## Sure Cuts A Lot 6 User Manual

## October 14, 2023

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

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

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

Chapter 1: All
Chapter 2: 2.01-2.04, 2.06.1, 2.07.1
Chapter 3: 3.01-3.06, 3.08-3.15, 3.17
Chapter 4: 4.01-4.04.1, 4.06, 4.07, 4.13, 4.14

Chapter 5: 5.01, 5.02, 5.03, 5.04.1
Chapter 6: 6.01, 6.06, 6.08, 6.09
Chapter 7: 7.01, 7.04.1, 7.05.1, 7.23
Chapter 8: 8.01, 8.02, 8.06.1, 8.07, 8.12.1-8.12.3

## Also Note

- This manual presents information by topics versus location on the screen. If you wish to look up all of the functions in one particular location, complete coverage of Panels, Bars, and Preferences is covered in the following Expanded Tutorial: https://tinyurl.com/mr2uhwa2
- A complete list of all icons and shortcuts is located at this link: https://tinyurl.com/yck2e85v

A Troubleshooting Guide is available here: https://tinyurl.com/nhkvv2d7

- To keep this manual from becoming a monstrosity, there are Expanded Tutorials linked "here and there" for those who want or need to obtain more details about a particular function.


## Are There Any Videos?

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


## Should I Print the Manual?

- Because I like to keep the manual up-to-date with frequent updates and new findings, I recommend you do not print the entire document. Instead use $\mathbf{C t r l + F}$ (command+F) to search on a particular function.


## Is This Manual for PC Users Only?

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


## Feedback

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


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## 1. SCAL: Installation, Preferences, and Workspace

### 1.01 Installing SCAL

### 1.01.1 Selecting and Downloading the Software

- Sure Cuts A Lot 6 (SCAL6) can be downloaded from the following link. Note that there are four choices Mac or PC and then regular or PRO:
http://www.craftedge.com/download/download.html
- The additional features in the PRO version are listed below. You can also find out more details about these features at the following link:


## http://www.iloveknk.com/wp-content/uploads/Info/SCAL6 Pro Features.pdf

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

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

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


### 1.01.2 Activating the Software

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

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

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

- Next, go to the following link:


## http://www.craftedge.com/activation/scal/

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

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


### 1.01.3 Installing Your Cutter

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

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

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

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



### 1.02 Main SCAL Screen

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

- Hovering your mouse over most of the screen icons will pop up the icon's name and, in some cases, details about usage.
- In order to better remember where major elements are located, note that the term "bar" is used when components are laid out horizontally (such as the Toolbar) and the term "panel" is used when components are laid out vertically (such as the Tools Panel).
- Four of the bars can be hidden and shown, as desired, by going to View and selecting either Hide or Show next to the bar you wish to change. On a Mac, there's also an option to Enter Full Screen in the View menu.
- Throughout this manual, Cutting Mat or Page (capitalized and in bold type) refers to the on-screen simulation of the physical cutting mat, which will be written with lower case, normal type.
- The Rulers can be toggled on and off by right-clicking on the screen and selecting Show Rulers. When hiding the rulers, click again on the screen for it to take effect. To change the units displayed on the Rulers, refer to Section 1.06.3.
- Shapes are the objects or images that you will be adding to your projects. They can be created from scratch or imported from other sources, such as the Library, your computer, or the Cutter's Market Store. As you will see throughout sections of this user manual, you have many options and resources available to you.
- Complete coverage of Panels, Bars, and Preferences is covered in the following Expanded Tutorial: https://tinyurl.com/mr2uhwa2


### 1.03 Library

- The SCAL Library provides a number of useful functions:

$\diamond$ It contains a collection of over 300 pre-installed shapes, organized into 16 subfolders
$\diamond$ It displays complete character sets for all fonts currently installed
$\checkmark$ You can organize your own shapes and projects into separate folders and view thumbnails for selecting
$\diamond$ You can assign commonly-used shapes and projects to a Favorites folder for quicker access
$\diamond$ It provides access to designs and projects downloaded from the Cutter's Market Store
- The Library automatically opens every time you open SCAL unless you create a custom Workspace (refer to Section 1.05). If you've closed it, the Library can be reopened by using one of the following:
$\diamond$ Click on Library icon on the upper Toolbar Lease
$\checkmark$ Press Ctrl+1
$\checkmark$ Go to Window>Library
- To add a shape from the Library to the Cutting Mat, click on the thumbnail for that shape or drag the shape onto the Cutting Mat. Note there are other categories within the Library listed on the left side. Check out the various subfolders of shapes as they are a great resource while learning SCAL and testing out your cutter.
- Further details on organizing and fully utilizing the Library is covered in Section 2.03.


### 1.04 Properties Panel

- The Properties Panel is located on the right side of the screen. Seven large icons represent seven different panels that you will frequently switch between:
- Document Panel $\square$ : contains the properties related to the Cutting Mat. Refer to Section 1.06.
$\diamond$ Position \& Size Panel
 : contains properties and manipulation functions related to any currentlyselected shapes in the project. Refer to Sections 3.04, 3.05.1, 3.06, 3.08, 3.18.
$\checkmark$ Fill \& Stroke Panel : contains properties for the fill and for the stroke on any currently-selected shapes in the project. Refer to Sections 3.14 and 3.15.
$\diamond$ Style Panel contains properties pertaining to how selected shapes will be cut or printed. Refer to Section 8.01.
$\diamond$ Text Panel $\quad \stackrel{\Delta}{A} A$ : contains properties pertaining to how text will appear. Refer to Section 4.05.
$\diamond$ Layers Panel : lists all shapes in the current project with options to organize, hide/show, lock/unlock and more. Refer to Section 2.04.
$\diamond$ Help Panel : opens a user guide to a section based on the currently selected tool. More tips and instructions can be found under Help>Help.
- Clicking on the icon for any the seven panels will open that panel. To expand a panel for easier viewing, click on the small icon to the right of the panel name. This will open the panel in the area to the left of the Properties Panel:

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

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


### 1.05 Customizing the Properties Panel / Workspace

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

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

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

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

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

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

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



### 1.06 Document Panel

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



### 1.06.1 Mat Size

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

Click here to create


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

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

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


### 1.06.2 Orientation

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

- There are three ways to change the mat orientation:
$\diamond$ On the Documents Panel under Mat Size:

$\diamond$ Right-click on the screen and select Mat Orientation
$\diamond$ Go to Cutter>Mat Orientation


### 1.06.3 Units

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

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


### 1.06.4 Show Grid

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

- The grid lines can also be customized. For example, with this $12^{\prime \prime} \times 12^{\prime \prime}$ mat, major grid lines are set at 6 " and then minor grid lines are set at 1 " (by specifying 6 Subdivisions be used):

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



### 1.06.5 Show Guidelines

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

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


### 1.06.6 Workspace Alpha

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

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


### 1.06.7 Show Outlines Only

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



### 1.06.8 Show Print Margins

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



### 1.06.9 Show Reg Marks

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

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


### 1.06.10 Show Page Color

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

$$
\text { Click here first } \longrightarrow \square \text { Show Page Color } \longleftarrow \begin{aligned}
& \text { Then click on this box to open a } \\
& \text { color section window. }
\end{aligned}
$$

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

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


### 1.06.11 Show Template

- SCAL6 has the ability to add templates to the Cutting Mat that are non-selectable shapes to aid in designing. Typically, these templates are representations of actual objects onto which cut shapes will be applied. Here are several examples:
$\diamond$ Designing an etching stencil for a champagne glass
$\diamond$ Designing a decoration for a light switch
$\diamond$ Designing a rhinestone template or HTV pattern for a T-Shirt
- To show or hide a template, mark the box next to Show Template:

$$
\text { Click here } \longrightarrow \text { show Template: Set Template }
$$

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


### 1.07 Snap To

- The Snap To option allows you to choose how shapes behave as they are being moved. Being able to snap to other objects, to guidelines or to the grid can help align shapes more easily when designing or editing a project.
- To access the Snap To options, go to View>Snap To and mark your preferences based on the following options:
$\diamond$ Grid: selected shape will snap to the grid lines
$\diamond$ Guidelines: selected shape will snap to guidelines (refer to Section 7.02)
$\diamond$ Objects (Bounds): selected shape will snap to other shapes' boundaries
$\diamond$ Objects (Centers): selected shape will snap to other shapes' centers
$\checkmark$ 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 able to go back to the menu and change any of the options.
- When snapping to the grid, the grid can be showing or hidden.
- When a shape snaps to the grid, a guideline, or to another shape, blue lines appear indicating the shape is aligned at that point. Here are two examples:


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


### 1.08 Other Preferences

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


### 1.09 Zooming and Panning

### 1.09.1 Zooming

- To zoom in and zoom out, use any of the following methods:
$\diamond$ Hold down the Alt key (Option key on a Mac) while rolling the mouse wheel
$\checkmark$ Access the Zoom menu on the Status Bar in the lower left corner of the screen $56 \% \quad \mathrm{lv}$
$\diamond$ Go to View>Zoom In or View>Zoom Out
- Use the following shortcut keys:
- Ctrl+ ++... (hold Ctrl key (Command key on a Mac) and repeatedly click on + key): Zoom in - Ctrl+ ---... (hold Ctrl key (Command key on a Mac and repeatedly click on - key): Zoom out
- Right-click on the screen and select Zoom In or Zoom Out
- Click the Zoom in Tool icon on the Tools Panel ${ }^{\oplus}$. 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:
$\diamond$ Click on the icon while the Zoom in Tool is activated (see prior screenshot)
$\diamond$ Use the shortcut Ctrl+ Shift+ = (on a Mac: Control+ Shift+ =)
$\diamond$ Go to View>Zoom Selection
- To zoom to the Cutting Mat, use one of the following:
$\diamond$ Click on the icon while the Zoom in Tool is activated (see prior screenshot)
$\diamond$ Use the shortcut Ctrl+ F (Command + F on a Mac)
$\diamond$ Right click on the screen and select Fit to Window
$\diamond$ Select Fit to Window from the Zoom menu on the Status Bar
- To change the zoom level so that a selected shape will be the same size on the screen as its actual size, go to View>Actual Size.


### 1.09.2 Panning

- To move the workspace up and down, roll the mouse wheel.
- To pan the workspace, use either of these methods:
$\diamond$ Press and hold the Spacebar while dragging the left mouse button
$\diamond$ Click the Hand tool icon on the Tools Panel $\stackrel{\text { in }}{ }$. Then drag the left mouse button.


### 1.10 Undo/Redo

### 1.10.1 Undo

- As with most Windows applications, there is an Undo function to reverse the most recent steps performed. You can use any of the following to execute the Undo function:
$\diamond$ Click on the Undo icon on the upper Toolbar
- Press Ctrl+Z
$\diamond$ Go to Edit>Undo


### 1.10.2 Redo

- As with most applications, there is also a Redo function in case you Undo too many steps or simply change your mind. You can use any of the following to execute the Redo function:
$\diamond$ Click on the Redo icon on the upper Toolbar


## $\diamond$ Press Ctrl+Shift+Z

$\diamond$ Go to Edit>Redo

### 1.11 Projects and Pages

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

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

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

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

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

$\checkmark$ Note: The color selected for the page tab will also be the color of the Cutting Mat if you mark the Show Page Color option on the Document Panel.
$\diamond$ If you change your mind and want to edit the Name and/or Color, either go to Page>Page Properties or double-click on the Page Name and the same Page Properties window will open, allowing you to make changes.
- To switch between pages, click on the Page name or go to Page on the Menu Bar and the menu will have all pages listed.
- To delete a page, make sure it's selected and then either go to Page>Delete Page or click on the Delete Page icon ${ }^{*}$. A window will open asking for confirmation.


### 1.12 Getting Help and Additional Resources

- A SCAL6 Troubleshooting Guide is available at this link: https://tinyurl.com/nhkvv2d7
- The following steps within SCAL will take you to help resources (note that some of these will require an Internet connection):
$\diamond$ Go to Help>Help for access to an on-line user guide
$\diamond$ Click on the Help Panel icon on the Properties Panel to open the user guide to a section based on the currently selected tool
$\diamond$ Go to Help>Forums to access the SCAL user forum
$\diamond$ Go to Help>Online Video Tutorials to access a page with links to both videos and written tutorials
$\diamond$ Go to Help>Support>Technical Support for the following:
- Contact the SCAL team
- Retrieve your serial code
- Download latest updates
- Access the forum
- Access tutorials
- An online training program, with over 10 hours of videos which can be viewed as often as you need, is available at this link: Sure Cuts a Lot 5/6 Classroom.
- While you may be able to find some free videos on You Tube, be cautious as some of them are using older versions of SCAL and others are made by people who haven't mastered the software and, as a result, present inaccurate and misleading information.
- Facebook has a number of groups devoted to SCAL. Other online support groups for SCAL include:
$\diamond$ Let's Learn Cricut, SCAL, \& MTC Facebook Group
$\diamond$ MTC and SCAL Facebook Group
$\diamond$ Sure Cuts A Lot (SCAL) Facebook Group
$\checkmark$ Siser Juliet and Romeo with Sure Cuts A Lot


## 2. SCAL: Handling Files and Organizing Layers

### 2.01 Opening Files

### 2.01.1 Opening a New File/Project

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

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

- If SCAL is already open, then you can start a new file (aka a new project), using any of the following:
$\diamond$ Click on the New Project icon on the upper Toolbar
$\diamond$ Click on the New Project tab above the Cutting Mat

$\oplus$ New Project.
$\diamond$ Press Ctrl+N
$\diamond$ Go to File>New Project
- The same New Project window shown above will open where you can specify the same preferred settings.
- Note that as of SCAL6, you can have more than one project open at a time.


### 2.01.2 Opening an Existing .SCUT File

- An existing .SCUTx file (where $x$ is blank, 2, 3, 4, 5, or 6 indicating which SCAL version created it) can be opened in SCAL6 using any of the following:
$\diamond$ Click on Open Project when you first open SCAL
$\diamond$ Click on the thumbnail, if it appears, when you first open SCAL.
$\diamond$ Click on the Open Project icon on the upper Toolbar
$\checkmark$ Press Ctrl+O
$\diamond$ Go to File>Open Project
$\diamond$ Go to File>Recent Projects, if the file is one of the last five you had open in SCAL
$\diamond$ Double-click a .SCUTx file in Windows Explorer or attached to an email
$\diamond$ Drag and drop a .SCUTx file onto the main screen of SCAL
$\diamond$ Import from the Library (refer to Section 2.03.3)
- In the first three options above, a window will open where you can browse to locate the file you wish to open:

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


### 2.02 Saving SCAL Files

- A file can be saved in .SCUT5 format using any of the following:
$\diamond$ Click on the Save Project icon on the upper Toolbar ssve
$\diamond$ Press Ctrl+S (for save) or Ctrl+Shift+S (for save as)
$\diamond$ Go to File>Save Project or File>Save Project As

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

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


### 2.03 Customizing the Library

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


### 2.03.1 Shapes Tab

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

- On the left side you will see the Library folder which contains the included 300 shapes. The number in parentheses, after each subfolder, indicates how many shapes are assigned to that subfolder. Basic Shapes, as an example, has 42 assigned to it.
- Because the Basic Shapes subfolder is currently selected, thumbnails for all shapes contained in that subfolder are shown in the larger area on the right side. To add one of these shapes to the Cutting Mat either:
$\diamond$ Click on the shape and it will be placed in a certain location on the Cutting Mat
$\diamond \quad$ 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 $: \square:!$ :

Click here to

| Name | Category | Artist | Type | Date |
| :---: | :---: | :---: | :---: | :---: |
| Arch | Shapes | Craft Edge | scal | 2016-08-29 |
| Arrow | Shapes | Craft Edge | scal | 2016-08-29 |
| Asterix | Shapes | Craft Edge | scal | 2016-08-29 |
| Circle | Shapes | Craft Edge | scal | 2016-08-29 |
|  | $\sim$ | ---ar」-- | ---- | ance an an |

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

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

$\diamond$ 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.

$\diamond$ This popup menu also has these options:
- Delete File (only active in the My Designs folder)
- Reveal File - opens the location on your computer where file is stored
- Instructions - some files from the Cutter's Market Store may include instructions for the user
- My Designs: This folder is for storing your own SVG files for easy access.
$\diamond$ Once you click on My Designs, the icons above the folder menu will become active:

$\diamond$ 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
$\checkmark$ After choosing to add a folder, the following window opens where you have two options:

$\diamond$ 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:


$\diamond$ Note that the Folder Name was changed to Force PNC Files before clicking on OK. The name will have a .Ink extension added indicating that it is linked to another folder on your computer.
$\diamond$ 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.
$\diamond$ 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
$\diamond$ 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
$\diamond$ 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 ${ }^{-\equiv}$ are part of the Cutter's Market Store functions. Refer to Section 2.05.


### 2.03.2 Fonts Tab

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

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

| Click here to only display fonts you've added to your Favorites list |  | All $\quad \checkmark$ | Click here to only display fonts already in use in current file |
| :---: | :---: | :---: | :---: |
|  |  | All |  |
|  | $\longrightarrow$ | Favorites |  |
|  |  | This Project A |  |
| Selecting any letter will move display list to the start of those fonts beginning with that letter |  | D |  |
|  |  | E |  |
|  |  | F |  |
|  |  | G |  |
|  |  | H |  |
|  |  | I |  |
|  |  | J |  |
|  | - |  |  |

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


### 2.03.3 Projects Tab

- The Projects tab is similar to the Shapes tab. Instead of .SVG files, however, it helps you organize and access your .SCUT files, also referred to as projects.
- As with the Shapes tab, there are no default categories or pre-added files. However, you will notice these other similar features:
$\diamond$ Favorites folder - select any project, right-click, and select Add to Favorites from the popup menu
$\diamond \quad$ My Projects folder - virtually identical to My Designs folder (more information follows)
$\diamond$ Search field and search icon $Q^{-}$for locating files with a particular word in the file name
$\diamond$ Project Downloads and Recent Downloads folders and top right icon ${ }^{\stackrel{\equiv}{\equiv}}$ : these pertain to Cutter's Market Store. Refer to Section 2.05.
$\diamond$ Scroll bar to change the size of the thumbnails.
$\diamond$ 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.
$\diamond$ Once you click on My Projects, the icons above the folder menu will become active:

$\diamond \quad$ 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:
$\diamond$ Click on the Add Folder icon
$\diamond$ Right-click on My Projects and select Add Folder from the popup menu
$\diamond$ After choosing to add a folder, the following window opens and you can name this folder:

$\diamond$ 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:

$\diamond$ 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.
$\diamond$ 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
$\diamond$ To rename a folder, right-click and select Rename Folder from the popup menu.


### 2.04 Layers Panel

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

### 2.04.1 Introduction to the Layers Panel

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


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

- You do not have to worry about adding shapes to the Layers Panel. They will automatically be assigned to new layers as you add them. You will want to learn how to move shapes to new layers or combine shapes into the same layer, depending on the circumstances. This is covered in Section 2.04.
- Here are a few examples of when shapes need to be on different layers:
$\checkmark$ 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).
$\diamond$ 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.
$\diamond$ 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:
$\diamond$ Ability to select, with one click of the mouse, all shapes assigned to a layer
$\checkmark$ Ability to hide or lock layers so that the shapes on that layer are not inadvertently selected, moved, resized, etc.
$\diamond$ Ability to change the color, line style, and tool choice on all of the shapes assigned to a particular layer.


### 2.04.2 Parts of the Layers Panel

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

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

- Layer Thumbnail: Each layer has a thumbnail showing the shapes assigned to that layer. Click on that thumbnail and all shapes on that layer will be selected. If you wish to add the shapes from another layer to the section, hold the Shift key and click on the other thumbnail.
- Layer Type: To the right of the Layer Thumbnail is the Layer Type, represented by one of four different icons:


## $\checkmark \quad$ Regular shape

(T) Text shape which is still able to be edited as text, such as changing the font


Layer folder of individual shapes: When the folder is opened, by clicking the gray triangle, the icon changes $\nabla$ and all layers or subfolders within are displayed.
$\checkmark$ 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 $\nabla$ 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:
$\diamond$ Hide/Show Layer: Click on the eye icon to hide that layer. The icon will be replaced with a dot as shown for the Red Hearts layer and the shapes on that layer will no longer be seen on the Cutting Mat and will not be included when printing or cutting the project. Clicking on the dot icon will restore the layer to the Cutting Mat:

Layer Hidden:


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

- Layer Color: Click on the current layer color icon and a Color window will open where a different color can be assigned. This color is then the outline color of a shape when you hover your mouse over that shape. It can also make layers easier to distinguish on the Layers Panel and doesn't change the Fill or Stroke color of the shapes themselves.
- Layers Menu: At the top of the Layers Panel is an icon for the Layers Menu
$\square$ This menu is also available by clicking on Layer on the Menu Bar at the top of the screen. The following functions are available in this menu:

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



### 2.04.3 Creating Folders and Moving Layers

- As mentioned in Section 2.04.1, each new shape added to the Cutting Mat will initially be assigned to a new layer. This can quickly clutter the Layers Panel. The ability to combine shapes into folders and subfolders helps organize a project and make things easier for printing and/or cutting.
- There are three ways to create a new folder:
$\checkmark$ Click on the Add layer folder icon $\stackrel{\square}{ }$ at the bottom of the Layers Panel
$\diamond$ Click on the Layers Menu icon ${ }^{*}$ ㅌ and select Add Layer Folder
$\diamond$ 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
$\checkmark$ 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.
$\diamond$ 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:

$\diamond$ Now the Asterisk layer is inside of the Yellow Shapes folder and can be seen in the thumbnail for that folder:

$\diamond$ 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:

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


Asterisk layer is moved; Yellow Shapes folder is gone

- Layers can also be moved out of an existing folder into other folders. In this example, the yellow centers of the flowers in the layers named Flower 1 and Flower 2, can be similarly dragged and dropped into the Yellow Shapes folder:
$\diamond$ Open the Flower 2 group folder and then make sure only the yellow layer is selected:

$\diamond$ 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:



Yellow layer is no longer in this group folder
$\diamond$ Repeat for the yellow shape inside the Flower1 folder.

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

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


### 2.05 Cutter's Market

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



### 2.06 Importing Other File Formats

### 2.06.1 Importing Vector Files

- The following vector formats can be imported into SCAL:
$\diamond$ SVG: common export format for vector programs, thus popular format used for sharing files on blogs and selling files in online design sites
$\diamond$ SCUT6: format used to save projects in SCAL6
$\diamond$ SCAL: format used by Cutter's Market Store
$\checkmark$ 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.
$\diamond \mathrm{Al}$ (Adobe Illustrator): common format due to the popularity of Adobe Illustrator
$\checkmark$ EPS: another common export format for many vector programs
$\diamond$ Nine embroidery file formats: .DST, .EXP, .HUS, .YEF, .PEC, .PES, .SEW, .VIP, .XXX
$\checkmark$ CREATE: format used by StarCraft CREATE software (must drag and drop)
$\diamond$ FCM: format used by the Brother ScanNCut machines
$\diamond$ GSD: format created by RoboMaster, RoboMaster Pro and Wishblade Advance. This format was used with the Craft Robos, Wishblade, and original Silhouette cutter.
- MTC: format created by Make The Cut for cutting to a wide range of hobby and semi-professional cutters. Refer to the special notes about MTC import later in this section.
$\diamond \quad$ PLT (SCAL PRO version only): developed by HP for their plotters, the PLT file evolved into a standard format used by early vinyl cutters
$\diamond$ DXF (SCAL PRO version only): common format exported by CAD programs
$\diamond$ 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:
$\diamond$ Click on the Import icon on the upper Toolbar


## 蝺

$\diamond$ Go to File>Import

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

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


Select a default DPI here for SVG imported files

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


### 2.06.2 Importing Raster Files

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


### 2.06.3 Importing Fonts

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


### 2.07 Exporting in Other File Formats

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

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


### 2.07.1 Exporting in SVG Format

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

- The Resolution setting affects the dimensions of the shapes upon importing into another program:
$\diamond$ 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.
$\checkmark$ If the project is designed with specific dimensions affecting the final result, such as an envelope for a card, include a separate Read Me text file noting the dimensions of the project in SCAL so that the imported SVG can be resized accordingly.
- The Selection Only setting was mentioned earlier as the option to mark when specific shapes have been selected for export versus exporting all of the shapes in the file.


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

- There are various reasons why you might want to export your file as a raster. For example:
$\checkmark$ The image is going to be posted on a web site or blog
$\diamond$ The image will be shared with a friend or a customer
$\diamond$ You wish to use the image in a digital scrapbooking program
$\diamond$ 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
$\diamond$ Show Registration Marks: option to print with the registration marks that will be used for a PNC application
$\diamond$ Selection only: when specific shapes have been selected for export versus exporting all of the shapes in the file
$\diamond$ Crop: increase or decrease the background border around the exported image
$\diamond$ Drop Shadow: add a shadow effect to the image
- The following screenshot shows an example of an export in a raster format:



### 2.07.3 Exporting in FCM Format

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



### 2.07.4 Exporting in PLT Format

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

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


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


### 2.07.5 Exporting to SCAL2

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


## 3. SCAL: Manipulating and Coloring Shapes

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

### 3.01 Basic Shapes

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


### 3.01.1 Rectangle

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


Freely dragging mouse


Holding Shift key

### 3.01.2 Rounded Rectangle

- After selecting the Rounded Rectangle shape $\square_{\Delta}$, 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:

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



### 3.01.3 Circle and Oval

- After selecting the Circle shape ${ }^{\circ}$, 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

### 3.01.4 Triangle

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


Freely dragging mouse


Holding Shift key

### 3.01.5 Polygon

- After selecting the Polygon shape , drag the left mouse button to form a polygon: $_{\text {. }}$,

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

$$
\text { Polygon corners: } 5
$$

$\diamond$ This setting can be used to change the number of sides on the polygon. For example:


### 3.01.6 Star

- After selecting the Star shape $\hat{\sim}_{\perp}$, drag the left mouse button to form a star:

- In the Tool Options, two settings will appear:
Star points: $5 \quad$ Inner Radius: $\quad 48$.
$\diamond$ The Star points setting can be used to change the number of points on the star. The Inner radius setting can be used to change the angle of the inner points:


5 Points Radius: 38\%


4 Points, Radius: 47\%


8 Points Radius: 10\%

### 3.01.7 Arrow

- After selecting the Arrow shape ${ }^{\boxed{ } 4}$, drag the left mouse button to form an arrow:

- In the Tool Options, five settings will appear:
$\diamond$ Fixed Head Width: when enabled, a sizing box appears where you can enter a specific width for the head to remain as you are dragging and sizing the arrow:

$\diamond$ Head Length: Increase or decrease by either a percentage change or by entering a new dimension:

$25 \%$


50\%

$75 \%$
$\diamond$ Tail Width: Increase or decrease by either a percentage change or by entering a new dimension:

### 3.01.8 Spiral

- After selecting the Spiral shape ${ }^{®^{\bullet}}$, drag the left mouse button to form a spiral:

- In the Tool Options, four settings will appear:
Turns: $3.00 \quad$ Divergence: $1.00 \quad$ Inner Radius: 0.000 in $\dagger$ clockwise
$\diamond$ Turns: Number of rotations around the center:


Turns: 3


Turns: 6


Turns: 20
$\diamond$ Divergence: Tightness of the spiral: larger = looser; smaller = tighter:


Divergence: 1


Divergence: 3


Divergence: 0.5
$\diamond$ Inner Radius: Starting point of the spiral

Inner Radius: 0

Inner Radius: 0.2

Inner Radius: 0.5
$\diamond$ Clockwise: Whether spiral rotates clockwise or counter-clockwise from center:


### 3.02 Selecting

- To select a shape, make sure the Selection Tool is indented on the Tools Panel ${ }^{\star}$. Then:
$\diamond$ Click anywhere on the shape (along an edge or inside a closed shape):

Click here, along an edge.
 Or click here, inside the shape.
$\diamond \quad$ 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:


Shape cannot yet be selected.


Cursor has changed. Shape can be selected.
$\diamond$ Another way to select: drag the mouse to enclose the entire shape (aka marquee-select).

$\diamond$ A third way: hold the Shift key and marquee-select just a portion of the shape.

$\diamond$ A fourth way: click on the layer which contains this shape:


### 3.02.1 Basic Selection Handles

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



### 3.02.2 Advanced Selection Handles

- While in the Selection Tool mode, the Tool Options bar indicates a setting called Handles. The dropdown 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:
$\diamond$ Select the first shape and hold down the Shift key while clicking on additional shapes.
$\checkmark$ 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.
$\checkmark$ If all of the shapes are on the same layer, click on the thumbnail for that layer or hold the Shift key while clicking on more than one layer. Refer to Section 2.04.
$\diamond \quad$ Use the Lasso Selection tool on the Tools Panel want to include in the selection:

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


### 3.02.3 Selecting by Color (and more)

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

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


### 3.03 Deleting

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


### 3.04 Moving

- To move a selected shape, hold down the left mouse button on the upper left corner icon or anywhere within the shape and drag to another location. Note that if you see this cursor $\stackrel{\text { 领 }}{ }$, 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 $\mathbf{X}$ : and $\mathbf{Y}$ : windows to move the shape to a new location:

- The Nudge icons, which are just below the $\mathbf{X}$ and $\mathbf{Y}$ 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:
$\diamond \quad$ Right-click on a selected shape and go to Transform>Move
$\diamond$ Go to Object>Transform>Move
- This Move windows provides two moving options:
$\diamond \quad$ Move the shape to a specific position on the Cutting Mat (called Absolute Position)
$\diamond$ Move the shape a certain distance from its current location (called Relative Position)

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



### 3.05 Resizing, Scaling, Auto fit

### 3.05.1 Resizing

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


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

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

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


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


Drag left or right sides to resize width only.


4 Drag top or bottom sides to resize height only.

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

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


Check this box to hold the aspect ratio constant.

### 3.05.2 Scaling

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

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

Apply Individually not checked:


$$
\nabla
$$

$\square$

Apply Individually checked:


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


### 3.05.3 Auto Fit

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

$\diamond$ The new size of the circle is $11.875^{\prime \prime} \times 11.875^{\prime \prime}$.
$\diamond$ If the circle is placed on a $15^{\prime \prime} \times 15^{\prime \prime}$ mat, then it resizes to $14.85^{\prime \prime} \times 14.875^{\prime \prime}$. However, if the circle is placed on letter size mat ( $8.5^{\prime \prime} \times 11^{\prime \prime}$ ), then it becomes an oval:

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



### 3.06 Rotating

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

$\checkmark$ Holding the Shift key, while rotating, will rotate the shape in $15^{\circ}$ increments. However, if you need to rotate in increments other than $15^{\circ}$, go to Edit>Preferences, click on the Edit tab, and change the Constrain Angle to the desired increment (from 1 to $180^{\circ}$ ). Click on OK to save the change:

$\diamond$ The Status Bar at the bottom of the screen will indicate the current degree of rotation:

$\diamond$ 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 $45^{\circ}$ clockwise or counter-clockwise, by clicking the Rotate icons on the Position \& Size Panel:

- To rotate a specific angle, open the Rotate window in either of two ways:
$\diamond$ Right-click on a selected shape and go to Transform>Rotate


## $\diamond$ Go to Object>Transform>Rotate

- Enter the desired angle:



### 3.07 Skewing and Distorting

### 3.07.1 Skewing

- Shapes can be skewed either horizontally or vertically:

Starting Shape

Horizontal Skew

Vertical Skew

Both horizontal and vertical skew
- There are two ways to skew a shape:
$\checkmark$ 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:

$\diamond$ 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
$\diamond$ Then switch from Angle to Skew and enter a skew angle:



### 3.07.2 Distorting

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

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

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



### 3.08 Mirroring and Flipping

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



### 3.09 Locking and Unlocking

- Locking a shape is normally done to prevent accidental selection and movement of that shape.
- To lock a selected shape, use any of the following options:
$\checkmark$ Right-click and select Lock from the menu
$\checkmark$ Go to Object>Lock
- Press Ctrl+Alt+L
$\diamond$ 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:
$\diamond$ Right-click and choose Select All, then right-click and choose Lock
$\diamond$ Click on the Layers Menu icon $\stackrel{ }{ }{ }^{\equiv}$ 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:
$\diamond$ Right-click on a selected unlocked shape and select Unlock All from the menu
$\diamond$ Go to Object>Unlock All
$\diamond$ Press Ctrl+Shift+Alt+L

- To toggle the lock/unlock status of all layers on the Layers Panel, click on the Layers Menu icon and select Lock/Unlock>Toggle All Layers


### 3.10 Hiding and Showing

- To hide a selected shape, use either of the following options:
$\diamond$ Right-click and select Hide from the menu
- Go to Object>Hide
$\diamond$ 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:
$\diamond$ Right-click and choose Select All, then right-click and choose Hide
$\diamond$ Click on the Layers Menu icon $\stackrel{\text { 码 }}{ }$ 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:
$\diamond$ Right-click on a selected unhidden shape and select Show All from the menu
$\diamond$ Go to Object>Show All
$\diamond$ Select any shape (including a hidden one) on the Layers Panel, right-click and select Show All from the menu.

- To toggle the hide/unhide status of all layers on the Layers Panel, click on the Layers Menu icon $\square$ and select Show/Hide>Toggle All Layers


### 3.11 Grouping and Ungrouping

### 3.11.1 Group

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


Before applying Group


After applying Group

### 3.11.2 Ungroup

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


Before applying Ungroup


After applying Ungroup

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

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

After applying Ungroup: clicking on any letter selects only that letter
$\diamond$ On the Layers Panel:


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


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


Opening folder shows the three letters as individual text shapes

### 3.12 Breaking and Merging

### 3.12.1 Break Apart

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


## $\left.\left.\oplus_{( }^{\oplus}\right)^{\oplus}\right)_{(\square)}^{\oplus} \square_{(3)}^{\ominus}$

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


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


The child shapes can now be individually selected
$\diamond$ On the Layers Panel:


Before applying Break Apart


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


### 3.12.2 Merge

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


## $\diamond$ Go to Object>Merge

$\diamond$ 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:

$\diamond$ 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:


Before applying Merge: Two shapes: a white star on top of a blue star


After applying Merge:
Single shape with a starshaped hole

### 3.13 Arranging (Ordering) Shapes

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


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

- In Section 2.04.3, moving layers was presented and could be used here to change the order of the shapes. However, another way to reorder these shapes is to select one and then access the Arrange functions using one of the following:
$\diamond$ Go to Object>Arrange
$\diamond$ Right-click and select Arrange from the popup menu

- Four options will then appear:
$\diamond$ Bring to Front (or Layer to Top): Move selection to the very top
$\diamond$ Bring Forward (or Raise Layer): Move selection up one level
$\checkmark$ Send Backward (or Lower Layer): Move selection down one level
$\diamond$ 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 Forward

Triangle moves above blue star but is still below red heart



- 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:

```
\diamond ~ B r i n g ~ t o ~ F r o n t ~ - ~ C t r l + S h i f t + U p ~
Bring Forward - Ctrl+Up
\ Send Backward - Ctrl+Shift+Down
\diamond Send to Back - Ctrl+Shift+Down
```


### 3.14 Fill \& Stroke: Fill

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

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

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


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



### 3.14.1 No Fill

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



### 3.14.2 Color Fill

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

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

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


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

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


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

### 3.14.3 Pattern Fill

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

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

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

$\diamond$ The selected shape now fills with the uploaded image:

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


### 3.14.4 Gradient Fill

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

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

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

$\diamond$ 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:

$\diamond$ 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.
$\diamond$ 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 $\triangleq$
$\diamond$ 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:

$\diamond$ The gradient can be rotated using the Gradient tool on the Tools Panel. After selecting the shape, click on the Gradient icon $\square$ and then drag the mouse from bottom to top or from top to bottom to rotate $90^{\circ}$. Start dragging along the bottom or top edge of the shape and end at the other side:

Select shape and Gradient tool

Drag mouse from bottom to top
or

$\diamond$ 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:

$\diamond$ To access your saved Gradient Presets, click on the Presets tab and the menu will appear:



### 3.14.5 Opacity

- Just below the Fill setting is Opacity:

- Decreasing the Opacity setting will make a shape more transparent. This can be used for changing the appearance for printing or for revealing shapes that are completely or just partially hidden by other shapes.
$\diamond$ In the following example, the Opacity is decreased on the blue circle, allowing the blocked portion of the red square to be seen:

$\diamond$ Lowering the Opacity can be applied to shapes filled with Patterns and Gradients, as well:

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



### 3.15 Fill \& Stroke: Stroke

### 3.15.1 Stroke Settings

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

- Stroke: All shapes have a Stroke assignment using one of the following choices:
$\checkmark$ 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:


Fill: Color Stroke: None


Fill: None Stroke: None Shape is selected


Fill: None Stroke: None Hovering mouse over it
$\diamond$ Color: As with Fill Color, you have several options for selecting the color of the Stroke:

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

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

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

$\diamond$ 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\%
$\diamond$ 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:
$\diamond$ Miter $\Gamma^{\Gamma}$ : Corners are sharp but will become beveled at low values of Miter
$\diamond$ Round $\sqrt{\text { FI }}$ : Corners are rounded off.
$\diamond$ Bevel : Corners are clipped at a $45^{\circ}$ 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:
$\diamond$ Butt : The end is squared off, aligned with the actual end of the path
$\checkmark$ Round : The end is rounded.
$\diamond$ Square : The end is squared off and extends beyond the actual end based on the Stroke Width.


End Cap: Butt


End Cap: Round


End Cap: Square

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

End Cap: Butt - cap ends at the line end
End Cap: Square - cap extends beyond end

### 3.15.2 Stroke Line Style

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

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


### 3.15.3 Converting Strokes into Closed Shapes

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

- If you want to retain the original shape, make a backup copy of it before applying the Stroke to Path function to the original.


### 3.16 Dropper and Replace Color

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



### 3.16.1 Using the Dropper Tool

- Shapes can also have the Fill, Stroke or both changed based on the settings for another shape. This is accomplished using the Dropper tool on the Tools Panel.
- To use this function:
$\diamond$ Select the shape to be recolored. In this example, it will be a yellow triangle with no Stroke:

$\diamond$ Click on the Dropper tool icon and choose a setting from the Tool Options:
Sample: Fill and Stoke $\checkmark \longleftarrow$ Select Fill, Stroke, or Fill and Stroke
$\diamond$ Finally, click on the shape that has the color property you wish to use. In this case, it's the red circle with the black Stroke. The selected triangle is recolored to match.


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


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

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


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


All three shapes are filled at once

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


All three shapes recolored at once


Shapes recolored individually

### 3.16.2 Using the Replace Color Tool

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

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

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


### 3.17 Cutting, Copying, Pasting, Duplicating

### 3.17.1 Cutting to the Clipboard

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


### 3.17.2 Copying to the Clipboard

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


### 3.17.3 Pasting from the Clipboard

- There are three Paste functions in SCAL:
$\diamond$ Paste: pastes the shape offset slightly ( $0.25^{\prime \prime}$ ) from the original
$\checkmark$ Paste in Place: pastes the shape in exactly the same location as the original
$\diamond$ Paste (Auto Fill): pastes enough copies to auto-fill the Cutting Mat
- To Paste shapes from the clipboard, use any of the following:
$\diamond$ Click on the icon located on the upper Toolbar

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


### 3.17.4 Duplicating - Duplicate

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

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


### 3.17.5 Quick Duplicate

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


### 3.18 Alignment

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

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

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


Align Left To Page


Align Top To Selection


Align Horizontal Center To Selection


Align Vertical Center To Page


Align Right To Page


Align Bottom To Selection

- To center all three shapes, use either:
$\diamond$ A combination of Align Horizontal Center and Align Vertical Center:


## $\diamond$ Go to Object>Alignment>Align Centers



Align Centers

- More examples are presented in Sections 3.18.1, 3.18.2 and 3.18.3 of the following Expanded Tutorial: https://tinyurl.com/3ebkma82


### 3.19 Distribute

- The Distribute function rearranges the spacing between shapes. Similar to the Alignment function, you can Distribute to Page (Cutting Mat) or you can Distribute to Selection (selected shapes). There's also a third, called Distribute to Selection Below, which distributes based on whatever shape is positioned at the lowest level on the Layers Panel.
- After selecting the shapes, these functions can be accessed by going to Object>Distribute. Because Distribute to Selection is the most common used, examples of it are shown using these as examples:


Will be used for vertical distribute examples

- Further, only the most commonly-used options will be shown. For a complete coverage of all examples, refer to Sections 3.19.1, 3.19.2 and 3.19.3 in the Expanded Tutorial: https://tinyurl.com/3ebkma82
$\diamond$ Distribute Center Horizontally: spaces shapes so that the centers of each shape are the same distance apart:

$\diamond$ Distribute Space Horizontally: spaces shapes so that the gaps between the shapes are the same.

$\diamond$ Distribute Center Vertically: spaces shapes so that the centers of each shape are the same distance apart:

$\diamond$ Distribute Space Vertically: spaces shapes so that the gaps between the shapes are the same.



## 4. SCAL: Working with Text

### 4.01 Text Options

- There are four modes for adding text to the Cutting Mat:
$\diamond$ Type Tool: normal left to right typing of text
$\diamond$ Vertical Type Tool: vertical aligned lettering
$\diamond$ Type on Path Tool: text is aligned along the path of your choosing
$\diamond$ Type on arch: text is arranged in a circular pattern
- To select a mode, hold down the mouse button on the Type Tool icon $\frac{T_{4}}{}$ on the Tools Panel. The screenshot below indicates where to go for further instructions on using that text mode:



### 4.02 Selecting a Font

### 4.02.1 Choosing a Font from the Font Menu

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


### 4.02.2 Choosing a Font via Font Preview

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

- You can expand this window and decrease the size of the fonts by scrolling the size bar to view mores 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:
$\diamond$ Expand the window and highlight those you want to further compare:

$\diamond$ After scrolling through fonts and highlighting only those of further interest, click on Display selected only:

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

$\diamond$ Once you are down to a single sample, you can then click on Change Font:

$\diamond$ The text will now be changed to the new font:



### 4.02.3 Temporarily Installing a Font

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

$\diamond$ 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 dropdown menu
$\checkmark$ If you have no plans to edit the text, then you can avoid the message by converting text before saving the file. To do this, select the text and apply one of the following:
- Go to Text>Convert Text to Outlines
- Go to Path>Object to Path
- Right-click and select Path>Object to Path


### 4.03 Adding Text Options

- There are three ways to add text to the Cutting Mat:
- Click on the Type Tool icon $\mathrm{T}_{4}$ on the Tools Panel, click anywhere on the Cutting Mat, and begin typing. This is the easiest method when adding ordinary text.
$\diamond$ 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 $\mathrm{T}_{4}$ on the Tools Panel
$\checkmark$ Click on the Fonts tab in the Library and click on characters shown in the character map. This is the easiest method when using dingbat fonts:



### 4.04 Four Modes of Text

### 4.04.1 Type Tool



- 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:
$\checkmark$ Pressing the Enter key will move the cursor to a new line and you can continue typing
$\diamond$ Clicking elsewhere on the Cutting Mat will allow you to begin adding new text at that location
$\diamond$ When done, either press the Esc key or click on the Select icon ${ }^{\star}$ on the Tools Panel


### 4.04.2 Vertical Type Tool



- Hold down the mouse button on the Type Tool icon $\mathrm{T}_{4}$ on the Tools Panel and select the second choice: Vertical Type Tool.
- Click anywhere on the Cutting Mat and begin typing. Note that:
$\diamond$ Clicking elsewhere on the Cutting Mat will allow you to begin adding new text at that location
$\diamond$ When done, either press the Esc key or click on the Select icon ${ }^{\star}$ on the Tools Panel


### 4.04.3 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:
$\diamond$ Add the shape to the Cutting Mat. IMPORTANT: If you want to retain the original shape so that it can be printed or cut, make a duplicate of the shape first and hide the copy.
$\diamond$ Hold down the mouse button on the Type Tool icon ${ }^{T_{4}}$ on the Tools Panel and select the third choice: Type on Path Tool.
$\diamond$ 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:


$\diamond \quad$ When done, either press the Esc key or click on the Select icon $\star$ 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:
$\diamond$ First apply Path>Reverse Path to the shape. Then type the text:

$\diamond$ 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:

$\diamond$ After applying Text>Convert Text to Outlines:

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


### 4.04.4 Type on Arch Tool



- With this function, text is typed as if it were following an imaginary circle.
- Hold down the mouse button on the Type Tool icon $\mathrm{T}_{4}$ 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 ${ }^{\star}$ on the Tools Panel.


### 4.05 Text Settings

- The Text Panel offers an array of settings related to the creation and editing of text. To open, click on the Text icon ${ }^{\hat{A} A}$ on the Properties Panel:

- To apply a change to any of these settings:
$\diamond$ Type some text using the instructions in Section 4.04. Then click on the Selection Tool icon ${ }^{*}$ at the top of the Tools Panel.
$\checkmark$ With the text selected, you can now change any of these various settings and the changes will immediately be applied to that selected text.
$\diamond$ If you only want to apply a change to a portion of the text, click on the Text Tool icon ${ }^{T_{4}}$ on the Tools Panel and drag your mouse to highlight whatever part you want to change.
- The following is a list of the settings and how to apply them:
$\diamond$ View: Controls which fonts show in the menu under Font:
- All: Displays all installed fonts plus any that have been temporarily installed during this session of SCAL
- Favorites: Displays all fonts you have assigned as a Favorite
- This Project: Displays all fonts currently used since starting this particular project during this session
$\diamond$ Font: Menu of installed fonts which can be used for new or existing text. Note that you can also add to your Favorites list by selecting a font and then clicking on the ${ }^{\infty}$ icon to the right.
$\diamond$ Bold and Italic
B $\boldsymbol{I}$
- IMPORTANT: Some fonts will change significantly if the Bold option is selected. The same is true of the Italic option. Make sure these icons are not indented/blue unless you are confident you want to use either or both of them.
- With either option highlighted, the text may not immediately reflect that option. If not, highlight the text and then try applying again.
- Instead of using Bold, you can use Effects>Shadow Layer (refer to Section 7.05) or Path>Offset Path (Section 6.05).
- Instead of using Italic, you can use the Skew function (refer to Section 3.07).
$\checkmark$ Reload C is only needed if you have separately installed new fonts on your computer since opening the current SCAL session.
- Load a Font File is used to open a .TTF, .OTF, or .OPF font that is not already installed on your computer. Refer to Section 4.02.3.
$\diamond$ Alignment: 高 氞 Standard text justify options: Left Align, Center Align, and Right Align and Justified.
$\diamond$ Sizing: The setting determines the height of the letters in the selected text based on these options:
- Standard: A character's height is based on how the font was designed


## Skycut

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

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


## SkyCut

- This example doesn't illustrate a typical application for the Sizing setting. Refer to the following Expanded Tutorial for examples of its usefulness: https://tinyurl.com/4wbku3vy
$\diamond$ 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 " $y$ ".
$\diamond$ 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.
$\diamond$ Tracking: This is the spacing between letters. Increasing will spread letters apart while decreasing will force them closer together and can result in overlapping:


Tracking: 100\%


Tracking: 120\%


Tracking: 80\%

Leading: Changes the spacing between lines of text:

# Cutting with my Skycut 

Leading: 0 inches

## Cutting with

my Skycut
Leading: 0.3 inches
$\diamond$ V Offset: Raises or lowers a line of text or, more commonly, can be used to raise and lower individually words or selected letters:

## Cutting with my Skycut

$\diamond$ Rotate: Rotates a line of text or can be applied to individual letters:

## Cutting with my Skycut

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

- X Axis Skew set to 30:



## Cutting with my Skycut

- Y Axis Skew set to 30:



## Cutting with my skyout

### 4.06 Other Text Editing

### 4.06.1 Split Text

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


## George is sech a cute dog

Split All - any individual letter can now be selected

George is
${ }^{\text {e suche }}$ $\stackrel{\oplus}{c}$ cute dog

Split by Spaces - any individual word can now be selected

George is


Split by Lines - any individual line can now be selected

### 4.06.2 Break Apart

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


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


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


The child shapes can now be individually selected

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


### 4.06.3 Node Editing Text

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

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

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



### 4.07 Welding Text

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

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


Drag your mouse
to highlight letters
Change Tracking \% Sizing: Standard

- Decreasing the Tracking \% will increase the overlap.
$\diamond$ Apply Object>Ungroup to the text and manually move the letters by:
- Using the arrows keys on your keyboard
- Tapping the Nudge keys on the Position \& Size Panel
- Dragging letters using the middle arrow:


3. Drag middle left handle

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

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

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


### 4.08 Stencil Bridge

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


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

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

- 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 $\sim 1$ inch. The Stencil bridge size is set at 0.10 , but it could be smaller or larger depending on your personal preference. Before applying, you can drag the mouse in an empty area of the screen to see the size that will be used and adjust accordingly:

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

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

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

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


### 4.09 Open Path Fonts (OPF)

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


TTF version


OPF version of the same font

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

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


### 4.10 Knockout

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

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

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



Knockout with 0 Gap


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

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


Top image extends beyond the edges of the lettering


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

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


### 4.11 Title Crawl

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

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

$\diamond$ Angle: As the Angle setting is increased, the top of the title will rotate towards you. Decreasing the Angle setting will rotate away:


## SKYCUI

Angle: -45
Height: 3.0


Angle: -25
Height: 3.0


Angle: 25 Height: 3.0
$\diamond$ 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:

## NTVTN N

Angle: -45
Height: 3.0

## SKYCUT

Angle: -45
Height: 5.0


Angle: -45
Height: 1.0

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



### 4.12 Monogram




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

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

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


### 4.13 Using Object on Path with Text

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

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

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

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



Text is now aligned the other way along the path

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

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


### 4.14 Other Text Effects

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

| 3D Extrude | $\cdots \times{ }^{\circ}$ |
| :---: | :---: |
| 3D Rotate | RNM RNE RJT RJN |
| Barrel Distortion | LUCY LUCYCUCY |
| Bridge Warp |  |
| Bulge | FINN F\|NN F(N) |
| Canned | *DOggien * Doggie** |
| Cast Shadow | R |
| Data Source Copies | Bob Jay Max |


| Drop Shadow | A- |
| :---: | :---: |
| Lattice |  |
| Rays | Mible Nila |
| Rhinestones |  |
| Rhinestone Scatter | Mhlum : \% g o |
| Shadow Layer (Contour Cut) |  |
| Wave | Twinkle Twinkle Little Star |
| Wrapper (for tumblers or cupcakes) | Fikkis |

## 5. SCAL: Tracing and Drawing

### 5.01 Raster versus Vector

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


Vector

- 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:


Raster


Vector

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

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

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

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


### 5.02 Finding Easy Images to Trace

- 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:
$\diamond$ Black and white images are easier to vectorize than colored images
$\diamond$ Colored images with flat colors are easier to trace than those with variegated colors
$\diamond$ Large, high-resolution images are easier to trace than tiny, low-resolution images
$\diamond$ Images with tiny details will be more difficult to trace than simpler images with fewer details
$\diamond$ 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:

Click on Clip art to find better images for tracing


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

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


### 5.03 Trace Function

> Images used in this tutorial can be downloaded here.

### 5.03.1 Trace Settings

- There are a number of ways of "importing" a raster image into SCAL. Please refer to Section 2.06.2.
- To begin the tracing process, open the Trace Image window using one of the following ways:
$\diamond$ Click on the Trace icon on the Toolbar trese
$\checkmark$ Go to File>Trace Image
$\diamond$ 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:


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

- Input

$\diamond$ Click on Choose an image and browse to locate the raster file (BMP, GIF, JPG, or PNG). Upon opening, a thumbnail appears, along with the name of the file and the size in pixels.
$\checkmark$ 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.


Option to add a High Pass Filter setting
$\diamond$ 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.

$\diamond$ 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.
$\diamond$ Contrast controls the level of color differentiation included in the trace: lower will include less, higher will include more.
$\diamond$ Resample: choose $\mathbf{x} \mathbf{2 . 0}$, $\mathbf{x} 3.0$, or $\mathbf{x} 4.0$ to increase the pixels in the image which typically provides a more precise tracing of the image. More nodes result but increasing the setting can be especially important in some PNC (print and cut) applications where the cut line needs to precisely follow the printed image.
$\diamond$ Despeckle: mark this option to eliminate the tracing of tiny shapes that are not needed for cutting.
$\diamond$ High Pass Filter: used to improve the tracing of photographs and other challenging images by sharpening the image in order to better detect edges


## - Output Settings


$\diamond$ 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.
$\diamond$ Detail: If tiny undesired shapes appear, decrease to filter those shapes out.
$\diamond$ Single Line Threshold: When tracing coloring book images (image with black outlines), use to convert those double lines to single lines.
$\diamond$ 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.
$\checkmark$ Blackout: Check this box so that internal shapes (child shapes) are not included in the tracing.
$\diamond$ 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."
$\checkmark$ Offset: Option to convert the cut line to an outer contour (or mark Inset for inner cut line), then adjust Size and Miter, as required.

- Output

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

$\diamond$ Edit Mode: Draw Mask This option allows you to add or subtract parts of the image you want to include or exclude from the trace.


## - Bottom of the Screen Settings

## Restore Settings <br> Save as SVG...

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

## - Tips on Tracing

$\diamond$ PNG files with a transparent background (aka alpha channel) do not require tracing if you use drag and drop, File>Import, or the Import icon on the Tool Bar to bring the image into SCAL6.

- If you do want to retrace the PNG file, open the grouped folder on the Layer Panel and highlight the layer called Print. Then go to the Trace Image window.


Select only the
Print layer
$\diamond$ Take advantage of the Show Source Image slider which displays the trace line only when slid to the far-left side and the original image when slid to the far-right side:


Show Image - middle
Blend of trace lines and original


Show Image - left side Trace lines only


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

### 5.04 Draw Functions

### 5.04.1 The Draw Tool

- The Draw Tool is accessed by clicking on the $5^{\text {th }}$ icon 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:

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


Left click to start and left click at a $2^{\text {nd }}$ location


Move to a $5^{\text {th }}$ location and left click again. left click again.


Move to a $4^{\text {th }}$ location and left click again.
Move to a $3^{\text {rd }}$ location and


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 $45^{\circ}$ angle, hold the Shift key while clicking:

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


Left click to start and then left click at a $2^{\text {nd }}$ location


Move to a $3^{\text {rd }}$ location and left click again


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


Left click and the shape will close and fill with color

## Drawing Bézier Curves

- Drawing curves is a bit more difficult. The key is to take it one step at a time, practice the technique a lot, and remember that you can later correct your curves using the Shape Tool (refer to Section 6.11).
- To draw a curve, use your mouse to left-click once where you want to begin the curve. Then, instead of leftclicking, 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:
$\diamond$ 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:

$\diamond$ 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

- To learn how to use the Draw Tool for manual tracing, refer to the following Expanded Tutorial: https://tinyurl.com/yb8vu5mu


### 5.04.2 Freehand Drawing

- The Freehand tool is accessed by clicking on the $6^{\text {th }}$ 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:
Freehand smoothing: $100 \quad \star$
- The two extremes for the Freehand smoothing setting clearly demonstrate the difference:

smoothing: 0

smoothing: 100
- When drawing closed shapes, the shape will remain an open path regardless of how precise you attempt to be in returning to the start. To close the shape, select it and go to Path>Close Path:


Freehand tree


After applying Path>Close Path and selecting a Fill color

### 5.04.3 Brush Drawing

- The Brush tool is accessed by clicking on the $7^{\text {th }}$ icon 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:

```
Size: 0.100 in 
```

- Select the Size you desire and freehand draw:

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

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


Overlaps automatically removed

## 6. SCAL: Editing

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

### 6.01 Simplify

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

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

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

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



### 6.02 Split Path

- The Split Path function allows you to break the connection between two paths.
- Select a node using the Shape Tool ${ }^{{ }^{\circ}-\bar{\lambda}}$ on the Tools Panel. Note that it's usually easier to select a node by zooming in on the shape and, as you move your cursor towards the node, the cursor icon will change when you are close enough to click on it. Then you can access Split Path using either of the following:


## $\diamond$ Right-click and select Path>Split Path

$\diamond$ Go to Path>Split Path

- You can also select two nodes at one time and apply Split Path. The following door shape will be used as an example to show the steps. The goal is to change the left side of the door from a solid cut line to a dashed cutline:

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

$\diamond$ Select the shape and click on the Shape Tool icon
on the Tools Panel. The nodes will appear on the shape:

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

$\diamond$ 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:

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


Left side will cut dashed


Left side will be scored separately


Left side won't cut at all

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

### 6.03 Close Path

- 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:


## $\diamond$ Go to Path>Close Path

$\diamond$ Right-click and select Path>Close Path

- The path will then fill with whatever Fill property is currently assigned to that shape.


### 6.04 Join Paths

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

Move one line to just touch the other

- 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:


Four individual lines


Select all 4 and apply Path>Join Paths

### 6.05 Offset Path

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

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

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

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


Regular


Rounded


Bevel

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

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

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

$\diamond$ Select the Cut layer only on the Layers Panel:

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



### 6.06 Eraser

- The Eraser is the $8^{\text {th }}$ 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: Circle $\hat{v}$ Size: 0.100 in $\hat{v} \checkmark$ Keep closed paths Inverse
$\checkmark$ Eraser Shape: Choose either Circle or Square:

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


Keep closed paths checked


Keep closed paths unchecked


Keep closed paths
checked


Keep closed paths unchecked
$\diamond$ Inverse: when this option is marked, the Eraser will "add to" shapes. This can be used to fill in holes connect broken paths, serve as a brush tool, etc.:


Initial trace left this part of the leaf incomplete
 complete the path to better match the other leaf

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


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


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


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

### 6.07 Knife and Crop

- The Knife tool can be accessed by clicking this icon 4 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.



### 6.07.1 Using Knife

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

- There are four ways to control the angle of the cut:
$\diamond$ 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)
$\diamond$ 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
$\diamond$ 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
$\diamond$ Hold the Shift key and click and hold the left mouse button and drag diagonally: the red cut line will be at exactly $45^{\circ}$
- If you wish to close the cut shapes, select them and either:
$\diamond$ Go to Path>Close Path
$\diamond$ Right-click and select Path>Close Path



### 6.07.2 Using Crop

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


The top part of this shape will be cropped


Marquee-select the area to be retained


After pressing the Enter key

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

IMPORTANT: If left unchecked, only the marqueeselected 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:

$\diamond$ With the Crop Selection Only box not checked, the other shapes are deleted as well as the lower half of the pink doily:

$\diamond \quad$ With the Crop Selection Only box checked, the shape is selected first and then only the bottom half is deleted:



### 6.08 Stencil Bridge

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

$\diamond$ If you wish to separate the shapes, apply Object>Break Apart, as shown.
- If you need the cut to be perfectly horizontal, vertical or at a $45^{\circ}$ angle, hold the Shift key as you drag the mouse:

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



### 6.09 Which Cutting Tool to Use?

- Having so many cutting functions to use can make it difficult to know which one to use in a particular instance. Experience will be your best guide, as well as testing them out. But a summary of the functions is presented in this section and this may prove to be helpful when selecting which tool to try first.
- The following table summarizes the capabilities of the various options for cutting shapes. Note that Path Operations (aka Boolean Joins) has also been added but isn't covered until Section 7.04 because they are more often used for designing than for editing.

|  | Can make <br> straight line <br> cuts | Can force <br> horizontal, <br> vertical cuts | Can force <br> diagonal <br> cuts | Can do <br> freehand <br> cuts | Can change <br> thickness of <br> the cut | Can cut using <br> square or <br> circle shapes | Can cut <br> using any <br> shape | Can cut with <br> open shapes <br> remaining | Can cut with <br> closed shapes <br> remaining |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Eraser <br> Section 6.06 |  |  |  | $\checkmark$ | $\checkmark$ | $\checkmark$ |  | $\checkmark$ |  |
| Knife <br> Section 6.07.1 | $\checkmark$ | $\checkmark$ | $\checkmark$ |  |  |  |  |  |  |
| Crop <br> Section 6.07.2 | $\checkmark$ | $\checkmark$ |  |  | $\checkmark$ |  | $\checkmark$ |  |  |
| Split <br> Section 6.02 |  |  |  |  |  |  |  |  |  |
| Stencil Bridge <br> Section 6.08 | $\checkmark$ | $\checkmark$ | $\checkmark$ |  | $\checkmark$ |  |  |  |  |
| Path <br> Operations <br> Section 7.04 | $\checkmark$ | $\checkmark$ | $\checkmark$ |  |  |  |  |  |  |

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

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


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


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

Separate a shape using a straight-line cut
Stencil Bridge:


Path Operation:


Cut a shape with any other shape or shapes

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


### 6.10 Ruler

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

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

$\checkmark \quad \mathbf{X} / \mathbf{Y}$ : This is the starting position on the screen and will match the $\mathrm{X} / \mathrm{Y}$ grid location on the Cutting Mat. You can extend beyond the boundaries of the mat, if needed.
$\diamond$ 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 $\mathbf{H}$ should be zero since it's a vertical measurement only. In fact, making sure $\mathbf{H}$ is 0 is one way to make sure the $\mathbf{W}$ is the correct measurement needed:

$\diamond$ Distance: This is the actual measurement between the starting location and the ending location. In the prior measurement, $\mathbf{W}$ is the same as Distance because the measurement was a horizontal one. But measuring the length of " $b$ " is not:


The measurement for $\mathbf{b}$ is 2.10 "
$\diamond \quad$ 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, " $\mathbf{c}$ " is an acute angle so -128.24 doesn't represent the actual angle shown in the screenshot. To get the true value, you subtract -128.24 from 180 (degrees in a straight line) to get 51.76 degrees.
- However, the other way to get "c" without having to do a calculation is to drag from the other direction:



### 6.11 The Shape Tool - Path and Node Editing

- Path editing involves moving paths as well as reshaping them. This topic was first introduced in Section 5.04 where you were shown how to draw with the Draw Tool and then curve a straight-line path. If you haven't read Section 5.04, please do so before proceeding with the rest of this section.
- To use the Shape Tool, click on the third icon on the Tools Panel and then click on a shape. You should see the nodes which currently define that shape. If you do not see any nodes, then most likely you have clicked on a group of shapes. Go to Object>Ungroup and then try again.
- Path editing involves dragging path or dragging Bezier control points to Cutter's Market them. Node editing involves moving nodes and changing the type of node to then form desired curves.
- The most likely mistake you'll make while learning path and node editing is failing to zoom in close enough so that you can click precisely on paths and nodes. Keep that in mind while experimenting.


### 6.11.1 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:



$\diamond$ 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:

$\diamond$ 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:

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

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

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


### 6.11.2 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.
$\diamond$ squares, triangles, stars, etc. Once selected, the shape will appear as below and either path can be moved as was demonstrated in the prior Section 6.11.1.



Right side dragged


Right side dragged


Left side dragged

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

Top node only selected

Left side nodes selected

All three nodes selected

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

- 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:

$\diamond$ 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:

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


## 7. SCAL: Designing

- SCAL offers some excellent easy-to-use designing tools to assist you in creating whatever you can imagine. The best way to learn these tools is to focus on only one at a time and play with settings. You aren't going to break anything in the software by experimenting and you never know what you might discover!
- While many of the Effects and Path menu functions are included in this chapter, I felt that some were more aptly presented elsewhere. Use $\mathbf{C t r l}+\mathbf{F}$ (Command+F) to locate any that you cannot find.


### 7.01 Project Info

- Before getting started on the fun and amazing design capability of SCAL, it's worth noting a feature that allows you to add your name and some other details to your file. This can save you time later when you're not remembering some of the original details and also help others with whom you share your files. Using this feature is, of course, entirely optional.
- To open the Project Info window, go to Window>Project Info. The following example shows some of the optional information you can add in this window that will be saved with your actual project:

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

Colors Tab


Fonts Tab



- Note: When changing tabs, such as from Colors to Fonts, always take note of the Page number. It will not automatically update to the page you were just checking. Thus, if you are on Page 2 when on the Colors tab, you may discover you're on Page 1 on the Fonts tab. Simply change to the page you need from the drop-down menu.


### 7.02 Guidelines

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

- The following window opens:



## Select Vertical or Horizontal

$\times$


Options to Remove or Modify selected guideline or Add a new guideline based on settings

Options to remove all guidelines

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

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


### 7.03 Templates

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


### 7.03.1 Mat Template Window

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

- The following Mat Template window opens:

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


The Apparel and Home \&
Kitchen folders each contain 14 templates
$\diamond$ A scrollbar beneath the thumbnails window can be used to resize the thumbnails:

Scroll to increase the size of the thumbnails

$\diamond$ Hovering over a thumbnail will cause it to become larger and will display the name of the template:

Name of selected mat template


Larger thumbnail appears when mouse cursor is over image
$\diamond$ Templates can be displayed either with a thumbnail image or a list view:

$\diamond$ You can assign templates to a Favorites folder for quicker access. To do that, right click on a thumbnail image and select Add to Favorites. That popup menu also has two other options:

- Delete File: This option isn't used except when you import your own template files
$\circ$
Reveal File: Opens the location on your computer where the template file is located
$\diamond$ You can create your own subfolders and import templates. Details are covered in Section 7.03.3.


### 7.03.2 Template File Settings

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

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


### 7.03.3 Importing Your Own Templates

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

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

```
Add Folder...
Rename Folder...
Delete Folder
Add File...
```

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

- IMPORTANT! As mentioned before, when an SVG file is imported, its file format changes to SCALMAT. This is important to note because this is where a significant difference lies between the Mat Template window and the Library. Referring back to Section 2.03.1, it was noted that you can import an entire folder at one time into My Designs in the Library. While it appears that the same functionality is available when
creating a new folder in My Mats, you cannot import an entire folder of SVG files that same way. Instead, the folder you wish to import (create a shortcut to) must contain .SCALMAT files.


### 7.04 Path Operations

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


### 7.04.1 Union

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

- To apply this operation, select two or more shapes and use one of the following:
- Go to Path>Union
- Press Alt+U
$\diamond$ Right-click and select Path>Union
- Section 4.07 shows an example of the Union operation applied to text. Here's an example using basic shapes and the Union function to create a balloon:


Start with a circle, a triangle and heart


Overlap the shapes


Apply Union


Apply a Fill

- In this next example, a scalloped border will be designed:
$\diamond$ Start with two circles that will be used to create an eyelet circle:

$\diamond$ Select this new shape and use Object>Duplicate to open the Duplicate window:

$\diamond$ Add a long rectangle and align with the pattern of circles. Apply the Union function:



### 7.04.2 Intersection

- The Intersection operation is the opposite of the Union operation. Instead of removing overlap, the overlap is what remains. The color of the new shape will be that of the bottom shape:

- To apply this operation, select two vector shapes and use one of the following:
$\diamond$ Go to Path>Intersection
$\diamond$ Right-click and select Path>Intersection
- One example involves filling a shape with a pattern:
$\diamond$ 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:

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

$\diamond$ Select the pattern and flower and apply Path>Intersection:

$\diamond$ Recolor the spare flower white with a red Stroke. Then center the pattern with the spare flower. Perfect for a print and cut!



### 7.04.3 Exclude

- The Exclude operation subtracts the intersection of two shapes from both of the shapes. The color of the new shapes will be that of the upper shape.


With a Fill color: before and after Exclude


With no Fill: before and after Exclude


After applying Break Apart and moving shapes apart

- To apply this operation, select two vector shapes and use one of the following:
- Go to Path>Exclude
$\diamond$ 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:
$\diamond$ Start with a rounded rectangle as the card base (refer to Section 3.01.2):
$\diamond$ Add the pattern from Section 7.04.2, without the spare flower shape. Arrange the pattern so that it will cut from the front of the card:

$\diamond$ Select the card and pattern and apply Path>Exclude:



### 7.04.4 Front Minus Back

- The Front Minus Back operation subtracts the intersection of two shapes from the front (or upper) shape, leaving only that front shape:


With a Fill color: before and after Front Minus Back


With no Fill: before and after Front Minus Back

- To apply this operation, select two vector shapes and use one of the following:

```
Go to Path>Front Minus Back
\(\diamond\) Right-click and select Front Minus Back
```

- As an example, add the word HELLO to the card designed in Section 7.04.3.
$\diamond$ Select a font and type out the letters. Add a rectangle (with no Fill color) so that the tops and the bottoms of the letters will just overlap the rectangle:


## HEGGO

$\diamond$ Select the rectangle and the lettering and apply Path>Front Minus Back:

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


### 7.04.5 Back Minus Front

- The Back Minus Front operation is the opposite of Front Minus Back. It subtracts the intersection of two shapes from the back (or bottom) shape, leaving only that back shape:


With a Fill color: before and after Back Minus Front


With no Fill: before and after Back Minus Front

- To apply this operation, select two vector shapes and use one of the following

```
Go to Path>Back Minus Front
Right-click and select Back Minus Front
```

- Any examples for Back Minus Front are essentially the same as for Front Minus Back. When choosing which to use, check the Layers Panel and think about which one you need to remain. Alternatively, just try one and, if it's the wrong choice, use Undo to back up one step and then pick the other function. ©


### 7.04.6 Divide

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

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


### 7.04.7 Divide Below

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


Before and after Divide Below is applied


After moving the shapes apart

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


### 7.04.8 Round Corners

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


Before Round Corners is applied


After Round Corners is applied

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

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

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


With Shape Tool enabled, drag mouse to select one or more nodes


Go to Path>Round Corners and select style and Radius


Click OK and selected corners are rounded

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



### 7.04.9 Flatten

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



3 shapes- before and after Flatten

- To apply this operation, select two or more vector shapes and go to Path>Flatten.
- One use for the Flatten function is to remove overlap when designing for HTV applications in which you typically do not want to layer one HTV color on top of another. For example, the white fur band and pompom on this Santa hat overlap the red hat itself which can be seen when both colors are made transparent:

$\diamond$ Applying Path>Flatten removes the overlap from the red hat shape, leaving the white shapes "just touching" the hat:


Path>Flatten


The red shape is cut out by the white ones


Moving the shapes apart confirms the cut

### 7.05 Clip Path and Clip Mask

### 7.05.1 Clip Path

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


Use File>Place Image to import photo and select a shape to fill


Arrange shape over photo


Select both and apply
Object>Clip Path>Set Clip Path

- There are two ways to access the Clipping function:
$\diamond$ Select both shapes and go to Object>Clip Path>Set Clip Path
$\diamond$ Select the two layers and, on the Style Panel, change Clipping from None to Path:
STYLE
Style: Normal
$\square$ Weld
Cut Line Type: $\longrightarrow \square$
Tool: 1 (left)
Clipping: Path
- Unlike some of the path functions (Union, Intersection, Exclude, etc.), the original two shapes are still intact. To restore the original shapes:


## $\diamond$ Go to Object>Clip Path>Release Clip Path

$\diamond$ Reset the Clipping option to None on the Style Panel
$\diamond$ Note that the shapes will be grouped, thus you'll need to apply Object>Ungroup in order to individually select one of the shapes but not the other.

- A few other things to note about Clip Path:
$\checkmark$ If you apply Clip Path to two vector shapes, both shapes will still cut out. To avoid that, select the shape that you do not want to cut, and change the Cut Line Type, on the Style Panel, to Print + Cut Print. Then apply Clip Path to the two vector shapes.

$\diamond$ When applying the Duplicate or Rotated Duplicate function on shapes that have Clip Path applied, you will initially see the copies in their original "unclipped" format. But once you click on OK, the correct result will appear:



### 7.05.2 Clip Mask

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

- To apply Clip Mask to selected shapes, either
$\diamond$ Go to Object>Clip Mask>Set Clip Mask
$\diamond$ Select the two layers and, on the Style Panel, change Clipping from None to Mask:

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

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


### 7.06 Duplicate Rotated

### 7.06.1 Duplicate Rotated Settings

- The Duplicate Rotated function allows you to make duplicates arranged in a circle or partial circle pattern.
- To access Duplicate Rotated, first select the shape(s) and then use either of the following:
$\diamond$ Go to Object>Duplicate Rotated
$\diamond$ 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:

$\diamond$ Start by increasing the number of copies. If the shapes are overlapping too much, increase Rotate $\mathbf{V}$ Offset which is the distance from the center. Increasing the Rotate H Offset setting shifts the center of rotation toward the right, leaving the original in the same location on the Cutting Mat:

$\checkmark$ 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.
$\diamond$ The Direction setting changes the order of the duplicates around the circle.
- With clockwise selected, the order of the shapes follows a clockwise progression so that the last copy is just to the left of the original at the top. You can visually see that circle is on top. The opposite is true if counter-clockwise is selected:


- Does it matter which Direction is used? Most likely, it would only matter for display or possibly in a print and cut design.
$\diamond$ Rotate has two options: Evenly and Custom. With Evenly selected, the copies are distributed evenly in a full $360^{\circ}$ circle. But let's say you want a semi-circle of shapes:
- First, create a circle pattern using the desired number of shapes. Note that the greyed-out box below Rotate is changing as you add more shapes:

- Change the Rotate to Custom and then, because you want a semi-circle of shapes, divide that value by 2 . Thus, in this example, it will be changed to 30 :

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


### 7.06.2 Using Duplicate Rotated to Design a Wreath

- Begin with a desired shape. In this example, a shape from the Library's Swirls folder will be used.
- Select and go to Object>Duplicate Rotated. Begin increasing Total Copies and the Rotate V Offset until a desired overlapping pattern is obtained:

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


### 7.06.3 Using Duplicate Rotated to Design a Frame

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

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

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

- Click on OK and then apply Path>Union.


### 7.07 3D Extrude (SCAL PRO only)

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

$\diamond$ X Offset: Increasing X Offset will extend the extrusion to the right while decreasing it will retract the extrusion towards the left. Note that $\mathbf{Y}$ Offset has been set to 0 and Depth is at the default of 0.5 :


X Offset $=0.25$
Y Offset $=0$


X Offset $=0.35$
Y Offset $=0$

$X$ Offset $=-0.25$ Y Offset = 0


X Offset $=-0.35$
Y Offset $=0$
$\diamond \quad$ Y Offset: Increasing Y Offset will extend the extrusion downwards while decreasing it will retract the extrusion towards the top. Note that $\mathbf{X}$ Offset has been set to 0 and Depth is at the default of 0.5 :

X Offset = 0
Y Offset $=0.25$

X Offset = 0
Y Offset $=0.35$

X Offset = 0
Y Offset $=-0.25$

X Offset = 0 Y Offset = 1.0
$\diamond$ Depth: Adds the actual 3D effect by increasing the extension of the extrusion:

$X$ Offset $=0.35$
Y Offset = 0.35
Depth $=0.25$


X Offset $=0.35$
Y Offset $=0.35$
Depth $=0.5$

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


$$
\text { X Offset }=-0.35
$$

Y Offset =-0.35

$$
\text { Depth }=0.5
$$

$\checkmark$ Use Perspective provides a vanishing point effect:


Use Perspective: Off


Use Perspective: On


Use Perspective: Off


Use Perspective: On
$\diamond$ Remove Foreground:

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

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

$\diamond$ Color: Clicking on the colored box to the right of Color will allow you to select the color of your choice for the extrusion.

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



### 7.08 3D Rotate

- The 3D Rotate function is used to rotate a shape along the $X, Y$, and/or $Z$ axis. To access this function, select a shape and go to Effects>3D Rotate. In the following example, text will be used to show the effects of the settings:

$\diamond \quad$ X Axis Rotation:


X: 60


X: 73


X: 90


X: 120
$\diamond \quad$ Y Axis Rotation:


Y: 60


Y: 73


Y: 85


Y: 120
$\diamond$ Z Axis Rotation:

Z: 30

Z: 60

Z: 90

Z: 120
$\checkmark$ Perspective: This is where the fun begins. Combining this setting with another rotation provides the 3D illusion. Here are examples:


X: $0 \quad \mathbf{Y}:-50 \mathbf{Z}: 0$ Perspective: 65


X: $0 \quad$ Y: 50 Z: 0
Perspective: 65


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


X: -26 Y: $26 \quad$ Z: -20
Perspective: 100

### 7.09 Barcode Generator (SCAL Pro only)

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

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



### 7.10 Barrel Distortion

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

- In the following example, text will again be used to show the effects of the settings. To open the Barrel Distortion window, select the text and go to Effects>Barrel Distortion:

- As you increase the Threshold, you will see a narrowing of the shape in the middle:

Threshold = 10


Threshold = 20


Threshold $=40$

- As you decrease the Threshold, you will see a thickening of the shape in the middle:
LUCY
Threshold =-10

Threshold $=-20$

Threshold $=-40$


### 7.11 Bridge Warp

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

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

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

- Increasing Top Offset warps the top of the shape:

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


Top Offset $=0.3$ in


Top Offset $=0.6$ in


Top Offset $=1.0$ in

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

Bottom Offset $=0.3$ in

Bottom Offset $=0.6$ in

Bottom Offset = 1.0 in
- If the Sync Offset option is checked, then both the top and the bottom will be warped together:

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

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



Top Offset $=1.0$ in
Scale Width is increased while still in the Bridge Warp window
$\diamond$ The two examples on the right have the same overall width and height, but the lettering from scaling in the Bridge Warp window is compressed more towards the two ends

### 7.12 Bulge

- The Bulge feature allows you to apply various expanding or shrinking distortions to a shape. These distortions can be applied to the top side of the shape, the bottom side, or both. They can be applied to the left side, the right side, or both. And the distortions can be expanding on both sides, shrinking on both sides, or a combination.
- To open the Bulge window, select the shape and go to Effects>Bulge:

- In the top portion of the window are settings for applying Bulge to the top or bottom of a shape. The Top/Bottom setting allows you to choose if you want to apply the settings in one of three ways:
$\diamond$ Separately: The Offset and Curve settings can be different for the top versus the bottom

$\diamond$ 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.

$\diamond$ 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.

- 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:


Top Offset $=1.0$ Bottom Offset = 0


Top Offset $=0.0$
Bottom Offset = 1.0


Top Offset $=2.0$ Bottom Offset $=0$


Top Offset $=0.0$
Bottom Offset = 2.0


Top Offset $=-0.5$ Bottom Offset $=0$


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 $=0$

Top Offset $=1.5$
Top Curve $=50$


# TEDDY 

Bottom Offset $=1.5$
Bottom Curve $=0$


Bottom Offset $=1.5$
Bottom Curve $=50$


Top Offset $=1.5$
Top Curve $=90$


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:
$\diamond$ Left/Right: choose from Separately, Together, or Opposite:


Separately


Together


Opposite
$\diamond$ Effect of Left Offset and Right Offset:

Left Offset = 1.0

Left Offset =-1.0

Right Offset = 1.0
$\diamond$ Effect of Left Curve and Right Curve:


Left Offset = 1.0
Left Curve $=50$


Left Offset = 1.0
Left Curve $=90$


Right Offset $=1.0$
Right Curve $=75$
$\diamond$ Or just have some fun with it:
FINN


### 7.13 Canned

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


## HDoggie\% $\Longrightarrow$ 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.
- 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:
*Doggie*
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.
*Doggie*
Angle $=-30$
Diameter $=3.0$


Angle $=-30$
Diameter $=7.5$


Angle $=-30$
Diameter $=3.5$

### 7.14 Cast Shadow

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

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

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


Cast Shadow visible through original


Cast Shadow is now behind original

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

Remove foreground left disabled

Remove foreground enabled


### 7.15 Drop Shadow

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

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

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

- Increasing $\mathbf{X}$ Offset moves the shadow to the right, while decreasing it moves the shadow to the left:

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



X Offset $=0.3$
Y Offset $=0.3$

$X$ Offset $=0.3$
$\mathbf{Y}$ Offset $=-0.3$

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


X Offset $=0.5$
Y Offset = 0.2 Inset = 0

$X$ Offset $=0.5$
Y Offset $=0.2$ Inset = 0.1


X Offset $=0.5$
Y Offset = 0.2 Inset = 0.2

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


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

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


$$
\begin{gathered}
\text { X Offset }=06 \\
\text { Y Offset }=0.2 \\
\text { Inset }=0.05
\end{gathered}
$$

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

$\diamond$ Remove foreground marked:



### 7.16 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:


Preview based on current settings

- Width and Height: If you plan to apply this puzzle over a specific image, you may want to choose dimensions that correspond to your image. For example, let's assume you have a photo that is 5 " $\times 3.75$ "
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 $90^{\circ}$. If you want rounded corners, increase this setting:


Corner Radius $=0$


Corner Radius $=0.25$


Corner Radius $=0.5$


Corner Radius $=1.0$

- Columns and Rows: To keep the shapes from becoming too distorted, make the number of Columns and Rows similar to the dimensions. If you want more pieces, then increase the number of Columns and Rows proportionately. For example, instead of having 5 Columns and 4 Rows, double the number to 10 Columns and 8 Rows. But don't use, for example, 10 Columns and 3 Rows with these dimensions:


5 Columns, 4 Rows


10 Columns, 8 Rows


10 Columns, 3 Rows

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

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


Select Puzzle Layer

$\diamond$ The jigsaw puzzle is ready for a print and cut application.

### 7.17 Lattice

- The Lattice feature can be used to create a lattice design within a shape or as part of the shape itself. To access this feature, select one or more shapes and then use either of the following:
$\diamond$ Go to Effects>Lattice
$\diamond$ Right-click and select Appearance>Lattice
- In this example, a rectangle is used to show the effects of the settings in the Lattice window:


After clicking on Preview,
selected shape will display lattice
based on current settings
$\checkmark$ Lines: Besides the traditional crisscross pattern, you can also choose to only have horizontal lines or only have vertical lines:



Lines: Horizontal Only


Lines: Vertical Only
$\diamond$ 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
$\diamond$ The Angle setting will skew the lattice shape while the Rotate setting will simply rotate the overall pattern:


Angle: 0
Rotate: 0


Angle: 45
Rotate: 0


Angle: 0
Rotate: 45
$\diamond$ Inverse is used to create a kind of negative lattice. An example will follow later in this section:


Inverse checked

- 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:
$\diamond$ A ring is created by applying Object>Merge to two centered circles:

$\diamond$ Select a heart shape from the Library and apply Effects>Lattice:

$\checkmark$ Align the latticed heart in the center of the ring and weld using Path>Union:

- An example of when Inverse would be checked is when you want a lattice aperture cut from the front of a greeting card:
$\diamond$ Using the same heart as above, make sure Inverse is selected:

$\diamond$ Arrange the latticed heart over a base greeting card. Select all and go to Object>Merge to complete the design:

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


### 7.18 Object on Path

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

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

- 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:

$\diamond$ Start Offset: This is the distance from the left side of the path to the location of the first shape:


Start Offset $=0$


Start Offset = 0.5"


Start Offset = 1.5"
$\checkmark$ Repeat: Choose Count if you want to specify how many copies to place along the path. Choose Fill Path length if you want the program to automatically fill in the number of repeats that will fill the path using the spacing you enter:


Repeats: Count 10


Repeats: Fill path length
$\diamond$ Spacing: Enter the desired spacing between repeats:


Spacing $=0$


Spacing = 0.2"


Spacing $=0.5 "$
$\diamond$ 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:
0000
Alignment: Top


Alignment: Middle


Alignment: Bottom
$\checkmark$ Offset: This is how far away from the path you want the repeats to be. For example, if you choose Bottom for Alignment and then 0.15 " or $0.25^{\prime \prime}$ for Offset, then the bottom of the shapes will be 0.15 " or 0.25 " above the path:


Offset $=0$


Offset $=0.15 "$


Offset $=0.25$ "

### 7.18.1 Designing a Scalloped Oval

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

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


Shape to be repeated should be above the path shape

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

$\diamond$ NOTE: Always enable Auto Preview before adjusting settings to make sure the object to be placed on the path actually appears on the path. Otherwise, return to the main window and verify:
- The Layers Panel order
- The path is a single path and does not contain any interior paths
- Next the Offset can be decreased to soften the scallop. Also a few new settings are noted as shown and described below:

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


After clicking on OK


After applying Break
Apart, select inner scallop


After deleting inner scallop, apply Merge and a Fill

### 7.18.2 Warp a Shape to a Path

- The Object on Path function can also be used to stretch a shape to fit a path. For example, let's start with an arrow (from the Library's Arrows) and a spiral (refer to Section 3.01.8):

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

- Next, two new settings are applied:

$\diamond$ Warp to path: causes the arrow to bend/curve to fit the spiral:

$\diamond$ Stretch to path length: causes the arrow to be elongated so that it starts and ends at the same locations as the spiral:


Warp to path: On Stretch to path length: Off

### 7.18.3 Remaining Settings

- The two remaining settings in the Object On Path window are:
$\diamond$ 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:


Follow path orientation: On


Follow path orientation: Off

Stars do not rotate
$\diamond$ 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:


Reverse path order: Off


Reverse path order: On


Reverse path order: Off


Reverse path order: On

### 7.19 QR Code

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

$\times$

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

| URL |
| :--- |
| Contact Information (BIZCARD) |
| Contact Information (meCard) |
| Contact Information (vCard) |
| E-Mail |
| Geographic Location |
| Plain Text |
| SMS |
| Telephone number |
| URL |

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


### 7.20 Rays

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


Circle


Line


Radial

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

$\diamond$ Line Fill Type:



## $\diamond$ Radial Fill Type:



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


### 7.21 Rhinestones

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

### 7.21.1 Guidelines for Rhinestone Pattern Design

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


### 7.21.2 Rhinestone Effect Overview

- After selecting a shape, the feature can be accessed in either of the following ways:
$\diamond$ Go to Effects>Rhinestones
$\diamond$ Right-click and select Appearance>Rhinestones
- The following window opens:

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


### 7.21.3 Rhinestone Outline

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

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

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

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

- These settings will require experimenting in order to optimize equal spacing between the stones. Initially, however, just click on Preview after marking the box and the spacing should change. This is often all that is
required. However, from the drop-down menu, you can also choose to only Decrease or only Increase the spacing. The Threshold, which controls how much spacing will be used, is also available to adjust:

Spacing is much improved

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

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

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


### 7.21.4 Rhinestone Fill



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

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

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

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


Tends to work better with symmetrical images

## $\diamond$ Fade Linear:

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

$\diamond$ Fade Radial:


Use Fade Linear guidelines Origin - try different options to better fit the shape
$\diamond$ Linear:
Angle - adjust in order to better fit the shape

$\diamond$ Ray:


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

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



### 7.21.5 Editing Rhinestone Designs

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


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

- If you wish to remove the simulation, select the layer and apply Object>Merge. If you then need to work with any individual circles, apply Object>Break Apart.
- The simulation can be restored now or after editing or not at all. The circles will still remain as individual shapes. Again, this does not affect how the design cuts; the simulation is only for displaying or printing. If the design is extremely large or you have a slow computer, you may find that the simulation causes more lagging as you are editing the design. In that case, save the following step until after editing is completed.
- To restore the simulation, select the layer and reopen the Rhinestone window. In the Outline section only, enter the same Stone Size setting used to create the design. Note that the Spacing doesn't matter any longer, nor is it necessary to select the Fill option:

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

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

- Sometimes the circles you want to re-space equally may fall closer to a $45^{\circ}$ angle versus vertically or horizontally. Select your entire design and rotate until the line of circles is closer to vertical or horizontal. Re-space the circles and then rotate back into place.
- After editing the design, you may wish to group the design to avoid inadvertently moving one or more stones out of place. To do that select the design and go to Object>Group or apply Ctrl+G.
- If you have a shape that has a Rhinestone effect applied and want to remove it (even after the file has been saved and re-opened), select the shape and go to Object>Remove Effects.

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

### 7.22 Rhinestone Scatter

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

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

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


### 7.23 Shadow Layer

- The Shadow Layer function allows you to create an outline or an inline of any shape including, of course, text. After selecting a shape, you can access the function in either of two ways:
$\diamond$ Go to Effects>Shadow Layer (Contour Cut)
$\diamond$ Right-click and select Appearance>Add Shadow Layer
- The following window will open:



### 7.23.1 Shadow Layer Settings

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

$\diamond$ 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:

$\diamond \quad$ Note that the first choice, Shadow, also has a Miter setting which should work in the same way as Miter affects the Stroke (refer to Section 3.15).
- Inset Shadow is the opposite of Shadow - instead of creating a contour that is larger than the original shape, a contour is created that is smaller and fits inside the original shape.
$\diamond$ For example, let's say you are going to create a two-color vinyl sign that says "For Sale":


## For Sale

$\diamond$ 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:

$\diamond$ 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 set in 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:

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


Variance: 1.0


Variance: 0.75


Variance: 1.25
$\checkmark$ End color: If the End color is chosen to be different from the original Color, a gradual transition between the two colors will be created. This can be used to create some beautiful designs for a print and cut:


### 7.24 Symmetrical Mirror

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

$\diamond$ Notice how the left side traced nicely but the right side isn't smooth and, overall, the vase doesn't appear symmetrical.
- To use Symmetrical Mirror to correct this image, select the traced shape and go to Effects>Symmetrical Mirror. The following window opens:

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

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


Original Shape


New shape as a result of Symmetrical Mirror

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

$\diamond$ Symmetrical Mirror can be used to expand this one element into more designs:


Symmetrical Mirror again applied using Top to Bottom

### 7.25 Wave

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

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



## Enable Auto Preview

- 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:

$$
\begin{aligned}
& \text { Twinkle Twinkle Little Star } \\
& \text { Twinkle Twinkle Lit+le Star }
\end{aligned}
$$

### 7.26 Wrapper

- The Wrapper feature can be used for shaping designs to fit around conical shapes in which the top is a different diameter than the bottom. Some typical applications include tumblers and cupcake wrappers. It's important to recognize what shapes will work versus not work. You need straight edges with no rounding in the middle:


Will work



Will not work

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

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

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

$\checkmark$ 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.
$\diamond$ Adjust the X Offset and/or Y Offset to move the design, if needed. For example, making Y Offset a negative value moves the design higher up on the template:

$\diamond$ Adjust the $\mathbf{X}$ Scale and/or $\mathbf{Y}$ Scale to resize the design, if needed. If you want to scale proportionately, mark the Keep Proportions box:

- After clicking on $\mathbf{O K}$, the fill color returns to the design and the project is ready for completion:



### 7.27 Data Source Copies



- Data Source Copies is a powerful feature which generates duplicates of your original design but customizing each one based on changing selected elements in that design. Some typical applications include:
$\diamond$ Address labels
$\checkmark$ Name tags
$\checkmark$ Escort cards
$\diamond$ Student ID cards (and other school applications)
$\checkmark$ Product serial number labels
$\diamond$ Planner stickers
- The types of options (called Data Source) for changing the data include the following:
$\diamond$ Code or number sequencing in which each duplicate has a different increasing number with the interval you require
$\diamond$ CSV importing in which you import a .csv file that contains information which can include text items (such as names, addresses, team assignments, table assignments), as well as color and image paths
$\diamond$ Date sequencing in which each duplicate has a different increasing date in a variety of available date formats and with the interval you desire
$\diamond$ Text in combinations with all 3 of the above in which you can add any text you want repeated in each duplicate along with any of the other items you've already made using Code, Date, CSV or other Text.
- The Data Source Copies process involves five steps:
(1) Creating your original design to be duplicated with the various elements you'll want changed in each copy
(2) Going to the Data Source window to define each Data Source that will be changed
(3) Assigning each element in the original design to one of the Data Sources created in Step (2)
(4) Accessing a Preview window to set up the rows and columns on each page, spacing, number of pages required and verifying the Preview looks correct
(5) Generating the pages with the duplicates
- Most of the information needed is covered in the instructions in the Data Source window. The following is an expanded tutorial covering all aspects of the Data Source Copies function. https://tinyurl.com/yukjdc5m


## 8. SCAL: Output

### 8.01 The Style Panel

- The Style Panel has various settings that are typically, but not necessarily, applied for the purpose of cutting and printing:
$\diamond$ Set a contour cut (Shadow)
$\diamond$ Remove any interior shapes (Blackout)
$\diamond$ Apply a weld (Union) on any overlapping shapes (only applied during printing and/or cutting)
$\diamond$ Assign an intended use for the layer (called Cut Line Type)
$\diamond$ Assign a layer to a particular tool (for cutters with more than one head)
$\diamond$ Assign Presets to a layer (for Cut by Layer applications in SCAL6 Pro)
$\diamond$ Access the Data Source Copies functions (refer to Section 7.27).
- To open this panel, click on the Style icon on the Properties Panel:

- Style: In this menu are various combinations of Shadow and Blackout applications. Refer to 7.23 for instructions and examples. Note, however, that if you later change your mind and you haven't applied any subsequent changes (such as those in the Path menu), then re-selecting Normal from the Style drop-down menu will restore the original style.
$\diamond$ For example, let's say you've applied Blackout to a shape and then cut it out. You can now select that same shape and return the style to Normal:

- Weld: This option applies the Union function (refer to Section 7.04.1) to any overlapping shapes. $\diamond$ Note that if the shapes are on different layers, the Weld option needs to be marked on each layer.
$\diamond$ As mentioned before, settings in the Style window do not become permanent changes to the shapes on
the Cutting Mat. However, you can verify the Weld effect by clicking on the Preview icon on the Toolbar (for more details on Preview, refer to Section 8.02):

- Clipping: options are available for either Clip Path or Clip Mask. Refer to Section 7.05. The clipping is only applied during the cutting process.
- Cut Line Type: There are five options in this menu:
$\diamond$ None: layers assigned as None will be ignored from any output operations
$\diamond$ Cut: choose this option for regular cutting. Because this is the default, you don't normally need to select it
$\diamond$ Draw: choose this option when using a pen, embosser, engraver, glue pen, rotary tool or other device that doesn't require a blade offset
$\diamond$ Score: choose this option when you want to use a different Force setting on some layers versus others, such as when kiss cutting stickers that will also be fully cut from the sheet
$\diamond$ (Print+Cut) Cut Only: in print and cut applications, choose this option for the layer that will be cut. It will not be printed.
$\diamond$ (Print+Cut) Print Only: in print and cut applications, choose this option for the layer that will be printed only. It will not appear in the cut window.
$\diamond$ Color layer alignment (Pro version only): in applications such as vinyl where several layers will be cut from different colors and aligned, choose this option for the layer that has registration shapes that need to be cut from every color along with that color's shapes. These registration shapes can then be used to layer the colors perfectly. Refer to last part of Section 8.06.3.
- Tool: for cutters with more than one head, such as the Skycut D Series, choose if the layer should be executed by the left side or by the right side.
- Preset (Pro version only) allows you to assign saved cut settings, called Presets, to individual layers. Refer to Section 8.06.2.


### 8.02 Preview

- To see what your cutter will cut, draw, score, print and more, click on the Preview icon on the Toolbar. The following window will open. Note that settings applied on the Style Panel are reflected in this Preview window:

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

$\diamond$ In the Preview Options window:


Show Cut Lines and Show Draw Lines are both checked

- In this next example, a page of stickers is set up with (Print+Cut) Print Only, Score layers and Cut layers:

- The Preview is used to confirm the layer assignments:

- For print and cut applications (PNC), you might wish to verify what will be printed, along with where it will be printed and where the registration marks will print:

$\diamond$ Show Printable: The layers set to print now appear in the Preview
$\diamond$ Show Print+Cut registration marks: The registration marks are now visible, along with their spacing (which can be valuable when troubleshooting certain auto-registration issues)
- NOTE: If the registration marks do not appear:
- Verify that you have set up a cutter (refer to Section 1.01.3)
- Verify that the layer(s) with cut lines are not hidden on the Layers Panel
- In the Cut Settings window, verify that you have not marked the option for Cut selection only
$\diamond$ Show print margins: The printable boundaries based on the current printer's settings appear


### 8.03 Printing

- Go to File>Print Setup (or File>Page Setup on a Mac) and make sure the correct printer and printout dimensions appear. Before printing, verify the location of the print margins and reg marks using either of the two following methods:
$\diamond$ Preview (refer to Section 8.02)
$\diamond$ Mark the options on the Document Panel for Show Print Margins and Show Reg Marks. The Page will now indicate the boundaries for your currently selected printer and the registration marks based on their current settings.
- Go to File>Print or press Ctrl+P. The following window will open:

$\diamond$ To set up printer settings, click on the Properties button. (Note that you can also access your printer's properties by going to File>Print Setup (or File>Page Setup on a Mac) and clicking on Properties.) The window which opens should be familiar to you and will not be covered in this user manual.
$\diamond$ 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.
$\diamond$ Print registration marks: If your application is a print and cut, then you will want to check this option. Note that If you have not yet set up a cutter (refer to Section 1.01.3), then registration marks will not be sent to the printer. Also, refer to Section 8.12 for details on the Print+Cut process.
$\diamond$ 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.
$\diamond$ On the Document Panel, if the Mat Size dimensions are larger than the printout dimensions, then make sure the shapes are located in the upper left portion of the Page area or else any shapes outside of the printout boundary will be omitted or cut off. To verify, click on the Preview icon on the Toolbar and select Show Print Margins.
- For example, let's say you have a PNC application and your shapes are arranged like this on a 12 " $\times 12^{\prime \prime}$ Cutting Mat:

$\diamond$ 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:

$\diamond$ You have two choices. You can either switch to Landscape printing under File>Print Setup or you can move the shape on the right to be below the left shape:


Option 1: Switch to Landscape under File>Print Setup


Option 2: Rearrange the shapes

### 8.04 Weeding (SCAL PRO only)

- Weeding is an important function for those who do vinyl applications. When removing the waste vinyl from around the cut shapes, it's very helpful to have extra cut lines. This way you don't end up trying to weed out large pieces at one time.
- To set up a weed, select the shapes and go to Effects>Weeding. The following window will open:

$\checkmark$ IMPORTANT：If you cannot see the design or it＇s very faint，close the Weeding window and，with the design selected，increase the Stroke Width on the Fill \＆Stroke Panel．Then，return to the Weeding window and the design should easily be visible．You can also then drag a corner of this window to make the design even larger and easier to view while adding the desired weeding lines．
$\diamond$ 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：


$\diamond$ 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 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| ■ | ■ | 母 | 日 | 亩 | $\square$ | 申 | 四 |

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

5


- 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)
2

6

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

7


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

8

$\diamond$ 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:

| LAYERS |  |  |  |
| :---: | :---: | :---: | :---: |
| © ${ }^{\text {B }}$ | Layer Name |  | - |
| © . |  | $\square$-Weeding> | $\wedge$ |
| (3) | Finu | $\square$ <Union> (1) |  |

### 8.05 Tiling (SCAL PRO only)

- The Tiling function is used to split large designs into rectangular sections for cutting. This is usually needed either because the cutter isn't wide enough to cut the design or the material being used isn't wide enough for the design, or both!
$\diamond$ In the following example, a tree design that is 40 " wide and 36 " tall will be used:

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

$\diamond$ Columns and Rows: Under both of these you have the following choices:
- Evenly spaced: Enter a number and that many columns (or rows) are created, all the same width. For example, you could enter 3 columns and 2 rows:

- Fixed width: Enter a specific width for the columns. This is probably the most useful choice since you should know the dimensions of the material being used. For example, if you have $12^{\prime \prime}$ wide vinyl, then you will probably want the columns to be no wider than $\sim 11$ " or, possibly, 11.5". Also, let's say your vinyl is in 24 " long pieces:


The design is 40 " wide and 36 " tall.

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

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

- Custom: Because the tiling line can sometimes fall into undesirable spots resulting in, for example, slivers or extremely tiny shapes, using Custom is another option. With it selected, you can then use the icons above the preview to add cut lines wherever you like:

$\diamond$ To delete any of the lines, click on the Delete icon ${ }^{x}$ and then click on the line inside the Preview window.
$\diamond$ 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:

- Once you are satisfied with the settings, you have three options:
(1) Click on OK. You won't observe any changes on the Cutting Mat or on the Layers Panel. However, the results of the Tiling process will appear once you enter the Cut Settings window and click on the Tiles tab. Refer to Section 8.06.4.
(2) Click on Make Pages and each tile will be placed on its own page in the file. The first page will retain the original image with no tiling. Thus, it's not necessary to use the Tiles tab in the Cut Settings window.
(3) Click on Export and the SVG Export window will open. After you name the file, select the export settings, and click on OK, wait while the export files (one for each tile) are saved as separate SVG files, numbered with the file name you chose. Once the Tiling window closes, you are back to the same situation as in option (1).


### 8.06 Cut Settings

The cut settings vary from one cutter to the next based on the manufacturer of that cutter and its built-in functionality. For this reason, the screenshots presented in this section may vary from those you see.

### 8.06.1 Cut Window Settings

- When you are ready to execute a cut (or draw), the cut window can be opened using either of the following:
$\diamond$ Click on the Cutter icon on the Toolbar
$\diamond$ Go to Cutter>Cut With Siser (or whichever brand/model of cutter you have added)
- The following window will open:

- Cut Settings tabs: The regular version of SCAL will only have the General tab. The PRO version has four additional tabs:
$\diamond$ Layers (refer to Section 8.06.7)
$\diamond$ Cut by Color (refer to Section 8.06.3)
$\diamond$ Tiles (refer to Section 8.06.4)
$\diamond$ Extras (refer to Section 8.06.5)
- Zoom icons apply to the Preview window. Use the Preview to confirm where shapes will cut relative to the cutter itself, which is also shown.
- Connection Settings: Choose the model of cutter being used and the connection settings. For Siser, Skycut, or StarCraft, choose either USB or TCP/IP (Wi-Fi).

- Settings, which can also be accessed by going to Cutter>Cutter Settings, opens a new window with additional settings relevant to that model. Thus, this window may appear differently based on the cutter model you're using:

$\diamond$ Sizing Calibration: Most cutters are subject to cutting slightly different dimensions than what the shape is assigned in the software. For example, a 200 mm square might measure $199 \mathrm{~mm} \times 201 \mathrm{~mm}$.
- X Resolution (also called Belt Resolution) = left to right correction (width) as you face the cutter and $\mathbf{Y}$ Resolution (also called Wheel Resolution) = up and down correction (height) as you face the cutter.
- In both cases, you draw or cut a large rectangle, carefully measure with a ruler, and calculate:

Resolution $=($ What the measurement should be $) \div($ What the measurement actually is) $\times$ (Current Resolution entered). Then enter those numbers into the Cutter Settings window and test again.
$\diamond$ Baud Rate: This is the speed at which data travels from the computer to the cutter. In general, this is not a setting you would ever change. Refer to your cutter's user manual if you ever feel it may be in error.
$\diamond$ Registration Marks: Refer to Section 8.12.3.
$\diamond$ Jog Distance: The following settings apply when moving the head left/right or moving the mat or material in and out of the cutter:

- Normal: the distance the head or mat moves with each arrow key increment
- Fast: the distance the head or mat moves while holding Shift with each arrow key increment
- Cut Mode Settings: This section covers the following:

$\diamond$ Cut Mode: Refer to Section 8.07 which covers controlling where shapes will cut.
$\diamond$ Use Software Speed and Force: On cutters with a control panel, the Speed and Force settings can typically be set there instead of in the software. Note, however, Score Force cannot be activated from the cutter's control panel, thus you will want to enable this option whenever you need to cut at two different pressures.
$\diamond$ 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 field appears $\longrightarrow$ End Action: Advance amount $\vee 1.00$ in $\longleftarrow$ Enter distance to advance

- Do Nothing: the head stops at the location where it finished cutting
$\diamond$ Cut selection only: If you only want the shapes you have selected on the page to cut, then mark this box.
$\diamond$ Mirror H and Mirror V: Use one or the other options to if you want the shapes mirrored for cutting. This is very handy when cutting HTV or embossing. In both cases, you will be flipping over the material once the cutting or embossing is complete.
- Cutting/Drawing Settings: As mentioned earlier, this section will vary from one brand/model of cutter to the next:

$\diamond$ Preset is a customizable menu where you can store settings for a particular material or application. Refer to Section 8.06.2 for directions.
$\checkmark$ Holder has choices for Blade or Pen. Like Preset, you can enter your own menu choices, such as other blades. Again, refer to Section 8.06.2.
- If you select Draw (Pen) under Holder, then Draw draw lines is typically selected. There is also a Prompt for pen color change option. Marking that option will cause the cutter to pause after each pen color is executed so that a different pen or tool can be mounted:

$\checkmark$ Blade Offset controls how sharp corners are handled and the setting should be provided with the blades you use. If set too low, corners will be rounded. If set to high, little bubbles will appear on outside corners and divots will appear on inside corners. Adjust as needed using 0.1 increments.
$\diamond$ Overcut controls the closing of shapes. If left at 0 , you will find that fairly large shapes will still be attached to the waste material. In general, a setting of 1.0 mm is sufficient.
$\checkmark$ Multi-cut is used when cutting thicker or denser materials where more than one pass is recommended. Each shape is cut the number of passes selected before the blade moves to the next shape to cut.
$\checkmark$ Force and Speed (or other settings for your brand of cutter) should be covered in the user manual provided with your cutter. Note that if Score Force appears for your cutter, that is the Force that will be used for any layers you have assigned as Score on the Style Panel.


## - Send to Cut Options

$\checkmark$ Print+Cut: Clicking on this button opens the Print and Cut window. Because this function differs for each cutter, refer to the detailed instructions available for your cutter or read the on-screen instructions.
$\diamond$ Save to File (only available on some cutters): Click on this button to export and save the cut project as a PLT file onto a USB flash drive. This PLT file will not only contain the shapes to be cut but other relevant settings from the Cut Settings window.
$\diamond$ Preview: The preview displays the shapes that will cut and their orientation plus location based on other settings.

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

- Using the same WYSIWYG cutting mode, but having the Cutting Mat orientation set as Landscape, the Preview changes indicating the shapes will be cut in a landscape position:

- In Origin Point mode, it doesn't matter where the shapes are located on the Cutting Mat, they will cut so as to align with the origin you set:

- Additional details on controlling where shapes are cut are presented in Section 8.07.


### 8.06.2 Presets

- Presets allow you to save your settings for a particular material or blade type. To do this, enter the settings you wish to save. Then click on the " + " to the right of <Custom Preset>:

- After clicking on OK, the new preset will be found at the bottom of the list.
- In a similar manner, you can also add other Holders to your list, which would typically be blades with other Blade Offset values. For example:

- To delete either type of preset that you personally added, select it from the menu and then a " - " button will appear. Clicking on that button will then remove it from the list:



### 8.06.3 Cut by Color (SCAL PRO only)

- The Cut by Color function offers two capabilities:
$\diamond$ 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.
$\diamond$ 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.
$\diamond$ 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
$\diamond$ 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:

$\diamond$ 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 $\underline{D}$ next to the yellow shapes to hide those from cutting:

The yellow shapes are turned off

$\square$ Check/Uncheck All


The Preview shows where the shapes will cut and shows that the yellow ones are excluded
$\diamond$ The cut is executed and the red, orange, and lilac shapes are cut. Then the same procedure can be used for the remaining yellow shapes:


- Cut each color separately (Separate jobs): In this mode you can also turn or off colors for cutting. However, SCAL will prompt for each color before executing the cut.
$\diamond$ As an example, here is a layered design to be cut from vinyl:

$\diamond$ 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
$\diamond$ 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:

$\checkmark$ 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:

$\checkmark$ 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:

$\diamond$ Upon selecting Cut, the following window opens:

$\checkmark$ 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:

$\diamond$ And the process continues until all colors have been cut.
- In Section 8.01, Color Layer Alignment was mentioned as one of the options under Cut Line Type on the Style Panel. In applications, such as the one just presented, it can be tricky aligning the various colors after cutting. To make the job easier, small registration shapes can be added to the design and cut with every color so that they can then be lined up when layering color.
$\diamond$ In the Jurassic Park example, three small triangles are added and grouped to be on the same layer:

$\diamond$ The layer is selected and the Cut Line Type for this layer is changed to Color Layer Alignment:

$\diamond$ When the Cut by Color tab is then selected, the registration triangles are not in the menu however they do appear in the Preview:

$\diamond$ Then, as each color window opens, the triangles will appear in the Preview for that color:



### 8.06.4 Tiles (SCAL PRO only)

- In Section 8.05, you were shown how to use the Tiling function to split a design that is too large to cut based on the limits of your cutter:

- After clicking on OK, but before sending the design to cut, make the Cutting Mat dimensions fit the design. If any of the design extends beyond the boundaries of grid, those tiles will not cut.
- Open the Cut Settings window, click on the Tiles tab and check the box next to Cut Tiles to then open a menu showing the individual tiles with additional options:

$\diamond$ Cut Tiles: Mark this option first so that the menu and preview appears.
$\diamond$ Edit Tiles: clicking this button will take you back to Effects>Tiling in case you need to edit the settings.
$\checkmark$ As with Cut by Color, clicking on the blade icon $\bar{\nabla}$ 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:

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


### 8.06.5 Extras (SCAL PRO only)

- The Extras feature allows you to duplicate shapes for cutting, without having to set it up on the Cutting Mat. To use this feature, click on the Extras tab in the Cut Settings window:

$\checkmark$ Cut Copies: Mark this option first so that other settings become editable
$\diamond$ 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.
$\diamond$ 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.
$\diamond$ Spacing: Adjust the spacing as desired. In general, shapes can be quite close together when cutting from thinner materials, such as vinyl and cardstock. In some cases, such as with a star, you can even use 0 for the Row Spacing, since the bottom of the shape is not close to the top of the shape in the row below it:

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


### 8.06.6 Cut Order (SCAL PRO only)

- The Cut Order function provides control over the order in which shapes will be cut on your cutter. To access this function, go to the Cut Settings window and, in the upper right corner, click on Cut Order:

Cut Settings


- When you click on Cut Order, the following window will open, displaying the shapes that will be cut:

$\diamond$ Order - Select start location preference from the following:
- Start closest to origin - The first shape to cut will be the one closest to the cutter's origin based on where the blade drops down to cut that shape.
- Start farthest from origin - The first shape to cut will be the one farthest from the cutter's origin, again based on where the blade drops down to cut that shape.
- Layer order (Back to Front) - The shapes will cut from bottom to top on the Layers Panel
- Layer order (Front to Back) - The shapes will cut from top to bottom on the Layers Panel
$\diamond$ Keep compound paths - If two or more shapes have been joined using Object>Merge, they will be treated as a single shape in the cutting order.
$\diamond$ Inner paths first - It's almost always desirable to have an inner/child shape cut before an outer/parent shape due to stability of cutting the inner shape. However, that option can be turned off and inner shapes will be treated independently in the cutting order.
$\diamond$ Minimize roller movement - The accuracy of cut location (very important in print and cut applications) can be affected if the material or mat is rolling in and out over long distances throughout the cut. This option is also usually left marked.
$\checkmark$ Roller threshold - Select from 0.01 inches to 10 inches based on the maximum roller movement allowed when cutting a series of shapes before advancing the mat/material to the next series. Note that if the Keep compound paths option is marked, it will take precedence over Roller threshold.
$\diamond$ Step by step cutting - When enabled, the cutting will cease on all paths once the Roller Threshold limit is reached. After those partial cuts within that limit are completed, the paths within the next range will be cut. Thus, in the example shown, with the Roller Threshold set to 3":

If cutter origin is at the top: All of the purple will cut first, followed by the green, then the blue and finally the red


4

3

2
If cutter origin is at the bottom:
All of the red will cut first, followed by the blue, then the green and finally the purple
$\diamond$ Job - If Cut by Color with Separate Jobs has been opted, select each job separately from this menu to set the cut order, as desired.

- A video simulation is available so that you can verify the cut order:
$\diamond$ Click on the Play icon $\quad$. The shapes will be sequentially highlighted in the order in which they will cut.
$\diamond$ There are three speeds in which this video can be played: Slow, Normal, Fast. As an example, verifying the cut order for a rhinestone pattern is probably best set at Fast.
$\diamond$ Marking the Show moves option will draw a green path between the shapes indicating the cut order. It also shows the starting location on each shape and the map will remain displayed at the end of the video. A simple example using only 4 shapes:

$\diamond$ To replay the video, click the black square icon first. Then the Play icon will return and can be clicked.


### 8.06.7 Layers (SCAL PRO only)

- There may be occasions where you want certain layers of your project to cut at different settings than other layers. Two examples would be:
$\diamond$ Cutting adhesive stickers where by you only want to kiss cut the stickers themselves, but then full cut around groups of them.
$\checkmark$ Cutting a thick or dense material whereby you might want the first few passes to be at a lower pressure, followed by a heavier pressure for the last few layers.
- The Cut by Layer feature of SCAL6 involves four steps:
(1) Create Presets for the different settings to be used. This was covered in Section 8.06.2.
(2) On the Style Panel, assign a Preset to each layer and order layers by Preset.
(3) In the Cut Order window (refer to Section 8.06.6) change the Order to match the Layers Panel order you wish to use.
(4) On the Layers tab in the Cut Settings window, select which layers will be cut and whether or not there needs to be a pause between cutting the layers to change out a tool.
- Using the first example, cutting adhesive stickers, let's assume that you have two blade holders set to cut out stickers. One has the blade barely exposed so that the stickers will be kiss cut without penetrating the backing sheet and the other blade holder is set to cut through the sticker material and the backing sheet.
$\diamond$ A project is designed with two sets of stickers and outside cuts around each set:

$\diamond$ Create two presets in the Cut Settings window. (Again, for directions on creating Presets, refer to Section 8.06.2):

$\diamond$ On the Style Panel, select each pair of layers and assign the required Preset to that pair:

$\diamond$ Order the layers so that those cutting with the kiss cut blade holder are at the top and the layers with the more-exposed blade holder are at the bottom:

$\diamond$ Go to the Cut Settings window and click on the Cut Order tab. In the Order menu, select Front to Back and the cut order will then be top to bottom on the Layers Panel. The video simulation confirms this:


Note the cutting order shown by the green lines
$\diamond$ Click on OK to close the Cut Order window. Now click on the Layers tab and the following window will open:

$\diamond$ Mark the option for Use Layers Presets and select Separate Jobs. Click on the Print + Cut button and the print and cut process can be carried out as normal. Watch for the job prompt windows to pop up and follow all instructions.

### 8.07 Controlling Where Shapes Will Cut

### 8.07.1 Overview

- There are two Orientations for cutting:
$\diamond$ Portrait - Shapes will cut in the same orientation you see on the Page
$\diamond$ Landscape - Shapes will cut $90^{\circ}$ clockwise to the orientation you see on the Page
- There are 4 available Cut Modes when cutting to the Skycut:
$\diamond$ WYSIWYG - Shapes will cut relative to their position on the Page (refer to Section 8.07.2)
$\diamond$ Origin Point - Shapes will cut to align with the origin set before cutting (refer to Section 8.07.3)
$\checkmark$ Center Point (not available for all cutters) - Shapes will cut to center around the origin set before cutting (refer to Section 8.07.4)
$\diamond$ Print and Cut - Shapes will cut based on manual or automatic alignment with printed registration marks
- The Orientation is set on the Document Panel:


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

- IMPORTANT: All three Cut Modes are based on setting an XY origin on the cutter (a location immediately before sending the shapes to cut).
- The best way to learn how these settings affect where shapes cut is to recreate what you see in these screen shots and test them out with a test pen and paper. Eventually, it will all make sense to you and, of course, there's help available if you need it.


### 8.07.2 WYSIWYG

- This is the mode recommended when you need to cut shapes based on their location on the Page. This is also the mode needed when you are utilizing multiple tools in applications such as draw and cut or emboss and cut.
- The Mat Size on the Document Panel is typically set up to match the actual cutting mat you plan to use. Shapes can be located anywhere on the Page. The shapes will be moved and aligned to cut with the origin you set on the material. As mentioned earlier, the origin is set using the position of the blade tip.
- Note the following differences in which you typically position your shapes (in Portrait mode) and where the shapes will then be cut, based on popular cutter brands:
$\diamond$ Silhouette Cameo (origin is top left):

$\diamond$ Siser Juliet (origin is bottom left):


Preview in Cut Settings window


Where shapes cut out

$\diamond$ Skycut, StarCraft SOLO, KNK USA, many other vinyl cutters (origin is bottom right)


- Also, if you set the origin on the material itself, the material can be located anywhere on the cutting mat. It is usually advisable to set that origin just a smidgeon inside the corner of the material so that you do not inadvertently cut off the edge.

Skycut, SOLO, KNK, and others

## All Silhouettes

Set Origin here


### 8.07.3 Origin Point

- This is the mode recommended for most applications as it economizes the use of your cutting materials.
- Shapes can be located anywhere on the Page. The shapes will be moved and aligned to cut with the origin you set on the material. As mentioned earlier, the origin is based on the location of the blade tip before cutting (with the exception of several brands that use the laser light instead, e.g., KNK Zing)
- Note the following differences in which you typically position your shapes (in Portrait mode) and where the shapes will then be cut, based on popular cutter brands:
$\diamond$ Silhouette Cameo (origin is top left):

$\diamond$ Siser Juliet (origin is bottom left):

Preview in Cut
Settings window



Where shapes cut out


Set Origin here
$\diamond$ Skycut, StarCraft SOLO, KNK USA, many other vinyl cutters (origin is bottom right)


### 8.07.4 Center Point

- This is a mode not available with most cutter models as it was not introduced until ~ 2018. It can useful for centered engraving on an existing item, such as a trophy label or a dog tag. It can be used when you want to cut a shape from a very specific location on a material.
- In the following example, you want to cut a tag shape from this patterned paper in this location so that the column of hearts will be perfectly aligned through the center of the tag:

- With the paper on the mat, set the origin over one of columns of hearts making sure you have enough room around that origin for the shape to cut out. The tag shape can be located anywhere on the Page. With Center Point enabled, cut the tag:


Set the origin over this heart


With Center Point mode selected, cut out the tag
$\checkmark$ When setting the origin, use the most exact method available to you. In other words, if you have a cutter with a camera, use that the camera. If you have a cutter with an alignment or a laser light, use that.

### 8.08 Path Details and Reverse Path

- Sometimes a cutting issue can be resolved by reversing the direction of a cut. In SCAL, the cut direction (clockwise versus counterclockwise) can be checked using the following steps:
$\diamond$ Select the shape, right-click and select Path>Path Details.
$\diamond$ 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:


The path selected in the list will turn red.
$\diamond$ Select the next path in the list and you will then be able to determine the direction of the cut:


This path will cut next; thus, the path direction is clockwise.

- To reverse the direction of a path, use either of the following after selecting the shape:


### 8.09 Line Fill

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

- Fill Type: There are 5 optional patterns from which to choose. Each pattern has its own settings for customizing the appearance and spacing of the lines:

- Because the most common pattern will be Linear, its settings are as follows. For details on the other patterns, refer to the following Expanded Tutorial: https://tinyurl.com/3tb36csw
$\diamond$ 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.
$\diamond$ 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.
$\diamond$ 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 $=4$
$\diamond$ 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
$\diamond$ 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:

$\diamond$ Apply individually: For some Fill Types, such as Ray, the pattern can be applied to each individual shape or applied across multiple shapes that have been grouped:


Apply individually not enabled


Apply individually enabled

### 8.10 Pierce

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

- Note that even though you see " $X$ " shapes on the screen, the cutter head will be making downward punch movements.
- At this time, there is no editing available for a pattern created using the Pierce function. If you find that your design has holes that are not evenly spaced, try altering the spacing by tiny increments and clicking on Preview.
$\diamond$ 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:

$\diamond$ Gradually increasing the Spacing didn't immediately result in an acceptable pattern until $0.253^{\prime \prime}$ was entered. Then the pattern looked even:

- If you have a shape that has the Pierce effect applied and want to remove it (even after the file has been saved and re-opened), select the shape and go to Object>Remove Effects.
- If you are unable to get an even pattern, then try using the Rhinestone effect instead. Refer to Section 7.21 and enter the smallest rhinestone circle size available: SSOOO.


### 8.11 Nest

- The Nest function rearranges all of the shapes on the current page in an effort to economize the area occupied.
- For example, let's say you want to cut out these 100 stars from a sheet of $12 \times 12$ cardstock:

- To access the Nest function, go to Effects>Nest. The following window opens:

$\diamond$ Area Width and Area Height: Enter the dimensions of the material from which you will be cutting so that the nesting will arrange the shapes within that available area, if possible.
$\diamond$ Spacing: Enter the minimum distance allowed between shapes.
$\diamond$ Max Rotations: Shapes will be rotated in an effort to pack them together more closely. The maximum rotations allowed can be set between 0 and 100 . However, the more rotations you select, the longer the rendering time for the nesting function. Note: When cutting from a material, such as patterned paper, where the shapes need to be oriented as designed on the Cutting Mat, set Max Rotations to 0 so that none of the shapes will be rotated during the nesting process.
$\diamond$ Fit Threshold: A setting between 1 and 100, with a higher value attempting to pack the shapes closer together than a lower value. As with Max Rotations, the higher the number, the longer the rendering time for the nesting function.
$\diamond$ Ungroup: If any of the shapes are grouped together, but you do not want them treated as a group when nesting, mark this option.
$\diamond$ Selection Only: Only shapes that are preselected before opening the Nest window will be nested.
- Clicking on Update Preview will perform the nesting process and the resulting arrangement will appear in the Preview:

- IMPORTANT: Choosing very high values for Max Rotations and Fit Threshold, when there are many shapes on the page, can lead to freezing of the software. Testing has shown that the amount of space saved may not amount to much compared to more conservative settings:


Max Rotations = 4
Fit Threshold = 10
Area $=113 \mathrm{in}^{2}$


Max Rotations $=12$
Fit Threshold = 30
Area $=111 \mathrm{in}^{2}$


Max Rotations $=36$
Fit Threshold = 90
Area $=111 \mathrm{in}^{2}$

- IMPORTANT: Be sure to check the arrangement before cutting to make sure there is no overlap. For example, if the available cardstock had only been $10^{\prime \prime} \times 10^{\prime \prime}$, then overlap between the shapes would have occurred:

$\diamond$ This could also have been caught while still in the Nest window by carefully checking the Preview and zooming in, as shown above.
- Nesting isn't restricted to identical shapes. In this next example, Christmas shapes are to be cut from red and green cardstock:

$\checkmark$ Note that each pair of holly leaves and its berries are grouped and then that holly grouping is further grouped with the mitten to its left. This is not an issue for the Nest function.
$\diamond$ Before opening the Nest window, open up a grouping on the Layers Panel and select a shape in the color you want to nest first. In this example, a red mitten will be selected. Then, on the Fill \& Stroke Panel, next to the red Fill color, click the menu icon so that Select All (Same Fill) can be selected:

$\diamond$ Open the Nest window and mark the options for Ungroup and Selection Only before clicking on Update Preview and OK:

$\diamond$ The red shapes are nested and the green holly leaves remain in place:

$\diamond$ The same process is repeated whereby the green shapes are selected and nested in the same way:

- The red and green shapes can again be separately selected and grouped for easier showing/hiding before cutting from their respective colors of materials.


### 8.12 Print and Cut (Contour Cutting)

### 8.12.1 P+C Facts

- The print and cut process (also called contour cutting) involves printing an image plus 3 or more registration marks from SCAL to any printer you own and then have the image or images cut out with perfect precision. Below are three typical kinds of print and cut applications but there can be other kinds.

- Different brands of cutters use different technologies for identifying the location of the registration marks. You need to research your own cutter to understand how the process works and how to calibrate your cutter for accurate results. SCAL does have calibration instructions in the Print+Cut window for some cutter brands.
- You need to know your printer well, in terms of managing the color, knowing which materials print well, and any custom sizing you might choose. You need to make sure you have the latest driver for your printer installed and your computer is using it.
- Be leery of borderless printing which can shift where registration marks are printed relative to one other, thus confusing those cutters with automatic scanning of registration marks. If you must use it, then please refer to this document for guidelines: Solving Borderless Printing Issues
- There are two types of inaccuracies that can commonly occur:


Calibration is off


Cut is drifting
$\diamond$ Calibration Error - Are all of the shapes off by the same amount in the same direction? Your results will only be as accurate as your calibration. Your first "project" after calibration should be a test of something simple, on copy paper, and preferably with a shape that has both horizontal and vertical lines, like an arrow, so that you will know which direction(s) needs the correction.
$\diamond$ Drifting Error - Are the initial cut shapes accurate but, as the cut progresses, the shapes become more and more off? That's called drifting and is unrelated to the calibration. Possible causes:

- Pinch wheels - Wrong locations for pinch wheels or pinch wheels are not centered over the grit shafts.
- Speed - the faster the material or cutting mat is moving in and out of the cutter, the more likely some slippage could occur. The more shapes being cut, the slower you may need to set the cut speed.
- Blade Exposure - if the blade is cutting into the mat, that will definitely cause more friction because the blade is now being forced to cut into a thick material. Verify from your test cut that any cut lines you are see are very faint as if the blade tip is only grazing the adhesive.
- Stickiness - any stickiness on the bottom of the cutting mat, on the pinch wheels, and/or on the grit shafts can also cause drag and slippage. Thus, keep all of these very clean.
- Thick materials - similar to the blade cutting into the mat, cutting thick materials can cause dragging which will then throw off the accuracy. Instead of single pass cutting, set Multi-cut to 2 or more passes and reduce the pressure so that the blade isn't being forced to cut a material faster and deeper than it's able to.


### 8.12.2 Setting Up a Print+Cut Project

- Here are the typical steps when performing a $\mathrm{P}+\mathrm{C}$ application:
$\diamond$ Prepare the image(s) that will be printed which can include the following:
- An imported raster image such as a JPG or PNG or BMP file
- A vector image (either imported or designed in SCAL) that will be printed and cut or not cut
- Text that will printed and also cut or not cut
$\diamond$ Prepare the cut lines which can include:
- The resulting cut lines from tracing imported raster files. Refer to Section 5.03 for details on using the Trace function in SCAL.
- A contour cut around the outside of the traced image: Refer to Sections 6.05, 7.23, and/or 8.01 for three options to use.
- Any other vector shapes, either imported or designed in SCAL
$\diamond$ Make sure individual shape layers are assigned to the Cut Line Type you need on the Style Panel:

Controlling What Will Happen to a Layer


What will happen?

| Cut Line Type | Layer will Print? | Layer will Cut? |
| :---: | :---: | :---: |
| Cut | yes | yes |
| Score* $^{*}$ | no | yes (using Score Force) |
| (Print+Cut) Cut Only | no | yes |
| (Print+Cut) Print Only | yes | no |

*Score option is only available on certain newer cutters
$\diamond$ Go to File>Print Setup (File>Page Setup on a Mac) before printing to make sure the correct printer is selected, as well as the correct size. Access the Properties windows and tabs and confirm that any necessary changes are made.
$\checkmark$ If you need to set up a custom print size or switch to Landscape printing, please refer to the tutorials at the following link. Note they were written based on another version of SCAL called CREATE but the same guidelines apply: https://tinyurl.com/49ejkjze
$\diamond$ On the Document Panel, always enable Show Print Margins and Show Reg Marks to confirm that the registration marks are within the print boundaries and not overlapping any images:

$\checkmark$ Print the project, making sure to mark the option to Print registration marks. You can print a project using either File>Print or by clicking the Print button in the Print and Cut window.
$\checkmark$ Perform a test cut so that you know the best cut settings to use. This test cut can often be performed on the printout itself if there is room in the waste area of the project.
$\diamond$ Perform the cutting process, selecting Print+Cut from the Cut Settings window and following the instructions.

### 8.12.3 Registration Mark Settings

- On many cutters, you have some control over the size and location of the registration marks. Under Cutter>Cutter Settings, the upper right section of that window shows the default settings for creating registration marks. These settings will vary with the cutter brand:

- Mark type: Usually this is fixed based on cutter brand and model.
- Mark size: Make marks larger or smaller, although some cutters may not allow for much variation.
$\diamond$ Mark thickness: This usually doesn't need to be changed unless an optic eye is struggling to successfully scan the marks.
$\diamond$ Mark Offset Reference: There are three options in this menu:
- Mark offset around design: The marks will be positioned based on the bounding box around the layer(s) that will be cut
- Mark inset from print bounds: The marks will be positioned based on the paper size specified in your printer properties
- Mark inset from page bounds: The marks will be positioned based on the Mat Size specified on the Document Panel
$\checkmark$ Mark Offset or Inset Distance: This is the distance from the registration marks to whatever reference point was selected. This can be reduced if you need more space on your printout for your images. Note, however, that if you have images too close to the registration marks, then the scanning process can fail.
$\diamond$ Use Segment Marks Y: Enabling this option will add additional pairs of reg marks for intermediate (extra) scanning, thus correcting for any drift occurring. The Max Y step indicates the longest distance allowable before additional marks are added to the printout.


### 8.12.4 Printing a PNC Project from Outside of SCAL

- Sometimes users prefer to print their designs from other applications, such as Adobe Illustrator or Photoshop. Please refer to the following Expanded Tutorial for instructions on the procedures: https://tinyurl.com/yc2m82fy


### 8.13 Scan2Cut

- Scan2Cut is similar to a print-and-cut process with these exceptions:
$\diamond$ The image (or multiple images) is already printed or drawn without any registration marks present. These marks will be added.
$\checkmark$ A digital photo or scan is made of the project so that it can be traced.
$\diamond$ The Scal2Cut window is used to identify where the reg marks are located on the digital photo or scan.
$\diamond$ Typically, you need a shadow (contour cut) around the design as an error allowance.
- There are more applications with Scan2Cut, which include:
$\diamond$ Cutting around an image that's been stamped and/or pre-printed
$\diamond$ Cutting out an image that's pre-printed on something small, such as the front of a greeting card or a piece of patterned paper or even fabric
$\diamond$ Utilizing scrap pieces of cardstock or other paper
- The original method was developed before SCAL5 added the ability to place reg marks based on distance from printout edges. For this reason, different cutters can use different methods for the Scan2Cut process. Documenting each method would take add another 12 pages to this already-lengthy manual. Thus, I refer you to the following videos and tutorials if you are interested in learning the process.
$\diamond$ Original method: Go to File>Scan2Cut and follow the on-screen instructions
$\diamond$ Newer "single window" method with reusable template: https://youtu.be/RnPxI47F5D8
$\diamond$ Alternative methods presented by CreateinSpain:
- https://www.youtube.com/watch?v=x88p64MwbIM
- https://www.youtube.com/watch?v=4 cQbiW1Vq0


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