

# **KNK Maxx Air with SCAL User Manual<sup>1</sup>**

<http://knkusa.com/>

January 30, 2018

**Do NOT read this entire manual...** unless you want to.

- Chapters 1 and 2 are very important in terms of setting up your Maxx Air to work with SCAL and learning the ins and outs of cutting.
- Chapters 3 – 10 are specific to SCAL and present every function in the software, many of which you may never need.
- Chapter 11 is for those owners wanting to perform print and cut applications.
- Chapter 12 covers cutting some of the more popular materials plus using the Maxx Air accessory tools.

**It's not practical to print this entire manual because:**

- It's a waste of paper and ink if you only ever need certain sections.
- The live links to videos, blog posts, products, etc. will not work.
- User manuals are updated from time to time (this current UM is based on SCAL 4.058).
- You cannot search on individual words.

**Also:**

- Having the *Table of Contents* continuously viewable makes navigation easier. It's also useful to know how to search for specific words or terms. Here is a link to a tutorial which covers how to do these two things: [How to Get the Most from your KNK UM](#).
- Note the green **Video** icons which link to videos related to the section in which they are located. These videos will enhance your learning.

## **Where to Start**

- Thank you for choosing a Klic-N-Kut. Before using a blade in your new cutter, we suggest you read *Chapters 1 and 2* and watch the videos provided via links in these two chapters.
- If you run into difficulties with the operation of your KNK, turn off the power and look for a solution in this manual. *Appendix B* is a list of Troubleshooting FAQ's. If you continue to have technical questions or issues, please contact your KNK supplier as soon as possible.
- If anything is missing from your order or you have mechanical issues with your Maxx Air, please contact KNK USA by either:
  - ◇ Calling 800-268-3672
  - ◇ Starting a support ticket at this link: <http://knkusa.com/support/>
- For additional support, please join one or more of the following:

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- ◇ KNK Maxx Facebook group: <https://www.facebook.com/groups/KNKMaxx/>
  - ◇ KNK Yahoo group: <http://groups.yahoo.com/group/Klic-N-Kut/>
  - ◇ I Love KNK Support page: <http://www.iloveknk.com/support/knk-maxx-air-support-page/>
  - ◇ KNK USA support forum: <http://knkusa.com/forums/>
- For SCAL support, please check the list of resources in *Section 3.12*.

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# **1. Introduction**

## **1.01 Unpacking**

- Verify that you have received all contents. There is a checklist below. Please notify your KNK supplier immediately if anything is missing.
- Remove all foam pieces and cut the white zip ties carefully before turning on the KNK. Do not inadvertently cut the black belt that is positioned behind the zip ties.
- Use the enclosed test pen as you experiment and become familiar with operating the KNK. Place scrap paper on the mat and simply draw shapes rather than cut them. This will prevent possible damage to the blade, mat, and cutting strip as you learn where shapes will cut and the basic operating procedures.
- Do not unplug the USB cable from your computer or from the cutter unless you first turn off the cutter. Doing so can cause power fluctuations that, in turn, can damage the cutter.
- Always turn off the KNK when not in use. Leaving the cutter turned on for extended periods of time can possibly damage the machine.

## **1.02 Contents**

- Your KNK package comes with the following:

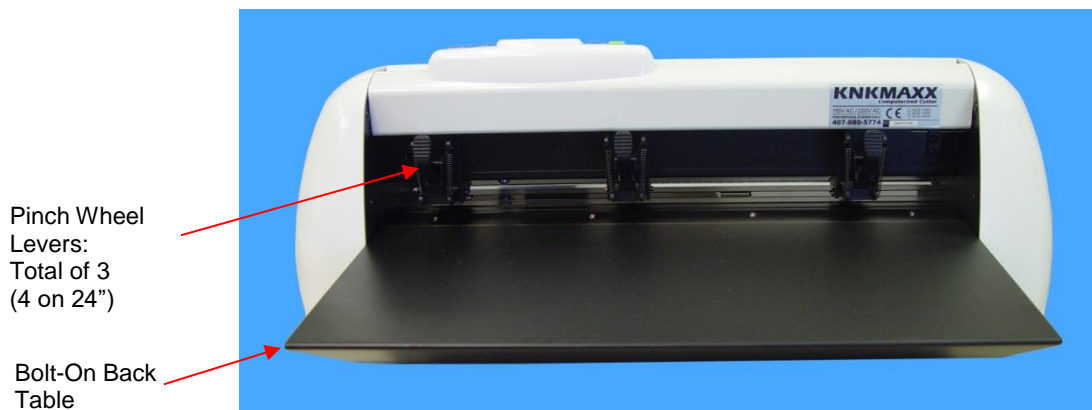
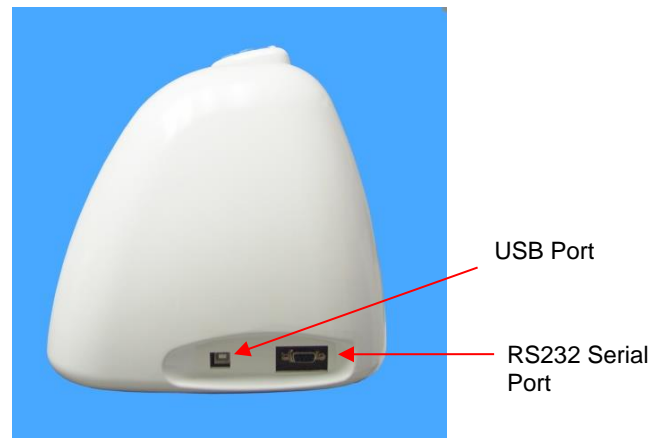
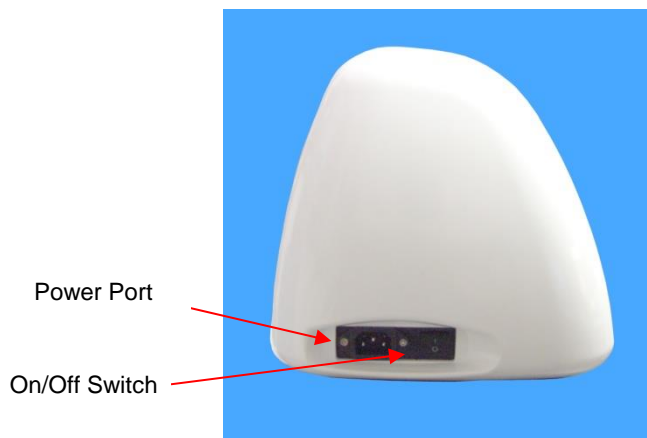
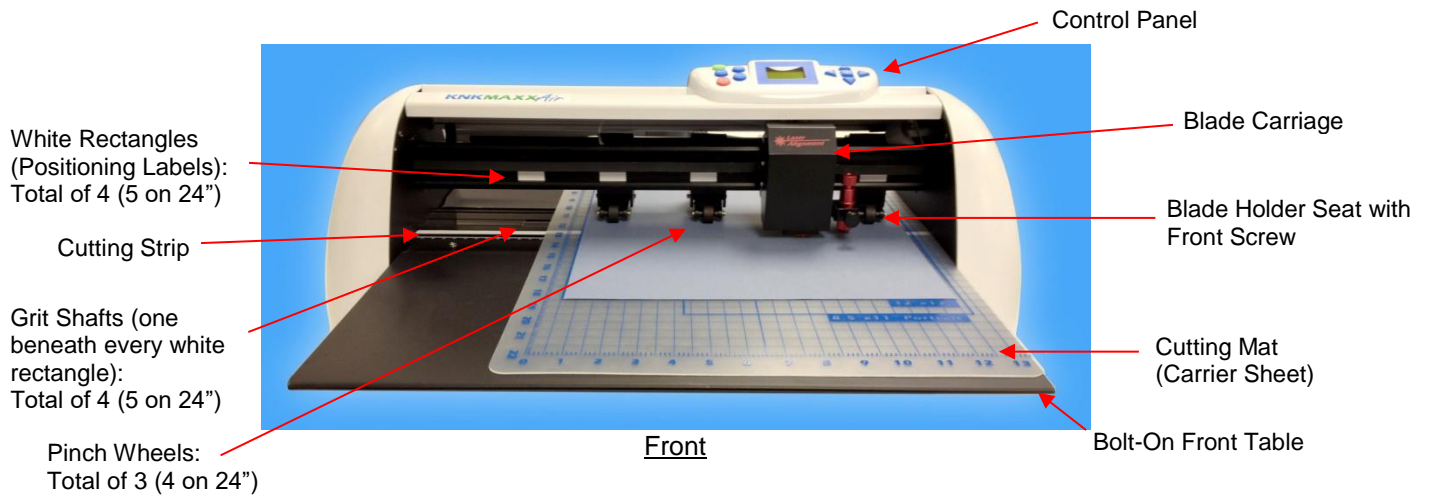
KNK digital die cutter	Bonus package
USB – Blue Tooth adaptor	45° blade (red cap) with spring
Cutting Mat	60° blade (blue cap) with spring
Blade Holder	USB and Serial cables
Test Pen with 2 inserts and a spring	Power cord
Bolt-on flatbed tables	
Screwdriver and screws for attaching tables	

## **1.03 Items to Note (Please Read!)**

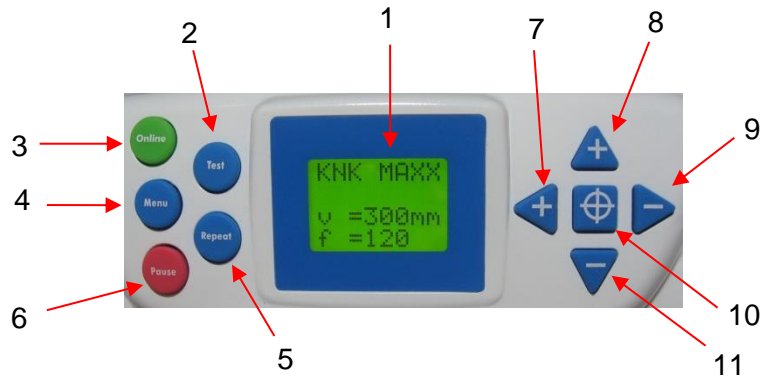
- Blades: The blades used by cutters are extremely fragile. Avoid dropping or bumping the blades against hard surfaces. When not in use, retract the blade into the blade holder or remove and cover the sharp end with the soft plastic cap. Keep these small blades and the springs in a safe place.
- Warranty: The one-year warranty covers Manufacturer's Defect only and does not include normal wear and tear. If warranty work is required, the owner is responsible for shipping costs to and from KNK USA. If a KNK is damaged during shipment, then your dealer should be notified as soon as possible. If damages are reported later than three weeks after delivery, then it will be the responsibility of the owner to ship the damaged KNK back to KNK USA for repair.
- KNK owners outside the USA should contact their KNK dealer for procedures regarding warranty work or shipping damage.
- Transporting: When transporting the cutter, move the pinch wheel levers into the upward position. Remove the accessories from the KNK and place in a separate bag. We also recommend retaining the original boxes with the foam inserts in case you ever need to ship your KNK.
- Additionally:
  - ◇ DO NOT touch or jam the plotter's track while it is operating. If the cutter is damaged, it is the owner's responsibility.
  - ◇ DO NOT shake the cutter while it is operating.
  - ◇ DO NOT cut any materials that have staples or other embellishments attached.

- ◇ DO NOT touch the cutter with a magnet.
- ◇ DO NOT allow small items to fall into the cutter.
- ◇ TURN OFF the cutter when not in use.

## **1.04 Parts of the KNK**



## 1.05 Control Panel



- |  |   |
|--|---|
| 1. LCD Display   | 7. Offline: moves carriage to the left<br>Online: increases force; other menu settings  |
| 2. Test: Cuts a small test shape when cutter is in Offline mode  | 8. Offline: moves mat to the back<br>Online: increases speed; other menu settings       |
| 3. Online / Offline Toggle   | 9. Offline: moves carriage to the right<br>Online: decreases force; other menu settings |
| 4. Menu: Cycles through six windows of settings  | 10. Offline: sets the Origin<br>Online: toggles the Laser on and off                    |
| 5. Repeat: repeats last cut when cutter is in Offline Mode; in Online mode, will lower and lift blade carriage | 11. Offline: moves mat forward<br>Online: decreases speed; other menu settings          |
| 6. Pause: Will pause cutter in the middle of a cut; press again to resume cutting                              |   |

## Online Mode Functions

### Online Mode Display

v = cutting velocity (speed), mm/sec (1 to 800)  
f = cutting force (scale from 1 to 255)

Step 1: Turn on your KNK.

A welcome message will flash for a few seconds when the cutter is first turned on. Then the cutter will come to rest in Online Mode. Experiment with the “+” and “-” buttons to change the Velocity and Force settings.



Increase/Decrease  
**Velocity (Speed)**

Increase/Decrease  
**Force (Pressure)**

### Online Mode: Laser

Step 2: In Online Mode, press the **Origin** button to turn on the laser light.

The laser light is used in two cut modes: WYSIWYG and Print and Cut



Press the **Origin** button to turn the laser light on. You will see a red light appear below the blade carriage. Press again to turn off, although the laser will automatically turn off at the end of a cut.

### Online Mode: Repeat

Step 3: In Online Mode, press the **Repeat** button.

The blade holder seat will drop. Press the **Repeat** button again and the blade holder seat will rise.



This feature can be used to check the positioning of a tool or pen inserted into the blade holder seat.

In Offline mode, the **Repeat** button repeats the last cut. Refer to the Offline Mode displays.

### Setting Display

Us = Traverse/Up speed (movement of carriage when head is up)  
BR = Baud Rate (Bluetooth: 38400; USB: 38400; Serial: 9600)

Step 4: In Online Mode, press the **Menu** button.

Experiment with the "+" and "-" buttons for the Traverse Speed. Change the Baud Rate based on the connection you are using.



Increases/Decreases **Traverse Velocity** (Up Speed). Set to 200 if doing PNC applications

Increases/Decreases **Baud Rate**: Bluetooth, USB: 38400  
Serial: 9600

### Set Per Display

Xp = Calibration of X scale  
Yp = Calibration of Y scale

Step 5: In Online Mode, press the **Menu** button again (after pressing it in Step 4.)



Do not change these values. Instead, the calibration of your KNK can be done from within the software. Refer to *Section 2.10*.

### Blue Tooth

Bluetooth Open?  
Bluetooth Close?

Step 6: In Online Mode, press the **Menu** button again (after pressing it in Step 5) to display the **Bluetooth** setting.



To enable the cutter to be a Bluetooth device, press the right "-" button. The display will change to **Bluetooth Close?** and will now be ready to be recognized by your computer.



**Dwell**  
0 to 5 seconds

Step 7: In **Online Mode**, press the **Menu** button again (after pressing it in Step 6) to display **Dwell**.



**Dwell** will delay the start of the cut. This is used in special applications, such as engraving with a rotary tool. Use the left and right arrow keys to set the **Dwell** from 0 to 5 seconds.

**Soft Landing**  
Yes or No

Step 8: In **Online Mode**, press the **Menu** button again (after pressing it in Step 7) to display the **Soft Landing** setting.

Press **Menu** again to return to the same display as shown in Step 1.



**Soft Landing** affects the force used when the blade drops to begin the cut. For some materials, you may need to turn this setting off to increase the downward impact. Use the right arrow to toggle the setting.

**Pause Display**  
v = cutting velocity, mm/sec (1 – 800)  
f = cutting force (scaled from 1 to 255)

Step 9: Press the **Pause** button during a cut and the cutter will immediately stop cutting.



Use the "+" and "-" buttons to change the cutting velocity or cutting force and press **Pause** again to resume the cut.

...OR...

Turn off the cutter to abort a cut.

## Offline Mode Functions

**Offline Mode Display**  
x = forward/back distance from origin  
y = left/right distance from origin

Step 10: Press the **Online** button.

This will change to Offline mode. Experiment with "+", "-", **Test**, and **Origin** buttons as shown.



Press the **Origin** button to set the origin for cutting.

Move the mat forward or towards the back

Move the blade carriage left or right

**Test and Repeat Display**  
Must be Offline to use these functions

Step 11: In Offline Mode, press the **Test** button for a small ring to cut at the origin. Note the cutter will then be in Online Mode. Press the **Online** button to go Offline again, as needed.



Step 12: Press the **Repeat** button to activate the same cut again. Note that the origin can be reset, if needed, before using the **Repeat** function.

## **Reset Function**

If you wish to reset all settings back to factory default, turn off the cutter. While pressing the **Origin** button, turn on the cutter and hold until you see **Reset** on the display.

## **1.06 Blades and Accessories**

### **1.06.1 Testing Pen Holder:**

#### **Video**

- The testing pen should be used until you are comfortable with the operation of your KNK and know, with certainty, where images will cut. To assemble this testing pen, remove the top cap, slip the spring over the top half of the pen insert and then drop the pen insert into the bottom half of the pen holder. Slide the cap over the pen insert, allowing the pen insert to fit through the hole at the top of the cap. Screw into place.



Spring goes over top of insert and stops at a small ridge on the pen insert.

### **1.06.2 Blades Included With Maxx Air Purchase:**

- There are two kinds of blades included: The 45 degree [red capped blade](#) is suited for cutting thinner materials such as paper, all cardstock types, iron-on transfer, and vinyl. The 60 degree [blue capped blade](#) is a much longer blade and is well-suited for cutting thicker materials, such as gum paste, craft plastic, craft foam, and rhinestone template material.
- Additionally, there are other tools sold separately, including a [fabric blade](#), [engraving tool](#), [embossing/scoring tool](#), [punch tool](#), and [pen holder](#). Details on these are covered in *Chapter 10* and in the following video. Note that these tools were originally designed for the KNK Zing, but also fit into the KNK Maxx Air.

#### **Video**

### 1.06.3 Blade Installation

#### Video

- The blade must be carefully inserted into the blade holder. Do this over a soft surface (e.g. over a hand towel). It's important to protect the fragile blade!
- The little springs that come with the blades are easy to lose, which is another reason to do this over a towel so that a dropped spring doesn't roll off the table. Remove the colored cap from the blade and slide the spring over the sharp end of the blade:

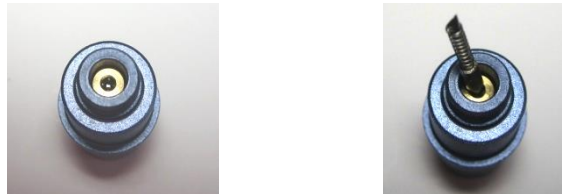


Spring is placed over the blade

- There are different ways to install the blade. This is the method I prefer, but experiment with other methods if you like. Again, the important thing is to just take it easy!
- ◇ Tighten the main part of the blade holder by turning it clockwise until it is about half-way closed:



- ◇ Place the non-sharp end of the blade into the tiny hole in the main part of the blade holder:



- ◇ Gently guide the cap over the top of the blade and then begin screwing the cap on. Do NOT try to force it. You may need to wiggle the cap slightly for the spring to be positioned and for the cap to catch the threads and screw onto the main part of the blade holder:



**IMPORTANT!** Do not force the cap. Wiggle gently until the threads catch.

- ◇ Screw the cap tight. Then, as you screw the top part of the blade holder, the blade will begin to show through the hole in the cap. You only need as much blade exposed as is necessary to penetrate the material you are cutting. More blade does NOT result in better cutting. In fact the opposite is true.

The blade depth should be just a tiny bit longer than the thickness of the material you are cutting.



Turn clockwise to expose more blade. Turn counterclockwise to retract the blade.

- Please read Chapter 2 before cutting. There are some additional tips on setting the blade exposure, as well as other important information you need to be successful with your cutting.

## **1.07 Preparing and Caring for the Cutting Mat**

Mat too sticky: [Video](#)

Adding more adhesive to a mat: [Video](#)

### **1.07.1 Tips on Using the Cutting Mat**

- Always use a mat to hold the material to be cut unless the material has its own protective backing. For example, vinyl and iron-on transfer both come with a layer that you do not cut. Thus, this backing layer serves as the carrier for cutting. Paper and cardstock do not have a backing, thus they must be cut on the mat.
- **IMPORTANT!** A new mat may be too sticky if you are cutting paper products. This can cause difficulty in removing cut items without tearing. Place an old but clean bath towel over the surface of the mat and press with a brayer or rolling pin. Then pull up. Test the stickiness by pressing the palm of your hand in the middle of the mat and lifting. If the mat remains stuck to your hand for more than a second or two, repeat until the mat can still be lifted but will release. It should only take a few pressings to greatly reduce the stickiness, as tiny (too small to be visible) fibers from the towel are added to the surface.
- Do not leave the pinch wheels in a down position when the Maxx Air isn't in use. This warps the plastic sooner, shortening the useful life of the cutting mat.

### **1.07.2 Cleaning and Replenishing the Cutting Mat**

- When mats begin to lose their stickiness, they can be washed:
  - ◇ Use a mild dishwashing detergent, warm water, and a soft brush to thoroughly clean the surface. You're not trying to scrub the adhesive but just wet the invisible fibers that have been deposited from your cutting materials and get them released from the glue.
  - ◇ Rinse well, shake off excess water, and place sticky side down onto a bath towel.
  - ◇ Thoroughly dry the non-sticky side of the mat with another towel.
  - ◇ Pull the mat up and the sticky side should now be dry enough for immediate use. Test by making sure the mat will stick to your hand.
- While washing with soap and water should revive the original adhesive, you can add more adhesive if necessary:
  - ◇ Virtually any repositionable adhesive may be used on the cutting mat. Some of the popular choices include: Krylon Easy Tack, Aleene's Tack It Over and Over (diluted 1 part glue : 2 parts water), Crafter's Companion Stick and Spray, Zig 2 Way Glue with wide tip, Craft Smart Off 'N On (also dilute), and Scotch Repositionable Craft Stick.
  - ◇ If you are cutting thicker materials, such as oil board or styrene, then you may want to experiment with a stronger adhesive and use painter's tape to secure the material to the mat. If you are cutting thin paper, then you may want to experiment with a lighter adhesive.
  - ◇ With most repositionable adhesives, you can control the tackiness based on the amount applied. Thus, always add a little bit at a time. As mentioned above, if you add too much, just apply a layer or two of cotton fibers by pressing with a bath towel.
- Other reported methods for cleaning mats:
  - ◇ Use a plastic scraper (an old credit card will suffice) to scrape off any random material pieces remaining on the mat after a cut.
  - ◇ For finer particles of paper or lint, you can use a lint roller. Tear off a sheet and then press down and pull up across the surface of the mat to clean in sections. Baby wipes can accomplish the same task.

- ◇ To completely remove adhesive from the mat, apply Goo Gone, Duck Adhesive Remover, or Avon's Skin So Soft Bath Oil (thank you, Joyce Wilson) across the surface. Allow a minute to soak in and then scrape off with a sharp metal spatula. Repeat, as necessary until the mat is thoroughly clean and no longer sticky. Wash, dry and then add any repositionable adhesive.
- When necessary, the rubber wheels and the grit shafts may be cleaned with isopropyl alcohol or Un-Du. Move the wheel away from a grit shaft, apply the cleaner to a clean lint-free rag and rub the entire wheel and/or grit shaft until free of adhesive.

### **1.08 Attaching the KNK Bolt-On Tables**

- It is strongly advisable that you attach the included bolt-on tables. They do not require any table support beneath, thus can extend out over the front or back of a desk or table. The benefits in using these tables are:
  - ◇ The top and bottom of the mat are kept horizontal, thus preventing bowing of the mat in the middle
  - ◇ The material being cut is less likely to come unstuck from the mat
  - ◇ The front table provides a firm surface when pressing or brayering your material both before and after cutting
- The installation of the front and rear tables on your KNK is best done with two people. Each box contains 2 identical tables (front and rear) and a supply of screws.

1. First, lay a soft towel down. Gently turn your KNK upside down to expose the bottom panel. Unscrew the screws along one side of the bottom panel.



2. Next, slip one of the tables into place and put the bottom screws back in. Once the screws are tightened, turn your KNK back over, where the cutter is facing up.

3. Insert 4 of the screws (5 on the 24" Maxx Air) that were packaged inside the box with the tables. Be sure to keep the screws relatively loose until all have been inserted. Then tighten down but not too tight or you will risk stripping the threads.

4. Repeat this for the other side of your KNK.



## **1.09 Registering and Installing Drivers and SCAL**

- The latest drivers can be obtained from this link: <http://www.ftdichip.com/Drivers/D2XX.htm>
- Select the driver for your computer's current operating system and install it before connecting to the KNK Maxx Air. Once the driver installs, restart your computer.
- To install SCAL, please go through *Section 3.01*. Then return here to continue setting up your Maxx Air.

## **1.10 Connecting the Maxx Air to Your Computer**

- Place your KNK on a sturdy horizontal surface. If you have not yet done so, attach the bolt-on tables to the cutter (refer to the instructions in *Section 1.08*.) If you are not going to use the tables, then be sure to allow enough free room in both the front and the back for the mat to extend during cutting.
- Connect the power cord to the left side of the cutter and plug into a wall outlet or power strip. Turn on the power using the power switch on the left side. The yellow LED display should come on and the cutter will initialize (the carriage will move to the right side of the cutter). Note that the display indicates the current pressure (force **f**) and speed (velocity **v**) settings:



- You have three options for connecting the Maxx Air to your computer: Bluetooth, USB, or Serial. The following sections present what steps are required for each type of connection. If you run into connectivity issues, please contact your KNK dealer first. If your dealer is unavailable, please contact KNK USA for assistance.

### **10.10.1 Connecting to a PC**

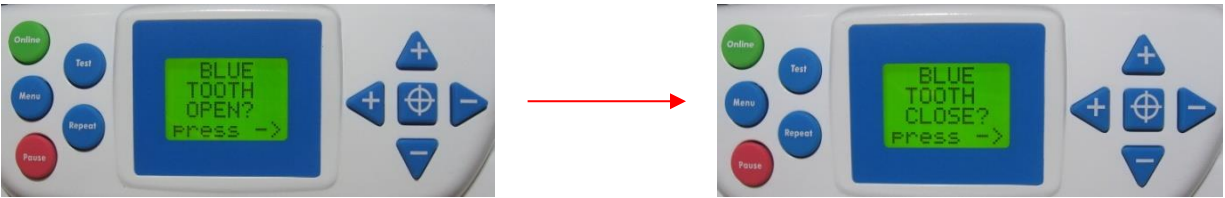
#### **Bluetooth Connection on a PC**

- With the Maxx Air powered on, press the **Menu** button once. The **Baud Rate** (BR) should be set to 38400. If it reads a different setting, use the right “-” or left “+” keys to change the setting.





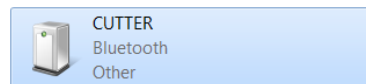
- Press the **Menu** button two more times. The display should now read "**Bluetooth Open?**" Press the right arrow key once. The display should now read "**Bluetooth Close?**" Don't be confused by the wording. For Bluetooth to be enabled, the display must read "**Bluetooth Close?**" (as in asking if you now want to close/disable it.)



- Press the **Menu** button three more times. The original KNK Maxx display should return.
- There are three situations for Bluetooth: (1) You know for sure your computer has Bluetooth, (2) You know for sure that your computer does not have Bluetooth, or (3) You're not sure. Thus, refer to the appropriate section below:

#### My computer has Bluetooth available

- Click on the **Show hidden icons** arrow on your Windows system tray.
- Right click on the Bluetooth icon and select **Add Bluetooth Device**. If you do not have this option but, instead, see an option for "**Open My Bluetooth**", then select that and then skip to step (10). If you do not see the Bluetooth icon, go to the section: "I'm not sure if my computer has Bluetooth."
- Check the option which says "**My device is up and ready to be found.**" Click on **Next**.
- If the Maxx Air is found it will show up as **CUTTER**:




or



- Highlight this device and click on **Next**.
- The pairing options will appear. Select the one which says **Enter Device's Pairing Option** (or, if your computer is running XP, it will say **Use the Passkey found in the documentation**).
- Type in **1234** and click on **Next**.
- A message saying that the device has been successfully added should now appear.
- Two COM Ports are assigned with a Bluetooth connection to the Maxx Air: an outgoing port and an incoming port. Refer to *Section 1.11* for further instructions and to test the communication. You are finished with this section and do not need to read Step (10).
- Click on **Search for Devices**. When the Maxx Air is found, it should be labeled as **CUTTER**. Double click on this icon and it will be automatically installed. If a pairing option is requested. go to Step (6). Otherwise, if the device has been successfully installed, go to *Section 1.11*.

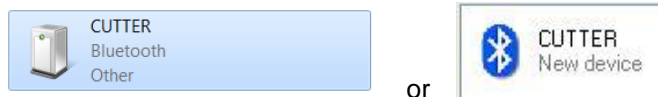
#### My computer does not have Bluetooth available

- A USB-Bluetooth adaptor came with your Maxx Air. Plug this adaptor into a free USB port on your computer.
- The device will be automatically installed in Windows. However, it may take about 30 – 60 seconds for the Bluetooth icon to appear in the Windows hidden icons. The Bluetooth icon looks like this: 
- Go to the prior section: *My computer has Bluetooth available* and proceed through the steps.

#### I'm not sure if my computer has Bluetooth

- On your computer, click the **Start** button and then select **Devices and Printers**.

- (2) Click on **Add a Device**. If the Maxx Air is found it will show up as **CUTTER**:



- (3) Note: it may take a short time for Windows to locate it, so be patient. If it is not located, then verify that the Maxx Air is still powered on and is within 30 feet with no obstructions or within 10 feet if an interior wall separates the cutter from the computer. If the Maxx Air is still not found, then close the window and go to the prior section: *My computer does not have Bluetooth available*.
- (4) Select the **CUTTER** icon and then click on **Next**.
- (5) A choice of three pairing options will appear. Select the second one: **Enter Device's Pairing Option** (or, if your computer is running XP, it will say **Use the passkey found in the document**).
- (6) Type in **1234** and then click on **Next**.
- (7) A message saying that the device has been successfully added should now appear.
- (8) Two COM Ports are assigned with a Bluetooth connection to the Maxx Air: an outgoing port and an incoming port. Typically, the lower COM Port number is the one needed in MTC. When you reach the point of selecting the COM Port from the dropdown list in MTC, select the lower number of the two COM Ports which will both read **Standard Serial over Bluetooth**. Refer to *Section 1.11* for further instructions and to test the communication.

### Problems

- If your computer is not locating the Maxx Air, verify that the Maxx Air is still powered on, Bluetooth has been enabled, and the Maxx Air is within 30 feet of your computer (with no obstructions) or within 10 feet if an interior wall separates the cutter from the computer.

### Connecting Via Bluetooth to Another Computer

- If you need to disconnect the Maxx Air from Bluetooth, click on the Bluetooth icon on your task bar and select **Show Bluetooth Devices**. **Devices and Printers** will open and you can then select **Cutter** and then click on **Remove Device**.

### USB Connection on a PC

- Connect the USB cable to the right side of the cutter and into an available USB port on your computer. The **Windows Hardware Manager** will identify the USB connection. If the **Hardware Installation** window pops open, proceed and accept all defaults.
- On the Maxx Air Control Panel, press the **Menu** button and verify that the **Baud Rate** is set to 38400. Then press the **Menu** button five more times to return to the screen with the V and F. (If necessary, refer to *Section 1.05, Step 4*.)

### Serial Connection on a PC

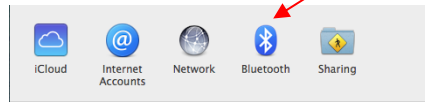
- Plug the RS232 serial cable into the serial port on the right side of the cutter. Connect the other end into a serial port on your computer. The Windows Hardware Manager will identify the connection. On the Control Panel of the Maxx Air, press the **Menu** button one time and change the **Baud Rate** to 9600. Then press the Menu button five more times to return to the screen with the V and F. (If necessary, refer to *Section 1.05, Step 4*.) Additional settings for a serial connection are covered in *Section 1.11*.

## 1.10.2 Connecting to a Mac

### Bluetooth Connection on a Mac

- (1) To verify you have Bluetooth available on your Mac, go to **System Preferences** and look for the Bluetooth icon:

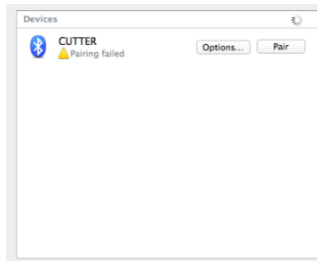




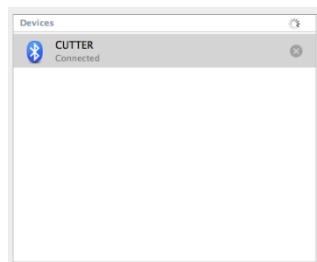
- (2) If you do not have Bluetooth, then insert the Bluetooth USB device which came with your Maxx Air and restart your Mac. Return to **System Preferences** to verify you now see the Bluetooth icon shown above.
- (3) Click on the Bluetooth icon and the following should appear:



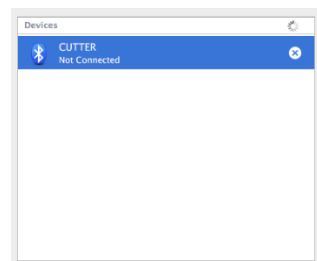
- (4) Click on **Pair** and you should get the following:



- (5) Click on **Options** and enter the "1234" code. Click on **Pair**. Then the Maxx Air should be connected:



- (6) If you happen to get the following window, click on the "X" and select **Remove**. Restart your Mac and follow the previous instructions again.



- (7) You are now ready to do the testing presented in *Section 1.11*.

## Problems

- If your computer is not locating the Maxx Air, verify that the Maxx Air is still powered on, Bluetooth has been enabled, and the Maxx Air is within 30 feet of your computer (with no obstructions) or within 10 feet if an interior wall separates the cutter from the computer.

## USB Connection on a Mac

- Connect the USB cable to the right side of the cutter and into an available USB port on your computer. Your Mac should identify the USB connection and the connection will later appear in the SCAL cut window.
- On the Maxx Air Control Panel, press the **Menu** button and verify that the **Baud Rate** is set to 38400. Then press the **Menu** button five more times to return to the screen with the V and F. (If necessary, refer to *Section 1.05, Step 4.*)

## 1.11 Verify Communication and Test Draw Shapes

New owners tend to be VERY eager to try out their KNK. It's also important to test your cutter to ensure that data is being sent properly from your computer to the cutter. The following steps will allow you to do some testing with the pen tool. But note that **the following steps are for DRAWING, not cutting**. Before inserting the blade tool into your KNK, please read the following Sections: *1.05, 1.06, 1.07, and 2.01.*

### 1.11.1 Setup for Communication Test and Drawing

- Press an 8.5" x 11" sheet of paper to the mat. If your mat has no adhesive, then use tape to firmly attach the paper to the mat surface. Note: Do NOT use this method when you begin using the blade. You must spray your mat with adhesive so that when shapes are cut, they will remain attached to the mat.
- While the paper can be placed anywhere on the mat, it is recommended that the paper be placed so that the wheels will pass over the edges of the paper. This prevents adhesive from the mat sticking to the rollers. You can also put down strips of scrap paper where the wheels are travelling to protect them.
- Raise the pinch wheel levers in the back and slide the mat into the cutter, aligning the mat along the right side of the cutter. **Make sure the wheels are aligned with white rectangles on the cutter.** (Refer to the photo below.) The pinch wheels can be slid left and right, as needed. Once they are positioned under rectangles, drop the levers. Note that only two wheels need to be used for this testing or when cutting most materials. The left-most wheel(s) can be moved to the left side and left in the up position.



- Assemble the pen holder as shown in *Section 1.06*. Make sure the pen will write by scribbling on scrap paper. If the pen isn't working, you can use any regular Bic pen or marker, however when using a felt tip marker, reduce the **Pressure** to about 5. This will be done in *Section 1.11.3*.
- Loosen the front screw on the blade holder seat and insert the pen. Make sure the pen nib is slightly above the cutting surface so that it will not drag across the paper. Firmly tighten the screw.

## **Video**

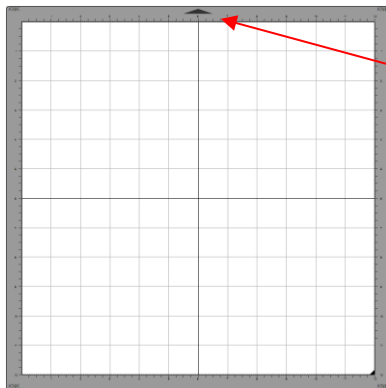
- Refer to *Section 1.05 Control Panel* for instructions on changing settings. Set the origin by going off-line and then using the + and - buttons to move the pen tip over to the front right corner of the paper (thus, most of

the mat and your material are behind the cutter at the start of the cut). Press the **Origin** button to set the origin. Press the **Online** button to return to online mode. NOTE: you must reset the origin every time you turn on the cutter.

## Video

◇ Alternatively, you can also set the origin within the SCAL program. This will be shown later in this section.

- Because the **Pressure/Force** and the **Speed/Velocity** can be set in SCAL, do not worry about setting the values on the Maxx Air for now. However, take note of the current settings, to verify that once you do send your first shape to the cutter, those settings will automatically be changed to match what is in the software.
- In SCAL, you will set the onscreen **Cutting Mat** to **Portrait** and make several other settings for doing the tests:

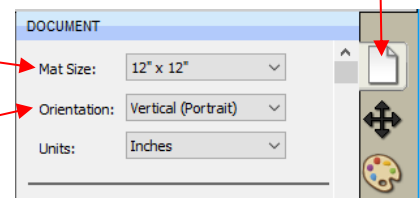



Indicates the direction the mat is fed into the cutter. In **Portrait** mode, the arrow will point up on the screen. In **Landscape** mode, the arrow will point to the left on the screen. More on the **Cutting Mat** is covered in *Section 3.05*.

Click here to show **Document Panel**

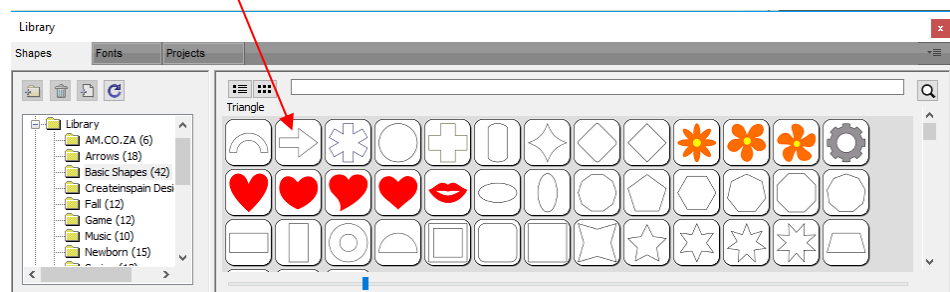
For now, select 12 x 12.

Select **Portrait** for this test. Later on, experiment with **Landscape**.



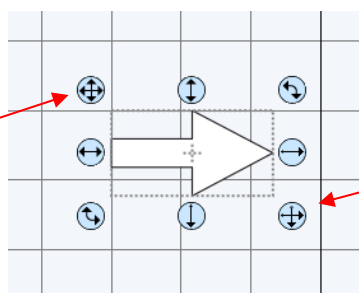
- If you closed the **Library**, click on this icon  at the top to reopen it. Click on the arrow thumbnail to add that shape to your screen. An arrow will help you better compare where a shape gets drawn versus how you see it on the screen:

Click on this arrow



- After clicking the arrow, you should see it on the screen. In this test, it doesn't matter where you place the arrow on the grid, as it will be drawn at the origin you set on the machine.

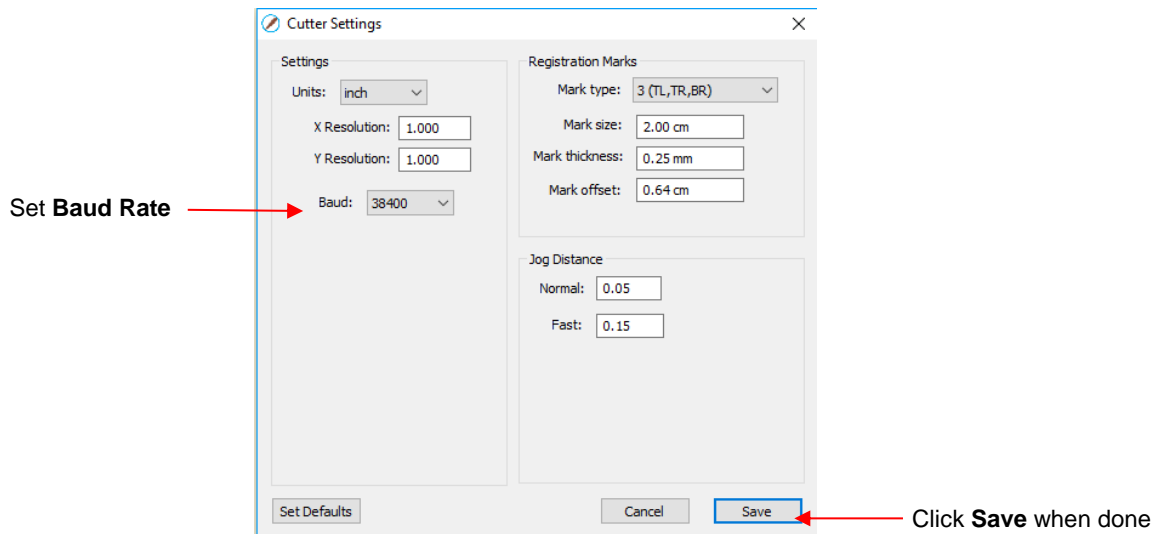
Drag this corner to move the arrow



Drag this corner to resize the arrow

More on moving and manipulating basic shapes is covered in *Chapter 5*.

- Go to **Cutter>Cutter Settings** and set the **Baud Rate** according to the connection you chose. For Bluetooth and USB connections, use 38400. For a Serial connection, use 9600:



- In Section 3.01.4, you installed the KNK Maxx Air in SCAL. To now open the **Cut Settings** window, either:

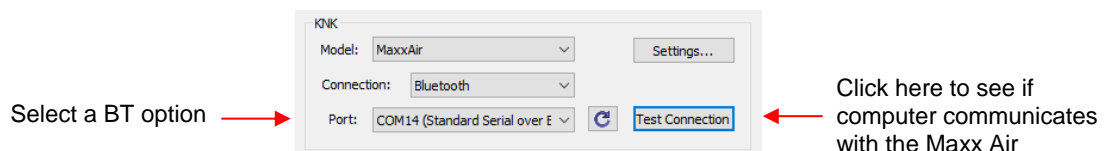
- Go to **Cutter> Cut with KNK**



- Click on the **Cutter** icon at the top

- IMPORTANT:** Be sure to select **MAXX Air** under **Model**. Using **KNK Max** will not work with the Maxx Air.
- Under **Connection**, select **Bluetooth**, **USB**, or **Serial**.
- Under **Port**, select based on one of the following:

- Bluetooth on a PC: there will be two different COM port listings for the Bluetooth connection. One is incoming and the other is outgoing, but there's no way to tell which is which from the COM port assignments. Use the **Test Connection** button to see which one works:

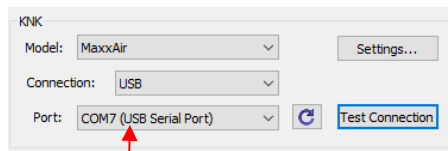


- Bluetooth on a Mac: the Bluetooth connection, with the word "CUTTER" in the name, will appear like this in the drop-down menu:



- USB: The following screenshots show how a PC and a Mac will list the USB connection. You can use the Test Connection to verify that the computer is sending data to the Maxx Air:

PC:



USB Connection

Mac:



USB Connection

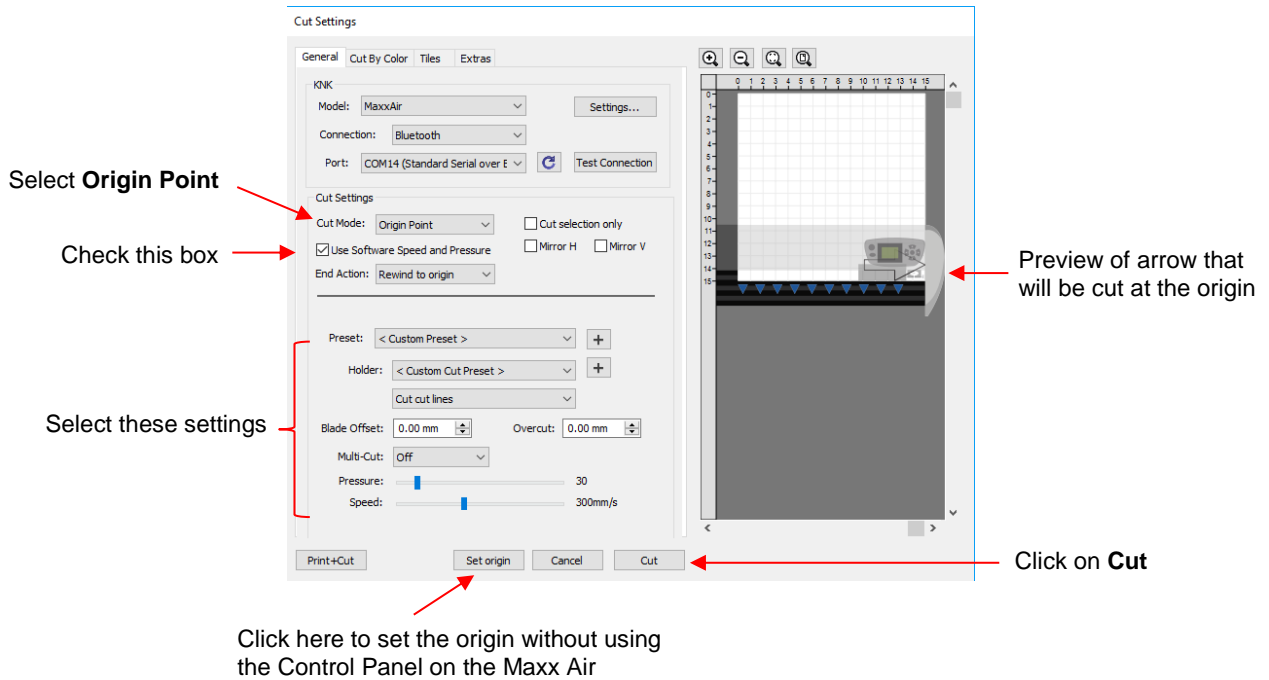
- ◇ Serial: Very few PC's have serial ports any longer and not sure that any Macs do. In the event you are using serial, Com 1 should be the serial connection listed.

### 1.11.2 Communication Test

- As mentioned in the last section, you can test communication between your computer and the cutter by clicking on the **Test Connection** button. A window will open describing the test. Click on **Yes** and the head will make a small movement to the left and back indicating that the connection is working. If it fails to move, here is a list of some of the possible communication errors that might occur:
  - ◇ Make sure the Maxx Air is in **Online** mode (display will show the **v** and **f** settings). Also, make sure that **Maxx Air** is selected versus one of the other KNK models. Make sure that 38400 is the selected **Baud Rate** on the Maxx Air itself.
  - ◇ If you are using USB and nothing happens, make sure the cutter is in **Online** mode (display will show the **v** and **f** settings). Also, verify that the **Baud Rate** in the software matches what is set on the Maxx Air.
  - ◇ If you are using serial and nothing happens, make sure the cutter is in **Online** mode (display will show the **v** and **f** settings). Also, verify that the **Baud Rate** is set to 9600 in the software and also on the Maxx Air.
- If the **Test Connection** still fails, please contact your KNK Supplier for assistance or post at the Klic-N-Kut Yahoo group mentioned on the first page.

### 1.11.3 Test Drawing: Origin Point Mode

- It is important to learn where images will cut before you begin cutting! By using the test pen, you can experiment with settings and not risk cutting outside the material on the mat. Also, you can draw many times on a single piece of paper, whereas if you are experimenting with the blade, you would need to be changing the paper more frequently.
- Make the following changes in the **Cut Settings** window:



- Use the same settings as above (unless using a felt tip marker in which case a **Pressure** of 5 should work). Then click on **Cut**.
- The arrow will be drawn to align with the origin you set on the paper with the test pen. If the pen doesn't draw, try increasing the **Pressure** by 5.
- If anything goes wrong during the cut, press the **Pause** button on the cutter to stop the cut. This is your panic button! Turn off the cutter and then turn back on again. Take the necessary steps to begin your cut fresh.
- To draw again, return to the cut window and choose a different origin.
  - ◇ Practice moving the origin to different locations on the paper. The shape will always align with the location of this origin. This is how **Origin Point** mode works.
  - ◇ If you want the image to draw where you have it on the **Cutting Mat** in SCAL, then you need to switch to **WYSIWYG** mode.
  - ◇ Try using **Landscape** to see if that mode suits you better. The shapes will be rotated 90 degrees relative to how you see them on the screen.
  - ◇ Refer to *Section 10.07* for more details on controlling where images will cut.

**IMPORTANT:** Please read Section 2.01 before cutting!

## 2. Maxx Air: Cutting

### 2.01 What You Need to Understand About Cutting

IMPORTANT: Please read all of 2.01!!!

#### You Have To Make Mistakes

- The key to becoming successful at cutting is to do a lot of it! Those who shy away from using their KNK never get to the stage of mastering it. It's very normal for new owners to be intimidated by their cutter. So, remember the following key things:
  - ◇ You won't break your new KNK by cutting paper, vinyl, cardstock, rhinestone rubber, and other easy-to-cut materials. The worst thing that might *possibly* happen is that you'll break a blade. That's it! And the likelihood of even that happening is low.
  - ◇ You need to start cutting so that you'll make a lot of mistakes! We ALL do that! It's in making these mistakes that you start to learn. You realize that those mistakes didn't result in a broken cutter. Plus, you'll stop making the same mistakes as you remember more of the things you need to check before every cut.
  - ◇ As you make fewer mistakes you begin to build confidence and you begin to have more cutting success! From there, you begin to experiment more and produce more. Thus, your best course of action is to just start cutting... a lot... after, of course, you have read the rest of this section!

#### The Most Common Mistakes Made by New Owners

- We all make them and we all learn from them. So, please note the following most common mistakes and then finish reading this entire Section 2.01 as the details behind these listed mistakes will be explained:
  - ◇ Too much blade is exposed on the blade holder
  - ◇ The blade tip is too close to the material
  - ◇ Too much or too little pressure is being used for the material being cut
  - ◇ Forget to change the **Blade Offset** before cutting
  - ◇ Failure to do a test cut to make sure settings are optimal
  - ◇ Not practicing enough with the test pen and paper to know where shapes will cut (go through *Section 10.07* to fully understand the settings in SCAL).

#### Begin with Easy Materials and Easy Shapes

- You didn't begin your first driving lesson out on the freeway. You probably started driving on a farm or in a parking lot. Then you progressed to the neighborhood and other low-traffic streets. Then you began driving on major streets. Think of your cutting in the same way and don't start your first cuts with thick difficult materials or detailed cutting files! Instead, start cutting basic shapes and inexpensive materials, such as cardstock from Wal-Mart or just scraps you have on hand. Work your way up to more difficult cuts after you master the easy ones.

#### Record Your Successes

- As you have successful cuts, take note of the settings you just used, such as **Pressure**, **Speed**, blade type, number of passes, brand of material, etc. There is a blank form at the end of this chapter that you can print and use to record your results. There are also suggested settings for common materials at the end of this chapter. Use these as starting guides but remember that your results may vary based on the many factors which can affect cutting.

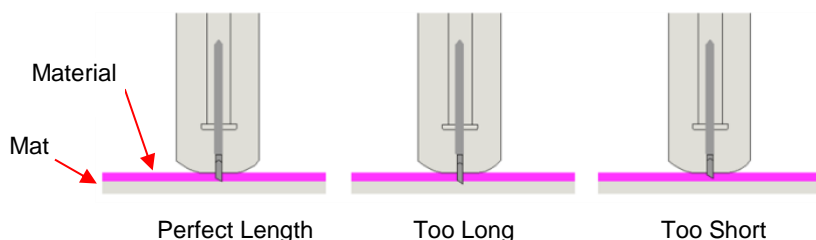
## Use the Correct Blade for the Material You Are Cutting

- Your KNK comes with a 45° blade (red cap) and a 60° blade (blue cap). An optional fabric blade (yellow cap) is also sold. Use the following as a guide for choosing the appropriate blade for the material you are cutting:
  - ◇ The 45° blade (red cap) should be used to cut vinyl, paper, cardstock, Dura-lar, Mylar, iron-on transfer, vellum
  - ◇ The 60° blade (blue cap) should be used to cut chipboard, Grungeboard, stiffened felt, craft foam, and some of the rhinestone template materials.
  - ◇ The fabric blade (yellow cap) should be used to cut all fabrics and unstiffened felt.
- Additional recommendations are in the suggested settings table at the end of this chapter.

## Set the Blade Length/Exposure Correctly

### Video

- The **Blade Length** (also called **Blade Exposure**) is how much blade is exposed at the bottom of the blade holder. You want this length to match the thickness of the material for optimal cutting. It is controlled by rotating the top of the blade holder. Rotating clockwise extends the blade (longer blade length). Rotating counter-clockwise retracts the blade (shorter blade length).
- When setting the blade length, hold the blade holder up next to the material before pressing the material to the mat, so that you can more accurately set the length to match the thickness of the material. For really thin materials, like vinyl and thin paper, just the very tip of the blade will be protruding from the bottom of the blade holder. In fact, you should just barely be able to feel it with your fingertip and not be able to see it very well, if at all.
- A good way to test your blade length is to fold a piece of the material onto itself and then cut a line into the material by hand, as shown in the video linked in this section. If the blade cannot cut through the material, you will need to extend the blade. If the blade cuts through the material and cuts into the next layer, you need to retract the blade. If the blade cuts through the material but does not nor scratch the layer below, you have the perfect length.
- Having the blade fully extended will never result in better cutting. In fact, it can cause skewing, tearing of the material, damage to the blade, and damage to the mat.
- When conducting the test cut, be sure to check your mat for cut lines after the test. You should be able to set the length to get clean cuts but with no visible markings on the mat. If you do see cut lines in your mat, retract the blade length by turning the top of the blade holder ¼ of a turn counterclockwise. You do not need to remove the blade holder from your KNK! Then repeat your test cut.



## Set the Blade Tip Height above the Material

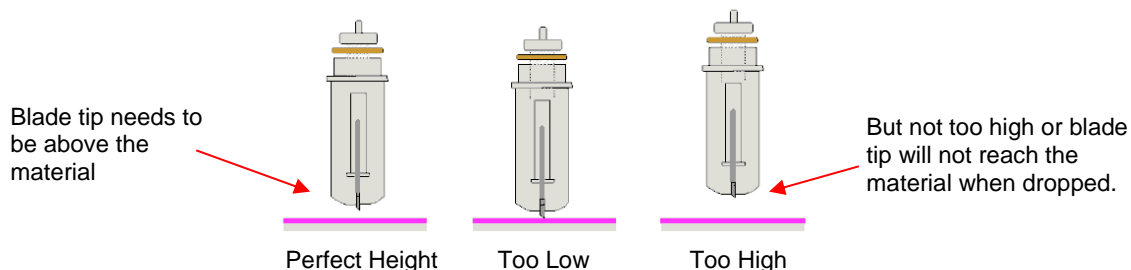
### Video

- The **blade height** is the distance from the tip of the blade to the top of the material you are about to cut. When you insert the blade holder into the blade holder seat, it does not necessarily have to be positioned



with the outer rim touching the blade holder seat. You have control over that height and can raise the blade holder up a little higher before locking it into place with the front screw on the blade holder seat.

- Adjust the blade height so that:
  - ◇ The blade tip will not be dragging across the material you are cutting when moving to the point to begin the cut.
  - ◇ The dropping of the blade will invoke more downward force... to a point! Thinner, easy-to-cut materials (such as paper and vinyl) can have the blade tip fairly close to the material. Denser materials, such as cardstock, chipboard and craft plastic, need the blade tip a little higher, but not too high:



- There are several methods to use in making sure the blade tip is set at a consistent height from one cut to the next:
  - ◇ One recommended method for getting the same height set for all of your cuts is to use a spacer of some kind. Place the spacer on top of the material you are cutting. Loosen the front screw and insert the blade holder so that the tip of the blade is touching the top of the spacer. Now tighten the front screw and remove the spacer. This distance will provide the blade some “punch room” to give the extra force and more consistent cutting of your material. What to use for this spacer? For materials such as cardstock and fabric, try using 25 Post-It note sheets or 12 squares cut from cardstock. When cutting very thick materials, such as 0.03” chipboard, felt, or craft foam, use 13 Post It note sheets or 6 squares of cardstock instead.
  - ◇ An alternate method is to cut O Rings to slip over the bottom of the blade holder and then allow the blade holder and O Rings to sit on top of the blade holder seat. Use 1 ring for thin materials (paper and vinyl), 2 rings for cardstock, 3 rings for rhinestone template materials, 4 rings for thick chipboard, and so forth. O Rings can be cut from cereal boxes with two glued together to create one ring. The cutting file for these is located here: <http://www.iloveknk.com/FreeFiles/KNK/Important/>

### **Adjust the Speed, Force, and Number of Passes Based on the Material and Shapes**

- Using correct cut settings is equally important as the type of blade, blade length, and blade height. Refer to *Section 2.03* for details. Again, some suggested settings are located at the end of this chapter and settings for using the various Maxx Air accessory tools are located at the end of *Chapter 12*.

### **Keep the Cutting Mat Clean and Sticky**

- Press your materials evenly to the mat. Think about using a brayer both before AND after cutting. Repressing the material after cutting can greatly aid in weeding the cut shapes from the waste.
- When necessary, tape thicker materials to the mat to keep them from slipping during the cut.
- If you cut a range of materials, you might need more than one mat so that you can use stickier mats for certain materials.

### **Perform Test Cuts!**

- Use the **TEST** button on the KNK to perform test cuts. Do not proceed with your cut until the test cut is clean. When cutting intricate shapes, a test cut of an intricate image, such as a letter or a small portion of your rhinestone pattern, might be a better indicator of correct settings.

- While in offline mode, press the **TEST** button to cut a small ring. This will indicate if your pressure settings and blade length are sufficient. If necessary, change your settings and perform additional test cuts until the material cuts a clean shape. Note: After each test cut the origin will advance forward by a little less than an inch. This allows you to do your tests along one side of your material until you have ideal settings and a perfect cut.
- If you need to repeat a test cut in the same location to simulate two passes, then use one of the basic shapes within SCAL, turn on **Multi-Cut** in the **Cut Settings** window and cut from there.
- While in the online mode, pressing the **TEST** button will cause nothing to happen.

## **Know Where Your Images Will Cut**

- Practice with the test pen until you know, with 100% confidence, where your images will be drawn. This is important since you do not want to be guessing when you begin actually cutting with a blade. Experiment with both **Origin Point** and **WYSIWG** modes, as well as **Portrait** versus **Landscape**. Refer to *Section 10.07*.

## **Don't Get Frustrated, Get Help!**

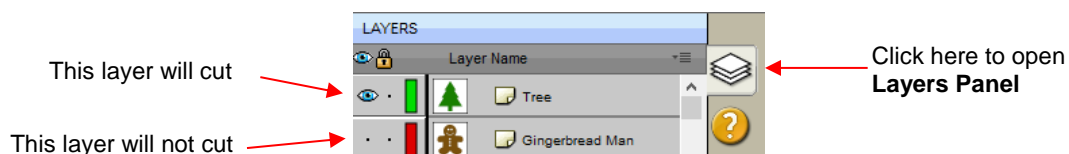
- Besides having your own KNK dealer as the first line of contact, there are many user forums, message boards, Yahoo groups, etc. where you can post questions and get answers from other users, dealers, and SCAL experts. Utilize these resources!
  - ◇ KNK Maxx Facebook group: <https://www.facebook.com/groups/KNKMaxx/>
  - ◇ Main Klic-N-Kut Yahoo Group: <http://groups.yahoo.com/group/Klic-N-Kut/>
  - ◇ KNK USA Forum: <http://knkusa.com/forums/>
  - ◇ For a list of SCAL resources, refer to *Section 3.12*.

## **2.02 Choices Before Cutting**

- There are a number of factors under your control for cutting:
  - ◇ What shapes to send to the cutter: *Section 2.02.1*
  - ◇ Where the shapes will be cut from the material: *Section 2.02.2*
  - ◇ What tool(s) will be used for cutting (or drawing, scoring, engraving, etc): *Section 2.02.3*
  - ◇ What settings will be used: *Section 2.02.4*

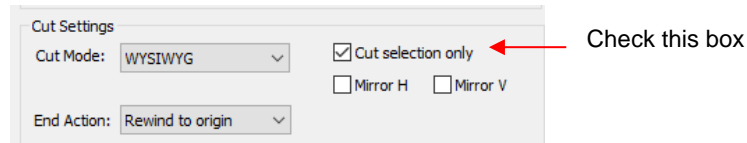
### **2.02.1 Controlling What Shapes Will Cut**

- There are four ways to control whether a shape will be cut or ignored:
  - ◇ Show/hide shapes on the **Layers Panel** (refer to *Sections 4.04* and *5.09*) – anything hidden will not be sent to the **Cut Settings** window. By clicking on the left side icon, a layer can be hidden. This is the most common way to control what shapes will cut.

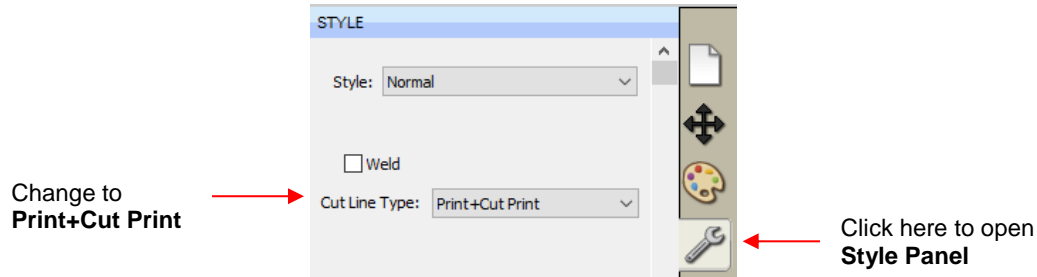


- ◇ Select/highlight which shapes you want to cut (refer to *Section 5.01*). Then, in the **Cut Settings** window, mark the option for only cutting those that are selected. This is useful if you have shapes you want to

cut that are in the same folder with other shapes you do not want to cut. You still have the option to hide those other shapes, as in the prior option, but this could be quicker if there are a lot of shapes to turn off:



- ◇ For shapes you do not wish to cut, change the **Cut Line Type** (on the **Style Panel**) to **Print+Cut Print**. Those shapes can then only be printed and will not be sent to the **Cut Settings** window. This is typically used in **Print and Cut** applications (refer to *Sections 10.01* and *11.04*).

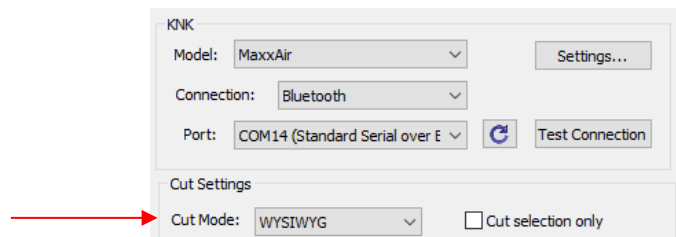


- ◇ For shapes you do not wish to cut, change the **Cut Line Type** (on the **Style Panel**) to **Draw (Pen)**. Those shapes will not be cut if you then have **Cut cut lines** selected in the **Cut Settings** window (refer to *Section 10.01*).



## 2.02.2 Controlling Where Shapes Will Cut

- In the **Cut Settings** window is a **Cut Mode** option:



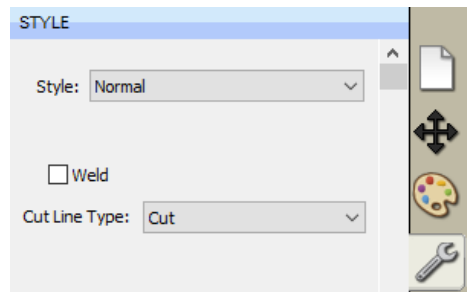
- This was briefly covered in *Section 1.11.3*. **Cut Mode** has two choices:
  - ◇ **WYSIWYG**: Cuts the shapes where they are positioned on the **Cutting Mat**. Refer to *Section 10.07.3*.
  - ◇ **Origin Point**: Moves the shapes to cut at the origin you have set on the cutter itself. Refer to *Section 10.07.2*.

- A third mode is called **Print+Cut** (aka **Print and Cut** or **PNC**):
  - ◇ This is the mode selected when you want to print images on your printer and then have the Maxx Air cut them out.
  - ◇ Three registration marks are printed, along with your images, from SCAL to your home or office printer. The printout is placed on the cutting mat. The laser light is then aligned at each printed mark. The Maxx Air will then cut out your shapes based on triangulation. This is far more precise than **WYSIWYG** because it takes into account not only any misalignment of your printout on the mat, but also any errors in the printing. Most printers do not print images precisely in the location on the paper as they are located on the screen.
  - ◇ Note that raster images (.JPG, .BMP, .PNG etc.) will need to be traced first so that cut lines are created. Refer to *Section 7.03* for tutorials on how to do the tracing
  - ◇ Access to the **Print+Cut** mode is located in the bottom left corner of the **Cut Settings** window. Refer to *Chapter 11* for complete instructions on calibrating the laser and examples of PNC applications.

### **2.02.3 Selecting the Tool to be Used for Cutting**

#### **Blade Holder**

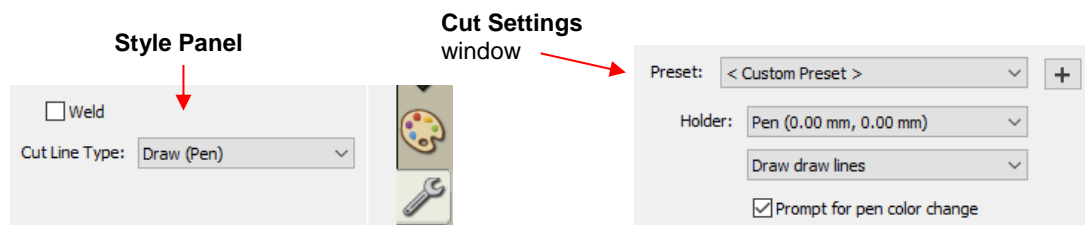
- When using the blade holder, you will leave the **Cut Line Type** (on the **Style Panel**) set to **Cut**:



- You have a choice of three blade types to use in your blade holder, as was covered in *Section 2.0.1*. Based on the blade type, you will need to set a **Blade Offset** value for that type of blade (refer to *Section 2.03.9*).

#### **Pen (or Engraving Tool, Embossing Tool, Punch/Piercing Tool)**

- When using a tool with no blade offset and no other tool, you can leave the **Cut Line Type** set to **Cut**, as with the blade holder. You will then change the **Blade Offset** and **Overcut** to 0, as you did in *Section 1.11.3*.
- If, however, you are using both the blade holder and a pen in your project and wish to change out tools, then you will set the **Cut Line Type** to **Draw (Pen)** (for those particular layers). Also, in the **Cut Settings** window, select **Pen** under **Holder**, select **Draw draw lines**, and mark the option **Prompt for pen color change**:



- When using both the pen and the blade holder, a specific procedure is needed to insure perfect alignment of the two. This is covered in *Section 12.07.2*.

## 2.02.4 Determining the Cut Settings

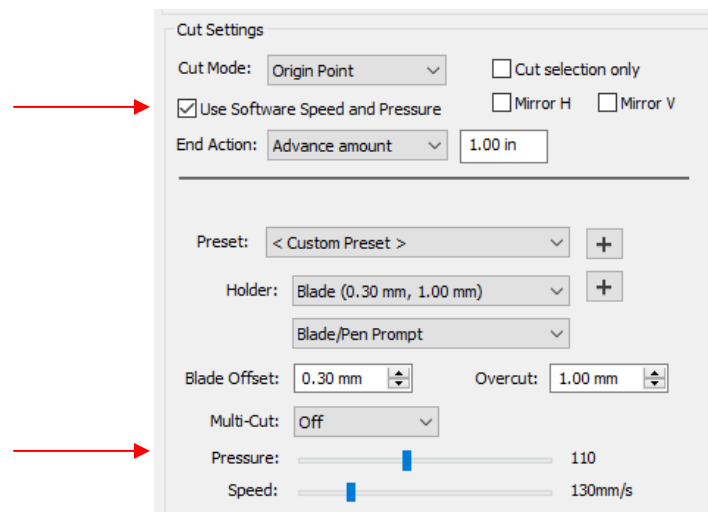
- In the lower half of the **Cut Settings** window, there are a number of settings which should be understood thoroughly, as you will be checking them before every cut. *Section 2.03* covers each setting in detail.
- The **Presets** provide very rough estimates of the settings to be used for about twenty materials. For a more thorough list of materials, it's recommended that the table at the end of this chapter be used for selecting settings.
- If you cannot find settings for your material, use the flow chart at the following link to test cut your material and determine optimum settings:

<http://www.iloveknk.com/2015/06/test-cutting-materials-a-troubleshooting-flow-chart/>

## 2.03 Cut Settings

### 2.03.1 Pressure

- The cutting **Pressure** (also called **Force**) ranges from 1 to 255 where the maximum of 255 represents ~1500g of cutting force. If it is set too low, the material cannot be cut. If it is set too high, you will get bad cutting (even incomplete cutting at times) and tearing of the material. Use suggested settings for the material you are cutting and perform small test cuts before cutting your actual project. Make adjustments in order to get a clean test cut before proceeding with your larger cut.
- To change the **Force (f)**, use the left and right “+” and “-” buttons on the Control Panel, while in Online mode. The force/pressure can also be set within the **Cut Settings** window in SCAL. Check the box next to **Use Software Speed and Pressure** and scroll the pressure bar (near the bottom of the screen) to the desired setting. If necessary, use the keys on your keyboard to fine-tune the setting.



- Dull blades will need more force than new blades, thus anticipate increasing the force over the life of the blade.
- When cutting materials that can use either blade, the 45 degree red blade will need more force than the 60 degree blue blade, because of the extra contact with the material being cut.
- Materials that absorb moisture (such as cardstock, paper, fabric, and chipboard) will need more force (and possibly more than one pass) if they have been exposed to humidity.
- Recommended settings for a wide range of materials are available in the tables at the end of this chapter and also at the end of chapter 12.

### 2.03.2 Speed

- The cutting **Speed** (also called **Velocity**) is how fast the blade travels while it is in the “down” or cutting position. The Maxx Air's speed ranges from 1 to 800 mm/sec.
  - ◇ The settings from 1 through 50 are the slow speeds and should be used when cutting dense difficult materials, such as chipboard, craft plastic, styrene, and balsa.
  - ◇ The settings from 50 through 500 are medium speeds and should be used for easy-to-cut materials, such as cardstock, vinyl, iron-on transfer, and rhinestone template material.
  - ◇ The settings above 500 are the fast speeds and should only be used for engraving, embossing, and drawing.
- To change the **Velocity (v)**, use the up and down “+” and “-” buttons on the Control Panel, while in Online mode. The speed/velocity can also be set within the **Cut Settings** window in SCAL. Check the box next to **Use Software Speed and Pressure** and scroll the speed bar (near the bottom of the screen) to the desired setting. If necessary, use the keys on your keyboard to fine-tune the setting.

### 2.03.3 Multi-Cut

- The **Multi-cut** setting causes each individual path to be cut the set number of passes before the blade moves to the next path to cut. This is better than just repeating the entire cut as each repeated pass is cut with the blade held down throughout the repeated passes, resulting in cleaner cutting.
- In general, when increasing **Multi-Cut**, the **Pressure** setting can be decreased. For example, you may find a cardstock that requires a **Pressure** of 80 to cut in a single pass will only need a **Pressure** of 60 if cutting in two passes.
- **Multicut** is recommended in the following situations:
  - ◇ Cutting thicker denser materials, such as chipboard, where multiple passes allow the blade to progressively “carve” through the material
  - ◇ Cutting of certain fibrous materials, such as fabric, where a second pass will insure that all of the fibers have been cleanly cut.
  - ◇ Cutting intricate or detailed shapes (such as script titles) from certain materials, such as heavily textured cardstock, where a single pass may leave certain spots not cleanly cut.
  - ◇ Cutting rhinestone template material where a second pass results in much cleaner weeding of the cut circles.

### 2.03.4 Blade Offset

- **Blade Offset** is the horizontal distance from the center of the blade shaft to the tip of the blade. A pen or engraving tool has an offset of 0 because the tip is centered with the center of the pen/engraving tool shaft. But a blade is different:



- If you set the **Blade Offset** to 0 when cutting with a blade, corners will be rounded. On the other hand, if it is set too high, bubbles will be cut on sharp corners:



Offset is too low:  
corners are rounded



Offset is too high: bubbles  
appear at the corners

- Below are the current **Blade Offset** settings to use for each of the three types of KNK Maxx blades:
  - ◇ Red capped blade: 0.3 mm
  - ◇ Blue capped blade: 0.4 mm
  - ◇ Yellow capped blade: 0.75 mm
- Any time you order new blades, check for the recommended **Blade Offset** on the packaging. However, it's not unusual for blades to be slightly off-spec. Based on cutting a rectangle or square, increase or decrease the **Blade Offset** in increments of 0.1 or smaller.

### **2.03.5 Overcut**

- **Overcut** is related to **Blade Offset** in that it isn't needed when using a pen, embosser, engraver, and so forth, because the tips of those tools are aligned with the center of the tools themselves. However, leaving **Overcut** at 0 when using the blade holder will result in large shapes not quite closing:

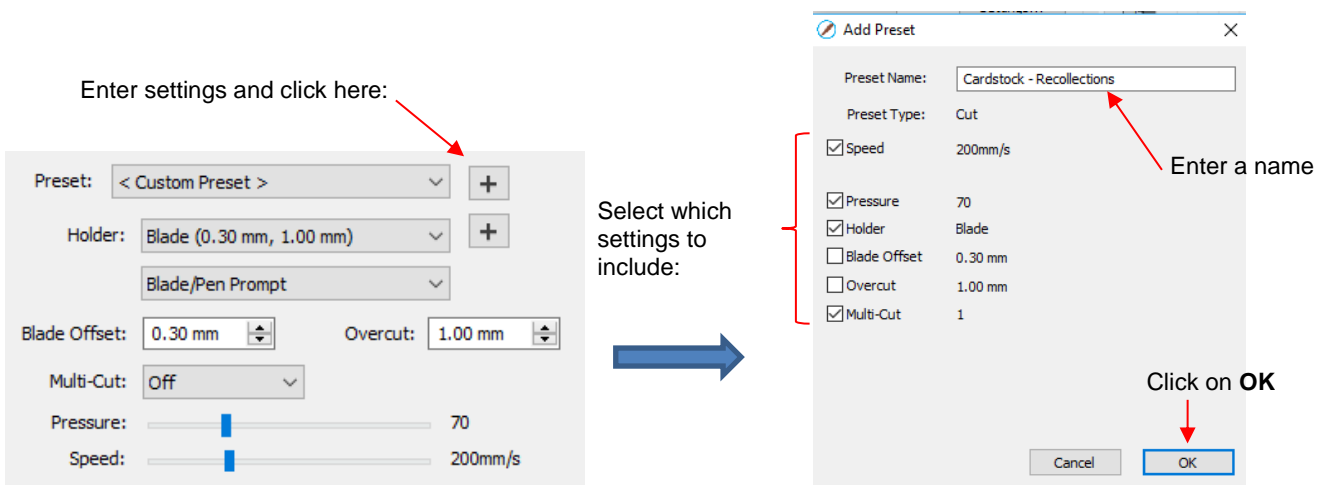


Overcut is too low:  
paths do not close

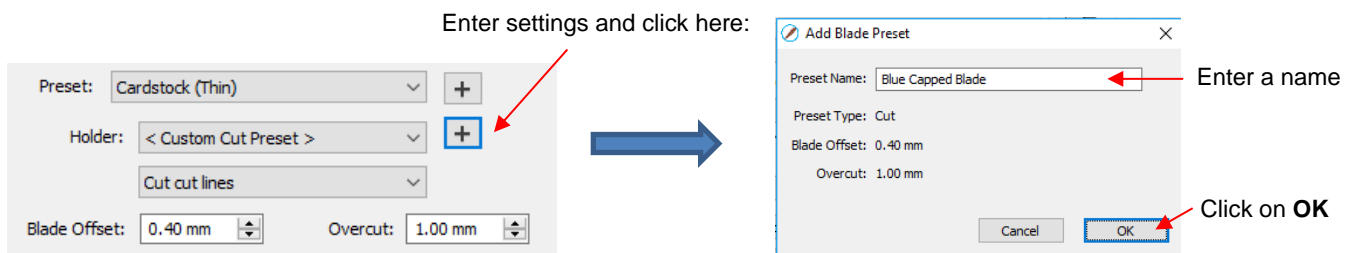
- In some cutting programs, **Overcut** is not a separate setting but rather automatically calculated and applied based on the **Blade Offset** entered. However, in SCAL, you enter an actual **Overcut** setting and should any time a blade is used.
- In general, the blade type doesn't greatly affect the **Overcut** required. Try using 1.00 mm. In the event you cut a large closed shape, like an 8" circle, you may find that you'll need to increase **Overcut** to 2.00 mm.

### **2.04 Presets**

- SCAL has presets for about twenty materials. To select a preset, click on the dropdown menu and browse the list to find the material you are cutting.
- When selecting one, remember these should only be used as starting points for a test cut. There are many factors which can affect the force required, including sharpness of the blade, condition of the mat, humidity, and intricacy of the design.
- SCAL also offers the ability to save your own presets. To do this, enter the settings you wish to save. Then click on the "+" to the right of **<Custom Preset>**:



- 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:

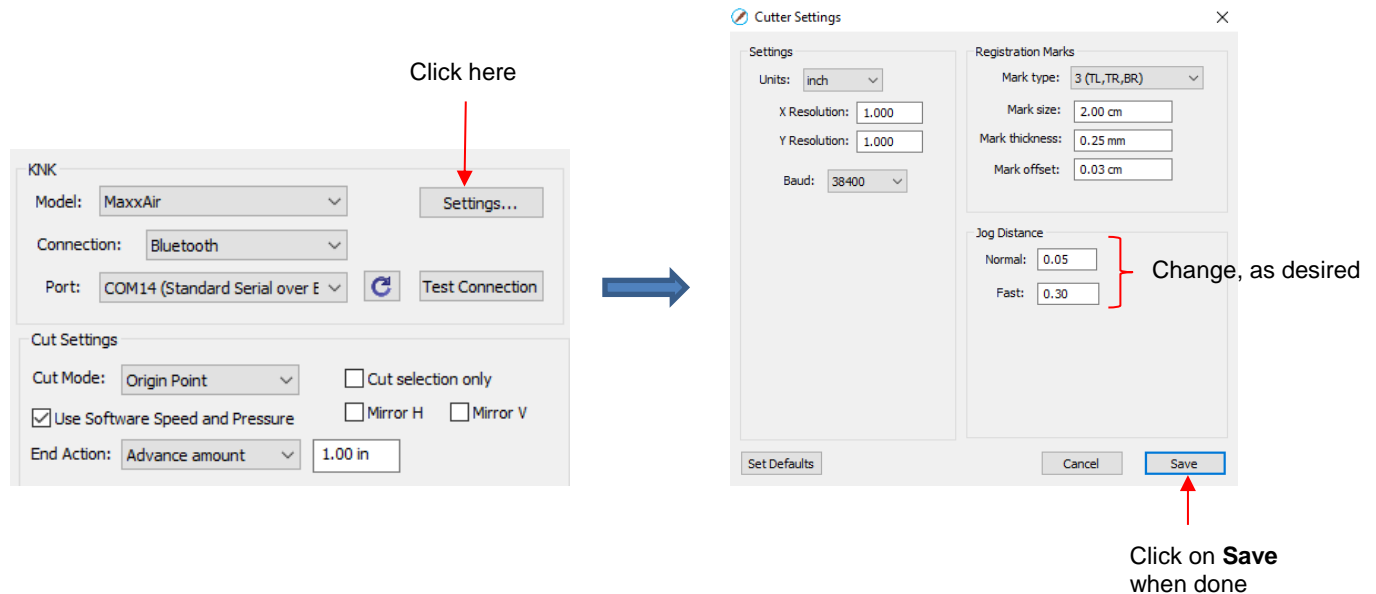


## 2.05 Set Origin

- Every time you turn on the Maxx Air, the blade carriage will be moved to the same spot. This is called the **Home Origin**. Now, you can always use that spot to start your cuts and never set a new origin, however, it limits you, somewhat, in situations where you may be performing your test cut at that location but will need to move over to a new location to cut out your shapes. Also, you may want to cut shapes from several scraps of material and would like to place those scraps on your mat prior to cutting.
- Set the origin by going off-line and then using the + and - buttons to move the pen or blade tip over to the front right corner of the paper (thus, most of the mat and your material are behind the cutter at the start of the cut). Press the **Origin** button to set the origin. The **X** and **Y** on the Control Panel should both read 0. Press the **Online** button to return to online mode.
- You can also set the origin from within SCAL. In the **Cut Settings** window, press the **Set Origin** icon to open the **Set Origin** window. The diagram allows you to move the blade carriage to a new location and define that location as the new origin for that cut. As a reminder, when using the buttons in this window or using the keys on your keyboard:



- ◇ Each click of an arrow moves a specific distance called the **Normal Jog Distance**
- ◇ Holding **Shift** with each click of an arrow moves a specific distance called the **Fast Jog Distance**
- ◇ Holding **Shift + Ctrl** (or, on a Mac, **Shift + Command**) with each click of an arrow moves the minimum possible distance.
- The **Normal** and **Fast Jog Distance** can be edited under **Cut>Cutter Settings** or by clicking on the **Settings** button near the top of the **Cut Settings** window. These defaults can be made larger or smaller according to your preference:



## 2.06 Other Output Functions

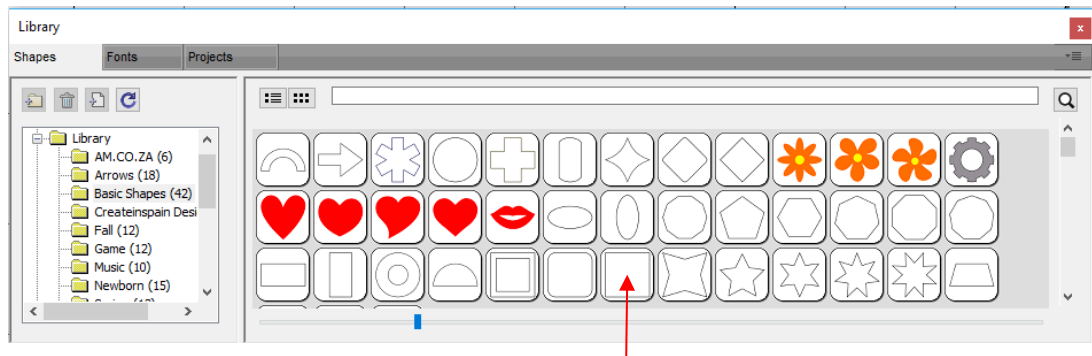
- There are other functions and features in the **Cut Settings** window. Some of these, such as **Weeding** and **Tiling**, are only present in the PRO version of SCAL. Refer to *Section 10.06* for details on all of the settings.

## 2.07 Important Checklist Before You Cut!

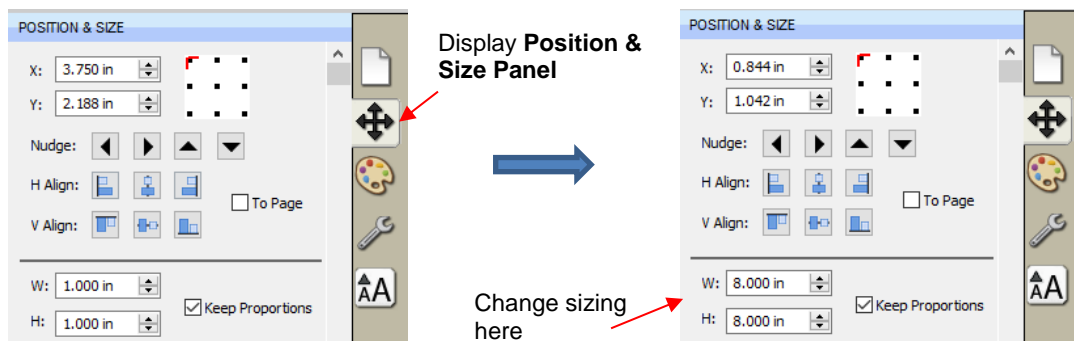
- Do you have your material on the mat and the mat inserted into the Maxx Air? (Note: materials with a backing sheet, such as vinyl and iron-on transfer do not require a mat for cutting)
- Do you have the pinch wheels under rectangles and in the down position?
- Have you set the blade length based on the thickness of the material you are cutting?
- Do you have the blade holder firmly mounted in the blade holder seat and the blade tip at the correct height above the material?
- Have you set the **Origin** at the bottom right corner of your material (or wherever you need the origin to be)?
- Have you set the **Pressure**? And the **Speed**?
- Have you selected the correct **Offset** for the blade you are using?
- Do you need to turn on **Multi-cut** for this material?
- Have you selected the **Cut Mode** you wish to use? Do you know, with confidence, where your shapes are going to cut?

## 2.08 Resolution Calibration

- If you were to cut out any particular shape, for example, a 10" x 10" square, you might find that it actually measures 9-15/16" x 10-1/32". It will be very close to 10" x 10" but perhaps just slightly smaller or larger in either or both dimensions. Now this might be perfectly acceptable for the type of cutting you do. Therefore, it may not even be necessary to do this particular calibration. However, if you do want to make sure your shapes are cut precisely, the following procedure will allow you to calibrate your Maxx Air.
- Note that this **Resolution** only applies to **Origin Point** and **WYSIWYG** cutting modes. For **Print and Cut** applications, **Resolution** is determined automatically based on where the registration marks are set with the laser light during the print and cut process.
- Go to the **Library** and select the square shape:

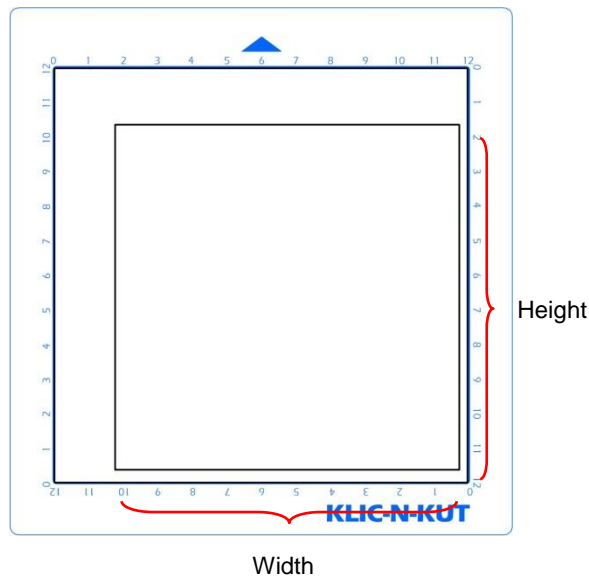


- Make sure you have selected the square and not the rounded square to the left of it because you will be measuring this square with a ruler after drawing it.
- To resize the square, select it and then click on the **Position & Size** icon to display that panel. The square will be 1" x 1". Change the size (**W** and **H**) to the largest size that will fit on the paper you have available. It is recommended that at least 10" x 10" be used:

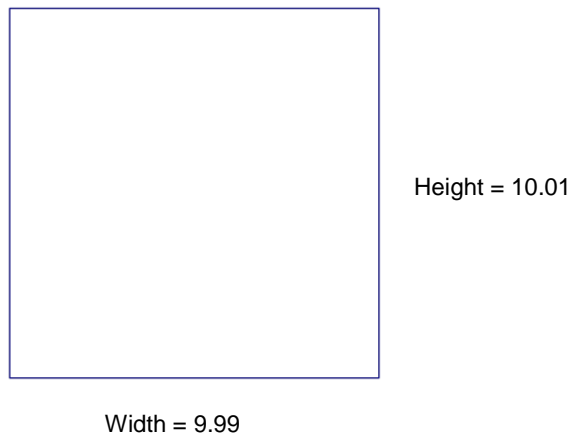


- Draw the square on your paper using the test pen or some other thin line pen. Then carefully measure the **Width** (the left-to-right length that drew) and the **Height** (the top-to-bottom length that drew):

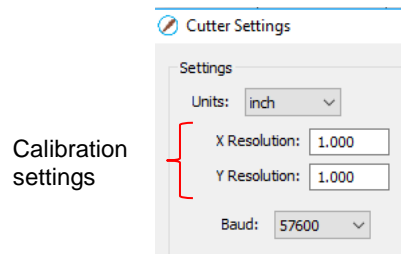
Feed the mat this direction  
into the Maxx Air



- Because the Maxx Airs are so very accurate, only take note if the sides are slightly larger than 10" or slightly smaller than 10" because it will probably be so close that you cannot even measure how much larger or smaller than 10 inches it might be. Instead, let's say the **Height** is just the tiniest bit over 10". Mark that side as being 10.01". Let's say the **Width** is slightly less than 10." Mark that side as 9.99". Now, if you feel you can measure accurately, with a ruler, then do so. But just estimating should work fine, too. Write those measurements onto your sheet:



- Go to **Cutter>Cutter Settings**. In the top left corner of that window you will see the calibration settings:

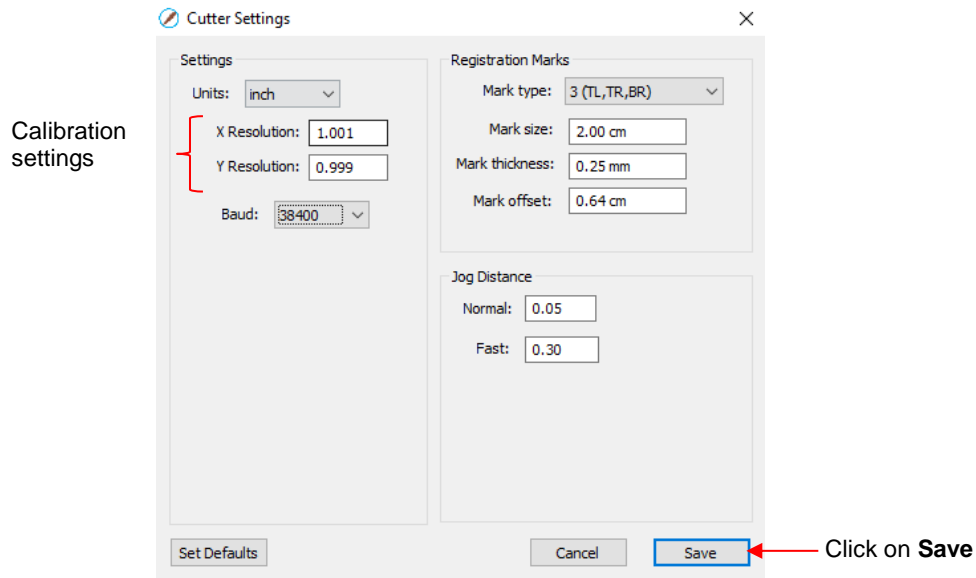


- Use a calculator to calculate the **X Resolution** and **Y Resolution** based on the measurements you obtained versus the size in SCAL. Note that it doesn't matter if you used **Portrait** or **Landscape** mode, the **X Resolution** is based on left-to-right (width) and the **Y Resolution** is based on top-to-bottom (height):

$$\begin{aligned}
 \text{New X Resolution} &= \text{Current X Resolution multiplied by the desired value divided by the actual value} \\
 &= 1.0 * 10 / 9.99 \\
 &= 1.001
 \end{aligned}$$

$$\begin{aligned}\text{New Y Resolution} &= \text{Current Y Resolution multiplied by the desired value divided by the actual value} \\ &= 1.0 * 10.00 / 10.01 \\ &= 0.999\end{aligned}$$

- Enter those new values into the **Cutter Settings** window and click on **Save**:



- If, after testing again, you find that the sizing is still slightly off, then just repeat again. Note that in the calculations the second time, instead of using 1.00 for the **Current X Resolution** and/or **Y Resolution**, you will use whatever values you entered into the **Cutter Settings** window prior to drawing the square the second time.

## Settings Form for Cutting Materials

[illegible]

## **Suggested Cut Settings for Various Materials on Maxx Air<sup>1</sup>**

Material Type	Material Brand or Source	Blade	Pressure	Speed	Blade Offset	# of Passes	Blade Ht*	Other Comments
Acetate	Grafix - 0.005"	Red	45-60	400	0.35	1	25	
Aluminum	Soda can	Red	160-180	15	0.35	1	25	Taped to mat
Basswood	1/16"	Blue	200	20	0	4	13	Taped to mat; very difficult to cut, hard on blades
Binding Cover Clear Plastic	Akiles clear, 7 mil	Red	45-55	400	0.35	4	25	
Cardstock	Bazzill - Basics	Red	45-65	300	0.35	1	25	Force will vary with color of cardstock
Cardstock	Georgia Pacific 110 lb (298g) white	Red	45-60	200	0.35	1	25	
Cardstock	Neenah - 110 lb (298g) white	Red	80-95	200	0.35	1	25	Will cut cleaner at lower force and 2 passes
Cardstock	Neenah - 80 lb (218g) white	Red	45-60	300	0.35	1	25	
Cardstock	Paper Studio - smooth finish	Red	55-70	300	0.35	1	25	Tested black
Chipboard	0.02" white	Red	90-120	200	0.35	2	25	May need 2 passes on small detail
Chipboard	0.03" (knkusa.com)	Blue	160-190	100	0.7	2	25	Can cut simple shapes in 1 pass
Craft Plastic	0.015" PETG from Dick Blick	Red	140-155	300	0.35	2	25	has clear protection film
Craft Plastic	0.02" PETG from Grafix , scrapbook.com, ebay	Red	170-185	302	0.35	2	25	has blue protection film, Called Dura-lar clear plastic at Dick Blick
Craft Plastic	Clear Scraps (0.024")	Red	185-200	301	0.35	2	25	has clear protection film
Fabric - thin cotton	Type used for quilting - with Heat n' Bond	Fabric	55-85	200	0.75	1-2	25	Varies with fabric
Felt - Soft, ~1/16"	Michael's - with Heat n Bond applied	Fabric	80-100	400	0.6	1-2	13	Taped to mat; More force needed for black felt than for white
Felt - Sticky Back	Kunin Stick'rzfelt	Fabric	150	165	0.6	3	13	
Felt	National NonWovens	Fabric	90-110	300	0.6	2	13	Taped to mat; no stabilizer but pressed to a very sticky mat
Felt: Stiffened	Michael's - 1/16" (0.06")	Fabric	50-60	150	0.6	3	13	

Material Type	Material Brand or Source	Blade	Pressure	Speed	Blade Offset	# of Passes	Blade Ht*	Other Comments
Felt: Stiffened	Michael's - 0.05"	Fabric	30-40	150	0.6	3	13	
Foam	Fun Foam from Michael's	Blue	1-10	300	0.6	1	19	Use a very sticky mat or tape to mat. Set blade length to just cut through
Glimmer Paper	Stampin Up - #124005	Red	55-70	300	0.35	1	25	Taped to Mat, avoid contact with wheels: glitter comes off paper easily
Glitter Paper	American Crafts POW	Red	55-70	300	0.35	1	25	May need to tape to mat
Glitter Paper	Recollections Signature	Blue	50-60	300	0.75	2	25	Tape to a sticky mat upside down; mirror images
Iron-On Transfer	knkusa.com	Red	25-40	300	0.35	1	25	With no mat, blade holder rests on rim
Chipboard	Stampin' Up: 0.06" (1.5 mm)	Blue	225-235	25	0.75	3	13	Very dense. Will cut better if freezer paper is applied.
Lutradur - Light Wt	ctpub.com	Red	30-40	200	0.35	1	25	
Magnetic Material	knkusa.com, 0.035"	Blue	170-190	300	0.75	1	19	Taped to Mat, magnet side up
Mat Board	UK - 1/16" (1.5 mm)	Blue	175-185	50	0.75	2	13	
Paper - Copy/Printer	20 lb (75g) Multi-purpose	Red	10-20	200	0.35	1	25	Set blade to minimal exposure to avoid tearing
Patterned Paper	Recollections Pads from Michael's	Red	40-60	400	0.35	1	25	
Patterned Paper - with Glitter	Recollections Pads from Michael's	Red	40-60	400	0.35	2	25	Uneven texture does better with 2 passes
Pelmet Vylene	UK	Fabric	70-80	200	0.6	1	25	
Posterboard	Grocery Store	Red	60-75	400	0.35	1	25	
Rhinestone Template Material	Green from knkusa.com	Blue	55-70	400	0.75	2	25	Peel off backing and place sticky side onto mat
Rhinestone Template Material	KNK Rock-it from knkusa.com	Blue	60-75	500	0.75	2	25	Leave material on liner and press liner side down to sticky mat
Rhinestone Template Material	Sticky Flock	Red	45-60	500	0.35	1	25	Remove liner and brayer sticky side to a sticky mat for easier weeding.
Shrink Film	Grafix - clear	Red	170-190	300	0.35	1	25	Taped to mat
Shrinky Dink	Frosted Ruff N' Ready	Red	170-190	300	0.35	1	25	Taped to mat
Styrene	www.knkusa.com, white, ~0.02"	Red	120-140	50	0.35	2	25	Taped to Mat

Styrene	Lowe's sign dept (pink and green)	Red	140-160	50	0.35	2	25	Taped to Mat
<b>Material Type</b>	<b>Material Brand or Source</b>	<b>Blade</b>	<b>Pressure</b>	<b>Speed</b>	<b>Blade Offset</b>	<b># of Passes</b>	<b>Blade Ht*</b>	<b>Other Comments</b>
Window Sheets	Stampin Up - #114323	Red	150-170	300	0.35	1	25	Taped to Mat
Vellum	Heavy	Red	60-75	400	0.35	1	25	
Vellum - thin	WorldWin Colormates	Red	15-25	400	0.35	1	25	
Vinyl	knkusa.com	Red	5-15	300	0.35	1	25	With no mat, blade holder rests on rim
Wool: 100%	w/ freezer paper applied	Fabric	140-160	100	0.75	3	13	Taped to mat

\* Number of Post-It notes used to set blade tip distance from material

These settings should be used for the initial test cut. Adjustments may be necessary based on the condition of the blade, variations in the material, humidity, condition of the cutting mat, etc.

<sup>1</sup> © 2009- 2018 Sandy McCauley, All Rights Reserved



## **3. SCAL: Installation, Preferences, and Workspace**

This chapter begins the Sure Cuts a Lot User Manual and is based on Version 4.069.

### **3.01 Installing SCAL**

#### **3.01.1 Selecting and Downloading the Software**

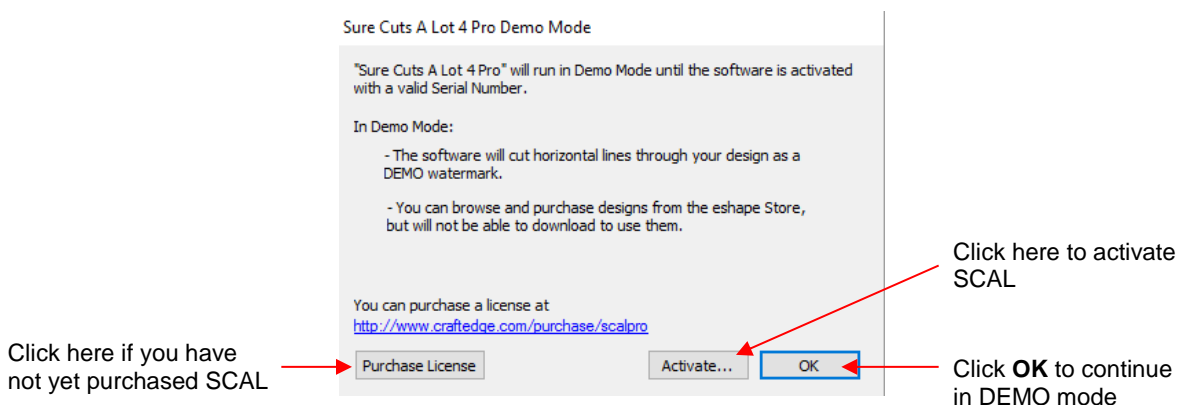
- *Sure Cuts A Lot 4* (SCAL) can be downloaded from the following link. Note that there are four choices - Mac or PC and then regular or PRO:

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

- The additional features in the PRO version are listed below:
  - ◇ 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
  - ◇ End action options – where cutting head moves at the end of a cut
  - ◇ Color layer alignment
  - ◇ 3D extrude
  - ◇ Importing DXF, PLT
- Install the downloaded file and open SCAL. The software will run in DEMO mode until a registration is purchased. This mode will have the following limitations:
  - ◇ When cutting, horizontal lines will be added across the design
  - ◇ Digital shapes from the **eshape Store** cannot be downloaded
  - ◇ Exporting will add a DEMO watermark
- Note that the demo version of SCAL5 will expire after 15 days.

#### **3.01.2 Activating the Software**

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



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

- If you do not have an Internet connection on this computer or the automatic activation fails, use the **Activate manually** option in the prior screenshot.

◇ The window will then pop up a **Site Code**:

◇ Next, go to the following link:

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

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

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

- If you need to activate your **Serial Number** on both a PC and a Mac, go to **Help>Support>Technical Support** and click on **Contact Support Team**.

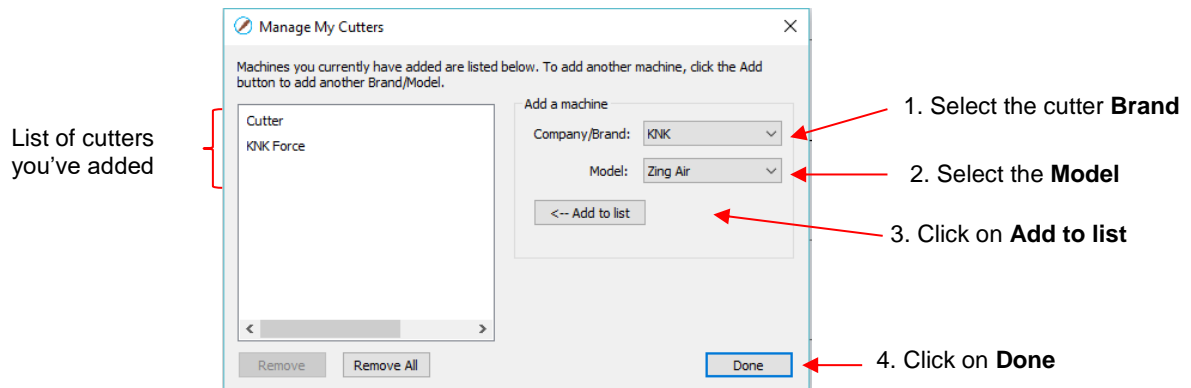
### 3.01.3 Installing the USB Driver

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

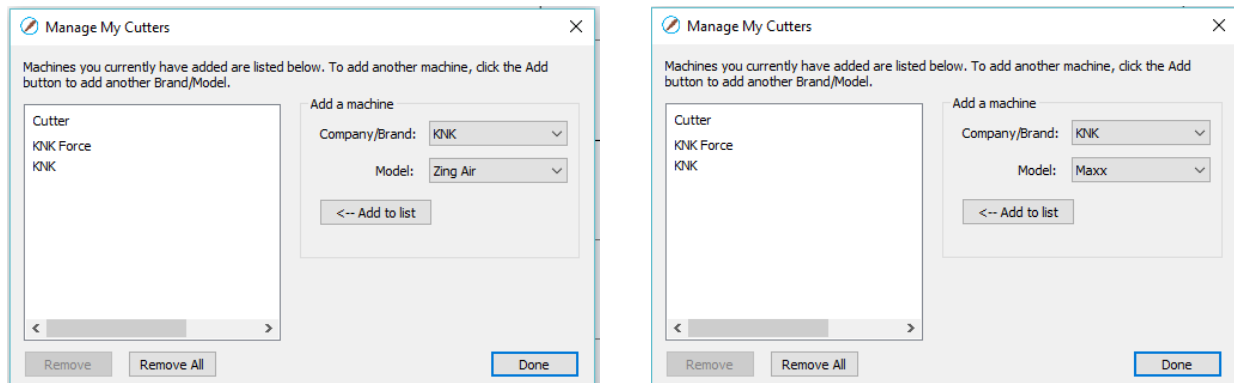
<http://knkusa.com/resources/>

### 3.01.4 Installing Your Cutter

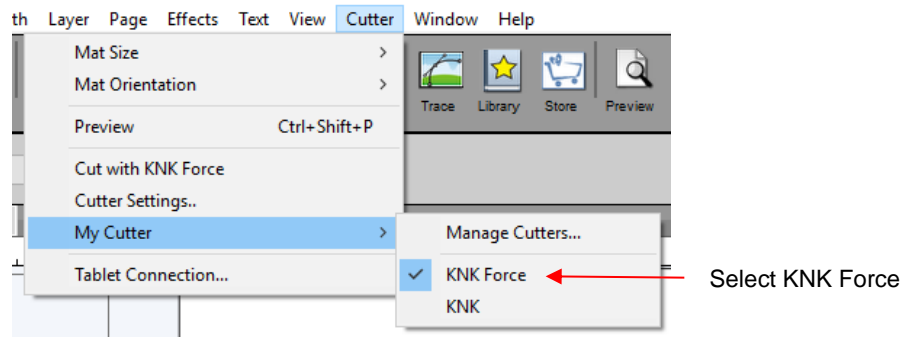
- Go to **Cutter>My Cutter>Manage Cutters** and the following window will open:



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

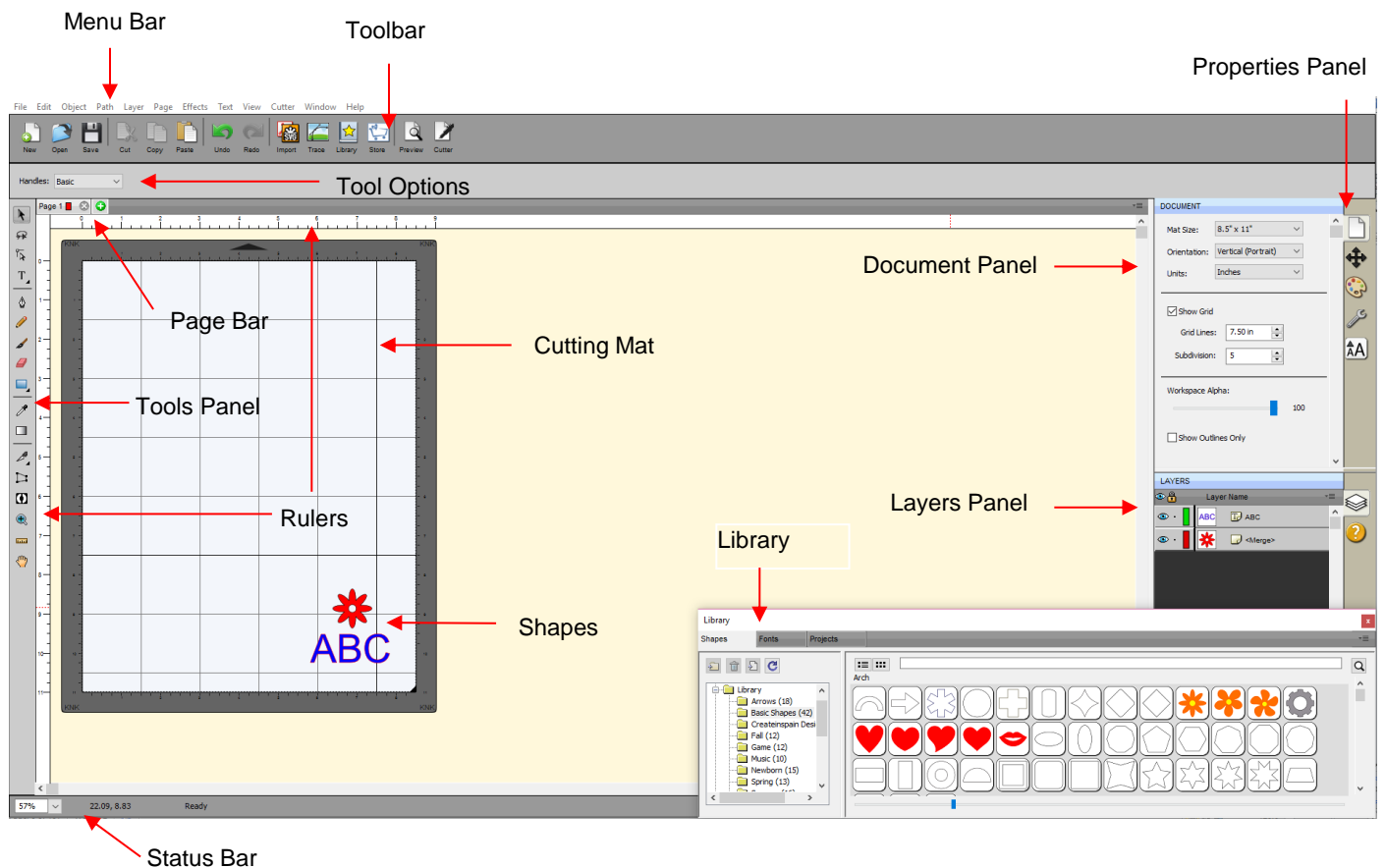


- Click on **Done** to save and close the window. Now, when you are ready to cut, the cutter you use will be selected by going to **Cutter>My Cutter** and picking which cutter you which to use:



### 3.02 Main SCAL Screen

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



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



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

- Hovering your mouse over most of the screen icons will pop up the icon's name and, in some cases, details about usage.
- In order to better remember where major elements are located, note that the term "bar" is used when components are laid out horizontally (such as the **Toolbar**) and the term "panel" is used when components are laid out vertically (such as the **Tools Panel**).

- Throughout this manual, **Cutting Mat** (capitalized and in bold type) refers to the on-screen simulation of the physical cutting mat, which will be written with lower case, normal type.
- Shapes** are the objects or images that you will be adding to your projects. They can be created from scratch or imported from other sources, such as the **Library**, your computer, or the **eshape Store**. As you will see throughout sections of this user manual, you have many options and resources available to you.
- This manual also presents information by topics versus location on the screen. If you need to look up all of the functions on one particular element, for example the **Tool Panel**, refer to **Appendix C**.

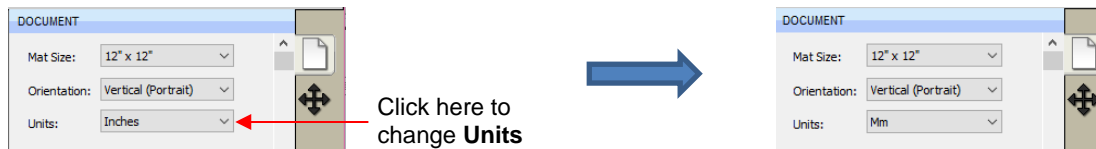
### **3.03 Language Preference**

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



### **3.04 Units Preference**

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



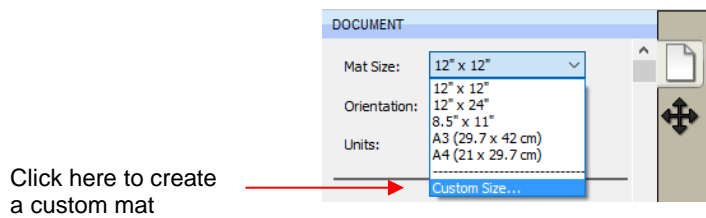
- The units can also be changed in either of the following locations:
  - ◇ Go to **View>Ruler Units**
  - ◇ Right-click on the screen and select **Ruler Units**

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

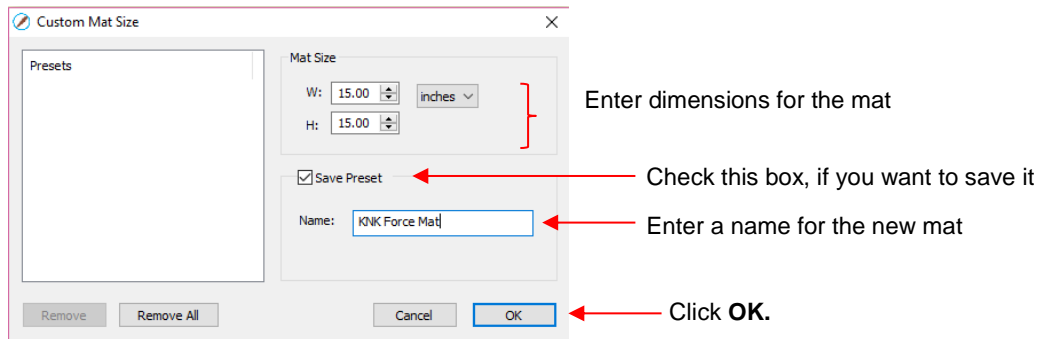
- The **Cutting Mat** serves as a design area for the software as well as to indicate, in some cutting modes, where the shapes will be cut.

#### **3.05.1 Mat Size**

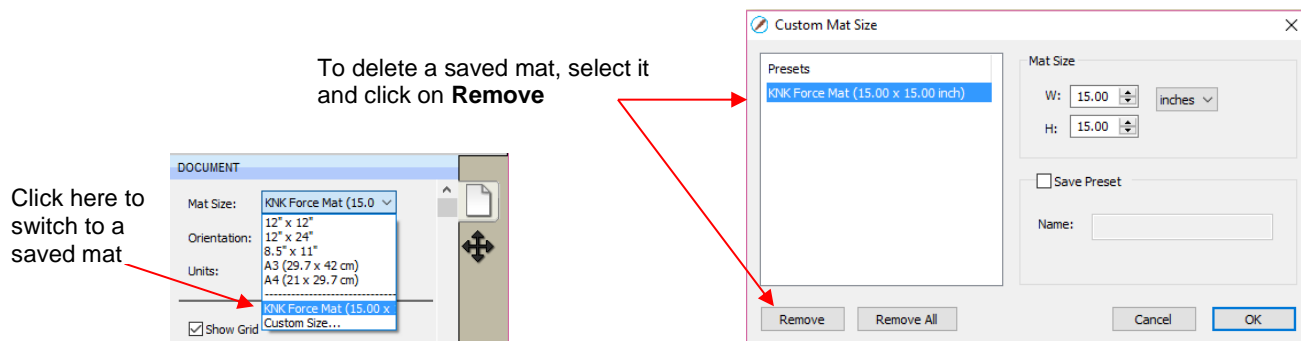
- There are three ways to access the **Cutting Mat** menu:
  - ◇ Click on the drop-down menu next to **Mat Size** on the **Documents Panel**
  - ◇ Right-click on the screen and select **Mat Size**
  - ◇ Go to **Cutter>Mat Size**
- There are five options for setting **Cutting Mat** dimensions under **Mat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



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



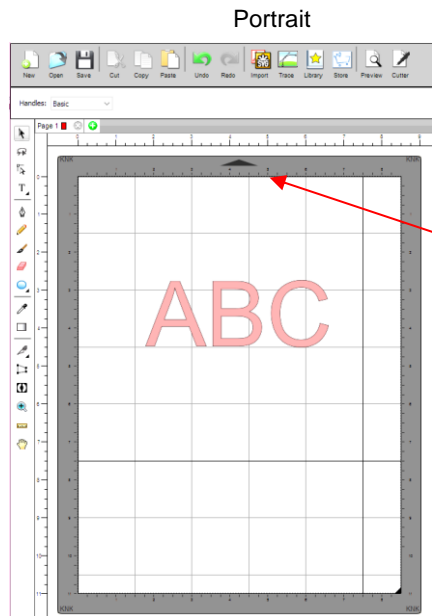
- A saved mat will now appear at the bottom in the **Mat Size** menu and will be listed under **Presets** when you return to the **Custom Mat Size** window:



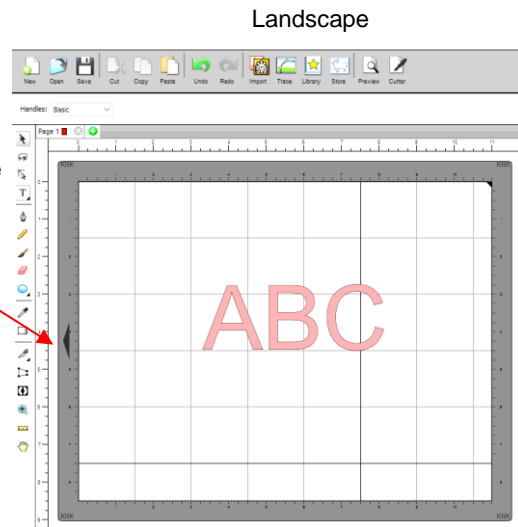
- To remove a custom **Cutting Mat** from the menu, go back to the **Custom Mat Size** window and select the mat under **Presets**. Click on **Remove**.

### 3.05.2 Mat Orientation

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



Portrait



Landscape

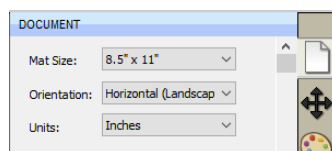
The black triangles show the direction the actual cutting mat should be fed into the cutter

- There are three ways to change the mat orientation:

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

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

(2)

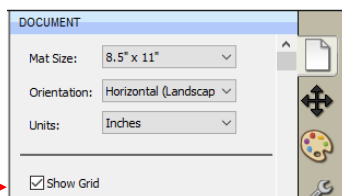


- ◊ Right-click on the screen and select **Mat Orientation**
- ◊ Go to **Cutter>Mat Orientation**

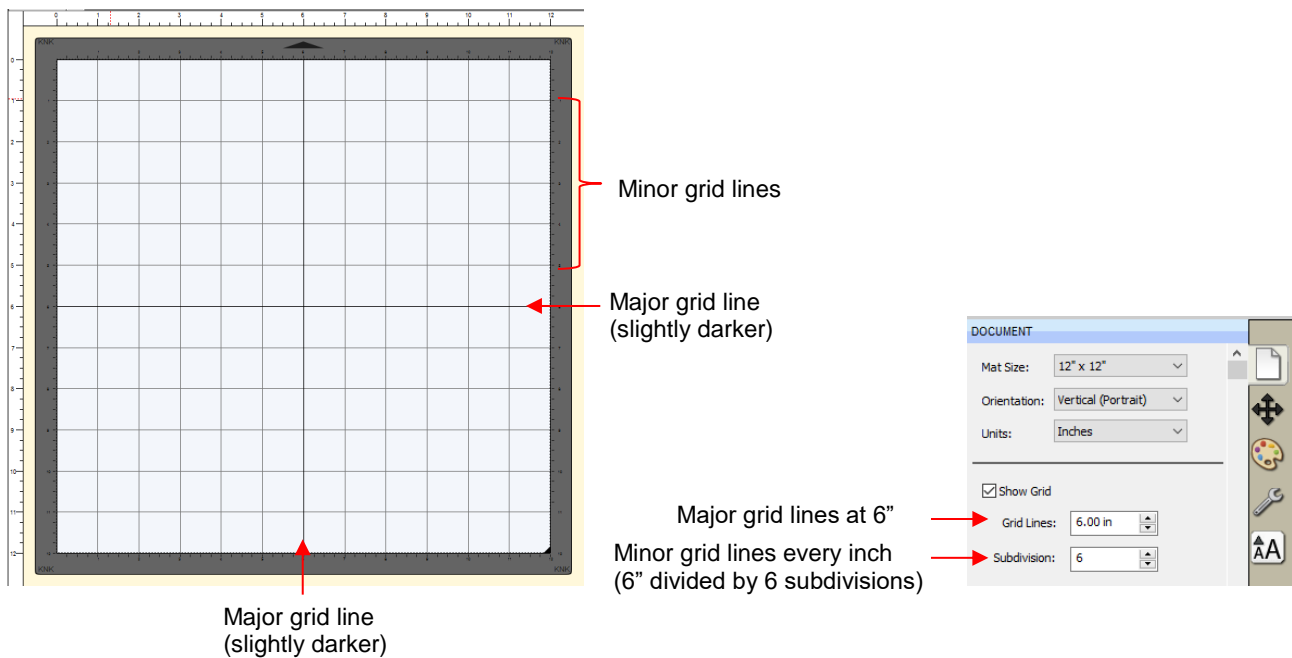
### 3.05.3 Mat Grid

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

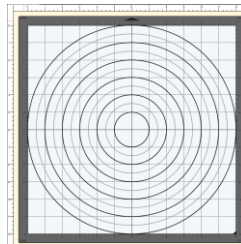
Check or uncheck



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

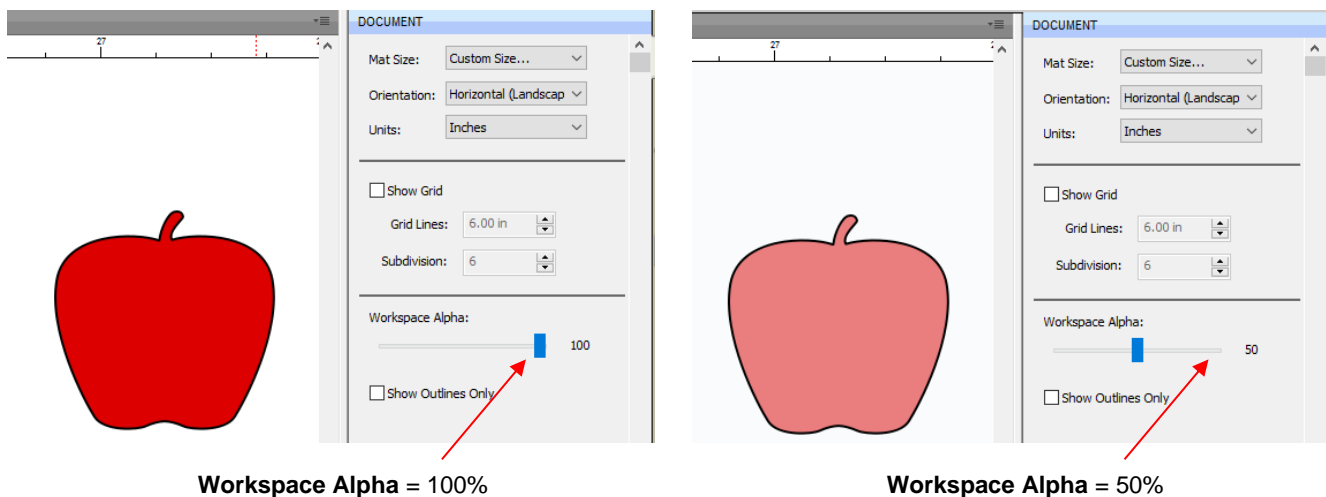


- A final grid option involves circular grid lines which can, as an example, be used for cake design. Go to **View>Show Mat Cake Circles**:



### 3.05.4 Workspace Alpha

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



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

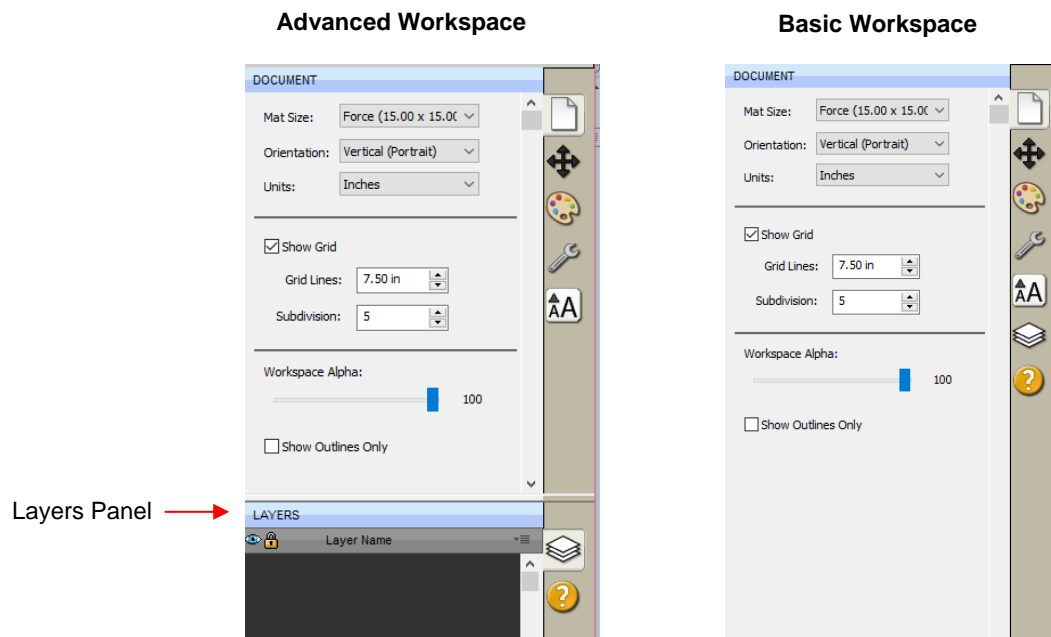


### 3.05.5 Rulers

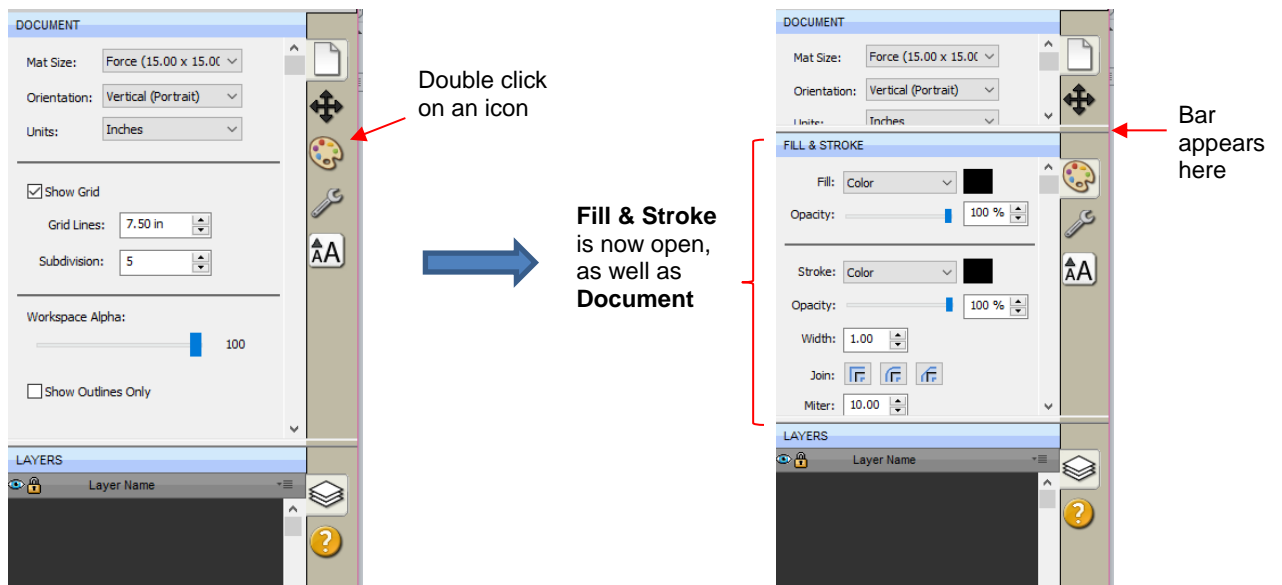
- The **Rulers** can be toggled on and off by right-clicking on the screen and selecting **Show Rulers**. Note that when hiding the rulers, click again on the screen for it to take effect.
- To change the units displayed on the **Rulers**, refer back to *Section 3.04*.

### 3.06 Customizing the Workspace

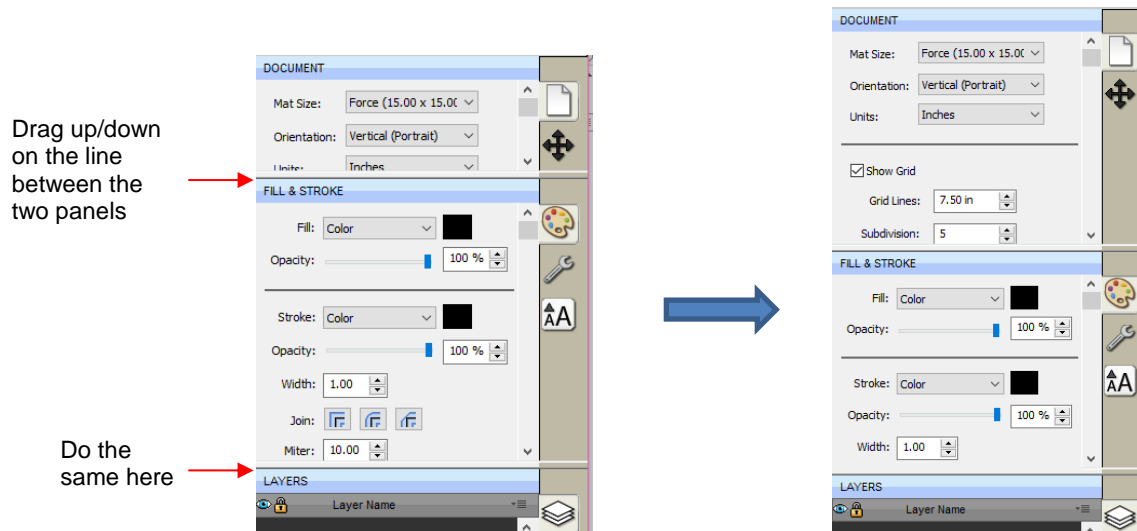
- In SCAL, the **Workspace** refers to the arrangement of windows on the **Properties Panel**. There are two versions already set up: **Basic** and **Advanced**. You can then make changes and name and save others, as desired.
- By default, the **Advanced Workspace** opens. To switch to **Basic**, go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



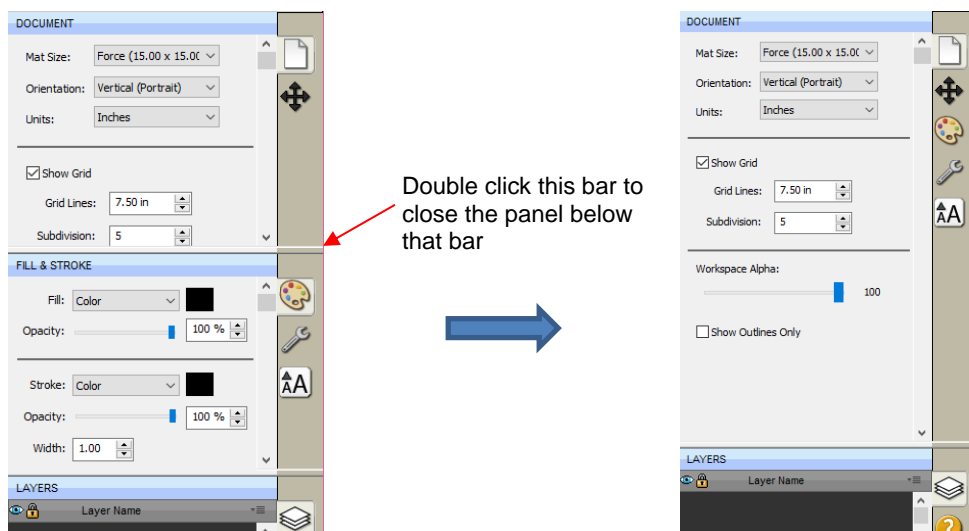
- To switch to other panels, click on the icons along the right side. If there's a particular panel you access often, then you can create a custom workspace. For example, let say you want the **Fill & Stroke Settings** panel to always be open. Double-click that icon and the **Properties Panel** will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



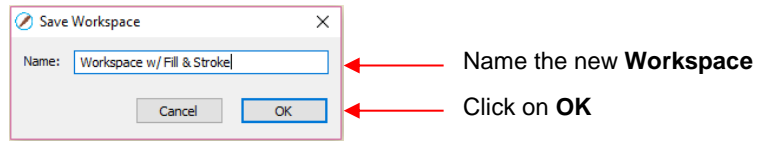
- These separate panels can also be resized by dragging them up or down:



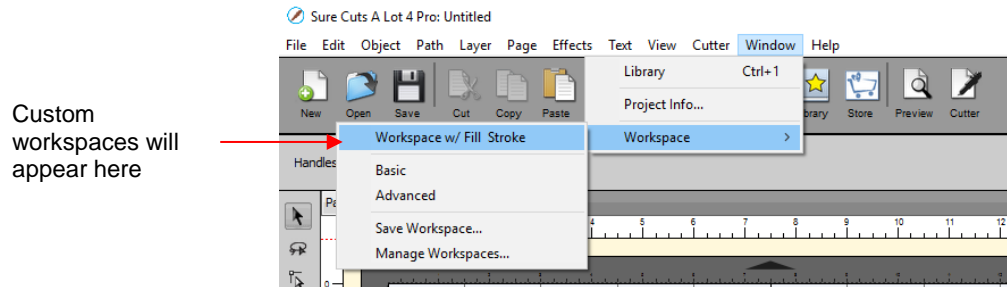
- To close a panel, double-click on the bar on the right side:



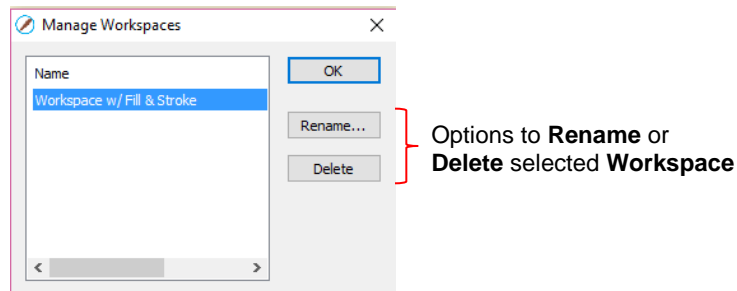
- To save workspace changes, go to **Window>Workspace>Save Workspace**. A window will open and you can name this new configuration:



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



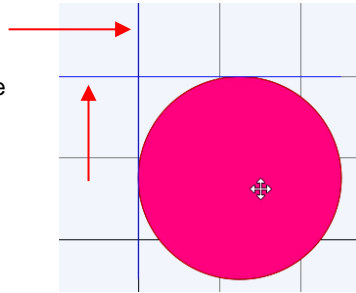
- To rename or delete a custom workspace, go to **Window>Workspace>Manage Workspaces** and a window will open with **Delete** and **Rename** options:



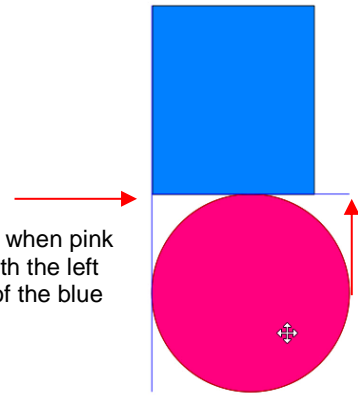
### 3.07 Snap To

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

Grid lines turn blue when the pink circle snaps to them



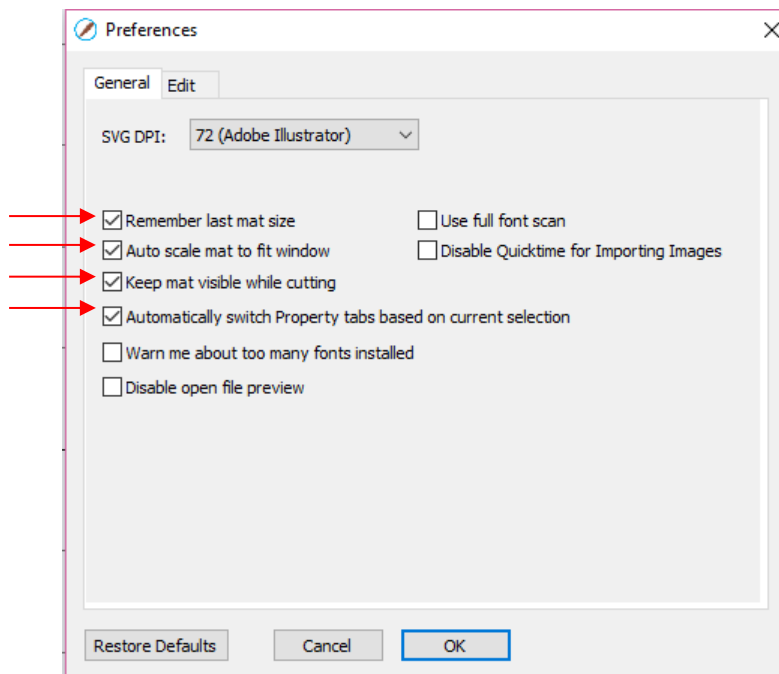
Blue lines appear when pink circle snaps to both the left side and bottom of the blue rectangle



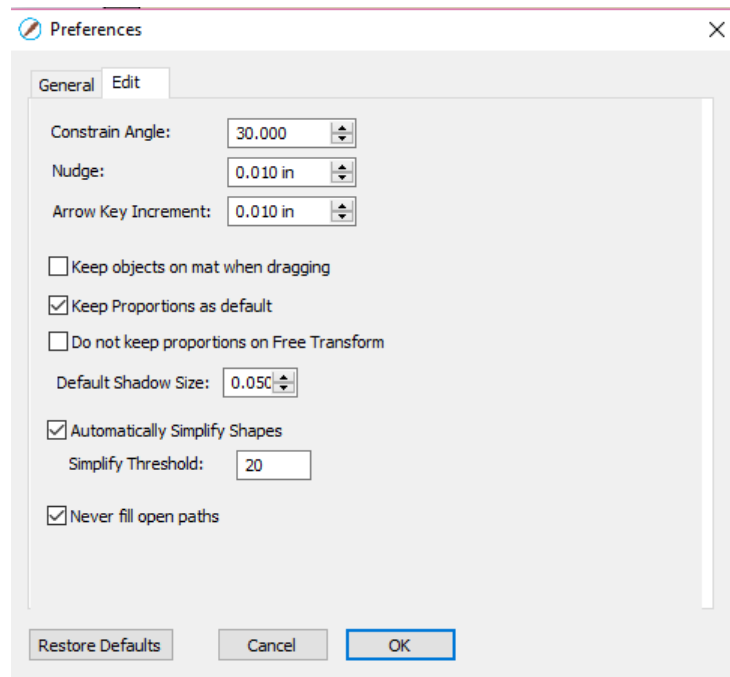
### 3.08 Other Preferences

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

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



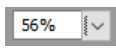

- If you click on the **Edit** tab, more preferences are listed. As with the preferences on the **General** tab, most will be covered in later sections of the manual:

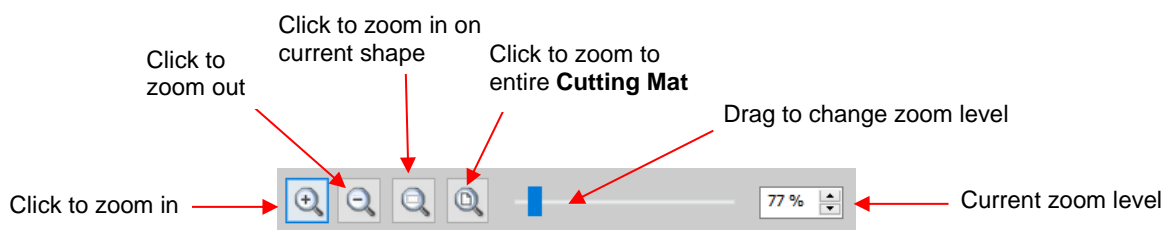



- For more details on these settings, go to *Appendix C4*.

## **3.09 Zooming and Panning**

### **3.09.1 Zooming**


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



- Note that while the **Zoom in Tool** is activated, you can also marquee-select an area of the screen to zoom to that location.
- To zoom in on a selected shape or shapes, use one of the following:
  - ◇ Click on the icon  while the **Zoom in Tool** is activated (see prior screenshot)
  - ◇ Use the shortcut (Mac only) **Option+ Shift+ =** (on a Mac only)


◇ Go to **View>Zoom Selection**

- To zoom to the **Cutting Mat**, use one of the following:

- ◇ Click on the icon  while the **Zoom in Tool** is activated (see prior screenshot)
- ◇ Use the shortcut **Ctrl+ F (Command + F** on a Mac)
- ◇ Right click on the screen and select **Fit to Window**
- ◇ Select **Fit to Window** from the **Zoom** menu on the **Status Bar**

- To change the zoom level so that a selected shape will be the same size on the screen as its actual size, go to **View>Actual Size**.

### **3.09.2 Panning**

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

## **3.10 Undo/Redo**

### **3.10.1 Undo**

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

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



### **3.10.2 Redo**

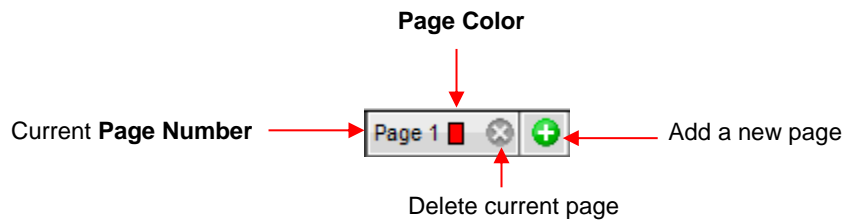
- As with most applications, there is also a **Redo** function in case you **Undo** too many steps or simply change your mind. You can use any of the following to execute the **Redo** function:


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

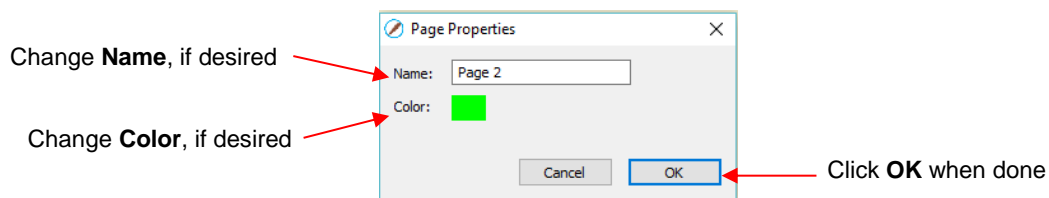


## **3.11 Pages**

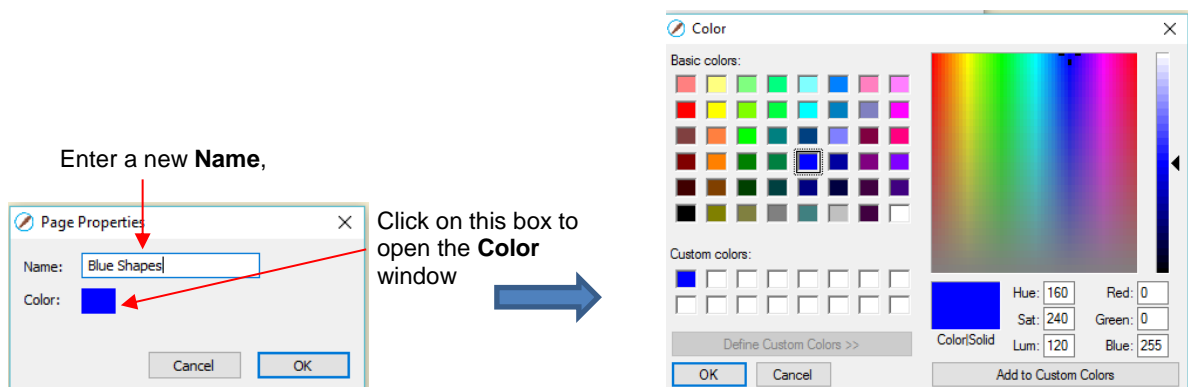
- The **Page Bar** allows you to add more pages to your current file/project. This can be convenient for organizing projects with many shapes and or layers.
- The **Page Bar** is located just above the top **Ruler** and displays the current page, a color for quickly identifying pages, and icons for adding and deleting pages:



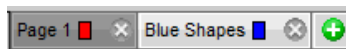
- To add a page, either go to **Page>Add Page** or click the green icon  on the **Page Bar** itself and the following window will open




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




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



- If you change your mind and want to edit the **Name** and/or **Color**, either go to **Page>Page Properties** or double-click on the **Page Name** and the same **Page Properties** window will open, allowing you to make changes.
- To switch between pages, click on the **Page** name or go to **Page** on the **Menu Bar** and the menu will have all pages listed.
- To delete a page, make sure it's selected and then either go to **Page>Delete Page** or click on the **Delete Page** icon . A window will open asking for confirmation.

### 3.12 Help Resources

- The following steps within SCAL will take you to help resources (note that some of these will require an Internet connection):

- ◇ Go to **Help>Help** for access to a user guide
- ◇ Click on the **Help Panel** icon  on the **Properties Panel** to open the user guide to a section based on the currently selected tool
- ◇ Go to **Help>Forums** to access the SCAL user forum
- ◇ Go to **Help>Online Video Tutorials** to access a page with links to both videos and written tutorials
- ◇ Go to **Help>Support>Technical Support** for the following:
  - Contact the SCAL team
  - Retrieve your serial code
  - Download latest updates
  - Access the forum
  - Access tutorials
- Other online support groups for SCAL include:
  - ◇ [SCAL Facebook Page](#)
  - ◇ [MTC and SCAL Facebook Group](#)
  - ◇ [SCAL Users Yahoo Group](#)
- An online training program with over 4 hours of videos is available at this link: [Sure Cuts a Lot 4 Beginner Class](#).



## 4. SCAL: Handling Files and Organizing Layers

### 4.01 Opening Files

#### 4.01.1 Opening a New File/Project

- When you launch SCAL, a new blank **Cutting Mat** will appear with a new blank project opened.
- To open a new file (start a new project), any of the following can be used:

- ◇ Click on the **New Project** icon on the upper **Toolbar**
- ◇ Press **Ctrl+N**
- ◇ Go to **File>New Project**



- Note that if any changes have been made to the existing project, a popup window will ask if you wish to save the changes that have been made. Refer to *Section 4.02*.
- If you wish to have more than one file open, you will need to open additional instances of SCAL.

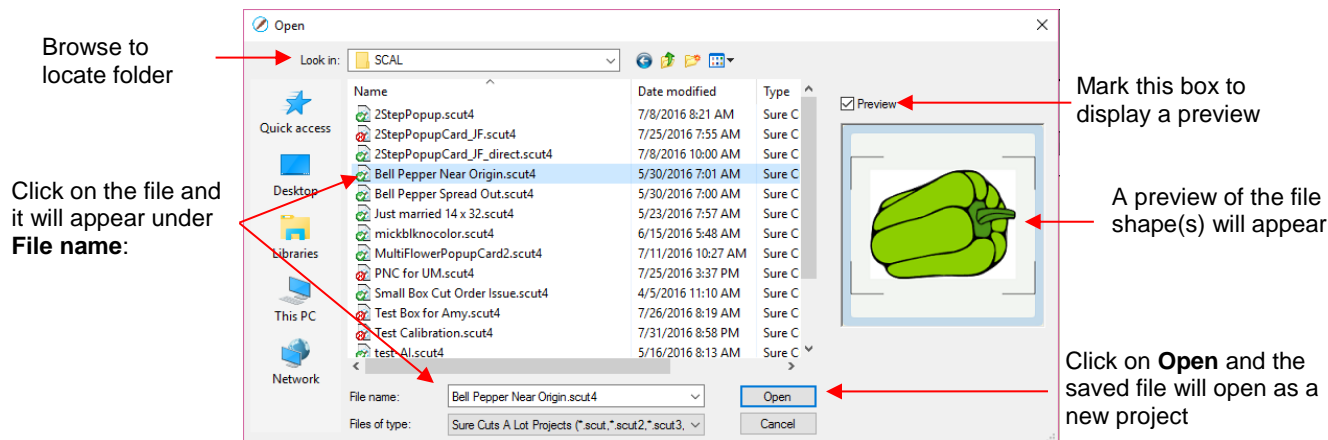
#### 4.01.2 Opening an Existing SCUT File

- An existing SCUTx file (where x is blank, 2, 3, or 4 indicating which SCAL version created it) can be opened in SCAL4 using any of the following:

- ◇ Click on the **Open Project** icon on the upper **Toolbar**
- ◇ Press **Ctrl+O**
- ◇ Go to **File>Open Project**
- ◇ Go to **File>Recent Projects**, if the file is one of the last five you had open in SCAL
- ◇ Double-click a SCUTx file in Windows Explorer or attached to an email
- ◇ Drag and drop a SCUTx file onto the main screen of SCAL
- ◇ Import from the **Library** (refer to *Section 4.03.3*)




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




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

## **4.02 Saving SCAL Files**

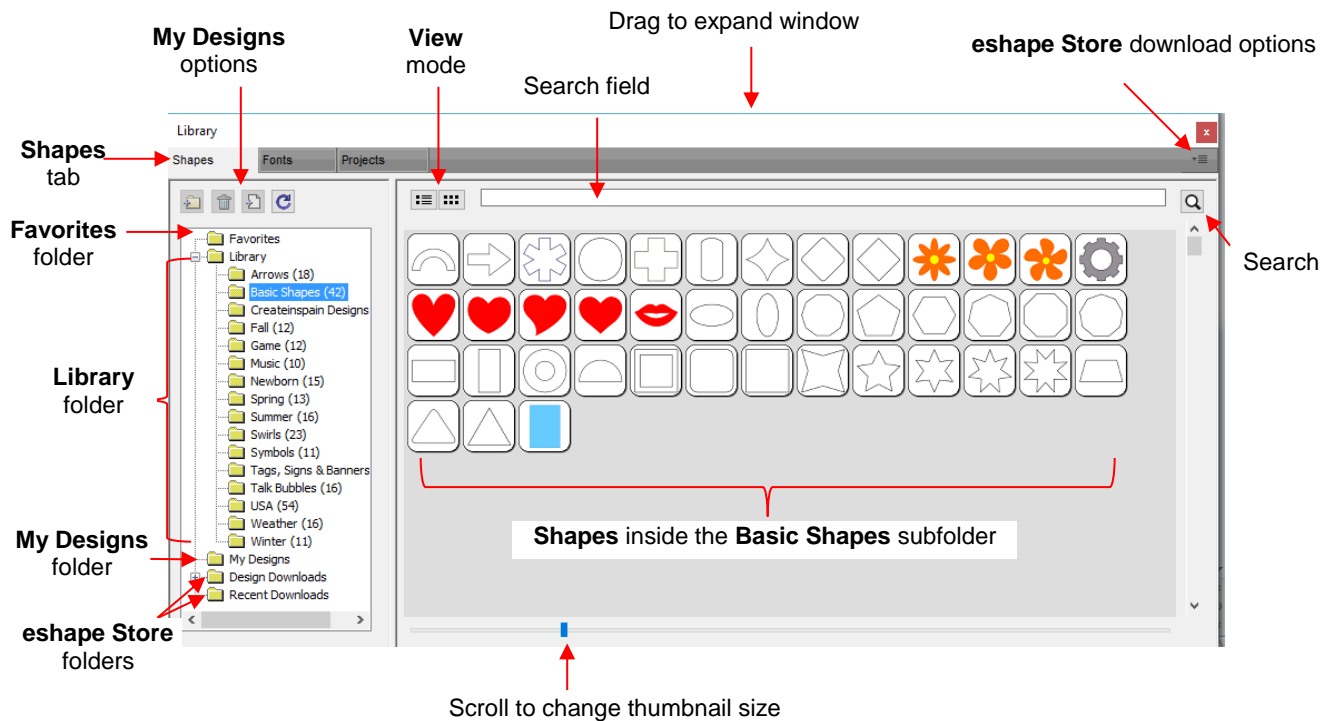
- A file can be saved in SCUT4 format using any of the following:
  - ◇ Click on the **Save Project** icon on the upper **Toolbar** 
  - ◇ Press **Ctrl+S** (for save) or **Ctrl+Shift+S** (for save as)
  - ◇ Go to **File>Save Project** or **File>Save Project As**
- If you've made changes and wish to save under a different file name, choose **File>Save As**. Name the file, choose a location, and click on **Save**.
- You can include notes about your file by going to **Window>Project Info**. This can be handy for your own future reference or for others using your files. Refer to *Section 9.02*.
- You can also export files in a host of other formats. Refer to *Section 4.08*.

## **4.03 Using the Library**

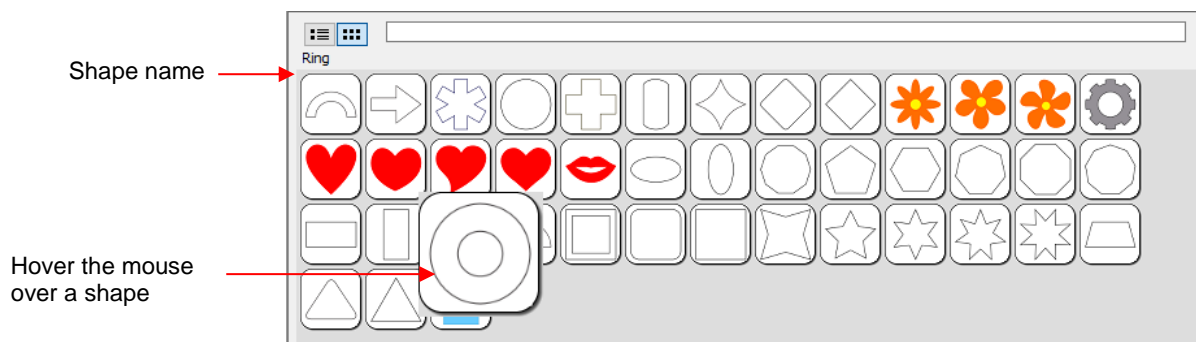
- The SCAL **Library** provides a number of useful functions:
  - ◇ It contains a collection of over 300 pre-installed shapes, organized into 16 subfolders
  - ◇ It displays complete character sets for all fonts currently installed
  - ◇ You can organize your own shapes and projects into separate folders and view thumbnails for selecting
  - ◇ You can assign commonly-used shapes and projects to a **Favorites** folder for quicker access
  - ◇ It provides access to designs and projects downloaded from the **eshape Store**
- The **Library** automatically opens every time you open SCAL. If you've closed it, the **Library** can be reopened by using one of the following:
  - ◇ Click on Library icon on the upper **Toolbar** 
  - ◇ Press **Ctrl+1**
  - ◇ Go to **Window>Library**
- The **Library** consists of three tabs: **Shapes**, **Fonts**, and **Projects**. Each is covered in the following subsections:



### **4.03.1 Shapes Tab**

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

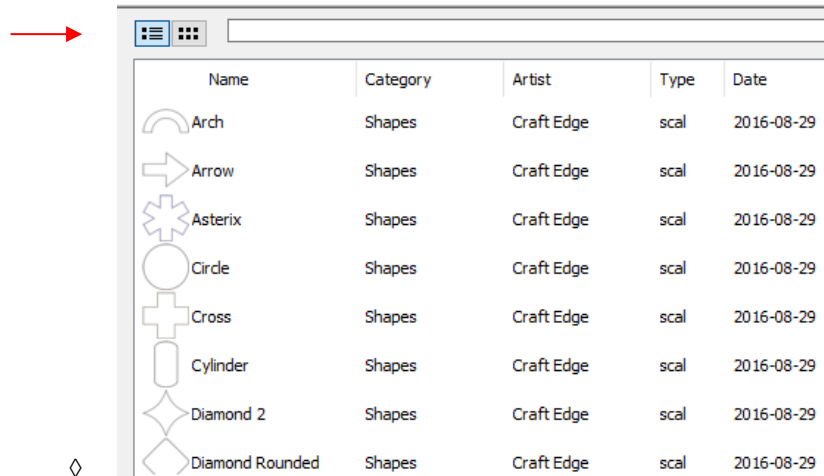


- On the left side you will see the **Library** folder which contains the included 300 shapes. The number in parentheses, after each subfolder, indicates how many shapes are assigned to that subfolder. **Basic Shapes**, as an example, has 42 assigned to it.
- Because the **Basic Shapes** subfolder is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



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

Click here to  
change to list view



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

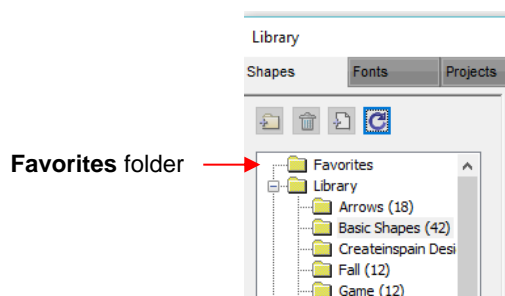
1. Enter search word

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

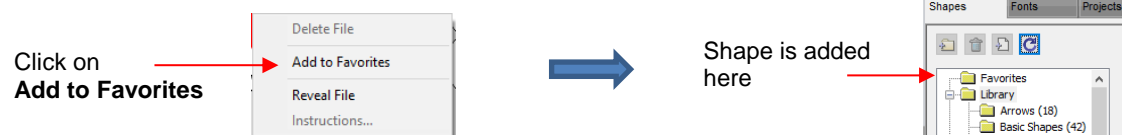
3. All shapes with the  
search word in their  
name will appear



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



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

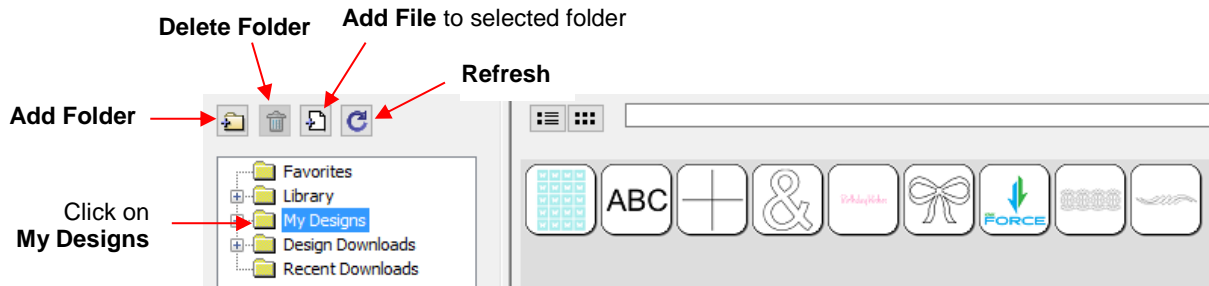


- ◇ This popup menu also has these options:


- **Delete File** (only active in the **My Designs** folder)
- **Reveal File** – opens the location on your computer where file is stored
- **Instructions** – some files from the **eshape Store** may include instructions for the user

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

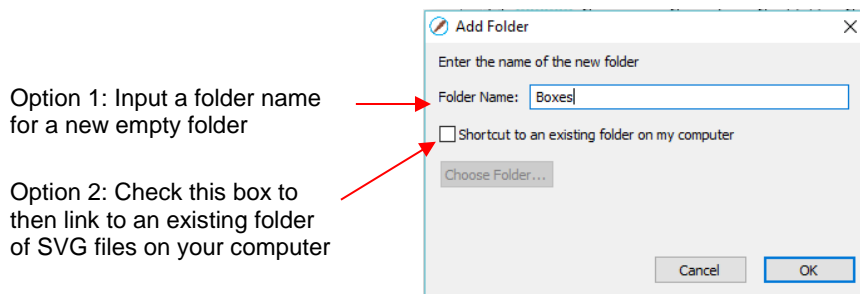
- ◇ Once you click on **My Designs**, the icons above the folder menu will become active:



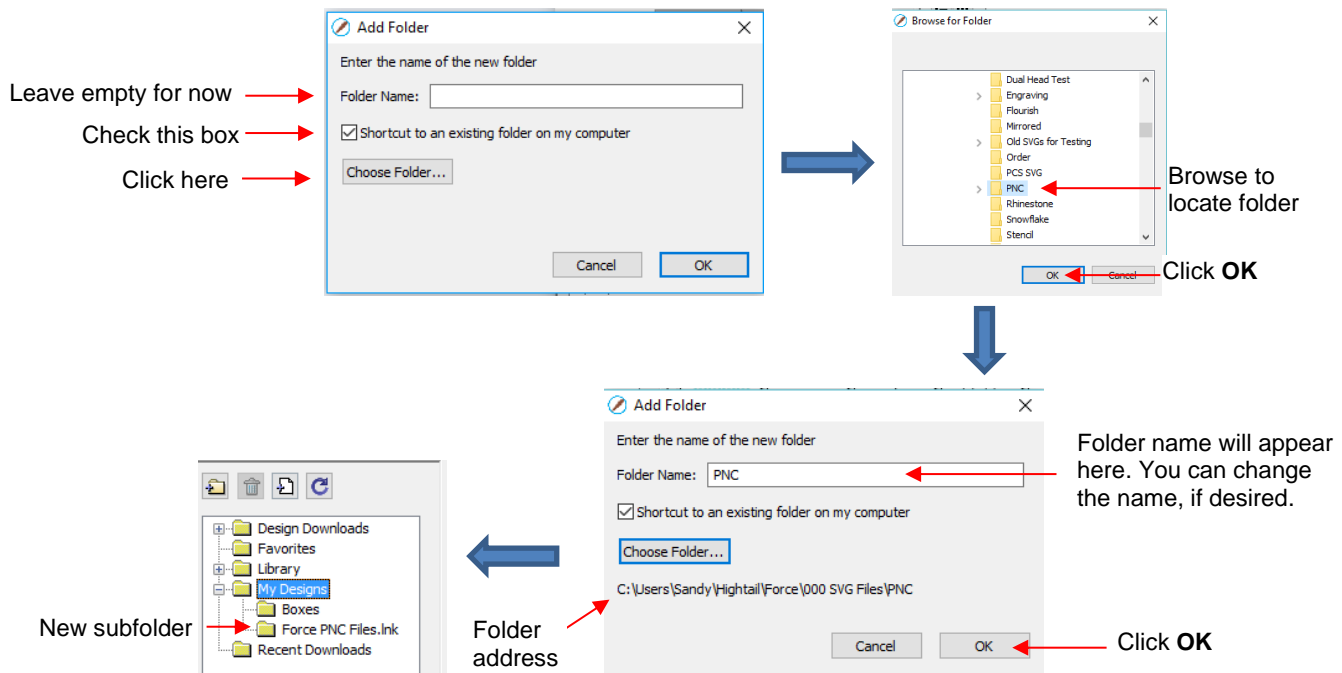
- ◇ Add subfolders: The shapes in the above screenshot have been added to **My Designs** but not into subfolders. To create subfolders for additional organizing:

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




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

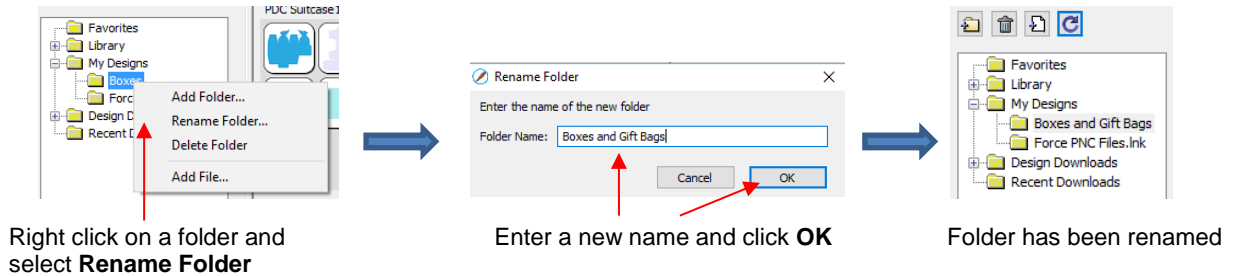



- ◇ If you select Option 2, the **Choose Folder** button will activate and clicking it will bring up this window where you can browse your computer to locate an existing folder of SVG files:



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

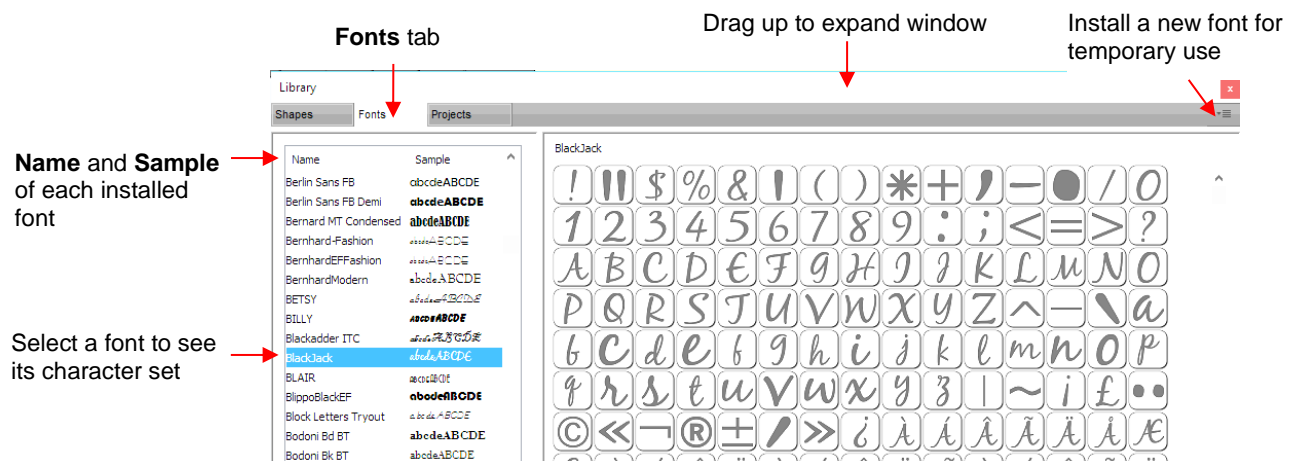
- Select the folder and do either of the following:
  - Click on the **Add File** icon 
  - Right-click and select **Add File** from the popup menu
- A window will open where you can then browse to find the SVG file to be added. You also have the option of selecting multiple files at once to import into that folder.
- ◇ To delete a file from a folder, right-click and select **Delete File** from the popup menu.
  - **IMPORTANT:** Note that deleting the file could also delete it from your computer unless it has been backed up elsewhere.
  - After deleting files, you will need to click on the **Refresh** icon  to update the thumbnail images.
- ◇ To delete a folder, select it and then do one of the following:
  - Click on the **Delete Folder** icon 
  - Right-click and select **Delete Folder** from the popup menu
- ◇ To rename a folder, right-click and select **Rename Folder** from the popup menu.




- **Design Downloads** and **Recent Downloads:** These two folders, along with the menu icon at the top right  are part of the **eshape Store** functions. These will be covered in *Section 4.05.1*.



### 4.03.2 Fonts Tab

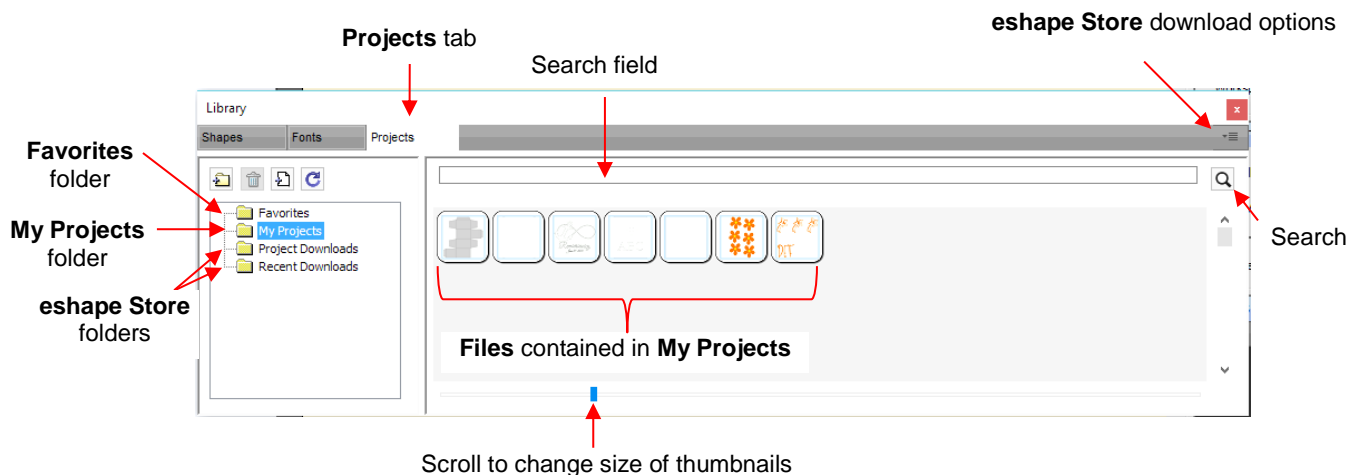
- The **Fonts** tab lists all of the currently installed fonts on your computer. Selecting any font in the list will show the entire character set on the right side of the window. It will also then make it the default font that will be used when adding text with any of the methods available in SCAL.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



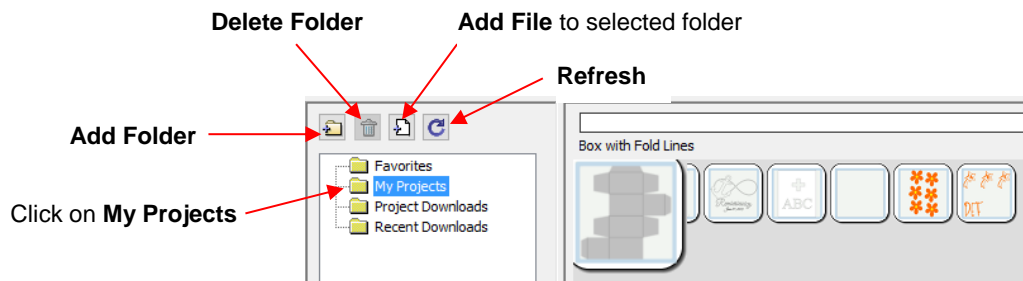
- Scroll the bar at the bottom to change the size of the lettering. To add a character to the **Cutting Mat**, left-click on it. While it is far quicker to type out text using the **Type** tool (again, refer to *Section 6.03*), this window is the best way to add special characters within a font or when using dingbat fonts.
- The menu icon  in the upper right corner can be used to temporarily add a font that's not installed on your computer. Click on it and then browse to the folder containing the font you wish to add. Again, refer to *Section 6.03* regarding temporary font usage.

### 4.03.3 Projects Tab


- The **Projects** tab is similar to the **Shapes** tab. Instead of .SVG files, however, it helps you organize and access your .SCUT files, also referred to as projects.
- As with the **Shapes** tab, there are no default categories or pre-added files. However, you will notice these other similar features:
  - ◇ **Favorites** folder – select any project, right-click, and select **Add to Favorites** from the popup menu
  - ◇ **My Projects** folder – virtually identical to **My Designs** folder (more information follows)
  - ◇ **Search** field and search icon  – for locating files with a particular word in the file name
  - ◇ **Project Downloads** and **Recent Downloads** folders and top right icon  : these pertain to **eshape Store**. Refer to *Section 4.05*.
  - ◇ Scroll bar to change the size of the thumbnails.
  - ◇ Hover over a thumbnail and it will get larger. The project name will appear below the **Search** field.



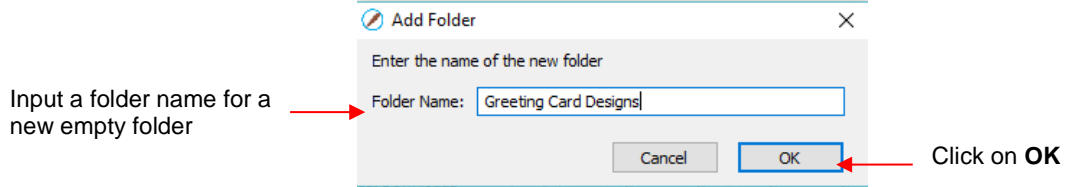
- **My Projects**: This is the main folder where you can organize your own projects for easy access.
  - ◇ Once you click on **My Projects**, the icons above the folder menu will become active:




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

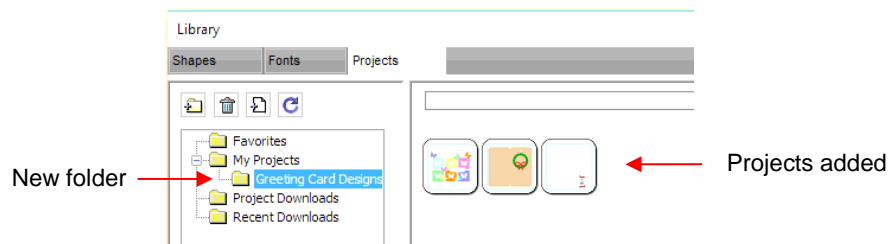
- Click on the **Add Folder** icon 
- Right-click on **My Projects** and select **Add Folder** from the popup menu



- ◇ After choosing to add a folder, the following window opens and you can name this folder:



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

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



- ◇ To delete a file from a folder, right-click and select **Delete File** from the popup menu.
  - **IMPORTANT**: Note that deleting the file could also delete it from your computer unless it has been backed up elsewhere.
  - After deleting files, you will need to click on the **Refresh** icon  to update the thumbnail images.
- ◇ To delete a folder, select it and then do one of the following:
  - Click on the **Delete Folder** icon 
  - Right-click and select **Delete Folder** from the popup menu
- ◇ To rename a folder, right-click and select **Rename Folder** from the popup menu.

## 4.04 Layers Panel

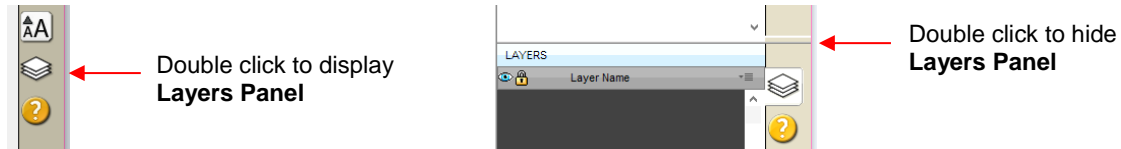
Because of the importance of the **Layers Panel** in successfully using SCAL, it is being presented before the other file handling sections.

### 4.04.1 Introduction to the Layers Panel

- The **Layers Panel** is used for the following:



- ◇ Assigning or grouping shapes into separate layers to better organize a project
- ◇ More easily applying changes to a group of shapes
- ◇ Selecting one shape or a layer of shapes on the screen
- ◇ Controlling what is sent to the cutter or printer
- The **Layers Panel** can be displayed by double-clicking its icon and hidden by double-clicking the small bar just above its icon:



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

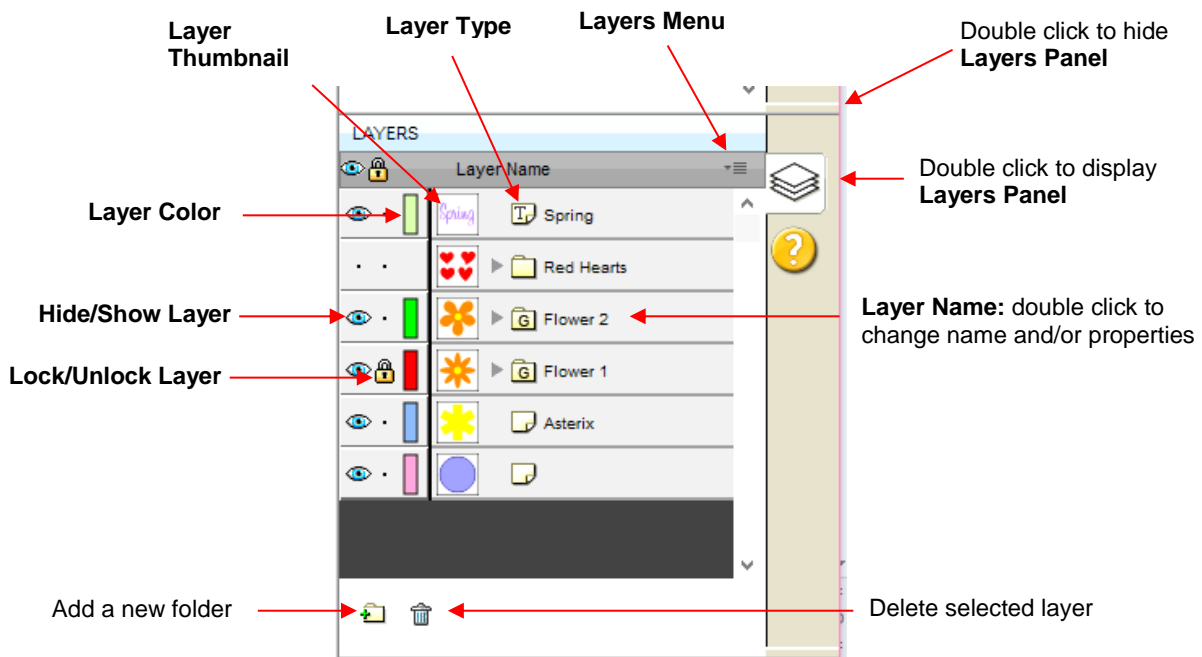
- You do not have to worry about adding shapes to the **Layers Panel**. They will automatically be assigned to new layers as you add them. You will want to learn how to move shapes to new layers or combine shapes into the same layer, depending on the circumstances. This is covered in *Section 4.04.3*.
- Here are a few examples of when shapes need to be on different layers:
  - ◇ Paper piecing or shadowed shape projects where some shapes will be cut from one color and other shapes from another color (or a number of other colors).
  - ◇ Fold-up projects (boxes, envelopes, popup cards, etc.) where the fold lines will need to have different settings and/or different tools used than your cut lines.
  - ◇ Rhinestone template projects where you need to cut two different templates, such as a fill that will be done in one color of rhinestones and an outline in another color.
- Other benefits of assigning shapes to specific layers include:
  - ◇ Ability to select, with one click of the mouse, all shapes assigned to a layer
  - ◇ Ability to hide or lock layers so that the shapes on that layer are not inadvertently selected, moved, resized, etc.
  - ◇ Ability to change the color, line style, and tool choice on all of the shapes assigned to a particular layer.

#### **4.04.2 Parts of the Layers Panel**

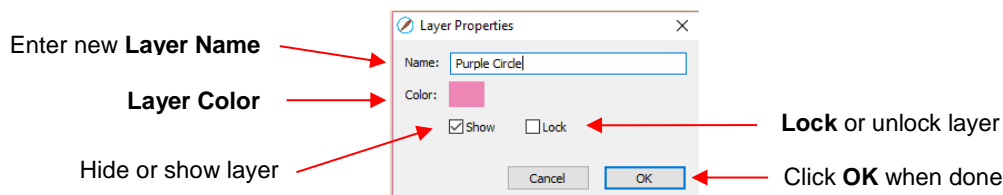
- The next few sections will use the following simple project to illustrate the **Layers Panel**:



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



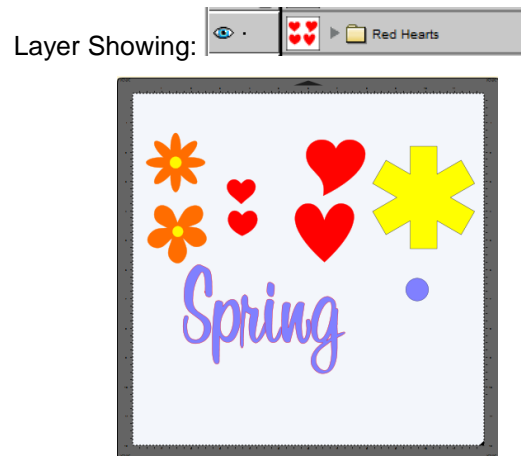
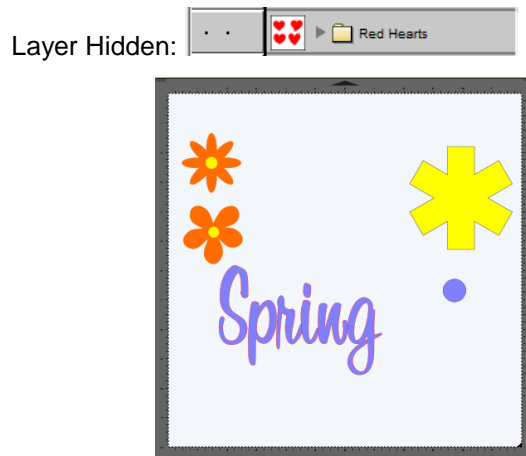
- **Layer Thumbnail:** Each layer has a thumbnail showing the shapes assigned to that layer. Click on that thumbnail and all shapes on that layer will be selected. If you wish to add the shapes from another layer to the section, hold the **Shift** key and click on the other thumbnail.
- **Layer Type:**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






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

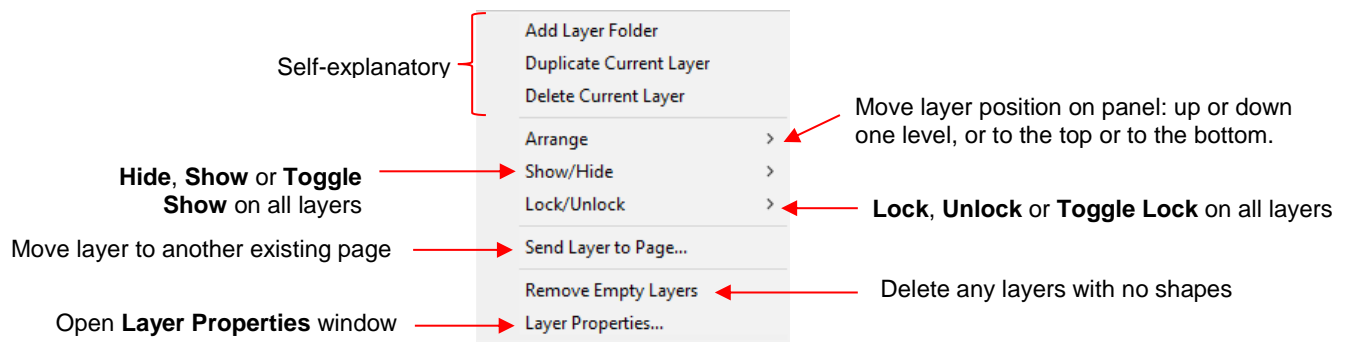
- ◇ **Hide/Show Layer:** Click on the eye icon to hide that layer. The icon will be replaced with a dot as shown for the *Red Hearts* layer and the shapes on that layer will no longer be seen on the **Cutting**



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

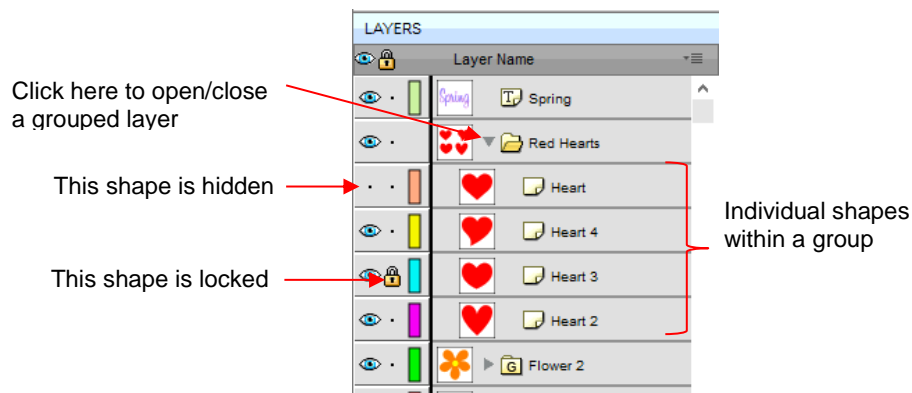


- ◇ **Lock/Unlock Layer:** Click on the dot to the right of the eye icon and the layer will become locked , such as shown for the *Flower 1* layer. The shapes on that layer will still be included in printing and in cutting, however cannot be selected on the **Cutting Mat**. This can be useful when shapes should not be inadvertently moved or if you are having problems selecting shapes nearby.
- ◇ **Layer Color:** Click on the current layer color icon  and a **Color** window will open where a different color can be assigned. Again, this is only for making layers easier to distinguish on the **Layers Panel** and doesn't change the **Fill** or **Stroke** color of the shapes themselves.

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





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



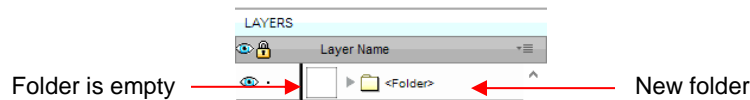
#### 4.04.3 Creating Folders and Moving Layers

- As mentioned in *Section 4.04.1*, each new shape added to the **Cutting Mat** will initially be assigned to a new layer. This can quickly clutter the **Layers Panel**. The ability to combine shapes into folders and subfolders helps organize a project and make things easier for printing and/or cutting.

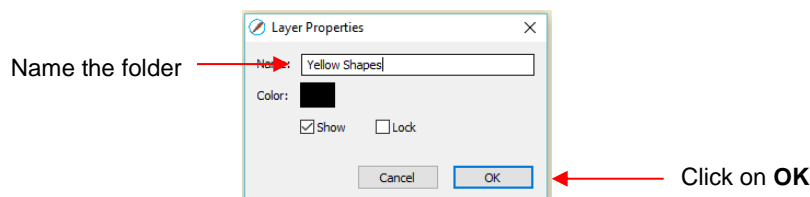
- There are three ways to create a new folder:

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

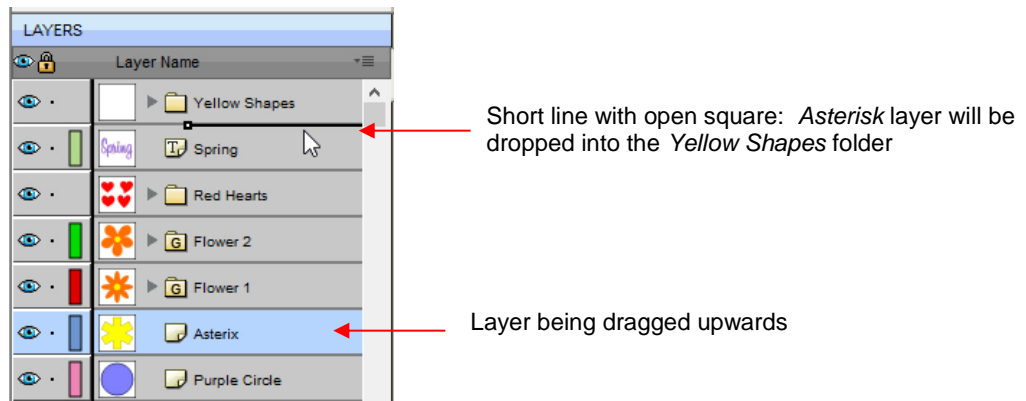
- When a new folder is added, it will appear at the top and look like this:



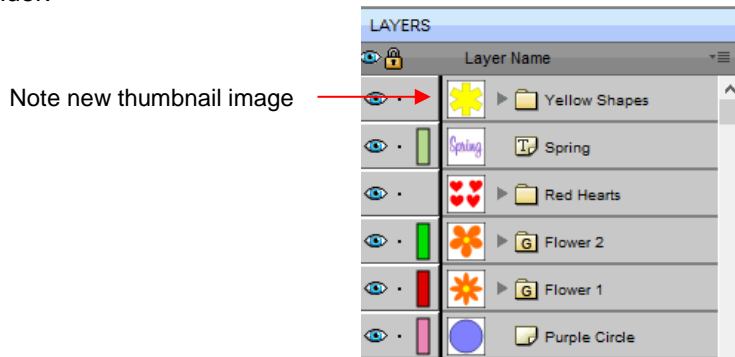
- Just as covered in the prior section, if you double-click on this new folder, you can rename it:



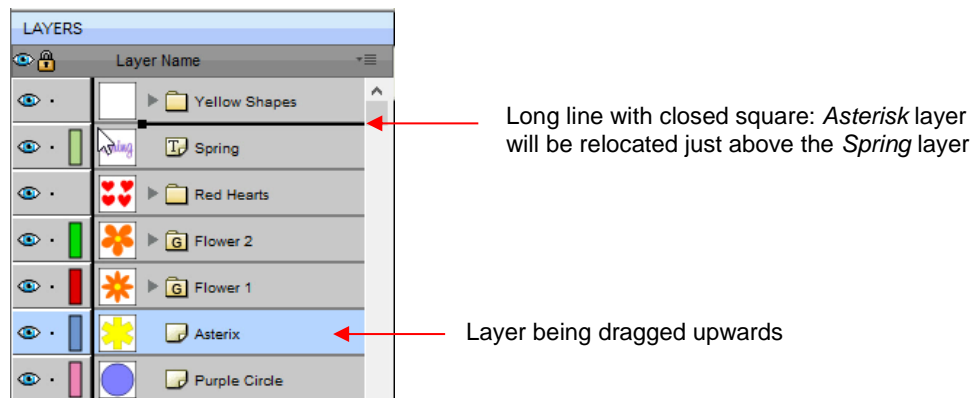
- In the prior section, it was also noted that layers can be re-ordered using the **Arrange** option in the **Layers Panel Options** menu. Alternatively, layers and folders can also be moved directly on the **Layers Panel** by dragging them up or down.
- There are two possible outcomes when dragging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



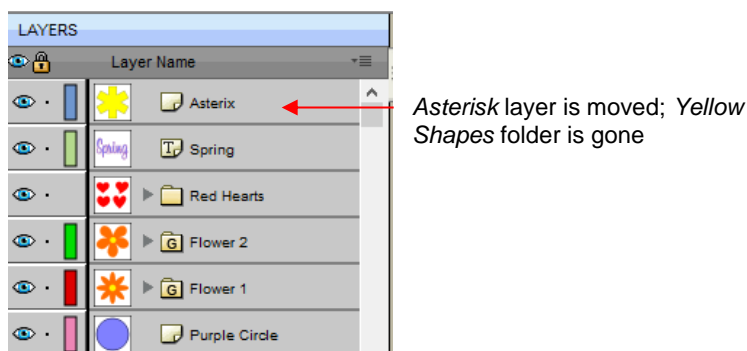
- ◇ Now the *Asterisk* layer is inside of the *Yellow Shapes* folder and can be seen in the thumbnail for that folder:



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

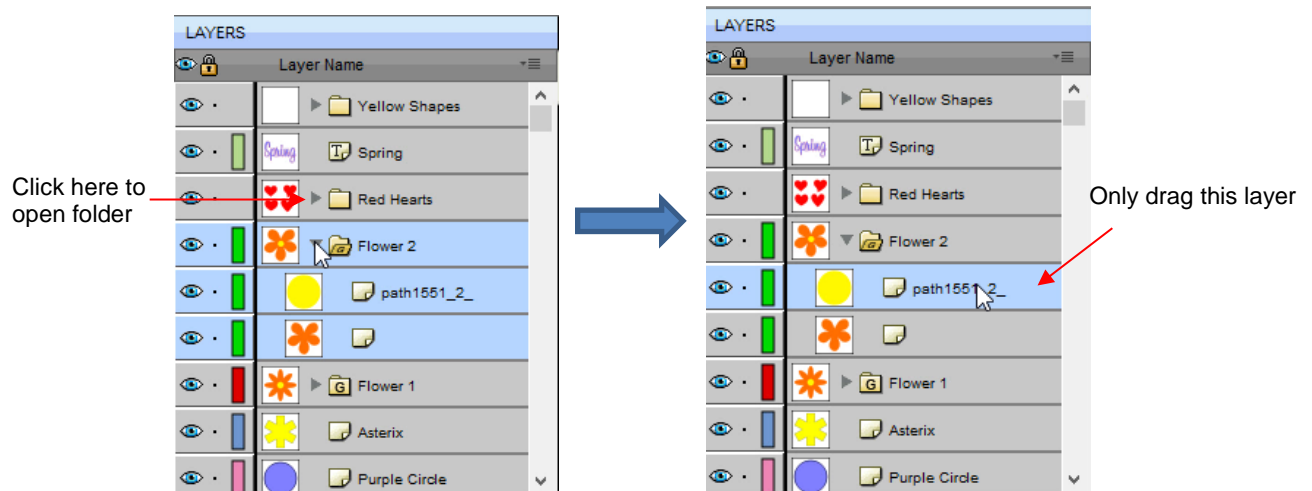


- ◇ **IMPORTANT:** Once you've created a new empty folder, like the *Yellow Shapes* folder, you cannot move that layer or other layers without the empty folder being deleted. So, in the case above, if the *Asterisk* layer had been simply relocated, the *Yellow Shapes* folder would then be gone:

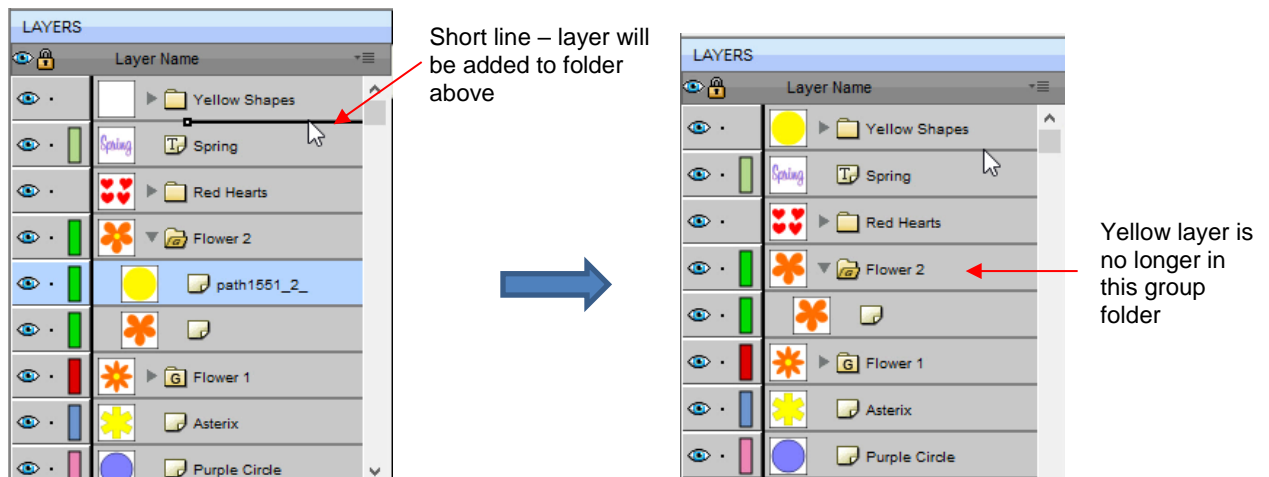


- Layers can also be moved out of an existing folder into other folders. In this example, the yellow centers of the flowers in the layers named *Flower 1* and *Flower 2*, can be similarly dragged and dropped into the *Yellow Shapes* folder:

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



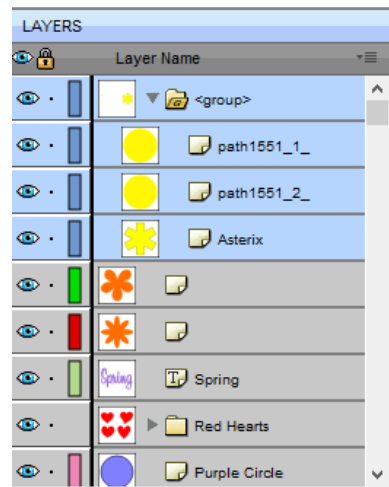
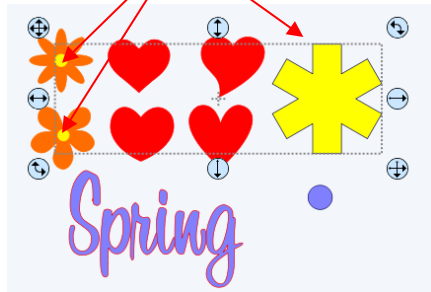
◇ Then drag the yellow layer up to the *Yellow Shapes*, again making sure only a short line is present. The yellow layer is then moved out of the *Flower 2* group:



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

- Note: This was just one way to achieve this goal. Another way would have been to ungroup the *Flower 1* and *Flower 2* layers. Then to select all of the yellow shapes on the **Cutting Mat** and go to **Object>Group**. A new group folder would be added to the **Layers Panel** with those shapes moved to it. Specific instructions on **Grouping** and **Ungrouping** are covered in *Section 5.10*.

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



New group folder contains these yellow shapes

## 4.05 The eshape Store

### 4.05.1 Importing from the eshape Store

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



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

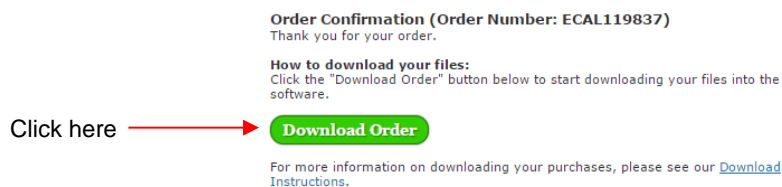
◇ Go to **File>eshape Store**

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

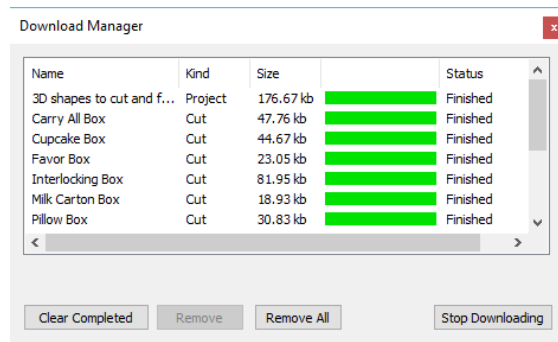


Sign in or Register

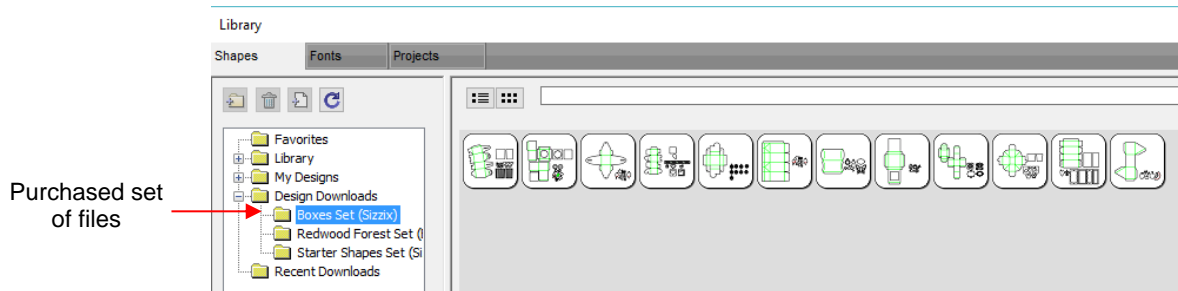
- Next, browse the site to find files of interest. After payment, the following screen shows your order number and a green **Download Order** button can be clicked to download the files you purchased:



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



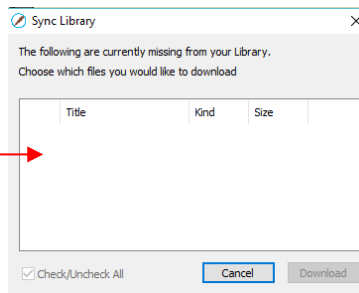
- Now open the **Library** to access the **eshape Store** files. Depending on the file type, the downloaded files will either appear on the **Shapes** tab, under **Design Downloads** or on the **Projects** tab, under **Project Downloads**:




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

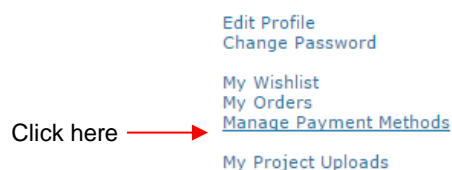
- ◇ Go to **File>Sync My Library**  and the following window will open:

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



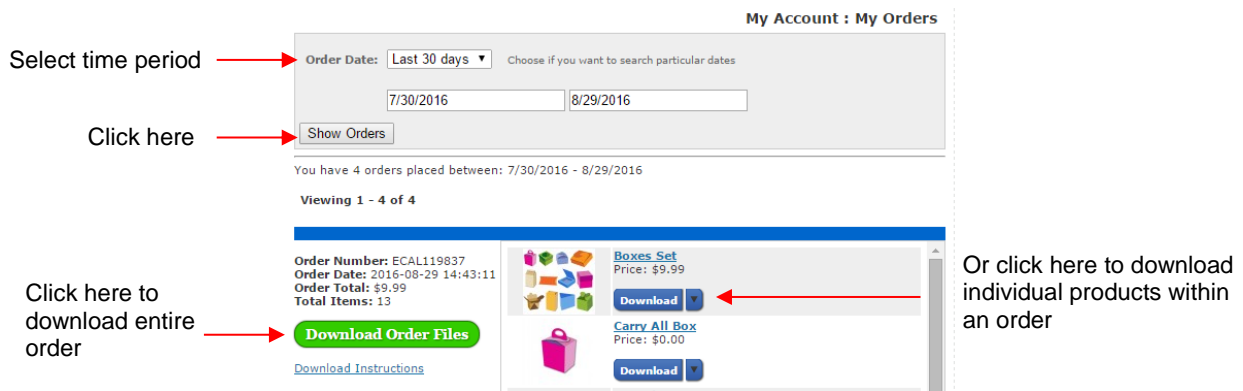
After selecting files, click on the **Download** button.

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



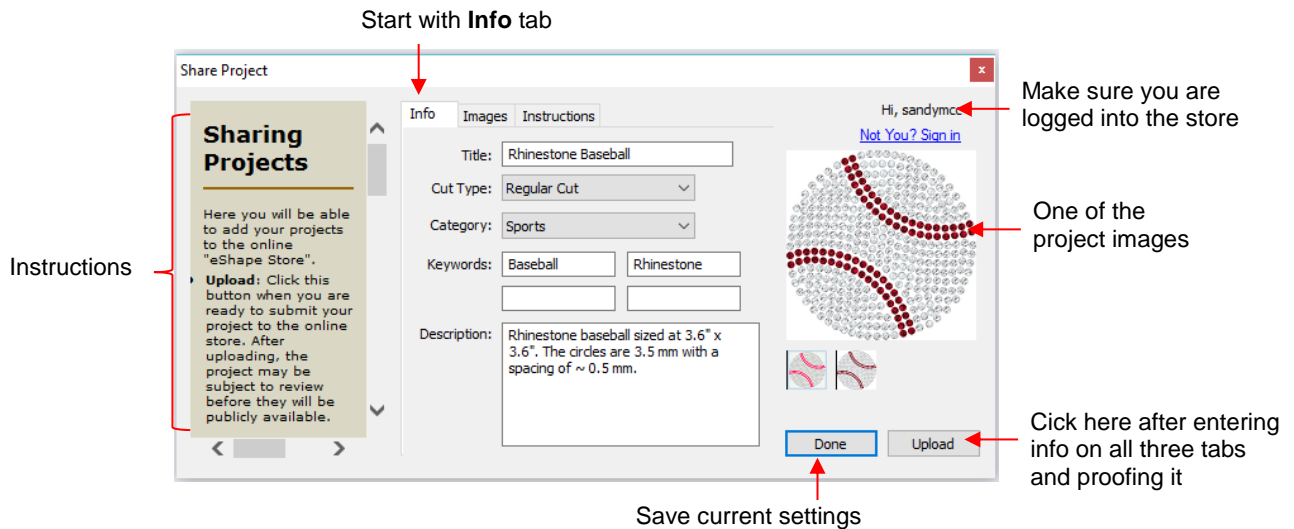
- Select a time period for the order and click on **Show Orders**. Then click on the **Download** icon:



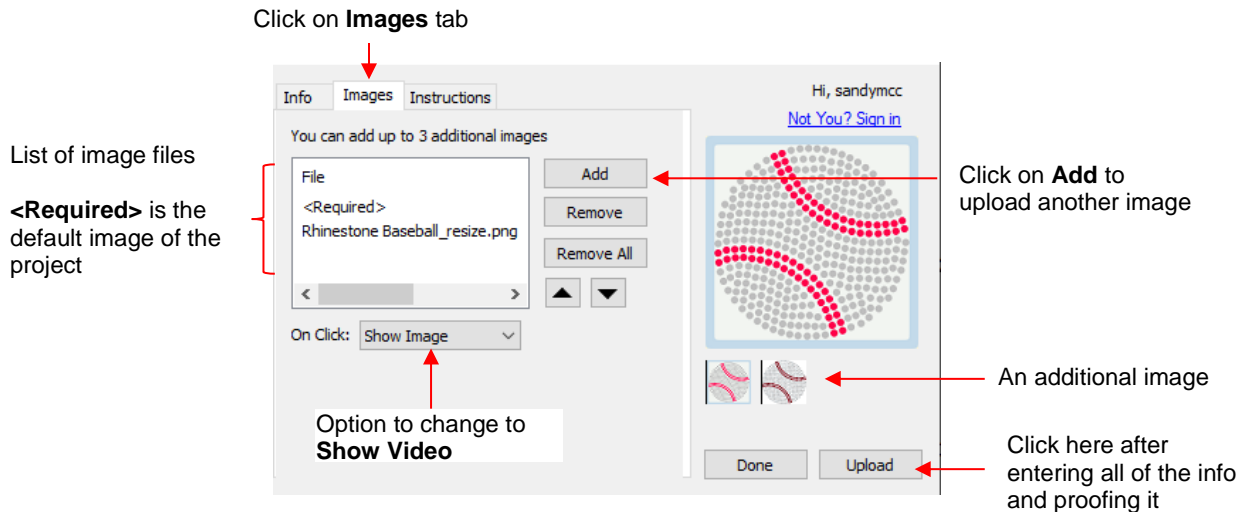


#### 4.05.2 Exporting to the eshape Store

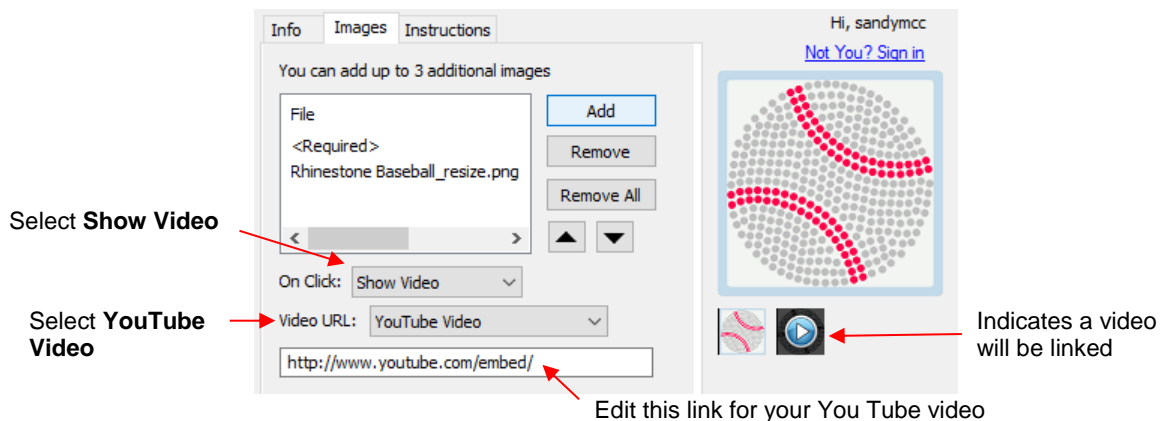
- To freely share your own SCAL creations, go to **File>Share Project**. The following window will open:



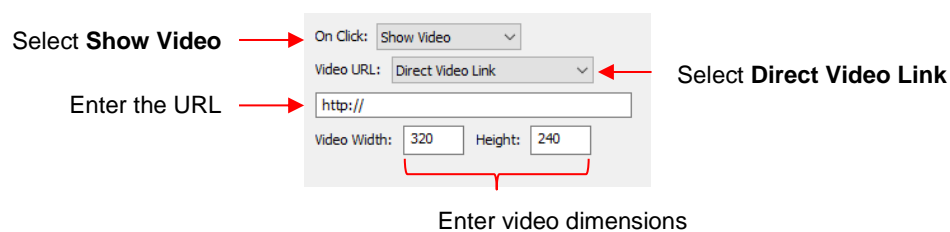
- There are instructions on the left-hand side. **Important:** Make sure all of the following settings have been completed before clicking on **Upload**:
  - ◇ **Title:** Provide a descriptive name for your project.
  - ◇ **Cut Type:** Select from the following:
    - **Regular Cut:** typical cutting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



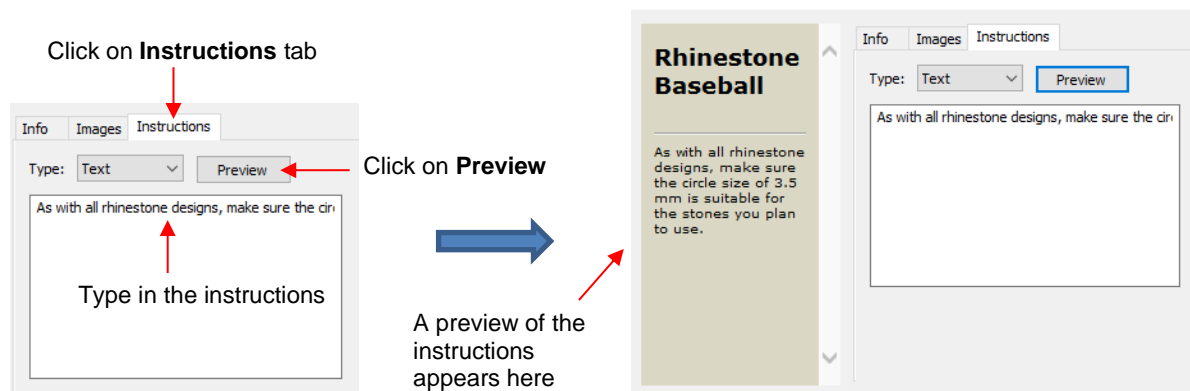
- ◇ Additional images can be uploaded, such as the rhinestone simulation version shown. Other examples where more images are appropriate might include final versions of finished greeting cards, fold-up boxes, and detailed paper-piecing projects.
- ◇ **On Click:** the default indicates **Show Image**.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



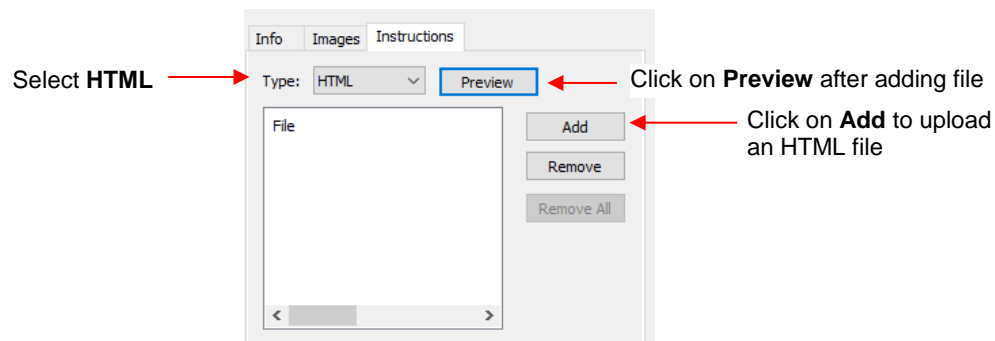
- Alternatively, you can link to an MP4 video located elsewhere:



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



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



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

## **4.06 Importing Other File Formats**

### **4.06.1 Importing Vector Files**

- The following vector formats can be imported into SCAL:
  - ◇ SVG: common export format for vector programs, thus popular format used for sharing files on blogs and selling files in online design sites
  - ◇ SCUT4: format used to save projects in SCAL4
  - ◇ SCAL: format used by **eshape Store**
  - ◇ PDF: While a PDF can be created from a raster image, a vector image, or both, only the vector parts of a PDF will import into SCAL.
  - ◇ AI (Adobe Illustrator): common format due to the popularity of Adobe Illustrator
  - ◇ EPS: another common export format for many vector programs
  - ◇ FCM: format used by the Brother ScanNCut machines
  - ◇ GSD: format created by RoboMaster, RoboMaster Pro and Wishblade Advance. This format was used with the Craft Robos, Wishblade, and original Silhouette cutter.
  - ◇ PLT (SCAL PRO version only): developed by HP for their plotters, the PLT file evolved into a standard format used by early vinyl cutters

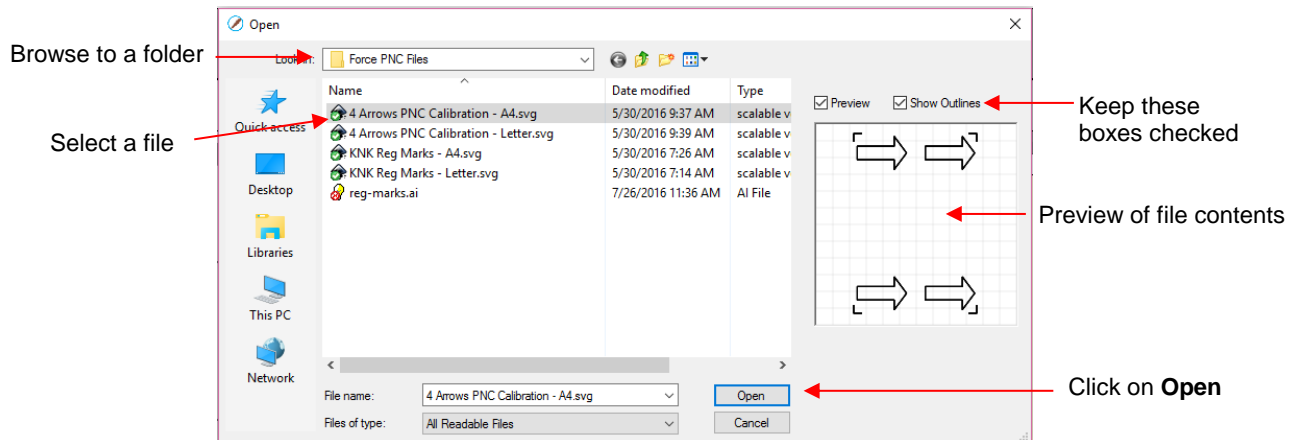
- ◇ DXF (SCAL PRO version only): common format exported by CAD programs
- ◇ WPC: format used in programs developed by Sign Max, which include WinPC Sign, Funtime, Pazzles Inspiration, and Gazelle.

- There are two ways to open the import window:

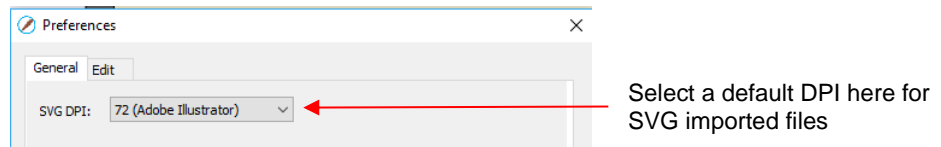


- ◇ Click on the **Import** icon on the upper **Toolbar**
- ◇ Go to **File>Import**

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



- You can also drag and drop any of the file formats directly onto the SCAL screen to import that file.
- If the file is in SVG format, it can also be imported via the **Library**. Refer to *Section 4.03.1*. Also, SVG files vary in size depending on the program which exported them. Thus, always check the imported size before cutting your project. If you are regularly importing SVG files from one of the following programs: Adobe Illustrator, Inkscape, Corel Draw, or you know the DPI used by the exporting program, you can set it under **Edit>Preferences** (on a Mac, press **Command + ,**) so that you will not need rescale the file:



- PDF files can contain multiple pages. If this is the case with a PDF file you wish to import, note the following:
  - ◇ Use Adobe Reader or some other PDF browser to locate which page you wish to import
  - ◇ After selecting the PDF file to import, a second window will open where you can select which page you want to import. Note that if there are many pages, there will be a delay in opening the **Preview** window and you may wish to uncheck that box.
  - ◇ Only vector shapes in a PDF will be imported. Raster shapes will be ignored.

## 4.06.2 Importing Raster Files

- There are several ways to import a raster file (JPG, BMP, GIF, PNG) depending on the intended purpose for that file:
  - ◇ **File>Import**: will import PNG files with a transparent background, simultaneously adding a vector cut line along the transparent border. This is very useful for PNC applications. This is the only raster format that will work using this method.

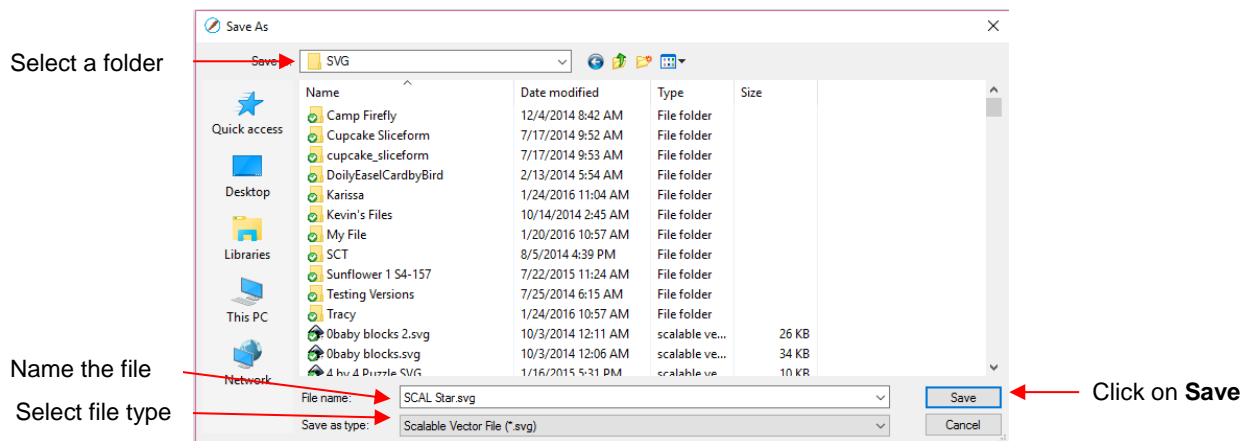
- ◇ **File>Place Image:** will import JPG, BMP, GIF, and PNG files for the purpose of printing or manually tracing in the event the auto-tracing function doesn't adequately perform due to the image quality. It's also another way to load an image for the **Trace Image** window. Refer to *Section 7.03*.
- ◇ **Trace:** will import and auto-trace JPG, BMP, GIF and PNG files. Various options and settings can be applied to obtain the desired results. Refer to *Section 7.03*.

### 4.06.3 Importing Fonts

- SCAL will display and utilize all fonts currently installed on your computer. You can also open non-installed fonts for temporary use. The formats supported include TTF, OTF, and OPF (open path / single line fonts). For more details, refer to *Section 6.02*.

### 4.07 Exporting in Other File Formats

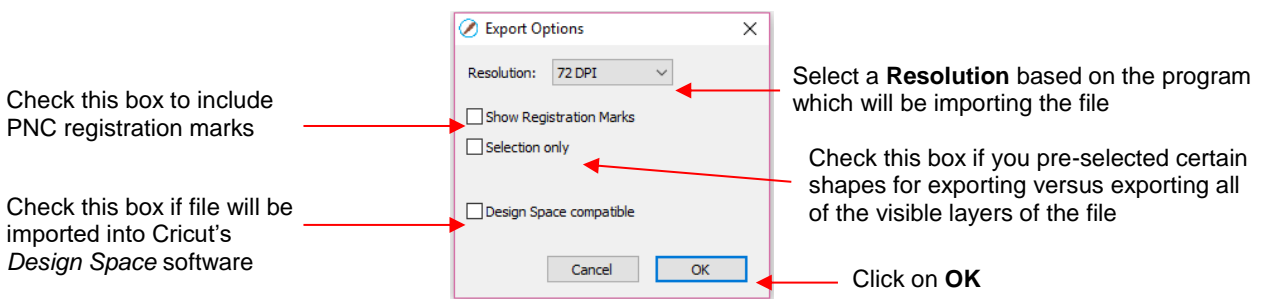
- Besides saving as a .SCUT4 file, you can also export in the following formats: SVG, JPG, BMP, PNG, TIFF, FCM, and PLT. Only SVG, FCM and PLT are vector formats. The others are raster.
- If there are only certain shapes in the file that you want to export, you have two options:
  - ◇ Select those particular shapes before exporting and then mark a box called **Selection only** in the export window.
  - ◇ Place those shapes on one or more separate layers and hide them on the **Layers Panel**. Refer to *Sections 4.04.2 and 5.09*.
- To export a file, use either of the following options:
  - ◇ Go to **File>Export**
  - ◇ Press **Ctrl+Shift+E**
- The following window will open where you can name the file, select the file format, and the location for saving:



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

#### 4.07.1 Exporting in SVG Format

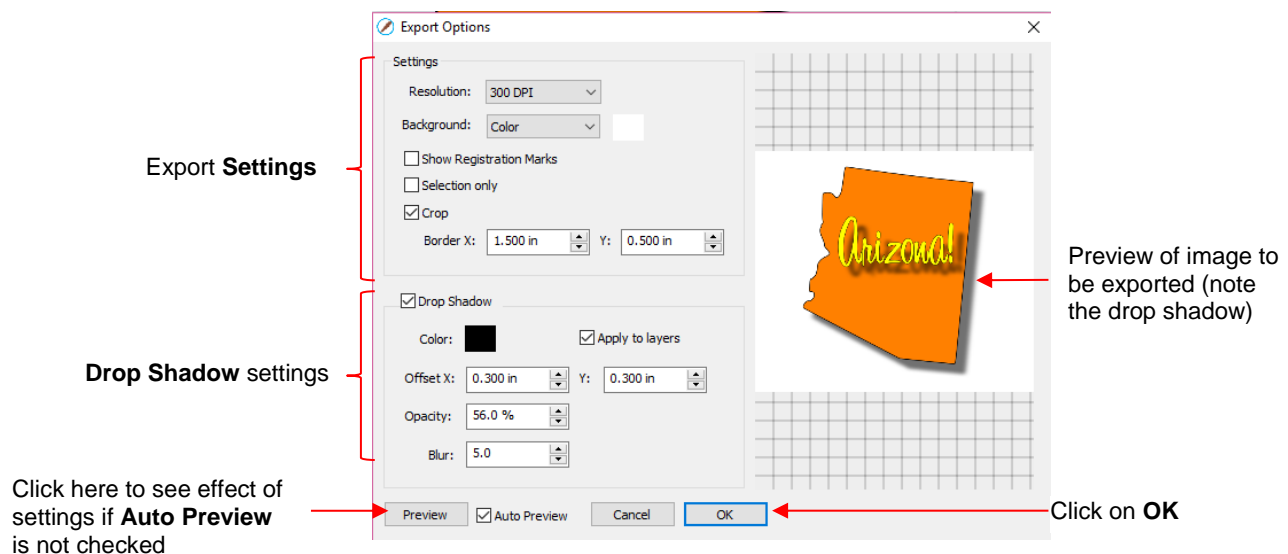
- The **SVG Export Options** are shown in the following screenshot:



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

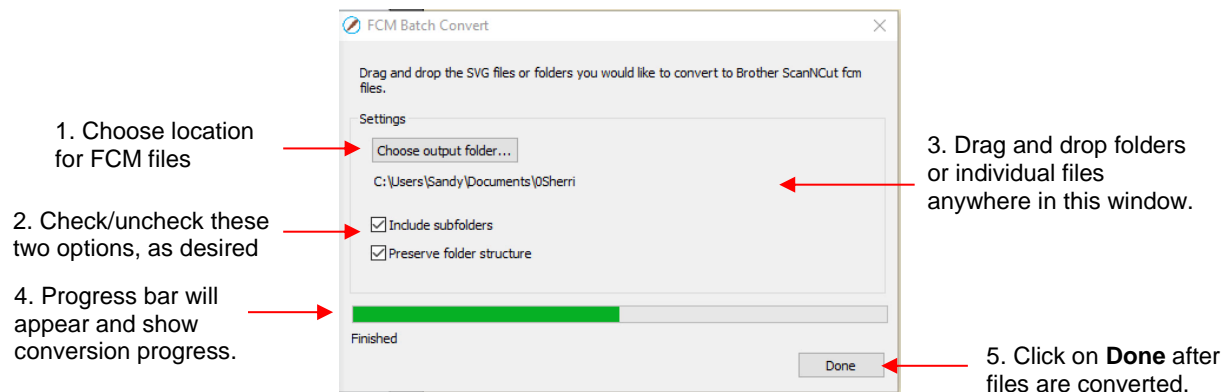
#### **4.07.2 Exporting in JPG, PNG, BMP and TIFF Formats**

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



#### 4.07.3 Exporting in FCM Format

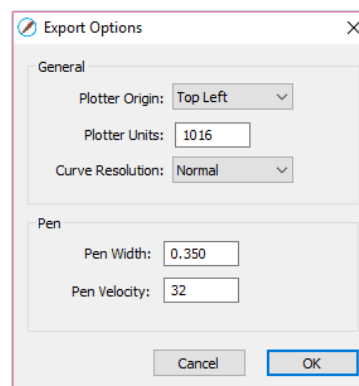
- The FCM format is used by the Brother ScanNCut models. There is no secondary window with export settings. After clicking on **Save**, the .FCM file will be located in the folder you chose in the **Save As** window.
- There is also a batch SVG-to-FCM converter available in SCAL. Go to **File>FCM Batch Convert** and the following window will open. Note that you have the option to convert entire folders of SVG files at one time:



#### 4.07.4 Exporting in PLT Format

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

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



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

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



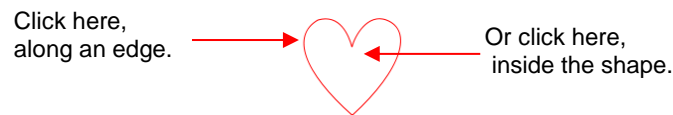
## 5. SCAL: Manipulating and Coloring Shapes

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

### 5.01 Selecting

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

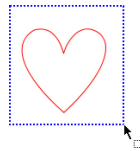
- ◇ Click anywhere on the shape (along an edge or inside a closed shape):



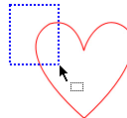
- ◇ Note that the cursor will change once the shape can be selected. For example, when selecting a line, wait for the cursor to change before clicking:



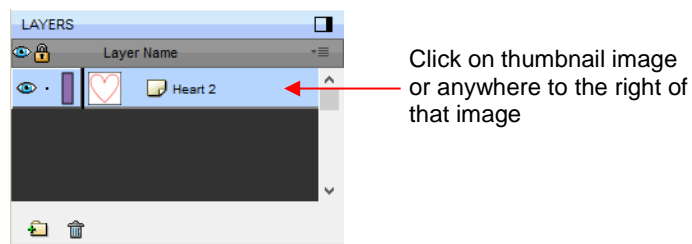
- ◇ Another way to select: drag the mouse to enclose the entire shape (aka marquee-select).



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

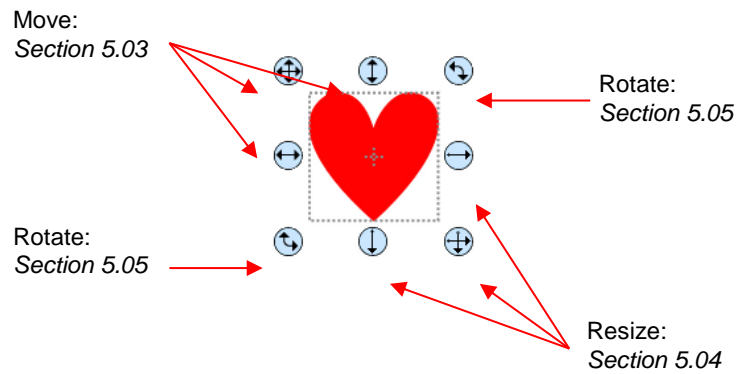


- ◇ A fourth way: click on the layer which contains this shape:



### 5.02.1 Basic Selection Handles

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

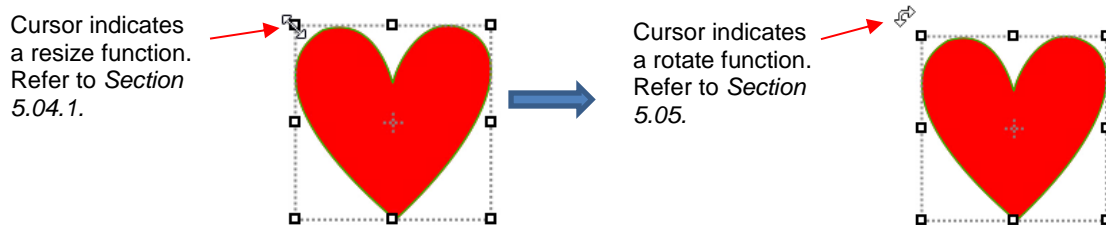


### 5.02.2 Advanced Selection Handles

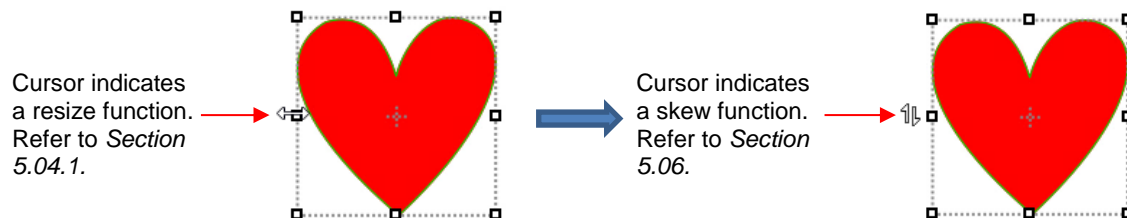
- While in the **Selection Tool** mode, the **Tool Options** bar indicates a setting called **Handles**. The drop-down menu offers another option called **Advanced**:




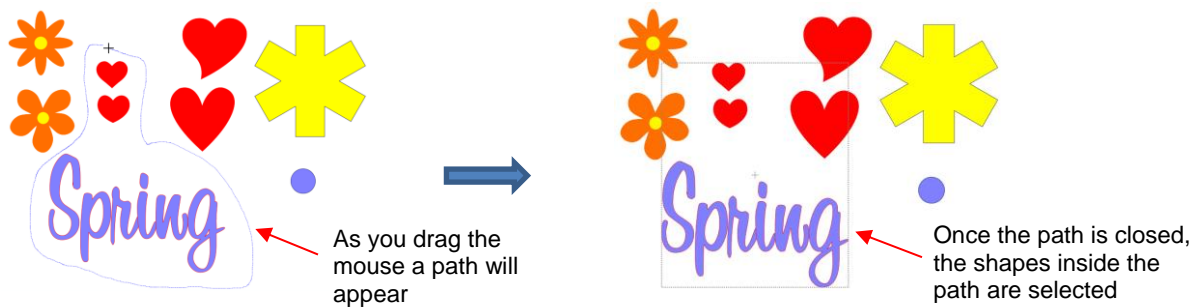
- In **Advanced** mode, a selected shape will appear with six identical handles. However, each handle now has two functions, depending on whether the mouse hovers directly over the handle or is moved slightly away from the handle:



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




- There are several ways to select more than one shape:
  - ◇ Select the first shape and hold down the **Shift** key while clicking on additional shapes.
  - ◇ Drag the mouse (marquee-select) to encompass the shapes. Always make sure you start clearly outside the boundaries of the images you want to select.
  - ◇ If all of the shapes are on the same layer, click on the thumbnail for that layer. Refer to *Section 4.04.2*.
  - ◇ Use the **Lasso Selection** tool on the **Tools Panel** . Freely drag the mouse around the shapes you want to include in the selection:




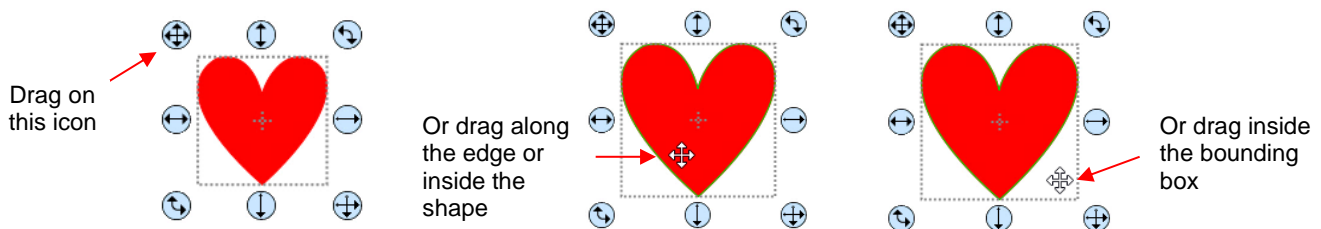
- If you wish to select all of the shapes on the screen, there are several options:
  - ◇ Press **Ctrl+A**
  - ◇ Right-click on the screen and choose **Select All** from the menu
  - ◇ Go to **Edit>Select All**
- To unselect all shapes, use one of the following ways:
  - ◇ “Click away” – click anywhere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

## 5.02 Deleting

- To delete a selected shape, use any of the following options:
  - ◇ Press the **Delete** key on the keyboard
  - ◇ Right-click on the screen and choose **Delete** from the menu
  - ◇ If the shape is on its own layer, click on the **Delete Layer** icon: 
- To delete all of the shapes in the current project:
  - ◇ Use one of the methods from *Section 5.01* to select all shapes
  - ◇ Then delete using any of the prior options listed for deleting a selected shape
- You can also delete a layer of shapes at one time from the **Layers Panel**. Refer to *Section 4.04.2*.

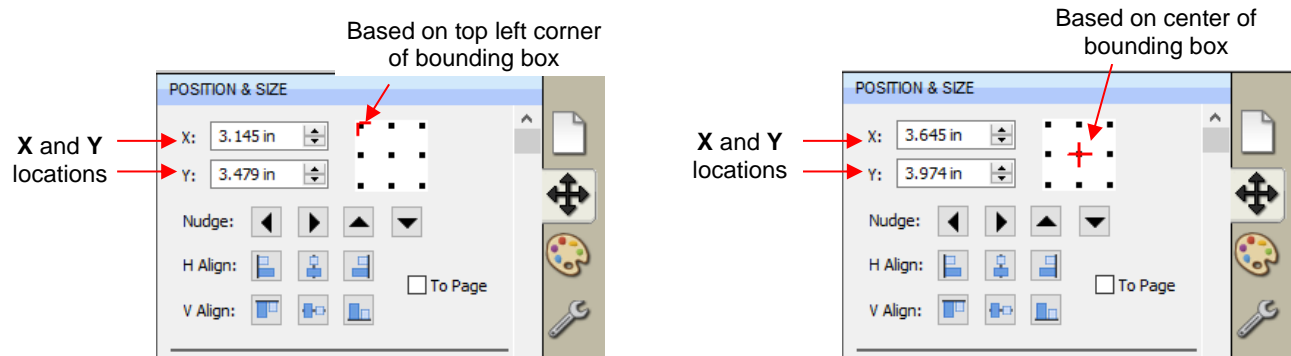
## 5.03 Moving

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

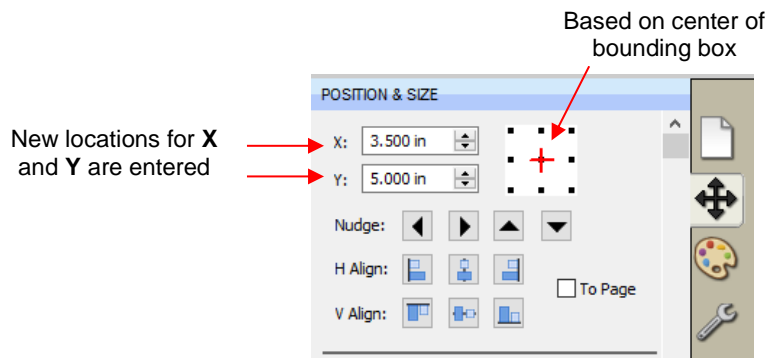


- To move a shape and maintain horizontal or vertical alignment, hold the **Shift** key while dragging or use the arrow keys on your keyboard.

- With a shape selected, the **Position & Size Settings on the Properties Panel** indicate the exact location of the bounding box around a selected shape. Note that this location is how far the shape is from the top left corner of the grid on the mat and the red mark indicates which part of the bounding box is being referenced. For example:



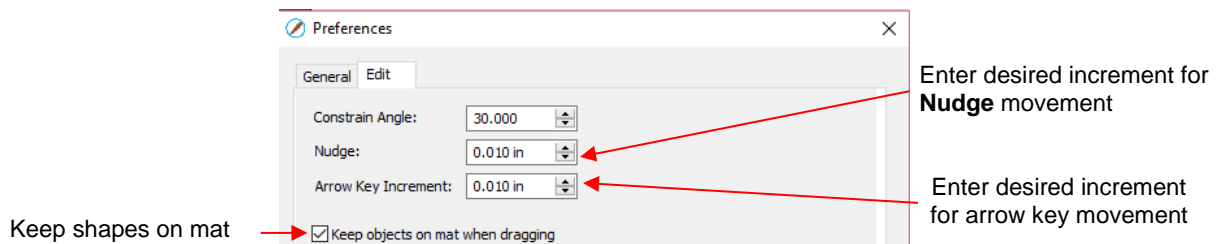
- You can enter new values into either or both of the **X:** and **Y:** windows to move the shape to a new location:



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

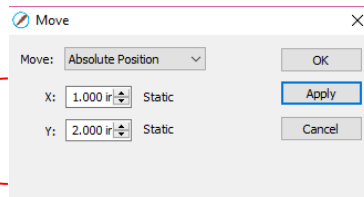


- The increment size for both the keyboard moves and the **Nudge** moves can be changed by going to **Edit>Preferences** and then selecting the **Edit** tab. This window also offers the option to force shapes to remain within the boundaries of the **Cutting Mat** while being moved with the mouse:

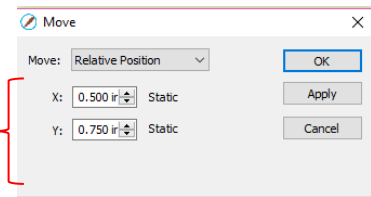


- There is also a **Move** function available which can be accessed these two ways:
  - Right-click on a selected shape and go to **Transform>Move**
  - Go to **Object>Transform>Move**
- This **Move** windows provides two moving options:
  - Move the shape to a specific position on the **Cutting Mat** (called **Absolute Position**)
  - Move the shape a certain distance from its current location (called **Relative Position**)

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

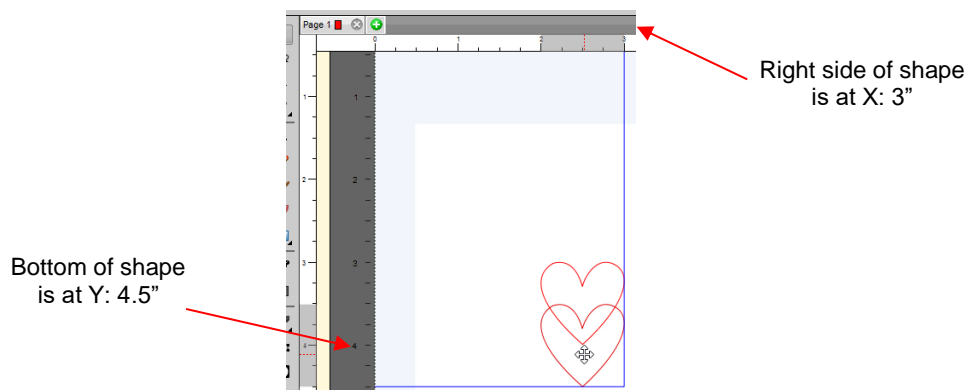


**Relative Position:**  
how far to move the  
shape in both an X  
and Y direction



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

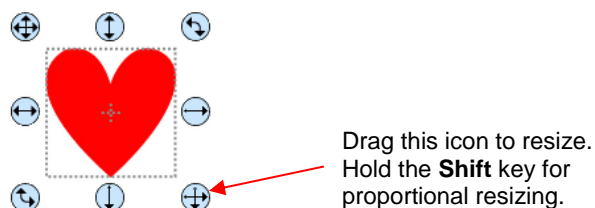
- You can also use the **Rulers** to estimate a new location for moving shapes. Blue lines will appear when the shape is aligned with a major marking, such as shown below:



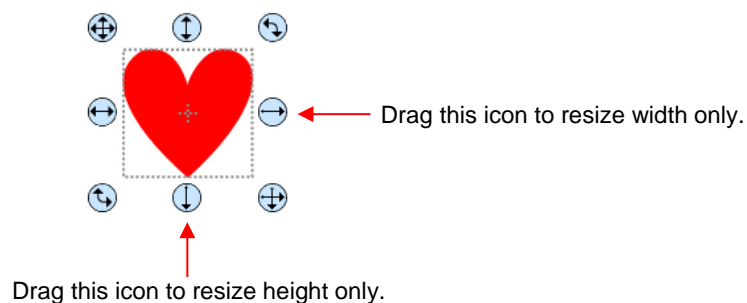
## 5.04 Resizing, Scaling, Auto Fit

### 5.04.1 Resizing

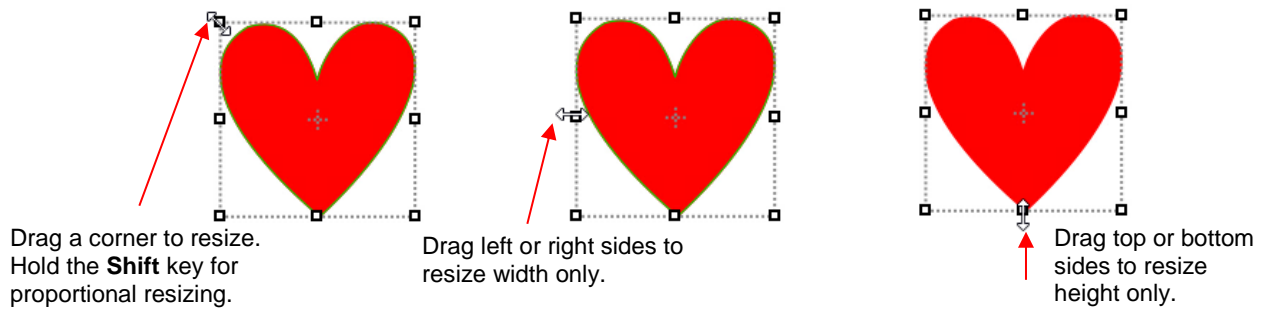
- With the shape selected, use your mouse to drag the lower right corner of the shape to freely resize. If you want to keep the width and height proportional, hold the **Shift** key down before dragging that icon:



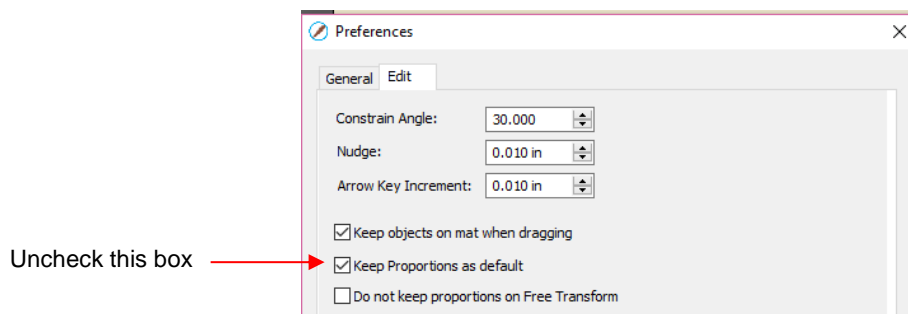
- To resize only the width or the height, drag the middle right or the middle bottom icons, respectively:



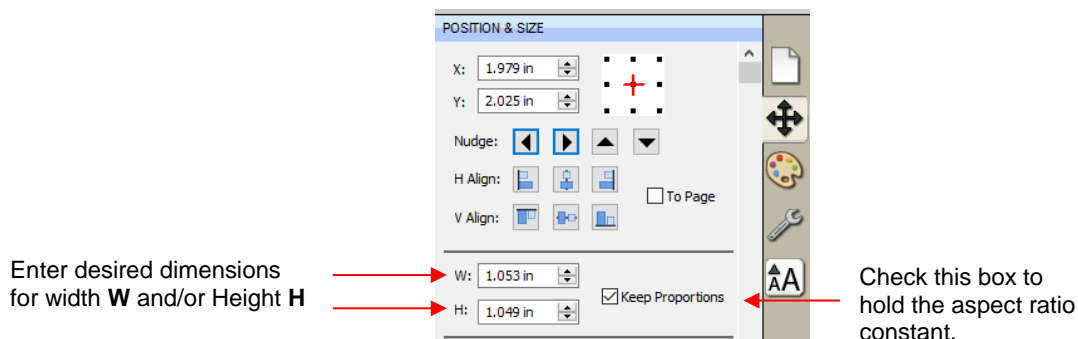
- If the **Handles** are in **Advance** mode, then drag a corner or a side when the cursor is directly over the handle. Again, holding the **Shift** key will resize height and width proportionately:



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

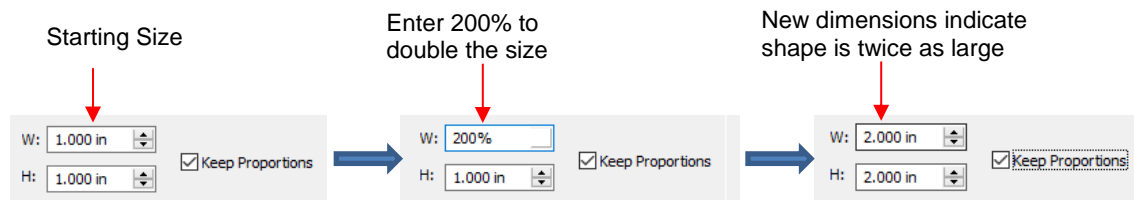


- Important:** Unchecking this box does not then affect shapes created using the **Shapes** tool on the **Tools Panel**. You will need to hold the **Shift** key to maintain proportions when resizing by dragging the lower right corner.
- If you need to make the shape an exact size, then enter the dimension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



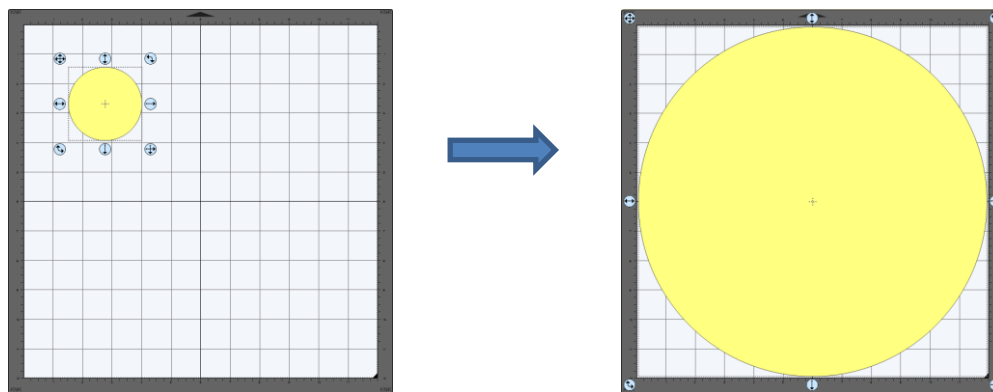
## 5.04.2 Scaling

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

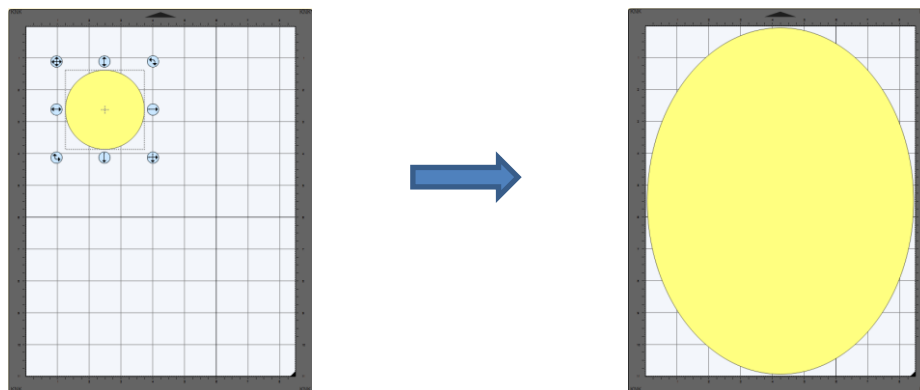


### 5.04.3 Auto Fit (PC only)

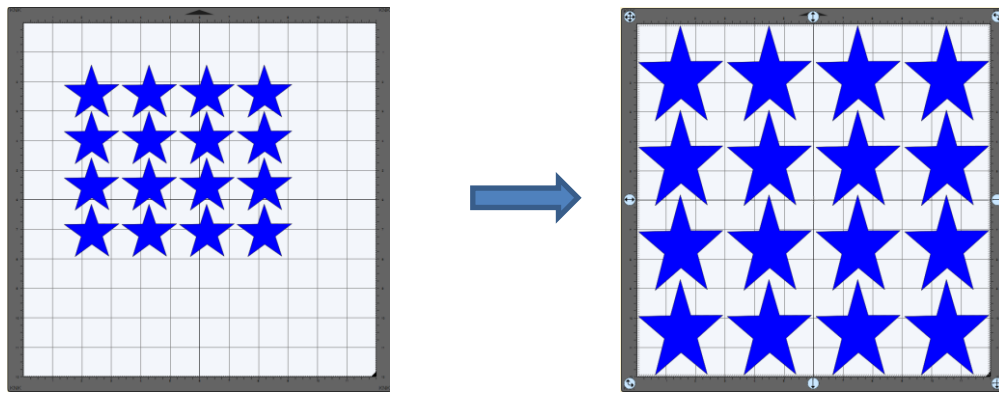
- The **Auto Fit** function will resize a shape or selection of shapes to fit the boundaries of the **Cutting Mat** with a slight (1/16") margin. It is accessed by going to **Object>Transform>Auto Fit**.
- Example: Select a circle on a 12" x 12" **Cutting Mat** and go to **Object>Transform>Auto Fit**:



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

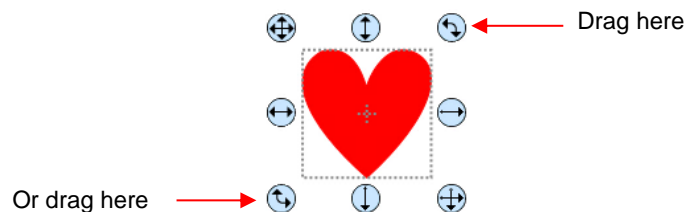


- A practical example might be something like this: You have one 12 x 12 sheet of cardstock and you want to cut out 16 stars for a party decoration and you want those stars as large as possible. Rather than having to "do the math", you can create a grid of stars (refer to *Section 5.16.4*) and then use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

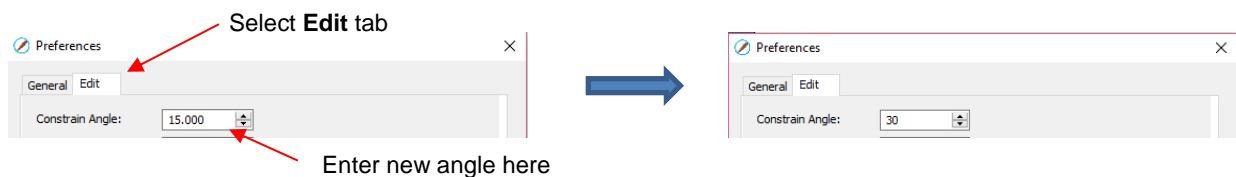


## 5.05 Rotating

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



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



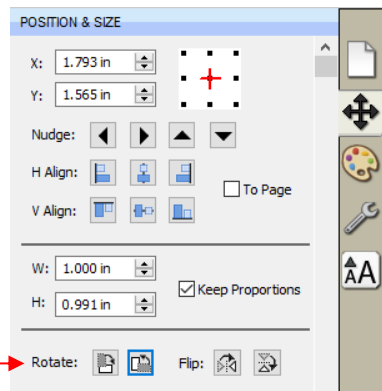
- ◇ The **Status Bar** at the bottom of the screen will indicate the current degree of rotation:



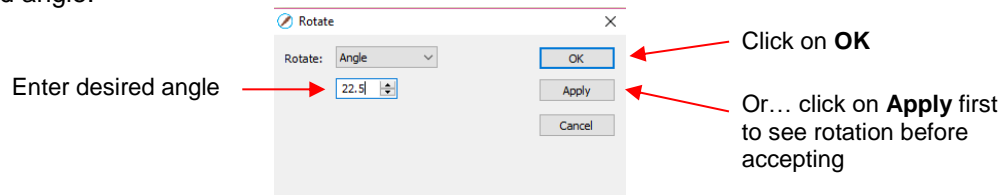
- ◇ Note: the **Status Bar** will continue to show the last degree of rotation until another shape is selected and rotated.
- A selected shape can be rotated exactly 45° clockwise or counter-clockwise, by clicking the **Rotate** icons on the **Position & Size Panel**:



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



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



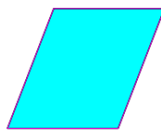
## 5.06 Skewing and Distorting

### 5.06.1 Skewing

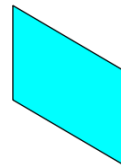
- Shapes can be skewed either horizontally or vertically:



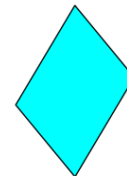
Starting Shape



Horizontal Skew

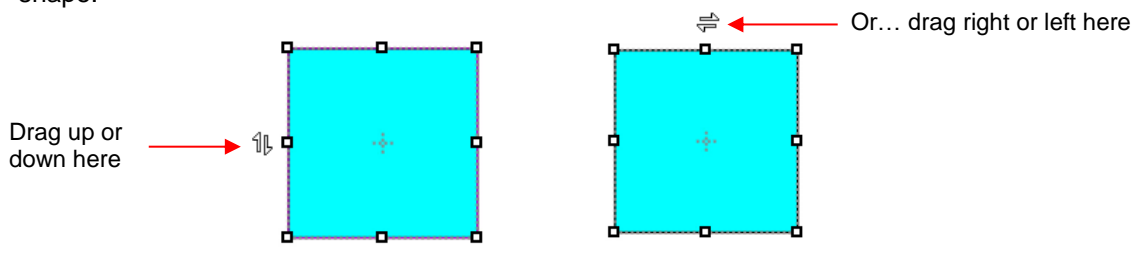


Vertical Skew



Both horizontal and vertical skew

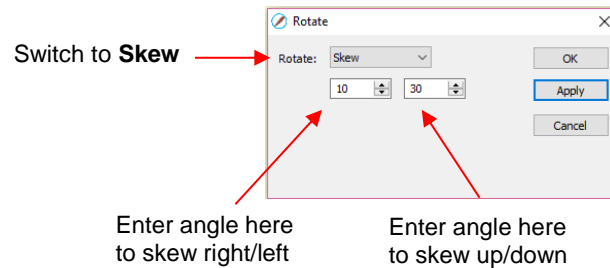
- There are two ways to skew a shape:
  - ◇ With the shape selected and **Advanced** selected on the **Tool Options**, rest your mouse slightly outside of a handle in the middle of a side. The skew mode cursor will appear and it can be dragged to skew the shape:




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

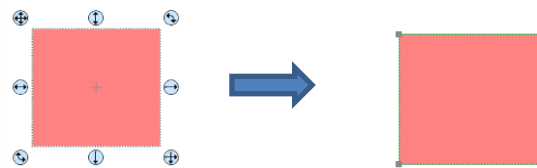
- Right-click and select **Transform>Rotate**
- Go to **Object>Transform>Rotate**

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

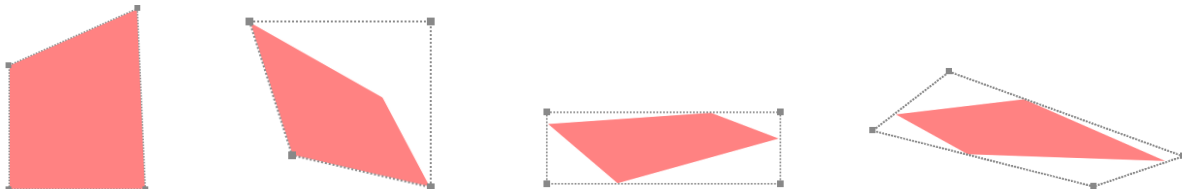


## 5.06.2 Distorting

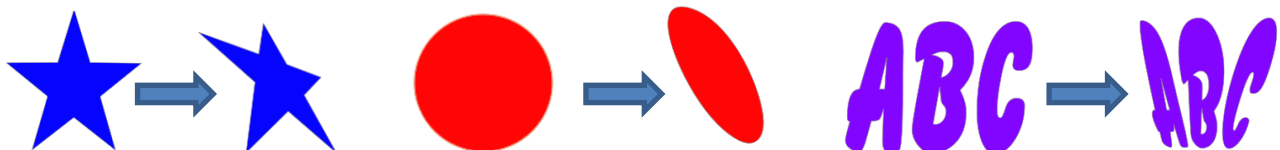
- The **Distort** tool is the 5<sup>th</sup> icon  from the bottom on the **Tools Panel**. Select a shape and then click on the icon. The four corners of the bounding box will display small boxes:



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

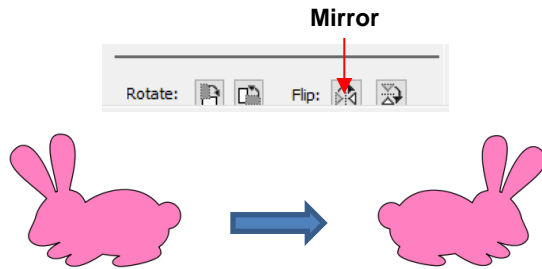


- Of course, the shape doesn't have to be rectangular. The **Distort** tool can be applied to anything:

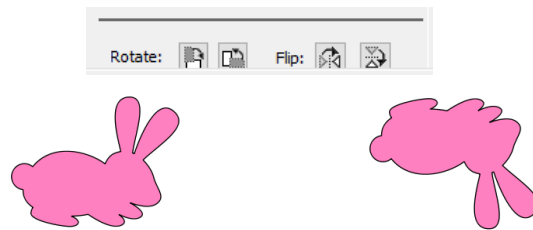


## 5.07 Mirroring and Flipping






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








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



## **5.08 Locking and Unlocking**

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

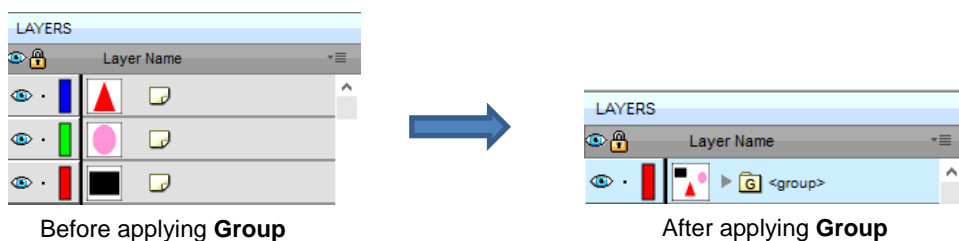
## 5.09 Hiding and Showing

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

## 5.10 Grouping and Ungrouping

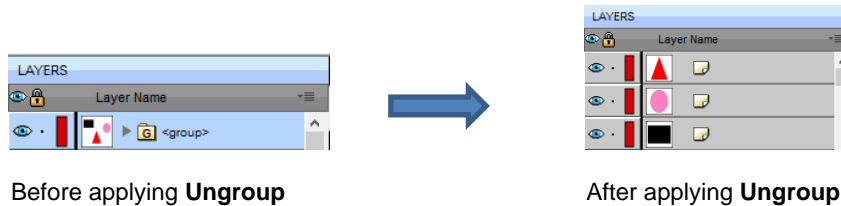
### 5.10.1 Group

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



### 5.10.2 Ungroup

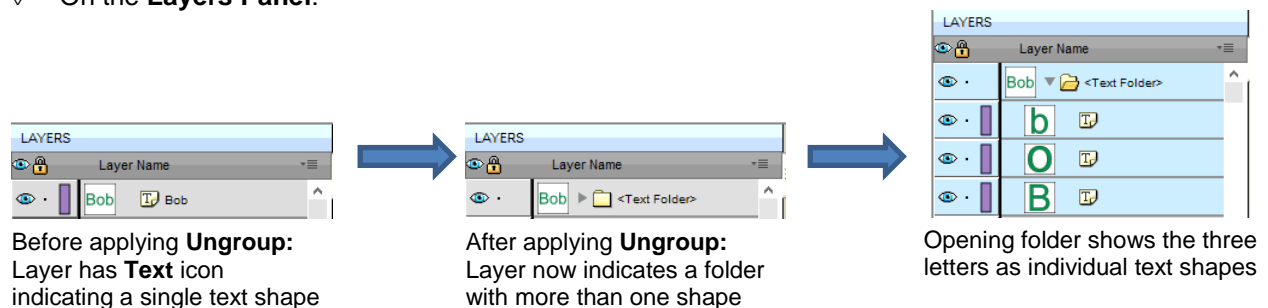
- The **Ungroup** function is used to separate a grouped layer of shapes into individual layers.
- After selecting a group, the **Ungroup** function can be applied in any of the following ways:
  - ◇ Right-click and select **Ungroup** from the popup menu
  - ◇ Go to **Object>Ungroup**
  - ◇ Press **Ctrl+Shift+G**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



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



- ◇ On the **Layers Panel**:

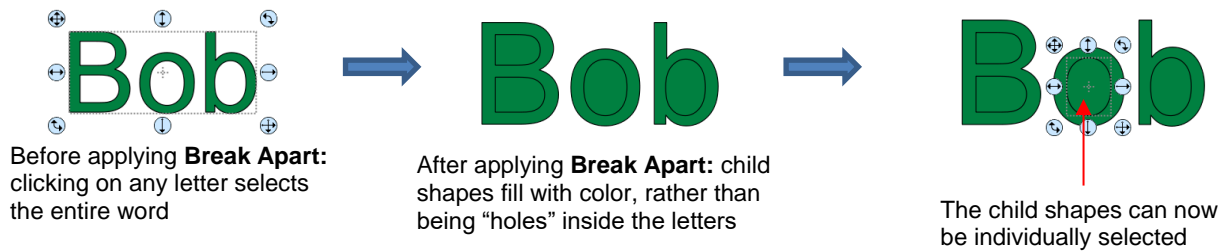


## 5.11 Breaking and Merging

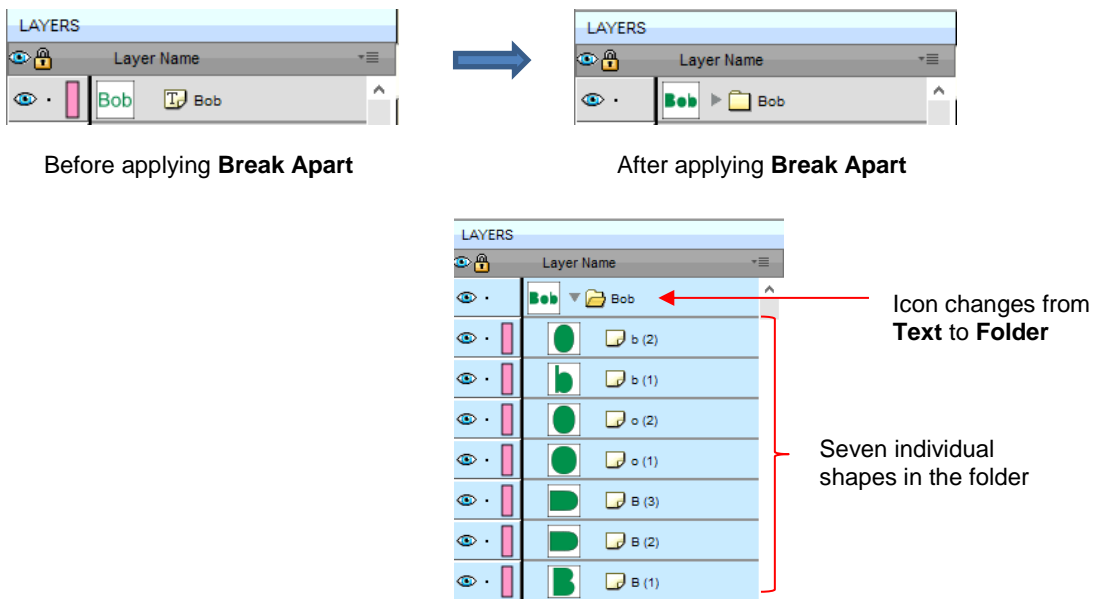
### 5.11.1 Break Apart

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

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



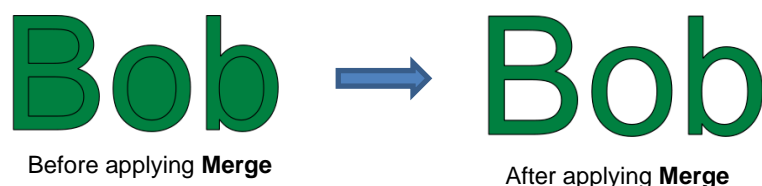
◇ On the **Layers Panel**:



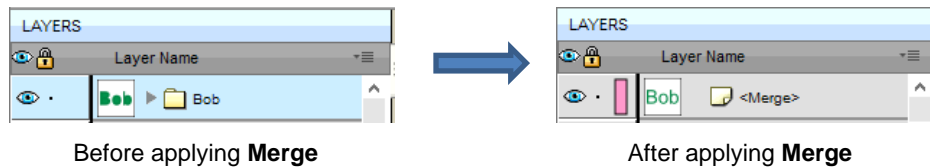
- Once you apply **Break Apart**, you have complete editing control over each individual shape within a design. But be careful! It’s also easy to inadvertently move an individual shape (especially the tiny ones) and you can risk messing up the design. Thus, only use **Break Apart** when needed and then,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

### 5.11.2 Merge

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



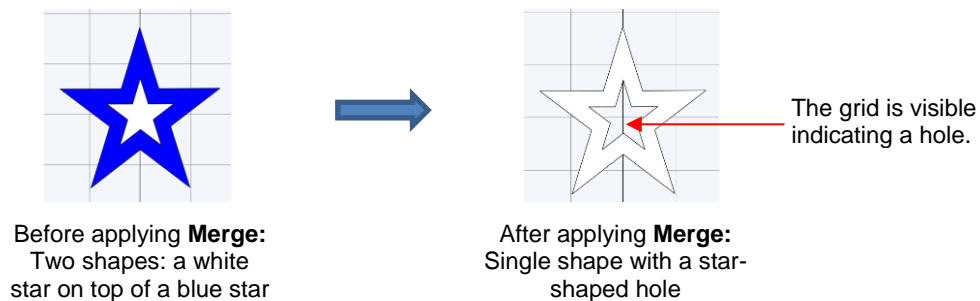
On the **Layers Panel**, this is what will appear:



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

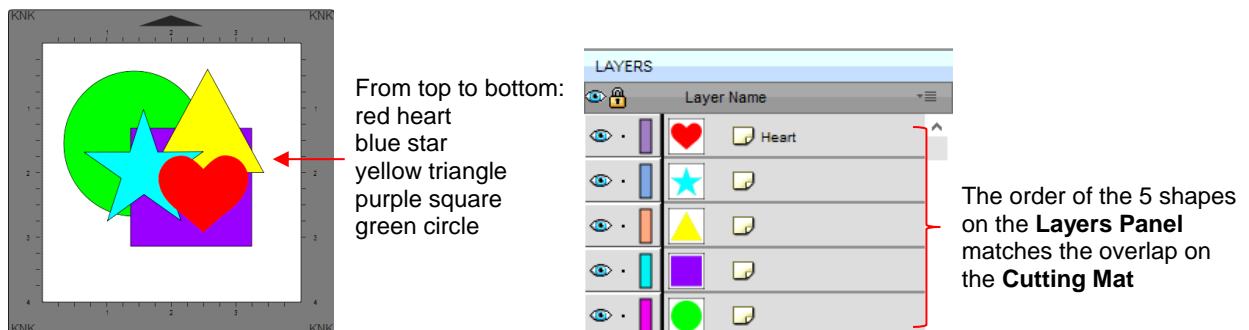


- ◇ A child shape that is merged with a parent shape essentially becomes a hole in that shape. This can be proven by having the grid showing when merging:




## 5.12 Arranging (Ordering) Shapes

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



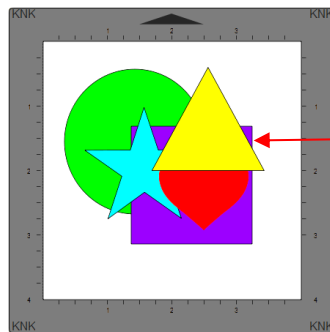
- In *Section 4.04.3*, moving layers was presented and could be used here to change the order of the shapes. However, another way to reorder these shapes is to select one and then access the **Arrange** functions using one of the following:
  - ◇ Go to **Object>Arrange**
  - ◇ Right-click and select **Arrange** from the popup menu

◇ Click on the **Layers Menu** icon  and select **Arrange**

• Four options will then appear:

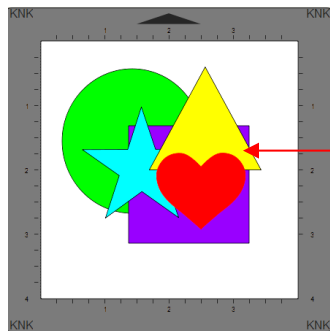
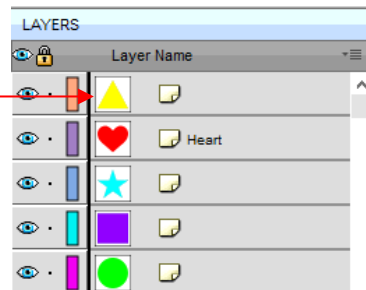
- ◇ **Bring to Front** (or **Layer to Top**): Move selection to the very top
- ◇ **Bring Forward** (or **Raise Layer**): Move selection up one level
- ◇ **Send Backward** (or **Lower Layer**): Move selection down one level
- ◇ **Send to Back** (or **Layer to Bottom**): Move selection to the very bottom

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



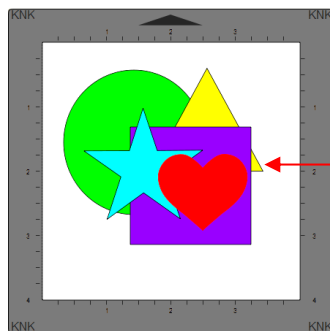
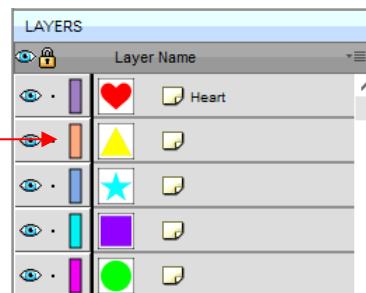
#### Bring to Front

Triangle moves to the top



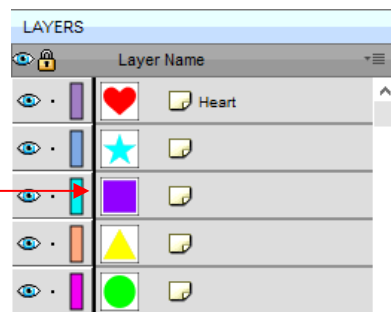
#### Bring Forward

Triangle moves above blue star but is still below red heart

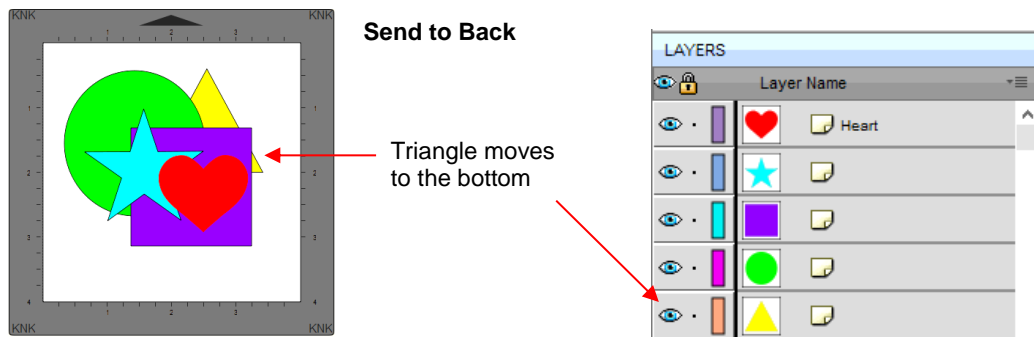


#### Send Backward

Triangle moves below purple square but is still above green circle



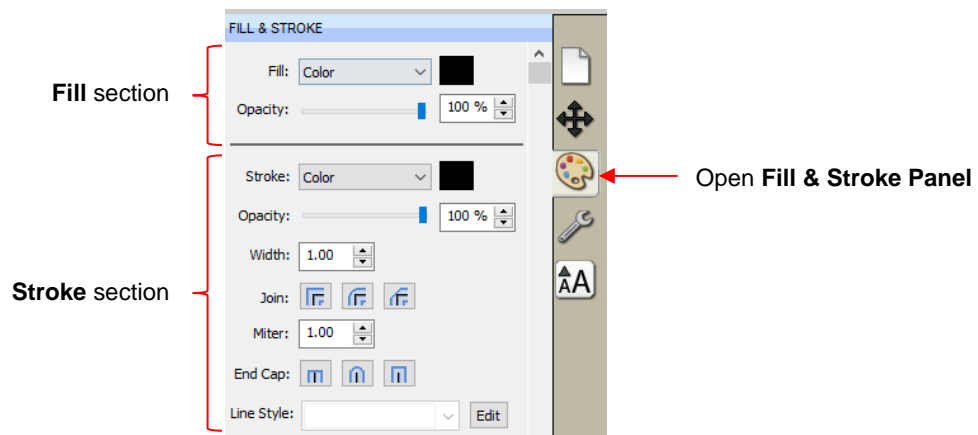




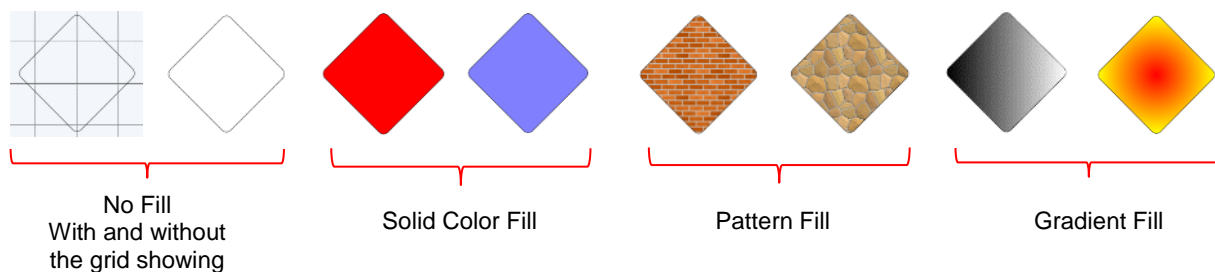
- It is worth noting that if any of the other layers had been locked or hidden, the movement of the triangle would have been the same. In other words, if the red heart had been hidden and/or locked, the triangle would still have ended up above it using **Bring to Front**.
- There are also shortcut keys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

### 5.13 Fill & Stroke: Fill

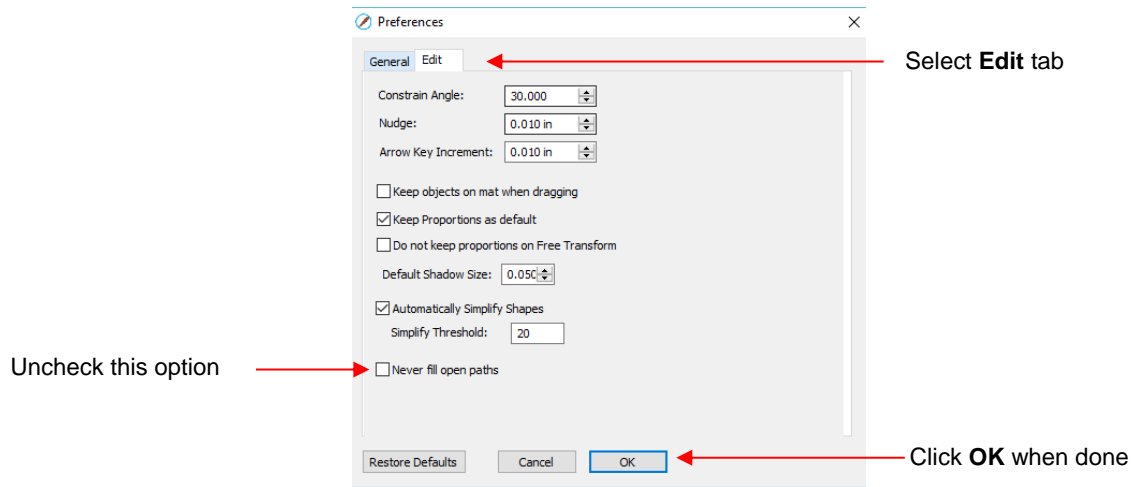
- The **Fill & Stroke Panel** provides options for changing how a shape or open path appears on the screen and, in the case of **Line Style** (solid versus dashed), how it cuts. This can be helpful in designing a project and also in print and cut applications.
- To open this panel, click on the **Fill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



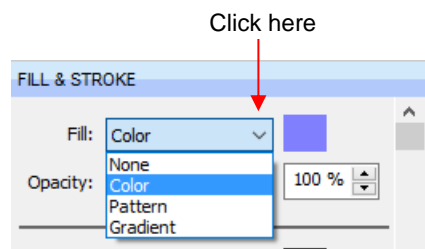
- Shapes can be filled with nothing, a solid color, a pattern or a gradient:



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

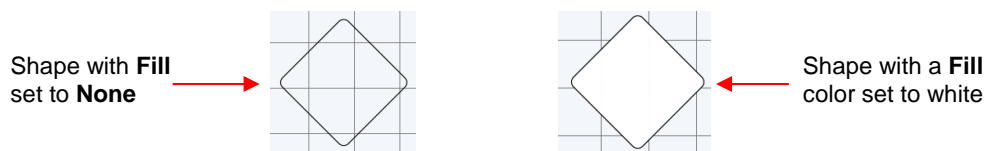


To select a type of **Fill**, click on the drop-down menu and select from the four options:



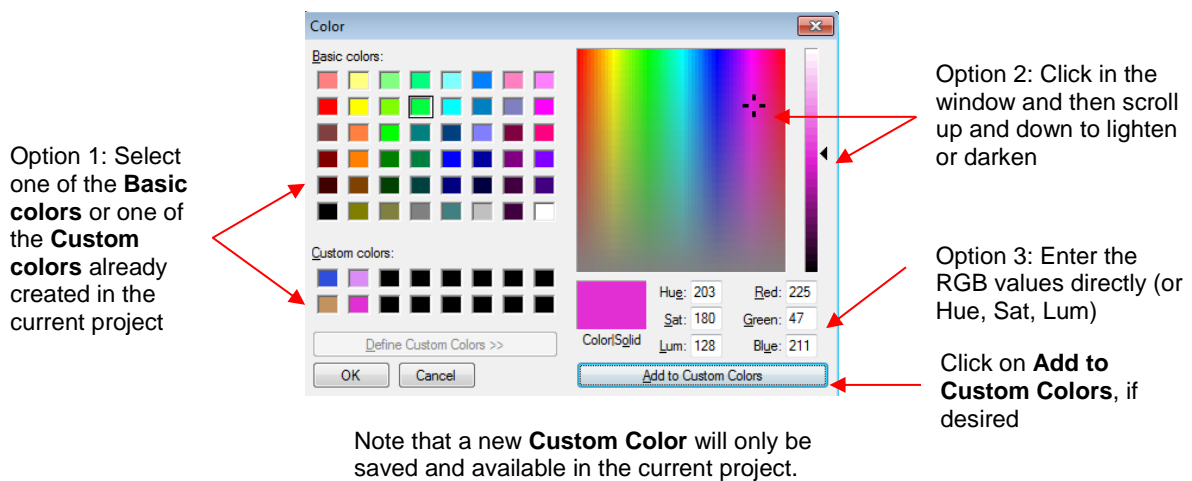
### 5.13.1 No Fill

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



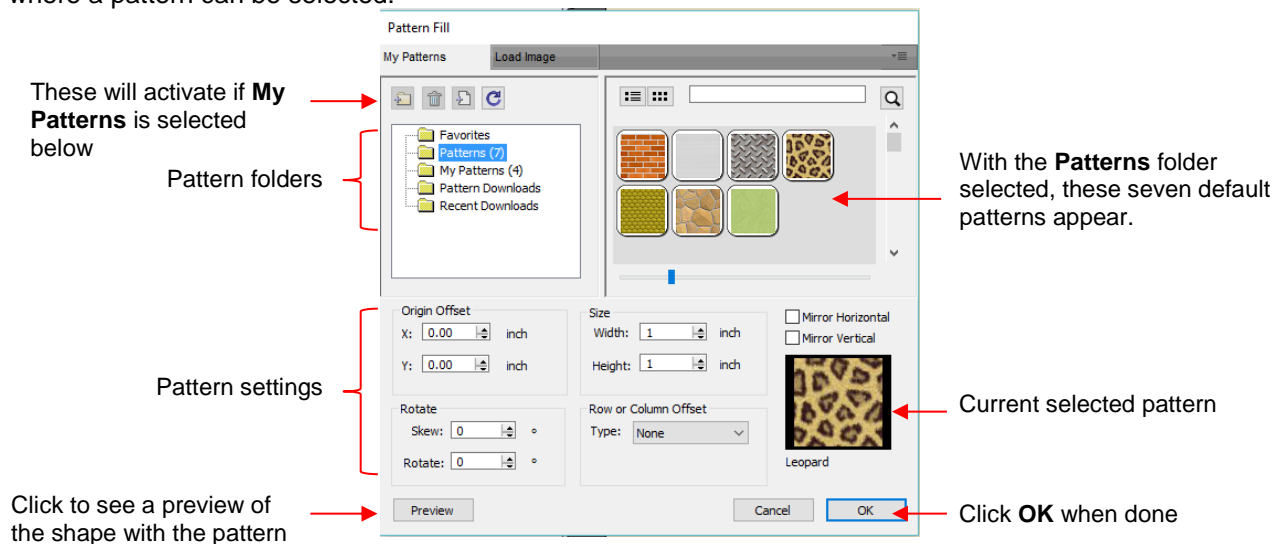
### 5.13.2 Color Fill

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

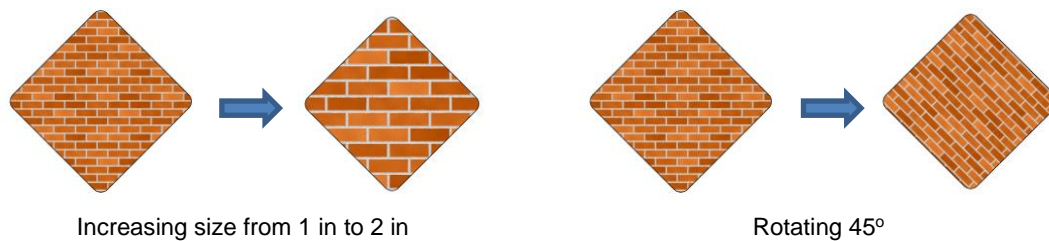


### 5.13.3 Pattern Fill

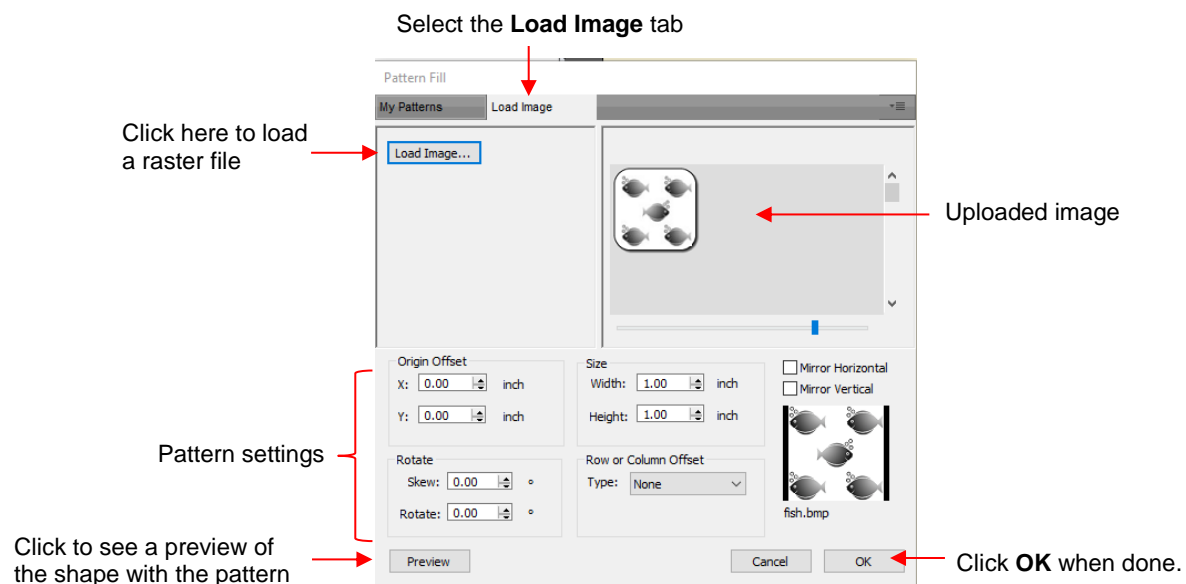
- From the **Fill** menu, select **Pattern** and then click on the color box to the right to open the following window where a pattern can be selected:



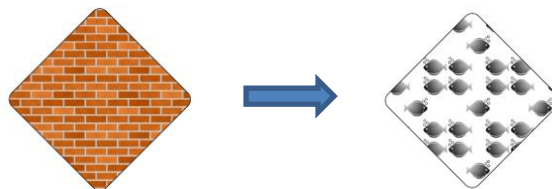
- Many of the functions in the **Pattern Fill** window are identical to those under the **Shapes** tab in the **Library**. Refer to *Section 4.03.1* for directions on searching, adding new folders, adding new files, adding to **Favorites**, etc.
- When adding your own patterns under **My Patterns**,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



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



- The selected shape now fills with the uploaded image:

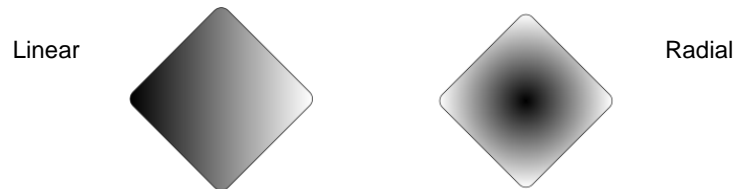


#### **5.13.4 Gradient Fill**

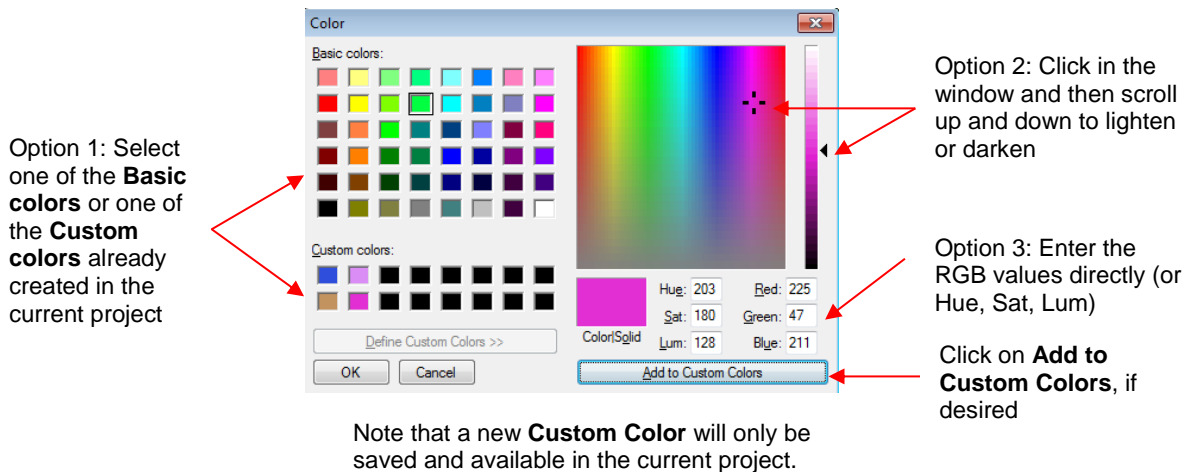
- From the **Fill** menu, select **Gradient** and then click on the color box to the right to open the following window where a gradient can be designed:



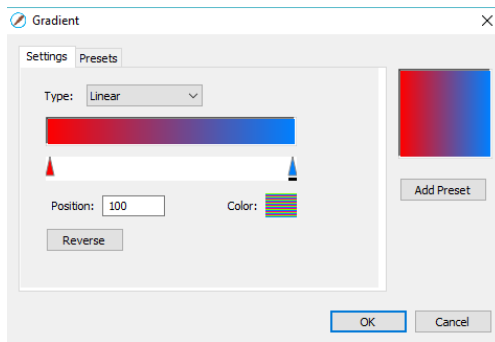
- **Type:** Choose **Linear** for a left-to-right gradient. Choose **Radial** for a center outwards gradient:



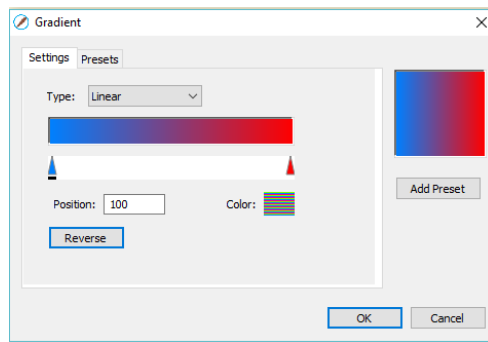
- ◇ To change colors, click on one of the markers, then click on the color selector box and choose a color from the **Color** window. Repeat for the other marker. As with other color selections, you can choose a base color or create a custom color:



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

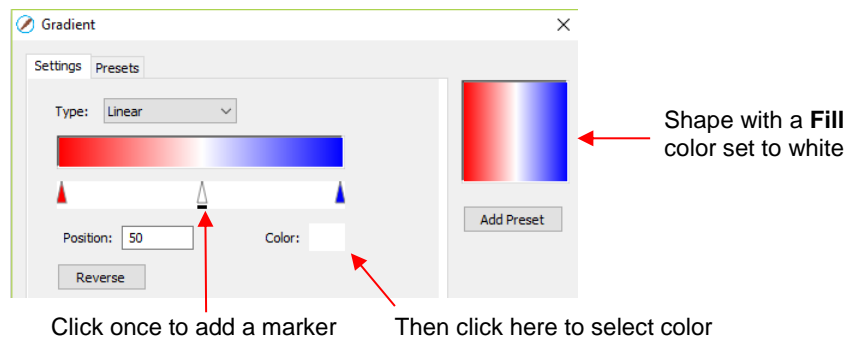


After selecting new colors



After applying **Reverse**

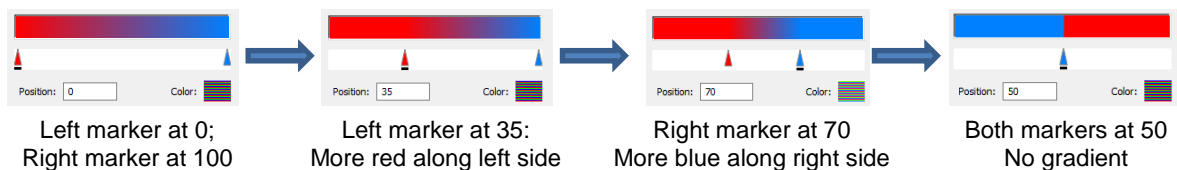
- ◇ More markers can be added by clicking on the **Position Bar** and then clicking on the **Color** selector. For example, white could have been added to the middle:



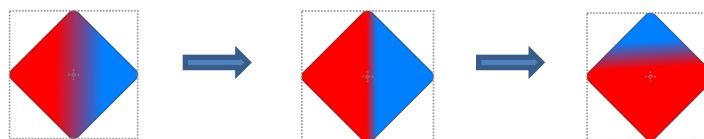
- ◇ If you inadvertently add a marker or decide you don't want one or more of the new ones, drag the marker downward and it will be removed.
- ◇ **Position:** The **Position** value is a location from 0 to 100 and applies to whichever marker is selected.

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:

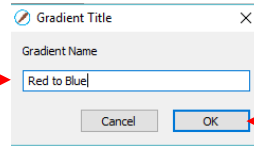


- ◇ The **Position** can also be changed after the shape is filled and the **Gradient** window is closed. On the **Tools Panel** is a **Gradient** tool . After selecting the shape, click on the **Gradient** icon and then drag the mouse across the shape to change the **Positions** and even rotate the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



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

Name the **Gradient Preset**

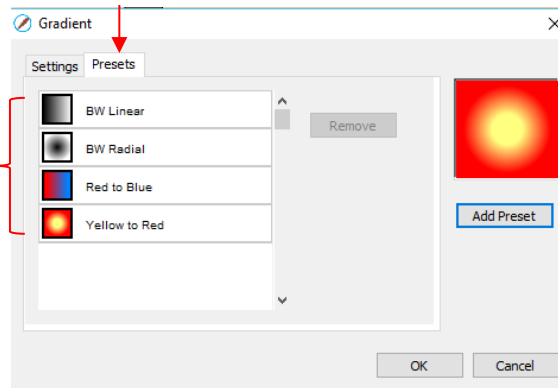


Click on **OK**

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

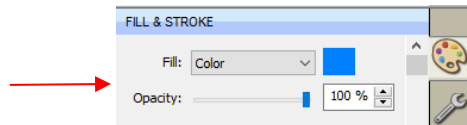
Click on the **Presets** tab

Saved **Presets**



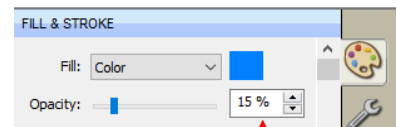
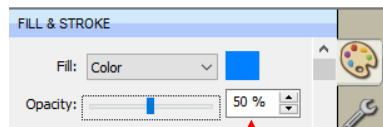
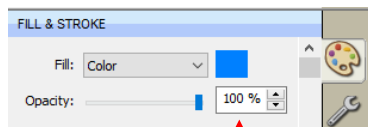
### 5.13.5 Opacity

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

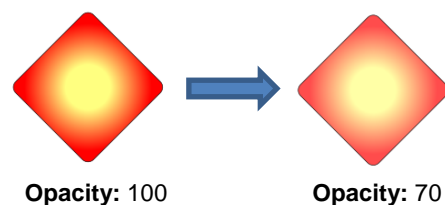
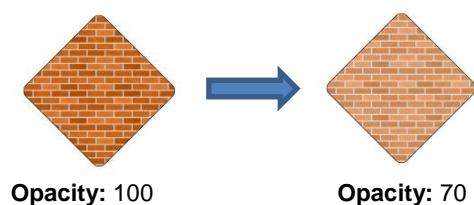


- Decreasing the **Opacity** setting will make a shape more transparent. This can be used for changing the appearance for printing or for revealing shapes that are completely or just partially hidden by other shapes.

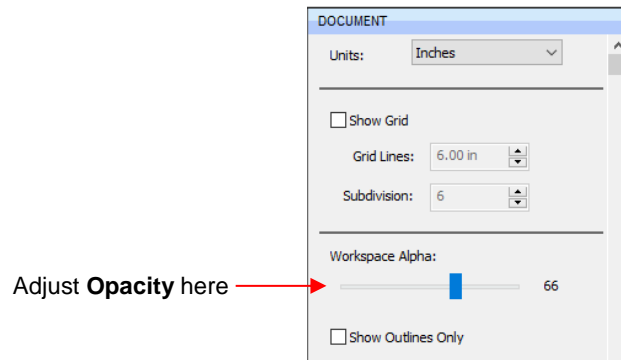
- ◇ In the following example, the **Opacity** is decreased on the blue circle, allowing the blocked portion of the red square to be seen:



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

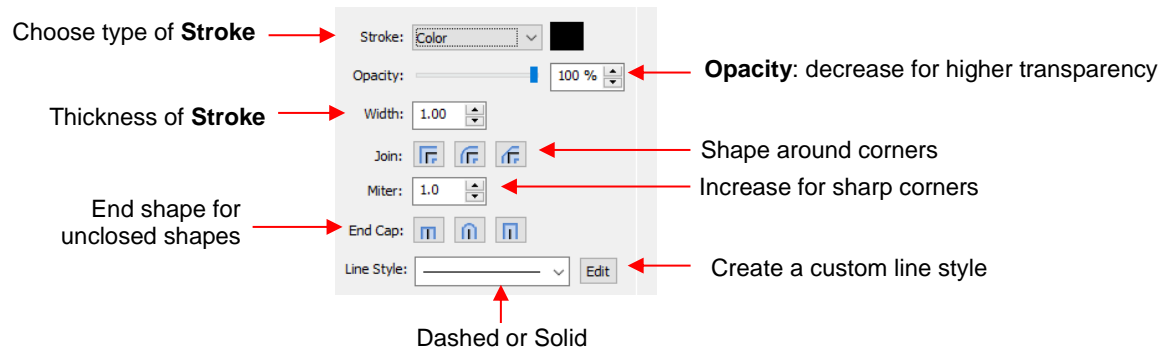


- ◇ If you want to decrease the **Opacity** for all shapes, the **Workspace Alpha** setting on the **Documents Panel** can be reduced from 100% to the desired level:



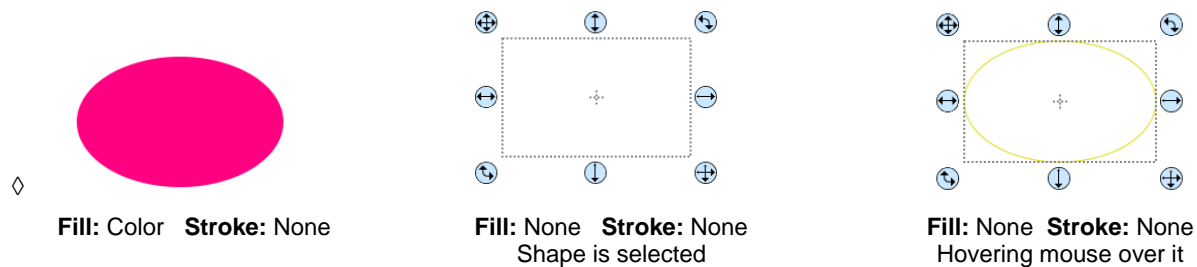
## 5.14 Fill & Stroke: Stroke

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



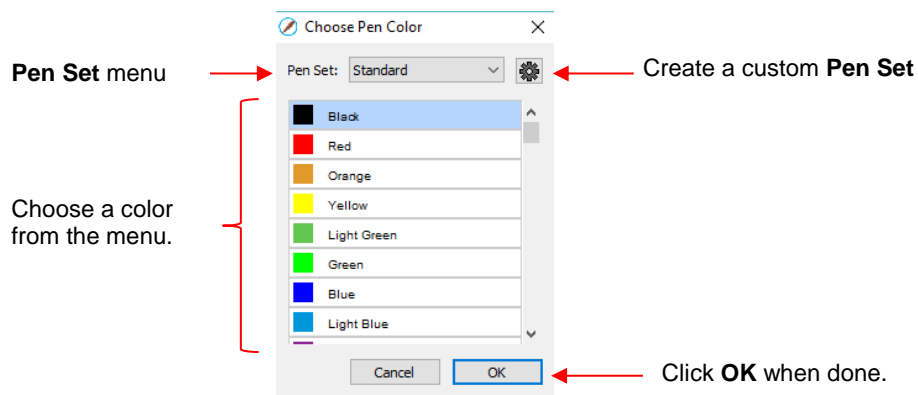
- **Stroke**: All shapes have a **Stroke** assignment using one of the following choices:


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

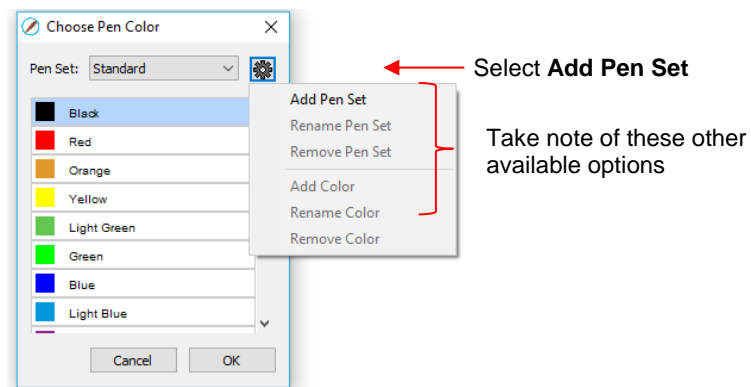


- ◇ **Color**: Once **Color** is selected, click on the box to the right and the **Color** window will open. This is the same window that opened when **Color** was selected under **Fill**. As with other color selections, you can choose a base color or create a custom color.
- ◇ **Pen Color**: Choose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

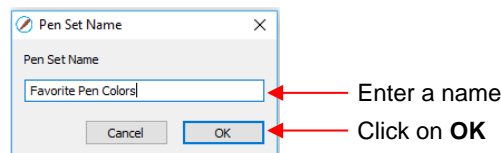




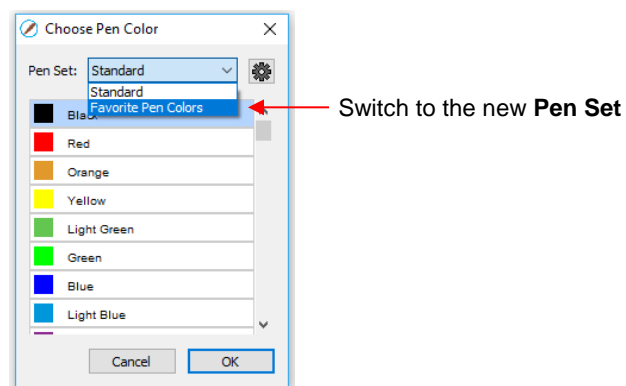
- Select the desired color from the menu and click **OK**. You also have the option to create your own custom **Pen Set** by clicking on the small icon in the upper right corner . The following menu appears and you can then select **Add Pen Set**:




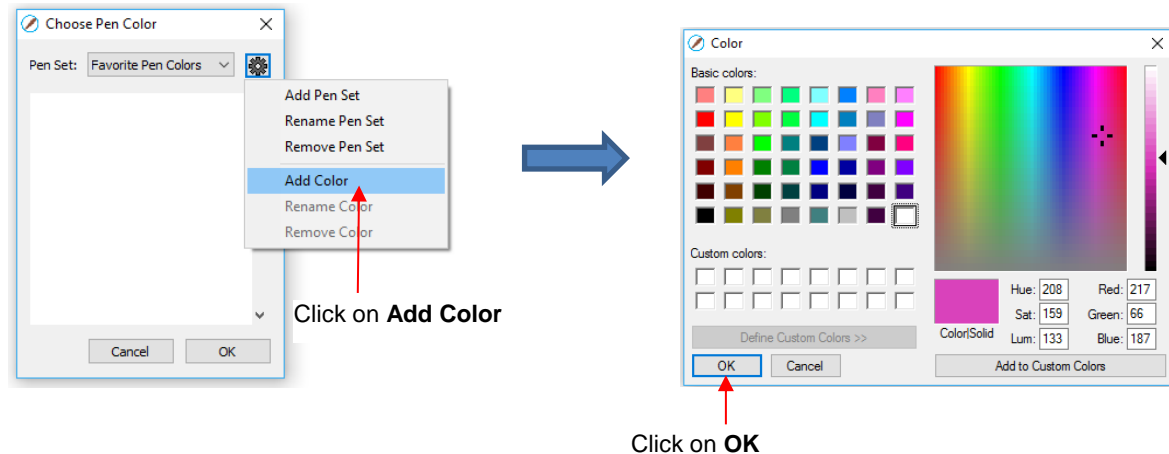
- Next, name the pen set:



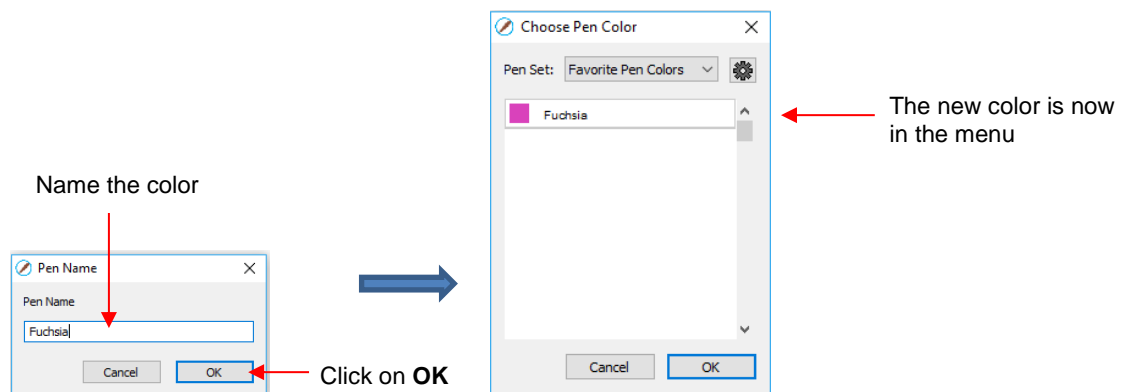
- In the **Pen Set** menu, you can now select the new **Pen Set Name**:



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



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



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

- **Opacity:** Decreasing the **Opacity** setting will make the **Stroke** color more transparent. It's not particularly noticeable until you increase the **Stroke Width**, thus examples will be shown in the next bullet.
- **Width:** Increasing the **Width** will make the **Stroke** thicker. The units are in pixels thus the same values give the same results whether your SCAL **Units** are set to inches, cm, or mm.



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



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




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




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

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

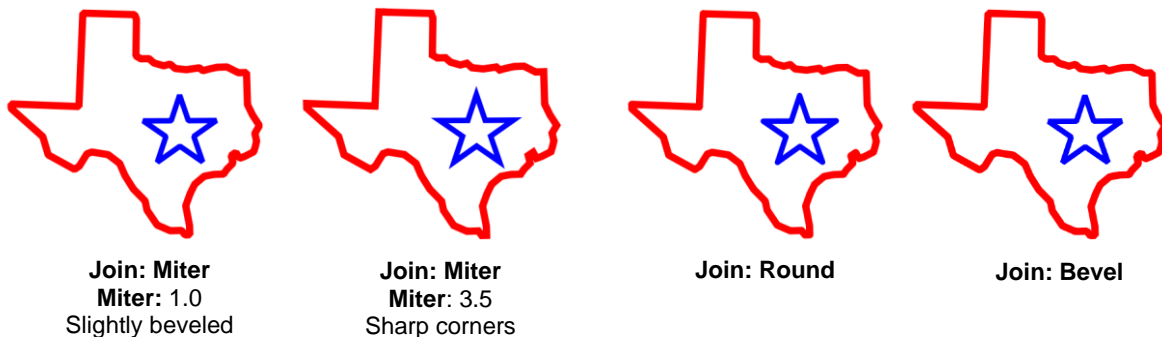
- **Join** consists of three options which affect how sharp corners are handled:

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


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

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


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

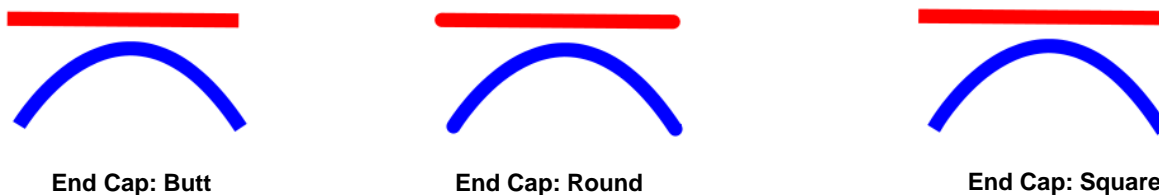


- End Caps:** Unclosed shapes, such as lines and arcs, can have the **Stroke** shape on the ends changed, similar to the **Join** setting. The choices are:

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

◇ **Round** : The end is rounded.

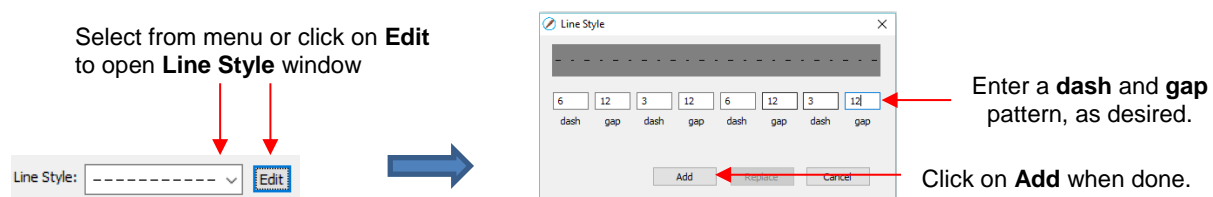
◇ **Square** : The end is squared off and extends beyond the actual end based on the **Stroke Width**.



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




- Line Style:** The **Line Style** can be either solid or dashed. If dashed is selected, then one of the default patterns can be selected or you can specify the dash length and spacing desired by clicking on **Edit**:



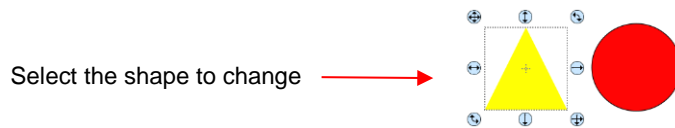
- ◇ The **Line Style** selected will be displayed on the screen and will be cut or drawn with that style by the cutter. Again, the **Stroke Width**, however, is ignored by the cutter.

## 5.15 Dropper Tool

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

- To use this function:

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



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



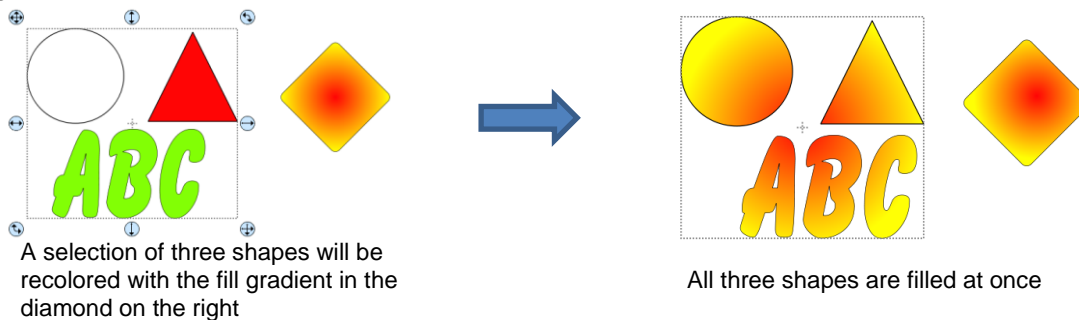
- ◇ Finally, click on the shape that has the color property you wish to use. In this case it's the red circle with the black **Stroke**. The selected triangle is recolored to match.



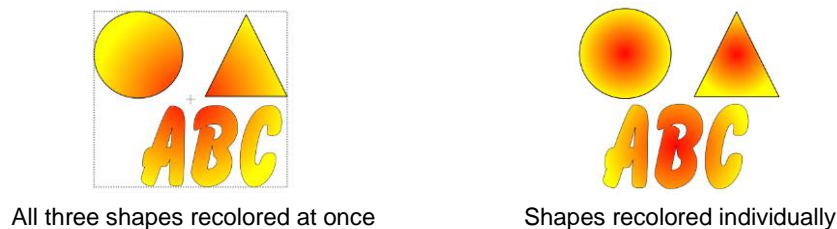
Move the mouse over the shape that has the desired color(s)

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

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



- 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:



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

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

- To cut shapes to the clipboard (copy to the clipboard and delete from the **Cutting Mat**), first select the shape or shapes and then use any of the following:

- ◇ Click on the **Cut** icon located on the upper **Toolbar**
- ◇ Right-click on the screen and select **Cut**
- ◇ Press **Ctrl+X**
- ◇ Go to **Edit>Cut**



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

- To copy shapes to the clipboard, first select the shape or shapes and then use any of the following:

- ◇ Click on the **Copy** icon located on the upper **Toolbar**
- ◇ Right-click on the screen and select **Copy**
- ◇ Press **Ctrl+C**
- ◇ Go to **Edit>Copy**



- To make multiple copies, refer to the **Duplicate** function described later in this section.

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

- There are three **Paste** functions in SCAL:

- ◇ **Paste:** pastes the shape offset slightly (0.25") from the original
- ◇ **Paste in Place:** pastes the shape in exactly the same location as the original
- ◇ **Paste (Auto Fill):** pastes enough copies to auto-fill the **Cutting Mat**

- To **Paste** shapes from the clipboard, use any of the following:

- ◇ Click on the icon located on the upper **Toolbar**
- ◇ Right-click on the screen and select **Paste**
- ◇ Press **Ctrl+V**
- ◇ Go to **Edit>Paste**



- To **Paste in Place** shapes from the clipboard, use any of the following:

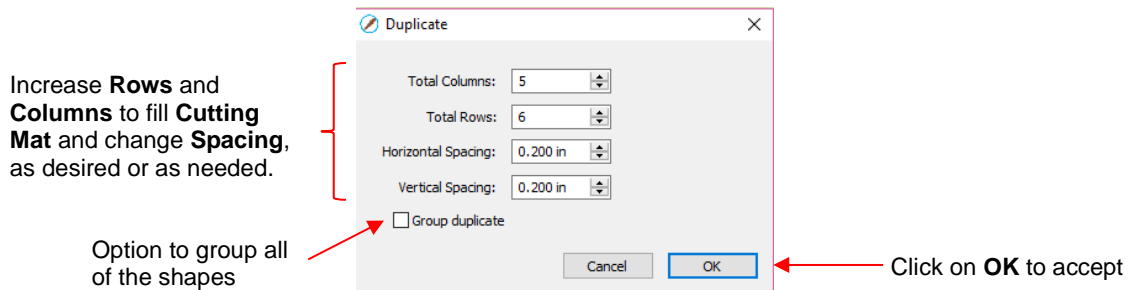
- ◇ Right-click on the screen and select **Paste in Place** (without any shapes selected)
- ◇ Press **Ctrl+Shift+V**
- ◇ Go to **Edit>Paste in Place**

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

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

### 5.16.4 Duplicating - Duplicate

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



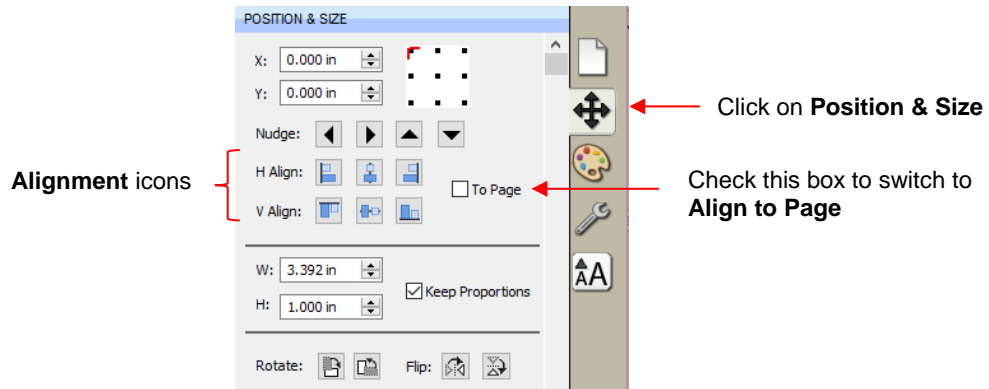
- To create a single row of repeats, set the **Rows** value to 1. For a single column of repeats, set the **Columns** value to 1. To overlap the repeats, enter a negative number under **Spacing**. Refer to *Section 9.03.1* for a tutorial on how this function can be used to create a border.
- There is also a **Duplicate Rotated** function to arrange the duplicates in a circular formation. Because this is more typically used for design purposes, it is covered in *Section 9.06*.

### 5.16.5 Quick Duplicate

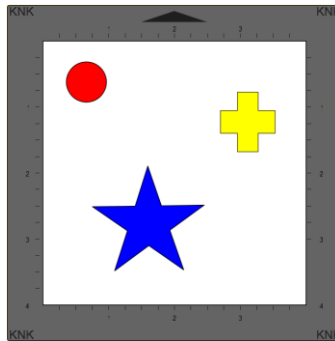
- A quick way to make a single copy of a shape is to hold the **Alt** key while dragging the shape. The original will be left behind and new copy will be moved with the mouse.
- You can also hold the **Alt** key and left-click on a shape and it will duplicate that shape leaving the copy on top of the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

### 5.17 Alignment




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

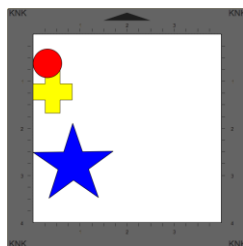


- The following three shapes, in their current relative positions, will be used to illustrate what happens when each alignment function is applied. Note that a small custom mat was created to facilitate screenshots:

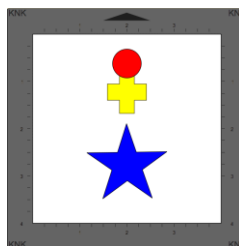


### 5.17.1 Align to Page

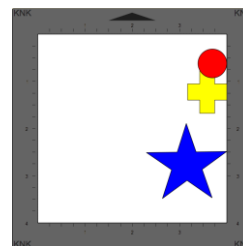
- Make sure the alignment mode is set to **Align to Page**. To do this, either:
  - Go to **Object>Alignment** and make sure **Align to Page** is checked
  - Check the **To Page** option on the **Position & Size** panel
- With the shapes selected, the horizontal alignment options are:
  - Align Left** aligns shapes along the left side of the **Cutting Mat**. 
  - Align Horizontal Center** aligns shapes through the center of the **Cutting Mat**. 
  - Align Right** aligns shapes along the right side of the right side of the **Cutting Mat**. 




Align Left



Align Horizontal  
Center



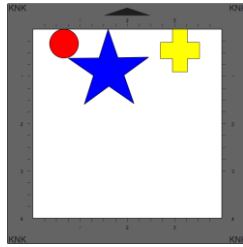
Align Right

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

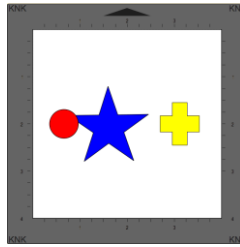
◇ **Align Vertical Center** aligns shapes through the center of the **Cutting Mat**.



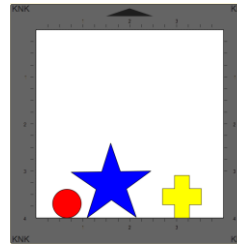
◇ **Align Bottom** aligns shapes along the bottom side of the **Cutting Mat**.



Align Top



Align Vertical Center



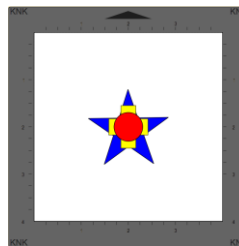
Align Bottom

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

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



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



Align Centers

### 5.17.2 Align to Selection

- First, make sure the alignment mode is set to **Align to Selection**. This is done by either making sure the **To Page** option is not checked on the **Position & Size** panel or by going to **Object>Alignment** and making sure **Align to Selection** is checked.
- With the shapes selected, the horizontal alignment options are:

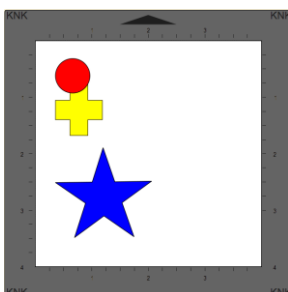
◇ **Align Left** aligns shapes along the left side of the leftmost shape of the group.



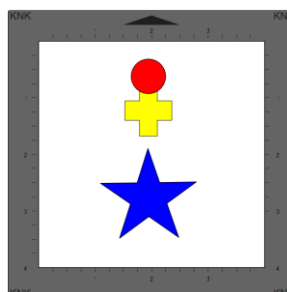
◇ **Align Horizontal Center** aligns shapes to a vertical axis through the center.



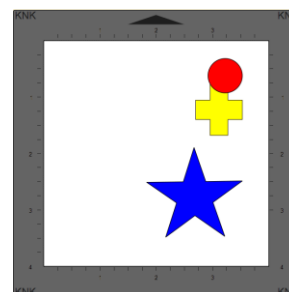
◇ **Align Right** aligns shapes along the right side of the rightmost shape of the group.



Align Left






Align Horizontal Center

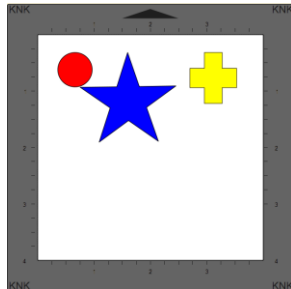


Align Right

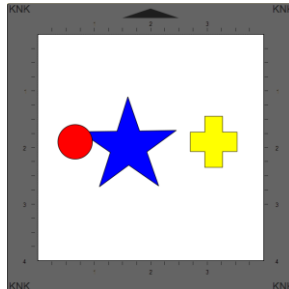


- With the shapes selected, the vertical alignment options are:

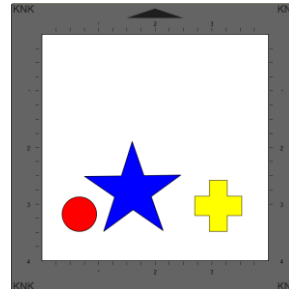
- ◇ **Align Top** aligns shapes along the top side of the uppermost shape of the group. 
- ◇ **Align Vertical Center** aligns shapes to a horizontal axis through the center. 
- ◇ **Align Bottom** aligns shapes along the bottom side of the bottommost shape of the group. 



Align Top



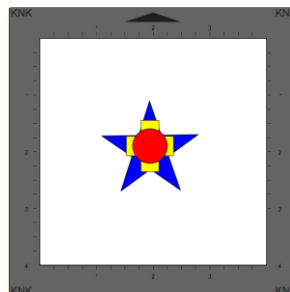
Align Vertical Center



Align Bottom

- To center all three shapes, use either:

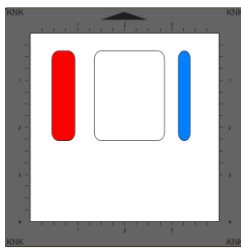
- ◇ A combination of **Align Horizontal Center** and **Align Vertical Center**:  
- ◇ Go to **Object>Alignment>Align Centers**



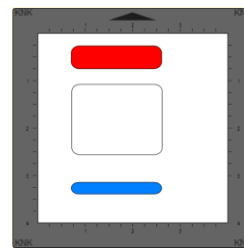
Align Centers

## **5.18 Distribute**

- The **Distribute** function rearranges the spacing between shapes. Similar to the **Alignment** function, you can **Distribute to Page (Cutting Mat)** or you can **Distribute to Selection** (selected shapes). There's also a third, called **Distribute to Selection Below**, which distributes based on whatever shape is positioned at the lowest level on the **Layers Panel** and its difference in size relative to the outermost shape in the opposite direction of the distribute option (and yes, this is confusing, but will be explained in *Section 5.18.3*)
- After selecting the shapes, these functions can be accessed by going to **Object>Distribute**.
- The following three shapes, in their current relative positions, will be used to illustrate what happens with each distribute function when **Distribute to Selection** or **Distribute to Page** is applied. Note that a small custom mat was created to facilitate screenshots:



Will be used for horizontal distribute examples

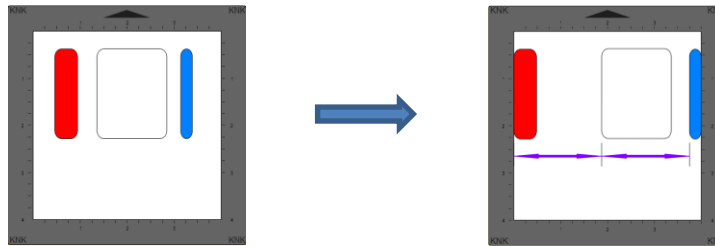


Will be used for vertical distribute examples

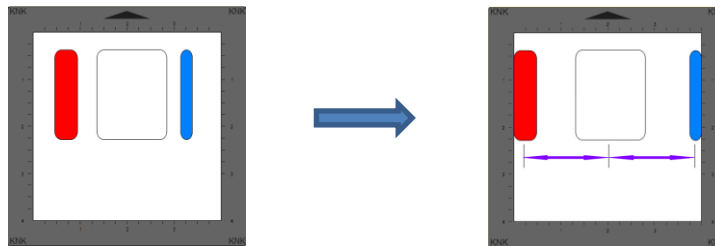
### 5.18.1 Distribute to Page

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

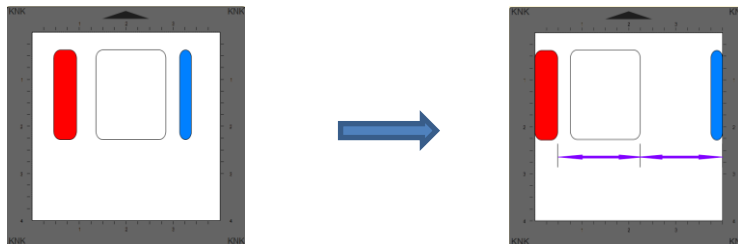
- ◇ **Distribute Left:** spaces shapes so that the left sides of each shape are the same distance apart:



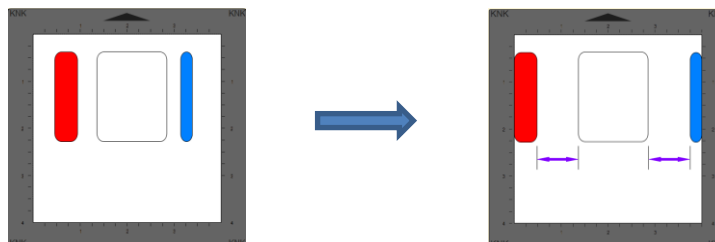
- ◇ **Distribute Center Horizontally:** spaces shapes so that the centers of each shape are the same distance apart:



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

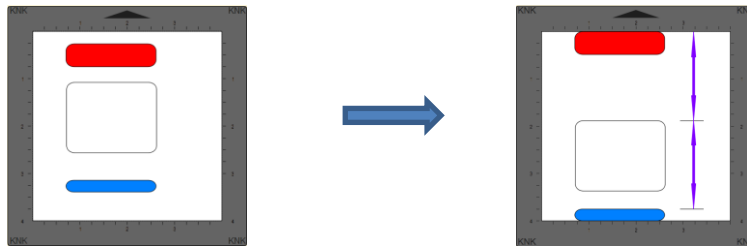


- ◇ **Distribute Space Horizontally:** spaces shapes so that the gaps between the shapes are the same.

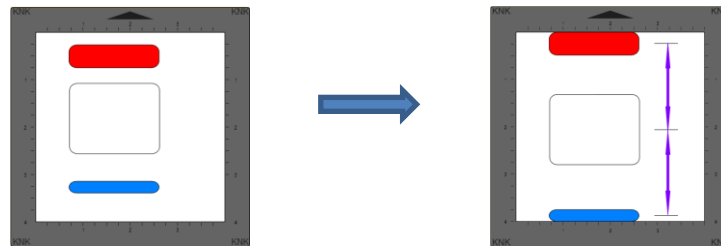


- With the shapes selected, the vertical distribute options are:

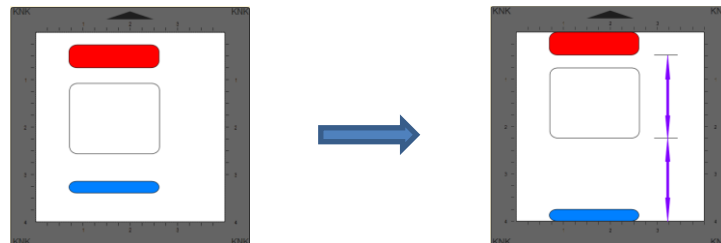
◇ **Distribute Top:** spaces shapes so that the top sides of each shape are the same distance apart:



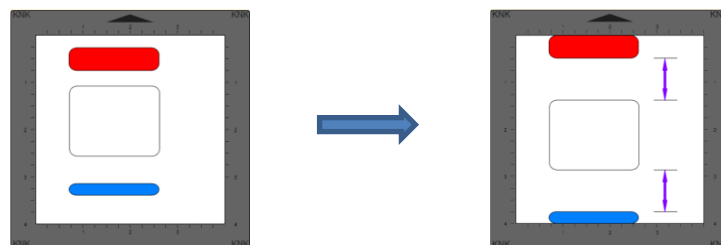
◇ **Distribute Center Vertically:** spaces shapes so that the centers of each shape are the same distance apart:



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

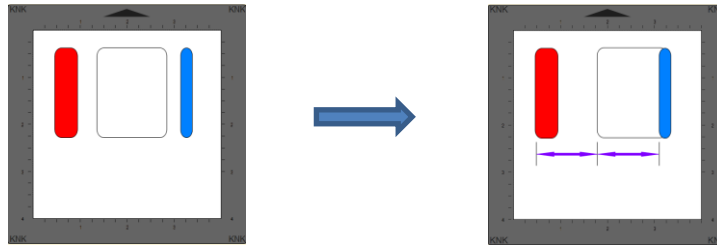


◇ **Distribute Space Vertically:** spaces shapes so that the gaps between the shapes are the same.

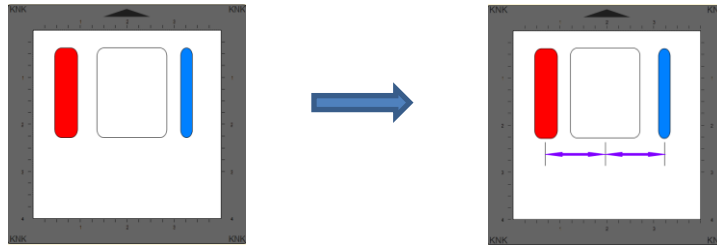


### **5.18.2 Distribute to Selection**

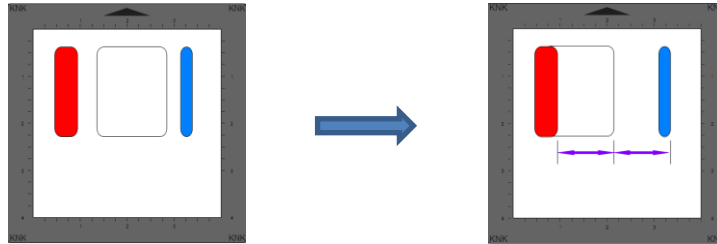
- Select the shapes and go to **Object>Distribute** and then make sure **Distribute to Selection** is checked. In this mode, the two outermost shapes will remain in position and then other shapes will be evenly spaced, according to which additional option is chosen. All options, with screenshots, are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



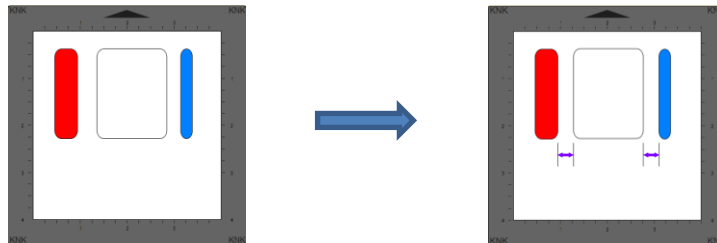
- ◇ **Distribute Center Horizontally:** spaces shapes so that the centers of each shape are the same distance apart:



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

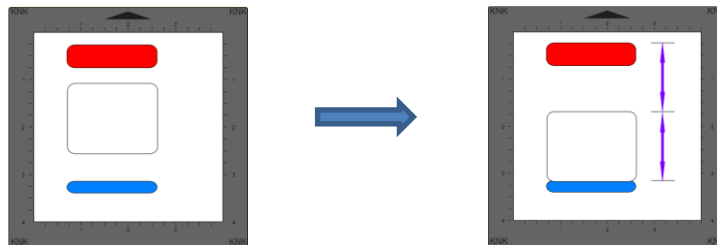


- ◇ **Distribute Space Horizontally:** spaces shapes so that the gaps between the shapes are the same.

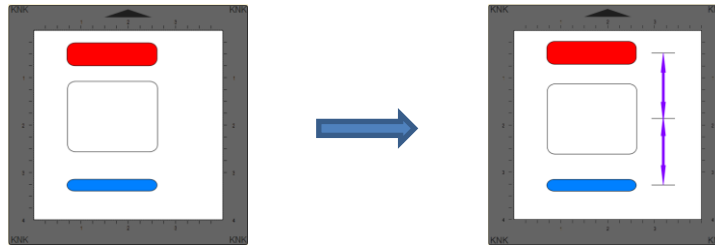


- With the shapes selected, the vertical distribute options are:

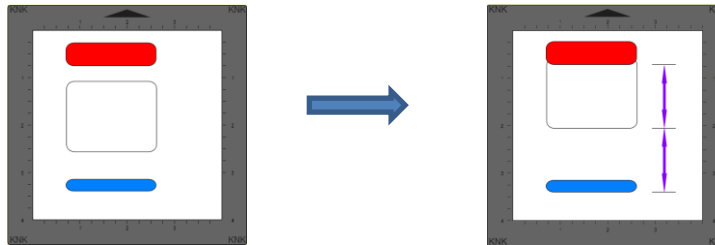
- ◇ **Distribute Top:** spaces shapes so that the top sides of each shape are the same distance apart:



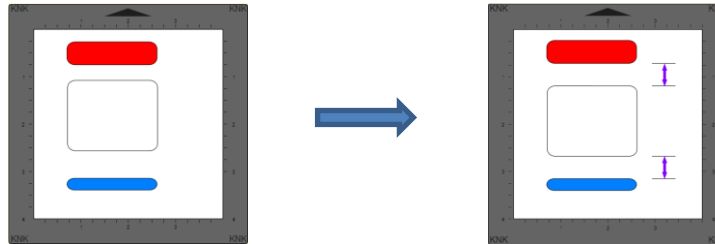
- ◇ **Distribute Center Vertically:** spaces shapes so that the centers of each shape are the same distance apart:



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

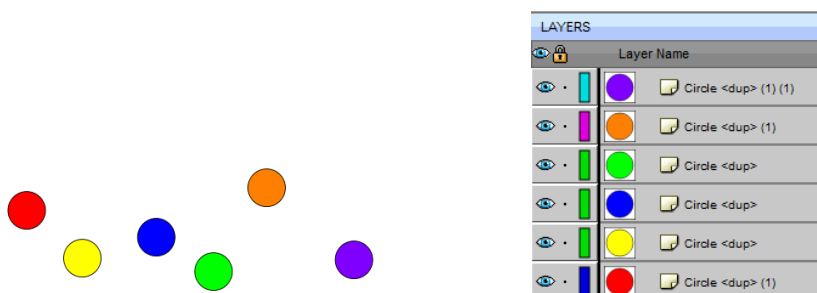


- ◇ **Distribute Space Vertically:** spaces shapes so that the gaps between the shapes are the same.

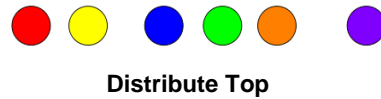
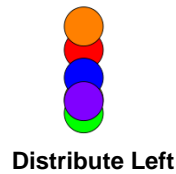


### 5.18.3 Distribute to Selection Below

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

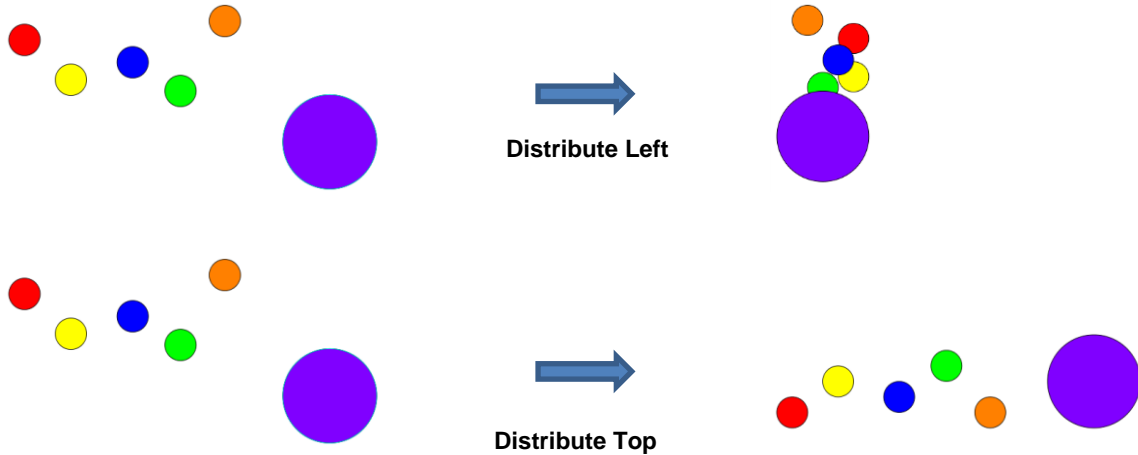


- ◇ Applying **Distribute Left** will move all of the circles to align with the left side of the red one. Applying **Distribute Top** will move all of the circles to align with the top side of the red one. Because the circles are all the same size, there is no spacing applied, only alignment:



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

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



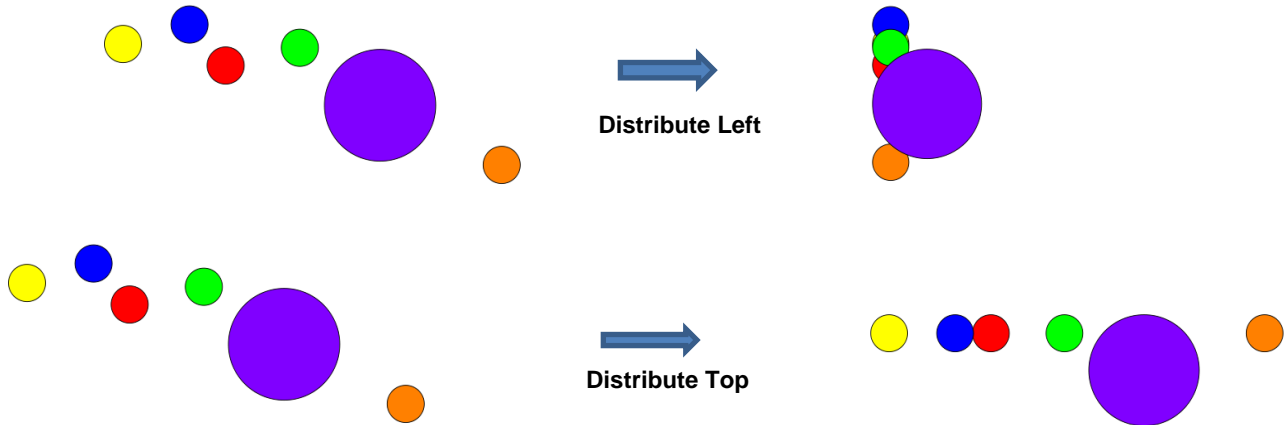
- ◇ **Distribute Left:** The new location for the 3" purple circle is now 2" to the left of the 1" red circle, which was, again, the bottommost shape. The 2" is a result of subtracting 1" from 3". The locations of the other circles are an equal spacing of that 2 inches, however note that one of the circles,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

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

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

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


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



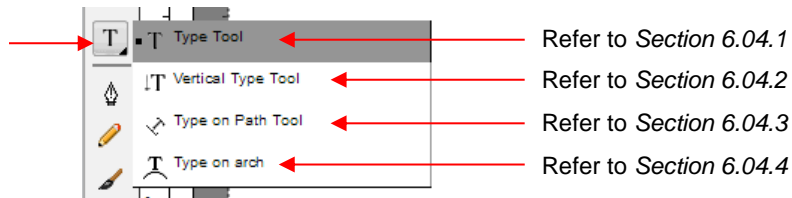
- At this time, no further details will be presented. However, if a practical application comes to light, I will be happy to include it.

## 6. SCAL: Working with Text

### 6.01 Text Options


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

Click and hold left mouse button here:



### 6.02 Selecting a Font

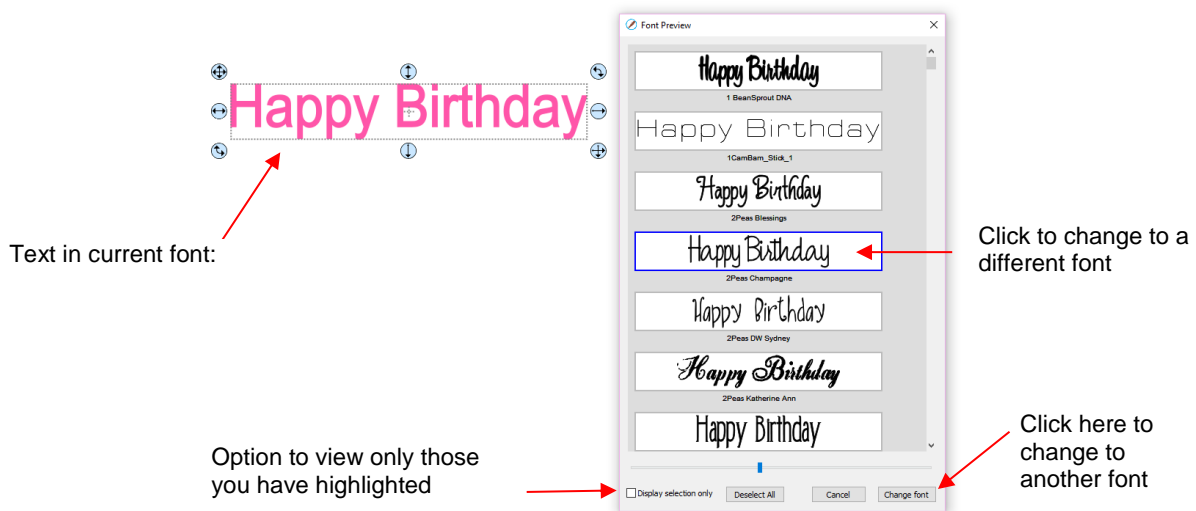
#### 6.02.1 Choosing a Font from the Font Menu

- There are three places to select the font:
  - ◇ Click the **Text Settings** icon  on the **Properties Panel** to open the **Text Panel**. Select from the **Font** drop-down menu.
  - ◇ Go to **Text>Font**
  - ◇ Click on the **Fonts** tab in the **Library** (refer to *Section 4.03.2*).
- If you are looking for a particular font in any of those three menus, type the first letter of the font name and you will be taken to the fonts that begin with that letter.

#### 6.02.2 Choosing a Font via Font Preview

- To view the text you're using in different fonts, first type out the text using the instructions in *Sections 6.03 and 6.04*. Then select the text and go to **Text>Font Preview**. There you can scroll through all of the fonts currently installed in SCAL to view others you might prefer:



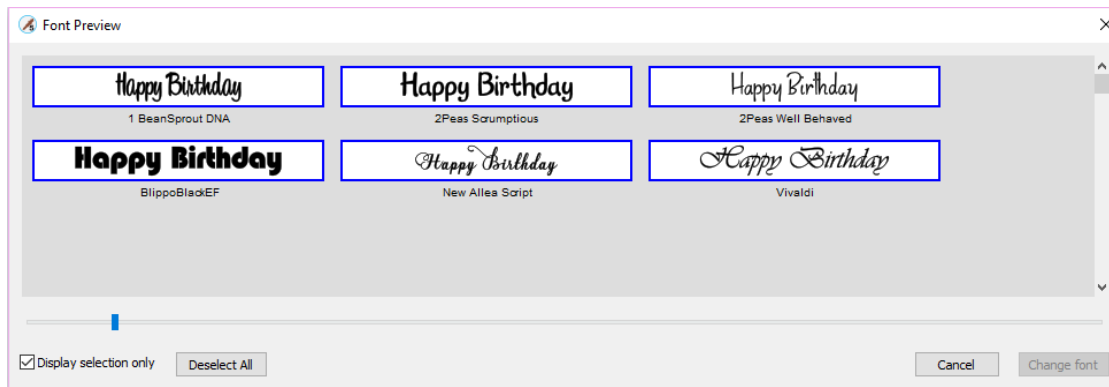


- You can expand this window and decrease the size of the fonts by scrolling the size bar to view more samples. Also, you can highlight those of interest and then click **Display selection only** to more easily decide which ones you might like to use:

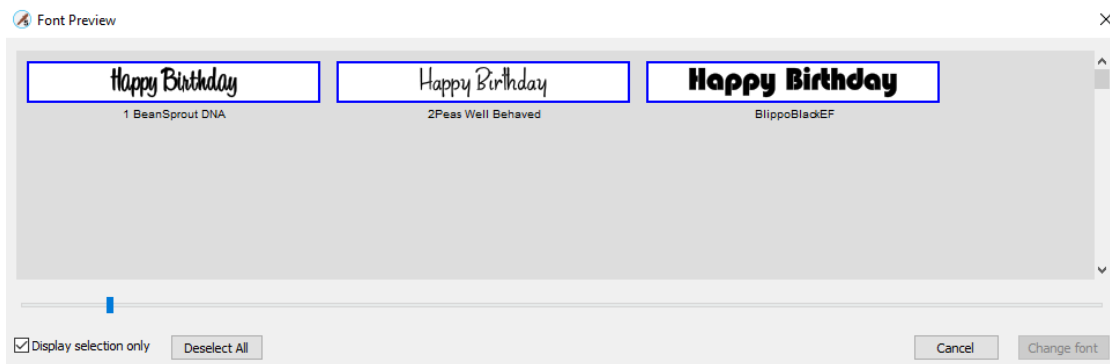
◇ Expand the window and highlight those you want to further compare:



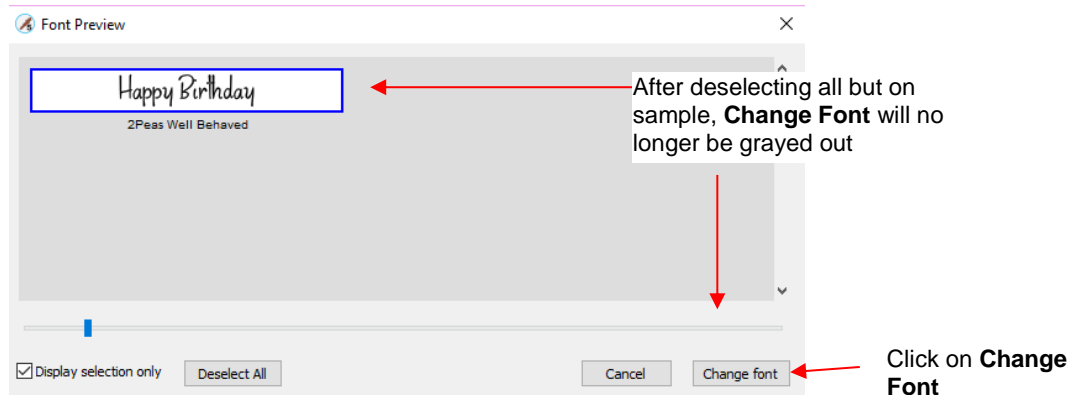
- ◇ After scrolling through fonts and highlighting only those of further interest, click on **Display selected only**:



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



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



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

Happy Birthday

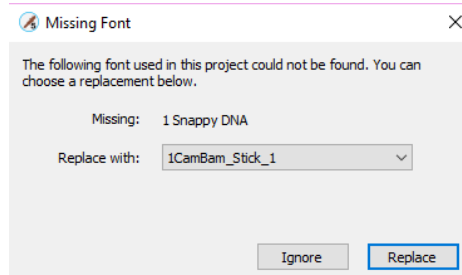
### 6.02.3 Temporarily Installing a Font

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

◇ Go to **Text>Load Font File**

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

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



◇ Two options are provided:



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

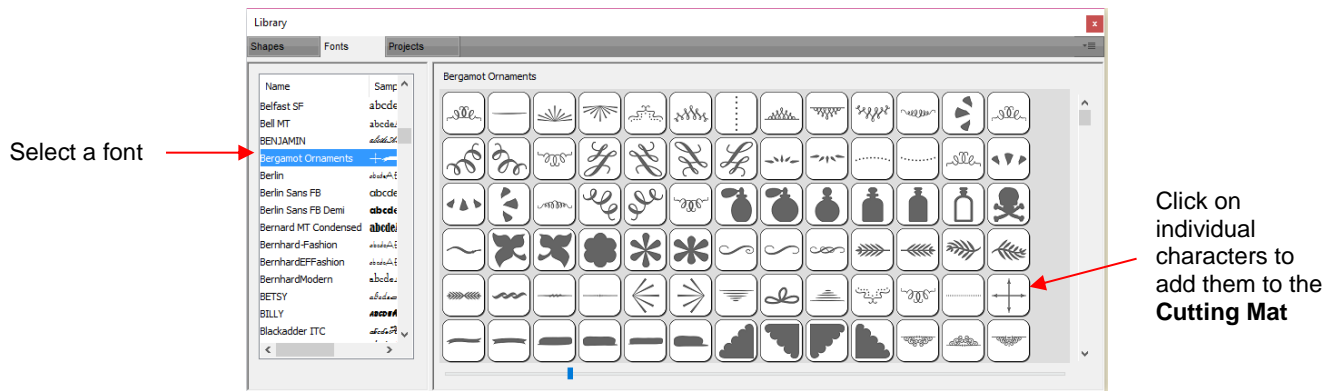
◇ If you have no plans to edit the text, then you can avoid the message by converting text before saving the file. To do this, select the text and apply one of the following:

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

## **6.03 Adding Text Options**

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

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





## 6.04 Four Modes of Text

### 6.04.1 Type Tool

Jay  
McCauley



Max  
McCauley

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

### 6.04.2 Vertical Type Tool

J  
a  
y

M  
a  
x


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

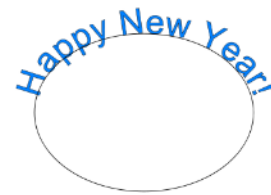
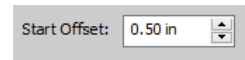
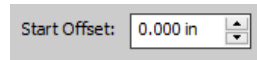
### 6.04.3 Type on Path Tool




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



- To use this function:
  - ◇ Add the shape to the **Cutting Mat**.
  - ◇ Hold down the mouse button on the **Type Tool** icon  on the **Tools Panel** and select the third choice: **Type on Path Tool**.
  - ◇ Click on or inside the shape and begin typing. In the **Tools Options**, a setting appears which allows you to move the start point for the text further along the path. Otherwise it will start at the leftmost side:



- ◇ 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.



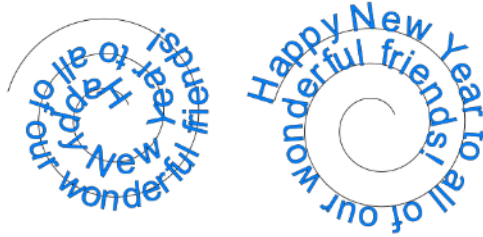
- If you want the text on the inside of the shape:
  - ◇ First apply **Path>Reverse Path** to the shape. Then type the text:



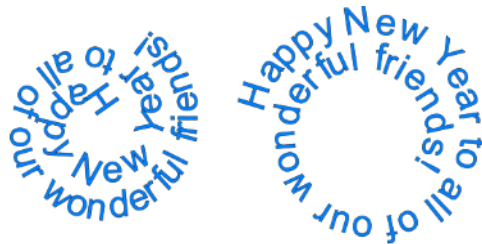
- ◇ Again, use **Text>Convert Text to Outlines** to delete the path:



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




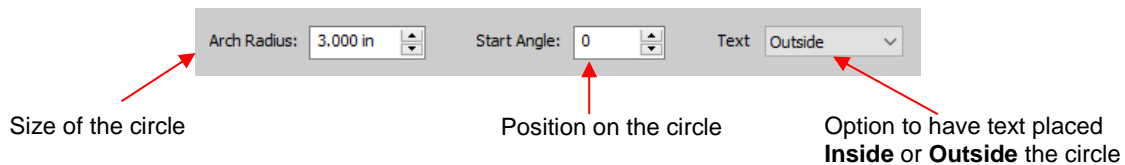
- ◊ After applying **Text>Convert Text to Outlines**:



#### 6.04.4 Type on Arch Tool

Max and Jay

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

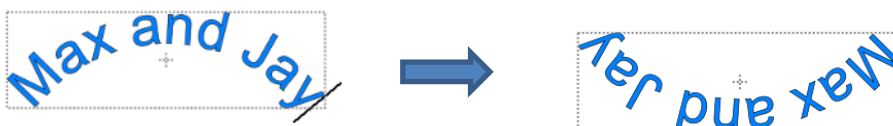


- For example:

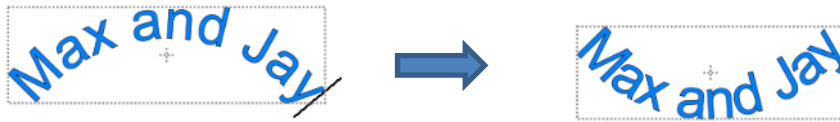
Decreasing the **Arch Radius** from 1.0 to 2.0:



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





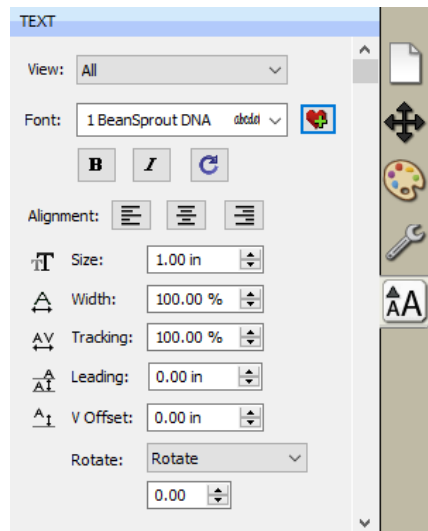
Changing **Text** from **Outside** to **Inside**:




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

## 6.05 Text Settings

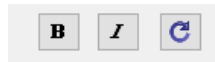
- The **Text Settings** window offers an array of settings related to the creation and editing of text:
  - ◊ Before typing text, make changes in this window so that they will be in place when text is then typed.
  - ◊ For existing text, drag your mouse to highlight the letters and then change settings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



Click here to open  
**Text Panel**

- The following is a list of these settings and how to apply them. Note that if the text is already typed, you can highlight all or only a portion of the text for the change.
  - ◊ **View:** Controls which fonts show in the menu under **Font**:
    - **All:** Displays all installed fonts plus any that have been temporarily installed during this session of SCAL
    - **Favorites:** Displays all fonts you have assigned as a **Favorite** in the **Library**
    - **This Project:** Displays all fonts currently used since starting this particular project during this session
  - ◊ **Font:** Menu of fonts which can be used for new or existing text. Note that you can also add to your **Favorites** list by selecting a font and then clicking on the  icon to the right.

◇ **Bold Italic Reload:**



- **IMPORTANT:** Some fonts will change significantly if the **Bold** option is selected. The same is true of the **Italic** option. Make sure these icons are not indented/blue unless you are confident you want to use either or both of them.
- **Reload** is only needed if you have separately installed new fonts on your computer since opening the current SCAL session.

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



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

KNK Force      KNK Force      KNK Force

Tracking: 100%      Tracking: 120%      Tracking: 80%

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

KNK Force      KNK Force

& Zing Orbit      & Zing Orbit

Leading: 0 inches      Leading: 0.2 inches

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

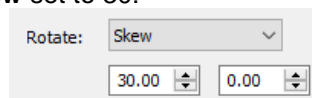
KNK Force & Zing Orbit

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

KNK Force & Zing Orbit

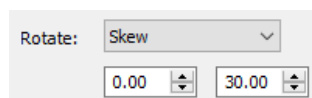
- ◇ **Skew:** In the same menu with **Rotate** is the **Skew** option which can also be applied to a line of text or to individual letters. There are two settings: one for X axis skew and one for Y axis skew:

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



KNK Zing Orbit

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



KNK Zing Orbit



## 6.06 Other Text Editing

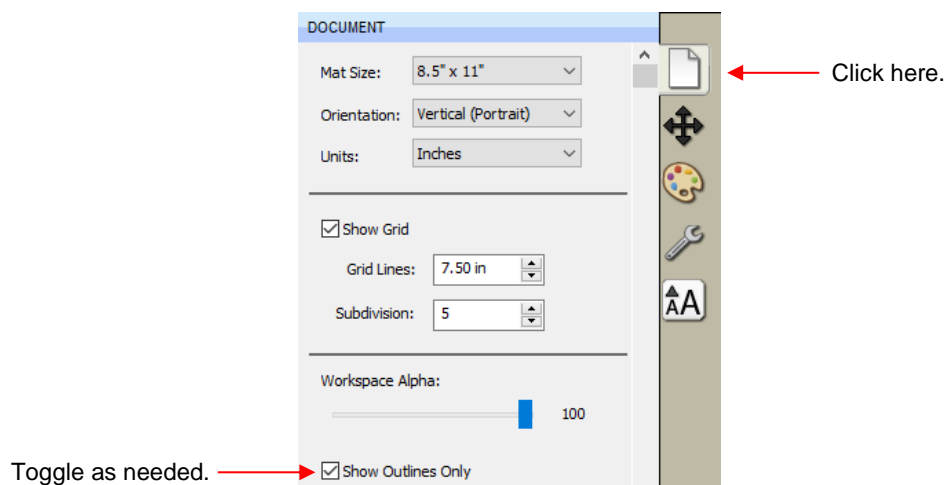
- **Ungroup:** To split a selection of text into individual letters, apply the **Ungroup** function using one of the following ways:
  - ◇ Right-click and select **Ungroup** from the popup menu
  - ◇ Go to **Object>Ungroup**
  - ◇ Apply **Ctrl+Shift+G**
- **Break:** To break a selection of text into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

## 6.07 Creating a Connected Letter Title

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

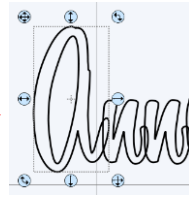
Happy Anniversary

- Because you will be working with the letters individually, select the title and apply **Ungroup** (*Section 6.06*).
- With the letters split, you can select one or more and use the left and right arrow keys to change the spacing between letters, overlapping as desired. It is advisable to zoom in on the text to get a more accurate view of the actual positioning of the letters. You may also want to check the text both with and without **Show Outlines Only** option turned on (which can be changed on the **Document Panel**):



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

Drag this icon so that letter can only move horizontally.



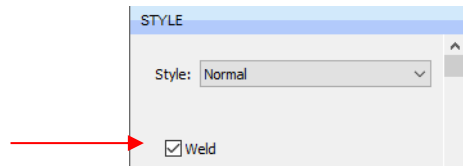
- Continue arranging letters as desired. Remember that you can customize freely to get the desired look. For example, in this font called 1 Bean Sprout DNA, the vowels tend to be a bit oversized compared to other characters in the font. Thus, the uppercase “A” can be sized smaller to better match the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



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



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



- To create an outline/shadow for titles and other shapes or if you need to thicken a font that turns out to be too thin for cutting, refer to *Section 9.04*.

## **6.08 Incorporating Shapes into a Title**

- A quick way to incorporate a shape into a welded title is to use any of thousands of dingbat fonts available from the Internet for free or even check the **SCAL Library** for a shape. In this example, a script font is being used for the title and a turkey, found in the **Library** under the *Fall* folder, will be used for the shape.
- Using the steps in *Section 6.04.1*, create the title:

Happy Thanksgiving

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

Happy Thanksgiving

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



- Go to **Path>Union** or press **Ctrl+Shift+U** to remove the overlap:



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

## 6.09 Welding Titles in Imaginative Ways

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

Billy

Type the letters



Billy

Overlap the letters



Bty

Weld the letters – undesirable result

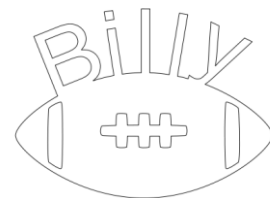
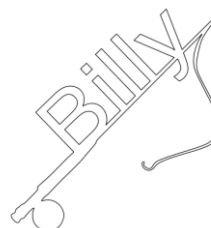
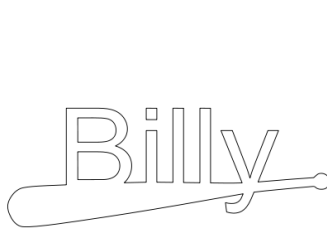
- Most crafters will start looking for a different font... one with ligatures (extenders) that easily connect the letters to one another. However, many fonts with ligatures are script fonts and may not convey the desired look. Instead, look for objects that can be used to connect the letters. A basic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

Billy



Billy

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



## 6.10 Stenciling Letters


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



After cutting and lifting the stencil from the mat, the interior

Teddy

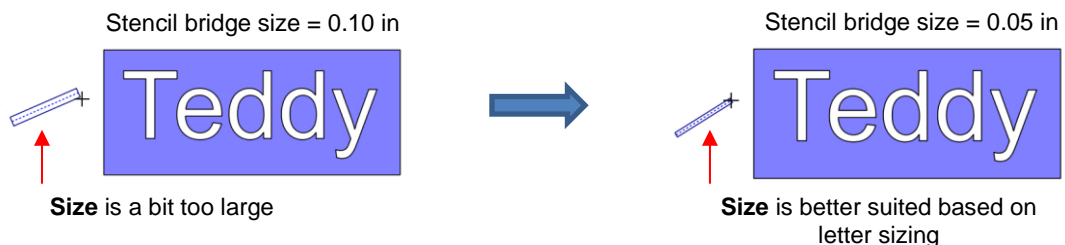
Teddy

- To avoid this, a procedure called stenciling can be used to connect the area outside of the letters to the child shapes, essentially eliminating them. There is a feature on the **Tools Panel** called the **Stencil Bridge** which can be used to connect the interior parts to the surrounding area.
- Before using this function, select the text and go to **Object>Ungroup**. Failure to do this can cause distortion of other letters as the stencil function is applied. Then click on the **Stencil Bridge** icon .

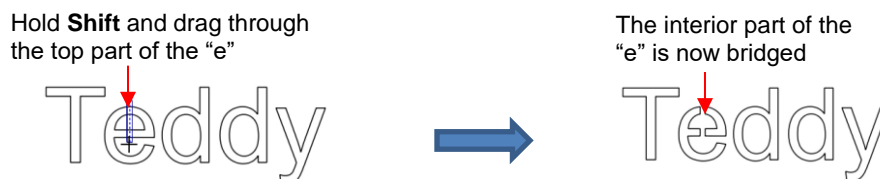
- Zoom in close on the lettering so that you'll be able to see exactly where you need to connect. Click on the **Stencil Bridge** icon and, in the **Tools Options** at the top, a setting for the width or thickness of the bridge can be set:



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



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



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

Teddy

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

Teddy

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



Completed stencil

### 6.11 Open Path Fonts (OPF)

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



TTF version



OPF version of the same font

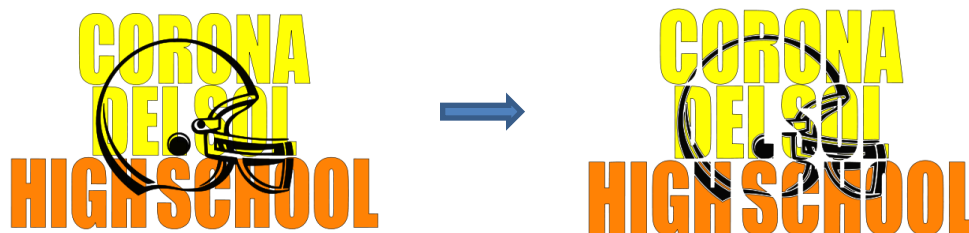
- These fonts are useful when using a pen or engraving tool in your cutter or for designing single line rhinestone titles:



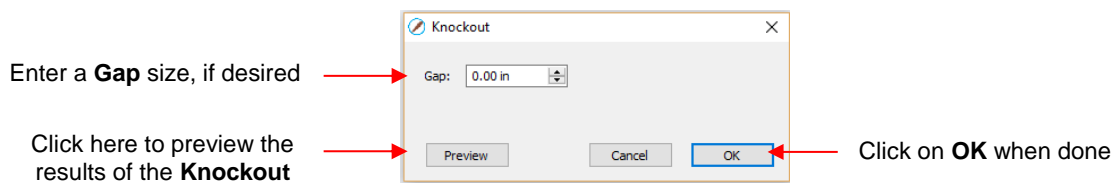
- Currently, this font type only works in a few applications like SCAL and does not install into Windows or on a Mac O/S for use in programs such as Word.
- To try out using Open Path Fonts, there are some free ones to download here:  
<http://www.iloveknk.com/Support/Software/Open-Path-Fonts/>
- Because these are open path, they may not appear on the **Cutting Mat** when you first add them. You will need to select a **Stroke** color on the **Fill & Stroke Panel**. Refer to *Section 5.14*.
- You can purchase Open Path Fonts (also called Thin Fonts) from [www.letteringdelights.com](http://www.letteringdelights.com) and from [www.onlinefonts.com](http://www.onlinefonts.com) to use in SCAL. Note that these also come with the TTF equivalents, which are not actual single lines and curves, but are still very thin.

### 6.12 Knockout

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



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



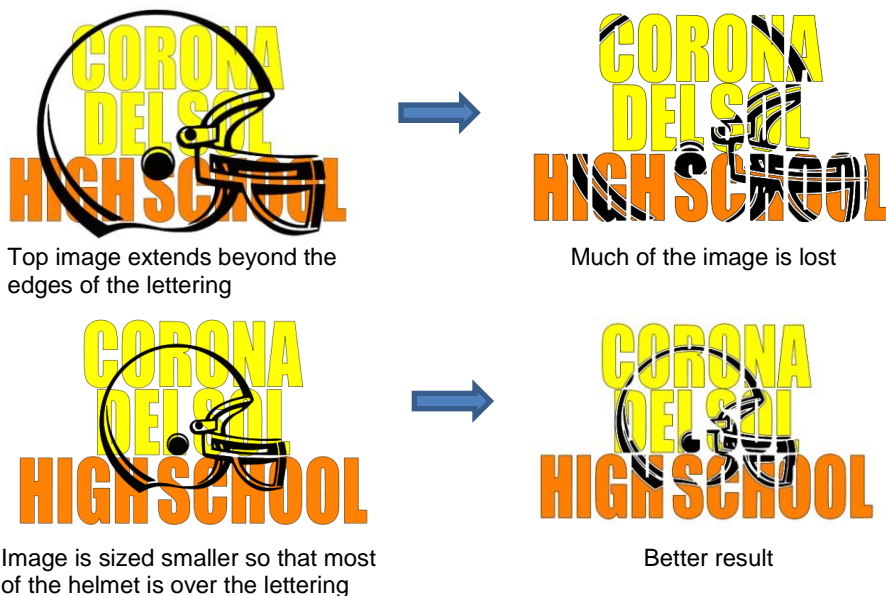
- The **Gap** will create an offset between the top image and the bottom image. This is not only pleasing to the eye but also makes alignment of two layers of HTV easier to manage. Here's an example showing how the gap affects the overall appearance:



- IMPORTANT!** When you click on **Preview**, it will take a few seconds or longer for the image to update. Be patient. Also, in cases where you have multiple images on top, such as the hearts in the prior screenshot, it is recommended that those shapes be joined first using **Object>Merge**.
- When preparing text, you want as little "white space" as possible. Thus, here are some guidelines:
  - ◇ Select a thick dark font. In the examples in this section, *Impact* was used.
  - ◇ After creating the text, move rows of letters together until they almost touch.
  - ◇ Reduce spacing between words, but make sure the text is still readable.
  - ◇ The text does not need to be all one shape. Thus, you can recolor parts of it if you wish.



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



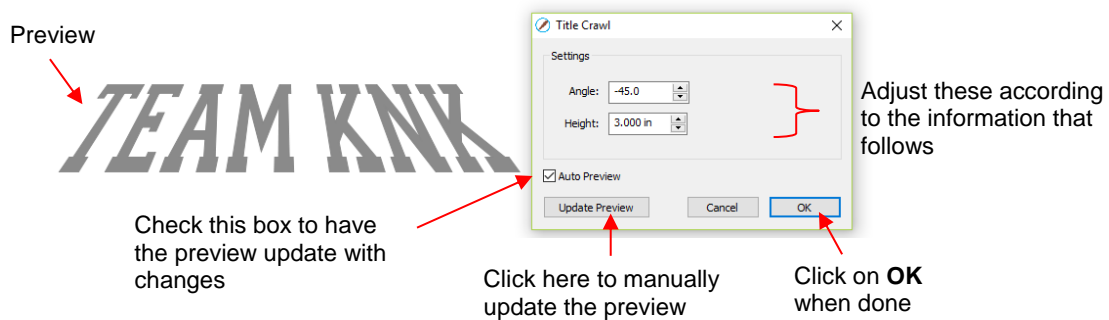
- Note that the **Knockout** function isn't just for text. It can be used on any vector shapes. Because it is so popular with lettering, its presentation in this chapter seemed appropriate.

### 6.13 Title Crawl

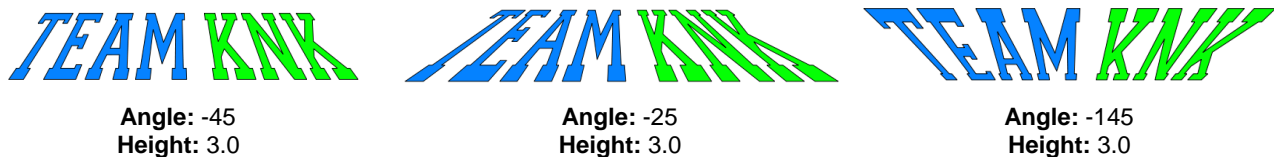
- Title Crawl** distorts text (or any shape) so that it appears to be stretching towards you or away from you:



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



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



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



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

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

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

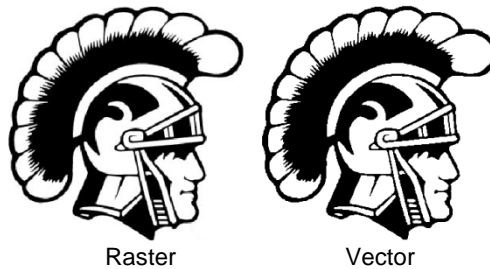
SCAL offers many other design functions to customize text for your projects. Refer to *Sections 9.12 – 9.17* for more ideas.



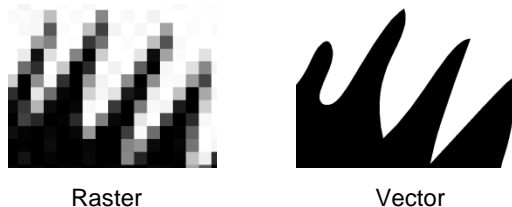
## 7. SCAL: Tracing and Drawing

### 7.01 Raster versus Vector

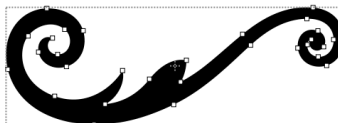
- All graphics are either raster or vector and there is no third type. While you can often tell by the file format, even that isn't always a good way to know for certain. For example, a PDF file can be made from either raster images or vector images and some PDF's will contain both types.
- You may not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



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



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



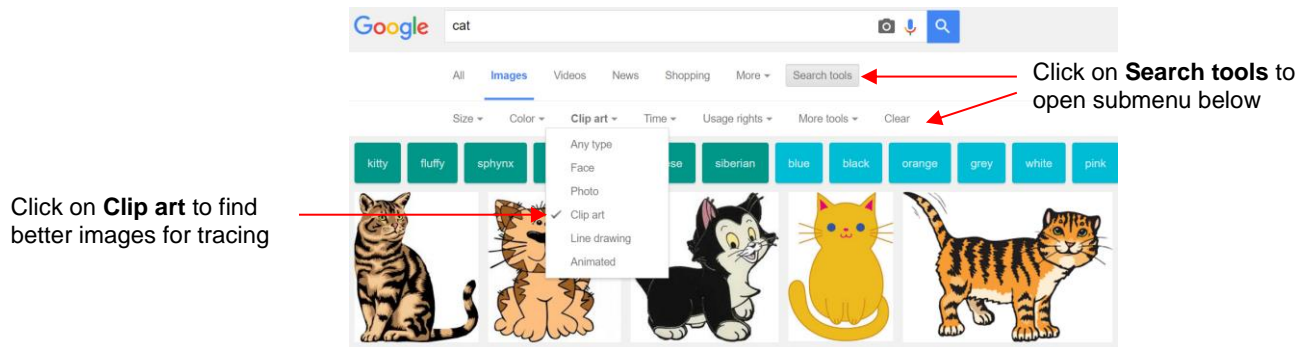
- As mentioned earlier, you can often tell whether a file is a raster or a vector based on the file format. Here are some guidelines:

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

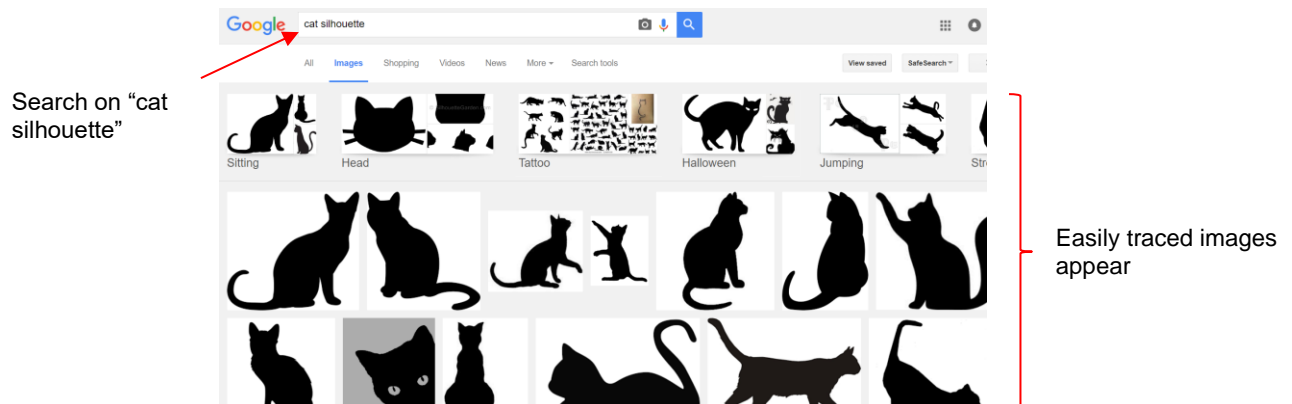
- To convert a raster into a vector, SCAL offers both an automatic and a manual trace function. Because the automatic **Trace** feature in SCAL is so fast and powerful, it is always worth trying it first. The only situation in which it may not be able to provide the results you need are (1) the image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

## 7.02 Finding Easy Images to Trace

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



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




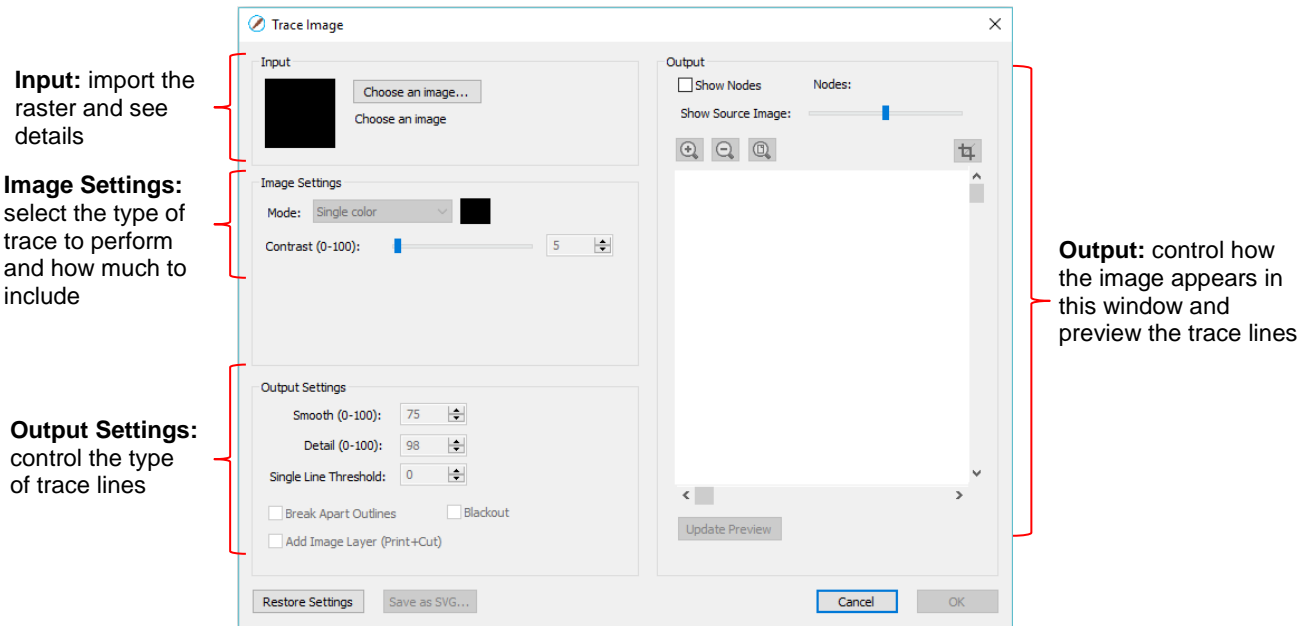
- When you find an image you want to trace, click on it first to bring up a larger version. Then right-click and select **Save image as** from the popup menu. Note: If you use a browser other than Chrome, the popup menu may have slightly different wording for saving a file.
- IMPORTANT!** Before tracing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

## 7.03 Trace Function

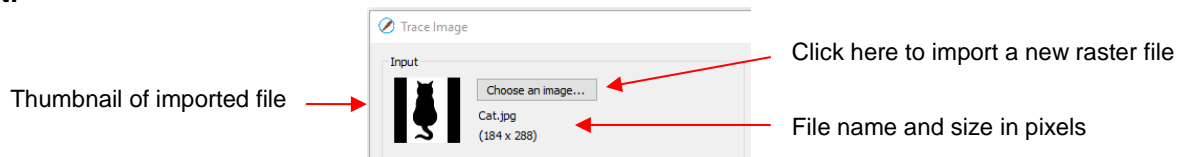
Images used in this tutorial can be downloaded at: <http://iloveknk.com/Images/>

### 7.03.1 Trace Settings

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



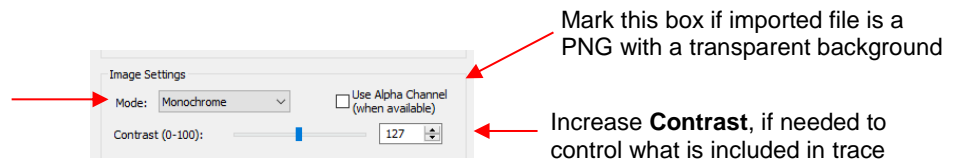
- Input:**



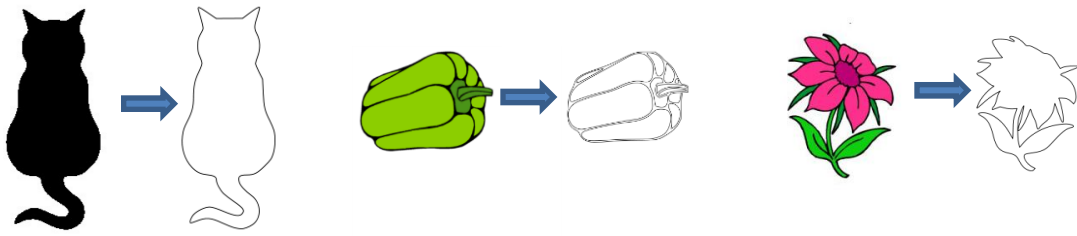
- Alternatively, before opening the **Trace Image** window, you can import the raster file using **File>Place Image**. Then, with the image selected, open the **Trace Image** window and this image will be loaded and ready for changes to trace settings.

- Image Settings:**

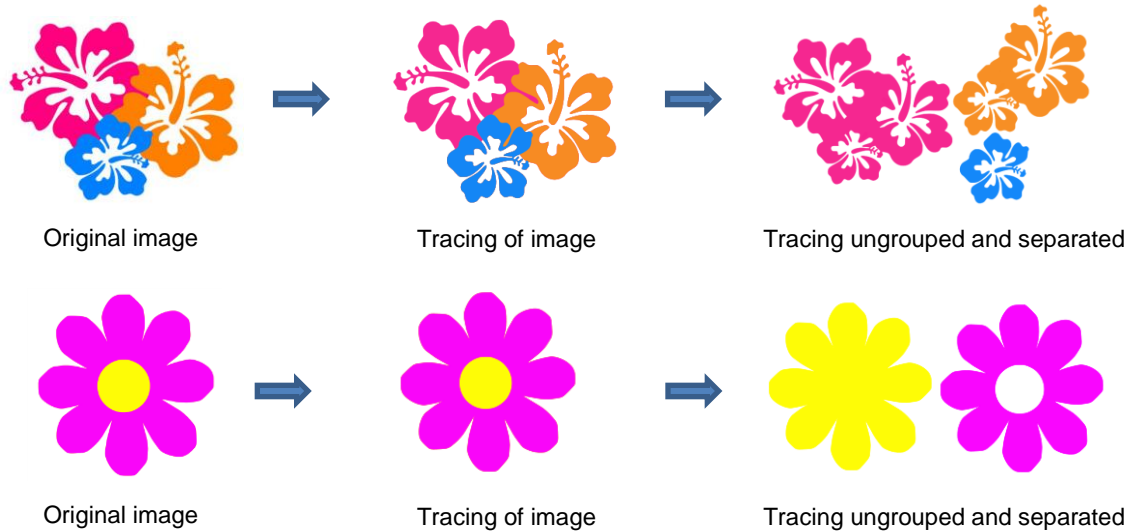
Choose from three modes:  
**Monochrome**, **Color Layers**, or **Single Color**



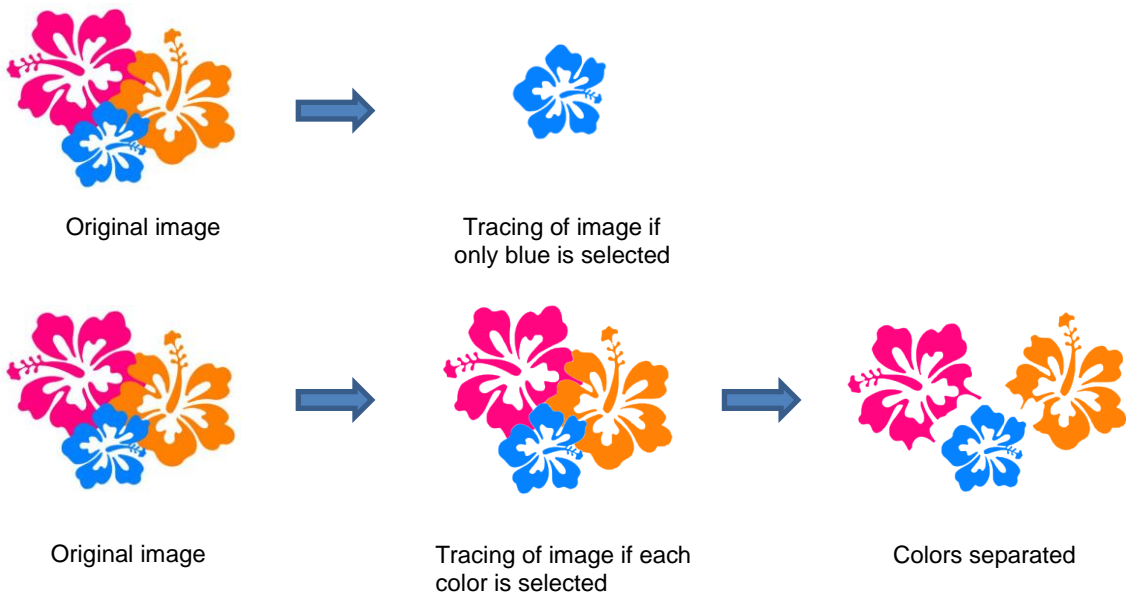
- The **Mode** you choose is determined by the desired outcome / project application, as follows:
  - Monochrome:** choose this mode when you only need a black and white trace of the image:



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



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





Original image



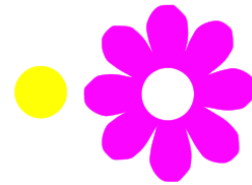
Tracing of image if only pink is selected



Original image



Tracing of image if each color is selected



Colors separated

- ◇ Check the **Use Alpha Channel** box if the imported file is a PNG file with a transparent background. The transparent background is easily identified by the trace program requiring very little adjustment to other settings.
- ◇ **Contrast** controls the level of color differentiation included in the trace: lower will include less, higher will include more.

#### • Output Settings:

Sharp or smooth curves →

Prevent double line tracing →

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

Output Settings

Smooth (0-100):

Detail (0-100):

Single Line Threshold:

☐ Break Apart Outlines    ☐ Blackout

☐ Add Image Layer (Print+Cut)

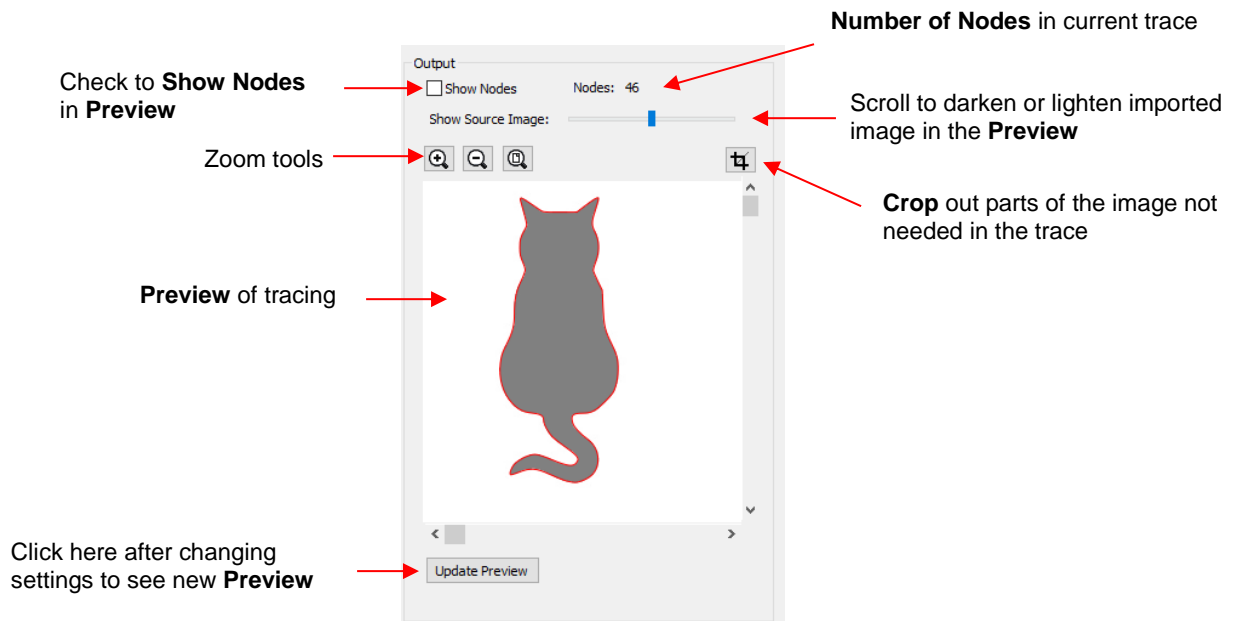
Use to filter out small specks

Use to remove child shapes

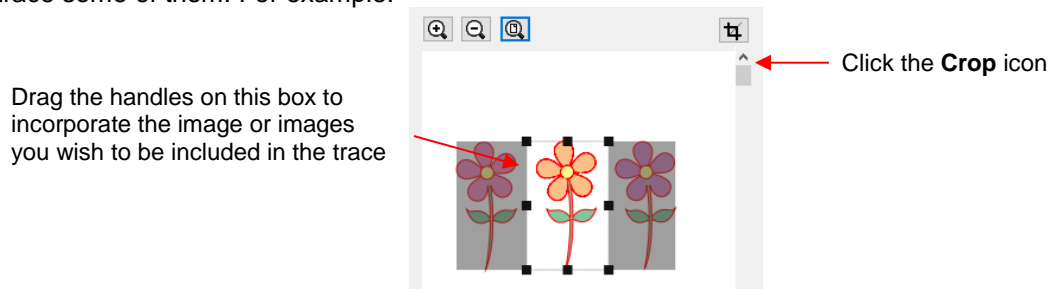
Include the original image

- ◇ **Smooth:** Adjust according to type of image. For example, decrease (make sharper) if tracing a shape with sharp corners like an envelope template. Increase (make smoother) if tracing a shape with soft curves, like a teddy bear. Refer to *Section 7.03.3*.
- ◇ **Detail:** If tiny undesired shapes appear, decrease to filter those shapes out.
- ◇ **Single Line Threshold:** When tracing coloring book images (image with black outlines), use to convert those double lines to single lines.
- ◇ **Break Apart Outlines:** Checking the **Break Apart Outlines** box will save a step if different parts of the tracing need to be edited separately or placed on separate layers.
- ◇ **Blackout:** Check this box so that internal shapes (child shapes) are not included in the tracing.
- ◇ **Add Image Layer:** Check this box if a copy of the imported image will be needed, such as for a print and cut application. The result will be two layers grouped: one will be labeled "Print" and the other layer will be labeled "Cut."

- **Output:**

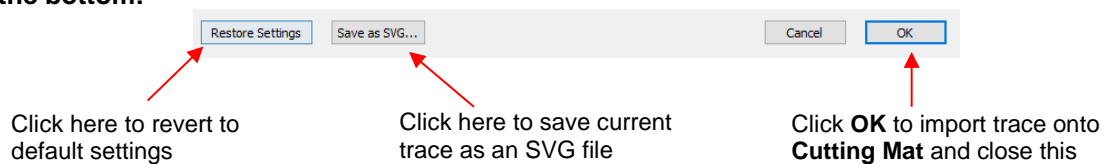


- ◇ None of the settings in the **Output** section affect the final result, with the exception of the **Crop** function. The other settings only affect the **Preview** so adjust as desired.
- ◇ When you click on the **Crop** icon, a rectangle will appear that can be resized to fit around the desired part of the image. This is useful when there are multiple images in a raster file and you only want to trace some of them. For example:



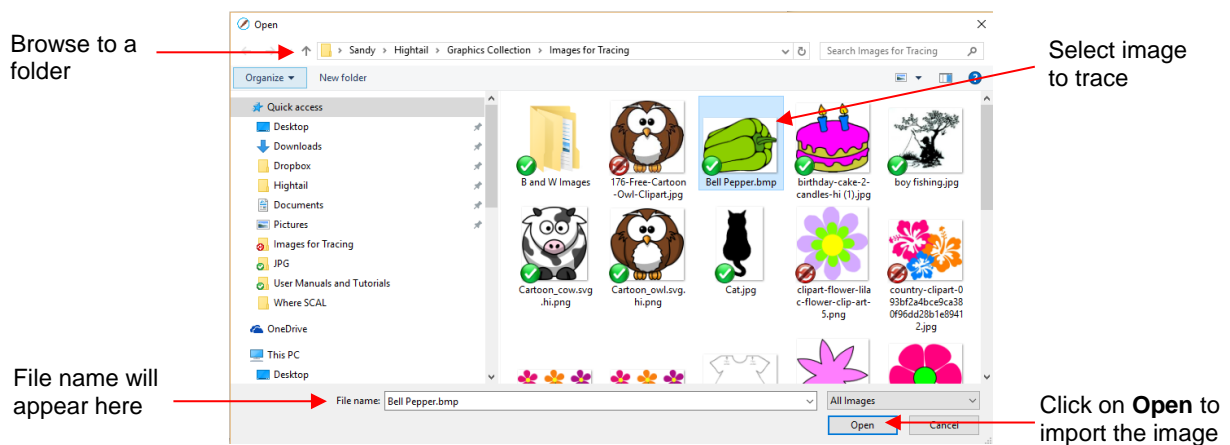
- ◇ Note that the red lines in and around shapes in the **Preview** window indicate the actual trace lines as a result of current settings

- **At the bottom:**

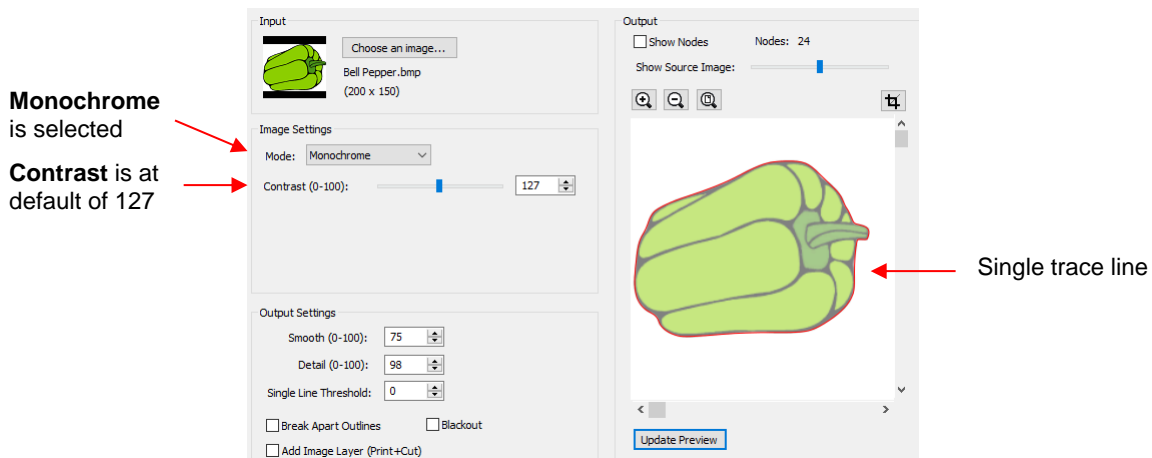


### 7.03.2 Monochrome Trace of a Colored Image: Effects of Contrast

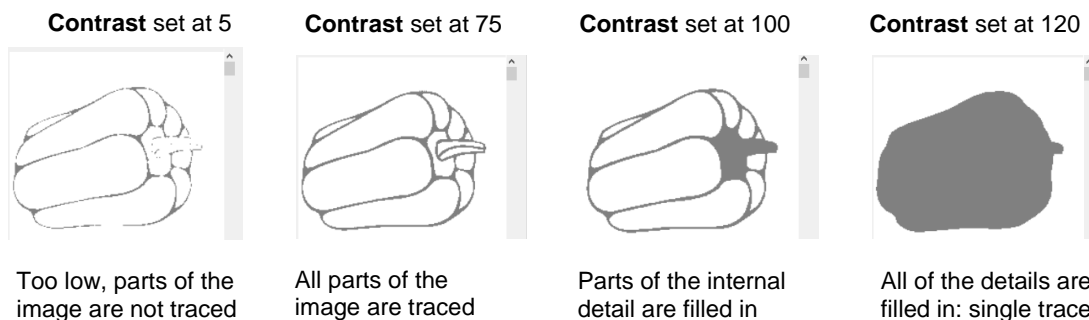
- Start by clicking on **Choose an image** in the **Input** section and then browse to locate the raster file you wish to trace:



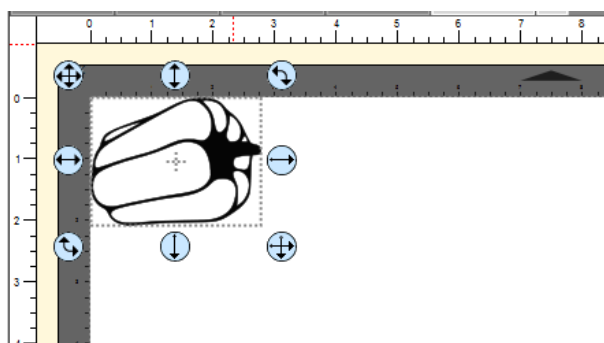
- In this example, a bell pepper image is imported for tracing and the **Preview** indicates a single trace path around the image:



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

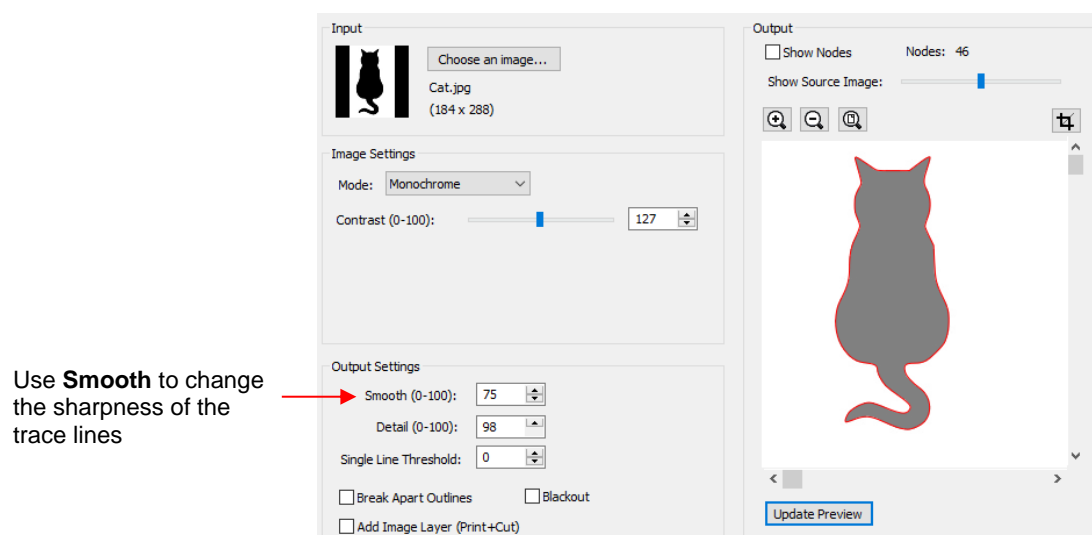


- Thus, for any given image, scroll the **Contrast** setting to see the effects and determine which version best suits your project needs. Once satisfied, click on **OK** and the image will appear in the top left corner of the **Cutting Mat**, ready to be resized and cut out:

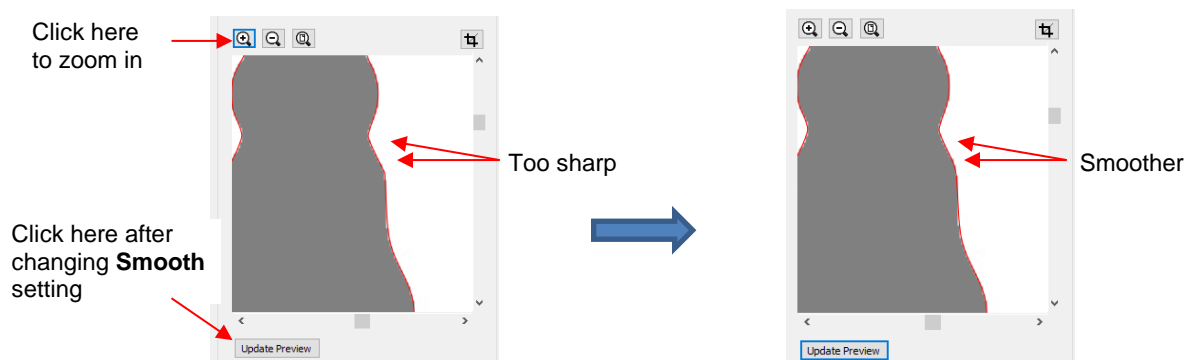


### 7.03.3 Monochrome Trace of a Silhouette Image: Effects of Smooth

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

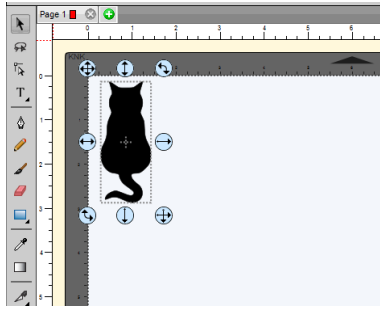


- To soften the outline of the cat, zoom in on that area and then increase the **Smooth** setting until a desired result is obtained. In the following screenshot, the **Smooth** setting is increased from 75 to 85. Remember to click on **Update Preview** after every adjustment to settings:



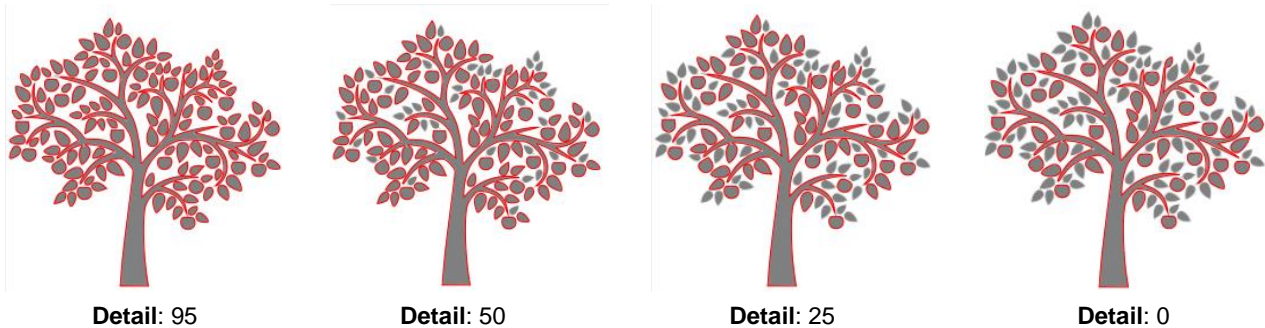
- After clicking on **OK**, the cat shape appears on the **Cutting Mat** and is ready to be sized and cut:





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

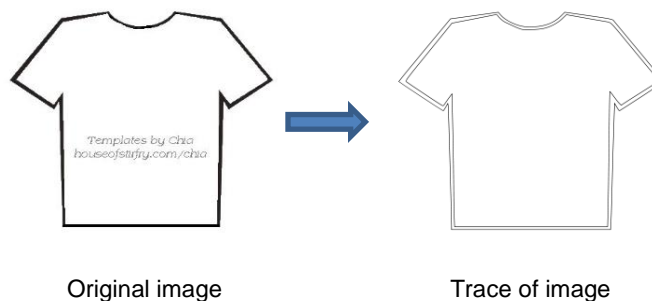
- The **Detail** setting can be used to filter out small shapes. Sometimes these shapes are just random pixels that show up from, say, a dirty scanner bed. Other times they are shapes that make up the design but will be too small to cut and are not needed.
- Before showing examples of the **Detail** effect, note that there will be times when some small shapes might be needed but not all of them. In those situations, it's best to include them and then they can be edited out using other tools in SCAL.
- The following tree image is imported into the **Trace Image** window. You have decided that not all of the leaves needed. The **Detail** setting can be lowered to filter out some of the smaller ones:



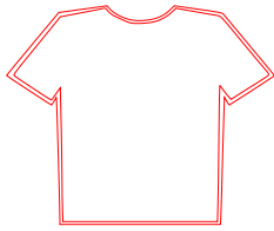
- As shown in the prior screenshot, decreasing **Detail** will remove small shapes. However, even at 0, there are still shapes of a certain size that will be included in the trace. Again, there are editing tools that can be used in case more of the small shapes need to be removed. Refer to *Section 8.06*.

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

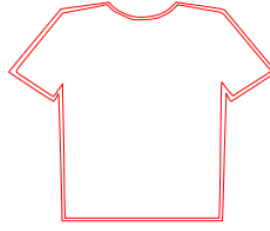
- The **Single Line Threshold** setting is useful when the imported image had a black border around it and you do not want a double line trace. For example, if the following T-shirt image is traced using default settings, two trace lines result: one line is following the outside of the black border while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



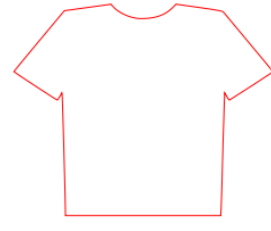
- To have only one trace line, increase the **Single Line Threshold** setting until there is only a single line showing in the **Preview** window:



Single Line Threshold = 0  
double line

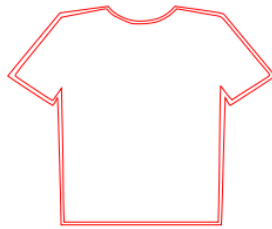


Single Line Threshold = 5  
double line

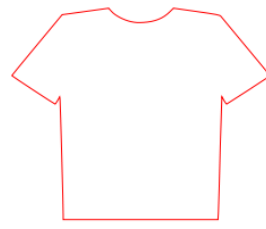


Single Line Threshold = 10  
single line

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

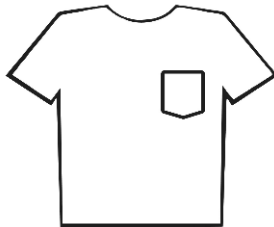


With **Blackout** unchecked

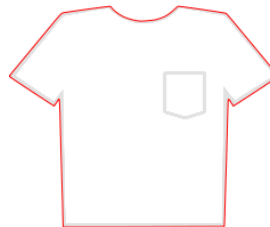


With **Blackout** checked

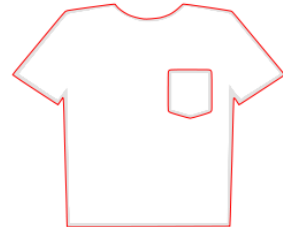
- ◇ However, if the T-shirt had internal details, such as a pocket, then **Blackout** could not be used as the entire pocket would have been ignored. In this situation, **Single Line Threshold** is the better choice:



Original image



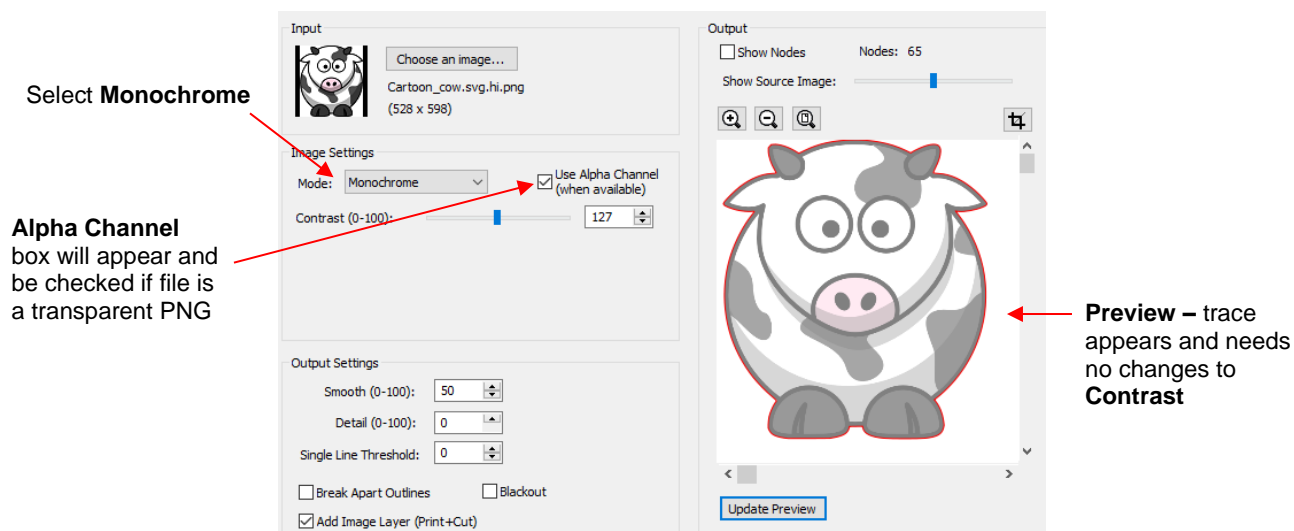
Preview of trace with  
**Blackout** checked



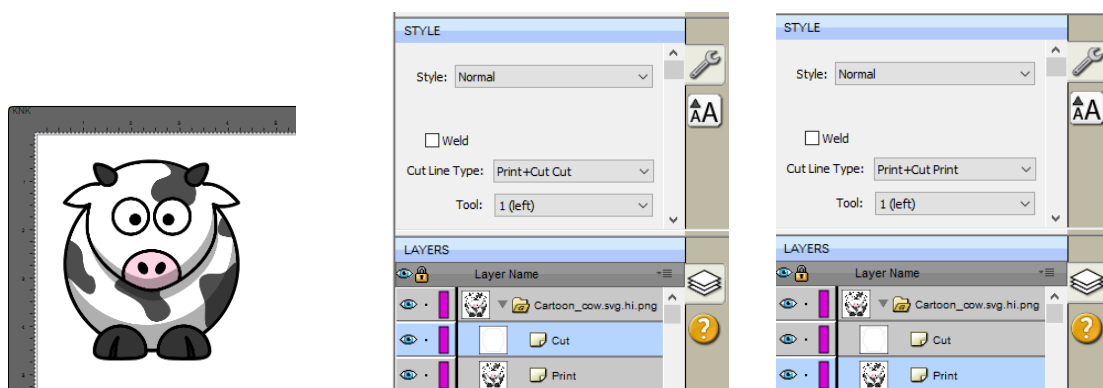
Preview of trace with  
**Single Line Threshold**  
increased

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

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



- Regarding a few of the relevant **Settings**:
  - ◇ **Contrast**: It shouldn't be necessary to adjust this setting because of the transparent background
  - ◇ **Smooth**: In some cases, it might be necessary to decrease **Smooth** to get a tighter fit for a print and cut application. Alternatively, you can also create an **Inset** after the trace, when needed. Refer to the **Inset Offset** option in *Section 8.05*.
  - ◇ **Blackout**: apply if there are internal cut lines that are not needed
  - ◇ **Add Image Layer (Print + Cut)**: Mark this box if you want a second layer with the original image.
- If the **Add Image Layer** option is marked, after clicking on **OK**, the image will appear on the **Cutting Mat** and the **Layers Panel** will indicate which layer is the **Print** and which is the **Cut**. Note that on the **Style Panel**, the **Cut** layer will be designated as **Print+Cut Cut** and the **Print** layer will be designated at **Print+Cut Print**. This means that the **Cut** layer will not be printed and the **Print** layer will not be cut:



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

### 7.03.7 Color Layers Trace

- As mentioned in *Section 7.03.1*, **Color Layers** might be a good mode to choose for a paper piecing or layered vinyl project if you want under-layers present. In this section, a flower that has two shades of pink and two shades of green is chosen:



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

Select **Color layers**

Scroll to select number of colors to identify

Colors identified

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

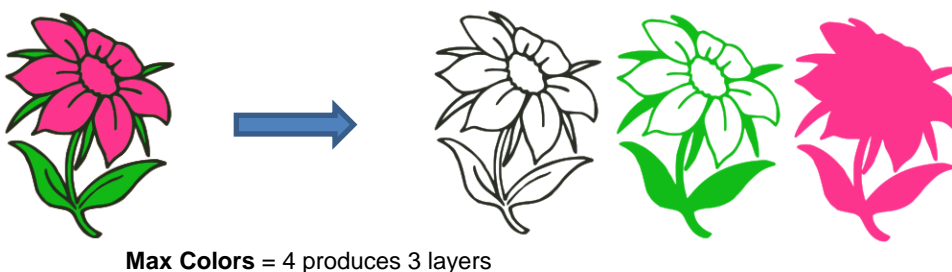
**Preview**

Click here after every change

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

**Max Colors** increased to 6

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

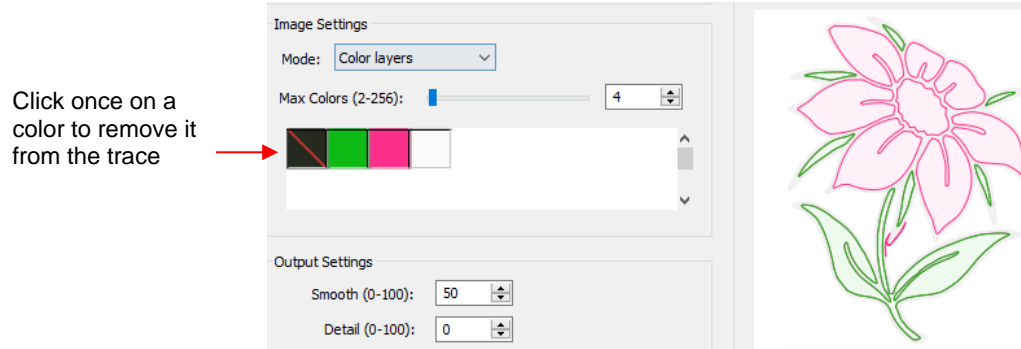


**Max Colors = 4** produces 3 layers

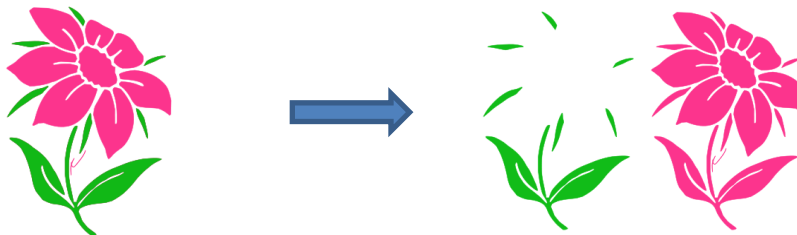


**Max Colors** = 6 produces 5 layers

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



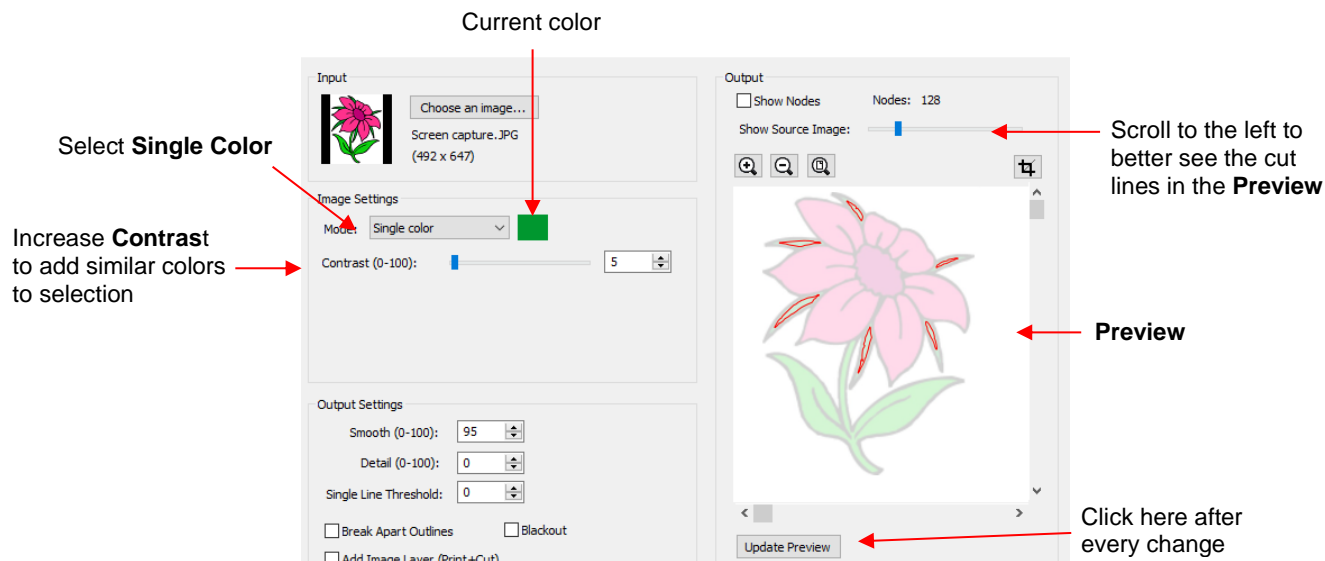
- The result is this:



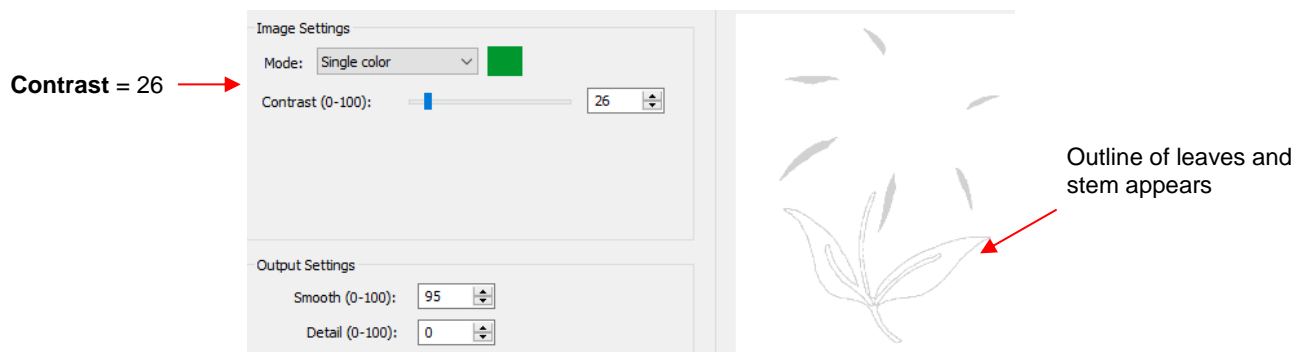
- In simple designs, **Color Layers** can be quick and easy to implement. Realistically, in cases like this image just covered, it might not be easy to layer these detailed cuts perfectly. Thus, the **Single Color** option will more likely be used in most cases.

### **7.03.8 Single Color Trace**

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



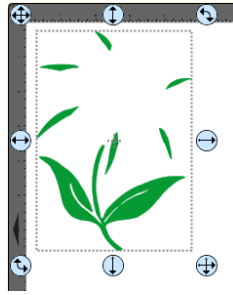
- In the screenshot, the initial color identified was a shade of green. In the **Preview**, you can see how many parts of the flower were included as being in the range of that shade.
  - If you want to add more of the green parts of the flower, then increase the **Contrast**. As you hold down the left mouse button and scroll, the image will turn gray so that you can more clearly see what is being added.
- ◇ With a **Contrast** of 26, the outline of the flower stem and leaf appear:



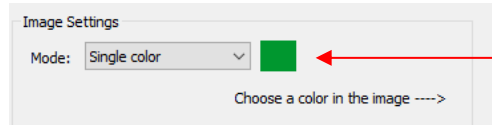
- ◇ With a **Contrast** of 41, the leaves and stem fill:



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

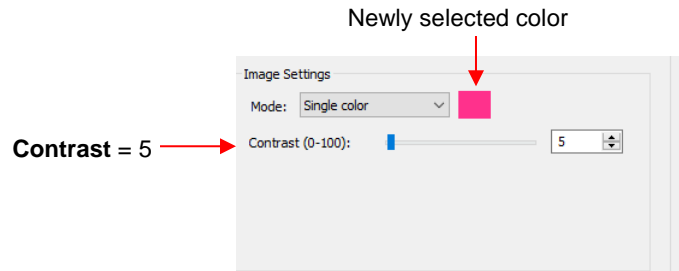


- Now, reopen the **Trace** window, reload the same image and then click on the color box next to **Single Color**. A message will pop up indicating you are to click on another color on the **Preview**:



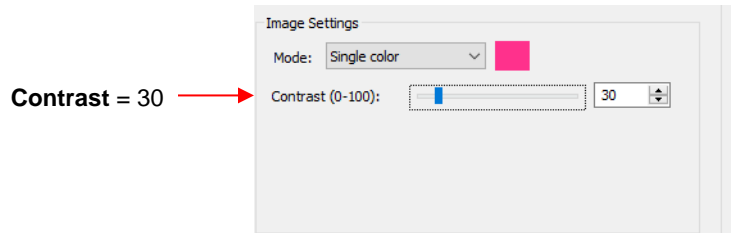
Click on this box

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



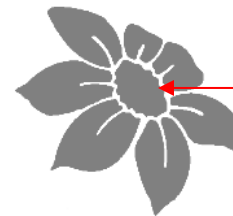
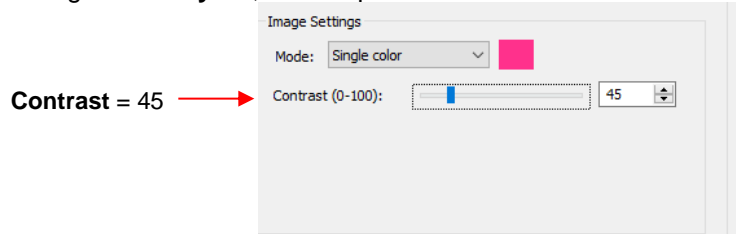
These petals are included in this color

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



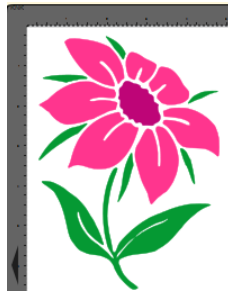
The petals fill out a bit more at a higher **Contrast**

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



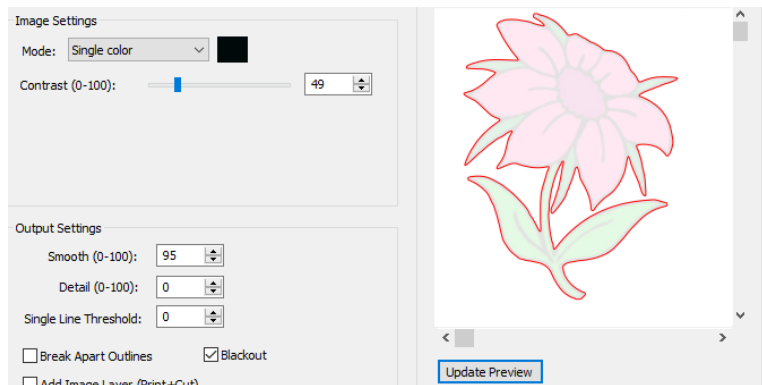
The center of the flower is now added

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

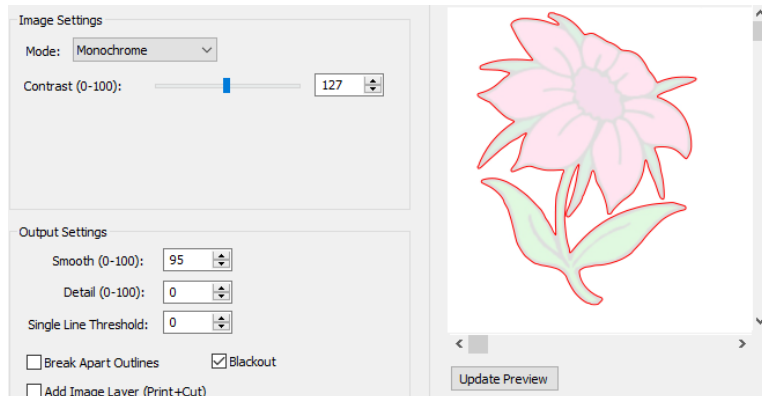


- You now have several options for completing the trace which involves adding a final outline/shadow layer to the flower:

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



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



◇ Option 3: Forgo using the **Trace** window. Select the layers traced so far and use the **Shadow Layer** function to add a black outline. Details of this procedure are covered in *Section 9.04*.


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





## 7.04 Draw Functions

### 7.04.1 The Draw Tool

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

#### Drawing Straight Lines

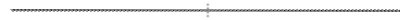
- To draw a single straight line, use your mouse to click once where you want to start the line and click again where you want to end the line. Then immediately press **Esc** or the **Enter** key:



Left click once to begin.



Move cursor to where you want to finish the line.

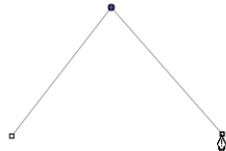


To stop drawing, press **Esc** or the **Enter** key

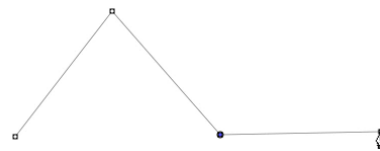
- If you wish to continue drawing a path of connected lines, keep left-clicking each time you need to change directions. Each click produces a node:



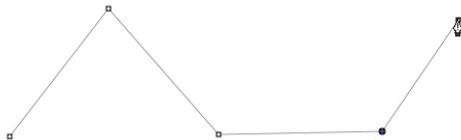
Left click to start and left click at a 2<sup>nd</sup> location



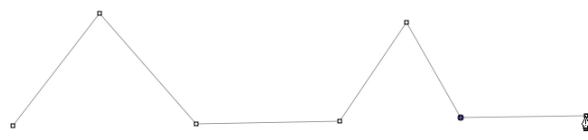
Move to a 3<sup>rd</sup> location and left click again.



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

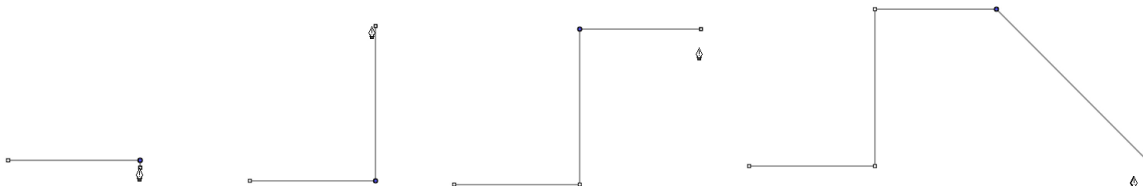


Move to a 5<sup>th</sup> location and left click again.

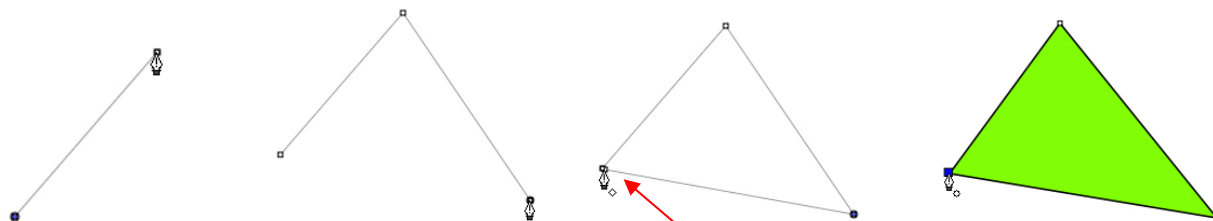


Continue clicking until you are ready to end. Click **Esc** or the press the **Enter** key.

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



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



Left click to start and then left click

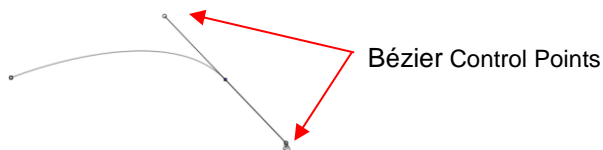
Move to a 3<sup>rd</sup> location and left click again

As you approach the start, watch for the

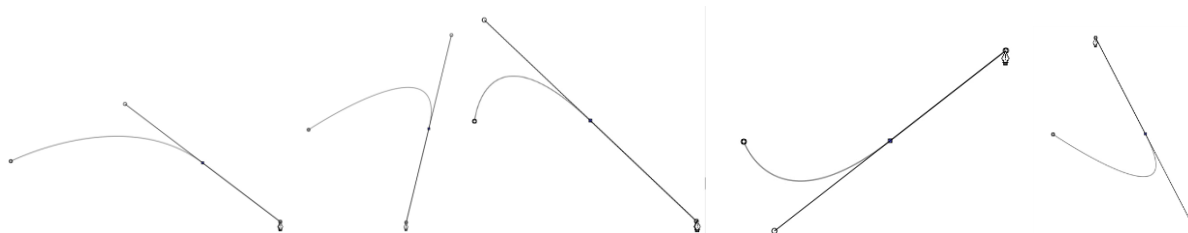
Left click and the shape will close and fill

## Drawing Bézier Curves

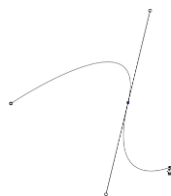
- Drawing curves is a bit more difficult. The key is to take it one step at a time, practice the technique a lot, and remember that you can later correct your curves using the **Shape Tool** (refer to *Section 8.10*).
- To draw a curve, use your mouse to left-click once where you want to begin the curve. Then, instead of left-clicking, hold the left mouse button down and begin dragging the mouse. Continue holding the left button and notice a second line appears with two circles at either end. These are called Bézier control points:



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



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

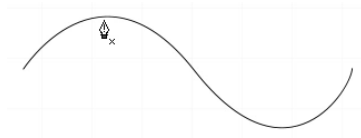


- ◇ Release the left mouse button and press the **Esc** key or press the **Enter** key to stop the drawing process:

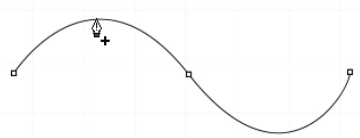


## Adding and Deleting Nodes

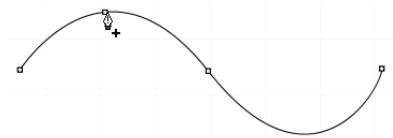
- Zoom in on the curve, select it, and then click on the **Draw Tool** icon.
- To add a node, move the cursor next to the path and watch for the cursor to change. With the cursor right on the path, left-click to add a node:



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



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

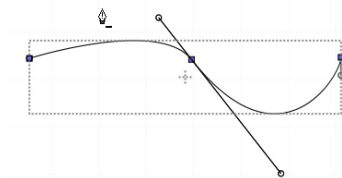


New node has been added

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




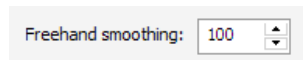
Once the cursor changes and the node turns blue, left click



The node is deleted and the curve will change accordingly

### 7.04.2 Freehand Drawing

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



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



smoothing: 0



smoothing: 100

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




Freehand tree



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

### 7.04.3 Brush Drawing

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



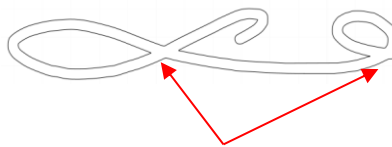
- Select the **Size** you desire and freehand draw:



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



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



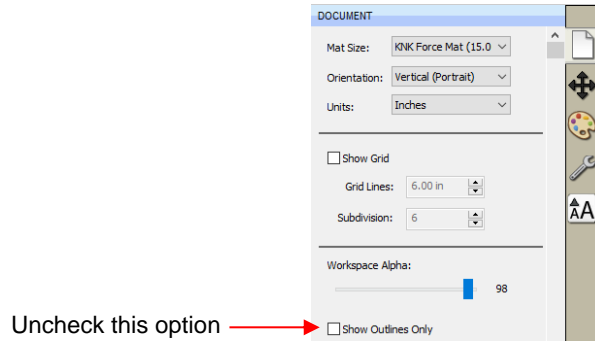
Overlaps automatically removed

## **7.05 Manual Tracing of an Imported Image**

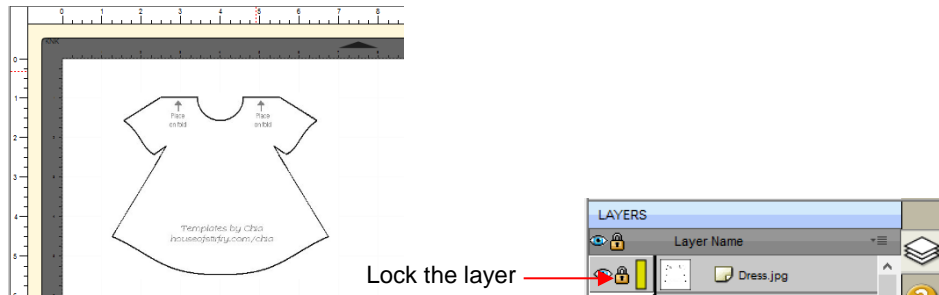
- Sometimes the quality of an image will fail to yield a good auto-trace. It could be that the image is too small or too detailed. If the image is important to you, then manually tracing offers another option for conversion to a vector cut line.
- The easiest way to manually trace a raster graphic is using the **Draw Tool** presented in **Section 7.04.1**. However, instead of trying to create the Bézier curves as you go, it's faster and easier to simply and quickly click, click, click around the image placing a node wherever the path changes directions. Then you can go back and manually move nodes and drag curves to fit the original image. This process is presented in the next few subsections.

### **7.05.1 Importing an Image for Manual Tracing**

- Since you won't be trying to auto-trace the raster image, use **File>Place Image** to import it onto the **Cutting Mat**. In this tutorial, the *Dress.jpg* file shared at the link in *Section 7.03* will be used.
- While this dress could easily be auto-traced, it provides a great example of how the **Draw Tool** can be used to fit a shape such as this. So, it will be used for the manual tracing example.
- In order to see the image, make sure **Show Outlines Only** is not checked on the **Document Panel**:

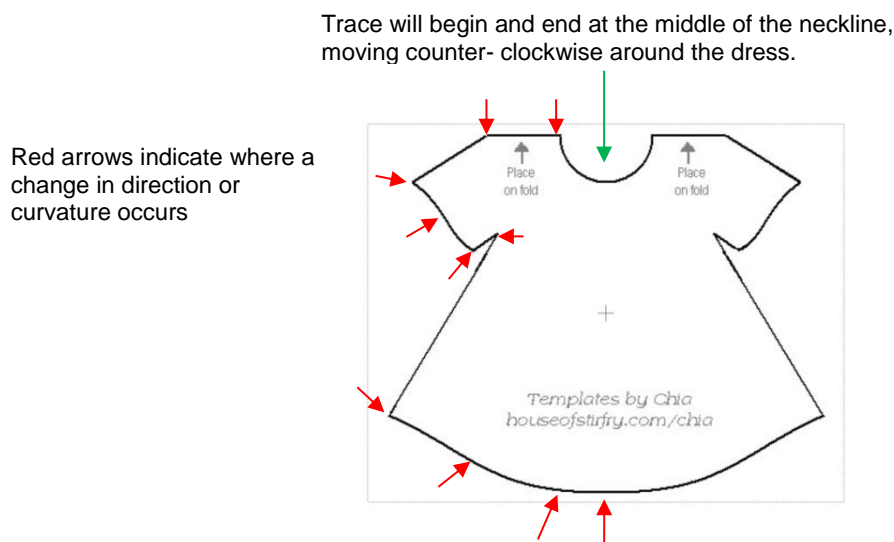


- To avoid inadvertently selecting the image while tracing, lock that layer on the **Layers Bar**:



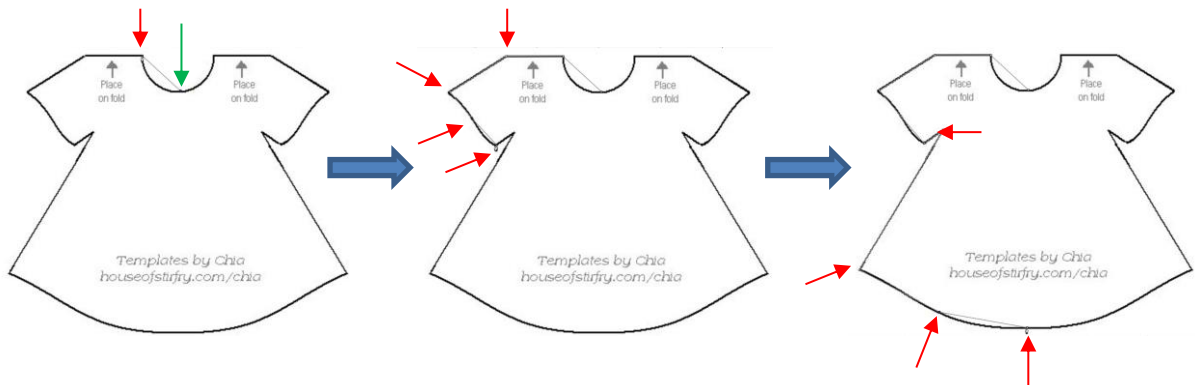
### 7.05.2 Manual Tracing Using the Draw Tool

- Make sure you have read *Section 7.04.1* to learn how to comfortably and successfully use the **Draw Tool**.
- Now, the best method for tracing a symmetrical image is to only trace one half. Then you can make a copy of it, mirror the copy, and weld the two together to create a perfectly symmetrical shape. This is what will be done in this case because the dress is symmetrical.
- Before beginning the trace, visually note how many changes in curves and straight lines exist. This will help you understand where to click as you work around the image. But don't overthink it. Remember that you can add nodes, delete nodes and move nodes during the editing process:

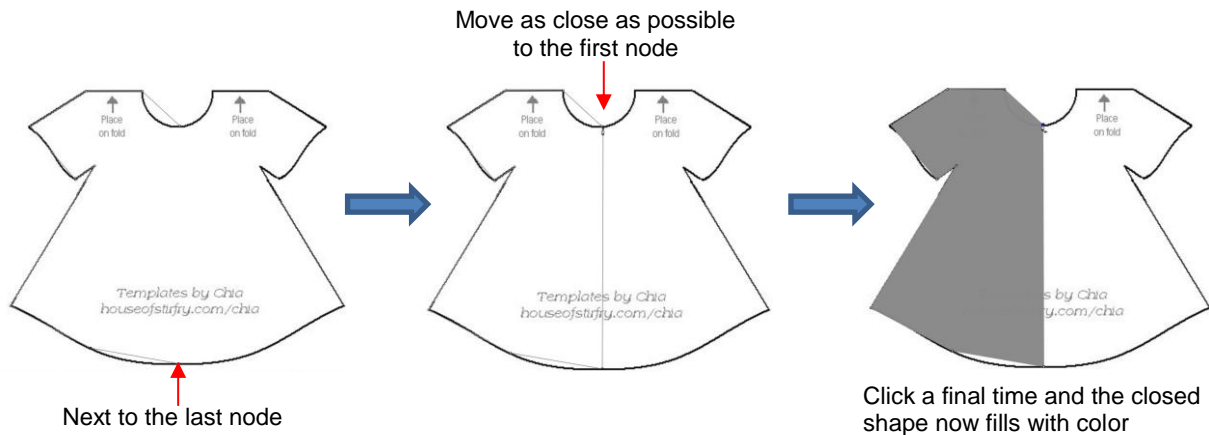


- The process is as follows:

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




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



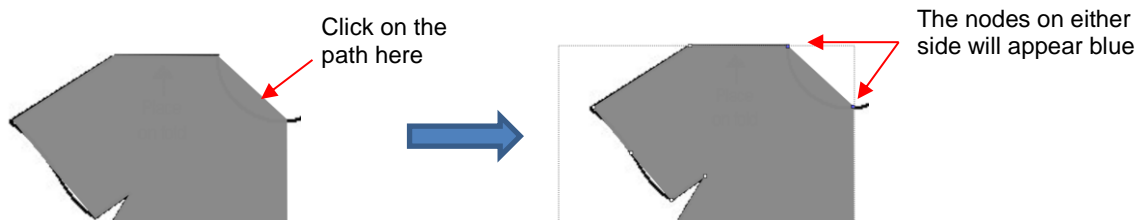
### 7.05.3 Editing the Trace

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

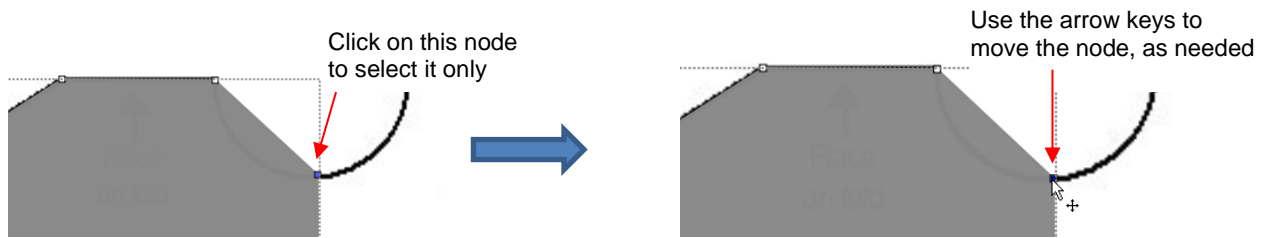
**Shape Tool**  which is the 3<sup>rd</sup> icon on the **Tools Panel**. Note that more details about using the **Shape Tool** will be presented in *Section 8.10*. For now, only a portion of this function's capability is needed.

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

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



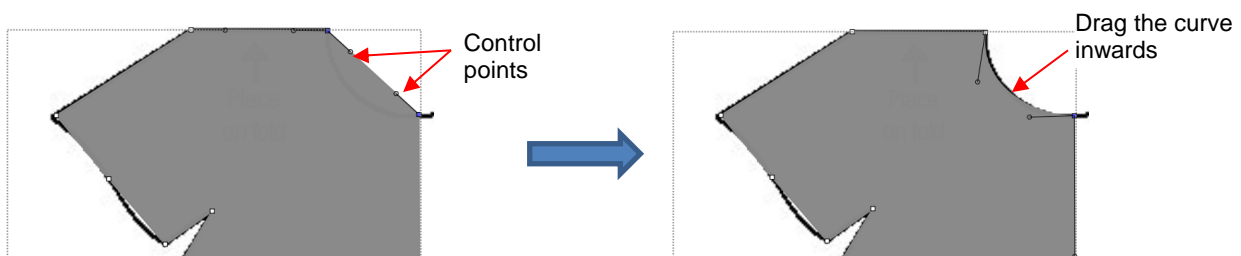
- ◇ If you need to move either node, click on the node to be moved and the other node will turn white. Be very precise in clicking as it is easy to miss the node. If that happens, you will need to click the path again to show the nodes.
- ◇ Once you have the single node highlighted in blue, you can now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



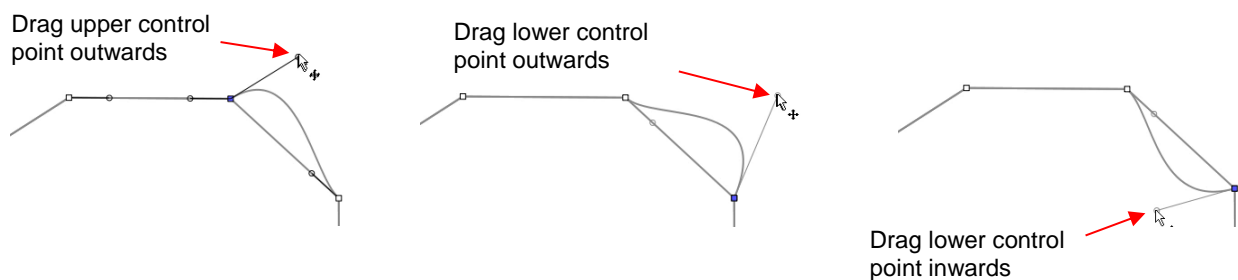
- ◇ Next, click on the second icon on the **Tool Options**:




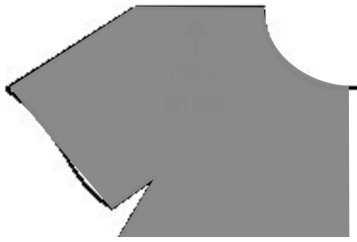
- ◇ Then click again on the neckline path and you will see Bézier control points. This means you can now drag the middle of the path inwards to form the neckline:



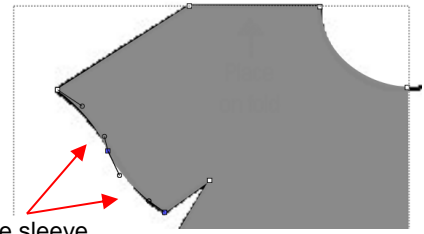
- ◇ Alternatively, the Bézier control points can also be dragged. This is useful if the curve isn't symmetrical. Here are a few examples of how that curve could be altered:



- ◇ Just like with nodes, when selecting a Bézier control point, you need to click precisely on the little circle. If you inadvertently see all of the nodes disappear, just click on the path again.
- ◇ Once the neckline is curved, go over to the sleeve and repeat the process for both parts of the sleeve since one side curves inwards and the other side curves outwards. Again, click on the path, click on the 2<sup>nd</sup> icon on the **Tool Options** , click on the path again and then drag the curve:



Before editing




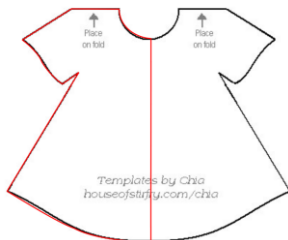
Both parts of the sleeve are reshaped

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

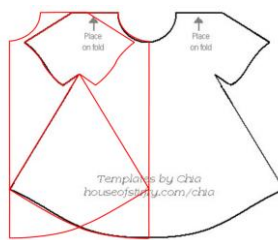


#### **7.05.4 Copy, Mirror and Weld to Complete Symmetrical Shapes**

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



Original trace

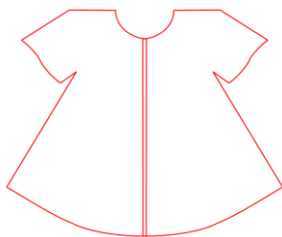


**Copy made and Mirror applied**

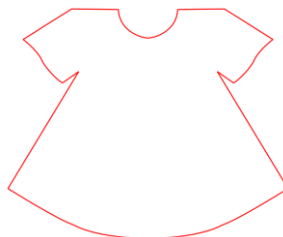


Copy is moved to the right side

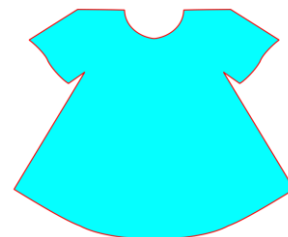
- The original image is no longer needed. The trace and the copy are welded using **Path>Union**. Fill is then applied to complete the trace:



Imported raster is removed



Apply **Path>Union**



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

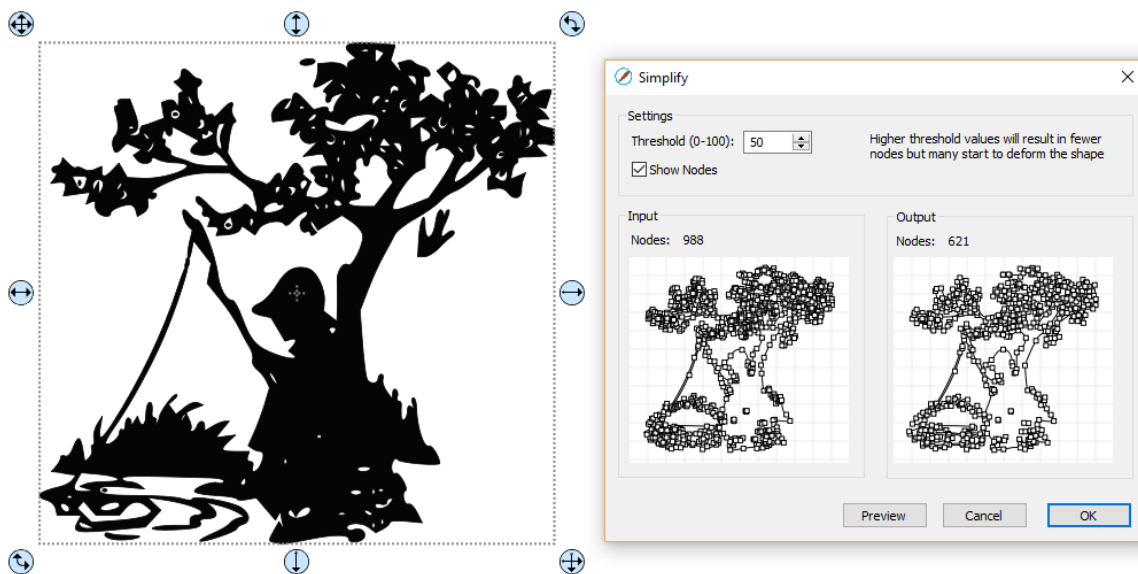


## 8. SCAL: Editing

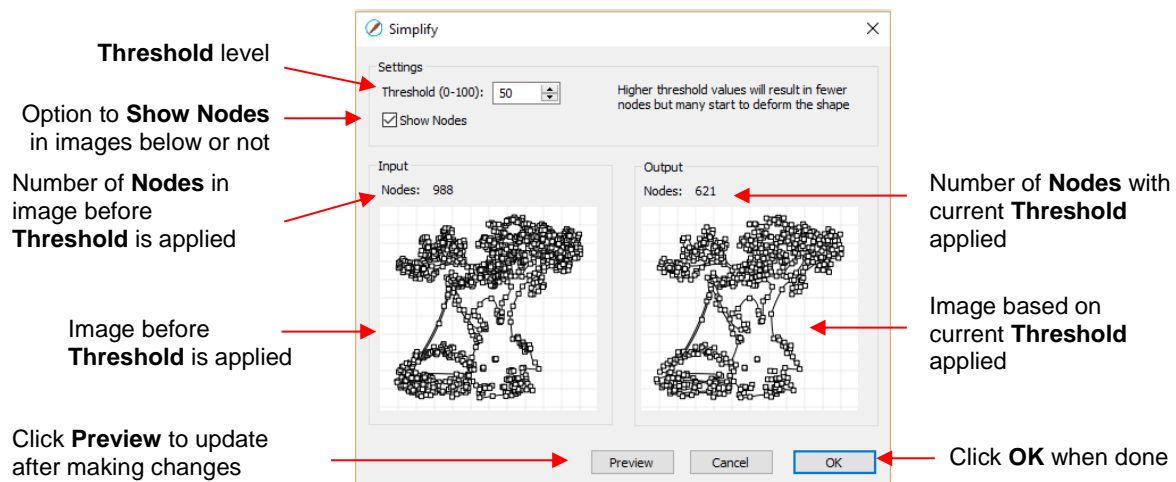
This chapter covers functions that are used to modify shapes in SCAL as well as prepare shapes for cutting. For functions used in designing, refer to *Chapter 9*.

### 8.01 Simplify

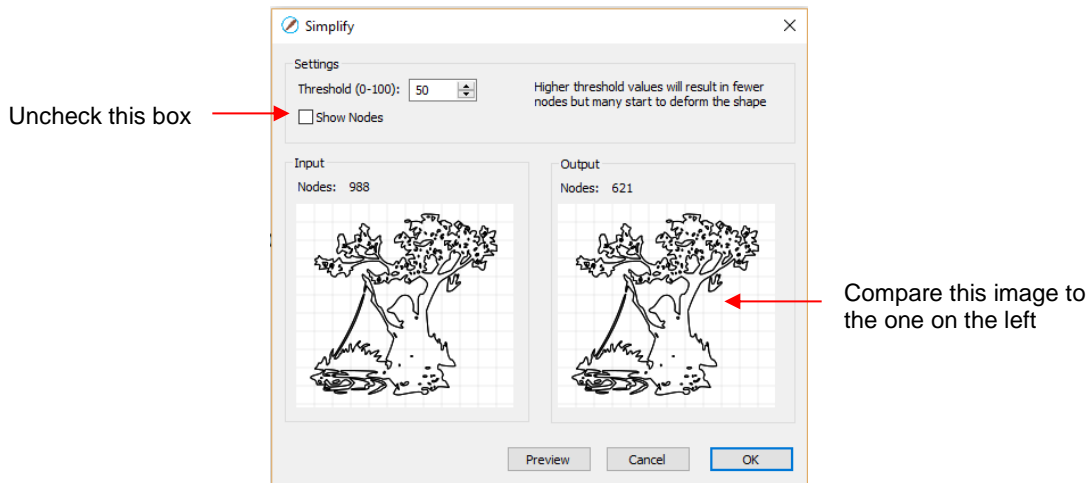
- The purpose of the **Simplify** function is to reduce the number of nodes. This can be important when cutting small vector shapes in which clustering of nodes in tight locations can sometimes lead to poor cutting.
- There are two ways to open the **Simplify** window after selecting a shape:
  - ◇ Right-click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



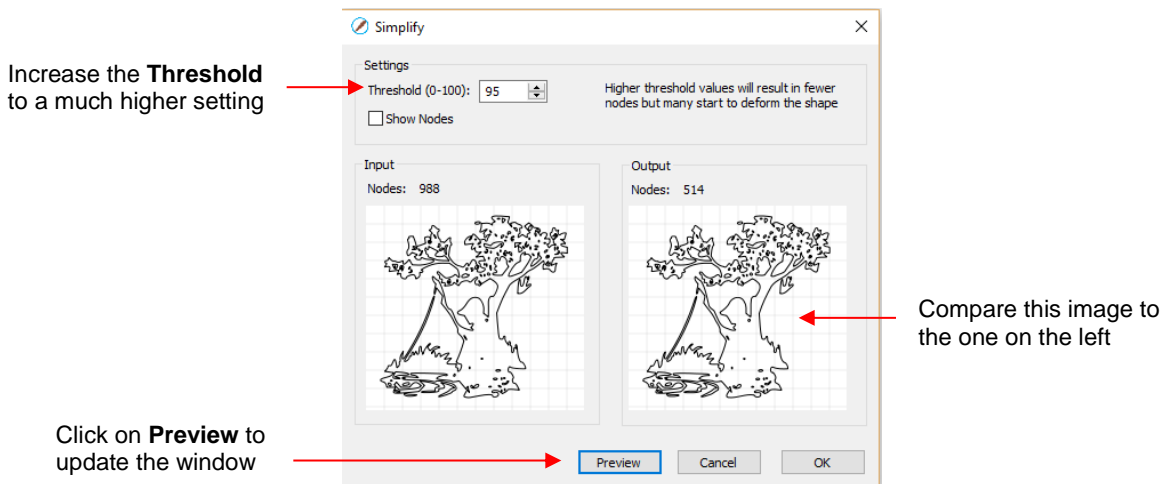
- The **Simplify** window shows the nodes of the selected image in two side-by-side windows: an **Input** and an **Output**, along with the number of **Nodes** in each one. That count is based on the current **Threshold** setting:




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



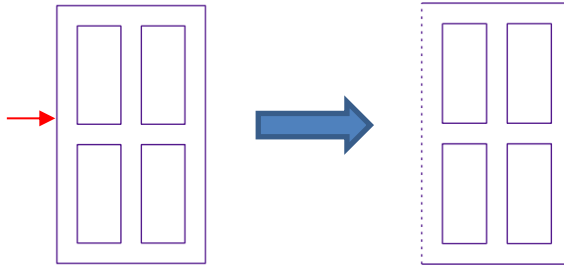
- Try increasing the **Threshold** setting to reduce more nodes. In general, you should be able to use a high **Threshold** without compromising the image:



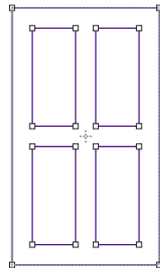
## 8.02 Split Path

- The **Split Path** function allows you to delete the path between any two adjacent nodes. First you must select two nodes using the **Shape Tool**  on the **Tools Panel**. Then you can access **Split Path** using either of the following:
  - ◇ Right-click and select **Path>Split Path**
  - ◇ Go to **Path>Split Path**
- The following door shape will be used as an example to show the steps. The goal is to change the left side of the door from a solid cut line to a dashed cut line:

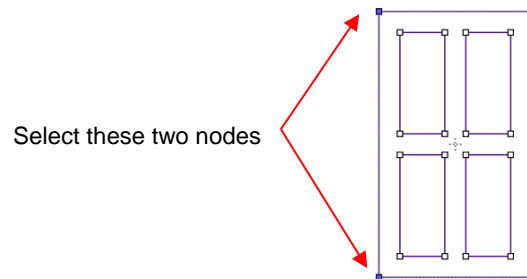
The left side of this paneled door will be separated and made dashed so that the door can be folded to open instead of being cut out




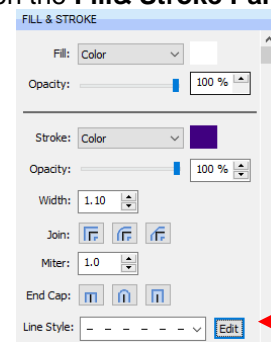
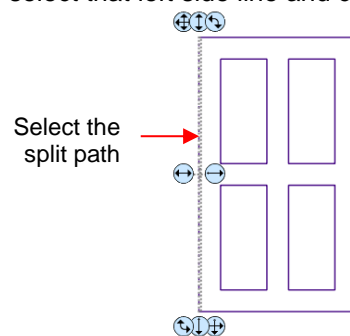
- ◇ Select the shape and click on the **Shape Tool** icon  on the **Tools Panel**. The nodes will appear on the shape:



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

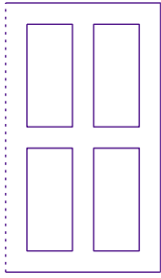


- ◇ Break that path by going to **Path>Split Path**. Then click on the **Select** icon . Now you can separately select that left side line and change to a dashed cut on the **Fill & Stroke Panel**:

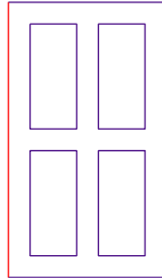


Select a dashed cut

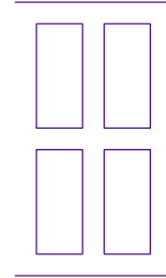
- ◇ The left side of the window will now cut dashed. Alternatively, the left side could have been left solid and scored with an embosser in the cutter or the left side could have been deleted and the fold made by hand:



Left side will cut dashed



Left side will be scored separately



Left side won't cut at all

### 8.03 Close Path

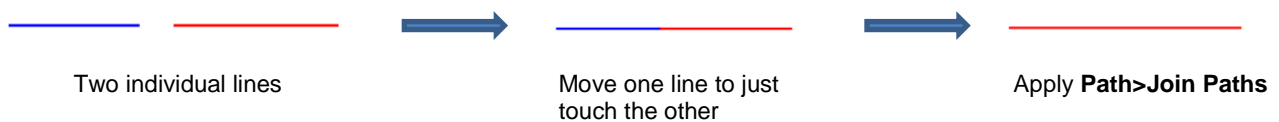
- The **Close Path** function can be applied to any open shape, other than a straight line, to join the start and ending nodes with a straight line:



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

### 8.04 Join Paths

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

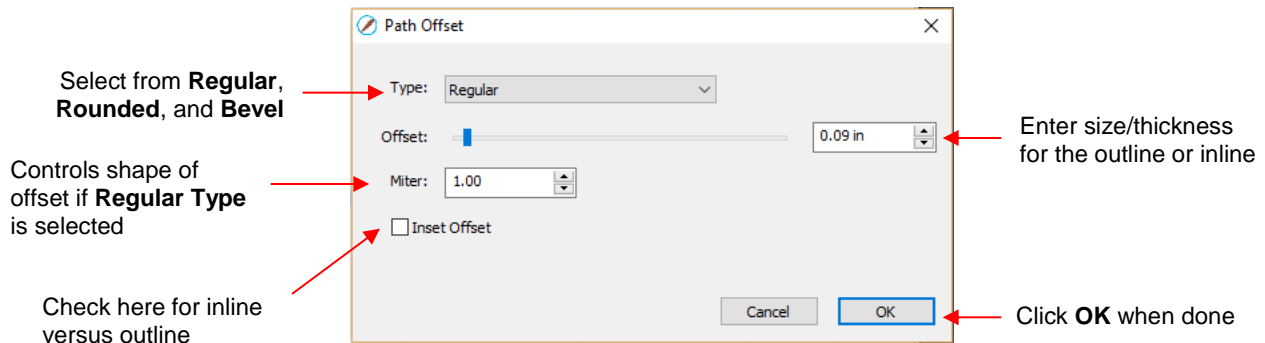


- If you are joining several lines at once, such as these four lines to create a box, then all four lines can be selected at one time and be joined. However, for the new shape to be an actual closed shape, you must then apply **Path>Close Path**:

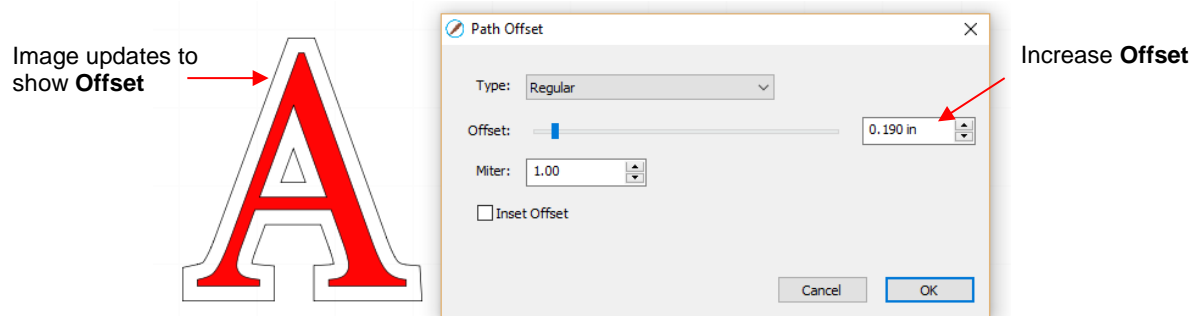


## 8.05 Path Offset

- **Path Offset** creates an outline or inline of a shape and will delete the original upon clicking on **OK**. Note that if you want the original, either make a backup copy or use the **Shadow Layer** function presented in *Section 9.04*.
- To access **Path Offset**, select the shape and go to **Path>Path Offset**:



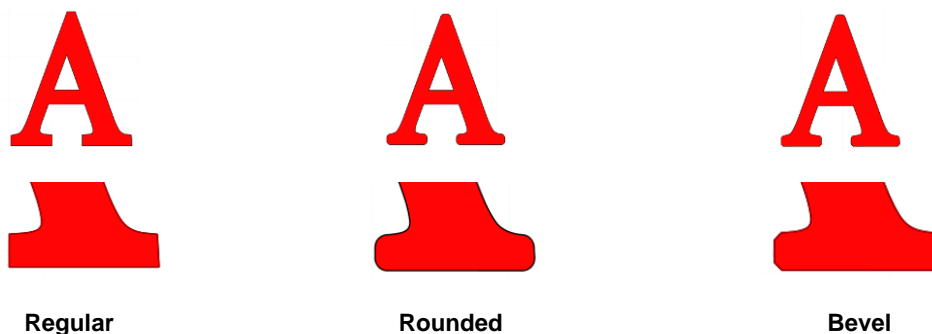
- As you increase the **Offset**, you will begin to see the outline form on your selected shape:



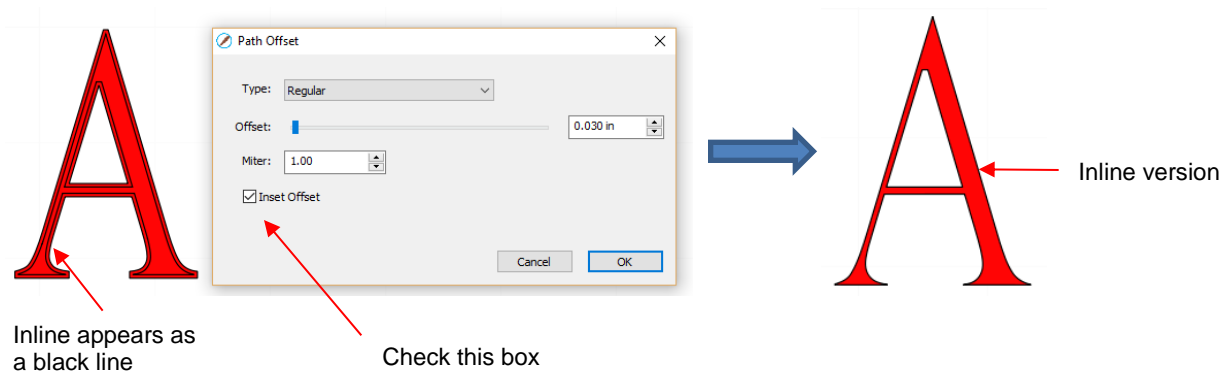
- After clicking on **OK**, the **Offset** will fill with the same color and the original will be deleted:



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



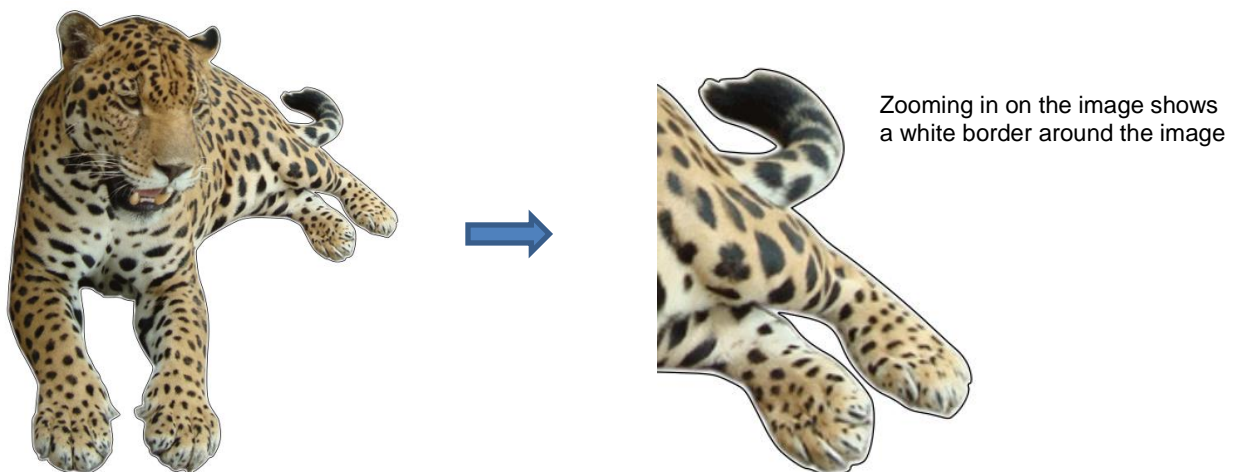
- Note that the first choice, **Regular**, also has a **Miter** setting which should work in the same way as **Miter** affects the **Stroke** (refer to *Section 5.14*). However, at this time, it appears that the **Miter** setting is not working.
- Checking the **Inset Offset** box creates an inline instead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



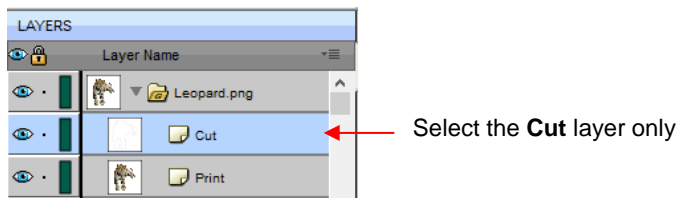
- A practical example of using **Path Offset** is when you have a font that is too thin to cut at the size you need. Applying a very small **Offset** can make the difference in whether or not text can be cut at certain small sizes. In the case below, the 1" lettering was offset by only 0.005":



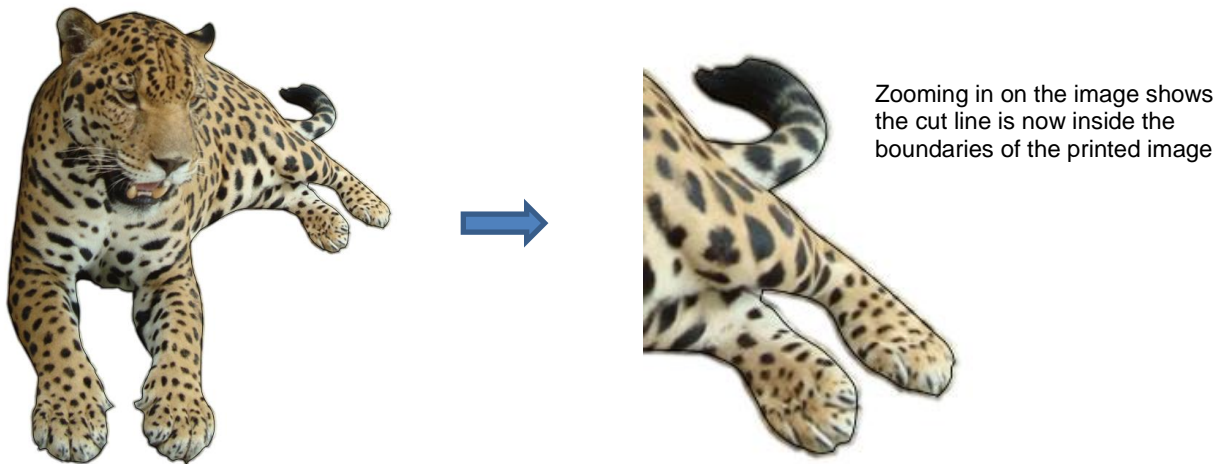
- A second practical example showing the use of **Inset Offset**, is the following print and cut application. A PNG with a transparent background was traced using the **Trace** function. However, based on the location of the cut line, relative to the printed image, there will be small amount of white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




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

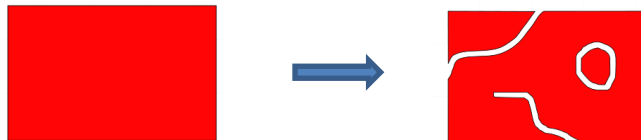


- ◇ Open the **Path Offset** window. Set the **Offset** to a small size, such as 0.03". Be sure to mark the box for **Inset Offset**. The result is a cut line which will eliminate that white border around the image:

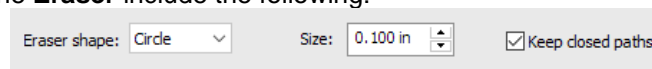


## 8.06 Eraser

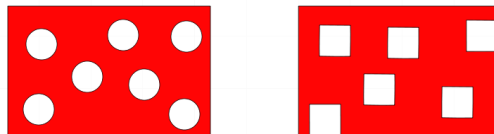
- The **Eraser** is the 8<sup>th</sup> icon  on the **Tools Panel**. Use this tool to erase parts of a shape by dragging your mouse across the shape:



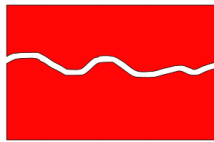
- The **Tool Options** for the **Eraser** include the following:



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



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



Keep closed paths  
checked



Keep closed  
paths unchecked





Keep closed paths  
checked

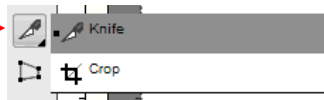


Keep closed  
paths unchecked

## 8.07 Knife and Crop

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

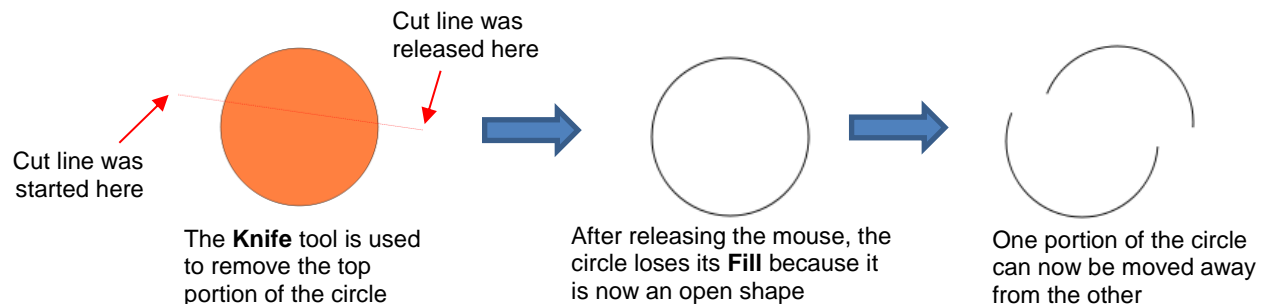
Click and hold this icon



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

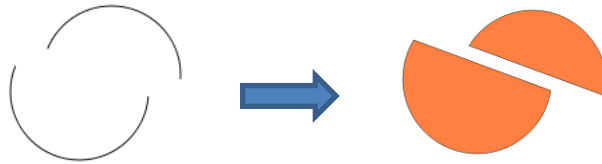
### 8.07.1 Using Knife

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



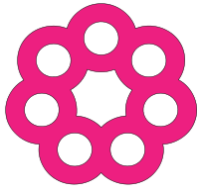
- There are four ways to control the angle of the cut:
  - ◇ Click and hold the left mouse button – you can freely drag the red cut line to cut at any angle (as shown in the screenshot)
  - ◇ Hold the **Shift** key and click and hold the left mouse button and drag left or right: the red cut line will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



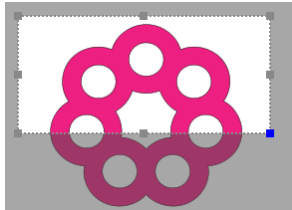


### 8.07.2 Using Crop

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



The top part of this shape will be cropped

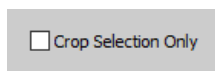


Marquee-select the area to be retained

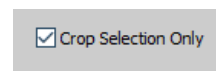


After pressing the **Enter** key

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

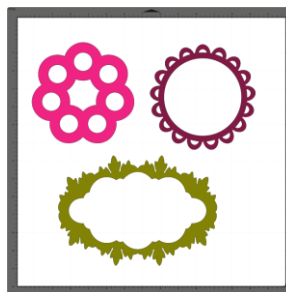


**IMPORTANT:** If left unchecked, only the marquee-selected part of the shape will be retained. The rest of that shape and every other shape on the page will be deleted, even those that might be hidden or locked!

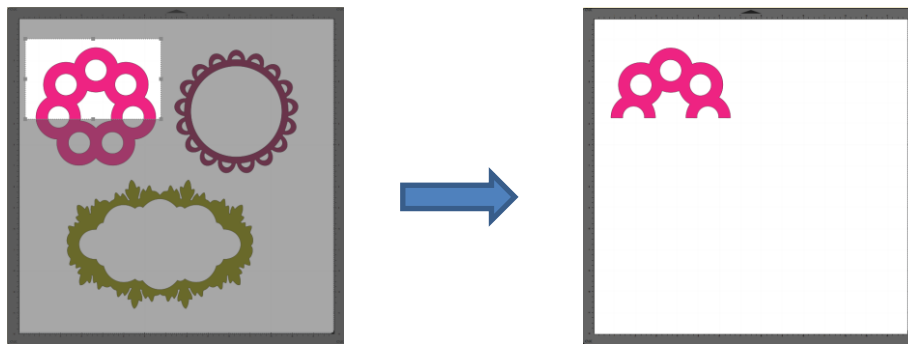


If checked, the marquee-selected part of the selected shape will be retained, as well as all other shapes on the page.

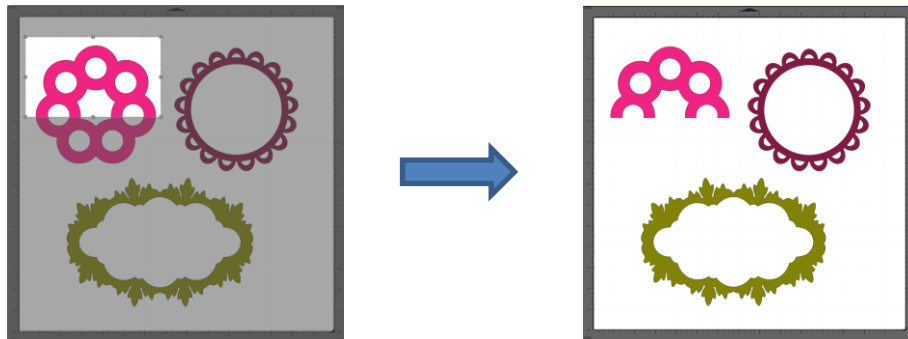
- Here is an example to show what would happen in both cases. The file has three shapes and the top right shape will be cropped just as in the prior screenshot:



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



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



## 8.08 Which Cutting Tool to Use?

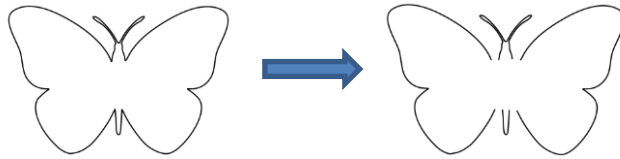
- Having so many cutting functions to use can make it difficult to know which one to use in a particular instance. Experience will be your best guide, as well as testing them out. But a summary of the functions is presented in this section and this may prove to be helpful when selecting which tool to try first.
- The following table summarizes the capabilities of the various options for cutting shapes. Note that **Boolean Join** has also been added but isn't covered until *Section 9.05* because it is more often used for designing than for editing.

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

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



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



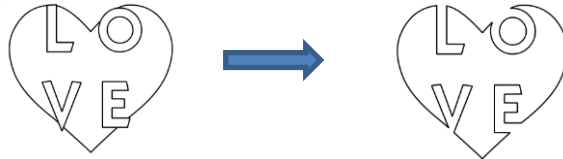
Cut up the butterfly without closing the shapes. Used for projects where the shapes are folded along one side instead of cut out

**Crop**



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


**Boolean**  
**Join:**

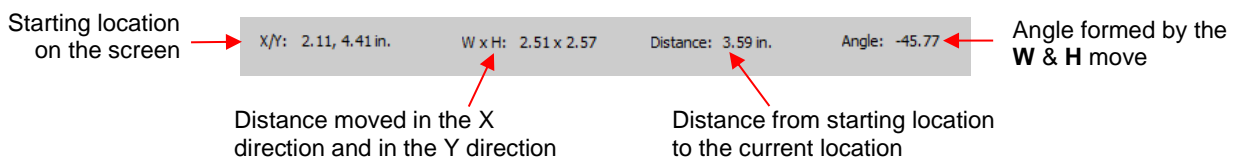


Cut a shape with any other shape or shapes

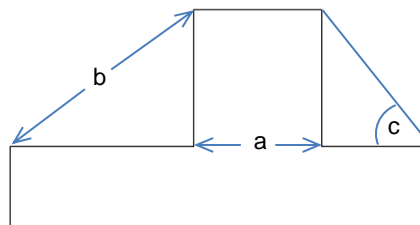
- **Knife** and **Split** have the same effect. **Split** is a bit more limiting because there needs to be nodes present in the location where the cut will occur. It might be useful if you are already in the **Shape Tool** mode where you can then select the nodes and apply the **Split**. Otherwise, **Knife**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

## 8.09 Ruler

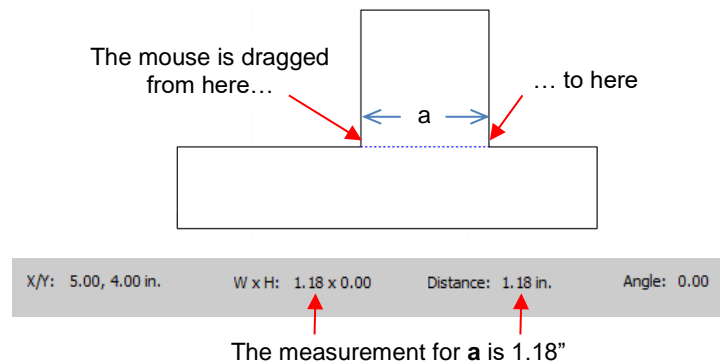
- The **Ruler** function allows you to measure the distance and angle between any two points on the screen. It is accessed by clicking on the second icon from the bottom  on the **Tools Panel**.
- No shapes need to be preselected. Just hold down the left mouse button at any location and then drag the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



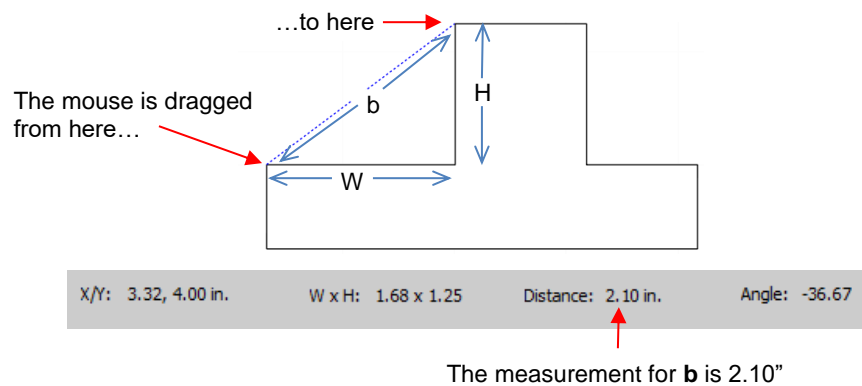
- To better illustrate these variables, the following shape will be used and the various measurements will be determined using the **Ruler**:



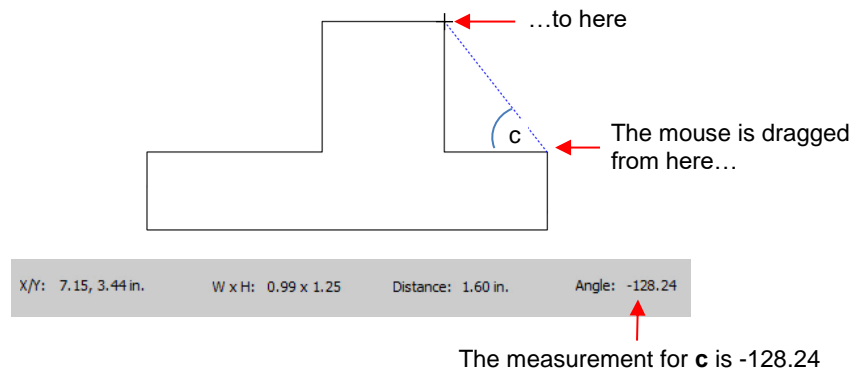
- ◇ **X/Y:** This is the starting position on the screen and will match the X/Y grid location on the **Cutting Mat**. You can extend beyond the boundaries of the mat, if needed.
- ◇ **W x H:** Indicates how far the mouse has been dragged away from the starting point. Note that as the mouse is dragged,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



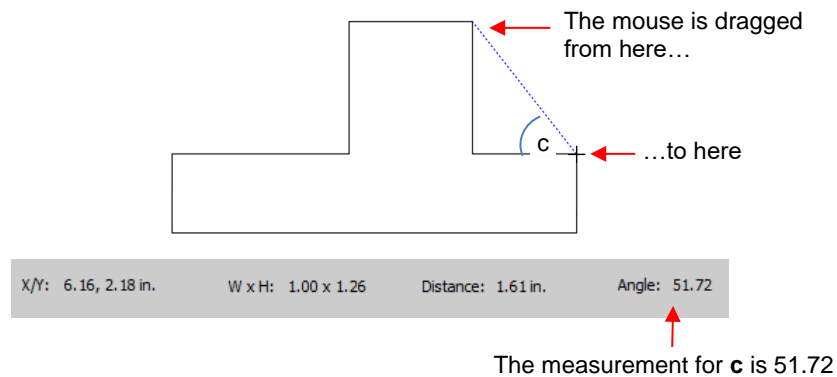
- ◇ **Distance:** This is the actual measurement between the starting location and the ending location. In the prior measurement, **W** is the same as **Distance** because the measurement was a horizontal one. But measuring the length of "**b**" is not:




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



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

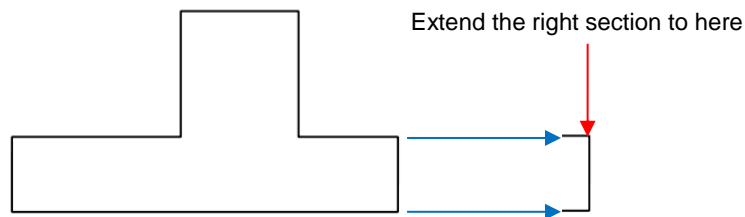


## 8.10 The Shape Tool - Path and Node Editing

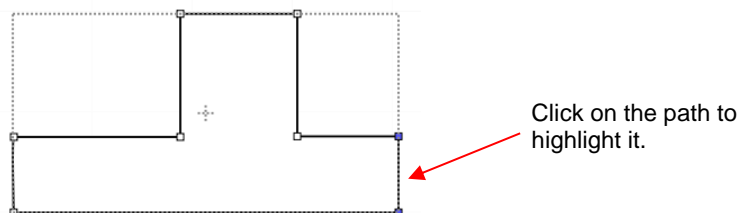
- Path editing involves moving paths as well as reshaping them. This topic was first introduced in *Section 7.05* where you were shown how to draw with the **Draw Tool** and then curve a straight-line path. If you haven't read *Section 7.05*, please do so before proceeding with the rest of this section.
- To use the **Shape Tool**, click on the third icon  on the **Tools Panel** and then click on a shape. You should see the nodes which currently define that shape. If you do not see any nodes, then:
  - ◇ The shape is grouped with one or more other shapes. Go to **Object>Ungroup** and then try again.
  - ◇ The shape is still in text mode. To convert, return to **Select** mode. Select the letters and go to **Object>Break Apart** and then marquee-select all and go to **Object>Merge**.
- Path editing involves dragging a path or dragging **Bezier** control points to reshape them. Node editing involves moving nodes and changing the type of node to then form desired curves.
- The most likely mistake you'll make while learning path and node editing is failing to zoom in close enough so that you can click precisely on paths and nodes. Keep that in mind while experimenting.

### 8.10.1 Moving a Path

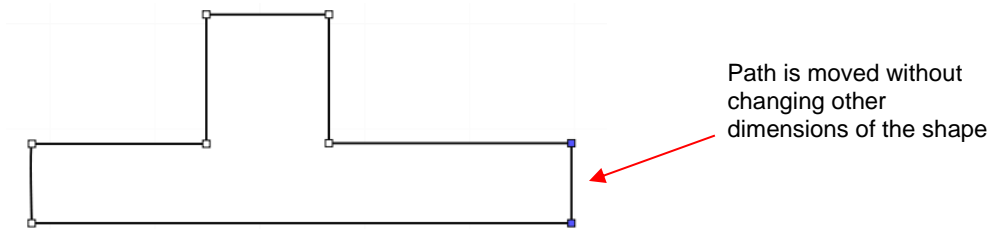
- Sometimes a path needs to be extended without resizing the rest of the shape. For example: let's say you need to extend the right section of this shape by a few inches:



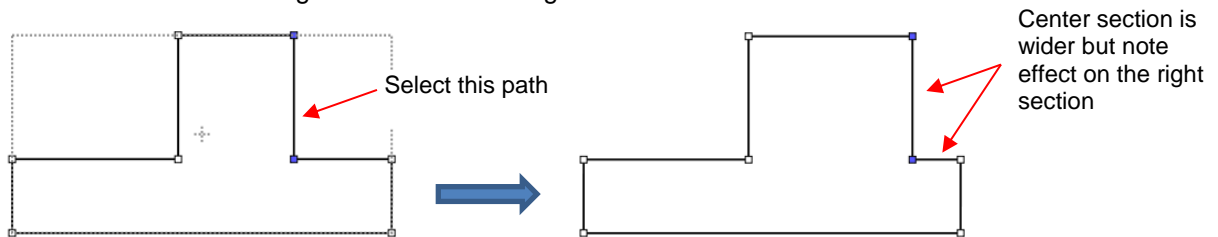
- ◇ Select the **Shape Tool**  on the **Tools Panel** and then click on that path:



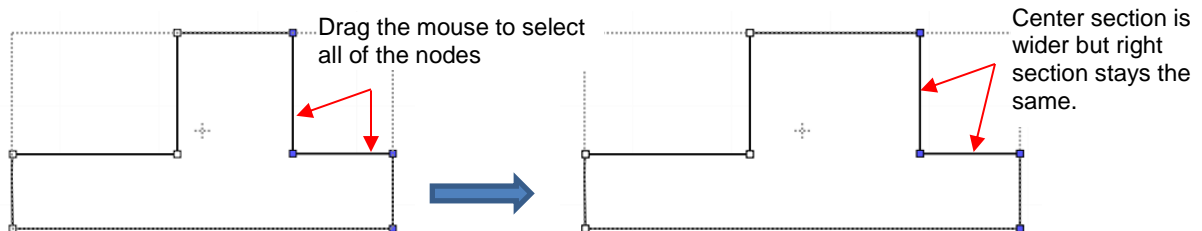
- ◇ You can now use the arrow keys on your keyboard to move that path. Holding the **Shift** key while clicking on an arrow key will move it in larger increments:



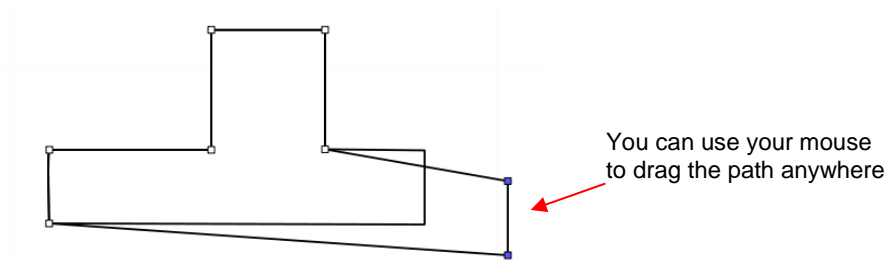
- ◇ If instead, the center section had been widened by selecting the path on its right side, then that would have resulted in shortening the section to the right of it:



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



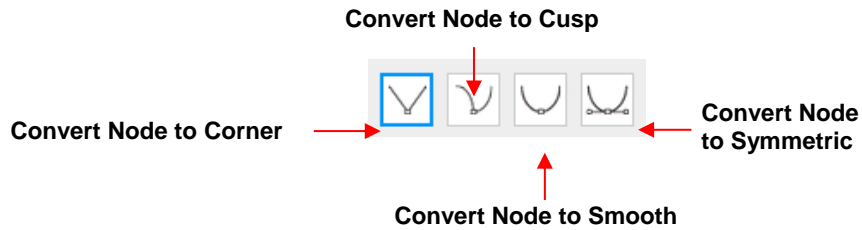
- If the shape is made up of straight line segments, versus curves, you can also drag the segments with your mouse instead of using the keyboard arrows. Note that it can be a bit tricky getting the cursor in the perfect spot to start dragging. However, you won't have the same control if you wish to keep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




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

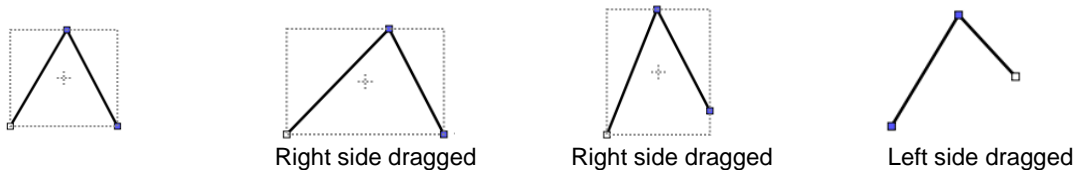
### 8.10.2 Reshaping a Path


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

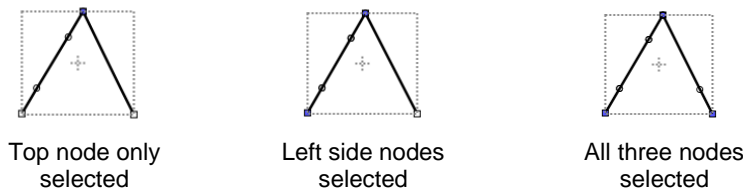


- One or more nodes are highlighted and then the appropriate icon selected. These same four functions can also be accessed by right-clicking and selecting **Path>Convert Node to**.
- To illustrate each one of these options, a simple path with a sharp corner will be used. This shape is already in **Corner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

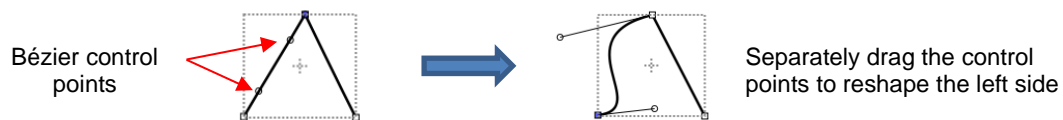
- ◇  **Corner Nodes:** These are the nodes that make up straight-line shapes such as rectangles, squares, triangles, stars, etc. Once selected, the shape will appear as below and either path can be moved as was demonstrated in the prior *Section 8.10.1*.



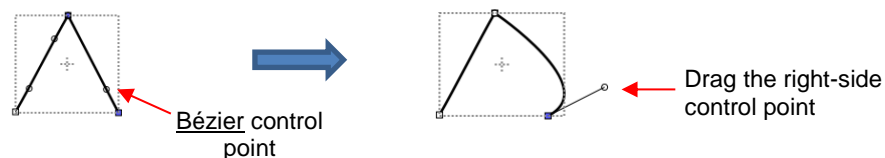
- ◇  **Cusp Nodes:** In this mode the Bézier control points appear and can be moved independently. First note how the paths appear when in this mode, depending on how many of the adjacent nodes are selected:




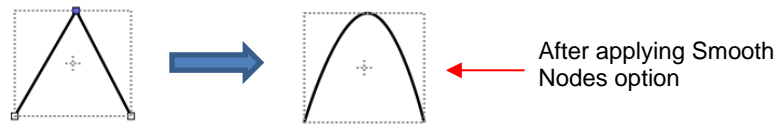
- The dots along the path are Bézier control points which are not linked to one another. You can freely drag either or both to create curves:



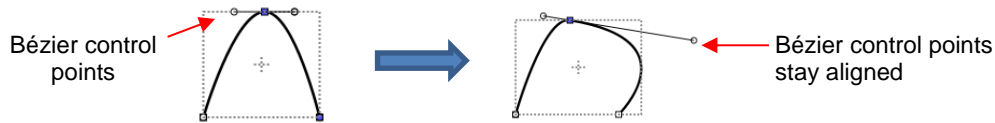
- In the case where there is a single Bézier control point on the right side, you can again drag the control point to create a curve:



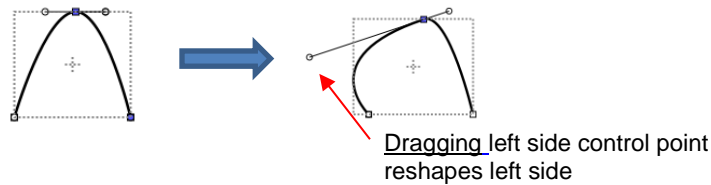
- ◇  **Smooth Nodes:** In this mode the Bézier control points always stay in a straight line. Notice that when you convert to **Smooth Nodes**, the shape immediately forms a curve:




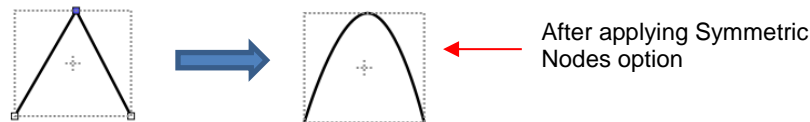
- When the newly formed shape is selected again, the Bézier control points appear in a straight line. If you move one, the other will move as well, in order to maintain that straight line:



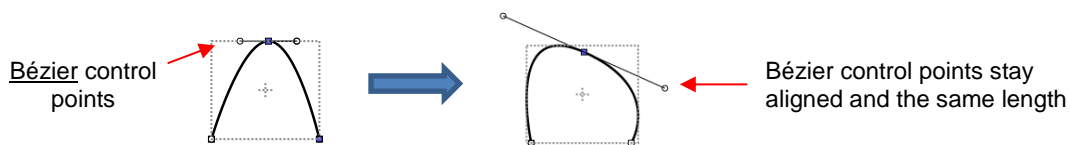
- The left side Bézier control point controls the curve on the left side. Thus, if it had been moved instead this would have resulted:



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

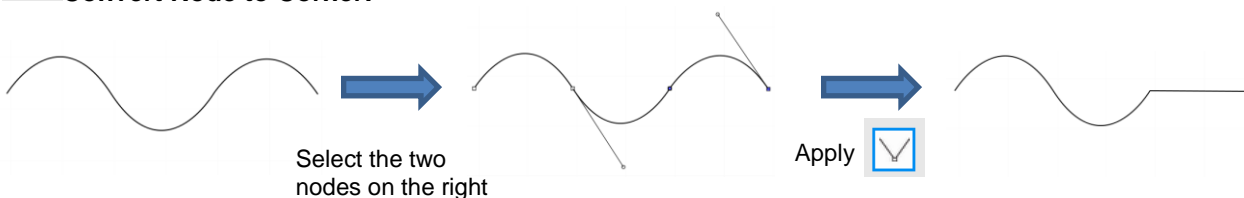


- When the newly formed shape is selected again, the Bézier control points appear in a straight line and the image appears the same as with **Smooth Node** status. However, when you now move one control point, the other will not only maintain that straight line, but also the same length. And the curves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



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

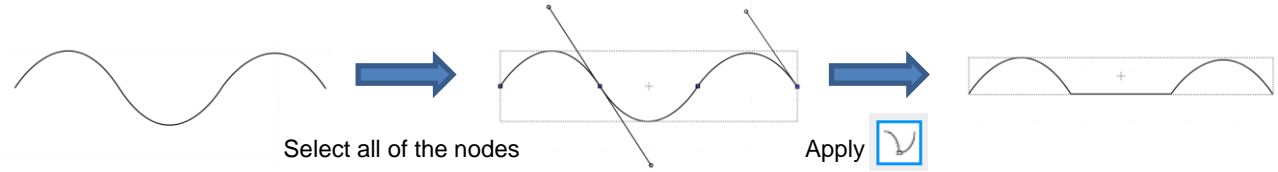
#### **Convert Node to Corner:**



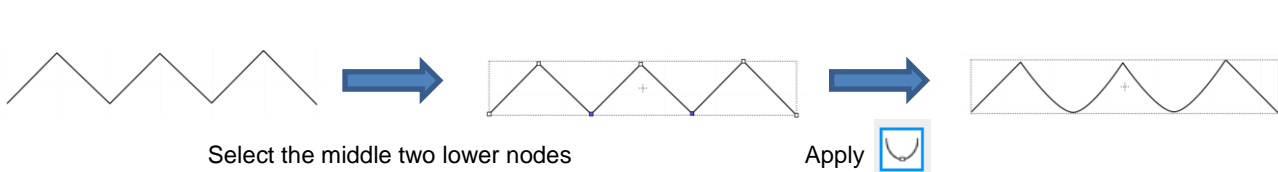




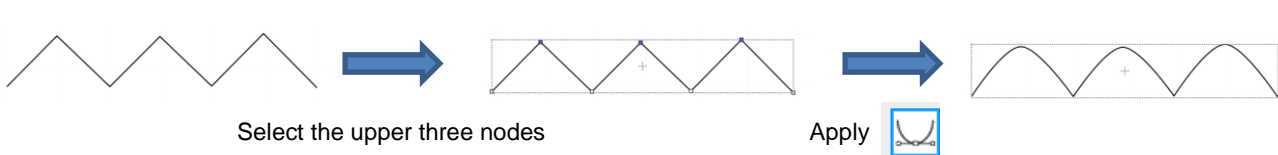
### Convert Node to Cusp:




### Convert Node to Smooth:

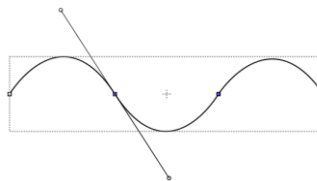


### Convert Node to Symmetric:

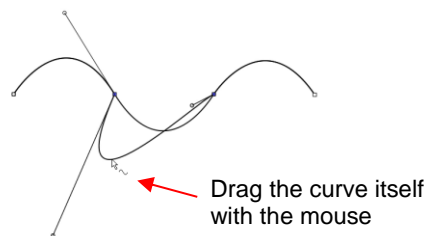


- As was shown in *Section 7.05.3*, you can also drag the path itself to reshape it, if one of the nodes has been converted to **Cusp**, **Smooth**, or **Symmetric**. For example:

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

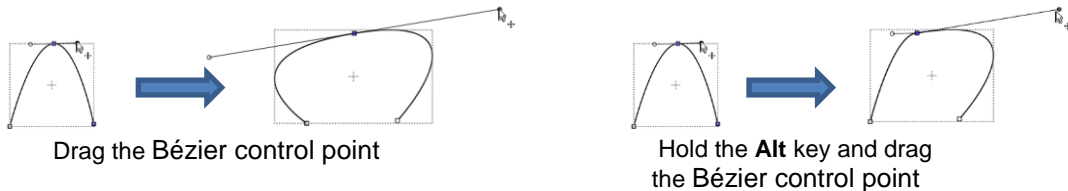


- ◇ The path can now be dragged with the mouse:



- You will recall that when a node is in either **Smooth** or **Symmetric** mode, adjusting one Bézier control point will automatically affect the other one and the curves on either side will change. To avoid this, hold the **Alt** key while dragging the control point and the other control point will remain in place:

- ◇ For example, with the following **Smooth** node shape, the same change is made with and without holding the **Alt** key during the adjustment:




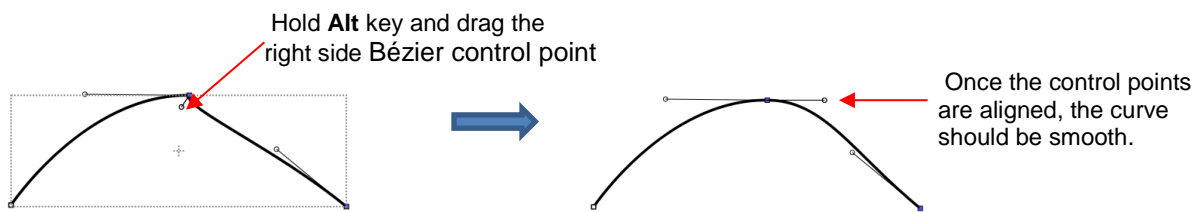
### 8.10.3 Examples of Smoothing Curves


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

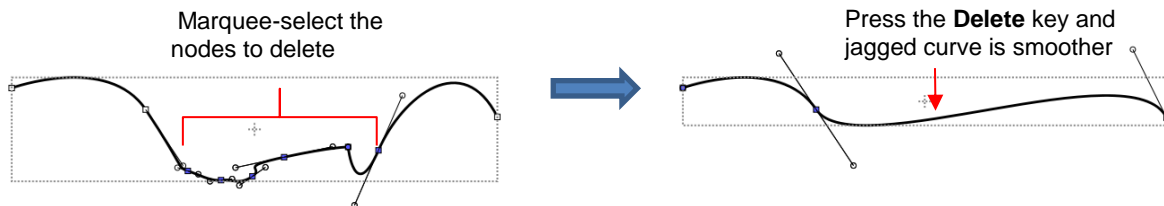
◇ For example, let's say you want to make the following shape have a nice smooth curve:



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

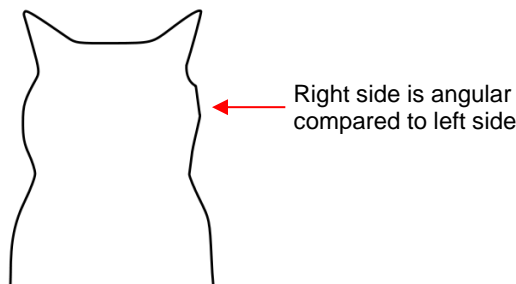


- In *Section 7.04.1*, you were shown how to add or delete nodes while in the **Draw Tool**  mode. Any time you want to add nodes to an existing path, you will need to be in this mode. However, you can delete nodes while in the **Shape Tool** mode. Select a node or marquee-select a group of nodes and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

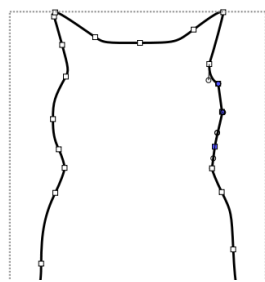


- Based on such a drastic change, it's worth noting that deleting smaller numbers of nodes at a time is usually advisable to avoid losing the original structure of the shape.

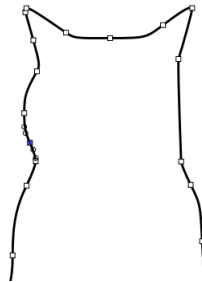
◇ As a practical example, here is a traced image of a cat. Note the right side of the cat's head is not smooth and rounded like the left side:



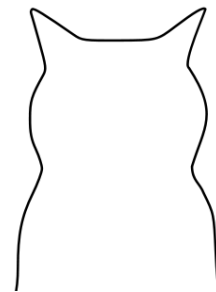
- Using the **Shape Tool**, the nodes causing the angular shape are marquee-selected and deleted. Then the path is reshaped:



**Shape Tool** shows nodes causing angular shape



After deleting the nodes, the right side is flat



After reshaping the line into a curve

## 8.10.4 Applications for the Shape Tool

- It's not always obvious when the **Shape Tool** might be needed. Here are a few examples to keep in mind:
  - ◇ Editing of pixel traced images: Sometimes a pixel trace will appear to be perfect until, for example, you use it for a print and cut and discover that some of the paths are slightly outside the printed areas of the original image:



Trace line doesn't follow shape here.



A node can be added or the Bezier curve can be reshaped.



- ◇ Manual tracing: As shown in *Section 7.05*, one of the quickest ways to manually trace a raster image is to use the **Draw Tool** and simply click/click/click around the image and then use the **Shape Tool** to create curves and move nodes to more closely align with the original image.
- ◇ Improving a cut: If you have problems with a particular location on a cut shape, examine the nodes in that location. You may find a cluster of nodes or a sharp cusp. Delete those excess nodes, reform the path, and then retest the cut.
- ◇ Modifying poorly designed files: Sometimes you will pick up free files that don't quite cut the way you expected. Examples are often fold-up templates where corners and fold lines do not quite meet. Having the ability to move paths and nodes can correct these kinds of files and provide cleaner and more professional end products.

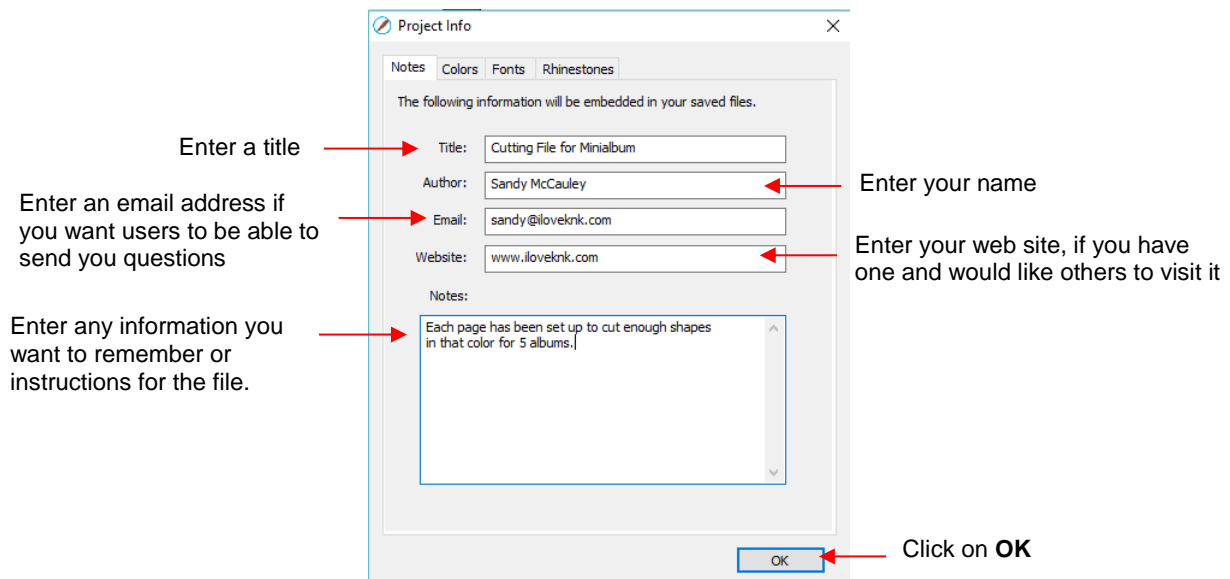
## 9. SCAL: Designing

### 9.01 Where Do I Start with Learning to Design?

- SCAL offers some excellent easy-to-use designing tools to assist you in creating whatever you can imagine. The best way to learn these tools is to focus on only one at a time and play with settings. You aren't going to break anything in the software by experimenting and you never know what you might discover!

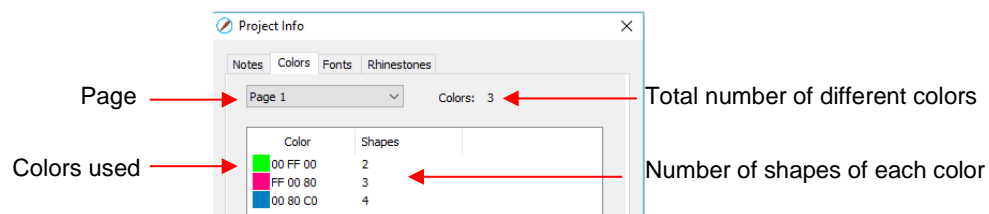
### 9.02 Project Info

- Before getting started on the fun and amazing design capability of SCAL, it's worth noting a feature that allows you to add your name and some other details to your file. This can save you time later when you're not remembering some of the original details and also help others with whom you share your files. Using this feature is, of course, entirely optional.
- To open the **Project Info** window, go to **Window>Project Info**. The following example shows some of the optional information you can add in this window that will be saved with your actual project:

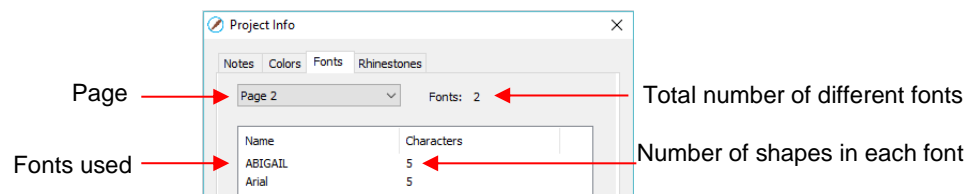


- Note the other tabs in this window: **Colors**, **Fonts**, and **Rhinstones**. These do not require your input. Instead, they automatically track, by **Page**, those elements that are currently present in the file. For example:

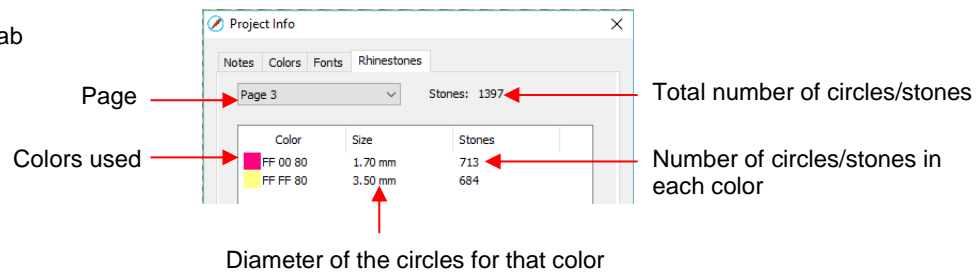
#### **Colors Tab**



#### **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 dropdown menu.

## 9.03 Basic Shapes

- The **Tools Panel** has access to the following basic shapes: **Rectangle**, **Rounded Rectangle**, **Circle**, **Triangle**, **Polygon**, **Star**, and **Spiral**. Some of these have customizing functions which will appear on the **Tool Options** bar and will be detailed in the following subsections.
- To access these various shapes, hold down the left mouse button on the **Rectangle** icon  on the **Tools Panel** and then select the desired shape from the popup menu.
- Once a different shape is selected, that shape's icon will then replace the **Rectangle** icon.

### 9.03.1 Rectangle

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



Freely dragging mouse



Holding **Shift** key

### 9.03.2 Rounded Rectangle

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

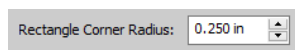


Freely dragging mouse



Holding **Shift** key

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





Radius: 0.10



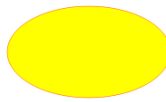
Radius: 0.25



Radius: 0.75

### 9.03.3 Circle and Oval

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



Freely dragging mouse



Holding **Shift** key

### 9.03.4 Triangle

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



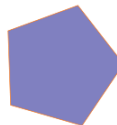
Freely dragging mouse



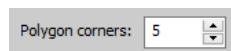
Holding **Shift** key

### 9.03.5 Polygon

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



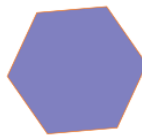
- In the **Tool Options**, a **Polygon corners** setting will appear:



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



Polygon corners: 3



Polygon corners: 6



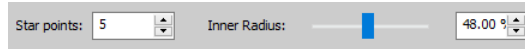
Polygon corners: 10

### 9.03.6 Star

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



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



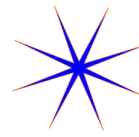
- ◊ The **Star points** setting can be used to change the number of points on the star. The **Inner radius** setting can be used to change the angle of the inner points:



5 Points  
Radius: 38%



4 Points,  
Radius: 47%



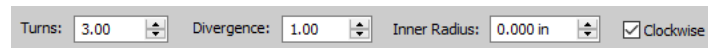
8 Points  
Radius: 10%

### 9.03.7 Spiral

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



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



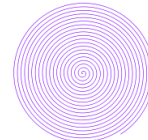
- ◊ **Turns:** Number of rotations around the center:



Turns: 3



Turns: 6



Turns: 20

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



Divergence: 1



Divergence: 3



Divergence: 0.5

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



Inner Radius: 0



Inner Radius: 0.2



Inner Radius: 0.5

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



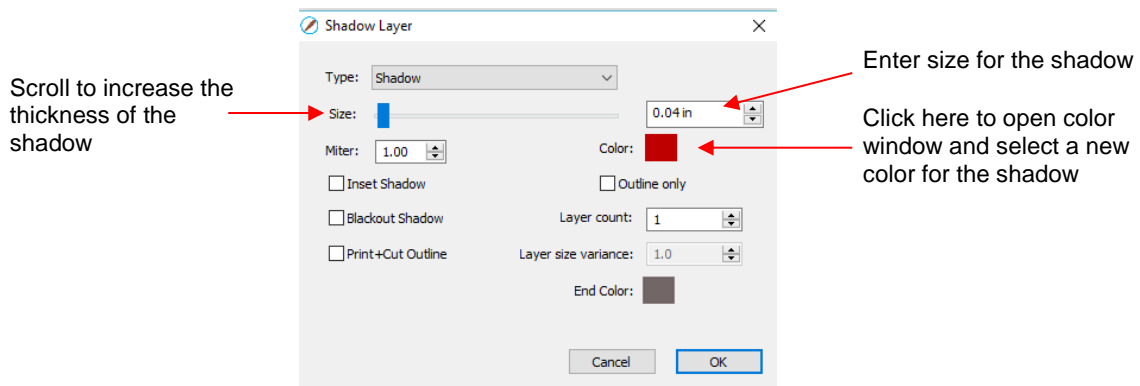
Clockwise: checked



Clockwise: not checked

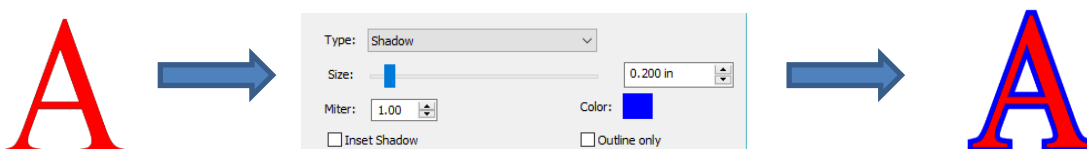
## 9.04 Shadow Layer

- The **Shadow Layer** function allows you to create an outline or an inline of any shape including, of course, text. After selecting a shape, you can access the function in either of two ways:
  - ◇ Go to **Effects>Shadow Layer (Contour Cut)**
  - ◇ Right-click and select **Appearance>Add Shadow Layer**
- The following window will open:



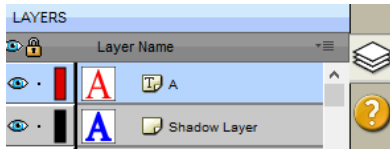
### 9.04.1 Shadow Layer Settings

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



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





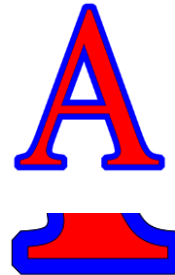
- **Type** controls the style or shape of the shadow at the corners. There are three choices:



Shadow



Shadow (Rounded)



Shadow (Straight)

- ◇ Note that the first choice, **Shadow**, also has a **Miter** setting which should work in the same way as **Miter** affects the **Stroke** (refer to Section 5.14). However, at this time, it appears that the **Miter** setting is not working.

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

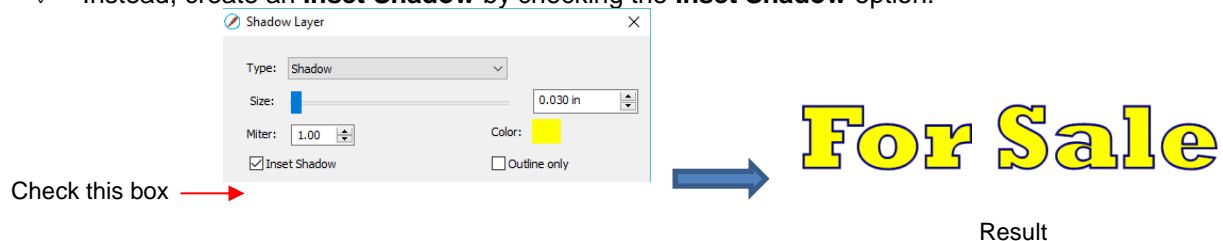
- ◇ For example, let's say you are going to create a two-color vinyl sign that says "For Sale":

**For Sale**

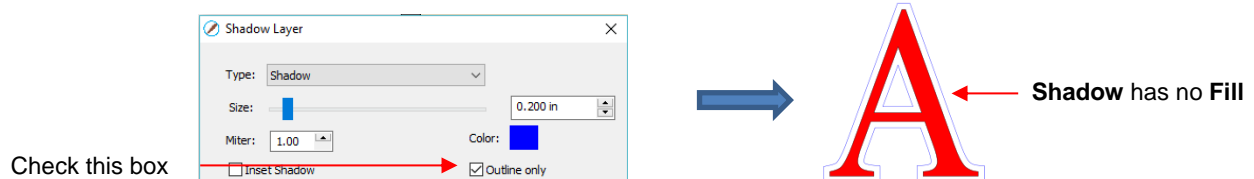
- ◇ If a normal **Shadow** is used to create the second layer, the letters will automatically be welded because of their proximity to one another. This may not be suitable for your application:

**For Sale**

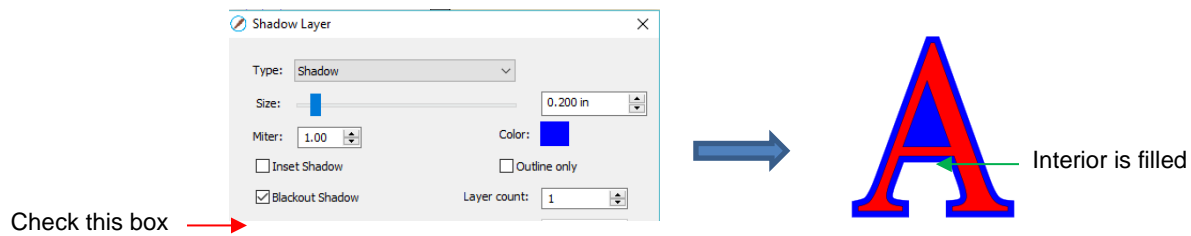
- ◇ Instead, create an **Inset Shadow** by checking the **Inset Shadow** option:



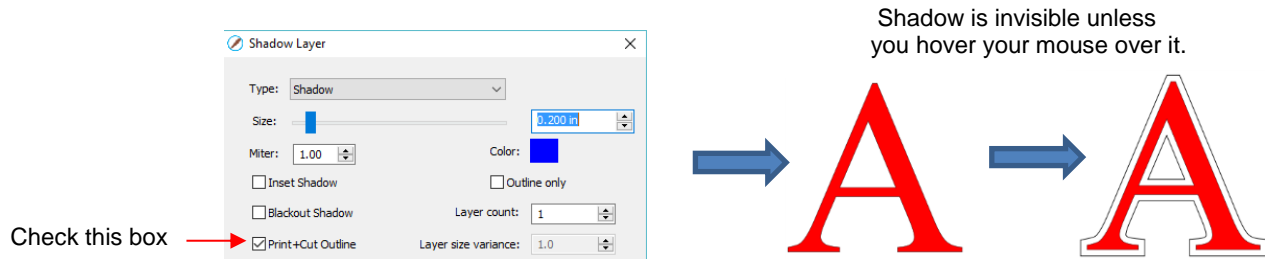
- **Outline only** can be checked to set the **Fill** on the shadow to **None**. The **Stroke** color will be whatever is indicated next to **Color**:



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



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



◇ Two print-and-cut examples for this function are:

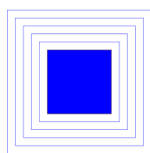
- Add a contour cut around a printed shape
- Cut just inside the boundaries of a printed image (in this case you also use the **Inset Shadow** option)

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

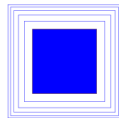
◇ **Layer count:** Total number of shadow layers to be created

◇ **Layer size variance:** If left at 1.0, the increasing thickness of each layer will be based on the original **Size** of the first shadow. If less than 1, the increasing thickness of each layer will be progressively smaller than the prior, based on the variance. If greater than 1, the increasing thickness of each layer will be progressively larger based on the variance.

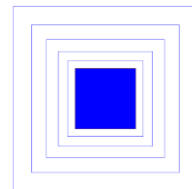
- For example, a square is used where the original shadow **Size** is 0.25 and the **Layer count** is set to 5. **Outline only** mode is also chosen so that the individual layers are easier to see. Note the different results when **Layer size variance** is set 1, 0.75 and 1.25:



Variance: 1.0

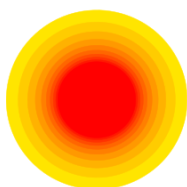


Variance: 0.75



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:

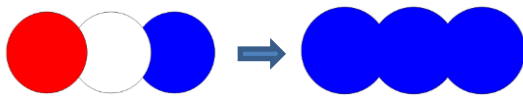


## 9.05 Boolean Operations

- Under **Path** on the **Menu Bar**, there are five Boolean operations that are very useful when designing cutting files. This section illustrates how each works and provides a practical example for each one.

### 9.05.1 Union

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

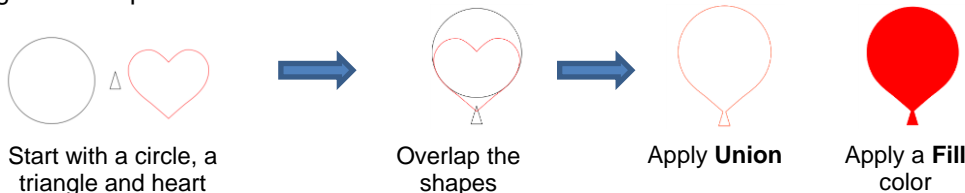


With a **Fill** color: before and after **Union**



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

- To apply this operation, select two or more shapes and use one of the following:
  - ◇ Go to **Path>Union**
  - ◇ Press **Alt+U**
  - ◇ Right-click and select **Path>Union**
- Sections 6.07 – 6.09* showed several examples of the **Union** operation applied to text. Here's an example using basic shapes and the **Union** function to create a balloon:



Start with a circle, a triangle and heart

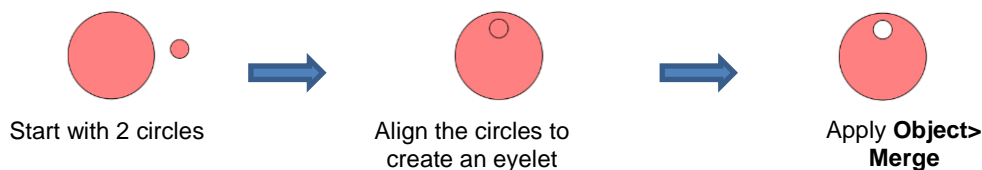
Overlap the shapes

Apply **Union**

Apply a **Fill** color

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

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

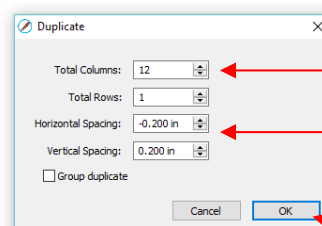


Start with 2 circles

Align the circles to create an eyelet

Apply **Object>Merge**

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



Increase **Total Columns**

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

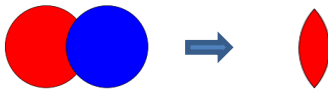
Click on **OK**

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



### 9.05.2 Intersection

- The **Intersection** operation is the opposite of the **Union** operation. Instead of removing overlap, the overlap is what remains. The color of the new shape will be that of the bottom shape:

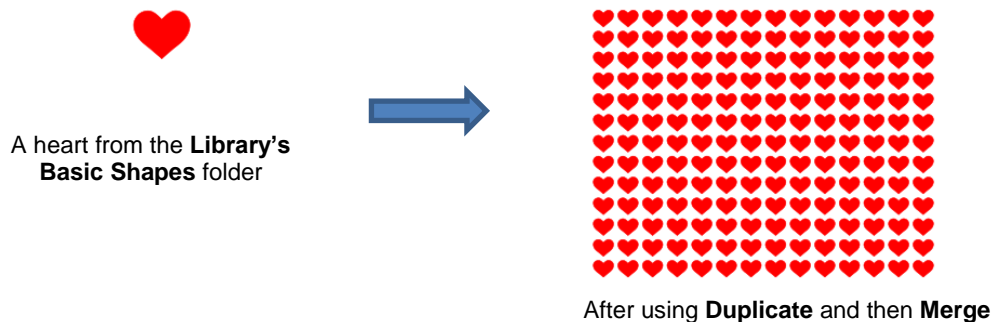


With a **Fill** color: before and after **Intersection**

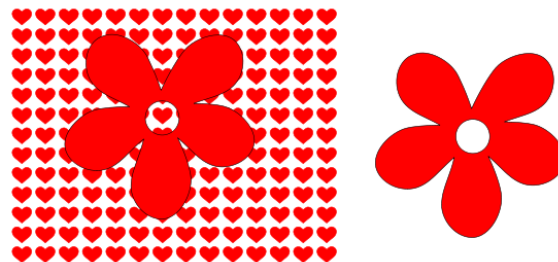


With no **Fill**: before and after **Intersection**

- To apply this operation, select two shapes and use one of the following:
  - ◇ Go to **Path>Intersection**
  - ◇ Right-click and select **Path>Intersection**
- One example involves filling a shape with a pattern:
  - ◇ This pattern was designed by using the **Duplicate** function to create a grid of hearts. Then, by applying **Object>Merge** on the hearts, it is now a single shape:



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



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

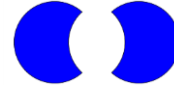
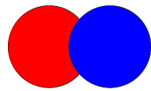


- ◇ Recolor the spare flower with a white **Fill** and a red **Stroke**. Then center the pattern with the spare flower. Perfect for a print and cut!



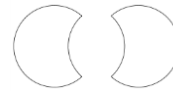
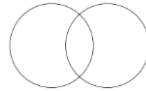
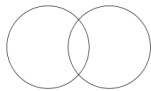
### 9.05.3 Exclude

- The **Exclude** operation subtracts the intersection of two shapes from both of the shapes. The color of the new shapes will be that of the upper shape.



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

After applying **Break Apart** and moving one of the shapes



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

After applying **Break Apart** and moving one of the shapes

- To apply this operation, select two shapes and use one of the following:
  - ◇ Go to **Path>Exclude**
  - ◇ Right-click and select **Path>Exclude**
- After applying, use **Object>Break Apart** if you need to move one shape away from the other.
- As an example, use the heart-filled flower from the prior section as a cut design on the front of a greeting card:
  - ◇ Start with a rounded rectangle as the card base (refer to *Section 9.03.2*):



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

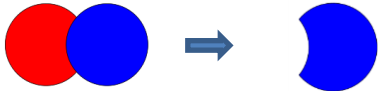


- ◇ Select the card and pattern and apply **Path>Exclude**:

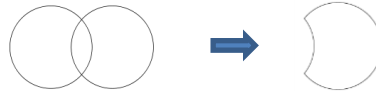


#### 9.05.4 Front Minus Back

- The **Front Minus Back** operation subtracts the intersection of two shapes from the front (or upper) shape, leaving only that front shape:



With a **Fill** color: before and after **Front Minus Back**



With no **Fill**: before and after **Front Minus Back**

- To apply this operation, select two shapes and use one of the following:
  - ◇ Go to **Path>Front Minus Back**
  - ◇ Right-click and select **Front Minus Back**
- An example involves adding the word HELLO to the card designed in *Section 9.05.3*.
  - ◇ Select a font and type out the letters. Add a rectangle so that the tops and the bottoms of the letters will just overlap the rectangle:



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



or when filled with color:

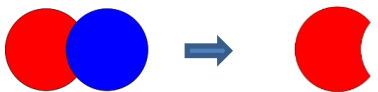


- ◇ Arrange the greeting on the front of the card designed in *Section 9.05.3*. Select both and apply either **Object>Merge** or **Path>Exclude** so that all internal shapes are cut before the outside card base:

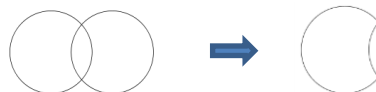


#### 9.05.5 Back Minus Front

- The **Back Minus Front** operation is the opposite of **Front Minus Back**. It subtracts the intersection of two shapes from the back (or bottom) shape, leaving only that back shape:



With a **Fill** color: before and after **Back Minus Front**



With no **Fill**: before and after **Back Minus Front**

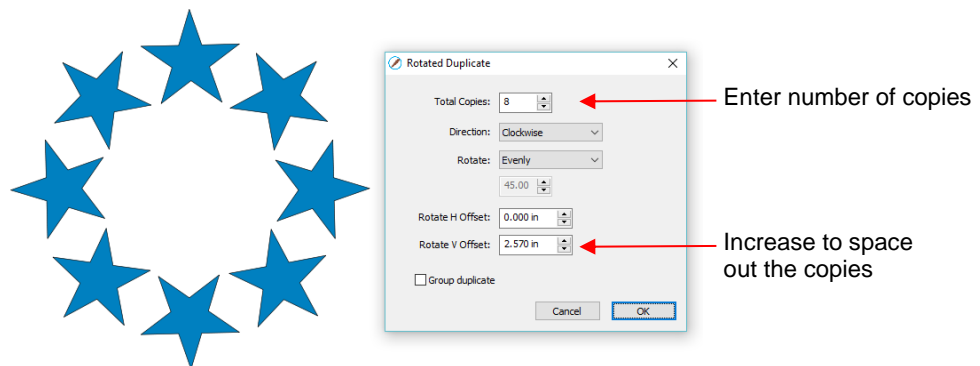
- To apply this operation, select two shapes and use one of the following
  - ◇ Go to **Path>Back Minus Front**
  - ◇ Right-click and select **Back Minus Front**
- Any examples for **Back Minus Front** are essentially the same as for **Front Minus Back**. When choosing which to use, just check the screen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

## 9.06 Duplicate Rotated

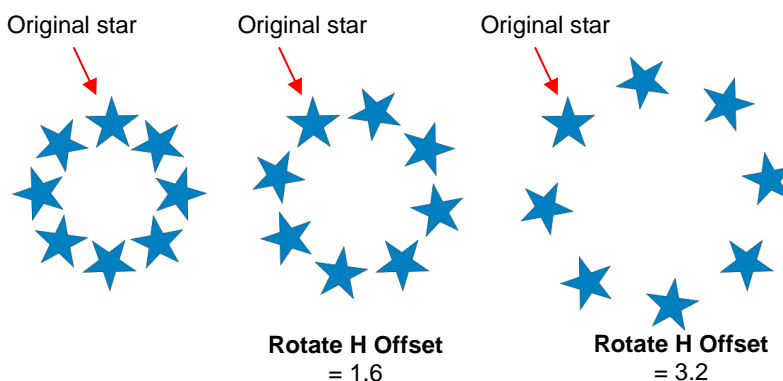
### Video

### 9.06.1 Duplicate Rotated Settings

- The **Duplicate Rotated** function allows you to make duplicates arranged in a circle or partial circle pattern.
- To access **Duplicate Rotated**, first select the shape(s) and then use either of the following:
  - ◇ Go to **Object>Duplicate Rotated**
  - ◇ Press **Ctrl+Shift+D**
- To illustrate how this works, start with a small shape. Select it and then activate the **Duplicate Rotated** function using either of the methods just mentioned. The following window opens:



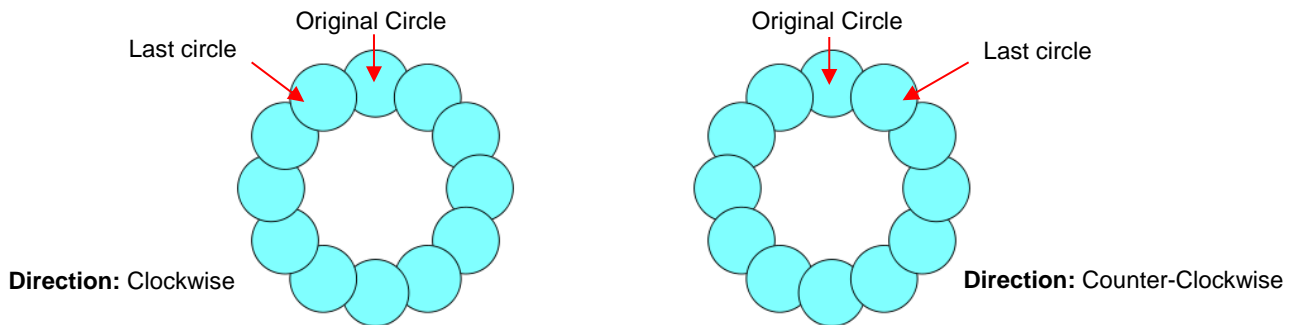
- ◇ Start by increasing the number of copies. If the shapes are overlapping too much, increase **Rotate V Offset** which is the distance from the center. Increasing the **Rotate H Offset** setting shifts the center of rotation toward the right:



- ◇ Because the stars must spread out in order to keep the original in its same position, one can then decrease the **Rotate V Offset** at the same time as increasing the **Rotate H Offset**, if you need to spread the shapes but keep the design in the current display area of SCAL.

- The **Direction** setting changes the order of the duplicates around the circle.

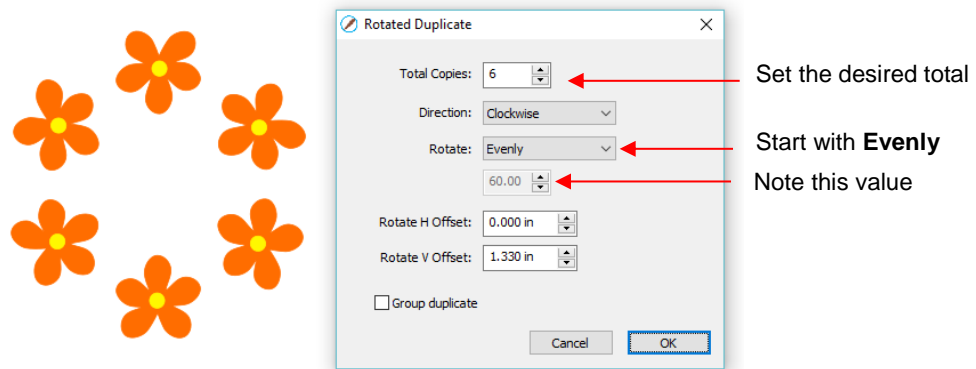
- ◇ With clockwise selected, the order of the shapes follows a clockwise progression so that the last copy is just to the left of the original at the top. You can visually see that circle is on top. The opposite is true if counter-clockwise is selected:



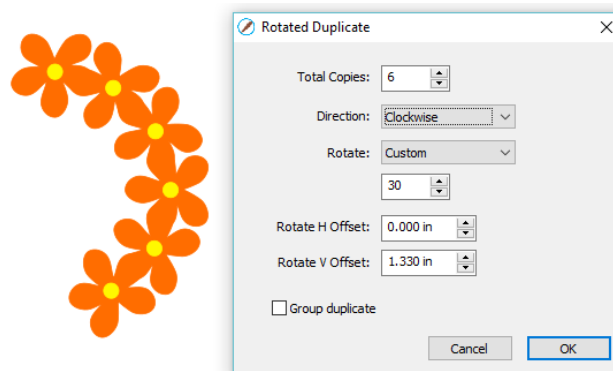
- ◇ Does it matter which **Direction** is used? Most likely, only if you need it for display purposes.

- **Rotate** has two options: **Evenly** and **Custom**. With **Evenly** selected, the copies are distributed evenly in a full 360° circle. But let's say you want a semi-circle of shapes:

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



- ◇ Change the **Rotate** to **Custom** and then, because you want a semi-circle of shapes, divide that value by 2. Thus, in this example, it will be changed to 30:



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

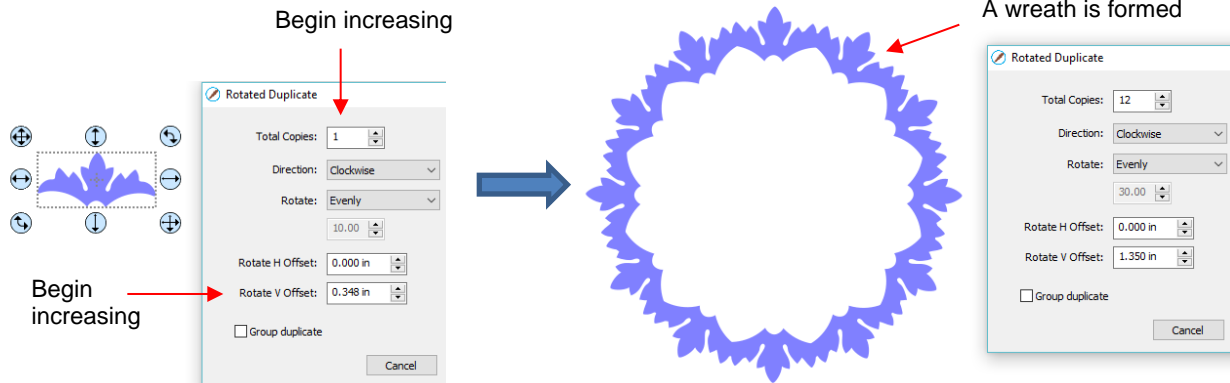


### 9.06.2 Using Duplicate Rotated to Design a Wreath

- Begin with a desired shape. In this example, a shape from the **Library's Swirls** folder will be used.



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



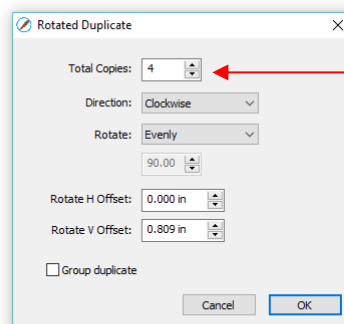
- After creating the pattern, go to **Path>Union** to remove the overlap and the shape is ready to cut.

### 9.06.3 Using Duplicate Rotated to Design a Frame

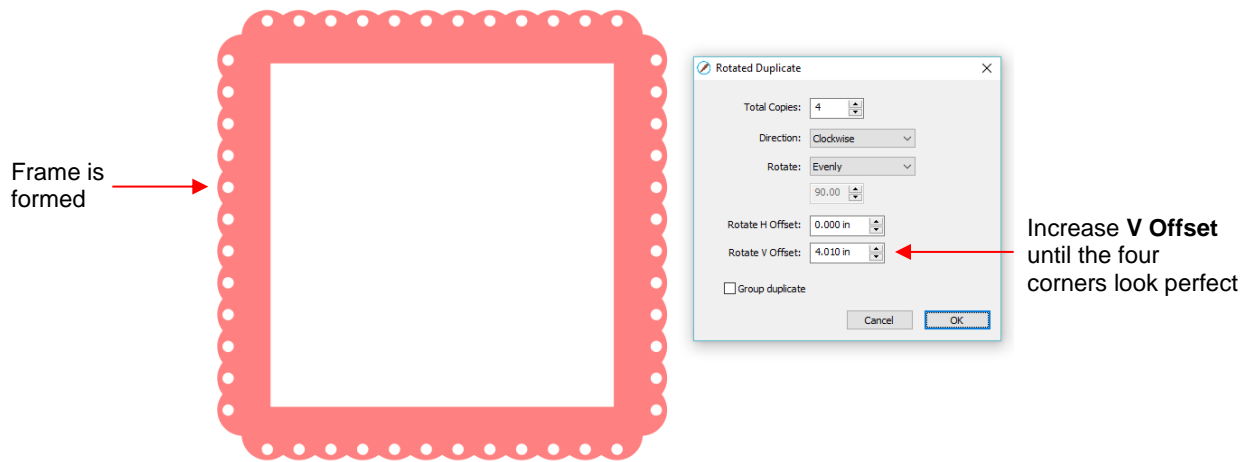
- In *Section 9.05.1*, the **Duplicate** and **Union** functions were used to create this scalloped border:



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



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



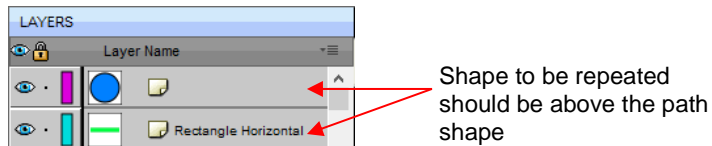
- Click on **OK** and then apply **Path>Union**.

## 9.07 Object on Path

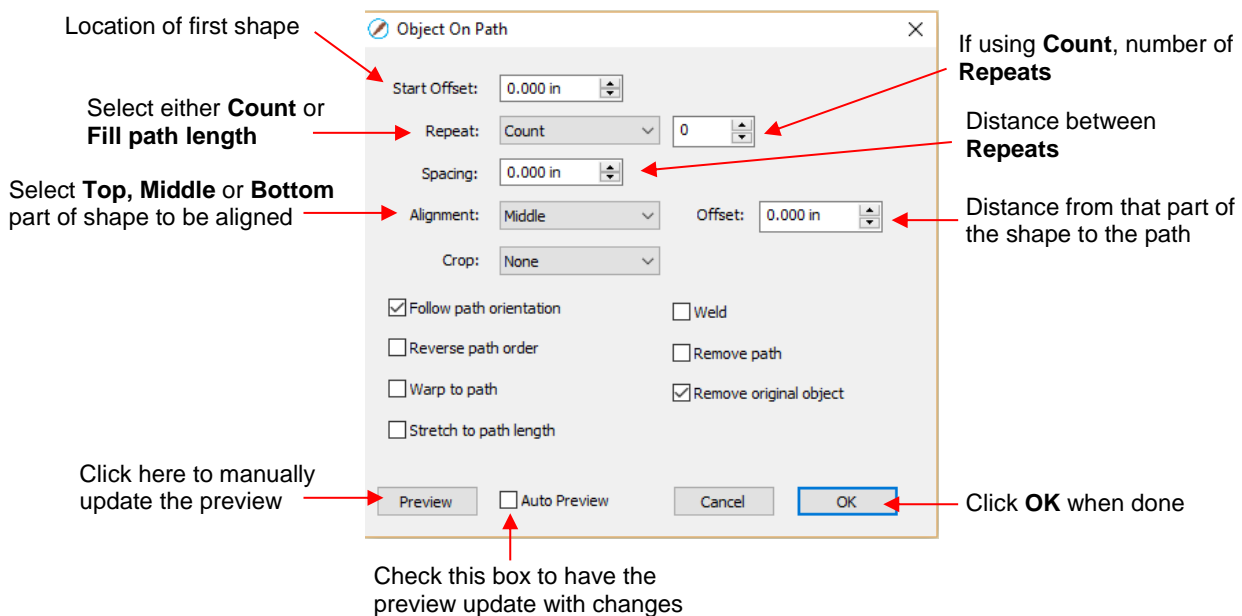
- The **Object on Path** function can be used to align repeats of a shape along the path of another shape:



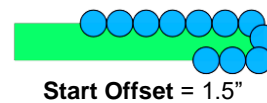
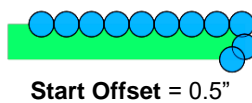
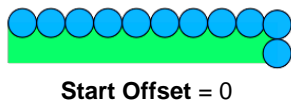
- IMPORTANT:** Before applying the function, check the **Layers Panel** to make sure the shape to be repeated is on a higher layer than the path:



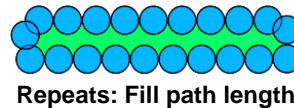
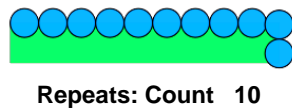
- To open the **Object on Path** window, select both the path and the shape to be repeated and go to **Effects>Object on Path**. Because there are so many settings in this window, only about half will be explained at this point:



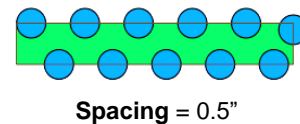
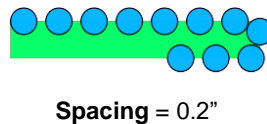
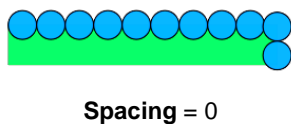
- ◇ **Start Offset:** This is the distance from the left side of the path to the location of the first shape:



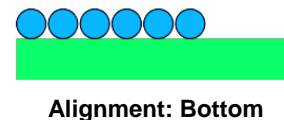
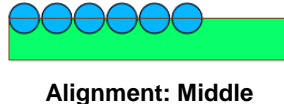
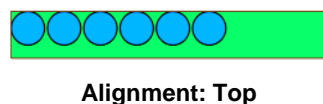
- ◇ **Repeat:** Choose **Count** if you want to specify how many copies to place along the path. Choose **Fill Path length** if you want the program to automatically fill in the number of repeats that will fill the path using the **spacing** you enter:



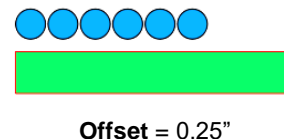
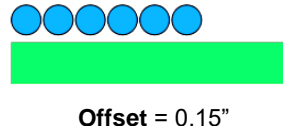
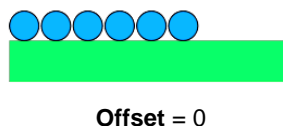
- ◇ **Spacing:** Enter the desired spacing between repeats:



- ◇ **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:

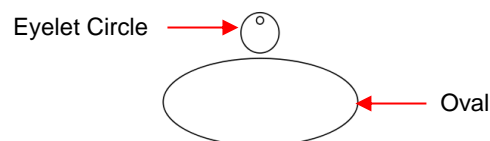


- ◇ **Offset:** This is how far from the path the repeats will be positioned. For example, if you choose **Bottom** for **Alignment** and then 0.15" or 0.25" for **Offset**, then the top of the shapes will be 0.15" or 0.25" above the path:

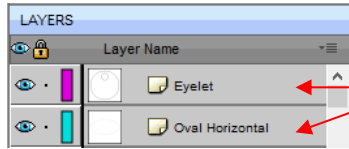


### 9.07.1 Designing a Scalloped Oval

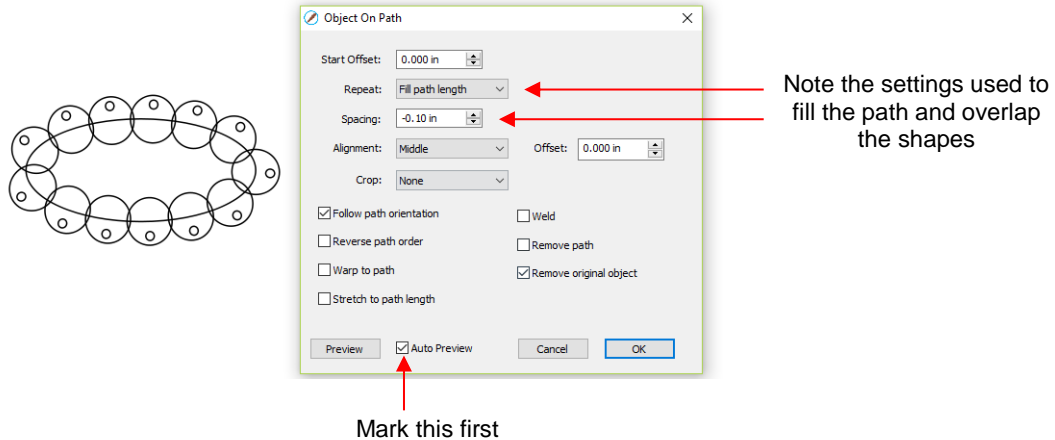
- Create an eyelet circle as described in *Section 9.05.1*. Add an oval from the **Library's Basic Shapes** and resize both shapes as shown in the following screenshot:



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

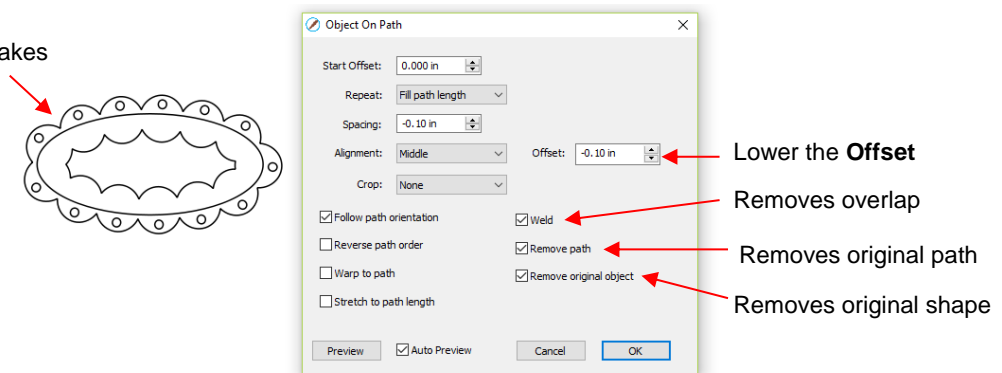


- Select the shapes and open the **Object on Path** window using **Effects>Object on Path**. Begin by marking the **Auto Preview** option so that all changes will be immediately reflected. Then choose **Fill path length** so the shapes will be distributed over the entire path. Set the **Spacing** to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



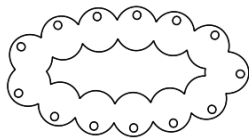
- Next the **Offset** is decreased to soften the scallop. Also a few new settings are noted as shown and described below:

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

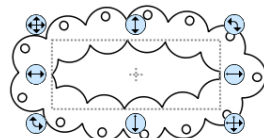


- ◇ **Weld:** Mark this box if you want the shapes welded together, as shown in the screenshot.
- ◇ **Remove path:** Choose if you will no longer need the path shape (in this case, the oval)
- ◇ **Remove original object:** Choose if you will no longer need the original shape (in this case, the eyelet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

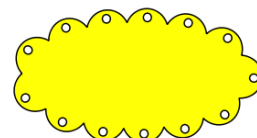
- Click on **OK** and the scalloped oval is mostly complete. To remove the internal scallop, apply **Object>Break Apart**. Carefully select the internal scallop shape and delete. Then marquee-select the remaining scallop border with eyelet circles and apply **Object>Merge**:



After clicking on **OK**



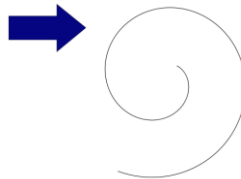
After applying **Break Apart**, select inner scallop



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

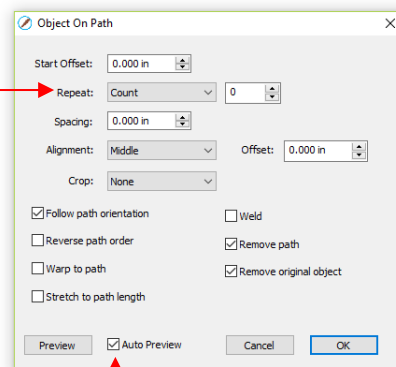
### 9.07.2 Warp a Shape to a Path

- The **Object on Path** function can also be used to stretch a shape to fit a path. For example, let's start with an arrow (from the **Library's Arrows**) and a spiral (refer to *Section 9.03.7*):

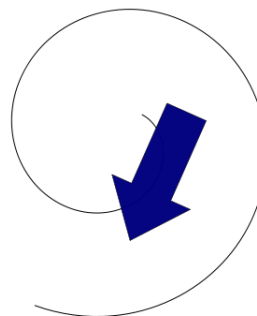


- Verify that the arrow is above the spiral on the **Layers Panel**. Then select both and go to **Effects>Object on Path**. Note that since there is only one shape involved, **Repeat** is left at **Count** and set to 0:

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



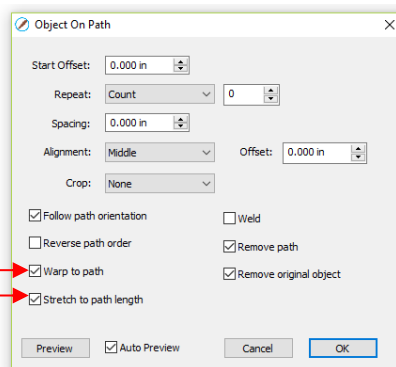
Mark this first



Original arrow appears positioned at start of spiral

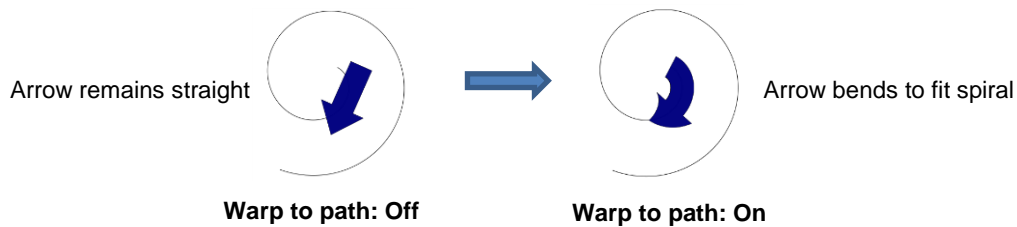
- Next, two new settings are applied:

Mark these two options

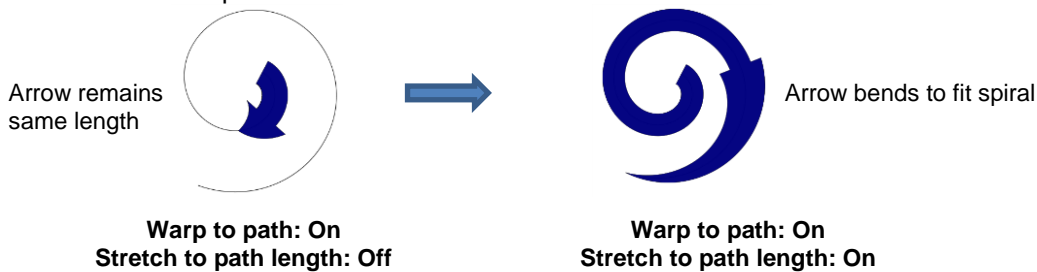


Arrow is now curved and stretched to fit the spiral

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



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

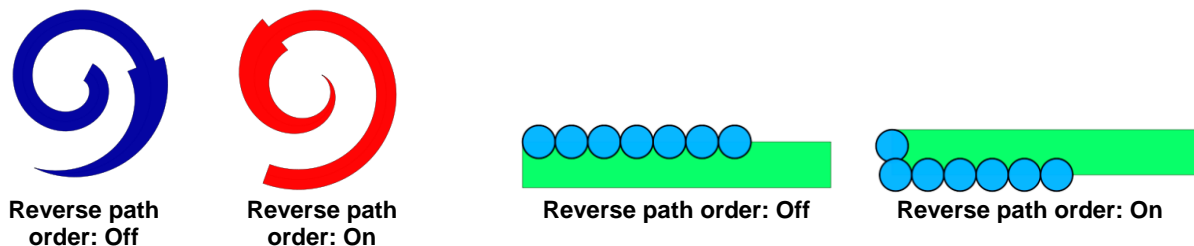


### 9.07.3 Remaining Settings

- The two remaining settings in the **Object On Path** window are:
  - ◇ **Follow path orientation:** With this setting turned on, the repeats will rotate so that they stay aligned with the path. With the setting turned off, the shapes never rotate:



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



### 9.08 Wrapper

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



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

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 itself

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

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

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

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

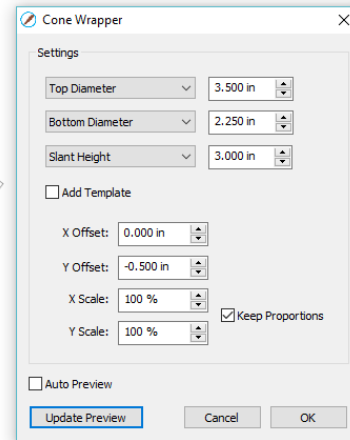
Click here to see latest changes before accepting

Click **OK** when done

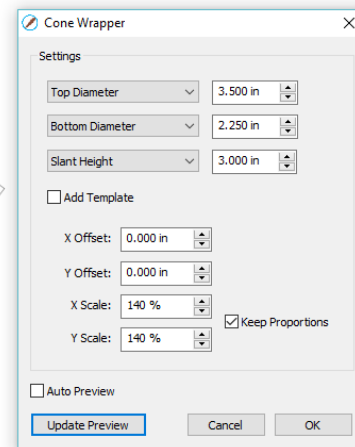
- ◇ Measure the cup: **Top Diameter**, **Bottom Diameter** and along the side from bottom to top (**Slant Height**). Enter those as shown in the screenshot. Alternatively, you can measure the radius or the circumference, as well as use the vertical height versus the horizontal height. These other choices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



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



- ◇ Adjust the **X Scale** and/or **Y Scale** to resize the design, if needed. If you want to scale proportionately, mark the **Keep Proportions** box:



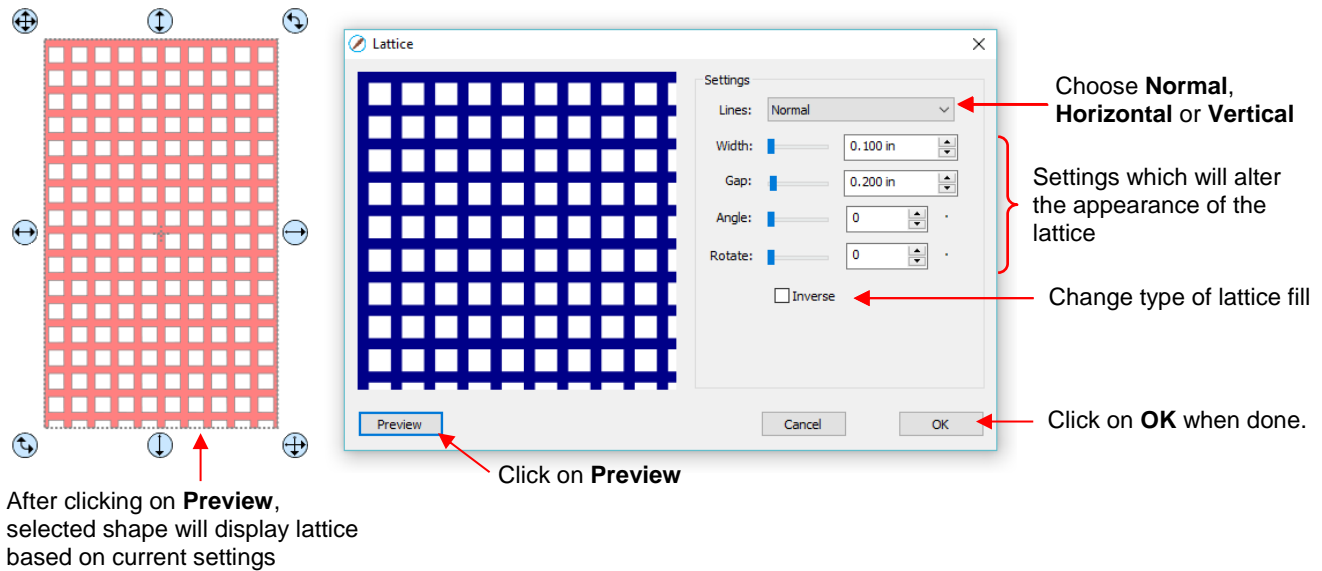
- ◇ Remember to click on **Update Preview** after each change in the settings. **Auto Preview** doesn't currently work.
- After clicking on **OK**, the fill color returns to the design and the project is ready for completion:



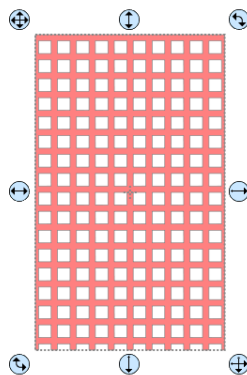
## 9.09 Lattice

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

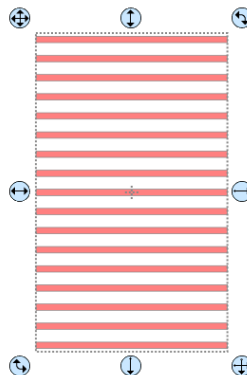




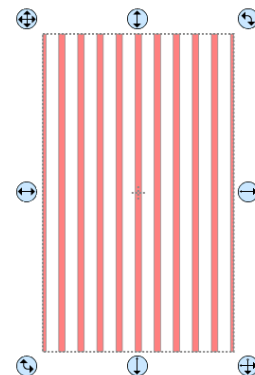
- ◇ **Lines:** Besides the traditional crisscross pattern, you can also choose to only have horizontal lines or only have vertical lines:



**Lines:** Normal

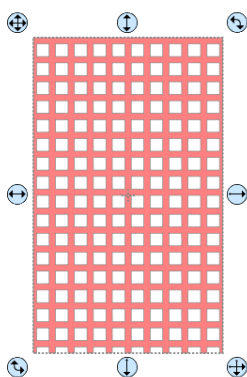


**Lines:** Horizontal Only

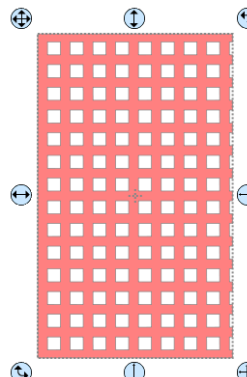


**Lines:** Vertical Only

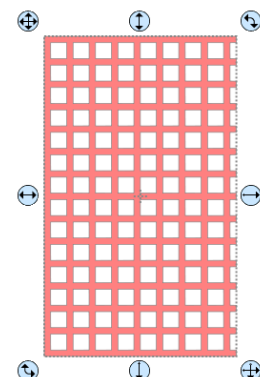
- ◇ Change **Width** and **Gap** to produce desired appearance. Remember that if the lattice pattern is too small, it might be difficult to cut:



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

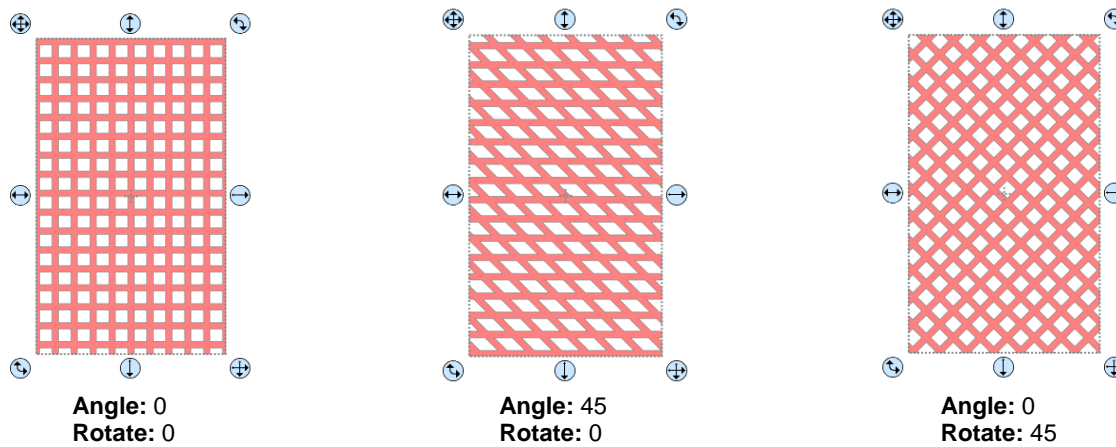


**Width:** 0.15 in  
**Gap:** 0.2 in

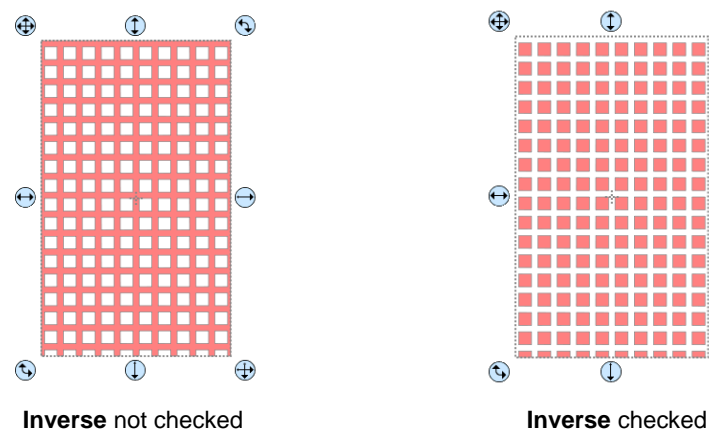


**Width:** 0.1 in  
**Gap:** 0.25 in

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

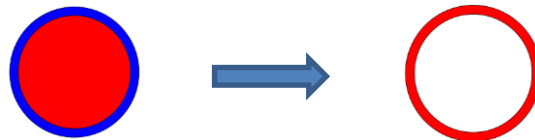


◇ **Inverse** is used to create a kind of negative lattice (an example will follow later in this section):

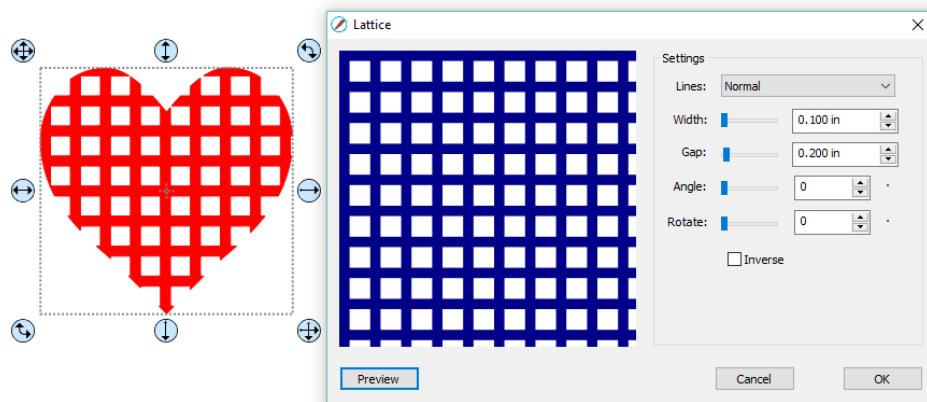


- An example of when **Inverse** would not be checked is when you want to attach/weld a latticed shape to something else. In the following example, a latticed heart is attached to the center of a ring:

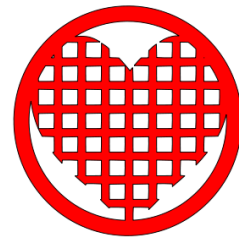
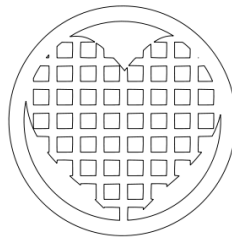
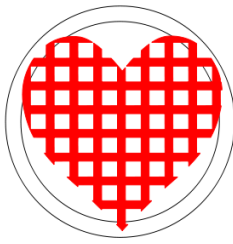
◇ A ring is created by applying **Object>Merge** to two centered circles:



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



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



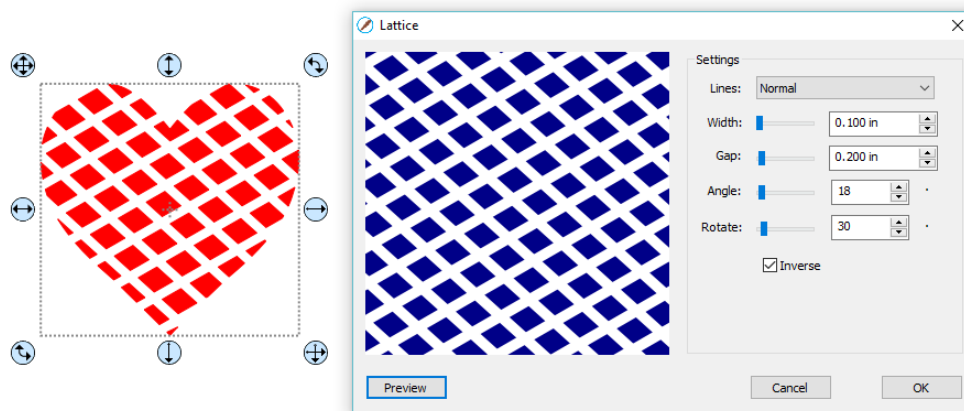
Remove **Fill** from ring  
to make overlap easier  
to see

After applying  
**Path>Union**

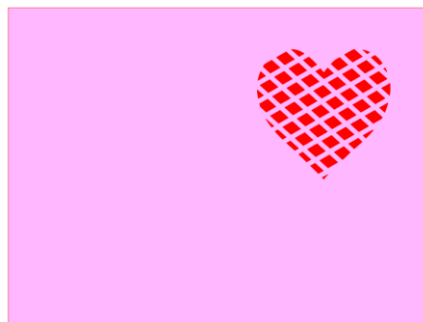
Set **Fill** to red again

- An example of when **Inverse** would be checked is when you want a lattice aperture cut from the front of a greeting card:

◇ Using the same heart as above, make sure **Inverse** is selected:



◇ Arrange the latticed heart over a base greeting card:



◇ Select all and go to **Object>Merge**. The card is complete:



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

## **9.10 Rhinestones**

- SCAL's **Rhinestones** feature provides both outlining and horizontal fill of shapes with the size of circles needed for your rhinestones and the desired spacing. After selecting a shape, the feature can be accessed in either of the following ways:
  - ◇ Go to **Effects>Rhinestones**
  - ◇ Right-click and select **Appearance>Rhinestones**

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

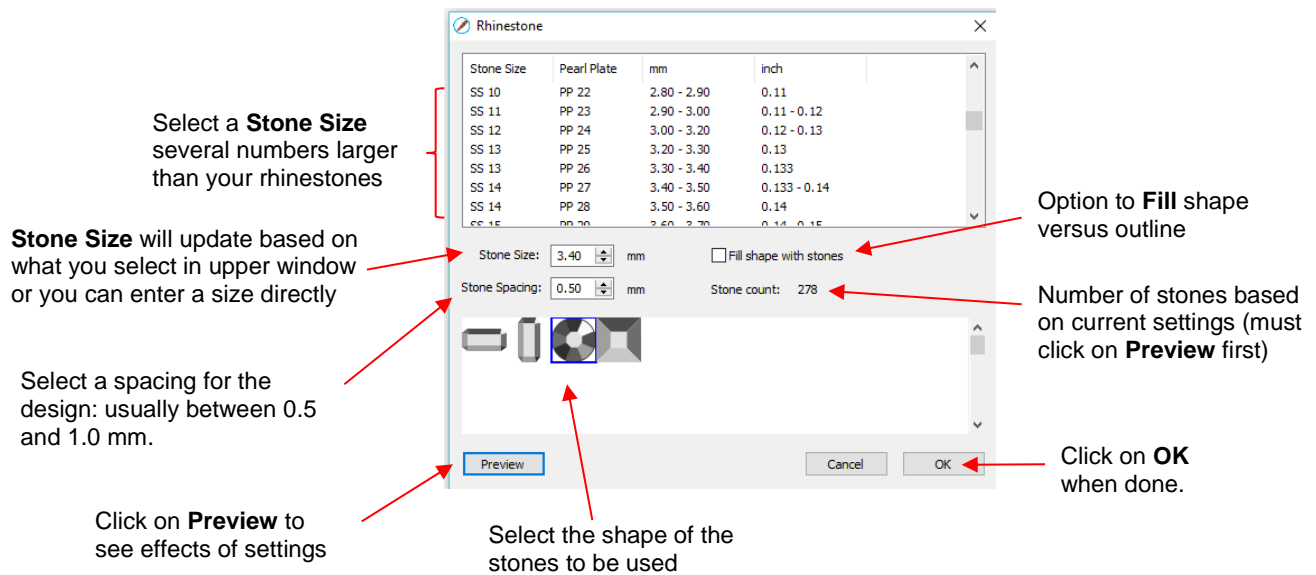
- There are some very specific guidelines to follow when designing a rhinestone pattern:
  - ◇ In general, you want to size the shape before applying the rhinestone circles. If you later want to resize the design, SCAL does have the ability to regenerate the rhinestone pattern, maintaining the original selected stone size and spacing. But in order to have a good sense of how the design is going to appear on your garment and to make sure lettering is readable, you want to design close to the target size.
  - ◇ **IMPORTANT:** Always make a backup copy of your design before entering the **Rhinestone** window because the original design will be replaced with the new rhinestone pattern. You might later want to use that same original design but apply a different size rhinestone or create a shadow layer from it, or some other change.
  - ◇ The circle size selected will need to be larger than the stone size you purchase. As a general rule, select a size three numbers larger than your stones. Thus, if you purchased SS10 stones, then in the rhinestone design window, you would select SS13 stones. This larger size will allow the SS10 stones to more easily brush into the holes, saving a lot of time and tedium.
  - ◇ When selecting a font to use, be leery of "fancy fonts." You want the lettering to be readable after it is converted to circles. When in doubt, have someone who doesn't know the words you've used attempt to read the rhinestone design on your monitor. If they cannot decipher your words, then try a more basic font.

### **9.10.2 Rhinestone Outline**

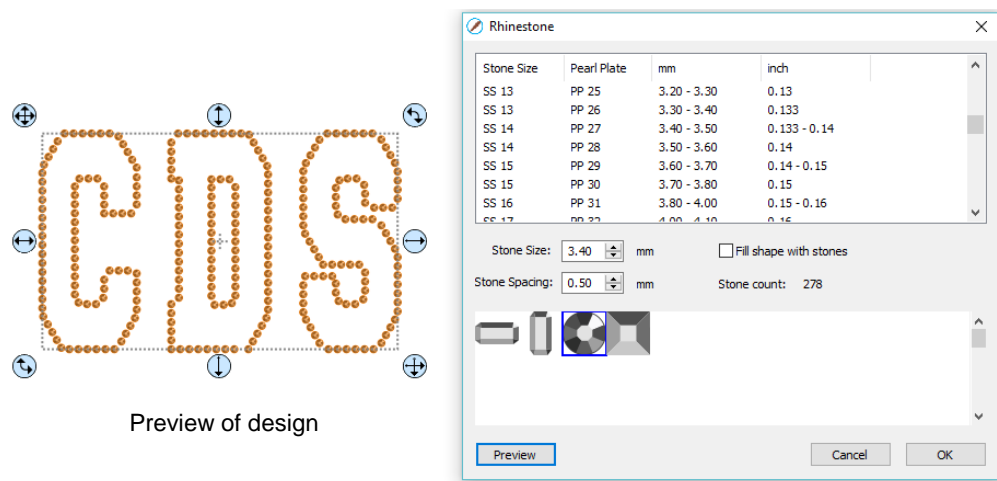
- In this example, the initials from a high school will be outlined. As mentioned previously, the first step is to size the width and height of the design. Make sure there is enough space between the letters so that the circles will not overlap. Also, you may want to resize the lettering vertically,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



- To apply a rhinestone outline, first make a backup copy of the shape. Then select the shape and go to **Effects>Rhinestones**:



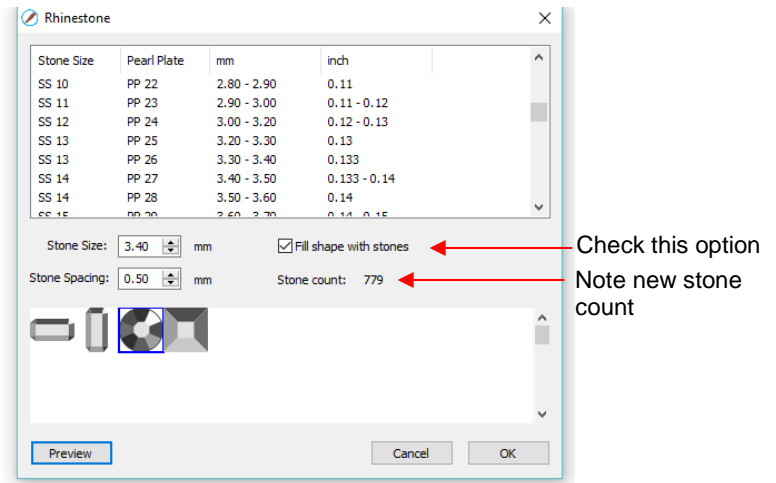
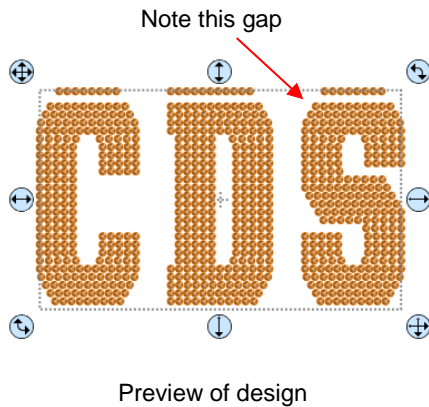
- After inputting the initial settings, click on **Preview** and your selected design will be outlined with simulated stones:



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

### 9.10.3 Rhinestone Fill

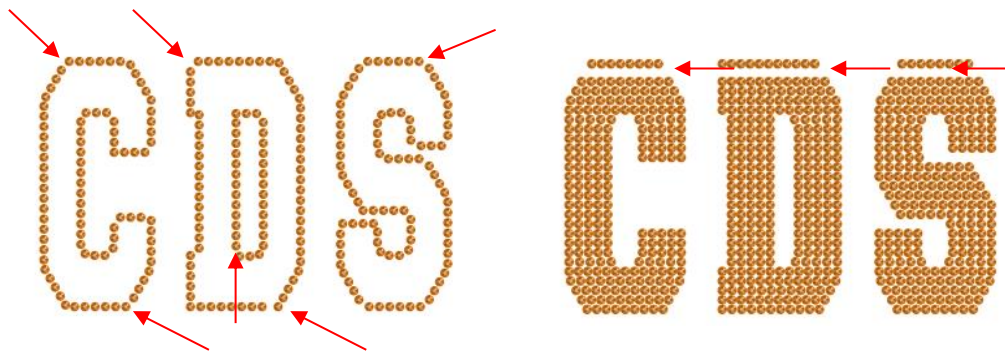
- Another option in the **Rhinestone** window is **Fill shape with stones**. Instead of outlining the shape, the image will be filled with circles in horizontal rows. In our prior example, the same letters will now appear like this:



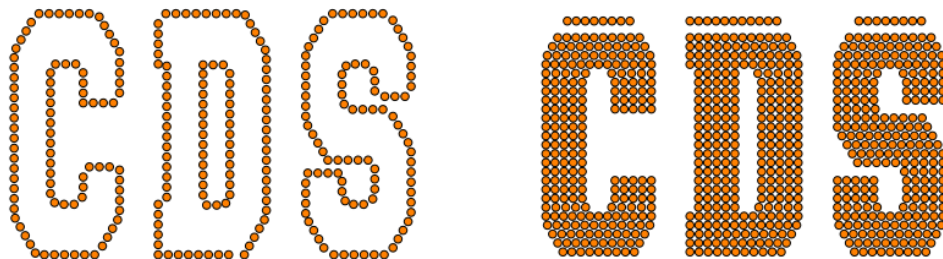
- The gap in the design is one of the inconsistencies that will sometimes occur with automatic fill algorithms. Thus, all rhinestone designs will need some editing as covered in *Section 9.10.4*. If you wish to restore the simulation after editing, be sure to record the settings you used before clicking on **OK**.
- Also, note the increase in the number of stones as a result of switching to a line fill. Rhinestones are typically sold by the gross and 1 gross equals ~ 144 stones. Thus, this design would require over 5 gross of stones compared to just under 2 gross for the outline version.

#### 9.10.4 Editing Rhinestone Designs


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

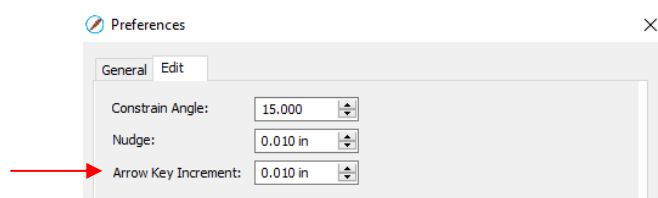


- The first step is to break the design so that individual circles can be moved. Select the pattern and apply **Object>Break Apart** or **Ctrl-B**. The simulation will vanish but this will be remedied:

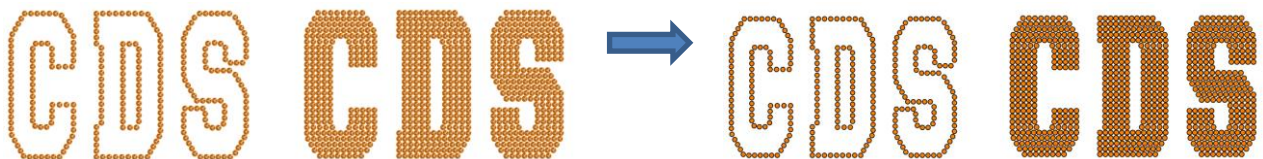




- To restore the simulation, select the design and reopen the **Rhinestone** window. Enter the same original settings just used, including selecting the same stone again. Click on **OK** and the simulation will return. But you will now be able to individually select stones and move them or delete them.
- The following list shows the most common functions applied when editing rhinestone designs:
  - ◇ Use the **Zoom** functions (*Section 3.09*) to move in close for easier selection of individual or small groups of circles
  - ◇ Use the **Lasso Selection** tool  (*Section 5.01*) to more easily select a group of circles
  - ◇ To quickly add a circle, select one and then hold the **Alt** key while dragging a copy to its new location
  - ◇ To delete multiple circles, hold the **Delete** key while clicking on individual circles
  - ◇ Use the arrow keys on your keyboard to move a circle or row of circles in smaller increments. It's advisable to change the increment to 0.01" (0.25 mm) by going to **Edit>Preferences** (or, on a Mac, press **Command + ,**). Then click on the **Edit** tab and change the **Arrow Key Increment**, as shown here:

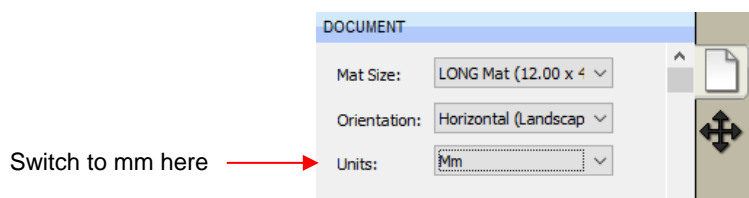


- ◇ To realign a row or column of circles, use the alignment functions covered in *Section 5.17.2*
- ◇ To respace a row or column of circles, use the spacing functions covered in *Section 5.18.2*
- Sometimes the circles you want to re-space equally may fall closer to a 45° angle versus vertically or horizontally. Select your entire design and rotate until the line of circles is closer to vertical or horizontal. Re-space the circles and then rotate back into place.
- After editing the design, you may wish to group the design to avoid inadvertently moving one or more stones out of place. To do that select the design and go to **Object>Group** or apply **Ctrl+G**.
- If you have a shape that has a **Rhinestone** effect applied and want to remove it (even after the file has been saved and re-opened), select the shape and go to **Object>Remove Effects**.

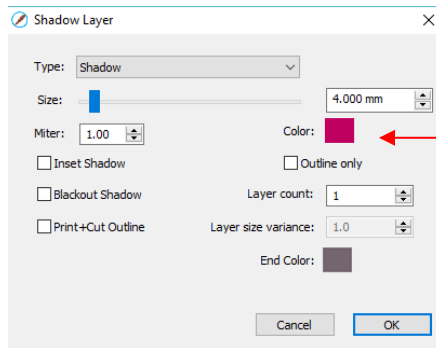


### 9.10.5 Additional Tips on Rhinestone Designing

- If you want to outline your design, then create the outline first using the **Shadow Layer** function (*Section 9.04*). Choose a **Shadow Size** at least the size of the circles plus the spacing. Otherwise, the stones will overlap. Since rhinestone design programs work in metric, it's easier if you temporarily change the units in SCAL to mm. This setting is on the **Document Panel**:



- For the following example, a swirl design from the **Library** is added to the **Cutting Mat** and sized for a T-shirt. The same settings for SS 10 stones will be used - the circles will be 3.4 mm in diameter and the spacing will be 0.5 mm. Thus, the **Shadow Size** needs to be at least 3.9 mm. So, just to be safe, a **Shadow Size** of 4.0 mm will be entered:

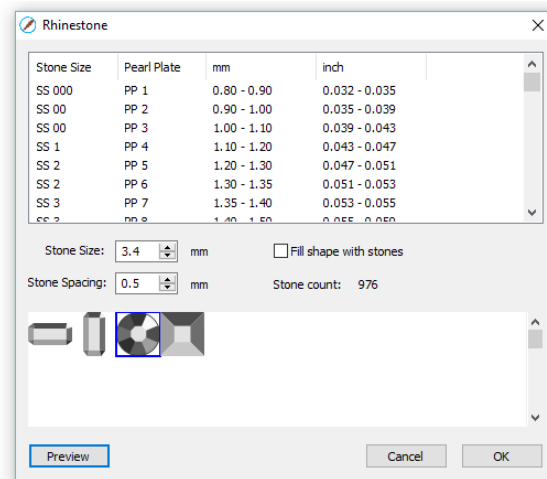
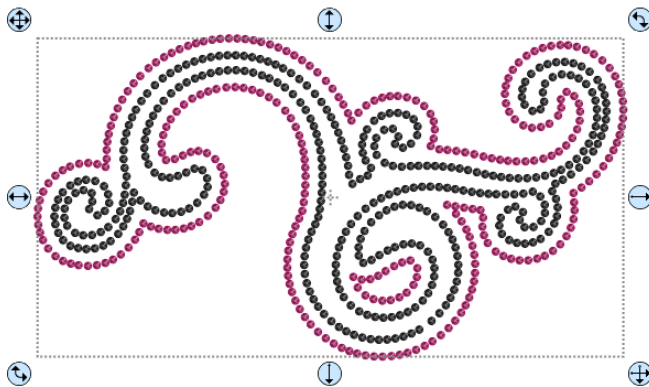


Enter **Shadow Size**

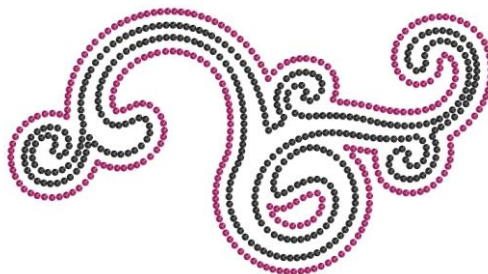
Select a color for the stones



- Next, select the design and the shadow and make a backup copy. Then go to the **Rhinestone** window. Since the same settings will be used for both the original design and the outline, both can have the rhinestone effect applied in the same step:



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



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

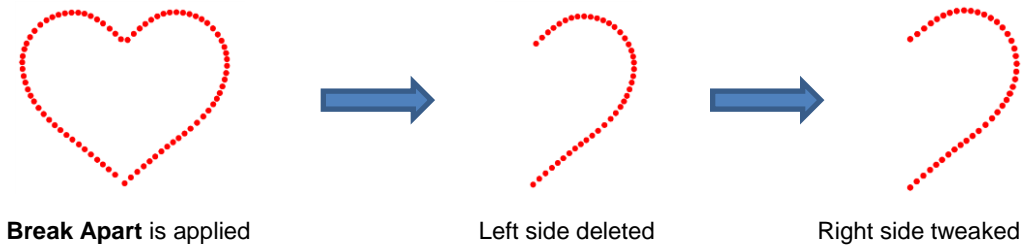
◇ This heart outline is clearly not symmetrical:



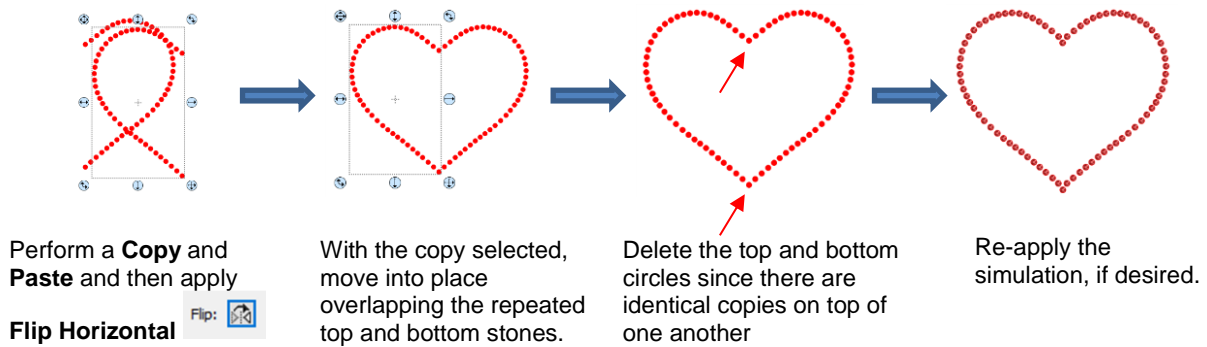
Right half of heart is not symmetrical with left half



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



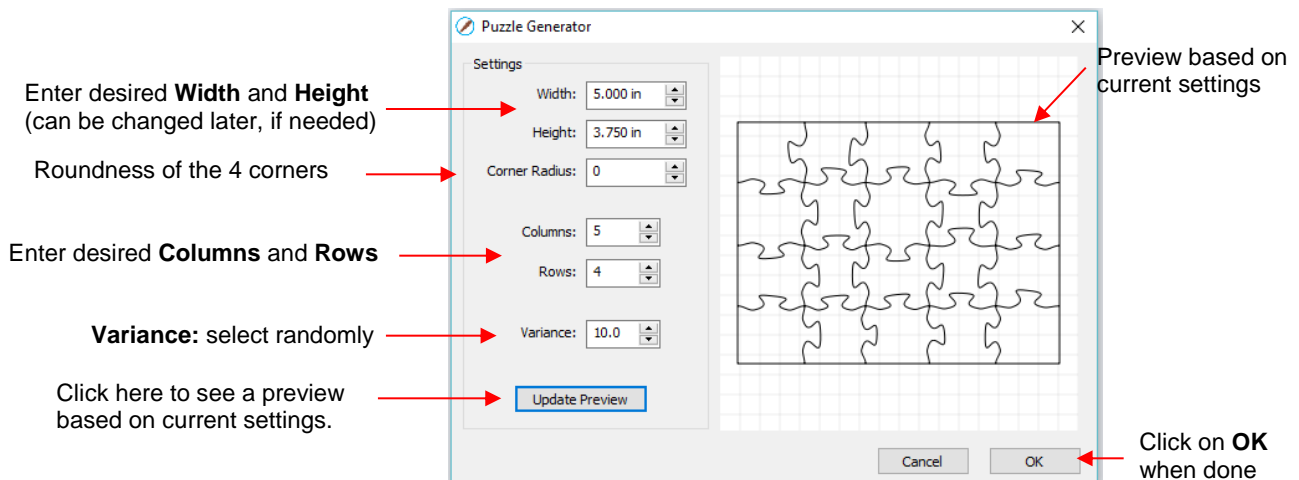
- ◇ Select the tweaked design and then perform the following steps shown:



- A final tip: If you plan to do a lot of rhinestone applications, create and cut a template with small patterns (~15 – 20 circles) in different sizes so that you can test brush your rhinestones to find out the optimum size to use when designing. A difference of just 0.1 or 0.2 mm can affect how easily the stones will brush into a pattern right side up. If the size is too small, the stone will tend to not fall in. If the size is too large, then the ones that land right side up will tend to get flipped over by the brush. Also, stones can vary slightly in size from one manufacturer to the next and also from one color to the next. Further, the size of the cut holes can vary slightly from one template material to the next.

## 9.11 Jigsaw Puzzle

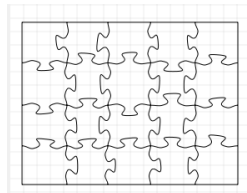
- The **Jigsaw Puzzle** feature will generate a rectangular jigsaw pattern with a number of options from which to choose. To open the window, go to **Effects>Puzzle Generator**:



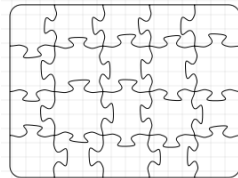
- ◇ **Width and Height:** If you plan to apply this puzzle over a specific image, you may want to choose dimensions that correspond to your image. For example, let's assume you have a photo that is 5" x

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

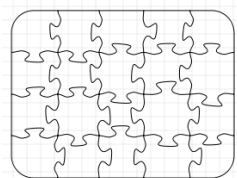
- ◇ **Corner Radius:** With a setting of 0, the corners of the rectangle are 90°. If you want rounded corners, increase this setting:



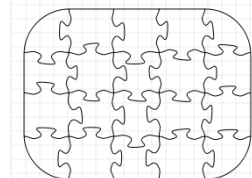
**Corner Radius = 0**



**Corner Radius = 0.25**

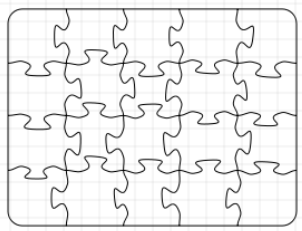


**Corner Radius = 0.5**

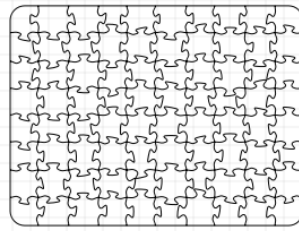


**Corner Radius = 1.0**

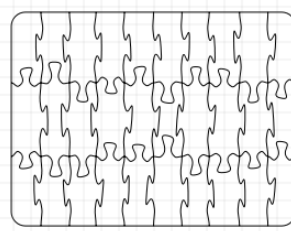
- ◇ **Columns and Rows:** To keep the shapes from becoming too distorted, make the number of **Columns** and **Rows** similar to the dimensions. If you want more pieces, then increase the number of **Columns** and **Rows** proportionately. For example, instead of having 5 **Columns** and 4 **Rows**, double the number to 10 **Columns** and 8 **Rows**. But don't use, for example, 10 **Columns** and 3 **Rows** with these dimensions:



**5 Columns, 4 Rows**



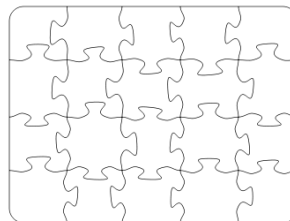
**10 Columns, 8 Rows**



**10 Columns, 3 Rows**

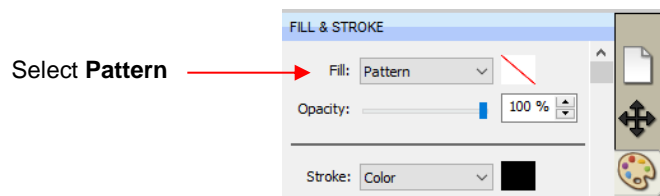
- ◇ **Variance:** This setting can be used to make sure one puzzle is not identical to the next, if all other settings are the same.

- When you are satisfied with the appearance of your puzzle pieces, click on **OK** and the puzzle will be on the **Cutting Mat**:



- For a print and cut application:

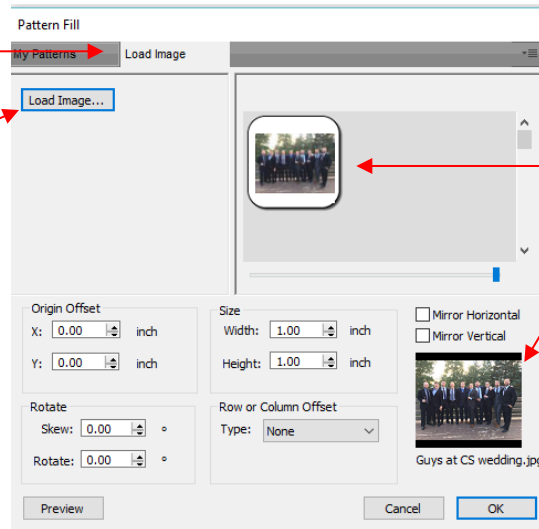
- ◇ Select the shape and, on the **Fill & Stroke Panel**, select **Pattern** from the **Fill** menu:



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

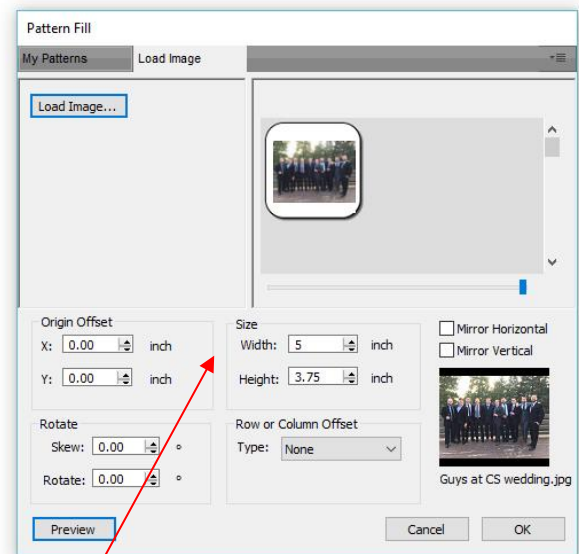
Select **Load Image** tab

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



Click on image and it will appear below

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



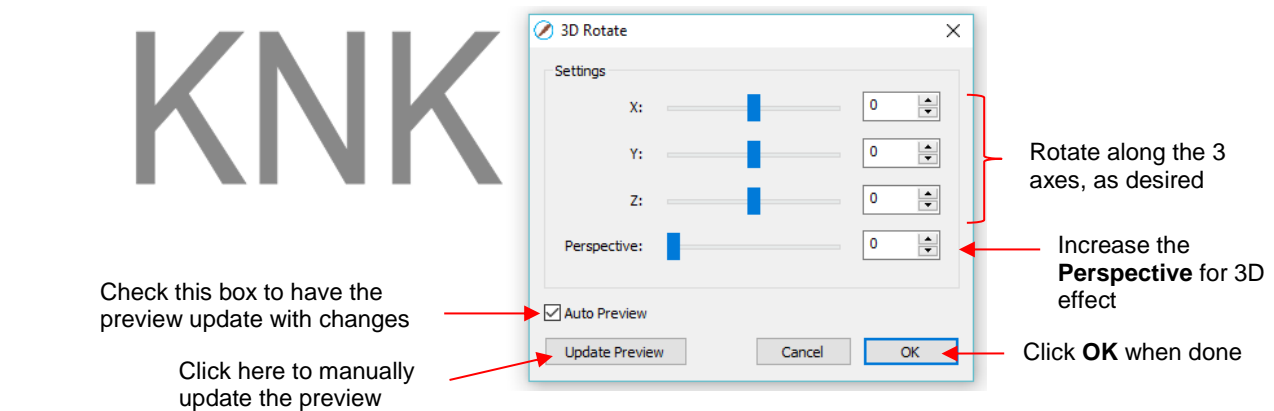
Enter same dimensions as were used in the **Generate Puzzle** window

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

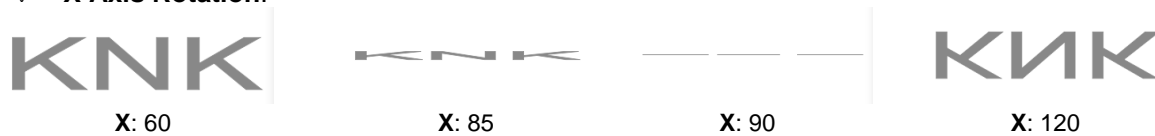


## 9.12 3D Rotate

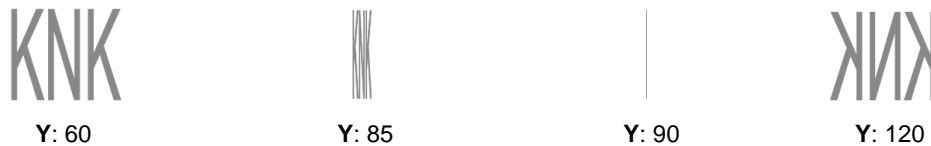
- The **3D Rotate** function is used to rotate a shape along the X, Y, and/or Z axis. To access this function, select a shape and go to **Effects>3D Rotate**. In the following example, text will be used to show the effects of the settings:



### ◇ X Axis Rotation:



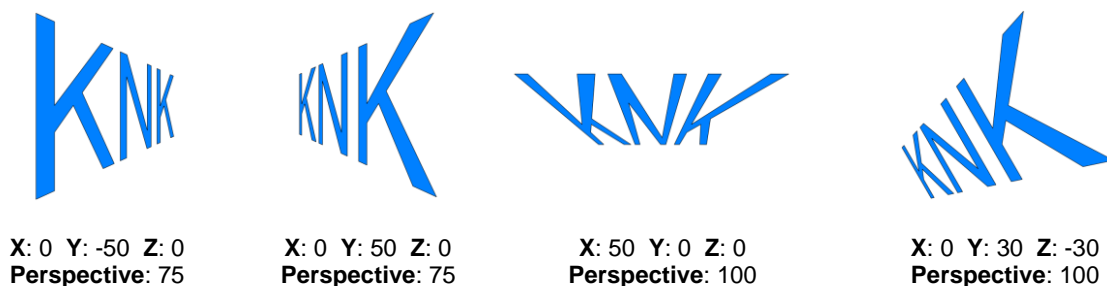
### ◇ Y Axis Rotation:



### ◇ Z Axis Rotation:

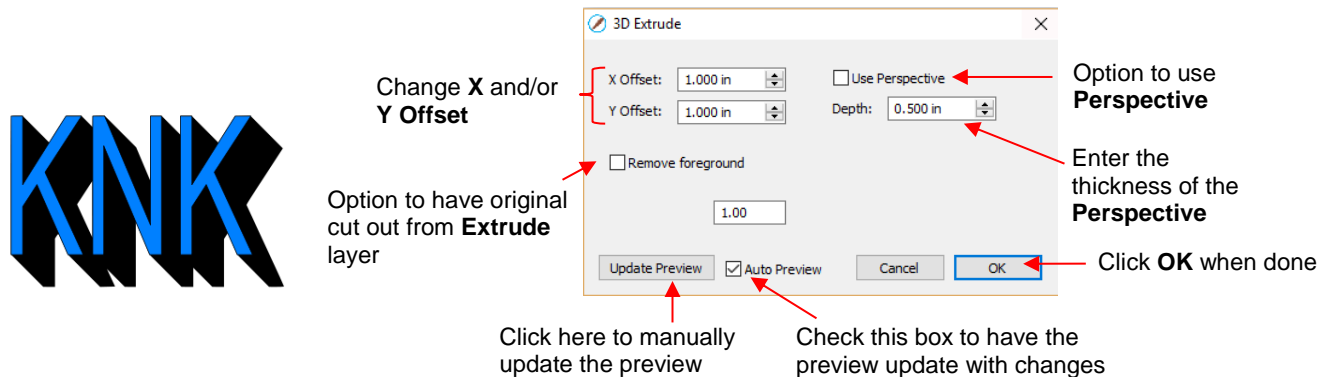


- ◇ **Perspective:** This is where the fun begins. Combining this setting with another rotation provides the 3D illusion. Here are examples:

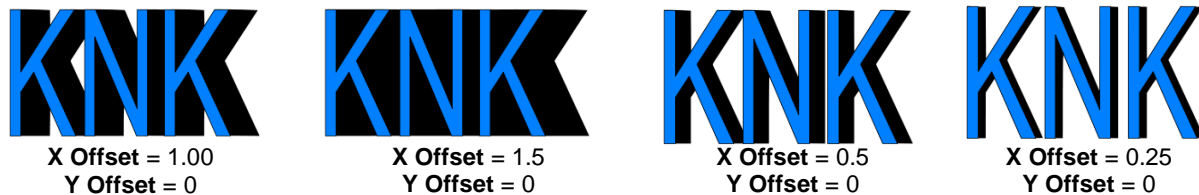


### 9.13 3D Extrude (SCAL PRO only)

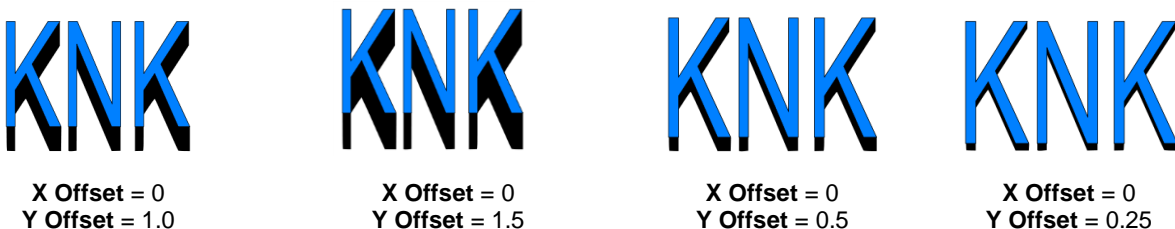
- The **3D Extrude** is used to create a cast or 3D shadow. To access this function, select a shape and go to **Effects>3D Extrude**. In the following example, text will be used to show the effects of the settings:



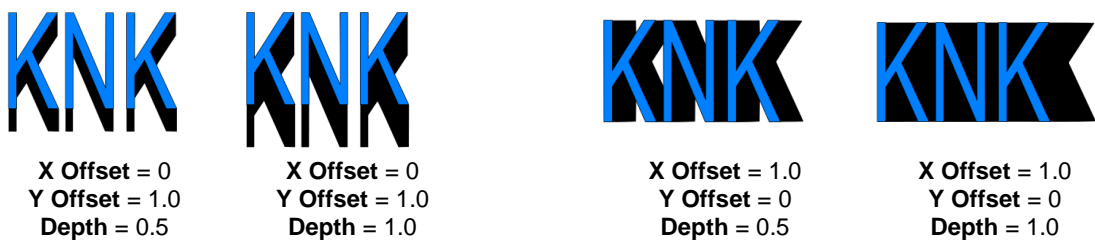
- ◇ **X Offset:** Increasing **X Offset** will extend the shadow to the right while decreasing it will retract the shadow towards the left. Note that **Y Offset** has been set to 0:



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



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

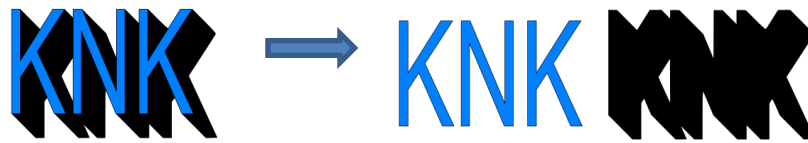


- ◇ **Use Perspective** provides a vanishing point effect:

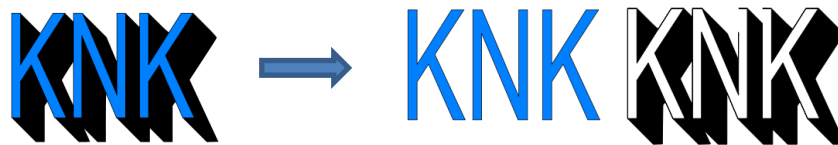


◇ **Remove foreground:**

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

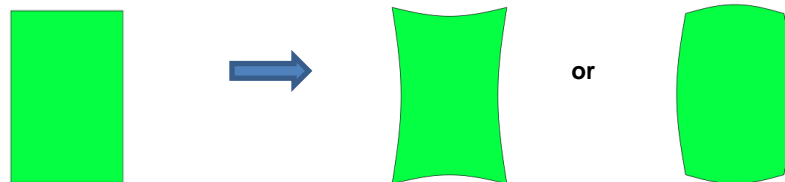


- With **Remove foreground** checked, the original shape will be cut away from the shadow. This would be the typical choice when layering HTV where some kinds cannot be pressed on top of each other (such as glitter HTV):

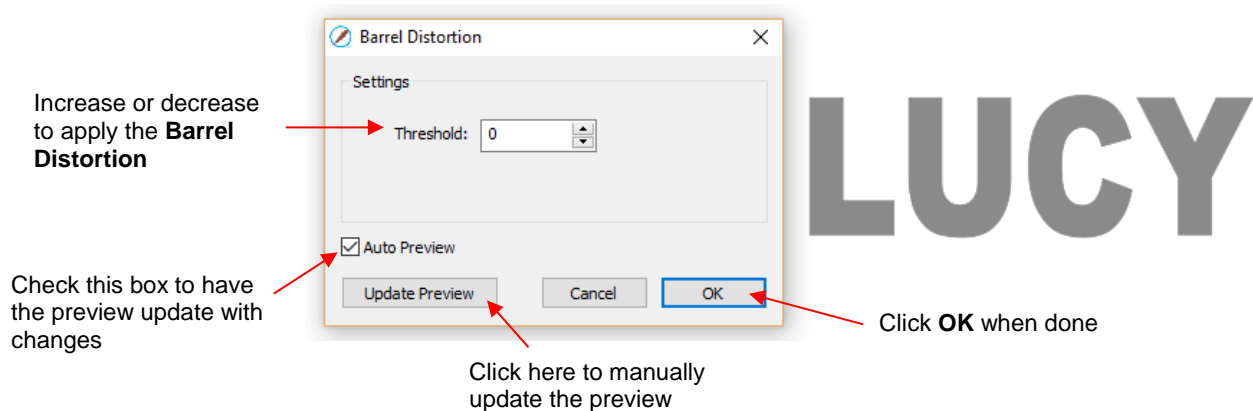


## 9.14 Barrel Distortion

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



- In the following example, text will again be used to show the effects of the settings. To open the **Barrel Distortion** window, select the text and go to **Effects>Barrel Distortion**:



- As you increase the **Threshold**, you will see a narrowing of the shape in the middle:



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

LUCY

Threshold = -10

LUCY

Threshold = -20

LUCY

Threshold = -40

## 9.15 Bulge

- The **Bulge** feature allows you to apply various expanding or shrinking distortions to a shape. These distortions can be applied to the top side of the shape, the bottom side, or both. They can be applied to the left side, the right side, or both. And the distortions can be expanding on both sides, shrinking on both sides, or a combination.
- To open the **Bulge** window, select the shape and go to **Effects>Bulge**:

Choose from **Separately**, **Together**, or **Opposite**

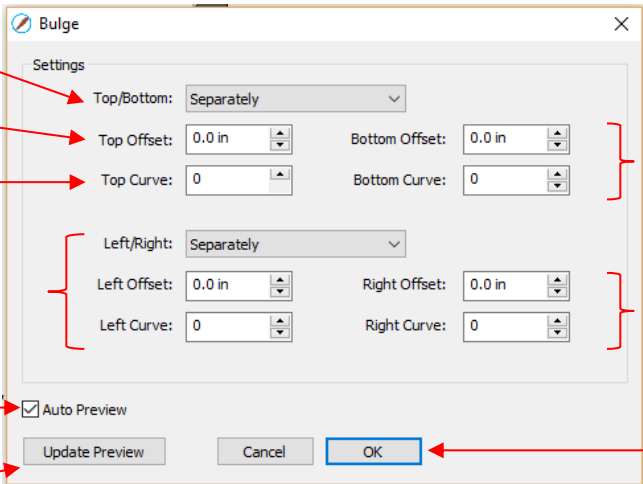
Increase to round up, decrease to curve down

Add more customization to the effect of the bulge

Same settings as above, but applied to the **Left** and **Right** sides instead of **Top** and **Bottom**

Check this box to have the preview update with changes

Click here to manually update the preview



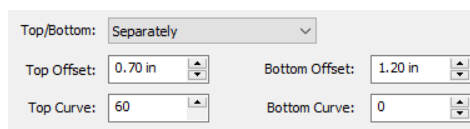
Bottom side settings

Right side settings

Click **OK** when done

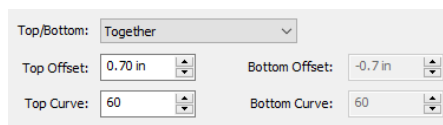
- In the top portion of the window are settings for applying **Bulge** to the top or bottom of a shape. The **Top/Bottom** setting allows you to choose if you want to apply the settings in one of three ways:

◇ **Separately:** The **Offset** and **Curve** settings can be different for the top versus the bottom



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.



Top/Bottom: Opposite

Top Offset: 0.70 in Bottom Offset: 0.7 in

Top Curve: 60 Bottom Curve: 60

LUCY

- The **Top Offset** rounds the top side of the shape up or down depending on whether a positive or negative value is applied. The **Bottom Offset** does the same, but applies it to the bottom side of the shape:

NIKKI

Top Offset = 1.0  
Bottom Offset = 0

NIKKI

Top Offset = 2.0  
Bottom Offset = 0

NIKKI

Top Offset = -0.5  
Bottom Offset = 0

NIKKI

Top Offset = 0.0  
Bottom Offset = 1.0

NIKKI

Top Offset = 0.0  
Bottom Offset = 2.0

NIKKI

Top Offset = 0.0  
Bottom Offset = -0.5

- The **Top Curve** setting will alter the roundness of the **Top Offset** to add even more customization to the **Bulge** effect. Likewise, the **Bottom Curve** setting does the same to the **Bottom Offset**:

TEDDY

Top Offset = 1.5  
Top Curve = 0

TEDDY

Top Offset = 1.5  
Top Curve = 50

TEDDY

Top Offset = 1.5  
Top Curve = 90

TEDDY

Bottom Offset = 1.5  
Bottom Curve = 0

TEDDY

Bottom Offset = 1.5  
Bottom Curve = 50

TEDDY

Bottom Offset = 1.5  
Bottom Curve = 90

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

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

LEO

Separately

LEO

Together

LEO

Opposite

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

LEO

Left Offset = 1.0

LEO

Left Offset = -1.0

LEO

Right Offset = 1.0



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

**LEO**

Left Offset = 1.0  
Left Curve = 50

**LEO**

Left Offset = 1.0  
Left Curve = 90

**LEO**

Right Offset = 1.0  
Right Curve = 75

- ◇ Or just have some fun with it:

**FINN**

**FINN**

**FINN**

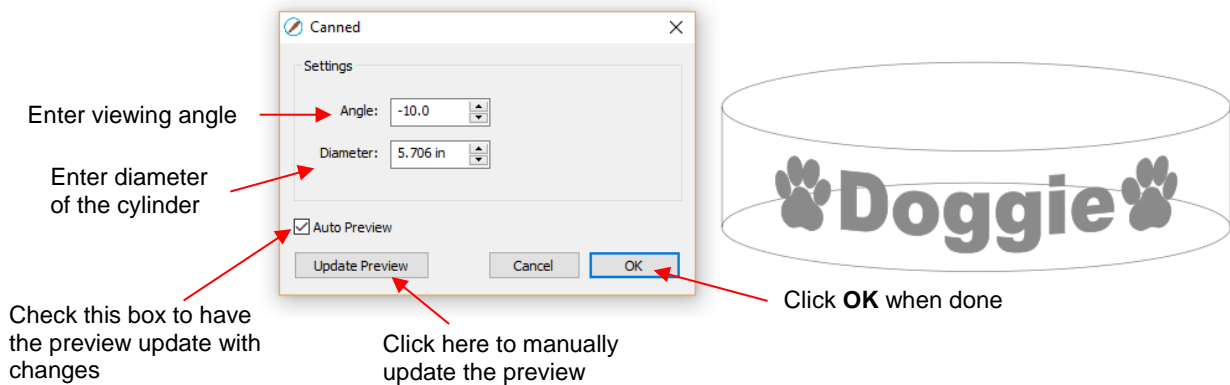
**FINN**

## 9.16 Canned

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

**Doggie** → **Doggie**

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



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

**Doggie**      **Doggie**      **Doggie**

Angle = -10      Angle = -45      Angle = -90

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



Angle = 0



Angle = 45



Angle = 90

- The **Diameter** of the cylinder can be increased or decreased, as well. A larger **Diameter**, applied at the same **Angle**, will lessen the roundness, while a smaller **Diameter** will increase it.



Angle = -30  
Diameter = 5.0



Angle = -30  
Diameter = 7.5



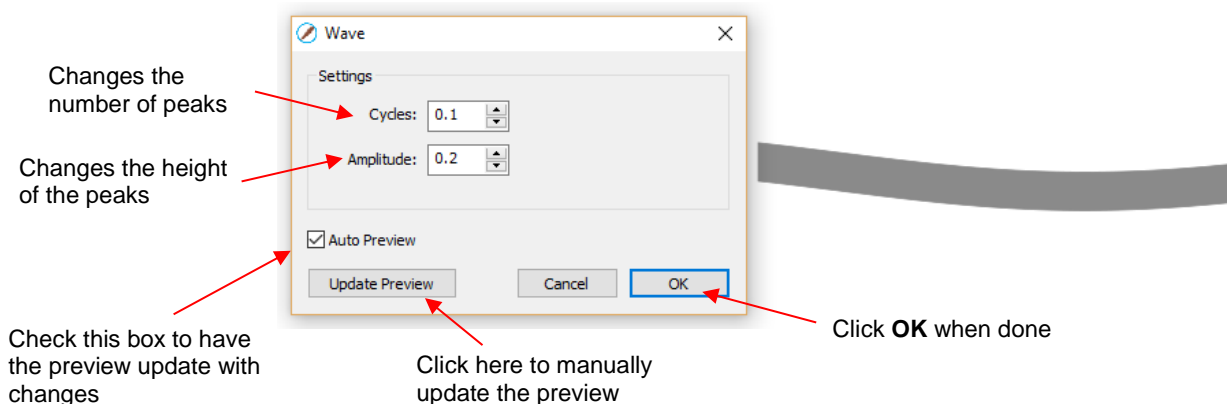
Angle = -30  
Diameter = 3.5

## 9.17 Wave

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



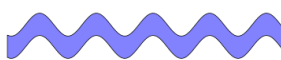
- To open the **Wave** window, select a shape and go to **Effects>Wave**:



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



Cycles = 0.5

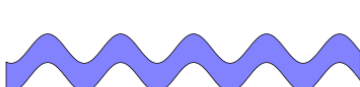


Cycles = 1.0

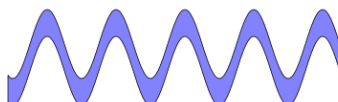


Cycles = 2.0

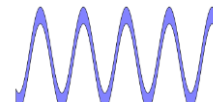
- Increasing **Amplitude** make the peaks higher:



Cycles = 1.0  
Amplitude = 0.2



Cycles = 1.0  
Amplitude = 0.5



Cycles = 1.0  
Amplitude = 1.0

- The **Wave** function can be used on text to achieve this effect:

Twinkle Twinkle Little Star

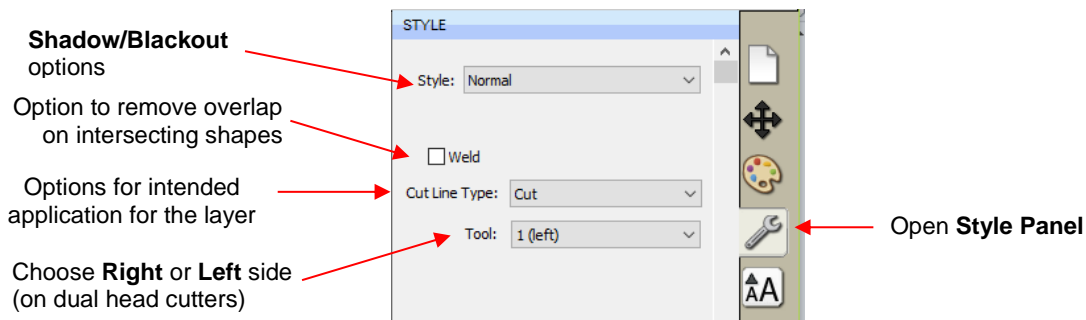


Twinkle Twinkle Little Star

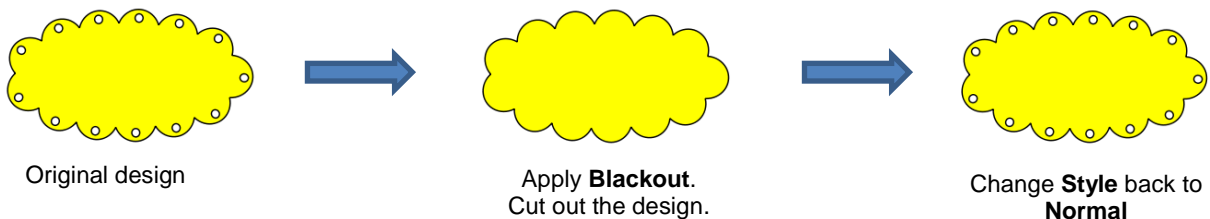
## 10. SCAL: Output


### 10.01 The Style Panel

- The **Style Panel** has various settings that are typically, but not necessarily, applied for the purpose of cutting and printing:
  - ◇ Set a contour cut (**Shadow**)
  - ◇ Remove any interior shapes (**Blackout**)
  - ◇ Apply a weld (**Union**) on any overlapping shapes (only applied during printing and/or cutting)
  - ◇ Assign an intended use for the layer (called **Cut Line Type**)
  - ◇ Assign a layer to a particular tool (for cutters with more than one head)
- To open this panel, click on the **Style** icon on the **Properties Panel**:

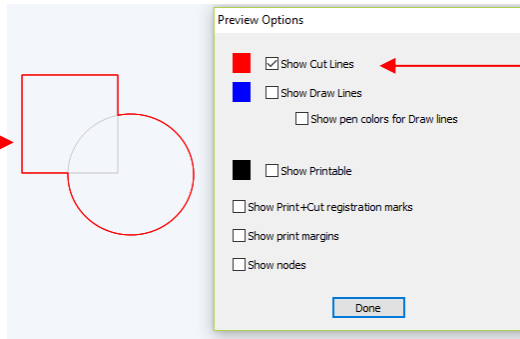


- **Style:** In this menu are various combinations of **Shadow** and **Blackout** applications. Refer to *Section 9.04* for instructions and examples. Note, however, that if you later change your mind and you haven't applied any subsequent changes (such as those in the **Path** menu), then re-selecting **Normal** from the **Style** drop-down menu will restore the original style.
  - ◇ For example, let's say you've applied **Blackout** to a shape and then cut it out. You can now select that same shape and return the style to **Normal**:



- **Weld:** This option applies the **Union** function (refer to *Section 9.05.1*) to any overlapping shapes.
  - ◇ Note that if the shapes are on different layers, the **Weld** option needs to be marked on each layer.
  - ◇ As mentioned before, settings in the **Style** window do not become permanent changes to the shapes on the **Cutting Mat**. However, you can verify the **Weld** effect by clicking on the **Preview** icon  on the **Toolbar** (for more details on **Preview**, refer to *Section 10.02*):


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

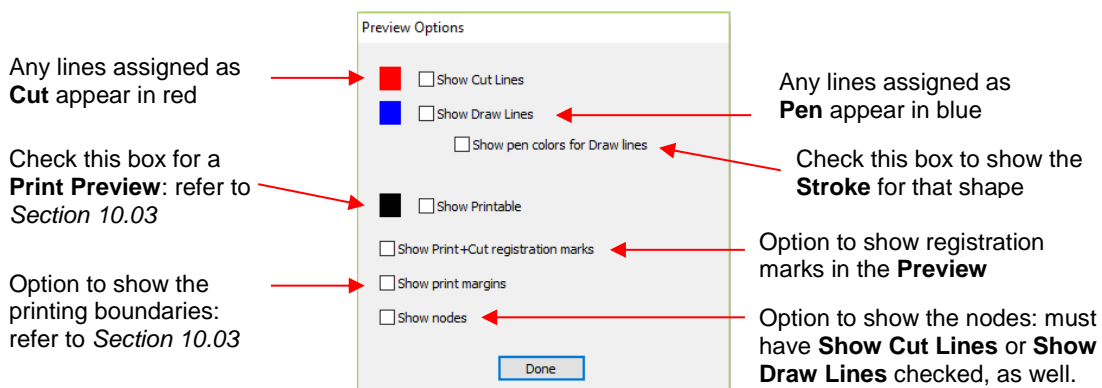


Red lines in the **Preview** window show what will actually cut.

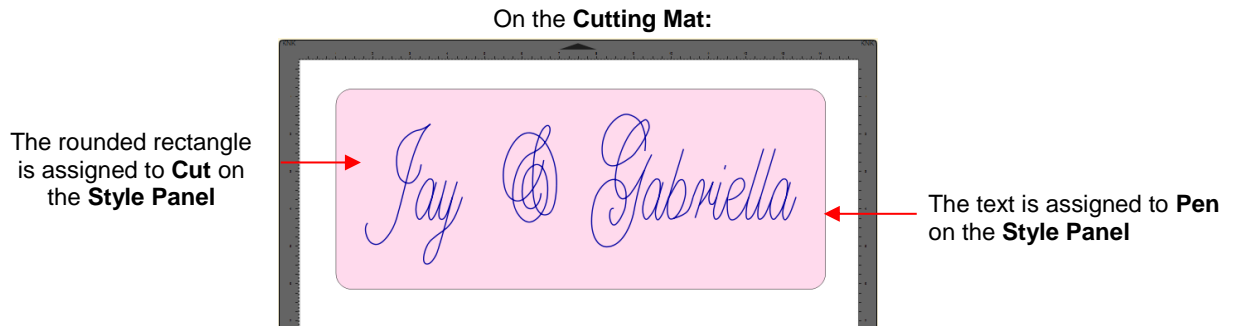
- **Cut Line Type:** There are five options in this menu:
  - ◇ **Cut:** choose this option for regular cutting. Because this is the default, you don't normally need to select it.
  - ◇ **Pen:** choose this option when using a pen, embosser, engraver, glue pen, rotary tool or other device that doesn't require a blade offset.
  - ◇ **Print+Cut Cut:** in print and cut applications, choose this option for the layer that will be cut.
  - ◇ **Print+Cut Print:** in print and cut applications, choose this option for the layer that will be printed only. It will not appear in the cut window.
  - ◇ **Color layer alignment** (Pro version only): in applications such as vinyl where several layers will be cut from different colors and aligned, choose this option for the layer that has registration shapes that need to be cut from every color along with that color's shapes. These registration shapes can then be used to layer the colors perfectly. Refer to the last part of *Section 10.06.2*.
- **Tool:** for cutters with more than one head, such as the KNK Force, choose if the layer should be executed by the left side or by the right side.

## 10.02 Preview

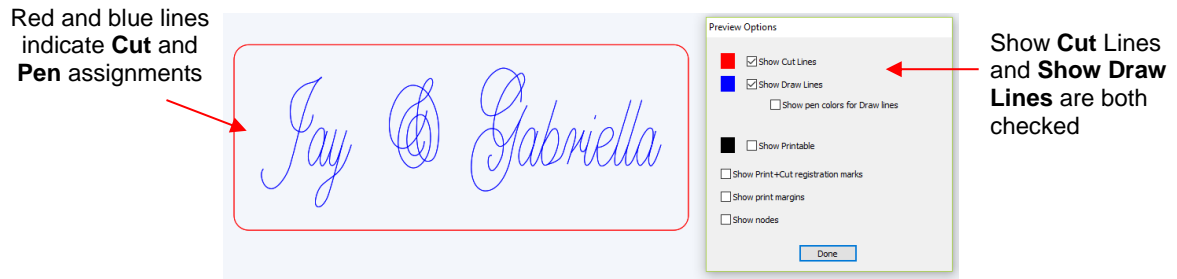
- To see what your cutter will cut or what your printer will print, click on the **Preview** icon  on the **Toolbar**. The following window will open. Note that settings applied on the **Style Panel** are reflected in the **Preview** window:



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

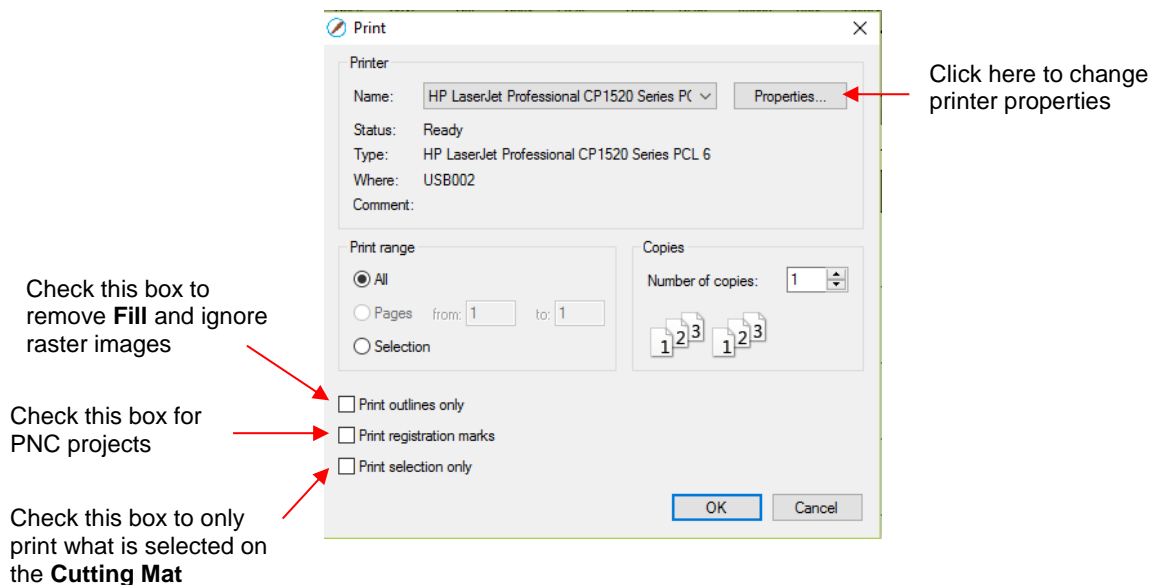


In the **Preview Options** window:



## 10.03 Printing

- To print from SCAL, go to **File>Print** or press **Ctrl+P**. The following window will open:



- To set up printer settings, click on the **Properties** button. (Note that you can also access your printer's properties by going to **File>Print Setup** and clicking on **Properties**.) The window which opens should be familiar to you and will not be covered in this user manual.
- Print outlines only:** Only vector shapes will be printed. Imported raster images (.JPG, .PNG, .BMP, etc.) will not appear. If you've applied a **Fill** to shapes including colors, gradients, or patterns, then those will not appear either.
- Print registration marks:** If your application is a print and cut, then you will want to check this option. Refer to *Chapter 11* for details on PNC calibration and how to set the properties for the registration marks.

- **Print selection only:** This is one way to control what is printed. You will need to select the shapes to be printed prior to entering the **Print** window. Alternatively, you can hide layers on the **Layers Panel** that you do not want printed.
- If your **Cutting Mat** is larger than the printout dimensions, then make sure the shapes are located in the upper left portion of the **Cutting Mat** or else any shapes outside of the printout boundary will be omitted or

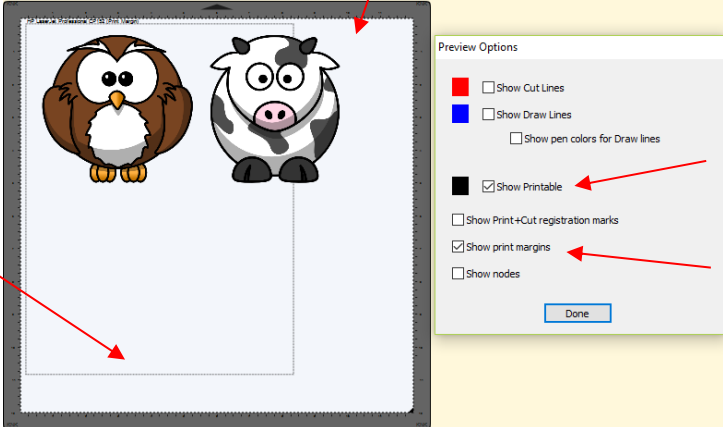
cut off. To verify, click on the **Preview** icon  on the **Toolbar** and select **Show Print Margins**.

- ◇ For example, let's say you have a PNC application and your shapes are arranged like this on a 12" x 12" **Cutting Mat**:



- ◇ When you click on the **Preview** icon and mark **Show print margins**, you can see that a portion of the cow will not be printed:

This part of the cow will not be printed



This border indicates the printer's current settings for size and orientation

Preview Options

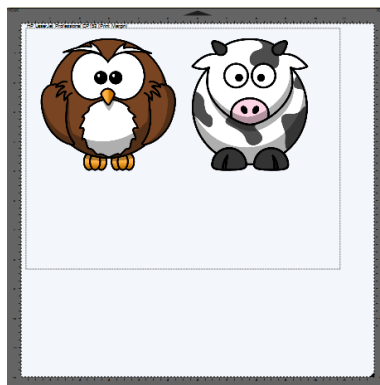
- ☐ Show Cut Lines
- ☐ Show Draw Lines
  - ☐ Show pen colors for Draw lines
- ☒ Show Printable
- ☐ Show Print+Cut registration marks
- ☒ Show print margins
- ☐ Show nodes

Done

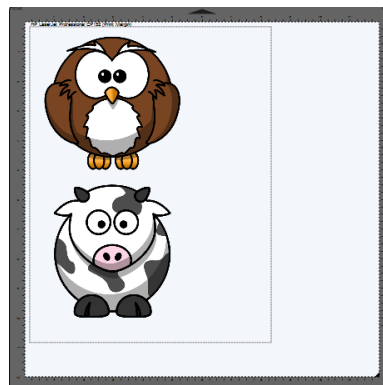
Check this box so that the original graphic appears

Check this box to see the boundaries of the printer

- ◇ You have two choices. You can either switch to **Landscape** printing under **File>Print Setup** or you can move the shape on the right to be below the left shape:



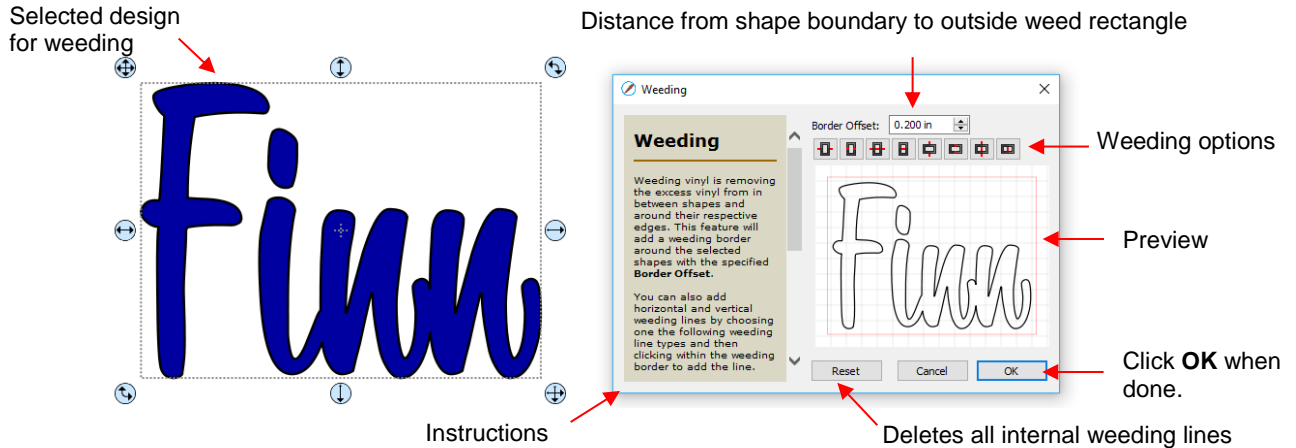
Option 1: Switch to **Landscape** under **File>Print Setup**



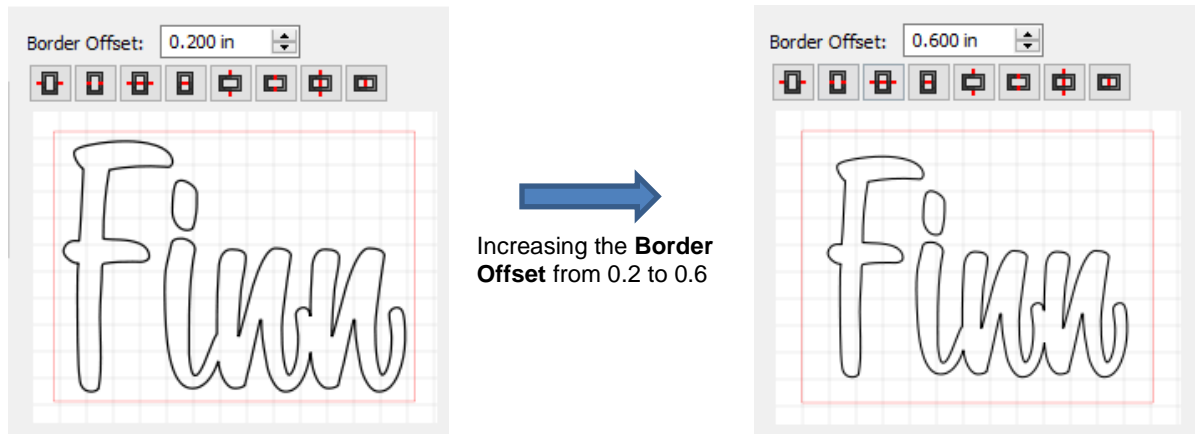
Option 2: Rearrange the shapes

## 10.04 Weeding (SCAL PRO only)

- Weeding is an important function for those who do vinyl applications. When removing the waste vinyl from around the cut shapes, it's very helpful to have extra cut lines. This way you don't end up trying to weed out large pieces at one time.
- To set up a weed, select the shapes and go to **Effects>Weeding**. The following window will open:



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

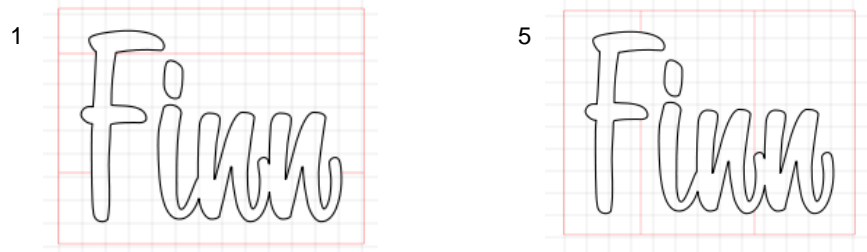


- ◇ **Border Options:** These icons can be used to add additional cut lines inside the outer weed border. Each icon in the following screenshot indicates where the lines will be added but a description and example are also shown. Note that once you select an option, you can click at the desired location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

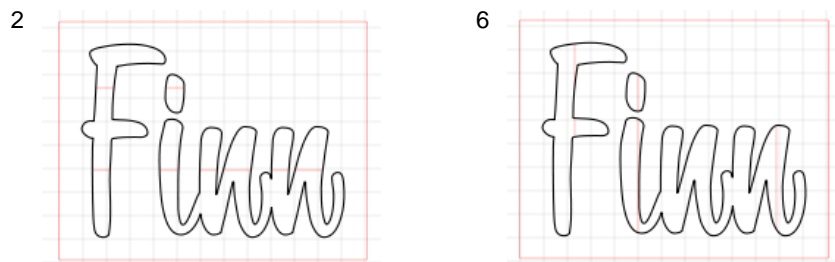




- 1 or 5: Add horizontal or vertical weed cuts between shapes and outer weed border



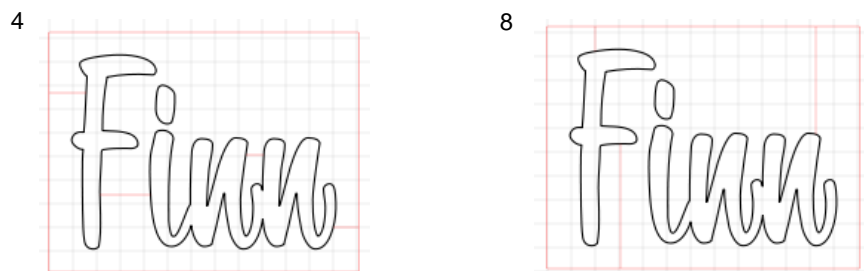
- 2 or 6: Add horizontal or vertical weed cuts inside the shapes (this is used for applications such as glass etching where the outside “waste vinyl” is actually kept and the shapes themselves are weeded out)



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

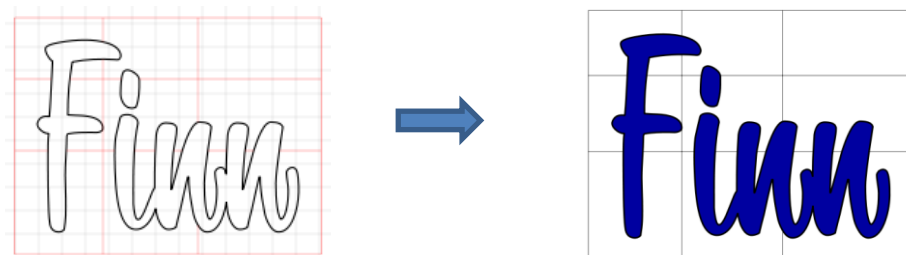


- 4 or 8: Add horizontal or vertical weed cuts anywhere you like

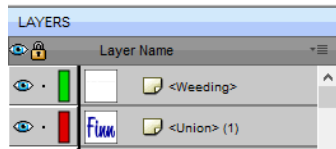


◇ **Reset:** At any point, you can click on **Reset** to remove any of the internal cut lines and begin again.

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



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

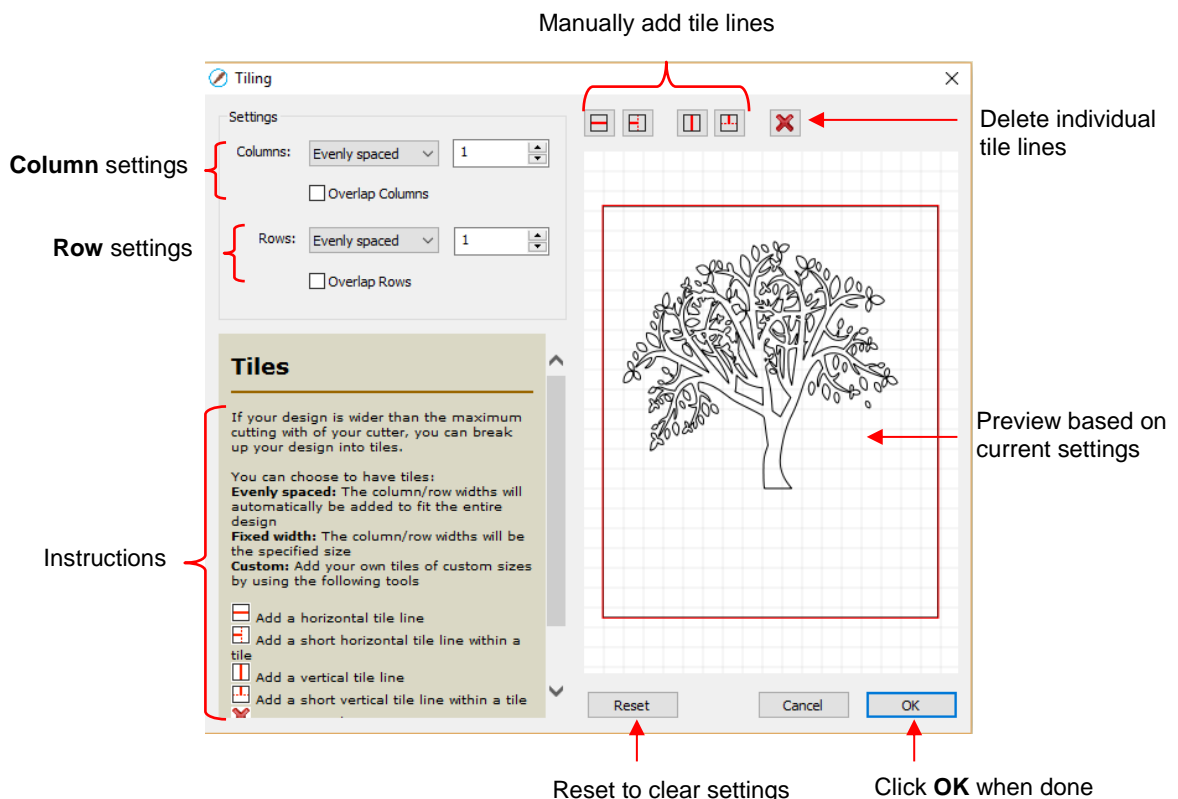


## 10.05 Tiling (SCAL PRO only)

- The **Tiling** function is used to split large designs into rectangular sections for cutting.
- In the following example, a design that is 40" wide and 36" tall cannot be cut on a cutter that only has a maximum 15" wide cutting range (such as the KNK Force or Zing Orbit):



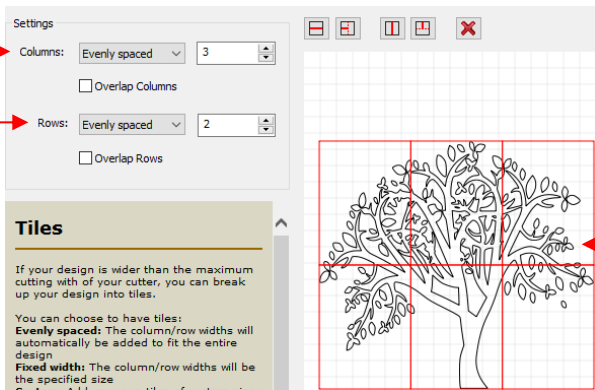
- To open the **Tiling** window, select the shape and go to **Effects>Tiling**:



- ◇ **Columns** and **Rows**: Under both of these you have the following choices:

- **Evenly spaced:** Enter a number and that many columns (or rows) are created, all the same width. For example, you could enter 3 columns and 2 rows:

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



Preview shows the project evenly split into 3 columns and 2 rows

**Tiles**

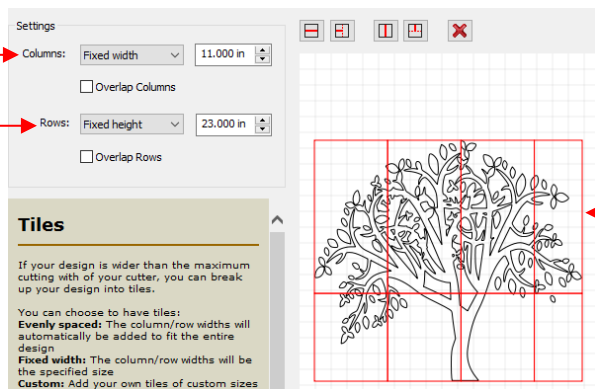
If your design is wider than the maximum cutting width of your cutter, you can break up your design into tiles.

You can choose to have tiles:

- Evenly spaced:** The column/row widths will automatically be added to fit the entire design
- Fixed width:** The column/row widths will be the specified size
- Custom:** Add your own tiles of custom sizes

- **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.

**Tiles**

If your design is wider than the maximum cutting width of your cutter, you can break up your design into tiles.

You can choose to have tiles:

- Evenly spaced:** The column/row widths will automatically be added to fit the entire design
- Fixed width:** The column/row widths will be the specified size
- Custom:** Add your own tiles of custom sizes

- **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:

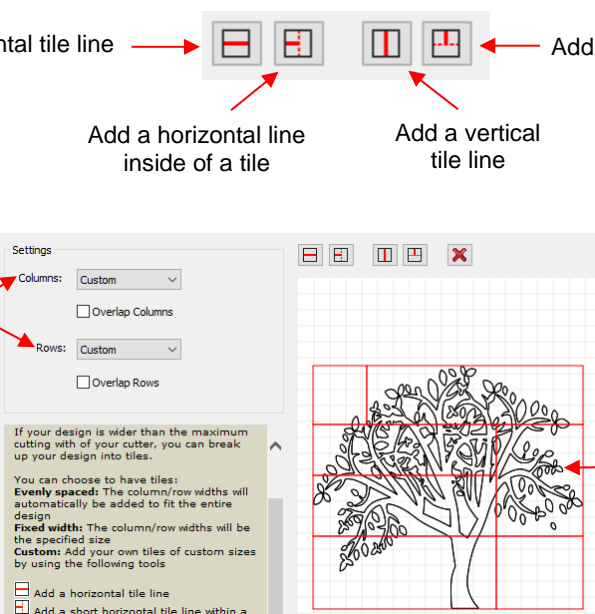
Add a horizontal tile line

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.


**Tiles**

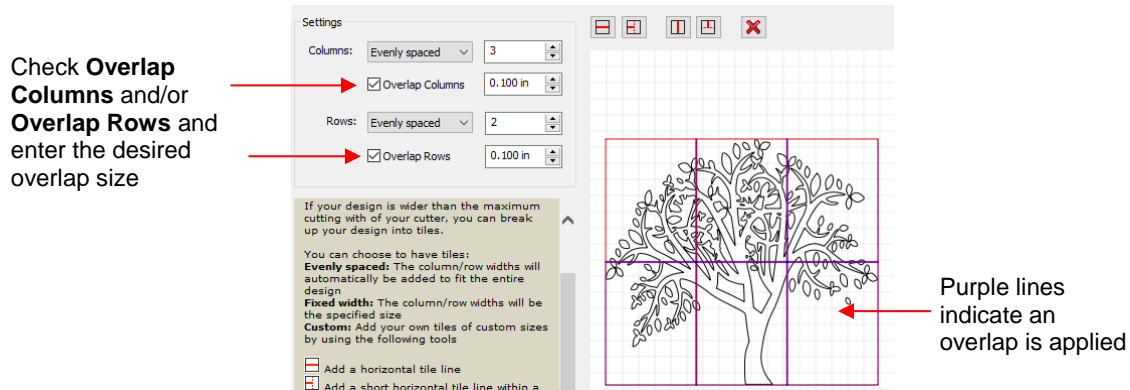
If your design is wider than the maximum cutting width of your cutter, you can break up your design into tiles.

You can choose to have tiles:

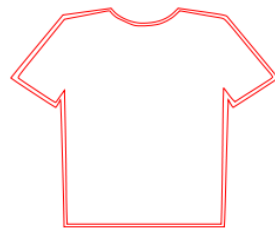
- Evenly spaced:** The column/row widths will automatically be added to fit the entire design
- Fixed width:** The column/row widths will be the specified size
- Custom:** Add your own tiles of custom sizes by using the following tools

- Add a horizontal tile line
- Add a short horizontal tile line within a

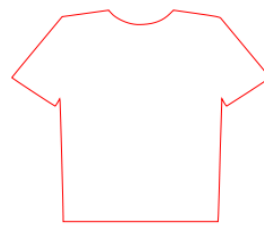
- ◇ To delete any of the lines, click on the **Delete** icon  and then click on the line inside the **Preview** window.
- ◇ **Overlap Columns** and **Overlap Rows**: If you want an overlap created so that each tile slightly overlaps with an adjacent one, check the box and then enter the desired overlap:



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



With **Blackout** unchecked




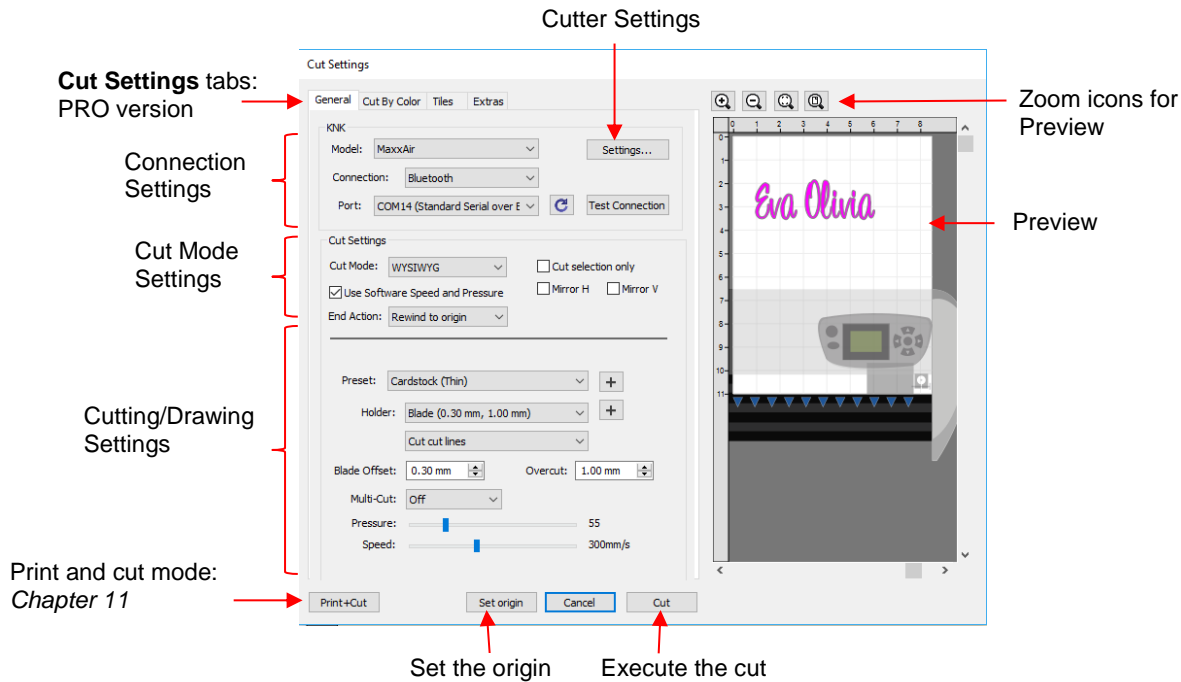
With **Blackout** checked

## 10.06 Cut Settings

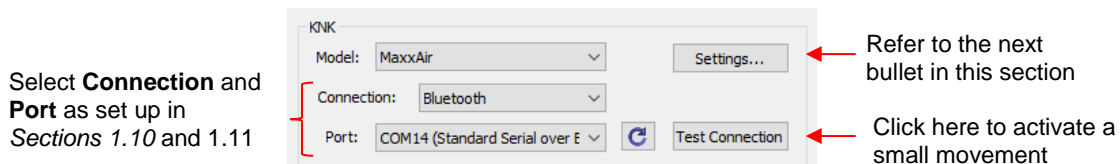
The cut settings vary from one cutter to the next based on the manufacturer of that cutter and its built-in functionality. For this reason, the information presented here will only apply to the brand and model of cutter presented in Chapters 1 and 2.

### 10.06.1 Cut Window Settings

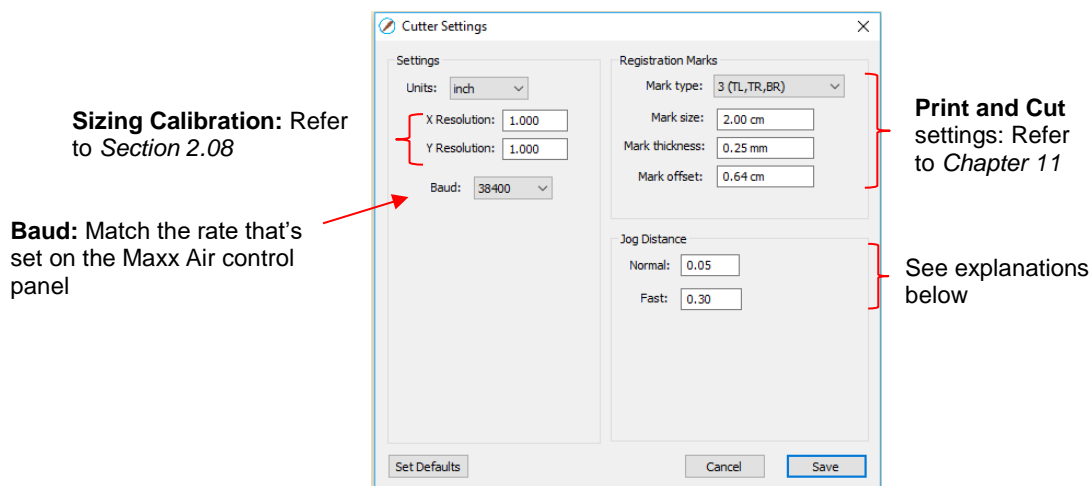
- When you are ready to execute a cut (or draw), the cut window can be opened using either of the following:
  - ◇ Click on the **Cutter** icon  on the **Toolbar**
  - ◇ Go to **Cutter>Cut With KNK**
- The following window will open:



- ◇ **Cut Settings** tabs: The regular version of SCAL will only have the **General** tab. The PRO version will have three additional tabs; **Cut by Color** (refer to *Section 10.06.2*), **Tiles** (refer to *Section 10.06.3*) and **Extras** (refer to *Section 10.06.4*).
- ◇ **Connection Settings**: Choose the model of cutter being used and connection settings:



- ◇ **Cutter Settings**, which can also be accessed by going to **Cutter>Cutter Settings**, opens a new window with additional settings relevant to that model. For the KNK Maxx Air:



- **Jog Distance**: The following settings apply when setting the origin or moving the Force camera or Maxx/Zing laser light:
  - **Normal**: the distance the head or mat moves with each arrow key increment
  - **Fast**: the distance the head or mat moves while holding **Shift** with each arrow key increment

- ◇ **Cut Mode Settings:** Refer to *Section 10.07* which covers controlling where shapes will cut.

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

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

Check if only selected shapes should be cut

Check either or both if you wish to have shapes mirrored before cutting

- **Cut Mode:** Refer to *Section 10.07* which covers controlling where shapes will cut.
- **End Action** (PRO version only): controls what happens at the conclusion of the cut. There are three choices:
  - **Rewind to origin:** default setting in which the head returns to the origin set before the cut began
  - **Advance Amount:** when this option is selected, the head moves to the end of the cut, over to the right side, and then advances the mat or rolled material forward based on a value you enter into a new window:

Select **Advance Amount** and a new input pops up

Enter distance to advance

- **Do Nothing:** the head stops at the location where it finished cutting
- **Cut selection only:** If you have pre-selected which shapes you want to cut, then mark this box.
- **Mirror H** and **Mirror V:** Options to check if you want the shapes mirrored for cutting. This is very handy when cutting HTV or embossing. In both cases, you will be flipping over the material once the cutting or embossing is complete.

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

Select a **Preset** of suggested settings

Select type of tool

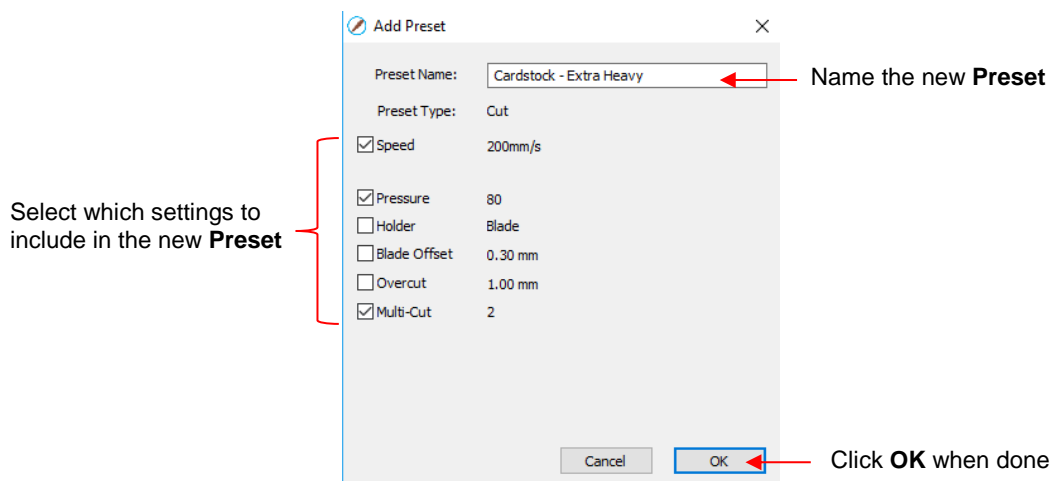
Change settings, as needed


Add a new **Preset**

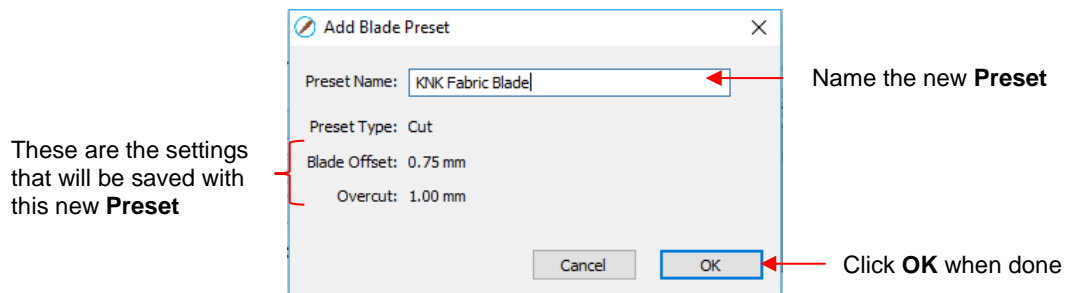
Add a new tool

Type of action

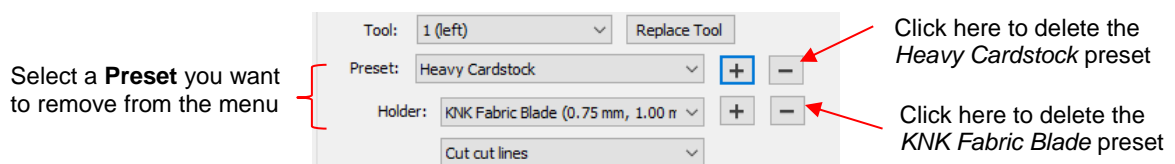
- First, select from the **Preset** menu, the material you will be cutting. Alternatively, make any changes to the settings for this material or a new material. If you wish to save the new settings, click on the icon to the right of **Preset** and the following window will open:



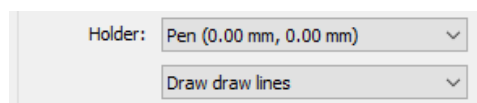
- Presets for the **Holder** are also available to select. If you wish to enter a new **Preset**, first make changes to the **Blade Offset** and **Overcut** settings. Then click on the icon  to the right of **Holder**. The following window will open:



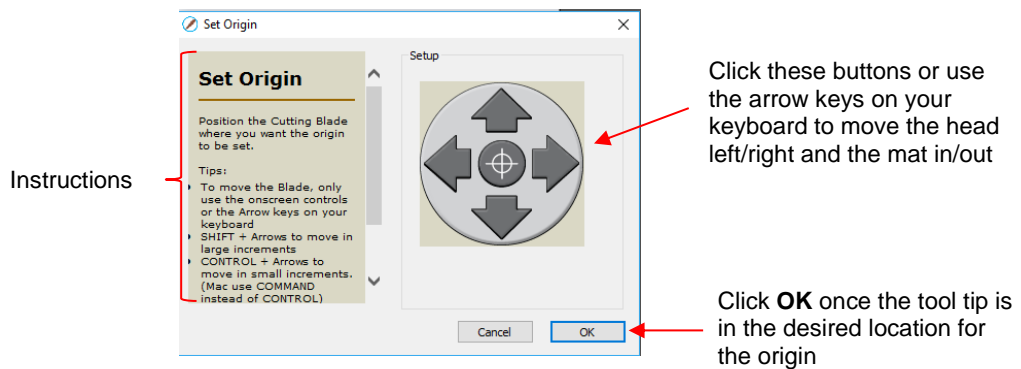
- If you need to delete any of the **Presets** you added yourself, select the **Preset** from the menu and then a delete option will be available for removing that **Preset**:



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

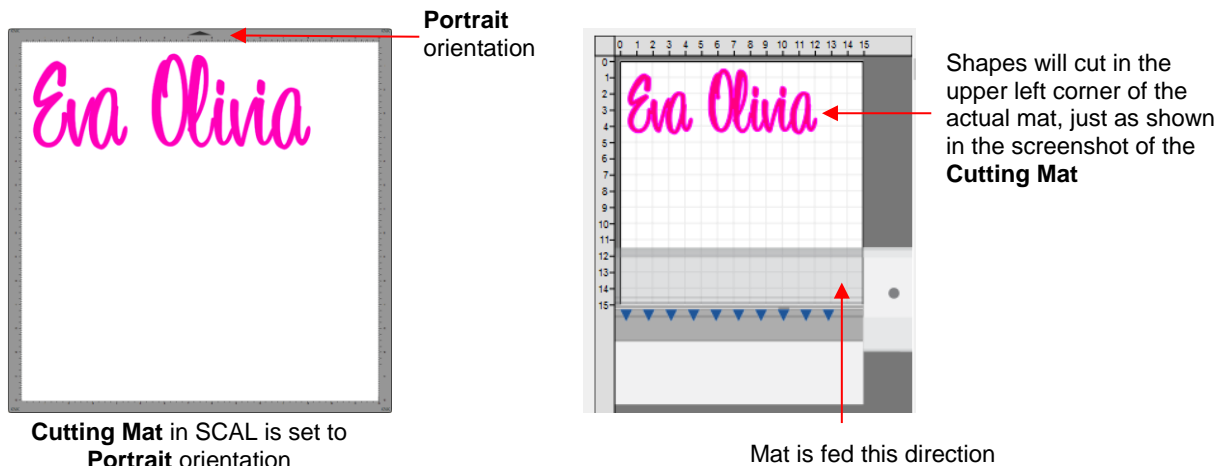


- ◇ **Print+Cut:** Clicking on this button opens the **Print and Cut** window. Refer to *Chapter 11* for detailed instructions on calibrating the laser and performing print and cut applications.
- ◇ **Set Origin:** Click on this button to set the origin for cutting. The following window will open:

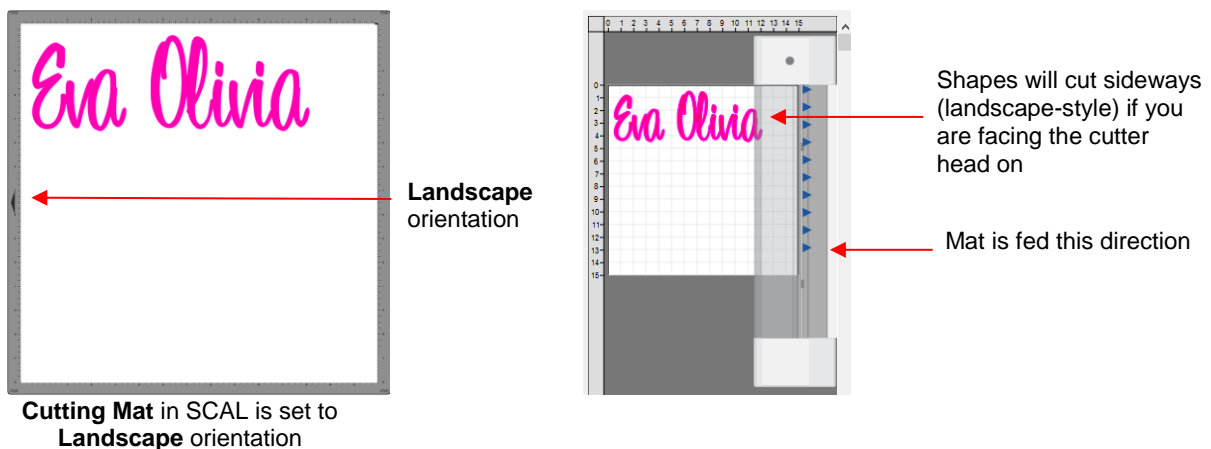


- In general, you always set the origin in the lower right corner of the material as was presented in *Section 1.11*. (Note: This may not be true with other brands of cutters.)
- 
- ◇ **Preview:** The preview displays the shapes that will cut and their orientation plus location based on other settings.

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

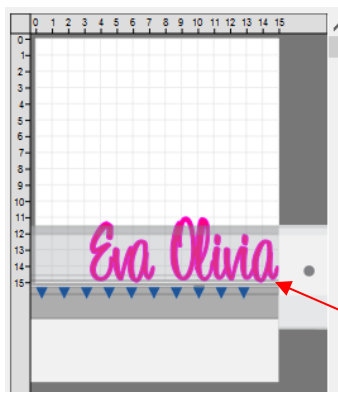


- Using the same **WYSIWYG** cutting mode, but having the **Cutting Mat** orientation set as **Landscape**, the **Preview** changes indicating the shapes will be cut in a landscape position:



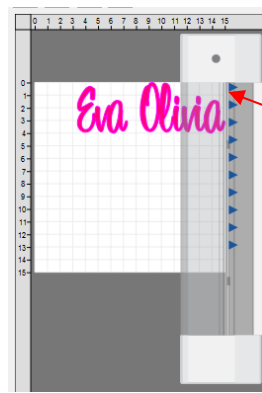
- In **Origin Point** mode, it doesn't matter where the shapes are located on the **Cutting Mat**, they will cut so as to align with the origin you set:





Portrait

Shapes are aligned with the origin



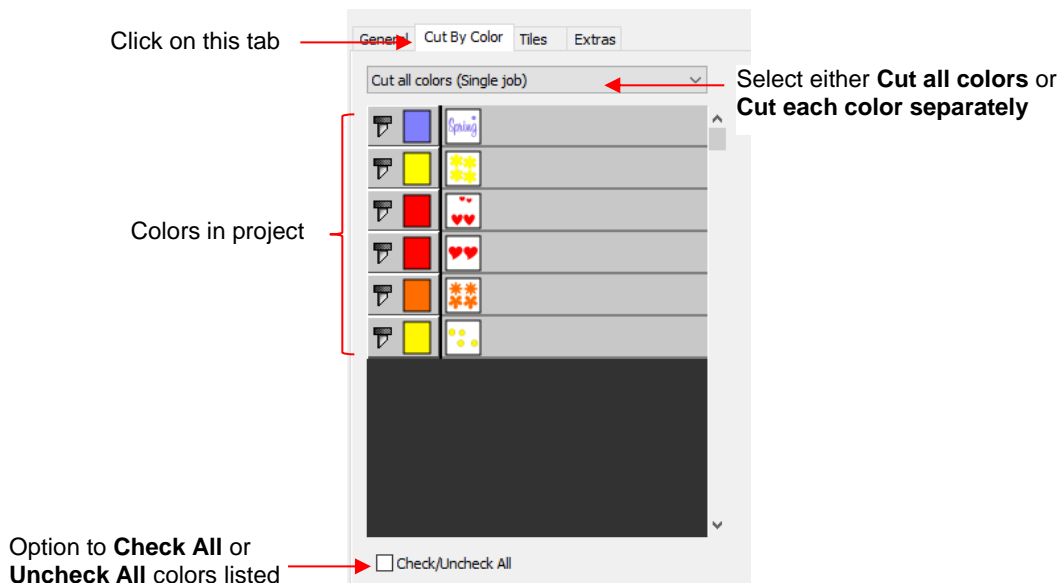
Landscape

Shapes are aligned with the origin

- Additional details on controlling where shapes are cut are presented in *Section 10.07*.

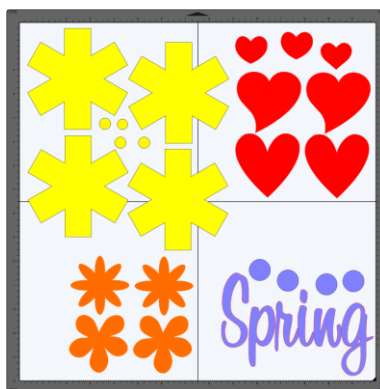
### 10.06.2 Cut by Color (SCAL PRO only)

- The **Cut by Color** function offers two capabilities:
  - ◇ Turn on and off colors to be cut without the need to hide layers on the **Layers Panel** or pre-select shapes to cut. In fact, you don't even need to ungroup mixed-color groups.
  - ◇ Cut all of the colors at once or have the cutter pause between colors, thus permitting the change out of materials
- To access **Cut by Color**, click on the **Cut by Color** tab in the **Cut Settings** window:



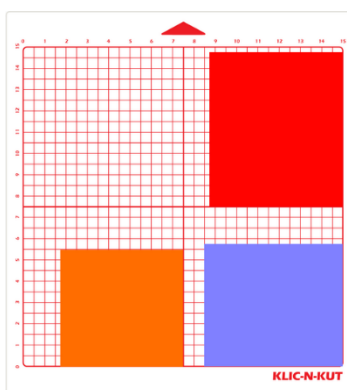
- **Cut all colors (Single job):** In this mode all of the colors marked in this window will be cut at one time.
  - ◇ As an example, here are some shapes laid out on the **Cutting Mat**. Note how the grid is set to divide the mat into four quadrants:


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



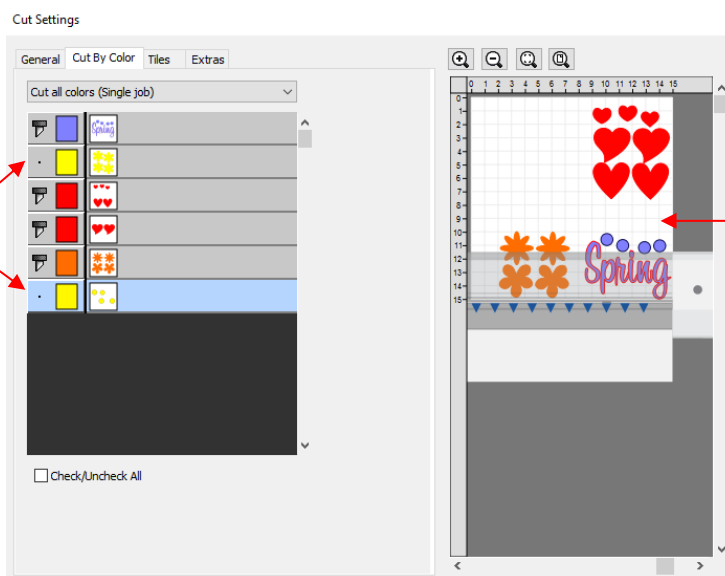
The **Cutting Mat** is divided into quadrants for easier placement of the scraps onto the actual cutting mat

- ◇ Let's say you also have scraps you want to use, however the yellow scrap you plan to use won't fit onto the mat with the other scraps. So, you want to cut lilac, red, and orange first. You place those colors into quadrants on the mat that match the layout on the **Cutting Mat** in SCAL:



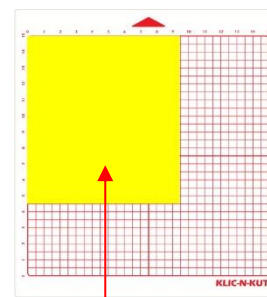
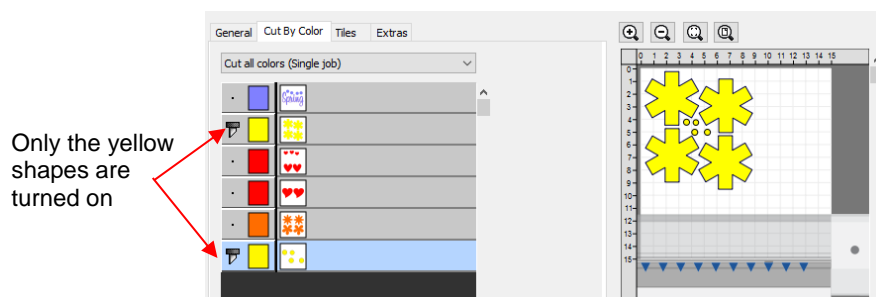
- ◇ In the **Cut Settings**, make sure **WYSIWYG** mode is selected and you have the other settings selected. Then select the **Cut by Colors** tab and click on the blade icon  next to the yellow shapes to hide those from cutting:

The yellow shapes are turned off



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

- ◇ The cut is executed and the red, orange, and lilac shapes are cut. Then the same procedure can be used for the remaining yellow shapes:

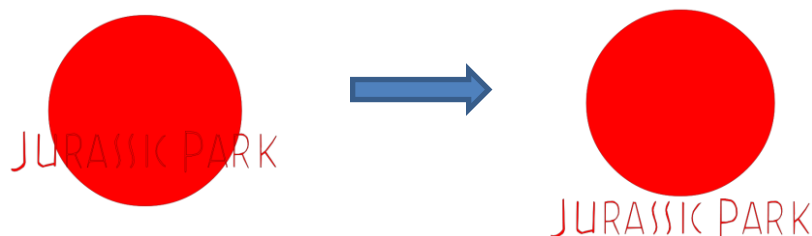


The yellow scrap is placed in the upper left corner of the mat to match the **Preview** window

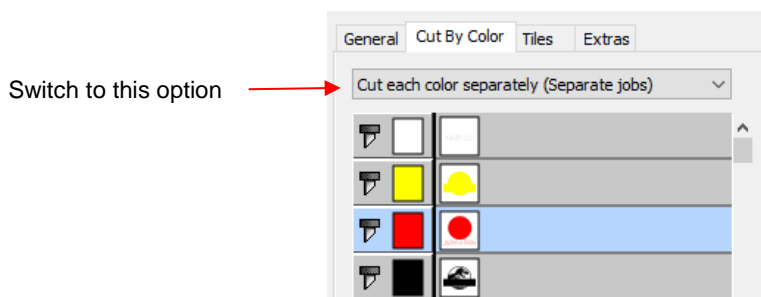
- **Cut each color separately (Separate jobs):** In this mode you can also turn on or off colors for cutting. However, SCAL will prompt for each color before executing the cut.
  - ◇ As an example, here is a layered design to be cut from vinyl:



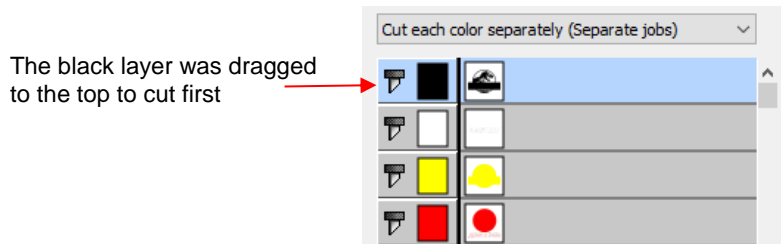
- ◇ Choosing the option to **Cut each color separately** is logical because:
  - The shapes are arranged on top of one another
  - The size is so large that the individual colors cannot be placed on the cutting mat to cut all at one time
- ◇ However, before sending the project to the cutter, take note of any colors that might have shapes that need to be moved. In this example, the thin red lettering "Jurassic Park" would cut through the background red circle, hence it needs to be moved away:



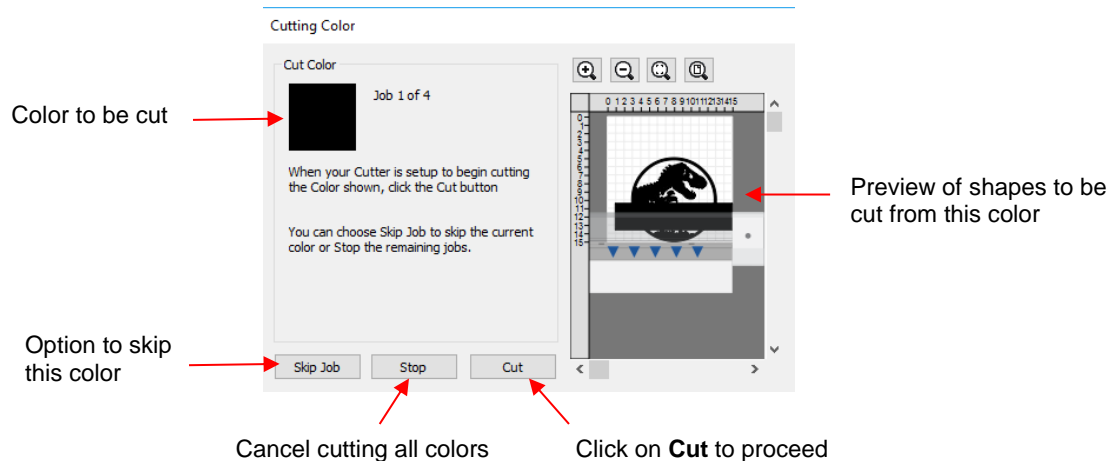
- ◇ In the **Cut Settings**, **Origin Point** should be chosen so that each color is moved to align with the origin and, thus, the material loaded each time in the same location. In the **Cut by Color** tab, the **Cut each color separately** option is chosen:



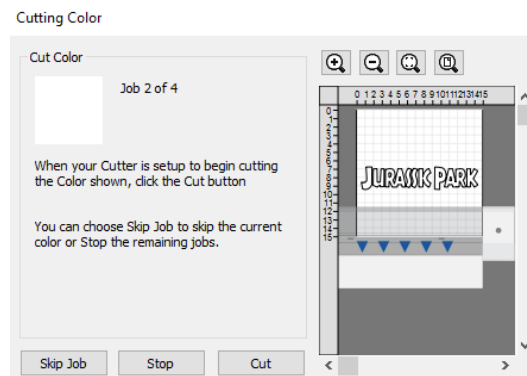
- ◇ Note that you can change the cut order by dragging the colors up or down the menu. For example, let say you already have black vinyl loaded into the cutter and the origin set to cut:



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



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

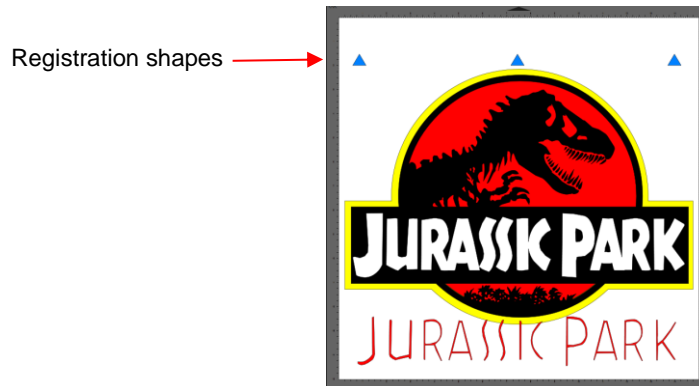


- ◇ And the process continues until all colors have been cut.

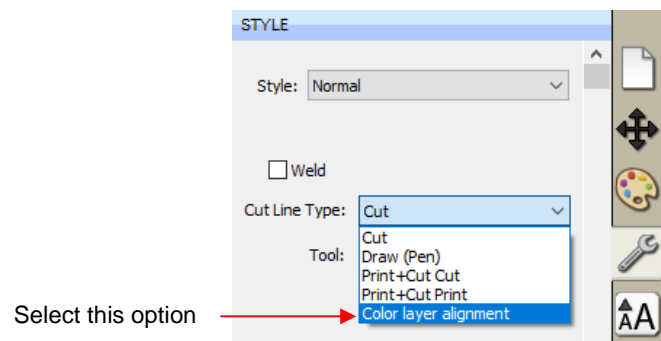
- In *Section 10.01*, **Color Layer Alignment** was mentioned as one of the options under **Cut Line Type** on the **Style Panel**. In applications, such as the one just presented, it can be tricky aligning the various colors after

cutting. To make the job easier, small registration shapes can be added to the design and cut with every color so that they can then be lined up when layering color.

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



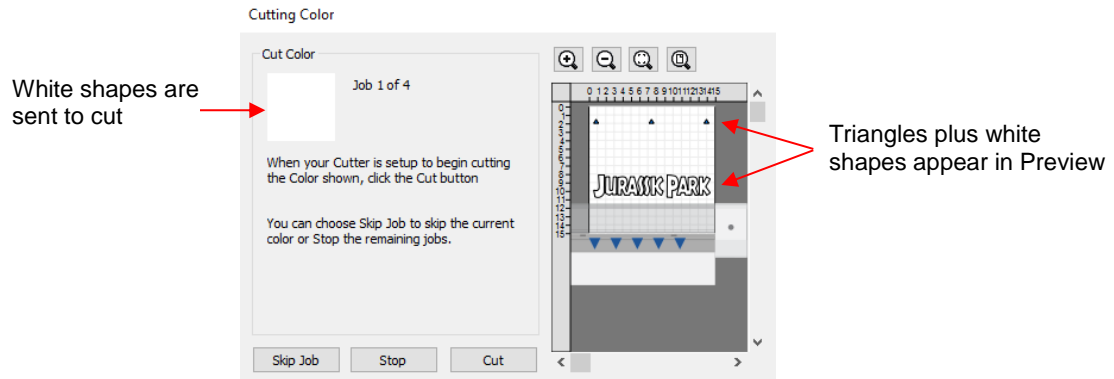
- ◇ The layer is selected and the **Cut Line Type** for this layer is changed to **Color Layer Alignment**:



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

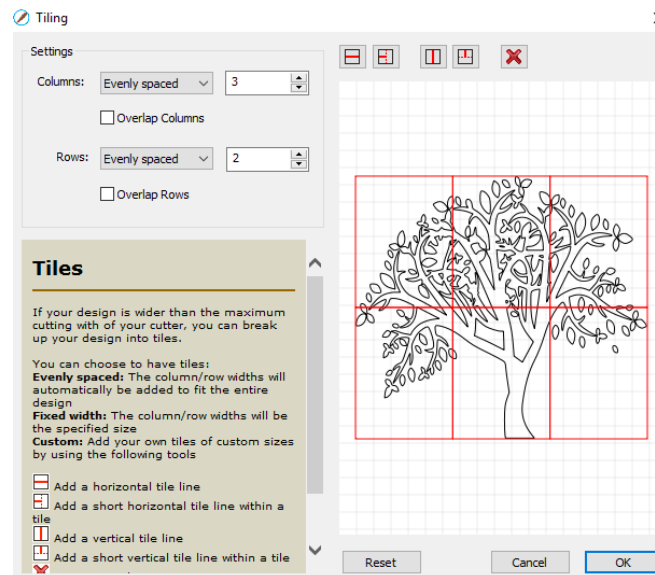


- ◇ Then, as each color window opens, the triangles will appear in the **Preview** for that color:

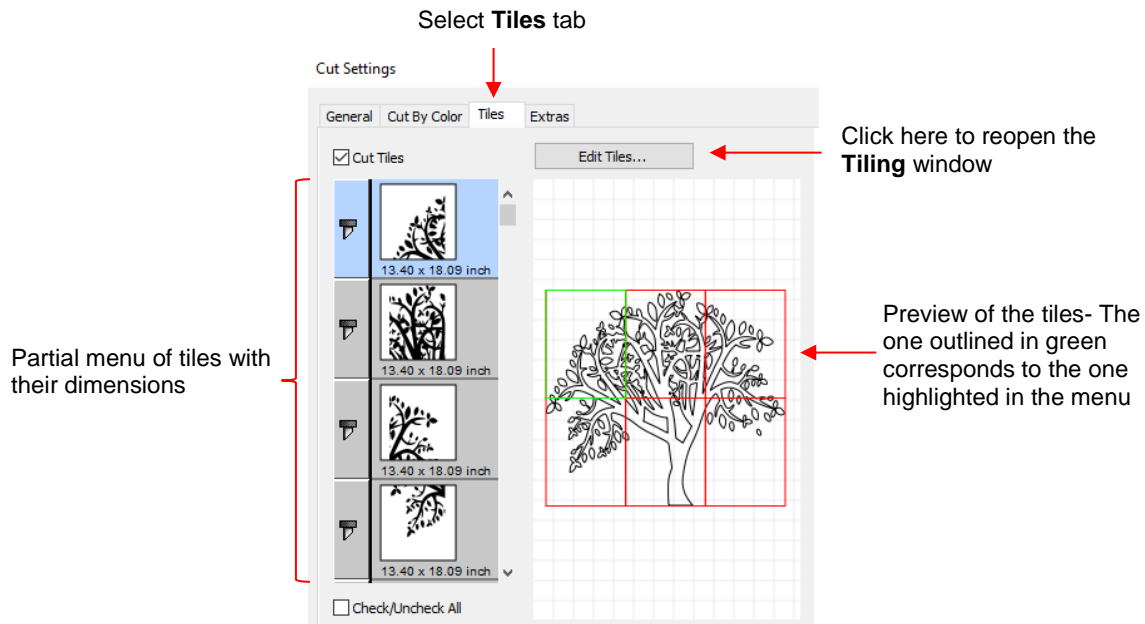



### 10.06.3 Tiles (SCAL PRO only)

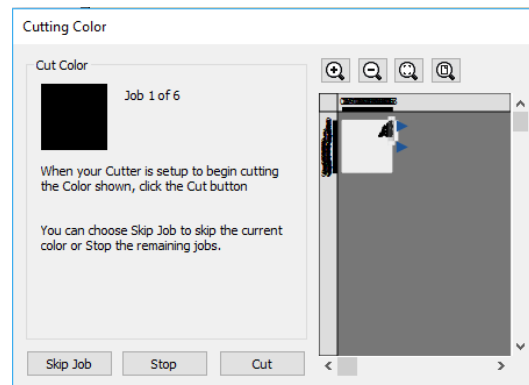
- In *Section 10.05*, you were shown how to use the **Tiling** function to split a design that is too large to cut based on the limits of your cutter:



- After clicking on **OK**, but before sending the design to cut, make the Cutting Mat dimensions fit the design. If any of the design extends beyond the boundaries of grid, those tiles will not cut.
- Open the **Cut Settings** window, click on the **Tiles** tab and check the box next to **Cut Tiles** to then open a menu showing the individual tiles with additional options:



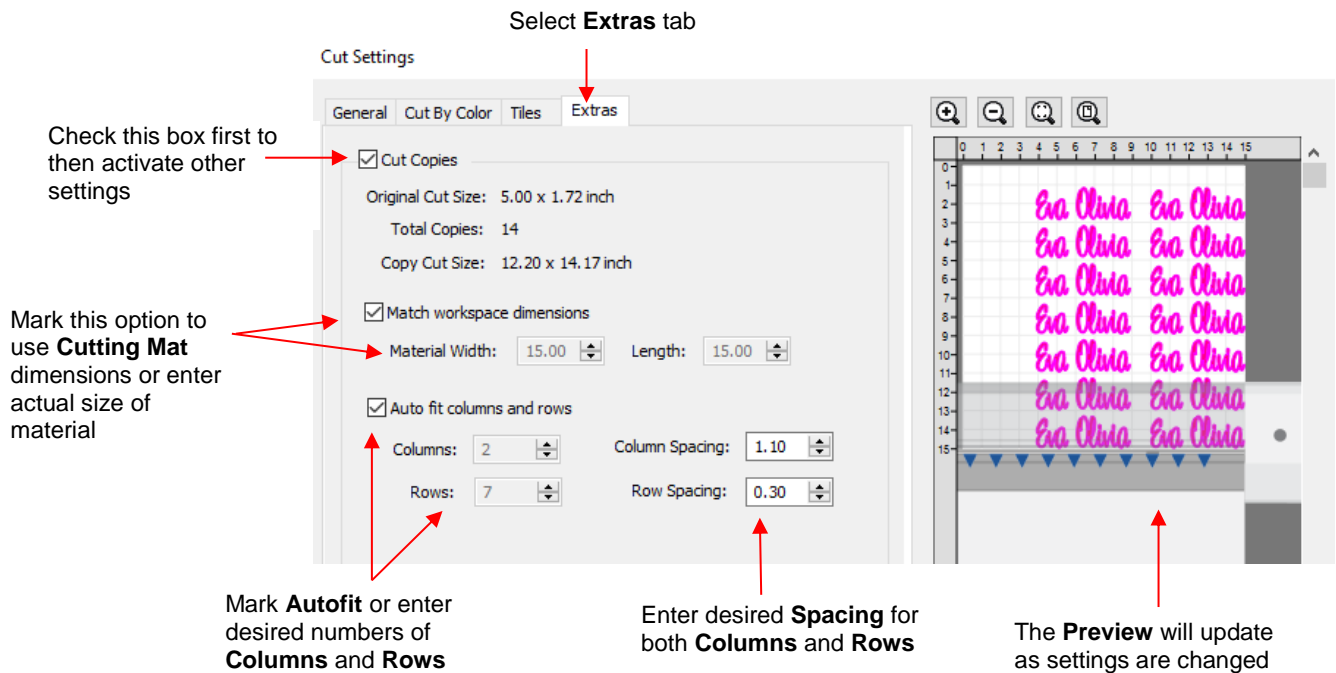
- ◇ **Cut Tiles:** Mark this option first so that the menu and preview appears.
- ◇ **Edit Tiles:** clicking this button will take you back to **Effects>Tiling** in case you need to edit the settings.
- ◇ As with **Cut by Color**, clicking on the blade icon  next to any tile will prevent that tile from cutting. You can also drag tiles up or down in the menu to change the cutting order.
- After you click on **Cut**, be patient. It can take a minute or more for a large and/or detailed design to be processed by the software. Eventually, a window will open showing the first tile to be cut:



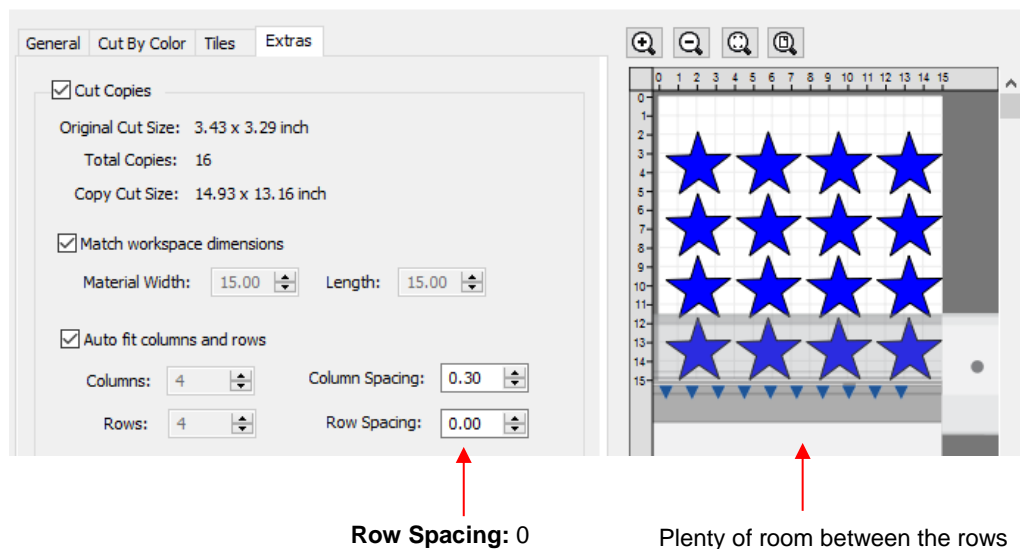
- ◇ Just as with **Cut by Color**, you can
  - Click on **Cut** to proceed with cutting that tile. After it is cut the next tile will be selected.
  - Click on **Skip Job** to skip cutting that tile and bring up the next tile
  - Click on **Stop** to cancel all cutting.

#### **10.06.4 Extras (SCAL PRO only)**

- The **Extras** feature allows you to duplicate shapes for cutting, without having to set it up on the **Cutting Mat**. To use this feature, click on the **Extras** tab in the **Cut Settings** window:



- ◇ **Cut Copies:** Mark this option first so that other settings become editable
- ◇ **Match workspace dimensions:** If your material is the same size as the **Cutting Mat**, then mark this option. Otherwise, enter the **Width** and **Length** of the material to be used. Pay attention to the **Preview** window to make sure you have the orientation correct to match how the material is placed on the cutting mat.
- ◇ **Auto fit columns and rows:** Mark this option if you want as many duplicates as possible cut from the material. Otherwise, enter the desired number of **Columns** and **Rows** to match the number of copies needed.
- ◇ **Spacing:** Adjust the spacing as desired. In general, shapes can be quite close together when cutting from thinner materials, such as vinyl and cardstock. In some cases, such as with a star, you can even use 0 for the **Row Spacing**, since the bottom of the shape is not close to the top of the shape in the row below it:





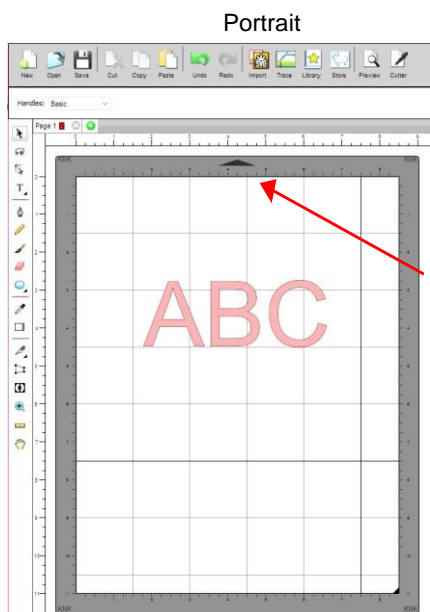
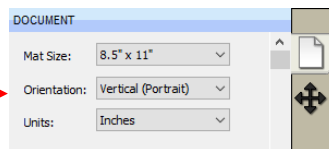
- Make sure you have all of the cut settings made under the **General** tab of the **Cut Settings** window. Once you click on **Cut**, all of the duplicates will be cut out and it appears that using **Cancel**, in the current version of SCAL, will not abort the cut.

## **10.07 Controlling Where Shapes Will Cut**

### **10.07.1 Overview**

- There are two **Orientations** for cutting:
  - ◇ **Portrait** – Shapes will cut in the same orientation you see on the **Cutting Mat**
  - ◇ **Landscape** – Shapes will cut 90° clockwise to the orientation you see on the **Cutting Mat**
- There are 3 available **Cut Modes** when cutting to the KNK Maxx Air
  - ◇ **WYSIWYG** – Shapes will cut relative to their position on the virtual Cutting Mat
  - ◇ **Origin Point** – Shapes will cut to align with the origin set before cutting
  - ◇ **Print and Cut** – Shapes will cut based on aligning the camera with printed registration marks (refer to *Chapter 11*)
- The **Orientation** is set on the **Document Panel**:

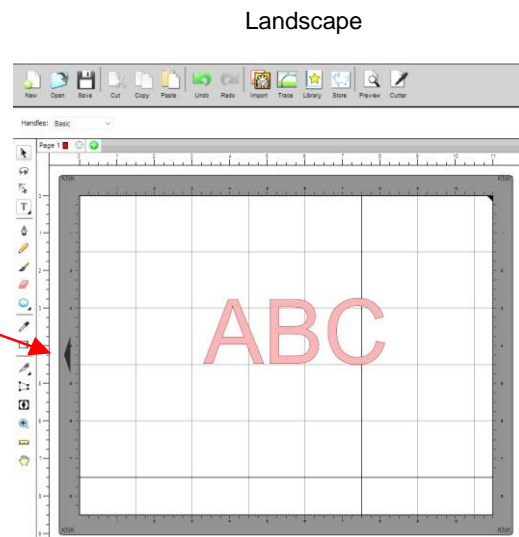
Select either **Vertical (Portrait)** or **Horizontal (Landscape)**



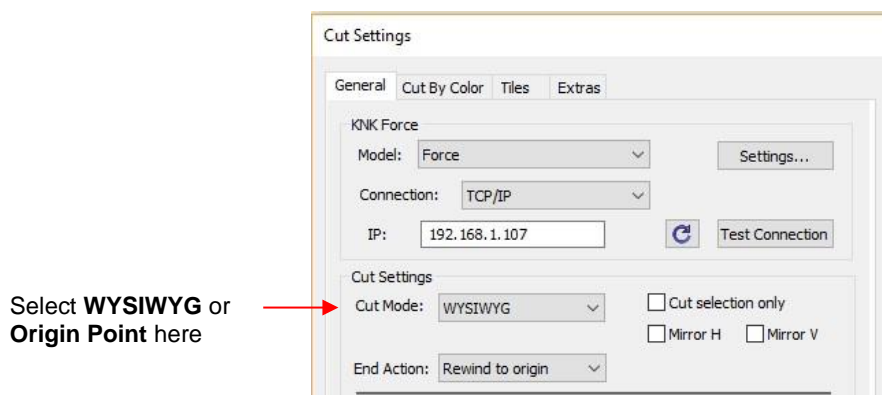
into the

Portrait

Landscape

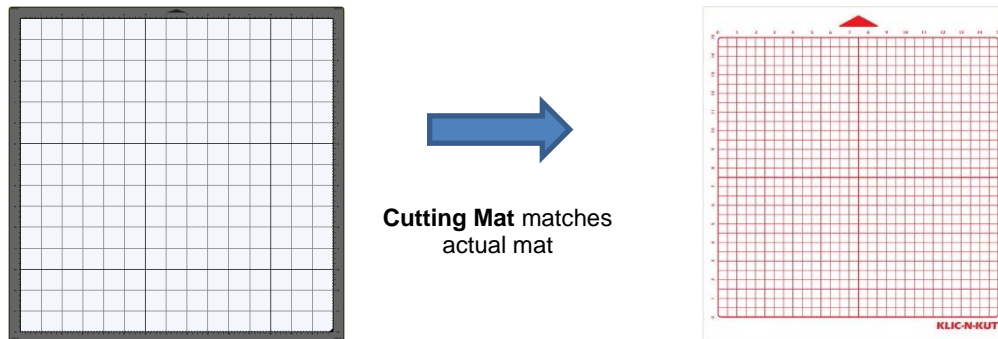


- The choice between **Portrait** and **Landscape** is a personal one – use whichever one makes the most sense to you. For long projects, such as for large vinyl cuts, **Landscape** is usually chosen because the project displays better on the computer monitor. However, you still have the option to use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

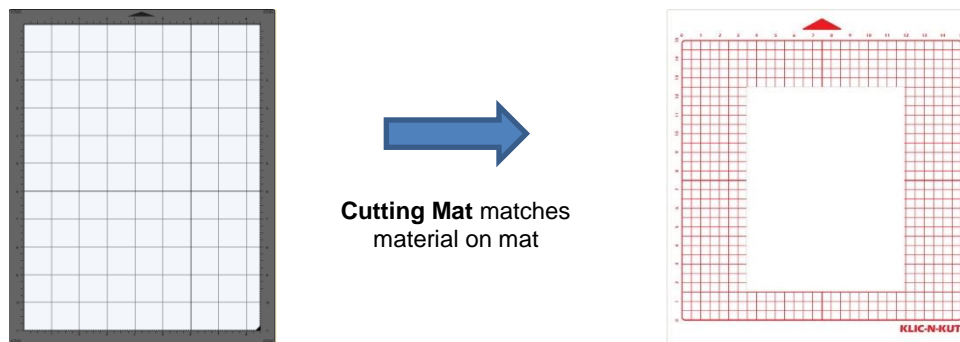


- **IMPORTANT:** Both **Cut Modes** are based on setting an XY origin on the cutter. On a Maxx Air, this origin is set by moving the tip of the blade (or pen or tool) to the lower right corner of the mat grid or the material.
- The following sections show where shapes will cut based on the possible combinations of **Cut Mode** and **Orientation**. Note that with **WYSIWYG** mode, there will be two options and the one that makes the most sense to you, is the one to use:

◇ **Cutting Mat Method:** The virtual **Cutting Mat** is the same dimensions as the actual cutting mat:



◇ **Material Method:** Create a custom virtual **Cutting Mat** that matches the dimension of the material to be cut:



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

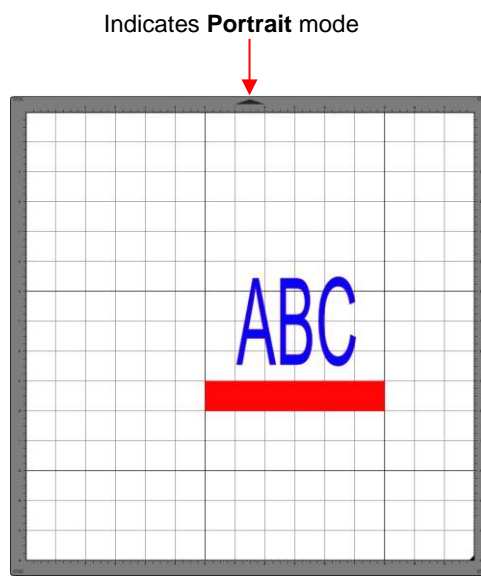
### 10.07.2 Origin Point

- This is the mode recommended for most applications as it economizes the use of your cutting materials.
- Shapes can be located anywhere on the virtual **Cutting Mat**. The shapes will be moved and aligned to cut with the origin you set on the material. As mentioned earlier, the origin is set using the position of the **blade**

**tip** (or other tool installed on the left side). It is typically set just inside the lower right corner of the material being cut.

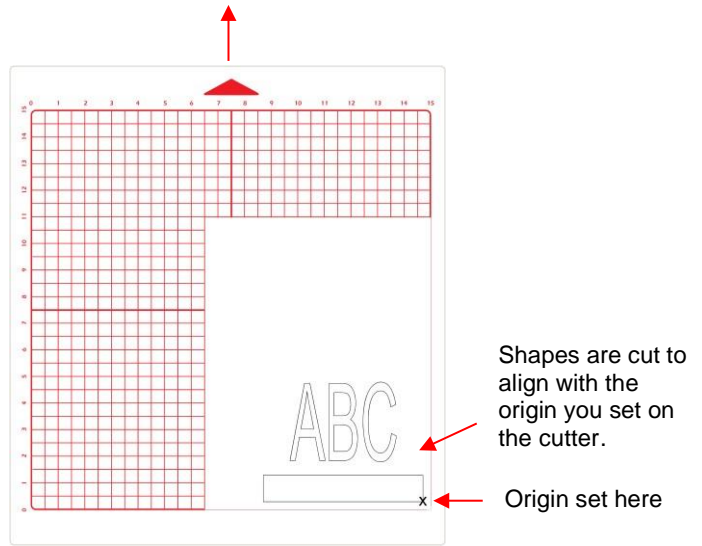
- When more than one shape will be cut, the shape closest to the origin will be cut at the origin and any other shapes will be cut the distance and direction from that shape as positioned on the screen. The following figures show examples of where images will cut. Use the arrow on the **Cutting Mat** as a guide to the direction to insert the actual mat or material into your cutter.

#### ◇ Origin Point – Portrait Mode



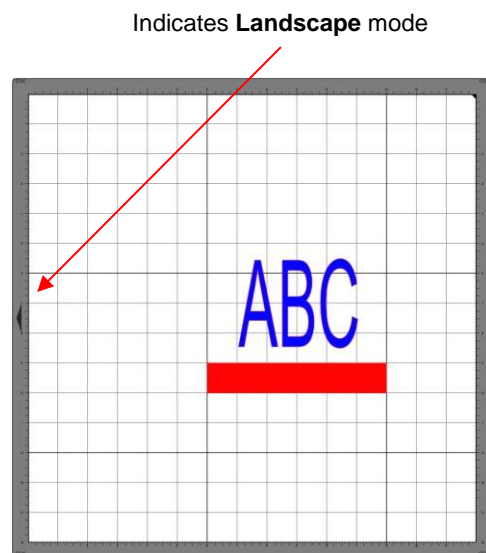
Location of shapes in SCAL

Feed the mat this direction into the cutter



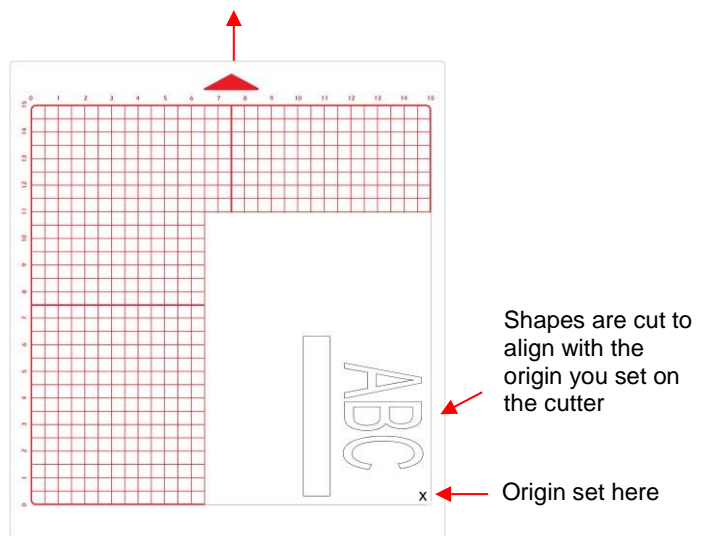
Where shapes will draw or cut on the material

#### ◇ Origin Point – Landscape Mode



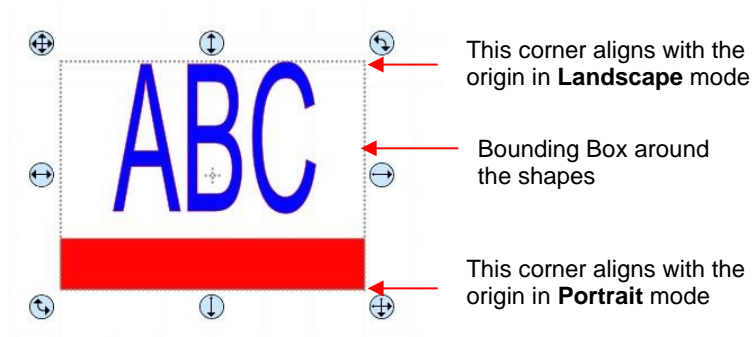
Location of shapes in SCAL

Feed the mat this direction into the cutter

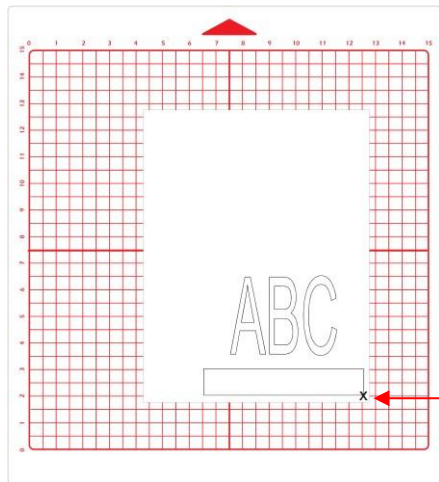


Where shapes will draw or cut on the material

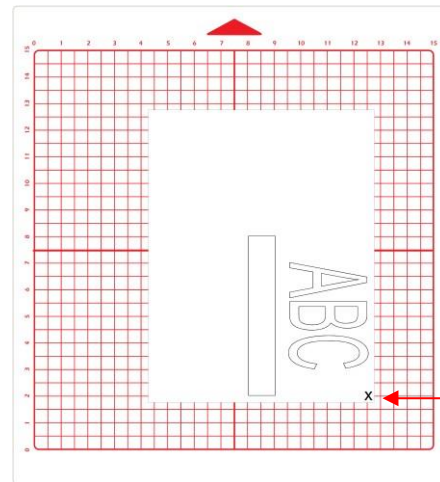
- Note that the alignment is based on the bounding box around the shapes:



- Also, note that the material can be located anywhere on the cutting mat because you are setting the origin on the material itself. It is usually advisable to set that origin just a little way inside the corner of the material so that you do not inadvertently cut off the edge.



**Portrait mode**

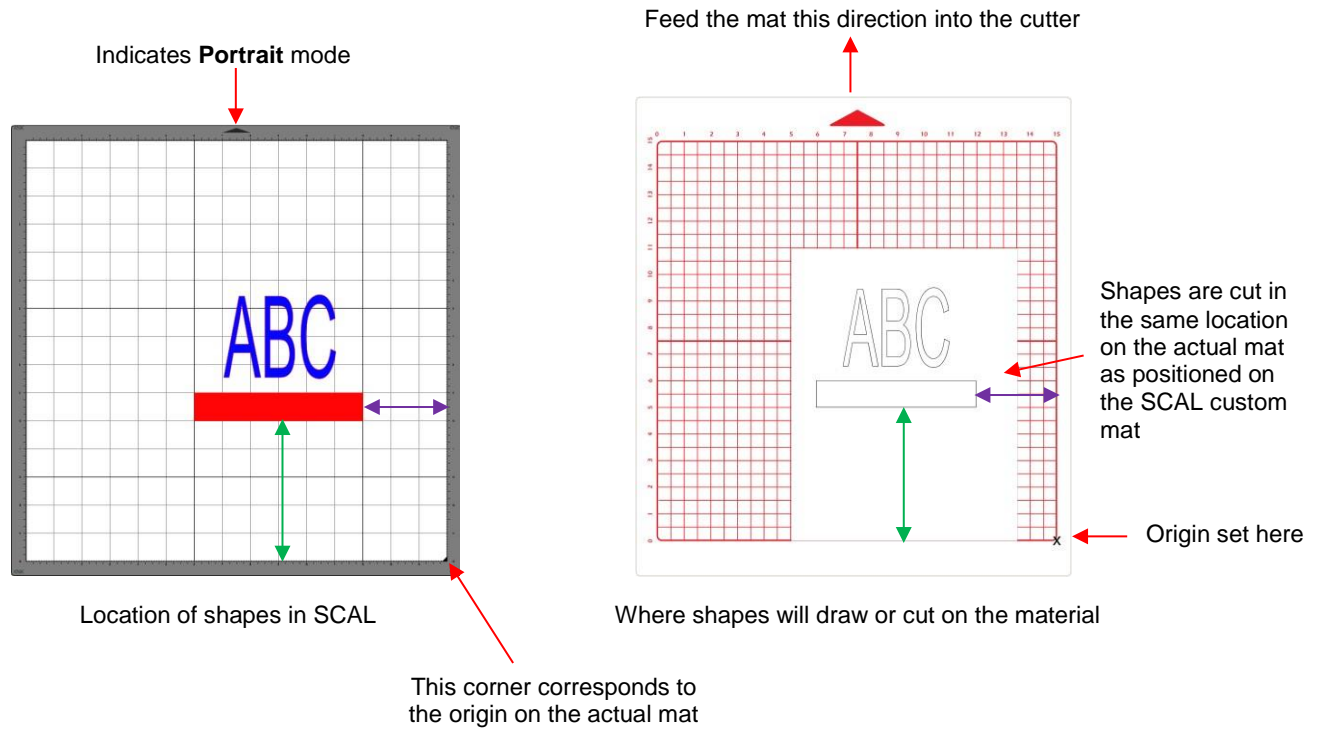


**Landscape mode**

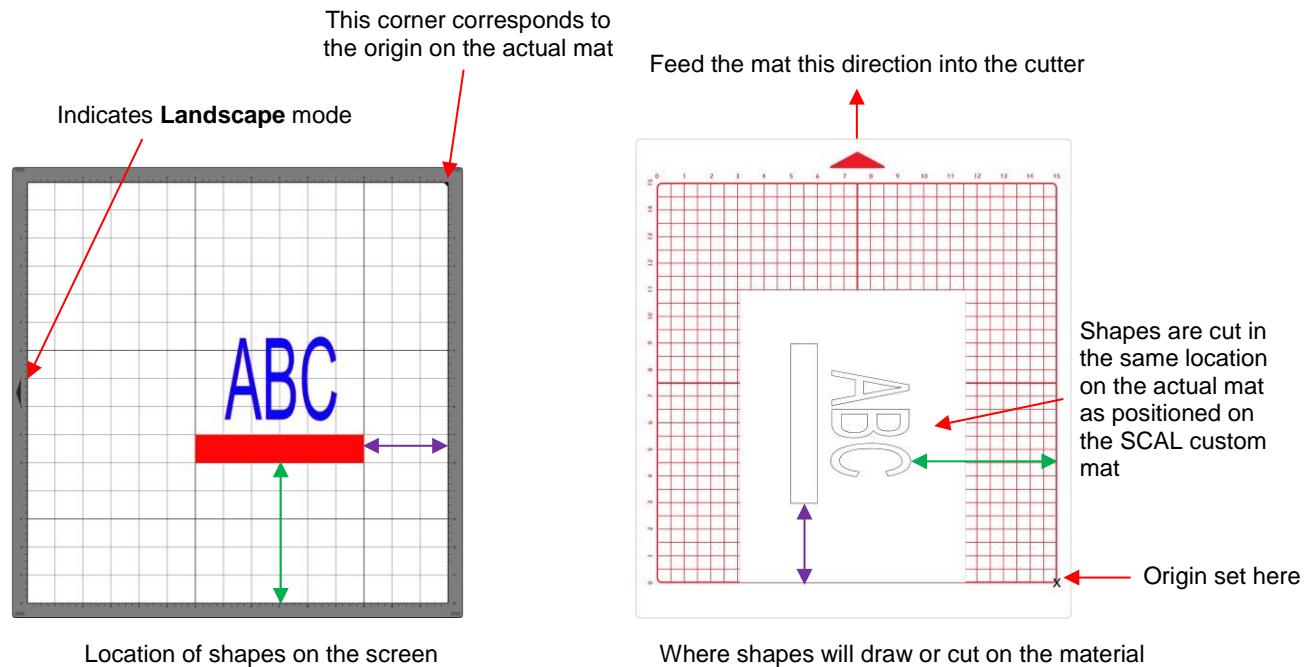
### **10.07.3 WYSIWYG**

- This is the mode recommended when you need to cut shapes in very specific locations on your material (such as the center front of a greeting card).
- Shapes are cut based on where they are located on the virtual **Cutting Mat**. There are two methods used:
  - ◇ **Cutting Mat Method:** The virtual **Cutting Mat** dimensions should match those of the grid on the actual cutting mat. The origin is set in the exact lower right corner of the mat's grid. The material needs to be placed on the cutting mat so that it covers the area where the shapes will be cut.
  - ◇ **Material Method:** The virtual **Cutting Mat** dimensions should match those of the material being placed on the actual cutting mat. The origin is set in the lower right corner of the material regardless of where the material is placed on the mat. In the example later on, the material is assumed to be letter size (8.5" x 11").
- In the following diagrams the purple and green arrows are used to indicate the equivalent distances between the shapes and the origin on the virtual **Cutting Mat** and on the actual mat.

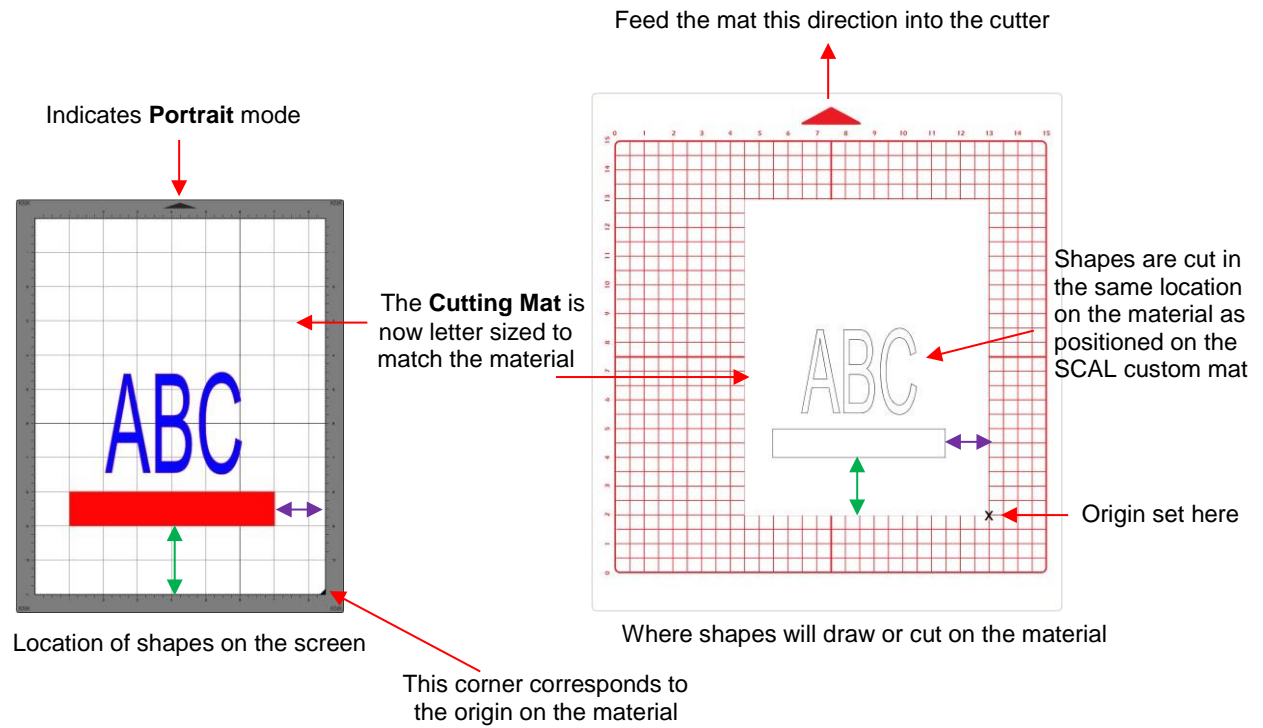
## ◇ WYSIWYG – Portrait – Cutting Mat Method



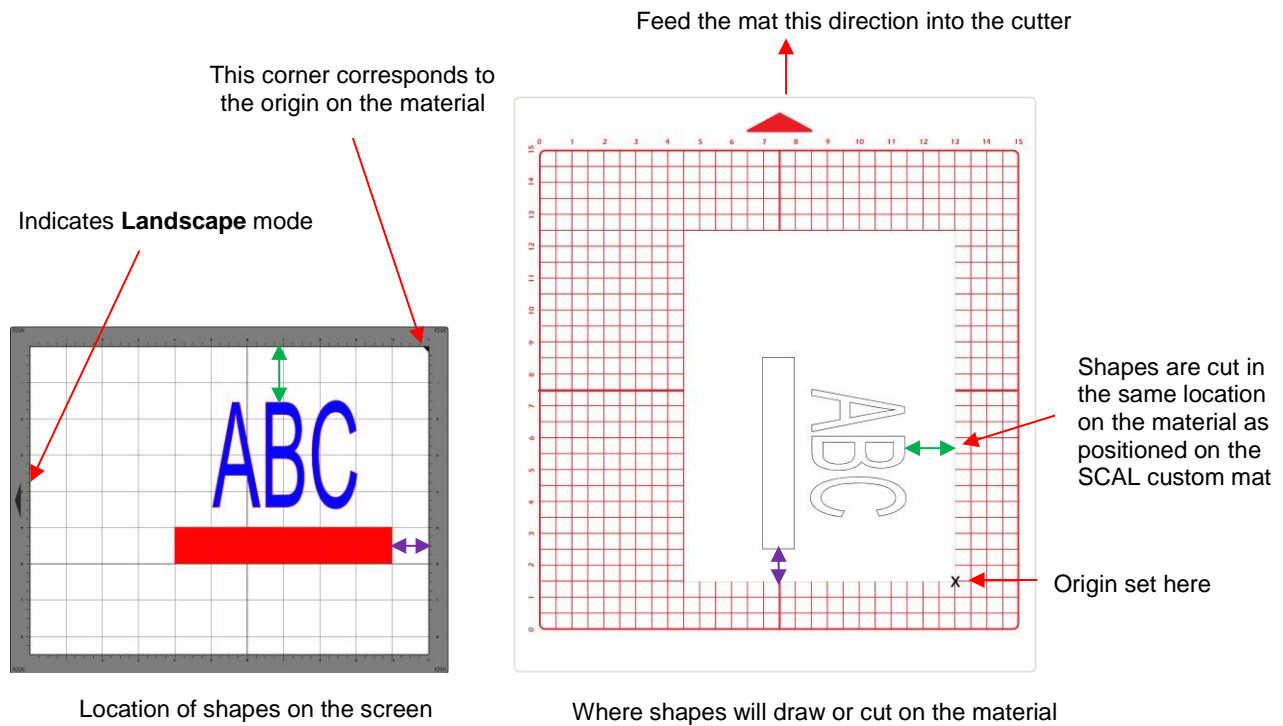
## ◇ WYSIWYG – Landscape – Cutting Mat Method



## ◇ WYSIWYG – Portrait – Material Method



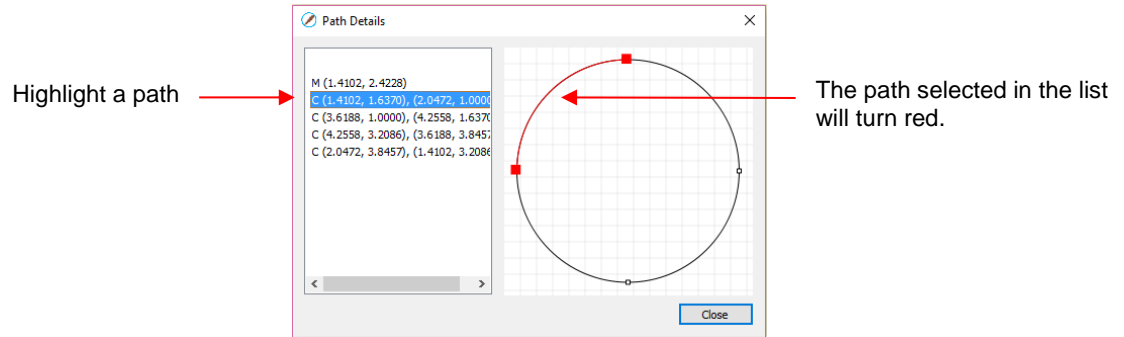
#### ◇ WYSIWYG – Landscape – Material Method



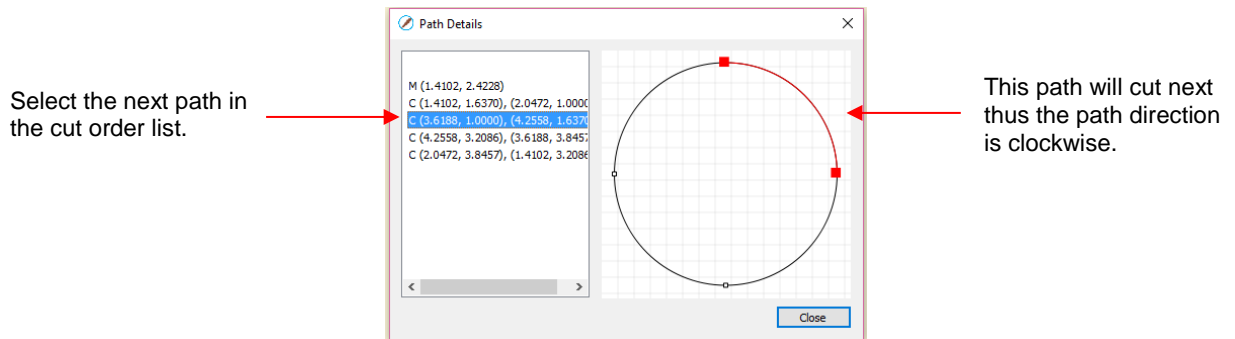


## 10.08 Path Details and Reverse Path

- Sometimes a cutting issue can be resolved by reversing the direction of a cut. In SCAL, the cut direction (clockwise versus counterclockwise) can be checked using the following steps:
  - ◇ Select the shape, right-click and select **Path>Path Details**.
  - ◇ A window will open. On the left side is a list of the paths in the order they will cut. Click on any path in the list and that path will turn red:



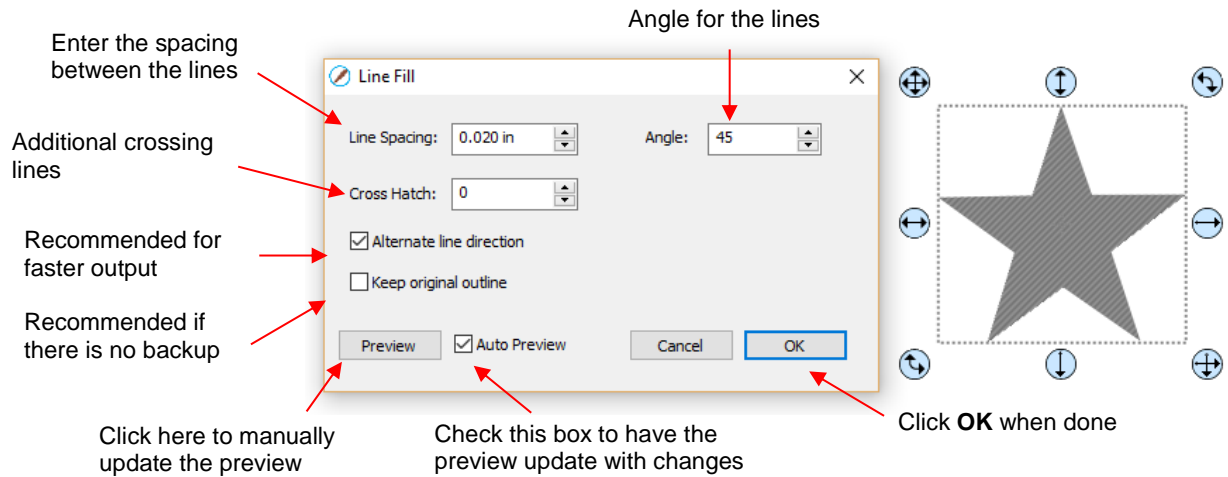
- ◇ Select the next path in the list and you will then be able to determine the direction of the cut:



- To reverse the direction of a path, use either of the following after selecting the shape:
  - ◇ Right-click and select **Path>Reverse Path**
  - ◇ Go to **Path>Reverse Path**

## 10.09 Line Fill

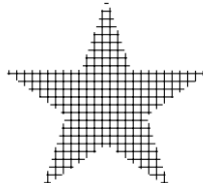
- The **Line Fill** function creates a line or hatch fill pattern, typically used for engraving with an engraving tool. It can also be used for coloring in shapes with a pen or embossing some materials with an embosser.
- To access this function, select a shape and go to **Effects>Line Fill**:



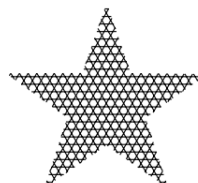
- ◇ **Line Spacing:** This is selected based on the width of the line produced by the tool to be used. If it's too small to accurately measure, use 0.02" or 0.5 mm for a small test shape and then adjust, as needed, to fit the tool and application.
- ◇ **Angle:** Choose an angle for the **Line Fill**. An **Angle** of 0 results in horizontal lines and an **Angle** of 90 results in vertical lines. Note the diagonal pattern in the prior screenshot using an **Angle** of 45.
- ◇ **Cross Hatch:** Increasing **Cross Hatch** adds additional intersecting lines to the pattern which can result in a more complete fill but will take longer to engrave or draw:



**Cross Hatch = 0**



**Cross Hatch = 1**

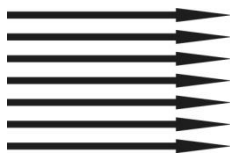


**Cross Hatch = 2**

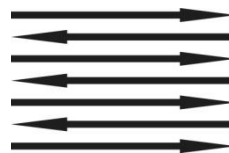


**Cross Hatch = 4**

- ◇ **Alternate Line Direction:** This controls whether the tool always returns to the same side before dropping down to engrave or draw. In some applications, it may need to be unchecked to provide a more even appearance, however it will take much longer to execute:



**Alternate Line Direction: not marked**  
Tool only travels in one direction



**Alternate Line Direction: marked**  
Tool travels in both directions

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

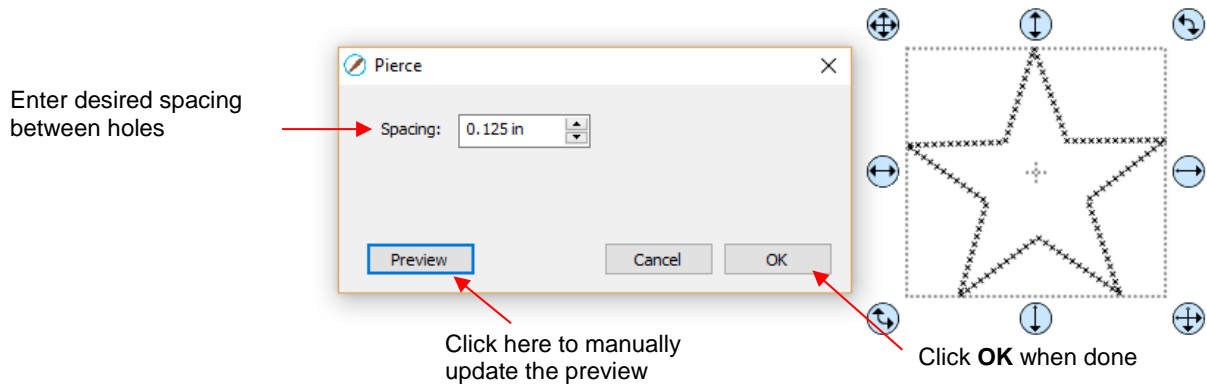


- For more information on using an engraver, refer to *Section 12.09*.

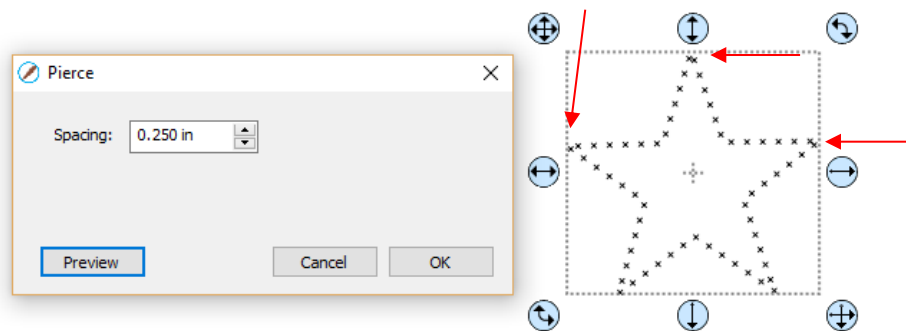


## 10.10 Pierce

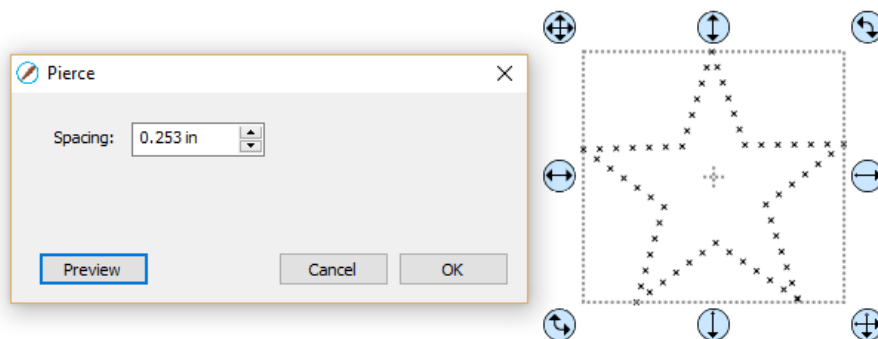
- The **Pierce** function creates holes for punch tools. This can be used to create pergamano designs and paper embroidery patterns.
- To access this function, select a shape and go to **Effects>Pierce**:



- Note that even though you see "X" shapes on the screen, the cutter head will be making downward punch movements.
  - At this time, there is no editing available for a pattern created using the **Pierce** function. If you find that your design has holes that are not evenly spaced, try altering the spacing by tiny increments and clicking on **Preview**.
- ◇ For example, the star shape used above shows uneven spacing when a value of 0.25" is entered. Note how the star has holes too close to one another at the upper points:



- ◇ Gradually increasing the **Spacing** didn't immediately result in an acceptable pattern until 0.253" was entered. Then the pattern looked even:



- If you have a shape that has the **Pierce** effect applied and want to remove it (even after the file has been saved and re-opened), select the shape and go to **Object>Remove Effects**.
- For more information on using a punch tool, refer to *Section 12.10*.

## 11. Maxx Air: Print and Cut

### 11.01 What Is a Print and Cut (PNC)?

- The print and cut process involves printing an image from SCAL to any printer you own and then, with the aid of the Maxx Air's laser having the image or images cut out with perfect precision. Below are three typical kinds of print and cut applications but there are other kinds. You even have the ability to cut out shapes from pre-printed sheets. This will be covered in *Section 11.06*.

- ◇ Cuts along the actual borders of the printed image(s):

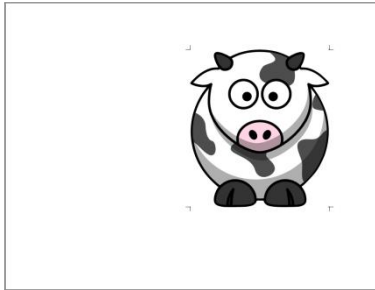


Image is precisely cut along printed borders

- ◇ Cuts outside of the borders but following the shapes of the printed image(s):

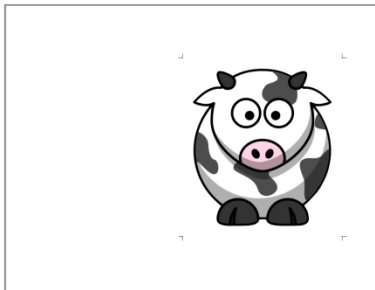
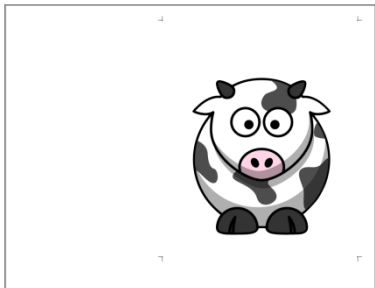


Image is cut in same shape but offset from outside printed borders

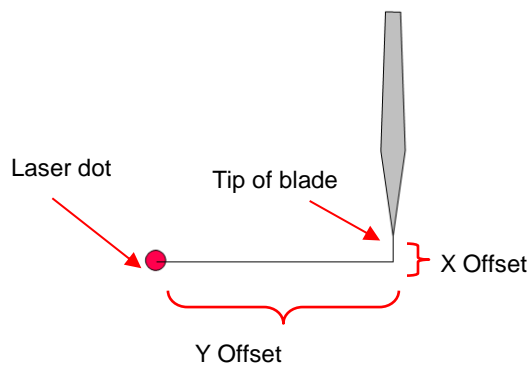
- ◇ Cuts follow a different shape from that of the printed image(s):



A custom shape is cut around the printed image.

### 11.02 What is a PNC Calibration?

- In order to get precise PNC results, you must tweak the **Laser Offset** calibration. This is nothing more than determining how far away the laser light on your KNK is located relative to the tip of the blade. Because the laser is manually installed into a small hole inside the blade carriage, the distance from the laser light to the tip of the blade will vary from one KNK to the next. Also, you will want to use the same blade holder with all of your PNC applications, as the distance can also change with larger or smaller diameter holders.
- The distance is measured in an X direction and in a Y direction:



- This calibration only needs to be done one time, for a given blade holder, and then you can record this calibration in case you ever need to install SCAL on a new computer or you have to reformat the hard drive on your current computer.
- The process involves performing and repeating a PNC to see how much you need to adjust the **X** and **Y** values in order to get perfect results. And you **SHOULD** be able to get perfect PNC's.

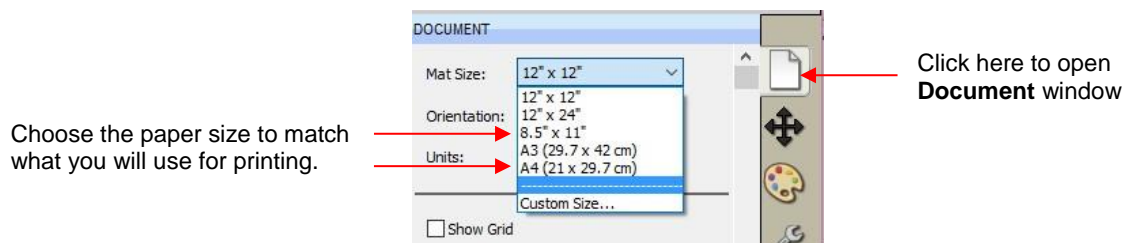
### **11.03 Laser Calibration Procedure**

#### **11.03.1 What You Need for Calibrating**

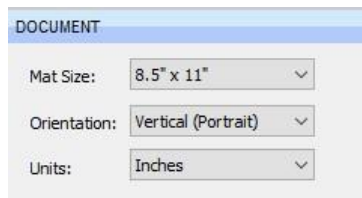
- You need to be well rested! You don't want to start learning the PNC process when you are tired, stressed, or in a hurry. Mastering a PNC comes when you have the time to repeat it about 4 times in a row. At that point, you will not only have repeated the process enough times to feel very comfortable with the order of the steps, but you'll have your calibration perfected and then be ready to do future PNC's quickly and with ease.
- Next, you will need the following items:
  - ◇ Printer
  - ◇ Blade holder (you cannot do this calibration with the test pen; it must be the blade holder you'll be using for your PNC applications)
  - ◇ Copy/printer paper in either Letter size (8.5" x 11") or A4 (21 x 29.7 cm)
  - ◇ Calibration File (available here: <http://cutterpunk.com/files/knk/BasicShapes.zip>)
- **Important!** In order to facilitate the calibration process, please follow all instructions exactly. Later, after calibration, you can change up methods, such as paper orientation and mat sizing, as desired.

#### **11.03.2 Preparing the Calibration File**

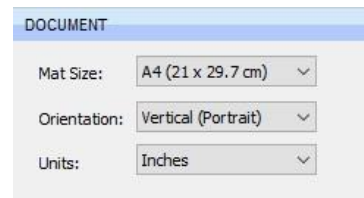
- (1) It is strongly recommended that you set the dimensions to match the paper size you'll be using for the calibration. Working closer to the origin reduces unnecessary movement that can introduce factors which may affect accuracy. In the **Document** window, open the **Mat Size** dropdown menu and select either 8.5" x 11" or A4 (21 x 29.7cm):



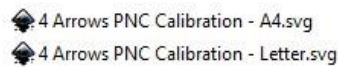
- (2) Next change the mat orientation, if needed, so that you are working in **Portrait** mode. Again, after calibrating you can work in **Landscape** mode if you prefer. However, in order to use the diagram for adjusting calibration settings, it is very important to use Portrait. Your settings should now look like this:



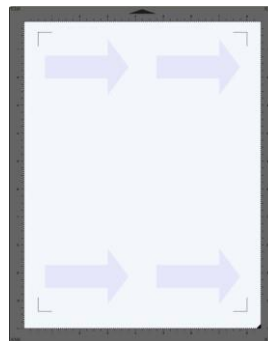
or



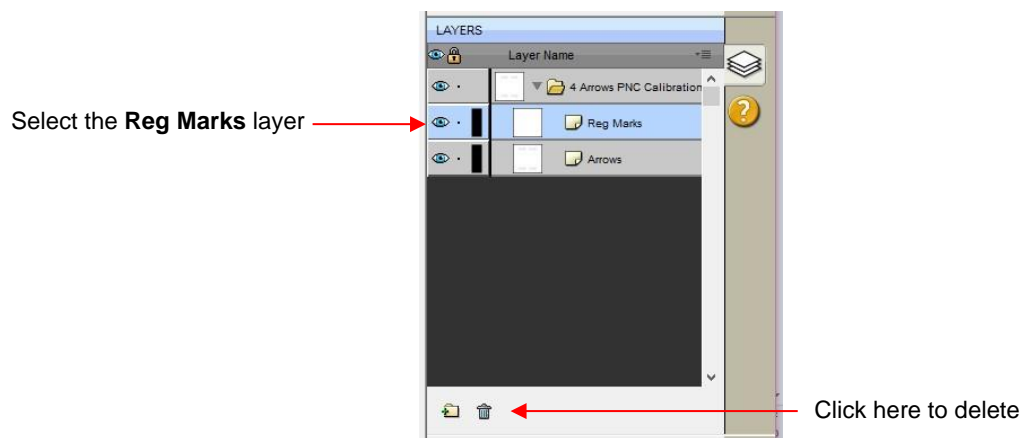
- (3) Inside the **Basic Shapes** folder from the downloaded zip file, you will find the following two files interspersed with the other files:



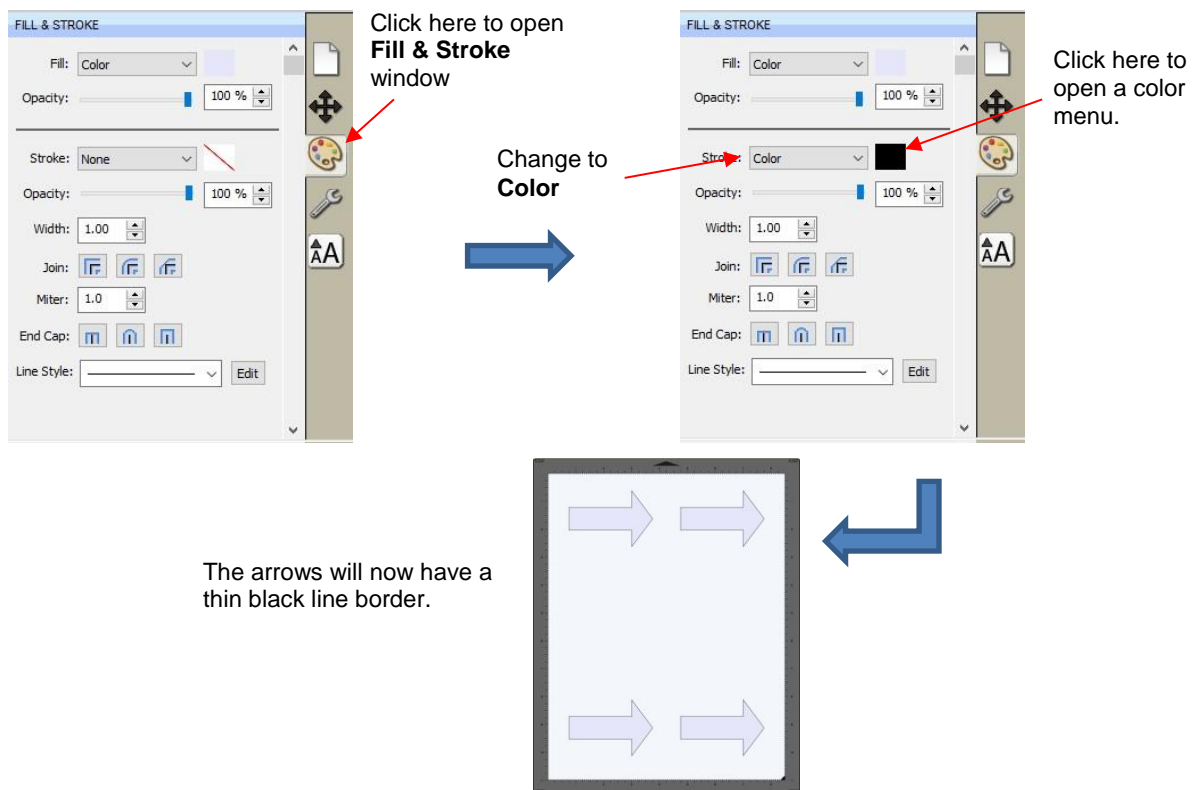
- (4) Use **File>Import** to open whichever one matches the printer paper you're using, i.e. A4 or Letter. Move the imported shapes so they are roughly centered in the document area:



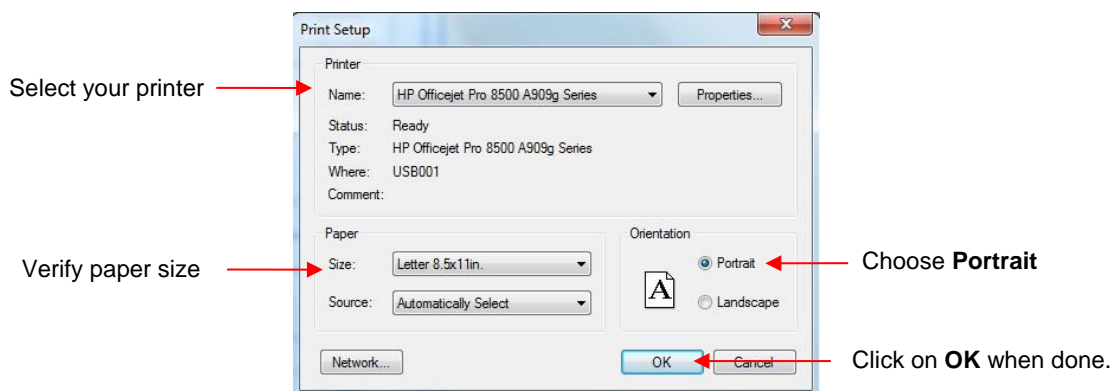
- (5) Because this calibration file was created for calibrating in a different software, it contains a registration mark layer not needed in SCAL. On the **Layers Bar**, select the **Reg Marks** layer and delete it:



- (6) It is also recommended that the arrows be outlined for printing. Select that layer and click on the **Fill & Stroke** icon. Change the **Stroke** from **None** to **Color** and then click on the box to the right of that to open a color selection menu.



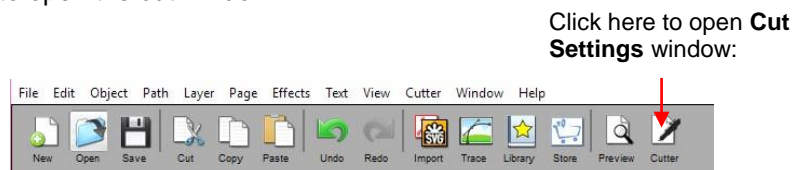
(7) Go to **File>Print Setup**, select the printer you plan to use, paper size, and **Orientation**:



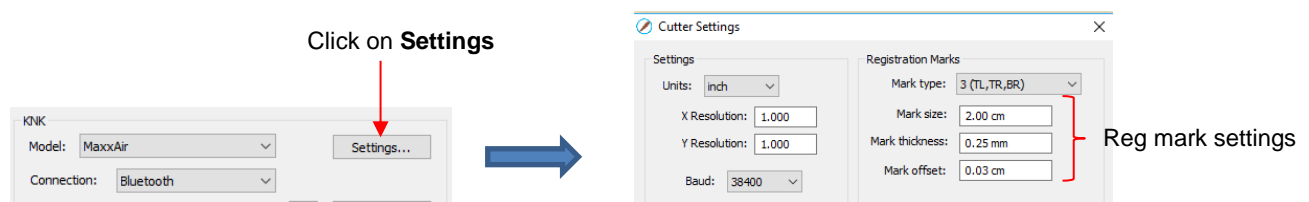
(8) Do NOT use **File>Print** at this point because the reg mark settings still need to be adjusted. This will be done in the next section.

### **11.03.3 Entering Settings and Printing**

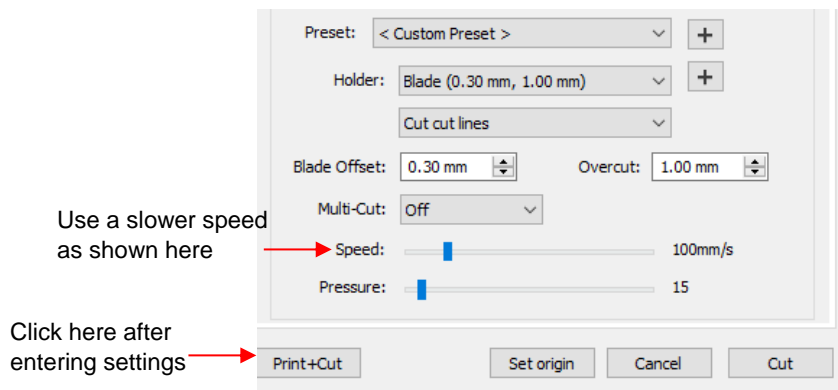
(1) Click on the **Cutter** icon to open the cut window:



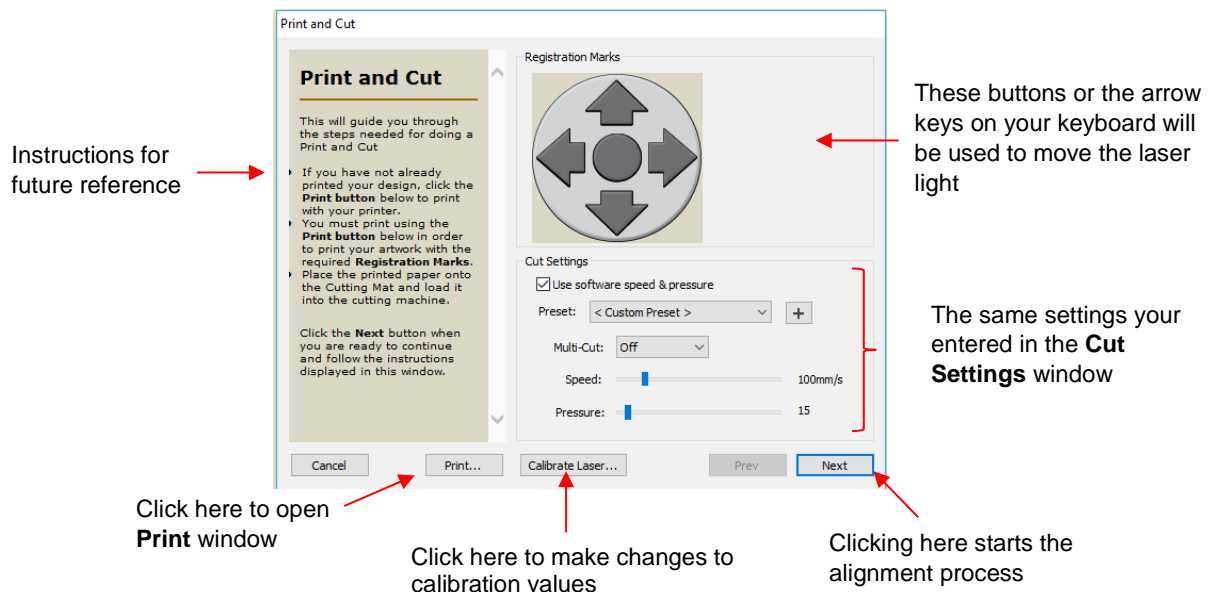
(2) Click on the **Settings** button to open the **Cutter Settings** windows:



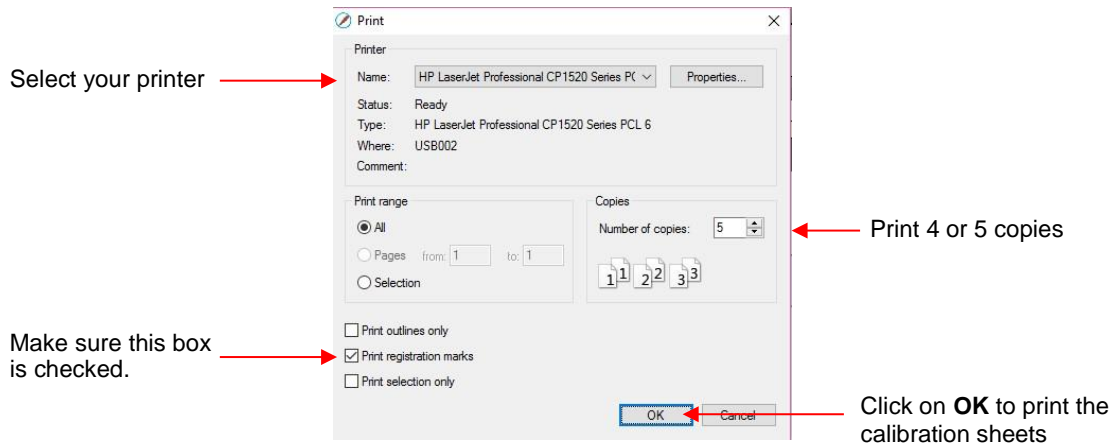
- (3) You can modify the settings for the reg mark size, line thickness, and offset from the image to be cut. The latter one, **Mark offset**, should be changed to 0.03 cm so that the reg marks will be as close as possible to the printed image. This isn't an absolute requirement but it does allow more of the page to be used for your project. Once the settings have been changed, click on **Save** at the bottom of that window.
- (4) Enter the settings in the following screenshot. If you know you need a higher or lower **Pressure** for the paper you're cutting, use that pressure instead:



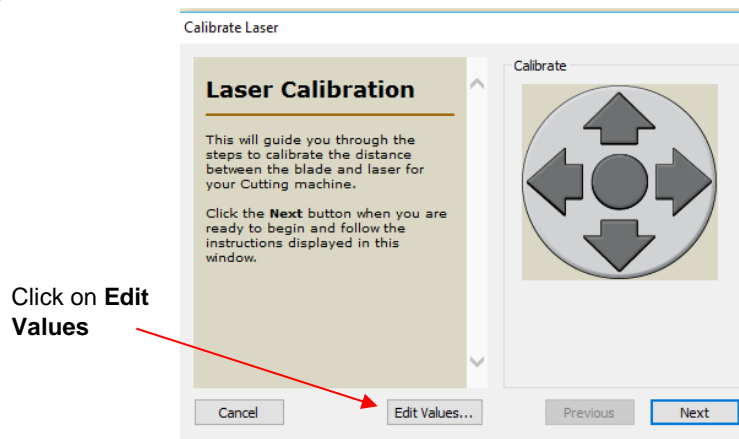
- (5) At the bottom of the **Cut Settings** window, click on **Print+Cut**. The following **Print and Cut** window will open:



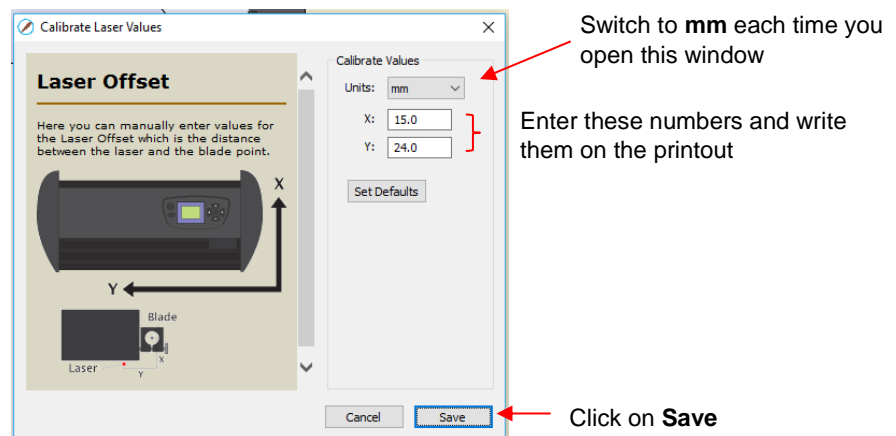
- (6) To print the arrows with the registration marks, click on **Print**:



- (7) After printing, click on the **Calibrate Laser** button. The following window will open and you will then click on **Edit Values**:



- (8) It is highly recommended that the calibration numbers be entered and adjusted in mm. So, change the **Units** first and then enter the **X** and **Y** values shown below. Also, write them somewhere on your first printout. It's helpful to track each test in case you need to go back and check the results again:

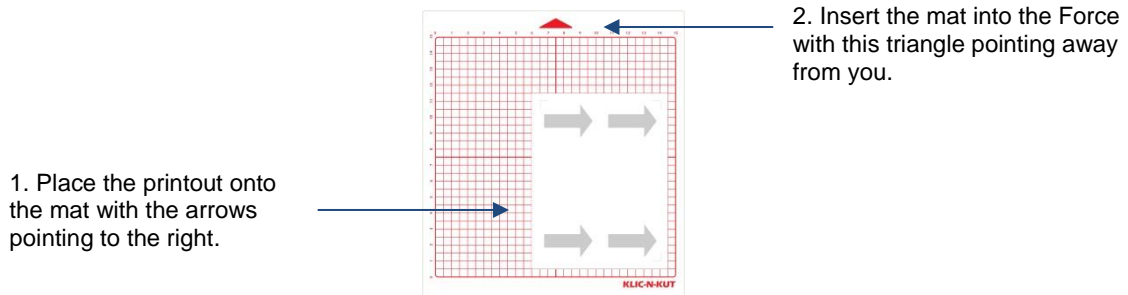


- ◇ **IMPORTANT:** If you already calibrated your Maxx Air using a different software program, enter those same **X** and **Y** settings here, however note that the **Y** value should be entered as a positive number. Thus, if your calibration numbers were, say, **X**: 15.6 and **Y**: -30.7, then you would enter them as **X**: 15.6 and **Y**: 30.7, again making sure that **mm** is selected under **Units**.
- ◇ **NOTE:** There is a built-in calibration procedure to set more accurate initial calibrations than the ones suggested above. You will still need to perform the printed arrow test in order to tweak the calibration but it will guarantee that you'll be closer than using average values. To do this built-in calibration, begin with the on-screen instructions as shown in the screenshot in *Step (7)*.

- (9) Click on **Save** and you will return to the **Print and Cut** window.

#### **11.03.4 Setting the Registration Marks and Cutting**

- (1) Place the printout onto the mat and align with the grid. As you are facing the Maxx Air, the printout should be on the mat in a portrait orientation with the arrows pointing towards the right end cap.



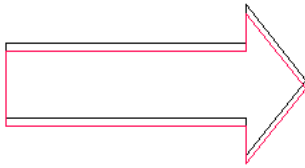
- (2) Because of a “random bug” in SCAL, it is recommended that the origin be set using the option in the software. Thus, return to the **Cut Settings** window and click on the **Set origin** button. Set the origin with the tip of the blade approximately at the corner of the lower right registration mark. Click on **OK** and then click on the **Print+Cut** button.
- (3) In the **Print and Cut** window, click on **Next** and the laser light will move towards the upper left registration mark but will most likely be at least ¼” away. You will then either click the direction buttons in SCAL or use the arrow keys on your keyboard to move the laser dot precisely over the corner of that registration mark. (Note that you cannot use the buttons on the control panel.) Also, the following shortcuts enable you to move in larger or smaller increments:
- ◇ **Shift + arrow key**: move in a larger increment
  - ◇ **Ctrl + arrow key**: move in a smaller increment (on a Mac: **Command + arrow key**)
  - ◇ **Shift + Ctrl + arrow key**: move in the smallest increment possible (on a Mac: **Shift + Command + arrow key**)
- (4) Once you have the blade tip centered at that corner, press the **Enter** key or click on **Next**. The laser will then move to the top right registration mark and you will, again, move the laser light to be precisely at the corner of that registration mark. Press the **Enter** key or click on **Next** and repeat at the third, lower right registration mark.
- (5) At this point, you’ll notice that instead of **Next**, the lower right button reads **Cut**. Pressing either the **Enter** key or that **Cut** button initiates the cutting of the four arrows.

#### **11.03.5 Adjusting the X and Y Laser Offsets**

- (1) After the print and cut is completed, examine how the cut lines were made relative to the printed lines. If the offset is large enough, use a metric ruler to measure. If the offset is very small, then just estimating will be fine as you refine your calibration.
- (2) Also, examine the four arrows. If you see a difference in how the four cut out, focus on the lower right one for now. After the calibration is complete, if you still see an inconsistency, then refer to the checklist later in this section.
- (3) In the following diagram, the red lines represent the cut lines and the black lines represent the printed lines. Use this diagram to determine whether your **Laser Offset** values need to be raised or lowered for your laser:

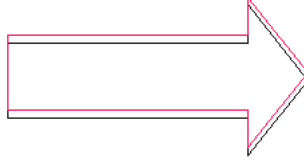


If the red cut line is below the black print line, then **decrease** the value of **X**.



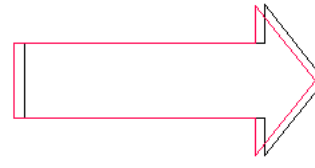
Red line is lower than black line: change X from 15.0 to 14.0

If the red cut line is above the black print line, then **increase** the value of **X**.



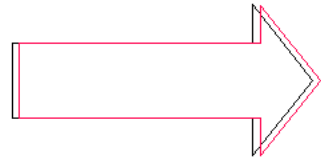
Red line is higher than black line: change X from 15.0 to 16.0.

If the red cut line is left of the black print line, then **decrease** the value of **Y**.



Red line is left of black line: change Y from 24.0 to 23.0

If the red cut line is right of the black print line, then **increase** the value of **Y**.



Red line is 1mm right of black line: change Y from 24.0 to 25.0

- Modify your **X** and **Y Offset** values in the window shown at the end of *Section 9.03.3*. Start with 1 mm adjustments (like shown above). Remember to switch the **Units** to mm and then write down the numbers you're entering onto the next printout.
- Repeat the test and note whether you need to increase or decrease **X** and/or **Y**. Again, adjust by 1 mm unless you now need to do the reverse. For example, let's say you adjusted X from 15.0 to 14.0 after the first test. After the second test, do this:
  - ◇ If **X** still need to be decreased, then make **X** = 13.0 for the third test
  - ◇ However, if **X** now needs to be increased, then make **X** = 14.5 for the third test
- After adjusting my 0.5 mm, you will want to adjust by 0.2 mm. Continue narrowing in on the correct calibrations. Once you are adjusting by 0.1 mm, you should be able to achieve the optimum settings. If you are still off by "just a hair" in one direction or the other, then adjust by a final 0.05 mm.
- During the testing, you may find that one side is aligned but the other is not. For example, the cut line may be perfectly aligned with the print line on the lower side of the arrow but a little above the arrow along the upper side. Adjust the calibration based on the side that is off. It won't cause the other side of the arrow to be off.
- If you find that one or two arrows are perfect but the others are off:
  - ◇ Check the **Cut Speed** setting. Too high of a speed can cause inaccuracies.
  - ◇ Make sure the pinch wheels are still centered under the white rectangles.
  - ◇ Make sure the bottom of the mat, the pinch wheels, and the grit shafts are clean.
  - ◇ Make sure nothing is interfering with the smooth traveling of the mat.
  - ◇ Make sure the blade isn't cutting too deeply into the mat. Lessen the blade exposure by retracting it a tiny bit back into blade holder.
- **IMPORTANT!** Once you have your calibration completed, **write down** these final **X** and **Y offsets**! Some of the software updates can cause the calibration numbers to reset to default values. It will save you time and frustration to have these numbers recorded so that you can quickly reenter them without repeating the calibration process.

## **11.04 Preparing an Actual Print and Cut Application**

### **Video**

- Here are the typical steps when preparing a PNC application:
  - ◇ Prepare the image that will be printed which can be either or both of the following:

- An imported raster image such as a JPG or PNG which will need tracing (refer to *Section 7.03*)
- A vector image (either imported or designed in SCAL) that will be printed but not cut
- ◇ Make sure shapes that will only be printed are on a different layer than the shapes that will be cut.
- ◇ Select each layer and then open the **Style Panel** (refer to *Section 10.01*). Under **Cut Line Type** choose:
  - **Print+Cut Cut:** for the layers that will be cut
  - **Print+Cut Print:** for the layers that will be printed
- ◇ Print the project, making sure to mark the option to **Print registration marks**.
- ◇ If needed, perform a test cut so that you know the best settings to use. This test cut can often be performed on the printout itself if there is room in waste area of the project.
- ◇ Set the origin with the blade tip over the lower right registration mark.
- ◇ Perform the cutting process, selecting **Print+Cut** from the **Cut Settings** window and following the instructions.

### **11.05 Print and Cut Tips**

- When tracing imported images, the trace lines will not necessarily be perfectly aligned with the image. This can result in tiny bits of white appearing in certain spots, suggesting the PNC wasn't accurate. Zoom in close on the image so that you can see the trace line following the outline of the image. Look at the same spots where the cut didn't follow the image perfectly. This could be the cause of the inaccurate PNC. There are three ways of handling this situation:
  - ◇ Retrace the imported image, using a lower **Contrast** and/or **Smooth** setting to get a tighter fit of the trace line to the original graphic (refer to *Section 7.03*).
  - ◇ Use **Path Editing** to move the trace lines to more closely fit the original graphic (refer to *Section 8.10.2*).
  - ◇ Create an inset line to use for cutting instead of the original trace line (refer to *Section 8.05*).
- If a PNC is not precise and the cause is not the alignment of the trace lines, then try slowing down the speed. If the mat is moving numerous times, in and out of the cutter, a slight shifting can occur, especially at high speeds. Decrease the **Speed** from 100 to, say, 70.
- Remember that the calibration of the **Laser Offset** is specific to the blade holder type being used. Thus, if you change brands, the laser calibration will need to be modified.
- If your test arrow is cutting perfectly, thus indicating you have the correct calibration, but your next print and cut is way off, then perhaps your situation is something outside of the ordinary. Get help at one of the recommended online support groups listed in on the first page of this manual.
- If you wish to use **Landscape** mode for your print and cut applications, then change the **Orientation** on the **Document Panel** and under **File>Print Setup** to **Landscape** and orient the printout the correct way on the cutting mat. There is no need to modify the laser calibrations.

### **11.06 Scan2Cut**

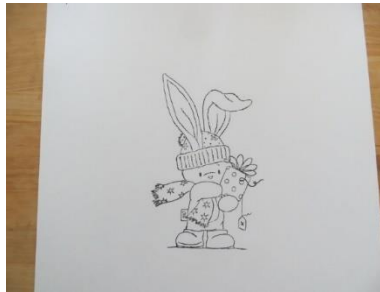
- Scan2Cut is a function in SCAL that allows you to photograph or scan an already-printed image to then cut out with your Klic-N-Kut cutter. To open the Scan2Cut window, go to **File>Scan2Cut**.

#### **11.06.1 Scan2Cut: Introductory Tutorial**

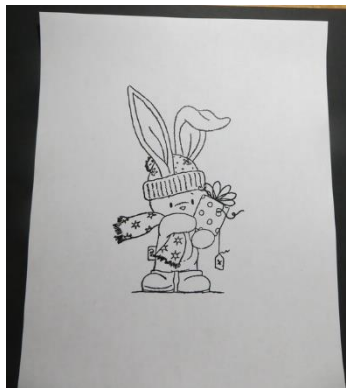
- There are several methods that can be used. The one presented in this section is considered to be the quickest to learn. It is highly recommended that you follow this tutorial in your first attempt at learning this

function. In *Section 11.06.2*, alternative methods will be presented and the very last one in that section in my personal preference.

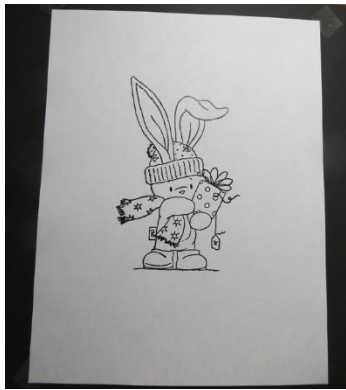
- Make sure you have calibrated your KNK for print and cut (refer to *Section 11.03*). Also, for this initial tutorial only, please use either Letter sized or A4 sized paper or cardstock. It is very important that you not precut the sheet as this method requires the dimensions to be known and very precise.
- Prepare an image for Scan2Cut. Some options include:
  - ◇ Stamping an image or two on the paper
  - ◇ Drawing your own image on the paper
  - ◇ Printing any image from your computer
- In this example, an image has been stamped onto a letter sized sheet of cardstock:



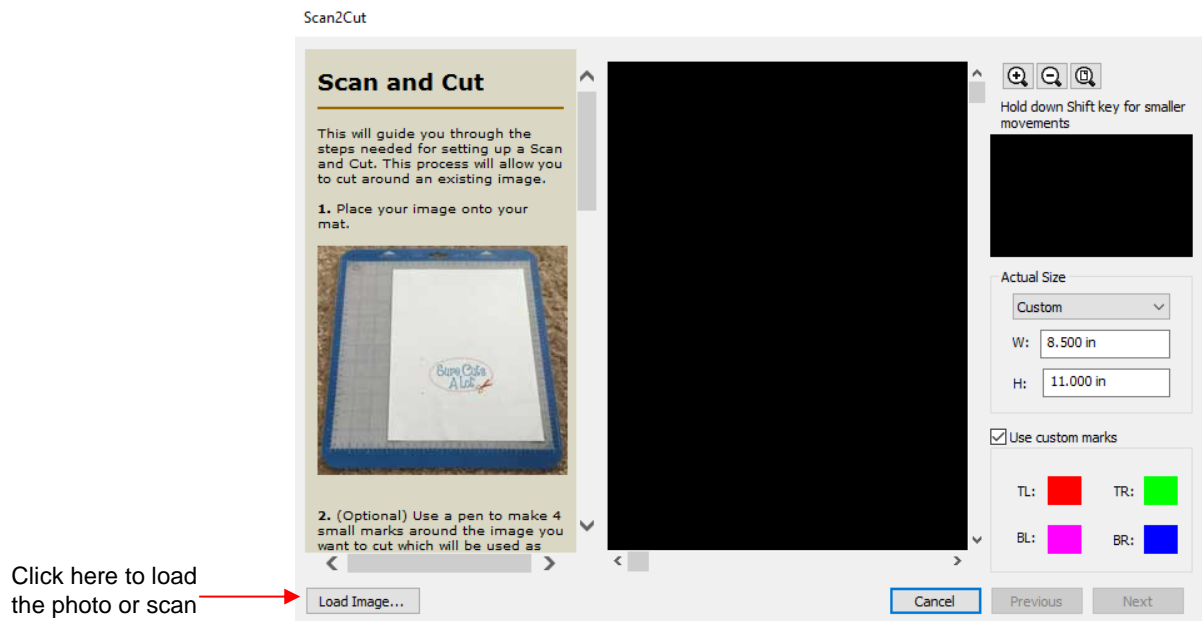
- Place the sheet on top of a dark colored sheet of paper/cardstock or any flat dark surface so that the dark surface extends beyond the boundaries of the sheet. This will allow a clear distinction between the white paper and the background:



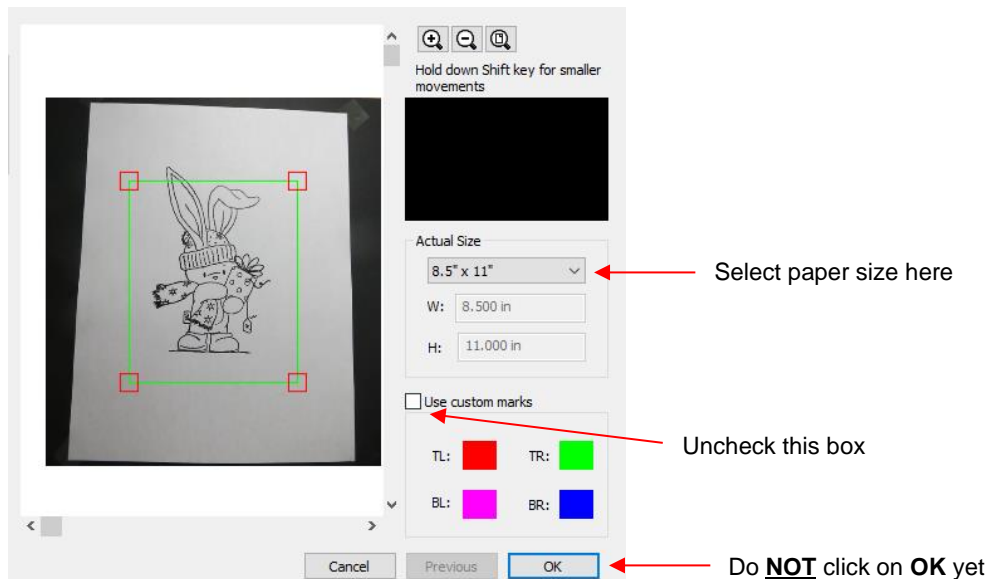
- Scan or photograph your printout:
  - ◇ Make sure all four corners are included.
  - ◇ When taking a photo, make sure the printout is flat. Use tape to secure the four corners if the printout isn't laying flat. In the prior photo, you can see that the top of the sheet isn't flat.
  - ◇ Also, when using a camera, it is okay for the photo to be taken at an angle (as in the following photo). The software can calculate the perspective by noting the difference in the distances between the corners. It can then apply a correction to the image being photographed:



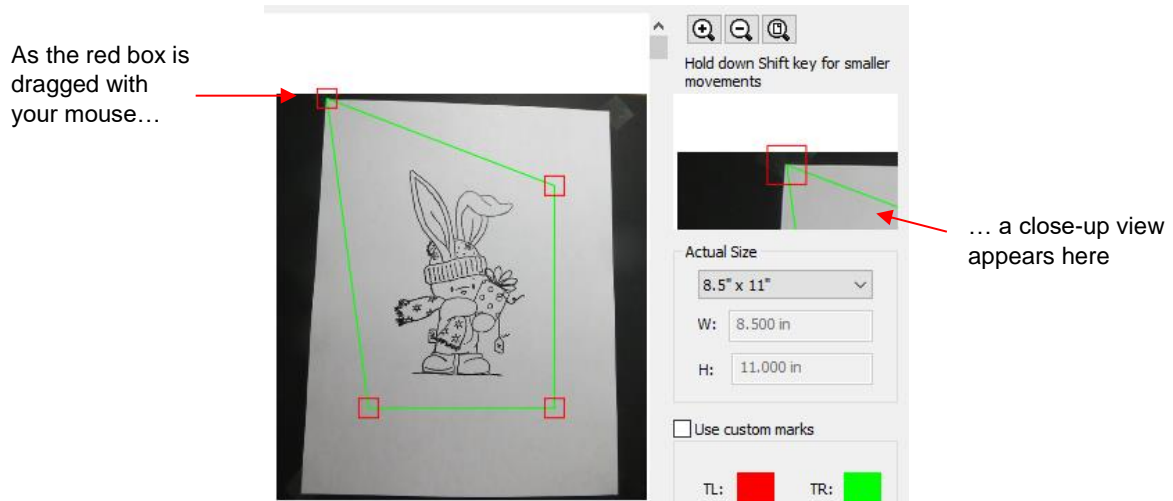
- Start a new file in SCAL. Go to **File>Scan2Cut** and the following window will open. Click on **Load Image**, then browse and select your photo or scan:



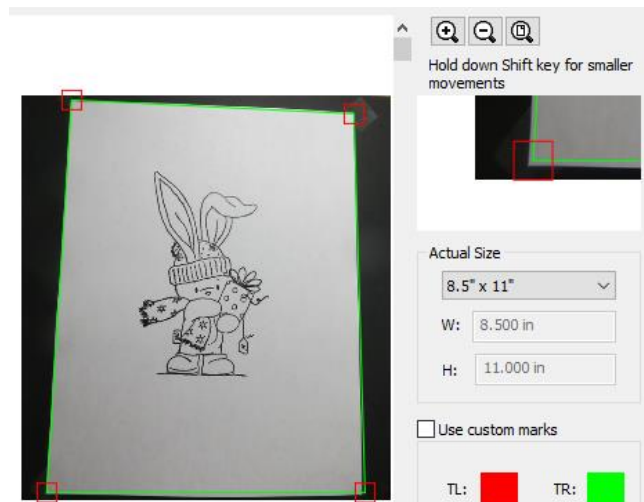
- From the **Actual Size** dropdown menu, choose the dimensions of your sheet. In this tutorial, Letter size is being used, thus 8.5 x 11 is selected. Next, uncheck the box next to “**Use custom marks**” (this option will later be presented in *Section 11.06.2*). Do not yet click on **OK**:



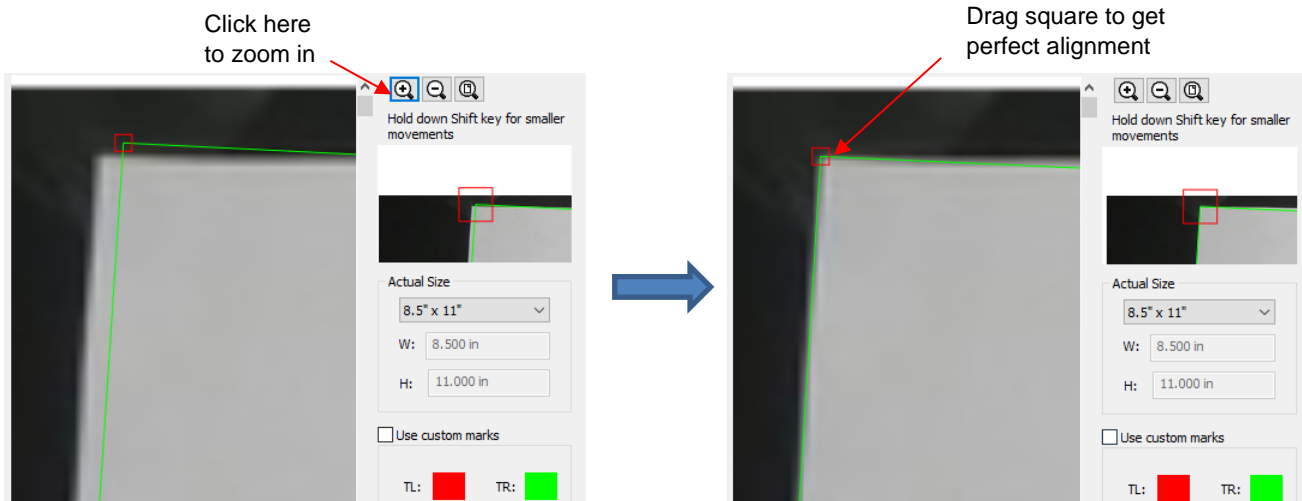
- The next step is to move and perfectly align the four corners of the green rectangle over the four corners of the paper. Before zooming in, use your mouse to drag each of the four red squares “roughly” over those four corners. This will make it easier to find the red squares after zooming in. Note that as you drag one of the boxes to the corner, you’ll be able to see a close-up in the small window to the right:



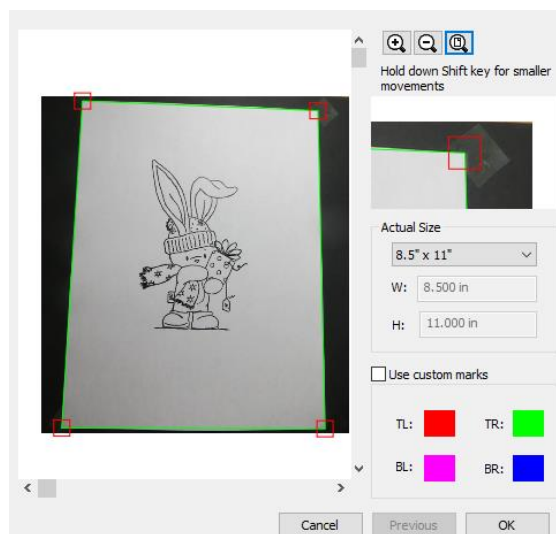
- Repeat with the other three boxes until all four are approximately on top of the corners. Once you have a square near the corner, pressing **Shift**, while dragging the mouse, will provide better control:



- Now click the **Zoom** icon repeatedly to get a much closer view. Then you will be able to precisely match up the center of the square with the corner:



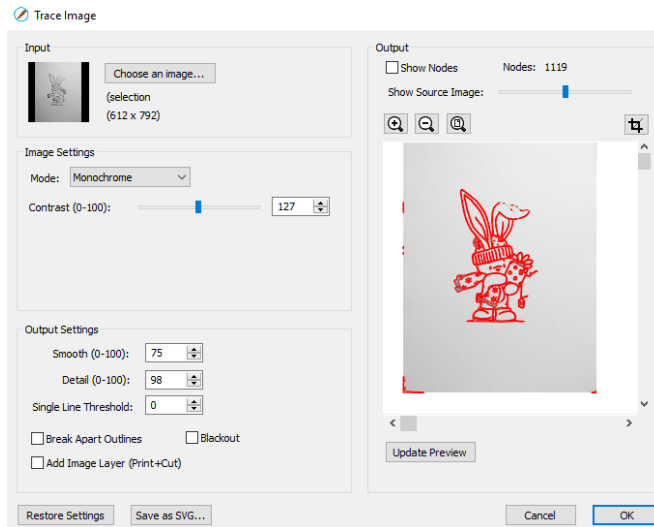
- Drag the scroll bars to move along the green line to another corner and, again, drag the square until it is perfectly centered with the corner of the paper. Repeat on the other two corners. All four red squares should now be aligned at the corners and you can click on **OK**:



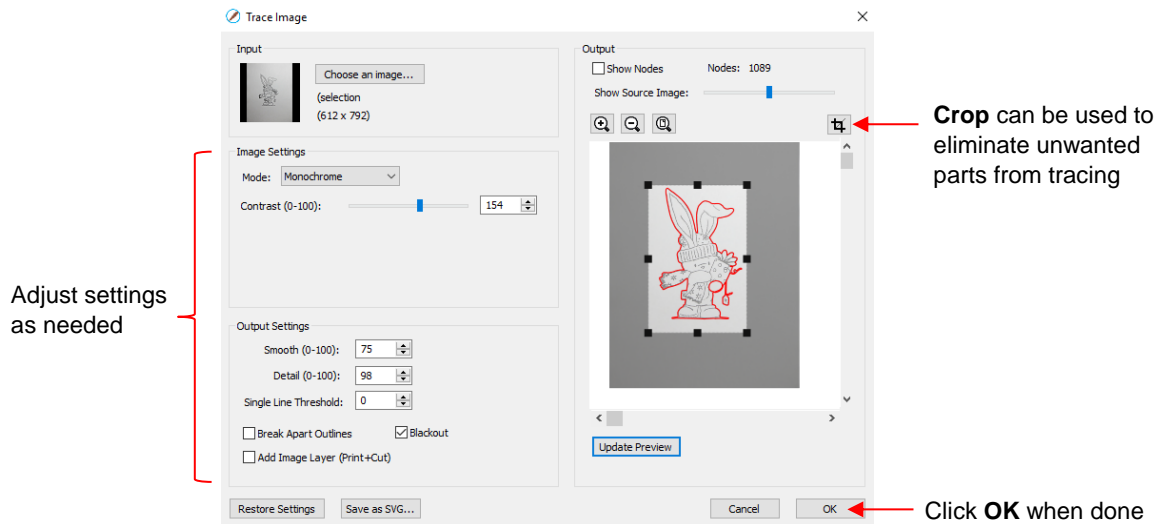
- The **Scan2Cut** window will close and the photo or scan will appear in the main SCAL window:



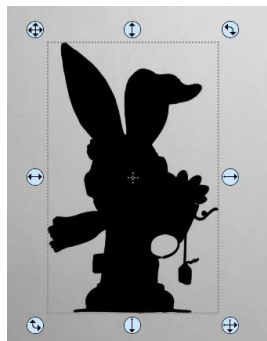
- With the image selected, click on the **Trace** icon on the **Toolbar**. The **Trace Image** window will open:



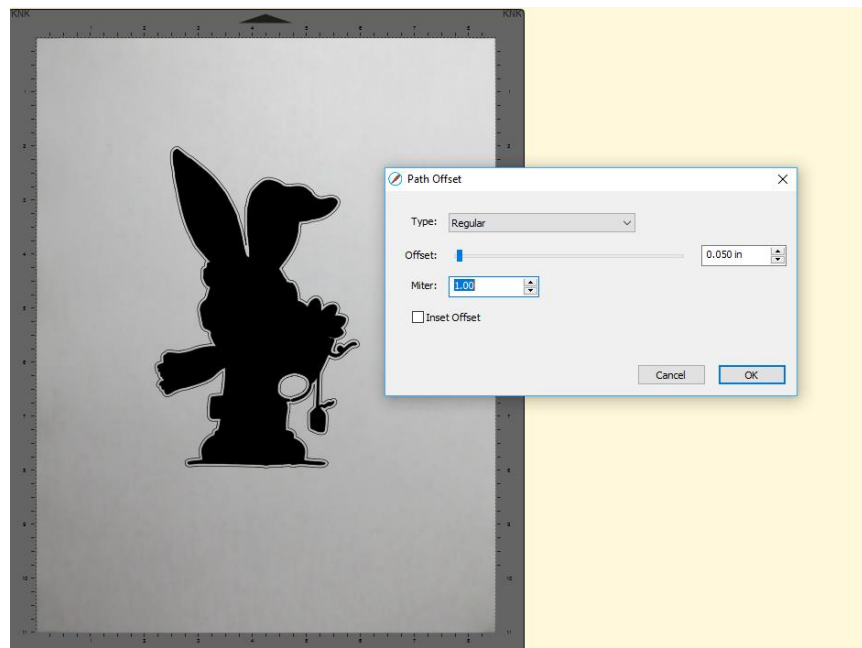
- Choose appropriate trace settings for the image you are using. You can also use the crop function to reduce the tracing to only include the images and not any of the outside corners of the paper:



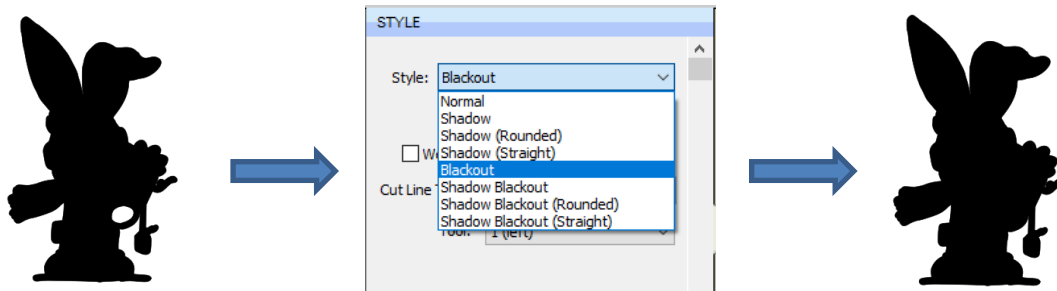
- After clicking on **OK**, the traced image appears in the main screen of SCAL:



- Because photographing the image can lend itself to slight errors, a contour cut is recommended. This will be created by going to **Path>Path Offset**. Enter the **Offset** size you desire:



- Click on **OK**. The prior tracing of the image will be deleted (as always happens when using **Path Offset**. At this point you also no longer need the original graphic. You can either hide that layer or delete it.
- Note that the resulting shape still has an internal shape. To avoid having this cut, select the shape and open the **Style Panel**. Under the **Style** dropdown menu, select **Blackout**:



- Place the printout on the mat and set an origin with the tip of the blade approximately over the lower right corner of the sheet. Continue the PNC process in the same manner as usual. You will align the laser light with the corners of the sheets. Your final cut should be quite accurate:



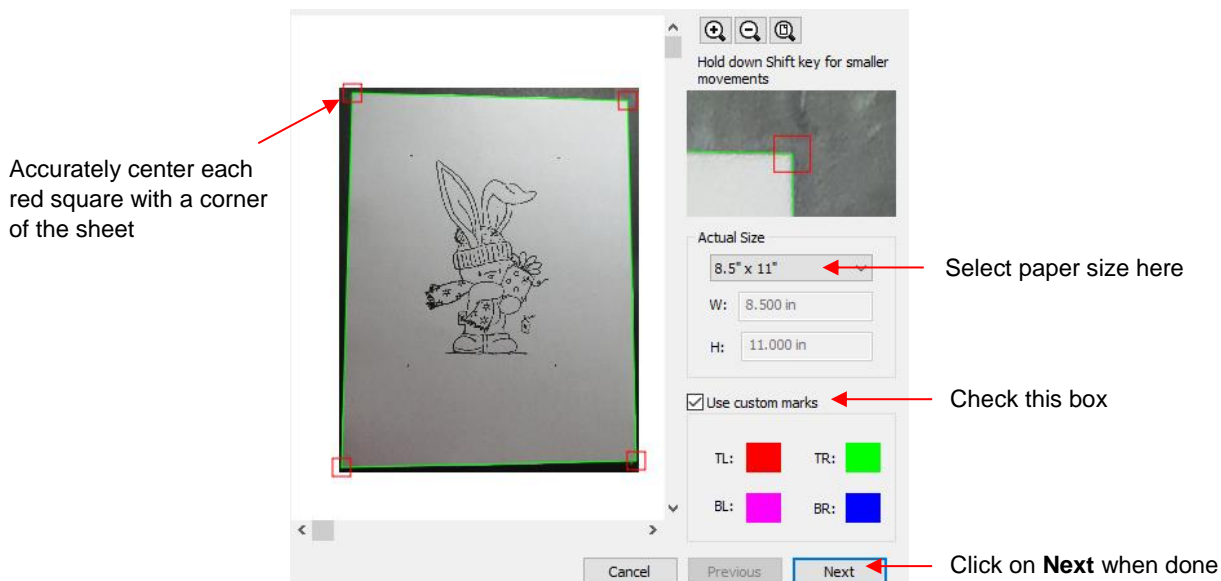


### 11.06.2 Scan2Cut: Additional Methods and Details

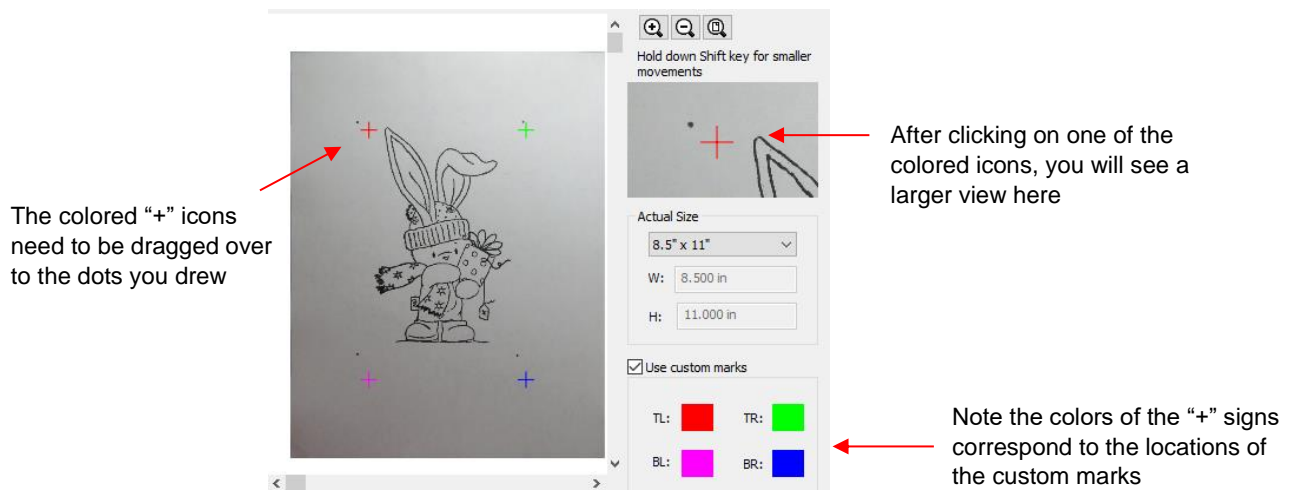
- As was mentioned in the prior section, there are alternative methods that will also work and may be more suitable. Note that these alternatives are presented in a logical order versus a preferential one. My favorite, by far, is Alternative 3 so don't skip reading it! :-)

#### Alternative 1 Use Custom Registration Marks

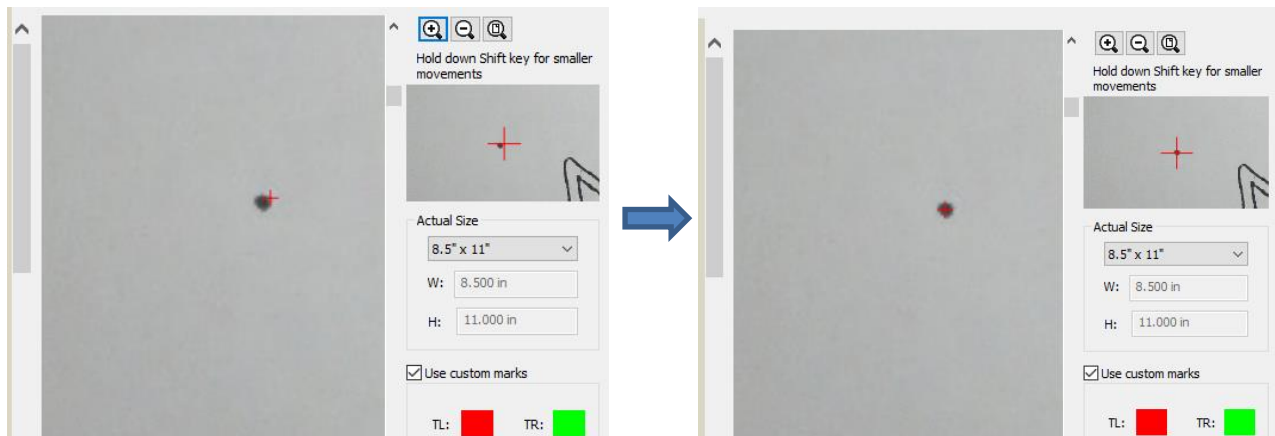
- Instead of using the corners of the sheet for aligning the laser, you can use a black pen and draw your own four registration marks around the image(s):
  - ◇ The four marks can be anything easy to draw but typically dots ● are the easiest to align.
  - ◇ The marks should be positioned outside of the bounding box that would surround the images.
  - ◇ The marks do not need to be aligned. This is assuming you still initially use the four corners of the sheet to align the red boxes.
  - ◇ The advantage of this method is that the registration marks will be closer to the image being cut which lends itself to better accuracy in most cutters. The black dots are also easier for alignment than the corners of a white sheet of a paper.
- Repeat the steps outlined in *Section 11.06.2* up to opening the Scan2Cut window. After loading the image and selecting the paper size, again roughly position the four red squares over the four corners of the sheet. Then zoom in and accurately position them:



- Click on **Next** and, this time, the image is surrounded by colored "+" icons and you will then center these icons with the dots you drew around the image:



- As with the red squares in the prior step, first drag the colored marks so they are approximately over the hand-draw marks. Then, zoom in and precisely center them:



- Repeat for the other three marks and then click on **OK**. The main SCAL window will now have the image ready to trace. Complete the same steps as in the earlier method but use the dots for alignment of the laser light instead of the corners of the paper.

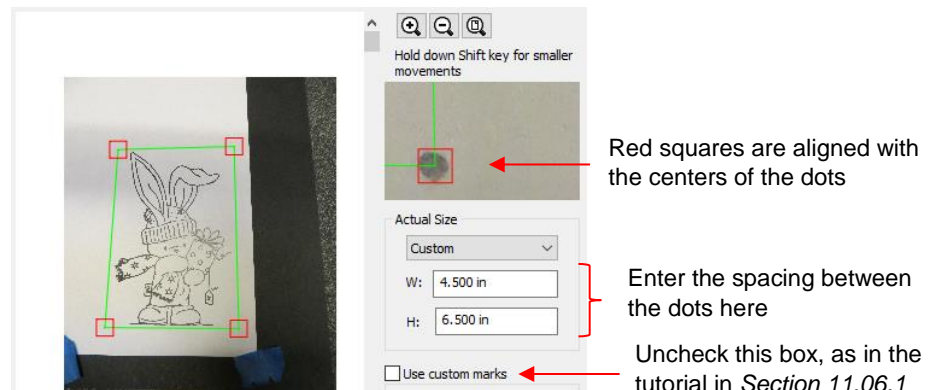
#### Alternative 2 Use Registration Marks Drawn onto the Mat

- Instead of using the sheet of paper, carefully add permanent registration marks to the grid of your mat:
  - ◇ The advantage of this method is that your images can be on any size of paper, such as a scrap.
  - ◇ Use a black Sharpie and a ruler and choose suitable grid intersections so that you can accurately determine the **W** and **H** to enter into the Scan2Cut window.
  - ◇ You can also have several sets in case you want some that are nearer to the images on small sheets.
  - ◇ You can also add the four custom marks onto your sheet, if desired.
  - ◇ Once you've placed your sheet onto the mat and photographed or scanned it, do not move that sheet.
  - ◇ Proceed as in the original tutorial using the registration marks on the mat as the corners for aligning the laser.

#### Alternative 3 Use Custom Registration Marks for Both Alignments

- Instead of using the sheet of paper, you add a perfect regular pattern of hand drawn dots ● around the image(s). The advantages to this method are:

- ◇ The dots are easier for alignment with the laser
- ◇ Having the dots closer to the image versus using the outside corners of the paper allow for more accurate PNC
- ◇ You can skip the second window where alignment is needed with the colored icons
- Note that you must be very precise in placing those four dots:
  - ◇ The dots must be arranged in a perfect rectangular pattern
  - ◇ You must know the exact distance between the dots for the **W** and **H** dimensions under **Actual Size**
- To facilitate the drawing of these dots, a template file<sup>2</sup> can be cut and used whenever this method will be employed:
  - ◇ The template is a grid of perfectly spaced and perfectly aligned holes. You can download these templates in both Letter size (spacing is every 0.5 inch) and A4 (spacing is every 10 mm) from this link: <http://www.iloveknk.com/FreeFiles/SCAL/SCAL-Scan2Cut-Grids.zip>
  - ◇ The template is cut from acetate or any material that is durable enough to be used over and over. You can use ordinary cardstock, however be careful to not tear or even crumple the edges of the holes.
  - ◇ This template is used to add the dots around the image(s) with the assurance that the measurements are precise and the dots are aligned in a perfect rectangle.
- After adding the dots, photograph or scan the image. Again, make sure the sheet is lying flat on the surface.
- Use a ruler to measure the left-to-right (**W**) and the up-and-down (**H**) space between the dots on the sheet:
  - ◇ Note that because the grid is designed with precise spacing, measuring the spacing will be easy. In the Letter size grid, the circles are 0.5" apart. In the A4 grid, the circles are 10 mm apart. Thus:
    - If the Letter template is used, the spacing will be to the nearest half of an inch
    - If the A4 template is used, the spacing will be to the nearest 10 mm or nearest centimeter
- In the Scan2Cut window, select **Custom** under **Actual Size** and then enter the **W** and **H** measurements:



- As in the prior instructions, be very precise when aligning the red squares with the centers of the drawn dots.
- Proceed as before, with the tracing of the shape and using **Path>Path Offset** to provide some room for error in the cut.
- Set the origin with the tip of the blade approximately over the lower right dot.
- Carry out the **Print+Cut** process aligning the laser dot with the four dots you added around the image(s). The results should be quite accurate, even when using a photographed image.

<sup>2</sup> This idea was first posted by Sandra Alicante, an original documenter of the Scan2Cut function.

## **12. Maxx Air: Applications**

### **12.01 Cardstock and Paper**

#### *Ideas!*

#### **Selecting Cardstock**

- White core cardstock does not yield the same cutting quality as solid color core cardstocks.
- Some cardstock brands or types simply do not cut well. Use those for something else besides cutting intricate shapes. Other cardstock, such as Bazzill Smoothies, [Worldwin Cutmates](#), Colormates, and Michael's Recollections, cut beautifully.
- If a textured cardstock cuts poorly, try flipping it over and placing the textured side face down. Remember to mirror the shapes before cutting, as needed (e.g. text).
- If your cardstock has been exposed to humidity, then dry the cardstock for about 15 – 30 minutes in an oven that has been preheated to ~100 – 150 F, but then turned off before placing the cardstock inside. It's also been reported that using the fabric blade with moisture-exposed cardstock works better, as well.
- With each brand of cardstock, record the settings that worked well so that next time, you'll have a good starting point for your test cut.

#### **Settings**

- Remember to set your blade exposure to only cut through the material. For thin paper, just the tiniest tip of the blade will be needed. For thicker cardstock, use a little more blade, but still not as much as you may think. Revisit Section 2.01 for reminders on both the setting of the blade length and the blade height.
- There are recommended forces shown in the *Suggested Settings for Various Materials* table near the end of Chapter 2. Use these as guidelines for your test cuts and then adjust, as needed. Remember to record your own successes!
- A speed of 200 - 250 should work well for most cutting of paper and cardstock. Some users prefer to cut faster and some slower. Use your own experience as a guideline.
- For most paper and cardstock, use the red capped blade. For very thick or heavily textured cardstock, you may wish to use the blue capped blade.
- The cutting force will vary depending on the density of the paper or cardstock, any exposure to humidity, dullness of the blade, and even the dye used to color the material! Two passes can often be needed with some cardstock, regardless of the cutting force available.
- Keep your cutting mat clean and sticky. Brayering cardstock to the mat will insure firm and even adhesion. Brayering again after the cut can aid in weeding the waste from the cut shapes.

#### **Troubleshooting**

- The following list presents the various causes of tearing:
  - ◇ Too much blade is exposed. If you see that the blade is cutting into your mat, shorten the blade exposure. You should only be cutting through the material itself and then, maybe, grazing the adhesive layer on the mat.
  - ◇ The blade is chipped. Try a different blade.
  - ◇ The paper is not adhered well to the mat. Make sure the mat is clean, sticky, and the paper is pressed smoothly and evenly on the surface.
  - ◇ You may be using too much cutting force. Try reducing it and doing test cuts.
  - ◇ You may have too many nodes in the shape. Refer to *Section 8.01*.

- ◇ If the cardstock has been exposed to humidity, then the moisture in the material can make it difficult to cut cleanly. Try drying the cardstock.
- ◇ The material itself may be subject to tearing, especially on intricate cuts. Try a different cardstock.
- If the cardstock has spots that didn't completely cut:
  - ◇ Try increasing the blade tip height (not exposure) and/or the cutting force and verify the cardstock is will adhered to the mat. Also, some cardstock brands require two passes, so reduce the cutting force and set **Multi-Cut** to 2 passes.
  - ◇ To “save the cut”, flip the entire sheet over, and use sandpaper to sand the spots where the cuts didn't complete. You should be able to sand down to where the blade did cut in those spots and your design will then be released from the waste. This is the best way to maintain smooth outer edges.
- My shapes are not quite cut out. Most of them are still attached to the waste at one spot:
  - ◇ You probably have **Overcut** turned off or set too low. Refer to *Section 2.03.5*

## **12.02 Chipboard**

**Video**   **Ideas!**

### **Selecting Chipboard**

- There are many types of materials considered to be chipboard. Some can be cut and others cannot. The best guidelines are:
  - ◇ If the chipboard is thicker than the maximum blade length, then it cannot be cut.
  - ◇ If the chipboard is very stiff and cannot easily be bent, then it possibly can be cut, but the shapes may need to be simple.
  - ◇ Thin flexible chipboards are the best choice. It's worthwhile finding a particular brand of chipboard, such as that [sold at KNK USA](#), to use in your projects so that you will know which blades and settings work best each time.
  - ◇ For a thicker look, consider cutting two copies of the same shape from thinner chipboard and adhering together.
  - ◇ Just like with some textured brands of cardstock, some chipboard types will yield cleaner cuts on the bottom side. So, mirror your images first after verifying so that you can use the other side of the cut shape.

### **Settings**

- As with all materials, set the blade length to be just a fraction longer than the thickness of your chipboard and use the thick materials, blue capped blade. For thin chipboard you can use the red capped blade. Adjust the blade offset accordingly.
- Chipboard can easily come loose from the mat. Try using masking tape or blue painter's tape around the outside edges of the chipboard to prevent the chipboard from slipping during cutting. You can also apply a stabilizer such as freezer paper or Heat n' Bond to greatly improve both the consistency of cutting, as well as the intricacy of what can be cleanly cut.
- Some thin soft chipboards, such as cereal box, may cut at a force setting of 80, thus try this setting for your test cut. Increase in increments of 10, as needed. For denser, thicker chipboards, you will need at least 160 and two or more passes. Because the **TEST** button advances the origin on the Maxx Air, you will need to use a test shape from within SCAL, if you feel your chipboard will require more than one pass for a clean cut. Set **Multi-cut** to two, three, or even more passes, as necessary.
- The Maxx Air offers some very slow speeds and cutting chipboard may require these. Don't hesitate to reduce the speed a setting of less than 50, if you find the cutter is struggling to cut the chipboard or the shapes being cut are distorted.

- When cutting thicker materials, the blade holder needs to be raised in the blade holder seat to enhance the downward force. To do this, try using a stack of 13 Post It notes, as described in *Section 2.01*.
- Just like with some textured brands of cardstock, some chipboard types will yield cleaner cuts on the bottom side. So, mirror your images first after verifying so that you can use the other side of the cut shape.

## **Troubleshooting**

- Some chipboard will produce a lot of “crumbs” during the cut and this can build up inside the blade holder as well as build up around the cut lines causing interference with the blade during the second pass. For this reason, some users will use canned air to blow the crumbs away from the surface between each pass. You may also need to clean the inside of the blade holder by removing the blade and taking it apart, so that any small pieces can be removed.
- If the test cut was perfect, but the shapes failed to cut cleanly, the mat may not have been sticky enough to hold the chipboard throughout the cut. Rather than add more adhesive, you may want to use a stabilizer as described under *Selecting Chipboard*. Also, try slowing the cut if the shapes were fairly detailed and the uncut sections were on tight curves.
- If a stuttering sound is heard during the cut and/or the shapes are distorted, then reduce the speed and force and increase the number of passes. The blade is catching in the chipboard causing the mat to slip. You need to make things easier on the cutter as the blade works its way through the dense chipboard.

## **12.03 Vinyl**

Wall Vinyl: *Ideas!*      Decal Vinyl: *Ideas!*

## **Types of Vinyl**

- There are many kinds of [vinyl available at KNK USA](#): decal, wall, glitter, metallic, chalkboard, etc. It's a very easy material to cut and has [many applications](#).

## **Settings**

- Vinyl has a backing sheet which can serve as the carrier/mat during cutting. The vinyl needs to be at least 4" wide so that both sides will be gripped by the pinch wheels. If you are cutting from vinyl which is narrower than this or cutting from scraps, then use a cutting mat to hold the vinyl during the cut.
- On long cuts, it's important to have the vinyl aligned straight in the machine. Cut the needed length from the vinyl roll (add a few inches for error allowance). Feed the excess underneath the cutter and around to meet the other end. Line up and drop the pinch wheels. Use the + and – buttons on the Control Panel to feed the vinyl in and out, most of the way, to make sure the vinyl stays aligned.
- Set the origin at least 1/2" away from the right side and a little way in from the bottom. Make sure the vinyl is past the screws on the flatbed table, or apply clear mailing tape to cover the screws so that the vinyl will not catch on them.
- While there are many types and thickness of vinyl, in general it is very easy to cut. Thus, start with a conservative estimate for the force setting in the initial test cut, say 5. Use the red capped blade and start with barely any blade exposed. Do the test cut and then gently lift the corner of the vinyl from the backing sheet. Make sure the test cut is a clean cut and the blade did not penetrate the backing paper.
- Vinyl can usually be cut at a speed of ~ 200 - 300 unless very small, intricate shapes are involved.
- If you store your vinyl in a warm location, the adhesive can be affected and that can then affect the cutting. Also, note that some vinyl colors have a tendency to pull away from the backing sheet more easily than others. If you notice the vinyl pulling up in corners and tight spots, try slowing the cutting speed.



## Applying Vinyl

- For easier removal of the waste from the backing, add a rectangle around the perimeter of the shape(s) you are cutting. Select everything and apply **Object>Merge**. This will then ensure that the interior shapes are cut first, with the outside rectangle cut last. If you own SCAL Pro, then use the **Weeding** function to add that rectangle and any desired internal weeding cuts (refer to *Section 10.04*).
- If you only added an external rectangle then, while weeding, you may need to cut away and remove smaller waste parts versus trying to lift the entire waste section at one time. You do not want the waste vinyl inadvertently coming into contact with the shapes you want to keep. Use a craft knife or paper piercer to gently lift away pieces of waste vinyl to discard.
- If you are applying small lettering or doing an etching application, do NOT weed the waste vinyl. The entire piece should be applied to the project surface, smoothed down firmly and evenly, and then weeded. The adhesion between the vinyl and the hard surface will make weeding much easier, with less likelihood of small shapes coming loose.
- To transfer vinyl to a wall (or window or other surface), apply transfer tape across the vinyl, repeating rows of tape to completely cover the shapes. At the top, have one layer of tape with just the bottom half covering the vinyl so that the top half can be pressed to the wall and used as a hinge. Once you have the vinyl aligned as desired, flip up, leaving that top piece of tape adhered/hinged to the wall. Remove the backing sheet from the vinyl. Then carefully bring the vinyl back down and begin pressing to the wall, smoothly and evenly. Use an old credit card or plastic scraper to smooth out wrinkles and get better adhesion. Gently peel away the transfer tape from the top and press again with the credit card or scraper.

## 12.04 Fabric and Felt

Stabilizers: [More Info](#)   Felt: [More Info](#)   Fabric: [Ideas!](#)   Felt: [Ideas!](#)

- It is highly recommended that the [Fabric Blade](#) be used when cutting fabric and felt. It is designed to give sharper cutting in tight corners and points.
- When cutting with the fabric blade, it is not necessary to apply a stabilizer to all fabrics. While some thicker fabrics will cut much better with an iron-on stabilizer such as Steam-a-Seam 2 or Thermo-Web's Heat n' Bond, others will still yield good results when cut without it. Some users also prefer to iron their fabrics to freezer paper before cutting.
- With or without a stabilizer, it is highly recommended that a clean and sticky mat be used. If no stabilizer has been applied, then brayer the fabric firmly and evenly to the mat. With most fabrics it will be necessary to use stickier mats than normal and tape the outside edges of the fabric.
- Because the backing sheets on Steam-a-Seam 2 and Heat n' Bond are slippery, spraying them with Odif USA 505 Temporary adhesive can then make them stick firmly to the mat and not slip during cutting. Some residue from the 505 may get onto the mat, thus the reason to use a dedicated mat for fabric. This residue will add to the bonding for future cuts. (Thanks to Lynn Keniston for this idea!)
- Some users also prefer to remove the backing sheets on stabilized fabrics before brayering to the cutting mats. This works as well.
- The best unstiffened (soft) felt to use is 100% wool. It cuts cleaner than other types. A wool blend should also work well. The [Nonwovens WoolFelt](#) is 35% wool, 65% Dacron and tends to cut very cleanly. If the felt you have is not cutting well, consider applying one of the stabilizers mentioned above.
- If the felt is pre-stiffened, then it should cut fine using the blue capped thick materials blade versus the fabric blade. Because of the thickness, you may need to tape the felt to the mat to prevent slippage during cutting.
- In general, you will need to use 2 or 3 passes when cutting most fabrics and felts. It is necessary so that all fibers will be cleanly cut.
- For cutting force, it will depend on the fabric. Refer to the table at the end of Chapter 2 for recommended settings.

## 12.05 Iron-On or Heat Transfer Vinyl (HTV)

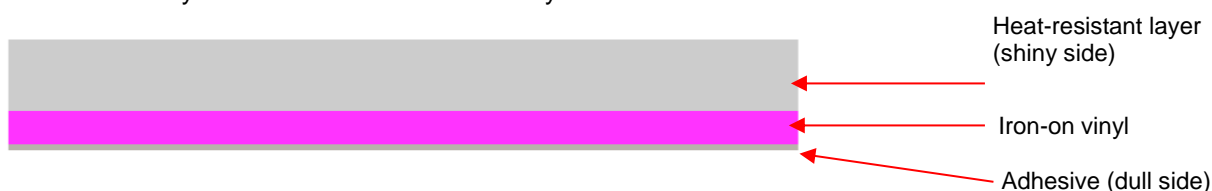
[Video](#)   [More Info](#)   [Ideas!](#)

### Types of Iron-On Transfer

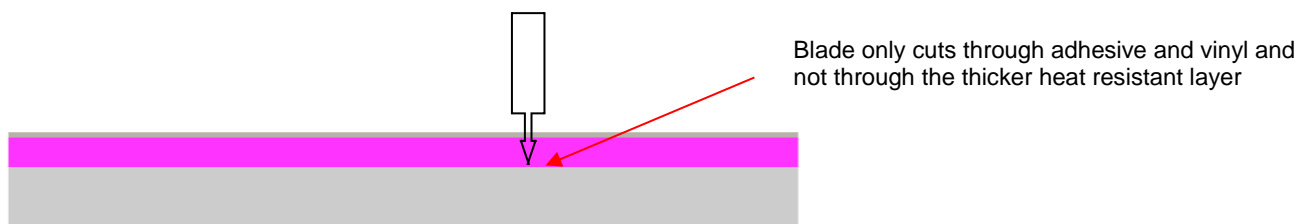
- There are many kinds of [heat transfer vinyl](#) (HTV) available at KNK USA: regular, glitter, animal print, reflective, neon, and more. When selecting one, take note of the application recommendations, such as which types of fabric are recommended, pressing time and temperature, and laundering instructions. This information is readily available by scrolling down on the product description page.

### Cutting Iron-On

- Iron-on transfer vinyl and flock consists of three layers:



- For cutting, have the **dull side up** (adhesive side up):



- Because iron-on transfer has the heat protection layer, which will not be cut, this can serve as the carrier/mat during cutting. The material will need to be at least 4" wide so that both sides will be gripped by the pinch wheels. If you are cutting from scraps, then use a cutting mat to hold the material during the cut.
- The force required is ~30 for regular iron-on. Other types may require higher settings. Be sure to do a test cut first and then see if vinyl layer will peel away from backing.
- Remember to **reverse your image** before cutting! Because you are cutting with the adhesive side up, you'll be flipping the material over, after weeding, but before pressing. To mirror your image, use either of the following methods:
  - ◇ Select the shape(s) and click on either of the **Flip** icons on the **Size & Position Panel**
  - ◇ In the **Cut Settings** window, mark either of the **Mirror** options
- Cut around your image with scissors before weeding. Note that it's really hard to see the cut image, so be careful!
- Use a paper piercer or craft knife to grab onto a piece of the waste vinyl and then pull to remove. Remember to weed small internal parts, as well.

### Adhering Iron-On

- If using iron-on transfer from KNK USA, use the following guidelines. If your iron-on material was purchased elsewhere, obtain recommended instructions from the supplier!
- Use a hot dry iron (cotton setting) and with steam turned off.



- Use a fairly firm surface.... Not a highly-cushioned ironing board.
- Insert a cloth between the layers of a shirt in case adhesive melts through to other side
- Press shirt first to create a smooth flat dry surface.
- Arrange pattern on shirt, carefully centering.
- Press firmly for 10 full seconds. Do not move iron around... just press firmly.
- Allow to slightly cool and then remove top heat-resistant layer. If pattern begins to come up, then cover with the heat-resistant layer and immediately repress for another 10 seconds.
- Some people will also flip shirt inside out and press from other side for another 5 seconds. Note: other types of iron-on may require additional pressing time or even less pressing time. Contact your supplier for information.
- Wait 24 hours before laundering.

## **12.06 Rhinestone Templates**

### *Ideas!*

- Refer to *Section 9.10* for specific instructions on designing rhinestone patterns in SCAL.

### **12.06.1 Cutting Rhinestone Template Material**

#### *Video*

- Rhinestone templates can be used hundreds of times. There are several commonly used materials for making these templates. The current most popular choices are:
  - ◇ The green [rhinestone template material](#) sold at KNK USA is the most popular because it is less expensive than the other options and has been around longer. It is recommended over a similar thinner rubber sold by companies who market their material for the lower force cutters. The disadvantages to using any rubber template material is that you need to apply a solid backing after the template is cut and also dust the template with a powder so that the powder will cover any of the permanent adhesive exposed in the holes. The solid backing typically chosen is foam board or stencil board.
  - ◇ The black [Rock-it flock](#), also sold at KNK USA, is more expensive than the rubber template materials but doesn't require a backing to be applied after cutting. It also doesn't require dusting. The Rock-It templates can be used to mix and match designs, such as combining letters and images.
  - ◇ Sticky Flock is a similar material to Rock-it but is more expensive still and slightly thinner. It has the same advantages as Rock-it.
- The first step before cutting the template is to check the size of the design you've created and then cut a piece of rhinestone template material that is at least 1" larger in both height and width compared to your design. It is beneficial to have a little bit of material around the edges of the design where excess rhinestones can still be brushed back over the design.
- Peel off the backing sheet first and press the rhinestone material to a clean sticky mat. Brayer firmly to make sure the rubber has excellent contact with the mat.
- Set **Multi-cut** to 2 times, again to aid in weeding the cut circles. Use a 60 degree blade for cutting and a force of about 70 for the green rubber and 50 - 60 for the flocks. Perform test cuts of small numbers of circles (say, around 8 – 10) to make sure the force you're using is sufficient.

### **12.06.2 Weeding and Brushing in Rhinestones**

- After cutting, brayer the template material again. As you lift the pattern, the majority of the little circles should remain stuck to the mat. If there are still circles attached, then press firmly and lift on other parts of your cutting mat. Eventually, you should have the majority removed.
- If your template was cut from a rubber, apply your pattern to a backing material such as [stencil board](#) or foam board. Make sure it's a different color from your rubber. You may wish to first cover the backing board with clear mailing tape for a slicker, more permanent surface. Verify that none of the little circles are still attached to the back of the template and causing a "bump" in the pattern.
- Again, if your template was cut from rubber, using an old toothbrush and brush some powder (talc, baking, facial) into the holes. Tap upside down to remove excess powder and then wipe the top of the pattern clean. The powder will stick to any adhesive inside the holes and prevent rhinestones from getting stuck in the holes.
- Place your template into the bottom of a bead tray, cake pan, or another large flat container. Those who use the flock materials will often cover the bottom of their container with a layer of the same flock. Pour the rhinestones on top of the template.
- Use a [Shur-Line Trim and Touch-up Pad](#) to brush the [rhinestones](#) in a circular motion. Keep brushing and you will find that the stones that landed upside down will be brushed out and correct ones will replace them. This pad type brush is essential to the ease and success of this important step!
- When ~95% of the pattern is correctly filled, then use tweezers, a toothpick, or just your finger to position the last few rhinestones into the pattern.
- Cut the [rhinestone transfer tape](#) to size and then press it down onto your stones. Press firmly but do not push the stones deep into the holes. If you have a problem with the stones jumping as you are dropping the transfer tape, then try using a Bounce sheet or anti-static spray on the tape before pressing.
- As you lift the tape, start in a corner and keep one side pressed down and watch to make sure all stones are being lifted. If a stone fails to lift, press back down to pick it up. Once the stones are lifted, you can now place the transfer tape back onto its backing or go ahead and press the stones to your shirt, other fabric, or even cardstock!
- Note that the transfer tape is reusable! You should be able to get 4 or 5 pressings from one piece, even though it becomes wrinkled from the pressing. Keep using until it doesn't pick up and hold the stones.

### **12.06.3 Heat Pressing Rhinestones**

- If using your home iron to press the stones to a shirt:
  - ◇ Use a hot dry iron (cotton setting or higher with steam option turned off).
  - ◇ Use a firm surface... not a highly cushioned ironing board
  - ◇ Insert a cloth between the layers of a shirt.
  - ◇ Press shirt first to create a smooth flat dry surface.
  - ◇ Arrange pattern on shirt, carefully centering.
  - ◇ Press firmly for 10 seconds. Then move about ½" in case steam holes were over areas of some stones and then press firmly for another 10 seconds.
  - ◇ Move to another area of stones and repeat.
  - ◇ Flip shirt inside out and press for another 10 seconds on side where stones are applied.
  - ◇ Allow to thoroughly cool before removing clear transfer tape.
- If using a [heat press](#) to press the stones to a shirt:
  - ◇ Set the temperature to ~ 330—350 degrees F (165 – 175 degrees C) and set the pressure to medium.
  - ◇ Press garment first for a flat dry surface.

- ◇ Arrange pattern on shirt, carefully centering. Press for 10-12 seconds.
- ◇ Peel cold, cover with Teflon sheet, and re-press another 10-12 seconds. Alternatively, flip the shirt inside out and press from the back for 10-12 seconds.
- ◇ Use a lower temperature if pressing on 50/50 cotton poly fabric. Use a higher temperature on denim or tote bags.

#### **12.06.4 Extra tips on Rhinestone Applications**

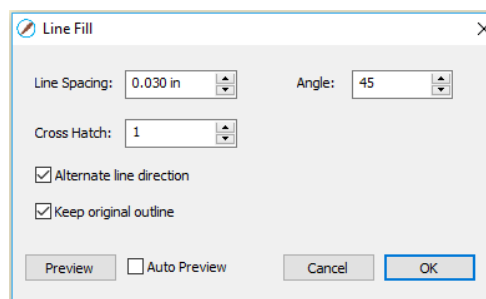
- If you are combining iron-on transfer with rhinestones, do not press the rhinestones onto the iron-on vinyl. While it will appear to have worked well, the stones will fall off once the garment is laundered. When using both, create a contour line around your iron-on pattern for the stones.
- Pressing rhinestones to cardstock also works very well. If pressing onto the front of a greeting card, unfold the card first.
- After pressing and allowing to cool, use your fingernail or an old credit card/gift card to scrape the pattern to see if any stones come loose. If so, replace those stones with new ones and press again.

#### **12.07 Drawing with a Pen or Glue Pen**

- With the Maxx Air, you can draw with any pen, pencil, marker, or glue pen, that can be securely gripped by the blade holder seat and not be dragging across the material. The optional [Pen Tool](#) can also be used to hold thinner pens. The advantage of this holder is that the center of the pen will be positioned the same as the blade on the Maxx Air Blade Holder, thus allowing you to draw with the pen and then cut out a shape. The pen will draw in the correct relative positions to the cut:



- If you do not own the Pen Tool or you wish to use a pen which does not fit into the holder, then refer to the *Section 12.07.2* for instructions on how to draw and cut with perfect alignment. But first, continue reading the remainder of this section for tips on drawing.
- If you wish to fill in a drawn shape, refer back to *Section 10.09* which covers how to add a **Line Fill** pattern to a shape. Here are some suggestions on settings to use in the **Line Fill** window:

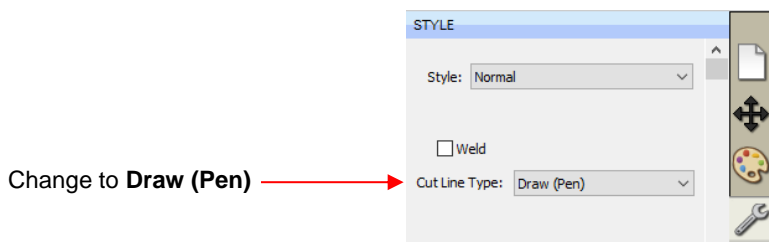


- ◇ To fully color in a shape, measure the width of the pen stroke and then use a slightly smaller width in the **Line Fill** window. For example, a Sharpie Fine Point pen is ~ 1 mm or 0.04" thick. So, for the **Line Spacing** setting, use 0.9 mm or 0.03".

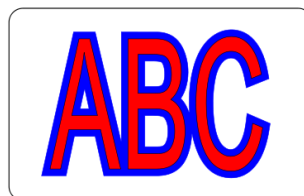
- ◇ Adding a **Cross Hatch** will insure a more complete fill, although it will add to the time it takes to color the shape.
- ◇ Checking the option for **Keep original outline** will better define the shape. Although, in some cases, you might want to outline the shape in a different color, thus you would leave this unchecked and have the outline repeated on a different layer with a different pen color assigned.
- Do not have the pen positioned too low in the blade holder seat or the tip of the pen could drag across the paper when moving from one shape to the next.
- Make sure your shapes will not be drawn where any of the pinch wheels travel over the material. Otherwise, the ink or glue could smear. Thus, arrange the pinch wheels or the material on the mat so that this won't be an issue.
- The Sakura Quickie glue pens work well in the Maxx Air. They will fit into the Maxx Pen Holder, as well as directly into the blade holder seat (if alignment with cutting isn't needed).
- The open path fonts available in SCAL should work well for drawing as they provide single drawn lines and curves versus an outline form that usually then require a fill. Refer to *Section 6.11*.

### 12.07.1 Draw and Cut: Using the Maxx Pen Tool

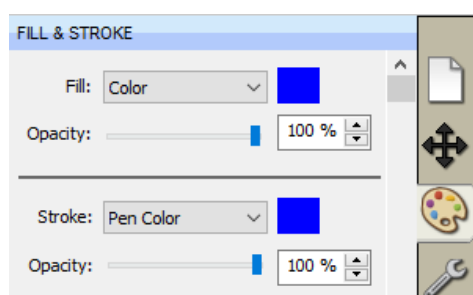
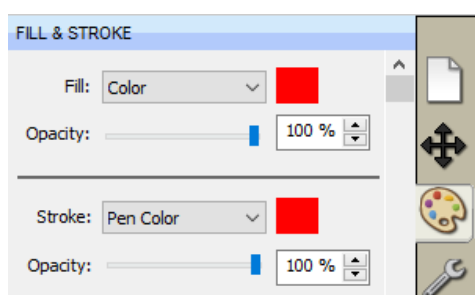
- Make sure the shapes to be drawn are on a different layer than the shapes to be cut.
- Open the **Style Panel** and select the layer(s) to be drawn and change **Cut Line Type** to **Draw (Pen)**:



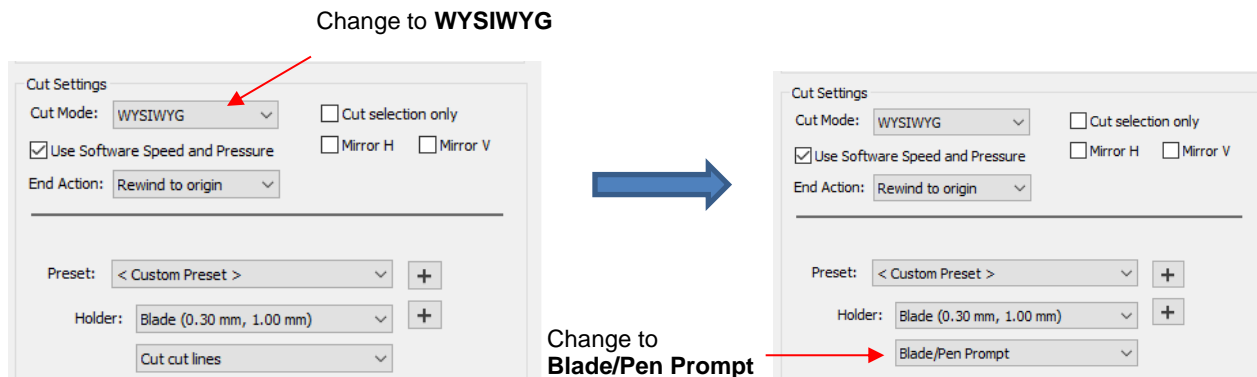
- If more than one pen will be used, open the **Fill & Stroke Panel**. Select each **Draw (Pen)** layer and change the **Stroke** color so that the Maxx Air will pause between each color, permitting a change out of the pen. For example, let's say you were going to draw the ABC and its shadow in two colors, followed by cutting out the rounded rectangle around the letters:



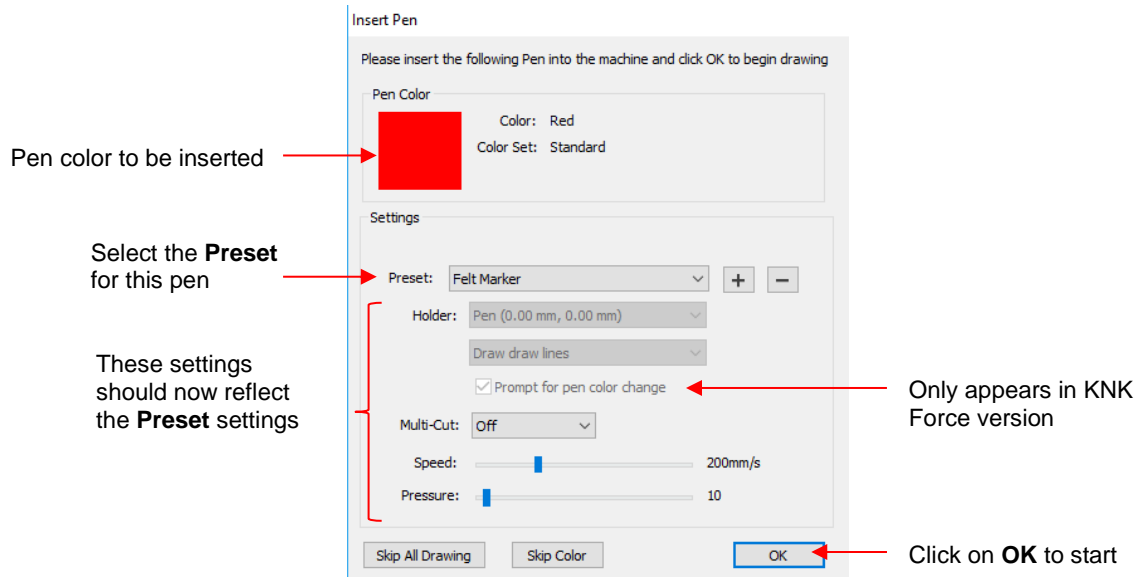
- ◇ After assigning the *ABC* layer and the *Shadow* layer to **Draw (Pen)** on the **Style Panel**, then each is assigned a **Stroke** color on the **Fill & Stroke Panel**:



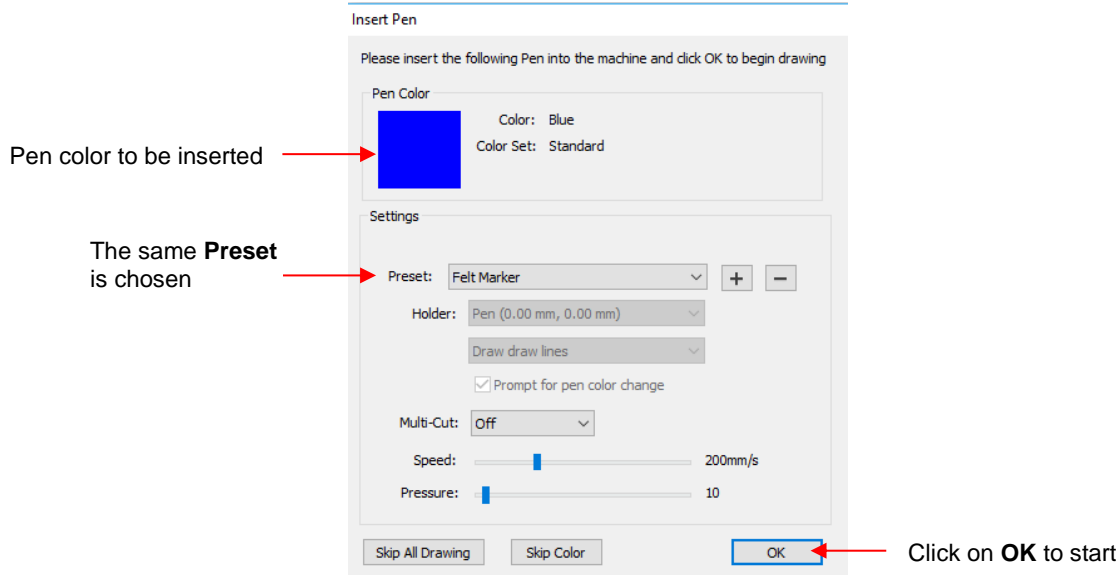
- In the **Cut Settings** window, make sure **Cut Mode** is set to **WYSIWYG**. Then, change **Cut cut lines** to **Blade/Pen Prompt**:



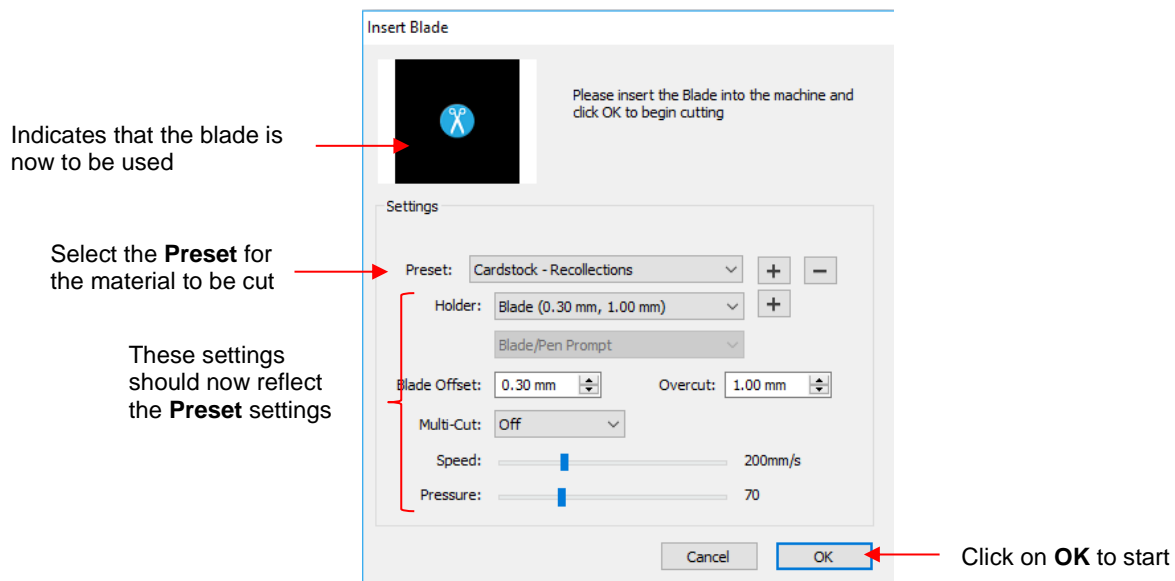
- Before you begin, make sure you know the settings you'll need for each pen and for the blade. Because of a current bug in SCAL, you will need to set up **Presets** for these various combinations of settings so that the preset can be selected at each tool prompt. Refer back to *Section 2.04* for directions on how to create presets.
- Set the origin and then click on **Cut**. A window will pop open prompting you to use the first pen color. From the dropdown menu, choose the needed preset:



- The settings should change to reflect those used for the **Preset** you choose. Click on **OK** to start the drawing of that selected color using those settings.
- After the shapes are drawn, the next prompt will be for the blue shapes. Change out the pen and, again, choose the desired **Preset** and click on **OK**.



- Finally, the prompt for cutting will open. Switch out the pen for the blade holder and choose the **Preset** for the material you are cutting. Then click on **OK**.



- After cutting, you will be returned to the main window in SCAL

### **12.07.2 Draw and Cut: When the Pen and Blade Holder Are Not Aligned**

The following method was first presented by Bryan Williams in an MTC Forum webinar. It has been adapted for use in SCAL.

- If you plan to use two tools with different diameters, then you will face an alignment problem. In the following example, two glasses and an inner circle will be drawn with a silver gel pen and then the outside circle cut out.



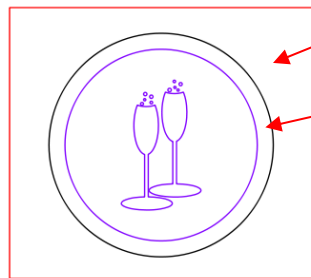
- Because the gel pen is thin, it sits further back in the blade holder seat than the blade holder. With no adjustments made, the resulting drawn image and cut circle are out of alignment:



- However, there is a straight-forward method one can use to compensate for tools with different diameters. This method involves adding a rectangle, within SCAL, around the shapes. This rectangle will be drawn with the pen and then the corners will be used as registration marks for a print and cut process.
- The following screenshot shows the image to be draw and cut:

The red rectangle is added which completely surrounds the shapes in the project.

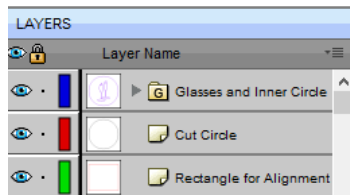
This rectangle should be on its own layer. It will be drawn with the pen but then also sent to cut.



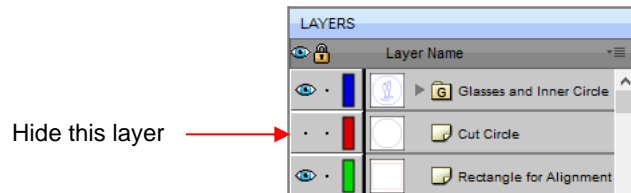
The black line is the cut line.

The purples lines will be drawn with a pen.

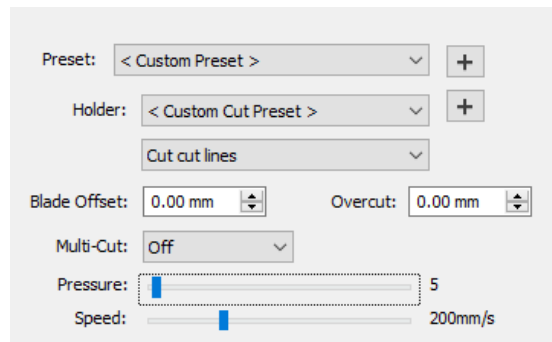
- The layers for drawing, cutting and alignment should be on separate layers on the **Layers Panel**:



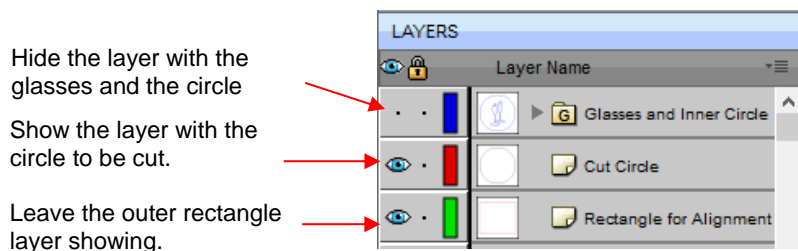
- For convenience, leave all layers set to **Cut** under the **Style Panel**.
- Hide the *Cut Circle* layer since the first step is to draw the design and the rectangle.



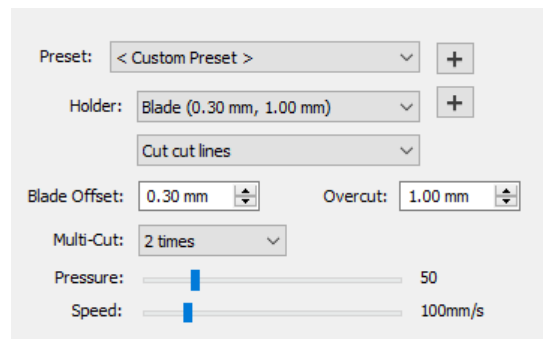
- Open the **Cut Settings** window. Set **Blade Offset** and **Overcut** to 0 since you will be drawing these shapes with a pen. Then set the appropriate **Pressure** and **Speed** for the pen you will using:



- Set an origin and then draw the shapes. Note that it doesn't matter if you use **WYSIWYG** mode or **Origin Point**. Choose whichever one results in having the shapes drawn where you desire on your material.
- Turn off the layer with the glasses and the circle, but leave the outer rectangle layer turned on. Also, now show the layer with the circle to be cut:



- Again, open the **Cut Settings** window. Set the **Blade Offset**, **Overcut**, and other settings:



- Click on **Settings** near the top and make sure **Mark Offset** is at the minimum which is 0.03 cm. This moves the virtual registration marks as close as possible to that outer rectangle:



- Click on **Save** to close the **Cutter Settings** window.
- Set an origin with the blade tip over the lower right corner of the drawn rectangle. Then click on **Print+Cut**. Perform the registration process aligning the laser light to the corners of each rectangle. Note that if you used a thick marker for drawing, then center the laser light in the middle of the drawn lines versus along the outside or inside of the line. The end result should be perfect alignment:





## **12.08 Embossing and Scoring**

### **General Info on Embossing**

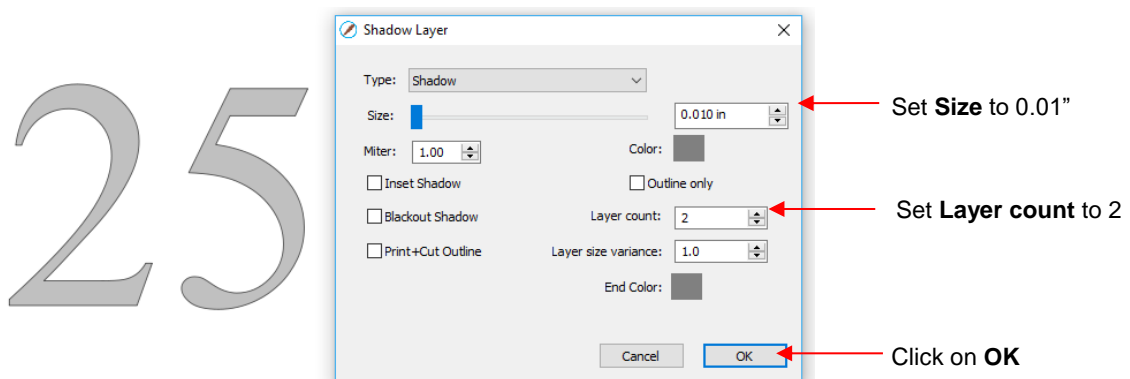
- The [Maxx Air Embossing Tool](#) has two different sized embossing heads. The smaller one is recommended when scoring cardstock for fold-up projects, such as pop-up cards, gift bags, and small boxes. Either head can be used for embossing shapes.
- When the project involves both embossing/scoring and cutting, you will need to use **WYSIWYG** for the cut mode so that the shapes will be aligned. Also, set **Blade Offset** and **Overcut** to 0.
- When embossing cardstock, it is recommended that a soft material be placed beneath the paper or cardstock to allow a deeper impression to be made. One excellent material to use is non-slip shelf liner. Other materials which can be used include rhinestone rubber, craft foam, and felt. Make sure the material is well adhered to the mat (tape it down, if necessary). Then tape your paper or cardstock to the top of this material.
- When scoring, the paper or cardstock can be applied directly to the mat, just as you do for cutting. This makes it much simpler when you need to score and then immediately cut.
- Make sure you do some tests first to get the best settings for the scoring or embossing you need. For scoring cardstock, this typically involves a higher force (~100) and two or three passes. Refer to the *Suggested Settings* table at the end of this chapter. If you have a soft material beneath your paper/cardstock, then a lower force will be used, but you may still need several passes. Also, raise the tool in the blade holder seat the same way you do with the blade holder, to get more force applied.

### **Embossing Paper or Cardstock**

- When embossing paper or cardstock, it is recommended that you use the **Shadow Layer** effect to create a several very small outlines at a thickness of, say, 0.01" (0.25 mm). These tiny offset lines will then produce a slightly thicker overall outline of your shapes. This works better than fill embossing which can stress the cardstock and cause wrinkling. Here are the steps:
  - ◇ Create the shape you wish to emboss. In this example, the number 25 is used:

25

- ◇ Select the shape and go to Effects>**Shadow Layer** function and perform the following:




- ◇ Now you have three versions of the shape, each one slightly outset from the other. Thus, when using the embossing tool, you will have a thicker outline made of this shape.

## **Embossing Leather**

Thank you to Lidia Pallo for providing the following information on embossing leather on a Maxx. Note that this same method would apply to other KNK cutters.

- Use craft-store tooling leather - the kind that comes in ~ 8" X 11" sheets and is about 2-3mm thick. These can usually be found at the major craft stores.
- Once you are ready to emboss, use a spray bottle of water to saturate the leather piece. This is key because if you try to emboss over it without "getting it ready first" the leather will retain very little of the embossing. Saturating it with water preps the surface. Spray the entire surface two or three times while waiting in between for it to soak in (it doesn't take long). If, after drying, the leather becomes cracked-looking than it's possible you over-saturated it and it became distorted in the drying process.
- You do not want the rollers or the press rings to travel over the leather. Thus, arrange the leather on the mat accordingly. The small press rings can be rolled over to the sides of the pinch roller bar, just as one would do when using a glue pen or certain inks that might smear.
- The small end of the embossing tool should be used. Insert with the tip of the embosser just above the leather surface. Refer to the settings table at the end of this chapter for recommended settings.
- To finish off the leather piece you can do a number of things, like dyeing it, staining it, or doing any additional hand-tooling. Tandy Leather has a lot of video tutorials on You Tube just about any project. One can also apply a gloss coat to make it shiny. To ensure the leather is well taken care of and lasts, you can also use leather conditioner.

## **12.09 Engraving**

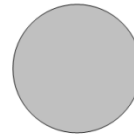
Engraving Precut Items: 

- The [Maxx Air Engraving Tool](#) can be used to engrave vellum, foils, acrylic, and most metals, including trophy labels, dog tags, and jewelry charms.
- The same basic guidelines apply to engraving as in embossing and scoring:
  - ◇ You will probably need to use the **WYSIWYG** mode
  - ◇ You will need to set **Blade Offset** and **Overcut** to 0
  - ◇ You will probably need to use multiple passes to get the desired results.
- On softer metals, you may not want the engraving tip too far above the metal as it can leave a pock marks when it drops to start engraving. If possible, test on scraps first.
- Refer to the *Suggested Settings* table at the end of this chapter for **Pressure** and **Speed** settings on various materials. Note that you can engrave on materials that cannot be cut on the Maxx Air, such as jewelry charms, dog tags, and trophy plates.
- To design an engraving fill pattern, use the **Line Fill** function. Refer to *Section 10.09*. Also, open path fonts should work well for engraving. They contain single path lines and curves versus outlines and are usually more desirable when engraving letters. Refer to *Section 6.11*.

## Project: Engraving a Dog Tag

- When engraving items that are already cut (such as the items listed previously), it can sometimes be tricky getting the perfect alignment you need. Here's a method that works well (thank you to Michelle Hessler for posting this technique):
  - ◇ Carefully measure the dimensions of the item. For example, if it is a circular dog tag, then measure the diameter. Recreate the shape in SCAL and size it to be the same. In the follow example, the diameter of the dog tag is 1-1/8", so a circle of the same size is drawn:

Photo of actual  
dog tag



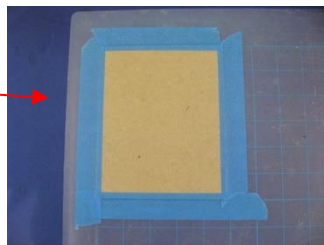
Circle created in SCAL at  
the same diameter as the  
tag

- ◇ Because this shape will be cut from another material to use in the alignment process, the shape is resized to be a tiny bit larger. For a circle, you can simply resize it in the **Position & Size Panel**. If the shape is non-symmetrical, then use the **Shadow Layer** effect with a shadow **Size** of about 0.04".
- ◇ Next the desired lettering and/or shapes are added. In this case, the dog's name and a phone number with "Please Call" are chosen. Because there is also a hole near the top of this dog tag, a 1/4" high square is added just to show the top limit of where the lettering could be located. This is deleted as soon as the lettering is added and positioned:

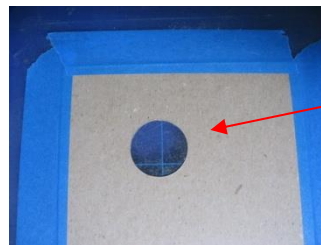


- The lettering is placed on one layer in SCAL while the circle is place on a different layer. A sheet of thin chipboard is placed on the cutting mat. Using **WYSIWYG** cut mode, the circle is sent to cut:

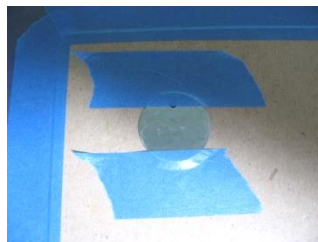
Tape chipboard  
to top of mat



Circle layer is sent to  
cut and removed from  
the rest of the  
chipboard.



- After the hole is cut in the chipboard, you can go **Offline** on the Control Panel and move the mat to access and remove the cut circle. Replace it with the actual dog tag and use tape to secure the tag. However, do NOT press the **Origin** button. Instead, press the **Online** button so that the mat will return to the same origin. This is important!



- The blade holder is replaced with the Maxx Engraving Tool. The settings are changed for engraving metal. The letter is engraved in the same location on the tag as was designed on the **Cutting Mat**:



## **12.10 Using the Punch Tool**

- The [Maxx Punch Tool](#) can be used for creating decorative designs (such as pergamano and other parchment arts) or for creating small holes for paper embroidery.
- To protect the mat and the thin punch, it is recommended that a thick soft material be used as a cushion between the paper/cardstock and the cutting mat. Suggested materials that will work well include non-slip shelf liner, craft foam, and stiffened felt.
- The same basic principles apply to punching as in embossing and scoring:
  - ◇ You will probably need to use the **WYSIWYG** cut mode
  - ◇ You will need to set **Blade Offset** and **Overcut** to 0
  - ◇ You will possibly need to use multiple passes to get the desired results.
- Refer to the *Suggested Settings* table at the end of this chapter or force and speed settings on various materials.
- To design a punch pattern, use the **Pierce** function. Refer to *Section 10.10*.
- As with the other tools, testing is necessary to get the perfect settings for the particular material you are punching. Don't forget to set the punch tip height higher, just as you do with the blade holder, in order to get more force applied.

## **12.11 Cake Decorating**

### **Video Video**

- Here are some ways to use the KNK Maxx Air in cake decorating (thank you to Rebecca Stewart for providing most of the following info in this section):
  - ◇ Cupcake wrappers (refer to *Section 8.10*)
  - ◇ Icing sheets: both regular and print and cut
  - ◇ Stencils for airbrushing cakes
  - ◇ Fondant, gum paste, Sugar Veil cut shapes
  - ◇ Templates from thin chipboard to use as patterns when cutting thick layers of gum paste
- Icing sheets can be cut on the regular KNK Maxx mat, although it's a good idea to have one dedicated to cake use only. The same is true for the blade holder and blade.
- Press the icing sheet to the mat, making sure the pinch rollers will not travel over the icing sheet! The plastic backing on the sheet acts just like the backing on vinyl - cut through just the icing, leave the backing intact. Peel off the cut and put the leftover sheet back in the bag. Recommend cut settings for icing sheets are presented in the table at the end of *Chapter 2*.
- When cutting fondant or gum paste, roll it out and place it on a lightly greased piece of wax paper, and stick that down on the sticky mat. Whether you cut through the wax paper or not, the wax paper makes it easier

to get the cut shapes off the mat without distorting them. Some people prefer to use shortening applied to a mat that has no adhesive, however, it can be tricky getting the shapes cleanly off the mat.

## **12.12 Additional Applications**

### **Wood**

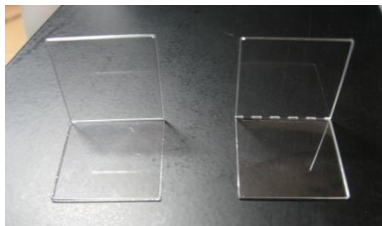
#### **Video**

- Cutting wood can be tricky because it is subject to splintering. Stick to very thin pieces of balsa or birch (1/16" or thinner).
- Use a low force and not the typical blade tip height used for other materials, which can increase the chance of splintering when the blade drops to puncture the wood. Try using 6 Post It notes for setting the blade tip height.
- Tape the balsa to a sticky mat to keep it from shifting during the cut. Also, decrease the blade offset so that corners will be cut more rounded. Use a low speed ~50 or slower.
- If you plan to engrave the wood first, use the small end of the [Embossing Tool](#). Unlike the procedure when embossing or engraving other materials, perform the cut first and then emboss/engrave. If you try embossing first, the wood can be weakened and made more susceptible to splintering.



### **Craft Plastic**

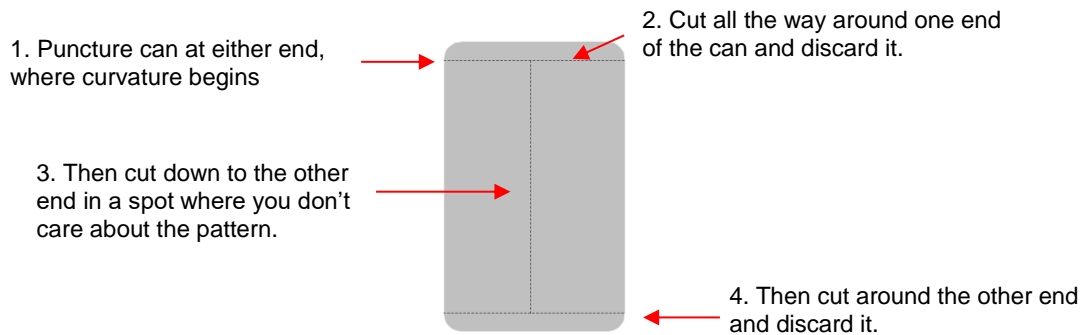
- Craft plastic (PET-G) is sold at a variety of Internet sites, including E-Bay, Dick Blick, Clear Scraps, and Scrapbook.com. Not only can it be cut on the Maxx Air, but fold lines can be created using the [engraving](#) tool. The advantage of PET-G is that you can fold these score lines back and forth many times without the plastic snapping. If you prefer, you can also create fold lines by cutting dashed lines. These also are very strong and can be folded dozens of times before weakening.



- PET-G comes in 0.015" and 0.2" thicknesses with protective sheets on the front and back to protect it from scratches. These protective sheets will make it appear to be colored, but it is perfectly clear when the sheets are removed. You can remove both before cutting, but you might prefer to leave one of the sheets attached to protect the bottom side from any adhesive on the cutting mat. This bottom sheet can also serve as a stabilizer during the cut.
- PET-G doesn't need to be cut totally clean. So, if there are parts that are not cleanly cut, try tearing the shape away from the waste. That should work just fine. Ideally, of course, the cut will be clean and this step not needed. Refer to the table at the end of *Chapter 2* for cut settings and the table at the end of this chapter for scoring settings.

## Aluminum

- Soda cans are able to be cut on the Maxx Air. The number one issue is getting them flat onto the cutting mat for clean cutting. Note that preparing a can should only be done by an adult as the outside edges you cut with scissors will be very sharp and ragged.
- Once the can is clean, place it on its side and use a sharp knife to puncture the can at the point of curvature, either at the top or at the bottom. Then use a pair of scissors suitable for cutting metal, such as those made by Pampered Chef:



- The next issue is the fact the aluminum will still curl up in the original shape of the can. One way to get the can uncurled is to wrap it the opposite way around a rolling pin. Secure with rubber bands. Then place into a preheated oven at 200°F for about 20 minutes. Allow to cool for a few minutes and then remove.
- Brayer well to a very sticky mat and tape completely around the outside edges. Use the recommended cut settings in the table at the end of Chapter 2.

## Suggested Maxx Air Settings for Various Accessories<sup>1</sup>

**Important:** Remember to turn **Blade Offset** back on after using accessory tools and before cutting with your blade again!

These are estimated settings based on testing with prior KNK models!

Be sure to test on scrap materials first!

This table will be updated once actual testing takes place.

<u>Application/Material</u>	<u>Tool</u>	<u>Force</u>	<u>Speed</u>	<u># Passes</u>	<u>Surface</u>	<u>Other Comments</u>
Drawing on paper	Sharpie Marker	5	500	1	Mat	Pen was almost touching paper in order to be grasped by front screw
Drawing on paper	Sharpie Liquid Pencil	10	500	2	Mat	Used 2 passes because pencil hesitates to start drawing each time.
Drawing with glue on paper	Sakura Quickie Glue Pen	20	300	2	Mat	2 passes provided a little more glue. Also used 0.01" Inset Shadow and Outset Shadow to provide a thicker outline of shape.
Embossing Cardstock - Georgia Pacific 100#	Embossing - large end	85	300	3	Shelf Liner	Used 0.01" Inset Shadow and Outset Shadow to provide a thicker outline of shape.
Scoring Cardstock - Georgia Pacific 100#	Embossing - small end	100	500	2	Shelf Liner	
Scoring Cardstock - Recollections	Embossing - small end	100	500	2	Shelf Liner	
Scoring PET-G (craft plastic)	Engraving	120	400	2	Tape to Mat	
Engraving Vellum - 48#	Engraving	75	500	2	Mat	Used 0.01" Inset Shadow and Outset Shadow to provide a thicker outline of shape.
Engraving Vellum - thin	Engraving	40	500	2	Mat	Used 0.01" Inset Shadow and Outset Shadow to provide a thicker outline of shape.
Engraving Metal Dog Tag	Engraving	120	300	3	Mat	
Engraving Balsa	Embossing - large end	60	200	2	Tape to Mat	Cut shape first and tape around shape to stabilize, then emboss. This minimizes splintering
Punching Cardstock - Georgia Pacific 100#	Punching	60	400	2	Shelf Liner	

<sup>1</sup>These settings should be used for the initial testing. Adjustments may be necessary based on variations in the material, surface beneath paper, humidity, condition of the cutting mat, etc. Most tests were done with a blade tip height equal to a stack 25 Post-it notes or 12 Georgia Pacific 100# cardstock pieces.

<sup>1</sup> © 2009- 2017 Sandy McCauley, All Rights Reserved







**Settings Form for Accessory Tools<sup>1</sup>**

<u>Application/Material</u>	<u>Tool</u>	<u>Force</u>	<u>Speed</u>	<u># Passes</u>	<u>Surface</u>	<u>Other Comments</u>







<sup>1</sup> © 2009- 2017 Sandy McCauley, All Rights Reserved




## Appendix A SCAL: Key Board Shortcuts










<u>Shortcut</u>	<u>Icon</u>	<u>Description</u>	<u>Menu (m:) and/or Icon (i:) Location</u>
<b>Main Screen and Project Functions</b>			
Ctrl+N		Open a new file/project	m:File>New Project i:Toolbar
Ctrl+O		Open an existing .scut file/project	m:File>Open Project i:Toolbar
Ctrl+S		Save a file/project	m:File>Save Project i:Toolbar
Ctrl+Shift+S		Save file/project in new location	m:File>Save Project As
Ctrl+P		Print	m:File>Print
Ctrl+Z		Undo last action	m:Edit>Undo i:Toolbar
Ctrl+Shift+Z		Redo last action	m:Edit>Redo i:Toolbar
		Open Document Panel	i:Properties Panel
Right click>Mat Size		Change the size of the Cutting Mat	m:Cutter>Mat Size
Right click>Mat Orientation		Toggle between Landscape and Portrait	m:Cutter>Mat Orientation
Right click>Show Rulers		Toggles Rulers on and off	
Right click>Ruler Units		Set units for software: in, cm, mm	m:View>Ruler Units
Alt+F4		Close SCAL	m:File>Exit

### Zooming and Panning Tools








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

### Help











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

<u>Shortcut</u>	<u>Icon</u>	<u>Description</u>	<u>Menu (m:) and/or Icon (i:) Location</u>
<b>Importing and Exporting</b>			
Ctrl+Shift+I		Import a file	m:File>Import i:Toolbar
Ctrl+Shift+E		Export a file (save in a different format)	m:File>Export
Ctrl+Shift+T		Open Trace Image window	m:File>Trace Image i:Toolbar
Ctrl+1		Open the Library window	m:Window>Library i:Toolbar
		Open the eshape store window	m:File>eshape Store i:Toolbar
<b>Selecting and Moving Shapes</b>			
Click on shape		Left click on shape to select it	i:Tools Panel
Shift + click on shape		Add additional shapes to selection	
Freely drag mouse around shapes		Lasso select shapes	i:Tools Panel
Ctrl+A (or right click>Select All)		Select all shapes	m:Edit>Select All
Ctrl+Shift+A		Deselect all shapes	m:Edit>Deselect All
Right click>Transform>Move		Move a shape to a new location	
<b>Duplicating Shapes</b>			
Alt + drag shape		Creates a duplicate of the shape being dragged	
Alt + click on shape		Creates a duplicate of shape on top of original	
Ctrl+C (or right click>Copy)		Copy to clipboard	m:Edit>Copy i:Toolbar
Ctrl+V (or right click>Paste)		Paste from clipboard	m:Edit>Paste i:Toolbar
Ctrl+Shift+V (or right click>Paste in Place)		Paste in place from clipboard (on top of original)	m:Edit>Paste in Place
Ctrl+Alt+Shift+V		Fill the grid with selection from clipboard	m:Edit>Paste (Auto Fill)
Ctrl+D		Create duplicate copies of selected shape (s)	m:Object>Duplicate
Ctrl+Shift+D		Create duplicate copies in a circular formation	m:Object>Duplicate Rotated
<b>Cutting/Deleting Shapes</b>			
Ctrl+X (or right click>Cut)		Cut to clipboard	m:Cut to clipboard
Del (or right click>Delete)		Delete selected shape(s)	
Hold Del and click on one shape at a time		Deletes each shape as it is left clicked	





**Shortcut****Icon****Description****Menu (m:) and/or Icon (i:) Location****Text and Font Icons**





		Open Text Panel	i:Properties Panel
		Bold	i:Text Panel
		Italic	i:Text Panel
		Reload installed fonts list	i:Text Panel
		Add font to Favorites	i:Text Panel
		Type text	i:Tools Panel
		Connect interior shapes to the outside	i:Tools Panel

**Library**










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




**Manipulating and Coloring Shapes**

		Open Position & Size Panel	i:Properties Panel
Right click>Transform>Scale		Resize a selected shape	
Right click>Transform>Rotate		Rotate a selected shape	i:Position & Size Panel
Right click>Transform>Flip Horizontal		Mirror/Horizontally flip a selected shape	i:Position & Size Panel
Right click>Transform>Flip Vertical		Vertically flip a selected shape	i:Position & Size Panel
Ctrl+Shift+Up (or right click>Arrange>Bring to Front)		Bring selected shape to top	m:Object>Arrange>Bring to Front






<u>Shortcut</u>	<u>Icon</u>	<u>Description</u>	<u>Menu (m:) and/or Icon (i:) Location</u>
<b>Manipulating and Coloring Shapes (continued)</b>			
Ctrl+Up (or right click>Arrange>Bring Forward)		Bring selected shape up one level	m:Object>Arrange>Bring Forward
Ctrl+Down (or right click>Arrange>Send Backward)		Send selected shape down one level	m:Object>Arrange>Send Backward
Ctrl+Shift+Down (or right click>Arrange>Send to Back)		Send selected shape to the bottom	m:Object>Arrange>Send to Back
Ctrl+Alt+L (or right click>Lock)		Lock selected shape	m:Object>Lock
Ctrl+Alt+Shift+L (or right click>Unlock All)		Unlock all shapes	m:Object>Unlock All
Right click>Hide		Hide select shape	m:Object>Hide
Right click>Show All		Show all shapes	m:Object>Show All
Ctrl+G (or right click>Group)		Group selected shapes	m:Object>Group
Ctrl+Shift+G (or right click>Ungroup)		Ungroup selected shapes	m:Object>Ungroup
Ctrl+B (or right click>Break Apart)		Break a shape into all of its individual paths	m:Object>Break Apart
Ctrl+Shift+B		Join selected shapes into a single shape	m:Object>Merge
		Open Fill & Stroke Panel	i:Properties Panel
		Copy a Fill and/or Stroke color from one shape to another	i:Tools Panel
		Edit a gradient start and end points	i:Tools Panel
		Distort a shape	i:Tools Panel

#### Layers Panel







		Open the Layers Panel	i:Properties Panel
Right click>Hide		Hide a layer	m:Object>Hide i:Layers Panel
		Show a layer	i:Layers Panel
Click icon + Show/Hide>Hide All Layers		Hide all layers	m:Layer>Show/Hide>Hide All Layers i:Layers Panel
Right click>Show All (or click icon + Show/Hide>Show All Layers)		Show all layers	m:Layer>Show/Hide>Show All Layers i:Layers Panel
Ctrl+Alt+L (or right click>Lock)		Lock a layer	m:Object>Lock i:Layers Panel
		Unlock a layer	i:Layers Panel
		Lock all layers	m:Layer>Lock/Unlock>Lock All Layers i:Layers Panel
Ctrl+Alt+Shift+L (or right click>Unlock All)		Unlock all layers	m:Layer>Lock/Unlock>Unlock All Layers i:Layers Panel





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

### Designing Tools




Alt+U (or right click>Path>Union)		Weld selected shapes to remove overlap	m:Path>Union
Right click>Path>Intersection		Apply the Boolean Join intersection to two shapes	m:Path>Intersection
Right click>Path>Exclude		Apply the Boolean Join exclude to two shapes	m:Path>Exclude
Right click>Path>Front Minus Back		Apply the Boolean Join front minus back to two shapes	m:Path>Front Minus Back
Right click>Path>Back Minus Front		Apply the Boolean Join back minus front to two shapes	m:Path>Back Minus Front
		Draw straight lines and Bézier curves	i:Tools Panel
		Freehand draw thin lines	i:Tools Panel
		Freehand draw thick lines	i:Tools Panel
		Draw basic shapes: rectangle, rounded rectangle, circle, triangle, polygon, star, spiral	i:Tools Panel
		Measure distances and angles on screen	i:Tools Panel
Right click>Appearance>Add Shadow Layer		Add an outline or inline to a selected shape	m:Effects>Shadow Layer
Right click>Appearance>Lattice		Create a lattice design in a selected shape	m:Effects>Lattice
Right click>Appearance>Rhinstones		Create a rhinestone outline or fill on a selected shape	m:Effects>Rhinstones

### Editing Tools

		Move or reshape a path or move and edit nodes	i:Tools Panel
		Erase parts of a shape	i:Tools Panel
		Make thin, straight-line cuts through a shape	i:Tools Panel
		Drag the mouse to marquee-select an area to be retained	i:Tools Panel
Alt + drag Bezier control point		Only reshape the current path and not adjoining path	i:Tools Panel
Right click>Path>Simplify		Reduce the number of nodes in the selected shape	m:Path>Simplify
Right click>Path>Split Path		Break the path between the two selected nodes	m:Path>Split Path i:Tools Panel

<b>Shortcut</b>	<b>Icon</b>	<b>Description</b>	<b>Menu (m:) and/or Icon (i:) Location</b>
<b>Editing Tools (continued)</b>			
Right click>Path>Reverse Path		Reverses the direction the path will cut	m:Path>Reverse Path
Right click>Path>Object to Path		Remove the text, rhinestone or lattice status	m:Path>Object to Path
Right click>Path>Close Path		Close shape by adding a straight line between the start and ending nodes	m:Path>Close Path
Right click>Path>Convert Node to Corner		Convert current selected node to corner	i:Tools Panel>Tool Options
Right click>Path>Convert Node to Cusp		Convert current selected node to cusp	i:Tools Panel>Tool Options
Right click>Path>Convert Node to Smooth		Convert current selected node to smooth	i:Tools Panel>Tool Options
Right click>Path>Convert Node to Symmetric		Convert current selected node to symmetric	i:Tools Panel>Tool Options
Right click>Path>Path Details		Show path to be travelled when shape cuts	

### Output

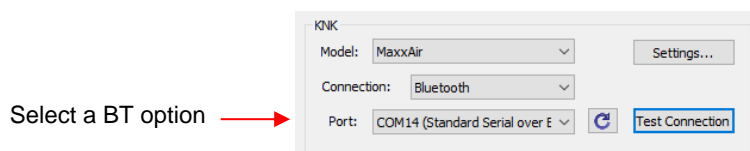
		Open controller window for current default cutter	m:Cutter>Cut with (name of cutter) i:Toolbar
Ctrl+Shift+P		Show preview of cut shapes	m:Cutter>Preview i:Toolbar
Ctrl+P		Open print window	m:File>Print
		Open Style Panel	i:Properties Panel

## Appendix B Maxx Air and SCAL: Troubleshooting

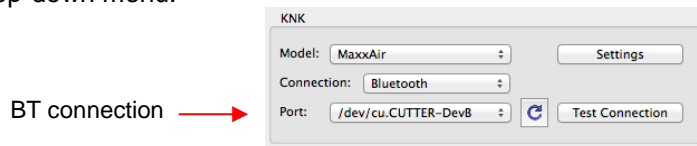
### Communication Issues

The **Test Connection** failed.

- If you have connected via USB, make sure the cable is properly seated.
- From the **Port** menu, select the connection being used based on the following screenshots. Once you select an option under **Port**, then click on **Test Connection**:
  - ◇ Bluetooth on a PC: there will be two different COM port listings for the Bluetooth connection. One is incoming and the other is outgoing, but there's no way to tell which is which from the COM port assignments. Use the **Test Connection** button to see which one works:

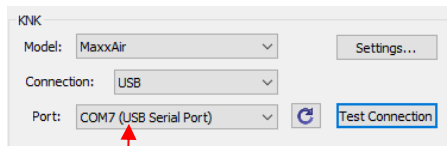


- ◇ Bluetooth on a Mac: the Bluetooth connection, with the word "CUTTER" in the name, will appear like this in the drop-down menu:



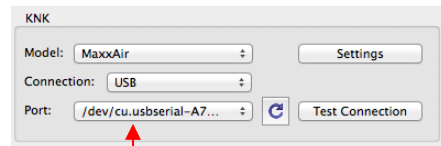
- ◇ USB: The following screenshots show how a PC and a Mac will list the USB connection. You can use **Test Connection** to verify that the computer is sending data to the Maxx Air:

PC:



USB Connection

Mac:



USB Connection

- If the **Test Connection** still fails, reinstall the driver. Refer to *Section 1.09*.
- If the **Test Connection** still fails, contact KNK USA by either calling 800-268-3672 or starting a support ticket: <http://knkusa.com/support/>.

---

*I'm using Parallels on a Mac and the KNK isn't being recognized.*

- Go to **Devices>USB** and make sure that the FT232R USB UART connection is checked.
-

*I have the USB cable attached but there is no "USB-Serial" COM Port connection available in the list of available COM ports.*

- Unplug the KNK from your computer. Go to this link and download the driver for the KNK Maxx.:  
<http://knkusa.com/resources/>
  - Once you have downloaded and installed the driver, reboot your computer. When your computer has finished restarting, reconnect the KNK to your computer. You should get a pop-up that will finish the installation. If you continue to have trouble, contact your KNK dealer or KNKUSA.
- 

*When I tried to cut, nothing happened, no error messages either.*

- Make sure your cutter is online.
  - Make sure you have **KNK Maxx Air** selected.
  - Check the baud rate on the machine to make sure it matches what is selected in the window.
- 

## **Operating Issues**

*My mat is rotating when the KNK starts to cut!*

- Both pinch wheels need to be gripping the mat. Move the mat either left or right so that it is under both wheels.
- 

*The rollers are ripping the top layer of my material.*

- It's important to keep the rollers clean of adhesive. Use Un-Du or Goo Gone to thoroughly clean the wheels. Then either make sure the wheels are always over the material you are cutting or place strips of paper where the wheels will be crossing the mat.
- 

*Some of the buttons are hard to use on the control panel. I have to press really hard to get them to work.*

- There is a tutorial available for fixing that. It's very easy to do and will make a big difference:  
<http://www.iloveknk.com/Support/Tutorials/Klic-N-Kut/Buttons Sticking - Cleaning the Control Panel.pdf>
- 

*At low pressures the blade doesn't touch the surface.*

- That is correct. Simply increase the force, as necessary, to get a good test cut.
- 

*The KNK stops cutting when the screen saver comes on.*

- This can happen with some computers. Turn off the screen saver before cutting.
- 

*During a cut, the KNK stopped and went into the Pause mode.*



- The blade is trying to reach a point outside of the available cutting width. Turn off the cutter and click on Cancel. Answer “Yes” to quit. Then turn the cutter back on. Set your origin closer to the far right limit so that you have the full cutting range width available.
- 

*Sometimes, while the KNK is turned on, but not cutting, there's a faint whistling sound being emitted.*

- This is due to what is called "micro stepping." It is a high-pitched noise caused by idling between 2 veins on the encoder, but shouldn't be of concern to the user.
- 

## **Cutting/Drawing Issues**

*I am getting large lines sliced through all of my cuts.*

- Your Sure Cuts a Lot software is still in trial mode. You need to register your copy of SCAL. Refer to *Section 3.01.2*.
- 

*The KNK starts cutting my design and then suddenly goes crazy. It's cutting lines in random places.*

- This is referred to as random cutting and it is just that: random. It affects all brands of cutters and can be caused by a host of factors such as a bad USB cable, software quirks, interference from another device or software program, or a problem with the main board. Please contact your KNK dealer or KNK USA for assistance in troubleshooting.
- 

*The KNK cut part of my design and then went back to the origin as if it had completed all of it. Why didn't all of my design cut.*

- This is usually the same random cutting issue as the prior problem. Refer to the solution.
- 

*My shapes are drawing off the material. What am I doing wrong?*

- When setting the origin, make sure you are using the tip of the blade as the reference point and not the laser light. It was set up differently in SCAL versus other cutting programs.
  - Check whether your **Cutting Mat** is in **Portrait** or **Landscape** mode. This will change whether your image appears the same way you see it on the screen or rotated 90 degrees relative to the screen.
  - Details on these various settings are covered in *Section 10.07*.
- 

*When drawing with the test pen, I have extra lines being drawn.*

- Make sure you raise the pen in the blade holder seat on the KNK before tightening the front screw. The blade holder seat needs to be able to drop the pen down when it reaches the spot to draw the shape. Otherwise, the pen tip will be dragging across the paper from the origin to where the shape will begin to be drawn and then back to the origin at the end of the “cut”.
- 

*I'm drawing with the test pen and there are bubbles at the corners.*

- For perfect corners, turn off **Blade Offset** (set to 0) since you do not need an offset for pens. Refer to *Section 2.03.4*.
- 

*My cut started out fine but by the end of the cut, it's not cutting through the material.*

- Make sure the blade holder housing doesn't have any bits of material inside of it.
  - Make sure the front screw is tight so that the blade holder isn't slipping upwards during the cut.
  - Make sure the cutting mat is clean and sticky so that the material remains stabilized during the cut.
- 

*My cut is clean in some places but not in others. Why am I not getting consistent cutting?*

- Try raising the blade holder in the blade holder seat (~0.1" or ~2.5 mm). If the blade is too close to the material, not enough force is being applied. Refer to *Section 2.01, Set the Blade Height Above the Material*.
  - Make sure your material is pressed firmly onto a clean and sticky mat (assuming you are cutting a material such as paper or cardstock).
  - You may need to increase the force. Try raising it by a setting of 10 and repeat the cut.
  - Your material may require two passes. If a material is not homogenous or if it is heavily textured, using two passes is sometimes needed to get the entire shape cut cleanly. Also, if the material has been exposed to humidity, then it will become difficult to cut in one pass. You can dry paper and cardstock in a slightly heated oven for around 15 minutes or so to release the moisture. Preheat the oven at the lowest temperature and then turn it off before putting your paper into the oven.
- 

*I am getting a lot of tearing in my cuts.*

- A number of things can cause tearing so work through this check list:
    - ◇ Too much blade is exposed. If you see cut lines in your mat, shorten the blade exposure. You should only be cutting through the material itself.
    - ◇ The blade is chipped. Try a different blade.
    - ◇ The paper is not adhered well to the mat. Make sure the mat is clean, sticky, and the paper is pressed smoothly and evenly on the surface.
    - ◇ You may be using too much cutting force. Try reducing it and doing test cuts.
    - ◇ You may have too many nodes in the shape. Refer to *Section 8.01*.
    - ◇ The material itself may be subject to tearing, especially on intricate cuts.
    - ◇ Also, if the material has been exposed to humidity, then it will become difficult to cut in one pass. You can dry paper and cardstock using a blow dryer or in an oven. Refer to *Section 12.01 Selecting Cardstock*.
- 

*I am cutting a file with dashed lines for folds and the dashes look terrible in some places. How can I fix this?*

- Those dashes are probably a series of separate straight line paths or even rectangles, versus being a solid cut line with a dashed line style assigned. Try replacing them with solid lines (*Section 7.04.1*) and then converting the **Line Style** from solid to dash as shown in *Section 5.14*.
-

*My shapes are not completely cutting out. They are still attached to the waste part of the material.*

- Make sure you have an appropriate **Overcut** setting for the blade you are using.
  - Make sure the mat is not skewing during the cut due to a high speed or force the blade through a dense material at a high pressure.
- 

*My cardstock is not cutting all the way through. I have the blade all the way out and using the maximum force.*

- Please refer to *Section 2.01*. It's important to only have as much blade exposed as is necessary to penetrate the cardstock. You may also need to raise the blade tip height. Reduce your force back to suggested values for the material you are cutting and do a test cut.
  - Do not use more pressure than is needed. If the cardstock is cutting through about 90% of the cut, then turn on **Multi-cut**. Some cardstocks do better with a second pass versus using a lot of force.
- 

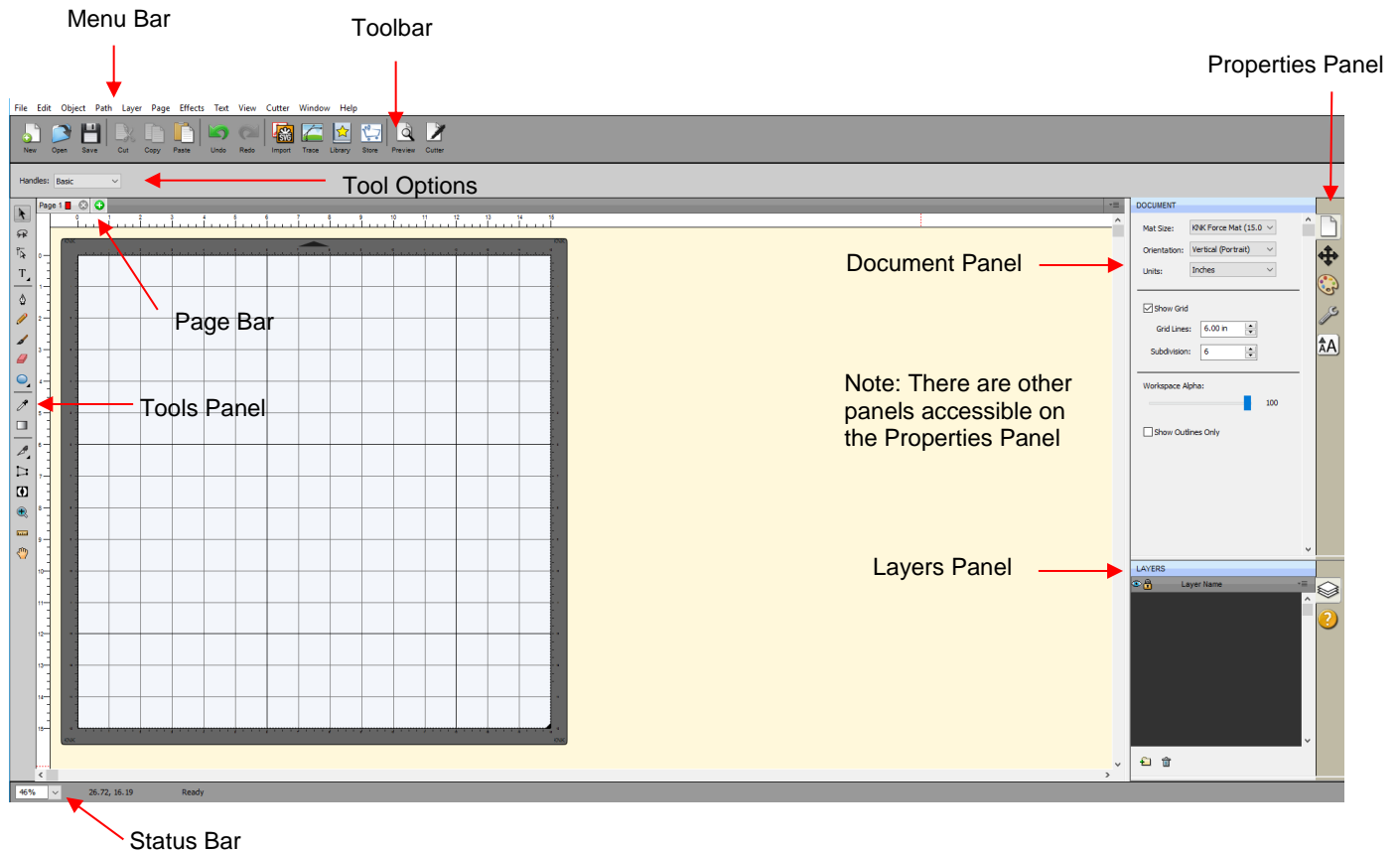
*The Maxx Air stopped during a cut.*

- If the Maxx Air stops with the head over on the left side of the cutter, you have most likely exceeded the 15" cutting range. Several things to consider:
    - ◇ Check the width (**W**) of your project (or the height **H** if in **Landscape** mode). It cannot exceed 15".
    - ◇ Check how far you are moving the head to the left when setting the origin. If your project is 14" and you moved the head more than 1" to the left, you will send the cut out of range and the Maxx Air will stop.
    - ◇ If you are working in **WYSIWYG** mode, move your shapes towards the bottom right of the **Cutting Mat** when working in **Portrait** mode or towards the top right when working in **Landscape** mode. This will then locate your cuts closer to the origin and reduce the likelihood of sending them outside of the 15" cutting range.
  - If the Maxx Air stops and the head is not located near the left side:
    - ◇ You may have exceeded a buffer limit. Try reducing the number of nodes: Refer to *Section 8.01*.
-

## Appendix C SCAL Details

### C1 Screenshot of SCAL Screen

Below is a screen shot of the main screen in SCAL identifying ONLY **Bars** and **Panels**.



### C2 Bars

- The bars in SCAL have components positioned left to right. The following sections present the four bars and where to find more information for each item on that bar.

#### C2.1 Menu Bar

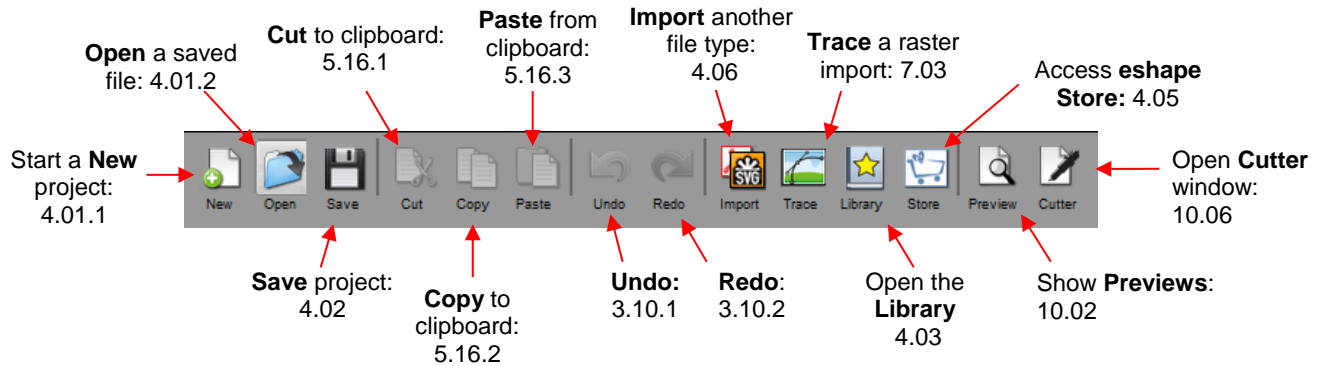
- Like most computer applications, the **Menu Bar** is located at the top of the screen and provides access to most of the functions in the software.

File Edit Object Path Layer Page Effects Text View Cutter Window Help

- Throughout the user manual, a reference such as this: Go to **Path>Simplify** refers to using the **Menu Bar** to access a function. In this case, you would click **Path** on the **Menu Bar** and then click on **Simplify** in the submenu that appears.
- Because there are dozens of submenu options, each one isn't listed with a reference. Instead, it is recommended that you use a search function to locate any given listing within the user manual.

## C2.2 Toolbar

- The **Toolbar** is located at the top of the screen, just below the **Menu Bar**.



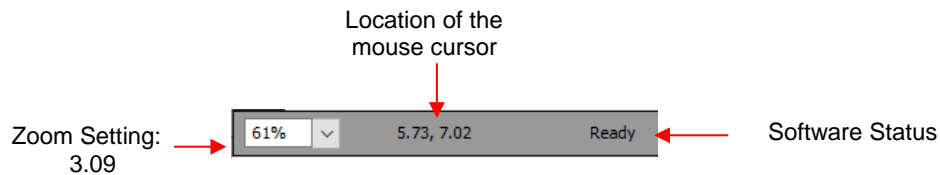
## C2.3 Pages Bar

- All information on the **Pages Bar** is presented in *Section 3.11*.



## C2.4 Status Bar

- The **Status Bar** is located at the bottom of the screen:



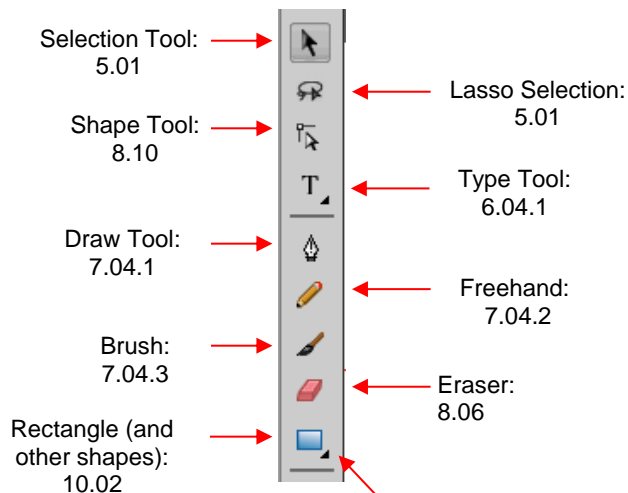
## C3 Panels

- The panels in SCAL have components positioned top to bottom. The following sections present the four bars and where to find more information for each item on that bar.

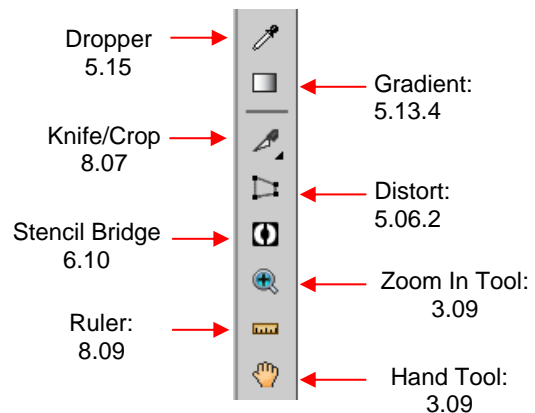
### C3.1 Tools Panel

- The **Tools Panel** is located along the left side of the screen:

Upper part



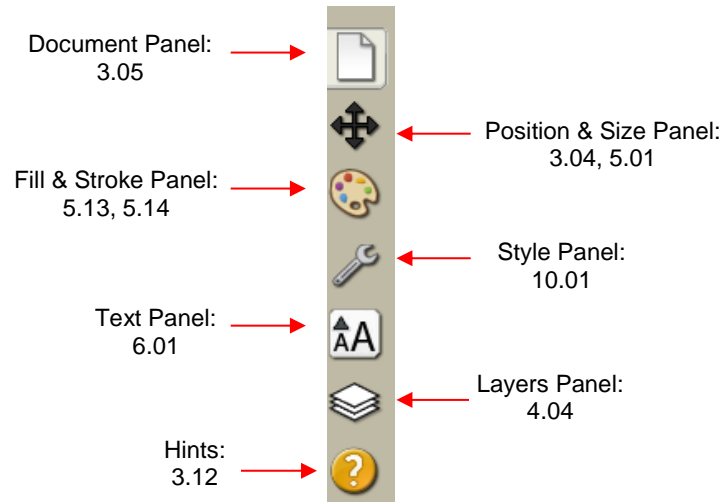
Lower part



Note: Icons with a small black arrow have more options when left mouse button is held down

## C3.2 Properties Panel

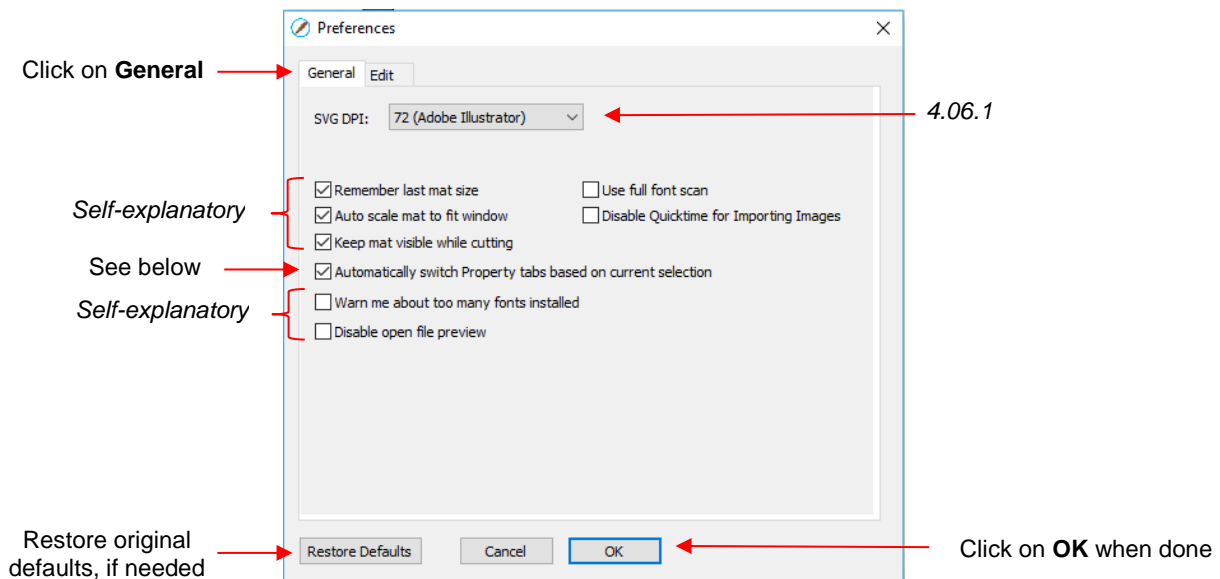
- The **Properties Panel** is located on the right side of the screen and contains 6 subpanels and a Hints access:



## C4 Preferences

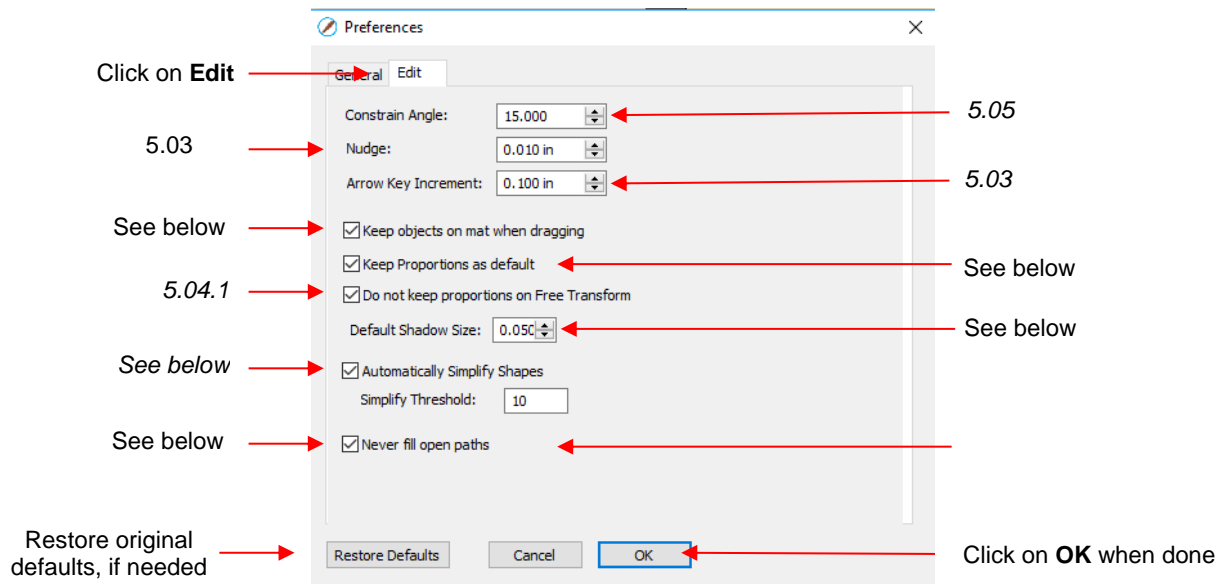
- The following preferences can be found under **Edit>Preferences** (or, on a Mac, press **Command + ,**). If the preference was already presented in other sections, it is noted in the screen shots. For those not previously mentioned, details are presented if they are considered important.

### C4.1 Preferences: General Tab

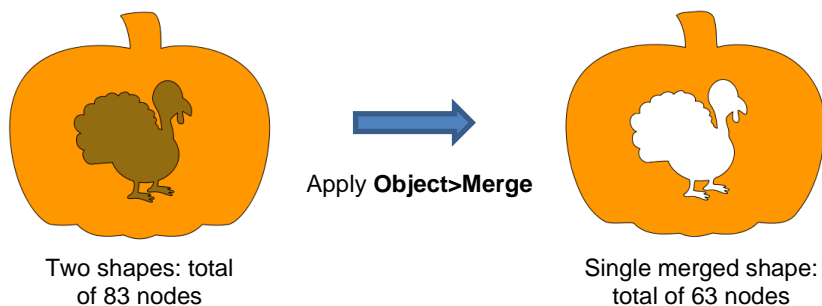


- Automatically switch Property tabs based on current selection:** with this option turned on, the **Properties Subpanel** related to the task at hand will open. For example, when you select a shape, the **Position & Size Panel** will open. When you click on the **Type Tool**, the **Text Panel** will open.

## C4.2 Preferences: Edit Tab

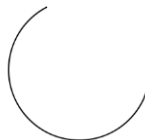


- **Keep objects on mat when dragging:** With this option checked, you cannot drag shapes beyond the outside borders of the **Cutting Mat**. You can, however, move them beyond the **Cutting Mat** by entering the desired **X, Y** location on the **Position & Size Panel**.
- **Keep Proportions as default:** With this option checked, the **Keep Proportions** setting on the **Position & Size Panel** will automatically be checked when you launch SCAL and will remain checked until you uncheck it. If you choose to uncheck this option, you will need to relaunch SCAL and the **Keep Proportions** setting will be unchecked.
- **Default Shadow Size:** This affects the initial **Size** shown under **Effects>Shadow Layer**.
- **Automatically Simplify Shapes:** With this option checked, nodes will be reduced after certain functions are applied. For example, the following two shapes (pumpkin and turkey) have a total of 83 nodes. If you select them and apply **Object>Merge** so that the inside turkey will cut before the outside pumpkin, the total number of nodes is reduced to 63 because of the **Automatically Simplify Shapes** option being checked.



- **Never fill open paths:** Unlike most other vector programs, SCAL offers the ability to fill open shapes by applying an invisible straight line to close the shape. By unchecking this option and selecting a **Fill Color**, **Pattern**, or **Gradient**, the open shapes on your **Cutting Mat** will contain that **Fill**.

◇ For example, here is a circle with a section cut off. The option to **Never fill open paths** is still checked:



◇ The **Never fill open paths** is now unchecked and various **Fills** options applied:



**Fill: Color**



**Fill: Pattern**



**Fill: Gradient**

- ◇ Note that even though the shape appears to be closed, it is not. If you were to cut this shape, it would still be attached to the outside material.