

Sure Cuts A Lot 6 User Manual

March 20, 2025

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

Do I Have to Read All of this Manual?

- Not unless you need it as a sleeping aid! ☺ Think of this as a reference book. But if you want to learn the basic functions, here are some recommended sections for a new SCAL user:

Chapter 1: All

Chapter 2: 2.01 - 2.04, 2.06.1, 2.07.1

Chapter 3: 3.01 - 3.06, 3.08 - 3.15, 3.17

Chapter 4: 4.01 - 4.04.1, 4.06, 4.07, 4.13, 4.14

Chapter 5: 5.01, 5.02, 5.03, 5.04.1

Chapter 6: 6.01, 6.06, 6.08, 6.09

Chapter 7: 7.01, 7.04.1, 7.05.1, 7.23

Chapter 8: 8.01, 8.02, 8.06.1, 8.07, 8.12.1 - 8.12.3

Also Note

- This manual presents information by topics versus location on the screen. If you wish to look up all of the functions in one particular location, complete coverage of **Panels**, **Bars**, and **Preferences** is covered in the following *Expanded Tutorial*: <https://tinyurl.com/mr2uhwa2>
- A complete list of all shortcuts is located at this link: <https://tinyurl.com/yck2e85v>
A *Troubleshooting Guide* is available here: <https://tinyurl.com/nhkvv2d7>
- To keep this manual from becoming a monstrosity, there are *Expanded Tutorials* linked “here and there” for those who want or need to obtain more details about a particular function.

Are There Any Videos?

- Please visit my SCAL Support page for recommended videos: <https://www.iloveknk.com/support/sure-cuts-a-lot-scal-support/>
- While you may be able to find some free videos on You Tube, be cautious as some of them are using older versions of SCAL and others are made by people who haven’t mastered the software and, as a result, present inaccurate and misleading information.

Should I Print the Manual?

- Because I like to keep the manual up-to-date with frequent updates and new findings, I recommend you do not print the entire document. Instead use **Ctrl+F (command+F)** to search on a particular function.

Is This Manual for PC Users Only?

- While a PC was used for taking screenshots to include in this manual, most if not all of the windows are virtually identical in the Mac version.
- An attempt has been made to include shortcut keys for both PC and Mac users. Where I may have failed to include the Mac equivalent, note that **Ctrl** on a PC is replaced with **Command** on a Mac and **Alt** on a PC is replaced with **Option** on a Mac.

Feedback

- I strive to provide well-written and accurate information on all functions within this superb program. If you find any errors, feel free to email me at smccauley45@cox.net.

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1. SCAL: Installation, Preferences, and Workspace

1.01 Installing SCAL

1.01.1 Selecting and Downloading the Software

- *Sure Cuts A Lot 6* (SCAL6) can be downloaded from the following link. Note that there are four choices - Mac or PC and then regular or PRO:

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

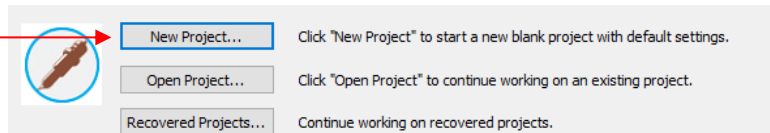
- The additional features in the PRO version are listed below. You can also find out more details about these features at the following link:

http://www.iloveknk.com/wp-content/uploads/Info/SCAL6_Pro_Features.pdf

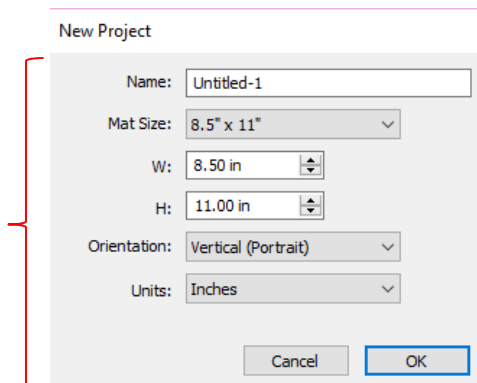
- ◇ Ability to cut longer than 72 inches
- ◇ Weeding – add weeding boxes and internal lines
- ◇ Tiling – splitting large designs into sections for cutting
- ◇ Duplicate cutting – setting up a grid of repeats in the cutting window
- ◇ Cut by color
- ◇ Cut by layer – use different settings, as needed
- ◇ Cut order control
- ◇ End action options – where cutting head moves at the end of a cut
- ◇ Color layer alignment
- ◇ 3D extrude
- ◇ Barcode generator
- ◇ Importing DXF, PLT

- Install the downloaded file and open SCAL. An initial window will open where you can choose if you are starting a new project, opening an existing project, or recovering a project after a software crash. Because this is the first time you are opening SCAL6, choose **New Project** and accept the defaults shown:

Click on **New Project**



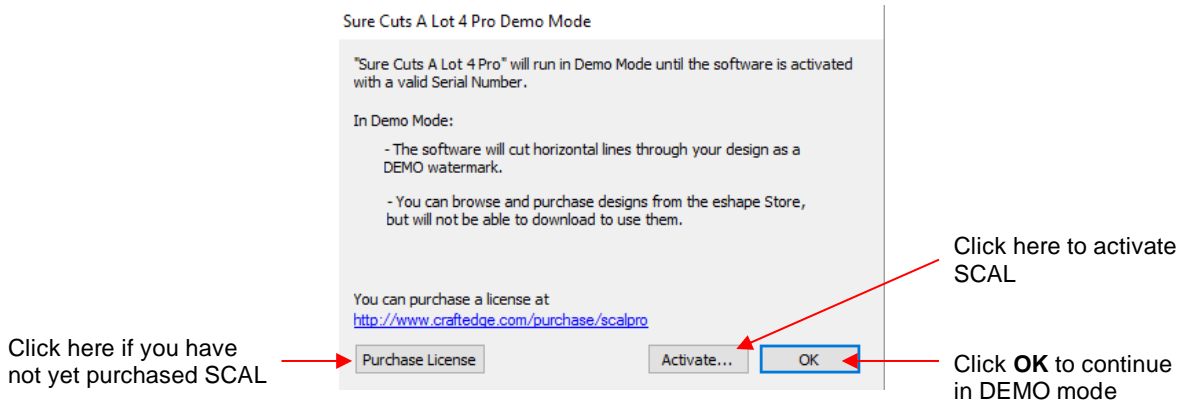
Accept whatever settings are shown. Later in this chapter, details about these settings will be covered.



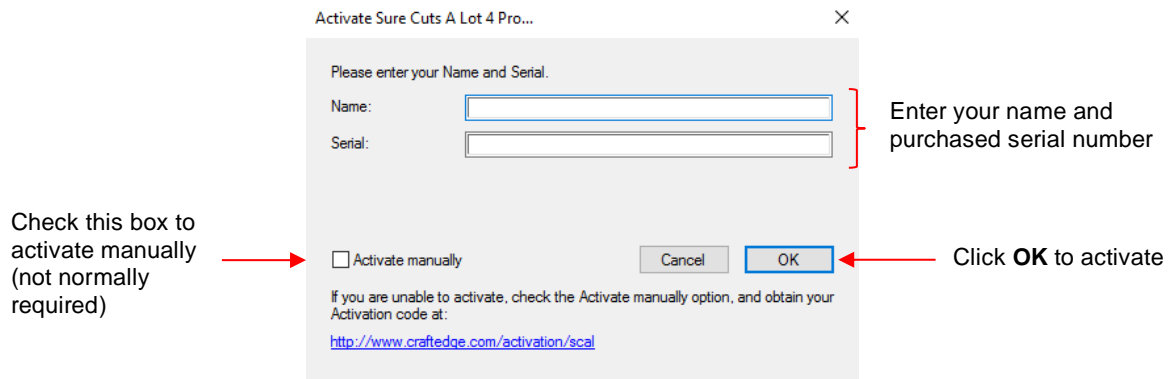
- The software will run in DEMO mode until a registration is purchased. This mode will have the following limitations:
 - ◊ When cutting, horizontal lines will be added across the design
 - ◊ Digital shapes from the **Store (Cutter's Market)** cannot be downloaded
 - ◊ Exporting will add a DEMO watermark
- Note that the demo version of SCAL6 will expire after 15 days.

1.01.2 Activating the Software

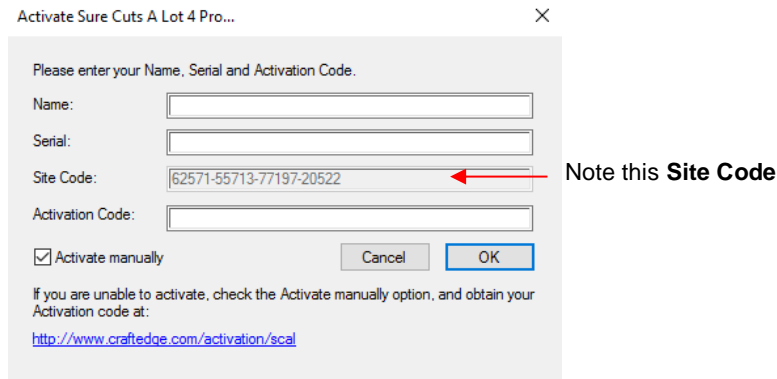
- To convert the DEMO version into a registered version, click on **Activate** when opening the software and seeing this popup screen:



- **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.craftededge.com/activation/scal/>

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

[Standard Activation Video Tutorial](#)
[Manual Activation Video Tutorial](#)

Name: Enter your name and purchased serial number

Serial: What is this?
Please enter your full name
(example: 12345-12345-12345-12345-12345)

Site Code: What is this?

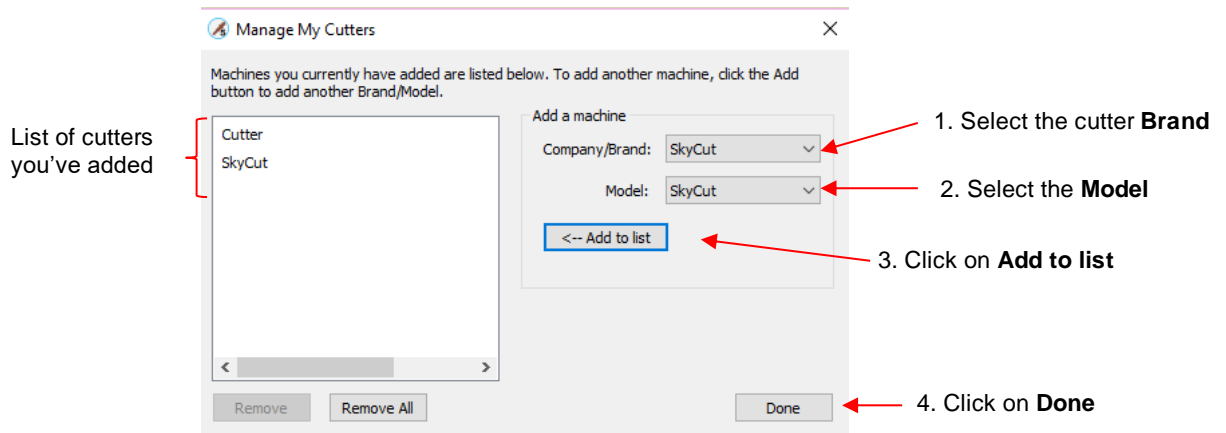
Click here Enter the **Site Code**

- 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.

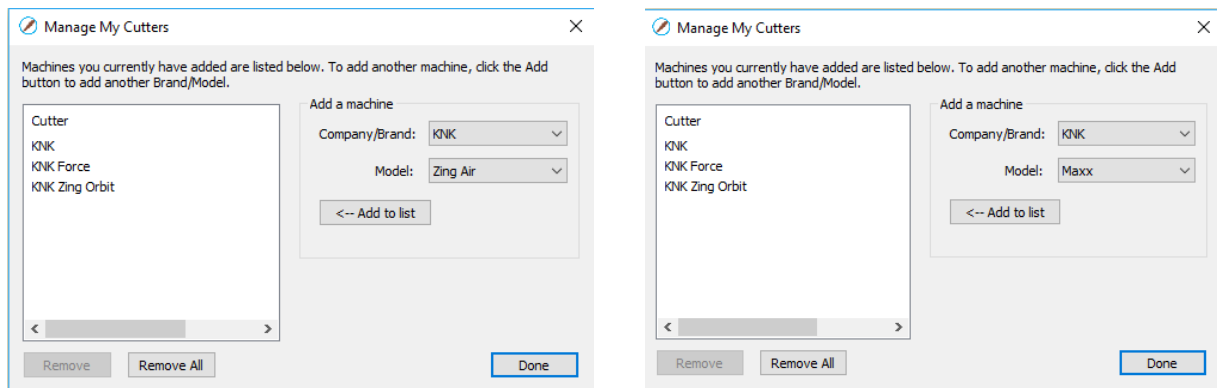
1.01.3 Installing Your Cutter

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

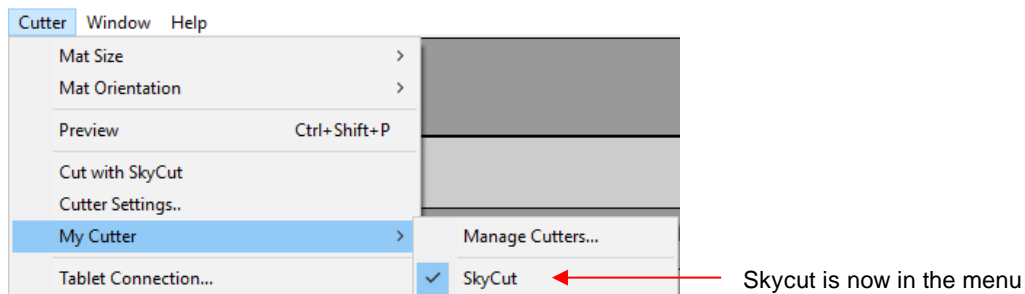
- Go to **Cutter>My Cutter>Manage Cutters** and the following window will open:



- As shown in the above 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.

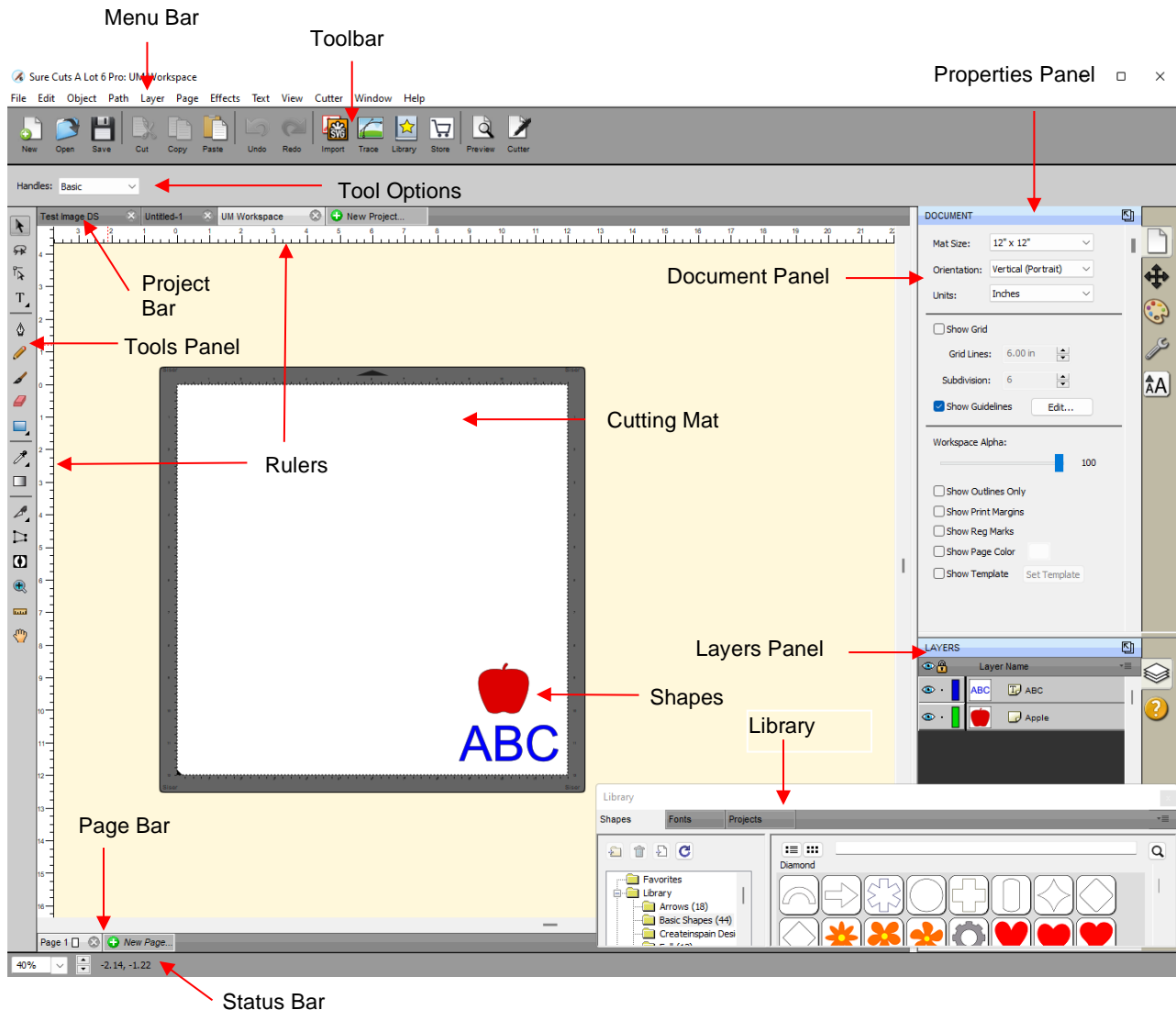


- Click on **Done** to save and close the window. Now, when you are ready to cut, the cutter you selected will be located and marked in the **Cutter>My Cutter** menu:



1.02 Main SCAL Screen

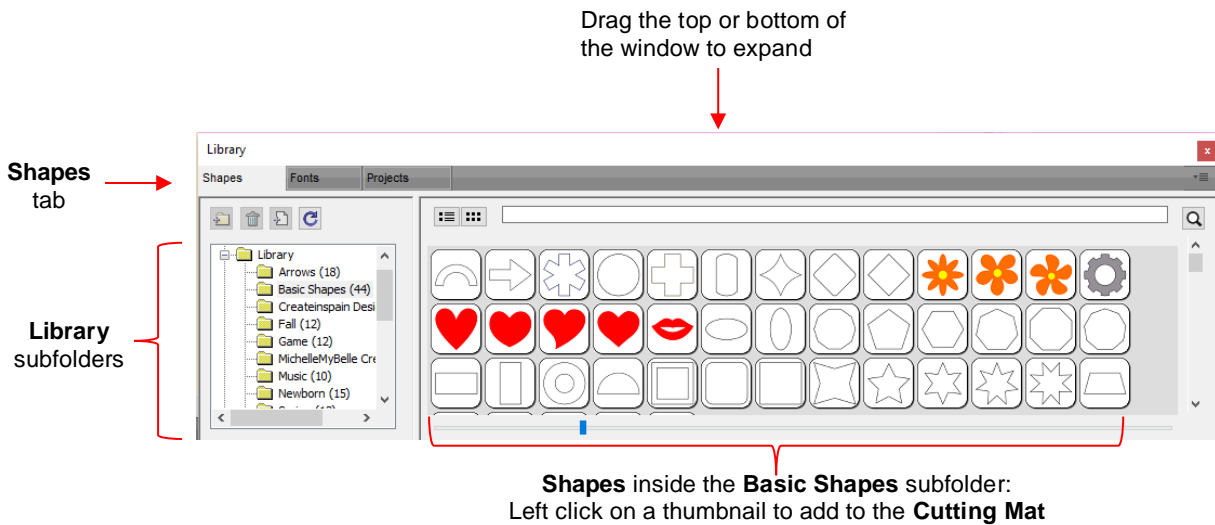
- The following screenshot of the main screen in SCAL identifies various elements. Note the names of the items shown as they will be referenced throughout this user manual. New to SCAL6 is the ability to work above and to the left of the main **Page** area:




- 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**).
- Four of the bars can be hidden and shown, as desired, by going to **View** and selecting either **Hide** or **Show** next to the bar you wish to change. On a Mac, there's also an option to **Enter Full Screen** in the **View** menu.
- Throughout this manual, **Cutting Mat** or **Page** (capitalized and in bold type) refers to the on-screen simulation of the physical cutting mat, which will be written with lower case, normal type.
- The **Rulers** can be toggled on and off by right-clicking on the screen and selecting **Show Rulers**. When hiding the rulers, click again on the screen for it to take effect. To change the units displayed on the **Rulers**, refer to *Section 1.06.3*.
- **Shapes** are the objects or images that you will be adding to your projects. They can be created from scratch or imported from other sources, such as the **Library**, your computer, or the **Cutter's Market Store**. As you will see throughout sections of this user manual, you have many options and resources available to you.
- Complete coverage of **Panels**, **Bars**, and **Preferences** is covered in the following *Expanded Tutorial*:
<https://tinyurl.com/mr2uhwa2>

1.03 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 **Cutter's Market Store**
- The **Library** can be opened by using one of the following:
 - ◇ Click on **Library** icon on the upper **Toolbar** 
 - ◇ Press **Ctrl+1**
 - ◇ Go to **Window>Library** or **Window>Workspace>Basic** (or **Advanced**)
 - To add a shape from the **Library** to the **Cutting Mat**, click on the thumbnail for that shape or drag the shape onto the **Cutting Mat**. Note there are other categories within the **Library** listed on the left side. Check out the various subfolders of shapes as they are a great resource while learning SCAL and testing out your cutter.
 - Further details on organizing and fully utilizing the **Library** is covered in *Section 2.03*.

1.04 Properties Panel

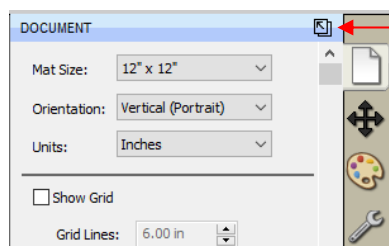
- The **Properties Panel** is located on the right side of the screen. Seven large icons represent seven different panels that you will frequently switch between:

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

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

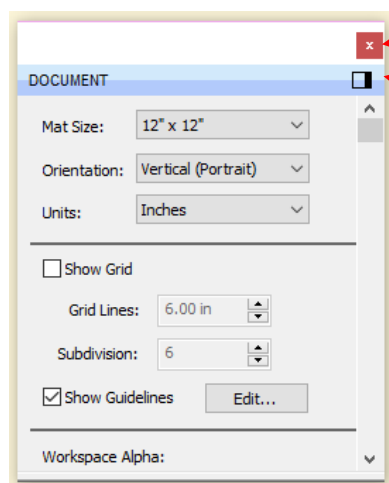
- ◇ **Fill & Stroke Panel**  : contains properties for the fill and for the stroke on any currently-selected shapes in the project. Refer to *Sections 3.14* and *3.15*.
- ◇ **Style Panel**  : contains properties pertaining to how selected shapes will be cut or printed. Refer to *Section 8.01*.
- ◇ **Text Panel**  : contains properties pertaining to how text will appear. Refer to *Section 4.05*.
- ◇ **Layers Panel**  : lists all shapes in the current project with options to organize, hide/show, lock/unlock and more. Refer to *Section 2.04*.
- ◇ **Help Panel**  : opens a user guide to a section based on the currently selected tool. More tips and instructions can be found under **Help>Help**.

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



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

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



Click here to close a panel

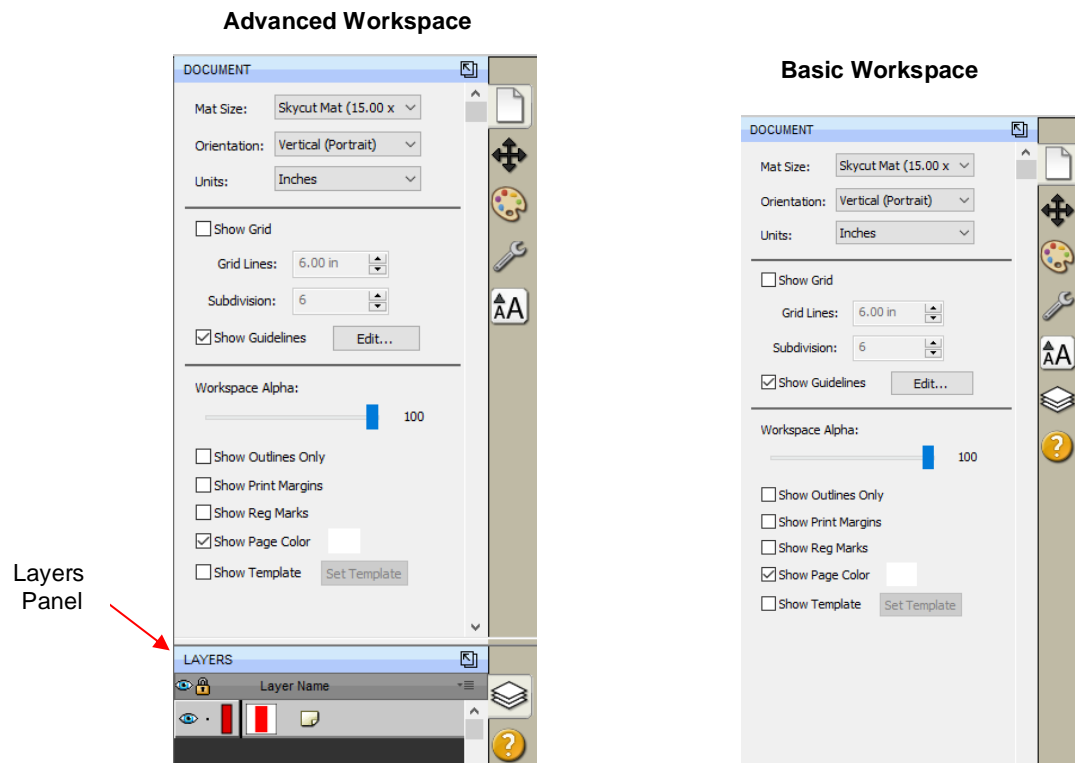
Click here to return a panel to the **Properties Panel**

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

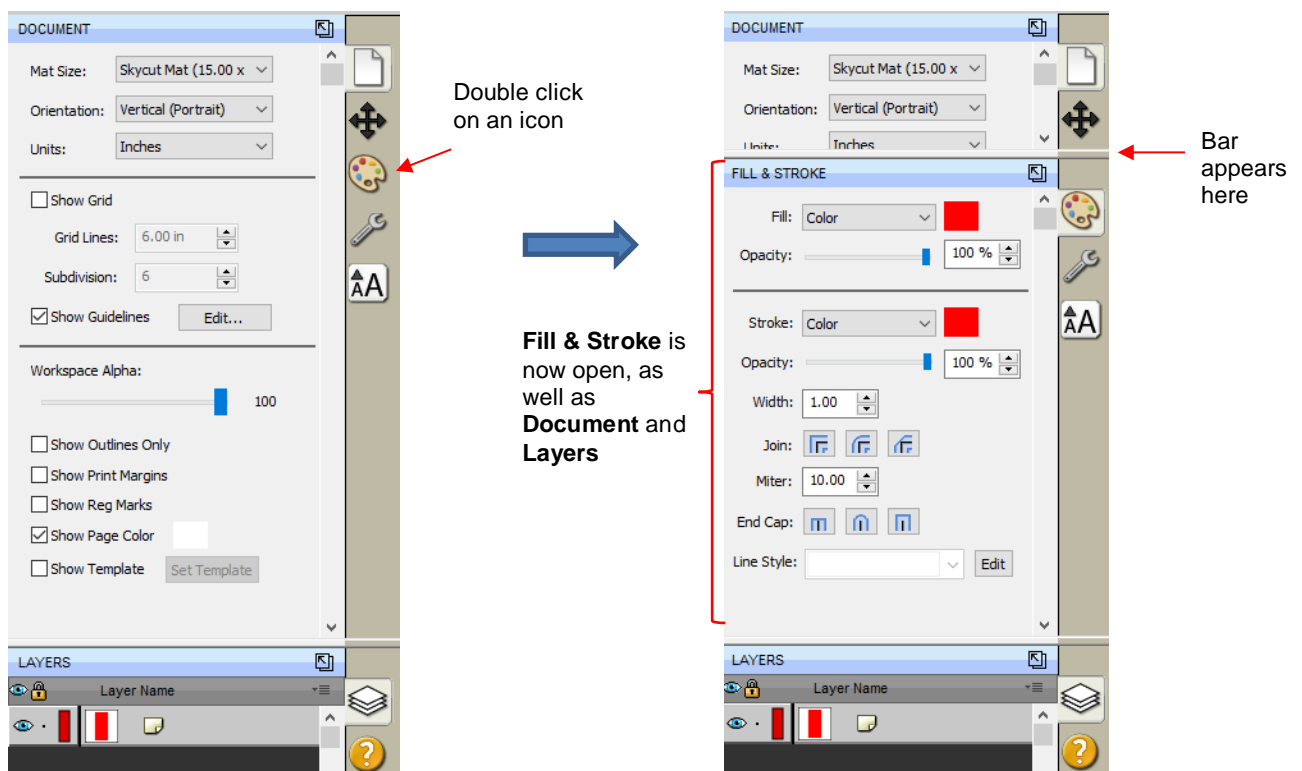
1.05 Customizing the Properties Panel / Workspace

- In SCAL, the **Workspace** refers to the arrangement of individual panels 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.

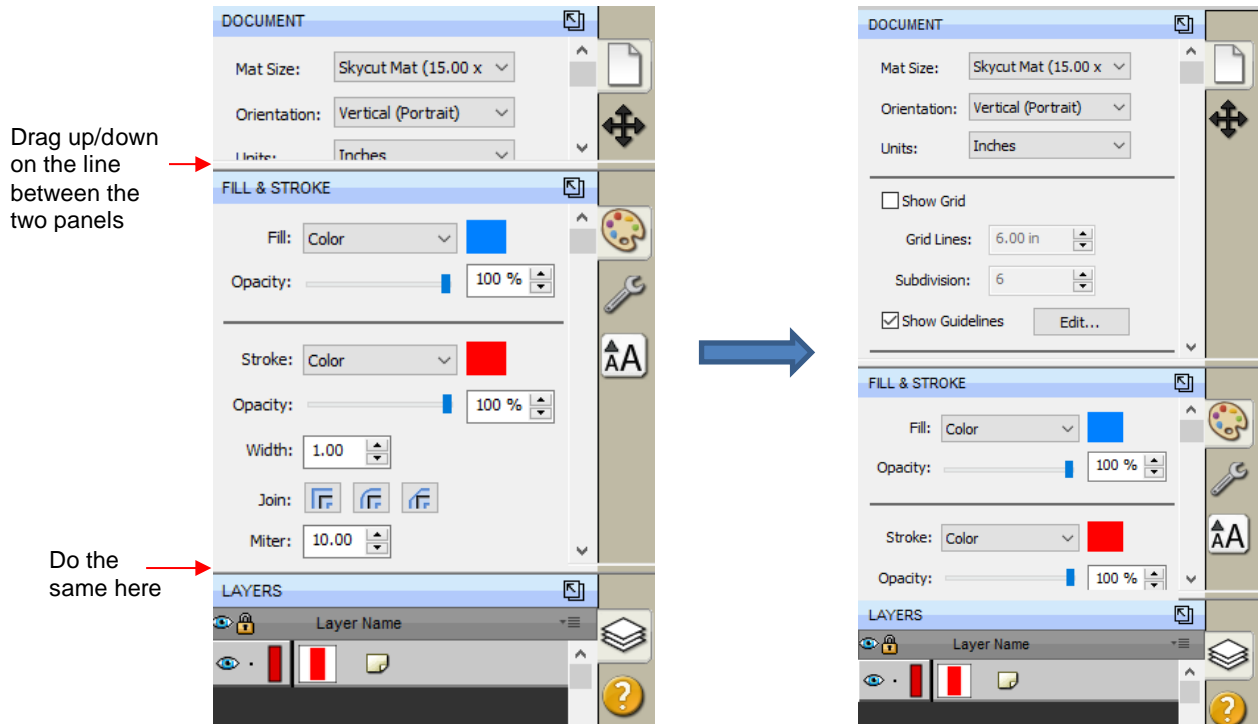
- By default, the **Advanced Workspace** opens. To switch to **Basic**, go to **Window>Workspace>Basic**. The only difference between **Advanced** and **Basic** is the former has the **Layers Panel** open:



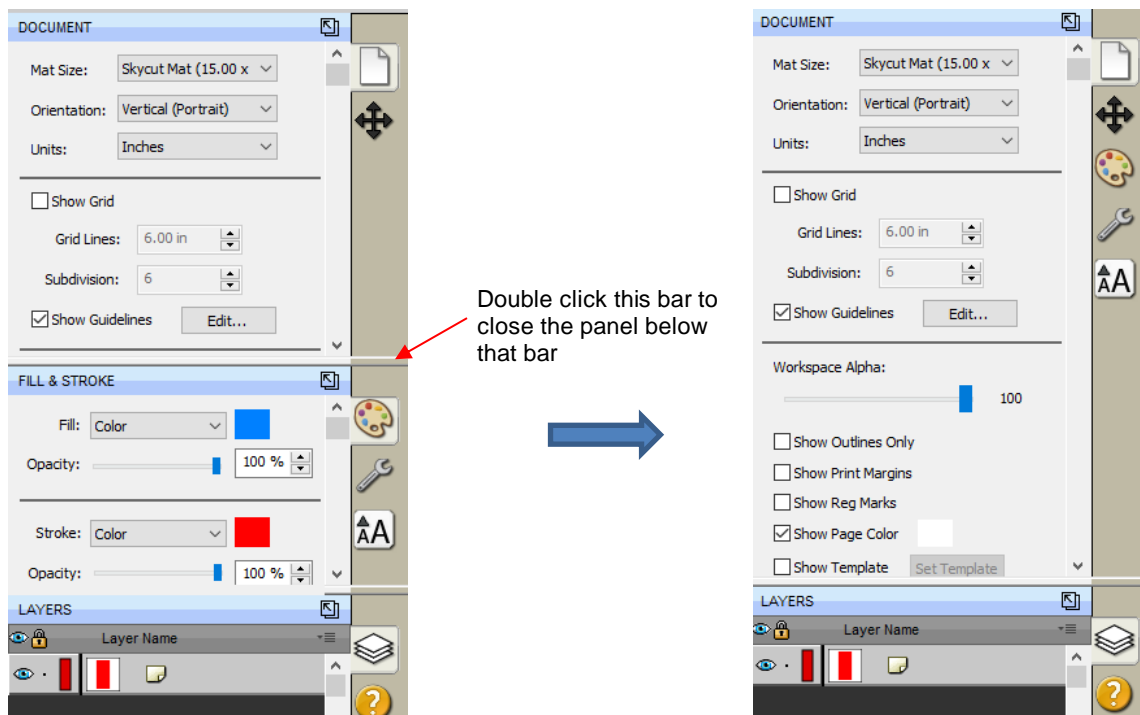
- To switch to other panels, click on the icons along the right side. If there's a particular panel you access often, then you can create a custom workspace. For example, let say you want the **Fill & Stroke Settings** panel to always be open. Double-click that icon and the **Properties Panel** will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



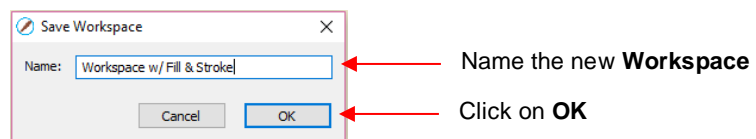
- These separate panels can also be resized by dragging them up or down:



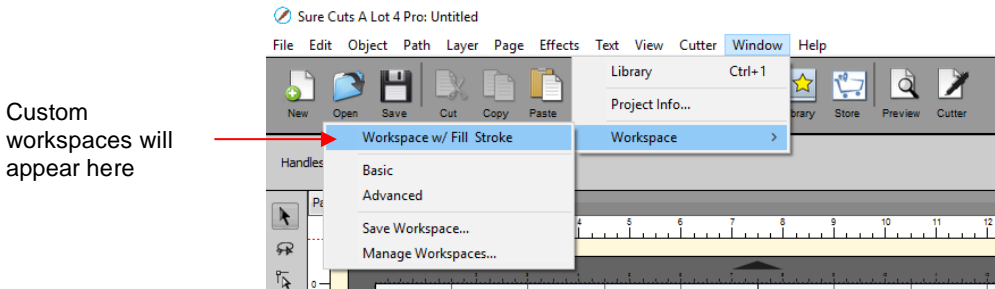
- To close a panel, double-click on the bar on the right side:



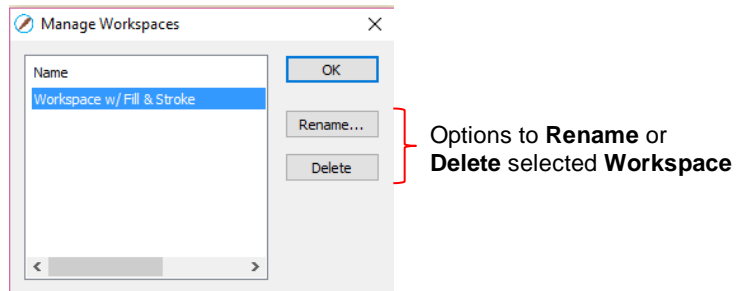
- To save workspace changes, go to **Window>Workspace>Save Workspace**. A window will open and you can name this new configuration:



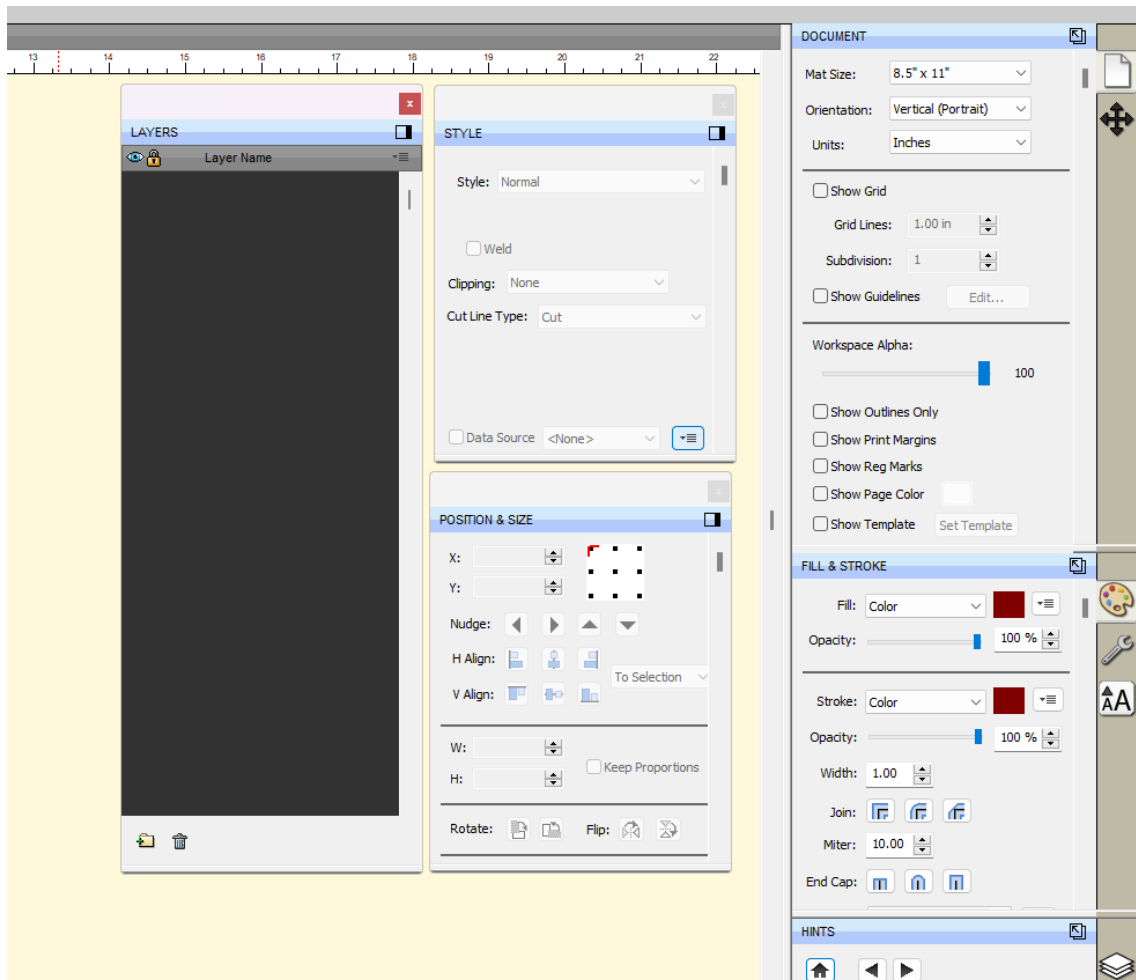
- When you now go to **Window>Workspace**, the new workspace will appear at the top:



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



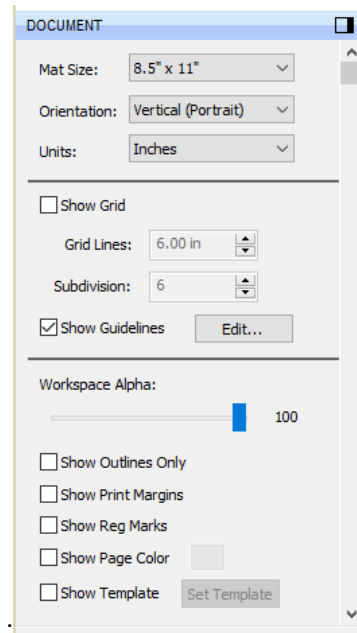
- Note that you can also pop out one or more of the **Panels** and save that arrangement, as well:



1.06 Document Panel

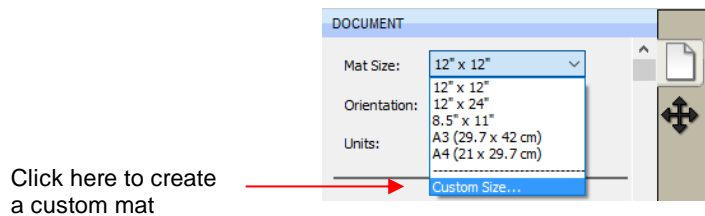


- The **Document Panel** contains settings for the **Cutting Mat** which serves as a design area for the software as well as to indicate, in some cutting modes, where the shapes will be cut.

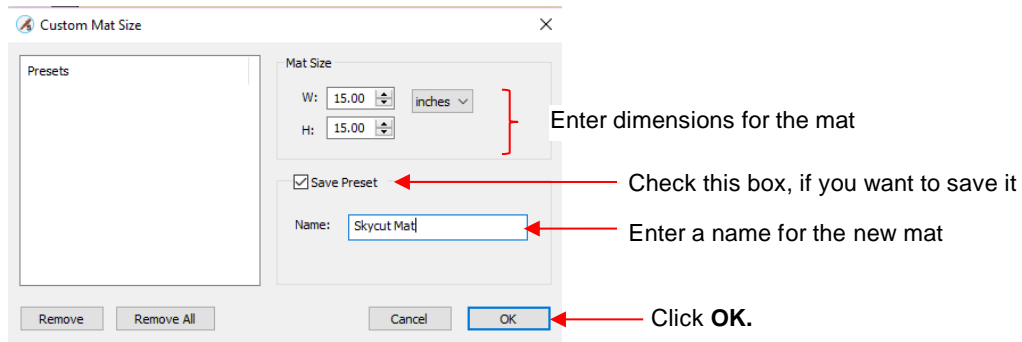


1.06.1 Mat Size

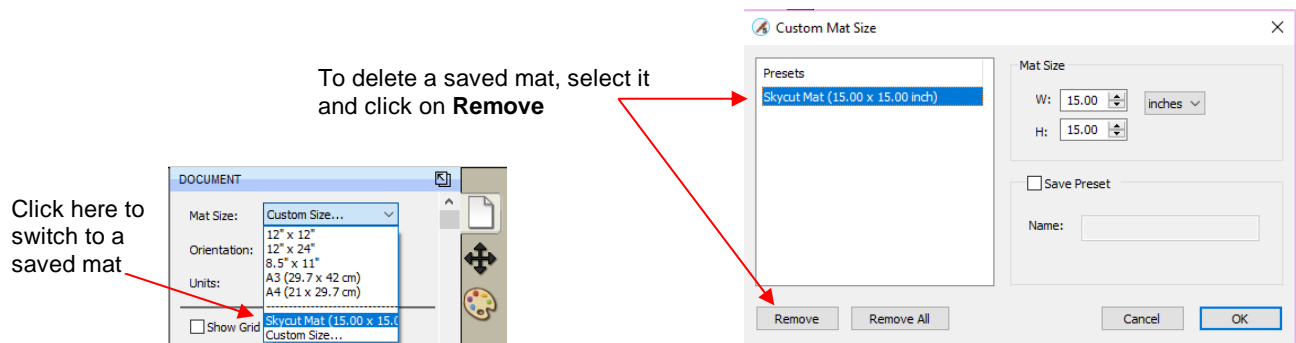
- There are three ways to access the **Mat Size** menu:
 - Click on the drop-down menu next to **Mat Size** on the **Documents Panel**
 - Right-click on the screen and select **Mat Size**
 - Go to **Cutter>Mat Size**
- There are five options for setting **Cutting Mat** dimensions under **Mat Size**.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



- 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:



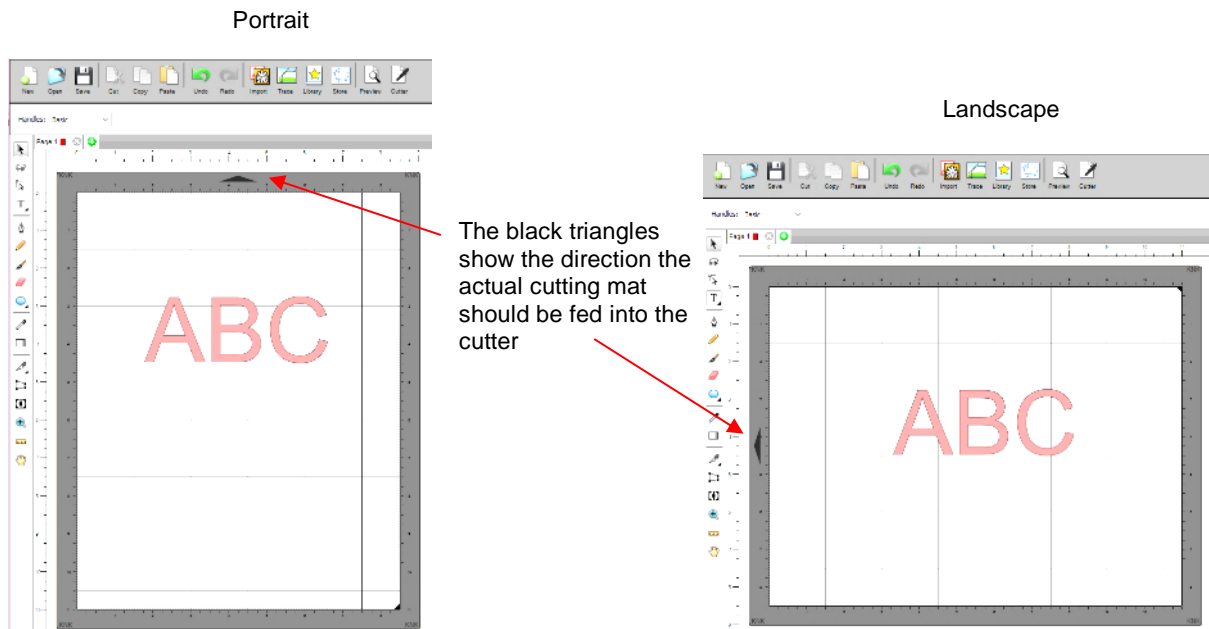
- A saved mat will now appear at the bottom in the **Mat Size** menu and will be listed under **Presets** when you return to the **Custom Mat Size** window:



- 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**.

1.06.2 Orientation

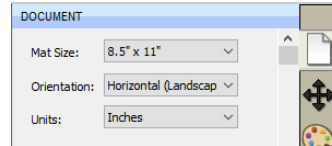
- A **Cutting Mat** can appear in either **Portrait** mode or **Landscape** mode with a triangle indicating the direction the mat will be fed into the cutter. To better illustrate this, a letter-size **Cutting Mat** is selected:



- There are three ways to change the mat orientation:

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

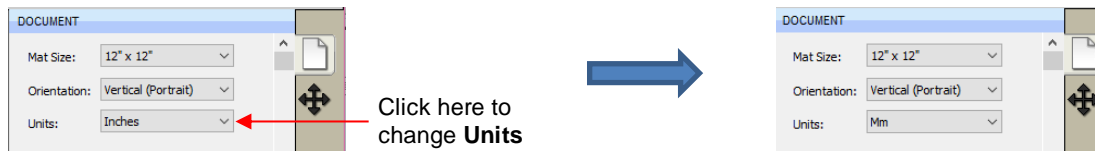
Select **Portrait** or **Landscape** here



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

1.06.3 Units

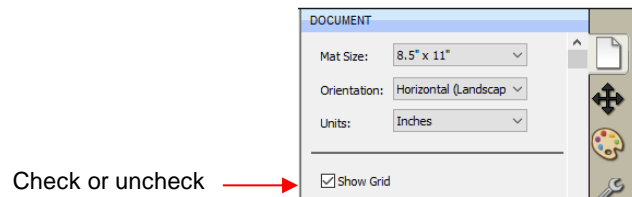
- By default, the unit setting is in inches. To switch to mm or cm, click on the drop-down menu next to **Units** on the **Documents Panel**:



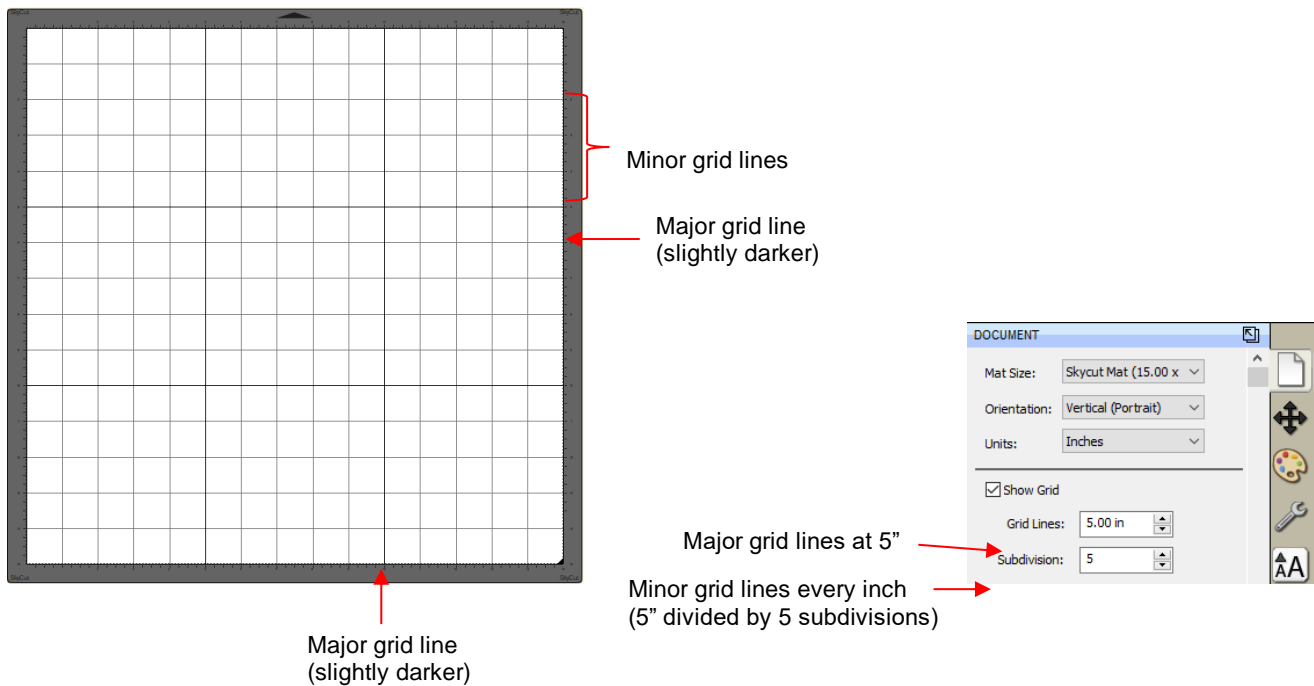
- The units can also be changed in either of the following locations:
 - ◇ Go to **View>Ruler Units**
 - ◇ Right-click on the screen and select **Ruler Units**

1.06.4 Show Grid

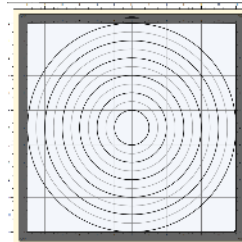
- The mat grid can be toggled on or off by either of these two ways:
 - ◇ Go to **View>Show Grid**
 - ◇ Check or uncheck the **Show Grid** box on the **Documents Panel**:



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

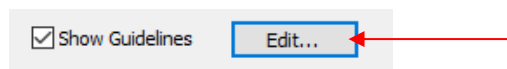


- A final grid option involves circular grid lines which can, as an example, be used for cake design. Go to **View>Show Mat Cake Circles:**



1.06.5 Show Guidelines

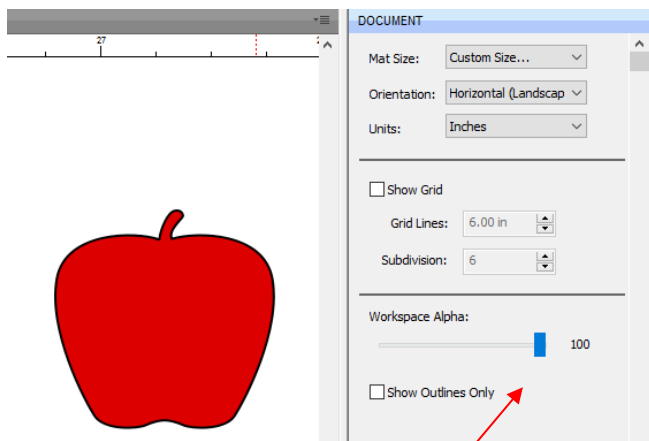
- Guidelines are very useful when designing projects, such as boxes or pop-up cards, from scratch. They can be added to the **Cutting Mat** in two ways:
 - ◊ By dragging your mouse from the horizontal or vertical rulers on the screen
 - ◊ By manually adding in the **Guidelines Edit** window
- You can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



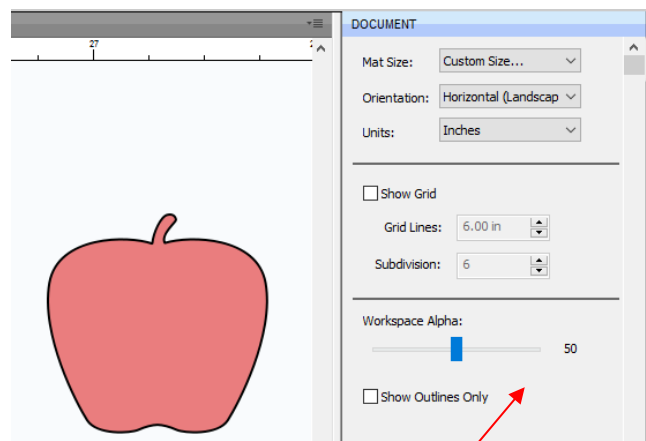
- Details on adding, changing, and deleting guidelines is covered in *Section 7.02*.

1.06.6 Workspace Alpha

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



Workspace Alpha = 100%



Workspace Alpha = 50%

- You can also change the opacity of individual shapes versus all shapes. Refer to *Section 3.14.5*.

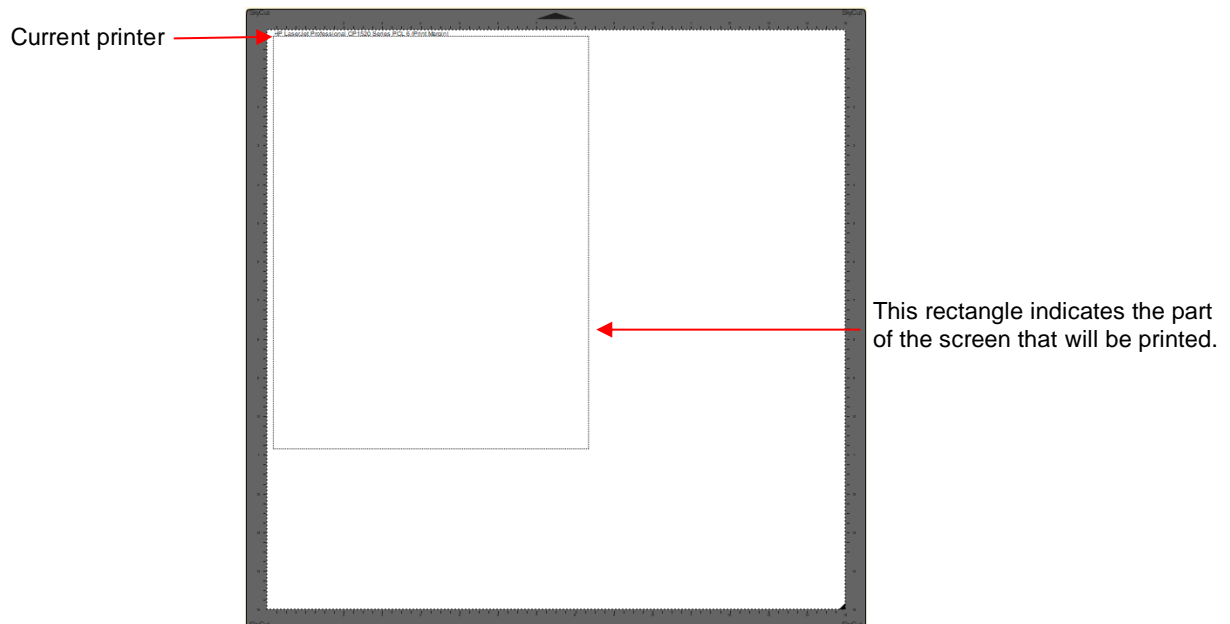
1.06.7 Show Outlines Only

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



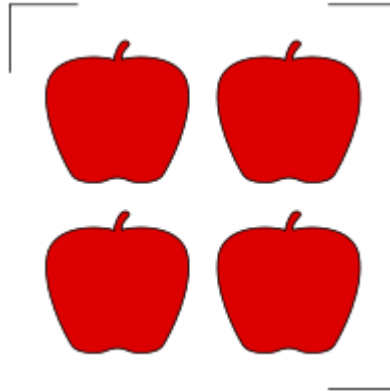
1.06.8 Show Print Margins

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



1.06.9 Show Reg Marks

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



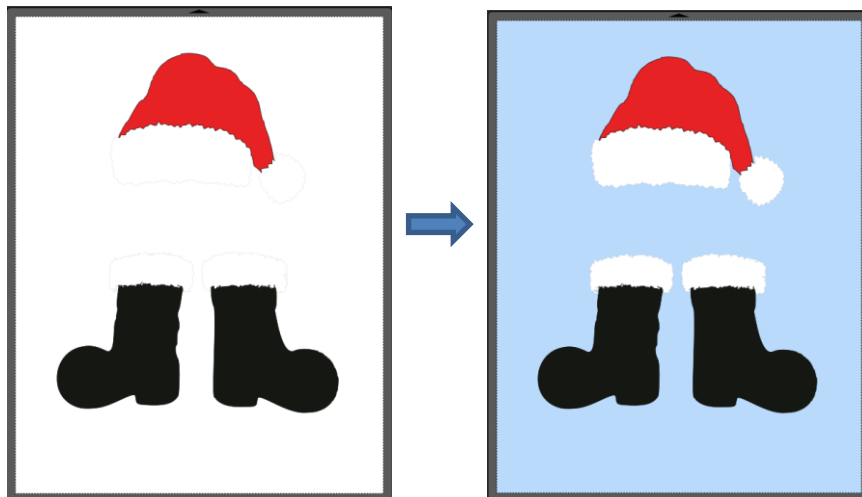
- The number of reg marks, their location, type, length, thickness, etc. will vary depending on the selected cutter in use, as well as properties that can be changed under **Cutter>Cutter Settings**. Refer to *Section 8.12.3*.

1.06.10 Show Page Color

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



- For example, if you have white shapes in your project, you might prefer a **Page Color** that makes them more visible:

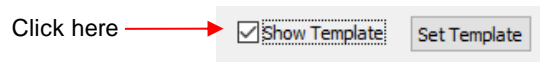


- Note that the color can be different for each page in a project, if desired.

1.06.11 Show Template

- SCAL6 has the ability to add templates to the **Cutting Mat** that are non-selectable shapes to aid in designing. Typically, these templates are representations of actual objects onto which cut shapes will be applied. Here are several examples:

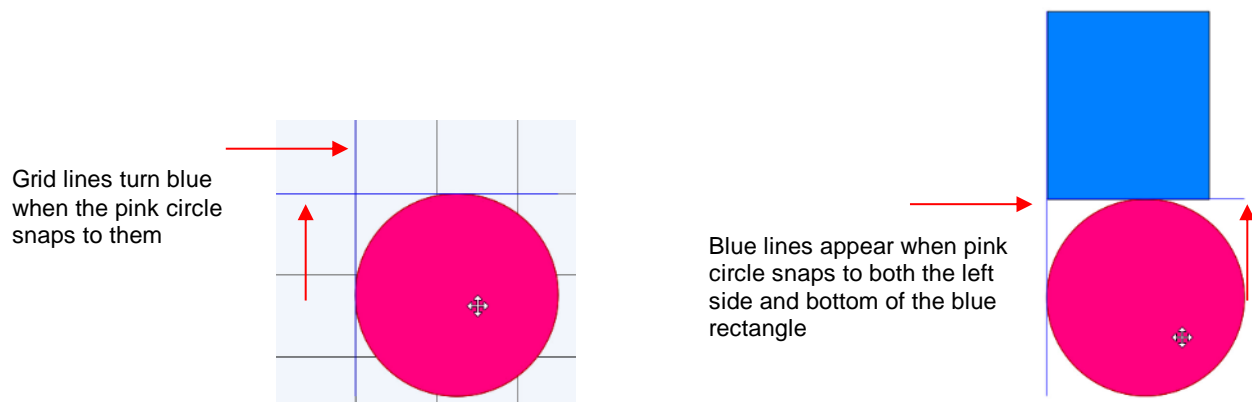
- ◇ Designing an etching stencil for a champagne glass
- ◇ Designing a decoration for a light switch
- ◇ Designing a rhinestone template or HTV pattern for a T-Shirt
- To show or hide a template, mark the box next to **Show Template**:



- Details on customizing and organizing templates is covered in *Section 7.03*.

1.07 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, to guidelines or to the grid can help align shapes more easily when designing or editing a project.
- To access the **Snap To** options, go to **View>Snap To** and mark your preferences based on the following options:
 - ◇ **Grid**: selected shape will snap to the grid lines
 - ◇ **Guidelines**: selected shape will snap to guidelines (refer to *Section 7.02*)
 - ◇ **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)
 - ◇ **Length**: selected shape will snap a given distance as it is dragged horizontally or vertically
- When you first access the **Snap To** menu, you will most likely see the last two grayed out. In order to access those options, make sure **Objects (Bounds)** is checked. Then you will be able to go back to the menu and change any of the options.
- When snapping to the grid, the grid can be showing or hidden.
- When a shape snaps to the grid, a guideline, or to another shape, blue lines appear indicating the shape is aligned at that point. Here are two examples:

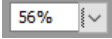



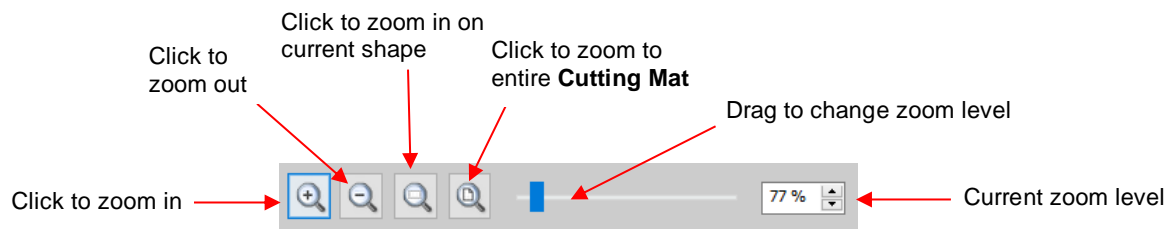
1.08 Other Preferences



- Under **Edit>Preferences**, you will find a number of other options, some of which you will probably never need to change. Others will be covered in later sections, as they pertain to the function involved. For a complete coverage of these preferences, refer to the following tutorial: <https://tinyurl.com/mr2uhwa2>

1.09 Zooming and Panning


1.09.1 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:
 - 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 **Ctrl+ Shift+ =** (on a Mac: **Control+ Shift+ =**)
 - Go to **View>Zoom Selection**
- To zoom to the **Cutting Mat**, use one of the following:
 - Click on the icon  while the **Zoom in Tool** is activated (see prior screenshot)
 - Use the shortcut **Ctrl+ F** (**Command + F** on a Mac)
 - Right click on the screen and select **Fit to Window**
 - Select **Fit to Window** from the **Zoom** menu on the **Status Bar**
- To change the zoom level so that a selected shape will be the same size on the screen as its actual size, go to **View>Actual Size**.

1.09.2 Panning

- 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.

1.10 Undo/Redo

1.10.1 Undo

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

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



1.10.2 Redo

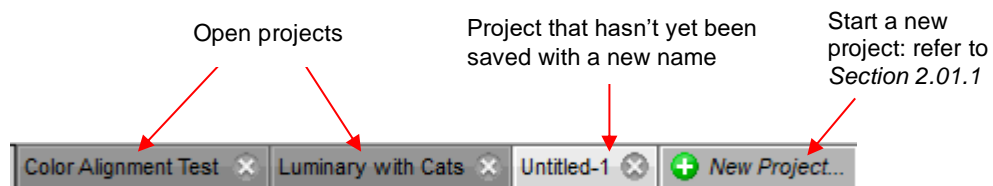
- As with most applications, there is also a **Redo** function in case you **Undo** too many steps or simply change your mind. You can use any of the following to execute the **Redo** function:

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

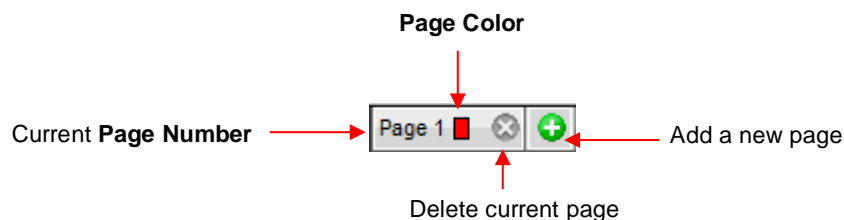



1.11 Projects and Pages

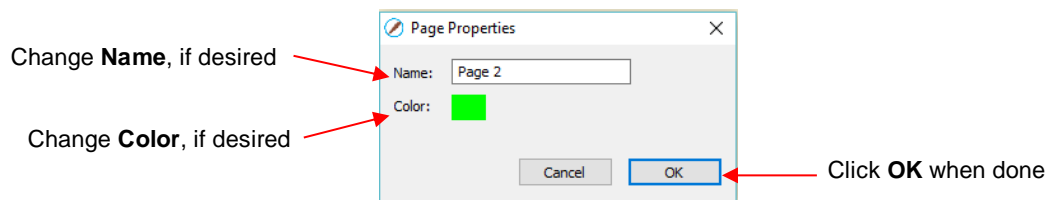
- The **Project Bar** is located right above the **Ruler** and shows what projects (files) are open and have been named, new projects that have been started but not named, and an option to open a new project:



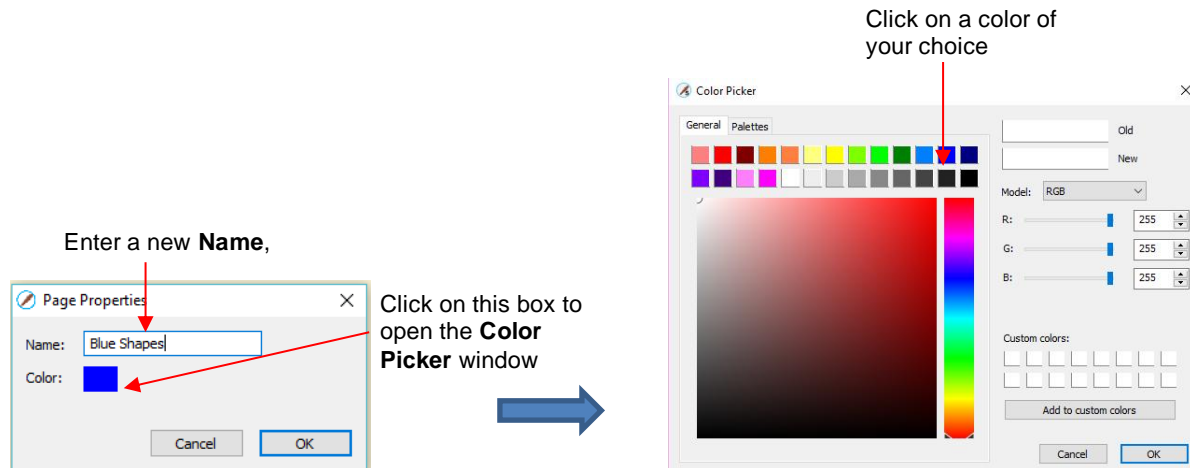
- Clicking on any **Project Tab** on the **Project Bar** will then access that project. Note that you can copy/paste and cut/paste between open projects. Refer to *Section 3.17*.
- Projects can contain one page or many pages. The option to add multiple pages can be convenient for organizing projects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



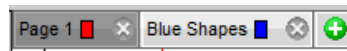
- To add a page, either go to **Page>Add Page** or click the green icon  on the **Pages Bar** itself and the following window will open:




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



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




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

- To switch between pages, click on the **Page** name or go to **Page** on the **Menu Bar** and the menu will have all pages listed.
- To delete a page, make sure it's selected and then either go to **Page>Delete Page** or click on the **Delete Page** icon . A window will open asking for confirmation.
- To make a copy of the current page, go to **Page>Duplicate Page**.
- To make a copy of the current page and place it into a new project file, go to **Page>Make New Project from Page**.

1.12 Getting Help and Additional Resources

- A *SCAL6 Troubleshooting Guide* is available at this link: <https://tinyurl.com/nhkv2d7>
- 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 an on-line user guide

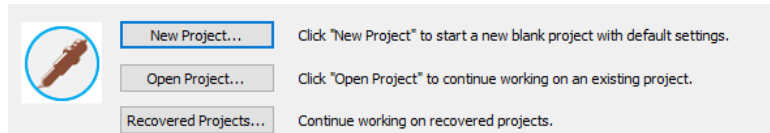
- ◇ Click on the **Help Panel** icon  on the **Properties Panel** to open the user guide to a section based on the currently selected tool
- ◇ Go to **Help>Forums** to access the SCAL user forum
- ◇ Go to **Help>Online Video Tutorials** to access a page with links to both videos and written tutorials
- ◇ 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
- An online training program, with over 10 hours of videos which can be viewed as often as you need, is available at this link: [Sure Cuts a Lot 5/6 Classroom](#).
- While you may be able to find some free videos on You Tube, be cautious as some of them are using older versions of SCAL and others are made by people who haven't mastered the software and, as a result, present inaccurate and misleading information.
- Facebook has a number of groups devoted to SCAL. Other online support groups for SCAL include:
 - ◇ [Let's Learn Cricut, SCAL, & MTC Facebook Group](#)
 - ◇ [MTC and SCAL Facebook Group](#)
 - ◇ [Sure Cuts A Lot \(SCAL\) Facebook Group](#)
 - ◇ [Siser Juliet and Romeo with Sure Cuts A Lot](#)

2. SCAL: Handling Files and Organizing Layers

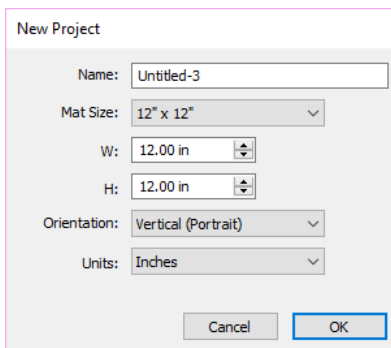
2.01 Opening Files

2.01.1 Opening a New File/Project

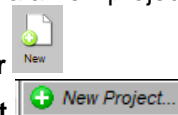
- When you launch SCAL, a popup window appears where you can choose if you are starting a new project, opening an existing project, or recovering a project after a software crash:



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



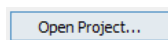
- If SCAL is already open, then you can start a new file (aka a new project), using any of the following:
 - Click on the **New Project** icon on the upper **Toolbar**
 - Click on the **New Project** tab above the **Cutting Mat**
 - Press **Ctrl+N**
 - Go to **File>New Project**
- The same **New Project** window shown above will open where you can specify the same preferred settings.
- Note that as of SCAL6, you can have more than one project open at a time.



2.01.2 Opening an Existing .SCUT File

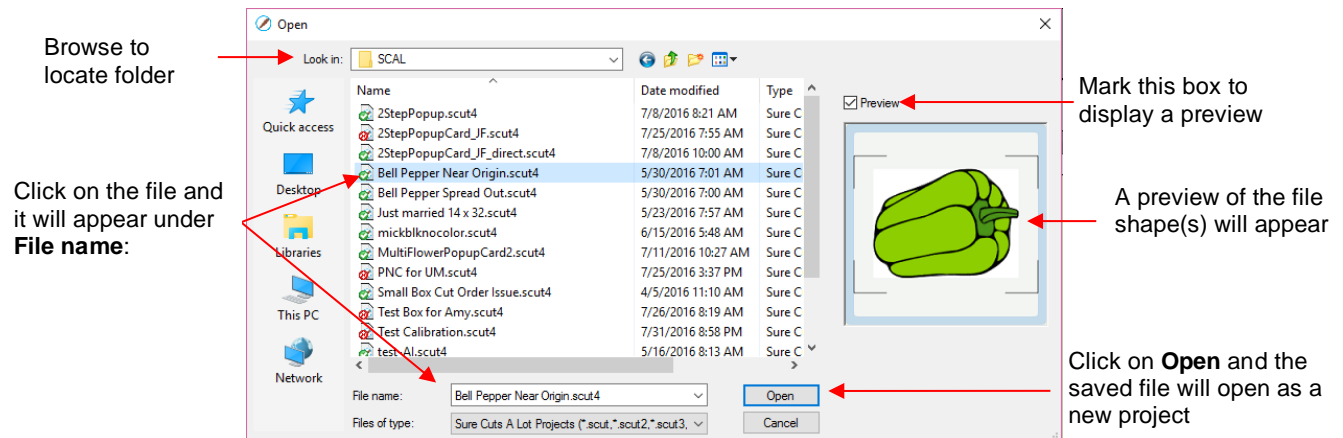
- An existing .SCUTx file (where x is blank, 2, 3, 4, 5, or 6 indicating which SCAL version created it) can be opened in SCAL6 using any of the following:

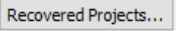
- Click on **Open Project** when you first open SCAL
 - Click on the thumbnail, if it appears, when you first open SCAL.
 - Click on the **Open Project** icon on the upper **Toolbar**
 - Press **Ctrl+O**
 - Go to **File>Open Project**



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


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



- In the case of opening a file from Windows Explorer, an email, or using a drag and drop method, the file will automatically open.
- In the opening window of SCAL, you also have the option of opening a **Recovered Project**  which will be an auto-saved project or projects that were open before a software crash.
- Note that other file formats, besides .SCUT, can be imported into SCAL6. Refer to *Section 2.06*.

2.02 Saving SCAL Files

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

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

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

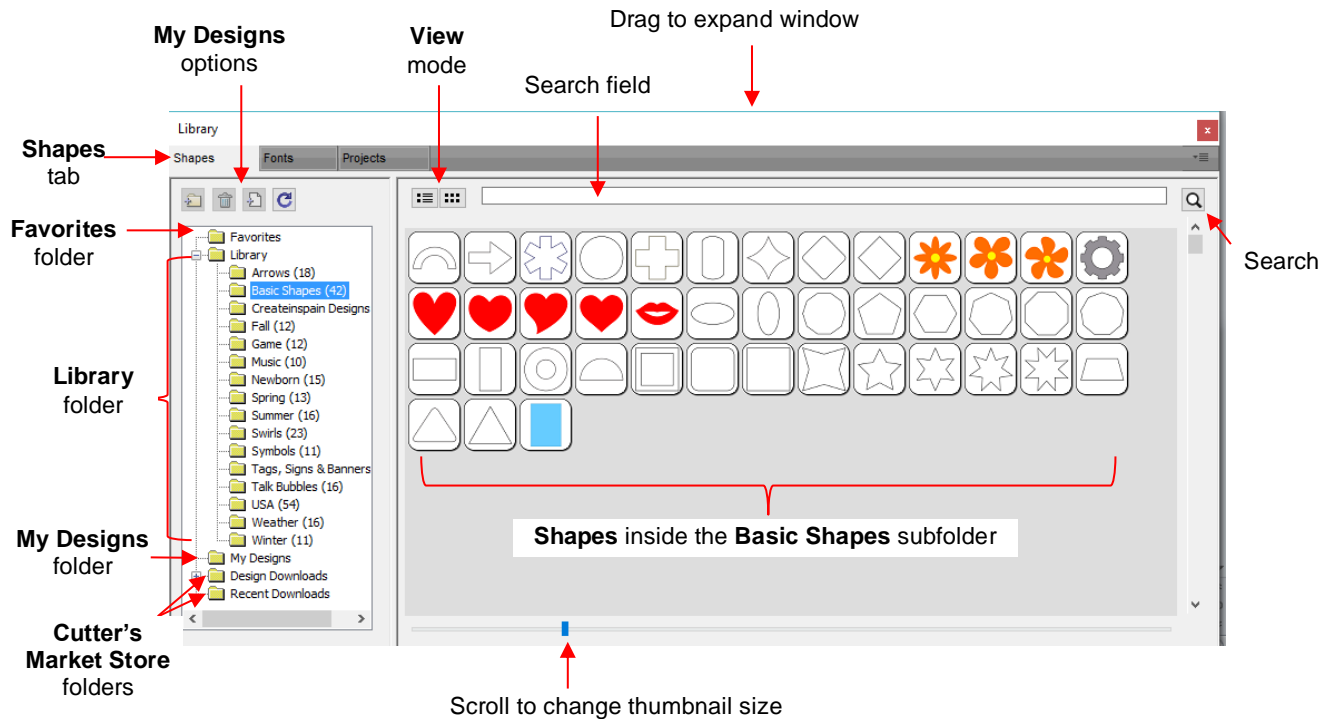
- If you've made changes and wish to save under a different file name, choose **File>Save As**. Name the file, choose a location, and click on **Save**.
- You can include notes about your file by going to **Window>Project Info**. This can be handy for your own future reference or for others using your files. Refer to *Section 7.01*.
- You can also export files in a host of other formats. Refer to *Section 2.07*.

2.03 Customizing the Library

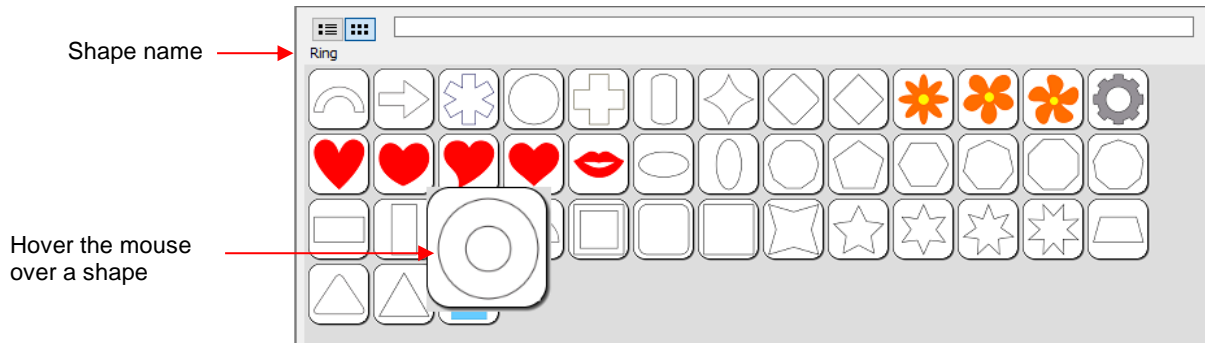
- The **Library** was briefly introduced in *Section 1.03*. The purpose of this section is to expand on how to fully utilize it.
- The **Library** consists of three tabs: **Shapes**, **Fonts**, and **Projects**. Each is covered in the following subsections:


2.03.1 Shapes Tab

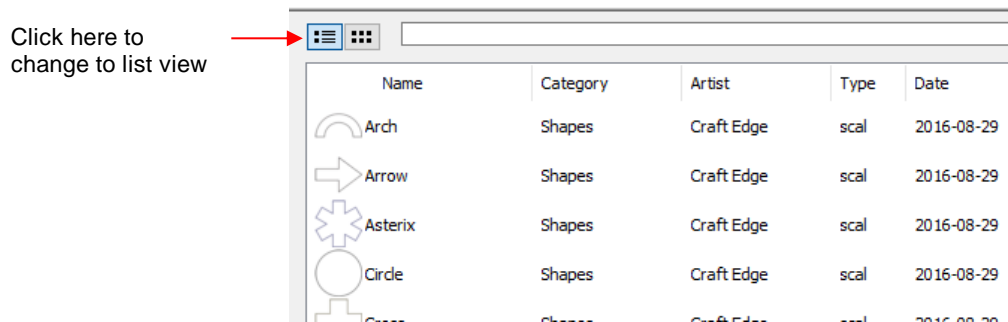
- When you first open the **Library**, the **Shapes** tab will be selected.
- In order to see all of the contents under this tab, drag the top of the window upwards until you see the following screenshot. Note the various parts of this window:



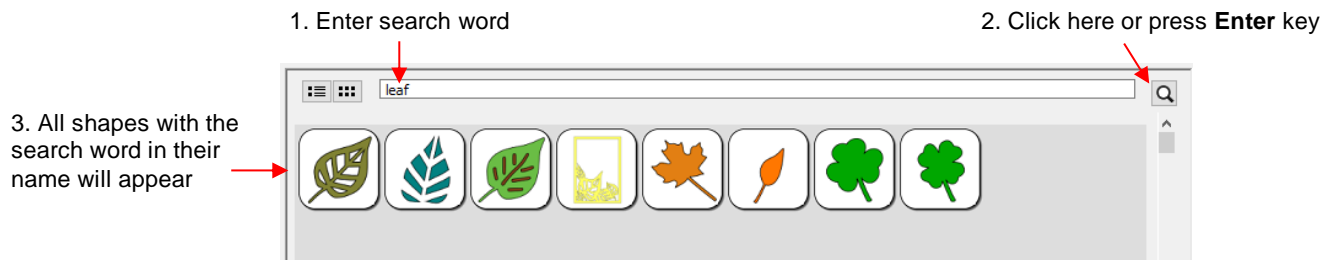
- On the left side you will see the **Library** folder which contains the included 300 shapes. The number in parentheses, after each subfolder, indicates how many shapes are assigned to that subfolder. **Basic Shapes**, as an example, has 42 assigned to it.
- Because the **Basic Shapes** subfolder is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



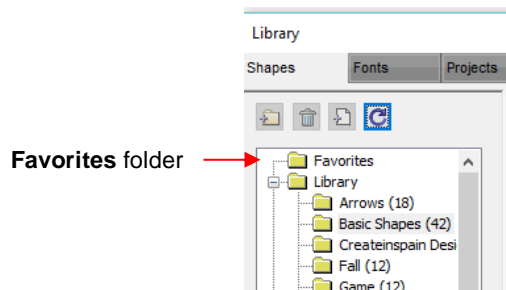
- You can toggle between the thumbnail view and a list view using these icons at the top  :



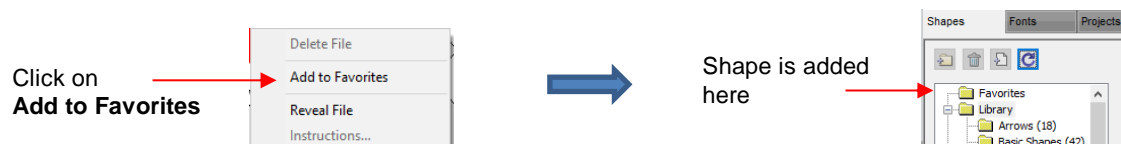
- A search function enables you to see all of the shapes with a particular word in the name. For example, enter the word leaf and click on the search button:



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



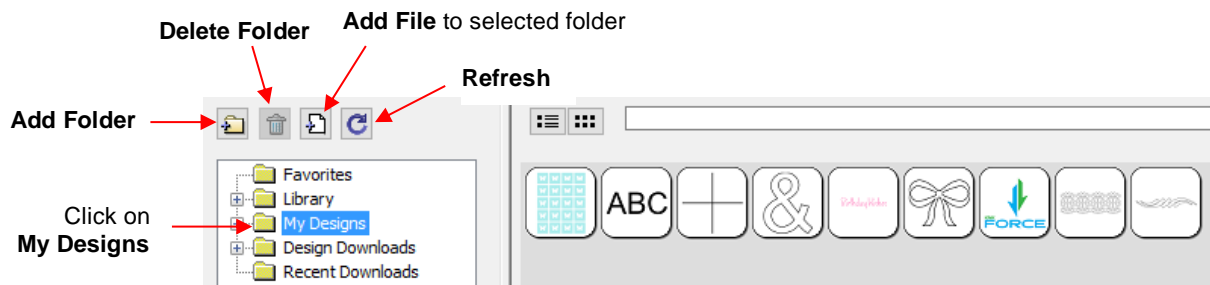
- ◊ The **Favorites** folder is for storing the shapes you access often. Locate the shape you want to add, right-click, and select **Add to Favorites** from the popup menu.




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

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

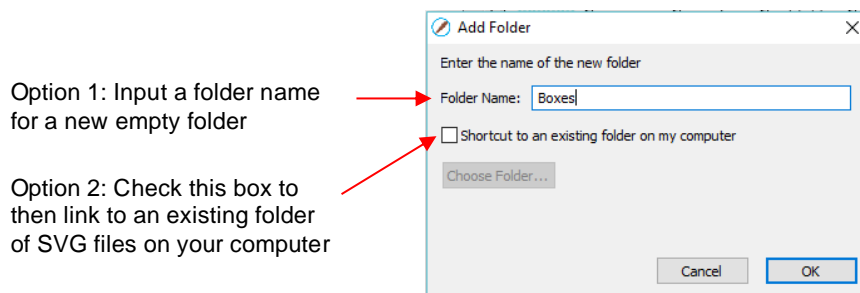
- ◇ Once you click on **My Designs**, the icons above the folder menu will become active:



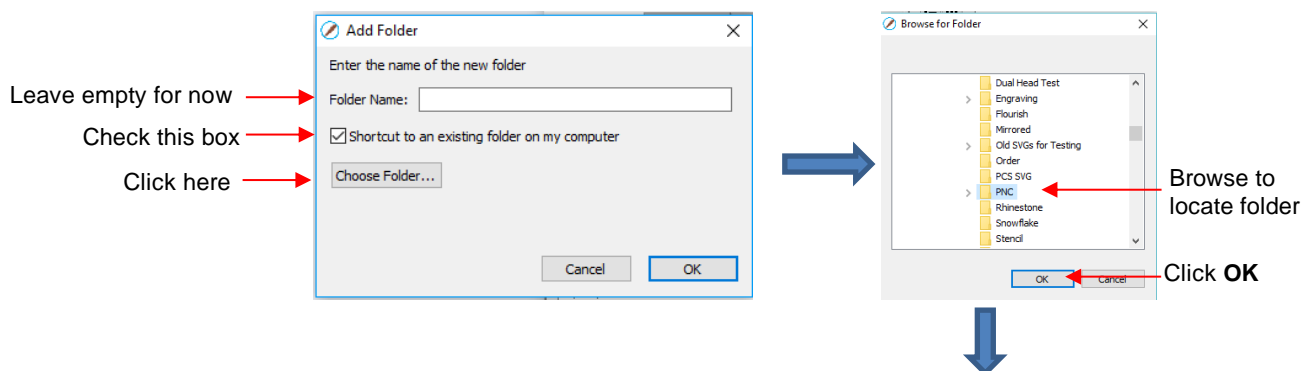
- ◇ **Add subfolders:** The shapes in the above screenshot have been added to **My Designs** but not into subfolders. To create subfolders for additional organizing:

- 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:

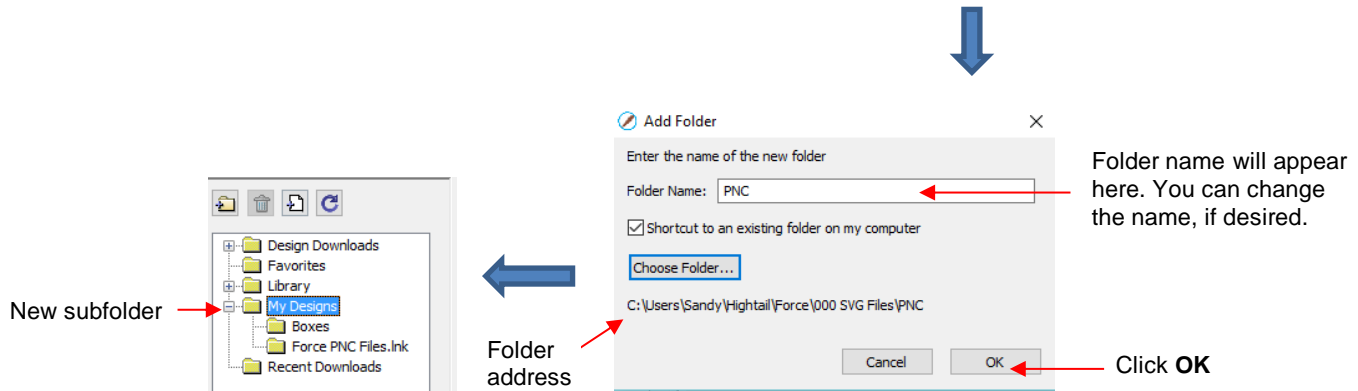


- ◇ If you select Option 2, the **Choose Folder** button will activate and clicking it will bring up this window where you can browse your computer to locate an existing folder of SVG files:



Continued on
next page


Continued from prior page



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

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

○ Select the folder and do either of the following:

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


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

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

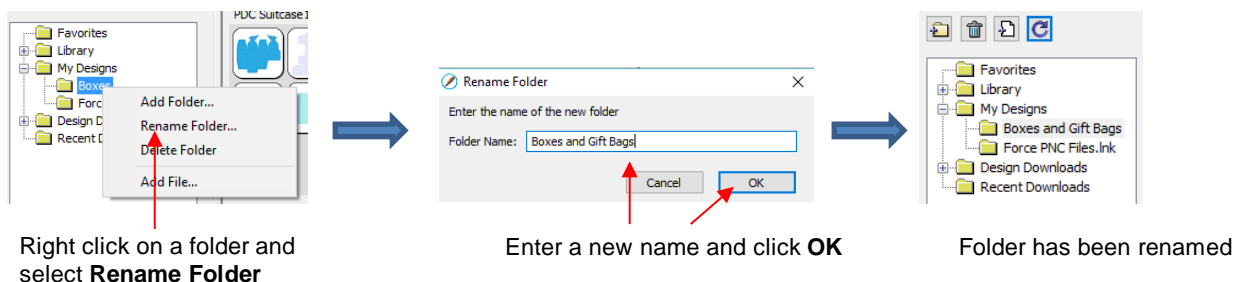
○ **IMPORTANT:** Note that deleting the file could also delete it from your computer unless it has been backed up elsewhere.


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

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

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

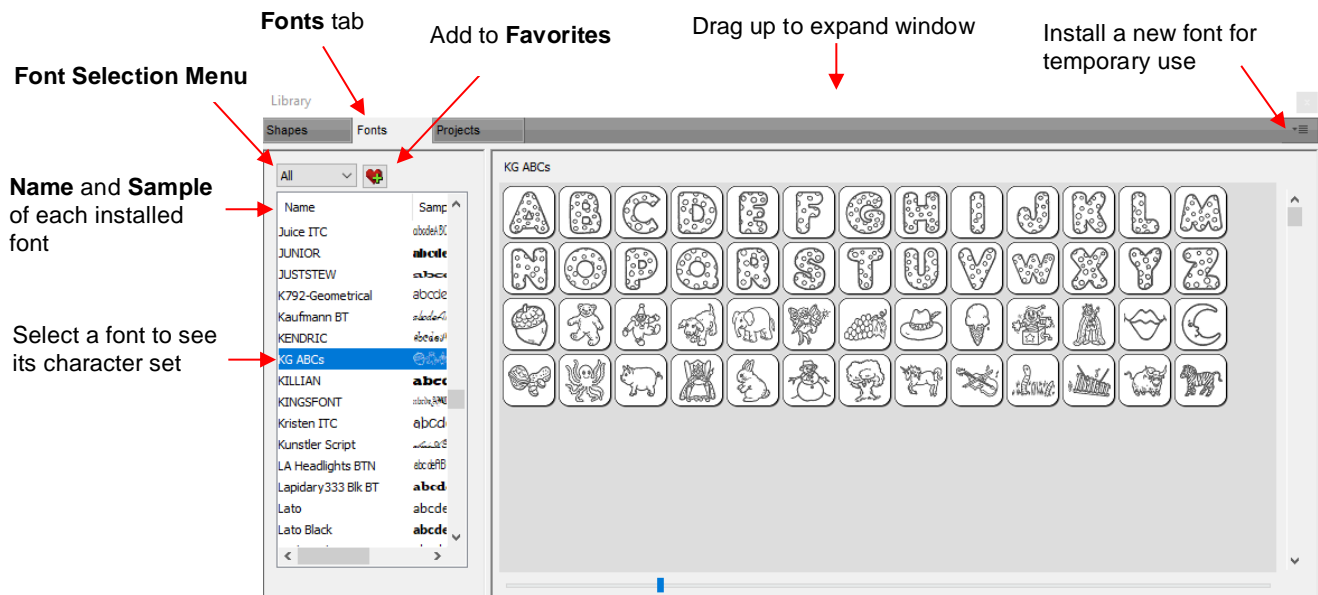
◇ To rename a folder, right-click and select **Rename Folder** from the popup menu:




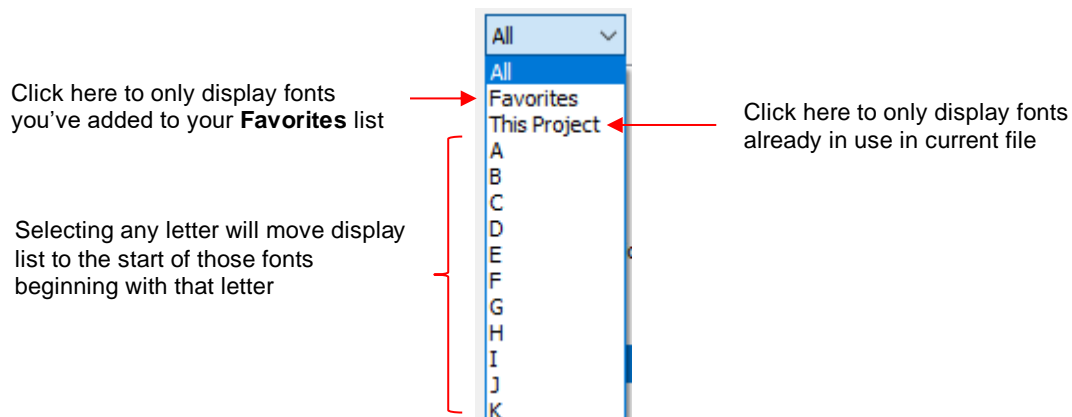
- **Design Downloads** and **Recent Downloads**: These two folders, along with the menu icon at the top right  are part of the **Cutter's Market Store** functions. Refer to *Section 2.05*.


2.03.2 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 4.02*.





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

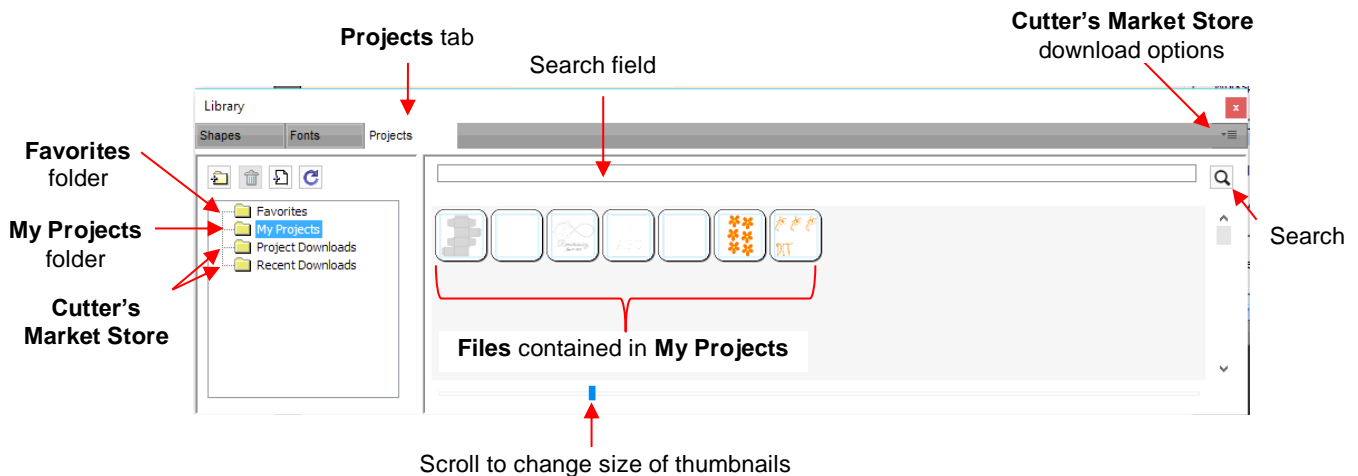


- Favorites:** With a font selected, you can click on the  icon to add that font to your **Favorites** folder.
- For alternative methods for selecting fonts, refer to *Section 4.02*.

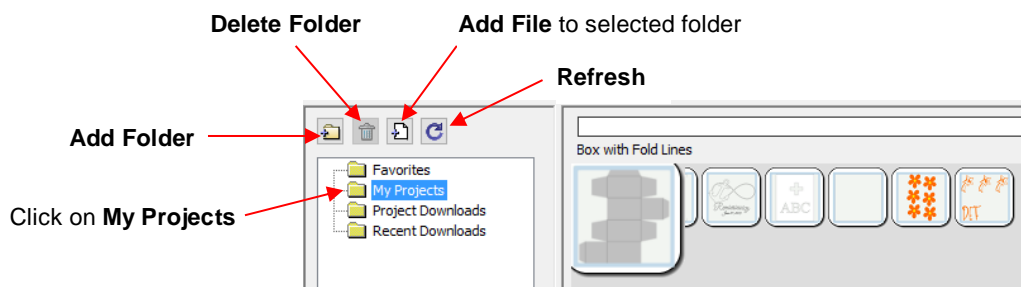
2.03.3 Projects Tab


- 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.

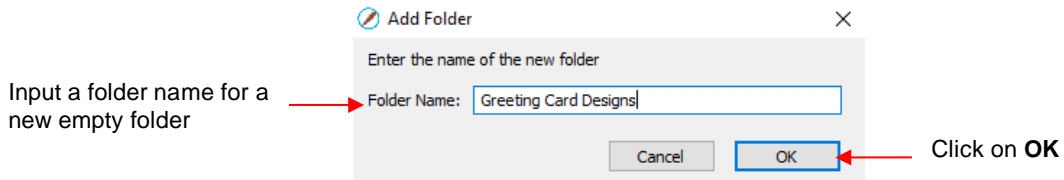
- As with the **Shapes** tab, there are no default categories or pre-added files. However, you will notice these other similar features:
 - ◇ **Favorites** folder – select any project, right-click, and select **Add to Favorites** from the popup menu
 - ◇ **My Projects** folder – virtually identical to **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 **Cutter's Market Store**. Refer to *Section 2.05*.
 - ◇ Scroll bar to change the size of the thumbnails.
 - ◇ Hover over a thumbnail and it will get larger. The project name will appear below the **Search** field.



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




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

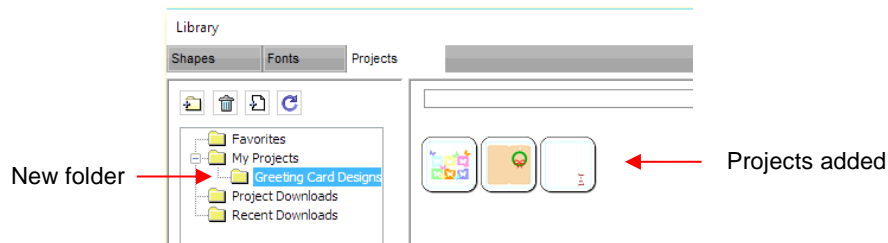


◇ To add files to a folder inside **My Projects**:


- Select the folder and do either of the following:

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


- A window will open where you can then browse to find the SCUT file to be added. You also have the option of selecting multiple files at once to import into that folder.
- After adding the files, the thumbnails for those projects will appear when the folder is selected:



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

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

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

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

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

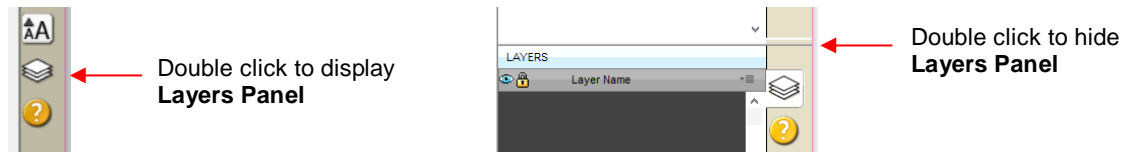
2.04 Layers Panel

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

2.04.1 Introduction to the Layers Panel

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

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



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

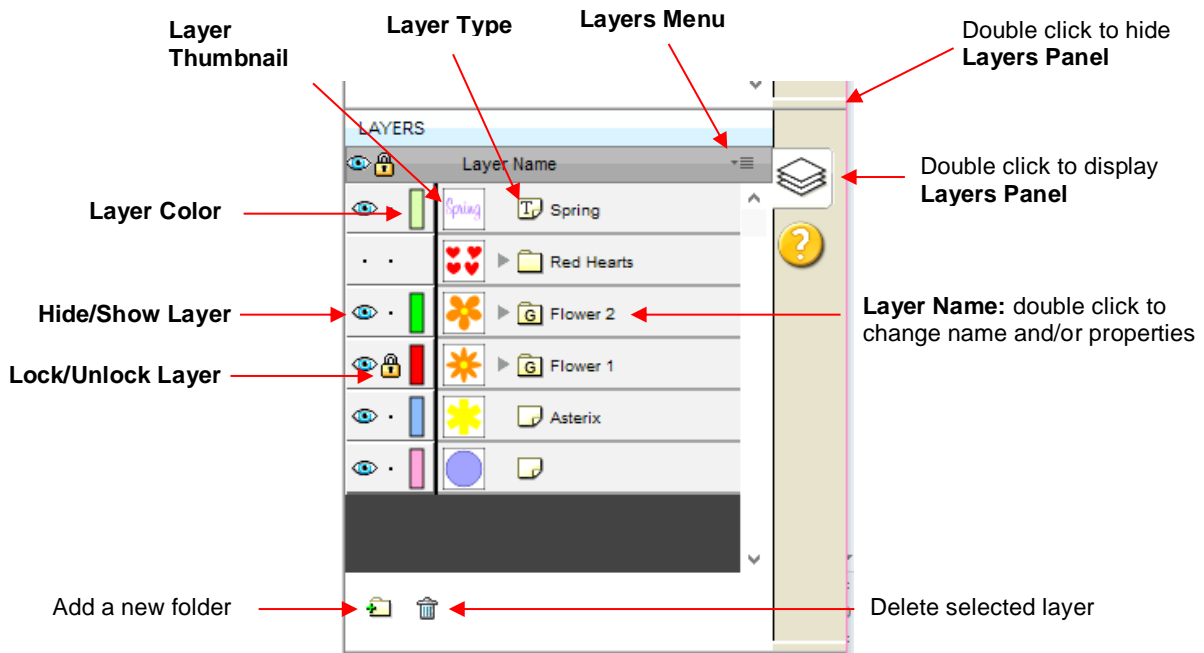
- You do not have to worry about adding shapes to the **Layers Panel**. They will automatically be assigned to new layers as you add them. You will want to learn how to move shapes to new layers or combine shapes into the same layer, depending on the circumstances. This is covered in *Section 2.04*.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

2.04.2 Parts of the Layers Panel

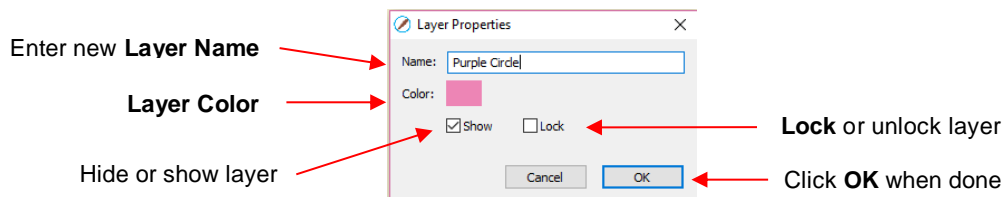
- The next few sections will use the following simple project to illustrate the **Layers Panel**:



- 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
 - ◇ Layer 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**:


Layer Hidden:   Red Hearts




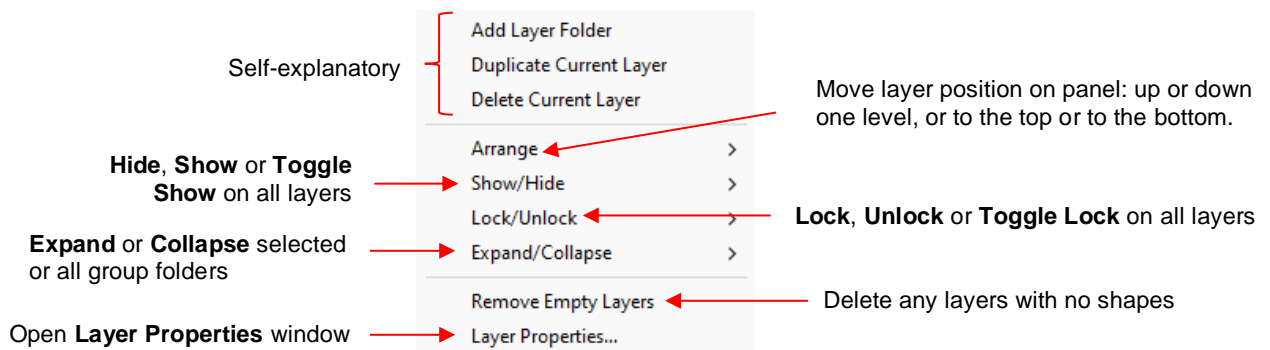
Layer Showing:   Red Hearts





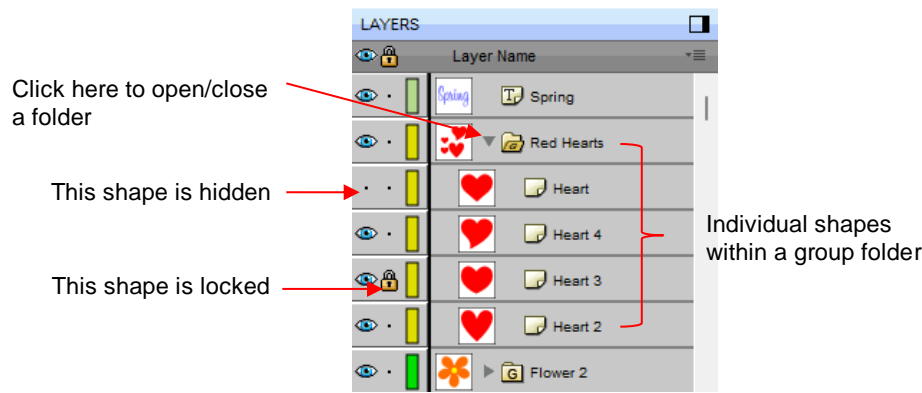
◇ **Lock/Unlock Layer:** Click on the dot to the right of the eye icon and the layer will become locked , such as shown for the *Flower 1* layer. The shapes on that layer will still be included in printing and in cutting, however cannot be selected on the **Cutting Mat**. This can be useful when shapes 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. This color is then the outline color of a shape when you hover your mouse over that shape. It can also make 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 folder  and deleting a selected layer  are also available at the bottom of the **Layers Panel**.
- Individual shapes within a layer folder or a group folder can also have individual properties changed. For example, let's say you have various shapes grouped together and you want to keep some locked and you want to hide others. Opening the grouped layer displays each thumbnail and the **Show/Hide** and **Lock/Unlock** icons can be individually changed. In this example, some basic shapes have been used for a clearer understanding:



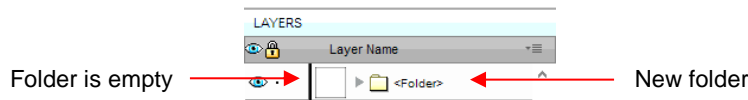
2.04.3 Creating Folders and Moving Layers

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

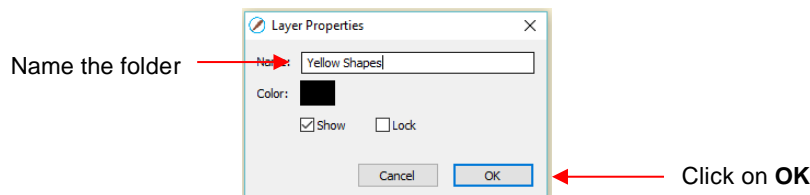
- There are three ways to create a new folder:

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


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



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



- Selected layers can be moved (reordered) in three ways:

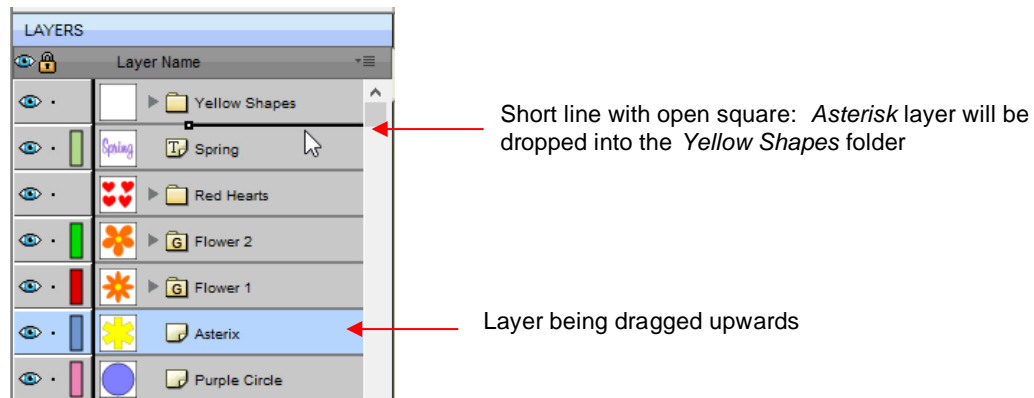
- ◇ From the **Layers Menu** , select **Arrange** and raise/lower a selection up/down one level or to the top or bottom of the **Layers Panel**. Note this same **Arrange** menu is available in the **Object** menu, or in the **Layer** menu, or right click on the screen.
- ◇ Use the shortcut keys: **Ctrl+]**, **Ctrl+[**, **Ctrl+Shift+]** or **Ctrl+Shift+[** to move the selection up/down one level or to the top of bottom of the **Layers Panel**.
- ◇ Drag the selection up and down the **Layers Panel** with your mouse.

- There are two possible outcomes when dragging layers:

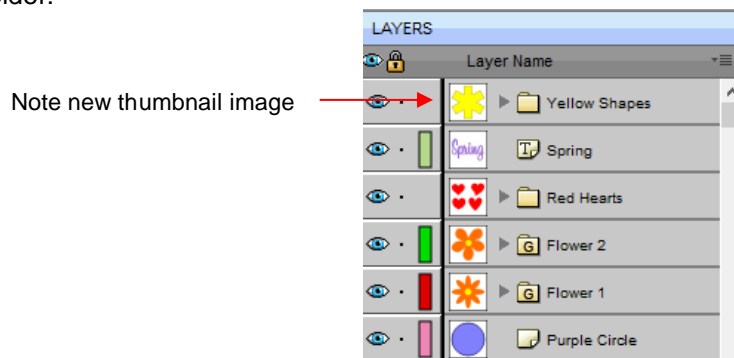
- ◇ The layer is moved to a new location
- ◇ The layer is moved into an existing folder

- 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.

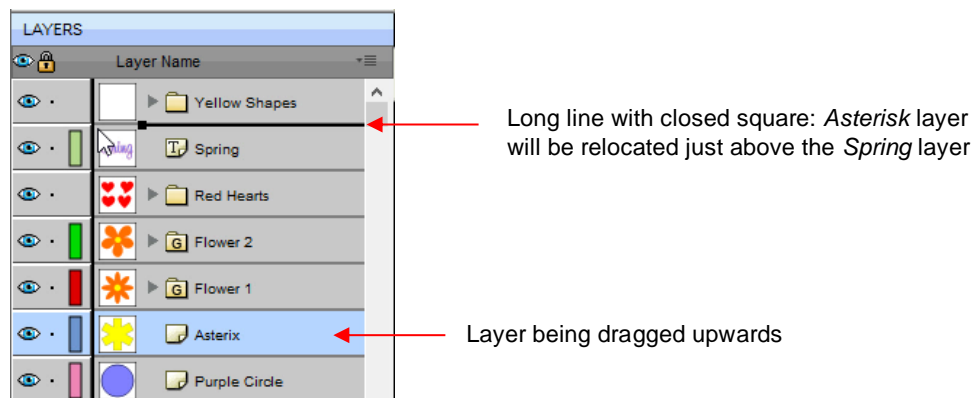
- ◇ If you drag a layer without moving to the left, you will see a short line with an open square. This means it will be added to the folder directly above it:



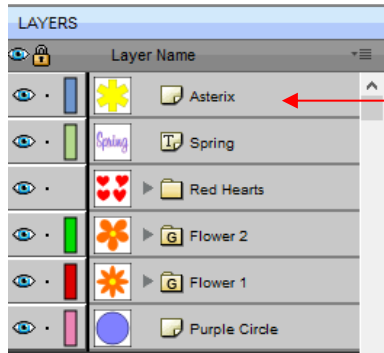
- ◇ Now the *Asterisk* layer is inside of the *Yellow Shapes* folder and can be seen in the thumbnail for that folder:



- ◇ 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:



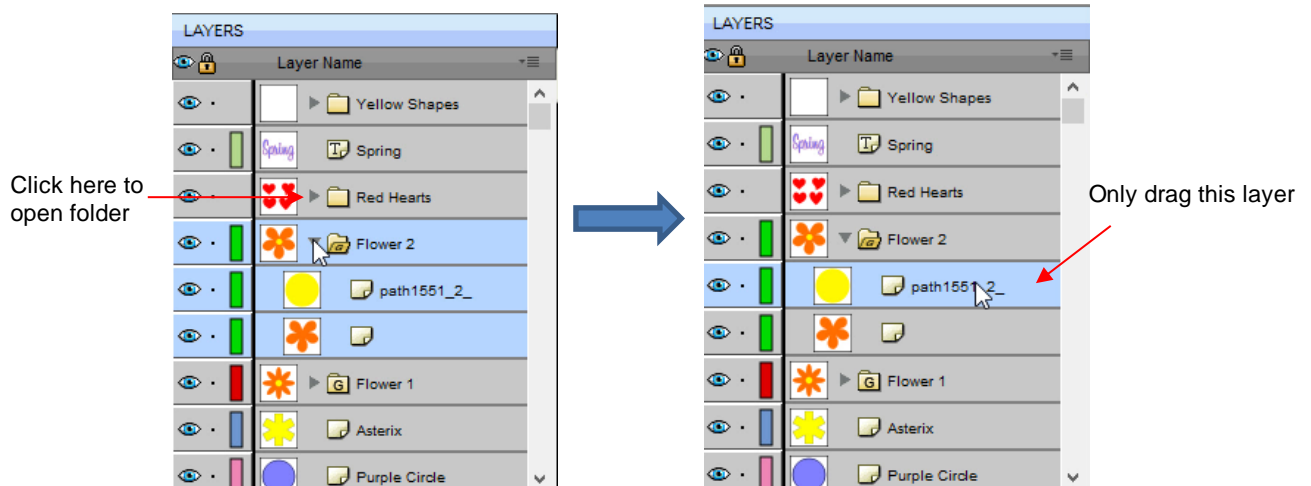
- ◇ **IMPORTANT:** Once you've created a new empty folder, like the *Yellow Shapes* folder, you cannot move that layer or other layers without the empty folder being deleted. So, in the case above, if the *Asterisk* layer had been simply relocated, the *Yellow Shapes* folder would then be gone:



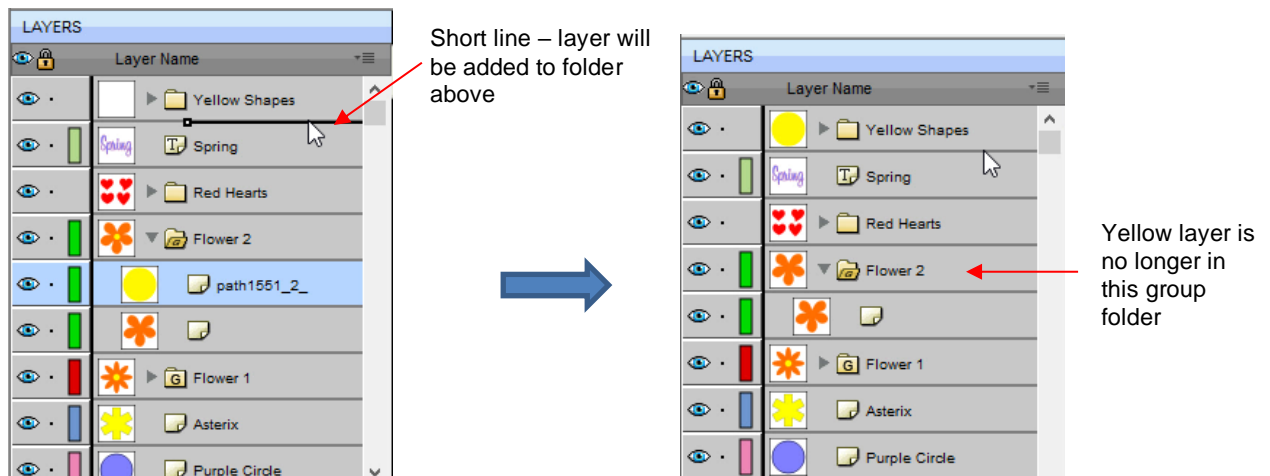
Asterisk layer is moved; Yellow Shapes folder is gone

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

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



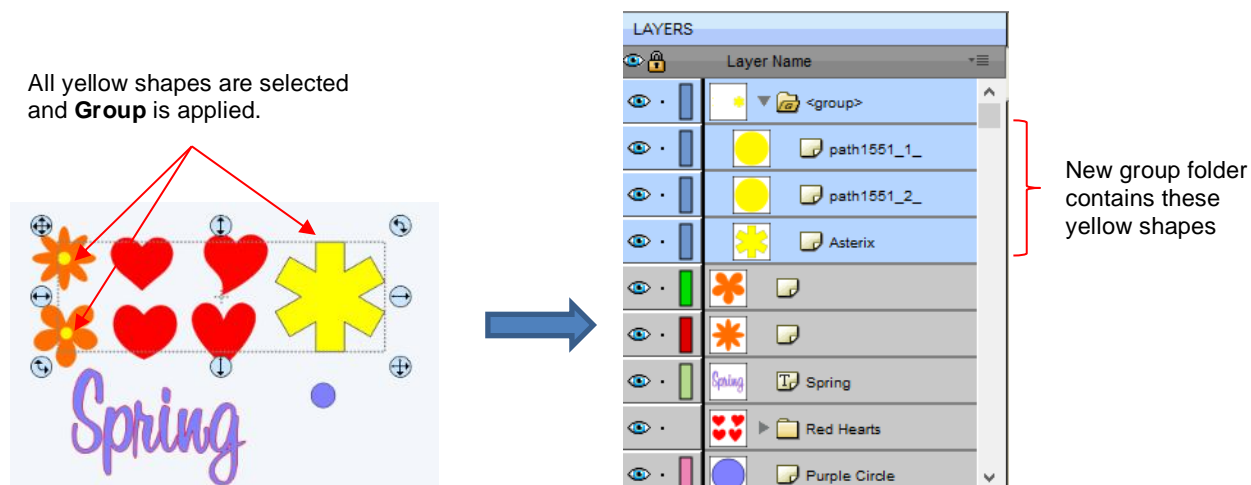
◇ Then drag the yellow layer up to the *Yellow Shapes*, again making sure only a short line is present. The yellow layer is then moved out of the *Flower 2* group:




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

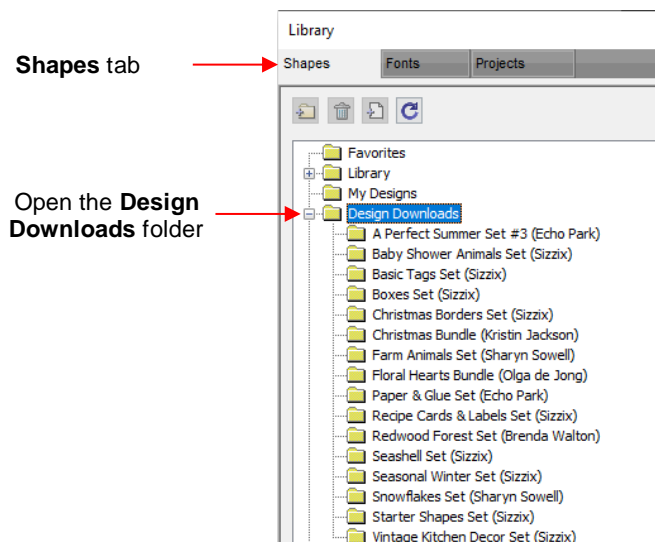
- Note: This was just one way to achieve this goal. Another way would have been to ungroup the *Flower 1* and *Flower 2* layers. Then to select all of the yellow shapes on the **Cutting Mat** and go to **Object>Group**.

A new group folder would be added to the **Layers Panel** with those shapes moved to it. Specific instructions on **Grouping** and **Ungrouping** are covered in *Section 3.11*.



2.05 Cutter's Market

- **Cutter's Market** is an online store with an abundance of cutting files from popular designers. While most of the files require purchasing, there are some free files, as well!
- To access the **Cutter's Market**, click on the **Store** icon  on the **Toolbar** or go to **File>Share and Get Shapes>Get Shapes**.
- After creating an account, you can pre-purchase credits to use when buying cutting files. After purchasing the files, you will immediately see a green **Download Order** button. Clicking that button will open the **Download Manager** window and your files will be downloaded to your **SCAL6 Library**. You can then locate these downloaded files on the **Shapes** tab under the **Design Downloads** folder:



2.06 Importing Other File Formats

2.06.1 Importing Vector Files

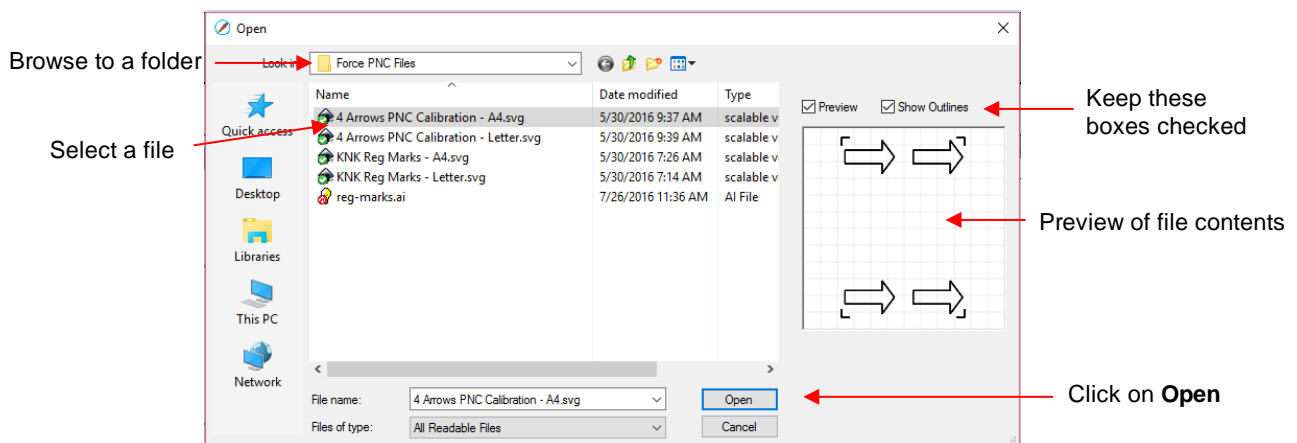
- The following vector formats can be imported into SCAL:
 - ◇ SVG: common export format for vector programs, thus popular format used for sharing files on blogs and selling files in online design sites
 - ◇ SCUT6: format used to save projects in SCAL6
 - ◇ SCAL: format used by **Cutter's Market Store**
 - ◇ PDF: a PDF can be created from a raster image, a vector image, or both. Refer to the PDF bullet.
 - ◇ AI (Adobe Illustrator): common format due to the popularity of Adobe Illustrator
 - ◇ CREATE: format used by StarCraft CREATE software (must drag and drop)
 - ◇ DXF (SCAL PRO version only): common format exported by CAD programs
 - ◇ 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.
 - ◇ MTC: format created by Make The Cut for cutting to a wide range of hobby and semi-professional cutters. Refer to the special notes about MTC import later in this section.
 - ◇ PLT (SCAL PRO version only): developed by HP for their plotters, the PLT file evolved into a standard format used by early vinyl cutters
 - ◇ STUDIO and STUDIO3: format used by Silhouette Studio
 - ◇ WPC: format used in programs developed by Sign Max, which include WinPC Sign, Funtime, Puzzles Inspiration, and Gazelle.
 - ◇ Nine embroidery file formats: .DST, .EXP, .HUS, .JEF, .PEC, .PES, .SEW, .VIP, .XXX

- There are two ways to open the import window:



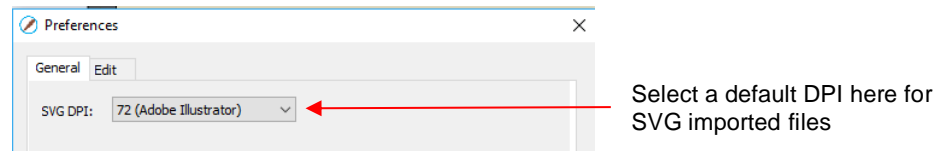
- ◇ Click on the **Import** icon on the upper **Toolbar**
- ◇ Go to **File>Import**

- Either choice will open the following window where you can browse to locate the file you need. Note there are options to see a **Preview** and **Show Outlines**:



- You can also drag and drop any of the file formats directly onto the SCAL screen to import that file.

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



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

2.06.2 Importing Raster Files

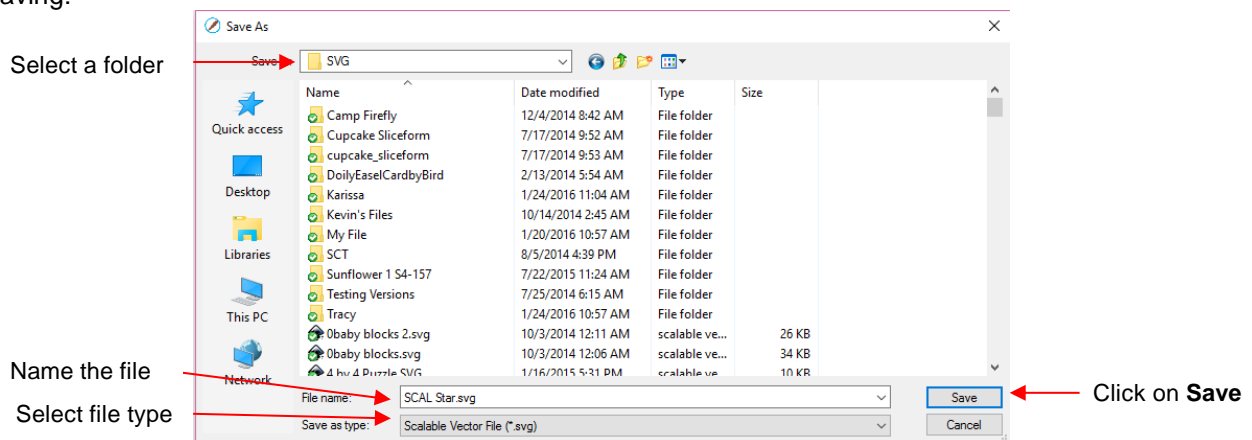
- There are several ways to import a raster file (JPG, BMP, GIF, PNG, PDF) depending on the intended purpose for that file:
 - ◊ **File>Import:** will import PNG files with a transparent background, simultaneously adding a vector cut line along the transparent border. It will also crop out any excess transparent space around the image as long as the *Print* layer and *Cut* layer remain grouped. This is very useful for PNC applications. Note: this is the only raster format that will work using this method.
 - ◊ **File>Place Image:** will import JPG, BMP, GIF, and PNG files for the purpose of printing or manually tracing in the event the auto-tracing function doesn't adequately perform due to the image quality. It's also another way to load an image for the **Trace Image** window. Refer to *Section 5.03*.
 - ◊ **File>Trace Image** (or click the **Trace** icon on the **Toolbar**): will import and auto-trace JPG, BMP, GIF and PNG files. Various options and settings can be applied to obtain the desired results. Refer to *Section 5.03*.
 - ◊ **File>Import:** will also import PDF files with raster content. Select the *Print* layer (only) on the **Layers Panel** and click the **Trace** icon on the **Toolbar**.
 - ◊ Drag and drop files into SCAL: will import PNG files as if **File>Import** is used. The other raster formats will import as if **File>Place Image** is used. Note that you can select multiple raster files at one time using the method.

2.06.3 Importing Fonts

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

2.07 Exporting in Other File Formats

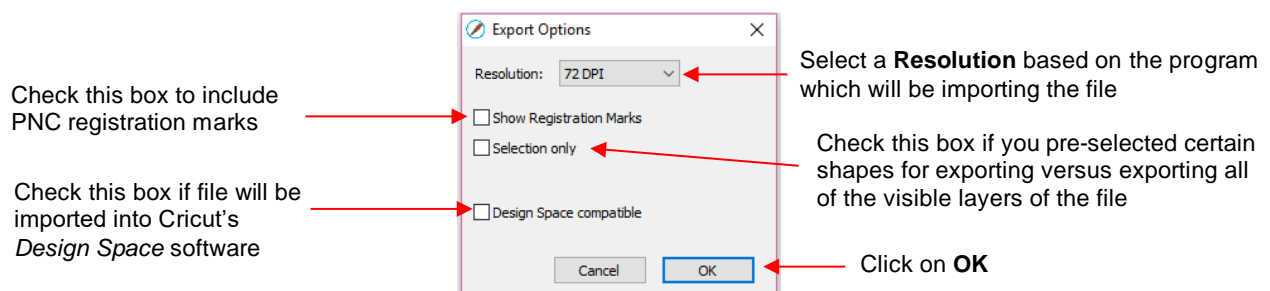
- Besides saving in SCUT6 format, you can also export in the following formats: SVG, JPG, BMP, PNG, PDF, TIFF, FCM, PLT (Pro-only), and NE (G-code) for CNC machines). SVG, FCM, PDF, NE, and PLT are vector formats. The others are raster.
- If there are only certain shapes in the file that you want to export, you have two options:
 - ◇ Select those particular shapes before exporting and then mark a box called **Selection only** in the export window.
 - ◇ Hide the shapes you do not want to export on the **Layers Panel**. Refer to *Sections 2.04.2* and *3.10*.
- To export a file, use either of the following options:
 - ◇ Go to **File>Export**
 - ◇ Press **Ctrl+Shift+E**
- The following window will open where you can name the file, select the file format, and the location for saving:



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

2.07.1 Exporting in SVG Format

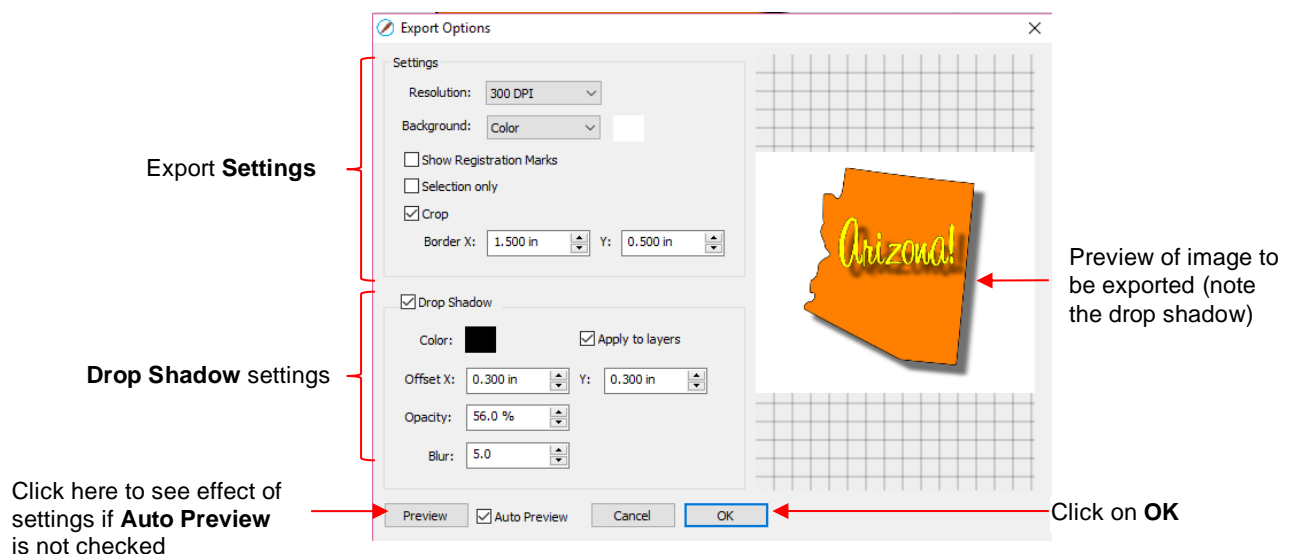
- The **SVG Export Options** are shown in the following screenshot:



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

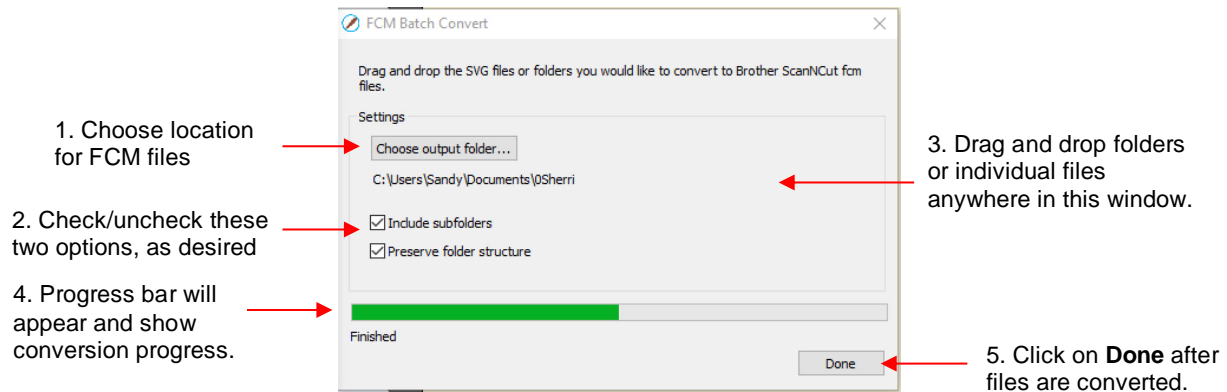
2.07.2 Exporting in JPG, PNG, BMP and TIFF Formats

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



2.07.3 Exporting in FCM Format

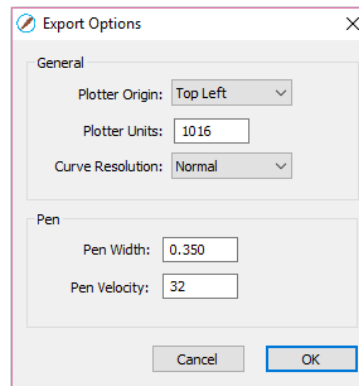
- The FCM format is used by the Brother ScanNCut models. To export a project, go to **File>Export** and, in the drop down menu, change from **SVG(*.svg)** to **ScanNCut (*.fcm)**. After clicking on **Save**, the FCM file will be located in the folder you chose in the **Save As** window.
- There is also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



2.07.4 Exporting in PLT Format

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

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



- **IMPORTANT:** Some of the cutter brands supporting direct cutting from SCAL6 (e.g., Skycut, Siser, and StarCraft) have a **Save to File** option in the **Cut Settings** window. This also is a PLT export option, but will also contain relevant cut settings in that window.


2.07.5 Exporting to SCAL2

- If you still use SCAL2, you can send a file from SCAL6 to SCAL2 by going to **File>Send to> Sure Cuts A Lot 2**. You will need both versions of SCAL open at the time.


3. SCAL: Manipulating and Coloring Shapes

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

3.01 Basic Shapes

- Besides the shapes included in the **Library**, SCAL also offers the ability to add various geometric shapes to the **Cutting Mat: Rectangle, Rounded Rectangle, Circle, Triangle, Polygon, Star, Arrow, 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, right click on the **Rectangle** icon  on the **Tools Panel** and then select the desired shape from the popup menu.
- Once a different shape is selected, that shape's icon will then replace the **Rectangle** icon on the **Tools Panel**.

3.01.1 Rectangle

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




Freely dragging mouse



Holding **Shift** key

3.01.2 Rounded Rectangle

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

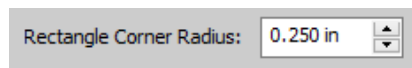


Freely dragging mouse



Holding **Shift** key

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



Radius: 0.10




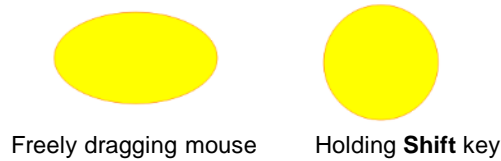
Radius: 0.25




Radius: 0.75

3.01.3 Circle and Oval

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




3.01.4 Triangle

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

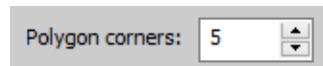


3.01.5 Polygon

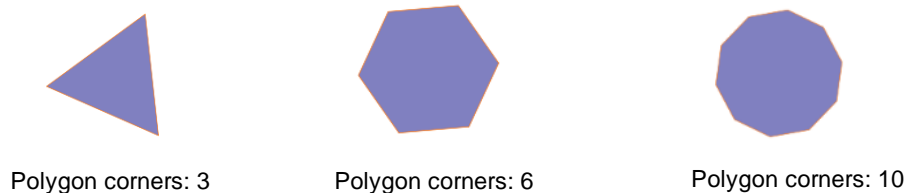
- After selecting the **Polygon** shape , drag the left mouse button to form a polygon:




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



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

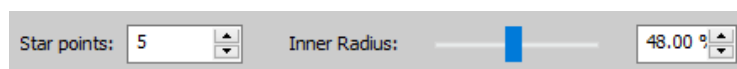


3.01.6 Star

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



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



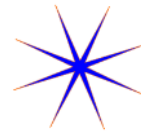
- ◇ The **Star points** setting can be used to change the number of points on the star. The **Inner radius** setting can be used to change the angle of the inner points:



5 Points
Radius: 38%




4 Points,
Radius: 47%



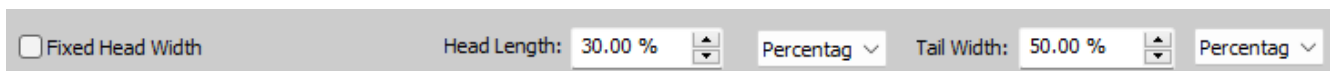
8 Points
Radius: 10%

3.01.7 Arrow

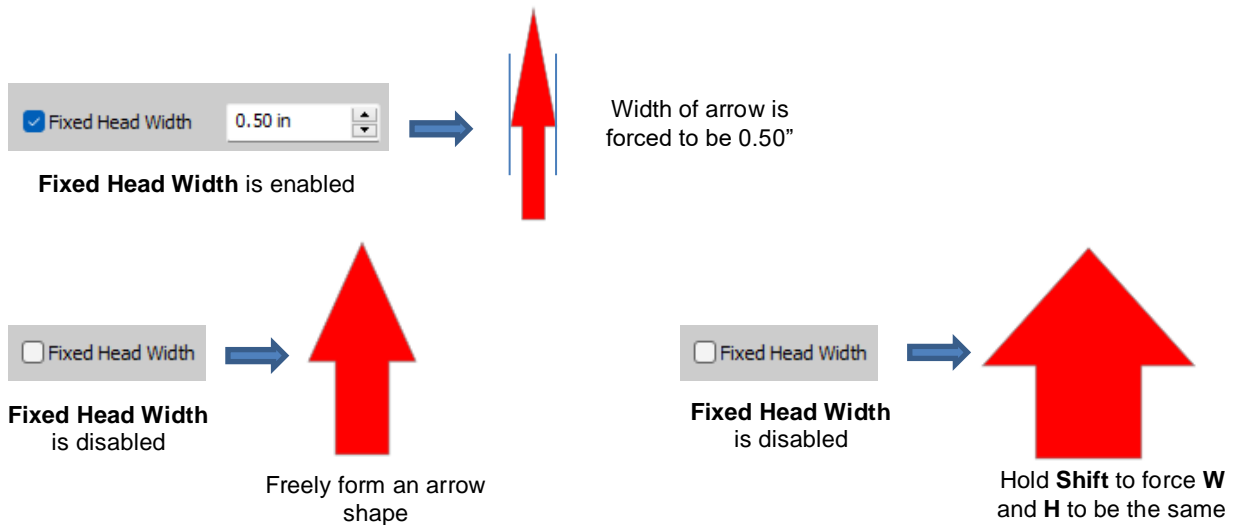
- After selecting the **Arrow** shape , drag the left mouse button to form an arrow:



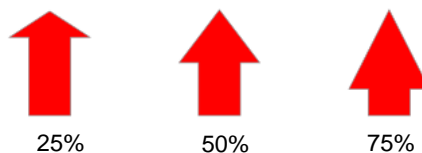
- In the **Tool Options**, five settings will appear:



- ◇ **Fixed Head Width:** when enabled, a sizing box appears where you can enter a specific width for the head to remain as you are dragging and sizing the arrow:




- ◇ **Head Length:** Increase or decrease by either a percentage change or by entering a new dimension:



- ◇ **Tail Width:** Increase or decrease by either a percentage change or by entering a new dimension:



3.01.8 Spiral

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



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



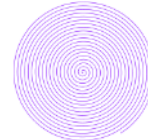
- ◇ **Turns:** Number of rotations around the center:



Turns: 3



Turns: 6



Turns: 20

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



Divergence: 1



Divergence: 3



Divergence: 0.5

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



Inner Radius: 0



Inner Radius: 0.2



Inner Radius: 0.5

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




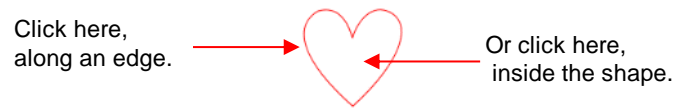
Clockwise: checked



Clockwise: not checked

3.02 Selecting

- 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):



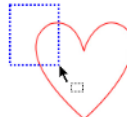
- ◇ Note that the cursor will change once the shape can be selected. For example, when selecting a line, wait for the cursor to change before clicking:



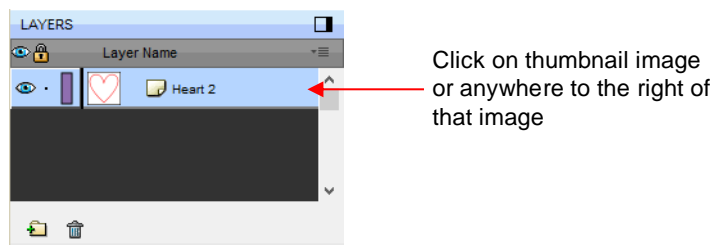
- ◇ Another way to select: drag the mouse to enclose the entire shape (aka marquee-select).



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

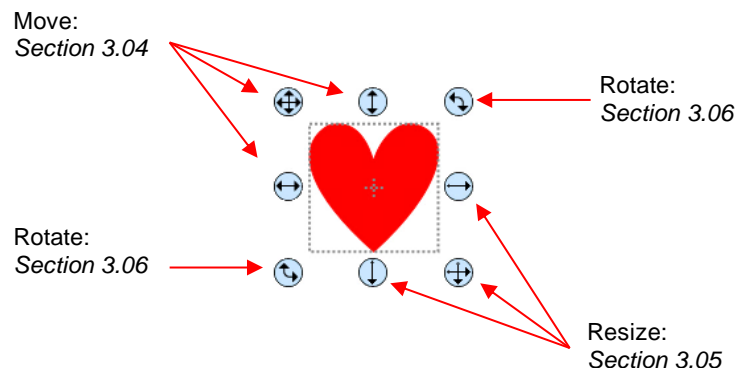


- ◇ A fourth way: click on the layer which contains this shape:



3.02.1 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:

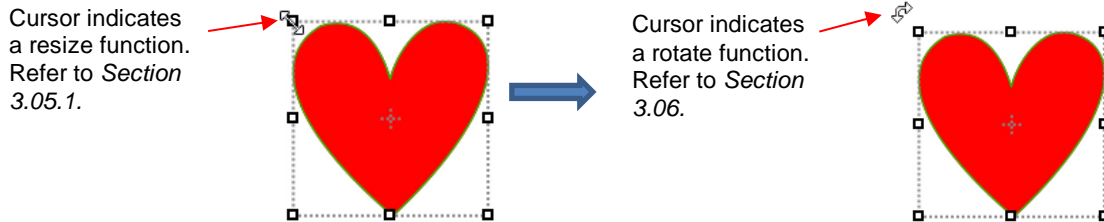


3.02.2 Advanced Selection Handles

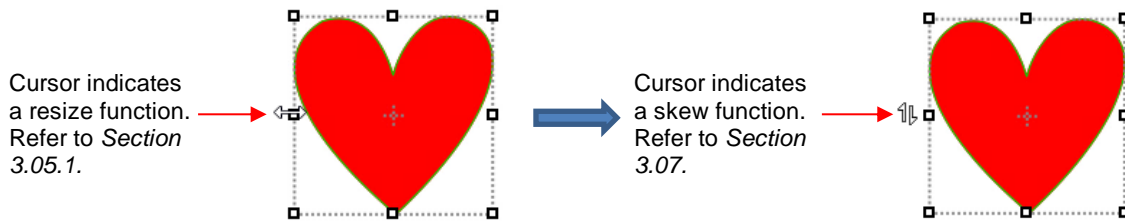
- While in the **Selection Tool** mode, the **Tool Options** bar indicates a setting called **Handles**. The drop-down menu offers another option called **Advanced**:




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

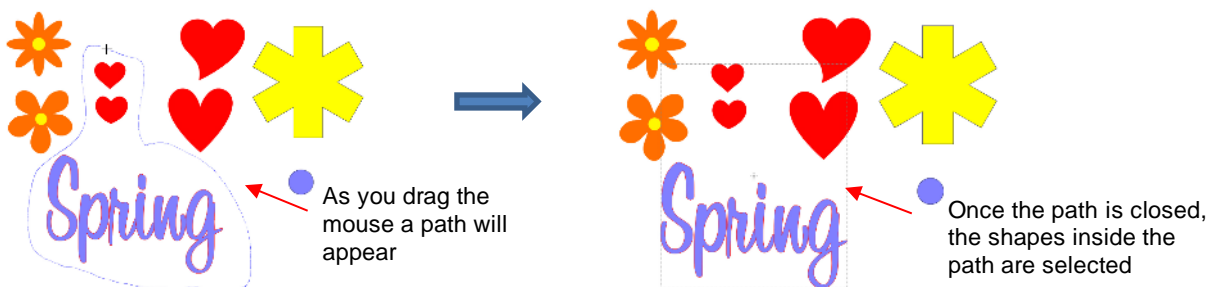


- All four corner handles offer the same resizing and rotating functions. The middle handles along the four sides offer resizing and skewing:



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

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



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

- ◇ Press **Ctrl+A**
- ◇ Right-click on the screen and choose **Select All** from the menu
- ◇ Go to **Edit>Select All**

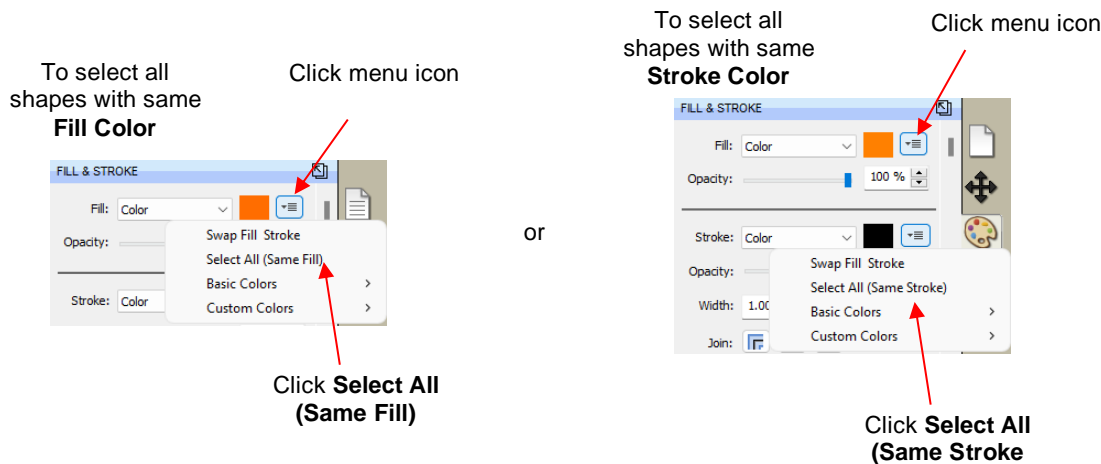
- To unselect all shapes, use one of the following ways:

- ◇ "Click away" – click anywhere else on the screen and the shapes will be de-selected
- ◇ Press **Ctrl+Shift+A**

- ◇ Go to **Edit>Deselect All**

3.02.3 Selecting by Color (and more)

- Coloring shapes is covered in *Sections 3.14* and *3.15*.
- If you need to select all of the shapes with a particular **Fill Color** or **Stroke Color**, first select one of the shapes of that color. Then click on the menu icon and choose **Select All (Same Fill)** or **Select All (Same Stroke)**, depending on which one you picked:



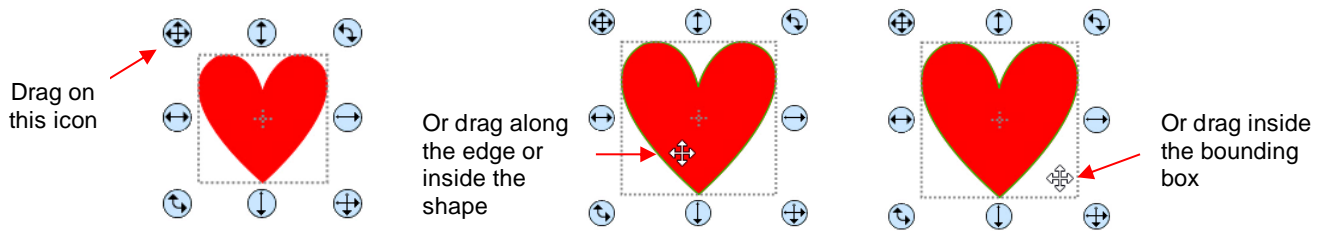
- Select by color isn't restricted to a solid color. You can also select shapes based on:
 - ◇ **Fill** set to **None**, **Pattern**, or **Gradient**
 - ◇ **Stroke** set to **None** or **Pen Color**

3.03 Deleting

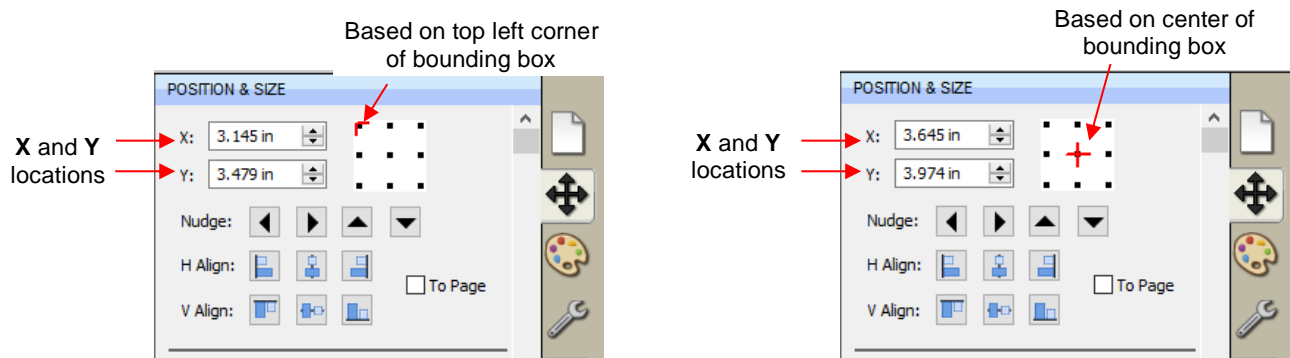
- To delete a selected shape, use any of the following options:
 - ◇ Press the **Delete** key on the keyboard
 - ◇ Right-click on the screen and choose **Delete** from the menu
 - ◇ If the shape is on its own layer, click on the **Delete Layer** icon:
- To delete all of the shapes in the current project: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

3.04 Moving

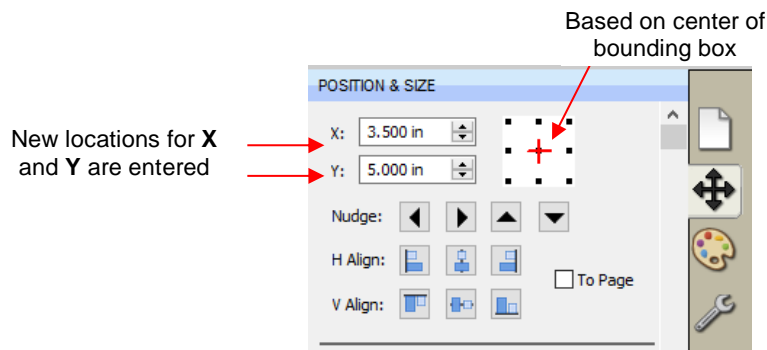
- To move a selected shape, hold down the left mouse button on the upper left corner icon or anywhere within the shape and drag to another location. Note that if you see this cursor , the shape can be moved:



- 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:



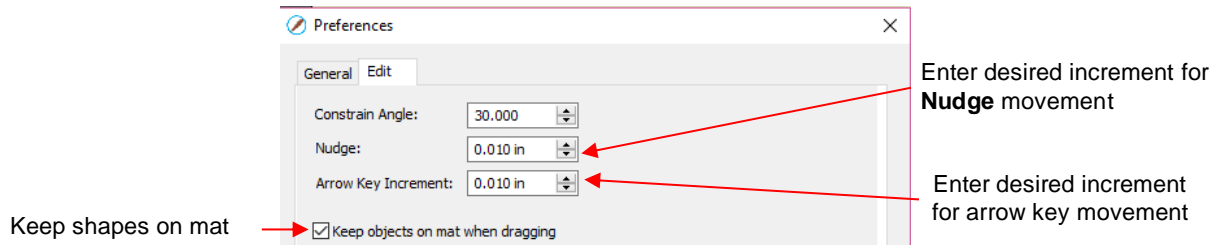
- You can enter new values into either or both of the **X:** and **Y:** windows to move the shape to a new location:



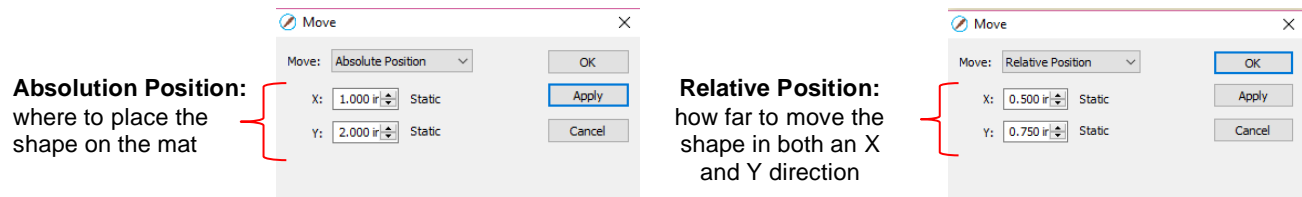
- The **Nudge** icons, which are just below the **X** and **Y** entries, can also be used to move a selected shape. These move in the same increments as the keyboard arrows:



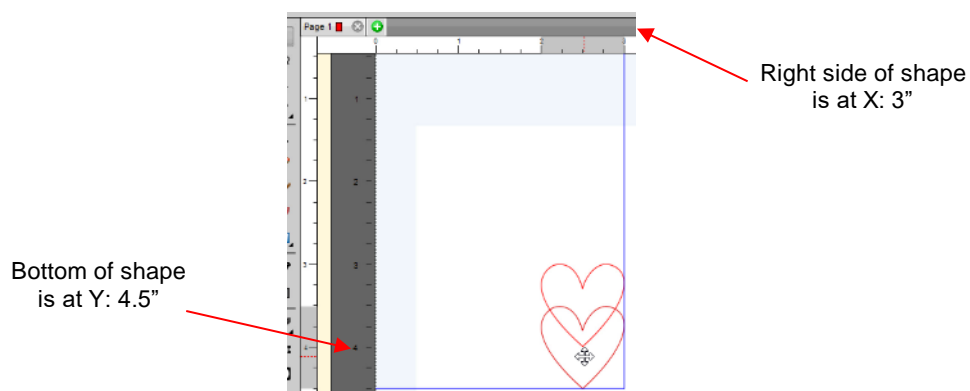
- The increment size for both the keyboard moves and the **Nudge** moves can be changed by going to **Edit>Preferences** and then selecting the **Edit** tab. This window also offers the option to force shapes to remain within the boundaries of the **Cutting Mat** while being moved with the mouse:



- 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**)



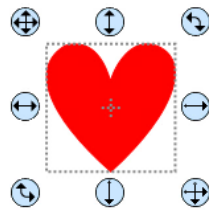
- Important:** After applying a move in the **Move** window, click on **OK** and then re-enter the window if you need to make subsequent move.
- You can also use the **View>Snap To** menu to select any or all of the following options: **Grid**, **Guidelines**, and/or **Objects** to control the new location when moving shapes. Blue lines will appear when the shape is aligned with one of the snap-to options, such as shown in the following screenshot when **Snap To Grid** is enabled:



3.05 Resizing, Scaling, Auto fit

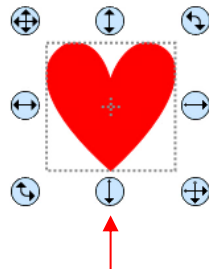
3.05.1 Resizing

- 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. If you want the resize to occur with the shape remaining centered in the same spot, hold the **Alt** key:



Drag this icon to resize.
Hold the **Shift** key for
proportional resizing.
Also holding the **Shift** key
keeps the shape centered.

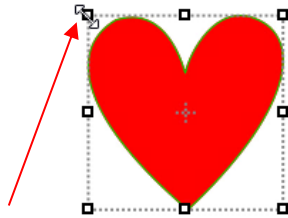
- To resize only the width or the height, drag the middle right or the middle bottom icons, respectively:



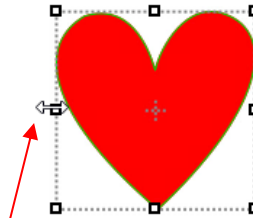
Drag this icon to resize width only.

Drag this icon to resize height only.

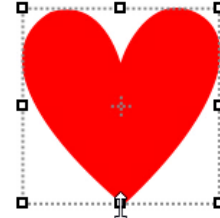
- If the **Handles** are in **Advance** mode, then drag a corner or a side when the cursor is directly over the handle. Again, holding the **Shift** key will resize height and width proportionately:



Drag a corner to resize.
Hold the **Shift** key for
proportional resizing.

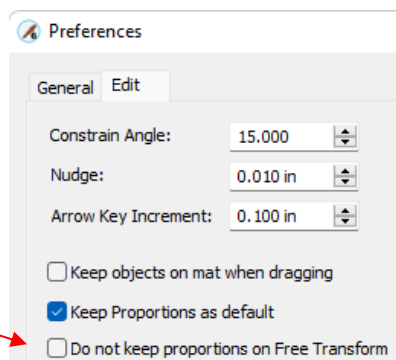


Drag left or right sides to
resize width only.



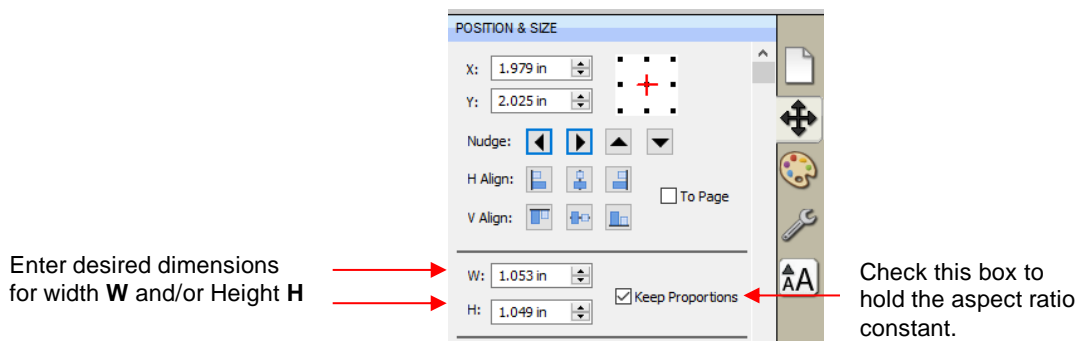
Drag top or bottom
sides to resize
height only.

- 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:



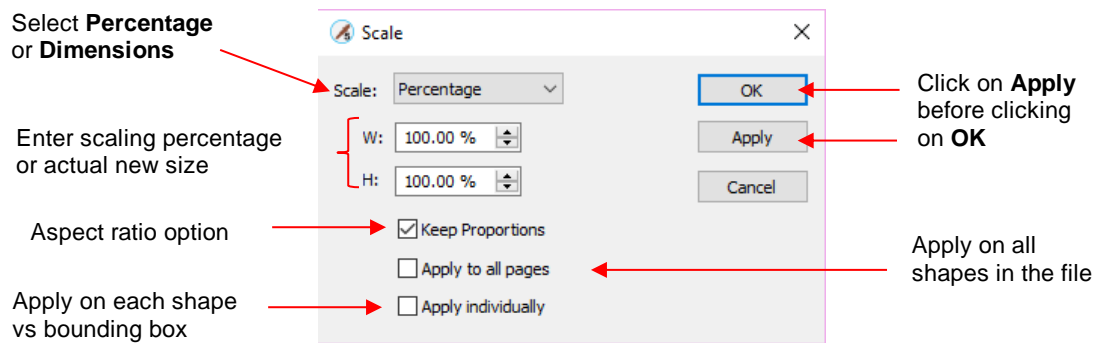
Uncheck this box

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



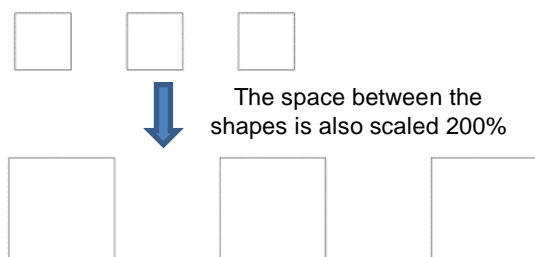
3.05.2 Scaling

- To access the **Scale** function, select one or more shapes and then use either of the following:
 - Right-click the selected shape and go to **Transform>Scale**
 - Go to **Object>Transform>Scale**
- The following window opens:

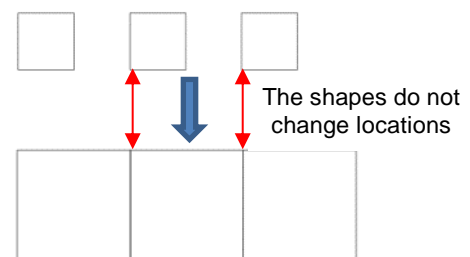


- ◇ **Scale:** Select **Dimensions** if you wish to specify the exact width and height for your selection or select **Percentage** if prefer to resize that way.
- ◇ **W:** and **H:** Enter the new dimensions or scaling percentage
- ◇ **Keep Proportions:** Leave the option checked if you want to enter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

Apply Individually not checked:



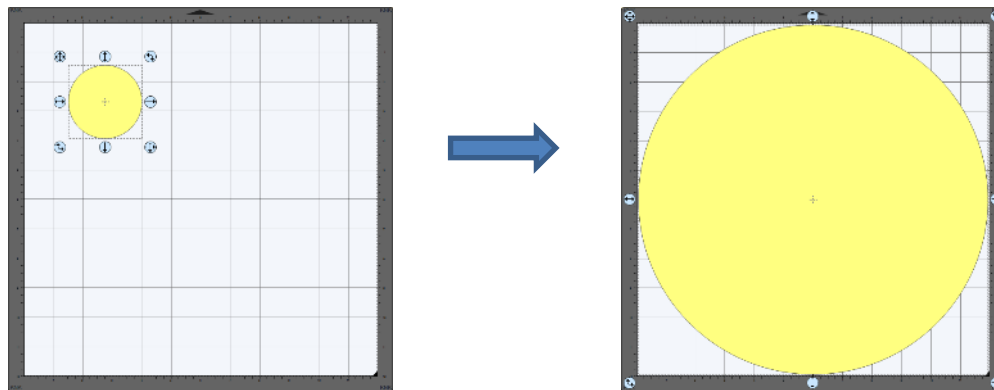
Apply Individually checked:



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

3.05.3 Auto Fit

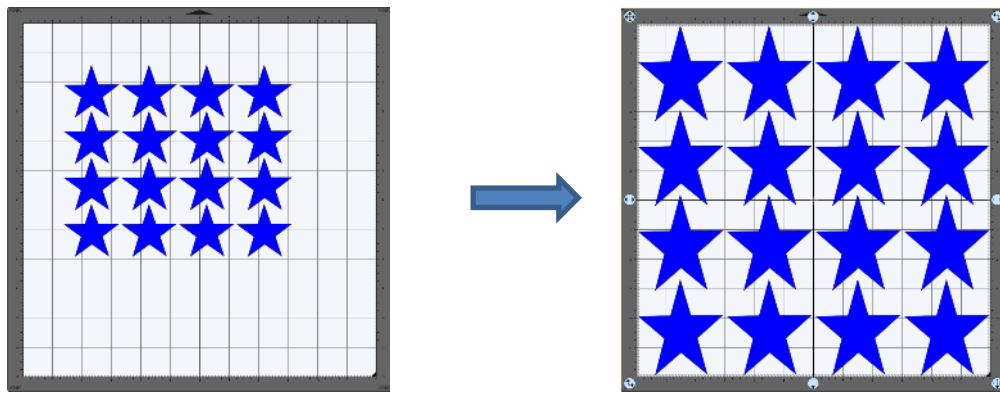
- The **Auto Fit** function will resize a shape or selection of shapes to fit the boundaries of the **Cutting Mat** with a slight (1/16") margin. It is accessed by going to **Object>Transform>Auto Fit**.
- Example: Select a circle on a 12" x 12" **Cutting Mat** and go to **Object>Transform>Auto Fit**:



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

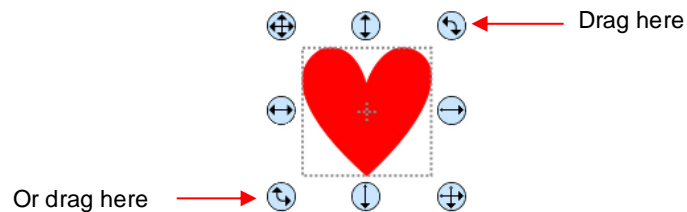


- A practical example might be something like this: You have one 12 x 12 sheet of cardstock and you want to cut out 16 stars for a party decoration and you want those stars as large as possible. Rather than having to "do the math", you can create a grid of stars (refer to *Section 3.17.4*) and then use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

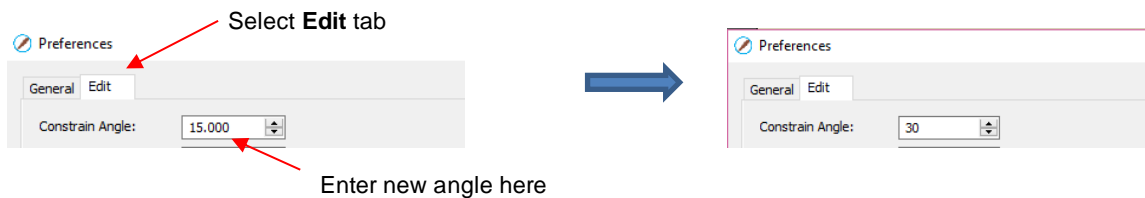


3.06 Rotating

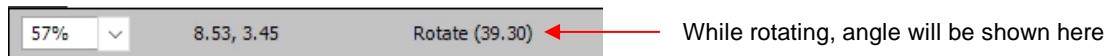
- With the **Handles** set to **Basic** mode and the shape selected, dragging the top right icon will freely rotate the shape:



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

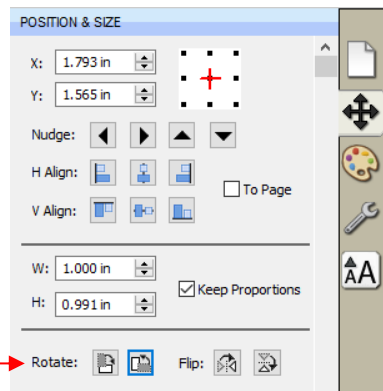


- ◇ The **Status Bar** at the bottom of the screen will indicate the current degree of rotation:

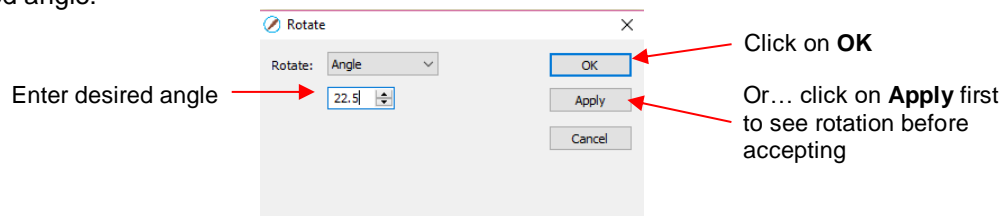


- ◇ Note: the **Status Bar** will continue to show the last degree of rotation until another shape is selected and rotated.
- A selected shape can be rotated exactly 45° clockwise or counter-clockwise, by clicking the **Rotate** icons on the **Position & Size Panel**:

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



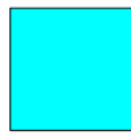
- To rotate a specific angle, open the **Rotate** window in either of two ways:
 - ◇ Right-click on a selected shape and go to **Transform>Rotate**
 - ◇ Go to **Object>Transform>Rotate**
- Enter the desired angle:



3.07 Skewing and Distorting

3.07.1 Skewing

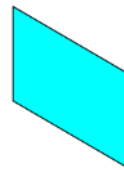
- Shapes can be skewed either horizontally or vertically:



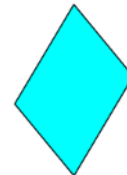
Starting Shape



Horizontal Skew

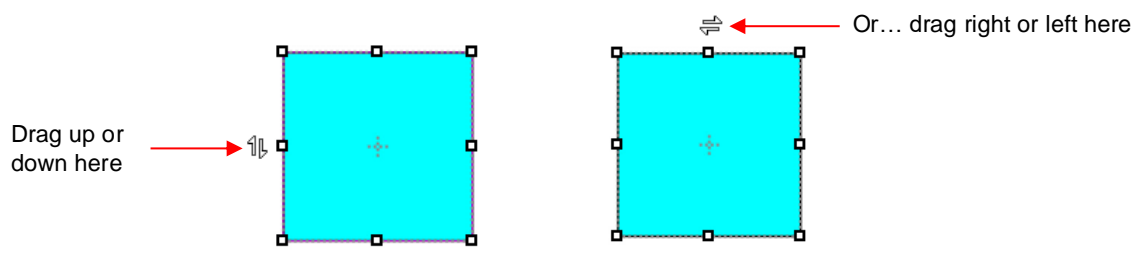


Vertical Skew

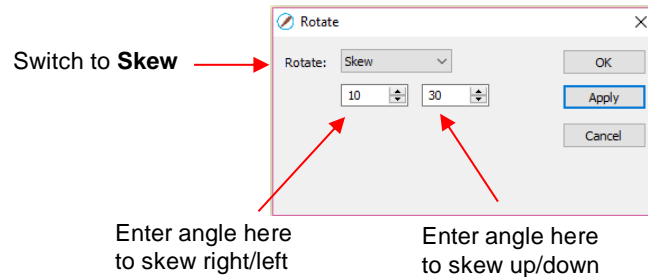


Both horizontal and vertical skew


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

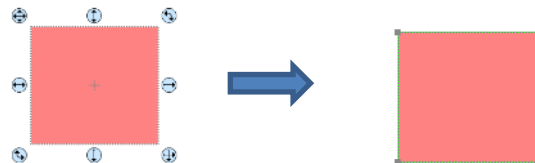


- ◇ With the shape selected, open the **Rotate** window by using one of these two methods:
 - Right-click and select **Transform>Rotate**
 - Go to **Object>Transform>Rotate**
- ◇ Then switch from **Angle** to **Skew** and enter a skew angle:

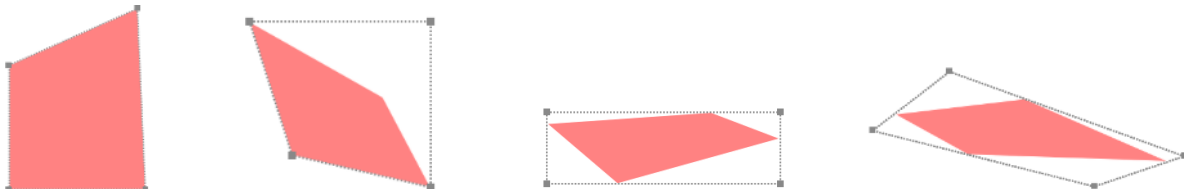


3.07.2 Distorting

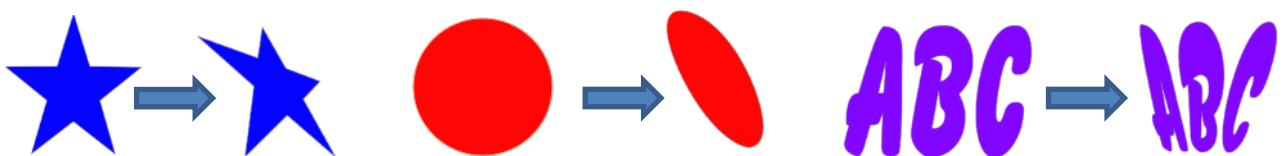
- The **Distort** tool is the 5th icon  from the bottom on the **Tools Panel**. Select a shape and then click on the icon. The four corners of the bounding box will display small boxes:



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



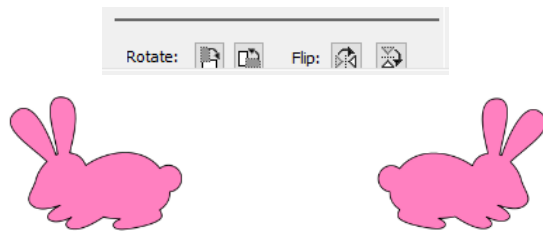
- Of course, the shape doesn't have to be rectangular. The **Distort** tool can be applied to anything:



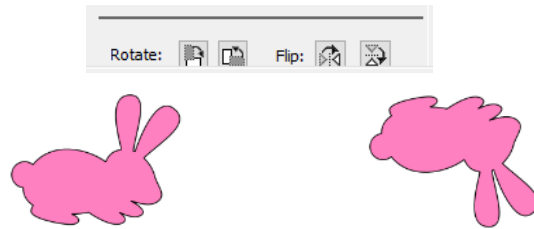
3.08 Mirroring and Flipping

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















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



3.09 Locking and Unlocking

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

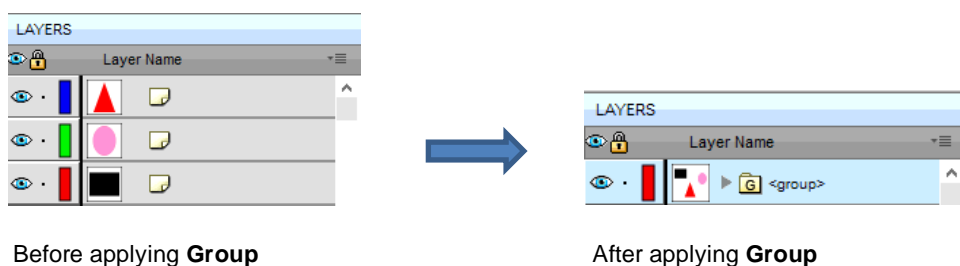
3.10 Hiding and Showing

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

3.11 Grouping and Ungrouping

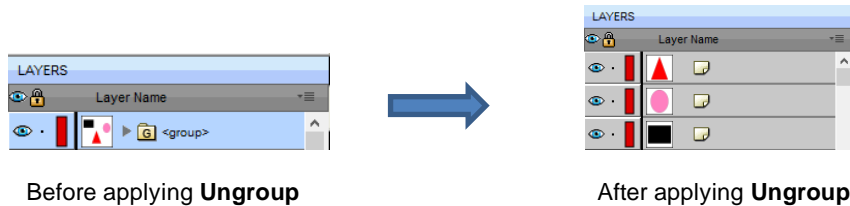
3.11.1 Group

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



3.11.2 Ungroup

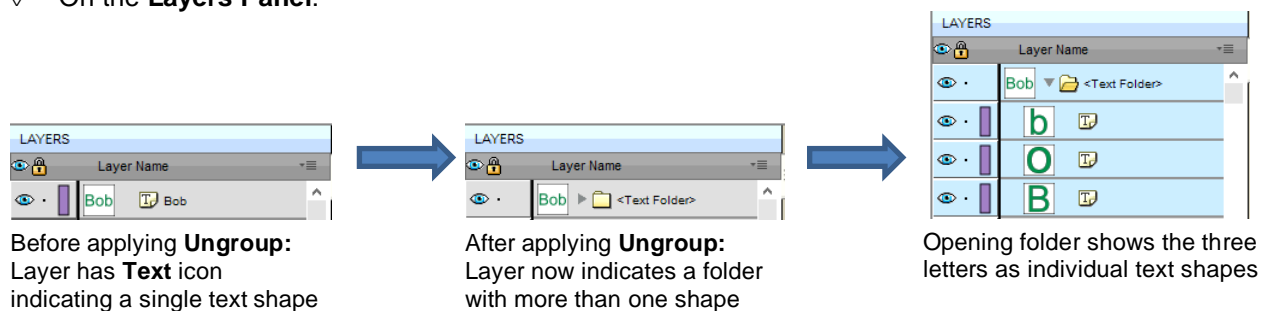
- The **Ungroup** function is used to separate a grouped layer of shapes into individual layers.
- After selecting a group, the **Ungroup** function can be applied in any of the following ways:
 - ◇ Right-click and select **Ungroup** from the popup menu
 - ◇ Go to **Object>Ungroup**
 - ◇ Press **Ctrl+Shift+G**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



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



- ◇ On the **Layers Panel**:

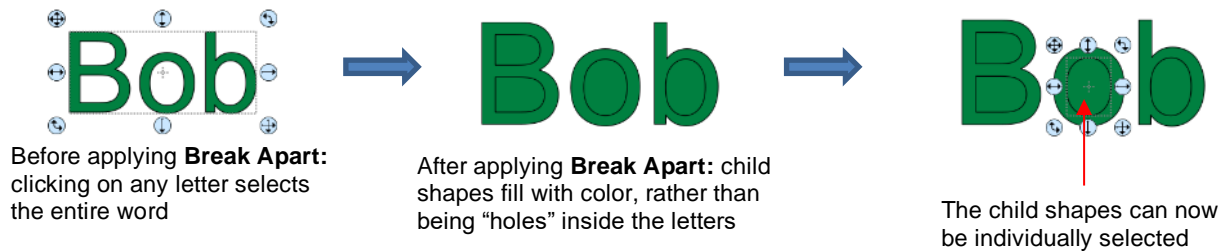


3.12 Breaking and Merging

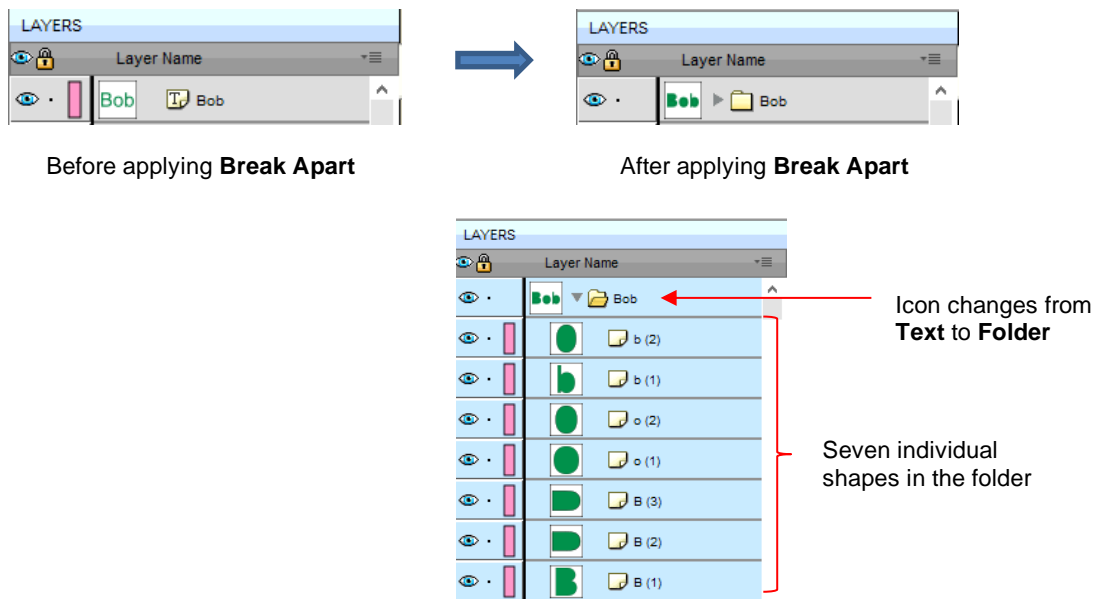
3.12.1 Break Apart

- The **Break Apart** function goes one step further than **Ungrouping**. It is used to separate a combined shape into the individual parts that make up that shape.
- After selecting a combined shape, the **Break Apart** function can be applied in any of the following ways:
 - ◇ Right-click and select **Break Apart** from the popup menu
 - ◇ Go to **Object>Break Apart**
 - ◇ Press **Ctrl+B**

- The following screenshot shows **Break Apart** being applied to the same word “Bob” to separate the internal closed paths (also called child shapes) from the external paths (also called parent shapes):



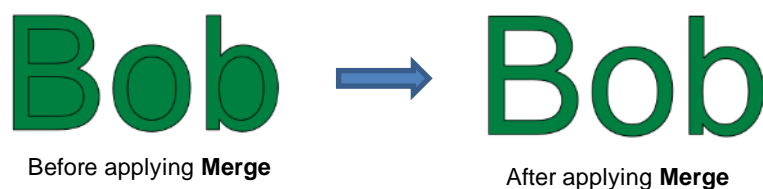
◇ On the **Layers Panel**:



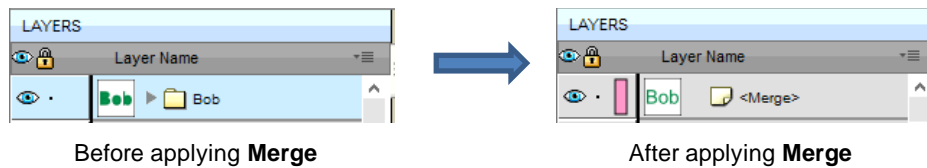
- Once you apply **Break Apart**, you have complete editing control over each individual shape within a design. But be careful! It’s also easy to inadvertently move an individual shape (especially the tiny ones) and you can risk messing up the design. Thus, only use **Break Apart** when needed and then,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

3.12.2 Merge

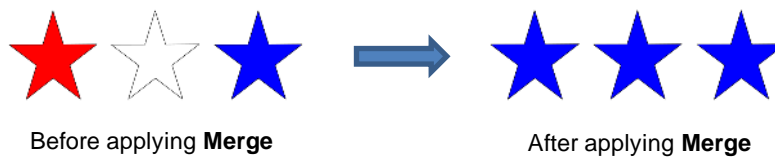
- The **Merge** function is used to combine individual paths, curves, and lines into a single shape. This is basically the opposite function to **Break Apart**.
- After selecting two or more shapes, the **Merge** function can be accessed in either of the following ways:
 - ◇ Go to **Object>Merge**
 -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



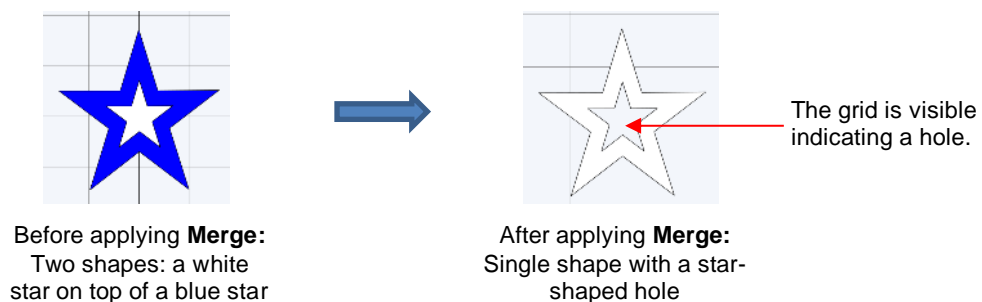
On the **Layers Panel**, this is what will appear:



- 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:

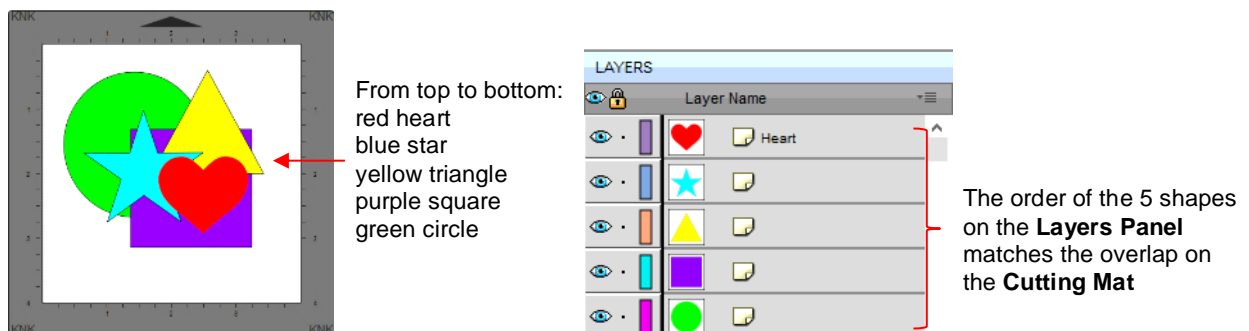


- ◊ A child shape that is merged with a parent shape essentially becomes a hole in that shape. This can be proven by having the grid showing when merging:




3.13 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 five overlapping shapes and how they appear on the **Layers Panel**:



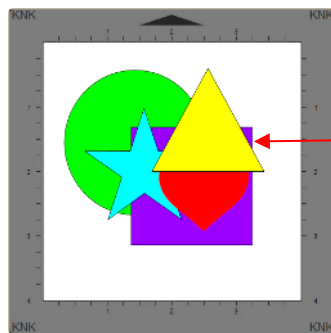
- In *Section 2.04.3*, moving layers was presented and could be used here to change the order of the shapes. However, another way to reorder these shapes is to select one and then access the **Arrange** functions using one of the following:

- ◇ Go to **Object>Arrange**
- ◇ Right-click and select **Arrange** from the popup menu
- ◇ Click on the **Layers Menu** icon  and select **Arrange**

- Four options will then appear:

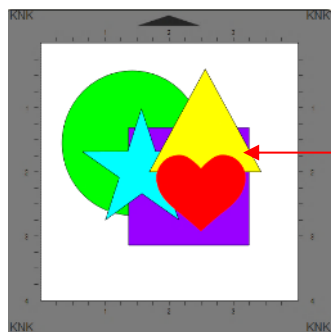
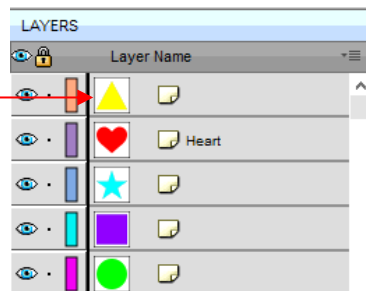
- ◇ **Bring to Front (or Layer to Top)**: Move selection to the very top
- ◇ **Bring Forward (or Raise Layer)**: Move selection up one level
- ◇ **Send Backward (or Lower Layer)**: Move selection down one level
- ◇ **Send to Back (or Layer to Bottom)**: Move selection to the very bottom

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



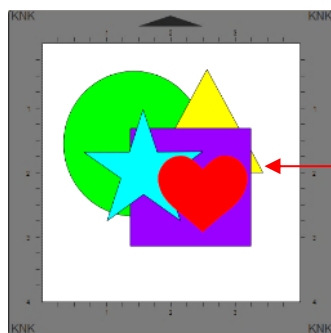
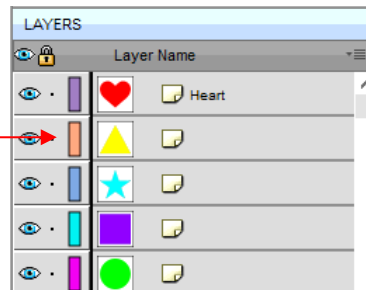
Bring to Front

Triangle moves to the top



Bring Forward

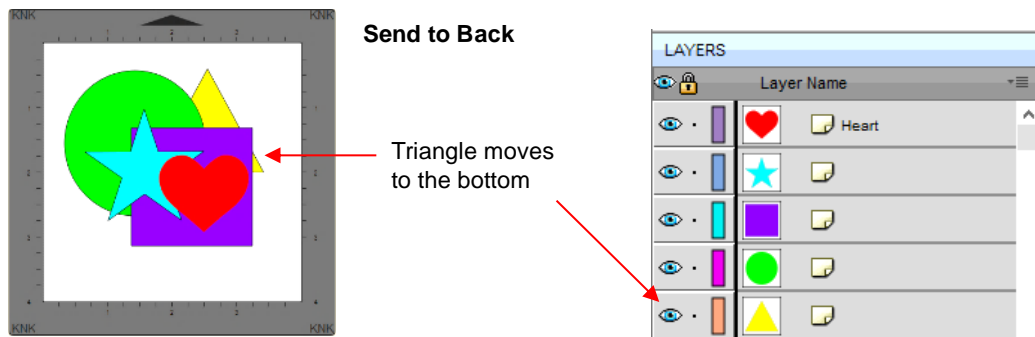
Triangle moves above blue star but is still below red heart



Send Backward

Triangle moves below purple square but is still above green circle

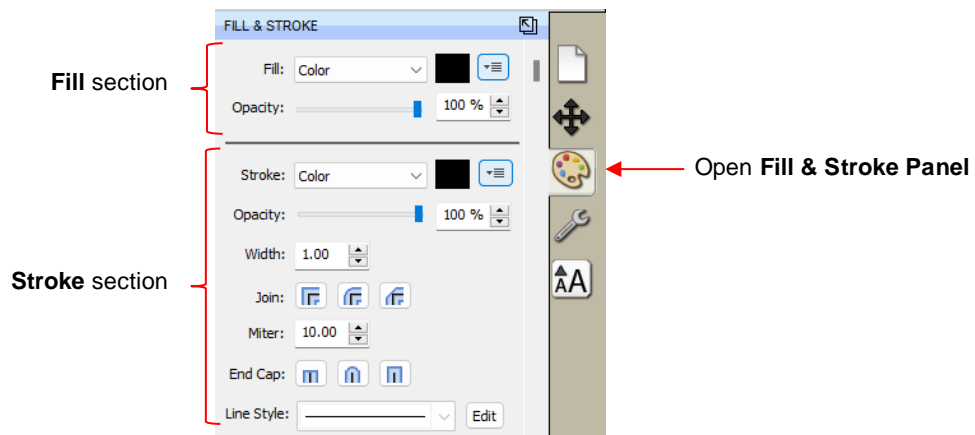




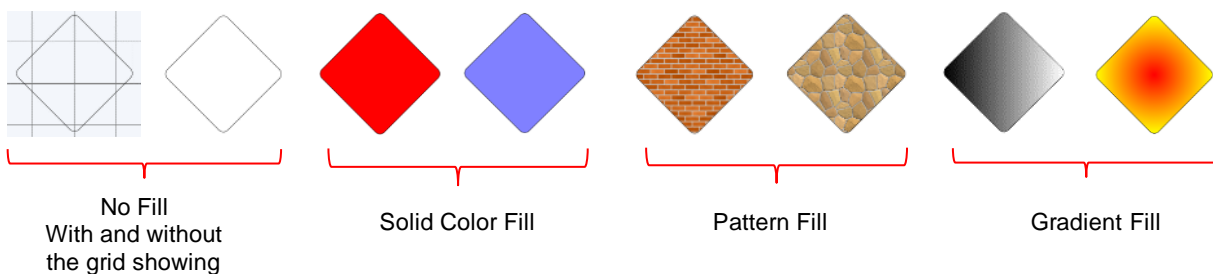
- It is worth noting that if any of the other layers had been locked or hidden, the movement of the triangle would have been the same. In other words, if the red heart had been hidden and/or locked, the triangle would still have ended up above it using **Bring to Front**.
- There are also shortcut keys (Windows version only) for these four **Arrange** functions:
 - ◇ Bring to Front - **Ctrl+Shift+Up**
 - ◇ Bring Forward - **Ctrl+Up**
 - ◇ Send Backward - **Ctrl+Shift+Down**
 - ◇ Send to Back - **Ctrl+Shift+Down**

3.14 Fill & Stroke: Fill

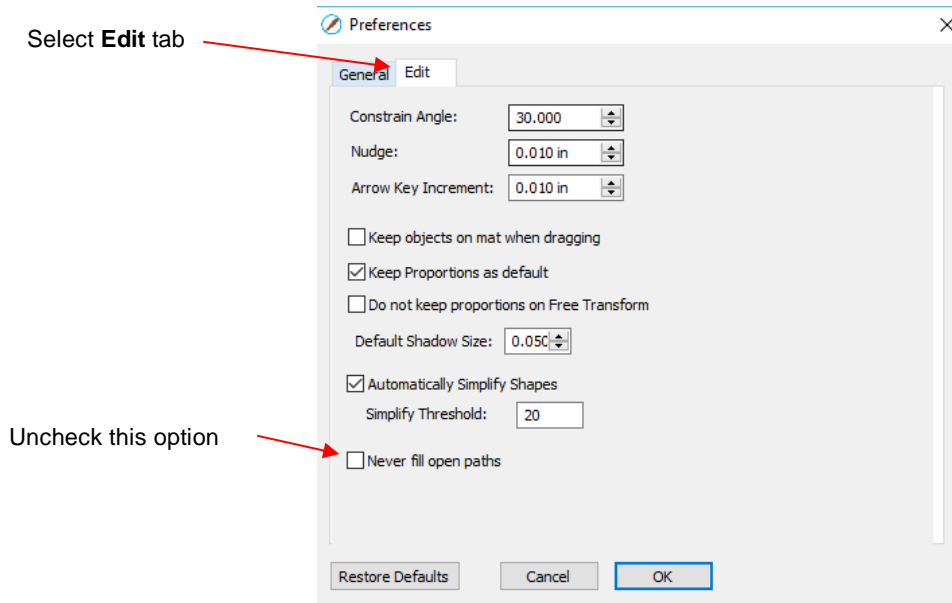
- The **Fill & Stroke Panel** provides options for changing how a shape or open path appears on the screen and, in the case of **Line Style** (solid versus dashed), how it cuts. This can be helpful in designing a project and also in print and cut applications.
- To open this panel, click on the **Fill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



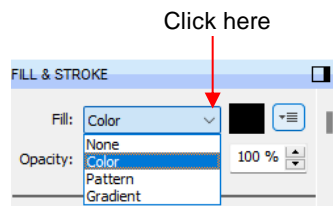
- Shapes can be filled with nothing, a solid color, a pattern or a gradient:



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

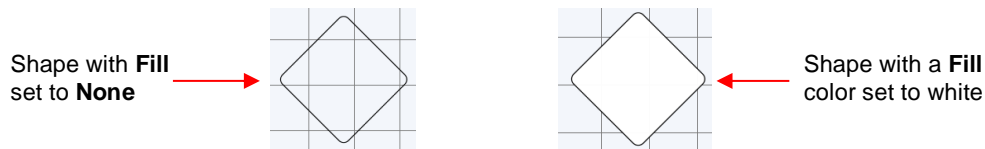


- To select a type of **Fill**, click on the drop-down menu and select from the four options:



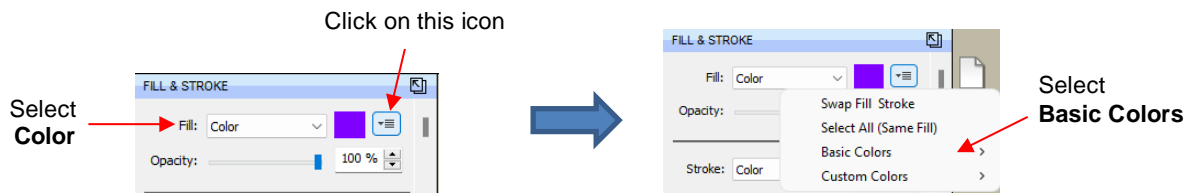
3.14.1 No Fill

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

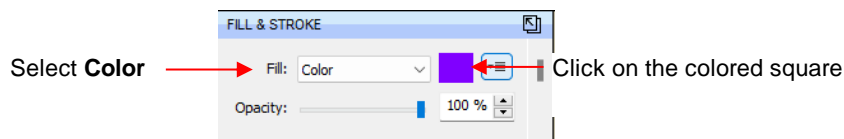


3.14.2 Color Fill

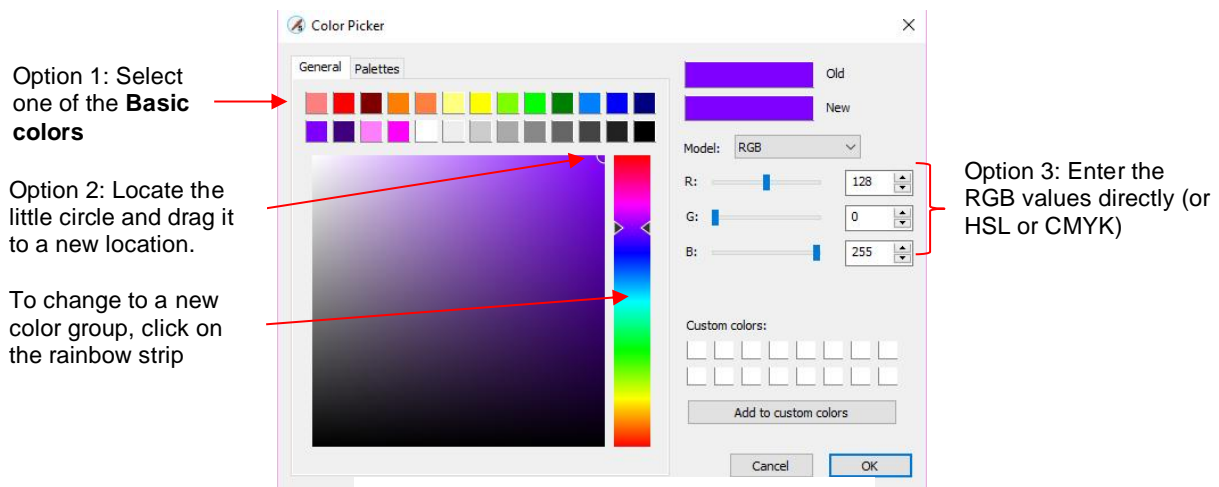
- As of SCAL6, there are several ways to select a new **Fill Color**:
 - Click the menu icon and select **Basic Colors**:



- A panel of 51 colors will pop open and you can select your color of choice.
- ◇ Click the same menu icon and select **Custom Colors**. If you have previously set up custom colors, as covered below, those colors will appear in a new panel.
- ◇ Click the same menu icon and select **Swap Fill Stroke**. The color assigned to the **Fill** will be exchanged with the color assigned to the **Stroke**.
- ◇ From the **Fill** menu, select **Color** and then click on the color box to the right:

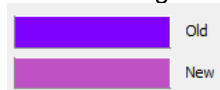


- Upon clicking the color box, the following **Color Picker** window opens where you have the option to select a basic color or create a custom color:

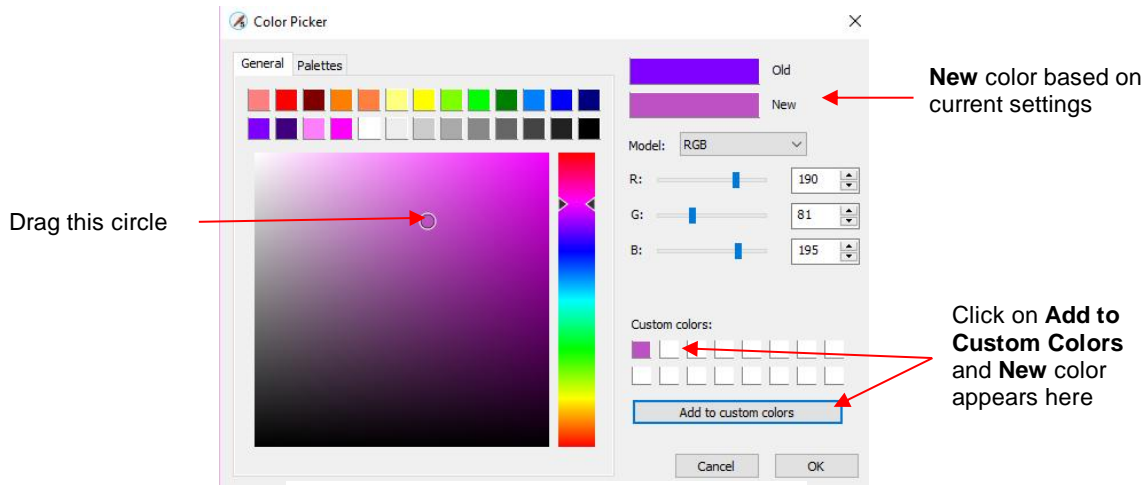


Note that a new **Custom Color** will only be saved and available in the current project.

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

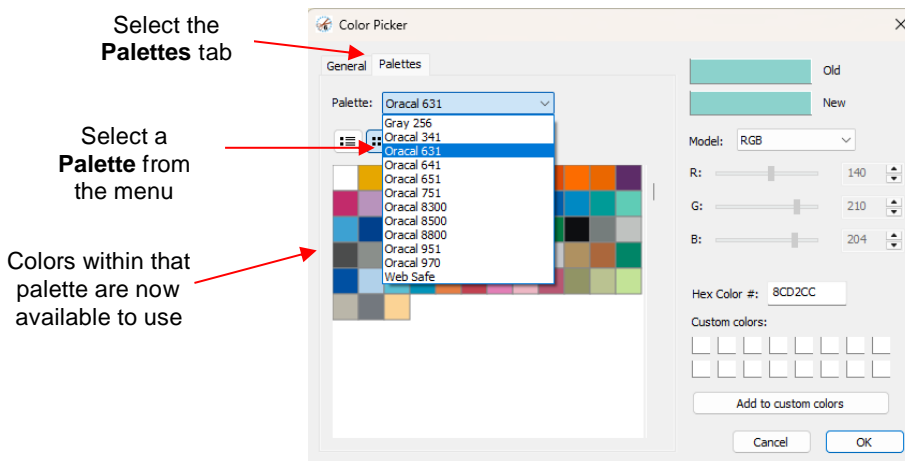


- ◇ Once you have the color you wish to use, click on **OK**. However, if you want that same color available to select again within this same file, click on **Add to custom colors** before clicking on **OK**.



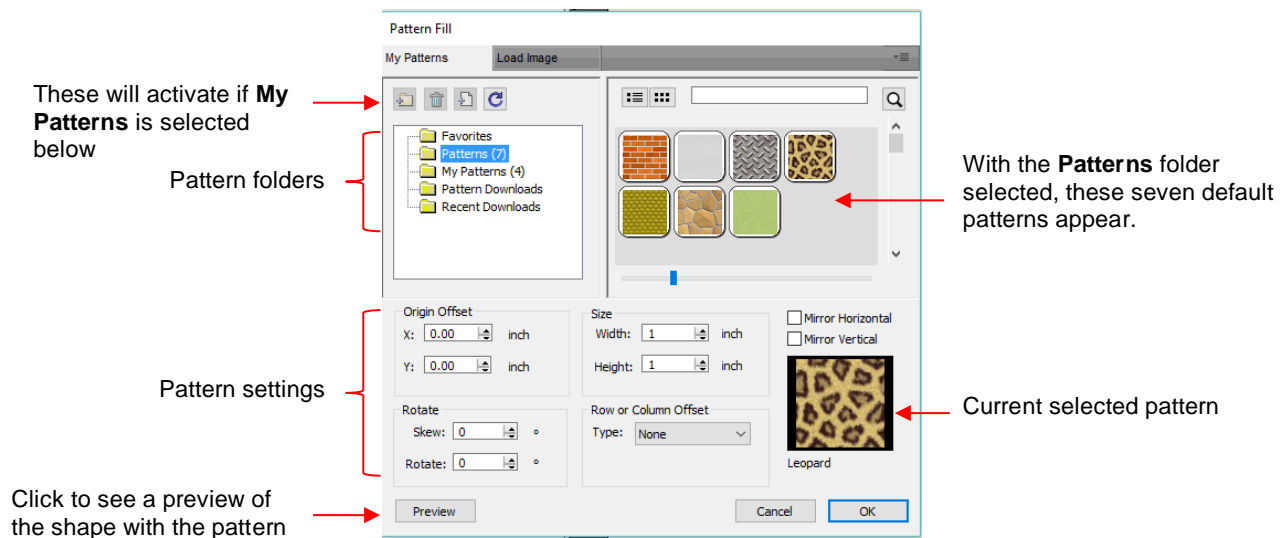
Note that a new **Custom Color** will only be saved and available in the current project.

- The **Color Fill** window also has a **Palettes** tab, offering 12 optional color palettes:

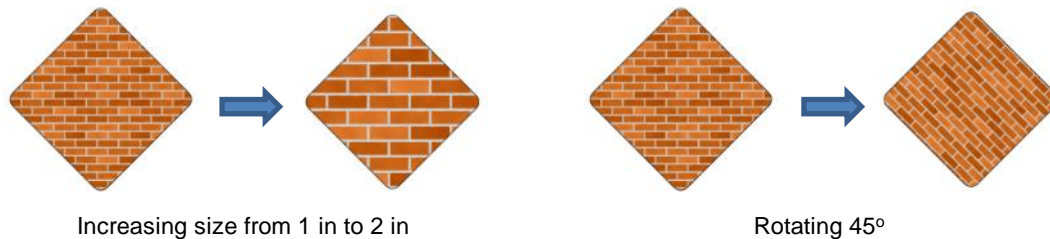


3.14.3 Pattern Fill

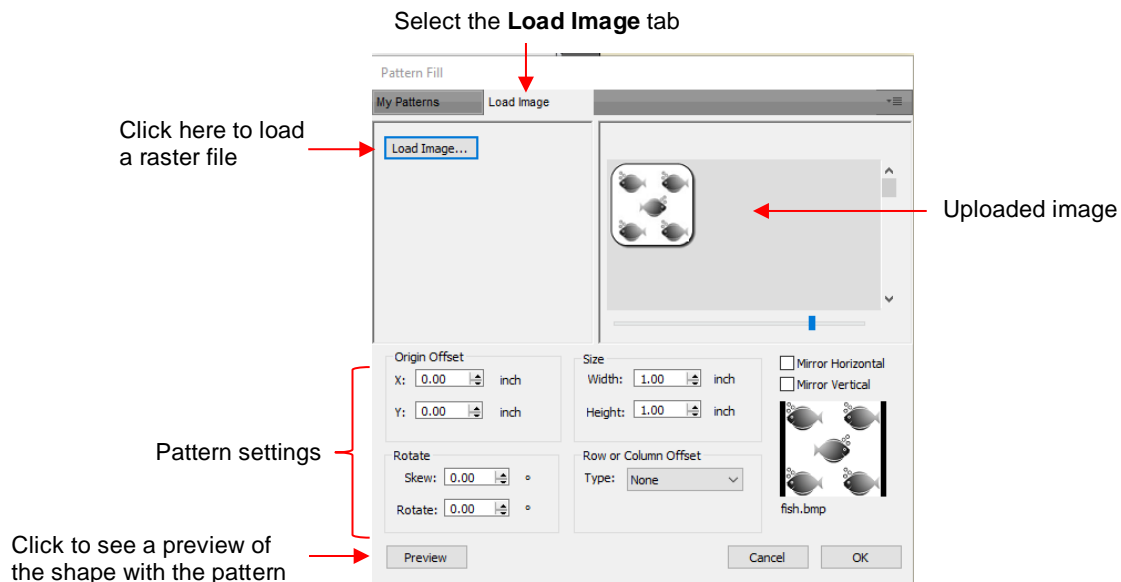
- From the **Fill** menu, select **Pattern** and then click on the color box to the right to open the following window where a pattern can be selected:



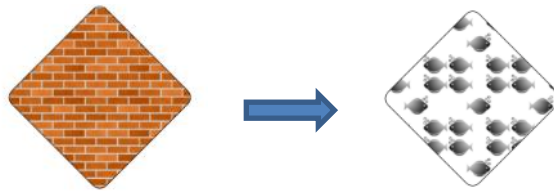
- Many of the functions in the **Pattern Fill** window are identical to those under the **Shapes** tab in the **Library**. Refer to *Section 2.03.1* for directions on searching, adding new folders, adding new files, adding to **Favorites**, etc.
- When adding your own patterns under **My Patterns**,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



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



◇ The selected shape now fills with the uploaded image:



- If you need to fill a shape with a raster image, such as a photo, using the **Clip Path** and **Clip Mask** functions are easier alternatives. Refer to *Section 7.05*.

3.14.4 Gradient Fill

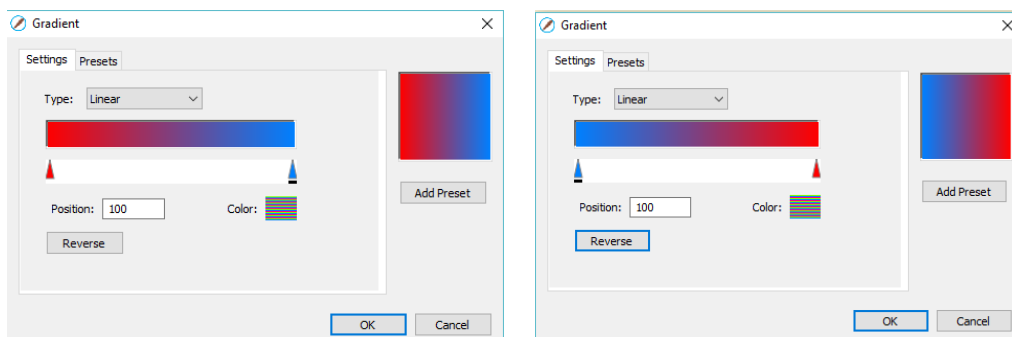
- From the **Fill** menu, select **Gradient** and then click on the color box to the right to open the following window where a gradient can be designed:



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



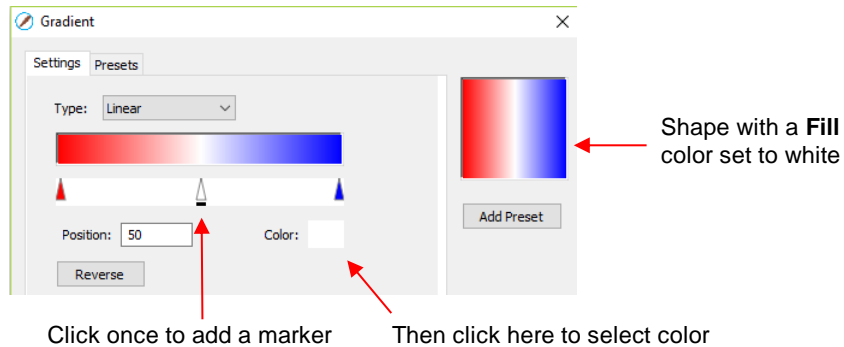
- ◇ To change colors, click on one of the markers, then click on the color selector box and choose a color from the **Color Picker** window. Repeat for the other marker. As with other color selections, you can choose a base color or create a custom color. Refer to *Section 3.14.2* for details on using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



After selecting new colors

After applying **Reverse**

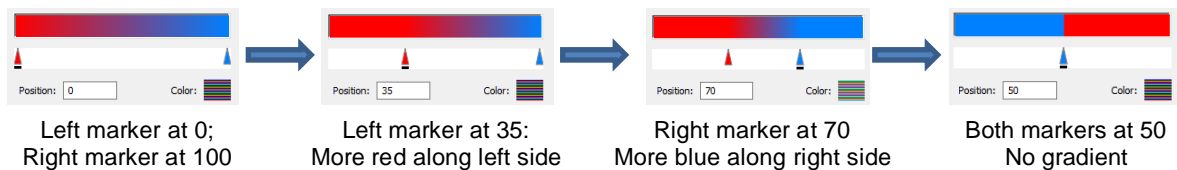
- ◇ More markers can be added by clicking on the **Position Bar** and then clicking on the **Color** selector. For example, white could have been added to the middle:




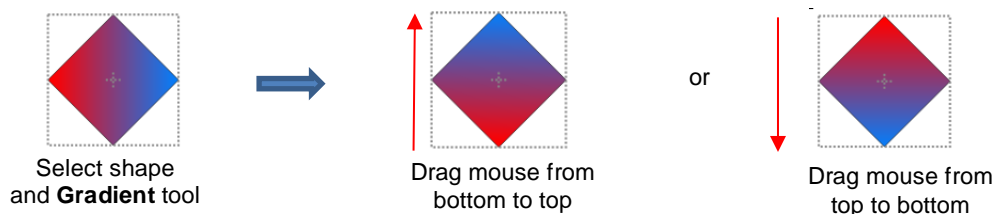
- ◇ If you inadvertently add a marker or decide you don't want one or more of the new ones, drag the marker downward and it will be removed.
- ◇ **Position:** The **Position** value is a location from 0 to 100 and applies to whichever marker is selected.

Note the little black line under a selected marker

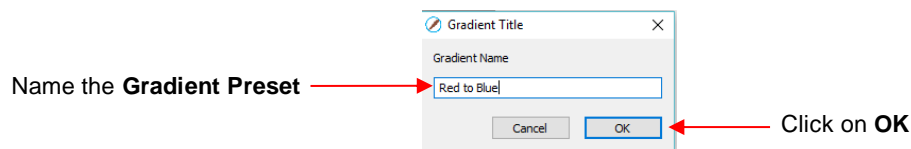
- ◇ Changing the **Position** moves the marker and resets where the gradient begins on that side. You can also manually slide the markers to change the **Position**, as well. Returning to the two-color example:



- ◇ The gradient can be rotated using the **Gradient** tool on the **Tools Panel**. After selecting the shape, click on the **Gradient** icon  and then drag the mouse from bottom to top or from top to bottom to rotate 90°. Start dragging along the bottom or top edge of the shape and end at the other side:



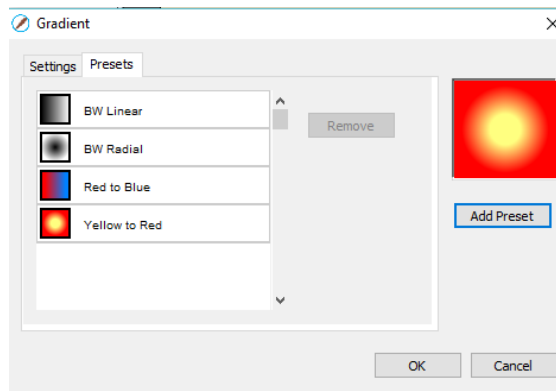
- ◇ If you want to save a particular gradient for future applications, click on **Add Preset** and a window will open where you can name this **Preset**:



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

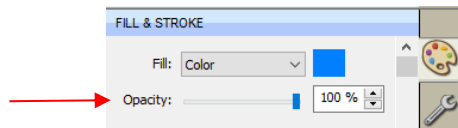
Click on the **Presets** tab





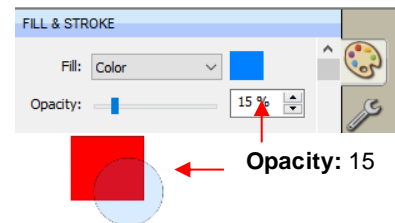
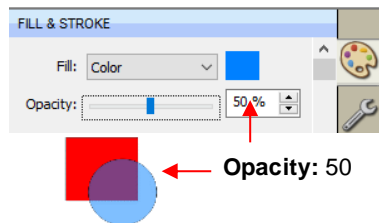
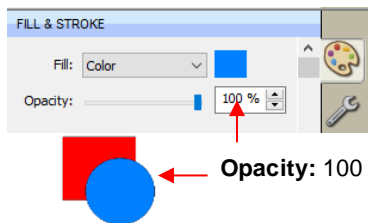
3.14.5 Opacity

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

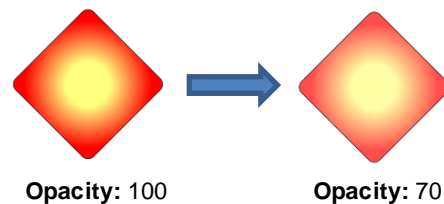
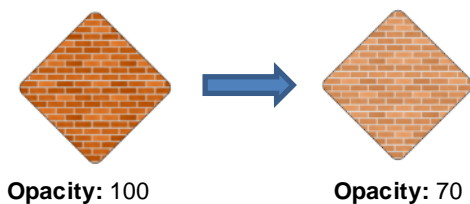


- Decreasing the **Opacity** setting will make a shape more transparent. This can be used for changing the appearance for printing or for revealing shapes that are completely or just partially hidden by other shapes.

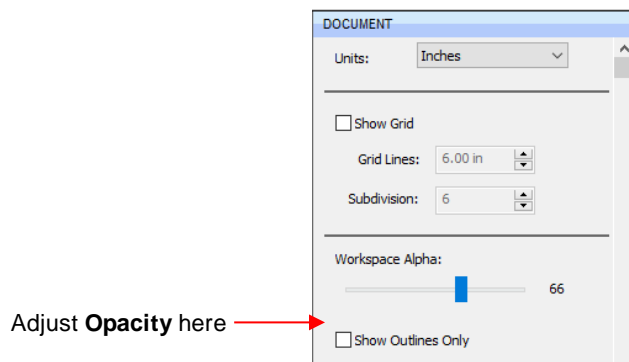
- ◇ In the following example, the **Opacity** is decreased on the blue circle, allowing the blocked portion of the red square to be seen:



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



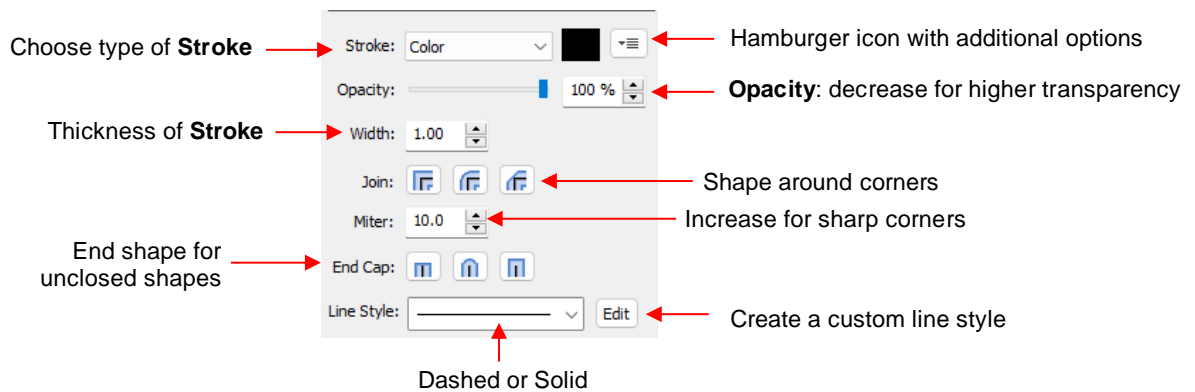
- ◇ If you want to decrease the **Opacity** for all shapes, the **Workspace Alpha** setting on the **Documents Panel** can be reduced from 100% to the desired level:



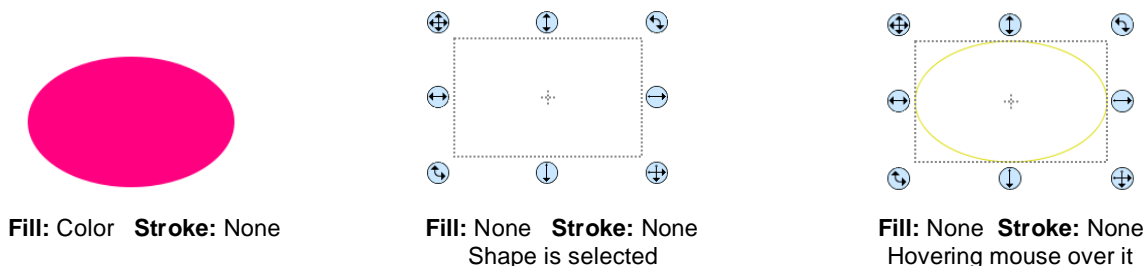
3.15 Fill & Stroke: Stroke

3.15.1 Stroke Settings

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

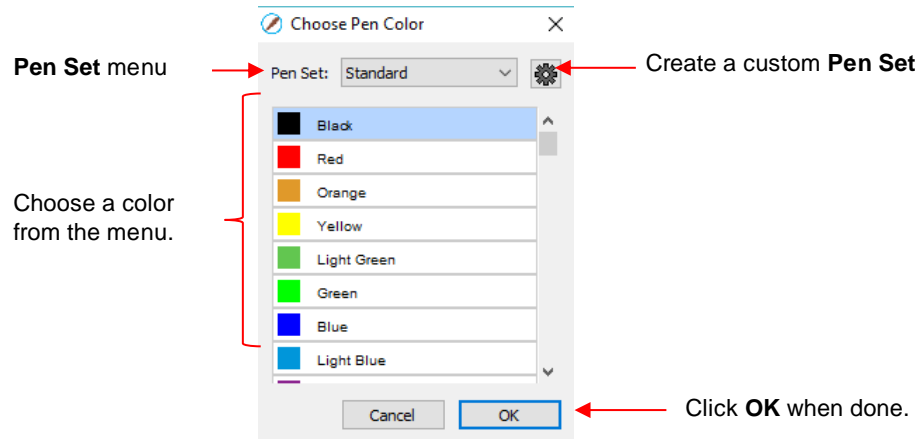



- Stroke**: All shapes have a **Stroke** assignment using one of the following choices:
 - ◇ **None**: The shape will not have an outline. Note that if you also choose **None** for the **Fill**, then you will not be able to see the shape at all unless you hover the mouse over it:

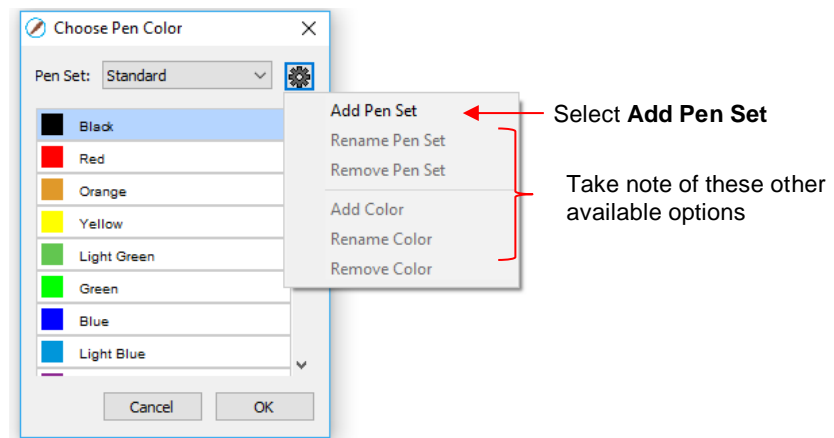


- ◇ **Color**: As with **Fill Color**, you have several options for selecting the color of the **Stroke**:
 - Click the menu icon and select **Basic Colors** to open a panel of 51 colors from which to choose
 - Click the same menu icon and select **Custom Colors**. If you have previously set up custom colors those colors will appear in a new panel.
 - Click the same menu icon and select **Swap Fill Stroke**. The color assigned to the **Stroke** will be exchanged with the color assigned to the **Fill**.
 - With the **Color** option selected, click on the box to the right and the **Color** window will open. This is the same window that opened when **Color** was selected under **Fill**. As with other color selections, you can choose a base color or create a custom color.

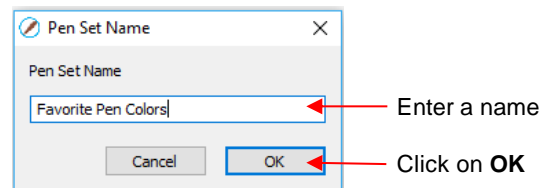
- ◇ **Pen Color:** Choose this if you are recoloring lines based on selecting actual pens or other tools to switch out during the cut.
- When you choose **Pen Color** and then click on the box to the right, the **Choose Pen Color** window opens:



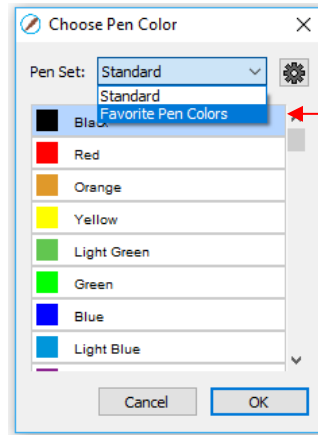
- Select the desired color from the menu and click **OK**. You also have the option to create your own custom **Pen Set** by clicking on the small icon in the upper right corner . The following menu appears and you can then select **Add Pen Set**:




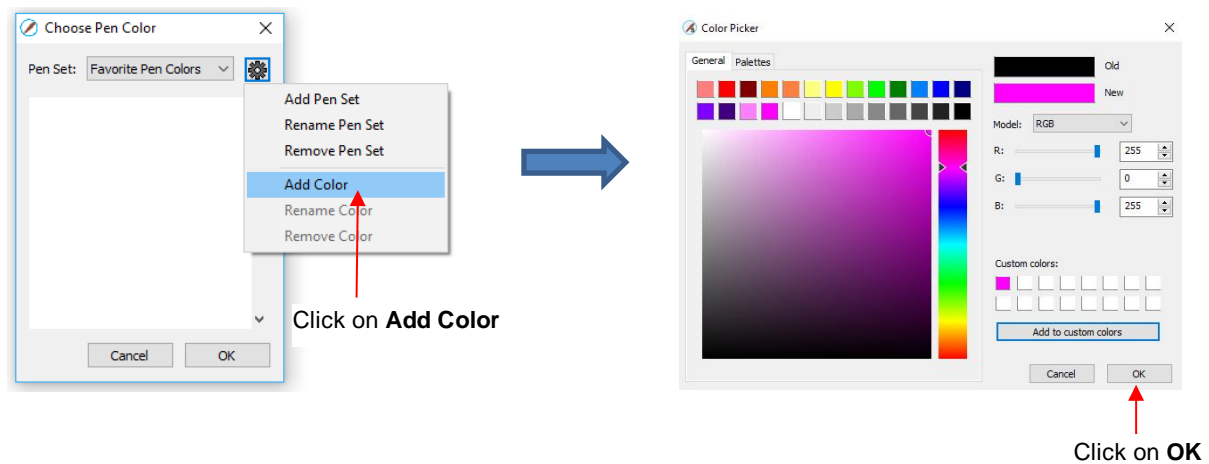
- Next, name the pen set:



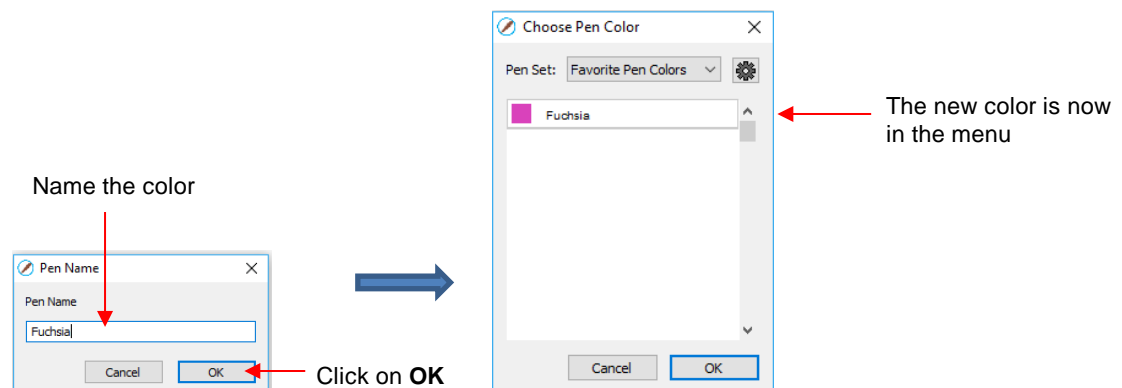
- In the **Pen Set** menu, you can now select the new **Pen Set Name**:



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



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



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

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

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



Stroke Width: 1
Opacity: 100%



Stroke Width: 10
Opacity: 100%




Stroke Width: 20
Opacity: 100%




Stroke Width: 20
Opacity: 50%

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

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

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

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

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

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



Join: Miter
Miter: 1.0
Slightly beveled



Join: Miter
Miter: 3.5
Sharp corners




Join: Round




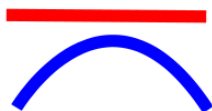
Join: Bevel

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

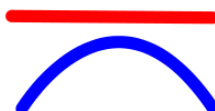
- ◇ **Butt** : The end is squared off, aligned with the actual end of the path

- ◇ **Round** : The end is rounded.

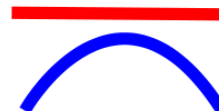
- ◇ **Square** : The end is squared off and extends beyond the actual end based on the **Stroke Width**.



End Cap: Butt



End Cap: Round



End Cap: Square

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



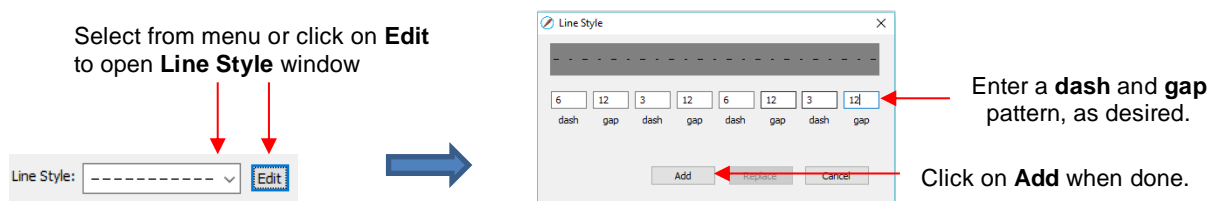
End Cap: Butt – cap ends at the line end



End Cap: Square – cap extends beyond end

3.15.2 Stroke Line Style

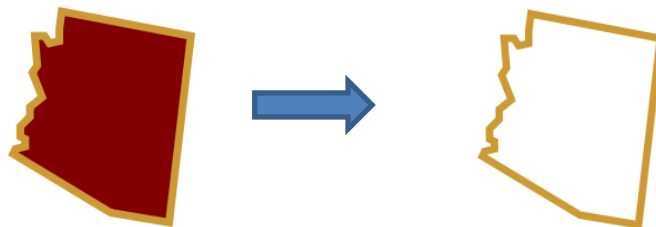
- One additional **Stroke** setting deserves its own subsection because it also affects how a shape will be drawn or cut by your cutter.
- The **Line Style** can be either solid or dashed. If dashed is selected, then one of the default patterns can be selected or you can specify the dash length and spacing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



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



3.15.3 Converting Strokes into Closed Shapes

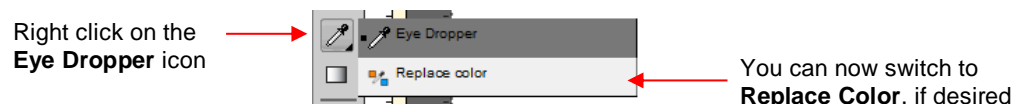
- In the event you decide the stroke should be its own shape, select the shape and go to **Path>Stroke to Path**. The stroke will be converted:




- If you want to retain the original shape, make a backup copy of it before applying the **Stroke to Path** function to the original.
- Note: before using **Stroke to Path** on a text shape, apply **Text>Convert Text to Outlines**.

3.16 Dropper and Replace Color

- The **Dropper** 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 **Replace Color** tool  can be accessed by right clicking on this icon and then selecting **Replace Color** from the popup menu.

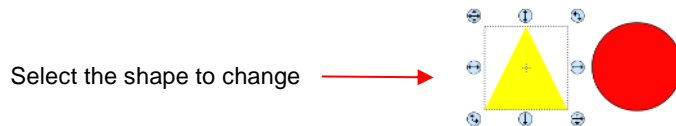


3.16.1 Using the Dropper Tool

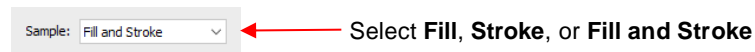
- Shapes can also have the **Fill**, **Stroke** or both changed based on the settings for another shape. This is accomplished using the **Dropper** tool  on the **Tools Panel**.

- To use this function:

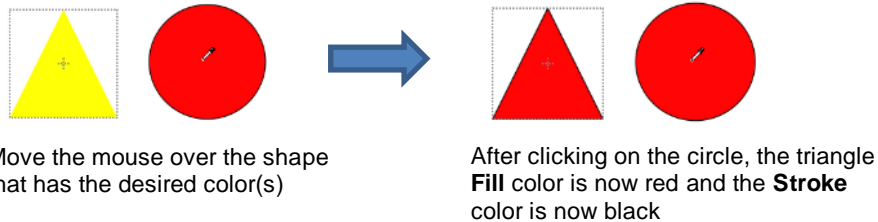
- ◇ Select the shape to be recolored. In this example, it will be a yellow triangle with no **Stroke**:



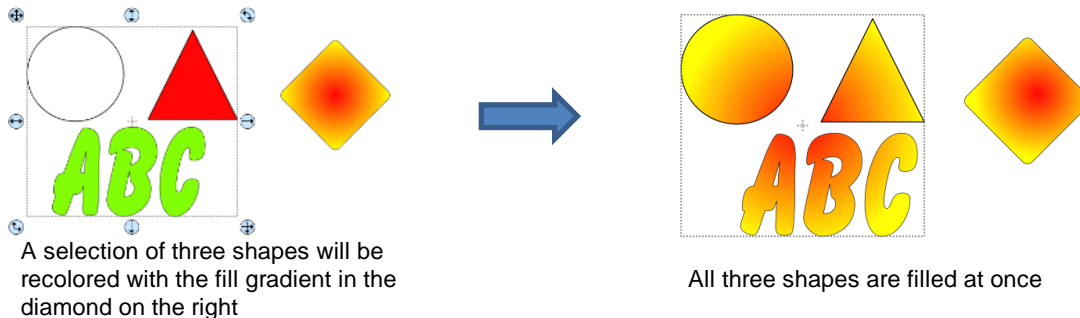
- ◇ Click on the **Dropper** tool icon and choose a setting from the **Tool Options**:



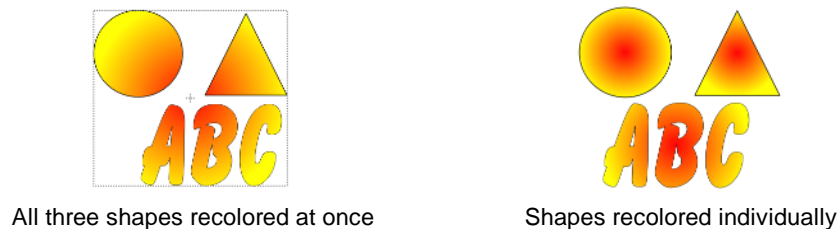
- ◇ Finally, click on the shape that has the color property you wish to use. In this case, it's the red circle with the black **Stroke**. The selected triangle is recolored to match.




- 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:



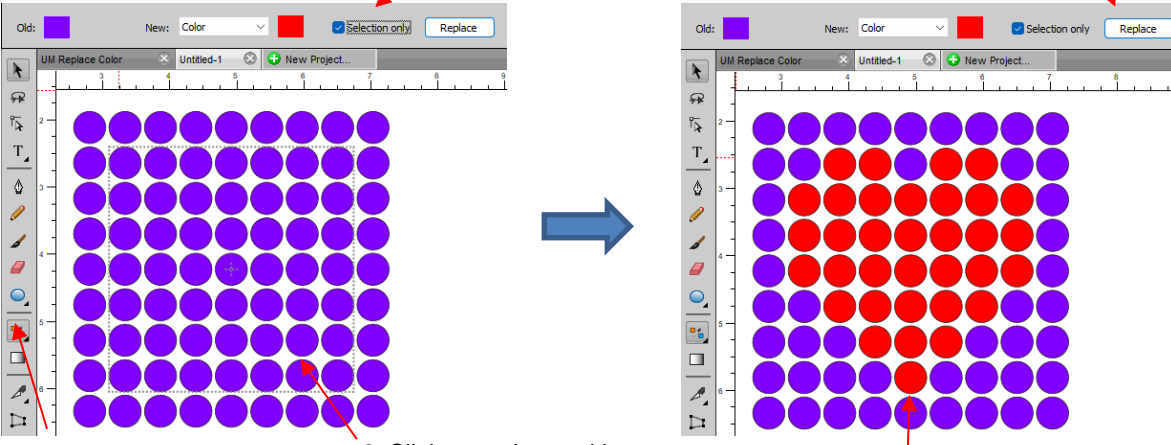
- Note, however, that the three shapes were treated as one object when filling with the gradient. A different result is obtained if each shape had been filled separately:



3.16.2 Using the Replace Color Tool

- The **Replace Color** tool  can be used to replace the **Fill** color of the selected shape(s) or all shapes with the same color. To only replace the color of a selection, first select the shape(s) and then click on the **Replace Color** icon:

3. Click to change to color to be replaced 4. Click to change to new color 5. Enable **Selection only** 6. Click **Replace**

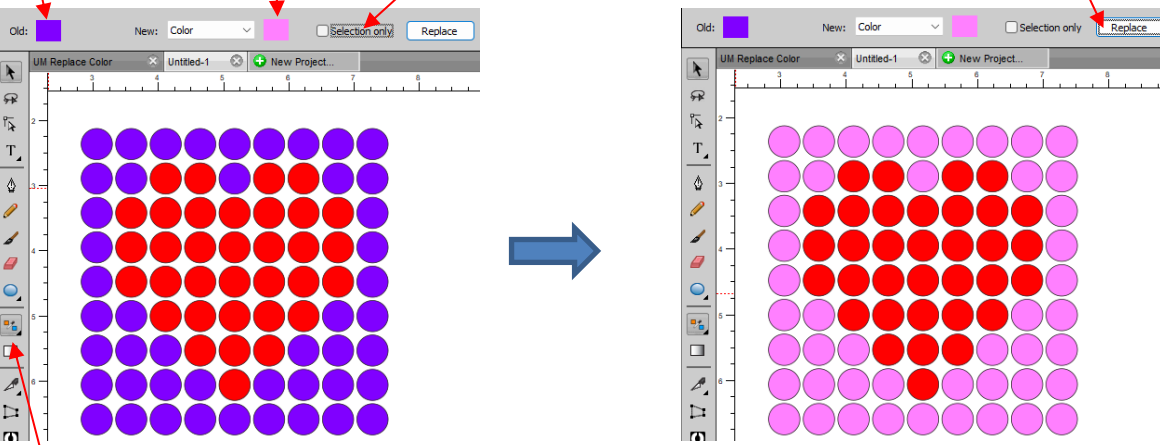


1. After selecting shapes, click **Replace Color** tool 2. Click on a shape with the color to replace

Selected shapes with the **Old** color are changed to the new color

- To replace all of the shapes of a certain color, no preselection is needed:

2. Click to change to color to be replaced 3. Click to change to new color 4. Uncheck 5. Click **Replace**



1. Click **Replace Color** tool

All of the **Old** color shapes are changed to the new color

- Note that the other **Fill** options (**None**, **Pattern**, and **Gradient**) can also be used instead of **Color**.

3.17 Cutting, Copying, Pasting, Duplicating

3.17.1 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**



3.17.2 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.

3.17.3 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:

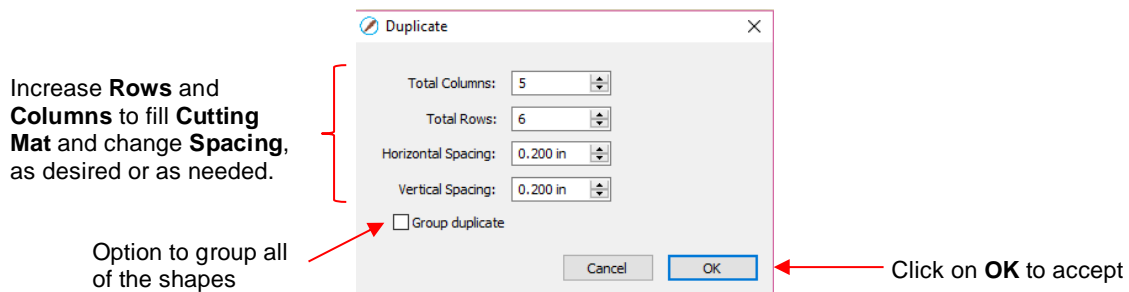
- ◇ Right-click on the screen and select **Paste in Place** (without any shapes selected)
- ◇ Press **Ctrl+Shift+V**
- ◇ Go to **Edit>Paste in Place**

- To **Paste (Auto Fill)**: use either of the following:

- ◇ Press **Ctrl+Shift+Alt+V**
- ◇ Go to **Edit>Paste (Auto Fill)**

3.17.4 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:



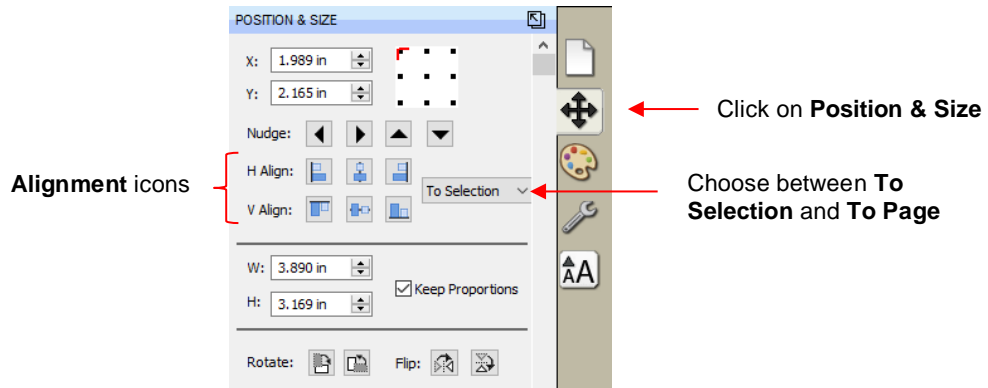
- To create a single row of repeats, set the **Rows** value to 1. For a single column of repeats, set the **Columns** value to 1. To overlap the repeats, enter a negative number under **Spacing**.
- There is also a **Duplicate Rotated** function to arrange the duplicates in a circular formation. Because this is more typically used for design purposes, it is covered in *Section 7.06*.

3.17.5 Quick Duplicate

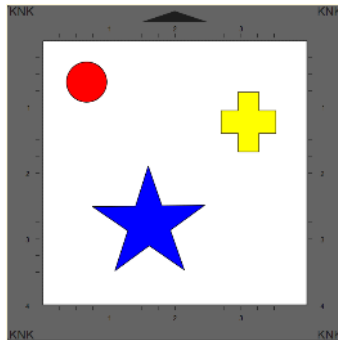
- A quick way to make a single copy of a shape is to hold the **Alt** key while dragging the shape. The original will be left behind and new copy will be moved with the mouse.
- You can also hold the **Alt** key and left-click on a shape and it will duplicate that shape leaving the copy on top of the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

3.18 Alignment

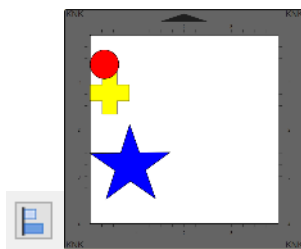
- There are fourteen functions used to align shapes, seven of them with respect to the **Cutting Mat** (referred to as **Page**) and another seven with respect to one another (referred to as **Selection**). After selecting two or more shapes, these functions can be accessed using either of the following: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



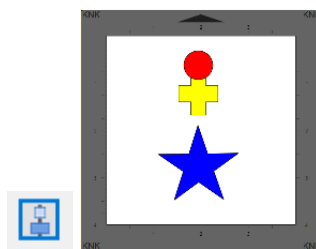
- The following three shapes, in their current relative positions, will be used to illustrate what happens when each alignment function is applied. Note that a small custom mat was created to facilitate screenshots:



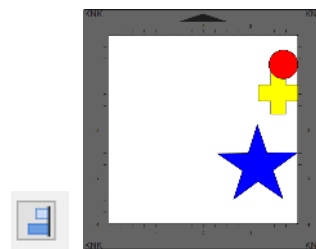
- The **Alignment** icons on the **Position & Size Panel** indicate how the shapes will be aligned. Note in these examples, if **To Page** or **To Selection** was used:



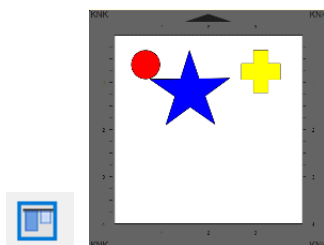
**Align Left
To Page**



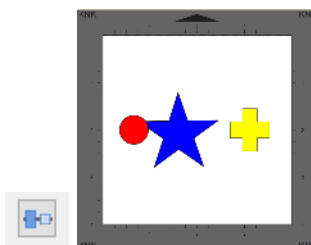
**Align Horizontal Center
To Selection**



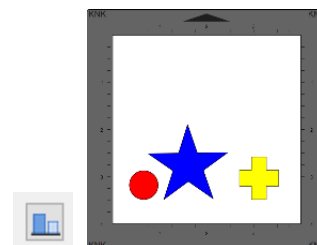
**Align Right
To Page**



**Align Top
To Selection**



**Align Vertical Center
To Page**



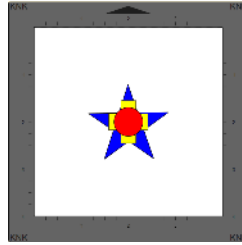
**Align Bottom
To Selection**

- To center all three shapes, use either:

- ◊ A combination of **Align Horizontal Center** and **Align Vertical Center**:



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

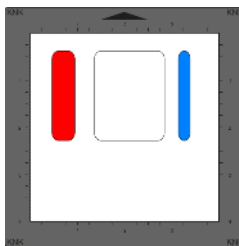


Align Centers

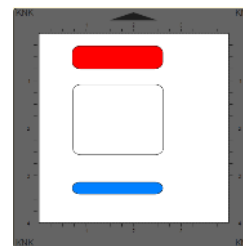
- More examples are presented in the *Expanded Tutorial*: <https://tinyurl.com/3ebkma82>

3.19 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**.
- After selecting the shapes, these functions can be accessed by going to **Object>Distribute**. Because **Distribute to Selection** is the most common used, examples of it are shown using these as examples:



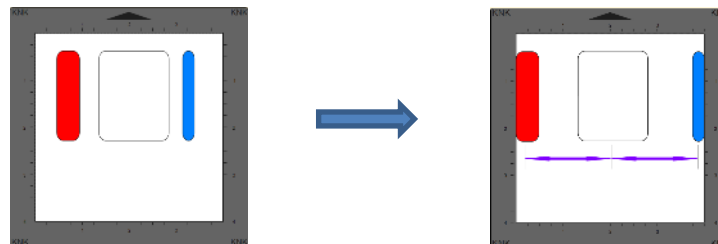
Will be used for
horizontal distribute
examples



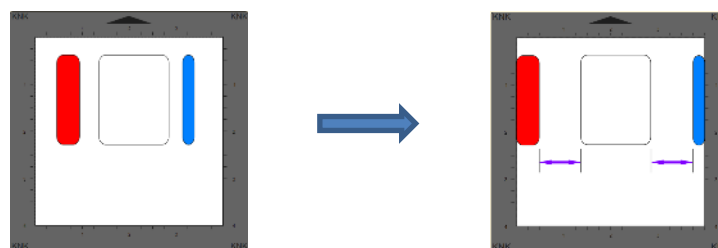
Will be used for
vertical distribute
examples

- Further, only the most commonly-used options will be shown. For a complete coverage of all examples, refer to *Sections 3.19.1, 3.19.2 and 3.19.3* in the *Expanded Tutorial*: <https://tinyurl.com/3ebkma82>

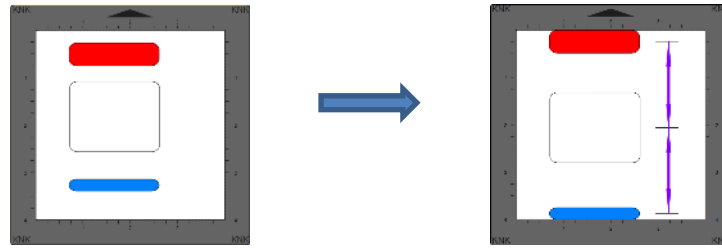
- ◇ **Distribute Center Horizontally**: spaces shapes so that the centers of each shape are the same distance apart:



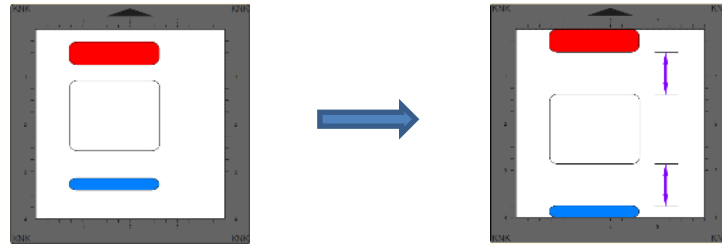
- ◇ **Distribute Space Horizontally**: spaces shapes so that the gaps between the shapes are the same.



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




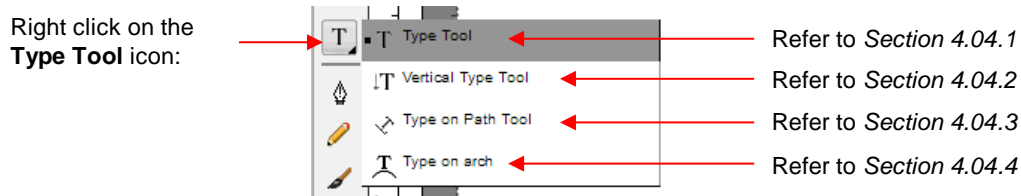
- ◇ **Distribute Space Vertically:** spaces shapes so that the gaps between the shapes are the same.



4. SCAL: Working with Text


4.01 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, right click on the **Type Tool** icon  on the **Tools Panel**. The screenshot below indicates where to go for further instructions on using that text mode:



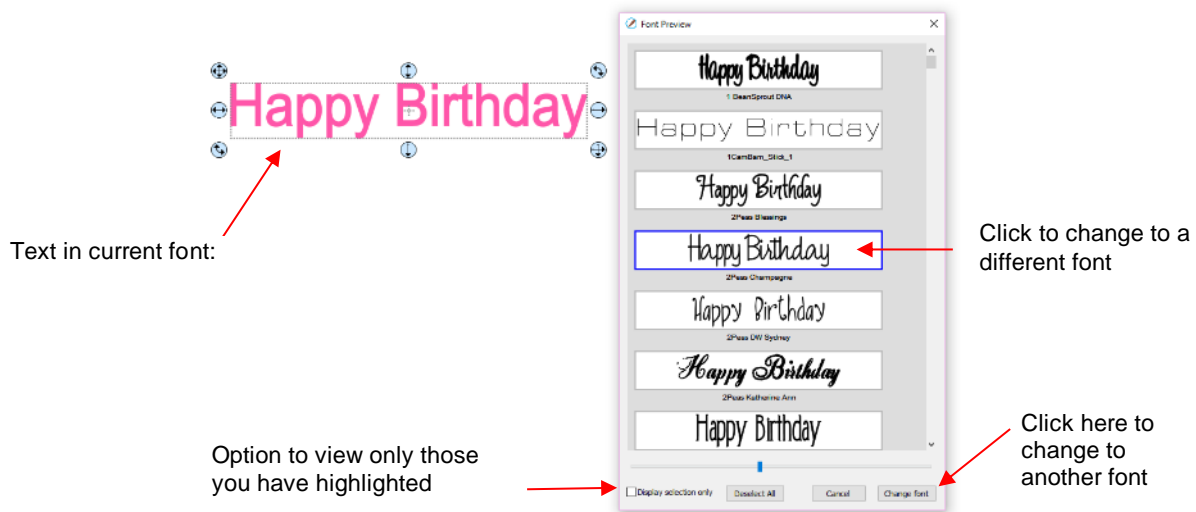
4.02 Selecting a Font

4.02.1 Choosing a Font from the Font Menu

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

4.02.2 Choosing a Font via Font Preview

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

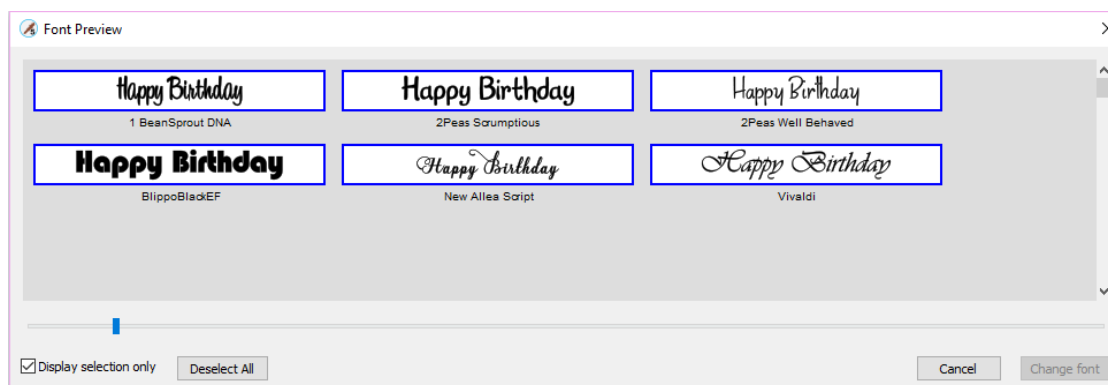


- You can expand this window and decrease the size of the fonts by scrolling the size bar to view more samples. Also, you can highlight those of interest and then click **Display selection only** to more easily decide which ones you might like to use:

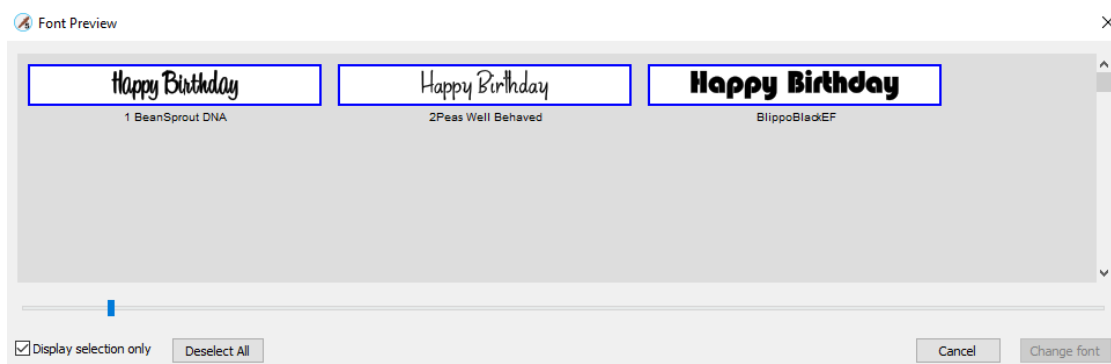
◇ Expand the window and highlight those you want to further compare:



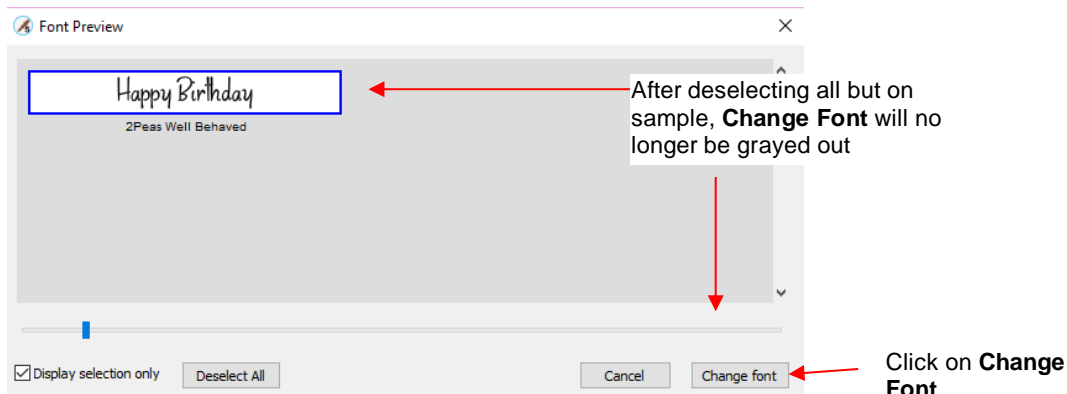
- ◇ After scrolling through fonts and highlighting only those of further interest, click on **Display selected only**:



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




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




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

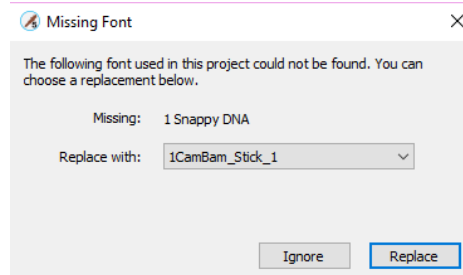
Happy Birthday

4.02.3 Temporarily Installing a Font

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

◇ Open the **Library**, click on the **Fonts** tab, and then click on the **Menu** icon 

- Any font file with a format of .TTF, .OTF, or .OPF) can be opened and will be available until SCAL is closed.
- When you open a font file for temporary use, that font will be uninstalled upon closing SCAL. If you have saved that file without first converting the text, the next time the file is reopened, you will receive the following message:



◇ Two options are provided:



- **Ignore:** The text with the missing font will be converted to an outline (no longer editable as a text object)
- **Replace:** The text will be replaced with the font shown or another font you select from the drop-down menu

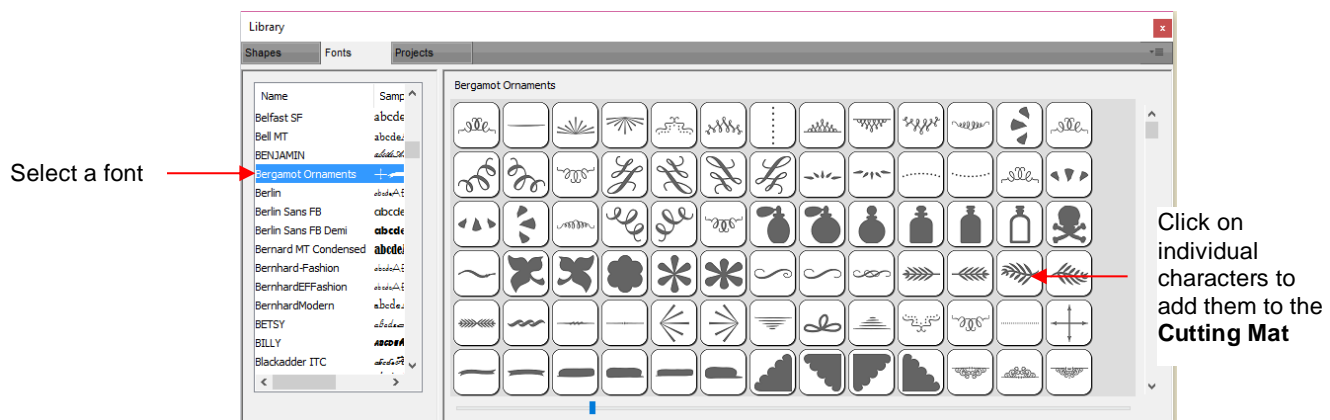
◇ If you have no plans to edit the text, then you can avoid the message by converting text before saving the file. To do this, select the text and apply one of the following:

- Go to **Text>Convert Text to Outlines**
- Go to **Path>Object to Path**
- Right-click and select **Path>Object to Path**

4.03 Adding Text Options

- There are three ways to add text to the **Cutting Mat**:



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



4.04 Four Modes of Text



4.04.1 Type Tool

Jay
McCauley Max
McCauley

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

4.04.2 Vertical Type Tool

J M
a a
Y X


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

4.04.3 Type on Path Tool

Happy New Year!
Happy New Year!
Happy New Year to all of our wonderful friends!
Happy New Year to all of our wonderful friends!


- 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**. **IMPORTANT:** If you want to retain the original shape so that it can be printed or cut, make a duplicate of the shape first and hide the copy.
 - ◇ Right click on the **Type Tool** icon  on the **Tools Panel** and select the third choice: **Type on Path Tool**.

- ◇ Click on or inside the shape and begin typing. In the **Tools Options**, a setting appears which allows you to move the start point for the text further along the path. Otherwise, it will start at the leftmost side:



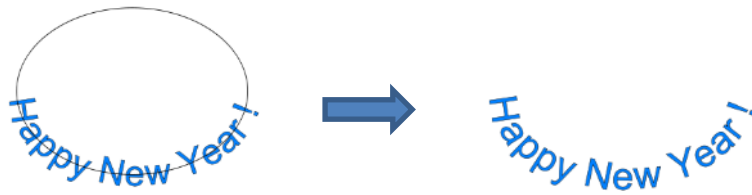
- ◇ When done, either press the **Esc** key or click on the **Select** icon  on the **Tools Panel**. Note that if you no longer need the path for your project, go to **Text>Convert Text to Outlines** and the path will be deleted.



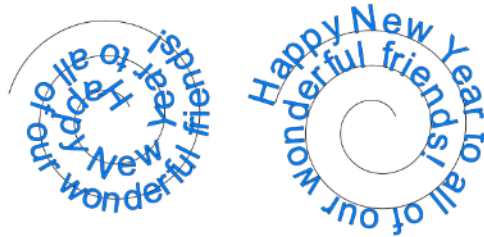
- If you want the text on the inside of the shape:
 - ◇ First apply **Path>Reverse Path** to the shape. Then type the text:



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



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




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

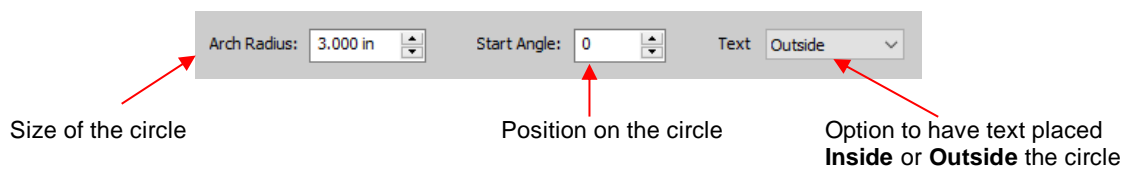


- For placing text onto a circle, the **Type on Path** tool doesn't always yield the best results. Thus, check out both the following method (**Type on Arch Tool**) as well as using **Object on Path** present in *Section 4.13*.

4.04.4 Type on Arch Tool

Max and Jay

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



- For example:

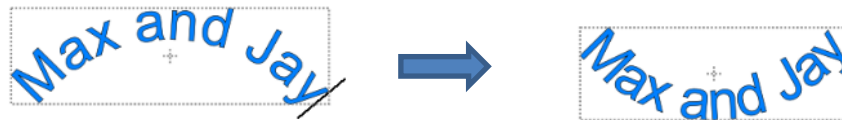
Decreasing the **Arch Radius** from 1.0 to 2.0:



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




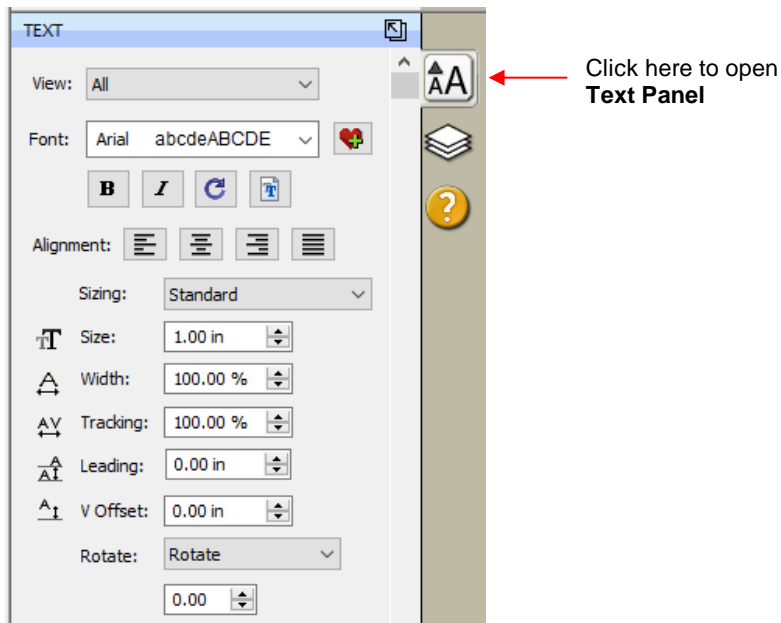
Changing **Text** from **Outside** to **Inside**:










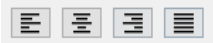
- When done, either press the **Esc** key or click on the **Select** icon  on the **Tools Panel**.

4.05 Text Settings

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



- To apply a change to any of these settings:
 - ◇ Type some text using the instructions in *Section 4.04*. Then click on the **Selection Tool** icon  at the top of the **Tools Panel**.
 - ◇ With the text selected, you can now change any of these various settings and the changes will immediately be applied to that selected text.
 - ◇ If you only want to apply a change to a portion of the text, click on the **Text Tool** icon  on the **Tools Panel** and drag your mouse to highlight whatever part you want to change.
- The following is a list of the settings and how to apply them:
 - ◇ **View:** Controls which fonts show in the menu under **Font:**
 - **All:** Displays all installed fonts plus any that have been temporarily installed during this session of SCAL
 - **Favorites:** Displays all fonts you have assigned as a **Favorite**
 - **This Project:** Displays all fonts currently used since starting this particular project during this session
 - ◇ **Font:** Menu of installed fonts which can be used for new or existing text. Note that you can also add to your **Favorites** list by selecting a font and then clicking on the  icon to the right.
 - ◇ **Bold and Italic**  
 - **IMPORTANT:** Some fonts will change significantly if the Bold option is selected. The same is true of the Italic option. Make sure these icons are not indented/blue unless you are confident you want to use either or both of them.
 - With either option highlighted, the text may not immediately reflect that option. If not, highlight the text and then try applying again.
 - Instead of using **Bold**, you can use **Effects>Shadow Layer** (refer to *Section 7.05*) or **Path>Offset Path** (*Section 6.05*).
 - Instead of using **Italic**, you can use the **Skew** function (refer to *Section 3.07*).

- ◇ **Reload**  is only needed if you have separately installed new fonts on your computer since opening the current SCAL session.
- ◇ **Load a Font File**  is used to open a .TTF, .OTF, or .OPF font that is not already installed on your computer. Refer to *Section 4.02.3*.
- ◇ **Alignment:**  Standard text justify options: **Left Align**, **Center Align**, and **Right Align** and **Justified**.
- ◇ **Sizing:** The setting determines the height of the letters in the selected text based on these options:
 - **Standard:** A character's height is based on how the font was designed

Skycut

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

SkyCuT

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

SkyCuT

- This example doesn't illustrate a typical application for the **Sizing** setting. Refer to the following *Expanded Tutorial* for examples of its usefulness: <https://tinyurl.com/4wbku3vy>
- ◇ **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:

Skycut

Tracking: 100%

Skycut

Tracking: 120%

Skycut

Tracking: 80%

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

Cutting with
my Skycut

Leading: 0 inches

Cutting with
my Skycut

Leading: 0.3 inches

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

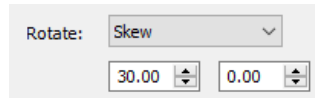
Cutting with my Skycut

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

Cutting with my Skycut

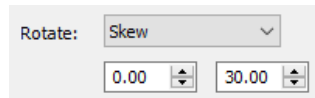
- ◇ **Skew:** In the same menu with **Rotate** is the **Skew** option which can also be applied to a line of text or to individual letters. There are two settings: one for X axis skew and one for Y axis skew:

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



Cutting with my Skycut

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



Cutting with my Skycut

4.06 Other Text Editing

4.06.1 Split Text

- To split a selection of text into individual letters, individual words, or individual lines, go to **Text>Split Text:**
 - ◇ **Split All** – separates all of the text into its individual characters/glyphs
 - ◇ **Split by Spaces** – separates text by spaces, thus individual words will be separately grouped
 - ◇ **Split by Lines** – separate text by lines (if you used the **Enter/Return** key when you create the text)
- For example:

George is
such a
cute dog

Split All – any individual letter can now be selected

George is
such a
cute dog

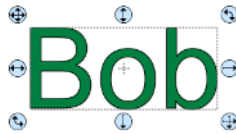
Split by Spaces – any individual word can now be selected

George is
such a
cute dog

Split by Lines - any individual line can now be selected

4.06.2 Break Apart

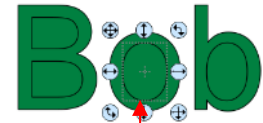
- To break a selection of text into individual paths, apply the **Break Apart** function using one of the following ways:
 - ◇ Right-click and select **Break Apart** from the popup menu
 - ◇ Go to **Object>Break Apart**
 - ◇ Apply **Ctrl+B**
- The following screenshot shows **Break Apart** being applied to the same word “Bob” to separate the internal closed paths (also called child shapes) from the external paths (also called parent shapes):



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



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




The child shapes can now be individually selected

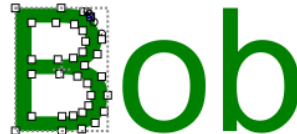
- More information on the **Break Apart** function is covered in *Section 3.12.1*.

4.06.3 Node Editing Text

- Before text will display nodes for node editing, two functions must be applied in this order:

1. **Text>Convert Text to Outline**
2. **Object>Ungroup**

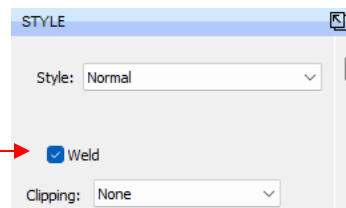
- At this point, the **Shape Tool**  can be selected and the nodes will appear on each letter individually:



4.07 Welding Text

- To prevent overlapping letters from cutting into one another, users will often want to remove the overlap by welding the letters. There are two ways to do this:
 - ◇ Enable **Weld** on the **Style Panel** – a temporary setting which will apply to the shapes for cutting but can be disabled at a later point in time:

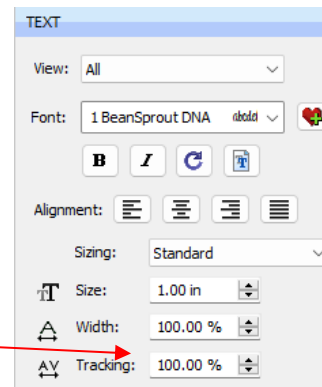
Select text and enable **Weld**



- ◇ Go to **Path>Union** (or right click and select **Path>Union**) – a permanent weld unless **Undo** is applied before the text is cut or the file is saved.
- Before making any changes to your text, it is highly recommended that you either set the **Fill** color to **None** on the **Fill & Stroke Panel** or enable **Show Outlines Only** on the **Document Panel**. This will allow you to more clearly see the overlapping and later verify the results of the weld.
- There are two ways to manipulate the spacing between the overlapping letters:
 - ◇ Use the **Tracking Percentage** on the **Text Panel** which can be applied to the entire text object or a highlight selection of text:



Drag your mouse to highlight letters



Change **Tracking %**

- Decreasing the **Tracking %** will increase the overlap.

◇ Apply **Object>Ungroup** to the text and manually move the letters by:

- Using the arrows keys on your keyboard
- Tapping the **Nudge** keys on the **Position & Size Panel**
- Dragging letters using the middle arrow:

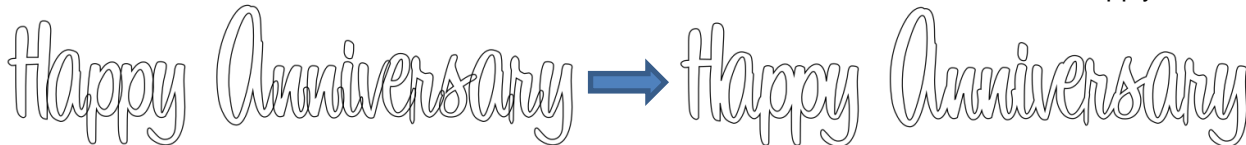


1. **Ungroup** the text

2. Select letters to move

3. Drag middle left handle

- Once the desired overlap is achieved, select all of the letters and either enable **Weld** or apply **Path>Union**.

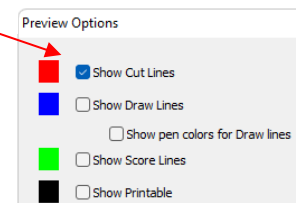


Apply **Path>Union**

- Note:** If you choose to enable **Weld** on the **Style Panel**, the lettering will continue to appear as overlapping. However, if you click on **Preview**, the lettering will then update indicating the path that will actually cut:



Enable **Show Cut Lines**

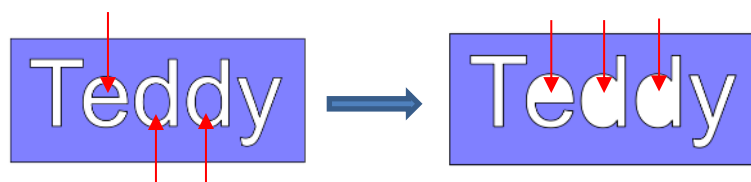


- For additional examples of welding, refer to the following *Expanded Tutorial*: <https://tinyurl.com/365che5n>


4.08 Stencil Bridge

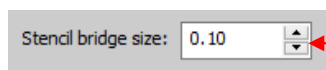
- When creating a stencil, you keep the “waste” or “negative” of a cut. When using regular fonts, such as Arial, some of the letters, such as a “B”, “a”, “d”, and “e”, will not work because they have interior paths called child shapes. Those child shapes are not connected to the waste portion of the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

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



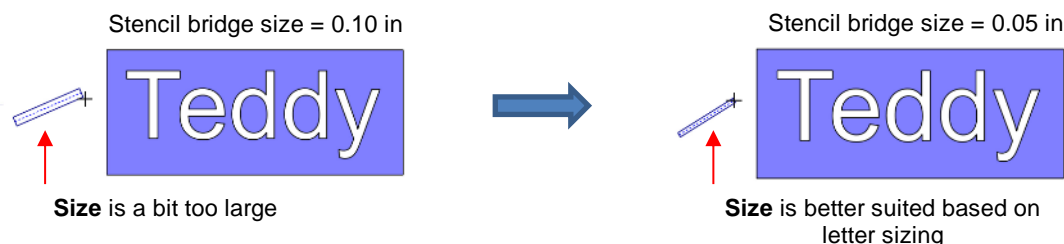
After cutting and lifting the stencil from the mat, the interior parts of the “e” and the “d”’s will be cut away.

- 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:

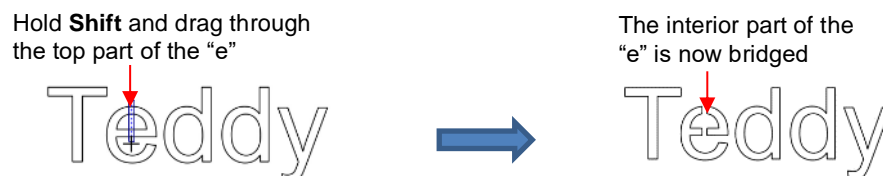


Enter the **Size** (thickness) to use

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



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



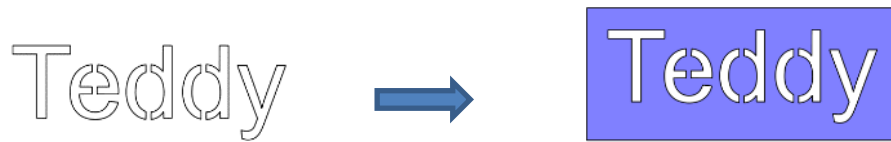
- Repeat the process with the other letters containing child shapes:



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



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



Completed stencil

4.09 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

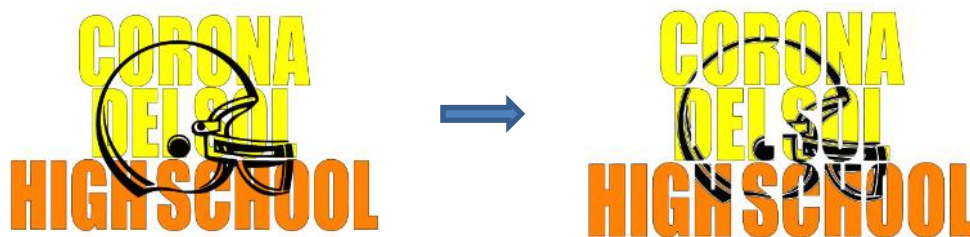
- These fonts are useful when using a pen or engraving tool in your cutter or for designing single line rhinestone titles:

Open Path Font

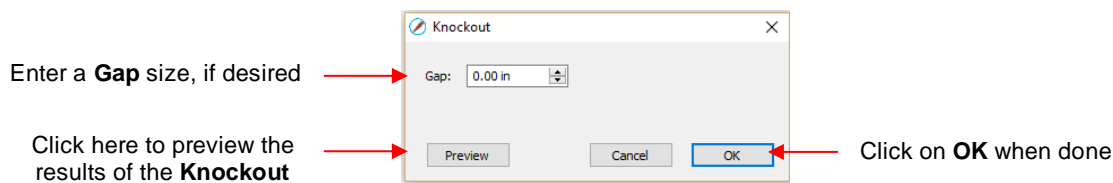
- Currently, this font type only works in a few applications like SCAL and does not install into Windows or on a Mac O/S for use in programs such as Word. If you want to permanently install an OPF font for use in SCAL, copy and paste the font into the following folder: Documents\Craft Edge\My Fonts.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

4.10 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:



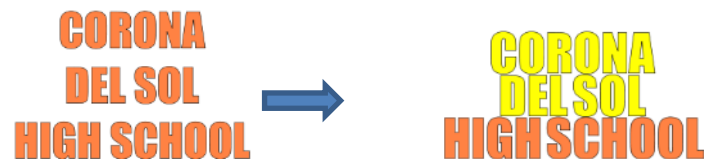
- To open the **Knockout** function window, select two or more shapes and go to **Effects>Knockout**:



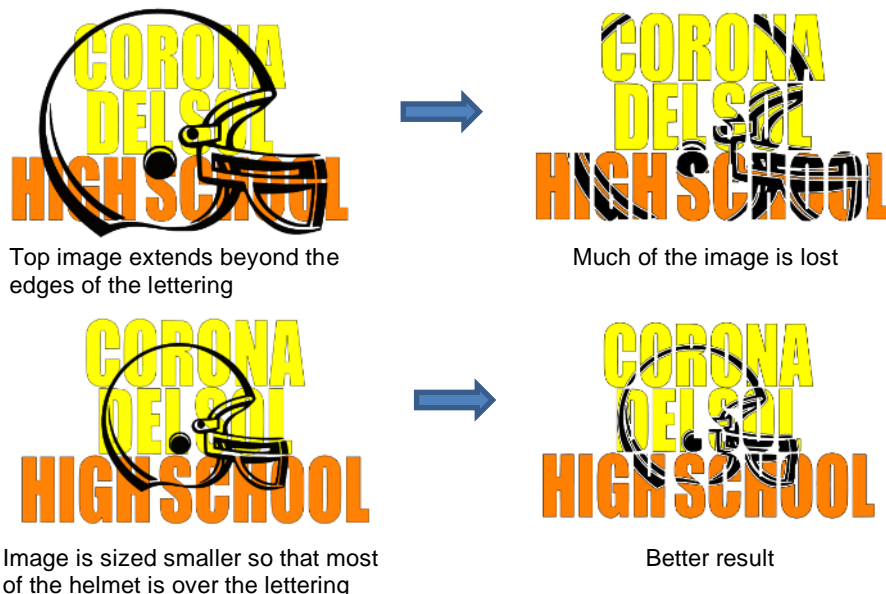
- The **Gap** will create an offset between the top image and the bottom image. This is not only pleasing to the eye but also makes alignment of two layers of HTV easier to manage. Here's an example showing how the gap affects the overall appearance:



- 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. So, size the image accordingly:



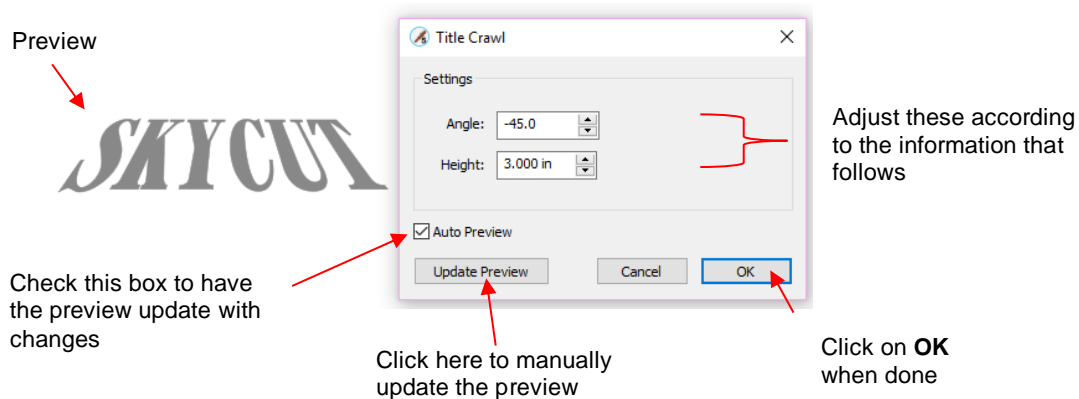
- Note that the **Knockout** function isn't just for text. It can be used on any vector shapes. Because it is so popular with lettering, its presentation in this chapter seemed appropriate.

4.11 Title Crawl

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

SKYCUT → SKYCUT SKYCUT

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



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

SKYCUT

Angle: -45
Height: 3.0

SKYCUT

Angle: -25
Height: 3.0

SKYCUT

Angle: 25
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:

SKYCUT

Angle: -45
Height: 3.0

SKYCUT

Angle: -45
Height: 5.0

SKYCUT

Angle: -45
Height: 1.0

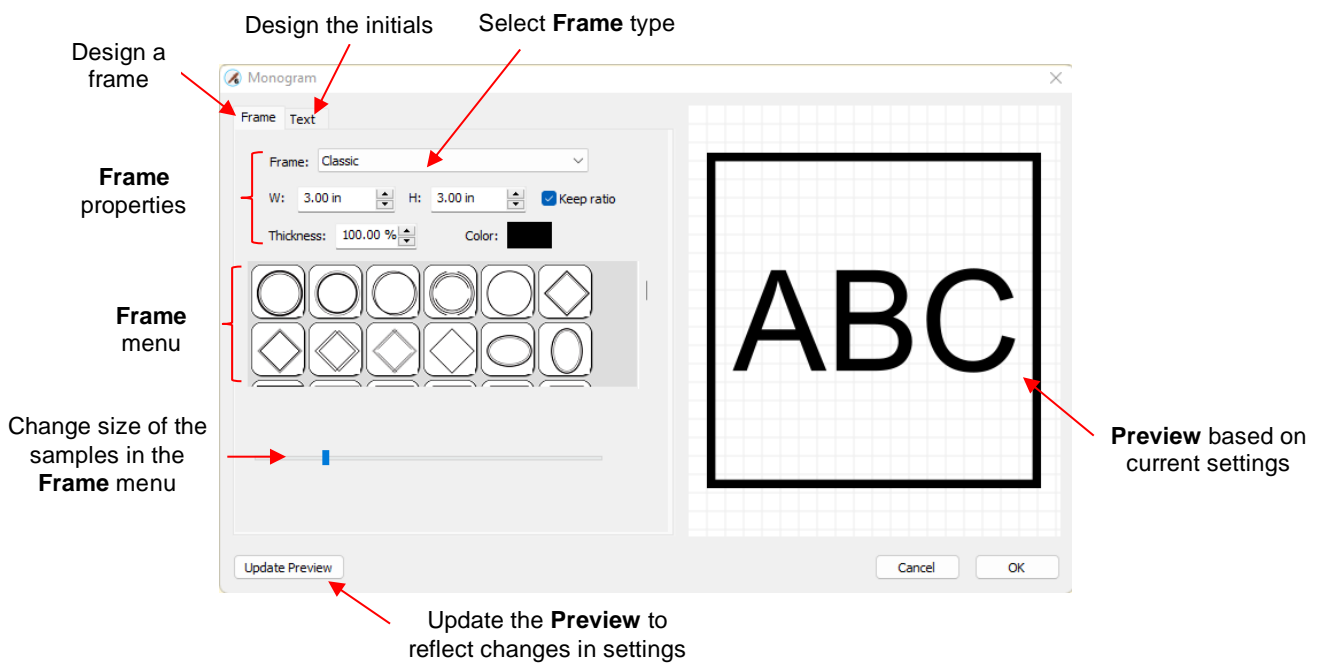
- Multiple lines of text can have **Title Crawl** applied to create the famous Star Wars “in a galaxy far far away” effect:

*The Owl and the Pussycat
went to sea in a
beautiful pea-green boat.
They took some honey and
plenty of money wrapped up
in a five pound note.*

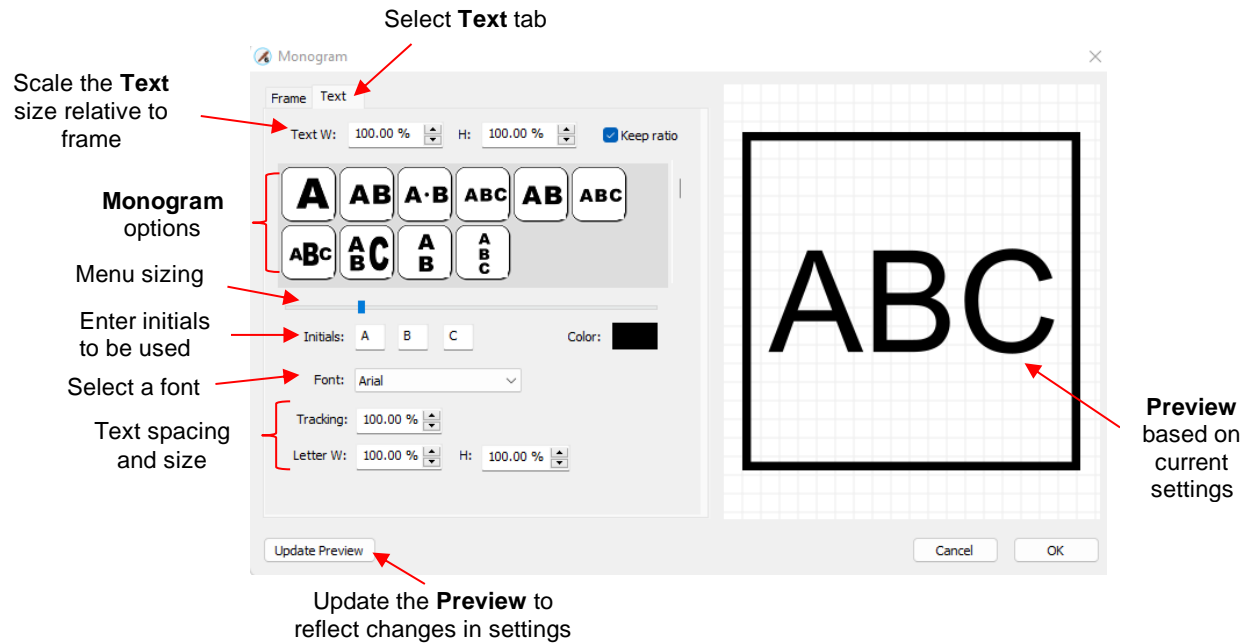
4.12 Monogram



- The **Monogram** effect allows you to design a monogram of up to 3 letters using any font you have installed. Other features include:
 - ◇ The option to create an unframed monogram or choose from over two dozen frames and modify their size, thickness, and color
 - ◇ Choose from various letter arrangements, based on single, double or triple letter monograms
 - ◇ Customize the text size, letter size, font choice, color, and tracking
- To open the **Monogram** window, go to **Effects>Monogram** (note that prior creation of text does not apply). There are two tabs: **Frame** and **Text**. Either can be selected first. On the **Frame** tab, select the desired frame and customize:



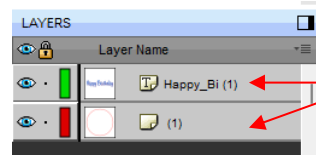
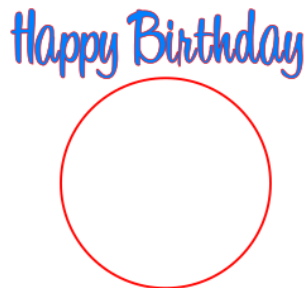
- The **Frame** menu contains 3 categories with a total of 36 different designs, as well as the option to forgo having a frame at all.
- Select any design, choose a new color, thickness, size etc. Certain frames will look better with certain layouts of the initials so don't hesitate to move back and forth between the Frame tab and the Text tab while customizing your monogram.
- Selecting the **Text** tab provides these settings, which is where you may wish to begin your monogram design:



- ◇ Choosing the number and layout of the initials and font are a good place to begin your monogram design. As with the **Frame** tab, various settings will allow you to resize and space your monogram relative to the frame.
- ◇ When you are happy with the design, click **OK** and your final design will be added to the page area. Note that with some fonts and designs you may need to tweak the design for visual centering. Apply **Object>Ungroup** to separate elements as needed.

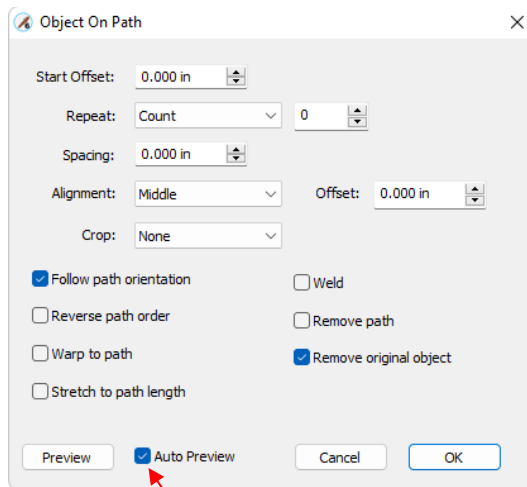
4.13 Using Object on Path with Text

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



Text layer should be above the path shape

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

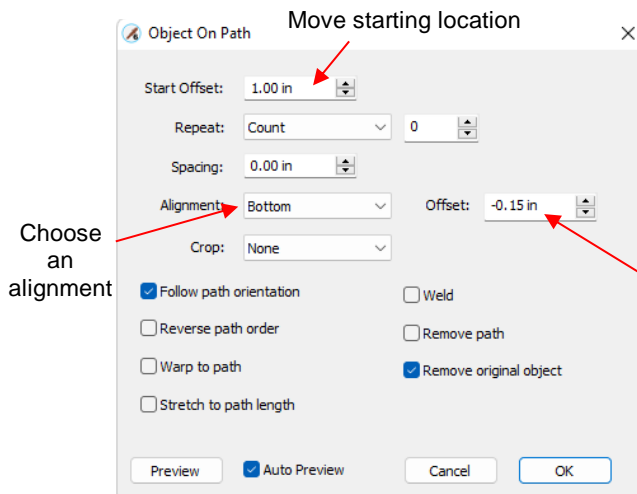


Select **Auto Preview**



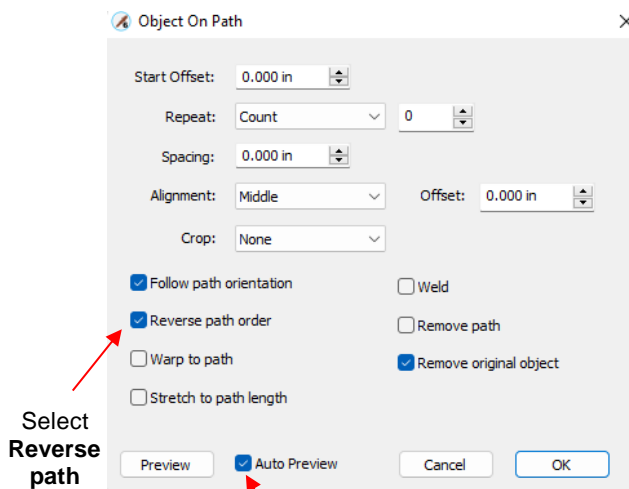
The text should now be located somewhere on the path

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



Tweak the alignment

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



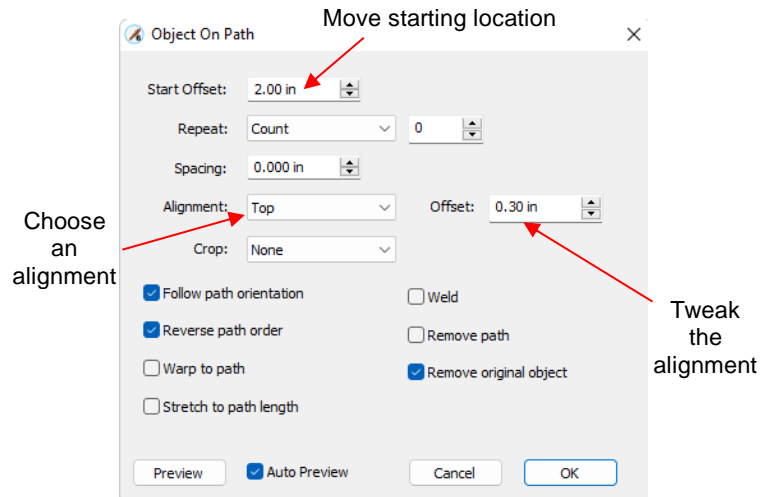
Select **Reverse path order**

Again, enable **Auto Preview**



Text is now aligned the other way along the path

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



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

4.14 Other Text Effects

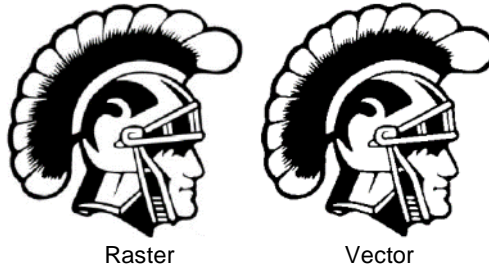
SCAL offers many other design functions to customize text for your projects. Refer to *Chapter 7* for tutorials on these functions:

3D Extrude		Drop Shadow	
3D Rotate		Lattice	
Barrel Distortion		Rays	
Bridge Warp		Rhinestones	
Bulge		Rhinestone Scatter	
Canned		Shadow Layer (Contour Cut)	
Cast Shadow		Wave	
Data Source Copies		Wrapper (for tumblers or cupcakes)	

5. SCAL: Tracing and Drawing

5.01 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:



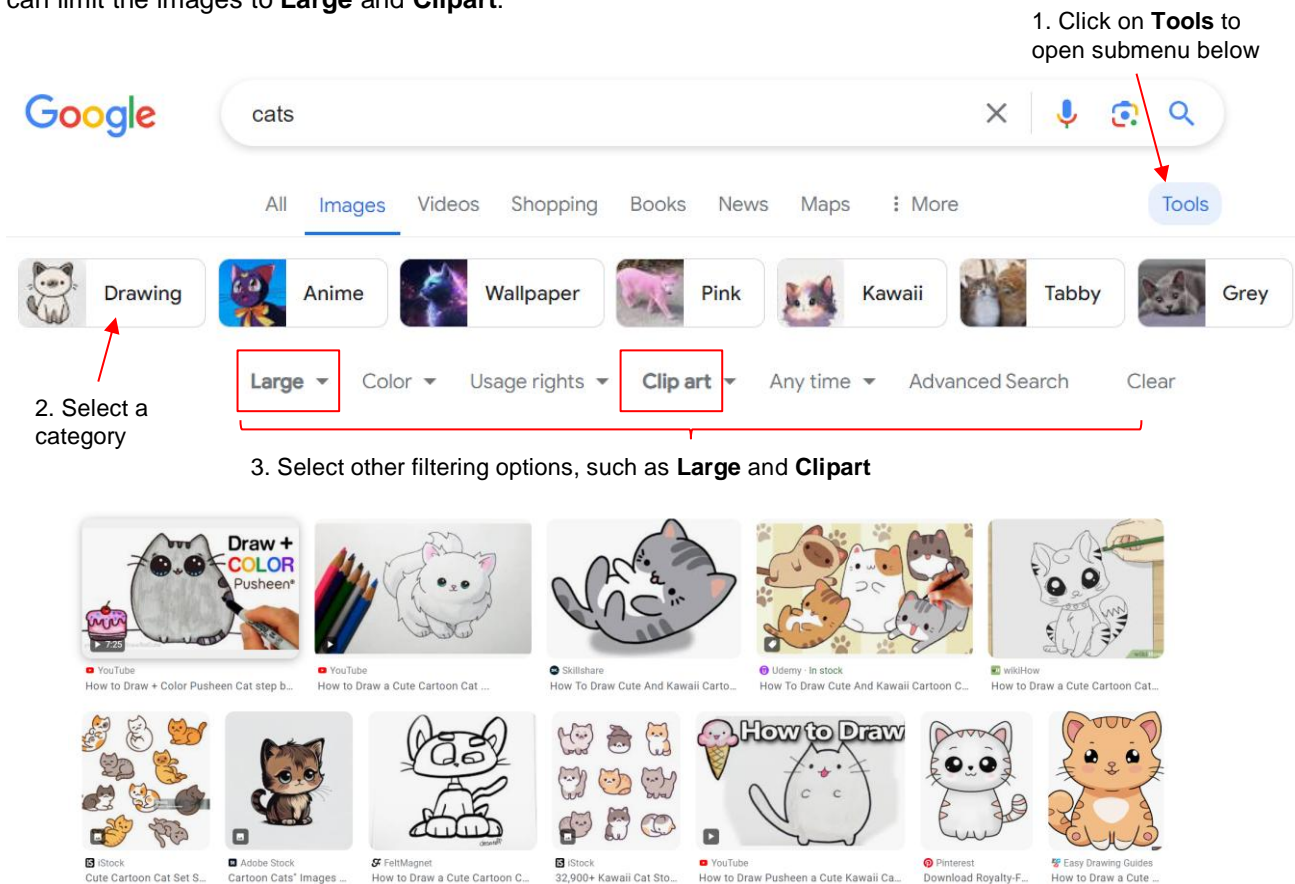
- As mentioned earlier, you can often tell whether a file is a raster or a vector based on the file format. Here are some guidelines:

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

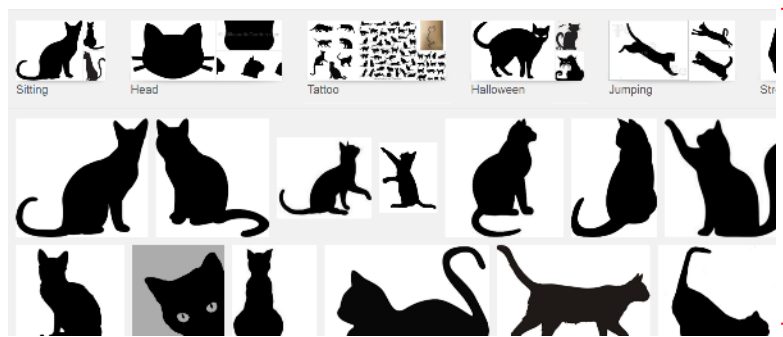
- To convert a raster into a vector, SCAL offers both an automatic and a manual trace function. Because the automatic **Trace** feature in SCAL is so fast and powerful, it is always worth trying it first. The only situation in which it may not be able to provide the results you need are (1) the image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

5.02 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
 - ◇ Any images with lettering, especially a block shaped font, will not trace well because the eye is unforgiving when it comes to text. The slightest inconsistencies will stand out like a sore thumb. It's usually advisable to recreate any text parts of an image using the same or a similar font.
 - ◇ 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 categories and filters to refine the search. Click on **Tools** to open these available filters. For example, after searching on the word cat, one can limit the images to **Large** and **Clipart**:



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



Easily traced images appear


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

5.03 Trace Function

Images used in this tutorial can be [downloaded here](#).

5.03.1 Trace Settings

- There are a number of ways of “importing” a raster image into SCAL. Please refer to *Section 2.06.2*.
- 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**

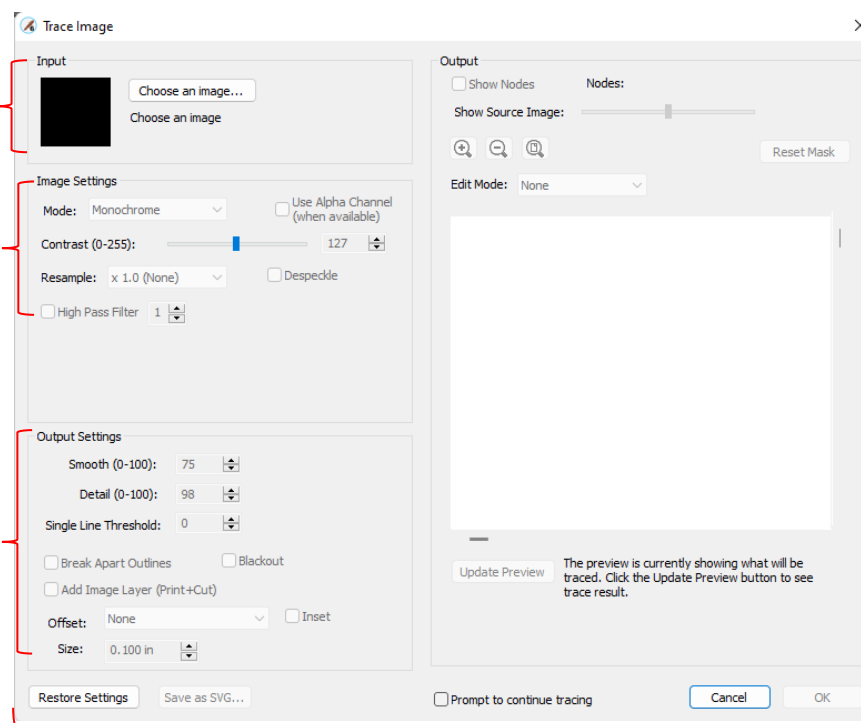
- There are five sections to the **Trace Image** window: **Input**, **Image Settings**, **Output Settings**, **Output**, and then the bottom bar. Note the location of each section and its main purpose. More details about each section follows:

Input: import the raster and see details

Image Settings: select the type of trace and how much to include

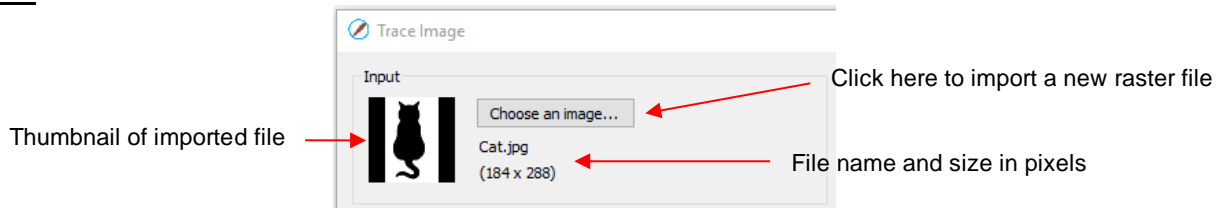
Output Settings: control the type of trace lines

Output: control how the image appears in this window and preview the trace lines



Additional “bottom of the screen” settings

- **Input**

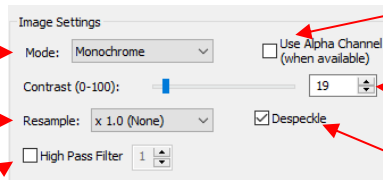


- ◇ Click on **Choose an image** and browse to locate the raster file (BMP, GIF, JPG, or PNG). Upon opening, a thumbnail appears, along with the name of the file and the size in pixels.
- ◇ Alternatively, before opening the **Trace Image** window, you can import the raster file using **File>Place Image**.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

- **Image Settings**

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

Increase when a more precise tracing is needed



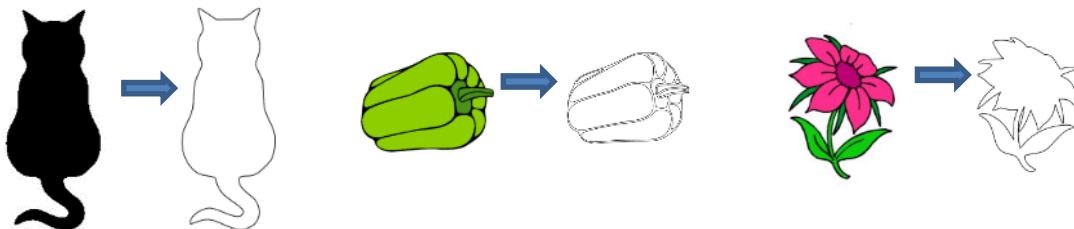
Mark this box if imported file is a PNG with a transparent background

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

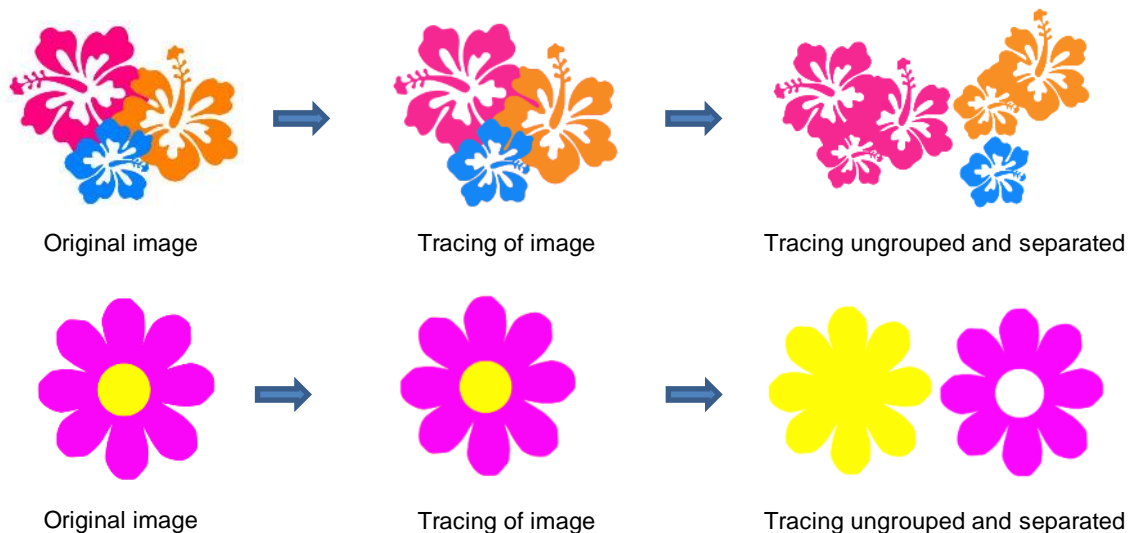
Ignore tiny specks in the imported image

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

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



- **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 blue is selected



Original image



Tracing of image if each color is selected



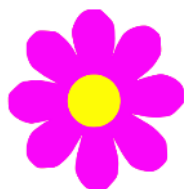
Colors separated



Original image



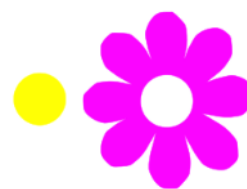
Tracing of image if only pink is selected



Original image



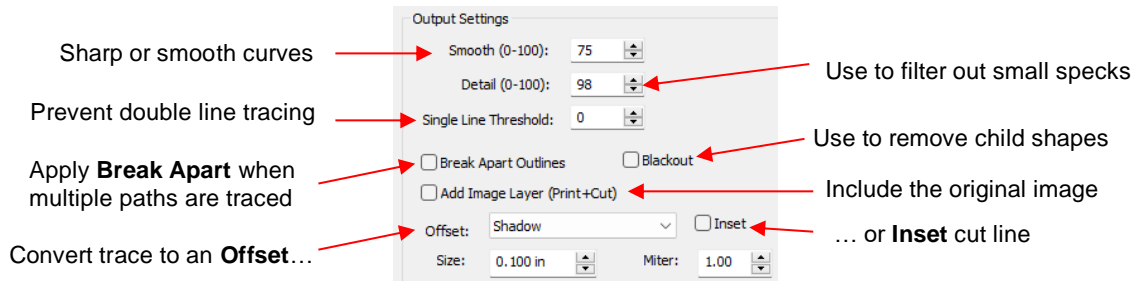
Tracing of image if each color is selected



Colors separated

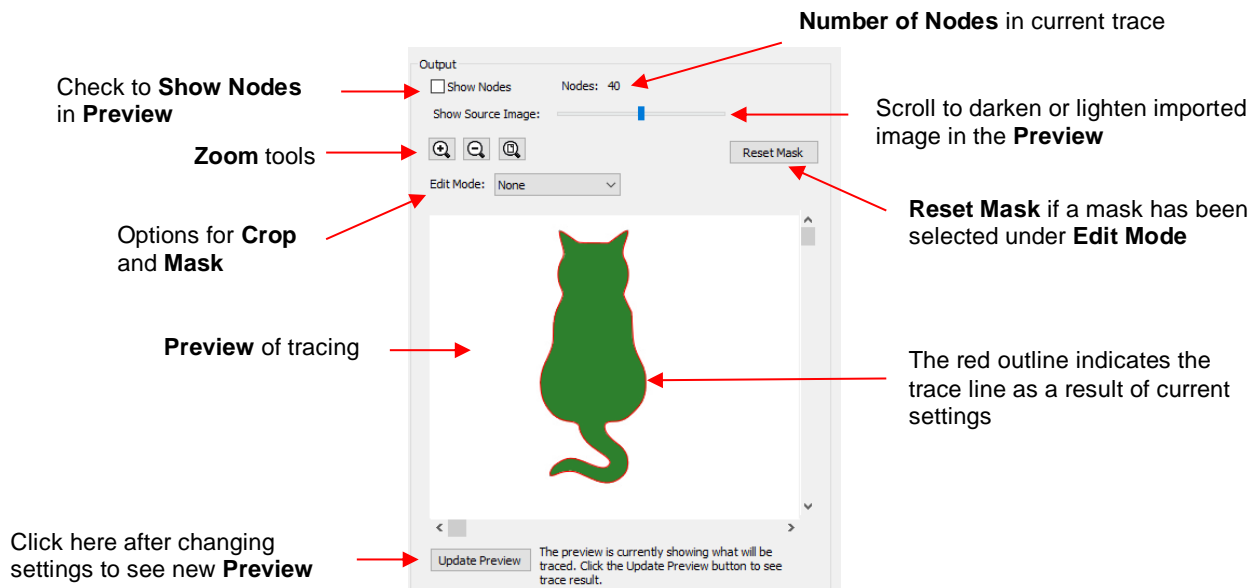
- ◇ Check the **Use Alpha Channel** box if the imported file is a PNG file with a transparent background. The transparent background is easily identified by the trace program requiring very little adjustment to other settings.
- ◇ **Contrast** controls the level of color differentiation included in the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

- **Output Settings**



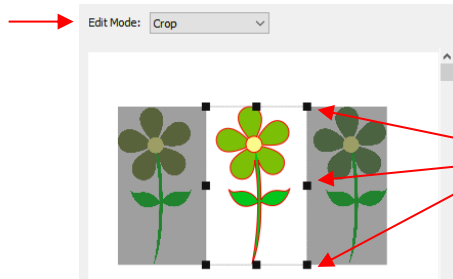
- ◇ **Smooth:** Adjust according to type of image. For example, decrease (make sharper) if tracing a shape with sharp corners like an envelope template. Increase (make smoother) if tracing a shape with soft curves, like a teddy bear.
- ◇ **Detail:** If tiny undesired shapes appear, decrease to filter 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."
- ◇ **Offset:** Option to convert the cut line to an outer contour (or mark **Inset** for inner cut line), then adjust **Size** and **Miter**, as required.

- **Output**



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

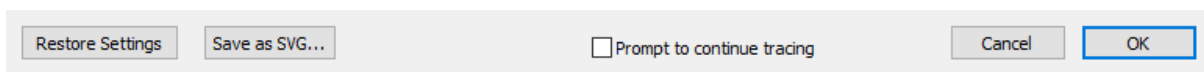
Select **Crop**



Drag the black squares on this box until only the image(s) you wish to trace are inside the box

- ◇ **Edit Mode: Draw Mask** This option allows you to add or subtract parts of the image you want to include or exclude from the trace.

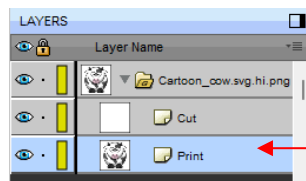
• Bottom of the Screen Settings



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

• Tips on Tracing

- ◇ PNG files with a transparent background (aka alpha channel) do not require tracing if you use drag and drop, **File>Import**, or the **Import** icon on the **Tool Bar** to bring the image into SCAL6.
 - If you do want to retrace the PNG file, open the grouped folder on the **Layer Panel** and highlight the layer called **Print**. Then go to the **Trace Image** window.



Select only the *Print* layer

- ◇ Take advantage of the **Show Source Image** slider which displays the trace line only when slid to the far-left side and the original image when slid to the far-right side:

Show Source Image:



Show Image – middle
Blend of trace lines and original

Show Source Image:



Show Image – left side
Trace lines only

Show Source Image:




Show Image – right
Original image

- ◇ Pay attention to the node count. If there are over a thousand nodes, your design will take much longer to cut and possibly result in tearing in tight corners due to clusters of nodes. You can also zoom in on the trace line to see if it's smooth or jagged.
- ◇ Using **File>Place Image** to import the raster file is preferable because sometimes the image is way larger than what you intend to ever use. In that case, reducing it down to your project size before tracing often results in a smoother cut line with fewer nodes.
- ◇ You can use more than one trace mode if needed and then separately edit the results. For example, using **Single Color** to isolate one particular color's trace line can then be combined with **Monochrome** tracing of the overall image.
- ◇ Detailed tutorials illustrating the use of the various options and settings are presented as *Sections 5.03.2 – 5.03.12* in the following *Expanded Tutorial*: <https://tinyurl.com/3m2v9ae6>

5.04 Draw Functions

5.04.1 The Draw Tool

- The **Draw Tool** is accessed by clicking on the 5th 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

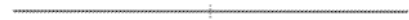
- To draw a single straight line, use your mouse to click once where you want to start the line and click again where you want to end the line. Then immediately press **Esc** or the **Enter** key:



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



Left click to start and left click at a 2nd location



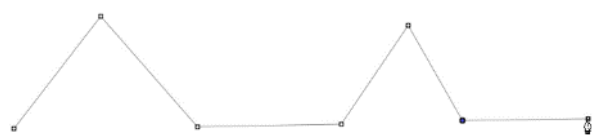
Move to a 3rd location and left click again.



Move to a 4th location and left click again.

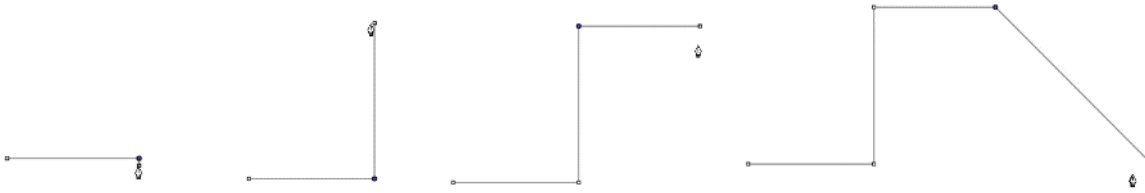


Move to a 5th location and left click again.

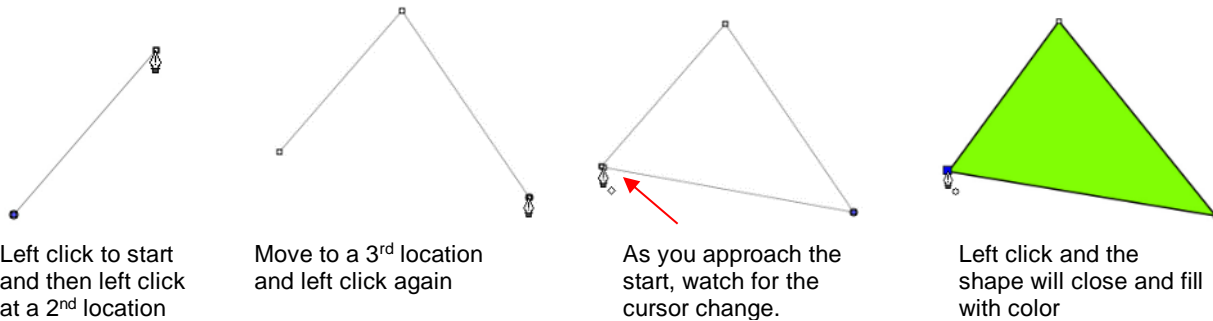


Continue clicking until you are ready to end. Click **Esc** or the press the **Enter** key.

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

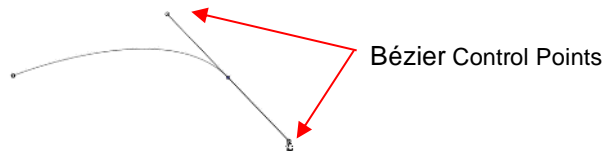


- If are drawing a closed path then, just as the mouse cursor approaches the starting node, a small diamond will appear next to the cursor and you can click one last time to end the process. The shape will automatically join the first and last nodes and fill with color, provided a **Fill** color is assigned:

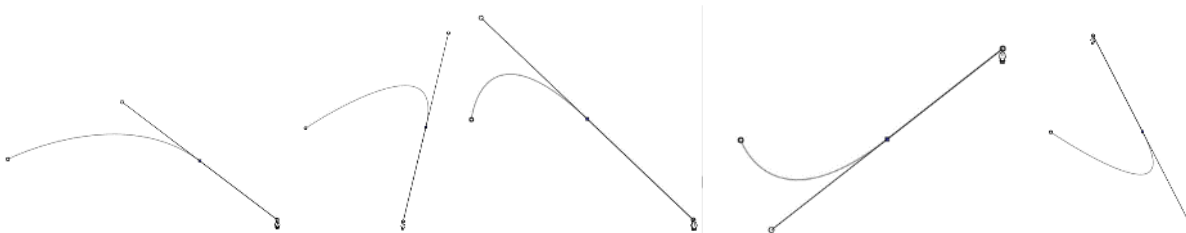


Drawing Bézier Curves

- Drawing curves is a bit more difficult. The key is to take it one step at a time, practice the technique a lot, and remember that you can later correct your curves using the **Shape Tool** (refer to *Section 6.11*).
- 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:

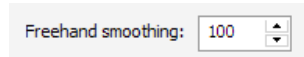


Adding and Deleting Nodes

- As of SCAL 6.066 update, adding new nodes along a path or deleting existing nodes is performed using the **Shape Tool**. Please refer to *Section 6.11.1*.
- To learn how to use the **Draw Tool** for manual tracing, refer to the following *Expanded Tutorial*: <https://tinyurl.com/yb8vu5mu>

5.04.2 Freehand Drawing

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



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



smoothing: 0



smoothing: 100

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




Freehand tree



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

5.04.3 Brush Drawing

- The **Brush** tool is accessed by clicking on the 7th 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:



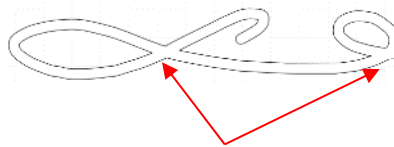
- Select the **Size** you desire and freehand draw:



- 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:



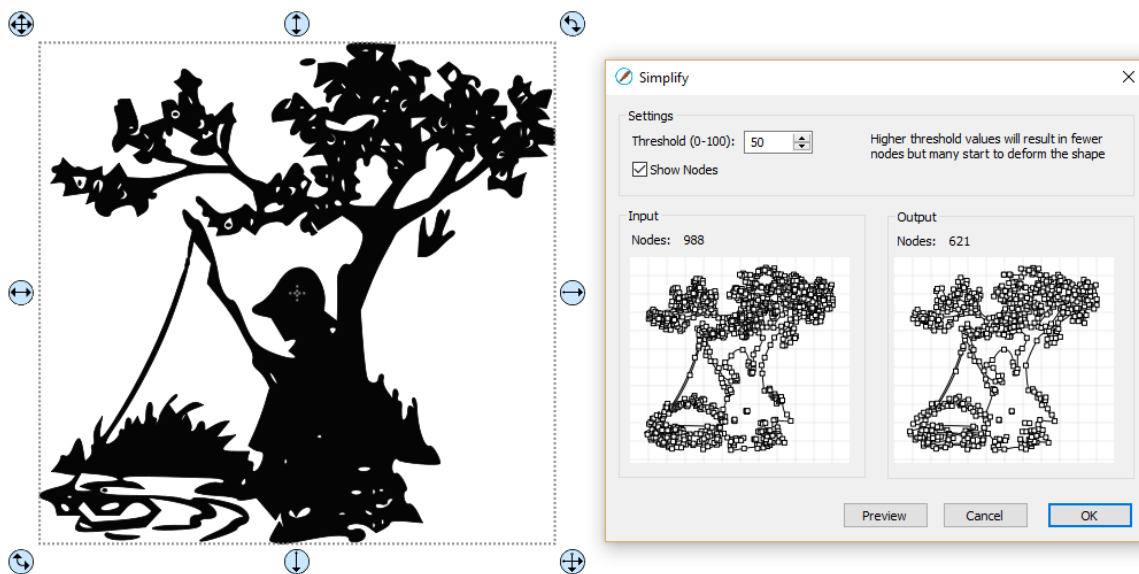
Overlaps automatically removed

6. SCAL: Editing

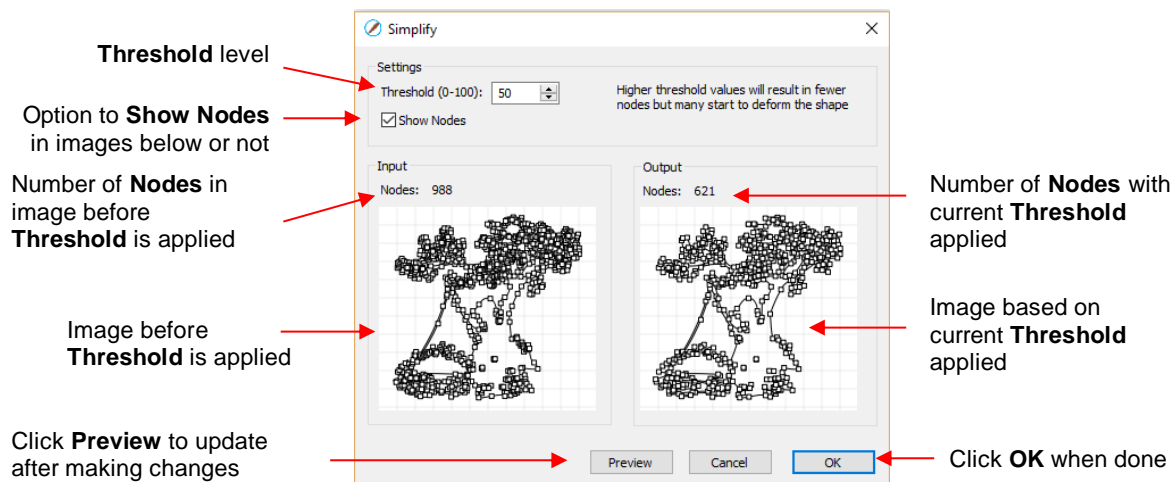
This chapter covers functions that are used to modify shapes in SCAL as well as prepare shapes for cutting. For functions used in designing, refer to *Chapter 7*.

6.01 Simplify

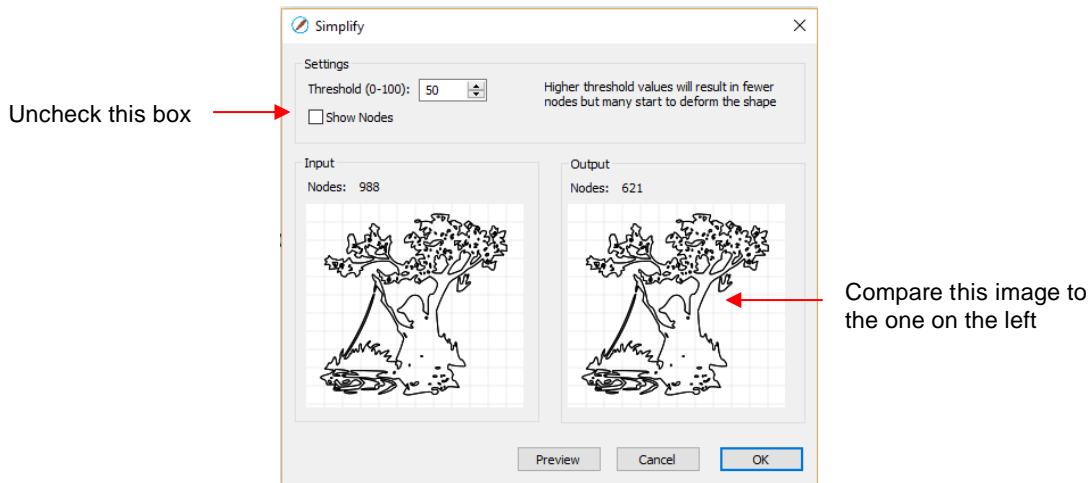
- The purpose of the **Simplify** function is to reduce the number of nodes. This can be important when cutting small vector shapes in which clustering of nodes in tight locations can sometimes lead to poor cutting.
- There are two ways to open the **Simplify** window after selecting a shape:
 - ◇ Right-click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



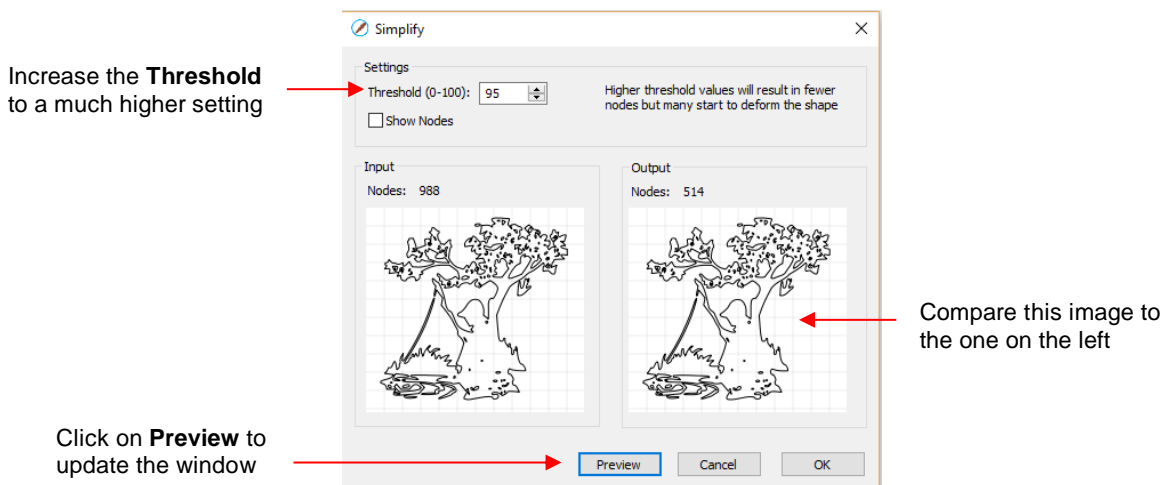
- The **Simplify** window shows the nodes of the selected image in two side-by-side windows: an **Input** and an **Output**, along with the number of **Nodes** in each one. That count is based on the current **Threshold** setting:



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




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

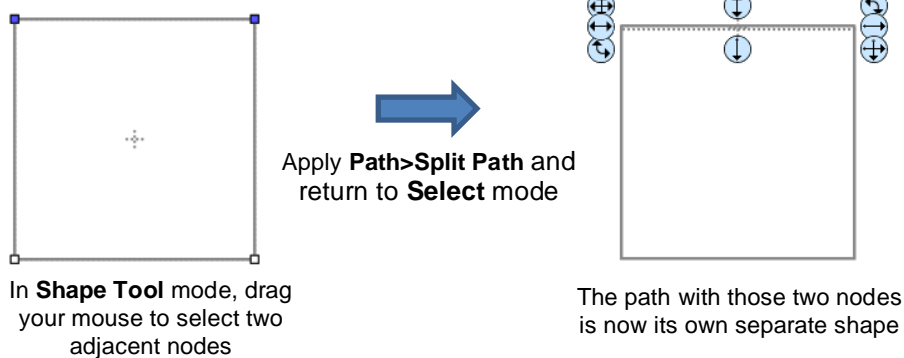


6.02 Split Path

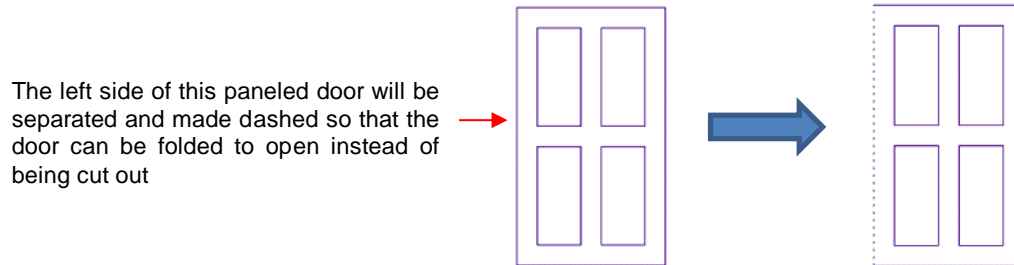
- The **Split Path** function allows you to break away paths. There are two ways to use it:
 - ◇ Select the shape (while in regular **Select** mode) and apply **Path>Split Path** (or right click and select **Path>Split Path**). ALL of the paths will be broken apart:



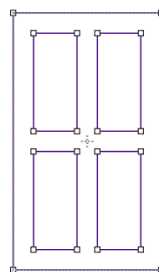
- ◇ Select the **Shape Tool**  icon on the **Tools Panel** and drag your mouse to highlight any two adjacent and connect nodes. Apply **Path>Split Path**. Return to **Select** mode. The path connecting those two nodes will be separated from the rest of the shape's paths:



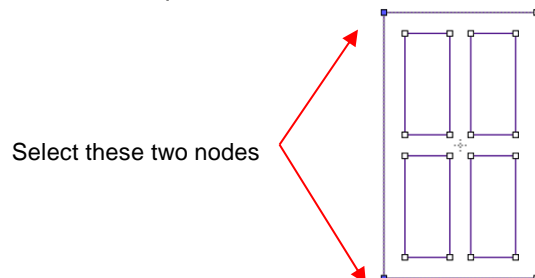
- For a practical application, consider the following door shape. The goal is to change the left side of the door from a solid cut line to a dashed cutline:




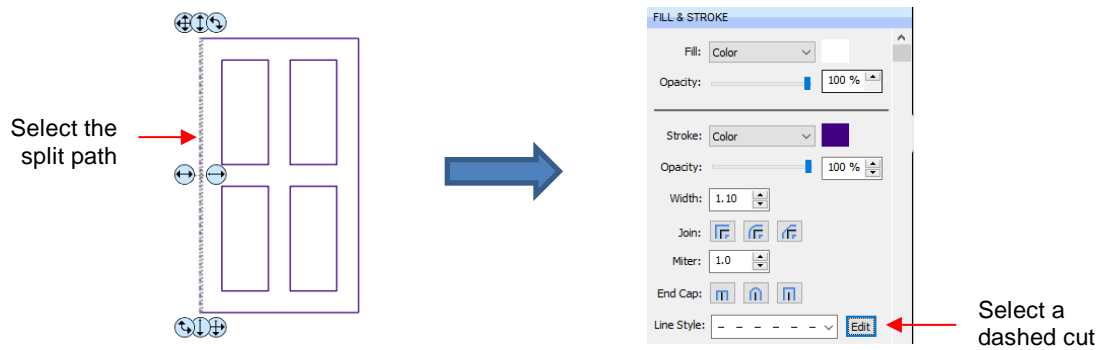
- ◇ Select the shape and click on the **Shape Tool** icon  on the **Tools Panel**. The nodes will appear on the shape:



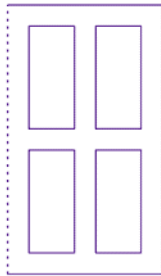
- ◇ Drag your mouse to marquee-select the two nodes on the left side of the window:



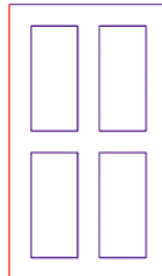
- ◇ Break that path by going to **Path>Split Path**. Then click on the **Select** icon . Now you can separately select that left side line and change to a dashed cut on the **Fill& Stroke Panel**:



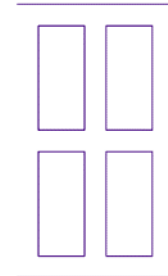
- ◇ The left side of the window will now cut dashed. Alternatively, the left side could have been left solid and scored with an embosser in the cutter or the left side could have been deleted and the fold made by hand:



Left side will cut dashed



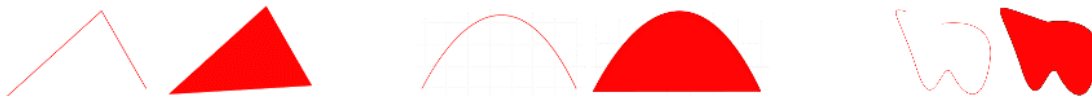
Left side will be scored separately



Left side won't cut at all

6.03 Close Path

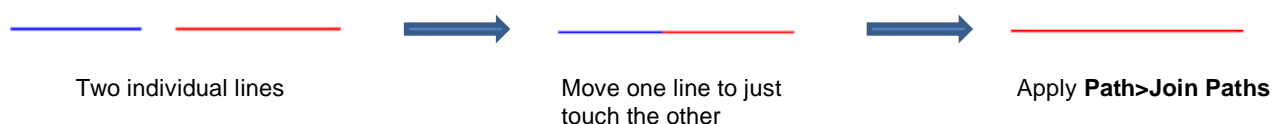
- The **Close Path** function can be applied to any open shape, other than a straight line, to join the start and ending nodes with a straight line:



- 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.

6.04 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**:

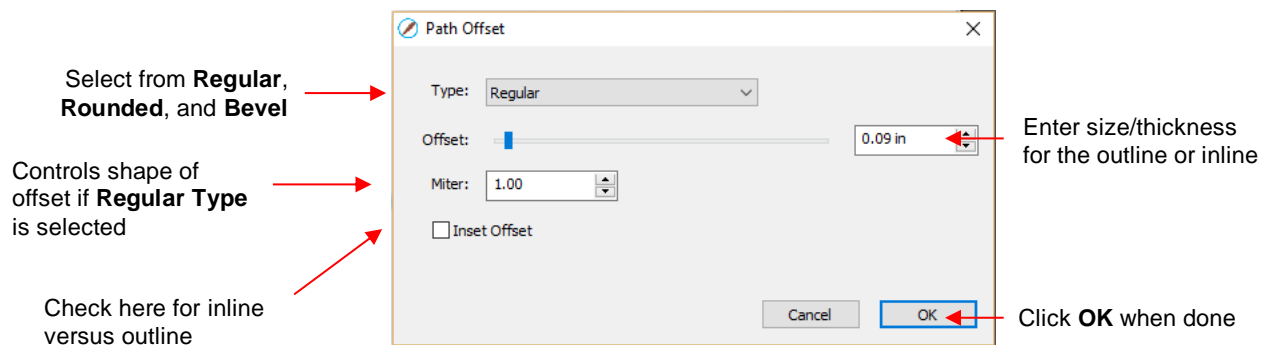


- If you are joining several lines at once, such as these four lines to create a box, then all four lines can be selected at one time and be joined. However, for the new shape to be an actual closed shape, you must then apply **Path>Close Path**:

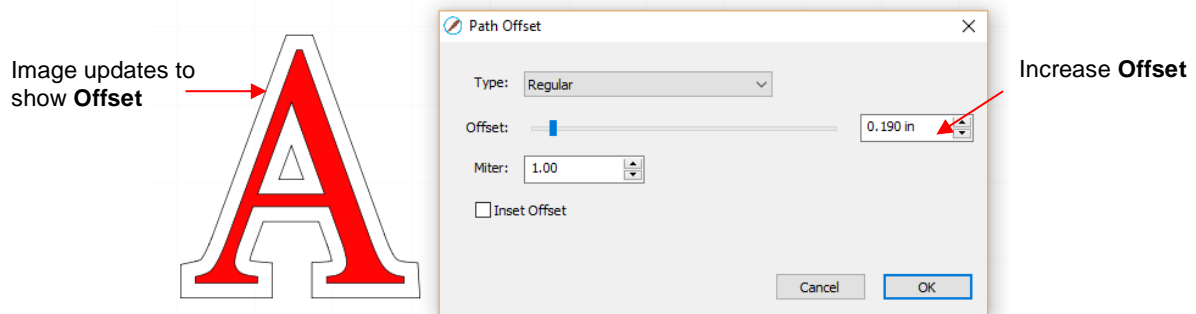


6.05 Offset Path

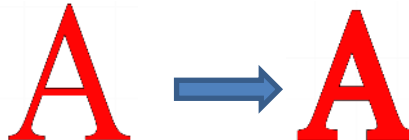
- Offset Path** creates an outline or inline of a shape and will delete the original upon clicking on **OK**. Note that if you want the original, either make a backup copy or use the **Shadow Layer** function presented in *Section 7.23*.
- To access **Offset Path**, select the shape and go to **Path>Offset Path**:



- 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:





Regular

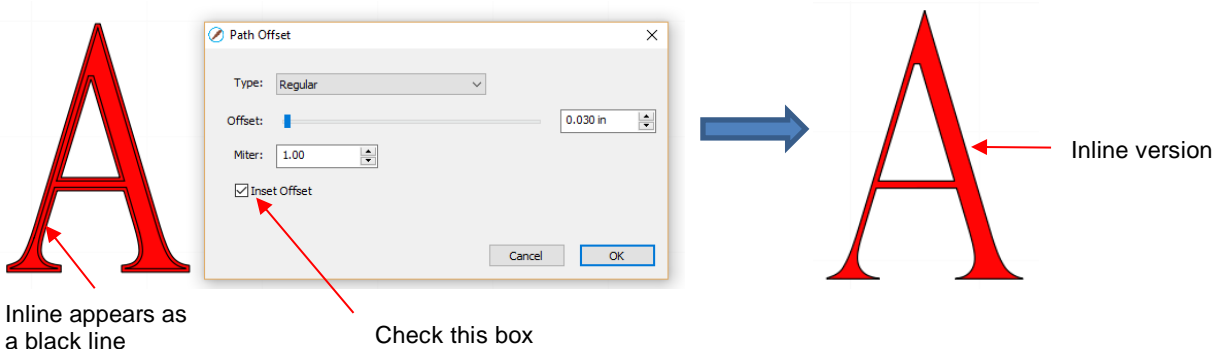


Rounded



Bevel

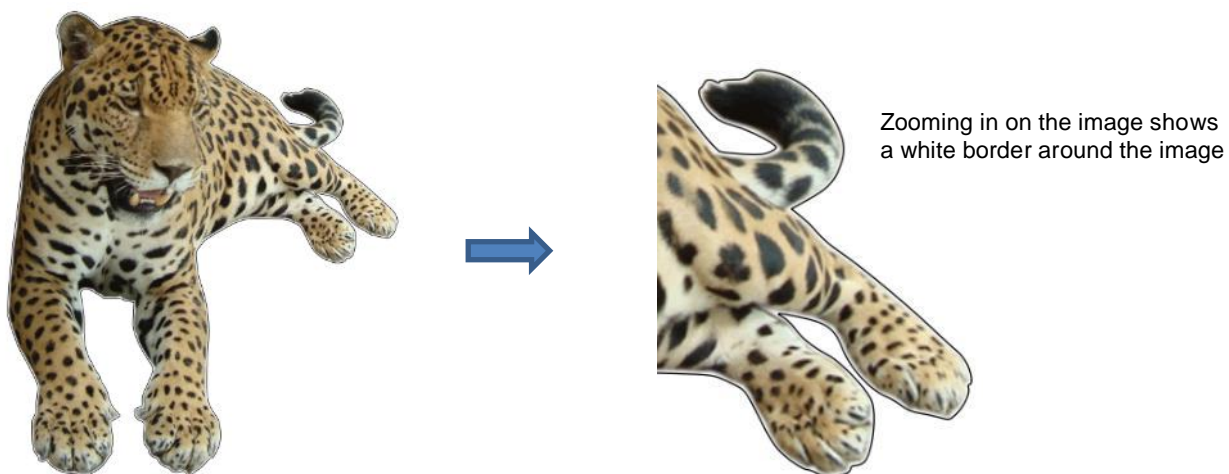
- Note that the first choice, **Regular**, also has a **Miter** setting which should work in the same way as **Miter** affects the **Stroke** (refer to *Section 3.15*). However, at this time, it appears that the **Miter** setting is not working.
- Checking the **Inset Offset** box creates an inline instead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



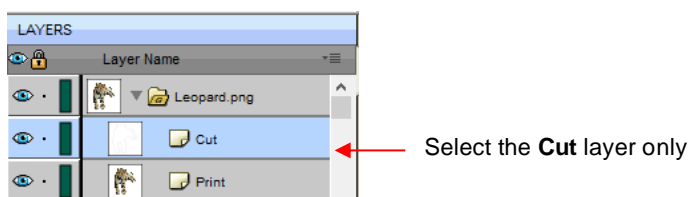
- A practical example of using **Offset Path** is when you have a font that is too thin to cut at the size you need. Applying a very small **Offset** can make the difference in whether or not text can be cut at certain small sizes. In the case below, the 1" lettering was offset by only 0.005":



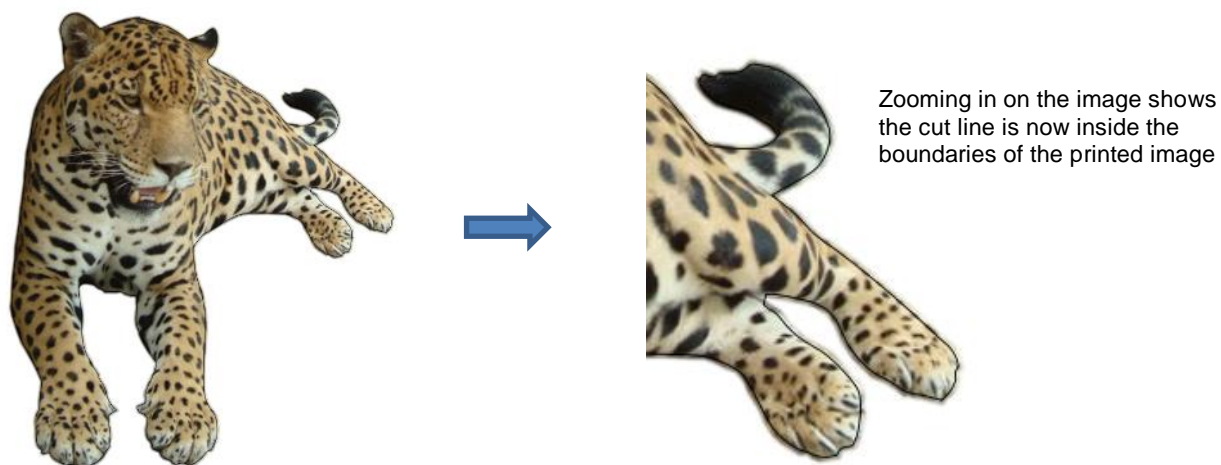
- A second practical example showing the use of **Inset Offset**, is the following print and cut application. A PNG with a transparent background was traced using the **Trace** function. However, based on the location of the cut line, relative to the printed image, there will be small amount of white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




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

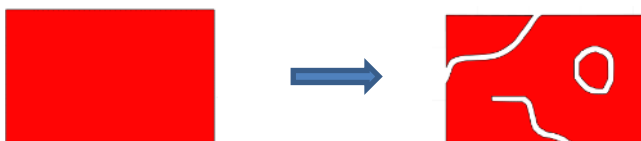


- ◇ Open the **Path Offset** window. Set the **Offset** to a small size, such as 0.03". Be sure to mark the box for **Inset Offset**. The result is a cut line which will eliminate that white border around the image:



6.06 Eraser

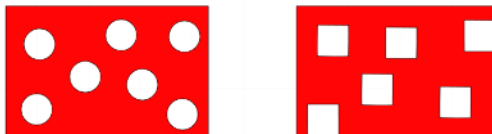
- The **Eraser** is the 8th icon  on the **Tools Panel**. Use this tool to erase parts of a shape by dragging your mouse across the shape:



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

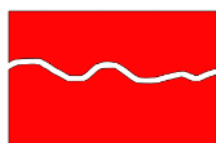


- ◇ **Eraser Shape:** Choose either **Circle** or **Square**:



- ◇ **Size:** select a thickness for the erasure. Scroll up and down or enter a specific size.

- ◇ **Keep closed paths:** Mark this option if you split a shape and you want the two resulting shapes to be closed. Otherwise, you end up with two open shapes:



Keep closed paths
checked



Keep closed paths
unchecked

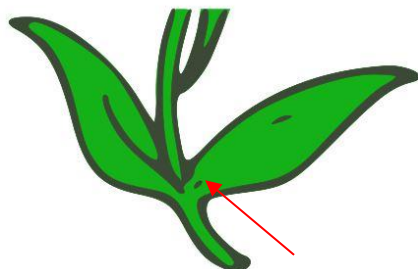


Keep closed paths
checked

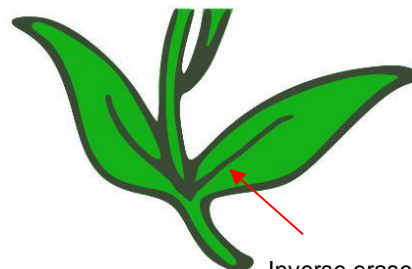


Keep closed paths
unchecked

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

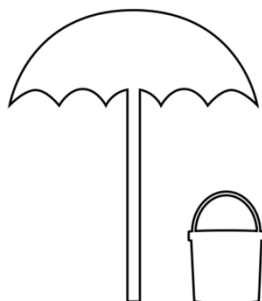


Initial trace left this part of the leaf incomplete

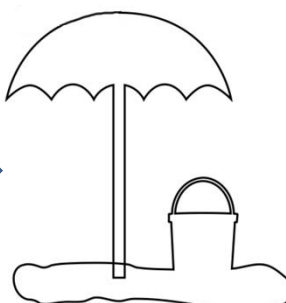


Inverse erase is used to complete the path to better match the other leaf

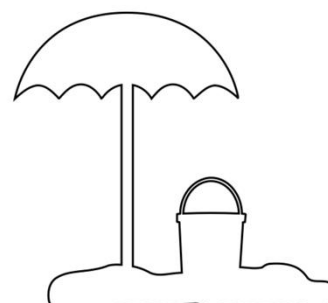
- Note: If you use **Inverse Erase** to connect two or more separate shapes, those shapes should first have **Object>Merge** applied. Otherwise, the connection will not become part of the new shapes:



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





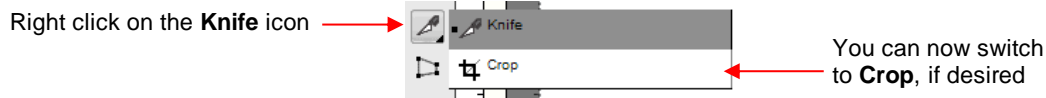
The sand is welded to the pail but not to the umbrella



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

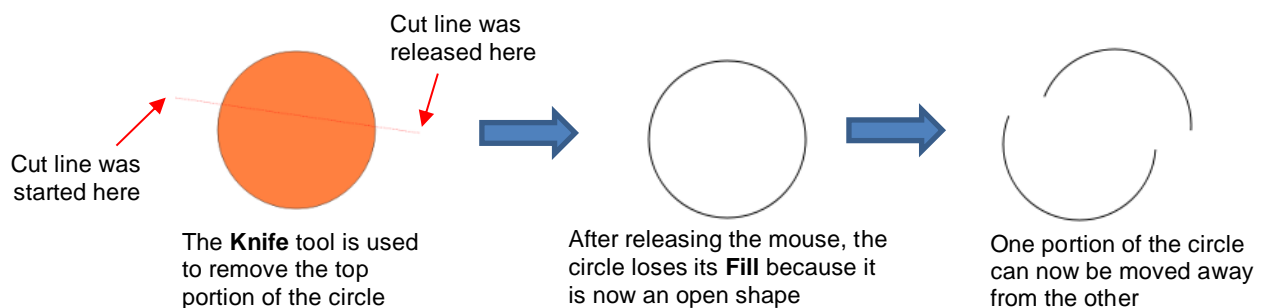
6.07 Knife and Crop

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



6.07.1 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**

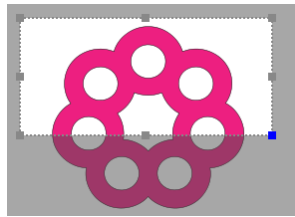


6.07.2 Using Crop

- 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

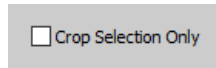


Marquee-select the area to be retained

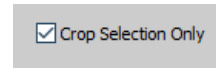


After pressing the **Enter** key

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

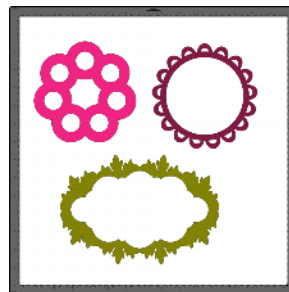


IMPORTANT: If left unchecked, only the marquee-selected part of the shape will be retained. The rest of that shape and every other shape on the page will be deleted, even those that might be hidden or locked!

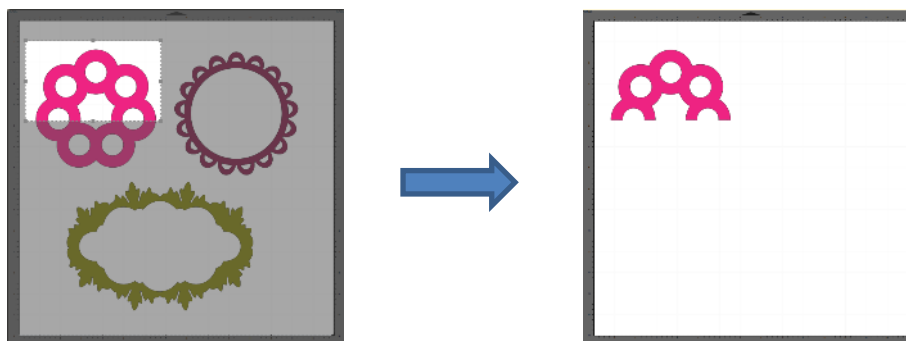


If checked, the marquee-selected part of the selected shape will be retained, as well as all other shapes on the page.

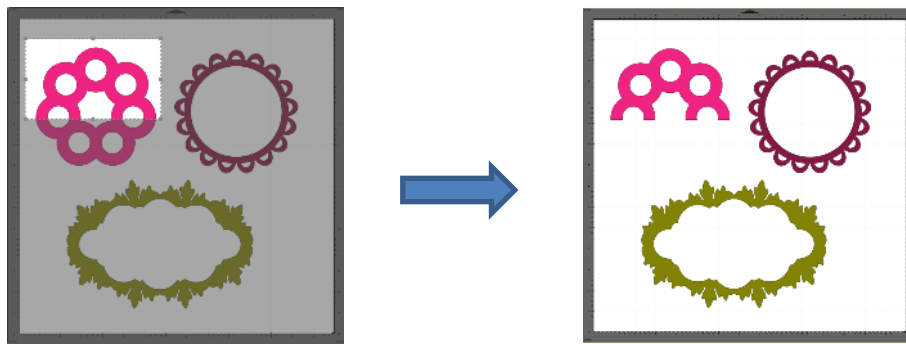
- Here is an example to show what would happen in both cases. The file has three shapes and the top right shape will be cropped just as in the prior screenshot:




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

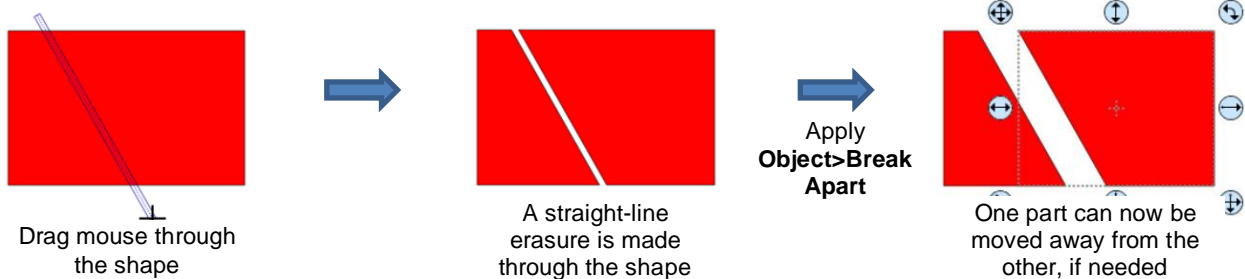


- ◇ With the **Crop Selection Only** box checked, the shape is selected first and then only the bottom half is deleted:



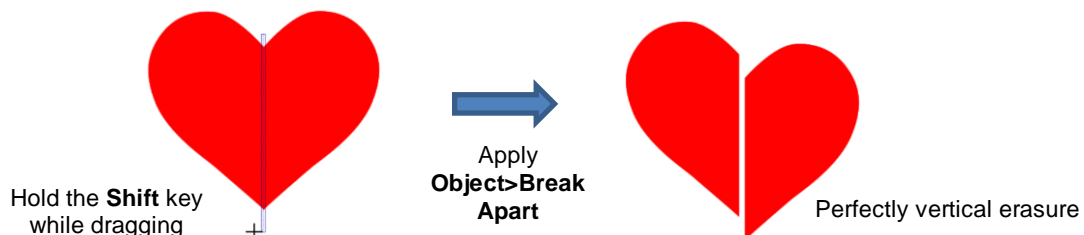
6.08 Stencil Bridge

- The **Stencil Bridge** tool is typically used to cut a rectangular bridge from an interior path to the outside of that path. An example showing the stenciling of text is covered in *Section 4.08*.
- Another useful application is when you need to erase a path but maintain a straight line versus the freehand nature of the **Eraser** tool covered in *Section 6.06*. Select the **Stencil Bridge** tool  on the **Tools Panel** and drag the mouse to create a straight-line cut through a shape:

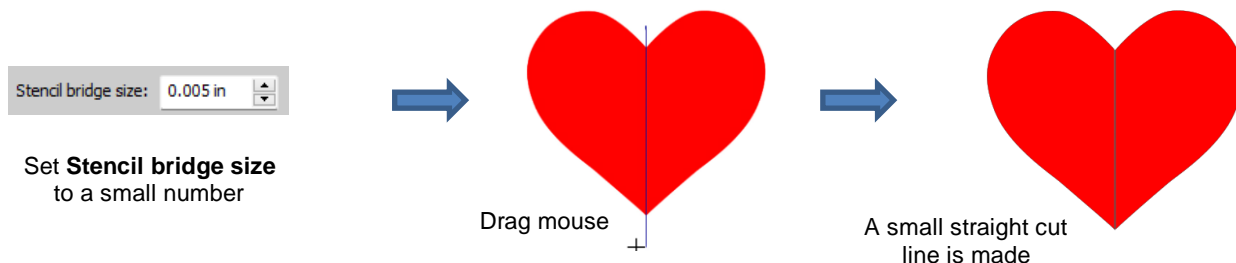


◇ If you wish to separate the shapes, apply **Object > Break Apart**, as shown.

- If you need the cut to be perfectly horizontal, vertical or at a 45° angle, hold the **Shift** key as you drag the mouse:



- Change the **Stencil Bridge Size** to a very small number and the erasure is essentially a cut line and can be used to bisect a shape or whatever thin, straight, cut line is needed:




6.09 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 **Path Operations** (aka **Boolean Joins**) has also been added but isn't covered until *Section 7.04* because they are 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 Section 6.06				✓	✓	✓		✓	✓
Knife Section 6.07.1	✓	✓	✓					✓	
Crop Section 6.07.2	✓	✓			✓				✓
Split Section 6.02								✓	
Stencil Bridge Section 6.08	✓	✓	✓		✓				✓
Path Operations Section 7.04	✓	✓	✓		✓	✓	✓		✓

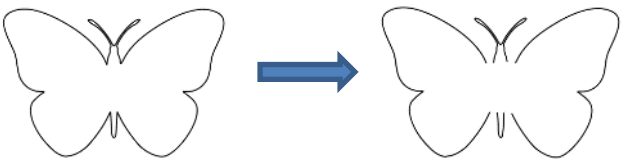
- Here are a few samples to show which functions would be the best choices for making the cut:

Eraser:




Cut the leaf and stem away from the apple – used for creating paper piecing designs

Knife or Split:



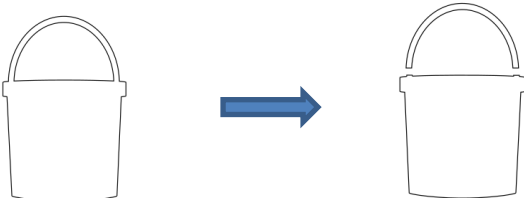
Cut up the butterfly without closing the shapes. Used for projects where the shapes are folded along one side instead of cut out

Crop



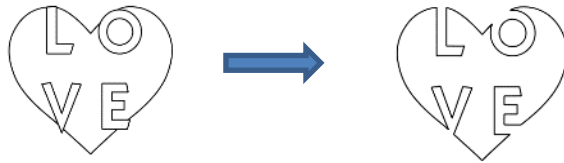
Slice off the top and bottom of a word. Used for a popup card.

Stencil Bridge:



Separate a shape using a straight-line cut


**Path
Operation:**

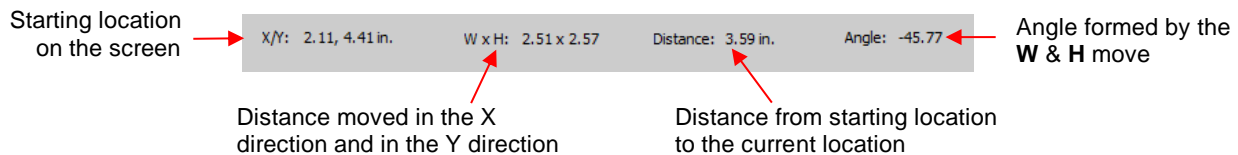


Cut a shape with any other shape or shapes

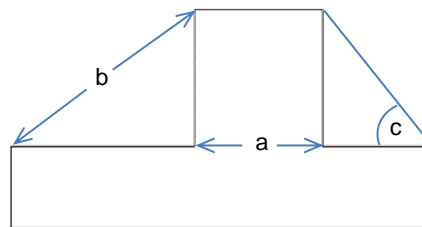
- **Knife** and **Split** have the same effect. **Split** is a bit more limiting because there needs to be nodes present in the location where the cut will occur. It might be useful if you are already in the **Shape Tool** mode where you can then select the nodes and apply the **Split**. Otherwise, **Knife**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

6.10 Ruler

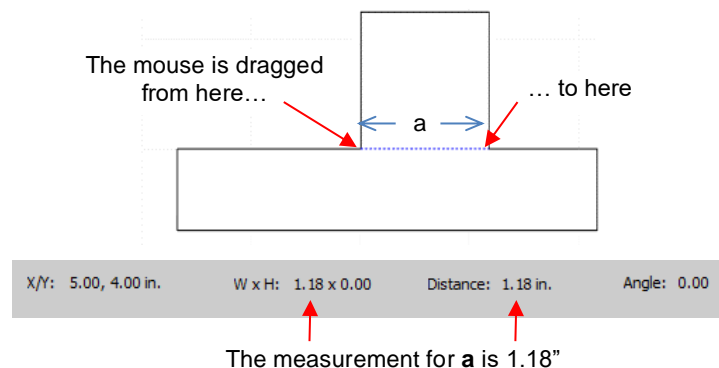
- The **Ruler** function allows you to measure the distance and angle between any two points on the screen. It is accessed by clicking on the second icon from the bottom  on the **Tools Panel**.
- No shapes need to be preselected. Just hold down left mouse button at any location and then drag the mouse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



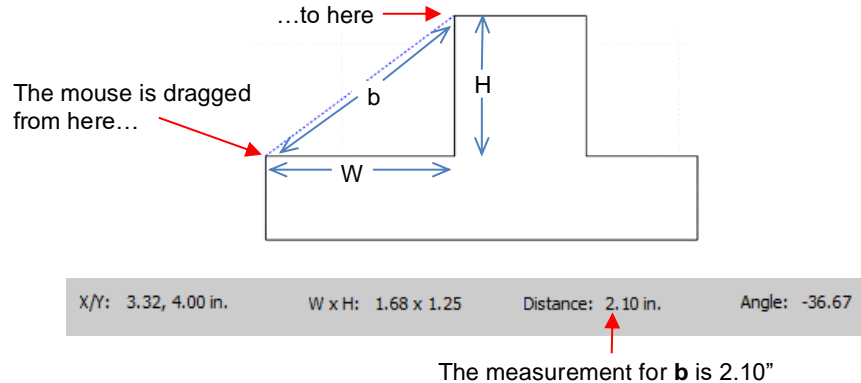
- To better illustrate these variables, the following shape will be used and the various measurements will be determined using the **Ruler**:



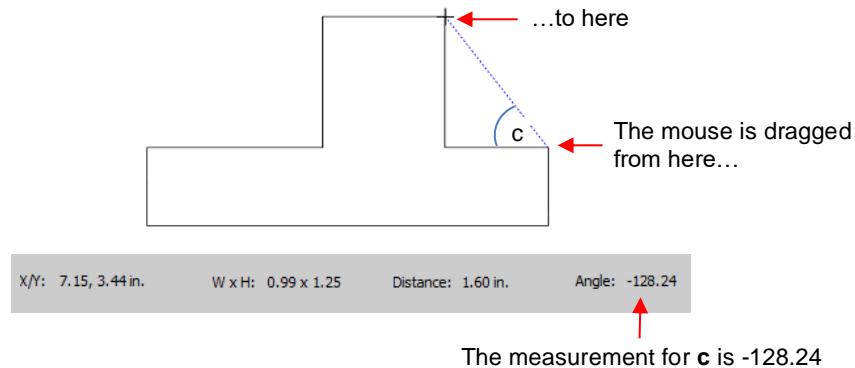
- ◇ **X/Y**: This is the starting position on the screen and will match the X/Y grid location on the **Cutting Mat**. You can extend beyond the boundaries of the mat, if needed.
- ◇ **W x H**: Indicates how far the mouse has been dragged away from the starting point. Note that as the mouse is dragged,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



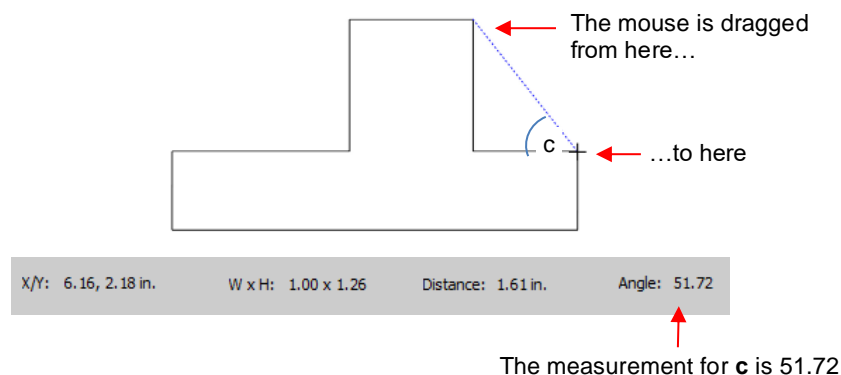
- ◇ **Distance:** This is the actual measurement between the starting location and the ending location. In the prior measurement, **W** is the same as **Distance** because the measurement was a horizontal one. But measuring the length of “**b**” is not:




- ◇ **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:

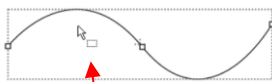


6.11 The Shape Tool - Path and Node Editing

- This topic was first introduced in *Section 5.04* where you were shown how to draw with the **Draw Tool** and then curve a straight-line path. If you haven't read *Section 5.04*, 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 most likely you have clicked on a group of shapes. Go to **Object>Ungroup** and then try again.
- Path editing involves dragging a path or dragging **Bezier** control points to reshape them. Node editing involves adding, deleting, moving nodes and changing the type of node to then form desired curves.
- The most likely mistake you'll make while learning path and node editing is failing to zoom in close enough so that you can click precisely on paths and nodes. Keep that in mind while experimenting.

6.11.1 Adding and Deleting Nodes

- To add a node, move the cursor next to the path and watch for the cursor to change to an "s" shape. Double click:



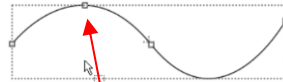
Note the cursor as you move the mouse towards the path



When the cursor changes to an "s" shape, stop



Double click the mouse button to add a node

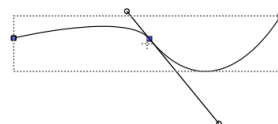


New node has been added

- To delete a node, hover over a node until it turns blue. Left click and it will select that node. Left-click once to delete:



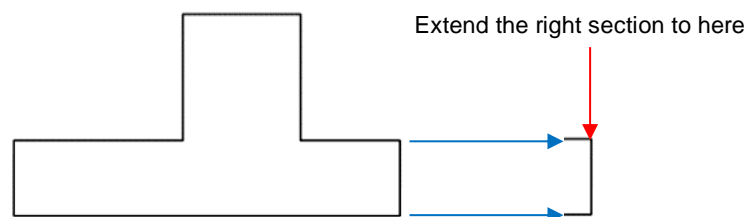
Click once on the node to be deleted



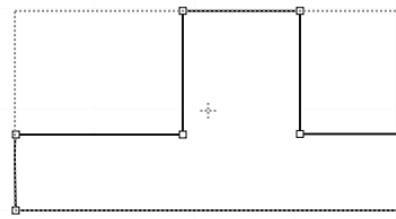
The node is deleted and the curve will change accordingly

6.11.2 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:

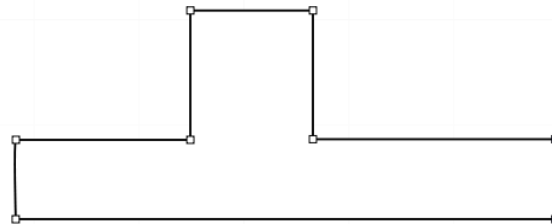


- ◇ Select the **Shape Tool**  on the **Tools Panel** and then click on that path:



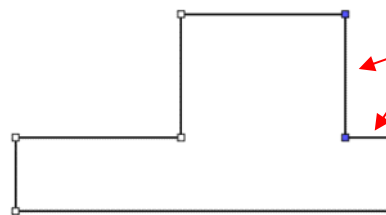
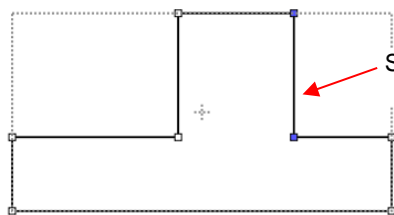
As you move your mouse near a path, the cursor will change. Then you can click and select that path.

- ◇ 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:



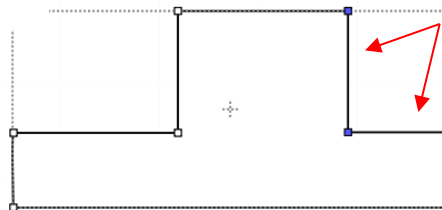
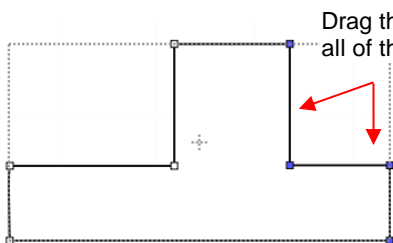
Path is moved without changing other dimensions of the shape

- ◇ 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:



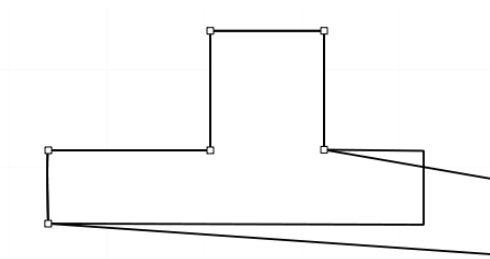
Center section is wider but note effect on the right section

- ◇ 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:



Center section is wider but right section stays the same.

- 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:

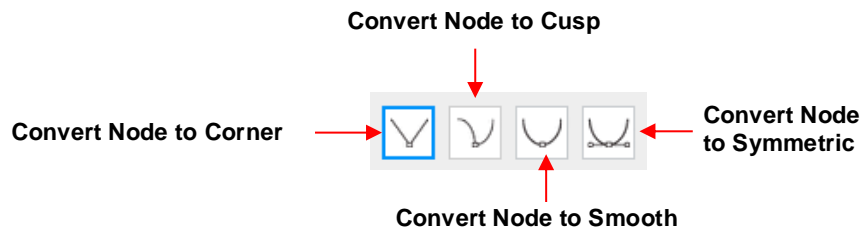


You can use your mouse to drag the path anywhere

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

6.11.3 Reshaping a Path

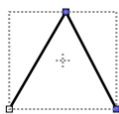
- With the **Shape Tool** selected, you'll observe four icons in the **Tool Options**. The purpose of each option is to convert one or more selected nodes to that type of node:



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



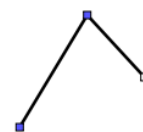
- ◇ **Corner Nodes:** These are the nodes that make up straight-line shapes such as rectangles, squares, triangles, stars, etc. Once selected, the shape will appear as below and either path can be moved as was demonstrated in the prior *Section 6.11.1*.



Right side dragged



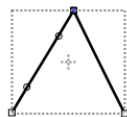
Right side dragged



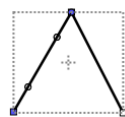
Left side dragged



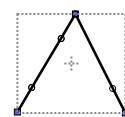
- ◇ **Cusp Nodes:** In this mode the Bézier control points appear and can be moved independently. First note how the paths appear when in this mode, depending on how many of the adjacent nodes are selected:



Top node only selected

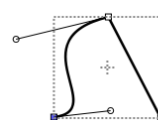


Left side nodes selected



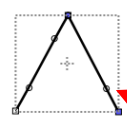
All three nodes selected

- 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:



Separately drag the control points to restore the left side

- 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:

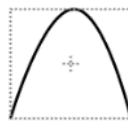
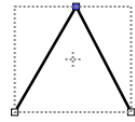


Bézier control point

Drag the right-side control point

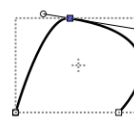
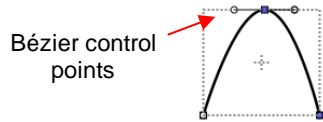


- ◇ **Smooth Nodes:** In this mode the Bézier control points always stay in a straight line. Notice that when you convert to **Smooth Nodes**, the shape immediately forms a curve:

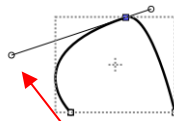
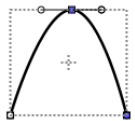


After applying **Smooth Nodes** option

- 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:



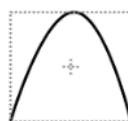
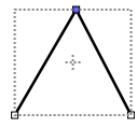
- The left side Bézier control point controls the curve on the left side. Thus, if it had been moved instead this would have resulted:



Dragging left side control point restores left side

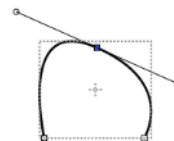
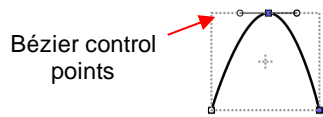


- ◇ **Symmetric Nodes:** In this mode the Bézier control points not only stay in a straight line, they also stay the same length. As with **Smooth Nodes**, when you convert to **Symmetric Nodes**, the shape immediately forms a curve:



After applying **Symmetric Nodes** option

- 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:



Bézier control points stay aligned and the same length

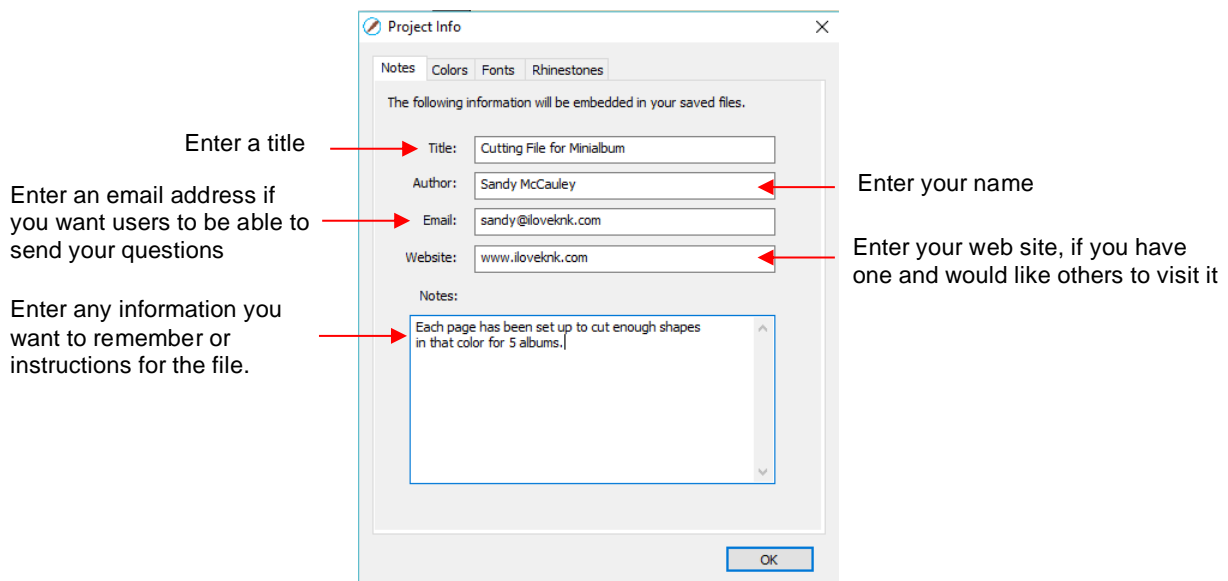
- Additional information on converting nodes from one type to another and practical application are covered in the following *Expanded Tutorial*: <https://tinyurl.com/26z4uj3h>

7. SCAL: Designing

- 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!
- While many of the **Effects** and **Path** menu functions are included in this chapter, I felt that some were more aptly presented elsewhere. Use **Ctrl+F (Command+F)** to locate any that you cannot find.

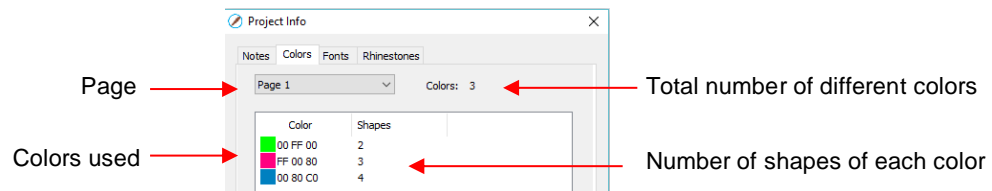
7.01 Project Info

- 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:

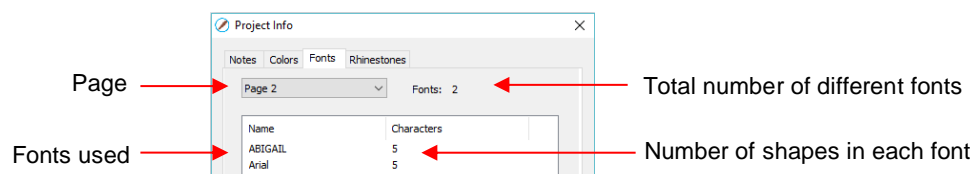


- Note the other tabs in this window: **Colors**, **Fonts**, and **Rhinstones**. These do not require your input. Instead, they automatically track, by **Page**, those elements that are currently present in the file. For example:

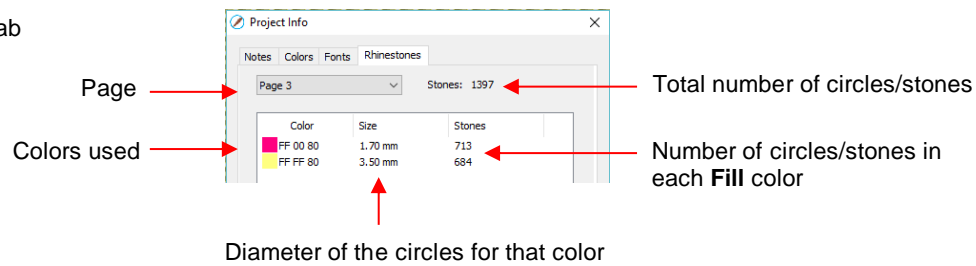
Colors Tab



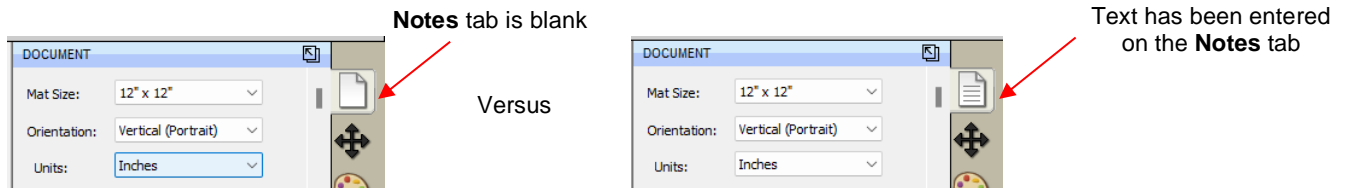
Fonts Tab



Rhinestones Tab

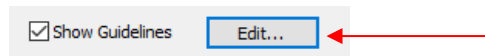


- Note: When changing tabs, such as from **Colors** to **Fonts**, always take note of the **Page** number. It will not automatically update to the page you were just checking. Thus, if you are on *Page 2* when on the **Colors** tab, you may discover you're on *Page 1* on the **Fonts** tab. Simply change to the page you need from the drop-down menu.
- Also, information has been added to the Notes tab, the Document icon the Properties Panel changes to reflect this:

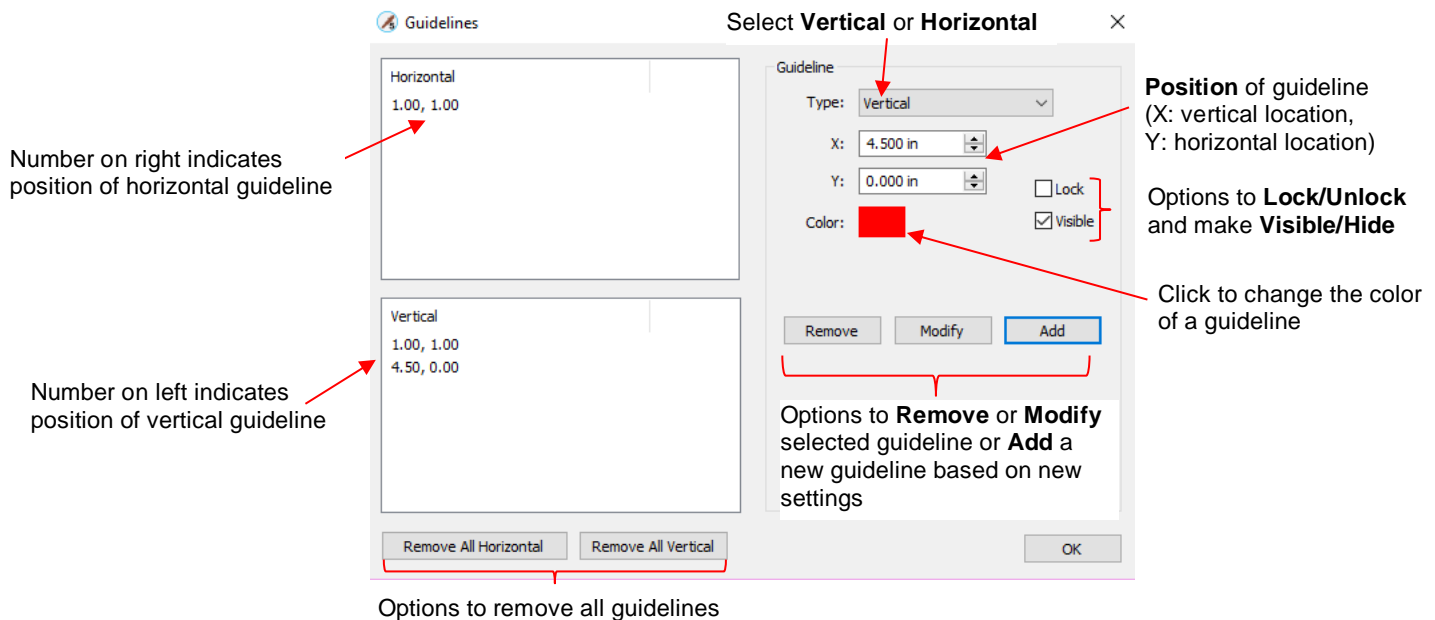


7.02 Guidelines

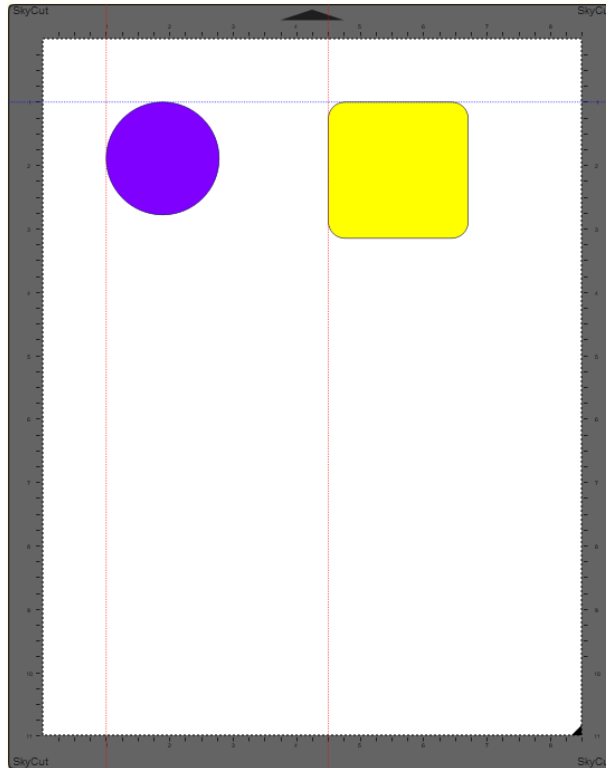
- Guidelines were first introduced in *Section 1.06.5*. It was noted that they can be added to the **Cutting Mat** in two ways:
 - By dragging your mouse from the horizontal or vertical rulers on the screen
 - By manually adding in the **Guidelines** window
- You can toggle guidelines on and off by clicking on the box next to **Show Guidelines** on the **Document Panel**. To open the **Guidelines** window, either go to **View>Guidelines>Edit Guidelines** or click on the **Edit** button next to **Show Guidelines**:



- The following window opens:



- This window serves three functions:
 - ◊ Ability to delete guidelines: Select a guideline on the left and then click on **Remove**. You can also remove all of the horizontal guidelines and/or all of the vertical guidelines using the buttons shown.
 - ◊ Ability to edit an existing guideline: Select a guideline on the left and make changes such as position, color, lock/unlock and show/hide. Then click on **Modify**.
 - ◊ Ability to add a new guideline: Enter desired settings and click on **Add**.
- Based on the setting in the prior **Guidelines** window, the **Cutting Mat** would look like this:



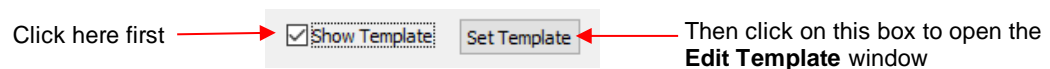
- The ability to show/hide all guidelines, lock/unlock all guidelines and delete (clear) all guidelines is also available under **View>Guidelines**.
- To have shapes snap to the guidelines, go to **View>Snap To>Guidelines** and make sure that option is checked. More about **Snap To** is covered in *Section 1.07*.

7.03 Templates

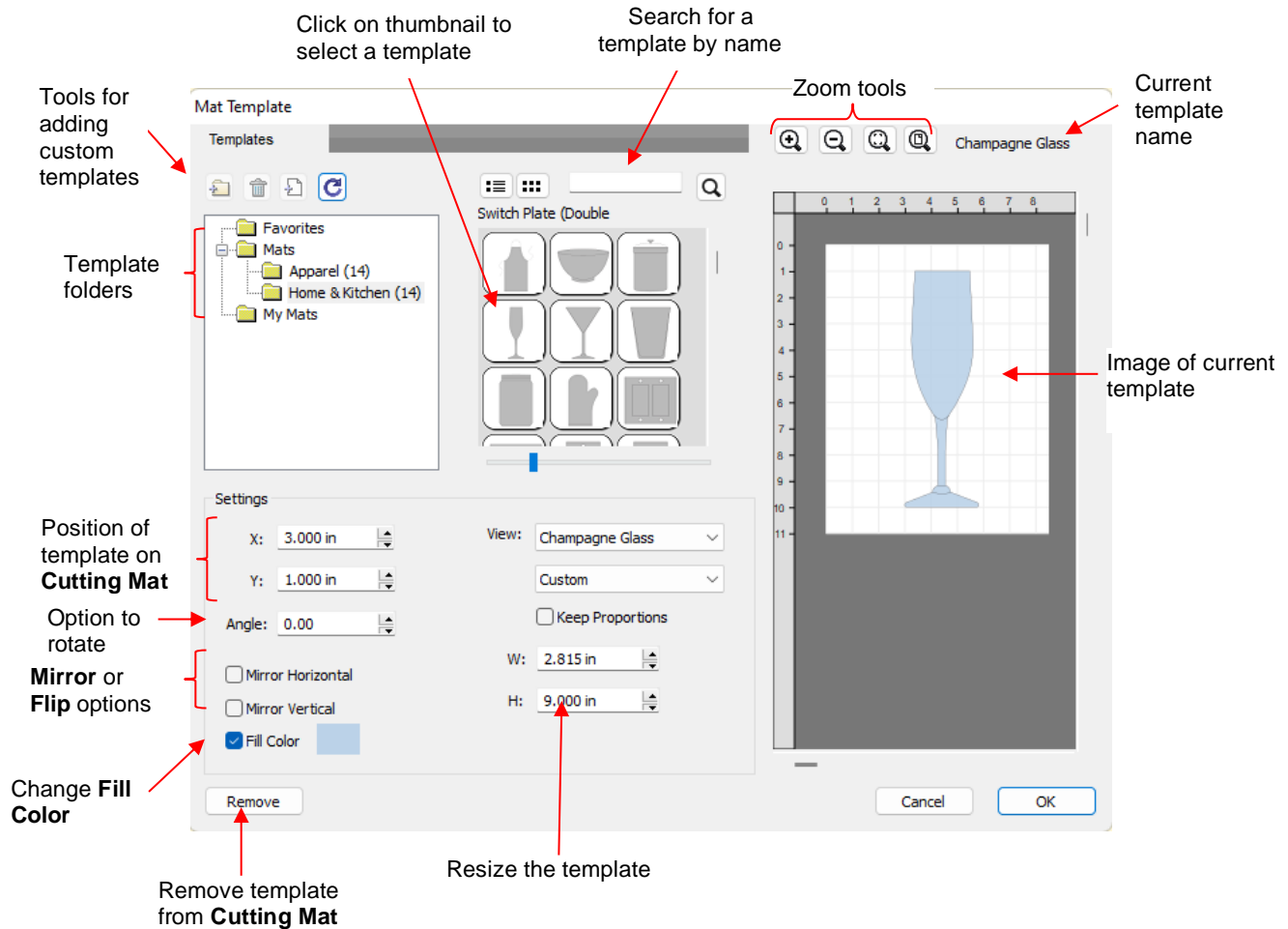
- As was first presented in *Section 1.06.11*, SCAL6 has the ability to add templates to the **Cutting Mat** that are non-selectable shapes to aid in various designing situations.

7.03.1 Mat Template Window

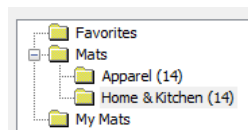
- There are fourteen templates included in SCAL6. However, you can import your own templates if they are in .SVG format or .SCALMAT format.
- To access templates, mark the option for **Show Template** and then click on the **Set Template** button:



- The following **Mat Template** window opens:

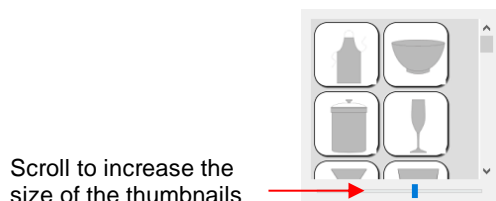


- The **Mat Template** window has a lot in common with the **Shapes** tab in the Library:
 - ◇ The **Mats** folder contains templates that come with SCAL. The number in parentheses indicates how many templates are included in that folder:

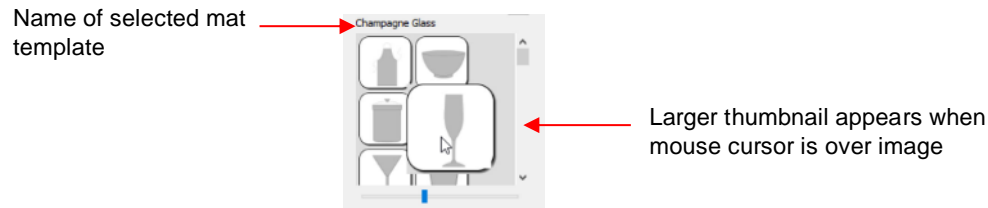


The **Apparel** and **Home & Kitchen** folders each contain 14 templates

- ◇ A scrollbar beneath the thumbnails window can be used to resize the thumbnails:



- ◇ Hovering over a thumbnail will cause it to become larger and will display the name of the template:



- ◇ Templates can be displayed either with a thumbnail image or a list view:



- ◇ You can assign templates to a **Favorites** folder for quicker access. To do that, right click on a thumbnail image and select **Add to Favorites**. That popup menu also has two other options:
 - **Delete File**: This option isn't used except when you import your own template files
 - **Reveal File**: Opens the location on your computer where the template file is located
- ◇ You can create your own subfolders and import templates. Details are covered in *Section 7.03.3*.

7.03.2 Template File Settings

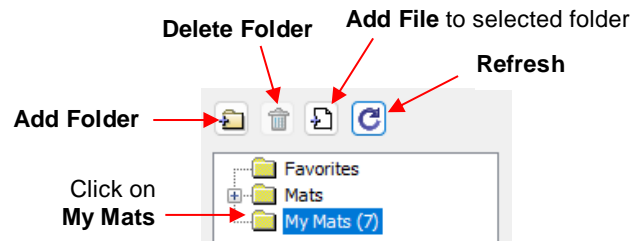
- The right side of the **Mat Template** window has a preview of the selected template on a simulation of the **Cutting Mat**. This preview is useful while customizing the settings.
- Once a template is selected, you have the following settings for customizing:
 - ◇ Size: adjust the **W** and **H** settings to change the width and height of the template. The optional **Keep Proportions** box, when checked, will maintain the aspect ratio as you change either the width or height.
 - ◇ Position: Increasing **X** and/or **Y** will move the template away from the upper left corner of the **Cutting Mat**.
 - ◇ Rotate: increase the **Angle** setting to rotate the template, if needed.
 - ◇ Color: Mark the **Fill Color** box and then click on the colored box to open a color selection window.
- When you are satisfied with the settings, click on **OK** to add the template to the **Cutting Mat**. Note that the template will not print or cut. Again, it's a tool for designing:



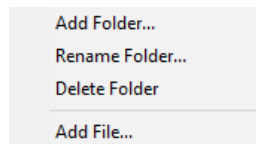
- To replace the template, reopen the **Mat Template** window and select a different template file.
- To remove the template from your **Cutting Mat** either uncheck the **Show Template** option on the **Document Panel** or return to the **Mat Template** window and click on **Remove** button.

7.03.3 Importing Your Own Templates

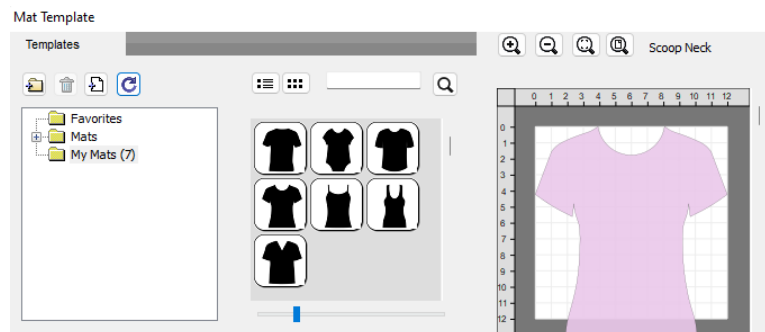
- SVG files can be imported into the **Mat Template** window. If you are designing them in SCAL, use a **DPI** of 72 in the SVG export window and the size of your imported template will match that of your original design.
- Once an SVG file is imported it is saved as a SCALMAT file. These files can be located in the following folder on your computer: **Documents>Craft Edge>My Mats**.
- To import and organize templates, first click on **My Mats**. The following functions are now available:



- You can import new template files into the **My Mats** folder by clicking **Add File**. You can also create new subfolders within **My Mats** by clicking on **Add Folder**.
- These same two functions are also accessible when you right click while **My Mats** is selected. Note: this is also how you would rename one of your custom folders:



- If you need to delete a folder, first empty it by right clicking on each thumbnail and selecting **Delete File**. Then you will be able right click on the folder name and select **Delete Folder**.
- Sometimes you may need to click on the **Refresh** icon in order to see new folders or to see deleted folders removed.
- When you select **Add File**, browse to locate the SVG file you wish to add as a template. It will then appear as a thumbnail image. Clicking on the thumbnail adds the shape to the simulated **Cutting Mat** on the right:



- **IMPORTANT!** As mentioned before, when an SVG file is imported, its file format changes to SCALMAT. This is important to note because this is where a significant difference lies between the **Mat Template** window and the **Library**. Referring back to *Section 2.03.1*, it was noted that you can import an entire folder at one time into **My Designs** in the **Library**. While it appears that the same functionality is available when

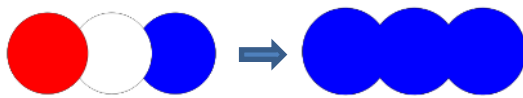
creating a new folder in **My Mats**, you cannot import an entire folder of SVG files that same way. Instead, the folder you wish to import (create a shortcut to) must contain .SCALMAT files.

7.04 Path Operations

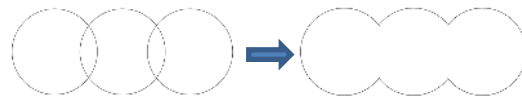
- Under **Path** on the **Menu Bar**, there are various operations which prove useful when designing cutting files. This section illustrates how these work and provides some practical examples. **IMPORTANT:** These functions can only be used on vector (i.e., cutting) shapes. Attempting to apply on raster images (imported clipart and photos) will result in the raster image turning gray.

7.04.1 Union

- The **Union** operation, also commonly called welding, removes the overlap between two or more vector shapes. The color of the new shape will be that of the bottom-most shape:

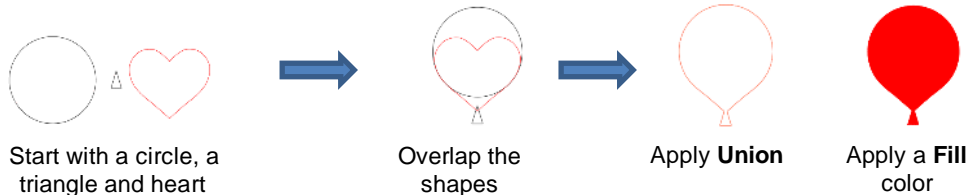


With a **Fill** color: before and after **Union**



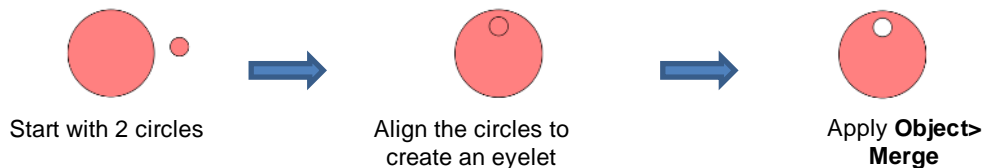
With no **Fill**: before and after **Union**

- 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**
- Section 4.07** shows an example of the **Union** operation applied to text. Here's an example using basic shapes and the **Union** function to create a balloon:

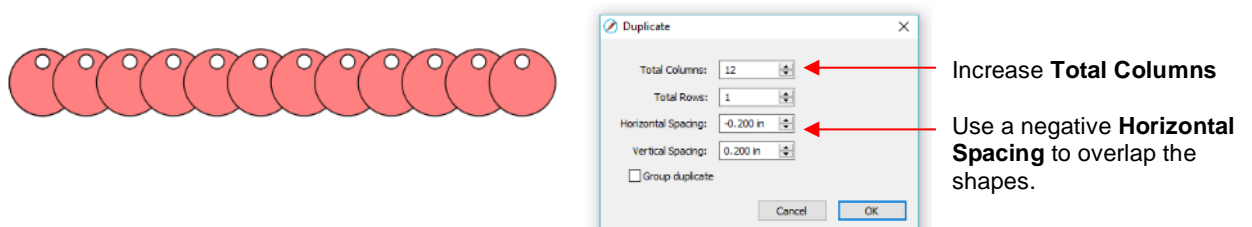


- In this next example, a scalloped border will be designed:

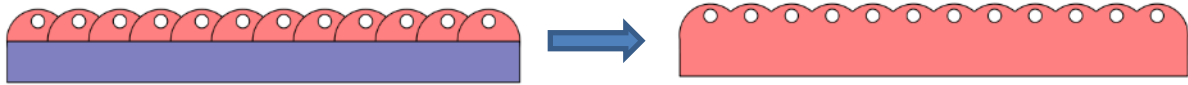
- ◇ Start with two circles that will be used to create an eyelet circle:



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

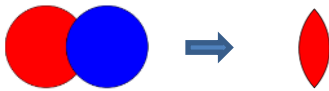


- ◇ Add a long rectangle and align with the pattern of circles. Apply the **Union** function:



7.04.2 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:

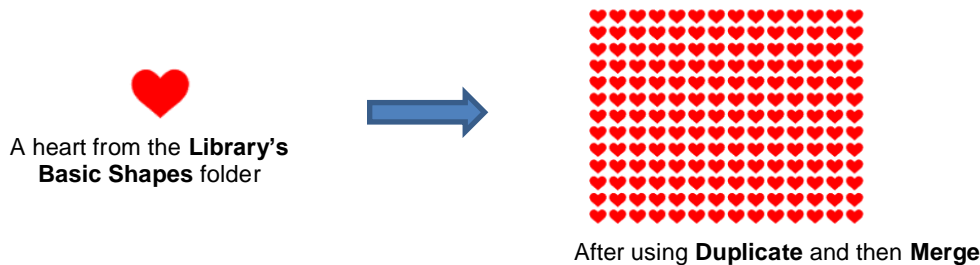


With a **Fill** color: before and after **Intersection**

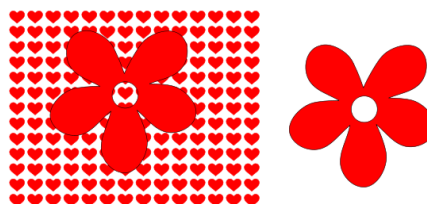


With no **Fill**: before and after **Intersection**

- To apply this operation, select two vector 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:



- ◇ Arrange the shape to be filled (in this case, a flower) over the pattern. Also, set aside a copy or the flower shape to use later as a border.



- ◇ Select the pattern and flower and apply **Path>Intersection**:

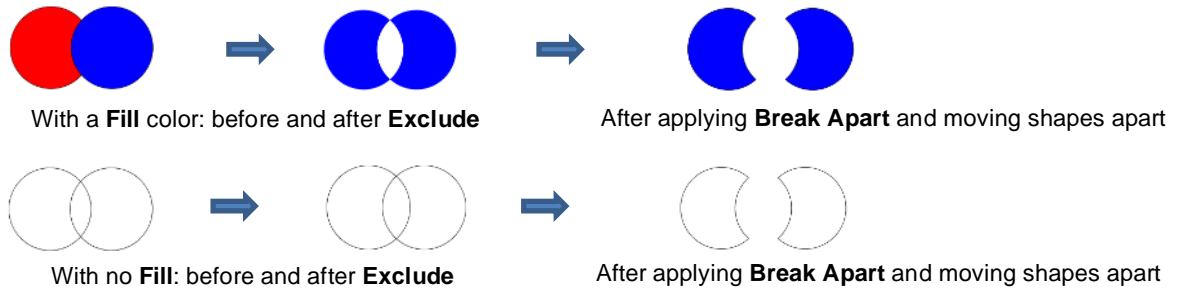


- ◇ Recolor the spare flower white with a red **Stroke**. Then center the pattern with the spare flower. Perfect for a print and cut!



7.04.3 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 vector shapes and use one of the following:
 - ◇ Go to **Path>Exclude**
 - ◇ Right-click and select **Path>Exclude**
- After applying, use **Object>Break Apart** if you need to move one shape away from the other.
- As an example, use the heart-filled flower from the prior section as a cut design on the front of a greeting card:
 - ◇ Start with a rounded rectangle as the card base (refer to *Section 3.01.2*):



- ◇ Add the pattern from *Section 7.04.2*, without the spare flower shape. Arrange the pattern so that it will cut from the front of the card:

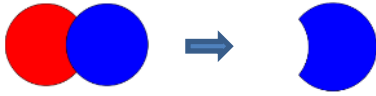


- ◇ Select the card and pattern and apply **Path>Exclude**:

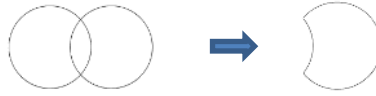


7.04.4 Front Minus Back

- 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 vector shapes and use one of the following:
 - ◇ Go to **Path>Front Minus Back**
 - ◇ Right-click and select **Front Minus Back**
- As an example, add the word HELLO to the card designed in *Section 7.04.3*.
 - ◇ Select a font and type out the letters. Add a rectangle (with no **Fill** color) so that the tops and the bottoms of the letters will just overlap the rectangle:



- ◇ Select the rectangle and the lettering and apply **Path>Front Minus Back**:



or when a **Fill** color is added:

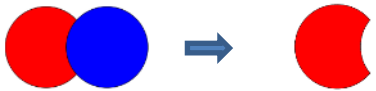


- ◇ Arrange the greeting on the front of the card designed in *Section 7.04.3*. Select both and apply either **Object>Merge** or **Path>Exclude** so that all internal shapes are cut before the outside card base:

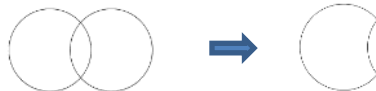


7.04.5 Back Minus Front

- 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 vector shapes and use one of the following
 - ◇ Go to **Path>Back Minus Front**
 - ◇ Right-click and select **Back Minus Front**
- Any examples for **Back Minus Front** are essentially the same as for **Front Minus Back**. When choosing which to use, check the **Layers Panel** and think about which one you need to remain. Alternatively, just try one and, if it's the wrong choice, use **Undo** to back up one step and then pick the other function. ☺

7.04.6 Divide

- The **Divide** operation is a combination of **Intersection** and **Exclude**. It splits up all shapes along the overlap, thus the result is a separate **Intersection** shape, as well as the two parts from the **Exclude**:



- To apply this operation, select two or more vector shapes and go to **Path>Divide**.

7.04.7 Divide Below

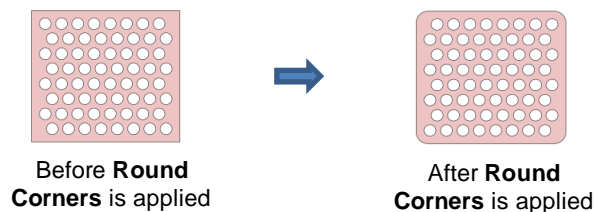
- The **Divide Below** operation is a combination of **Intersection** and **Back Minus Front**. It splits up all shapes below the top shape where the top shape intersects, retaining the **Intersection** shape and the back shape.



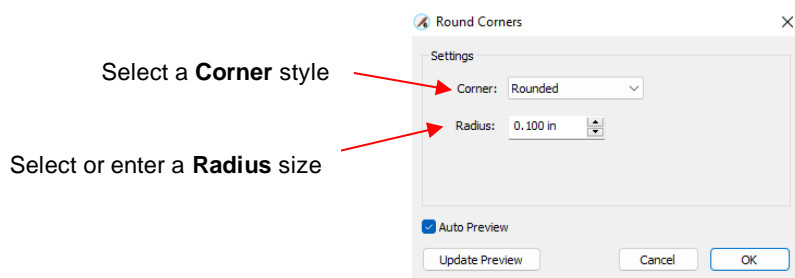
- To apply this operation, select two or more vector shapes and go to **Path>Divide Below**.

7.04.8 Round Corners

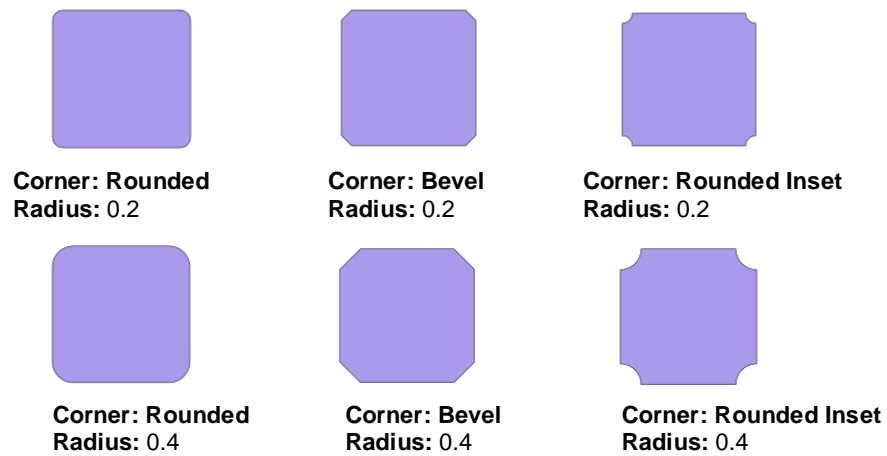
- As the name suggests, **Round Corners** will round off sharp corners on a selected shape. The most common situation is when a design has right angle corners but the user would prefer those corners to be rounded:




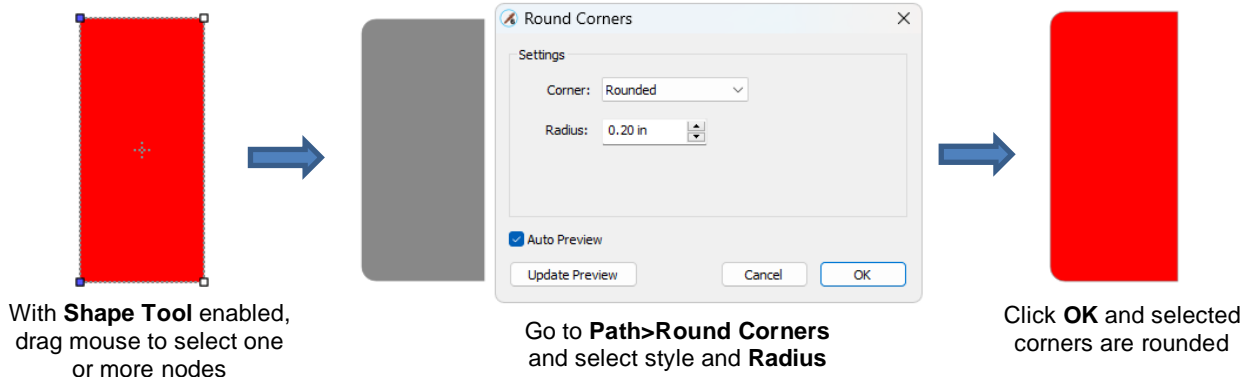
- The **Round Corners** settings allow you to control the amount and type of **Corner** to apply to the selection. To apply this operation, select two or more vector shapes and go to **Path>Round Corners**:



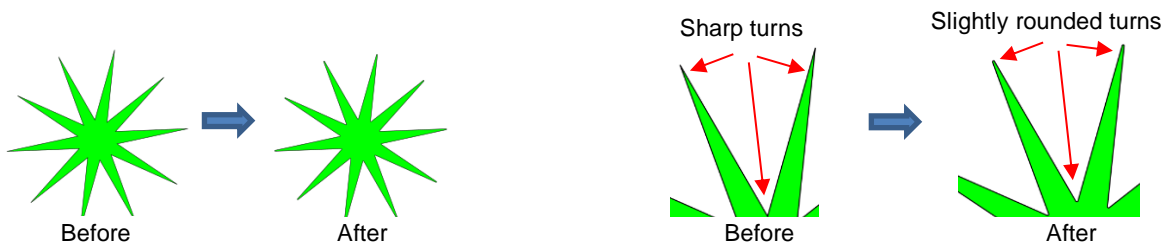
- Some examples of **Corner** and **Radius** combinations applied to a square:



- You can also apply **Round Corners** to a particular corner without affecting the others. To do that, click on the **Shape Tool**  on the **Tools Panel** and drag your mouse to select one or more nodes at the desired corners to round. Then go to **Path>Round Corners** as proceed as before:



- Besides being use for designing, **Round Corners** can also be used to improve cutting of sharp points and inside tight corners (to reduce the likelihood of tearing):



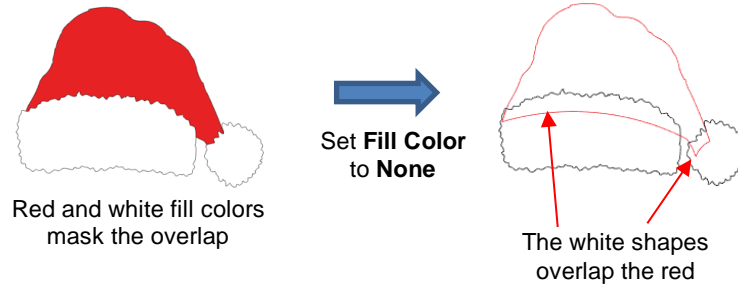
7.04.9 Flatten

- The **Flatten** function is similar to the **Back Minus Front** function, but can be used with multiple shapes at once and the shapes on top are retained.

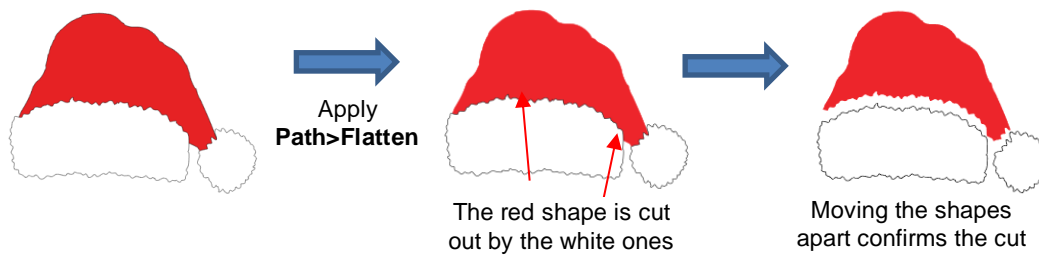


- To apply this operation, select two or more vector shapes and go to **Path>Flatten**.

- One use for the **Flatten** function is to remove overlap when designing for HTV applications in which you typically do not want to layer one HTV color on top of another. For example, the white fur band and pom-pom on this Santa hat overlap the red hat itself which can be seen when both colors are made transparent:



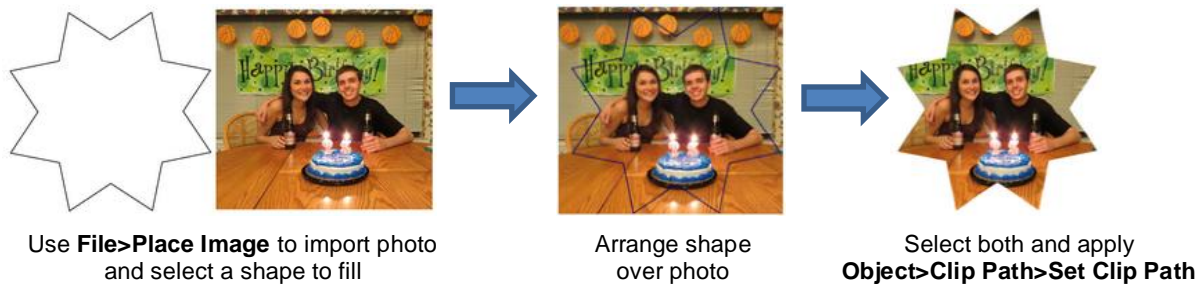
- ◇ Applying **Path>Flatten** removes the overlap from the red hat shape, leaving the white shapes “just touching” the hat:



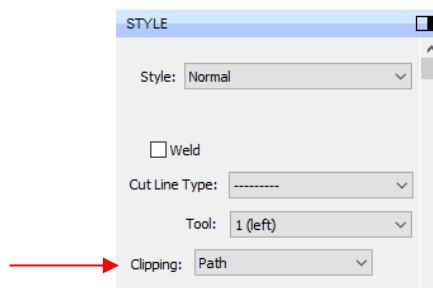
7.05 Clip Path and Clip Mask

7.05.1 Clip Path

- Clip Path** applies one selected shape as a die cutter onto another selected shape (vector or raster) positioned below it:

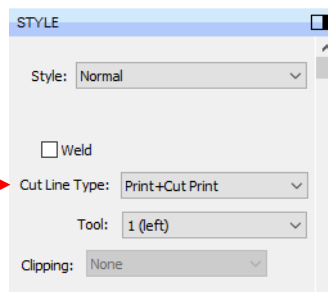


- There are two ways to access the **Clipping** function:
 - ◇ Select both shapes and go to **Object>Clip Path>Set Clip Path**
 - ◇ Select the two layers and, on the **Style Panel**, change **Clipping** from **None** to **Path**:

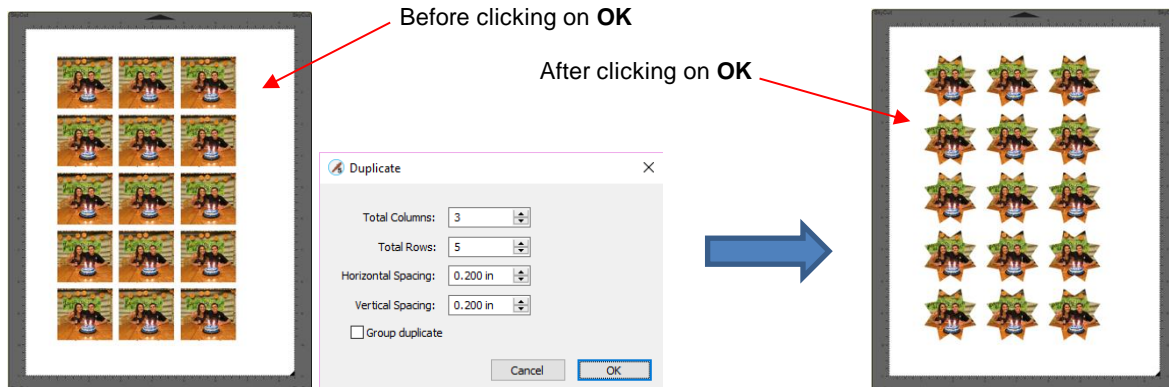


- Unlike some of the path functions (**Union**, **Intersection**, **Exclude**, etc.), the original two shapes are still intact. To restore the original shapes:
 - ◊ Go to **Object>Clip Path>Release Clip Path**
 - ◊ Reset the **Clipping** option to **None** on the **Style Panel**
 - ◊ Note that the shapes will be grouped, thus you'll need to apply **Object>Ungroup** in order to individually select one of the shapes but not the other.
- A few other things to note about **Clip Path**:
 - ◊ If you apply **Clip Path** to two vector shapes, both shapes will still cut out. To avoid that, select the shape that you do not want to cut, and change the **Cut Line Type**, on the **Style Panel**, to **Print + Cut Print**. Then apply **Clip Path** to the two vector shapes.

Change to **Print + Cut Print** on the vector shape that is not to be cut

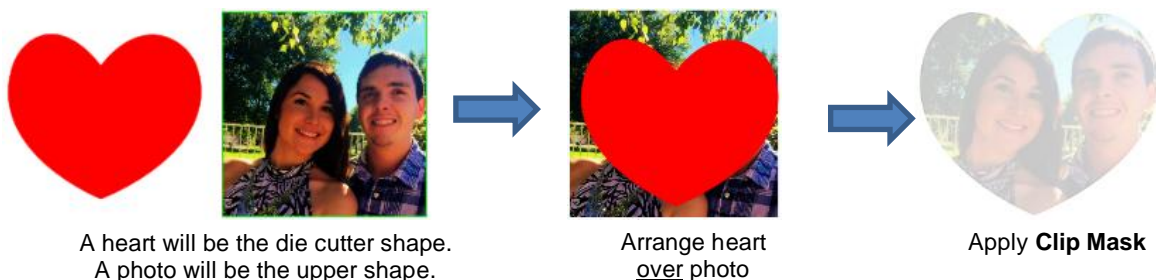


- ◊ When applying the **Duplicate** or **Rotated Duplicate** function on shapes that have **Clip Path** applied, you will initially see the copies in their original “uncropped” format. But once you click on OK, the correct result will appear:



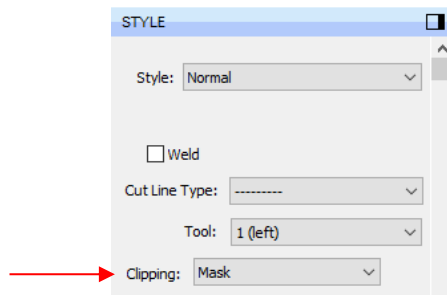
7.05.2 Clip Mask

- **Clip Mask** is similar to **Clip Path** except the shape performing the die cut will alter the opacity of the other shape based on its color intensity.
- As with **Clip Path** the die cut shape is placed on top of the other image:

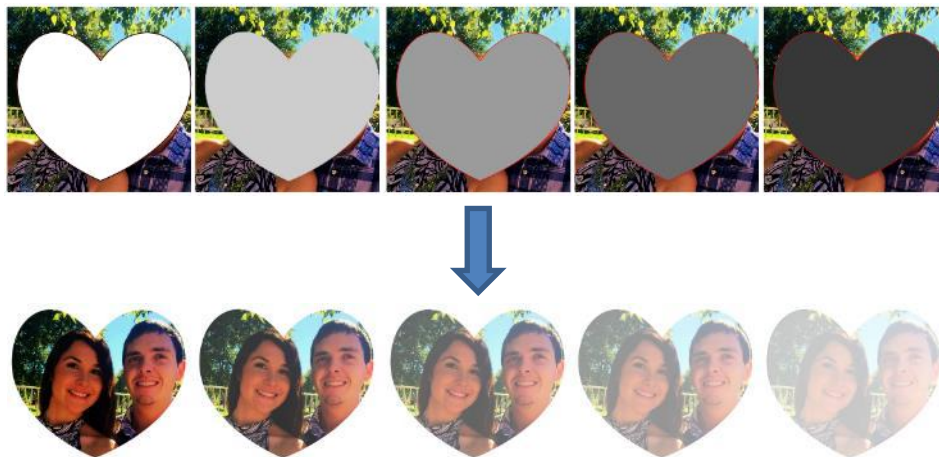


- To apply **Clip Mask** to selected shapes, either

- ◇ Go to **Object>Clip Mask>Set Clip Mask**
- ◇ Select the two layers and, on the **Style Panel**, change **Clipping** from **None** to **Mask**:



- In the following five examples, the color of the heart ranges from white to dark gray. Notice the differences in the five results after **Clip Mask** is applied:

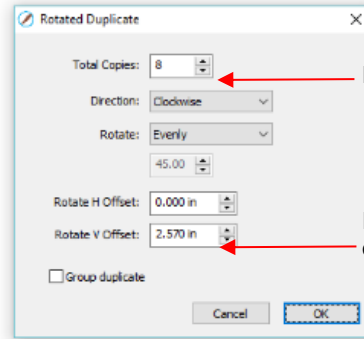


- To restore the original shapes, either:
 - ◇ Go to **Object>Clip Mask>Release Clip Mask**
 - ◇ Reset the **Clipping** option to **None** on the **Style Panel**
 - ◇ Note that the shapes will be grouped, thus you'll need to apply **Object>Ungroup** in order to individually select one of the shapes but not the other.
- The same additional things to note that applied to **Clip Path** also apply to **Clip Mask**. Refer to the last bullet in [Section 7.05.1](#).

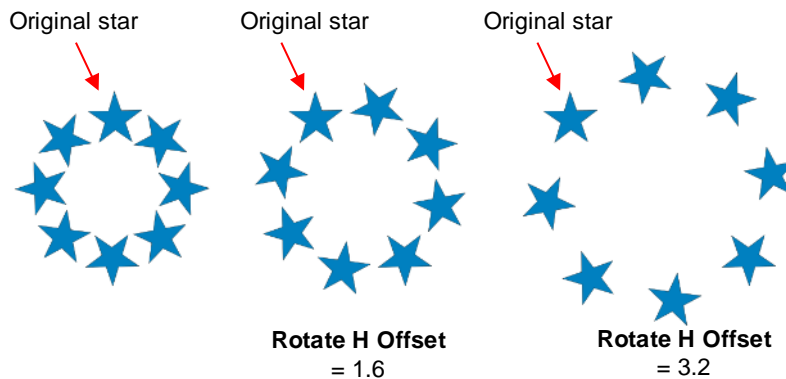
7.06 Duplicate Rotated

7.06.1 Duplicate Rotated Settings

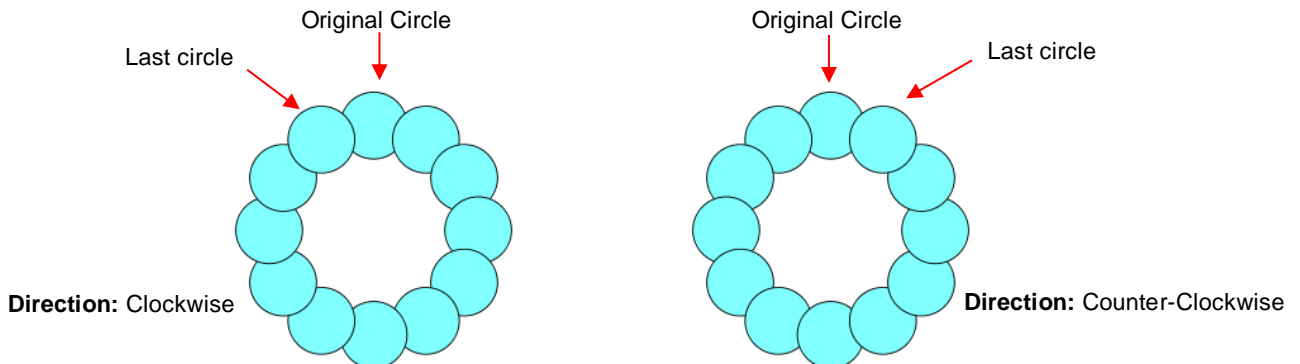
- The **Duplicate Rotated** function allows you to make duplicates arranged in a circle or partial circle pattern.
- To access **Duplicate Rotated**, first select the shape(s) and then use either of the following:
 - ◇ Go to **Object>Duplicate Rotated**
 - ◇ Press **Ctrl+Shift+D**
- To illustrate how 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, leaving the original in the same location on the **Cutting Mat**:

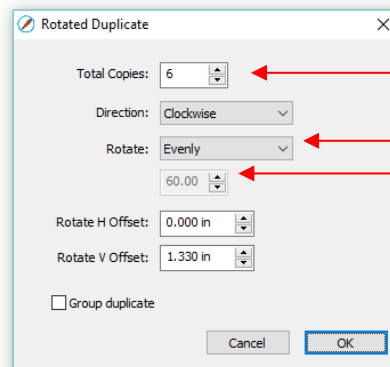
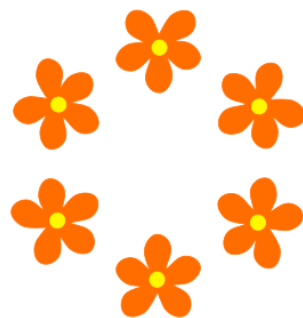


- ◇ Because the stars must spread out in order to keep the original in its same position, one can then decrease the **Rotate V Offset** at the same time as increasing the **Rotate H Offset**, if you need to spread the shapes but keep the design in the current display area of SCAL.
- ◇ The **Direction** setting changes the order of the duplicates around the circle.
 - With clockwise selected, the order of the shapes follows a clockwise progression so that the last copy is just to the left of the original at the top. You can visually see that circle is on top. The opposite is true if counter-clockwise is selected:



- Does it matter which **Direction** is used? Most likely, it would only matter for display or possibly in a print and cut design.
- ◇ **Rotate** has two options: **Evenly** and **Custom**. With **Evenly** selected, the copies are distributed evenly in a full 360° circle. But let's say you want a semi-circle of shapes:

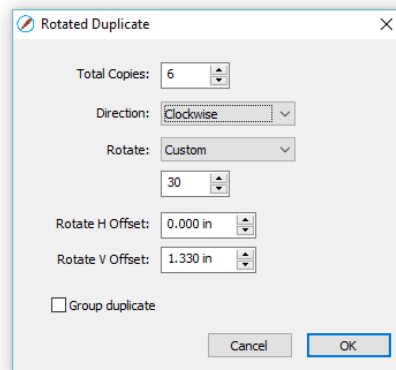
- First, create a circle pattern using the desired number of shapes. Note that the greyed-out box below **Rotate** is changing as you add more shapes:



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:



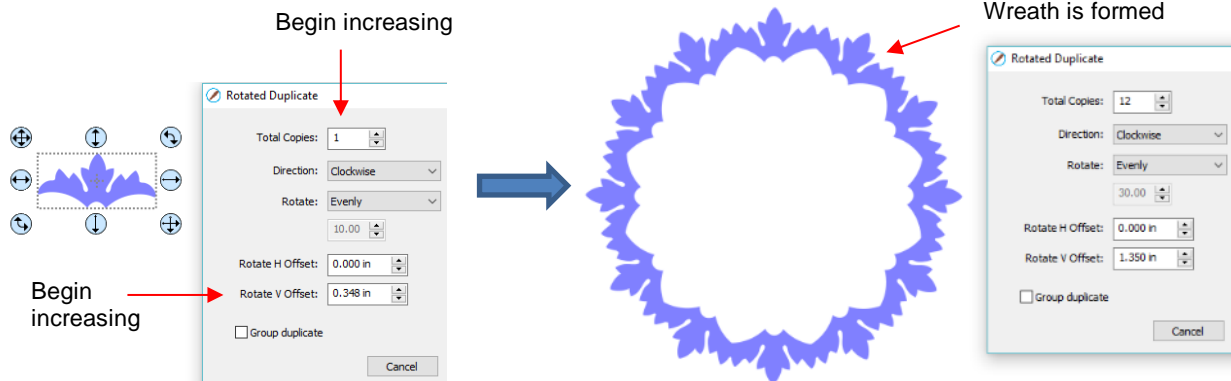
- If you want the shapes to be grouped, mark the **Group duplicate** box. Otherwise leave it unchecked.

7.06.2 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.



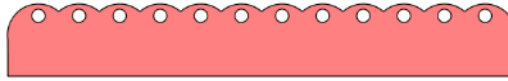
- Select and go to **Object>Duplicate Rotated**. Begin increasing **Total Copies** and the **Rotate V Offset** until a desired overlapping pattern is obtained:



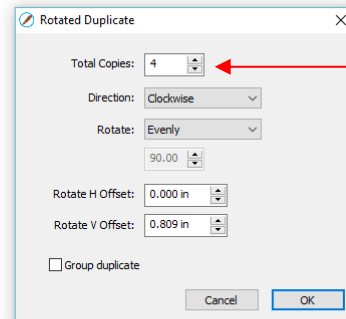
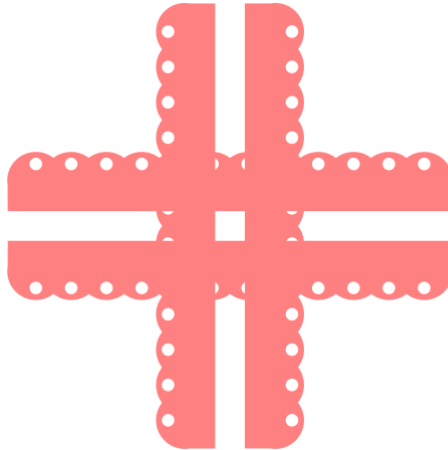
- After creating the pattern, go to **Path>Union** to remove the overlap and the shape is ready to cut.

7.06.3 Using Duplicate Rotated to Design a Frame

- In *Section 7.04.1*, the **Duplicate** and **Union** functions were used to create this scalloped border:

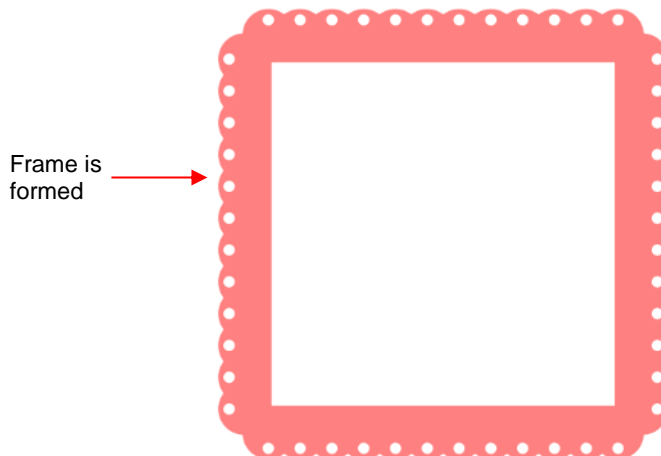


- Select the shape, go to **Object>Duplicate Rotated**, and enter 4 for **Total Copies**:

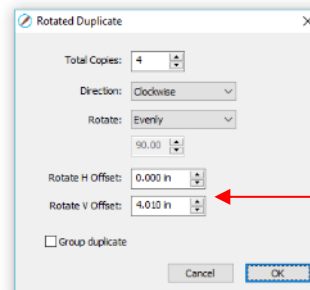


Set **Total Copies** to 4

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



Frame is formed



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

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

7.07 3D Extrude (SCAL PRO only)

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

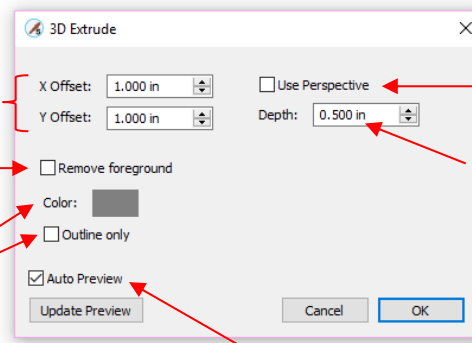


Change **X** and/or **Y Offset**

Option to remove overlap from extrusion

Change extrusion color

Option to make extrusion an outline only



Option to use **Perspective**

Enter the thickness of the **Perspective**

Enable **Auto Preview**

- ◇ **X Offset:** Increasing **X Offset** will extend the extrusion to the right while decreasing it will retract the extrusion towards the left. Note that **Y Offset** has been set to 0 and **Depth** is at the default of 0.5:



X Offset = 0.25
Y Offset = 0



X Offset = 0.35
Y Offset = 0



X Offset = -0.25
Y Offset = 0



X Offset = -0.35
Y Offset = 0

- ◇ **Y Offset:** Increasing **Y Offset** will extend the extrusion downwards while decreasing it will retract the extrusion towards the top. Note that **X Offset** has been set to 0 and **Depth** is at the default of 0.5:



X Offset = 0
Y Offset = 0.25



X Offset = 0
Y Offset = 0.35



X Offset = 0
Y Offset = -0.25



X Offset = 0
Y Offset = 1.0

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



X Offset = 0.35
Y Offset = 0.35
Depth = 0.25



X Offset = 0.35
Y Offset = 0.35
Depth = 0.5

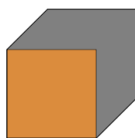


X Offset = -0.35
Y Offset = -0.35
Depth = 0.25



X Offset = -0.35
Y Offset = -0.35
Depth = 0.5

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



Use Perspective: Off



Use Perspective: On



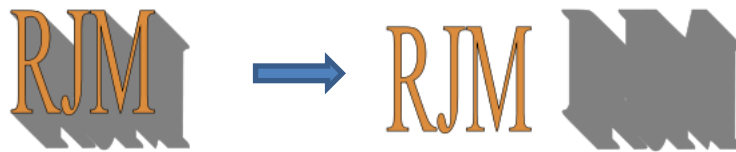
Use Perspective: Off



Use Perspective: On

◇ **Remove Foreground:**

- With this option off, when you separate the shape from the extrusion, you see that the extrusion is filled beneath the original. In other words, in a paper piecing or layered vinyl project, the original shape would need to be aligned over the top of the 3D extrusion:



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



- ◇ **Color:** Clicking on the colored box to the right of **Color** will allow you to select the color of your choice for the extrusion.

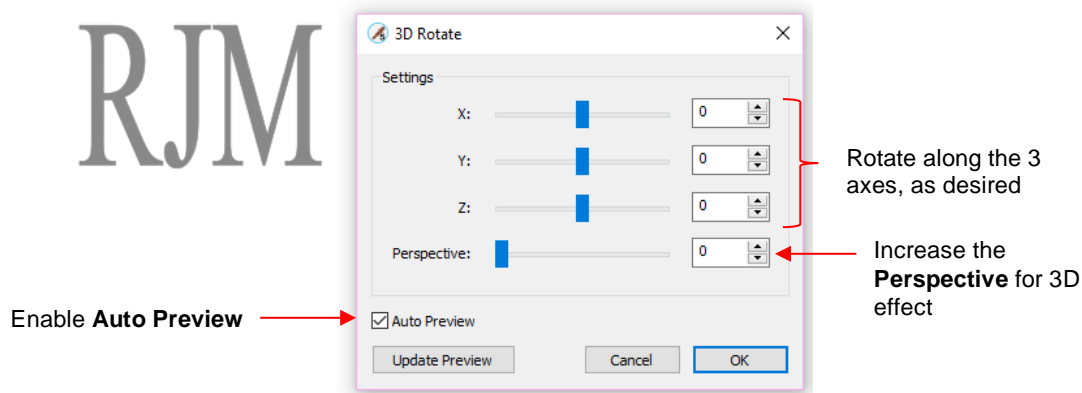


- ◇ **Outline Only:** If you prefer the extrusion not have a **Fill** color, select this option. The outline color will be that of the **Color** you selected in the **3D Extrude** window:



7.08 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:**

RJM
X: 60

RJM
X: 73

—
X: 90

RJM
X: 120

◇ **Y Axis Rotation:**

RJM
Y: 60

RJM
Y: 73

|||
Y: 85

RJM
Y: 120

◇ **Z Axis Rotation:**

RJM
Z: 30

RJM
Z: 60

RJM
Z: 90

RJM
Z: 120

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

RJM
X: 0 Y: -50 Z: 0
Perspective: 65

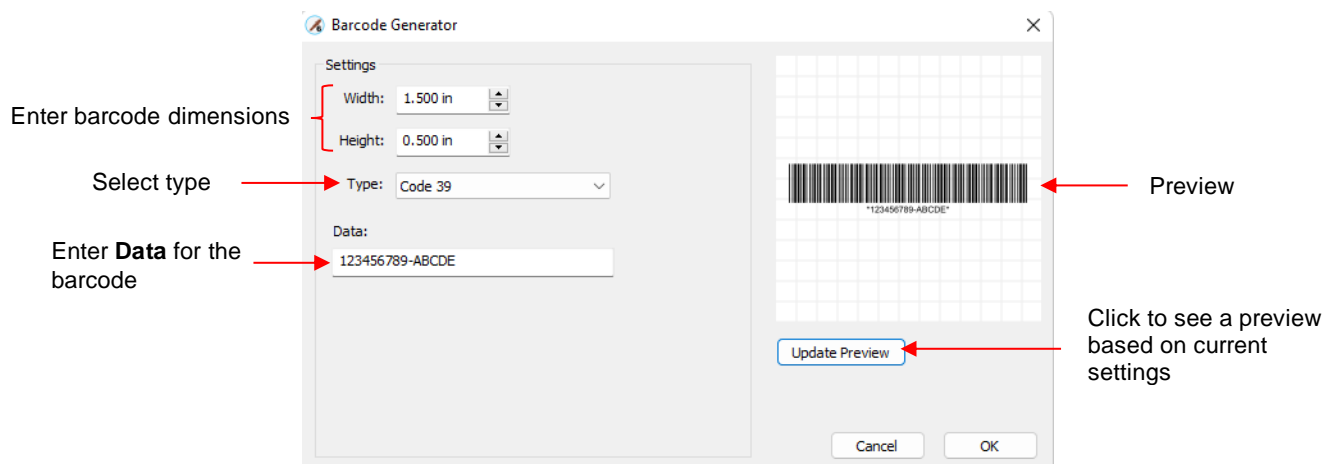
RJM
X: 0 Y: 50 Z: 0
Perspective: 65

RJM
X: 50 Y: 0 Z: 0
Perspective: 100

RJM
X: -26 Y: 26 Z: -20
Perspective: 100

7.09 Barcode Generator (SCAL Pro only)

- The **Barcode Generator** will create any of six different barcode types using the data you input, along an option for width and height. To open, go to **Effects>Barcode Generator**:

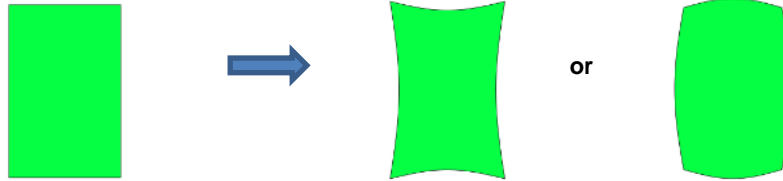


- After clicking **OK**, the barcode will be available for your particular application:

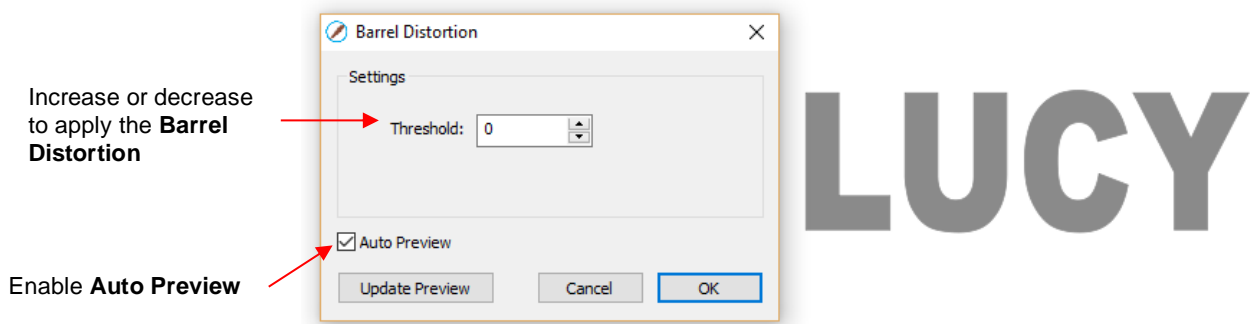


7.10 Barrel Distortion

- 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:

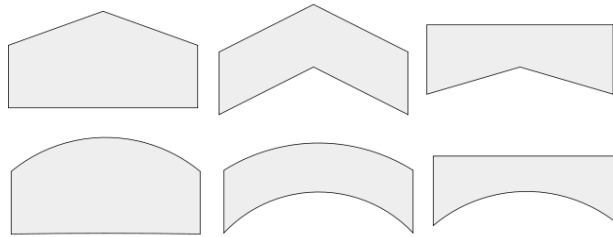


- As you decrease the **Threshold**, you will see a thickening of the shape in the middle:



7.11 Bridge Warp

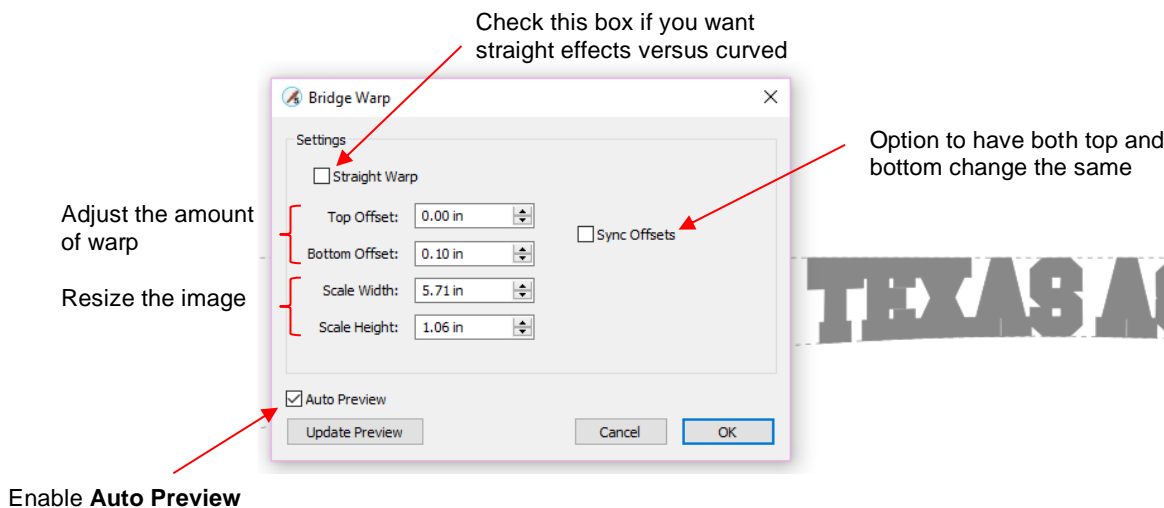
- The **Bridge Warp** function will transform shapes into the following styles:



- For this example, the following text will be used:

TEXAS A&M

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



- Increasing **Top Offset** warps the top of the shape:



Top Offset = 0.3 in

Top Offset = 0.6 in

Top Offset = 1.0 in

- With these same settings, note the difference if the **Straight Warp** setting is marked:



Top Offset = 0.3 in

Top Offset = 0.6 in

Top Offset = 1.0 in

- In a similar way, when **Bottom Offset** is increased the bottom is warped:

TEXAS A&M

Bottom Offset = 0.3 in

TEXAS A&M

Bottom Offset = 0.6 in

TEXAS A&M

Bottom Offset = 1.0 in

- If the **Sync Offset** option is checked, then both the top and the bottom will be warped together:

TEXAS A&M

Top Offset = 0.3 in

TEXAS A&M

Top Offset = 0.6 in

TEXAS A&M

Top Offset = 1.0 in

- With both the **Straight Warp** and **Sync Offset** options marked, then these are results with the same settings:

TEXAS A&M

Top Offset = 0.3 in

TEXAS A&M

Top Offset = 0.6 in

TEXAS A&M

Top Offset = 1.0 in

- Finally, there is a **Scaling** setting which can be used to rescale and, essentially, exaggerate the effect of the warp. Notice the difference between using Bridge Warp to rescale the width versus simply resizing to the same width normally:

TEXAS A&M

Top Offset = 1.0



TEXAS A&M

Top Offset = 1.0 in
Width only is resized on the **Size & Position** Panel

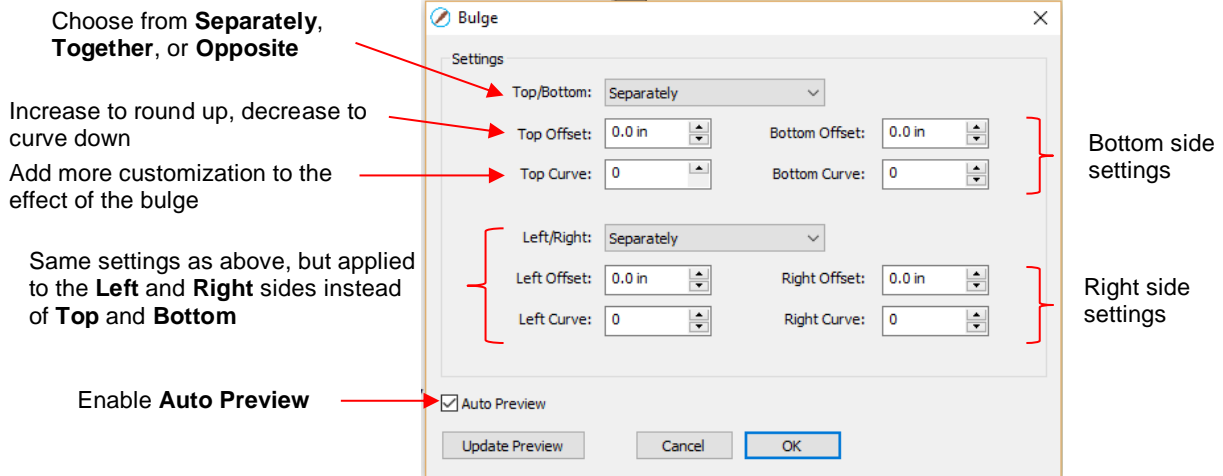
TEXAS A&M

Top Offset = 1.0 in
Scale Width is increased while still in the **Bridge Warp** window

- ◇ The two examples on the right have the same overall width and height, but the lettering from scaling in the **Bridge Warp** window is compressed more towards the two ends

7.12 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**:



- 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

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.

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.

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

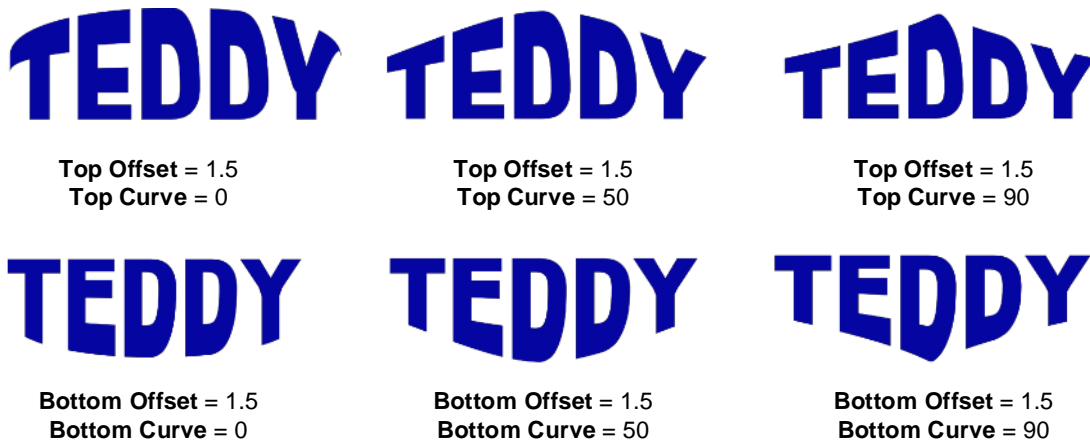
NIKKI

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**:



- The **Left/Right** settings all work in the same manner, except they affect the shape horizontally versus vertically. Here are some examples similar to the prior **Top/Bottom** ones:

◇ **Left/Right:** choose from **Separately**, **Together**, or **Opposite**:



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



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



◇ Or just have some fun with it:

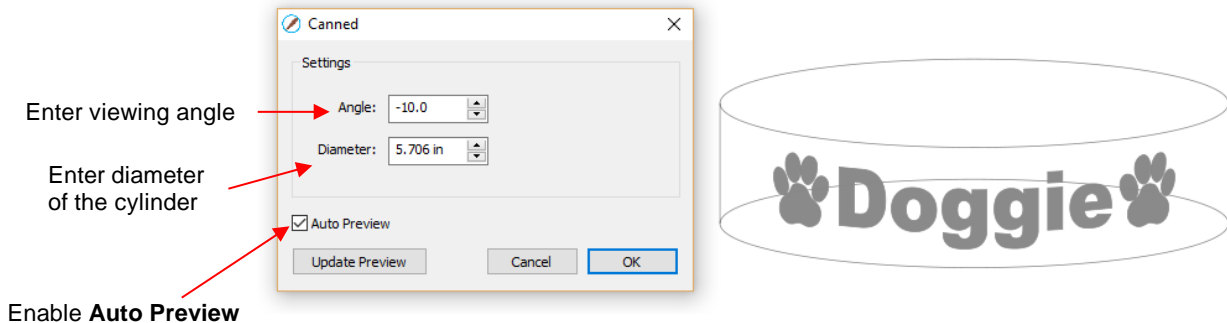


7.13 Canned

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



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



- Decreasing the **Angle** setting (i.e., making the setting more negative) will increase the perspective and cause a greater roundness to the lettering.



- Increasing the **Angle** has the opposite effect. At an **Angle** of 0, the lettering is horizontal. A positive **Angle** setting results in curving the lettering in the other direction:



- 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.

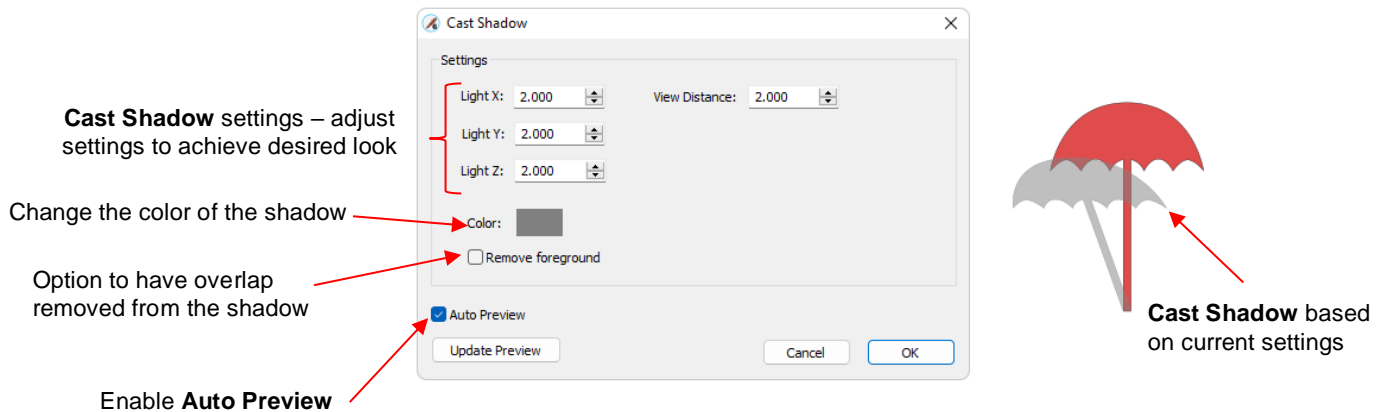


7.14 Cast Shadow

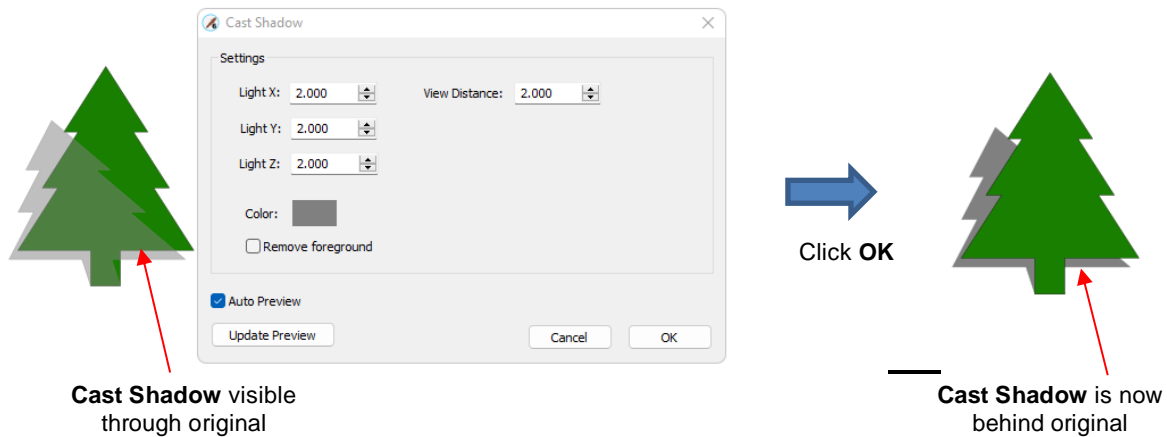
- Cast Shadow** effect produces a shadow similar to that formed when a solid object blocks a source of light:



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



- Initially, you will see the entire shape of the shadow visible through the solid object. But upon clicking on **OK**, the shadow will only appear outside the boundaries of the solid object.



- Remove foreground knocks out the original shape from the shadow for those applications where you wouldn't want overlapping of material layers:



7.15 Drop Shadow

- The **Drop Shadow** function is yet another way to produce a 3-dimensional shadow effect:



- For this example, the following shape from the **Library** will be used:



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

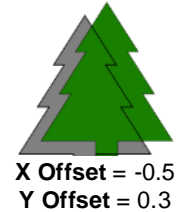
Drop Shadow offset and insets

Change the color of the shadow

Option to have overlap removed from the shadow

Enable **Auto Preview**

- Increasing **X Offset** moves the shadow to the right, while decreasing it moves the shadow to the left:



- Increasing **Y Offset** moves the shadow down, while decreasing it moves the shadow up:



- The **Inset** option can be used to create a gap between the original and the shadow, similar to the **Knock Out** function in SCAL:



- The color of the shadow can be changed by clicking on the color box next to **Color** and then selecting any available color or entering actual color values. The following three samples are just a few of the thousands of possibilities:



X Offset = 0.3
Y Offset = -0.1
Inset = 0.1



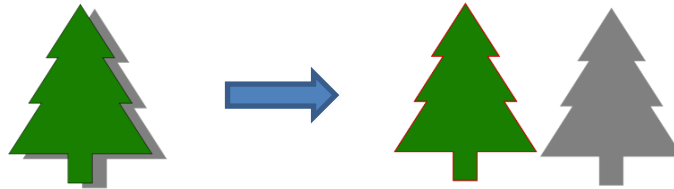
X Offset = -0.4
Y Offset = -0.2
Inset = 0.1



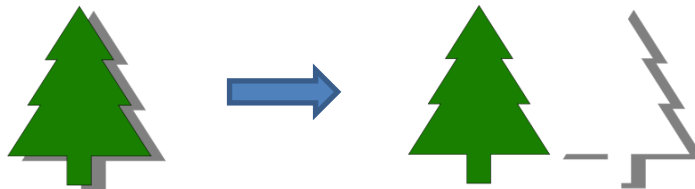
X Offset = 0.6
Y Offset = 0.2
Inset = 0.05

- The **Remove foreground** option is the same as that used in the **3D Extrude** function. It removes the overlap so that one piece is not covering the other. This option is obviously not needed when the **Inset** value is greater than 0.

◇ Remove foreground not marked:



◇ Remove foreground marked:



7.16 Jigsaw Puzzle

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

Enter desired **Width** and **Height**
(can be changed later, if needed) →

Roundness of the 4 corners →

Enter desired **Columns** and **Rows** →

Variance: select randomly →

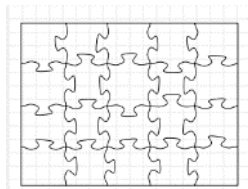
Click here to see a preview
based on current settings. →

Preview based on
current settings

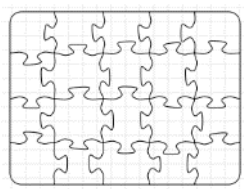
- Width and Height:** If you plan to apply this puzzle over a specific image, you may want to choose dimensions that correspond to your image. For example, let's assume you have a photo that is 5" x 3.75"

and plan to make a print and cut jigsaw puzzle. Enter those dimensions into the **Puzzle Generator**, as shown in the prior screenshot.

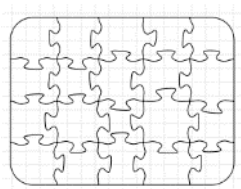
- **Corner Radius:** With a setting of 0, the corners of the rectangle are 90°. If you want rounded corners, increase this setting:



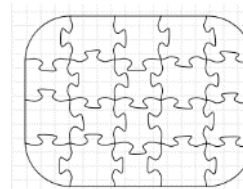
Corner Radius = 0



Corner Radius = 0.25

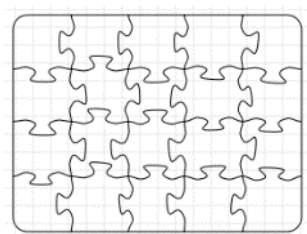


Corner Radius = 0.5

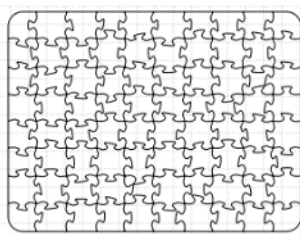


Corner Radius = 1.0

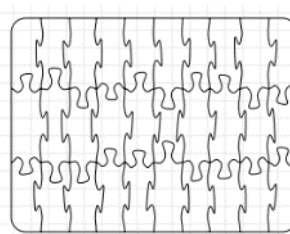
- **Columns and Rows:** To keep the shapes from becoming too distorted, make the number of **Columns** and **Rows** similar to the dimensions. If you want more pieces, then increase the number of **Columns** and **Rows** proportionately. For example, instead of having 5 **Columns** and 4 **Rows**, double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

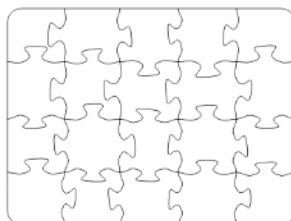


10 Columns, 8 Rows



10 Columns, 3 Rows

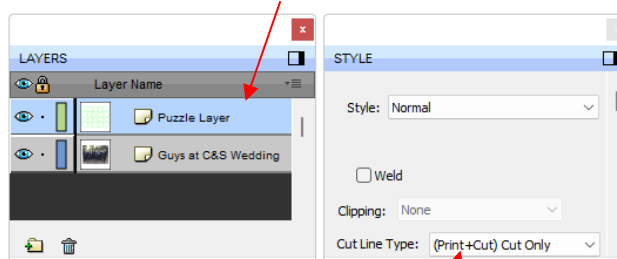
- **Variance:** This setting can be used to make sure one puzzle is not identical to the next, if all other settings are the same.
- When you are satisfied with the appearance of your puzzle pieces, click on **OK** and the puzzle will be on the **Cutting Mat**:



- For a print and cut application, use **File>Place Image** to import the photo or other image that will be printed. Arrange the puzzle design over the image and make sure it is assigned **Print+Cut Cut** on the **Style Panel** (refer to *Section 8.01*).



Select Puzzle Layer



Change to
(Print+Cut) Cut Only

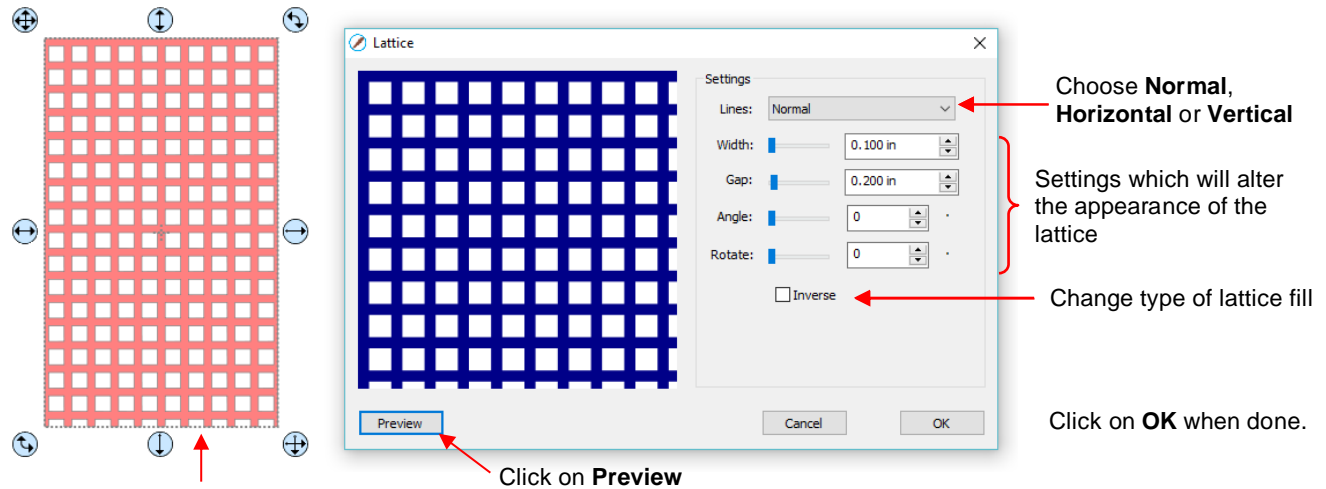
◇ The jigsaw puzzle is ready for a print and cut application.

7.17 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:

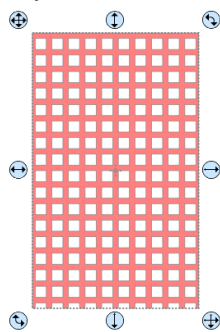
- ◇ Go to **Effects>Lattice**
- ◇ Right-click and select **Appearance>Lattice**

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

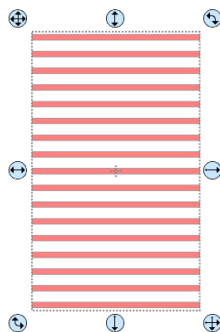


After clicking on **Preview**, selected shape will display lattice based on current settings

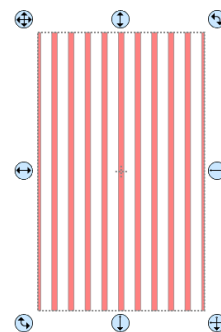
- ◇ **Lines:** Besides the traditional crisscross pattern, you can also choose to only have horizontal lines or only have vertical lines:



Lines: Normal

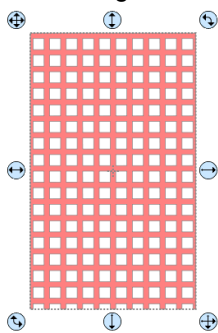


Lines: Horizontal Only

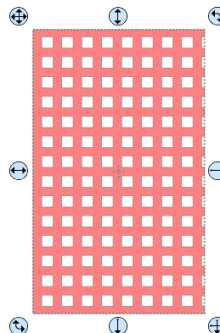


Lines: Vertical Only

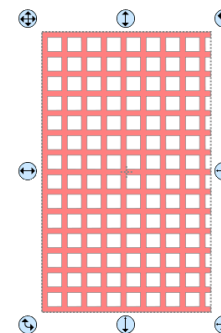
- ◇ Change **Width** and **Gap** to produce desired appearance. Remember that if the lattice pattern is too small, it might be difficult to cut:



Width: 0.1 in
Gap: 0.2 in

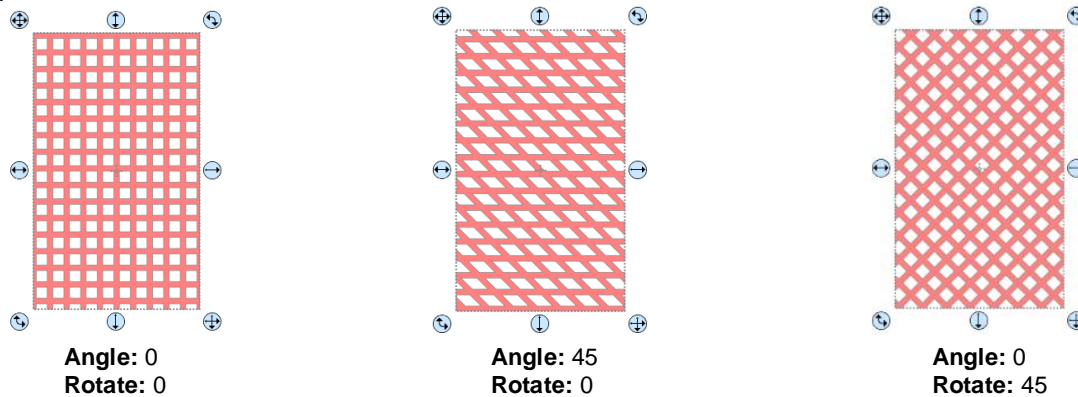


Width: 0.15 in
Gap: 0.2 in

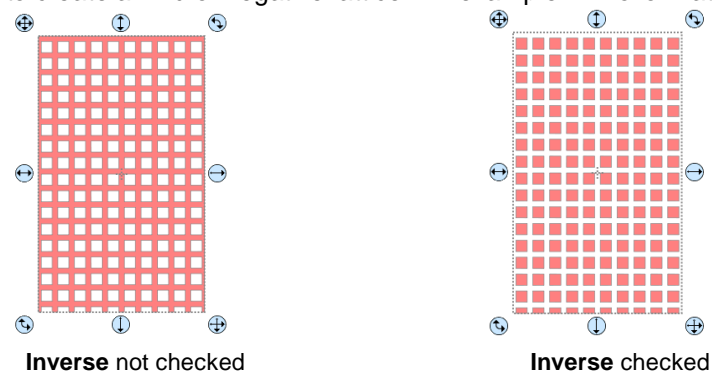


Width: 0.1 in
Gap: 0.25 in

- ◇ 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:

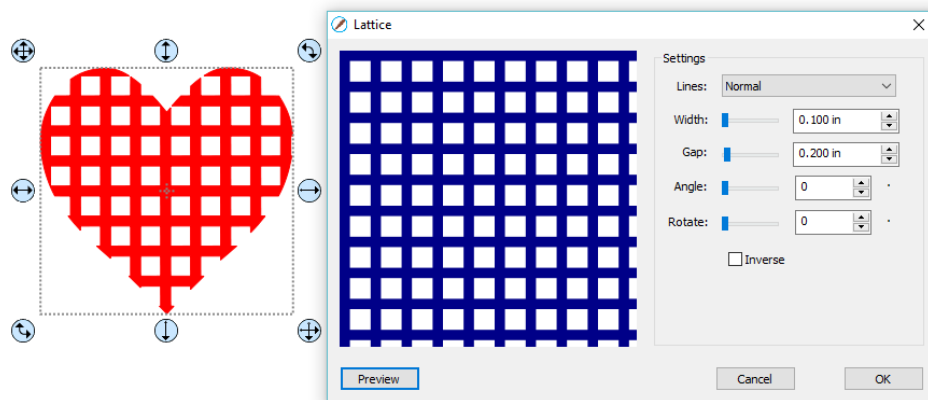


- An example of when **Inverse** would not be checked is when you want to attach/weld a latticed shape to something else. In the following example, a latticed heart is attached to the center of a ring:

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



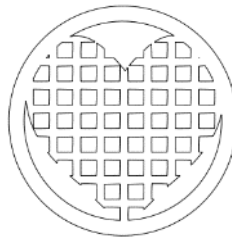
- ◇ Select a heart shape from the **Library** and apply **Effects>Lattice**:



- ◇ 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



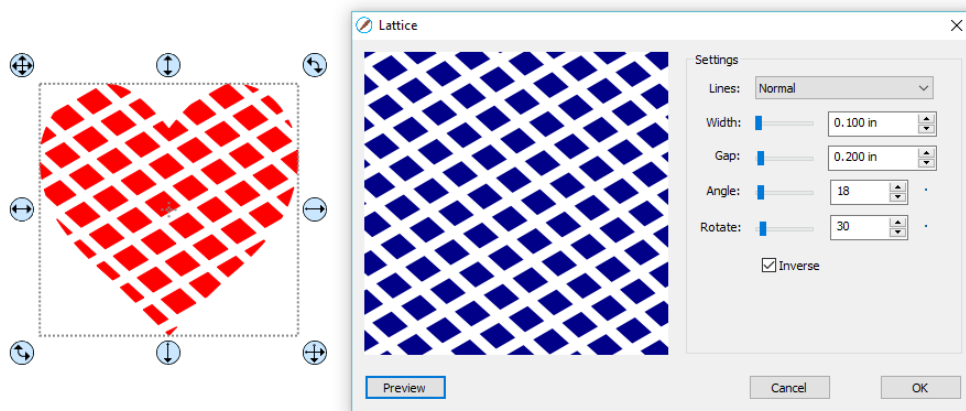
After applying
Path>Union



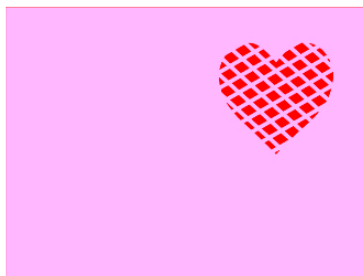
Set **Fill** to red again

- 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** to complete the design:



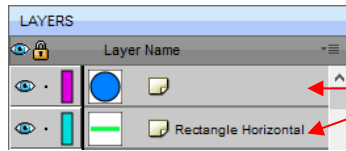
- If you have a shape that has the **Lattice** effect applied and want to remove it (even after the file has been saved and re-opened), select the shape and go to **Object>Remove Effects**.

7.18 Object on Path

- If you are planning to use **Object on Path** with text, refer to *Section 4.13*.
- The **Object on Path** function can be used to align a single shape or repeats of a shape along the path of another shape:

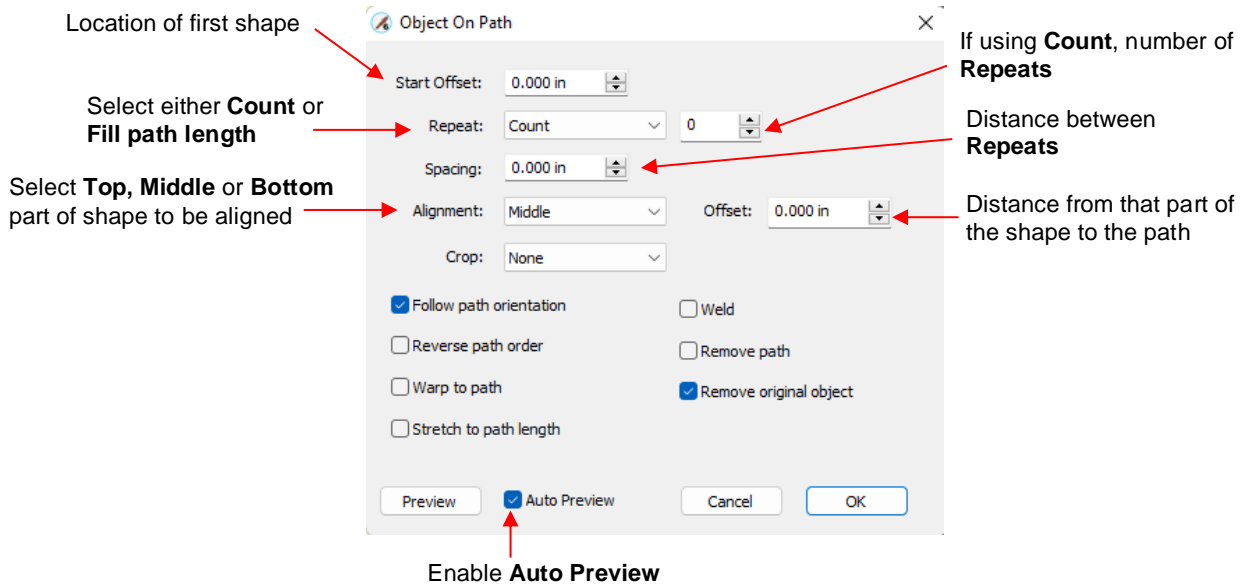


- **IMPORTANT:** Before applying the function, check the **Layers Panel** to make sure the shape to be repeated is on a higher layer than the path:

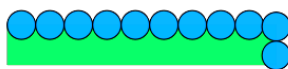


Shape to be repeated should be above the path shape

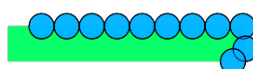
- To open the **Object on Path** window, select both the path and the shape to be repeated and go to **Effects>Object on Path**. Because there are so many settings in this window, only about half will be explained at this point:



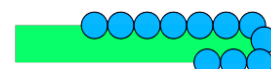
- ◇ **Start Offset:** This is the distance from the left side of the path to the location of the first shape:



Start Offset = 0

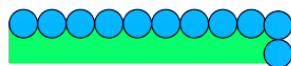


Start Offset = 0.5"

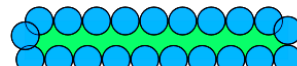


Start Offset = 1.5"

- ◇ **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:

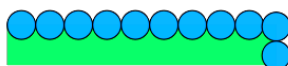


Repeats: Count 10

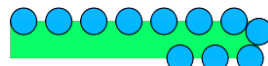


Repeats: Fill path length

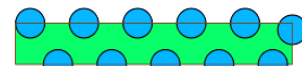
- ◇ **Spacing:** Enter the desired spacing between repeats:



Spacing = 0

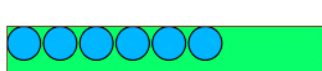


Spacing = 0.2"

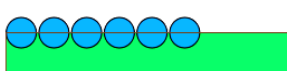


Spacing = 0.5"

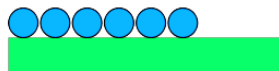
- ◇ **Alignment:** This refers to the object being repeated. Choose **Top** to have the top of the shape aligned along the path. Choose **Bottom** to have the bottom of the shape aligned along the path. Choose **Middle** to have the center of the shape aligned along the path:



Alignment: Top

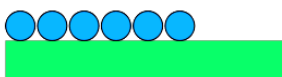


Alignment: Middle



Alignment: Bottom

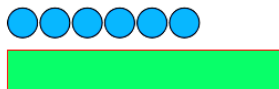
- ◇ **Offset:** This is how far away from the path you want the repeats to be. For example, if you choose **Bottom** for **Alignment** and then 0.15" or 0.25" for **Offset**, then the bottom of the shapes will be 0.15" or 0.25" above the path:



Offset = 0



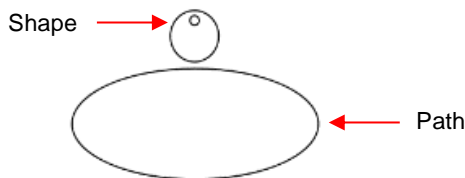
Offset = 0.15"



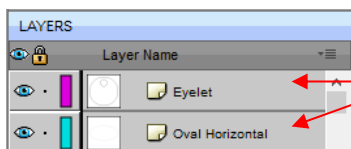
Offset = 0.25"

7.18.1 Designing a Scalloped Oval

- Create an eyelet circle like the one shown in *Section 7.04.1*. Also, use the **Circle** tool to create an oval for the path:

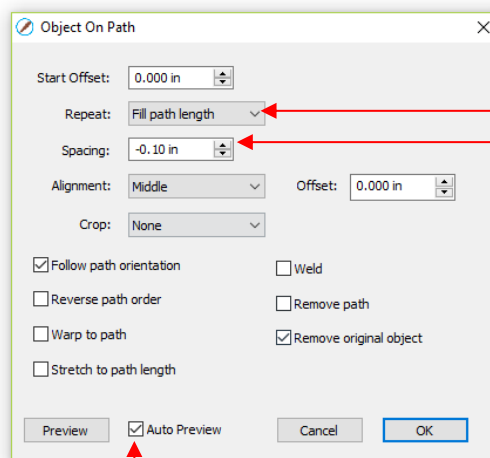
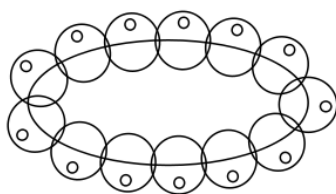


- Before using the **Object on Path** function, make sure the eyelet shape is above the oval path on the **Layers Panel**:



Shape to be repeated should be above the path shape

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



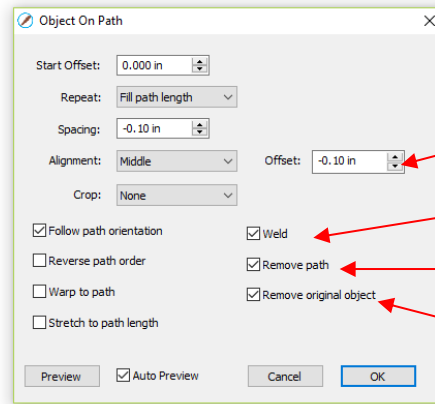
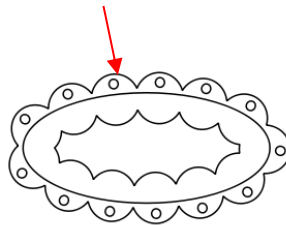
Note the settings used to fill the path and overlap the shapes

Enable **Auto Preview**

- ◇ **NOTE:** Always enable **Auto Preview** before adjusting settings to make sure the object to be placed on the path actually appears on the path. Otherwise, return to the main window and verify:

- The **Layers Panel** order
- The path is a single path and does not contain any interior paths
- Next the **Offset** can be decreased to soften the scallop. Also a few new settings are noted as shown and described below:

Lowering the **Offset** makes the scallop less acute



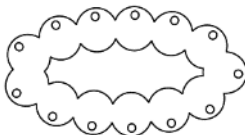
Lower the **Offset**

Removes overlap

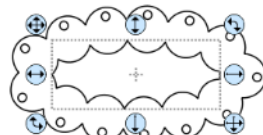
Removes original path

Removes original shape

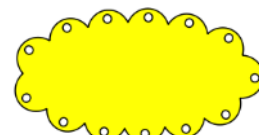
- ◇ **Weld:** Mark this option if you want the repeated shapes welded together, as shown in the screenshot
- ◇ **Remove path:** Mark this option if you will no longer need the path shape (in this case, the oval)
- ◇ **Remove original object:** Mark this option if you will no longer need the original shape (in this case, the eyelet circle)
- Click on **OK** and the scalloped oval is mostly complete. To remove the internal scallop, apply **Object>Break Apart**. Carefully select the internal scallop shape and delete. Then marquee-select the remaining scallop border with eyelet circles and apply **Object>Merge**:



After clicking on **OK**



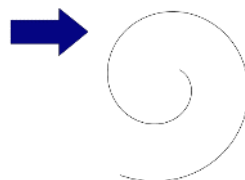
After applying **Break Apart**, select inner scallop



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

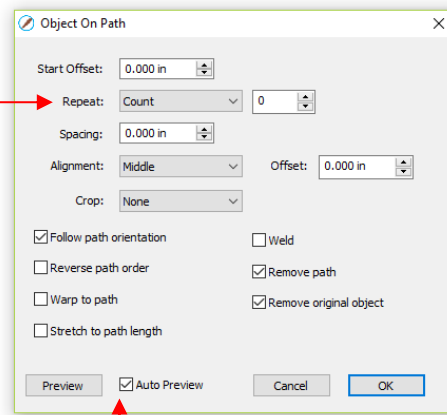
7.18.2 Warp a Shape to a Path

- 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 3.01.8*):

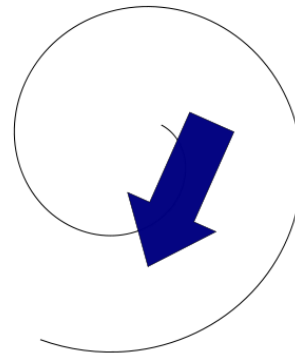


- Verify that the arrow is above the spiral on the **Layers Panel**. Then select both and go to **Effects>Object on Path**. Note that since there is only one shape involved, **Repeat** is left at **Count** and set to 0:

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

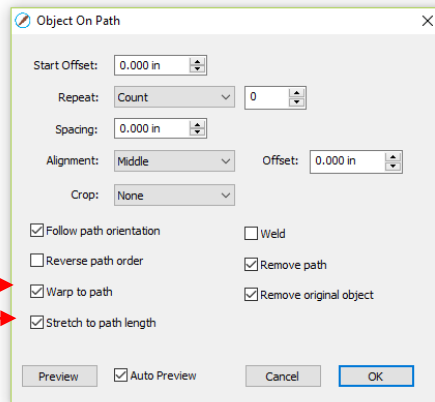


Mark this first



Original arrow appears positioned at start of spiral

- Next, two new settings are applied:

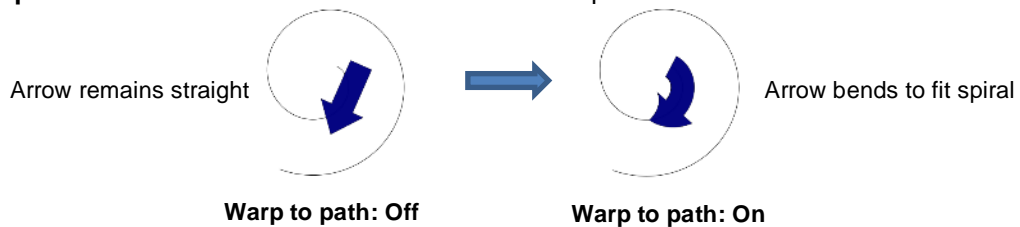


Mark these two options

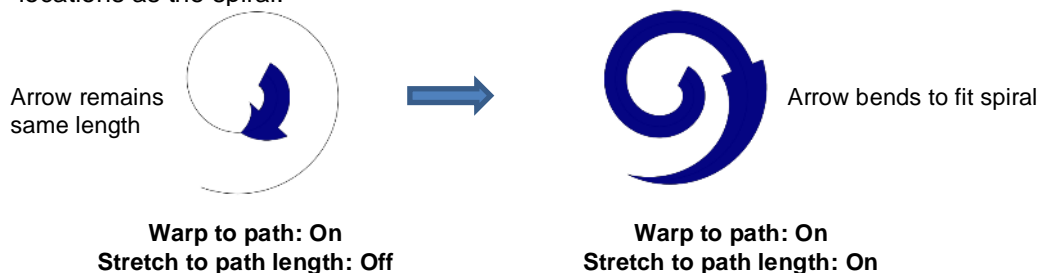


Arrow is now curved and stretched to fit the spiral

- ◇ **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:

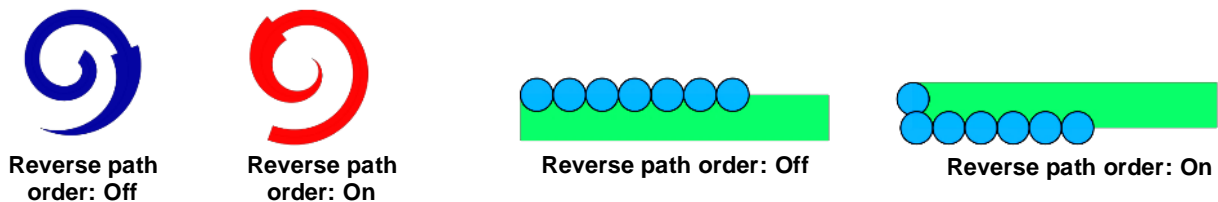


7.18.3 Remaining Settings

- 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:

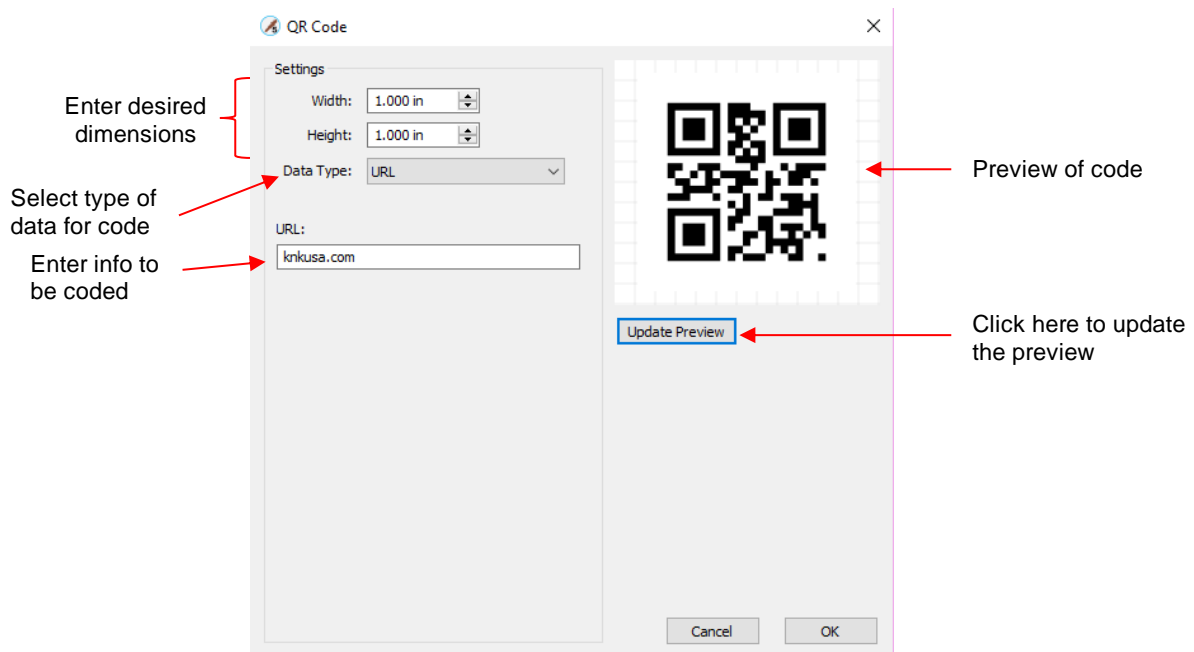


- ◇ **Reverse path order:** Changes the direction the shapes are applied. With **Reverse path order** turned off, the shapes are applied clockwise around the path. With **Reverse path order** selected, the shapes are applied counter-clockwise:

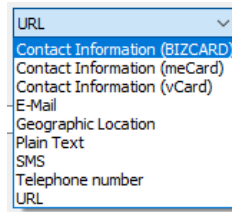


7.19 QR Code

- A **Quick Response Code** is a machine-readable optical label that contains information about the item to which it is attached. They have become quite commonplace in product advertising. One can download free apps for smart phones and tablets to scan these codes with a camera to obtain that additional item of information about the product. For example, if a web site link is encoded, then the app will pop up that link and you can then click on it to be taken to the web site.
- SCAL offers the ability to create a QR code. Go to **Effects>QR Code** and the following window will open:



- Enter the dimensions for the code and select the **Data Type**, which includes the following options:



- Each **Data Type** has its own specific fields to complete. In some cases, like the URL option, there is only one field. In a case such as the **Contact Information** options, more data fields are provided.
- IMPORTANT!** Once data is entered, you must click on **Update Preview** to generate the correct QR code. Note that if you have a QR code app on your phone you can launch it, hold the phone up to your monitor so that the camera can scan the code, and immediately verify that the information you entered correctly appears.
- After clicking on **OK**, the QR code appears on the **Cutting Mat**. It can now be used as needed, including being exported in any of the available file formats.

7.20 Rays

- The **Rays** effect allows you to fill a shape with one of three types of patterns:



Circle



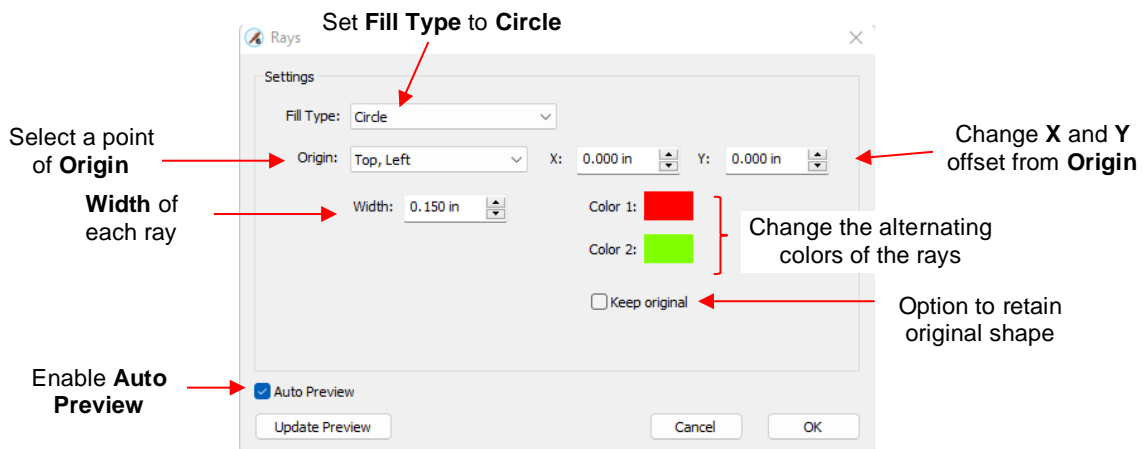
Line



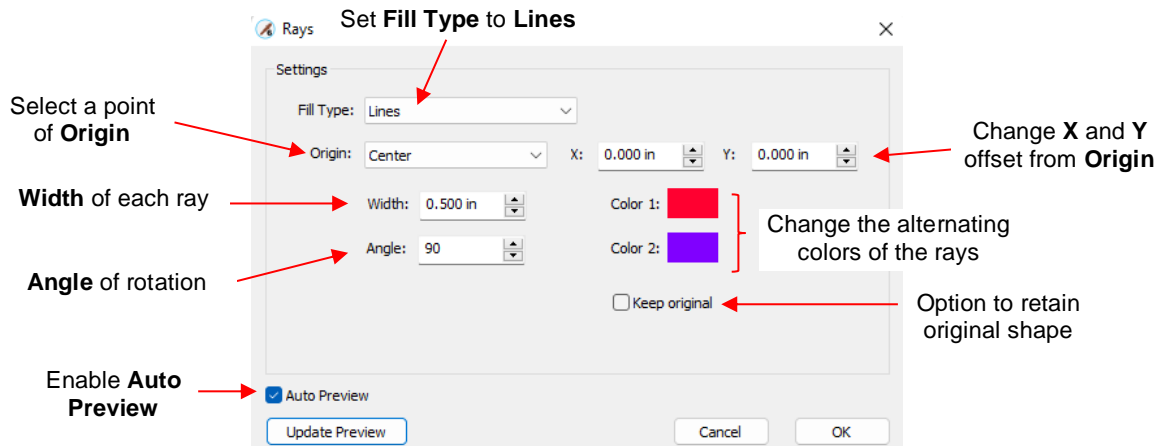
Radial

- The design is then ready to be cut from two colors or can have a contour cut added and used as a print+cut project.
- The two colors used for each **Fill Type** can be changed. Other available customizing settings vary by **Fill Type**. **IMPORTANT:** when testing new settings, it's not unusual to experience some lagging, so be patient while the algorithm generates a new image.

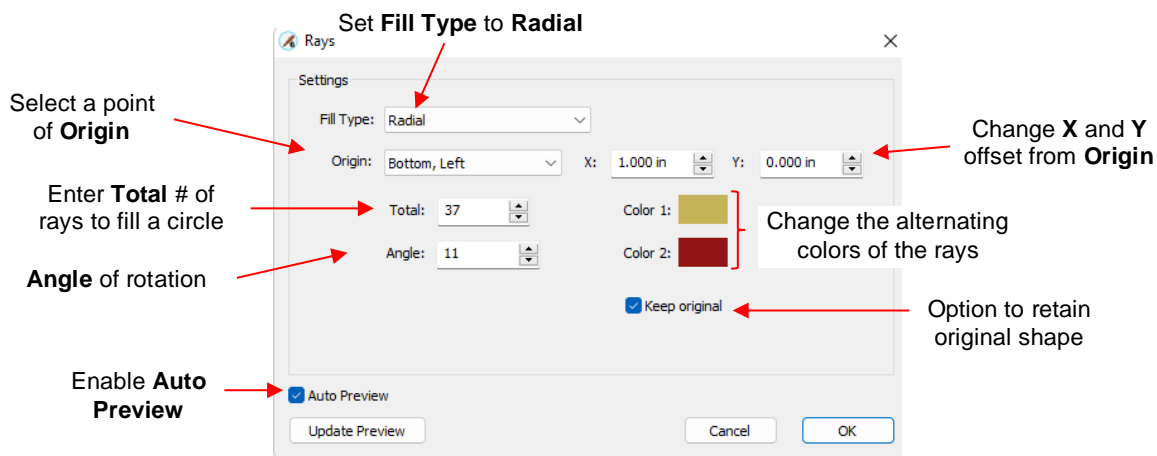
◇ Circle Fill Type:



◇ Line Fill Type:



◇ Radial Fill Type:



- For each type of design, after clicking on **OK**, it's a good idea to apply **Object>Group** so that the individual parts of the rays stay together.

7.21 Rhinestones

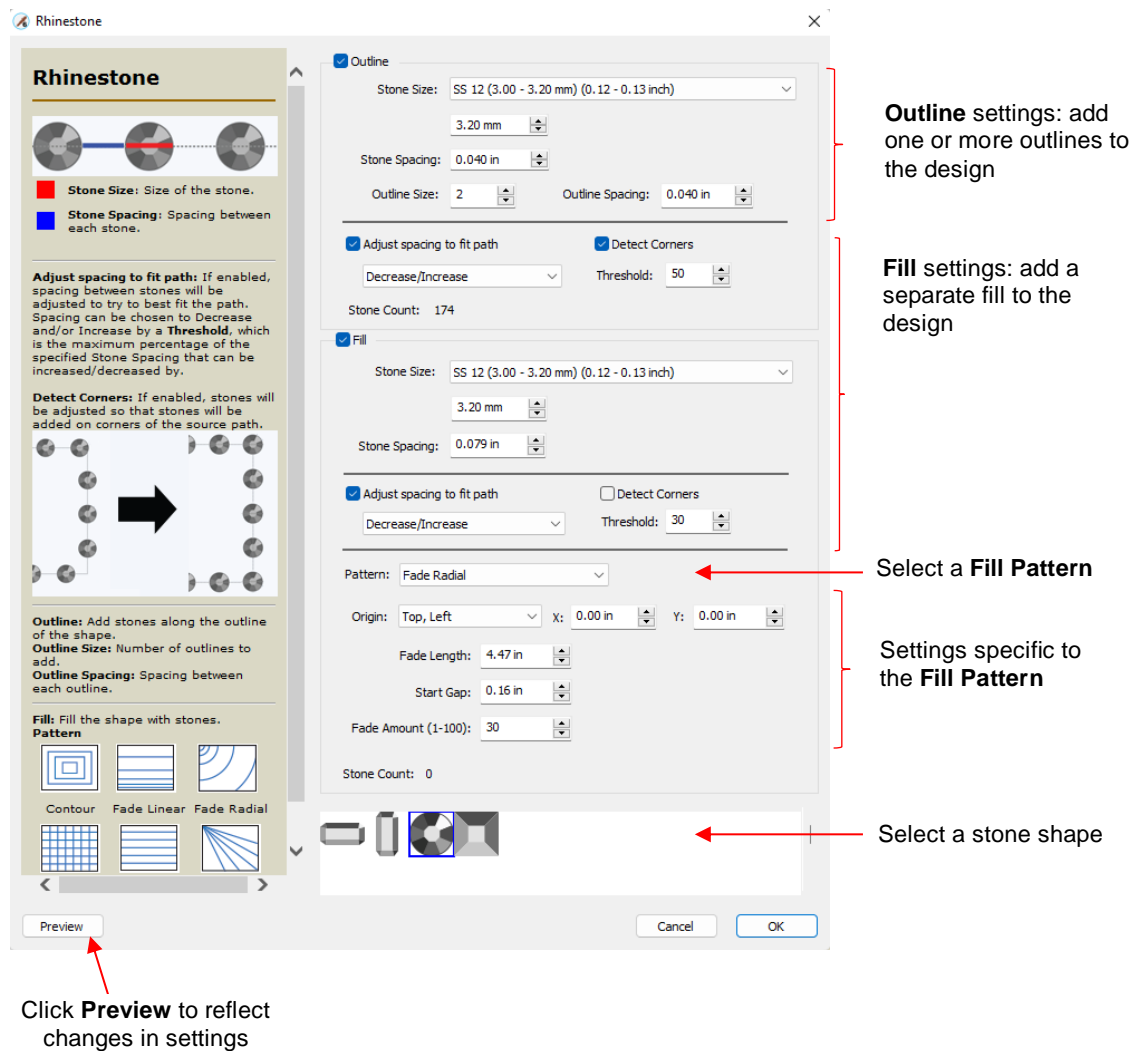
SCAL's **Rhinestones** feature provides outlining and a variety of fill options to create endless variations in patterns and styles. This feature can be used to create designs for cutting both hot fix rhinestone templates and for faux rhinestone HTV glitter materials.

7.21.1 Guidelines for Rhinestone Pattern Design

- Before using the function, it is important to understand some basic guidelines, especially if you are new to this application. Please refer to the following *Expanded Tutorial*: <https://tinyurl.com/3bhf9v2y>

7.21.2 Rhinestone Effect Overview

- 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**
- The following window opens:



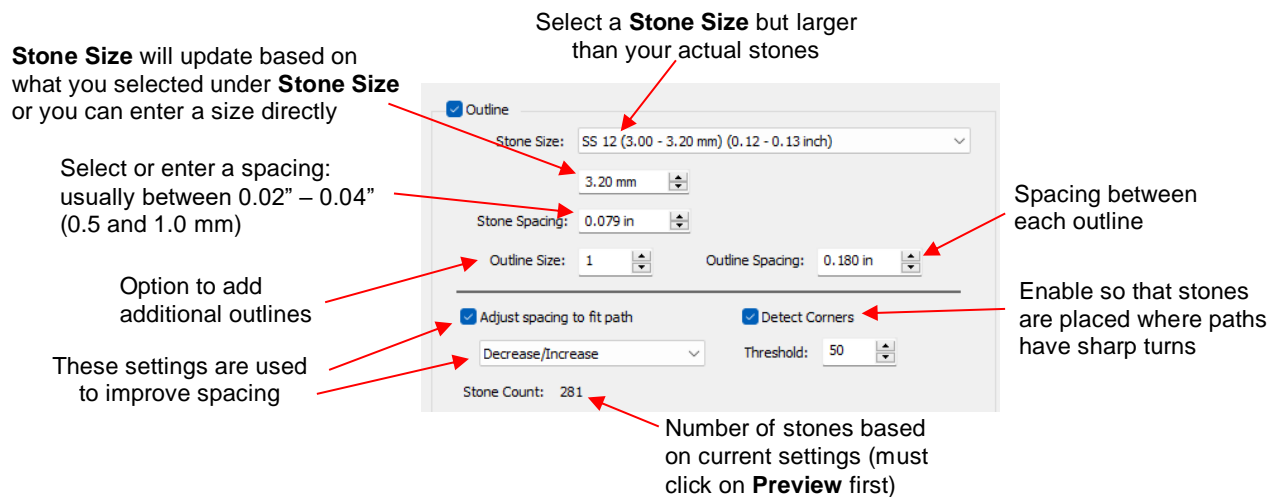
- Here are some general “do’s” and “don’ts” with respect to rhinestone designing:
 - ◇ Design close to your final target size.
 - ◇ Make sure any lettering is readable. Be leery of “fancy fonts.”
 - ◇ **IMPORTANT:** Always make a backup copy of your design before entering the **Rhinestone** window.
 - ◇ **IMPORTANT:** The circle size selected needs to be larger than the stone size you purchase. If you have SS10 stones then, in the rhinestone design window, select SS13 stones.

7.21.3 Rhinestone Outline

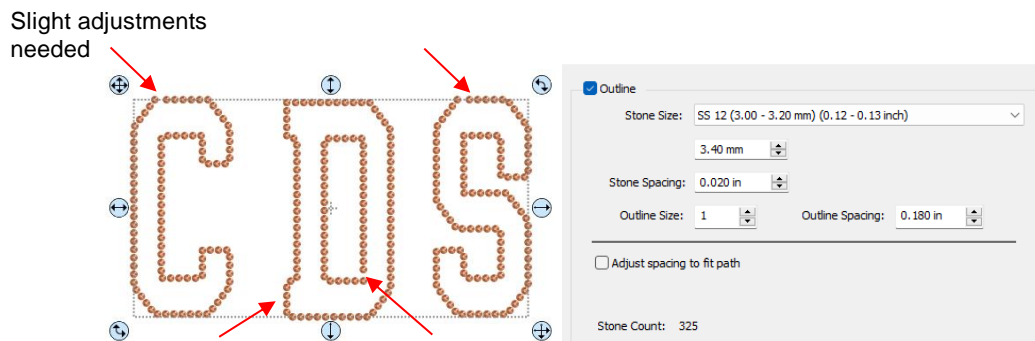
- In this example, the initials from a high school will be outlined. As mentioned previously, the first step is to size the width and height of the design. Make sure there is enough space between the letters so that the circles will not overlap. Also, you may want to resize the lettering vertically,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



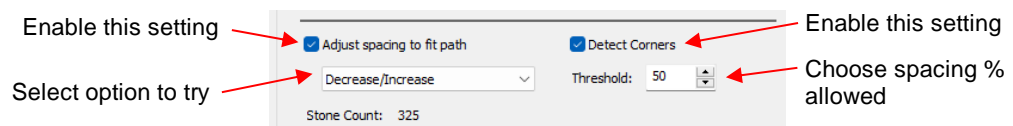
- To apply a rhinestone outline, first make a backup copy of the shape. Then select the shape and go to **Effects>Rhinestones**. The upper half of the **Rhinestone** window has the following settings:



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



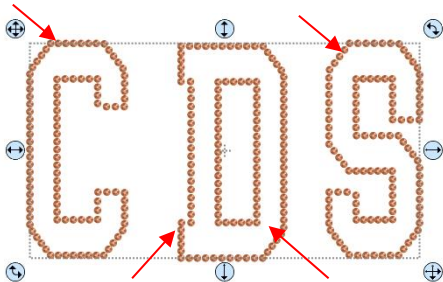
- The preview shows that the spacing is off a bit in places and some of the corners are rounded. There are two options which can be used to make adjustments. Check the box next to **Adjust spacing to fit path** and additional settings will appear:



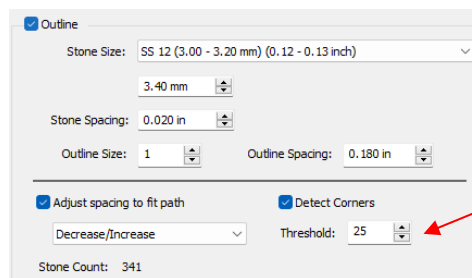
- These settings will require experimenting in order to optimize equal spacing between the stones. Initially, however, just click on **Preview** after marking the box and the spacing should change. This is often all that is

required. However, from the drop-down menu, you can also choose to only **Decrease** or only **Increase** the spacing. The **Threshold**, which controls how much spacing will be used, is also available to adjust:

Spacing is much improved



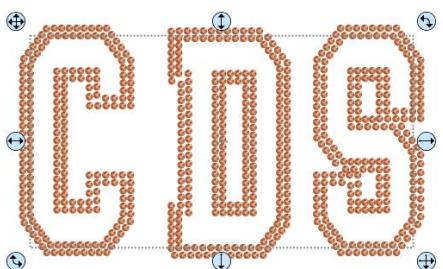
Corners are sharper



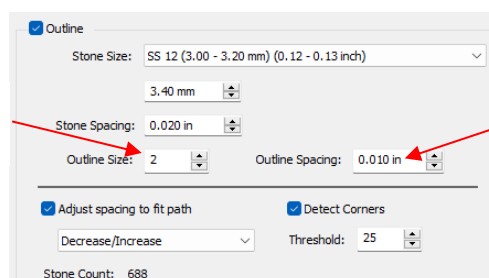
Keep **Threshold** lower versus higher

◇ Note that the higher the **Threshold**, the more increase in spacing you may see. So, typically, you want to keep that value lower versus higher.

- The **Outline Size** option allows you to add contour outlines of rhinestones to your design. Increase to the number of outlines you want, along with the spacing:



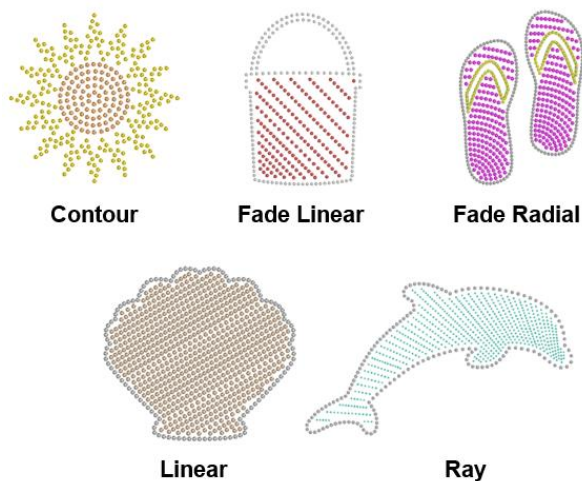
Set # of Outlines



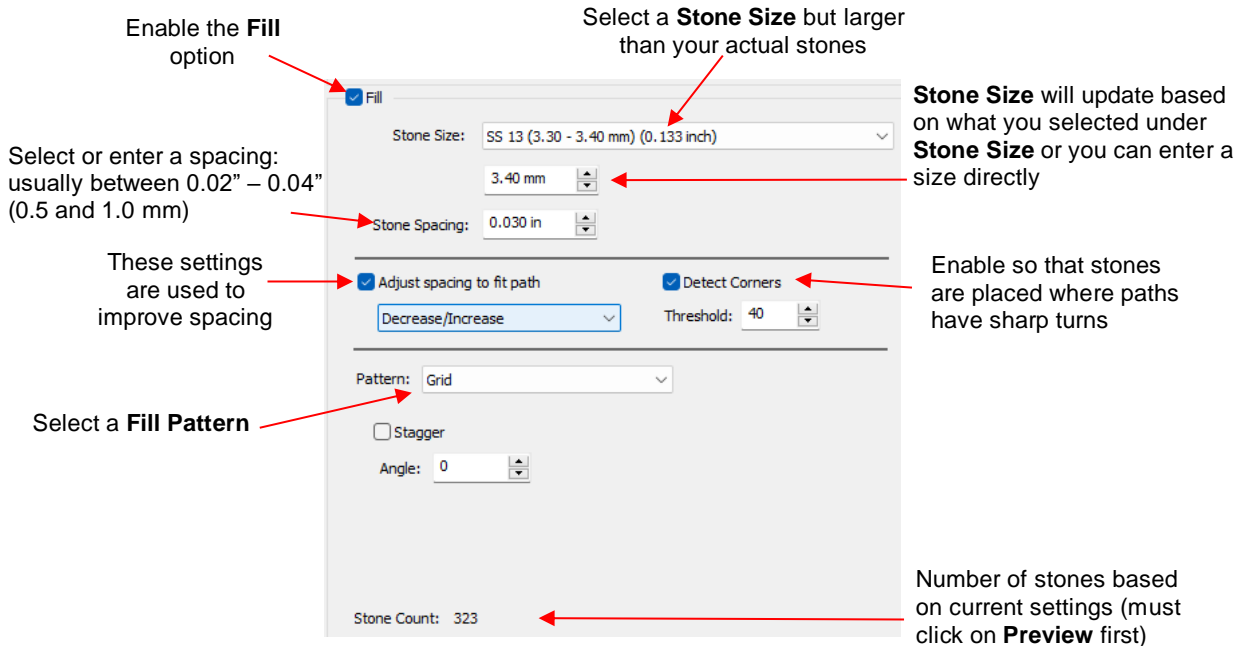
Set Spacing between Outlines

- Note that the color of stones for the outline is based on the **Stroke** color on the **Fill & Stroke Panel**.

7.21.4 Rhinestone Fill



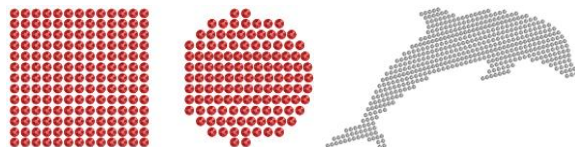
- As you can see from the above screenshot, SCAL6 now offers 5 additional fill patterns in addition to the default grid pattern in prior versions. Not all patterns work with all shapes, so experimenting will be key to achieving a result you find pleasing. You'll also find that each pattern has its own customizing settings based on the nature of that pattern.
- The lower half of the **Rhinestone** window is the **Fill** section:



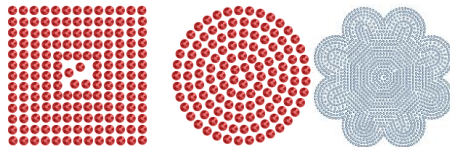
- Instead of outlining the shape, the image will be filled with rhinestones in a choice of patterns. The color of the simulated stones will be based on the **Fill** color of the shape on the **Fill & Stroke Panel**.
- **IMPORTANT:** Some of the **Fill** algorithms can take significant time to generate. Be patient and don't assume the program won't return to normal after 10 minutes or longer.
- The following examples were made on a square, a circle, and a dolphin from the **Library** that seemed to work well with all pattern fills but one. Some guidelines on which settings to test have also been included:

◇ **Grid** (default) - creates a fill of horizontal rows:

Test **Stagger** option and **Angle** to vary the pattern to better fit the shape



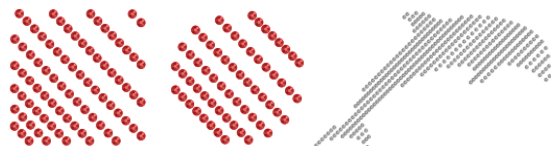
◇ **Contour** - also called an "island fill", this option typically works better with rounded shapes versus square shapes:



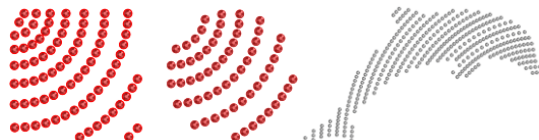
Tends to work better with symmetrical images

◇ **Fade Linear:**

Fade Length – increase to complete image
Start Gap – initially set to Stone Spacing
Fade Amount – decrease to add more rows



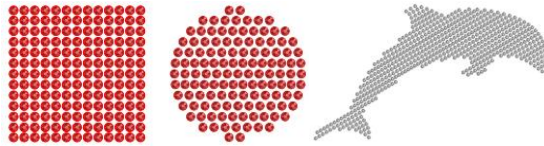
◇ **Fade Radial:**



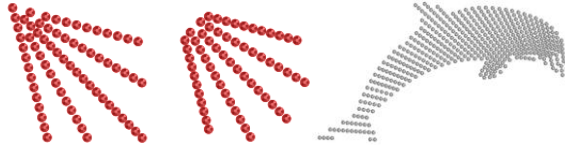
Use **Fade Linear** guidelines
Origin – try different options to better fit the shape

◇ **Linear:**

Angle – adjust in order to better fit the shape

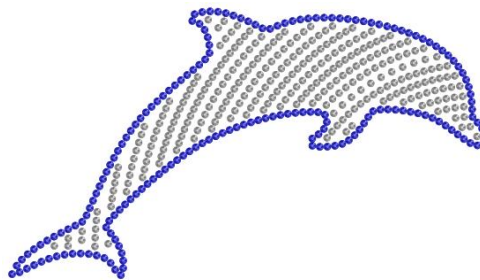


◇ **Ray:**



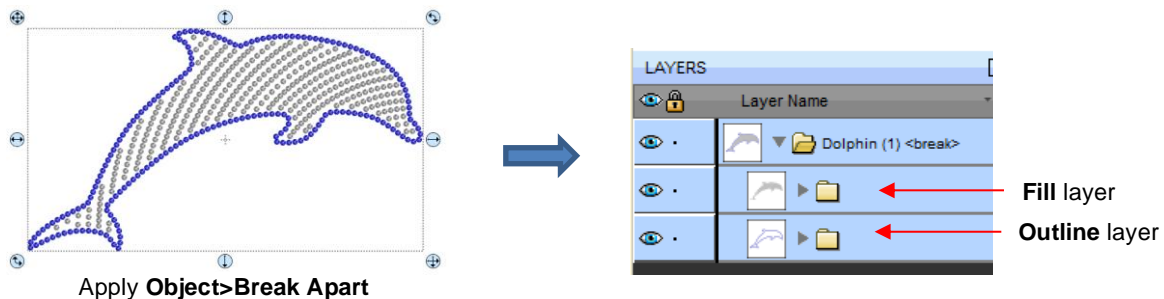
Angle – decrease for thicker fill
Origin – try different options to better fit the shape

- For better definition, you will probably want to use both an outline and a fill with your design. Separately select the size of the stones and spacing, plus adjust the various other settings available to you:



7.21.5 Editing Rhinestone Designs

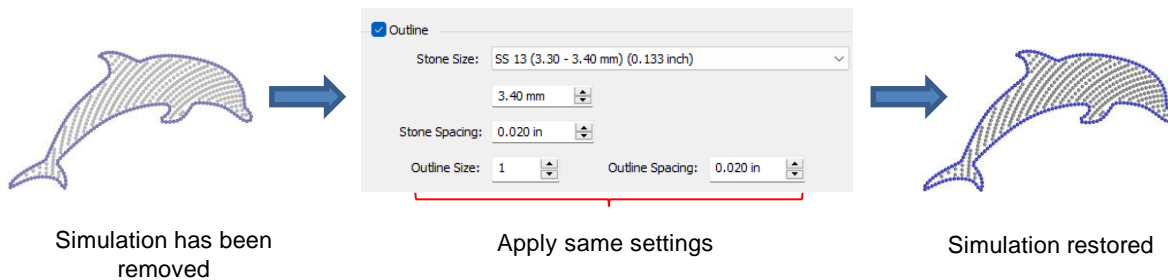
- Before editing, make a backup of the design created by the **Rhinestone** function. As was mentioned earlier you can resize rhinestone designs but if certain editing has occurred, you might or might not get the results you want after editing.
- Rhinestone designs will sometimes need “tweaking” which involves adding, deleting, moving, or re-spacing circles.
- When you have designs with both an outline a fill pattern, the first step is to separate those into two layers. To do this, select the design and apply **Object>Break Apart**. The **Layers Panel** will now display two layers:




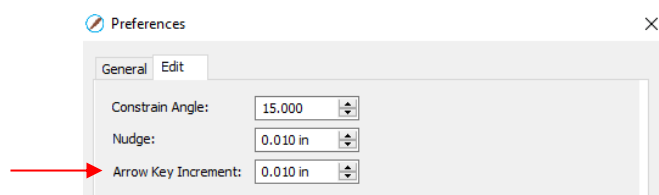
◇ At this point, every stone can be individually selected but with the **Fill** and **Outline** layers in their own folders you can easily recolor them and hide or lock, as needed. Once editing is completed, you may wish to separately group the two layers to keep any stones from shifting position from the others.

- If you wish to remove the simulation, select the layer and apply **Object>Merge**. If you then need to work with any individual circles, apply **Object>Break Apart**.
- The simulation can be restored now or after editing or not at all. The circles will still remain as individual shapes. Again, this does not affect how the design cuts; the simulation is only for displaying or printing. If the design is extremely large or you have a slow computer, you may find that the simulation causes more lagging as you are editing the design. In that case, save the following step until after editing is completed.

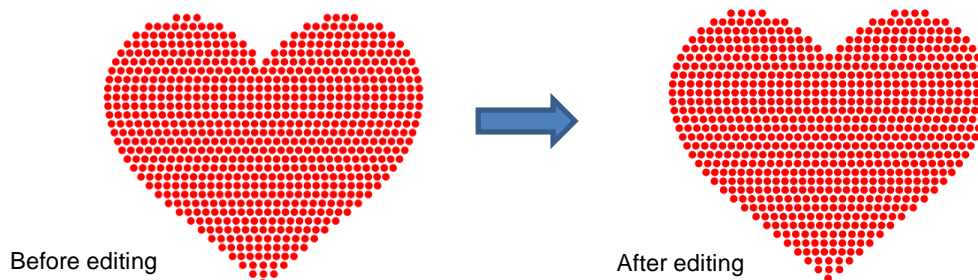
- To restore the simulation, select the layer and reopen the **Rhinestone** window. In the **Outline** section only, enter the same **Stone Size** setting used to create the design. Note that the **Spacing** doesn't matter any longer, nor is it necessary to select the **Fill** option:



- The following list shows the most common functions applied when editing rhinestone designs:
 - Use the **Zoom** functions (*Section 1.09*) to move in close for easier selection of individual or small groups of circles
 - Use the **Lasso Selection** tool  (*Section 3.02.2*) to more easily select a group of circles
 - To quickly add a circle, hold the **Alt** key and left click once on a circle. A duplicate is created in the same spot.
 - To delete multiple circles, hold the **Delete** key while clicking on individual circles
 - Use the **Nudge** arrow keys on the **Position & Size Panel** to move circles to new locations
 - Alternatively, use the arrow keys on your keyboard to move a circle or row of circles. If needed, change the increment to 0.01" (0.25 mm) by going to **Edit>Preferences** (or, on a Mac, press **Command + ,**). Then click on the **Edit** tab and change the **Arrow Key Increment**, as shown here:



- To realign a row or column of circles, use the alignment functions covered in *Section 3.18*.
 - To respace a row or column of circles, use the spacing functions covered in *Section 3.19*.
- In the following example, an additional heart is added at the top to balance the two sides. Also, the sixth row of circles are selected and **Distribute Center Horizontally** is applied:



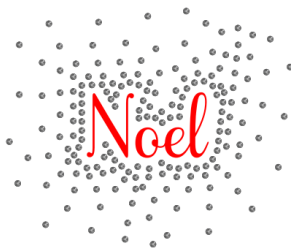
- Sometimes the circles you want to re-space equally may fall closer to a 45° angle versus vertically or horizontally. Select your entire design and rotate until the line of circles is closer to vertical or horizontal. Re-space the circles and then rotate back into place.
- After editing the design, you may wish to group the design to avoid inadvertently moving one or more stones out of place. To do that select the design and go to **Object>Group** or apply **Ctrl+G**.

- If you have a shape that has a **Rhinestone** effect applied and want to remove it (even after the file has been saved and re-opened), select the shape and go to **Object>Remove Effects**.

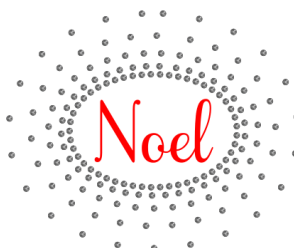
Please refer to the following *Expanded Tutorial* <https://tinyurl.com/3bhf9v2y> for sections on *Using Shadow to Add an Outline to a Rhinestone Design* and *Using Purchased Rhinestone Fonts and Designs*

7.22 Rhinestone Scatter

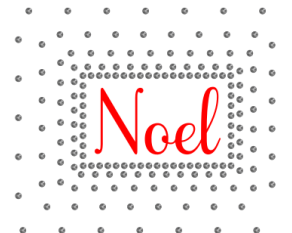
- Rhinestone Scatter** adds a spray of rhinestones based on 3 optional outline shapes surrounding a design and then various settings you tweak to alter the design:



Contour



Ellipse



Rectangle

- To create a **Rhinestone Scatter**, select a design and go to **Effects>Rhinestone Scatter**. The following window opens:

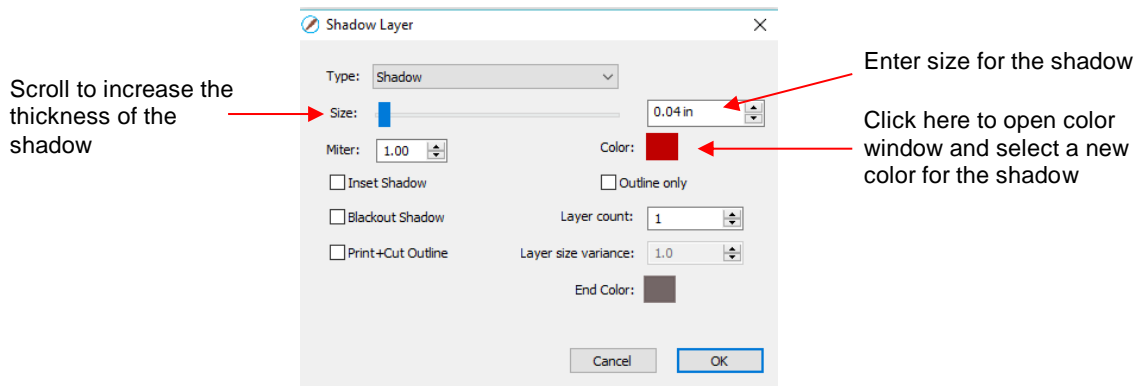
The screenshot shows the **Rhinestone Scatter** dialog box. On the left is an **Instruction Panel** with sections for **Stone Size**, **Stone Spacing**, **Adjust spacing to fit path**, and **Detect Corners**. The main area contains settings for **Stone Size** (SS 12 (3.00 - 3.20 mm) (0.12 - 0.13 inch)), **Stone Spacing** (0.079 in), **Adjust spacing to fit path** (checked), **Detect Corners** (checked), **Shape** (Contour), **Scatter Size** (2.000 in), **Initial Offset** (0.100 in), **Scatter Offset** (0.050 in), **+ Fade** (0.100 in), **Decay by percent** (50), and **Stone Count** (0). At the bottom, there are three stone shape icons, with the middle one selected. A **Preview** button is at the bottom left, and **Cancel** and **OK** buttons are at the bottom right. Red arrows point from text annotations to specific elements: 'Enter Rhinestone settings (refer to Instruction Panel on left side of this window)' points to the top settings; 'Select a Shape for the outline' points to the Shape dropdown; 'Enter Scatter settings (refer to Instruction Panel on left side of this window)' points to the bottom settings; 'Select a stone shape' points to the stone shape icons; and 'Click Preview to reflect changes in settings' points to the Preview button.

- The initial design sent to the **Rhinestone Scatter** window can also be **Rhinestone** pattern itself:

- The color of the **Rhinestone Scatter** will be gray (crystal). After clicking on **OK**, the *Scatter* layer can have the **Fill** color changed on the **Fill & Stroke Panel**.
- To edit the scatter pattern, apply **Object>Ungroup** to the *Scatter* layer and individual rhinestones can be moved, deleted or added.

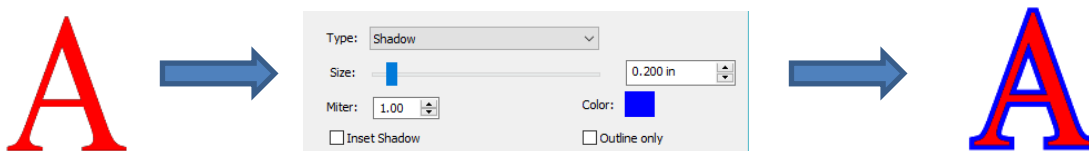
7.23 Shadow Layer

- 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:

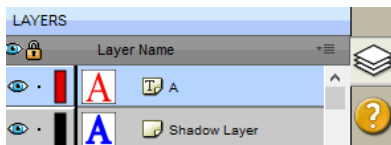


7.23.1 Shadow Layer Settings

- **Size** changes the thickness of the shadow layer. You can either scroll the **Size** bar or type in a size in the input window to the right.
- **Color** refers to the color of the shadow. Clicking on the color box opens the standard color window where a new color can be selected.
- As an example, a Times New Roman upper-case A is used. After increasing the **Size** and changing the **Color** to blue, the following result is obtained:



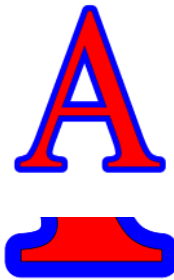
- ◇ The **Layers Panel** shows the addition of a new **Shadow Layer**:



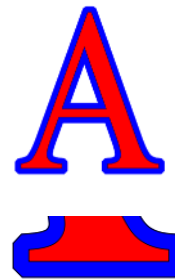
- **Type** controls the style or shape of the shadow at the corners. There are three choices:



Shadow



Shadow (Rounded)



Shadow (Straight)

◇ Note that the first choice, **Shadow**, also has a **Miter** setting which should work in the same way as **Miter** affects the **Stroke** (refer to *Section 3.15*).

- **Inset Shadow** is the opposite of **Shadow** – instead of creating a contour that is larger than the original shape, a contour is created that is smaller and fits inside the original shape.

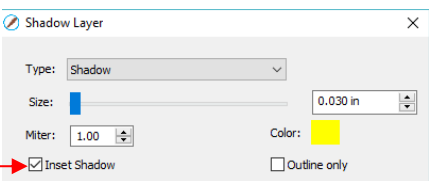
◇ For example, let's say you are going to create a two-color vinyl sign that says "For Sale":

For Sale

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

For Sale

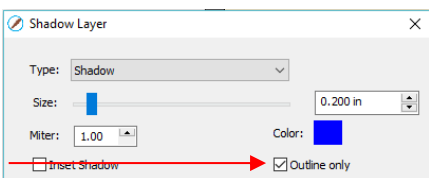
◇ Instead, create an **Inset Shadow** by checking the **Inset Shadow** option:


Check this box → 

→ **For Sale**

Result

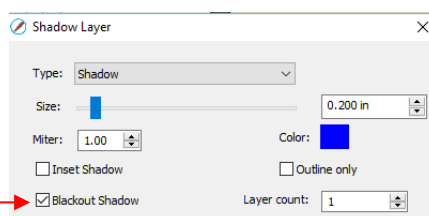
- **Outline only** can be checked to set the **Fill** on the shadow to **None**. The **Stroke** color will be whatever is set in **Color**:

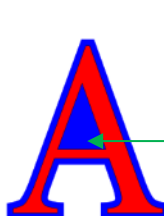
Check this box → 

→ 

Shadow has no Fill

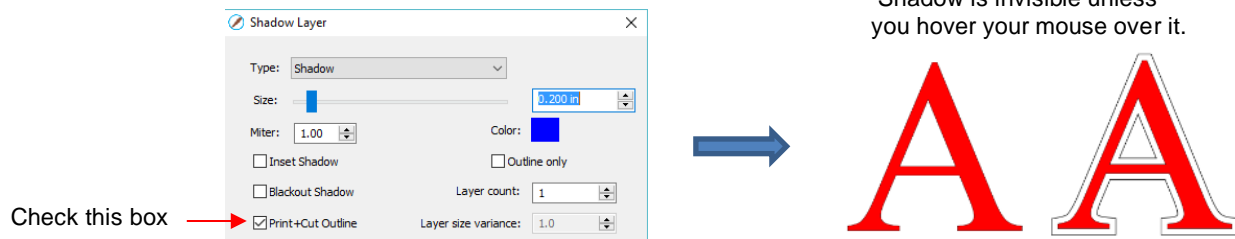
- **Blackout Shadow** can be used to remove any interior shadow lines, leaving only a single outset:

Check this box → 

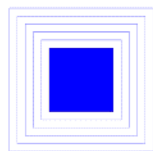
→ 

Interior is filled

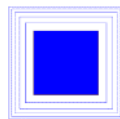
- **Print +Cut Outline** creates a shadow with a **Fill** and **Stroke** both set to **None**. The shadow will be invisible unless you hover the mouse over the shadow:



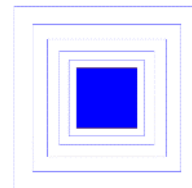
- ◇ Two print and cut examples for this function are:
 - To add a contour cut around a printed shape
 - To cut just inside the boundaries of a printed image (in this case you also use the **Inset Shadow** option)
- **Layer** settings: There are three additional settings in the **Shadow Layer** window used to create multiple shadows on a shape:
 - ◇ **Layer count:** Total number of shadow layers to be created
 - ◇ **Layer size variance:** If left at 1.0, the increasing thickness of each layer will be based on the original **Size** of the first shadow. If less than 1, the increasing thickness of each layer will be progressively less than the prior, based on the variance. If greater than 1, the increasing thickness of each layer will be progressively larger based on the variance.
 - For example, a square is used where the original shadow **Size** is 0.25 and the **Layer count** is set to 5. Outline only mode is also chosen so that the individual layers are easier to see. Note the different results when **Layer size variance** is set 1, 0.75 and 1.25:



Variance: 1.0

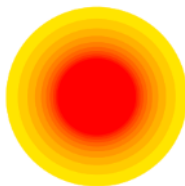


Variance: 0.75



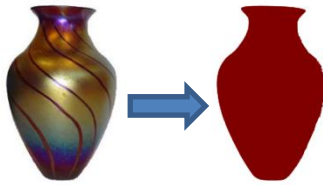
Variance: 1.25

- ◇ **End color:** If the **End color** is chosen to be different from the original **Color**, a gradual transition between the two colors will be created. This can be used to create some beautiful designs for a print and cut:



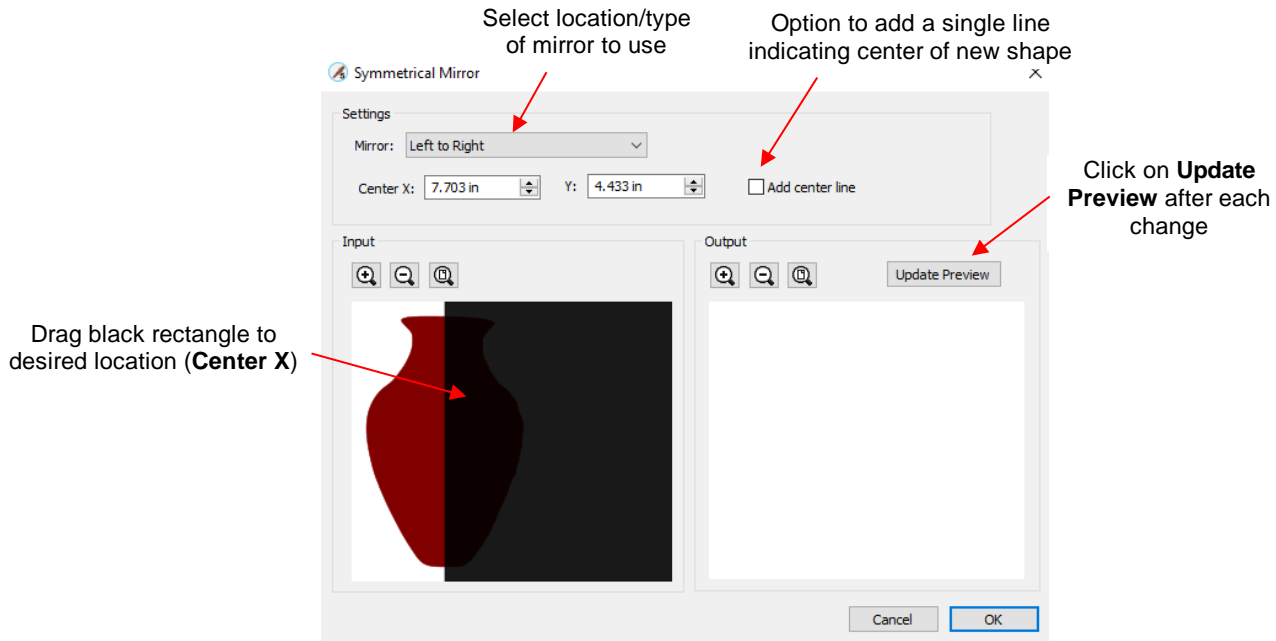
7.24 Symmetrical Mirror

- The **Symmetrical Mirror** function creates a symmetrical copy of a selected shape and welds that copy onto the original.
- For example, when tracing symmetrical images, the resulting trace may not appear perfectly symmetrical when can then appear unbalanced and unappealing. For example, here is a trace of a vase from a photo:

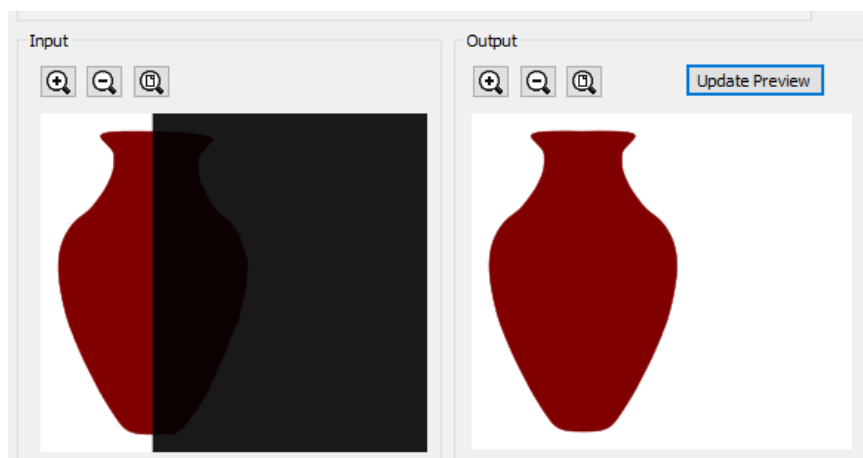


◇ Notice how the left side traced nicely but the right side isn't smooth and, overall, the vase doesn't appear symmetrical.

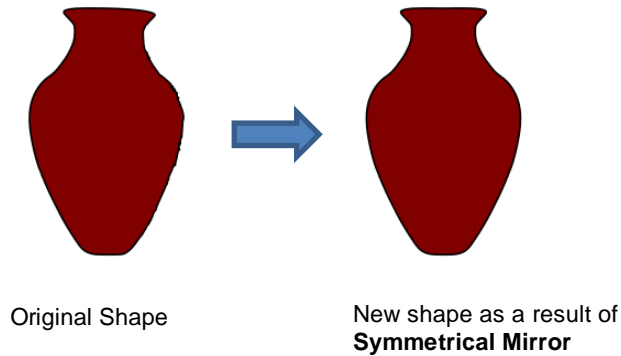
- To use **Symmetrical Mirror** to correct this image, select the traced shape and go to **Effects>Symmetrical Mirror**. The following window opens:



- ◇ **Mirror:** the default is **Left to Right** which is the correct option for this example since the right side is the half that needs to be replaced. Other options include **Right to Left**, **Top to Bottom**, and **Bottom to Top**.
- ◇ **Center X and Y:** You can manually enter the location for the mirror to be positioned. The default is the center of the currently-selected shape, but that can be changed to any location along the shape. Note that you can also drag the edge of the black rectangle to move the mirror, as well.
- ◇ **Update Preview:** Click on this button right away so that you can see how the current settings will change the shape:



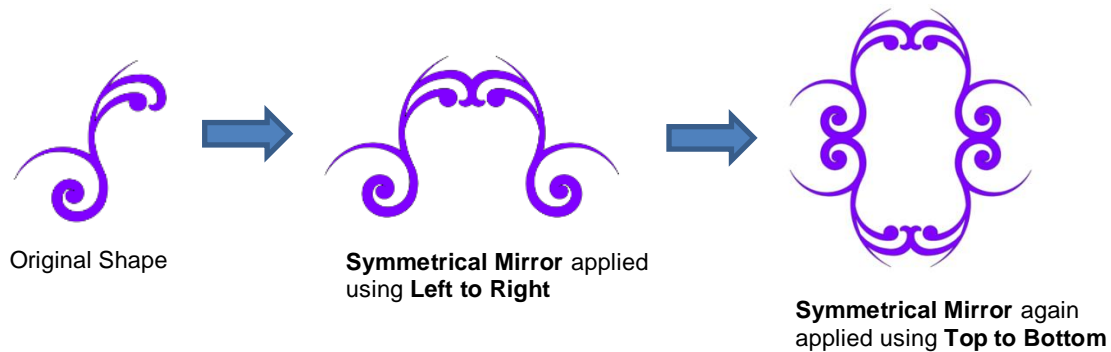
- ◇ **Zoom** tools can be used on either or both of the **Input** and **Output** views to more accurately position the mirror and to verify the resulting shape is what you need it to be.
- ◇ **Add Center Line:** This will add a single line at the location of the mirror. This line might be needed as either a cut line or a fold line, depending the application for the design.
- When you are satisfied with the image in the **Preview** window, click on **OK** and the new shape will replace the prior one on the **Cutting Mat**:



- **Symmetrical Mirror** can also be used in designing. The following shape was created by welding several flourishes together from the *Swirl* folder in the **Library**:



- ◇ **Symmetrical Mirror** can be used to expand this one element into more designs:

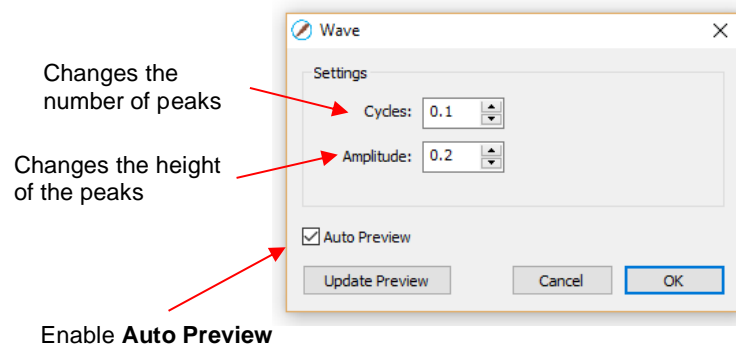


7.25 Wave

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



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



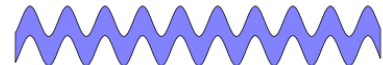
- Increasing **Cycles** adds more peaks along the shape:



Cycles = 0.5

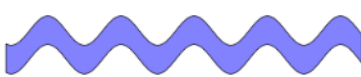


Cycles = 1.0

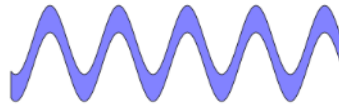


Cycles = 2.0

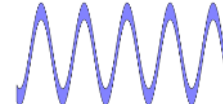
- Increasing **Amplitude** make the peaks higher:



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:

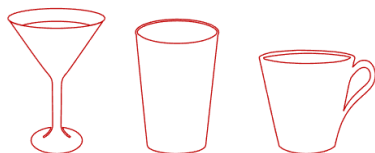
Twinkle Twinkle Little Star



Twinkle Twinkle Little Star

7.26 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. It's important to recognize what shapes will work versus not work. You need straight edges with no rounding in the middle:



Will work

versus



Will not work

- This function can be accessed by selecting one or more shapes and going to **Effects>Wrapper**. For this example, the following design was created with the intention of having it applied to a small cup:



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

Enter **Top** and **Bottom Diameters**, as well as the **Height** of the **Tumbler**, along the actual surface.

Add Template will create the cut line for the tumbler

Y Offset will move the design higher or lower on the template

Resize the design using **X Scale** and **Y Scale**

Enable **Auto Preview**

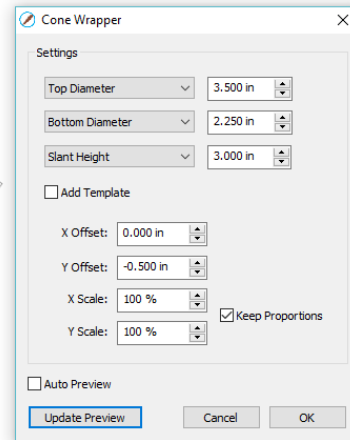
X Offset will move the design left or right on the template.

Check this box to have **Y Scale** change automatically with a change to **X Scale** and vice versa.

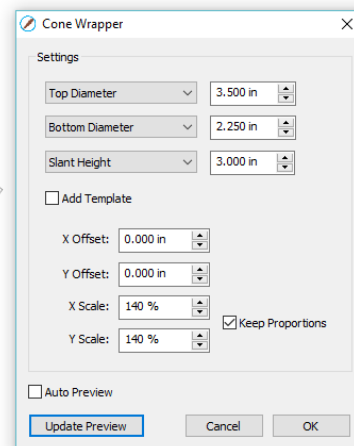
- Measure the cup: diameter of the top, diameter of the bottom, and length along the side from bottom to top. Enter those as shown in the screenshot. Alternatively, you can measure the radius or the circumference, as well as use the actual vertical height versus the slant height. These other choices are in the drop-down menus.
- Once these measurements are entered, click on **Update Preview** to see how the design will fit on the cup. Note that the design will be displayed in outline mode while working in this window:



- The template is the outside pattern based on the cup's dimensions. If you plan to cut that template, then check the box next to **Add Template**. Otherwise, it won't be on the **Cutting Mat** after you click on **OK**.
- Adjust the **X Offset** and/or **Y Offset** to move the design, if needed. For example, making **Y Offset** a negative value moves the design higher up on the template:



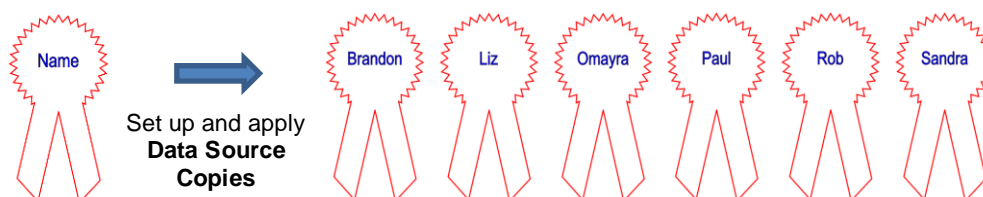
- ◇ Adjust the **X Scale** and/or **Y Scale** to resize the design, if needed. If you want to scale proportionately, mark the **Keep Proportions** box:



- After clicking on **OK**, the fill color returns to the design and the project is ready for completion:



7.27 Data Source Copies

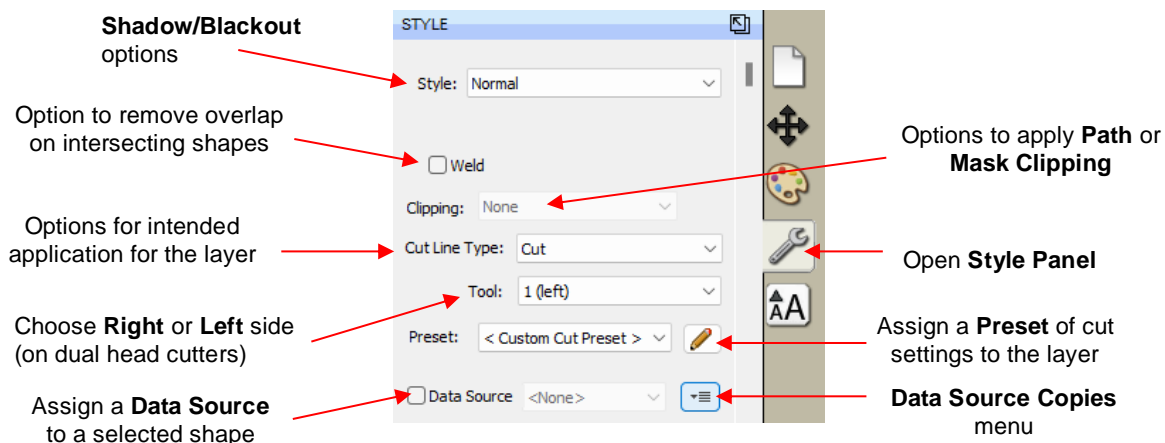


- **Data Source Copies** is a powerful feature which generates duplicates of your original design but customizing each one based on changing selected elements in that design. Some typical applications include:
 - ◇ Address labels
 - ◇ Name tags
 - ◇ Escort cards
 - ◇ Student ID cards (and other school applications)
 - ◇ Product serial number labels
 - ◇ Planner stickers
- The types of options (called **Data Source**) for changing the data include the following:
 - ◇ **Code** or number sequencing in which each duplicate has a different increasing number with the interval you require
 - ◇ **CSV** importing in which you import a .csv file that contains information which can include text items (such as names, addresses, team assignments, table assignments), as well as color and image paths
 - ◇ **Date** sequencing in which each duplicate has a different increasing date in a variety of available date formats and with the interval you desire
 - ◇ **Text** in combinations with all 3 of the above in which you can add any text you want repeated in each duplicate along with any of the other items you've already made using **Code**, **Date**, **CSV** or other **Text**.
- The **Data Source Copies** process involves five steps:
 - (1) Creating your original design to be duplicated with the various elements you'll want changed in each copy
 - (2) Going to the **Data Source** window to define each **Data Source** that will be changed
 - (3) Assigning each element in the original design to one of the **Data Sources** created in *Step (2)*
 - (4) Accessing a **Preview** window to set up the rows and columns on each page, spacing, number of pages required and verifying the **Preview** looks correct
 - (5) Generating the pages with the duplicates
- Most of the information needed is covered in the instructions in the **Data Source** window. The following is an expanded tutorial covering all aspects of the **Data Source Copies** function. <https://tinyurl.com/yukjdc5m>

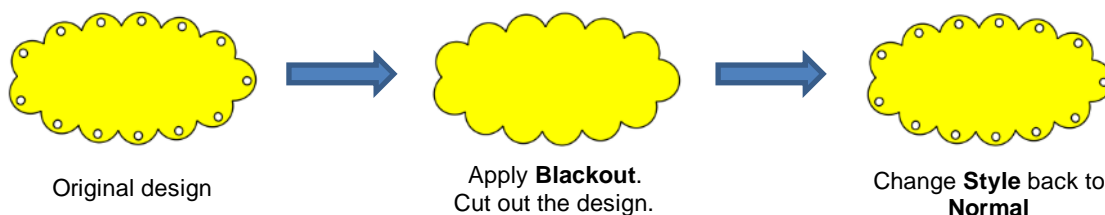
8. SCAL: Output

8.01 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)
 - ◇ Assign **Presets** to a layer (for **Cut by Layer** applications in SCAL6 Pro)
 - ◇ Access the **Data Source Copies** functions (refer to *Section 7.27*).
- To open this panel, click on the **Style** icon on the **Properties Panel**:

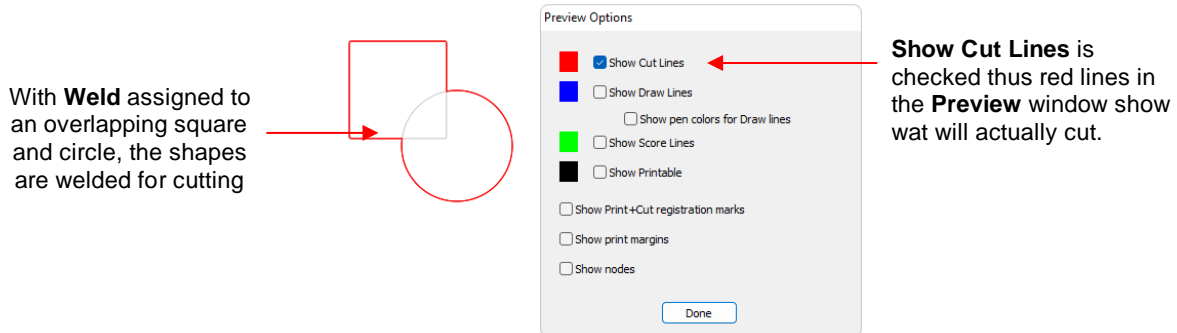


- **Style:** In this menu are various combinations of **Shadow** and **Blackout** applications. Refer to 7.23 for instructions and examples. Note, however, that if you later change your mind and you haven't applied any subsequent changes (such as those in the **Path** menu), then re-selecting **Normal** from the **Style** drop-down menu will restore the original style.
 - ◇ For example, let's say you've applied **Blackout** to a shape and then cut it out. You can now select that same shape and return the style to **Normal**:




- **Weld:** This option applies the **Union** function (refer to *Section 7.04.1*) to any overlapping shapes.
 - ◇ Note that if the shapes are on different layers, the **Weld** option needs to be marked on each layer.

- ◇ As mentioned before, settings in the **Style** window do not become permanent changes to the shapes on the **Cutting Mat**. However, you can verify the **Weld** effect by clicking on the **Preview** icon  on the **Toolbar** (for more details on **Preview**, refer to *Section 8.02*):



- **Clipping:** options are available for either **Clip Path** or **Clip Mask**. Refer to *Section 7.05*. The clipping is only applied during the cutting process.
- **Cut Line Type:** The following list may vary depending on the cutter selected:
 - ◇ **None:** layers assigned as **None** will be ignored from any output operations
 - ◇ **Cut:** choose this option for regular cutting. Because this is the default, you don't normally need to select it
 - ◇ **Draw:** choose this option when using a pen, embosser, engraver, glue pen, rotary tool or other device that doesn't require a blade offset
 - ◇ **Score:** choose this option when you want to use a different Force setting on some layers versus others, such as when kiss cutting stickers that will also be fully cut from the sheet
 - ◇ **(Print+Cut) Cut Only:** in print and cut applications, choose this option for the layer that will be cut. It will not be printed.
 - ◇ **(Print+Cut) Print Only:** in print and cut applications, choose this option for the layer that will be printed only. It will not appear in the cut window.
 - ◇ **Color layer alignment** (Pro version only): in applications such as vinyl where several layers will be cut from different colors and aligned, choose this option for the layer that has registration shapes that need to be cut from every color along with that color's shapes. These registration shapes can then be used to layer the colors perfectly. Refer to last part of *Section 8.06.3*.
- **Tool:** for cutters with more than one head, such as the Skycut D models, choose if the layer should be executed by the left side or by the right side.
- **Preset** (Pro version only) allows you to assign saved cut settings, called **Presets**, to individual layers. Refer to *Section 8.06.2*.

8.02 Preview

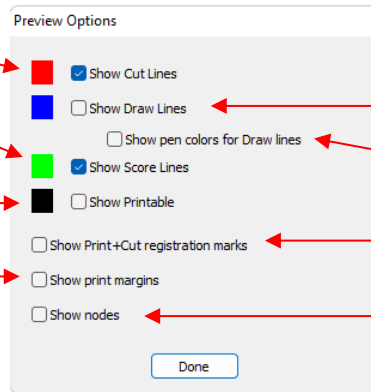
- To see what your cutter will cut, draw, score, print and more, click on the **Preview** icon  on the **Toolbar**. The following window will open. Note that settings applied on the **Style Panel** are reflected in this **Preview** window:

Any lines assigned as **Cut** appear in red

Any lines assigned as **Score** appear in green

Check this box for a **Print Preview**

Option to show the printing boundaries



Any lines assigned as **Draw** appear in blue

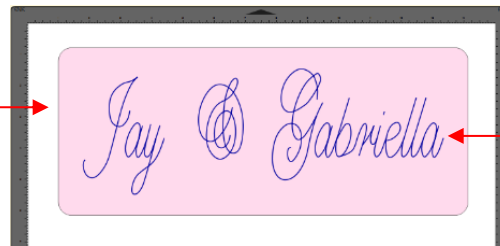
Check this box to show the **Stroke** for that shape

Option to show registration marks in the **Preview**

Option to show the nodes: must have **Show Cut Lines** or **Show Draw Lines** checked, as well.

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

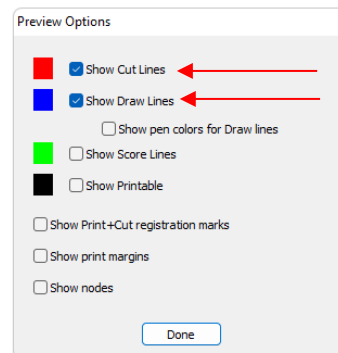
The rounded rectangle is assigned to **Cut** on the **Style Panel**



The text is assigned to **Pen** on the **Style Panel**

◇ In the **Preview Options** window:

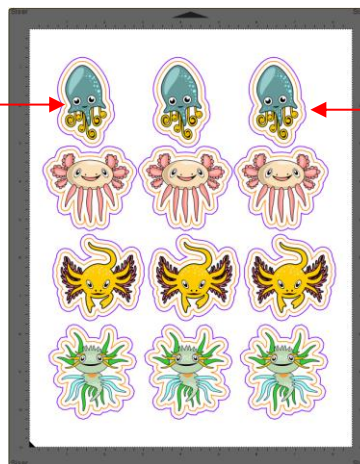
Red and blue lines indicate **Cut** and **Pen** assignments, respectively



Show Cut Lines and **Show Draw Lines** are both checked

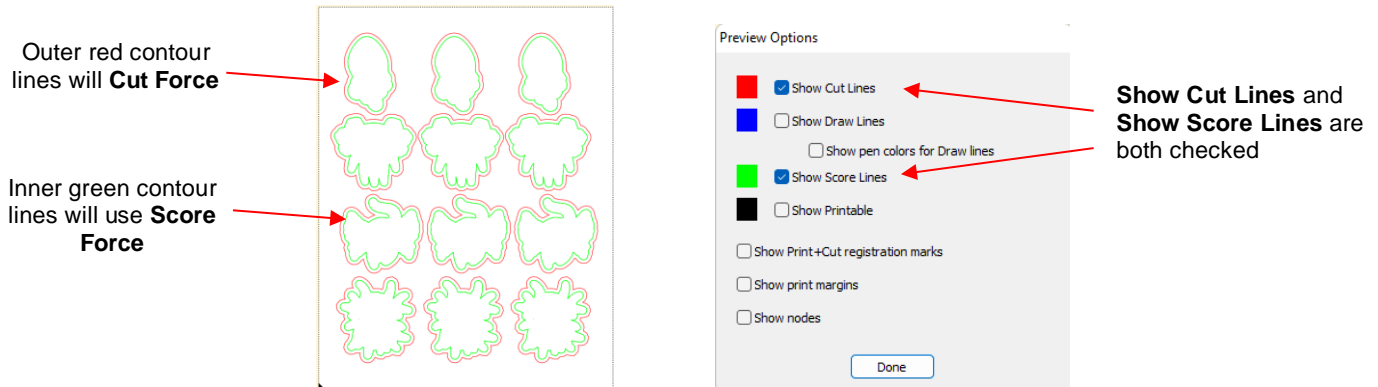
- In this next example, a page of stickers is set up with **(Print+Cut) Print Only**, **Score** layers and **Cut** layers:

Inner orange contour lines are set to **Score**

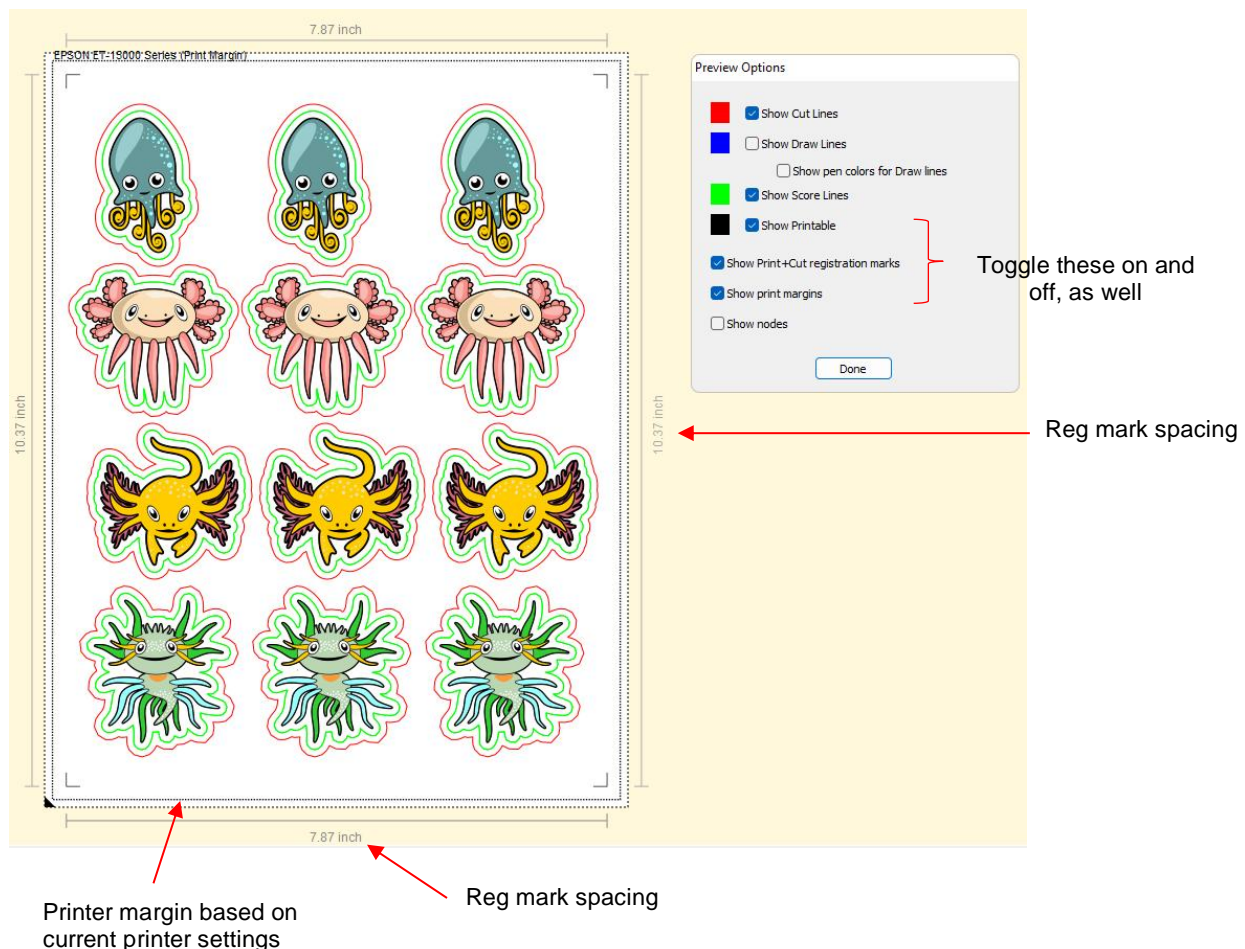


Outer purple contour lines are set to **(Print+Cut) Cut Only**

- The **Preview** is used to confirm the layer assignments:



- For print and cut applications (PNC), you might wish to verify what will be printed, along with where it will be printed and where the registration marks will print:

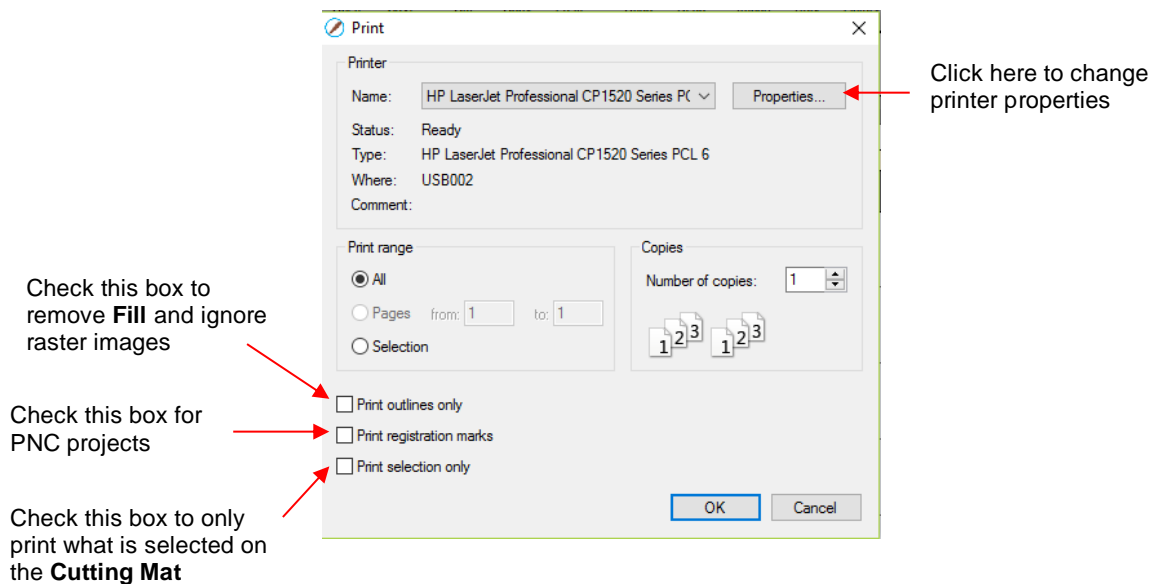



- ◇ **Show Printable:** The layers set to print now appear in the **Preview**
- ◇ **Show Print+Cut registration marks:** The registration marks are now visible, along with their spacing (which can be valuable when troubleshooting certain auto-registration issues)
 - **NOTE:** If the registration marks do not appear:
 - Verify that you have set up a cutter (refer to *Section 1.01.3*)
 - Verify that the layer(s) with cut lines are not hidden on the **Layers Panel**
 - In the **Cut Settings** window, verify that you have not marked the option for **Cut selection only**

- ◇ **Show print margins:** The printable boundaries based on the current printer's settings appear

8.03 Printing

- Go to **File>Print Setup** (or **File>Page Setup** on a Mac) and make sure the correct printer and printout dimensions appear. Before printing, verify the location of the print margins and reg marks using either of the two following methods:
 - ◇ **Preview** (refer to *Section 8.02*)
 - ◇ Mark the options on the **Document Panel** for **Show Print Margins** and **Show Reg Marks**. The **Page** will now indicate the boundaries for your currently selected printer and the registration marks based on their current settings.
- Go to **File>Print** or press **Ctrl+P**. The following window will open:

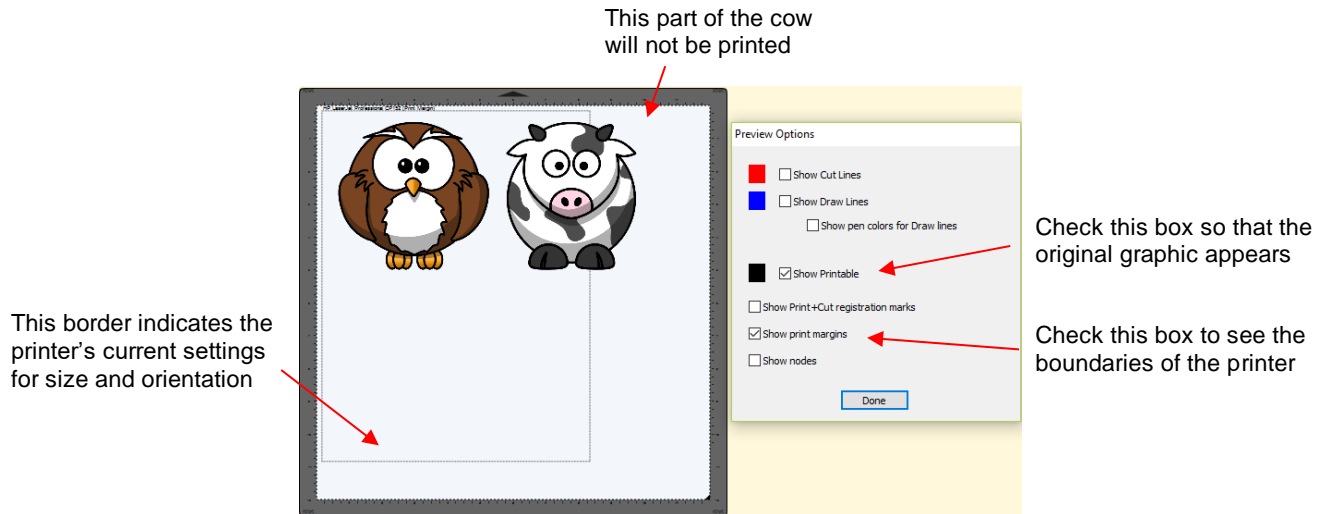


- ◇ To set up printer settings, click on the **Properties** button. (Note that you can also access your printer's properties by going to **File>Print Setup** (or **File>Page Setup** on a Mac) and clicking on **Properties**.) The window which opens should be familiar to you and will not be covered in this user manual.
- ◇ **Print outlines only:** Only vector shapes will be printed. Imported raster images (.JPG, .PNG, .BMP, etc.) will not appear. If you've applied a **Fill** to shapes including colors, gradients, or patterns, then those will not appear either.
- ◇ **Print registration marks:** If your application is a print and cut, then you will want to check this option. Note that If you have not yet set up a cutter (refer to *Section 1.01.3*), then registration marks will not be sent to the printer. Also, refer to *Section 8.12* for details on the **Print+Cut** process.
- ◇ **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.
- ◇ On the **Document Panel**, if the **Mat Size** dimensions are larger than the printout dimensions, then make sure the shapes are located in the upper left portion of the **Page** area 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**.

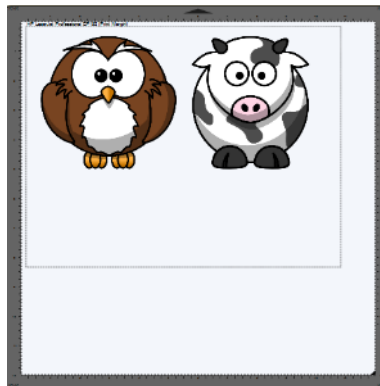
- For example, let's say you have a PNC application and your shapes are arranged like this on a 12" x 12" **Cutting Mat**:



- ◇ 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:



- ◇ You have two choices. You can either switch to **Landscape** printing under **File>Print Setup** or you can move the shape on the right to be below the left shape:



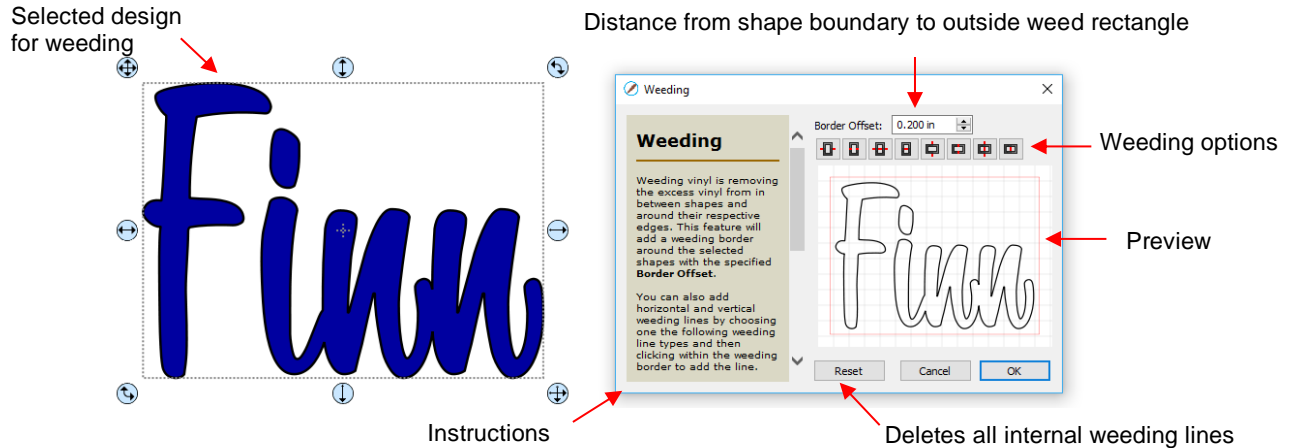
Option 1: Switch to **Landscape** under **File>Print Setup**



Option 2: Rearrange the shapes

8.04 Weeding (SCAL PRO only)

- 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:



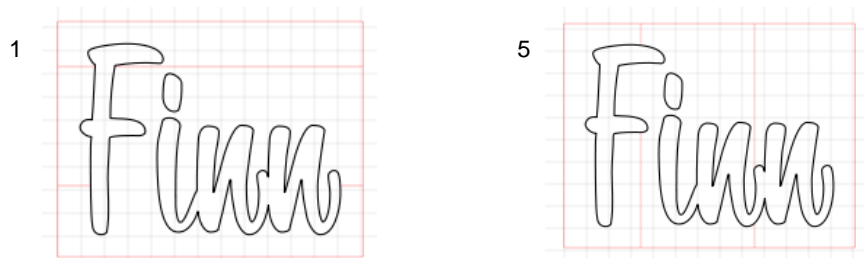
- ◇ **IMPORTANT:** If you cannot see the design or it's very faint, close the **Weeding** window and, with the design selected, increase the **Stroke Width** on the **Fill & Stroke Panel**. Then, return to the **Weeding** window and the design should easily be visible. You can also then drag a corner of this window to make the design even larger and easier to view while adding the desired weeding lines.
- ◇ **Border Offset:** Increase or decrease to set the spacing between the shapes and the outside weeding rectangle. The red line represents that outer cut. For example:



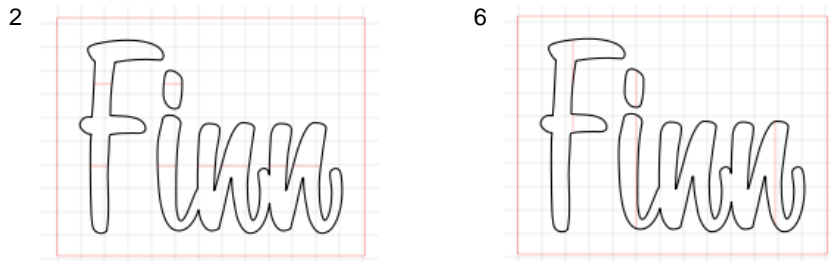
- ◇ **Border Options:** These icons can be used to add additional cut lines inside the outer weed border. Each icon in the following screenshot indicates where the lines will be added but a description and example are also shown. Note that once you select an option, you can click at the desired location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



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



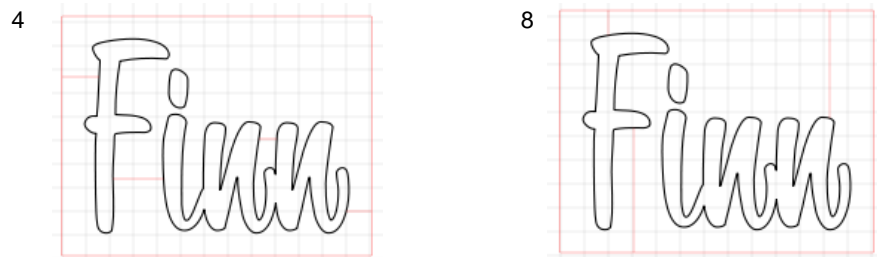
- 2 or 6: Add horizontal or vertical weed cuts inside the shapes (this is used for applications such as glass etching where the outside “waste vinyl” is actually kept and the shapes themselves are weeded out)



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

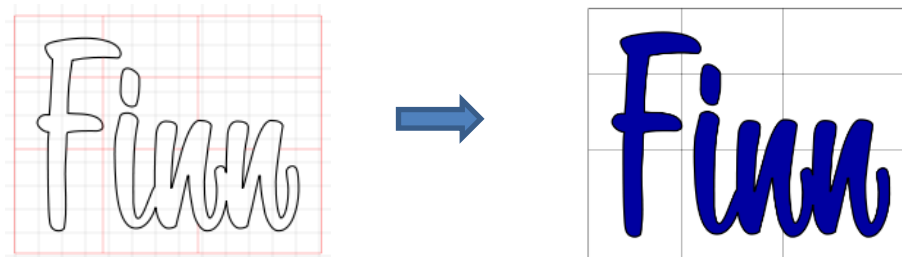


- 4 or 8: Add horizontal or vertical weed cuts anywhere you like

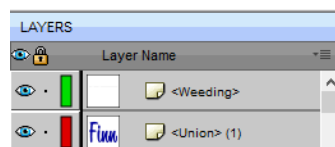


◇ **Reset:** At any point, you can click on **Reset** to remove any of the internal cut lines and begin again.

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



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



8.05 Tiling (SCAL PRO only)

- The **Tiling** function is used to split large designs into rectangular sections for cutting. This is usually needed either because the cutter isn't wide enough to cut the design or the material being used isn't wide enough for the design, or both!

◇ In the following example, a tree design that is 40" wide and 36" tall will be used:



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

Manually add tile lines

Column settings

Row settings

Instructions

Delete individual tile lines

Preview based on current settings

Reset to clear settings

◇ **Columns** and **Rows**: Under both of these you have the following choices:

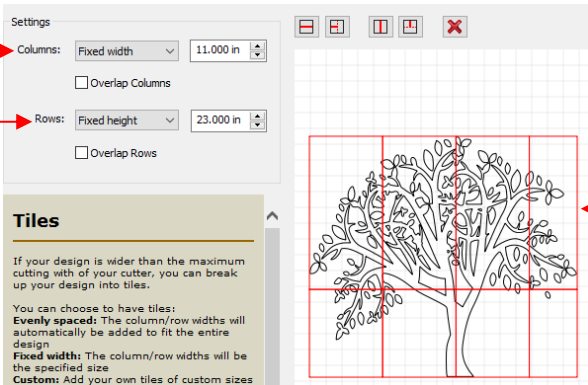
- **Evenly spaced**: Enter a number and that many columns (or rows) are created, all the same width. For example, you could enter 3 columns and 2 rows:

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:

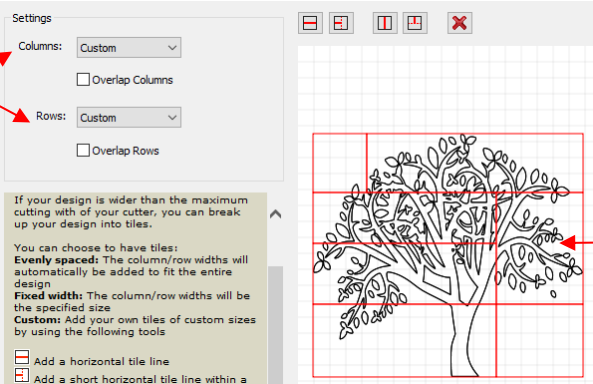
Add a horizontal tile line

Add a vertical line inside of a tile


Add a horizontal line inside of a tile

Add a vertical tile line

Select **Custom**



Custom lines are added.

- ◇ To delete any of the lines, click on the **Delete** icon  and then click on the line inside the **Preview** window.
- ◇ **Overlap Columns** and **Overlap Rows:** If you want an overlap created so that each tile slightly overlaps with an adjacent one, check the box and then enter the desired overlap:

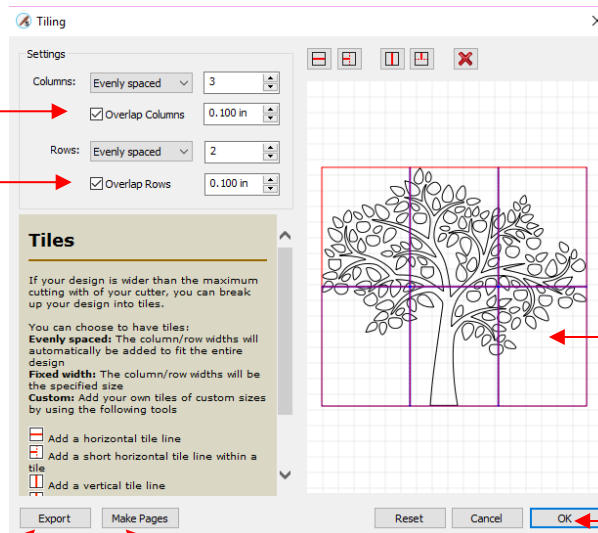
Check **Overlap Columns** and/or **Overlap Rows** and enter the desired overlap size

Export each tile as a separate SVG file

Click **Make Pages** to place each on its own page in the project

Purple lines indicate an overlap is applied

Click **OK** when done or click on **Make Pages** or select **Export**




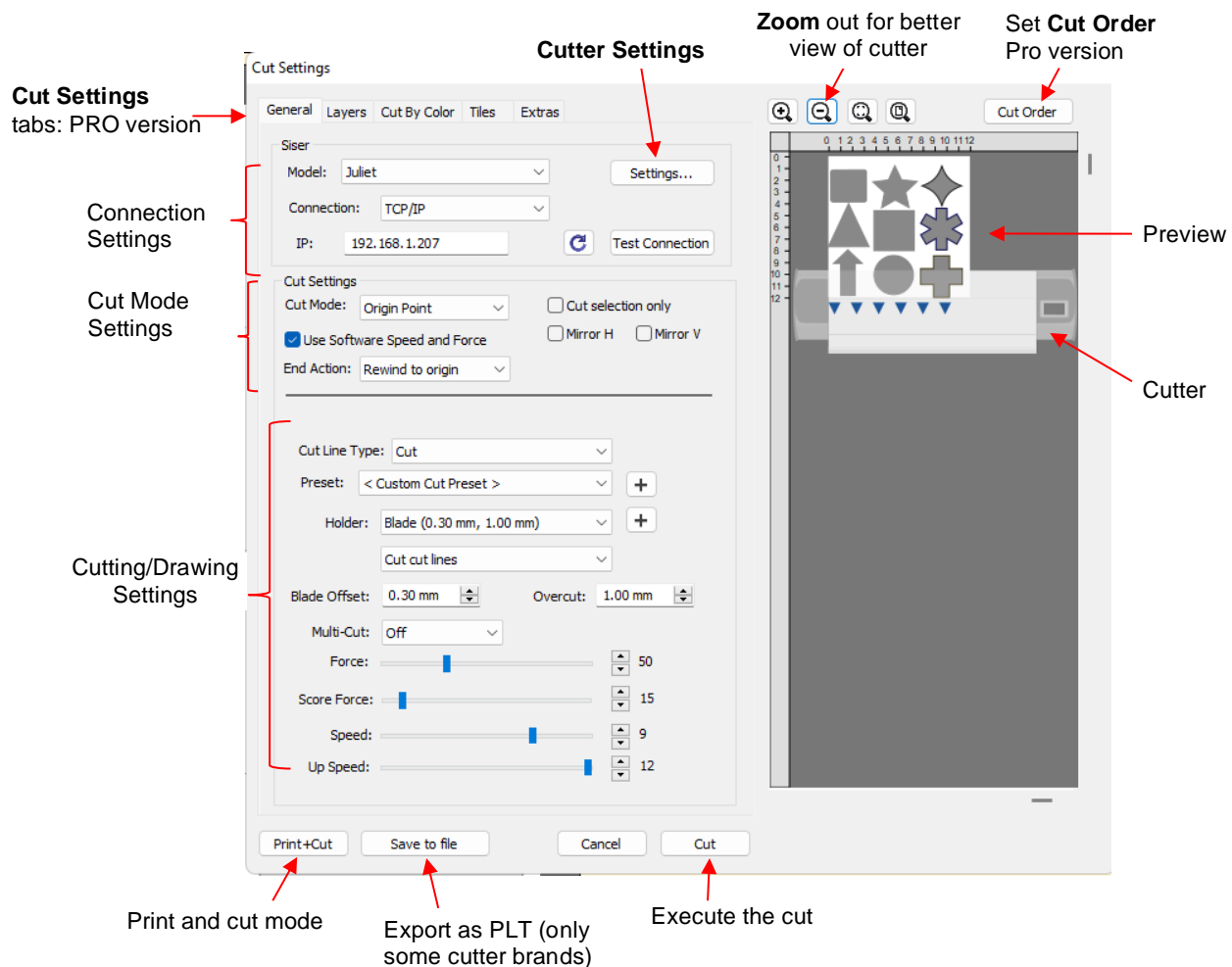
- Once you are satisfied with the settings, you have three options:
 - Click on **OK**. You won't observe any changes on the **Cutting Mat** or on the **Layers Panel**. However, the results of the **Tiling** process will appear once you enter the **Cut Settings** window and click on the **Tiles** tab. Refer to *Section 8.06.4*.
 - Click on **Make Pages** and each tile will be placed on its own page in the file. The first page will retain the original image with no tiling. Thus, it's not necessary to use the **Tiles** tab in the **Cut Settings** window.
 - Click on **Export** and the **SVG Export** window will open. After you name the file, select the export settings, and click on **OK**, wait while the export files (one for each tile) are saved as separate SVG files, numbered with the file name you chose. Once the **Tiling** window closes, you are back to the same situation as in option (1).

8.06 Cut Settings

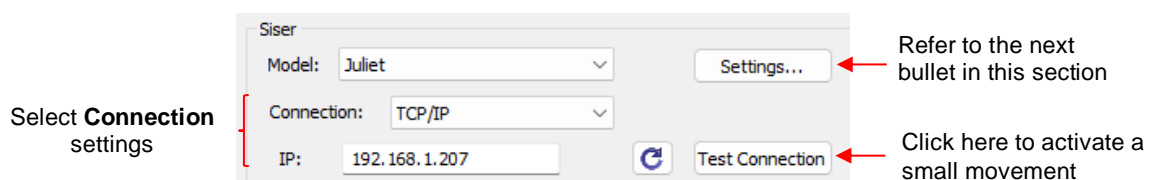
The cut settings vary from one cutter to the next based on the manufacturer of that cutter and its built-in functionality. For this reason, the screenshots presented in this section may vary from those you see.

8.06.1 Cut Window Settings

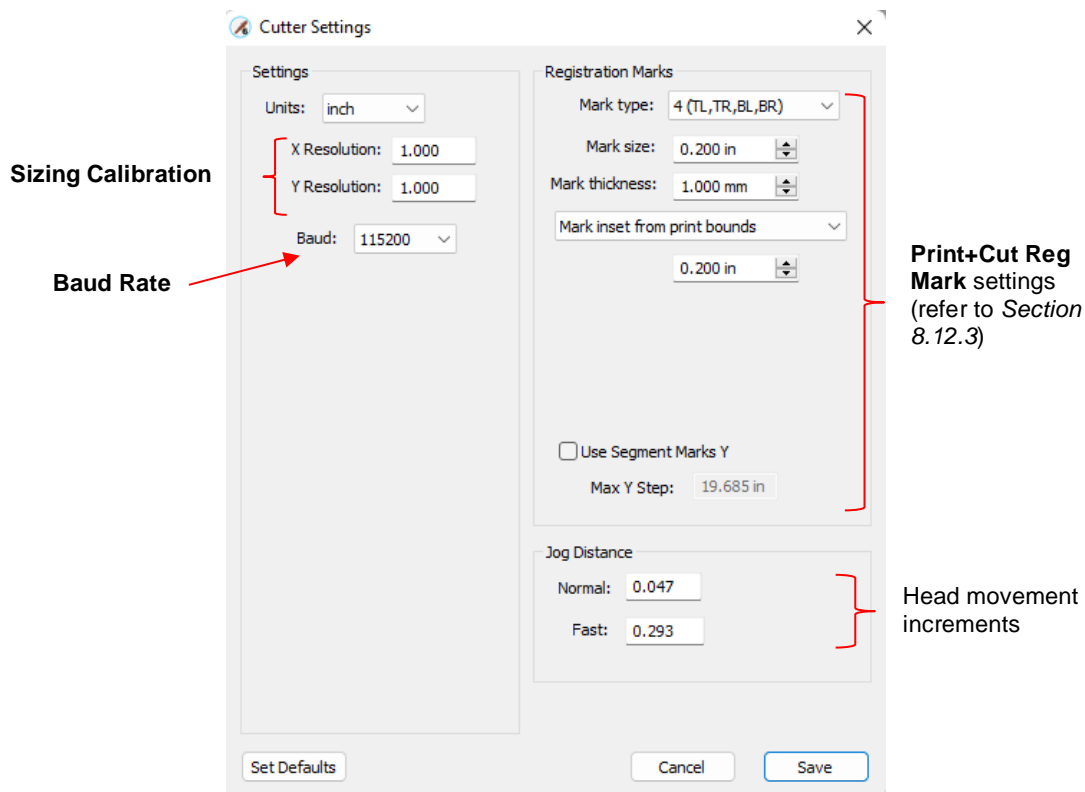
- When you are ready to execute a cut (or draw), the cut window can be opened using either of the following:
 - Click on the **Cutter** icon  on the **Toolbar**
 - Go to **Cutter>Cut With Siser** (or whichever brand/model of cutter you have added)
- The following window will open:



- **Cut Settings** tabs: The regular version of SCAL will only have the **General** tab. The PRO version has four additional tabs:
 - ◇ **Layers** (refer to *Section 8.06.7*)
 - ◇ **Cut by Color** (refer to *Section 8.06.3*)
 - ◇ **Tiles** (refer to *Section 8.06.4*)
 - ◇ **Extras** (refer to *Section 8.06.5*)
- **Zoom** icons apply to the **Preview** window. Use the **Preview** to confirm where shapes will cut relative to the cutter itself, which is also shown.
- **Connection Settings**: Choose the model of cutter being used and the connection settings. For Siser, Skycut, or StarCraft, choose either **USB** or **TCP/IP** (Wi-Fi).

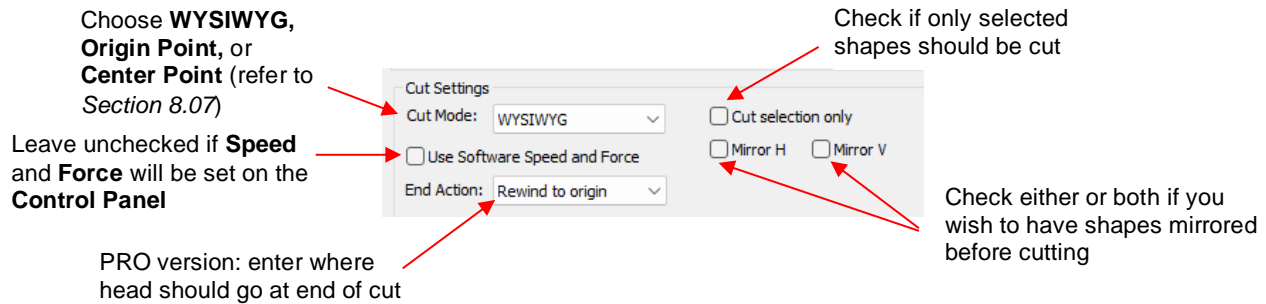


- **Settings**, which can also be accessed by going to **Cutter>Cutter Settings**, opens a new window with additional settings relevant to that model. Thus, this window may appear differently based on the cutter model you're using:

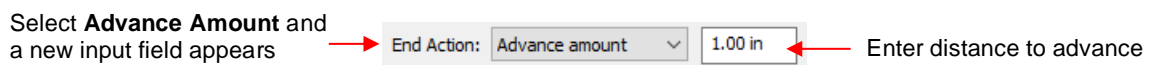


- ◇ **Sizing Calibration:** Most cutters are subject to cutting slightly different dimensions than what the shape is assigned in the software. For example, a 200 mm square might measure 199 mm x 201 mm.
 - **X Resolution** (also called **Belt Resolution**) = left to right correction (width) as you face the cutter and **Y Resolution** (also called **Wheel Resolution**) = up and down correction (height) as you face the cutter.
 - In both cases, you draw or cut a large rectangle, carefully measure with a ruler, and calculate:

$$\text{Resolution} = (\text{What the measurement should be}) \div (\text{What the measurement actually is}) \times (\text{Current Resolution entered})$$
 Then enter those numbers into the **Cutter Settings** window and test again.
- ◇ **Baud Rate:** This is the speed at which data travels from the computer to the cutter. In general, this is not a setting you would ever change. Refer to your cutter's user manual if you ever feel it may be in error.
- ◇ **Registration Marks:** Refer to *Section 8.12.3*.
- ◇ **Jog Distance:** The following settings apply when moving the head left/right or moving the mat or material in and out of the cutter:
 - **Normal:** the distance the head or mat moves with each arrow key increment
 - **Fast:** the distance the head or mat moves while holding **Shift** with each arrow key increment
- **Cut Mode Settings:** This section covers the following:



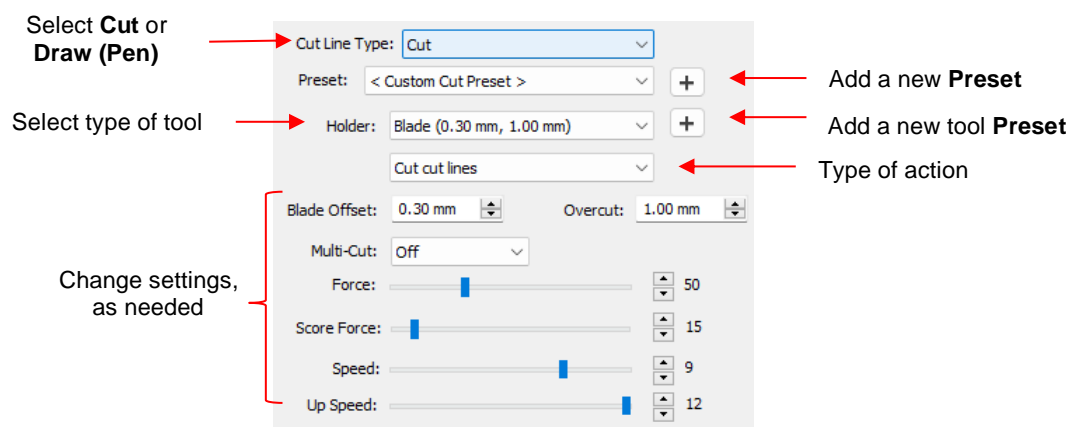
- ◇ **Cut Mode:** Refer to *Section 8.07* which covers controlling where shapes will cut.
- ◇ **Use Software Speed and Force:** On cutters with a control panel, the **Speed** and **Force** settings can typically be set there instead of in the software. Note, however, **Score Force** cannot be activated from the cutter's control panel, thus you will want to enable this option whenever you need to cut at two different pressures.
- ◇ **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:



- **Do Nothing:** the head stops at the location where it finished cutting

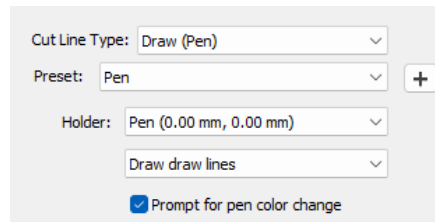
- ◇ **Cut selection only:** If you only want the shapes you have selected on the page to cut, then mark this box.
- ◇ **Mirror H and Mirror V:** Use one or the other options to if you want the shapes mirrored for cutting. This is very handy when cutting HTV or embossing. In both cases, you will be flipping over the material once the cutting or embossing is complete.

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



- ◇ **Preset** is a customizable menu where you can store settings for a particular material or application. Refer to *Section 8.06.2* for directions.

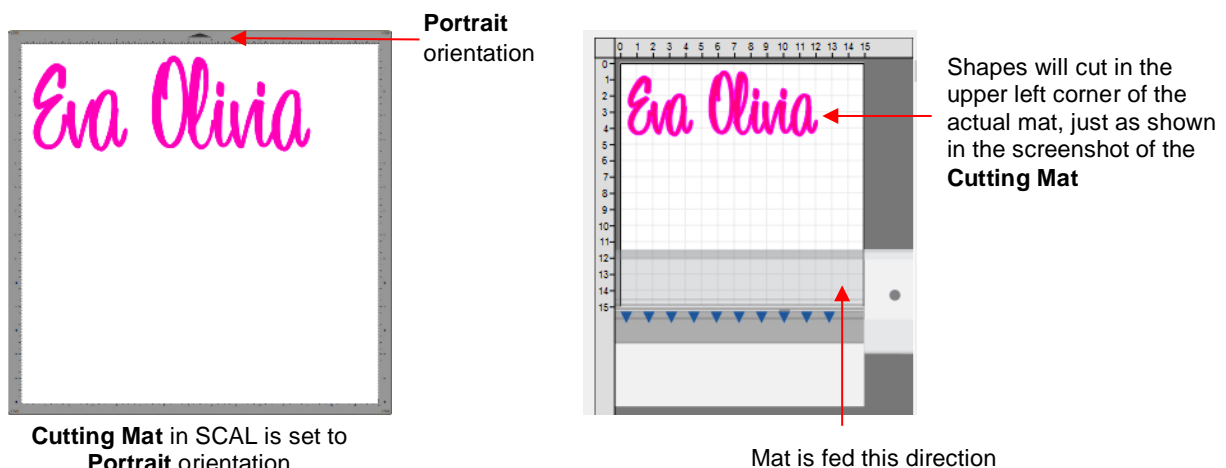
- ◇ **Holder** has choices for **Blade** or **Pen**. Like **Preset**, you can enter your own menu choices, such as other blades. Again, refer to *Section 8.06.2*.
 - If you select **Draw (Pen)** under **Holder**, then **Draw draw lines** is typically selected. There is also a **Prompt for pen color change option**. Marking that option will cause the cutter to pause after each pen color is executed so that a different pen or tool can be mounted:



- ◇ **Blade Offset** controls how sharp corners are handled and the setting should be provided with the blades you use. If set too low, corners will be rounded. If set to high, little bubbles will appear on outside corners and divots will appear on inside corners. Adjust as needed using 0.1 increments.
- ◇ **Overcut** controls the closing of shapes. If left at 0, you will find that fairly large shapes will still be attached to the waste material. In general, a setting of 1.0 mm is sufficient.
- ◇ **Multi-cut** is used when cutting thicker or denser materials where more than one pass is recommended. Each shape is cut the number of passes selected before the blade moves to the next shape to cut.
- ◇ **Force** and **Speed** (or other settings for your brand of cutter) should be covered in the user manual provided with your cutter. Note that if **Score Force** appears for your cutter, that is the **Force** that will be used for any layers you have assigned as **Score** on the **Style Panel**.

• Send to Cut Options

- ◇ **Print+Cut**: Clicking on this button opens the **Print and Cut** window. Because this function differs for each cutter, refer to the detailed instructions available for your cutter or read the on-screen instructions.
- ◇ **Save to File** (only available on some cutters): Click on this button to export and save the cut project as a PLT file onto a USB flash drive. This PLT file will not only contain the shapes to be cut but other relevant settings from the **Cut Settings** window.
- ◇ **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**:

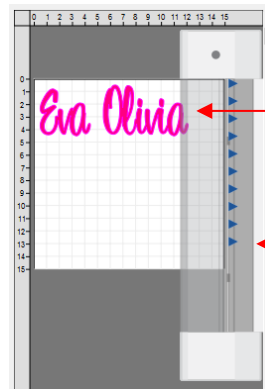


- Using the same **WYSIWYG** cutting mode, but having the **Cutting Mat** orientation set as **Landscape**, the **Preview** changes indicating the shapes will be cut in a landscape position:



Landscape orientation

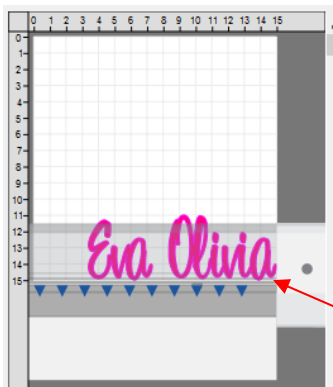
Cutting Mat in SCAL is set to Landscape orientation



Shapes will cut sideways (landscape-style) if you are facing the cutter head on

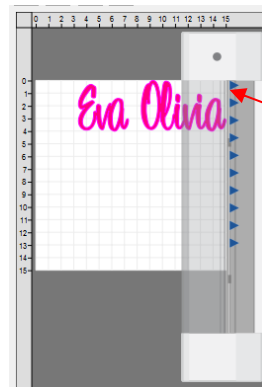
Mat is fed this direction

- 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:



Shapes are aligned with the origin

Portrait



Shapes are aligned with the origin

Landscape

- Additional details on controlling where shapes are cut are presented in *Section 8.07*.

8.06.2 Presets

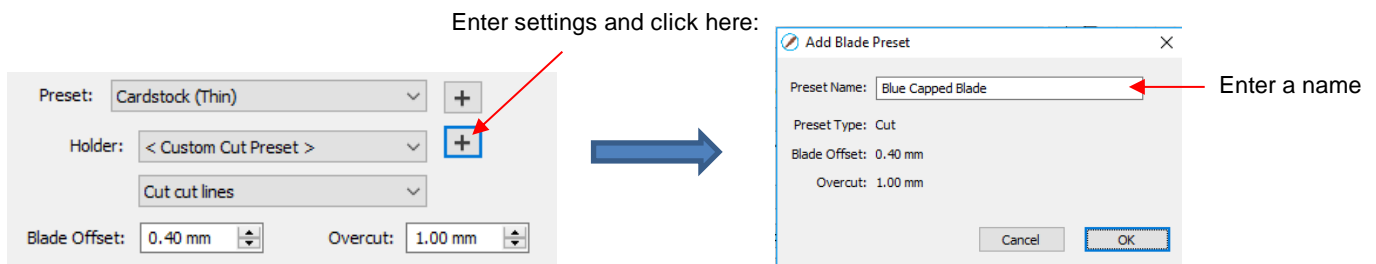
- **Presets** allow you to save your settings for a particular material or blade type. To do this, enter the settings you wish to save. Then click on the "+" to the right of **<Custom Preset>**:

Enter settings and click here:

Select which settings to include:

Enter a name

- After clicking on **OK**, the new preset will be found at the bottom of the list.
- In a similar manner, you can also add other **Holders** to your list, which would typically be blades with other **Blade Offset** values. For example:

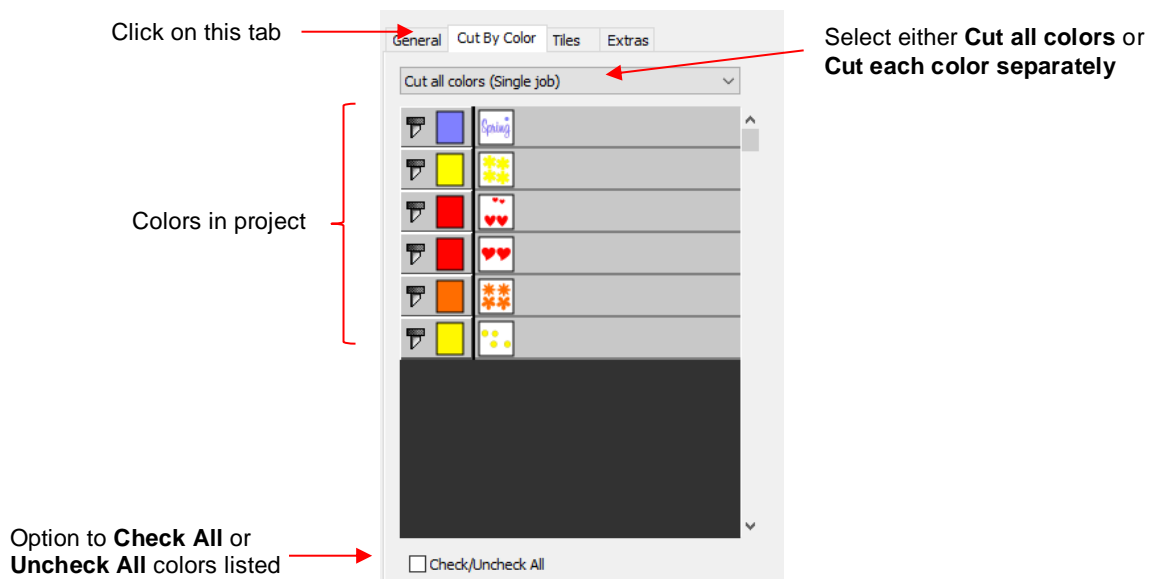


- To delete either type of preset that you personally added, select it from the menu and then a “ – ” button will appear. Clicking on that button will then remove it from the list:



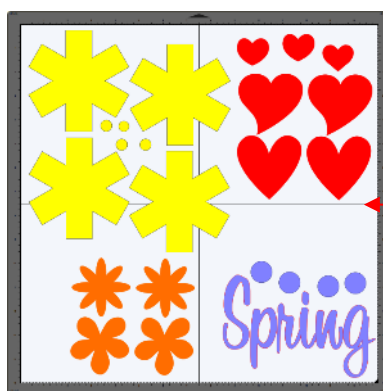
8.06.3 Cut by Color (SCAL PRO only)

- The **Cut by Color** function offers two capabilities:
 - Turn on and off colors to be cut without the need to hide layers on the **Layers Panel** or pre-select shapes to cut. In fact, you don't even need to ungroup mixed-color groups.
 - Cut all of the colors at once or have the cutter pause between colors, thus permitting the change out of materials
- To access **Cut by Color**, click on the **Cut by Color** tab in the **Cut Settings** window:



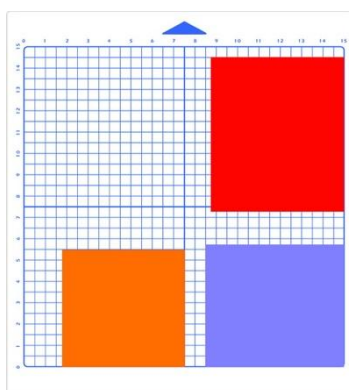
- Cut all colors (Single job):** In this mode all of the colors marked in this window will be cut at one time.
 - As an example, here are some shapes laid out on the **Cutting Mat**. Note how the grid is set to divide the mat into four quadrants:


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



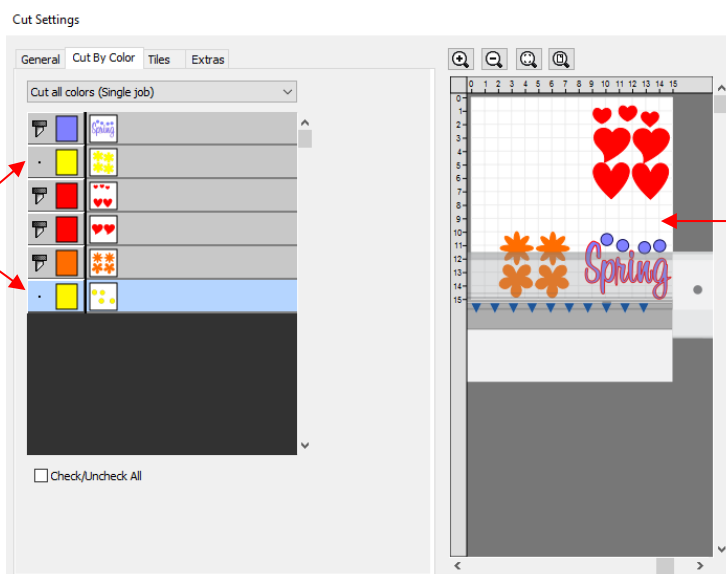
The **Cutting Mat** is divided into quadrants for easier placement of the scraps onto the actual cutting mat

- ◇ Let's say you also have scraps you want to use, however the yellow scrap you plan to use won't fit onto the mat with the other scraps. So, you want to cut lilac, red, and orange first. You place those colors into quadrants on the mat that match the layout on the **Cutting Mat** in SCAL:



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

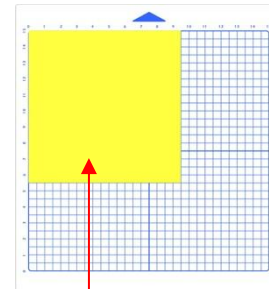
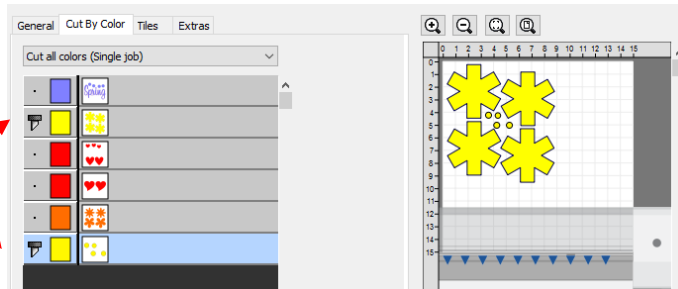
The yellow shapes are turned off



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:

Only the yellow shapes are turned on



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 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:

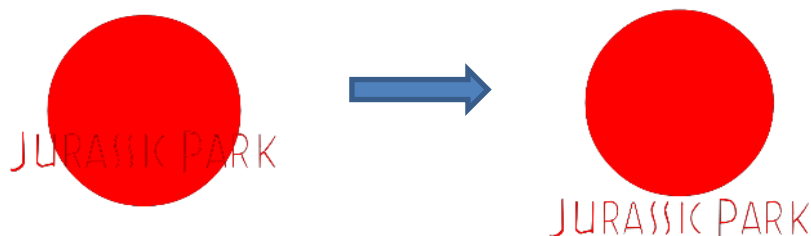


◇ Choosing the option to **Cut each color separately** is logical because:

The shapes are arranged on top of one another

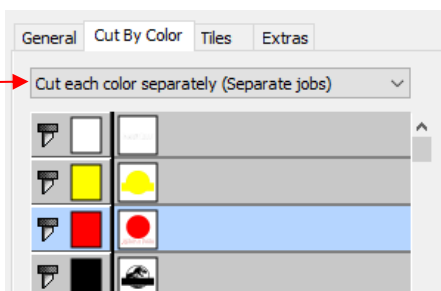
The size is so large that the individual colors cannot be placed on the cutting mat to cut all at one time

◇ 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:

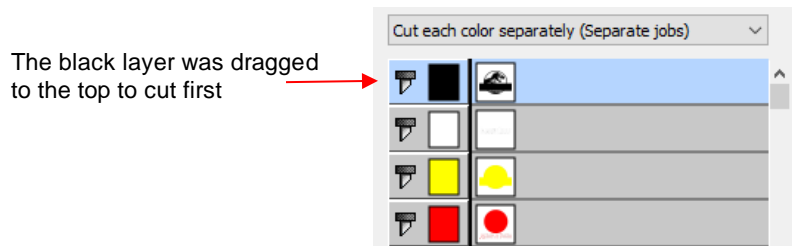


◇ In the **Cut Settings, Origin Point** should be chosen so that each color is moved to align with the origin and, thus, the material loaded each time in the same location. In the **Cut by Color** tab, the **Cut each color separately** option is chosen:

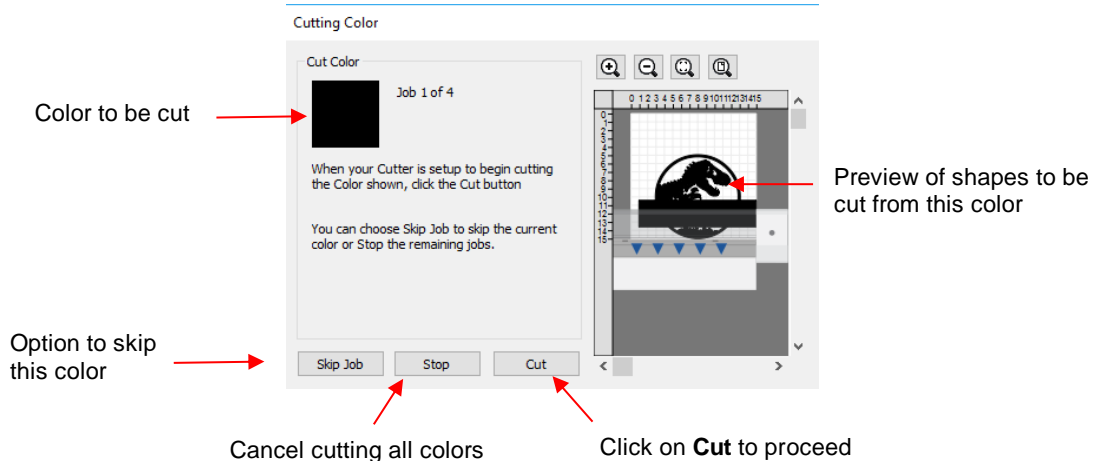
Switch to this option



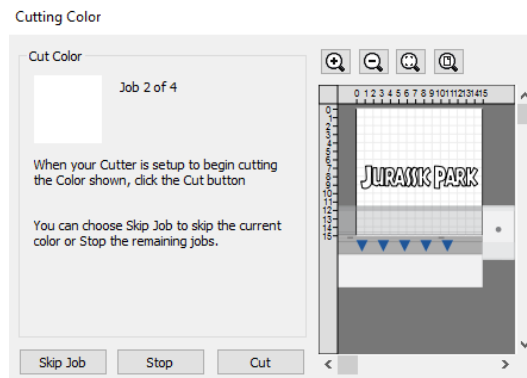
- ◇ Note that you can change the cut order by dragging the colors up or down the menu. For example, let say you already have black vinyl loaded into the cutter and the origin set to cut:



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

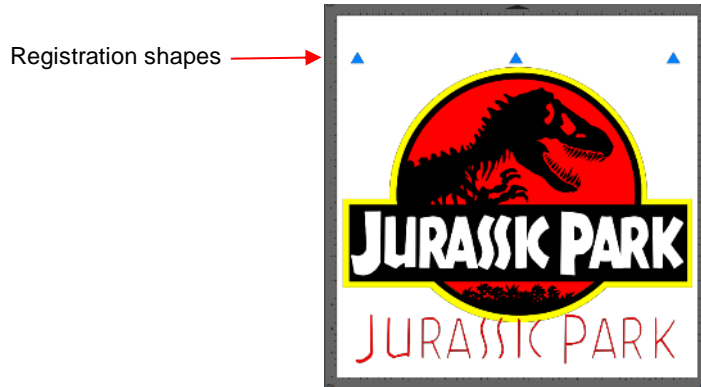


- ◇ If you decide not to cut this color, click on **Skip Job** and the next color in the menu will be selected. If you clicked on **Cut**, then the black shapes are cut out and then this same next color window will open:

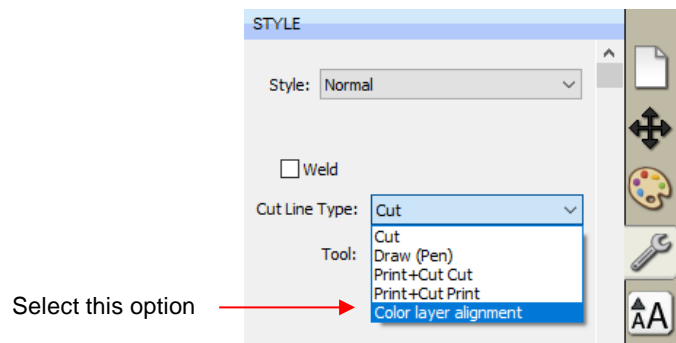


- ◇ And the process continues until all colors have been cut.

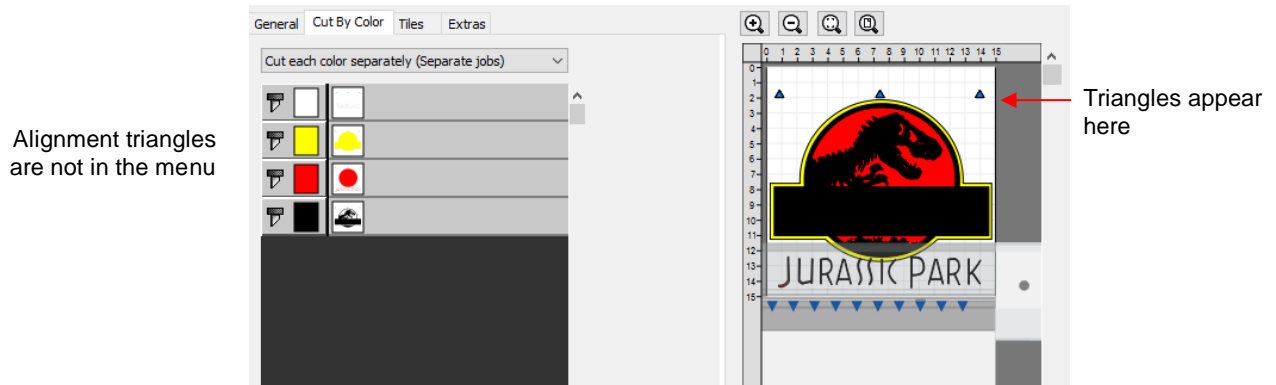
- In *Section 8.01*, **Color Layer Alignment** was mentioned as one of the options under **Cut Line Type** on the **Style Panel**. In applications, such as the one just presented, it can be tricky aligning the various colors after cutting. To make the job easier, small registration shapes can be added to the design and cut with every color so that they can then be lined up when layering color.
 - ◇ In the *Jurassic Park* example, three small triangles are added and grouped to be on the same layer:



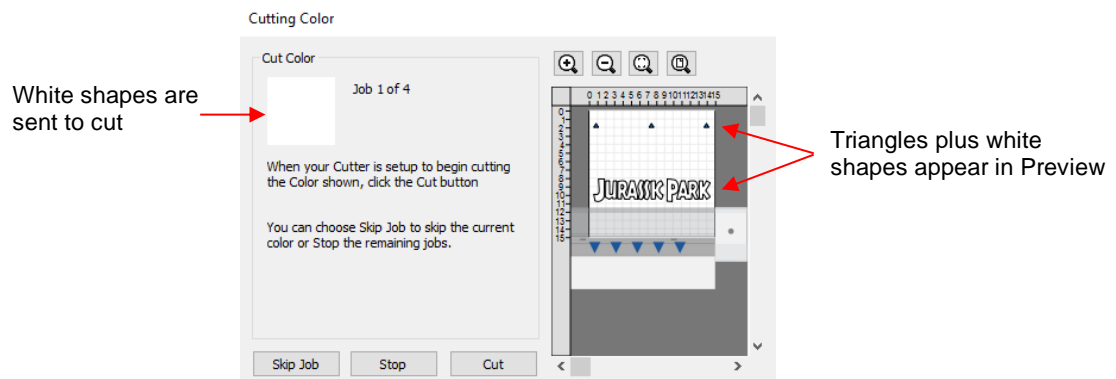
- ◇ The layer is selected and the **Cut Line Type** for this layer is changed to **Color Layer Alignment**:



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

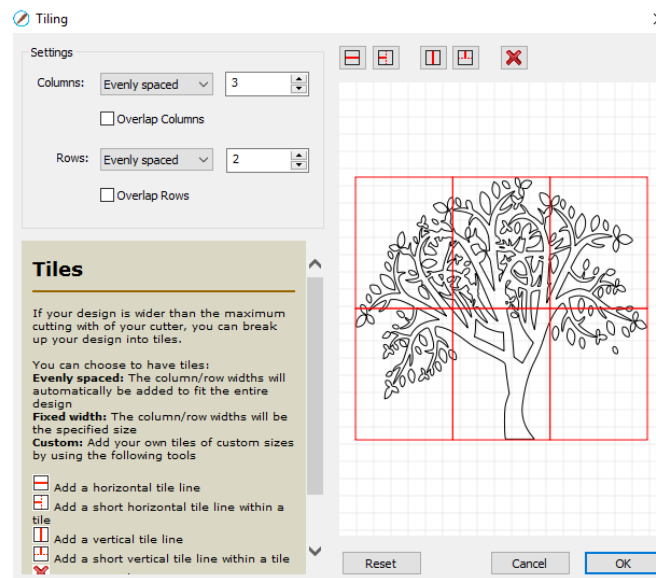


- ◇ Then, as each color window opens, the triangles will appear in the **Preview** for that color:

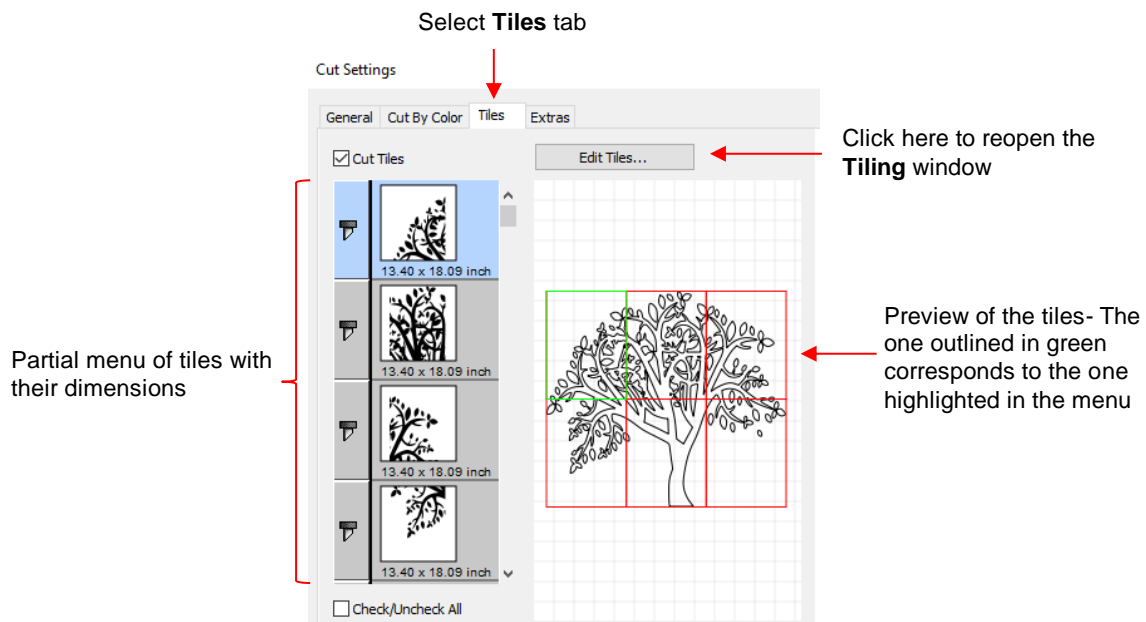



8.06.4 Tiles (SCAL PRO only)

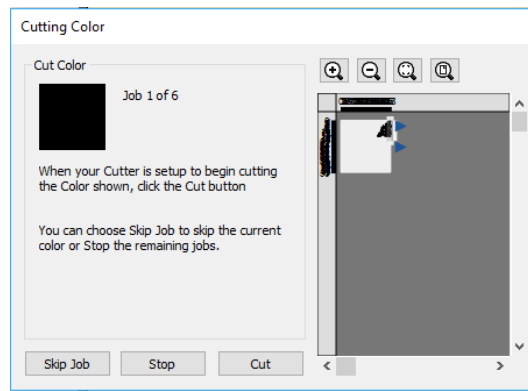
- In *Section 8.05*, you were shown how to use the **Tiling** function to split a design that is too large to cut based on the limits of your cutter:



- After clicking on **OK**, but before sending the design to cut, make the Cutting Mat dimensions fit the design. If any of the design extends beyond the boundaries of grid, those tiles will not cut.
- Open the **Cut Settings** window, click on the **Tiles** tab and check the box next to **Cut Tiles** to then open a menu showing the individual tiles with additional options:



- ◇ **Cut Tiles:** Mark this option first so that the menu and preview appears.
- ◇ **Edit Tiles:** clicking this button will take you back to **Effects>Tiling** in case you need to edit the settings.
- ◇ As with **Cut by Color**, clicking on the blade icon  next to any tile will prevent that tile from cutting. You can also drag tiles up or down in the menu to change the cutting order.
- After you click on **Cut**, be patient. It can take a minute or more for a large and/or detailed design to be processed by the software. Eventually, a window will open showing the first tile to be cut:



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

8.06.5 Extras (SCAL PRO only)

- The **Extras** feature allows you to duplicate shapes for cutting, without having to set it up on the **Cutting Mat**. To use this feature, click on the **Extras** tab in the **Cut Settings** window:

Select **Extras** tab

Check this box first to then activate other settings →

Mark this option to use **Cutting Mat** dimensions or enter actual size of material →

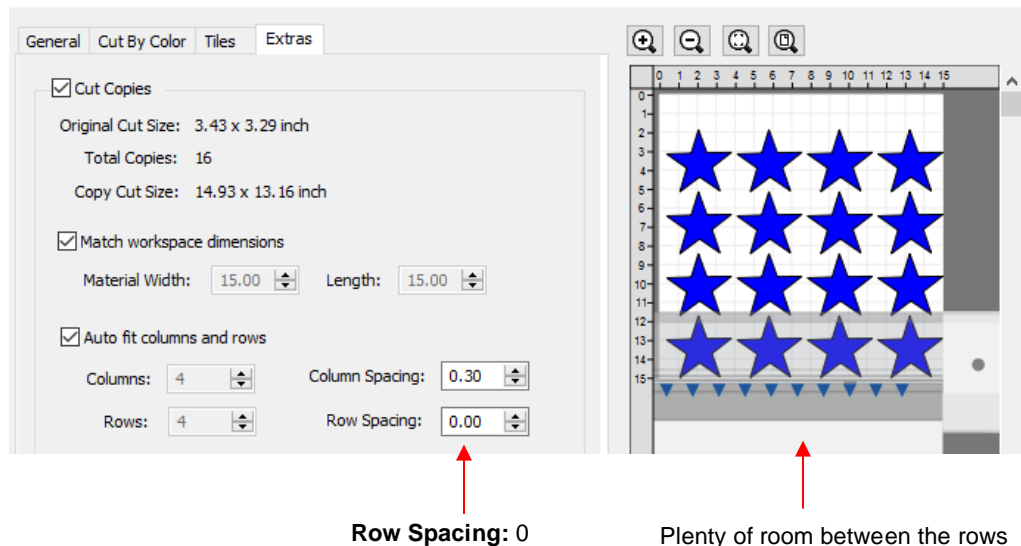
Mark **Auto fit** or enter desired numbers of **Columns** and **Rows** →

Enter desired **Spacing** for both **Columns** and **Rows** →

The **Preview** will update as settings are changed

- ◇ **Cut Copies:** Mark this option first so that other settings become editable
- ◇ **Match workspace dimensions:** If your material is the same size as the **Cutting Mat**, then mark this option. Otherwise, enter the **Width** and **Length** of the material to be used. Pay attention to the **Preview** window to make sure you have the orientation correct to match how the material is placed on the cutting mat.
- ◇ **Auto fit columns and rows:** Mark this option if you want as many duplicates as possible cut from the material. Otherwise, enter the desired number of **Columns** and **Rows** to match the number of copies needed.

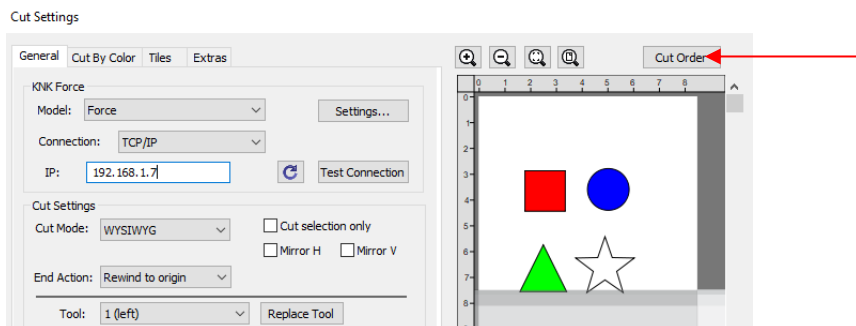
- ◇ **Spacing:** Adjust the spacing as desired. In general, shapes can be quite close together when cutting from thinner materials, such as vinyl and cardstock. In some cases, such as with a star, you can even use 0 for the **Row Spacing**, since the bottom of the shape is not close to the top of the shape in the row below it:



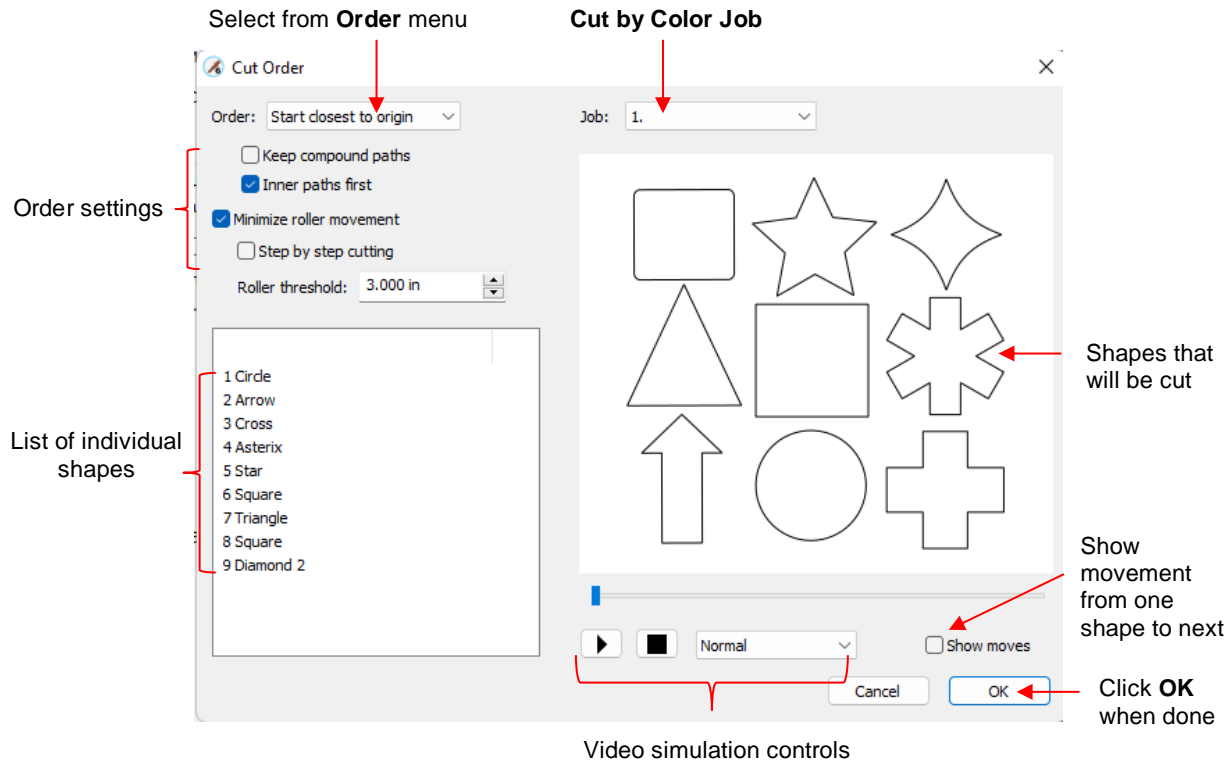
- Make sure you have all of the cut settings made under the **General** tab of the **Cut Settings** window. Once you click on **Cut**, all of the duplicates will be cut out and it appears that using **Cancel**, in the current version of SCAL, will not abort the cut.

8.06.6 Cut Order (SCAL PRO only)

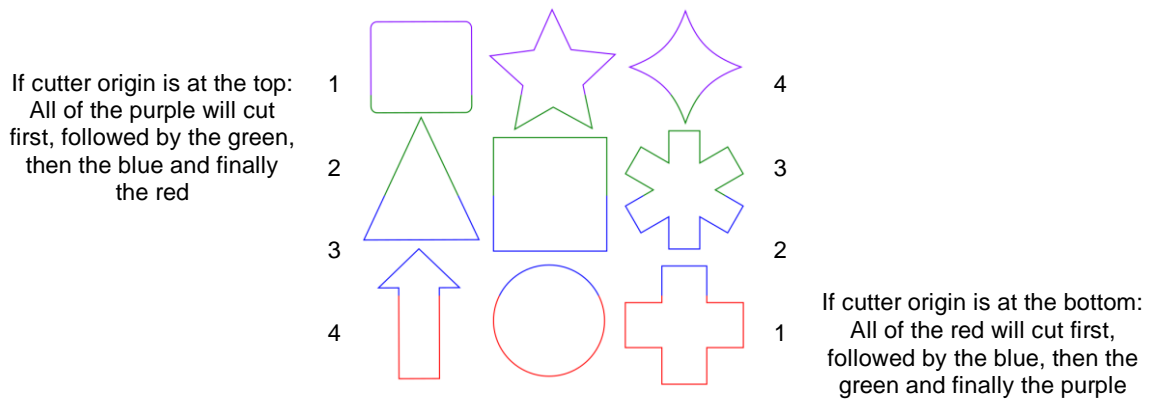
- The **Cut Order** function provides control over the order in which shapes will be cut on your cutter. To access this function, go to the **Cut Settings** window and, in the upper right corner, click on **Cut Order**:



- When you click on **Cut Order**, the following window will open, displaying the shapes that will be cut:




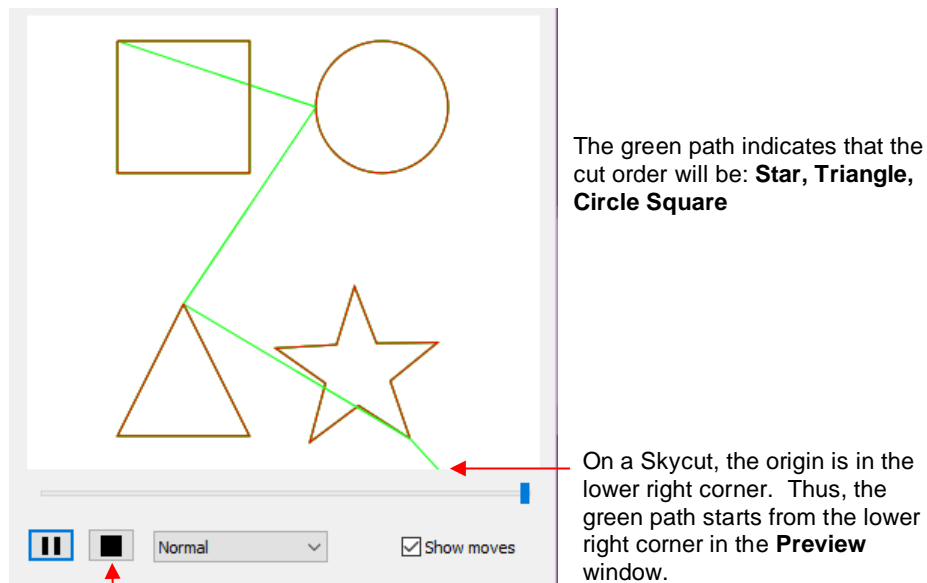
- ◇ **Order** - Select start location preference from the following:
 - **Start closest to origin** – The first shape to cut will be the one closest to the cutter's origin based on where the blade drops down to cut that shape.
 - **Start farthest from origin** – The first shape to cut will be the one farthest from the cutter's origin, again based on where the blade drops down to cut that shape.
 - **Layer order (Back to Front)** – The shapes will cut from bottom to top on the **Layers Panel**
 - **Layer order (Front to Back)** – The shapes will cut from top to bottom on the **Layers Panel**
- ◇ **Keep compound paths** – If two or more shapes have been joined using **Object>Merge**, they will be treated as a single shape in the cutting order.
- ◇ **Inner paths first** – It's almost always desirable to have an inner/child shape cut before an outer/parent shape due to stability of cutting the inner shape. However, that option can be turned off and inner shapes will be treated independently in the cutting order.
- ◇ **Minimize roller movement** – The accuracy of cut location (very important in print and cut applications) can be affected if the material or mat is rolling in and out over long distances throughout the cut. This option is also usually left marked.
- ◇ **Roller threshold** – Select from 0.01 inches to 10 inches based on the maximum roller movement allowed when cutting a series of shapes before advancing the mat/material to the next series. Note that if the **Keep compound paths** option is marked, it will take precedence over **Roller threshold**.
- ◇ **Step by step cutting** – When enabled, the cutting will cease on all paths once the **Roller Threshold** limit is reached. After those partial cuts within that limit are completed, the paths within the next range will be cut. Thus, in the example shown, with the **Roller Threshold** set to 3":



- ◇ **Job** – If **Cut by Color** with **Separate Jobs** has been opted, select each job separately from this menu to set the cut order, as desired.

- A video simulation is available so that you can verify the cut order:

- ◇ Click on the **Play** icon . The shapes will be sequentially highlighted in the order in which they will cut.
- ◇ There are three speeds in which this video can be played: **Slow**, **Normal**, **Fast**. As an example, verifying the cut order for a rhinestone pattern is probably best set at **Fast**.
- ◇ Marking the **Show moves** option will draw a green path between the shapes indicating the cut order. It also shows the starting location on each shape and the map will remain displayed at the end of the video. A simple example using only 4 shapes:



To replay video, click here first.
Then click the **Play** icon.

- ◇ To replay the video, click the black square icon  first. Then the **Play** icon will return and can be clicked.

8.06.7 Layers (SCAL PRO only)

- There may be occasions where you want certain layers of your project to cut at different settings than other layers. Two examples would be:

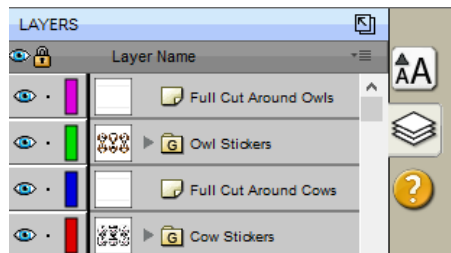
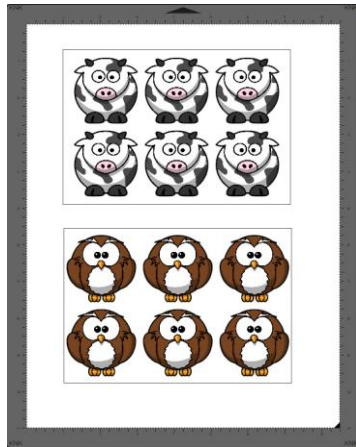
- ◇ Cutting adhesive stickers where by you only want to kiss cut the stickers themselves, but then full cut around groups of them.
- ◇ Cutting a thick or dense material whereby you might want the first few passes to be at a lower pressure, followed by a heavier pressure for the last few layers.

- The **Cut by Layer** feature of SCAL6 involves four steps:

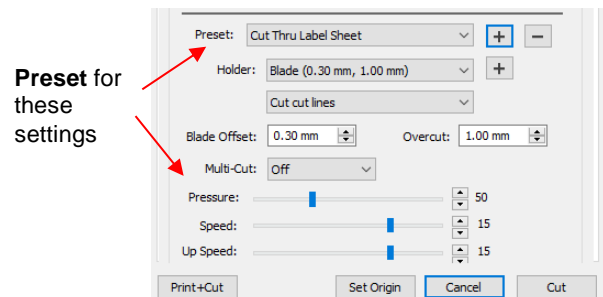
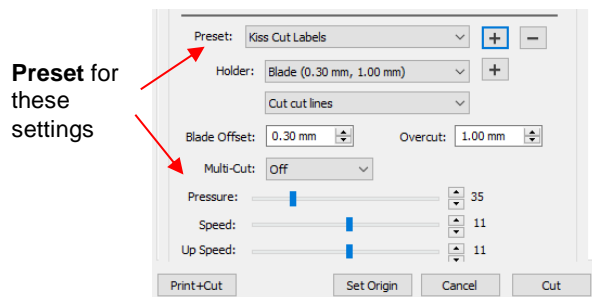
- (1) Create **Presets** for the different settings to be used. This was covered in *Section 8.06.2*.
- (2) On the **Style Panel**, assign a **Preset** to each layer and order layers by **Preset**.
- (3) In the **Cut Order** window (refer to *Section 8.06.6*) change the **Order** to match the **Layers Panel** order you wish to use.
- (4) On the **Layers** tab in the **Cut Settings** window, select which layers will be cut and whether or not there needs to be a pause between cutting the layers to change out a tool.

- Using the first example, cutting adhesive stickers, let's assume that you have two blade holders set to cut out stickers. One has the blade barely exposed so that the stickers will be kiss cut without penetrating the backing sheet and the other blade holder is set to cut through the sticker material and the backing sheet.

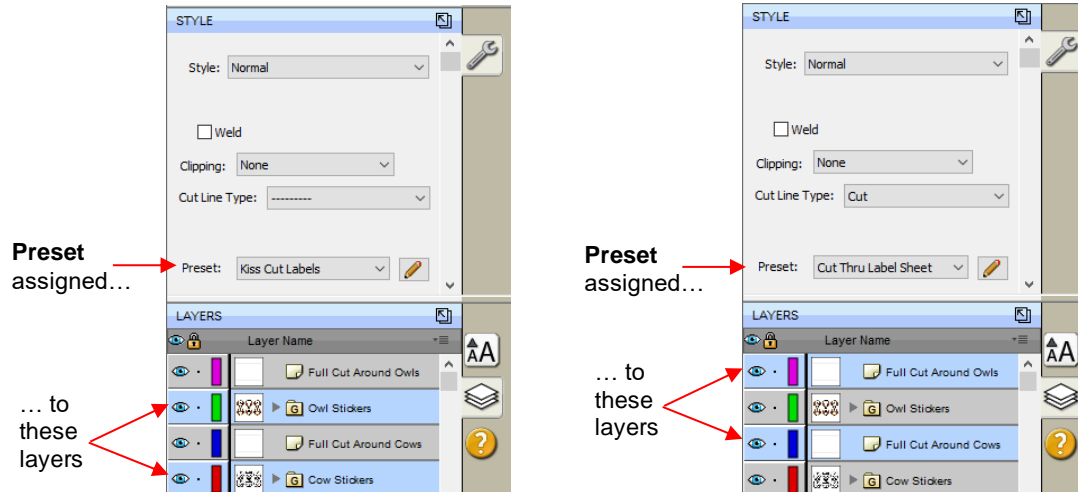
- ◇ A project is designed with two sets of stickers and outside cuts around each set:



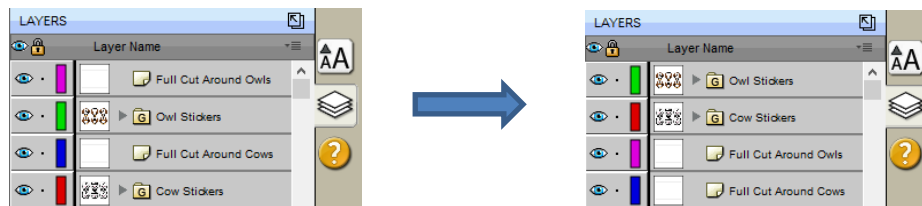
- ◇ Create two presets in the **Cut Settings** window. (Again, for directions on creating **Presets**, refer to *Section 8.06.2*):



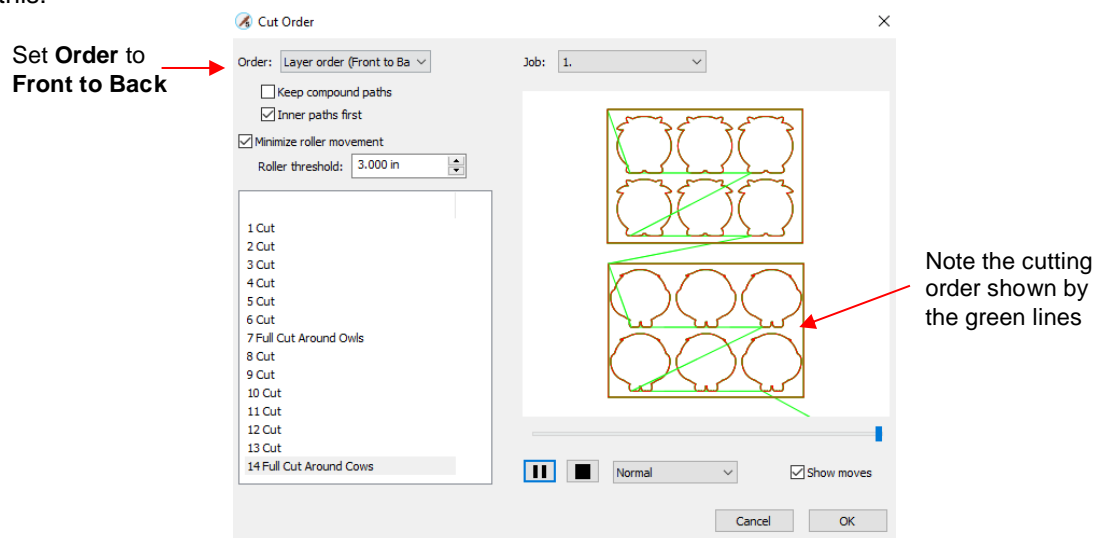
- ◇ On the **Style Panel**, select each pair of layers and assign the required **Preset** to that pair:



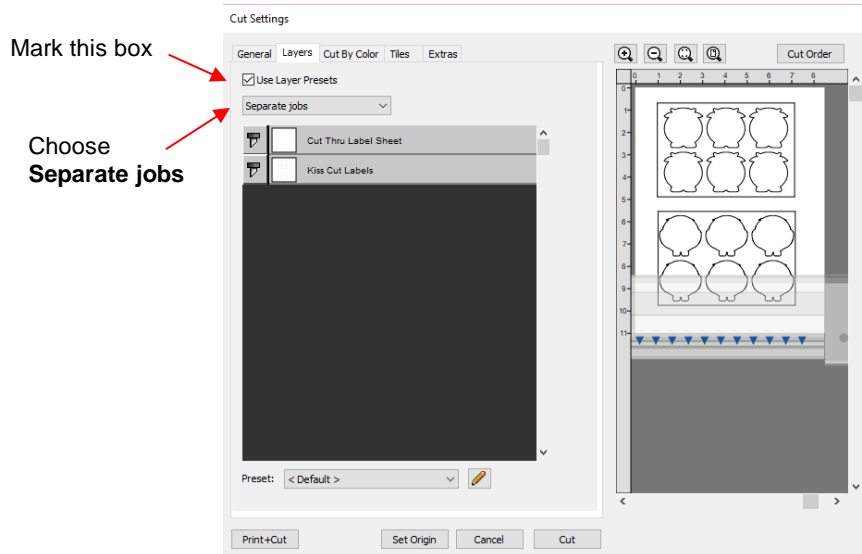
- ◇ Order the layers so that those cutting with the kiss cut blade holder are at the top and the layers with the more-exposed blade holder are at the bottom:



- ◇ Go to the **Cut Settings** window and click on the **Cut Order** tab. In the **Order** menu, select **Front to Back** and the cut order will then be top to bottom on the **Layers Panel**. The video simulation confirms this:



- ◇ Click on **OK** to close the **Cut Order** window. Now click on the **Layers** tab and the following window will open:



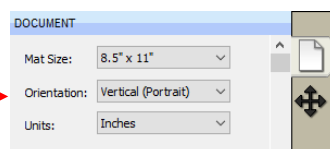
- ◇ Mark the option for **Use Layers Presets** and select **Separate Jobs**. Click on the **Print + Cut** button and the print and cut process can be carried out as normal. Watch for the job prompt windows to pop up and follow all instructions.

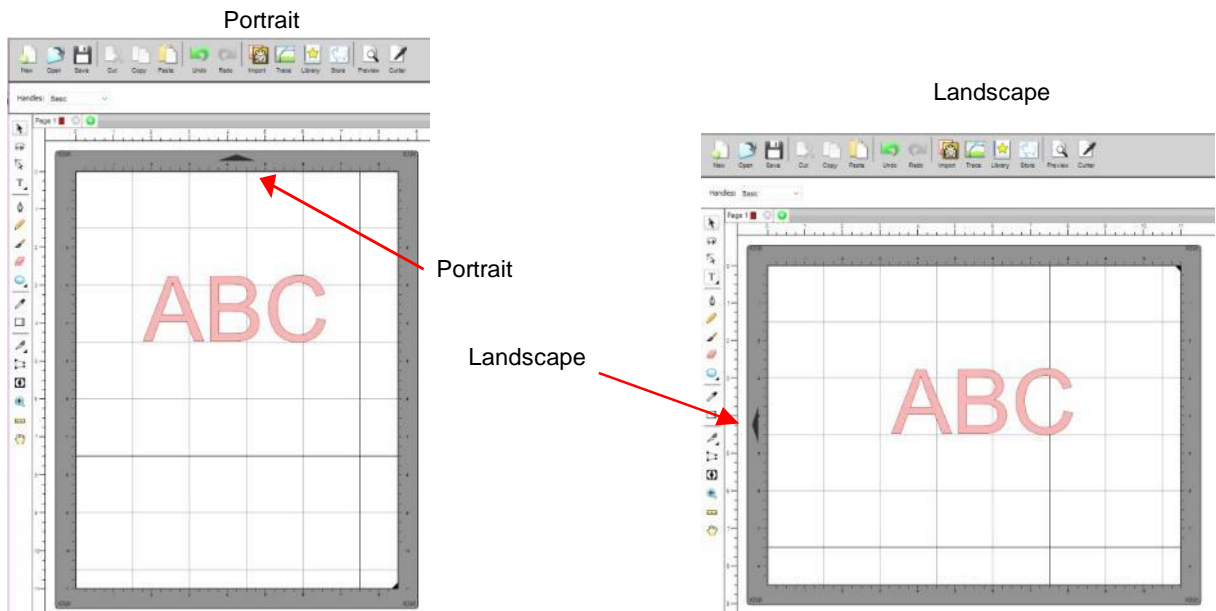
8.07 Controlling Where Shapes Will Cut

8.07.1 Overview

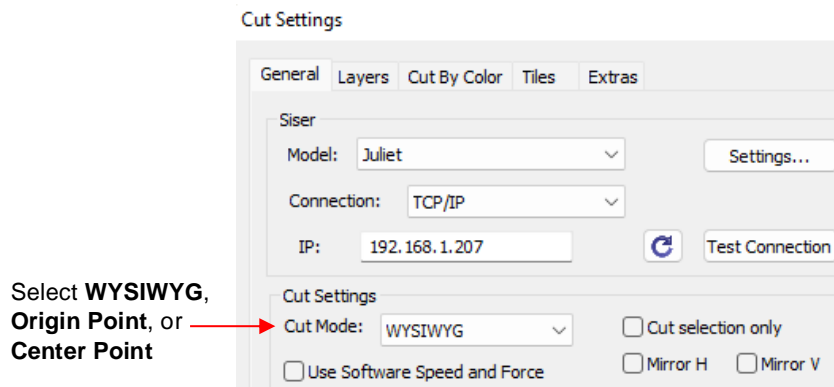
- There are two **Orientations** for cutting:
 - ◇ **Portrait** – Shapes will cut in the same orientation you see on the **Page**
 - ◇ **Landscape** – Shapes will cut 90° clockwise to the orientation you see on the **Page**
- There are 4 available **Cut Modes** when cutting to the Skycut:
 - ◇ **WYSIWYG** – Shapes will cut relative to their position on the **Page** (refer to *Section 8.07.2*)
 - ◇ **Origin Point** – Shapes will cut to align with the origin set before cutting (refer to *Section 8.07.3*)
 - ◇ **Center Point** (not available for all cutters) – Shapes will cut to center around the origin set before cutting (refer to *Section 8.07.4*)
 - ◇ **Print and Cut** – Shapes will cut based on manual or automatic alignment with printed registration marks
- The **Orientation** is set on the **Document Panel**:

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



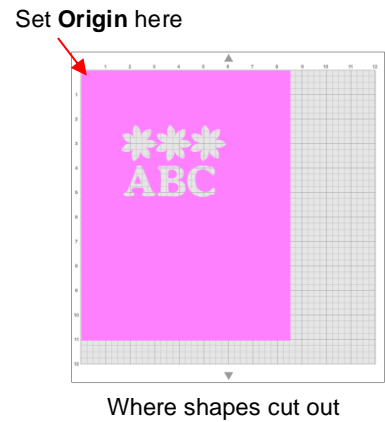
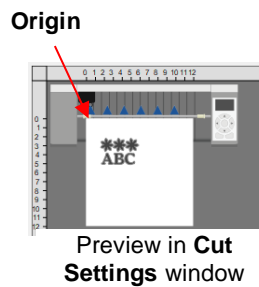
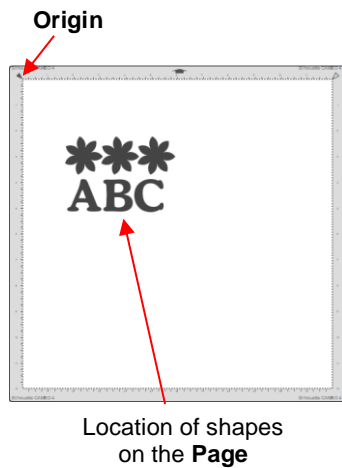
- **IMPORTANT:** All three **Cut Modes** are based on setting an XY origin on the cutter (a location immediately before sending the shapes to cut).
- The best way to learn how these settings affect where shapes cut is to recreate what you see in these screen shots and test them out with a test pen and paper. Eventually, it will all make sense to you and, of course, there's help available if you need it.

8.07.2 WYSIWYG

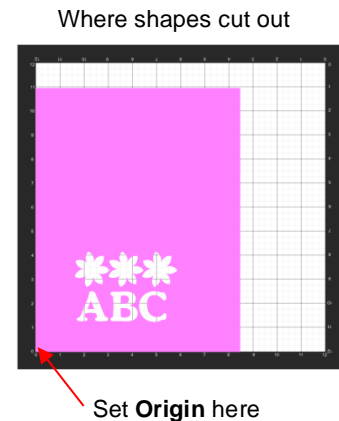
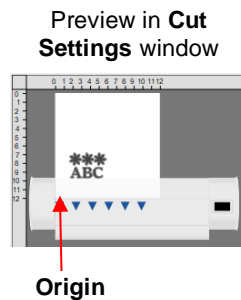
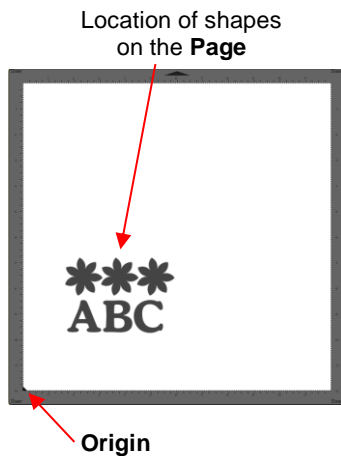
- This is the mode recommended when you need to cut shapes based on their location on the **Page**. This is also the mode needed when you are utilizing multiple tools in applications such as draw and cut or emboss and cut.
- The **Mat Size** on the **Document Panel** is typically set up to match the actual cutting mat you plan to use. Shapes can be located anywhere on the **Page**. 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.

- Note the following differences in which you typically position your shapes (in **Portrait** mode) and where the shapes will then be cut, based on popular cutter brands:

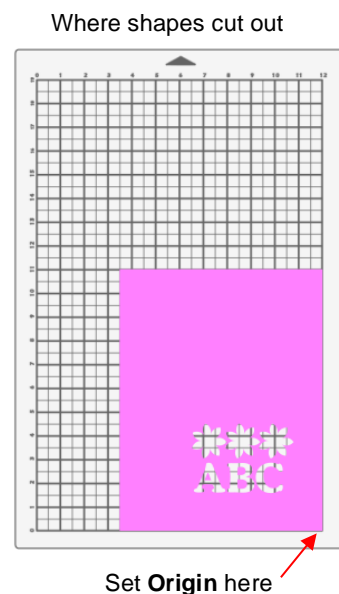
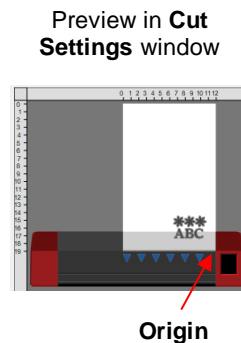
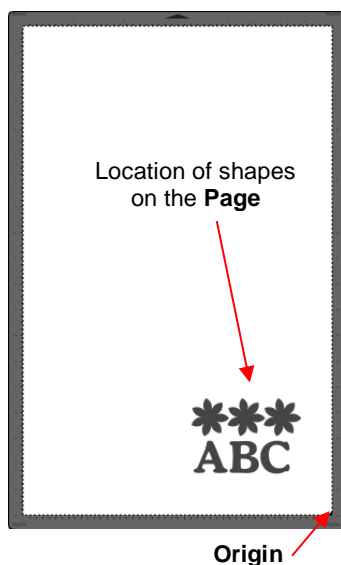
◇ Silhouette Cameo (origin is top left):



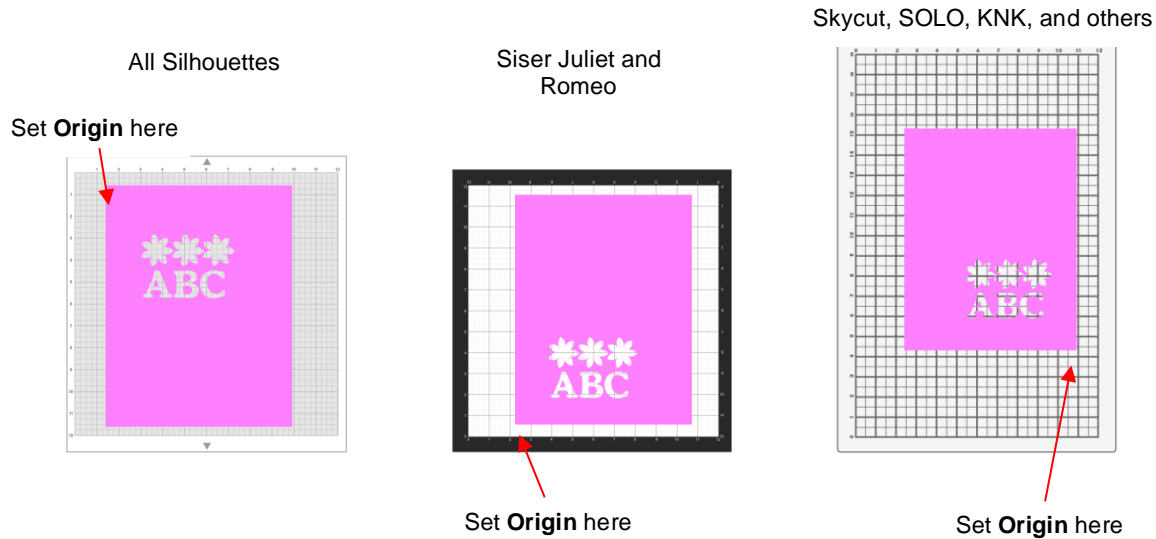
◇ Siser Juliet (origin is bottom left):



◇ Skycut, StarCraft SOLO, KNK USA, many other vinyl cutters (origin is bottom right)



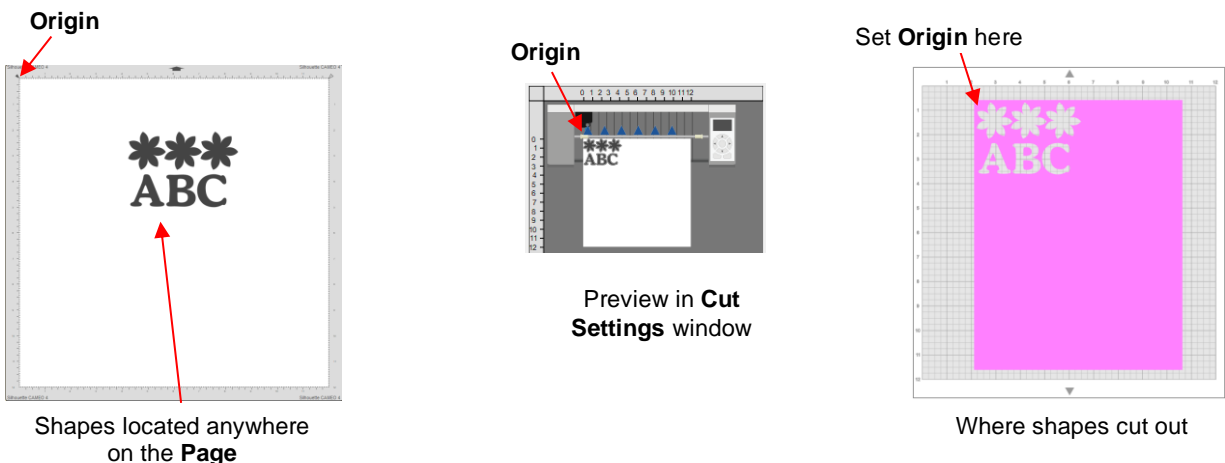
- Also, if you set the origin on the material itself, the material can be located anywhere on the cutting mat. It is usually advisable to set that origin just a smidgeon inside the corner of the material so that you do not inadvertently cut off the edge.



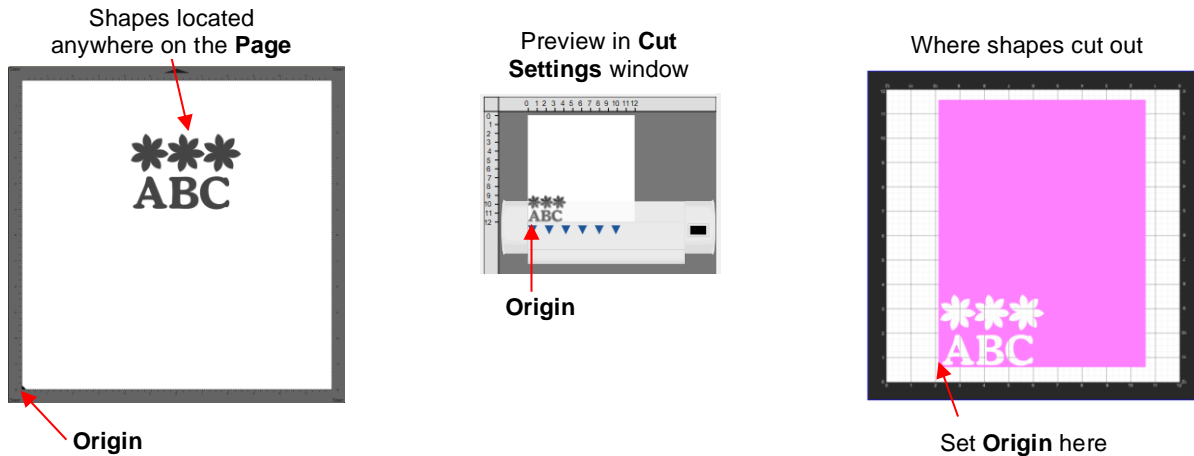
8.07.3 Origin Point

- This is the mode recommended for most applications as it economizes the use of your cutting materials.
- Shapes can be located anywhere on the **Page**. The shapes will be moved and aligned to cut with the origin you set on the material. As mentioned earlier, the origin is based on the location of the blade tip before cutting (with the exception of several brands that use the laser light instead, e.g., KNK Zing)
- Note the following differences in which you typically position your shapes (in **Portrait** mode) and where the shapes will then be cut, based on popular cutter brands:

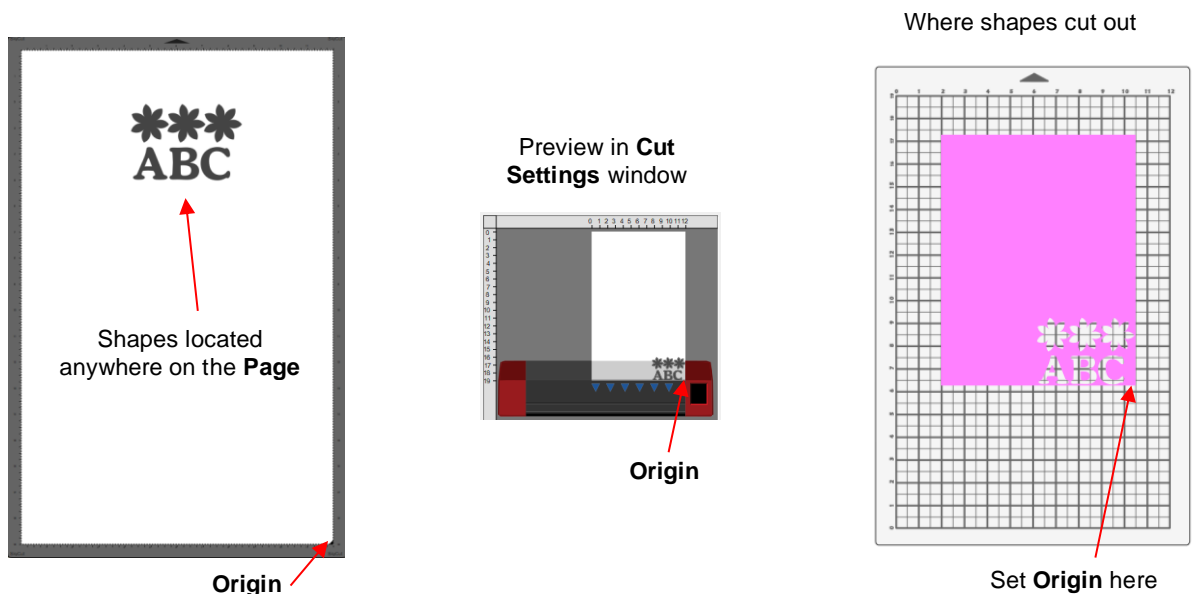
◇ Silhouette Cameo (origin is top left):



- ◇ Siser Juliet (origin is bottom left):

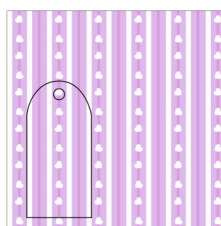


- ◇ Skycut, StarCraft SOLO, KNK USA, many other vinyl cutters (origin is bottom right)

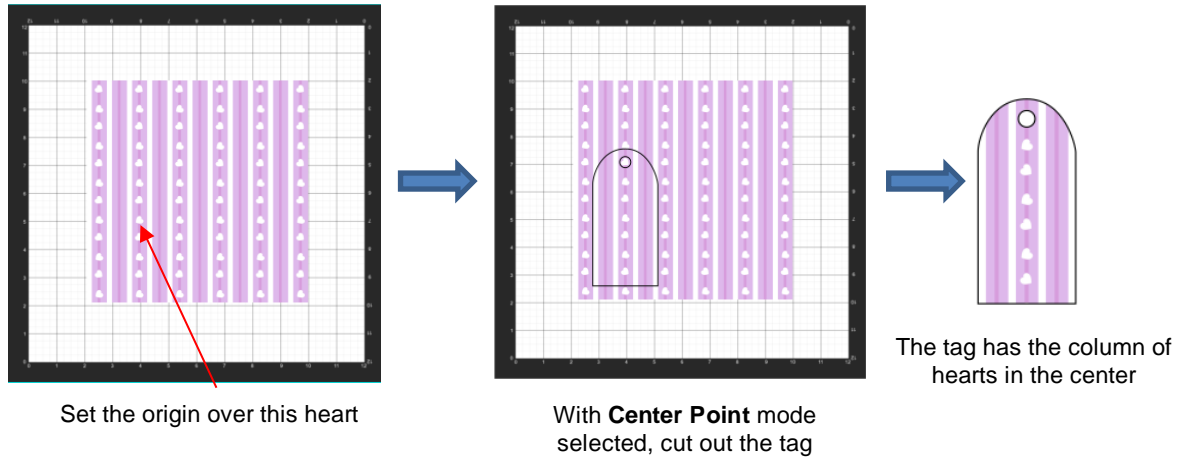


8.07.4 Center Point

- This is a mode not available with most cutter models as it was not introduced until ~ 2018. It can be useful for centered engraving on an existing item, such as a trophy label or a dog tag. It can be used when you want to cut a shape from a very specific location on a material.
- In the following example, you want to cut a tag shape from this patterned paper in this location so that the column of hearts will be perfectly aligned through the center of the tag:



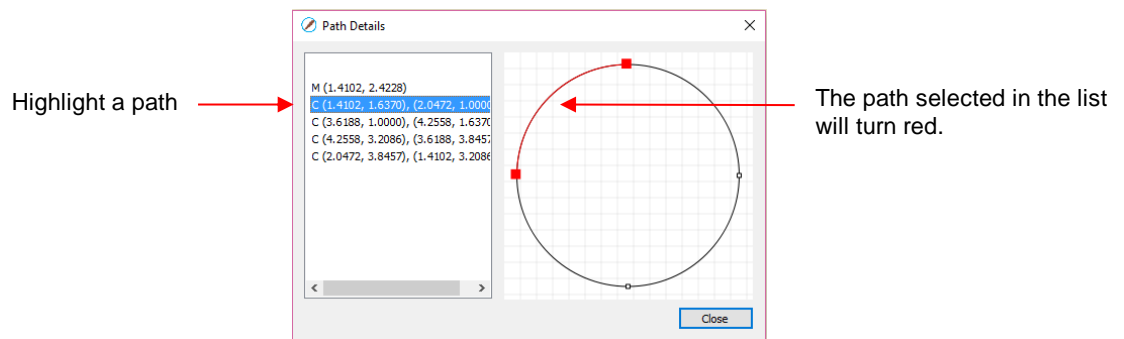
- With the paper on the mat, set the origin over one of columns of hearts making sure you have enough room around that origin for the shape to cut out. The tag shape can be located anywhere on the **Page**. With **Center Point** enabled, cut the tag:



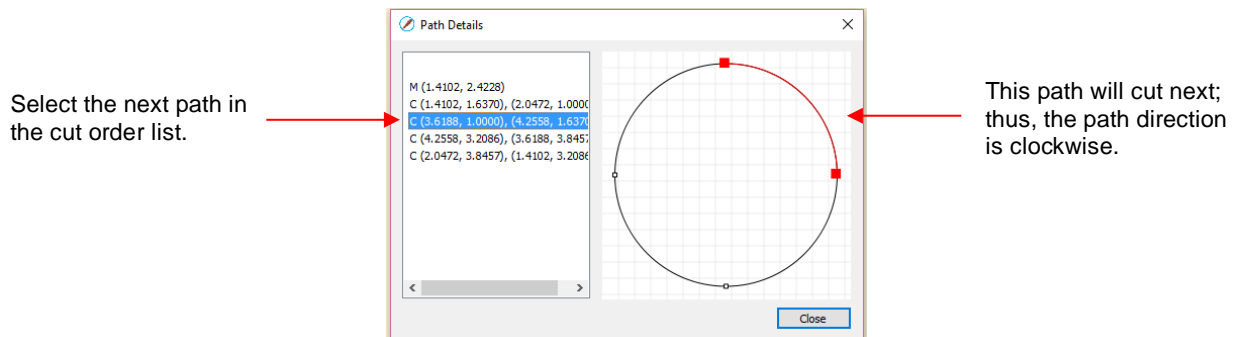
- ◇ When setting the origin, use the most exact method available to you. In other words, if you have a cutter with a camera, use that the camera. If you have a cutter with an alignment or a laser light, use that.

8.08 Path Details and Reverse Path

- Sometimes a cutting issue can be resolved by reversing the direction of a cut. In SCAL, the cut direction (clockwise versus counterclockwise) can be checked using the following steps:
 - ◇ Select the shape, right-click and select **Path>Path Details**.
 - ◇ A window will open. On the left side is a list of the paths in the order they will cut. Click on any path in the list and that path will turn red:



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

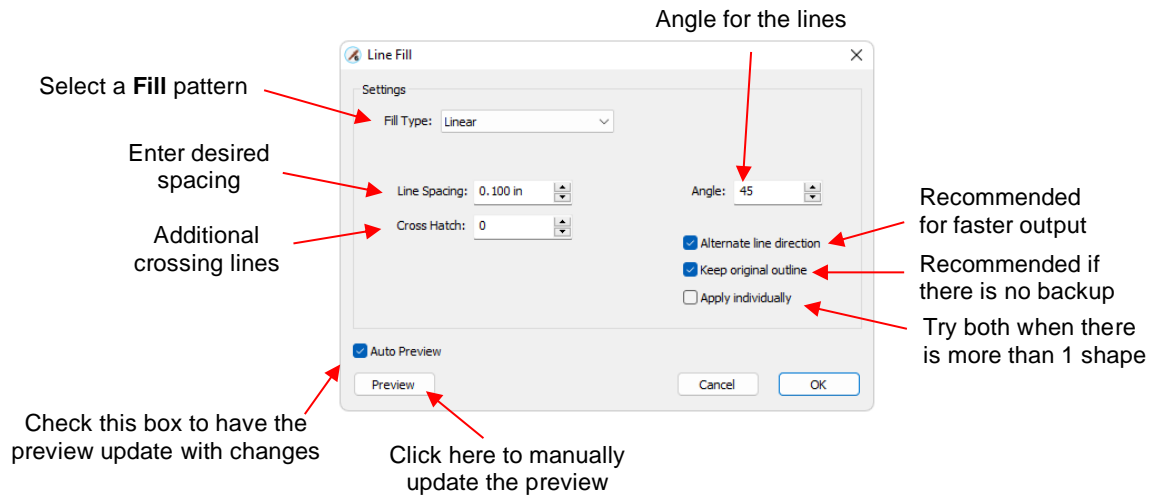


- To reverse the direction of a path, use either of the following after selecting the shape:

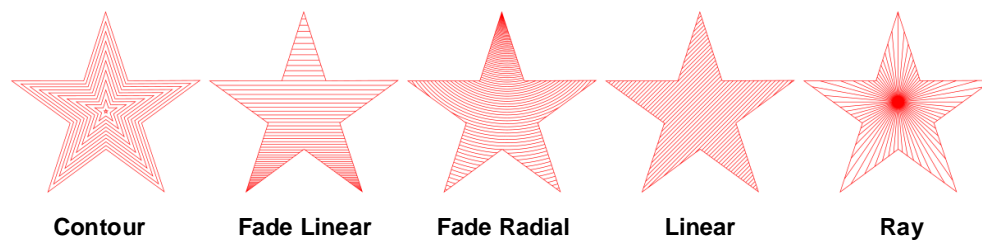
- ◇ Right-click and select **Path>Reverse Path**
- ◇ Go to **Path>Reverse Path**

8.09 Line Fill

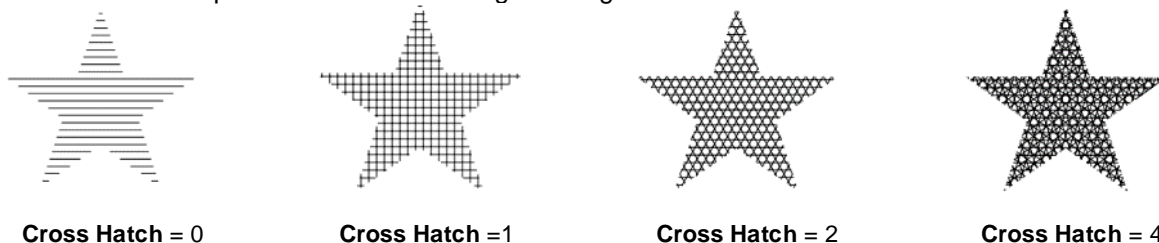
- The **Line Fill** function creates a line or hatch fill pattern, typically used for engraving with an engraving tool. It can also be used for coloring in shapes with a pen or embossing some materials with an embosser.
- To access this function, select one or more shapes and go to **Effects>Line Fill**:



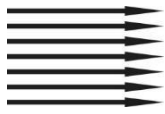
- **Fill Type:** There are 5 optional patterns from which to choose. Each pattern has its own settings for customizing the appearance and spacing of the lines:



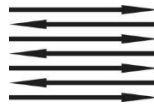
- Because the most common pattern will be **Linear**, its settings are as follows. For details on the other patterns, refer to the following *Expanded Tutorial*: <https://tinyurl.com/3tb36csw>
 - ◇ **Line Spacing:** This is selected based on the width of the line produced by the tool to be used. If it's too small to accurately measure, use 0.02" or 0.5 mm for a small test shape and then adjust, as needed, to fit the tool and application.
 - ◇ **Angle:** Choose an angle for the **Line Fill**. An **Angle** of 0 results in horizontal lines and an **Angle** of 90 results in vertical lines. Note the diagonal pattern in the prior screenshot using an **Angle** of 45.
 - ◇ **Cross Hatch:** Increasing **Cross Hatch** adds additional intersecting lines to the pattern which can result in a more complete fill but will take longer to engrave or draw:



- ◇ **Alternate line direction:** This controls whether the tool always returns to the same side before dropping down to engrave or draw. In some applications, it may need to be unchecked to provide a more even appearance, however it will take much longer to execute:



Alternate Line Direction: not marked
Tool only travels in one direction

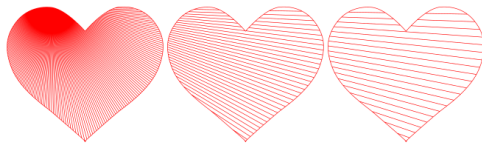


Alternate Line Direction: marked
Tool travels in both directions

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



- ◇ **Apply individually:** For some **Fill Types**, such as **Ray**, the pattern can be applied to each individual shape or applied across multiple shapes that have been grouped:



Apply individually not enabled

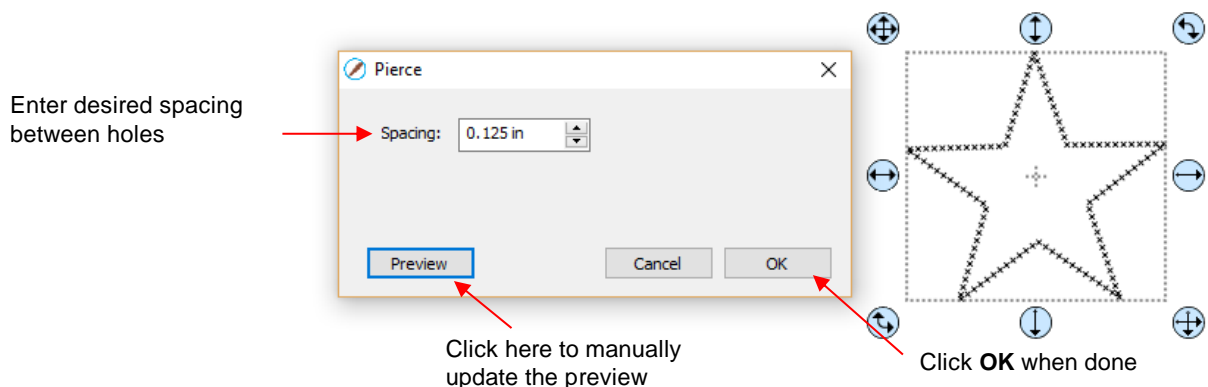
versus



Apply individually enabled

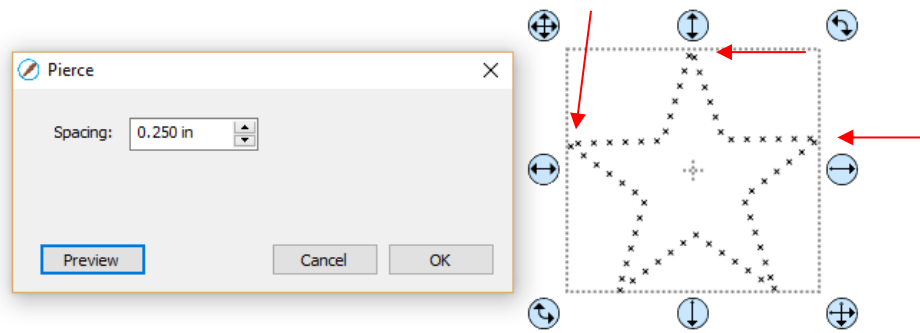
8.10 Pierce

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

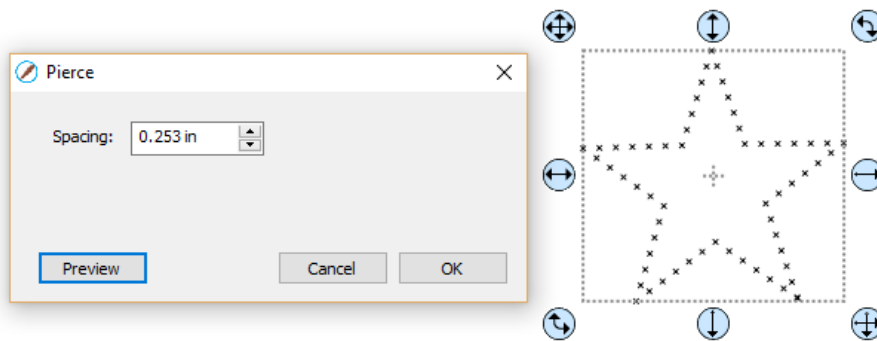


- Note that even though you see “X” shapes on the screen, the cutter head will be making downward punch movements.
- At this time, there is no editing available for a pattern created using the **Pierce** function. If you find that your design has holes that are not evenly spaced, try altering the spacing by tiny increments and clicking on **Preview**.

- ◇ For example, the star shape used above shows uneven spacing when a value of 0.25" is entered. Note how the star has holes too close to one another at the upper points:



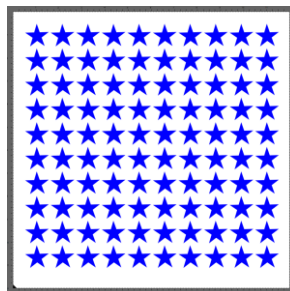
- ◇ Gradually increasing the **Spacing** didn't immediately result in an acceptable pattern until 0.253" was entered. Then the pattern looked even:



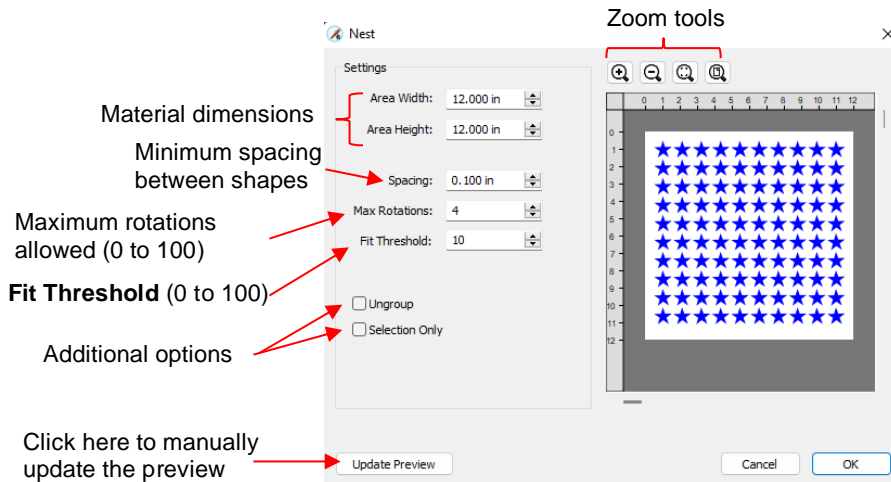
- If you have a shape that has the **Pierce** effect applied and want to remove it (even after the file has been saved and re-opened), select the shape and go to **Object>Remove Effects**.
- If you are unable to get an even pattern, then try using the **Rhinestone** effect instead. Refer to *Section 7.21* and enter the smallest rhinestone circle size available: SS000.

8.11 Nest

- The **Nest** function rearranges all of the shapes on the current page in an effort to economize the area occupied.
- For example, let's say you want to cut out these 100 stars from a sheet of 12 x 12 cardstock:

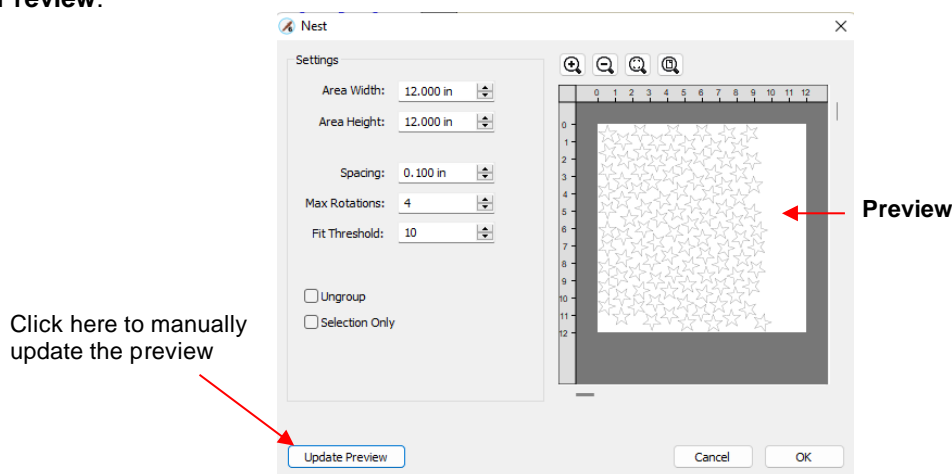


- To access the **Nest** function, go to **Effects>Nest**. The following window opens:

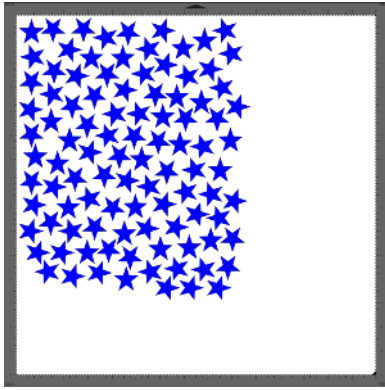


- ◇ **Area Width** and **Area Height:** Enter the dimensions of the material from which you will be cutting so that the nesting will arrange the shapes within that available area, if possible.
- ◇ **Spacing:** Enter the minimum distance allowed between shapes.
- ◇ **Max Rotations:** Shapes will be rotated in an effort to pack them together more closely. The maximum rotations allowed can be set between 0 and 100. However, the more rotations you select, the longer the rendering time for the nesting function. Note: When cutting from a material, such as patterned paper, where the shapes need to be oriented as designed on the **Cutting Mat**, set **Max Rotations** to 0 so that none of the shapes will be rotated during the nesting process.
- ◇ **Fit Threshold:** A setting between 1 and 100, with a higher value attempting to pack the shapes closer together than a lower value. As with **Max Rotations**, the higher the number, the longer the rendering time for the nesting function.
- ◇ **Ungroup:** If any of the shapes are grouped together, but you do not want them treated as a group when nesting, mark this option.
- ◇ **Selection Only:** Only shapes that are preselected before opening the **Nest** window will be nested.

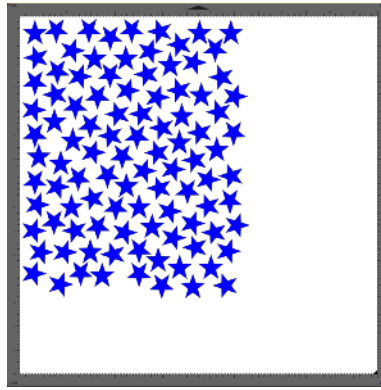
- Clicking on **Update Preview** will perform the nesting process and the resulting arrangement will appear in the **Preview**:



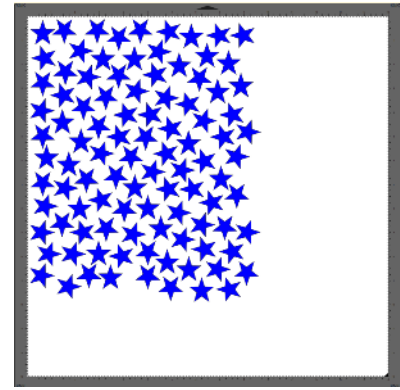
- **IMPORTANT:** Choosing very high values for **Max Rotations** and **Fit Threshold**, when there are many shapes on the page, can lead to freezing of the software. Testing has shown that the amount of space saved may not amount to much compared to more conservative settings:



Max Rotations = 4
Fit Threshold = 10
Area = 113 in²

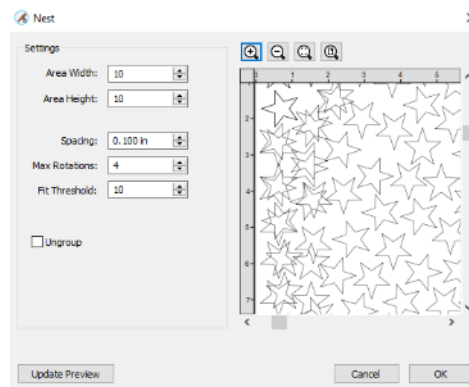
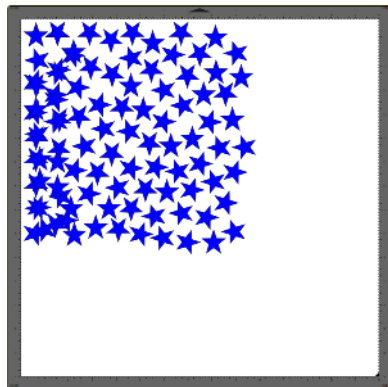


Max Rotations = 12
Fit Threshold = 30
Area = 111 in²

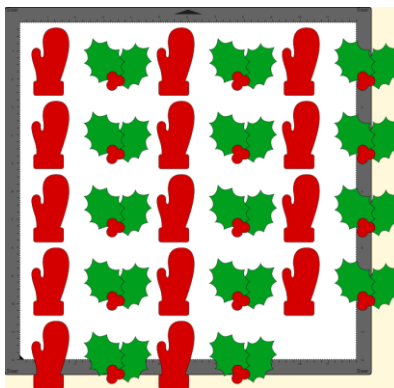


Max Rotations = 36
Fit Threshold = 90
Area = 111 in²

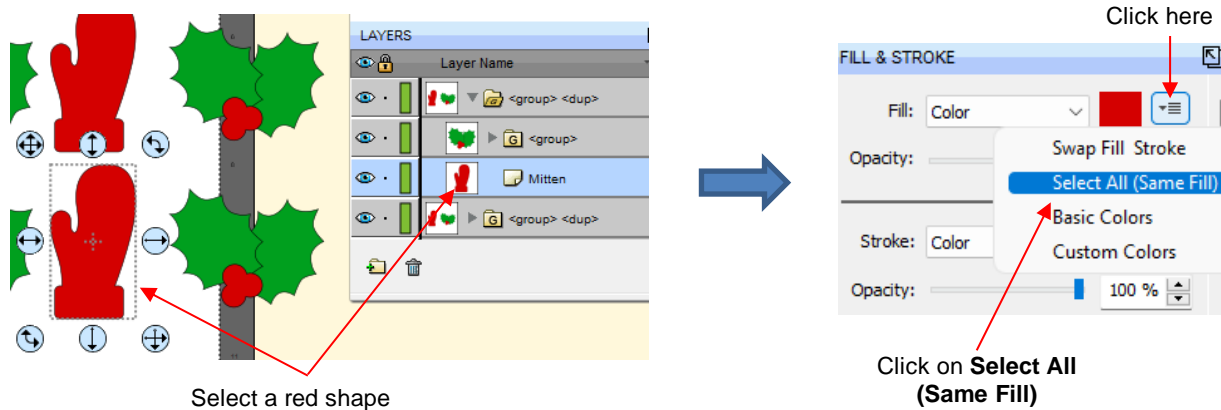
- **IMPORTANT:** Be sure to check the arrangement before cutting to make sure there is no overlap. For example, if the available cardstock had only been 10" x 10", then overlap between the shapes would have occurred:



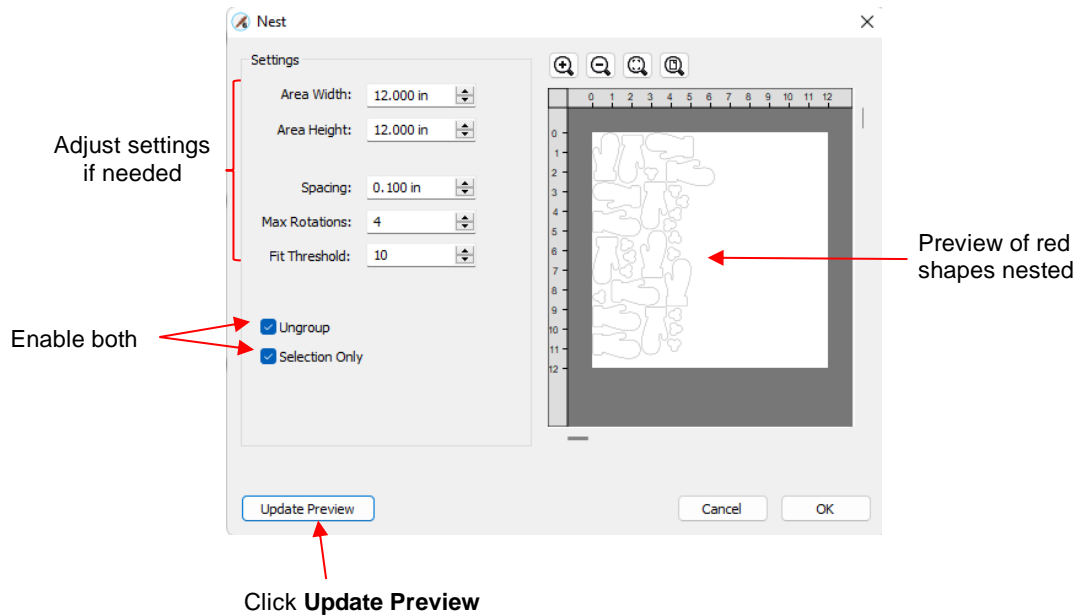
- ◇ This could also have been caught while still in the **Nest** window by carefully checking the **Preview** and zooming in, as shown above.
- Nesting isn't restricted to identical shapes. In this next example, Christmas shapes are to be cut from red and green cardstock:



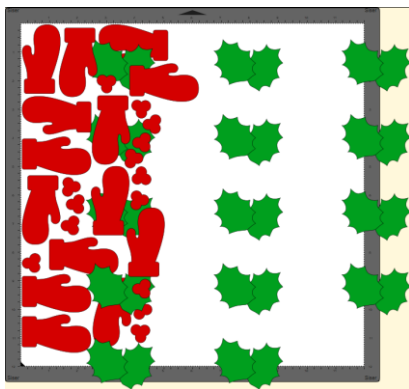
- ◇ Note that each pair of holly leaves and its berries are grouped and then that holly grouping is further grouped with the mitten to its left. This is not an issue for the **Nest** function.
- ◇ Before opening the **Nest** window, open up a grouping on the **Layers Panel** and select a shape in the color you want to nest first. In this example, a red mitten will be selected. Then, on the **Fill & Stroke Panel**, next to the red **Fill** color, click the menu icon so that **Select All (Same Fill)** can be selected:



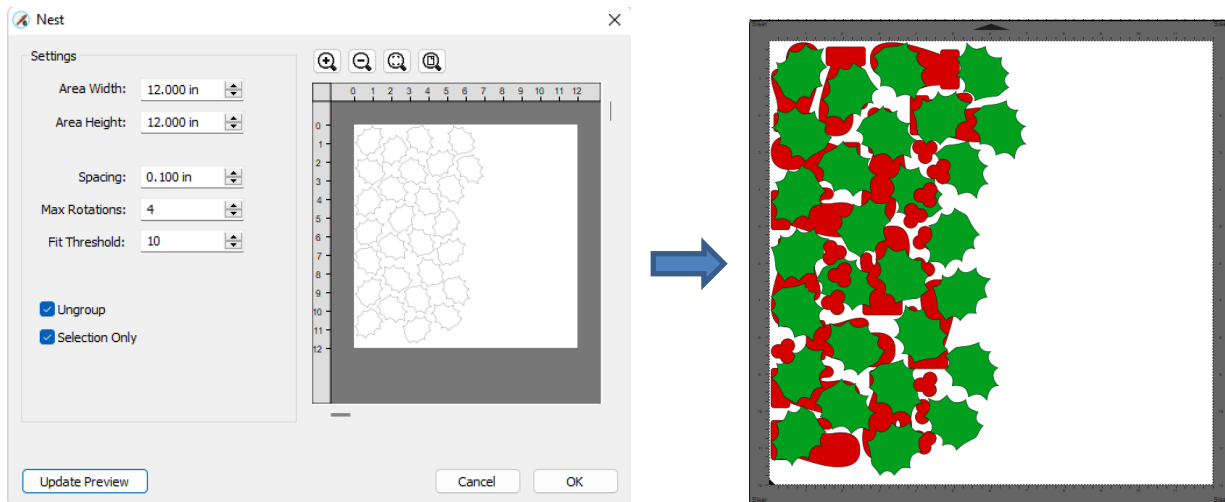
- ◇ Open the **Nest** window and mark the options for **Ungroup** and **Selection Only** before clicking on **Update Preview** and **OK**:



- ◇ The red shapes are nested and the green holly leaves remain in place:



- ◇ The same process is repeated whereby the green shapes are selected and nested in the same way:

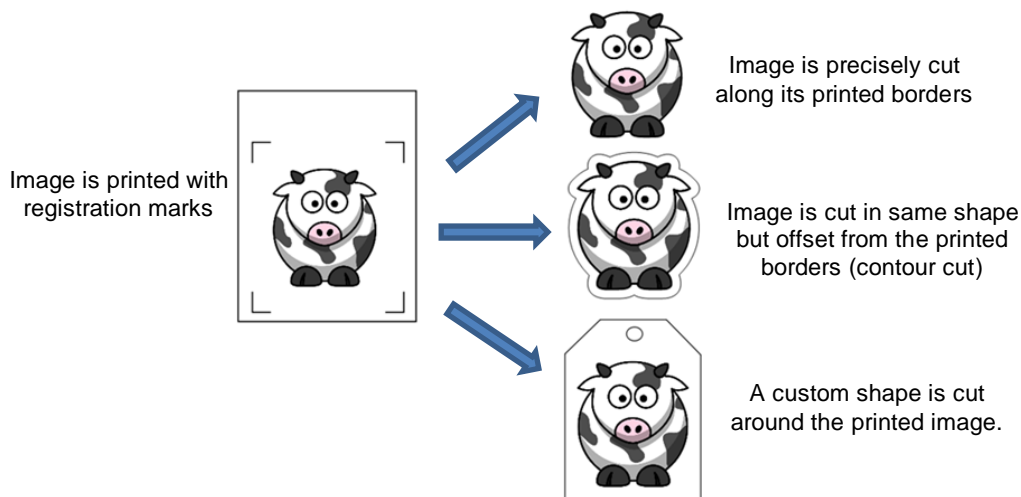


- The red and green shapes can again be separately selected and grouped for easier showing/hiding before cutting from their respective colors of materials.

8.12 Print and Cut (Contour Cutting)

8.12.1 P+C Facts

- The print and cut process (also called contour cutting) involves printing an image plus 3 or more registration marks from SCAL to any printer you own and then have the image or images cut out with perfect precision. Below are three typical kinds of print and cut applications but there can be other kinds.



- Different brands of cutters use different technologies for identifying the location of the registration marks. You need to research your own cutter to understand how the process works and how to calibrate your cutter for accurate results. SCAL does have calibration instructions in the **Print+Cut** window for some cutter brands.
- You need to know your printer well, in terms of managing the color, knowing which materials print well, and any custom sizing you might choose. You need to make sure you have the latest driver for your printer installed and your computer is using it.
- Be leery of borderless printing which can shift where registration marks are printed relative to one other, thus confusing those cutters with automatic scanning of registration marks. If you must use it, then please refer to this document for guidelines: [Solving Borderless Printing Issues](#)
- There are two types of inaccuracies that can commonly occur:



Calibration is off



Cut is drifting

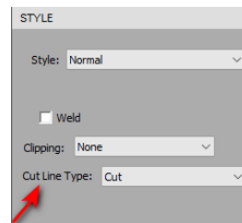
- ◇ **Calibration Error** – Are all of the shapes off by the same amount in the same direction? Your results will only be as accurate as your calibration. Your first “project” after calibration should be a test of something simple, on copy paper, and preferably with a shape that has both horizontal and vertical lines, like an arrow, so that you will know which direction(s) needs the correction.
- ◇ **Drifting Error** – Are the initial cut shapes accurate but, as the cut progresses, the shapes become more and more off? That’s called drifting and is unrelated to the calibration. Possible causes:
 - **Pinch wheels** – Wrong locations for pinch wheels or pinch wheels are not centered over the grit shafts.
 - **Speed** – the faster the material or cutting mat is moving in and out of the cutter, the more likely some slippage could occur. The more shapes being cut, the slower you may need to set the cut speed.
 - **Blade Exposure** – if the blade is cutting into the mat, that will definitely cause more friction because the blade is now being forced to cut into a thick material. Verify from your test cut that any cut lines you are see are very faint as if the blade tip is only grazing the adhesive.
 - **Stickiness** – any stickiness on the bottom of the cutting mat, on the pinch wheels, and/or on the grit shafts can also cause drag and slippage. Thus, keep all of these very clean.
 - **Thick materials** – similar to the blade cutting into the mat, cutting thick materials can cause dragging which will then throw off the accuracy. Instead of single pass cutting, set Multi-cut to 2 or more passes and reduce the pressure so that the blade isn’t being forced to cut a material faster and deeper than it’s able to.

8.12.2 Setting Up a Print+Cut Project

- Here are the typical steps when performing a P+C application:
 - ◇ Prepare the image(s) that will be printed which can include the following:
 - An imported raster image such as a JPG or PNG or BMP file
 - A vector image (either imported or designed in SCAL) that will be printed and cut or not cut
 - Text that will printed and also cut or not cut
 - ◇ Prepare the cut lines which can include:
 - The resulting cut lines from tracing imported raster files. Refer to *Section 5.03* for details on using the **Trace** function in SCAL.
 - A contour cut around the outside of the traced image: Refer to *Sections 6.05, 7.23, and/or 8.01* for three options to use.
 - Any other vector shapes, either imported or designed in SCAL

- ◇ Make sure individual shape layers are assigned to the **Cut Line Type** you need on the **Style Panel**:

Controlling What Will Happen to a Layer

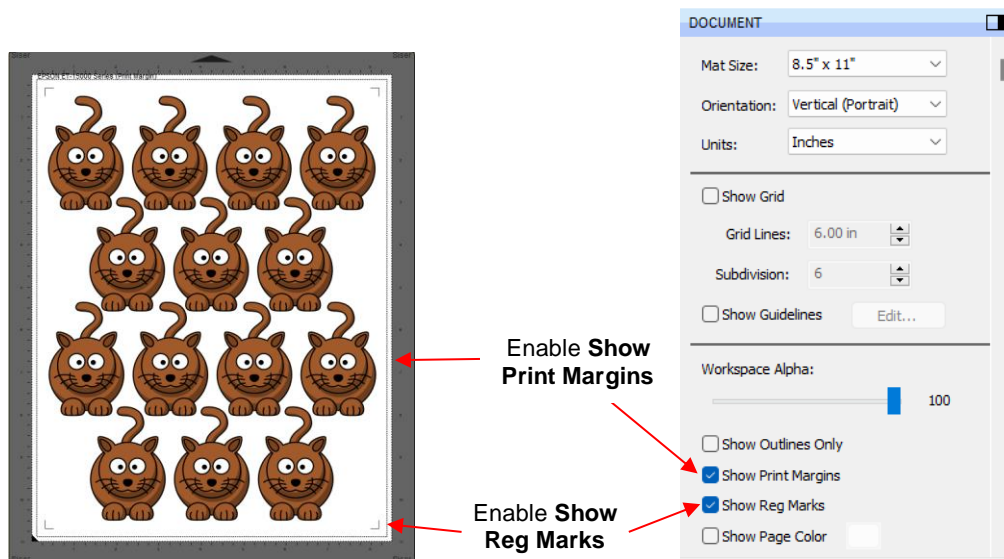


What will happen?

Cut Line Type	Layer will Print?	Layer will Cut?
Cut	yes	yes
Score*	no	yes (using Score Force)
(Print+Cut) Cut Only	no	yes
(Print+Cut) Print Only	yes	no

*Score option is only available on certain newer cutters

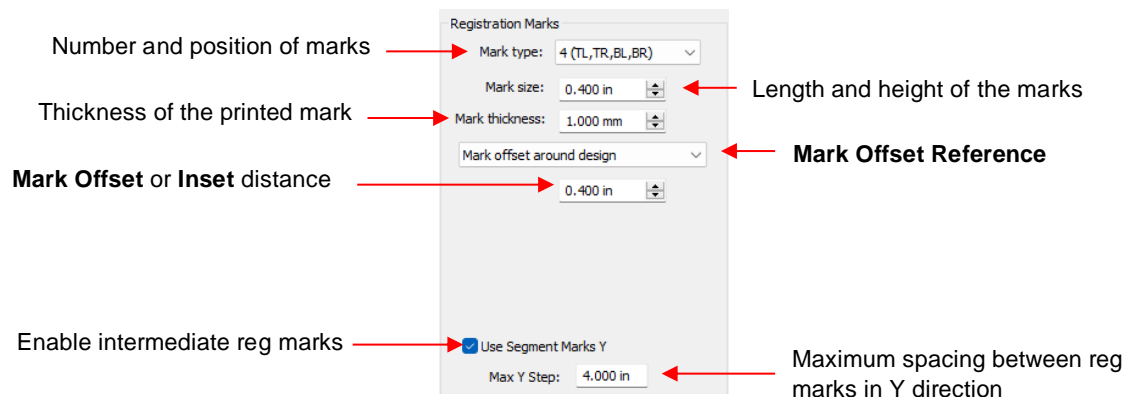
- ◇ Go to **File>Print Setup (File>Page Setup on a Mac)** before printing to make sure the correct printer is selected, as well as the correct size. Access the **Properties** windows and tabs and confirm that any necessary changes are made.
- ◇ If you need to set up a custom print size or switch to **Landscape** printing, please refer to the tutorials at the following link. Note they were written based on another version of SCAL called CREATE but the same guidelines apply: <https://tinyurl.com/49ejkzje>
- ◇ On the **Document Panel**, always enable **Show Print Margins** and **Show Reg Marks** to confirm that the registration marks are within the print boundaries and not overlapping any images:



- ◇ Print the project, making sure to mark the option to **Print registration marks**. You can print a project using either **File>Print** or by clicking the **Print** button in the **Print and Cut** window.
- ◇ Perform a test cut so that you know the best cut settings to use. This test cut can often be performed on the printout itself if there is room in the waste area of the project.
- ◇ Perform the cutting process, selecting **Print+Cut** from the **Cut Settings** window and following the instructions.

8.12.3 Registration Mark Settings

- On many cutters, you have some control over the size and location of the registration marks. Under **Cutter>Cutter Settings**, the upper right section of that window shows the default settings for creating registration marks. These settings will vary with the cutter brand:



- ◇ **Mark type:** Usually this is fixed based on cutter brand and model.
- ◇ **Mark size:** Make marks larger or smaller, although some cutters may not allow for much variation.
- ◇ **Mark thickness:** This usually doesn't need to be changed unless an optic eye is struggling to successfully scan the marks.
- ◇ **Mark Offset Reference:** There are three options in this menu:
 - **Mark offset around design:** The marks will be positioned based on the bounding box around the layer(s) that will be cut
 - **Mark inset from print bounds:** The marks will be positioned based on the paper size specified in your printer properties
 - **Mark inset from page bounds:** The marks will be positioned based on the **Mat Size** specified on the **Document Panel**
- ◇ **Mark Offset or Inset Distance:** This is the distance from the registration marks to whatever reference point was selected. This can be reduced if you need more space on your printout for your images. Note, however, that if you have images too close to the registration marks, then the scanning process can fail.
- ◇ **Use Segment Marks Y:** Enabling this option will add additional pairs of reg marks for intermediate (extra) scanning, thus correcting for any drift occurring. The **Max Y step** indicates the longest distance allowable before additional marks are added to the printout.

8.12.4 Printing a PNC Project from Outside of SCAL

- Sometimes users prefer to print their designs from other applications, such as Adobe Illustrator or Photoshop. Please refer to the following Expanded Tutorial for instructions on the procedures:
<https://tinyurl.com/yc2m82fy>

8.13 Scan2Cut

- Scan2Cut** is similar to a print-and-cut process with these exceptions:
 - ◇ The image (or multiple images) is already printed or drawn without any registration marks present. These marks will be added.
 - ◇ A digital photo or scan is made of the project so that it can be traced.
 - ◇ The Scan2Cut window is used to identify where the reg marks are located on the digital photo or scan.

- ◇ Typically, you need a shadow (contour cut) around the design as an error allowance.
- There are more applications with **Scan2Cut**, which include:
 - ◇ Cutting around an image that's been stamped and/or pre-printed
 - ◇ Cutting out an image that's pre-printed on something small, such as the front of a greeting card or a piece of patterned paper or even fabric
 - ◇ Utilizing scrap pieces of cardstock or other paper
- The original method was developed before SCAL5 added the ability to place reg marks based on distance from printout edges. For this reason, different cutters can use different methods for the Scan2Cut process. Documenting each method would take add another 12 pages to this already-lengthy manual. Thus, I refer you to the following videos and tutorials if you are interested in learning the process.
 - ◇ Original method: Go to **File>Scan2Cut** and follow the on-screen instructions
 - ◇ Newer "single window" method with reusable template: <https://youtu.be/RnPxl47F5D8>
 - ◇ Alternative methods presented by CreateinSpain:
 - <https://www.youtube.com/watch?v=x88p64MwblM>
 - https://www.youtube.com/watch?v=4_cQbiW1Vq0

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Sandy McCauley: <http://www.iloveknk.com/>