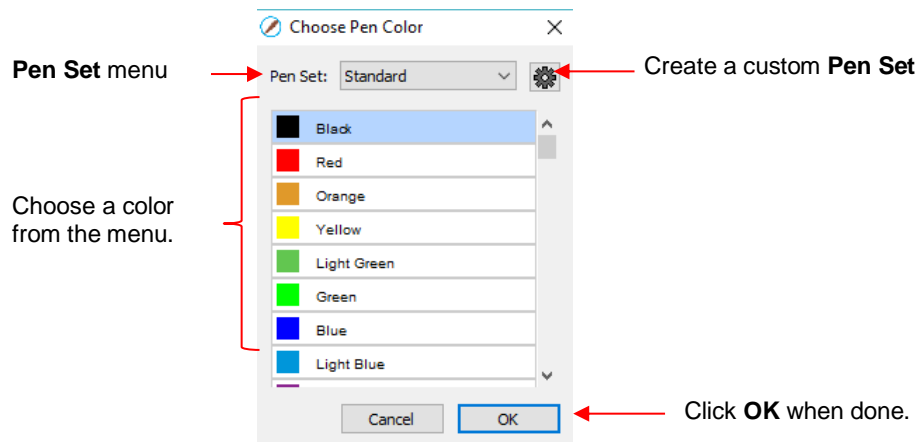



- **Stroke:** All shapes have a **Stroke** assignment using one of the following choices:

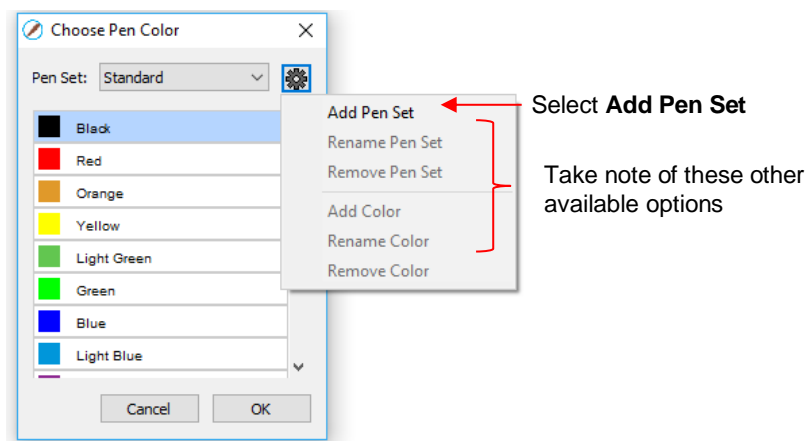
- ◇ **None:** The shape will not have an outline. Note that if you also choose **None** for the **Fill**, then you will not be able to see the shape at all unless you hover the mouse over it:



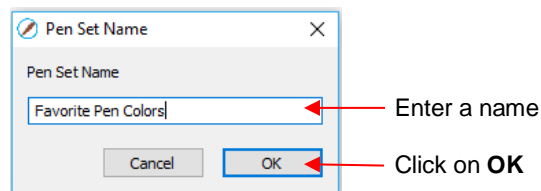
- ◇ **Color:** Once **Color** is selected, click on the box to the right and the **Color** window will open. This is the same window that opened when **Color** was selected under **Fill**. As with other color selections, you can choose a base color or create a custom color.
- ◇ **Pen Color:** Choose this if you are recoloring lines based on selecting actual pens or other tools to switch out during the cut.
- ◇ When you choose **Pen Color** and then click on the box to the right, the **Choose Pen Color** window opens:



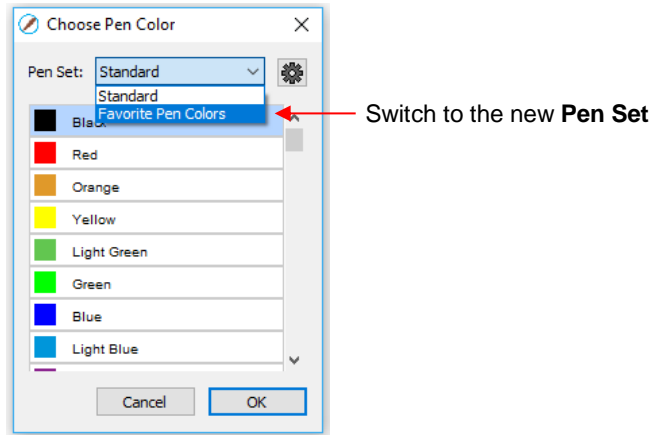
- Select the desired color from the menu and click **OK**. You also have the option to create your own custom **Pen Set** by clicking on the small icon in the upper right corner . The following menu appears and you can then select **Add Pen Set**:




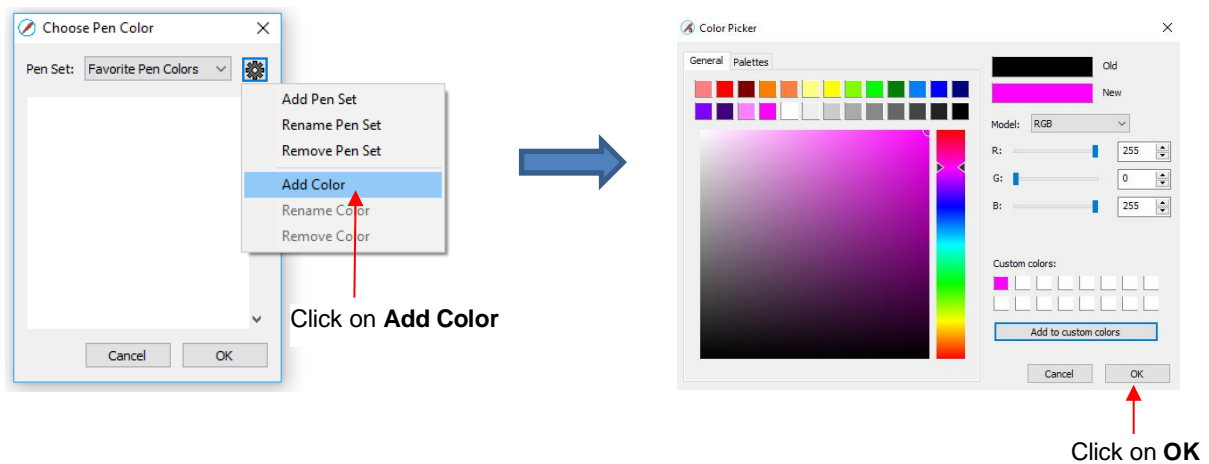
- Next, name the pen set:



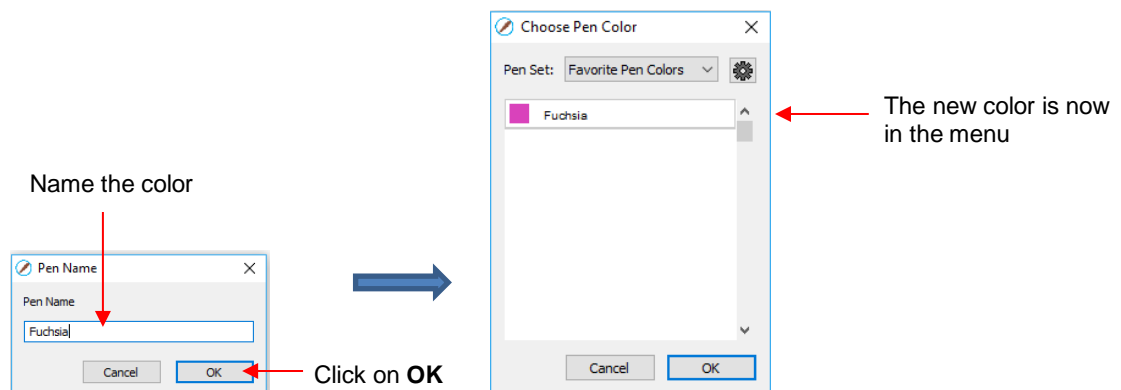
- In the **Pen Set** menu, you can now select the new **Pen Set Name**:



- ◇ Again, click on the small icon in the upper right corner  and you can begin adding pen colors with their respective color values or just scroll to create colors you like:



- ◇ After clicking on **OK**, you will be prompted to name this color and then it will show up in the menu:



- ◇ In the same menu where you can add new colors, are options to **Remove Color** or **Rename Color**. Before you can use these options, you will need to close and reopen SCAL.

- **Opacity:** Decreasing the **Opacity** setting will make the **Stroke** color more transparent. It's not particularly noticeable until you increase the **Stroke Width**, thus examples will be shown in the next bullet.



- **Width:** Increasing the **Width** will make the **Stroke** thicker. The units are in pixels thus the same values give the same results whether your SCAL **Units** are set to inches, cm, or mm.



**Stroke Width:** 1  
**Opacity:** 100%



**Stroke Width:** 10  
**Opacity:** 100%




**Stroke Width:** 20  
**Opacity:** 100%




**Stroke Width:** 20  
**Opacity:** 50%

- ◇ **IMPORTANT:** The **Stroke Width** does not affect how a shape or line is cut or drawn. It's only used for display and printing purposes.

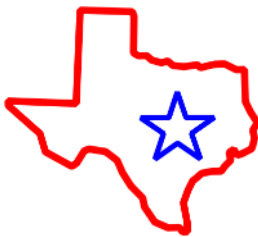
- **Join** consists of three options which affect how sharp corners are handled:

- ◇ **Miter**  : Corners are sharp but will become beveled at low values of **Miter**

- ◇ **Round**  : Corners are rounded off.

- ◇ **Bevel**  : Corners are clipped at a 45° angle.

- Just as with **Opacity**, there's not a strong visual difference if the **Stroke Width** is small. Thus to illustrate **Join**, a **Stroke Width** of 20 will be used:



**Join:** Miter  
**Miter:** 1.0  
Slightly beveled



**Join:** Miter  
**Miter:** 3.5  
Sharp corners




**Join:** Round




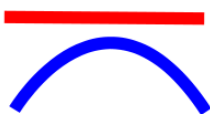
**Join:** Bevel

- **End Caps:** Unclosed shapes, such as lines and arcs, can have the **Stroke** shape on the ends changed, similar to the **Join** setting. The choices are:

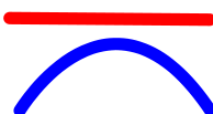
- ◇ **Butt**  : The end is squared off, aligned with the actual end of the path

- ◇ **Round**  : The end is rounded.

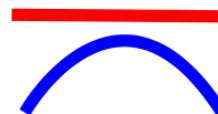
- ◇ **Square**  : The end is squared off and extends beyond the actual end based on the **Stroke Width**.



**End Cap:** Butt



**End Cap:** Round



**End Cap:** Square

- To better illustrate the difference between **Butt** and **Square**, the original line is shown in a close up:



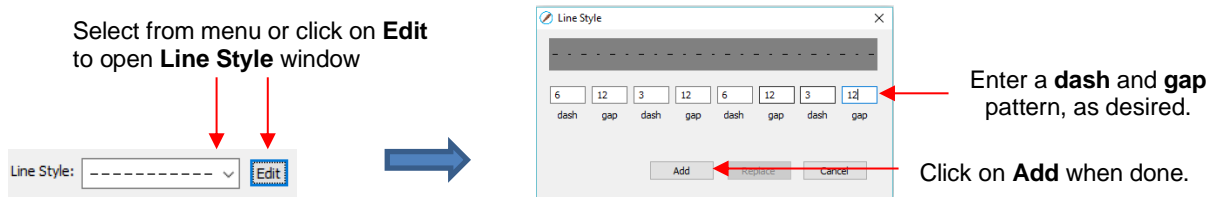
**End Cap: Butt** – cap ends at the line end



**End Cap: Square** – cap extends beyond end

### 3.15.2 Stroke Line Style

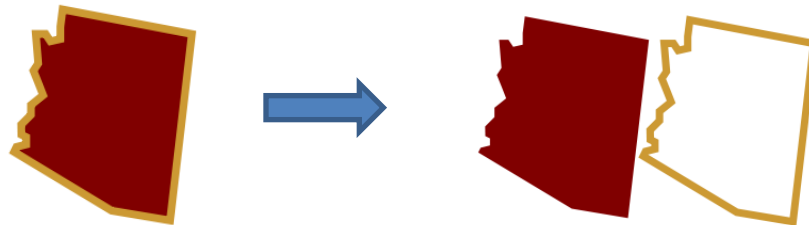
- One additional **Stroke** setting deserves its own subsection because it also affects how a shape will be drawn or cut by your cutter.
- The **Line Style** can be either solid or dashed. If dashed is selected, then one of the default patterns can be selected or you can specify the dash length and spacing desired by clicking on **Edit**:



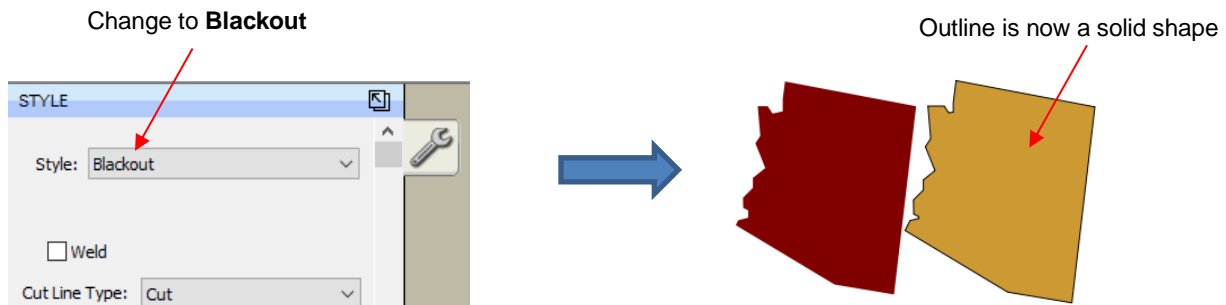
- ◇ The **Line Style** selected will be displayed on the screen and will be cut or drawn with that style by the cutter. Again, the **Stroke Width**, however, is ignored by the cutter.

### 3.15.3 Converting Strokes into Closed Shapes Video

- In the event you decide the stroke should be its own shape, select the shape and go to **Path>Stroke to Path**. You can now drag the stroke shape away from the original:




- If you want the new outline shape to be a solid background instead of an open frame, select it and then, on the **Style Panel**, change the **Style** settings from **Normal** to **Blackout**:



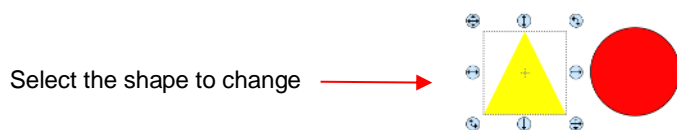
- More about the **Style** setting is covered in *Section 8.01*. There are also other ways to create shadow layers. Refer to **Path Offset** (*Section 6.05*) and **Shadow Layer** (*Section 7.05*).

### 3.16 Dropper Tool Video

- Shapes can also have the **Fill**, **Stroke** or both changed based on the settings for another shape. This is accomplished using the **Dropper** tool  on the **Tools Panel**.

- To use this function:

- ◇ Select the shape to be recolored. In this example, it will be a yellow triangle with no **Stroke**:



- ◇ Click on the **Dropper** tool icon and choose a setting from the **Tool Options**:



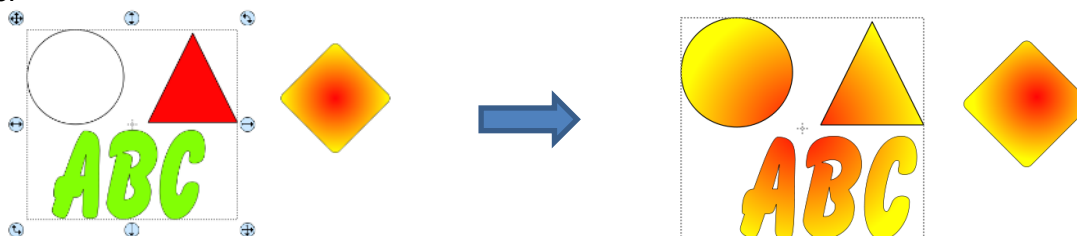
- ◇ Finally, click on the shape that has the color property you wish to use. In this case, it's the red circle with the black **Stroke**. The selected triangle is recolored to match.



Move the mouse over the shape that has the desired color(s)

After clicking on the circle, the triangle **Fill** color is now red and the **Stroke** color is now black

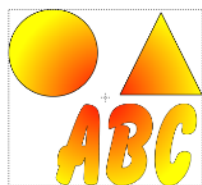
- Note that other properties, such as **Stroke Width** or **Opacity**, will not be copied onto the selected shape. On the other hand, if the **Fill** is a pattern or gradient, it will be copied. You can also fill multiple shapes at once:



A selection of three shapes will be recolored with the fill gradient in the diamond on the right

All three shapes are filled at once

- Note, however, that the three shapes were treated as one object when filling with the gradient. A different result is obtained if each shape had been filled separately:



All three shapes recolored at once




Shapes recolored individually

## 3.17 Cutting, Copying, Pasting, Duplicating


### 3.17.1 Cutting to the Clipboard

[Video](#)

- To cut shapes to the clipboard (copy to the clipboard and delete from the **Cutting Mat**), first select the shape or shapes and then use any of the following:
  - ◇ Click on the **Cut** icon located on the upper **Toolbar** 
  - ◇ Right-click on the screen and select **Cut**
  - ◇ Press **Ctrl+X**
  - ◇ Go to **Edit>Cut**


### 3.17.2 Copying to the Clipboard

[Video](#)

- To copy shapes to the clipboard, first select the shape or shapes and then use any of the following:
  - ◇ Click on the **Copy** icon located on the upper **Toolbar** 
  - ◇ Right-click on the screen and select **Copy**
  - ◇ Press **Ctrl+C**
  - ◇ Go to **Edit>Copy**
- To make multiple copies, refer to the **Duplicate** function described later in this section.

### 3.17.3 Pasting from the Clipboard

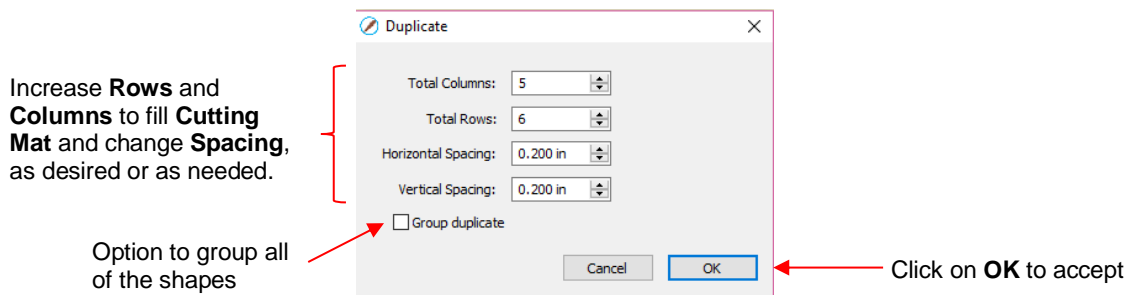
[Video](#)

- There are three **Paste** functions in SCAL:
  - ◇ **Paste**: pastes the shape offset slightly (0.25") from the original
  - ◇ **Paste in Place**: pastes the shape in exactly the same location as the original
  - ◇ **Paste (Auto Fill)**: pastes enough copies to auto-fill the **Cutting Mat**
- To **Paste** shapes from the clipboard, use any of the following:
  - ◇ Click on the icon located on the upper **Toolbar** 
  - ◇ Right-click on the screen and select **Paste**
  - ◇ Press **Ctrl+V**
  - ◇ Go to **Edit>Paste**
- To **Paste in Place** shapes from the clipboard, use any of the following:
  - ◇ Right-click on the screen and select **Paste in Place** (without any shapes selected)
  - ◇ Press **Ctrl+Shift+V**
  - ◇ Go to **Edit>Paste in Place**
- To **Paste (Auto Fill)**: use either of the following:
  - ◇ Press **Ctrl+Shift+Alt+V**

- ◇ Go to **Edit>Paste (Auto Fill)**

### 3.17.4 Duplicating – Duplicate Video

- The **Duplicate** function allows you to make multiple copies of a shape aligned in rows and/or columns, with the spacing you desire. To access **Duplicate**, first select the shape(s) and then use either of the following:
  - ◇ Press **Ctrl+D**
  - ◇ Go to **Object>Duplicate**
- To fill your grid with images, move the selected shape(s) to the top left corner of the gridded part of the **Cutting Mat**. With the shape(s) still selected, use **Ctrl-D** (or **Object>Duplicate**) to open the **Duplicate** window. As you begin clicking on **Total Columns** and **Total Rows**, the mat will fill with the shapes. Change the **Spacing**, as needed, to better fit the duplicates. Click on **OK** to accept:



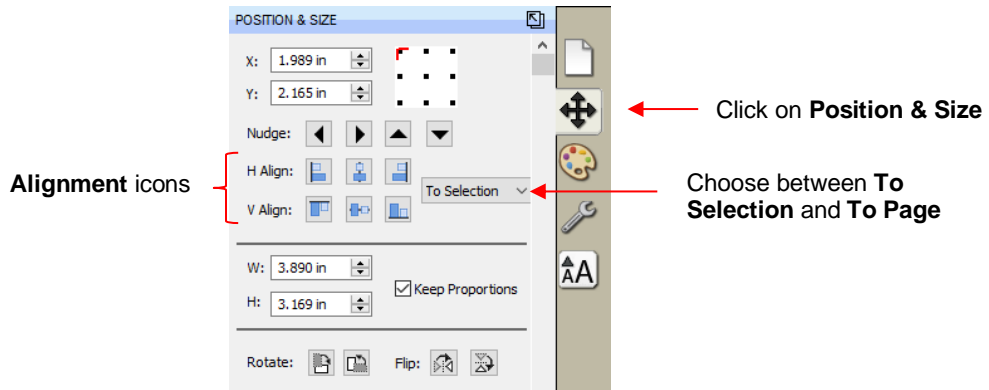
- To create a single row of repeats, set the **Rows** value to 1. For a single column of repeats, set the **Columns** value to 1. To overlap the repeats, enter a negative number under **Spacing**. Refer to *Section 7.06.1* for a tutorial on how this function can be used to create a border.
- There is also a **Duplicate Rotated** function to arrange the duplicates in a circular formation. Because this is more typically used for design purposes, it is covered in *Section 7.08*.

### 3.17.5 Quick Duplicate Video

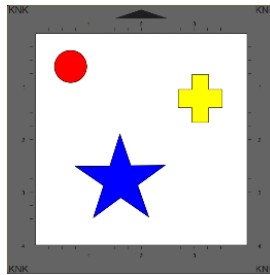
- A quick way to make a single copy of a shape is to hold the **Alt** key while dragging the shape. The original will be left behind and new copy will be moved with the mouse.
- You can also hold the **Alt** key and left-click on a shape and it will duplicate that shape leaving the copy on top of the original.

## 3.18 Alignment

- There are fourteen functions used to align shapes, seven of them with respect to the **Cutting Mat** (referred to as **Page**) and another seven with respect to one another (referred to as **Selection**). After selecting two or more shapes, these functions can be accessed using either of the following:
  - ◇ Go to **Object>Alignment**
  - ◇ Click on an alignment icon from the **Position & Size** window on the **Properties Panel**:






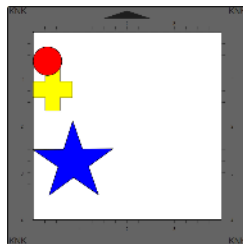
- The following three shapes, in their current relative positions, will be used to illustrate what happens when each alignment function is applied. Note that a small custom mat was created to facilitate screenshots:



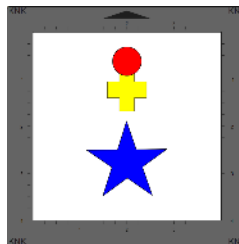
### 3.18.1 Align to Page Video

- Make sure the alignment mode is set to **Align to Page**. To do this, either:
  - Go to **Object>Alignment** and make sure **Align to Page** is checked
  - Select **To Page** on the **Position & Size** panel
- With the shapes selected, the horizontal alignment options are:

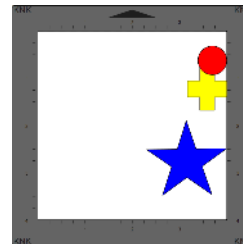
- Align Left** aligns shapes along the left side of the **Cutting Mat**. 
- Align Horizontal Center** aligns shapes through the center of the **Cutting Mat**. 
- Align Right** aligns shapes along the right side of the right side of the **Cutting Mat**. 




Align Left




Align Horizontal Center

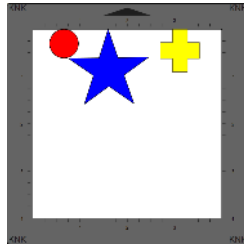


Align Right

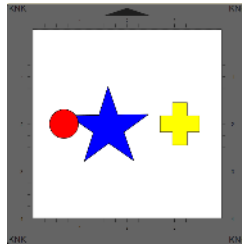
- With the shapes selected, the vertical alignment options are:
  - Align Top** aligns shapes along the top side of the **Cutting Mat**. 

◇ **Align Vertical Center** aligns shapes through the center of the **Cutting Mat**. 

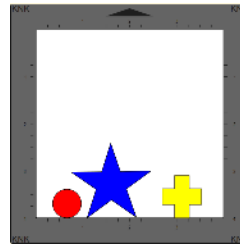
◇ **Align Bottom** aligns shapes along the bottom side of the **Cutting Mat**. 



Align Top



Align Vertical Center

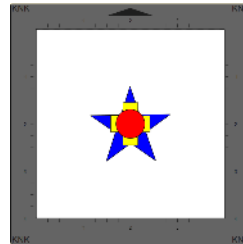


Align Bottom

• To center all three shapes in the middle of the **Cutting Mat**, use either:

◇ A combination of **Align Horizontal Center** and **Align Vertical Center**:  

◇ Go to **Object>Alignment>Align Centers**




Align Centers

### 3.18.2 Align to Selection [Video](#)

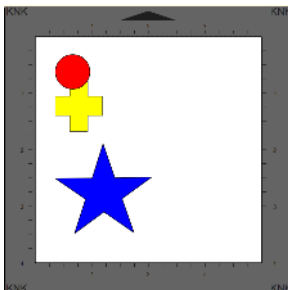
• First, make sure the alignment mode is set to **Align to Selection**. This is done by either making sure **To Selection** is chosen on the **Position & Size** panel or by going to **Object>Alignment** and making sure **Align to Selection** is checked.

• With the shapes selected, the horizontal alignment options are:

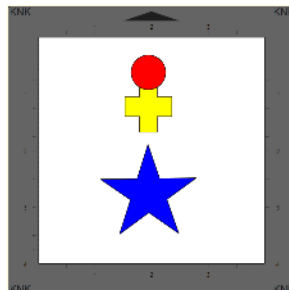
◇ **Align Left** aligns shapes along the left side of the leftmost shape of the group. 

◇ **Align Horizontal Center** aligns shapes to a vertical axis through the center. 

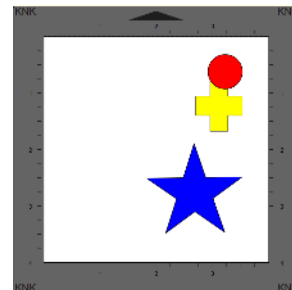
◇ **Align Right** aligns shapes along the right side of the rightmost shape of the group. 



Align Left






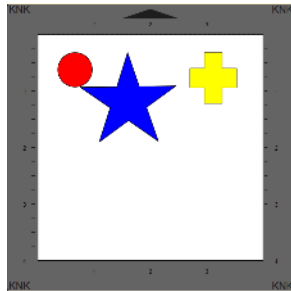
Align Horizontal Center



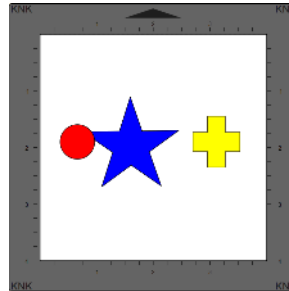
Align Right

- With the shapes selected, the vertical alignment options are:

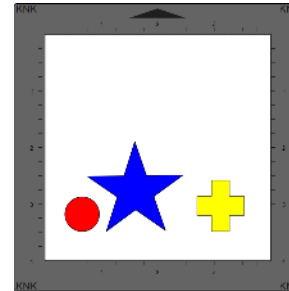
- ◇ **Align Top** aligns shapes along the top side of the uppermost shape of the group. 
- ◇ **Align Vertical Center** aligns shapes to a horizontal axis through the center. 
- ◇ **Align Bottom** aligns shapes along the bottom side of the bottommost shape of the group. 



Align Top



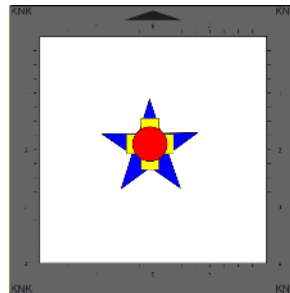
Align Vertical Center



Align Bottom

- To center all three shapes, use either:

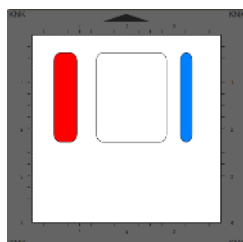
- ◇ A combination of **Align Horizontal Center** and **Align Vertical Center**:  
- ◇ Go to **Object>Alignment>Align Centers**



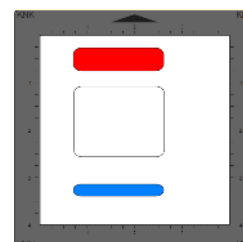
Align Centers

### 3.19 Distribute Video

- The **Distribute** function rearranges the spacing between shapes. Similar to the **Alignment** function, you can **Distribute to Page (Cutting Mat)** or you can **Distribute to Selection** (selected shapes). There's also a third, called **Distribute to Selection Below**, which distributes based on whatever shape is positioned at the lowest level on the **Layers Panel** and its difference in size relative to the outermost shape in the opposite direction of the distribute option (and yes, this is confusing, but will be explained in *Section 3.19.3*)
- After selecting the shapes, these functions can be accessed by going to **Object>Distribute**.
- The following three shapes, in their current relative positions, will be used to illustrate what happens with each distribute function when **Distribute to Selection** or **Distribute to Page** is applied. Note that a small custom mat was created to facilitate screenshots:



Will be used for horizontal distribute examples



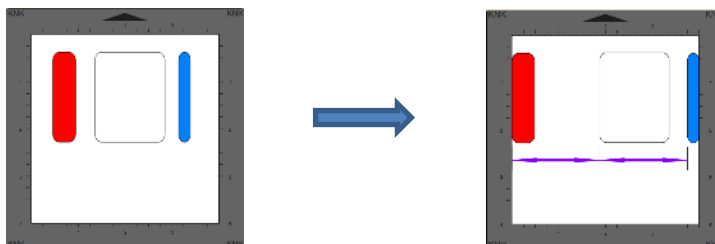
Will be used for vertical distribute examples



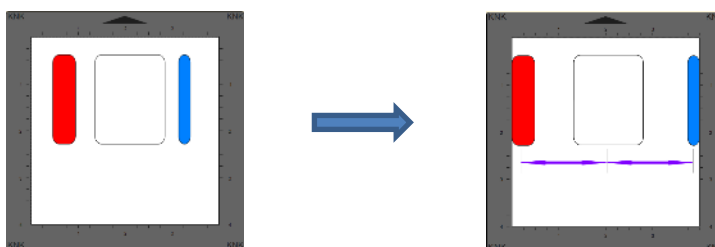
### 3.19.1 Distribute to Page Video

- Select the shapes and go to **Object>Distribute** and then make sure the **Distribute to Page** option is checked. In this mode, the two outermost shapes will align with the **Cutting Mat** and then other shapes will be evenly spaced from one side of the mat to the other, according to which additional option is chosen. All options, with screenshots, are presented. The purple arrows indicate equal spacing.
- With the shapes selected, the horizontal distribute options are:

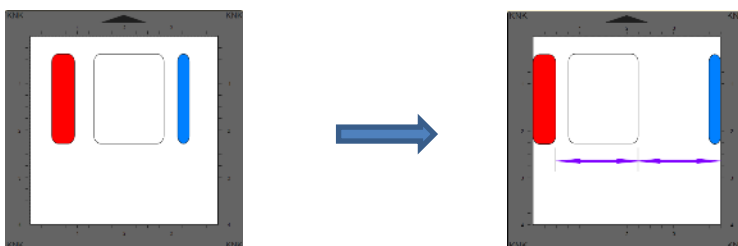
- ◇ **Distribute Left:** spaces shapes so that the left sides of each shape are the same distance apart:



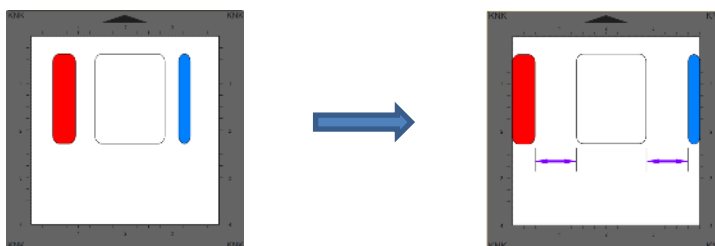
- ◇ **Distribute Center Horizontally:** spaces shapes so that the centers of each shape are the same distance apart:



- ◇ **Distribute Right:** spaces shapes so that the right sides of each shape are the same distance apart:

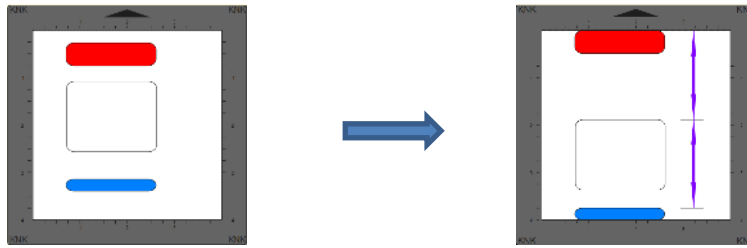


- ◇ **Distribute Space Horizontally:** spaces shapes so that the gaps between the shapes are the same.

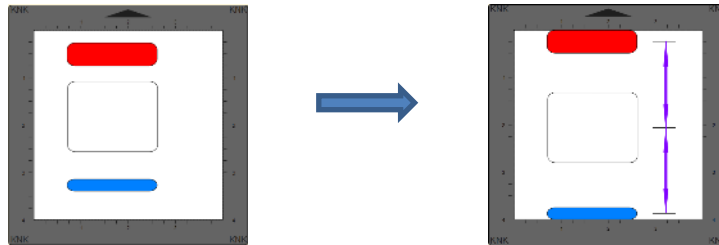


- With the shapes selected, the vertical distribute options are:

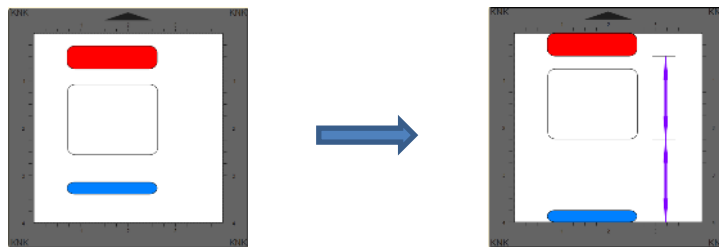
- ◇ **Distribute Top:** spaces shapes so that the top sides of each shape are the same distance apart:



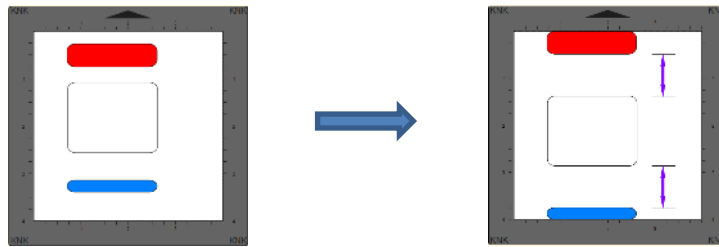
- ◇ **Distribute Center Vertically:** spaces shapes so that the centers of each shape are the same distance apart:



- ◇ **Distribute Bottom:** spaces shapes so that the bottom sides of each shape are the same distance apart:

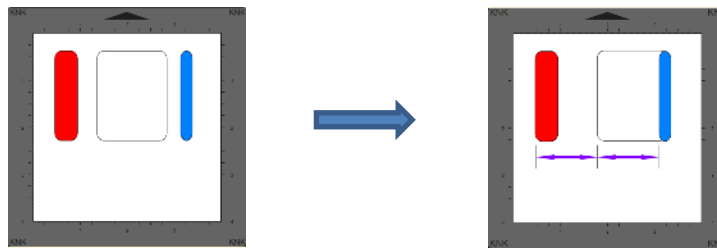


- ◇ **Distribute Space Vertically:** spaces shapes so that the gaps between the shapes are the same.

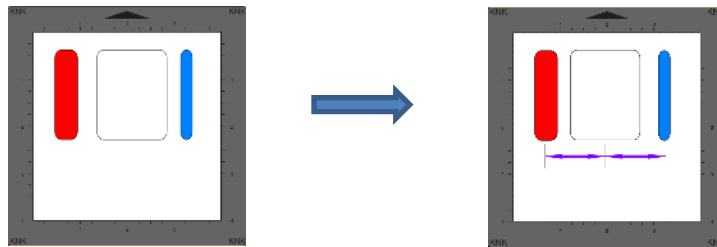


### 3.19.2 Distribute to Selection Video

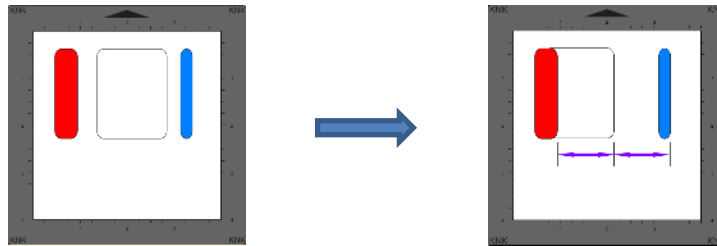
- Select the shapes and go to **Object>Distribute** and then make sure **Distribute to Selection** is checked. In this mode, the two outermost shapes will remain in position and then other shapes will be evenly spaced, according to which additional option is chosen. All options, with screenshots, are presented. Again, the purple arrows indicate equal spacing.
- With the shapes selected, the horizontal distribute options are:
  - ◇ **Distribute Left:** spaces shapes so that the left sides of each shape are the same distance apart:



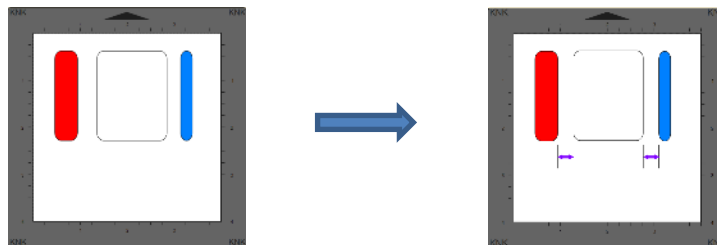
- ◇ **Distribute Center Horizontally:** spaces shapes so that the centers of each shape are the same distance apart:



- ◇ **Distribute Right:** spaces shapes so that the right sides of each shape are the same distance apart:

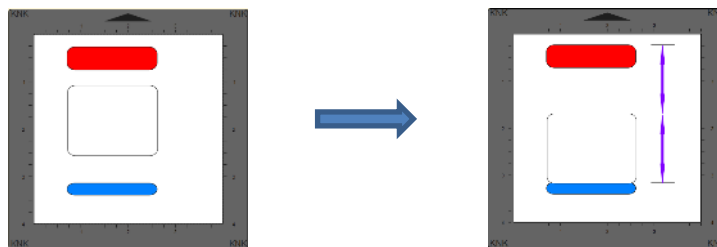


- ◇ **Distribute Space Horizontally:** spaces shapes so that the gaps between the shapes are the same.

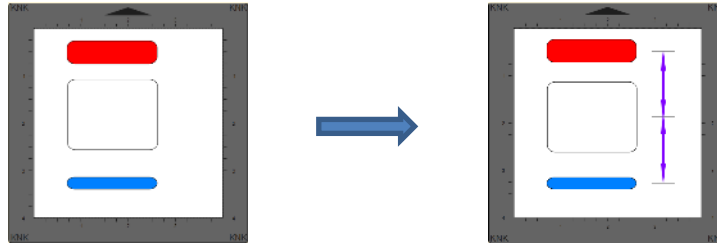


- With the shapes selected, the vertical distribute options are:

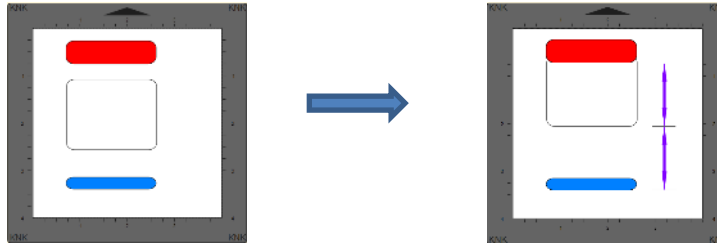
- ◇ **Distribute Top:** spaces shapes so that the top sides of each shape are the same distance apart:



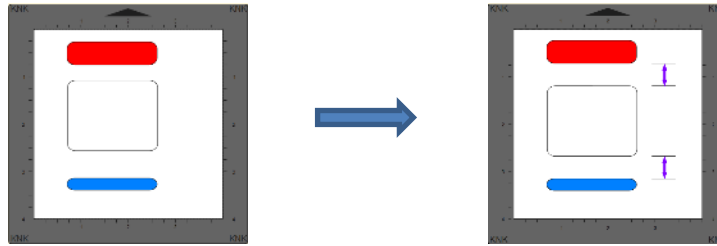
- ◇ **Distribute Center Vertically:** spaces shapes so that the centers of each shape are the same distance apart:



- ◇ **Distribute Bottom:** spaces shapes so that the bottom sides of each shape are the same distance apart:



- ◇ **Distribute Space Vertically:** spaces shapes so that the gaps between the shapes are the same.

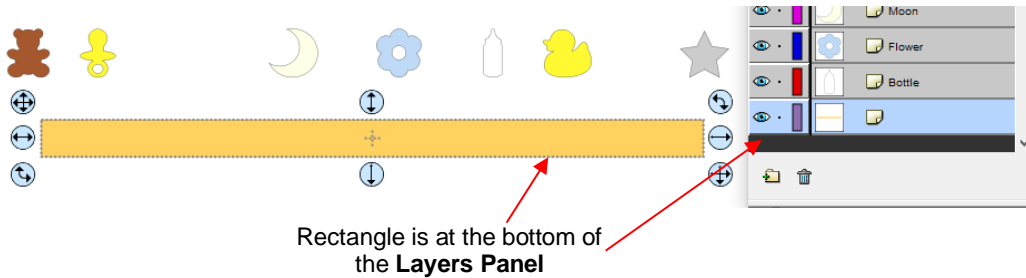


### 3.19.3 Distribute to Selection Below

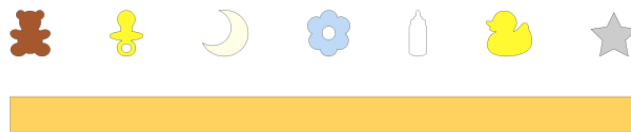
- This option is used to evenly distribute several shapes relative to another shape (called the **Reference Shape**) that needs to be positioned at the bottom of the **Layers Panel** (thus the term “**Selection Below**”).
  - ◇ It will also move the shapes at the furthest ends of the selection to align with the bounding edges of this **Reference Shape** and then the distribution will be based on whichever menu option you’ve chosen, just like previously shown in *Sections 3.19.1* and *3.19.2*.
  - ◇ Thus, you always need a minimum of 4 shapes so that one can be the **Reference Shape** and the other 3 can be spaced as desired.
- In this example, several shapes are to be spaced along a rectangle for the purpose of making a welded border:



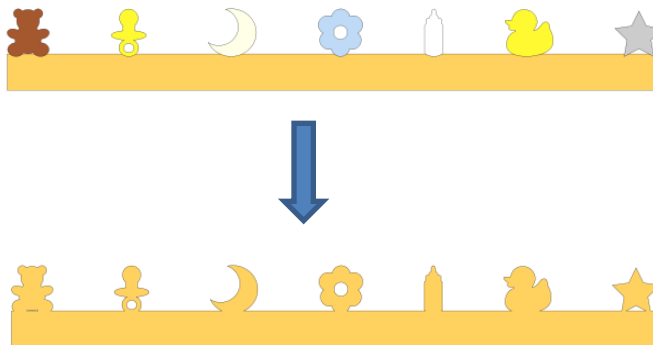
- Make sure the rectangle is the bottommost layer on the **Layers Panel**:



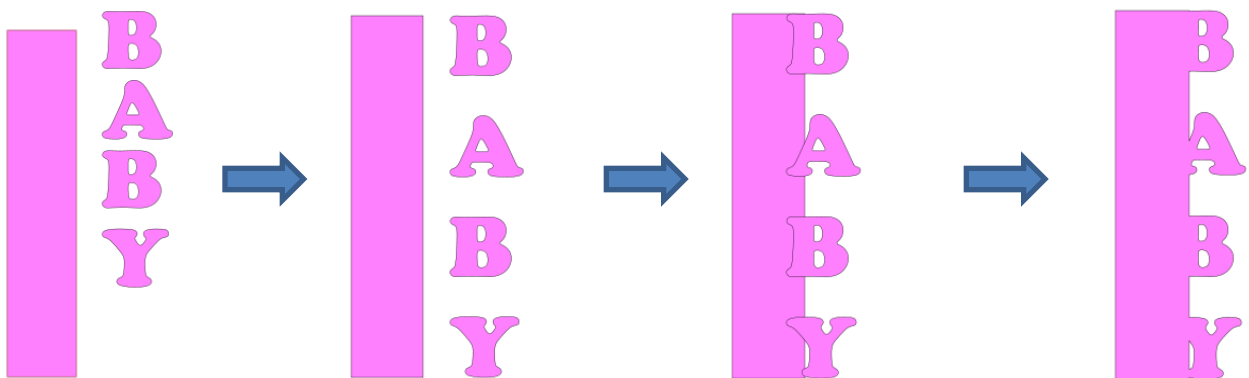
- Select all of the shapes and go to **Object>Distribute** and then make sure **Distribute to Selection Below** is checked. Go back to **Object>Distribute** and select one of the options in the horizontal section. In this example, **Distribute Space Horizontally** will be selected. The result is that the leftmost shape (the teddy bear) aligns with the left side of the rectangle, the rightmost shape (the star) aligns with the right side of the rectangle, and the remaining shapes are positioned so that the same amount of space is between each one:



- The shapes can now be moved down to overlap the rectangle and everything selected and welded (using **Path>Union**):



- The same technique could be used to distribute letters along a rectangle in a similar manner:



Individual letters and a rectangle are created. The rectangle is the bottommost layer.


Using **Distribute to Selection Below** and the **Distribute Space Vertically** option, the letters are equally spaced and aligned with the top and bottom of the rectangle. Then moved over to overlap the rectangle.

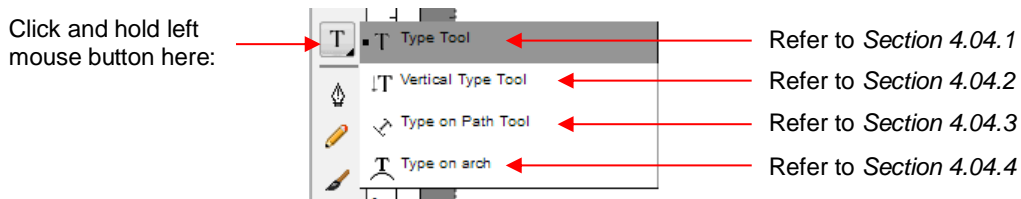
**Path>Union** is applied.

## 4. SCAL: Working with Text

### 4.01 Text Options

Video


- There are four modes for adding text to the **Cutting Mat**:
  - ◇ **Type Tool**: normal left to right typing of text
  - ◇ **Vertical Type Tool**: vertical aligned lettering
  - ◇ **Type on Path Tool**: text is aligned along the path of your choosing
  - ◇ **Type on arch**: text is arranged in a circular pattern
- To select a mode, hold down the mouse button on the **Type Tool** icon  on the **Tools Panel**. The screenshot below indicates where to go for further instructions on using that text mode:



### 4.02 Selecting a Font

#### 4.02.1 Choosing a Font from the Font Menu

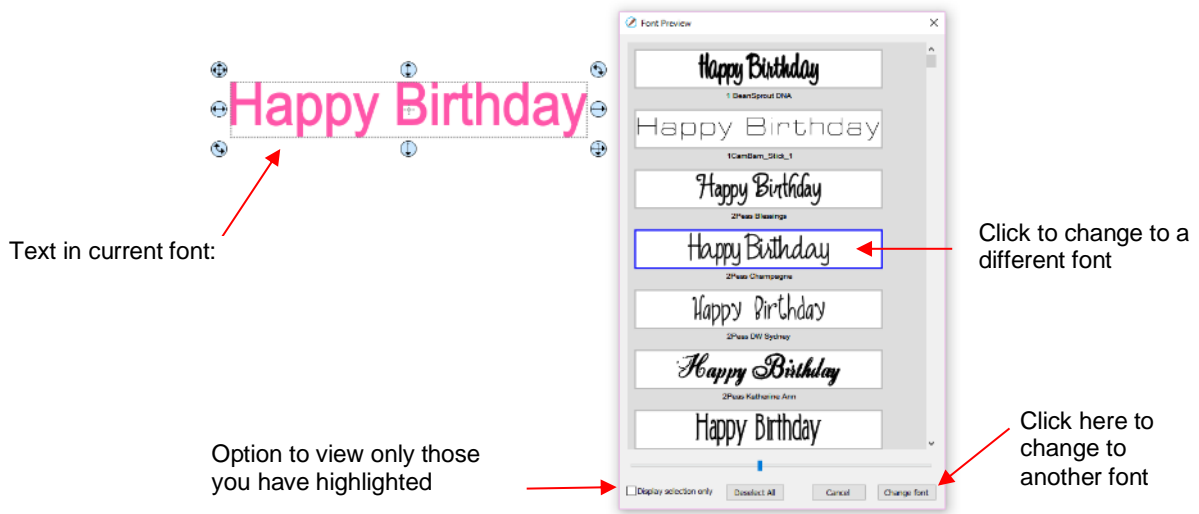
Video

- There are three places to select an installed font:
  - ◇ Click the **Text Settings** icon  on the **Properties Panel** to open the **Text Panel**. Select from the **Font** drop-down menu.
  - ◇ Go to **Text>Font**
  - ◇ Click on the **Fonts** tab in the **Library** (refer to *Section 2.03.2*).
- If you are looking for a particular font in any of those three menus, type the first letter of the font name and you will be taken to the fonts that begin with that letter.

#### 4.02.2 Choosing a Font via Font Preview

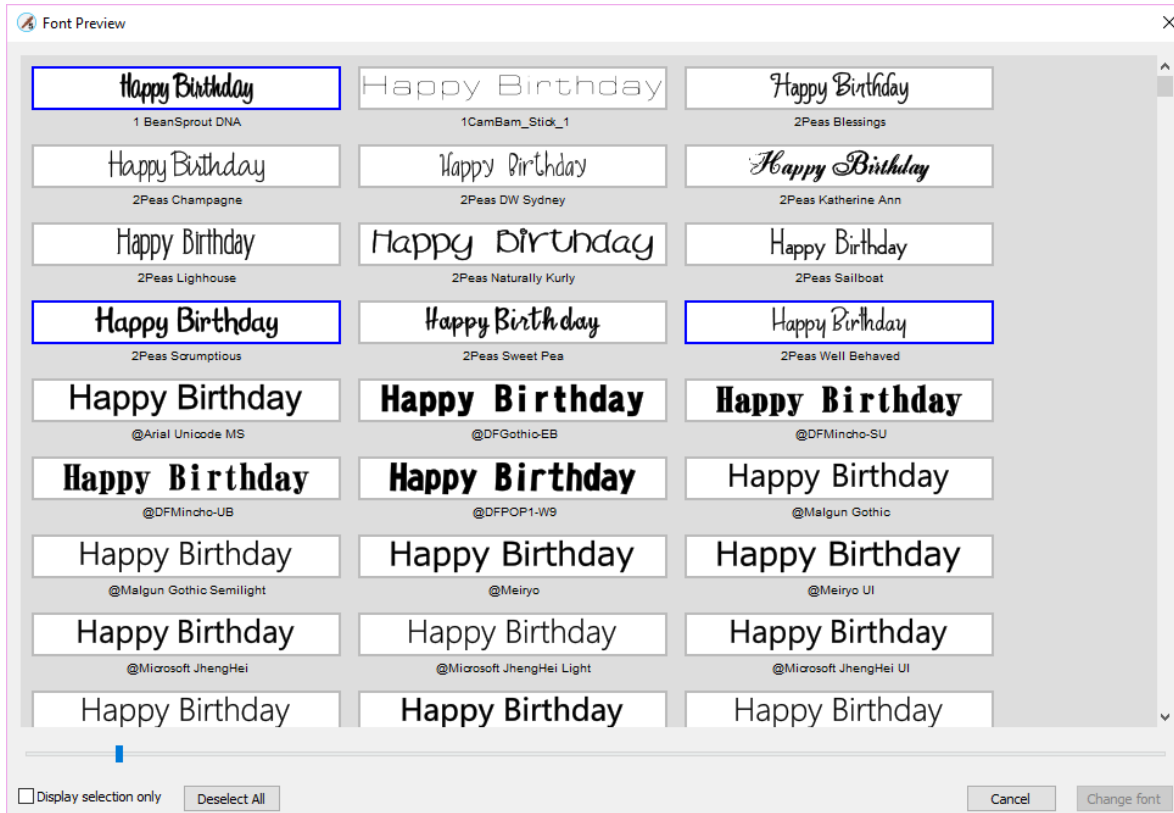
Video

- To view the text you're using in different fonts, first type out the text using the instructions in *Sections 4.03 and 4.04*. Then select the text and go to **Text>Font Preview**. There you can scroll through all of the fonts currently installed in SCAL to view others you might prefer:

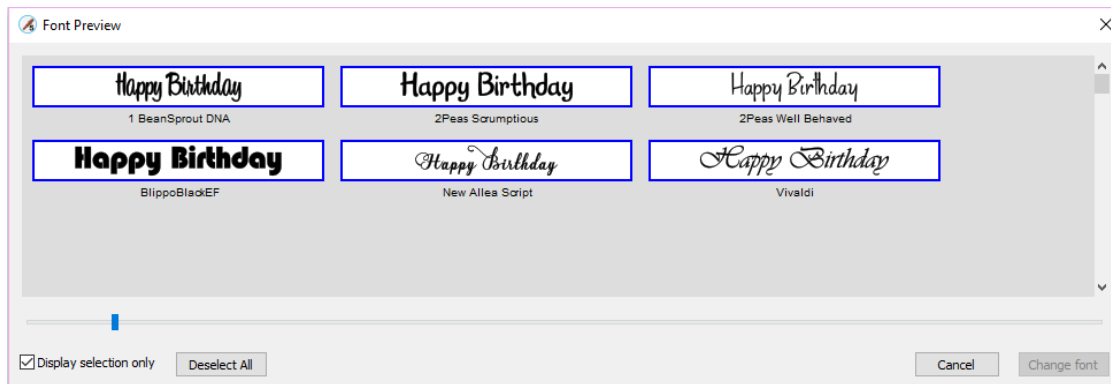


- You can expand this window and decrease the size of the fonts by scrolling the size bar to view more samples. Also, you can highlight those of interest and then click **Display selection only** to more easily decide which ones you might like to use:

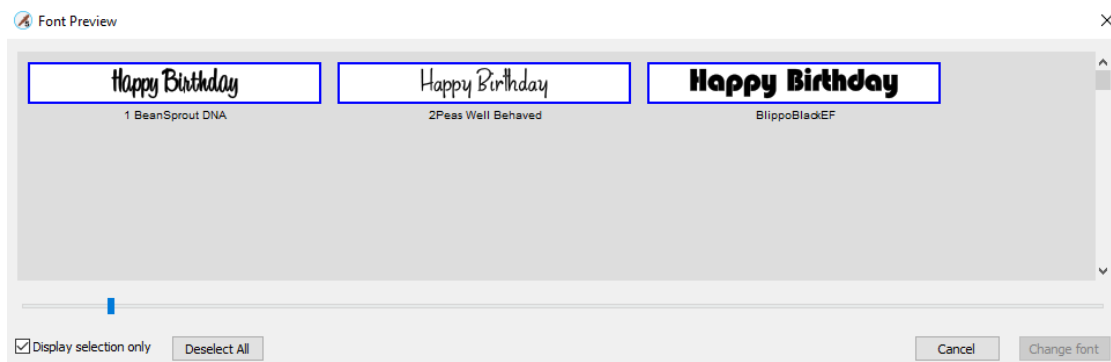
◇ Expand the window and highlight those you want to further compare:



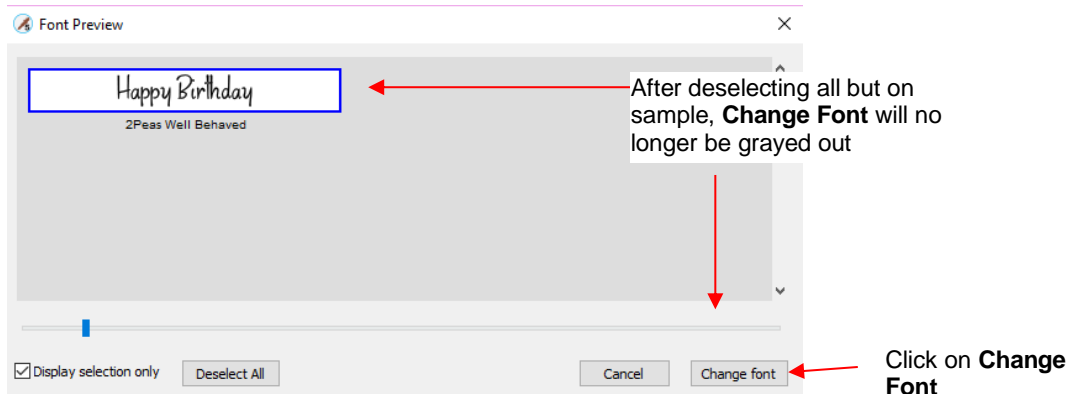
- ◇ After scrolling through fonts and highlighting only those of further interest, click on **Display selected only**:



- ◇ At this point, as you left click any sample, it will be removed from the display, allowing you to refine your selection:



- ◇ Once you are down to a single sample, you can then click on **Change Font**:





- ◇ The text will now be changed to the new font:

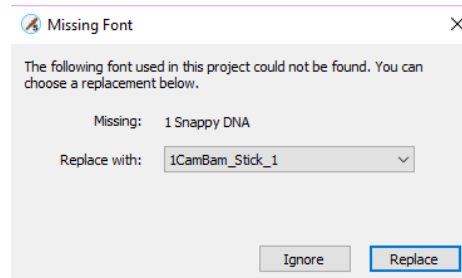
Happy Birthday

#### 4.02.3 Temporarily Installing a Font Video

- If you want to load a new font that's not already installed on your computer, there are three ways:
  - ◇ Go to **Text>Load Font File**





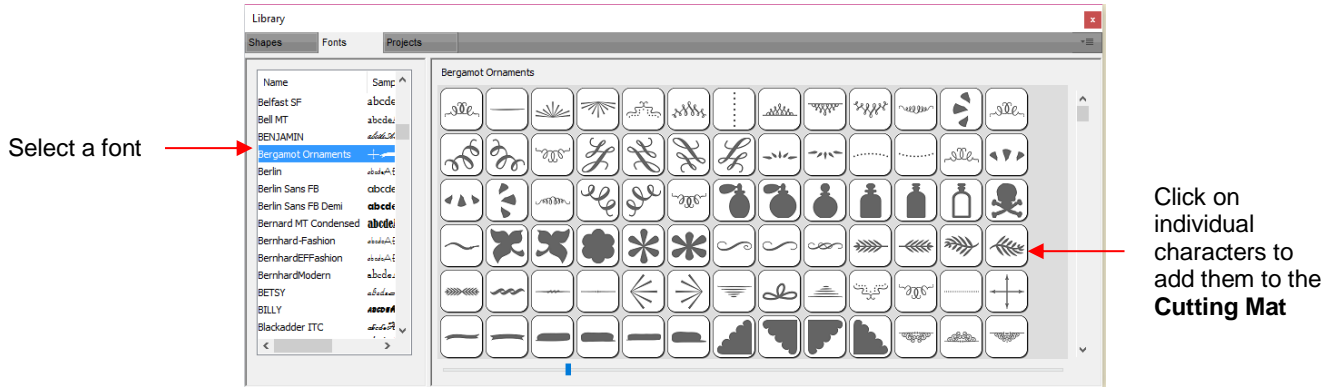
- ◇ Click on the **Load a Font File** icon  on the **Text Panel**
- ◇ Open the **Library**, click on the **Fonts** tab, and then click on the **Menu** icon 
- Any font file with a format of .TTF, .OTF, or .OPF) can be opened and will be available until SCAL is closed.
- When you open a font file for temporary use, that font will be uninstalled upon closing SCAL. If you have saved that file without first converting the text, the next time the file is reopened, you will receive the following message:



- ◇ Two options are provided:
  - **Ignore:** The text with the missing font will be converted to an outline (no longer editable as a text object)
  - **Replace:** The text will be replaced with the font shown or another font you select from the drop-down menu
- ◇ If you have no plans to edit the text, then you can avoid the message by converting text before saving the file. To do this, select the text and apply one of the following:
  - Go to **Text>Convert Text to Outlines**
  - Go to **Path>Object to Path**
  - Right-click and select **Path>Object to Path**

### 4.03 Adding Text Options

- There are three ways to add text to the **Cutting Mat**:
  - ◇ Click on the **Type Tool** icon  on the **Tools Panel** (shortcut **T**), click anywhere on the **Cutting Mat**, and begin typing. This is the easiest method when adding ordinary text.
  - ◇ Copy and paste text from another application, such as from Word, Excel, or from an email, onto the **Cutting Mat**. Before pasting, click on the **Type Tool** icon  on the **Tools Panel**
  - ◇ Click on the **Fonts** tab in the **Library** and click on characters shown in the character map. This is the easiest method when using dingbat fonts:





## 4.04 Four Modes of Text

### 4.04.1 Type Tool

Video



Jay  
McCauley      Max  
McCauley

- Hold down the mouse button on the **Type Tool** icon  on the **Tools Panel** and select the top choice: **Type Tool**.
- Click anywhere on the **Cutting Mat** and begin typing. Note that:
  - ◇ Pressing the **Enter** key will move the cursor to a new line and you can continue typing
  - ◇ Clicking elsewhere on the **Cutting Mat** will allow you to begin adding new text at that location
  - ◇ When done, either press the **Esc** key or click on the **Select** icon  on the **Tools Panel**

### 4.04.2 Vertical Type Tool

Video

J  
a  
y      M  
a  
x

- Hold down the mouse button on the **Type Tool** icon  on the **Tools Panel** and select the second choice: **Vertical Type Tool**.
- Click anywhere on the **Cutting Mat** and begin typing. Note that:
  - ◇ Clicking elsewhere on the **Cutting Mat** will allow you to begin adding new text at that location
  - ◇ When done, either press the **Esc** key or click on the **Select** icon  on the **Tools Panel**


### 4.04.3 Type on Path Tool

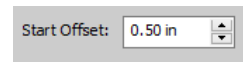
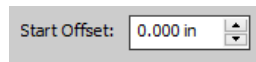
Video




- Determine which shape you want to use for the path. In the prior screen shot, ovals, spiral and a rectangle were used. But it could have been a square, triangle, or any other shape, even a curve path:



- To use this function:
  - ◇ Add the shape to the **Cutting Mat**. **IMPORTANT:** If you want to retain the original shape so that it can be printed or cut, make a duplicate of the shape first and hide the copy.
  - ◇ Hold down the mouse button on the **Type Tool** icon  on the **Tools Panel** and select the third choice: **Type on Path Tool**.
  - ◇ Click on or inside the shape and begin typing. In the **Tools Options**, a setting appears which allows you to move the start point for the text further along the path. Otherwise it will start at the leftmost side:



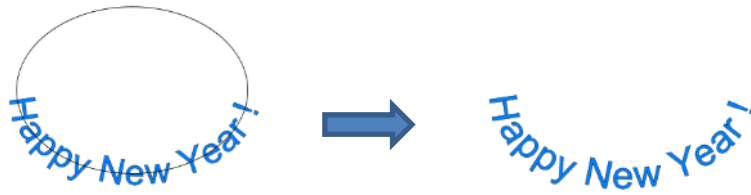
- ◇ When done, either press the **Esc** key or click on the **Select** icon  on the **Tools Panel**. Note that if you no longer need the path for your project, go to **Text>Convert Text to Outlines** and the path will be deleted.



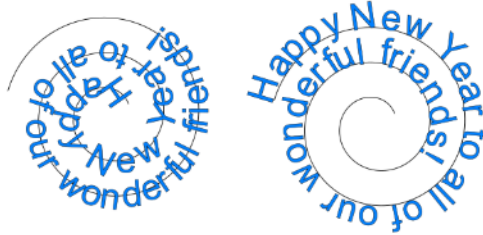
- If you want the text on the inside of the shape:
  - ◇ First apply **Path>Reverse Path** to the shape. Then type the text:



- ◇ Again, use **Text>Convert Text to Outlines** to delete the path:



- In a similar manner, using **Reverse Path** can change how text is applied along a spiral:




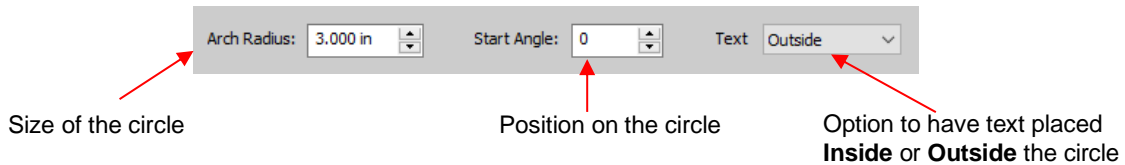
- ◊ After applying **Text>Convert Text to Outlines**:



#### 4.04.4 Type on Arch Tool [Video](#)

Max and Jay

- With this function, text is typed as if it were following an imaginary circle.
- Hold down the mouse button on the **Type Tool** icon  on the **Tools Panel** and select the last choice: **Type on arch**.
- Click anywhere on the **Cutting Mat** and begin typing. In the **Tools Options**, three settings will appear allowing you to customize the results:



- For example:

Decreasing the **Arch Radius** from 1.0 to 2.0:



Changing the **Start Angle** from 0 to 180:




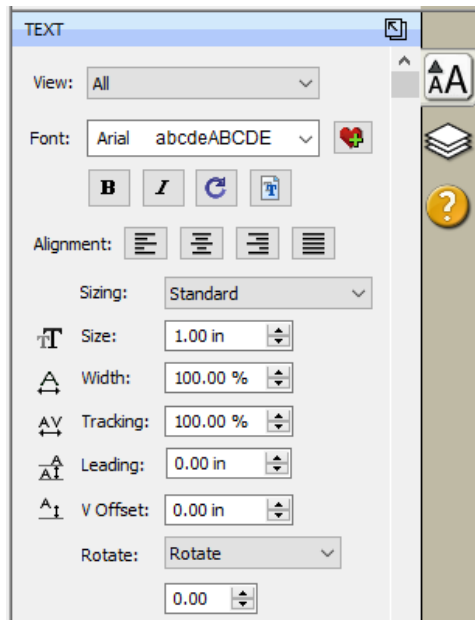
Changing **Text** from **Outside** to **Inside**:





- When done, either press the **Esc** key or click on the **Select** icon  on the **Tools Panel**.

#### 4.05 Text Settings Video

- The **Text Panel** offers an array of settings related to the creation and editing of text. To open, click on the **Text** icon  on the **Properties Panel**:




Click here to open  
**Text Panel**

- To apply a change to any of these settings:
  - ◇ Type some text using the instructions in *Section 8.04*. Then click on the **Selection Tool** icon  at the top of the **Tools Panel**.
  - ◇ With the text selected, you can now change any of these various settings and the changes will immediately be applied to that selected text.
  - ◇ If you only want to apply a change to a portion of the text, click on the **Text Tool** icon  on the **Tools Panel** and drag your mouse to highlight whatever part you want to change.

- The following is a list of the settings and how to apply them:


◇ **View:** Controls which fonts show in the menu under **Font**:


- **All:** Displays all installed fonts plus any that have been temporarily installed during this session of SCAL
- **Favorites:** Displays all fonts you have assigned as a **Favorite**
- **This Project:** Displays all fonts currently used since starting this particular project during this session


◇ **Font:** Menu of installed fonts which can be used for new or existing text. Note that you can also add to your **Favorites** list by selecting a font and then clicking on the  icon to the right.

◇ **Bold and Italic**  

- ***IMPORTANT:*** Some fonts will change significantly if the Bold option is selected. The same is true of the Italic option. Make sure these icons are not indented/blue unless you are confident you want to use either or both of them.
- With either option highlighted, the text may not immediately reflect that option. If not, highlight the text and then try applying again.
- Instead of using **Bold**, you can use **Effects>Shadow Layer** (refer to *Section 7.05*) or **Path>Offset Path** (*Section 6.05*).
- Instead of using **Italic**, you can use the **Skew** function (refer to *Section 3.07*).

◇ **Reload**  is only needed if you have separately installed new fonts on your computer since opening the current SCAL session.

◇ **Load a Font File**  is used to open a .TTF, .OTF, or .OPF font that is not already installed on your computer. Refer to *Section 4.02.3*.

◇ **Alignment:**  Standard text justify options: **Left Align**, **Center Align**, and **Right Align** and **Justified**.

◇ **Sizing:** The setting determines the height of the letters in the selected text based on these options:

- **Standard:** A character's height is based on how the font was designed

KNK Zing Orbit

- **Fixed Height:** All characters will be made the same height, based on the **Size** setting

KNK Zing Orbit

- **Fixed Height Proportional:** All characters will be made the same height, based on the **Size** setting and the width will be adjusted to maintain the original aspect ratio for that character

KNK Zing Orbit

- This example doesn't necessarily illustrate a typical application for the **Sizing** setting. Refer to *Section 4.14* for examples of its usefulness.

- ◇ **Size:** Approximate height of lettering based on an ascender and descender. For example, if text is set to 1.0 inches, then the height of the word “Baby” would be ~ 1.0.” However, the “B” typed by itself might only be 0.7” in height because there is no descender, such as the letter “y”.
- ◇ **Width:** Increasing the width will widen the letters leaving the height unchanged. Note that letter spacing will not be altered, thus the letters may end up overlapping unless **Tracking** is increased, as well.
- ◇ **Tracking:** This is the spacing between letters. Increasing will spread letters apart while decreasing will force them closer together and can result in overlapping:

**KNK Force**  
Tracking: 100%
**KNK Force**  
Tracking: 120%
**KNK Force**  
Tracking: 80%

- ◇ **Leading:** Changes the spacing between lines of text:

**KNK Force**  
& Zing Orbit  
Leading: 0 inches
**KNK Force**  
& Zing Orbit  
Leading: 0.2 inches

- ◇ **V Offset:** Raises or lowers a line of text or, more commonly, can be used to raise and lower individually selected letters:

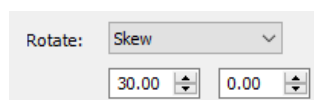
**KNK Force** & Zing Orbit

- ◇ **Rotate:** Rotates a line of text or can be applied to individual letters:

*KNK Force & Zing Orbit*

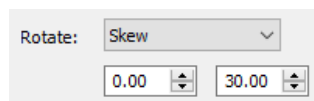
- ◇ **Skew:** In the same menu with **Rotate** is the **Skew** option which can also be applied to a line of text or to individual letters. There are two settings: one for X axis skew and one for Y axis skew:

- **X Axis Skew** set to 30:



*KNK Zing Orbit*

- **Y Axis Skew** set to 30:



kNk Zing Orbit

## 4.06 Other Text Editing Video

- **Ungroup:** To split a selection of text into individual letters, apply the **Ungroup** function using one of the following ways:
  - ◇ Right-click and select **Ungroup** from the popup menu
  - ◇ Go to **Object>Ungroup**
  - ◇ Apply **Ctrl+Shift+G**

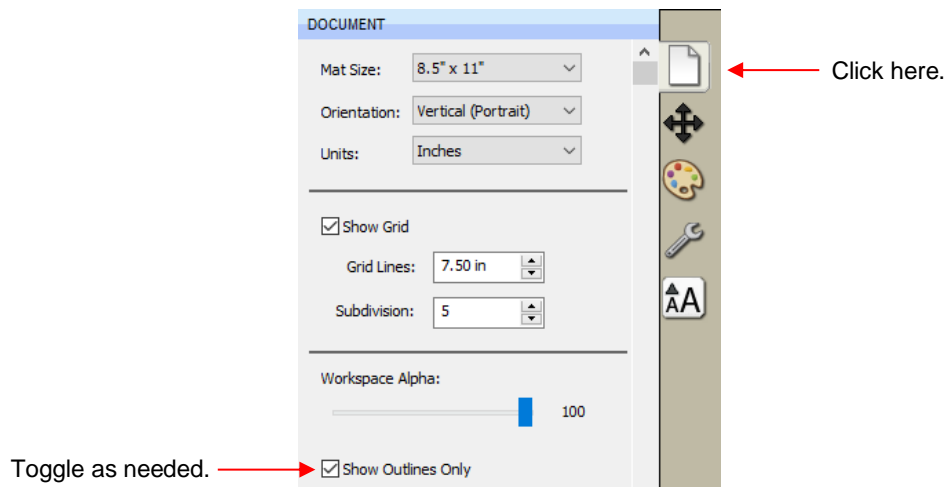
- **Break:** To break a selection of text into individual paths, apply the **Break Apart** function using one of the following ways:
  - ◇ Right-click and select **Break Apart** from the popup menu
  - ◇ Go to **Object>Break Apart**
  - ◇ Apply **Ctrl+B**
- For more information on **Ungroup** and **Break Apart**, refer to *Sections 3.10.2* and *3.12.1*.

#### 4.07 Creating a Connected Letter Title Video

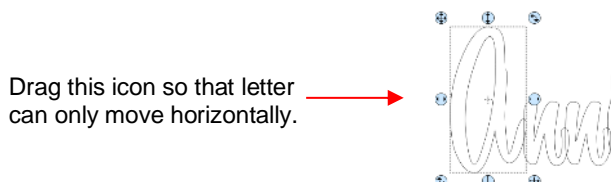
- Using the instructions from *Section 4.04.1*, type the letters of your title:

Happy Anniversary

- Because you will be working with the letters individually, select the title and apply **Ungroup** (*Section 4.06*).
- With the letters split, you can select one or more and use the left and right arrow keys to change the spacing between letters, overlapping as desired. It is advisable to zoom in on the text to get a more accurate view of the actual positioning of the letters. You may also want to check the text both with and without **Show Outlines Only** option turned on (which can be changed on the **Document Panel**):

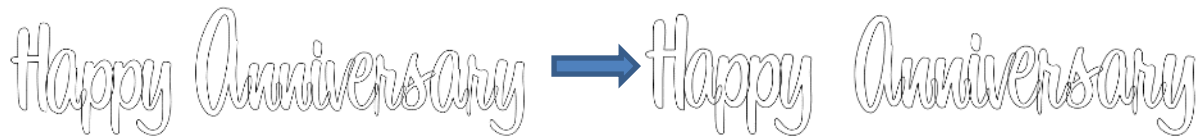


- Also, you should turn off **Snap to Grid** so that you can more freely move letters. This is located under **View>Snap To**.
- Begin overlapping the letters. It's usually advisable to move letters either by using the arrow keys on the keyboard or by using the left center icon:





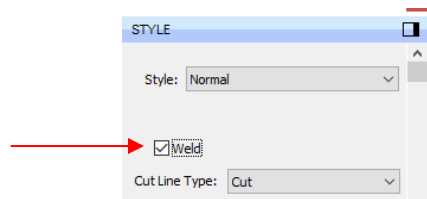
- Continue arranging letters as desired. Remember that you can customize freely to get the desired look. For example, in this font called 1 Bean Sprout DNA, the vowels tend to be a bit oversized compared to other characters in the font. Thus, the uppercase “A” can be sized smaller to better match the other letters:



- When you are satisfied with the overlap, select all of the letters and go to **Path>Union**. The overlap will be removed:



- Alternatively, if you do not want to make the weld permanent, you can select the shapes and mark the weld option on the **Style Panel**:



- To create an outline/shadow for titles and other shapes or if you need to thicken a font that turns out to be too thin for cutting, refer to *Section 7.05*.

#### **4.08 Incorporating Shapes into a Title**

- A quick way to incorporate a shape into a welded title is to use any of thousands of dingbat fonts available from the Internet for free or even check the **SCAL Library** for a shape. In this example, a script font is being used for the title and a turkey, found in the **Library** under the *Fall* folder, will be used for the shape.
- Using the steps in *Section 4.04.1*, create the title:



- Select the title and go to **Object>Ungroup**. Then move the “Thanksgiving” part to the right to add some spacing for the turkey. In this example, other parts were also moved so that all letters in “Happy” and all letters in “Thanksgiving” overlap.



- In the **Library**, locate the turkey shape and click on it to add to the **Cutting Mat**. Resize and arrange to overlap with the lettering:



- Go to **Path>Union** or press **Ctrl+Shift+U** to remove the overlap or mark the **Weld** option on the **Style Panel**:



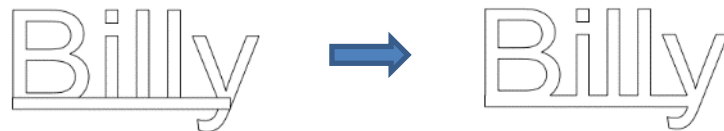
- Note that dingbat fonts and **Library** shapes are not the only shapes that can be welded to letters. Any shape imported or created within SCAL can be used!

#### 4.09 Welding Titles in Imaginative Ways

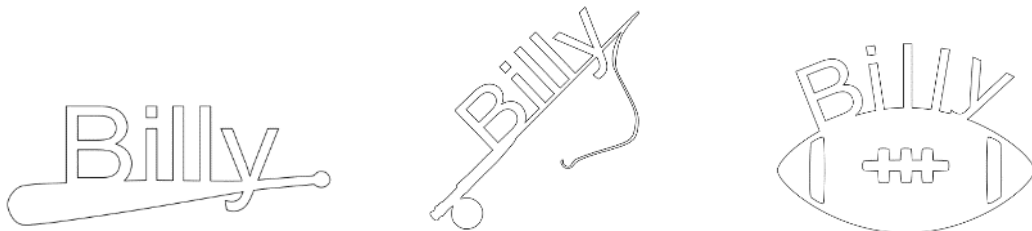
- Some fonts simply do not work well with the traditional overlapping of the letters to be welded into one piece for cutting. For example, let's take an extreme case with Arial font and the name, "Billy". Note what happens when you overlap the letters in this particular font:



- Most crafters will start looking for a different font... one with ligatures (extenders) that easily connect the letters to one another. However, many fonts with ligatures are script fonts and may not convey the desired look. Instead, look for objects that can be used to connect the letters. A basic thin rectangle is an easy solution. Just align it along the bottom of the letters and weld:



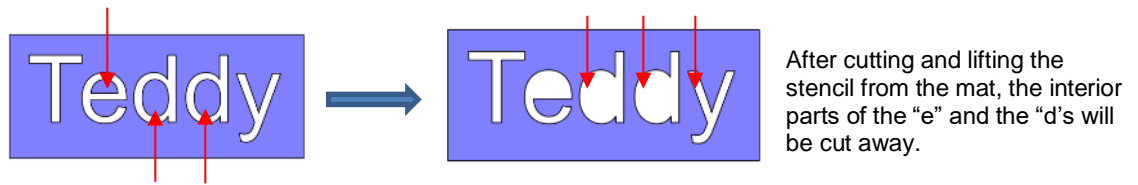
- However, the objects to use as a base do not have to be so basic. Look for objects that will tie into a theme. Here are just a few examples:




#### 4.10 Stenciling Letters [Video](#)

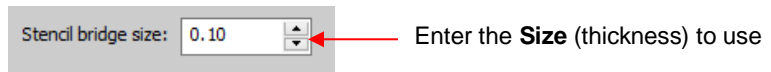
- When creating a stencil, you keep the "waste" or "negative" of a cut. When using regular fonts, such as Arial, some of the letters, such as a "B", "A", and "e", will not work because they have interior paths called child shapes. Those child shapes are not connected to the waste portion of the material and will be lost from

the stencil as shown below. The red arrows indicate the child shapes inside parent shapes for the letters “d” and “e”:

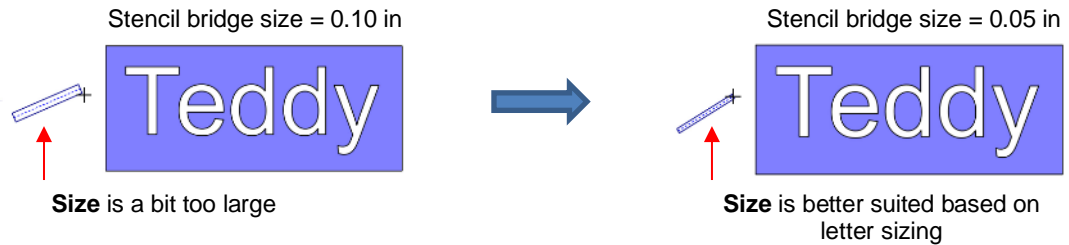


After cutting and lifting the stencil from the mat, the interior parts of the “e” and the “d’s will be cut away.

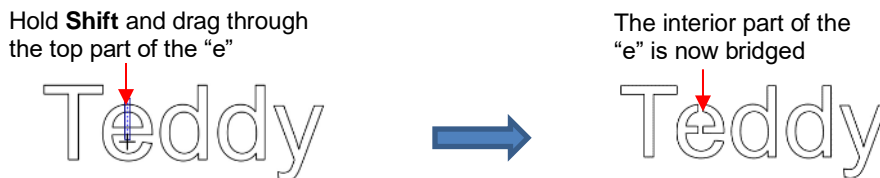
- To avoid this, a procedure called stenciling can be used to connect the area outside of the letters to the child shapes, essentially eliminating them. There is a feature on the **Tools Panel** called the **Stencil Bridge** which can be used to connect the interior parts to the surrounding area.
- Before using this function, select the text and go to **Object>Ungroup**. Failure to do this can cause distortion of other letters as the stencil function is applied. Then click on the **Stencil Bridge** icon .
- Zoom in close on the lettering so that you’ll be able to see exactly where you need to connect. Click on the **Stencil Bridge** icon and, in the **Tools Options** at the top, a setting for the width or thickness of the bridge can be set:



- The **Size** you enter will normally relate to the height and style of the lettering you are stenciling. In this example, the name “Teddy” was typed at a height of ~1 inch. The **Stencil bridge size** is set at 0.10, but it could be smaller or larger depending on your personal preference. Before applying, you can drag the mouse in an empty area of the screen to see the size that will be used and adjust accordingly:



- Before applying, hide the outside rectangle, so that it’s not affected. You can now drag the mouse across a letter to create a bridge. Hold down the **Shift** key, while dragging, and the bridge will be either perfectly vertical or perfectly horizontal:



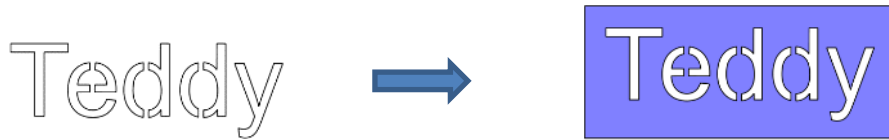
- Repeat the process with the other letters containing child shapes:



- Note that just one part of the letter could have been bridged instead of both the top and the bottom:



- Unhide the rectangle and the stencil is ready to cut:



Completed stencil

#### 4.11 Open Path Fonts (OPF) Video

- Besides TTF and OTF, a third type of font, Open Path Font (.OPF) can also be opened in SCAL. This font consists of single lines/curves only. Here's a comparison to help you understand the difference:



TTF version



OPF version of the same font

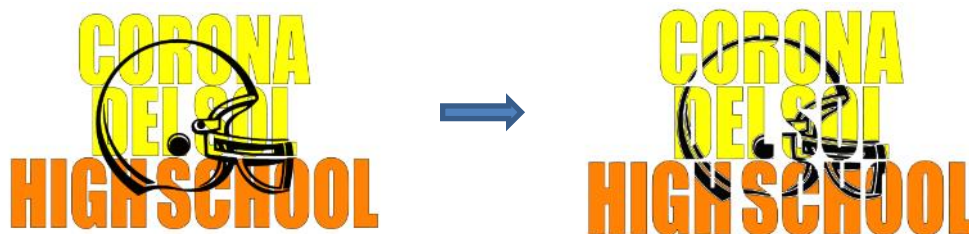
- These fonts are useful when using a pen or engraving tool in your cutter or for designing single line rhinestone titles:



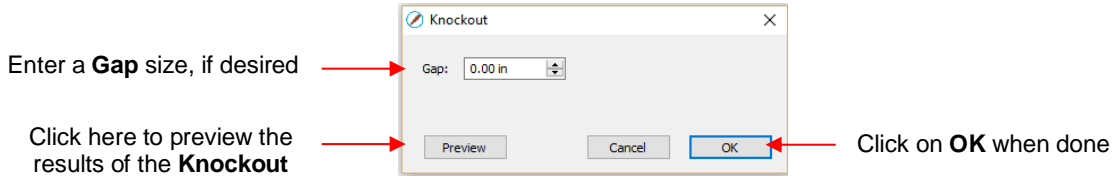
- Currently, this font type only works in a few applications like SCAL and does not install into Windows or on a Mac O/S for use in programs such as Word. If you want to permanently install an OPF font for use in SCAL, copy and paste the font into the following folder: Documents\Craft Edge\My Fonts.
- To try out using Open Path Fonts, there are some free ones to download here:  
<http://www.iloveknk.com/Support/Software/Open-Path-Fonts/>
- Because these are open path, they may not appear on the **Cutting Mat** when you first add them. You will need to select a **Stroke** color on the **Fill & Stroke Panel**. Refer to *Section 3.15*.
- You can purchase Open Path Fonts (also called Thin Fonts) from [www.letteringdelights.com](http://www.letteringdelights.com) and from [www.onlinefonts.com](http://www.onlinefonts.com) to use in SCAL. Note that these also come with the TTF equivalents, which are not actual single lines and curves, but are still very thin.

#### 4.12 Knockout Video

- The **Knockout** function involves overlaying one image on top of another and then merging the two so that the overlap between the two images is, essentially, cut out and replaced with that part of the top image. This is a popular design technique for HTV (heat transfer vinyl) applications so a typical high school design is used as an example:



- To open the **Knockout** function window, select two or more shapes and go to **Effects>Knockout**:



- The **Gap** will create an offset between the top image and the bottom image. This is not only pleasing to the eye but also makes alignment of two layers of HTV easier to manage. Here's an example showing how the gap affects the overall appearance:



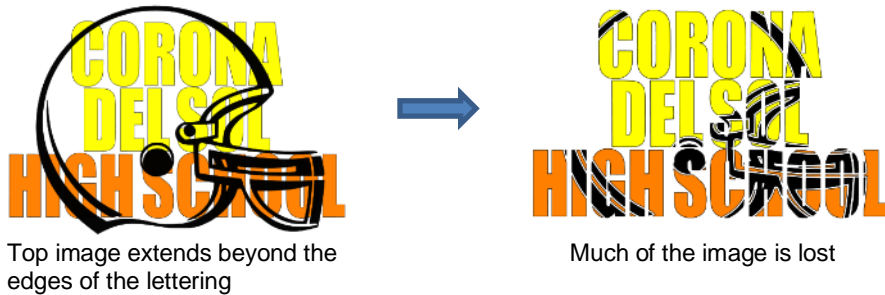
- IMPORTANT!** When you click on **Preview**, it will take a few seconds or longer for the image to update. Be patient. Also, in cases where you have multiple images on top, such as the hearts in the prior screenshot, it is recommended that those shapes be joined first using **Object>Merge**.

- When preparing text, you want as little “white space” as possible. Thus, here are some guidelines:

- ◇ Select a thick dark font. In the examples in this section, *Impact* was used.
- ◇ After creating the text, move rows of letters together until they almost touch.
- ◇ Reduce spacing between words, but make sure the text is still readable.
- ◇ The text does not need to be all one shape. Thus, you can recolor parts of it if you wish.



- When aligning the top image over the lettering, note that anything extending outside of the image or over white areas will be deleted. So, size the image accordingly:



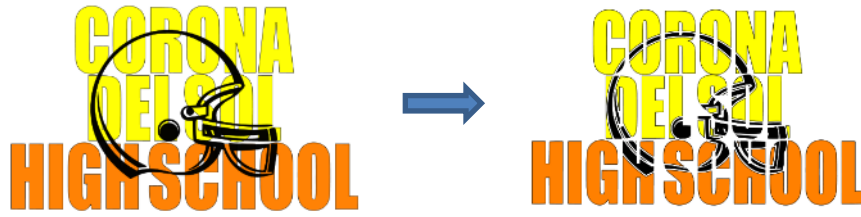


Image is sized smaller so that most of the helmet is over the lettering

Better result

- Note that the **Knockout** function isn't just for text. It can be used on any vector shapes. Because it is so popular with lettering, its presentation in this chapter seemed appropriate.

#### 4.13 Title Crawl [Video](#)

- Title Crawl** distorts text (or any shape) so that it appears to be stretching towards you or away from you:



- To apply **Title Crawl**, select the text and go to **Effects>Title Crawl**. The following window opens:

Preview

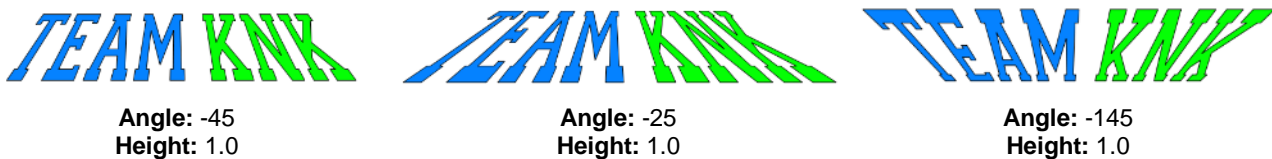
Adjust these according to the information that follows

Check this box to have the preview update with changes

Click here to manually update the preview

Click on **OK** when done

- ◇ **Angle:** As the **Angle** setting is increased, the top of the title will rotate towards you. Decreasing the **Angle** setting will rotate away:



- ◇ **Height:** This setting works in an opposite manner to how one would expect. Increasing **Height** will make the text less rotated whereas decreasing it will make the text more rotated:



- Multiple lines of text can have **Title Crawl** applied to create the famous Star Wars “in a galaxy far far away” effect:

Five years ago  
KNK USA selected  
designers to present  
three new projects every  
week to inspire and educate  
customers on using their KNK  
cutters. Visit [www.teamknk.com](http://www.teamknk.com)

#### 4.14 Applications Using the Sizing Function

- In *Section 4.05*, the **Sizing** setting on the **Text Panel** was briefly explained. The following examples better illustrate how you might be using this setting in your designing.

##### 4.14.1 Sizing Lettering for Particular Fonts [Video](#)

- One of my favorite free fonts is called *1 Bean Sprout DNA*. The only problem with this font is that some of its characters are unusually large. For years, I've simply manually resized the letters that were too high relative to others in that font. With the
- The word "Great !" is typed using this font:

GREAT!

- I recommend making a copy of the text and then applying both the **Fixed Height** option and the **Fixed Height Proportional** option for comparison:

GREAT!

Fixed Height

GREAT!

Fixed Height Proportional

- Note that the letters do not necessarily end up aligned along the bottom. To achieve that, apply **Object>Ungroup**, reselect all of the letters, and then select any of the **Vertical Align** icons



on the **Position & Size Panel**:

GREAT!

Fixed Height

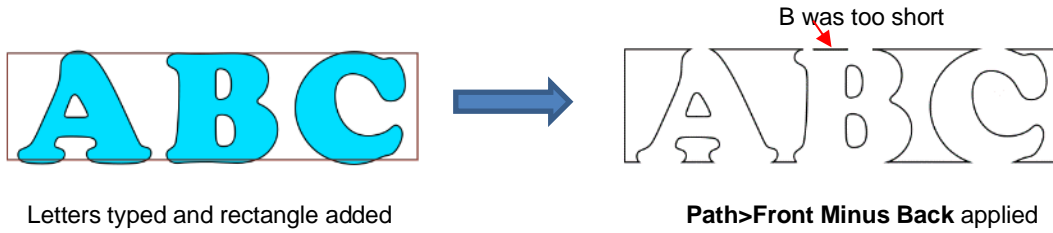
GREAT!

Fixed Height Proportional

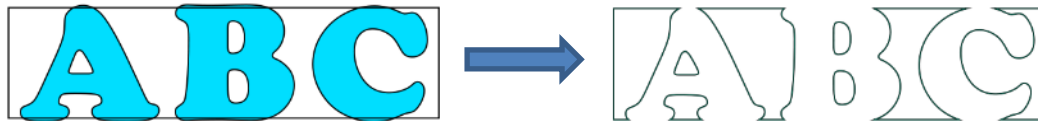
- You now the option to choose whichever result suits your needs.

##### 4.14.2 Sizing Letters for Welding Inside Rectangles [Video](#)

- A second application for the **Sizing** setting would be to even out upper-case letters when applying **Path>Front Minus Back**. In the next example, the letters ABC have been typed out using *Cooper Black* font. Notice how the letter B is shorter than the A and C. When applying Path>Front Minus Back, the result would be:

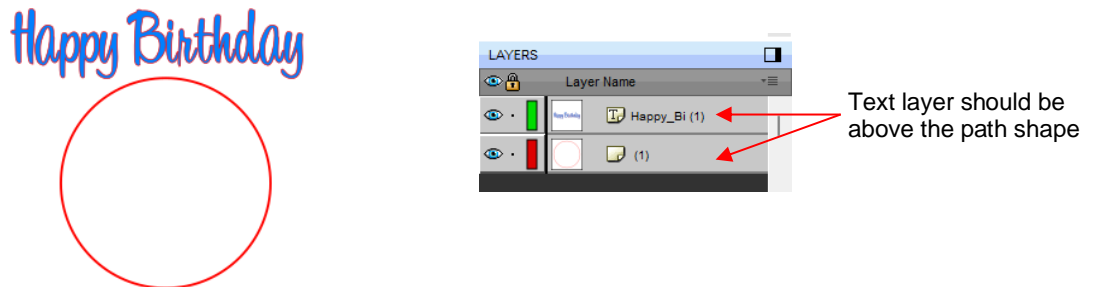


- The letters are selected and **Fixed Height Proportional** is applied. The letters are then resized to fit the rectangle and the **Path>Font Minus Back** can be applied with the desired results:

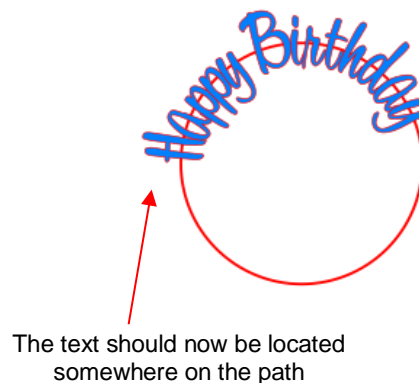
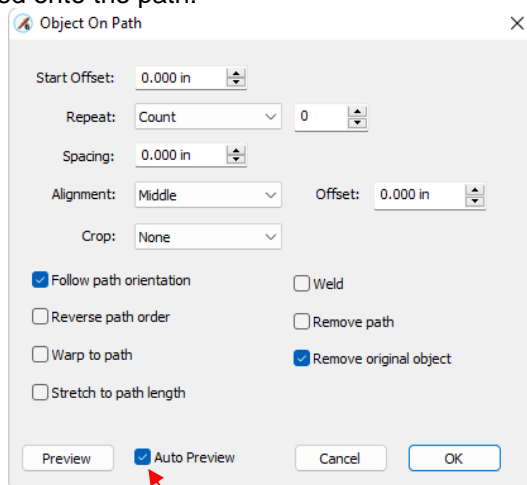


#### **4.15 Using Object on Path with Text**

- Several methods were shown in *Section 4.04* for placing text around a circle and other paths. An alternate and perhaps better method is using **Effects>Object on Path** instead. This function, which was added in a later version of SCAL provides more settings.
- First step is to create the path and type the text to be used. Then make sure the path is below the text on the **Layers Panel**:

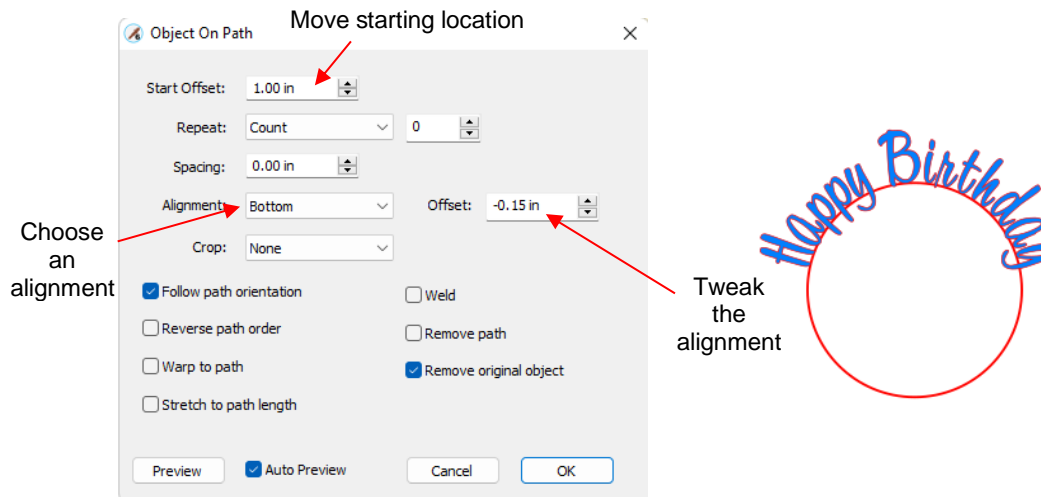


- Select both layers and go to **Effects>Object on Path**. Immediately enable **Auto Preview** to verify the text will be moved onto the path:

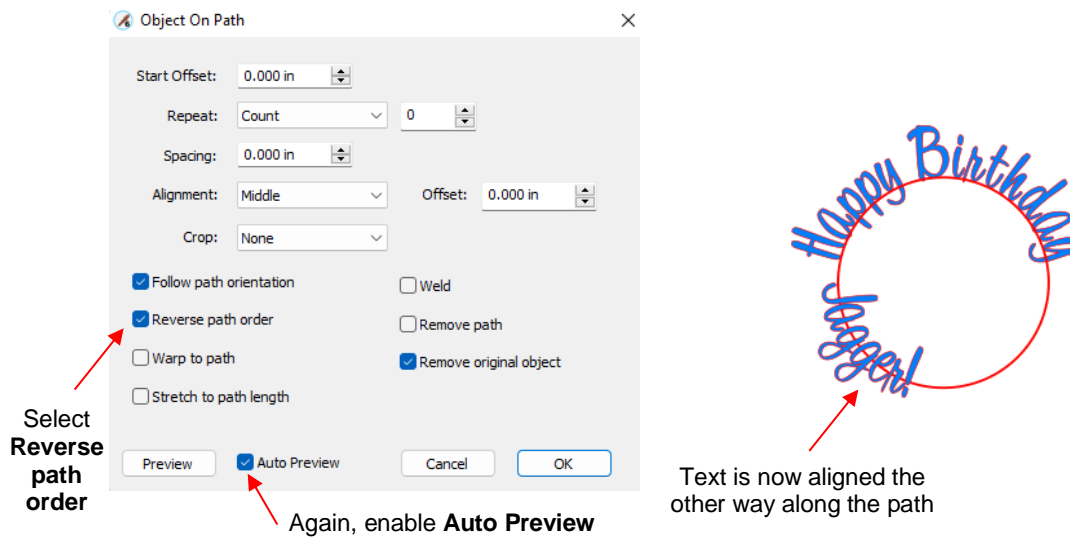




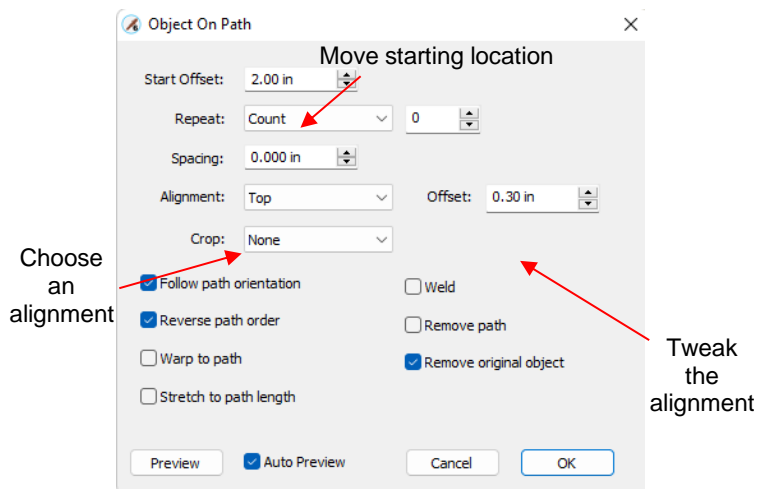
- The following settings can be used to move the text to the desired location and arranged where you want with respect to the circle:



- To add text going the other direction, again make sure the text layer is above the path layer and mark the **Reverse path order** option:



- Adjust the other settings as needed to achieve the desired results.



- For more information on using **Object on Path**, refer to *Section 7.18*.

#### 4.16 Other Text Effects

SCAL offers many design functions to customize text for your projects. Samples of the ones already presented in this chapter, as well as others are show below. Refer to *Chapter 7* for more tutorials.

<u>Name</u>	<u>Image</u>
3D Rotate	
Barrel Distortion	
Bridge Warp	
Bulge	
Canned	
Drop Shadow	
Knockout	

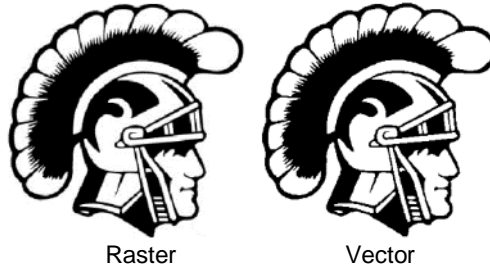
<u>Name</u>	<u>Image</u>
Object on Path	
Rhinestones	
Shadow Layer (Contour Cut)	
Stencil Bridge	
Title Crawl	
Wave	
Wrapper (for tumblers or cupcakes)	

## 5. SCAL: Tracing and Drawing

### 5.01 Raster versus Vector

Video

- All graphics are either raster or vector and there is no third type. While you can often tell by the file format, even that isn't always a good way to know for certain. For example, a PDF file can be made from either raster images or vector images and some PDF's will contain both types.
- You may not be able to tell, at first glance, whether an image is a raster or a vector. For example, this screen shot shows the same image in both formats:



- Most everyone today has a digital camera and, at the very least, has heard the term “mega-pixel.” A pixel is a square that is black, white, or colored. Photographs are made up of millions of these pixels to create the image you see. If you zoom in close enough on any raster image, you can see these tiny pixels. But when you zoom in close on the same area in the vector version, you will instead see lines and curves, not squares/pixels:



- A vector image isn't made up of pixels. Instead, a vector is like a connect-the-dot puzzle in which little dots (called nodes or points) are connected to each another with paths (either straight lines or curves). Digital die cutters need those paths so that they can communicate to the cutter where the blade should travel in order to cut what you want... kind of like a road map. In SCAL, the nodes look like this:



- As mentioned earlier, you can often tell whether a file is a raster or a vector based on the file format. Here are some guidelines:

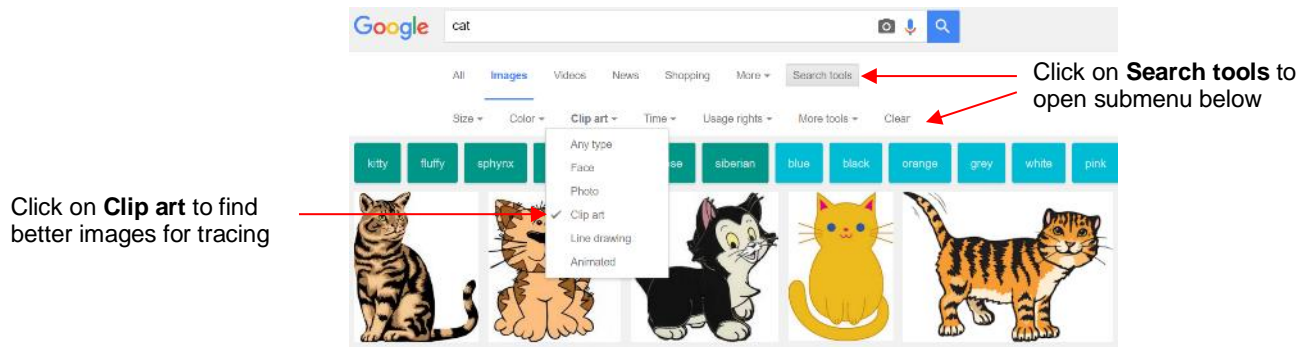
Raster: BMP, JPG, GIF, PNG    Vector: AI, EPS, DXF, SVG    Either: PDF, sometimes EPS & WMF

- To convert a raster into a vector, SCAL offers both an automatic and a manual trace function. Because the automatic **Trace** feature in SCAL is so fast and powerful, it is always worth trying it first. The only situation in which it may not be able to provide the results you need are (1) the image is very tiny or has a very poor resolution or (2) the image has poor contrast between one part and the next. For example, imagine a brown dog lying on brown carpet. How would the software know what part is the dog and what part is the carpet? Thus, you may need to manually trace some images, so both functions are covered, in detail, in this chapter.

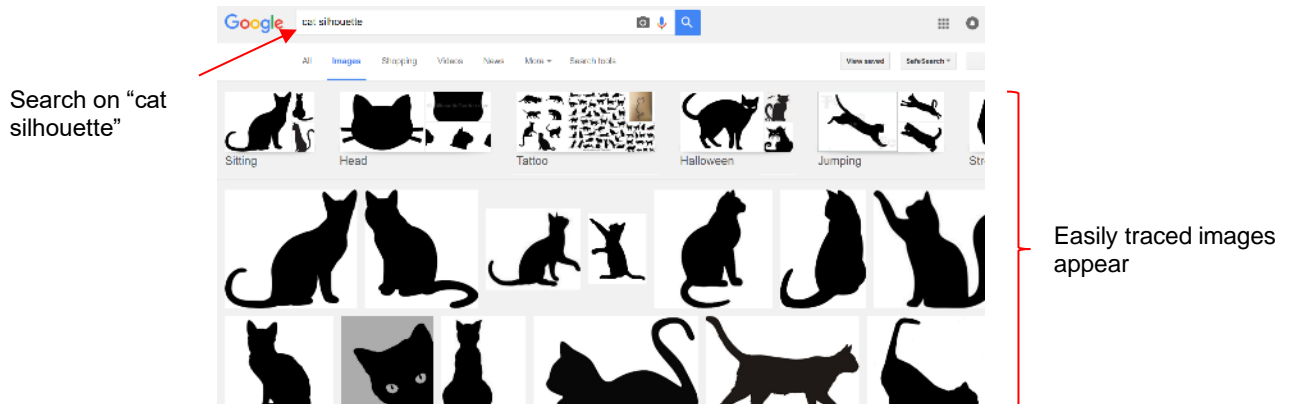
## 5.02 Finding Easy Images to Trace

Video

- What qualifies as an easy image? The obvious answer is “an image which gives you the results you want!” But those who are new to the vectorizing process do not always realize which images are going to be easy and which ones are not. Note that you shouldn’t be discouraged from trying to trace anything. But when you are learning the process, working with easier images will make the learning stage go smoother. So here are a few guidelines in selecting images:
  - ◇ Black and white images are easier to vectorize than colored images
  - ◇ Colored images with flat colors are easier to trace than those with variegated colors
  - ◇ Large, high-resolution images are easier to trace than tiny, low resolution images
  - ◇ Images with tiny details will be more difficult to trace than simpler images with fewer details
  - ◇ Photographs are usually the most difficult to trace, especially when some of the colors blend (such as the brown dog on the brown carpet, mentioned earlier).
- For your own personal use, there are many images that can be found on the Internet. Use [Google Images](#) to search and find images based on keywords. Google Images also has filters at the top of the window (under **Search Tools**) to limit your search to black and white, as well as to clipart or line drawings. For example, after searching on the word cat, one can limit the images in this way:



- Adding the word “*Silhouette*” in a search, will also produce images that are typically very easy to auto-trace:




- When you find an image you want to trace, click on it first to bring up a larger version. Then right-click and select **Save image as** from the popup menu. Note: If you use a browser other than Chrome, the popup menu may have slightly different wording for saving a file.
- ***IMPORTANT!*** Before tracing any Internet images, be sure to check the *Terms of Use* at the site hosting the image.

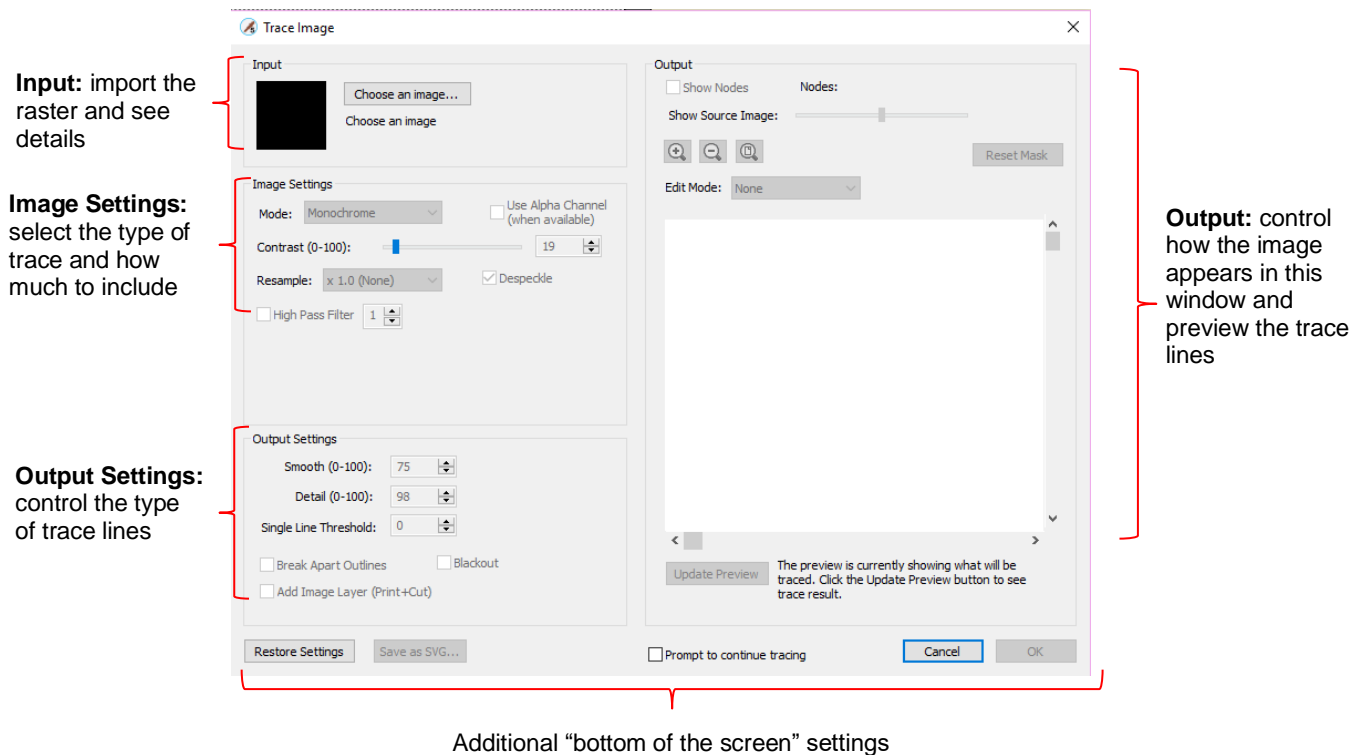
## 5.03 Trace Function

Images used in this tutorial can be downloaded at: <http://iloveknk.com/Images/>

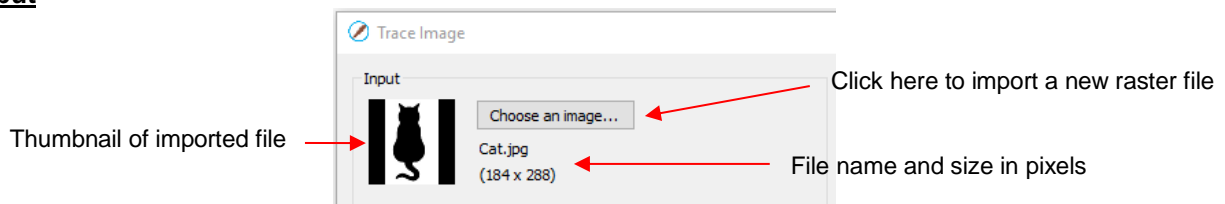
### 5.03.1 Trace Settings

Video

- To begin the tracing process, open the **Trace Image** window using one of the following ways:
  - Click on the **Trace** icon on the **Toolbar** 
  - Go to **File>Trace Image**
  - Press **Ctrl+Shift+T**
- There are five sections to the **Trace Image** window: **Input**, **Image Settings**, **Output Settings**, **Output**, and then the bottom bar. Note the location of each section and its main purpose. More details about each section follows:



#### Input

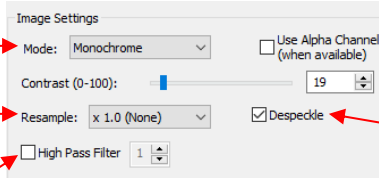


- Click on **Choose an image** and browse to locate the raster file (BMP, GIF, JPG, or PNG). Upon opening, a thumbnail appears, along with the name of the file and the size in pixels.
- Alternatively, before opening the **Trace Image** window, you can import the raster file using **File>Place Image**. Then, with the image selected, open the **Trace Image** window and this image will be loaded and ready for changes to trace settings.

- **Image Settings**

Choose from three modes:  
**Monochrome**, **Color Layers**, or **Single Color**

Increase when a more precise tracing is needed



Mark this box if imported file is a PNG with a transparent background

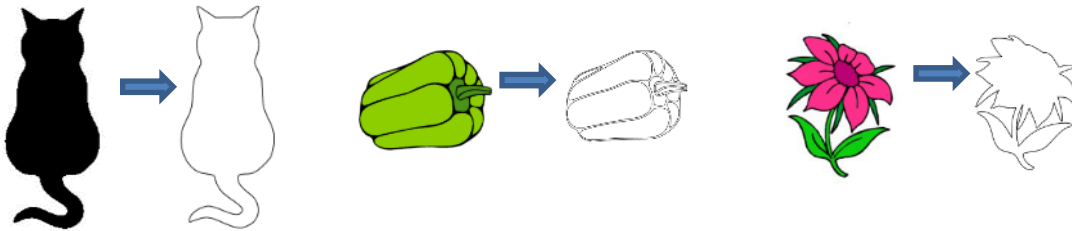
Increase **Contrast**, if needed to control what is included in trace

Ignore tiny specks in the imported image

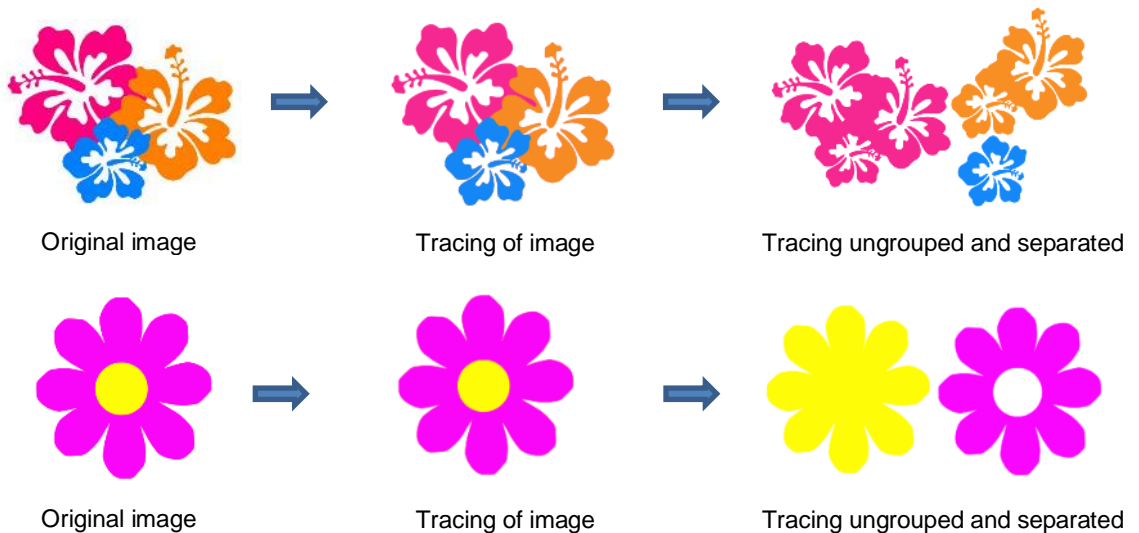
Option to add a **High Pass Filter** setting

◇ The **Mode** you choose is determined by the desired outcome / project application, as follows:

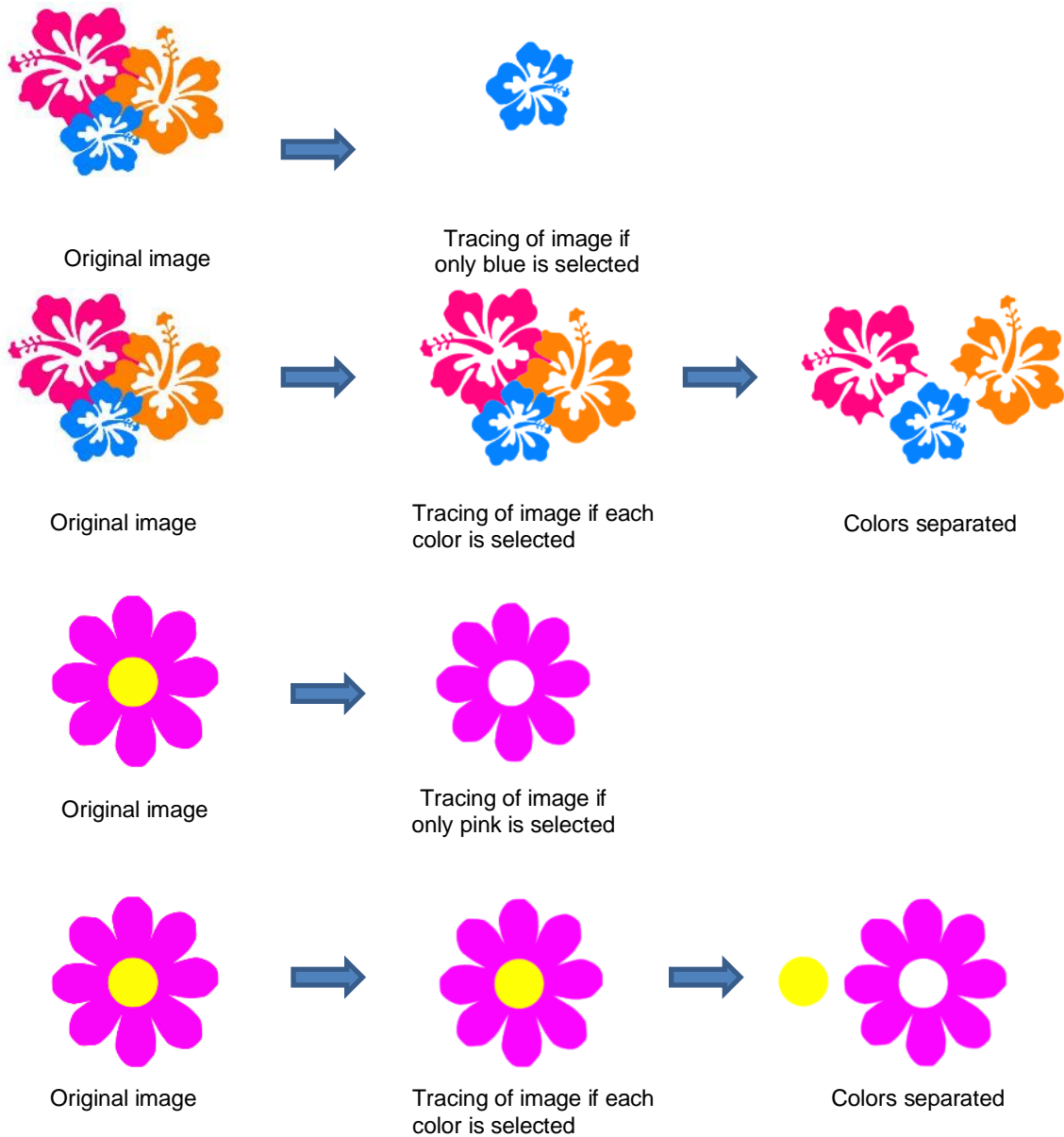
- **Monochrome:** choose this mode when you only need a black and white trace of the image. (Note: Sections 5.03.2 – 5.03.7 cover **Monochrome** examples in more detail.)



- **Color Layers:** choose this mode for multi-color images where you need separate colors, such as for a paper piecing or layered vinyl project and you want under-layers to use for alignment. Two examples follow which illustrate what is produced when **Color Layers** is chosen. (Note: Section 5.03.9 covers **Color Layers** in more detail.)

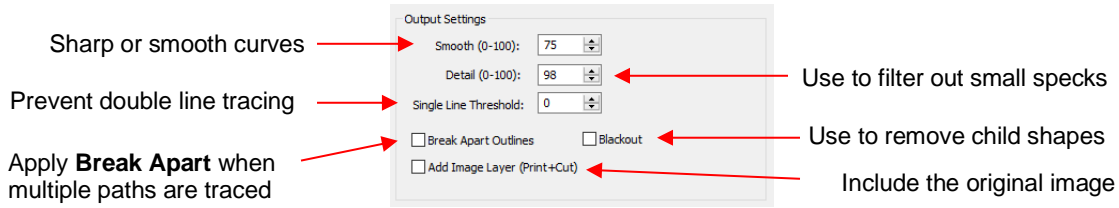


- **Single Color:** choose this mode when you want to single out a certain color to be traced or when the multi-color image needs to have colors traced exactly as displayed. This would be a typical choice for an HTV application where you do not want layers of material to overlap. The same examples are used again to demonstrate the difference. (Note: Section 5.03.10 covers **Single Color** in more detail.)



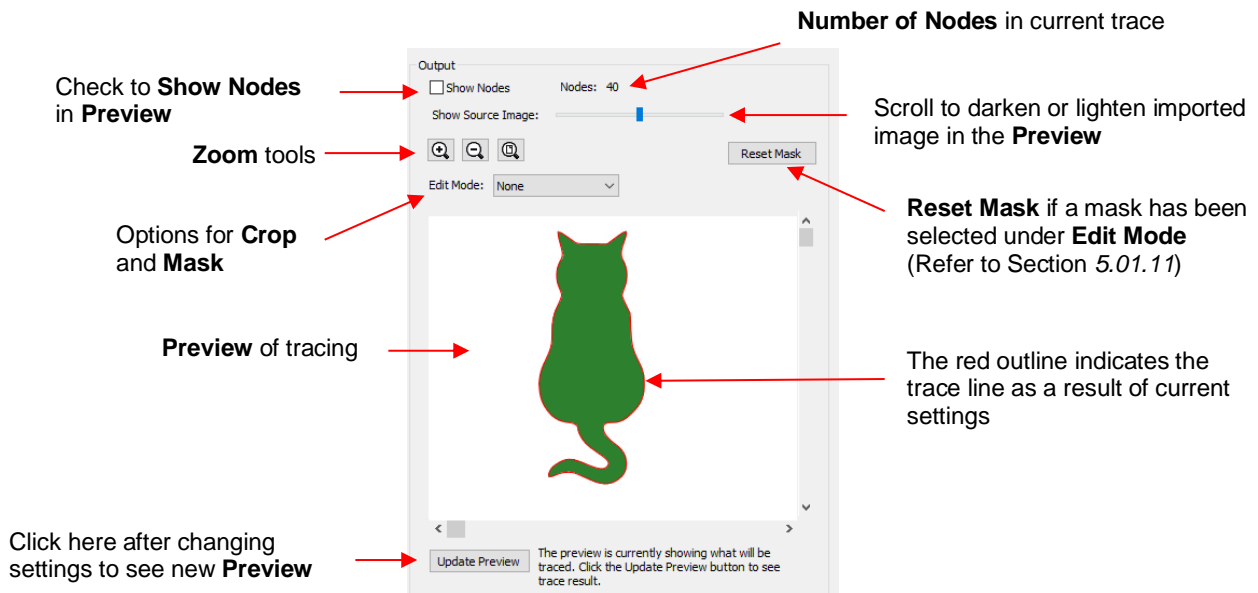
- ◇ Check the **Use Alpha Channel** box if the imported file is a PNG file with a transparent background. The transparent background is easily identified by the trace program requiring very little adjustment to other settings. Refer to *Section 5.03.6*.
- ◇ **Contrast** controls the level of color differentiation included in the trace: lower will include less, higher will include more. Refer to *Section 5.03.2*.
- ◇ **Resample**: choose **x 1.0**, **x 2.0**, **x 3.0**, or **x 4.0** to increase the pixels in the image which typically provides a more precise tracing of the image. More nodes result but increasing the setting can be especially important in some PNC (print and cut) applications where the cut line needs to precisely follow the printed image. Refer to *Sections 5.03.7* and *5.03.8*.
- ◇ **Despeckle**: mark this option to eliminate the tracing of tiny shapes that are not needed for cutting. Refer to *Section 5.03.4*.
- ◇ **High Pass Filter**: used to improve the tracing of photographs and other challenging images. Refer to *Section 5.03.12*

- **Output Settings**



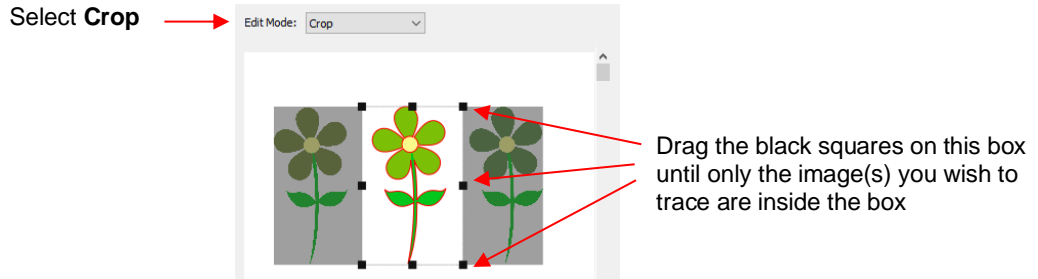
- ◇ **Smooth:** Adjust according to type of image. For example, decrease (make sharper) if tracing a shape with sharp corners like an envelope template. Increase (make smoother) if tracing a shape with soft curves, like a teddy bear. Refer to *Section 5.03.3*.
- ◇ **Detail:** If tiny undesired shapes appear, decrease to filter those shapes out. Refer to *Section 5.03.4*.
- ◇ **Single Line Threshold:** When tracing coloring book images (image with black outlines), use to convert those double lines to single lines. Refer to *Section 5.03.5*
- ◇ **Break Apart Outlines:** Checking the **Break Apart Outlines** box will save a step if different parts of the tracing need to be edited separately or placed on separate layers.
- ◇ **Blackout:** Check this box so that internal shapes (child shapes) are not included in the tracing. Refer to *Section 5.03.5*.
- ◇ **Add Image Layer:** Check this box if a copy of the imported image will be needed, such as for a print and cut application. The result will be two layers grouped: one will be labeled “Print” and the other layer will be labeled “Cut.” Refer to *Section 5.03.7*.

- **Output**



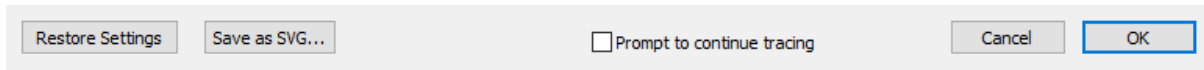
- ◇ Most of the settings in the **Output** section do not affect the final result, with the exception of the **Crop** and **Mask** functions in the **Edit Mode** menu. The other settings only affect the **Preview** so adjust as desired.
- ◇ **Edit Mode: Crop** When you select the **Crop** option, a rectangle will appear that can be resized to fit around the desired part of the image. This is useful when there are multiple images in a raster file and you only want to trace some of them. For example:





- ◇ **Edit Mode: Draw Mask** This option allows you to add or subtract parts of the image you want to include or exclude from the trace. Refer to *Section 5.03.11* for details on how to use this function.

- **Bottom of the Screen Settings**

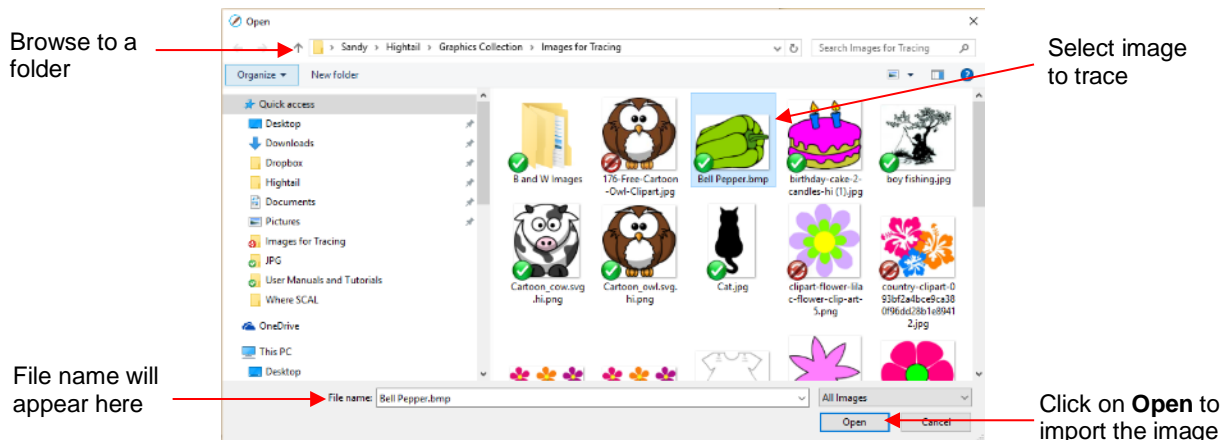


- ◇ **Restore Settings:** Click this button to change settings to the values that were in place when you entered the **Trace Image** window. To restore to original default SCAL settings, close and reopen SCAL.
- ◇ **Save as SVG:** Click this button to export the current tracing as an SVG file.
- ◇ **Prompt to Continue Tracing:** Mark this option if you want to remain in the **Trace Image** window after clicking on **OK** so that other trace settings can be used/tested with the same image or another image imported.

### 5.03.2 Monochrome Trace of a Colored Image: Effects of Contrast

*Video*

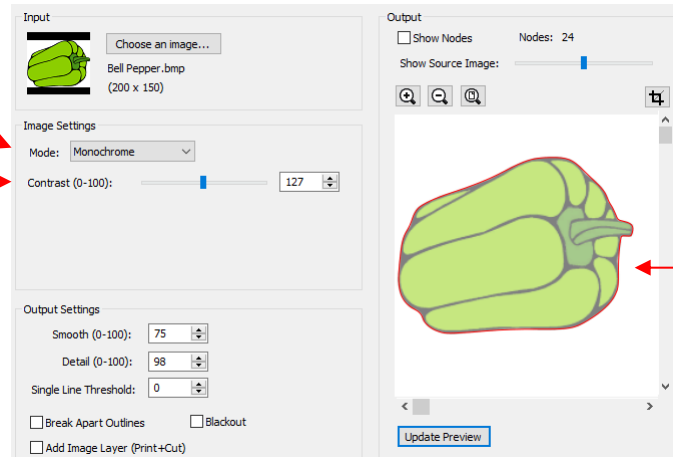
- Start by clicking on **Choose an image** in the **Input** section and then browse to locate the raster file you wish to trace:



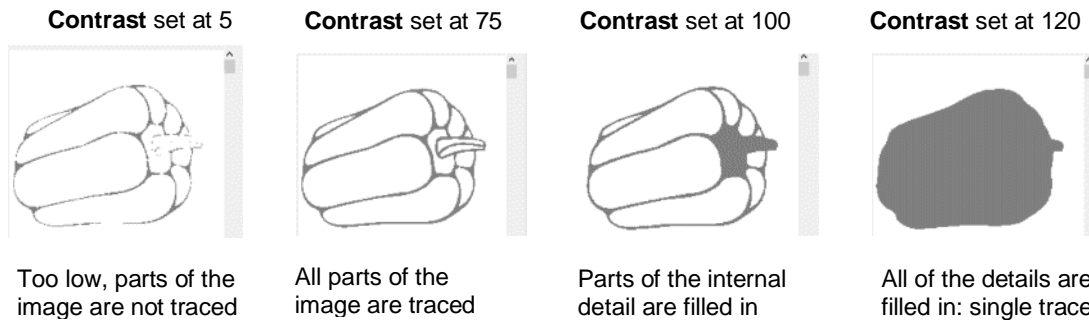
- In this example, a bell pepper image is imported for tracing and the **Preview** indicates a single trace path around the image:

Monochrome is selected

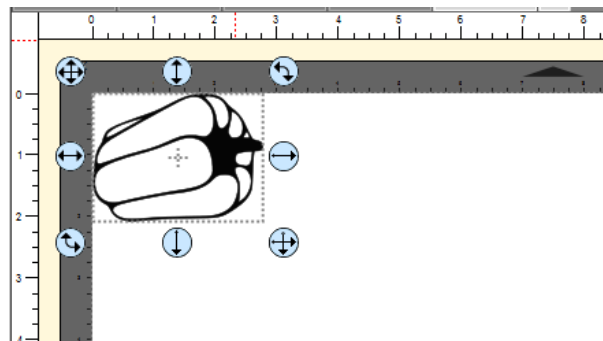
Contrast is at default of 127



- Let's experiment with the **Contrast** setting to fully understand how it works on an image of this type. Note that as you drag the **Contrast** scroll bar, the original image disappears so that you only see the trace lines:



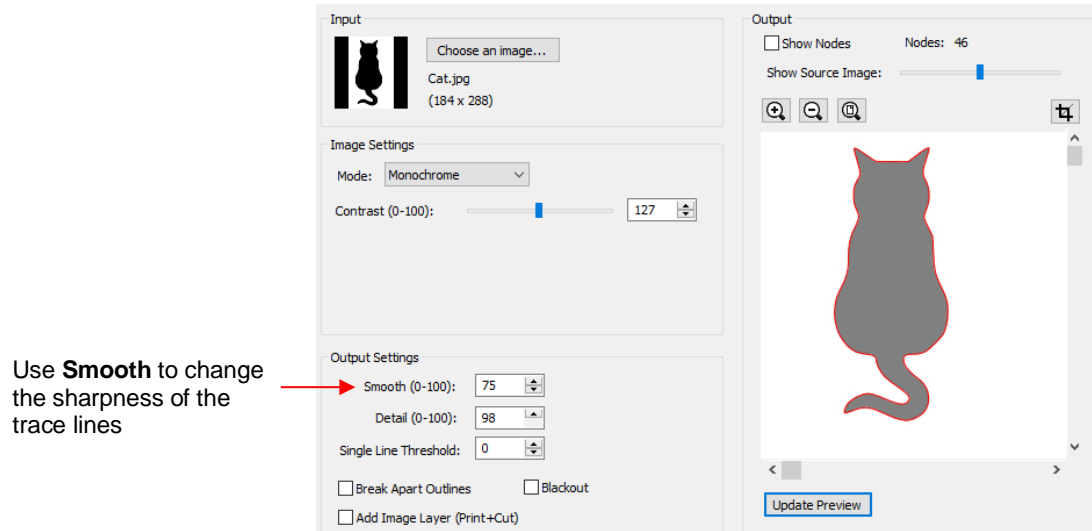
- Thus, for any given image, scroll the **Contrast** setting to see the effects and determine which version best suits your project needs. Once satisfied, click on **OK** and the image will appear in the top left corner of the **Cutting Mat**, ready to be resized and cut out:



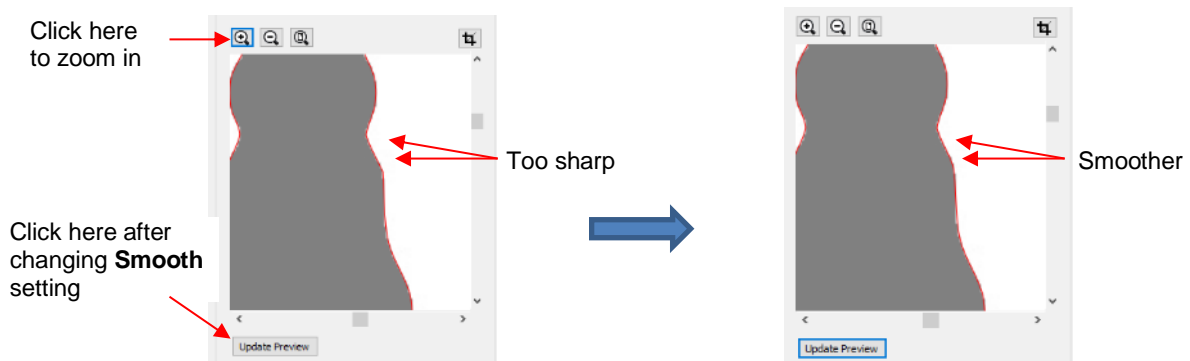
### 5.03.3 Monochrome Trace of a Silhouette Image: Effects of Smooth

Video

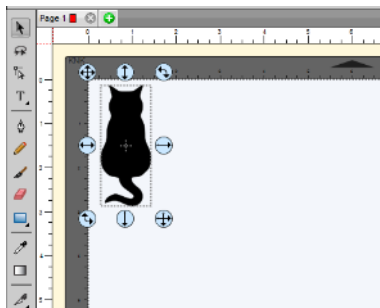
- As mentioned at the end of *Section 5.02*, silhouette images typically offer an easy trace. In this next example, a silhouette cat image is imported into the **Trace Image** window. Because this is a silhouette image, **Monochrome** mode is chosen and the image appears to have traced very well. However, upon a closer look at the right side of the cat, it appears that the neck area is a bit sharp:



- To soften the outline of the cat, zoom in on that area and then increase the **Smooth** setting until a desired result is obtained. In the following screenshot, the **Smooth** setting is increased from 75 to 85. Remember to click on **Update Preview** after every adjustment to settings:



- After clicking on **OK**, the cat shape appears on the **Cutting Mat** and is ready to be sized and cut:



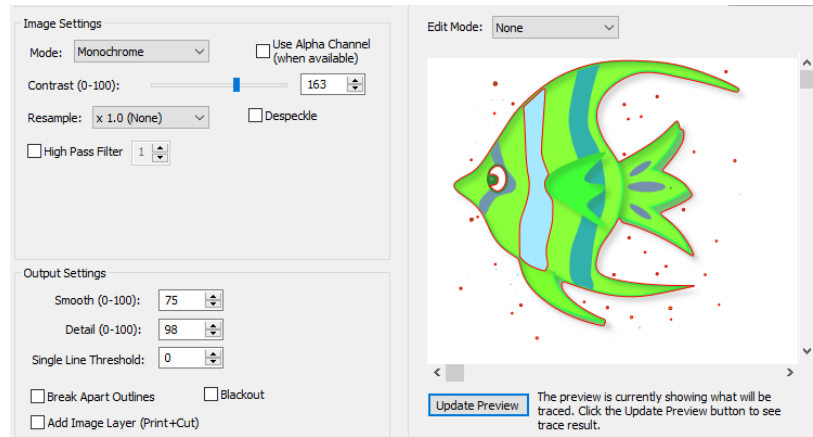
#### 5.03.4 Monochrome Trace of a Detailed Image: Effects of Despeckle and Detail

Video

- Either the **Despeckle** option or the **Detail** setting can be used to filter out small shapes. Sometimes these shapes are just random pixels that show up from, say, a dirty scanner bed. Other times they are shapes that make up the design but will be too small to cut and are not needed.
- Before showing examples, note that there will be times when some small shapes might be needed but not all of them. In those situations, it's best to include them and then they can be edited out using other tools in SCAL.

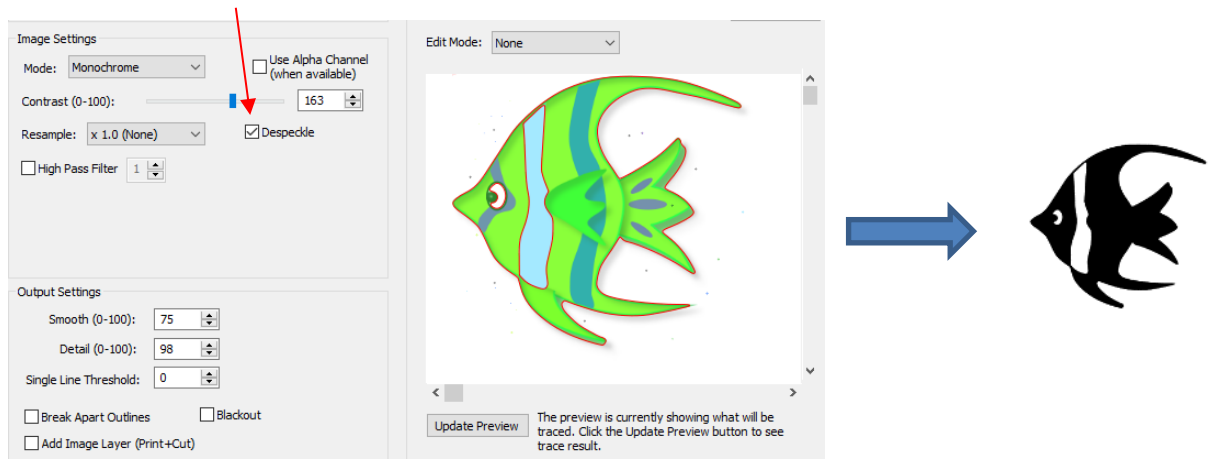
## Despeckle

- Since **Despeckle** is simply an on/off option, it makes sense to try it first when you see a lot of tiny unwanted shapes being included in the trace. For example, with the following clipart image of an angel fish, tiny specks surround the image in the **Preview**:



- ◇ Marking the option for **Despeckle** and clicking on **Update Preview**, removes the specks and the image is ready to import:

Check the **Despeckle** option



## Detail

- The **Detail** setting allows one to control the size of the small shapes that are eliminated.
  - ◇ The following tree image is imported into the **Trace Image** window. You have decided that not all of the leaves are needed. The **Detail** setting can be lowered to filter out some of the smaller ones:



Detail: 95



Detail: 50



Detail: 25



Detail: 0

◇ Even with **Detail** set at 0, there are still shapes of a certain size in that particular image that will be included in the trace. Again, there are editing tools that can be used in case more of the small shapes need to be removed. Refer to *Section 6.06*.

- Note that if **Despeckle** had been applied to the tree image, instead of deleting the smaller shapes, it would have included them in the trace:



**Despeckle: Off**



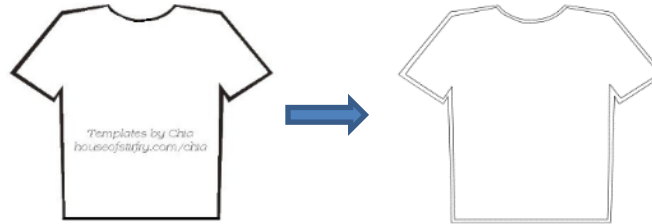
**Despeckle: On**

◇ This result indicates that when the small shapes are extremely close to a large shape, they will become part of that larger shape instead of being filtered out.

### 5.03.5 Monochrome Trace: Single Line Threshold and Blackout

**Video**

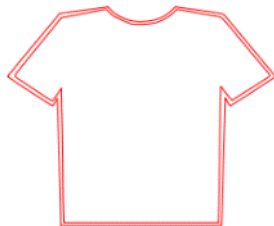
- The **Single Line Threshold** setting is useful when the imported image had a black border around it and you do not want a double line trace. For example, if the following T-shirt image is traced using default settings, two trace lines result: one line is following the outside of the black border while the other line is following the inside of the black border:



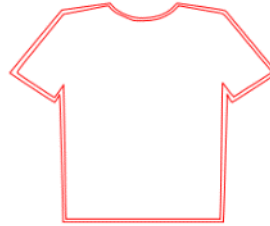
Original image

Trace of image

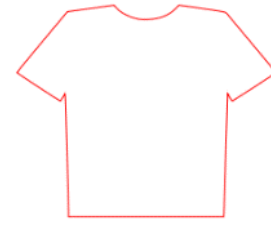
- To have only one trace line, increase the **Single Line Threshold** setting until there is only a single line showing in the **Preview** window:



Single Line Threshold = 0  
double line

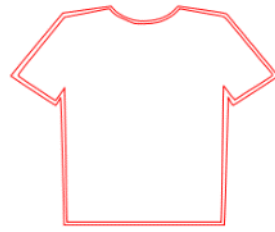


Single Line Threshold = 5  
double line

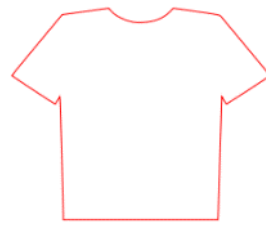


Single Line Threshold = 10  
single line

◇ Because the T-shirt image is a simple closed shape, the **Blackout** option could have been used instead of **Single Line Threshold**:

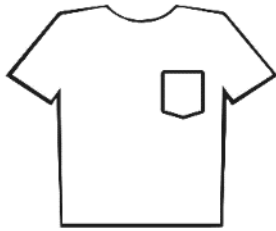


With **Blackout** unchecked

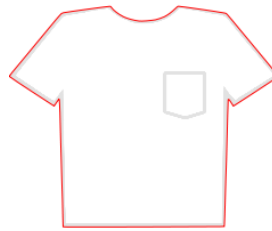


With **Blackout** checked

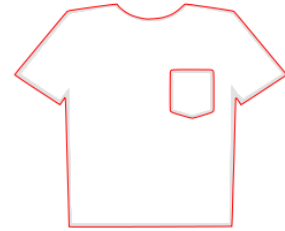
- ◇ However, if the T-shirt had internal details, such as a pocket, then **Blackout** could not be used as the entire pocket would have been ignored. In this situation, **Single Line Threshold** is the better choice:



Original image



Preview of trace with **Blackout** checked



Preview of trace with **Single Line Threshold** increased

### 5.03.6 Monochrome Trace: PNG Files and the Alpha Channel Option

Video

- PNG files with a transparent background are the easiest files to trace because the software can readily identify where the invisible background starts and ends. Furthermore, when you load a PNG file into the **Trace Image** window, an option will pop up if a transparent background is identified:

Select **Monochrome**

Alpha Channel box will appear and be checked if file is a transparent PNG

Preview – trace appears and needs no changes to **Contrast**

- Note that it wasn't necessary to adjust the **Contrast** setting because of the transparent background. This will not always be the case if there are internal cut lines that are needed. But in a case where just an outside trace is required, then leaving **Contrast** at the default of 127 will usually work.

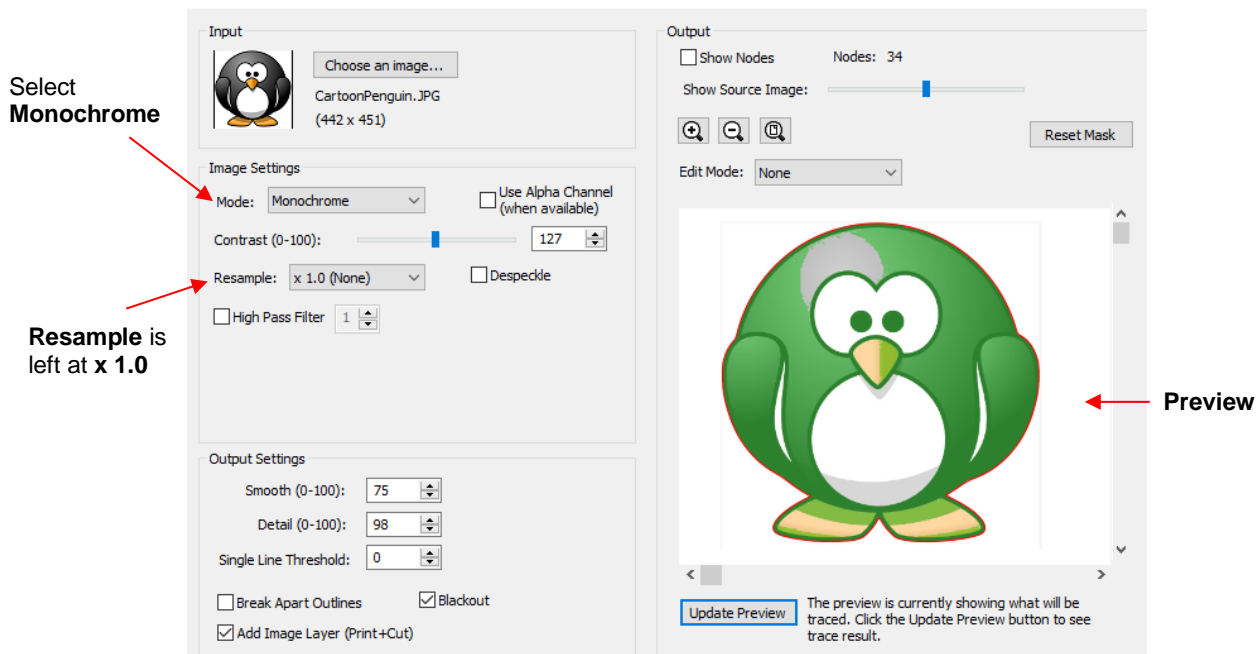
- ◇ **Contrast:** It shouldn't be necessary to adjust this setting because of the transparent background

- ◇ **Smooth:** In some cases, it might be necessary to decrease **Smooth** to get a tighter fit for a print and cut application. Alternatively, you can also create an **Inset** after the trace, when needed. Refer to the **Inset Offset** option in *Section 6.05*.

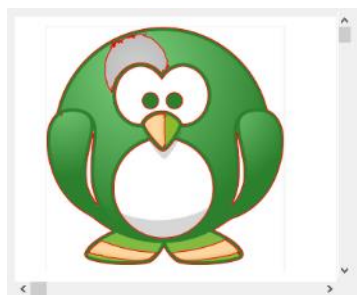
### 5.03.7 Monochrome Trace for a Print and Cut Application: Effect of Resample

[Video](#)

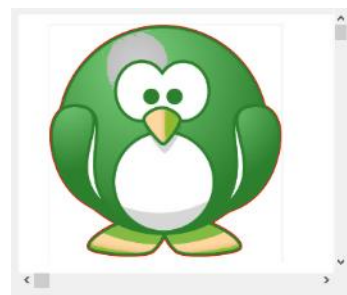
- In many print and cut applications, a raster image is imported with the intention of printing that image and then cutting precisely along the edges of that image. For this reason, it's very important to get as accurate of a trace as possible.
- The **Resample** setting multiplies the number of pixels in the image allowing a more precise scan of the border between the image and the background color. The following image is imported and traced with the default of **x 1.0** left as the **Resample** setting:



- Before clicking on **OK**, note two settings that have also been marked:
  - ◇ **Blackout:** apply if there are internal cut lines that are not needed. In this example, only the outside of the penguin needs to be traced. Thus, applying **Blackout** will remove the internal cut lines showing in the **Preview**:



Preview of trace with **Blackout** not checked. Note the internal red lines that would be cut.

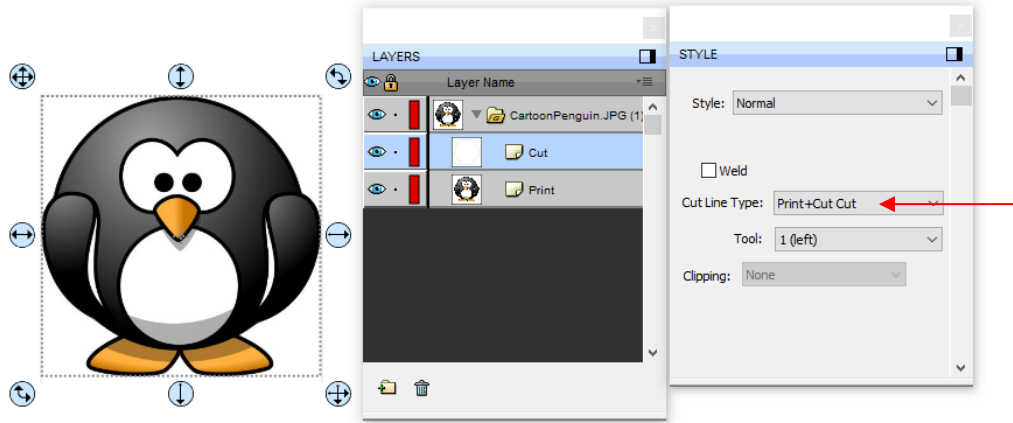


Preview of trace after **Blackout** is checked. The internal red cut lines are removed.

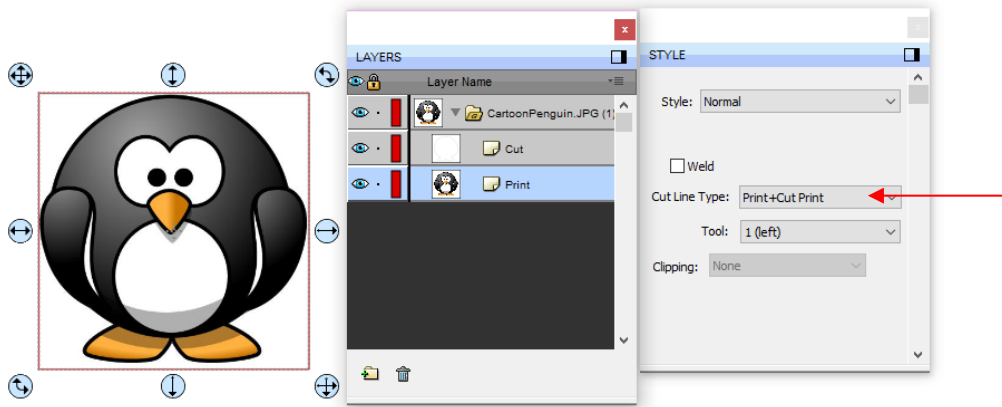
- ◇ **Add Image Layer (Print + Cut):** Mark this box so that the original image is also imported onto the **Cutting Mat**. Note that if you check the **Style Panel** settings on each layer, one will be assigned as

**Print + Cut Cut** (layer can only be cut, not printed) and the other will be assigned as **Print + Cut Print** (layer can only be printed, not cut). Click on **OK** and the following layers appear:

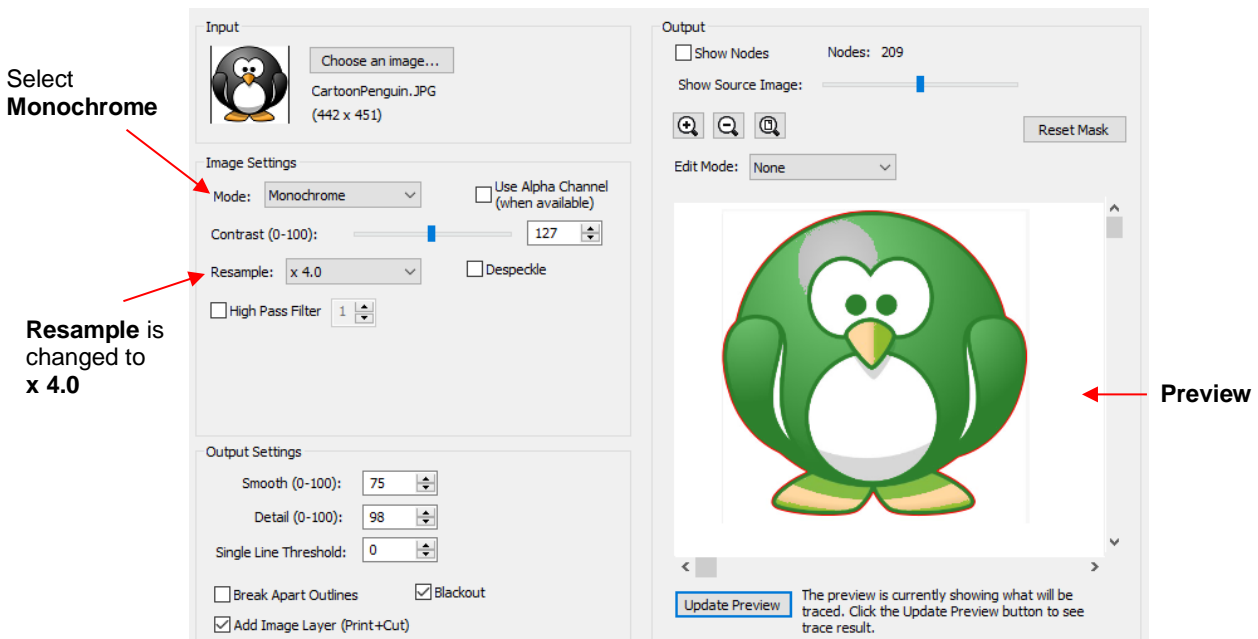
Cut Layer Assignment



Print Layer Assignment

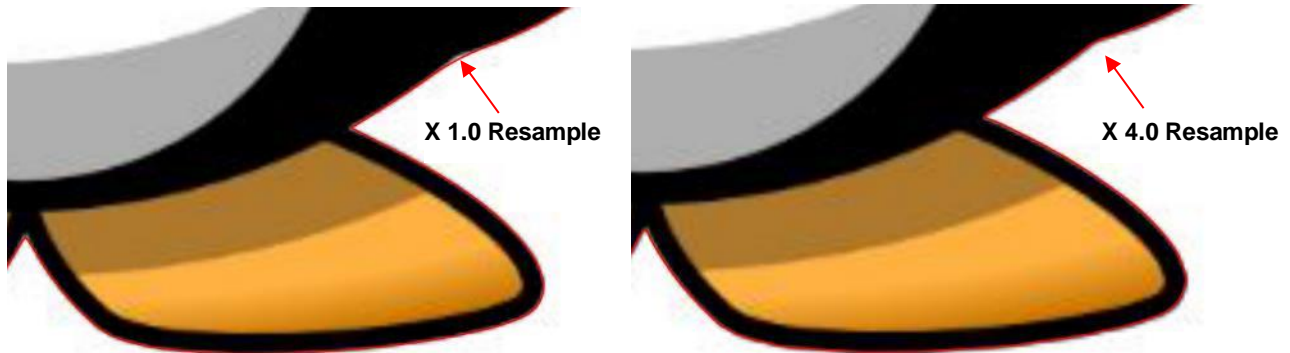


- Returning to the **Resample** setting, the same image is traced again, but the **Resample** will be set at a maximum value of **x4**:





- If you compare the **Preview** in both cases, there doesn't appear to be a difference in the trace. However, if you select the *Print + Cut Cut* layer on the **Layer Panel** and change the **Stroke** to a bright color and then zoom in closely, you can clearly see places where the **x 4.0 Resample** resulted in a tighter fit:



- In *Section 5.03.3*, it was shown how the **Smooth** setting affects the trace line. This setting can also be tested on PNC tracings as a way of getting a better fit, by decreasing the value. Alternatively, you can also create an **Inset** after the trace, if needed, to create a path that will cut just inside the image. Refer to the **Inset Offset** option in *Section 6.05*.

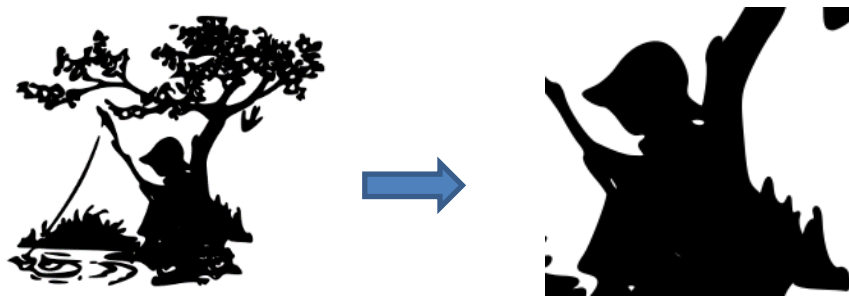
### 5.03.8 Resample Versus Smooth and the High Pass Filter

[Video](#)

- In many respects, the **Resample** setting appears to have the same effect as the **Smooth** setting. However, the **Resample** is applied to the imported raster image ahead of tracing, while the **Smooth** setting is applied to the actual trace lines.
- While there is no definite way of knowing which setting to use in any given tracing, keep in mind the following:
  - ◇ The purpose of **Resample** is to help the tracing algorithm “see” more pixels and provide a tighter, more precise trace.
  - ◇ The purpose of the **Smooth** setting is to make the trace less angular or more angular. Thus, the **Smooth** setting would probably be set high when tracing something like a stuffed toy but set very low when tracing something like a box pattern with lots of right angles.
- In general, you'll just need to test them to see which one is better or if applying both is the best option.
- In the example below, it will be shown that **Resample** improves the accuracy of the trace over **Smooth**.



- ◇ Using a **Resample** of **x 1.0** and other settings set (which will again be used when **Smooth** is tested), the trace results in the following. Since an important focal point would be on the boy's face and hat, note that the resulting trace isn't as sharp as one might want:



- ◇ By increasing the **Resample** to **x 2.0**, the shape of the hat and the face become closer to the original image:

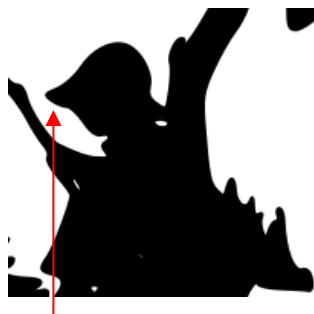


X 1.0 Resample



X 2.0 Resample

- ◇ On the other hand, if one leaves the **Resample** at **x 1.0** and, instead, decreases **Smooth** from 75 to 70, the hat becomes too pointed/angular without improving the shape of the face:



Smooth = 75



Smooth = 70

- ◇ Thus, in this particular example, increasing the **Resample** had a more desirable outcome than decreasing **Smooth**.
- ◇ Another setting, called the **High Pass Filter**, can even further sharpen a tracing. When it was applied in this same example, note the remarkable improvement in detail:



- ◇ Based on my initial experience, there are two downsides to using this setting:
  - Getting the optimum setting in combination with the **Resample** and **Contrast** settings, is tricky

- After applying and getting the trace onto the **Cutting Mat**, you'll need to apply **Object>Break Apart** and eliminate some unwanted paths. Alternatively, you can use the **Draw Mask** option to edit while still in the **Trace Image** window. Refer to *Section 5.03.11*.

◇ For more details on the **High Pass Filter**, refer to *Section 5.03.12*.

### 5.03.9 Color Layers Trace Video

- As mentioned in *Section 5.03.1*, **Color Layers** might be a good mode to choose for a paper piecing or layered vinyl project if you want under-layers present. In this section, a flower that has two shades of pink and two shades of green is chosen:



- After loading the image and then selecting **Color layers**, the window will update to show new settings:

- The **Max Colors** setting shows the current number of identified colors. Below that are icons of these colors. Note that white (or whatever has been used for the background color of the graphic, will also be included in the count. If you do not see those color samples, click on **Color layers** a second time.
- Depending on the image and what you want in your final trace, the **Max Colors** can be increased or decreased. Because this image has two shades of pink and two shades of green, those can be added to the count:

- After accepting **OK** in both cases, the layers are ungrouped and compared:



**Max Colors = 4** produces 3 layers



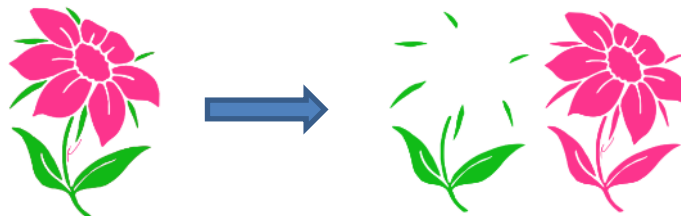
**Max Colors = 6** produces 5 layers

- You can also turn off colors by clicking on them. For example, if you do now want the black background traced:

Click once on a color to remove it from the trace



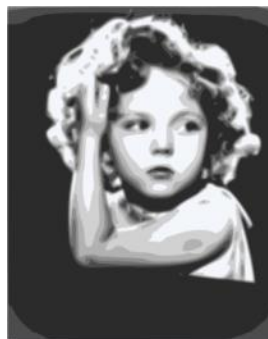
- The result is this:



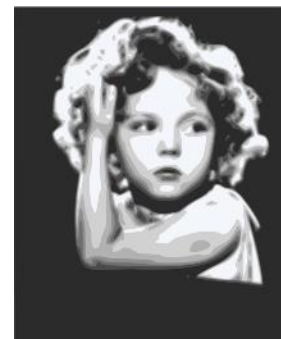
- A useful application for the **Color Layers** trace option is converting a photo (or another image) into a contoured cut project. Thanks to Leslie Merriett for sharing this on the KNK & Zing Users group:



Original Photo



**Color Layers Trace**  
**Max Colors: 7**



After darkest layer  
expanded to fill  
background



After cutting and assembling

### 5.03.10 Single Color Trace

Video Video

- With the **Single Color** option, each desired color is selected and traced individually. The advantage is that only the visible part of each color is traced. The disadvantage is that it takes a bit more effort.
- Again, the same flower image that was used in the prior section will be opened into the **Trace Image** window. When **Single Color** is selected from the drop-down menu, the window will update to show new settings:

Current color

Select **Single Color**

Increase **Contrast** to add similar colors to selection

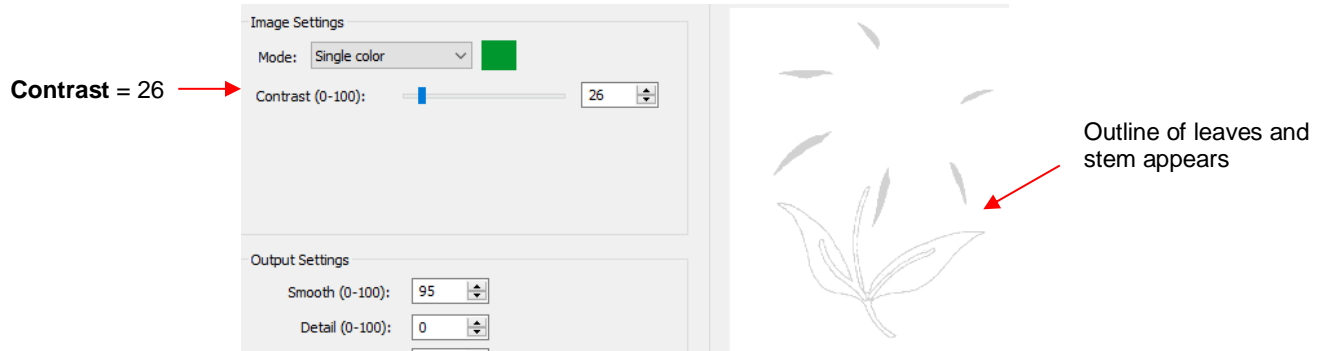
Mark this box

Scroll to the left to better see the cut lines in the **Preview**

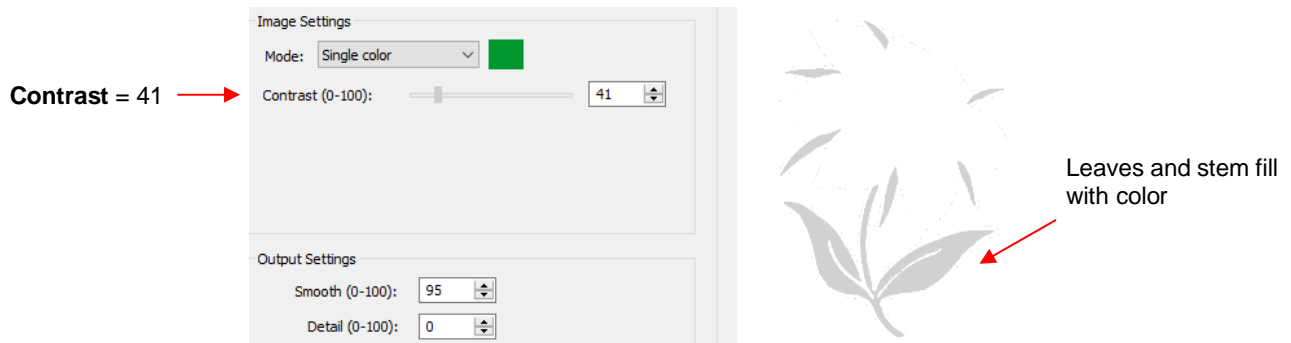
**Preview**

Click here after every change

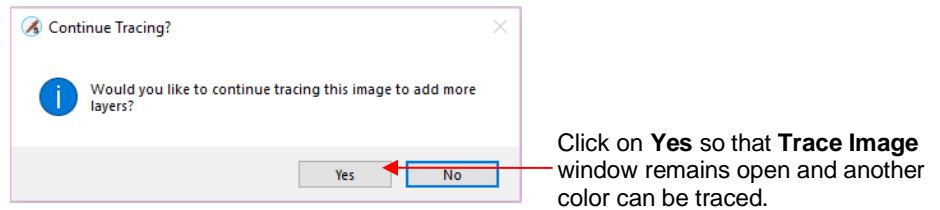
- Mark the option for **Prompt to continue tracing**. After you import each color to the **Cutting Mat**, the **Trace Image** window can be kept open to trace the next color.
- In the screenshot, the initial color identified was a shade of green. In the **Preview**, you can see how many parts of the flower were included as being in the range of that shade.
- If you want to add more of the green parts of the flower, then increase the **Contrast**. As you hold down the left mouse button and scroll, the image will turn gray so that you can more clearly see what is being added.
  - ◇ With a **Contrast** of 26, the outline of the flower stem and leaf appear:



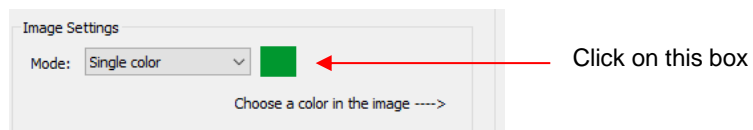
◇ With a **Contrast** of 41, the leaves and stem fill:



- Once you are satisfied, click on **OK** and you will be asked if you wish to continue tracing. Answer **Yes**:



- Click on the color box next to **Single Color**. A message will pop up indicating you are to click on another color on the **Preview**:



- One of the petals is clicked and the color box turns to that color. The **Preview** shows how much of the image is now included at the current **Contrast** of 5:



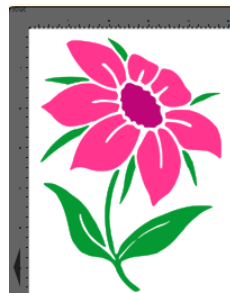
- The process is then repeated whereby the **Contrast** is increased. At a value of 30 more of the same petals are filled out, thus it is recommended to always tweak the **Contrast** some:



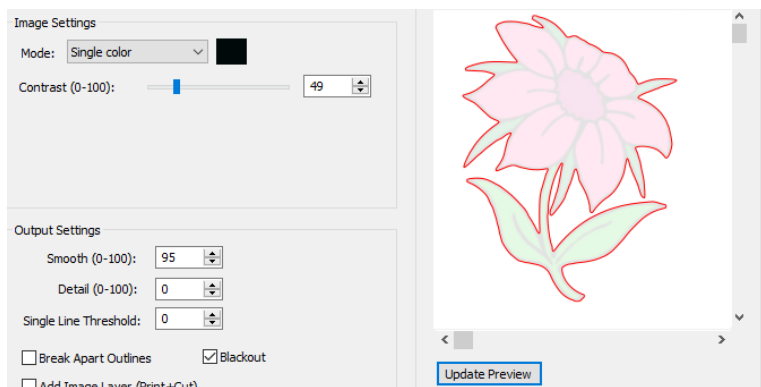
- If the **Contrast** is increased even higher, the center part of the flower gets added. Just as in the case of using **Color Layers**, this is optional.



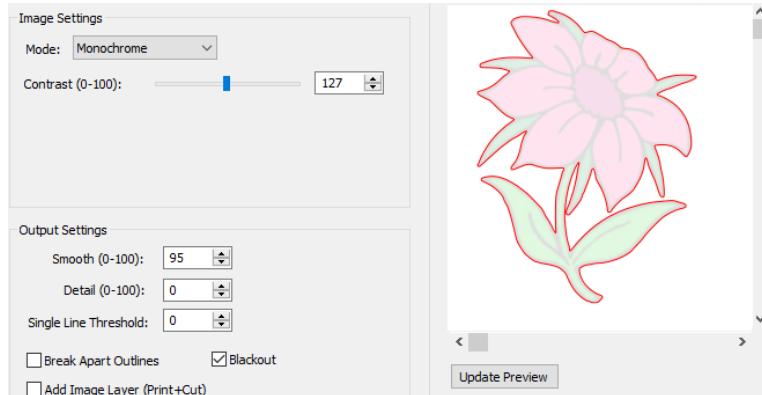
- After deciding on the **Contrast** for pink, click on **OK**. Now, let's assume that you did the petals and center in two parts and you are now at this point:



- You now have several options for completing the trace which involves adding a final outline/shadow layer to the flower:
  - ◇ Continue to use **Single Color**, click on the part of the image that is black, mark the **Blackout** option:



- ◇ Switch to **Monochrome** mode, mark the **Blackout** option:



- ◇ Forgo using the **Trace** window. Select the layers traced so far and use the **Shadow Layer** function to add a black outline. Details of this procedure are covered in *Section 7.05*.

- The final results, using the three options, are virtually identical:

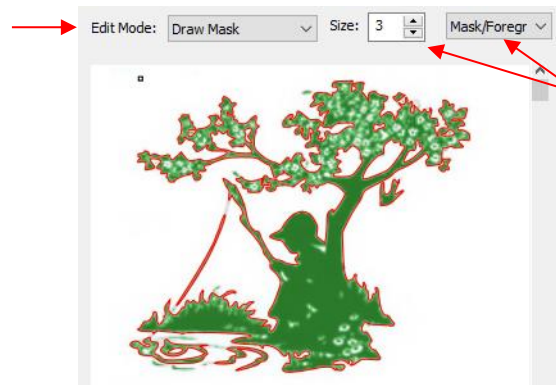


### 5.03.11 Draw Mask Function

**Video**

- In the **Output** section of the **Trace Image** window, under **Edit Mode** is a **Draw Mask** option which can be used to erase or add to a trace. With some images, finding the trace optimum settings can be tricky. You'll end up with some parts not quite traced and, perhaps, other parts not needed. This function allows you to "complete the task."
- When **Draw Mask** is selected, another option menu appears:

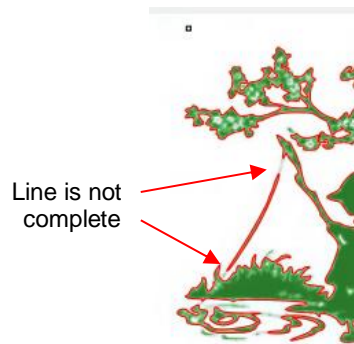
Select **Draw Mask**



A **Size** setting and options for either **Mask/Foreground** or **Mask/Background** appear

- **Mask/Foreground:** This option allows you to freely draw shapes to be added to the trace. For example, in the prior screenshot, you'll observe that the fishing pole line is not completely traced:





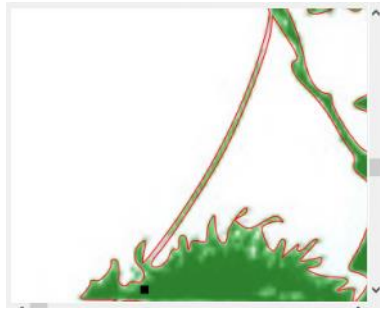
- ◇ Zoom in using the **Zoom In** icon and change the **Size** setting until the circle ~ matches the size of the fishing line. In this instance, the minimum of 1 will work best because the fishing line is so thin:



- ◇ Drag the mouse along the image where the fishing line wasn't trace. A pale green path appears:

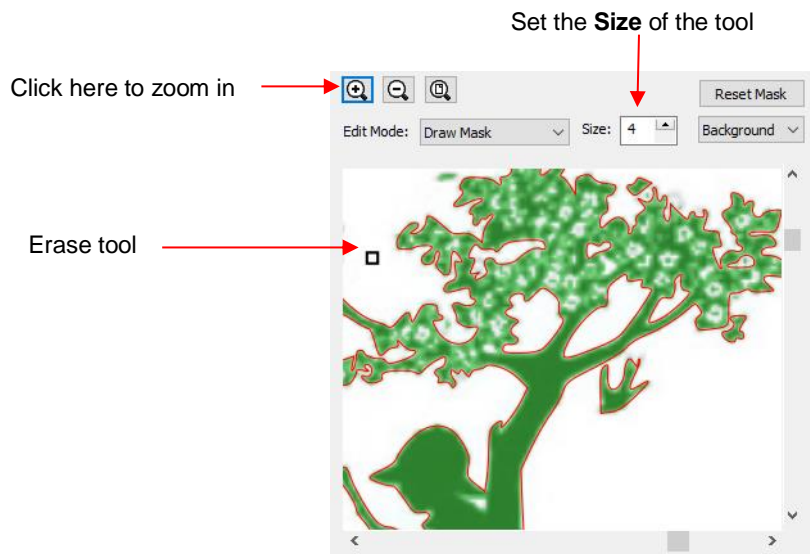


- ◇ Click on **Update Preview**. The added paths will be automatically welded to the part of the fishing line that was traced:

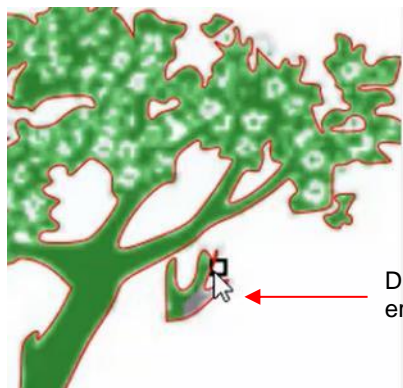


- **Background:** This option allows you to erase anything that's not wanted in the current tracing. For example, the bird just to the right of the tree, can be removed.

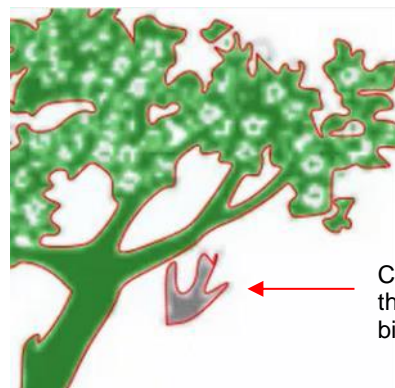
◇ As before, zoom in and set a **Size** for the tool:



◇ Drag the mouse across the image of the bird and the green shading indicating a traced image will begin to be erased. Continue until there's no longer any green:

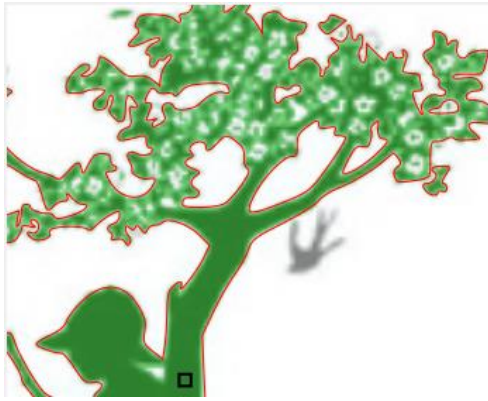


Drag mouse to erase the green



Continue until all of the green inside the bird is removed

◇ Click on **Update Preview** and the red outline and green fill of the bird is now gone:



- Click on **OK** and the resulting changes from both masks have been applied:



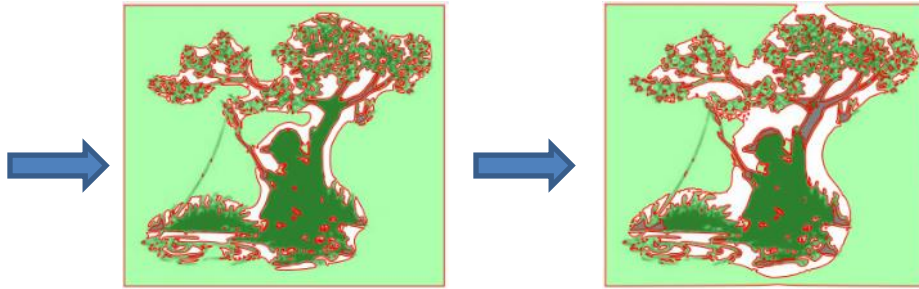
### 5.03.12 High Pass Filter Application *Video*

- The **High Pass Filter** setting is used to improve the tracing of photographs and other challenging images. The setting ranges from 0 to 20.

#### Improved Detail

- In the following example, the first image is with **High Pass Filter** turned off. The subsequent images show what happens as the **High Pass Filter** is set a 0, 1, 10, and 20. Obviously, none of these appear to be what you would want:

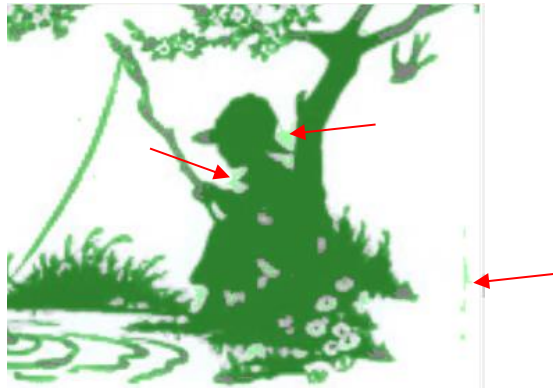




- The first step is to lower the **Contrast** back to the default setting of 127. The **High Pass Filter** setting is then set at 1 and a double trace line appears. As **High Pass Filter** is increased, the internal lines start to diminish:



- However, with too high of a setting, new tracings may also begin to appear:



- At this point, you can try adjusting the **Contrast**. However, if you are satisfied with most of the trace lines, you can then use the **Draw Mask** function, from *Section 5.03.11*, to erase these extra unwanted lines and to fill in any areas within the image. The final result:



## Converting a Photo to a Digital Stamp

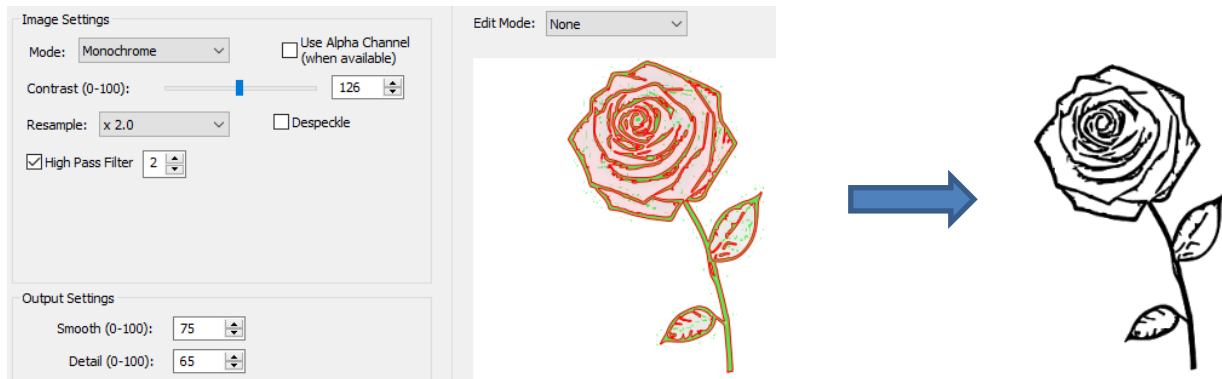
- The **High Pass Filter** setting will allow a much better conversion of a photo to a black and white image. The following photo of a rose will be used as the example:



- The best monochrome tracing without using the **High Pass Filter** required tracing in stages: one to get an overall outline, another to get the internal details of the rose, and a third to get the internal details of the leaves.
- **Object>Merge** was then applied and the resulting traced image looked like this:



- Instead of using three separate traces, the **High Pass Filter** could have been set instead:




- Obviously, it was not only quicker to simply apply the **High Pass Filter**, but the results turned out much better.

## 5.04 Draw Functions

### 5.04.1 The Draw Tool

*Video*

- The **Draw Tool** is accessed by clicking on the 5<sup>th</sup> icon  on the **Tools Panel** (shortcut **P**). This tool is used to draw straight lines and Bézier curves. It can be a bit tricky to master but just like with many good things- practice makes perfect!

## Drawing Straight Lines

- To draw a single straight line, use your mouse to click once where you want to start the line and click again where you want to end the line. Then immediately press **Esc** or the **Enter** key:



Left click once to begin.



Move cursor to where you want to finish the line.



To stop drawing, press **Esc** or the **Enter** key

- If you wish to continue drawing a connecting straight-line path, keep left-clicking each time you need to change directions. Each click produces a node:



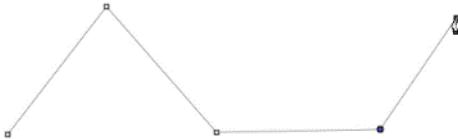
Left click to start and left click at a 2<sup>nd</sup> location



Move to a 3<sup>rd</sup> location and left click again.



Move to a 4<sup>th</sup> location and left click again.

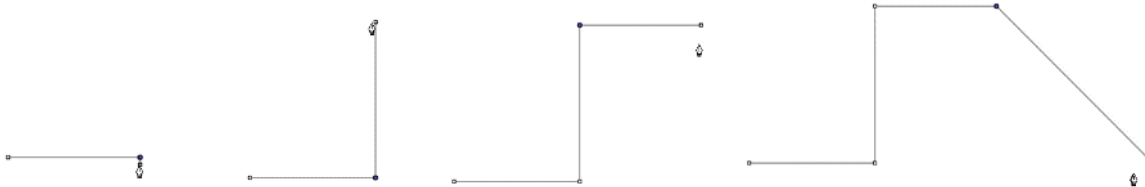


Move to a 5<sup>th</sup> location and left click again.



Continue clicking until you are ready to end. Click **Esc** or the press the **Enter** key.

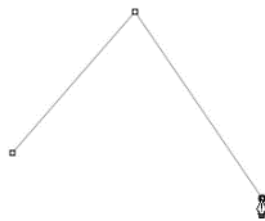
- If you want to draw perfectly vertical lines, perfectly horizontal lines, or lines at a 45° angle, hold the **Shift** key while clicking:



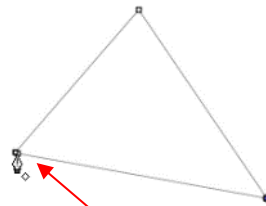
- Note that if you are on a Mac and you draw a 45° diagonal, you need to release the **Shift** key before clicking.
- If are drawing a closed path then, just as the mouse cursor approaches the starting node, a small diamond will appear next to the cursor and you can click one last time to end the process. The shape will automatically join the first and last nodes and fill with color, provided a **Fill** color is assigned:



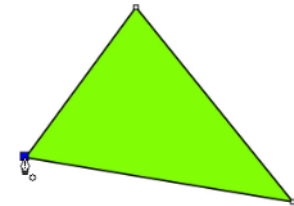
Left click to start and then left click at a 2<sup>nd</sup> location



Move to a 3<sup>rd</sup> location and left click again



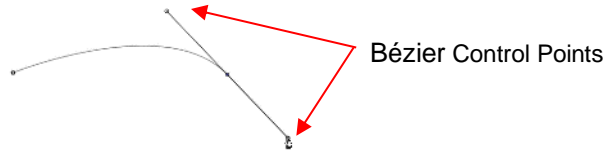
As you approach the start, watch for the cursor change.



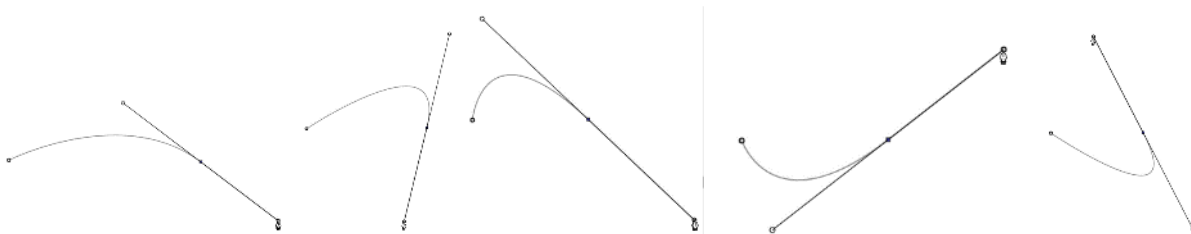
Left click and the shape will close and fill with color

## Drawing Bézier Curves

- Drawing curves is a bit more difficult. The key is to take it one step at a time, practice the technique a lot, and remember that you can later correct your curves using the **Shape Tool** (refer to *Section 6.10*).
- To draw a curve, use your mouse to left-click once where you want to begin the curve. Then, instead of left-clicking, hold the left mouse button down and begin dragging the mouse. Continue holding the left button and notice a second line appears with two circles at either end. These are called Bézier control points:



- As you drag the mouse, you'll see that you have full control over how long this line will be, as well as where the control points are positioned. Remember to just keep pressing the left mouse button. Experiment with longer and shorter control lines, as well as rotating the line to bend the curve in a range of different ways:



- When you are satisfied with the curve, you have two choices at this point:
  - ◇ Release the left mouse button, move the mouse to a new spot, left-click, and you'll begin creating a new curve connected to the prior curve:

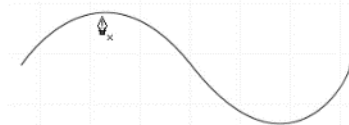


- ◇ Release the left mouse button and press the **Esc** key or press the **Enter** key to stop the drawing process:



## Adding and Deleting Nodes

- Zoom in on the curve, select it, and then click on the **Draw Tool** icon.
- To add a node, move the cursor next to the path and watch for the cursor to change. With the cursor right on the path, left-click to add a node:



Note the cursor has a small x next to it as it approaches the curve



After cursor changes, left click once and a node is added

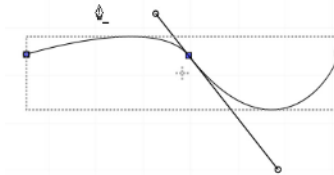


New node has been added

- To delete a node, move the cursor over an existing node until the cursor changes and you can see the node turn blue. Left-click once to delete that node:




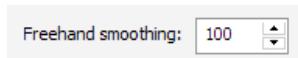
Once the cursor changes and the node turns blue, left click



The node is deleted and the curve will change accordingly

### 5.04.2 Freehand Drawing Video

- The **Freehand** tool is accessed by clicking on the 6<sup>th</sup> icon  on the **Tools Panel**. This tool is used to freely draw thin lines with your mouse or, better yet, a graphics tablet.
- In the **Tool Options**, there is a setting called **Freehand smoothing**. Increase that setting if you want the software to reduce “shakiness” as much as possible:



- The two extremes for the **Freehand smoothing** setting clearly demonstrate the difference:



smoothing: 0



smoothing: 100

- When drawing closed shapes, the shape will remain an open path regardless of how precise you attempt to be in returning to the start. To close the shape, select it and go to **Path>Close Path**:




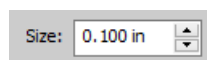
Freehand tree



After applying **Path>Close Path** and selecting a **Fill** color

### 5.04.3 Brush Drawing Video

- The **Brush** tool is accessed by clicking on the 7<sup>th</sup> icon  on the **Tools Panel**. It is used to freehand draw thick lines. As with the **Freehand** tool, using a stylus with a graphics tablet will provide the most control.
- In the **Tool Options** is a **Size** setting for the thickness of the **Brush** tool:



- Select the **Size** you desire and freehand draw:

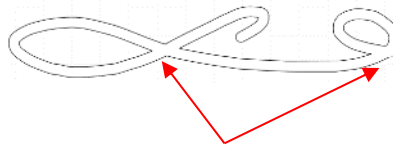




- One fun application is to use the **Brush** tool to easily add circles to a design. Select the **Size** and then just left-click without dragging the mouse. For example, the tree drawn with the **Freehand** tool in the prior section is now decorated:



- Note that if a path drawn with the **Brush** tool crosses itself, the overlap will be removed:



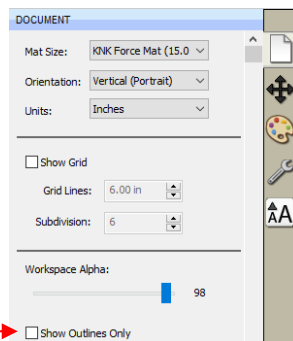
Overlaps automatically removed

## 5.05 Manual Tracing of an Imported Image

- Sometimes the quality of an image will fail to yield a good auto-trace. It could be that the image is too small or too detailed. If the image is important to you, then manually tracing offers another option for conversion to a vector cut line.
- The easiest way to manually trace a raster graphic is using the **Draw Tool** presented in *Section 5.04.1*. However, instead of trying to create the Bézier curves as you go, it's faster and easier to simply and quickly click, click, click around the image placing a node wherever the path changes directions. Then you can go back and manually move nodes and drag curves to fit the original image. This process is presented in the next few subsections.

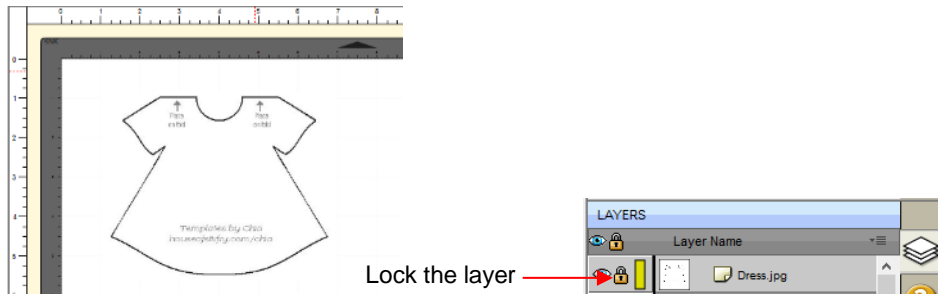
### 5.05.1 Importing an Image for Manual Tracing

- Since you won't be trying to auto-trace the raster image, use **File>Place Image** to import it onto the **Cutting Mat**. In this tutorial, the *Dress.jpg* file shared at the link in *Section 5.03* will be used.
- While this dress could easily be auto-traced, it provides a great example of how the **Draw Tool** can be used to fit a shape such as this. So, it will be used for the manual tracing example.
- In order to see the image, make sure **Show Outlines Only** is not checked on the **Document Panel**:



Uncheck this option →  Show Outlines Only

- To avoid inadvertently selecting the image while tracing, lock that layer on the **Layers Bar**:

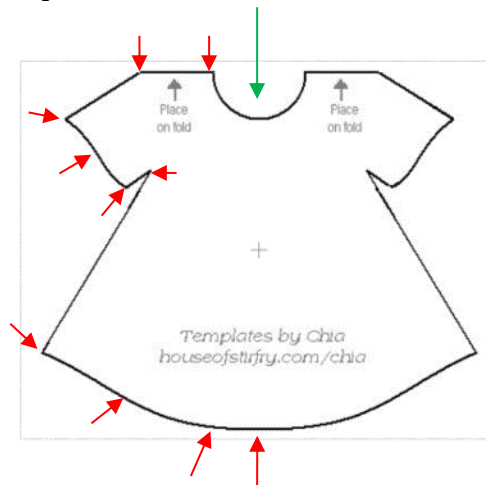


### 5.05.2 Manual Tracing Using the Draw Tool

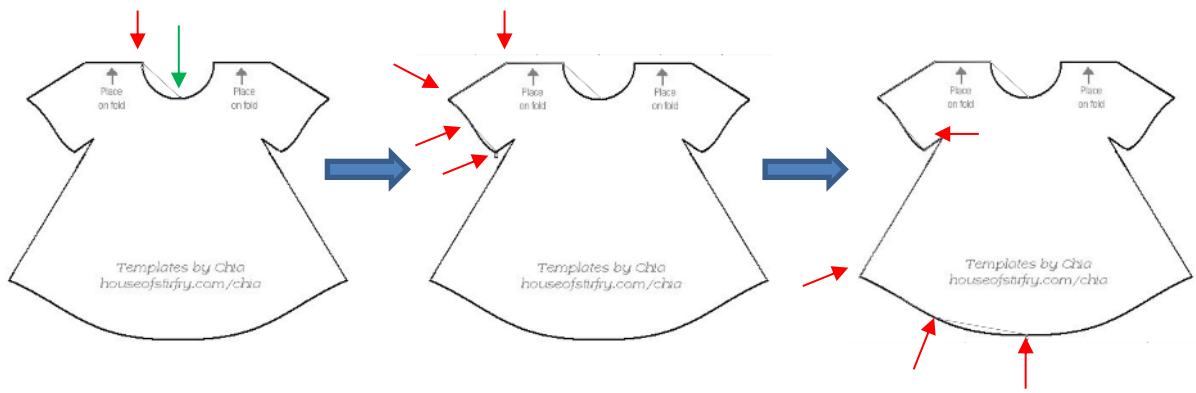
- Make sure you have read *Section 5.04.1* to learn how to comfortably and successfully use the **Draw Tool**.
- Now, the best method for tracing a symmetrical image is to only trace one half. Then you can make a copy of it, mirror the copy, and weld the two together to create a perfectly symmetrical shape. This is what will be done in this case because the dress is symmetrical.
- Before beginning the trace, visually note how many changes in curves and straight lines exist. This will help you understand where to click as you work around the image. But don't overthink it. Remember that you can add nodes, delete nodes and move nodes during the editing process:

Trace will begin and end at the middle of the neckline, moving counter-clockwise around the dress.

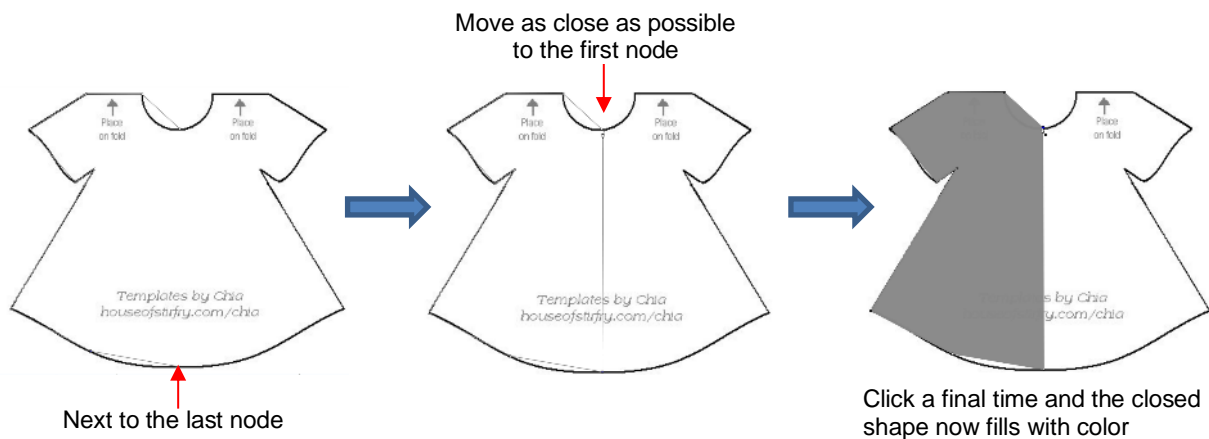
Red arrows indicate where a change in direction or curvature occurs



- The process is as follows:
  - ◇ Zoom in as close as possible, but make sure the entire image can still be seen. Click on the **Draw Tool** icon.
  - ◇ Left-click once in the middle of the neckline (see green arrow below). Then click at each point where the curve changes. A series of straight line segments will be made, one right after another:




- ◇ Once you've reached the next to the last node, click as close as possible on the first node and the shape will close and fill with color (based on the color currently assigned on the **Fill & Stroke Panel**)



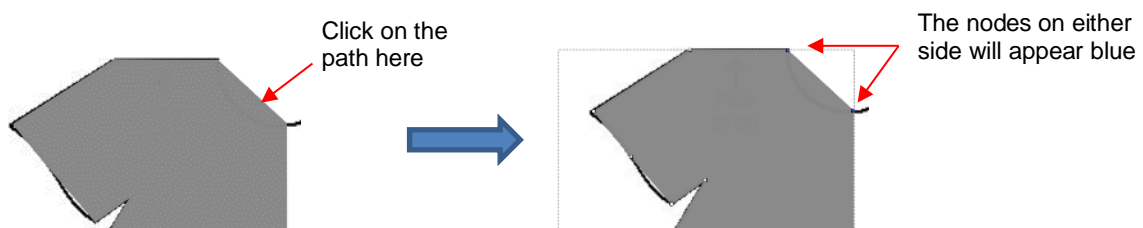
### 5.05.3 Editing the Trace Video

- The next step is to move nodes and convert any straight lines into curves, as needed. This is done using the

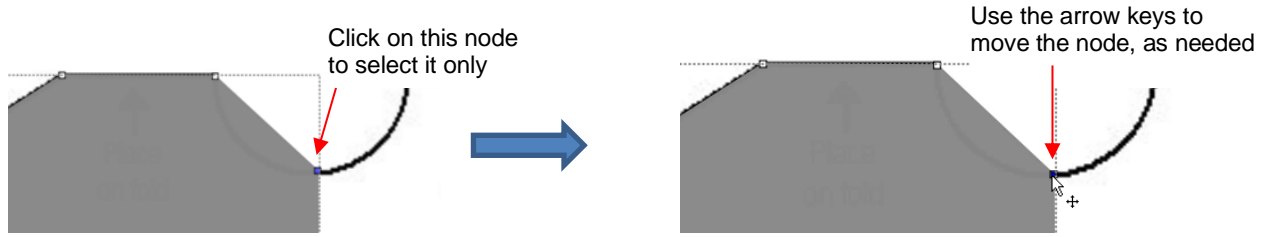
**Shape Tool**  which is the 3<sup>rd</sup> icon on the **Tools Panel**. Note that more details about using the **Shape Tool** will be presented in *Section 6.10*. For now, only a portion of this function's capability is needed.

- Using the **Shape Tool** will take a bit of patience and attention. But following the steps exactly as presented should yield successful results:

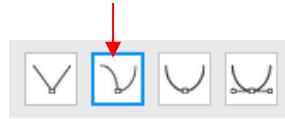
- ◇ With the **Shape Tool** selected, click on the neckline path. The two nodes on either side will be blue:



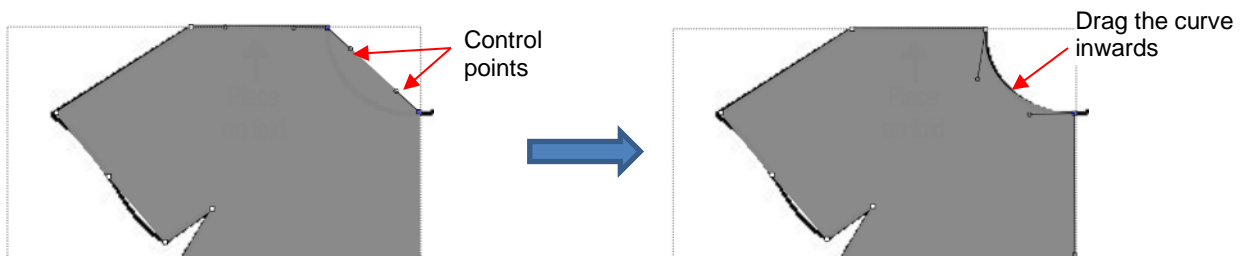
- ◇ If you need to move either node, click on the node to be moved and the other node will turn white. Be very precise in clicking as it is easy to miss the node. If that happens, you will need to click the path again to show the nodes.
- ◇ Once you have the single node highlighted in blue, you can now move the blue node by using the arrow keys on your keyboard:



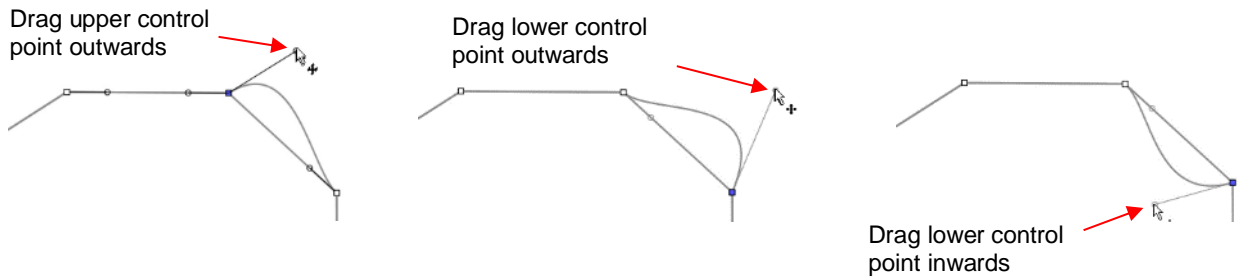
- ◇ Next, click on the second icon on the **Tool Options**:




- ◇ Then click again on the neckline path and you will see Bézier control points. This means you can now drag the middle of the path inwards to form the neckline:

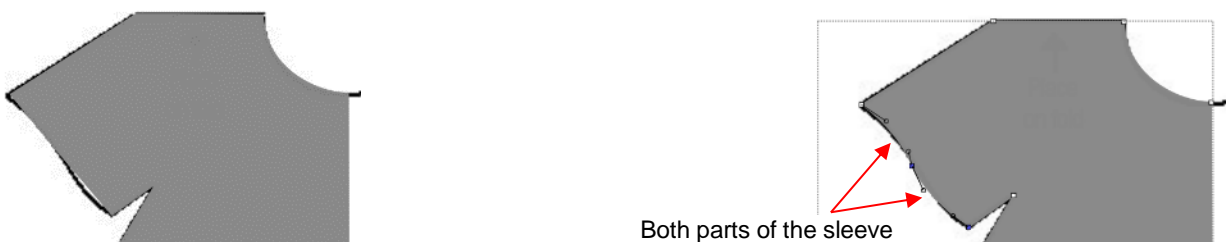


- ◇ Alternatively, the Bézier control points can also be dragged. This is useful if the curve isn't symmetrical. Here are a few examples of how that curve could be altered:



- ◇ Just like with nodes, when selecting a Bézier control point, you need to click precisely on the little circle. If you inadvertently see all of the nodes disappear, just click on the path again.

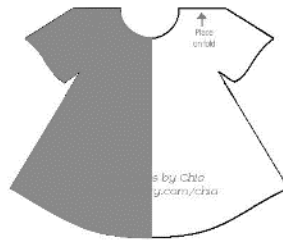
- ◇ Once the neckline is curved, go over to the sleeve and repeat the process for both parts of the sleeve since one side curves inwards and the other side curves outwards. Again, click on the path, click on the 2<sup>nd</sup> icon on the **Tool Options** , click on the path again and then drag the curve:



Before editing

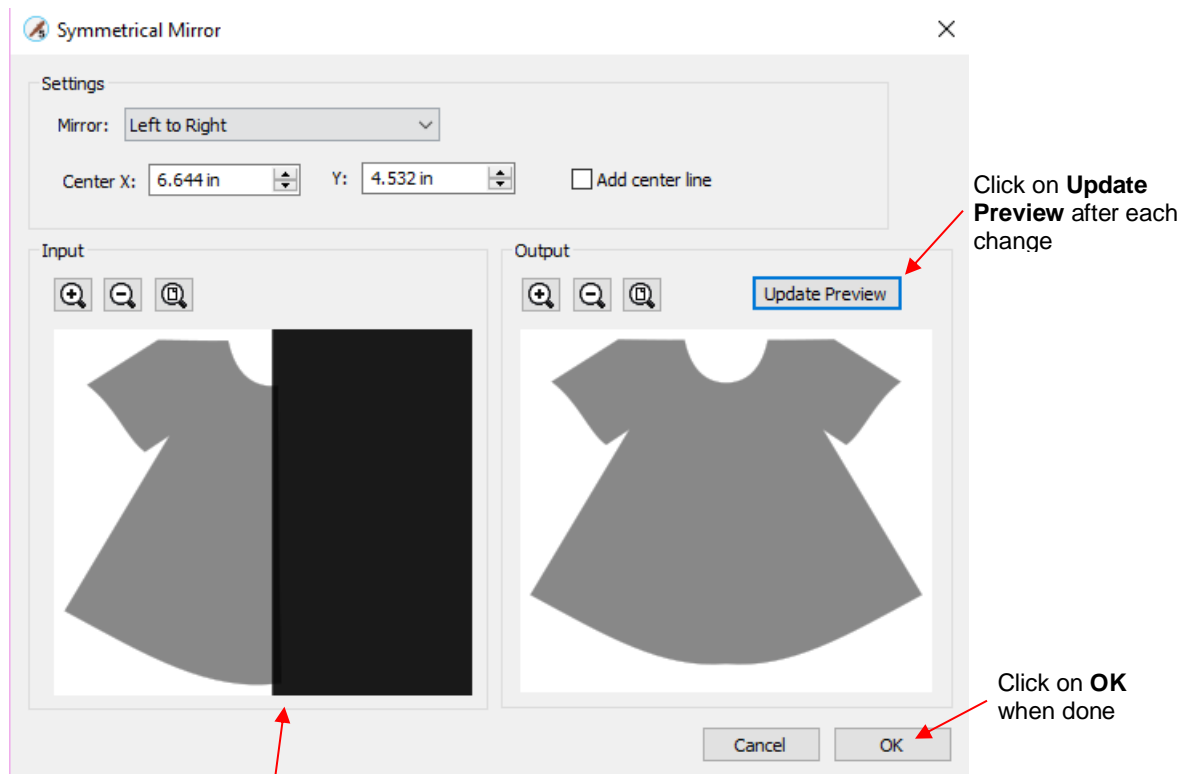
Both parts of the sleeve are reshaped

- ◇ Repeat on the bottom of the dress. The shape you traced should now fit the original image. If it's not a perfect fit, don't worry about it! No one will ever know. 😊



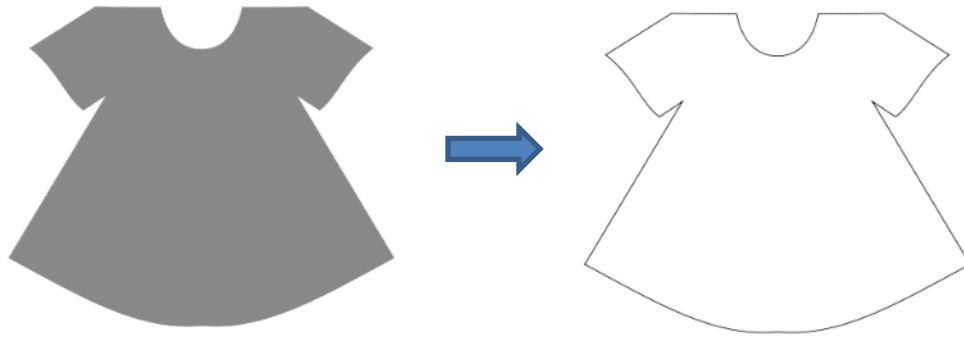
#### 5.05.4 Using Symmetrical Mirror to Complete the Trace

- The final step to complete the dress involves making a mirror image copy and then welding it to the original.
  - ◇ Select the dress and go to **Effects>Symmetrical Mirror**. Increase **Center X** or drag the black rectangle to the right and click on **Update Preview**. Continue adjusting **Center X** until the image is to your satisfaction:



Drag black rectangle to desired location (**Center X**)

- ◇ After clicking on **OK**, the dress is complete and the original image is no longer needed. Turning on **Show Outlines Only** on the **Document Panel** confirms that the symmetrical copy has been welded to the original:



- Other applications for **Symmetrical Mirror** are covered in *Section 7.23*.

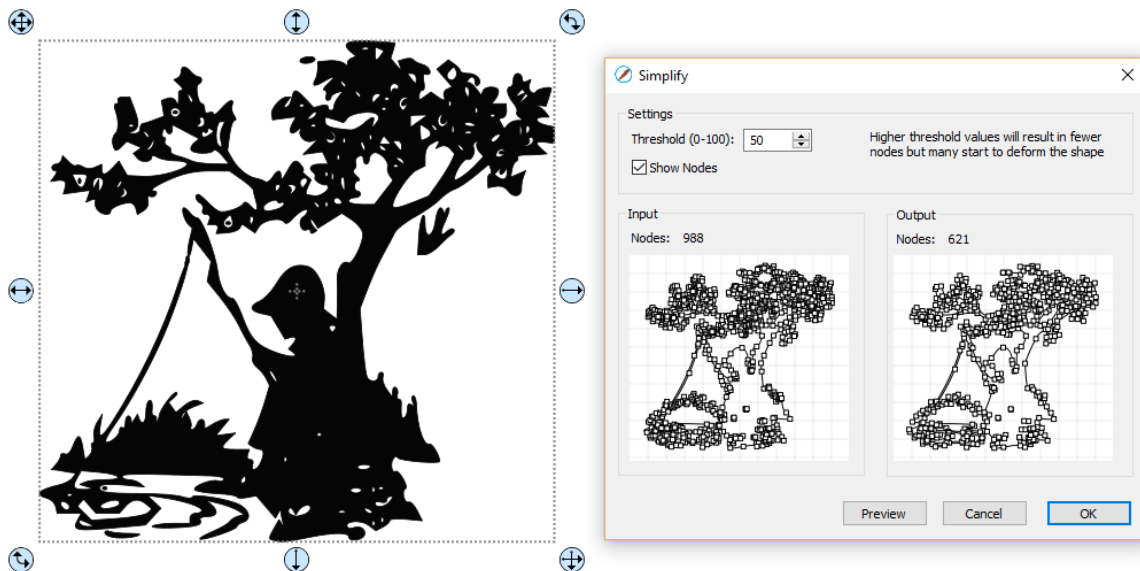
## 6. SCAL: Editing

This chapter covers functions that are used to modify shapes in SCAL as well as prepare shapes for cutting. For functions used in designing, refer to *Chapter 7*.

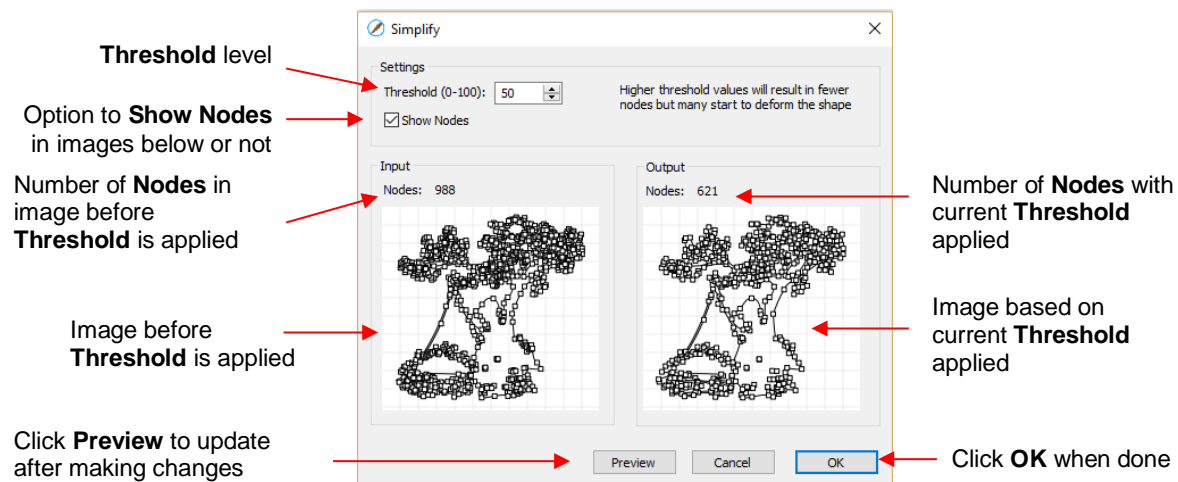
### 6.01 Simplify Video

- The purpose of the **Simplify** function is to reduce the number of nodes. This can be important when cutting small vector shapes in which clustering of nodes in tight locations can sometimes lead to poor cutting.
- There are two ways to open the **Simplify** window after selecting a shape:

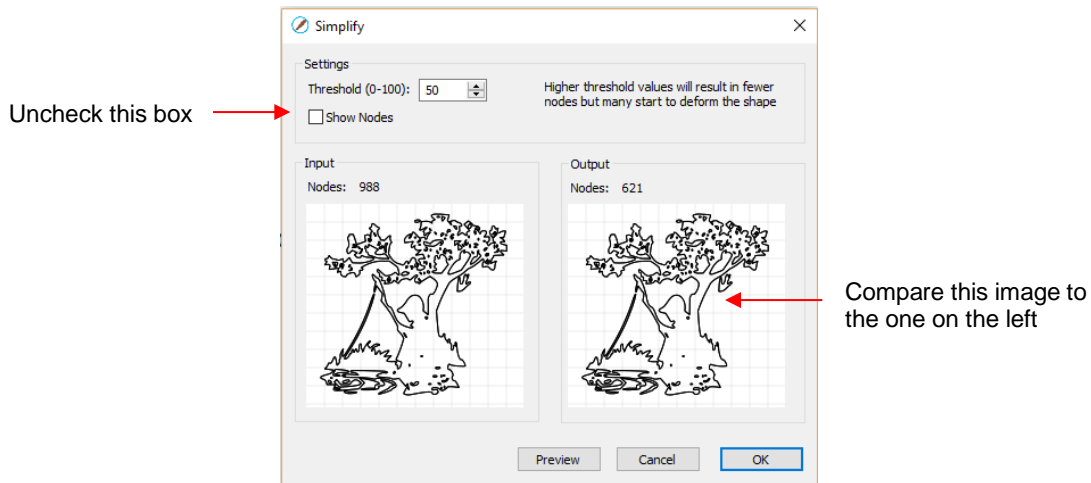
- ◇ Right-click and select **Path>Simplify**
- ◇ Go to **Path>Simplify**



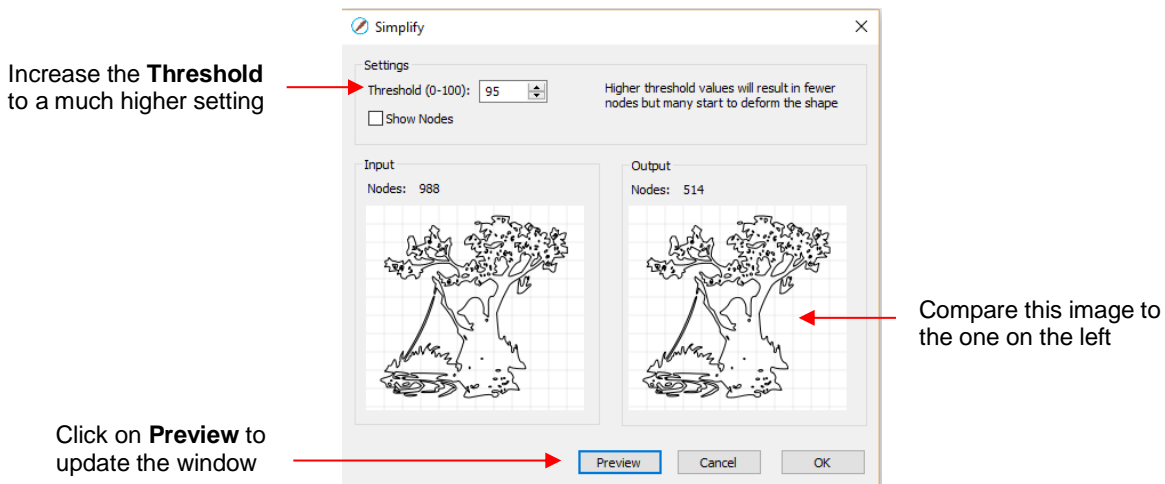
- The **Simplify** window shows the nodes of the selected image in two side-by-side windows: an **Input** and an **Output**, along with the number of **Nodes** in each one. That count is based on the current **Threshold** setting:




- To see the effect of **Threshold**, uncheck the **Show Nodes** box. Make sure the shapes haven't become distorted as a result of applying the current **Threshold** setting:



- Try increasing the **Threshold** setting to reduce more nodes. In general, you should be able to use a high Threshold without compromising the image:

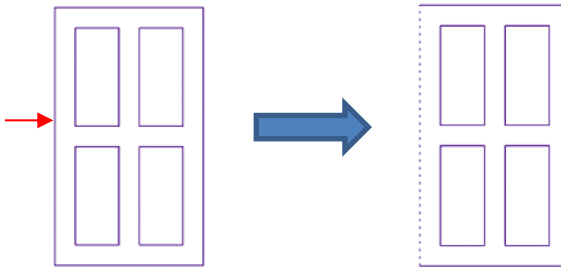


## 6.02 Split Path Video

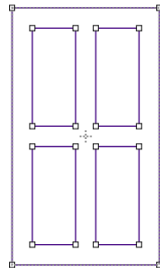
- The **Split Path** function allows you to break the connection between two paths.
- Select a node using the **Shape Tool**  on the **Tools Panel**. Note that it's usually easier to select a node by zooming in on the shape and, as you move your cursor towards the node, the cursor icon will change when you are close enough to click on it. Then you can access **Split Path** using either of the following:
  - ◇ Right-click and select **Path>Split Path**
  - ◇ Go to **Path>Split Path**
- You can also select two nodes at one time and apply **Split Path**. The following door shape will be used as an example to show the steps. The goal is to change the left side of the door from a solid cut line to a dashed cutline:



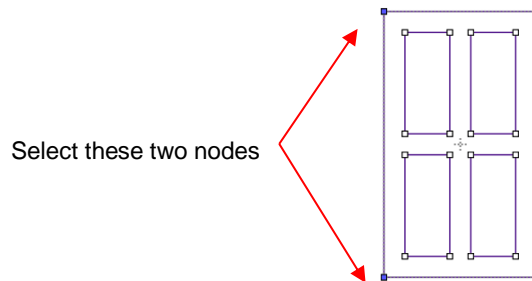
The left side of this paneled door will be separated and made dashed so that the door can be folded to open instead of being cut out




- ◇ Select the shape and click on the **Shape Tool** icon  on the **Tools Panel**. The nodes will appear on the shape:



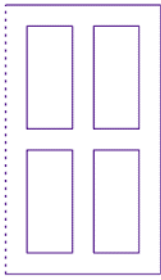
- ◇ Drag your mouse to marquee-select the two nodes on the left side of the window:



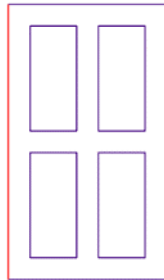
- ◇ Break that path by going to **Path>Split Path**. Then click on the **Select** icon . Now you can separately select that left side line and change to a dashed cut on the **Fill & Stroke Panel**:



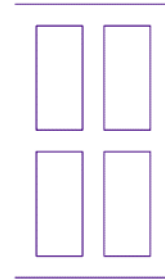
- ◇ The left side of the window will now cut dashed. Alternatively, the left side could have been left solid and scored with an embosser in the cutter or the left side could have been deleted and the fold made by hand:



Left side will cut dashed



Left side will be scored separately

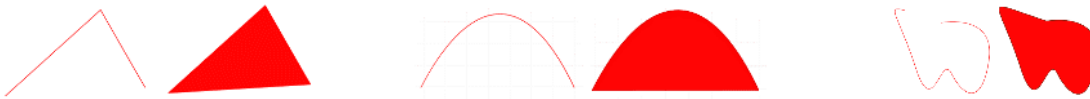


Left side won't cut at all

**IMPORTANT:** Use this function cautiously. In some cases more than one break can occur on a closed path.

### 6.03 Close Path Video

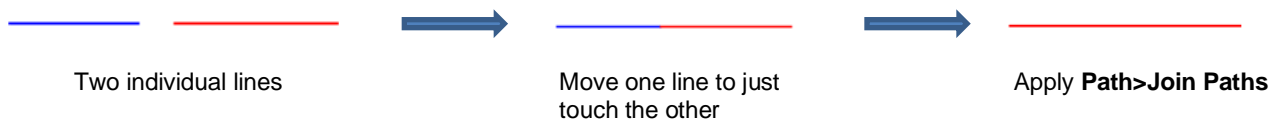
- The **Close Path** function can be applied to any open shape, other than a straight line, to join the start and ending nodes with a straight line:



- To apply **Close Path**, select an open shape and use either of the following:
  - ◇ Go to **Path>Close Path**
  - ◇ Right-click and select **Path>Close Path**
- The path will then fill with whatever **Fill** property is currently assigned to that shape.

### 6.04 Join Paths Video

- Join Paths** will connect two nodes from two different open paths if those nodes are in very close proximity to one another.
- To access **Join Paths**, select the two open shapes and go to **Path>Join Paths**:



- If you are joining several lines at once, such as these four lines to create a box, then all four lines can be selected at one time and be joined. However, for the new shape to be an actual closed shape, you must then apply **Path>Close Path**:



**6.05 Path Offset** Video

- **Path Offset** creates an outline or inline of a shape and will delete the original upon clicking on **OK**. Note that if you want the original, either make a backup copy or use the **Shadow Layer** function presented in *Section 7.05*.
- To access **Path Offset**, select the shape and go to **Path>Path Offset**:

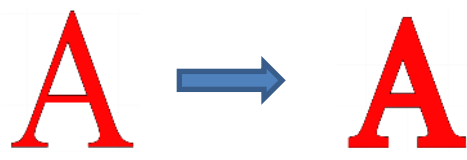
The screenshot shows the 'Path Offset' dialog box with the following annotations:

- Select from Regular, Rounded, and Bevel:** Points to the 'Type' dropdown menu.
- Controls shape of offset if Regular Type is selected:** Points to the 'Miter' dropdown menu.
- Check here for inline versus outline:** Points to the 'Inset Offset' checkbox.
- Enter size/thickness for the outline or inline:** Points to the 'Offset' input field showing '0.09 in'.
- Click OK when done:** Points to the 'OK' button.

- As you increase the **Offset**, you will begin to see the outline form on your selected shape:

The diagram shows a red letter 'A' with a white offset outline. To its right is the 'Path Offset' dialog box with the 'Offset' value set to '0.190 in'. An arrow points from the text 'Increase Offset' to the 'Offset' input field.

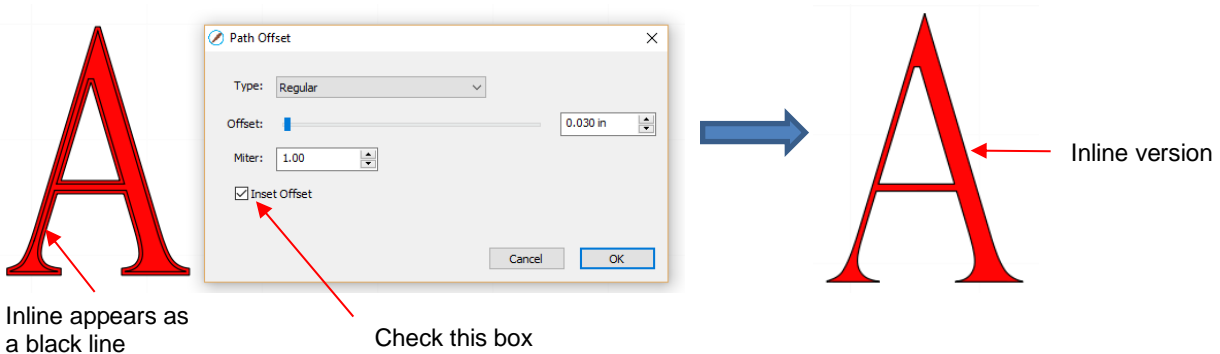
- After clicking on **OK**, the **Offset** will fill with the same color and the original will be deleted:



- **Type** controls the style or shape of the offset at the corners. There are three choices:



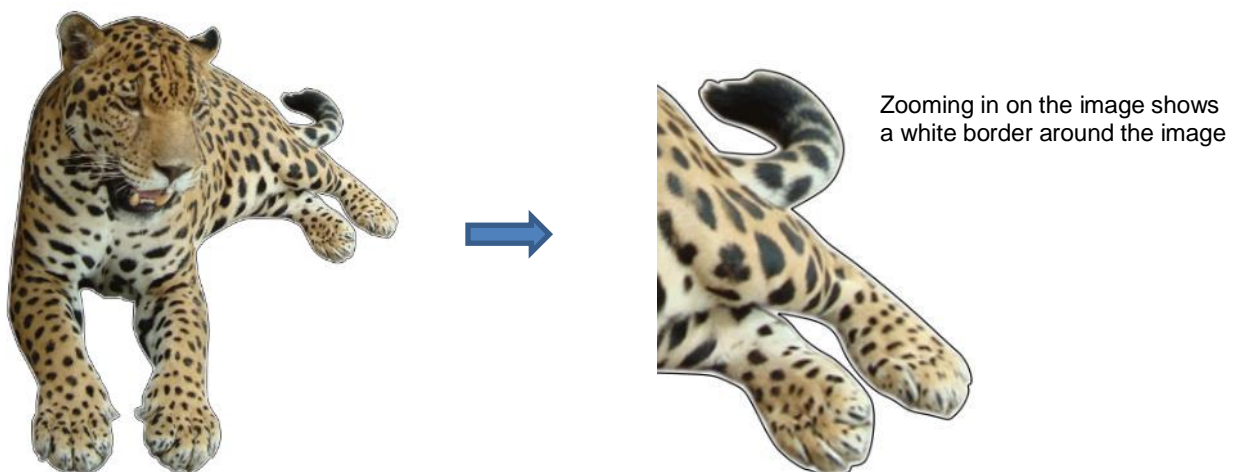
- Note that the first choice, **Regular**, also has a **Miter** setting which should work in the same way as **Miter** affects the **Stroke** (refer to *Section 3.15*). However, at this time, it appears that the **Miter** setting is not working.
- Checking the **Inset Offset** box creates an inline instead of an outline:



- A practical example of using **Path Offset** is when you have a font that is too thin to cut at the size you need. Applying a very small **Offset** can make the difference in whether or not text can be cut at certain small sizes. In the case below, the 1" lettering was offset by only 0.005":



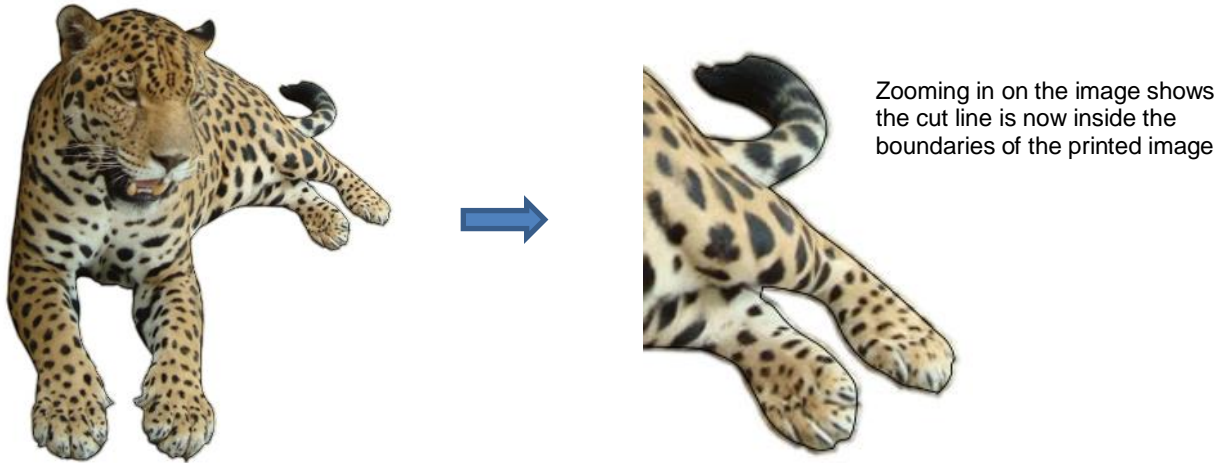
- A second practical example showing the use of **Inset Offset**, is the following print and cut application. A PNG with a transparent background was traced using the **Trace** function. However, based on the location of the cut line, relative to the printed image, there will be small amount of white surrounding the image:



- ◇ Select the **Cut** layer only on the **Layers Panel**:

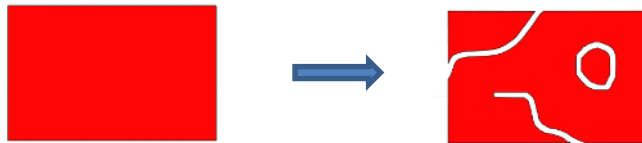


- ◇ Open the **Path Offset** window. Set the **Offset** to a small size, such as 0.03". Be sure to mark the box for **Inset Offset**. The result is a cut line which will eliminate that white border around the image:



## 6.06 Eraser Video

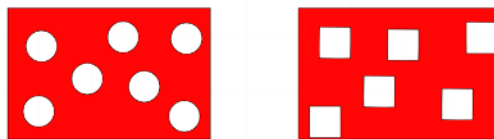
- The **Eraser** is the 8<sup>th</sup> icon  on the **Tools Panel**. Use this tool to erase parts of a shape by dragging your mouse across the shape:



- The **Tool Options** for the **Eraser** include the following:



- ◇ **Eraser Shape:** Choose either **Circle** or **Square**:



- ◇ **Size:** select a thickness for the erasure. Scroll up and down or enter a specific size.
- ◇ **Keep closed paths:** Mark this option if you split a shape and you want the two resulting shapes to be closed. Otherwise you end up with two open shapes:



**Keep closed paths checked**

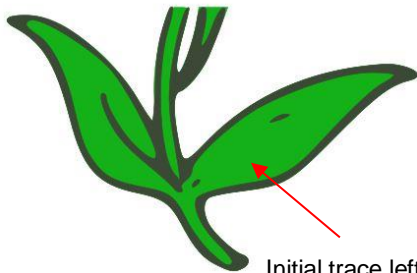
**Keep closed paths unchecked**



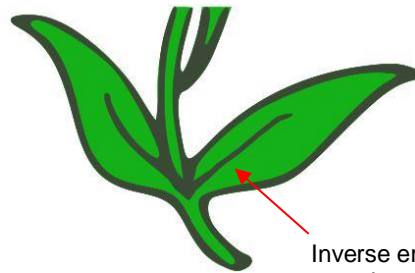
**Keep closed paths checked**

**Keep closed paths unchecked**

- ◇ **Inverse:** when this option is marked, the **Eraser** will “add to” shapes. This can be used to fill in holes connect broken paths, serve as a brush tool, etc.:

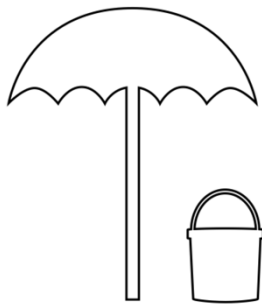


Initial trace left this part of the leaf incomplete

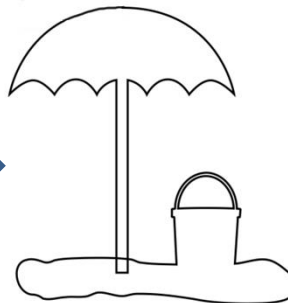


Inverse erase is used to complete the path to better match the other leaf

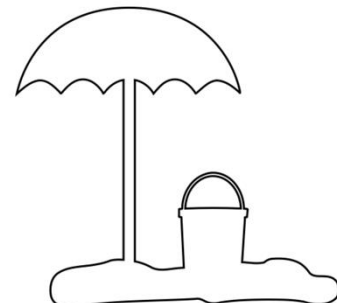
- Note: If you use **Inverse Erase** to connect two or more separate shapes, those shapes should first have **Object>Merge** applied. Otherwise the connection will not become part of the new shapes:



**Inverse Erase** will be used to add sand between these two shapes





The sand is welded to the pail but not to the umbrella



**Object>Merge** is first applied to the umbrella and pail. Then **Inverse Erase** is used to connect.

## 6.07 Knife and Crop

- The **Knife** tool can be accessed by clicking this icon  on the **Tools Panel**. Note the tiny triangle in the icon, indicating there are other options available. The **Crop** tool  can be accessed by holding down the left mouse button on this icon and then selecting **Crop** from the popup menu.

Click and hold this icon

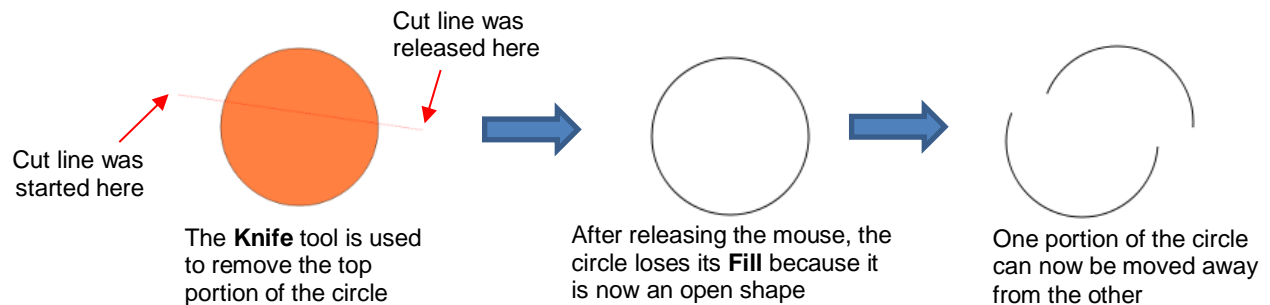


You can now switch to **Crop**, if desired

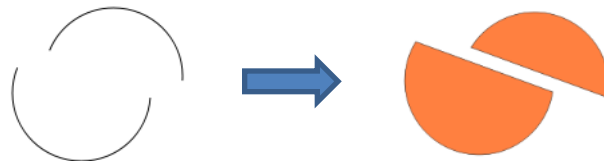
### 6.07.1 Using Knife

Video

- The **Knife** tool always makes a straight line cut. Starting outside the shape, click and hold the left mouse button and drag across the shape at the desired location for the cut. When you release the mouse button the cut will be applied and one shape can be moved away from the other:



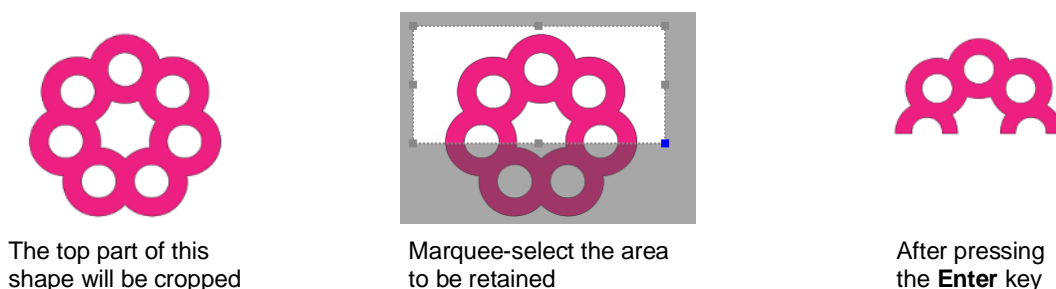
- There are four ways to control the angle of the cut:
  - ◇ Click and hold the left mouse button – you can freely drag the red cut line to cut at any angle (as shown in the screenshot)
  - ◇ Hold the **Shift** key and click and hold the left mouse button and drag left or right: the red cut line will be perfectly horizontal
  - ◇ Hold the **Shift** key and click and hold the left mouse button and drag up or down: the red cut line will be perfectly vertical
  - ◇ Hold the **Shift** key and click and hold the left mouse button and drag diagonally: the red cut line will be at exactly 45°
- If you wish to close the cut shapes, select them and either:
  - ◇ Go to **Path>Close Path**
  - ◇ Right-click and select **Path>Close Path**



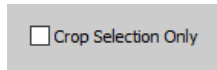
### 6.07.2 Using Crop

Video

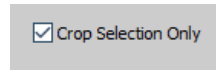
- With the **Crop** tool, you drag the mouse to marquee-select an area to be retained. Then you press the **Enter** key to complete the crop. Everything outside of the selected area will be deleted:



- There are two options when using the **Crop** tool based on a setting on the **Options Bar**:

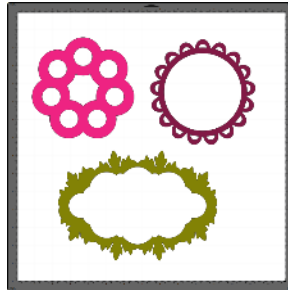


***IMPORTANT:*** If left unchecked, only the marquee-selected part of the shape will be retained. The rest of that shape and every other shape on the page will be deleted, even those that might be hidden or locked!

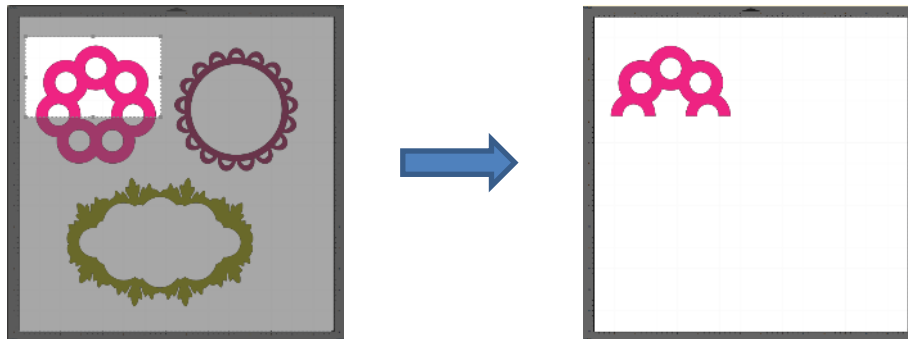


If checked, the marquee-selected part of the selected shape will be retained, as well as all other shapes on the page.

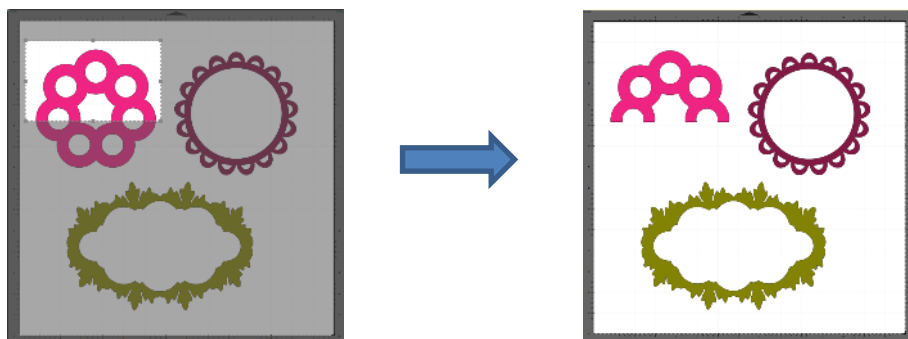
- Here is an example to show what would happen in both cases. The file has three shapes and the top right shape will be cropped just as in the prior screenshot:



- ◇ With the **Crop Selection Only** box not checked, the other shapes are deleted as well as the lower half of the pink doily:



- ◇ With the **Crop Selection Only** box checked, the shape is selected first and then only the bottom half is deleted:



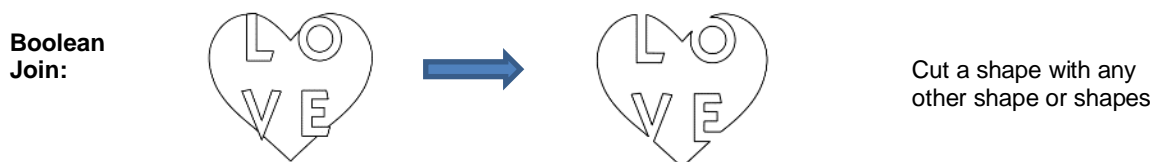


## 6.08 Which Cutting Tool to Use?

- Having so many cutting functions to use can make it difficult to know which one to use in a particular instance. Experience will be your best guide, as well as testing them out. But a summary of the functions is presented in this section and this may prove to be helpful when selecting which tool to try first.
- The following table summarizes the capabilities of the various options for cutting shapes. Note that **Boolean Join** has also been added but isn't covered until *Section 7.06* because it is more often used for designing than for editing.


	Can make straight line cuts	Can force horizontal, vertical cuts	Can force diagonal cuts	Can do freehand cuts	Can change thickness of the cut	Can cut using square or circle shapes	Can cut using any shape	Can cut with open shapes remaining	Can cut with closed shapes remaining
Eraser				✓	✓	✓		✓	✓
Knife	✓	✓	✓					✓	
Crop	✓	✓			✓				✓
Split								✓	
Boolean Join	✓	✓	✓		✓	✓	✓		✓

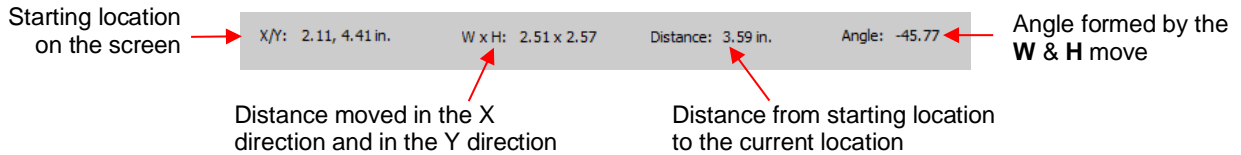
- Here are a few samples to show which functions would be the best choices for making the cut:



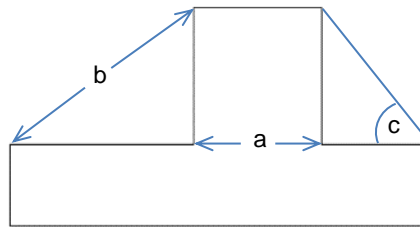
- **Knife** and **Split** have the same effect. **Split** is a bit more limiting because there needs to be nodes present in the location where the cut will occur. It might be useful if you are already in the **Shape Tool** mode where you can then select the nodes and apply the **Split**. Otherwise, **Knife** is probably the easier tool to use.

## 6.09 Ruler

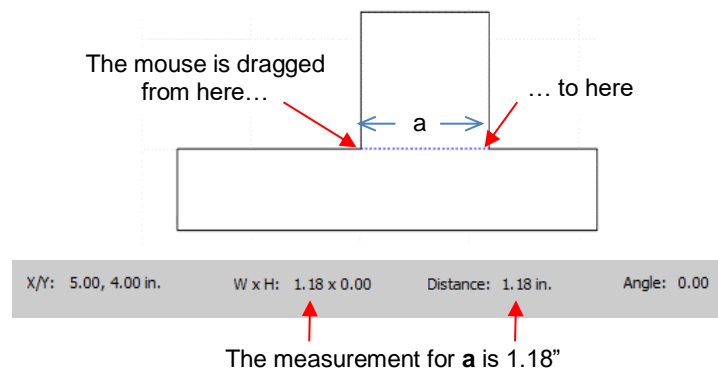
- The **Ruler** function allows you to measure the distance and angle between any two points on the screen. It is accessed by clicking on the second icon from the bottom  on the **Tools Panel**.
- No shapes need to be preselected. Just hold down left mouse button at any location and then drag the mouse to a new location. The **Tool Options** provide the following information:



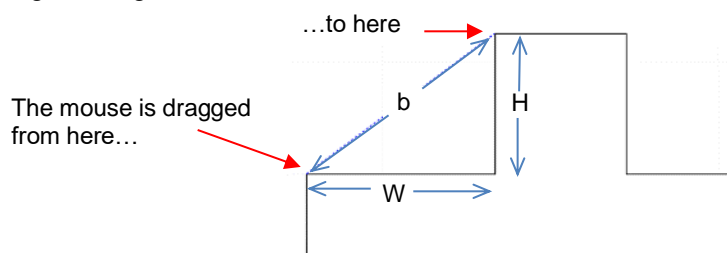
- To better illustrate these variables, the following shape will be used and the various measurements will be determined using the **Ruler**:



- ◇ **X/Y**: This is the starting position on the screen and will match the X/Y grid location on the **Cutting Mat**. You can extend beyond the boundaries of the mat, if needed.
- ◇ **W x H**: Indicates how far the mouse has been dragged away from the starting point. Note that as the mouse is dragged, a blue dotted line will appear. In this example, when measuring for the distance “a”, the **H** should be zero since it’s a vertical measurement only. In fact, making sure **H** is 0 is one way to make sure the **W** is the correct measurement needed:



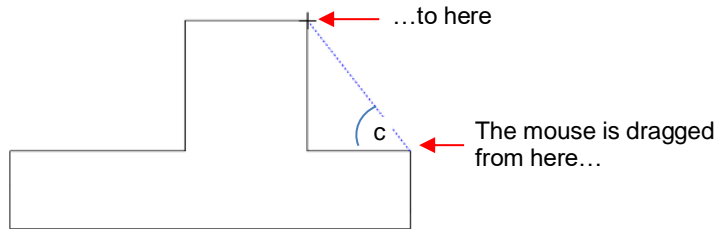
- ◇ **Distance**: This is the actual measurement between the starting location and the ending location. In the prior measurement, **W** is the same as **Distance** because the measurement was a horizontal one. But measuring the length of “b” is not:



X/Y: 3.32, 4.00 in.    W x H: 1.68 x 1.25    Distance: 2.10 in.    Angle: -36.67

The measurement for **b** is 2.10"

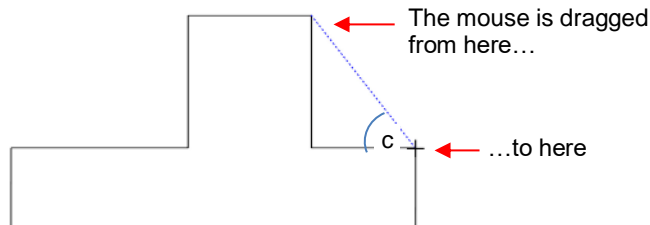
- ◇ **Angle:** This is the angle of the **Distance** line relative to the X axis.
  - In the first measurement of "a", the angle was 0 because it was a horizontal line. On the other hand, if the mouse had been dragged from the right side to the left side instead of the other way around, the angle would have read 180.
  - If the measurement had been vertical, then the **Angle** would have read 90 if measured from the top to the bottom. It would have read -90 if measured from the bottom to the top.
  - In the example being used, the angle "c" is measured to be -128.24:



X/Y: 7.15, 3.44 in.    W x H: 0.99 x 1.25    Distance: 1.60 in.    Angle: -128.24

The measurement for **c** is -128.24


- Obviously, "c" is an acute angle so -128.24 doesn't represent the actual angle shown in the screenshot. To get the true value, you subtract -128.24 from 180 (degrees in a straight line) to get 51.76 degrees.
- However, the other way to get "c" without having to do a calculation is to drag from the other direction:



X/Y: 6.16, 2.18 in.    W x H: 1.00 x 1.26    Distance: 1.61 in.    Angle: 51.72

The measurement for **c** is 51.72

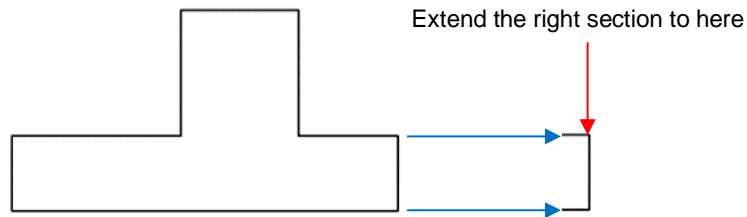
## 6.10 The Shape Tool - Path and Node Editing

- Path editing involves moving paths as well as reshaping them. This topic was first introduced in *Section 5.05* where you were shown how to draw with the **Draw Tool** and then curve a straight-line path. If you haven't read *Section 5.05*, please do so before proceeding with the rest of this section.
- To use the **Shape Tool**, click on the third icon  on the **Tools Panel** (shortcut **A**) and then click on a shape. You should see the nodes which currently define that shape. If you do not see any nodes, then most likely you have clicked on a group of shapes. Go to **Object>Ungroup** and then try again.
- Path editing involves dragging path or dragging **Bezier** control points to reshape them. Node editing involves moving nodes and changing the type of node to then form desired curves.

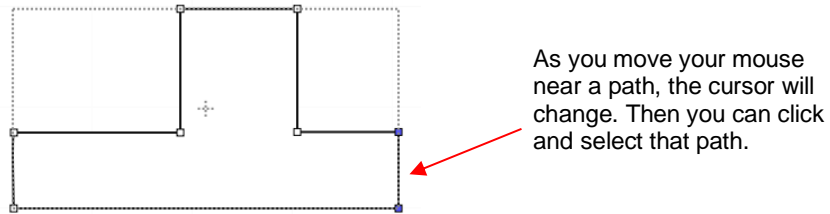
- The most likely mistake you'll make while learning path and node editing is failing to zoom in close enough so that you can click precisely on paths and nodes. Keep that in mind while experimenting.

### 6.10.1 Moving a Path

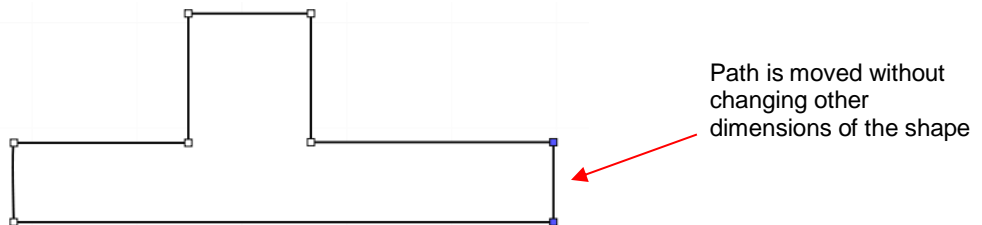
- Sometimes a path needs to be extended without resizing the rest of the shape. For example: let's say you need to extend the right section of this shape by a few inches:



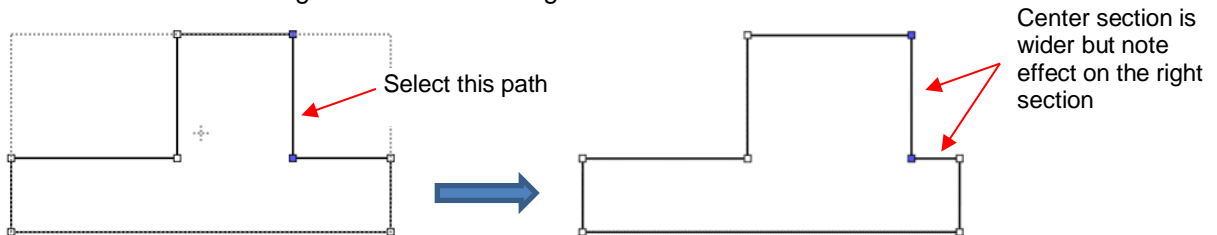
- ◇ Select the **Shape Tool**  on the **Tools Panel** and then click on that path:



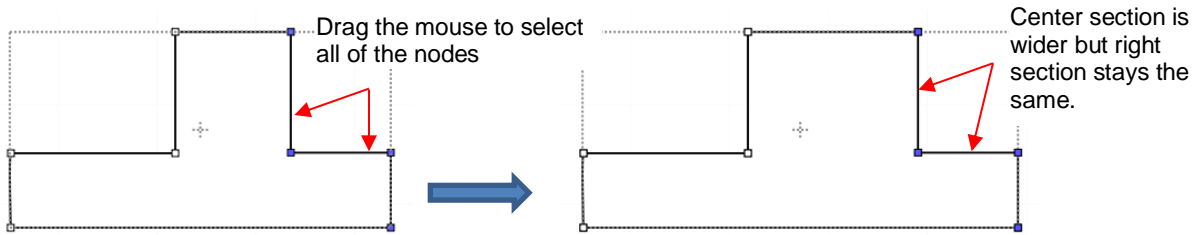
- ◇ You can now use the arrow keys on your keyboard to move that path. Holding the **Shift** key while clicking on an arrow key will move it in larger increments:



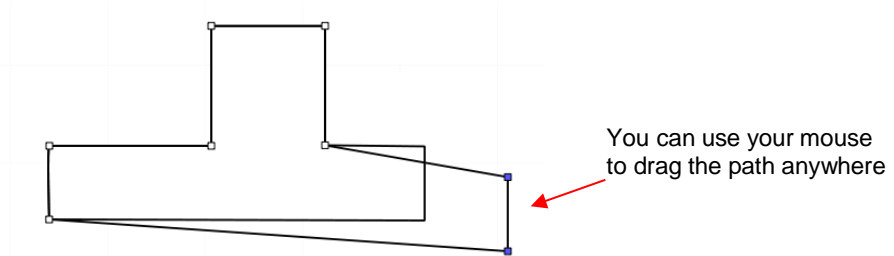
- ◇ If instead, the center section had been widened by selecting the path on its right side, then that would have resulted in shortening the section to the right of it:



- ◇ Thus, to maintain the dimensions of the right section, both paths need to be moved at the same time. To do this, marquee-select the nodes as shown and then move with the keyboard arrow:



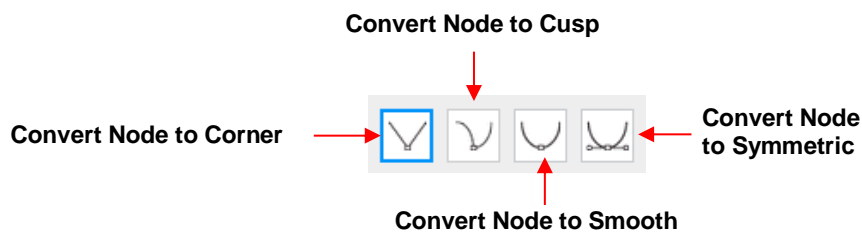
- If the shape is made up of straight line segments, versus curves, you can also drag the segments with your mouse instead of using the keyboard arrows. Note that it can be a bit tricky getting the cursor in the perfect spot to start dragging. However, you won't have the same control if you wish to keep the paths perfectly horizontal or vertical:




- Some practical examples of moving paths include resizing boxes and envelopes where you need the overall dimensions of the final project to be different but you do not want to change the size/thickness of the flaps.

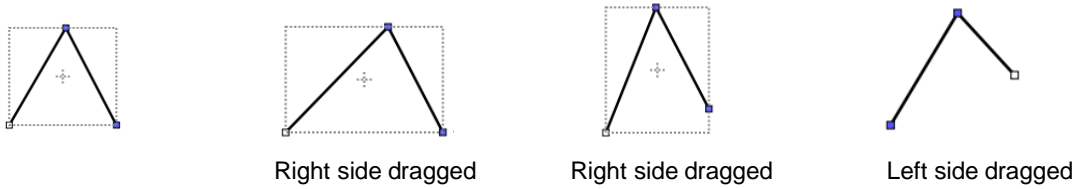
## 6.10.2 Reshaping a Path


- With the **Shape Tool** selected, you'll observe four icons in the **Tool Options**. The purpose of each option is to convert one or more selected nodes to that type of node:

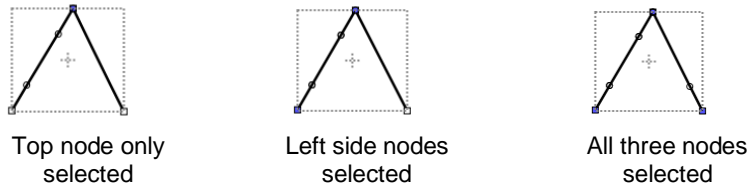


- One or more nodes are highlighted and then the appropriate icon selected. These same four functions can also be accessed by right-clicking and selecting **Path>Convert Node to**.
- To illustrate each one of these options, a simple path with a sharp corner will be used. This shape is already in **Corner Node** mode. To change to a different mode (in the examples that follow the first one), the top node is selected and then the option is clicked from the **Tool Options** or using the right-click and **Path>Convert Node to** menu option.

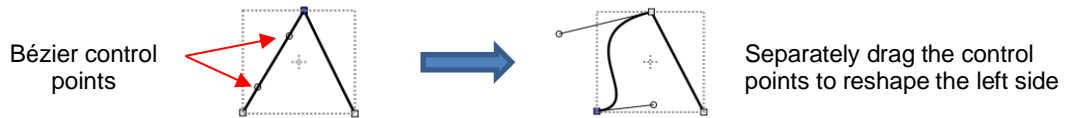
- ◇  **Corner Nodes:** These are the nodes that make up straight-line shapes such as rectangles, squares, triangles, stars, etc. Once selected, the shape will appear as below and either path can be moved as was demonstrated in the prior *Section 6.10.1*.



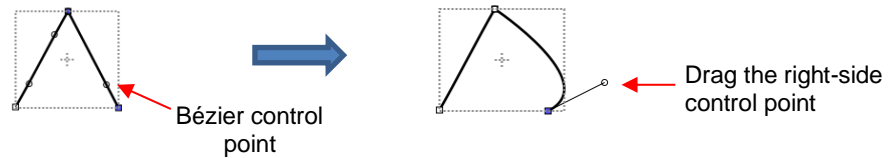
- ◇  **Cusp Nodes:** In this mode the Bézier control points appear and can be moved independently. First note how the paths appear when in this mode, depending on how many of the adjacent nodes are selected:




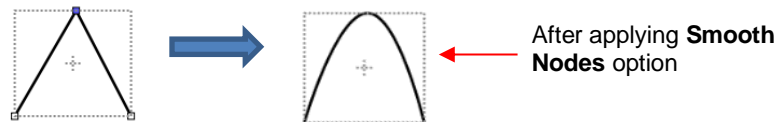
- The dots along the path are Bézier control points which are not linked to one another. You can freely drag either or both to create curves:



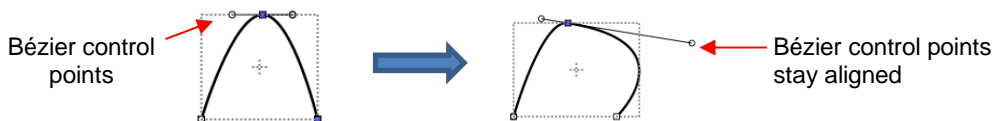
- In the case where there is a single Bézier control point on the right side, you can again drag the control point to create a curve:



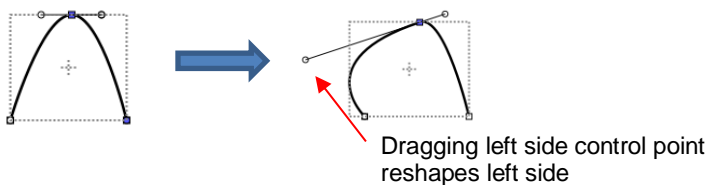
- ◇  **Smooth Nodes:** In this mode the Bézier control points always stay in a straight line. Notice that when you convert to **Smooth Nodes**, the shape immediately forms a curve:




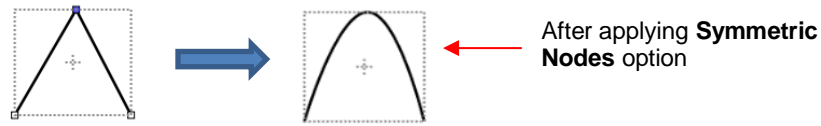
- When the newly formed shape is selected again, the Bézier control points appear in a straight line. If you move one, the other will move as well, in order to maintain that straight line:



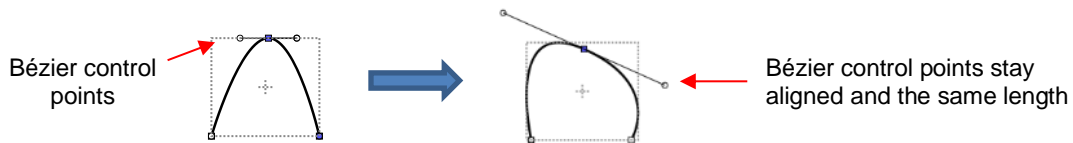
- The left side Bézier control point controls the curve on the left side. Thus, if it had been moved instead this would have resulted:



- ◇  **Symmetric Nodes:** In this mode the Bézier control points not only stay in a straight line, they also stay the same length. As with **Smooth Nodes**, when you convert to **Symmetric Nodes**, the shape immediately forms a curve:

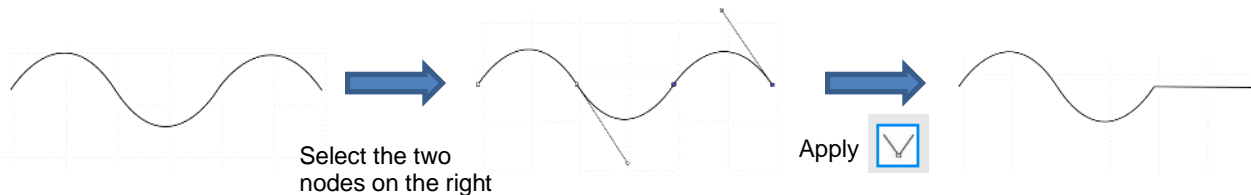


- When the newly formed shape is selected again, the Bézier control points appear in a straight line and the image appears the same as with **Smooth Node** status. However, when you now move one control point, the other will not only maintain that straight line, but also the same length. And the curves on both sides of the selected node will change:

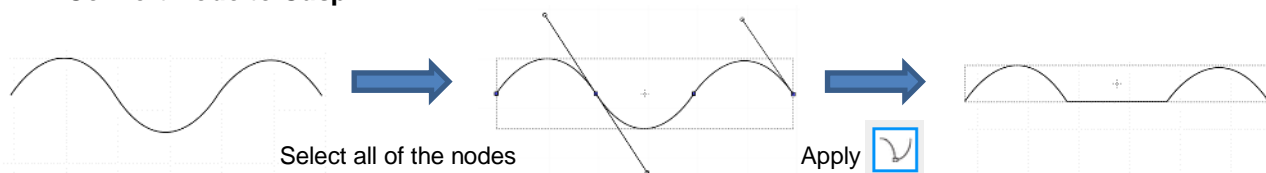


- To further illustrate these options, marquee-select a group of nodes to select more than one path and then click on whichever option you want to apply. The following examples show what occurs when the first two options are applied to curves and the last two options are applied to straight lines:

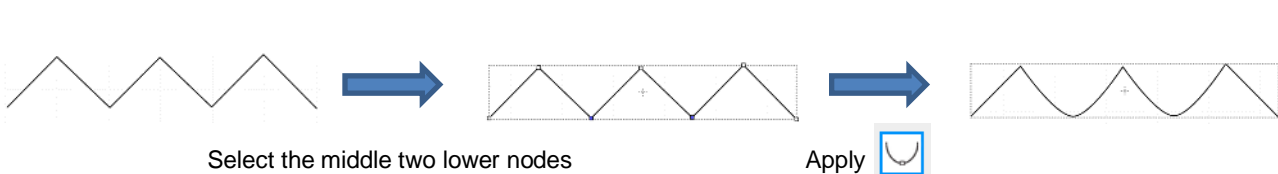
 **Convert Node to Corner:**



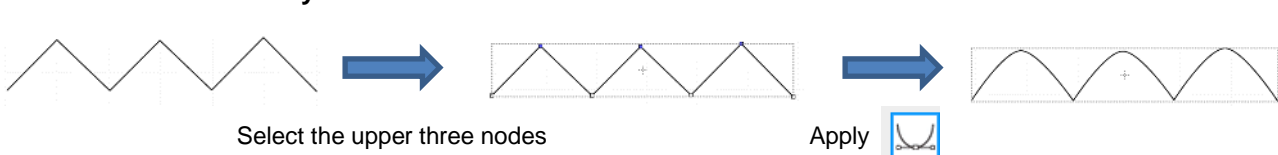
 **Convert Node to Cusp:**




 **Convert Node to Smooth:**

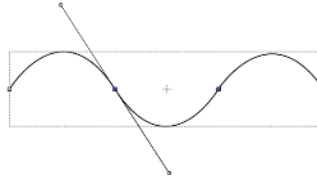


 **Convert Node to Symmetric:**

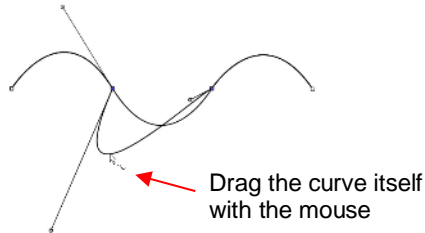


- As was shown in *Section 5.05.3*, you can also drag the path itself to reshape it, if one of the nodes has been converted to **Cusp**, **Smooth**, or **Symmetric**. For example:

- The following curve has the lower path selected and the  option marked:

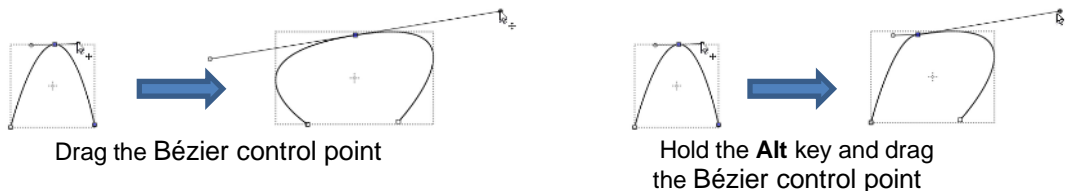


- The path can now be dragged with the mouse:



- You will recall that when a node is in either **Smooth** or **Symmetric** mode, adjusting one Bézier control point will automatically affect the other one and the curves on either side will change. To avoid this, hold the **Alt** key while dragging the control point and the other control point will remain in place:

- For example, with the following **Smooth** node shape, the same change is made with and without holding the **Alt** key during the adjustment:




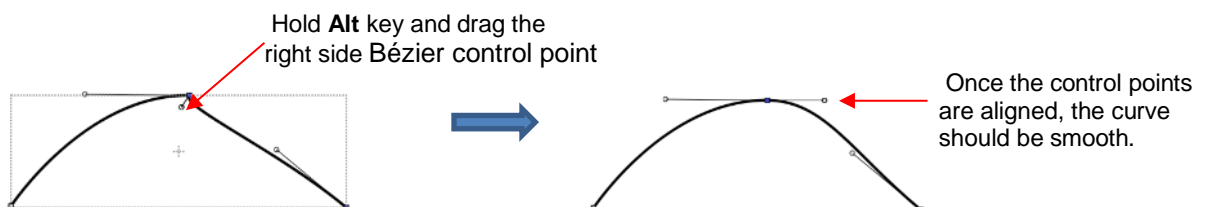
### 6.10.3 Examples of Smoothing Curves

- The last method shown in the prior section can be used to correct kinks in what should be a smooth curve.


- For example, let's say you want to make the following shape have a nice smooth curve:

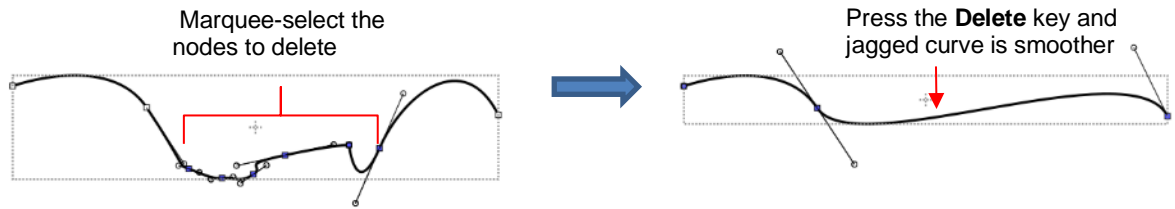


- Using the **Shape Tool**, click on the curve to reveal the node. Then click on the third icon , if needed, so that option will be highlighted. Hold the **Alt** key and drag the Bézier control point that's closest to the curve needing adjustment until the two control points are in a straight line:

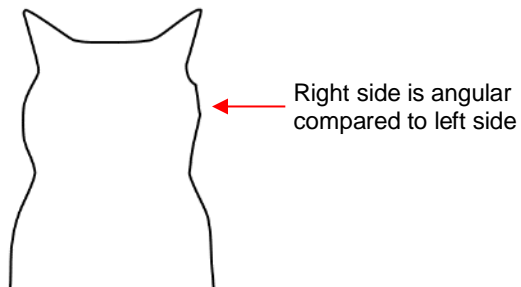




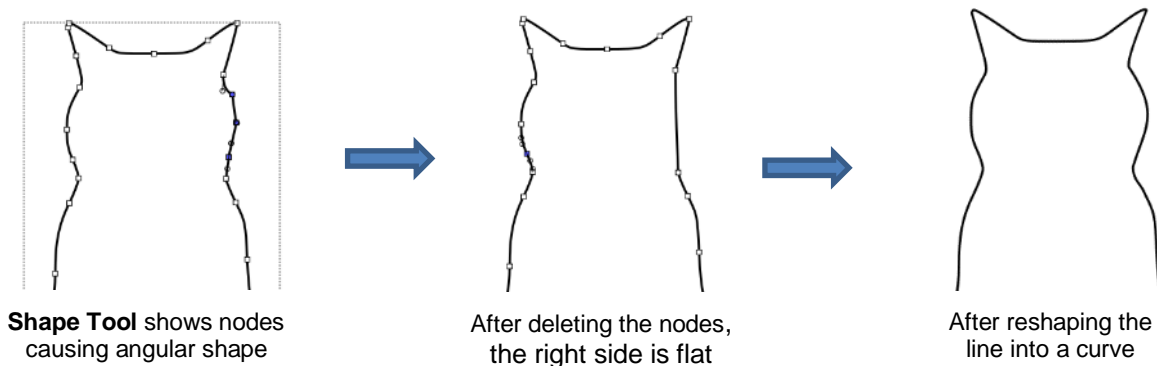
- In *Section 5.04.1*, you were shown how to add or delete nodes while in the **Draw Tool**  mode. Any time you want to add nodes to an existing path, you will need to be in this mode. However, you can delete nodes while in the **Shape Tool** mode. Select a node or marquee-select a group of nodes and press the **Delete** key on your keyboard:



- Based on such a drastic change, it's worth noting that deleting smaller numbers of nodes at a time is usually advisable to avoid losing the original structure of the shape.
  - ◇ As a practical example, here is a traced image of a cat. Note the right side of the cat's head is not smooth and rounded like the left side:



- Using the **Shape Tool**, the nodes causing the angular shape are marquee-selected and deleted. Then the path is reshaped:



## 6.10.4 Applications for the Shape Tool

- It's not always obvious when the **Shape Tool** might be needed. Here are a few examples to keep in mind:
  - ◇ Editing of pixel traced images: Sometimes a pixel trace will appear to be perfect until, for example, you use it for a print and cut and discover that some of the paths are slightly outside the printed areas of the original image:



Trace line doesn't follow shape here.



A node can be added or the Bezier curve can be reshaped.



- ◇ Manual tracing: As shown in *Section 5.05*, one of the quickest ways to manually trace a raster image is to use the **Draw Tool** and simply click/click/click around the image and then use the **Shape Tool** to create curves and move nodes to more closely align with the original image.
- ◇ Improving a cut: If you have problems with a particular location on a cut shape, examine the nodes in that location. You may find a cluster of nodes or a sharp cusp. Delete those excess nodes, reform the path, and then retest the cut.
- ◇ Modifying poorly designed files: Sometimes you will pick up free files that don't quite cut the way you expected. Examples are often fold-up templates where corners and fold lines do not quite meet. Having the ability to move paths and nodes can correct these kinds of files and provide cleaner and more professional end products.

## 7. SCAL: Designing

### 7.01 Where Do I Start with Learning to Design?

- SCAL offers some excellent easy-to-use designing tools to assist you in creating whatever you can imagine. The best way to learn these tools is to focus on only one at a time and play with settings. You aren't going to break anything in the software by experimenting and you never know what you might discover!

### 7.02 Project Info

Video

- Before getting started on the fun and amazing design capability of SCAL, it's worth noting a feature that allows you to add your name and some other details to your file. This can save you time later when you're not remembering some of the original details and also help others with whom you share your files. Using this feature is, of course, entirely optional.
- To open the **Project Info** window, go to **Window>Project Info**. The following example shows some of the optional information you can add in this window that will be saved with your actual project:

The following information will be embedded in your saved files.

Enter a title → Title: Cutting File for Minialbum

Enter your name → Author: Sandy McCauley

Enter an email address if you want users to be able to send your questions → Email: sandy@iloveknk.com

Enter your web site, if you have one and would like others to visit it → Website: www.iloveknk.com

Enter any information you want to remember or instructions for the file. → Notes: Each page has been set up to cut enough shapes in that color for 5 albums.

Click on OK → OK

- Note the other tabs in this window: **Colors**, **Fonts**, and **Rhinestones**. These do not require your input. Instead, they automatically track, by **Page**, those elements that are currently present in the file. For example:

#### Colors Tab

Page → Page 1

Total number of different colors → Colors: 3

Color	Shapes
00 FF 00	2
FF 00 80	3
00 80 C0	4

Colors used →

Number of shapes of each color →

#### Fonts Tab

Page → Page 2

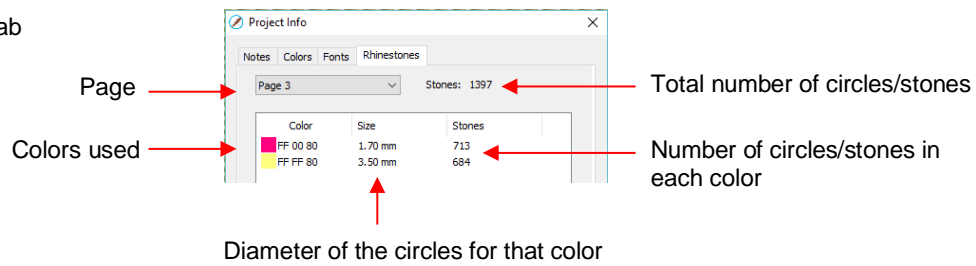
Total number of different fonts → Fonts: 2

Name	Characters
ABIGAIL	5
Arial	5

Fonts used →

Number of shapes in each font →

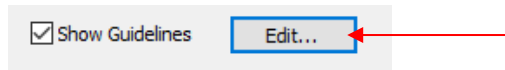
## Rhinestones Tab



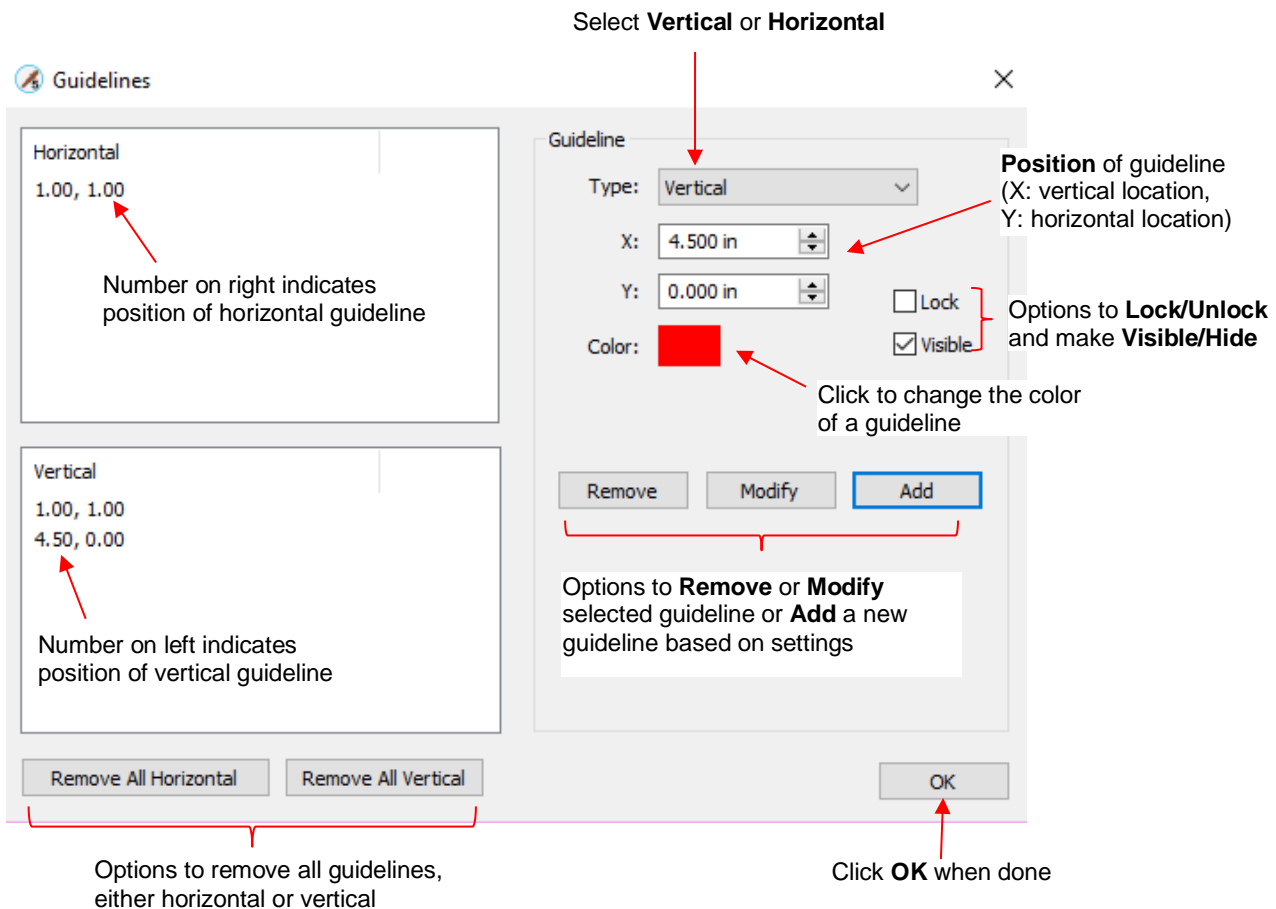
- Note: When changing tabs, such as from **Colors** to **Fonts**, always take note of the **Page** number. It will not automatically update to the page you were just checking. Thus, if you are on *Page 2* when on the **Colors** tab, you may discover you're on *Page 1* on the **Fonts** tab. Simply change to the page you need from the drop-down menu.

## 7.03 Guidelines Video

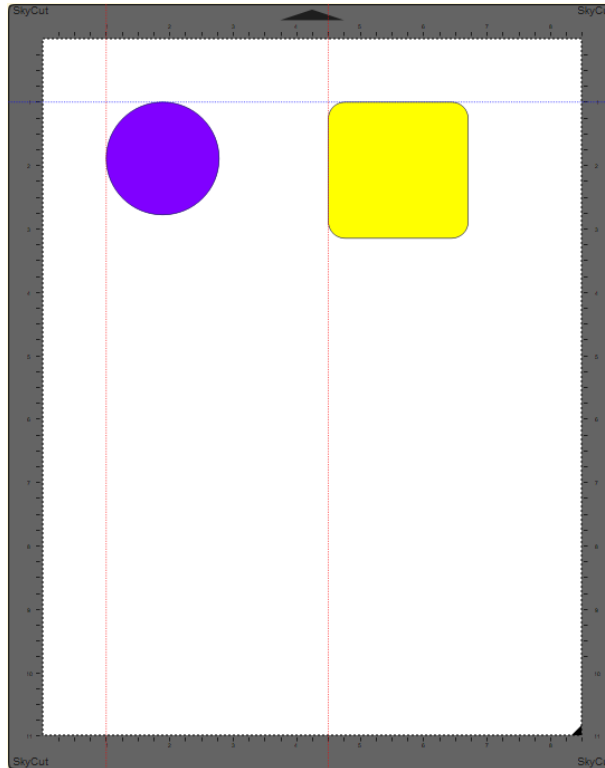
- Guidelines were first introduced in *Section 1.06.5*. It was noted that they can be added to the **Cutting Mat** in two ways:
  - By dragging your mouse from the horizontal or vertical rulers on the screen
  - By manually adding in the **Guidelines Edit** window
- You can toggle guidelines on and off by clicking on the box next to **Show Guidelines** on the **Document Panel**. To open the **Guidelines Edit** window, either go to **View>Guidelines>Edit Guidelines** or click on the **Edit** button next to **Show Guidelines**:



- The following window opens:



- This window serves three functions:
  - ◊ Ability to delete guidelines: Select a guideline on the left and then click on **Remove**. You can also remove all of the horizontal guidelines and/or all of the vertical guidelines using the buttons shown.
  - ◊ Ability to edit an existing guideline: Select a guideline on the left and make changes such as position, color, lock/unlock and show/hide. Then click on **Modify**.
  - ◊ Ability to add a new guideline: Enter desired settings and click on **Add**.
- Based on the setting in the prior **Guidelines** window, the **Cutting Mat** would look like this:



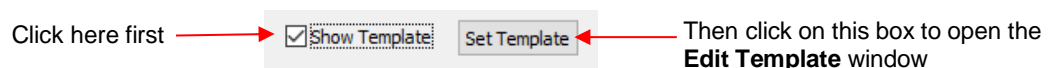
- The ability to show/hide all guidelines, lock/unlock all guidelines and delete (clear) all guidelines is also available under **View>Guidelines**.
- To have shapes snap to the guidelines, go to **View>Snap To>Guidelines** and make sure that option is checked. More about **Snap To** is covered in *Section 1.07*.

## 7.04 Templates Video

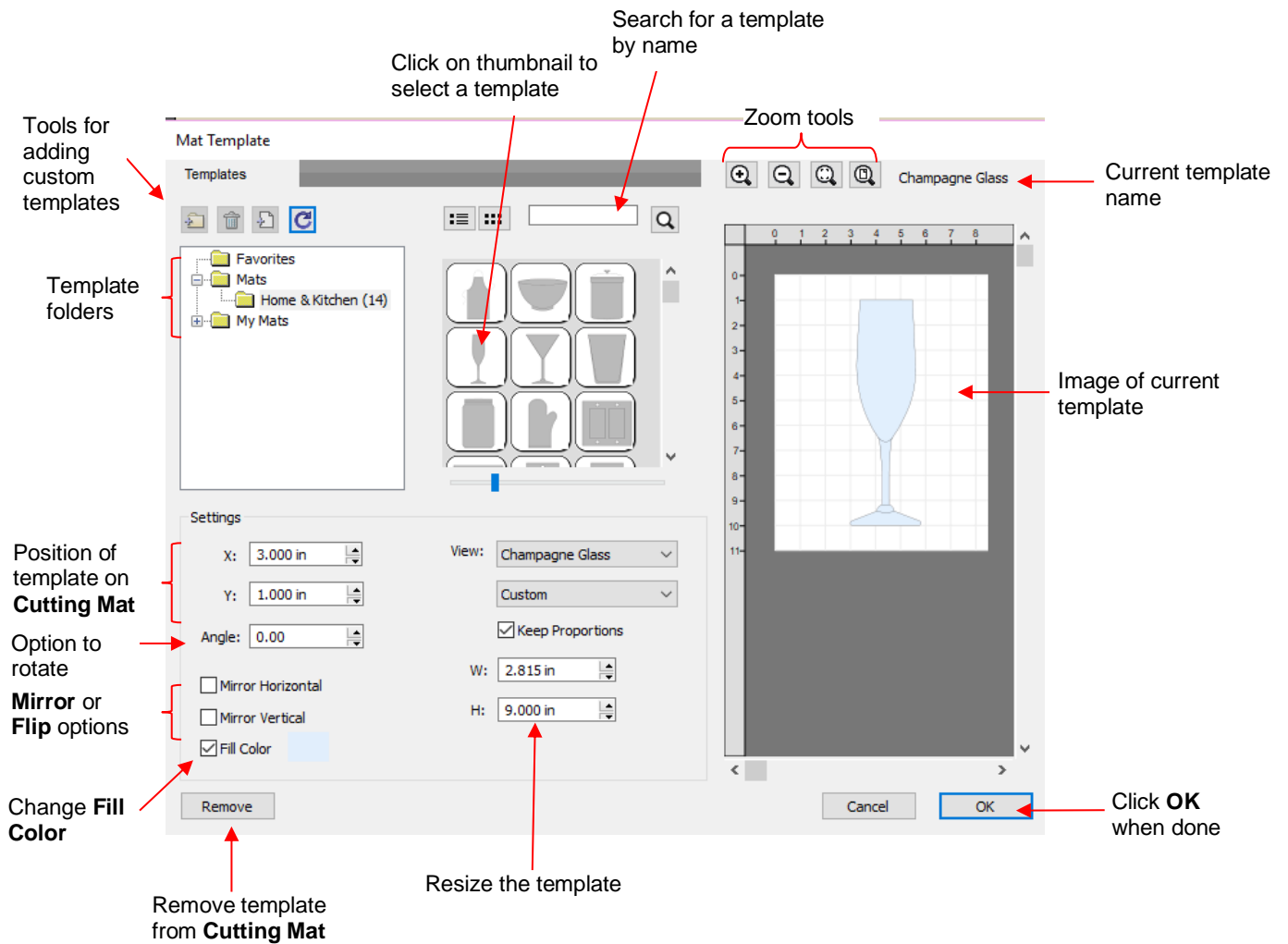
- As was first presented in *Section 1.06.11*, SCAL5 has the ability to add templates to the **Cutting Mat** that are non-selectable shapes to aid in various designing situations.

### 7.04.1 Mat Template Window

- There are fourteen templates included in SCAL5. However, you can import your own templates if they are in .SVG format or .SCALMAT format.
- To access templates, mark the option for **Show Template** and then click on the **Set Template** button:

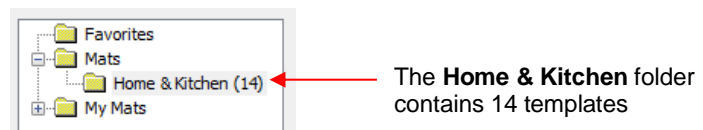


- The following **Mat Template** window opens:

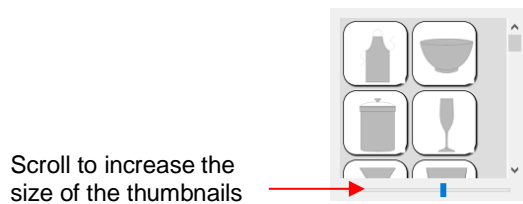


• The **Mat Template** window has a lot in common with the **Shapes** tab in the Library:

- ◊ The **Mats** folder contains templates that come with SCAL. The number in parentheses indicates how many templates are included in that folder:

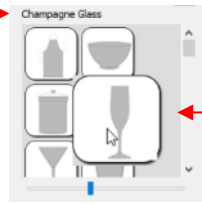


- ◊ A scrollbar beneath the thumbnails window can be used to resize the thumbnails:



- ◊ Hovering over a thumbnail will cause it to become larger and will display the name of the template:

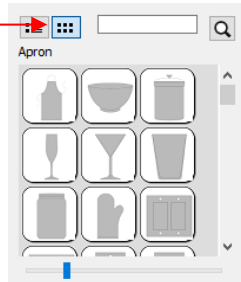
Name of selected mat template



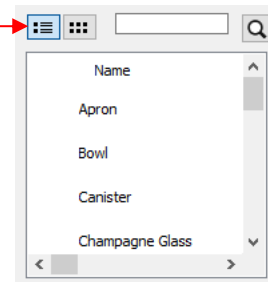
Larger thumbnail appears when mouse cursor is over image

- ◇ Templates can be displayed either with a thumbnail image or a list view:

Thumbnail view



List view



- ◇ You can assign templates to a **Favorites** folder for quicker access. To do that, right click on a thumbnail image and select **Add to Favorites**. That popup menu also has two other options:
  - **Delete File**: This option isn't used except when you import your own template files
  - **Reveal File**: Opens the location on your computer where the template file is located
- ◇ You can create your own subfolders and import templates. Details are covered in *Section 7.04.3*.

## **7.04.2 Template File Settings**

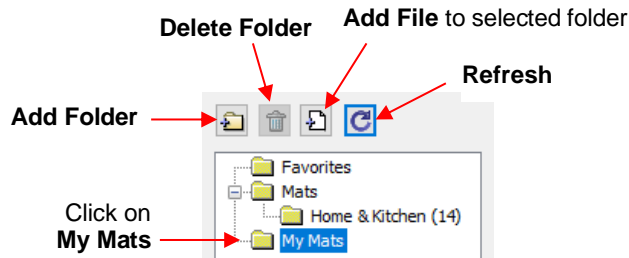
- The right side of the **Mat Template** window has a preview of the selected template on a simulation of the **Cutting Mat**. This preview is useful while customizing the settings.
- Once a template is selected, you have the following settings for customizing:
  - ◇ **Size**: adjust the **W** and **H** settings to change the width and height of the template. The optional **Keep Proportions** box, when checked, will maintain the aspect ratio as you change either the width or height.
  - ◇ **Position**: Increasing **X** and/or **Y** will move the template away from the upper left corner of the **Cutting Mat**.
  - ◇ **Rotate**: increase the **Angle** setting to rotate the template, if needed.
  - ◇ **Color**: Mark the **Fill Color** box and then click on the colored box to open a color selection window.
- When you are satisfied with the settings, click on **OK** to add the template to the **Cutting Mat**. Note that the template will not print or cut. Again, it's a tool for designing:



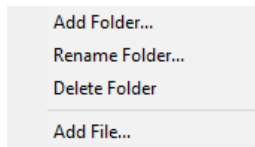
- To replace the template, reopen the **Mat Template** window and select a different template file.
- To remove the template from your **Cutting Mat** either uncheck the **Show Template** option on the **Document Panel** or return to the **Mat Template** window and click on **Remove** button.

### 7.04.3 Importing Your Own Templates

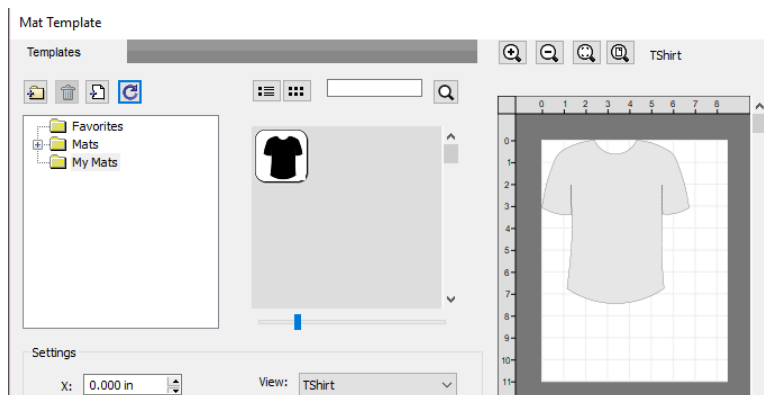
- SVG files can be imported into the **Mat Template** window. If you are designing them in SCAL, use a **DPI** of 72 in the SVG export window and the size of your imported template will match that of your original design.
- Once an SVG file is imported it is saved as a SCALMAT file. These files can be located in the following folder on your computer: **Documents>Craft Edge>My Mats**.
- To import and organize templates, first click on **My Mats**. The following functions are now available:



- You can import new template files into the **My Mats** folder by clicking **Add File**. You can also create new subfolders within **My Mats** by clicking on **Add Folder**.
- These same two functions are also accessible when you right click while **My Mats** is selected. Note: this is also how you would rename one of your custom folders:



- If you need to delete a folder, first empty it by right clicking on each thumbnail and selecting **Delete File**. Then you will be able right click on the folder name and select **Delete Folder**.
- Sometimes you may need to click on the **Refresh** icon in order to see new folders or to see deleted folders removed.
- When you select **Add File**, browse to locate the SVG file you wish to add as a template. It will then appear as a thumbnail image. Clicking on the thumbnail adds the shape to the simulated **Cutting Mat** on the right:

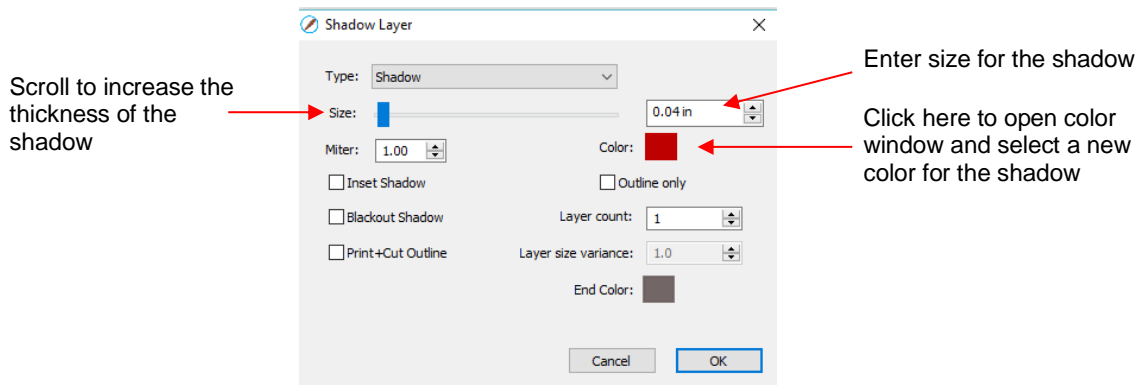




- **IMPORTANT!** As mentioned before, when an SVG file is imported, its file format changes to SCALMAT. This is important to note because this is where a significant difference lies between the **Mat Template** window and the **Library**. Referring back to *Section 2.03.1*, it was noted that you can import an entire folder at one time into **My Designs** in the **Library**. While it appears that the same functionality is available when creating a new folder in **My Mats**, you cannot import an entire folder of SVG files that same way. Instead, the folder you wish to import (create a shortcut to) must contain .SCALMAT files.

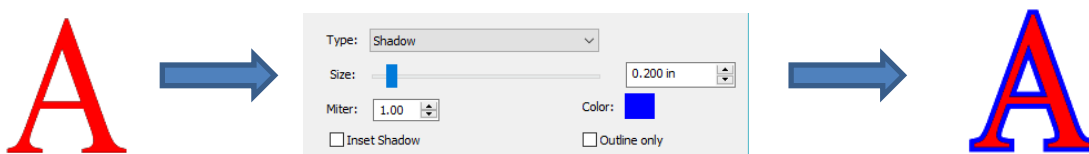
## 7.05 Shadow Layer Video

- The **Shadow Layer** function allows you to create an outline or an inline of any shape including, of course, text. After selecting a shape, you can access the function in either of two ways:
  - ◇ Go to **Effects>Shadow Layer (Contour Cut)**
  - ◇ Right-click and select **Appearance>Add Shadow Layer**
- The following window will open:

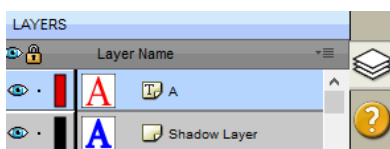


### 7.05.1 Shadow Layer Settings

- **Size** changes the thickness of the shadow layer. You can either scroll the **Size** bar or type in a size in the input window to the right.
- **Color** refers to the color of the shadow. Clicking on the color box opens the standard color window where a new color can be selected.
- As an example, a Times New Roman upper-case A is used. After increasing the **Size** and changing the **Color** to blue, the following result is obtained:



- ◇ The **Layers Panel** shows the addition of a new **Shadow Layer**:



- **Type** controls the style or shape of the shadow at the corners. There are three choices:



Shadow



Shadow (Rounded)



Shadow (Straight)

◇ Note that the first choice, **Shadow**, also has a **Miter** setting which should work in the same way as **Miter** affects the **Stroke** (refer to *Section 3.15*). However, at this time, it appears that the **Miter** setting is not working.

- **Inset Shadow** is the opposite of **Shadow** – instead of creating a contour that is larger than the original shape, a contour is created that is smaller and fits inside the original shape.

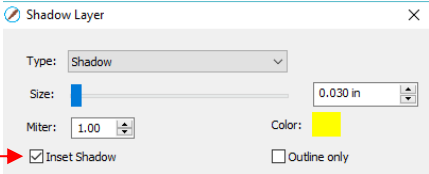
◇ For example, let's say you are going to create a two-color vinyl sign that says "For Sale":


# For Sale

◇ If a normal **Shadow** is used to create the second layer, the letters will automatically be welded because of their proximity to one another. This may not be suitable for your application:

# For Sale

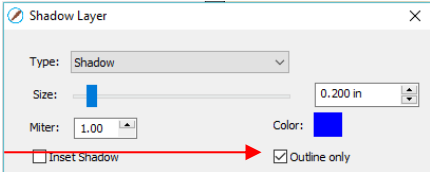
◇ Instead, create an **Inset Shadow** by checking the **Inset Shadow** option:


Check this box → 

→ 

Result

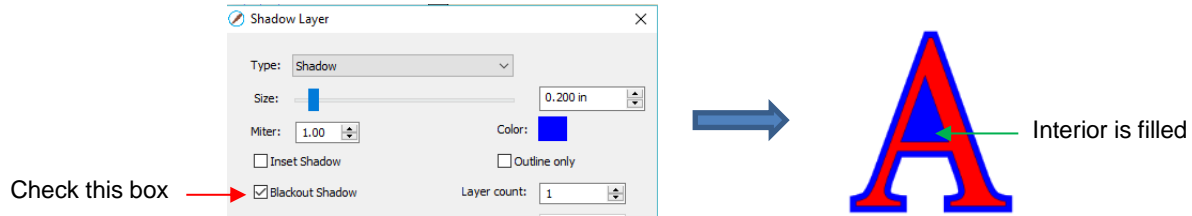
- **Outline only** can be checked to set the **Fill** on the shadow to **None**. The **Stroke** color will be whatever is set in **Color**:

Check this box → 

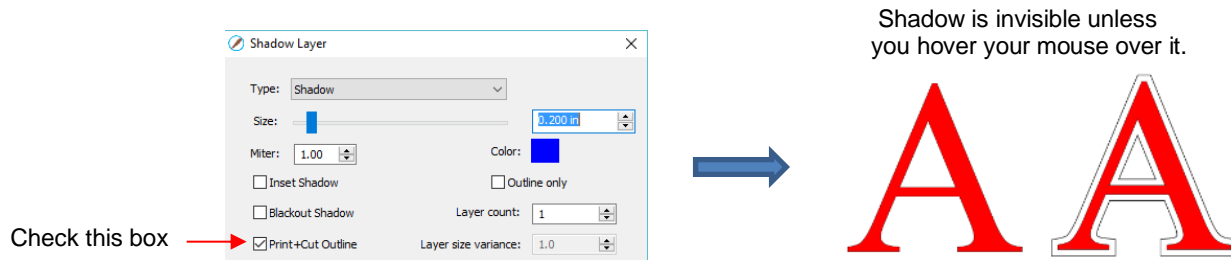
→ 

← **Shadow has no Fill**

- **Blackout Shadow** can be used to remove any interior shadow lines, leaving only a single outset:



- **Print +Cut Outline** creates a shadow with a **Fill** and **Stroke** both set to **None**. The shadow will be invisible unless you hover the mouse over the shadow:



◇ Two print and cut examples for this function are:

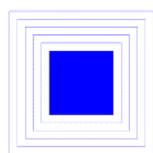
- To add a contour cut around a printed shape
- To cut just inside the boundaries of a printed image (in this case you also use the **Inset Shadow** option)

- **Layer** settings: There are three additional settings in the **Shadow Layer** window used to create multiple shadows on a shape:

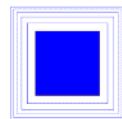
◇ **Layer count:** Total number of shadow layers to be created

◇ **Layer size variance:** If left at 1.0, the increasing thickness of each layer will be based on the original **Size** of the first shadow. If less than 1, the increasing thickness of each layer will be progressively less than the prior, based on the variance. If greater than 1, the increasing thickness of each layer will be progressively larger based on the variance.

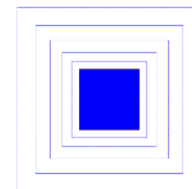
- For example, a square is used where the original shadow **Size** is 0.25 and the **Layer count** is set to 5. Outline only mode is also chosen so that the individual layers are easier to see. Note the different results when **Layer size variance** is set 1, 0.75 and 1.25:



Variance: 1.0

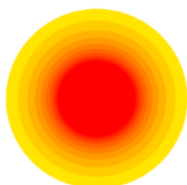


Variance: 0.75



Variance: 1.25

◇ **End color:** If the **End color** is chosen to be different from the original **Color**, a gradual transition between the two colors will be created. This can be used to create some beautiful designs for a print and cut:

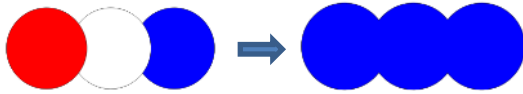


## 7.06 Boolean Operations

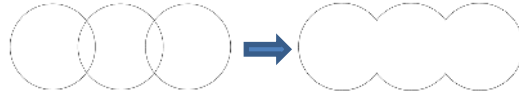
- Under **Path** on the **Menu Bar**, there are five Boolean operations that are very useful when designing cutting files. This section illustrates how each works and provides a practical example for each one.

### 7.06.1 Union Video

- The **Union** operation, also commonly called welding, removes the overlap between two or more selected shapes. The color of the new shape will be that of the bottom-most shape:

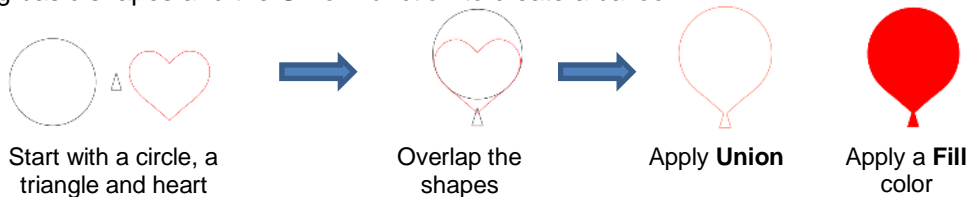


With a **Fill** color: before and after **Union**



With no **Fill**: before and after **Union**

- To apply this operation, select two or more shapes and use one of the following:
  - ◇ Go to **Path>Union**
  - ◇ Press **Alt+U**
  - ◇ Right-click and select **Path>Union**
- Sections 4.07 – 4.09* showed several examples of the **Union** operation applied to text. Here's an example using basic shapes and the **Union** function to create a balloon:



Start with a circle, a triangle and heart

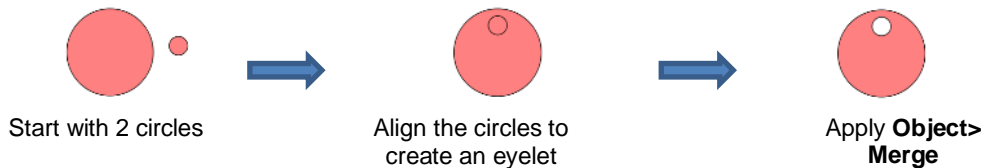
Overlap the shapes

Apply **Union**

Apply a **Fill** color

- In this next example, a scalloped border will be designed:

- ◇ Start with two circles that will be used to create an eyelet circle:

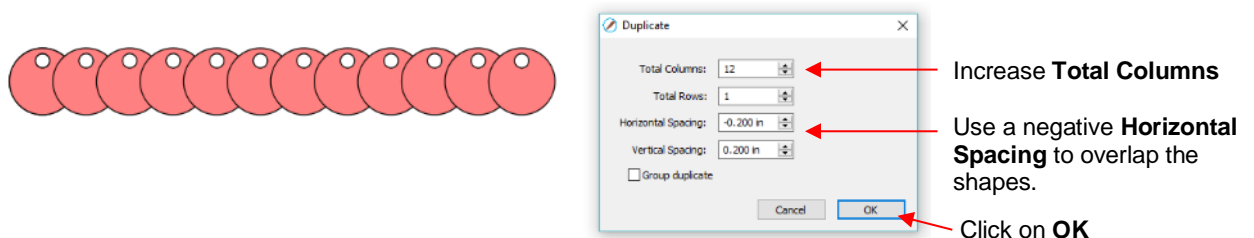


Start with 2 circles

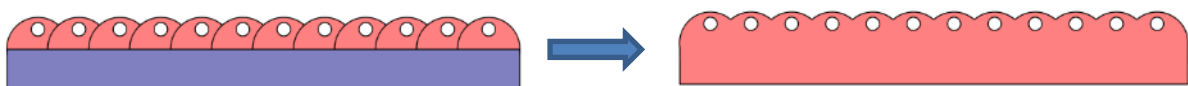
Align the circles to create an eyelet

Apply **Object>Merge**

- ◇ Select this new shape and use **Object>Duplicate** to open the **Duplicate** window:



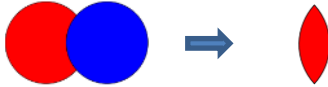
- ◇ Add a long rectangle and align with the pattern of circles. Apply the **Union** function:



## 7.06.2 Intersection

Video

- The **Intersection** operation is the opposite of the **Union** operation. Instead of removing overlap, the overlap is what remains. The color of the new shape will be that of the bottom shape:



With a **Fill** color: before and after **Intersection**



With no **Fill**: before and after **Intersection**

- To apply this operation, select two shapes and use one of the following:
  - ◇ Go to **Path>Intersection**
  - ◇ Right-click and select **Path>Intersection**
- One example involves filling a shape with a pattern:
  - ◇ This pattern was designed by using the **Duplicate** function to create a grid of hearts. Then, by applying **Object>Merge** on the hearts, it is now a single shape:

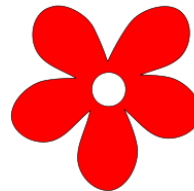


A heart from the **Library's Basic Shapes** folder



After using **Duplicate** and then **Merge**

- ◇ Arrange the shape to be filled (in this case, a flower) over the pattern. Also, set aside a copy of the flower shape to use later as a border.



- ◇ Select the pattern and flower and apply **Path>Intersection**:

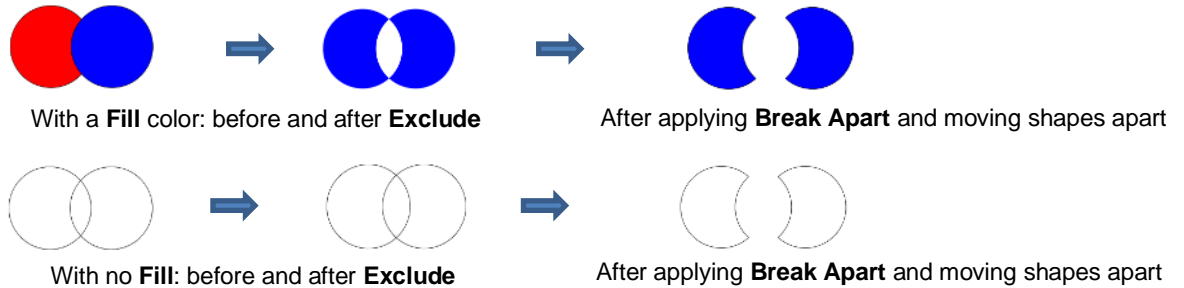


- ◇ Recolor the spare flower white with a red **Stroke**. Then center the pattern with the spare flower. Perfect for a print and cut!



### 7.06.3 Exclude Video

- The **Exclude** operation subtracts the intersection of two shapes from both of the shapes. The color of the new shapes will be that of the upper shape.



- To apply this operation, select two shapes and use one of the following:
  - ◇ Go to **Path>Exclude**
  - ◇ Right-click and select **Path>Exclude**
- After applying, use **Object>Break Apart** if you need to move one shape away from the other.
- As an example, use the heart-filled flower from the prior section as a cut design on the front of a greeting card:
  - ◇ Start with a rounded rectangle as the card base (refer to *Section 3.01.2*):



- ◇ Add the pattern from *Section 7.06.2*, without the spare flower shape. Arrange the pattern so that it will cut from the front of the card:

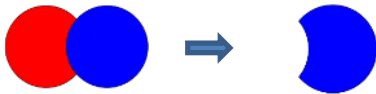


- ◇ Select the card and pattern and apply **Path>Exclude**:

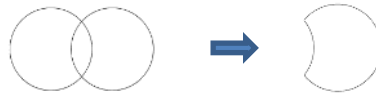


### 7.06.4 Front Minus Back [Video](#)

- The **Front Minus Back** operation subtracts the intersection of two shapes from the front (or upper) shape, leaving only that front shape:



With a **Fill** color: before and after **Front Minus Back**

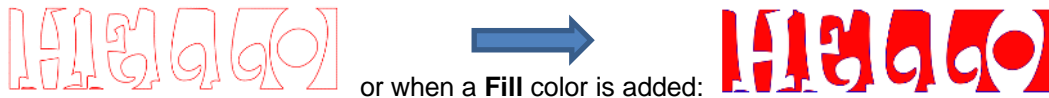


With no **Fill**: before and after **Front Minus Back**

- To apply this operation, select two shapes and use one of the following:
  - ◇ Go to **Path>Front Minus Back**
  - ◇ Right-click and select **Front Minus Back**
- As an example, add the word HELLO to the card designed in *Section 7.06.3*.
  - ◇ Select a font and type out the letters. Add a rectangle (with no **Fill** color) so that the tops and the bottoms of the letters will just overlap the rectangle:



- ◇ Select the rectangle and the lettering and apply **Path>Front Minus Back**:



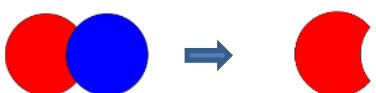
or when a **Fill** color is added:

- ◇ Arrange the greeting on the front of the card designed in *Section 7.06.3*. Select both and apply either **Object>Merge** or **Path>Exclude** so that all internal shapes are cut before the outside card base:



### 7.06.5 Back Minus Front [Video](#)

- The **Back Minus Front** operation is the opposite of **Front Minus Back**. It subtracts the intersection of two shapes from the back (or bottom) shape, leaving only that back shape:



With a **Fill** color: before and after **Back Minus Front**



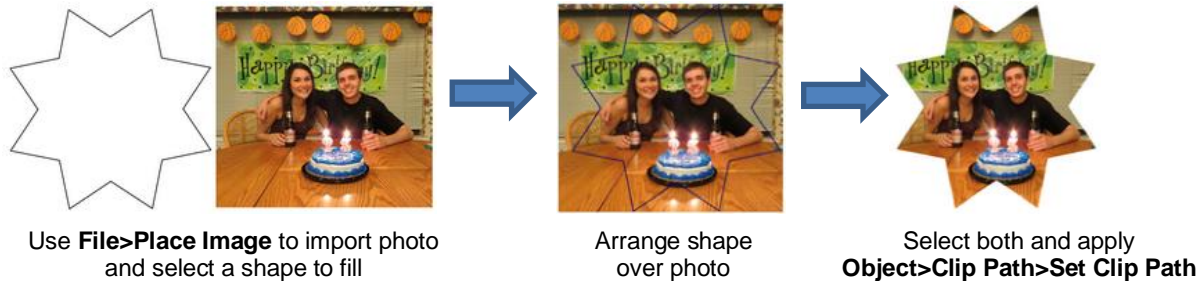
With no **Fill**: before and after **Back Minus Front**

- To apply this operation, select two shapes and use one of the following
  - ◇ Go to **Path>Back Minus Front**
  - ◇ Right-click and select **Back Minus Front**
- Any examples for **Back Minus Front** are essentially the same as for **Front Minus Back**. When choosing which to use, check the **Layers Panel** and think about which one you need to remain. Alternatively, just try one and, if it's the wrong choice, use **Undo** to back up one step and then pick the other function. 😊

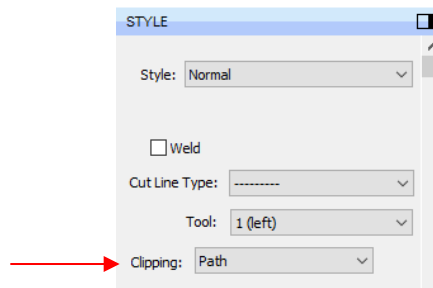
## 7.07 Clip Path and Clip Mask

### 7.07.1 Clip Path Video

- Clip Path** applies one selected shape as a die cutter onto another selected shape (vector or raster) positioned below it:



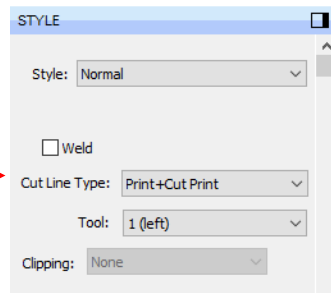
- There are two ways to access the **Clipping** function:
  - ◇ Select both shapes and go to **Object>Clip Path>Set Clip Path**
  - ◇ Select the two layers and, on the **Style Panel**, change **Clipping** from **None** to **Path**:



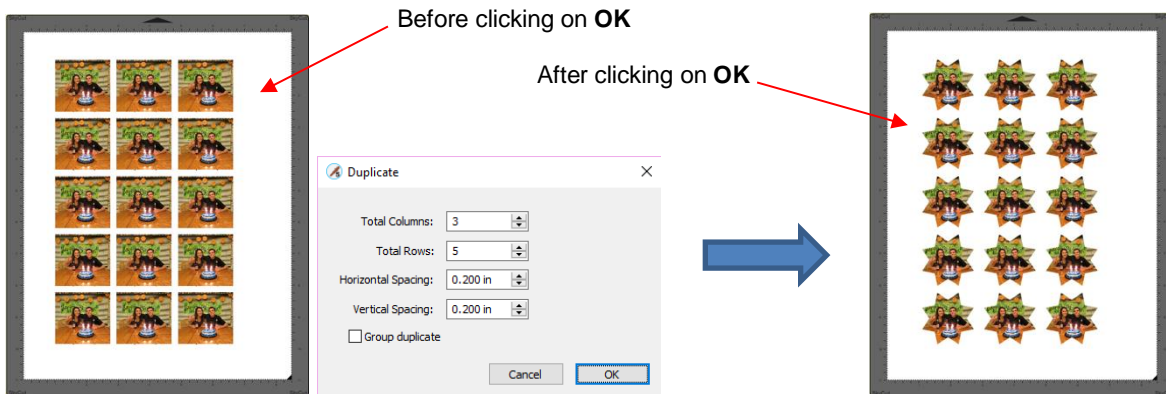
- Unlike other path functions in SCAL (**Union**, **Intersection**, **Exclude**, etc.), the original two shapes are still intact. To restore the original shapes:
  - ◇ Go to **Object>Clip Path>Release Clip Path**
  - ◇ Reset the **Clipping** option to **None** on the **Style Panel**
  - ◇ Note that the shapes will be grouped, thus you'll need to apply **Object>Ungroup** in order to individually select one of the shapes but not the other.
- A few other things to note about **Clip Path**:
  - ◇ If you apply **Clip Path** to two vector shapes, both shapes will still cut out. To avoid that, select the shape that you do not want to cut, and change the **Cut Line Type**, on the **Style Panel**, to **Print + Cut Print**. Then apply **Clip Path** to the two vector shapes.



Change to **Print + Cut Print** on the vector shape that is not to be cut



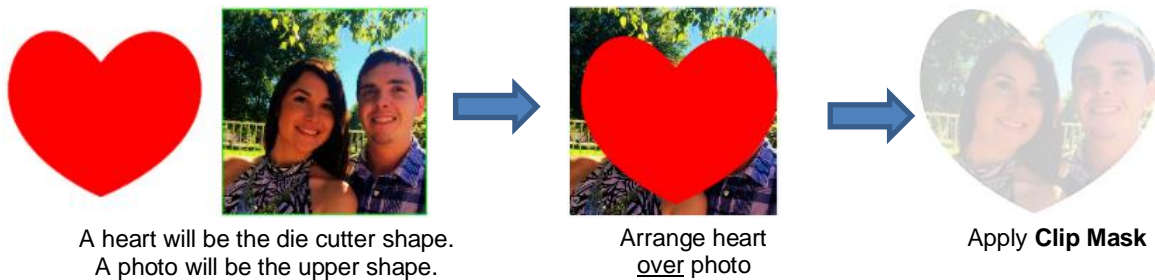
- ◇ When applying the **Duplicate** or **Rotated Duplicate** function on shapes that have **Clip Path** applied, you will initially see the copies in their original “unclipped” format. But once you click on OK, the correct result will appear:



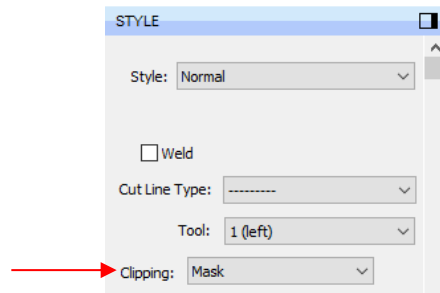
## 7.07.2 Clip Mask

Video

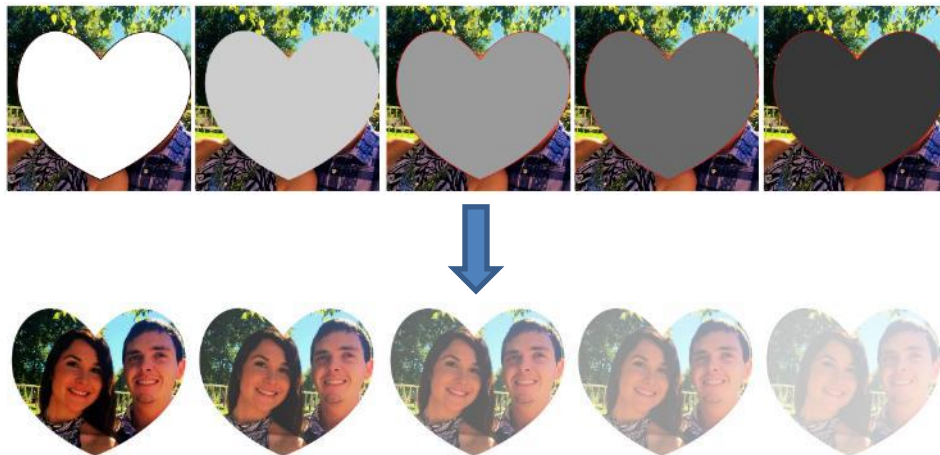
- **Clip Mask** is similar to **Clip Path** except the shape performing the die cut will alter the opacity of the other shape based on its color intensity.
- As with **Clip Path** the die cut shape is placed on top of the other image:



- To apply **Clip Mask** to selected shapes, either
  - ◇ Go to **Object>Clip Mask>Set Clip Mask**
  - ◇ Select the two layers and, on the **Style Panel**, change **Clipping** from **None** to **Mask**:



- In the following five examples, the color of the heart ranges from white to dark gray. Notice the differences in the five results after **Clip Mask** is applied:

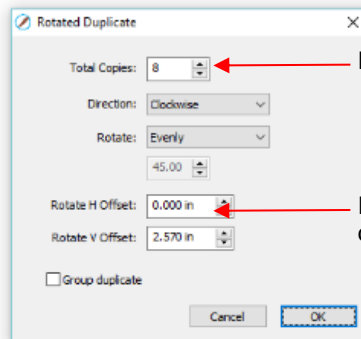


- To restore the original shapes, either:
  - ◇ Go to **Object>Clip Mask>Release Clip Mask**
  - ◇ Reset the **Clipping** option to **None** on the **Style Panel**
  - ◇ Note that the shapes will be grouped, thus you'll need to apply **Object>Ungroup** in order to individually select one of the shapes but not the other.
- The same additional things to note that applied to **Clip Path** also apply to **Clip Mask**. Refer to the last bullet in [Section 7.07.1](#).

## 7.08 Duplicate Rotated

### 7.08.1 Duplicate Rotated Settings Video

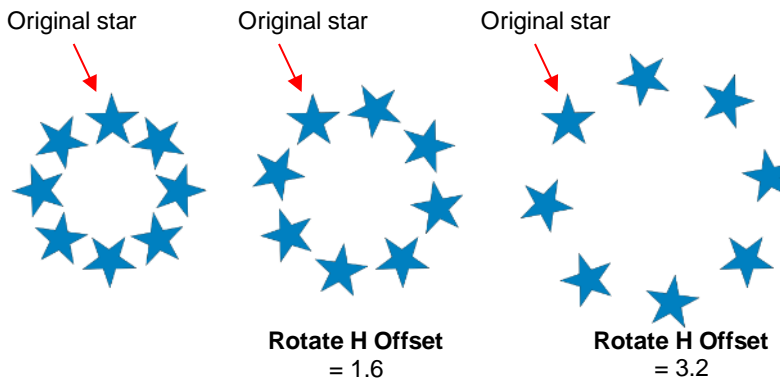
- The **Duplicate Rotated** function allows you to make duplicates arranged in a circle or partial circle pattern.
- To access **Duplicate Rotated**, first select the shape(s) and then use either of the following:
  - ◇ Go to **Object>Duplicate Rotated**
  - ◇ Press **Ctrl+Shift+D**
- To illustrate how this works, start with a small shape. Select it and then activate the **Duplicate Rotated** function using either of the methods just mentioned. The following window opens:



Enter number of copies

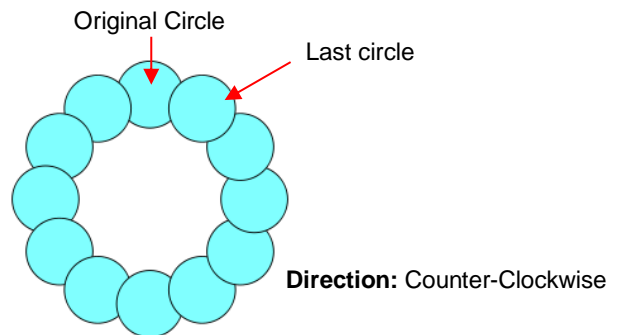
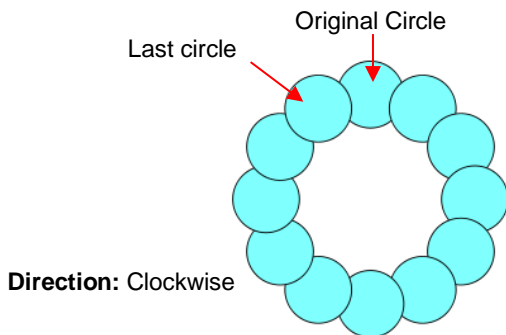
Increase to space out the copies

- ◇ Start by increasing the number of copies. If the shapes are overlapping too much, increase **Rotate V Offset** which is the distance from the center. Increasing the **Rotate H Offset** setting shifts the center of rotation toward the right, leaving the original in the same location on the **Cutting Mat**:



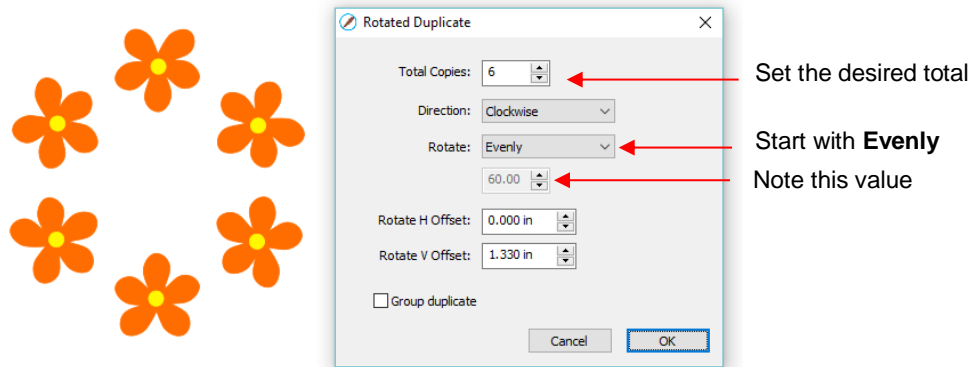
- ◇ Because the stars must spread out in order to keep the original in its same position, one can then decrease the **Rotate V Offset** at the same time as increasing the **Rotate H Offset**, if you need to spread the shapes but keep the design in the current display area of SCAL.

- ◇ The **Direction** setting changes the order of the duplicates around the circle.
  - With clockwise selected, the order of the shapes follows a clockwise progression so that the last copy is just to the left of the original at the top. You can visually see that circle is on top. The opposite is true if counter-clockwise is selected.

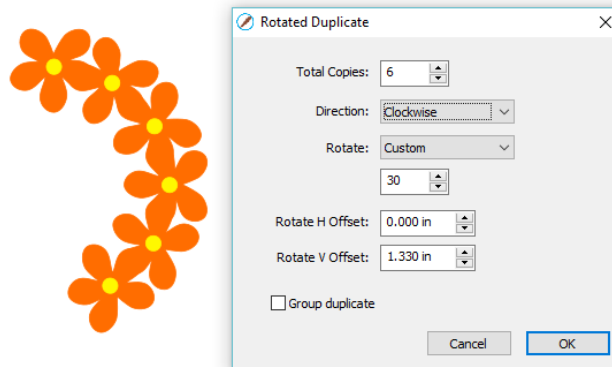


- Does it matter which **Direction** is used? Most likely, it would only matter for display or possibly in a print and cut design.

- ◇ **Rotate** has two options: **Evenly** and **Custom**. With **Evenly** selected, the copies are distributed evenly in a full 360° circle. But let's say you want a semi-circle of shapes:
  - First, create a circle pattern using the desired number of shapes. Note that the greyed-out box below **Rotate** is changing as you add more shapes:



- Change the **Rotate** to **Custom** and then, because you want a semi-circle of shapes, divide that value by 2. Thus, in this example, it will be changed to 30:



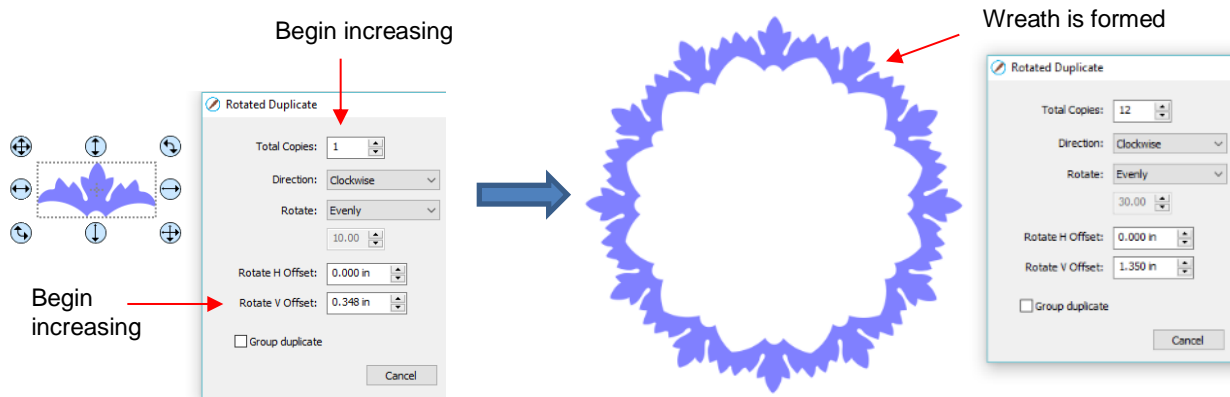
- If you want the shapes to be grouped, mark the **Group duplicate** box. Otherwise leave it unchecked.

### 7.08.2 Using Duplicate Rotated to Design a Wreath

- Begin with a desired shape. In this example, a shape from the **Library's Swirls** folder will be used.



- Select and go to **Object>Duplicate Rotated**. Begin increasing **Total Copies** and the **Rotate V Offset** until a desired overlapping pattern is obtained:



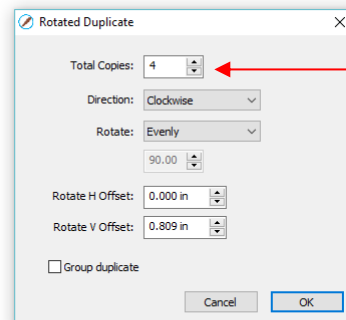
- After creating the pattern, go to **Path>Union** to remove the overlap and the shape is ready to cut.

### 7.08.3 Using Duplicate Rotated to Design a Frame

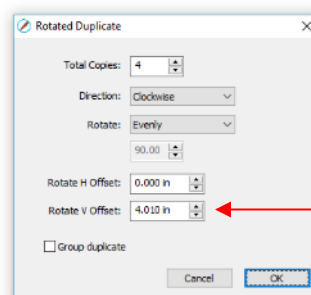
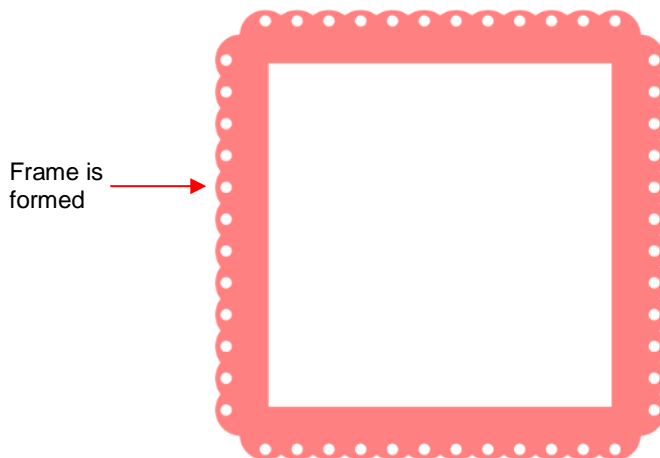
- In *Section 7.06.1*, the **Duplicate** and **Union** functions were used to create this scalloped border:



- Select the shape, go to **Object>Duplicate Rotated**, and enter 4 for **Total Copies**:



- Begin increasing the **Offsets** until the four corners overlap evenly:



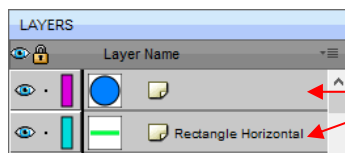
- Click on **OK** and then apply **Path>Union**.

## 7.09 Object on Path Video

- The **Object on Path** function can be used to align repeats of a shape along the path of another shape:



- IMPORTANT:** Before applying the function, check the **Layers Panel** to make sure the shape to be repeated is on a higher layer than the path:



Shape to be repeated should be above the path shape

- To open the **Object on Path** window, select both the path and the shape to be repeated and go to **Effects>Object on Path**. Because there are so many settings in this window, only about half will be explained at this point:

Location of first shape

Select either **Count** or **Fill path length**

Select **Top, Middle** or **Bottom** part of shape to be aligned

Click here to manually update the preview

Check this box to have the preview update with changes

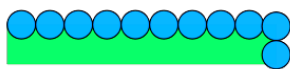
Click **OK** when done

If using **Count**, number of **Repeats**

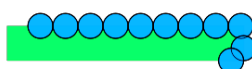
Distance between **Repeats**

Distance from that part of the shape to the path

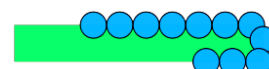
- ◇ **Start Offset:** This is the distance from the left side of the path to the location of the first shape:



Start Offset = 0

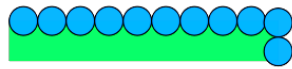


Start Offset = 0.5"

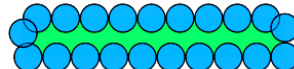


Start Offset = 1.5"

- ◇ **Repeat:** Choose **Count** if you want to specify how many copies to place along the path. Choose **Fill Path length** if you want the program to automatically fill in the number of repeats that will fill the path using the **spacing** you enter:

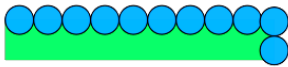


Repeats: Count 10

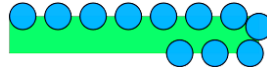


Repeats: Fill path length

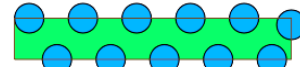
- ◇ **Spacing:** Enter the desired spacing between repeats:



Spacing = 0



Spacing = 0.2"

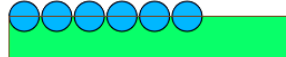


Spacing = 0.5"

- ◇ **Alignment:** This refers to the object being repeated. Choose **Top** to have the top of the shape aligned along the path. Choose **Bottom** to have the bottom of the shape aligned along the path. Choose **Middle** to have the center of the shape aligned along the path:



Alignment: Top

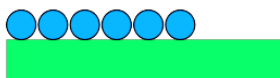


Alignment: Middle



Alignment: Bottom

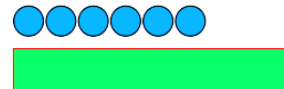
- ◇ **Offset:** This is how far away from the path you want the repeats to be. For example, if you choose **Bottom** for **Alignment** and then 0.15" or 0.25" for **Offset**, then the bottom of the shapes will be 0.15" or 0.25" above the path:



Offset = 0



Offset = 0.15"

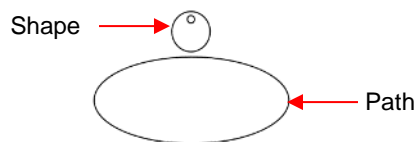


Offset = 0.25"

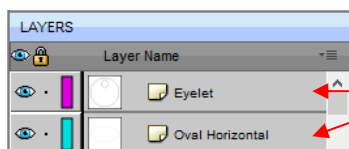
### 7.09.1 Designing a Scalloped Oval

Video

- Create an eyelet circle like the one shown in *Section 7.06.1*. Also, use the **Circle** tool to create an oval for the path:



- Before using the **Object on Path** function, make sure the eyelet shape is above the oval path on the **Layers Panel**:



Shape to be repeated should be above the path shape

- Select the shapes and open the **Object on Path** window using **Effects>Object on Path**. Begin by marking the **Auto Preview** option so that all changes will be immediately reflected. Then choose **Fill path length** so the shapes will be distributed over the entire path. Set the **Spacing** to a negative number so that the shapes will overlap:

Note the settings used to fill the path and overlap the shapes

Mark this first

- Next the **Offset** can be decreased to soften the scallop. Also a few new settings are noted as shown and described below:

Lowering the **Offset** makes the scallop less acute

Lower the **Offset**

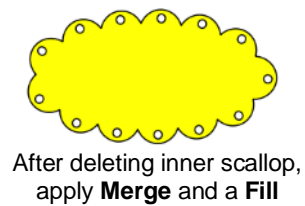
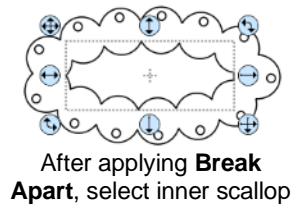
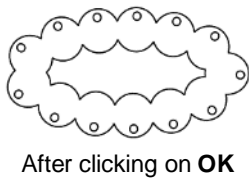
Removes overlap

Removes original path

Removes original shape

- ◇ **Weld:** Mark this option if you want the repeated shapes welded together, as shown in the screenshot
- ◇ **Remove path:** Mark this option if you will no longer need the path shape (in this case, the oval)
- ◇ **Remove original object:** Mark this option if you will no longer need the original shape (in this case, the eyelet circle)

- Click on **OK** and the scalloped oval is mostly complete. To remove the internal scallop, apply **Object>Break Apart**. Carefully select the internal scallop shape and delete. Then marquee-select the remaining scallop border with eyelet circles and apply **Object>Merge**:

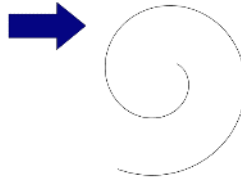




## 7.09.2 Warp a Shape to a Path

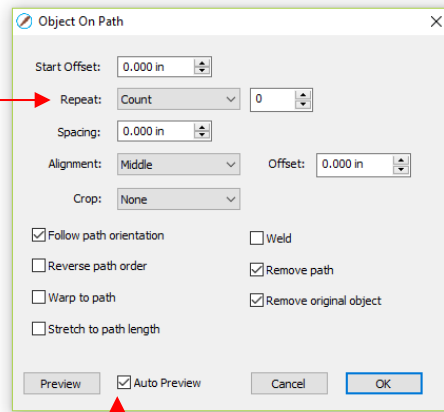
Video

- The **Object on Path** function can also be used to stretch a shape to fit a path. For example, let's start with an arrow (from the **Library's Arrows**) and a spiral (refer to *Section 3.01.7*):

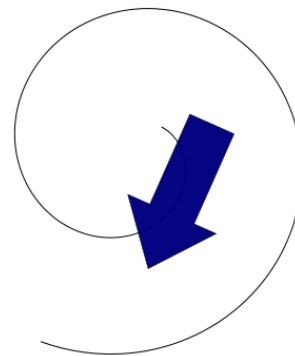


- Verify that the arrow is above the spiral on the **Layers Panel**. Then select both and go to **Effects>Object on Path**. Note that since there is only one shape involved, **Repeat** is left at **Count** and set to 0:

Repeat is set to **Count** but the number of repeats is set at 0



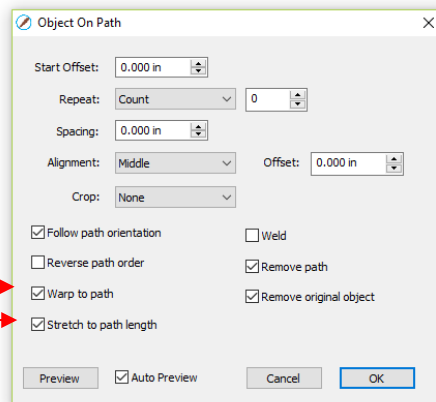
Mark this first



Original arrow appears positioned at start of spiral

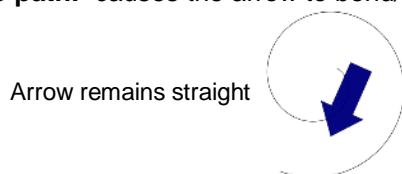
- Next, two new settings are applied:

Mark these two options



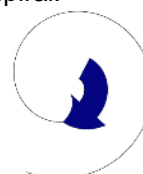
Arrow is now curved and stretched to fit the spiral

- ◇ **Warp to path:** causes the arrow to bend/curve to fit the spiral:



Arrow remains straight

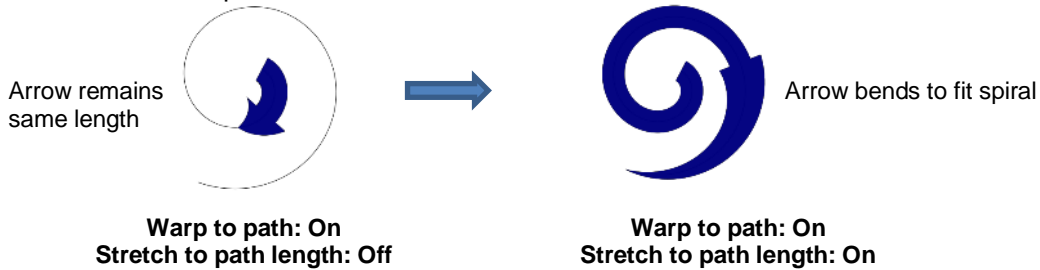
Warp to path: Off



Arrow bends to fit spiral

Warp to path: On

- ◇ **Stretch to path length:** causes the arrow to be elongated so that it starts and ends at the same locations as the spiral:

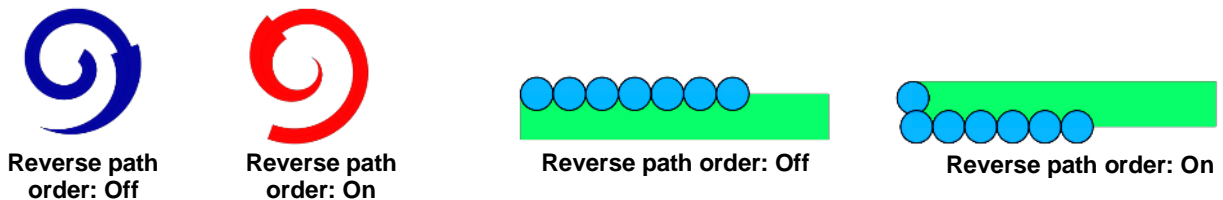


### 7.09.3 Remaining Settings [Video](#)

- The two remaining settings in the **Object On Path** window are:
  - ◇ **Follow path orientation:** With this setting turned on, the repeats will rotate so that they stay aligned with the path. With the setting turned off, the shapes never rotate:



- ◇ **Reverse path order:** Changes the direction the shapes are applied. With **Reverse path order** turned off, the shapes are applied clockwise around the path. With **Reverse path order** selected, the shapes are applied counter-clockwise:



### 7.10 Wrapper [Video](#)

- The **Wrapper** feature can be used for shaping designs to fit around conical shapes in which the top is a different diameter than the bottom. Some typical applications include tumblers and cupcake wrappers.
- This function can be accessed by selecting one or more shapes and going to **Effects>Wrapper**. For this example, the following design was created with the intention of having it applied to a small cup:



- Select the design and go to **Effects>Wrapper**. The following window will open:

Enter **Top** and **Bottom Diameters**, as well as the **Height** of the **Tumbler**, along the actual surface.

**Add Template** will create the cut line for the tumbler

**Y Offset** will move the design higher or lower on the template

Resize the design using **X Scale** and **Y Scale**

Click here to see latest changes before accepting

**X Offset** will move the design left or right on the template.

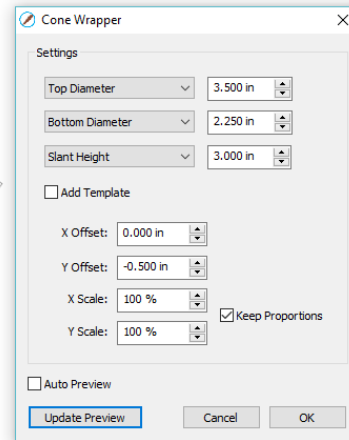
Check this box to have **Y Scale** change automatically with a change to **X Scale** and vice versa.

Click **OK** when done

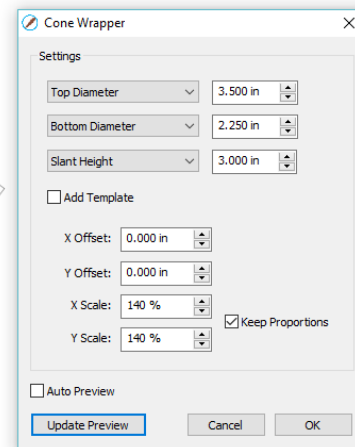
- ◇ Measure the cup: diameter of the top, diameter of the bottom, and length along the side from bottom to top. Enter those as shown in the screenshot. Alternatively, you can measure the radius or the circumference, as well as use the actual vertical height versus the slant height. These other choices are in the drop-down menus.
- ◇ Once these measurements are entered, click on **Update Preview** to see how the design will fit on the cup. Note that the design will be displayed in outline mode while working in this window:



- ◇ The template is the outside pattern based on the cup's dimensions. If you plan to cut that template, then check the box next to **Add Template**. Otherwise, it won't be on the **Cutting Mat** after you click on **OK**.
- ◇ Adjust the **X Offset** and/or **Y Offset** to move the design, if needed. For example, making **Y Offset** a negative value moves the design higher up on the template:



- ◇ Adjust the **X Scale** and/or **Y Scale** to resize the design, if needed. If you want to scale proportionately, mark the **Keep Proportions** box:

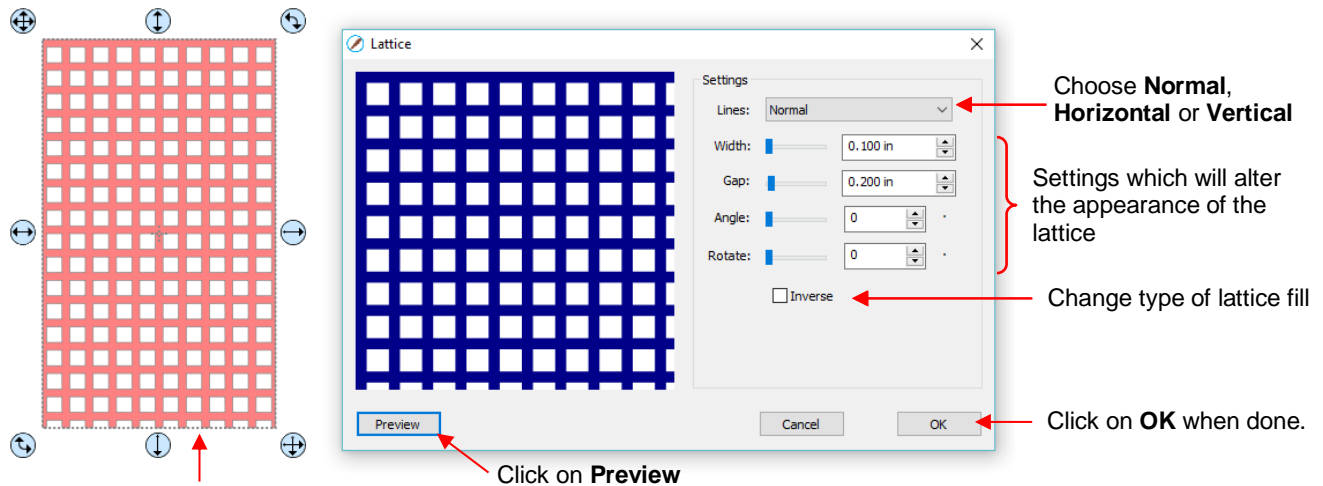


- After clicking on **OK**, the fill color returns to the design and the project is ready for completion:



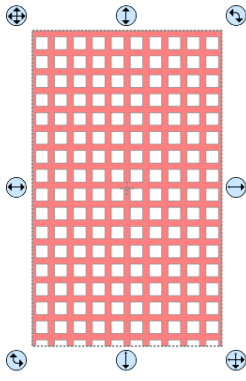
## 7.11 Lattice Video

- The **Lattice** feature can be used to create a lattice design within a shape or as part of the shape itself. To access this feature, select one or more shapes and then use either of the following:
  - ◇ Go to **Effects>Lattice**
  - ◇ Right-click and select **Appearance>Lattice**
- In this example, a rectangle is used to show the effects of the settings in the **Lattice** window:

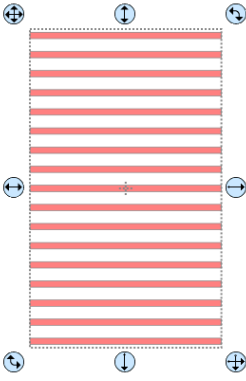


After clicking on **Preview**, selected shape will display lattice based on current settings

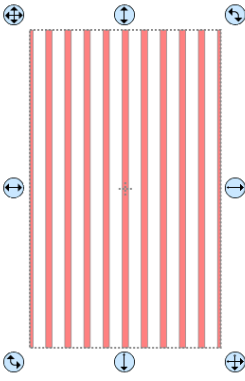
◇ **Lines:** Besides the traditional crisscross pattern, you can also choose to only have horizontal lines or only have vertical lines:



**Lines:** Normal

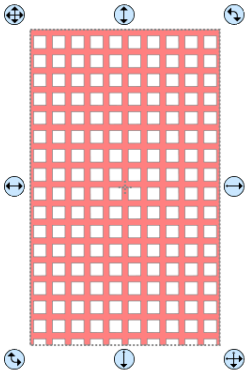


**Lines:** Horizontal Only

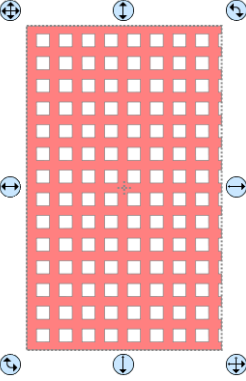


**Lines:** Vertical Only

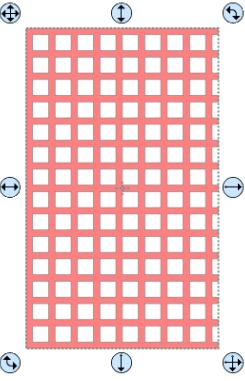
◇ Change **Width** and **Gap** to produce desired appearance. Remember that if the lattice pattern is too small, it might be difficult to cut:



**Width:** 0.1 in  
**Gap:** 0.2 in

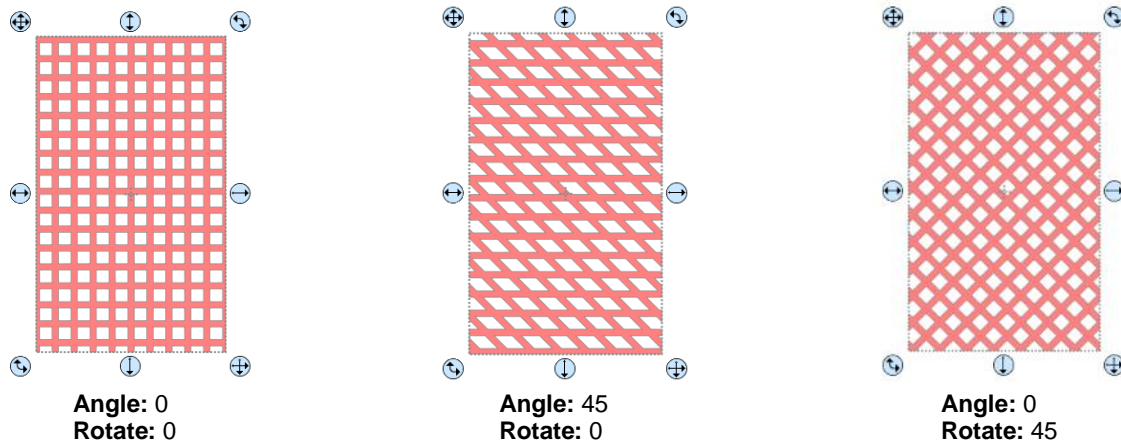


**Width:** 0.15 in  
**Gap:** 0.2 in

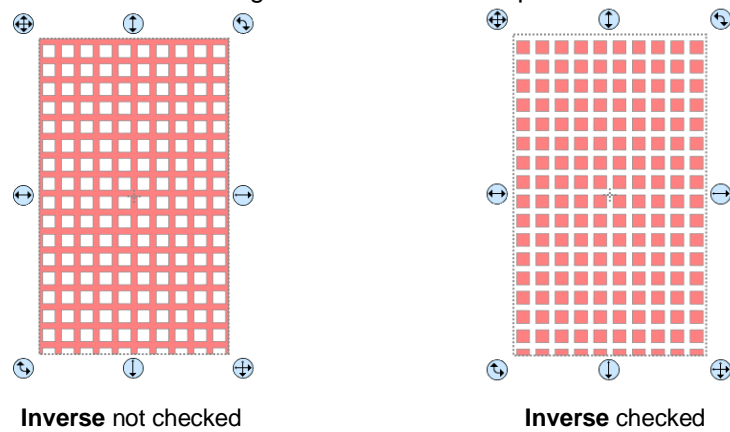


**Width:** 0.1 in  
**Gap:** 0.25 in

◇ The **Angle** setting will skew the lattice shape while the **Rotate** setting will simply rotate the overall pattern:

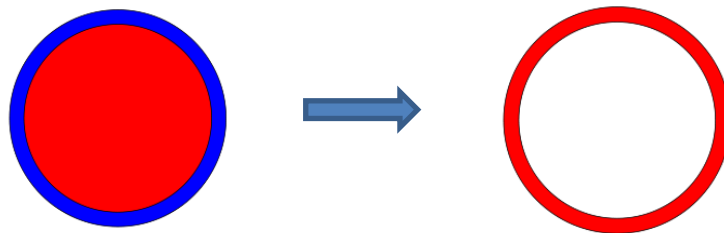


◇ **Inverse** is used to create a kind of negative lattice. An example will follow later in this section:

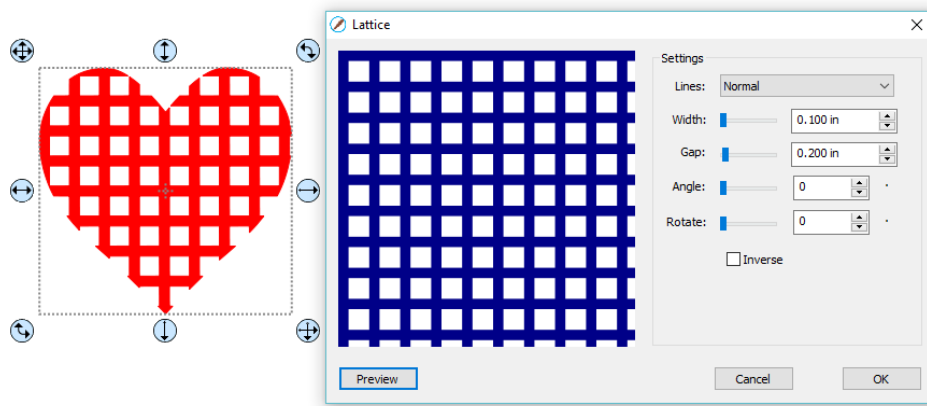


- An example of when **Inverse** would not be checked is when you want to attach/weld a latticed shape to something else. In the following example, a latticed heart is attached to the center of a ring:

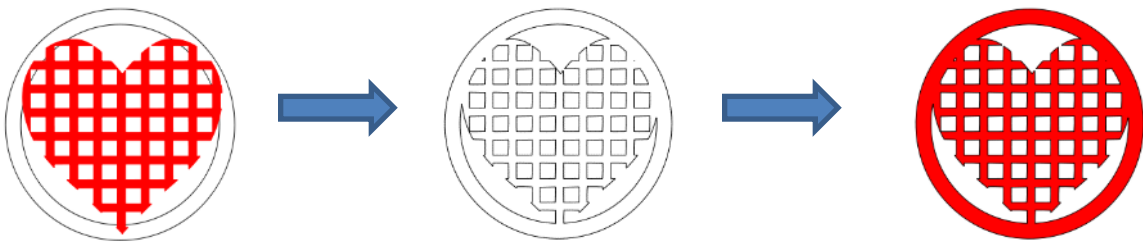
◇ A ring is created by applying **Object>Merge** to two centered circles:



◇ Select a heart shape from the **Library** and apply **Effects>Lattice**:



◇ Align the latticed heart in the center of the ring and weld using **Path>Union**:



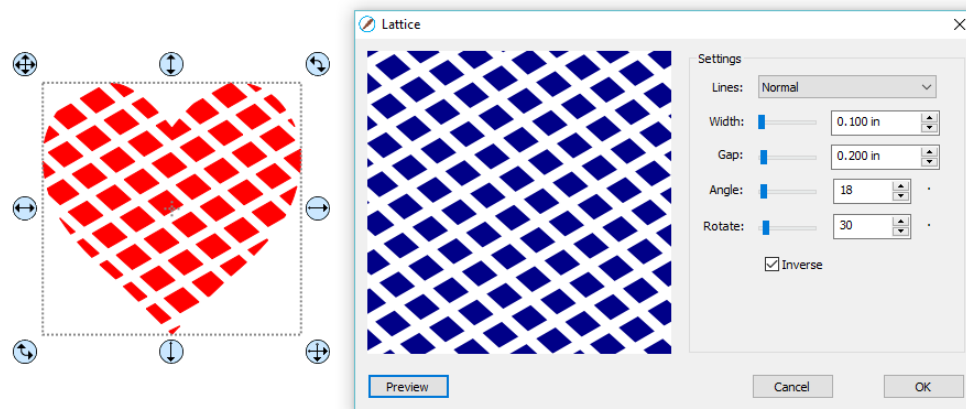
Remove **Fill** from ring to make overlap easier to see

After applying **Path>Union**

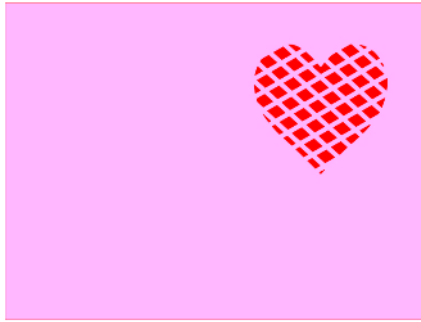
Set **Fill** to red again

- An example of when **Inverse** would be checked is when you want a lattice aperture cut from the front of a greeting card:

◇ Using the same heart as above, make sure **Inverse** is selected:



◇ Arrange the latticed heart over a base greeting card:



- ◇ Select all and go to **Object>Merge**. The card is complete:



- If you have a shape that has the **Lattice** effect applied and want to remove it (even after the file has been saved and re-opened), select the shape and go to **Object>Remove Effects**.

## 7.12 Rhinestones

- SCAL's **Rhinestones** feature provides both outlining and horizontal fill of shapes with the size of circles needed for your rhinestones and the desired spacing. After selecting a shape, the feature can be accessed in either of the following ways:
  - ◇ Go to **Effects>Rhinestones**
  - ◇ Right-click and select **Appearance>Rhinestones**

### 7.12.1 Guidelines for Rhinestone Pattern Design

**Video**

- There are some guidelines to follow when designing a rhinestone pattern:
  - ◇ In general, you want to size the shape before applying the rhinestone circles. If you later want to resize the design, SCAL does have the ability to regenerate the rhinestone pattern, maintaining the original selected stone size and spacing. But in order to have a good sense of how the design is going to appear on your garment and to make sure the lettering is readable, you want to design close to the target size.
  - ◇ **IMPORTANT:** Always make a backup copy of your design before entering the **Rhinestone** window because the original design will be replaced with the new rhinestone pattern. You might later want to use that same original design but apply a different size rhinestone or create a shadow layer from it, or some other change.
  - ◇ The circle size selected will need to be larger than the stone size you purchase. As a general rule, select a size three numbers larger than your stones. Thus, if you purchased SS10 stones, then in the rhinestone design window, you would select SS13 stones. This larger size will allow the SS10 stones to more easily brush into the holes, saving a lot of time and tedium.



- ◇ When selecting a font to use, be leery of “fancy fonts.” You want the lettering to be readable after it is converted to circles. When in doubt, have someone who doesn’t know the words you’ve used attempt to read the rhinestone design on your monitor or from a printout of the design. If they cannot easily decipher the words, then try a more basic font.
- ◇ If you plan to do a lot of rhinestone applications, create and cut a template with small patterns (~ 15 – 20 circles) in different sizes so that you can test brush your rhinestones to find out the optimum size to use when designing. A difference of just 0.1 or 0.2 mm can affect how easily the stones will brush into a pattern right side up. If the size is too small, the stones will tend to not fall in. If the size is too large, then the ones that land right side up will tend to get flipped over by the brush. Also, stones can vary slightly in size from one manufacturer to the next and also from one color to the next. Further, the size of the cut holes can vary slightly from one template material to the next.

### 7.12.2 Rhinestone Outline

*Video*

- In this example, the initials from a high school will be outlined. As mentioned previously, the first step is to size the width and height of the design. Make sure there is enough space between the letters so that the circles will not overlap. Also, you may want to resize the lettering vertically, leaving the width the same. This will better fill a T-shirt, allow more circles to be applied, and will improve the readability of the design:



- To apply a rhinestone outline, first make a backup copy of the shape. Then select the shape and go to **Effects>Rhinestones**:

**Rhinestone**

Stone Size	Pearl Plate	mm	inch
SS 9	PP 19	2.50 - 2.60	0.098 - 0.10
SS 9	PP 20	2.60 - 2.70	0.10 - 0.106
SS 10	PP 21	2.70 - 2.80	0.106 - 0.11
SS 10	PP 22	2.80 - 2.90	0.11
SS 11	PP 23	2.90 - 3.00	0.11 - 0.12
SS 12	PP 24	3.00 - 3.20	0.12 - 0.13
SS 13	PP 25	3.20 - 3.30	0.13
SS 13	PP 26	3.30 - 3.40	0.133
SS 14	PP 27	3.40 - 3.50	0.133 - 0.14

Stone Size: 3.40 mm  Fill shape with stones

Stone Spacing: 0.50 mm Stone Count: 268

Adjust spacing to fit path

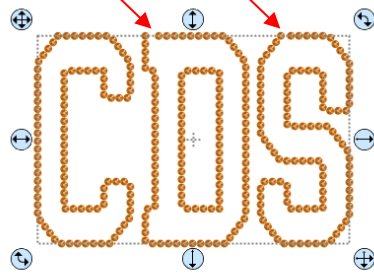
Preview Cancel OK

Annotations:

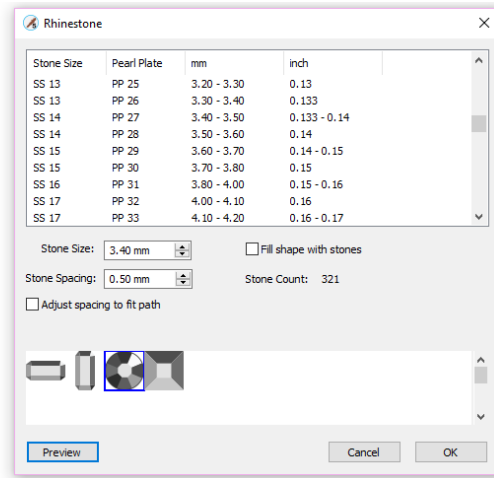
- Select a **Stone Size** but larger than your actual stones
- Stone Size** will update based on what you select in upper window or you can enter a size directly
- Select a spacing for the design: usually between 0.5 and 1.0 mm
- This setting is used to improve spacing
- Option to **Fill** shape versus outline
- Number of stones based on current settings (must click on **Preview** first)
- Click on **Preview** to see effects of settings
- Select the shape of the stones to be used
- Click on **OK** when done.

- After inputting the initial settings, click on **Preview** and your selected design will be outlined with simulated stones:

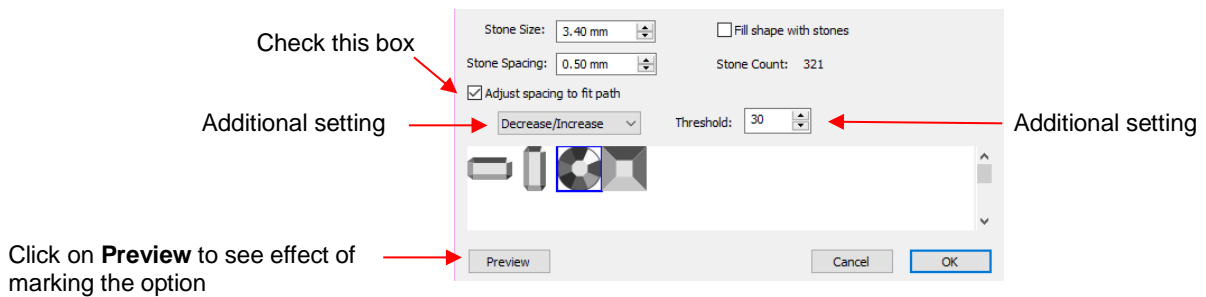
Slight adjustments needed



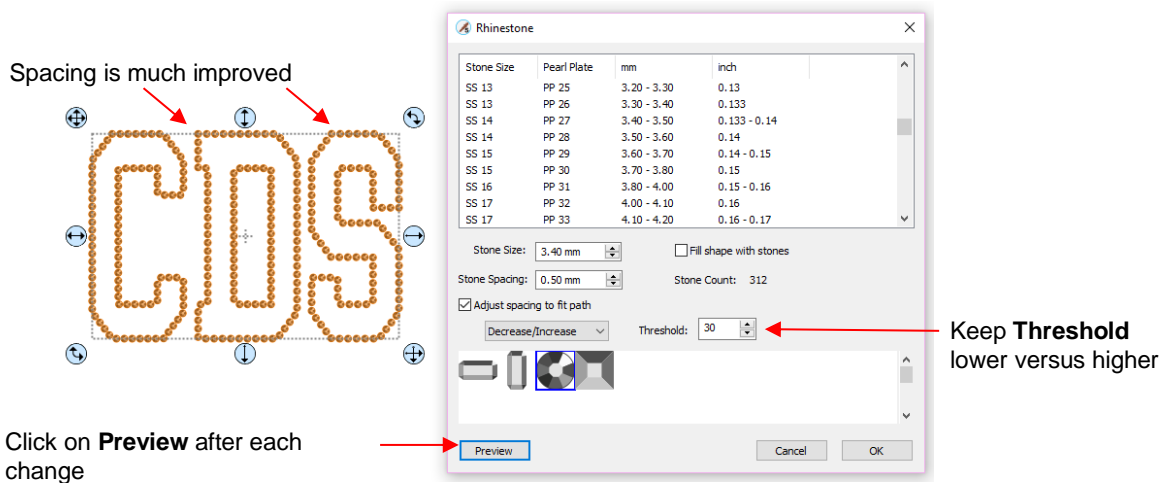
Preview of design



- The preview shows that the spacing is off a bit at the top of the “D” and the “S”. There is an option which can be used to make adjustments. Check the box next to **Adjust spacing to fit path** and additional settings will appear:



- These settings will require experimenting in order to optimize equal spacing between the stones. Initially, however, just click on **Preview** after marking the box and the spacing should change. This is often all that is required. However, from the drop-down menu, you can also choose to only **Decrease** or only **Increase** the spacing. The **Threshold**, which controls how much spacing will be used, is also available to adjust.

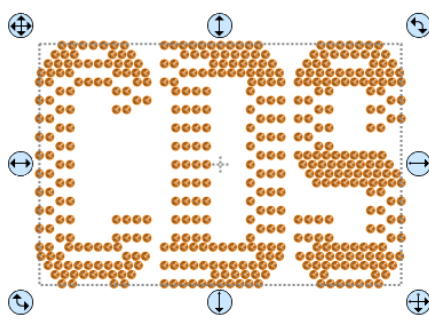


- Note that the higher the **Threshold**, the more increase in spacing you may see. So typically you want to keep that value lower versus higher.
- If additional stone-by-stone editing will be needed, note that the simulation will initially be lost. If you want to restore it, write down the Stone Size before clicking on OK. Also note, however, that the simulation is not needed when cutting the design from your template material. For guidelines on editing, refer to *Section 7.12.4*.

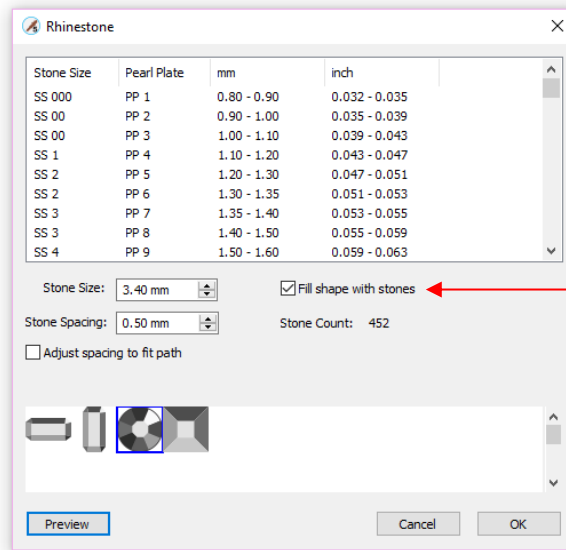
### 7.12.3 Rhinestone Fill

Video

- Another option in the **Rhinestone** window is **Fill shape with stones**. Instead of outlining the shape, the image will be filled with circles in horizontal rows. In our prior example, the same letters will now appear like this:

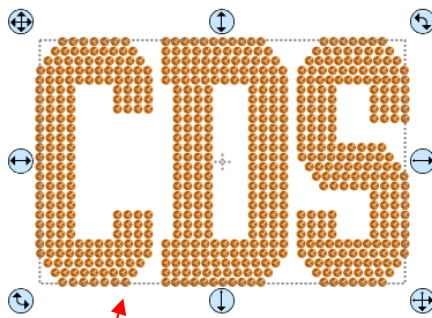


Lots of gaps appear with this **Stone Spacing**



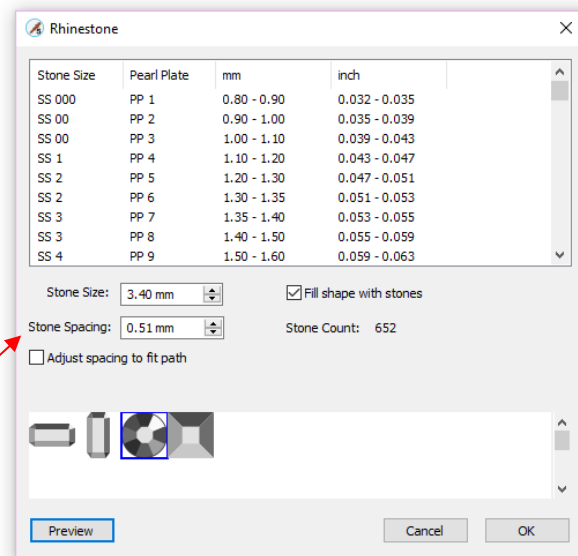
Check this option

- The gaps in the design can be easily corrected by adjusting the **Stone Spacing**. Instead of 0.50, the spacing is increased slightly to 0.51 mm. The result is a complete correction of the spacing and the design looks great:



Pattern is now correct

**Stone Spacing**  
changed from 0.50 to  
0.51 mm



- Also, note the increase in the number of stones as a result of switching to a line fill. Rhinestones are typically sold by the gross and 1 gross equals ~ 144 stones. Thus, this design would require over 5 gross of stones compared to just under 2 gross for the outline version.
- As with the outline option, any stone-by-stone editing will cause a loss of the simulation. If you wish to restore the simulation after editing, write down the **Stone Size** before clicking on **OK**. Also note, however, that the simulation is not needed when cutting the design from your template material. For guidelines on editing, refer to the following section.

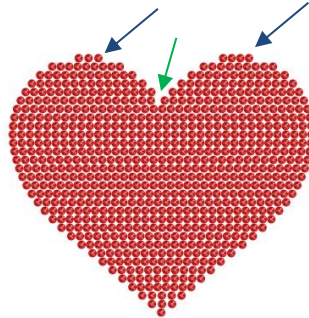
## 7.12.4 Editing Rhinestone Designs

Video

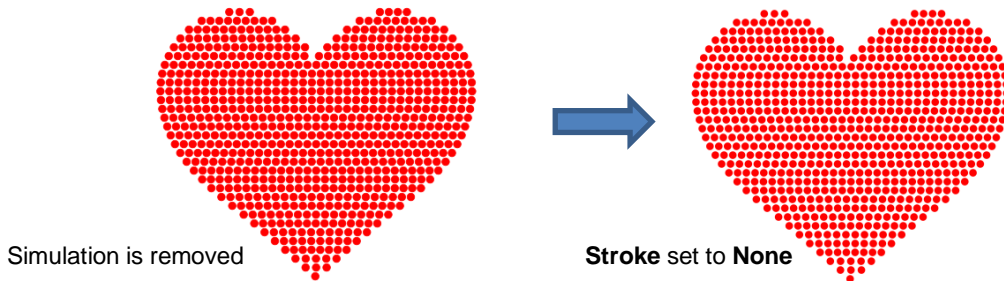
- Before editing, make a backup of the design created by the **Rhinestone** function. As was mentioned earlier you can resize rhinestone designs but if certain editing has occurred, you might or might not get the results you want after editing.
- Rhinestone designs will sometimes need “tweaking” which involves adding, deleting, moving, or re-spacing circles. In the following example, there are two corrections required:

1. The blue arrows indicate the top row on each side does not contain the same number of circles.

2. The green arrow indicates a gap in that row that can easily be corrected.



- The first step is to break the design so that a row of circles or even individual circles can be moved. Select the pattern and apply **Object>Break Apart** or **Ctrl-B**. You may wish to turn off **Stroke** to have a better sense of the actual spacing:



- The simulation can be restored now or after editing or not at all. The circles will still remain as individual shapes. Again, this does not affect how the design cuts; the simulation is only for displaying or printing. If the design is extremely large or you have a slow computer, you may find that the simulation causes more lagging as you are editing the design. In that case, save the following step until after editing is completed.
- To restore the simulation, select the design and reopen the **Rhinestone** window. Enter the same **Stone Size** setting used to create the design. Note that the **Spacing** doesn't matter any longer, nor is it necessary to select the **Fill** option:

Important: Enter same stone size

Stone Size	Pearl Plate	mm	inch
SS 000	PP 1	0.80 - 0.90	0.032 - 0.035
SS 00	PP 2	0.90 - 1.00	0.035 - 0.039
SS 00	PP 3	1.00 - 1.10	0.039 - 0.043
SS 1	PP 4	1.10 - 1.20	0.043 - 0.047
SS 2	PP 5	1.20 - 1.30	0.047 - 0.051
SS 2	PP 6	1.30 - 1.35	0.051 - 0.053
SS 3	PP 7	1.35 - 1.40	0.053 - 0.055
SS 3	PP 8	1.40 - 1.50	0.055 - 0.059
SS 4	PP 9	1.50 - 1.60	0.059 - 0.063


Stone Size: 3.40 mm  Fill shape with stones

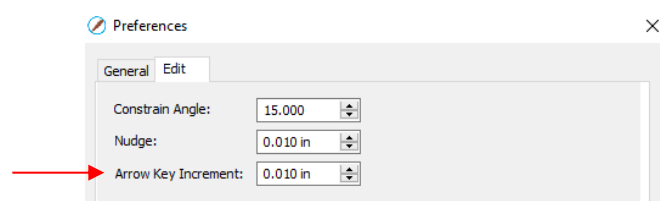
Stone Spacing: 2.00 mm Stone Count: 750

Adjust spacing to fit path

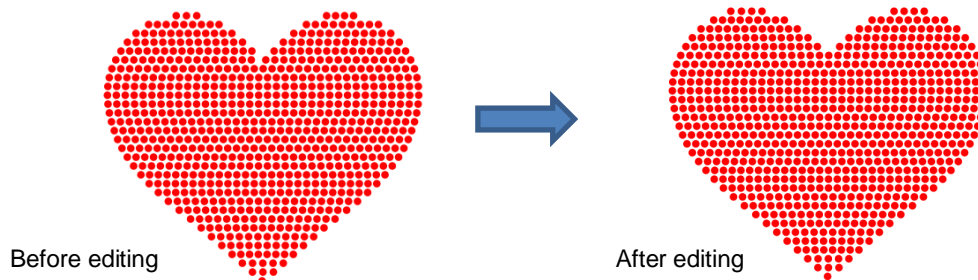
Leave unchecked

Any spacing will suffice

- Click on **OK** and the simulation will return. But you will now be able to individually select stones and move them or delete them.
- The following list shows the most common functions applied when editing rhinestone designs:
  - ◇ Use the **Zoom** functions (*Section 1.09*) to move in close for easier selection of individual or small groups of circles
  - ◇ Use the **Lasso Selection** tool  (*Section 3.02.2*) to more easily select a group of circles
  - ◇ To quickly add a circle, hold the **Alt** key and left click once on a circle. A duplicate is created in the same spot.
  - ◇ To delete multiple circles, hold the **Delete** key while clicking on individual circles
  - ◇ Use the **Nudge** arrow keys on the **Position & Size Panel** to move circles to new locations
  - ◇ Alternatively, use the arrow keys on your keyboard to move a circle or row of circles. If needed, change the increment to 0.01" (0.25 mm) by going to **Edit>Preferences** (or, on a Mac, press **Command + ,**). Then click on the **Edit** tab and change the **Arrow Key Increment**, as shown here:



- ◇ To realign a row or column of circles, use the alignment functions covered in *Section 3.18.2*.
- ◇ To respace a row or column of circles, use the spacing functions covered in *Section 3.19.2*.
- In the heart example, an additional heart is added at the top to balance the two sides. Also, the sixth row of circles are selected and **Distribute Center Horizontally** is applied:

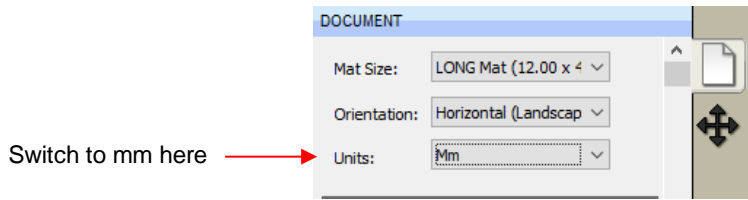


- Sometimes the circles you want to re-space equally may fall closer to a 45° angle versus vertically or horizontally. Select your entire design and rotate until the line of circles is closer to vertical or horizontal. Re-space the circles and then rotate back into place.
- After editing the design, you may wish to group the design to avoid inadvertently moving one or more stones out of place. To do that select the design and go to **Object>Group** or apply **Ctrl+G**.
- If you have a shape that has a **Rhinestone** effect applied and want to remove it (even after the file has been saved and re-opened), select the shape and go to **Object>Remove Effects**.

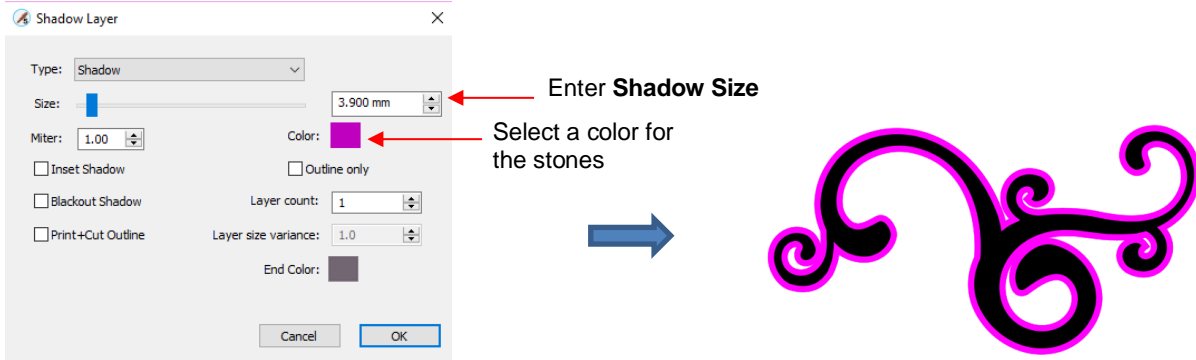
### 7.12.5 Adding an Outline to a Rhinestone Design

**Video**

- If you want to outline your design, then create the outline first using the **Shadow Layer** function (*Section 7.05*). Choose a **Shadow Size** at least the size of the circles plus the spacing. Otherwise, the stones will overlap. Since rhinestone design programs work in metric, it's easier if you temporarily change the units in SCAL to mm. This setting is on the **Document Panel**:

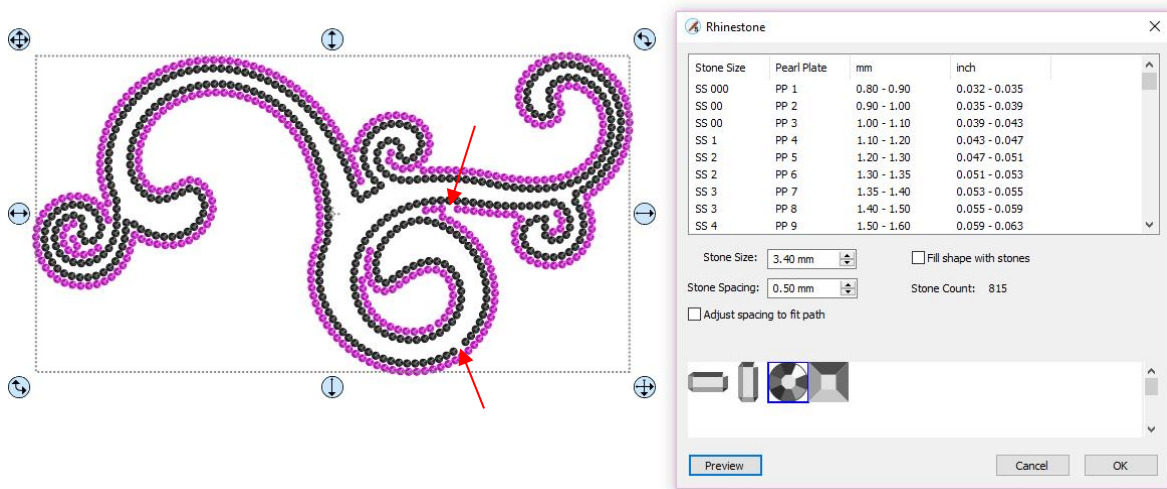


- For the following example, a swirl design from the **Library** is added to the **Cutting Mat** and sized for a T-shirt. The same settings for SS 10 stones will be used - the circles will be 3.4 mm in diameter and the spacing will be 0.5 mm. Thus, the **Shadow Size** needs to be 3.9 mm:

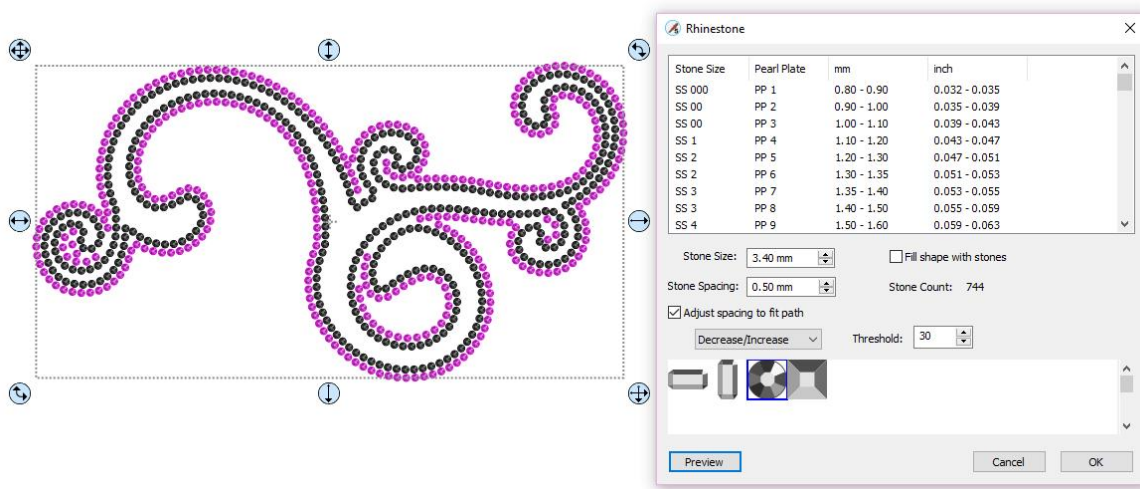


- Note: this was the **Shadow Size** to use if the same size stones are used for both the original design and the shadow layer. At the end of this section, the **Shadow Size** formula is shown for the situation when the stones are not identical in size.

- Next, select the design and the shadow and make a backup copy. Then go to the **Rhinestone** window. Since the same settings will be used for both the original design and the outline, both can have the rhinestone effect applied in the same step:



- The red arrows indicate that the spacing should be adjusted. In this case the **Adjust spacing to fit path** was again used to improve the design:



- However, additional editing is needed to improve the overall look. After removing some of the circles, the final design is ready to cut:



- If the stones are not the same size, the average should be used, plus the spacing:  
**Shadow Size** = (Size of circle for smaller stone + Size of circle for larger stone) / 2 + **Spacing**
- ◇ Thus, if the circle sizes were 3.4 mm and 4.6 mm, with a desired **Spacing** of 0.5 mm, then:

$$\begin{aligned}
 \text{Shadow Size} &= (3.4 + 4.6) / 2 + 0.5 \text{ mm} \\
 &= 8.0 / 2 + 0.5 \\
 &= 4.5 \text{ mm}
 \end{aligned}$$

- ◇ Note that this is the same calculation if the outline is using the smaller circles or the larger circles.

### 7.12.6 Using Purchased Rhinestone Fonts and Designs

**Video**

- One of the best investments you can make if you are planning to do a lot of rhinestone applications is to buy files instead of trying to make your own. While the disadvantage is that you will be somewhat limited in the sizing of the final design, the time-saving advantage can make it well worth the cost.
- This section will explain how to properly size a purchased font. The same technique would be used with a design. You can find beautiful rhinestone designs and fonts at the following two web sites:
  - ◇ [Synergy 17](#)
  - ◇ [The Rhinestone World](#)
- The first step with a rhinestone font is to install it the same way you would install any TTF font on your computer. Then open SCAL and the font should appear in your font menu.

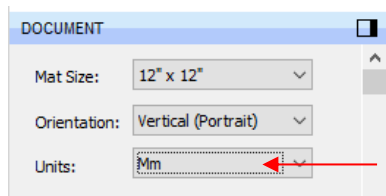
- Enter text using the same method with any font. This was presented in *Section 4.04.1*. In this tutorial, the phrase “Irish at Heart” will be typed out in a rhinestone font called *Dreamer*.

Irish at Heart

- If the circles seem too close together, set the **Stroke** to **None** on the **Fill & Stroke** panel:

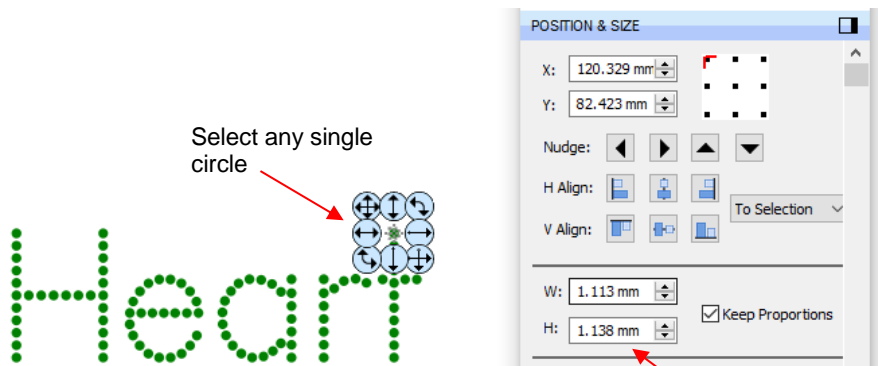
Irish at Heart

- Remember that it’s pointless to resize the design. The goal is to scale it so that the circles will be the correct size for the rhinestones you plan to use. Since rhinestone designing typically uses mm for measurement, change the **Units** to **mm**. Later you can switch back to inches, if needed, to know how large the final design will be at the size of rhinestones you’ll be using:



Select mm

- To find out what size these circles are, select the text and go to **Object>Break Apart**. Then select just one circle and check the size on the **Position & Size Panel**:



Note the size

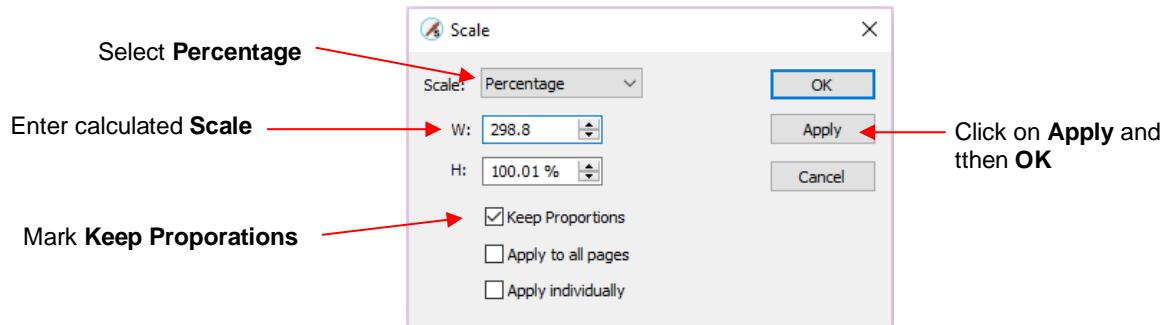
- The circle size in this case is 1.138 mm but let’s say the size needs to be 3.4 mm in order for the template holes to work with the SS10 rhinestones purchased. The **Scale** factor is always calculated as:

**Size Needed** divided by **Current Size** multiplied by **100**

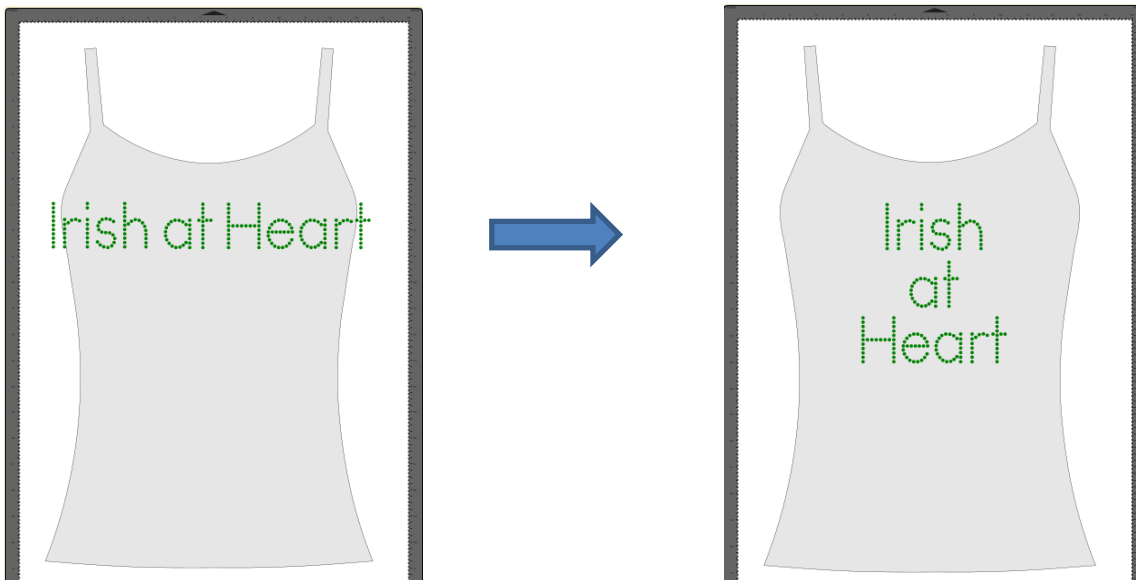
◇ Thus, in this case, the **Scale** = 3.4 divided by 1.138 times 100 = 298.8 %.

- To now scale the phrase to the correct size, select all of the wording and go to **Object>Transform>Scale**. In the window that opens, switch to **Percentage**, make sure the **Keep Proportion** option is marked, enter the **Scale** calculated and then click on **Apply**:





- The text is resized. You can then select a single circle and verify the new size is what you need (3.4 mm in this example) or within several hundredths of a mm.
- If you normally work in inches, switch back to inches to check the final size of your design to make sure it will fit onto your shirt or other medium. In this case, the phrase is now over 12" in width and will not fit onto the shirt in this arrangement. However the words can be arranged in a different manner and the design will work:

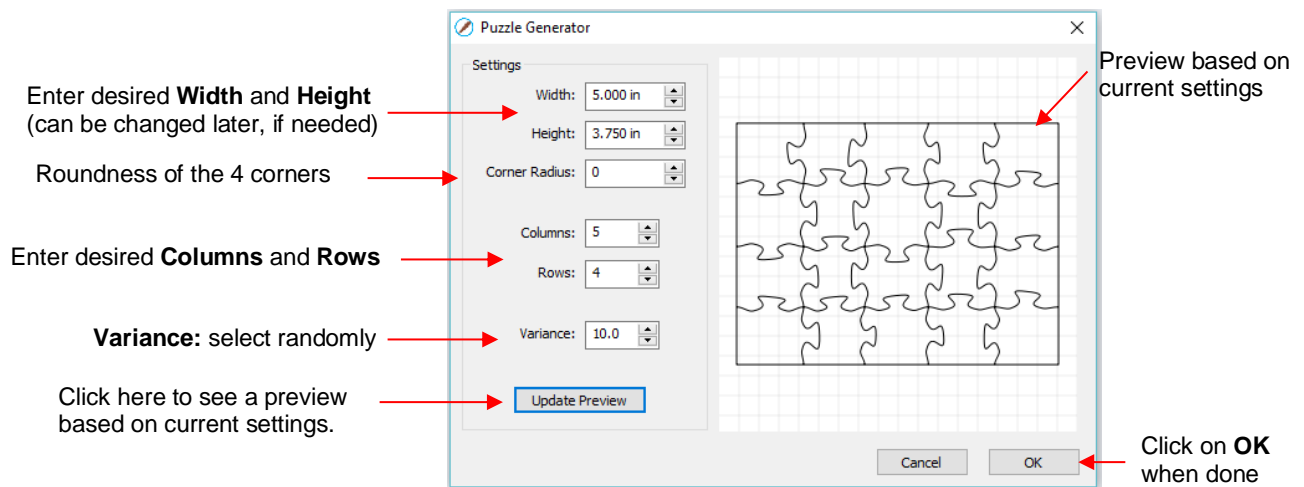


- The other alternative would have been to use size SS8 or size SS6 stones instead.
- Resizing patterns involves the same process. Insert the purchased file, **Break Apart**, determine the size of a circle and then calculated the needed **Scale** factor. Use the **Scale** window to resize the design and determine if it will work with the size of stones you plan to use.

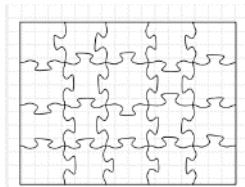
### 7.13 Jigsaw Puzzle

**Video**

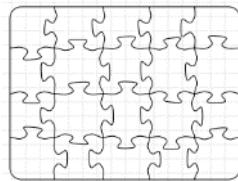
- The **Jigsaw Puzzle** feature will generate a rectangular jigsaw pattern with a number of options from which to choose. To open the window, go to **Effects>Puzzle Generator**:



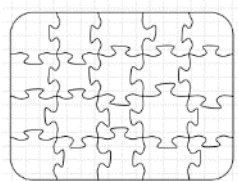
- **Width and Height:** If you plan to apply this puzzle over a specific image, you may want to choose dimensions that correspond to your image. For example, let's assume you have a photo that is 5" x 3.75" and plan to make a print and cut jigsaw puzzle. Enter those dimensions into the **Puzzle Generator**, as shown in the prior screenshot.
- **Corner Radius:** With a setting of 0, the corners of the rectangle are 90°. If you want rounded corners, increase this setting:



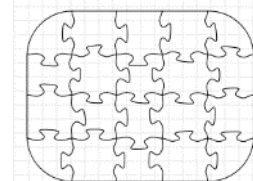
Corner Radius = 0



Corner Radius = 0.25

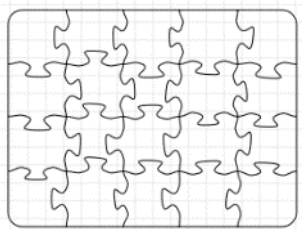


Corner Radius = 0.5

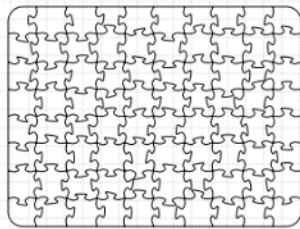


Corner Radius = 1.0

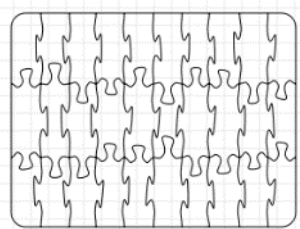
- **Columns and Rows:** To keep the shapes from becoming too distorted, make the number of **Columns** and **Rows** similar to the dimensions. If you want more pieces, then increase the number of **Columns** and **Rows** proportionately. For example, instead of having 5 **Columns** and 4 **Rows**, double the number to 10 **Columns** and 8 **Rows**. But don't use, for example, 10 **Columns** and 3 **Rows** with these dimensions:



5 Columns, 4 Rows

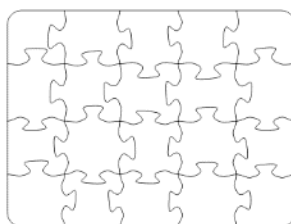


10 Columns, 8 Rows



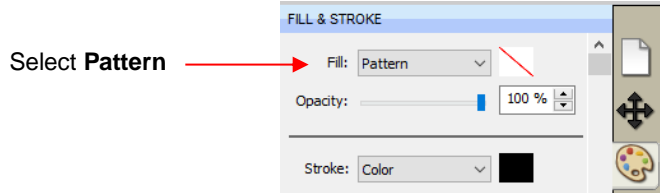
10 Columns, 3 Rows

- **Variance:** This setting can be used to make sure one puzzle is not identical to the next, if all other settings are the same.
- When you are satisfied with the appearance of your puzzle pieces, click on **OK** and the puzzle will be on the **Cutting Mat**:

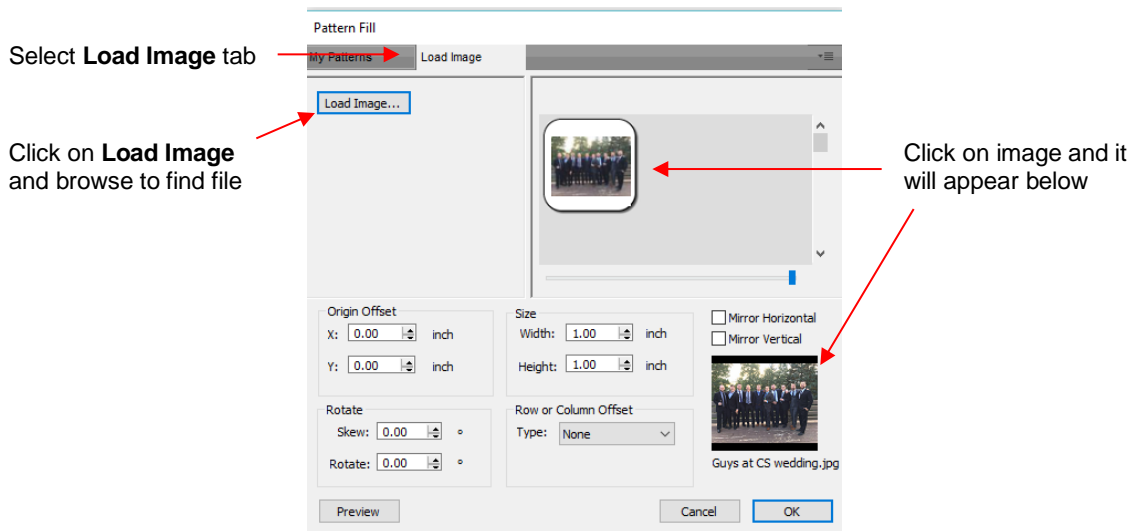


- For a print and cut application:

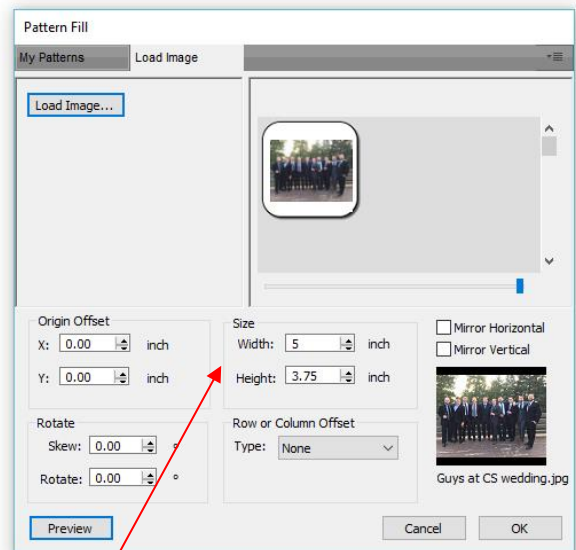
- ◇ Select the shape and, on the **Fill & Stroke Panel**, select **Pattern** from the **Fill** menu:



- ◇ The **Pattern Fill** window will open. Click on the **Load Image** tab and then click on the **Load Image** button to browse and find the image you want to use. It will then appear on the right side and can be selected:



- ◇ Enter the same **Size (Width and Height)** used when the jigsaw pattern was created and then click on **Preview**:



Enter same dimensions as were used in the **Generate Puzzle** window

- ◇ Click on **OK** and the jigsaw puzzle is ready for a print and cut application:



## 7.14 3D Rotate Video

- The **3D Rotate** function is used to rotate a shape along the X, Y, and/or Z axis. To access this function, select a shape and go to **Effects>3D Rotate**. In the following example, text will be used to show the effects of the settings:

RJM

3D Rotate X

Settings

X:  0

Y:  0

Z:  0

Perspective:  0

Auto Preview

Update Preview    Cancel    OK

Rotate along the 3 axes, as desired

Increase the **Perspective** for 3D effect

Click **OK** when done

Check this box to have the preview update with changes

Click here to manually update the preview

### ◇ X Axis Rotation:

RJM  
X: 60

RJM  
X: 73

—  
X: 90

RJM  
X: 120

### ◇ Y Axis Rotation:

RJM  
Y: 60

RJM  
Y: 73

|||  
Y: 85

RJM  
Y: 120

### ◇ Z Axis Rotation:

RJM  
Z: 30

RJM  
Z: 60

RJM  
Z: 90

RJM  
Z: 120

- ◇ **Perspective:** This is where the fun begins. Combining this setting with another rotation provides the 3D illusion. Here are examples:



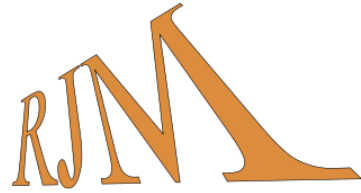
X: 0 Y: -50 Z: 0  
Perspective: 65



X: 0 Y: 50 Z: 0  
Perspective: 65



X: 50 Y: 0 Z: 0  
Perspective: 100



X: -26 Y: 26 Z: -20  
Perspective: 100

### 7.15 3D Extrude (SCAL PRO only) Video

- The **3D Extrude** is used to create the illusion of a shape being pushed or thrust outward. To access this function, select a shape and go to **Effects>3D Extrude**. In the following example, text will be used to show the effects of the settings:

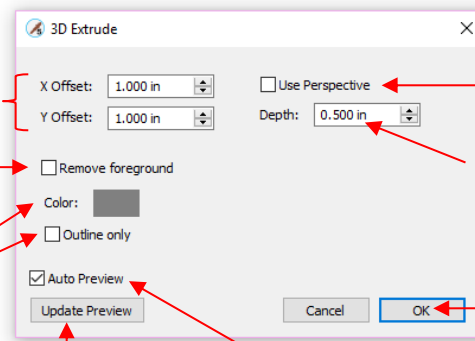


Change X and/or Y Offset

Option to remove overlap from extrusion

Change extrusion color

Option to make extrusion an outline only



Option to use **Perspective**

Enter the thickness of the **Perspective**

Click **OK** when done

Click here to manually update the preview

Check this box to have the preview update with changes

- ◇ **X Offset:** Increasing **X Offset** will extend the extrusion to the right while decreasing it will retract the extrusion towards the left. Note that **Y Offset** has been set to 0 and **Depth** is at the default of 0.5:



X Offset = 0.25  
Y Offset = 0



X Offset = 0.35  
Y Offset = 0



X Offset = -0.25  
Y Offset = 0



X Offset = -0.35  
Y Offset = 0

- ◇ **Y Offset:** Increasing **Y Offset** will extend the extrusion downwards while decreasing it will retract the extrusion towards the top. Note that **X Offset** has been set to 0 and **Depth** is at the default of 0.5:



X Offset = 0  
Y Offset = 0.25



X Offset = 0  
Y Offset = 0.35

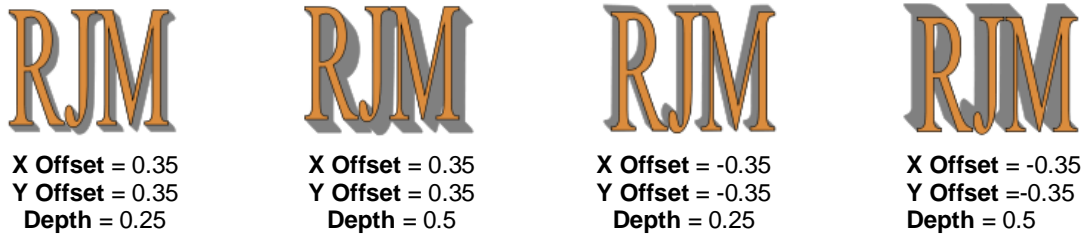


X Offset = 0  
Y Offset = -0.25

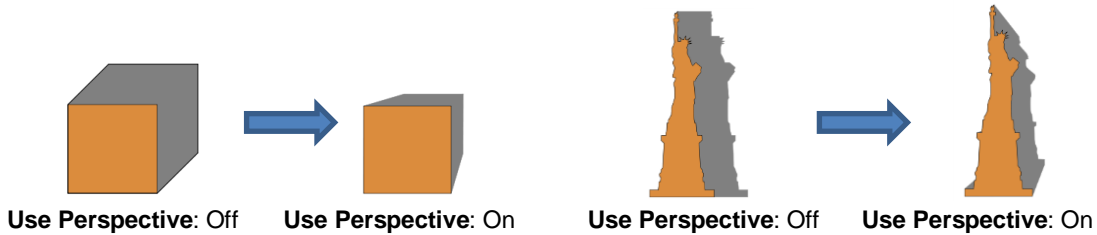


X Offset = 0  
Y Offset = 1.0

- ◇ **Depth:** Adds the actual 3D effect by increasing the extension of the extrusion:

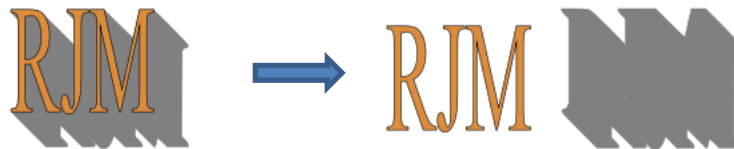


- ◇ **Use Perspective** provides a vanishing point effect:



- ◇ **Remove Foreground:**

- With this option off, when you separate the shape from the extrusion, you see that the extrusion is filled beneath the original. In other words, in a paper piecing or layered vinyl project, the original shape would need to be aligned over the top of the 3D extrusion:



- With **Remove Foreground** checked, the original shape will be cut away from the extrusion. This would be the typical choice when layering HTV where some types cannot be pressed on top of each other (such as glitter HTV):



- ◇ **Color:** Clicking on the colored box to the right of **Color** will allow you to select the color of your choice for the extrusion.



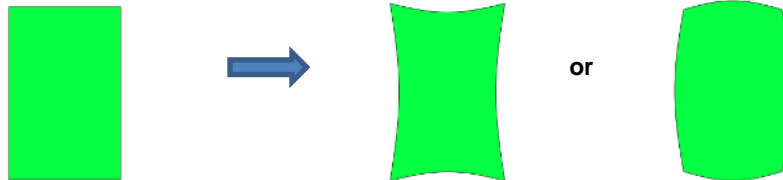
- ◇ **Outline Only:** If you prefer the extrusion not have a **Fill** color, select this option. The outline color will be that of the **Color** you selected in the **3D Extrude** window:



## 7.16 Barrel Distortion

Video

- The **Barrel Distortion** feature will warp a shape by narrowing or thickening the middle part of the shape:



- In the following example, text will again be used to show the effects of the settings. To open the **Barrel Distortion** window, select the text and go to **Effects>Barrel Distortion**:

Increase or decrease to apply the **Barrel Distortion**

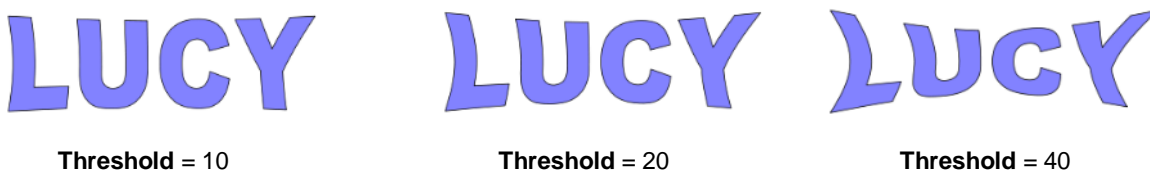
Check this box to have the preview update with changes

Click here to manually update the preview

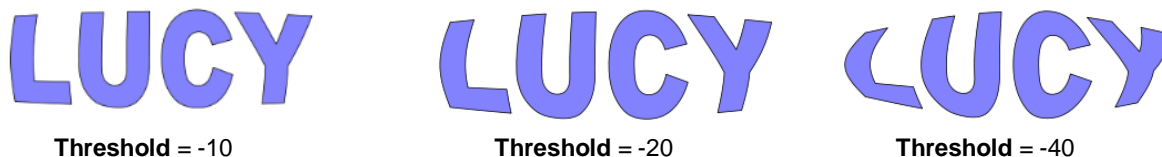
Click **OK** when done

**LUCY**

- As you increase the **Threshold**, you will see a narrowing of the shape in the middle:



- As you decrease the **Threshold**, you will see a thickening of the shape in the middle:



## 7.17 Bulge Video

- The **Bulge** feature allows you to apply various expanding or shrinking distortions to a shape. These distortions can be applied to the top side of the shape, the bottom side, or both. They can be applied to the left side, the right side, or both. And the distortions can be expanding on both sides, shrinking on both sides, or a combination.
- To open the **Bulge** window, select the shape and go to **Effects>Bulge**:

Choose from **Separately**, **Together**, or **Opposite**

Increase to round up, decrease to curve down

Add more customization to the effect of the bulge

Same settings as above, but applied to the **Left** and **Right** sides instead of **Top** and **Bottom**

Check this box to have the preview update with changes

Click here to manually update the preview

Bottom side settings

Right side settings

Click **OK** when done

- In the top portion of the window are settings for applying **Bulge** to the top or bottom of a shape. The **Top/Bottom** setting allows you to choose if you want to apply the settings in one of three ways:

◇ **Separately:** The **Offset** and **Curve** settings can be different for the top versus the bottom

Top/Bottom:	Separately	
Top Offset:	0.70 in	Bottom Offset: 1.20 in
Top Curve:	60	Bottom Curve: 0

LUCY

◇ **Together:** The **Offset** and **Curve** settings will be applied equally to both the top and the bottom. In this case the **Bottom Offset** and **Bottom Curve** settings will be grayed out.

Top/Bottom:	Together	
Top Offset:	0.70 in	Bottom Offset: -0.7 in
Top Curve:	60	Bottom Curve: 60

LUCY

◇ **Opposite:** The **Offset** and **Curve** settings will be applied opposite to one another on the top and the bottom. In this case, the **Bottom Offset** and **Bottom Curve** settings will again be grayed out.

Top/Bottom:	Opposite	
Top Offset:	0.70 in	Bottom Offset: 0.7 in
Top Curve:	60	Bottom Curve: 60

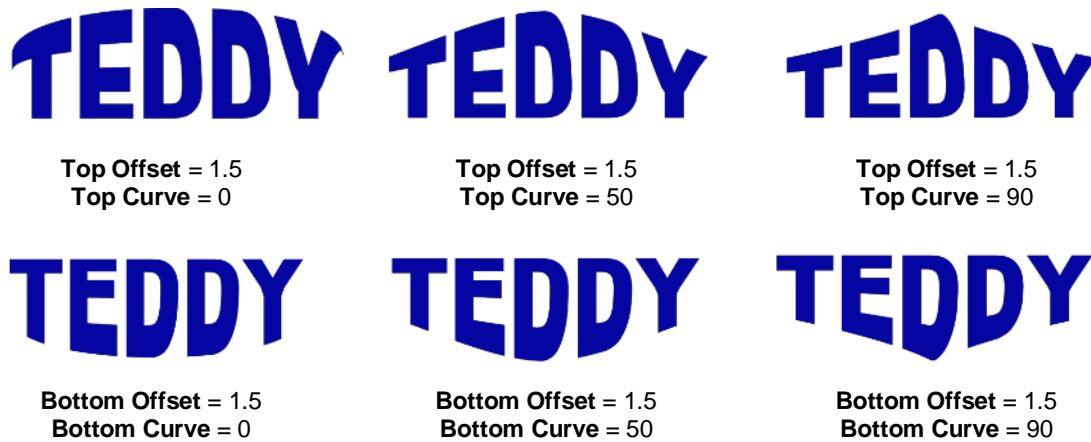
LUCY

- The **Top Offset** rounds the top side of the shape up or down depending on whether a positive or negative value is applied. The **Bottom Offset** does the same, but applies it to the bottom side of the shape:





- The **Top Curve** setting will alter the roundness of the **Top Offset** to add even more customization to the **Bulge** effect. Likewise, the **Bottom Curve** setting does the same to the **Bottom Offset**:



- The **Left/Right** settings all work in the same manner, except they affect the shape horizontally versus vertically. Here are some examples similar to the prior **Top/Bottom** ones:

- ◇ **Left/Right**: choose from **Separately**, **Together**, or **Opposite**:



- ◇ Effect of **Left Offset** and **Right Offset**:



- ◇ Effect of **Left Curve** and **Right Curve**:

LEO

Left Offset = 1.0  
Left Curve = 50

LEO

Left Offset = 1.0  
Left Curve = 90

LEO

Right Offset = 1.0  
Right Curve = 75

◇ Or just have some fun with it:

FINN FINN FINN FINN

### 7.18 Canned

Video

- The **Canned** effect will curve lettering as if it were wrapped around a cylinder (can) and viewed at an angle:



- To open the **Canned** window, select the shape and go to **Effects>Canned**:

- Decreasing the **Angle** setting (i.e. making the setting more negative) will increase the perspective and cause a greater roundness to the lettering.



- Increasing the **Angle** has the opposite effect. At an **Angle** of 0, the lettering is horizontal. A positive **Angle** setting results in curving the lettering in the other direction:



Angle = 0

Angle = 45

Angle = 90

- The **Diameter** of the cylinder can be increased or decreased, as well. A larger **Diameter**, applied at the same **Angle**, will lessen the roundness, while a smaller **Diameter** will increase it.



Angle = -30  
Diameter = 3.0



Angle = -30  
Diameter = 7.5



Angle = -30  
Diameter = 3.5

### 7.19 Wave

[Video](#)

- The **Wave** function will transform any shape into a wave:



- To open the **Wave** window, select a shape and go to **Effects>Wave**:

Changes the number of peaks → Cycles: 0.1

Changes the height of the peaks → Amplitude: 0.2

Auto Preview

Update Preview    Cancel    OK

Check this box to have the preview update with changes

Click here to manually update the preview

Click **OK** when done

- Increasing **Cycles** adds more peaks along the shape:



Cycles = 0.5

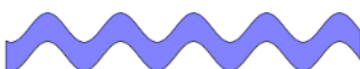


Cycles = 1.0



Cycles = 2.0

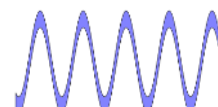
- Increasing **Amplitude** make the peaks higher:



Cycles = 1.0  
Amplitude = 0.2



Cycles = 1.0  
Amplitude = 0.5



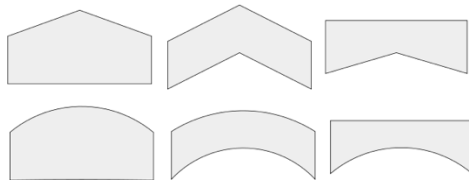
Cycles = 1.0  
Amplitude = 1.0

- The **Wave** function can be used on text to achieve this effect:

Twinkle Twinkle Little Star  
 ↓  
 Twinkle Twinkle Little Star

**7.20 Bridge Warp** Video

- The **Bridge Warp** function will transform shapes into the following styles:



- For this example the following text will be used:

**TEXAS A&M**

- To open the **Bridge Warp** window, select the shape and go to **Effects>Bridge Warp**:

Check this box if you want straight effects versus curved

Option to have both top and bottom change the same

Adjust the amount of warp

Resize the image

Click **OK** when done

Click here to manually update the preview

Check this box to have the preview update with changes

- Increasing **Top Offset** warps the top of the shape:



- With these same settings, note the difference if the **Straight Warp** setting is marked:



Top Offset = 0.3 in

Top Offset = 0.6 in

Top Offset = 1.0 in

- In a similar way, when **Bottom Offset** is increased the bottom is warped:



Bottom Offset = 0.3 in

Bottom Offset = 0.6 in

Bottom Offset = 1.0 in

- If the **Sync Offset** option is checked, then both the top and the bottom will be warped together:



Top Offset = 0.3 in

Top Offset = 0.6 in

Top Offset = 1.0 in

- With both the **Straight Warp** and **Sync Offset** options marked, then these are results with the same settings:



Top Offset = 0.3 in

Top Offset = 0.6 in

Top Offset = 1.0 in

- Finally, there is a **Scaling** setting which can be used to rescale and, essentially, exaggerate the effect of the warp. Notice the difference between using Bridge Warp to rescale the width versus simply resizing to the same width normally:



Top Offset = 1.0

Top Offset = 1.0 in  
Width only is resized on the **Size & Position** Panel

Top Offset = 1.0 in  
**Scale Width** is increased while still in the **Bridge Warp** window

- ◇ The two examples on the right have the same overall width and height, but the lettering from scaling in the **Bridge Warp** window is compressed more towards the two ends

## 7.21 Drop Shadow [Video](#)

- The **Drop Shadow** function is yet another way to produce a 3-dimensional shadow effect:

# INDIANA



- For this example the following shape from the **Library** will be used:



- To open the **Drop Shadow** window, select the shape and go to **Effects>Drop Shadow**:

**Drop Shadow** offset and insets

Change the color of the shadow

Option to have overlap removed from the shadow

Check this box to have the preview update with changes

Click here to manually update the preview

Click **OK** when done

- Increasing **X Offset** moves the shadow to the right, while decreasing it moves the shadow to the left:



X Offset = 0  
Y Offset = 0.3



X Offset = 0.5  
Y Offset = 0.3



X Offset = -0.5  
Y Offset = 0.3

- Increasing **Y Offset** moves the shadow down, while decreasing it moves the shadow up:



X Offset = 0.3  
Y Offset = 0



X Offset = 0.3  
Y Offset = 0.3



X Offset = 0.3  
Y Offset = -0.3

- The **Inset** option can be used to create a gap between the original and the shadow, similar to the **Knock Out** function in SCAL:



X Offset = 0.5  
Y Offset = 0.2  
Inset = 0



X Offset = 0.5  
Y Offset = 0.2  
Inset = 0.1



X Offset = 0.5  
Y Offset = 0.2  
Inset = 0.2

- The color of the shadow can be changed by clicking on the color box next to **Color** and then selecting any available color or entering actual color values. The following three samples are just a few of the thousands of possibilities:



X Offset = 0.3  
Y Offset = -0.1  
Inset = 0.1



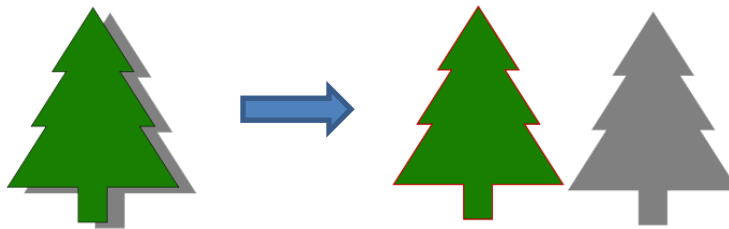
X Offset = -0.4  
Y Offset = -0.2  
Inset = 0.1



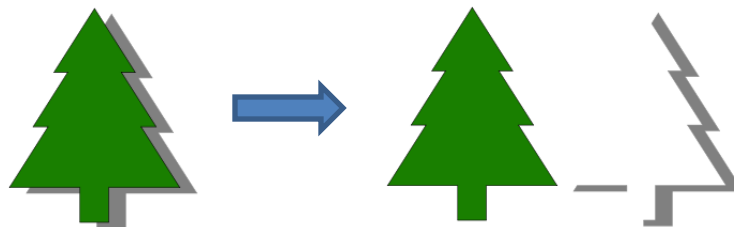
X Offset = 0.6  
Y Offset = 0.2  
Inset = 0.05

- The **Remove foreground** option is the same as that used in the **3D Extrude** function. It removes the overlap so that one piece is not covering the other. This option is obviously not needed when the **Inset** value is greater than 0.

◇ **Remove foreground** not marked:



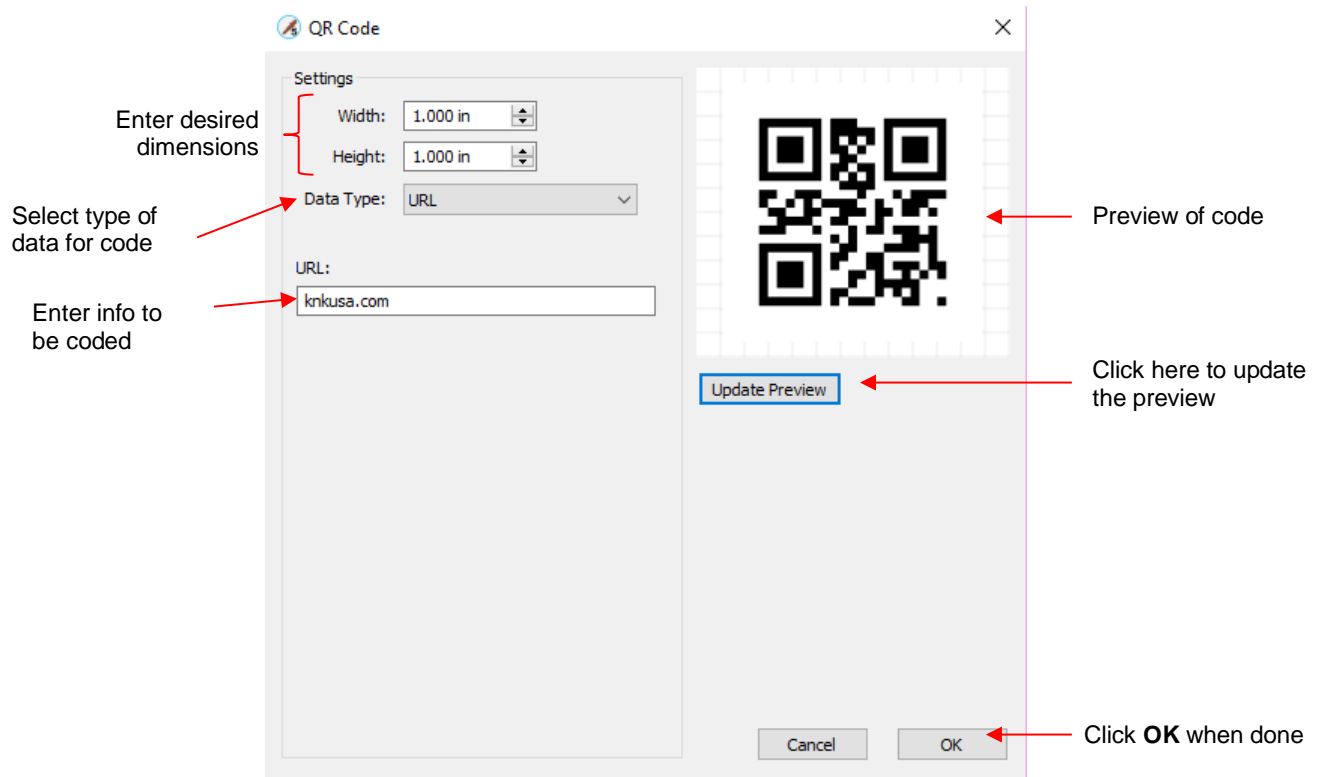
◇ **Remove foreground** marked:



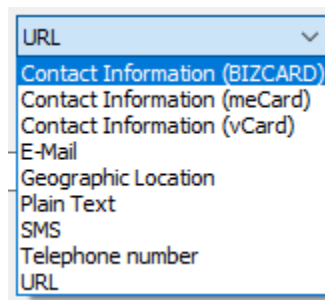
## 7.22 QR Code

Video

- A **Quick Response Code** is a machine-readable optical label that contains information about the item to which it is attached. They have become quite commonplace in product advertising. One can download free apps for smart phones and tablets to scan these codes with a camera to obtain that additional item of information about the product. For example, if a web site link is encoded, then the app will pop up that link and you can then click on it to be taken to the web site.
- SCAL offers the ability to create a QR code. Go to **Effects>QR Code** and the following window will open:



- Enter the dimensions for the code and select the **Data Type**, which includes the following options:

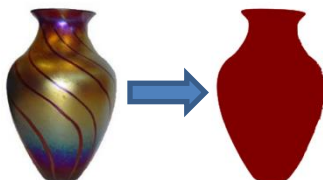


- Each **Data Type** has its own specific fields to complete. In some cases, like the URL option, there is only one field. In a case such as the **Contact Information** options, more data fields are provided.
- **IMPORTANT!** Once data is entered, you must click on **Update Preview** to generate the correct QR code. Note that if you have a QR code app on your phone you can launch it, hold the phone up to your monitor so that the camera can scan the code, and immediately verify that the information you entered correctly appears.
- After clicking on **OK**, the QR code appears on the **Cutting Mat**. It can now be used as needed, including being exported in any of the available file formats.

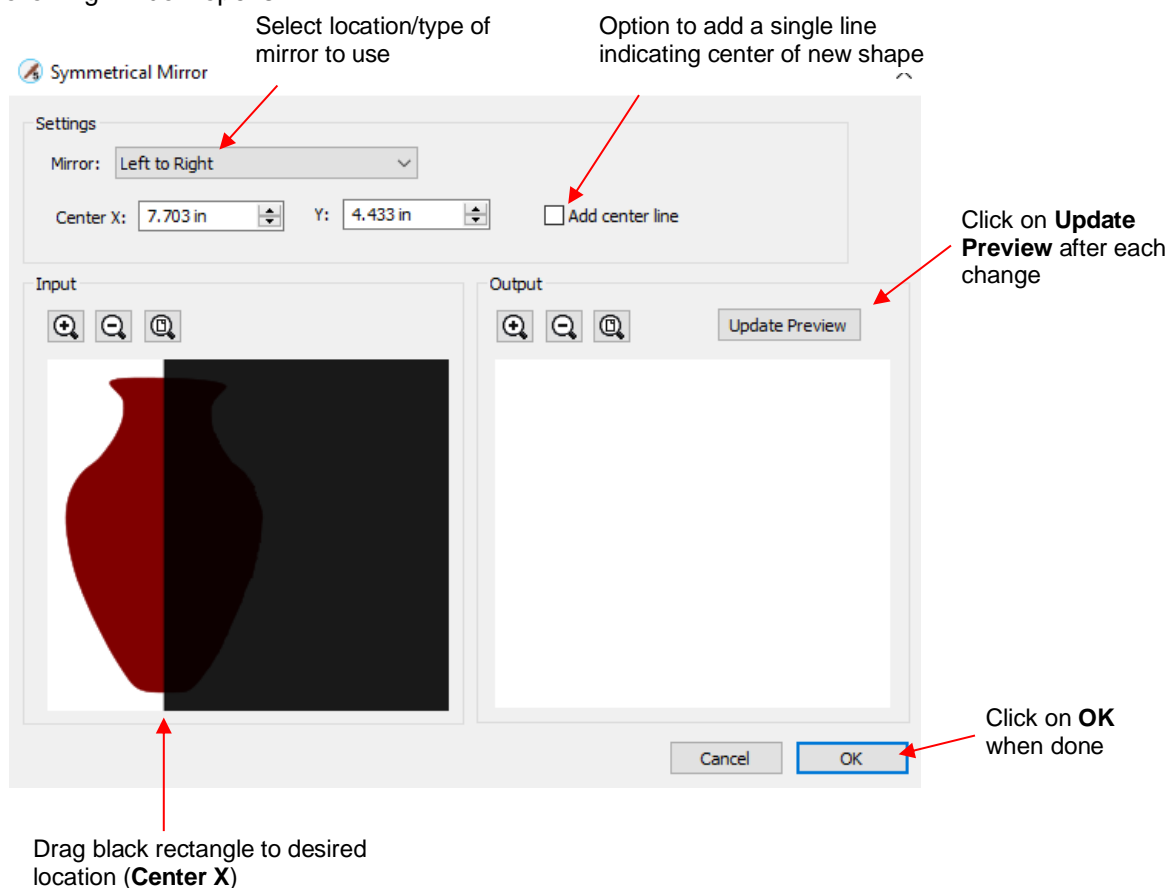


## 7.23 Symmetrical Mirror Video

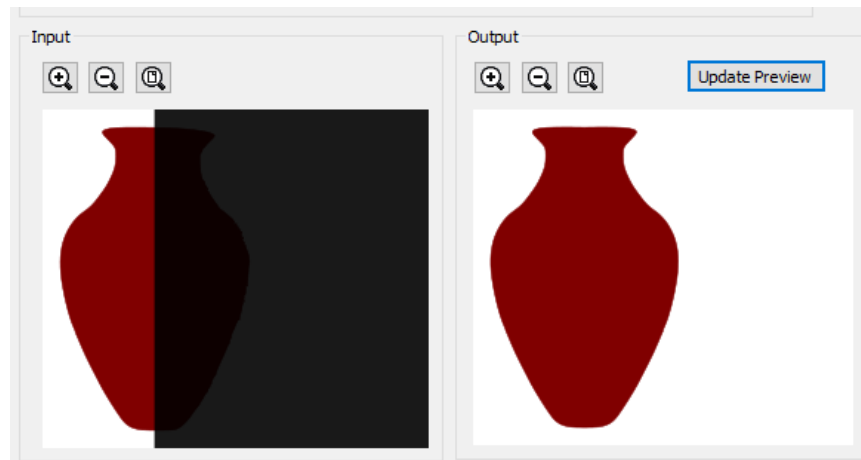
- The **Symmetrical Mirror** function creates a symmetrical copy of a selected shape and welds that copy onto the original.
- For example, when tracing symmetrical images, the resulting trace may not appear perfectly symmetrical when can then appear unbalanced and unappealing. For example, here is a trace of a vase from a photo:



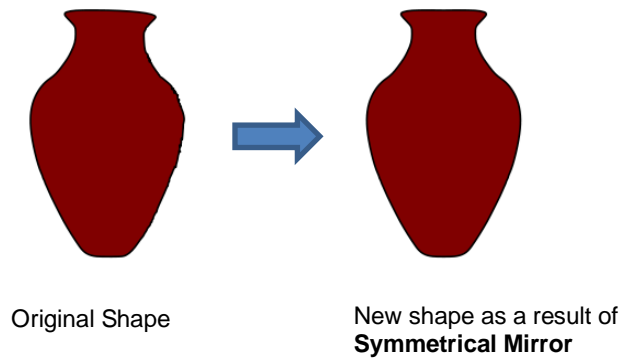
- ◇ Notice how the left side traced nicely but the right side isn't smooth and, overall, the vase doesn't appear symmetrical.
- To use **Symmetrical Mirror** to correct this image, select the traced shape and go to **Effects>Symmetrical Mirror**. The following window opens:



- ◇ **Mirror:** the default is **Left to Right** which is the correct option for this example since the right side is the half that needs to be replaced. Other options include **Right to Left**, **Top to Bottom**, and **Bottom to Top**.
- ◇ **Center X and Y:** You can manually enter the location for the mirror to be positioned. The default is the center of the currently-selected shape, but that can be changed to any location along the shape. Note that you can also drag the edge of the black rectangle to move the mirror, as well.
- ◇ **Update Preview:** Click on this button right away so that you can see how the current settings will change the shape:



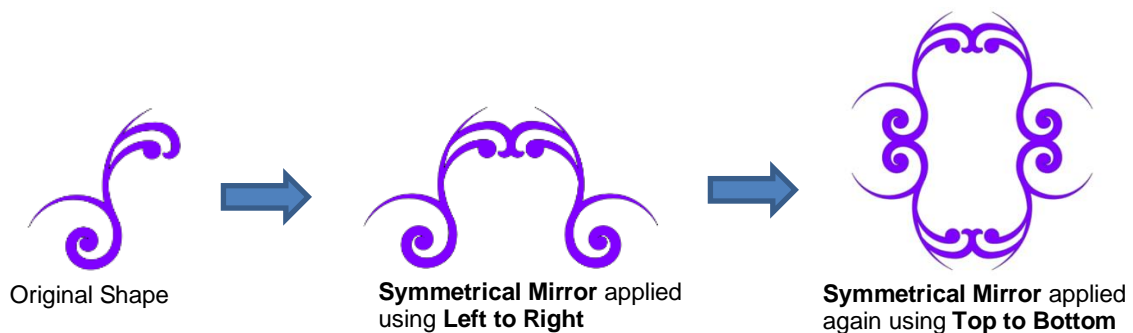
- ◇ **Zoom** tools can be used on either or both of the **Input** and **Output** views to more accurately position the mirror and to verify the resulting shape is what you need it to be.
- ◇ **Add Center Line:** This will add a single line at the location of the mirror. This line might be needed as either a cut line or a fold line, depending the application for the design.
- When you are satisfied with the image in the **Preview** window, click on **OK** and the new shape will replace the prior one on the **Cutting Mat**:



- **Symmetrical Mirror** can also be used in designing. The following shape was created by welding several flourishes together from the *Swirl* folder in the **Library**:



- ◇ **Symmetrical Mirror** can be used to expand this one element into more designs:

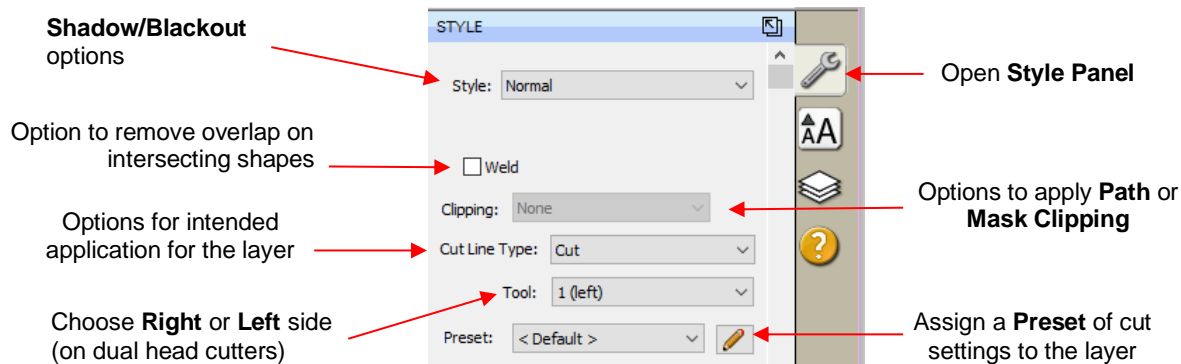


## 8. SCAL: Output

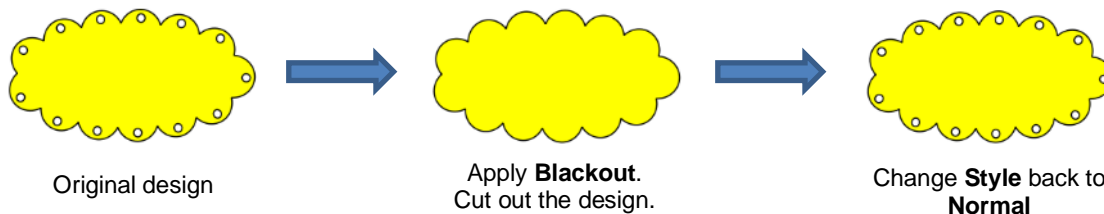
### 8.01 The Style Panel

Video


- The **Style Panel** has various settings that are typically, but not necessarily, applied for the purpose of cutting and printing:
  - ◇ Set a contour cut (**Shadow**)
  - ◇ Remove any interior shapes (**Blackout**)
  - ◇ Apply a weld (**Union**) on any overlapping shapes (only applied during printing and/or cutting)
  - ◇ Assign an intended use for the layer (**called Cut Line Type**)
  - ◇ Assign a layer to a particular tool (for cutters with more than one head)
  - ◇ Assign **Presets** to a layer (for **Cut by Layer** applications in SCAL5 Pro)
- To open this panel, click on the **Style** icon on the **Properties Panel**:

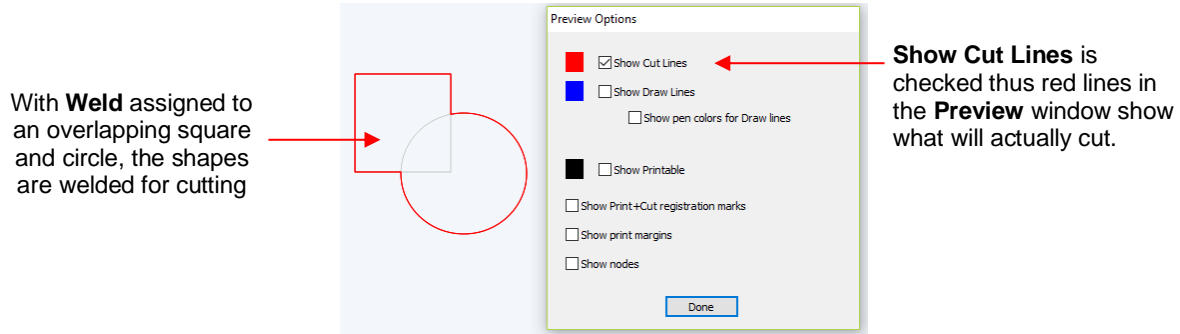


- **Style:** In this menu are various combinations of **Shadow** and **Blackout** applications. Refer to *Section 7.05* for instructions and examples. Note, however, that if you later change your mind and you haven't applied any subsequent changes (such as those in the **Path** menu), then re-selecting **Normal** from the **Style** drop-down menu will restore the original style.
  - ◇ For example, let's say you've applied **Blackout** to a shape and then cut it out. You can now select that same shape and return the style to **Normal**:




- **Weld:** This option applies the **Union** function (refer to *Section 7.06.1*) to any overlapping shapes.
  - ◇ Note that if the shapes are on different layers, the **Weld** option needs to be marked on each layer.

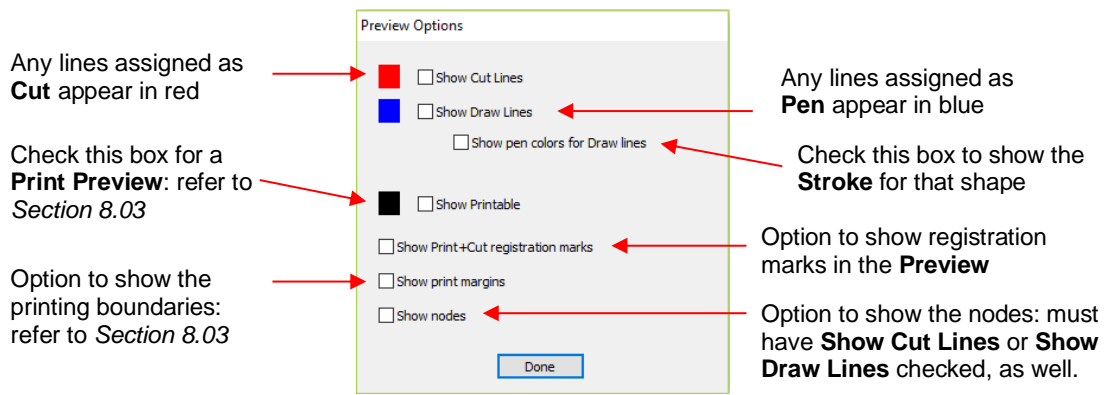
- ◇ As mentioned before, settings in the **Style** window do not become permanent changes to the shapes on the **Cutting Mat**. However, you can verify the **Weld** effect by clicking on the **Preview** icon  on the **Toolbar** (for more details on **Preview**, refer to *Section 8.02*):



- **Clipping:** options are available for either **Clip Path** or **Clip Mask**. Refer to *Section 7.07*. The clipping is only applied during the cutting process.
- **Cut Line Type:** There are five options in this menu:
  - ◇ **Cut:** choose this option for regular cutting. Because this is the default, you don't normally need to select it.
  - ◇ **Pen:** choose this option when using a pen, embosser, engraver, glue pen, rotary tool or other device that doesn't require a blade offset
  - ◇ **Print+Cut Cut:** in print and cut applications, choose this option for the layer that will be cut. It will not be printed.
  - ◇ **Print+Cut Print:** in print and cut applications, choose this option for the layer that will be printed only. It will not appear in the cut window.
  - ◇ **Color layer alignment** (Pro version only): in applications such as vinyl where several layers will be cut from different colors and aligned, choose this option for the layer that has registration shapes that need to be cut from every color along with that color's shapes. These registration shapes can then be used to layer the colors perfectly. Refer to last part of *Section 8.06.3*.
- **Tool:** for cutters with more than one head, such as the KNK Force, choose if the layer should be executed by the left side or by the right side.
- **Preset** (Pro version only) allows you to assign saved cut settings, called **Presets**, to individual layers. Refer to *Section 8.06.2*.

## 8.02 Preview

- To see what your cutter will cut or what your printer will print, click on the **Preview** icon  on the **Toolbar**. The following window will open. Note that settings applied on the **Style Panel** are reflected in the **Preview** window:



- The following example shows what would be seen in the **Preview** window compared to how it appears on the **Cutting Mat**:

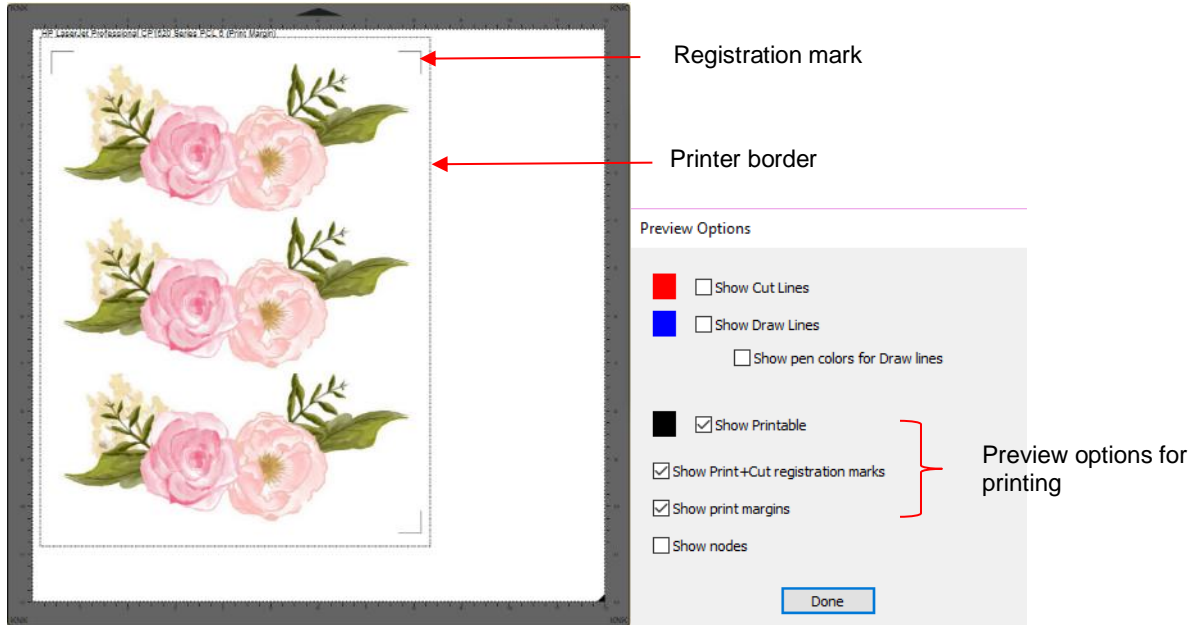
On the **Cutting Mat**:



◇ In the **Preview Options** window:



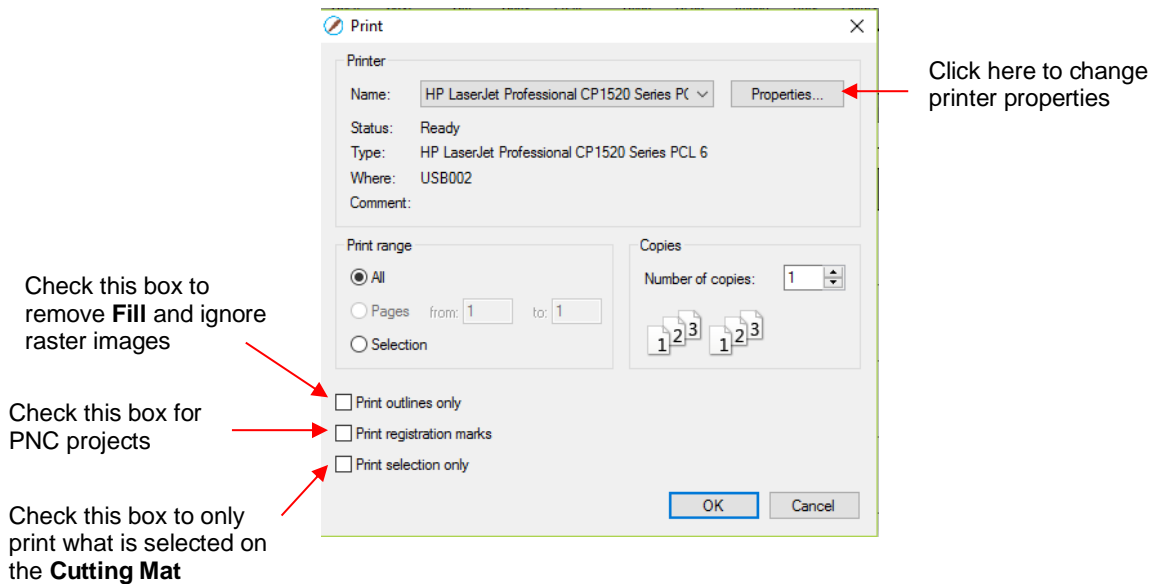
- For print and cut applications (PNC), you might wish to verify what will be printed, along with where it will be printed and where the registration marks will print:




- ◇ **NOTE:** If you mark the option for **Show Print + Cut registration marks** and they do not appear:
  - Verify that you have set up a cutter (refer to *Section 1.01.4*)
  - Verify that the layer(s) with cut lines are not hidden on the **Layers Panel**
  - In the **Cut Settings** window, verify that you have not marked the option for **Cut selection only**

### **8.03 Printing**

- To print from SCAL, go to **File>Print** or press **Ctrl+P**. The following window will open:



- ◇ To set up printer settings, click on the **Properties** button. (Note that you can also access your printer's properties by going to **File>Print Setup** and clicking on **Properties**.) The window which opens should be familiar to you and will not be covered in this user manual.


- ◇ **Print outlines only:** Only vector shapes will be printed. Imported raster images (.JPG, .PNG, .BMP, etc.) will not appear. If you've applied a **Fill** to shapes including colors, gradients, or patterns, then those will not appear either.
- ◇ **Print registration marks:** If your application is a print and cut, then you will want to check this option. Note that if you have not yet set up a cutter (refer to *Section 1.01.4*), then registration marks will not be sent to the printer.
- ◇ **Print selection only:** This is one way to control what is printed. You will need to select the shapes to be printed prior to entering the **Print** window. Alternatively, you can hide layers on the **Layers Panel** that you do not want printed.
- ◇ If your **Cutting Mat** is larger than the printout dimensions, then make sure the shapes are located in the upper left portion of the **Cutting Mat** or else any shapes outside of the printout boundary will be omitted or cut off. To verify, click on the **Preview** icon  on the **Toolbar** and select **Show Print Margins**.

- For example, let's say you have a PNC application and your shapes are arranged like this on a 12" x 12" **Cutting Mat**:




- ◇ When you click on the **Preview** icon and mark **Show print margins**, you can see that a portion of the cow will not be printed:


This border indicates the printer's current settings for size and orientation




This part of the cow will not be printed

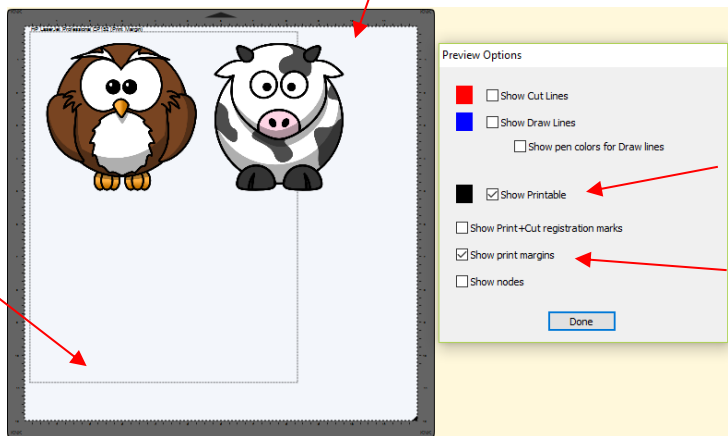


Check this box so that the original graphic appears



Check this box to see the boundaries of the printer





- ◇ You have two choices. You can either switch to **Landscape** printing under **File>Print Setup** or you can move the shape on the right to be below the left shape:



Option 1: Switch to **Landscape** under **File>Print Setup**



Option 2: Rearrange the shapes

### 8.04 Weeding (SCAL PRO only) Video

- Weeding is an important function for those who do vinyl applications. When removing the waste vinyl from around the cut shapes, it's very helpful to have extra cut lines. This way you don't end up trying to weed out large pieces at one time.
- To set up a weed, select the shapes and go to **Effects>Weeding**. The following window will open:

Selected design for weeding

Distance from shape boundary to outside weed rectangle

Instructions

Weeding options

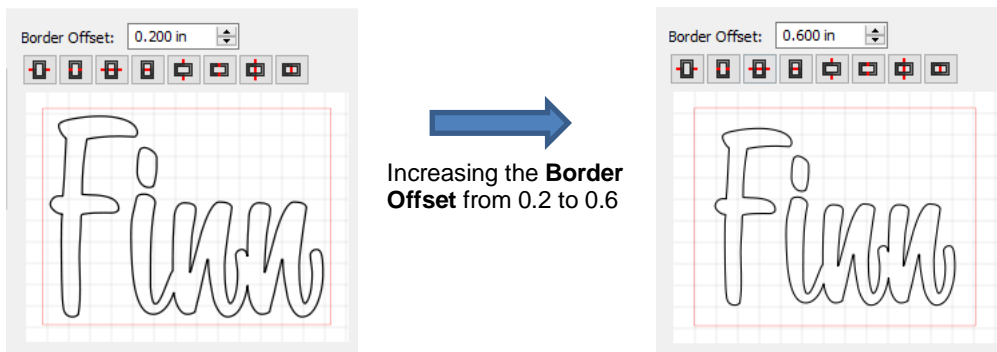
Preview

Click OK when done.

Deletes all internal weeding lines

- ◇ **IMPORTANT:** If you cannot see the design or it's very faint, close the **Weeding** window and, with the design selected, increase the **Stroke Width** on the **Fill & Stroke Panel**. Then, return to the **Weeding** window and the design should easily be visible. You can also then drag a corner of this window to make the design even larger and easier to view while adding the desired weeding lines.
- ◇ **Border Offset:** Increase or decrease to set the spacing between the shapes and the outside weeding rectangle. The red line represents that outer cut. For example:

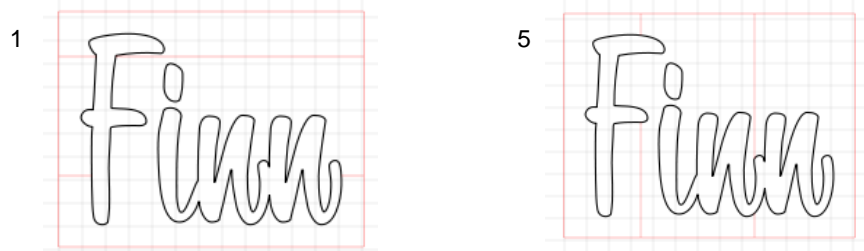




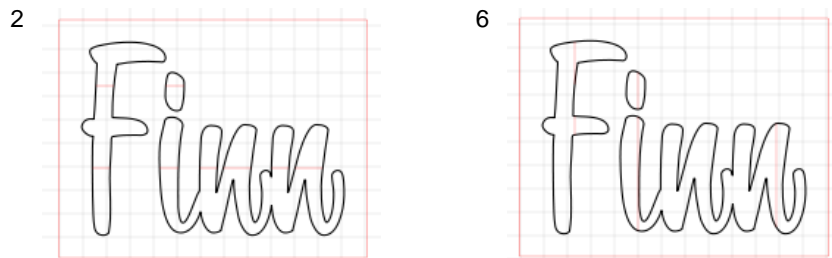
◇ **Border Options:** These icons can be used to add additional cut lines inside the outer weed border. Each icon in the following screenshot indicates where the lines will be added but a description and example are also shown. Note that once you select an option, you can click at the desired location on the preview image to add the cut line or lines:



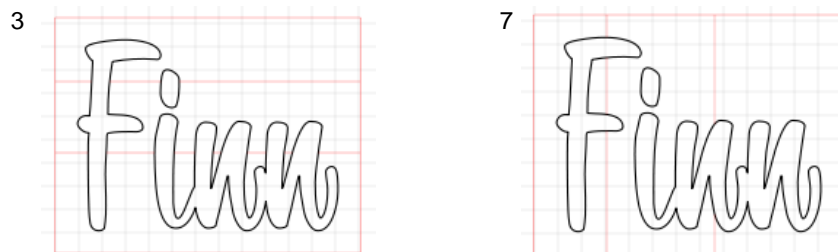
- 1 or 5: Add horizontal or vertical weed cuts between shapes and outer weed border



- 2 or 6: Add horizontal or vertical weed cuts inside the shapes (this is used for applications such as glass etching where the outside “waste vinyl” is actually kept and the shapes themselves are weeded out)

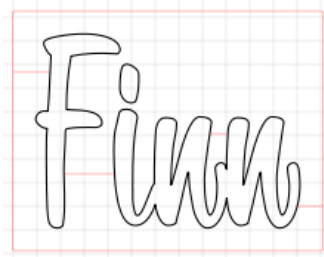


- 3 or 7: Add horizontal or vertical weed cuts in between shapes and outer weed border and also inside and between shapes



- 4 or 8: Add horizontal or vertical weed cuts anywhere you like

4

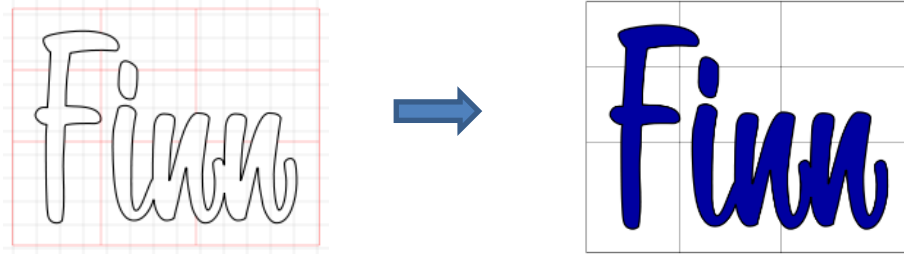


8

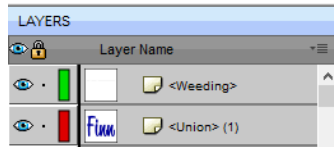


◇ **Reset:** At any point, you can click on **Reset** to remove any of the internal cut lines and begin again.

- Once you are satisfied with the weeding line, click on **OK**:



- On the **Layers Panel** you will observe a new layer called *Weeding*:



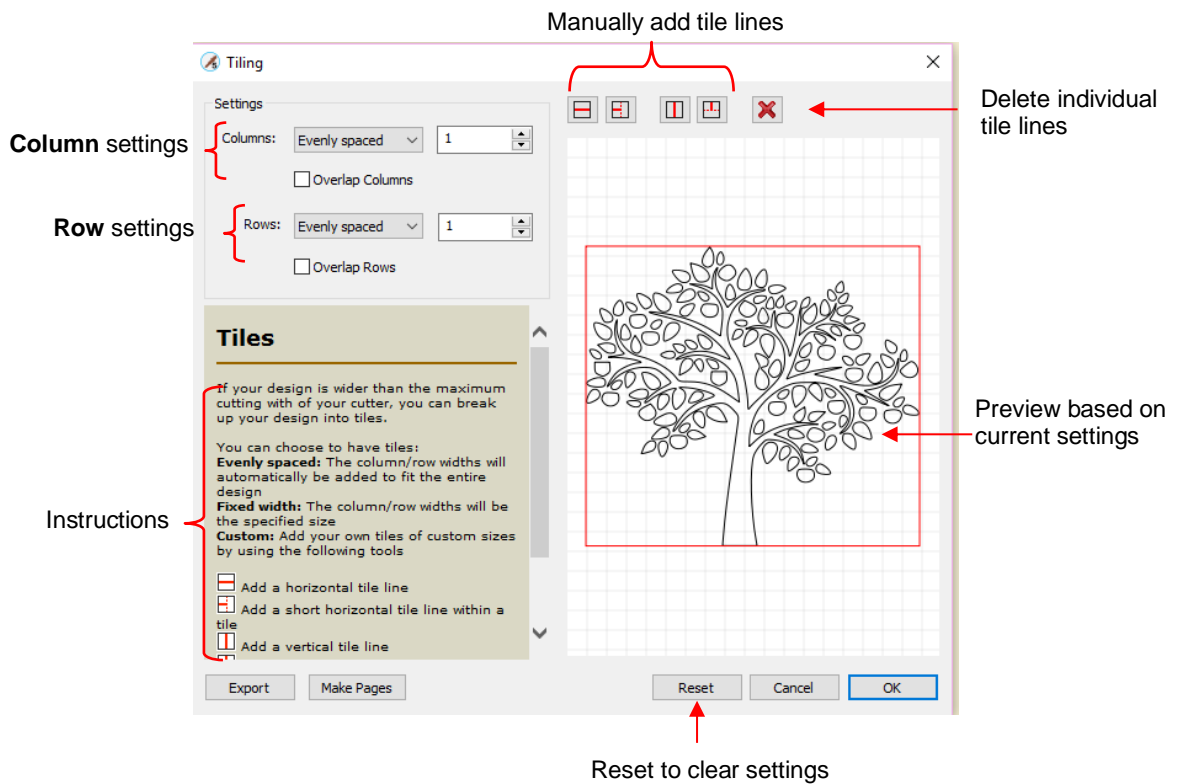
### 8.05 Tiling (SCAL PRO only)

[Video](#)

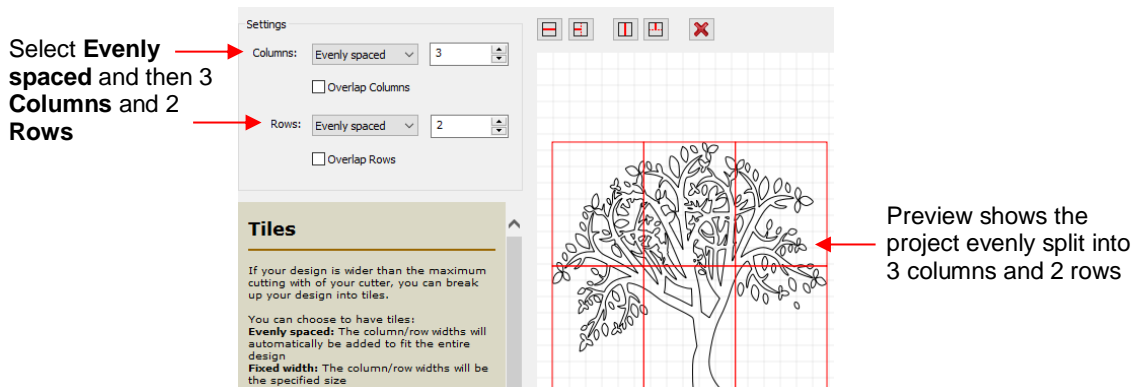
- The **Tiling** function is used to split large designs into rectangular sections for cutting.
  - ◇ In the following example, a design that is 40" wide and 36" tall cannot be cut on a cutter that only has a maximum 15" wide cutting range (such as the KNK Force or Zing Orbit):



- To open the **Tiling** window, select the shape and go to **Effects>Tiling**:

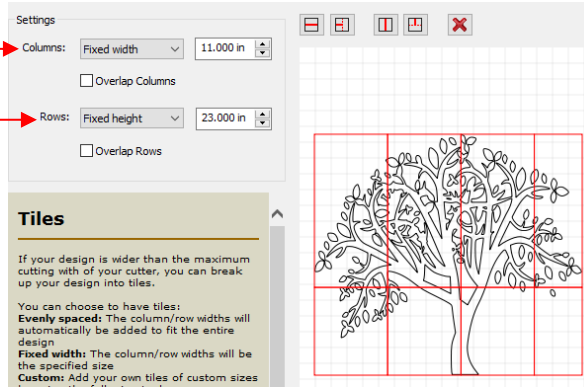


- ◇ **Columns and Rows:** Under both of these you have the following choices:
  - **Evenly spaced:** Enter a number and that many columns (or rows) are created, all the same width. For example, you could enter 3 columns and 2 rows:



- **Fixed width:** Enter a specific width for the columns. This is probably the most useful choice since you should know the dimensions of the material being used. For example, if you have 12" wide vinyl, then you will probably want the columns to be no wider than ~ 11" or, possibly, 11.5". Also, let's say your vinyl is in 24" long pieces:

Select **Fixed width**-  
11" wide **Columns**  
and 23" long **Rows**

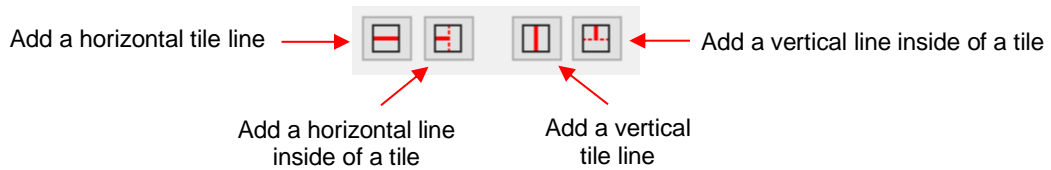


The design is 40" wide and 36" tall.

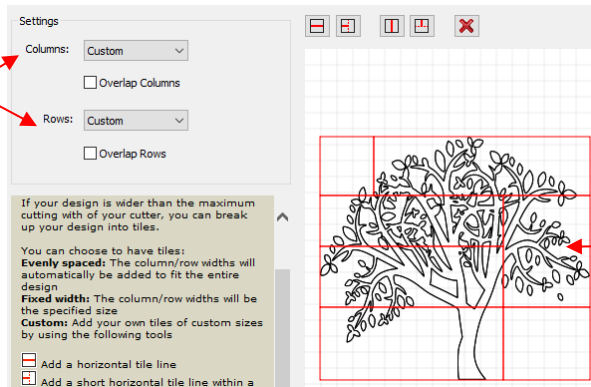
After creating three 11" wide columns, the remaining 7" in width is on the right side.

After creating one 23" row, the remaining 13" in height is at the bottom.


- **Custom:** Because the tiling line can sometimes fall into undesirable spots resulting in, for example, slivers or extremely tiny shapes, using **Custom** is another option. With it selected, you can then use the icons above the preview to add cut lines wherever you like:



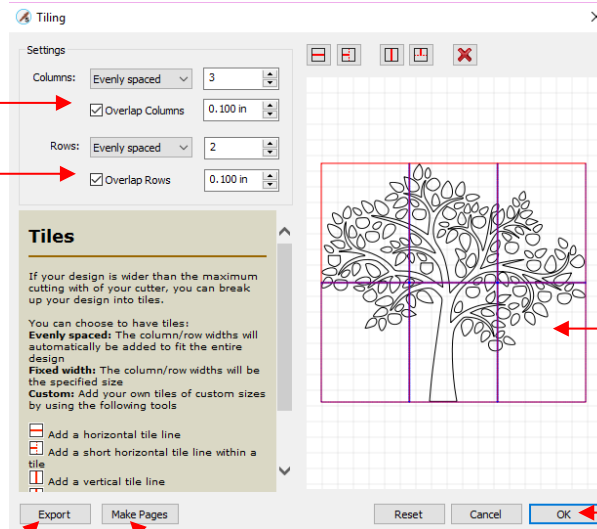
Select **Custom**



Custom lines are added.

- ◇ To delete any of the lines, click on the **Delete** icon  and then click on the line inside the **Preview** window.
- ◇ **Overlap Columns** and **Overlap Rows:** If you want an overlap created so that each tile slightly overlaps with an adjacent one, check the box and then enter the desired overlap:

Check **Overlap Columns** and/or **Overlap Rows** and enter the desired overlap size



Purple lines indicate an overlap is applied

Click **OK** when done or click on **Make Pages** or select **Export**

Export each tile as a separate SVG file


Click **Make Pages** to place each on its own page in the project

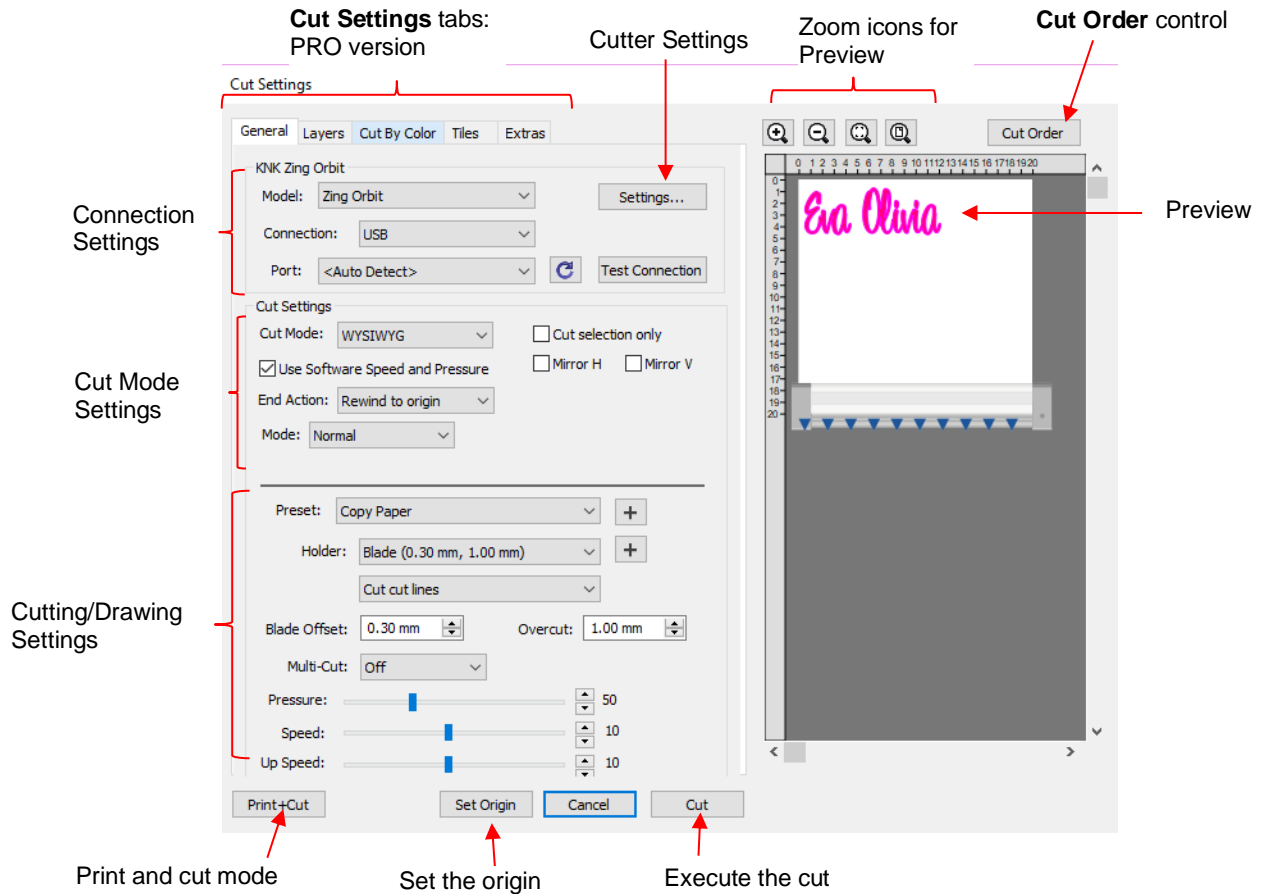
- Once you are satisfied with the settings, you have three options:
  - Click on **OK**. You won't observe any changes on the **Cutting Mat** or on the **Layers Panel**. However, the results of the **Tiling** process will appear once you enter the **Cut Settings** window and click on the **Tiles** tab. Refer to *Section 8.06.4*.
  - Click on **Make Pages** and each tile will be placed on its own page in the file. The first page will retain the original image with no tiling. Thus, it's not necessary to use the **Tiles** tab in the **Cut Settings** window.
  - Click on **Export** and the **SVG Export** window will open. After you name the file, select the export settings, and click on **OK**, wait while the export files (one for each tile) are saved as separate SVG files, numbered with the file name you chose. Once the **Tiling** window closes, you are back to the same situation as in option (1).

## **8.06 Cut Settings**

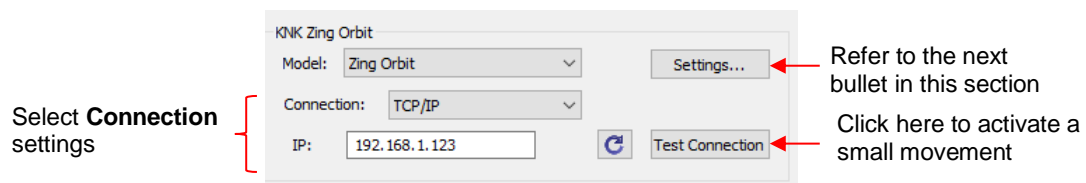
The **Cut Settings** vary from one cutter to the next based on the brand and model of the cutter and its built-in functionality. For this reason, the information presented may or may not apply to your cutter.

### **8.06.1 Cut Window Settings**

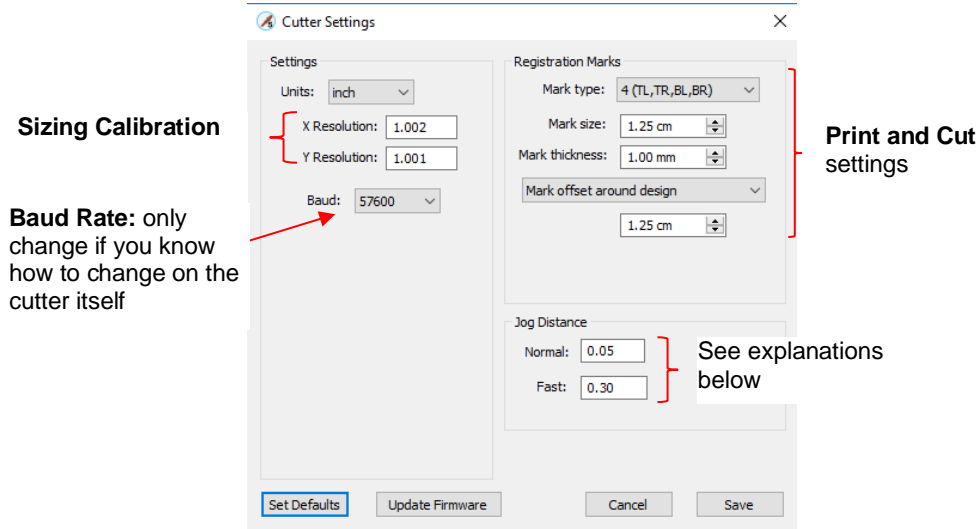
- When you are ready to execute a cut (or draw), the cut window can be opened using either of the following:
  - Click on the **Cutter** icon  on the **Toolbar**
  - Go to **Cutter>Cut With KNK Zing Orbit** (or select the model you have added to SCAL)
- The following window will open:



- ◇ **Cut Settings** tabs: The regular version of SCAL will only have the **General** tab. The PRO version has four additional tabs:
  - **Layers** (refer to *Section 8.06.7*)
  - **Cut by Color** (refer to *Section 8.06.3*),
  - **Tiles** (refer to *Section 8.06.4*)
  - **Extras** (refer to *Section 8.06.5*).
- ◇ **Zoom** icons apply to the **Preview** window. Use this **review** to confirm where shapes will cut relative to the cutter itself, which is also shown.
- ◇ The **Cut Order** button is located in the top right corner and opens the **Cut Order** window. Refer to *Section 8.06.6*.
- ◇ **Connection Settings**: Choose the model of cutter being used and the connection settings. For the Zing Orbit choose either **USB** or **TCP/IP** (Wi-Fi):

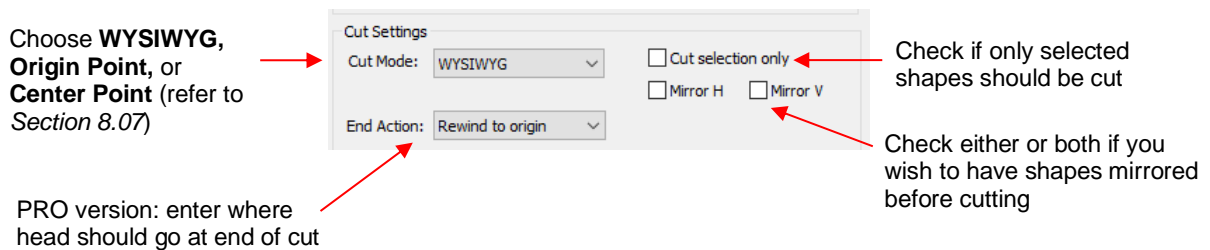


- ◇ **Cutter Settings**, which can also be accessed by going to **Cutter>Cutter Settings**, opens a new window with additional settings relevant to that model. For the KNK Zing Orbit:



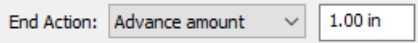
- **Sizing Calibration:** Most cutters are subject to cutting slightly different dimensions than what the shape is assigned in the software. For example, a 200 mm square might measure 199 mm x 201 mm.
  - **X Resolution** (also called **Belt Resolution**) = left to right error (width) as you face the cutter and **Y Resolution** (also called **Wheel Resolution**) = up and down (height) as you face the cutter.
  - In both cases, you calculate **Resolution** = What the measurement should be / what the measure actually is. Then enter those numbers into the **Cutter Settings** window and test again.
- **Baud Rate:** This is the speed at which data travels from the computer to the cutter. In general, this is not a setting you would ever change. Refer to your cutter's user manual if you ever feel it may be in error.
- **Registration Marks:** These settings are used in print and cut applications where, depending on the cutter brand/model, you might be able to adjust the number, size, thickness and distance of the registration marks from either the shapes you're cutting or set to a specific location on the printout.
- **Jog Distance:** The following settings apply when setting the origin:
  - **Normal:** the distance the head or mat moves with each arrow key increment
  - **Fast:** the distance the head or mat moves while holding **Shift** with each arrow key increment

◇ **Cut Mode Settings:** This section covers the following:

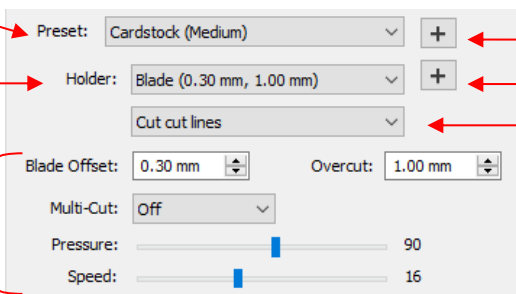


- **Cut Mode:** Refer to *Section 8.07* which covers controlling where shapes will cut.
- **End Action** (PRO version only): controls what happens at the conclusion of the cut. There are three choices:

- **Rewind to origin:** default setting in which the head returns to the origin set before the cut began
- **Advance Amount:** when this option is selected, the head moves to the end of the cut, over to the right side, and then advances the mat or rolled material forward based on a value you enter into a new window:

Select **Advance Amount** and a new input pops up →  ← Enter distance to advance

- **Do Nothing:** the head stops at the location where it finished cutting
- **Cut selection only:** If you only want the shapes you have selected on the cutting mat to cut, then mark this box.
- **Mirror H** and **Mirror V:** Use one or the other options to if you want the shapes mirrored for cutting. This is very handy when cutting HTV or embossing. In both cases, you will be flipping over the material once the cutting or embossing is complete.
- ◇ **Cutting/Drawing Settings:** As mentioned earlier, this section will vary from one brand/model of cutter to the next:



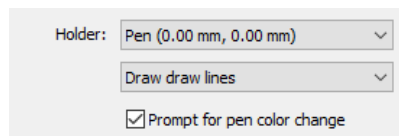
Select a **Preset** of cut settings → Add a new **Preset**

Select type of tool → Add a new tool

Change settings, as needed

Type of action

- **Preset** is a customizable menu where you can store settings for a particular material or application. Refer to *Section 8.06.2* for directions.
- **Holder** has choices for **Blade** or **Pen**. Like **Preset**, you can enter your own menu choices, such as other blades. Again, refer to *Section 8.06.2*.
  - If you select **Pen** under **Holder**, then **Draw draw lines** is typically selected. There is also a **Prompt for pen color change option**. Marking that option will cause the cutter to pause after each pen color is executed so that a different pen or tool can be mounted:



- ◇ **Blade Offset** is the horizontal distance from the center of the blade shaft to the tip of the blade. A pen or engraving tool has an offset of 0 because the tip is centered with the center of the pen/engraving tool shaft. But a blade is different:





- If you set the **Blade Offset** to 0 when cutting with a blade, corners will be rounded. On the other hand, if it is set too high, bubbles will be cut on sharp corners:



Offset is too low:  
corners are rounded



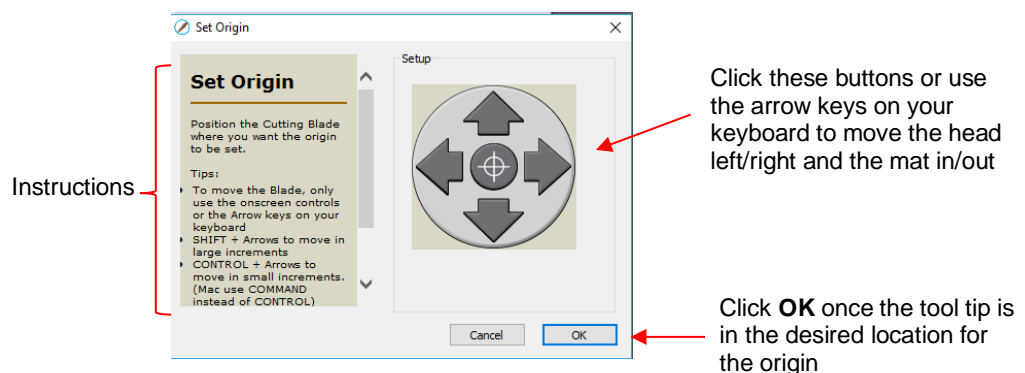
Offset is too high: bubbles  
appear at the corners

- Adjust **Blade Offset**, as needed, using 0.1 increments in order to get perfect corners.
- ◇ **Overcut** is related to **Blade Offset** in that it isn't needed when using a pen, embosser, engraver, and so forth, because the tips of those tools are aligned with the center of the tools themselves. However, leaving **Overcut** at 0 when using the blade holder will result in large shapes not quite closing:



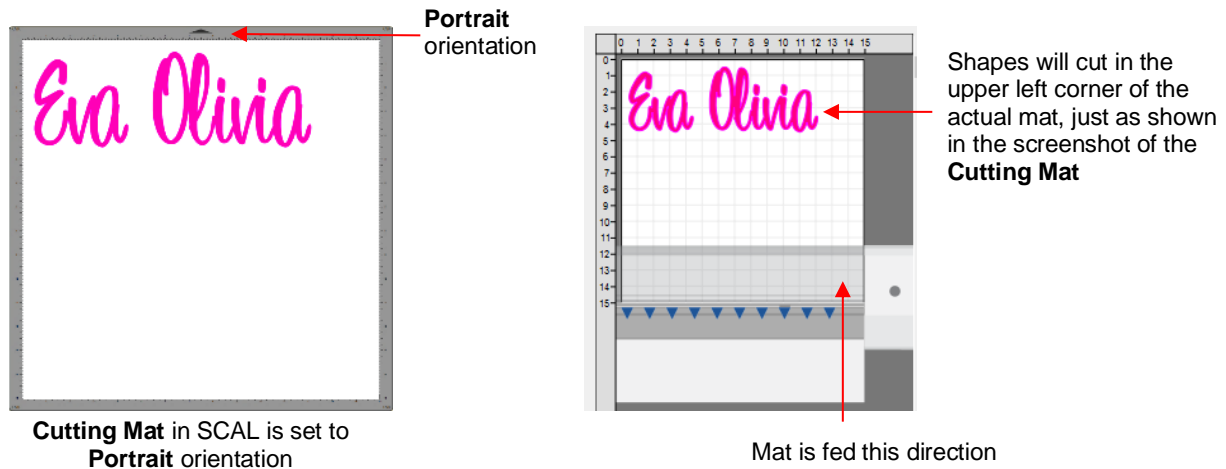
Overcut is too low:  
paths do not close

- In some cutting programs, **Overcut** is not a separate setting but rather automatically calculated and applied based on the **Blade Offset** entered. However, in SCAL, you can enter an actual **Overcut** setting and should do so any time a blade is used.
- In general, the blade type doesn't greatly affect the **Overcut** required. Try using 1.00 mm. In the event you cut a large closed shape, like an 8" circle, you may find that you'll need to increase **Overcut** to 2.00 mm.
- ◇ **Multi-cut** is used when cutting thicker or denser materials where more than one pass is recommended. Each shape is cut the number of passes selected before the blade moves to the next shape to cut.
- ◇ **Pressure** and **Speed** (or other settings for your brand of cutter) should be covered in the user manual provided with your cutter.
- ◇ **Print+Cut**: Clicking on this button opens the **Print and Cut** window. Because this function differs for each cutter, refer to for detailed instructions available for your cutter or read the on-screen instructions.
- ◇ **Set Origin**: Click on this button to set the origin for cutting on cutters that do not have the function on the control panel itself. The following window will open:

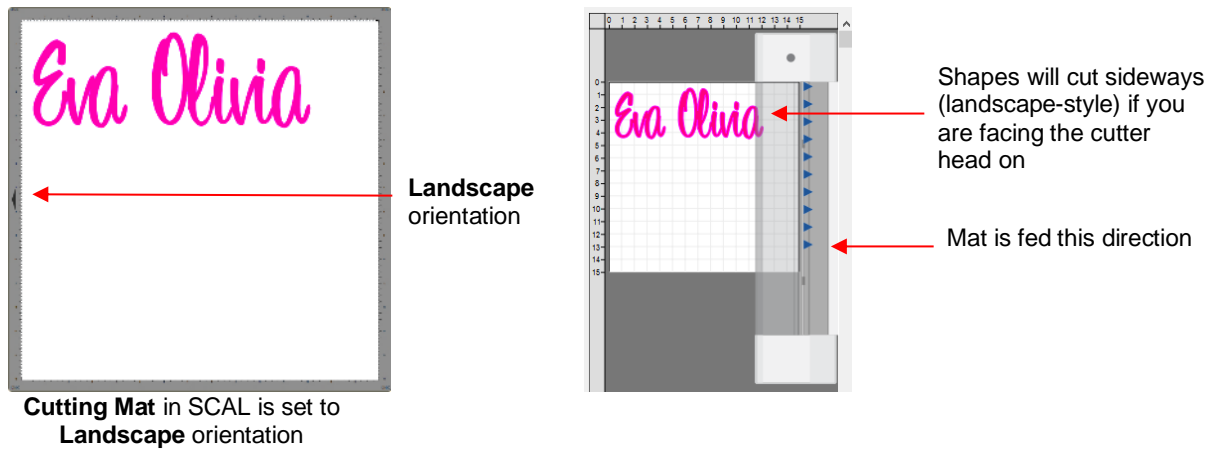


- ◇ **Preview**: The preview displays the shapes that will cut and their orientation plus location based on other settings.

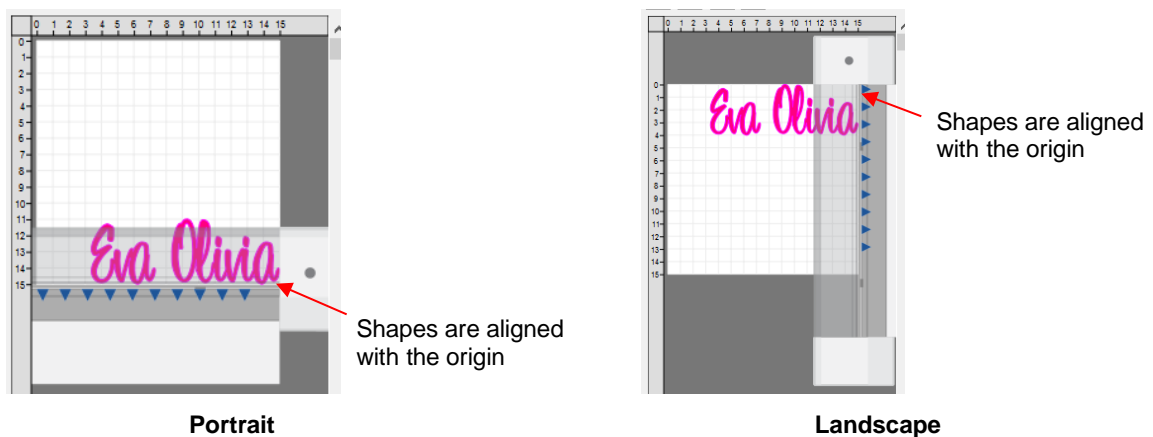
- For example, with a **Portrait** orientation and **WYSIWYG** cut mode, the **Preview** indicates the shapes will cut exactly in the same location and orientation as you see on the **Cutting Mat**:



- Using the same **WYSIWYG** cutting mode, but having the **Cutting Mat** orientation set as **Landscape**, the **Preview** changes indicating the shapes will be cut in a landscape position:



- In **Origin Point** mode, it doesn't matter where the shapes are located on the **Cutting Mat**, they will cut so as to align with the origin you set:



- Additional details on controlling where shapes are cut are presented in *Section 8.07*.

## 8.06.2 Presets

- **Presets** allow you to save your settings for a particular material or blade type. To do this, enter the settings you wish to save. Then click on the “+” to the right of **<Custom Preset>**:

Enter settings and click here:

Select which settings to include:

Enter a name

Click on **OK**

- After clicking on **OK**, the new preset will be found at the bottom of the list.
- In a similar manner, you can also add other **Holders** to your list, which would typically be blades with other **Blade Offset** values. For example:

Enter settings and click here:

Enter a name

Click on **OK**

- To delete either type of preset that you personally added, select it from the menu and then a “ – “ button will appear. Clicking on that button will then remove it from the list:

Click here to delete the *Blue Capped Blade* preset

## 8.06.3 Cut by Color (SCAL PRO only)

- The **Cut by Color** function offers two capabilities:
  - ◇ Turn on and off colors to be cut without the need to hide layers on the **Layers Panel** or pre-select shapes to cut. In fact, you don't even need to ungroup mixed-color groups.

◇ Cut all of the colors at once or have the cutter pause between colors, thus permitting the change out of materials

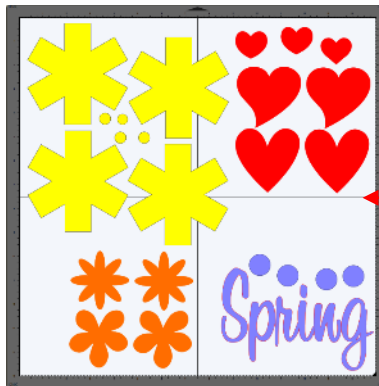
- To access **Cut by Color**, click on the **Cut by Color** tab in the **Cut Settings** window:



- **Cut all colors (Single job):** In this mode all of the colors marked in this window will be cut at one time.

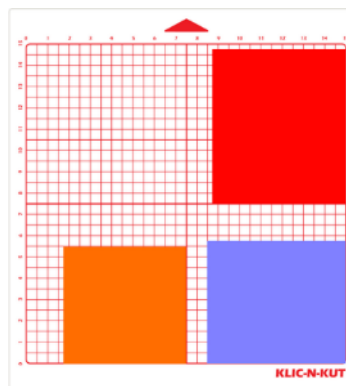
◇ As an example, here are some shapes laid out on the **Cutting Mat**. Note how the grid is set to divide the mat into four quadrants:

The shapes of each color have been arranged into quadrants on the **Cutting Mat**

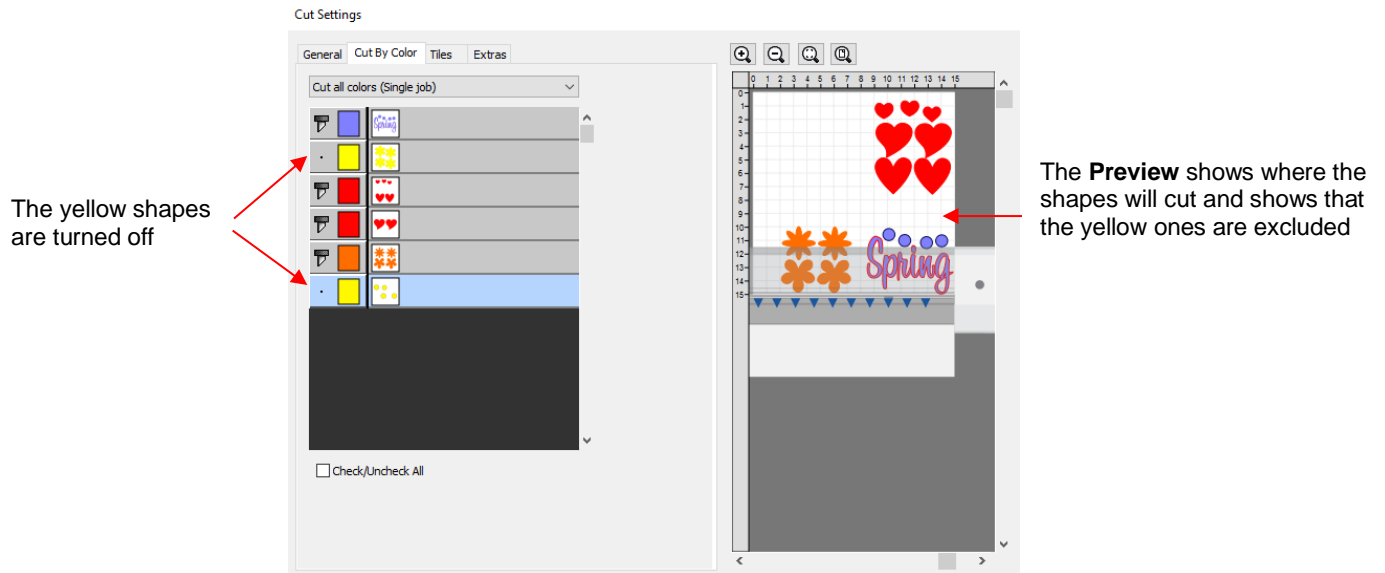


The **Cutting Mat** is divided into quadrants for easier placement of the scraps onto the actual cutting mat

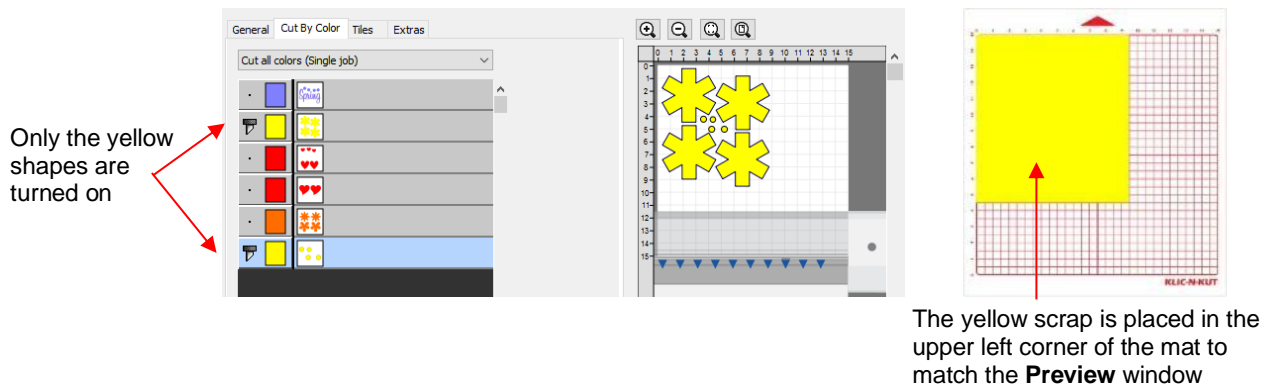
◇ Let's say you also have scraps you want to use, however the yellow scrap you plan to use won't fit onto the mat with the other scraps. So, you want to cut lilac, red, and orange first. You place those colors into quadrants on the mat that match the layout on the **Cutting Mat** in SCAL:



- ◇ In the **Cut Settings**, make sure **WYSIWYG** mode is selected and you have the other settings selected. Then select the **Cut by Colors** tab and click on the blade icon next to the yellow shapes to hide those from cutting:



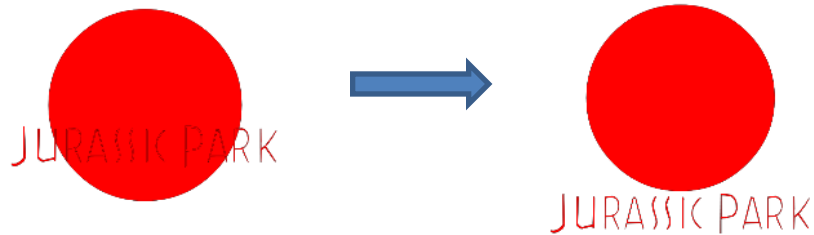
- ◇ The cut is executed and the red, orange, and lilac shapes are cut. Then the same procedure can be used for the remaining yellow shapes:



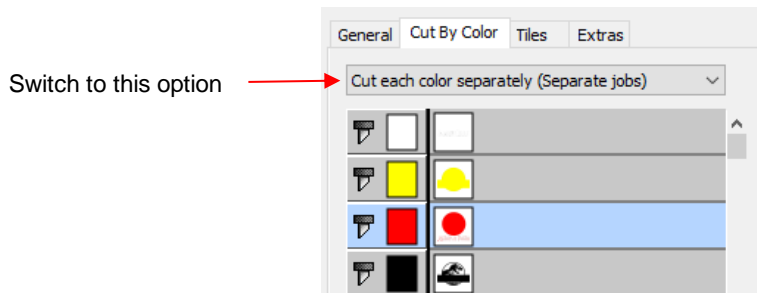
- **Cut each color separately (Separate jobs):** In this mode you can also turn on or off colors for cutting. However, SCAL will prompt for each color before executing the cut.
  - ◇ As an example, here is a layered design to be cut from vinyl:



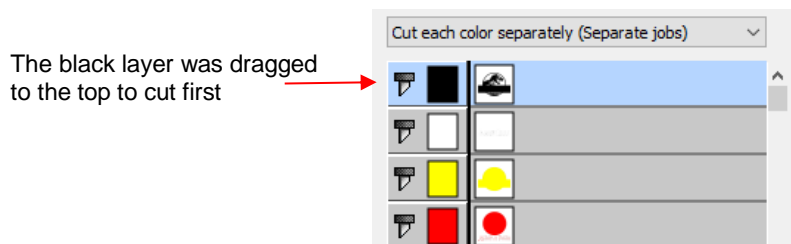
- ◇ Choosing the option to **Cut each color separately** is logical because:
  - The shapes are arranged on top of one another
  - The size is so large that the individual colors cannot be placed on the cutting mat to cut all at one time
- ◇ However, before sending the project to the cutter, take note of any colors that might have shapes that need to be moved. In this example, the thin red lettering “Jurassic Park” would cut through the background red circle, hence it needs to be moved away:



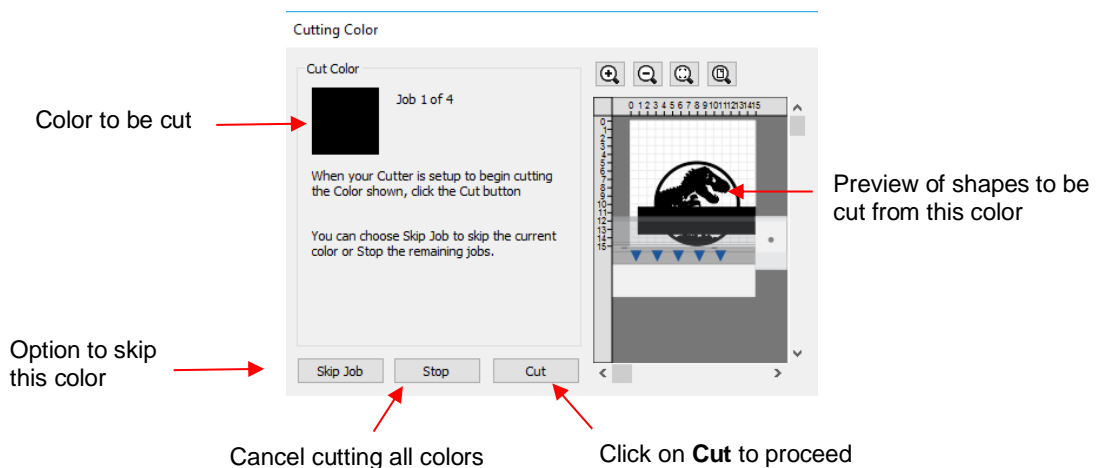
- ◇ In the **Cut Settings**, **Origin Point** should be chosen so that each color is moved to align with the origin and, thus, the material loaded each time in the same location. In the **Cut by Color** tab, the **Cut each color separately** option is chosen:



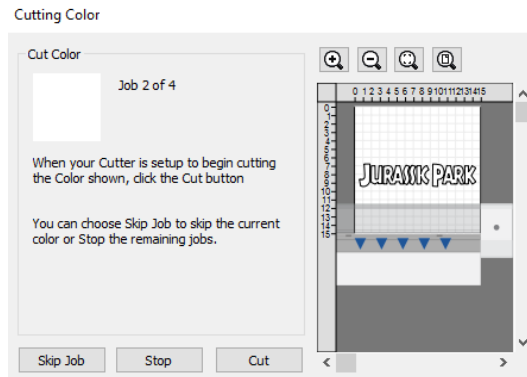
- ◇ Note that you can change the cut order by dragging the colors up or down the menu. For example, let say you already have black vinyl loaded into the cutter and the origin set to cut:



- ◇ Upon selecting **Cut**, the following window opens:



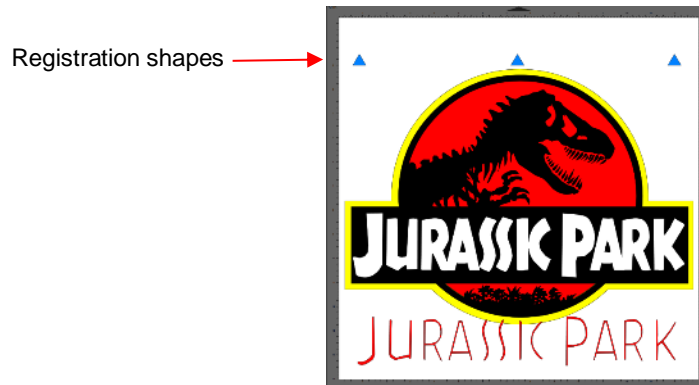
- ◇ If you decide not to cut this color, click on **Skip Job** and the next color in the menu will be selected. If you clicked on **Cut**, then the black shapes are cut out and then this same next color window will open:



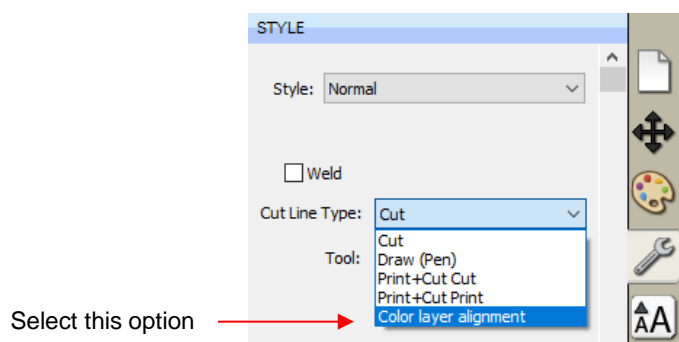
- ◇ And the process continues until all colors have been cut.

- In *Section 8.01*, **Color Layer Alignment** was mentioned as one of the options under **Cut Line Type** on the **Style Panel**. In applications, such as the one just presented, it can be tricky aligning the various colors after cutting. To make the job easier, small registration shapes can be added to the design and cut with every color so that they can then be lined up when layering color.

- ◇ In the *Jurassic Park* example, three small triangles are added and grouped to be on the same layer:



- ◇ The layer is selected and the **Cut Line Type** for this layer is changed to **Color Layer Alignment**:



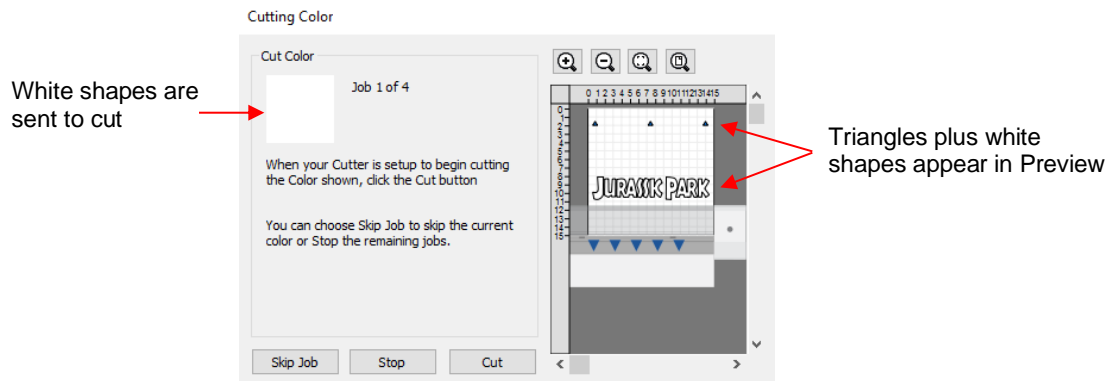
- ◇ When the **Cut by Color** tab is then selected, the registration triangles are not in the menu however they do appear in the **Preview**:

Alignment triangles are not in the menu



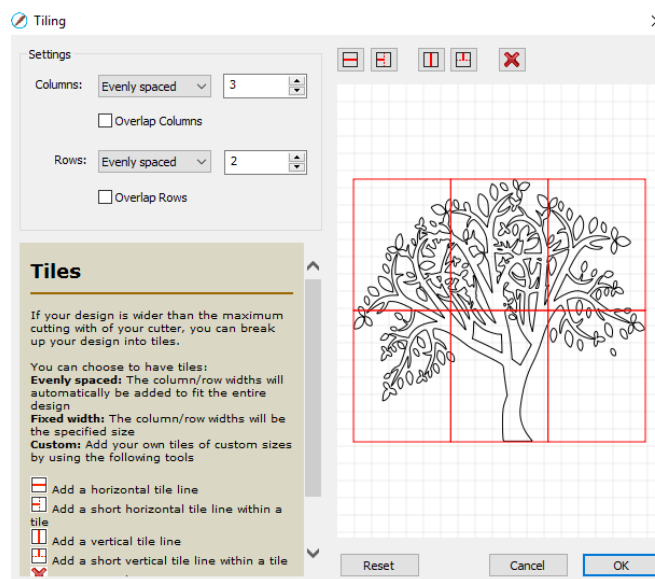
Triangles appear here

◇ Then, as each color window opens, the triangles will appear in the **Preview** for that color:



### 8.06.4 Tiles (SCAL PRO only)

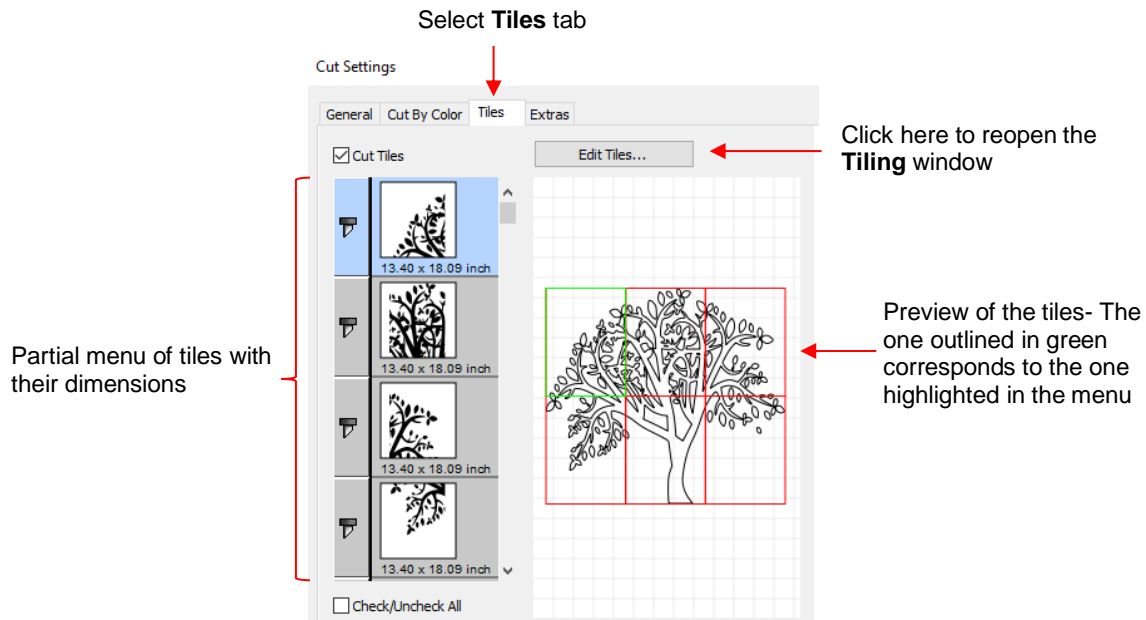
- In *Section 8.05*, you were shown how to use the **Tiling** function to split a design that is too large to cut based on the limits of your cutter:




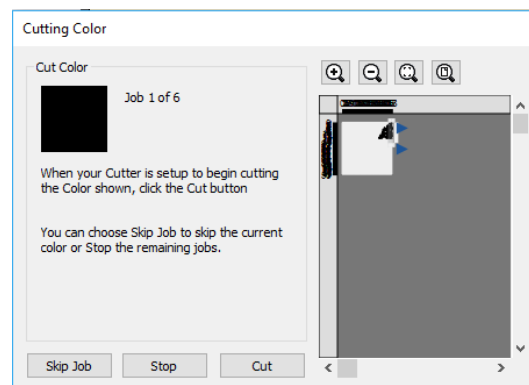
- After clicking on **OK**, but before sending the design to cut, make the Cutting Mat dimensions fit the design. If any of the design extends beyond the boundaries of grid, those tiles will not cut.



- Open the **Cut Settings** window, click on the **Tiles** tab and check the box next to **Cut Tiles** to then open a menu showing the individual tiles with additional options:



- ◇ **Cut Tiles:** Mark this option first so that the menu and preview appears.
- ◇ **Edit Tiles:** clicking this button will take you back to **Effects>Tiling** in case you need to edit the settings.
- ◇ As with **Cut by Color**, clicking on the blade icon  next to any tile will prevent that tile from cutting. You can also drag tiles up or down in the menu to change the cutting order.
- After you click on **Cut**, be patient. It can take a minute or more for a large and/or detailed design to be processed by the software. Eventually, a window will open showing the first tile to be cut:



- ◇ Just as with **Cut by Color**, you can
  - Click on **Cut** to proceed with cutting that tile. After it is cut the next tile will be selected.
  - Click on **Skip Job** to skip cutting that tile and bring up the next tile
  - Click on **Stop** to cancel all cutting.

### **8.06.5 Extras (SCAL PRO only)**

- The **Extras** feature allows you to duplicate shapes for cutting, without having to set it up on the **Cutting Mat**. To use this feature, click on the **Extras** tab in the **Cut Settings** window:

Select **Extras** tab

Check this box first to then activate other settings

Mark this option to use **Cutting Mat** dimensions or enter actual size of material

Mark **Auto fit** or enter desired numbers of **Columns** and **Rows**

Enter desired **Spacing** for both **Columns** and **Rows**

The **Preview** will update as settings are changed

- ◇ **Cut Copies:** Mark this option first so that other settings become editable
- ◇ **Match workspace dimensions:** If your material is the same size as the **Cutting Mat**, then mark this option. Otherwise, enter the **Width** and **Length** of the material to be used. Pay attention to the **Preview** window to make sure you have the orientation correct to match how the material is placed on the cutting mat.
- ◇ **Auto fit columns and rows:** Mark this option if you want as many duplicates as possible cut from the material. Otherwise, enter the desired number of **Columns** and **Rows** to match the number of copies needed.
- ◇ **Spacing:** Adjust the spacing as desired. In general, shapes can be quite close together when cutting from thinner materials, such as vinyl and cardstock. In some cases, such as with a star, you can even use 0 for the **Row Spacing**, since the bottom of the shape is not close to the top of the shape in the row below it:

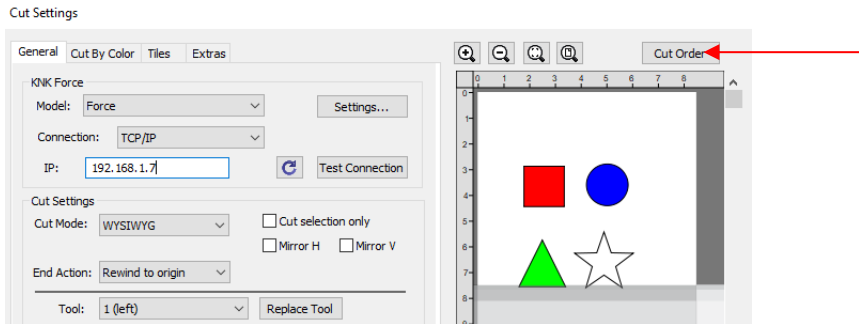
**Row Spacing: 0**

Plenty of room between the rows

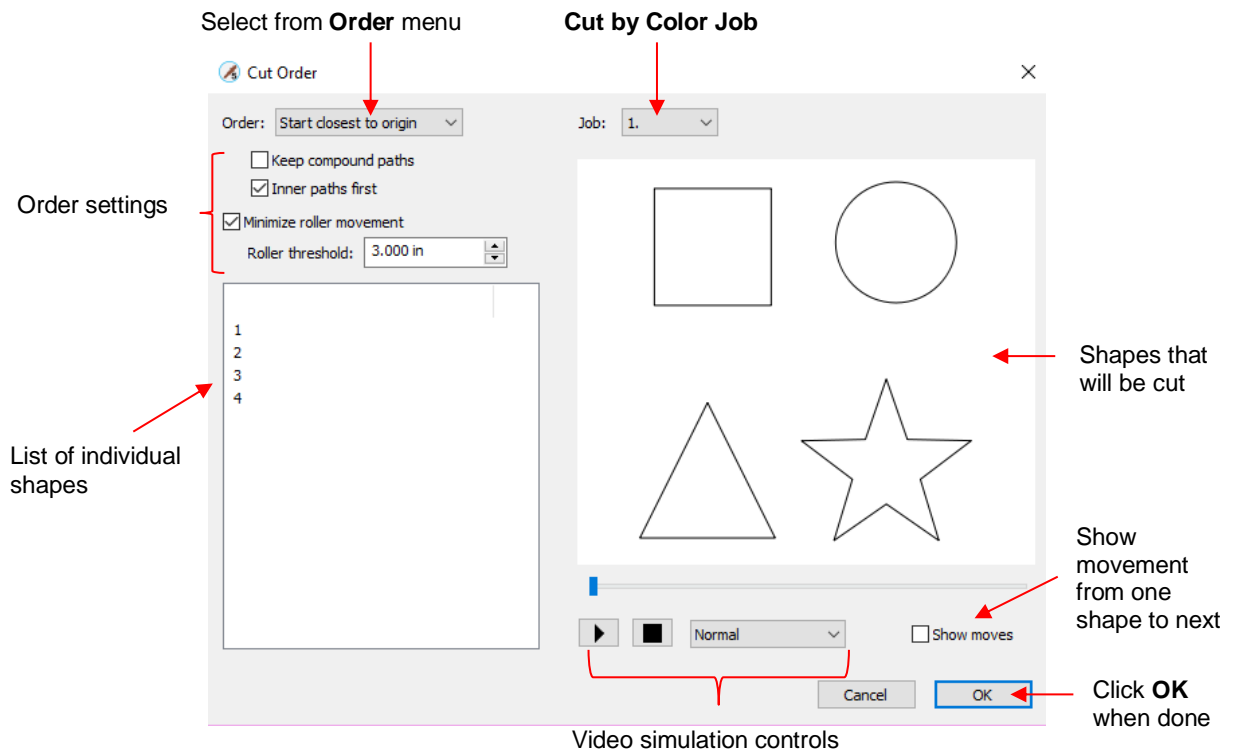
- Make sure you have all of the cut settings made under the **General** tab of the **Cut Settings** window. Once you click on **Cut**, all of the duplicates will be cut out and it appears that using **Cancel**, in the current version of SCAL, will not abort the cut.

### 8.06.6 Cut Order (SCAL PRO only)

- The **Cut Order** function provides control over the order in which shapes will be cut on your cutter. To access this function, go to the **Cut Settings** window and, in the upper right corner, click on **Cut Order**:




- When you click on **Cut Order**, the following window will open, displaying the shapes that will be cut:

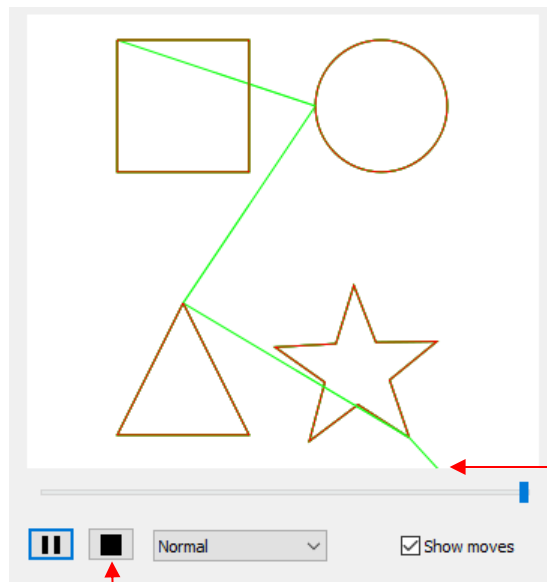


- ◇ **Order** - Select start location preference from the following:
  - **Start closest to origin** – The first shape to cut will be the one closest to the cutter's origin based on where the blade drops down to cut that shape.
  - **Start farthest from origin** – The first shape to cut will be the one farthest from the cutter's origin, again based on where the blade drops down to cut that shape.
  - **Layer order (Back to Front)** – The shapes will cut from bottom to top on the **Layers Panel**
  - **Layer order (Front to Back)** – The shapes will cut from top to bottom on the **Layers Panel**

- ◇ **Keep compound paths** – If two or more shapes have been joined using **Object>Merge**, they will be treated as a single shape in the cutting order.
- ◇ **Inner paths first** – It's almost always desirable to have an inner/child shape cut before an outer/parent shape due to stability of cutting the inner shape. However, that option can be turned off and inner shapes will be treated independently in the cutting order.
- ◇ **Minimize roller movement** – The accuracy of cut location (very important in print and cut applications) can be affected if the material or mat is rolling in and out over long distances throughout the cut. This option is also usually left marked.
- ◇ **Roller threshold** – Select from 0.01 inches to 10 inches based on the maximum roller movement allowed when cutting a series of shapes before advancing the mat/material to the next series. Note that if the **Keep compound paths** option is marked, it will take precedence over **Roller threshold**.
- ◇ **Job** – If **Cut by Color** with **Separate Jobs** has been opted, select each job separately from this menu to set the cut order, as desired.

• A video simulation is available so that you can verify the cut order:

- ◇ Click on the **Play** icon . The shapes will be sequentially highlighted in the order in which they will cut.
- ◇ There are three speeds in which this video can be played: **Slow, Normal, Fast**. As an example, verifying the cut order for a rhinestone pattern is probably best set at **Fast**.
- ◇ Marking the **Show moves** option will draw a green path between the shapes indicating the cut order. It also shows the starting location on each shape and the map will remain displayed at the end of the video:



The green path indicates that the cut order will be: **Star, Triangle, Circle Square**

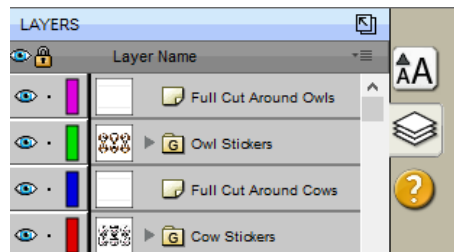
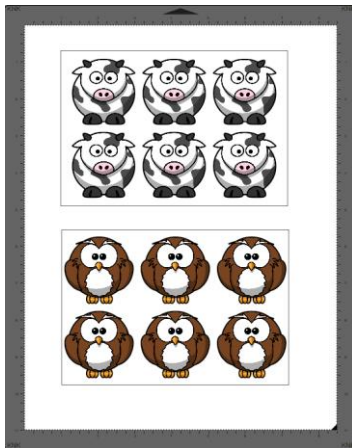
Because a KNK cutter has been selected, the origin is in the lower right corner. Thus, the green path starts from the lower right corner of the **Preview** window.

To replay video, click here first.  
Then click the **Play** icon.

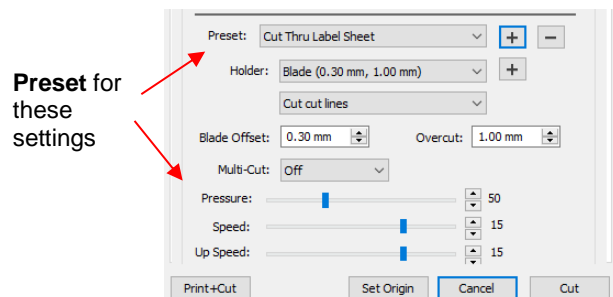
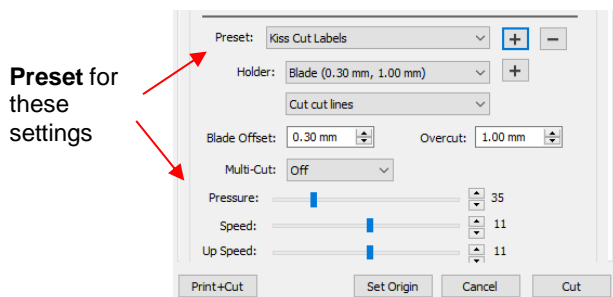
- ◇ To replay the video, click the black square icon  first. Then the **Play** icon will return and can be clicked.

### 8.06.7 Layers (SCAL PRO only)

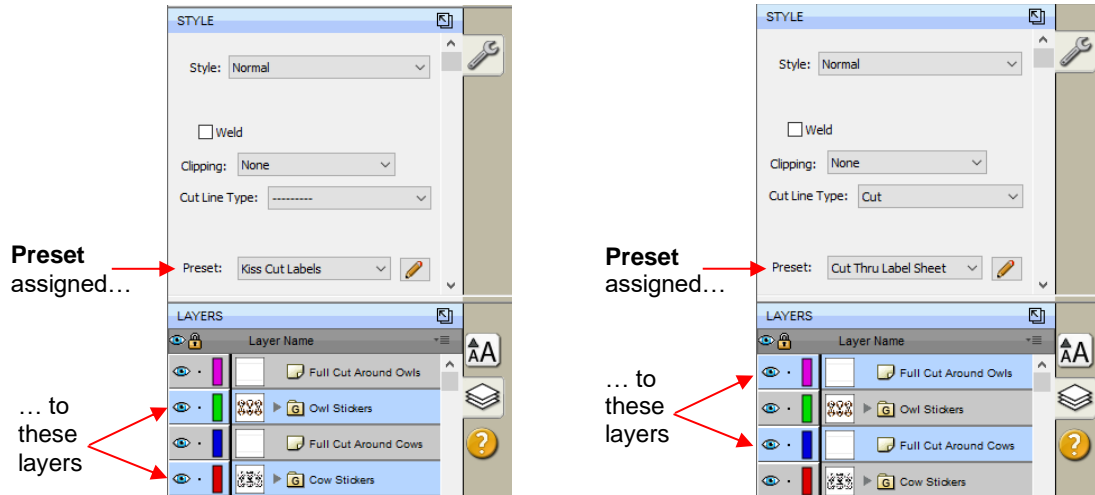
- There may be occasions where you want certain layers of your project to cut at different settings than other layers. Three examples would be:
  - ◇ Cutting adhesive stickers where by you only want to kiss cut the stickers themselves, but then full cut around groups of them.
  - ◇ Cutting a thick or dense material whereby you might want the first few passes to be at a lower pressure, followed by a heavier pressure for the last few layers.
  - ◇ Using a rotary tool in the KNK Force whereby you want to engrave parts of the design before fully cutting out outside of the design.
- The **Cut by Layer** feature of SCAL5 involves four steps:
  - (1) Create **Presets** for the different settings to be used. This was covered in *Section 8.06.2*.
  - (2) On the **Style Panel**, assign a **Preset** to each layer and order layers by **Preset**.
  - (3) In the **Cut Order** window (refer to *Section 8.06.6*) change the **Order** to match the **Layers Panel** order you wish to use.
  - (4) On the **Layers** tab in the **Cut Settings** window, select which layers will be cut and whether or not there needs to be a pause between cutting the layers to change out a tool.
- Using the first example, cutting adhesive stickers, let's assume that you have two blade holders set to cut out stickers. One has the blade barely exposed so that the stickers will be kiss cut without penetrating the backing sheet and the other blade holder is set to cut through the sticker material and the backing sheet.
  - ◇ A project is designed with two sets of stickers and outside cuts around each set:



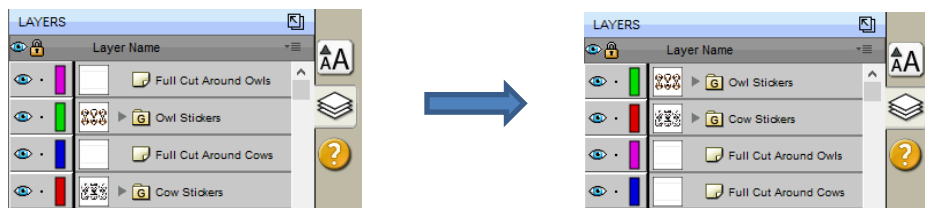
- ◇ Create two presets in the **Cut Settings** window. (Again, for directions on creating **Presets**, refer to *Section 8.06.2*):



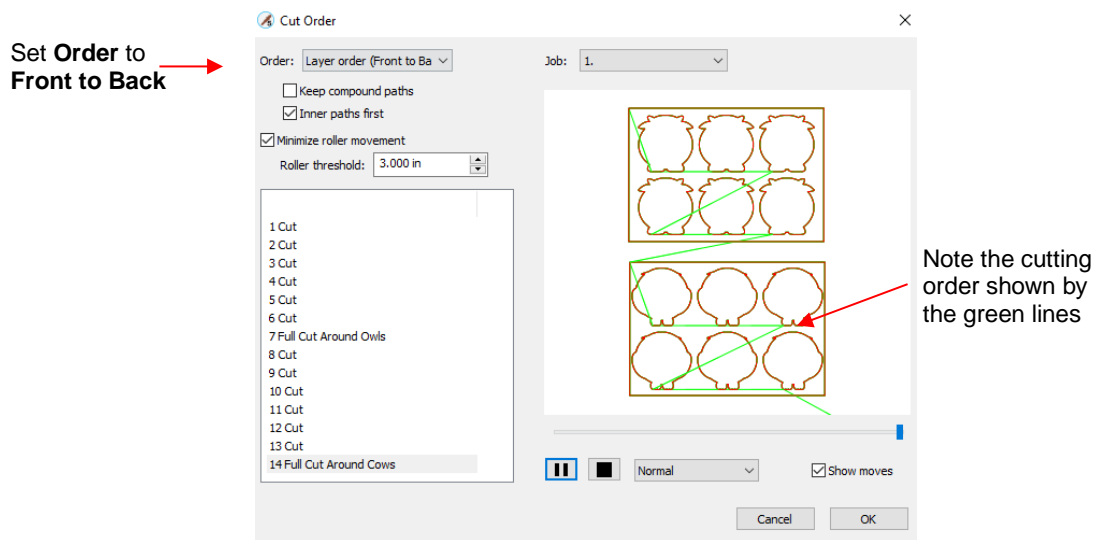
- ◇ On the **Style Panel**, select each pair of layers and assign the required **Preset** to that pair:



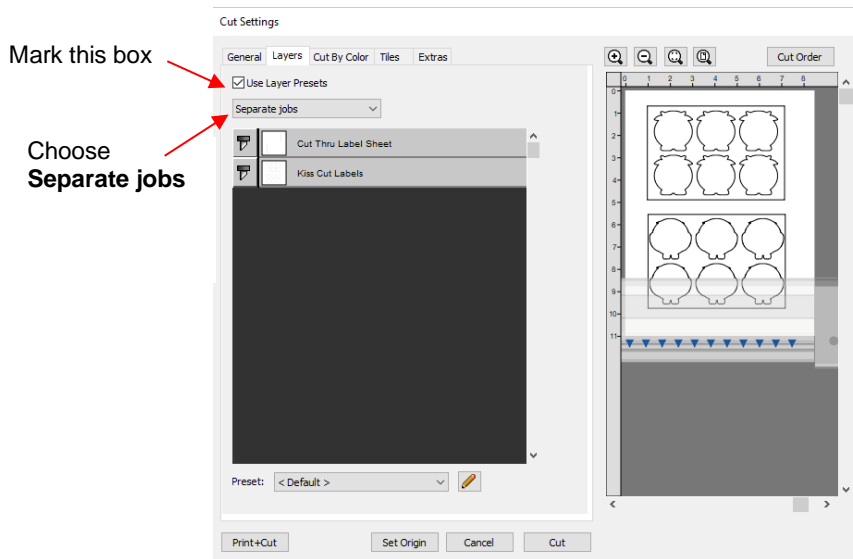
- ◇ Order the layers so that those cutting with the kiss cut blade holder are at the top and the layers with the more-exposed blade holder are at the bottom:



- ◇ Go to the **Cut Settings** window and click on the **Cut Order** tab. In the **Order** menu, select **Front to Back** and the cut order will then be top to bottom on the **Layers Panel**. The video simulation confirms this:



- ◇ Click on **OK** to close the **Cut Order** window. Now click on the **Layers** tab and the following window will open:

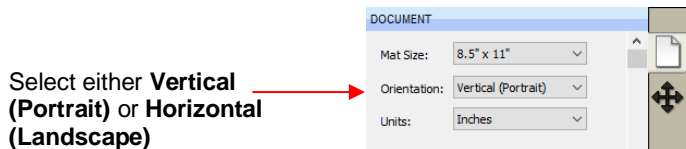


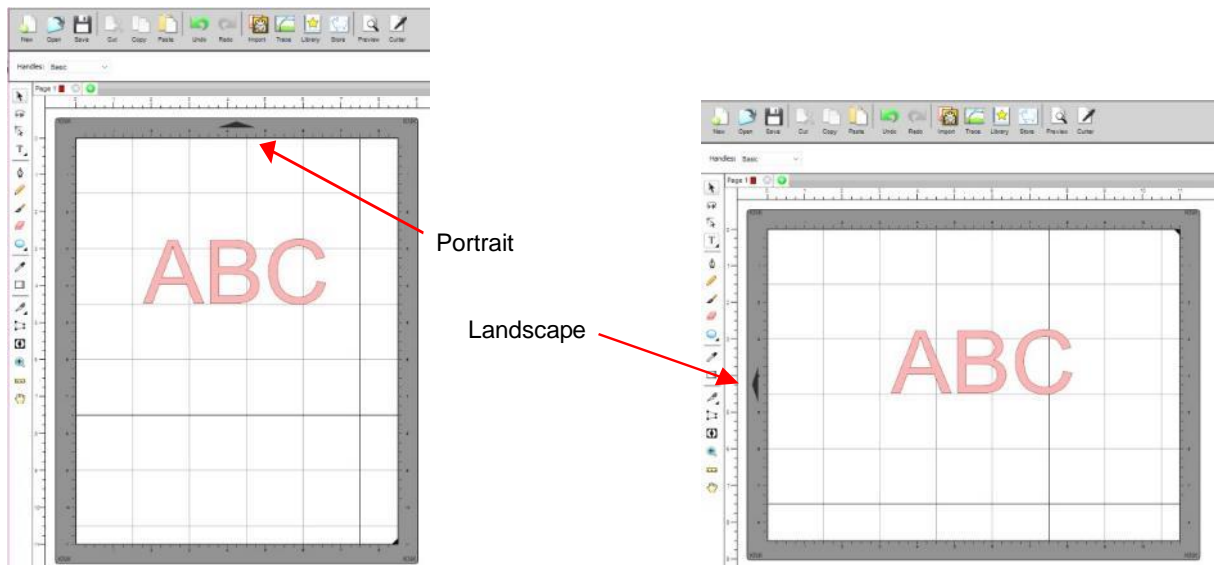
- ◇ Mark the option for **Use Layers Presets** and select **Separate Jobs**. Click on the **Print + Cut** button and the print and cut process can be carried out as normal. Watch for the job prompt windows to pop up and follow all instructions.

## **8.07 Controlling Where Shapes Will Cut**

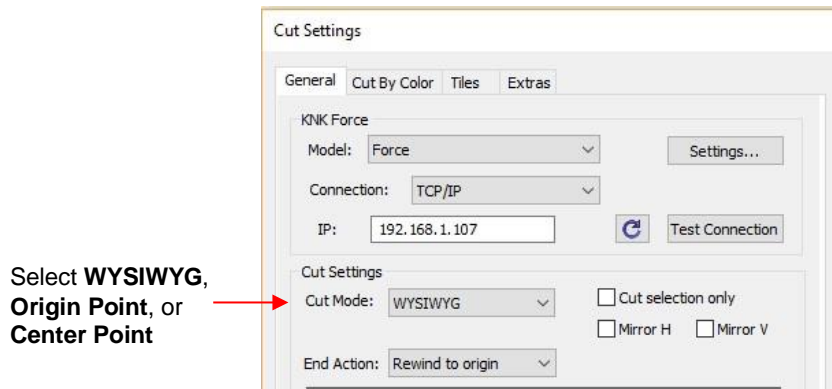
### **8.07.1 Overview**

- There are two **Orientations** for cutting:
  - ◇ **Portrait** – Shapes will cut in the same orientation you see on the **Cutting Mat**
  - ◇ **Landscape** – Shapes will cut 90° clockwise to the orientation you see on the **Cutting Mat**
- There are 4 available **Cut Modes** when cutting to the KNK Zing Orbit:
  - ◇ **WYSIWYG** – Shapes will cut relative to their position on the virtual Cutting Mat
  - ◇ **Origin Point** – Shapes will cut to align with the origin set before cutting
  - ◇ **Center Point** – Shapes will cut to center around the origin set before cutting
  - ◇ **Print and Cut** – Shapes will cut based on manual or automatic alignment with printed registration marks (refer to *Chapter 11*)
- The **Orientation** is set on the **Document Panel**:



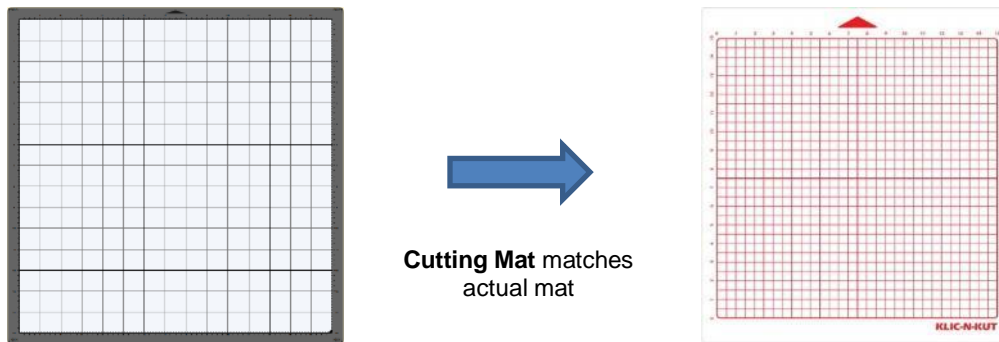


- The choice between **Portrait** and **Landscape** is a personal one – use whichever one makes the most sense to you. For long projects, such as for large vinyl cuts, **Landscape** is usually chosen because the project displays better on the computer monitor. However, you still have the option to use **Portrait**, if desired.
- The **Cut Mode** is set in the **Cut Settings** window:

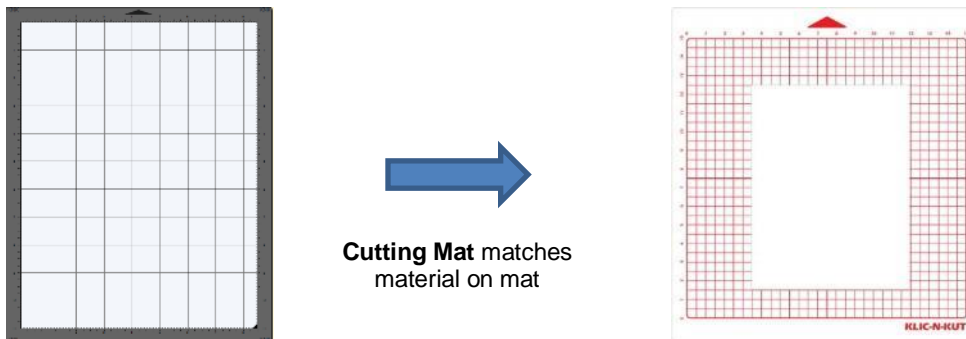


- **IMPORTANT:** All three **Cut Modes** are based on setting an XY origin on the cutter. On the Zing Orbit, this origin is set by moving the blade tip to a chosen location on the mat grid or on the material, depending on the application or your preference.
- The following sections show where shapes will cut based on the possible combinations of **Cut Mode** and **Orientation**. Note that with **WYSIWYG** mode, there will be two options and the one that makes the most sense to you, is the one to use:
  - ◇ **Cutting Mat Method:** The virtual **Cutting Mat** is the same dimensions as the actual cutting mat:





- ◇ **Material Method:** Create a custom virtual **Cutting Mat** that matches the dimension of the material to be cut:



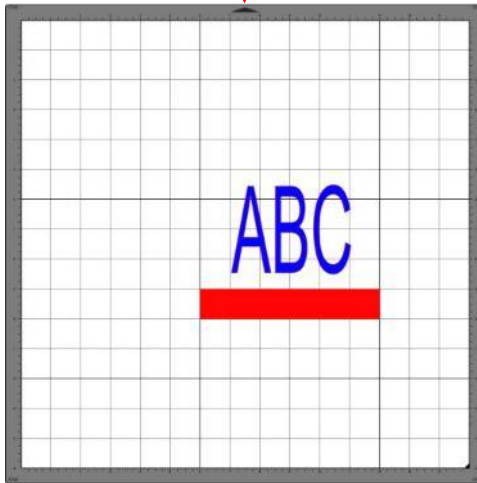
- The best way to learn how these settings affect where shapes cut is to recreate what you see in these screen shots and test them out with the test pen and paper. Eventually, it will all make sense to you and, of course, there's help available if you need it.

### **8.07.2 Origin Point**

- This is the mode recommended for most applications as it economizes the use of your cutting materials.
- Shapes can be located anywhere on the virtual **Cutting Mat**. The shapes will be moved and aligned to cut with the origin you set on the material. As mentioned earlier, the origin is set using the position of the blade tip and is typically set just inside the lower right corner of the material being cut.
- When more than one shape will be cut, the shape closest to the origin will be cut at the origin and any other shapes will be cut the distance and direction from that shape as positioned on the screen. The following figures show examples of where images will cut. Use the arrow on the **Cutting Mat** as a guide to the direction to insert the actual mat or material into your cutter.

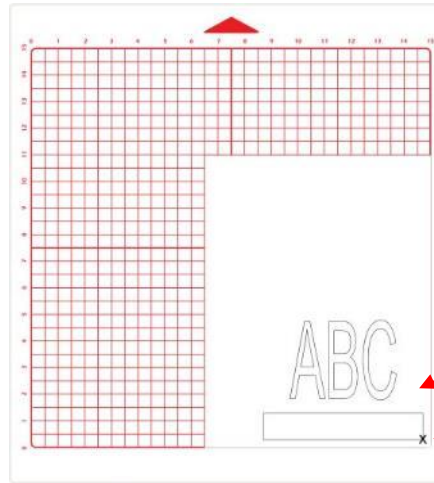
- ◇ **Origin Point – Portrait Mode**

Indicates **Portrait** mode



Location of shapes in SCAL

Feed the mat this direction into the cutter



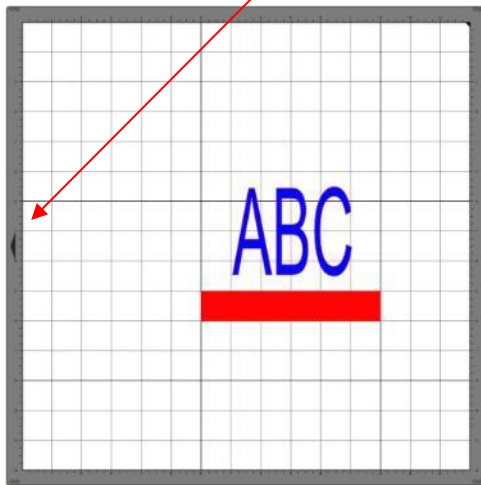
Shapes are cut to align with the origin you set on the cutter

Origin set here

Where shapes will draw or cut on the material

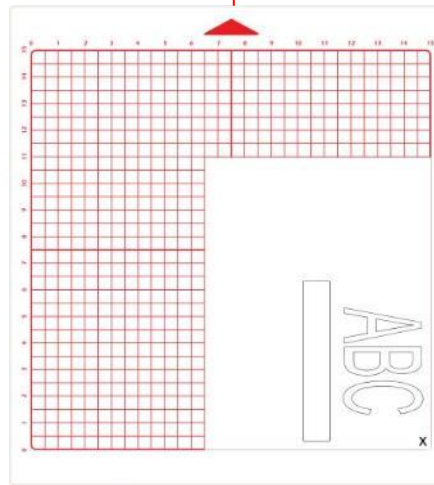
◇ **Origin Point – Landscape Mode**

Indicates **Landscape** mode



Location of shapes in SCAL

Feed the mat this direction into the cutter

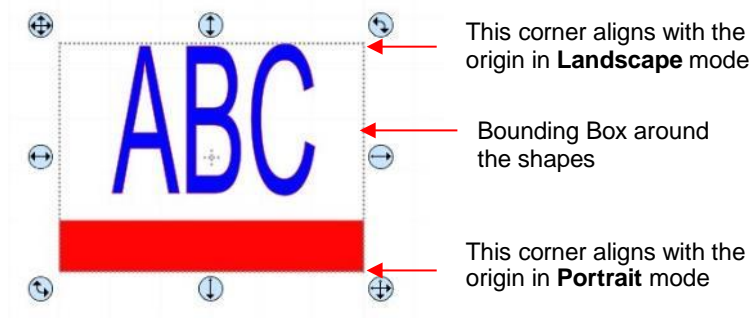


Shapes are cut to align with the origin you set on the cutter

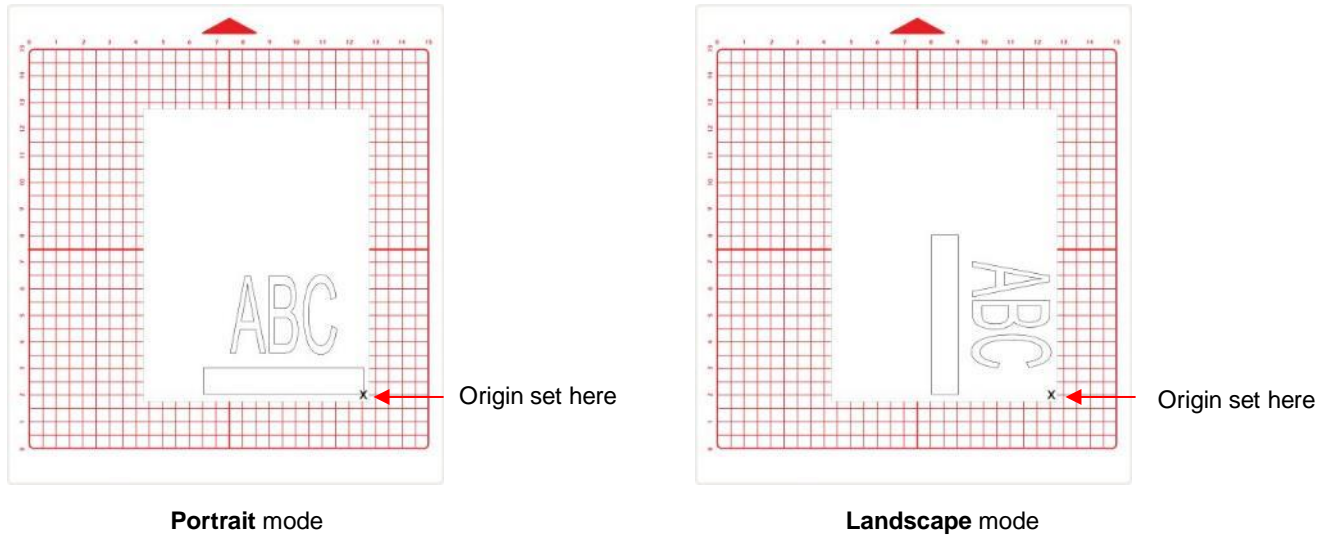
Origin set here

Where shapes will draw or cut on the material

- Note that the alignment is based on the bounding box around the shapes:



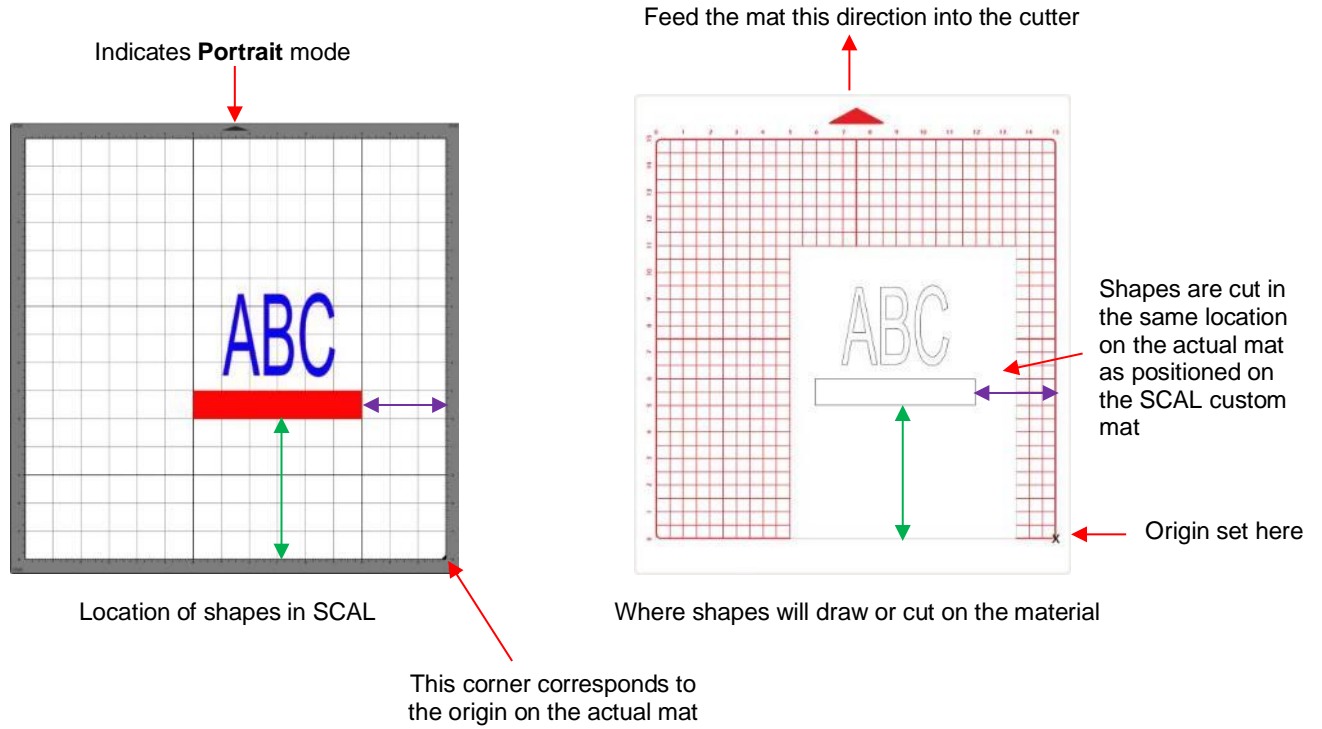
- Also, note that the material can be located anywhere on the cutting mat because you are setting the origin on the material itself. It is usually advisable to set that origin just a little way inside the corner of the material so that you do not inadvertently cut off the edge.



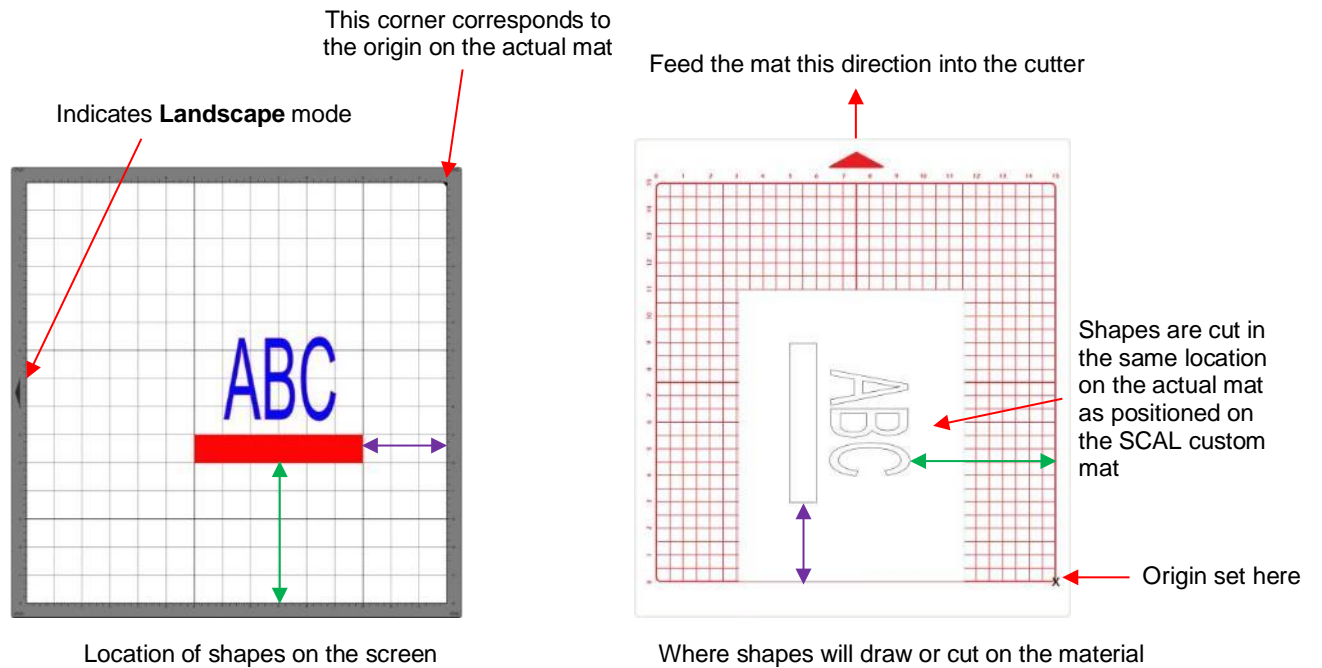
### **8.07.3 WYSIWYG**

- This is the mode recommended when you need to cut shapes in a very specific location relative to the onscreen **Cutting Mat** or when you are utilizing multiple tools in applications such as draw and cut or emboss and cut.
- Shapes are cut based on where they are located on the virtual **Cutting Mat**. There are two methods used:
  - ◇ **Cutting Mat Method:** The virtual **Cutting Mat** dimensions should match those of the grid on the actual cutting mat. The origin is set in the exact lower right corner of the mat's grid. The material needs to be placed on the cutting mat so that it covers the area where the shapes will be cut.
  - ◇ **Material Method:** The virtual **Cutting Mat** dimensions should match those of the material being placed on the actual cutting mat. The origin is set in the lower right corner of the material regardless of where the material is placed on the mat. In the example later on, the material is assumed to be letter size (8.5" x 11").
- In the following diagrams the purple and green arrows are used to indicate the equivalent distances between the shapes and the origin on the virtual **Cutting Mat** and on the actual mat.

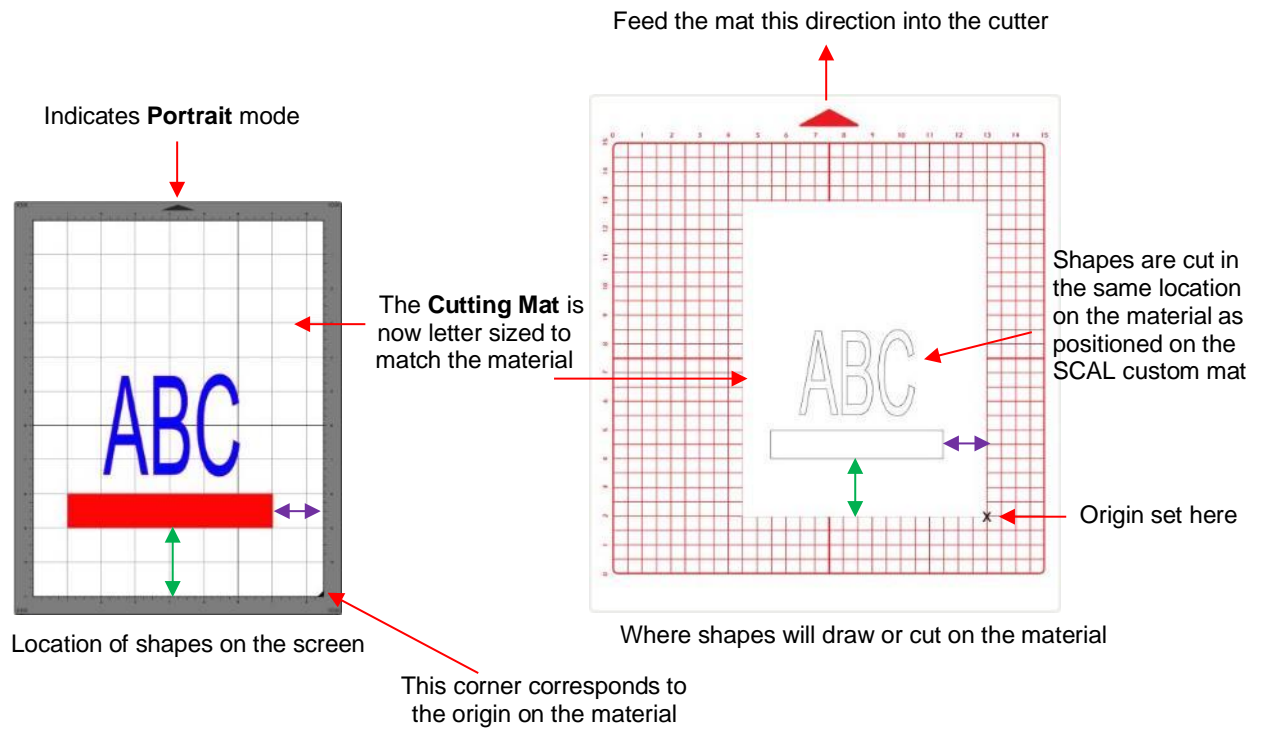
◇ **WYSIWYG – Portrait – Cutting Mat Method**



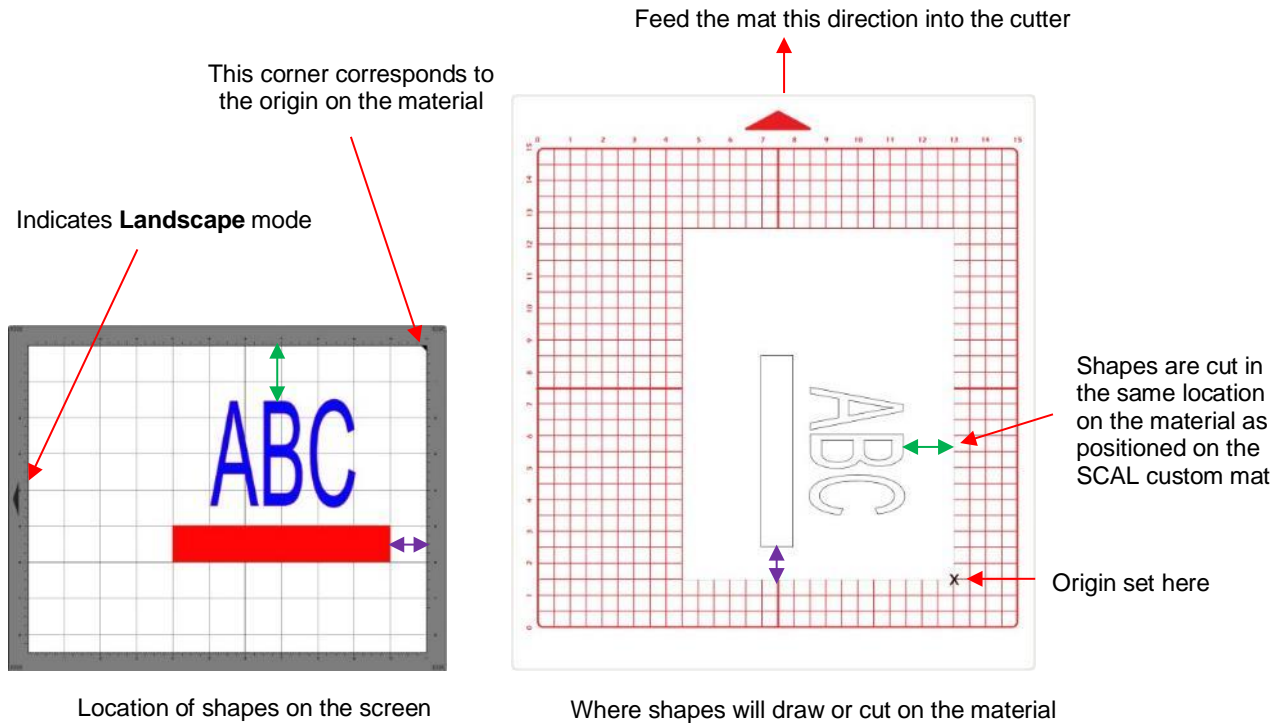
◇ **WYSIWYG – Landscape – Cutting Mat Method**



◇ **WYSIWYG – Portrait – Material Method**



◇ **WYSIWYG – Landscape – Material Method**

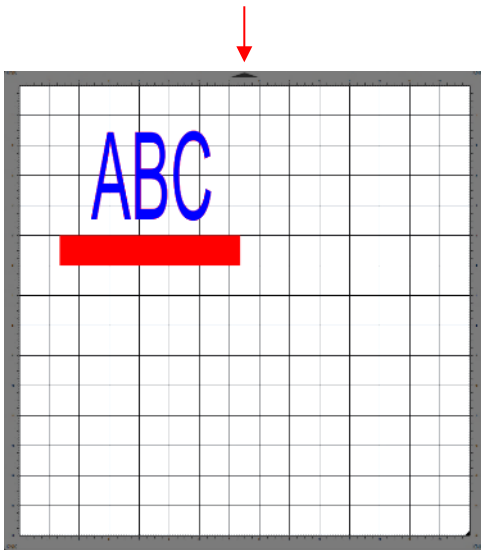


## 8.07.4 Center Point

- This is a mode not available with most other cutters in SCAL. It was needed for use with the Orbitizer but can also have other useful applications, such as cutting a shape from the center front of a greeting card.
- Shapes can be located anywhere on the virtual **Cutting Mat**. The shapes will be moved and centered around the origin you set on the material. While in the other two cut modes, the origin is typically set just inside the lower right corner of the mat or material, with **Center Point** mode, you want to set the origin in the center of the material or mat:

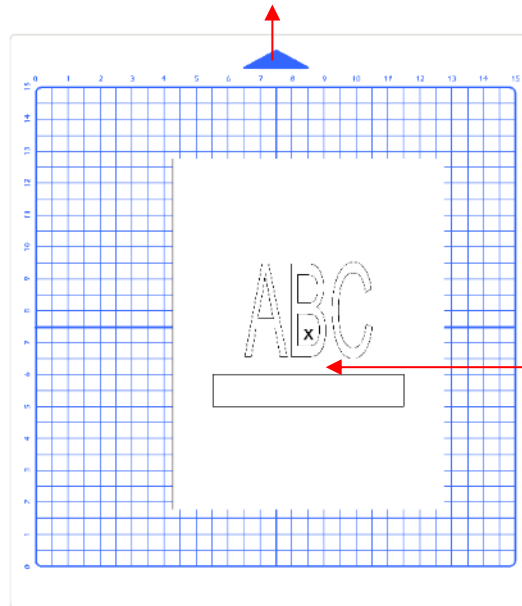
### Center Point - Portrait

Indicates **Portrait** mode



Location of shapes in SCAL

Feed the mat this direction into the cutter



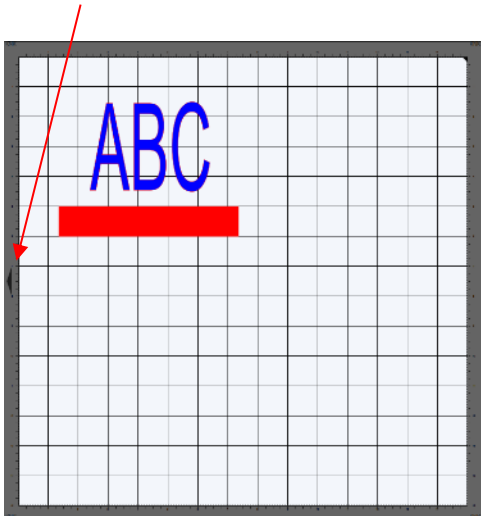
Origin set here

Shapes are centered around the origin you set on the material

Where shapes will draw or cut on the material

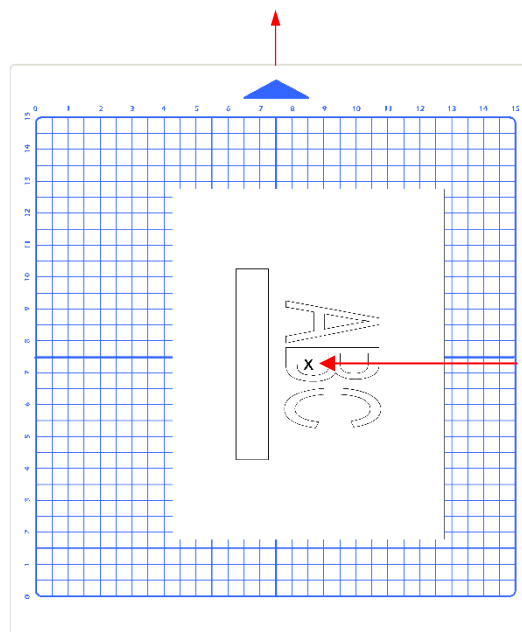
### ◇ Center Point – Landscape Mode

Indicates **Landscape** mode



Location of shapes in SCAL

Feed the mat this direction into the cutter

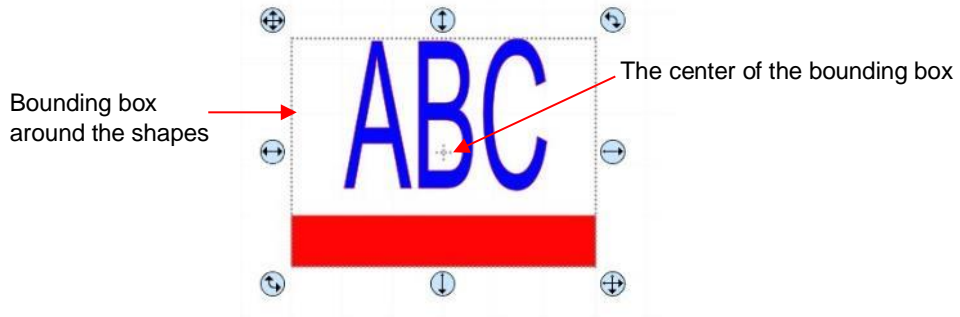


Origin set here

Shapes are centered around the origin you set on the material

Where shapes will draw or cut on the material

- ◇ Note that the alignment is based on the center of the bounding box around the shapes:

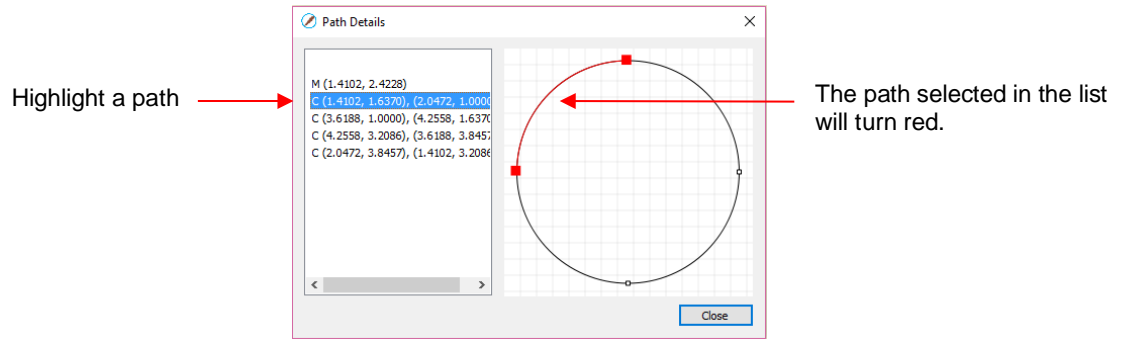


- ◇ Also, note that the material can be located anywhere on the cutting mat because you are setting the origin on the material itself. If you need the centering to be perfect:
  - Measure the material with a ruler to determine the center and mark the center with a pencil dot
  - Use the alignment pin in the blade holder to set the origin. It is far easier to see the tip of the pin than the tip of the blade.

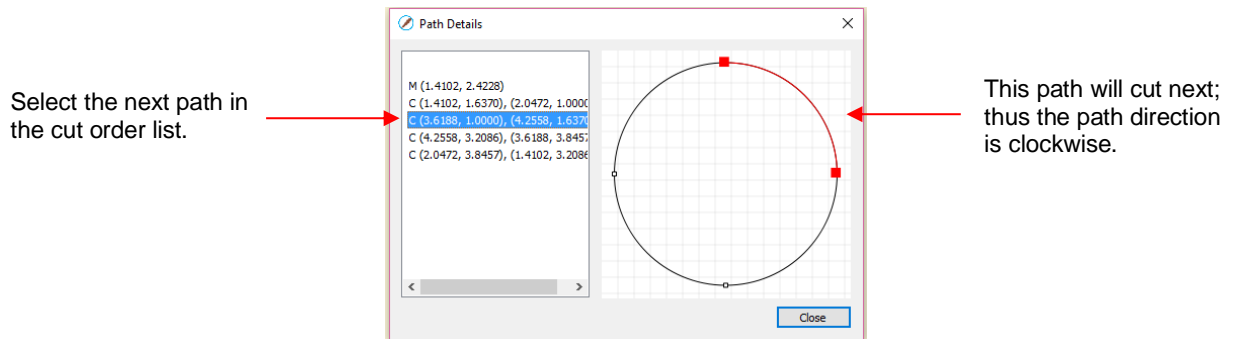
### **8.08 Path Details and Reverse Path**

- Sometimes a cutting issue can be resolved by reversing the direction of a cut. In SCAL, the cut direction (clockwise versus counterclockwise) can be checked using the following steps:

- ◇ Select the shape, right-click and select **Path>Path Details**.
- ◇ A window will open. On the left side is a list of the paths in the order they will cut. Click on any path in the list and that path will turn red:



- ◇ Select the next path in the list and you will then be able to determine the direction of the cut:



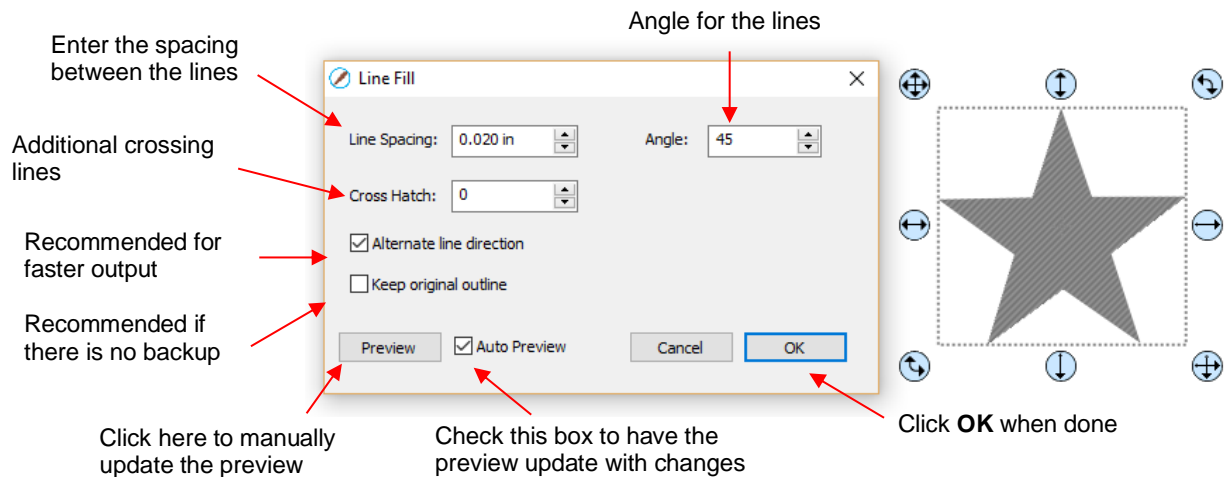
- To reverse the direction of a path, use either of the following after selecting the shape:

- ◇ Right-click and select **Path>Reverse Path**

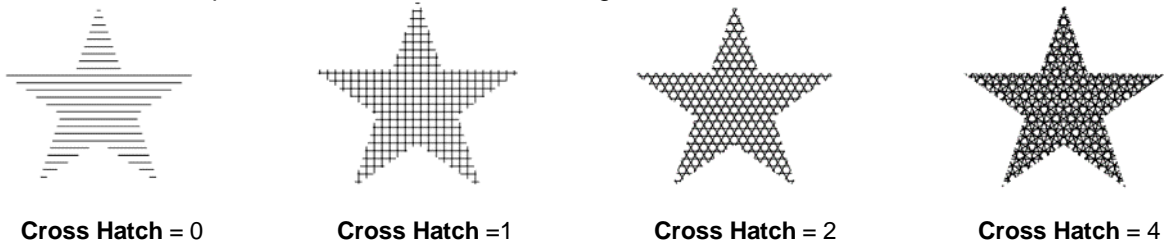
◇ Go to **Path>Reverse Path**

## 8.09 Line Fill Video

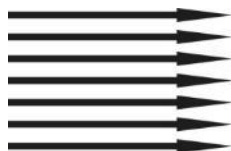
- The **Line Fill** function creates a line or hatch fill pattern, typically used for engraving with an engraving tool. It can also be used for coloring in shapes with a pen or embossing some materials with an embosser.
- To access this function, select a shape and go to **Effects>Line Fill**:



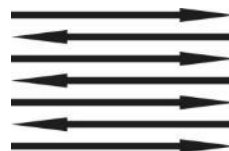
- ◇ **Line Spacing:** This is selected based on the width of the line produced by the tool to be used. If it's too small to accurately measure, use 0.02" or 0.5 mm for a small test shape and then adjust, as needed, to fit the tool and application.
- ◇ **Angle:** Choose an angle for the **Line Fill**. An **Angle** of 0 results in horizontal lines and an **Angle** of 90 results in vertical lines. Note the diagonal pattern in the prior screenshot using an **Angle** of 45.
- ◇ **Cross Hatch:** Increasing **Cross Hatch** adds additional intersecting lines to the pattern which can result in a more complete fill but will take longer to engrave or draw:



- ◇ **Alternate Line Direction:** This controls whether the tool always returns to the same side before dropping down to engrave or draw. In some applications, it may need to be unchecked to provide a more even appearance, however it will take much longer to execute:



**Alternate Line Direction: not marked**  
Tool only travels in one direction



**Alternate Line Direction: marked**  
Tool travels in both directions

- ◇ **Keep Original Outline:** Usually a good idea in case you want to revise your pattern later on. Also, when working with lettering, having the outline improves readability:

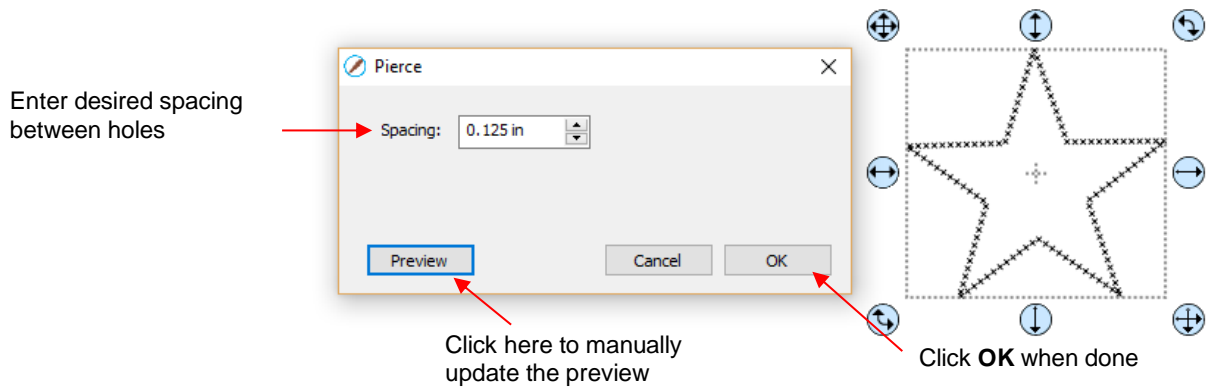


ASU

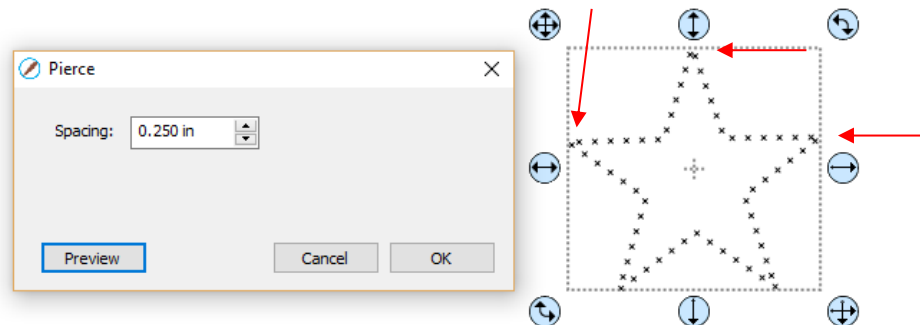
ASU

## 8.10 Pierce

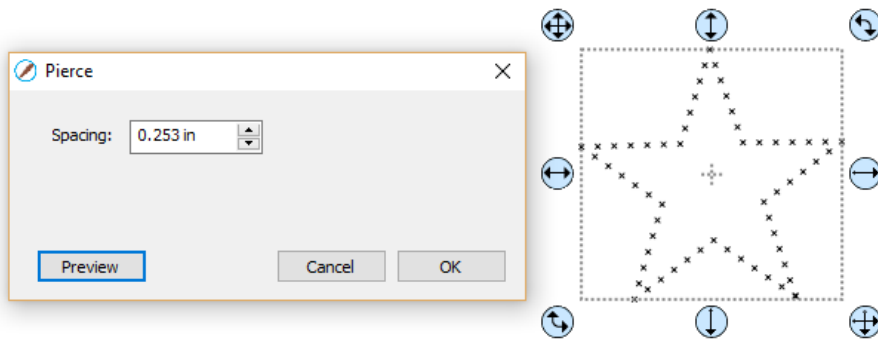
- The **Pierce** function creates holes for punch tools. This can be used to create Pergamum designs and paper embroidery patterns.
- To access this function, select a shape and go to **Effects>Pierce**:



- Note that even though you see “X” shapes on the screen, the cutter head will be making downward punch movements.
- At this time, there is no editing available for a pattern created using the **Pierce** function. If you find that your design has holes that are not evenly spaced, try altering the spacing by tiny increments and clicking on **Preview**.
- ◇ For example, the star shape used above shows uneven spacing when a value of 0.25” is entered. Note how the star has holes too close to one another at the upper points:



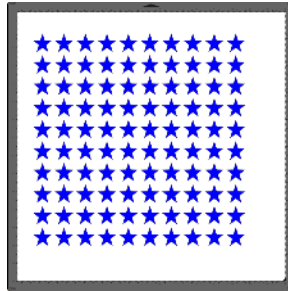
- ◇ Gradually increasing the **Spacing** didn't immediately result in an acceptable pattern until 0.253” was entered. Then the pattern looked even:



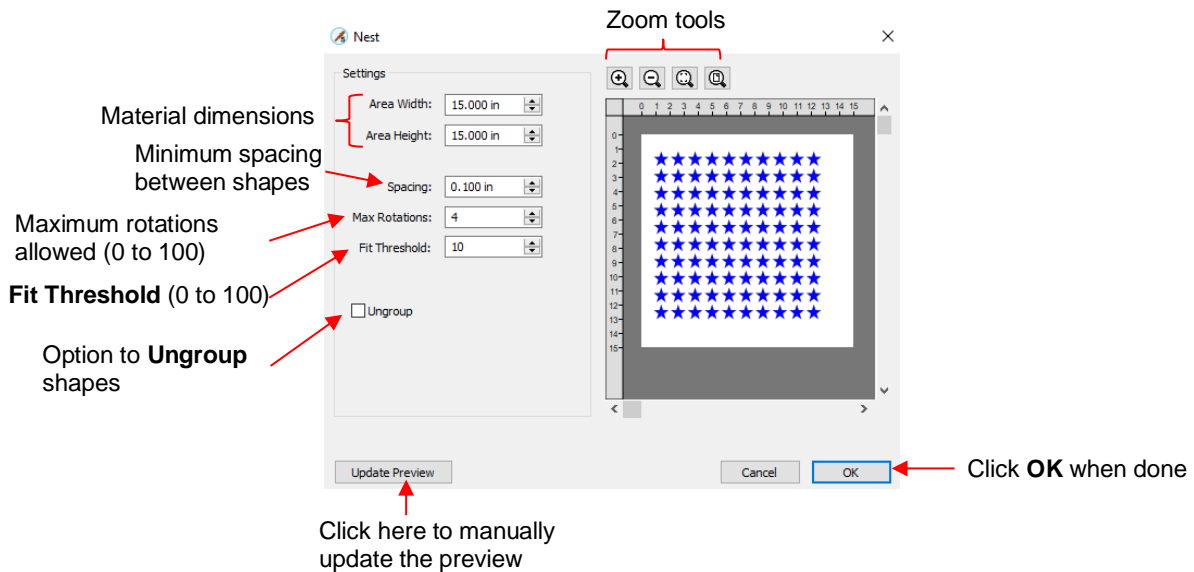
- If you have a shape that has the **Pierce** effect applied and want to remove it (even after the file has been saved and re-opened), select the shape and go to **Object>Remove Effects**.
- If you are unable to get an even pattern, then try using the **Rhinestone** effect instead. Refer to *Section 7.12* and enter the smallest rhinestone circle size available: SS000.

### 8.11 Nest

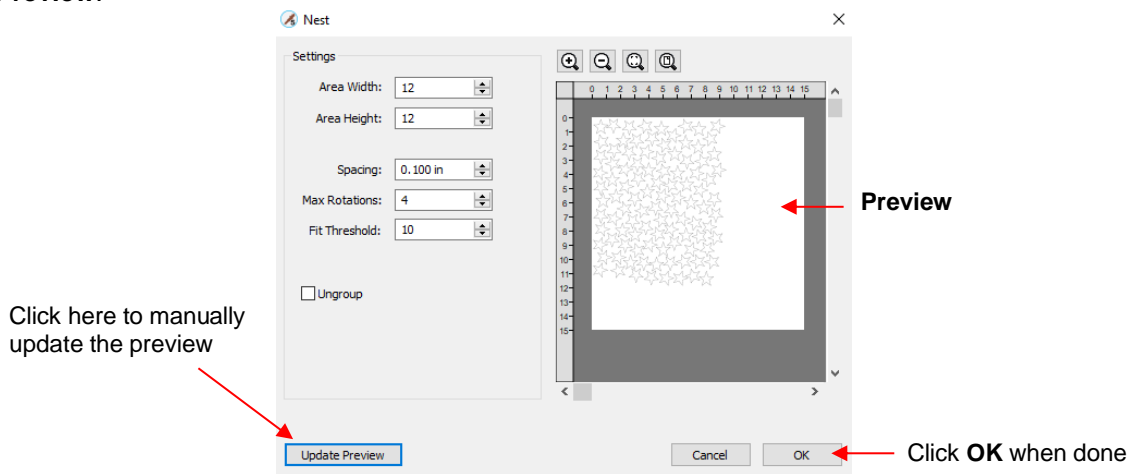
- The **Nest** function rearranges all of the shapes on the current page in an effort to economize the area occupied.
- For example, let's say you want to cut out these 100 stars from a sheet of 12 x 12 cardstock:



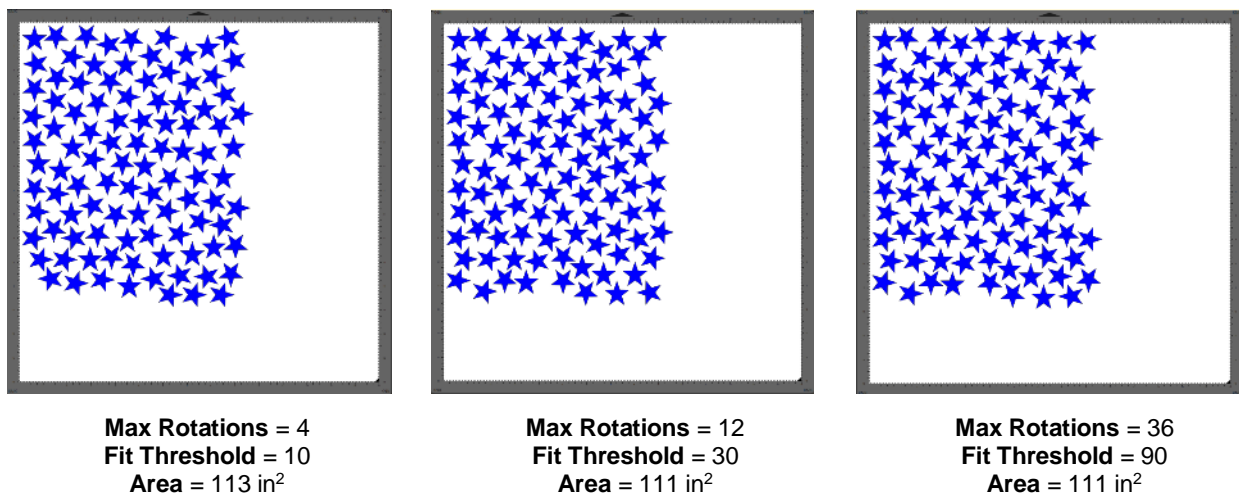
- To access the **Nest** function, go to **Effects>Nest**. The following window opens:



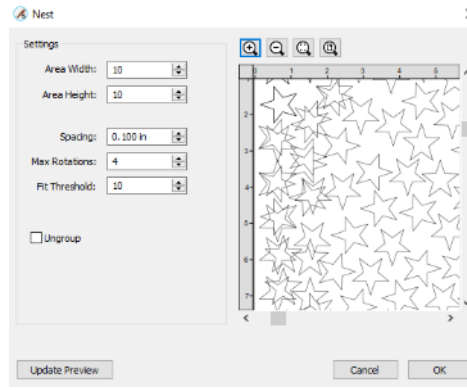
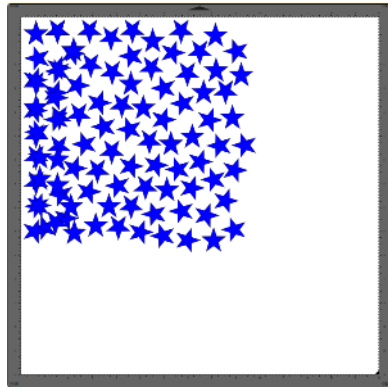
- ◇ **Area Width** and **Area Height**: Enter the dimensions of the material from which you will be cutting so that the nesting will arrange the shapes within that available area, if possible.
- ◇ **Spacing**: Enter the minimum distance allowed between shapes.
- ◇ **Max Rotations**: Shapes will be rotated in an effort to pack them together more closely. The maximum rotations allowed can be set between 0 and 100. However, the more rotations you select, the longer the rendering time for the nesting function. Note: When cutting from a material, such as patterned paper, where the shapes need to be oriented as designed on the **Cutting Mat**, set **Max Rotations** to 0 so that none of the shapes will be rotated during the nesting process.
- ◇ **Fit Threshold**: A setting between 1 and 100, with a higher value attempting to pack the shapes closer together than a lower value. As with **Max Rotations**, the higher the number, the longer the rendering time for the nesting function.
- ◇ **Ungroup**: If any of the shapes are grouped together, but you do not want them treated as a group when nesting, mark this option.
- Clicking on **Update Preview** will perform the nesting process and the resulting arrangement will appear in the **Preview**:



- **IMPORTANT:** Choosing very high values for **Max Rotations** and **Fit Threshold**, when there are many shapes on the page, can lead to freezing of the software. Testing has shown that the amount of space saved may not amount to much compared to more conservative settings:

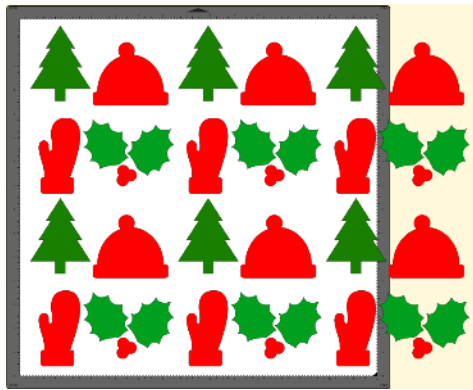


- **IMPORTANT:** Be sure to check the arrangement before cutting to make sure there is no overlap. For example, if the available cardstock had only been 10" x 10", then overlap between the shapes would have occurred:



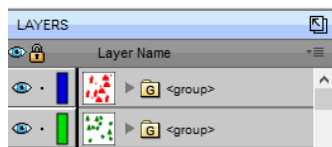
◇ This could also have been caught while still in the **Nest** window by carefully checking the **Preview** and zooming in, as shown above.

- Nesting isn't restricted to identical shapes. In this next example, Christmas shapes are to be cut from red and green cardstock:



◇ Note that the shapes extend beyond the boundary of the **Cutting Mat**. This is not an issue for the **Nest** function.

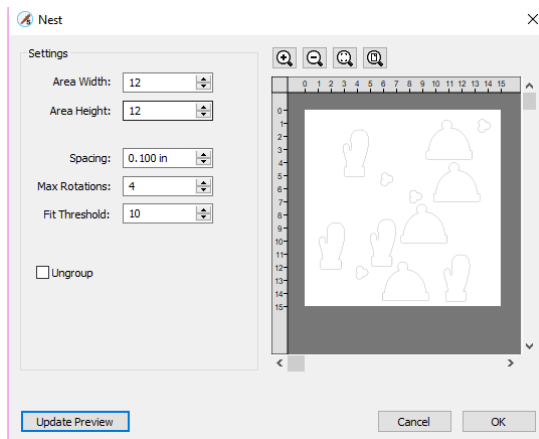
◇ The green shapes are all selected and grouped together on the **Layers Panel**, as are the red shapes:



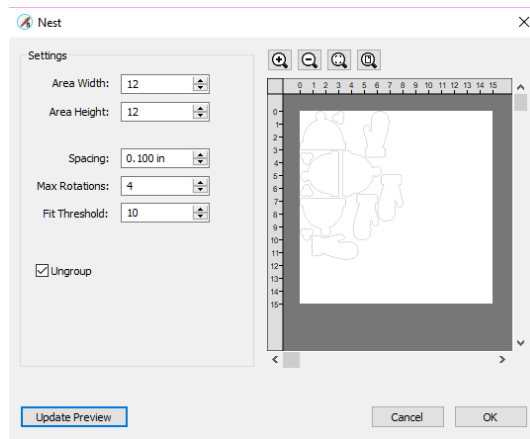
◇ **IMPORTANT:** Even if you were to lock or hide one of the layers, the **Nest** function will attempt to include it. Thus, separate the layers onto their own pages.

◇ Taking the red layer onto a new page, in the **Nest** window the dimensions of the cardstock are entered, along with the other settings.

◇ **IMPORTANT:** Because the shapes are grouped, the option for **Ungroup** should be marked before clicking on **Update Preview**. Otherwise the group will be treated as a single object and the individual shapes will not be nested at all:

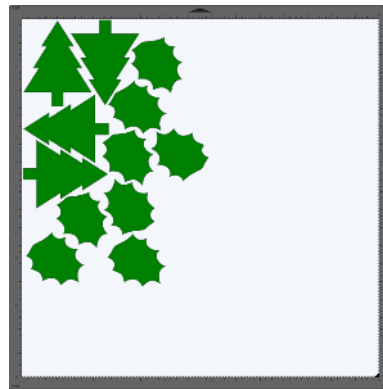
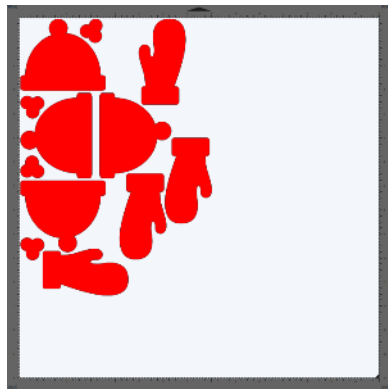


**Ungroup** not checked:  
shapes are not nested











**Ungroup** checked:  
shapes are nested








- ◇ The process is repeated for the green shapes, again making sure there are no other hidden layers and that the **Ungroup** box is checked before applying **Update Preview**. End result: two pages with the red shapes nested on one and the green shapes nested on the other:




## Appendix A Shortcuts and Icons in SCAL5

<u>Shortcut</u>	<u>Icon</u>	<u>Description</u>	<u>Menu (m:) and/or Icon (i:) Location</u>
<b>Main Screen and Project Functions</b>			
Ctrl+N		Open a new file/project	m:File>New Project i:Toolbar
Ctrl+O		Open an existing .scut file/project	m:File>Open Project i:Toolbar
Ctrl+S		Save a file/project	m:File>Save Project i:Toolbar
Ctrl+Shift+S		Save file/project in new location	m:File>Save Project As
Ctrl+W		Close current project	m:File>Close Project
Ctrl-Shift+W		Close all projects	m:File>Close All Projects
Ctrl+P		Print	m:File>Print
Ctrl+Z		Undo last action	m:Edit>Undo i:Toolbar
Ctrl+Shift+Z		Redo last action	m:Edit>Redo i:Toolbar
		Open Document Panel	i:Properties Panel
		Pop out a panel	i:Properties Panel
		Return panel to Properties Panel	i:Properties Panel
Right click>Mat Size		Change the size of the Cutting Mat	m:Cutter>Mat Size
Right click>Mat Orientation		Toggle between Landscape and Portrait	m:Cutter>Mat Orientation
Right click>Show Rulers		Toggles Rulers on and off	
Right click>Ruler Units		Set units for software: in, cm, mm	m:View>Ruler Units
Alt+F4		Close SCAL	m:File>Exit





### Zooming and Panning Tools

Z		Zoom in on selected area by dragging mouse	i:Tools Panel
Ctrl+ +++ (or right click>Zoom In)		Zoom in	m:View>Zoom In i:Tools Panel>Tool Options
Ctrl+ --- (or right click>Zoom Out)		Zoom out	m:View>Zoom Out i:Tools Panel>Tool Options
Ctrl + Shift + = (or click on Zoom tool and drag mouse)		Zoom to selected shape	m:View>Zoom Selection i:Tools Panel>Tool Options
Ctrl+F		Zoom so cutting mat fits in window	m:View>Fit to Window i:Tools Panel>Tool Options
Alt+roll mouse wheel		Zoom in and out, centered on middle of cutting mat	
H		Pan workspace	i:Tools Panel
Spacebar+drag left mouse button		Pan workspace while in Select mode or in Zoom mode	




**Shortcut****Icon****Description****Menu (m:) and/or Icon (i:) Location****Help**

		Open Hints window	i:Properties Panel
F1		Open Help window	m:Help>Help





**Importing and Exporting**

Ctrl+Shift+I		Import a file	m:File>Import i:Toolbar
Ctrl+Shift+E		Export a file (save in a different format)	m:File>Export
Ctrl+Shift+T		Open Trace Image window	m:File>Trace Image i:Toolbar
Ctrl+1		Open the Library window	m:Window>Library i:Toolbar
		Open the eshape store window	m:File>eshape Store i:Toolbar


**Selecting and Moving Shapes**

V		Left click on shape to select it	i:Tools Panel
Shift + click on shape		Add additional shapes to selection	i:Tools Panel
Freely drag mouse around shapes		Lasso select shapes	i:Tools Panel
Ctrl+A (or right click>Select All)		Select all shapes	m>Edit>Select All
Ctrl+Shift+A (or right click>Deselect All)		Deselect all shapes	m>Edit>Deselect All
Right click>Transform>Move		Move a shape to a new location	
















**Duplicating Shapes**

Alt + drag shape		Creates a duplicate of the shape being dragged	i:Tools Panel
Alt + click on shape		Creates a duplicate of shape on top of original	i:Tools Panel
Ctrl+C (or right click>Copy)		Copy to clipboard	m>Edit>Copy i:Toolbar
Ctrl+V (or right click>Paste)		Paste from clipboard	m>Edit>Paste i:Toolbar
Ctrl+Shift+V (or right click>Paste in Place)		Paste in place from clipboard (on top of original)	m>Edit>Paste in Place
Ctrl+Alt+Shift+V		Fill the grid with selection from clipboard	m>Edit>Paste (Auto Fill)
Ctrl+D		Create duplicate copies of selected shape (s)	m:Object>Duplicate
Ctrl+Shift+D		Create duplicate copies in a circular formation	m:Object>Duplicate Rotated






**Shortcut****Icon****Description****Menu (m:) and/or Icon (i:) Location****Cutting/Deleting Shapes**

Ctrl+X (or right click>Cut)		Cut to clipboard	m:Cut to clipboard
Del (or right click>Delete)		Delete selected shape(s)	
Hold Del and click on one shape at a time		Deletes each shape as it is left clicked	







**Text and Font Icons**

		Open Text Panel	i:Properties Panel
		Bold	i:Text Panel
		Italic	i:Text Panel
		Reload installed fonts list	i:Text Panel
		Load a font	i:Text Panel
		Left align text	i:Text Panel
		Center align text	i:Text Panel
		Right align text	i:Text Panel
		Justify text	i:Text Panel
		Add font to Favorites	i:Text Panel i: Library>Fonts tab
T		Type text	i:Tools Panel
T		Vertical type	i:Tools Panel
T		Type on path	i:Tools Panel
T		Type on arch	i:Tools Panel
Hold Ctrl		Resize, rotate, move text while in Text mode	i:Tools Panel
		Stencil Bridge: Connect interior shapes to the outside	i:Tools Panel





**Library**











Ctrl+1		Open the Library window	m:Window>Library i:Toolbar
		Add folder	i:Library>Shapes tab i:Library>Project tab
		Delete folder	i:Library>Shapes tab i:Library>Project tab
		Add file to selected folder	i:Library>Shapes tab i:Library>Project tab
		Refresh	i:Library>Shapes tab i:Library>Project tab















<u>Shortcut</u>	<u>Icon</u>	<u>Description</u>	<u>Menu (m:) and/or Icon (i:) Location</u>
<b>Library (cont.)</b>			
		Change to List View	i:Library>Shapes tab i:Library>Project tab
		Change to Thumbnail View	i:Library>Shapes tab i:Library>Project tab
		Search on keyword	i:Library>Shapes tab i:Library>Project tab
		Sync with eStore or access Download Manager	i:Library>Shapes tab i:Library>Project tab
		Temporarily open a font	i:Library>Fonts tab
		Add font to Favorites	i:Library>Fonts tab

### Manipulating and Coloring Shapes












		Open Position & Size Panel	i:Properties Panel
Right click>Transform>Scale		Resize a selected shape	
Right click>Transform>Rotate		Rotate a selected shape	i:Position & Size Panel
Right click>Transform>Flip Horizontal		Mirror/Horizontally flip a selected shape	i:Position & Size Panel
Right click>Transform>Flip Vertical		Vertically flip a selected shape	i:Position & Size Panel
Ctrl+Shift+Up (or right click>Arrange>Bring to Front)		Bring selected shape to top	m:Object>Arrange>Bring to Front
Ctrl+Up (or right click>Arrange>Bring Forward)		Bring selected shape up one level	m:Object>Arrange>Bring Forward
Ctrl+Down (or right click>Arrange>Send Backward)		Send selected shape down one level	m:Object>Arrange>Send Backward
Ctrl+Shift+Down (or right click>Arrange>Send to Back)		Send selected shape to the bottom	m:Object>Arrange>Send to Back
Ctrl+Alt+L (or right click>Lock)		Lock selected shape	m:Object>Lock
Ctrl+Alt+Shift+L (or right click>Unlock All)		Unlock all shapes	m:Object>Unlock All
Right click>Hide		Hide select shape	m:Object<Hide
Right click>Show All		Show all shapes	m:Object>Show All
Ctrl+G (or right click>Group)		Group selected shapes	m:Object>Group
Ctrl+Shift+G (or right click>Ungroup)		Ungroup selected shapes	m:Object>Ungroup
Ctrl+B (or right click>Break Apart)		Break a shape into all of its individual paths	m:Object>Break Apart
Ctrl+Shift+B		Join selected shapes into a single shape	m:Object>Merge

<u>Shortcut</u>	<u>Icon</u>	<u>Description</u>	<u>Menu (m:) and/or Icon (i:) Location</u>
<b>Manipulating and Coloring Shapes (cont.)</b>			
		Open Fill & Stroke Panel	i:Properties Panel
		Stroke with pointed corners	i:Fill & Stroke Panel
		Stroke with rounded corners	i:Fill & Stroke Panel
		Stroke with beveled corners	i:Fill & Stroke Panel
		Butt end cap	i:Fill & Stroke Panel
		Round end cap	i:Fill & Stroke Panel
		Extended end cap	i:Fill & Stroke Panel
		Copy a Fill and/or Stroke color from one shape to another	i:Tools Panel
		Edit a gradient start and end points	i:Tools Panel
		Distort a shape	i:Tools Panel






#### Layers Panel






		Open Layers Panel	i:Properties Panel
Right click>Hide		Hide a layer	m:Object>Hide i:Layers Panel
		Show a layer	i:Layers Panel
		Open Layer Options Menu	i:Layers Panel
Right click>Hide all (or click icon > Show/Hide>Hide All Layers)		Hide all layers	m:Layer>Show/Hide>Hide All Layers i:Layers Panel
Right click>Show All (or click icon > Show/Hide>Show All Layers)		Show all layers	m:Layer>Show/Hide>Show All Layers i:Layers Panel
Ctrl+Alt+L (or right click>Lock)		Lock a layer	m:Object>Lock i:Layers Panel
		Unlock a layer	i:Layers Panel
Right click>Lock All (or click icon > Lock/Unlock>Lock All Layers)		Lock all layers	m:Layer>Lock/Unlock>Lock All Layers i:Layers Panel
Ctrl+Alt+Shift+L (or right click>Unlock All) (or click icon > Lock/Unlock>Unlock All Layers)		Unlock all layers	m:Layer>Lock/Unlock>Unlock All Layers i:Layers Panel
Right click>Delete		Delete the selected layer	m:Layer>Delete Current Layer i:Layers Panel
		Create a new layer	m:Layer>Add Layer Folder i:Layers Panel

**Shortcut****Icon****Description****Menu (m:) and/or Icon (i:) Location****Designing Tools**




Alt+U (or right click>Path>Union)		Weld selected shapes to remove overlap	m:Path>Union
Right click>Path>Intersection		Apply the Boolean Join intersection to two shapes	m:Path>Intersection
Right click>Path>Exclude		Apply the Boolean Join exclude to two shapes	m:Path>Exclude
Right click>Path>Front Minus Back		Apply the Boolean Join front minus back to two shapes	m:Path>Front Minus Back
Right click>Path>Back Minus Front		Apply the Boolean Join back minus front to two shapes	m:Path>Back Minus Front
P		Draw straight lines and Bézier curves	i:Tools Panel
		Freehand draw thin lines	i:Tools Panel
		Freehand draw thick lines	i:Tools Panel
		Draw rectangle or square	i:Tools Panel
		Draw rounded rectangle or rounded square	i:Tools Panel
		Draw circle or oval	i:Tools Panel
		Draw triangle	i:Tools Panel
		Draw polygon	i:Tools Panel
		Draw star	i:Tools Panel
		Draw spiral	i:Tools Panel
		Measure distances and angles on screen	i:Tools Panel
Right click>Appearance>Add Shadow Layer		Add an outline or inline to a selected shape	m:Effects>Shadow Layer
Right click>Appearance>Lattice		Create a lattice design in a selected shape	m:Effects>Lattice
Right click>Appearance>Rhinstones		Create a rhinestone outline or fill on a selected shape	m:Effects>Rhinstones

**Editing Tools**

A		Move or reshape a path or move and edit nodes	i:Tools Panel
		Erase parts of a shape	i:Tools Panel
		Knife: Make thin, straight-line cuts through a shape	i:Tools Panel
		Crop: Drag the mouse to marquee-select an area to be retained	i:Tools Panel
Alt + drag Bezier control point		Only reshape the current path and not adjoining path	i:Tools Panel

<u>Shortcut</u>	<u>Icon</u>	<u>Description</u>	<u>Menu (m:) and/or Icon (i:) Location</u>
<b>Editing Tools (Cont.)</b>			
Right click>Path>Simplify		Reduce the number of nodes in the selected shape	m:Path>Simplify
Right click>Path>Split Path		Break the path between the two selected nodes	m:Path>Split Path i:Tools Panel
Right click>Path>Reverse Path		Reverses the direction the path will cut	m:Path>Reverse Path
Right click>Path>Object to Path		Remove the text, rhinestone or lattice status	m:Path>Object to Path
Right click>Path>Close Path		Close shape by adding a straight line between the start and ending nodes	m:Path>Close Path
Right click>Path>Convert Node to Corner		Convert current selected node to corner	i:Tools Panel>Tool Options
Right click>Path>Convert Node to Cusp		Convert current selected node to cusp	i:Tools Panel>Tool Options
Right click>Path>Convert Node to Smooth		Convert current selected node to smooth	i:Tools Panel>Tool Options
Right click>Path>Convert Node to Symmetric		Convert current selected node to symmetric	i:Tools Panel>Tool Options
Right click>Path>Path Details		Show path to be travelled when shape cuts	

### Output

Shift+Ctrl+C		Open Cut Settings window for current default cutter	m:Cutter>Cut with (name of cutter) i:Toolbar
Ctrl+Shift+P		Show preview of cut shapes and/or print shapes	m:Cutter>Preview i:Toolbar
Ctrl+P		Open print window	m:File>Print
		Open Style Panel	i:Properties Panel

## Appendix B Troubleshooting FAQ's

### B1 Cutting/Drawing Issues

*I am getting large lines sliced through all of my cuts.*

- Your Sure Cuts a Lot software is still in trial mode. You need to register your copy of SCAL5. Refer to *Section 1.01.2*.
- 

*My shapes are drawing (cutting) off the material. What am I doing wrong?*

- When setting the origin, make sure you are using the tip of the blade as the reference point or, in some cases, the laser light on your cutter.
  - Check whether your **Cutting Mat** is in **Portrait** or **Landscape** mode. This will change whether your image appears the same way you see it on the screen or rotated 90 degrees relative to the screen.
  - Check which **Cut Mode** is set in the **Cut Settings** window.
  - Details on these various settings are covered in *Section 8.07*.
- 

*I'm drawing with a pen and there are bubbles at the corners.*

- For perfect corners when using a pen, turn off **Blade Offset** (set to 0) since you do not need an offset for pens (or other tools like embossers and engravers).
- 

### B2 Software Issues

*I noticed that some of the settings I see in the screenshots in this manual are not in my version.*

- As long as you are staying up to date with SCAL releases, then these are most likely settings only available in the Pro version of SCAL5.
- 

*The **Shapes** tab in the **Library** doesn't show any shapes. Do I need to install them separately? I'm on a Mac.*

- This occurs when the user has dragged the Sure Cuts A Lot program to the desktop. It needs to remain in the **Sure Cuts A Lot 5** subfolder inside **Applications**.
- 

*I set the **Cut Line Type** to **Draw (Pen)** but my shapes are not being drawn. Nothing is happening.*

- In the **Cut Settings** window, you need to change the **Holder** setting to **Pen**.
-

*I installed some fonts inside of SCAL but they are no longer there!*

- SCAL allows you to open a font for temporary use but once you close SCAL, it is uninstalled. That's why you also need to convert any text that was created with that font before saving your file. Refer back to Section 4.02.3 for more details.
- 

*I'm trying to use the **Pattern Fill** feature to fill some shapes with a digital scrapbooking paper file. The pattern doesn't look right.*

- Most digital scrapbooking papers are designed for 12" x 12" printing. Thus, in the **Pattern Fill** window, set the **Width** and **Height** equal to 12 inches.
- 

*I'm doing a PNC project and the registration marks are not printing. I have the option selected in the **Print** settings but I also don't see them under **Preview** or when I turn on the **Show Reg Marks** on the **Document Panel**.*

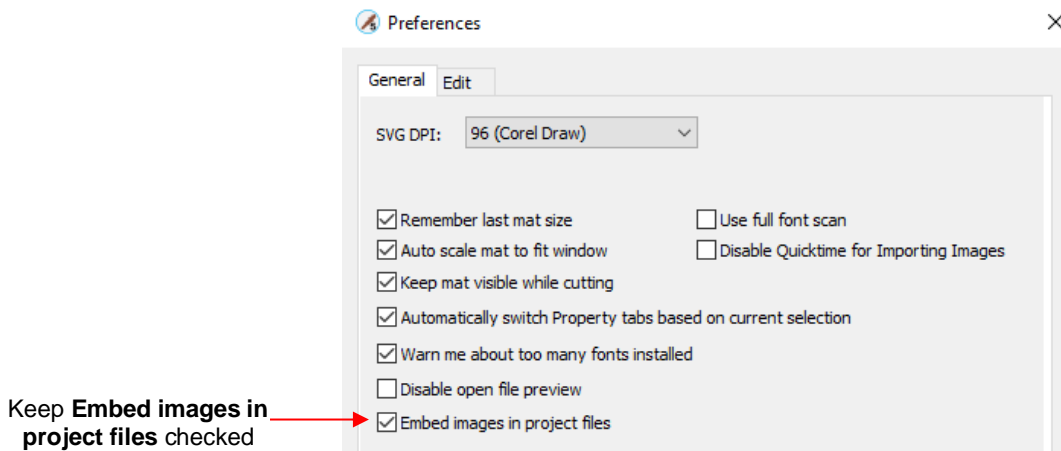
- Go to the **Cut Settings** window and verify that you do not have the option for **Cut Selection Only** checked.
  - Make sure you have the layer that will be cut showing on the **Layers Panel**.
  - Make sure you have a cutter added that has print and cut functionality. Refer to *Section 1.01.4*.
- 

*Help! I created and saved a file but I can't get it to reopen. It says that it's invalid or corrupt.*

- This can happen if you close SCAL before the file has finished saving. Unfortunately, there's no fix.
- 

*Everytime I open a SCUT file where I've previously imported a JPG (or PNG, BMP) image, the image isn't there. How do I fix it so that it will save the image?*

- Go to **Edit>Preferences** and make sure the **Embed images** option is marked:



I've read that SCAL is regularly updated but when I click on **Help>Check for Updates**, it always says "You're up to date."

- That feature never seems to work in SCAL. Instead, check this link to download the latest version.

<http://www.craftededge.com/download/download.html>

- Also note that it probably doesn't show the latest version at the web site. For example, in this screenshot, it indicates that 5.000 is the latest version but when the download is made, the version is actually 5.020:

**Sure Cuts A Lot 5**  
Download "Sure Cuts A Lot 5"  
Cut virtually any shape with your BossKut Gazelle™, CraftROBO/Graphtec™, eCraft™, GCC™, KNK™, Pazzles™, Silhouette™, Silver Bullet™, USCutter™, VinylExpress™, Wishblade™, & more. Export files for Brother ScanNCut™ & Cricut Explore™. [\[Learn More...\]](#)

Windows XP SP3/Vista/7/8/10  
5.000 [\[version history\]](#)  
[How to check if you are using 32 or 64 bit Windows](#)  
DOWNLOAD (64 bit)  
DOWNLOAD (32 bit)  
PURCHASE

Mac OS 10.10 - 10.14  
5.000 [\[version history\]](#)  
If you are using Mac OS 10.6 - 10.10, you can [download Sure Cuts A Lot version 4](#)  
DOWNLOAD  
PURCHASE

Not updated regularly →

This software will run in trial mode and will cut a horizontal line through your design as a DEMO watermark until you [purchase a license](#). Trial will expire after 15 days.

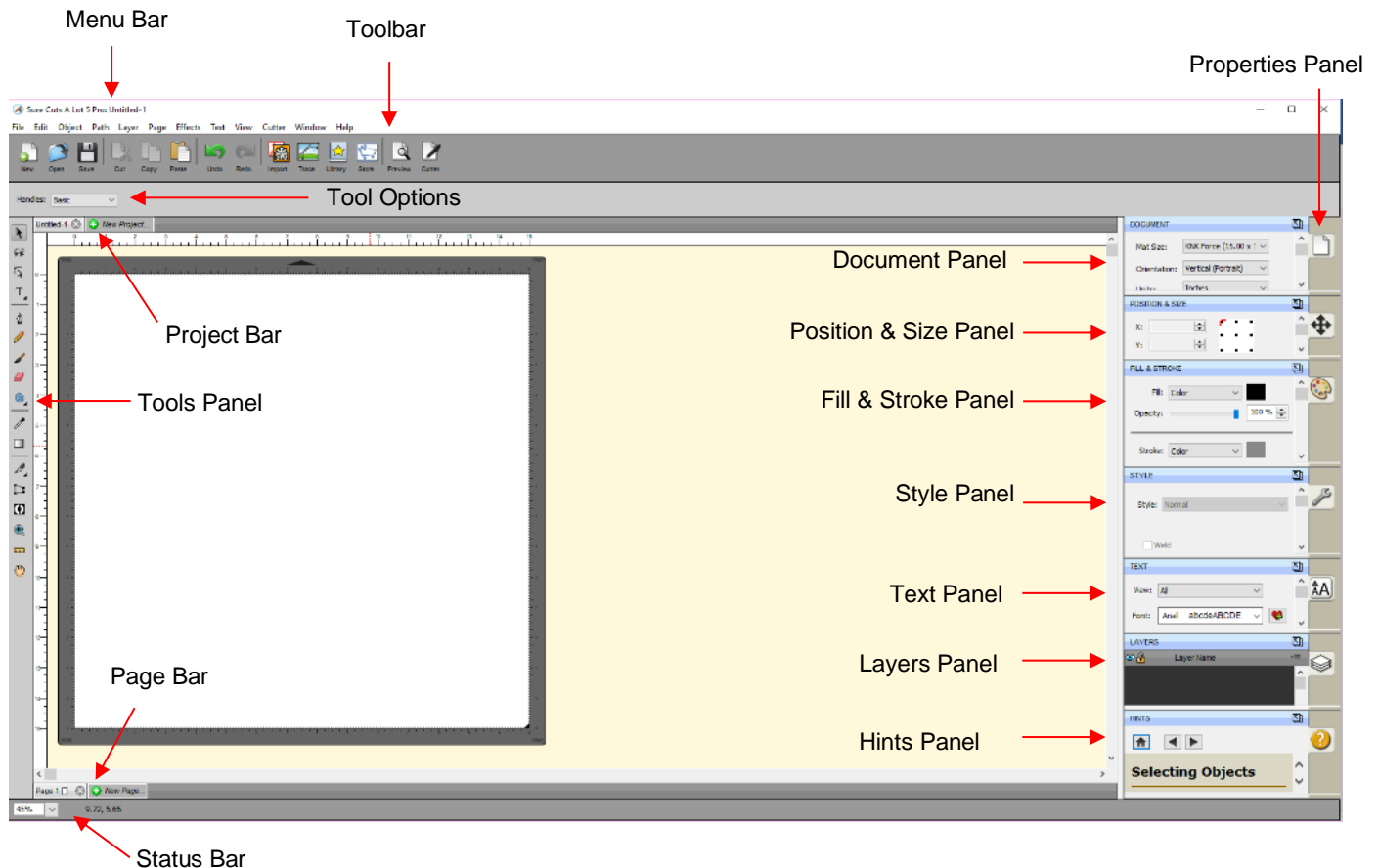
SCAL is suddenly not opening. I get an error message about a problem with the Library.

- This can happen when there's a new file in the **Library** that is invalid for some reason.
  - ◇ On your computer, go to **Documents>Craft Edge**.
  - ◇ There are two personal folders there that are accessed by the **Library**: **My Projects** and **My Designs**.
  - ◇ Copy and paste those two folders to a new location outside of the **Craft Edge** folder.
  - ◇ Delete all files in those two folders that are still in the **Craft Edge** folder.
  - ◇ Verify that you can now open SCAL successfully. If not, start a support ticket at [CraftEdge.com](http://CraftEdge.com). Otherwise, you can now begin copying/pasting back the older files based on their **Modified Date** since it's most likely a newer file in one of those two folders that caused the issue.

## Appendix C SCAL Details

### C1 Screenshot of SCAL Screen

Below is a screen shot of the main screen in SCAL identifying ONLY **Bars** and **Panels**.



### C2 Bars

- The bars in SCAL have components positioned left to right. The following sections present the five bars and where to find more information for each item on that bar.

#### C2.1 Menu Bar

- Like most computer applications, the **Menu Bar** is located at the top of the screen and provides access to most of the functions in the software.

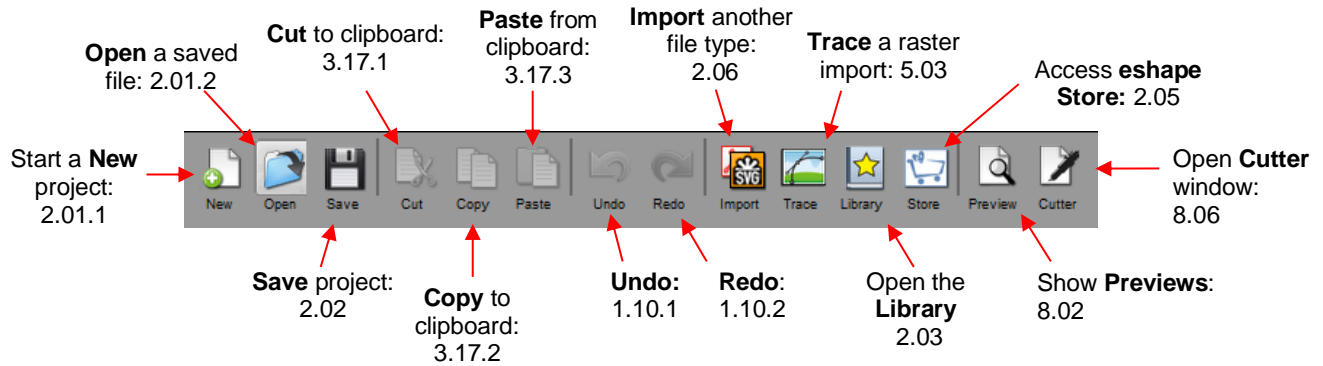
File Edit Object Path Layer Page Effects Text View Cutter Window Help

- Throughout the user manual, a reference such as this: Go to **Path>Simplify** refers to using the **Menu Bar** to access a function. In this case, you would click **Path** on the **Menu Bar** and then click on **Simplify** in the submenu that appears.
- Because there are dozens of submenu options, each one isn't listed with a reference. Instead, it is recommended that you use a search function to locate any given listing within the user manual.



## C2.2 Toolbar

- The **Toolbar** is located at the top of the screen, just below the **Menu Bar**.



## C2.3 Projects Bar

- The **Projects Bar** is presented in *Section 1.11*.



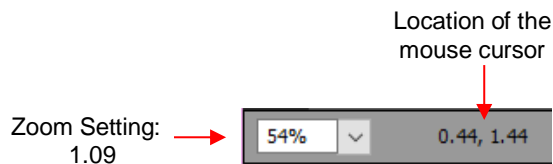
## C2.4 Pages Bar

- The **Pages Bar** is presented in *Section 1.11*.



## C2.5 Status Bar

- The **Status Bar** is located at the bottom of the screen:



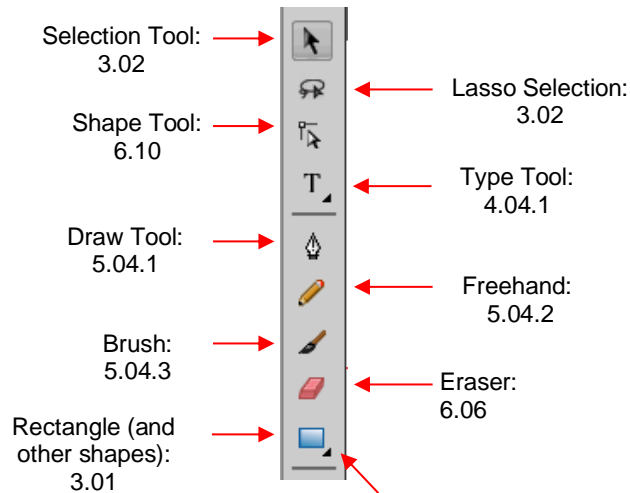
## C3 Panels

- The panels in SCAL have components positioned top to bottom. The following sections present the panels and where to find more information for each item on that panel.

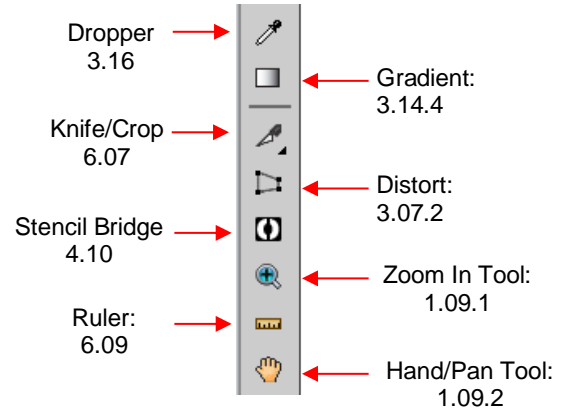
### C3.1 Tools Panel

- The **Tools Panel** is located along the left side of the screen:

### Upper part



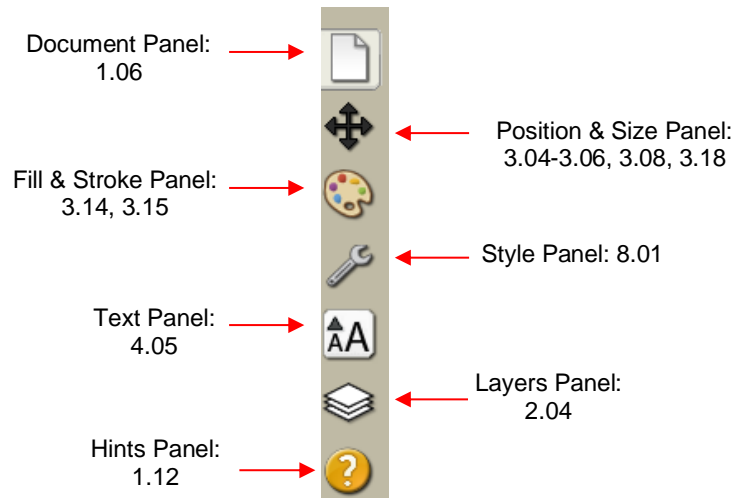
### Lower part



Note: Icons with a small black arrow have more options when left mouse button is held down

## C3.2 Properties Panel

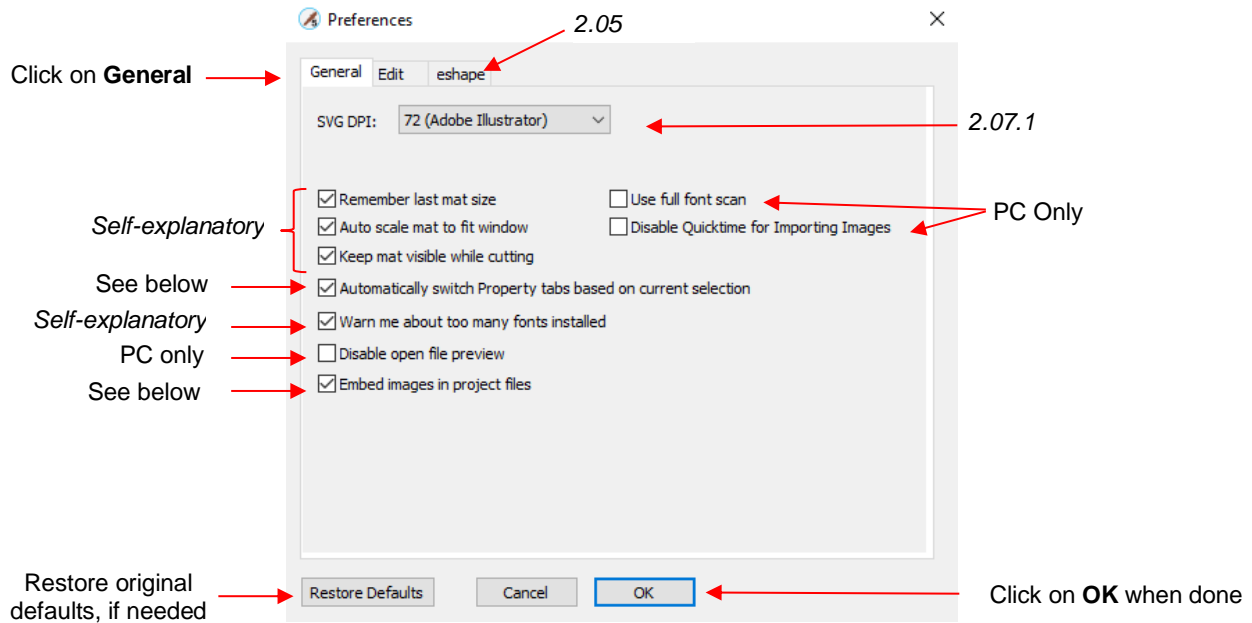
- The **Properties Panel** is located on the right side of the screen and contains 7 subpanels:



## C4 Preferences

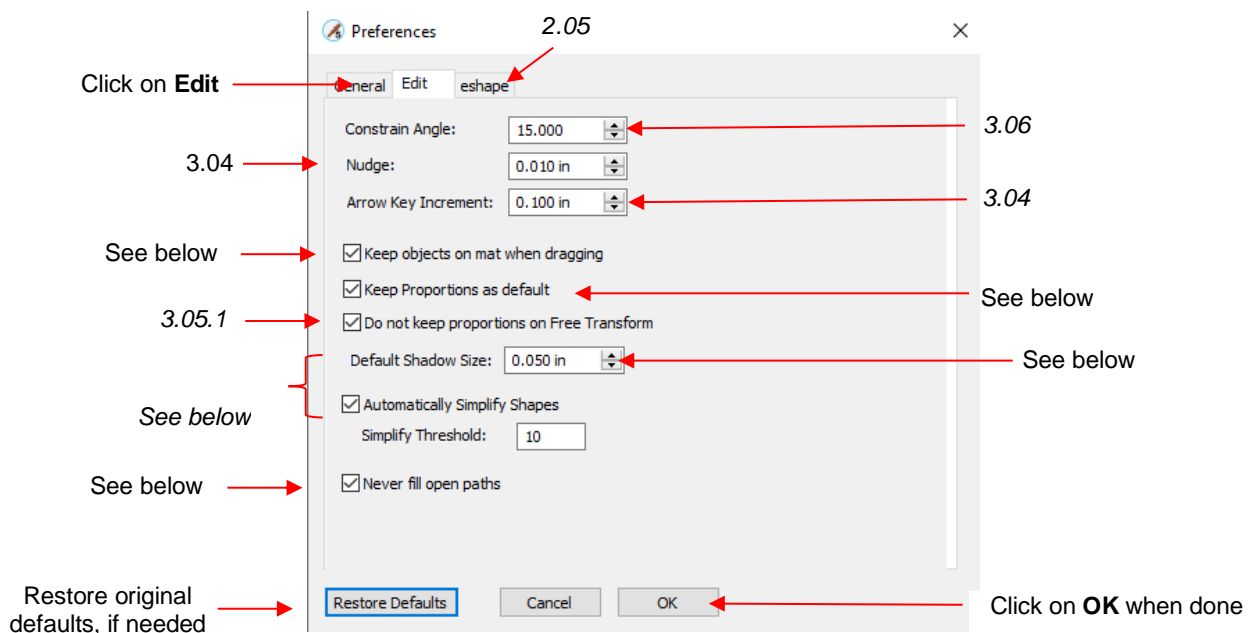
- The following preferences can be found under **Edit>Preferences** (or, on a Mac, press **Command + ,**). If the preference was already presented in other sections, it is noted in the screen shots. For those not previously mentioned, details are presented if they are considered important.

## C4.1 Preferences: General Tab

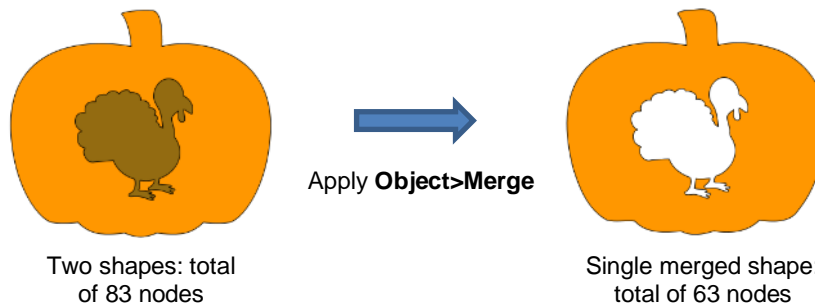


- **Automatically switch Property tabs based on current selection:** with this option turned on, the **Properties Subpanel** related to the task at hand will open. For example, when you select a shape, the **Position & Size Panel** will open. When you click on the **Type Tool**, the **Text Panel** will open.
- **Embed images in project files:** With this option marked, any imported raster images (PNG, BMP, JPG, and GIF) will be retained in the file when the file is saved. Unmarking this option will cause imported raster images to not be saved, thus not present when you reopen a saved file. Thus, when doing print and cut applications, you're most likely going to want that original image saved, so it is highly recommended that this option remain checked

## C4.2 Preferences: Edit Tab

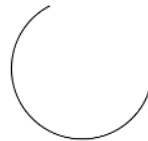


- **Keep objects on mat when dragging:** With this option checked, you cannot drag shapes beyond the outside borders of the **Cutting Mat**. You can, however, move them beyond the **Cutting Mat** by entering the desired **X, Y** location on the **Position & Size Panel**.
- **Keep Proportions as default:** With this option checked, the **Keep Proportions** setting on the **Position & Size Panel** will automatically be checked when you launch SCAL and will remain checked until you uncheck it. If you choose to uncheck this option, you will need to relaunch SCAL and the **Keep Proportions** setting will be unchecked.
- **Default Shadow Size:** This affects the initial **Size** shown under **Effects>Shadow Layer**.
- **Automatically Simplify Shapes:** With this option checked, nodes will be reduced after certain functions are applied. For example, the following two shapes (pumpkin and turkey) have a total of 83 nodes. If you select them and apply **Object>Merge** so that the inside turkey will cut before the outside pumpkin, the total number of nodes is reduced to 63 because of the **Automatically Simplify Shapes** option being checked.

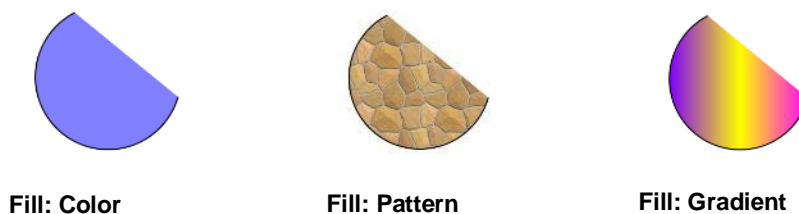


- **Never fill open paths:** Unlike most other vector programs, SCAL offers the ability to fill open shapes by applying an invisible straight line to close the shape. By unchecking this option and selecting a **Fill Color**, **Pattern**, or **Gradient**, the open shapes on your **Cutting Mat** will contain that **Fill**.

◇ For example, here is a circle with a section cut off. The option to **Never fill open paths** is still checked:



◇ The **Never fill open paths** is now unchecked and various **Fills** options applied:



◇ Note that even though the shape appears to be closed, it is not. If you were to cut this shape, it would still be attached to the outside material.

## **ACKNOWLEDGEMENTS**

Please send an email to [smccauley45@cox.net](mailto:smccauley45@cox.net) if any errors are found in this manual or if you have suggestions for additions or changes.

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Sandy McCauley: <http://www.iloveknk.com/>