

# SCAL4 User Manual

June 29, 2018

## Where are Chapters 1 and 2?

- This user manual is based on SCAL4 version 4.072. Because it is included in the various Klic-N-Kut User Manuals, the first chapter is titled Chapter 3.
- Chapters 3 through 9 are appropriate for all owners of SCAL4 and SCAL4 Pro. Functions that are only available in the Pro version are noted as so.
- Chapter 10 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 SCAL5 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.
- 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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## 3. SCAL: Installation, Preferences, and Workspace

This chapter begins the Sure Cuts a Lot User Manual and is based on Version 4.072.

### 3.01 Installing SCAL

#### 3.01.1 Selecting and Downloading the Software

- *Sure Cuts A Lot 4* (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>

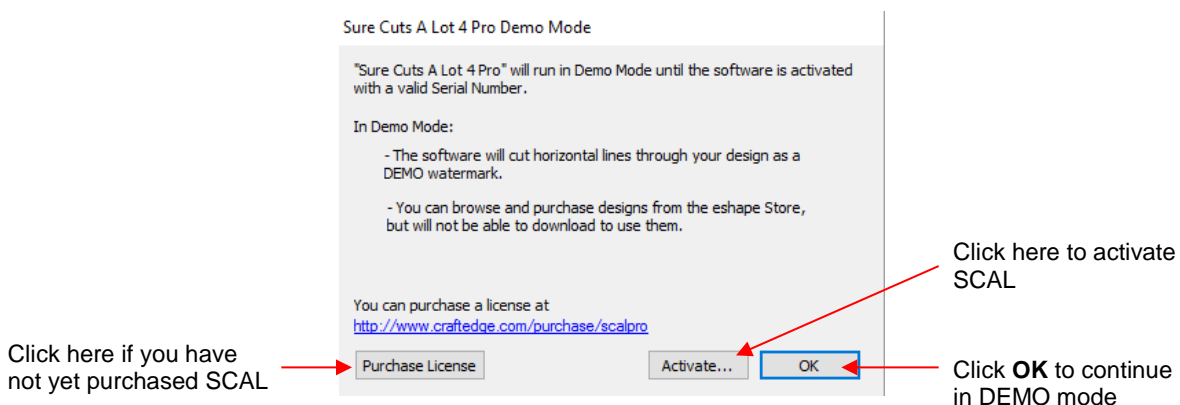
- The additional features in the PRO version are detailed at the following link:

[http://www.iloveknk.com/wp-content/uploads/Info/SCAL4\\_Pro\\_Features.pdf](http://www.iloveknk.com/wp-content/uploads/Info/SCAL4_Pro_Features.pdf)

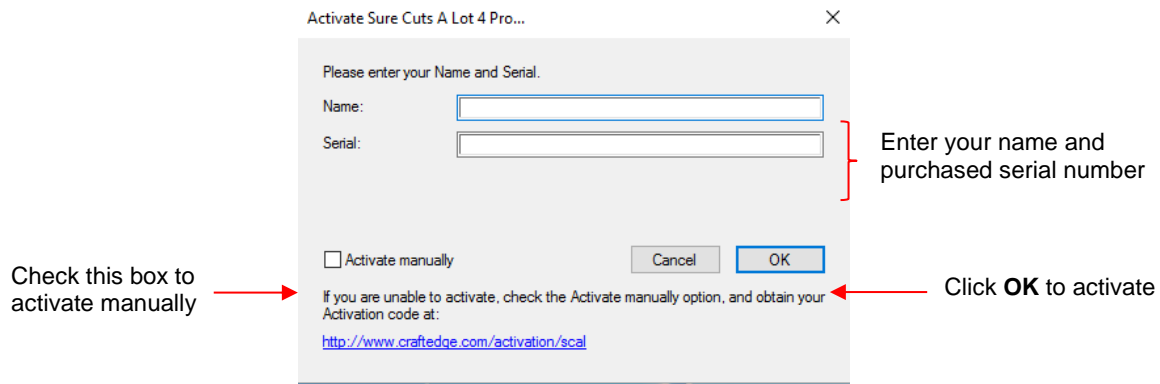
- Install the downloaded file and open SCAL. The software will run in DEMO mode until a registration is purchased. This mode will have the following limitations:
  - ◇ When cutting, horizontal lines will be added across the design
  - ◇ Digital shapes from the **eshape Store** cannot be downloaded
  - ◇ Exporting will add a DEMO watermark
- Note that the demo version of SCAL4 will expire after 15 days.

#### 3.01.2 Activating the Software

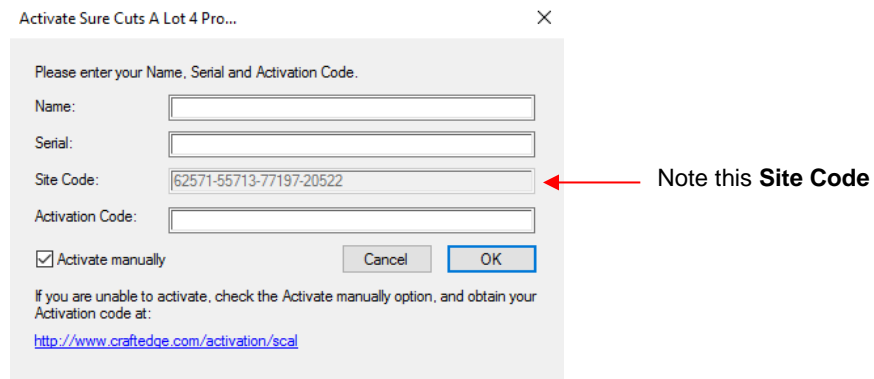
- To convert the DEMO version into a registered version, click on **Activate** when opening the software and seeing this popup screen:



- **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**.

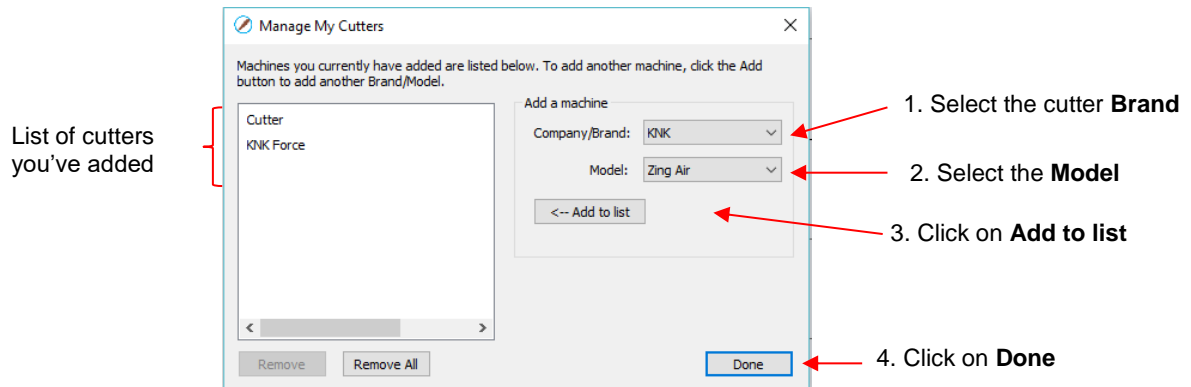
### 3.01.3 Installing the USB Driver

- If the cutter you are using connects via a USB cable, download and install the correct driver by going to **Help>Install Driver**. If you own a Klic-N-Kut, please go the following link to download the appropriate driver for your model:

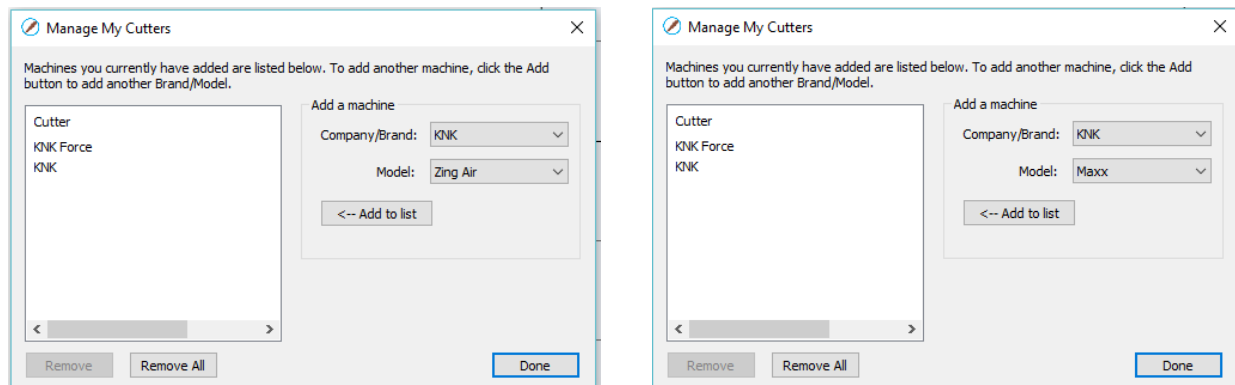
<http://knkusa.com/resources/>

### 3.01.4 Installing Your Cutter

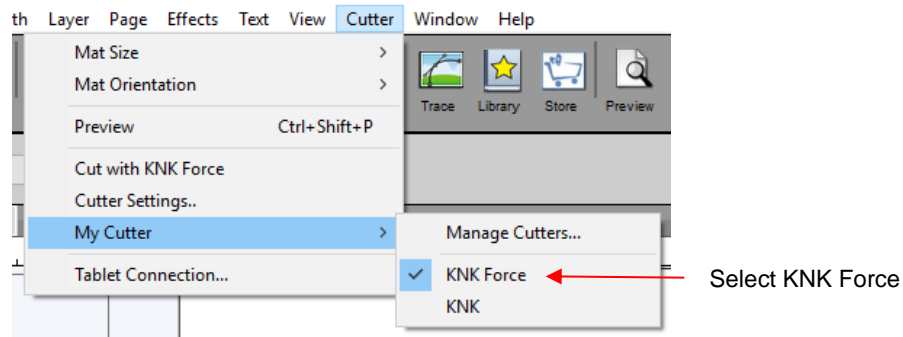
- Go to **Cutter>My Cutter>Manage Cutters** and the following window will open:



- 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.

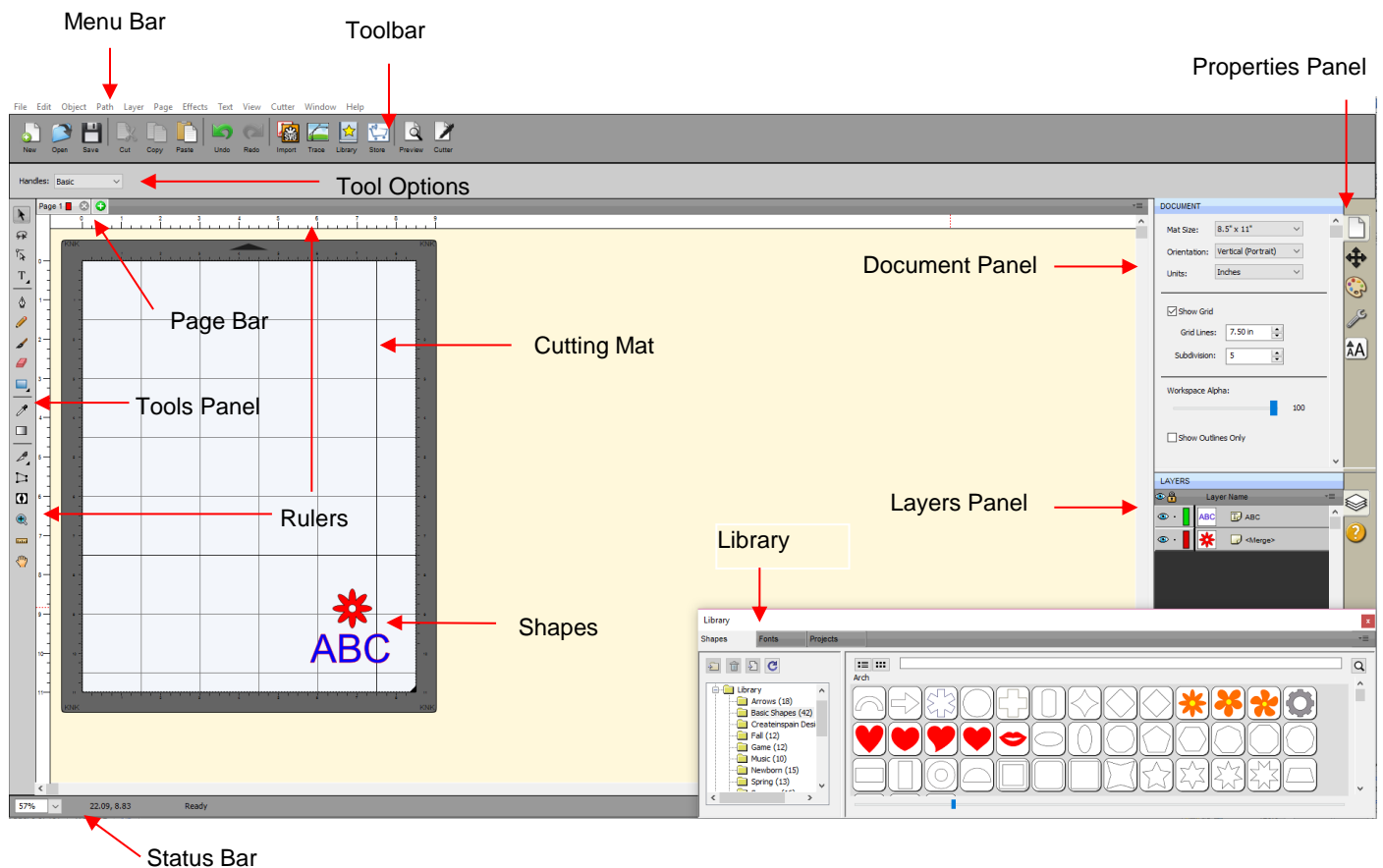


- Click on **Done** to save and close the window. Now, when you are ready to cut, the cutter you use will be selected by going to **Cutter>My Cutter** and picking which cutter you which to use:



### 3.02 Main SCAL Screen

- 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:



- Upon opening SCAL, another window will open which accesses SCAL's **eshape Store**. If you elect to no longer have it automatically open, you can also access it by going to **File>eshape Store** or clicking on its



icon on the **Toolbar**. More details are covered in *Section 4.05*.

- 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**).

- 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.
- **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**.

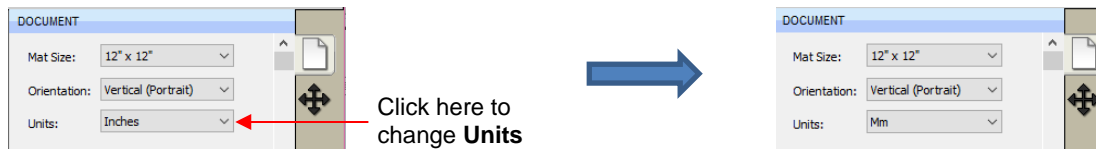
### **3.03 Language Preference**

- Six other languages, besides English, are available. Go to **Help>Language** to change:



### **3.04 Units Preference**

- 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**:



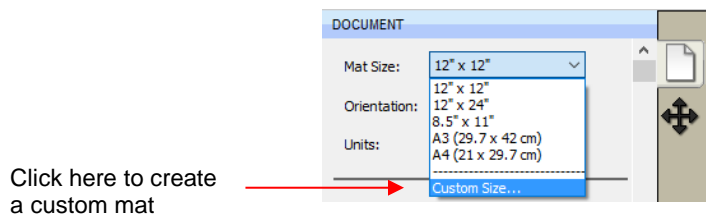
- The units can also be changed in either of the following locations:
  - ◇ Go to **View>Ruler Units**
  - ◇ Right-click on the screen and select **Ruler Units**

### **3.05 Customizing the Cutting Mat**

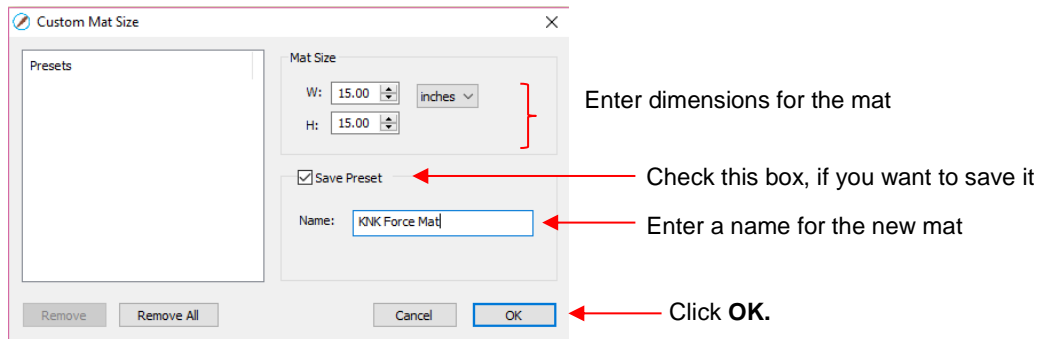
- The **Cutting Mat** serves as a design area for the software as well as to indicate, in some cutting modes, where the shapes will be cut.

#### **3.05.1 Mat Size**

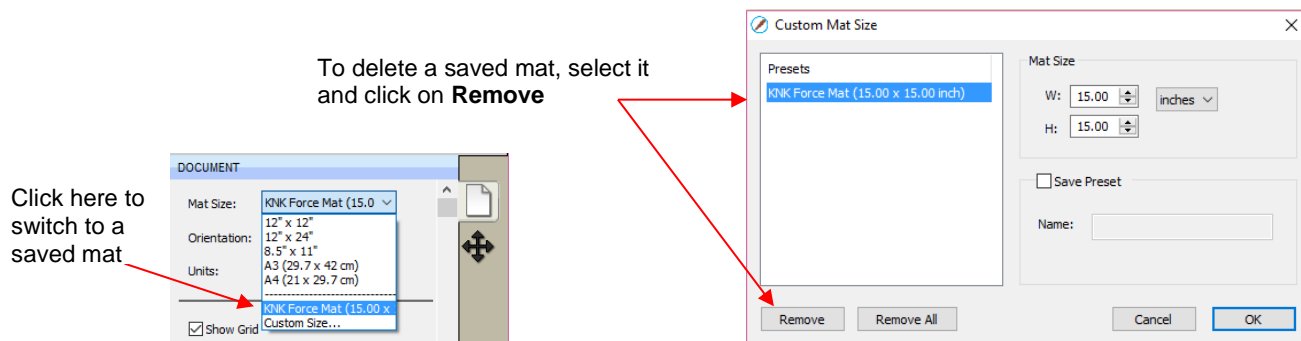
- There are three ways to access the **Cutting Mat** menu:
  - ◇ Click on the drop-down menu next to **Mat Size** on the **Documents Panel**
  - ◇ Right-click on the screen and select **Mat Size**
  - ◇ Go to **Cutter>Mat Size**
- There are five options for setting **Cutting Mat** dimensions under **Mat Size**. There is also the option to create a **Custom Size** for a mat:



- 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:



- 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:

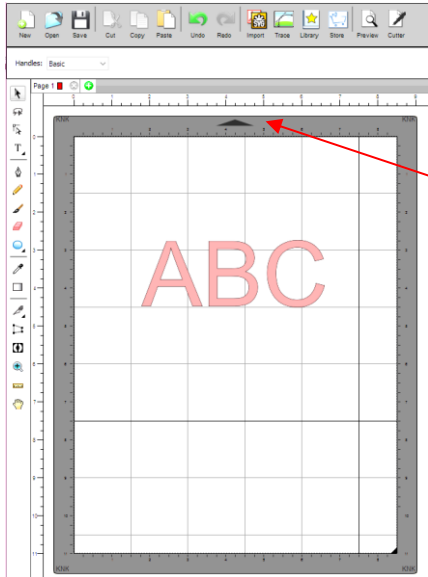


- To remove a custom **Cutting Mat** from the menu, go back to the **Custom Mat Size** window and select the mat under **Presets**. Click on **Remove**.

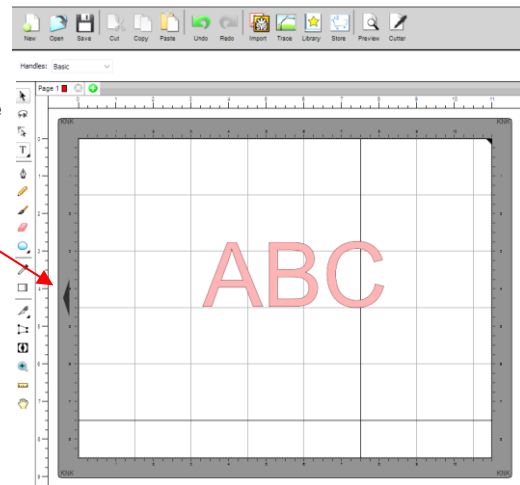
### 3.05.2 Mat Orientation

- 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:

## Portrait



## Landscape



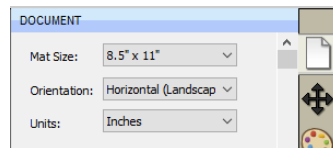
The black triangles show the direction the actual cutting mat should be fed into the cutter

- There are three ways to change the mat orientation:

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

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

(1)

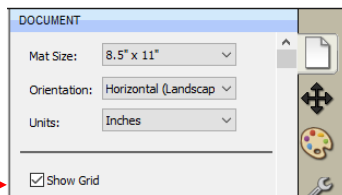


- Right-click on the screen and select **Mat Orientation**
- Go to **Cutter>Mat Orientation**

### 3.05.3 Mat Grid

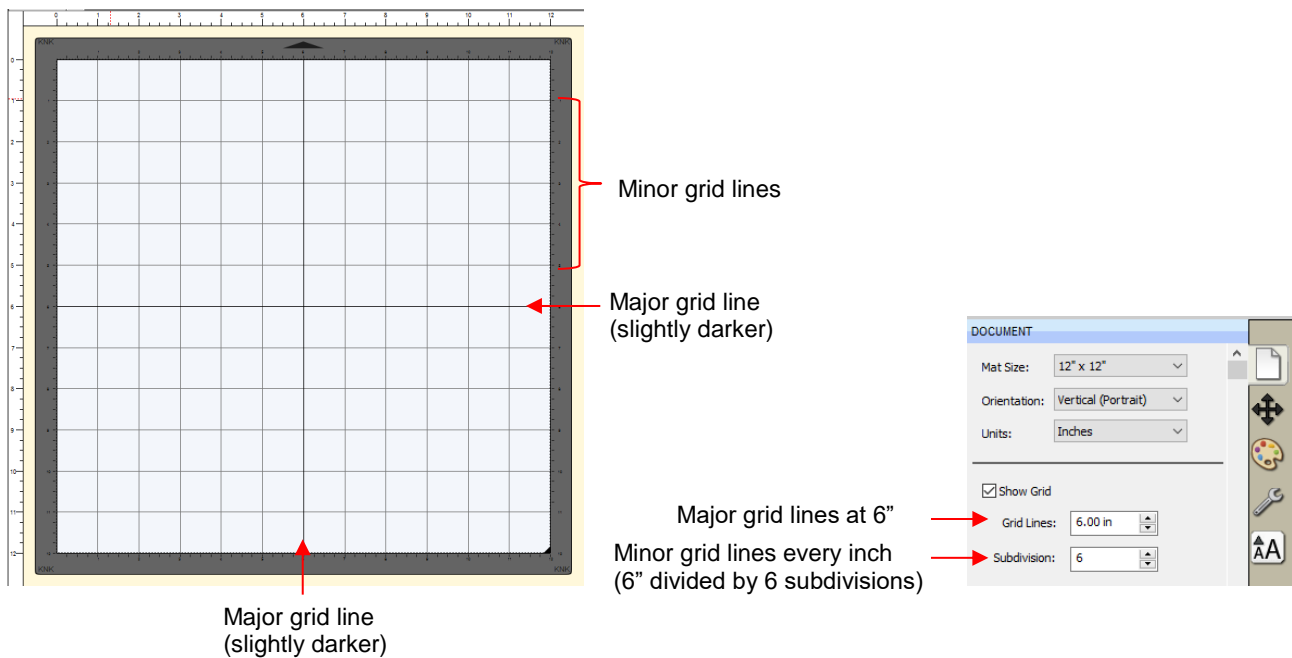
- The mat grid can be toggled on or off by either of these two ways:
  - Go to **View>Show Grid**
  - Check or uncheck the **Show Grid** box on the **Documents Panel**:

Check or uncheck

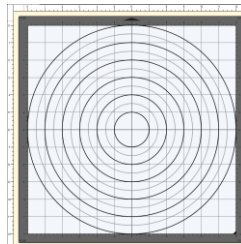


- The grid lines can also be customized. For example, with this 12" x 12" mat, major grid lines are set at 6" and then minor grid lines are set at 1" (by specifying 6 **Subdivisions** be used):



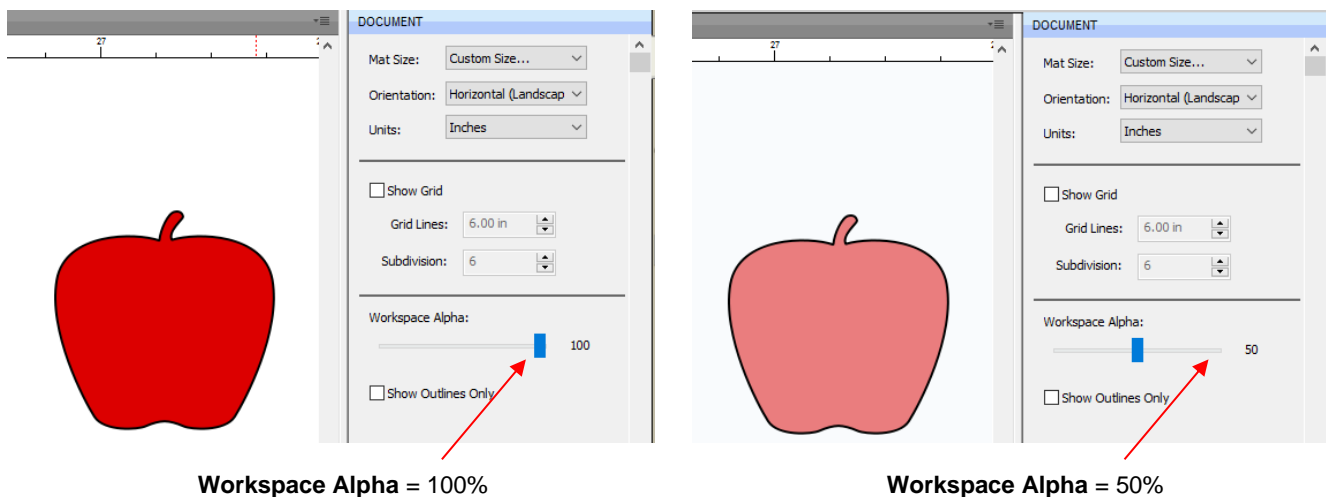


- A final grid option involves circular grid lines which can, as an example, be used for cake design. Go to **View>Show Mat Cake Circles**:



### 3.05.4 Workspace Alpha

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



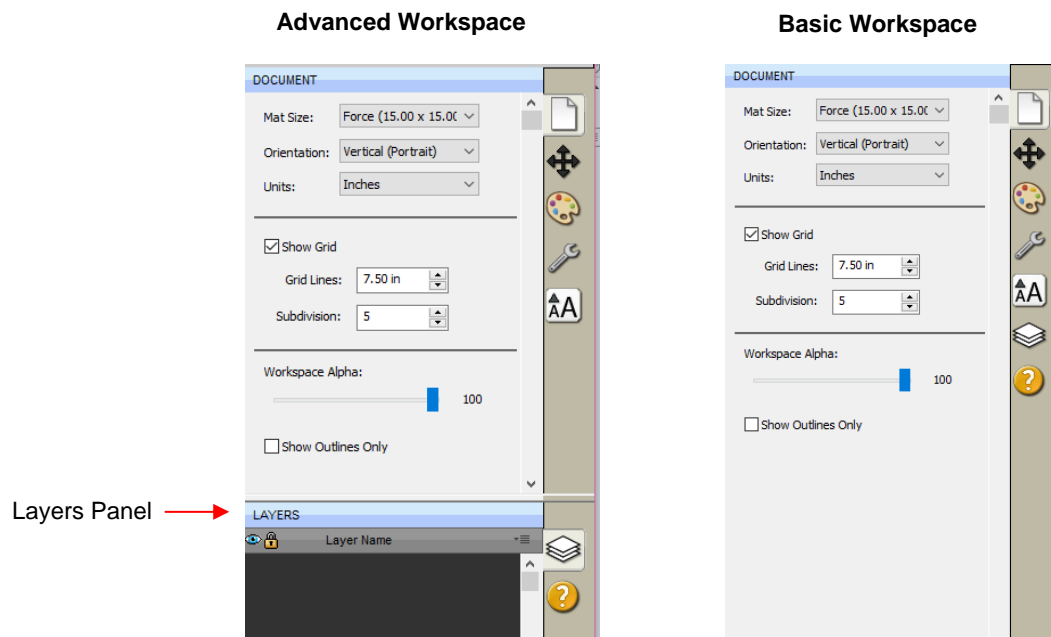
- You can also change the opacity of individual shapes versus all shapes. Refer to *Section 5.13.5*.

### **3.05.5 Rulers**

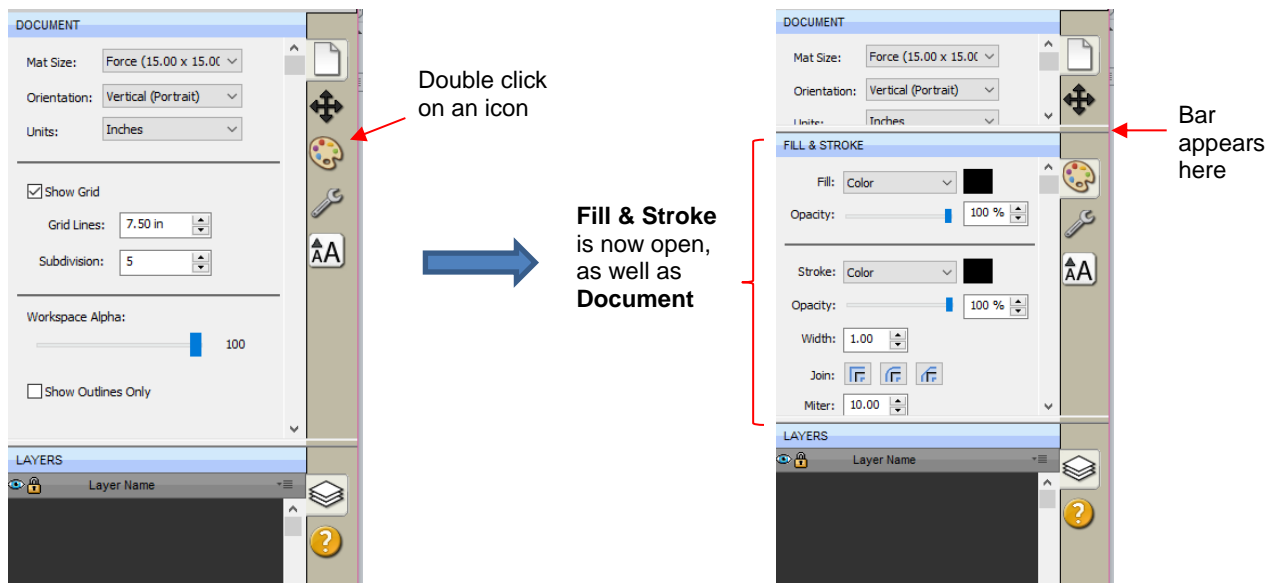
- The **Rulers** can be toggled on and off by right-clicking on the screen and selecting **Show Rulers**. Note that when hiding the rulers, click again on the screen for it to take effect.
- To change the units displayed on the **Rulers**, refer back to *Section 3.04*.

### **3.06 Customizing the Workspace**

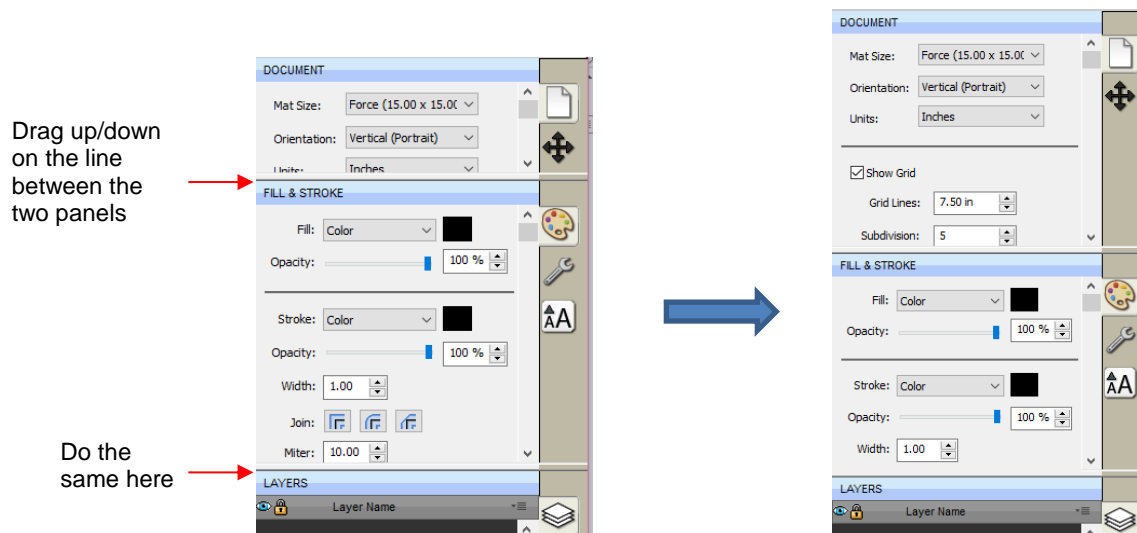
- In SCAL, the **Workspace** refers to the arrangement of windows on the **Properties Panel**. There are two versions already set up: **Basic** and **Advanced**. You can then make changes and name and save others, as desired.
- By default, the **Advanced Workspace** opens. To switch to **Basic**, go to **Window>Workspace>Basic**. The only difference between **Advanced** and **Basic** is the former has the **Layers Panel** open:



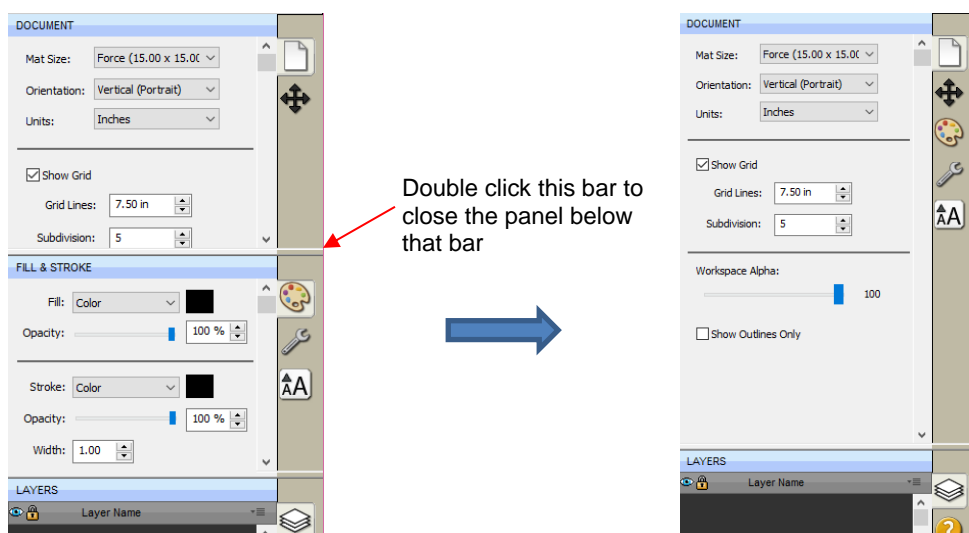
- To switch to other panels, click on the icons along the right side. If there's a particular panel you access often, then you can create a custom workspace. For example, let say you want the **Fill & Stroke Settings** panel to always be open. Double-click that icon and the **Properties Panel** will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



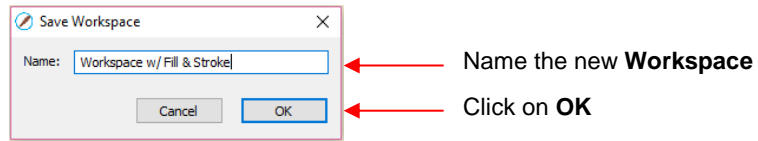
- These separate panels can also be resized by dragging them up or down:



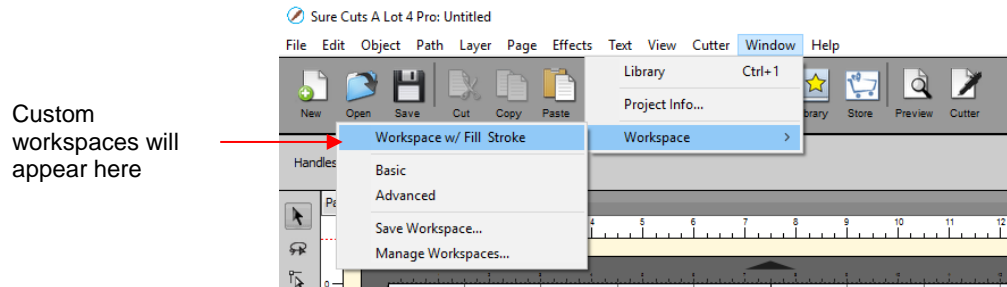
- To close a panel, double-click on the bar on the right side:



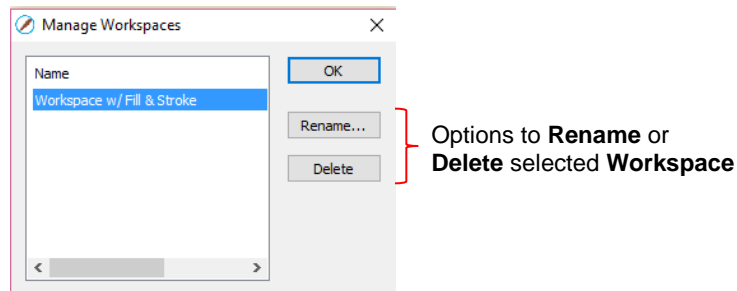
- To save workspace changes, go to **Window>Workspace>Save Workspace**. A window will open and you can name this new configuration:



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



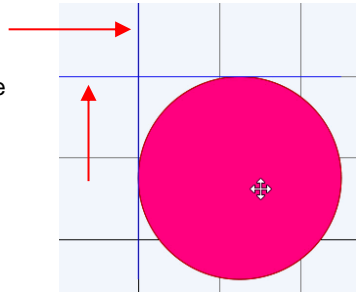
- To rename or delete a custom workspace, go to **Window>Workspace>Manage Workspaces** and a window will open with **Delete** and **Rename** options:



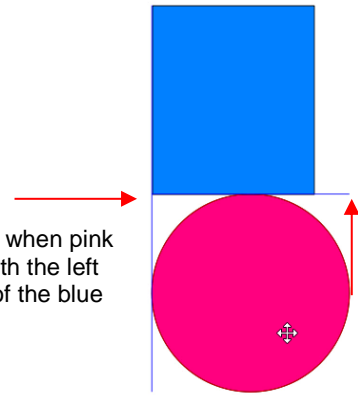
### 3.07 Snap To

- The **Snap To** option allows you to choose how shapes behave as they are being moved. Being able to snap to other objects 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
  - ◇ **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 either the grid or to another shape, blue lines appear indicating the shape is aligned at that point. Here are two examples:

Grid lines turn blue when the pink circle snaps to them



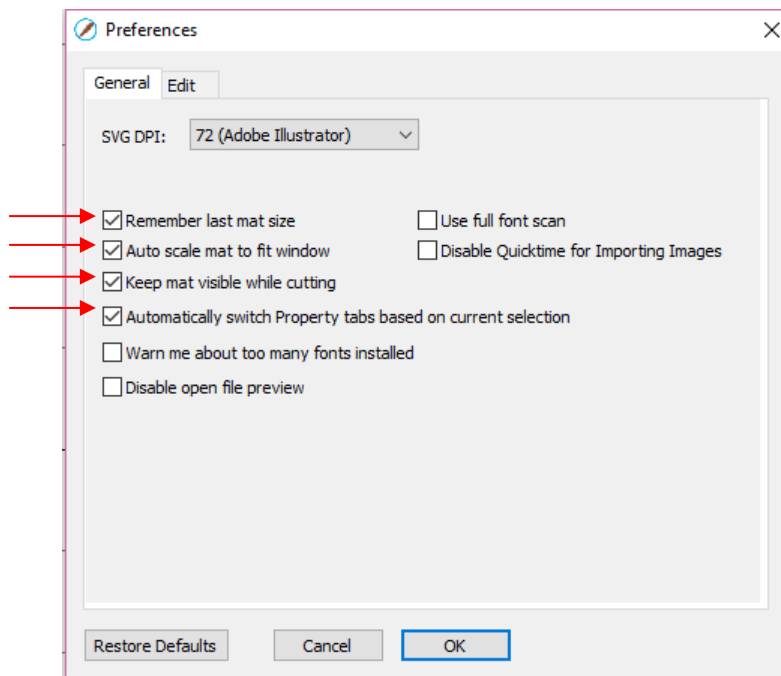
Blue lines appear when pink circle snaps to both the left side and bottom of the blue rectangle



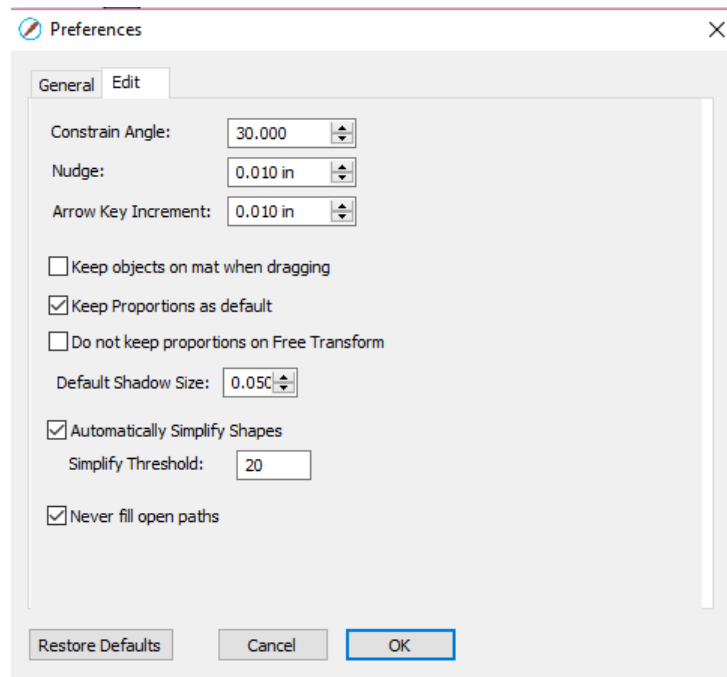
### 3.08 Other Preferences

- Under **Edit>Preferences** (or, on a Mac, press **Command + ,**), 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:

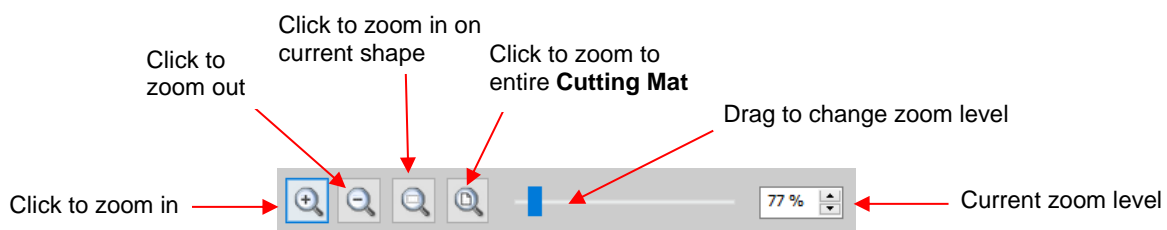


- For more details on these settings, go to *Appendix C4*.


## **3.09 Zooming and Panning**

### **3.09.1 Zooming**


- 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/icons:
    - **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** . 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 (Mac only) **Option+ Shift+ =** (on a Mac only)
- ◇ 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**.

### **3.09.2 Panning**


- 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** . Then drag the left mouse button.

## **3.10 Undo/Redo**

### **3.10.1 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**

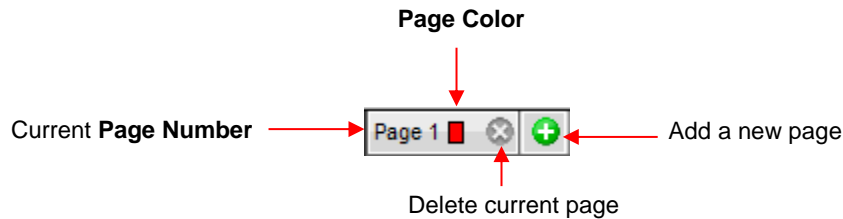
### **3.10.2 Redo**


- 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**

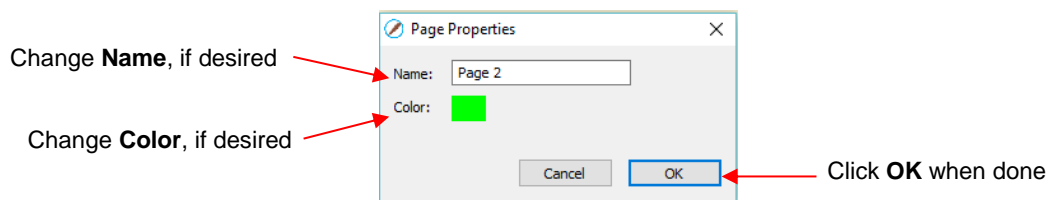
## **3.11 Pages**

- The **Page Bar** allows you to add more pages to your current file/project. This can be convenient for organizing projects with many shapes and or layers.

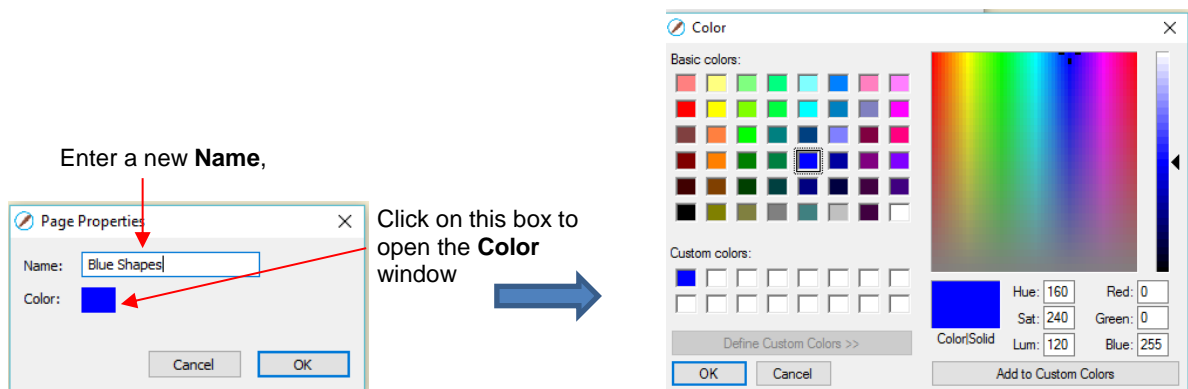
- The **Page Bar** is located just above the top **Ruler** and displays the current page, a color for quickly identifying pages, and icons for adding and deleting pages:



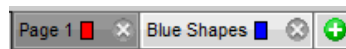
- To add a page, either go to **Page>Add Page** or click the green icon  on the **Page Bar** itself and the following window will open




- 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** window that opens. For example, you might want to have all of the blue shapes on their own page:




- After clicking on **OK**, the new page appears on the **Page Bar**:



- 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.




### **3.12 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:
  - ◇ [SCAL Facebook Page](#)
  - ◇ [MTC and SCAL Facebook Group](#)
  - ◇ [SCAL Users Yahoo Group](#)
- An online training program with over 4 hours of videos is available at this link: [Sure Cuts a Lot 4 Beginner Class](#).


## 4. SCAL: Handling Files and Organizing Layers

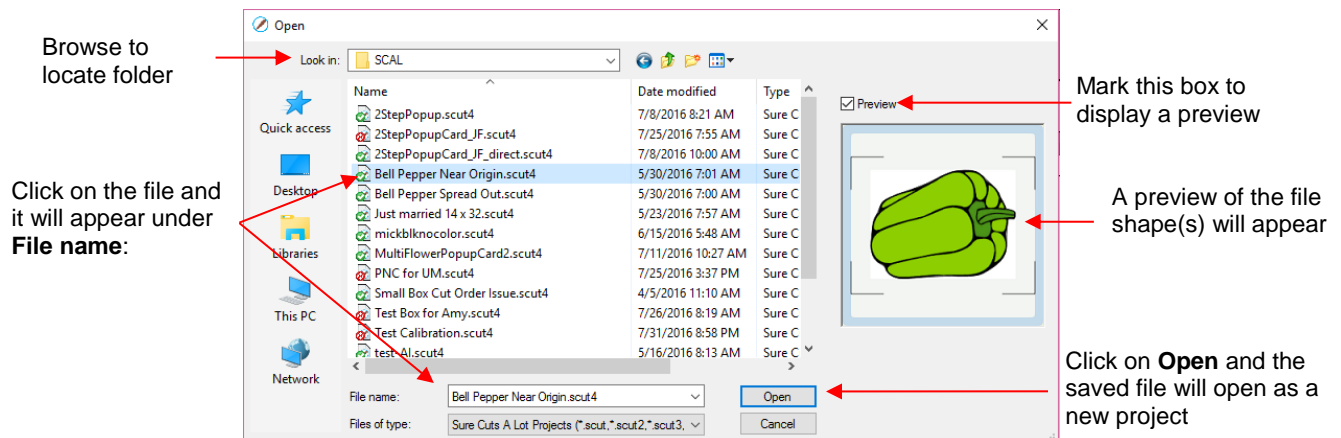
### 4.01 Opening Files

#### 4.01.1 Opening a New File/Project

- When you launch SCAL, a new blank **Cutting Mat** will appear with a new blank project opened.
- To open a new file (start a new project), any of the following can be used:
  - ◇ Click on the **New Project** icon on the upper **Toolbar** 
  - ◇ Press **Ctrl+N**
  - ◇ Go to **File>New Project**
- Note that if any changes have been made to the existing project, a popup window will ask if you wish to save the changes that have been made. Refer to *Section 4.02*.
- If you wish to have more than one file open, you will need to open additional instances of SCAL.

#### 4.01.2 Opening an Existing SCUT File


- An existing SCUTx file (where x is blank, 2, 3, or 4 indicating which SCAL version created it) can be opened in SCAL4 using any of the following:
  - ◇ 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 4.03.3*)
- In the first three options above, a window will open where you can browse to locate the file you wish to open:



- In the case of opening a file from Windows Explorer, an email, or using a drag and drop method, the file will automatically open.
- Note that other file formats, besides SCUT can be imported into SCAL4. Refer to *Section 4.06*.

## **4.02 Saving SCAL Files**

- A file can be saved in SCUT4 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**


- 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 9.02*.
- You can also export files in a host of other formats. Refer to *Section 4.08*.

## **4.03 Using the Library**

- 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**

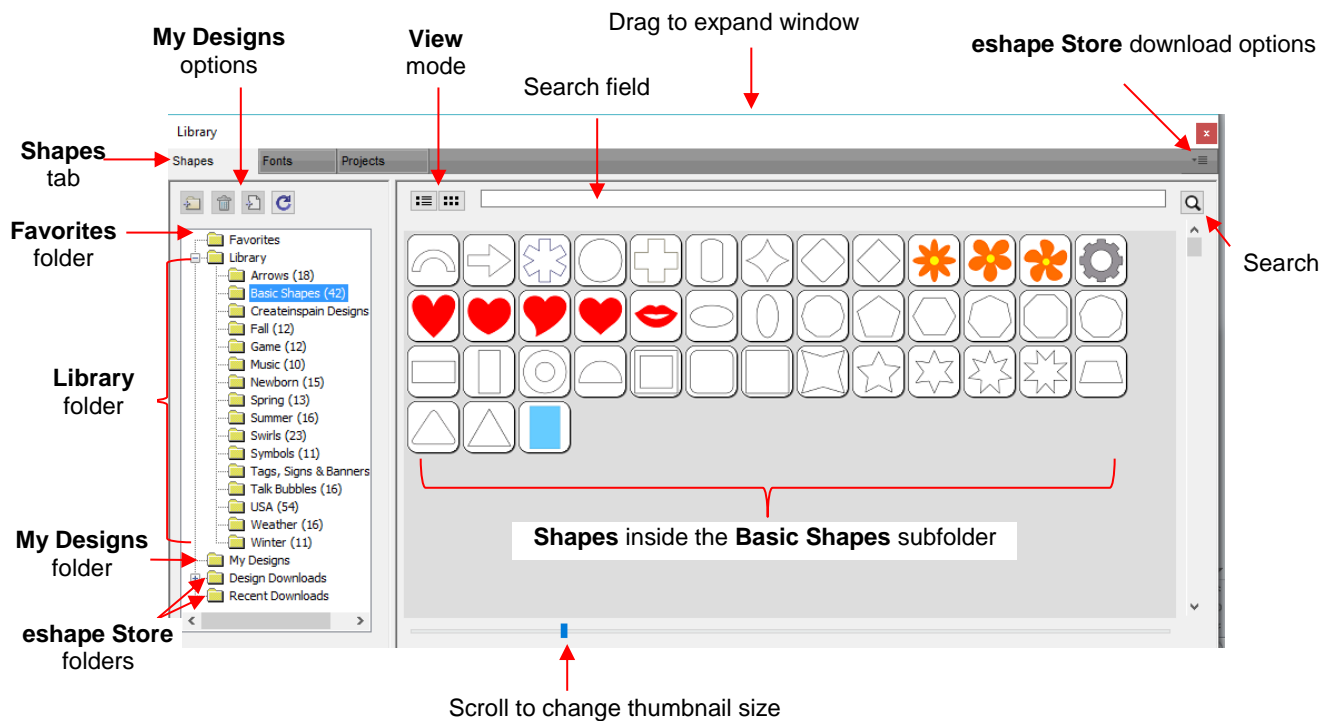
- The **Library** automatically opens every time you open SCAL. If you've closed it, the **Library** can be reopened by using one of the following:

- ◇ Click on Library icon on the upper **Toolbar** 
- ◇ Press **Ctrl+1**
- ◇ Go to **Window>Library**

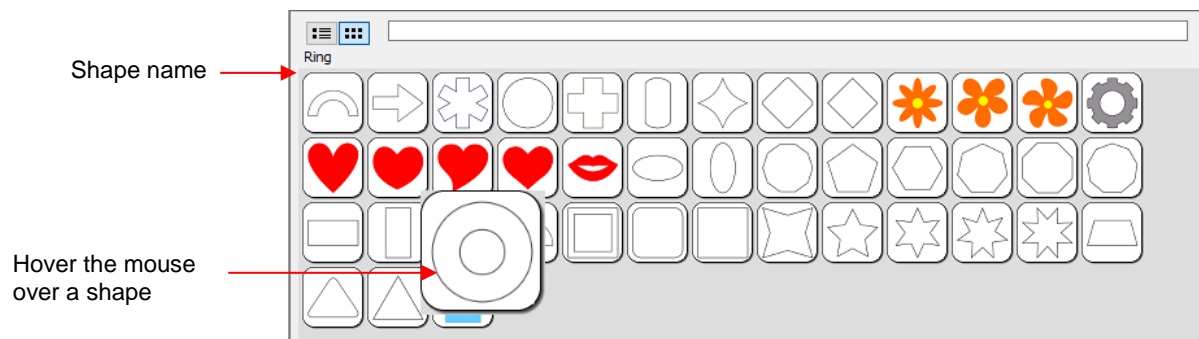
- The **Library** consists of three tabs: **Shapes**, **Fonts**, and **Projects**. Each is covered in the following subsections:



### **4.03.1 Shapes Tab**

- 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:

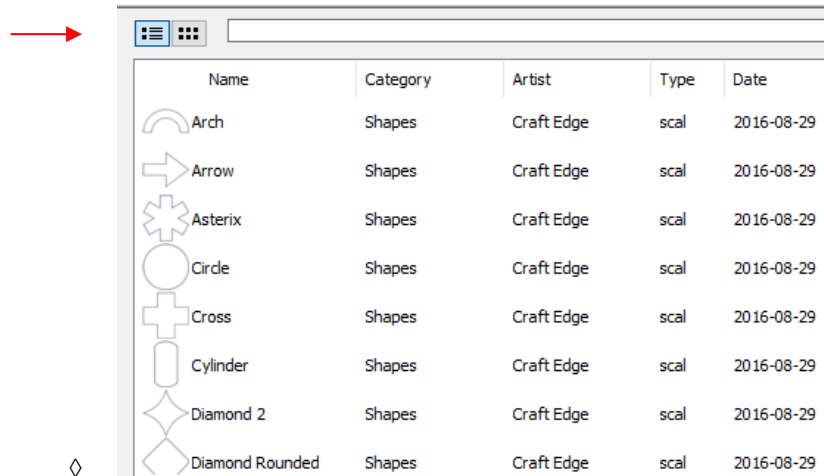


- On the left side you will see the **Library** folder which contains the included 300 shapes. The number in parentheses, after each subfolder, indicates how many shapes are assigned to that subfolder. **Basic Shapes**, as an example, has 42 assigned to it.
- Because the **Basic Shapes** subfolder is 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   :

Click here to  
change to list view



- 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:

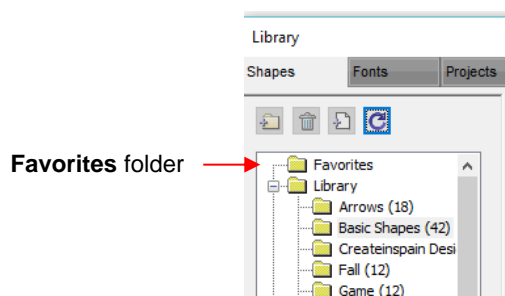
1. Enter search word

2. Click here or press **Enter** key

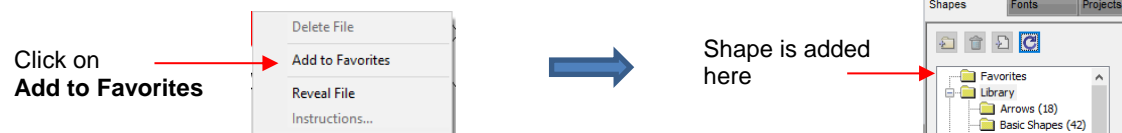
3. All shapes with the  
search word in their  
name will appear



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



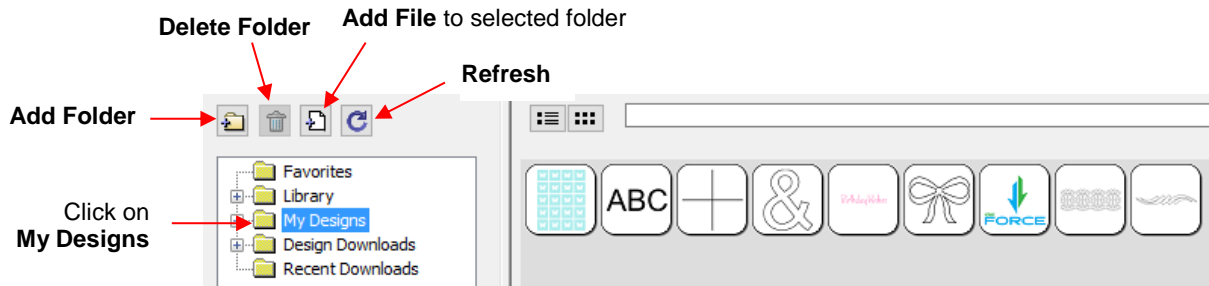
- ◇ The **Favorites** folder is for storing the shapes you access often. Locate the shape you want to add, right-click, and select **Add to Favorites** from the popup menu.




- ◇ 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.

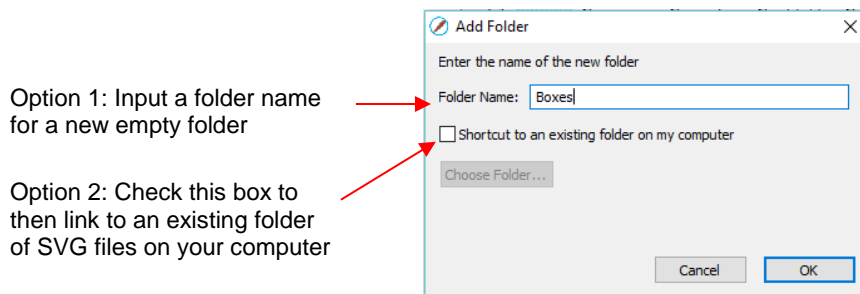
- ◇ Once you click on **My Designs**, the icons above the folder menu will become active:



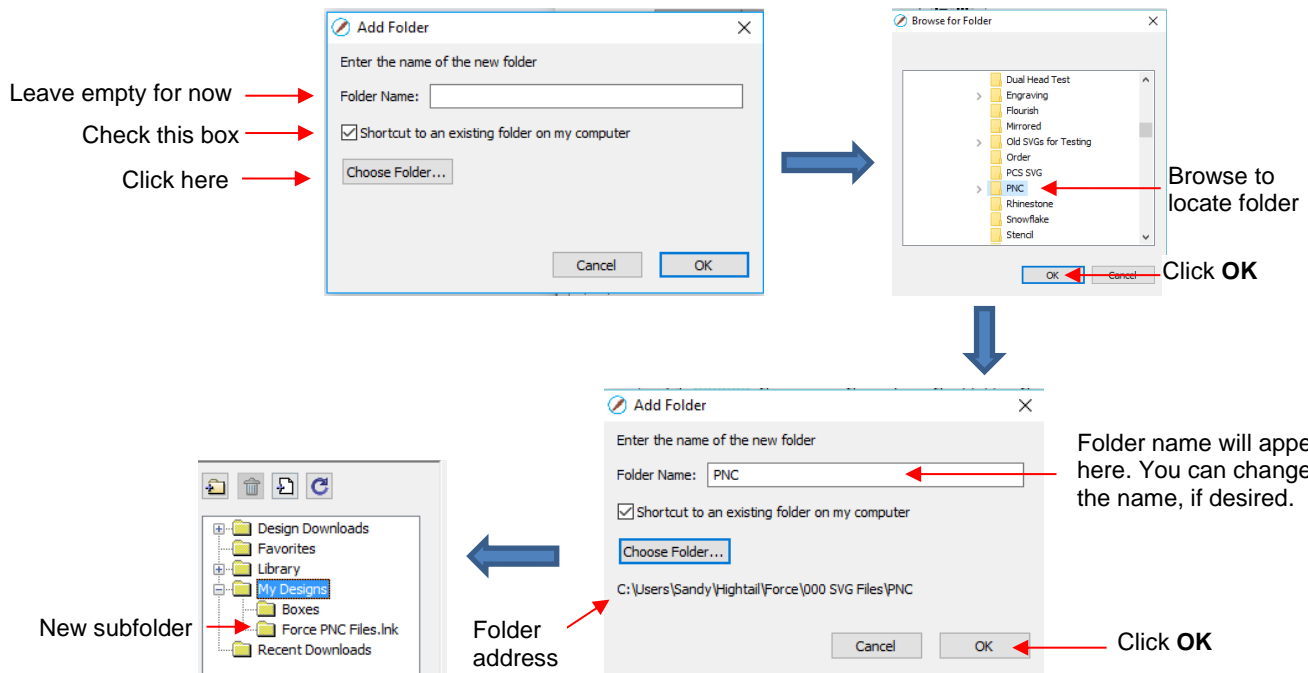
- ◇ Add subfolders: The shapes in the above screenshot have been added to **My Designs** but not into subfolders. To create subfolders for additional organizing:

- 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:

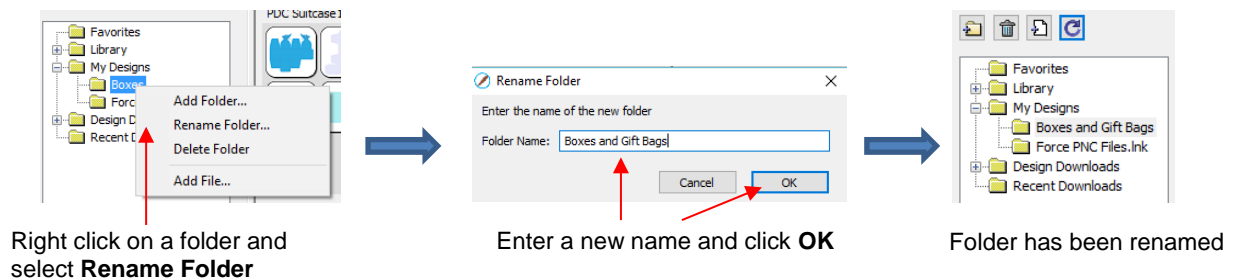



- ◇ If you select Option 2, the **Choose Folder** button will activate and clicking it will bring up this window where you can browse your computer to locate an existing folder of SVG files:



- ◇ 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.

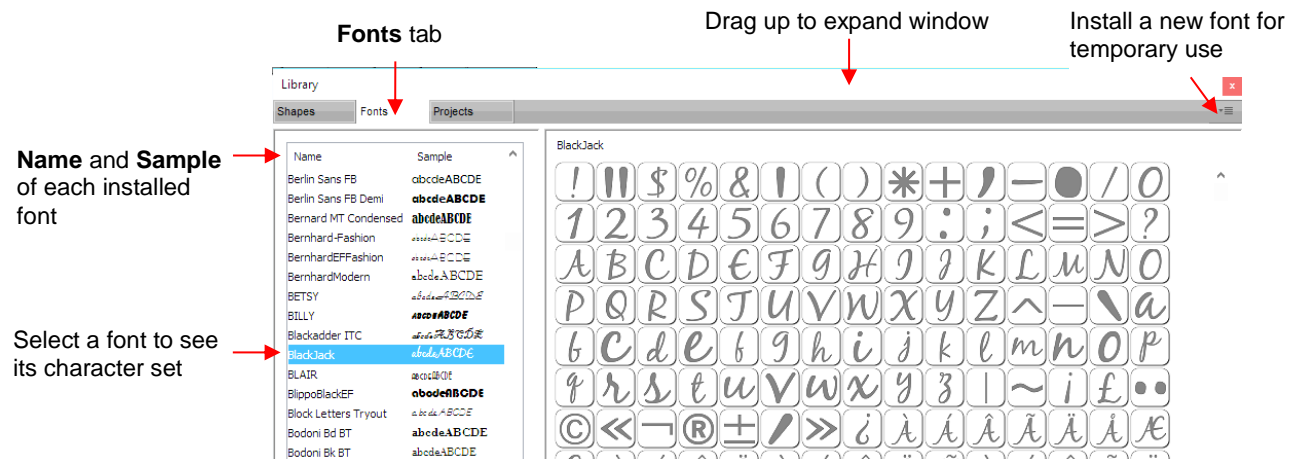
- ◇ To add files to a folder inside **My Designs**:
  - Select the folder and do either of the following:
    - Click on the **Add File** icon 
    - Right-click and select **Add File** from the popup menu
  - A window will open where you can then browse to find the SVG file to be added. You also have 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. These will be covered in *Section 4.05.1*.



### 4.03.2 Fonts Tab

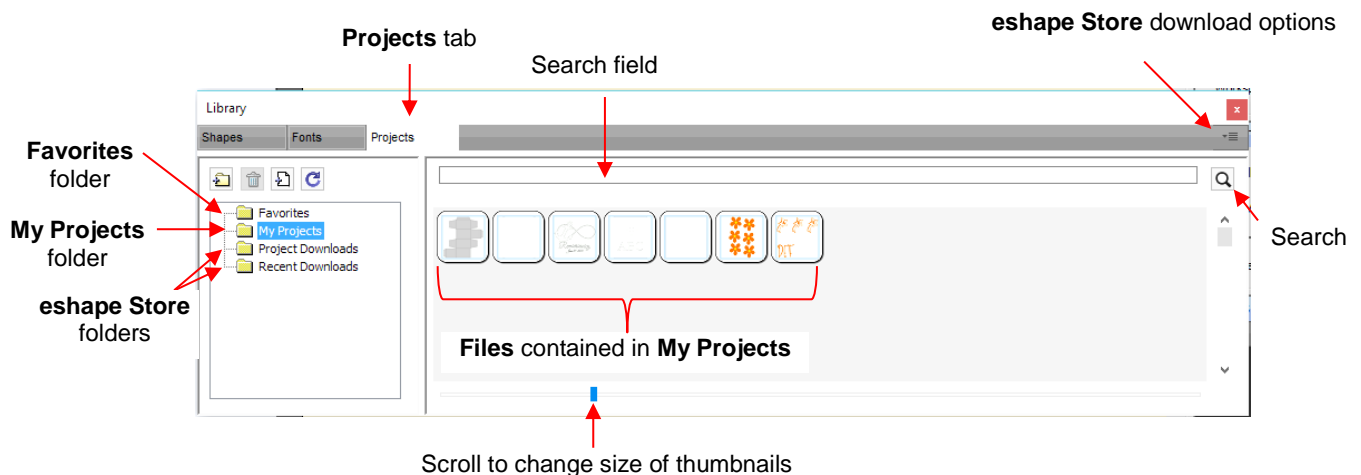
- The **Fonts** tab lists all of the currently installed fonts on your computer. Selecting any font in the list will show the entire character set on the right side of the window. It will also then make it the default font that will be used when adding text with any of the methods available in SCAL. Refer to *Section 6.03*.



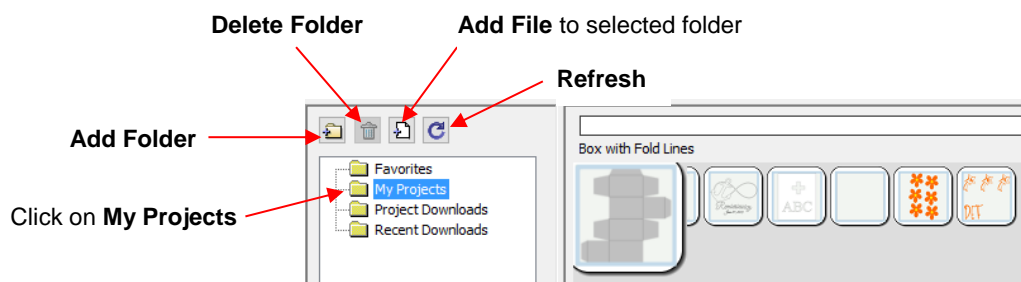
- Scroll the bar at the bottom to change the size of the lettering. To add a character to the **Cutting Mat**, left-click on it. While it is far quicker to type out text using the **Type** tool (again, refer to *Section 6.03*), this window is the best way to add special characters within a font or when 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. Again, refer to *Section 6.03* regarding temporary font usage.

### 4.03.3 Projects Tab

- 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 4.05*.
  - ◇ 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:

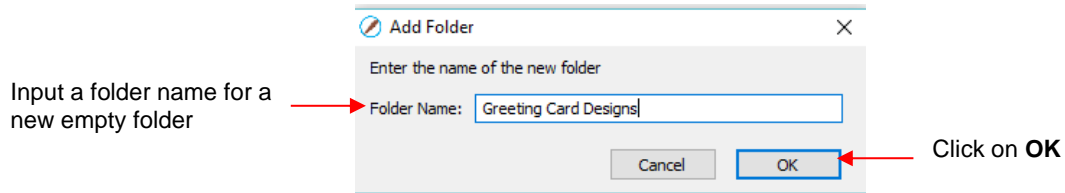





- ◇ Add subfolders: The projects in the above screenshot have been added to **My Projects** but are not in subfolders. To create subfolders for additional organizing:

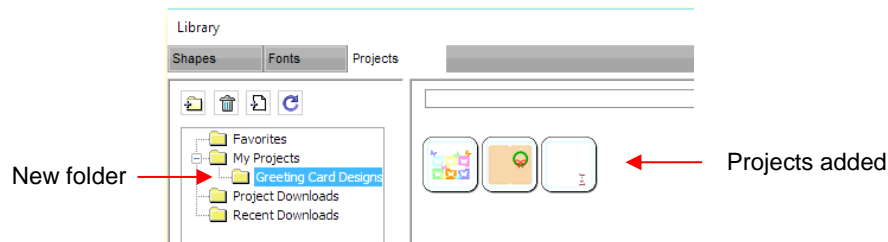
- Click on the **Add Folder** icon 
- Right-click on **My Projects** and select **Add Folder** from the popup menu



- ◇ 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:



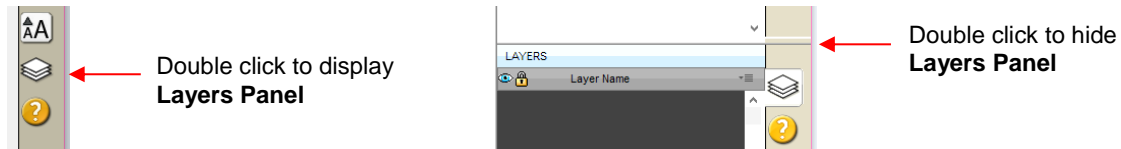
- ◇ To delete a file from a folder, right-click and select **Delete File** from the popup menu.
  - **IMPORTANT**: Note that deleting the file could also delete it from your computer unless it has been backed up elsewhere.
  - After deleting files, you will need to click on the **Refresh** icon  to update 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.

## 4.04 Layers Panel

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

### 4.04.1 Introduction to the Layers Panel

- 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.

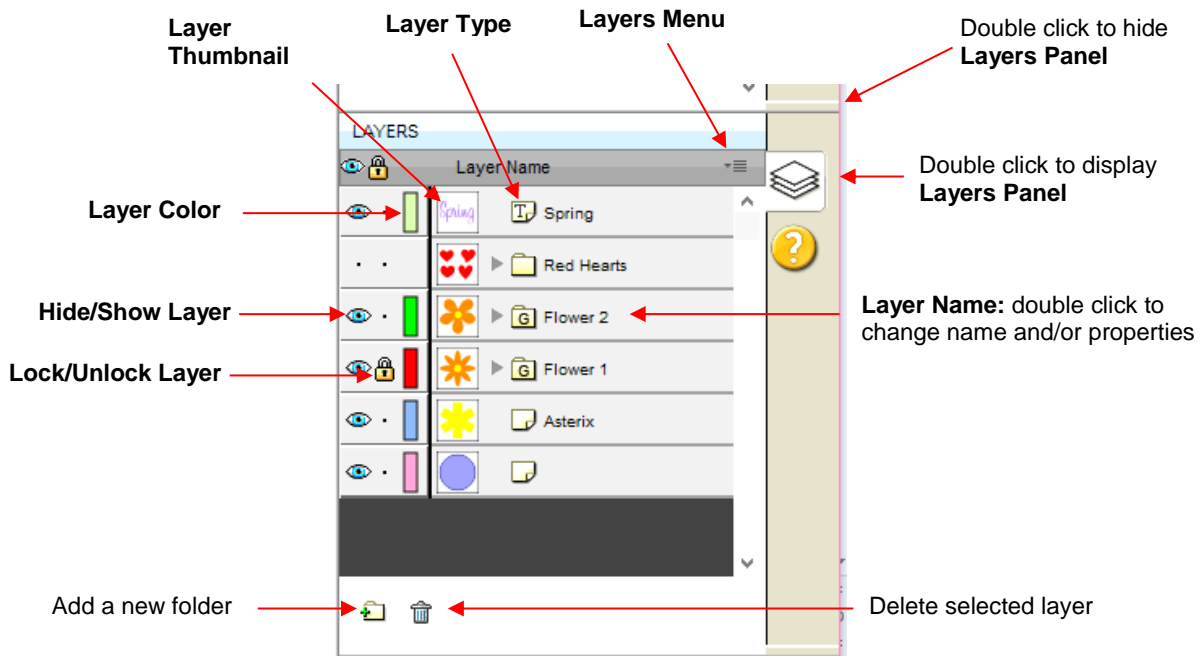
- You do not have to worry about adding shapes to the **Layers Panel**. They will automatically be assigned to new layers as you add them. You will want to learn how to move shapes to new layers or combine shapes into the same layer, depending on the circumstances. This is covered in *Section 4.04.3*.
- 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.

### 4.04.2 Parts of the Layers Panel

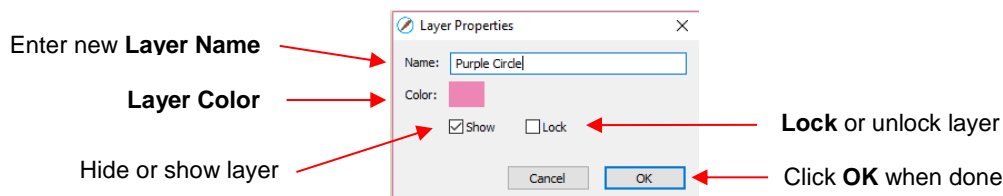
- The next few sections will use the following simple project to illustrate the **Layers Panel**:



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



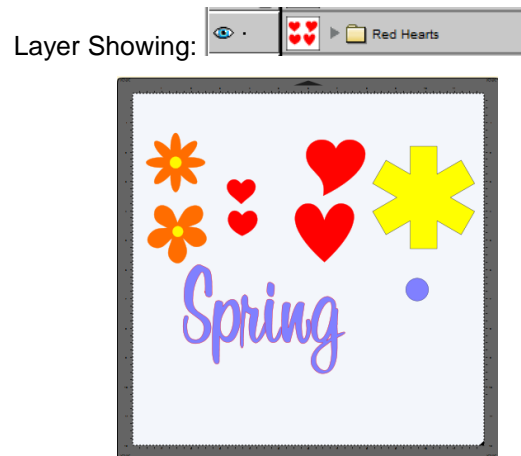
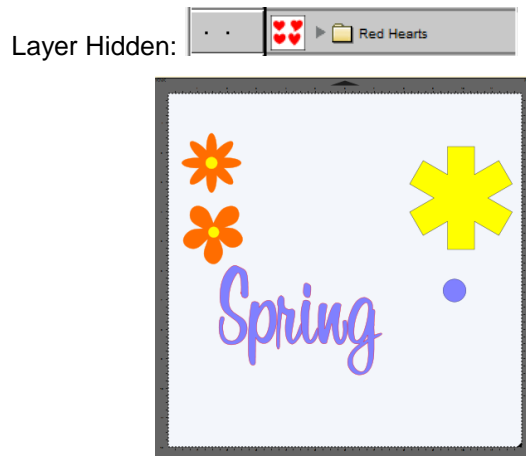
- Layer Thumbnail:** Each layer has a thumbnail showing the shapes assigned to that layer. Click on that thumbnail and all shapes on that layer will be selected. If you wish to add the shapes from another layer to the section, hold the **Shift** key and click on the other thumbnail.
- Layer Type:** To 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**:

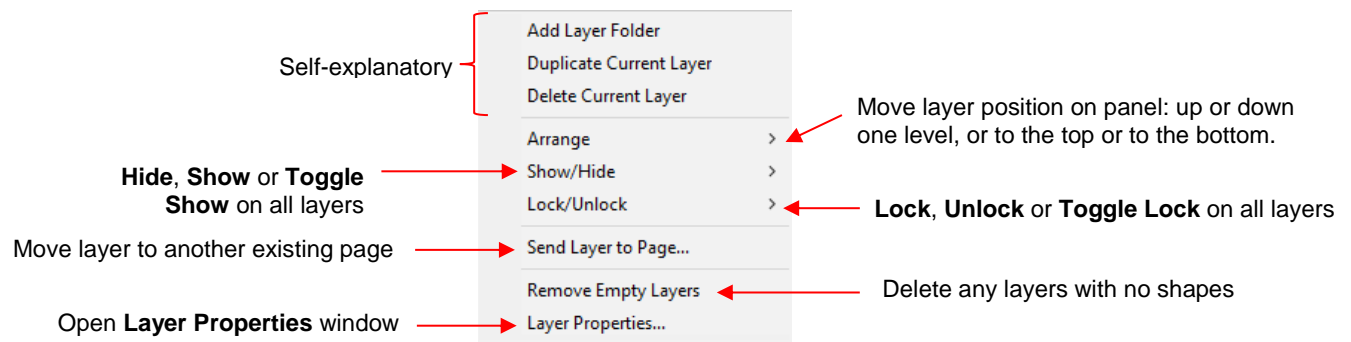
- ◇ **Hide/Show Layer:** Click on the eye icon to hide that layer. The icon will be replaced with a dot as shown for the *Red Hearts* layer and the shapes on that layer will no longer be seen on the **Cutting**



**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**:

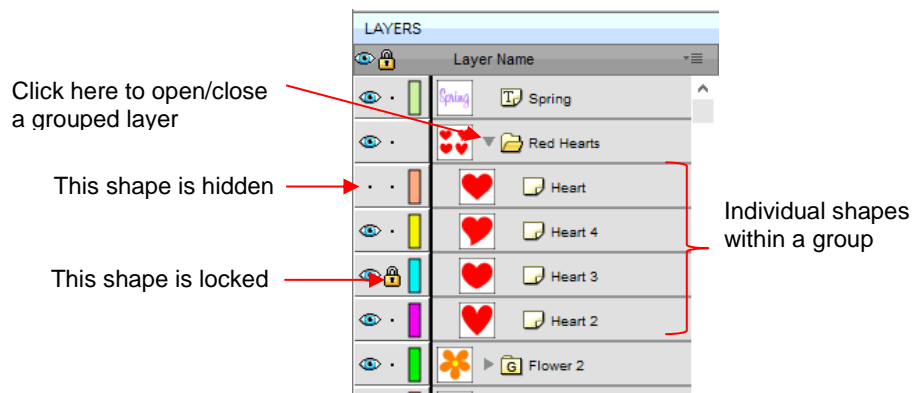


- ◇ **Lock/Unlock Layer:** Click on the dot to the right of the eye icon and the layer will become locked , such as shown for the *Flower 1* layer. The shapes on that layer will still be included in printing and in cutting, however cannot be selected on the **Cutting Mat**. This can be useful when shapes 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:





- 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:



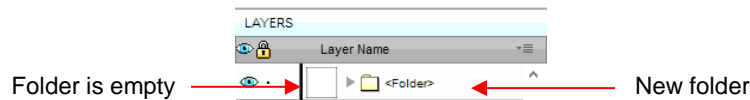
#### 4.04.3 Creating Folders and Moving Layers

- As mentioned in *Section 4.04.1*, 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.

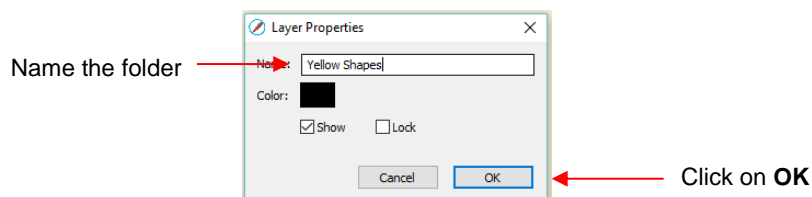
- There are three ways to create a new folder:

- ◇ 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**

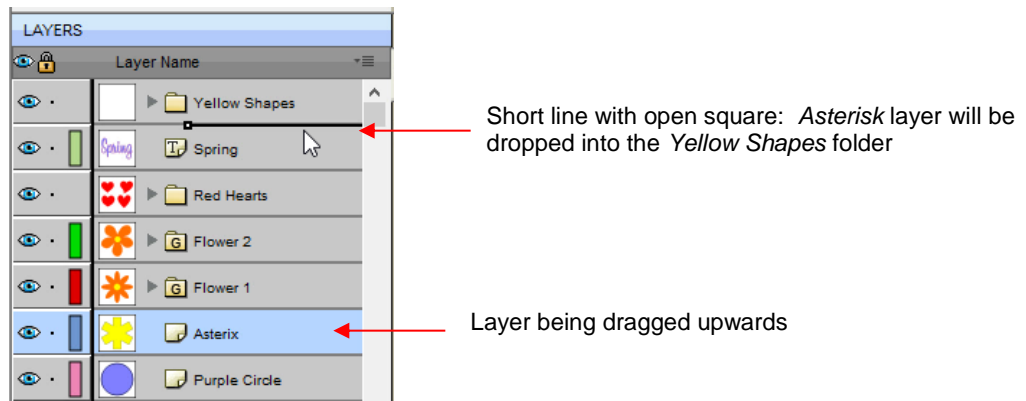
- When a new folder is added, it will appear at the top and look like this:



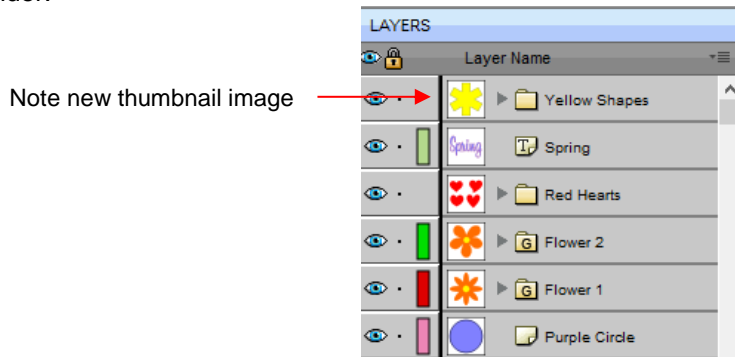
- Just as covered in the prior section, if you double-click on this new folder, you can rename it:



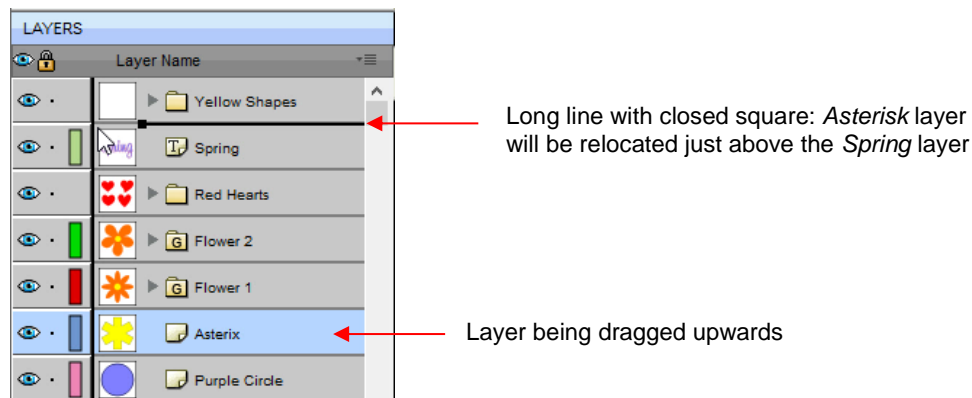
- In the prior section, it was also noted that layers can be re-ordered using the **Arrange** option in the **Layers Panel Options** menu. Alternatively, layers and folders can also be moved directly on the **Layers Panel** by dragging them up or down.
- There are two possible outcomes when dragging 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:



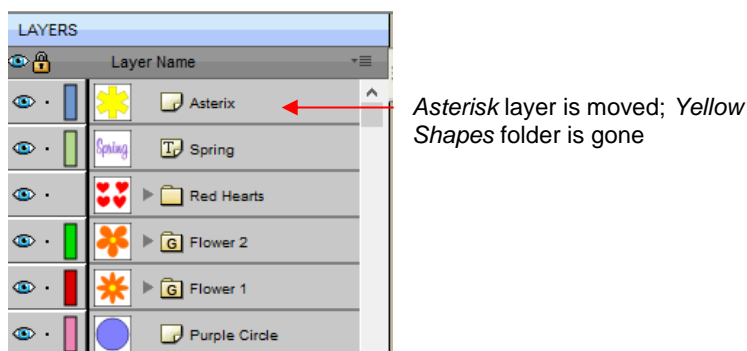
- ◇ Now the *Asterisk* layer is inside of the *Yellow Shapes* folder and can be seen in the thumbnail for that folder:



- ◇ 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:

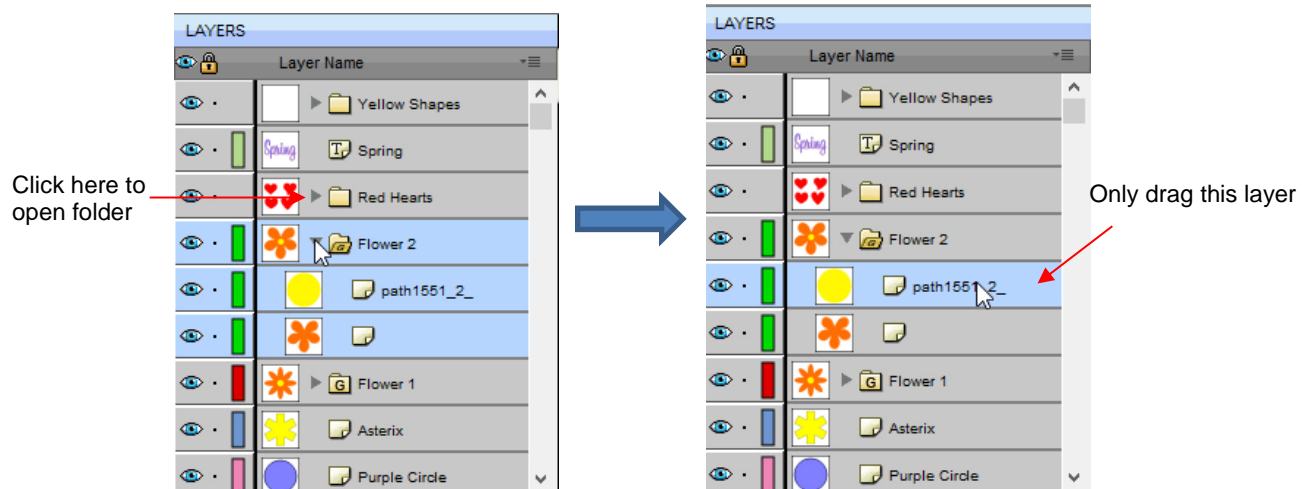


- ◇ **IMPORTANT:** Once you've created a new empty folder, like the *Yellow Shapes* folder, you cannot move that layer or other layers without the empty folder being deleted. So, in the case above, if the *Asterisk* layer had been simply relocated, the *Yellow Shapes* folder would then be gone:

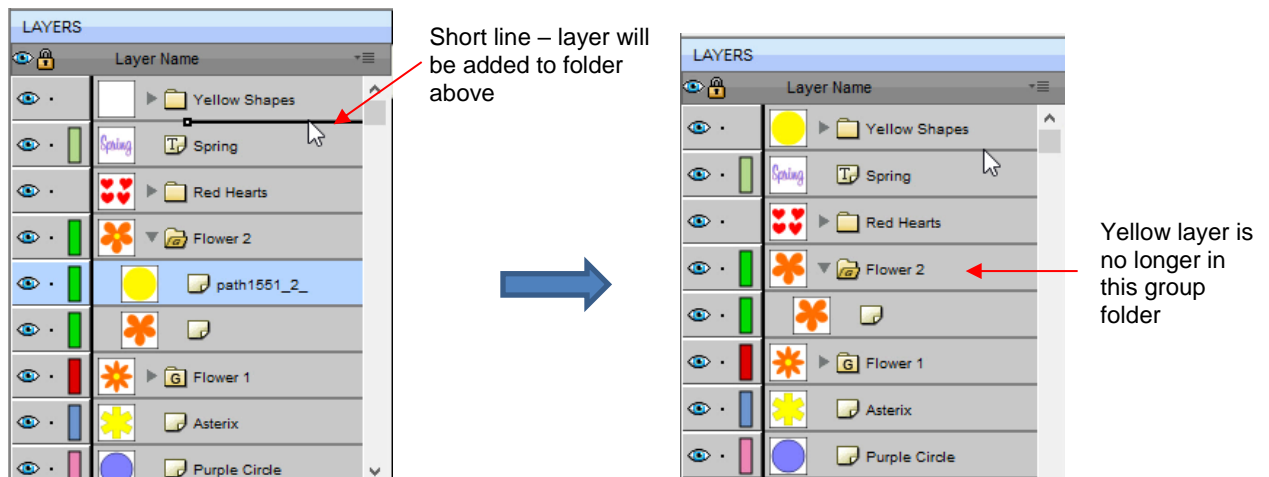


- Layers can also be moved out of an existing folder into other folders. In this example, the yellow centers of the flowers in the layers named *Flower 1* and *Flower 2*, can be similarly dragged and dropped into the *Yellow Shapes* folder:

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



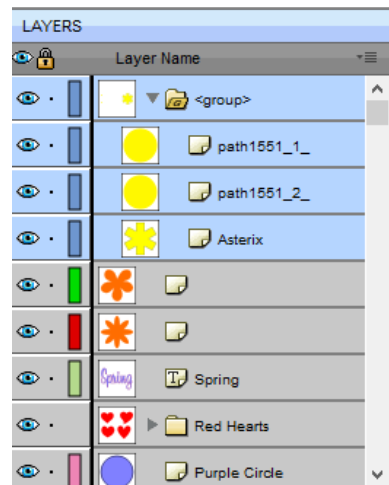
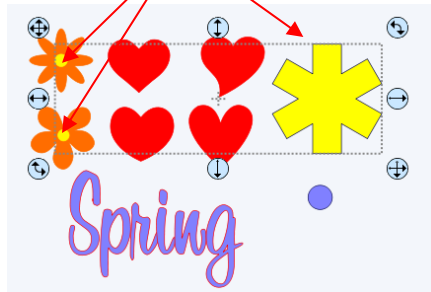
◇ Then drag the yellow layer up to the *Yellow Shapes*, again making sure only a short line is present. The yellow layer is then moved out of the *Flower 2* group:



◇ Repeat for the yellow shape inside the *Flower 1* 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 5.10*.

All yellow shapes are selected and **Group** is applied.



New group folder contains these yellow shapes

## 4.05 The eshape Store

### 4.05.1 Importing from the eshape Store

- The **eshape Store** is an online shopping site linked within SCAL. Cutting files and fonts can be purchased through the store and downloaded into SCAL.
- To get started, access the **eshape Store** in any of the following ways:



◇ Click on the **eshape Store** icon on the **Toolbar**

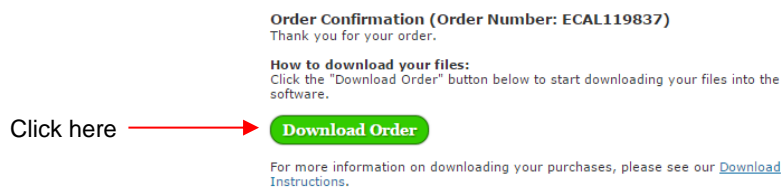
◇ Go to **File>eshape Store**

- The **eshape Store** window will open and you can either sign up for a free account or log in, if you have already registered:



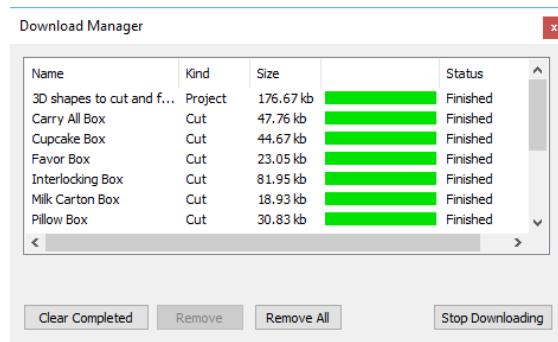
Sign in or Register

- Next, browse the site to find files of interest. After payment, the following screen shows your order number and a green **Download Order** button can be clicked to download the files you purchased:



- The following **Download Manager** window will open and the files you purchased will begin downloading:





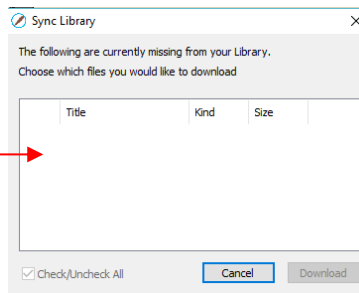
- Now open the **Library** to access the **eshape Store** files. Depending on the file type, the downloaded files will either appear on the **Shapes** tab, under **Design Downloads** or on the **Projects** tab, under **Project Downloads**:




- If you fail to download at the time of the purchase, your downloads can also be accessed in the following ways:

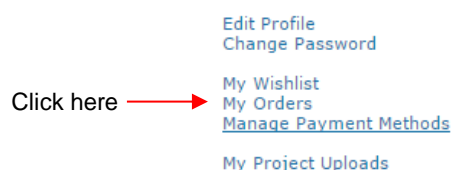
- ◇ Go to **File>Sync My Library**  and the following window will open:

If any files still need to be downloaded, they will be listed in this window for selection. →



→ After selecting files, click on the **Download** button.

- ◇ Click on the top right icon  in the **Library** window and select **Sync Library**. The same window will open and you can select any files not already downloaded.
- ◇ At the **eshape Store**:
  - Log in and click on **My Account** at the top.
  - Then click on **My Orders**:



- Select a time period for the order and click on **Show Orders**. Then click on the **Download** icon:

My Account : My Orders

Select time period → Order Date: Last 30 days ▼ Choose if you want to search particular dates

Click here → Show Orders

You have 4 orders placed between: 7/30/2016 - 8/29/2016

Viewing 1 - 4 of 4

Click here to download entire order → Download Order Files

Download Instructions

Boxes Set  
Price: \$9.99  
Download

Carry All Box  
Price: \$0.00  
Download

Or click here to download individual products within an order

#### 4.05.2 Exporting to the eshape Store

- To freely share your own SCAL creations, go to **File>Share Project**. The following window will open:

Start with Info tab

Instructions

Share Project

Info Images Instructions

Title: Rhinestone Baseball

Cut Type: Regular Cut

Category: Sports

Keywords: Baseball Rhinestone

Description: Rhinestone baseball sized at 3.6" x 3.6". The circles are 3.5 mm with a spacing of ~ 0.5 mm.

Hi, sandymc

Not You? Sign in

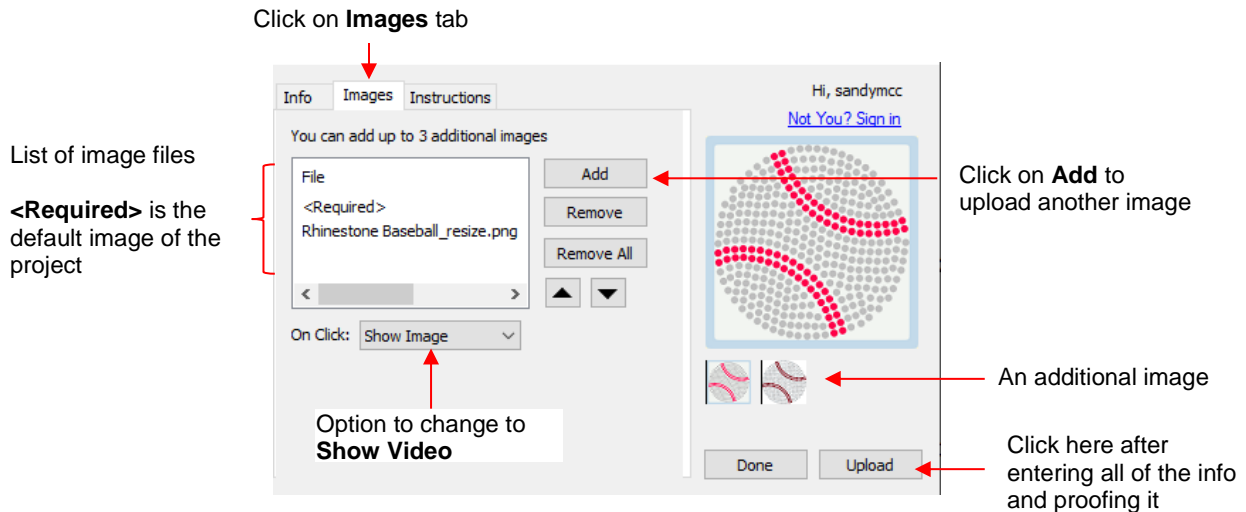
One of the project images

Click here after entering info on all three tabs and proofing it

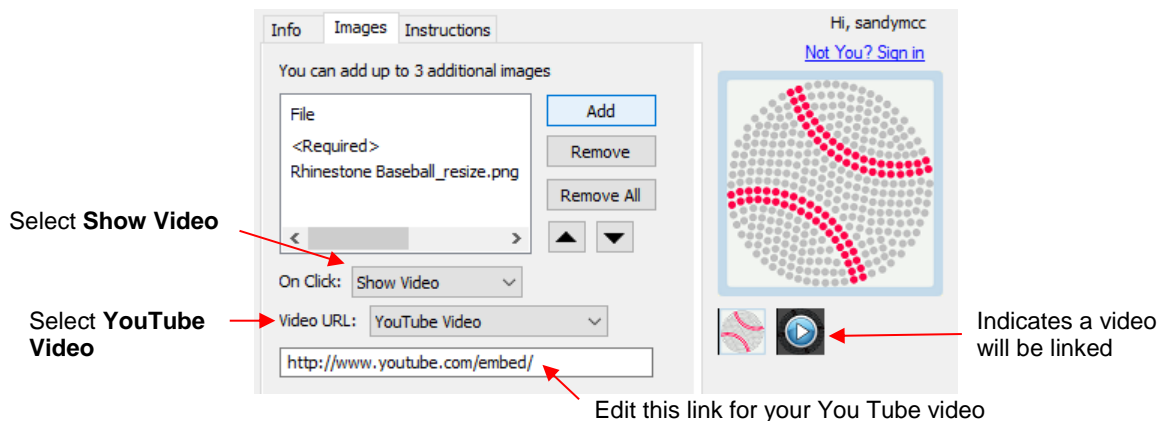
Done Upload

Save current settings

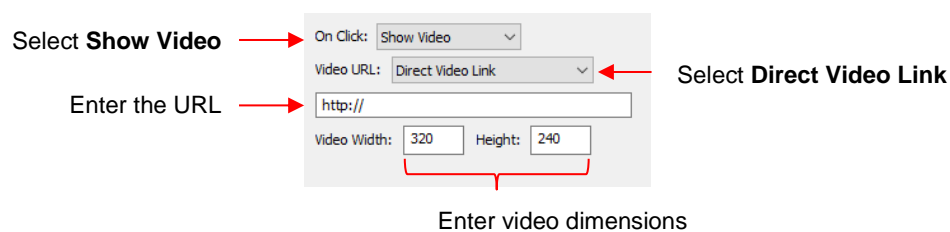
- There are instructions on the left-hand side. **Important:** Make sure all of the following settings have been completed before clicking on **Upload**:
  - ◇ **Title:** Provide a descriptive name for your project.
  - ◇ **Cut Type:** Select from the following:
    - **Regular Cut:** typical cutting projects
    - **Print2Cut:** print and cut projects
    - **Doodle:** projects drawn with a pen rather than cut with a blade
  - ◇ **Category:** Select from a long menu of choices. Review carefully to make sure the best choice is selected.
  - ◇ **Keywords:** Enter keywords based on what other SCAL owners might use to locate a file like yours.
  - ◇ **Description:** Enter information about the file that will help an owner know if it's what they might want or need.
- After completing the settings on the **Info** tab, click on the **Images** tab:



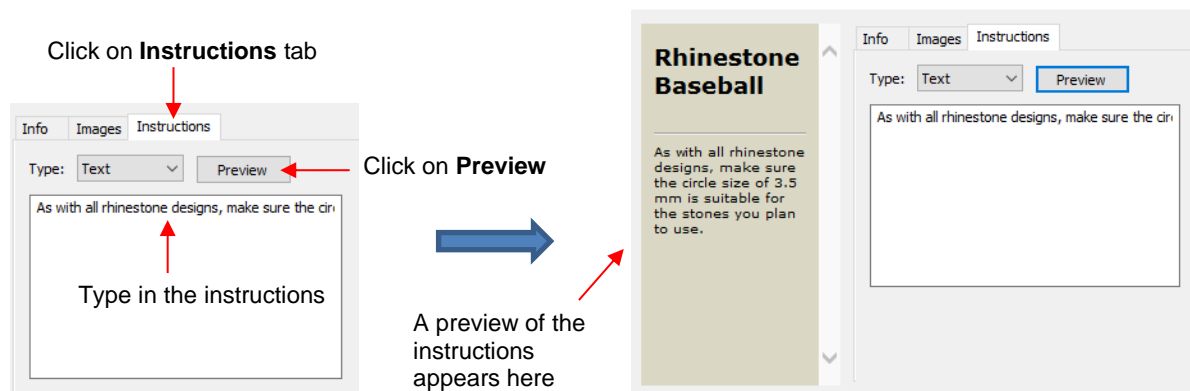
- ◇ Additional images can be uploaded, such as the rhinestone simulation version shown. Other examples where more images are appropriate might include final versions of finished greeting cards, fold-up boxes, and detailed paper-piecing projects.
- ◇ **On Click:** the default indicates **Show Image**. For videos, change this to **Show Video** from the menu.
  - If you have a YouTube video associated with your project, choose **YouTube** video and the window changes to include the start of an embedded YouTube video link:



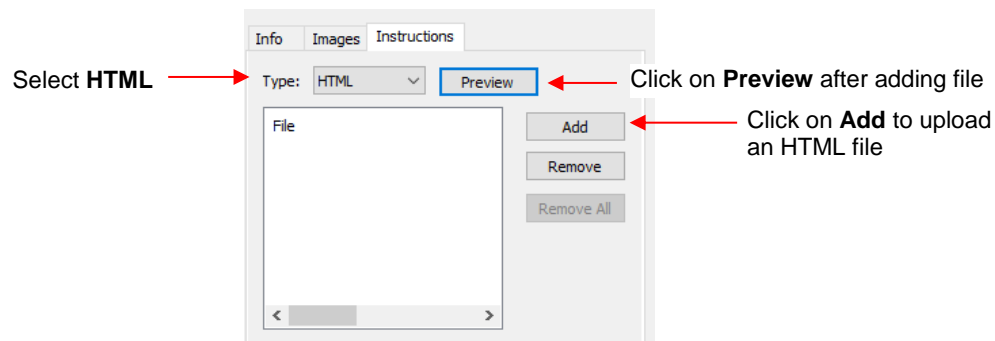
- Alternatively, you can link to an MP4 video located elsewhere:



- Finally, click on the **Instructions** tab and enter any instructions for the project. You have two options:
  - ◇ Type the instructions directly:



- ◇ Import an HTML formatted file by clicking on **Add** and then selecting the file:



- Once the desired choices and information are added for your file, check it all one last time. Then go back to the **Info** tab and click on **Upload**. Note that clicking on **Done** will save this information with your file for uploading at a later time.
- After clicking on **Upload**, a progress window will open indicating your file is being sent to the **eshape Store**. A final **Upload Finished** window will open and notify you that the uploaded file will be reviewed for approval before being available.

## **4.06 Importing Other File Formats**

### **4.06.1 Importing Vector Files**

- 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
  - ◇ SCUT4: format used to save projects in SCAL4
  - ◇ 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
  - ◇ 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.

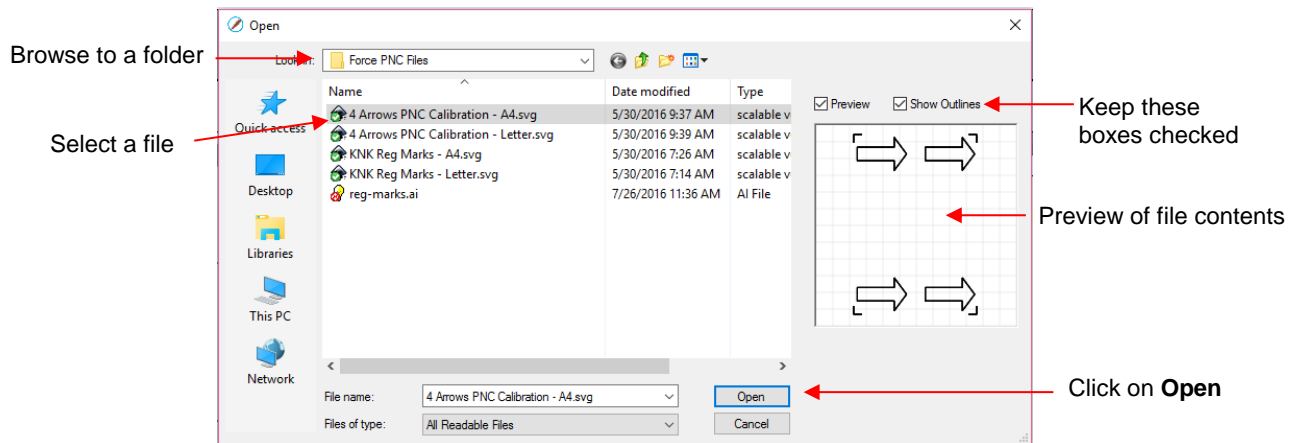
- ◇ PLT (SCAL PRO version only): developed by HP for their plotters, the PLT file evolved into a standard format used by early vinyl cutters
- ◇ DXF (SCAL PRO version only): common format exported by CAD programs
- ◇ WPC: format used in programs developed by Sign Max, which include WinPC Sign, Funtime, Pazzles Inspiration, and Gazelle.

- There are two ways to open the import window:

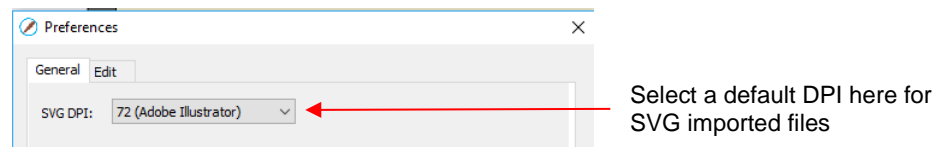
- ◇ Click on the **Import** icon on the upper **Toolbar**
- ◇ Go to **File>Import**



- 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 4.03.1*. 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.

## 4.06.2 Importing Raster Files

- There are several ways to import a raster file (JPG, BMP, GIF, PNG) depending on the intended purpose for that file:

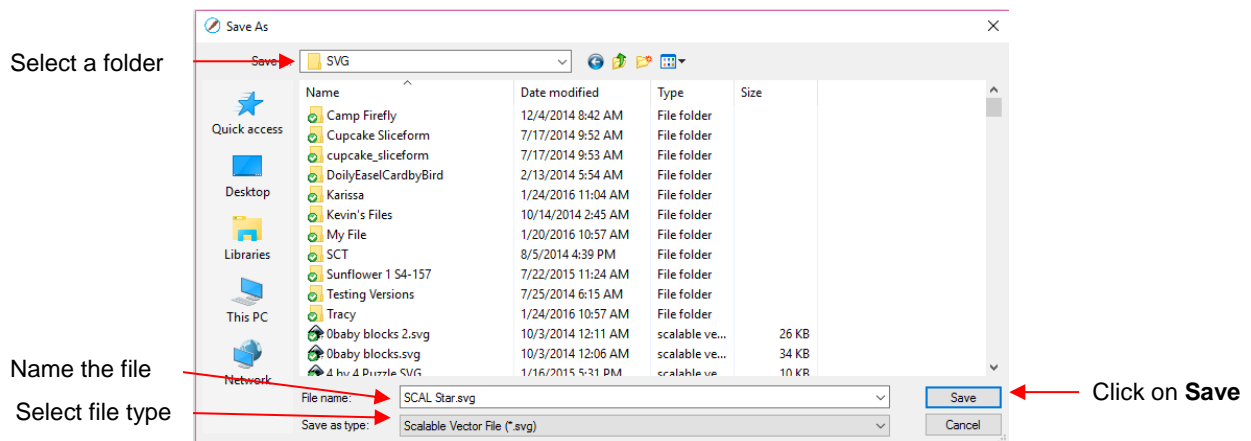
- ◇ **File>Import:** will import PNG files with a transparent background, simultaneously adding a vector cut line along the transparent border. This is very useful for PNC applications. This is the only raster format that will work using this method.
- ◇ **File>Place Image:** will import JPG, BMP, GIF, 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 7.03*.
- ◇ **Trace:** 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 7.03*.

### 4.06.3 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 6.02*.

### 4.07 Exporting in Other File Formats

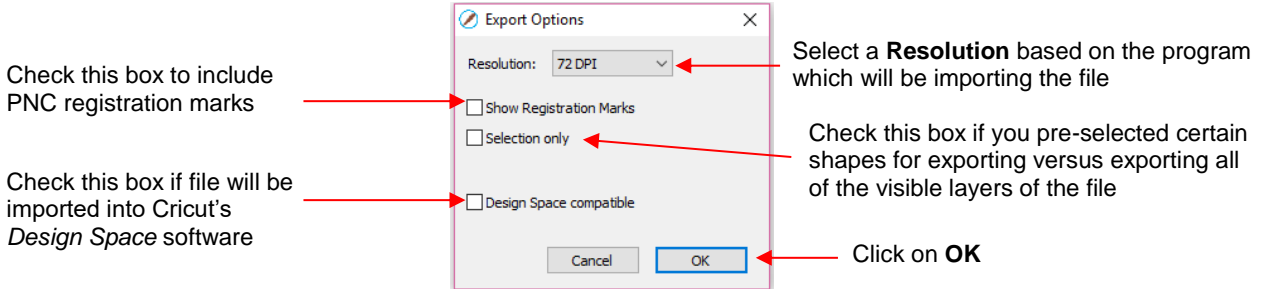
- Besides saving as a .SCUT4 file, you can also export in the following formats: SVG, JPG, BMP, PNG, TIFF, FCM, and PLT. Only SVG, FCM and PLT are vector formats. The others are raster.
- If there are only certain shapes in the file that you want to export, you have two options:
  - ◇ Select those particular 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 4.04.2 and 5.09*.
- 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.

### 4.07.1 Exporting in SVG Format

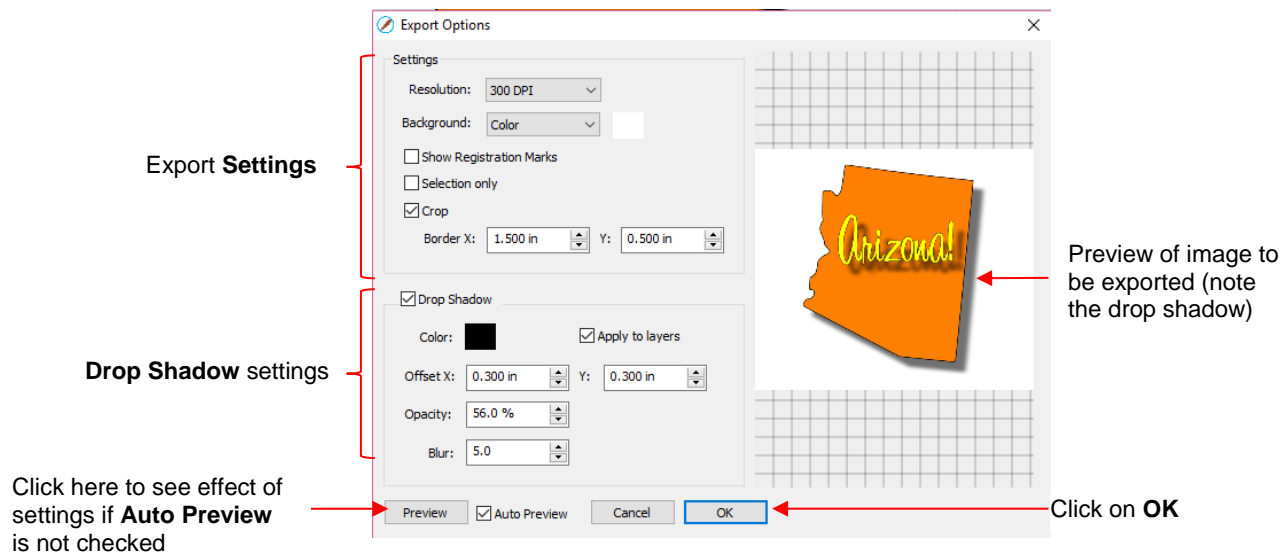
- The **SVG Export Options** are shown in the following screenshot:



- 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.

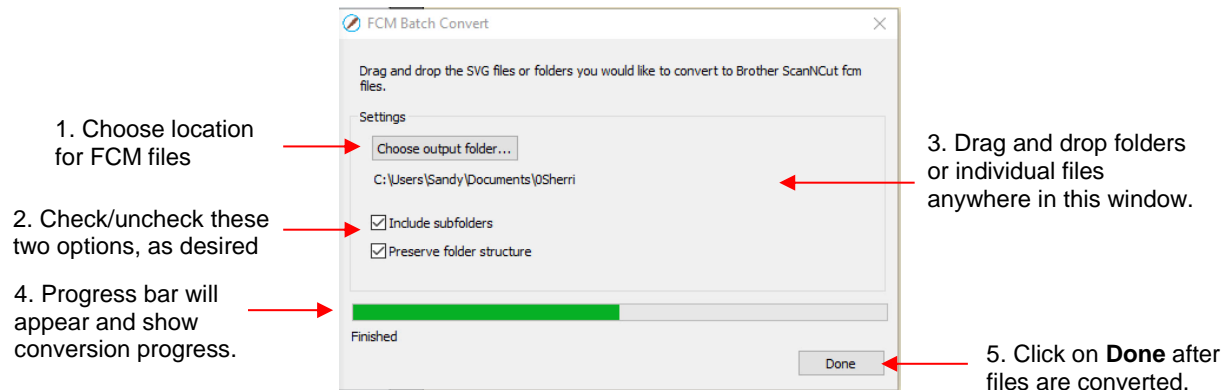
### 4.07.2 Exporting in JPG, PNG, BMP and TIFF Formats

- 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:



### 4.07.3 Exporting in FCM Format

- The FCM format is used by the Brother ScanNCut models. There is no secondary window with export settings. 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:

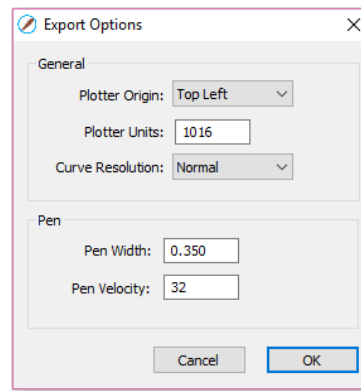


### 4.07.4 Exporting in PLT Format

- 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.



#### **4.07.5 Exporting to SCAL2**

- If you still use SCAL2, you can send a file from SCAL4 to SCAL2 by going to **File>Send to> Sure Cuts A Lot 2**. You will need both versions of SCAL open at the time.

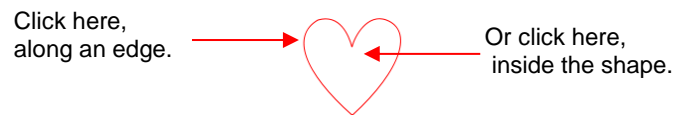
## 5. SCAL: Manipulating and Coloring Shapes

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.

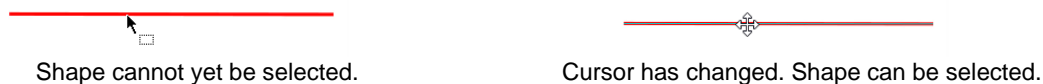
### 5.01 Selecting

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

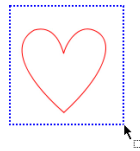
- ◇ Click anywhere on the shape (along an edge or inside a closed shape):



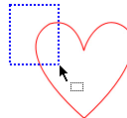
- ◇ Note that the cursor will change once the shape can be selected. For example, when selecting a line, wait for the cursor to change before clicking:



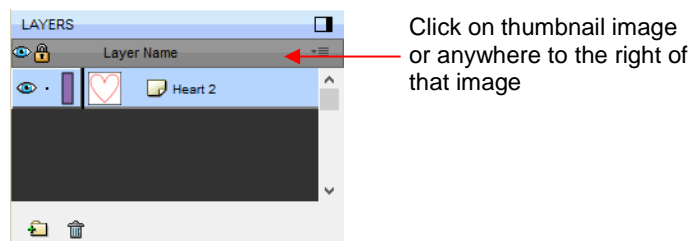
- ◇ Another way to select: drag the mouse to enclose the entire shape (aka marquee-select).



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

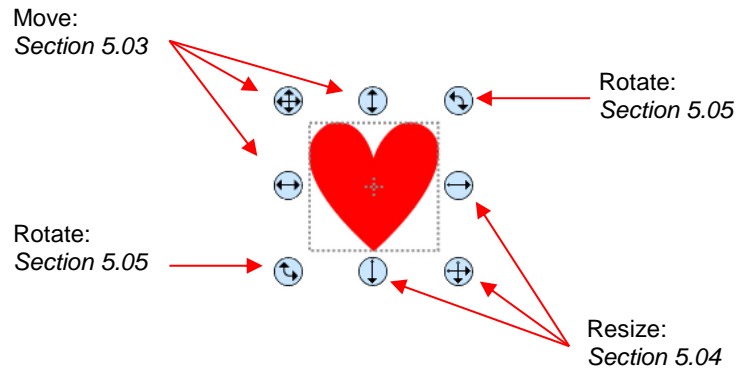


- ◇ A fourth way: click on the layer which contains this shape:



### 5.02.1 Basic Selection Handles

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

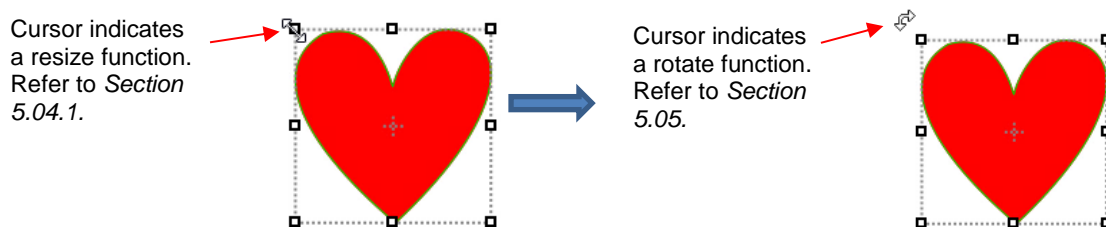


### 5.02.2 Advanced Selection Handles

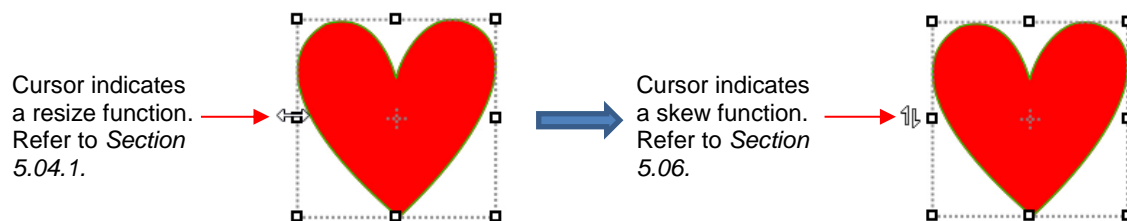
- While in the **Selection Tool** mode, the **Tool Options** bar indicates a setting called **Handles**. The drop-down menu offers another option called **Advanced**:




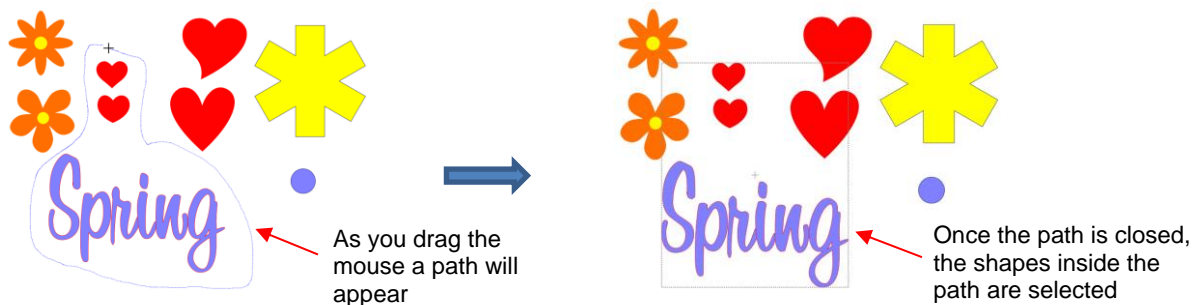
- In **Advanced** mode, a selected shape will appear with six identical handles. However, each handle now has two functions, depending on whether the mouse hovers directly over the handle or is moved slightly away from the handle:



- 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. Refer to [Section 4.04.2](#).
  - ◇ Use the **Lasso Selection** tool on the **Tools Panel** . Freely drag the mouse around the shapes you want to include in the selection:




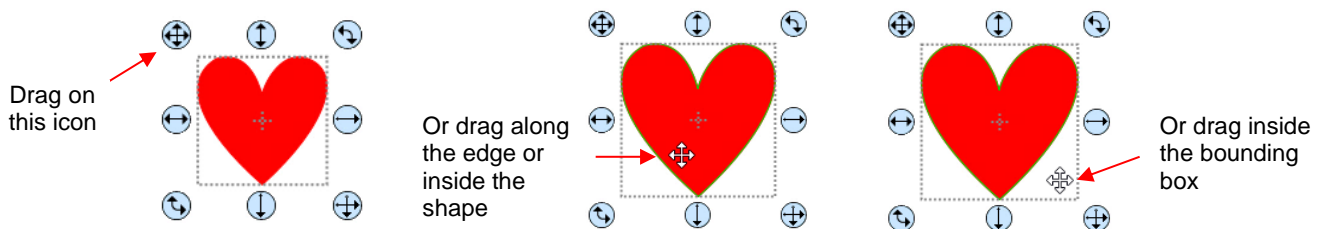
- If you wish to select all of the shapes on the screen, there are several options:
  - ◇ Press **Ctrl+A**
  - ◇ Right-click on the screen and choose **Select All** from the menu
  - ◇ Go to **Edit>Select All**
- To unselect all shapes, use one of the following ways:
  - ◇ “Click away” – click anywhere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

## 5.02 Deleting

- 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 5.01* 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 4.04.2*.

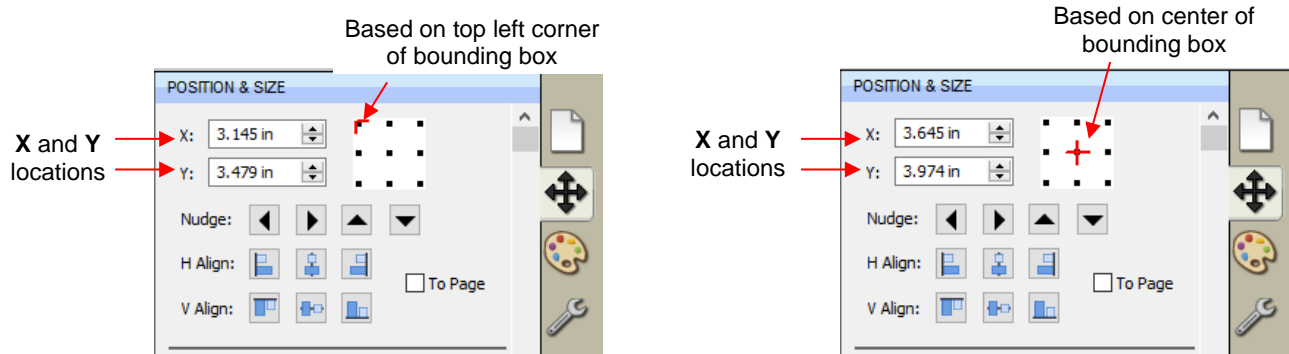
## 5.03 Moving

- 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:

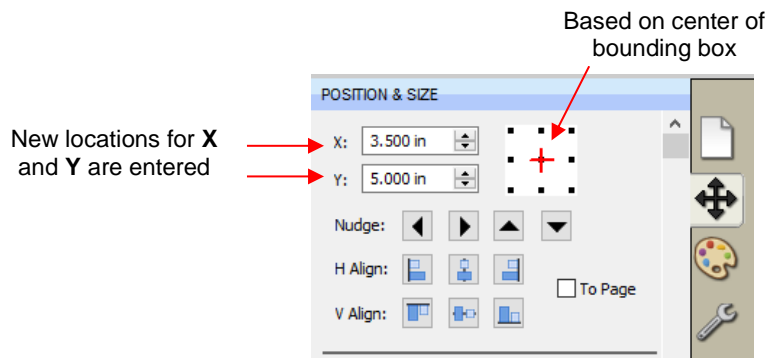


- To move a shape and maintain horizontal or vertical alignment, hold the **Shift** key while dragging or use the arrow keys on your keyboard.

- 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:



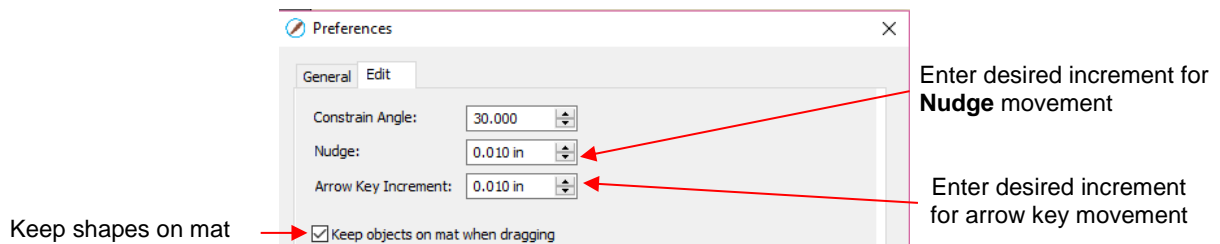
- You can enter new values into either or both of the **X:** and **Y:** windows to move the shape to a new location:



- 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:

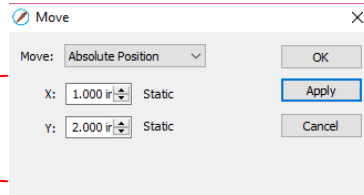


- The increment size for both the keyboard moves and the **Nudge** moves can be changed by going to **Edit>Preferences** and then selecting the **Edit** tab. This window also offers the option to force shapes to remain within the boundaries of the **Cutting Mat** while being moved with the mouse:

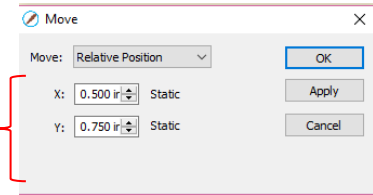


- There is also a **Move** function available which can be accessed these two ways:
  - Right-click on a selected shape and go to **Transform>Move**
  - Go to **Object>Transform>Move**
- This **Move** windows provides two moving options:
  - Move the shape to a specific position on the **Cutting Mat** (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

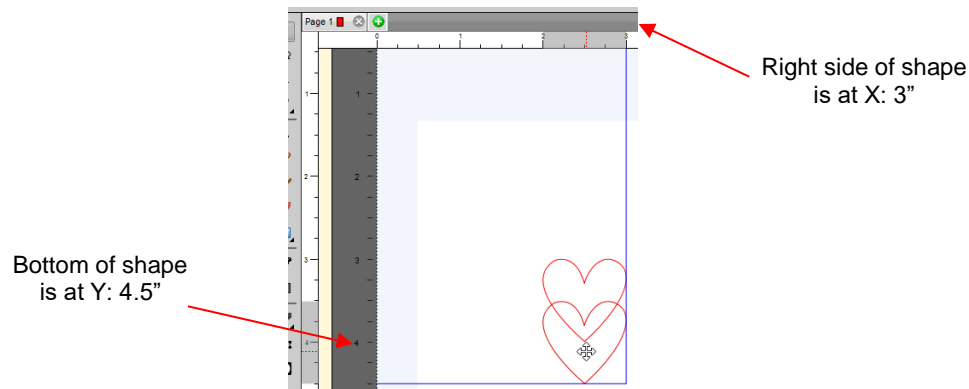


**Relative Position:**  
how far to move the  
shape in both an X  
and Y direction



◇ **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.

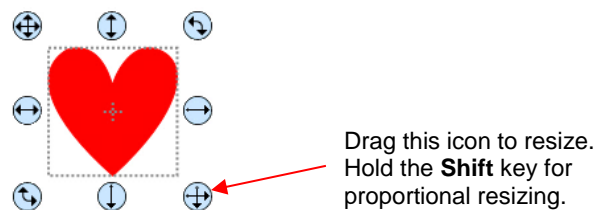
- You can also use the **Rulers** to estimate a new location for moving shapes. Blue lines will appear when the shape is aligned with a major marking, such as shown below:



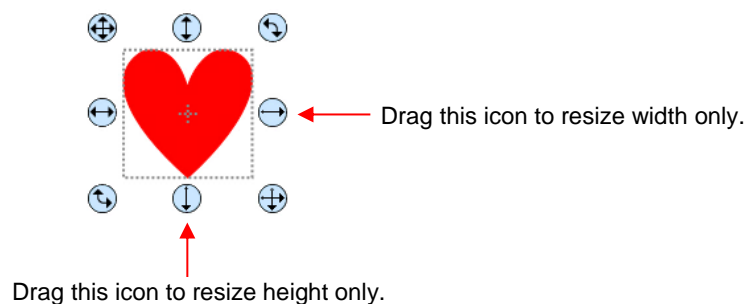
## 5.04 Resizing, Scaling, Auto Fit

### 5.04.1 Resizing

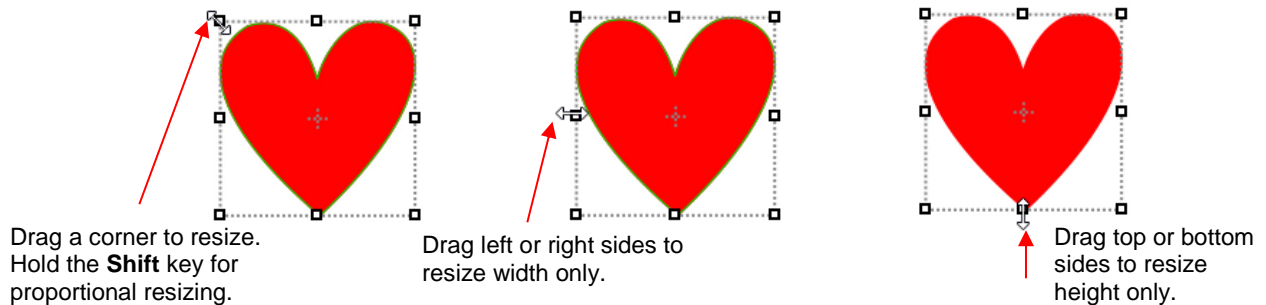
- With the shape selected, use your mouse to drag the lower right corner of the shape to freely resize. If you want to keep the width and height proportional, hold the **Shift** key down before dragging that icon:



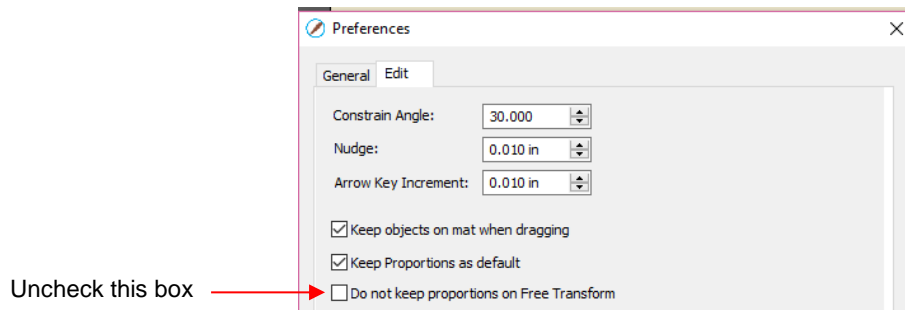
- To resize only the width or the height, drag the middle right or the middle bottom icons, respectively:



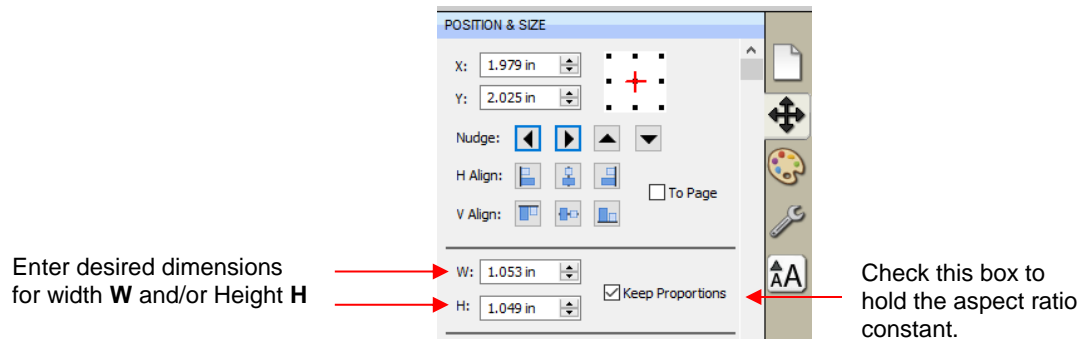
- To resize keeping the shape centered, hold the **Alt** key while dragging the corner,
- If the **Handles** are in **Advance** mode, then drag a corner or a side when the cursor is directly over the handle. Again, holding the **Shift** key will resize height and width proportionately:



- 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:

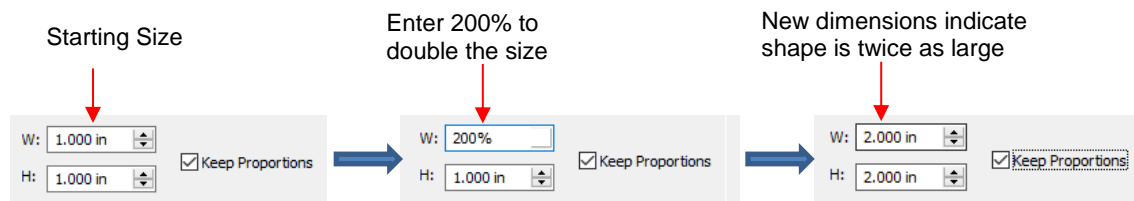


- **Important:** Unchecking this box does not then affect shapes created using the **Shapes** tool on the **Tools Panel**. You will need to hold the **Shift** key to maintain proportions when resizing by dragging the lower right corner.
- If you need to make the shape an exact size, then enter the dimension 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:



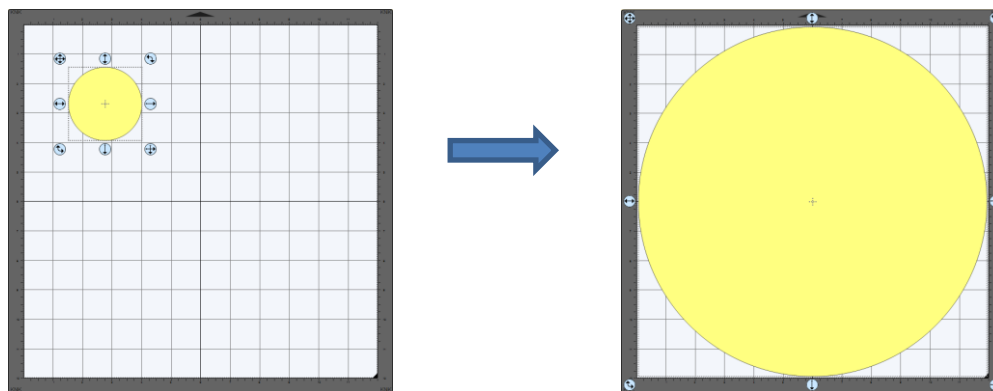
### 5.04.2 Scaling

- The **Scale** function can be accessed using either of these ways:
  - ◇ Right-click the selected shape and go to **Transform>Scale**
  - ◇ Go to **Object>Transform>Scale**
- Percentages can also be used in the dimension settings to scale. For example, if you want to double the size of a shape, you can enter 200%:

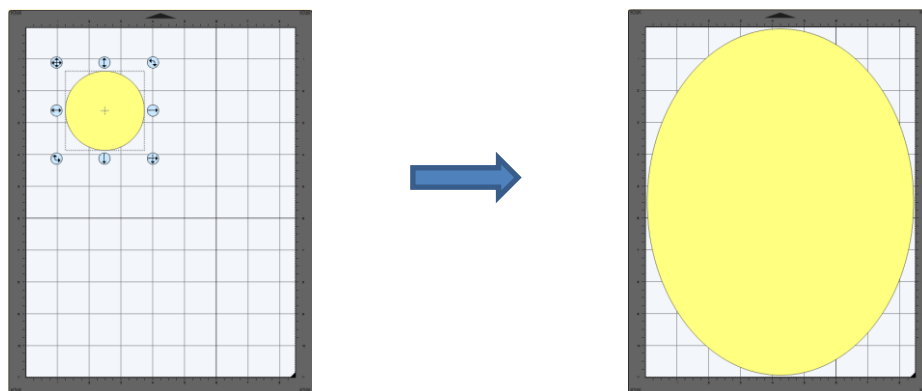


### 5.04.3 Auto Fit (PC only)

- 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**:

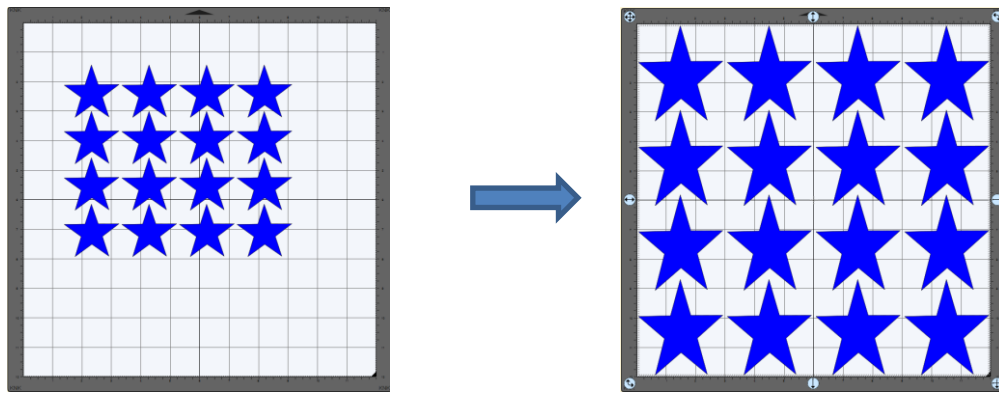


- ◇ The new size of the circle is 11.875" x 11.875".
- ◇ If the circle is placed on a 15" x 15" mat, then it resizes to 14.85" x 14.875". However, if the circle is placed on letter size mat (8.5" x 11"), then it becomes an oval:



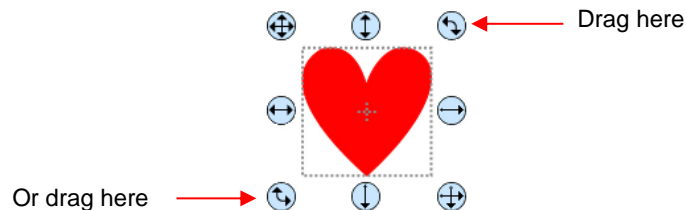
- A practical example might be something like this: You have one 12 x 12 sheet of cardstock and you want to cut out 16 stars for a party decoration and you want those stars as large as possible. Rather than having to "do the math", you can create a grid of stars (refer to *Section 5.16.4*) and then use the **Auto Fit** function to resize them for the cut:



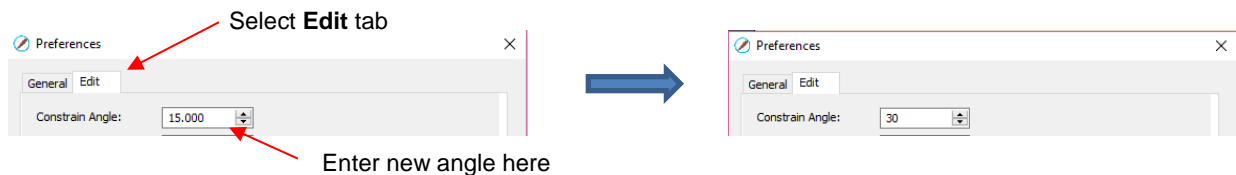


## 5.05 Rotating

- 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:

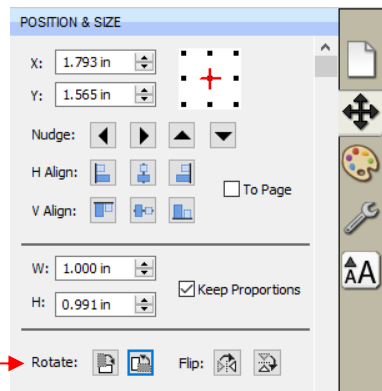


- ◇ The **Status Bar** at the bottom of the screen will indicate the current degree of rotation:

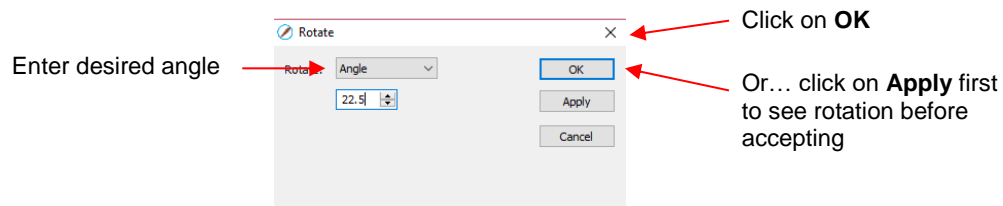


- ◇ Note: the **Status Bar** will continue to show the last degree of rotation until another shape is selected and rotated.
- A selected shape can be rotated exactly 45° clockwise or counter-clockwise, by clicking the **Rotate** icons on the **Position & Size Panel**:

Click the **Rotate** icons for a 45° rotation.



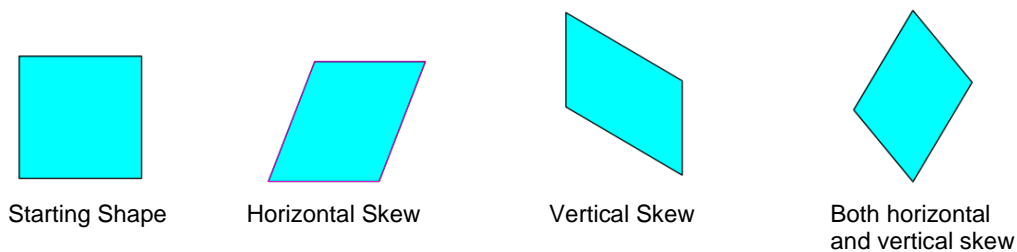
- To rotate a specific angle, open the **Rotate** window in either of two ways:
  - ◇ Right-click on a selected shape and go to **Transform>Rotate**
  - ◇ Go to **Object>Transform>Rotate**
- Enter the desired angle:



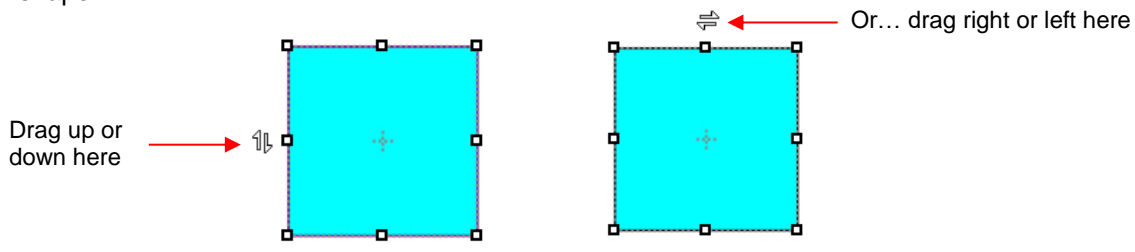
## 5.06 Skewing and Distorting

### 5.06.1 Skewing

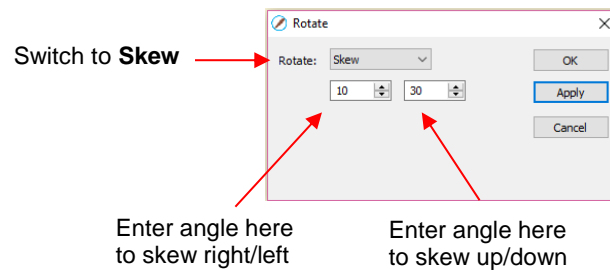
- Shapes can be skewed either horizontally or vertically:




- 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:

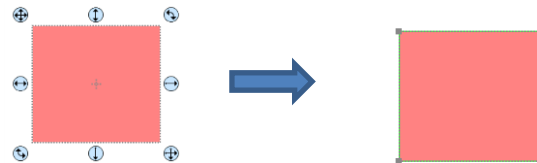


- ◇ With the shape selected, open the **Rotate** window by using one of these two methods:
  - Right-click and select **Transform>Rotate**
  - Go to **Object>Transform>Rotate**
- ◇ Then switch from **Angle** to **Skew** and enter a skew angle:

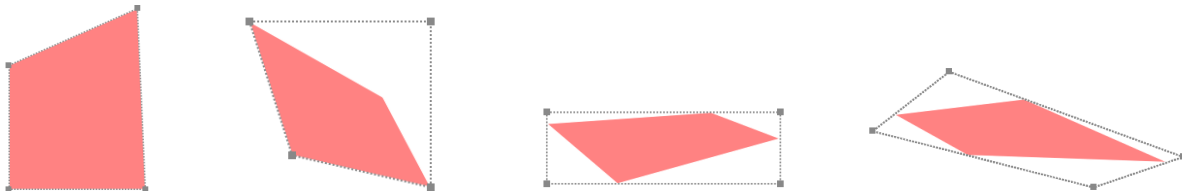


### 5.06.2 Distorting

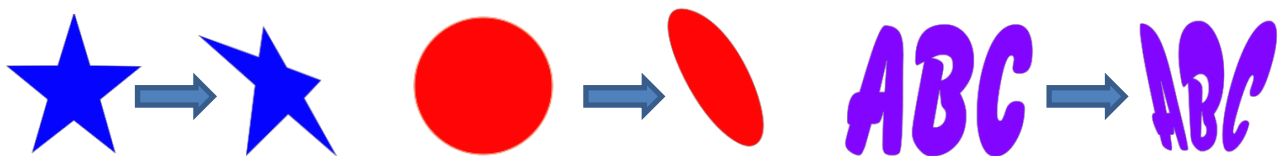
- The **Distort** tool is the 5<sup>th</sup> icon  from the bottom on the **Tools Panel**. Select a shape and then click on the icon. The four corners of the bounding box will display small boxes:



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

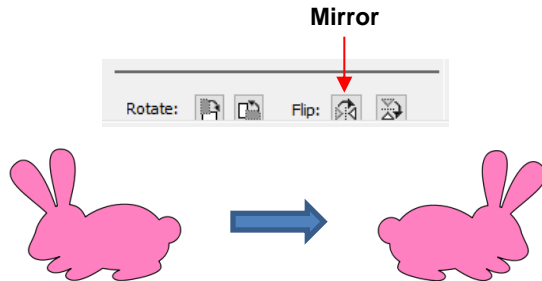


- Of course, the shape doesn't have to be rectangular. The **Distort** tool can be applied to anything:

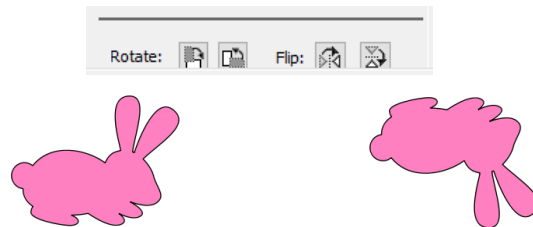


### 5.07 Mirroring and Flipping





- 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**:








## 5.08 Locking and Unlocking

- 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**

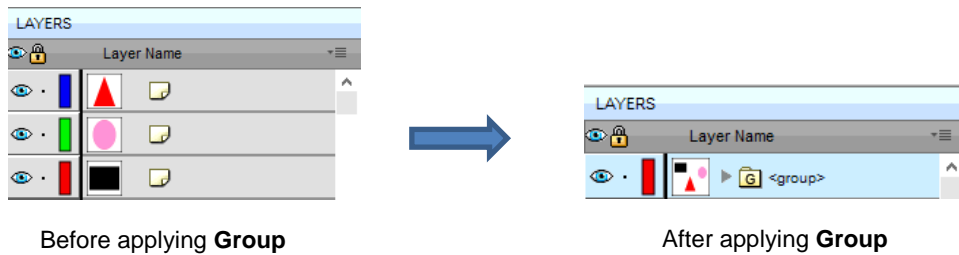
## **5.09 Hiding and Showing**

- 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**

## **5.10 Grouping and Ungrouping**

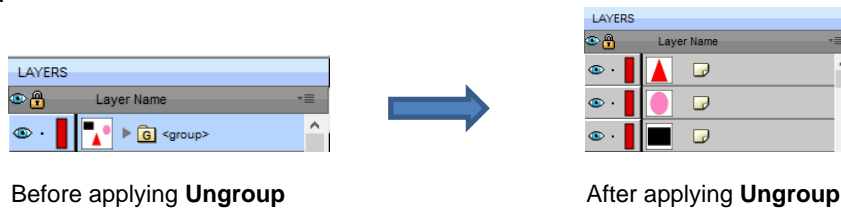
### **5.10.1 Group**

- 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:



### 5.10.2 Ungroup

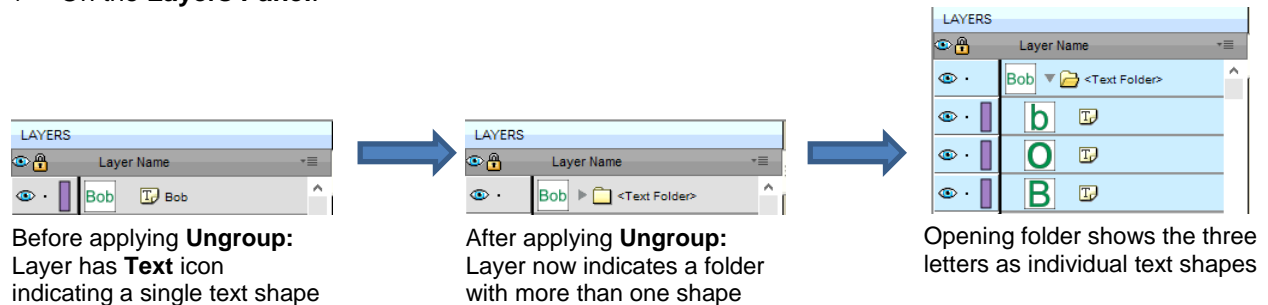
- The **Ungroup** function is used to separate a grouped layer of shapes into individual layers.
- After selecting a group, the **Ungroup** function can be applied in any of the following ways:
  - ◇ Right-click and select **Ungroup** from the popup menu
  - ◇ Go to **Object>Ungroup**
  - ◇ Press **Ctrl+Shift+G**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



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



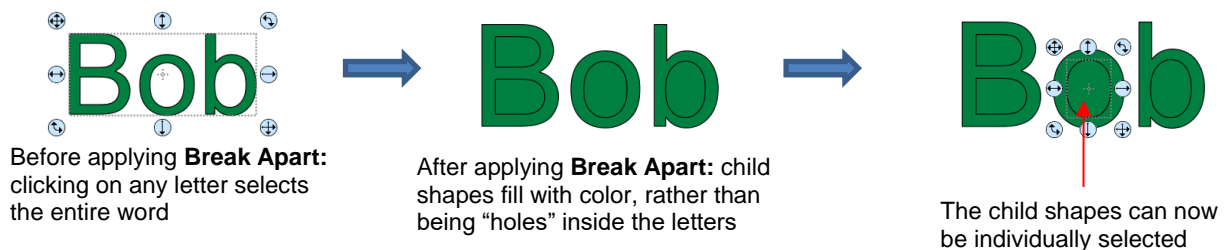
- ◇ On the **Layers Panel**:



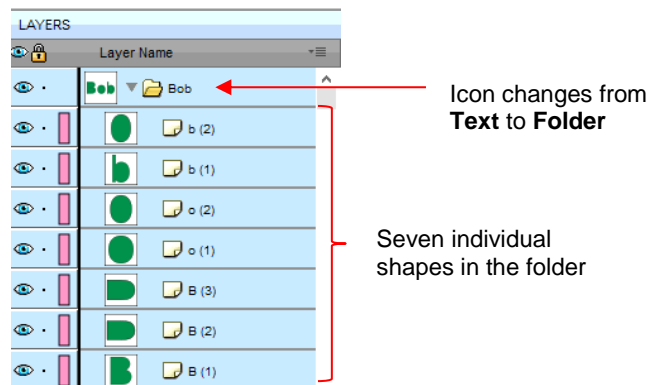
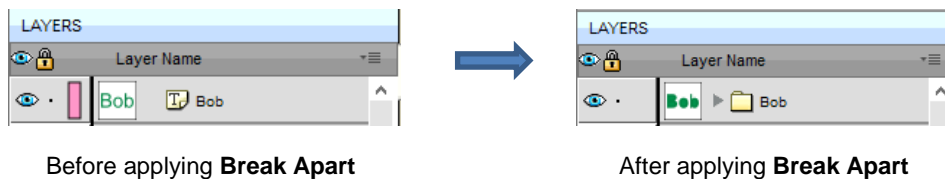
### 5.11 Breaking and Merging

### 5.11.1 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):



- ◇ On the **Layers Panel**:



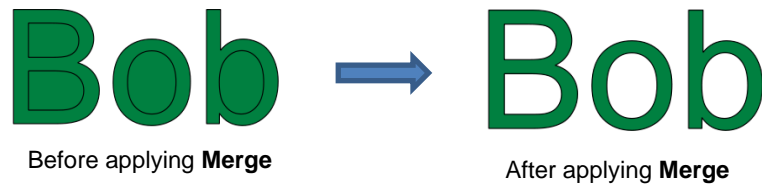
- Once you apply **Break Apart**, you have complete editing control over each individual shape within a design. But be careful! It's also easy to inadvertently move an individual shape (especially the tiny ones) and you can risk messing up the design. Thus, only use **Break Apart** when needed and then,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

### 5.11.2 Merge

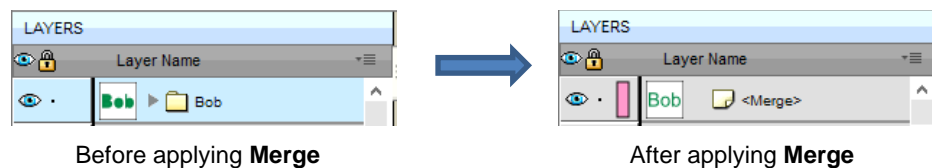
- The **Merge** function is used to combine individual paths, curves, and lines into a single shape. This is basically the opposite function to **Break Apart**.
- After selecting two or more shapes, the **Merge** function can be accessed in either of the following ways:
  - ◇ Go to **Object>Merge**

◇ Press **Ctrl+Shift+B**

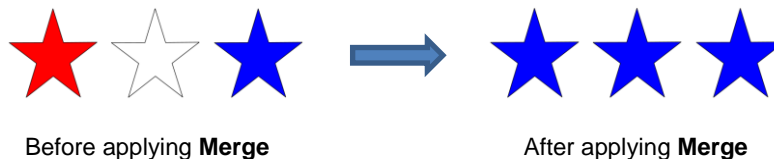
- If the **Merge** function is applied to the prior “Bob” example, after having **Break Apart** applied, the word will now become all one shape again. Separated child paths no longer exist and even the individual letters can no longer be selected:



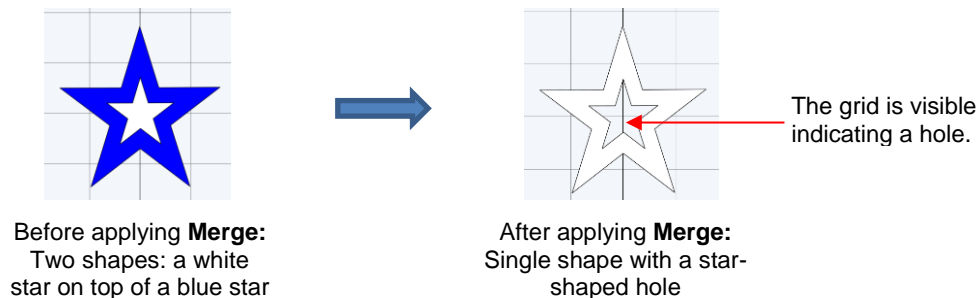
On the **Layers Panel**, this is what will appear:



- 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:



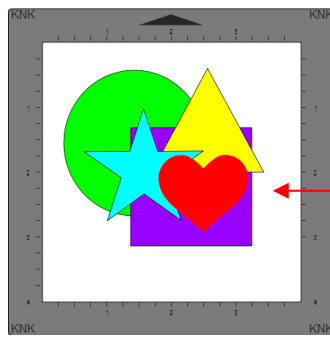
- ◇ A child shape that is merged with a parent shape essentially becomes a hole in that shape. This can be proven by having the grid showing when merging:



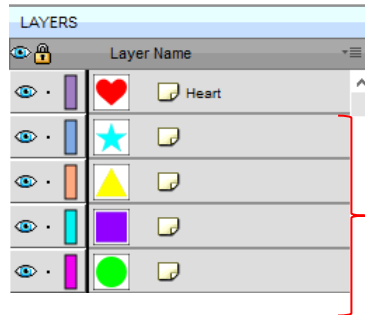
## **5.12 Arranging (Ordering) Shapes**

- 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 four overlapping shapes and how they appear on the **Layers Panel**:




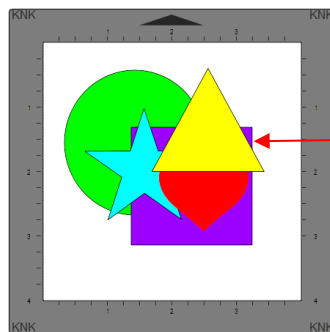


From top to bottom:  
red heart  
blue star  
yellow triangle  
purple square  
green circle



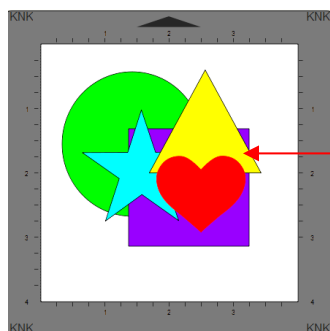
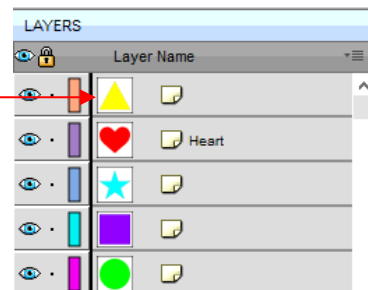
The order of the 5 shapes on the **Layers Panel** matches the overlap on the **Cutting Mat**

- In *Section 4.04.3*, 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:



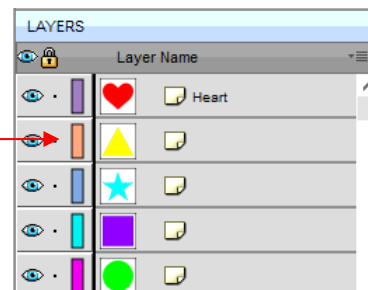
**Bring to Front**

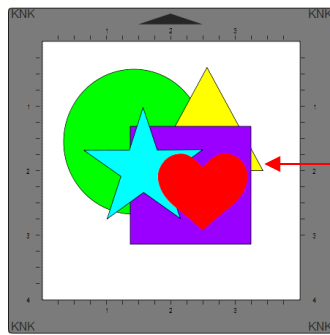
Triangle moves to the top



**Bring Forward**

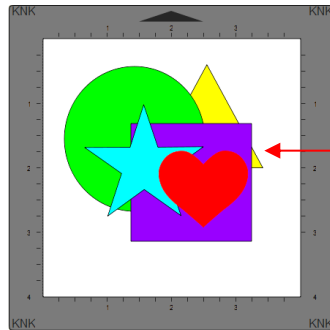
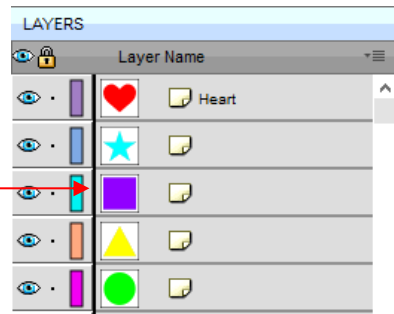
Triangle moves above blue star but is still below red heart





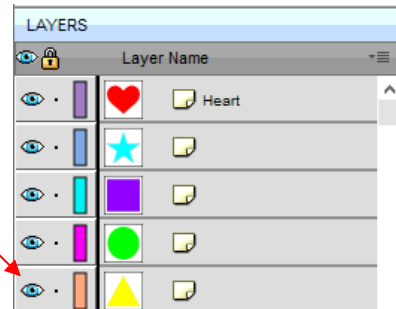
### Send Backward

Triangle moves below purple square but is still above green circle



### Send to Back

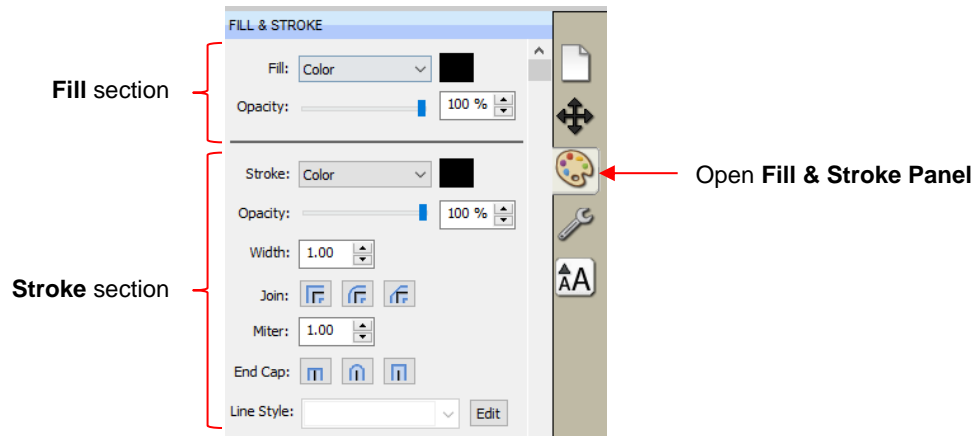
Triangle moves to the bottom



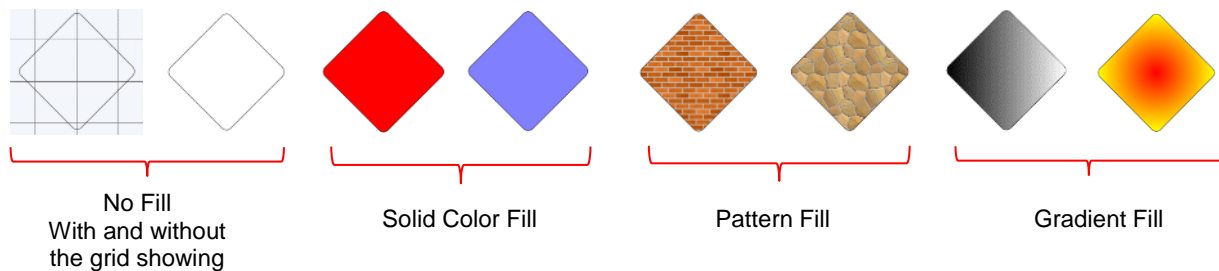
- It is worth noting that if any of the other layers had been locked or hidden, the movement of the triangle would have been the same. In other words, if the red heart had been hidden and/or locked, the triangle would still have ended up above it using **Bring to Front**.
- There are also shortcut keys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

## 5.13 Fill & Stroke: Fill

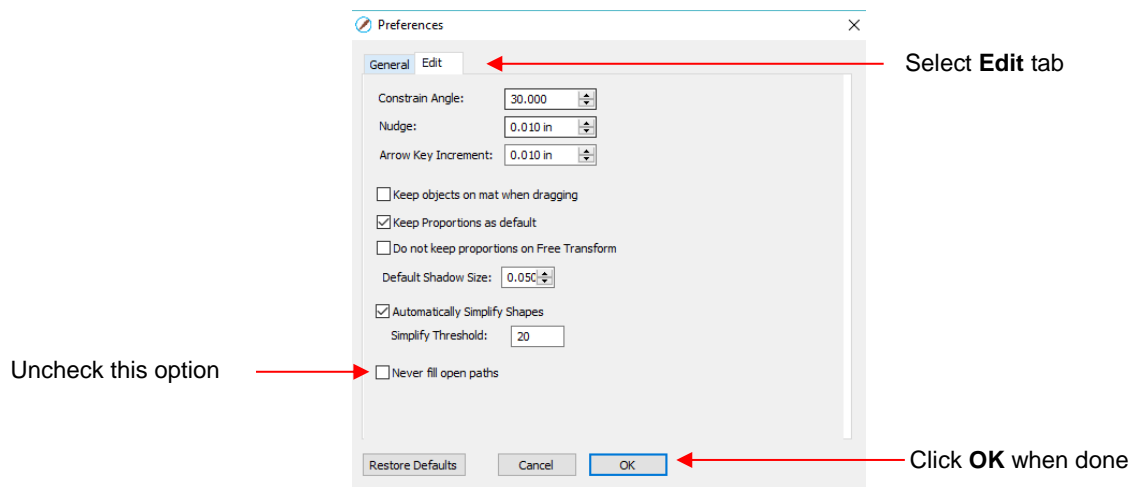
- The **Fill & Stroke Panel** provides options for changing how a shape or open path appears on the screen and, in the case of **Line Style** (solid versus dashed), how it cuts. This can be helpful in designing a project and also in print and cut applications.
- To open this panel, click on the **Fill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



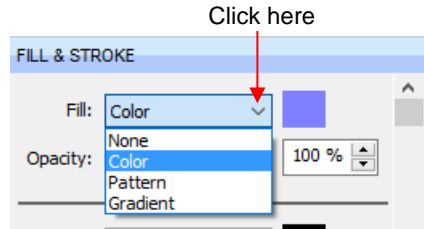
- Shapes can be filled with nothing, a solid color, a pattern or a gradient:



- 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**.

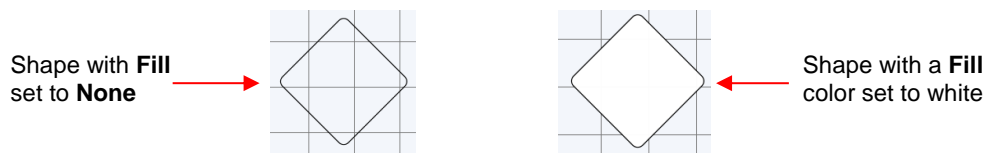


- To select a type of **Fill**, click on the drop-down menu and select from the four options:



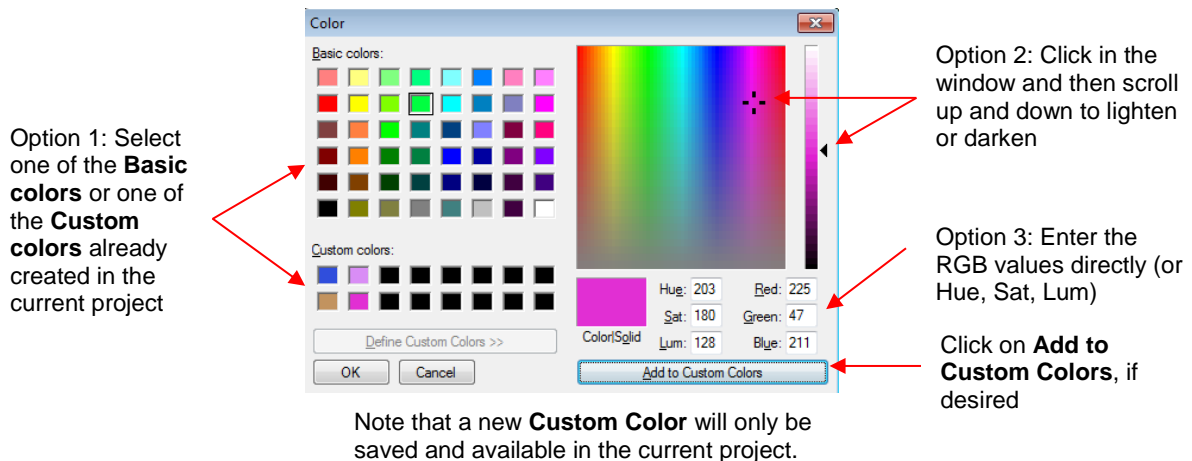
### 5.13.1 No Fill

- 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:



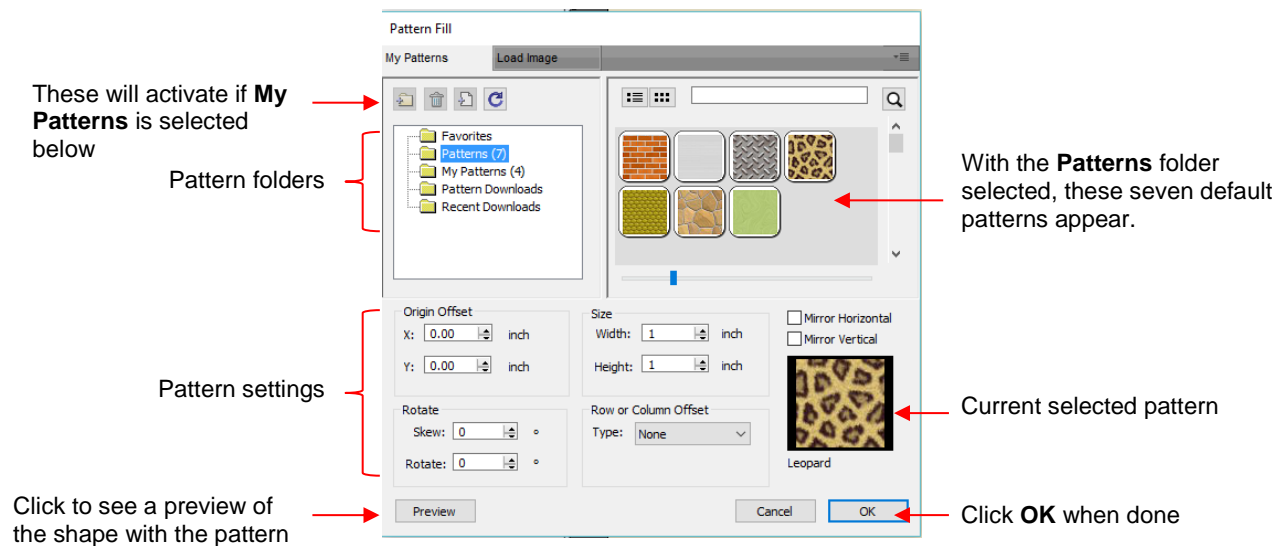
### 5.13.2 Color Fill

- From the **Fill** menu, select **Color** and then click on the color box to the right to open the following window where you will have the option to select a basic color or create your custom color:

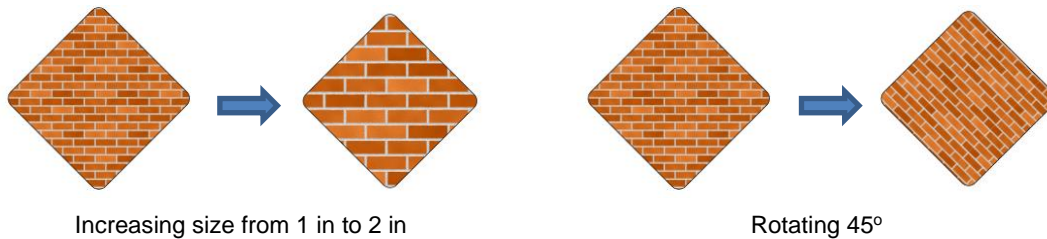


### 5.13.3 Pattern Fill

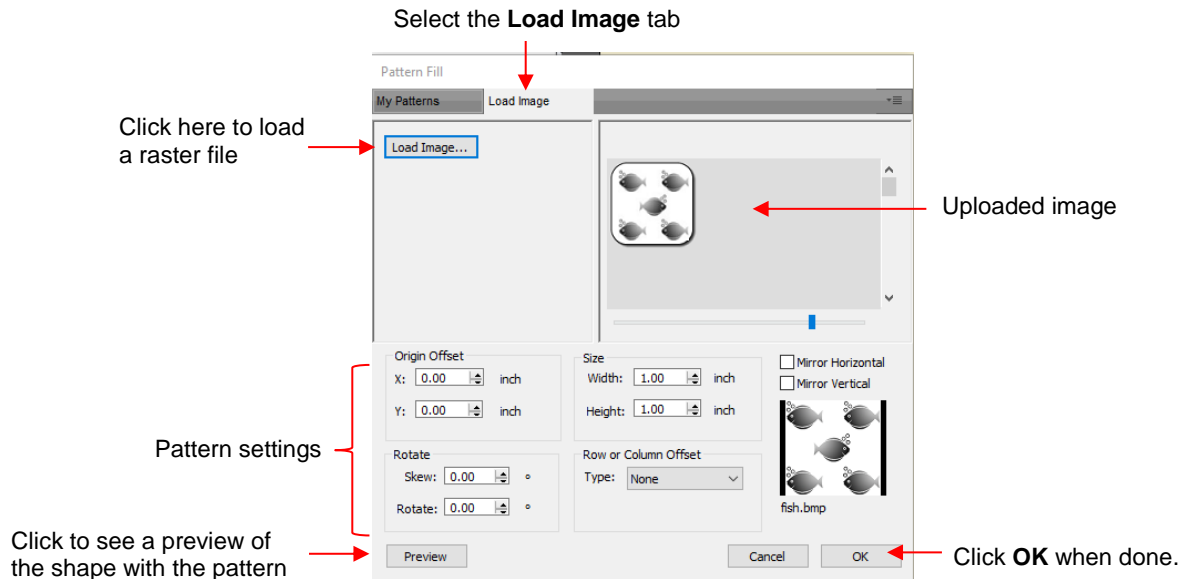
- From the **Fill** menu, select **Pattern** and then click on the color box to the right to open the following window where a pattern can be selected:



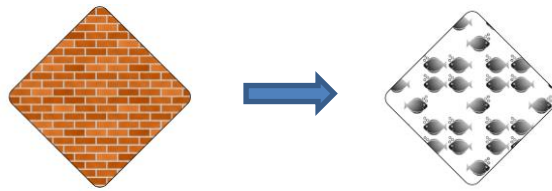
- Many of the functions in the **Pattern Fill** window are identical to those under the **Shapes** tab in the **Library**. Refer to *Section 4.03.1* for directions on searching, adding new folders, adding new files, adding to **Favorites**, etc.
- When adding your own patterns under **My Patterns**, select common raster file formats (e.g. BMP, PNG, JPG).
- 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:

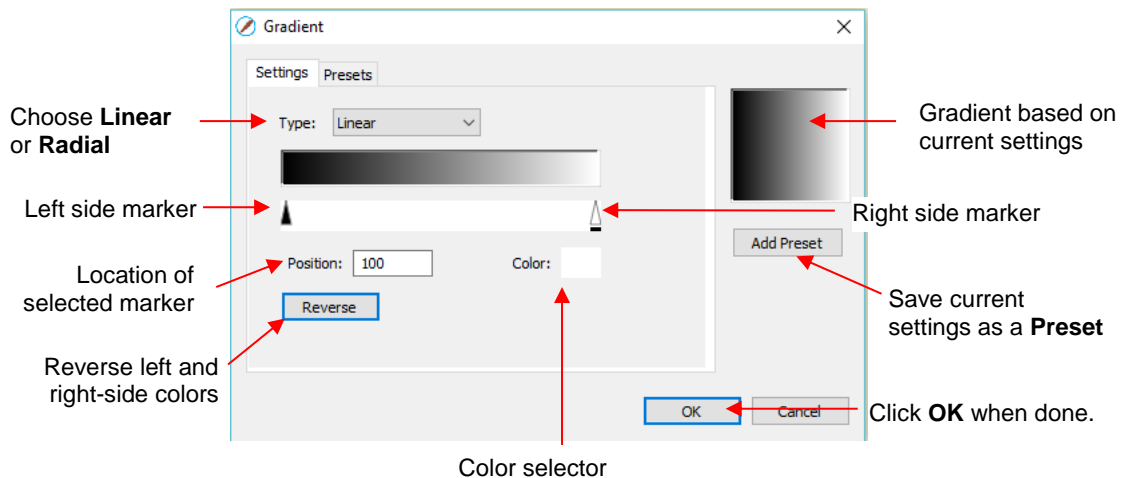


- The selected shape now fills with the uploaded image:

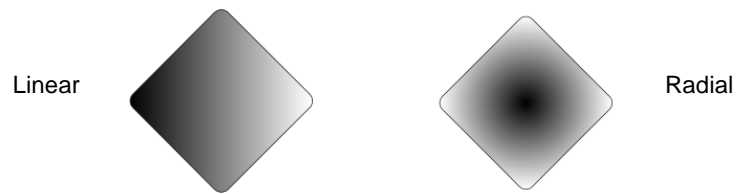


### 5.13.4 Gradient Fill

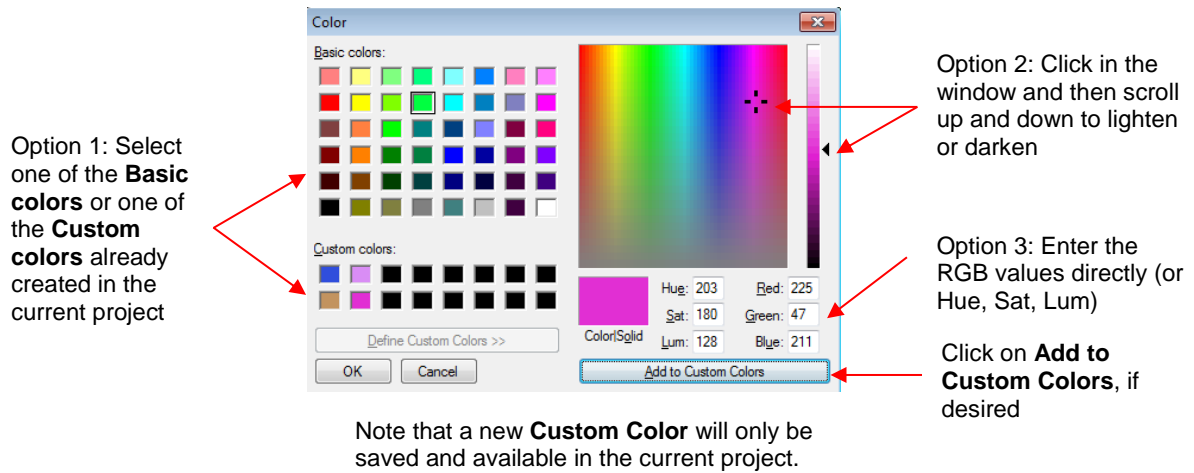
- From the **Fill** menu, select **Gradient** and then click on the color box to the right to open the following window where a gradient can be designed:



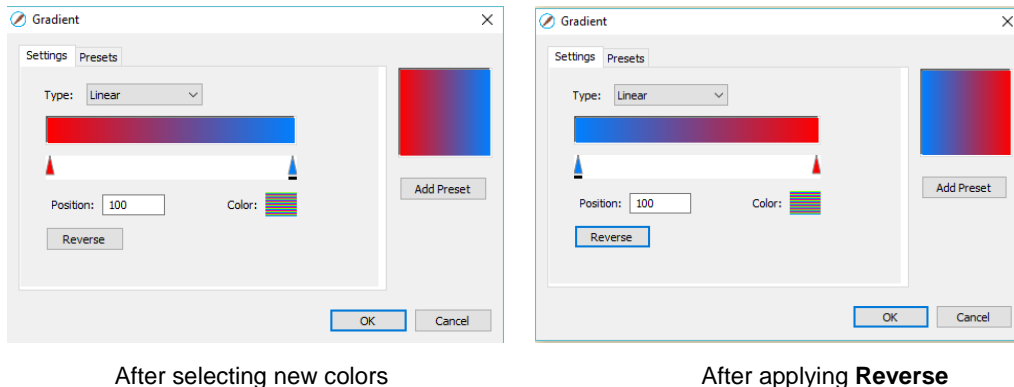
- **Type:** Choose **Linear** for a left-to-right gradient. Choose **Radial** for a center outwards gradient:



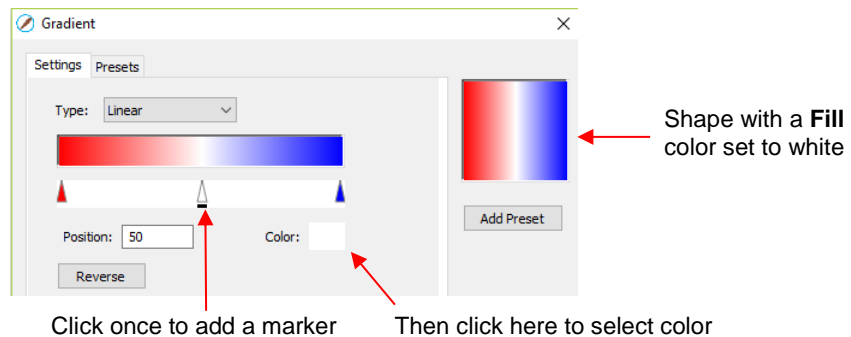
- ◇ To change colors, click on one of the markers, then click on the color selector box and choose a color from the **Color** window. Repeat for the other marker. As with other color selections, you can choose a base color or create a custom color:



- ◇ After selecting new colors, the thumbnail image will update. Note that clicking on **Reverse** will switch the two chosen colors:



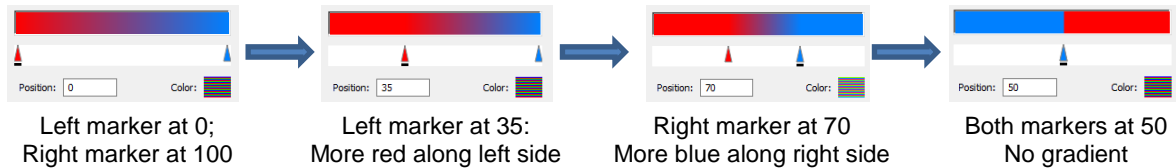
- ◇ More markers can be added by clicking on the **Position Bar** and then clicking on the **Color** selector. For example, white could have been added to the middle:




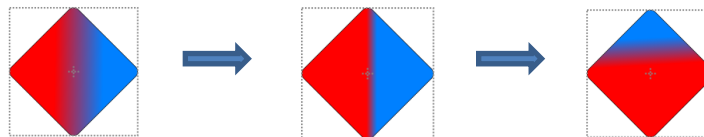
- ◇ If you inadvertently add a marker or decide you don't want one or more of the new ones, drag the marker downward and it will be removed.
- ◇ **Position:** The **Position** value is a location from 0 to 100 and applies to whichever marker is selected.

Note the little black line under a selected marker .

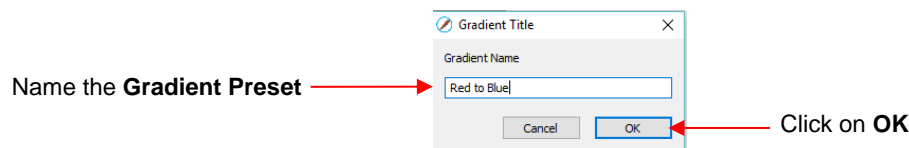
- ◇ Changing the **Position** moves the marker and resets where the gradient begins on that side. You can also manually slide the markers to change the **Position**, as well. Returning to the two-color example:



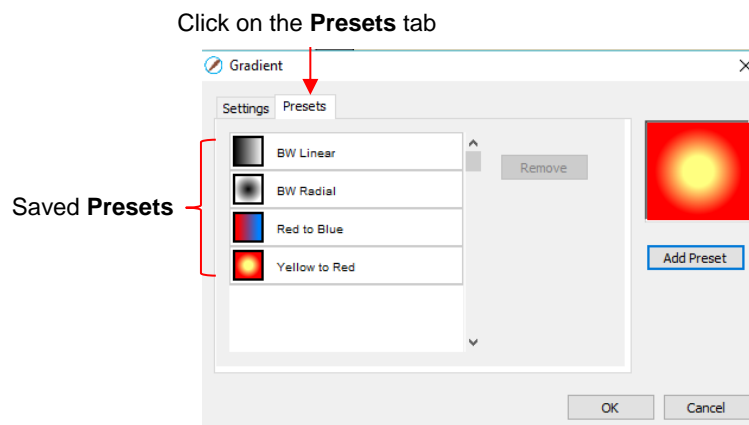
- ◇ The **Position** can also be changed after the shape is filled and the **Gradient** window is closed. On the **Tools Panel** is a **Gradient** tool . After selecting the shape, click on the **Gradient** icon and then drag the mouse across the shape to change the **Positions** and even rotate the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



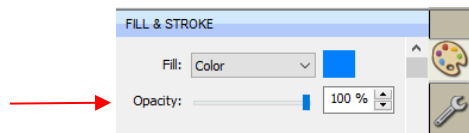
- ◇ To access your saved **Gradient Presets**, click on the **Presets** tab and the menu will appear:



### 5.13.5 Opacity

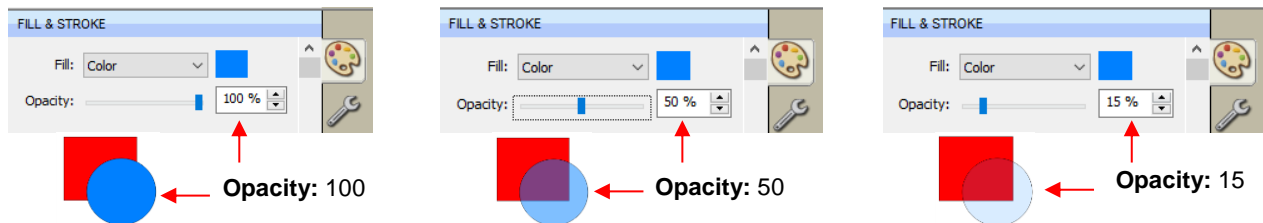
- Just below the **Fill** setting is **Opacity**:





- 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.

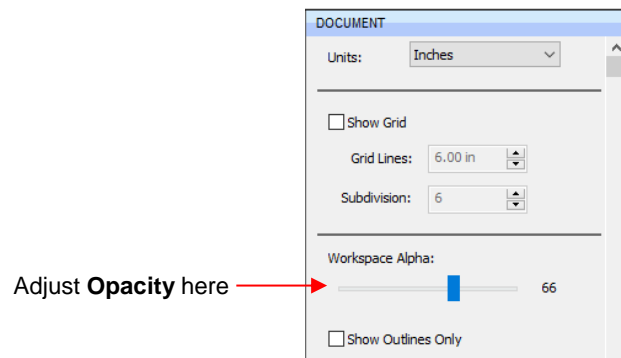
◇ In the following example, the **Opacity** is decreased on the blue circle, allowing the blocked portion of the red square to be seen:



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

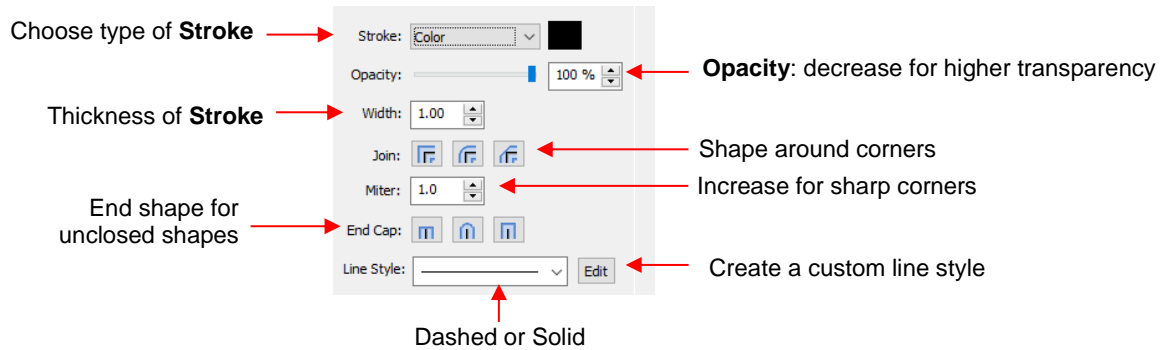


◇ If you want to decrease the **Opacity** for all shapes, the **Workspace Alpha** setting on the **Documents Panel** can be reduced from 100% to the desired level:



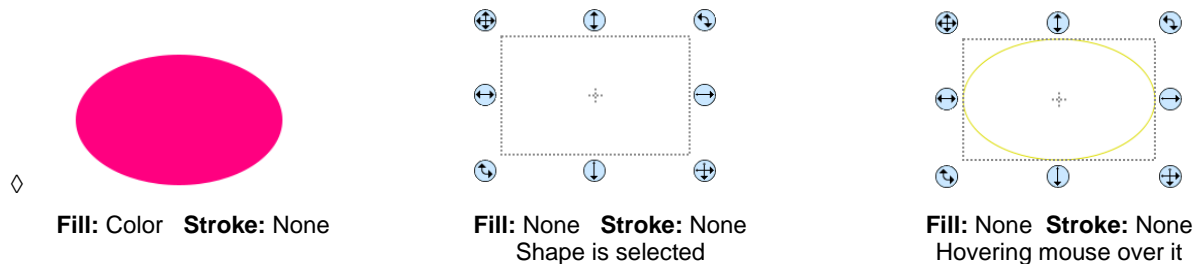
## 5.14 Fill & Stroke: Stroke

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



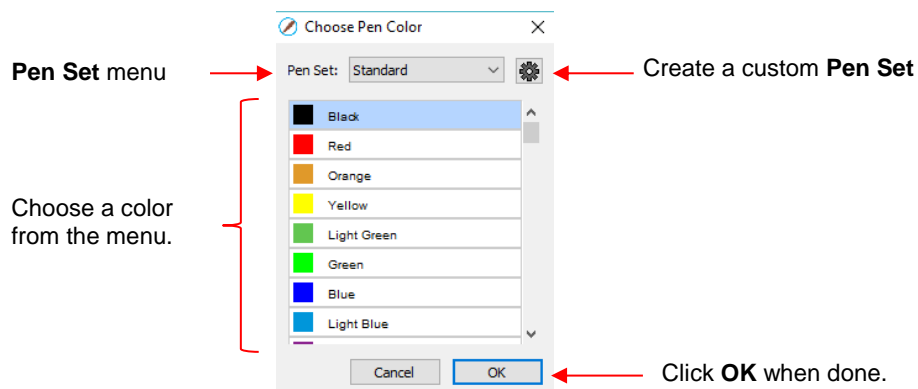
- **Stroke**: All shapes have a **Stroke** assignment using one of the following choices:

- ◇ **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:

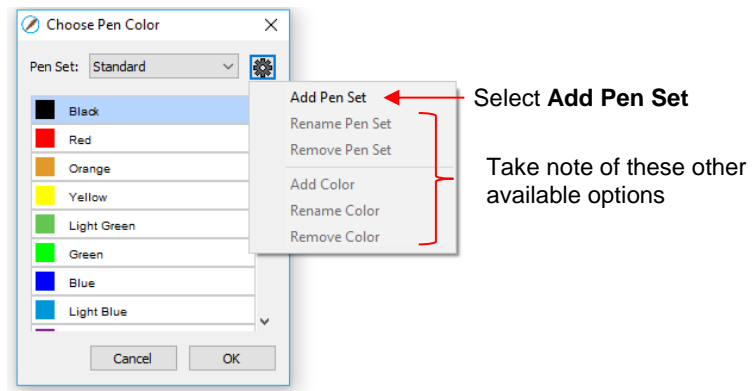


- ◇ **Color**: Once **Color** is selected, click on the box to the right and the **Color** window will open. This is the same window that opened when **Color** was selected under **Fill**. As with other color selections, you can choose a base color or create a custom color.
- ◇ **Pen Color**: Choose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

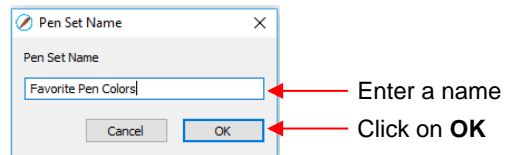
- When you choose **Pen Color** and then click on the box to the right, the **Choose Pen Color** window opens:



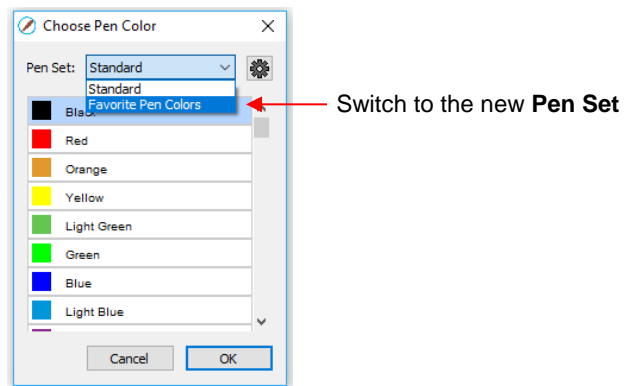
- Select the desired color from the menu and click **OK**. You also have the option to create your own custom **Pen Set** by clicking on the small icon in the upper right corner [Gear icon]. The following menu appears and you can then select **Add Pen Set**:




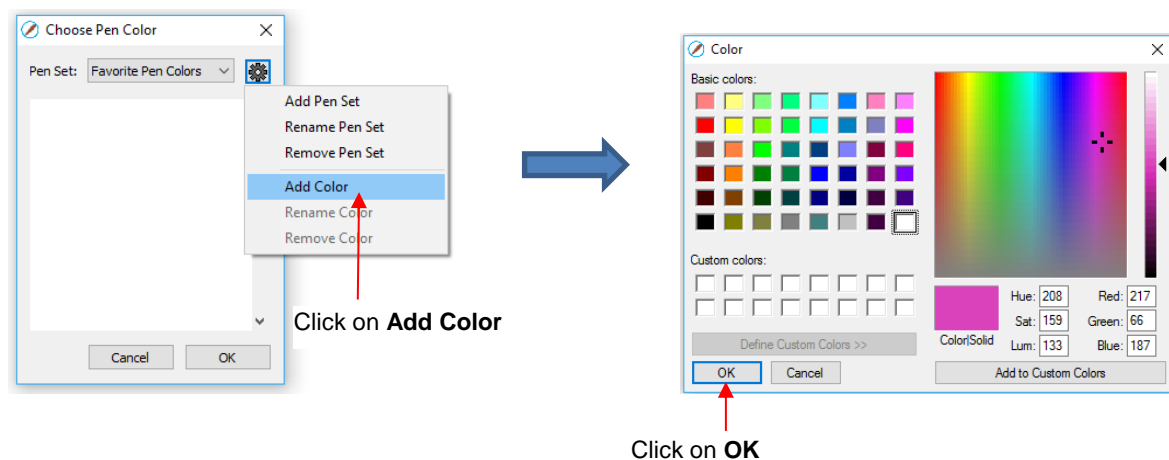
- Next, name the pen set:



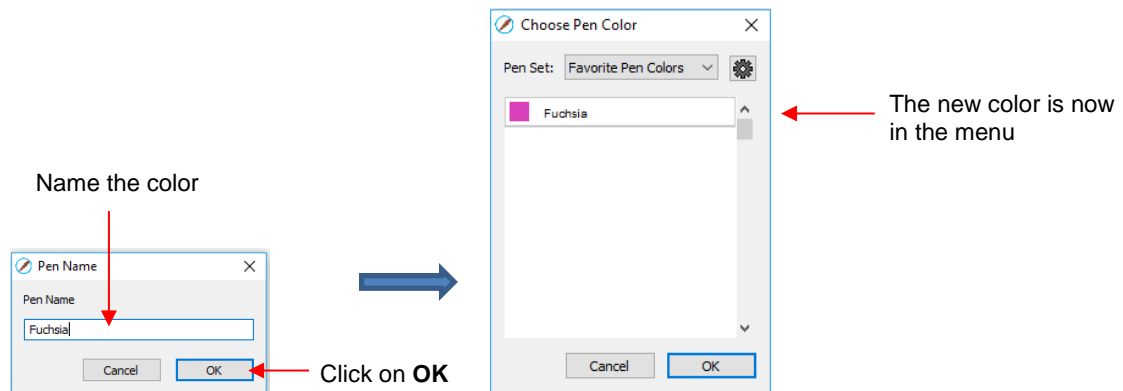
- In the **Pen Set** menu, you can now select the new **Pen Set Name**:



- Again, click on the small icon in the upper right corner  and you can begin adding pen colors with their respective RGB 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.

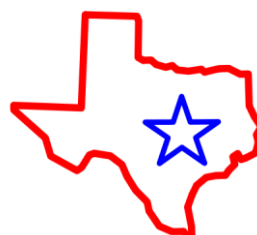
- Just as with **Opacity**, there's not a strong visual difference if the **Stroke Width** is small. Thus, to illustrate **Join**, a **Stroke Width** of 20 will be used:



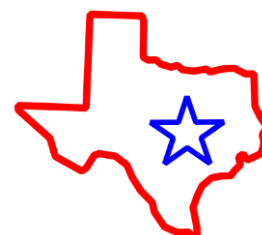
**Join: Miter**  
**Miter: 1.0**  
Slightly beveled



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






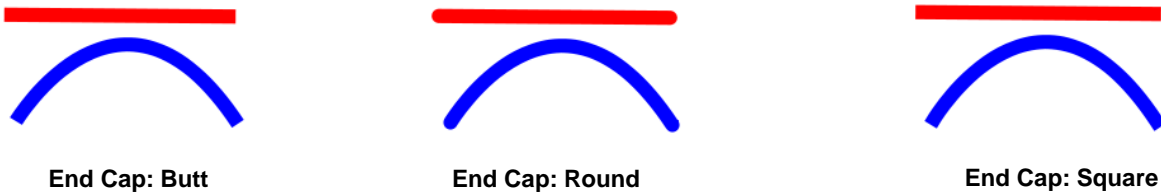
**Join: Round**



**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:

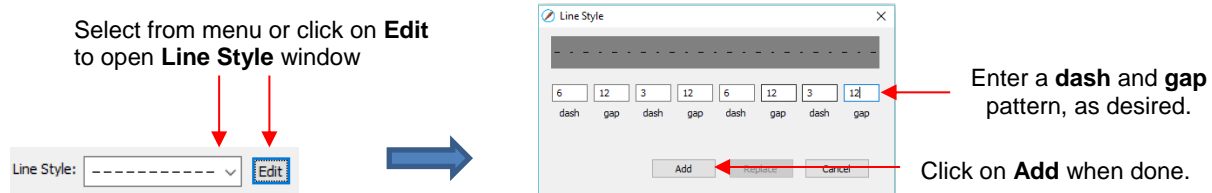
- ◇ **Butt** : The end is squared off, aligned with the actual end of the path
- ◇ **Round** : The end is rounded.
- ◇ **Square** : The end is squared off and extends beyond the actual end based on the **Stroke Width**.



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




- **Line Style:** 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**:



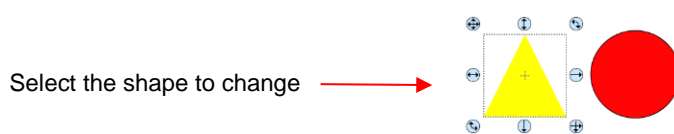
- ◇ The **Line Style** selected will be displayed on the screen and will be cut or drawn with that style by the cutter. Again, the **Stroke Width**, however, is ignored by the cutter.

## 5.15 Dropper Tool

- 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**:



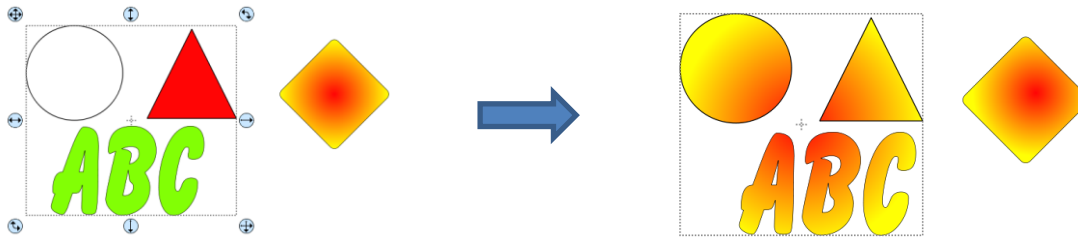
- ◇ Finally, click on the shape that has the color property you wish to use. In this case it's the red circle with the black **Stroke**. The selected triangle is recolored to match.



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

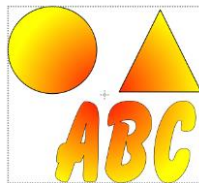
- Note that other properties, such as **Stroke Width** or **Opacity**, will not be copied onto the selected shape. On the other hand, if the **Fill** is a pattern or gradient, it will be copied. You can also fill multiple shapes at once:



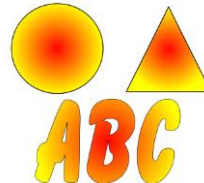
A selection of three shapes will be recolored with the fill gradient in the diamond on the right

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

## **5.16 Cutting, Copying, Pasting, Duplicating**

### **5.16.1 Cutting to the Clipboard**

- 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**



### **5.16.2 Copying to the Clipboard**

- 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.

### **5.16.3 Pasting from the Clipboard**

- 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**



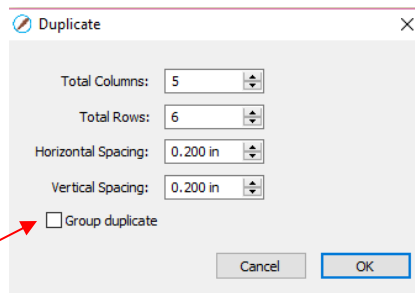
- To **Paste in Place** shapes from the clipboard, use any of the following:
  - ◇ Right-click on the screen and select **Paste in Place** (without any shapes selected)
  - ◇ Press **Ctrl+Shift+V**
  - ◇ Go to **Edit>Paste in Place**
- To **Paste (Auto Fill):** use either of the following:
  - ◇ Press **Ctrl+Shift+Alt+V**
  - ◇ Go to **Edit>Paste (Auto Fill)**

### **5.16.4 Duplicating - Duplicate**

- 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:

Increase **Rows** and **Columns** to fill **Cutting Mat** and change **Spacing**, as desired or as needed.

Option to group all of the shapes



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 9.03.1* 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 9.06*.

### 5.16.5 Quick Duplicate

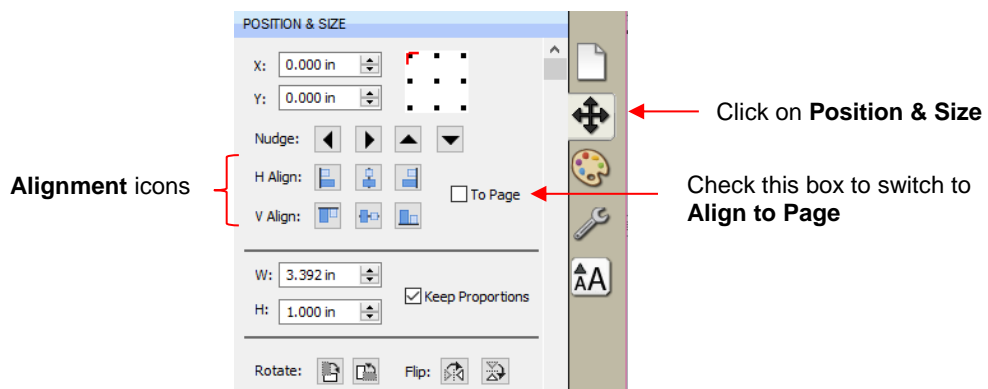
- A quick way to make a single copy of a shape is to hold the **Alt** key while dragging the shape. The original will be left behind and new copy will be moved with the mouse.
- You can also hold the **Alt** key and left-click on a shape and it will duplicate that shape leaving the copy on top of the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

## 5.17 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:

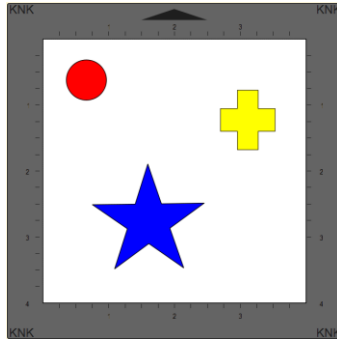
◇ Go to **Object>Alignment**

◇ 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:






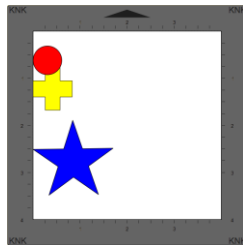


### 5.17.1 Align to Page

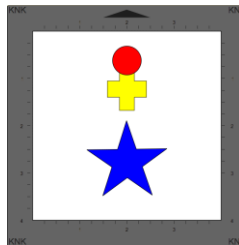
- Make sure the alignment mode is set to **Align to Page**. To do this, either:
  - ◇ Go to **Object>Alignment** and make sure **Align to Page** is checked
  - ◇ Check the **To Page** option on the **Position & Size** panel

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

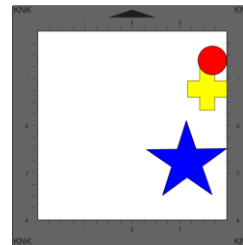
- ◇ **Align Left** aligns shapes along the left side of the **Cutting Mat**. 
- ◇ **Align Horizontal Center** aligns shapes through the center of the **Cutting Mat**. 
- ◇ **Align Right** aligns shapes along the right side of the right side of the **Cutting Mat**. 



Align Left






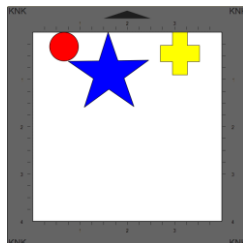
Align Horizontal  
Center



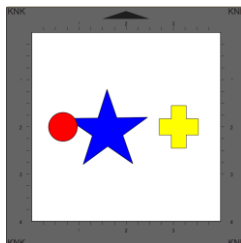
Align Right

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

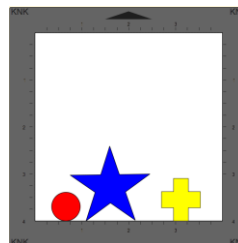
- ◇ **Align Top** aligns shapes along the top side of the **Cutting Mat**. 
- ◇ **Align Vertical Center** aligns shapes through the center of the **Cutting Mat**. 
- ◇ **Align Bottom** aligns shapes along the bottom side of the **Cutting Mat**. 



Align Top



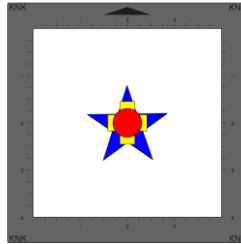
Align Vertical  
Center



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**

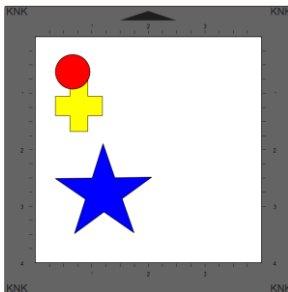
### **5.17.2 Align to Selection**

- First, make sure the alignment mode is set to **Align to Selection**. This is done by either making sure the **To Page** option is not checked 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:

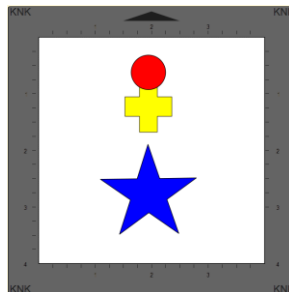
- ◇ **Align Left** aligns shapes along the left side of the leftmost shape of the group.

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

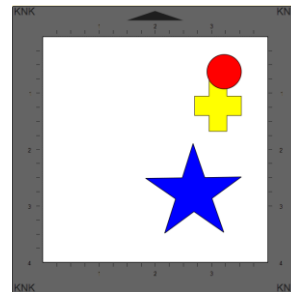
- ◇ **Align Right** aligns shapes along the right side of the rightmost shape of the group.



**Align Left**



**Align Horizontal Center**



**Align Right**

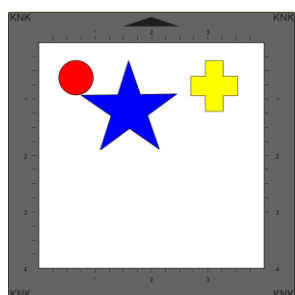
- With the shapes selected, the vertical alignment options are:

- ◇ **Align Top** aligns shapes along the top side of the uppermost shape of the group.

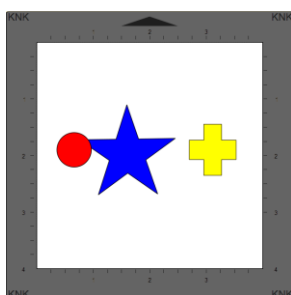
- ◇ **Align Vertical Center** aligns shapes to a horizontal axis through the center.

- ◇ **Align Bottom** aligns shapes along the bottom side of the bottommost shape of the group.

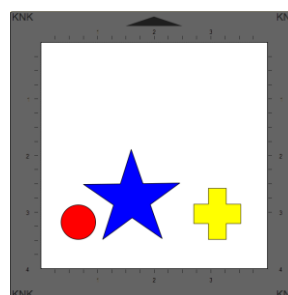




Align Top



Align Vertical Center



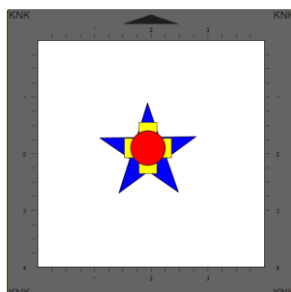
Align Bottom

- To center all three shapes use either:

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



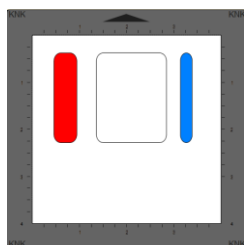
◇ Go to **Object>Alignment>Align Centers**



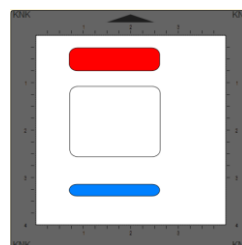
Align Centers

## 5.18 Distribute

- 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 5.18.3*)
- 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

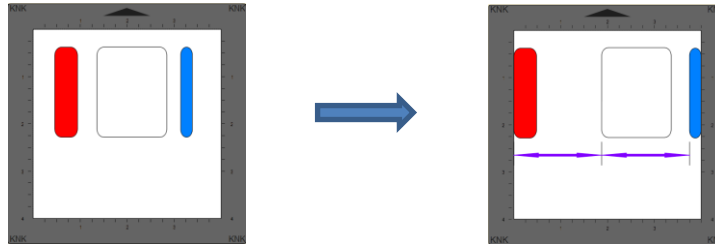
### 5.18.1 Distribute to Page

- 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

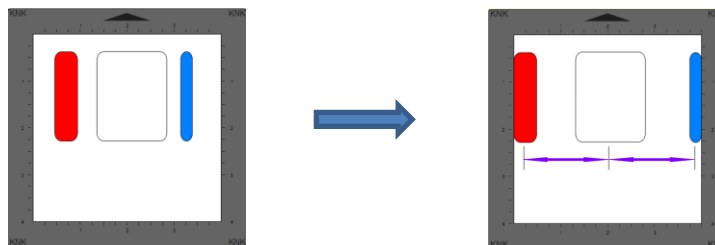
be evenly spaced from one side of the mat to the other, according to which additional option is chosen. All options, with screenshots, are presented. The purple arrows indicate equal spacing.

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

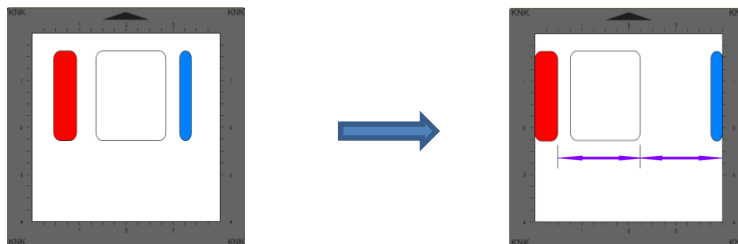
◇ **Distribute Left:** spaces shapes so that the left sides of each shape are the same distance apart:



◇ **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:

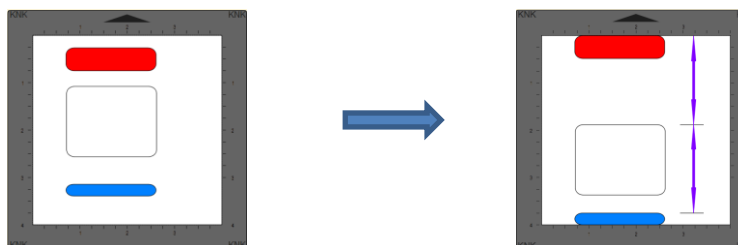


◇ **Distribute Space Horizontally:** spaces shapes so that the gaps between the shapes are the same.

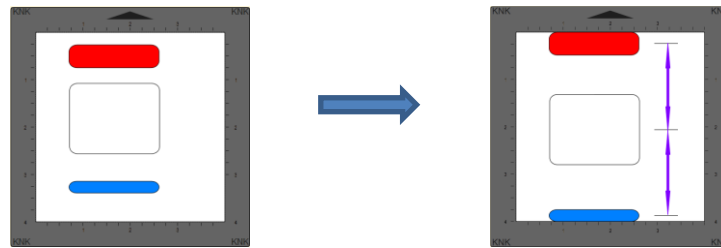


- With the shapes selected, the vertical distribute options are:

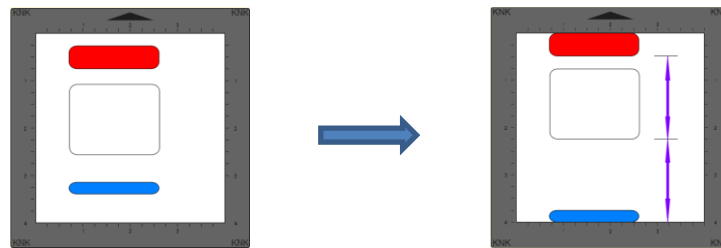
◇ **Distribute Top:** spaces shapes so that the top sides of each shape are the same distance apart:



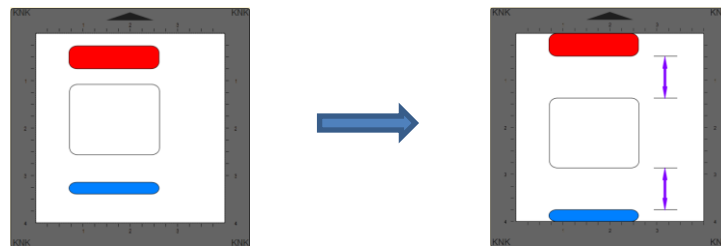
- ◇ **Distribute Center Vertically:** spaces shapes so that the centers of each shape are the same distance apart:



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

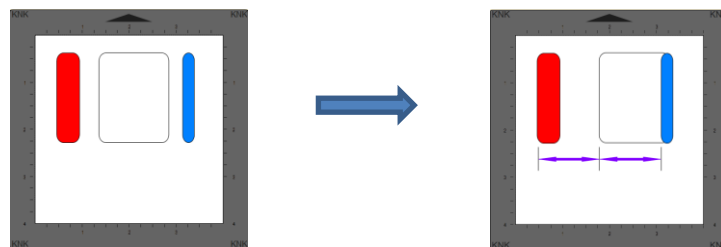


- ◇ **Distribute Space Vertically:** spaces shapes so that the gaps between the shapes are the same.

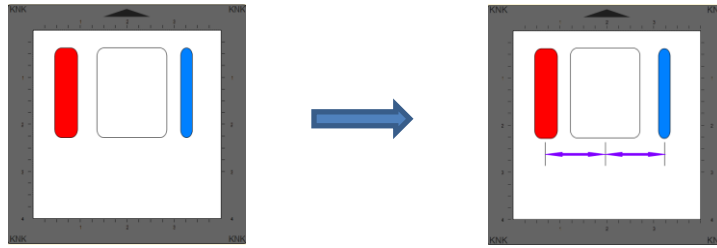


### **5.18.2 Distribute to Selection**

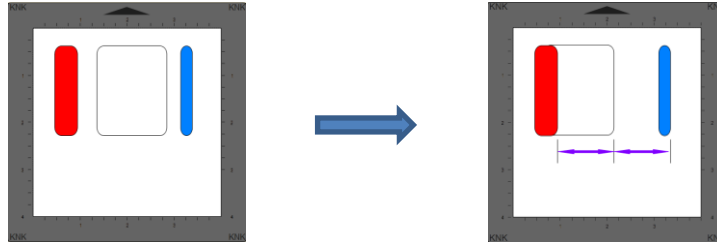
- Select the shapes and go to **Object>Distribute** and then make sure **Distribute to Selection** is checked. In this mode, the two outermost shapes will remain in position and then other shapes will be evenly spaced, according to which additional option is chosen. All options, with screenshots, are 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:



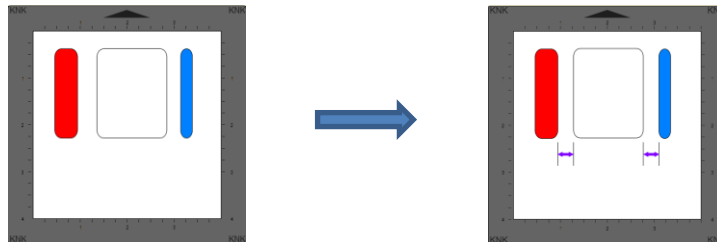
- ◇ **Distribute Center Horizontally:** spaces shapes so that the centers of each shape are the same distance apart:



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

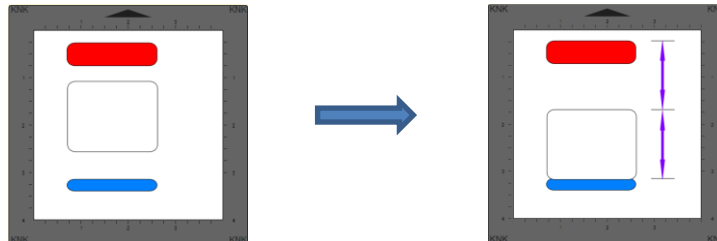


- ◇ **Distribute Space Horizontally:** spaces shapes so that the gaps between the shapes are the same.

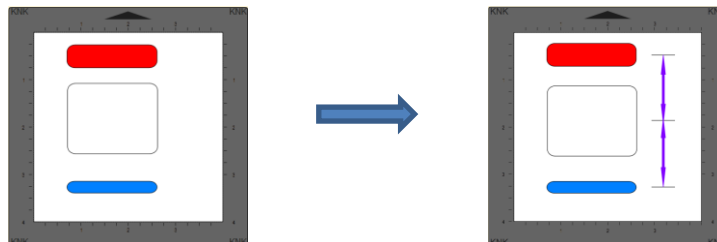


- With the shapes selected, the vertical distribute options are:

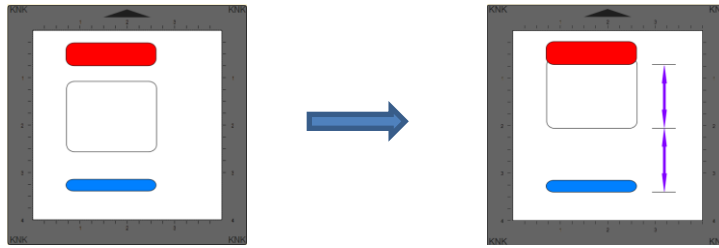
- ◇ **Distribute Top:** spaces shapes so that the top sides of each shape are the same distance apart:



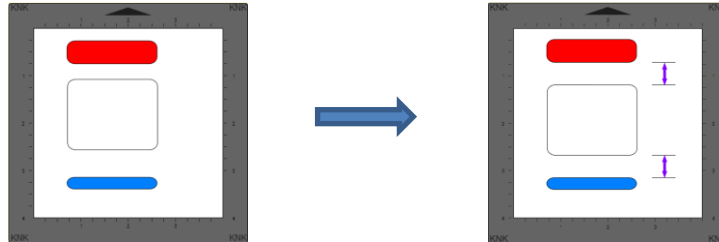
- ◇ **Distribute Center Vertically:** spaces shapes so that the centers of each shape are the same distance apart:



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

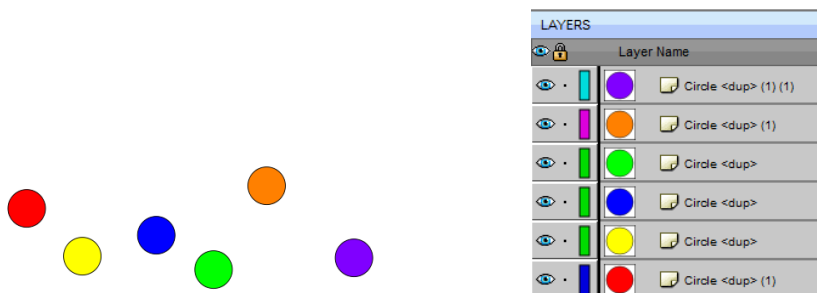


- ◇ **Distribute Space Vertically:** spaces shapes so that the gaps between the shapes are the same.

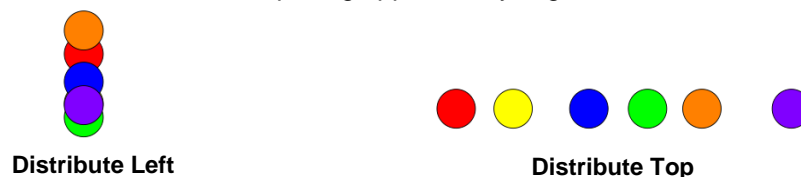


### 5.18.3 Distribute to Selection Below

- This function is, hands down, the strangest function I have encountered in 10 years of writing technical manuals. I have no practical applications to share and the developer hasn't responded to my request for assistance. Thus, I can only explain what happens when you apply it. Maybe one of our readers will figure out a great use for it and share with me so that I can add it to this section.
- Given a selection of shapes, applying one of the **Distribute to Selection Below** options will space the shapes based on the difference in size between the bottommost shape of the selection and then the shape that is the furthest away in the opposite direction to the distribute option.
- As an example, here is a random scattering of 1" circles. The red one is the bottommost of the selection, as shown on the **Layers Panel**:

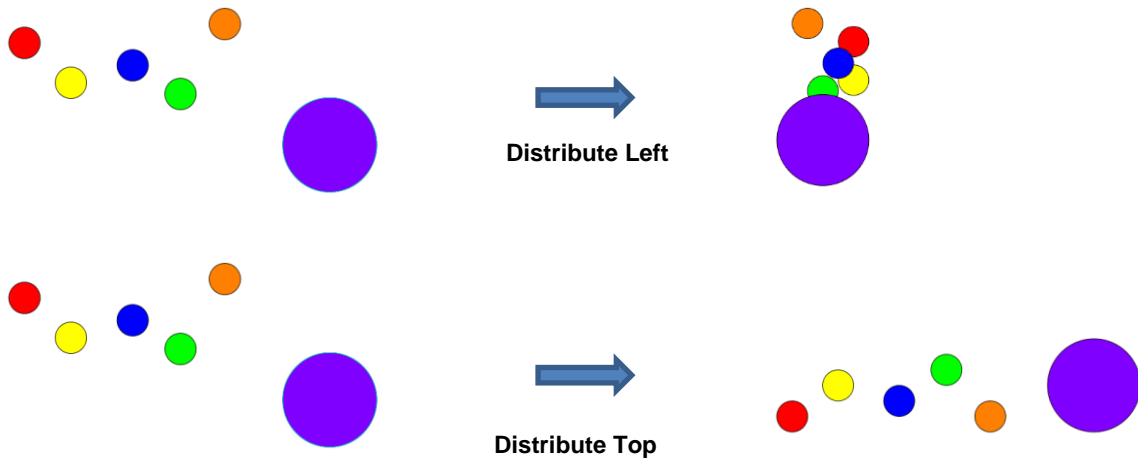


- ◇ Applying **Distribute Left** will move all of the circles to align with the left side of the red one. Applying **Distribute Top** will move all of the circles to align with the top side of the red one. Because the circles are all the same size, there is no spacing applied, only alignment:



- ◇ **Distribute Left:** Note that the up/down Y locations remain the same for all of the circles.
- ◇ **Distribute Top:** The left/right X locations remain the same for all of the circles.

- Now, let's make the purple circle that's both furthest to the right and furthest towards the bottom equal to 3" in size instead of just 1" and then apply the same **Distribute** options:



- ◇ **Distribute Left:** The new location for the 3" purple circle is now 2" to the left of the 1" red circle, which was, again, the bottommost shape. The 2" is a result of subtracting 1" from 3". The locations of the other circles are an equal spacing of that 2 inches, however note that one of the circles, the yellow one, is aligned with the red one and starts the distribution:

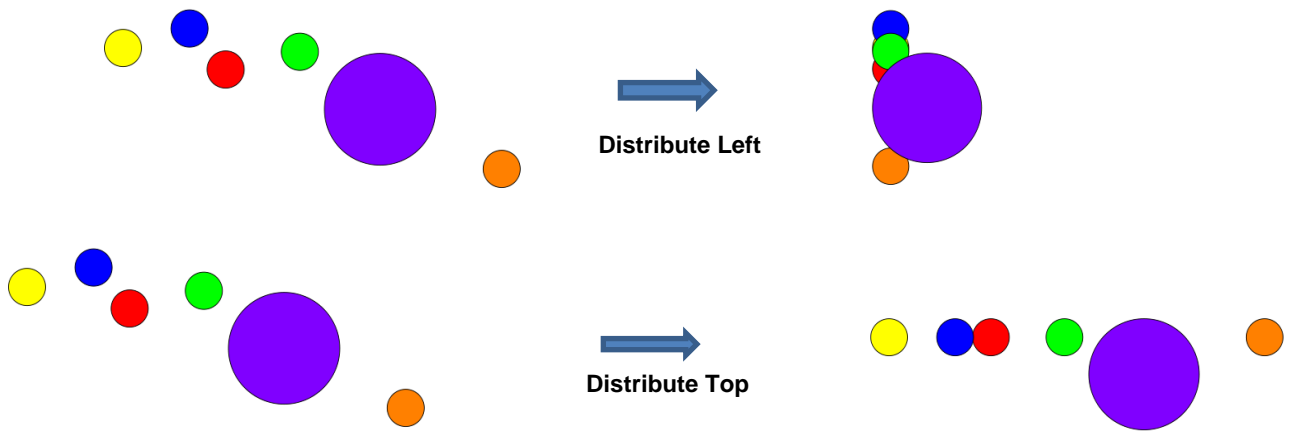
| Location of Left Side |      |
|-----------------------|------|
| Red                   | 5"   |
| Yellow                | 5"   |
| Blue                  | 4.5" |
| Green                 | 4.0" |
| Orange                | 3.5" |
| Purple                | 3.0" |

- ◇ **Distribute Top:** The same kind of new arrangement happened in this case as well, only in a vertical way. The red circle is still in the same location, but the top of the purple circle is now 2" higher than the red one and the other circles are evenly distributed, with the orange one first aligning with the red one:

| Location of Top Side |      |
|----------------------|------|
| Red                  | 3"   |
| Orange               | 3"   |
| Blue                 | 2.5" |
| Yellow               | 2.0" |
| Green                | 1.5" |
| Purple               | 1.0" |

- Now, this distribution happened because the purple circle was both larger than the red one AND it was the outermost circle in both of the opposite directions. In other words, when applying **Distribute Left**, the purple circle was the rightmost shape. When applying **Distribute Top**, the purple circle was the bottommost shape.
- If another one of the 1" circles had been the outermost, then both of those **Distribute** options would have yielded the same alignment when all of the circles were the same size. Note also that the bottommost red circle doesn't have to be on the far left or on the top. It can be located anywhere but the other circles will be moved to align with it:






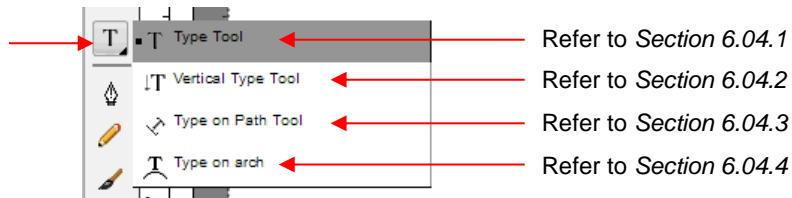
- At this time, no further details will be presented. However, if a practical application comes to light, I will be happy to include it.

## 6. SCAL: Working with Text

### 6.01 Text Options


- 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:

Click and hold left mouse button here:



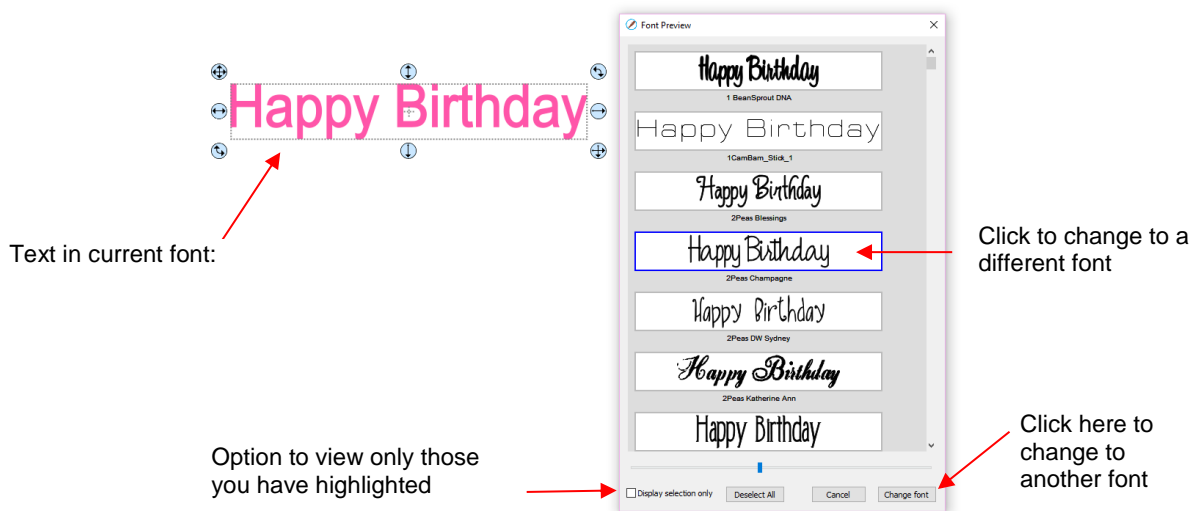
### 6.02 Selecting a Font

#### 6.02.1 Choosing a Font from the Font Menu

- There are three places to select the 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 4.03.2*).
- 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.

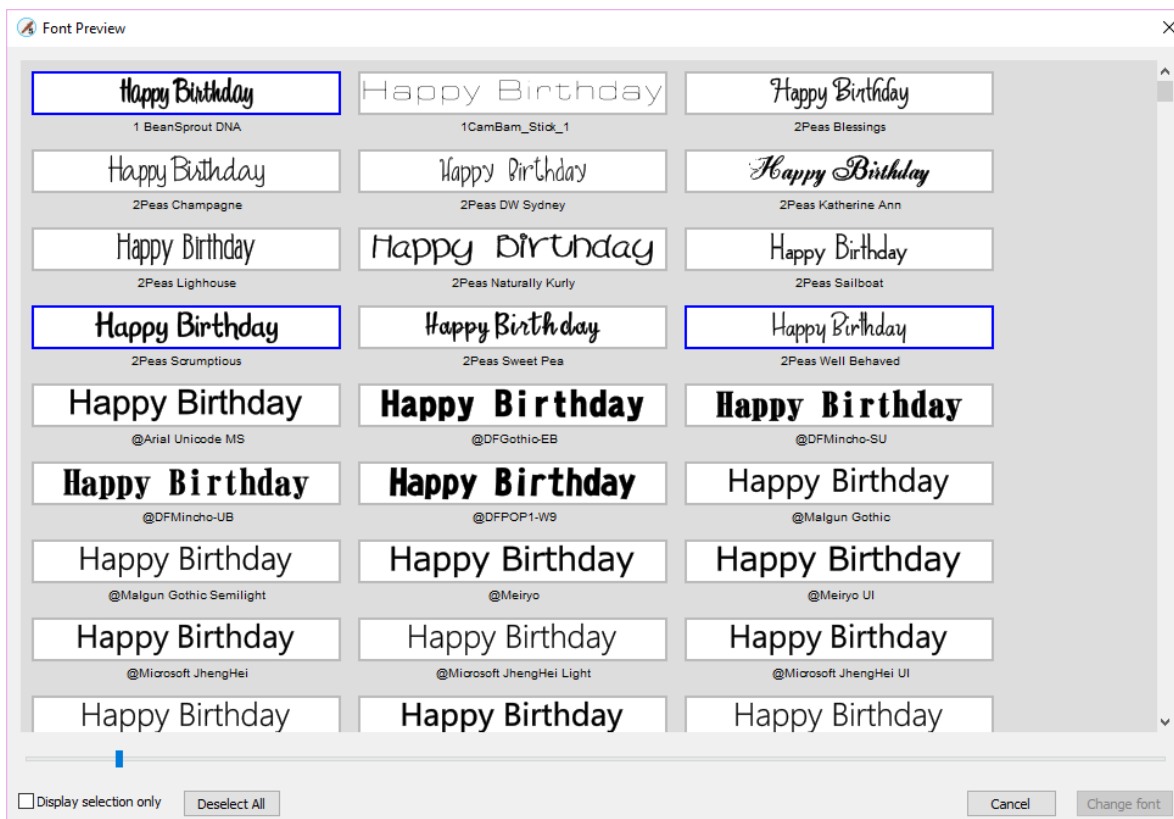
#### 6.02.2 Choosing a Font via Font Preview

- To view the text you're using in different fonts, first type out the text using the instructions in *Sections 6.03 and 6.04*. 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:

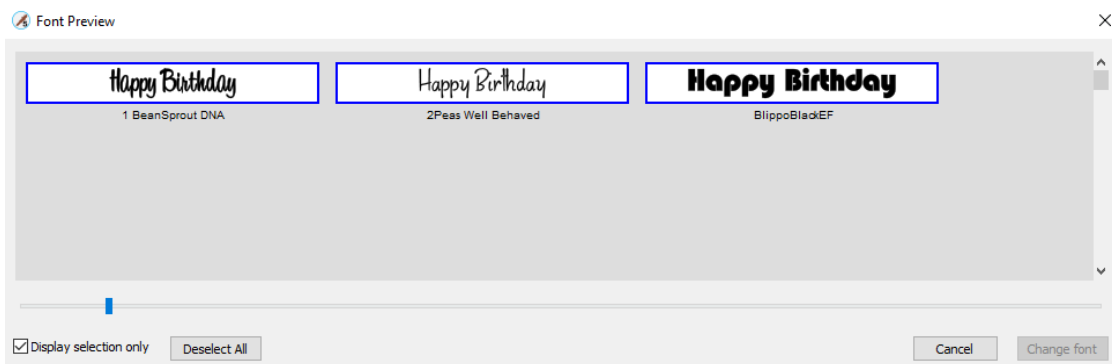
◇ Expand the window and highlight those you want to further compare:



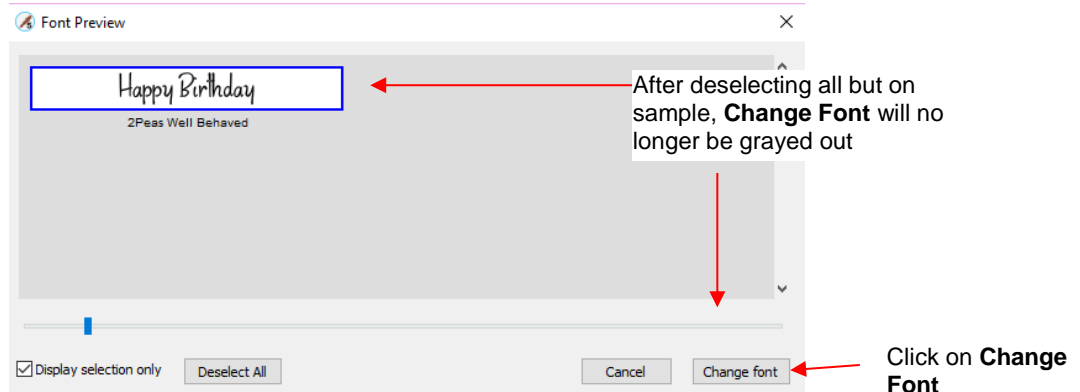
- ◇ After scrolling through fonts and highlighting only those of further interest, click on **Display selected only**:



- ◇ 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**:




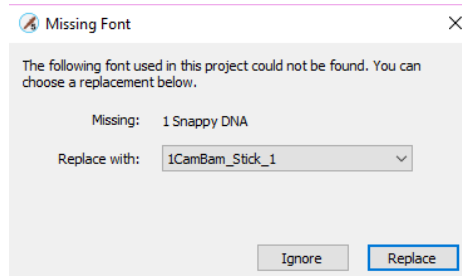
- ◇ The text will now be changed to the new font:

Happy Birthday

### 6.02.3 Temporarily Installing a Font



- If you want to load a new font that's not already installed on your computer, go to **Text>Load Font File**. Browse to locate the font file (including .TTF, .OTF, or .OPF) of your choosing and click on **Open**. This font will now be available until SCAL is closed. The **Library** also offers this feature. Refer to *Section 4.06.2*.

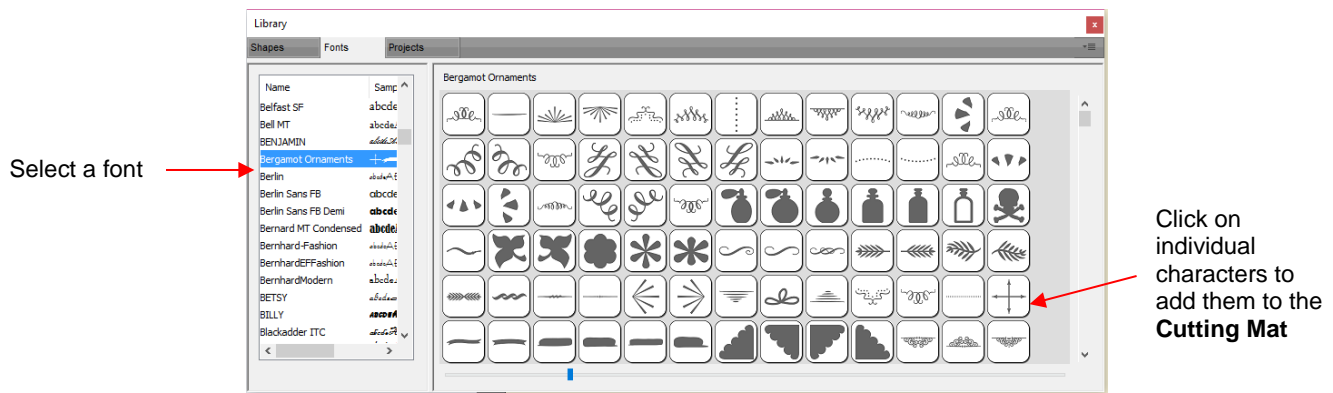
- If you want to load a new font that's not already installed on your computer, there are two ways:
  - ◊ Go to **Text>Load Font File**
  - ◊ Open the **Library**, click on the **Fonts** tab, and then click on the **Menu** icon 
- Any font file with a format of .TTF, .OTF, or .OPF) can be opened and 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**

### **6.03 Adding Text Options**



- There are three ways to add text to the **Cutting Mat**:
  - ◊ Click on the **Type Tool** icon  on the **Tools Panel**, 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:



## 6.04 Four Modes of Text



### 6.04.1 Type Tool

Jay Max  
McCauley 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

### 6.04.2 Vertical Type Tool

J M  
a a  
y 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**


### 6.04.3 Type on Path Tool



- 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:

Happy New Year to one and all!

- To use this function:


- ◇ Add the shape to the **Cutting Mat**.
- ◇ 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:

Start Offset: 0.000 in

Happy New Year!

Start Offset: 0.50 in

Happy New Year!

- ◇ 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.

Happy New Year!

- If you want the text on the inside of the shape:

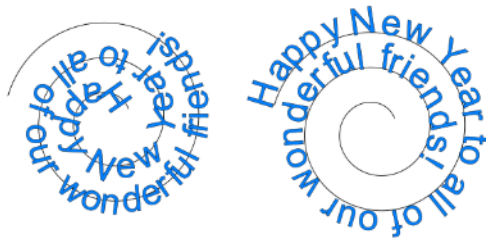
- ◇ First apply **Path>Reverse Path** to the shape. Then type the text:

Happy New Year!

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

Happy New Year!

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




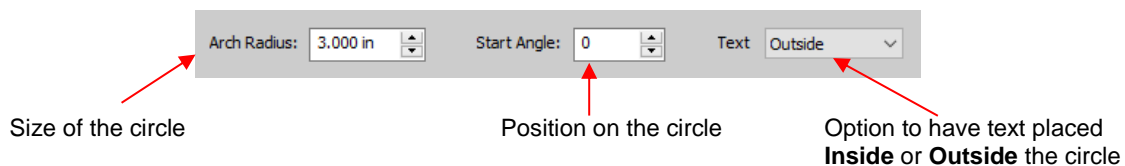
- ◇ After applying **Text>Convert Text to Outlines**:



#### 6.04.4 Type on Arch Tool

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:

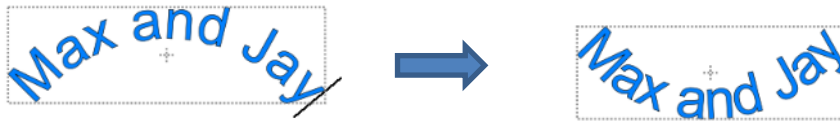


Changing the **Start Angle** from 0 to 180:







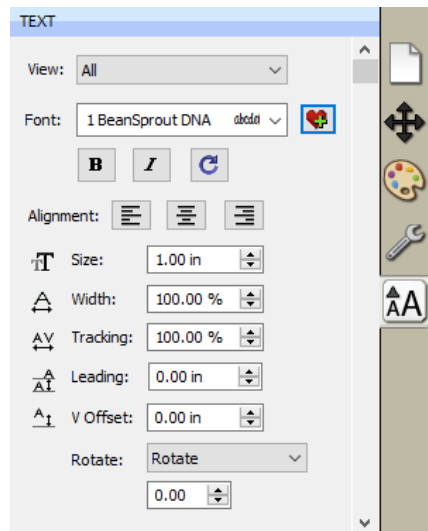
Changing **Text** from **Outside** to **Inside**:




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

## 6.05 Text Settings

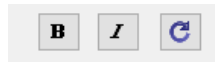
- The **Text Settings** window offers an array of settings related to the creation and editing of text:
  - ◊ Before typing text, make changes in this window so that they will be in place when text is then typed.
  - ◊ For existing text, drag your mouse to highlight the letters and then change settings to be applied. For example, a different font, different size, wider spacing, etc. (Note that in order to highlight text, you need to first click on the **Type Tool** icon  on the **Tools Panel**.)
- To open, click on the **Text Settings** icon  on the **Properties Panel** to open the **Text Panel**:



Click here to open  
**Text Panel**

- The following is a list of these settings and how to apply them. Note that if the text is already typed, you can highlight all or only a portion of the text for the change.
  - ◊ **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** in the **Library**
    - **This Project:** Displays all fonts currently used since starting this particular project during this session
  - ◊ **Font:** Menu of 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 Italic Reload:**



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

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



- ◇ **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    KNK Force    KNK Force

Tracking: 100%

Tracking: 120%

Tracking: 80%

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

KNK Force    KNK Force  
& Zing Orbit    & Zing Orbit

Leading: 0 inches

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:

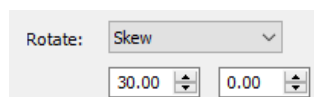
KNK Force & Zing Orbit

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

KNK Force & Zing Orbit

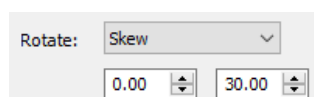
- ◇ **Skew:** In the same menu with **Rotate** is the **Skew** option which can also be applied to a line of text or to individual letters. There are two settings: one for X axis skew and one for Y axis skew:

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



KNK Zing Orbit

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



KNK Zing Orbit

## 6.06 Other Text Editing

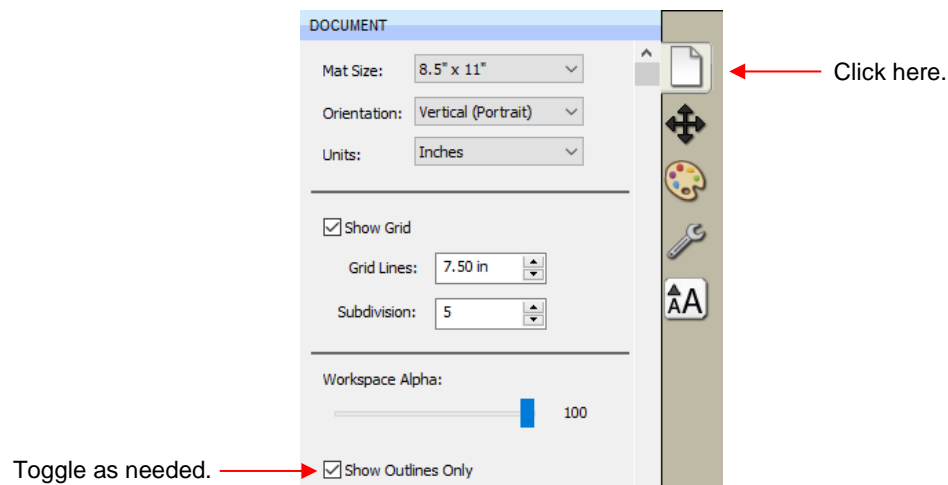
- **Ungroup:** To split a selection of text into individual letters, apply the **Ungroup** function using one of the following ways:
  - ◇ Right-click and select **Ungroup** from the popup menu
  - ◇ Go to **Object>Ungroup**
  - ◇ Apply **Ctrl+Shift+G**
- **Break:** To break a selection of text into 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 5.10.2* and *5.11.1*.

## 6.07 Creating a Connected Letter Title

- Using the instructions from *Section 6.04.1*, type the letters of your title:

Happy Anniversary

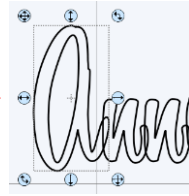
- Because you will be working with the letters individually, select the title and apply **Ungroup** (*Section 6.06*).
- With the letters split, you can select one or more and use the left and right arrow keys to change the spacing between letters, overlapping as desired. It is advisable to zoom in on 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:

Drag this icon so that letter can only move horizontally.



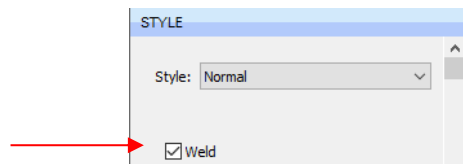
- Continue arranging letters as desired. Remember that you can customize freely to get the desired look. For example, in this font called 1 Bean Sprout DNA, the vowels tend to be a bit oversized compared to other characters in the font. Thus, the uppercase "A" can be sized smaller to better match the 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 9.04*.

## **6.08 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 6.04.1*, create the title:

Happy Thanksgiving

- 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.

# Happy Thanksgiving

- 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:



- 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!

## 6.09 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:

Billy

Type the letters



Billy

Overlap the letters



Bty

Weld the letters – undesirable result

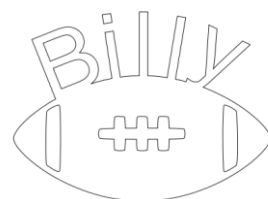
- Most crafters will start looking for a different font... one with ligatures (extenders) that easily connect the letters to one another. However, many fonts with ligatures are script fonts and may not convey the desired look. Instead, look for objects that can be used to connect the letters. A basic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

Billy



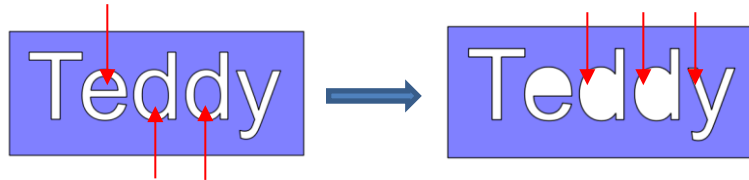
Billy

- 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:



## 6.10 Stenciling Letters

- 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 “B”, “a”, and “e”:



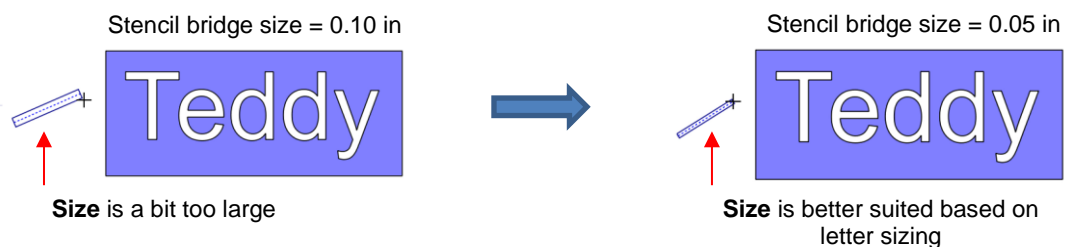
After cutting and lifting the stencil from the mat, the interior parts of the “e” and the “d”’s will be cut away.

- 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

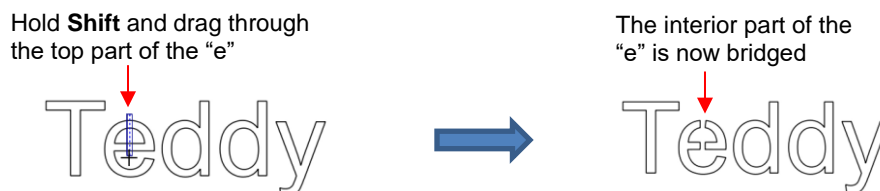
- Zoom in close on the lettering so that you’ll be able to see exactly where you need to connect. Click on the **Stencil Bridge** icon and, in the **Tools Options** at the top, a setting for the width or thickness of the bridge can be set:



- 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:

Teddy

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

Teddy

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

Teddy



Completed stencil

### **6.11 Open Path Fonts (OPF)**

- 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:

Open Path Font

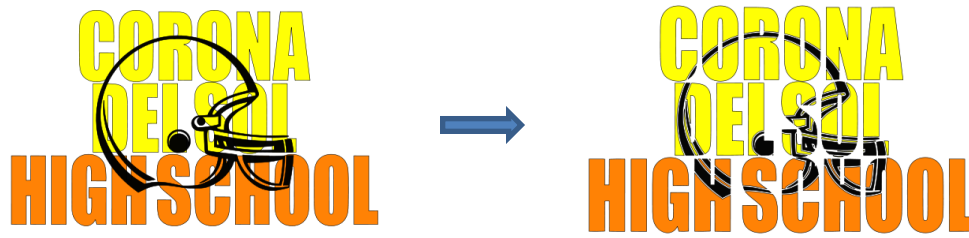
- Currently, this font type only works in a few applications like SCAL and does not install into Windows or on a Mac O/S for use in programs such as Word.
- To try out using Open Path Fonts, there are some free ones to download here:

<http://www.iloveknk.com/Support/Software/Open-Path-Fonts/>

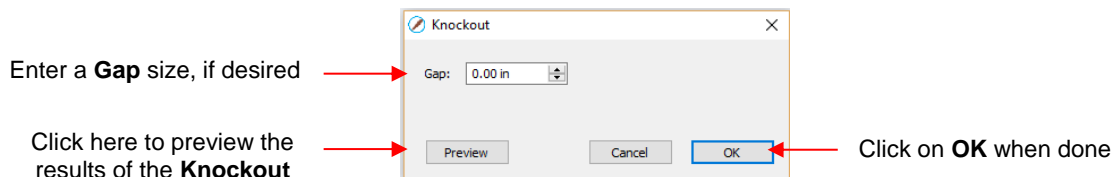
- Because these are open path, they may not appear on the **Cutting Mat** when you first add them. You will need to select a **Stroke** color on the **Fill & Stroke Panel**. Refer to *Section 5.14*.
- You can purchase Open Path Fonts (also called Thin Fonts) from [www.letteringdelights.com](http://www.letteringdelights.com) and from [www.onelinefonts.com](http://www.onelinefonts.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.

### **6.12 Knockout**

- 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. Thus, size the image accordingly:





Top image extends beyond the edges of the lettering



Much of the image is lost



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.

### 6.13 Title Crawl

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

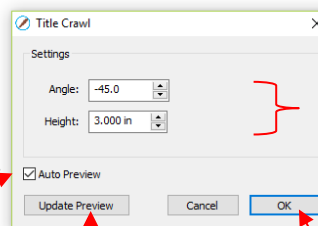


- To apply **Title Crawl**, select the text and go to **Effects>Title Crawl**. The following window opens

Preview



Check this box to have the preview update with changes



Click here to manually update the preview

Click on **OK** when done

Adjust these according to the information that follows

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



Angle: -45  
Height: 3.0



Angle: -25  
Height: 3.0



Angle: -145  
Height: 3.0

- ◇ **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:

**TEAM KKK**

Angle: -45  
Height: 3.0

**TEAM KKK**

Angle: -25  
Height: 6.0

**TEAM KKK**

Angle: -145  
Height: 2.0

- 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 KKK  
cutters. Visit [www.teamknk.com](http://www.teamknk.com)*

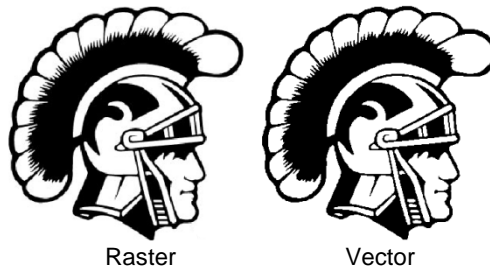
#### **6.14 Other Text Effects**

SCAL offers many other design functions to customize text for your projects. Refer to *Sections 9.12 – 9.17* for more ideas.

## 7. SCAL: Tracing and Drawing

### 7.01 Raster versus Vector

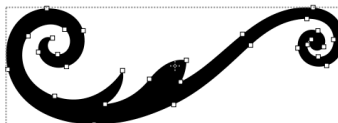
- All graphics are either raster or vector and there is no third type. While you can often tell by the file format, even that isn't always a good way to know for certain. For example, a PDF file can be made from either raster images or vector images and some PDF's will contain both types.
- You may not 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 other 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:



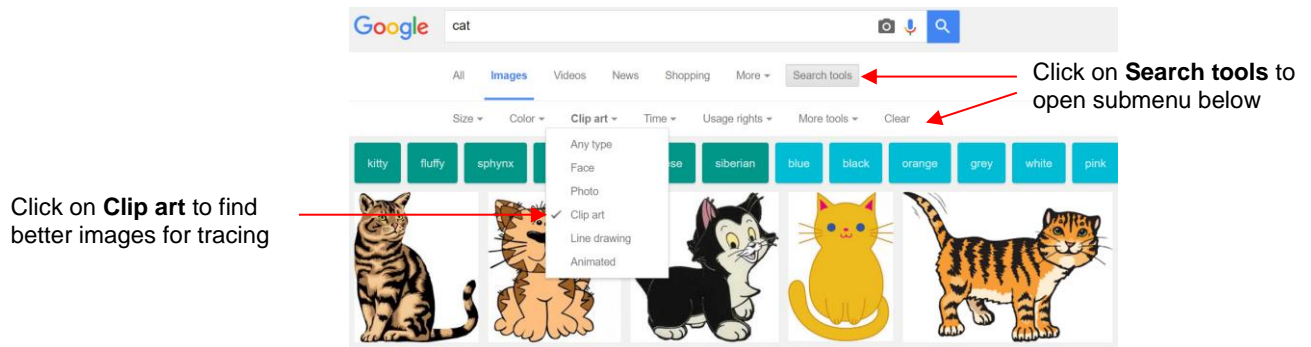
- As mentioned earlier, you can often tell whether a file is a raster or a vector based on the file format. Here are some guidelines:

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

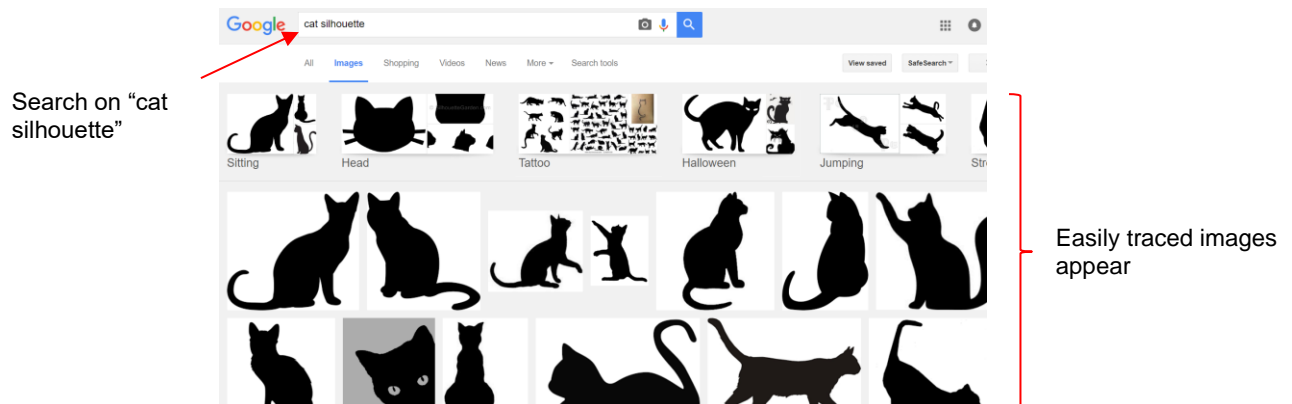
- To convert a raster into a vector, SCAL offers both an automatic and a manual trace function. Because the automatic **Trace** feature in SCAL is so fast and powerful, it is always worth trying it first. The only situation in which it may not be able to provide the results you need are (1) the image 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.

## 7.02 Finding Easy Images to Trace

- 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:




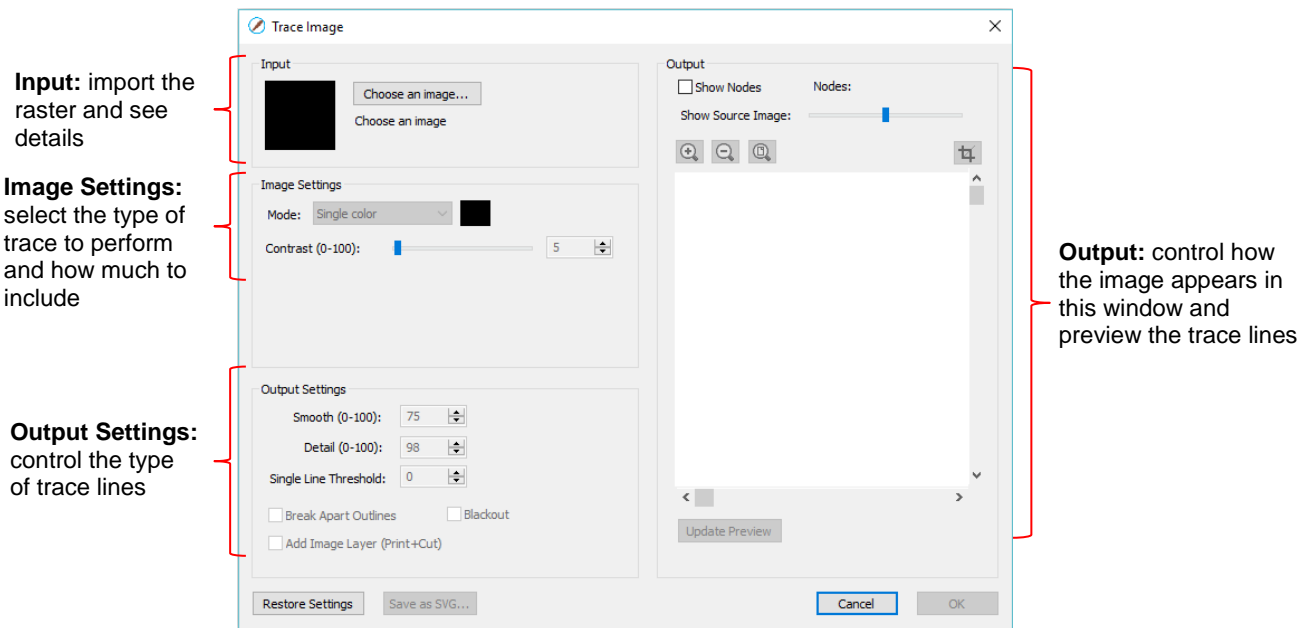
- When you find an image you want to trace, click on it first to bring up a larger version. Then right-click and select **Save image as** from the popup menu. Note: If you use a browser other than Chrome, the popup menu may have slightly different wording for saving a file.
- IMPORTANT!** Before tracing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

## 7.03 Trace Function

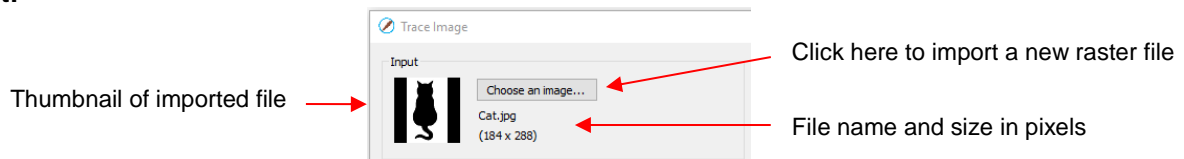
Images used in this tutorial can be downloaded at: <http://iloveknk.com/Images/>

### 7.03.1 Trace Settings

- 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:



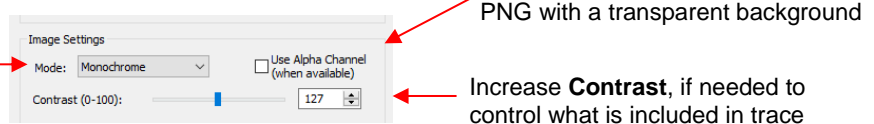
- Input:**



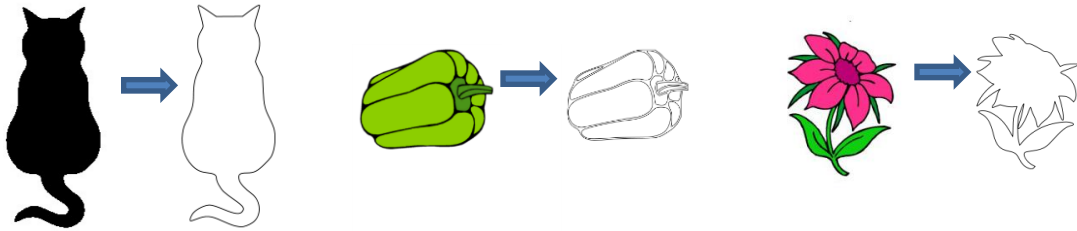
- Alternatively, before opening the **Trace Image** window, you can import the raster file using **File>Place Image**. Then, with the image selected, open the **Trace Image** window and this image will be loaded and ready for changes to trace settings.

- Image Settings:**

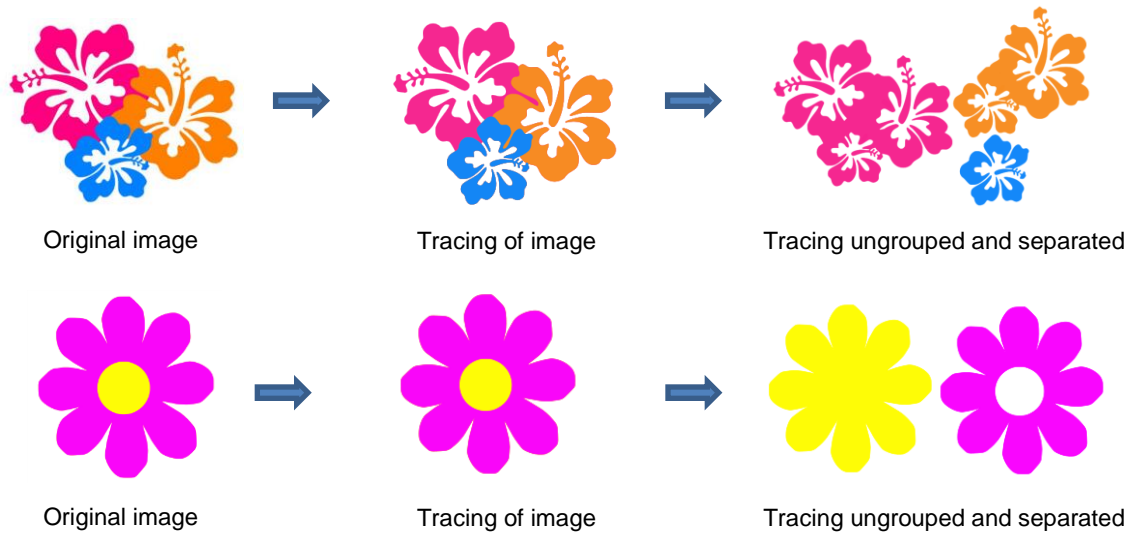
Choose from three modes:  
**Monochrome**, **Color Layers**, or **Single Color**



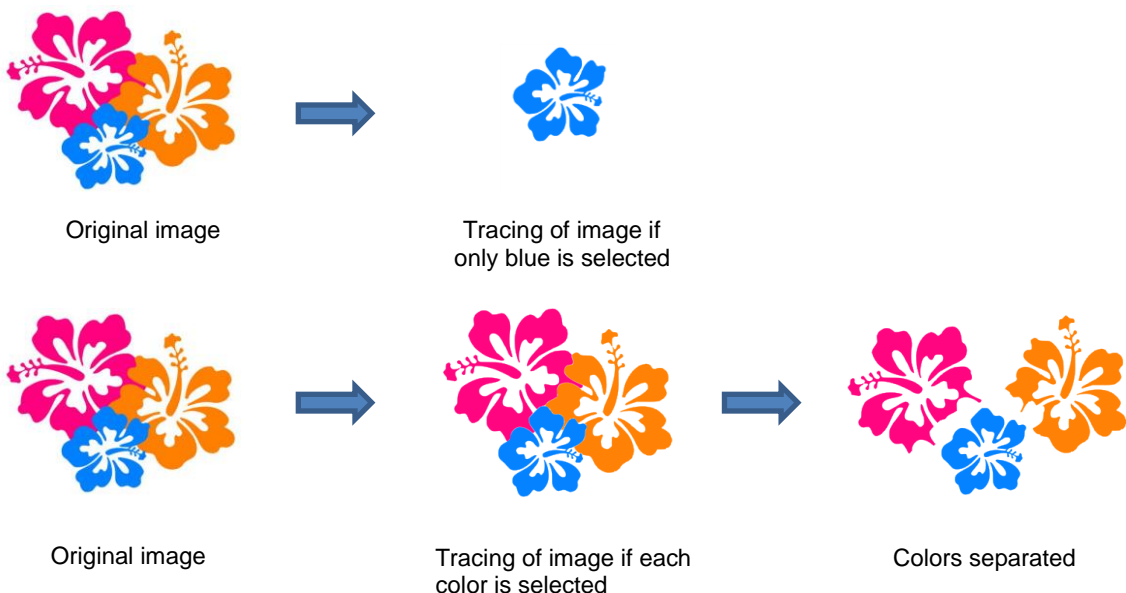
- The **Mode** you choose is determined by the desired outcome / project application, as follows:
  - Monochrome:** choose this mode when you only need a black and white trace of the image:

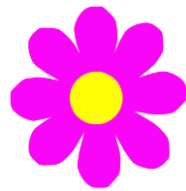


- **Color Layers:** choose this mode for multi-color images where you need separate colors, such as for a paper piecing or layered vinyl project and you want under-layers to use for alignment. Two examples follow which illustrate what is produced when **Color Layers** is chosen:



- **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:





Original image



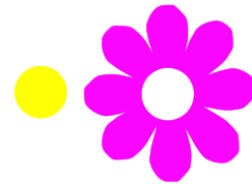
Tracing of image if only pink is selected



Original image



Tracing of image if each color is selected



Colors separated

- ◇ 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.
- ◇ **Contrast** controls the level of color differentiation included in the trace: lower will include less, higher will include more.

#### • Output Settings:

Sharp or smooth curves →

Prevent double line tracing →

Apply **Break Apart** when multiple paths are traced →

Output Settings

Smooth (0-100):

Detail (0-100):

Single Line Threshold:

☐ Break Apart Outlines    ☐ Blackout

☐ Add Image Layer (Print+Cut)

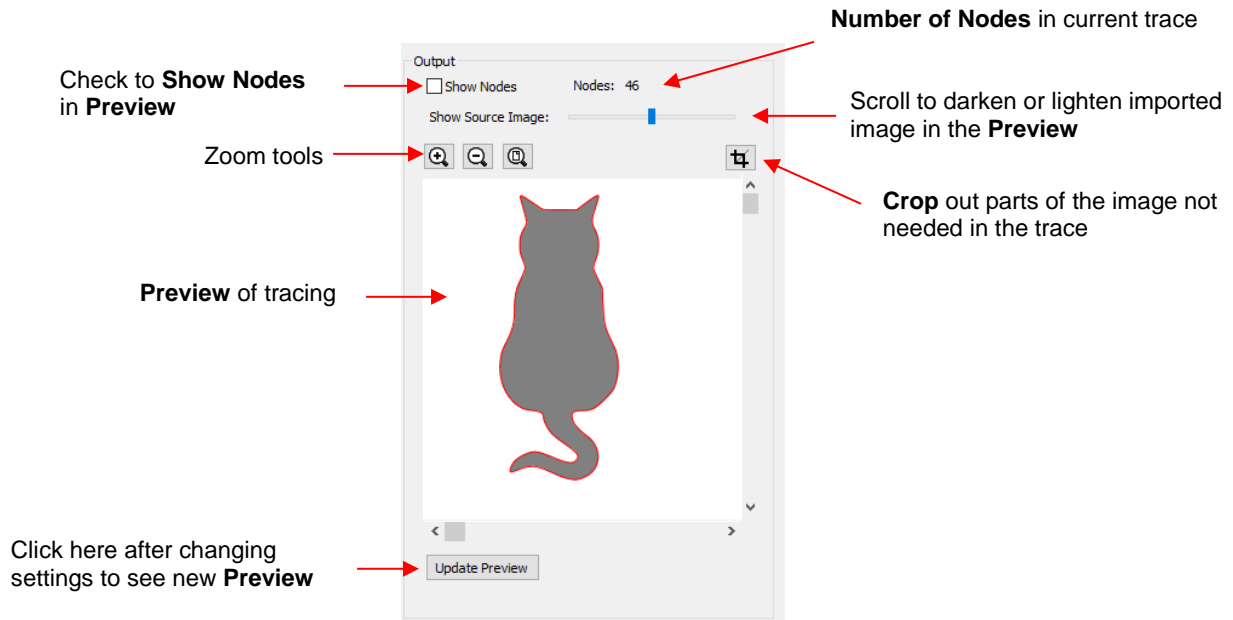
Use to filter out small specks

Use to remove child shapes

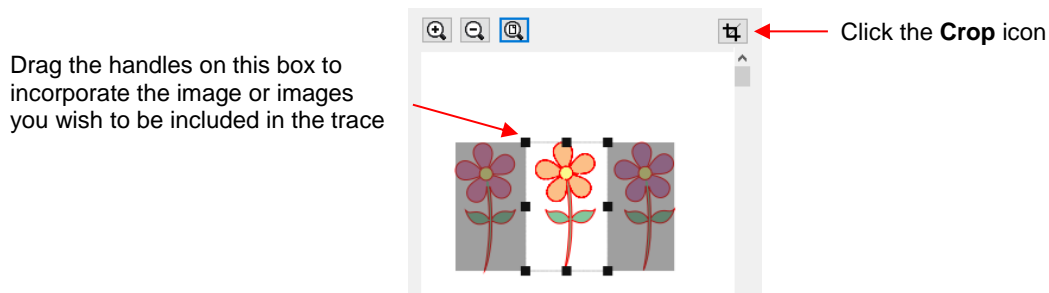
Include the original image

- ◇ **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 7.03.3*.
- ◇ **Detail:** If tiny undesired shapes appear, decrease to filter those shapes out.
- ◇ **Single Line Threshold:** When tracing coloring book images (image with black outlines), use to convert those double lines to single lines.
- ◇ **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.
- ◇ **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."

- **Output:**

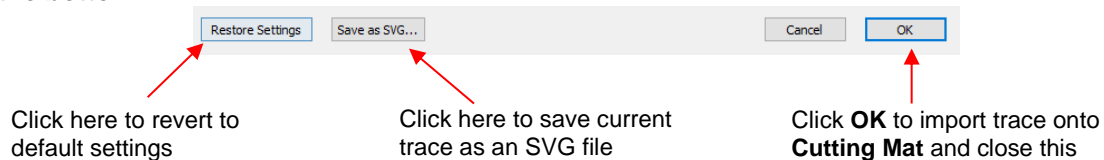


- ◇ None of the settings in the **Output** section affect the final result, with the exception of the **Crop** function. The other settings only affect the **Preview** so adjust as desired.
- ◇ When you click on the **Crop** icon, a rectangle will appear that can be resized to fit around the desired 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:



- ◇ Note that the red lines in and around shapes in the **Preview** window indicate the actual trace lines as a result of current settings

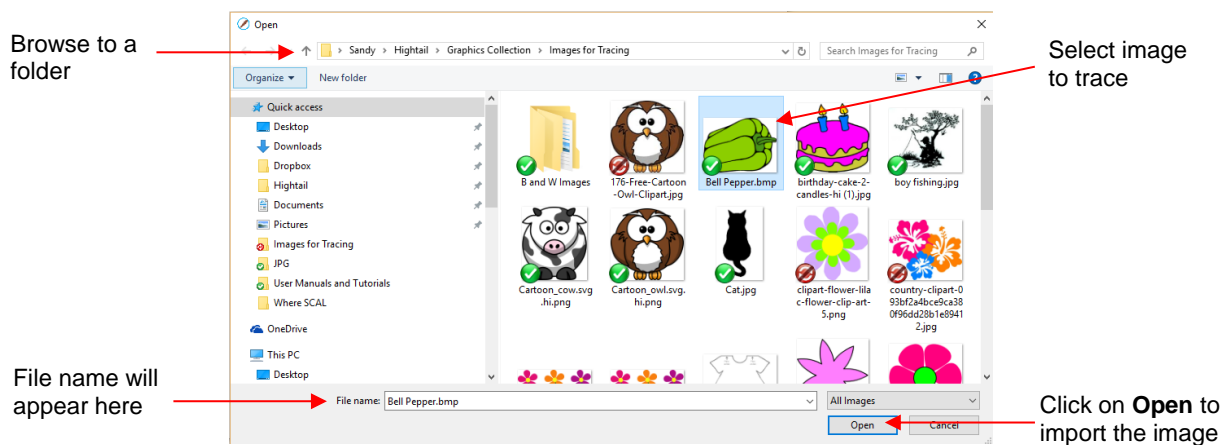
- **At the bottom:**



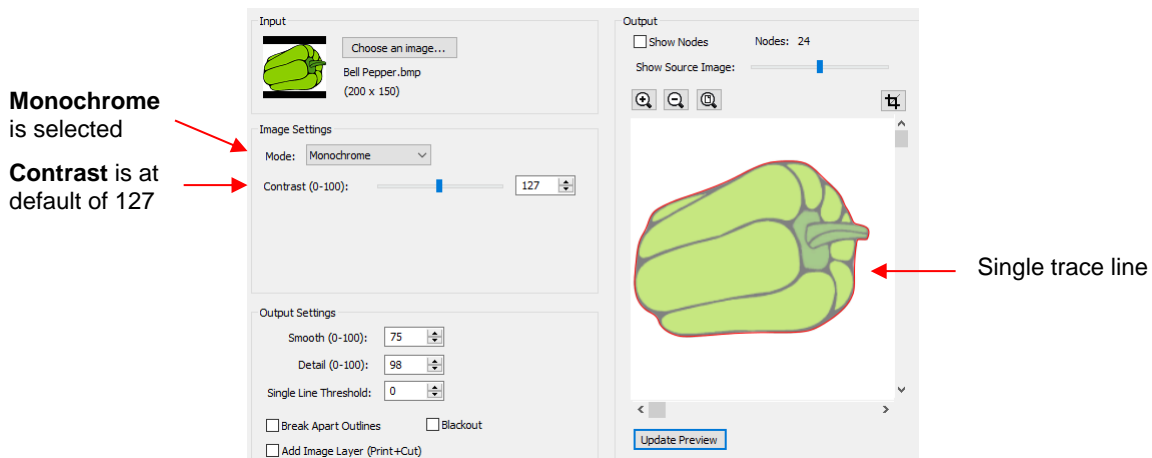
### 7.03.2 Monochrome Trace of a Colored Image: Effects of Contrast

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

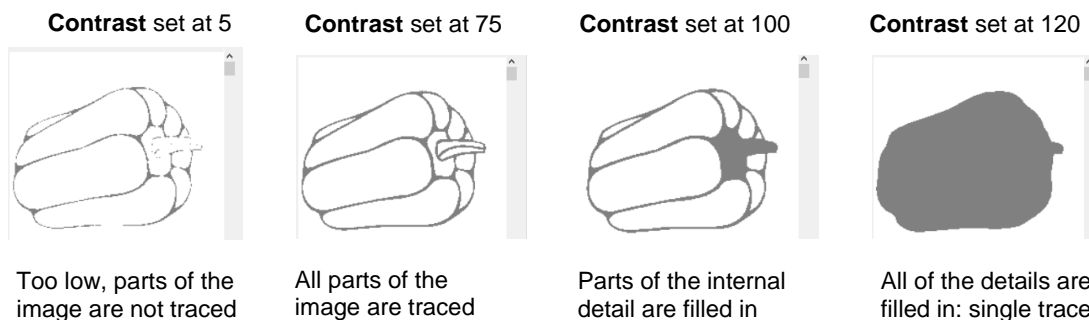




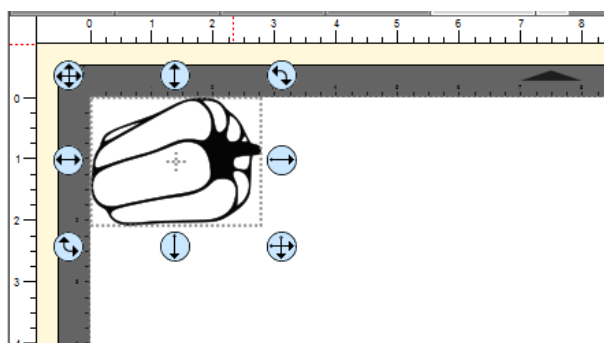
- In this example, a bell pepper image is imported for tracing and the **Preview** indicates a single trace path around the image:



- 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:

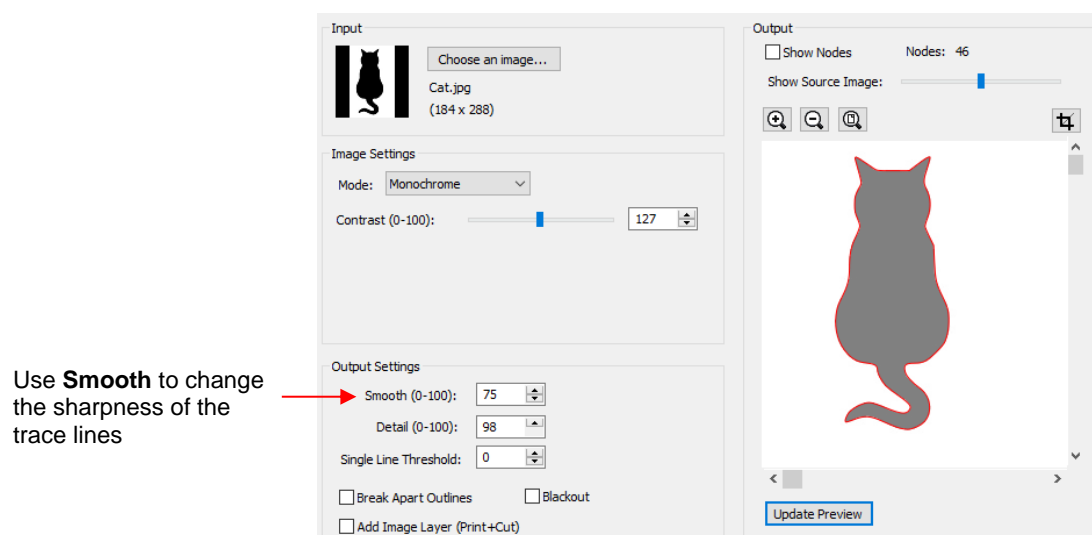


- Thus, for any given image, scroll the **Contrast** setting to see the effects and determine which version best suits your project needs. Once satisfied, click on **OK** and the image will appear in the top left corner of the **Cutting Mat**, ready to be resized and cut out:

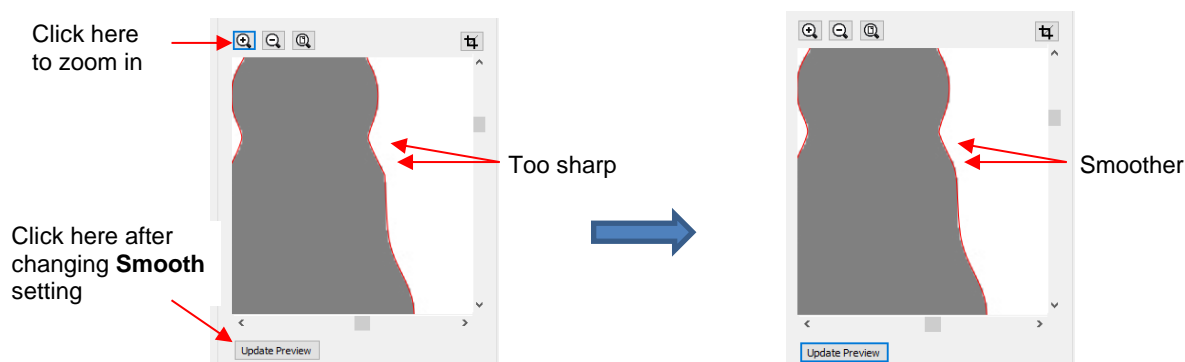


### 7.03.3 Monochrome Trace of a Silhouette Image: Effects of Smooth

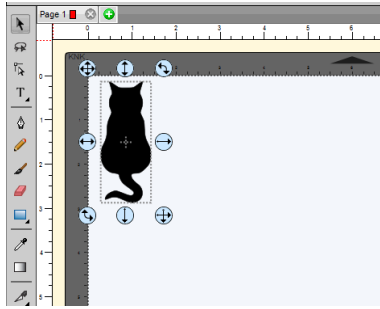
- As mentioned at the end of *Section 7.02*, silhouette images typically offer an easy trace. In this next example, a silhouette cat image is imported into the **Trace Image** window. Because this is a silhouette image, **Monochrome** mode is chosen and the image appears to have traced very well. However, 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:



#### 7.03.4 Monochrome Trace of a Detailed Image: Effects of Detail

- 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 of the **Detail** effect, 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.
- The following tree image is imported into the **Trace Image** window. You have decided that not all of the leaves needed. The **Detail** setting can be lowered to filter out some of the smaller ones:



Detail: 95



Detail: 50



Detail: 25



Detail: 0

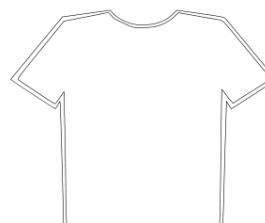
- As shown in the prior screenshot, decreasing **Detail** will remove small shapes. However, even at 0, there are still shapes of a certain size that will be included in the trace. Again, there are editing tools that can be used in case more of the small shapes need to be removed. Refer to *Section 8.06*.

#### 7.03.5 Monochrome Trace of a Coloring Book Image: Single Line Threshold and Blackout

- 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:

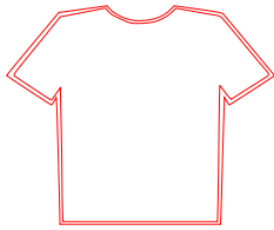


Original image

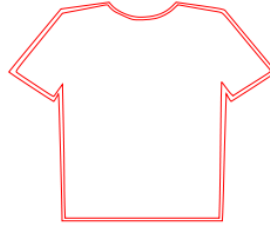


Trace of image

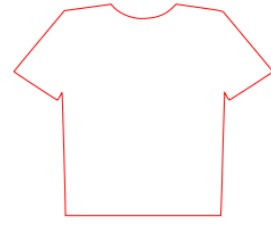
- To have only one trace line, increase the **Single Line Threshold** setting until there is only a single line showing in the **Preview** window:



Single Line Threshold = 0  
double line

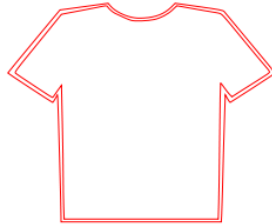


Single Line Threshold = 5  
double line

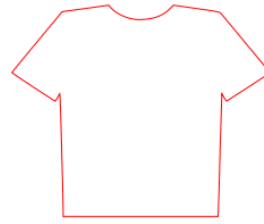


Single Line Threshold = 10  
single line

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

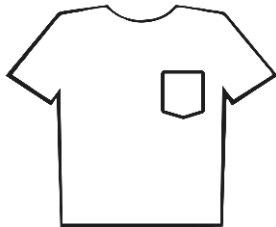


With **Blackout** unchecked

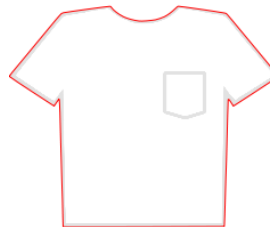


With **Blackout** checked

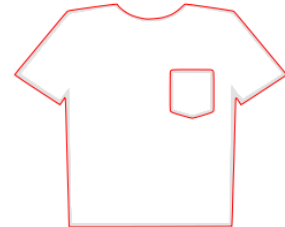
- ◇ However, if the T-shirt had internal details, such as a pocket, then **Blackout** could not be used as the entire pocket would have been ignored. In this situation, **Single Line Threshold** is the better choice:



Original image



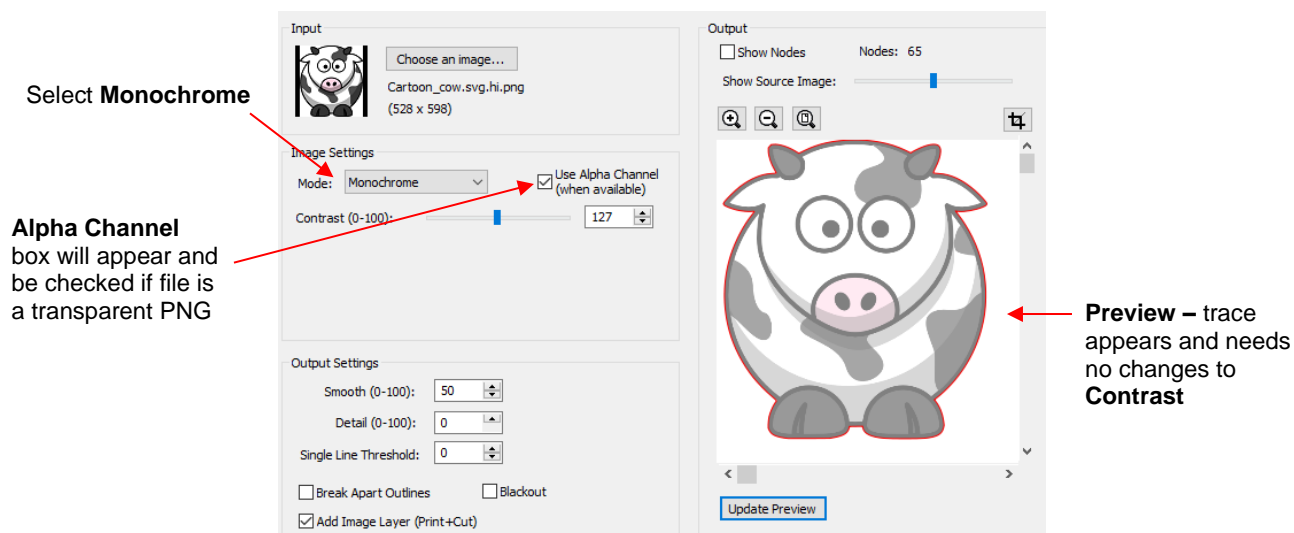
Preview of trace with  
**Blackout** checked



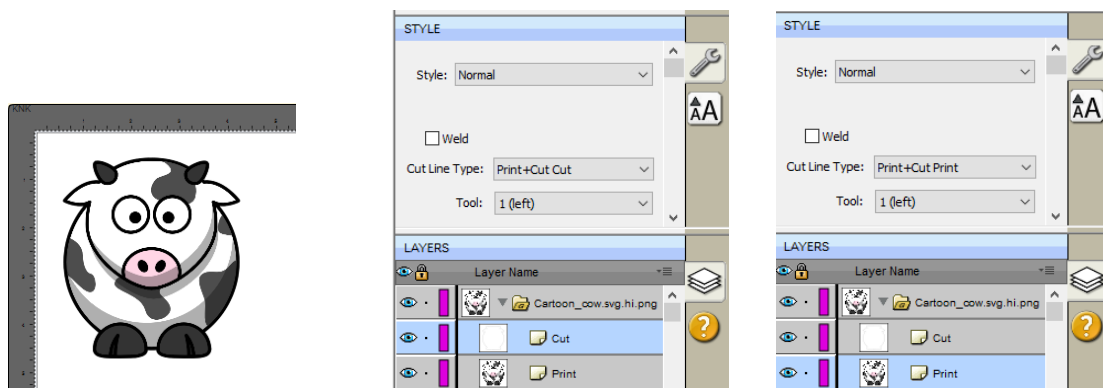
Preview of trace with  
**Single Line Threshold**  
increased

### **7.03.6 Monochrome Trace of a PNG File with a Transparent Background**

- 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:



- Regarding a few of the relevant **Settings**:
  - ◇ **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 8.05*.
  - ◇ **Blackout**: apply if there are internal cut lines that are not needed
  - ◇ **Add Image Layer (Print + Cut)**: Mark this box if you want a second layer with the original image.
- If the **Add Image Layer** option is marked, after clicking on **OK**, the image will appear on the **Cutting Mat** and the **Layers Panel** will indicate which layer is the **Print** and which is the **Cut**. Note that on the **Style Panel**, the **Cut** layer will be designated as **Print+Cut Cut** and the **Print** layer will be designated at **Print+Cut Print**. This means that the **Cut** layer will not be printed and the **Print** layer will not be cut:



- For more information on the **Style Panel**, refer to *Section 10.01*.

### 7.03.7 Color Layers Trace

- As mentioned in *Section 7.03.1*, **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:

Select **Color layers**

Scroll to select number of colors to identify

Colors identified

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

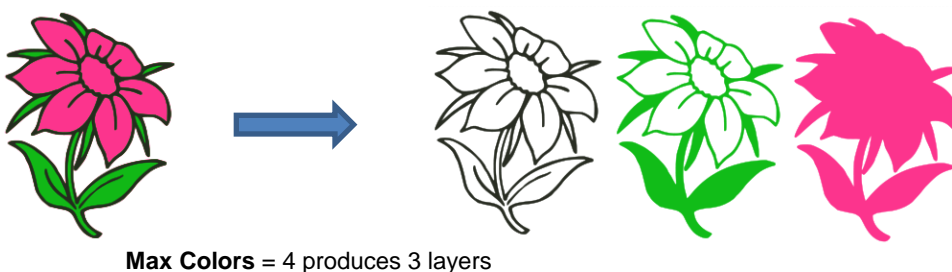
**Preview**

Click here after every change

- 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:

**Max Colors** increased to 6

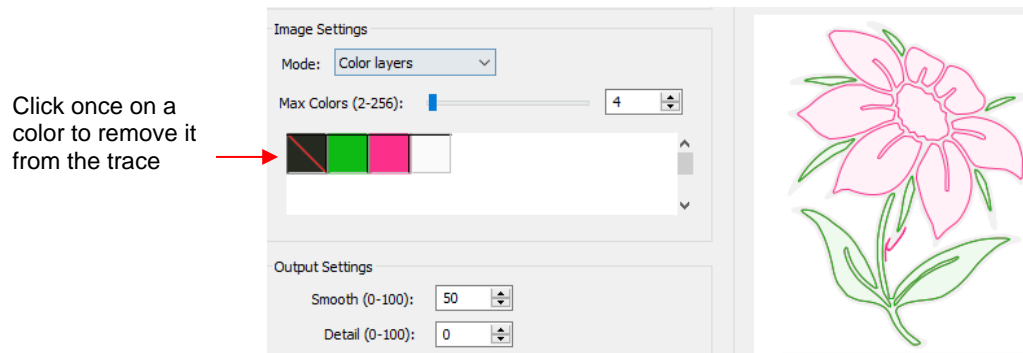
- After accepting **OK** in both cases, the layers are ungrouped and compared:



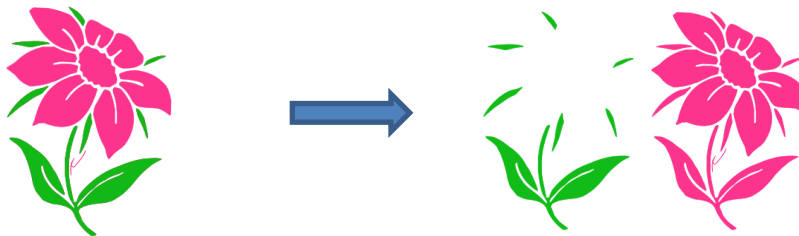
**Max Colors = 4** produces 3 layers



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



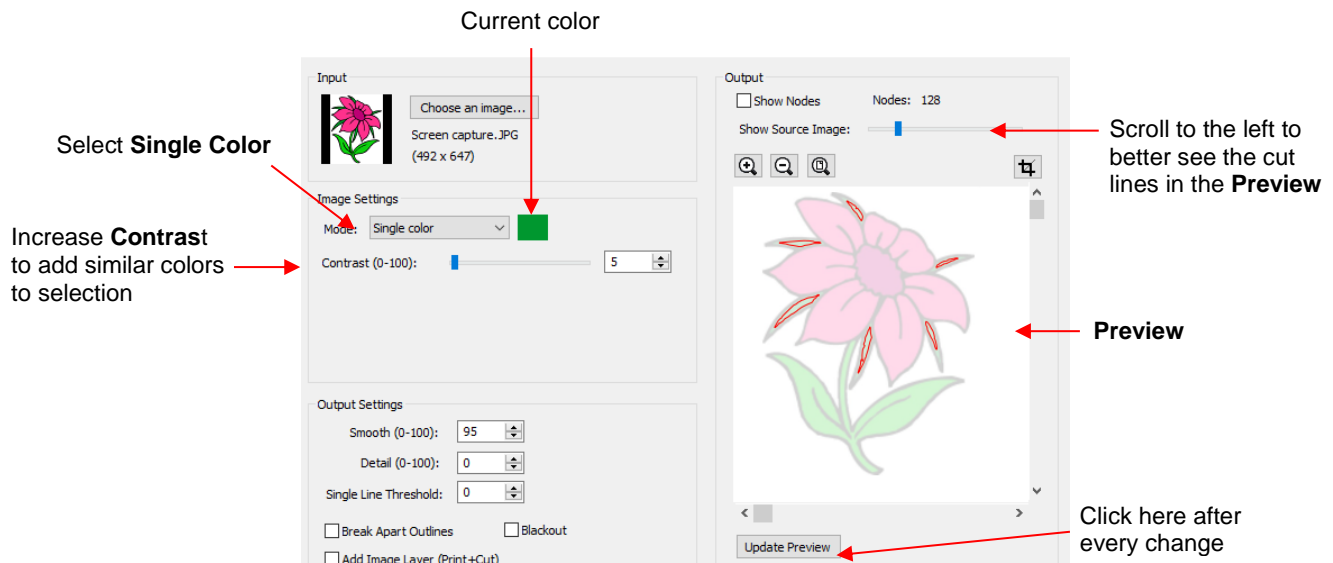
- The result is this:



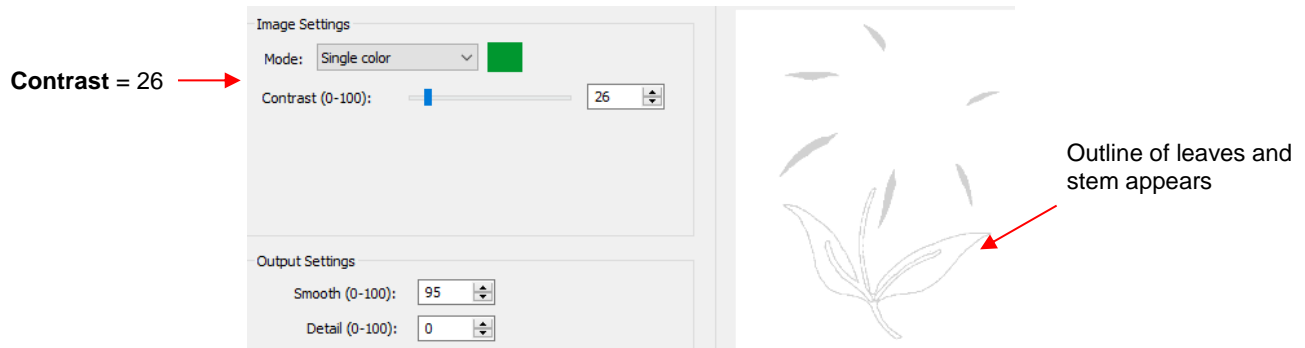
- In simple designs, **Color Layers** can be quick and easy to implement. Realistically, in cases like this image just covered, it might not be easy to layer these detailed cuts perfectly. Thus, the **Single Color** option will more likely be used in most cases.

### 7.03.8 Single Color Trace

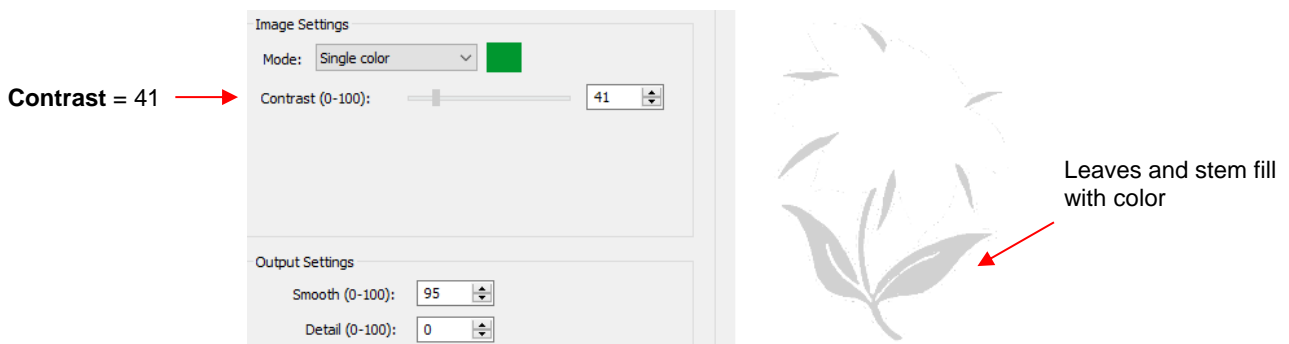
- With the **Single Color** option, each desired color is selected and traced individually. The advantage is that only the visible part of each color is traced. The disadvantage is that you must reload the image and perform a trace for each color desired.
- Again, the same flower image that was used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



- 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:

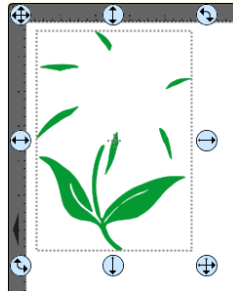


- ◇ With a **Contrast** of 41, the leaves and stem fill:

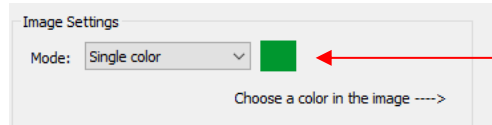


- Once you are satisfied, click on **OK** to import that green layer onto the **Cutting Mat**:



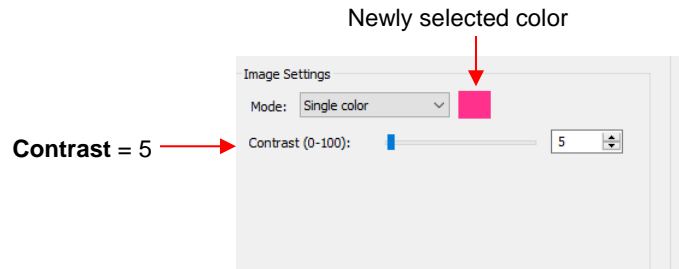


- Now, reopen the **Trace** window, reload the same image and then click on the color box next to **Single Color**. A message will pop up indicating you are to click on another color on the **Preview**:



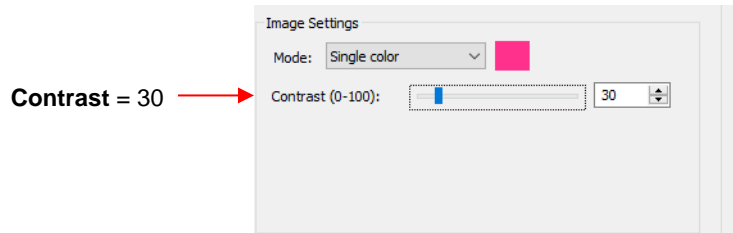
Click on this box

- 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:



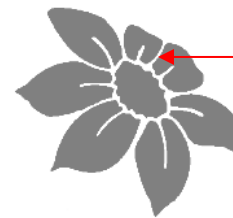
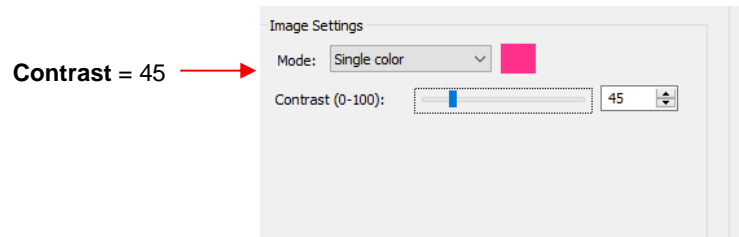
These petals are included in this color

- 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:



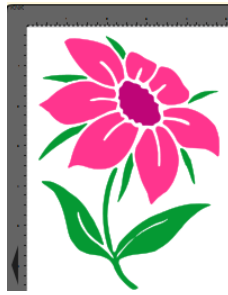
The petals fill out a bit more at a higher **Contrast**

- 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.



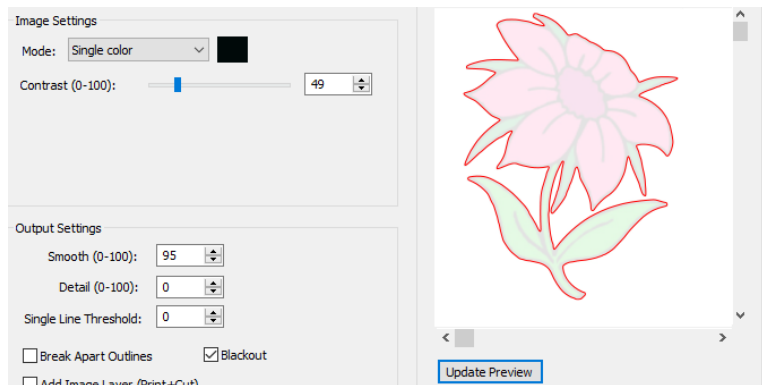
The center of the flower is now added

- 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:

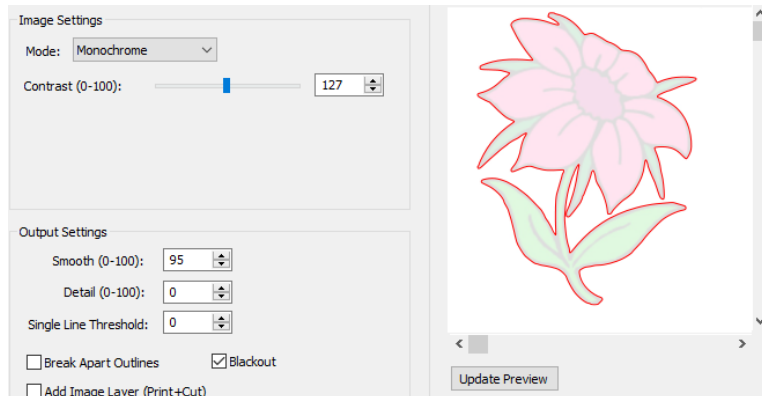


- You now have several options for completing the trace which involves adding a final outline/shadow layer to the flower:

◇ Option 1: Continue to use **Single Color**, click on the part of the image that is black, mark the **Blackout** option:



◇ Option 2: Switch to **Monochrome** mode, mark the **Blackout** option:




◇ Option 3: 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 9.04*.

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



## 7.04 Draw Functions

### 7.04.1 The Draw Tool

- The **Draw Tool** is accessed by clicking on the 5<sup>th</sup> icon  on the **Tools Panel**. 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

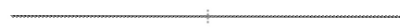
- To draw a single straight line, use your mouse to click once where you want to start the line and click again where you want to end the line. Then immediately press **Esc** or the **Enter** key:



Left click once to begin.



Move cursor to where you want to finish the line.

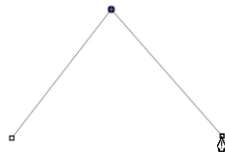


To stop drawing, press **Esc** or the **Enter** key

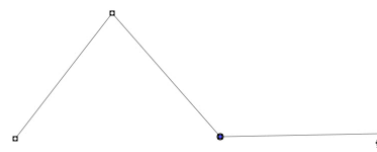
- If you wish to continue drawing a path of connected lines, keep left-clicking each time you need to change directions. Each click produces a node:



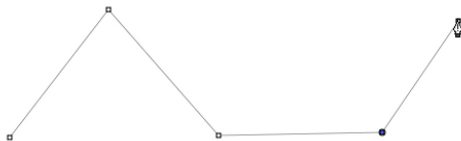
Left click to start and left click at a 2<sup>nd</sup> location



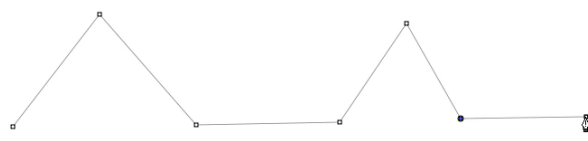
Move to a 3<sup>rd</sup> location and left click again.



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

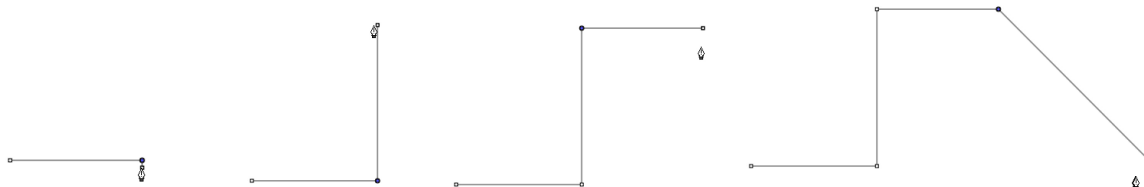


Move to a 5<sup>th</sup> location and left click again.



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

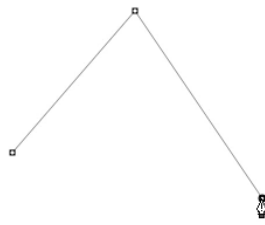
- If you want to draw perfectly vertical lines, perfectly horizontal lines, or lines at a 45° angle, hold the **Shift** key while clicking:



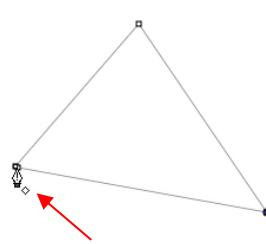
- If are drawing a closed path then, just as the mouse cursor approaches the starting node, a small diamond will appear next to the cursor and you can click one last time to end the process. The shape will automatically join the first and last nodes and fill with color, provided a **Fill** color is assigned:



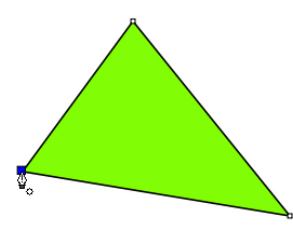
Left click to start and then left click at a 2<sup>nd</sup> location



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



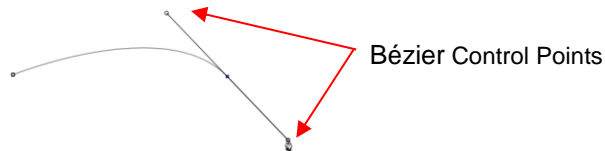
As you approach the start, watch for the cursor change.



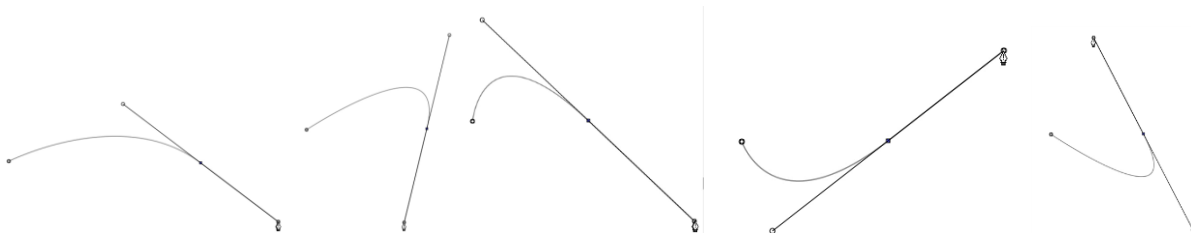
Left click and the shape will close and fill with color

## Drawing Bézier Curves

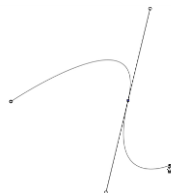
- Drawing curves is a bit more difficult. The key is to take it one step at a time, practice the technique a lot, and remember that you can later correct your curves using the **Shape Tool** (refer to *Section 8.10*).
- To draw a curve, use your mouse to left-click once where you want to begin the curve. 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:

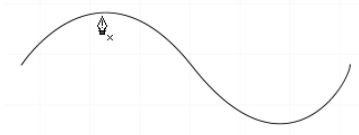


- ◇ Release the left mouse button and press the **Esc** key or press the **Enter** key to stop the drawing process:

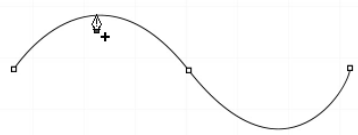


## Adding and Deleting Nodes

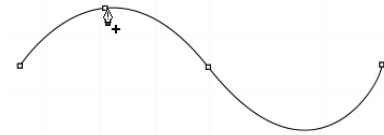
- Zoom in on the curve, select it, and then click on the **Draw Tool** icon.
- To add a node, move the cursor next to the path and watch for the cursor to change. With the cursor right on the path, left-click to add a node:



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

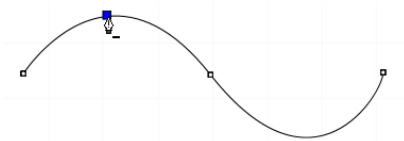


After cursor changes, left click once and a node is added

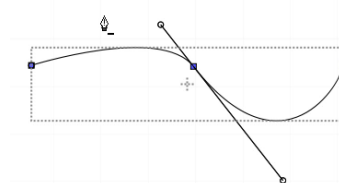


New node has been added

- 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:




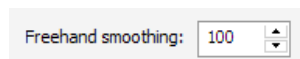
Once the cursor changes and the node turns blue, left click



The node is deleted and the curve will change accordingly

## 7.04.2 Freehand Drawing

- 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**:




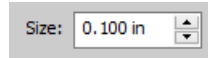
Freehand tree



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

### 7.04.3 Brush Drawing

- 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:



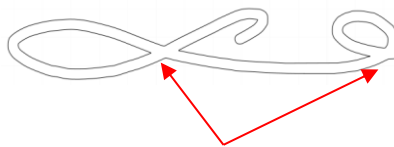
- Select the **Size** you desire and freehand draw:



- 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

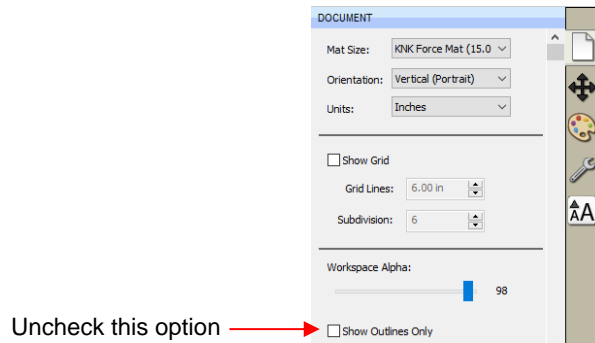
### 7.05 Manual Tracing of an Imported Image

- 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 7.04.1**. 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.

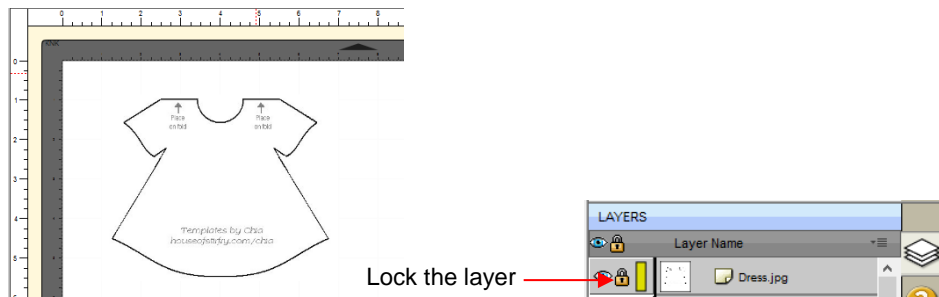
#### 7.05.1 Importing an Image for Manual Tracing

- 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 7.03* 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**:

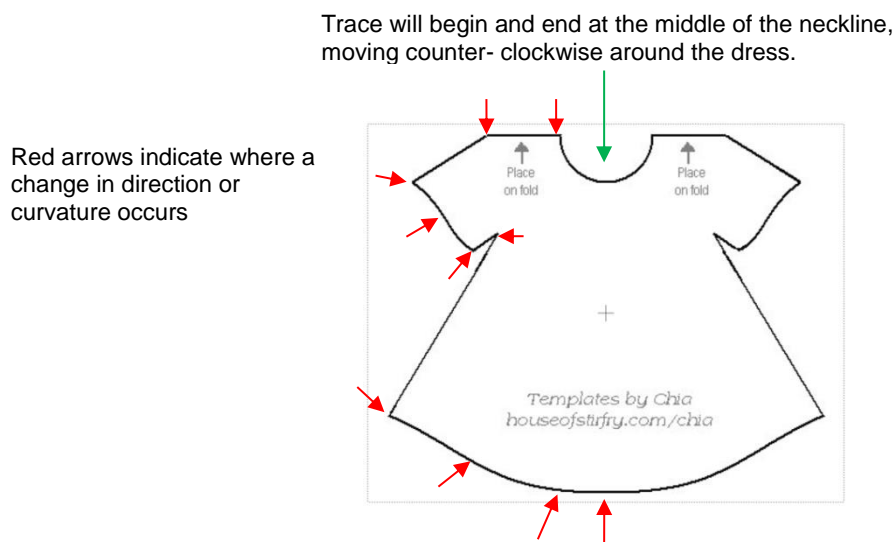


- To avoid inadvertently selecting the image while tracing, lock that layer on the **Layers Bar**:



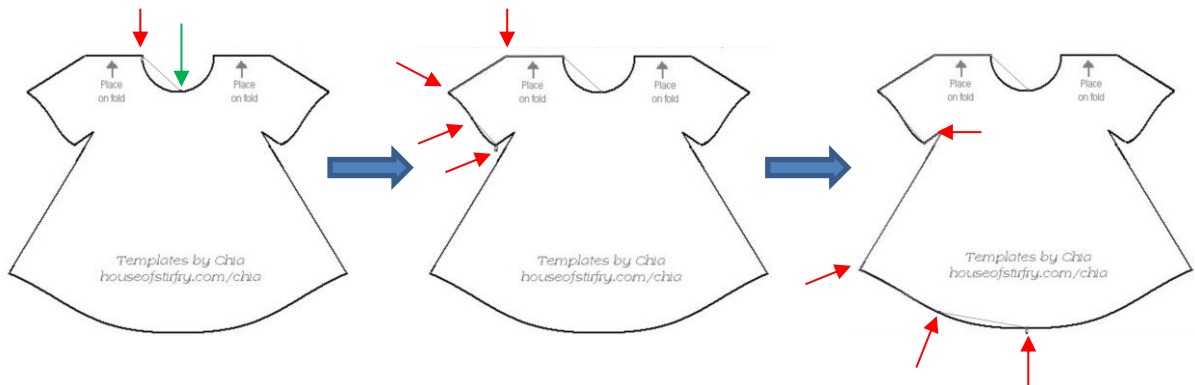
## 7.05.2 Manual Tracing Using the Draw Tool

- Make sure you have read *Section 7.04.1* 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:

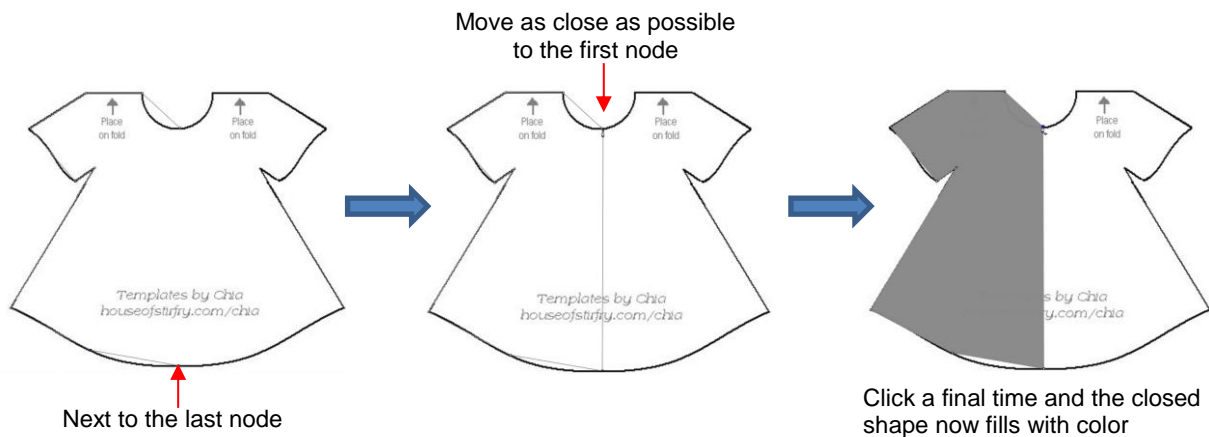


- The process is as follows:


- ◇ 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:



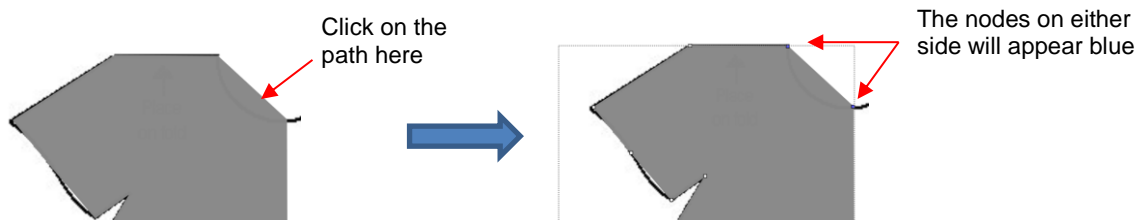
- ◇ Once you've reached the next to the last node, click as close as possible on the first node and the shape will close and fill with color (based on the color currently assigned on the **Fill & Stroke Panel**):



### 7.05.3 Editing the Trace

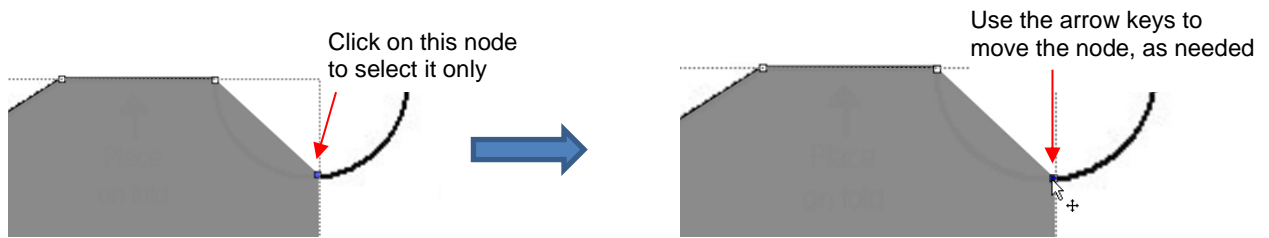
- The next step is to move nodes and convert any straight lines into curves, as needed. This is done using the **Shape Tool**  which is the 3<sup>rd</sup> icon on the **Tools Panel**. Note that more details about using the **Shape Tool** will be presented in *Section 8.10*. For now, only a portion of 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:





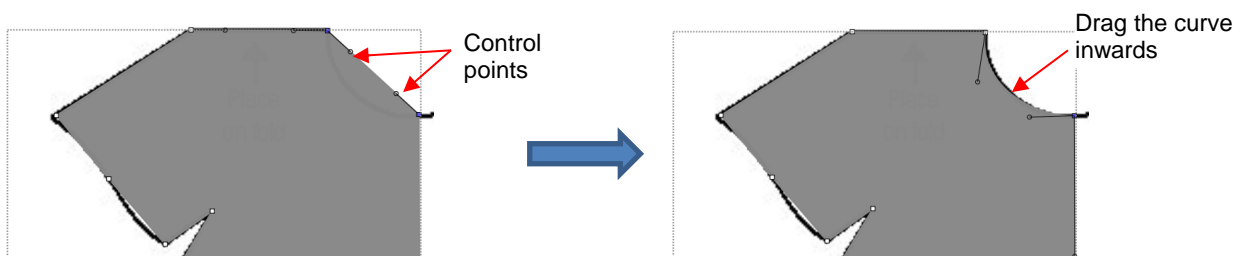
- ◇ If you need to move either node, click on the node to be moved and the other node will turn white. Be very precise in clicking as it is easy to miss the node. If that happens, you will need to click the path again to show the nodes.
- ◇ Once you have the single node highlighted in blue, you can now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



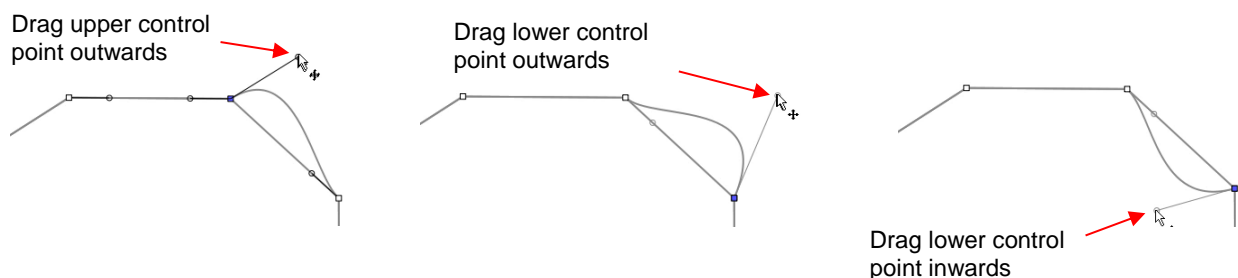
- ◇ Next, click on the second icon on the **Tool Options**:




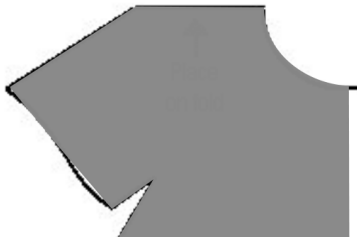
- ◇ Then click again on the neckline path and you will see Bézier control points. This means you can now drag the middle of the path inwards to form the neckline:



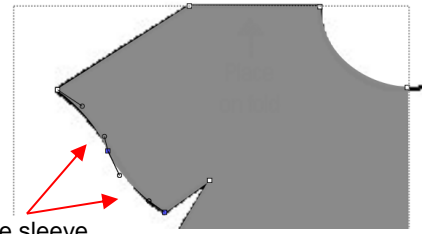
- ◇ Alternatively, the Bézier control points can also be dragged. This is useful if the curve isn't symmetrical. Here are a few examples of how that curve could be altered:



- ◇ 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




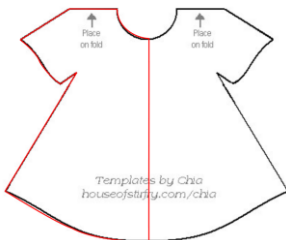
Both parts of the sleeve are reshaped

- ◇ 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. 😊

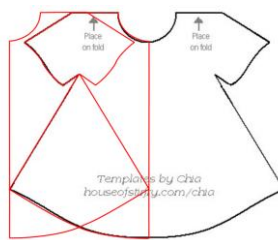


#### 7.05.4 Copy, Mirror and Weld to Complete Symmetrical Shapes

- The final step to complete the dress involves making a mirror image copy and then welding it to the original.
  - ◇ Select the dress and do a **Copy** and **Paste** or you can hold the **Alt** key and click once on the dress to make a copy of the image on top of the original.
  - ◇ With the image still selected, click the **Mirror** icon  on the **Position & Size Panel**.
  - ◇ Move the copy to the right until it slightly overlaps the original. In the following screenshots, **Fill** has been turned off and a thick red **Stroke** applied to better illustrate:



Original trace

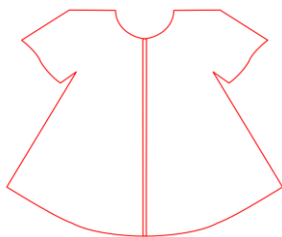


**Copy made and Mirror applied**

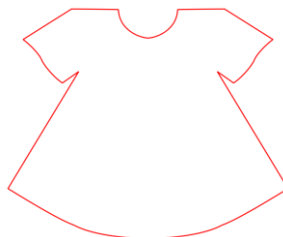


Copy is moved to the right side

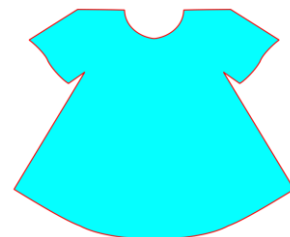
- The original image is no longer needed. The trace and the copy are welded using **Path>Union**. Fill is then applied to complete the trace:



Imported raster is removed



Apply **Path>Union**



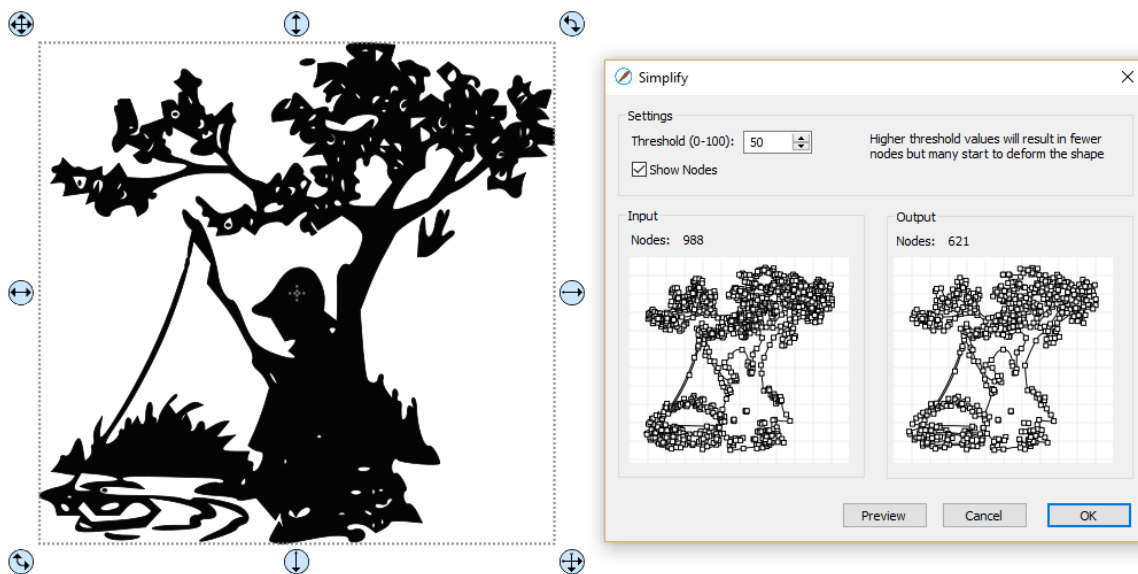
Turn on **Fill** and select a new color

## 8. SCAL: Editing

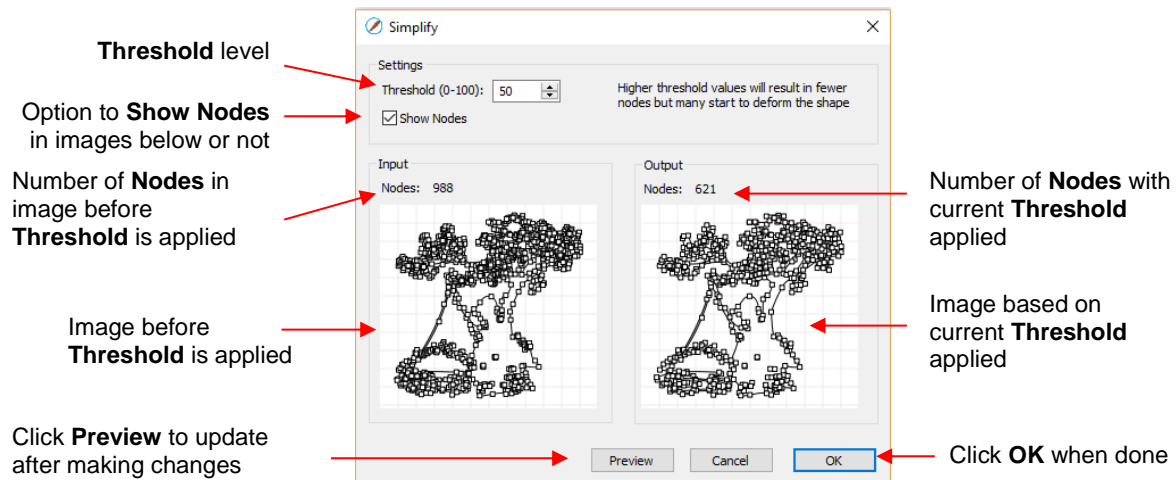
This chapter covers functions that are used to modify shapes in SCAL as well as prepare shapes for cutting. For functions used in designing, refer to *Chapter 9*.

### 8.01 Simplify

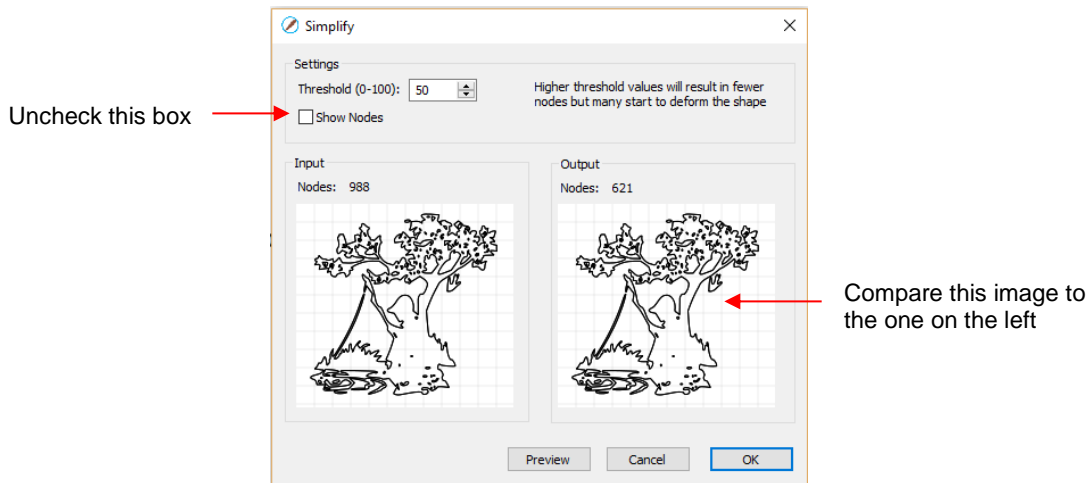
- The purpose of the **Simplify** function is to reduce the number of nodes. This can be important when cutting small vector shapes in which clustering of nodes in tight locations can sometimes lead to poor cutting.
- There are two ways to open the **Simplify** window after selecting a shape:
  - ◇ Right-click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



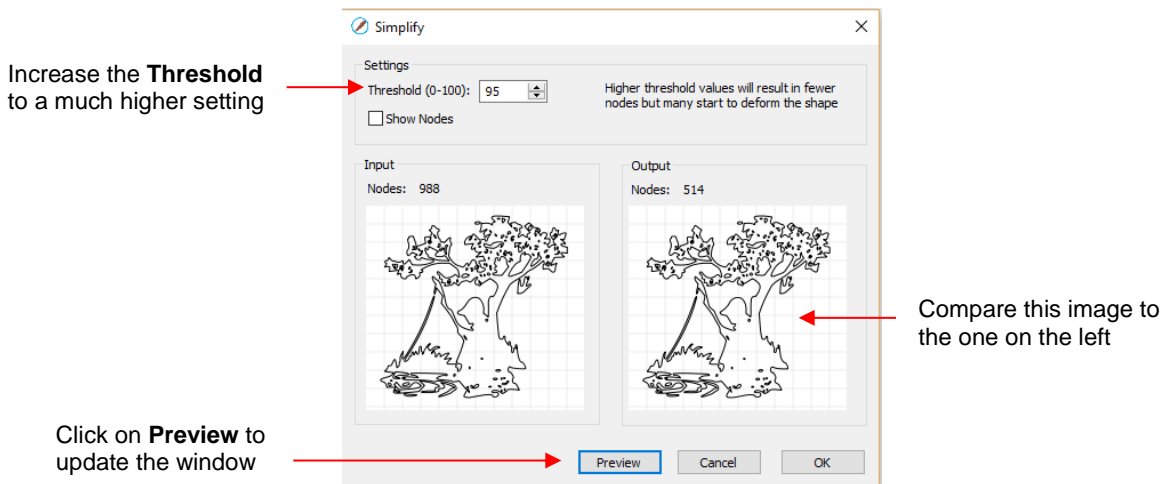
- The **Simplify** window shows the nodes of the selected image in two side-by-side windows: an **Input** and an **Output**, along with the number of **Nodes** in each one. That count is based on the current **Threshold** setting:




- 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:



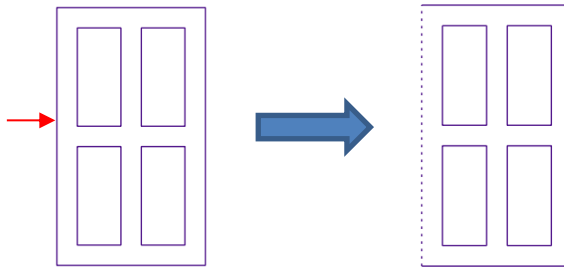
- Try increasing the **Threshold** setting to reduce more nodes. In general, you should be able to use a high **Threshold** without compromising the image:



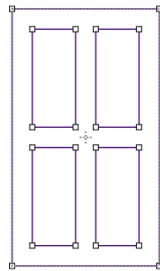
## 8.02 Split Path

- The **Split Path** function allows you to delete the path between any two adjacent nodes. First you must select two nodes using the **Shape Tool**  on the **Tools Panel**. Then you can access **Split Path** using either of the following:
  - ◇ Right-click and select **Path>Split Path**
  - ◇ Go to **Path>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 cut line:

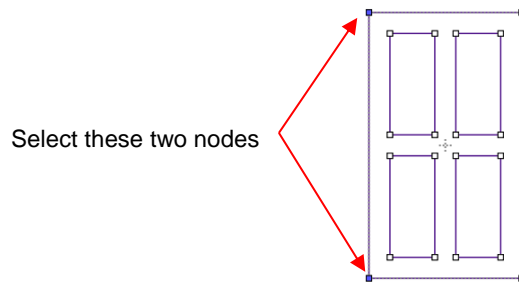
The left side of this paneled door will be separated and made dashed so that the door can be folded to open instead of being cut out




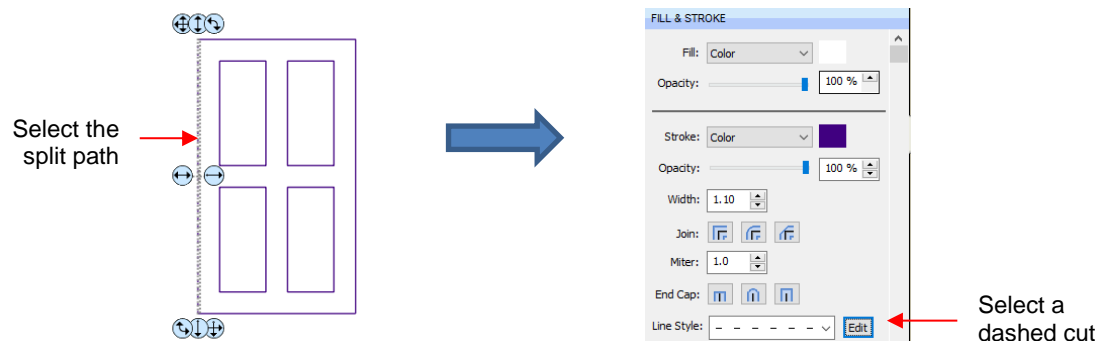
- ◇ Select the shape and click on the **Shape Tool** icon  on the **Tools Panel**. The nodes will appear on the shape:



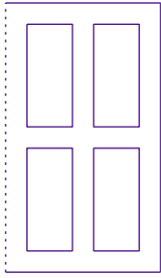
- ◇ Drag your mouse to marquee-select the two nodes on the left side of the window:



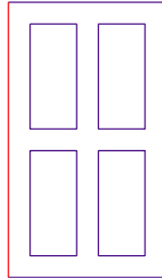
- ◇ Break that path by going to **Path>Split Path**. Then click on the **Select** icon . Now you can separately select that left side line and change to a dashed cut on the **Fill & Stroke Panel**:



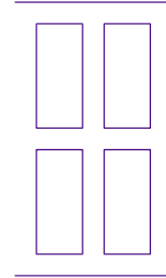
- ◇ The left side of the window will now cut dashed. Alternatively, the left side could have been left solid and scored with an embosser in the cutter or the left side could have been deleted and the fold made by hand:



Left side will cut dashed



Left side will be scored separately



Left side won't cut at all

### 8.03 Close Path

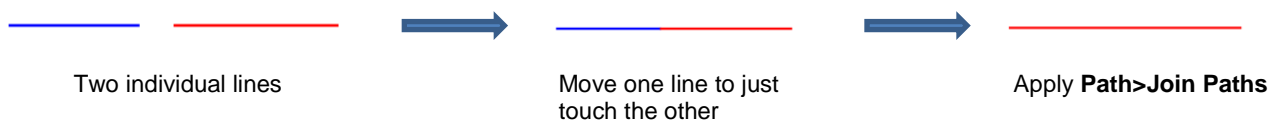
- The **Close Path** function can be applied to any open shape, other than a straight line, to join the start and ending nodes with a straight line:



- 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.

### 8.04 Join Paths

- 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**:

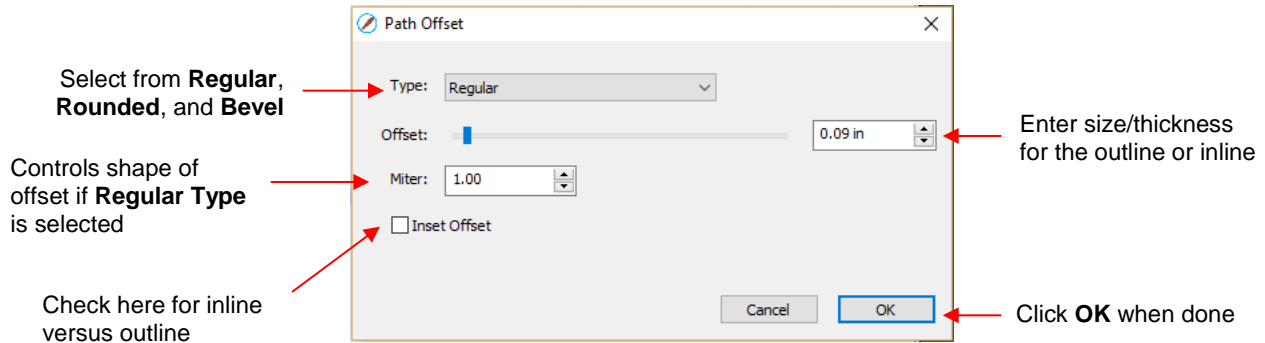


- If you are joining several lines at once, such as these four lines to create a box, then all four lines can be selected at one time and be joined. However, for the new shape to be an actual closed shape, you must then apply **Path>Close Path**:

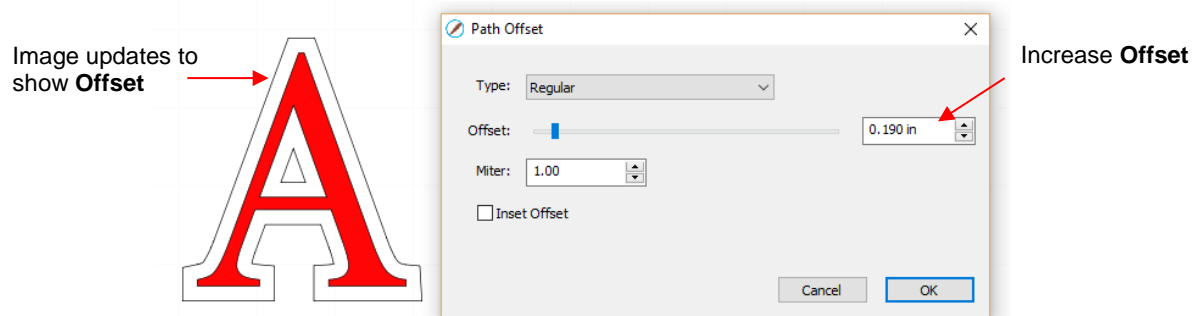


## 8.05 Path Offset

- **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 9.04*.
- To access **Path Offset**, select the shape and go to **Path>Path Offset**:



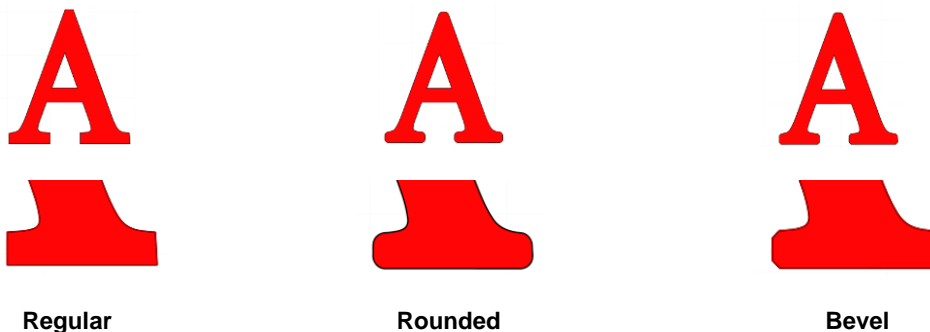
- As you increase the **Offset**, you will begin to see the outline form on your selected shape:



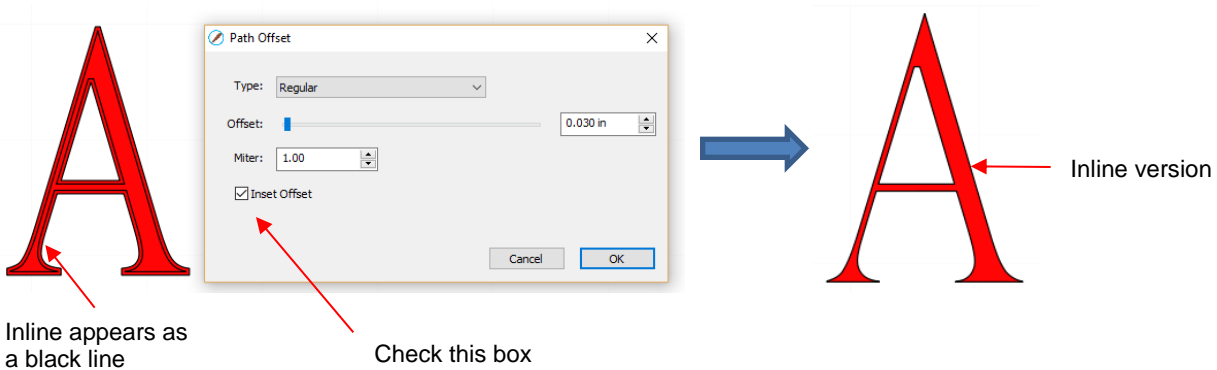
- After clicking on **OK**, the **Offset** will fill with the same color and the original will be deleted:



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



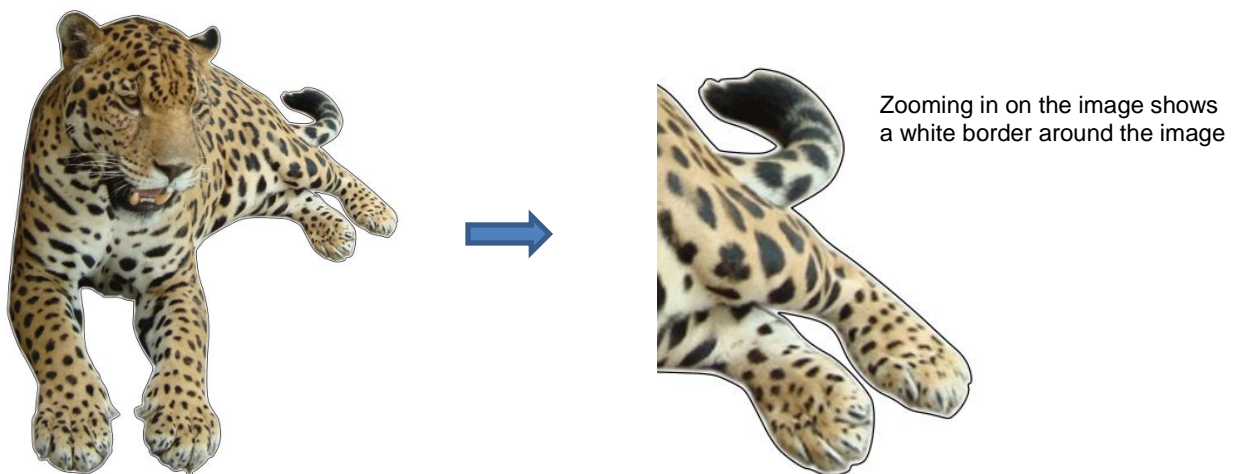
- Note that the first choice, **Regular**, also has a **Miter** setting which should work in the same way as **Miter** affects the **Stroke** (refer to *Section 5.14*). However, at this time, it appears that the **Miter** setting is not working.
- Checking the **Inset Offset** box creates an inline instead 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":

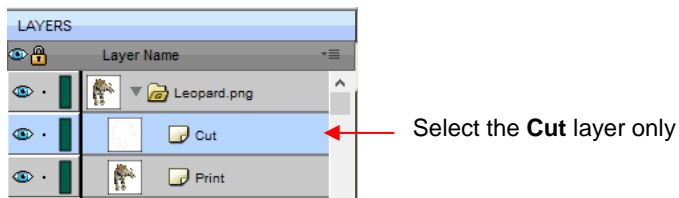


- A second practical example showing the use of **Inset Offset**, is the following print and cut application. A PNG with a transparent background was traced using the **Trace** function. However, based on the location of the cut line, relative to the printed image, there will be small amount of white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

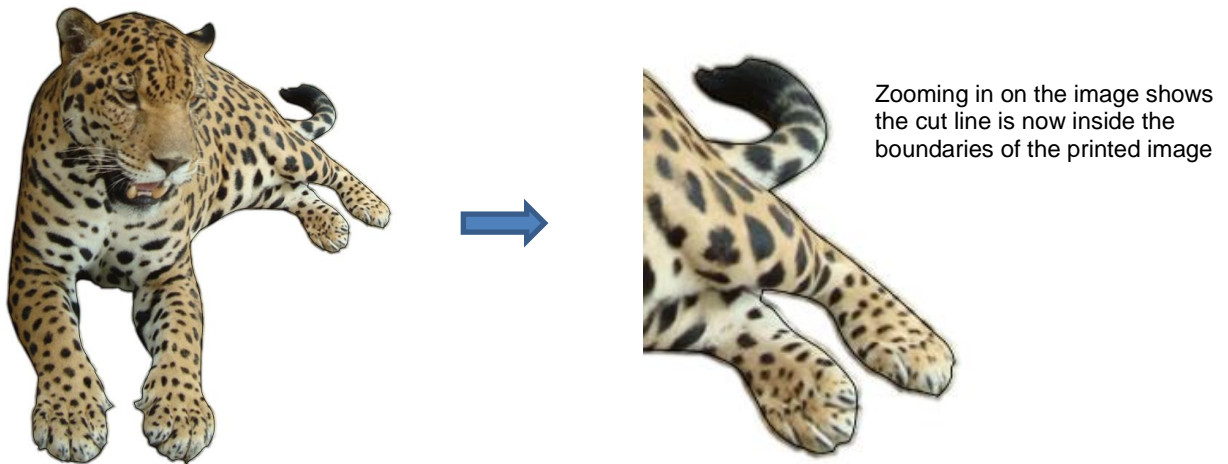


◇ Select the **Cut** layer only on the **Layers Panel**:



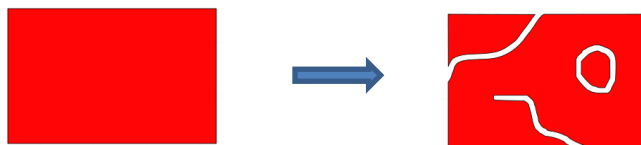


- ◇ Open the **Path Offset** window. Set the **Offset** to a small size, such as 0.03". Be sure to mark the box for **Inset Offset**. The result is a cut line which will eliminate that white border around the image:

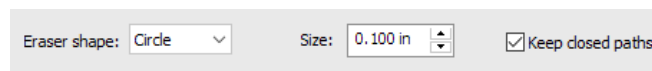


## 8.06 Eraser

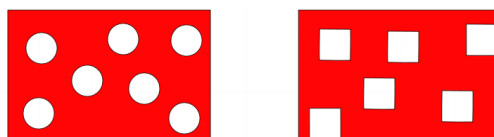
- The **Eraser** is the 8<sup>th</sup> icon  on the **Tools Panel**. Use this tool to erase parts of a shape by dragging your mouse across the shape:



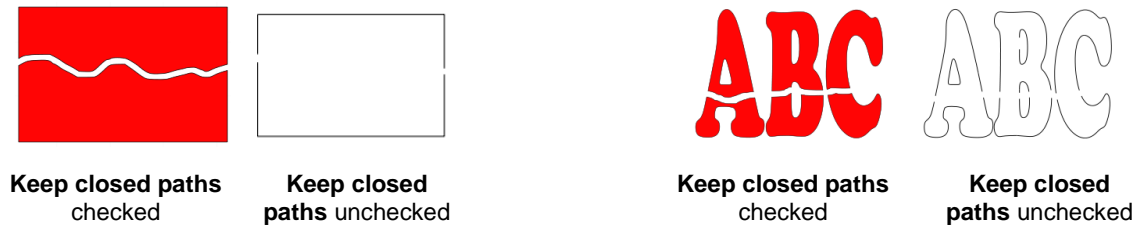
- The **Tool Options** for the **Eraser** include the following:





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

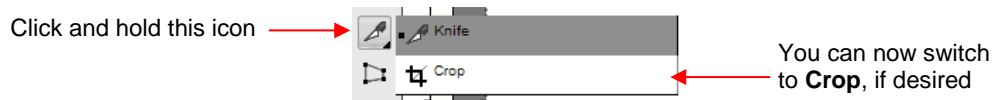


- ◇ **Size:** select a thickness for the erasure. Scroll up and down or enter a specific size.
- ◇ **Keep closed paths:** Mark this option if you bisect a shape and you want the two resulting shapes to be closed. Otherwise you end up with two open shapes:



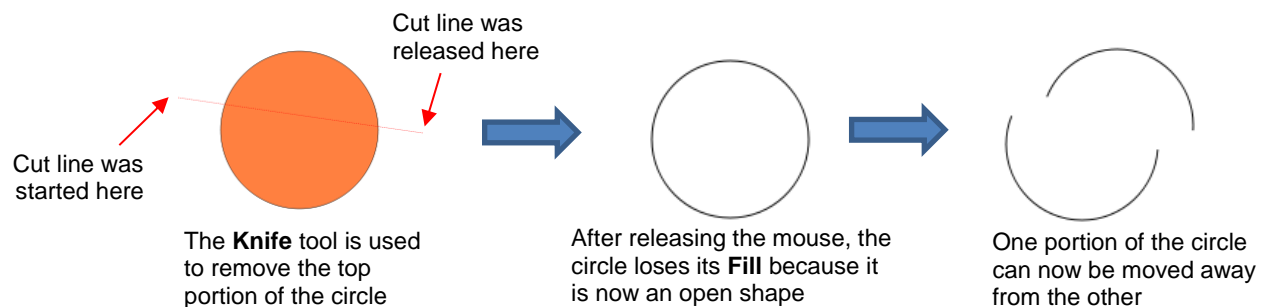
## 8.07 Knife and Crop

- 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.



### 8.07.1 Using Knife

- 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:



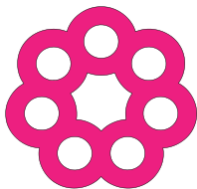
- There are four ways to control the angle of the cut:
  - ◇ Click and hold the left mouse button – you can freely drag the red cut line to cut at any angle (as shown in the screenshot)
  - ◇ Hold the **Shift** key and click and hold the left mouse button and drag left or right: the red cut line will 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**

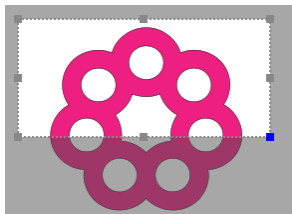


### 8.07.2 Using Crop

- 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:



The top part of this shape will be cropped

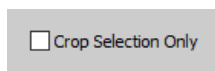


Marquee-select the area to be retained

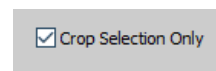


After pressing the **Enter** key

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

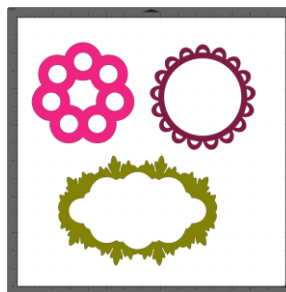


**IMPORTANT:** If left unchecked, only the marquee-selected part of the shape will be retained. The rest of that shape and every other shape on the page will be deleted, even those that might be hidden or locked!

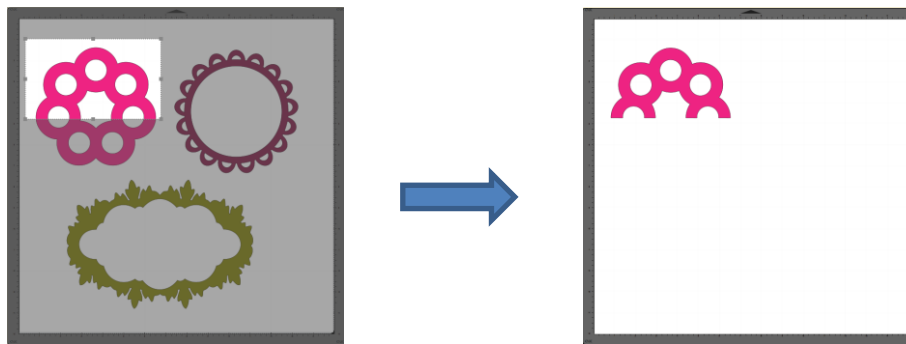


If checked, the marquee-selected part of the selected shape will be retained, as well as all other shapes on the page.

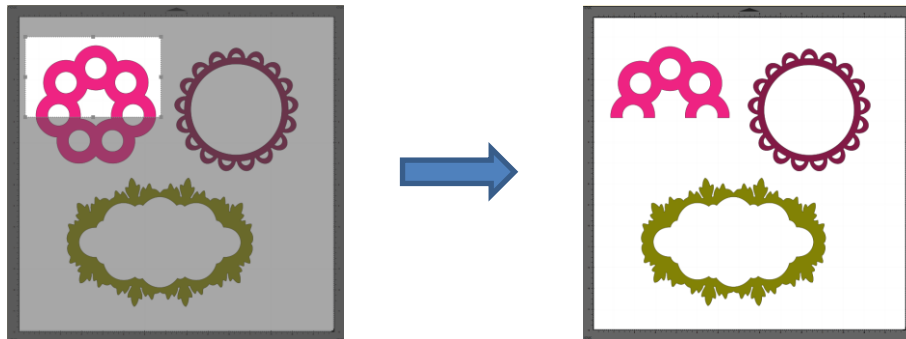
- Here is an example to show what would happen in both cases. The file has three shapes and the top right shape will be cropped just as in the prior screenshot:



- ◇ 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:



## 8.08 Which Cutting Tool to Use?

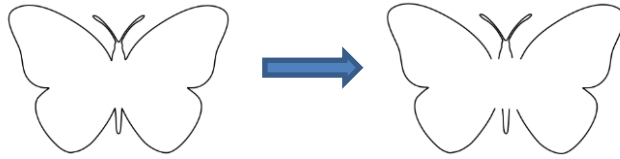
- Having so many cutting functions to use can make it difficult to know which one to use in a particular instance. Experience will be your best guide, as well as testing them out. But a summary of the functions is presented in this section and this may prove to be helpful when selecting which tool to 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 9.05* 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:

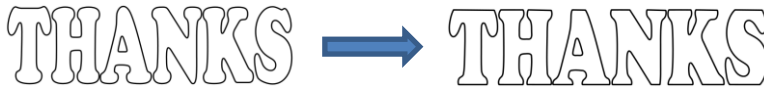


**Knife**  
or  
**Split:**



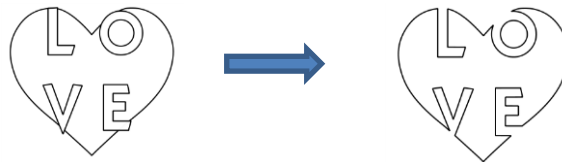
Cut up the butterfly without closing the shapes. Used for projects where the shapes are folded along one side instead of cut out

**Crop**



Slice off the top and bottom of a word. Used for a popup card.


**Boolean**  
**Join:**

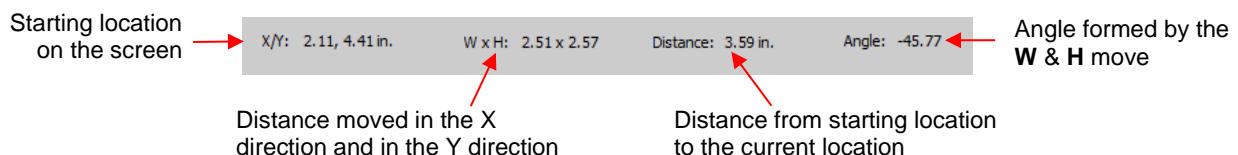


Cut a shape with any other shape or shapes

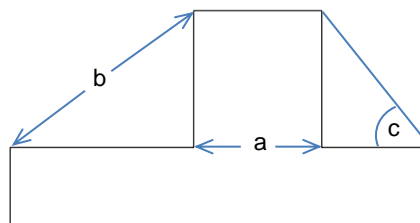
- **Knife** and **Split** have the same effect. **Split** is a bit more limiting because there needs to be nodes present in the location where the cut will occur. It might be useful if you are already in the **Shape Tool** mode where you can then select the nodes and apply the **Split**. Otherwise, **Knife**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

## 8.09 Ruler

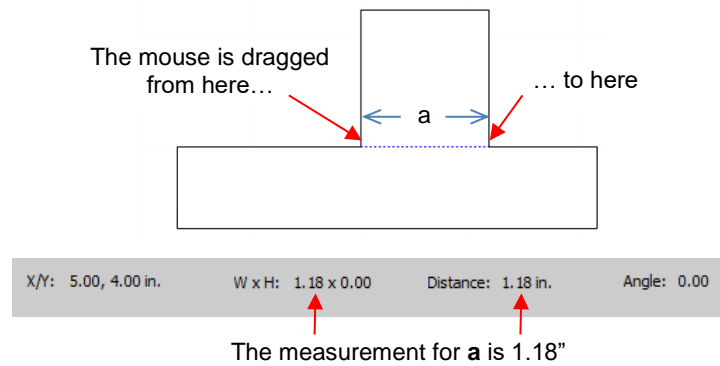
- The **Ruler** function allows you to measure the distance and angle between any two points on the screen. It is accessed by clicking on the second icon from the bottom  on the **Tools Panel**.
- No shapes need to be preselected. Just hold down the left mouse button at any location and then drag the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



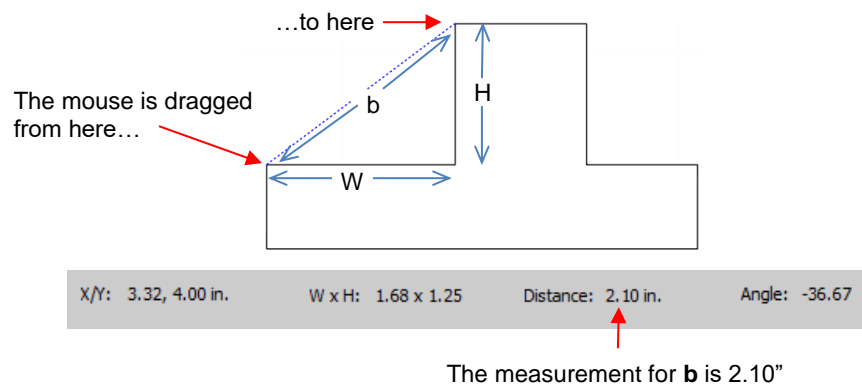
- To better illustrate these variables, the following shape will be used and the various measurements will be determined using the **Ruler**:



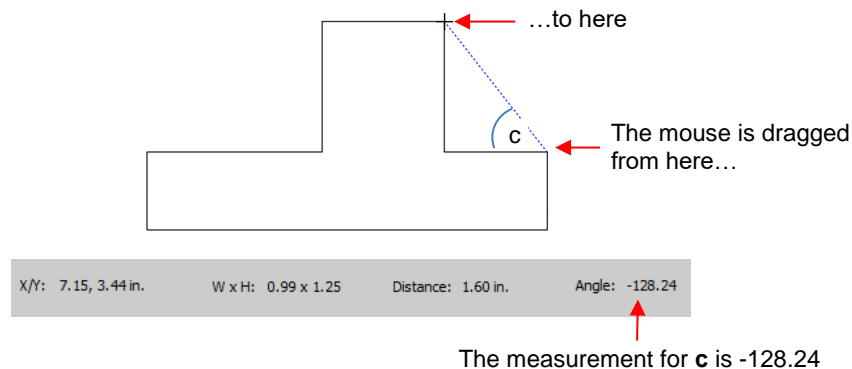
- ◇ **X/Y:** This is the starting position on the screen and will match the X/Y grid location on the **Cutting Mat**. You can extend beyond the boundaries of the mat, if needed.
- ◇ **W x H:** Indicates how far the mouse has been dragged away from the starting point. Note that as the mouse is dragged, 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:



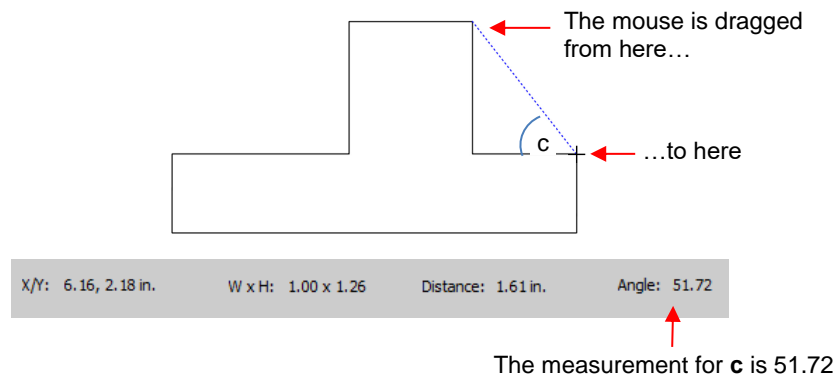
- ◇ **Distance:** This is the actual measurement between the starting location and the ending location. In the prior measurement, **W** is the same as **Distance** because the measurement was a horizontal one. But measuring the length of "**b**" is not:




- ◇ **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:



- 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:

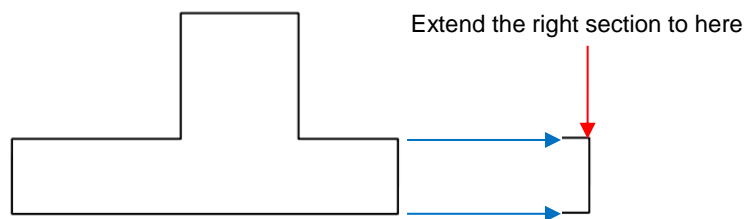


## 8.10 The Shape Tool - Path and Node Editing

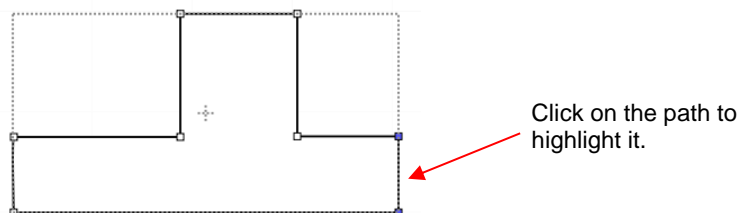
- Path editing involves moving paths as well as reshaping them. This topic was first introduced in *Section 7.05* where you were shown how to draw with the **Draw Tool** and then curve a straight-line path. If you haven't read *Section 7.05*, please do so before proceeding with the rest of this section.
- To use the **Shape Tool**, click on the third icon  on the **Tools Panel** and then click on a shape. You should see the nodes which currently define that shape. If you do not see any nodes, then:
  - ◇ The shape is grouped with one or more other shapes. Go to **Object>Ungroup** and then try again.
  - ◇ The shape is still in text mode. To convert, return to **Select** mode. Select the letters and go to **Object>Break Apart** and then marquee-select all and go to **Object>Merge**.
- Path editing involves dragging a 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.

### 8.10.1 Moving a Path

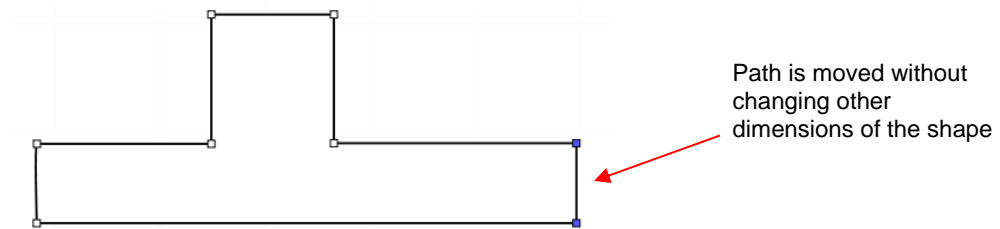
- Sometimes a path needs to be extended without resizing the rest of the shape. For example: let's say you need to extend the right section of this shape by a few inches:



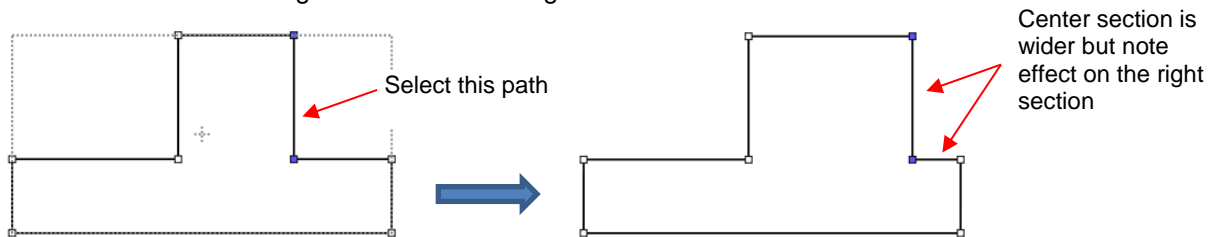
- ◇ Select the **Shape Tool**  on the **Tools Panel** and then click on that path:



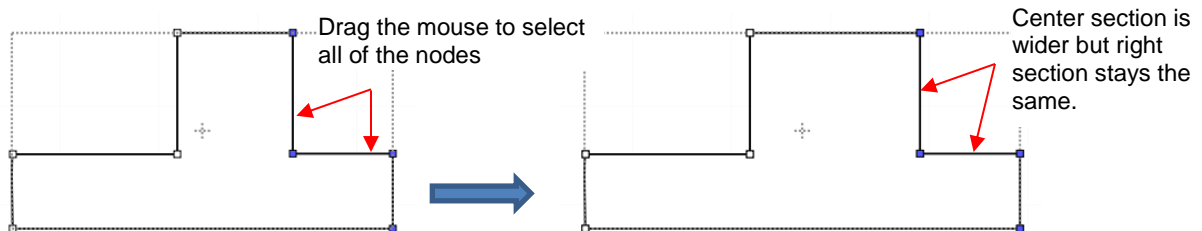
- ◇ You can now use the arrow keys on your keyboard to move that path. Holding the **Shift** key while clicking on an arrow key will move it in larger increments:



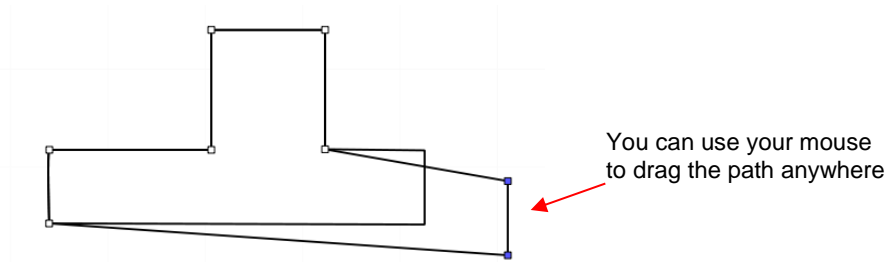
- ◇ If instead, the center section had been widened by selecting the path on its right side, then that would have resulted in shortening the section to the right of it:



- ◇ 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:

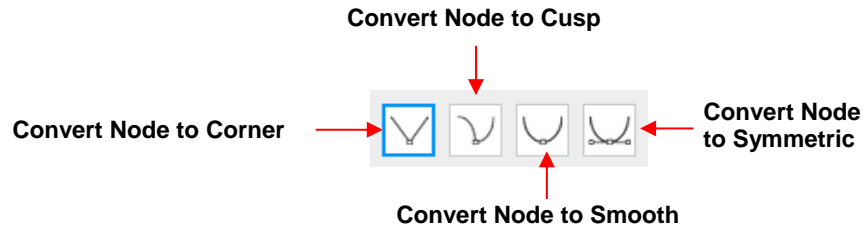


- One practical example of moving paths is in the resizing of boxes and envelopes where you need the overall dimensions of the final project to be different but you do not want to change the size/thickness of the flaps.

### 8.10.2 Reshaping a Path

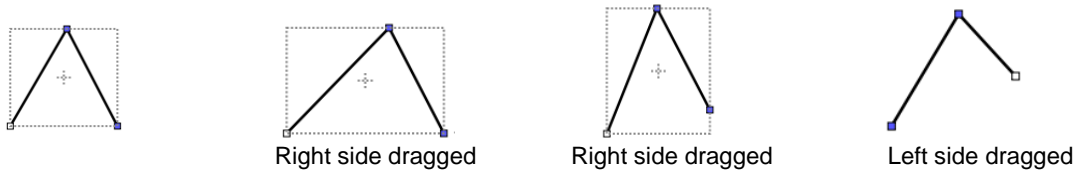
- With the **Shape Tool** selected, you'll observe four icons in the **Tool Options**. The purpose of each option is to convert one or more selected nodes to that type of node:



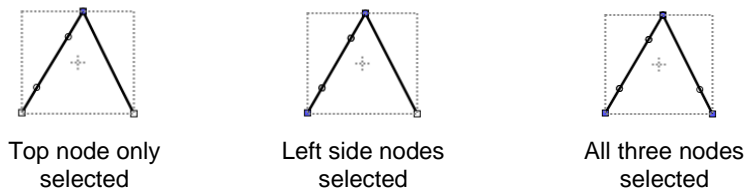


- One or more nodes are highlighted and then the appropriate icon selected. These same four functions can also be accessed by right-clicking and selecting **Path>Convert Node to**.
- To illustrate each one of these options, a simple path with a sharp corner will be used. This shape is already in **Corner 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.

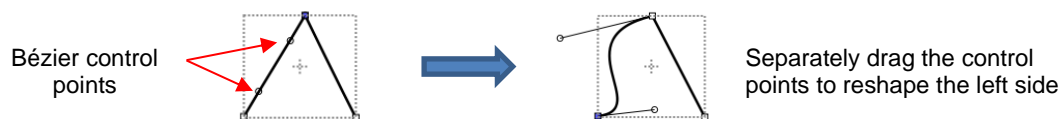
- ◇ **Corner Nodes:** These are the nodes that make up straight-line shapes such as rectangles, squares, triangles, stars, etc. Once selected, the shape will appear as below and either path can be moved as was demonstrated in the prior *Section 8.10.1*.



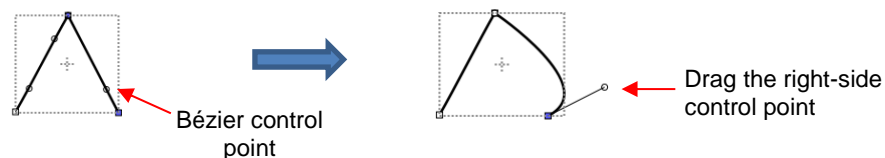
- ◇ **Cusp Nodes:** In this mode the Bézier control points appear and can be moved independently. First note how the paths appear when in this mode, depending on how many of the adjacent nodes are selected:



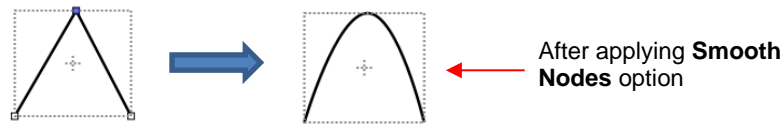
- The dots along the path are Bézier control points which are not linked to one another. You can freely drag either or both to create curves:



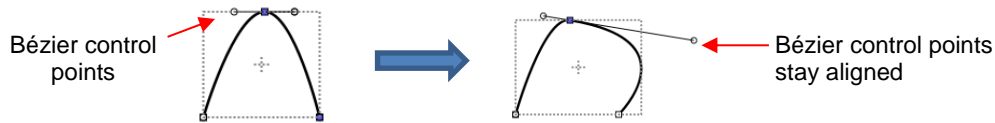
- In the case where there is a single Bézier control point on the right side, you can again drag the control point to create a curve:



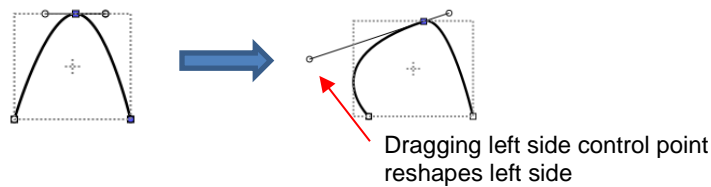
- ◇ **Smooth Nodes:** In this mode the Bézier control points always stay in a straight line. Notice that when you convert to **Smooth Nodes**, the shape immediately forms a curve:




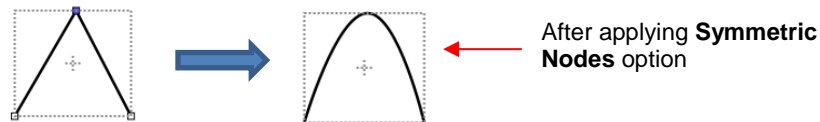
- When the newly formed shape is selected again, the Bézier control points appear in a straight line. If you move one, the other will move as well, in order to maintain that straight line:



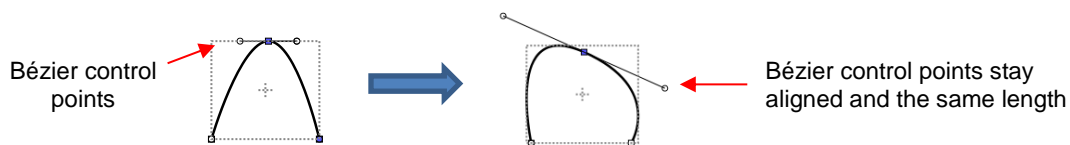
- The left side Bézier control point controls the curve on the left side. Thus, if it had been moved instead this would have resulted:



- ◇  **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:

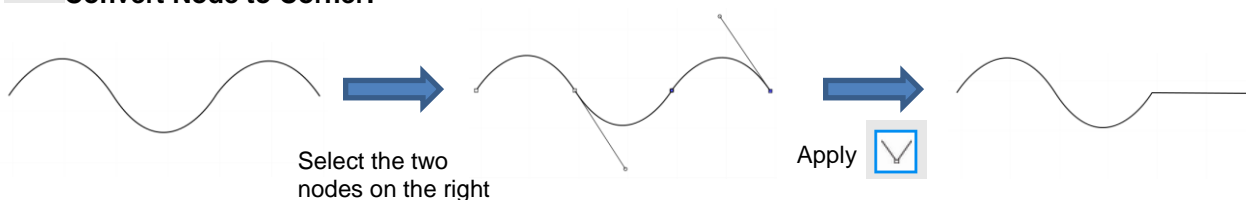


- When the newly formed shape is selected again, the Bézier control points appear in a straight line and the image appears the same as with **Smooth Node** status. However, when you now move one control point, the other will not only maintain that straight line, but also the same length. And the curves on both sides of the selected node will change:



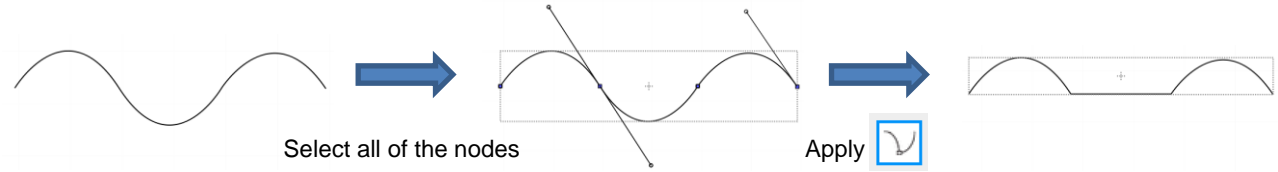
- To further illustrate these options, marquee-select a group of nodes to select more than one path and then click on whichever option you want to apply. The following examples show what occurs when the first two options are applied to curves and the last two options are applied to straight lines:

#### **Convert Node to Corner:**

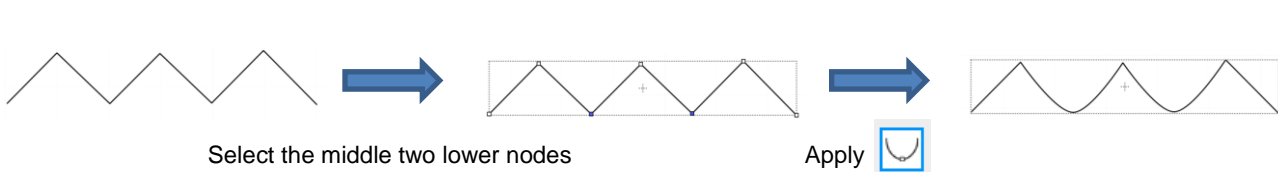




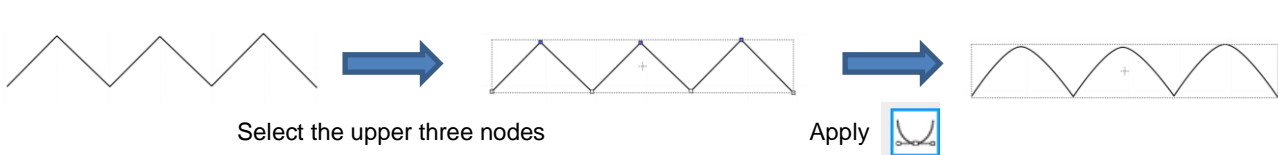
### Convert Node to Cusp:



### Convert Node to Smooth:

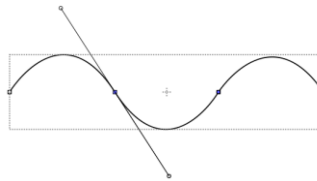


### Convert Node to Symmetric:

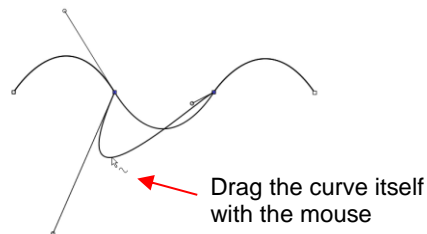


- As was shown in *Section 7.05.3*, you can also drag the path itself to reshape it, if one of the nodes has been converted to **Cusp**, **Smooth**, or **Symmetric**. For example:

- ◇ The following curve has the lower path selected and the option marked:

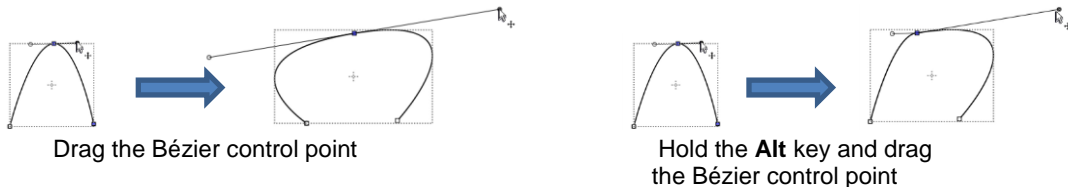


- ◇ The path can now be dragged with the mouse:



- 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:




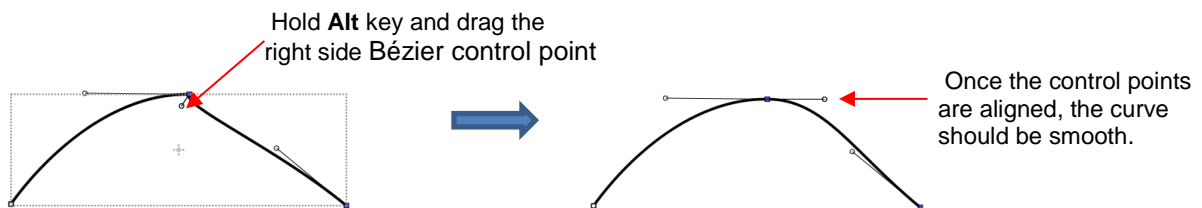
### 8.10.3 Examples of Smoothing Curves


- The last method shown in the prior section can be used to correct kinks in what should be a smooth curve.

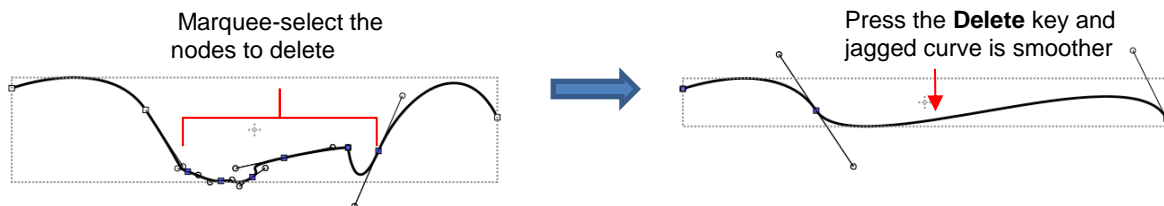
◇ For example, let's say you want to make the following shape have a nice smooth curve:



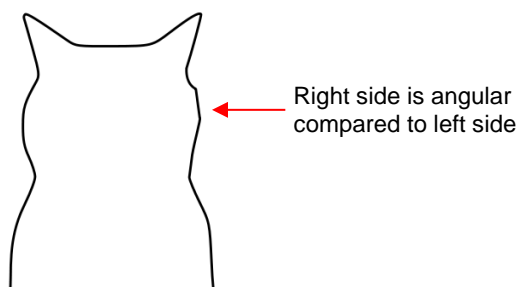
- ◇ Using the **Shape Tool**, click on the curve to reveal the node. Then click on the third icon , if needed, so that option will be highlighted. Hold the **Alt** key and drag the Bezier control point that's closest to the curve needing adjustment until the two control points are in a straight line:



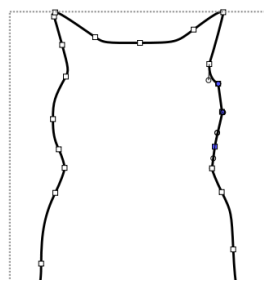
- In *Section 7.04.1*, you were shown how to add or delete nodes while in the **Draw Tool**  mode. Any time you want to add nodes to an existing path, you will need to be in this mode. However, you can delete nodes while in the **Shape Tool** mode. Select a node or marquee-select a group of nodes and press the **Delete** key on your keyboard:



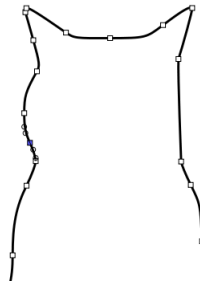
- Based on such a drastic change, it's worth noting that deleting smaller numbers of nodes at a time is usually advisable to avoid losing the original structure of the shape.
- ◇ As a practical example, here is a traced image of a cat. Note the right side of the cat's head is not smooth and rounded like the left side:



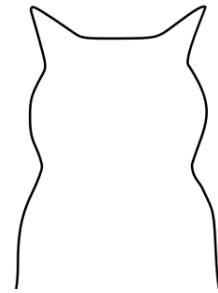
- Using the **Shape Tool**, the nodes causing the angular shape are marquee-selected and deleted. Then the path is reshaped:



**Shape Tool** shows nodes causing angular shape



After deleting the nodes, the right side is flat



After reshaping the line into a curve

## 8.10.4 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 7.05*, 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.

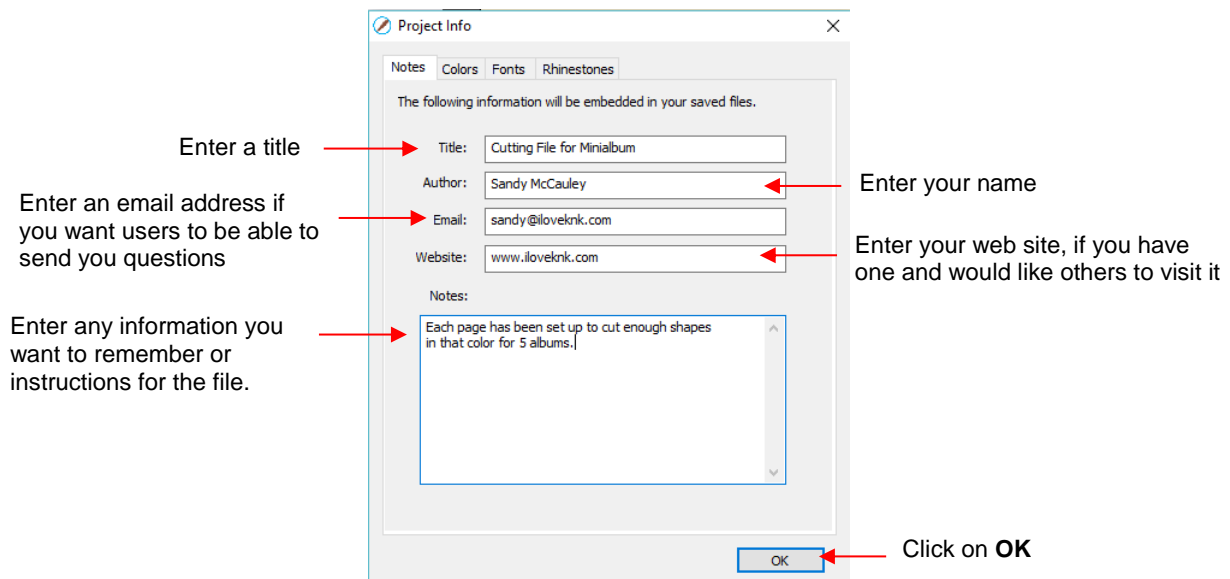
## 9. SCAL: Designing

### 9.01 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!

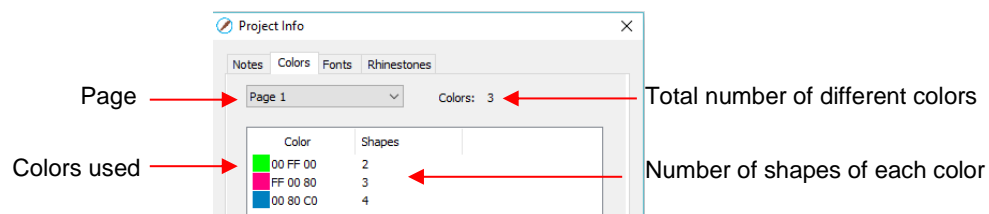
### 9.02 Project Info

- 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:

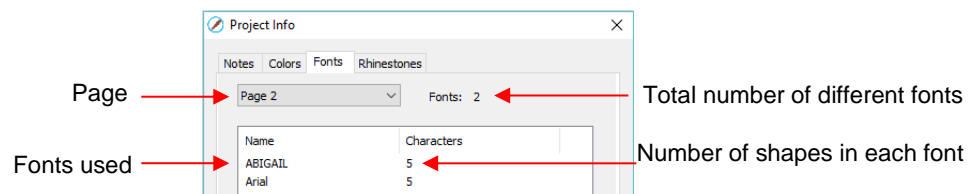


- Note the other tabs in this window: **Colors**, **Fonts**, and **Rhinestones**. These do not require your input. Instead, they automatically track, by **Page**, those elements that are currently present in the file. For example:

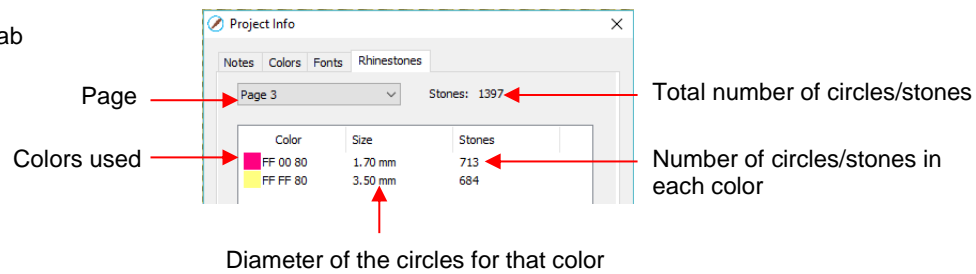
#### **Colors Tab**



#### **Fonts Tab**




## 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 dropdown menu.

## 9.03 Basic Shapes

- The **Tools Panel** has access to the following basic shapes: **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.

### 9.03.1 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

### 9.03.2 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:

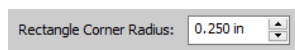


Freely dragging mouse



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



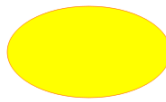
Radius: 0.25



Radius: 0.75

### 9.03.3 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:



Freely dragging mouse



Holding **Shift** key

### 9.03.4 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 with equal height and width:



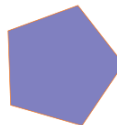
Freely dragging mouse



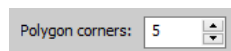
Holding **Shift** key

### 9.03.5 Polygon

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



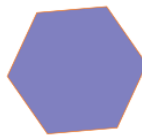
- In the **Tool Options**, a **Polygon corners** setting will appear:



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



Polygon corners: 3



Polygon corners: 6



Polygon corners: 10

### 9.03.6 Star

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





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



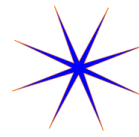
- ◊ The **Star points** setting can be used to change the number of points on the star. The **Inner radius** setting can be used to change the angle of the inner points:



5 Points  
Radius: 38%



4 Points,  
Radius: 47%



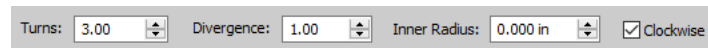
8 Points  
Radius: 10%

### **9.03.7 Spiral**

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



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



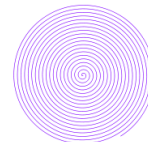
- ◊ **Turns:** Number of rotations around the center:



Turns: 3



Turns: 6



Turns: 20

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



Divergence: 1



Divergence: 3

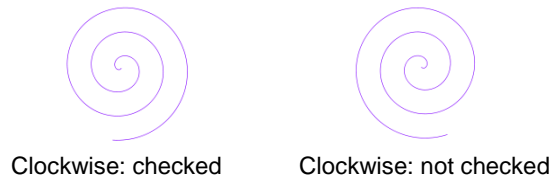


Divergence: 0.5

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

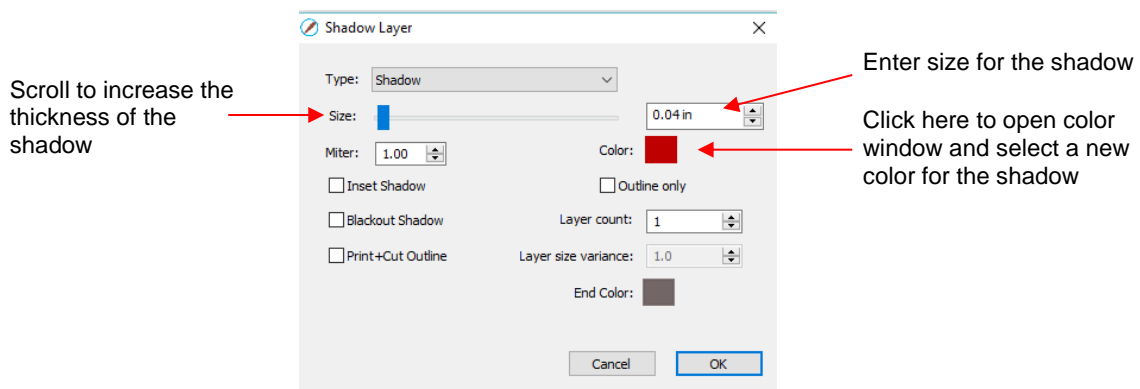


- ◇ **Clockwise:** Whether spiral rotates clockwise or counter-clockwise from center:



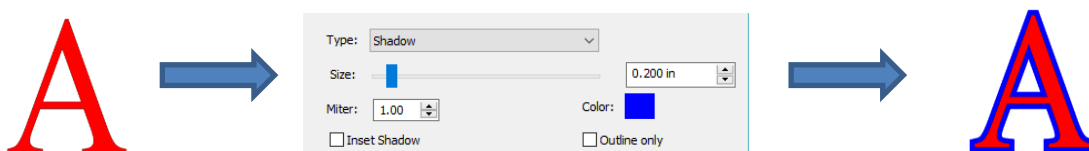
## 9.04 Shadow Layer

- 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:

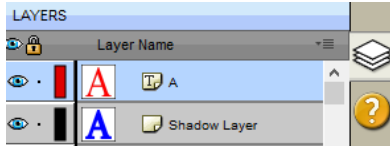


### 9.04.1 Shadow Layer Settings

- 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 color window where a new color can be selected.
- As an example, an uppercase Times New Roman “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 5.14*). 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.

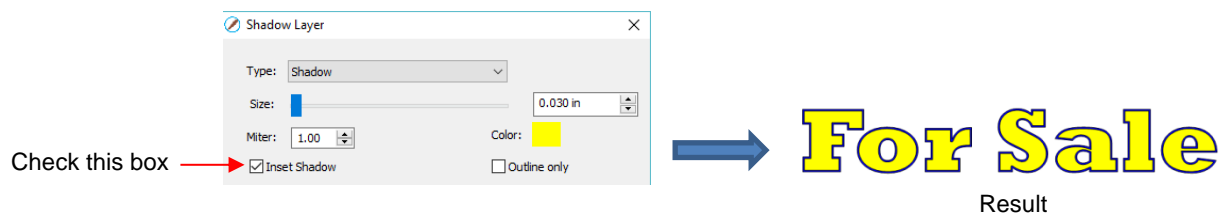
- ◇ For example, let's say you are going to create a two-color vinyl sign that says "For Sale":

**For Sale**

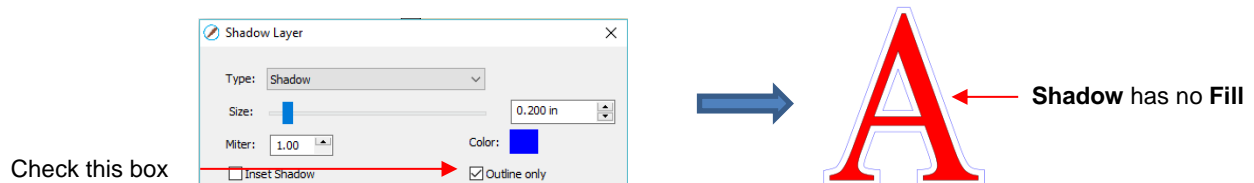
- ◇ If a normal **Shadow** is used to create the second layer, the letters will automatically be welded because of their proximity to one another. This may not be suitable for your application:

**For Sale**

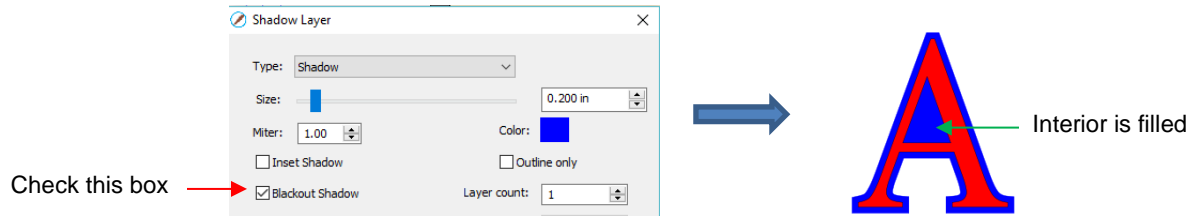
- ◇ Instead, create an **Inset Shadow** by checking the **Inset Shadow** option:



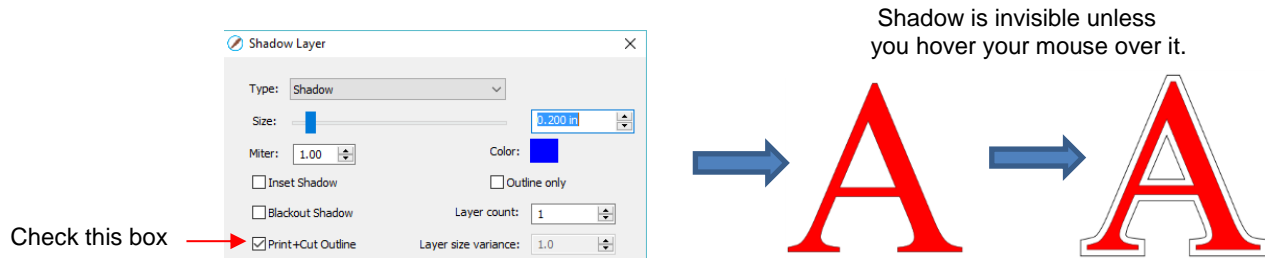
- **Outline only** can be checked to set the **Fill** on the shadow to **None**. The **Stroke** color will be whatever is indicated next to **Color**:



- **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:

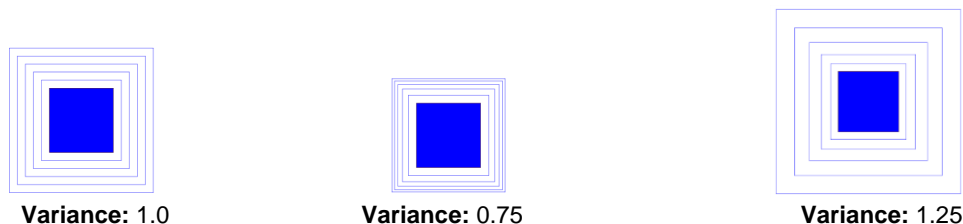
- Add a contour cut around a printed shape
- Cut just inside the boundaries of a printed image (in this case you also use the **Inset Shadow** option)

- **Layer** settings: There are three additional settings in the **Shadow Layer** window used to create multiple shadows on a shape:

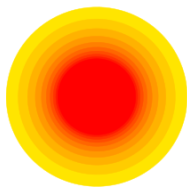
◇ **Layer count:** Total number of shadow layers to be created

◇ **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 smaller 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:



◇ **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:

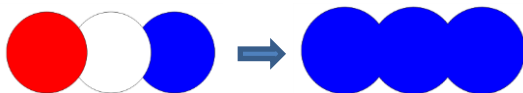


## 9.05 Boolean Operations

- 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.

### 9.05.1 Union

- 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:

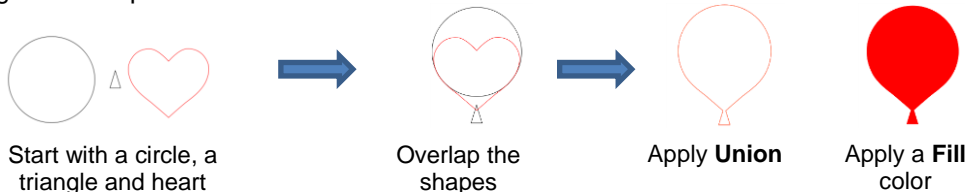


With a **Fill** color: before and after **Union**



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 6.07 – 6.09* 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

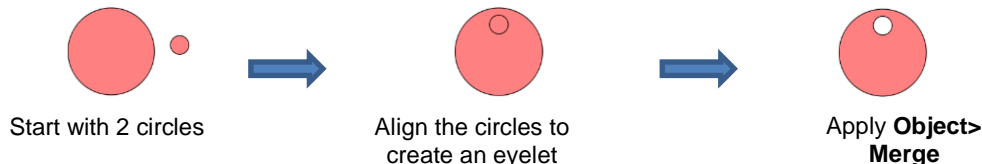
Overlap the shapes

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:

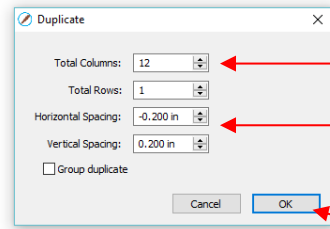
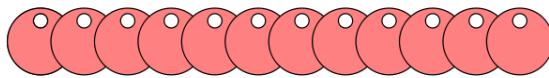


Start with 2 circles

Align the circles to create an eyelet

Apply **Object>Merge**

- ◇ Select this new shape and use **Object>Duplicate** to open the **Duplicate** window:



Increase **Total Columns**

Use a negative **Horizontal Spacing** to overlap the shapes.

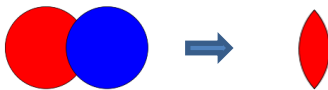
Click on **OK**

- ◇ Add a long rectangle and align with the pattern of circles. Apply the **Union** function:



### 9.05.2 Intersection

- 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**

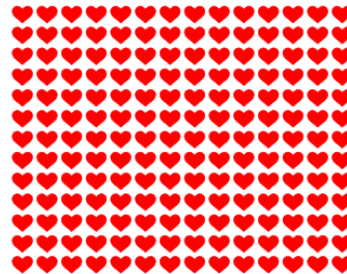


With no **Fill**: before and after **Intersection**

- 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:

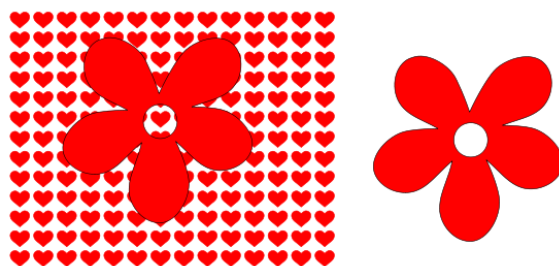


A heart from the **Library's Basic Shapes** folder



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**:

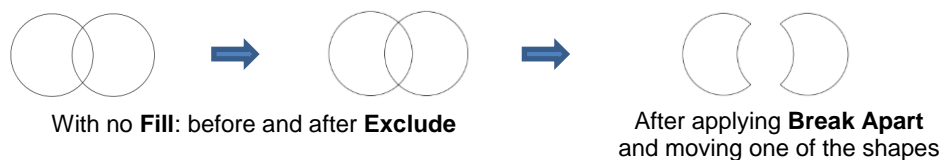
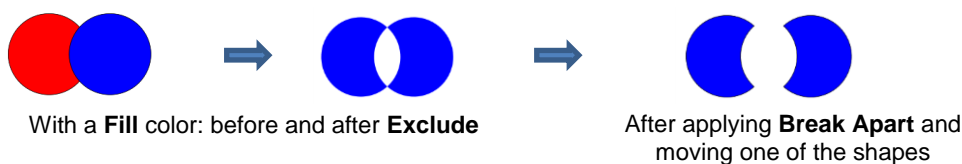


- ◇ Recolor the spare flower with a white **Fill** and a red **Stroke**. Then center the pattern with the spare flower. Perfect for a print and cut!



### **9.05.3 Exclude**

- 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 9.03.2*):



- ◇ Add the pattern from *Section 9.05.2*, without the spare flower shape. Arrange the pattern so that it will cut from the front of the card:

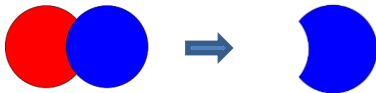


- ◇ Select the card and pattern and apply **Path>Exclude**:

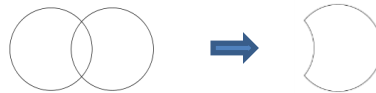


#### **9.05.4 Front Minus Back**

- 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**
- An example involves adding the word HELLO to the card designed in *Section 9.05.3*.
  - ◇ Select a font and type out the letters. Add a rectangle 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 filled with color:



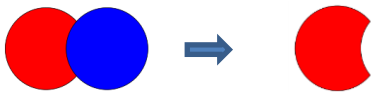


- ◇ Arrange the greeting on the front of the card designed in *Section 9.05.3*. Select both and apply either **Object>Merge** or **Path>Exclude** so that all internal shapes are cut before the outside card base:

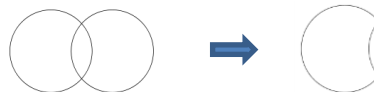


### **9.05.5 Back Minus Front**

- 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**

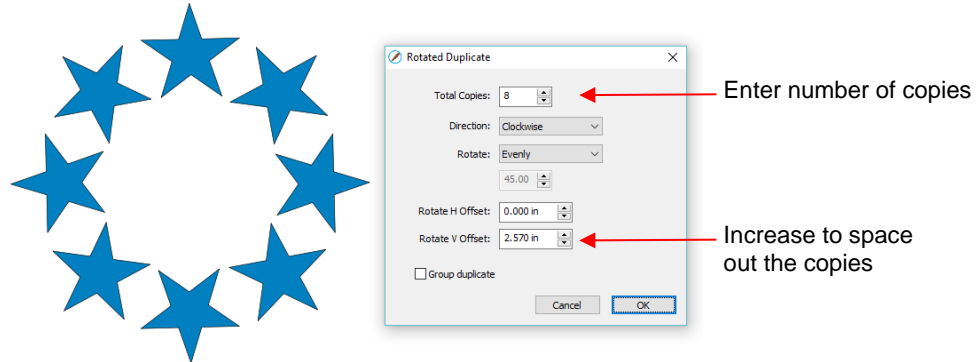
- To apply this operation, select two shapes and use one of the following
  - ◇ Go to **Path>Back Minus Front**
  - ◇ Right-click and select **Back Minus Front**
- Any examples for **Back Minus Front** are essentially the same as for **Front Minus Back**. When choosing which to use, just check the screen 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. ☺

## **9.06 Duplicate Rotated**

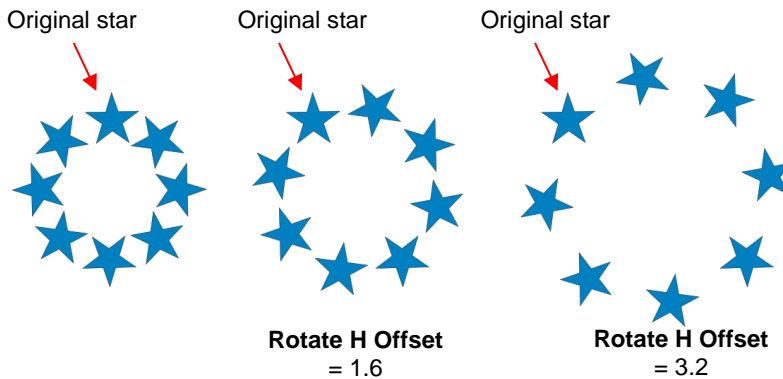
### **Video**

### **9.06.1 Duplicate Rotated Settings**

- 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:



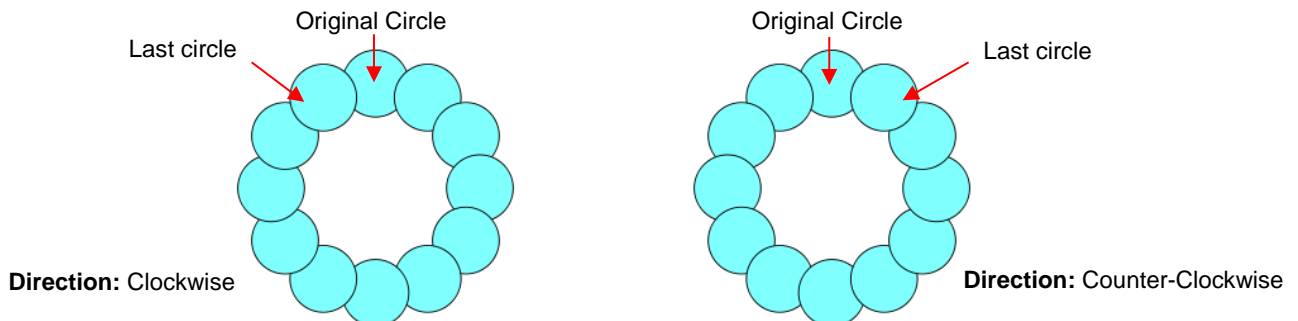
- ◇ Start by increasing the number of copies. If the shapes are overlapping too much, increase **Rotate V Offset** which is the distance from the center. Increasing the **Rotate H Offset** setting shifts the center of rotation toward the right:



- ◇ 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.

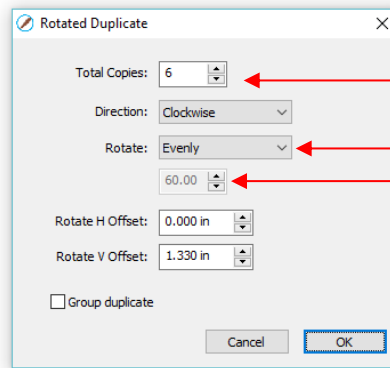
- ◇ With clockwise selected, the order of the shapes follows a clockwise progression so that the last copy is just to the left of the original at the top. The opposite is true if counter-clockwise is selected:



- ◇ Does it matter which **Direction** is used? Most likely, only if you need it for display purposes.

- **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:

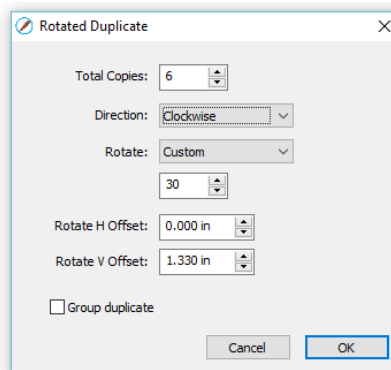


Set the desired total

Start with **Evenly**

Note this value

- ◇ 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:



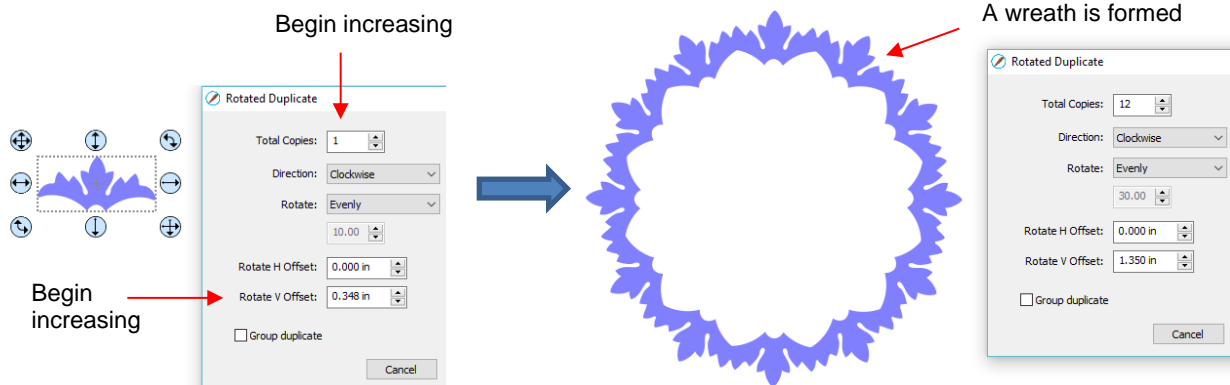
- ◇ If you want the shapes to be grouped, mark the **Group duplicate** box. Otherwise leave it unchecked.

## 9.06.2 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.



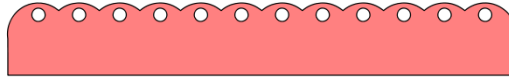
- Select and go to **Object>Duplicate Rotated**. Begin increasing **Total Copies** and the **Rotate V Offset** until a desired overlapping pattern is obtained:



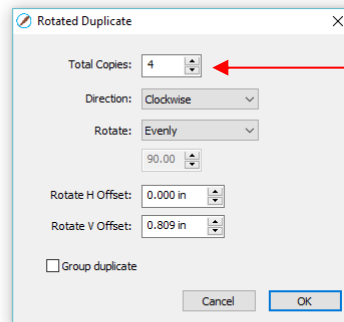
- After creating the pattern, go to **Path>Union** to remove the overlap and the shape is ready to cut.

### 9.06.3 Using Duplicate Rotated to Design a Frame

- In *Section 9.05.1*, the **Duplicate** and **Union** functions were used to create this scalloped border:

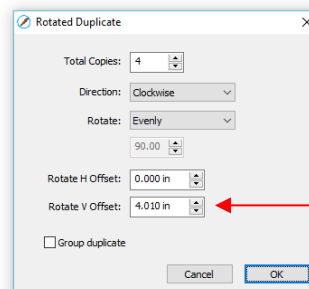
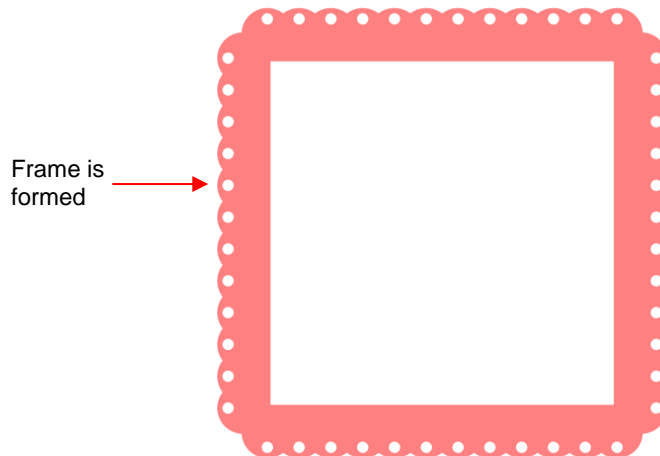


- Select the shape, go to **Object>Duplicate Rotated**, and enter 4 for **Total Copies**:



Set **Total Copies** to 4

- Begin increasing the **Offsets** until the four corners overlap evenly:



Increase **V Offset** until the four corners look perfect

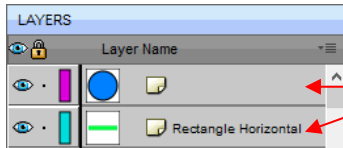
- Click on **OK** and then apply **Path>Union**.

### 9.07 Object on Path

- The **Object on Path** function can be used to align repeats of a shape along the path of another shape:

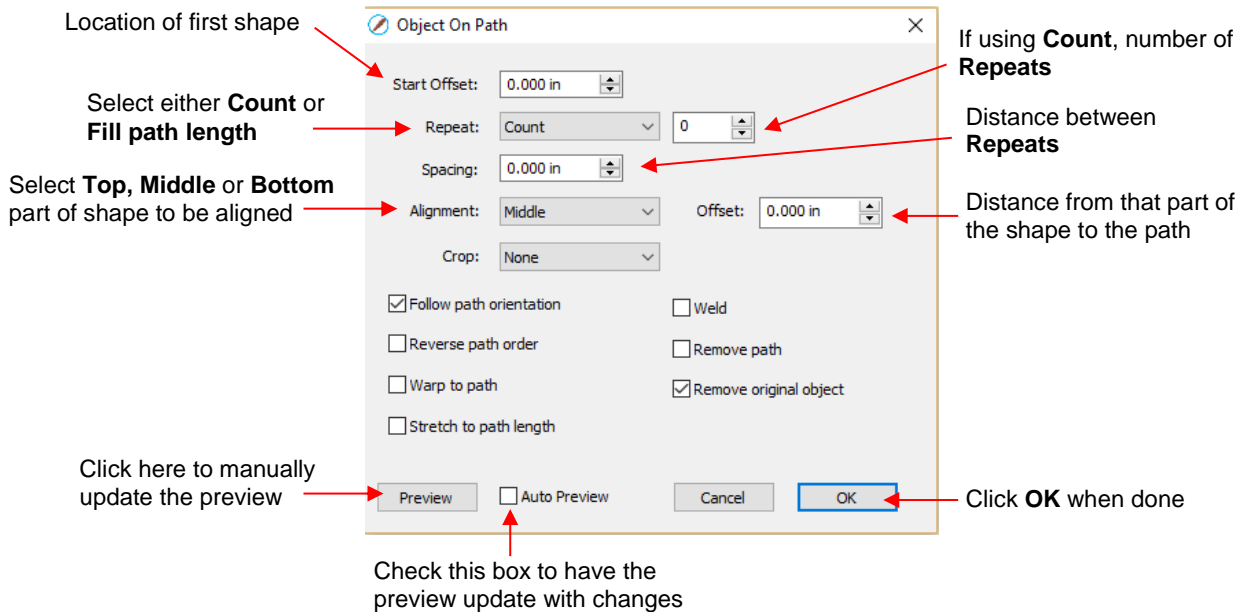


- IMPORTANT:** Before applying the function, check the **Layers Panel** to make sure the shape to be repeated is on a higher layer than the path:

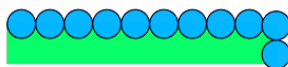


Shape to be repeated should be above the path shape

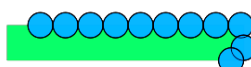
- To open the **Object on Path** window, select both the path and the shape to be repeated and go to **Effects>Object on Path**. Because there are so many settings in this window, only about half will be explained at this point:



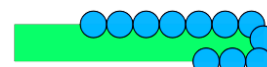
- ◇ **Start Offset:** This is the distance from the left side of the path to the location of the first shape:



Start Offset = 0

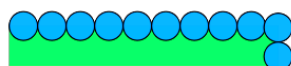


Start Offset = 0.5"

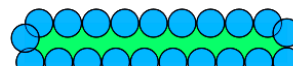


Start Offset = 1.5"

- ◇ **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:

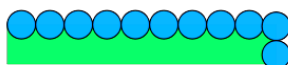


Repeats: Count 10

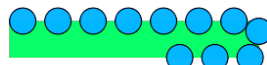


Repeats: Fill path length

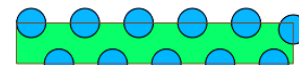
- ◇ **Spacing:** Enter the desired spacing between repeats:



Spacing = 0

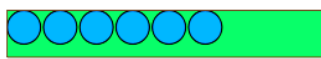


Spacing = 0.2"

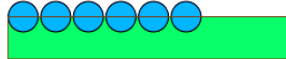


Spacing = 0.5"

- ◇ **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

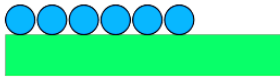


Alignment: Middle



Alignment: Bottom

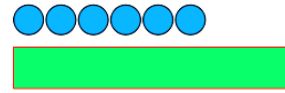
- ◇ **Offset:** This is how far from the path the repeats will be positioned. For example, if you choose **Bottom** for **Alignment** and then 0.15" or 0.25" for **Offset**, then the top of the shapes will be 0.15" or 0.25" above the path:



Offset = 0



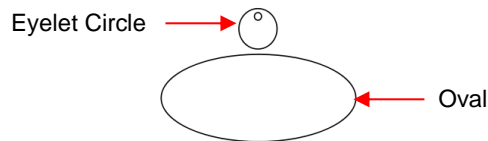
Offset = 0.15"



Offset = 0.25"

### 9.07.1 Designing a Scalloped Oval

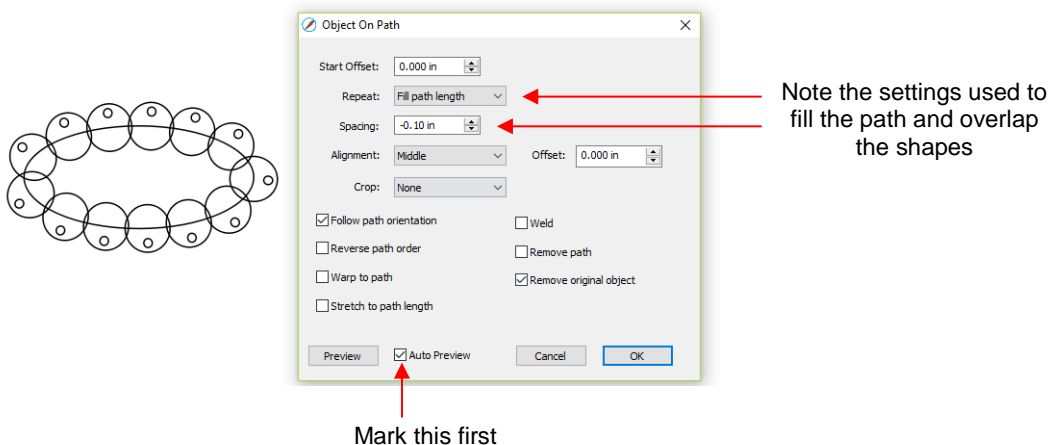
- Create an eyelet circle as described in *Section 9.05.1*. Add an oval from the **Library's Basic Shapes** and resize both shapes as shown in the following screenshot:



- Before using the **Object on Path** function, make sure the eyelet shape is above the oval path on the **Layers Panel**:

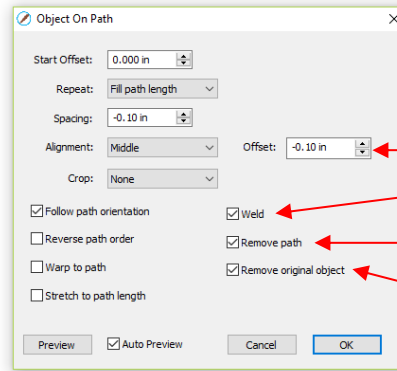
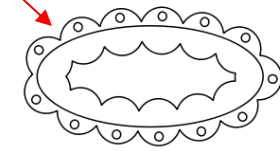


- Select the shapes and open the **Object on Path** window using **Effects>Object on Path**. Begin by marking the **Auto Preview** option so that all changes will be immediately reflected. Then choose **Fill path length** so the shapes will be distributed over the entire path. Set the **Spacing** to a negative number so that the shapes will overlap:



- Next the **Offset** is 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

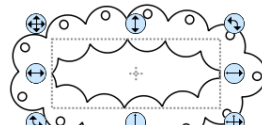
Removes original path

Removes original shape

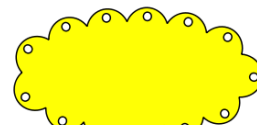
- ◇ **Weld:** Mark this box if you want the shapes welded together, as shown in the screenshot.
- ◇ **Remove path:** Choose if you will no longer need the path shape (in this case, the oval)
- ◇ **Remove original object:** Choose if you will no longer need the original shape (in this case, the eyelet 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**:



After clicking on **OK**



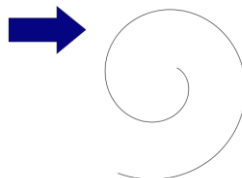
After applying **Break Apart**, select inner scallop



After deleting inner scallop, apply **Merge** and a **Fill**

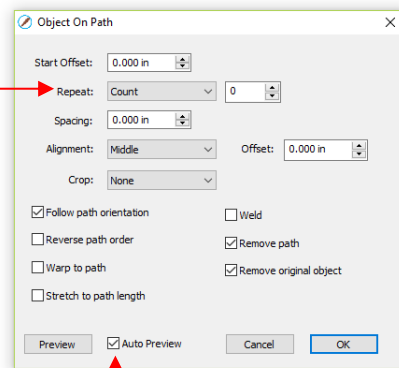
### 9.07.2 Warp a Shape to a Path

- 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 9.03.7*):

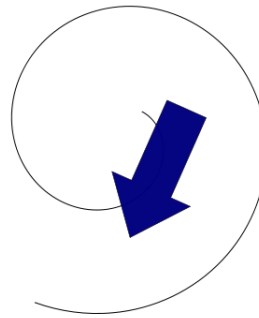


- Verify that the arrow is above the spiral on the **Layers Panel**. Then select both and go to **Effects>Object on Path**. Note that since there is only one shape involved, **Repeat** is left at **Count** and set to 0:

**Repeat** is set to **Count**  
but the number of  
repeats is set at 0

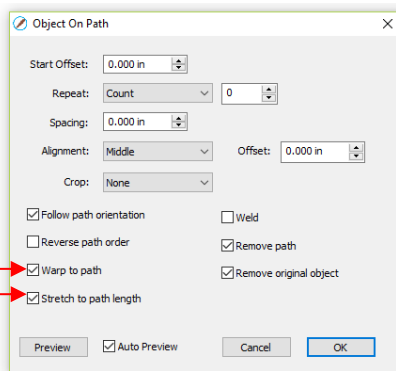


Mark this first



Original arrow appears  
positioned at start of  
spiral

- Next, two new settings are applied:

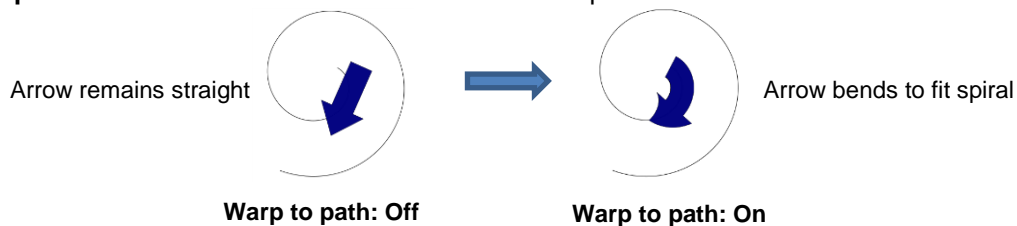


Mark these two  
options

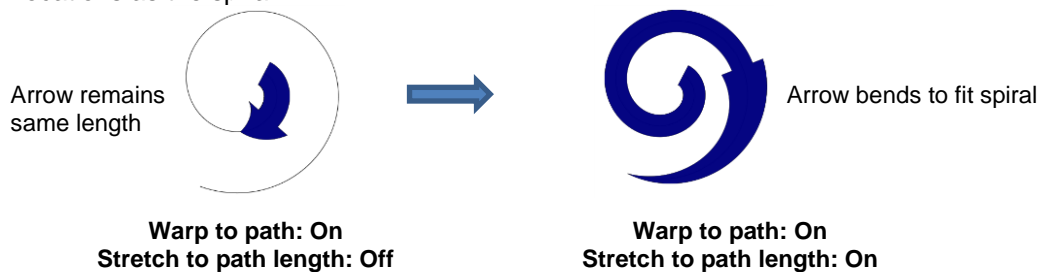


Arrow is now curved and  
stretched to fit the spiral

- ◇ **Warp to path:** causes the arrow to bend/curve to fit the spiral:



- ◇ **Stretch to path length:** causes the arrow to be elongated so that it starts and ends at the same locations as the spiral:

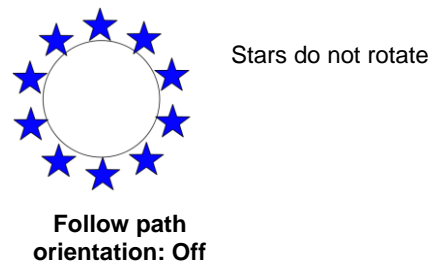
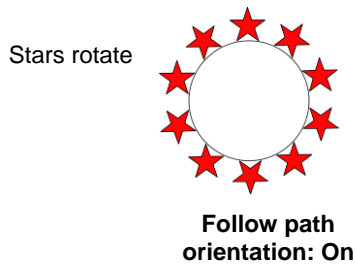


### 9.07.3 Remaining Settings

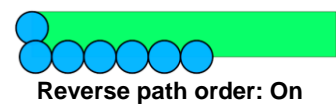
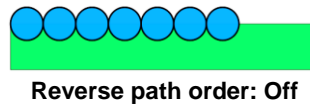
- The two remaining settings in the **Object On Path** window are:



- ◇ **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:

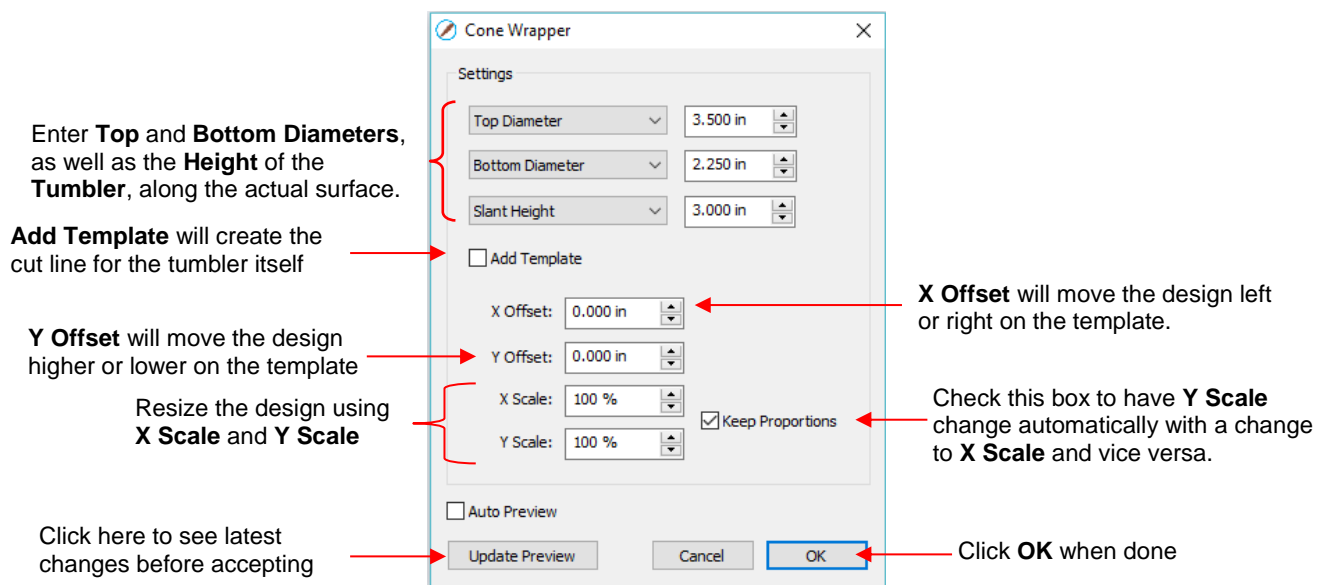


## 9.08 Wrapper

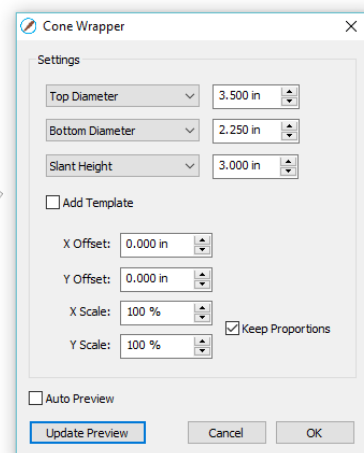
- The **Wrapper** feature can be used for shaping designs to fit around conical shapes in which the top is a different diameter than the bottom. Some typical applications include tumblers and cupcake wrappers.
- This function can be accessed by selecting one or more shapes and going to **Effects>Wrapper**. For this example, the following design was created with the intention of having it applied to a small cup:



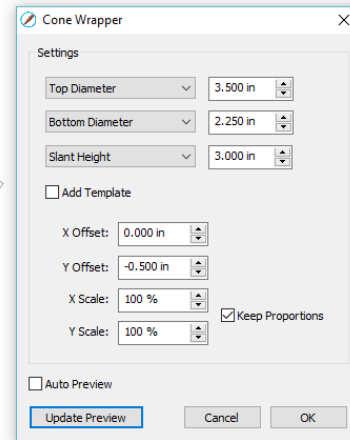
- Select the design and go to **Effects>Wrapper**. The following window will open:



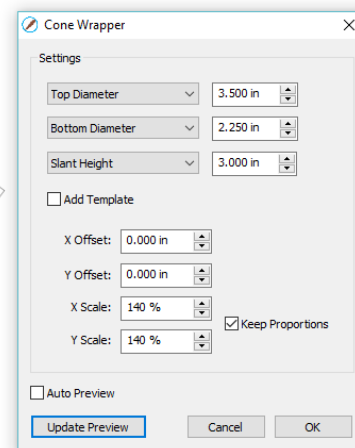
- ◇ Measure the cup: **Top Diameter**, **Bottom Diameter** and along the side from bottom to top (**Slant Height**). Enter those as shown in the screenshot. Alternatively, you can measure the radius or the circumference, as well as use the vertical height versus the horizontal height. These other choices 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 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** negative 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:



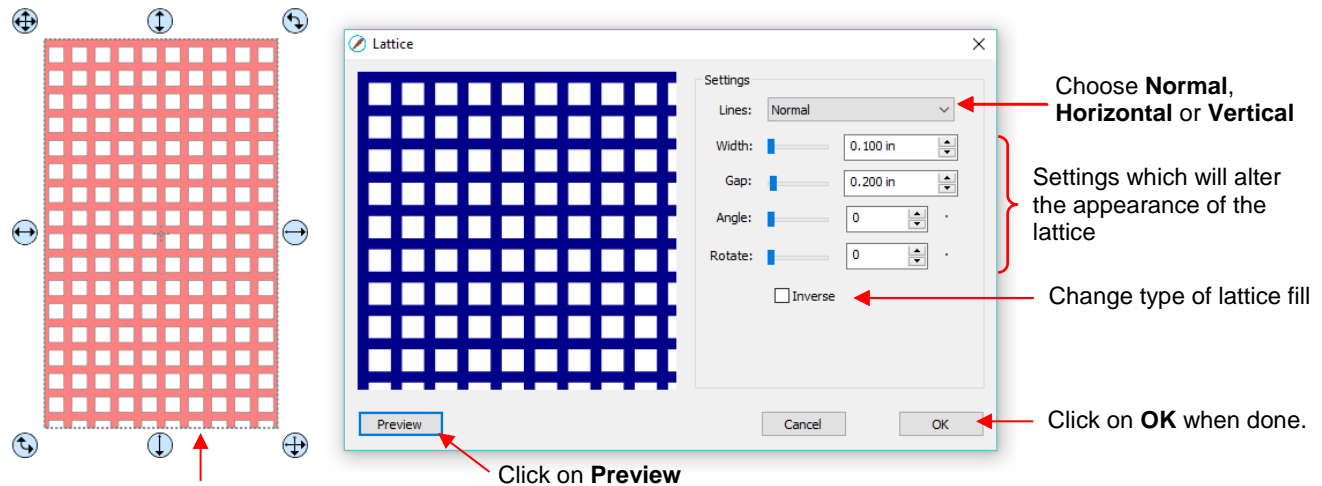
- ◇ Remember to click on **Update Preview** after each change in the settings. **Auto Preview** doesn't currently work.
- After clicking on **OK**, the fill color returns to the design and the project is ready for completion:



## 9.09 Lattice

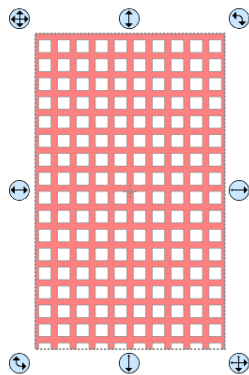
- The **Lattice** feature can be used to create a lattice design within a shape or as part of the shape itself. To access this feature, select one or more shapes and then use either of the following:
  - ◇ Go to **Effects>Lattice**
  - ◇ Right-click and select **Appearance>Lattice**

- In this example, a rectangle is used to show the effects of the settings in the **Lattice** window:

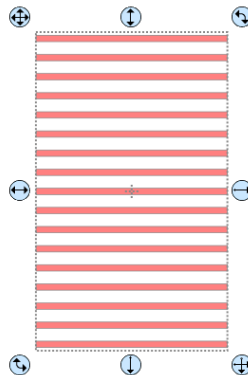


After clicking on **Preview**, selected shape will display lattice based on current settings

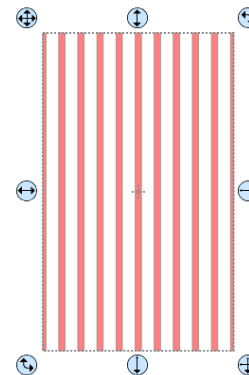
- ◇ **Lines:** Besides the traditional crisscross pattern, you can also choose to only have horizontal lines or only have vertical lines:



**Lines:** Normal

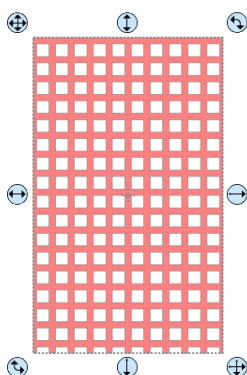


**Lines:** Horizontal Only

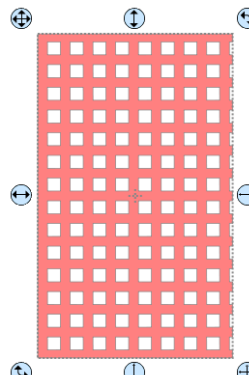


**Lines:** Vertical Only

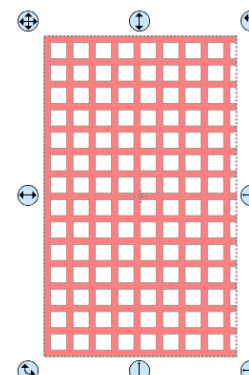
- ◇ Change **Width** and **Gap** to produce desired appearance. Remember that if the lattice pattern is too small, it might be difficult to cut:



**Width:** 0.1 in  
**Gap:** 0.2 in

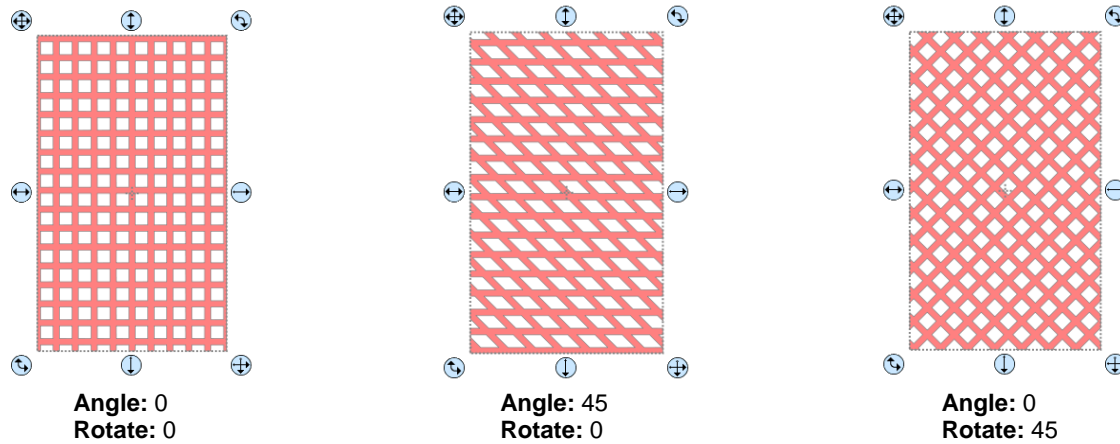


**Width:** 0.15 in  
**Gap:** 0.2 in

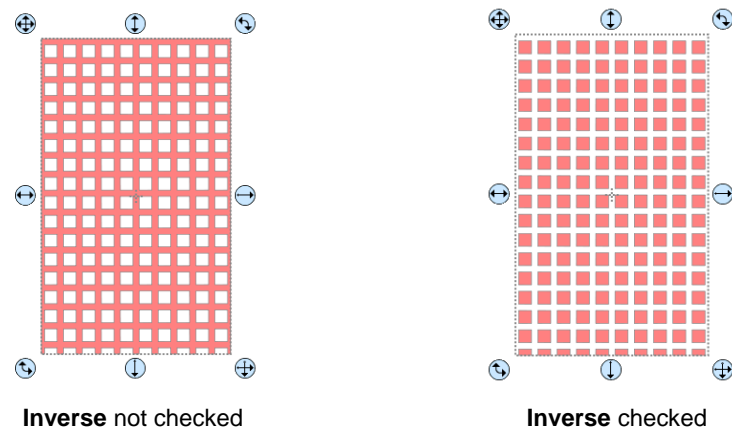


**Width:** 0.1 in  
**Gap:** 0.25 in

- ◇ The **Angle** setting will skew the lattice shape while the **Rotate** setting will simply rotate the overall pattern:

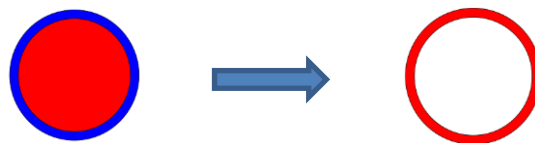


- ◇ **Inverse** is used to create a kind of negative lattice (an example will follow later in this section):

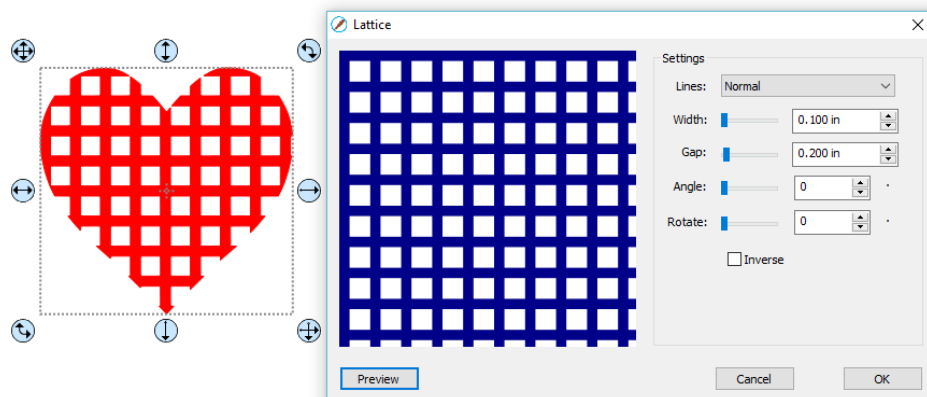


- An example of when **Inverse** would not be checked is when you want to attach/weld a latticed shape to something else. In the following example, a latticed heart is attached to the center of a ring:

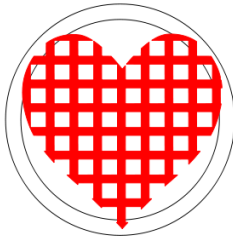
- ◇ A ring is created by applying **Object>Merge** to two centered circles:



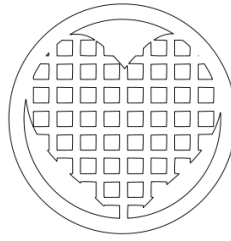
- ◇ Select a heart shape from the **Library** and apply **Effects>Lattice**:



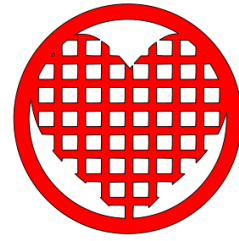
- ◇ Align the latticed heart in the center of the ring and weld using **Path>Union**:



Remove **Fill** from ring  
to make overlap easier  
to see



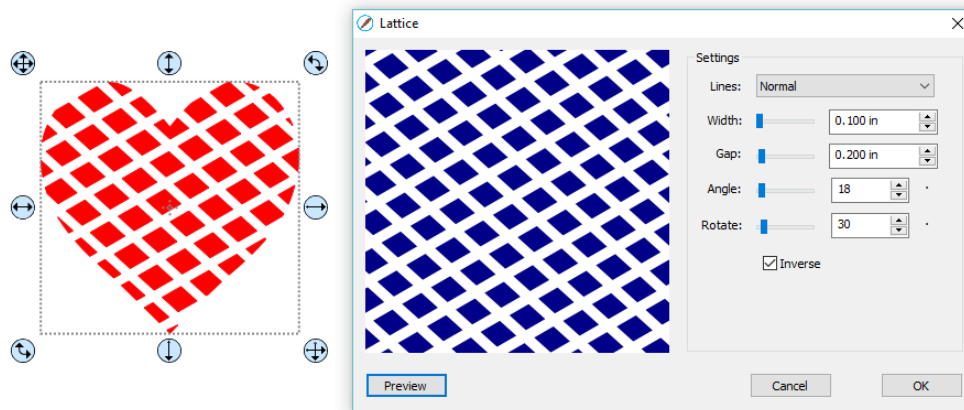
After applying  
**Path>Union**



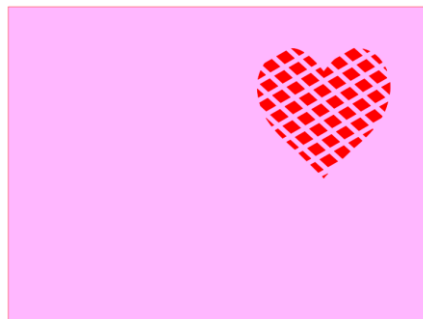
Set **Fill** to red again

- 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**.

## **9.10 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**

### **9.10.1 Guidelines for Rhinestone Pattern Design**

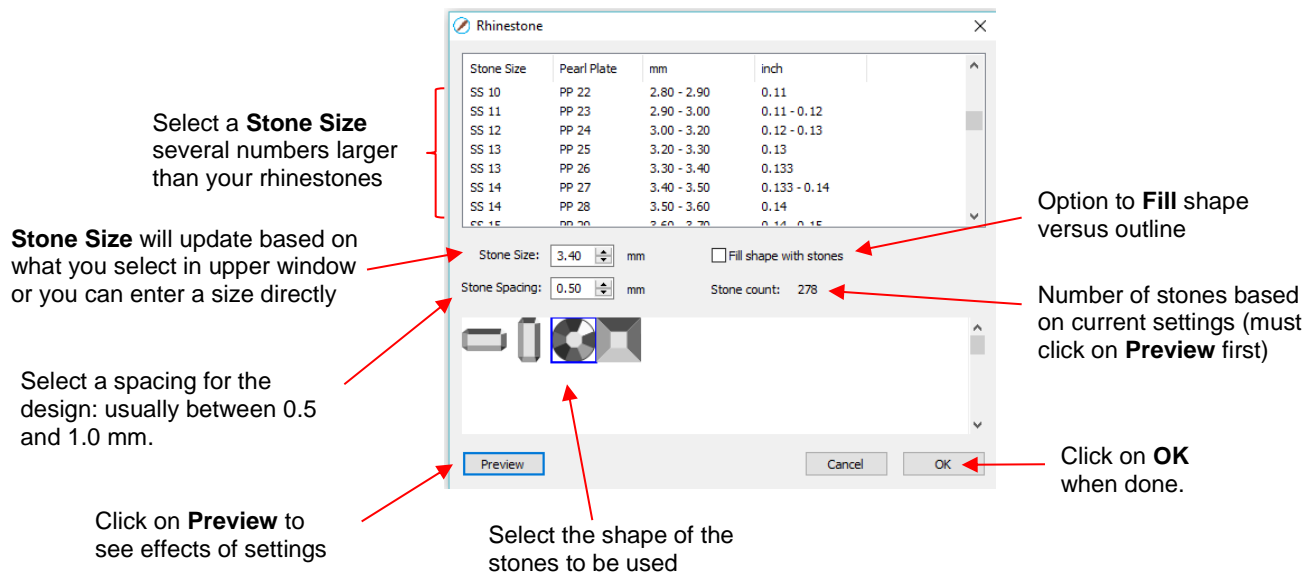
- There are some very specific guidelines to follow when designing a rhinestone pattern:
  - ◇ In general, you want to size the shape before applying the rhinestone circles. If you later want to resize the design, SCAL does have the ability to regenerate the rhinestone pattern, maintaining the original 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 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. If they cannot decipher your words, then try a more basic font.

### **9.10.2 Rhinestone Outline**

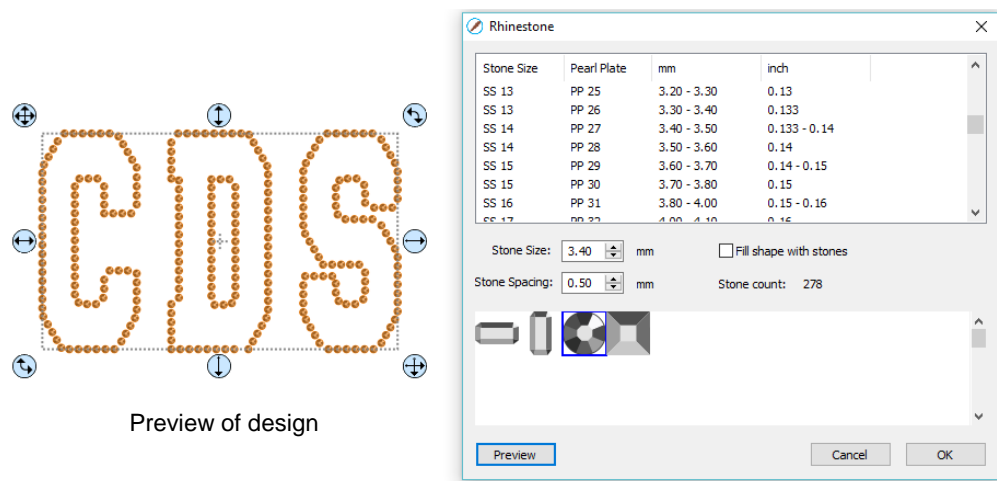
- In this example, the initials from a high school will be outlined. As mentioned previously, the first step is to size the width and height of the design. Make sure there is enough space between the letters so that the circles will not overlap. Also, you may want to resize the lettering vertically, 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**:



- After inputting the initial settings, click on **Preview** and your selected design will be outlined with simulated stones:

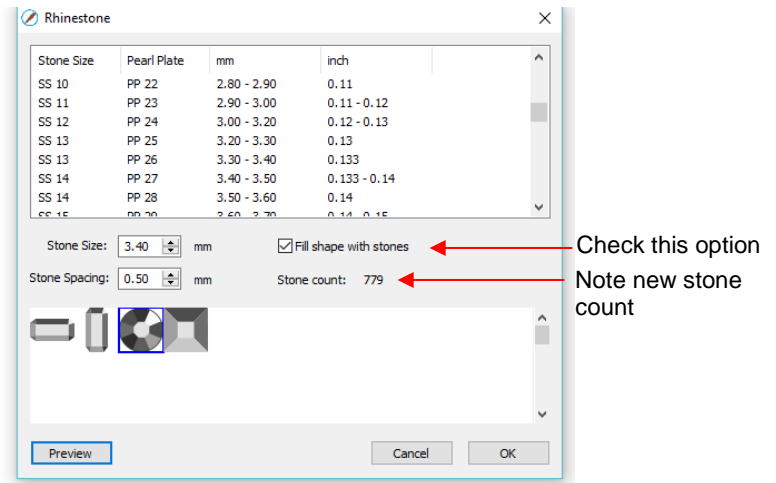
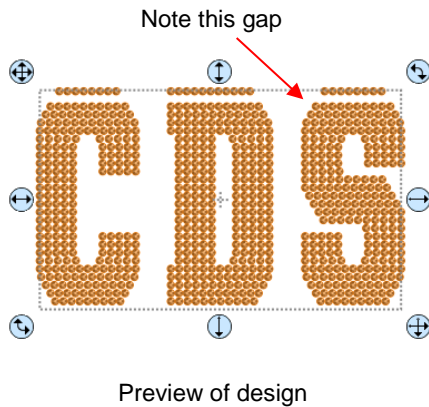


- During the editing process, the simulation will be lost. If you want to restore it, record your current settings before clicking on **OK**. For guidelines on editing, refer to *Section 9.10.4*.

### 9.10.3 Rhinestone Fill

- 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:

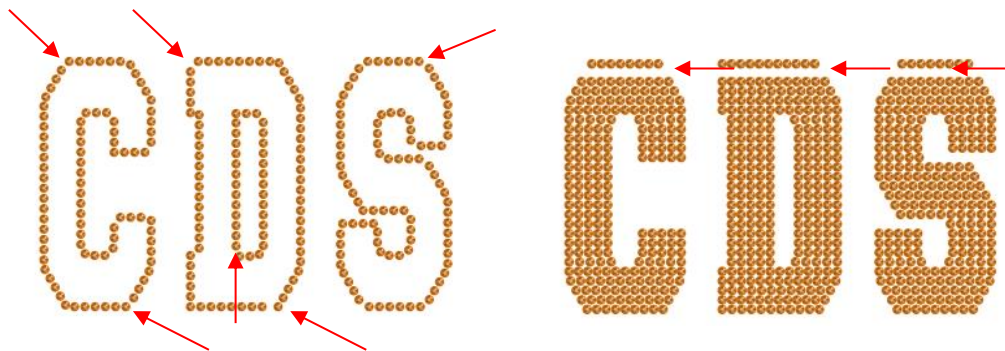




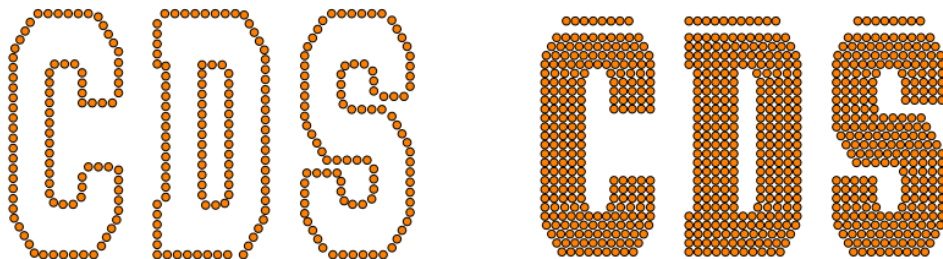
- The gap in the design is one of the inconsistencies that will sometimes occur with automatic fill algorithms. Thus, all rhinestone designs will need some editing as covered in *Section 9.10.4*. If you wish to restore the simulation after editing, be sure to record the settings you used before clicking on **OK**.
- 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.


#### 9.10.4 Editing Rhinestone Designs

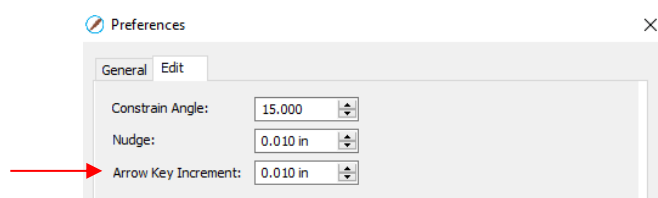
- Before editing, make a backup of the design created by the **Rhinestone** function. As was mentioned earlier you can resize rhinestone designs but if certain editing has occurred, you might or might not get the results you want after editing.
- Rhinestone designs typically will need “tweaking” which involves adding, deleting, moving, or re-spacing circles. Looking at the two designs created in the prior two subsections reveals some needed edits as indicated by the red arrows:



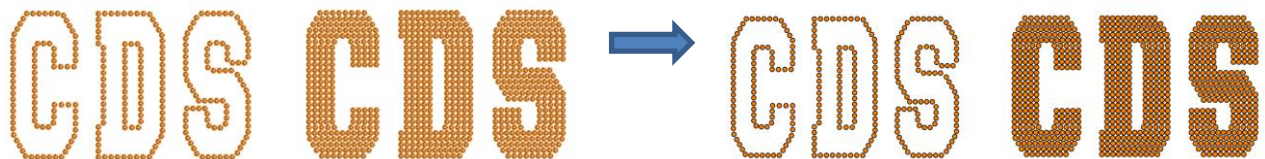
- The first step is to break the design so that individual circles can be moved. Select the pattern and apply **Object>Break Apart** or **Ctrl-B**. The simulation will vanish but this will be remedied:



- To restore the simulation, select the design and reopen the **Rhinestone** window. Enter the same original settings just used, including selecting the same stone again. 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 3.09*) to move in close for easier selection of individual or small groups of circles
  - ◇ Use the **Lasso Selection** tool  (*Section 5.01*) to more easily select a group of circles
  - ◇ To quickly add a circle, select one and then hold the **Alt** key while dragging a copy to its new location
  - ◇ To delete multiple circles, hold the **Delete** key while clicking on individual circles
  - ◇ Use the arrow keys on your keyboard to move a circle or row of circles in smaller increments. It's advisable to 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:

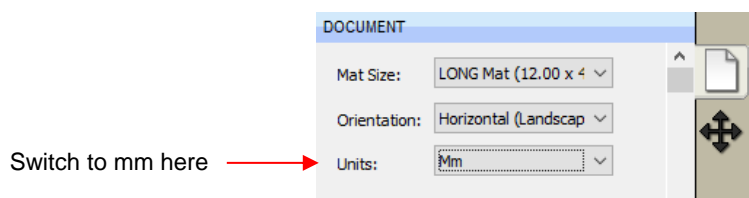


- ◇ To realign a row or column of circles, use the alignment functions covered in *Section 5.17.2*
- ◇ To respace a row or column of circles, use the spacing functions covered in *Section 5.18.2*
- Sometimes the circles you want to re-space equally may fall closer to a 45° angle versus vertically or 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**.

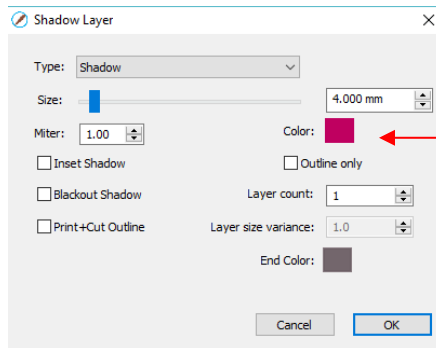


### 9.10.5 Additional Tips on Rhinestone Designing

- If you want to outline your design, then create the outline first using the **Shadow Layer** function (*Section 9.04*). 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 at least 3.9 mm. So, just to be safe, a **Shadow Size** of 4.0 mm will be entered:

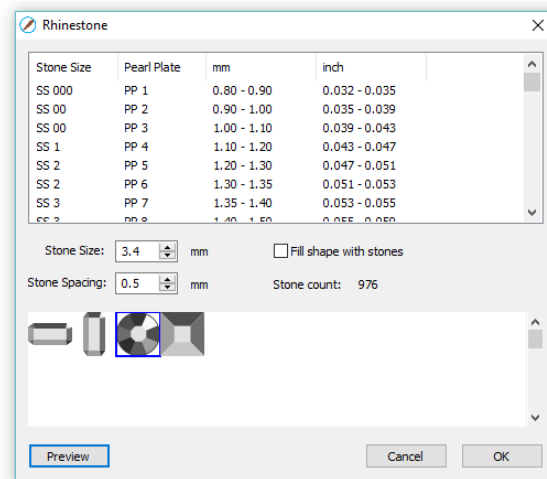
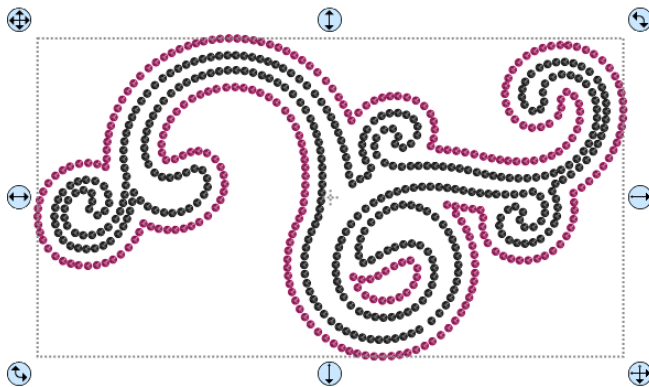


Enter **Shadow Size**

Select a color for the stones



- 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:



- After some minor tweaking the design is complete and ready to cut:



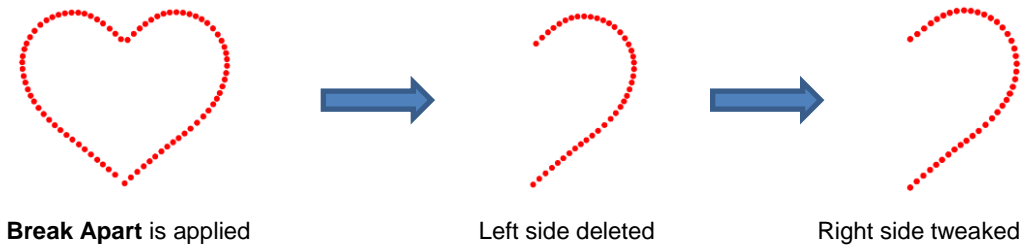
- With symmetrical rhinestone designs, consider using the following process to perfect your design:

◇ This heart outline is clearly not symmetrical:

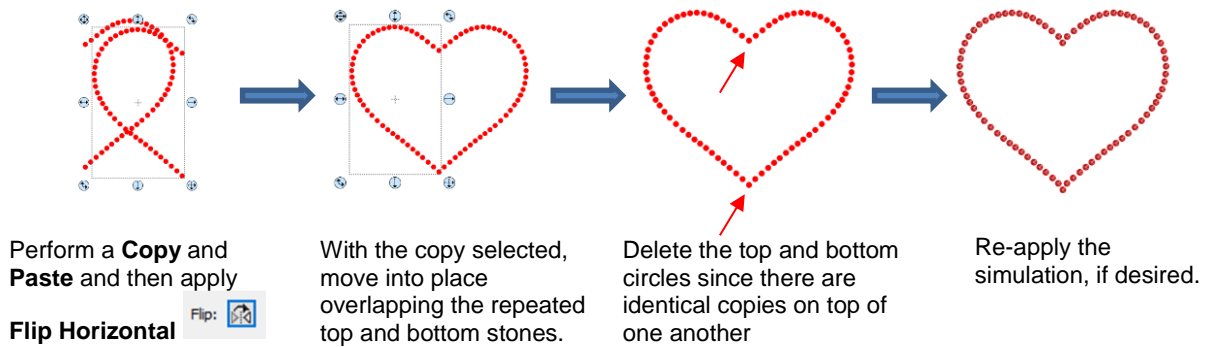


Right half of heart is not symmetrical with left half

- ◇ Apply **Object>Break Apart** to the design. Then decide which half is closer to perfect and delete the other half. Then tweak the remaining half:



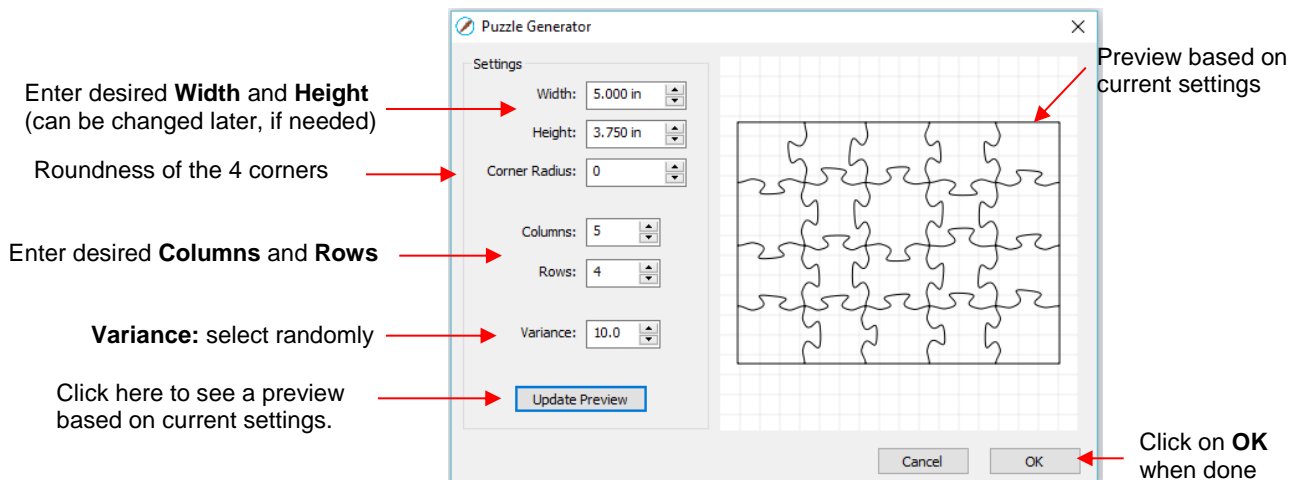
- ◇ Select the tweaked design and then perform the following steps shown:



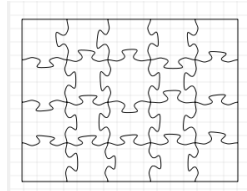
- A final tip: If you plan to do a lot of rhinestone applications, create and cut a template with small patterns (~15 – 20 circles) in different sizes so that you can test brush your rhinestones to find out the optimum size to use when designing. A difference of just 0.1 or 0.2 mm can affect how easily the stones will brush into a pattern right side up. If the size is too small, the stone 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.

## 9.11 Jigsaw Puzzle

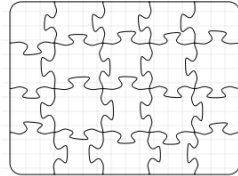
- The **Jigsaw Puzzle** feature will generate a rectangular jigsaw pattern with a number of options from which to choose. To open the window, go to **Effects>Puzzle Generator**:



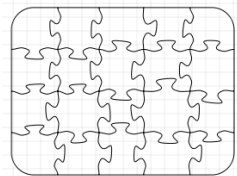
- ◇ **Width and Height:** If you plan to apply this puzzle over a specific image, you may want to choose dimensions that correspond to your image. For example, let's assume you have a photo that is 5" x 3.75" and plan to make a print and cut jigsaw puzzle. Enter those dimensions into the **Puzzle Generator**, 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:



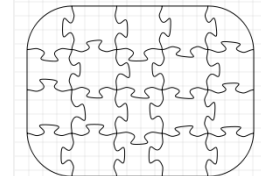
**Corner Radius = 0**



**Corner Radius = 0.25**

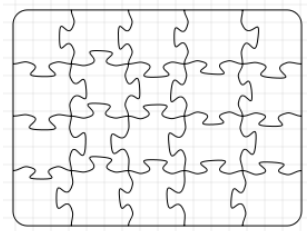


**Corner Radius = 0.5**

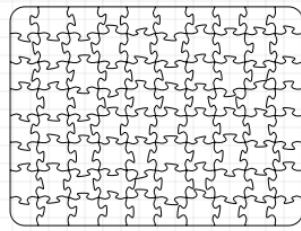


**Corner Radius = 1.0**

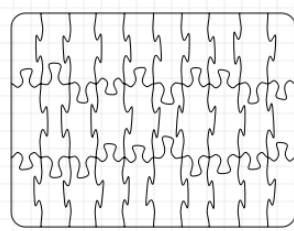
- ◇ **Columns and Rows:** To keep the shapes from becoming too distorted, make the number of **Columns** and **Rows** similar to the dimensions. If you want more pieces, then increase the number of **Columns** and **Rows** proportionately. For example, instead of having 5 **Columns** and 4 **Rows**, 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**



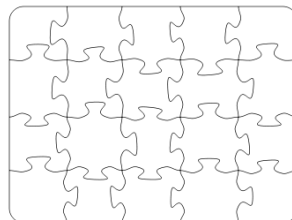
**10 Columns, 8 Rows**



**10 Columns, 3 Rows**

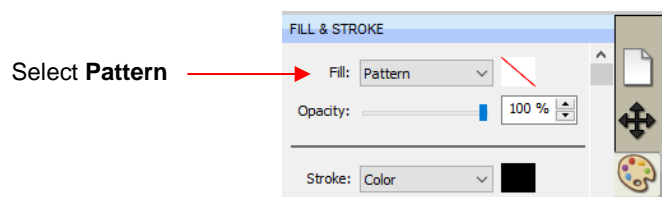
- ◇ **Variance:** This setting can be used to make sure one puzzle is not identical to the next, if all other settings are the same.

- 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:

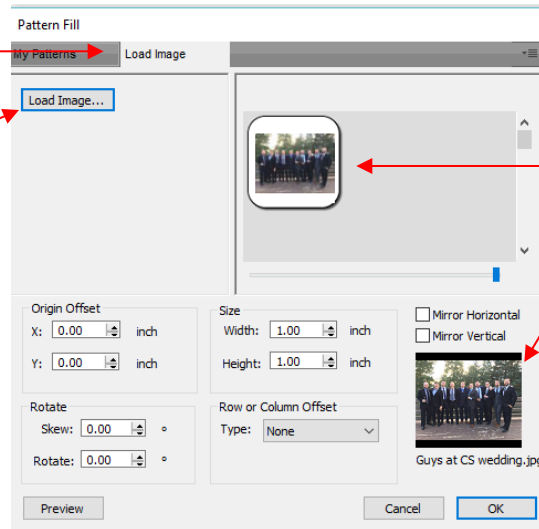


- ◇ The **Pattern Fill** window will open. Click on the **Load Image** tab and then click on the **Load Image** button to browse and find the image you want to use. It will then appear on the right side and can be selected:



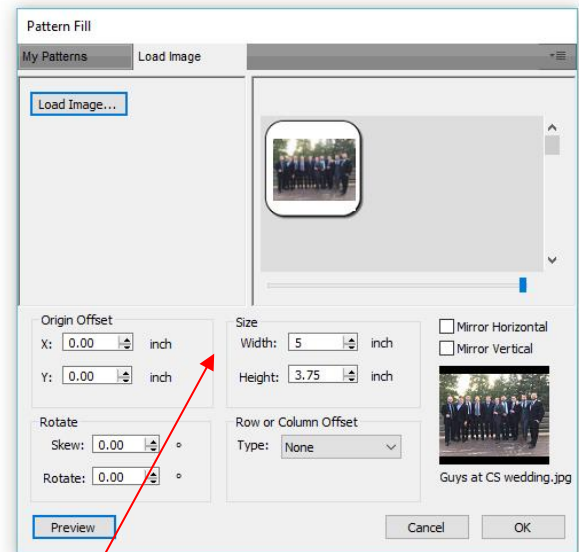
Select **Load Image** tab

Click on **Load Image** and browse to find file



Click on image and it will appear below

- ◇ Enter the same **Size (Width and Height)** used when the jigsaw pattern was created and then click on **Preview**:



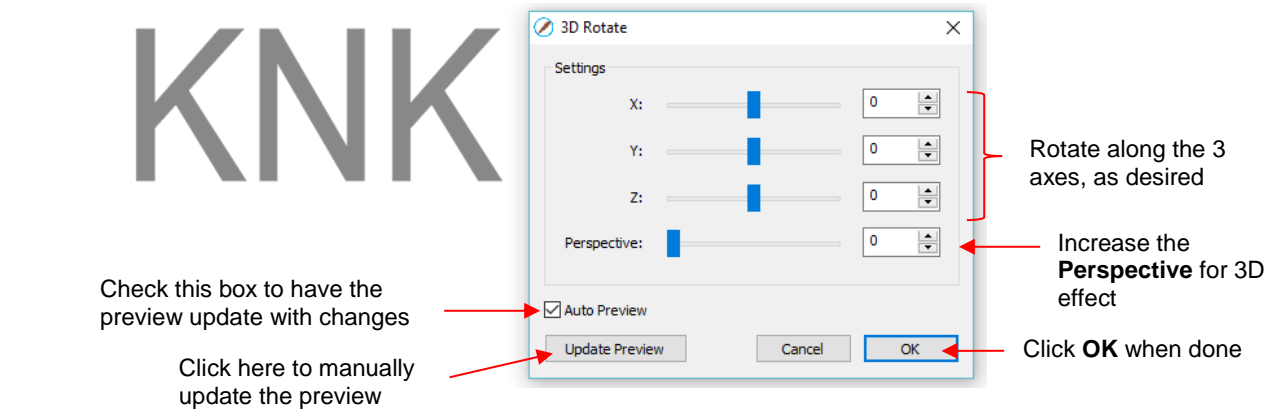
Enter same dimensions as were used in the **Generate Puzzle** window

- ◇ Click on **OK** and the jigsaw puzzle is ready for a print and cut application:

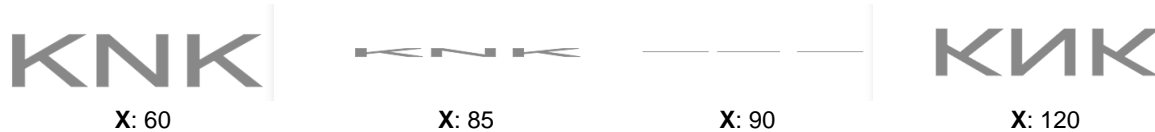


## 9.12 3D Rotate

- 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:



### ◇ X Axis Rotation:



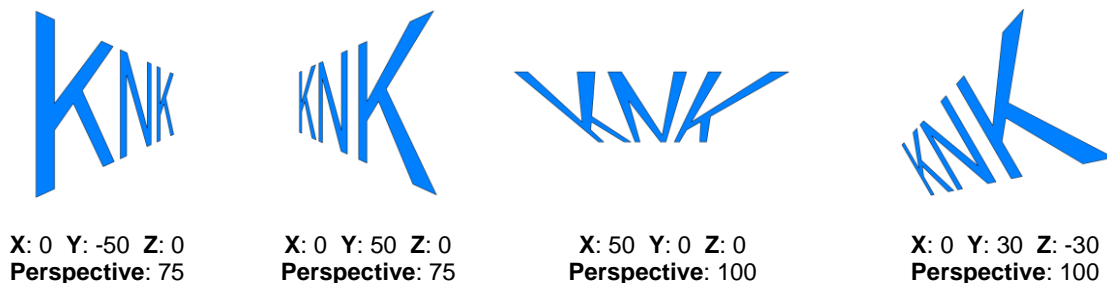
### ◇ Y Axis Rotation:



### ◇ Z Axis Rotation:

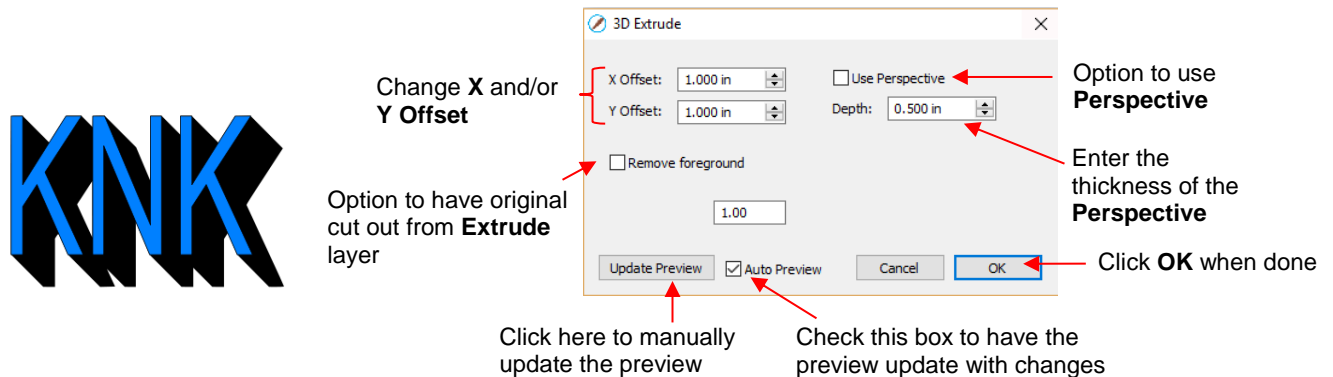


- ◇ **Perspective:** This is where the fun begins. Combining this setting with another rotation provides the 3D illusion. Here are examples:

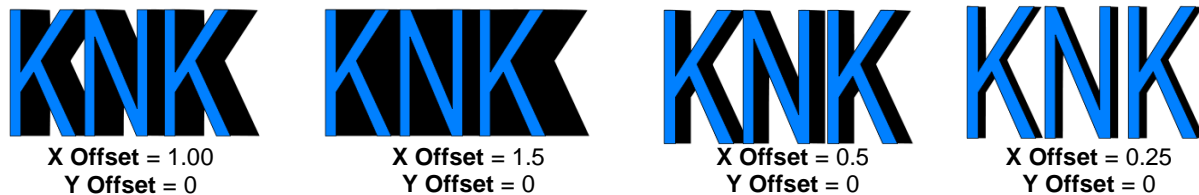


### 9.13 3D Extrude (SCAL PRO only)

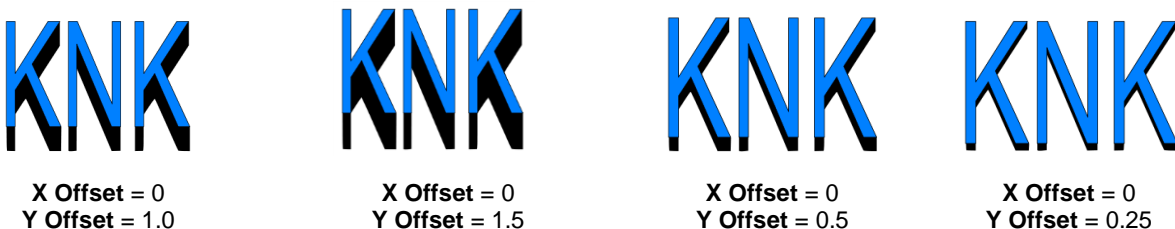
- The **3D Extrude** is used to create a cast or 3D shadow. To access this function, select a shape and go to **Effects>3D Extrude**. In the following example, text will be used to show the effects of the settings:



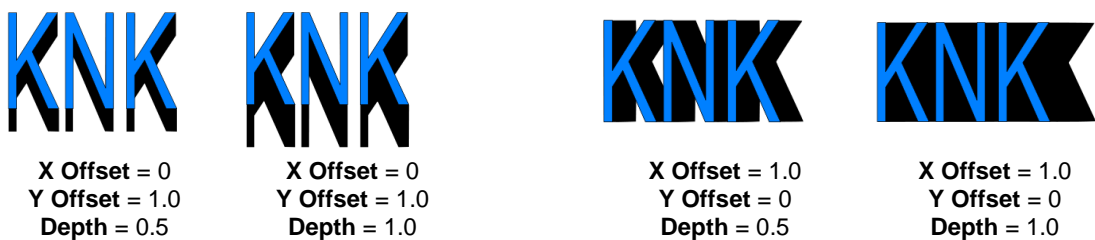
- ◇ **X Offset:** Increasing **X Offset** will extend the shadow to the right while decreasing it will retract the shadow towards the left. Note that **Y Offset** has been set to 0:



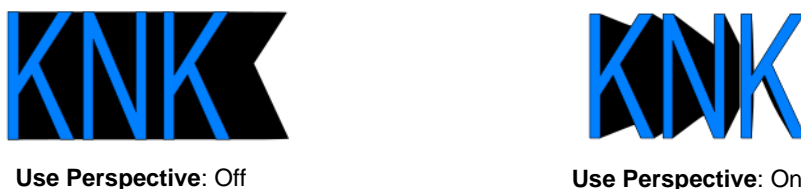
- ◇ **Y Offset:** Increasing **Y Offset** will extend the shadow downwards while decreasing it will retract the shadow towards the top. Note that **X Offset** has been set to 0:



- ◇ **Depth:** Adds the actual 3D effect by increasing the extension of the shadow:



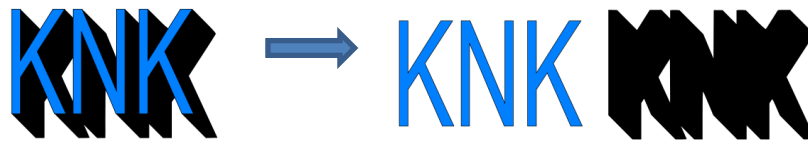
- ◇ **Use Perspective** provides a vanishing point effect:



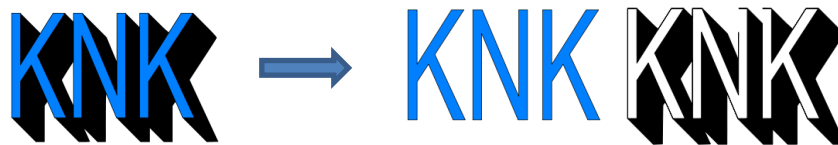


◇ **Remove foreground:**

- With this option off, when you separate the shape from the shadow, you see that the shadow 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 shadow:

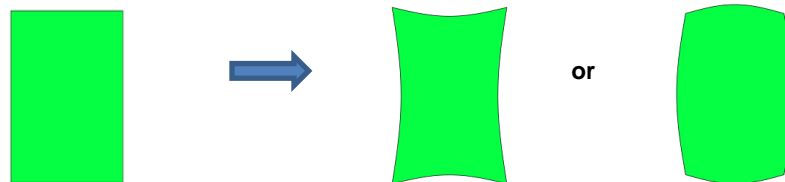


- With **Remove foreground** checked, the original shape will be cut away from the shadow. This would be the typical choice when layering HTV where some kinds cannot be pressed on top of each other (such as glitter HTV):

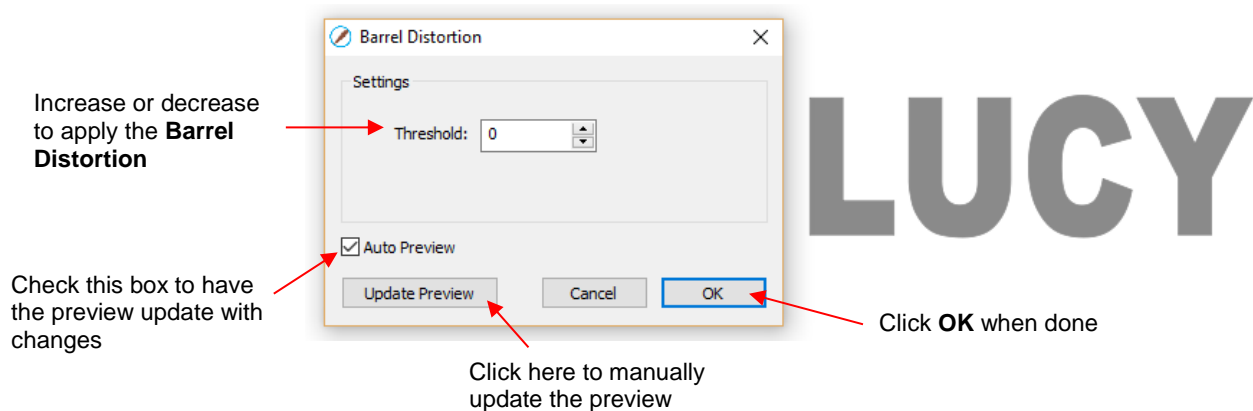


## 9.14 Barrel Distortion

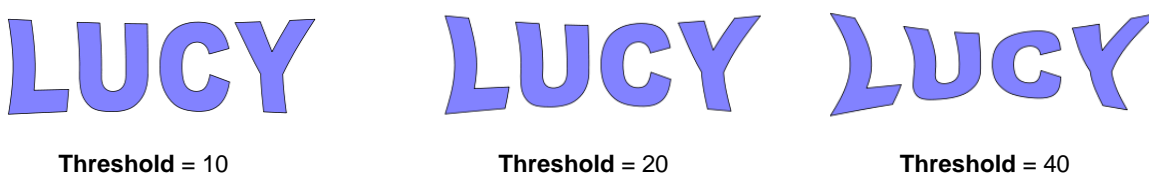
- The **Barrel Distortion** feature will warp a shape by narrowing or thickening the middle part of the shape:



- 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**:



- 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:

LUCY

Threshold = -10

LUCY

Threshold = -20

LUCY

Threshold = -40

## 9.15 Bulge

- 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

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:

NIKKI

Top Offset = 1.0  
Bottom Offset = 0

NIKKI

Top Offset = 2.0  
Bottom Offset = 0

NIKKI

Top Offset = -0.5  
Bottom Offset = 0

NIKKI

Top Offset = 0.0  
Bottom Offset = 1.0

NIKKI

Top Offset = 0.0  
Bottom Offset = 2.0

NIKKI

Top Offset = 0.0  
Bottom Offset = -0.5

- 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**:

TEDDY

Top Offset = 1.5  
Top Curve = 0

TEDDY

Top Offset = 1.5  
Top Curve = 50

TEDDY

Top Offset = 1.5  
Top Curve = 90

TEDDY

Bottom Offset = 1.5  
Bottom Curve = 0

TEDDY

Bottom Offset = 1.5  
Bottom Curve = 50

TEDDY

Bottom Offset = 1.5  
Bottom Curve = 90

- 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**:

LEO

Separately

LEO

Together

LEO

Opposite

◇ Effect of **Left Offset** and **Right Offset**:

LEO

Left Offset = 1.0

LEO

Left Offset = -1.0

LEO

Right Offset = 1.0

- ◇ 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**

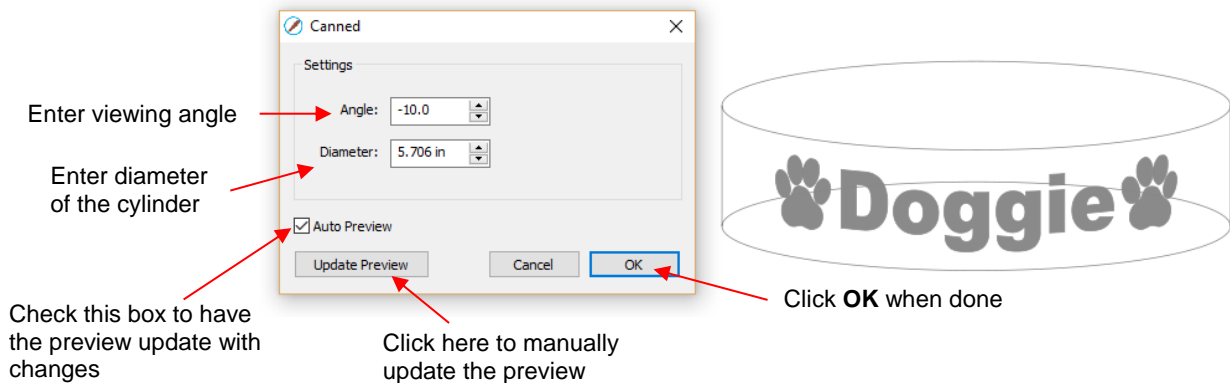
**FINN**

## 9.16 Canned

- The **Canned** effect will curve lettering as if it were wrapped around a cylinder (can) and viewed at an angle:

**Doggie** → **Doggie**

- 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.

**Doggie**

Angle = -10

**Doggie**

Angle = -45

**Doggie**

Angle = -90

- 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 = 5.0



Angle = -30  
Diameter = 7.5



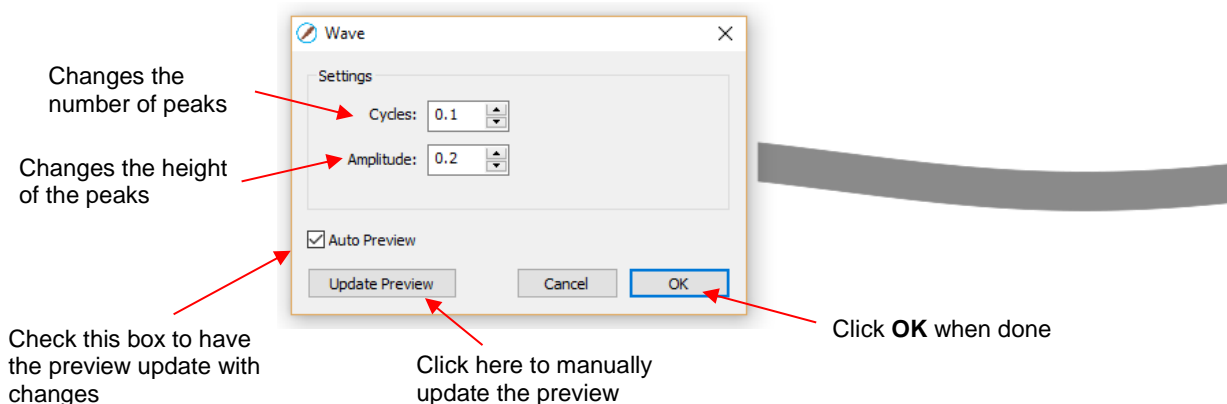
Angle = -30  
Diameter = 3.5

## 9.17 Wave

- The **Wave** function will transform any shape into a wave:



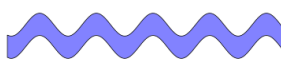
- To open the **Wave** window, select a shape and go to **Effects>Wave**:



- Increasing **Cycles** adds more peaks along the shape:



Cycles = 0.5

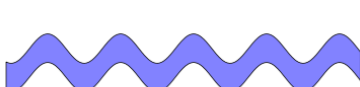


Cycles = 1.0

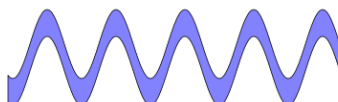


Cycles = 2.0

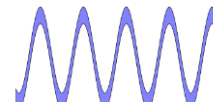
- Increasing **Amplitude** make the peaks higher:



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

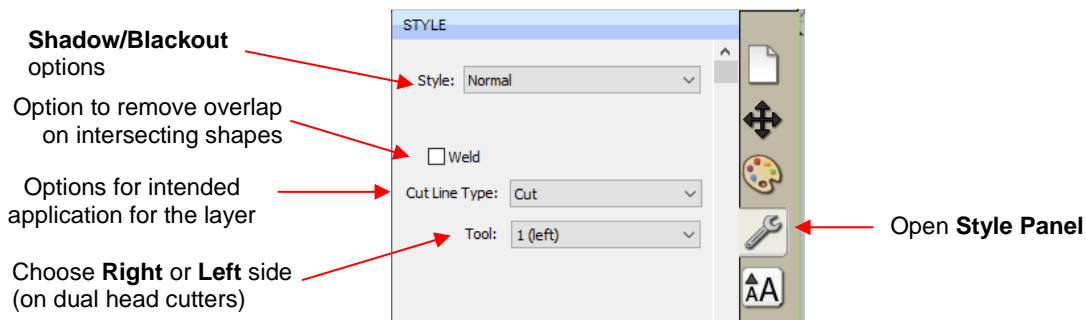


Twinkle Twinkle Little Star

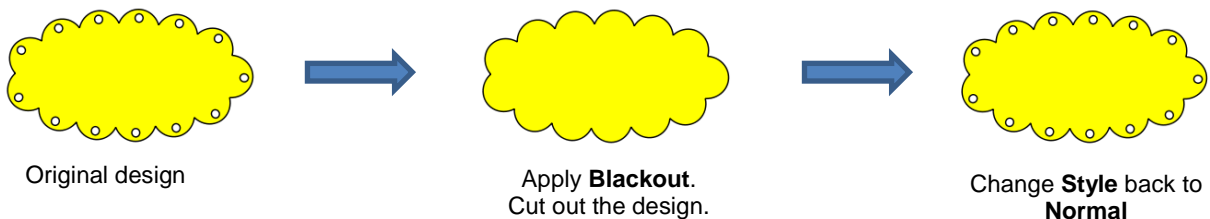
## 10. SCAL: Output


### 10.01 The Style Panel

- 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)
- To open this panel, click on the **Style** icon on the **Properties Panel**:

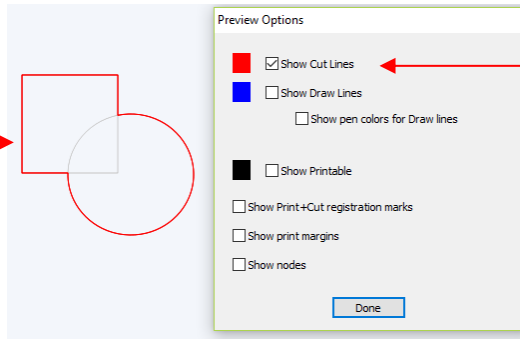


- **Style:** In this menu are various combinations of **Shadow** and **Blackout** applications. Refer to *Section 9.04* for instructions and examples. Note, however, that if you later change your mind and you haven't applied any subsequent changes (such as those in the **Path** menu), then re-selecting **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 9.05.1*) 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 10.02*):


With **Weld** assigned to an overlapping square and circle, the shapes are welded for cutting

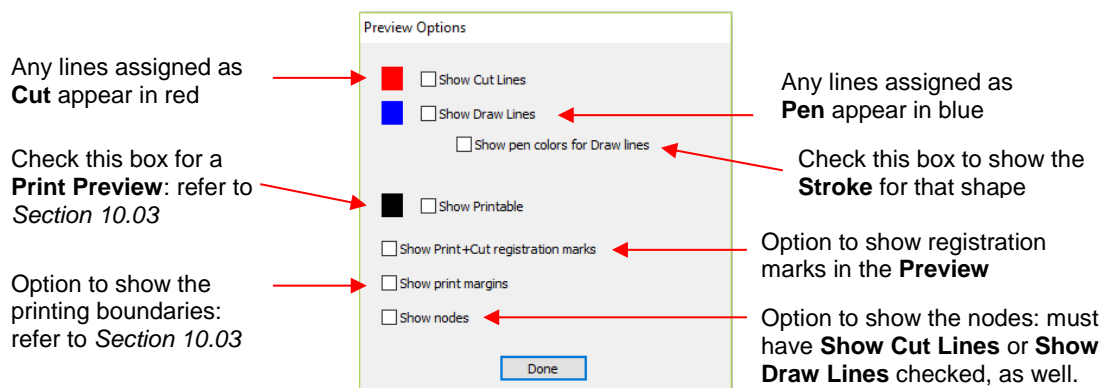


Red lines in the **Preview** window show what will actually cut.

- **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.
  - ◇ **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 the last part of *Section 10.06.2*.
- **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.

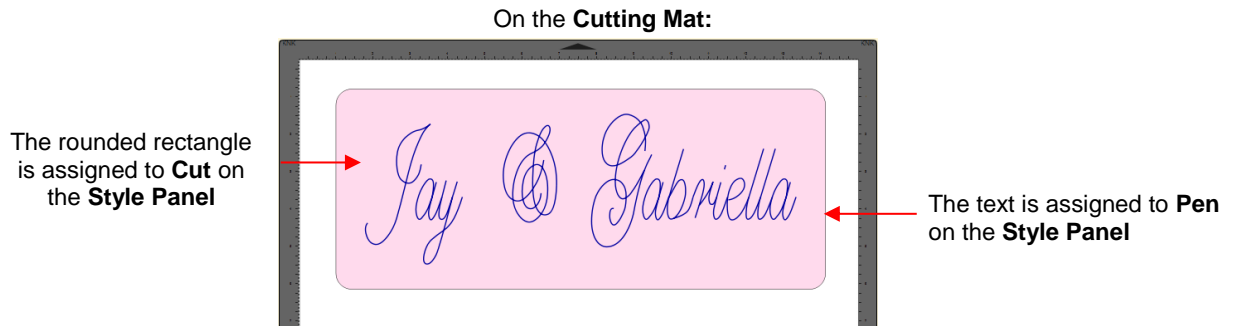
## 10.02 Preview

- 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:

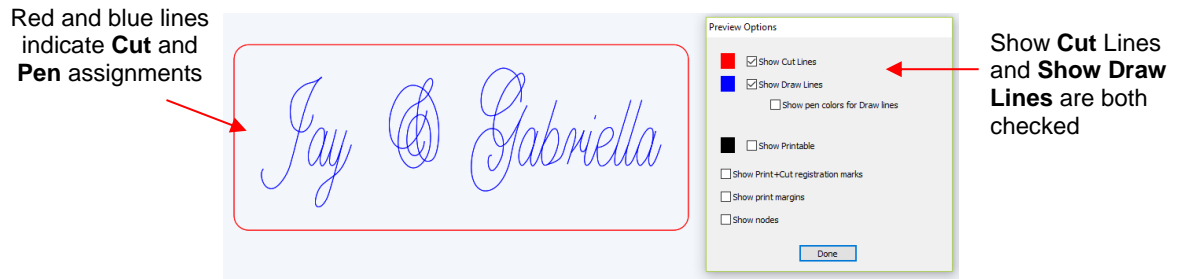


- The following example shows what would be seen in the **Preview** window compared to how it appears on the **Cutting Mat**:



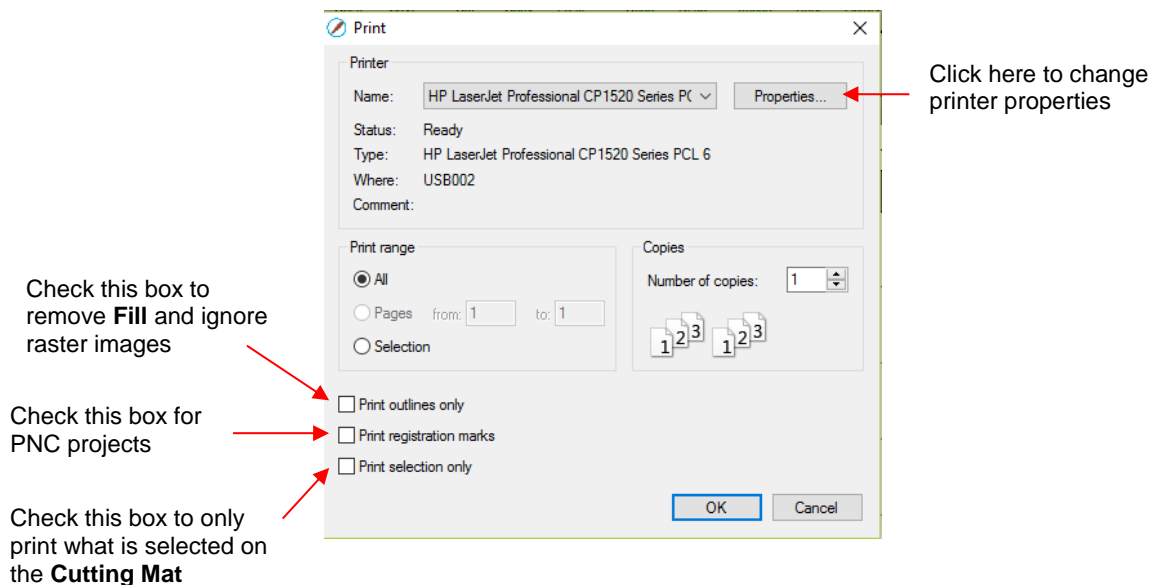


In the **Preview Options** window:




## 10.03 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. Refer to *Chapter 11* for details on PNC calibration and how to set the properties for the registration marks.

- **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 part of the cow will not be printed

Preview Options

☐ Show Cut Lines

☐ Show Draw Lines

☐ Show pen colors for Draw lines

☒ Show Printable

☐ Show Print+Cut registration marks

☒ Show print margins

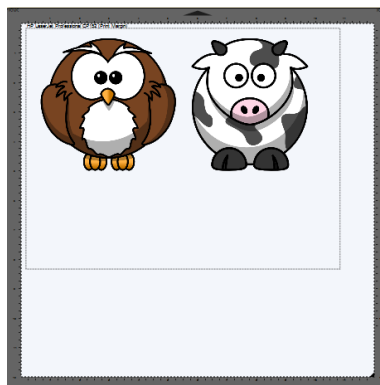
☐ Show nodes

Done

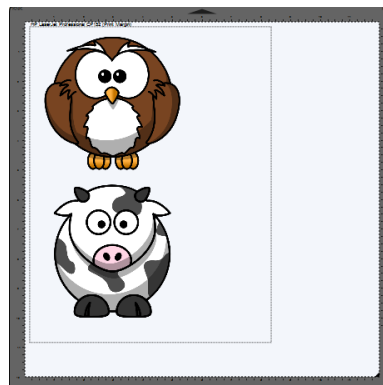
Check this box so that the original graphic appears

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:



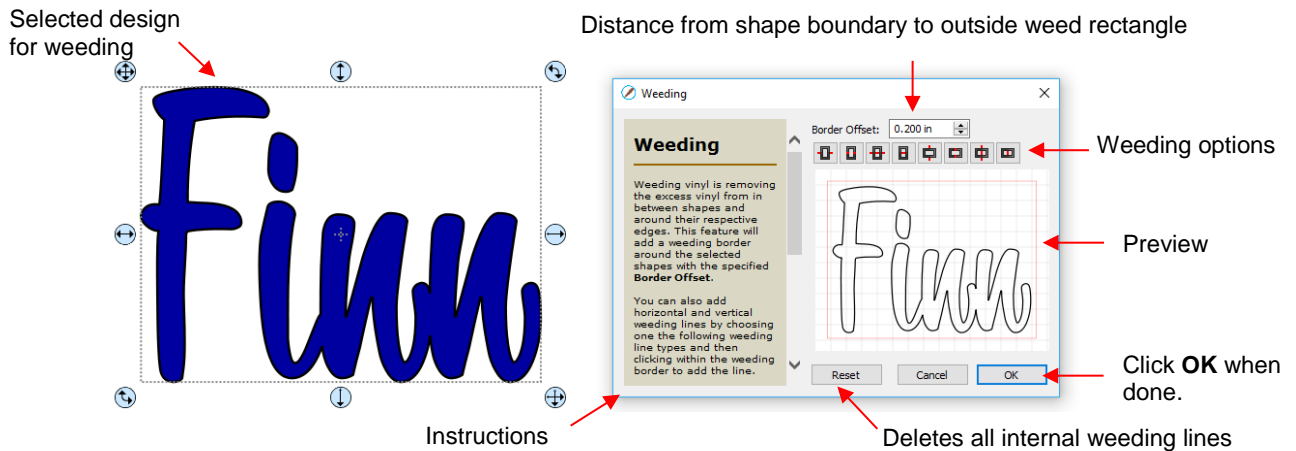
Option 1: Switch to **Landscape** under **File>Print Setup**



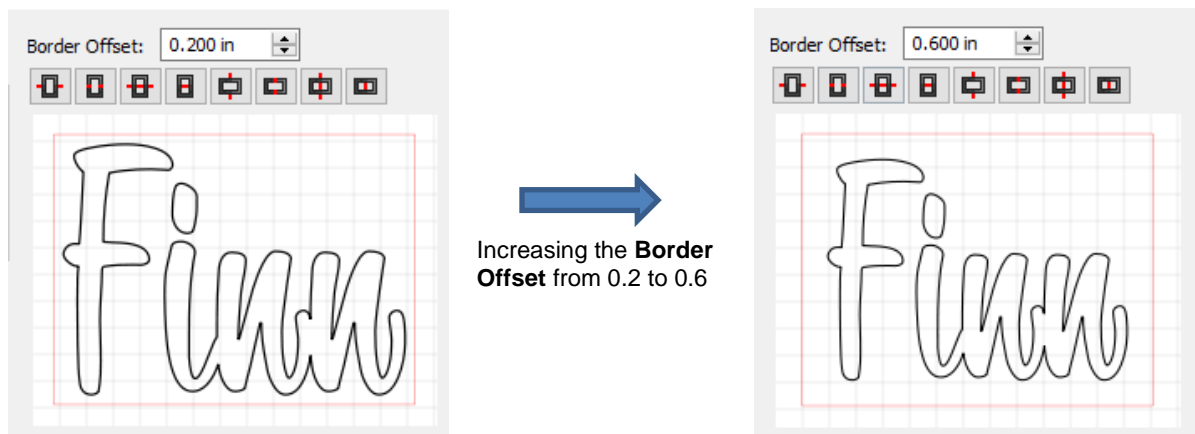
Option 2: Rearrange the shapes

## 10.04 Weeding (SCAL PRO only)

- 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:



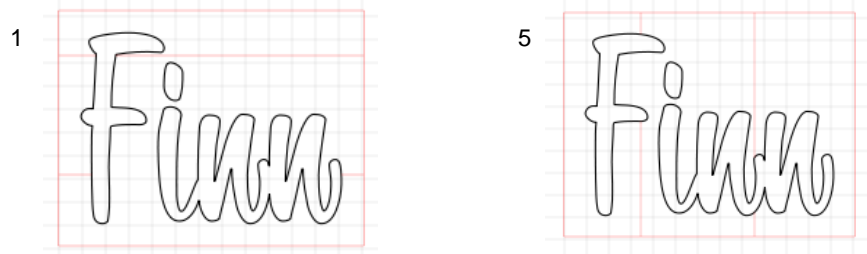
- ◇ **Border Offset:** Increase or decrease to set the spacing between the shapes and the outside weeding rectangle. The red line represents that outer cut. For example:



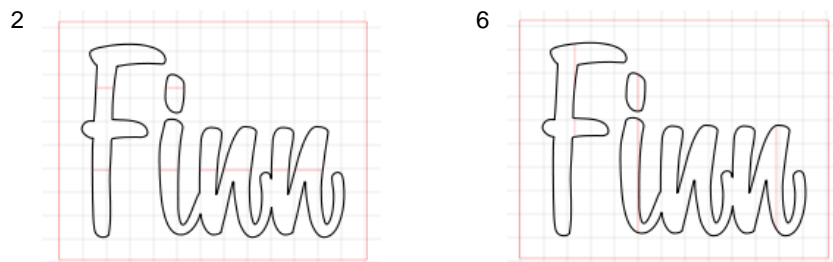
- ◇ **Border Options:** These icons can be used to add additional cut lines inside the outer weed border. Each icon in the following screenshot indicates where the lines will be added but a description and example are also shown. Note that once you select an option, you can click at the desired location on the preview image to add the cut line or lines:



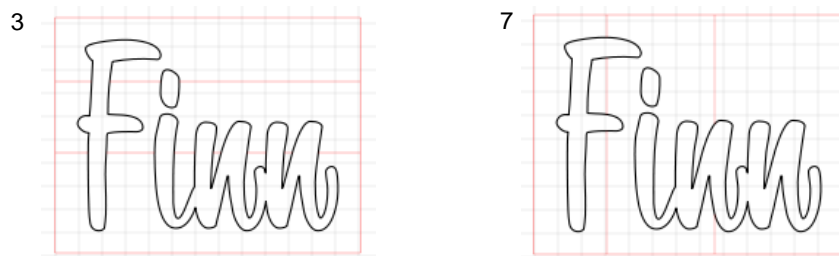
- 1 or 5: Add horizontal or vertical weed cuts between shapes and outer weed border



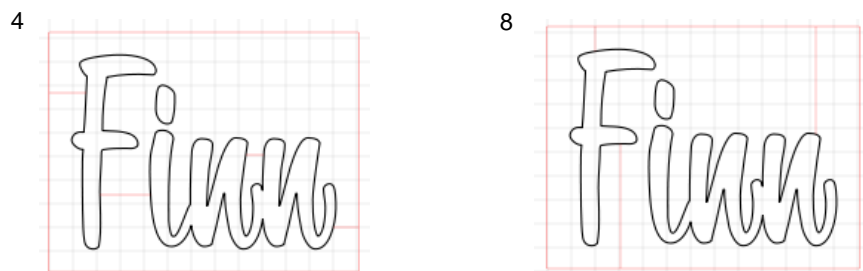
- 2 or 6: Add horizontal or vertical weed cuts inside the shapes (this is used for applications such as glass etching where the outside “waste vinyl” is actually kept and the shapes themselves are weeded out)



- 3 or 7: Add horizontal or vertical weed cuts in between shapes and outer weed border and also inside and between shapes

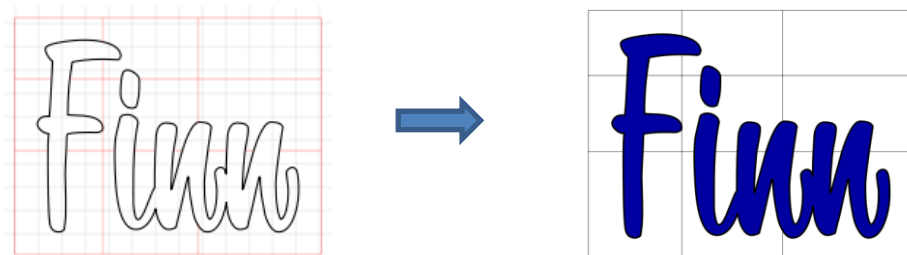


- 4 or 8: Add horizontal or vertical weed cuts anywhere you like

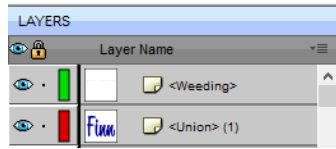


◇ **Reset:** At any point, you can click on **Reset** to remove any of the internal cut lines and begin again.

- Once you are satisfied with the weeding line, click on **OK**:



- On the **Layers Panel** you will observe a new layer called *Weeding*:

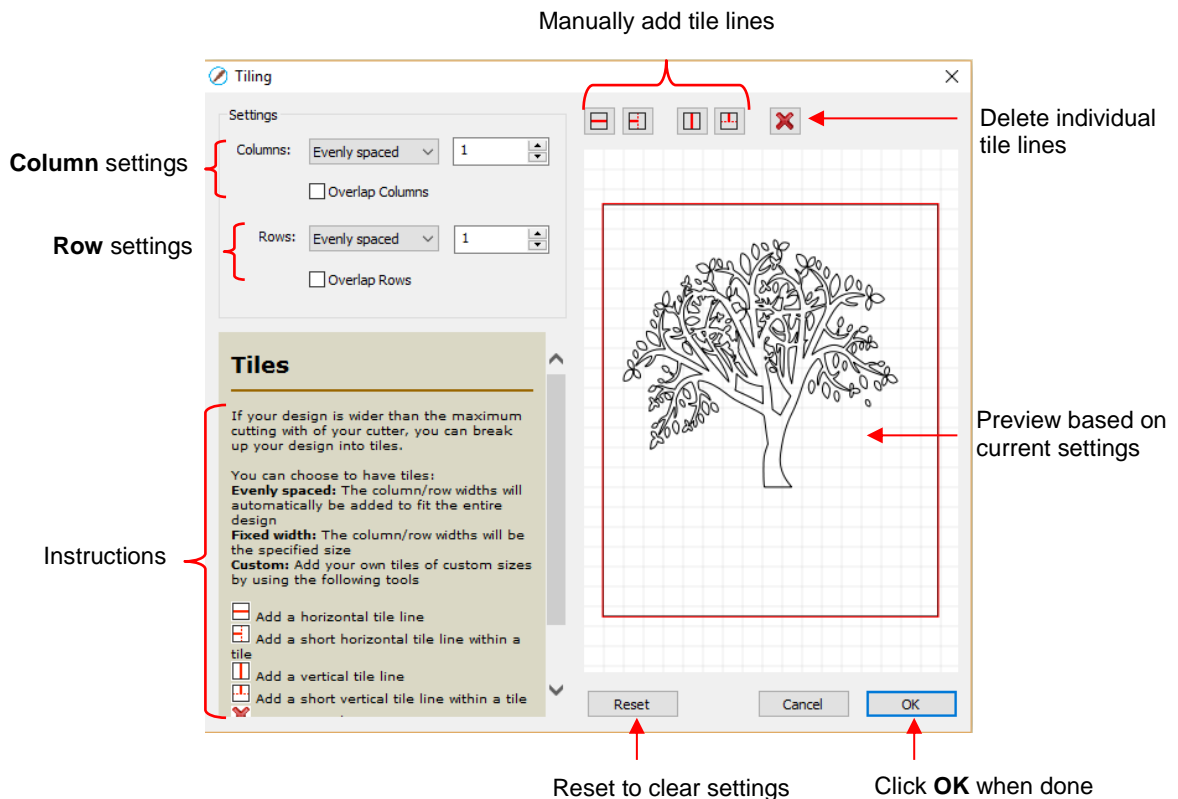


### 10.05 Tiling (SCAL PRO only)

- 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):



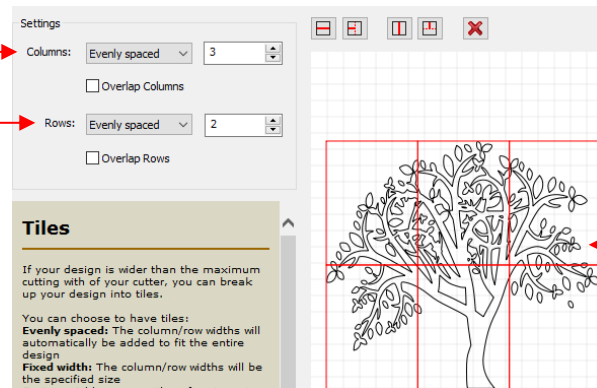
- To open the **Tiling** window, select the shape and go to **Effects>Tiling**:



◇ **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:

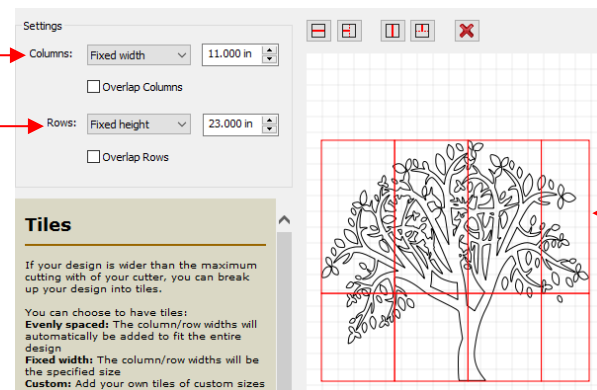
Select **Evenly spaced** and then 3 **Columns** and 2 **Rows**



Preview shows the project evenly split into 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**

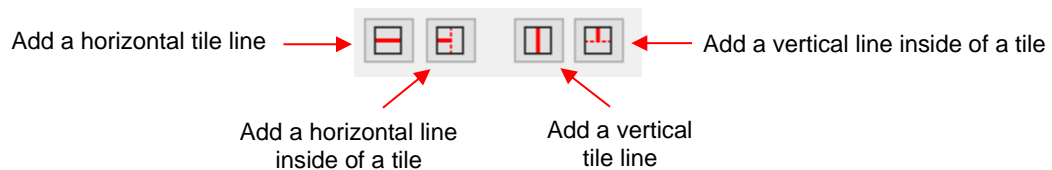


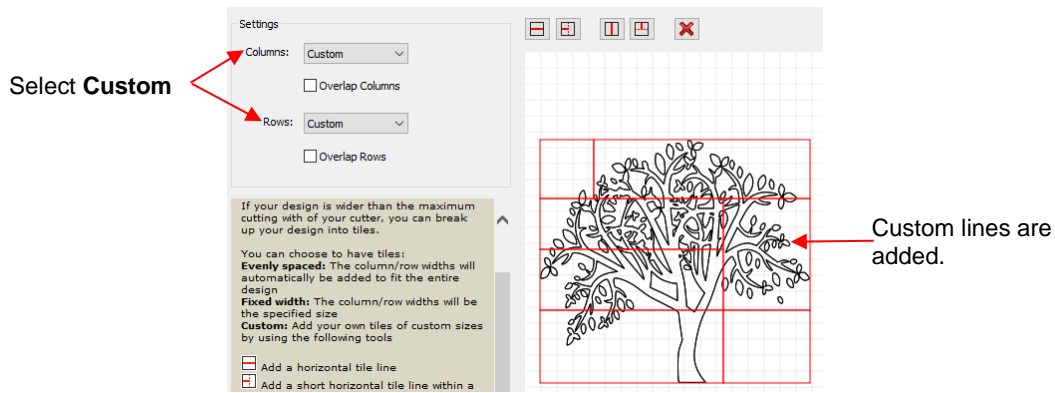
The design is 40" wide and 36" tall.


After creating three 11" wide columns, the remaining 7" in width is on the right side.

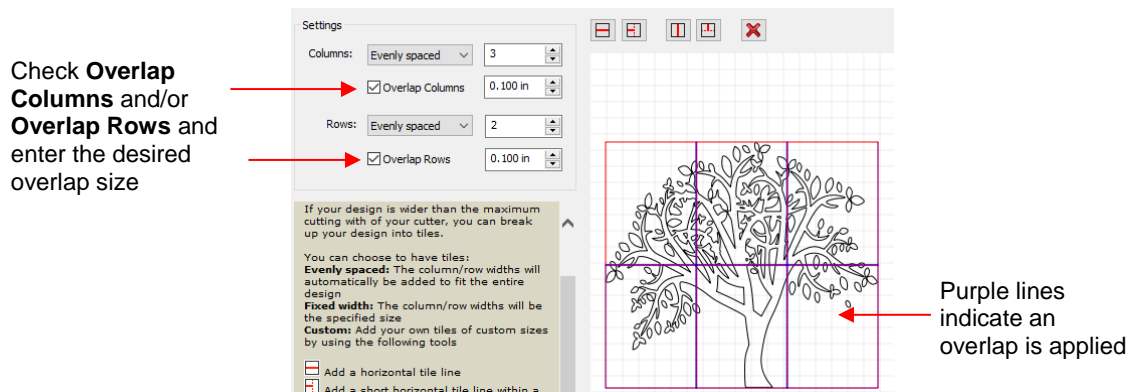
After creating one 23" row, the remaining 13" in height is at the bottom.

- **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:





- ◇ 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:




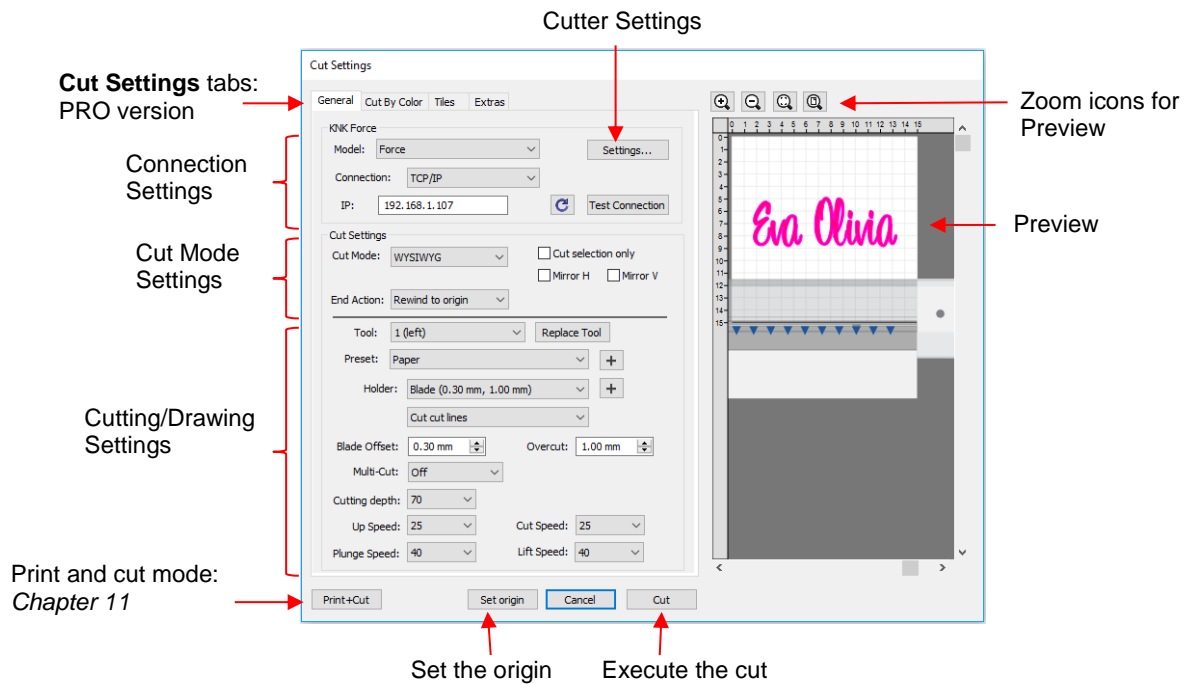
- After clicking on **OK**, you won't observe any changes on the **Cutting Mat** or on the **Layers Panel**. The results of the **Tiling** process will apply once you enter the cutting window. Refer to *Section 10.06.3*.

## 10.06 Cut Settings

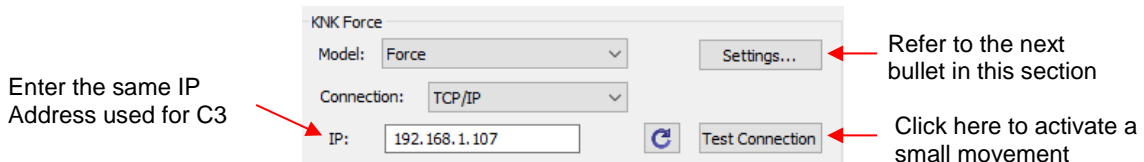
The cut settings will vary from one cutter to the next based on the brand and model of that cutter and its built-in functionality. For this reason, the information presented here will only apply to the brand and model of cutter presented in Chapters 1 and 2.

### 10.06.1 Cut Window Settings

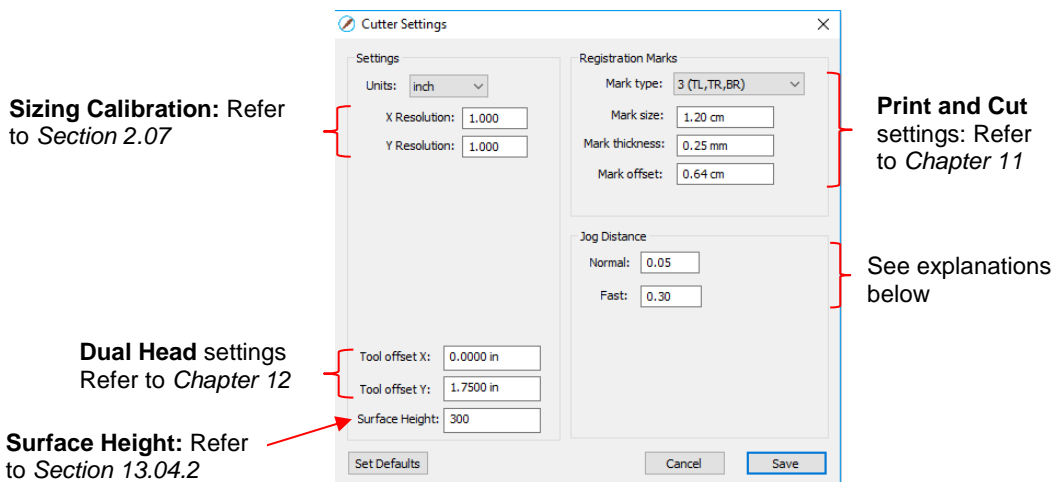
- When you are ready to execute a cut (or draw), the cut window can be opened using either of the following:
  - ◇ Click on the **Cutter** icon  on the **Toolbar**
  - ◇ Go to **Cutter>Cut With KNK Force** (or model you have added)
- The following window will open:



- ◇ **Cut Settings tabs:** The regular version of SCAL will only have the **General** tab. The PRO version has three additional tabs; **Cut by Color** (refer to *Section 10.06.2*), **Tiles** (refer to *Section 10.06.3*) and **Extras** (refer to *Section 10.06.4*).
- ◇ **Connection Settings:** Choose the model of cutter being used and connection settings. For the KNK Force this includes the IP address set up under C3.



- ◇ **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 Force:





- **Jog Distance:** The following settings apply when setting the origin or moving the Force camera or Maxx/Zing laser light:
  - **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 Settings:**

Choose either **WYSIWYG** or **Origin Point** (refer to Section 10.07)

PRO version: enter where head should go at end of cut

Check if only selected shapes should be cut

Check either or both if you wish to have shapes mirrored before cutting (on the KNK Force, these are reversed)

- **Cut Mode:** Refer to *Section 10.07* 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

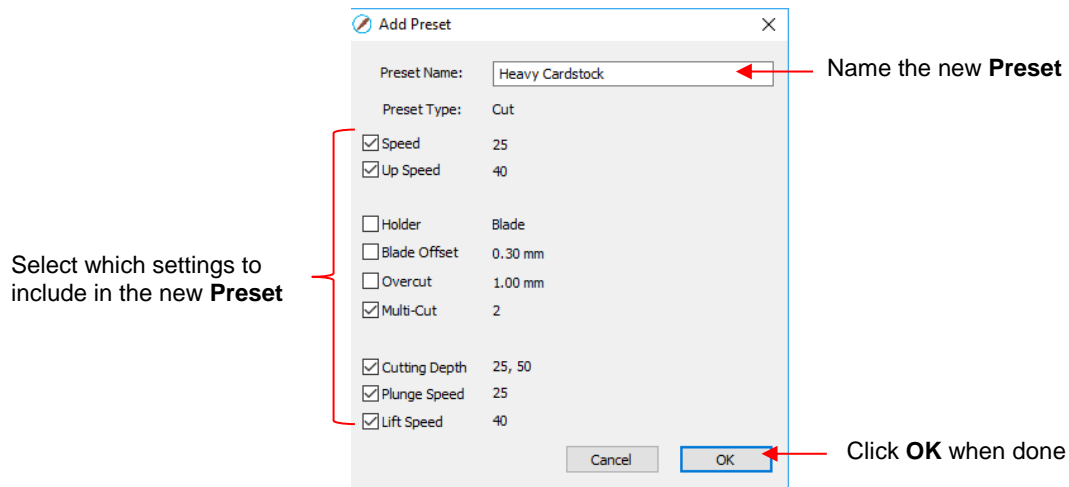
Enter distance to advance


- **Do Nothing:** the head stops at the location where it finished cutting
- **Cut selection only:** If you have pre-selected which shapes you want to cut, then mark this box.
- **Mirror H** and **Mirror V:** Options to check 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.

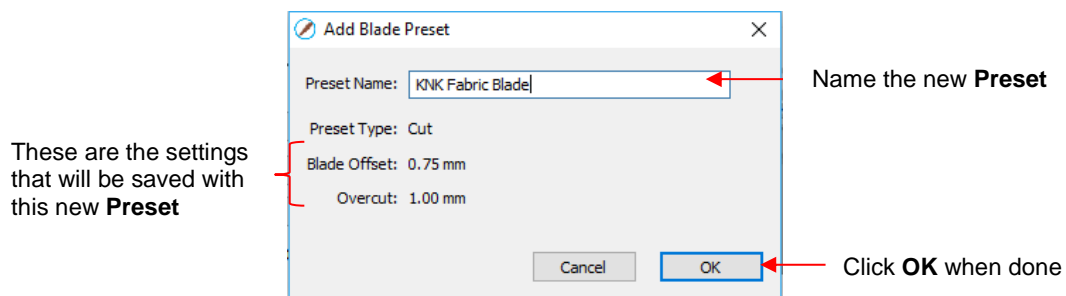
#### ◇ **Cutting/Drawing Settings:** As mentioned earlier, this section will vary considerably from one brand/model of cutter to the next:

- First, select the **Tool** (left or right side) and then, if you like, select from the **Preset** menu, the material you will be cutting. Alternatively, make any changes to the settings for this material. If you

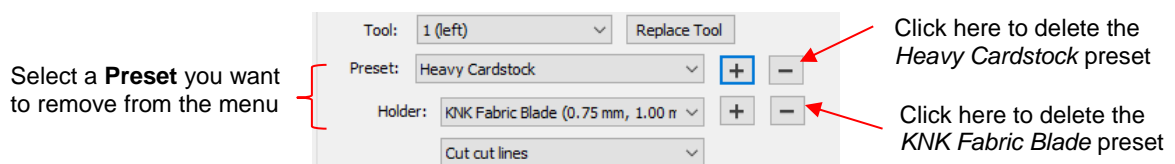
wish to save the new settings, click on the icon  to the right of **Preset** and the following window will open:



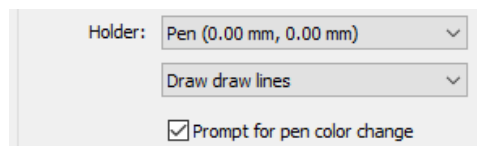
- Presets for the **Holder** are also available to select. If you wish to enter a new **Preset**, first make changes to the **Blade Offset** and **Overcut** settings. Then click on the icon  to the right of **Holder**. The following window will open:



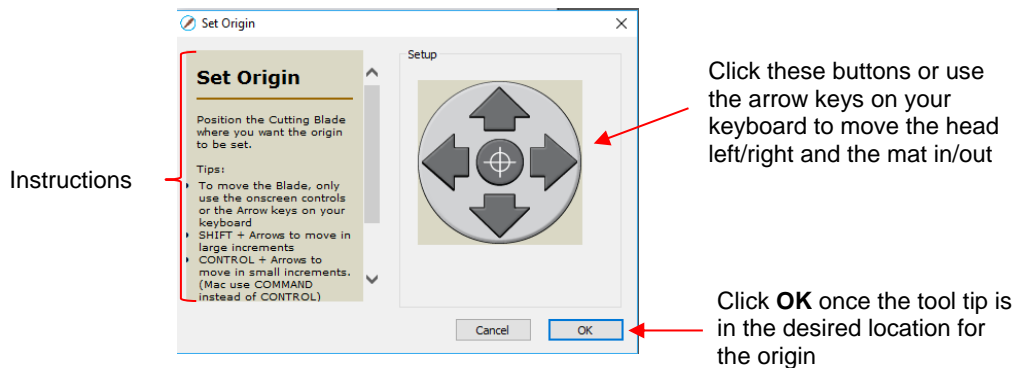
- If you need to delete any of the **Presets** you added yourself, select the **Preset** from the menu and then a delete option will be available for removing that **Preset**:



- If you select **Pen** under **Holder**, then an additional option called **Prompt for pen color change** will appear. Marking this setting will cause the cutter to pause between colors so that the tool can be changed out, if desired.



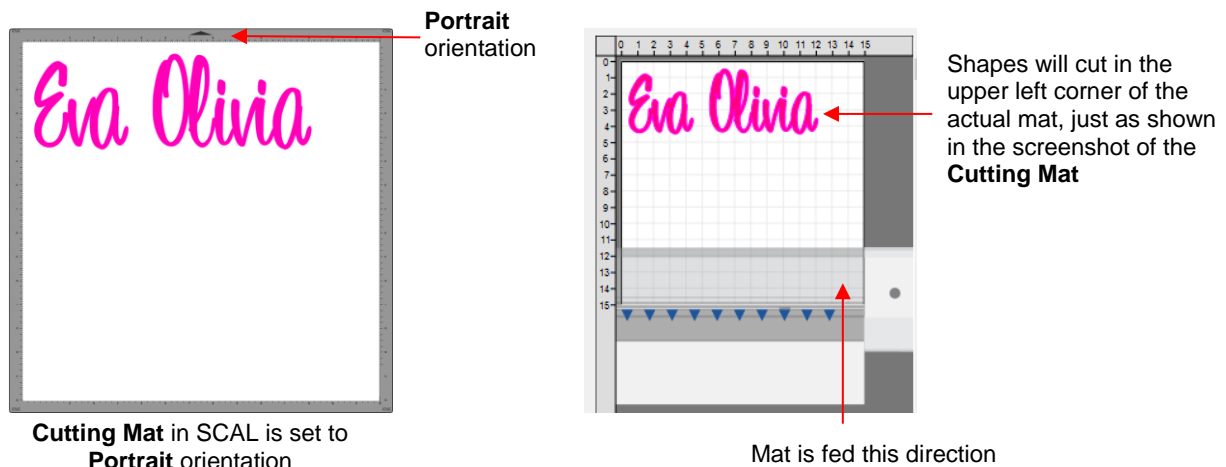
- Detailed instructions on utilizing both heads on the KNK Force are presented in *Chapter 12*.
- ◇ **Print+Cut:** Clicking on this button opens the **Print and Cut** window. Refer to *Chapter 11* for detailed instructions on calibrating the camera and performing print and cut applications.
- ◇ **Set Origin:** Click on this button to set the origin for cutting. The following window will open:



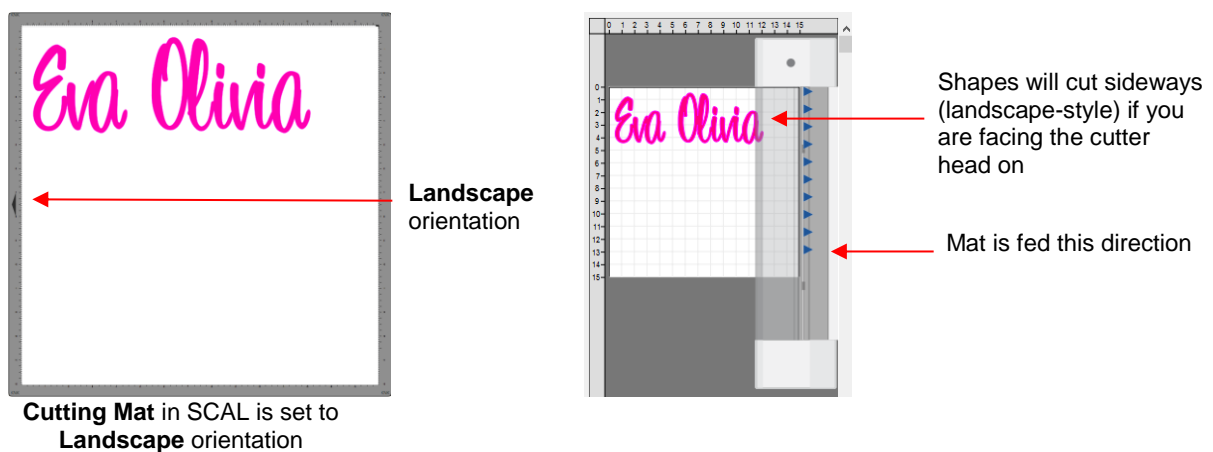
- In general, you always set the origin in the lower right corner of the material as was presented in *Section 1.06*. (Note: This may not be true with other brands of cutters.)

◇ **Preview:** The preview displays the shapes that will cut and their orientation plus location based on other settings.

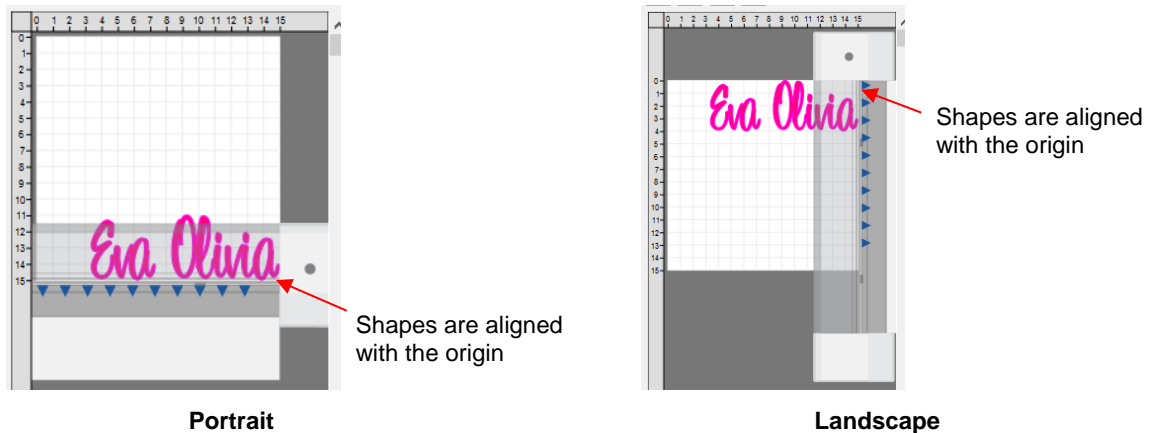
- For example, with a **Portrait** orientation and **WYSIWYG** cut mode, the **Preview** indicates the shapes will cut exactly in the same location and orientation as you see on the **Cutting Mat**:



- 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 10.07*.

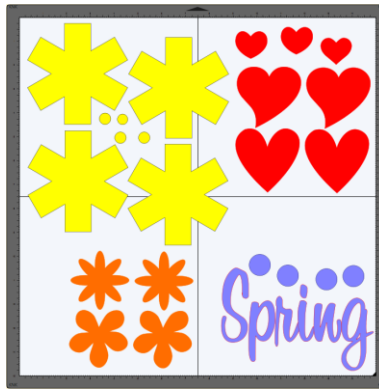
### **10.06.2 Cut by Color (SCAL PRO only)**

- The **Cut by Color** function offers two capabilities:
  - ◇ Turn on and off colors to be cut without the need to show/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:



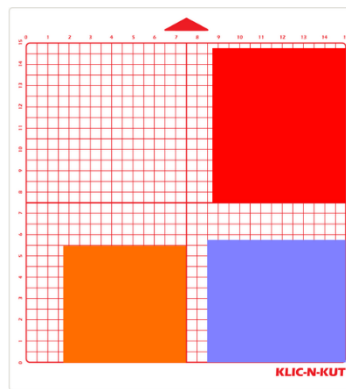
- **Cut all colors (Single job):** In this mode all of the colors marked in this window will be cut at one time.
  - ◇ As an example, here are some shapes laid out on the **Cutting Mat**. Note how the grid is set to divide the mat into four quadrants:


The shapes of each color have been arranged into quadrants on the **Cutting Mat**



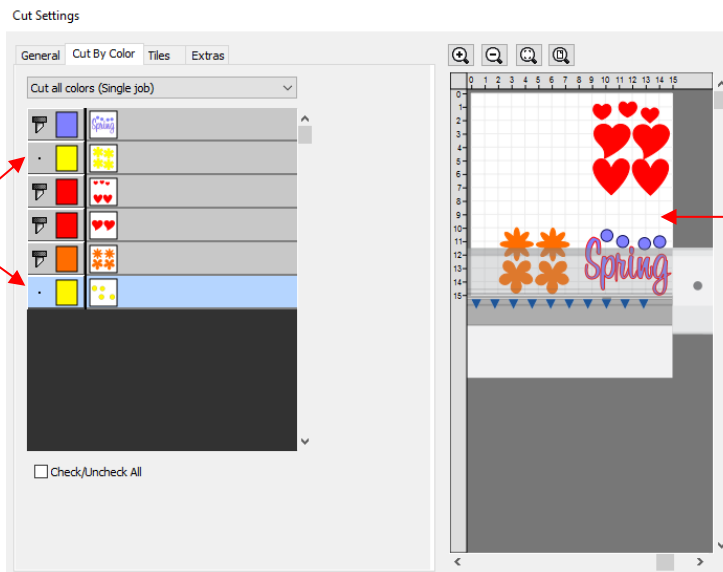
The **Cutting Mat** is divided into quadrants for easier placement of the scraps onto the actual cutting mat

- ◇ 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:



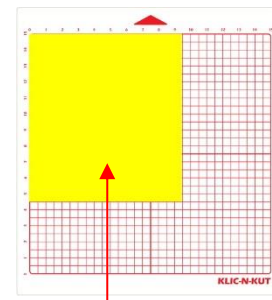
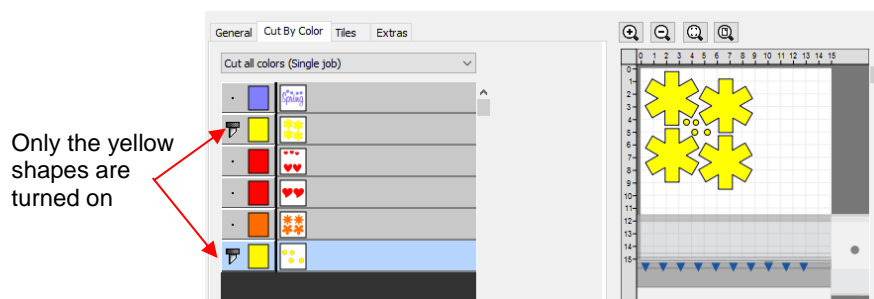
- ◇ In the **Cut Settings**, make sure **WYSIWYG** mode is selected and you have the other settings selected. Then select the **Cut by Colors** tab and click on the blade icon  next to the yellow shapes to hide those from cutting:

The yellow shapes are turned off



The **Preview** shows where the shapes will cut and shows that the yellow ones are excluded

- ◇ 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:



The yellow scrap is placed in the upper left corner of the mat to match the **Preview** window

- **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.

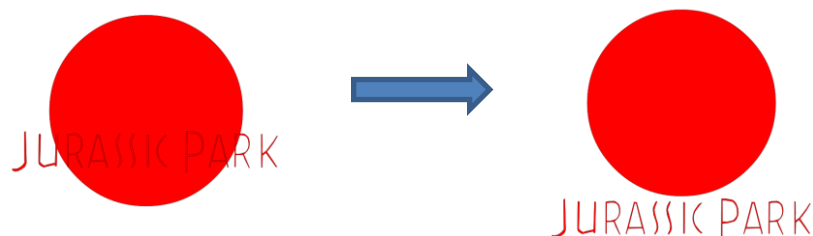
◇ As an example, here is a layered design to be cut from vinyl:



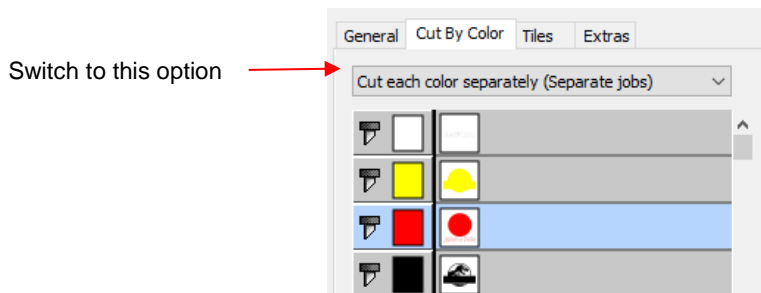
◇ Choosing the option to **Cut each color separately** is logical because:

- 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

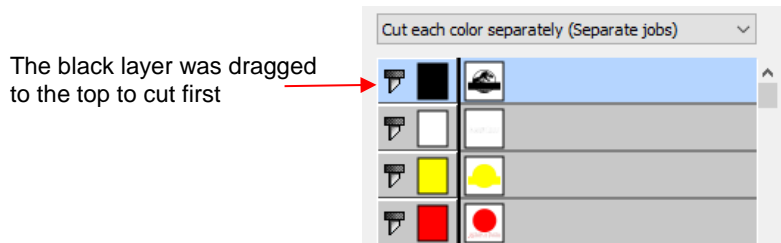
◇ However, before sending the project to the cutter, take note of any colors that might have shapes that need to be moved. In this example, the thin red lettering "Jurassic Park" would cut through the background red circle, hence it needs to be moved away:



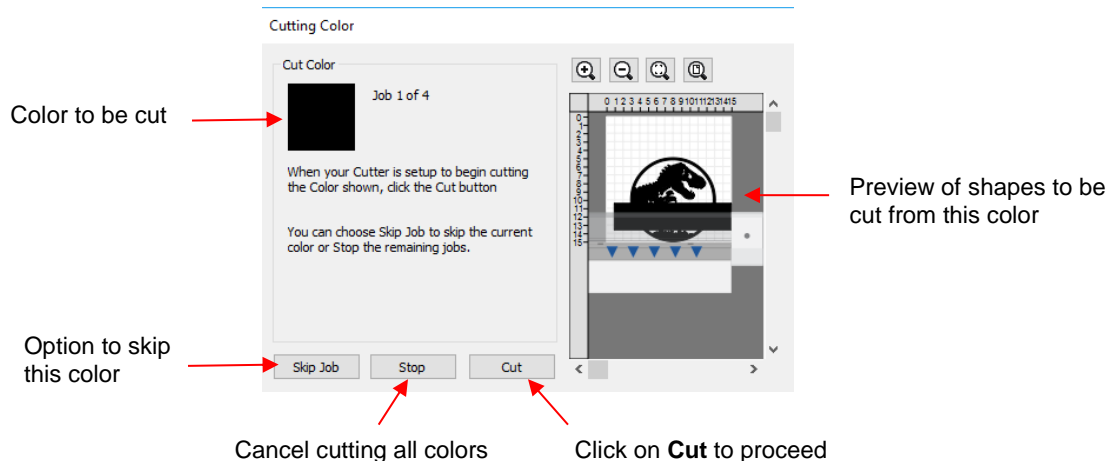
◇ In the **Cut Settings**, **Origin Point** should be chosen so that each color is moved to align with the origin and, thus, the material loaded each time in the same location. In the **Cut by Color** tab, the **Cut each color separately** option is chosen:



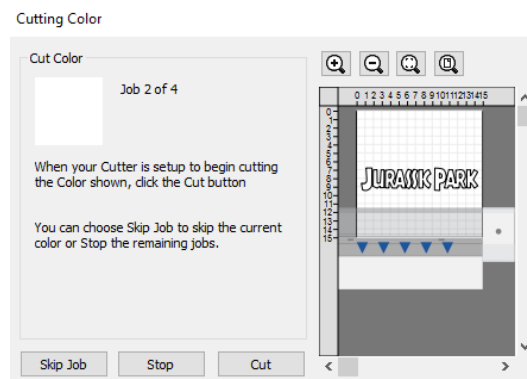
- ◇ Note that you can change the cut order by dragging the colors up or down the menu. For example, let say you already have black vinyl loaded into the cutter and the origin set to cut:



- ◇ Upon selecting **Cut**, the following window opens:



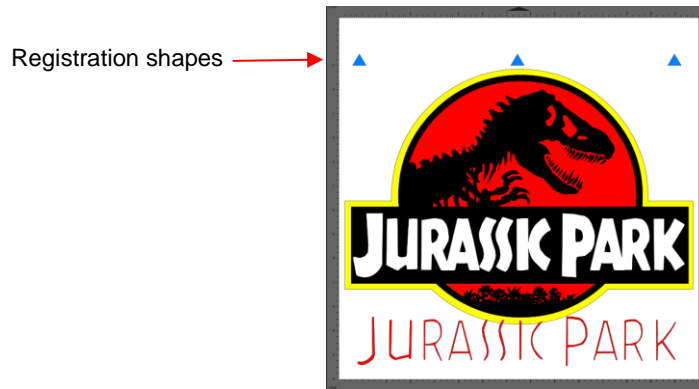
- ◇ If you decide not to cut this color, click on **Skip Job** and the next color in the menu will be selected. If you clicked on **Cut**, then the black shapes are cut out and then this same next color window will open:



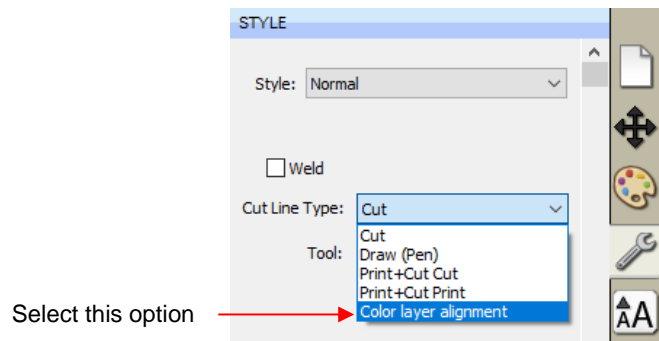
- ◇ And the process continues until all colors have been cut.

- In *Section 10.01*, **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.

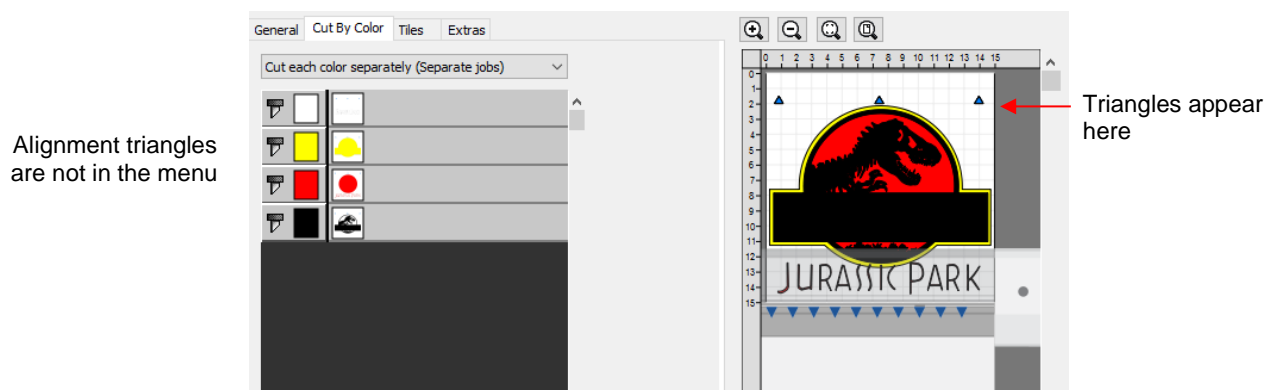
◇ In the *Jurassic Park* example, three small triangles are added and grouped to be on the same layer:



◇ The layer is selected and the **Cut Line Type** for this layer is changed to **Color Layer Alignment**:

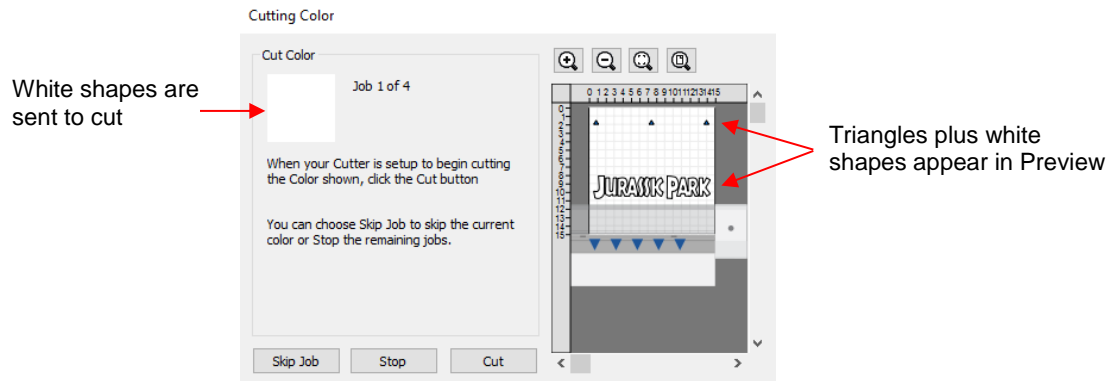


◇ When the **Cut by Color** tab is then selected, the registration triangles are not in the menu. However they do appear in the **Preview**:



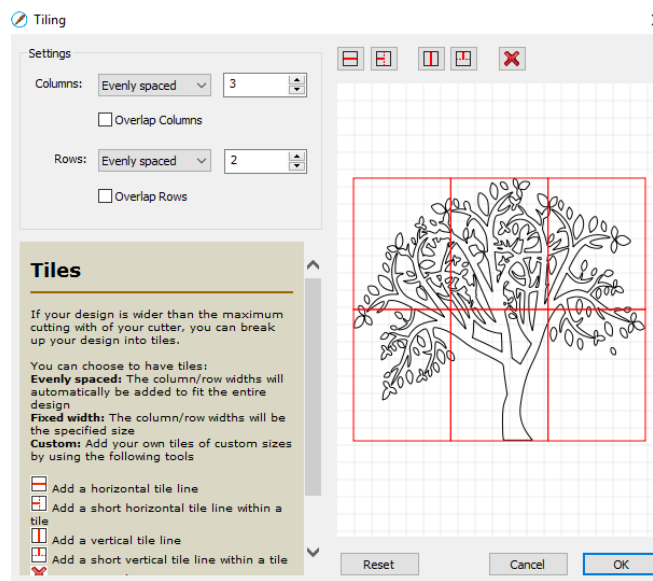
◇ Then, as each color window opens, the triangles will appear in the **Preview** for that color:



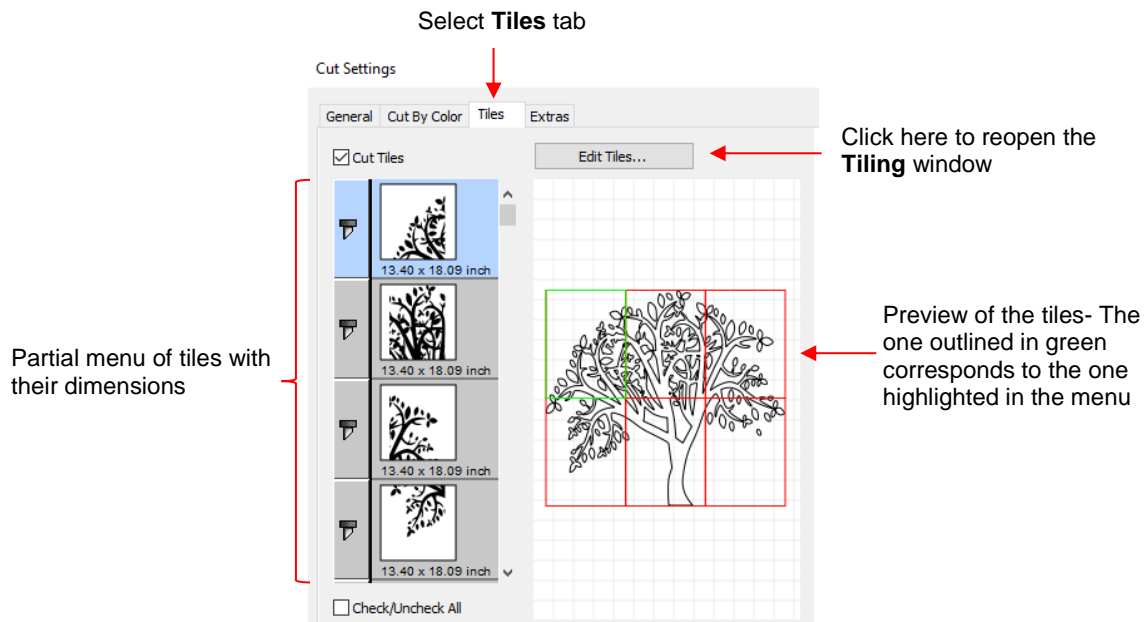



### 10.06.3 Tiles (SCAL PRO only)

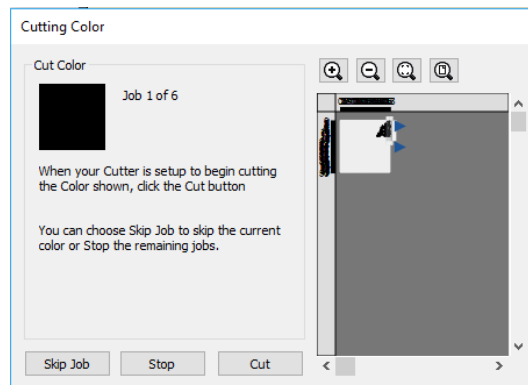
- In *Section 10.05*, you were shown how to use the **Tiling** function to split a design that is too large to cut based on the limits of your cutter:



- 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:



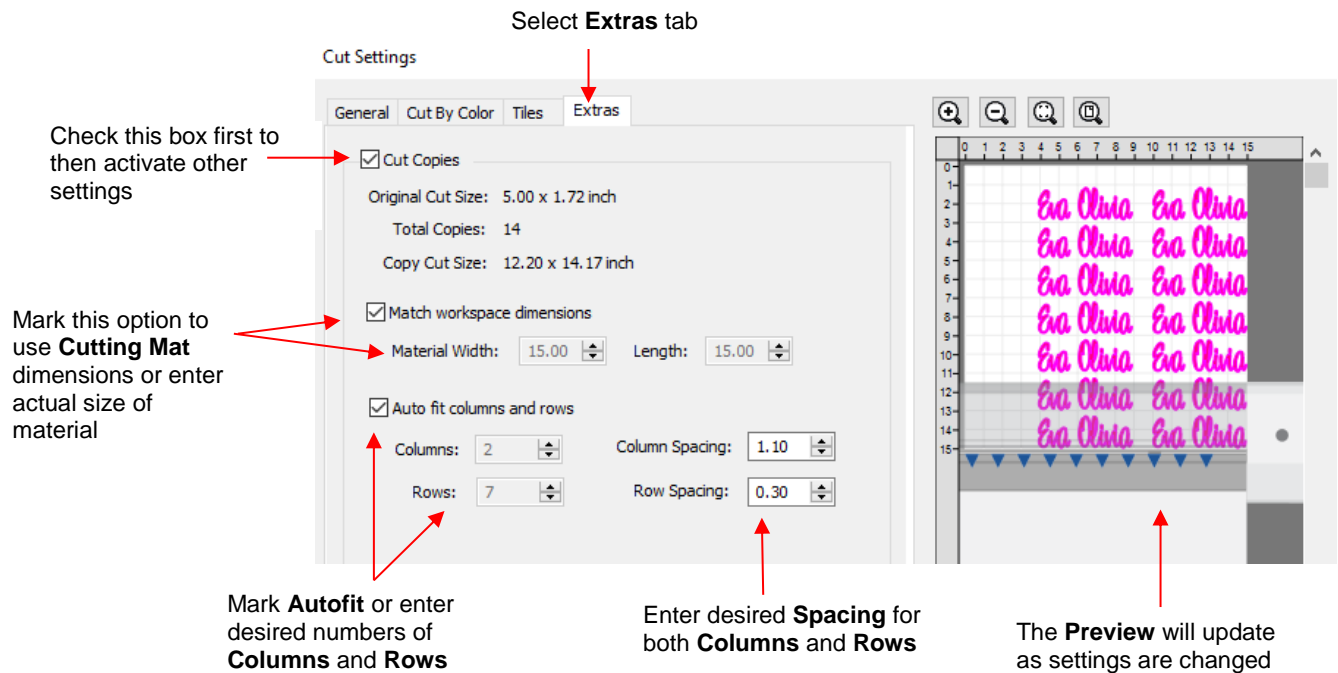
- ◇ **Cut Tiles:** Mark this option first so that the menu and preview appears.
- ◇ **Edit Tiles:** clicking this button will take you back to **Effects>Tiling** in case you need to edit the settings.
- ◇ As with **Cut by Color**, clicking on the blade icon  next to any tile will prevent that tile from 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:



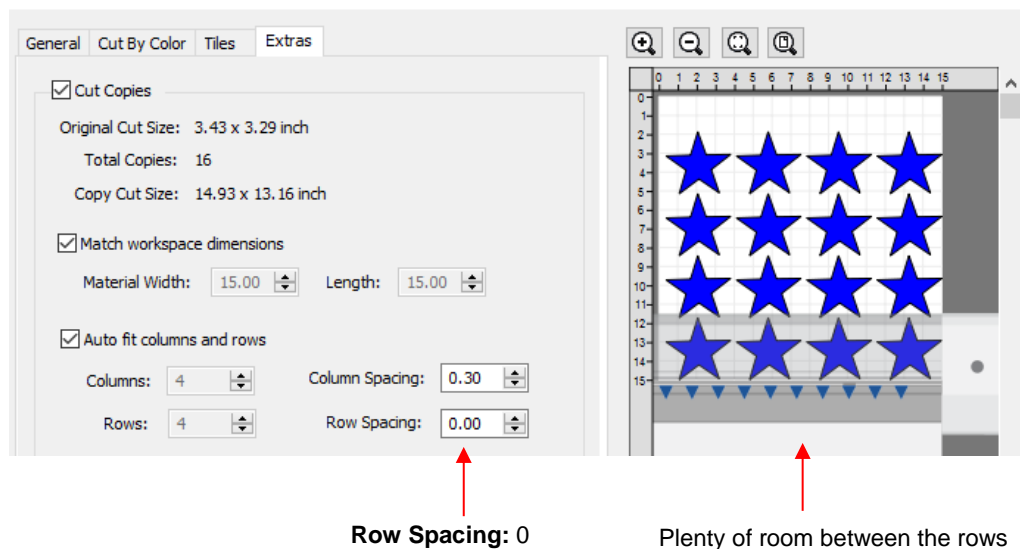
- ◇ Just as with **Cut by Color**, you can
  - Click on **Cut** to proceed with cutting that tile. After it is cut the next tile will be selected.
  - Click on **Skip Job** to skip cutting that tile and bring up the next tile
  - Click on **Stop** to cancel all cutting.

#### **10.06.4 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



- ◇ **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:



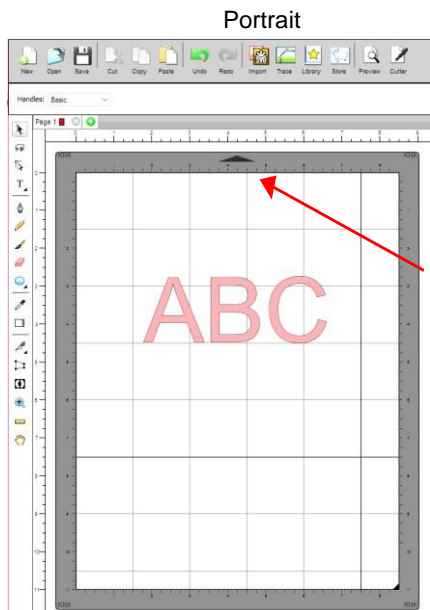
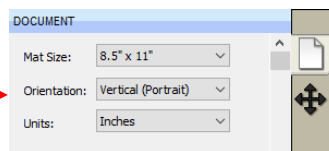
- Make sure you have all of the cut settings made under the **General** tab of the **Cut Settings** window. Once you click on **Cut**, all of the duplicates will be cut out and it appears that using **Cancel**, in the current version of SCAL, will not abort the cut.

## 10.07 Controlling Where Shapes Will Cut

### 10.07.1 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 3 available **Cut Modes** when cutting to the KNK Force:
  - ◇ **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
  - ◇ **Print and Cut** – Shapes will cut based on aligning the camera with printed registration marks (refer to *Chapter 11*)
- The **Orientation** is set on the **Document Panel**:

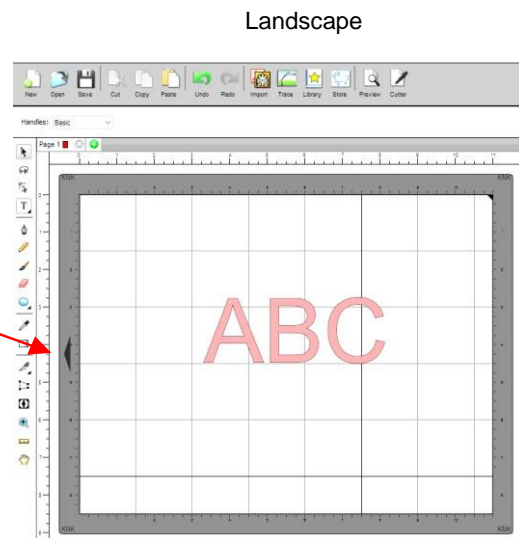
Select either **Vertical (Portrait)** or **Horizontal (Landscape)**



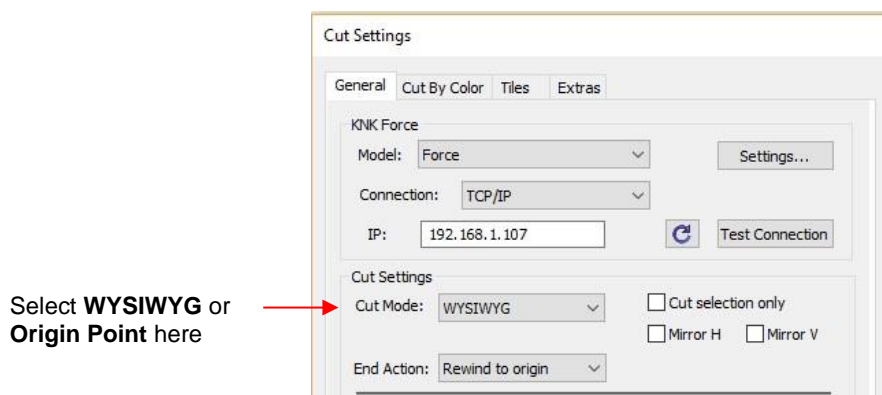
into the

Portrait

Landscape

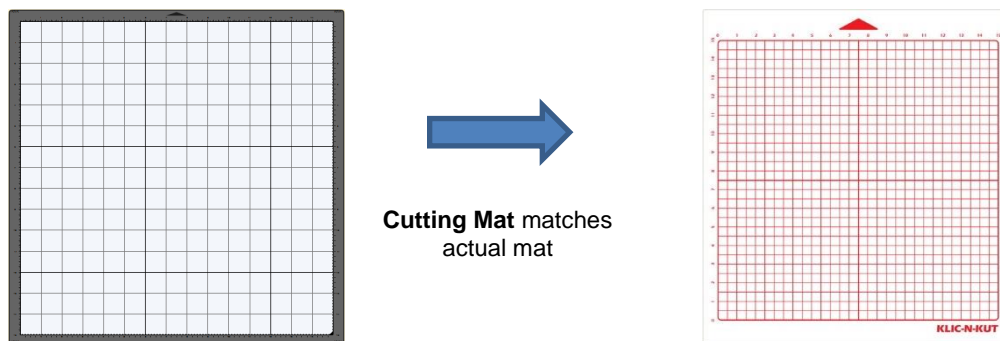


- The choice between **Portrait** and **Landscape** is a personal one – use whichever one makes the most sense to you. For long projects, such as for large vinyl cuts, **Landscape** is usually chosen because the project displays better on the computer monitor. However, you still have the option to use **Portrait**, if desired.
- The **Cut Mode** is set in the **Cut Settings** window:

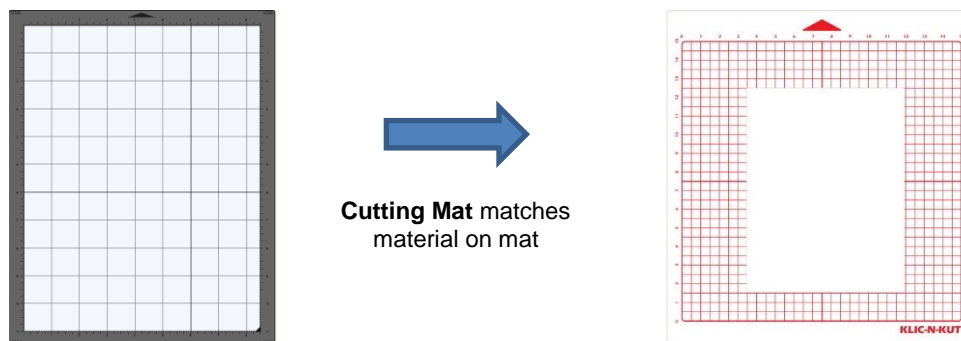


- **IMPORTANT:** Both **Cut Modes** are based on setting an XY origin on the cutter. On a Force, this origin is set by moving the tip of the blade (or pen or tool), on the left side of the dual head, to the lower right corner of the mat grid or the material.
- The following sections show where shapes 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:



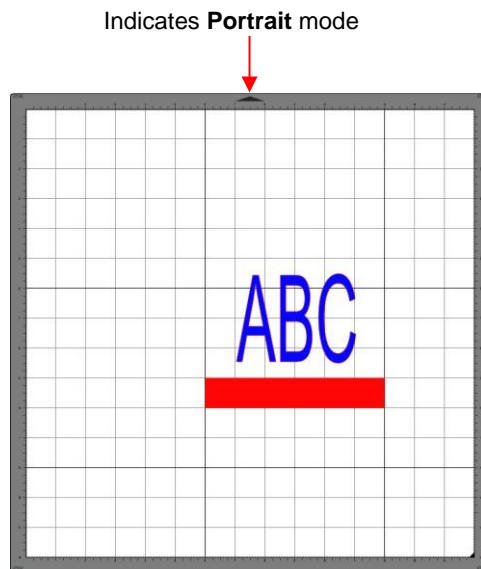
- The best way to learn how these setting affect where shapes cut is to recreate what you see in these screen shots and test them out with the test pen and paper. Eventually, it will all make sense to you and, of course, there's help available if you need it.

### 10.07.2 Origin Point

- This is the mode recommended for most applications as it economizes the use of your cutting materials.

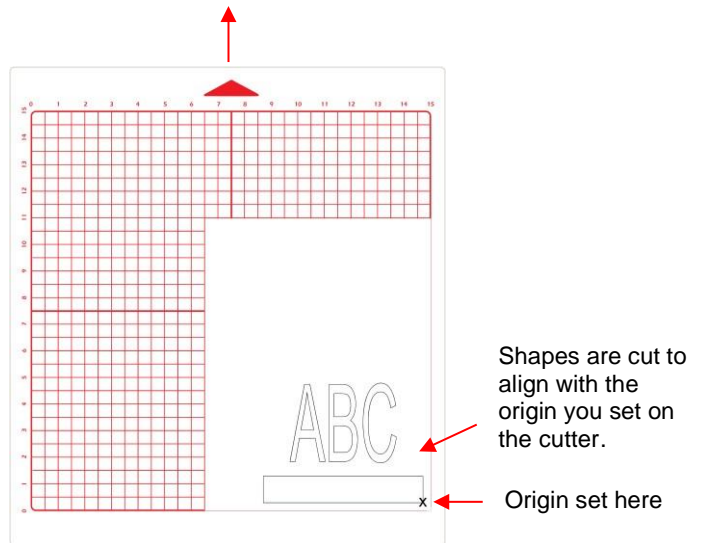
- Shapes can be located anywhere on the virtual **Cutting Mat**. The shapes will be moved and aligned to cut with the origin you set on the material. As mentioned earlier, the origin is set using the position of the **blade tip** (or other tool installed on the left side). It is typically set just inside 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**



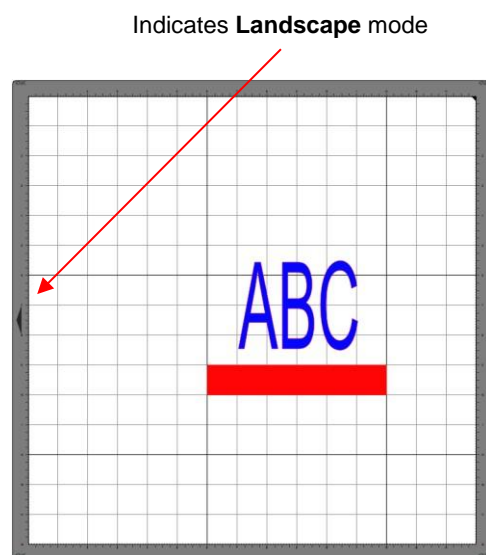
Location of shapes in SCAL

Feed the mat this direction into the cutter



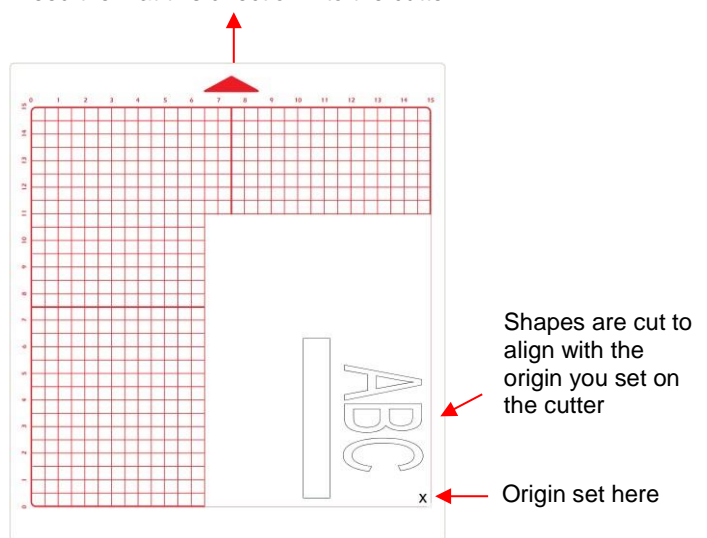
Where shapes will draw or cut on the material

#### ◇ **Origin Point – Landscape Mode**



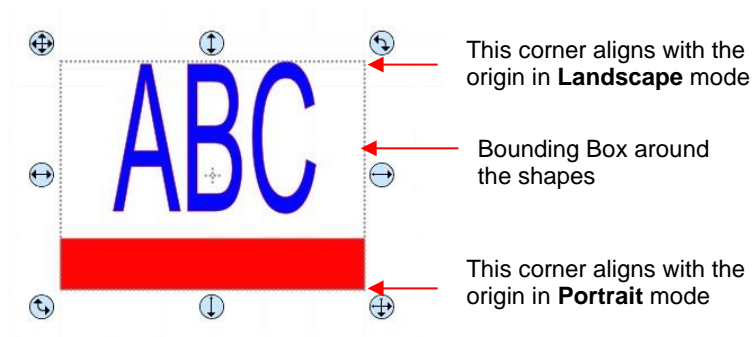
Location of shapes in SCAL

Feed the mat this direction into the cutter

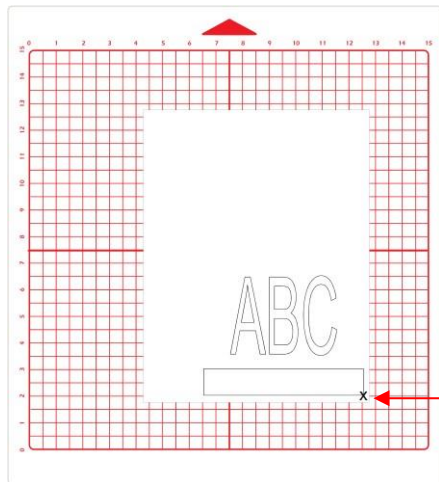


Where shapes will draw or cut on the material

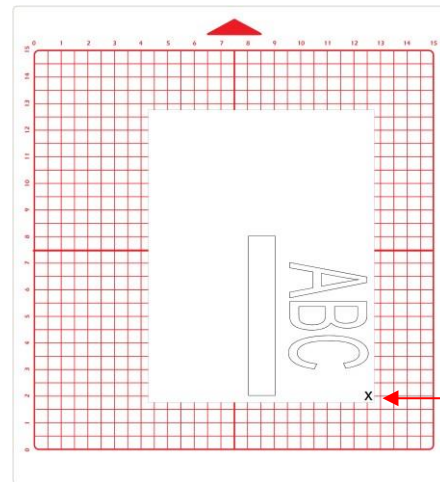
- Note that the alignment is based on the bounding box around the shapes:



- 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.



**Portrait mode**



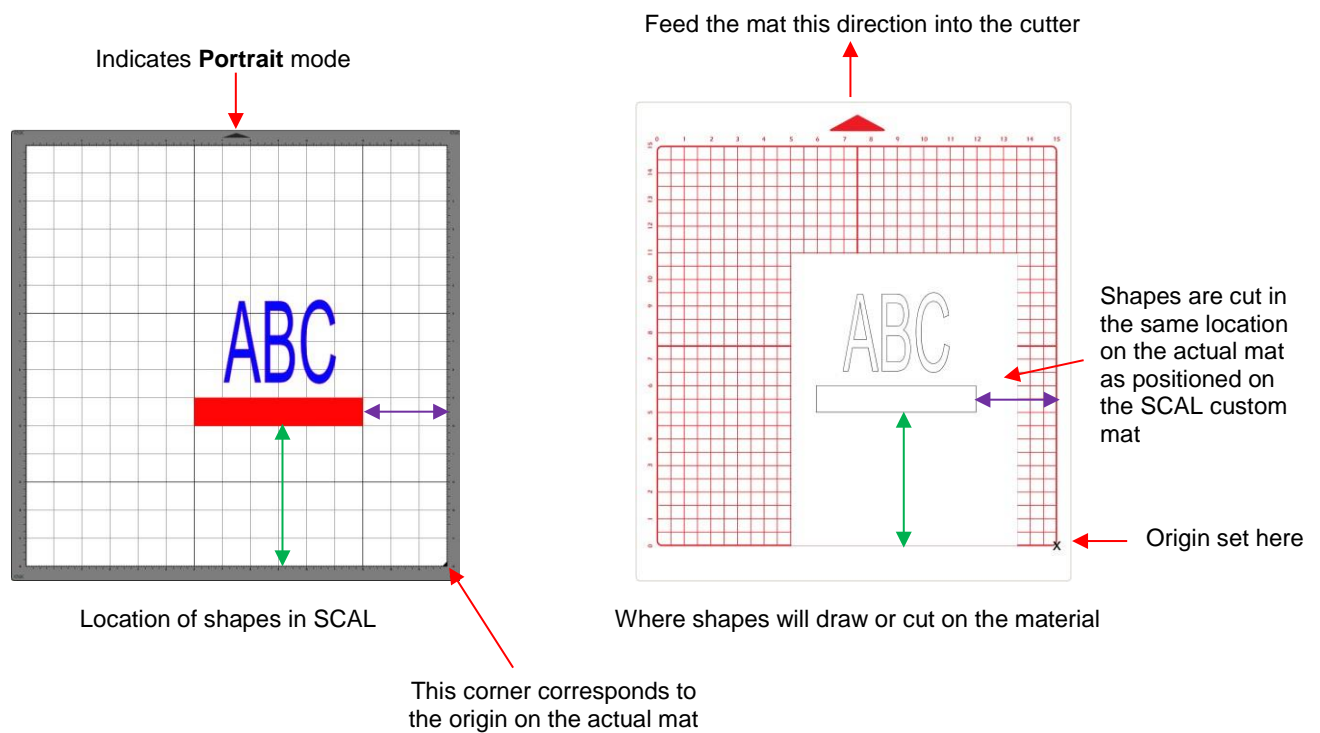
**Landscape mode**

### **10.07.3 WYSIWYG**

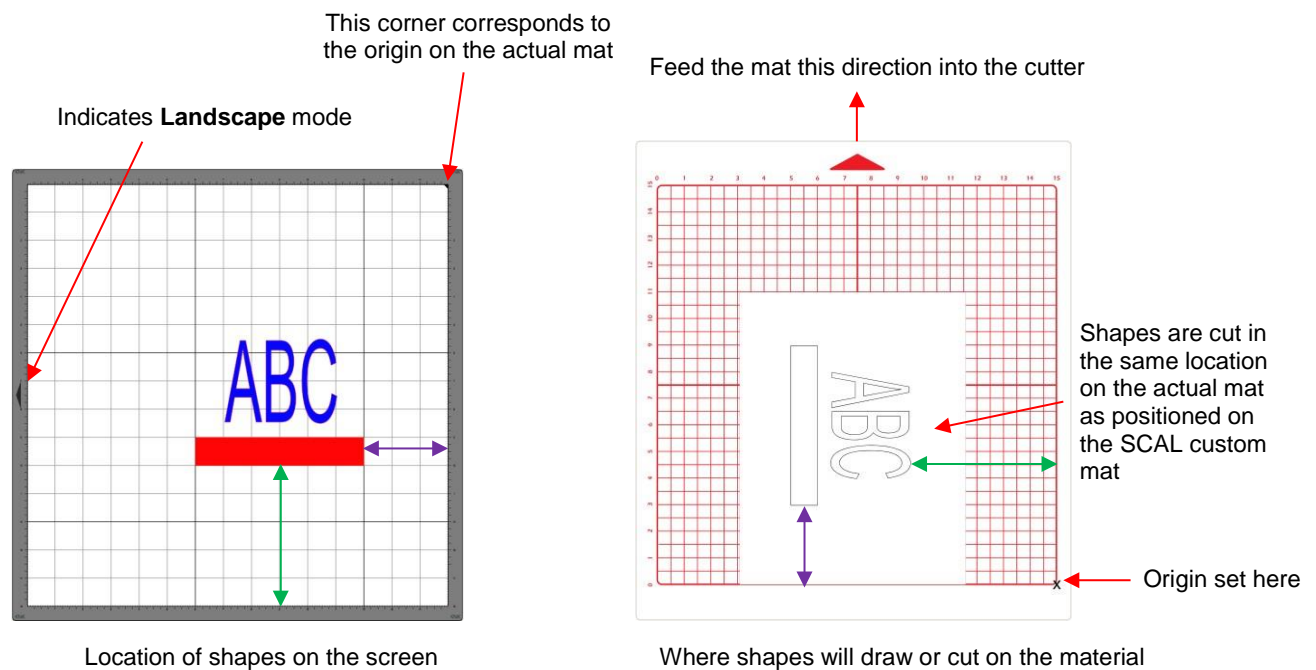
- This is the mode recommended when you need to cut shapes in very specific locations on your material (such as the center front of a greeting card).
- Shapes are cut based on where they are located on the virtual **Cutting Mat**. There are two methods used:
  - ◇ **Cutting Mat Method:** The virtual **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

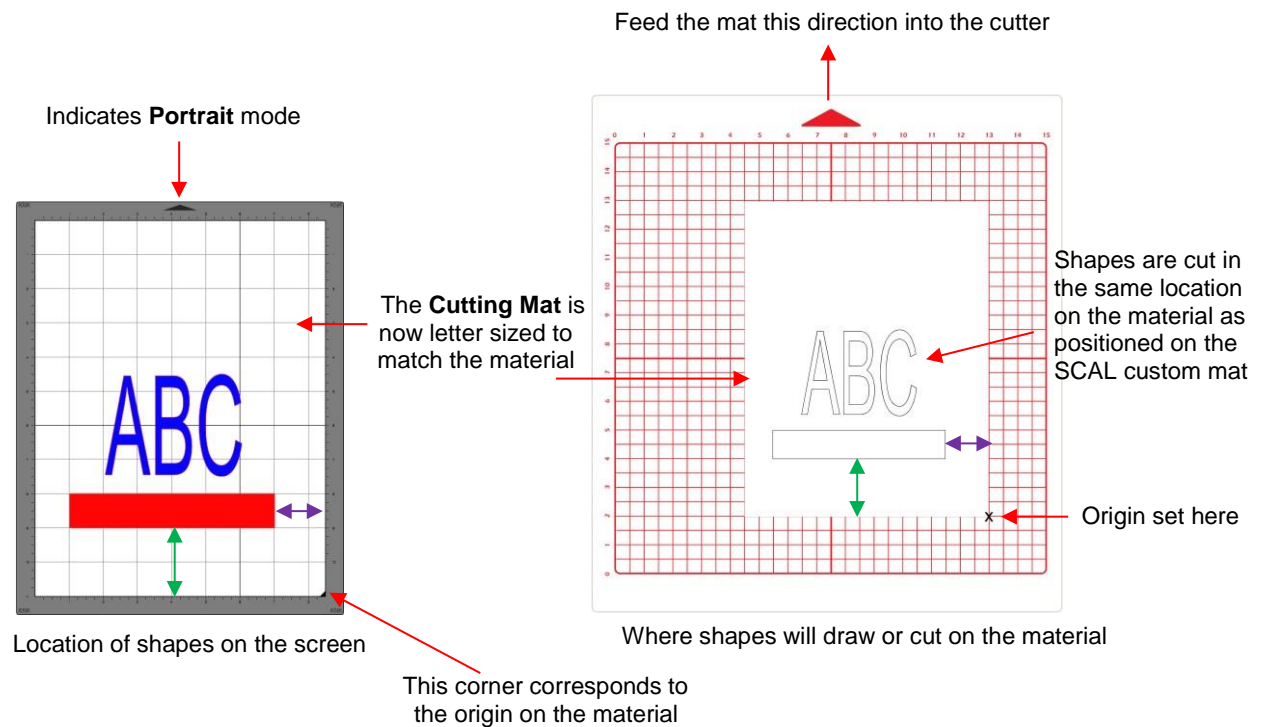


## ◇ WYSIWYG – Landscape – Cutting Mat Method

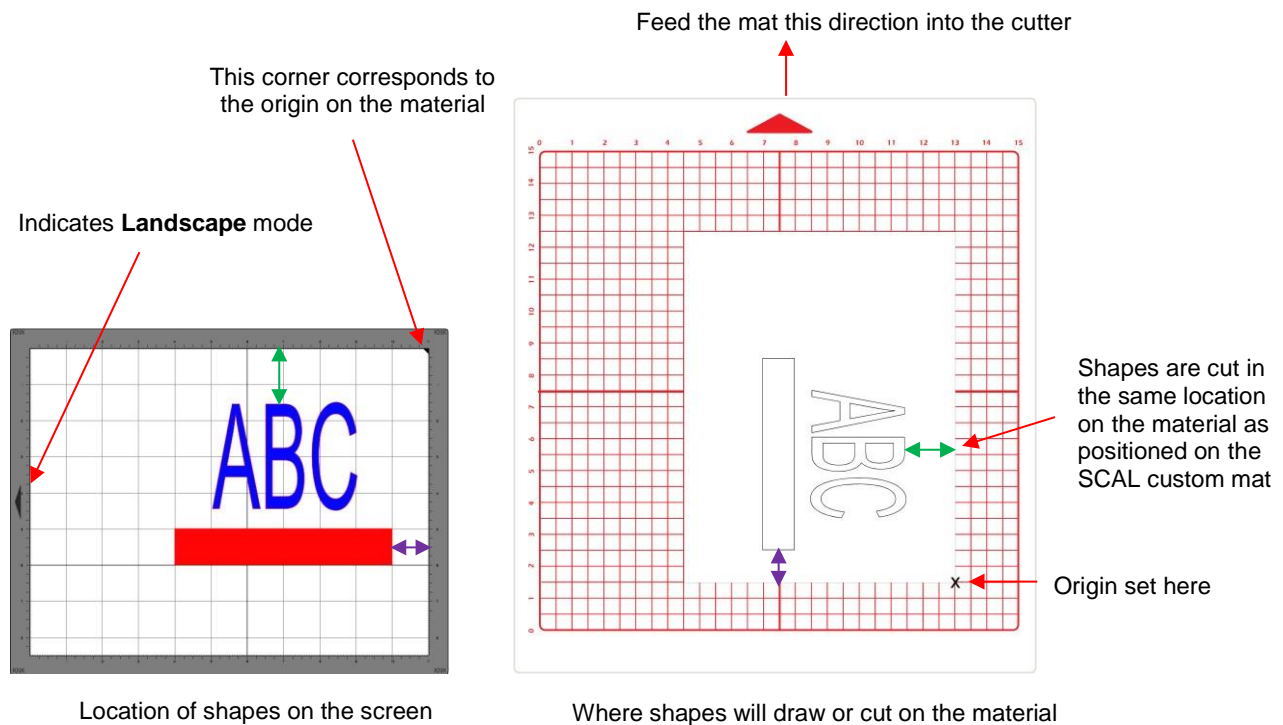




## ◇ WYSIWYG – Portrait – Material Method

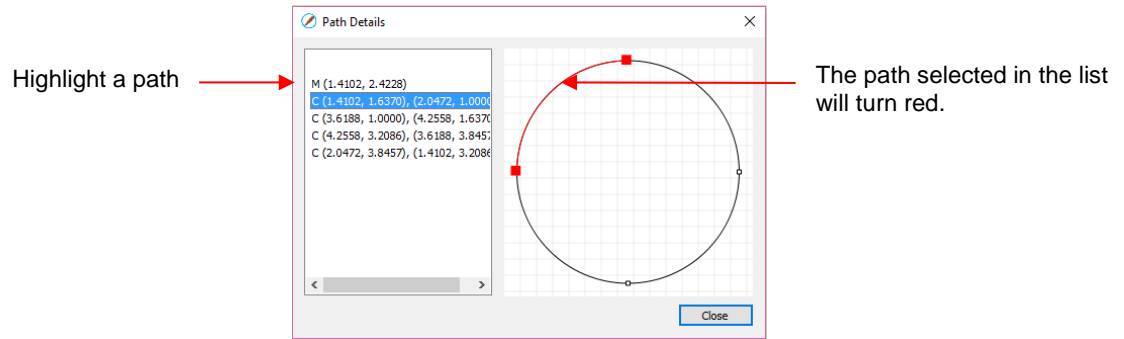


## ◇ WYSIWYG – Landscape – Material Method

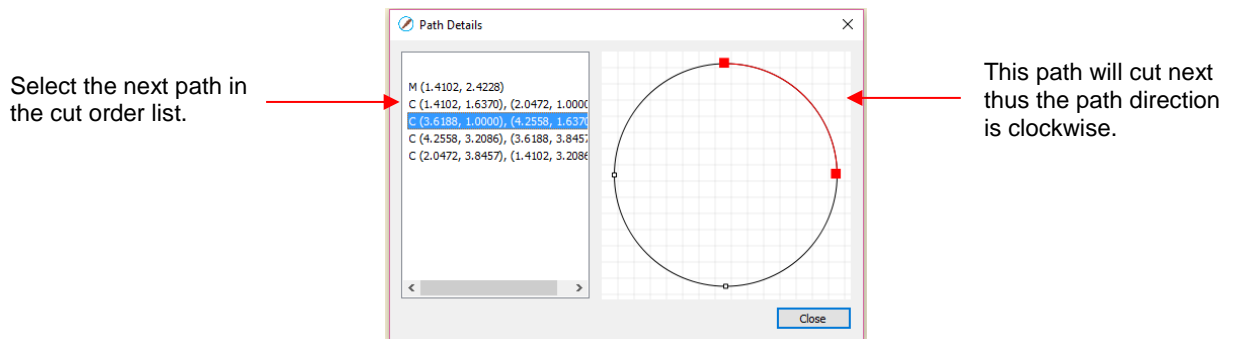


## 10.08 Path Details and Reverse Path

- 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:



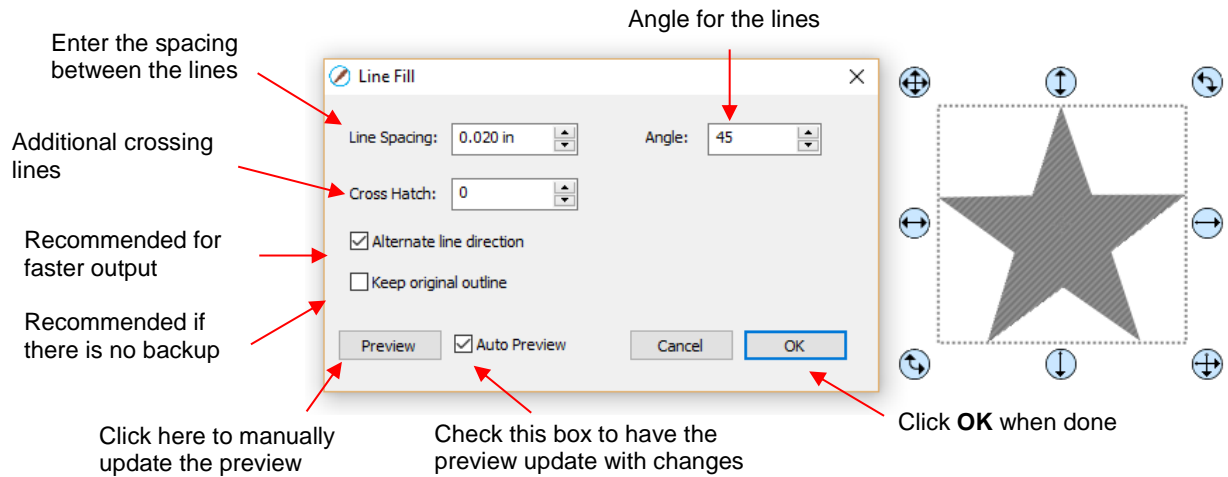
- ◇ Select the next path in the list and you will then be able to determine the direction of the cut:



- 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**

## 10.09 Line Fill

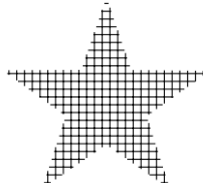
- The **Line Fill** function creates a line or hatch fill pattern, typically used for engraving with an engraving tool. It can also be used for coloring in shapes with a pen or embossing some materials with an embosser.
- To access this function, select a shape and go to **Effects>Line Fill**:



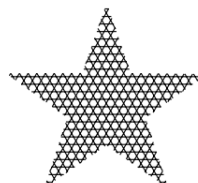
- ◇ **Line Spacing:** This is selected based on the width of the line produced by the tool to be used. If it's too small to accurately measure, use 0.02" or 0.5 mm for a small test shape and then adjust, as needed, to fit the tool and application.
- ◇ **Angle:** Choose an angle for the **Line Fill**. 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:



**Cross Hatch = 0**



**Cross Hatch = 1**

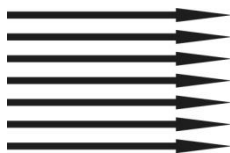


**Cross Hatch = 2**

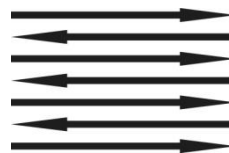


**Cross Hatch = 4**

- ◇ **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

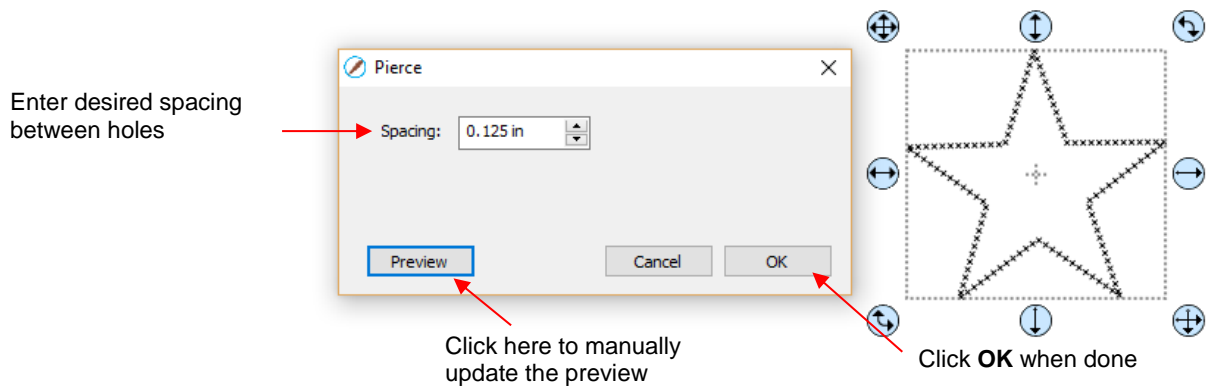
- ◇ **Keep Original Outline:** Usually a good idea in case you want to revise your pattern later on. Also, when working with lettering, having the outline improves readability:



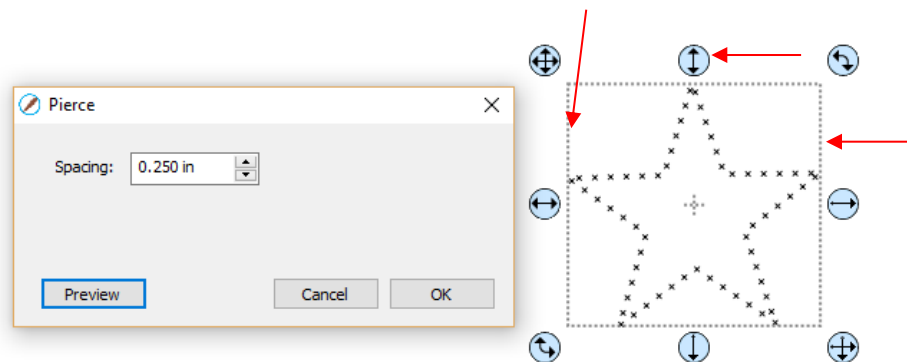
- For more information on using an engraver, refer to *Section 12.06*.

## 10.10 Pierce

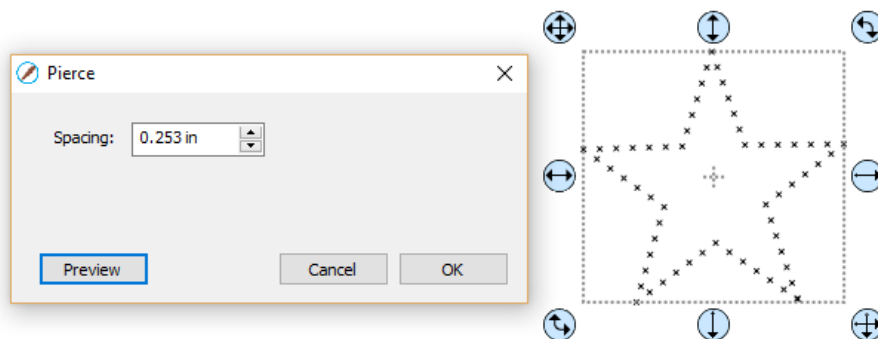
- The **Pierce** function creates holes for punch tools. This can be used to create pergamano designs and paper embroidery patterns.
- To access this function, select a shape and go to **Effects>Pierce**:



- 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**.
- For more information on using a punch tool, refer to *Section 12.07*.


## Appendix A SCAL: Key Board Shortcuts










| <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<br>i:Toolbar            |
| Ctrl+O                                   |  | Open an existing .scut file/project   | m:File>Open Project<br>i:Toolbar           |
| Ctrl+S                                   |  | Save a file/project                   | m:File>Save Project<br>i:Toolbar           |
| Ctrl+Shift+S                             |   | Save file/project in new location     | m:File>Save Project As                     |
| Ctrl+P                                   |   | Print                                 | m:File>Print                               |
| Ctrl+Z                                   |  | Undo last action                      | m:Edit>Undo<br>i:Toolbar                   |
| Ctrl+Shift+Z                             |  | Redo last action                      | m:Edit>Redo<br>i:Toolbar                   |
|  |  | Open Document 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**








|                                     |   |  |   |
|-------------------------------------|---|--|---|
| Click icon and drag mouse           |  | Zoom in on selected area                           | i:Tools Panel                                       |
| Ctrl+ +++ (or right click>Zoom In)  |  | Zoom in  | m:View>Zoom In<br>i:Tools Panel>Tool Options        |
| Ctrl+ --- (or right click>Zoom Out) |  | Zoom out   | m:View>Zoom Out<br>i:Tools Panel>Tool Options       |
|                                     |  | Zoom to selected shape                             | m:View>Zoom Selection<br>i:Tools Panel>Tool Options |
| Ctrl+F                              |  | Zoom so cutting mat fits in window                 | m:View>Fit to Window<br>i:Tools Panel>Tool Options  |
| Alt+roll mouse wheel                |   | Zoom in and out, centered on middle of cutting mat |   |
| Spacebar+drag left mouse button     |  | Pan workspace                                      | i:Tools Panel                                       |

### **Help**











|    |   |                   |                    |
|----|---|-------------------|--------------------|
|    |  | Open Hints window | i:Properties Panel |
| F1 |   | Open Help window  | m:Help>Help        |

| <u>Shortcut</u>                              | <u>Icon</u>   | <u>Description</u>                                 | <u>Menu (m:) and/or Icon (i:) Location</u> |
|--|---|--|--|
| <b>Importing and Exporting</b>               |   |  |  |
| Ctrl+Shift+I                                 |    | Import a file                                      | m:File>Import<br>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<br>i:Toolbar            |
| Ctrl+1                                       |    | Open the Library window                            | m:Window>Library<br>i:Toolbar              |
|  |    | Open the eshape store window                       | m:File>eshape Store<br>i:Toolbar           |
| <b>Selecting and Moving Shapes</b>           |   |  |  |
| Click on shape                               |    | Left click on shape to select it                   | i:Tools Panel                              |
| Shift + click on shape                       |   | Add additional shapes to selection                 |  |
| 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                                 |   | Deselect all shapes                                | m:Edit>Deselect All                        |
| Right click>Transform>Move                   |   | Move a shape to a new location                     |  |
| <b>Duplicating Shapes</b>                    |   |  |  |
| Alt + drag shape                             |   | Creates a duplicate of the shape being dragged     |  |
| Alt + click on shape                         |   | Creates a duplicate of shape on top of original    |  |
| Ctrl+C (or right click>Copy)                 |  | Copy to clipboard                                  | m:Edit>Copy<br>i:Toolbar                   |
| Ctrl+V (or right click>Paste)                |  | Paste from clipboard                               | m:Edit>Paste<br>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                 |
| <b>Cutting/Deleting Shapes</b>               |   |  |  |
| 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           |  |





**Shortcut****Icon****Description****Menu (m:) and/or Icon (i:) Location****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       |
|  |  | Add font to Favorites                  | i:Text Panel       |
|  |  | Type text                              | i:Tools Panel      |
|  |  | Connect interior shapes to the outside | i:Tools Panel      |

**Library**










|        |   |   |   |
|--------|---|---|---|
| Ctrl+1 |    | Open the Library window                     | m:Window>Library<br>i:Toolbar                 |
|        |    | Add folder                                  | i:Library>Shapes tab<br>i:Library>Project tab |
|        |   | Delete folder                               | i:Library>Shapes tab<br>i:Library>Project tab |
|        |  | Add file to selected folder                 | i:Library>Shapes tab<br>i:Library>Project tab |
|        |  | Refresh                                     | i:Library>Shapes tab<br>i:Library>Project tab |
|        |  | Change to List View                         | i:Library>Shapes tab<br>i:Library>Project tab |
|        |  | Change to Thumbnail View                    | i:Library>Shapes tab<br>i:Library>Project tab |
|        |  | Search on keyword                           | i:Library>Shapes tab<br>i:Library>Project tab |
|        |  | Sync with eStore or access Download Manager | i:Library>Shapes tab<br>i:Library>Project tab |
|        |  | Temporarily open a font                     | 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 |

| <u>Shortcut</u>                                       | <u>Icon</u>   | <u>Description</u>  | <u>Menu (m:) and/or Icon (i:) Location</u> |
|---|---|---|--|
| <b>Manipulating and Coloring Shapes (continued)</b>   |   |   |  |
| 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                             |
|   |  | Open Fill & Stroke Panel                                  | i:Properties 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 the Layers Panel | i:Properties Panel                                      |
| Right click>Hide   |  | Hide a layer          | m:Object>Hide<br>i:Layers Panel                         |
|  |  | Show a layer          | i:Layers Panel  |
| Click icon + Show/Hide>Hide All Layers                           |  | Hide all layers       | m:Layer>Show/Hide>Hide All Layers<br>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<br>i:Layers Panel     |
| Ctrl+Alt+L (or right click>Lock)                                 |  | Lock a layer          | m:Object>Lock<br>i:Layers Panel                         |
|  |  | Unlock a layer        | i:Layers Panel  |
|  |  | Lock all layers       | m:Layer>Lock/Unlock>Lock All Layers<br>i:Layers Panel   |
| Ctrl+Alt+Shift+L (or right click>Unlock All)                     |  | Unlock all layers     | m:Layer>Lock/Unlock>Unlock All Layers<br>i:Layers Panel |













| <u>Shortcut</u>                 | <u>Icon</u>   | <u>Description</u>        | <u>Menu (m:) and/or Icon (i:) Location</u>     |
|---------------------------------|---|---------------------------|--|
| <b>Layers Panel (continued)</b> |   |                           |  |
| Right click>Delete              |  | Delete the selected layer | m:Layer>Delete Current Layer<br>i:Layers Panel |
|                                 |  | Create a new layer        | m:Layer>Add Layer Folder<br>i:Layers Panel     |
|                                 |  | Open Layer Options Menu   | i:Layers Panel                                 |

### 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 |
|   |    | Draw straight lines and Bézier curves  | i:Tools Panel           |
|   |    | Freehand draw thin lines   | i:Tools Panel           |
|   |  | Freehand draw thick lines  | i:Tools Panel           |
|   |  | Draw basic shapes: rectangle, rounded rectangle, circle, triangle, polygon, star, 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

|                                 |   |   |                                    |
|---------------------------------|---|---|------------------------------------|
|                                 |  | Move or reshape a path or move and edit nodes           | i:Tools Panel                      |
|                                 |  | Erase parts of a shape                                  | i:Tools Panel                      |
|                                 |  | Make thin, straight-line cuts through a shape           | i:Tools Panel                      |
|                                 |  | 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                      |
| 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<br>i:Tools Panel |

| <u>Shortcut</u>                            | <u>Icon</u>   | <u>Description</u>   | <u>Menu (m:) and/or Icon (i:) Location</u> |
|--|---|--|--|
| <b>Editing Tools (continued)</b>           |   |  |  |
| 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

|              |   |   |   |
|--------------|---|---|---|
|              |    | Open controller window for current default cutter | m:Cutter>Cut with (name of cutter)<br>i:Toolbar |
| Ctrl+Shift+P |    | Show preview of cut shapes                        | m:Cutter>Preview<br>i:Toolbar                   |
| Ctrl+P       |   | Open print window                                 | m:File>Print                                    |
|              |  | Open Style Panel                                  | i:Properties Panel                              |