



Skycut Series C with Sure Cuts A Lot

September 3, 2021

You can expect updates to this manual over the next few months

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

- At the start of Chapters 1 - 4 are short sections with references to find what you need plus some important reminders. PLEASE read these short sections at the very least and refer back to them, when needed.
- Chapters 1 and 2 are very important in terms of correctly setting up your Skycut to work with SCAL and learning the ins and outs of cutting.
- Chapter 3 is for those owners wanting to perform print and cut applications.
- Chapter 4 covers using the Skycut accessory tools.
- Chapters 5 – 12 are specific to SCAL and present every function in the software, many of which you may never need.

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

- It's a waste of paper and ink if you only ever need certain sections.
- The live links to videos and section numbers in the manual will not work.
- This manual will be updated from time to time.
- You cannot search on individual words.

Also:

- Note the green **Video** icons which link to videos related to the section in which they are located. These videos will enhance your learning experience.



Table of Contents



SKY CUT SERIES C WITH SURE CUTS A LOT	1
1. INTRODUCTION AND SETTING UP	9
1.00 QUICK REFERENCE FOR THIS CHAPTER	9
1.01 SUPPORT	9
1.02 SAFETY AND WARNINGS	9
1.03 WARRANTY	10
1.04 UNPACKING Video	10
1.05 CONTENTS Video	11
1.06 PARTS OF THE SKY CUT Video	12
<i>Front</i>	12
<i>Right Side</i>	12
<i>Back</i>	13
1.07 ACCESSORIES	13
1.07.1 <i>Assembling the Skycut C Stand (optional)</i>	13
1.07.2 <i>Test Pen</i>	13
1.07.3 <i>Skycut Blades</i>	13
1.07.4 <i>Blade Installation</i>	14
1.08 PREPARING AND CARING FOR THE CUTTING MAT	15
1.08.1 <i>Tips on Using the Cutting Mat</i>	15
1.08.2 <i>Cleaning and Replenishing the Cutting Mat</i>	15
1.09 PINCH WHEELS	16
1.10 CONTROL PANEL Video	17
1.10.1 <i>Set Screen</i>	18
1.11 REGISTERING AND INSTALLING SCAL	18
1.12 CONNECTING THE SKY CUT TO YOUR COMPUTER Video	19
1.12.1 <i>USB Connection</i> Video	19
1.12.2 <i>Wi-Fi Connection</i> Video	20
1.12.3 <i>Wireless Stand-Alone</i> Video	22
1.12.4 <i>USB Flash Drive</i> Video	23
1.13 VERIFY COMMUNICATION AND TEST DRAW SHAPES	25
1.13.1 <i>Setup for Drawing</i>	25
1.13.2 <i>Drawing Your First Shape</i>	27
1.14 DEFAULT SETTINGS TO CONSIDER	32
1.14.1 <i>Advanced Settings</i>	32
1.14.2 <i>General Settings</i>	35
1.14.3 <i>Sys Information</i>	37
1.15 MAINTENANCE	38
1.16 OTHER USEFUL TOOLS AND SUPPLIES	38
2. CUTTING	40
2.00 QUICK REFERENCE FOR THIS CHAPTER	40
2.01 WHAT YOU NEED TO UNDERSTAND ABOUT CUTTING	40
2.01.1 <i>You Have To Make Mistakes</i>	40
2.01.2 <i>Record Your Successes</i>	41
2.01.3 <i>Set the Blade Height Above the Material</i>	41
2.01.4 <i>Adjust the Speed, Force, and Number of Passes Based on the Material and Shapes</i>	42
2.01.5 <i>Perform Test Cuts!</i>	42
2.01.6 <i>Keep the Cutting Mat Clean and Sticky</i>	42

2.01.7 <i>Don't Get Frustrated, Get Help!</i>	43
2.02 CHOICES BEFORE CUTTING	43
2.02.1 <i>Controlling Which Shapes Will Cut</i>	43
2.02.2 <i>Controlling Where Shapes Will Cut</i>	44
2.02.3 <i>Selecting the Tool to be Used for Cutting</i>	44
2.02.4 <i>Determining the Cut Settings</i>	46
2.03 CUT SETTINGS	46
2.03.1 <i>Pressure</i>	46
2.03.2 <i>Speed and Up Speed</i>	47
2.03.3 <i>Blade Offset</i>	47
2.03.4 <i>Overcut</i>	48
2.03.5 <i>Multi-Cut</i>	48
2.04 PRESETS	49
2.05 SETTING THE ORIGIN BEFORE CUTTING	52
2.05.1 <i>Setting an Origin Using the Camera</i>	53
2.06 OTHER CUT SETTING FUNCTIONS	55
2.07 IMPORTANT CHECKLIST BEFORE YOU CUT!	55
2.08 RESOLUTION/SCALE CALIBRATION	56
2.08.1 <i>Skycut Resolution Using Millimeters for Measurement</i>	56
2.08.2 <i>Skycut Resolution Using Inches for Measurement</i>	58
2.09 TEST CUTTING FLOW CHART FOR THE SKYCUT.....	61
2.10 SETTINGS FORM FOR CUTTING MATERIALS	61
2.11 SUGGESTED CUT SETTINGS FOR VARIOUS MATERIALS	63
3. PRINT AND CUT (CONTOUR CUT)	67
3.00 QUICK REFERENCE FOR CHAPTER 3	67
3.01 WHAT IS A PRINT AND CUT (PNC)?	67
3.02 WHAT IS A PNC CALIBRATION?.....	68
3.03 CAMERA CALIBRATION PROCEDURE.....	68
3.04 PERFORMING A PNC IN SCAL	71
3.04.1 <i>Summary of Steps</i>	71
3.04.2 <i>Step-by-Step Sample PNC Project</i>	72
3.05 ADDITIONAL INFORMATION ON PRINT AND CUT APPLICATIONS	77
3.05.1 <i>Registration Mark Settings</i>	77
3.05.2 <i>Inaccurate Tracings</i>	78
3.06 PRINTING A PNC PROJECT FROM OUTSIDE OF SCAL	79
3.07 PNC FROM USB FLASH DRIVE	80
3.07.1 <i>PNC from Flash Drive – Single Cut</i>	80
3.07.2 <i>PNC from Flash Drive – Using Array Mark for Repeats</i>	81
3.07.3 <i>Mark Set Options</i>	84
4. ACCESSORY TOOLS	87
4.00 QUICK REFERENCE FOR CHAPTER 4	87
4.01 DRAWING WITH THE TEST PEN.....	87
4.01.1 <i>Draw and Cut</i>	87
4.02 EMBOSSING AND SCORING	90
4.02.1 <i>General Info on Embossing</i>	90
4.02.2 <i>Score and Cut Project</i>	90
4.02.3 <i>Embossing Paper or Cardstock</i>	93
4.03 SCRATCH ENGRAVING	94
4.03.1 <i>Engraving a Metal Tag</i>	94
4.04 SETTINGS FORM FOR ACCESSORY TOOLS.....	99
4.05 SUGGESTED SETTINGS FOR VARIOUS ACCESSORIES ¹	100
5. SCAL: INSTALLATION, PREFERENCES, AND WORKSPACE	101
5.01 INSTALLING SCAL.....	101
5.01.1 <i>Selecting and Downloading the Software</i>	101
5.01.2 <i>Activating the Software</i>	102
5.01.3 <i>Installing the USB Driver</i>	104
5.01.4 <i>Installing Your Cutter</i>	104
5.02 MAIN SCAL SCREEN.....	104

5.03 LIBRARY	105
5.04 PROPERTIES PANEL	106
5.05 CUSTOMIZING THE PROPERTIES PANEL / WORKSPACE	107
5.06 DOCUMENT PANEL	111
5.06.1 Mat Size	111
5.06.2 Orientation	112
5.06.3 Units	113
5.06.4 Show Grid	113
5.06.5 Show Guidelines	114
5.06.6 Workspace Alpha	114
5.06.7 Show Outlines Only	115
5.06.8 Show Print Margins	115
5.06.9 Show Reg Marks	116
5.06.10 Show Page Color	116
5.06.11 Show Template	116
5.07 SNAP TO	116
5.08 OTHER PREFERENCES	117
5.09 ZOOMING AND PANNING	118
5.09.1 Zooming	118
5.09.2 Panning	119
5.10 UNDO/REDO	119
5.10.1 Undo	119
5.10.2 Redo	120
5.11 PROJECTS AND PAGES	120
5.12 HELP RESOURCES	121
6. SCAL: HANDLING FILES AND ORGANIZING LAYERS	123
6.01 OPENING FILES	123
6.01.1 Opening a New File/Project	123
6.01.2 Opening an Existing .SCUT File	123
6.02 SAVING SCAL FILES	124
6.03 CUSTOMIZING THE LIBRARY	124
6.03.1 Shapes Tab	125
6.03.2 Fonts Tab	129
6.03.3 Projects Tab	129
6.04 LAYERS PANEL	131
6.04.1 Introduction to the Layers Panel	131
6.04.2 Parts of the Layers Panel	132
6.04.3 Creating Folders and Moving Layers	135
6.05 CUTTER'S MARKET (FORMERLY THE ESHAPE STORE)	138
6.06 IMPORTING OTHER FILE FORMATS	139
6.06.1 Importing Vector Files	139
6.06.2 Importing Raster Files	140
6.06.3 Importing Fonts	141
6.07 EXPORTING IN OTHER FILE FORMATS	141
6.07.1 Exporting in SVG Format	142
6.07.2 Exporting in JPG, PNG, BMP and TIFF Formats	142
6.07.3 Exporting in FCM Format	143
6.07.4 Exporting in PLT Format	143
6.07.5 Exporting to SCAL2	144
7. SCAL: MANIPULATING AND COLORING SHAPES	145
7.01 BASIC SHAPES	145
7.01.1 Rectangle	145
7.01.2 Rounded Rectangle	145
7.01.3 Circle and Oval	146
7.01.4 Triangle	146
7.01.5 Polygon	146
7.01.6 Star	146
7.01.7 Spiral	147
7.02 SELECTING	147

7.02.1 Basic Selection Handles	148
7.02.2 Advanced Selection Handles	148
7.03 DELETING	150
7.04 MOVING.....	150
7.05 RESIZING, SCALING, AUTO FIT	152
7.05.1 Resizing	152
7.05.2 Scaling	154
7.05.3 Auto Fit.....	154
7.06 ROTATING.....	155
7.07 SKEWING AND DISTORTING	157
7.07.1 Skewing.....	157
7.07.2 Distorting	157
7.08 MIRRORING AND FLIPPING	158
7.09 LOCKING AND UNLOCKING	158
7.10 HIDING AND SHOWING	159
7.11 GROUPING AND UNGROUPING.....	160
7.11.1 Group	160
7.11.2 Ungroup	160
7.12 BREAKING AND MERGING.....	161
7.12.1 Break Apart	161
7.12.2 Merge	162
7.13 ARRANGING (ORDERING) SHAPES.....	163
7.14 FILL & STROKE: FILL	164
7.14.1 No Fill	166
7.14.2 Color Fill.....	166
7.14.3 Pattern Fill.....	167
7.14.4 Gradient Fill.....	168
7.14.5 Opacity	170
7.15 FILL & STROKE: STROKE	171
7.15.1 Stroke Settings.....	171
7.15.2 Stroke Line Style	175
7.15.3 Converting Strokes into Closed Shapes	175
7.16 DROPPER TOOL	176
7.17 CUTTING, COPYING, PASTING, DUPLICATING	177
7.17.1 Cutting to the Clipboard	177
7.17.2 Copying to the Clipboard	177
7.17.3 Pasting from the Clipboard	177
7.17.4 Duplicating – Duplicate	178
7.17.5 Quick Duplicate	178
7.18 ALIGNMENT	178
7.18.1 Align to Page.....	179
7.18.2 Align to Selection	180
7.19 DISTRIBUTE	181
7.19.1 Distribute to Page.....	182
7.19.2 Distribute to Selection	183
7.19.3 Distribute to Selection Below	185
8. SCAL: WORKING WITH TEXT	187
8.01 TEXT OPTIONS	187
8.02 SELECTING A FONT	187
8.02.1 Choosing a Font from the Font Menu	187
8.02.2 Choosing a Font via Font Preview	187
8.02.3 Temporarily Installing a Font.....	189
8.03 ADDING TEXT OPTIONS	190
8.04 FOUR MODES OF TEXT	191
8.04.1 Type Tool	191
8.04.2 Vertical Type Tool	191
8.04.3 Type on Path Tool	192
8.04.4 Type on Arch Tool.....	193
8.05 TEXT SETTINGS.....	194
8.06 OTHER TEXT EDITING	196

8.07 CREATING A CONNECTED LETTER TITLE	197
8.08 INCORPORATING SHAPES INTO A TITLE	198
8.09 WELDING TITLES IN IMAGINATIVE WAYS	199
8.10 STENCILING LETTERS	199
8.11 OPEN PATH FONTS (OPF).....	200
8.12 KNOCKOUT	201
8.13 TITLE CRAWL	202
8.14 APPLICATIONS USING THE SIZING FUNCTION	203
8.14.1 <i>Sizing Lettering for Particular Fonts</i>	204
8.14.2 <i>Sizing Letters for Welding Inside Rectangles</i>	204
8.15 OTHER TEXT EFFECTS	205
9. SCAL: TRACING AND DRAWING	206
9.01 RASTER VERSUS VECTOR.....	206
9.02 FINDING EASY IMAGES TO TRACE.....	207
9.03 TRACE FUNCTION.....	208
9.03.1 <i>Trace Settings</i>	208
9.03.2 <i>Monochrome Trace of a Colored Image: Effects of Contrast</i>	212
9.03.3 <i>Monochrome Trace of a Silhouette Image: Effects of Smooth</i>	213
9.03.4 <i>Monochrome Trace of a Detailed Image: Effects of Despeckle and Detail</i>	214
9.03.5 <i>Monochrome Trace of a Coloring Book Image: Single Line Threshold and Blackout</i>	216
9.03.6 <i>Monochrome Trace of a PNG File with a Transparent Background</i>	217
9.03.7 <i>Monochrome Trace for a Print and Cut Application: Effect of Resample</i>	218
9.03.8 <i>Resample Versus Smooth and the High Pass Filter</i>	220
9.03.9 <i>Color Layers Trace</i>	222
9.03.10 <i>Single Color Trace</i>	224
9.03.11 <i>Draw Mask Function</i>	227
9.03.12 <i>High Pass Filter Application</i>	230
9.04 DRAW FUNCTIONS.....	232
9.04.1 <i>The Draw Tool</i>	232
9.04.2 <i>Freehand Drawing</i>	235
9.04.3 <i>Brush Drawing</i>	235
9.05 MANUAL TRACING OF AN IMPORTED IMAGE	236
9.05.1 <i>Importing an Image for Manual Tracing</i>	236
9.05.2 <i>Manual Tracing Using the Draw Tool</i>	237
9.05.3 <i>Editing the Trace</i>	238
9.05.4 <i>Using Symmetrical Mirror to Complete the Trace</i>	240
10. SCAL: EDITING	242
10.01 SIMPLIFY	242
10.02 SPLIT PATH.....	243
10.03 CLOSE PATH.....	245
10.04 JOIN PATHS	245
10.05 PATH OFFSET	246
10.06 ERASER.....	248
10.07 KNIFE AND CROP.....	249
10.07.1 <i>Using Knife</i>	250
10.07.2 <i>Using Crop</i>	250
10.08 WHICH CUTTING TOOL TO USE?	251
10.09 RULER.....	252
10.10 THE SHAPE TOOL - PATH AND NODE EDITING	254
10.10.1 <i>Moving a Path</i>	254
10.10.2 <i>Reshaping a Path</i>	256
10.10.3 <i>Examples of Smoothing Curves</i>	259
10.10.4 <i>Applications for the Shape Tool</i>	260
11. SCAL: DESIGNING	261
11.01 WHERE DO I START WITH LEARNING TO DESIGN?	261
11.02 PROJECT INFO	261
11.03 GUIDELINES	262
11.04 TEMPLATES	263

11.04.1 Mat Template Window	263
11.04.2 Template File Settings	265
11.04.3 Importing Your Own Templates	266
11.05 SHADOW LAYER	267
11.05.1 Shadow Layer Settings	267
11.06 BOOLEAN OPERATIONS	270
11.06.1 Union	270
11.06.2 Intersection	271
11.06.3 Exclude	272
11.06.4 Front Minus Back	273
11.06.5 Back Minus Front	273
11.07 CLIP PATH AND CLIP MASK	274
11.07.1 Clip Path	274
11.07.2 Clip Mask	275
11.08 DUPLICATE ROTATED	276
11.08.1 Duplicate Rotated Settings	276
11.08.2 Using Duplicate Rotated to Design a Wreath	278
11.08.3 Using Duplicate Rotated to Design a Frame	278
11.09 OBJECT ON PATH	279
11.09.1 Designing a Scalloped Oval	281
11.09.2 Warp a Shape to a Path	282
11.09.3 Remaining Settings	284
11.10 WRAPPER	284
11.11 LATTICE	286
11.12 RHINESTONES	290
11.12.1 Guidelines for Rhinestone Pattern Design	290
11.12.2 Rhinestone Outline	291
11.12.3 Rhinestone Fill	293
11.12.4 Editing Rhinestone Designs	294
11.12.5 Adding an Outline to a Rhinestone Design	295
11.12.6 Using Purchased Rhinestone Fonts and Designs	297
11.13 JIGSAW PUZZLE	299
11.14 3D ROTATE	302
11.15 3D EXTRUDE (SCAL PRO ONLY)	303
11.16 BARREL DISTORTION	305
11.17 BULGE	306
11.18 CANNED	308
11.19 WAVE	309
11.20 BRIDGE WARP	310
11.21 DROP SHADOW	311
11.22 QR CODE	314
11.23 SYMMETRICAL MIRROR	315
12. SCAL: OUTPUT	317
12.01 THE STYLE PANEL	317
12.02 PREVIEW	318
12.03 PRINTING	320
12.04 WEEDING (SCAL PRO ONLY)	322
12.05 TILING (SCAL PRO ONLY)	324
12.06 CUT SETTINGS	326
12.06.1 Cut Window Settings	326
12.06.2 Presets	331
12.06.3 Cut by Color (SCAL PRO only)	331
12.06.4 Tiles (SCAL PRO only)	336
12.06.5 Extras (SCAL PRO only)	337
12.06.6 Cut Order (SCAL PRO only)	339
12.06.7 Layers (SCAL PRO only)	340
12.07 CONTROLLING WHERE SHAPES WILL CUT	343
12.07.1 Overview	343
12.07.2 Origin Point	345
12.07.3 WYSIWYG	347

12.07.4 Center Point	349
12.08 PATH DETAILS AND REVERSE PATH	351
12.09 LINE FILL	352
12.10 PIERCE	353
12.11 NEST	354
APPENDIX A SHORTCUTS AND ICONS IN SCAL5	358
APPENDIX B TROUBLESHOOTING FAQ'S.....	365
B1 COMMUNICATION ISSUES.....	365
B2 OPERATING ISSUES.....	366
B3 CUTTING/DRAWING ISSUES	368
B4 SOFTWARE ISSUES	370
APPENDIX C SCAL DETAILS	374
C1 SCREENSHOT OF SCAL SCREEN.....	374
C2 BARS	374
C2.1 Menu Bar	374
C2.2 Toolbar	375
C2.3 Projects Bar	375
C2.4 Pages Bar	375
C2.5 Status Bar	375
C3 PANELS.....	375
C3.1 Tools Panel.....	375
C3.2 Properties Panel.....	376
C4 PREFERENCES	376
C4.1 Preferences: General Tab	376
C4.2 Preferences: Edit Tab.....	377
APPENDIX D ORIGINAL CAMERA CALIBRATION.....	379
D1 CAMERA CALIBRATION PROCEDURE Video	379
D2 TWEAKING THE CALIBRATION VALUES.....	381
APPENDIX E ACTIVATING COMMANDS.....	384

1. Introduction and Setting Up

1.00 Quick Reference for This Chapter

- How to download and set up SCAL: *Section 1.11*
- How to set up communication between a computer and Skycut: *Section 1.12*
- How to use the control panel: *Sections 1.10 and 1.14*
- How to adjust the blade holder: *Section 1.07.4*
- Where to position the pinch wheels: *Section 1.09*
- The cutting mat is too sticky (or not sticky enough): *Section 1.08*
- How to use the USB Flash Drive feature: *Section 1.12.4*

Important Notes:

- Please read *Section 1.02* regarding safe operation of the Skycut.
- Report any damage or missing contents to your dealer promptly.
- Retain the original box and packing materials in case you ever need to ship your Skycut.

1.01 Support

- Thank you for choosing a Skycut digital die cutter. Before using a blade in your new cutter, we urge you to read Chapters 1 and 2 and watch the videos linked in these chapters.
- If you run into difficulties with the operation of your Skycut, turn off the power and look for a solution in this manual. Note that *Appendix B* is a Troubleshooting section. If you continue to have technical questions or issues, please contact your dealer as soon as possible.
- If anything is missing from your order or you have mechanical issues with your Skycut, please contact your dealer as soon as possible. You can also contact Skycut directly using this email address: skycut@skycut.cn.
- For additional information and support with the Skycut, please check out the following:
 - ◇ Skycut web site: <https://www.skycutcutter.com/>
 - ◇ Skycut Facebook page: <https://www.facebook.com/skycutcuttingplotter/>
 - ◇ Skycut Facebook group: <https://www.facebook.com/groups/Skycut>
 - ◇ Skycut YouTube channel: <https://www.youtube.com/channel/UCrPn5hFLbiRNDgccY8iXwoA>
- For SCAL support, please check the list of resources in *Section 5.12*.

1.02 Safety and Warnings

Please be aware of the following safety guidelines when working with the Skycut:

- **Pinch Points:** Keep hands, long hair, loose clothing, jewelry, etc. away from the moving parts.
- **Risk to Children and Pets:** Please supervise children around the cutter when it is in use.
- **Movement and Touching:** Do not move the Skycut or touch any circuitry while it is plugged in.

- **Power Adaptor:** ONLY use the included power adaptor. Attempting to use a different model can result in seriously damaging the Skycut. If either the power cable or adaptor are damaged, replace with the appropriate parts.
- DO NOT touch or jam the plotter's track while it is operating. If the cutter is damaged, it is the owner's responsibility.
- DO NOT shake the cutter while it is operating.
- DO NOT cut any materials that have staples or other embellishments attached.
- DO NOT touch the cutter with a magnet. It is safe, however, to cut magnetic materials, such as those used on refrigerators and car exteriors.
- DO NOT allow any liquids to spill into the cutter.
- DO NOT allow small items to fall into the cutter.
- Place the Skycut on a sturdy and stable table, desk, or trolley. The optional Skycut stand can also be used.
- Always turn off the Skycut when not in use. Leaving the cutter turned on for extended periods of time can possibly damage the machine.
- Always turn off the Skycut before unplugging the power adaptor or removing the power cable from the wall outlet or power strip.
- Unplug the Skycut from a wall outlet or power strip during an electrical storm or when the cutter will not be used for an extended period of time.
 - Transporting: When transporting the cutter, move the pinch wheel lever into the upward position. Remove the blade from the blade holder and cover the tip with the plastic cap.

1.03 Warranty

- **IMPORTANT!** If your Skycut is damaged during shipment or appears to be defective, your dealer should be notified as soon as possible.
- For additional information regarding your warranty, please refer to your Skycut dealer.
- It is recommended that you **retain the original box with packing materials** in case you ever need to ship your Skycut.

1.04 Unpacking









Video

- Verify that you have received all contents. There is a checklist in *Section 1.05*. Please notify your Skycut supplier immediately if anything is missing.
- Remove all foam pieces and other packaging before turning on the Skycut. Currently, the cutter ships with two end cap foam protectors and one small foam piece tucked under the head. There are also three plastic zip ties that will need to be cut. **Be very careful to only cut those ties and NOT the black cable behind them.**
- Because the cutting mat must be folded over to fit into the box, it may have become slightly rounded during shipping. Gently and only partially roll the mat in the opposite direction to remove the roundness and place on a flat table to make sure the mat now lies horizontally to the surface. Refer to *Section 1.08* for additional instructions on preparing the mat for use.
- Use the enclosed test pen as you experiment and become familiar with operating the Skycut. Place scrap paper on the mat and simply draw shapes rather than cut them. This will prevent possible damage to the blade, mat, and cutting strip as you learn where shapes will cut and the basic operating procedures.

1.05 Contents

Video

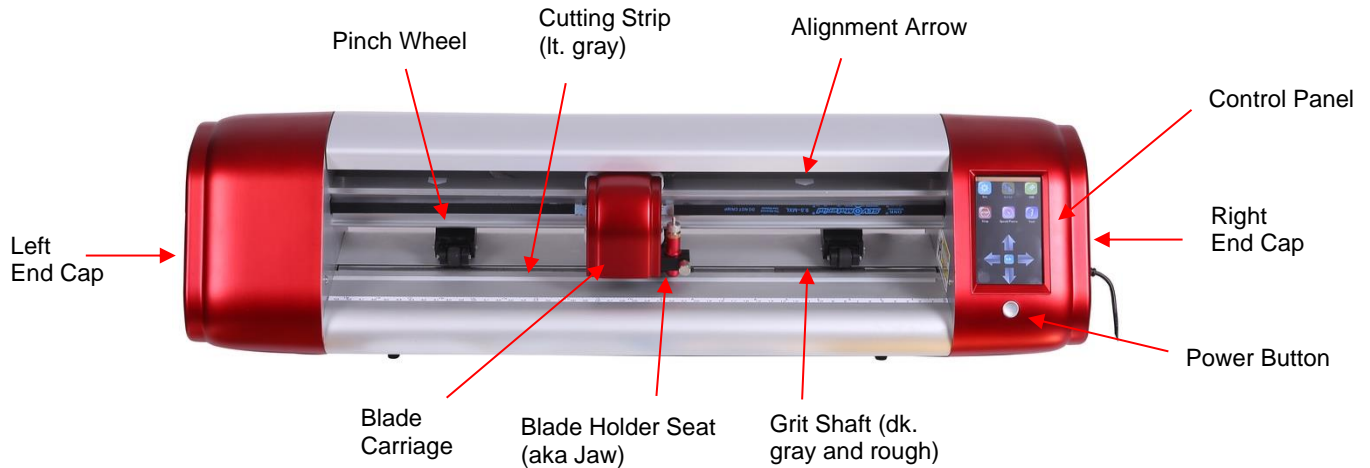
- Besides the cutter, your box should also contain the following items:

#	Description	Image	Quantity
1	Power Supply		1
2	Power Cable		1
3	USB Cable		1
4	60° Blade(blue cap)		1
5	45° Blade(red cap)		2
6	Blade Holder		1
7	Test Pen and 1 Refill		1 set
8	Cutting Mat		1

1.06 Parts of the Skycut

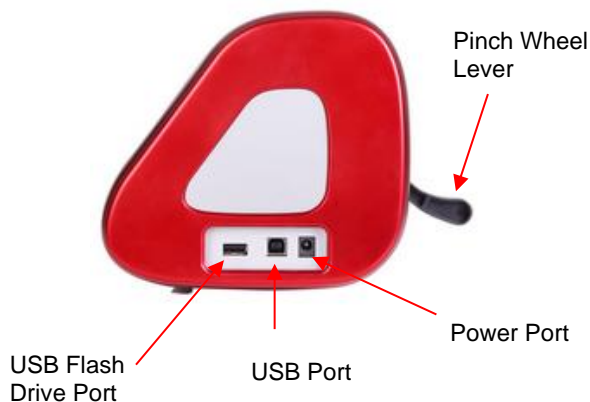
Video

Front



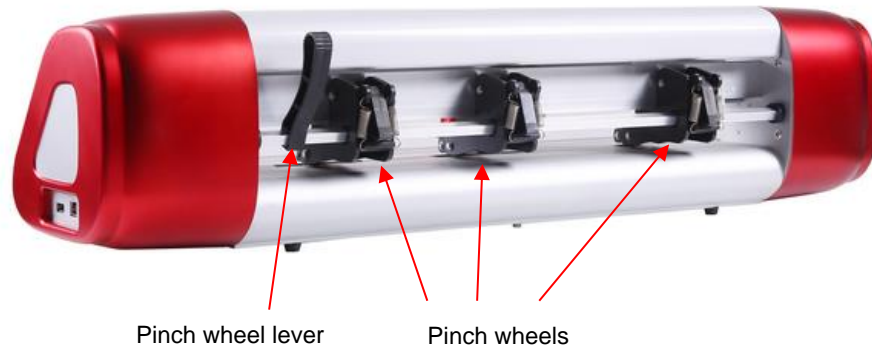
- Alignment Arrows: indicate to the user the available positions for the pinch wheels
- Blade Carriage: moves the Blade Holder Seat left and right
- Blade Holder Seat (Jaw): holds the blade holder, test pen, and other accessories
- Control Panel: used to change settings, set up Wi-Fi, calibrate camera, cut PLT files, and more
- Cutting Strip: protects a blade when cutting backed materials without using a cutting mat
- Grit Shafts (3 on 16" model; 4 on 24" model): allow the pinch wheels to grip the mat or material so they can be moved in and out of the cutter during cutting
- Pinch Wheels (3 on 16" model; 4 on 24" model): grip the mat or material so that the grit shafts beneath will feed the mat or material in and out during cutting
- Power Button: turns cutter on or off

Right Side



- Pinch Wheel Lever: lifts the pinch wheels up for loading the mat or material and then lowers the pinch wheels for cutting
- USB Flash Drive Port: used to load PLT files via control panel for cutting
- USB Port: option to connect computer to Skycut with included USB cable
- Power Port: connect Skycut power adaptor

Back



1.07 Accessories

- Go to *Chapter 4* for details on using the engraving and scoring tools.

1.07.1 Assembling the Skycut C Stand (optional)

- If you purchased the optional stand, please refer to this [Video](#) for detailed instructions on assembling the stand and mounting the cutter onto it.

1.07.2 Test Pen

- The test pen should be used until you are comfortable with the operation of your Skycut and know, with certainty, where images will cut. The test pen should arrive pre-assembled. However, if you need to change out the insert, note how the test pen is assembled:



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

1.07.3 Skycut Blades

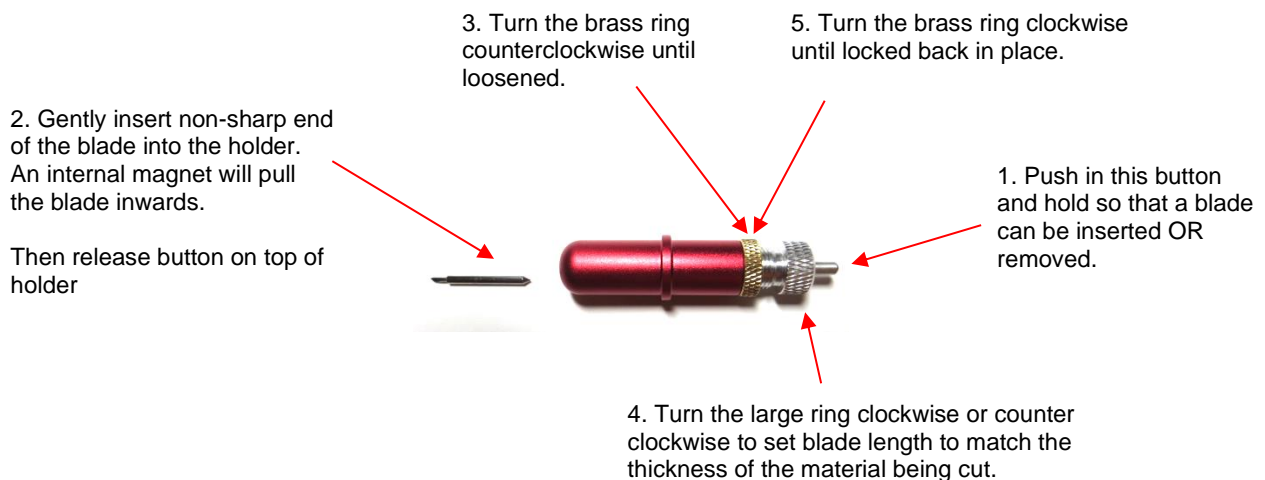
- There are three kinds of blades that fit inside the Skycut blade holder:



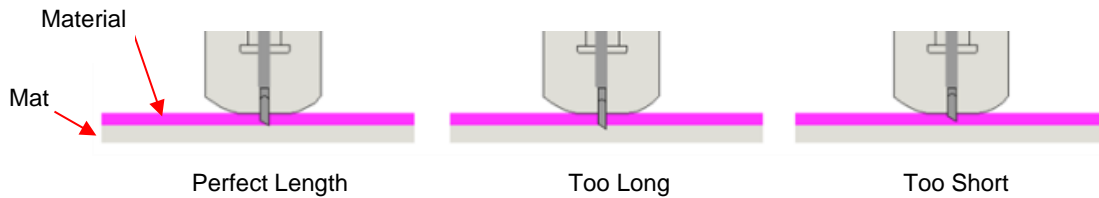
- ◇ The 45° **red** capped blade is suited for cutting thinner materials such as paper, all cardstock types, heat transfer vinyl, and wall/auto/decal vinyl.
 - ◇ The 60° **blue** capped blade is a much longer blade and is well-suited for cutting thicker materials, such as gum paste, craft plastic, craft foam, and rhinestone template material.
 - ◇ Sold separately is the 30° **yellow** capped blade. It is a wide blade and is well suited for cutting fabric, felt, and tint. It has been reported that it also works well with cardstock that has been exposed to humidity.
- Note that the red capped blade and blue capped blade have a cutback on the opposing side of the blade (right side, in the earlier photo). This reduces the blade offset value and allows for better detailed cutting of small shapes.
 - Additionally, there are other tools sold separately, including a stand, an engraving tool and an embossing/scoring tool. Details on the engraving tool and embosser are covered in *Chapter 4*.

1.07.4 Blade Installation

- The blade must be carefully inserted into the blade holder. Do this over a soft surface (e.g. over a hand towel). It's important to protect the fragile blade! To install, follow the numbered steps as shown:



- The **Blade Length** (also called **Blade Exposure**) is how much blade is exposed at the bottom of the blade holder. For optimal cutting, you want this length to match the thickness of the material or be just a tiny bit longer.
- When setting the blade length (*Step 4* in the prior photo), hold the blade holder up next to the material before pressing the material to the mat, so that you can more accurately set the length to match the thickness of the material. For really thin materials, like vinyl and thin paper, just the very tip of the blade will be protruding from the bottom of the blade holder. In fact, you should just barely be able to feel it with your fingertip and not be able to see it very well, if at all. Having the blade fully extended will never result in better cutting. In fact, it can cause skewing, tearing of the material, damage to the blade, and damage to the mat.
- A good way to test your blade length is to fold a piece of the material onto itself and then cut a line into the material by hand. Press firmly but not too hard, as more force will not determine if the blade is set to the right length. If the blade cannot cut through the material, you will need to extend the blade. If the blade cuts through the material and cuts into the next layer, you need to retract the blade. If the blade cuts through the material but does not cut into the layer below, you have the perfect length:



- When conducting a test cut, be sure to check your mat (or the top of a backing sheet) for cut lines after the test. You should be able to set the length to get clean cuts but with only fine lines or no lines in the mat or backing sheet. If you do see deep cut lines, retract the blade length $\sim\frac{1}{4}$ of a turn counterclockwise. Repeat your test cut.

1.08 Preparing and Caring for the Cutting Mat

1.08.1 Tips on Using the Cutting Mat

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

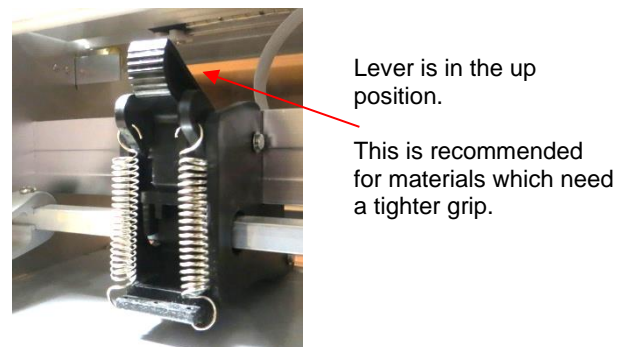
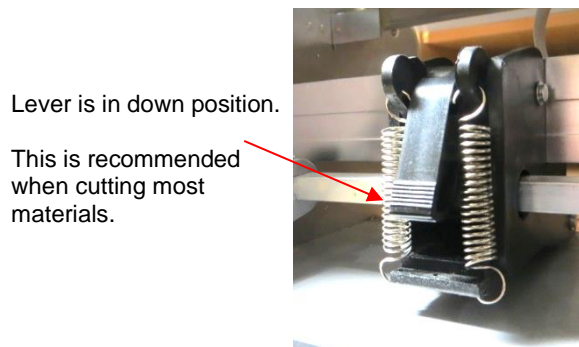
1.08.2 Cleaning and Replenishing the Cutting Mat

- When mats begin to lose their stickiness, they can be washed:
 - ◇ Use a mild dishwashing detergent, warm water, and a soft brush to thoroughly clean the surface. You're not trying to scrub the adhesive but just wet the invisible fibers that have been deposited from your cutting materials and get them released from the glue.
 - Rinse well, shake off excess water, and place sticky side down onto a bath towel.
 - Thoroughly dry the non-sticky side of the mat with another towel.
 - Pull the mat up and the sticky side should now be dry enough for immediate use. Test by making sure the mat will stick to your hand.
- While washing with soap and water should revive the original adhesive, you can add more adhesive if necessary:
 - ◇ Virtually any repositionable adhesive may be used on the cutting mat. Some of the popular choices include: Krylon Easy Tack, Aleene's Tack It Over and Over (view the video at the start of this section), Crafter's Companion Stick and Spray, Zig 2 Way Glue with wide tip, Craft Smart Off 'N On, and Scotch Repositionable Craft Stick. There's another spray adhesive, Scotch Super 77, which does not leave a sticky surface but is excellent for stabilizing paper and cardstock.
 - ◇ If you are cutting thicker materials, such as oil board or styrene, then you may want to experiment with a stronger adhesive and use painter's tape to secure the material to the mat. If you are cutting thin paper, then you may want to experiment with a lighter adhesive.

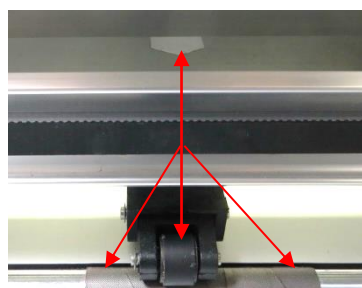
- ◇ With most repositionable adhesives, you can control the tackiness based on the amount applied. Thus, always add a little bit at a time. As mentioned above, if you add too much, just apply a layer or two of cotton fibers by pressing with a bath towel.
- Other reported methods for cleaning mats:
 - ◇ Use a plastic scraper (an old credit card will suffice) to scrape off any random material pieces remaining on the mat after a cut.
 - ◇ For finer particles of paper or lint, you can use a lint roller. Tear off a sheet and then press down and pull up across the surface of the mat to clean in sections. Baby wipes can accomplish the same task.
 - ◇ To completely remove adhesive from the mat, apply Goo Gone, Duck Adhesive Remover, or Avon's Skin So Soft Bath Oil across the surface. Allow a minute to soak in and then scrape off with a sharp metal spatula. Repeat, as necessary until the mat is thoroughly clean and no longer sticky. Wash, dry and then add any repositionable adhesive.
- When necessary, the rubber wheels and the grit shafts may be cleaned with isopropyl alcohol or Un-Du. Apply the cleaner to a clean lint-free rag and rub the entire wheel and/or grit shaft until free of adhesive.

1.09 Pinch Wheels

- The pinch wheels can be raised and lowered using the pinch lever located at the back-right side of the machine. Press down on the lever and the pinch wheels will be raised. Pull the lever up to lower the pinch wheels so that they can grip the mat or the material inserted in the cutter. ***IMPORTANT:*** Always hold the lever while raising and lowering. Never allow the lever to pop up on its own as this can put a lot of stress on the two couplers gripping the pinch wheel bar in the back.
- There is also a small black lever on each individual pinch wheel. When the lever is raised, there is more downward pressure exerted. ***IMPORTANT:*** Only push these small levers up when an extra tight grip is needed, such as when cutting glossy or slick materials or extra thick materials.



- Note that for a pinch roller to grip properly, it must be fully positioned over a grit shaft. To facilitate alignment, note the white arrows positioned along the horizontal bar below the cover. Slide the pinch wheels along the bar, as needed.



Use the white arrow labels as a guide for pinch roller placement.

Rollers can be anywhere along a gray grit shaft, as long as they are completely over it.

- When using the cutting mat, it is recommended that the material be placed in the middle of the mat and the left most pinch wheel moved to the far-left side. Then slide the middle pinch wheel to serve as the left side grip and the right pinch wheel left in the far-right position as shown in the following photo. This keeps the pinch wheels off the material and provides an equal balance while the mat moves in and out during cutting:

Left pinch wheels is on far left side (not in use)

Middle pinch wheel is under left-most arrow




Right pinch wheel is under white arrow on right side.


- Note that if your material is very wide, then it is fine to have the pinch wheels over the material. However, you may need to be extra careful when removing any cut shapes or waste material in those locations.

1.10 Control Panel

Video

- When you first turn power on the Skycut, after several seconds, the following **Main Screen** or **Home Screen** will be displayed:

Repeat last cut. While cutting, this icon and function changes to **Pause**. 



Change settings Refer to 1.10.1


Stop and cancel the current cut

4 arrow keys for moving the head left/right and for moving the pinch rollers

Open and cut PLT files from an inserted USB flash drive

Execute a test cut using current speed and force settings

Set the desired speed and force.

Toggle the speed for moving the head and pinch rollers. In slow mode, the icon changes to: 

- Throughout this manual, the functions above will be referenced along with submenus and additional screens. You will also see the following icons at the bottom of many screens. Pressing the one on the left will always return you to the **Main Screen** above. Pressing the one on the right will return you to the prior window/screen.

Go back to **Main Screen/Home Screen**   Go back to prior screen

1.10.1 Set Screen

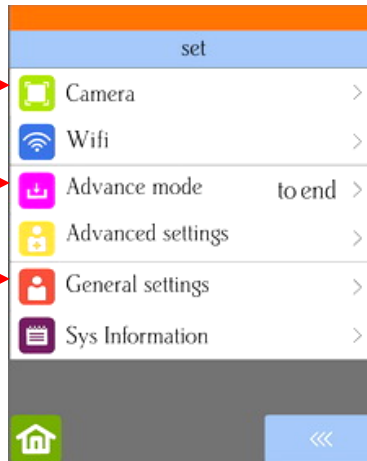


- Pressing the **Set** icon opens the **Set Screen** which contains access to many functions and settings. Note the general description and section number (if you wish to learn more about that function now):

Calibrate and use camera for print and cut applications: *Chapter 3*

Set end-of-cut options: *Section 2.06*

Settings for: LED, Units, Language, Screensaver, Alarm: *Section 1.14.2*



Set up wireless connection to home or office network: *Section 1.12.2*

Array setup, Scale, and options for display and cutter behavior: *Section 1.14.2*

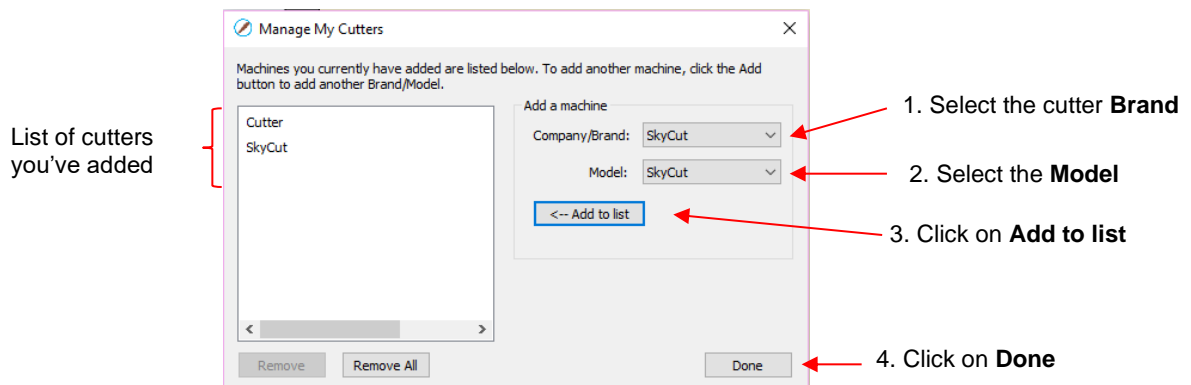
Version numbers, software selection, reset: *Section 1.14.3*

1.11 Registering and Installing SCAL

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

http://www.sky-cut.com/page89?product_id=64

- The additional features in the PRO version are detailed at [this link](#).
- Install the downloaded file and open SCAL. The software will run in DEMO mode for only 15 days unless a registration is purchased. For step-by-step details on activating SCAL, refer to *Section 5.01.2*.
- To add Skycut to SCAL, go to **Cutter>My Cutter>Manage Cutters** and the following window will open:



- Click on **Done** to save and close the window. Now, when you are ready to cut, the Skycut can be selected by going to **Cutter>My Cutter**.

1.12 Connecting the Skycut to Your Computer

Video

- Place your Skycut on a sturdy horizontal surface. If using the cutting mat, be sure to allow enough free room in both the front and the back for the mat to extend during cutting.
- Powering On:
 - ◇ Connect the power cord to the power adaptor.
 - ◇ Plug the power cord into a wall outlet or power strip. Then plug the power adaptor into the right side of the cutter.
 - ◇ Turn on the power using the power button below the control panel. After several seconds, the light inside the Skycut will turn on and the head will do a slight jog.
- Powering Off: Press and hold the power button until the light shuts off.
- You have four options for connecting the Skycut:
 - ◇ Direct USB: using the included USB cable to connect your computer to the Skycut
 - ◇ Wi-Fi: adding the Skycut to a home/office network that is also accessed by your computer
 - ◇ Wireless Stand-Alone: - connecting wirelessly to your computer
 - ◇ U_Disk: Exporting PLT files from SCAL onto a USB flash drive and then loading those files using the control panel on the Skycut.
- Review the information in the following table to understand the differences between these options:

Connection Options for the Skycut

Option	USB	Wireless to Network (Wi-Fi)	Wireless Stand-Alone	USB Flash Drive
<u>Description</u>	The Skycut is connected to the computer via a USB cable	The Skycut is wirelessly connected to a network router	The Skycut is wirelessly connected to the computer.	Files are saved in PLT format from SCAL to a USB flash drive
<u>Requirements</u>	USB cable (included)	Wireless network router and knowledge of router's name and password	Computer must have wireless capability	USB flash drive
<u>Pros</u>	Easy to install; Reliable and fast form of communication.	Skycut can be located anywhere within range of the router; Other computers can cut to the Skycut	Skycut can be located anywhere within range of the computer; Other computers can cut to the Skycut	Skycut can be located anywhere
<u>Cons</u>	Skycut is physically connected to the computer; Cannot be accessed by other computers at the same time	Requires more steps to set up; Some routers may require setting changes in order to work with the Skycut	Computer is now connected to the Skycut, thus no <u>wireless</u> access to the Internet or to other wireless devices	More steps due to saving and then loading the file; Cannot adjust size and certain cut settings once saved

- Note that implementing any of these options does not preclude you from changing to another one, as needed.
- The following sections present what steps are required for each type of connection. If you run into connectivity issues, please contact your dealer.

1.12.1 USB Connection

Video

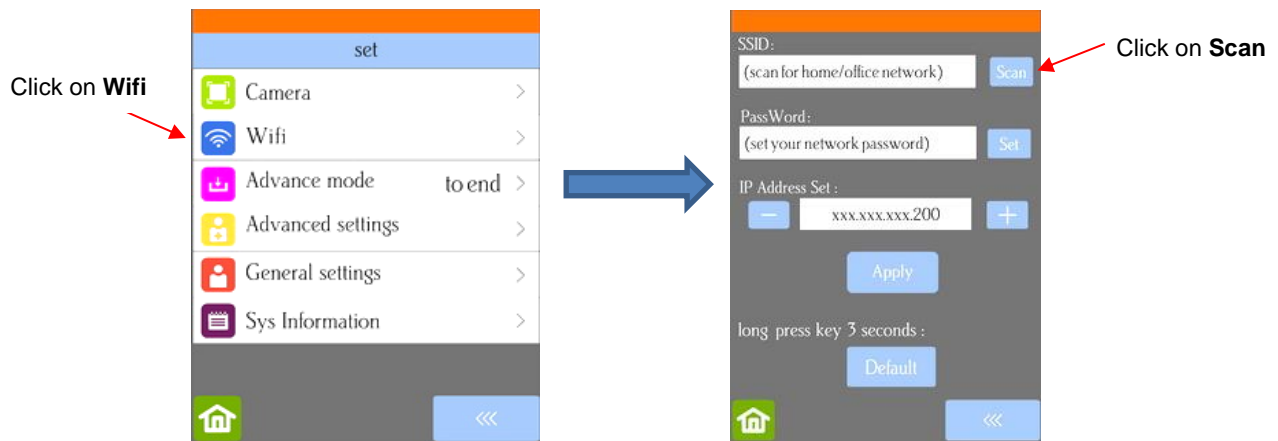
- Connect the USB cable to the right side of the cutter and into an available USB port on your computer. Both PC's and Mac's should automatically identify the device. Proceed to *Section 1.13* to test the communication.

1.12.2 Wi-Fi Connection

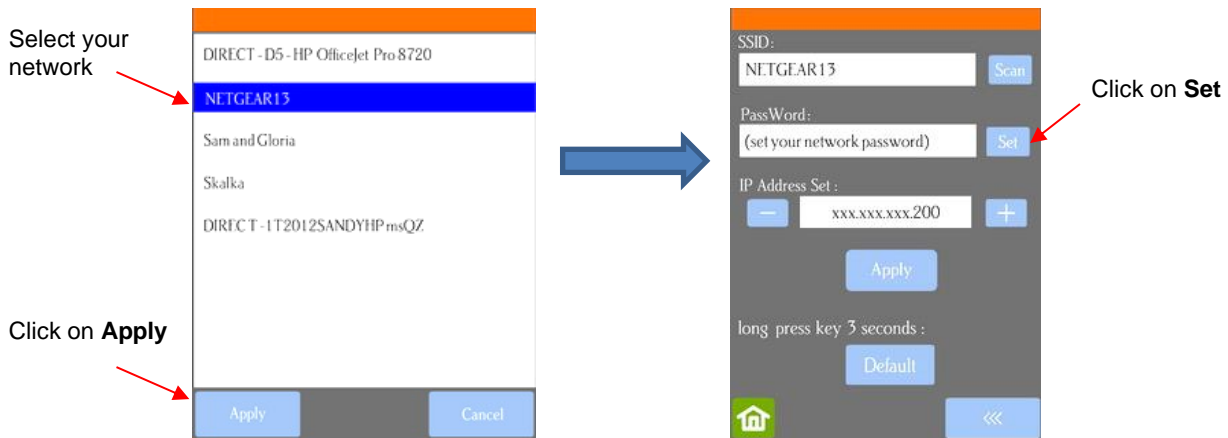
Video

- Note: Not all routers have the same signal strength. It's usually best to connect the Skycut while it is in the same room with the router. Once connectivity is established, you can then experiment to see how far from the router the Skycut can be located.
- What you'll need:
 - ◇ Name of your home/office network
 - ◇ The password for your network
- Carefully complete the following steps:

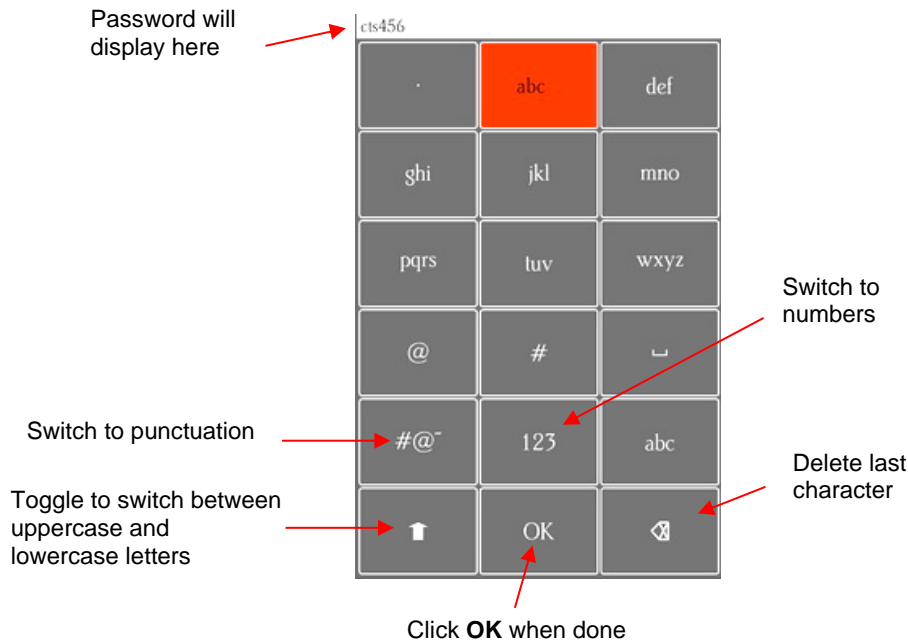
(1) On the Skycut's control panel, select **Set**  and then select **Wifi**. The **Wifi** screen will appear:



(2) Click on the **Scan** button and a list of the available networks will appear. Select your home/office network and click on **Apply**. You will then be returned to the **Wifi** screen:



(3) Click on **Set** and the following screen will open:



(4) To enter the password, use the following tips if you are unfamiliar with this type of screen:

- ◇ “Rapid tap” multiple times in succession to select a letter. For example, if your network password is *cts456*, then to enter “c”, you would tap three times on “abc” because “c” is the third letter in “abc”. Next you would proceed to “stu” and tap two times to enter “t”. Then you would only need to tap on “stu” once to enter the letter “s.”
- ◇ To enter numbers, click on “123” to open the number entry screen.
- ◇ For punctuation, click on “#@~” to open the extra characters screen.
- ◇ To enter upper case letters, click on the up arrow in the lower left part of the screen.

(5) Once you have the password entered in the display box at the top, click on **OK** to return to the **Wifi** screen:



- (6) Next check the **IP Address** that will be assigned to the Skycut. The Skycut will automatically pick up the first three sets of digits from your router but will continue to display them as shown above. You only need to decide if the last set, which should be defaulting to “200”, can be used. Use the “+” or “-” buttons to make any needed changes.
- (7) Click on **Apply** and wait for several minutes while your router assigns this **IP Address** to the Skycut. Eventually, you will see **Connected OK** appear:



Click on **Apply**


Wait will be displayed for several minutes

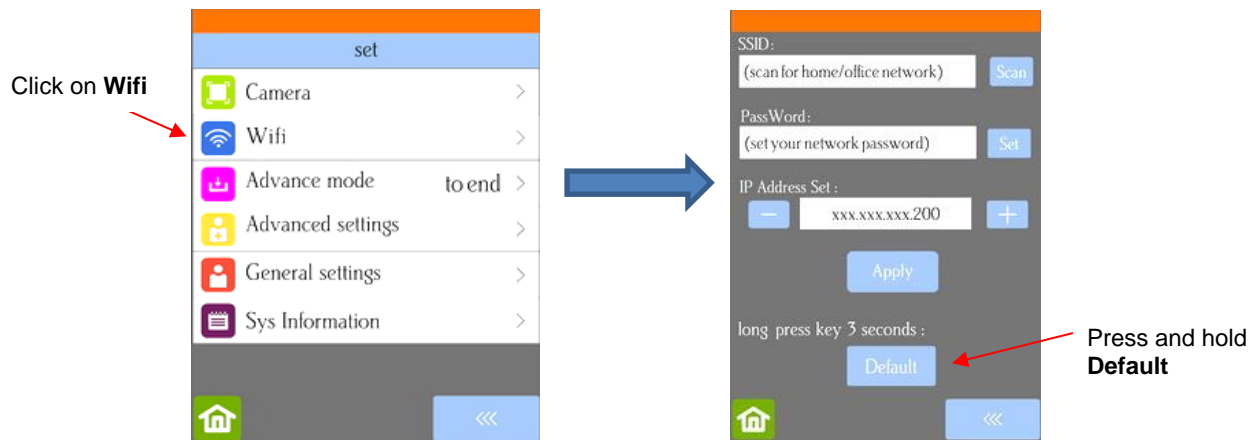
Success!

- (8) If instead of receiving a **Connected OK** display, you see **Password err**, again verify the network you selected and the password you entered. If you are unable to successfully connect and the Skycut is within a few feet of your router, please check your router's user manual and/or search online for issues with your particular router model.
- (9) If you wish to reset and start again, press and hold the **Default** button for 3 seconds until the button turns red. Then click on **Scan** and repeat from *Step 3*.
- (10) Once you receive the **Connected OK** display, proceed to *Section 1.13*.

1.12.3 Wireless Stand-Alone

Video

- It's usually best to connect the Skycut while it is next to the wireless computer. Once connectivity is established, you can then experiment to see how far from the computer the Skycut can be located.
 - There are two situations to consider before getting started. If you are not sure which applies to your Skycut, then select *B* and go to that section first.
 - A. The Skycut has never been set up wirelessly to a network.
 - B. The Skycut has previously been connected to a wireless network.
- A. The Skycut has never been set up wirelessly to a network
- Power on the Skycut and wait for the light to come on.
 - On your computer, open your list of available networks. In the list, you should see one with this type of name format: *HI_LINK_XXXX* where "XXXX" can be any alphanumeric combination, such as "92BF" or "08A5".
 - Select that network and enter the following **Network Key** when prompted: *12345678*. The IP Address for accessing the Skycut in this mode is 192.168.16.254.
 - Proceed to *Section 1.13*. Remember that your computer will not have access to the Internet or other network devices while in **Wireless Stand-alone** mode.
- B. The Skycut has previously been connected to a network
- On the Skycut's control panel, select **Set**  and then select **Wifi**. The **Wifi** screen will appear:



- To reset the Skycut so that it will be found as an available network, press and hold the **Default** button for 3 seconds. Release and you should see the **Apply** button now displays **Wait..** In a minute the **Apply** should return and you can then proceed back to A and use the same procedure as if the Skycut was never set up on a network.

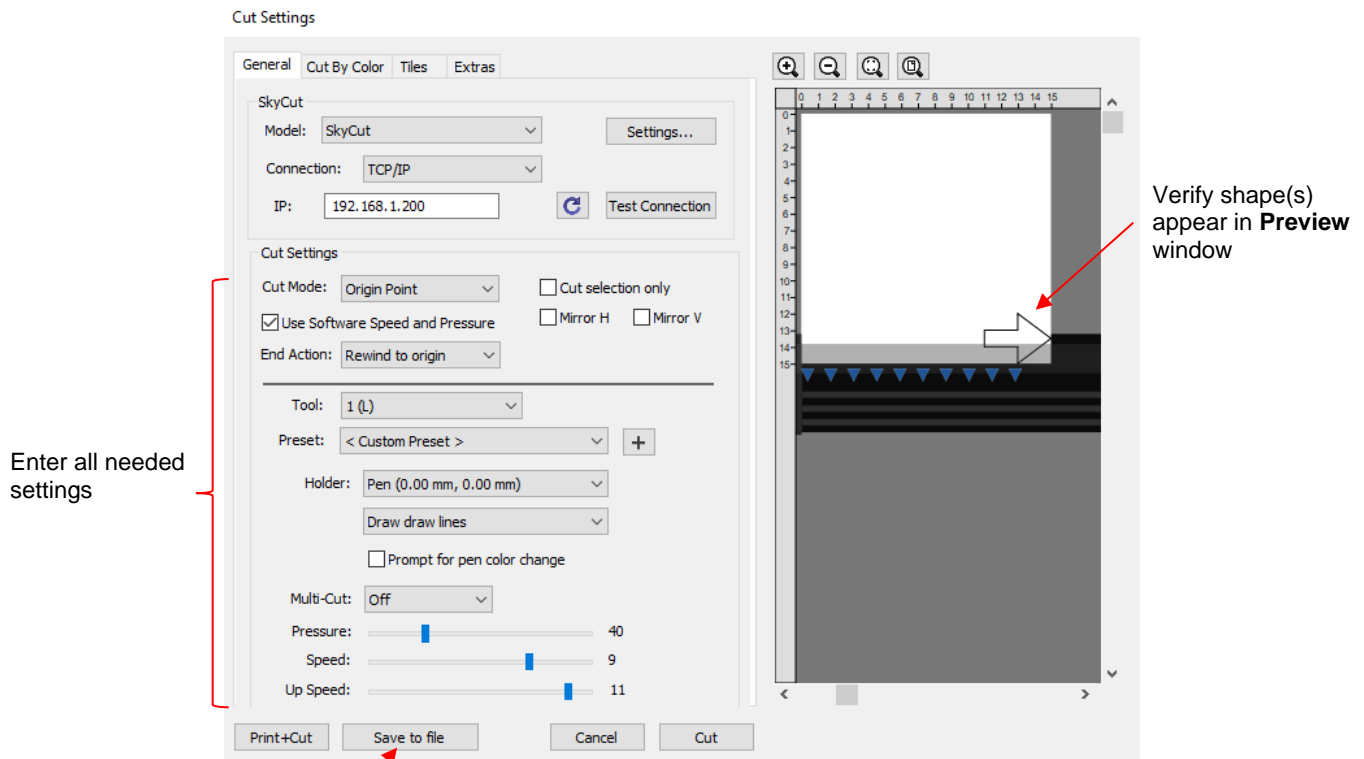
1.12.4 USB Flash Drive Video

- With a USB Flash Drive connection, you will normally be following these steps:

(1) Design or open a file in SCAL. After making any changes, go to **Cutter>Cut with Skycut** or click on the

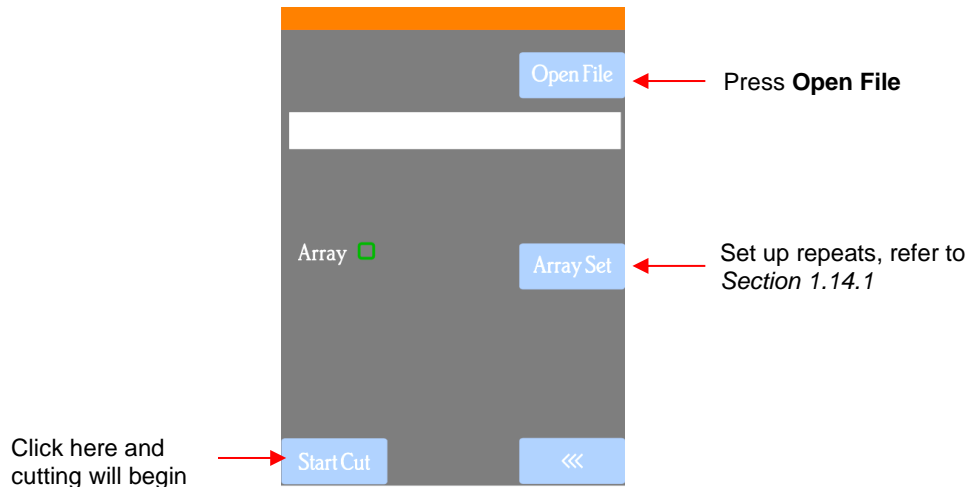


Cutter icon at the top of the screen. The **Cut Settings** window will open:

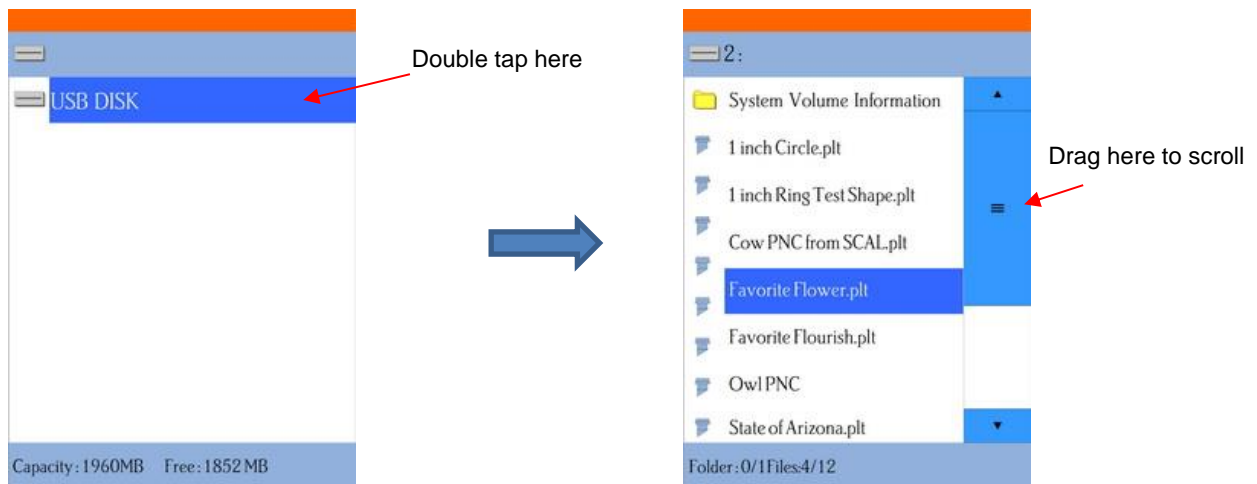


Click here to save design and settings to a PLT file to open directly on the Skycut

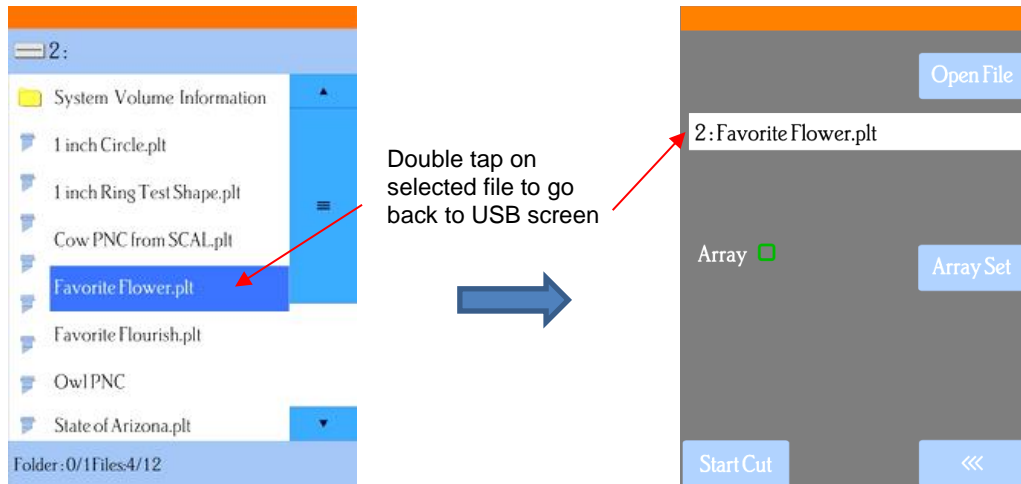
- (2) Select the desired cut settings. Note the following:
 - ◇ Check the box for **Use Software Speed and Pressure** in order for those settings to be used on the Skycut. Otherwise, the settings on the Skycut's control panel will be used instead. The latter option would make sense if you were planning to cut the same file from different materials.
 - ◇ Verify that you can see the shapes (s) in the **Preview** window. If not, close the **Cut Settings** windows and refer to *Section 2.02.1* to adjust settings, as needed.
 - ◇ The **End Action** setting (in SCAL Pro only) is overridden by the **Advance Mode** setting on the control panel (refer to *Section 2.06*).
- (3) Click on **Save to File** at the bottom of the screen and select the location of the flash drive, enter a name for the file, and whether or not **Reg Marks** will be needed. The file will then be saved as PLT.
- (4) Insert the flash drive into the right side of the Skycut. On the control panel, select **USB** and then **Open File**:



- (5) Double tap on **USB DISK** and a screen will open showing any folders and PLT files on the flash drive. Double tap a folder to open it, as needed. Drag the scroll bar on the right to see more files:



- (6) Once you have located the PLT file you want to cut, double tap the name. You will be taken back to the USB screen and the selected file name will be displayed:



- (7) If you wish to cut repeats of the file, select **Array Set** and a screen will open where you can then select the number of rows and columns of repeats, along with the spacing between the repeats. Refer to *Section 1.14.1*.
- (8) If your project is a print and cut (aka contour cut) application, please refer to *Section 3.07*.
- (9) When you are ready to cut, click on **Start Cut**. **IMPORTANT:** If you elected NOT to set the speeds and force/pressure within SCAL for the PLT file, go back to the **Speed/Force Screen** before clicking on **Start Cut**.

1.13 Verify Communication and Test Draw Shapes

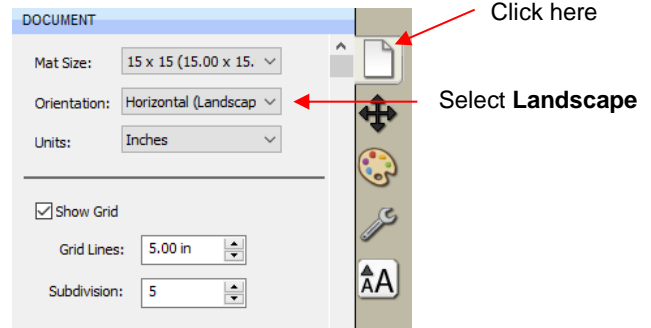
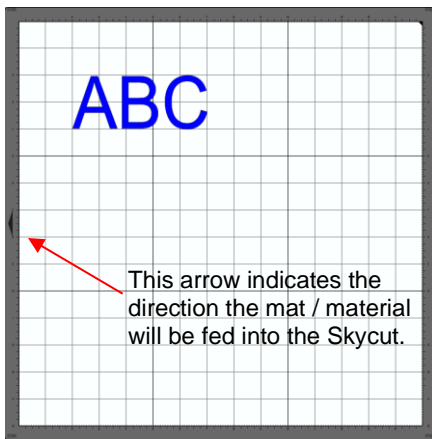
- New owners tend to be VERY eager to try out their Skycut. It's important to test your cutter to ensure that data is being sent properly from your computer to the cutter. The following steps will allow you to do some testing with the pen tool. But note that **the following steps are for DRAWING, not cutting**. Before inserting the blade holder into your cutter, please read the following *Sections 1.07.3, 1.07.4, 2.01, 2.02, and 2.03*.
- It is also very important to understand where shapes will cut based on various available options in SCAL. This is partially addressed in the next section; complete details are covered in *Section 12.07*.

1.13.1 Setup for Drawing

Landscape Versus Portrait: Which do you prefer?

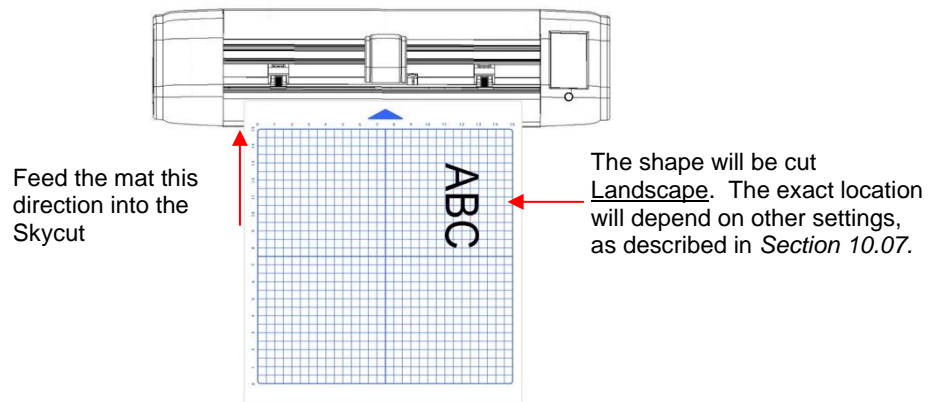
- Based on your own past experience with SCAL or other cutting programs and cutters, you may have a particular orientation (landscape or portrait) that you are accustomed to using. There is no right or wrong choice; select the one that makes the most sense to you.
- In SCAL, the orientation is set on the **Document Panel**. Other settings on this panel are presented in detail in *Section 5.04*. For now, just note the location of the **Mat Configuration** settings for **Landscape** and **Portrait**:

◇ Landscape Mode

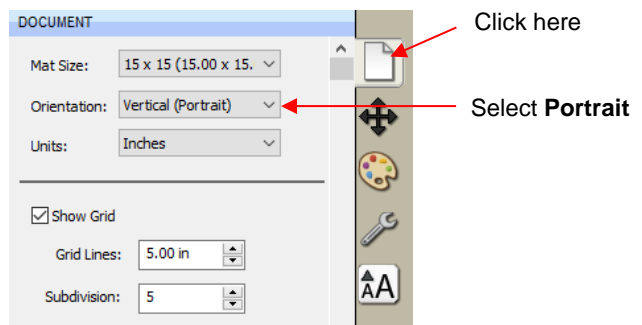
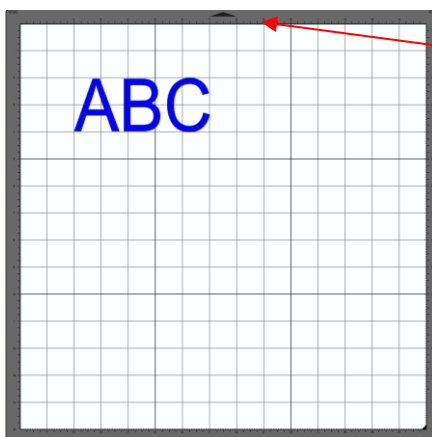


Note: in the screenshot above, a custom mat has been set up in SCAL to match the Skycut mat. To create a mat with these same dimensions, refer back to the video linked at the start of this section or refer to *Section 5.06.1*.

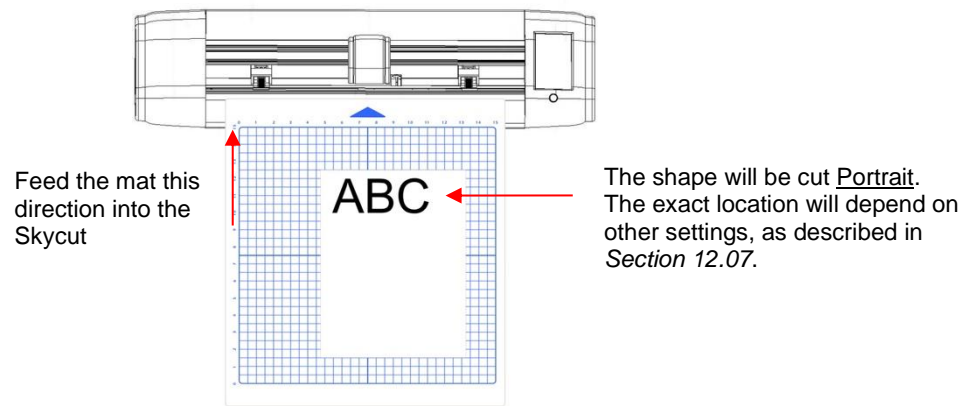
- In **Landscape** mode, the arrow/triangle on the **Cutting Mat** will point to the left. When you draw or cut out the “ABC” shown on a **Landscape Cutting Mat**, it will be drawn or cut top to bottom as you face the Skycut:



◇ **Portrait Mode**



- In **Portrait** mode, the arrow/triangle on the **Cutting Mat** will point upwards. When you draw or cut out the “ABC” shown on a **Portrait Cutting Mat**, it will be drawn or cut left to right as you face the Skycut:



1.13.2 Drawing Your First Shape

- This first test will show you how **Origin Point** mode works. This is a very useful setting because it is easy to know where your shapes will cut on your material, plus it economizes the use of your materials. Instead of cutting shapes where they are located on the **Cutting Mat** in SCAL (which is how **WYSIWYG** mode works), the shapes will be moved and aligned to cut where you set the origin on the material, using the tip of the blade.

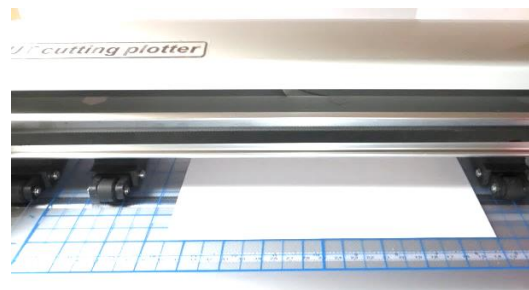
(1) You have two options when using the test pen:

- ◇ Insert a sheet of paper directly into the cutter:

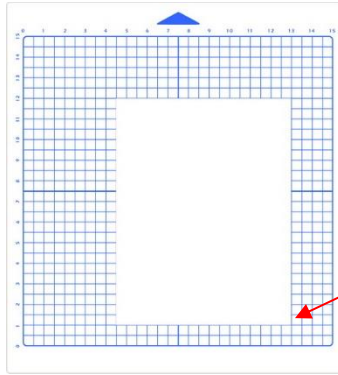
Observe how pinch wheels are centered with white arrows



- ◇ Or...Place the paper onto the cutting mat and then insert the cutting mat into the cutter:



Feed the mat this direction into the Skycut



Align the paper along one of the grid lines on the cutting mat.

- (2) Before installing the test pen, make sure the pen will write by scribbling on scrap paper. Note that there is a little piece of wax on the pen nib that will need removing. Then follow these steps:
- ◇ Loosen the screw on the blade holder seat.
 - ◇ Insert the blade holder allowing it to freely rest on top of the paper.
 - ◇ Before tightening the front screw, raise the test pen up a little bit (~ 1/8" or several mm). You don't want the pen still touching the paper but you also don't want the pen too high above the paper either.
 - ◇ Tighten the front screw to lock in the test pen. Be careful not to push down on the blade holder seat while tightening.

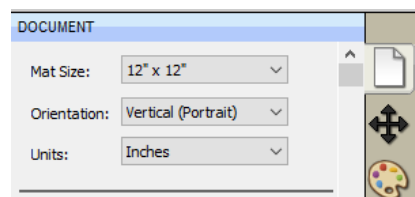
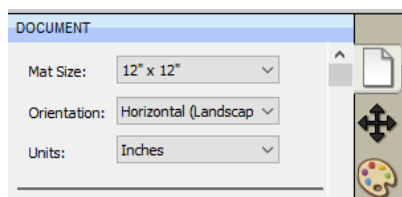
IMPORTANT! This is NOT the recommended method for loading the blade holder into the cutter. This is presented as a quick way to insert the test pen so that it is in a good position for drawing. The instructions for inserting the blade holder and setting a blade distance above the material will be covered in *Section 2.01.3*.

- (3) Use any of the horizontal markings at the front of the Skycut to align the mat so that it's straight. Lift the pinch lever to drop the pinch wheels onto the cutting mat. Most of the mat and the paper should now be behind the cutter, not in the front:


Only the front part of the mat and material will be in the front of the machine.

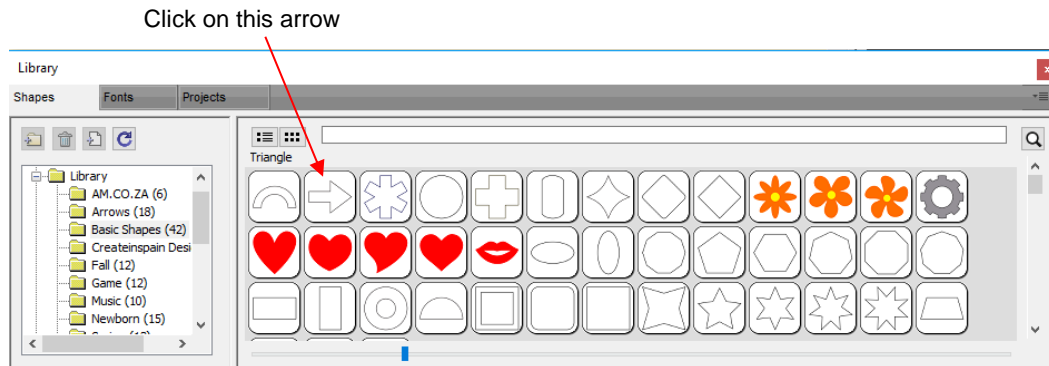


- (4) Select either **Landscape** or **Portrait**, on the **Document Panel**, depending on your personal preference (as described at the beginning of *Section 1.13.1*):

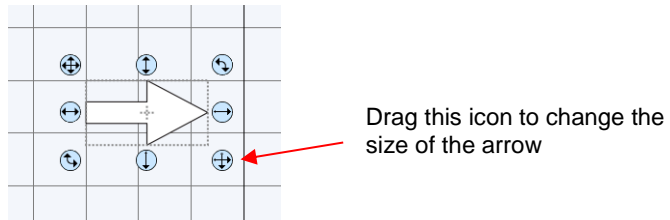


Select your preferred **Orientation: Horizontal (Landscape) or Vertical (Portrait)**

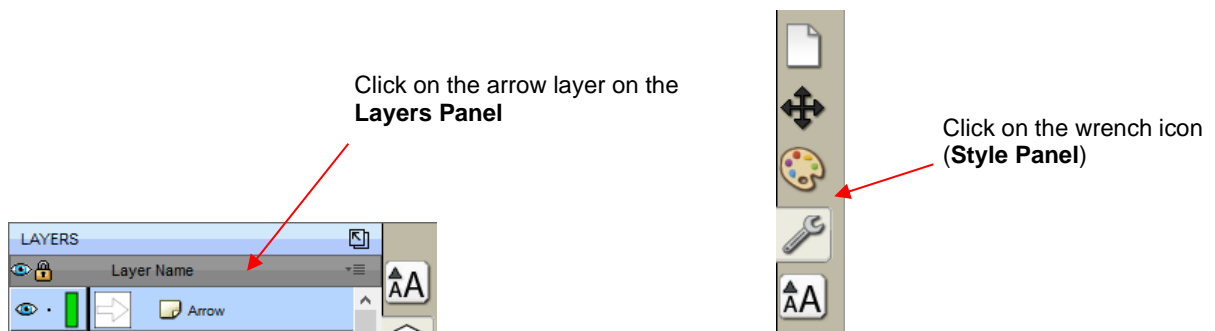
- (5) If you closed the **Library** when you opened SCAL, click on this icon  at the top to reopen it. Click on the arrow thumbnail to add that shape to your screen. An arrow will help you better compare where a shape gets drawn versus how you see it on the screen:



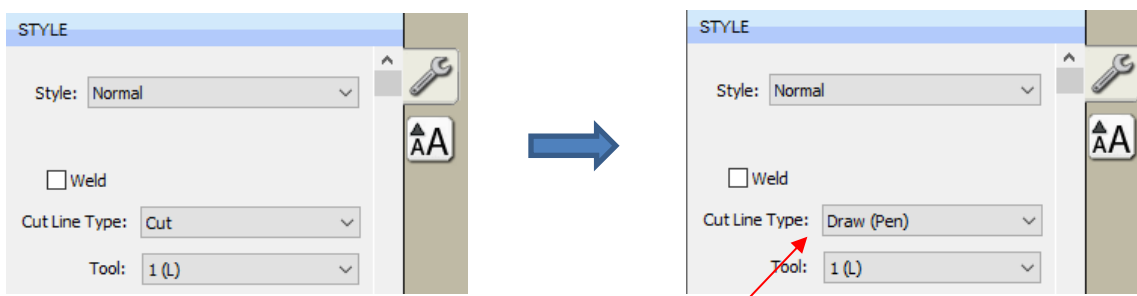
- (6) In this test, it doesn't matter where you place the arrow on SCAL's virtual **Cutting Mat**, as it will be drawn at the origin you set on the machine. If you want to change the size of the arrow, drag the lower right corner:



- (7) Because you are drawing and not cutting, you need to assign this shape to **Draw (Pen)**. The default is always **Cut** unless you make the change. Select the shape on the screen or click on the shape's layer on the **Layers Panel**. Then click on the **Style Panel** icon on the right side of the screen:




- (8) Change the **Cut Line Type** to **Draw (Pen)**:

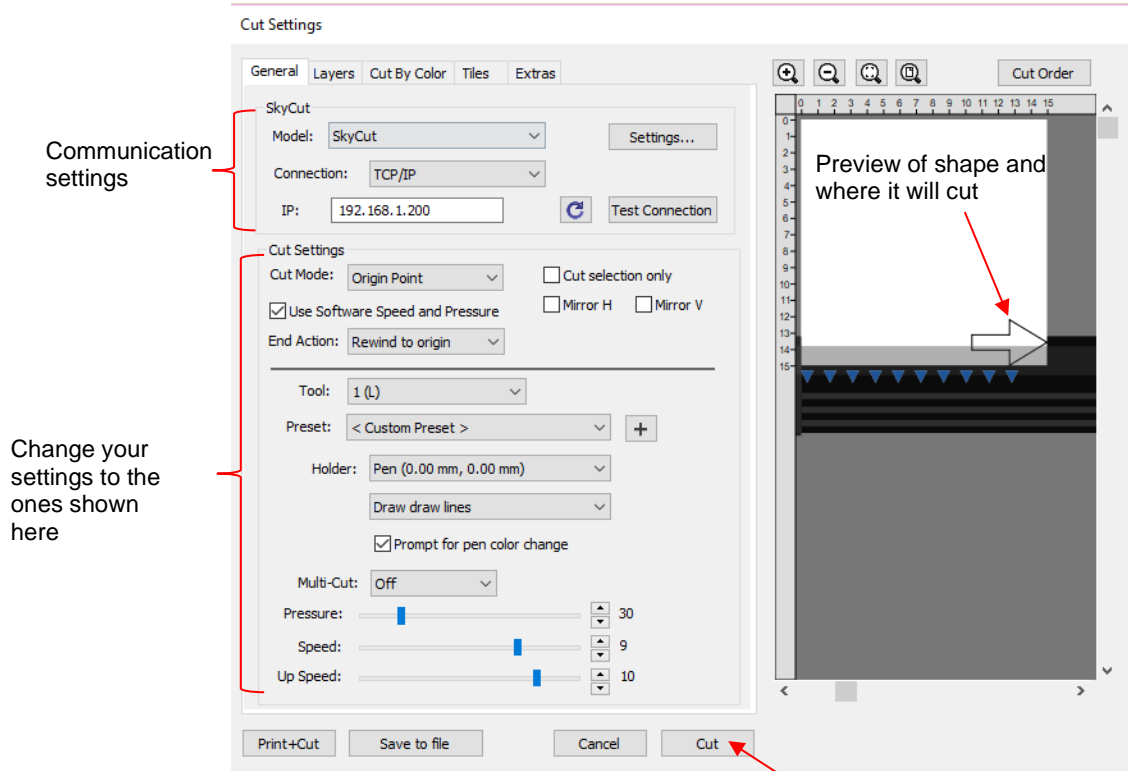


Change to **Draw (Pen)**

(9) In *Section 1.11* you installed the Skycut in SCAL. To now open the **Cut Settings** window, either:

- Go to **Cutter> Cut with Skycut**
- Click on the **Cutter** icon  at the top

(10) The follow window opens:



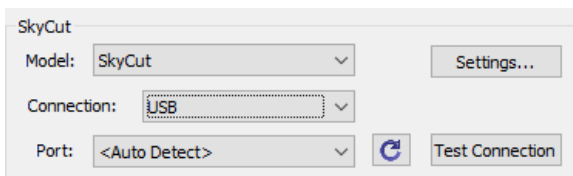
Communication settings

Change your settings to the ones shown here

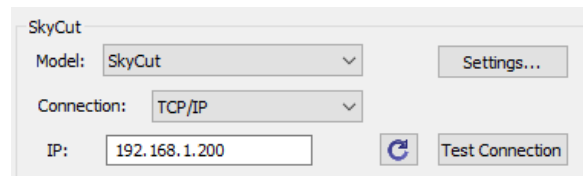
Click here to cut design with these settings

- ◇ **Model:** Verify that **Model** reads **Skycut**. If not, return to **Cutter>My Cutter>Manage Cutters** and add the Skycut to the menu.
- ◇ **Connection,** select **USB** or **TCP/IP** (for Wi-Fi or Stand-Alone). If using USB, leave **Auto-Detect** selected. If using Wi-Fi, enter the IP address you previously chose in *Section 1.12.2*. If using Stand-Alone, enter 192.168.16.254. If you plan to save the file as a PLT file on a flash drive, you can skip this step.

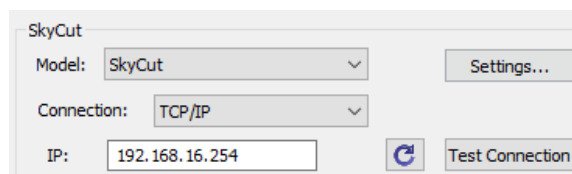
USB:




Wi-Fi:

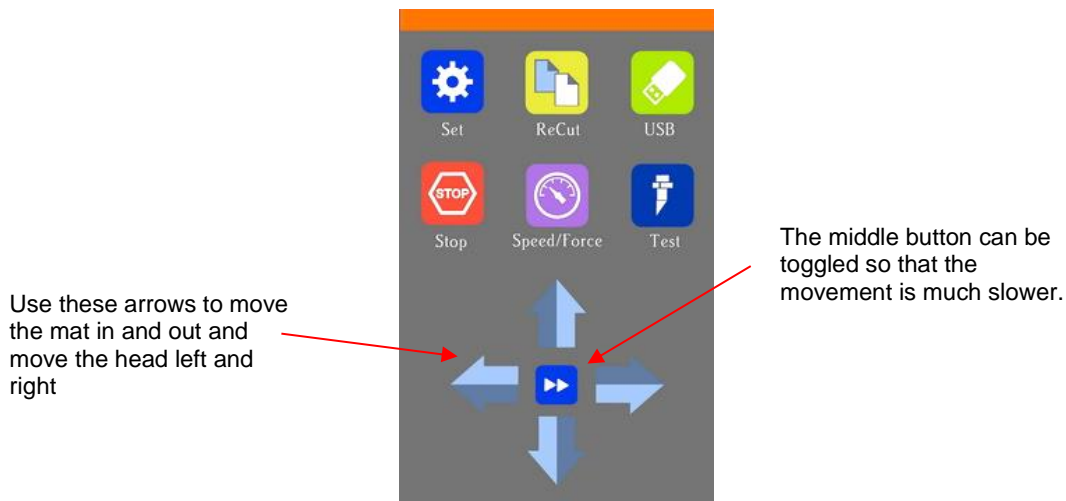


Stand-Alone:

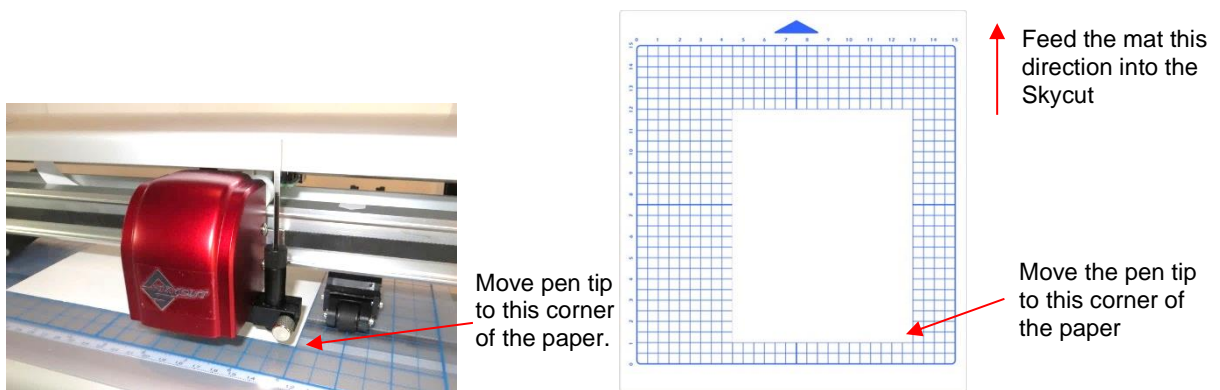


- ◇ Click on **Test Connection** to verify that the head will do a quick jog to the left and back again. If the test connection fails, click on the **Reload** icon  and try again. If it still fails after several attempts, refer to **Appendix A**, first question.
- ◇ **Cut Mode:** Set to **Origin Point**. Later you can test **WYSIWG** mode, as well.
- ◇ Change the remaining settings to match the prior screenshot. More details about these settings will be covered in other sections.
- ◇ ***IMPORTANT!*** The preview of the arrow will not appear until **Pen** is selected under **Holder**. The default, **Blade**, would have been used if the **Cut Line Type** on the **Style Panel** had been left at the default of **Cut**.

(11) The arrow keys on the Skycut's control panel will always be used to set the origin for cutting:

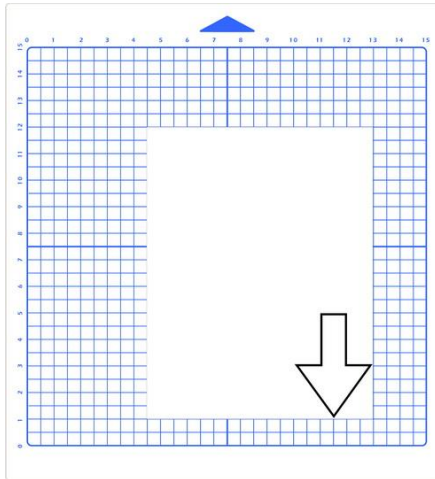


- ◇ Click on the buttons or the arrow keys on your keyboard to move the head left or right and the mat in and out. The goal is to have the tip of the pen close to the lower right corner of the paper:



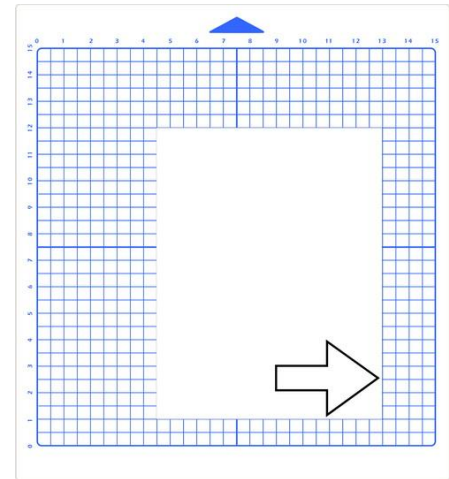
- ◇ Once the pen tip is in the lower right corner, you are ready to proceed with the test.

(12) Click on the **Cut** button at the bottom of the **Cut Settings** window and the arrow will be drawn to align with the origin you set. After the cut is complete, the cut window will close. Your arrow will be drawn as shown, with the direction related to whether you originally chose **Landscape** or **Portrait** for your **Cutting Mat**:



Landscape Results: The arrow is drawn at the origin and points downwards.

↑
Feed the mat this direction into the Skycut



Portrait Results: The arrow is drawn at the origin and points to the right.

- (13) To draw again, return to the cut window and choose a different origin. Practice moving the origin to different locations. This is how **Origin Point** mode works.
- (14) If you wish to change to a different shape or add more shapes, remember to change the **Cut Line Type** to **Draw (Pen)**, as you did in *Step (9)* and change the **Holder** to **Pen** in the **Cut Settings** window. Again, these two changes won't be needed when you are cutting with the blade holder.
- (15) If you want the image to draw where you have it located on the virtual **Cutting Mat** in SCAL, then you need to switch to **WYSIWYG** mode. Set the origin in the lower right corner of the mat's grid and then place the paper in the correct location on the mat to correspond to where the shape is positioned on the **Cutting Mat** in SCAL. Refer to *Section 12.07* for more details on controlling where images will cut.

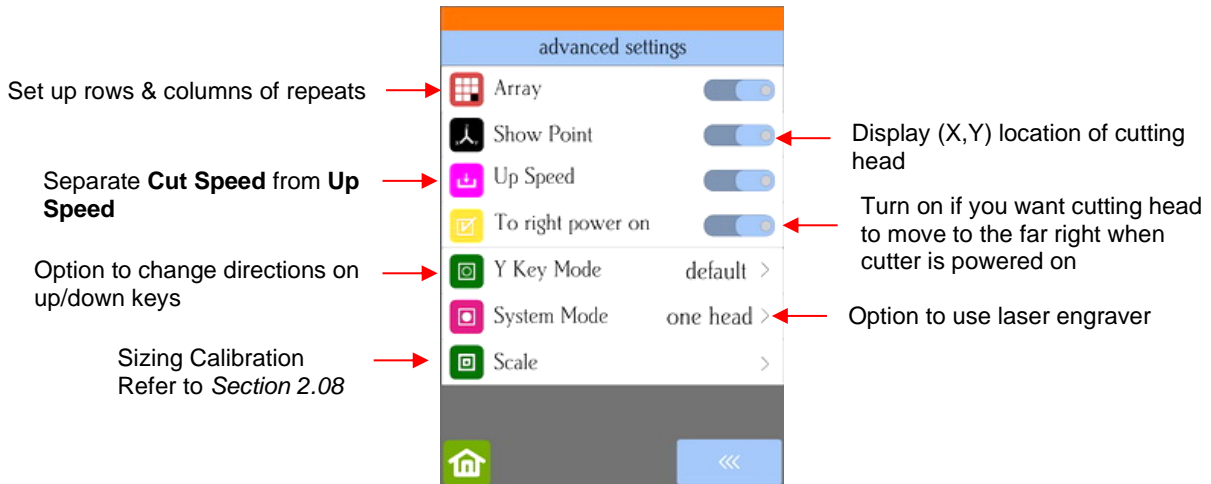
IMPORTANT: Please read *Section 2.01* before cutting!

1.14 Default Settings To Consider

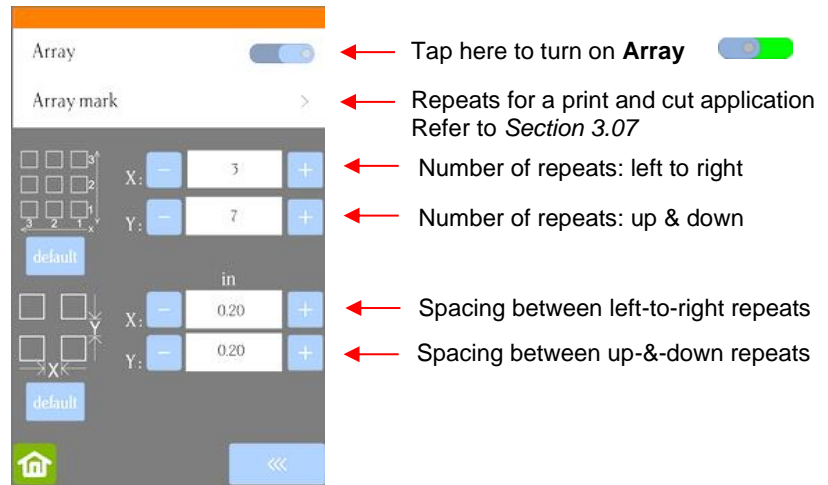
- The Skycut's control panel offers a number of default settings. Some of these may not be important at this point in the learning process. So, you may want to skip this section for now but remember that it's here and could provide you some options to improve your experience with the Skycut.
- Each of the following sections will refer to one of the settings in the **Set** screen.

1.14.1 Advanced Settings

- The optional settings in the **Advanced Settings** screen are:

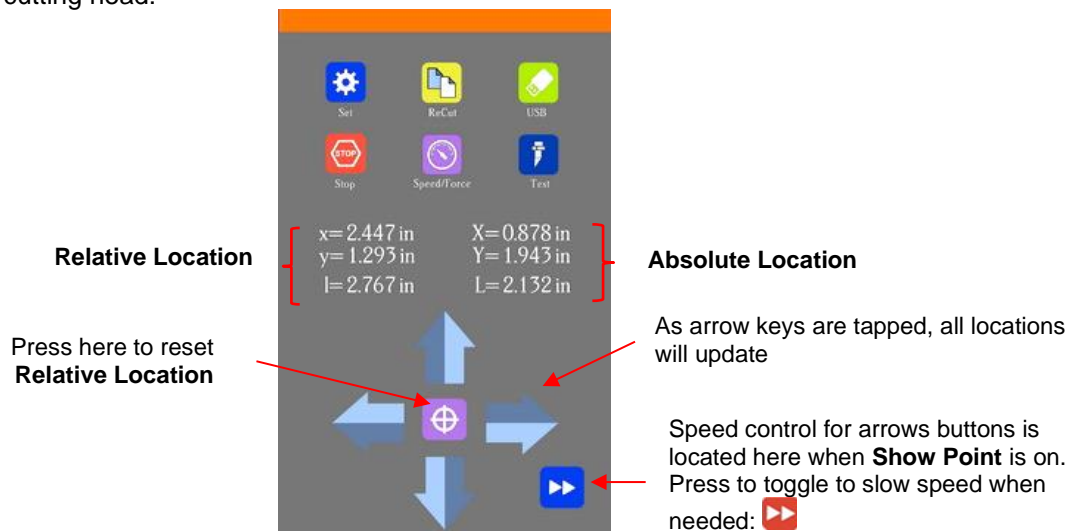


- **Array:** Tap the **Array** button to open the **Array** screen:

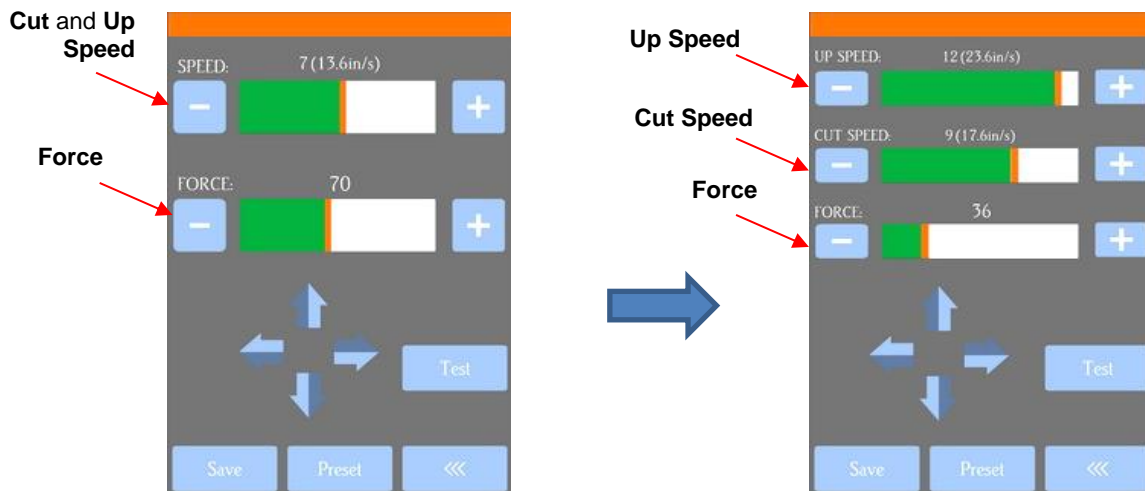


◇ In the above screenshot, the shape sent to the Skycut would cut 3 across and 7 up & down, for a total of 21 shapes. The spacing between each shape would be 0.20 inches (Note: to use mm instead of inches, switch the **Units** setting. Refer to *Section 1.14.2*).

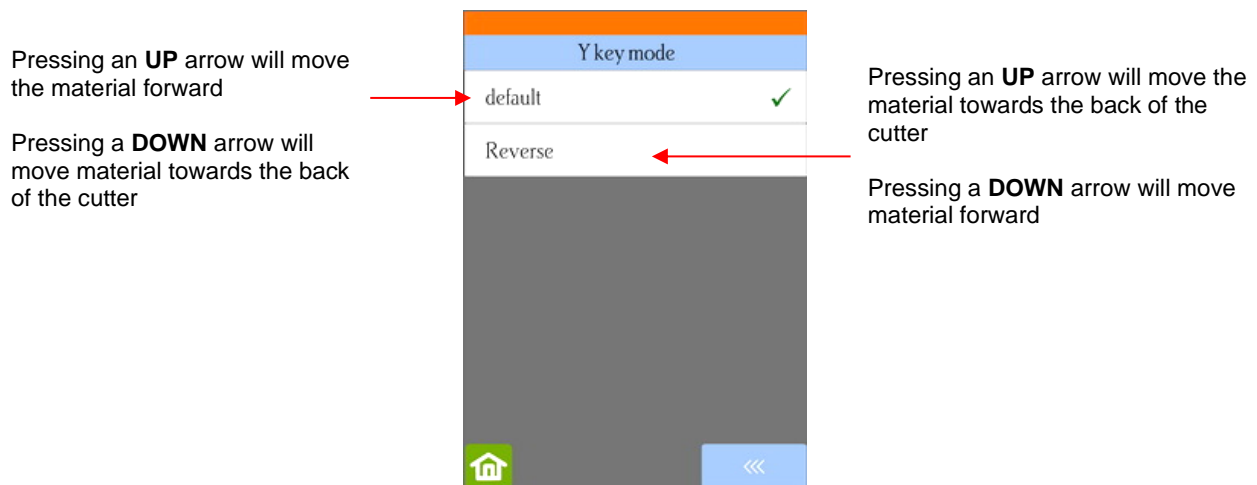
- **Show Point:** When toggled on, the **Main Screen** displays movement and location output based on the position of the cutting head:



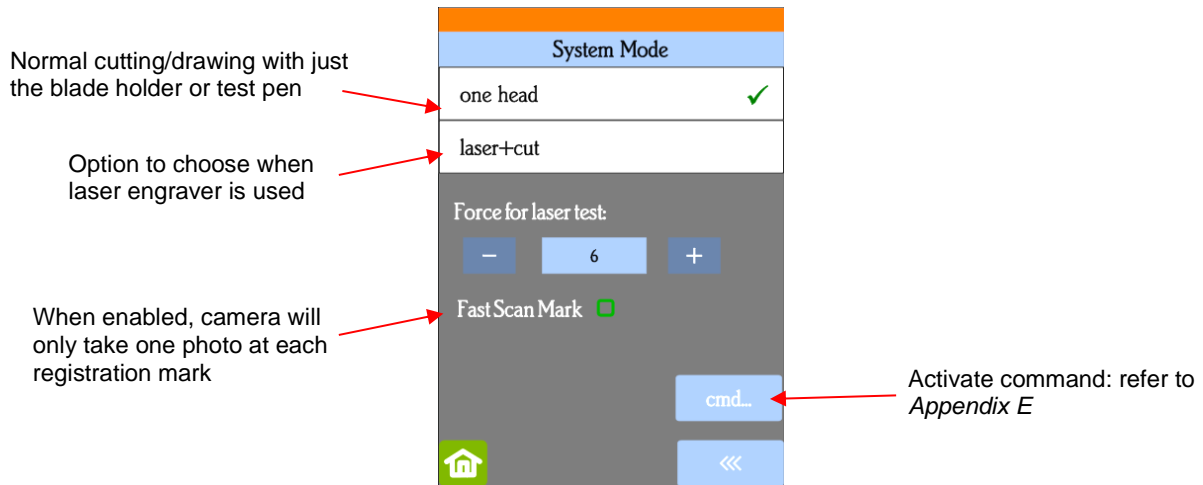
- ◇ **Absolute Location** displays the current location relative to a “power-on” location of (0,0):
 - **X** is the left-to-right location
 - **Y** is the up-&-down location
 - **L** is the straight-line distance from (0,0)
- ◇ **Relative location** displays the change in location currently being made as you press the arrow keys:
 - **x** is the current left-to-right distance moved from **X**
 - **y** is the current up-&-down distance moved from **Y**
 - **l** is the straight-line distance from the (**X,Y**) location
- **Up Speed** is how fast the blade travels while in the “up” position, such as when it is moving from the origin to the location of the first shape to cut or when moving from one cut shape to begin cutting another. When turned off, **Up Speed** will match the **SPEED** set for cutting. Turning on this setting will change the **Speed/Force** screen to display both speeds, allowing them to have different settings:



- **To right power on:** With this setting turned on, the cutting head will move to the far right whenever the Skycut is powered on.
- **Y Key Mode:** This setting controls the movement of the material or cutting mat when using the up and down arrows in the **Main Screen**:



- **System Mode** is changed when a laser engraving tool is put into use:



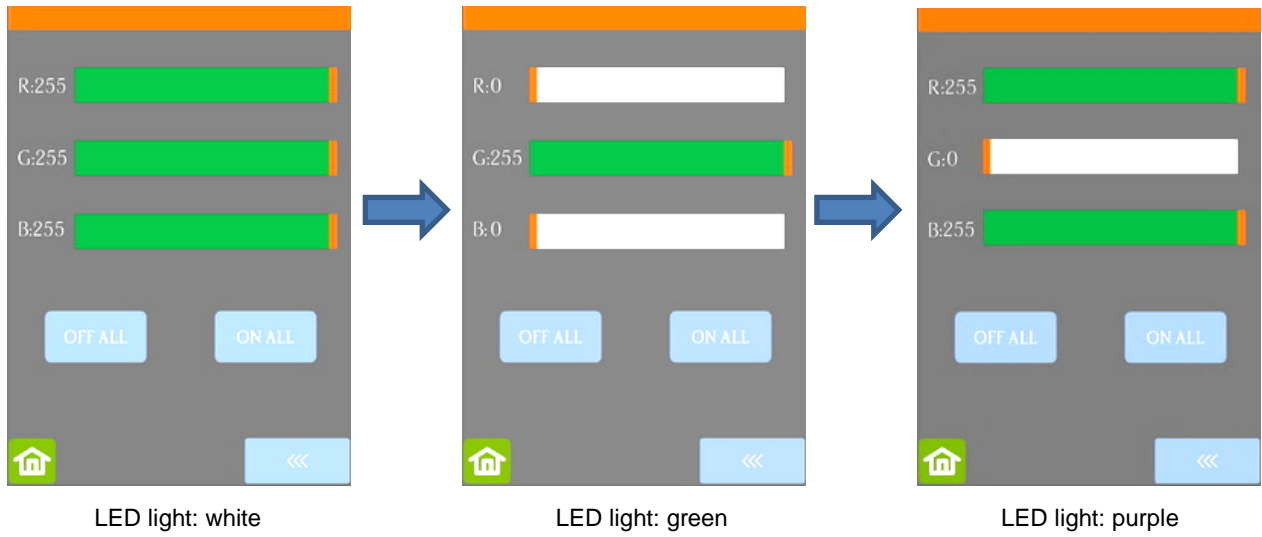
- **Scale** is used to input the sizing calibration. Refer to *Section 2.08*.

1.14.2 General Settings

- The optional settings in the **General Settings** screen are:



- **LED set** allows you to change the color of the light inside the Skycut. The default is white but you can change it by dragging the scroll bars on the LED set screen. For example, if you wanted a blue light, you could drag red and green all the way to the left. For a purple light, only drag green all the way to the left, etc.



- ◇ Pressing **Off All** will set **R**, **G**, and **B** to 0 which turns off the light
- ◇ Pressing **On All** will set **R**, **G**, and **B** back to 255 or white light mode.

- **Screen and alarm** has three settings:

- ◇ **Screensaver time:** Set a black-out time, in minutes, for the control panel
- ◇ **Alarm after finish working:** When a job is complete, have an alarm sound (five beeps)
- ◇ **Change the LED:** When a job is complete, have the LED light change to blue

Decrease **Screensaver time** (or drag the orange bar) →

Turn on **Alarm** to beep at end of cut →

Turn on **Change the LED** to have light turn blue at end of cut →

← Increase **Screensaver time** (or drag the orange bar)

- **Unit** allows you to choose either inches or mm for settings such as **Show Point** and the **Spacing** setting under **Array**.

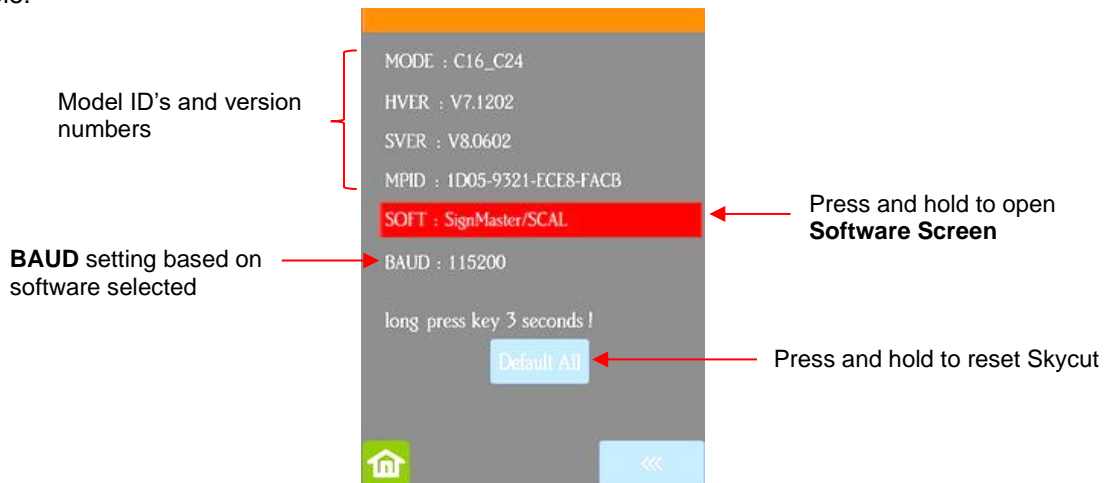


- **Language** allows you to choose from seven languages throughout the control panel display screens:

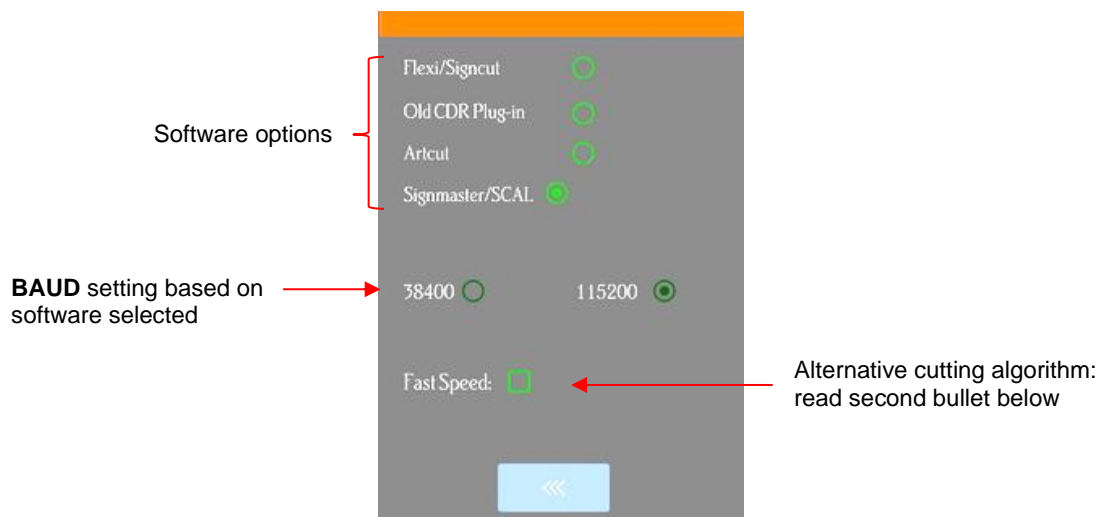


1.14.3 Sys Information

- The **Sys Information** screen displays information about the Skycut and only has three setting changes available:



- ◇ This initial screen displays current version numbers.
- ◇ If you ever need to reset your Skycut, press and hold **Default All** until it turns red. Then wait for the button to update to **Success!**
- ◇ If you ever need to change which software is in use with your Skycut, press and hold **SOFT** for two seconds and release. The following screen will open:



- ◇ To use a different software program to cut to the Skycut, press inside the appropriate circle. The **Baud Rate** indicator will automatically change if needed.
- ◇ **Fast Speed** changes the algorithm used for cutting long paths and can shorten the cut time for larger projects. However, accuracy is also compromised and this setting would certainly not be advisable for print and cut applications or when precise measurements are needed.

1.15 Maintenance

Skycut machines do not require any kind of lubrication or routine checks. However, here are a few things to keep in mind for successful operation of your cutter:

- Keep the pinch wheels clean. Depending on the adhesive being used on the cutting mat, it's possible for the pinch wheels to become sticky and pick up small pieces of cardstock or other material being cut. This can lead, in some cases, to the mat skewing or ruining materials during subsequent cuts. To clean the pinch wheels, use a lint-free cloth and an adhesive remover such as isopropyl alcohol or Un-Du to clean the pinch wheels thoroughly.
- Keep the grit shafts clean. Equally important as the pinch wheels, the grit shafts beneath the cutting mat should also be free of adhesive and tiny bits of material. They can be cleaned the same way as the pinch wheels. Note: Do not pour cleaner onto a grit shaft. Instead, dab some adhesive remover onto a lint-free cloth and then use the damp cloth to clean the shafts. You can also use tweezers to remove any material or adhesive that is stuck to a shaft.
- Keep the cutting mat clean and sticky. As mentioned in the *Section 1.08.2*, the cutting mat can be washed with soap and water to remove small invisible pieces of material which are reducing the tackiness of the cutting mat. After drying, you can add more repositionable adhesive, if needed.
- Check your blade holder, as needed. If suddenly you cannot get a clean cut, check the blade holder for any tiny slivers of material that may have been caught up by the blade and fed up inside the blade holder.
- If you cut vinyl or other backed materials regularly, you may need to replace the cutting strip at some point. You will be able to tell based on seeing deep cuts in the strip and an inconsistency in the cutting. Contact your dealer for information on obtaining a replacement.

1.16 Other Useful Tools and Supplies

- The following list has items you may or may not need while enjoying your Skycut. These are suggestions based on twelve years of collecting information from other cutter owners:
 - ◇ Brayer or Rolling Pin: (1) to apply lint from a towel onto an overly sticky mat (2) to press materials evenly onto a mat for cutting

- ◇ Post-It Notes: (1) for setting blade/tool tip height above a material (2) for draw and cut applications
- ◇ Old Fluffy Bath Towel: (1) to dry a washed mat (2) to apply an invisible layer of lint onto an overly-sticky mat
- ◇ Dishwashing Soap: (1) to remove visible and invisible fibers from the mat, thus renewing the adhesive (2) to clean the mat well before adding more adhesive
- ◇ Soft Brush: (1) to gently remove waste scraps during the washing of a mat. Refer to *Section 1.08.2*.
- ◇ Artist Palette Knife: (1) to gently remove cut shapes from a mat (2) to scrape off small waste pieces from a mat
- ◇ Blue Painter's Tape: (1) to tape around the edges of thicker materials that might slip during cutting
- ◇ Repositionable Adhesives: (1) to add more adhesive to a cutting mat (most any brand or type can be used, provided it is repositionable). Refer to *Section 1.08.2* for suggestions and instructions.
- ◇ Adhesive Removers: (1) to completely strip a cutting mat of adhesive (2) to disarm adhesive long enough to remove large scraps of material that will not peel off
- ◇ Lint-free Cloth: (1) for dusting off your cutter and cleaning pinch wheels and grit shafts
- ◇ Awl or Paper Piercer (or other sharp pointed tool): (1) to pick or lift out a test cut to verify results
- ◇ Stabilizers: A stabilizer is an adhesive material that is applied to the bottom of the material you are cutting so that cleaner cuts can be achieved. The stabilizer works in one or more of the following ways – (1) provides firmer contact with the cutting mat (2) provides a final layer that does not need to be cut if the stabilizer will be removed after cutting (3) prevent some slightly-elastic materials from being stretched by the blade. Recommended stabilizers include freezer paper, Thermo-web Heat n' Bond, and Steam-a-Seam 2.
- ◇ Double-sided Tape: (1) For securing metal tags or charms to the cutting mat for engraving
- ◇ Non-slip Shelf Liner: (1) To place under cardstock and other material when embossing

2. Cutting

2.00 Quick Reference for this Chapter

- How to *properly* mount the blade holder: *Section 2.01.3*
- How to control which shapes get cut: *Section 2.02.1*
- How to control where shapes get cut: *Section 2.02.2*
- Understanding **Blade Offset** and **Overcut**: *Section 2.03.3* and *Section 2.03.4*
- How to set a very precise origin: *Section 2.05.1*
- How to get shapes to cut to precise dimensions: *Section 2.08*
- How to know which settings to adjust to solve cutting issues: *Section 2.09*
- Suggested settings for cutting materials: *Section 2.11*

The Most Common New Owner Mistakes:

- Too much blade is exposed on the blade holder (material is lifting up and/or tearing) - refer back to *Section 1.07.4*
- The blade tip (or pen nib) is too close to the material (inconsistent cutting) - refer to *Section 2.01.3*
- The pinch wheels are not properly positioned (material or mat is sliding around during the cut) – refer back to *Section 1.09*
- Failing to do a test cut (recommended cut settings are not working) – refer to *Section 2.01.5* and *2.09*
- Not practicing enough with the test pen and paper (shapes are not cutting in the correct locations) – refer to *Section 2.02.2*

2.01 What You Need to Understand About Cutting

IMPORTANT: Please read all of 2.01!!!

2.01.1 You Have To Make Mistakes

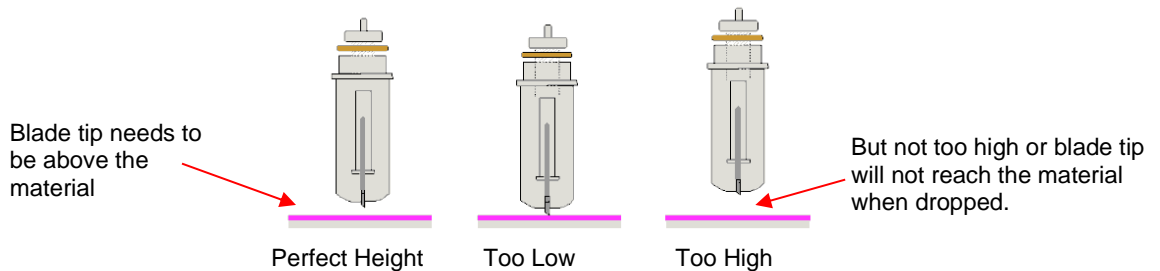
- The key to becoming successful at cutting is to do a lot of it! Those who shy away from using their Skycut will never get to the stage of mastering it. It's very normal for new owners to be intimidated by their cutter, so remember the following key things:
 - ◇ You won't break your new Skycut by cutting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

2.01.2 Record Your Successes

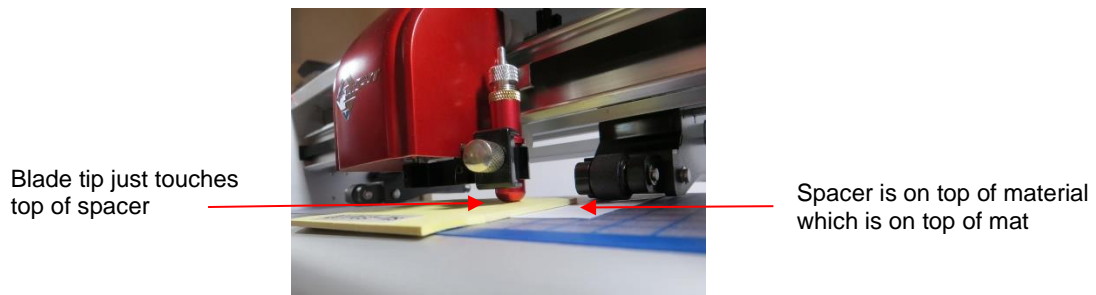
- As you have successful cuts, take note of the settings you just used, such as **Pressure**, **Speed**, blade type, number of passes, brand of material, etc. There is a blank form in *Section 2.10* that you can print and use to record your results. There are also suggested settings for common materials at the end of this chapter. Use these as starting guides but remember that your results may vary based on the many factors which can affect cutting.

2.01.3 Set the Blade Height Above the Material

- The **Blade Height** is the distance from the tip of the blade to the top of the material you are about to cut. You have control over that height and will need to raise the blade holder up a little higher before locking it into place with the screw on the blade holder seat.
- Adjust the blade height so that:
 - ◇ The blade tip will not be dragging across the material you are cutting when moving to the point to begin the cut. This will ensure that the dropping of the blade will invoke more downward force... to a point!



- ◇ In *Section 1.13.2*, you were instructed to raise the test pen a small distance above the material. However, this isn't a very accurate method and does not necessarily optimize the cutting force on the Skycut.
- ◇ The recommended method for getting the same height set from one cut to the next is to use a spacer of some kind:
 - Place the spacer on top of the material you are cutting, with the material loaded into the Skycut.
 - Loosen the screw on the blade holder seat and insert the blade holder so that the tip of the blade is just touching the top of the spacer:



- Now tighten the front screws carefully making sure you are NOT pushing down on the blade holder seat. Once tight, remove the spacer. You should feel the blade gently scratching the top of the spacer.
- This distance will provide the blade some “punch room” to give extra force and more consistent cutting of your material.
- ◇ What to use for this spacer? Try Post-It notes or copy paper.
 - For materials such as cardstock, vinyl, and fabric, use 20 Post-It notes.

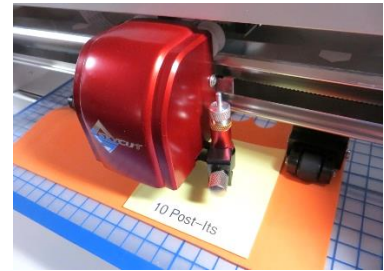
- When cutting thin chipboard with the red blade, use 20 Post-It notes. Use 15 with slightly thicker materials and/or when cutting with the blue blade.
- For very thick materials, such as balsa or craft foam, use 10 Post-It notes. Note that you do not want the rim of the blade holder mounted above the black tool-holder piece. Otherwise, the blade will not reach the material or will be too high to apply the needed pressure for cutting.
- The table at the end of this chapter includes a column for blade height based on the number of Post-It note sheets used by the testers.



Use 20 for cardstock, vinyl, fabric



Use 15 with blue blade and for slightly thicker materials



Use 10 for thick materials like craft foam and balsa

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

- Using correct cut settings is equally important as the type of blade, blade length, and blade height. Refer to *Section 2.03* for details. Suggested settings are located at the end of this chapter and settings for using the various Skycut accessory tools are located at the end of *Chapter 4*.

2.01.5 Perform Test Cuts!

- You have two options:
 - (1) Perform the built-in test cut on the Skycut itself using the **Test** option on the **Main Screen** or from within the **Speed/Force Screen**.
 - (2) Select a shape from the SCAL Library and size it to be around 0.3" – 0.5" (~ 8 mm – 13 mm):
 - I personally like using one of the shapes with an internal circle (such as a ring). You can then easily see if the blade is cutting into the mat (or into the backing sheet on rolled materials) when you lift out the cut shape and observe where the internal shape cut.
 - When cutting intricate shapes, use a small letter or a shape with lots of sharp turns for testing. For a rhinestone project, use a small portion of your rhinestone pattern as a test.
- There is a flow chart in *Section 2.09* which will help you determine which settings to change when test cutting a material.

2.01.6 Keep the Cutting Mat Clean and Sticky

- Press your materials evenly to the mat. Consider using a brayer both before AND after cutting. Repressing the material after cutting can greatly aid in weeding the cut shapes from the waste.
- When necessary, tape thicker materials to the mat to keep them from slipping during the cut.
- If you cut a range of materials, you might need more than one mat so that you can use stickier mats for certain materials.
- Refer back to *Section 1.08* for information on cleaning the cutting mat and adding more adhesive,

2.01.7 Don't Get Frustrated, Get Help!

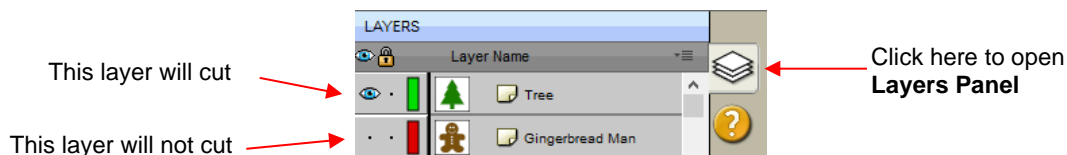
- Besides having your own Skycut dealer as your first line of contact, there are other resources where you can ask questions and get answers. Utilize the resources listed in *Section 1.01*.

2.02 Choices Before Cutting

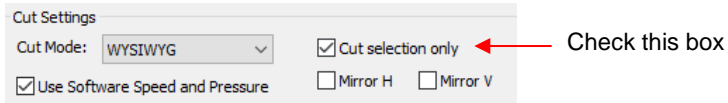
- There are a number of factors under your control for cutting:
 - ◇ What shapes to send to the cutter: *Section 2.02.1*
 - ◇ Where the shapes will be cut from the material: *Section 2.02.2*
 - ◇ What tool(s) will be used for cutting (or drawing, scoring, engraving, etc.): *Section 2.02.3*
 - ◇ What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

2.02.1 Controlling Which Shapes Will Cut

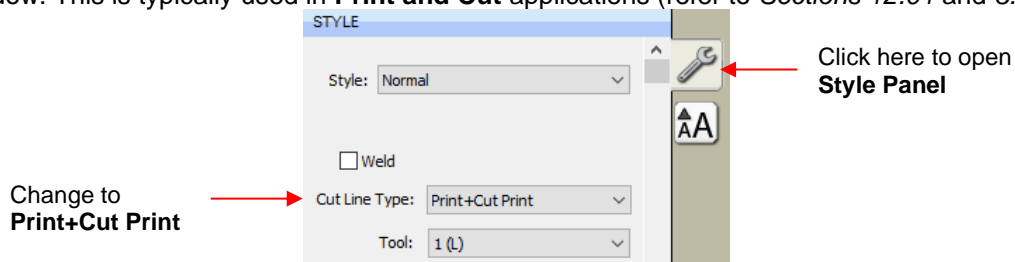
- There are four ways to control whether a shape will be cut or ignored:
 - ◇ Option 1: Show/hide shapes on the **Layers Panel** (refer to *Sections 6.04* and *7.10*) – anything hidden will not be sent to the **Cut Settings** window. By clicking on the left side icon, a layer can be hidden. This is the most common way to control what shapes will cut.



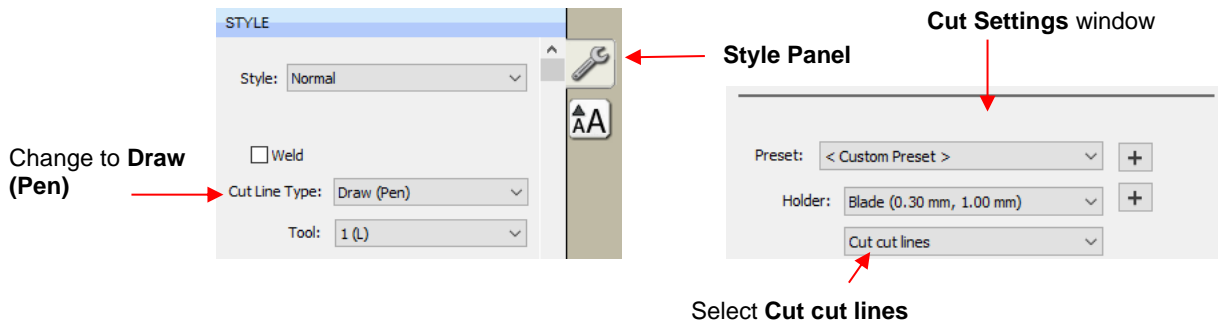
- ◇ Option 2: Select/highlight which shapes you want to cut (refer to *Section 7.02*). Then, in the **Cut Settings** window, mark the option for only cutting those that are selected. This is useful if you have shapes you want to cut that are in the same folder with other shapes you do not want to cut. You still have the option to hide those other shapes, as in the prior option, but this could be quicker if there are a lot of shapes to omit:



- ◇ Option 3: For shapes you do not wish to cut, change the **Cut Line Type** (on the **Style Panel**) to **Print+Cut Print**. Those shapes can then only be printed and will not be sent to the **Cut Settings** window. This is typically used in **Print and Cut** applications (refer to *Sections 12.01* and *3.04*).

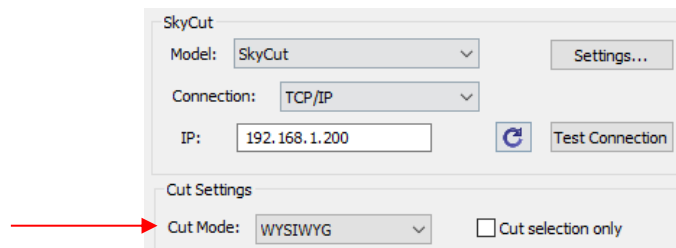


- ◇ Option 4: For shapes you do not wish to cut, change the **Cut Line Type** (on the **Style Panel**) to **Draw (Pen)**. Those shapes will not be cut if you then have **Cut cut lines** selected in the **Cut Settings** window (refer to *Section 12.01*).



2.02.2 Controlling Where Shapes Will Cut

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

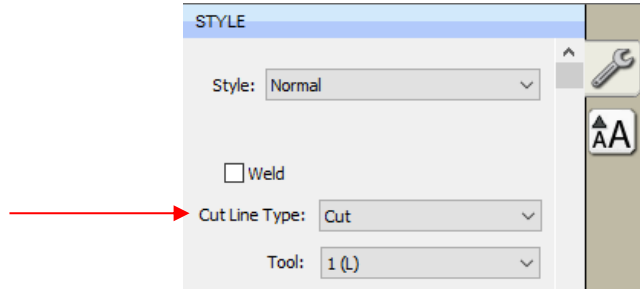


- This was briefly covered in *Section 1.13.2*. **Cut Mode** has three choices:
 - ◇ **WYSIWYG**: Cuts the shapes where they are positioned on the **Cutting Mat**. For more details, refer to *Section 12.07.3*.
 - ◇ **Origin Point**: Moves the shapes to align with the origin you have set based on the blade tip. Refer to *Section 12.07.2*.
 - ◇ **Center Point**: Moves the shapes to center around the origin you have set based on the blade tip. Refer to *Section 12.07.4*.
- A fourth mode is called **Print+Cut** (aka **Print and Cut** or **PNC**):
 - ◇ This is the mode selected when you want to print images on your printer and then have the Skycut cut them out.
 - ◇ Four registration marks are printed, along with your images, from SCAL to your home or office printer. The printout is placed on the cutting mat. The camera automatically locates and aligns with each printed mark. The Skycut will then cut out your shapes based on triangulation. This is far more precise than **WYSIWYG** because it takes into account not only any misalignment of your printout on the mat, but also any errors in the printing. Most printers do not print images precisely in the location on the paper as they are located on the screen.
 - ◇ Note that raster images (.JPG, .BMP, .PNG etc.) will need to be traced first so that cut lines are created. Refer to *Section 9.03* for tutorials on how to do the tracing
 - ◇ Access to the **Print+Cut** mode is located in the bottom left corner of the **Cut Settings** window. Refer to *Chapter 3* for complete instructions on calibrating the camera and examples of PNC applications.

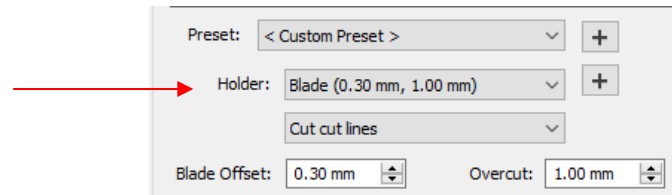
2.02.3 Selecting the Tool to be Used for Cutting

Blade Holder

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



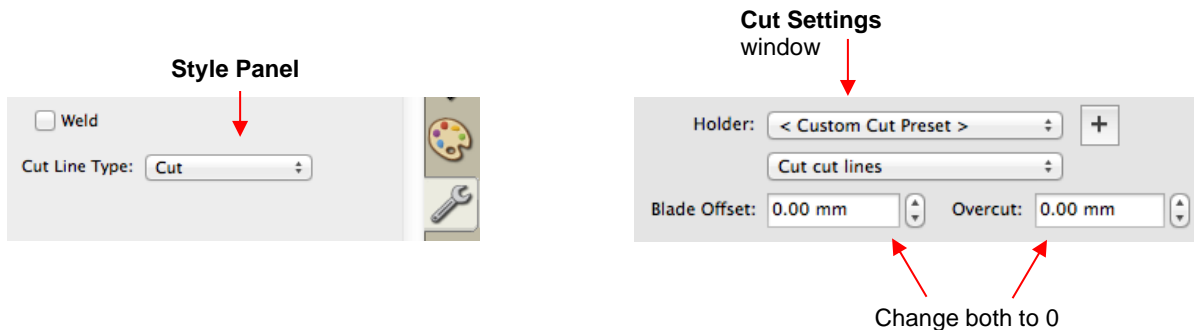
- In the **Cut Settings** window, make sure **Blade** is selected under **Holder**:



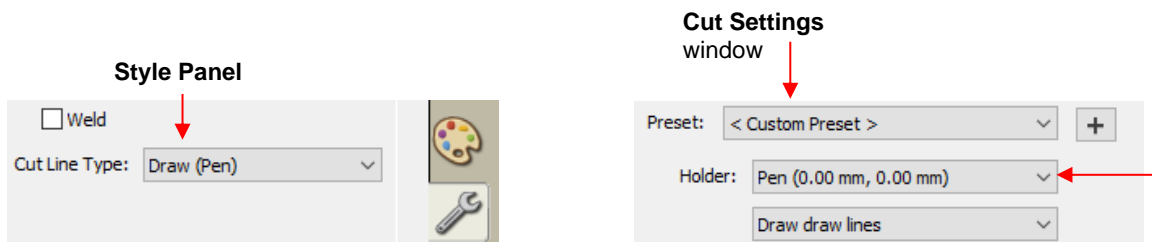
- You have a choice of three blade types to use in your blade holder, as was covered in *Section 1.07.3*. Based on the blade type, you will need to set a **Blade Offset** value for that type of blade (refer to *Section 2.03.3*).

Pen (or Engraving Tool or Embossing Tool)

- There are two options for setting up SCAL to either draw with a pen or use one of the accessory tools:
 - ◇ Option 1: When only using a single pen or tool, you can leave the **Cut Line Type**, on the **Style Panel**, set to **Cut**, as with the blade holder. You will then need to change the **Blade Offset** and **Overcut** to 0:

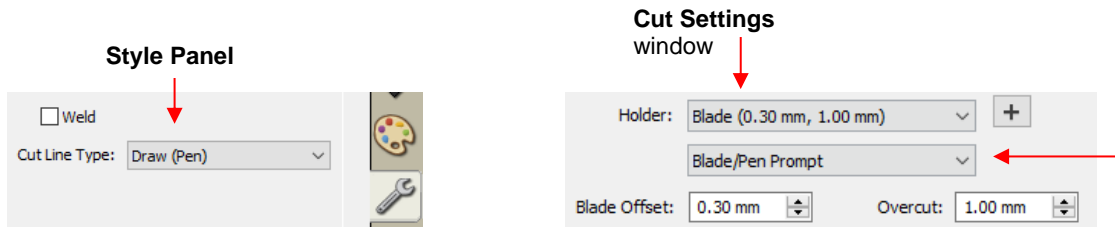


- ◇ Option 2: When only using a single pen or tool, change the **Cut Line Type** on the **Style Panel** to **Draw (Pen)** and then change the **Holder** to **Pen**, just as you did in when you first tested the Skycut (*Section 1.13.2*):



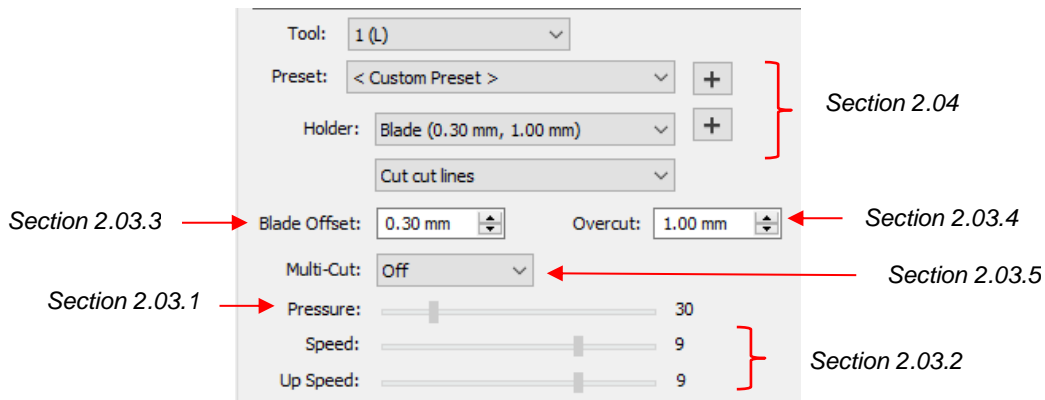
- ◇ Option 3: If, however, you are using both the blade holder and a pen (or more than one pen) in your project and wish to change out tools during the process, then you will need to set the **Cut Line Type** to

Draw (Pen) (for those particular layers). Then, in the **Cut Settings** window, change **Cut cut lines** to **Blade/Pen Prompt**:



2.02.4 Determining the Cut Settings

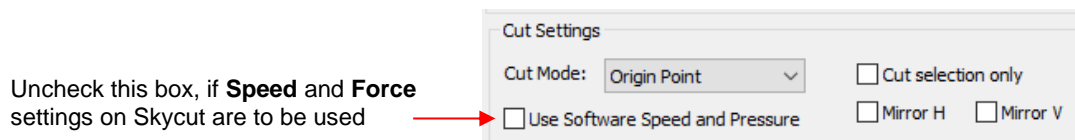
- In the lower half of the **Cut Settings** window, there are a number of settings which should be understood thoroughly, as you will be checking these settings before every cut. The following screenshot shows the section number to go to for more information:



- The table at the end of this chapter contains recommended settings for your initial test cut. If you cannot find your material in the table, use the flow chart in *Section 2.09* while test cutting your material to determine optimum settings.


2.03 Cut Settings

- Before presenting the various settings, note that the **Pressure/Force** and **Speed** settings can be set on the control panel itself. In order to cut from SCAL and use the settings on the Skycut, uncheck this box in the upper half of the **Cut Settings** window:




2.03.1 Pressure

- The cutting **Pressure** (also called **Force**) ranges from 1 to 160 where the maximum of 160 represents ~850g of cutting force. If it is set too low, the material cannot be cut. If it is set too high, you will get bad cutting (even incomplete cutting at times) and tearing of the material. Use suggested settings for the material you are cutting and perform small test cuts before cutting your actual project. Make adjustments in order to get a clean test cut before proceeding with your larger cut.
- Dull blades will need more force than new blades, thus anticipate increasing the force over the life of the blade.

- When cutting materials that can use either blade, the 45° blade (red cap) will need a little more force than the 60° blade (blue cap), because of the extra contact with the material being cut and because the 60° blade is cut much thinner, making it a “sliver blade.”
- As noted earlier, this setting can be made on the Skycut control panel instead. Press the **Force/Speed** icon  and then set the **FORCE** to the desired level.

2.03.2 Speed and Up Speed

- **Speed** (also called **Cut Speed**) is how fast the blade travels while it is in the “down” or cutting position. **Up Speed** is how fast the blade travels while in the “up” position, such as when it is moving from the origin to the location of the first shape to cut or when moving from one cut shape to begin cutting another.
- The Skycut has 12 speed settings ranging from “snail’s pace slow” to “insanely fast.”
 - ◇ The settings from 1 through 4 are the slow speeds and should be used when cutting dense difficult materials, such as chipboard, craft plastic, styrene, and balsa.
 - ◇ The settings from 5 through 8 are medium speeds and should be used for easy-to-cut materials, such as cardstock, vinyl, iron-on transfer, and rhinestone template material.
 - ◇ The settings from 9 through 12 are the fast speeds and are useful for engraving, embossing, and drawing. You may, however, find that some materials will cut well at the faster speeds.
- **Cut Speed** is usually more important to control since the blade may need more contact time with a particular material. **Up Speed** can usually be left quite high although, for print and cut accuracy, it may need to be lowered if there are many shapes to be cut from a printout.
- On the Skycut control panel, the default setting is to have the **Up Speed** and **Cut Speed** the same and referred to as **SPEED**. This can be adjusted by pressing the **Force/Speed** icon  and then setting the **SPEED** to the desired level. In order to enter a separate **Up Speed** on the control panel, refer to [Section 1.14.1](#).

2.03.3 Blade Offset

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



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



Offset is too low:
corners are rounded



Offset is too high: bubbles
appear at the corners

- Currently it is recommended that a **Blade Offset** of between 0.25 – 0.35 be used for each of the three types of Skycut blades. Any time you order new blades, check for the recommended **Blade Offset** on the packaging. However, it's not unusual for blades to be slightly off-spec. Based on cutting a rectangle or square, increase or decrease the **Blade Offset** in increments of 0.1 or smaller until the shape has perfectly square corners.

2.03.4 Overcut

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

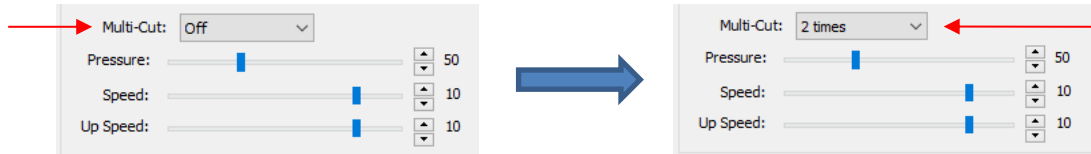


Overcut is too low:
paths do not close

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

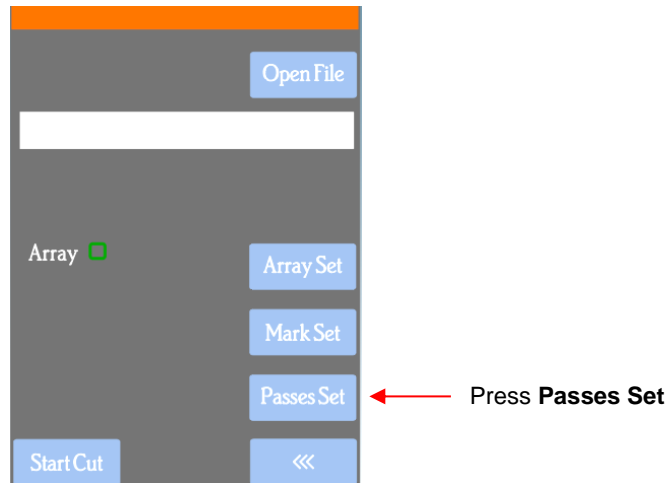
2.03.5 Multi-Cut

- The **Multi-cut** setting (also referred to as **Passes**) causes each individual path to be cut the set number of times before the blade moves to the next path to cut. This is better than just repeating the entire cut as each repeated pass is cut with the blade held down throughout the repeated passes, resulting in cleaner cutting.
- In general, when increasing **Multi-Cut**, the **Pressure** setting can be decreased. For example, you may find a cardstock that requires a **Pressure** of 55 to cut in a single pass will only need a **Pressure** of 45 if cutting in two passes.
- **Multi-cut** is recommended in the following situations:
 - ◇ Cutting thicker denser materials, such as chipboard, where multiple passes allow the blade to progressively "carve" through the material
 - ◇ Cutting certain fibrous materials, such as fabric, where a second pass will ensure that all of the fibers have been cleanly cut
 - ◇ Cutting intricate or detailed shapes (such as script titles) from certain materials, such as heavy or textured cardstock, where a single pass may leave certain spots not cleanly cut
 - ◇ Cutting rhinestone template material where a second pass results in much cleaner weeding of the cut circles
 - ◇ In SCAL's **Cut Settings** window, change the **Multi-cut** setting according to the number of passes desired:

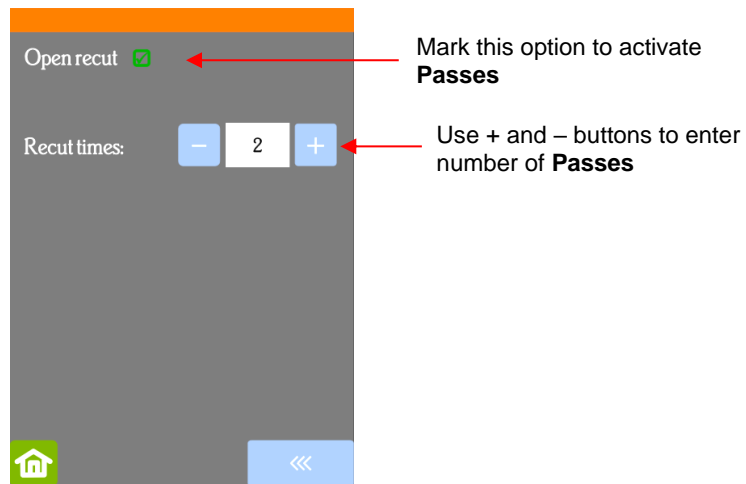


- ◇ Alternatively, passes can be set on the control panel by pressing the **USB** button on the main screen and you will see a **Passes Set** button:

NOTE: If your screen does not have **Passes Set** displayed, please go to *Appendix E* for activation instructions.



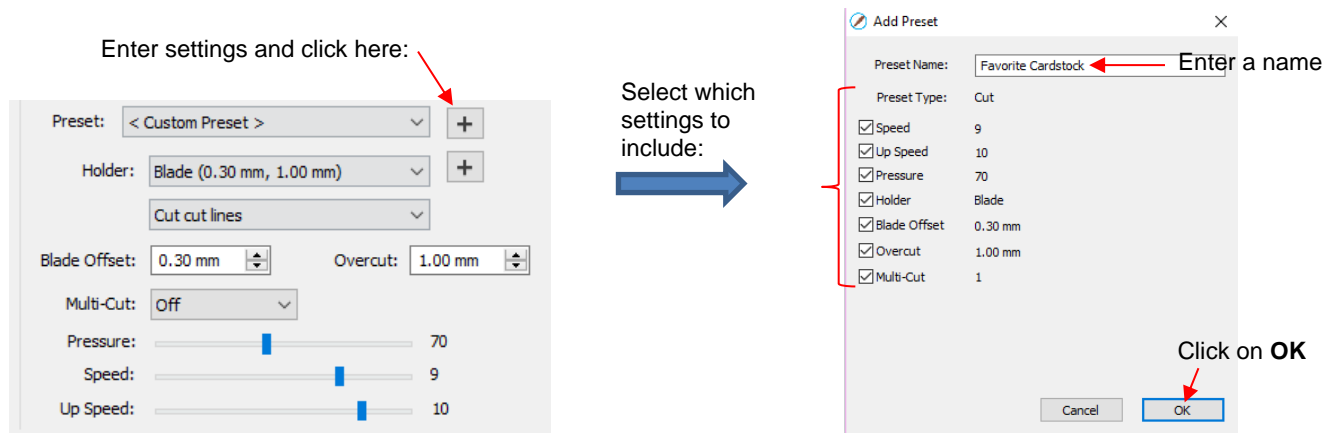
- ◇ Press the **Quantity Set** button to open the following screen where you can turn on the **Recut** function and enter the desired number of repeats:



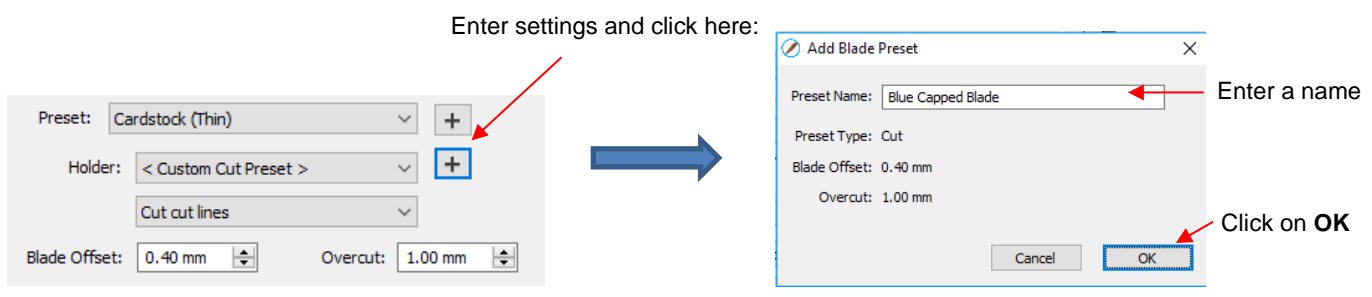
- **IMPORTANT:** Currently the **Open recut** option will default to unmarked (off) whenever the Skycut is first powered on. Thus, make a mental note (or, even better, put a Post-It note on your cutter) to turn this option on when needed. Also, note that when this setting is activated, it will be combined with the **Multi-Cut** setting in SCAL. Thus, if you have 2 passes set in SCAL and on the control panel, the shapes will cut 4 times.

2.04 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:

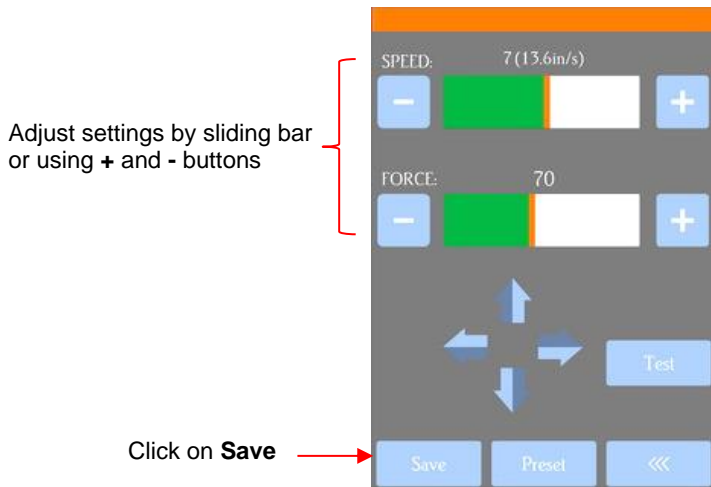


- To delete either type of preset that you personally added, select it from the menu and then a “ – “ button will appear. Clicking on that button will then remove it from the list:

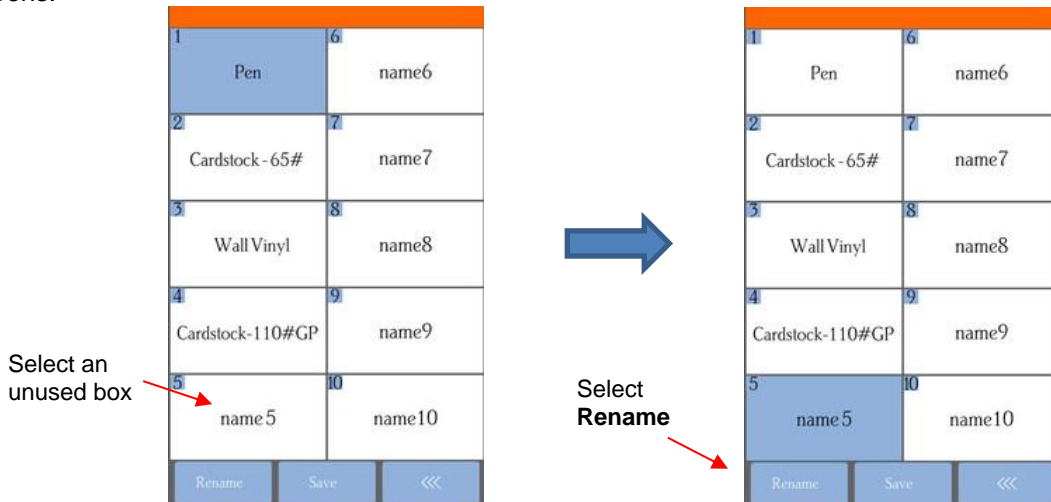


- Presets can also be saved on the Skycut control panel. However, they only include **Force**, **Cut Speed** and **Up Speed**, if **Up Speed** is set to show (refer to *Section 1.14.1*). To create a preset:

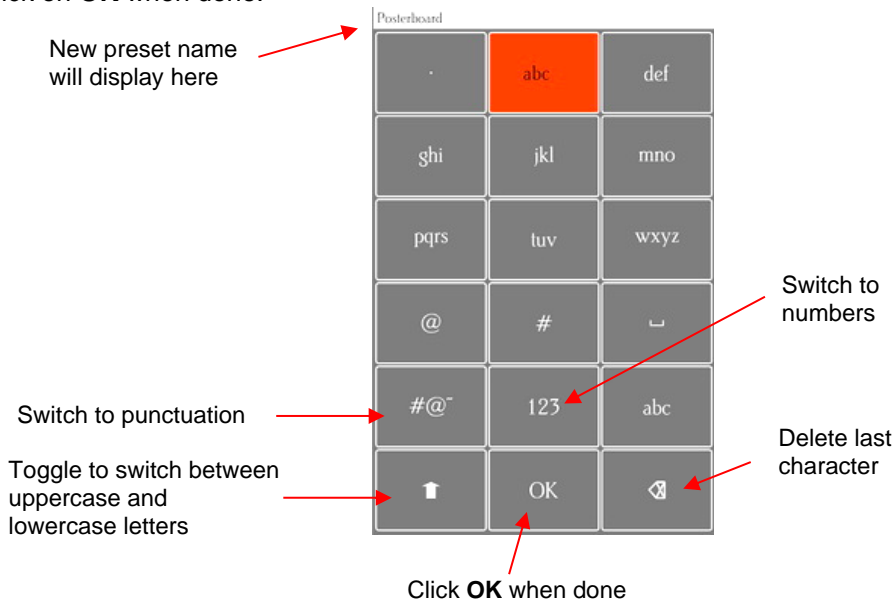
◇ Press the **Force/Speed** icon  to open the **Force/Speed** screen:



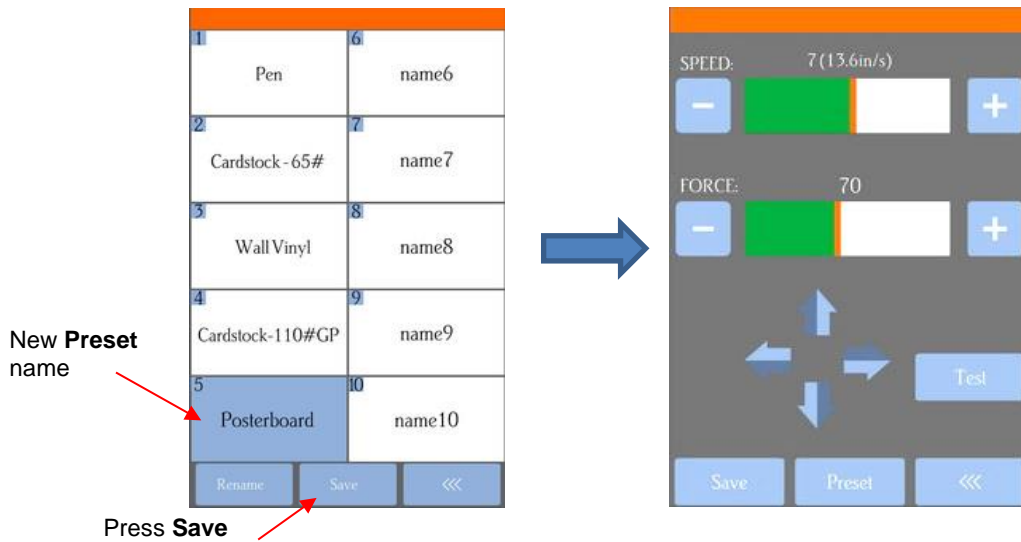
- ◇ Make the necessary changes to the **SPEED** and **FORCE** settings. Select **Save** and the following screen opens:



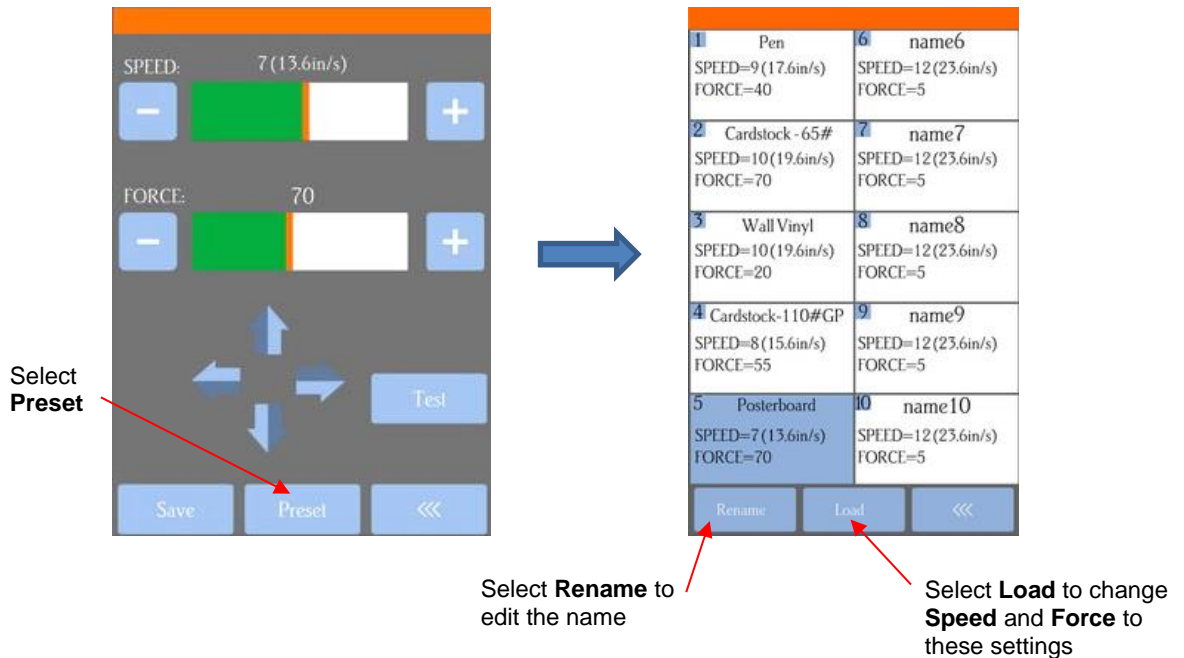
- ◇ Press one of the unused preset boxes, e.g. *name5*, and it will turn blue indicating it is highlighted. Select **Rename**.
- ◇ A window opens where you can enter the name for the new **Preset**. The characters are entered in the same manner as the **Password** entry window in *Section 1.12.2*. Note that there is a 15-character limit. Click on **OK** when done.



- ◇ You will now see the name of your new preset and you can press **Save** to add it to the saved presets with the **FORCE** and **SPEED** you set. You will be returned to the **Force/Speed** screen.



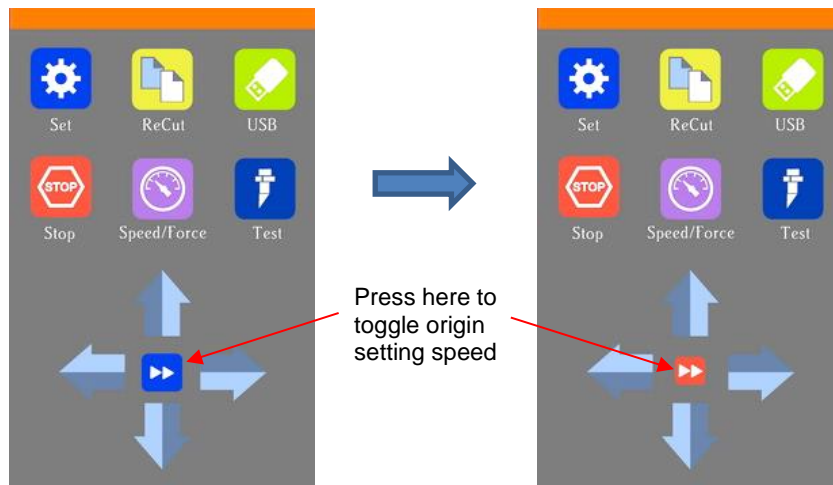
- ◇ To verify the preset or to select a different preset, press **Preset**. The **Preset** window opens where you can see all of the **Presets**, along with the settings for those presets. In that window you can also select a different preset. Then you can select **Rename** to edit its name or select **Load** to select that preset's **Force** and **Speed** into the **Force/Speed** screen.



2.05 Setting the Origin before Cutting

- Before you cut, you should check to see where the blade tip is located in relation to the material so that the shapes will cut in the appropriate location.
- **IMPORTANT!** The C16 Skycut has a maximum cutting width of 16 inches; 24 inches on the C24. If you move the head too far to the left to begin the cut and your project is wide, you may exceed the left side limit and cutting will stop at that point with no option but to abort. The newer Skycut models have a sticker at the front of the machine indicating where the outside limit for cutting can occur:

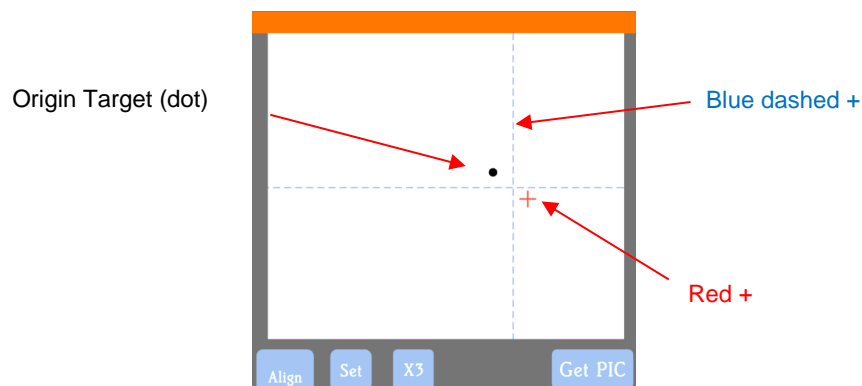
- To set the origin, press the arrow buttons on the main screen of the control panel. Remember that the middle button can be toggled between regular speed and a slow speed for more control:



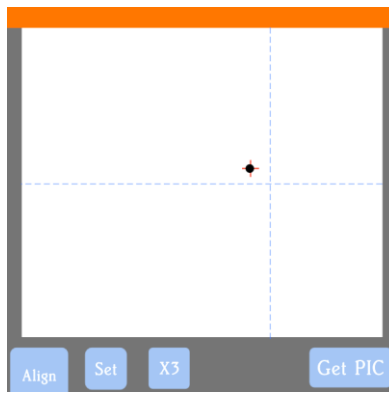
- In general, you set the origin near the lower right corner of the material, as you did during your initial test drawing in *Section 1.13.2*. However, when cutting in, say, **Center Point** mode or for certain other applications, you will need to set the origin elsewhere.

2.05.1 Setting an Origin Using the Camera

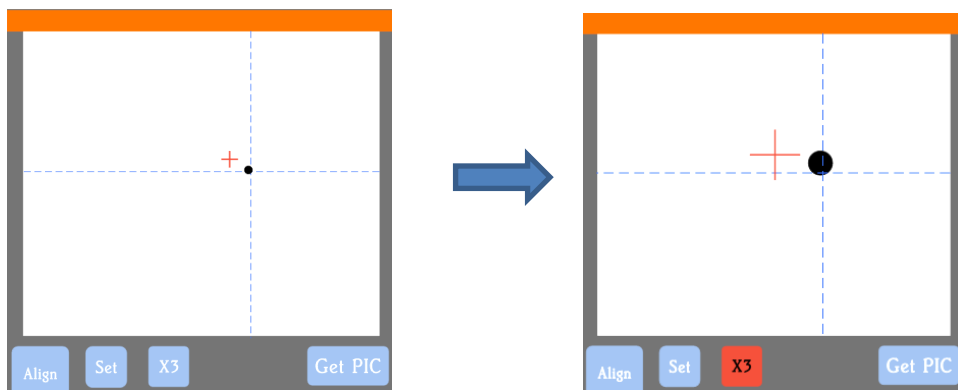
- In the event you need to set an extremely precise origin, the Skycut's built-in camera can be used:
 - Go to *Section 3.03* and perform the camera calibration.
 - Choose where you want the origin to be set. You'll need an "origin target" to use when the camera takes a photo. It can be a dot on your material, the corner of your material, the intersection of grid lines on the mat, etc. If you do choose the latter, make sure there's a way to clearly distinguish which intersection you want to use.
 - On the Skycut's **Main Screen**, use the arrows to move the center of the blade holder roughly over the origin target. In this example, a dot will be used.
 - Select **Set** and **Camera**. In the **Camera Screen**, press **OK**. A photo will be taken and displayed. If needed, press **X3** so that you are zoomed out and able to see the origin target (dot) in the photo:



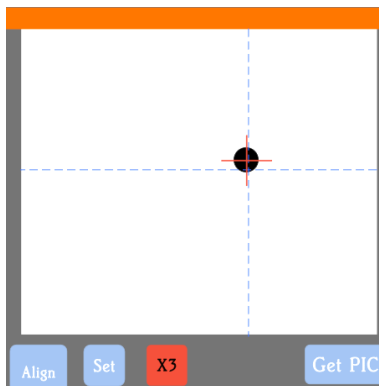
- Press the center of the origin target in the photo so that the red + will be moved approximately over it:



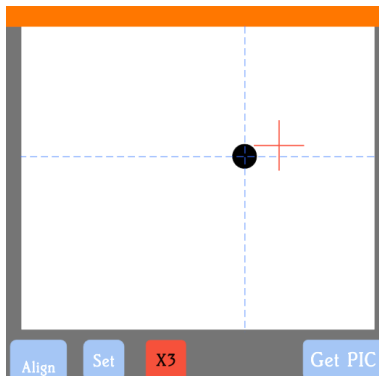
(6) Press **OK**. In the new photo, the blue dashed + should be close to the origin target. Press **X3** to zoom in:



(7) Use the arrow buttons to move the red + as close as possible to the center of the origin target:



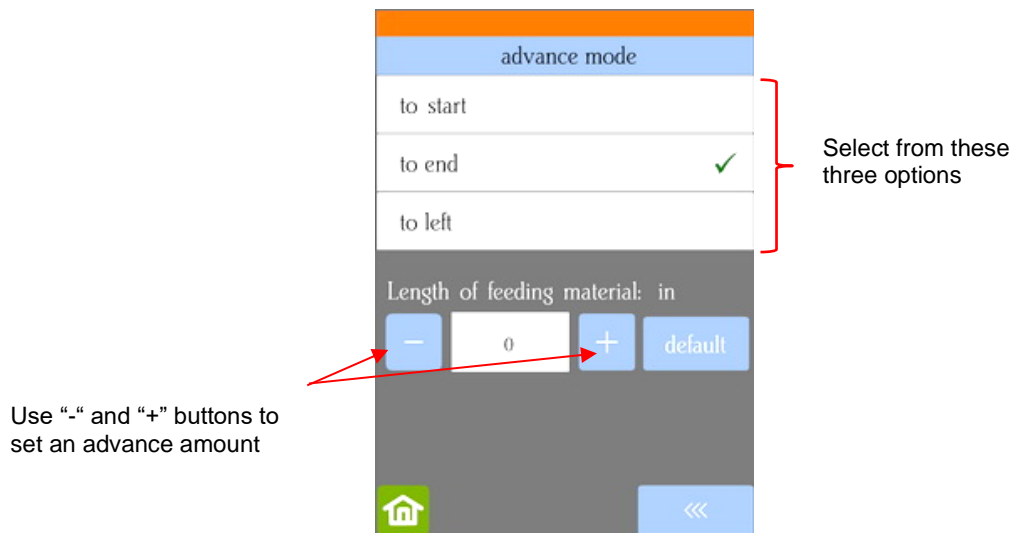
(8) Press **OK**. At this point the blue dashed + should be centered with the origin target:



- (9) Press the **Home** icon to return to the **Main Screen**. The head should move so that the blade holder is now located over the origin target and you can proceed with the cutting process.

2.06 Other Cut Setting Functions

- There are other functions and features in the **Cut Settings** window. Some of these, such as **Cut by Color** and **Tiles**, are only present in the PRO version of SCAL. Refer to *Section 12.06* for details on all of the settings.
- The **End Action** function in SCAL Pro is actually performed on the Skycut itself. The function can be opened by going to **Set>Advance Mode** on the control panel.



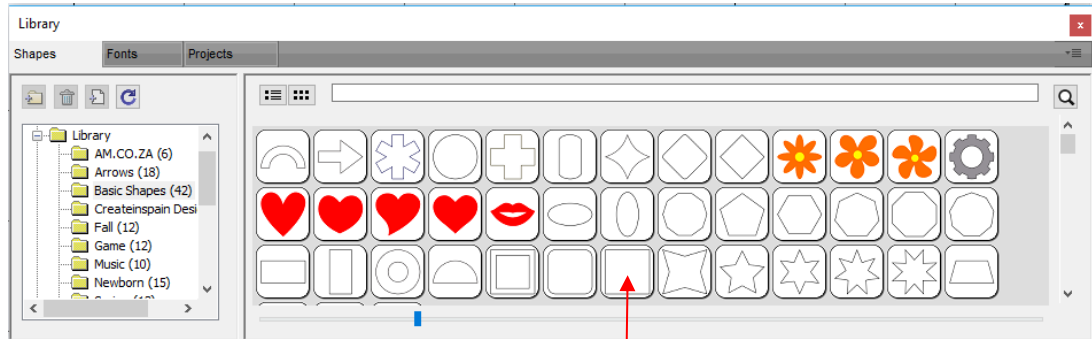
- ◇ **to start** will cause the blade holder to return to the origin after cutting.
- ◇ **to end** will cause the blade holder to advance forward to the end of the cut project.
- ◇ **to left** will cause the blade holder to move to the left of the cut project.
- ◇ The settings below the option are activated when choosing either **to end** or **to left**. You can enter a specific distance for the blade holder to advance. This is useful when cutting repeats of the same project because it allows for the origin to be set automatically for the next repeated cut.

2.07 Important Checklist Before You Cut!

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

2.08 Resolution/Scale Calibration

- If you were to cut out any particular shape, for example, a 10" x 10" square, you might find that it actually measures 9-15/16" x 10-1/32". It will be very close to 10" x 10" but perhaps just slightly smaller or larger in either or both dimensions. Now this might be perfectly acceptable for the type of cutting you do. Therefore, it may not even be necessary to do this particular calibration. However, if you do want to make sure your shapes are cut precisely to scale, the following procedure will allow you to calibrate your Skycut.
- Go to the **Library** and select the square shape:



Select this square

- Make sure you have selected the square and not the rounded square to the left of it because you will be measuring this square with a ruler after drawing it.
- On your Skycut control panel, go to **Set>Advanced Settings> Scale**. The following window opens where you can verify that the current **X Scale** and **Y Scale** values are both set to 1.0000:

Verify **X Scale** and **Y Scale** are both set to 1.0000

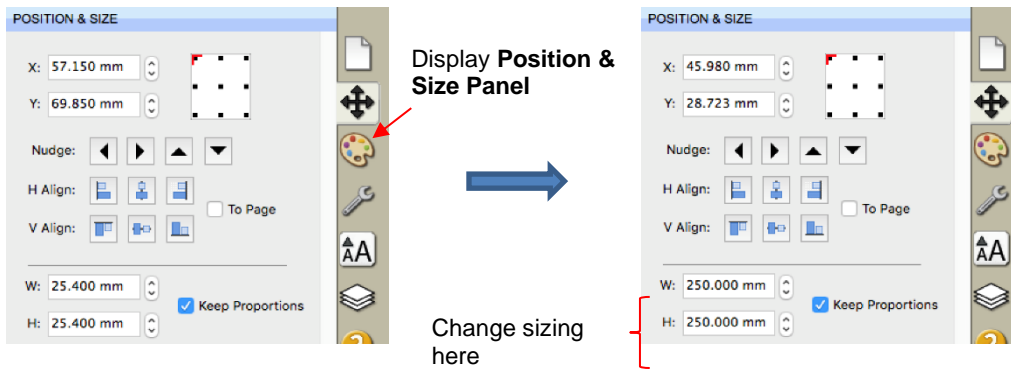
Use the + and - buttons to adjust the numbers, if needed



- The calibration process can be conducted in inches, cm, or mm. Both mm and inches will be presented here. In general, it is recommended that mm be used, however, if you do not have a metric ruler, then you can use inches instead.
- Pick one of the two following sections and follow the instructions. Once you have calculated your new **X Scale** and **Y Scale**, return to the screen above and enter the values using the + and - buttons.

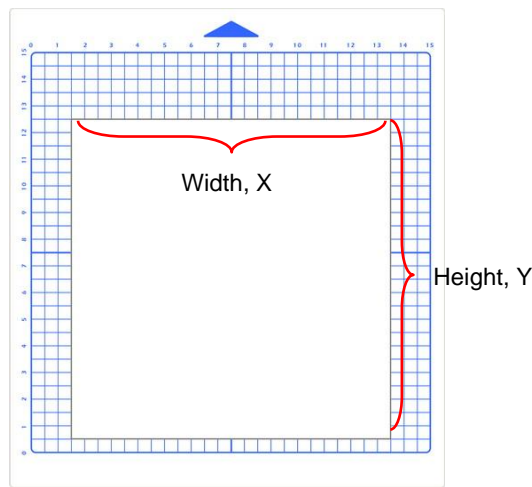
2.08.1 Skycut Resolution Using Millimeters for Measurement

- In SCAL, go to **View>Ruler Units** and select **Millimeters (mm)**.
- To resize the square, select it and then click on the **Position & Size** icon to display that panel. Change the size (**W** and **H**) to the largest size that will fit on the paper you have available. It is recommended that the square be at least 250 mm x 250 mm:

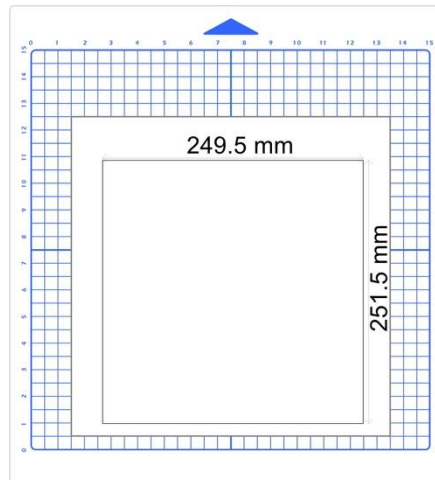


- Draw the square on your paper using the test pen. Then, using a mm ruler, carefully measure the **Width** (the left-to-right length that drew) and the **Height** (the top-to-bottom length that drew). Note that it doesn't matter if you had **Portrait** or **Landscape** selected in SCAL. It's the same as shown below:

Feed the mat this direction into the Skycut



- Write those measurements onto your sheet:



- Use a calculator to calculate the **X Scale** and **Y Scale** based on the measurements you obtained versus the size in SCAL

$$\begin{aligned}
 \text{New X Scale} &= \text{Width of the square in SCAL divided by the measured width} \\
 &= 250 / 249.5 \\
 &= 1.0020
 \end{aligned}$$

$$\begin{aligned} \text{New Y Scale} &= \text{Height of the square in SCAL divided by the measured height} \\ &= 250 / 251.5 \\ &= 0.9940 \end{aligned}$$

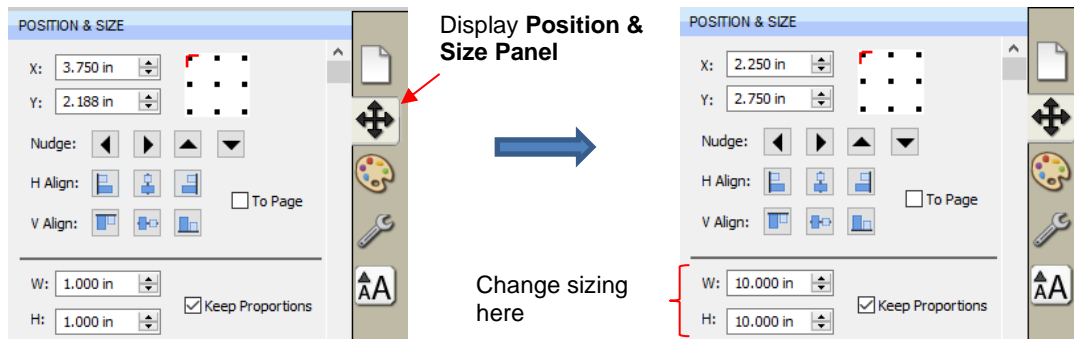
- Return to the **Scale** screen (**Set>Advanced Settings>Scale**) and use the **+** and **-** buttons to enter these calibrations:



- Draw the square again and measure to verify the square is now 250 mm x 250 mm.
- Once you have your calibration set, please record these values in your “little black book” in case you ever need to reset your Skycut to default settings or install a firmware update.

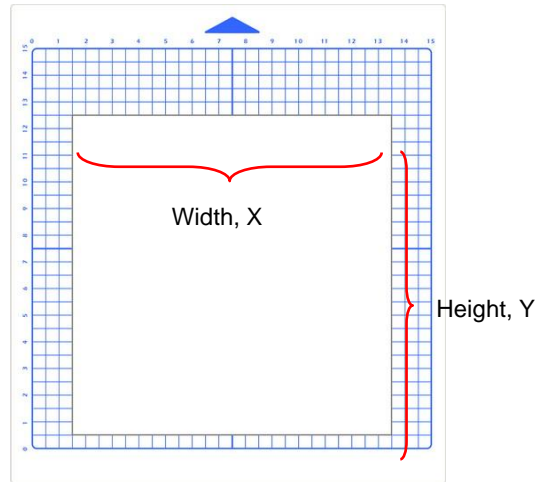
2.08.2 Skycut Resolution Using Inches for Measurement

- In SCAL, go to **View>Ruler Units** and select **Inches (inch)**.
- To resize the square, select it and then click on the **Position & Size** icon to display that panel. The square will be 1” x 1”. Change the size (**W** and **H**) to the largest size that will fit on the paper you have available. It is recommended that at least 10” x10” be used:

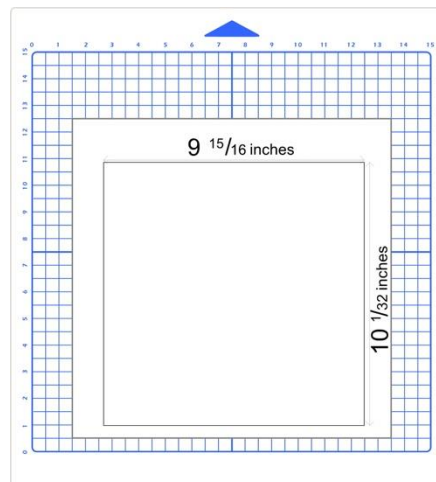


- Draw the square on your paper using the test pen. Then, using a ruler, carefully measure the **Width** (the left-to-right length that drew) and the **Height** (the top-to-bottom length that drew). Note that it doesn't matter if you had **Portrait** or **Landscape** selected in SCAL. It's the same as shown below:

Feed the mat this direction
into the Skycut



- Write those measurements onto your sheet:



- Use a calculator to calculate the **X Scale** and **Y Scale** based on the measurements you obtained versus the size in SCA:

New **X Scale** = Width of the square in SCAL divided by the measured width

$$= 10 / 9 \frac{15}{16}$$

$$= 10 / 9.9375$$

$$= 1.0063$$

New **Y Scale** = Height of the square in SCAL divided by the measured height

$$= 10 / 10 \frac{1}{32}$$

$$= 10 / 10.03125$$

$$= 0.9969$$

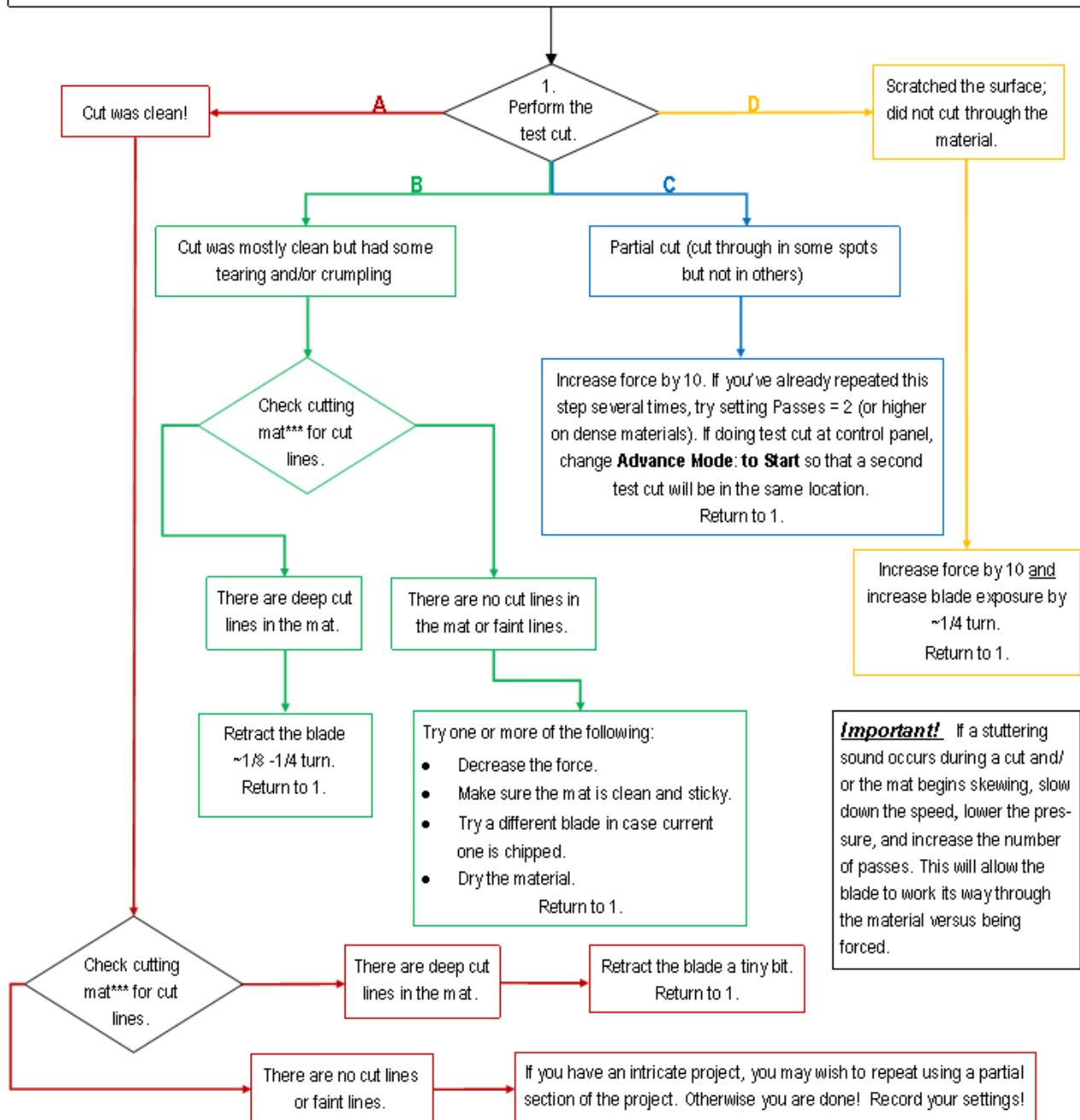
- Return to the **Scale** screen (**Set>Advanced Settings>Scale**) and use the **+** and **-** buttons to enter the calibrations:



- Draw the square again and measure to verify the square is now 10 in x 10 in.
- Once you have your calibration set, please record these values in your “little black book” in case you ever need to reset your Skycut to default settings or install a firmware update.

2.09 Test Cutting Flow Chart for the Skycut

- Select a small test shape. You can use the built-in test on the Skycut if your square cuts an internal circle. Otherwise, select a shape in your design software (such as a ring) that has an internal path. This works better as it allows you to more easily check to see if the blade is cutting into the backing sheet or cutting mat.
- Start with conservative Force and Speed. Refer to a similar material in the *Suggested Settings Table* in *Section 2.11*.
- Set the blade tip height above the material based on a similar material in the *Suggested Settings Table* in *Section 2.11*.
- On the control panel: **Set>Advance Mode**, choose **to End** or **to Left** and enter a small distance, such as 0.5" or 10 mm to space each test.
- Set origin in the lower right corner of the material.



*** or backing sheet, such as with vinyl

2.10 Settings Form for Cutting Materials

<u>Material Type</u>	<u>Material Brand or Source</u>	<u>Blade</u>	<u>Force</u>	<u>Speed</u>	<u>Blade Offset</u>	<u># Passes</u>	<u>Ht*</u>	<u>Other Comments</u>

*Number of Post-It notes used to set blade tip distance above material.

2.11 Suggested Cut Settings for Various Materials

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

ALSO IMPORTANT: Do not use a Blade Ht.* greater than 15 Post-Its with a blue capped blade. It is very fragile!

* **Blade Ht.** = number of Post-It notes used to set blade tip distance above the material: Refer to *Section 2.01.3*.

Material Type	Material Brand/Source	Blade	Passes	Force	Speed	Blade Ht.*	Other Comments
Acetate	5 mil (0.13mm)	R	1	45	8	20	
Acetate	Apollo Inkjet Transparency Film (0.13mm)	R	1	60	8	20	Alt 2 passes at Force = 40
Candle Wax	Rayher: 0.025" (0.6 mm)	B	1	20	5	15	Alt Paper side up, Force 30
Candle Wax	Stockmar: 0.05" (1.2 mm)	B	1	25	5	10	
Cardstock	AC Textured 216gsm, 80lb cover	R	1	60	8	20	Alt 2 passes at Force = 50
Cardstock	Bazzill Linen	R	1	55	8	20	
Cardstock	Carolina C2S Digital 144lb (234gsm)	R	1	75	8	20	
Cardstock	Darice Core'dinations Premium (65lb)	R	1	45	8	20	
Cardstock	Georgia Pacific, 110lb index (199gsm)	R	1	55	8	20	Alt 2 passes at Force = 45
Cardstock	Graphic 45 (0.22mm)	R	1	50	8	20	6x6 Cardstock Pad
Cardstock	Neenah Astrobrights 176gsm	R	1	50	8	20	
Cardstock	Neenah Pastel 176gsm (65lb)	R	1	50	8	20	Alt 2 passes at Force = 40
Cardstock	Recollections 176gsm (65lb)	R	1	50	8	20	
Cardstock	Recollections 176gsm (65lb) Kraft	R	1	55	8	20	
Cardstock	Wassau 176gsm (65 lb)	R	1	50	8	20	Alt 2 passes at Force = 40
Cardstock	Worldwin Colormats (65 lb)	R	1	50	8	20	Alt 2 passes at Force = 40
Cardstock	Worldwin Cutmates	R	1	50	8	20	Alt 2 passes at Force = 40
Cardstock	Worldwin Smooth & Silky	R	1	70	8	20	Alt 2 passes at Force = 60

Material Type	Material Brand/Source	Blade	Passes	Force	Speed	Blade Ht.*	Other Comments
Chipboard	0.022" (0.5 mm)	R	2	100	5	20	Brayer well and tape edges
Chipboard	Cereal box 0.018" (0.4 mm)	R	2	100	5	20	Brayer well and tape edges
Chipboard	0.03" (0.76mm)	B	2	120	5	15	Brayer well and tape edges
Chipboard	0.015" (.38mm)	R	1	80	5	15	
Construction Paper	Creablogy - pink	R	1	30	7	20	
Construction Paper	Pacon Tru-Ray - black	R	1	35	7	20	Alt 2 passes at Force = 30
Craft Plastic	0.02" PET-G with blue protection sheets	B	2	130	3	15	Paper layer peeled off. Corners taped to mat
Craft Plastic	Dick Blick; 0.015" (0.38mm)	B	2	110	3	15	Paper layer peeled off. Corners taped to mat
Double Sided Adhesive	Sookwang	R	1	60	8	20	
Fabric - Cork	embroiderygarden.com	Y	2	50	5	15	Used an extra sticky mat
Fabric - Cotton Batik	with Lite Steam-A-Seam 2	Y	1	65	5	20	Steam-a-Seam2 fused to wrong side, paper removed and sticky side pressed down to mat
Fabric - Cotton Flannel	with Lite Steam-A-Seam 2	Y	2	75	5	20	Steam-a-Seam2 fused to wrong side, paper removed and sticky side pressed down to mat
Fabric - Denim	with Heat n Bond applied	Y	3	115	7	20	Left paper layer on.
Fabric - Quilting Cotton	with Heat n Bond applied	Y	2	65	7	20	
Fabric - Quilting Cotton	with Lite Steam-A-Seam 2	Y	1	80	5	20	Alt 2 Passes at Force = 70; Steam-a-Seam2 fused to wrong side, paper removed and sticky side pressed down to mat
Foam (Fun Foam)	Michael's 0.07" (1.8mm)	B	2	20	6	10	
HTV	refer to Vinyl - Heat Transfer						
Label Sheets: water resistant	Creative Label Concepts	R	1	35	8	20	The Force is for kiss cutting the labels.
Leather	0.02" Bookbinding quality	R	2	75	7	20	
Leather	~ 0.06"	B	2	100	4	10	
Magnet	0.035" (0.9mm)	B	2	120	5	10	Tape magnet to a sticky mat, may need slower speed for accurate shapes

Material Type	Material Brand/Source	Blade	Passes	Force	Speed	Blade Ht.*	Other Comments
Magnet	Printable Magnet Sheets (.25mm)	R	1	50	8	20	
Magnet	Printable Magnet Sheets-15 mil (0.4mm)	R	1	70	8	15	Alt 2 passes at Force = 50
Mylar	5 mil (0.12mm)	R	1	50	8	20	
Mylar	10 mil (0.25mm)	R	2	100	5	15	Extra sticky mat; tape corners
Mylar	7 mil (0.18mm)	R	1	65	8	20	
Paper - Copy Paper	HP Everyday 20lb (75gsm)	R	1	35	8	20	
Paper - Watercolor	Canson 140lb (300g) Cold Press	R	1	100	8	20	
Photo Paper	HP Glossy	R	1	80	8	20	Alt 2 passes at Force = 65
Photo Paper	Royal Brites Matte White - 200 gsm	R	1	70	8	20	Alt 2 passes at Force = 55
Poster Board	Grocery store 0.013" (0.33mm)	R	1	70	6	20	Alt 2 passes at Force = 60
Rhinestone Flock	Sticky Flock	R	2	45	8	20	Backing peeled and sticky side pressed to mat
Rhinestone Rubber	Hartco 425S - green	R	2	60	8	20	Backing peeled and sticky side pressed to mat
Shrink Film	Grafix clear	R	2	80	6	20	
Shrink Film	Grafix Ink Jet white	R	2	120	6	15	
Shrinky Dink	Bright White	R	1	125	6	20	
Shrinky Dink	Frosted Ruff N' Ready	R	1	125	6	20	
Shrinky Dink	Printable Ink Jet white	R	1	125	6	20	
Stencil Blanks (also see Mylar)	Show-Offs 15 mil from Hobby Lobby	R	3	120	5	15	Place side with protection sheet down; tape corners
Styrene	ASI .02" (.47mm)	R	2	120	8	20	
Styrene	Evergreen .02" (.47mm)	R	3	155	5	15	
Styrene	Plastruct .01" (.25mm)	R	1	90	8	20	Alt 2 passes at Force = 65
Vinyl - Heat Transfer	Glitter Iron On - White	R	1	30	8	20	Cut on mat

Material Type	Material Brand/Source	Blade	Passes	Force	Speed	Blade Ht.*	Other Comments
Vinyl - Heat Transfer	Easy Weed - white, navy	R	1	40	6	20	Cut on mat
Vinyl - Heat Transfer	GlitterFlex Ultra - Black	R	1	50	8	20	Cut on mat
Vinyl - Permanent	Expressions Vinyl 51 Series - Black	R	1	20	8	20	Cut on mat
Vinyl - Wall (no mat)	Vinyl - Oracal 631 - yellow	R	1	20	8	20	Not using a mat note lower Blade Height
Vinyl - Wall (no mat)	Vinyl - Oracal 631 - yellow	R	1	25	8	20	Not using a mat
Vinyl - Wall (on mat)	Vinyl - Oracal 631 - yellow	R	1	20	8	20	Cut with vinyl on the mat
Wood Veneer	0.015" (0.4mm) from cardsofwood.com	B	2	100	5	15	Taped to mat, tested both oak and walnut

© 2018-2021 Sandy McCauley, All Rights Reserved

The latest version of this table is available at: [Skycut C Suggested Settings](#)

3. Print and Cut (Contour Cut)

Video

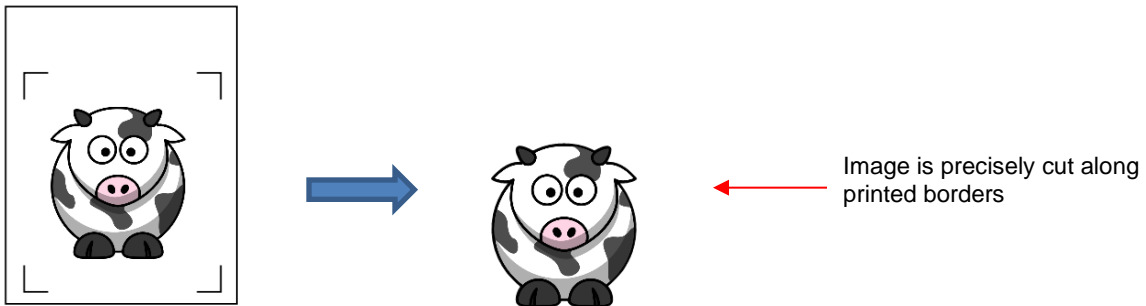
3.00 Quick Reference for Chapter 3

- How to calibrate the camera: *Section 3.03*
- What to assign each layer on the **Style Panel**: *Section 3.04.2*
- How to adjust the registration mark size, thickness or offset: *Section 3.05.1*
- Troubleshooting inaccurate PNC results: *Section 3.05.2*
- Printing a PNC project from Illustrator or another program: *Section 3.06*
- How to do a PNC from a USB flash drive file: *Section 3.07.1*
- How to use the **Array Mark** function on the control panel: *Section 3.07.2*

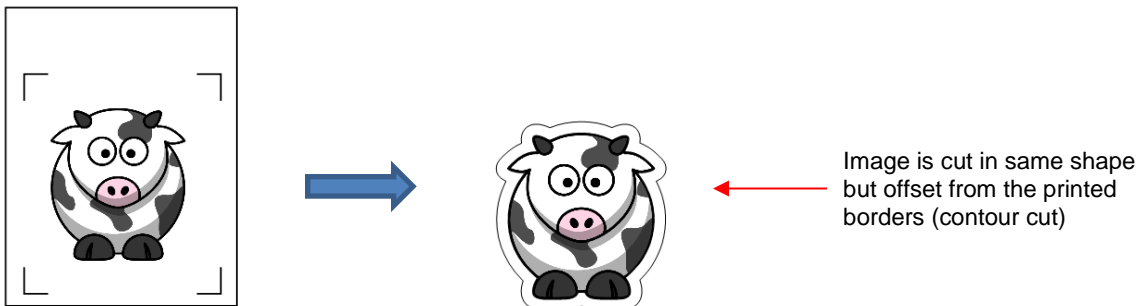
3.01 What Is a Print and Cut (PNC)?

- The print and cut process (also called contour cutting) involves printing an image from SCAL to any printer you own and then, with the aid of the Skycut's camera, 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.

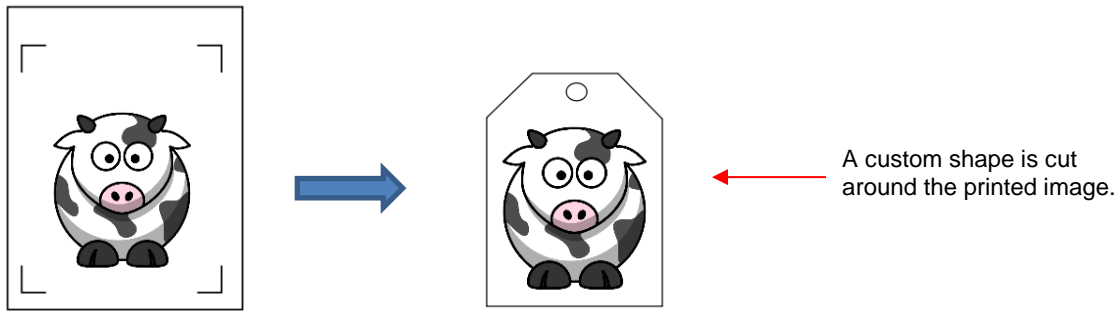
- ◇ Cuts along the actual borders of the printed image(s):



- ◇ Cuts outside of the borders but follows the shape(s) of the printed image(s):



- ◇ Cuts follow a different shape from that of the printed image(s):



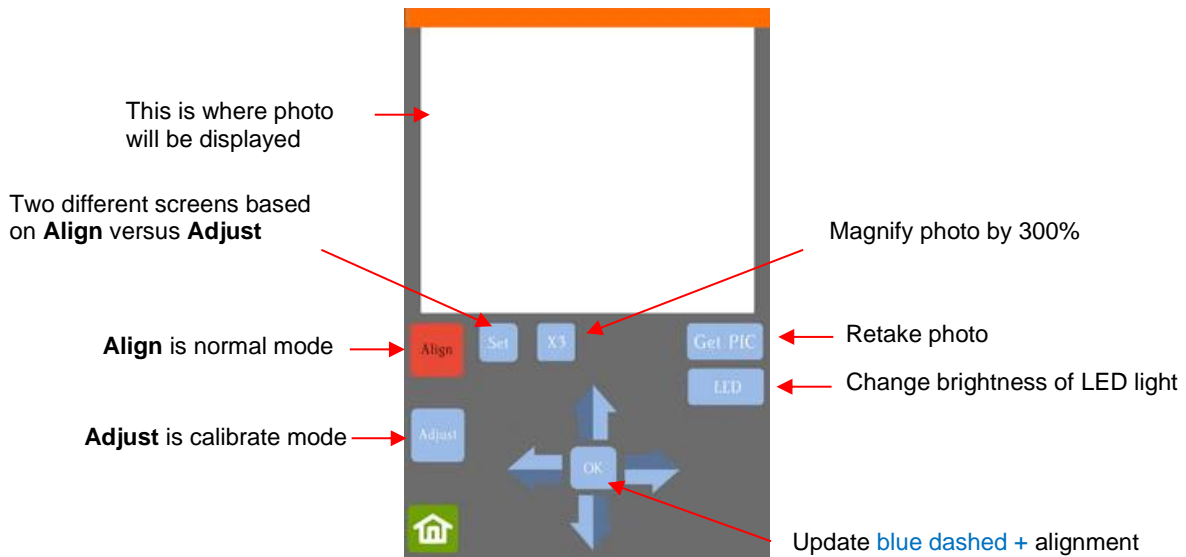
3.02 What is a PNC Calibration?

- In order to get precise PNC results, you must calibrate the camera. This is nothing more than letting the Skycut know how far away the camera lens is located relative to the tip of the blade. Because the camera is manually installed inside the blade carriage, the distance from the camera's center to the tip of the blade will vary slightly from one Skycut to the next.
- This calibration only needs to be done one time. If you have travelled with your Skycut or it's been bumped fairly hard, you might want to run a test to make sure your calibration hasn't changed. It's also recommended that you check your calibration after any firmware updates are installed.
- The process, which is conducted through the control panel involves:
 - (1) Having the Skycut draw a test shape. At that point the camera takes a photo and displays it on the control panel, along with a red + and a large blue dashed +.
 - (2) Aligning the red + with the center of the test shape display several times until the blue dashed + is centered with the test shape.

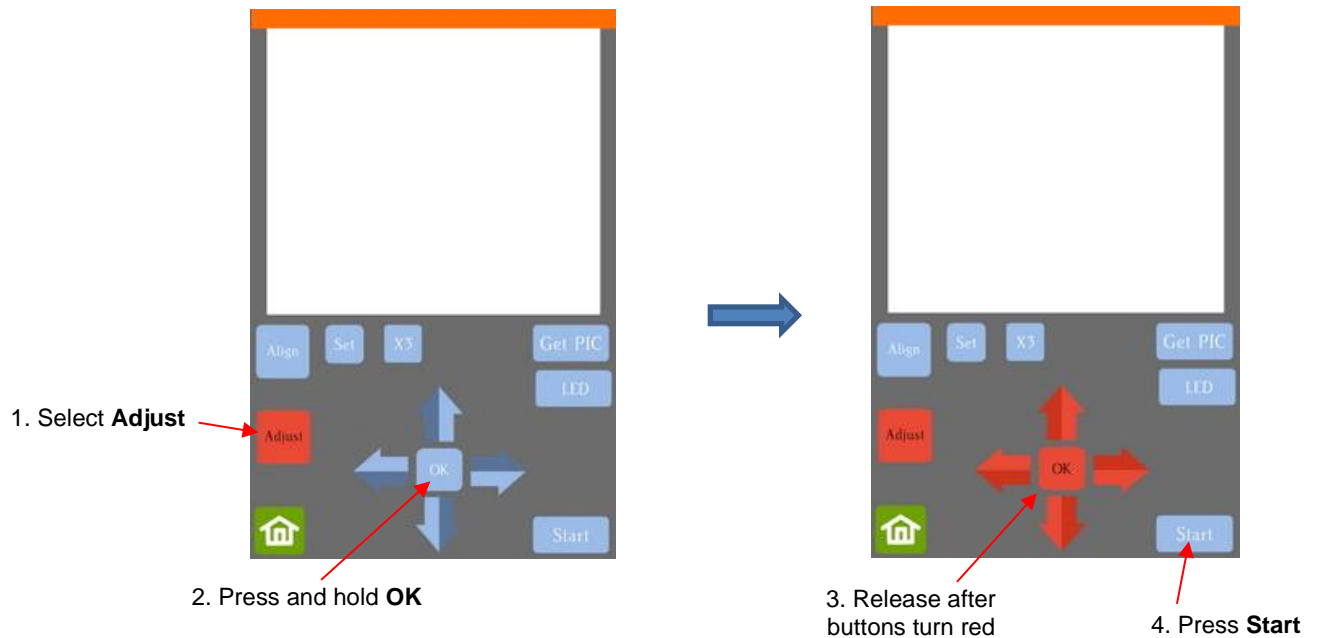
3.03 Camera Calibration Procedure

Video

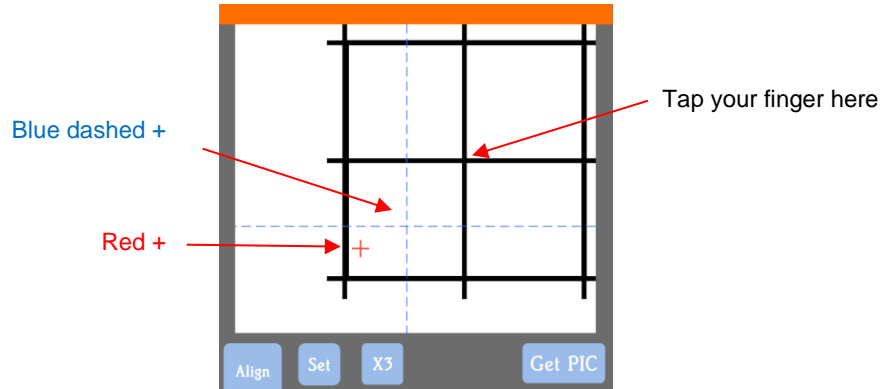
- You need the following items for this calibration:
 - ◇ Sheet of paper
 - ◇ Test pen that came with your Skycut
- (1) Insert the test pen into the Skycut. Place the sheet of paper into the Skycut. You can use the cutting mat to hold the paper or insert the paper directly. **IMPORTANT:** For all camera applications, make sure the starting origin is at least 3 inches from the right end cap so that the camera has room to move to the right to take a photo.
- (2) On the control panel, move the test pen over the sheet of paper.
- (3) Select **Speed/Force** and set **SPEED** to ~ 8 and **FORCE** to ~ 30. Click on **Test** to verify that a square is clearly drawn. If it is too faint, increase **FORCE** as needed and repeat.
- (4) Move the pen an inch or two away from the test so that there is room for the calibration shape to be drawn.
- (5) On the **Main Screen**, press **Set** and then **Camera**:



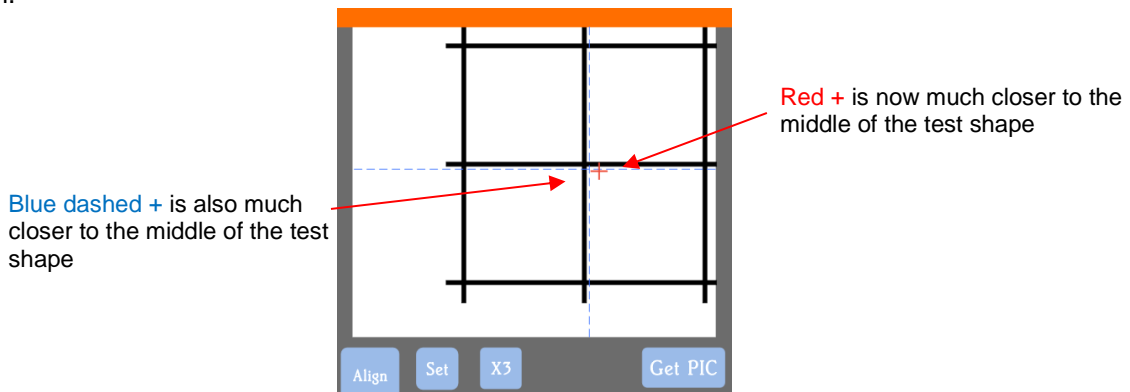
(6) Press **Adjust** to switch to calibrate mode. Press and hold the **OK** button for several seconds until it and the arrows around it turn red (if the buttons do not turn red, please refer to *Appendix D1*):



(7) Press **Start**. The test shape, which is a grid of 6 lines, will be drawn on the paper and the camera will move over the test shape, take a photo, and display the photo on the control panel. If you cannot see the test shape clearly, press the LED button once so that it reads LED 50% and press the **Get PIC** button. You should see three items in the photo: the test shape that was drawn with the pen, a red +, and the blue dashed +:

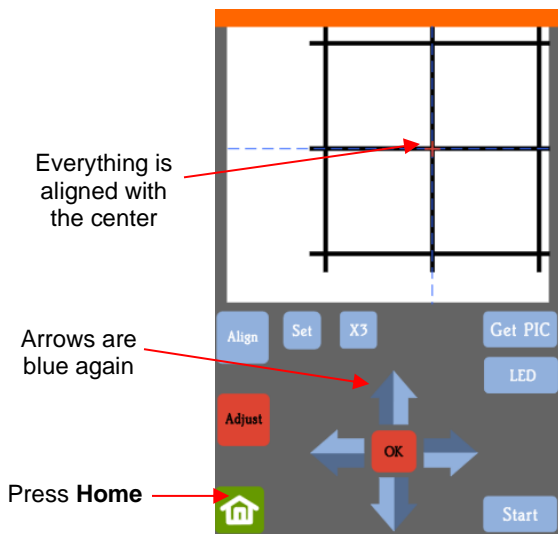


(8) Tap your finger near the middle of the drawn test shape on the screen. This will move the red + close to that location.

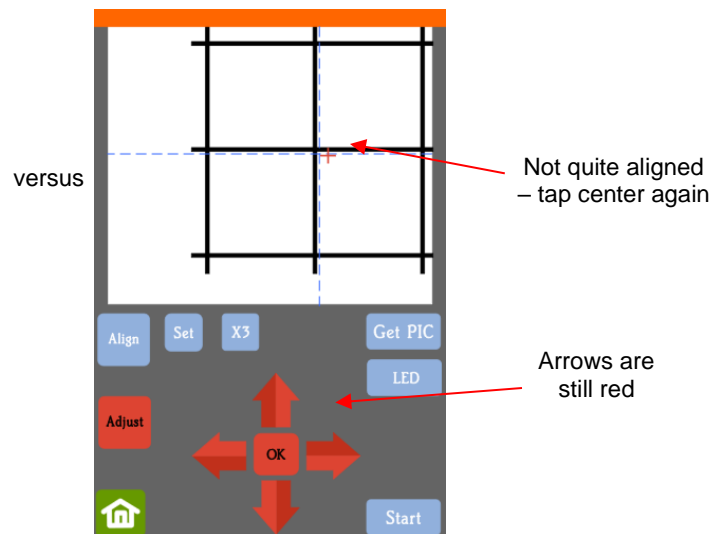


(9) Press **OK**. A new photo will be taken and one of two things will happen:

- ◇ Situation 1: The red + is so close to the center that the Skycut will now take over and find the true center on its own. You will see the red + and the blue dashed + aligned in the center and the arrows (only) will return to their blue color. Refer to the left side of the next screenshot.
- ◇ Situation 2: The red + and the blue dashed + are still not aligned and the arrows around the **OK** button are still red. Refer to the right side of the next screenshot. You will need to tap the center again and press **OK**. Continue, if needed, until the center is identified.

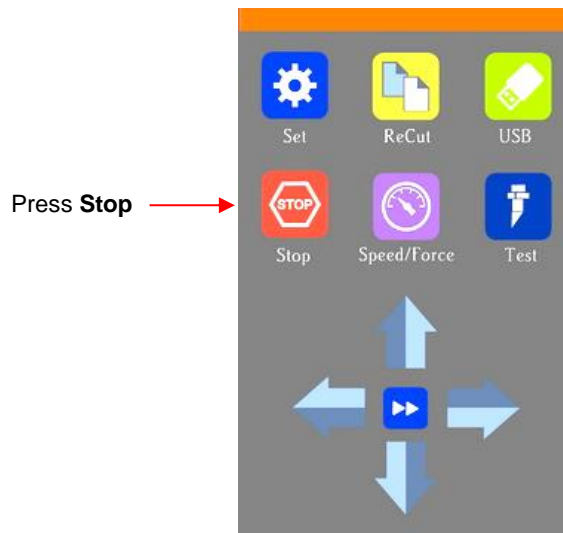


Situation 1



Situation 2

- (10) Once the alignment is in place and the arrows have turned blue, press the **Home** button and then press **Stop** on the **Main Screen** to save the calibration and conclude the process:



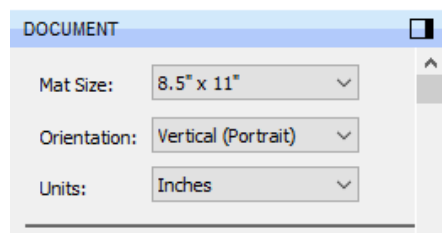
3.04 Performing a PNC in SCAL

3.04.1 Summary of Steps

- Here are the typical steps when performing a PNC application:
 - ◇ Prepare the image(s) that will be printed which can include the following:
 - An imported raster image such as a JPG or PNG or BMP file
 - A vector image (either imported or designed in SCAL) that will be printed but not cut
 - Text that will be printed but not cut
 - ◇ Prepare the cut lines which can include:
 - The resulting cut lines from tracing imported raster files. Refer to *Section 9.03* for details on using the **Trace** function in SCAL.
 - A contour cut around the outside of the traced image: Refer to *Sections 10.05, 11.05, and/or 12.01* for three options to use.
 - Any other vector shapes, either imported or designed in SCAL
 - ◇ Make sure shapes that will only be printed are on a different layer than the shapes that will be cut. To do this, select each layer and open the **Style Panel** (refer to *Section 12.01*). Under **Cut Line Type** choose:
 - **Print+Cut Cut:** for a layer that will only be cut
 - **Print+Cut Print:** for a layer that will only be printed
 - **Cut:** for a layer that will be both printed and cut
 - ◇ Print the project, making sure to mark the option to **Print registration marks**. You can print a project using either **File>Print** or by clicking the **Print** button in the **Print and Cut** window.
 - ◇ Perform a test cut so that you know the best cut settings to use. This test cut can often be performed on the printout itself if there is room in the waste area of the project.
 - ◇ Perform the cutting process, selecting **Print+Cut** from the **Cut Settings** window and following the instructions.

3.04.2 Step-by-Step Sample PNC Project

- (1) If you are new to SCAL, you may want to read a few sections in order to be more familiar with certain functions. The following are recommended: 5.02, 5.04, 5.05, 5.06, 6.04, 7.02.1, 7.04, 7.05.1, and 7.17.4.
- (2) The **Cutting Mat** dimensions can be any size you choose. For convenience, **Letter** size (8.5" x 11") will be used since it matches the paper size that will be used for printing in the screenshots. But you can use a much larger size than your printout if, for example, you prefer to match the actual cutting mat:

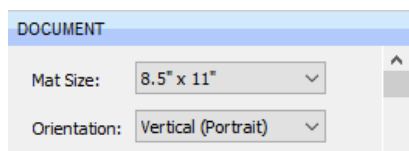


◇ To create a custom sized mat, refer to *Section 5.06.1*.

- (3) For this project, go to [this link](#) and download the *SCAL5 Sample Images* zip file. It contains a number of different images used in *Chapter 9* for learning SCAL5's tracing function.
- (4) To keep things simple for this exercise, a PNG file with a transparent background will be selected because SCAL has the ability to automatically recognize the border of the image and create the necessary cut line. The file selected is called *Cartoon Cow*. Use **File>Import** to open this file onto the **Cutting Mat**:

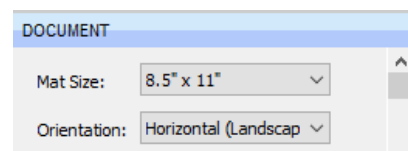


- (5) For **Orientation**, you may choose either **Vertical (Portrait)** mode or **Horizontal (Landscape)** mode, whichever one you're most accustomed to using. This is selected on the **Document Panel**:



Portrait Orientation

Or

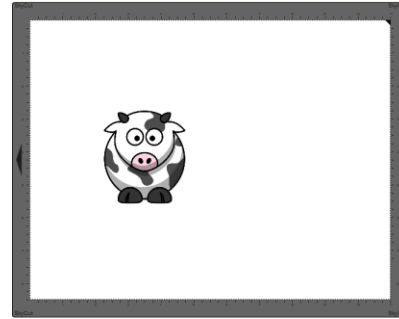


Landscape Orientation



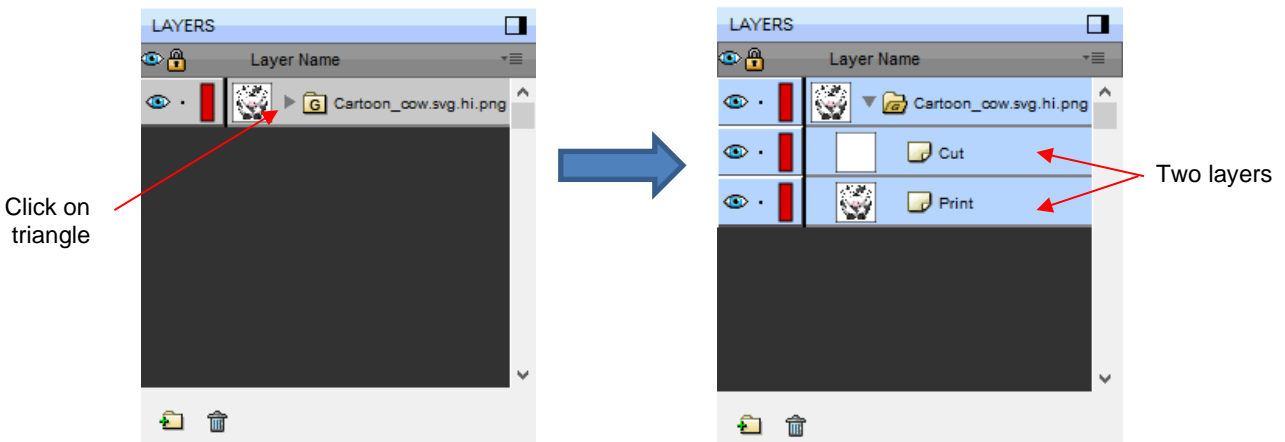
Portrait Orientation

Or

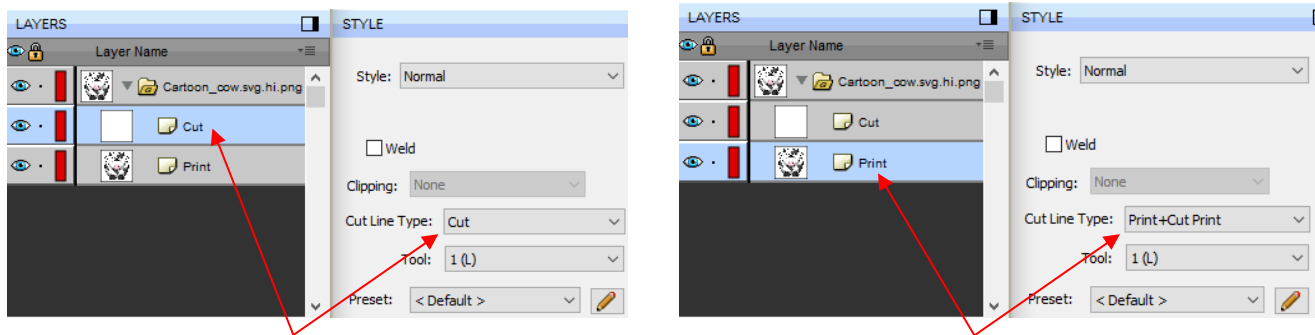


Landscape Orientation

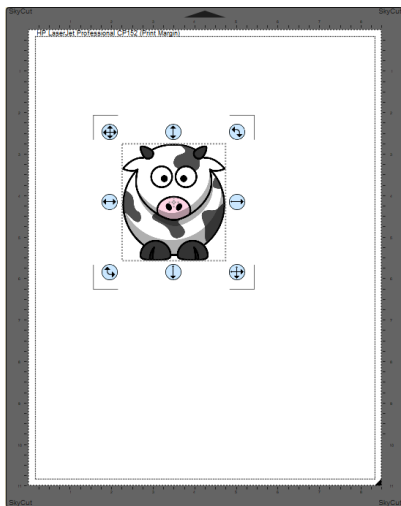
- (6) Open up the **Layers Panel**. As mentioned earlier, PNG files with a transparent background import and have cut lines added. Click on the down arrow to open up the grouped layer to see that there is both a cut layer and a print layer within that group:



- (7) When you select just one of the two layers and look at the assignment on the **Style Panel**, you'll see that the *Cut* layer is assigned as **Cut** and the *Print* layer is assigned as **Print + Cut Print**. This is typically what you want for this type of PNC application (note that the *Cut* layer will not print because it doesn't have a **Fill** or **Stroke** color assigned. For more details on **Fill** and **Stroke**, refer to *Sections 7.14 and 7.15*):

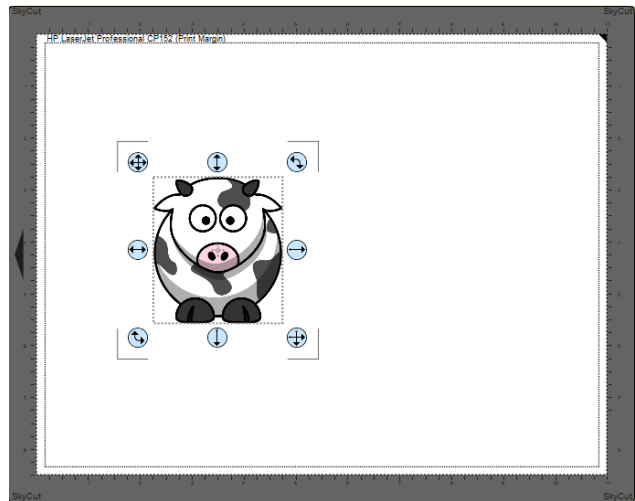


- (8) Before printing, mark the options on the **Document Panel** for **Show Print Margins** and **Show Reg Marks**. The **Cutting Mat** will now indicate the boundaries for your currently select printer and the registration marks based on their current settings. (Refer to *Section 3.05.1* to learn about adjusting these settings.)



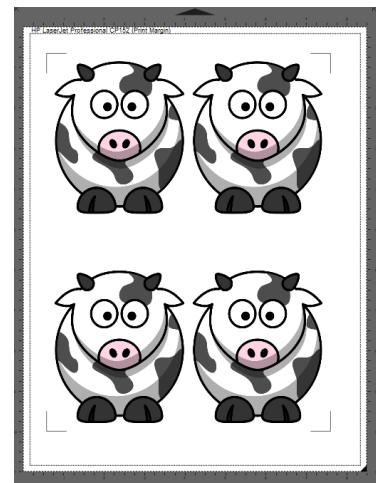
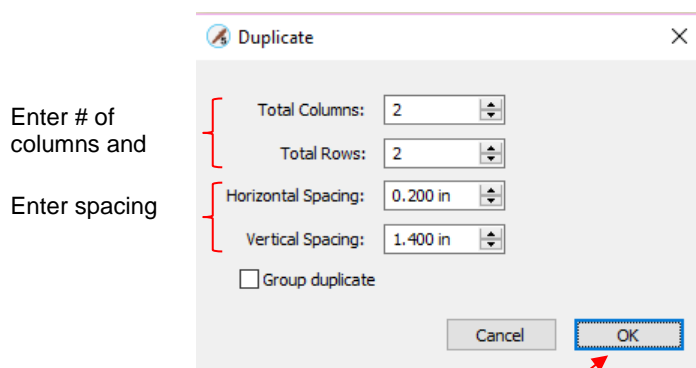
Portrait Orientation

Or



Landscape Orientation

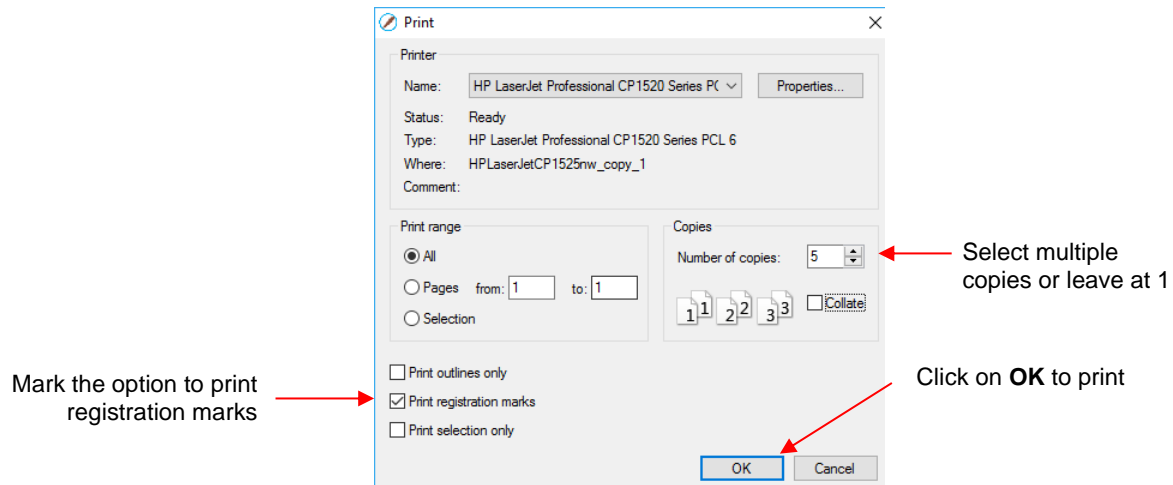
- (9) If you want to make copies, select the grouped shape and resize as desired by dragging the lower right corner. Then, to open the **Duplicate** window, either go to **Object>Duplicate** or use the shortcut key **Ctrl+D**. You can then add rows and columns of repeats, spaced as you like to fill the available document area:



Click on **OK**

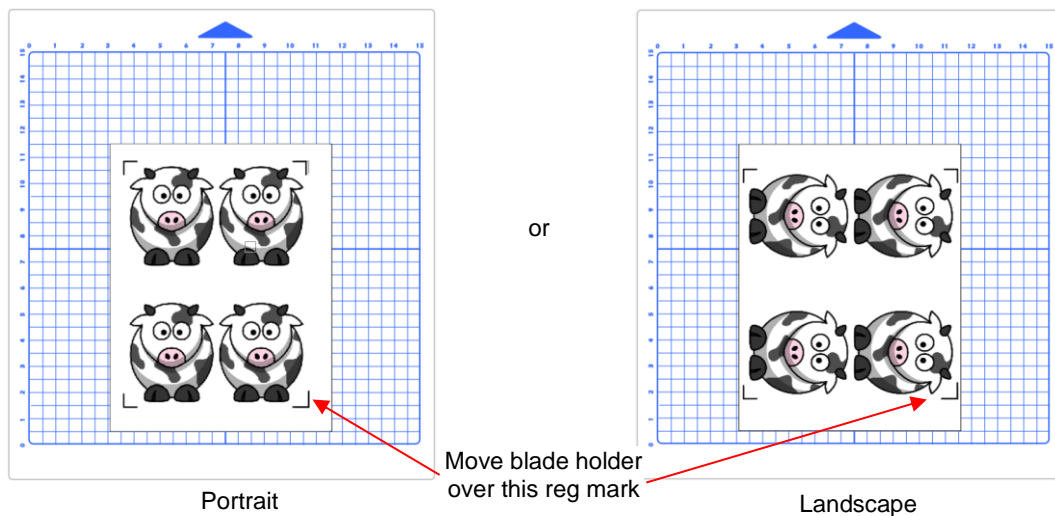
- Note that if you are making many duplicates, you will probably want to mark the option for **Group duplicate** so that you have one layer on your **Layers Panel** instead of dozens or more.

- (10) Go to **File>Print** and mark the box next to **Print Registration Marks**. Click on **OK** to print the project. Note that on some printers, you may need to switch to **Landscape** mode (under **Properties**) if using the **Landscape Orientation** in SCAL.



(11) Place the printout onto the cutting mat using the following guidelines:

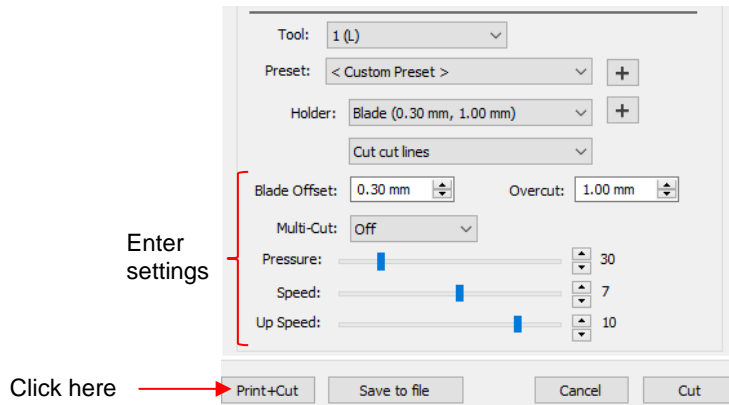
- If you used **Portrait Orientation**, the cows should face forward. If you used **Landscape Orientation**, the cows should face towards the left. Refer back to the prior screenshots and note the direction of the triangle on the cutting mat relative to the images of the cows.
- Place the printout towards the center of the mat and align the printout along grid lines so that it's approximately straight. If you take note of which grid mark is being used, it will make things faster with any subsequent repeats.
- Make sure the printout is smoothly pressed to the mat.



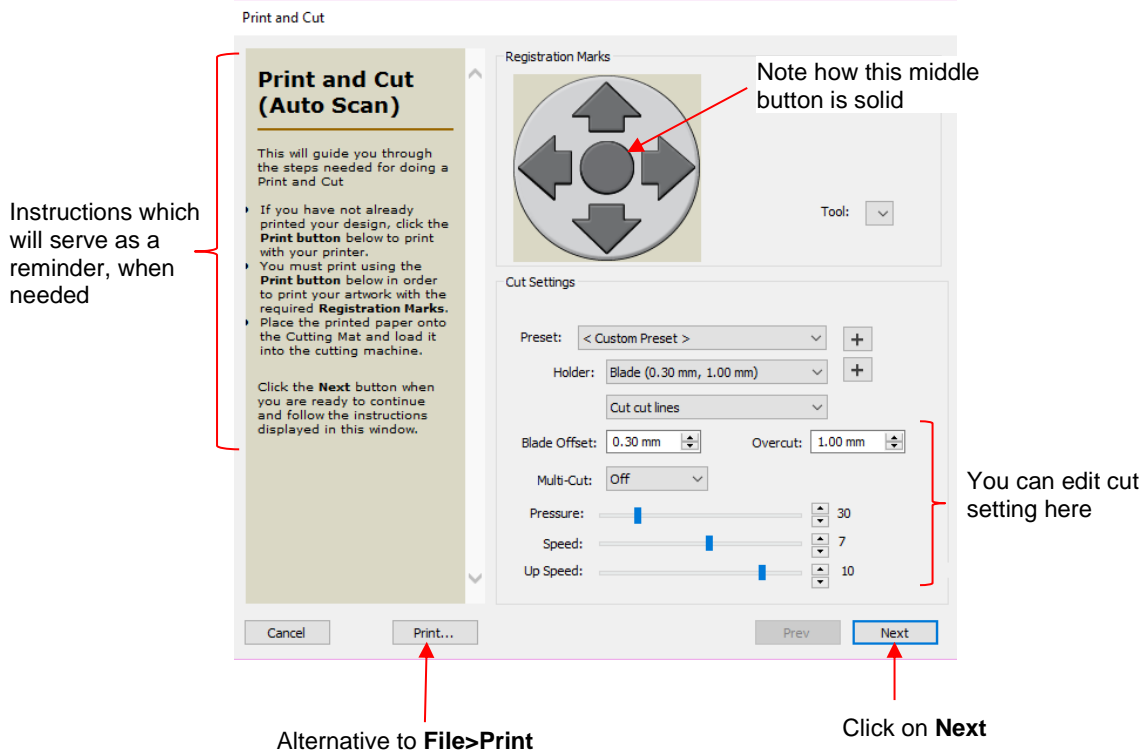
(12) Insert the mat into the cutter, aligning one of the grid lines with the ruler or some other horizontal line visible through the mat. The alignment doesn't need to be perfect, just close enough that it makes for a faster and, of course, successful detection by the camera.

(13) Place the blade holder into the Skycut and move the head until the blade holder is over the lower right printed registration mark as shown in the prior screenshot. Note that you can also set this same origin from within SCAL's **Print+Cut** window, as will be shown later in this tutorial.

(14) In SCAL, open the **Cut Settings** window and enter the cut settings you use for the paper you are cutting. Then click on the **Print+Cut** button:

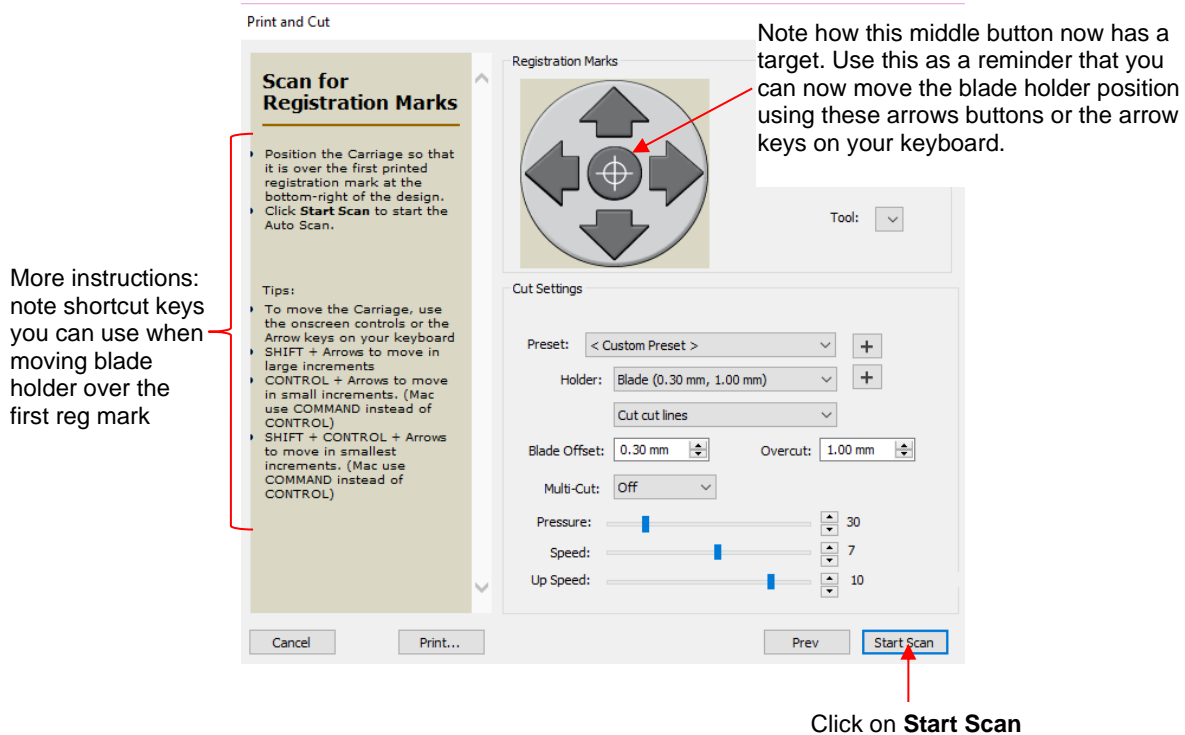


(15) The following window opens where you'll again see the cut settings and some instructions. There's also a **Print** button in case you want to print your project from here versus using **File>Print**. Note how the middle circle between the arrows appears in this window. Then click on **Next**:



(16) In the following window, that middle circle now has a target-style icon. This indicates that you can now move the head to the first reg mark, if needed, using the buttons in the software or using the arrow keys on your keyboard. Note the following shortcut keys when using these buttons:

- Holding the **Shift** key will increase the size of the increment
- Holding the **Ctrl** key (on a Mac: use **Command** key) decreases the size of the increment
- Holding both the **Shift** key and **Control** key (on a Mac: **Command** key) minimizes the size of the increment.

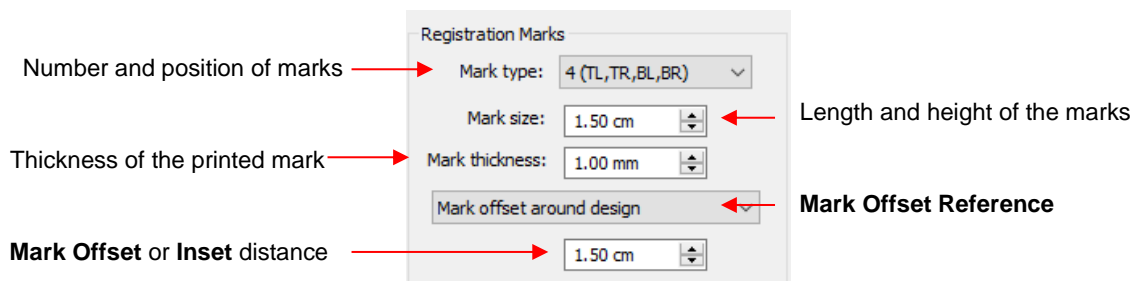


(17) Click on **Scan** and the Skycut's camera will now move over each registration mark and take a photo and make an adjustment. Once it has read all four marks plus the first one a second time, it will proceed to cut out the printed shapes. That's the process!

3.05 Additional Information on Print and Cut Applications

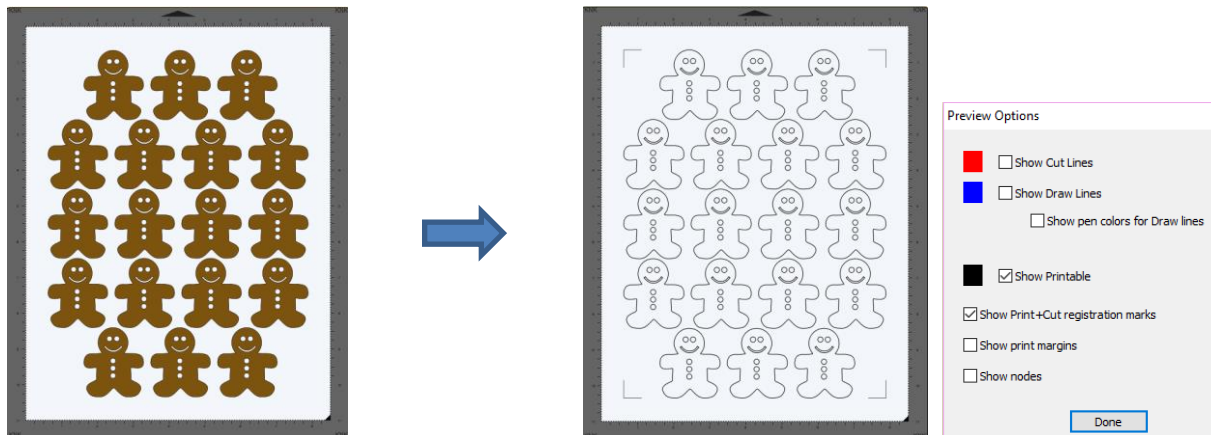
3.05.1 Registration Mark Settings

- 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:



- ◇ **Mark type:** The Skycut's camera uses four marks, thus this option will always remain the same.
- ◇ **Mark size:** The default size of 1.50 cm is advisable if the material is angled a bit with respect to the cutter or if the material isn't flat. Using a shorter size of, say, 0.5 cm will result in a quicker scan and may be needed if the printed images are too close to the reg marks or have L shaped corners.
- ◇ **Mark thickness:** Testing has shown that the lower limit is about 0.75 mm. Thinner than that and the camera will fail to see the mark.
- ◇ **Mark Offset Reference:** There are three options in this menu:

- **Mark offset around design:** The marks will be positioned based on the bounding box around the layer(s) that will be cut
 - **Mark inset from print bounds:** The marks will be positioned based on the paper size specified in your printer properties
 - **Mark inset from page bounds:** The marks will be positioned based on the **Mat Size** specified on the **Document Panel**
- ◇ **Mark Offset or Inset Distance:** This is the distance from the registration marks to whatever reference point was selected. This can be reduced if you need more space on your printout for your images. Note, however, that if you have images too close to the registration marks, then the scanning process can fail.
- When using **Mark Offset around design**, some users prefer to set the **Mark Offset** or **Inset** close to 0, but then remove any shapes that are close to the corners:



- When using **Mark inset from print bounds**, you may need to turn on **Borderless** printing in your printer properties window. This can introduce a problem with the reg marks being relocated so you'll also need to locate a setting called **Extension** or **Expansion** or **Overspray** and make it the minimum setting.

3.05.2 Inaccurate Tracings

- When tracing imported images, the trace lines will not necessarily be perfectly aligned with the image. This can result in tiny bits of white appearing in certain spots, suggesting the PNC wasn't accurate. Zoom in on the image so that you can see the trace line following the outline of the image. Look at the same spots where the cut didn't follow the image perfectly. This could be the cause of the inaccurate PNC. There are three ways of handling this situation:
 - ◇ Retrace the imported image using a higher **Resample** setting (refer to *Section 9.03.7*). If you are still using SCAL4, try using a lower **Contrast** and/or **Smooth** setting to get a tighter fit of the trace line to the original graphic (refer to *Sections 9.03.2* and *9.03.3*).
 - ◇ Use **Path Editing** to move the trace lines to more closely fit the original graphic (refer to *Section 10.10.4*).
 - ◇ Create an inset line to use for cutting instead of the original trace line (refer to *Section 11.05*).
- If a PNC is not precise and the cause is not the alignment of the trace lines, then try slowing down the speed. If the mat is moving numerous times, in and out of the cutter, a slight shifting can occur, especially at high speeds. On the Skycut, use a speed of 7 or lower.

3.06 Printing a PNC Project from Outside of SCAL

- Sometimes users prefer to print their designs from other applications, such as Adobe Illustrator or Photoshop. The following procedure cover this process somewhat generically.
 - Open the file in the alternative program. To make things easier, make sure the document size matches that which will be used for printing.
 - If the program is a raster designing program, such as Photoshop, export the file as PNG. If the program is a vector designing program, such as Illustrator, export the file as AI. For vectors, only export the cut lines.
 - In SCAL, set the document/cutting mat dimensions to also match that which will be used for printing.
 - If the file to be imported is PNG, then import and trace the design. It is not necessary to also include the original image. You only need the vector trace line. If the file to be imported is AI, then import as you would any other vector file.
 - Save this file so that it can later be used for cutting.
 - For PC owners: Go to **File>Print** and mark the option for **Print registration marks**. For printer, select **Microsoft Print to PDF**. (If you have an older version of Windows, you may need to download and install a PDF printer. There are free ones like Cute PDF.) Click on **OK**. Name the file and note where it is being saved.

Select a PDF printer option →

Mark this option →

Click on OK →

IMPORTANT: If a cutter has not yet been set up in SCAL, reg marks will not be printed. Thus, make sure you have gone through Section 5.01.4 before doing this step.

For Mac owners: Go to **File>Print** and mark the option for **Print registration marks**. Click on the **PDF** button in the lower left corner and, in the popup menu, select **Save as PDF**:

1. →

2. →

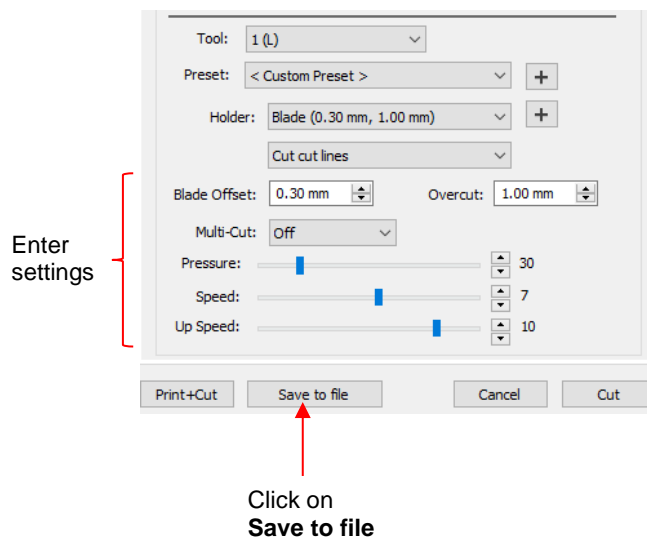
3. →

- (7) In the design software, import the PDF file. Make sure the imported cut lines are properly aligned with the shapes to be printed so that the registration marks will print in the correct location. This is where having the document sizes match should allow for easy placement. But you may want to do a complete test print and cut on copy paper before printing on expensive materials.
- (8) Before printing the design, make sure the registration marks show but the cut lines do not. Change layer position or delete cut lines shapes, as needed. In some cases, it might be best to go back to SCAL, change the **Fill** to white and the **Stroke** to **None** so that the images will be properly hidden from printing.
- (9) Print the design. Then place the printout onto your cutting mat and proceed, from SCAL with the cutting process under **Print+Cut**. Remember that it's very important to maintain alignment so do not alter the shapes to be cut or the **Mark Offset** setting under **Cutter>Cutter Settings**.

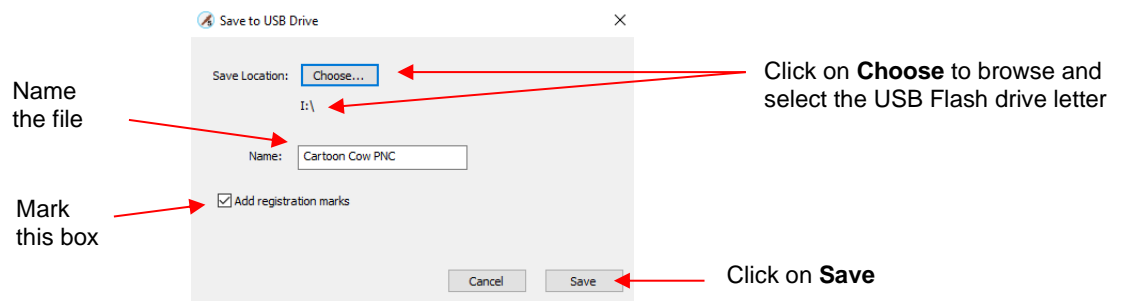
3.07 PNC from USB Flash Drive

3.07.1 PNC from Flash Drive – Single Cut

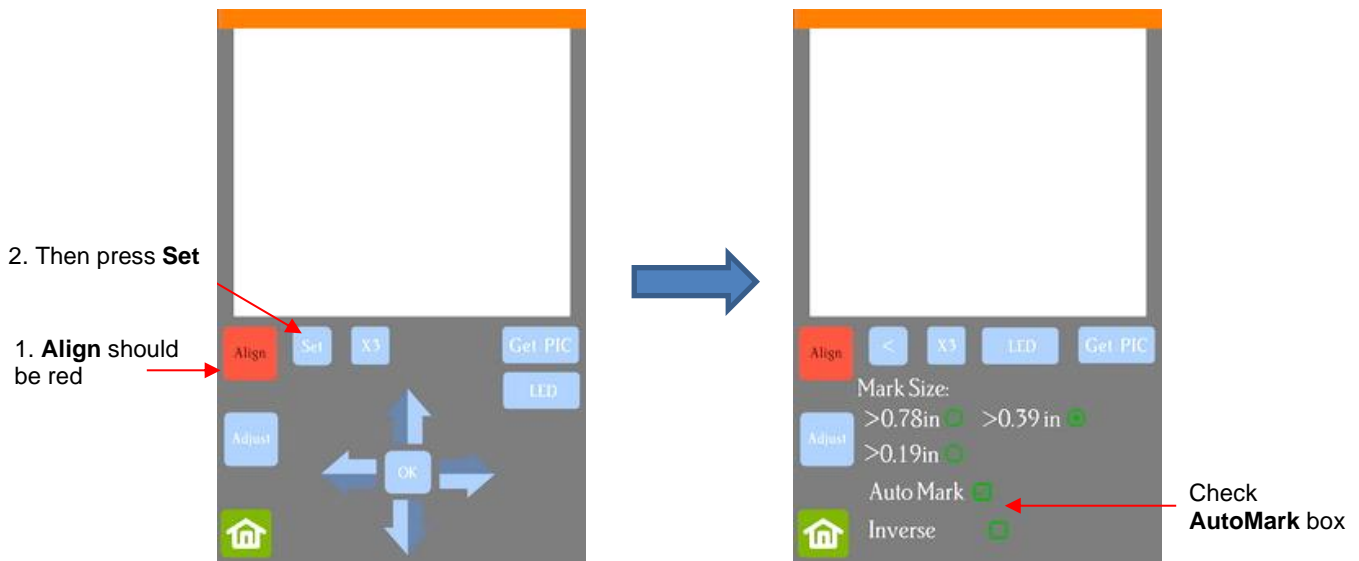
- To perform a print and cut project from the control panel, first perform *Steps (1) – (13)* from *Section 3.04.2*.
- Next, instead of clicking on the **Print+Cut** button, select **Save to File** instead:



- A window will open and you can name your file, select the location, and indicate the file has registration marks:

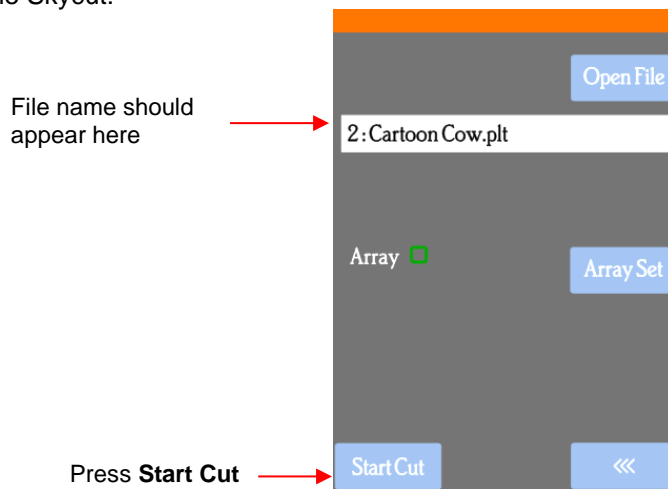


- On the control panel, a few settings should be checked:
- Go to **Set>Camera**. With **Align** selected, press **Set** and the following window will open:



◇ Verify that **AutoMark** box is checked. Then click on **Home**.

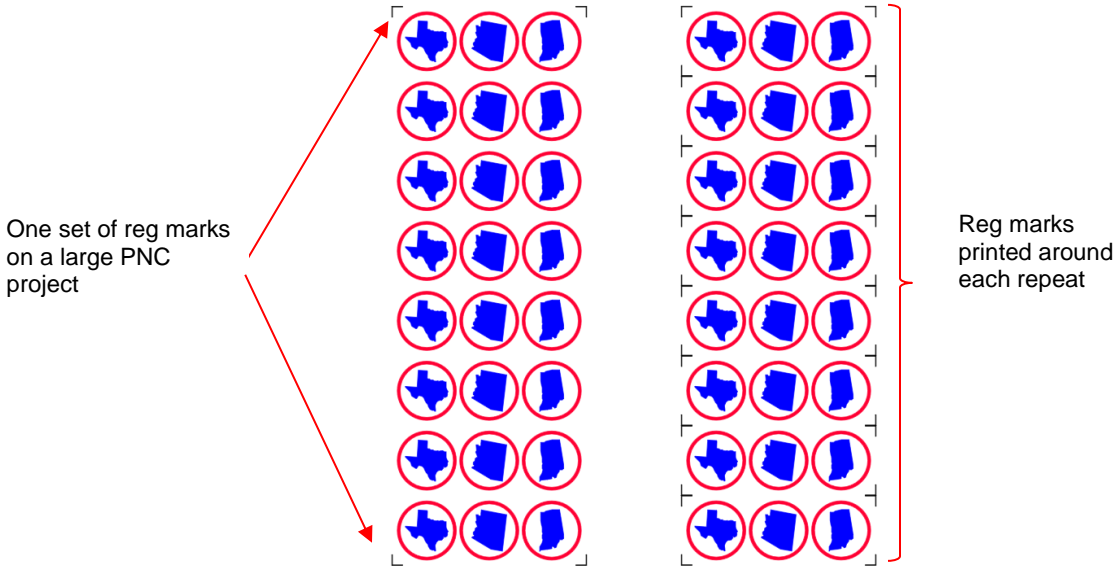
- Insert the flash drive into the right side of the Skycut and use the instructions in *Section 1.12.4* to open the file into the Skycut:



◇ Assuming the printout is on the cutting mat and the blade holder is over the lower right registration mark, click on **Start Cut** and the marks will be scanned by the camera and the shapes cut out.

3.07.2 PNC from Flash Drive – Using Array Mark for Repeats

- The Skycut has the ability to set up an array of repeats for PNC applications. The advantage to using the Skycut's control panel for this process is that the **Array Mark** function permits the scanning of additional registration marks as repeats are cut. This is far more accurate than only scanning the original four marks on significantly large projects:



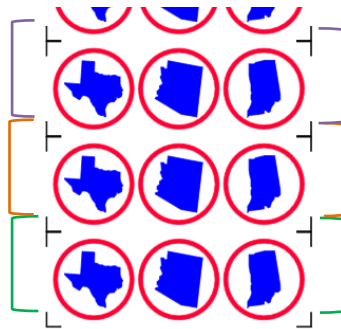
- The **Array Mark** window on the control panel can be opened in two ways:

- ◇ Go to **Set>Advanced Settings>Array>Array mark**
- ◇ Go to **USB>Array Set>Array mark**

- In the **Array Mark** window, you have three options:

- ◇ **4 Mark:** Scan all four marks on every repeat

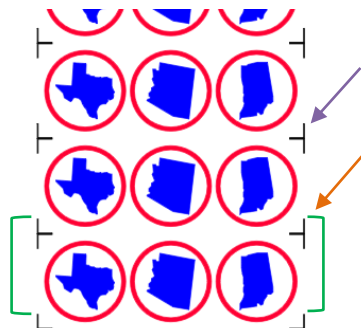
The number of marks	
4 Mark	✓
1 Mark	
Alternate	



- Four marks in **green set** are scanned first and first three shapes cut.
 - Four marks in **orange set** scanned, next three shapes cut.
 - Four marks in **purple set** scanned, next three shapes cut.
- etc.

- ◇ **1 Mark:** Scan first four marks on first set only. Then scan one mark only on each remaining repeat

The number of marks	
4 Mark	
1 Mark	✓
Alternate	



- Four marks in **green set** are scanned first and first three shapes cut.
 - Single mark by **orange arrow** scanned, next three shapes cut.
 - Single mark by **purple arrow** scanned, next three shapes cut
- etc.

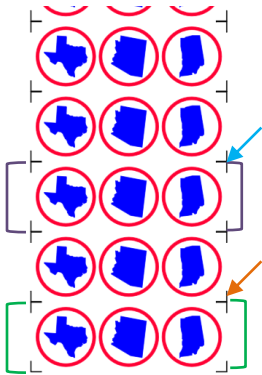
◇ **Alternate:**

Combination of **4 Mark** and **1 Mark** options →

The number of marks	
4 Mark	
1 Mark	
Alternate	✓
changing interval:	
-	2
+	default

Alternate between scanning all 4 marks and scanning only 1 mark, based on a set **Interval**

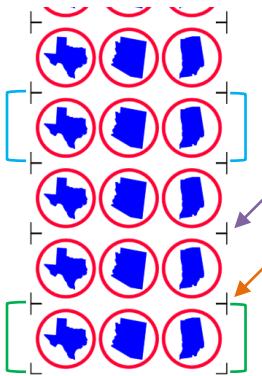
Interval set to 1:



Interval set to 2:

1. Marks in **green set** scanned and first three shapes cut.
 2. Single mark by the **orange arrow** scanned, next three shapes cut.
 3. Marks in **purple set** scanned, next three shapes cut.
 4. Single mark by **blue arrow** scanned, next three shapes cut.
- etc.

Interval set to 2:



1. Marks in **green set** scanned and first three shapes cut.
 2. Single mark by **orange arrow** scanned, next three shapes cut.
 3. Single mark by **purple arrow** scanned, next three shapes cut.
 4. Marks in **blue set** scanned, next three shapes cut.
- etc.

- When choosing an **Array Mark** option, keep the following in mind:
 - ◇ The purpose of having intermediate scans is to correct for any slippage that occurs due to friction or excessively fast cutting speed.
 - ◇ Use 4 Mark in situations where the repeats are quite large, thus there's a larger distance between the repeats and slippage is more likely to occur. It's also a good option when cutting thicker materials because the higher force applied by the blade can cause more drag on the material or cutting mat.
 - ◇ Use 1 Mark in situations where the material is thin, the cuts are simple, and the distance between the repeats is relatively small. Obviously, this is the most time-efficient choice of the three options since a 4 mark scan is only performed one time.
 - ◇ Use Alternate as a compromise between the other two options. Experience will determine how high of an Interval can still yield the accuracy you need.
- SCAL does not have the ability to add multiple sets of registration marks on its own. So, note the following options:

- ◇ Large scale printing: Some printing services offer the ability to print a file of repeats such that the offset between the repeats is set to 0. Thus, the printout would resemble those in the prior screenshots in this section. Performing a Print to PDF is probably the approach to use. However, contacting the printing service would be the best first step and always plan to do a full start-to-finish test first before printing a large number of sheets.
- ◇ Small scale printing: If you want to use the Array Mark feature for repeats in a project that is small enough to be printed on your own printer, refer to following tutorial: [Adding and Using Intermediate Registration Marks in SCAL](#).

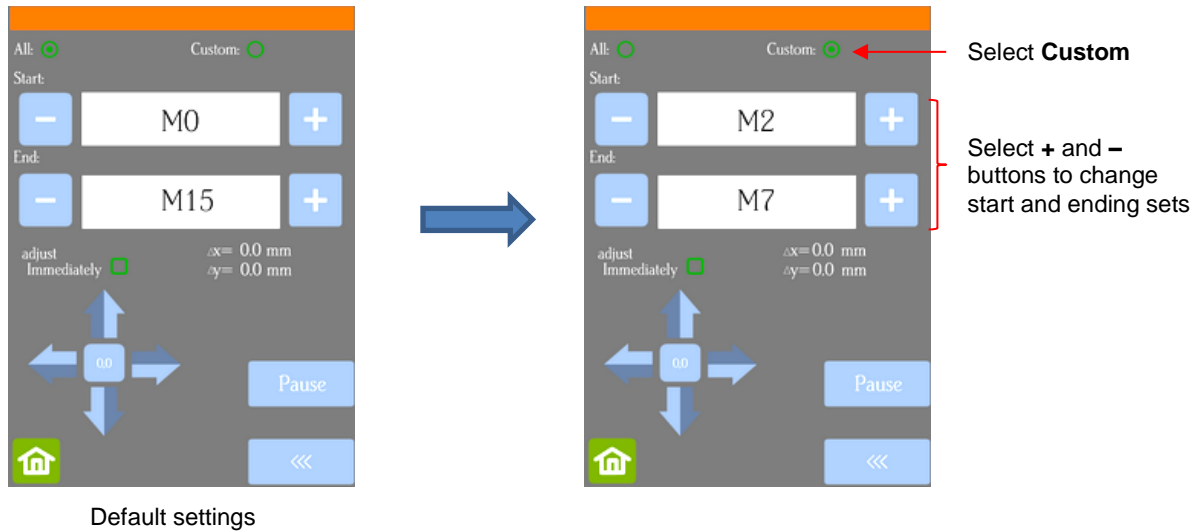
3.07.3 Mark Set Options

- The **Mark Set** window has the following two applications:
 - ◇ Select a specific range of images to cut versus the entire project file.
 - ◇ While the cutting is underway, if you observe that the accuracy is off, you can immediately pause the cutter and tweak the calibration for just that particular cut.
- To open the **Mark Set** window, press **Mark Set** on the **USB** screen:

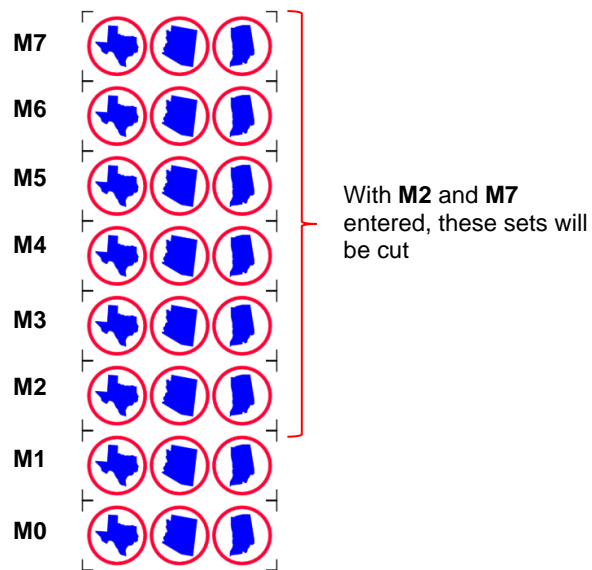
NOTE: If your screen does not have **Mark Set** displayed, please go to *Appendix E* for activation instructions.



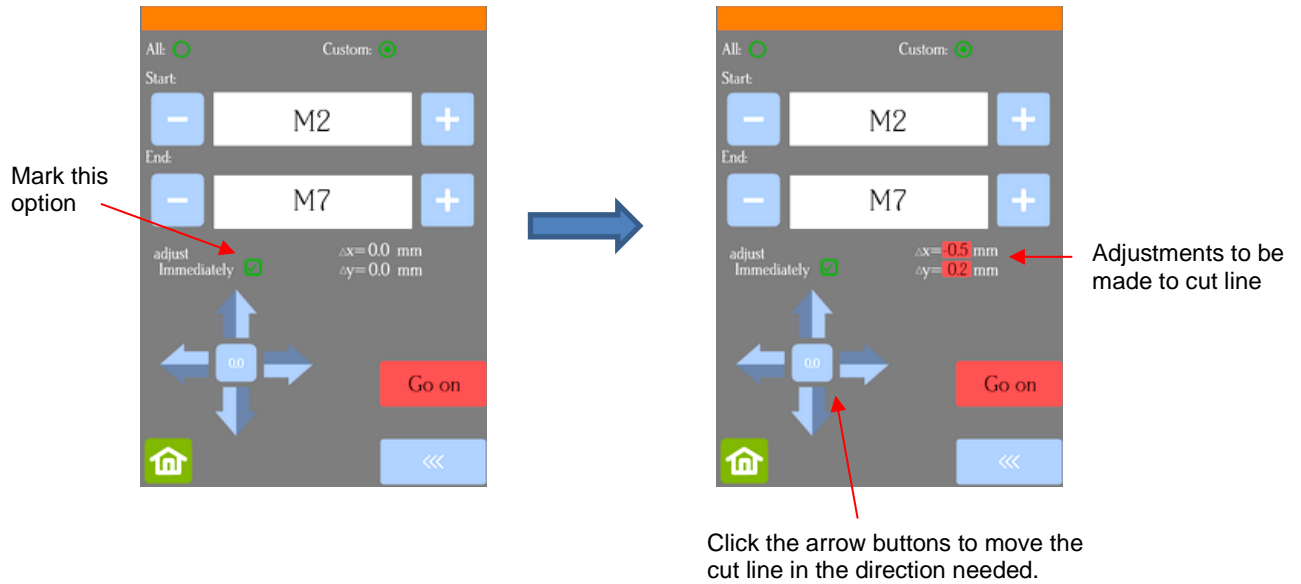
- To select a specific range of images, note the following:
 - ◇ The first set to cut is referred to as **M0** and then subsequent sets are **M1**, **M3**, **M3**, etc.
 - ◇ In the **Mark Set** window, select **Custom** and then enter the start and ending sets. For example, if you want to start with the second set and end with the seventh, you would change to **M2** and **M7**:



◇ The resulting sets will be sent versus the entire project:



- To tweak the calibration after a cut has begun:
 - ◇ Press the **Pause** button on the **Home** screen to immediately stop the cutting.
 - ◇ Press the **USB** button on the **Home** screen.
 - ◇ Press the **Mark Set** button.
 - ◇ Mark the **adjust Immediately** option. Then click on the arrow buttons to adjust the Δx and Δy by the amount and in the direction you need the cut line to move:



◇ **Important:** Remember that the Δx and Δy values will return to 0 at the conclusion of the cut.

- Once you have entered the Δx and Δy values you wish to use, press the **Go on** button and the cutting will resume.

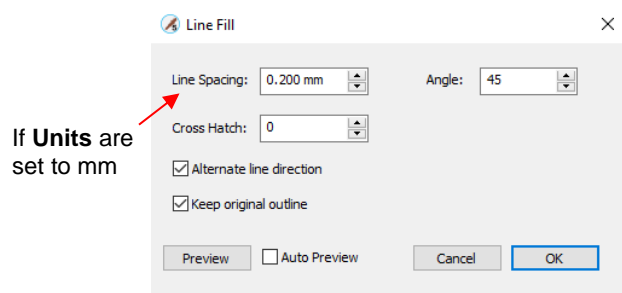
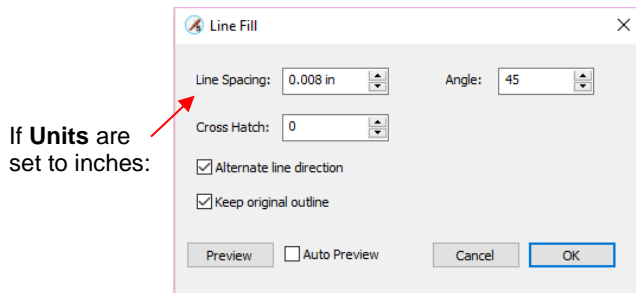
4. Accessory Tools

4.00 Quick Reference for Chapter 4

- Settings for test pen, embosser, engraver: *Section 4.05*
- How to draw with the test pen and cut around the drawing: *Section 4.01.1*
- How to score and cut a fold-up project: *Section 4.02.2*
- How to emboss cardstock: *Section 4.02.3*
- How to engrave a metal tag: *Section 4.03.1*

4.01 Drawing with the Test Pen

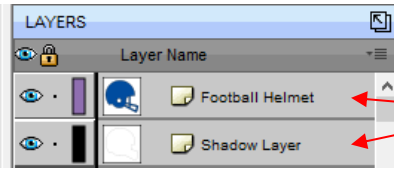
- With the Skycut, you can draw shapes and lettering with the test pen.
- If you wish to fill in a drawn shape, refer to *Section 12.09* which covers how to add a **Line Fill** pattern to a shape. Here is a suggestion on settings to try in the **Line Fill** window based on inches or mm:



- If you want a more complete fill, two options will achieve that:
 - Use a smaller **Line Spacing**, such as 0.004" (or 0.1 mm)
 - Adding a **Cross Hatch** which then fills in the shape from a different direction
- Checking the option for **Keep original outline** will better define the shape, as it will also draw the original shape.
- Do not have the pen positioned too low in the blade holder seat or the tip of the pen could drag across the paper when moving from one shape to the next. Thus, use the same 20 Post-It note method as with the blade holder.
- Make sure your shapes will not be drawn where any of the pinch wheels travel over the material. Otherwise, the ink might smear.
- For quicker drawing of lettering, open path fonts work well as they provide single drawn lines and curves versus an outline form that usually then requires a fill. Refer to *Section 8.11*.

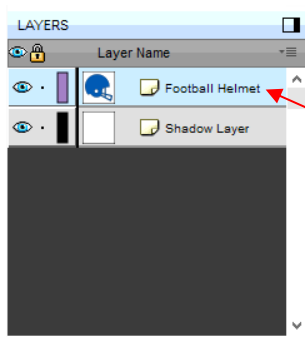
4.01.1 Draw and Cut

- A draw-and-cut application involves using the test pen to draw shapes and then using the blade holder to cut them out. This rest of this section covers the process.
- Create the shape(s) to be drawn along with the shape(s) to be cut. In this case a football helmet will be drawn followed by having a shadow layer cut around it. Make sure the shape(s) to be drawn are also on a separate layer from the shape(s) to be cut:

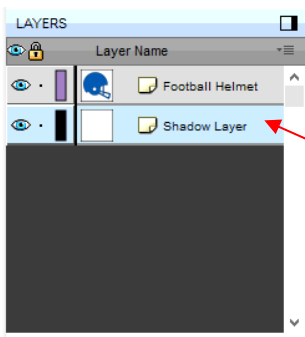
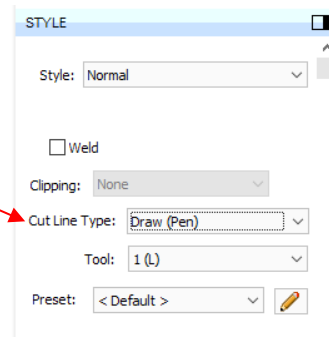


Separate layers

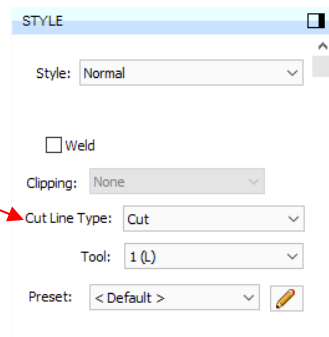
- Move the shape(s) to an appropriate location on the **Cutting Mat** (usually lower right corner in **Portrait** orientation or upper right corner in **Landscape** orientation). Because this project requires using **WYSIWYG** mode, the location for drawing and cutting directly corresponds to where shapes are positioned on the **Cutting Mat**.
- Select the layer to be drawn (*Football Helmet*) and, on the **Style Panel**, set the **Cut Line Type** to **Draw (Pen)**. Select the layer to be cut (*Shadow Layer*) and, on the **Style Panel**, verify that the **Cut Line Type** is still set to **Cut**:



Select layer to be drawn and set **Cut Line Type** to **Draw (Pen)**

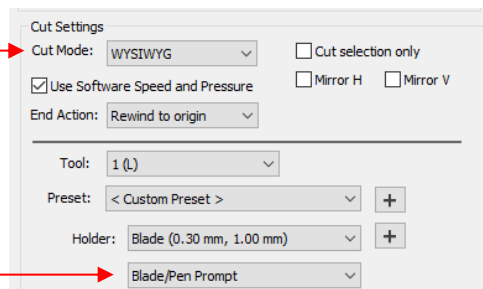


Select layer to be cut and set **Cut Line Type** to **Cut**



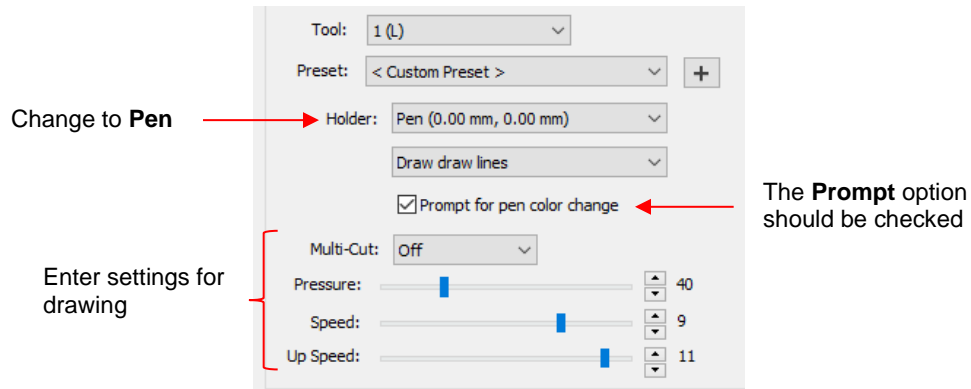
- Open the **Cut Settings** window and set the **Cut Mode** to **WYSIWYG**. This is very important to ensure the draw layer ends up aligned with the cut layer. Also, change **Cut cut lines** to **Blade/Pen Prompt**:

Change to **WYSIWYG**

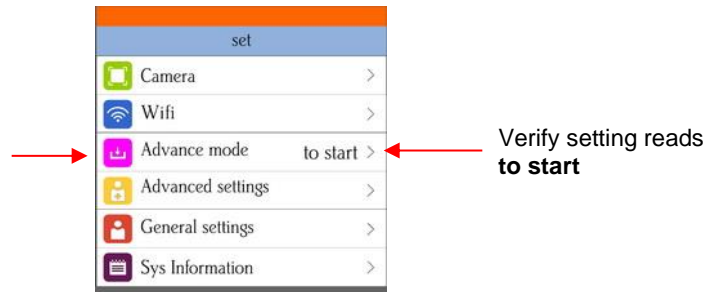


Change to **Blade/Pen Prompt**

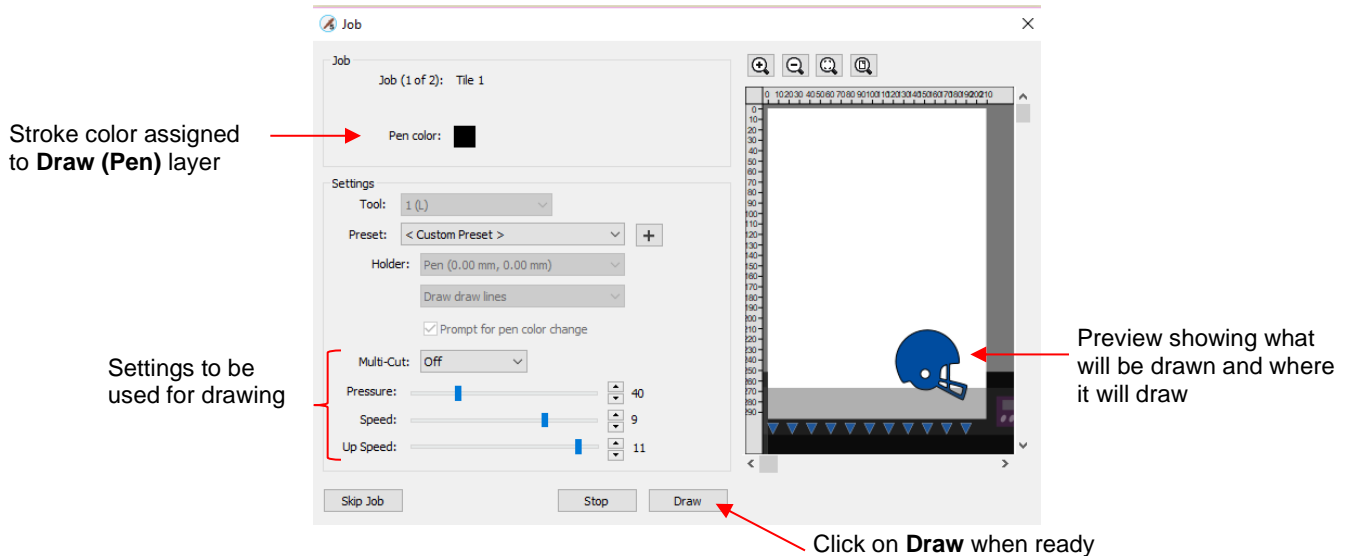
- Before you begin, make sure you know the settings you'll need for the blade so that you can create a **Preset**. Refer to *Section 2.04* for directions on how to create one. Since the pen will be used first, enter the setting you normally use:



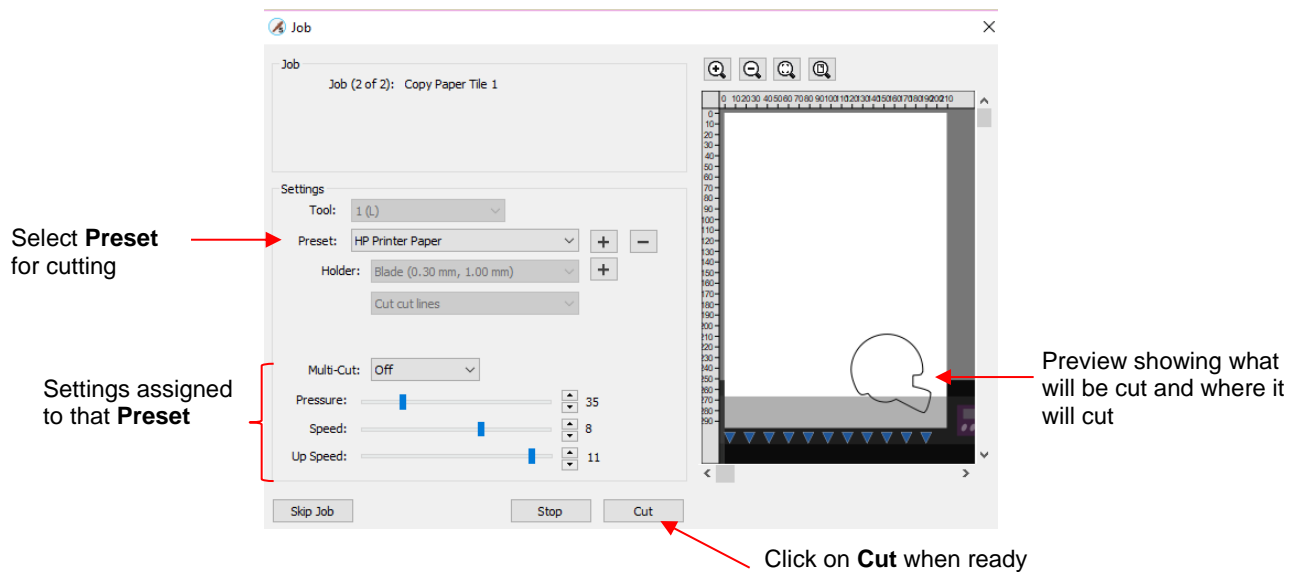
- Insert the pen into the Skycut and use the control panel to move the pen to the location for the origin. **IMPORTANT:** Go to **Set>Advance mode** and make sure the Skycut is set to return to **Start**:



- Back in SCAL, click on **Cut**. A window will pop open indicating the pen settings will be used. After verifying everything looks correct, click on **Draw**:



- Note the other two options at the bottom of the screen:
 - Skip Job** will cancel the drawing but you will still have the option to perform the cut.
 - Stop** will cancel the entire process and return you to the main SCAL screen.
- After the drawing is completed, the prompt window again opens. First, change out the pen for the blade holder on the Skycut. Then select the **Preset** for cutting. After verifying everything looks correct, click on **Cut**:



- After cutting, you will be returned to the main window in SCAL.
- Note that if you are using SCAL5 Pro, then you also have the option to assign **Presets** to layers on the **Style Panel** and use the **Layers** tab in the **Cut Settings** window. Refer to *Section 12.06.7*.

4.02 Embossing and Scoring

4.02.1 General Info on Embossing

- The Skycut embossing tool has two different sized embossing heads. The smaller one is recommended when scoring cardstock for fold-up projects, such as pop-up cards, gift bags, and small boxes. Either head can be used for embossing shapes.

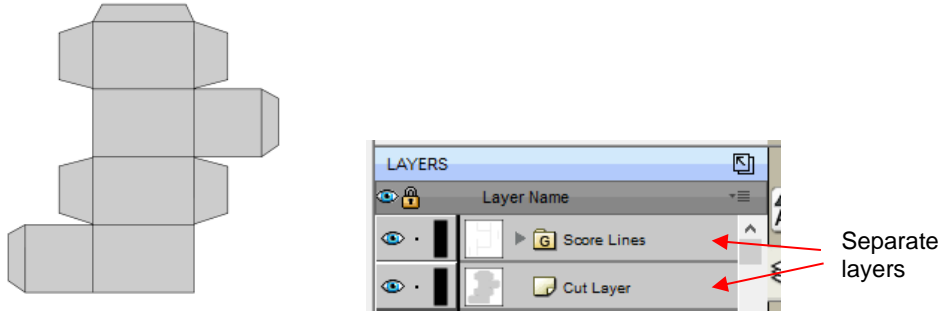


- When embossing cardstock, it is recommended that a soft material be placed beneath the paper or cardstock to allow a deeper impression to be made. One excellent material to use is non-slip shelf liner. Other materials which can be used include rhinestone rubber, craft foam, and felt. Make sure the material is well adhered to the mat (tape it down, if necessary). Then tape your paper or cardstock to the top of this material.
- When using the embossing tool for scoring fold-up projects, the paper or cardstock can be applied directly to the mat, just as you do for cutting. This makes it much simpler when you need to score and then immediately cut. Because the scoring may not be as deep on the underside of the paper or cardstock as the top side, fold all score lines (valley and mountain) forward to establish the fold on both sides. Then flip over and fold any mountain scores the opposite way. This especially works well on pop-up cards.
- Make sure you do some tests first to get the best settings for the scoring or embossing you need. For scoring cardstock, this typically involves a higher force (~160) and two or three passes. Refer to the *Suggested Settings* table at the end of this chapter. If you have a soft material beneath your paper/cardstock, then a lower force will be used, but you may still need several passes. Also, to get more force applied, raise the tool in the blade holder seat the same way you do with the blade holder (i.e. 20 Post-It notes).

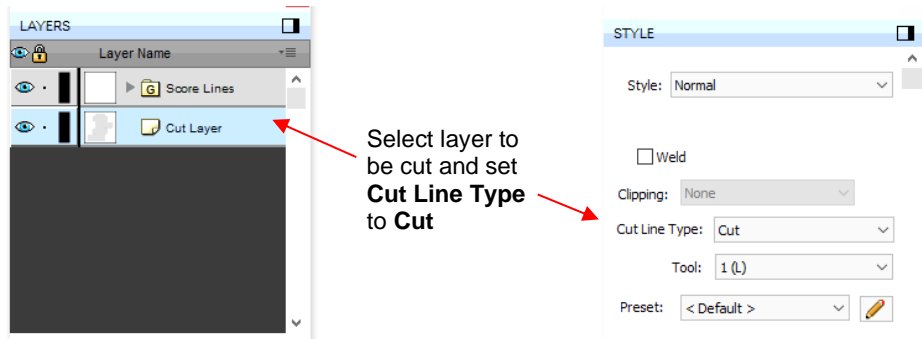
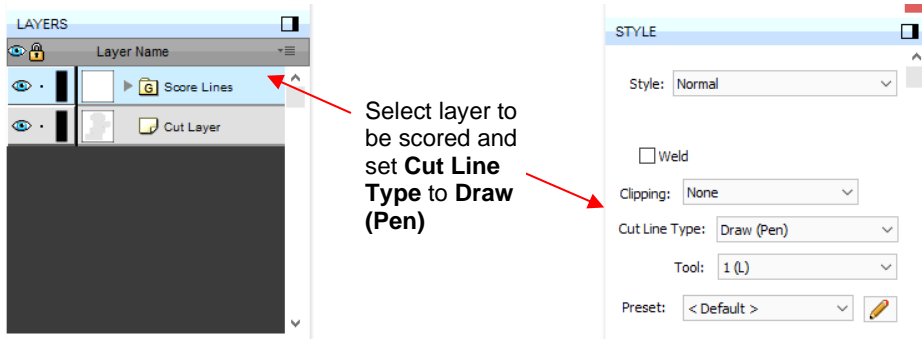
4.02.2 Score and Cut Project

- When the project involves both scoring and cutting, the same process used in *Section 4.01.1* is followed. In this tutorial, a fold up box project will be used as a more typical example.

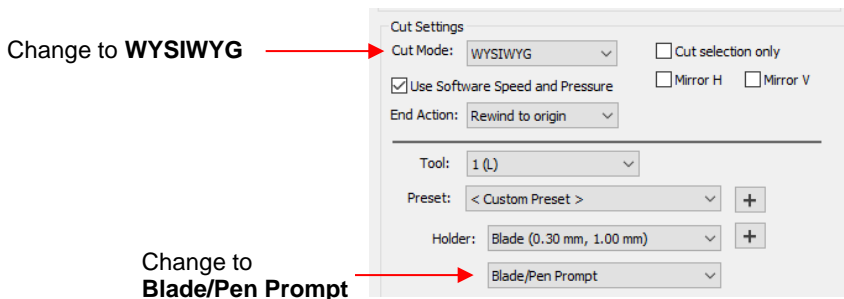
- Open the project and make sure all score lines are on a separate layer from cut lines:



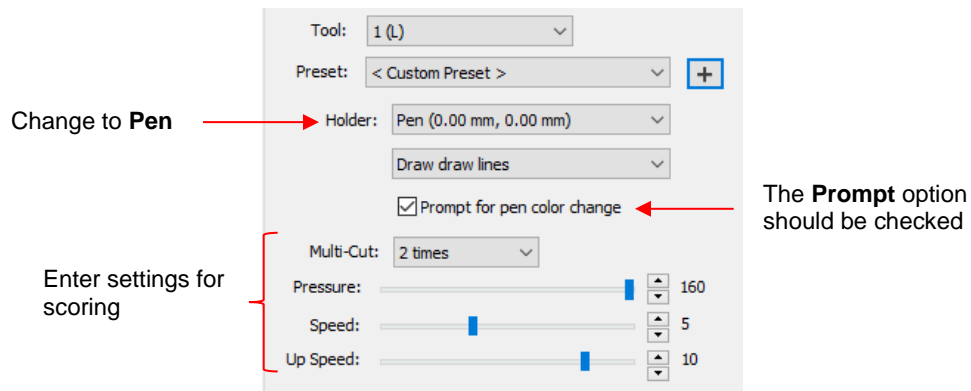
- Move the shape(s) to an appropriate location on the **Cutting Mat** (usually lower right corner in **Portrait** orientation or upper right corner in **Landscape** orientation). Because this project requires using **WYSIWYG** mode, the location for scoring and cutting directly corresponds to where shapes are positioned on the **Cutting Mat**.
- Select the *Score Lines* layer and, on the **Style Panel**, set the **Cut Line Type** to **Draw (Pen)**. Select the *Cut Layer* and, on the **Style Panel**, verify that the **Cut Line Type** is still set to **Cut**:



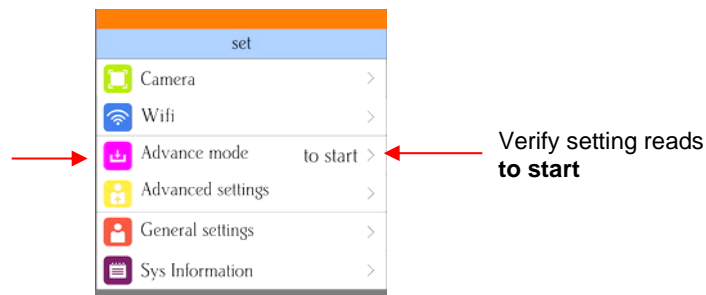
- Open the **Cut Settings** window and set the **Cut Mode** to **WYSIWYG**. This is very important to ensure the score layer ends up aligned with the cut layer. Also, change **Cut cut lines** to **Blade/Pen Prompt**:



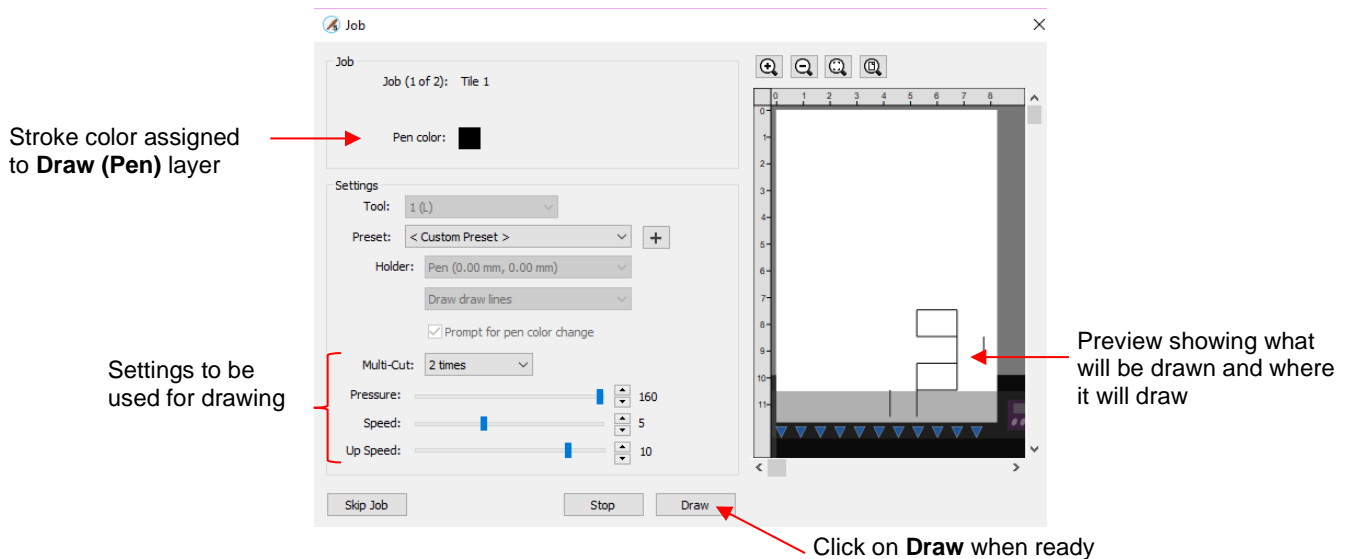
- Before you begin, make sure you know the settings you'll need for the blade so that you can create a **Preset**. Refer to *Section 2.04* for directions on how to create one. Since the embosser/scorer will be used first, enter the setting you normally use:



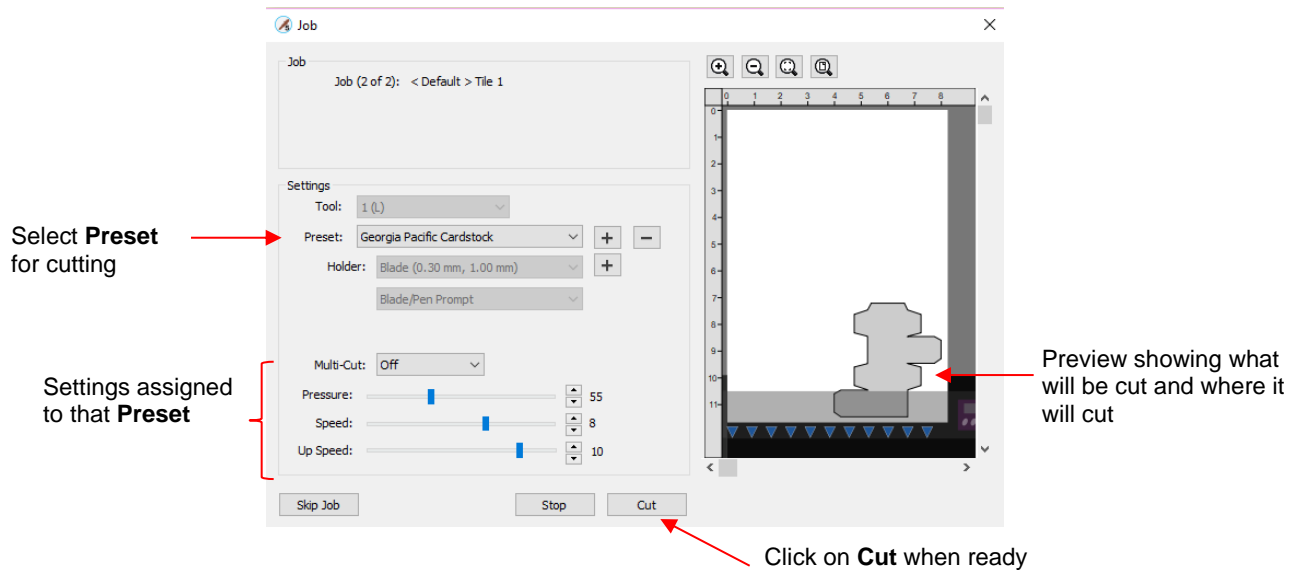
- Insert the embosser into the Skycut and use the control panel to move the tool to the location for the origin. **IMPORTANT:** Go to **Set>Advance mode** and make sure the Skycut is set to return to **Start** so that the cut process will use the same origin as the scoring process:



- Back in SCAL, click on **Cut**. A window will pop open indicating the settings from the **Cut Settings** window. After verifying everything looks correct, click on **Draw**:



- Note the other two options at the bottom of the screen:
 - **Skip Job** will cancel the drawing but you will stop have the option to perform the cut.
 - **Stop** will cancel the entire process and return you to the main SCAL screen.
- After the drawing is completed, the prompt window again opens. First, change out the pen for the blade holder on the Skycut. Then select the **Preset** for cutting. After verifying everything looks correct, click on **Cut**:



- After cutting, you will be returned to the main window in SCAL.
- Note that if you are using SCAL5 Pro, then you also have the option to assign **Presets** to layers on the **Style Panel** and use the **Layers** tab in the **Cut Settings** window. Refer to *Section 12.06.7*.

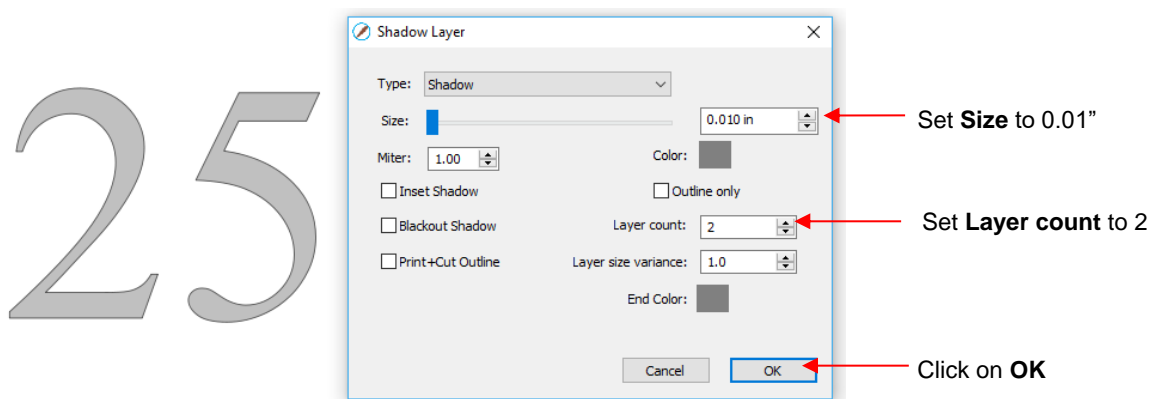
4.02.3 Embossing Paper or Cardstock

- When embossing paper or cardstock, it is recommended that you use the **Shadow Layer** effect to create several very small outlines at a thickness of, say, 0.01" (0.25 mm). These tiny offset lines will then produce a slightly thicker overall outline of your shapes. This works better than line-filled embossing which can stress the cardstock and cause wrinkling. Here are the steps:

- ◇ Create the shape you wish to emboss. In this example, the number 25 is used:

25

- ◇ Select the shape and go to **Effects>Shadow Layer** function and perform the following:



- ◇ Now you have three versions of the shape, each one slightly offset from the other. Thus, when using the embossing tool, this will result in a thicker outline made of this shape.
- ◇ **Important:** don't forget to mark the **Mirror H** option in the **Cut Settings** window so that when you flip over the cardstock, after embossing, the design will "read correctly."

4.03 Scratch Engraving

- The Skycut engraving tool can be used to engrave vellum, foils, acrylic, and most metals, including trophy labels, dog tags, and jewelry charms.

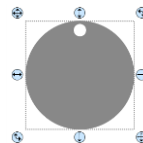


- The same basic guidelines apply to engraving as in drawing and embossing:
 - ◇ You will probably need to use **WYSIWYG** mode
 - ◇ You will want to set layers to **Draw (Pen)** on the **Style Panel** so that **Blade Offset** and **Overcut** are both 0
 - ◇ On the control panel, verify the **Advance** mode setting is to **Start**
- On softer metals, you may not want the engraving tip too far above the metal as it can leave pock marks when it drops to start engraving. If possible, test on scraps first.
- Refer to the *Suggested Settings* table at the end of this chapter for **Pressure** and **Speed** settings on various materials. Note that you can engrave on materials that cannot be cut on the Skycut, such as jewelry charms, dog tags, and trophy plates.
- To design an engraving fill pattern, use the **Line Fill** function. Refer to *Section 12.09*. Depending on the application, open path fonts (refer to *Section 8.11*) can be used for faster engraving. They contain single path lines and curves versus outlines. You may want to use more than one pass for a deeper engraving.

4.03.1 Engraving a Metal Tag

- When engraving items that are already cut (such as metal tags, trophy plates, charms, etc.), it's very important to have precise alignment before proceeding. Therefore, the camera on the Skycut will be used to set the origin for engraving. If you haven't already calibrated the camera, go to *Section 3.03*.
- The following is a list of the items you'll need for this kind of an application:
 - ◇ The item to be engraved
 - ◇ The Skycut engraving tool
 - ◇ Double sided tape to secure the item to the cutting mat. Thermo-web is perfect for this.
- Create a replica of the item to be engraved:
 - ◇ If it's something simple, like a square or a rectangle, use the basic shapes available in SCAL:

Photo of actual tag

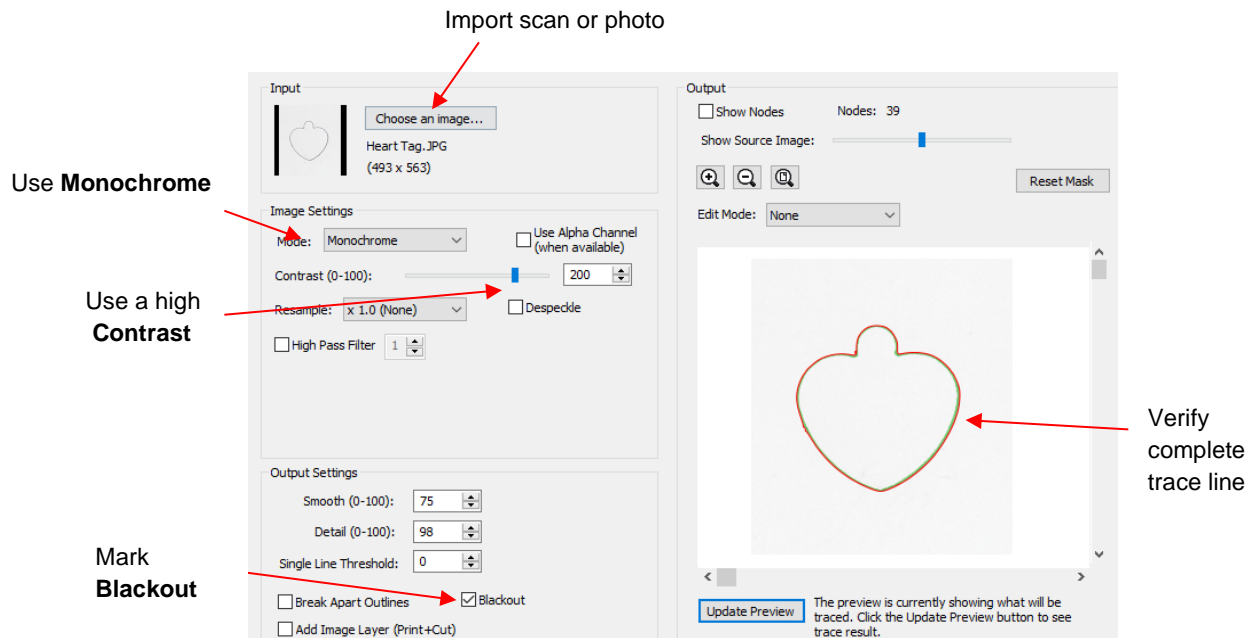


Replica of tag created using two circles

- ◇ If it's not a shape that can easily be recreated in SCAL, then trace it onto paper:

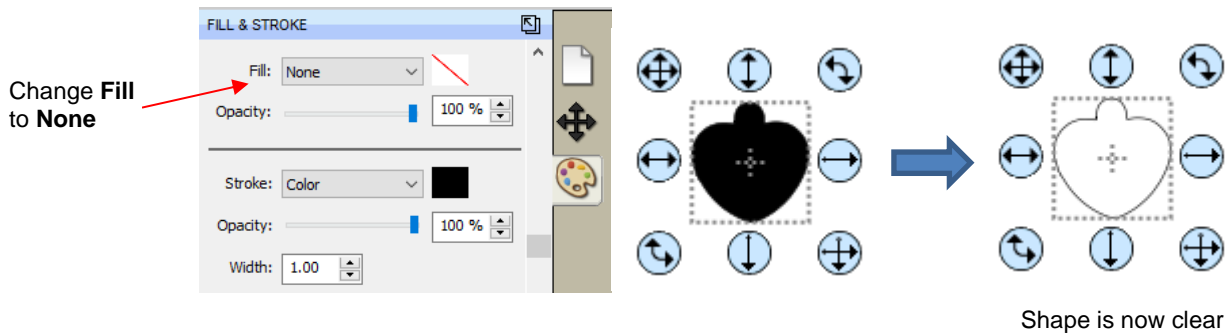


- Scan or photograph the trace and import into the **Trace Image** window in SCAL (refer to *Section 9.03*). The following settings were used:



- In both cases, measure the dimensions of the actual shape and compare it to the image in SCAL. Resize if needed.

- On the **Fill & Stroke Panel**, change the **Fill** color to **None** or just change to white so that you will be able to see the design you're adding on top:



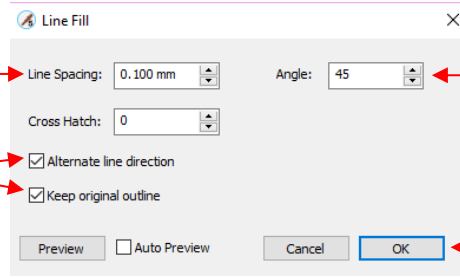
- Create the design. In this case both text and a vector shape of a bone are added:



- Because a filled engraving is desired, select the text and the bone shape and go to **Effects>Line Fill**. The following window suggests some settings to use. More information on **Line Fill** is covered in *Section 12.09*.

If using mm, enter 0.10, if using inches, enter 0.004

Typically, these two are marked

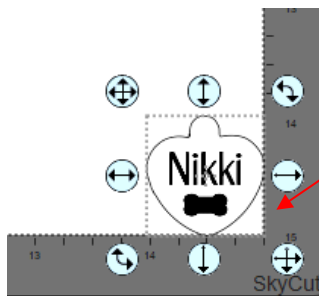


Choose desired fill angle

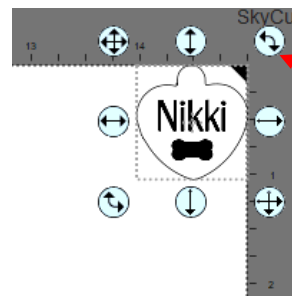
Click **OK** when done

- The next step is to relocate the project to align with the origin:

- ◇ Note the dimensions of the **Cutting Mat** in SCAL. In this example, the mat is set at 15" x 15". The shapes are going to be moved so that they align with the exact corner of the **Cutting Mat**. Depending on whether you are using **Portrait** orientation or **Landscape** orientation, you will be moving the shapes to the following corners:



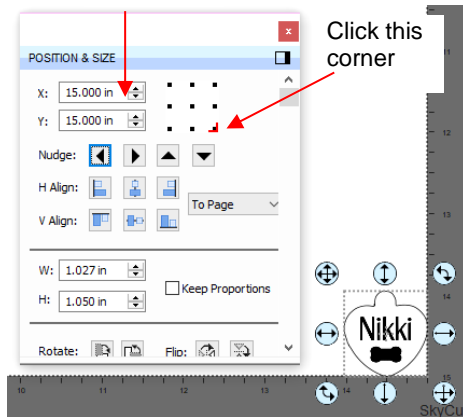
Portrait Orientation:
Move shapes to align with lower right corner



Landscape Orientation:
Move shapes to align with upper right corner

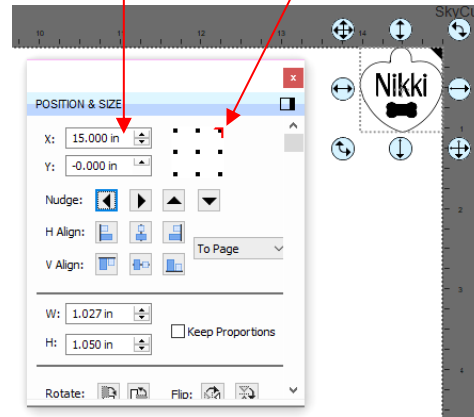
- ◇ To be more precise, use the **Position and Size Panel** to enter specific **X** and **Y** locations based on the corners of the **Cutting Mat**:

X: 15 Y: 15



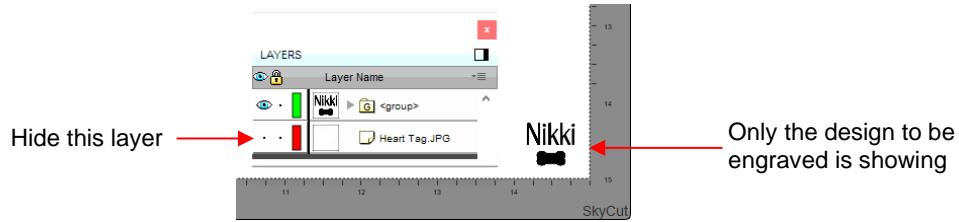
Portrait Orientation

X: 15 Y: 0 Click this corner

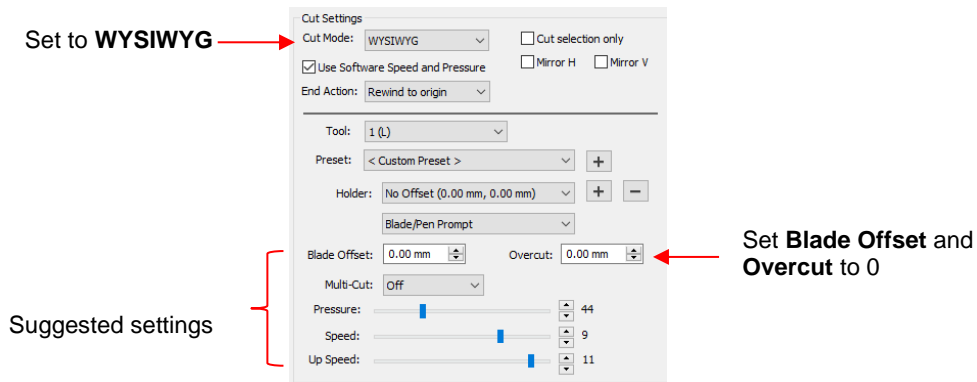


Landscape Orientation

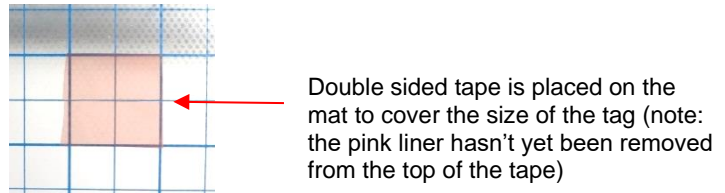
- Hide the layer with the heart shape, leaving only the layer with the design:



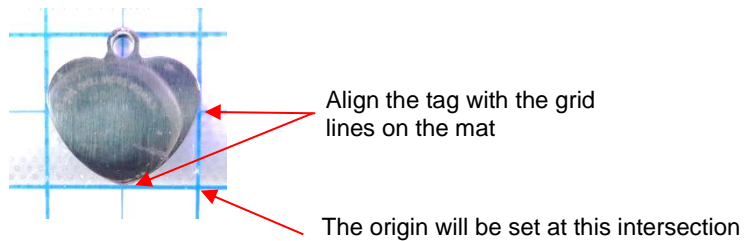
- Go to the **Cut Settings** window, verify **WYSIWYG** is select. Change the **Blade Offset** and **Overcut** to **0**:



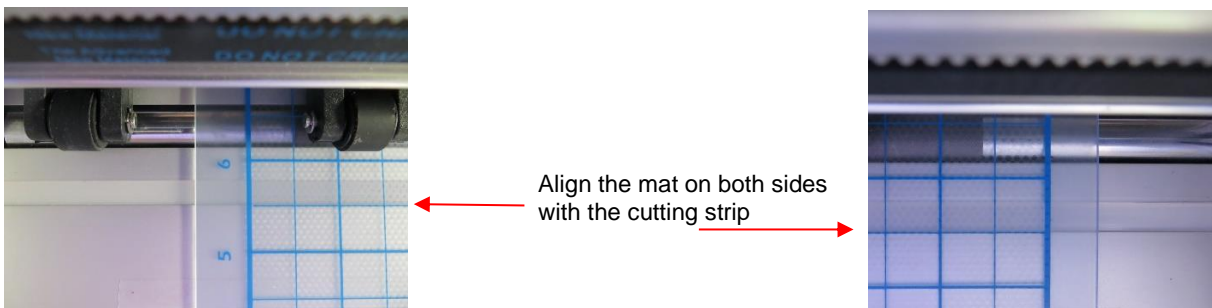
- On the Skycut, the metal tag needs to be very firmly attached to the cutting mat. Place strips of double-sided tape onto the mat, where the tag will be mounted:



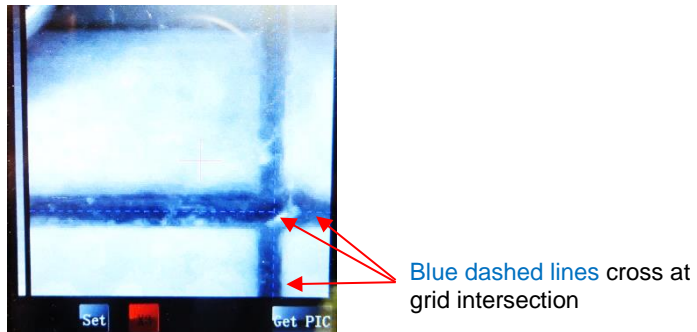
- When placing the tag onto the mat, align the rightmost side of the tag with a vertical grid line and the bottommost side of the tag with a horizontal grid line. The intersection of the two gridlines will be the origin for the engraving process:



- Load the mat into the Skycut and be very precise in alignment by using the cutting strip to make sure the mat is perfectly straight on both sides:



- Load the engraver into the Skycut using 15 Post-It notes, making sure the notes are on top of the tag.
- Move the cutting head so that the engraver tip is over the intersection of the two grid lines bounding the tag. Then use the camera instructions in *Section 2.05.1* to set the origin even more precisely by getting the **blue dashed +** in the middle of the grid intersection:



- After clicking on **Home**, press down on the engraver and verify, once more, that the correct grid intersection was used. Back in SCAL, click on **Cut** and the engraving process will be carried out.:



4.04 Settings Form for Accessory Tools

<u>Application/Material</u>	<u>Tool</u>	<u>Force</u>	<u>Speed (Cut/Up)</u>	<u># Passes</u>	<u>Surface</u>	<u>Other Comments</u>

4.05 Suggested Settings for Various Accessories¹

Make sure **Blade Offset** and **Overcut** are set to 0; test with a small shape first; mirror shapes for embossing

Tool Height = number of Post-It notes used to set blade tip distance above the material: Refer to *Section 2.01.3*.

Application/Material	Tool Used	Passes	Force	Speed	Tool Height	Surface	Other Comments
Drawing on Cardstock	Test pen	1	30	11	20	mat	
Embossing Cardstock - 65 lb (177 gsm) Recollections	Embosser - large end	4	80	6	10	Shelf Liner taped to mat	Used 2 shadow layers of 0.01" (0.25mm) to increase thickness; also tested Fun Foam taped to mat with same results
Engraving Acrylic	Scratch Engraver	1	110	8	20	mat	Used a Line Fill of 0.004" (0.1 mm)
Engraving Aluminum (36 gauge)	Scratch Engraver	1	20	11	15	mat	Used a Line Fill of 0.004" (0.1 mm)
Engraving Copper (36 gauge)	Scratch Engraver	1	30	11	15	mat	Used a Line Fill of 0.004" (0.1 mm)
Engraving Metal Tag (Al)	Scratch Engraver	1	44	9	15	mat	Used a Line Fill of 0.004" (0.1 mm)
Engraving Vellum	Scratch Engraver	1	38	11	15	mat	Vellum was medium weight
Scoring Cardstock - Georgia Pacific 110# index	Embosser - small end	2	155	8	20	mat	

© 2009- 2021 Sandy McCauley, All Rights Reserved

5. SCAL: Installation, Preferences, and Workspace

The following chapters 5 – 12 are a complete coverage of Sure Cuts A Lot 5 version 5.022.

Do I Have to Read All of this Manual?

- Not unless you need it as a sleeping aid! :P Here are the recommended sections for a new SCAL user:
 - ◇ Chapter 1 Installation, Preferences and Workspace
 - ◇ Chapter 2 Handling Files and Organizing Layers: 6.01 - 6.04, 6.06.1, 6.07.1
 - ◇ Chapter 3 Manipulating and Coloring Shapes: 7.01 - 7.06, 7.08 - 7.15, 7.17
 - ◇ Chapter 4 Working with Text: 8.01 - 8.07
 - ◇ Chapter 5 Tracing and Drawing: 9.01, 9.02, 9.03.1, 9.03.2, 9.03.3, 9.03.6, 9.03.7, 9.03.10
 - ◇ Chapter 6 Editing: 10.01, 10.06
 - ◇ Chapter 7 Designing: 11.01, 11.05, 11.06.1, 11.07.1
 - ◇ Chapter 8 Output: 8.01, 8.02, 8.06, 8.07

5.01 Installing SCAL

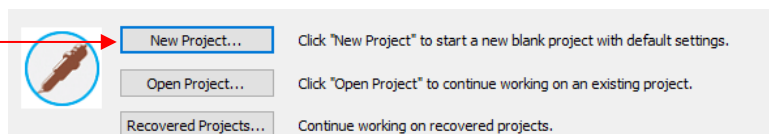
5.01.1 Selecting and Downloading the Software

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

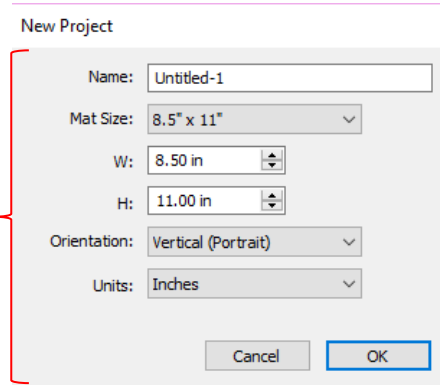
http://www.sky-cut.com/page89?product_id=64

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

Click on **New Project**



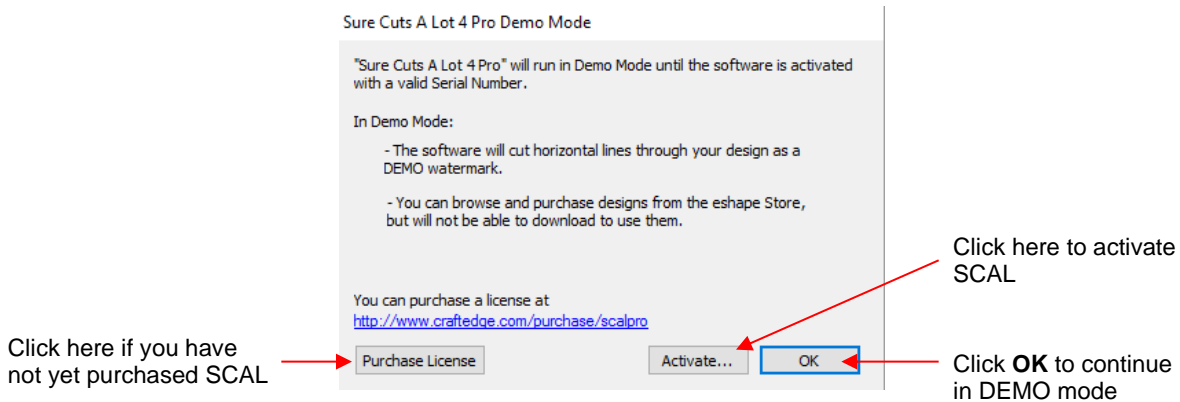
Accept whatever settings are shown. Later in this chapter, details about these settings will be covered.



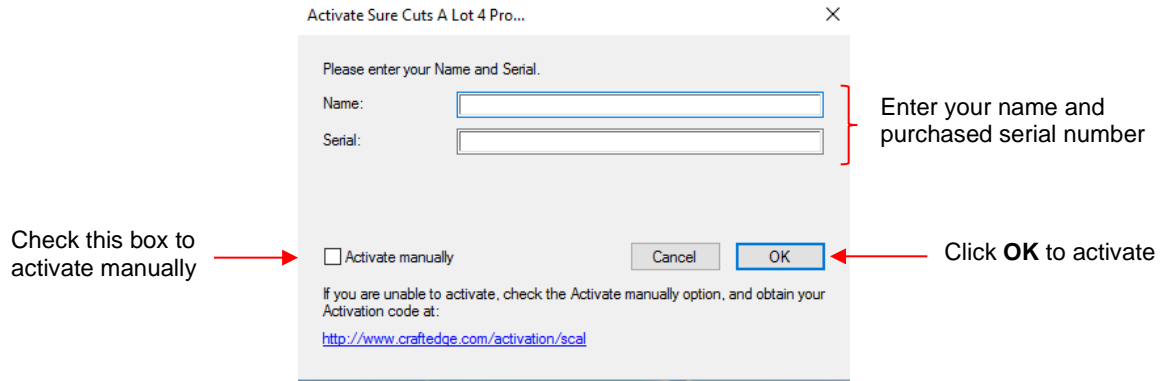
- The software will run in DEMO mode until a registration is purchased. This mode will have the following limitations:
 - ◇ When cutting, horizontal lines will be added across the design
 - ◇ Digital shapes from the **eshape Store** cannot be downloaded
 - ◇ Exporting will add a DEMO watermark
- Note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

5.01.2 Activating the Software

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

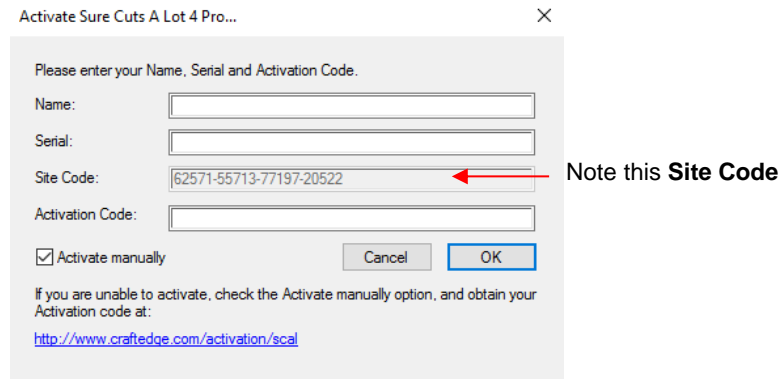


- **IMPORTANT:** Make sure the version of SCAL you installed matches the registration you purchased. You can verify this by going to **Help>About Sure Cuts a Lot**. If the wrong version is installed, uninstall this current version and download the correct one.
- After clicking on **Activate**, enter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



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

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



◇ Next, go to the following link:

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

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



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

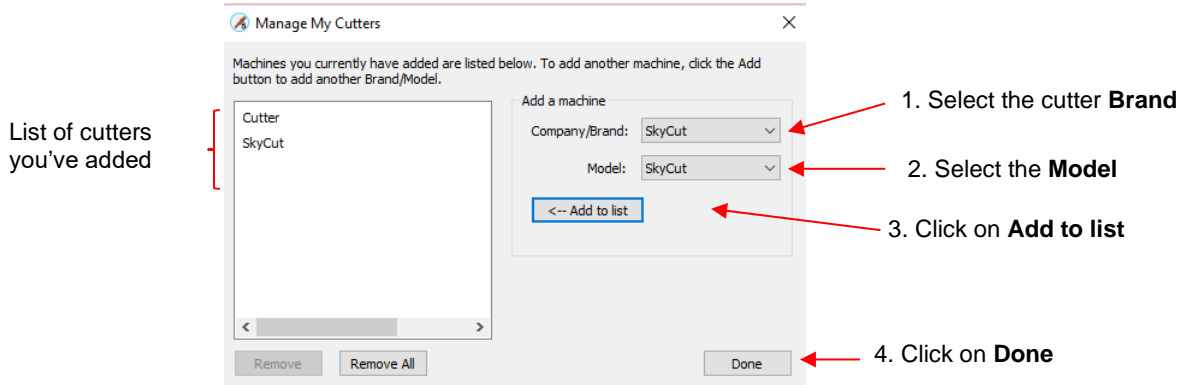
- If you need to activate your **Serial Number** on both a PC and a Mac, go to **Help>Support>Technical Support** and click on **Contact Support Team**.

5.01.3 Installing the USB Driver

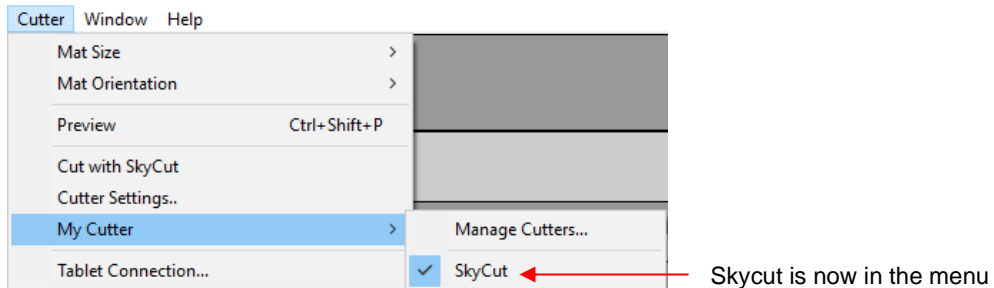
- If the cutter you are using connects via a USB cable, download and install the correct driver by going to **Help>Install Driver**. With the Skycut models, this step isn't required as they utilize true/direct USB connectivity.

5.01.4 Installing Your Cutter

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

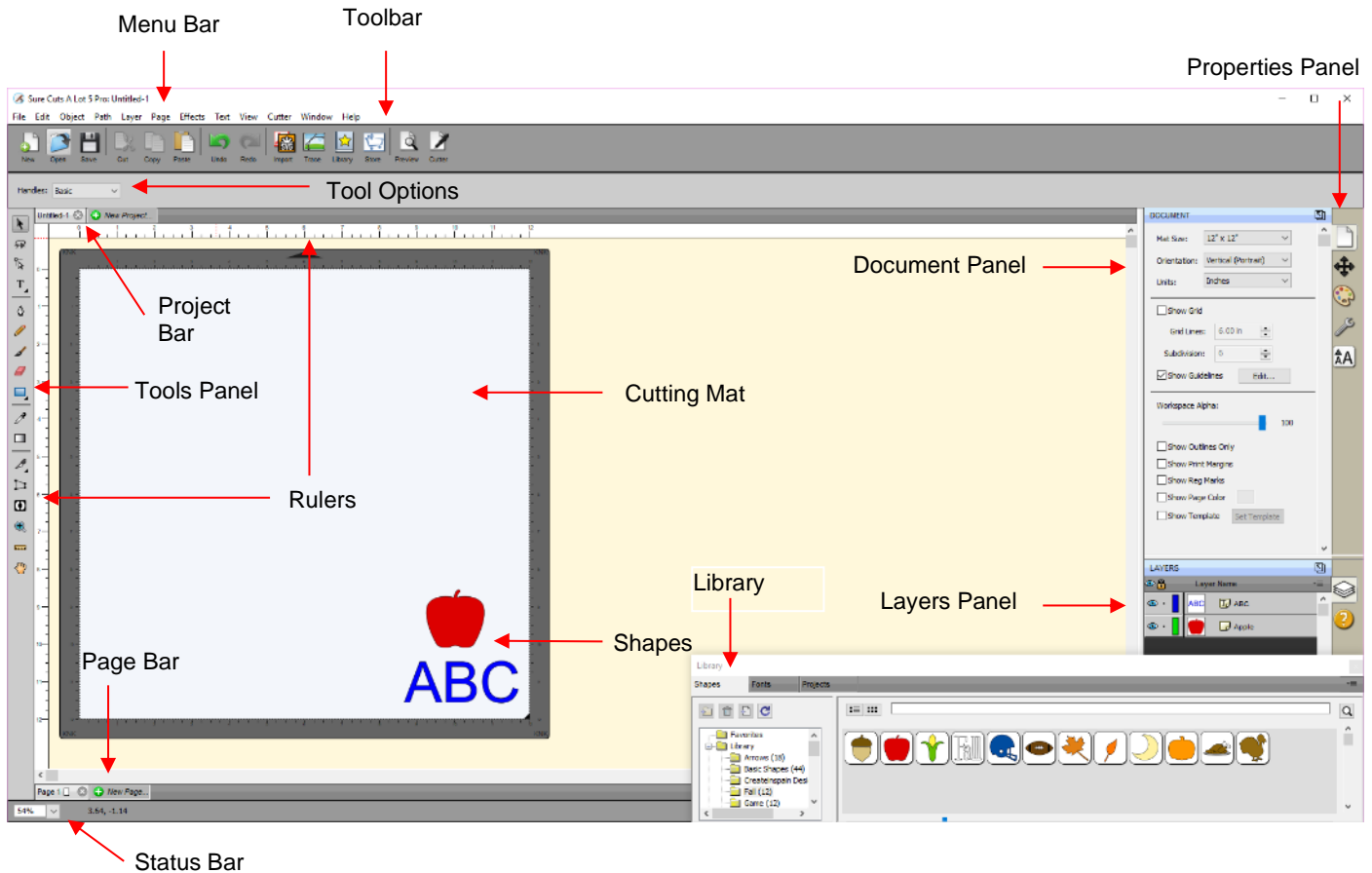


- Click on **Done** to save and close the window. Now, when you are ready to cut, the Skycut will be located and marked in the **Cutter>My Cutter** menu:



5.02 Main SCAL Screen

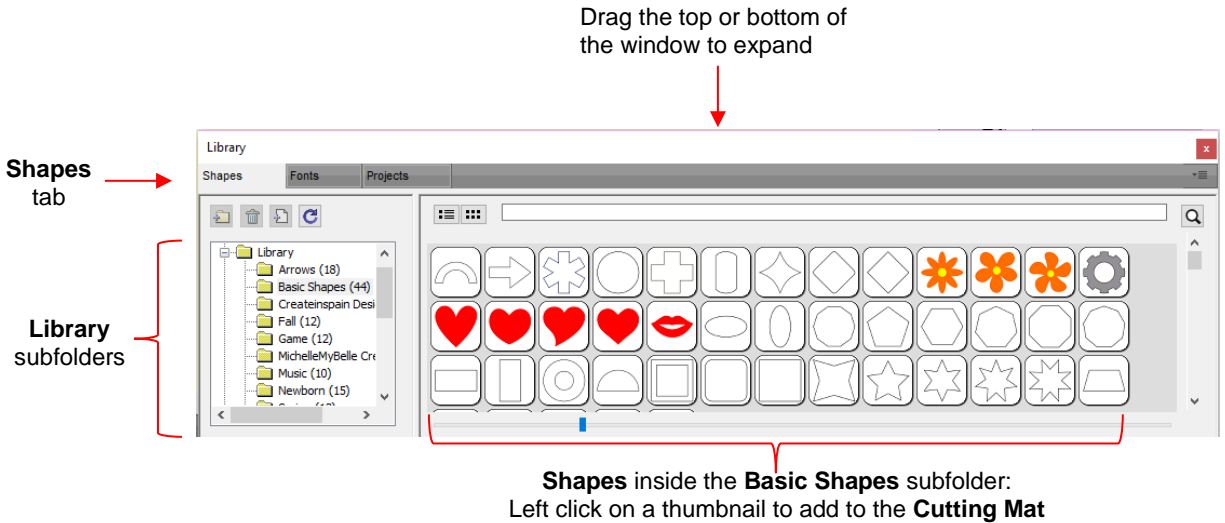
- Below is a screen shot of the main screen in SCAL identifying various elements. Note the names of the items shown as they will be referenced throughout this user manual:




- Hovering your mouse over most of the screen icons will pop up the icon's name and, in some cases, details about usage.
- In order to better remember where major elements are located, note that the term “bar” is used when components are laid out horizontally (such as the **Toolbar**) and the term “panel” is used when components are laid out vertically (such as the **Tools Panel**).
- The **Toolbar** and the **Status Bar** can be hidden, when desired, by going to **View>Hide Toolbar** and **View>Hide Status Bar**. On a Mac, there's also an option to **Enter Full Screen** in the **View** menu.
- Throughout this manual, **Cutting Mat** (capitalized and in bold type) refers to the on-screen simulation of the physical cutting mat, which will be written with lower case, normal type.
- The **Rulers** can be toggled on and off by right-clicking on the screen and selecting **Show Rulers**. Note that when hiding the rulers, click again on the screen for it to take effect. To change the units displayed on the **Rulers**, refer to *Section 5.06.3*.
- **Shapes** are the objects or images that you will be adding to your projects. They can be created from scratch or imported from other sources, such as the **Library**, your computer, or the **eshape Store**. As you will see throughout sections of this user manual, you have many options and resources available to you.
- This manual also presents information by topics versus location on the screen. If you need to look up all of the functions on one particular element, for example the **Tool Panel**, refer to **Appendix C**.

5.03 Library


- The SCAL **Library** provides a number of useful functions:





- ◇ It contains a collection of over 300 pre-installed shapes, organized into 16 subfolders
- ◇ It displays complete character sets for all fonts currently installed
- ◇ You can organize your own shapes and projects into separate folders and view thumbnails for selecting
- ◇ You can assign commonly-used shapes and projects to a **Favorites** folder for quicker access
- ◇ It provides access to designs and projects downloaded from the **eshape Store**
- The **Library** automatically opens every time you open SCAL unless you create a custom **Workspace** (refer to *Section 5.05*). If you've closed it, the **Library** can be reopened by using one of the following:
 - ◇ Click on **Library** icon on the upper **Toolbar** 
 - ◇ Press **Ctrl+1**
 - ◇ Go to **Window>Library**
- To add a shape from the **Library** to the **Cutting Mat**, click on the thumbnail for that shape or drag the shape onto the **Cutting Mat**. Note there are other categories within the **Library** listed on the left side. Check out the various subfolders of shapes as they are a great resource while learning SCAL and testing out your cutter.
- Further details on organizing and fully utilizing the **Library** is covered in *Section 6.03*.





5.04 Properties Panel

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

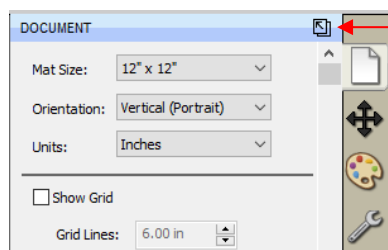
◇ **Document Panel**  : contains the properties related to the **Cutting Mat**. Refer to *Section 5.06*.

◇ **Position & Size Panel**  : contains properties and manipulation functions related to any currently-selected shapes in the project. Refer to *Sections 7.04, 7.05.1, 7.06, 7.08, 7.18*.

◇ **Fill & Stroke Panel**  : contains properties for the fill and for the stroke on any currently-selected shapes in the project. Refer to *Sections 7.14 and 7.15*.

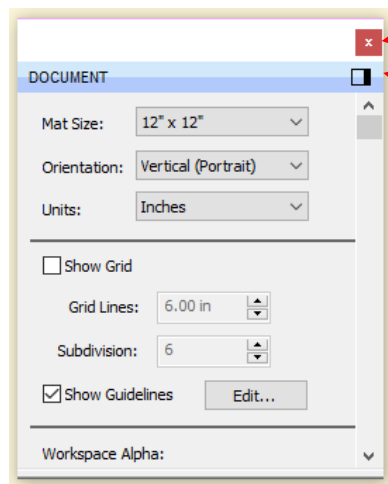
- ◇ **Style Panel**  : contains properties pertaining to how selected shapes will be cut or printed. Refer to *Section 8.01*.
- ◇ **Text Panel**  : contains properties pertaining to how text will appear. Refer to *Section 8.05*.
- ◇ **Layers Panel**  : lists all shapes in the current project with options to organize, hide/show, lock/unlock and more. Refer to *Section 6.04*.
- ◇ **Help Panel**  : opens a user guide to a section based on the currently selected tool. More tips and instructions can be found under **Help>Help**.

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



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

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



Click here to close a panel

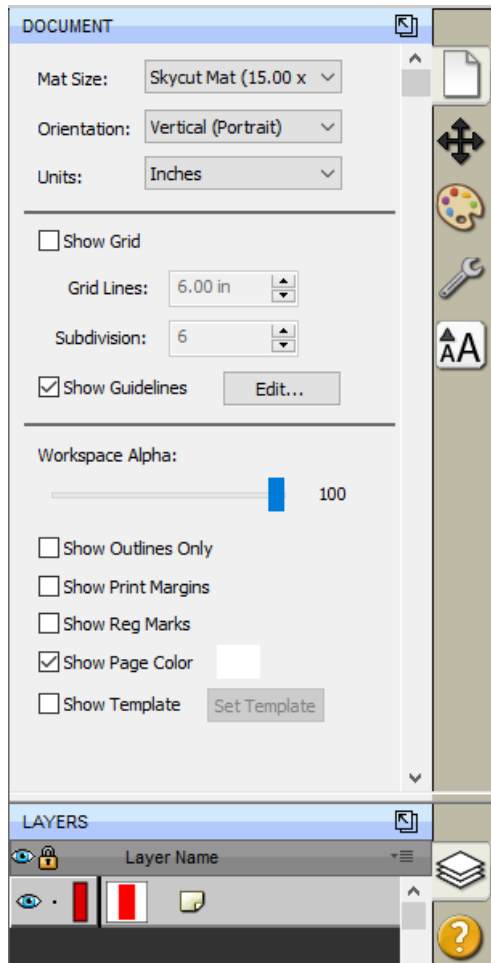
Click here to return a panel to the **Properties Panel**

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

5.05 Customizing the Properties Panel / Workspace

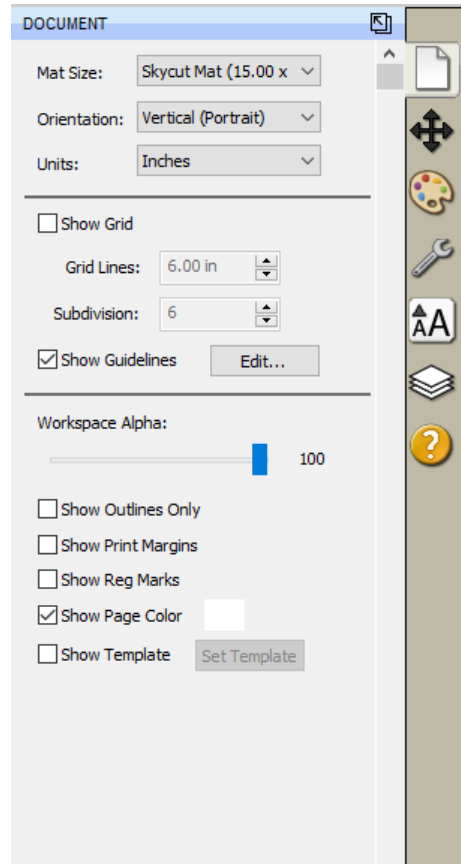
- In SCAL, the **Workspace** refers to the arrangement of panels and whether or not you want the **Library** to be open or closed by default. There are two versions already set up: **Basic** and **Advanced**. You can then make changes and name and save others, as desired.
- By default, the **Advanced 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:

Advanced Workspace

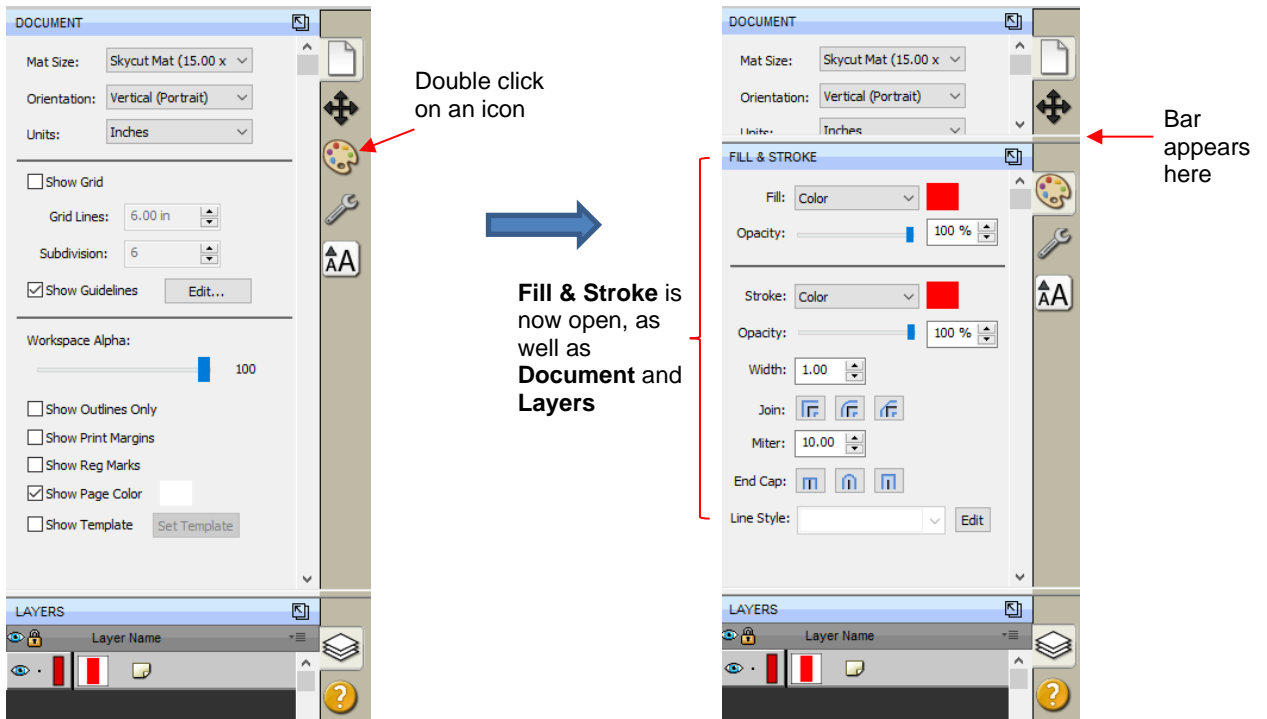


Layers Panel

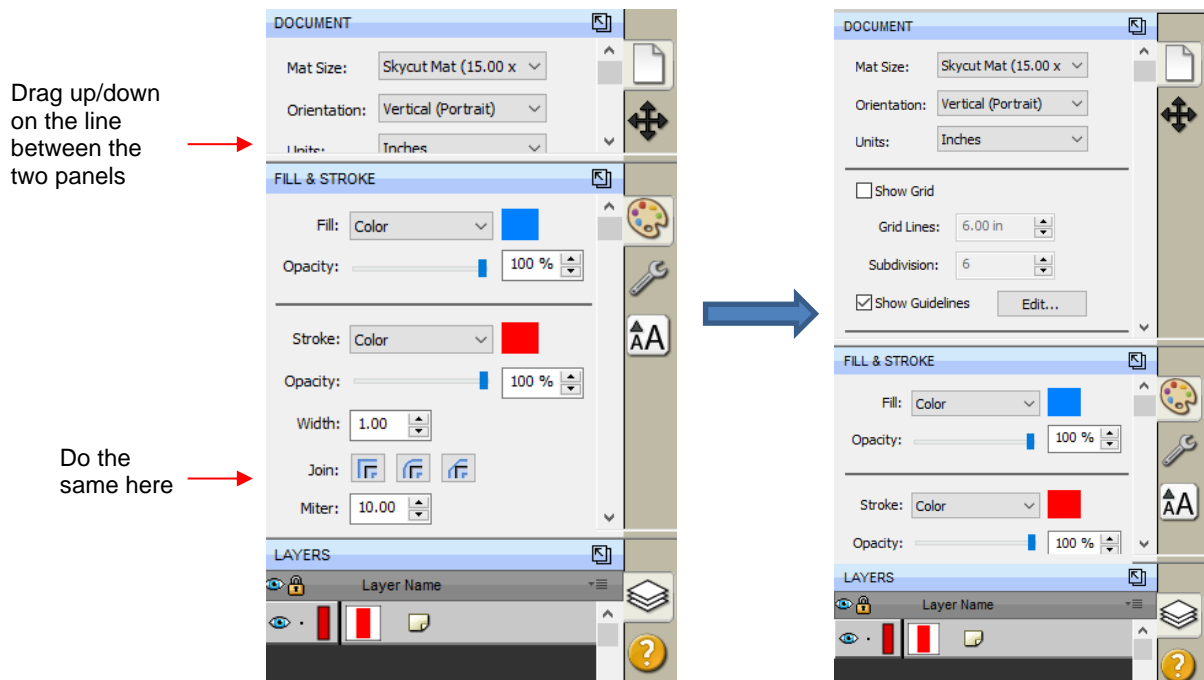
Basic Workspace



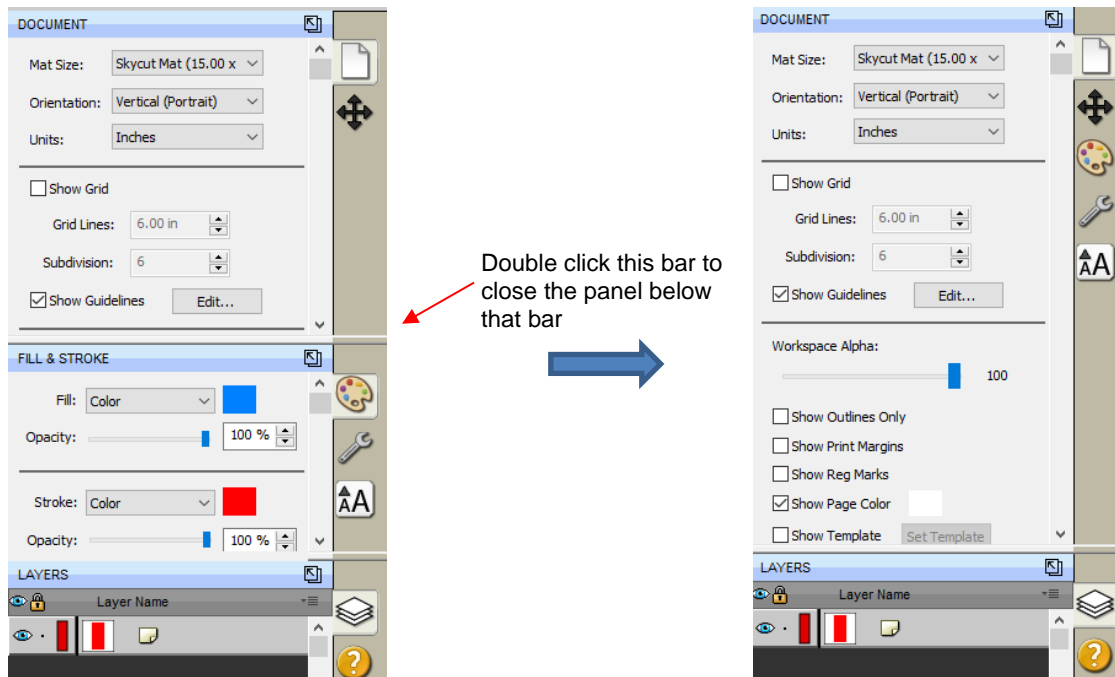
- To switch to other panels, click on the icons along the right side. If there's a particular panel you access often, then you can create a custom workspace. For example, let say you want the **Fill & Stroke Settings** panel to always be open. Double-click that icon and the **Properties Panel** will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



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

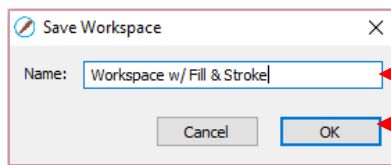


- To close a panel, double-click on the bar on the right side:



Double click this bar to close the panel below that bar

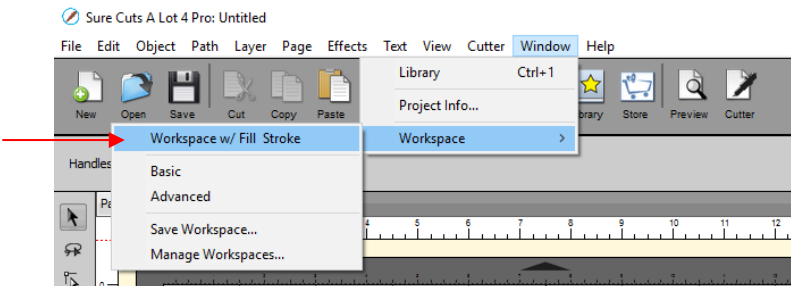
- By default, the **SCAL Library** opens every time you open the software, start a new project, or open an existing project. You might prefer to have the **Library** closed and only open it when needed. This can be accomplished by having it either opened or closed and then saving it along with your preferred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



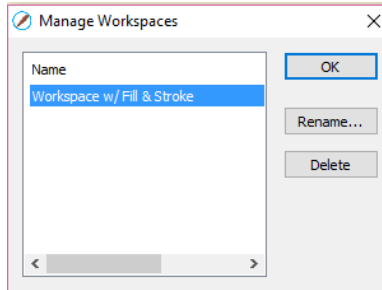
Name the new **Workspace**
Click on **OK**

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

Custom workspaces will appear here



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

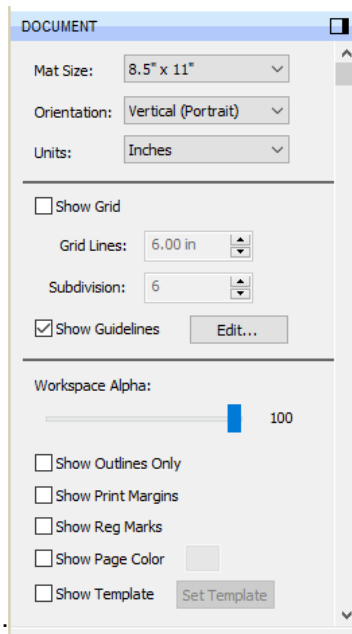


Options to **Rename** or **Delete** selected **Workspace**

5.06 Document Panel



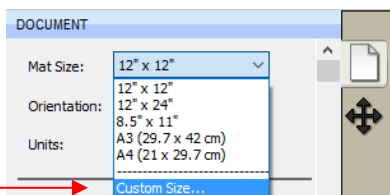
- The **Document Panel** contains settings for the **Cutting Mat** which serves as a design area for the software as well as to indicate, in some cutting modes, where the shapes will be cut.



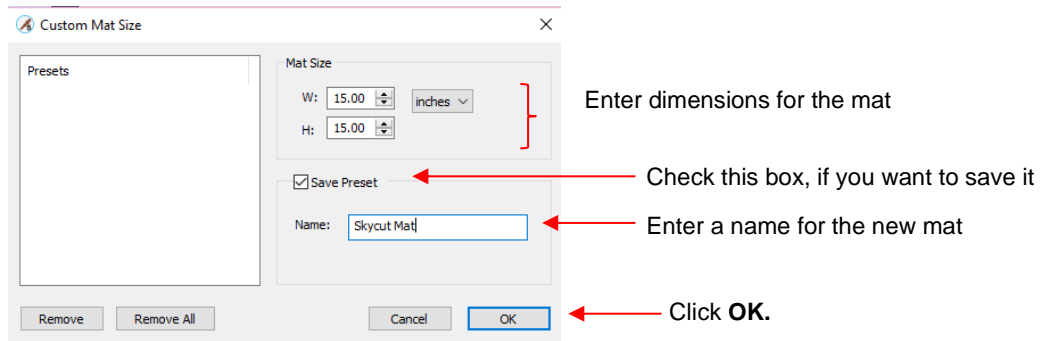
5.06.1 Mat Size

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

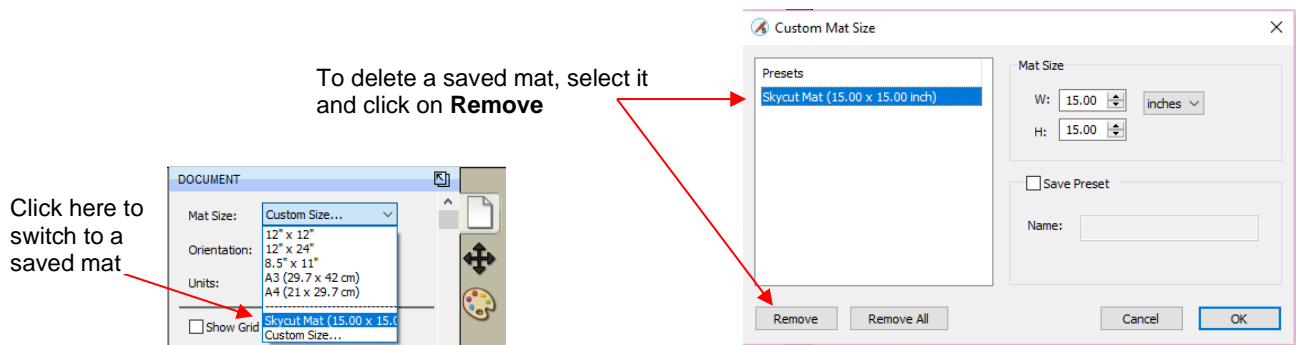
Click here to create a custom mat



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



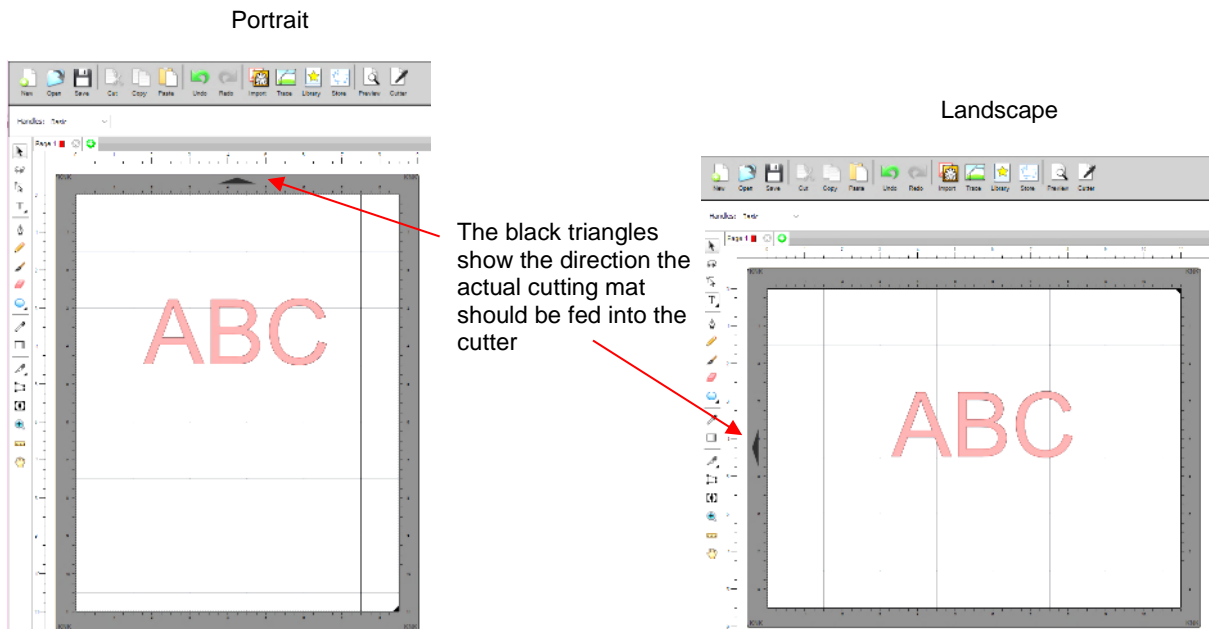
- A saved mat will now appear at the bottom in the **Mat Size** menu and will be listed under **Presets** when you return to the **Custom Mat Size** window:



- 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**.

5.06.2 Orientation

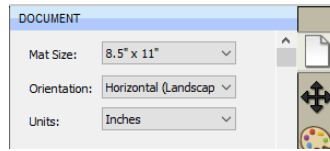
- A **Cutting Mat** can appear in either **Portrait** mode or **Landscape** mode with a triangle indicating the direction the mat will be fed into the cutter. To better illustrate this, a letter-size **Cutting Mat** is selected:



- There are three ways to change the mat orientation:

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

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



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

5.06.3 Units

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



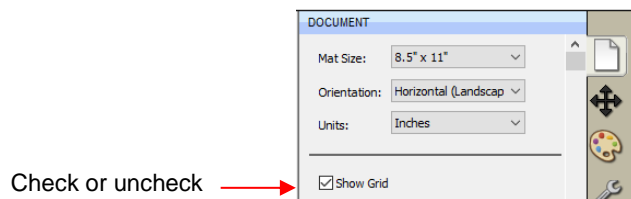
- The units can also be changed in either of the following locations:

- ◊ Go to **View>Ruler Units**
- ◊ Right-click on the screen and select **Ruler Units**

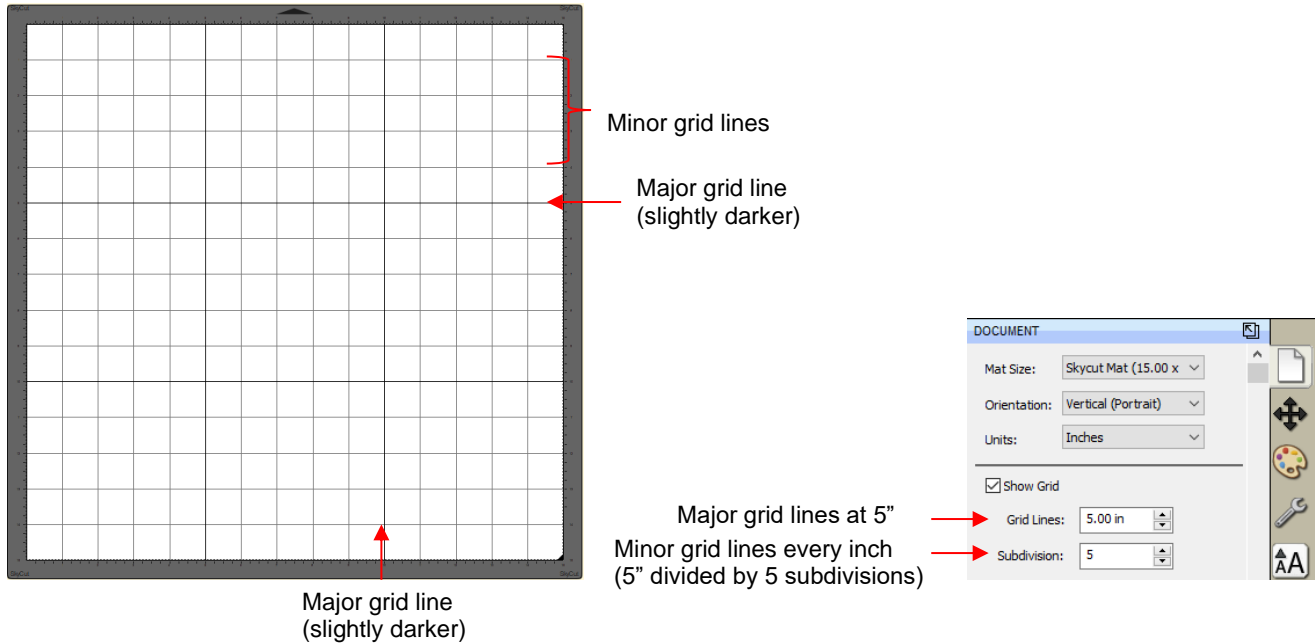
5.06.4 Show Grid

- The mat grid can be toggled on or off by either of these two ways:

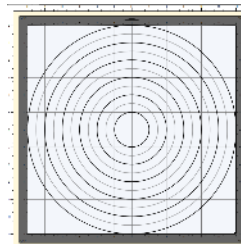
- ◊ Go to **View>Show Grid**
- ◊ Check or uncheck the **Show Grid** box on the **Documents Panel**:



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

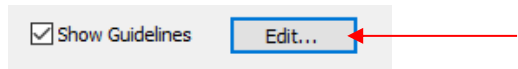


- A final grid option involves circular grid lines which can, as an example, be used for cake design. Go to **View>Show Mat Cake Circles**:



5.06.5 Show Guidelines

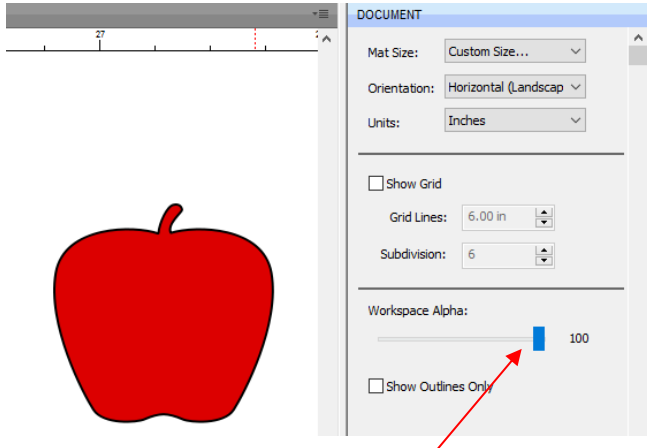
- Guidelines are very useful when designing projects, such as boxes or pop-up cards, from scratch. They can be added to the **Cutting Mat** in two ways:
 - ◇ By dragging your mouse from the horizontal or vertical rulers on the screen
 - ◇ By manually adding in the **Guidelines Edit** window
- You can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



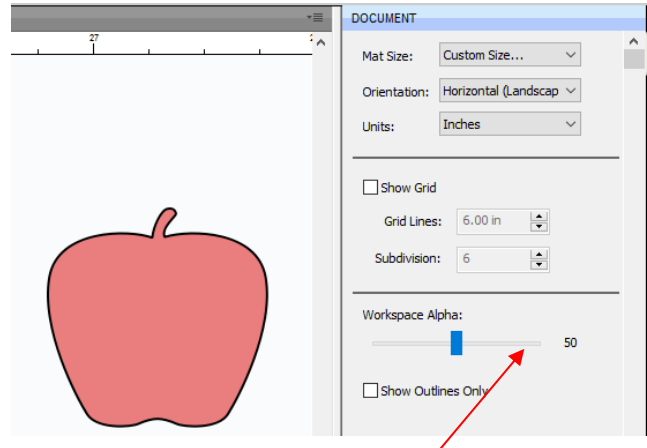
- Details on adding, changing, and deleting guidelines is covered in [Section 11.03](#).

5.06.6 Workspace Alpha

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



Workspace Alpha = 100%



Workspace Alpha = 50%

- You can also change the opacity of individual shapes versus all shapes. Refer to *Section 7.14.5*.

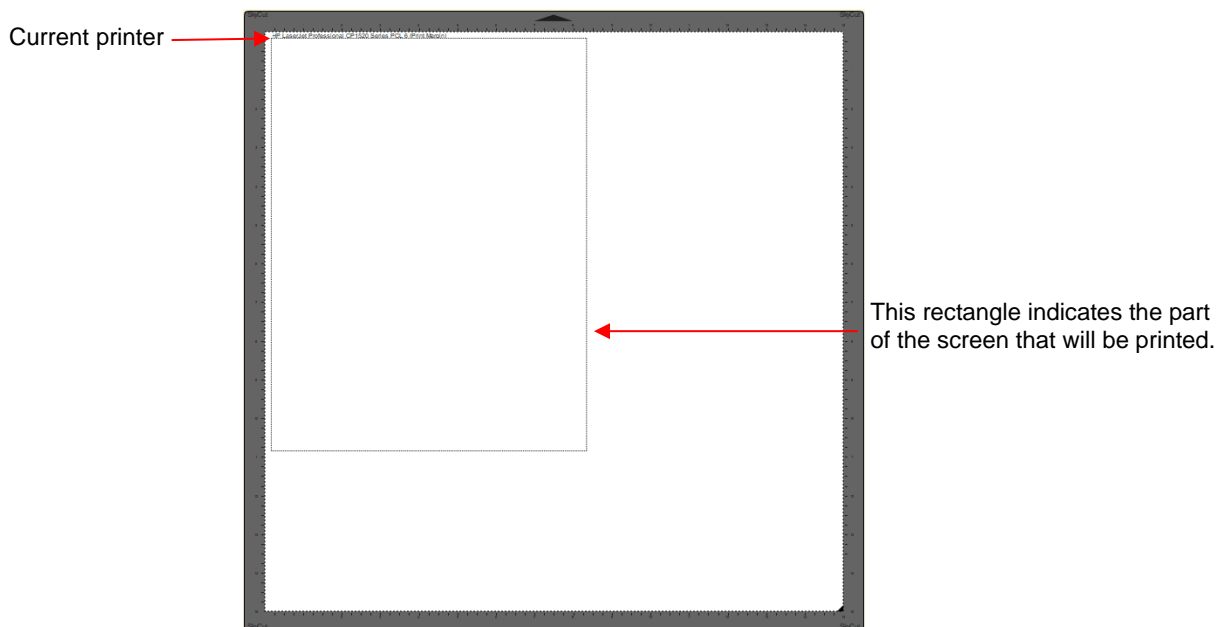
5.06.7 Show Outlines Only

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



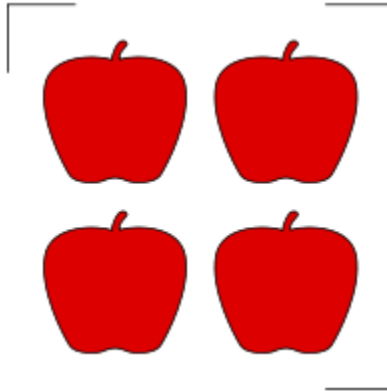
5.06.8 Show Print Margins

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



5.06.9 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 8.06.1*.

5.06.10 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.



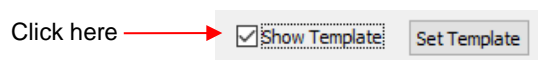
- Note that the color can be different for each page in a project, if desired.

5.06.11 Show Template

- SCAL5 has the ability to add templates to the **Cutting Mat** that are non-selectable shapes to aid in designing. Typically these templates are representations of actual objects onto which cut shapes will be applied. Here are several examples:

- ◇ Designing an etching stencil for a champagne glass
- ◇ Designing a decoration for a light switch
- ◇ Designing a rhinestone template or HTV pattern for a T-Shirt

- To show or hide a template, mark the box next to **Show Template**:

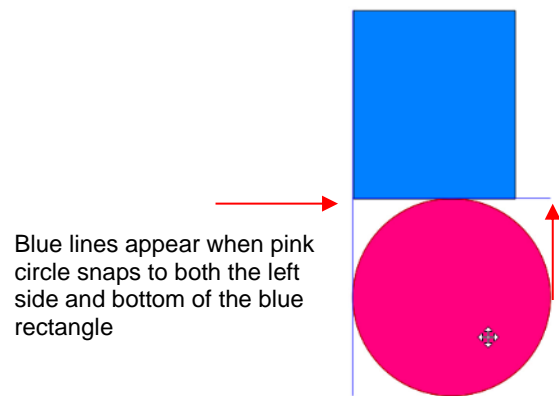
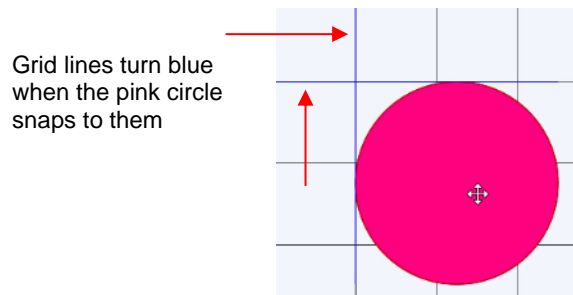


- Details on customizing and organizing templates is covered in *Section 11.04*.

5.07 Snap To

- The **Snap To** option allows you to choose how shapes behave as they are being moved. Being able to snap to other objects, to guidelines or to the grid can help align shapes more easily when designing or editing a project.

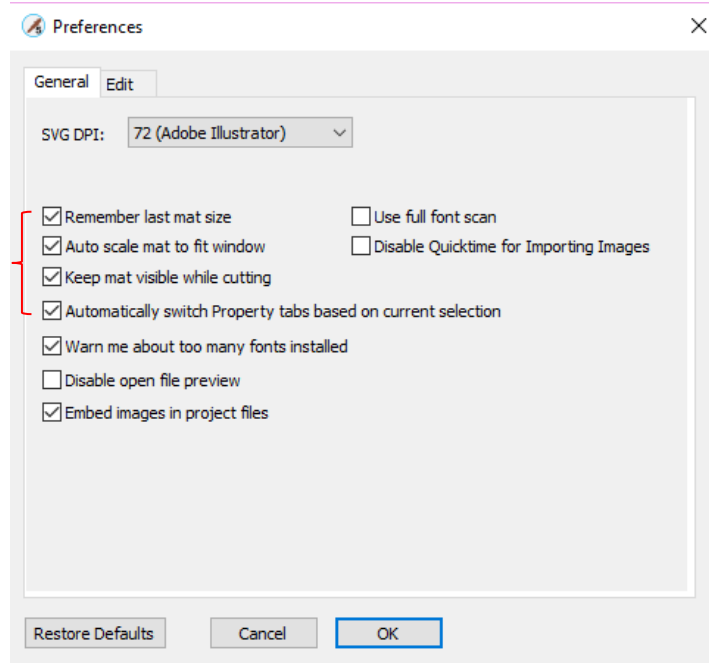
- To access the **Snap To** options, go to **View>Snap To** and mark your preferences based on the following options:
 - ◇ **Grid:** selected shape will snap to the grid lines
 - ◇ **Guidelines:** selected shape will snap to guidelines (refer to *Section 11.03*)
 - ◇ **Objects (Bounds):** selected shape will snap to other shapes' boundaries
 - ◇ **Objects (Centers):** selected shape will snap to other shapes' centers
 - ◇ **Object (Sublayers):** selected shape will also snap to shapes inside other shapes (child shapes)
- When you first access the **Snap To** menu, you will most likely see the last two grayed out. In order to access those options, make sure **Objects (Bounds)** is checked. Then you will be able to go back to the menu and change any of the options.
- When snapping to the grid, the grid can be showing or hidden.
- When a shape snaps to the grid, a guideline, or to another shape, blue lines appear indicating the shape is aligned at that point. Here are two examples:



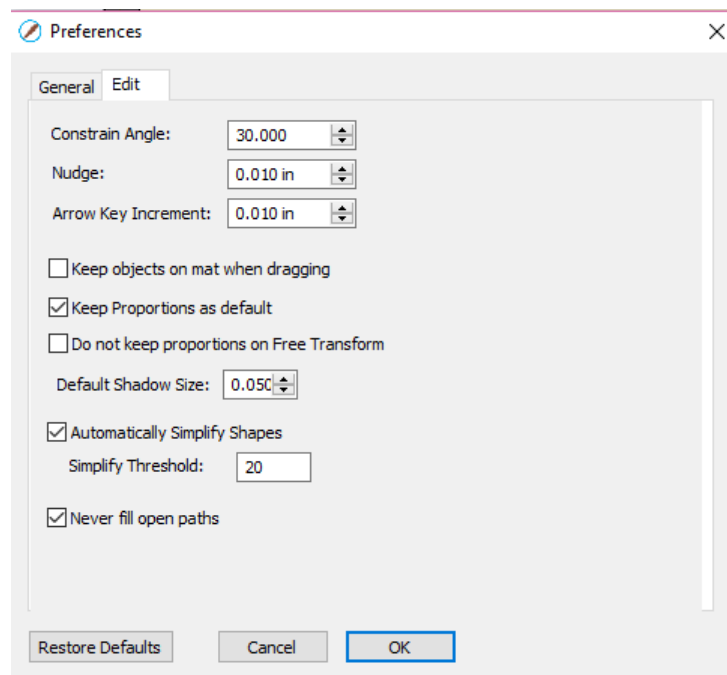
5.08 Other Preferences

- 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 now, note the following preferences that do relate to the material covered so far. These should be self-explanatory based on their names:

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



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

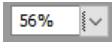



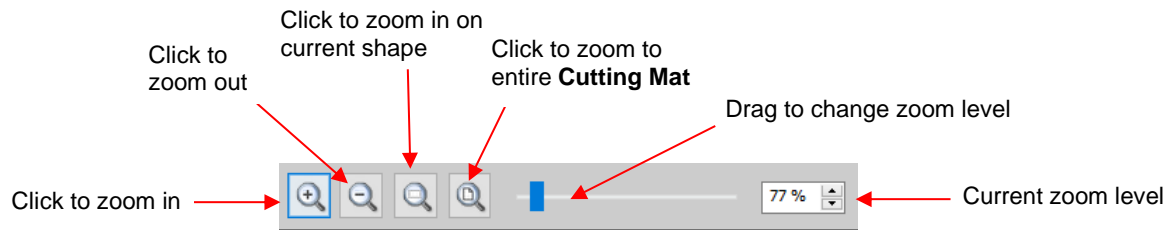
- For more details on these settings, go to *Appendix C4*.



5.09 Zooming and Panning

5.09.1 Zooming


- To zoom in and zoom out, use any of the following methods:
 - ◊ Hold down the **Alt** key (**Option** key on a Mac) while rolling the mouse wheel

- ◇ Access the **Zoom** menu on the **Status Bar** in the lower left corner of the screen 
- ◇ Go to **View>Zoom In** or **View>Zoom Out**
- ◇ Use the following shortcut keys:
 - **Ctrl+ ++...** (hold **Ctrl** key (**Command** key on a Mac) and repeatedly click on **+** key): Zoom in
 - **Ctrl+ ---...** (hold **Ctrl** key (**Command** key on a Mac) and repeatedly click on **-** key): Zoom out
 - Right-click on the screen and select **Zoom In** or **Zoom Out**
 - Click the **Zoom in Tool** icon on the **Tools Panel** . Then use the icons in the **Tool Options** at the top:



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

5.09.2 Panning

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

5.10 Undo/Redo

5.10.1 Undo

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

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



5.10.2 Redo

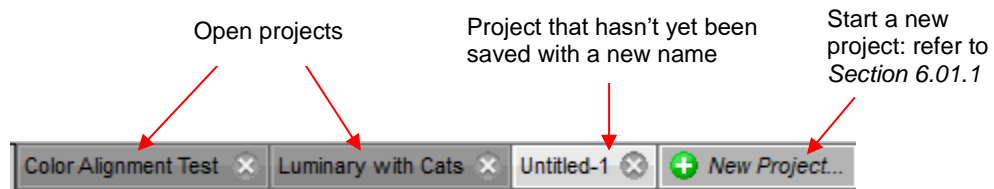
- As with most applications, there is also a **Redo** function in case you **Undo** too many steps or simply change your mind. You can use any of the following to execute the **Redo** function:

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

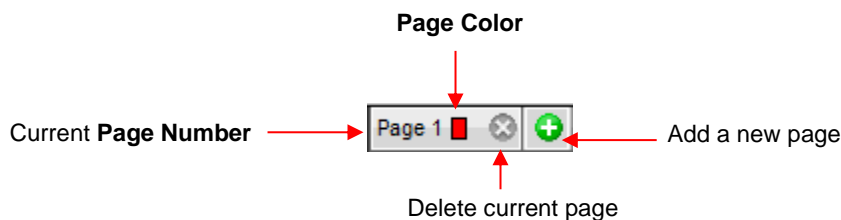



5.11 Projects and Pages

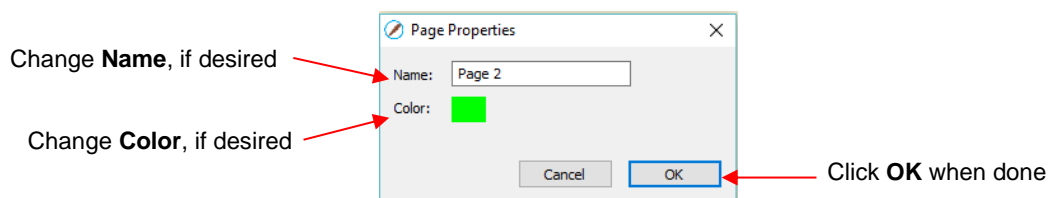
- The **Project Bar** is located right above the **Ruler** and shows what projects (files) are open and have been named, new projects that have been started but not named, and an option to open a new project:



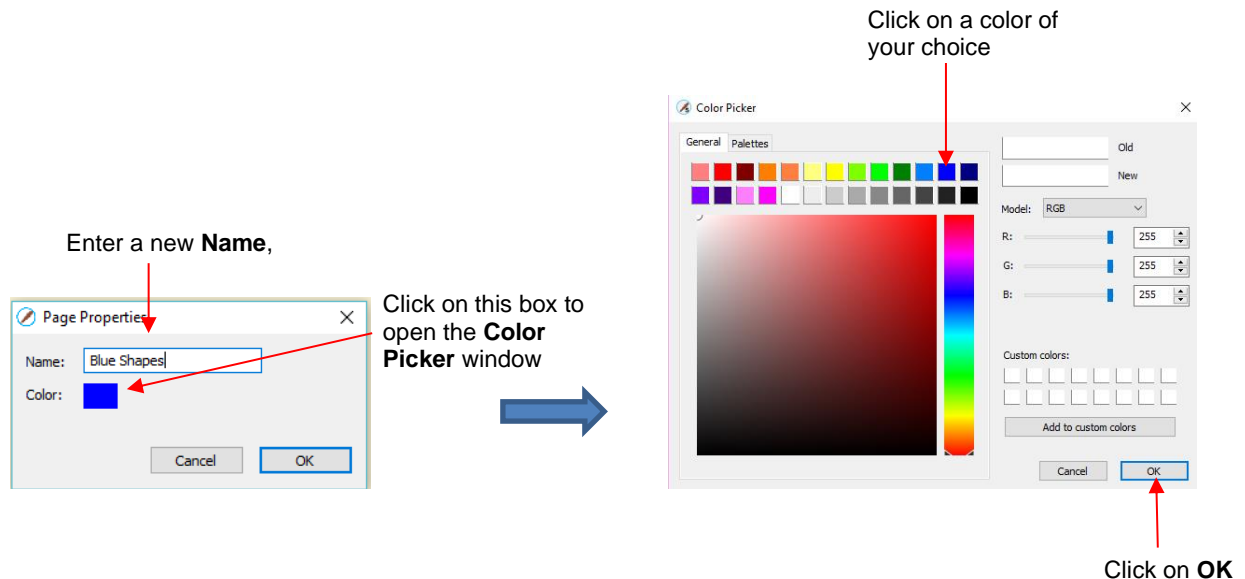
- Clicking on any **Project Tab** on the **Project Bar** will then access that project. Note that you can copy/paste and cut/paste between open projects. Refer to *Section 7.17*.
- Projects can contain one page or many pages. The option to add multiple pages can be convenient for organizing projects with many shapes and or layers.
- The **Page Bar** is located just below the **Cutting Mat** and displays the current page, a color for quickly identifying pages, and icons for adding and deleting pages:



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

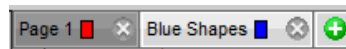


- ◇ Either accept the default **Page** number as the new **Name** or provide your own. The same with color – you can click on the default color provided and select a new color from the **Color Picker** window that opens. For example, you might want to have all of the blue shapes on their own page:




- ◇ Note: You can create your own custom colors within the **Color Picker** window. This will be covered in *Section 7.14.2*.

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




- ◇ Note: The color selected for the page tab will also be the color of the **Cutting Mat** if you mark the **Show Page Color** option on the **Document Panel**.

- ◇ If you change your mind and want to edit the **Name** and/or **Color**, either go to **Page>Page Properties** or double-click on the **Page Name** and the same **Page Properties** window will open, allowing you to make changes.

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

5.12 Help Resources

- The following steps within SCAL will take you to help resources (note that some of these will require an Internet connection):
 - ◇ Go to **Help>Help** for access to a user guide
 - ◇ Click on the **Help Panel** icon  on the **Properties Panel** to open the user guide to a section based on the currently selected tool
 - ◇ Go to **Help>Forums** to access the SCAL user forum
 - ◇ Go to **Help>Online Video Tutorials** to access a page with links to both videos and written tutorials
 - ◇ Go to **Help>Support>Technical Support** for the following:
 - Contact the SCAL team
 - Retrieve your serial code

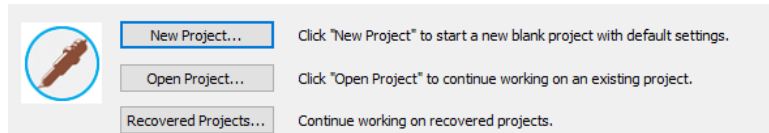
- Download latest updates
- Access the forum
- Access tutorials
- Other online support groups for SCAL include:
 - ◇ [SCAL Facebook Page](#)
 - ◇ [MTC and SCAL Facebook Group](#)
 - ◇ [SCAL Users Yahoo Group](#)
- An online training program with over 10 hours of videos is available at this link: [Sure Cuts a Lot 5 Beginner Class](#).

6. SCAL: Handling Files and Organizing Layers

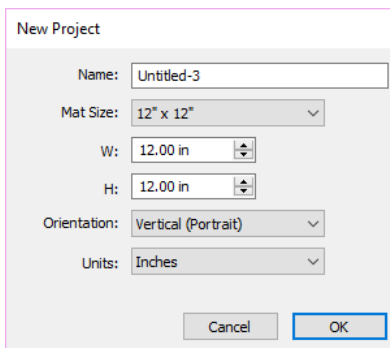
6.01 Opening Files

6.01.1 Opening a New File/Project

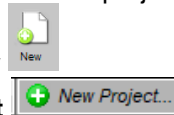
- When you launch SCAL, a popup window appears where you can choose if you are starting a new project, opening an existing project, or recovering a project after a software crash:



- 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**:



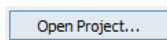
- If SCAL is already open, then you can start a new file (aka a new project), using any of the following:
 - ◇ Click on the **New Project** icon on the upper **Toolbar**
 - ◇ Click on the **New Project** tab above the **Cutting Mat**
 - ◇ Press **Ctrl+N**
 - ◇ Go to **File>New Project**
- The same **New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



6.01.2 Opening an Existing .SCUT File

- An existing .SCUTx file (where x is blank, 2, 3, 4, or 5 indicating which SCAL version created it) can be opened in SCAL5 using any of the following:

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




- ◇ Go to **File>Recent Projects**, if the file is one of the last five you had open in SCAL
- ◇ Double-click a .SCUTx file in Windows Explorer or attached to an email
- ◇ Drag and drop a .SCUTx file onto the main screen of SCAL
- ◇ Import from the **Library** (refer to *Section 6.03.3*)

- 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 SCAL5. Refer to *Section 6.06*.

6.02 Saving SCAL Files

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

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

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

- If you've made changes and wish to save under a different file name, choose **File>Save As**. Name the file, choose a location, and click on **Save**.
- You can include notes about your file by going to **Window>Project Info**. This can be handy for your own future reference or for others using your files. Refer to *Section 11.02*.
- You can also export files in a host of other formats. Refer to *Section 6.07*.

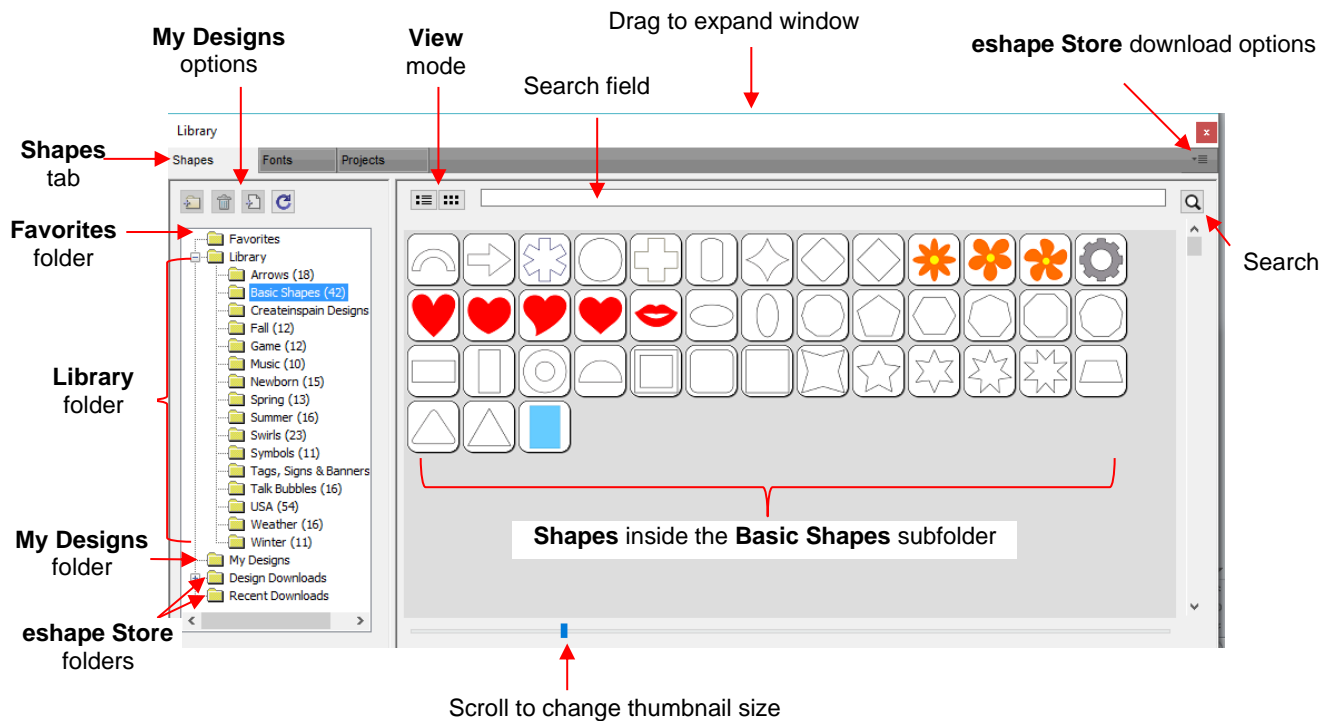
6.03 Customizing the Library

- The **Library** was briefly introduced in *Section 5.03*. The purpose of this section is to expand on how to fully utilize it.

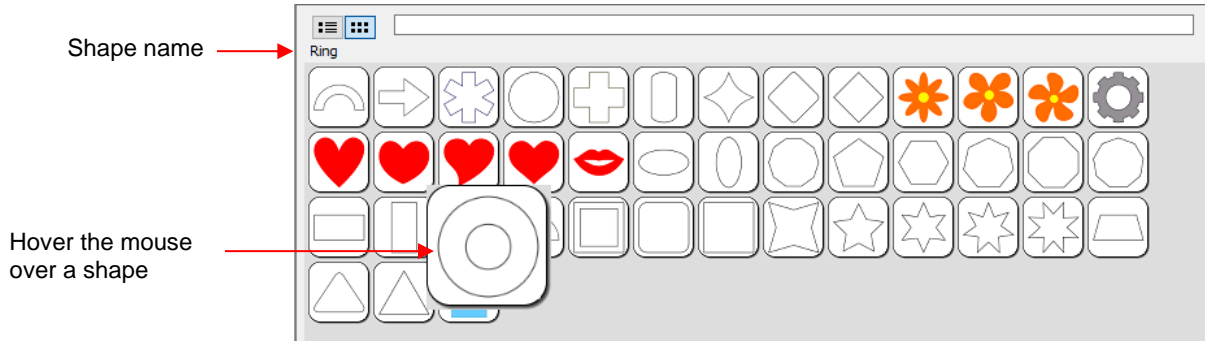
- The **Library** consists of three tabs: **Shapes**, **Fonts**, and **Projects**. Each is covered in the following subsections:

6.03.1 Shapes Tab

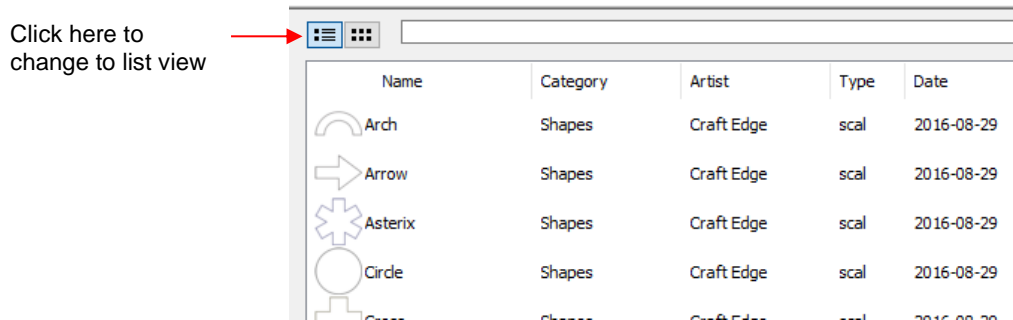
- When you first open the **Library**, the **Shapes** tab will be selected.
- In order to see all of the contents under this tab, drag the top of the window upwards until you see the following screenshot. Note the various parts of this window:



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



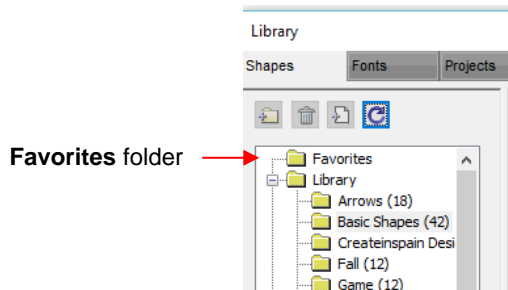
- You can toggle between the thumbnail view and a list view using these icons at the top  :



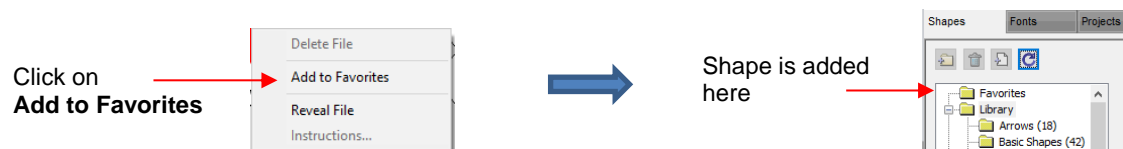
- A search function enables you to see all of the shapes with a particular word in the name. For example, enter the word leaf and click on the search button:



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



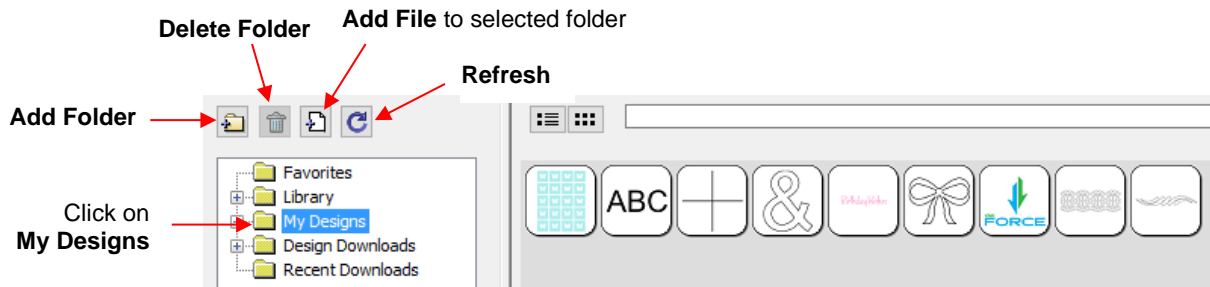
- ◇ The **Favorites** folder is for storing the shapes you access often. Locate the shape you want to add, right-click, and select **Add to Favorites** from the popup menu.




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

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

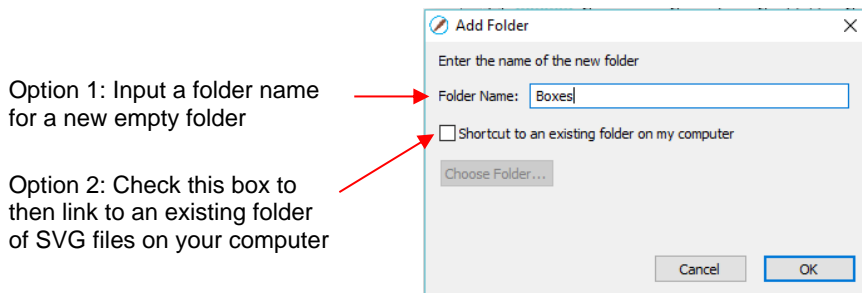
- ◇ Once you click on **My Designs**, the icons above the folder menu will become active:



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

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

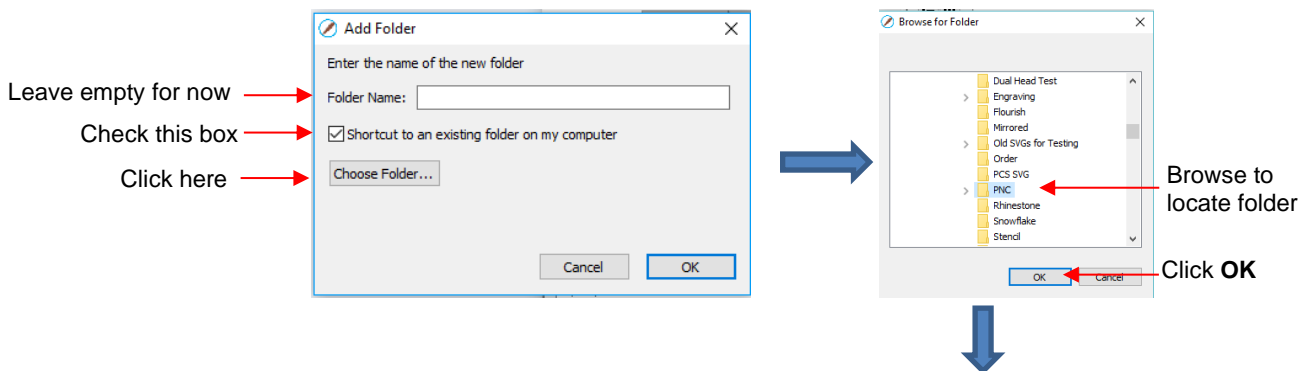
- ◇ After choosing to add a folder, the following window opens where you have two options:



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

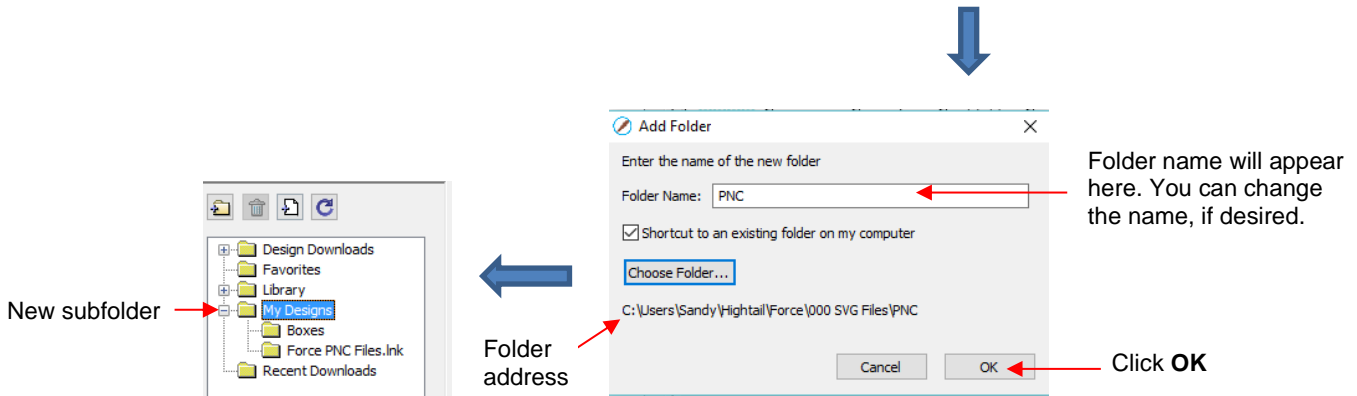
Option 2: Check this box to then link to an existing folder of SVG files on your computer

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



Continued on next page

Continued from prior page



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

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


○ Select the folder and do either of the following:

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


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

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

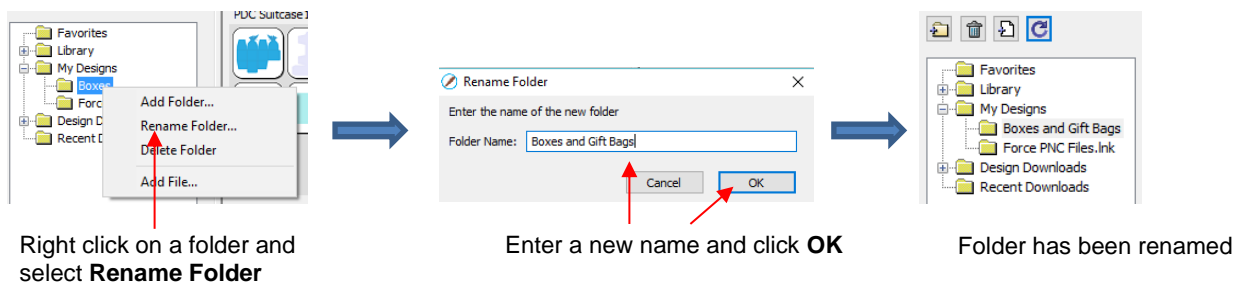
○ **IMPORTANT:** Note that deleting the file could also delete it from your computer unless it has been backed up elsewhere.


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

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

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

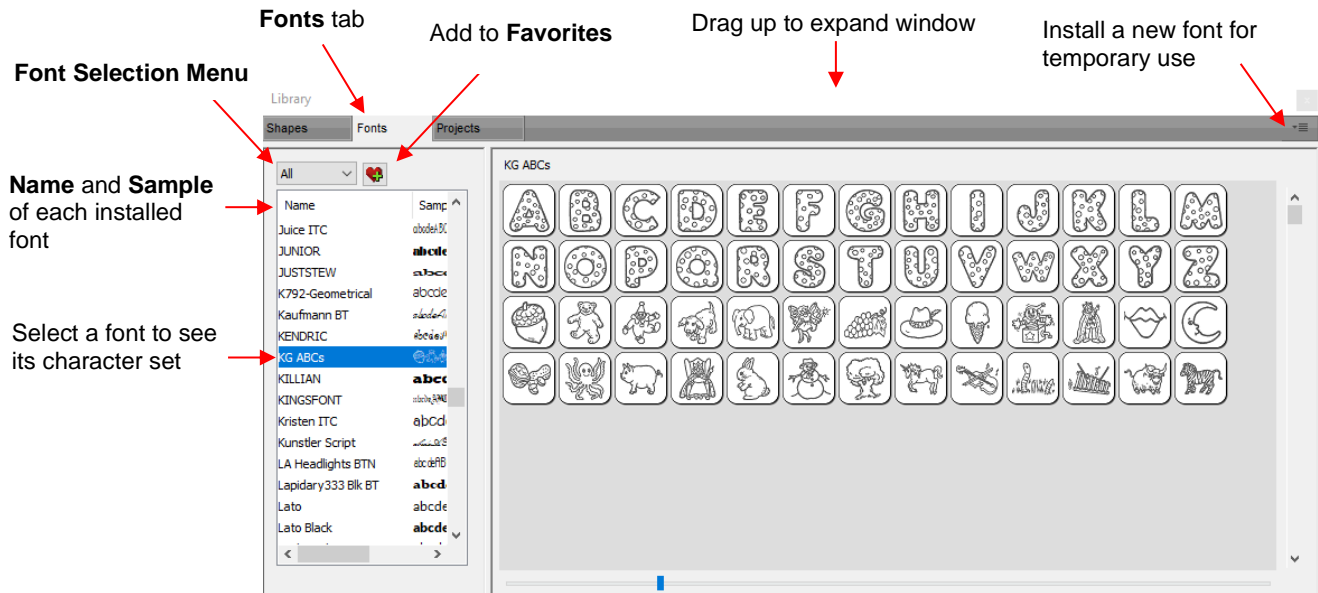
◇ To rename a folder, right-click and select **Rename Folder** from the popup menu:




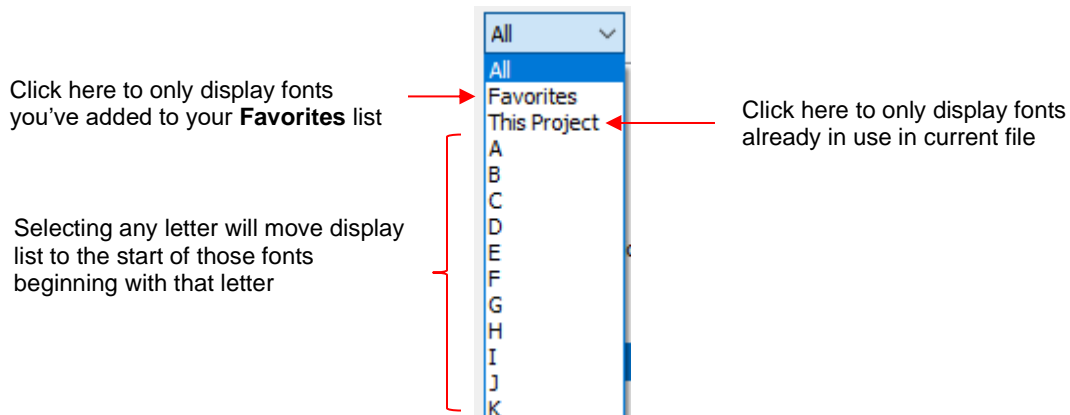
- **Design Downloads** and **Recent Downloads**: These two folders, along with the menu icon at the top right  are part of the **eshape Store** functions. These will be covered in *Section 6.03.1*.


6.03.2 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 8.02*.





- Scroll the bar at the bottom to change the size of the lettering. To add a character to the **Cutting Mat**, left-click on it. While it is far quicker to type out text using the **Type** tool (refer to *Section 8.04.1*), this window is the best way to add special characters within a font or when using dingbat fonts.
- The menu icon  in the upper right corner can be used to temporarily add a font that's not installed on your computer. Click on it and then browse to the folder containing the font you wish to add. Refer to *Section 8.02.3* regarding temporary font usage.
- Font Selection Menu:** Clicking on the down arrow next to **All** will open the following menu:

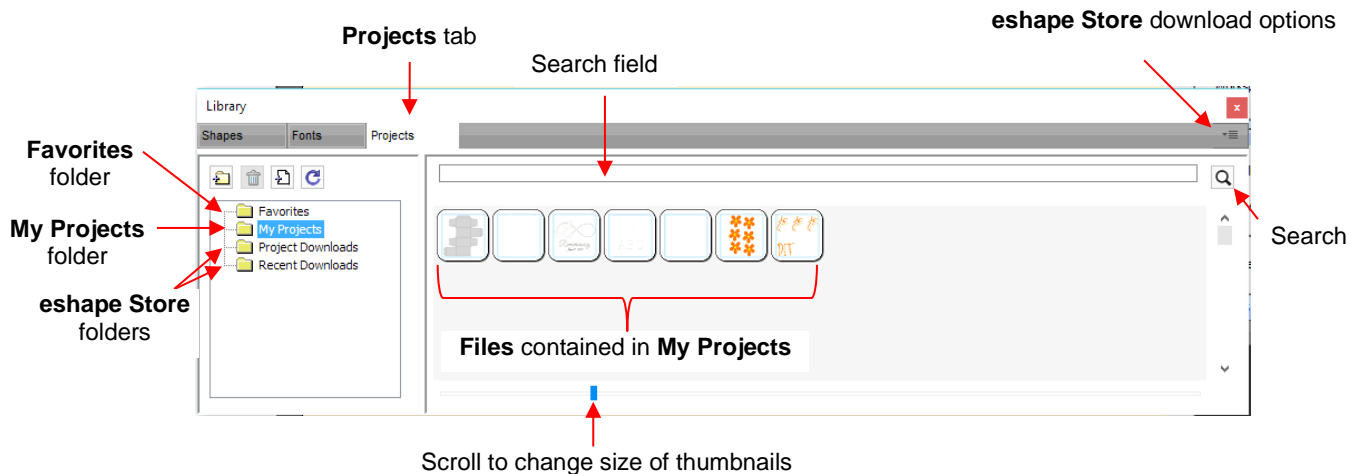


- Favorites:** With a font selected, you can click on the  icon to add that font to your **Favorites** folder.
- For alternative methods for selecting fonts, refer to *Section 8.02*.

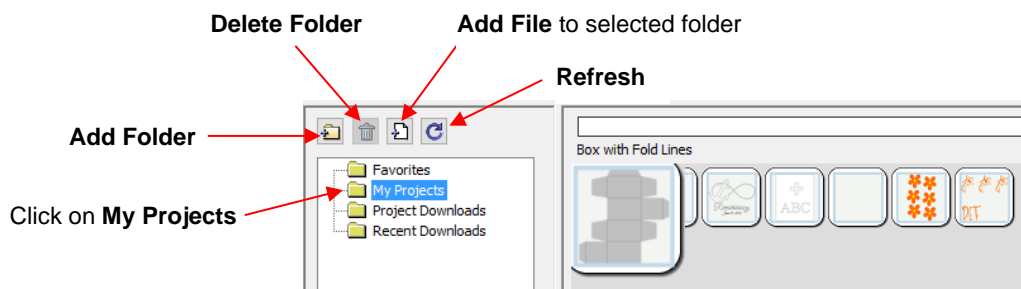
6.03.3 Projects Tab


- The **Projects** tab is similar to the **Shapes** tab. Instead of .SVG files, however, it helps you organize and access your .SCUT files, also referred to as projects.

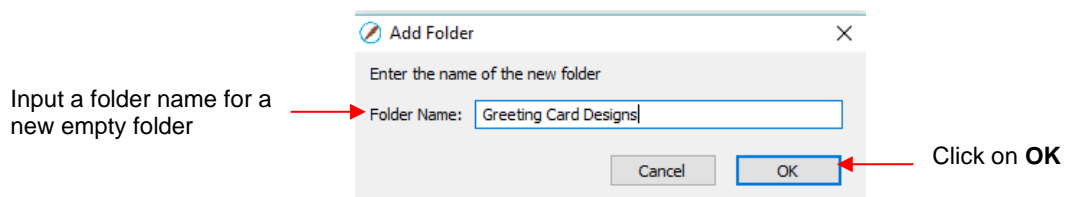
- As with the **Shapes** tab, there are no default categories or pre-added files. However, you will notice these other similar features:
 - ◇ **Favorites** folder – select any project, right-click, and select **Add to Favorites** from the popup menu
 - ◇ **My Projects** folder – virtually identical to **My Designs** folder (more information follows)
 - ◇ **Search** field and search icon  – for locating files with a particular word in the file name
 - ◇ **Project Downloads** and **Recent Downloads** folders and top right icon  : these pertain to **eshape Store**. Refer to *Section 6.05*.
 - ◇ Scroll bar to change the size of the thumbnails.
 - ◇ Hover over a thumbnail and it will get larger. The project name will appear below the **Search** field.




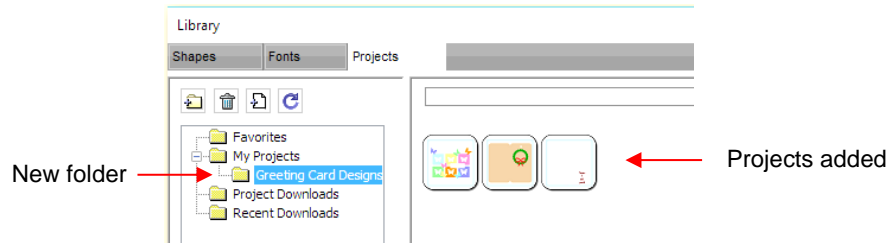
- **My Projects:** This is the main folder where you can organize your own projects for easy access.
 - ◇ Once you click on **My Projects**, the icons above the folder menu will become active:





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



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



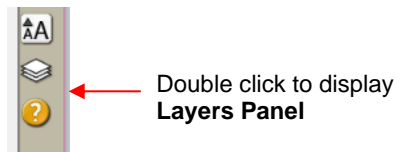
- ◇ To delete a file from a folder, right-click and select **Delete File** from the popup menu.
 - **IMPORTANT:** Note that deleting the file could also delete it from your computer unless it has been backed up elsewhere.
 - After deleting files, you will need to click on the **Refresh** icon  to update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

6.04 Layers Panel

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

6.04.1 Introduction to the Layers Panel

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



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

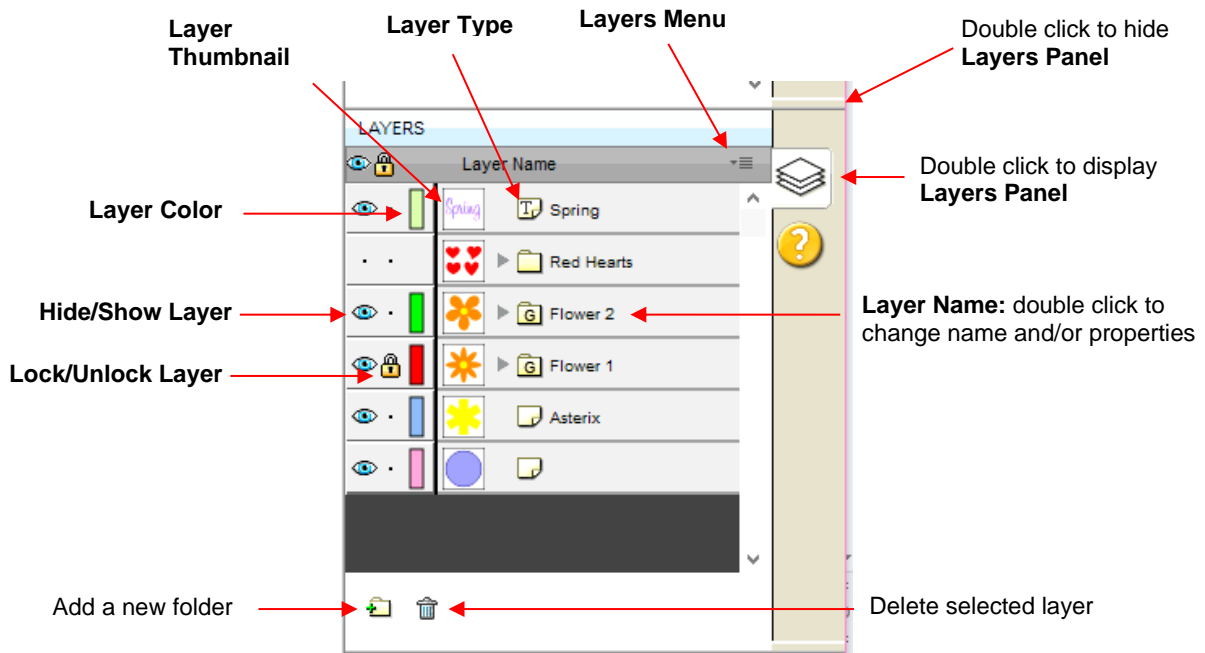
- You do not have to worry about adding shapes to the **Layers Panel**. They will automatically be assigned to new layers as you add them. You will want to learn how to move shapes to new layers or combine shapes into the same layer, depending on the circumstances. This is covered in *Section 6.04*.
- Here are a few examples of when shapes need to be on different layers:
 - ◇ Paper piecing or shadowed shape projects where some shapes will be cut from one color and other shapes from another color (or a number of other colors).
 - ◇ Fold-up projects (boxes, envelopes, popup cards, etc.) where the fold lines will need to have different settings and/or different tools used than your cut lines.
 - ◇ Rhinestone template projects where you need to cut two different templates, such as a fill that will be done in one color of rhinestones and an outline in another color.
- Other benefits of assigning shapes to specific layers include:
 - ◇ Ability to select, with one click of the mouse, all shapes assigned to a layer
 - ◇ Ability to hide or lock layers so that the shapes on that layer are not inadvertently selected, moved, resized, etc.
 - ◇ Ability to change the color, line style, and tool choice on all of the shapes assigned to a particular layer.







6.04.2 Parts of the Layers Panel

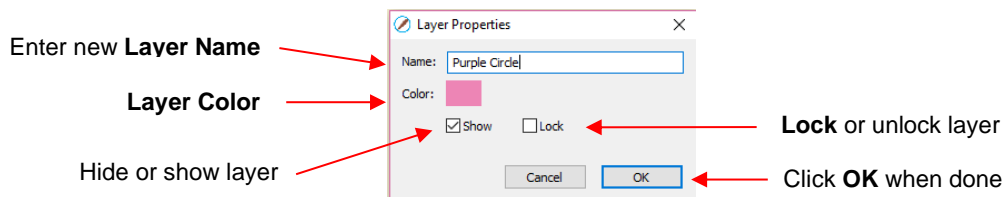
- The next few sections will use the following simple project to illustrate the **Layers Panel**:





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



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




- Hiding layers, locking layers, and assigning layer colors can also be done on the **Layers Panel**:
 - ◇ **Hide/Show Layer:** Click on the eye icon  to hide that layer. The icon will be replaced with a dot  as shown for the *Red Hearts* layer and the shapes on that layer will no longer be seen on the **Cutting Mat** and will not be included when printing or cutting the project. Clicking on the dot icon will restore the layer to the **Cutting Mat**:


Layer Hidden: 






Layer Showing: 

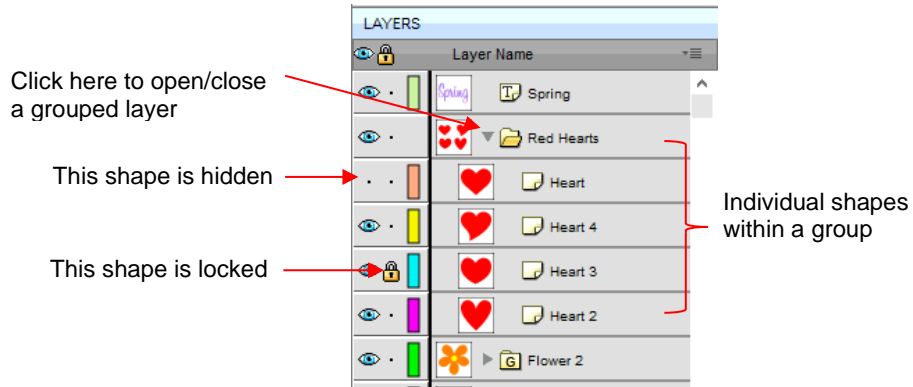


◇ **Lock/Unlock Layer:** Click on the dot to the right of the eye icon and the layer will become locked , such as shown for the *Flower 1* layer. The shapes on that layer will still be included in printing and in cutting, however cannot be selected on the **Cutting Mat**. This can be useful when shapes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



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

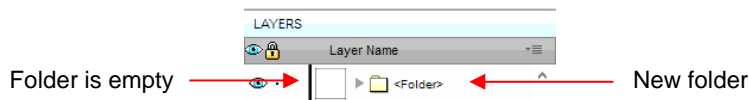
- **Layers Menu:** At the top of the **Layers Panel** is an icon for the **Layers Menu** . This menu is also available by clicking on **Layer** on the **Menu Bar** at the top of the screen. The following functions are available in this menu:

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

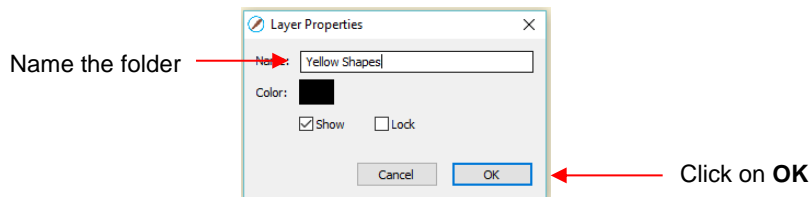


6.04.3 Creating Folders and Moving Layers

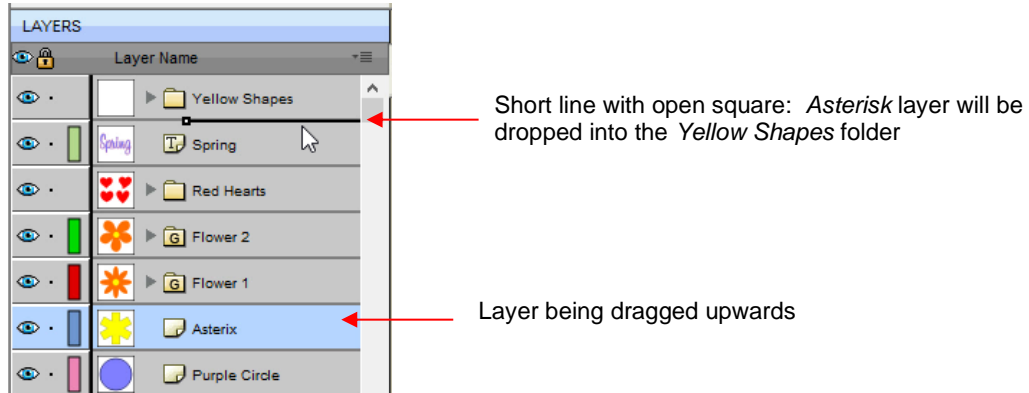
- As mentioned in *Section 6.04.1*, each new shape added to the **Cutting Mat** will initially be assigned to a new layer. This can quickly clutter the **Layers Panel**. The ability to combine shapes into folders and subfolders helps organize a project and make things easier for printing and/or cutting.
- There are three ways to create a new folder:
 - Click on the **Add layer folder** icon  at the bottom of the **Layers Panel**
 - Click on the **Layers Menu** icon  and select **Add Layer Folder**
 - Go to **Layer>Add Layer Folder**
- When a new folder is added, it will appear at the top and look like this:



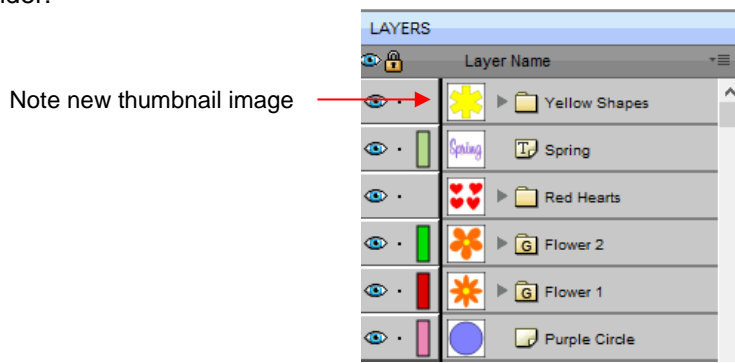
- Just as covered in the prior section, if you double-click on this new folder, you can rename it:



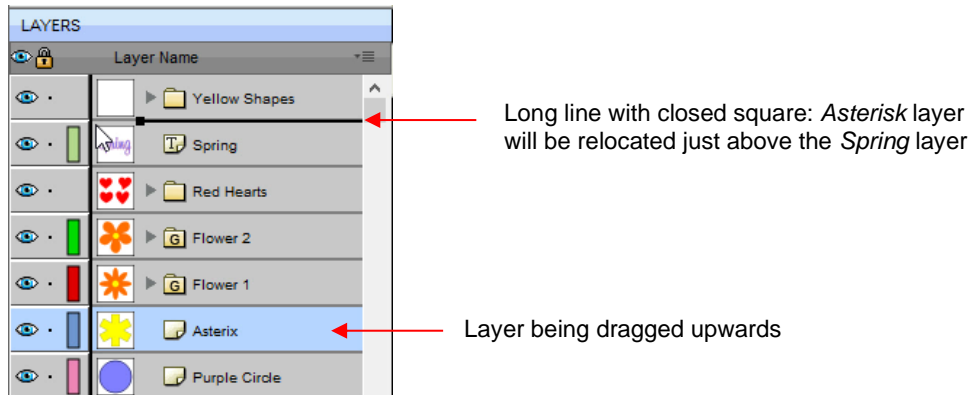
- In the prior section, it was also noted that layers can be re-ordered using the **Arrange** option in the **Layers Panel Options** menu. Alternatively, layers and folders can also be moved directly on the **Layers Panel** by dragging them up or down.
- There are two possible outcomes when dragging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



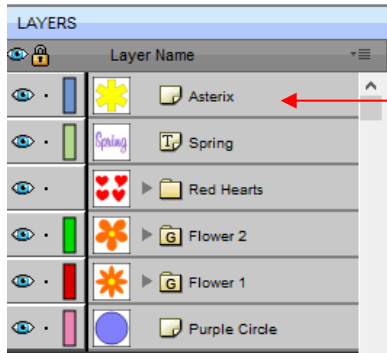
- ◇ Now the *Asterisk* layer is inside of the *Yellow Shapes* folder and can be seen in the thumbnail for that folder:



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



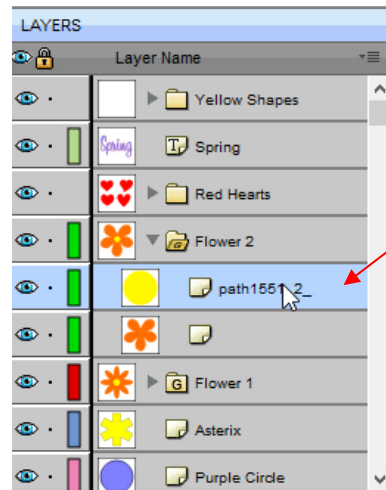
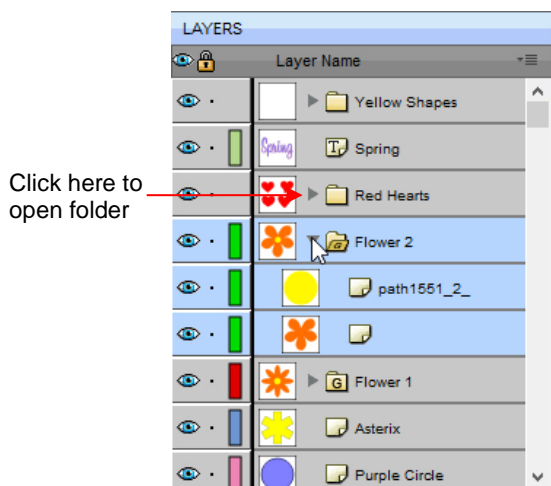
- ◇ **IMPORTANT:** Once you've created a new empty folder, like the *Yellow Shapes* folder, you cannot move that layer or other layers without the empty folder being deleted. So, in the case above, if the *Asterisk* layer had been simply relocated, the *Yellow Shapes* folder would then be gone:



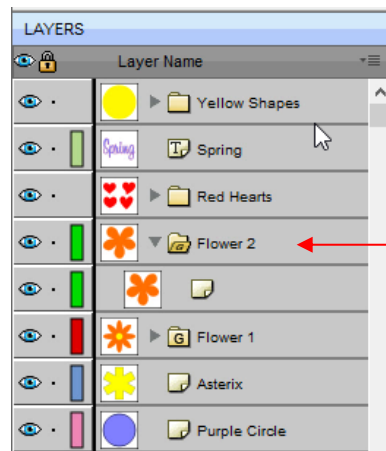
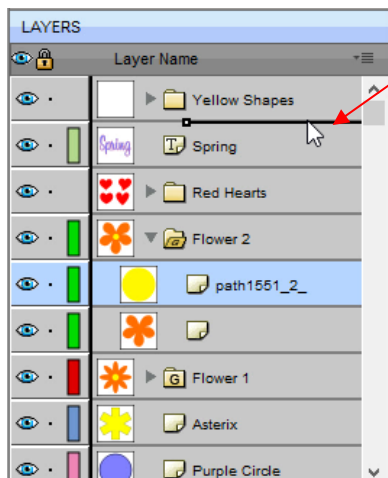
Asterisk layer is moved; Yellow Shapes folder is gone

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

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



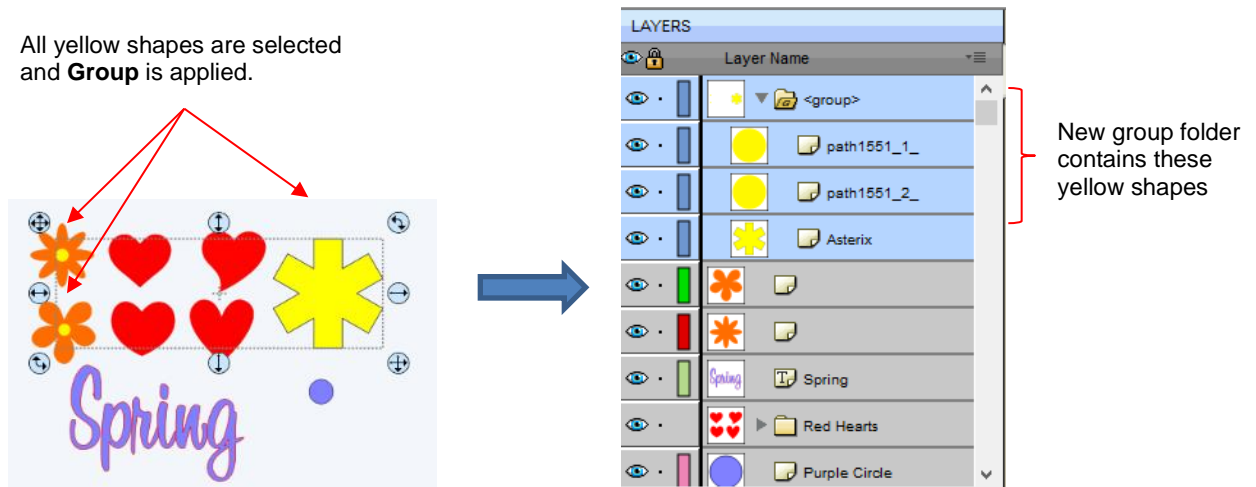
◇ Then drag the yellow layer up to the *Yellow Shapes*, again making sure only a short line is present. The yellow layer is then moved out of the *Flower 2* group:




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

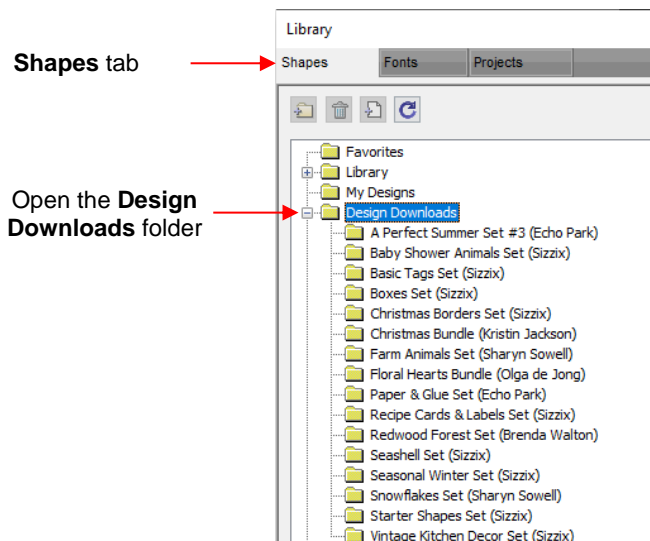
- Note: This was just one way to achieve this goal. Another way would have been to ungroup the *Flower 1* and *Flower 2* layers. Then to select all of the yellow shapes on the **Cutting Mat** and go to **Object>Group**.

A new group folder would be added to the **Layers Panel** with those shapes moved to it. Specific instructions on **Grouping** and **Ungrouping** are covered in *Section 7.11*.

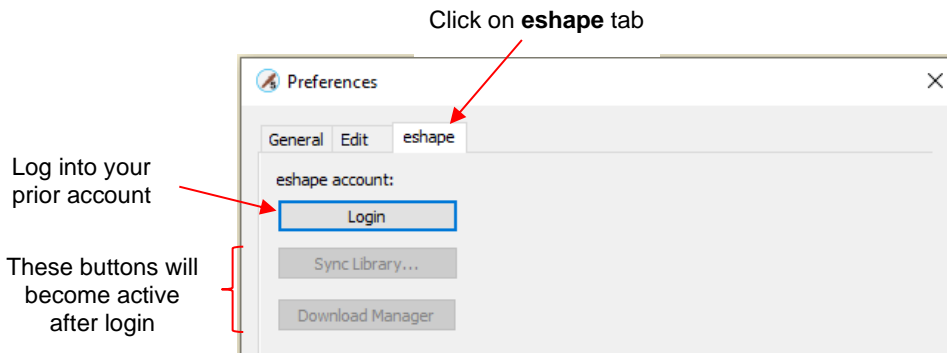


6.05 Cutter’s Market (formerly the eshape Store)

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




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



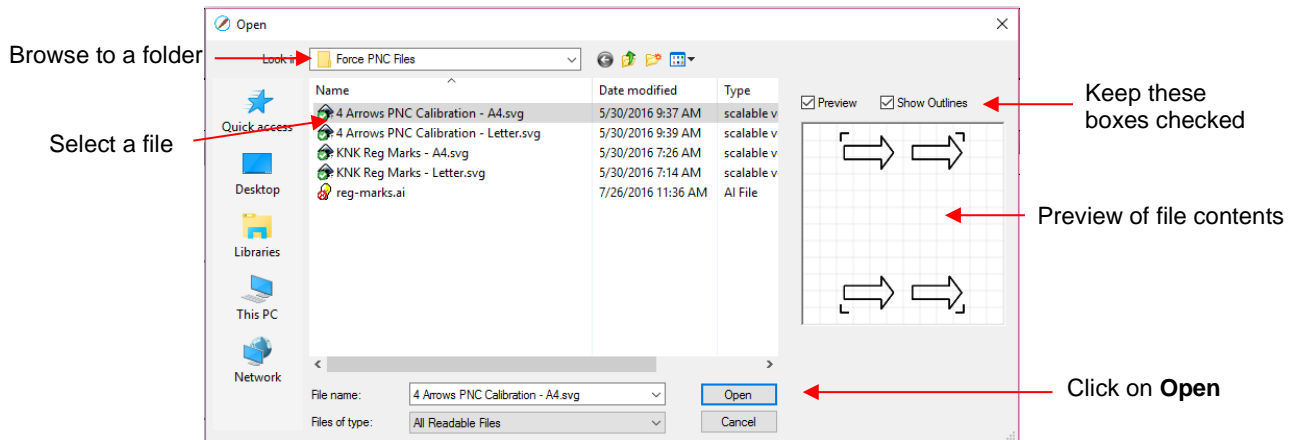
6.06 Importing Other File Formats

6.06.1 Importing Vector Files

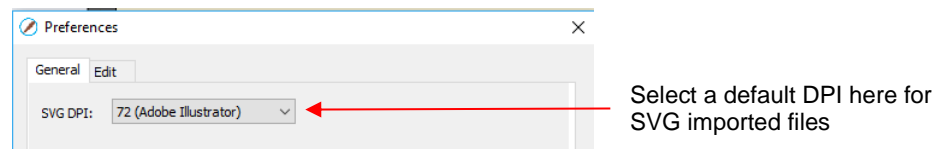
- The following vector formats can be imported into SCAL:
 - ◇ SVG: common export format for vector programs, thus popular format used for sharing files on blogs and selling files in online design sites
 - ◇ SCUT5: format used to save projects in SCAL5
 - ◇ SCAL: format used by **eshape Store**
 - ◇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

- There are two ways to open the import window:
 - ◇ Click on the **Import** icon on the upper **Toolbar** 
 - ◇ Go to **File>Import**

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



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



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

6.06.2 Importing Raster Files

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

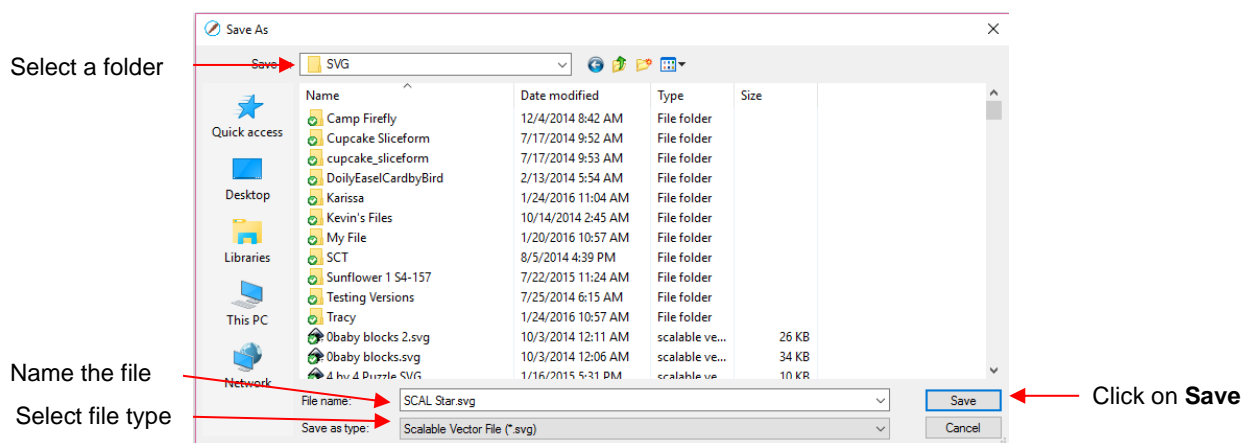
- ◇ **File>Import:** will import PNG files with a transparent background, simultaneously adding a vector cut line along the transparent border. This is very useful for PNC applications. This is the only raster format that will work using this method.
- ◇ **File>Place Image:** will import JPG, BMP, GIF, and PNG files for the purpose of printing or manually tracing in the event the auto-tracing function doesn't adequately perform due to the image quality. It's also another way to load an image for the **Trace Image** window. Refer to *Section 5.03*.
- ◇ **File>Trace Image** (or click the **Trace** icon on the **Toolbar**): will import and auto-trace JPG, BMP, GIF and PNG files. Various options and settings can be applied to obtain the desired results. Refer to *Section 5.03*.

6.06.3 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*.

6.07 Exporting in Other File Formats

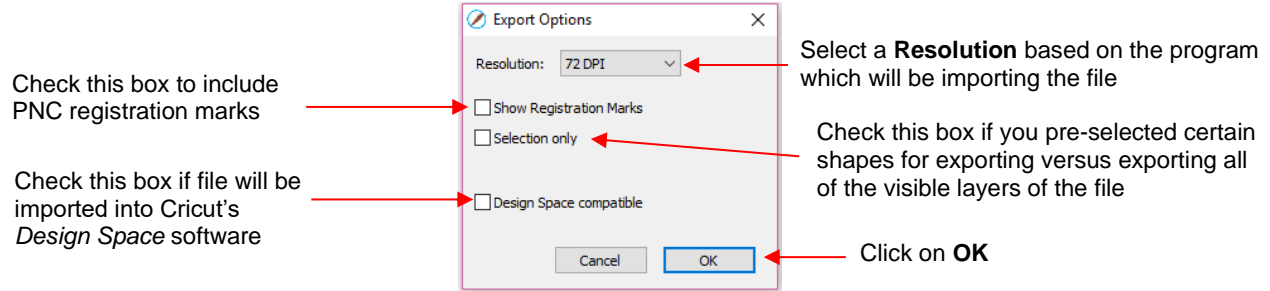
- Besides saving as a .SCUT5 file, you can also export in the following formats: SVG, JPG, BMP, PNG, PDF, TIFF, FCM, and PLT. Only SVG, FCM, PDF, and PLT are vector formats. The others are raster.
- If there are only certain shapes in the file that you want to export, you have two options:
 - ◇ Select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



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

6.07.1 Exporting in SVG Format

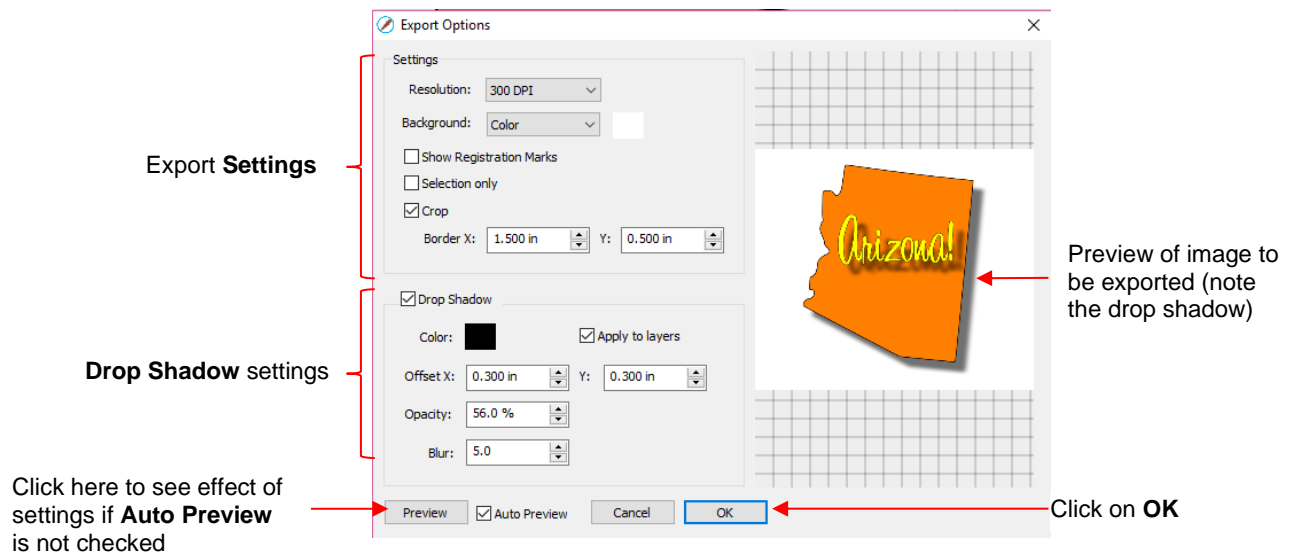
- The **SVG Export Options** are shown in the following screenshot:



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

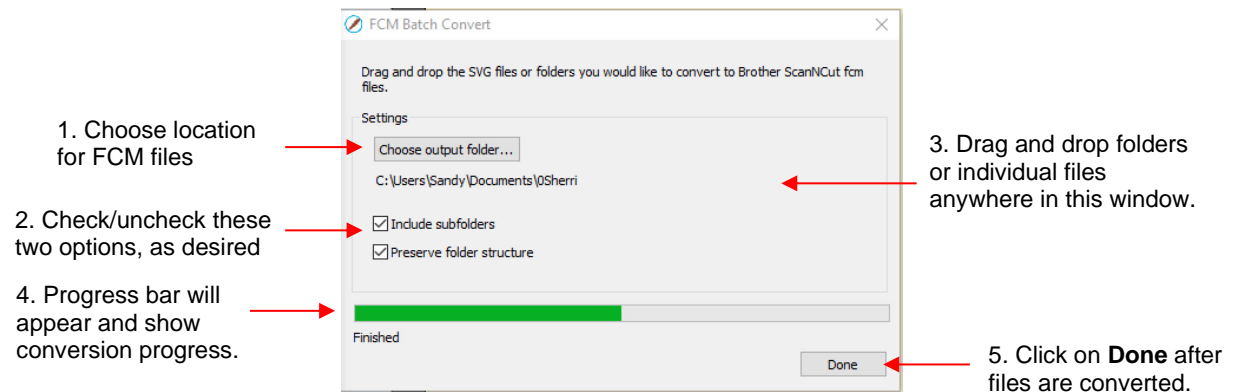
6.07.2 Exporting in JPG, PNG, BMP and TIFF Formats

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



6.07.3 Exporting in FCM Format

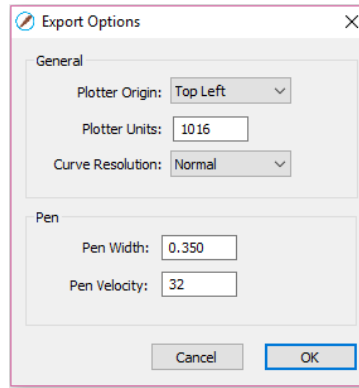
- The FCM format is used by the Brother ScanNCut models. To export a project, go to **File>Export** and, in the drop down menu, change from **SVG(*.svg)** to **ScanNCut (*.fcm)**. After clicking on **Save**, the FCM file will be located in the folder you chose in the **Save As** window.
- There is also 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:



6.07.4 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.




6.07.5 Exporting to SCAL2

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


7. 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.

7.01 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**, and **Spiral**. Some of these have customizing functions which will appear on the **Tool Options** bar and will be detailed in the following subsections.
- To access these various shapes, hold down the left mouse button on the **Rectangle** icon  on the **Tools Panel** and then select the desired shape from the popup menu.
- Once a different shape is selected, that shape’s icon will then replace the **Rectangle** icon on the **Tools Panel**.

7.01.1 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

7.01.2 Rounded Rectangle

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

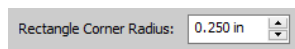


Freely dragging mouse



Holding **Shift** key

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



Radius: 0.10




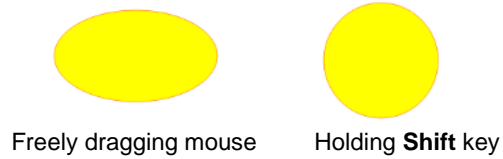
Radius: 0.25




Radius: 0.75

7.01.3 Circle and Oval

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



7.01.4 Triangle

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

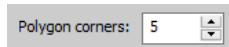


7.01.5 Polygon

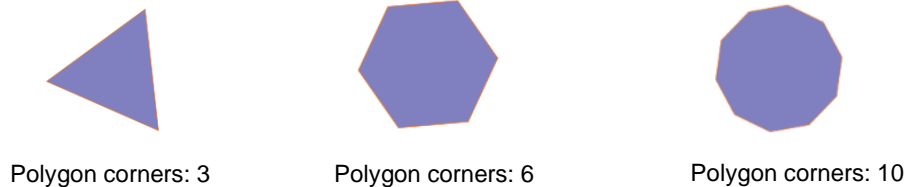
- After selecting the **Polygon** shape , drag the left mouse button to form a polygon:




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



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

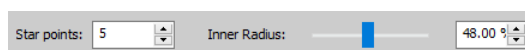


7.01.6 Star

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



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



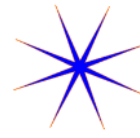
- ◇ The **Star points** setting can be used to change the number of points on the star. The **Inner radius** setting can be used to change the angle of the inner points:



5 Points
Radius: 38%




4 Points,
Radius: 47%



8 Points
Radius: 10%

7.01.7 Spiral

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



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



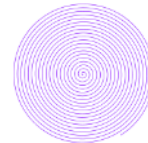
- ◇ **Turns:** Number of rotations around the center:



Turns: 3



Turns: 6



Turns: 20

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



Divergence: 1



Divergence: 3



Divergence: 0.5

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



Inner Radius: 0



Inner Radius: 0.2



Inner Radius: 0.5

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



Clockwise: checked

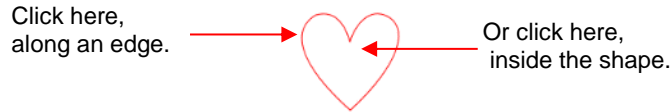


Clockwise: not checked

7.02 Selecting

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

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



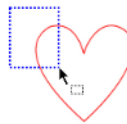
- ◇ Note that the cursor will change once the shape can be selected. For example, when selecting a line, wait for the cursor to change before clicking:



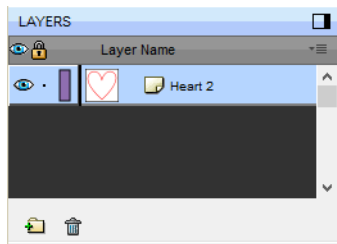
- ◇ Another way to select: drag the mouse to enclose the entire shape (aka marquee-select).



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



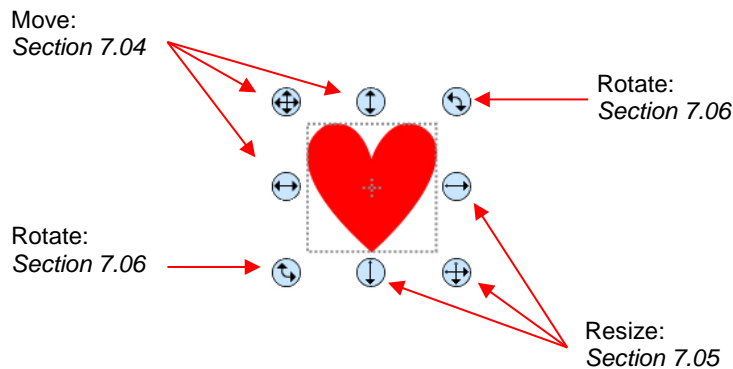
- ◇ A fourth way: click on the layer which contains this shape:



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

7.02.1 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:

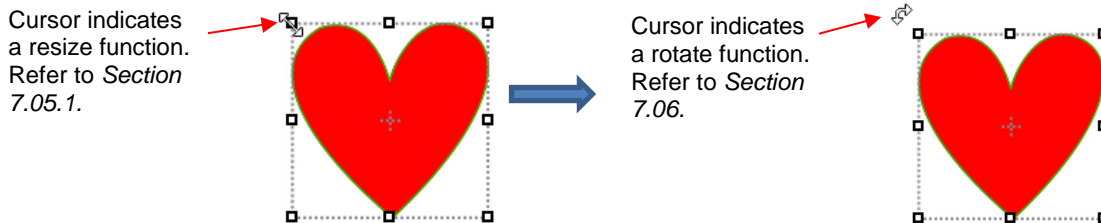


7.02.2 Advanced Selection Handles

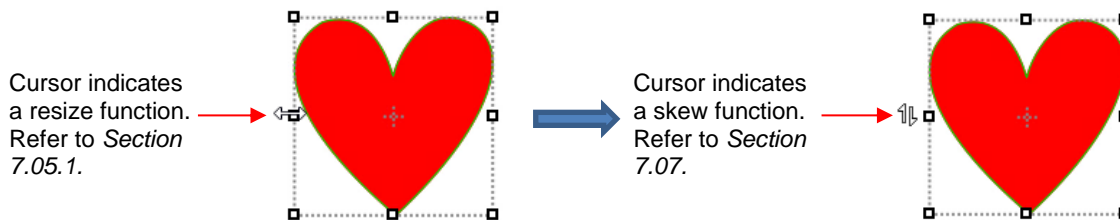
- While in the **Selection Tool** mode, the **Tool Options** bar indicates a setting called **Handles**. The drop-down menu offers another option called **Advanced**:




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

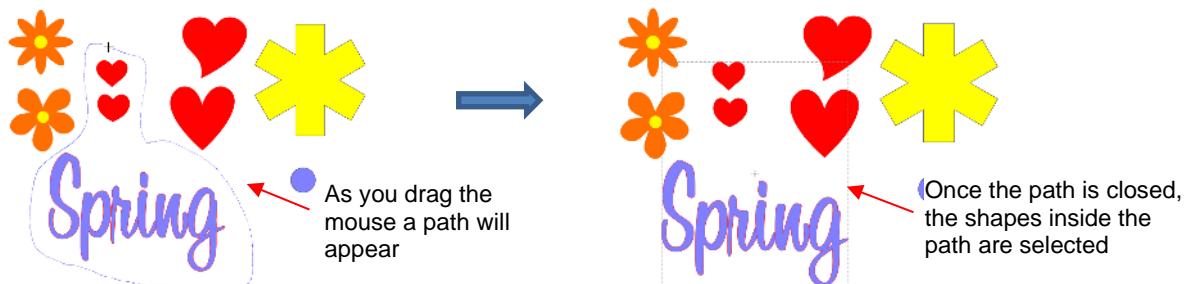


- All four corner handles offer the same resizing and rotating functions. The middle handles along the four sides offer resizing and skewing:



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

- ◇ Select the first shape and hold down the **Shift** key while clicking on additional shapes.
- ◇ Drag the mouse (marquee-select) to encompass the shapes. Always make sure you start clearly outside the boundaries of the images you want to select.
- ◇ If all of the shapes are on the same layer, click on the thumbnail for that layer or hold the **Shift** key while clicking on more than one layer. Refer to *Section 6.04*.
- ◇ Use the **Lasso Selection** tool on the **Tools Panel** . Freely drag the mouse around the shapes you want to include in the selection:




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

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


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

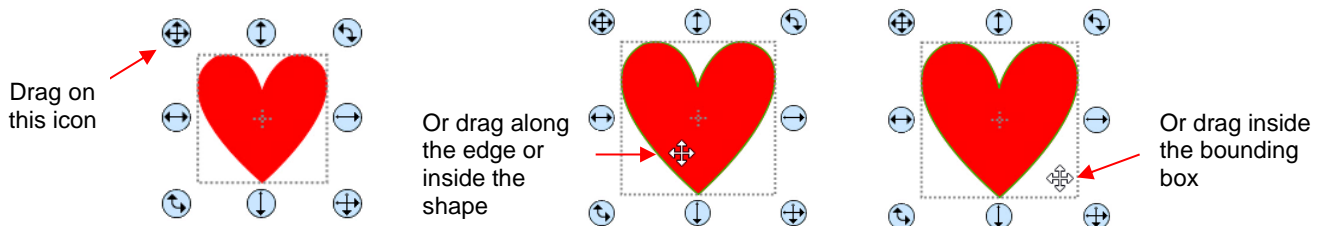
- ◇ “Click away” – click anywhere else on the screen and the shapes will be de-selected
- ◇ Press **Ctrl+Shift+A**
- ◇ Go to **Edit>Deselect All**

7.03 Deleting

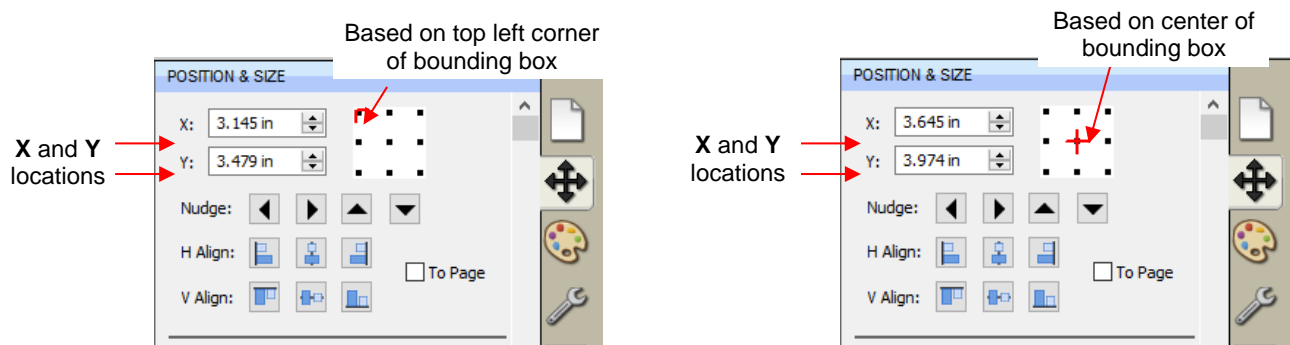
- To delete a selected shape, use any of the following options:
 - ◇ Press the **Delete** key on the keyboard
 - ◇ Right-click on the screen and choose **Delete** from the menu
 - ◇ If the shape is on its own layer, click on the **Delete Layer** icon: 
- To delete all of the shapes in the current project:
 - ◇ Use one of the methods from *Section 7.02* to select all shapes
 - ◇ Then delete using any of the prior options listed for deleting a selected shape
- You can also delete a layer of shapes at one time from the **Layers Panel**. Refer to *Section 6.04.2*.

7.04 Moving

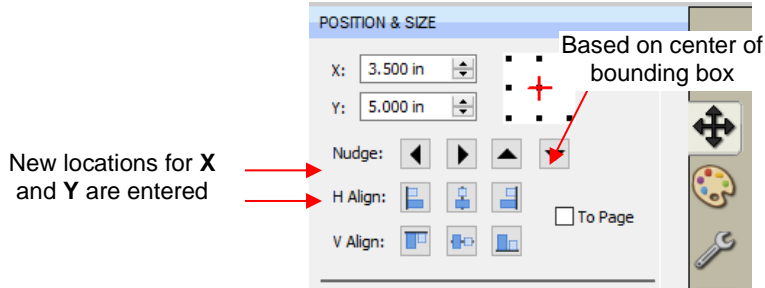
- To move a selected shape, hold down the left mouse button on the upper left corner icon or anywhere within the shape and drag to another location. Note that if you see this cursor , the shape can be moved:



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



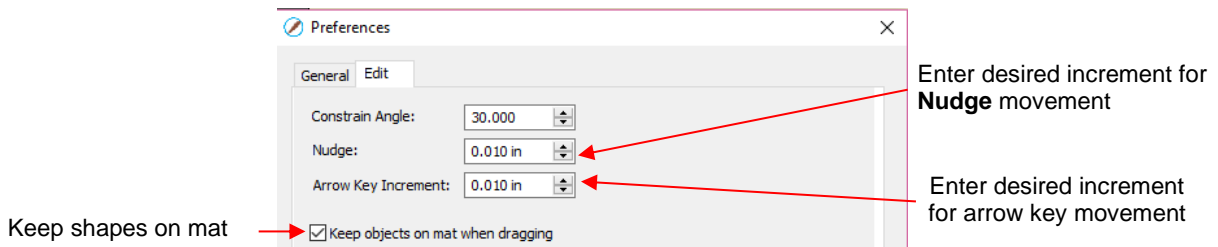
- You can enter new values into either or both of the **X**: and **Y**: windows to move the shape to a new location:



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



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



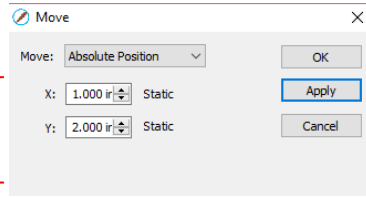
- There is also a **Move** function available which can be accessed these two ways:

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

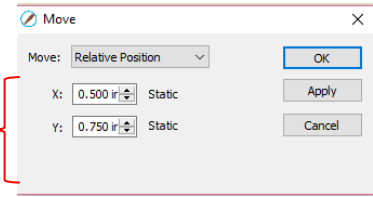
- This **Move** windows provides two moving options:

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

Absolution Position:
where to place the
shape on the mat

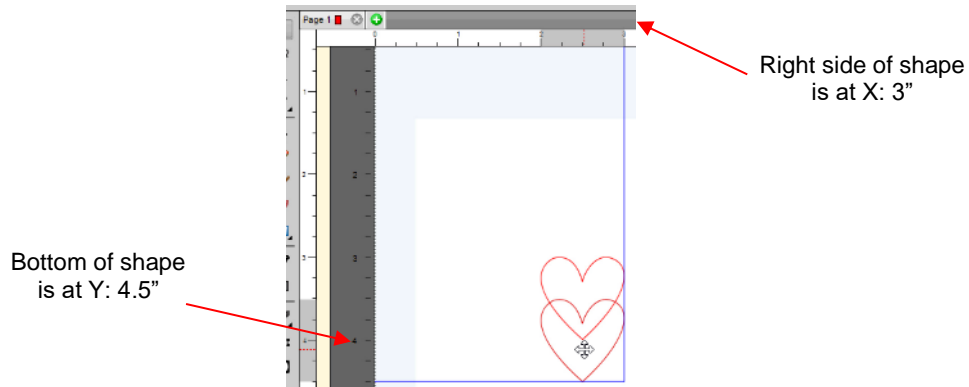


Relative Position:
how far to move the
shape in both an X
and Y direction



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

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

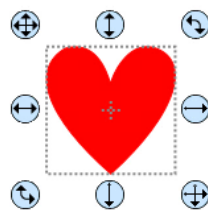


- Finally, you can add guidelines to the **Cutting Mat** at specific locations and then turn on **Snap To** in order to move shapes to snap to those guidelines. Refer to *Section 11.03*.

7.05 Resizing, Scaling, Auto fit

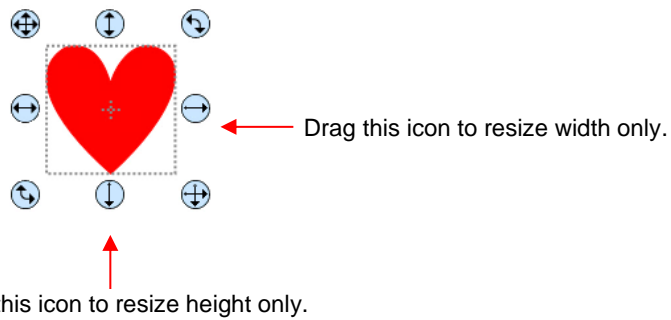
7.05.1 Resizing

- 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 in the same spot, hold the **Alt** key:

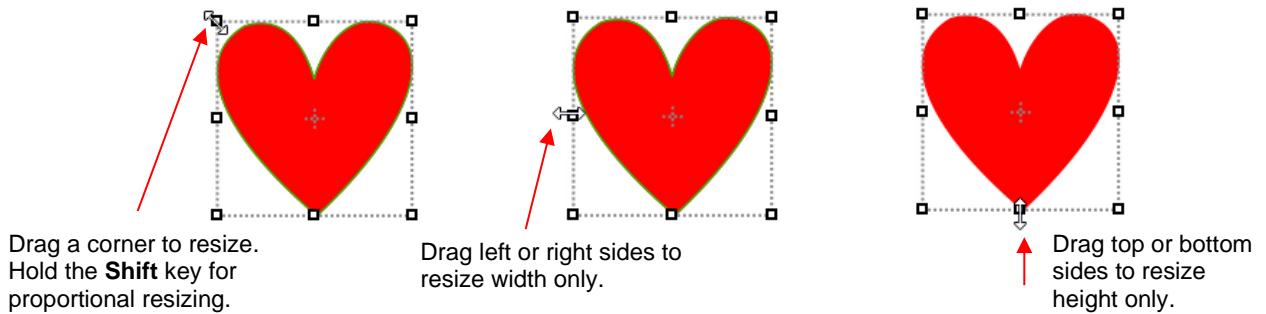


Drag this icon to resize.
Hold the **Shift** key for
proportional resizing.
Also holding the **Shift** key
keeps the shape centered.

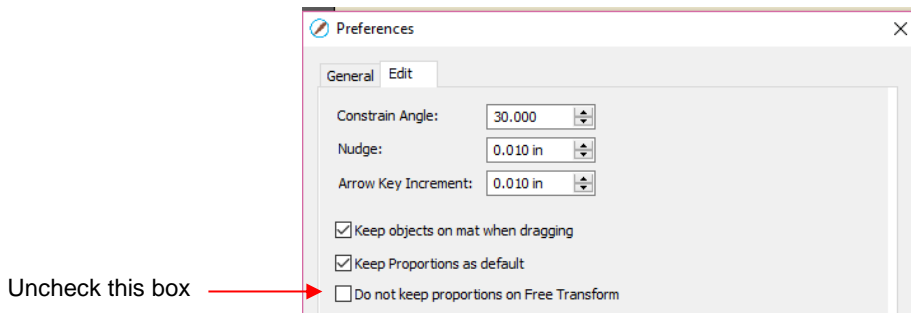
- To resize only the width or the height, drag the middle right or the middle bottom icons, respectively:



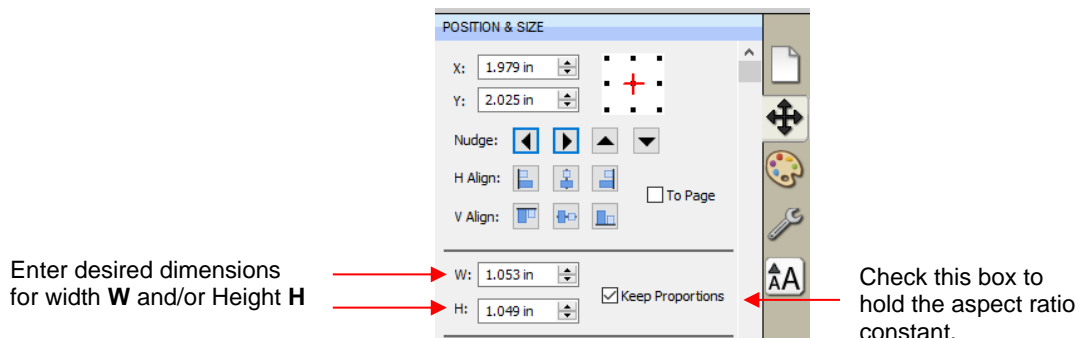
- If the **Handles** are in **Advance** mode, then drag a corner or a side when the cursor is directly over the handle. Again, holding the **Shift** key will resize height and width proportionately:



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

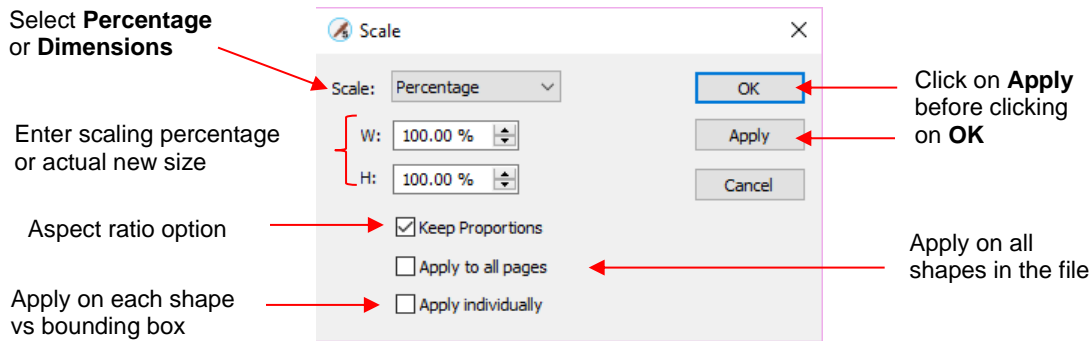


- **Important:** Unchecking this box does not then affect shapes created using the **Shapes** tool on the **Tools Panel**. You will need to hold the **Shift** key to maintain proportions when resizing by dragging the lower right corner.
- If you need to make the shape an exact size, then enter the dimension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



7.05.2 Scaling

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

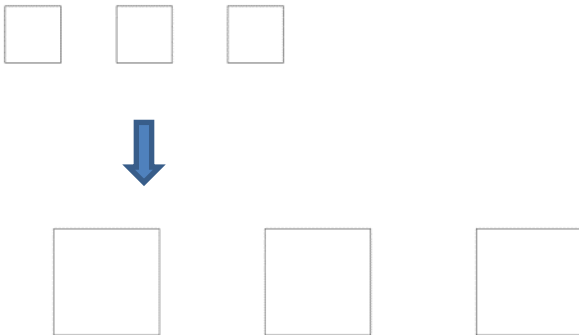


- ◇ **Scale:** Select **Dimensions** if you wish to specify the exact width and height for your selection or select **Percentage** if prefer to resize that way.
- ◇ **W:** and **H:** Enter the new dimensions or scaling percentage
- ◇ **Keep Proportions:** Leave the option checked if you want to enter into either **W** or **H** and have the other automatically calculated so that the aspect ratio remains the same.
- ◇ **Apply to all page:** Mark this option and the dimension change or percentage will be applied to every shape in the project that is showing and not locked.
- ◇ **Apply Individually:** Mark this option and the dimension change or percentage will be applied as if there were no bounding box around the shapes.

- For example, take three 1-inch squares that are 1 inch apart from one another. Select all three and apply a 200% scale.

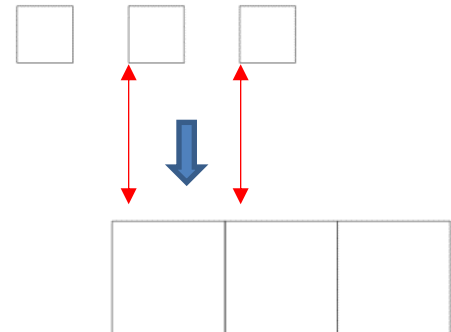
- Here are the results depending on whether or not **Apply Individually** is marked:

Apply Individually not checked:



The space between the shapes is also scaled 200%

Apply Individually checked:

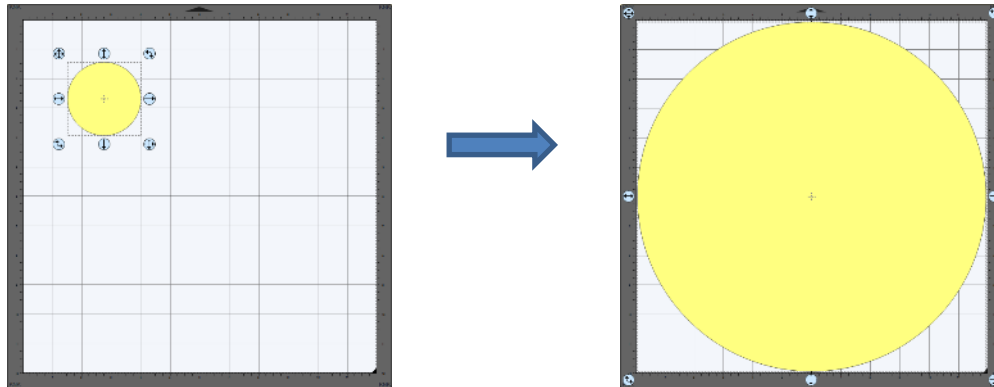


The shapes do not change locations

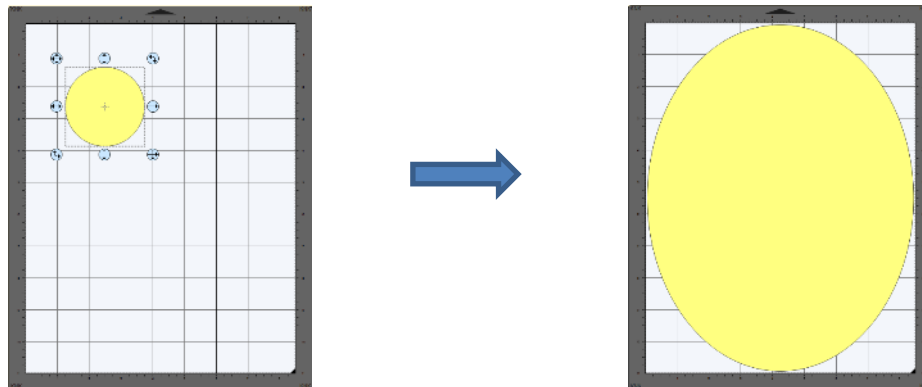
- When **Apply Individually** is not checked, the spacing between the shapes is also scaled and the squares end up 2 inches apart.
- When **Apply Individually** is checked, the spacing ends up filled by the expanding size of each square. Another way to look at it - the position of the shapes (the upper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

7.05.3 Auto Fit

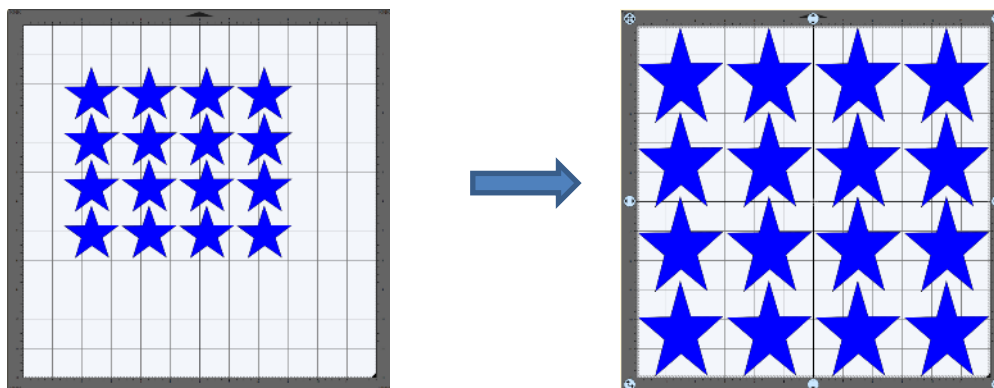
- The **Auto Fit** function will resize a shape or selection of shapes to fit the boundaries of the **Cutting Mat** with a slight (1/16") margin. It is accessed by going to **Object>Transform>Auto Fit**.
- Example: Select a circle on a 12" x 12" **Cutting Mat** and go to **Object>Transform>Auto Fit**:



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

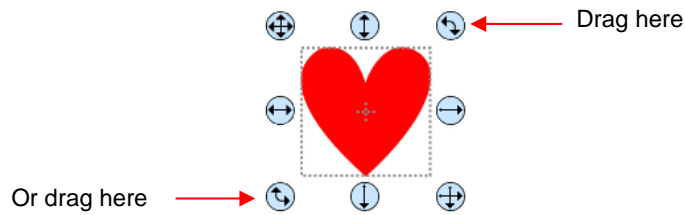


- A practical example might be something like this: You have one 12 x 12 sheet of cardstock and you want to cut out 16 stars for a party decoration and you want those stars as large as possible. Rather than having to "do the math", you can create a grid of stars (refer to *Section 7.17.4*) and then use the **Auto Fit** function to resize them for the cut:

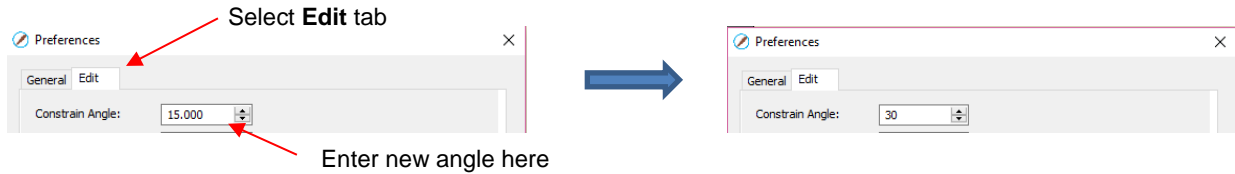


7.06 Rotating

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



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

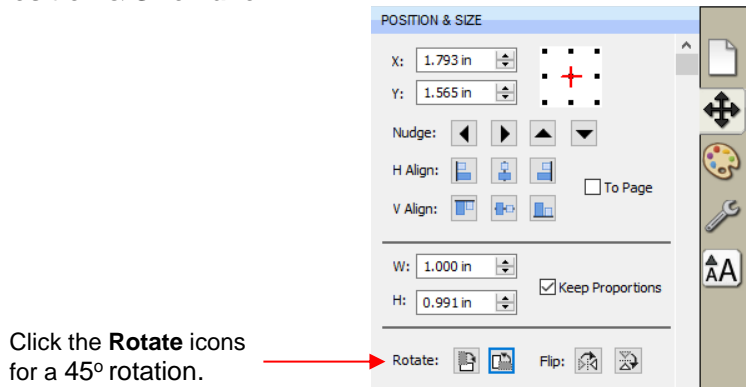


- ◇ The **Status Bar** at the bottom of the screen will indicate the current degree of rotation:



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

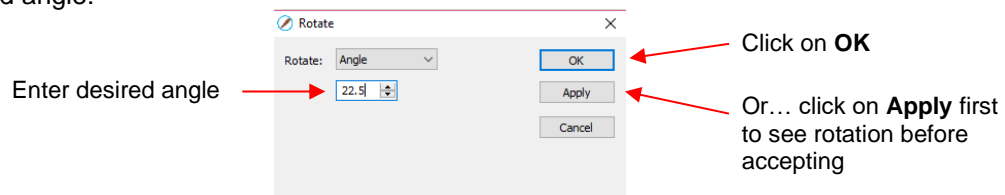
- A selected shape can be rotated exactly 45° clockwise or counter-clockwise, by clicking the **Rotate** icons on the **Position & Size Panel**:



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

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

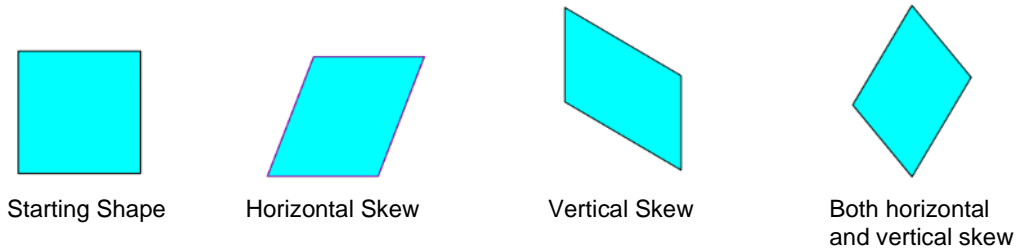
- Enter the desired angle:



7.07 Skewing and Distorting

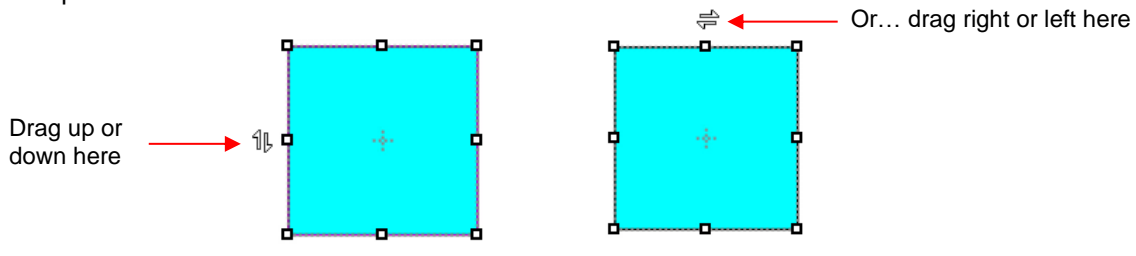
7.07.1 Skewing

- Shapes can be skewed either horizontally or vertically:

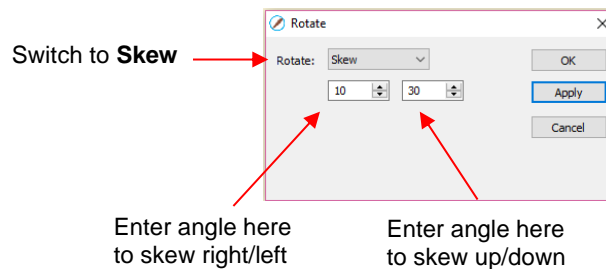


- There are two ways to skew a shape:


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

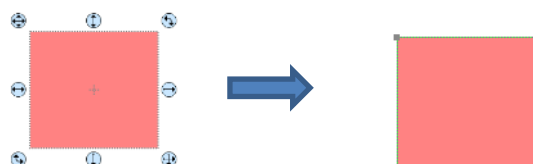


- ◇ With the shape selected, open the **Rotate** window by using one of these two methods:
 - Right-click and select **Transform>Rotate**
 - Go to **Object>Transform>Rotate**
- ◇ Then switch from **Angle** to **Skew** and enter a skew angle:

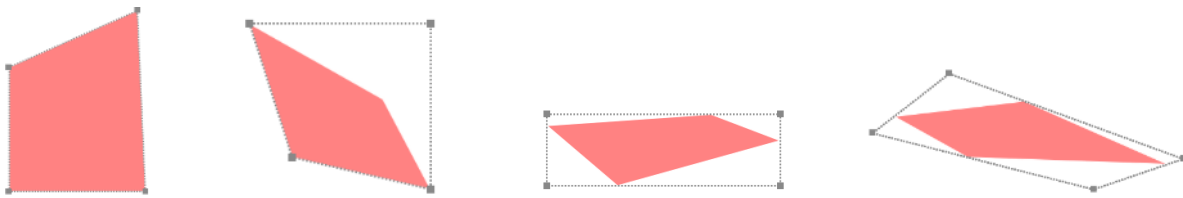


7.07.2 Distorting

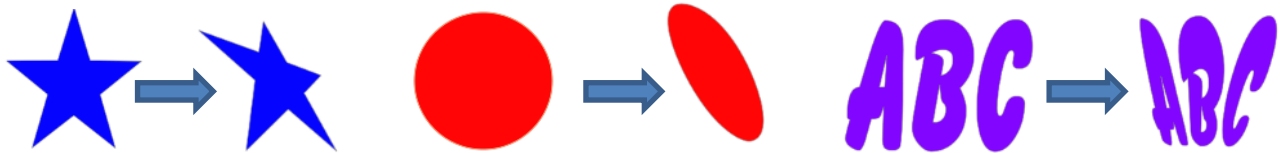
- The **Distort** tool is the 5th icon  from the bottom on the **Tools Panel**. Select a shape and then click on the icon. The four corners of the bounding box will display small boxes:



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

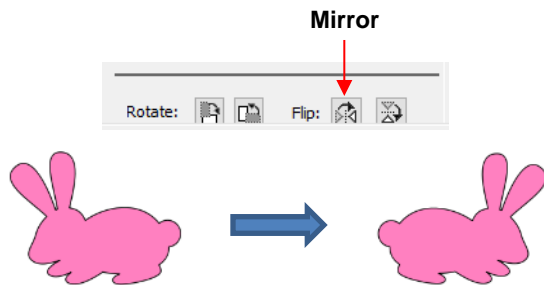


- Of course, the shape doesn't have to be rectangular. The **Distort** tool can be applied to anything:

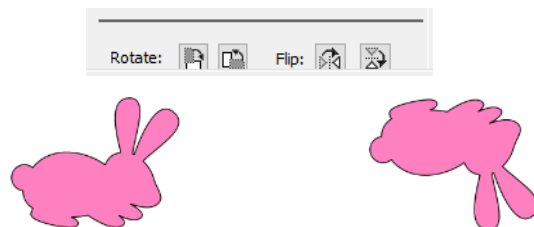


7.08 Mirroring and Flipping

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








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








7.09 Locking and Unlocking

- Locking a shape is normally done to prevent accidental selection and movement of that shape.
- To lock a selected shape, use any of the following options:
 - ◇ Right-click and select **Lock** from the menu

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

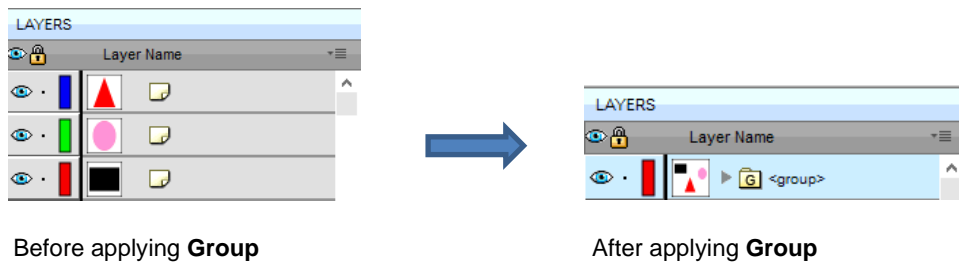
7.10 Hiding and Showing

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

7.11 Grouping and Ungrouping

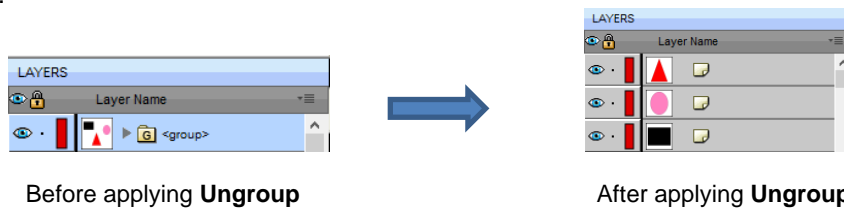
7.11.1 Group

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

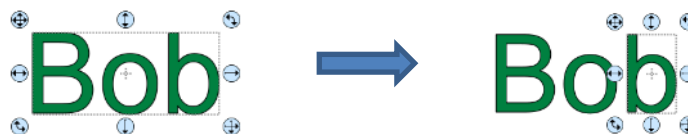


7.11.2 Ungroup

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



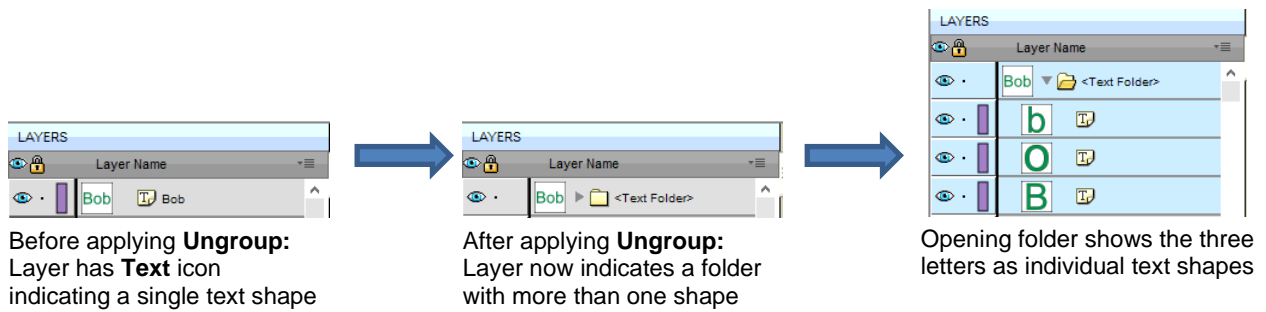
- Another example shows what happens when you ungroup a word. The individual letters of the word can now be selected:



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

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

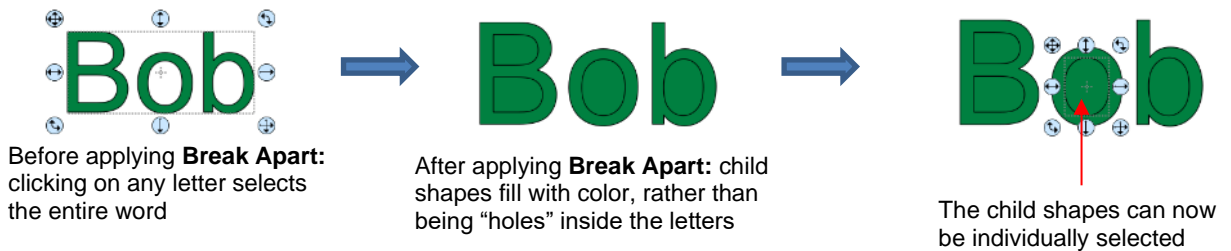
- ◇ On the **Layers Panel**:



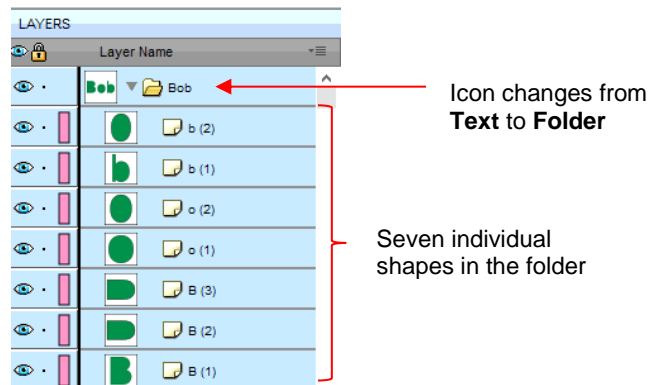
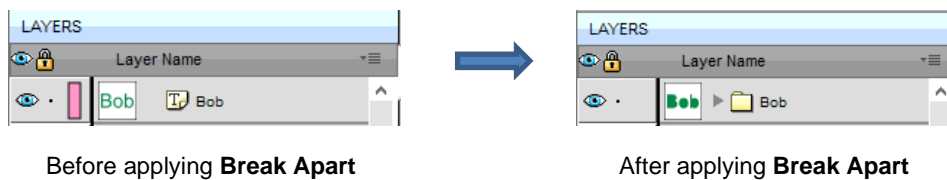
7.12 Breaking and Merging

7.12.1 Break Apart

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



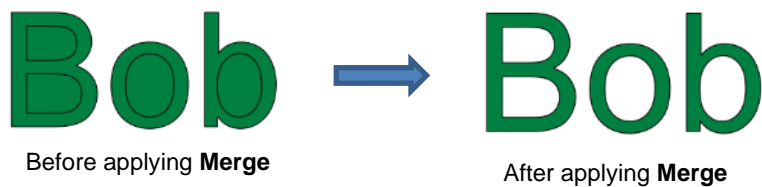
- ◇ On the **Layers Panel**:



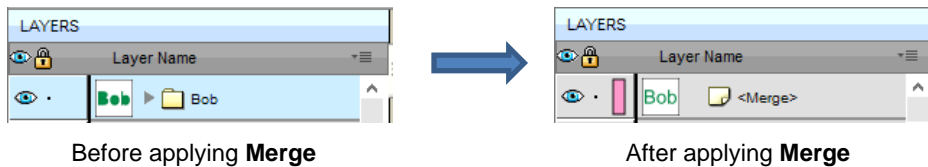
- Once you apply **Break Apart**, you have complete editing control over each individual shape within a design. But be careful! It's also easy to inadvertently move an individual shape (especially the tiny ones) and you can risk messing up the design. Thus, only use **Break Apart** when needed and then,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

7.12.2 Merge

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



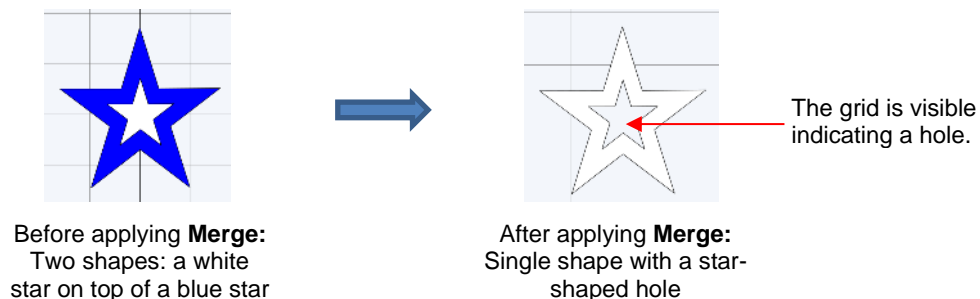
On the **Layers Panel**, this is what will appear:



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

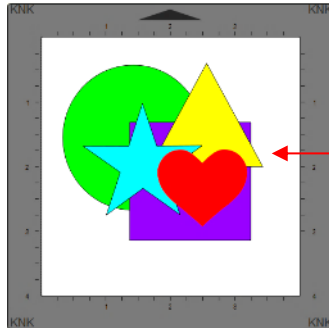


- ◇ A child shape that is merged with a parent shape essentially becomes a hole in that shape. This can be proven by having the grid showing when merging:

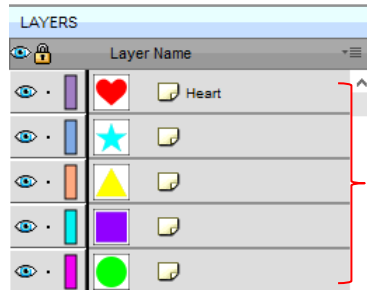


7.13 Arranging (Ordering) Shapes


- 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**:

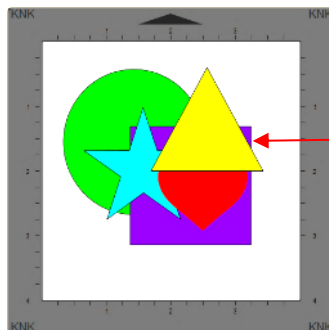


From top to bottom:
 red heart
 blue star
 yellow triangle
 purple square
 green circle



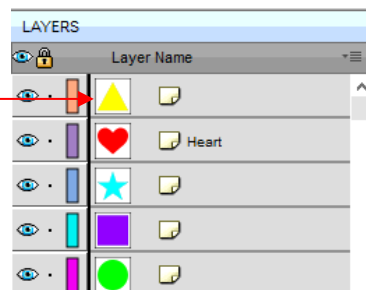
The order of the 5 shapes on the **Layers Panel** matches the overlap on the **Cutting Mat**

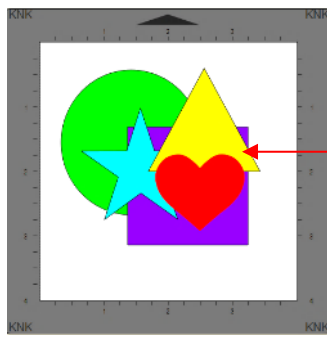
- In *Section 6.04.3*, moving layers was presented and could be used here to change the order of the shapes. However, another way to reorder these shapes is to select one and then access the **Arrange** functions using one of the following:
 - Go to **Object>Arrange**
 - Right-click and select **Arrange** from the popup menu
 - Click on the **Layers Menu** icon  and select **Arrange**
- Four options will then appear:
 - Bring to Front** (or **Layer to Top**): Move selection to the very top
 - Bring Forward** (or **Raise Layer**): Move selection up one level
 - Send Backward** (or **Lower Layer**): Move selection down one level
 - Send to Back** (or **Layer to Bottom**): Move selection to the very bottom
- In the above example, the yellow triangle is selected and each option shows what would have changed if it had been applied:



Bring to Front

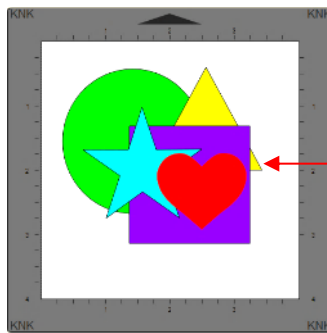
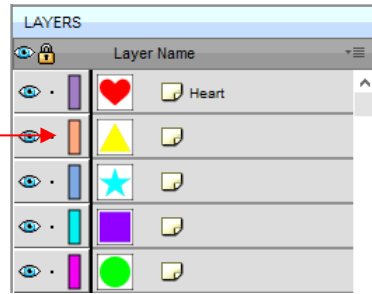
Triangle moves to the top





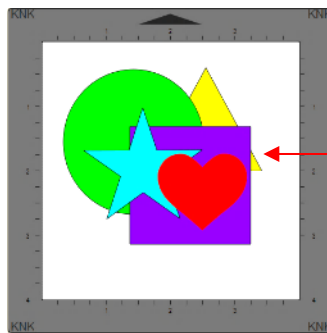
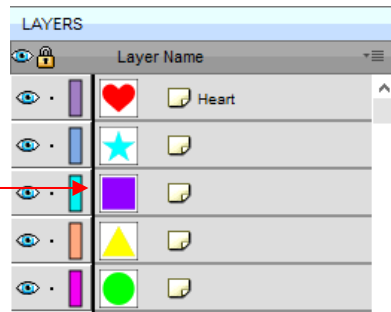
Bring Forward

Triangle moves above blue star but is still below red heart



Send Backward

Triangle moves below purple square but is still above green circle



Send to Back

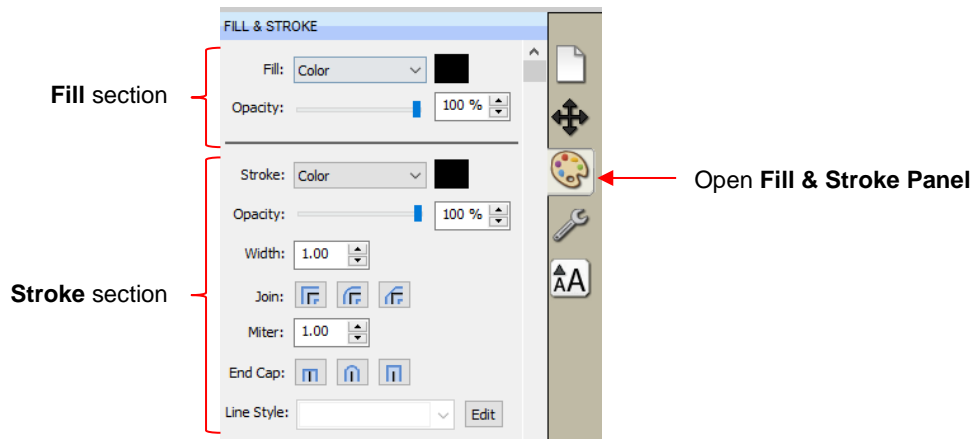
Triangle moves to the bottom



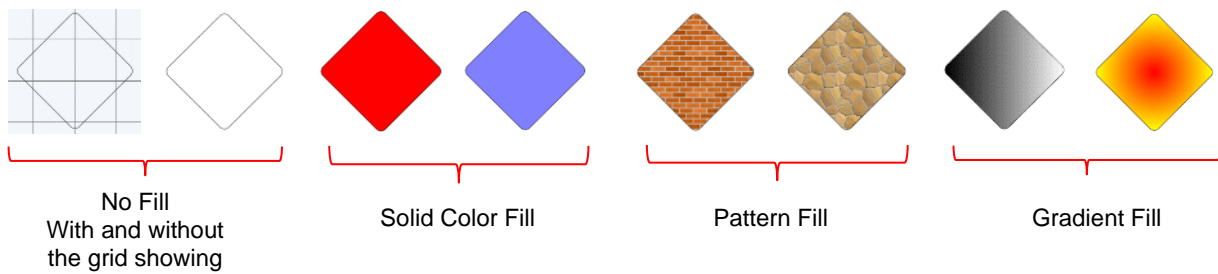
- It is worth noting that if any of the other layers had been locked or hidden, the movement of the triangle would have been the same. In other words, if the red heart had been hidden and/or locked, the triangle would still have ended up above it using **Bring to Front**.
- There are also shortcut keys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

7.14 Fill & Stroke: Fill

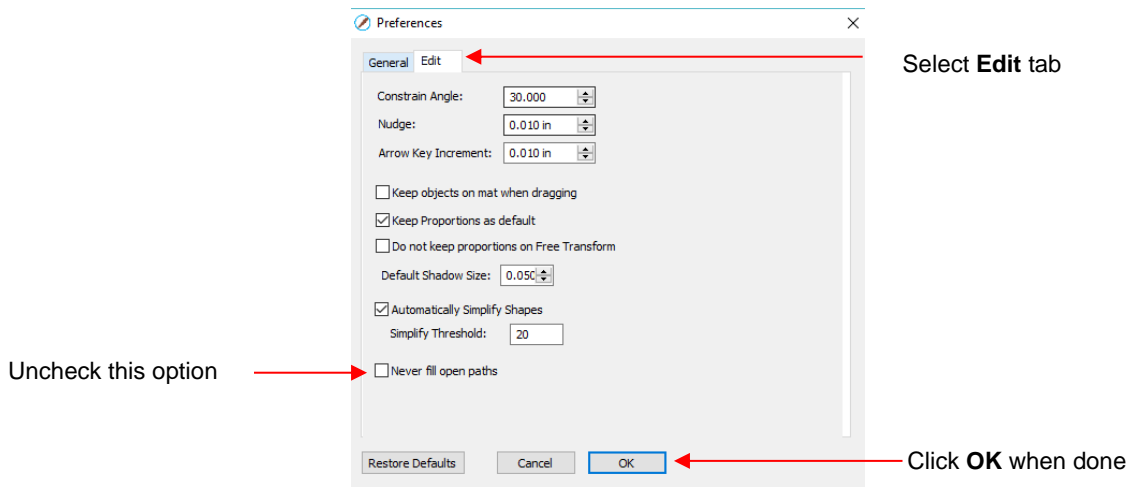
- The **Fill & Stroke Panel** provides options for changing how a shape or open path appears on the screen and, in the case of **Line Style** (solid versus dashed), how it cuts. This can be helpful in designing a project and also in print and cut applications.
- To open this panel, click on the **Fill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



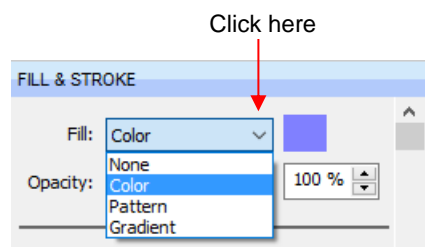
- Shapes can be filled with nothing, a solid color, a pattern or a gradient:



- 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**.

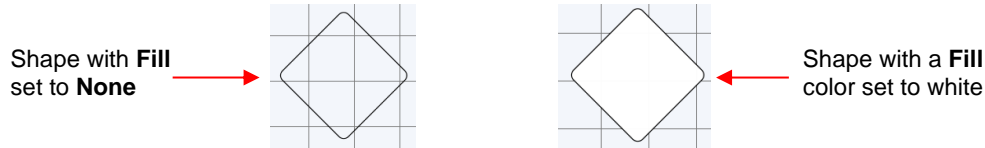


- To select a type of **Fill**, click on the drop-down menu and select from the four options:



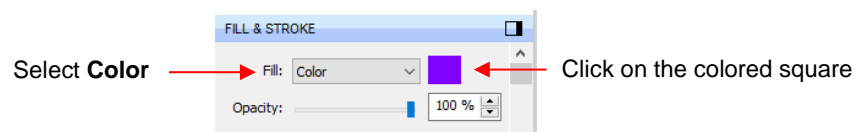
7.14.1 No Fill

- 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:

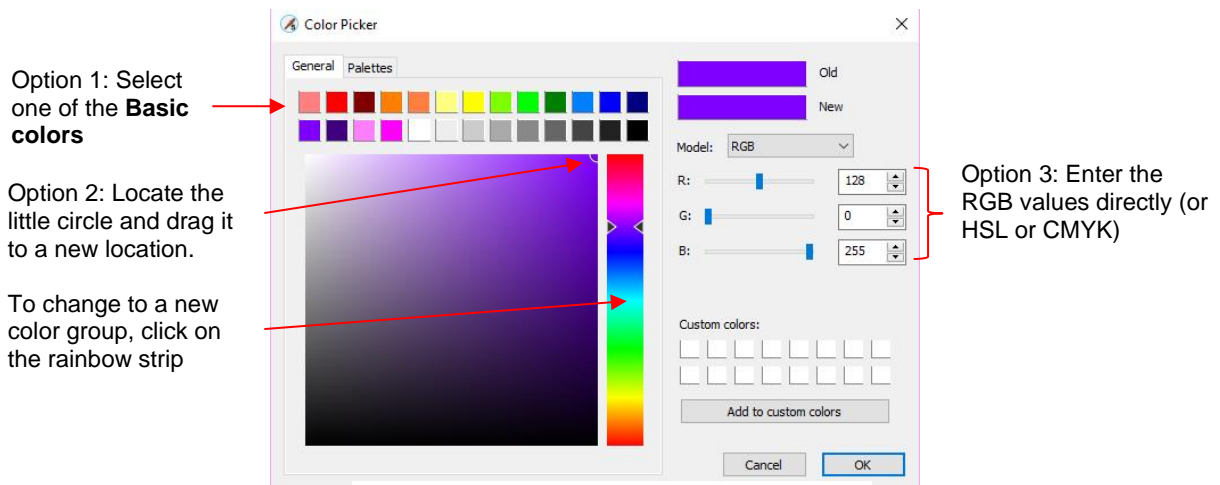


7.14.2 Color Fill

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

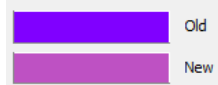


- The following **Color Picker** window opens where you have the option to select a basic color or create a custom color:



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

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



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

Drag this circle

New color based on current settings

Click on **Add to Custom Colors** and **New** color appears here

Click **OK** when done

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

7.14.3 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:

These will activate if **My Patterns** is selected below

Pattern folders

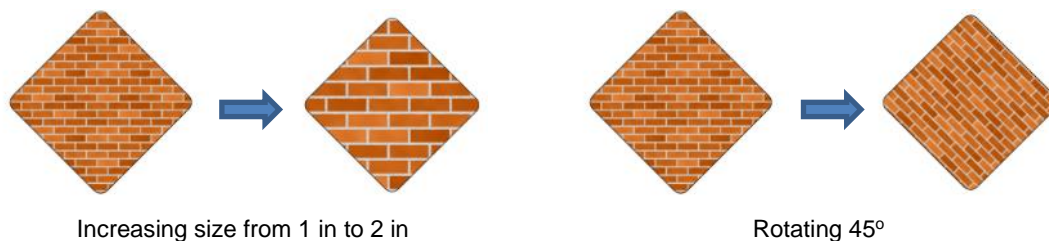
With the **Patterns** folder selected, these seven default patterns appear.

Current selected pattern

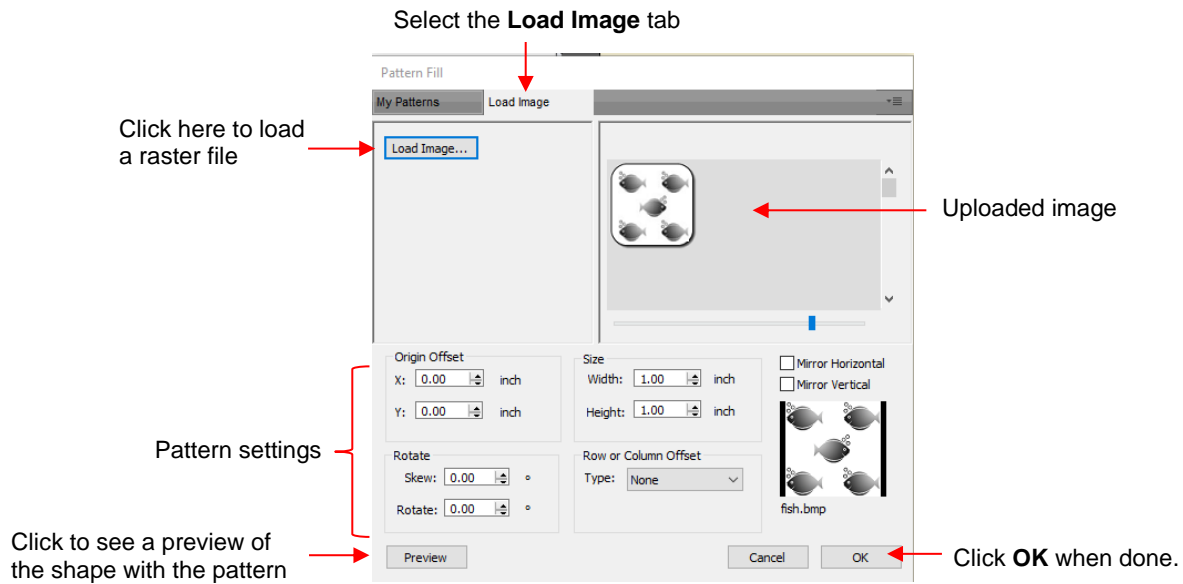
Click to see a preview of the shape with the pattern

Click **OK** when done

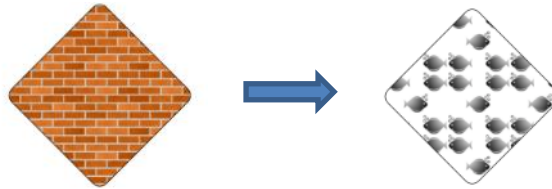
- Many of the functions in the **Pattern Fill** window are identical to those under the **Shapes** tab in the **Library**. Refer to *Section 6.03.1* for directions on searching, adding new folders, adding new files, adding to **Favorites**, etc.
- When adding your own patterns under **My Patterns**, select common raster file formats (e.g. BMP, PNG, JPG).
- The pattern settings can be used to modify how the pattern appears in the filled shape, for example:



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



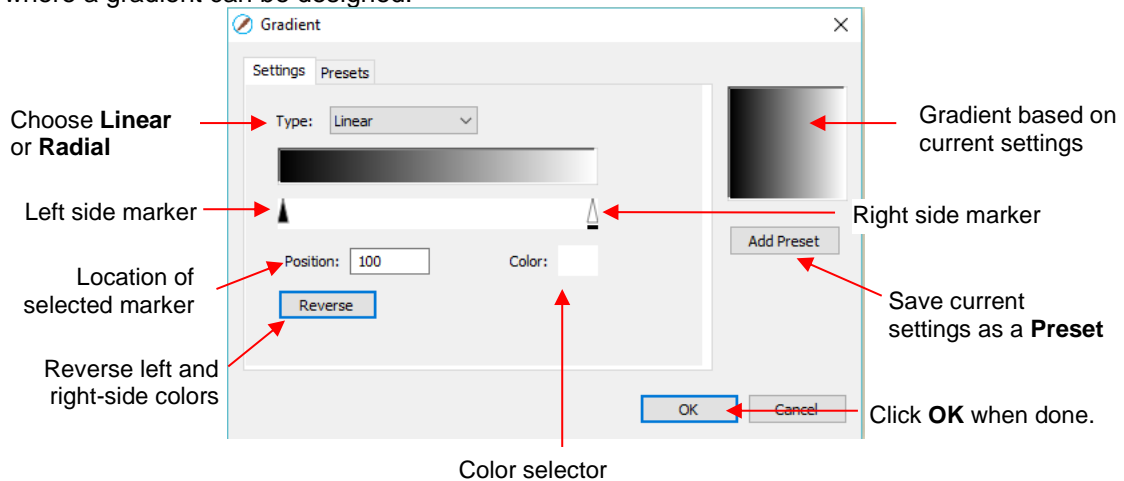
- The selected shape now fills with the uploaded image:



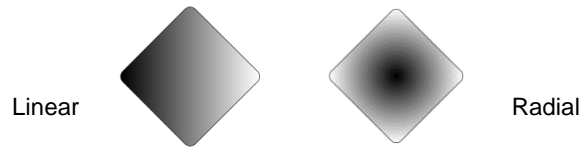
- If you need to fill a shape with a raster image, such as a photo, using the **Clip Path** and **Clip Mask** functions are easier alternatives. Refer to *Section 11.07*.

7.14.4 Gradient Fill

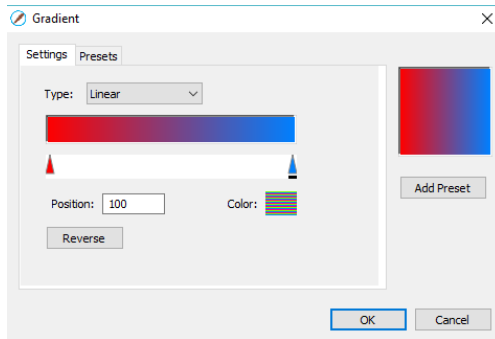
- From the **Fill** menu, select **Gradient** and then click on the color box to the right to open the following window where a gradient can be designed:



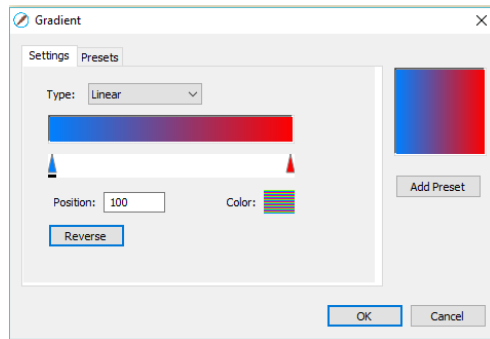
- Type:** Choose **Linear** for a left-to-right gradient. Choose **Radial** for a center outwards gradient:



- ◇ To change colors, click on one of the markers, then click on the color selector box and choose a color from the **Color Picker** window. Repeat for the other marker. As with other color selections, you can choose a base color or create a custom color. Refer to *Section 7.14.2* for details on using the **Color Picker** window.
- ◇ After selecting new colors, the thumbnail image will update. Note that clicking on **Reverse** will switch the two chosen colors:

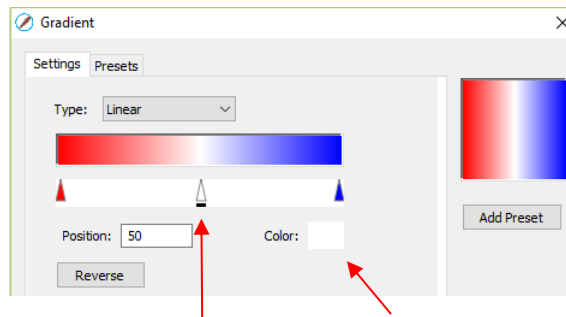


After selecting new colors



After applying **Reverse**

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



Shape with a **Fill** color set to white

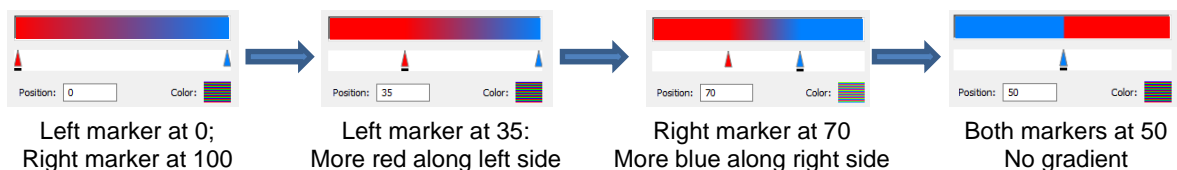
Click once to add a marker

Then click here to select color

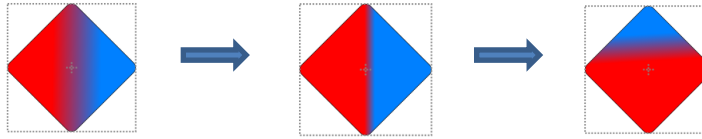
- ◇ If you inadvertently add a marker or decide you don't want one or more of the new ones, drag the marker downward and it will be removed.
- ◇ **Position:** The **Position** value is a location from 0 to 100 and applies to whichever marker is selected.

Note the little black line under a selected marker

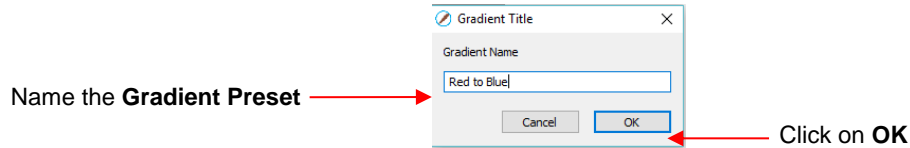
- ◇ Changing the **Position** moves the marker and resets where the gradient begins on that side. You can also manually slide the markers to change the **Position**, as well. Returning to the two-color example:



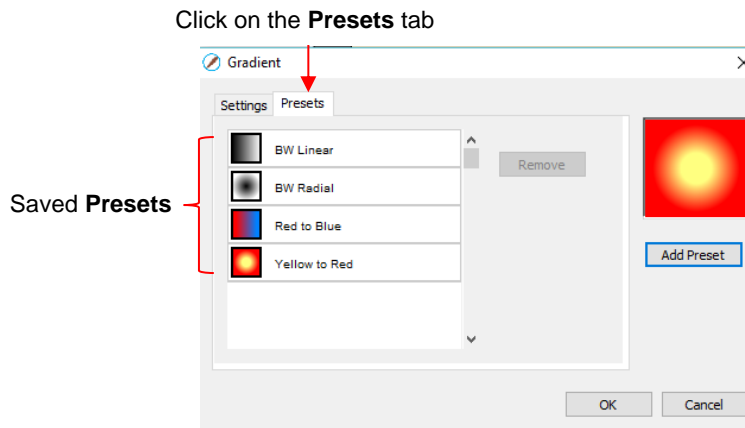
- ◇ The **Position** can also be changed after the shape is filled and the **Gradient** window is closed. On the **Tools Panel** is a **Gradient** tool. After selecting the shape, click on the **Gradient** icon and then drag the mouse across the shape to change the **Positions** and even rotate the gradient:



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

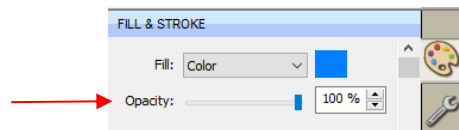


- ◇ To access your saved **Gradient Presets**, click on the **Presets** tab and the menu will appear:



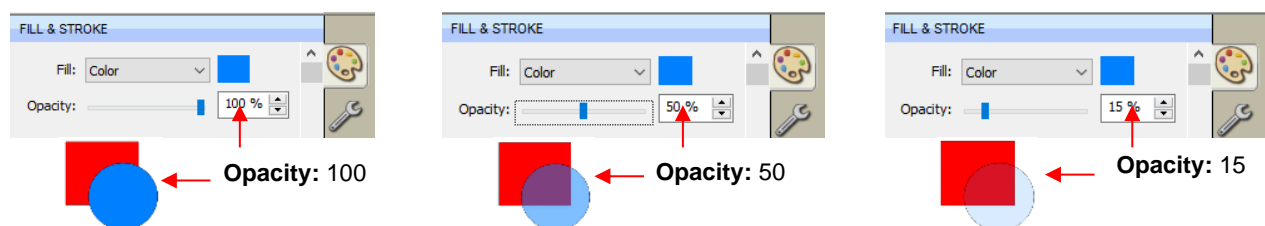
7.14.5 Opacity

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



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

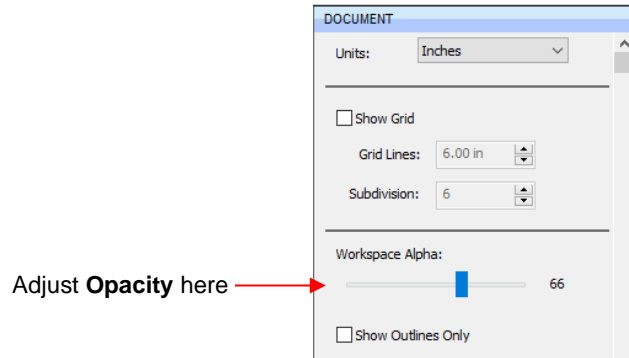
- ◇ In the following example, the **Opacity** is decreased on the blue circle, allowing the blocked portion of the red square to be seen:



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



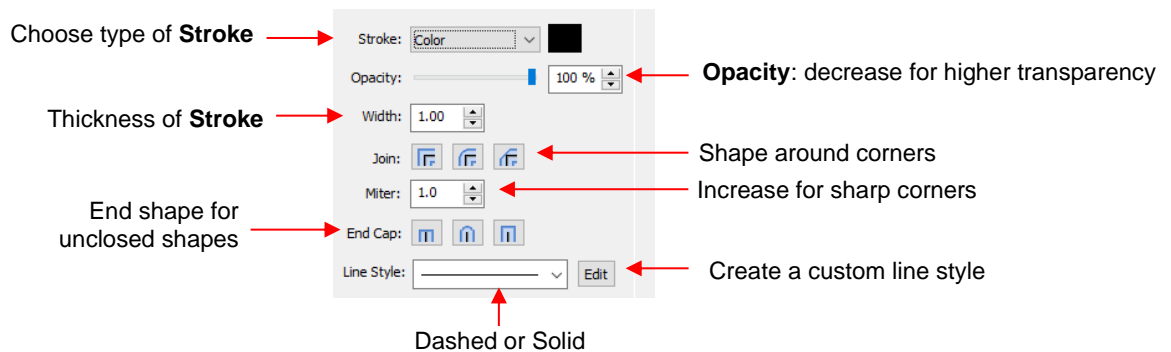
- ◇ If you want to decrease the **Opacity** for all shapes, the **Workspace Alpha** setting on the **Documents Panel** can be reduced from 100% to the desired level:



7.15 Fill & Stroke: Stroke

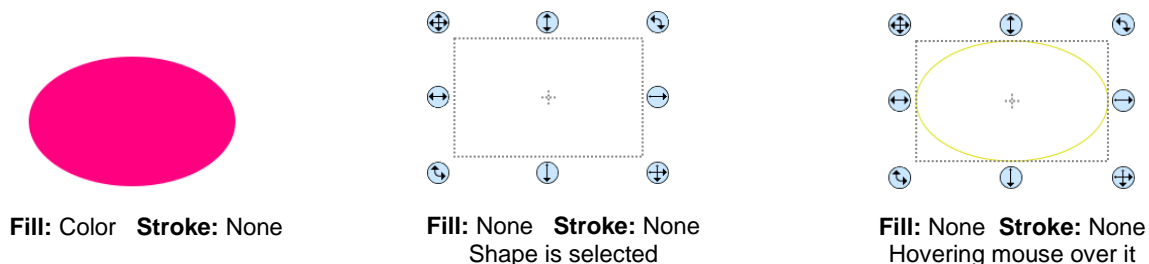
7.15.1 Stroke Settings

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

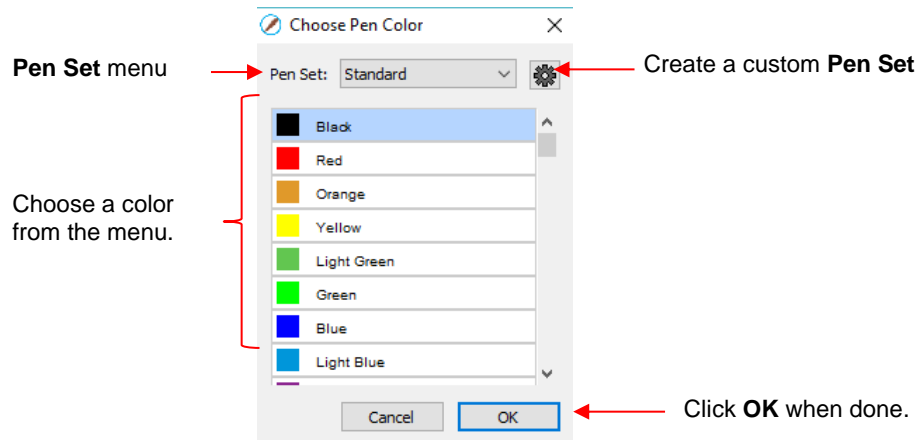


- **Stroke:** All shapes have a **Stroke** assignment using one of the following choices:

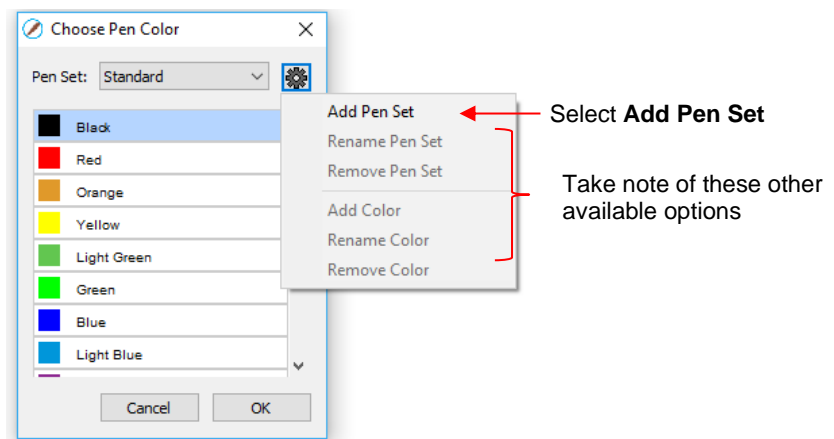
- ◇ **None:** The shape will not have an outline. Note that if you also choose **None** for the **Fill**, then you will not be able to see the shape at all unless you hover the mouse over it:



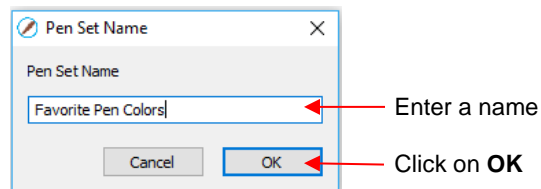
- ◇ **Color:** Once **Color** is selected, click on the box to the right and the **Color** window will open. This is the same window that opened when **Color** was selected under **Fill**. As with other color selections, you can choose a base color or create a custom color.
- ◇ **Pen Color:** Choose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



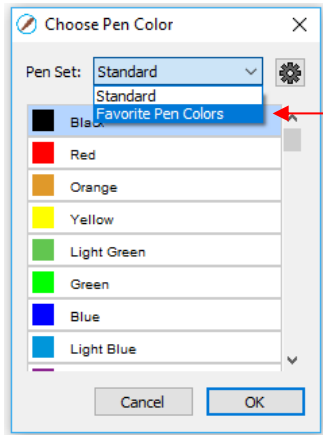
- Select the desired color from the menu and click **OK**. You also have the option to create your own custom **Pen Set** by clicking on the small icon in the upper right corner . The following menu appears and you can then select **Add Pen Set**:




- Next, name the pen set:

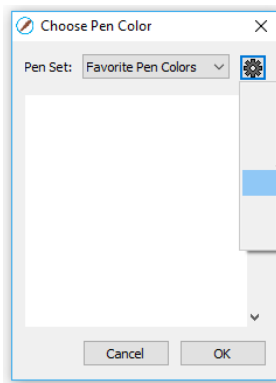


- In the **Pen Set** menu, you can now select the new **Pen Set Name**:

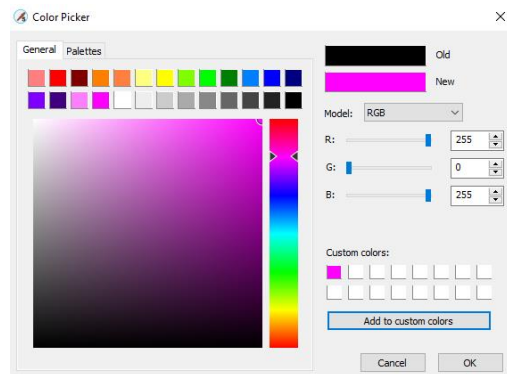


Switch to the new **Pen Set**

- ◇ 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:

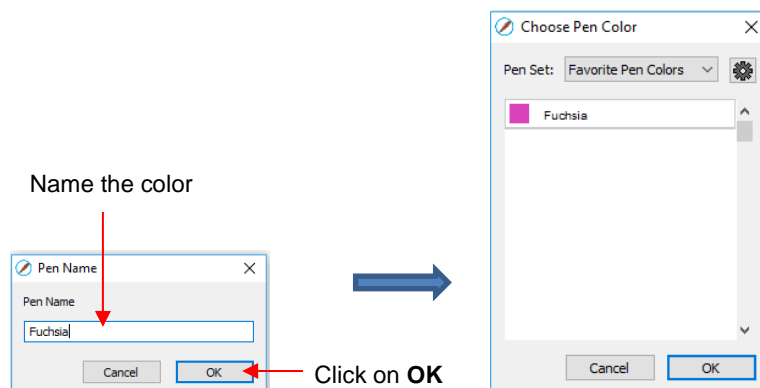


Click on **Add Color**



Click on **OK**

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



The new color is now in the menu

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

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

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



Stroke Width: 1
Opacity: 100%



Stroke Width: 10
Opacity: 100%






Stroke Width: 20
Opacity: 100%



Stroke Width: 20
Opacity: 50%

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

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

- ◇ **Miter**  : Corners are sharp but will become beveled at low values of **Miter**
- ◇ **Round**  : Corners are rounded off.
- ◇ **Bevel**  : Corners are clipped at a 45° angle.

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



Join: Miter
Miter: 1.0
Slightly beveled



Join: Miter
Miter: 3.5
Sharp corners






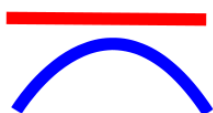
Join: Round



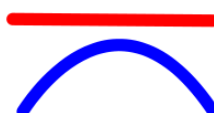
Join: Bevel

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

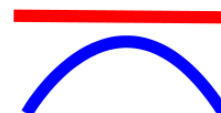
- ◇ **Butt**  : The end is squared off, aligned with the actual end of the path
- ◇ **Round**  : The end is rounded.
- ◇ **Square**  : The end is squared off and extends beyond the actual end based on the **Stroke Width**.



End Cap: Butt



End Cap: Round



End Cap: Square

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



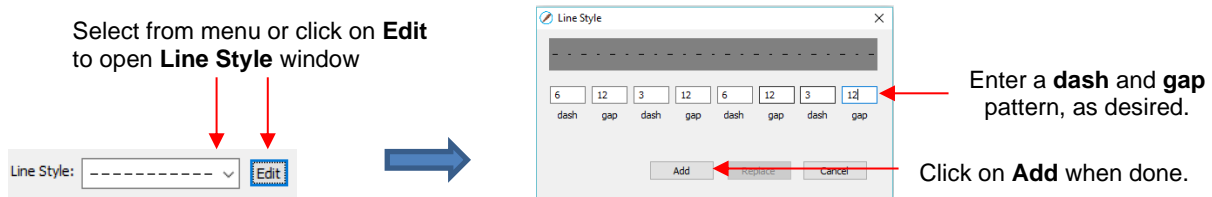
End Cap: Butt – cap ends at the line end



End Cap: Square – cap extends beyond end

7.15.2 Stroke Line Style

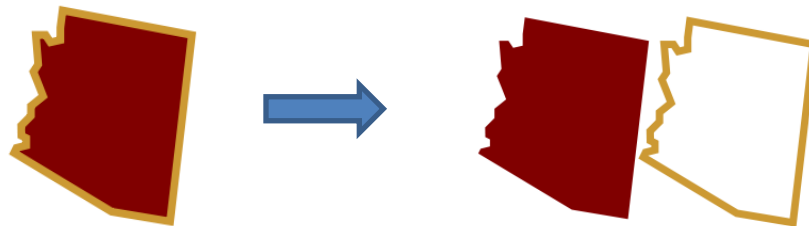
- One additional **Stroke** setting deserves its own subsection because it also affects how a shape will be drawn or cut by your cutter.
- The **Line Style** can be either solid or dashed. If dashed is selected, then one of the default patterns can be selected or you can specify the dash length and spacing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



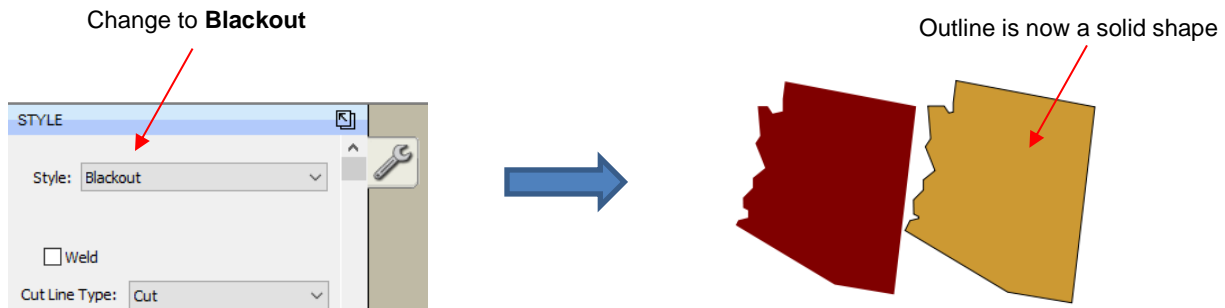
- ◊ The **Line Style** selected will be displayed on the screen and will be cut or drawn with that style by the cutter. Again, the **Stroke Width**, however, is ignored by the cutter.

7.15.3 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**. You can now drag the stroke shape away from the original:




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



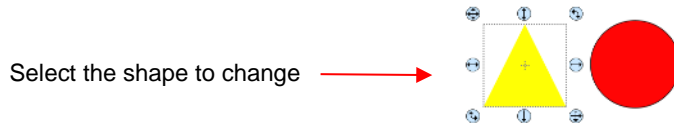
- More about the **Style** setting is covered in *Section 8.01*. There are also other ways to create shadow layers. Refer to **Path Offset** (*Section 10.05*) and **Shadow Layer** (*Section 11.05*).

7.16 Dropper Tool

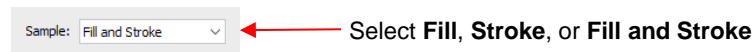
- Shapes can also have the **Fill**, **Stroke** or both changed based on the settings for another shape. This is accomplished using the **Dropper tool**  on the **Tools Panel**.

- To use this function:

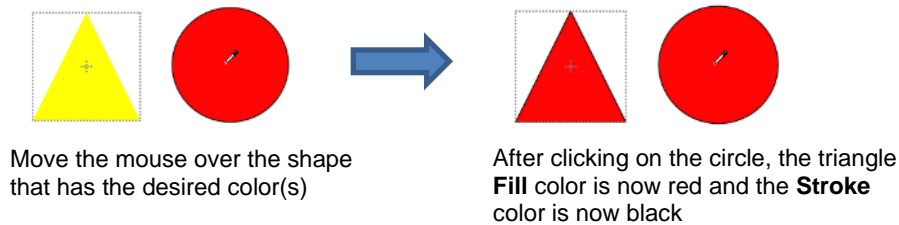
- ◇ Select the shape to be recolored. In this example, it will be a yellow triangle with no **Stroke**:



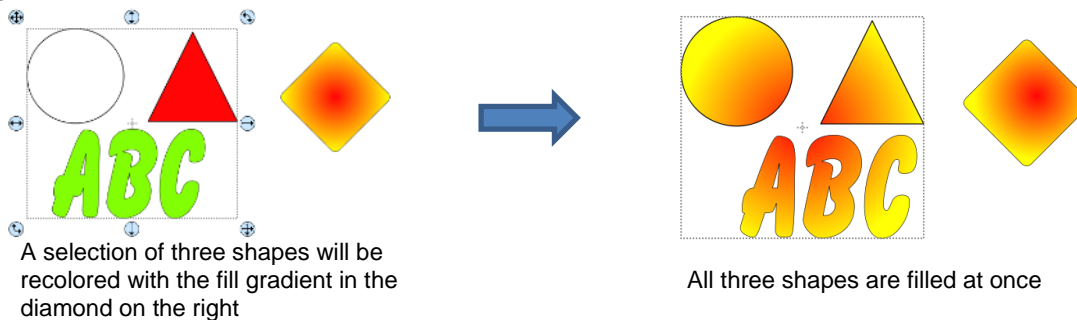
- ◇ Click on the **Dropper tool** icon and choose a setting from the **Tool Options**:



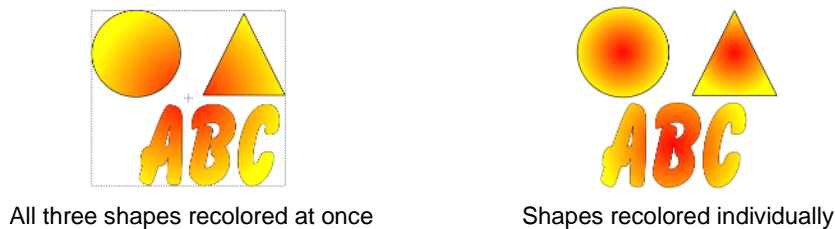
- ◇ Finally, click on the shape that has the color property you wish to use. In this case, it's the red circle with the black **Stroke**. The selected triangle is recolored to match.



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




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




7.17 Cutting, Copying, Pasting, Duplicating


7.17.1 Cutting to the Clipboard

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

7.17.2 Copying to the Clipboard

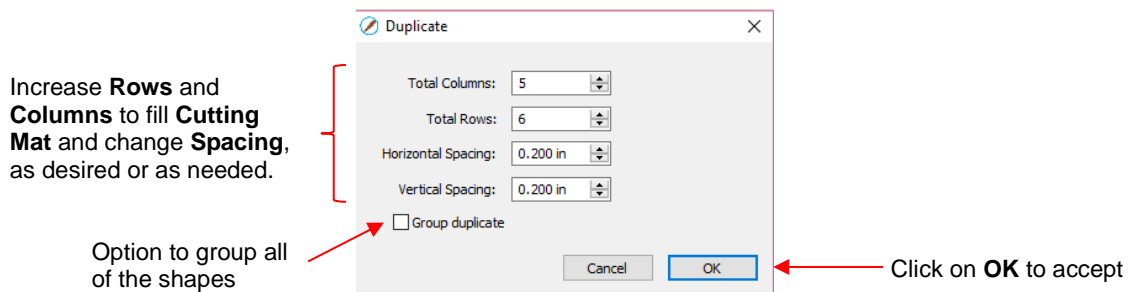
- To copy shapes to the clipboard, first select the shape or shapes and then use any of the following:
 - ◇ Click on the **Copy** icon located on the upper **Toolbar** 
 - ◇ Right-click on the screen and select **Copy**
 - ◇ Press **Ctrl+C**
 - ◇ Go to **Edit>Copy**
- To make multiple copies, refer to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

7.17.3 Pasting from the Clipboard

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

7.17.4 Duplicating – Duplicate

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



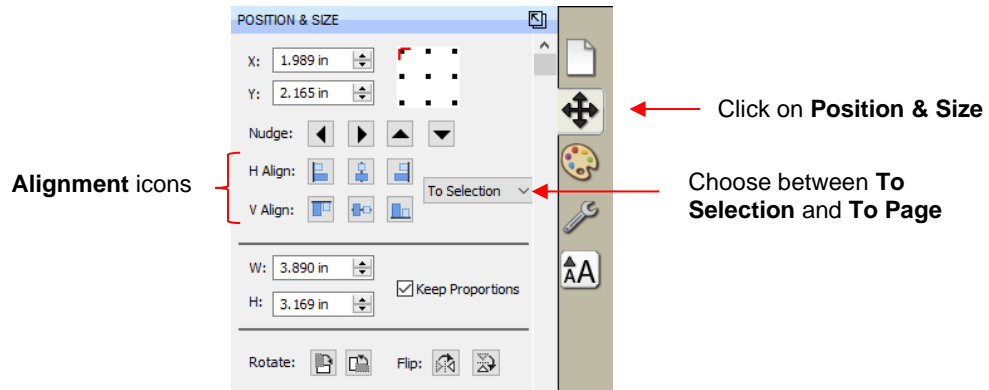
- To create a single row of repeats, set the **Rows** value to 1. For a single column of repeats, set the **Columns** value to 1. To overlap the repeats, enter a negative number under **Spacing**. Refer to *Section 11.06.1* for a tutorial on how this function can be used to create a border.
- There is also a **Duplicate Rotated** function to arrange the duplicates in a circular formation. Because this is more typically used for design purposes, it is covered in *Section 11.08*.

7.17.5 Quick Duplicate

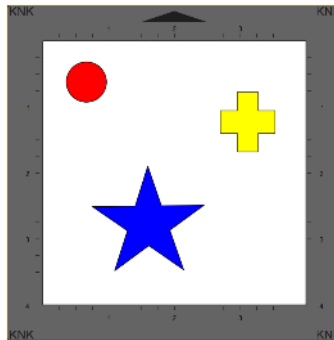
- A quick way to make a single copy of a shape is to hold the **Alt** key while dragging the shape. The original will be left behind and new copy will be moved with the mouse.
- You can also hold the **Alt** key and left-click on a shape and it will duplicate that shape leaving the copy on top of the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

7.18 Alignment

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






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

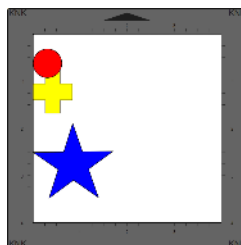


7.18.1 Align to Page

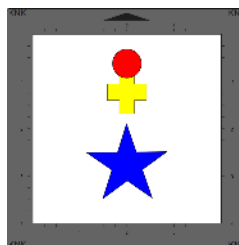
- Make sure the alignment mode is set to **Align to Page**. To do this, either:
 - Go to **Object>Alignment** and make sure **Align to Page** is checked
 - Select **To Page** on the **Position & Size** panel

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

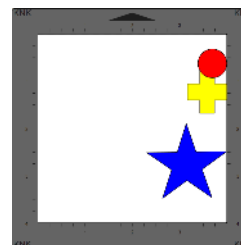
- Align Left** aligns shapes along the left side of the **Cutting Mat**. 
- Align Horizontal Center** aligns shapes through the center of the **Cutting Mat**. 
- Align Right** aligns shapes along the right side of the **Cutting Mat**. 



Align Left




Align Horizontal Center



Align Right

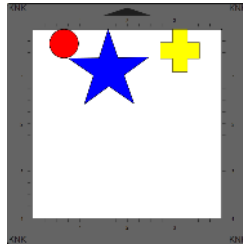
- With the shapes selected, the vertical alignment options are:

- Align Top** aligns shapes along the top side of the **Cutting Mat**. 

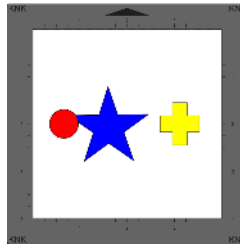
◇ **Align Vertical Center** aligns shapes through the center of the **Cutting Mat**.



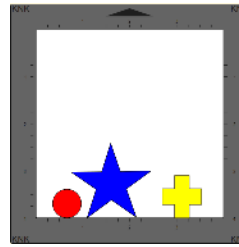
◇ **Align Bottom** aligns shapes along the bottom side of the **Cutting Mat**.



Align Top



Align Vertical Center



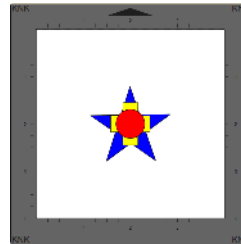
Align Bottom

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

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



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



Align Centers

7.18.2 Align to Selection

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

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

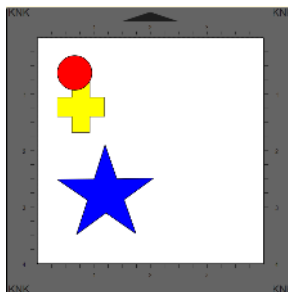
◇ **Align Left** aligns shapes along the left side of the leftmost shape of the group.



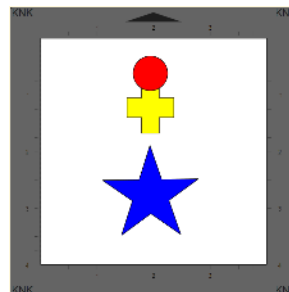
◇ **Align Horizontal Center** aligns shapes to a vertical axis through the center.



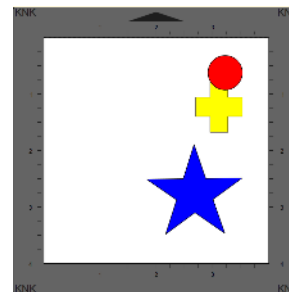
◇ **Align Right** aligns shapes along the right side of the rightmost shape of the group.



Align Left






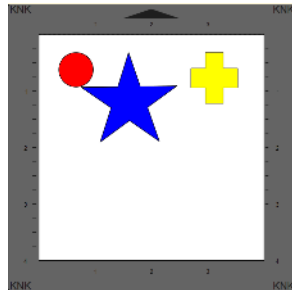
Align Horizontal Center



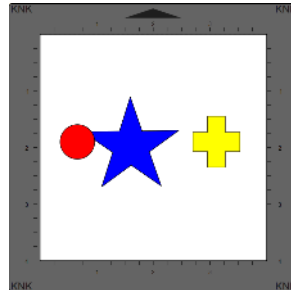
Align Right

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

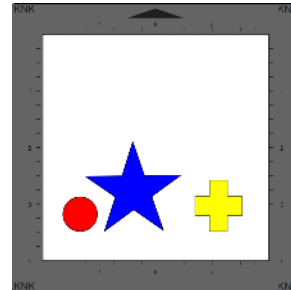
- ◇ **Align Top** aligns shapes along the top side of the uppermost shape of the group. 
- ◇ **Align Vertical Center** aligns shapes to a horizontal axis through the center. 
- ◇ **Align Bottom** aligns shapes along the bottom side of the bottommost shape of the group. 



Align Top



Align Vertical Center

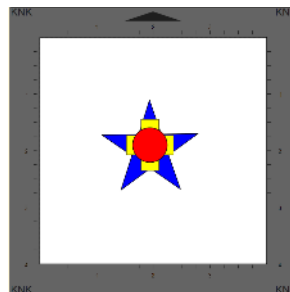


Align Bottom

- To center all three shapes, use either:

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

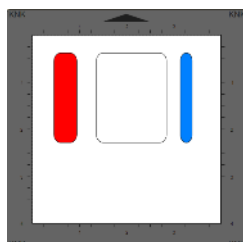
- ◇ Go to **Object>Alignment>Align Centers**



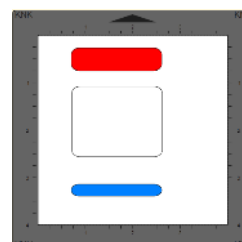
Align Centers

7.19 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** and its difference in size relative to the outermost shape in the opposite direction of the distribute option (and yes, this is confusing, but will be explained in *Section 7.19.3*)
- After selecting the shapes, these functions can be accessed by going to **Object>Distribute**.
- The following three shapes, in their current relative positions, will be used to illustrate what happens with each distribute function when **Distribute to Selection** or **Distribute to Page** is applied. Note that a small custom mat was created to facilitate screenshots:



Will be used for horizontal distribute examples



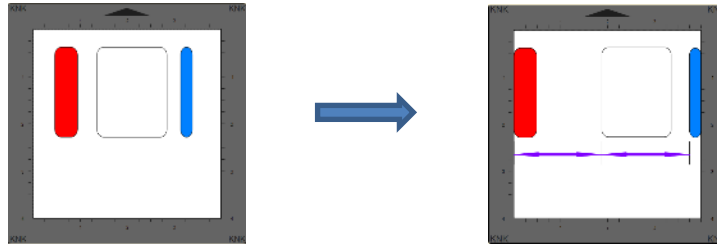
Will be used for vertical distribute examples

7.19.1 Distribute to Page

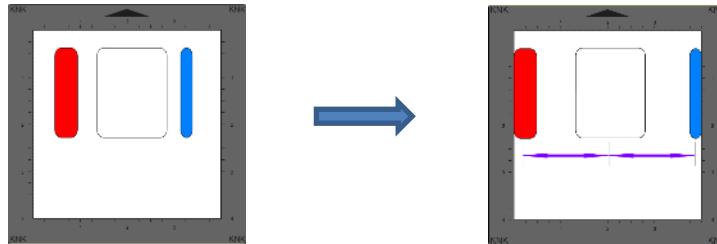
- Select the shapes and go to **Object>Distribute** and then make sure the **Distribute to Page** option is checked. In this mode, the two outermost shapes will align with the **Cutting Mat** and then other shapes will be evenly spaced from one side of the mat to the other, according to which additional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

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

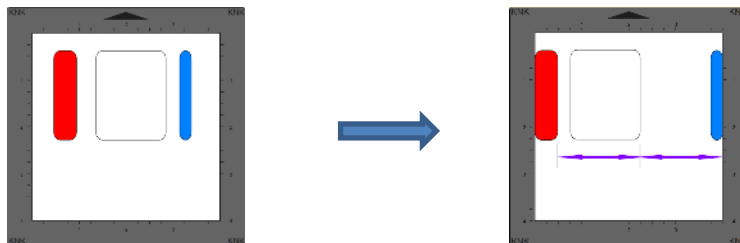
- ◇ **Distribute Left:** spaces shapes so that the left sides of each shape are the same distance apart:



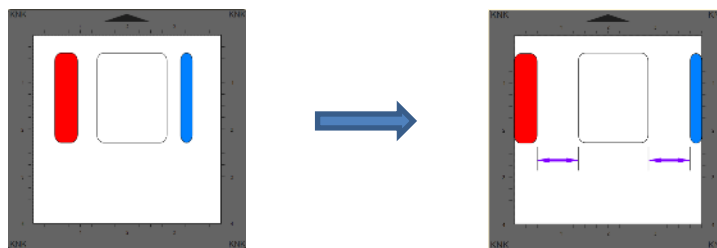
- ◇ **Distribute Center Horizontally:** spaces shapes so that the centers of each shape are the same distance apart:



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

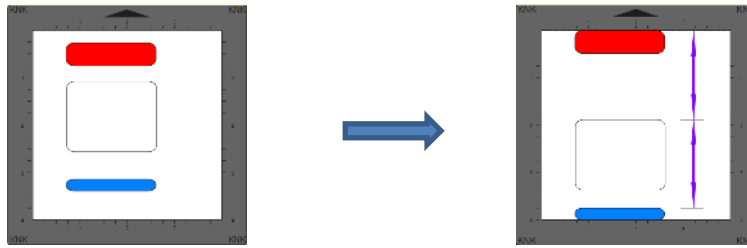


- ◇ **Distribute Space Horizontally:** spaces shapes so that the gaps between the shapes are the same.

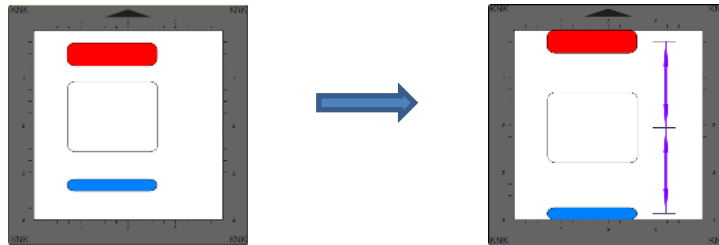


- With the shapes selected, the vertical distribute options are:

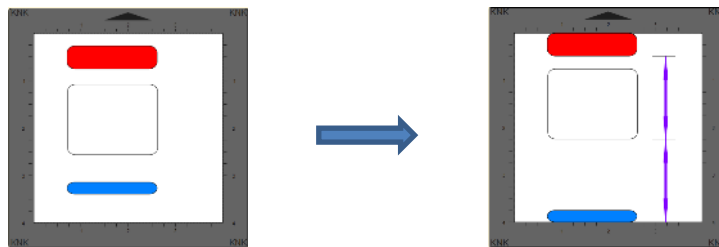
- ◇ **Distribute Top:** spaces shapes so that the top sides of each shape are the same distance apart:



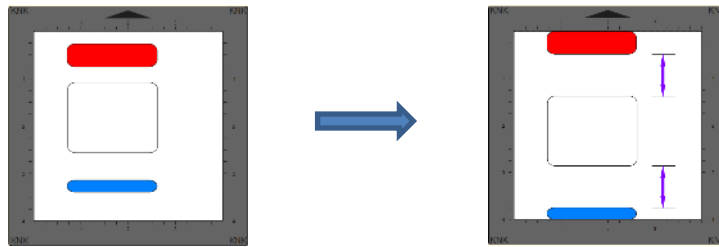
- ◇ **Distribute Center Vertically:** spaces shapes so that the centers of each shape are the same distance apart:



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

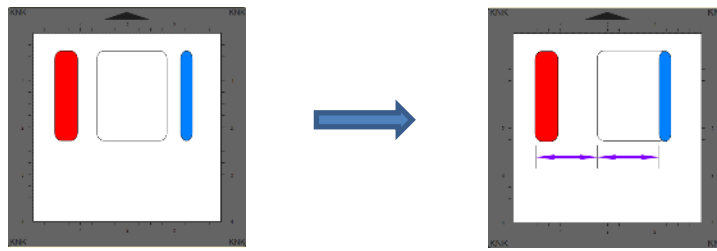


- ◇ **Distribute Space Vertically:** spaces shapes so that the gaps between the shapes are the same.

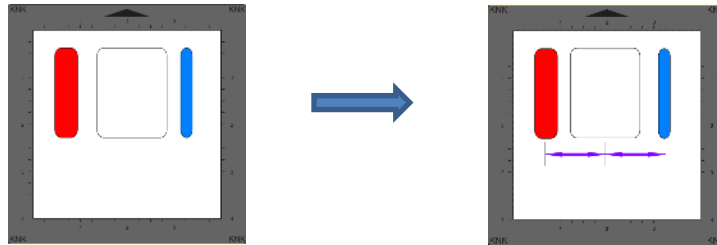


7.19.2 Distribute to Selection

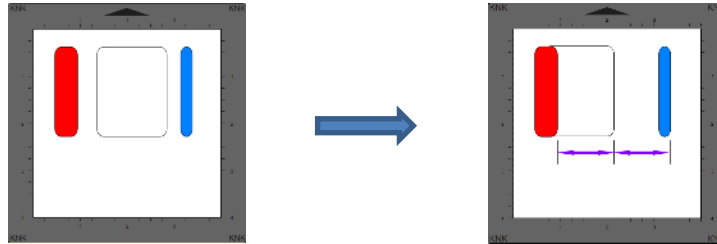
- Select the shapes and go to **Object>Distribute** and then make sure **Distribute to Selection** is checked. In this mode, the two outermost shapes will remain in position and then other shapes will be evenly spaced, according to which additional option is chosen. All options, with screenshots, are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



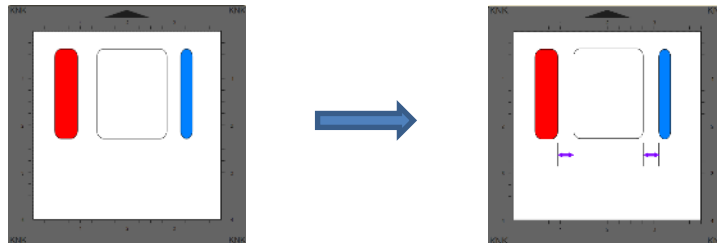
- ◇ **Distribute Center Horizontally:** spaces shapes so that the centers of each shape are the same distance apart:



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

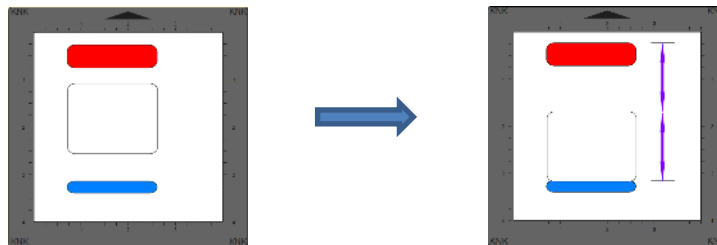


- ◇ **Distribute Space Horizontally:** spaces shapes so that the gaps between the shapes are the same.

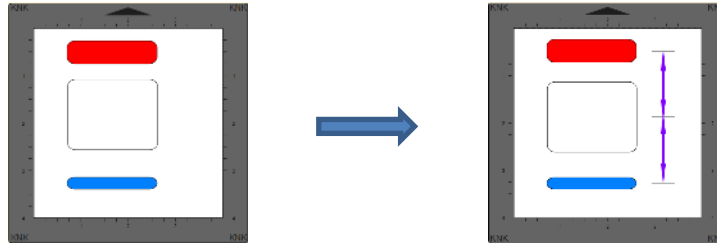


- With the shapes selected, the vertical distribute options are:

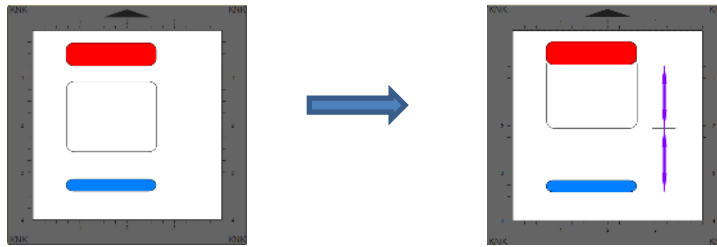
- ◇ **Distribute Top:** spaces shapes so that the top sides of each shape are the same distance apart:



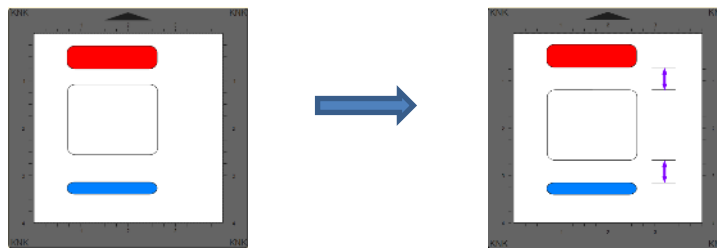
- ◇ **Distribute Center Vertically:** spaces shapes so that the centers of each shape are the same distance apart:



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



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

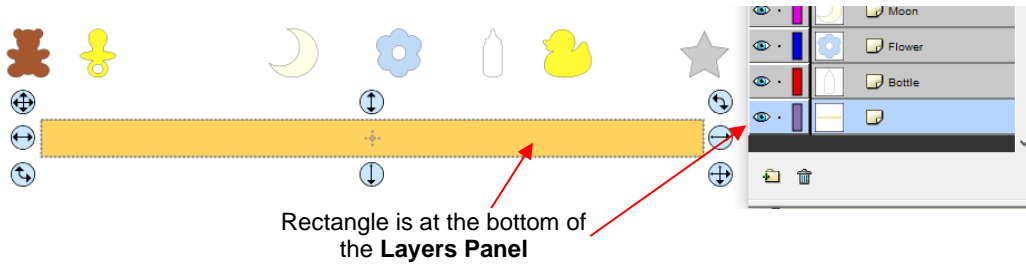


7.19.3 Distribute to Selection Below

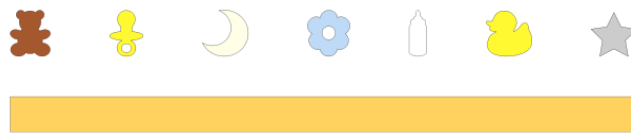
- This option is used to evenly distribute several shapes relative to another shape (called the **Reference Shape**) that needs to be positioned at the bottom of the **Layers Panel** (thus the term “**Selection Below**”).
 - ◇ It will also move the shapes at the furthest ends of the selection to align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



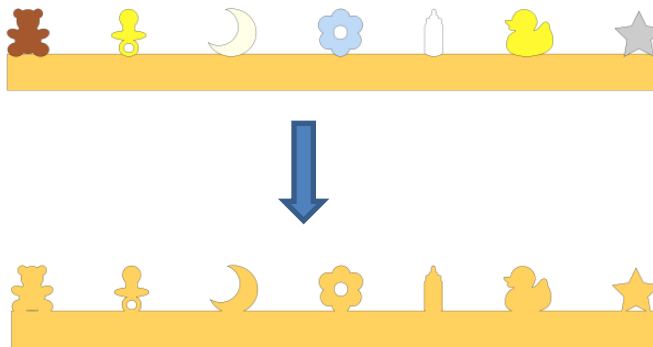
- Make sure the rectangle is the bottommost layer on the **Layers Panel**:



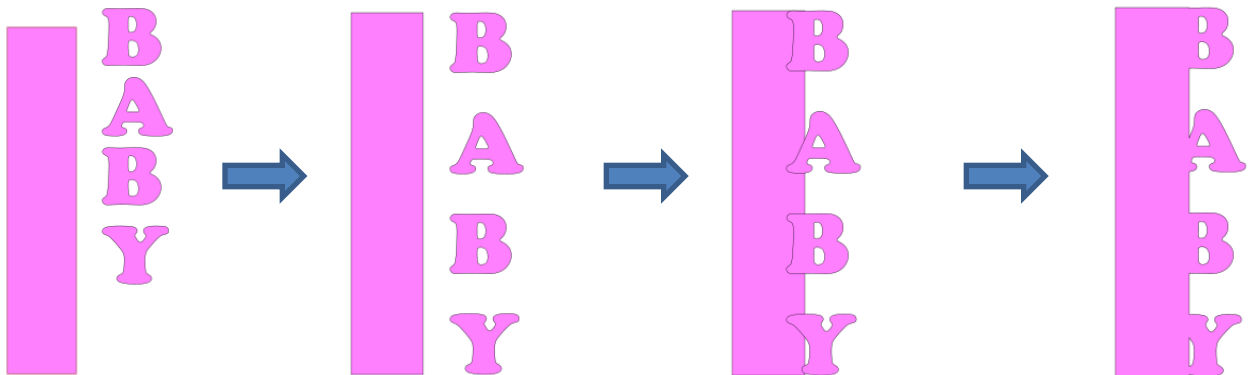
- Select all of the shapes and go to **Object>Distribute** and then make sure **Distribute to Selection Below** is checked. Go back to **Object>Distribute** and select one of the options in the horizontal section. In this example, **Distribute Space Horizontally** will be selected. The result is that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



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



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




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

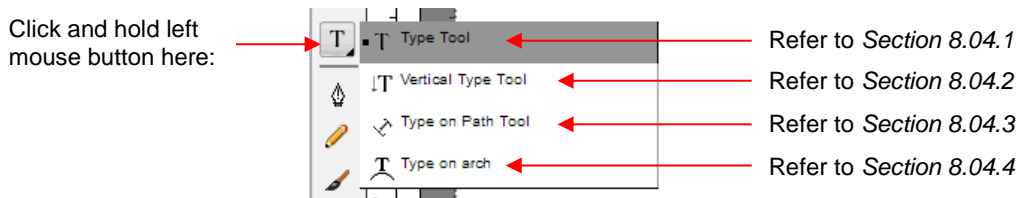
Using **Distribute to Selection Below** and the **Distribute Space Vertically** option, the letters are equally spaced and aligned with the top and bottom of the rectangle. Then moved over to overlap the rectangle.

Path>Union is applied.

8. SCAL: Working with Text


8.01 Text Options

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



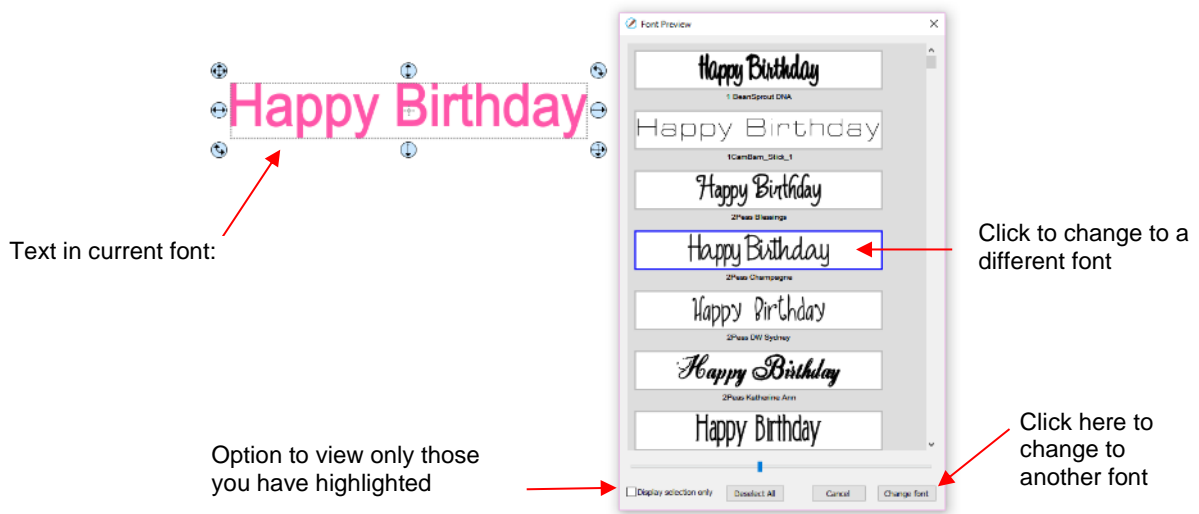
8.02 Selecting a Font

8.02.1 Choosing a Font from the Font Menu

- There are three places to select an installed font:
 - ◇ Click the **Text Settings** icon  on the **Properties Panel** to open the **Text Panel**. Select from the **Font** drop-down menu.
 - ◇ Go to **Text>Font**
 - ◇ Click on the **Fonts** tab in the **Library** (refer to *Section 6.03.2*).
- 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.

8.02.2 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 8.03 and 8.04*. Then select the text and go to **Text>Font Preview**. There you can scroll through all of the fonts currently installed in SCAL to view others you might prefer:

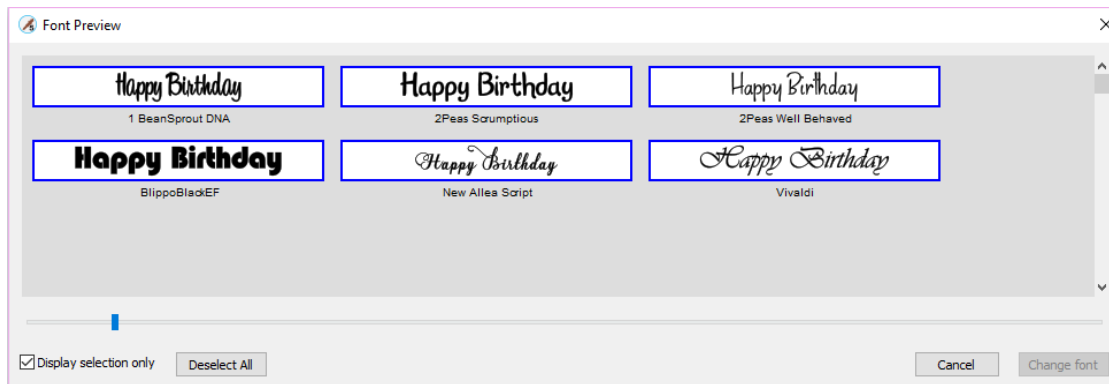


- You can expand this window and decrease the size of the fonts by scrolling the size bar to view more samples. Also, you can highlight those of interest and then click **Display selection only** to more easily decide which ones you might like to use:

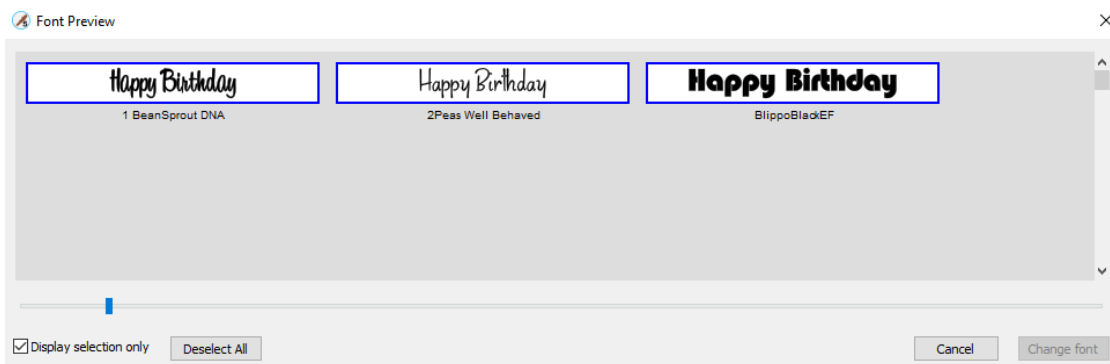
◇ Expand the window and highlight those you want to further compare:



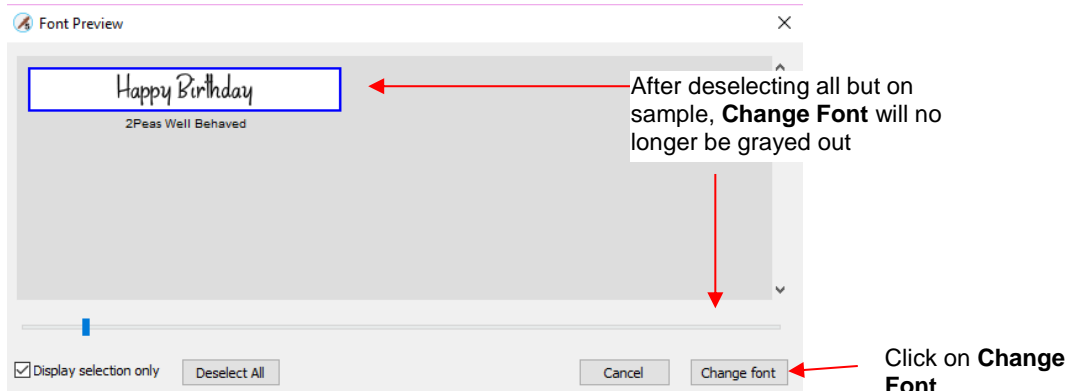
- ◇ After scrolling through fonts and highlighting only those of further interest, click on **Display selected only**:



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




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




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

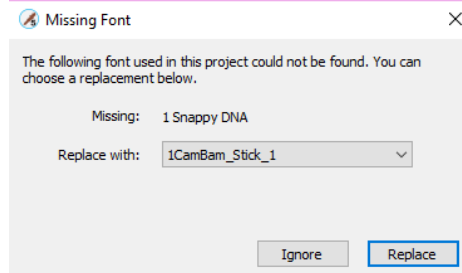
Happy Birthday

8.02.3 Temporarily Installing a Font

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

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

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





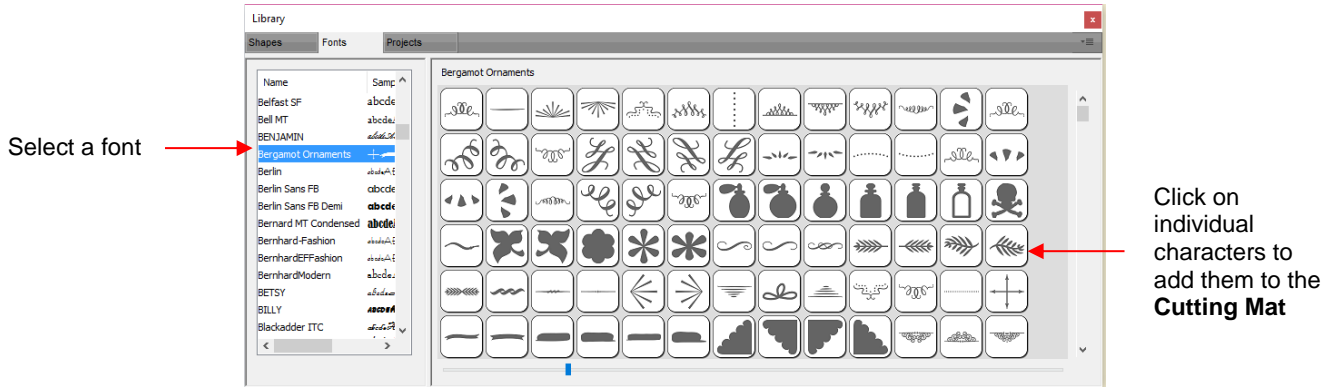
◇ Two options are provided:

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

8.03 Adding Text Options

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



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



8.04 Four Modes of Text



8.04.1 Type Tool

Jay Max
 McCauley McCauley

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

8.04.2 Vertical Type Tool

J M
 a a
 Y X

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


8.04.3 Type on Path Tool

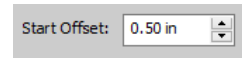
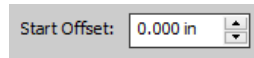



- Determine which shape you want to use for the path. In the prior screen shot, ovals, spiral and a rectangle were used. But it could have been a square, triangle, or any other shape, even a curve path:



- To use this function:

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



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



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

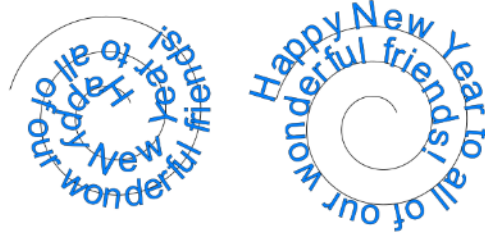
- ◇ First apply **Path>Reverse Path** to the shape. Then type the text:



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



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




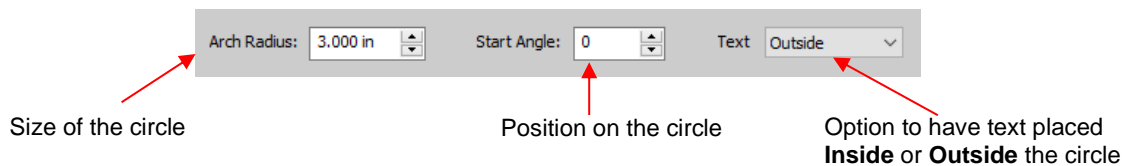
- ◊ After applying Text>Convert Text to Outlines:



8.04.4 Type on Arch Tool

Max and Jay

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



- For example:

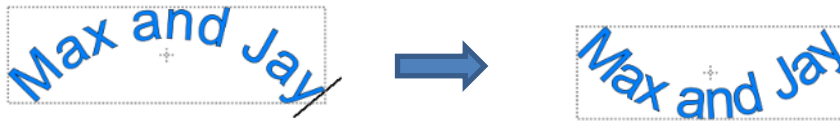
Decreasing the **Arch Radius** from 1.0 to 2.0:




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




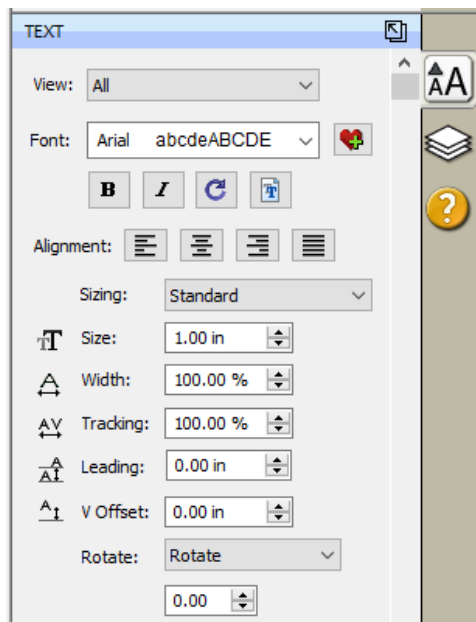
Changing **Text** from **Outside** to **Inside**:





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





8.05 Text Settings


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



Click here to open
Text Panel

- To apply a change to any of these settings:
 - ◇ Type some text using the instructions in *Section 8.04*. Then click on the **Selection Tool** icon  at the top of the **Tools Panel**.
 - ◇ With the text selected, you can now change any of these various settings and the changes will immediately be applied to that selected text.
 - ◇ If you only want to apply a change to a portion of the text, click on the **Text Tool** icon  on the **Tools Panel** and drag your mouse to highlight whatever part you want to change.
- The following is a list of the settings and how to apply them:
 - ◇ **View:** Controls which fonts show in the menu under **Font**:
 - **All:** Displays all installed fonts plus any that have been temporarily installed during this session of SCAL
 - **Favorites:** Displays all fonts you have assigned as a **Favorite**

- **This Project:** Displays all fonts currently used since starting this particular project during this session
- ◇ **Font:** Menu of installed fonts which can be used for new or existing text. Note that you can also add to your **Favorites** list by selecting a font and then clicking on the  icon to the right.
- ◇ **Bold and Italic** 
 - **IMPORTANT:** Some fonts will change significantly if the Bold option is selected. The same is true of the Italic option. Make sure these icons are not indented/blue unless you are confident you want to use either or both of them.
 - With either option highlighted, the text may not immediately reflect that option. If not, highlight the text and then try applying again.
 - Instead of using **Bold**, you can use **Effects>Shadow Layer** (refer to *Section 11.05*) or **Path>Offset Path** (*Section 10.05*).
 - Instead of using **Italic**, you can use the **Skew** function (refer to *Section 7.07*).
- ◇ **Reload**  is only needed if you have separately installed new fonts on your computer since opening the current SCAL session.
- ◇ **Load a Font File**  is used to open a .TTF, .OTF, or .OPF font that is not already installed on your computer. Refer to *Section 8.02.3*.

- ◇ **Alignment:**  Standard text justify options: **Left Align**, **Center Align**, and **Right Align** and **Justified**.
- ◇ **Sizing:** The setting determines the height of the letters in the selected text based on these options:
 - **Standard:** A character's height is based on how the font was designed

Skycut

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

SkyCuT

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

SkyCuT

- This example doesn't necessarily illustrate a typical application for the **Sizing** setting. Refer to *Section 8.14* for examples of its usefulness.
- ◇ **Size:** Approximate height of lettering based on an ascender and descender. For example, if text is set to 1.0 inches, then the height of the word "Baby" would be ~ 1.0." However, the "B" typed by itself might only be 0.7" in height because there is no descender, such as the letter "y".
- ◇ **Width:** Increasing the width will widen the letters leaving the height unchanged. Note that letter spacing will not be altered, thus the letters may end up overlapping unless **Tracking** is increased, as well.
- ◇ **Tracking:** This is the spacing between letters. Increasing will spread letters apart while decreasing will force them closer together and can result in overlapping:

Skycut

Tracking: 100%

Skycut

Tracking: 120%

Skycut

Tracking: 80%

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

Cutting with
my Skycut

Leading: 0 inches

Cutting with
my Skycut

Leading: 0.3 inches

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

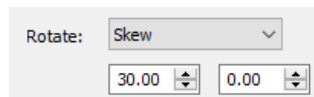
Cutting with my Skycut

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

Cutting with my Skycut

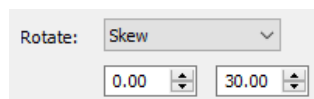
- ◇ **Skew:** In the same menu with **Rotate** is the **Skew** option which can also be applied to a line of text or to individual letters. There are two settings: one for X axis skew and one for Y axis skew:

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



Cutting with my Skycut

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



Cutting with my Skycut

8.06 Other Text Editing

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

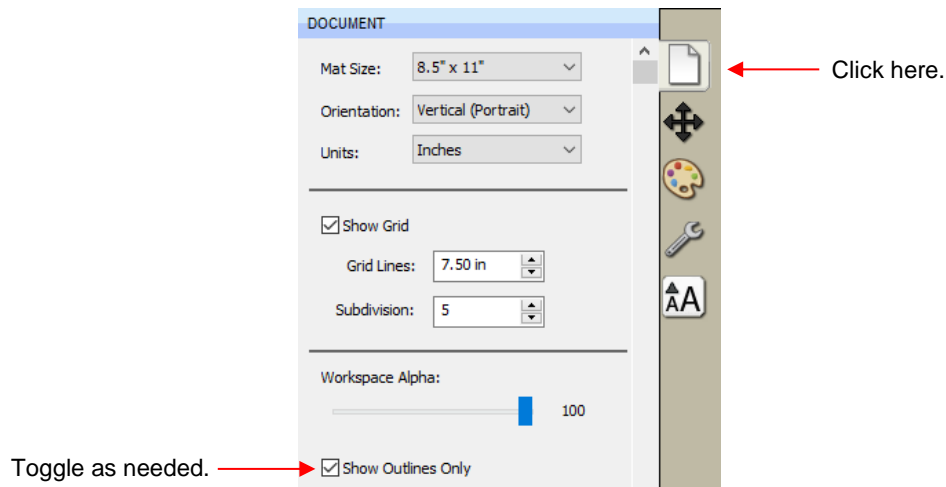
- For more information on **Ungroup** and **Break Apart**, refer to *Sections 7.10.2* and *7.12.1*.

8.07 Creating a Connected Letter Title

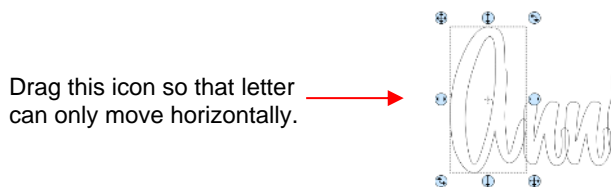
- Using the instructions from *Section 8.04.1*, type the letters of your title:

Happy Anniversary

- Because you will be working with the letters individually, select the title and apply **Ungroup** (*Section 8.06*).
- With the letters split, you can select one or more and use the left and right arrow keys to change the spacing between letters, overlapping as desired. It is advisable to zoom in on the text to get a more accurate view of the actual positioning of the letters. You may also want to check the text both with and without **Show Outlines Only** option turned on (which can be changed on the **Document Panel**):



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



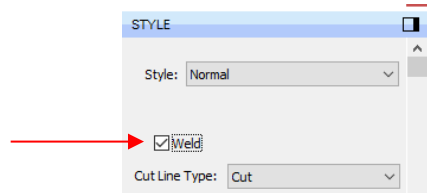
- Continue arranging letters as desired. Remember that you can customize freely to get the desired look. For example, in this font called 1 Bean Sprout DNA, the vowels tend to be a bit oversized compared to other characters in the font. Thus, the uppercase "A" can be sized smaller to better match the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

Happy Anniversary → Happy Anniversary

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

Happy Anniversary

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



- To create an outline/shadow for titles and other shapes or if you need to thicken a font that turns out to be too thin for cutting, refer to *Section 11.05*.

8.08 Incorporating Shapes into a Title

- A quick way to incorporate a shape into a welded title is to use any of thousands of dingbat fonts available from the Internet for free or even check the **SCAL Library** for a shape. In this example, a script font is being used for the title and a turkey, found in the **Library** under the *Fall* folder, will be used for the shape.
- Using the steps in *Section 8.04.1*, create the title:

Happy Thanksgiving

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

Happy Thanksgiving

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

Happy  Thanksgiving

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

Happy  Thanksgiving

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

8.09 Welding Titles in Imaginative Ways

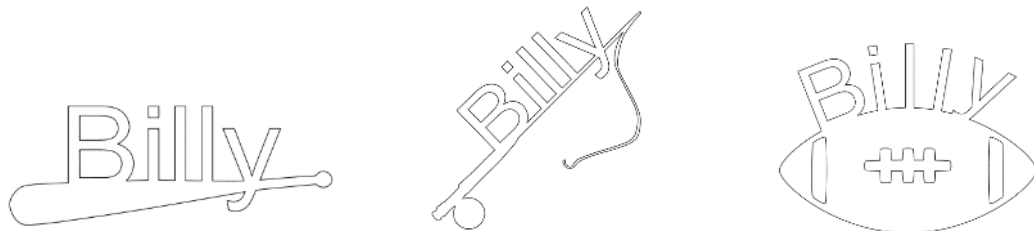
- Some fonts simply do not work well with the traditional overlapping of the letters to be welded into one piece for cutting. For example, let's take an extreme case with Arial font and the name, "Billy". Note what happens when you overlap the letters in this particular font:



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

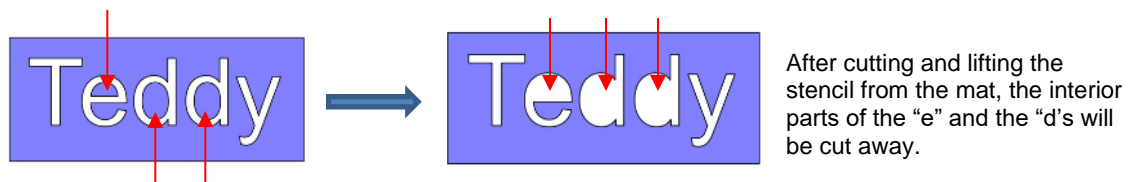



- However, the objects to use as a base do not have to be so basic. Look for objects that will tie into a theme. Here are just a few examples:



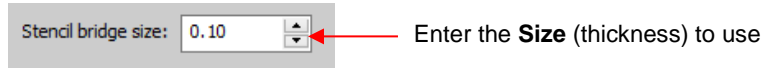
8.10 Stenciling Letters

- When creating a stencil, you keep the "waste" or "negative" of a cut. When using regular fonts, such as Arial, some of the letters, such as a "B", "a", "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 the two "d"s:

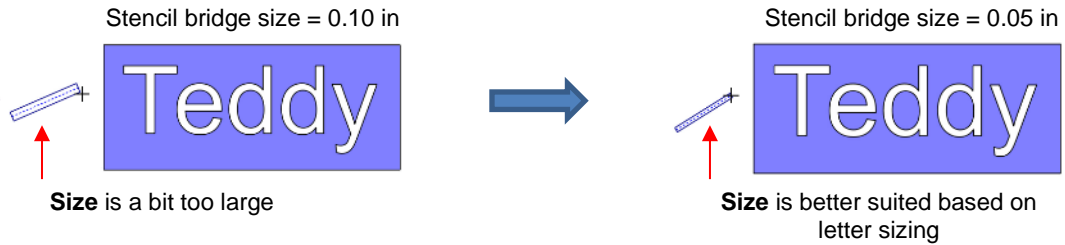


- To avoid this, a procedure called stenciling can be used to connect the area outside of the letters to the child shapes, essentially eliminating them. There is a feature on the **Tools Panel** called the **Stencil Bridge** which can be used to connect the interior parts to the surrounding area.
- Before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

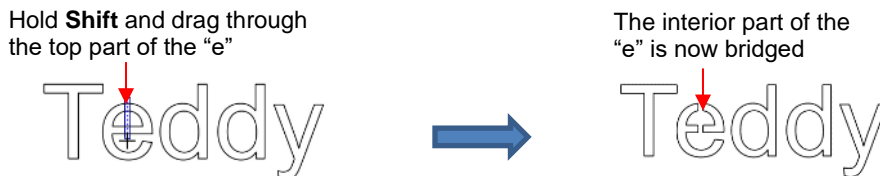
- Zoom in close on the lettering so that you'll be able to see exactly where you need to connect. Click on the **Stencil Bridge** icon and, in the **Tools Options** at the top, a setting for the width or thickness of the bridge can be set:



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



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



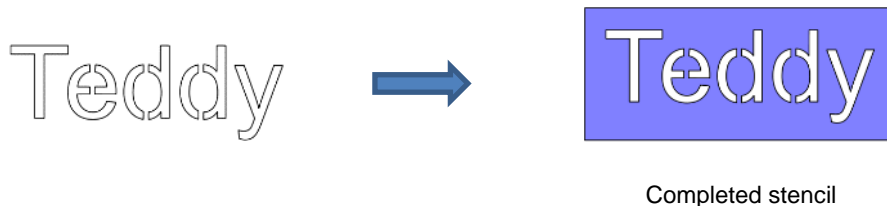
- Repeat the process with the other letters containing child shapes:



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



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



8.11 Open Path Fonts (OPF)

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



TTF version



OPF version of the same font

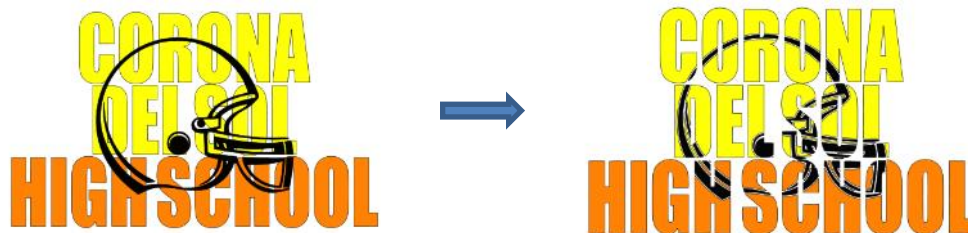
- These fonts are useful when using a pen or engraving tool in your cutter or for designing single line rhinestone titles:



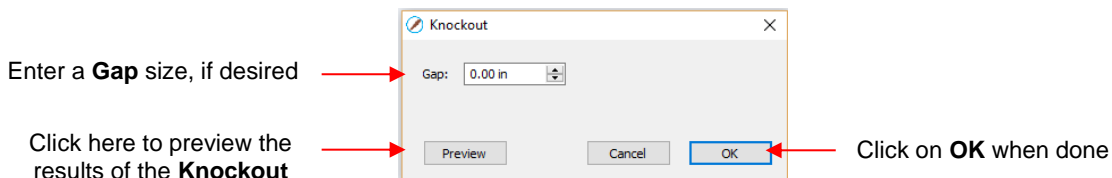
- Currently, this font type only works in a few applications like SCAL and does not install into Windows or on a Mac O/S for use in programs such as Word. If you want to permanently install an OPF font for use in SCAL, copy and paste the font into the following folder: Documents\Craft Edge\My Fonts.
- To try out using Open Path Fonts, there are some free ones to [download here](#).
- Because these are open path, they may not appear on the **Cutting Mat** when you first add them. You will need to select a **Stroke** color on the **Fill & Stroke Panel**. Refer to *Section 7.15*.
- You can purchase Open Path Fonts from www.onlinefonts.com to use in SCAL. Note that these also come with the TTF equivalents, which are not actual single lines and curves, but are still very thin.

8.12 Knockout

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



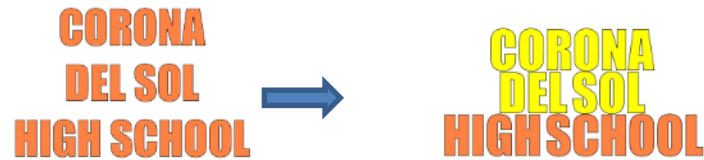
- To open the **Knockout** function window, select two or more shapes and go to **Effects>Knockout**:



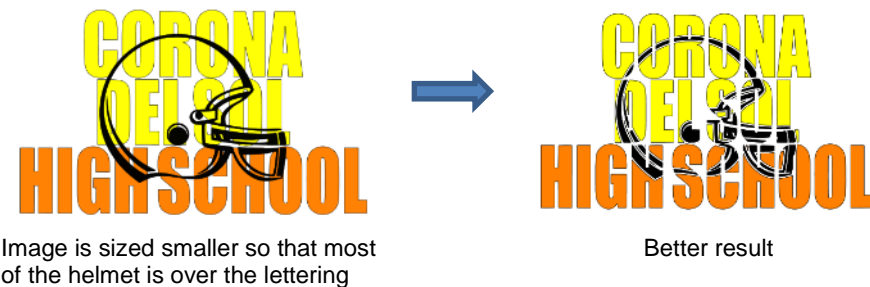
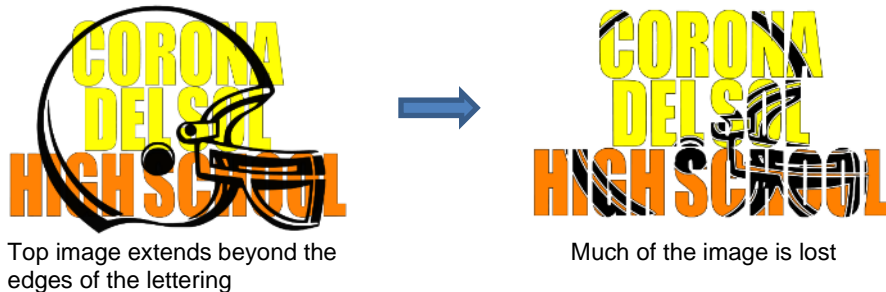
- The **Gap** will create an offset between the top image and the bottom image. This is not only pleasing to the eye but also makes alignment of two layers of HTV easier to manage. Here's an example showing how the gap affects the overall appearance:



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



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



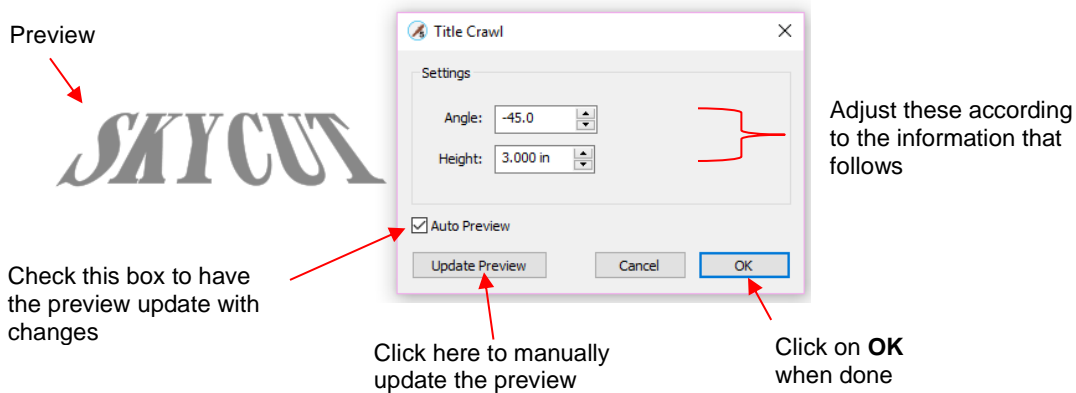
- Note that the **Knockout** function isn't just for text. It can be used on any vector shapes. Because it is so popular with lettering, its presentation in this chapter seemed appropriate.

8.13 Title Crawl

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



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



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

SKYCU

Angle: -45
Height: 3.0

SKYCU

Angle: -25
Height: 3.0

SKYCU

Angle: 25
Height: 3.0

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

SKYCU

Angle: -45
Height: 3.0

SKYCU

Angle: -45
Height: 5.0

SKYCU

Angle: -45
Height: 1.0

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

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

8.14 Applications Using the Sizing Function

- In *Section 8.05*, the **Sizing** setting on the **Text Panel** was briefly explained. The following examples better illustrate how you might be using this setting in your designing.

8.14.1 Sizing Lettering for Particular Fonts

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

GREAT!

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

GREAT!

Fixed Height

GREAT!

Fixed Height Proportional

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



on the **Position & Size Panel**:

GREAT!

Fixed Height

GREAT!

Fixed Height Proportional

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

8.14.2 Sizing Letters for Welding Inside Rectangles

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

ABC

Letters typed and rectangle added



B was too short

Path>Front Minus Back applied

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

ABC



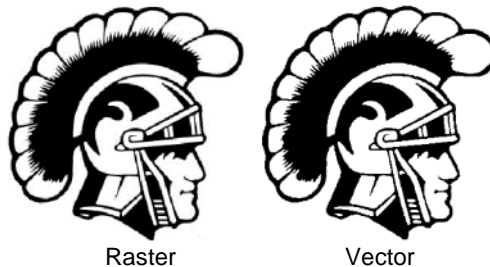
8.15 Other Text Effects

SCAL offers many other design functions to customize text for your projects. Refer to *Sections 11.14 – 11.19* for more ideas.

9. SCAL: Tracing and Drawing

9.01 Raster versus Vector

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



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



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



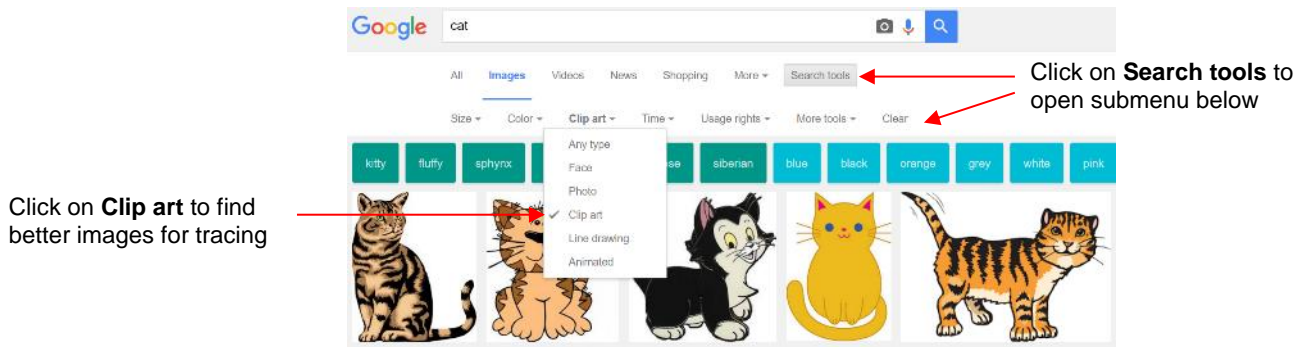
- As mentioned earlier, you can often tell whether a file is a raster or a vector based on the file format. Here are some guidelines:

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

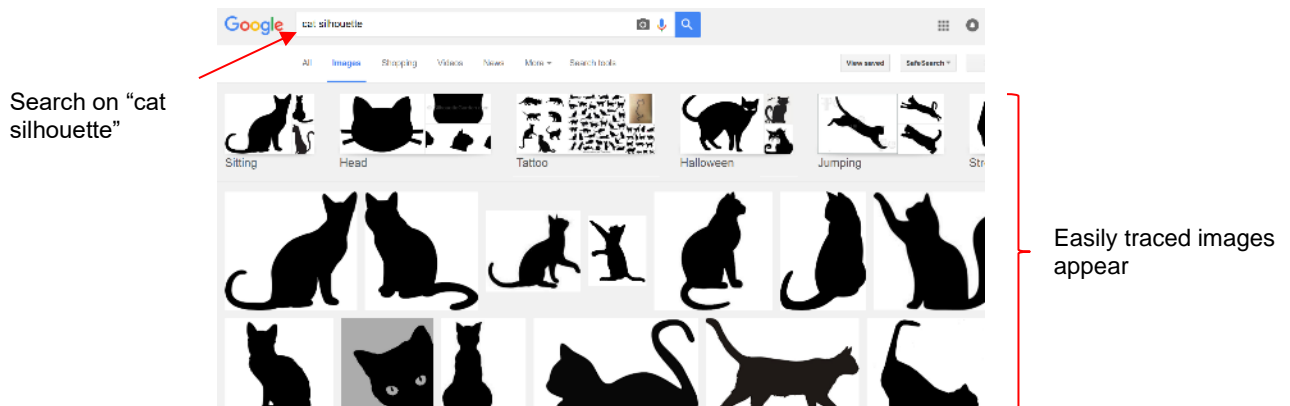
- To convert a raster into a vector, SCAL offers both an automatic and a manual trace function. Because the automatic **Trace** feature in SCAL is so fast and powerful, it is always worth trying it first. The only situation in which it may not be able to provide the results you need are (1) the image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

9.02 Finding Easy Images to Trace

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



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




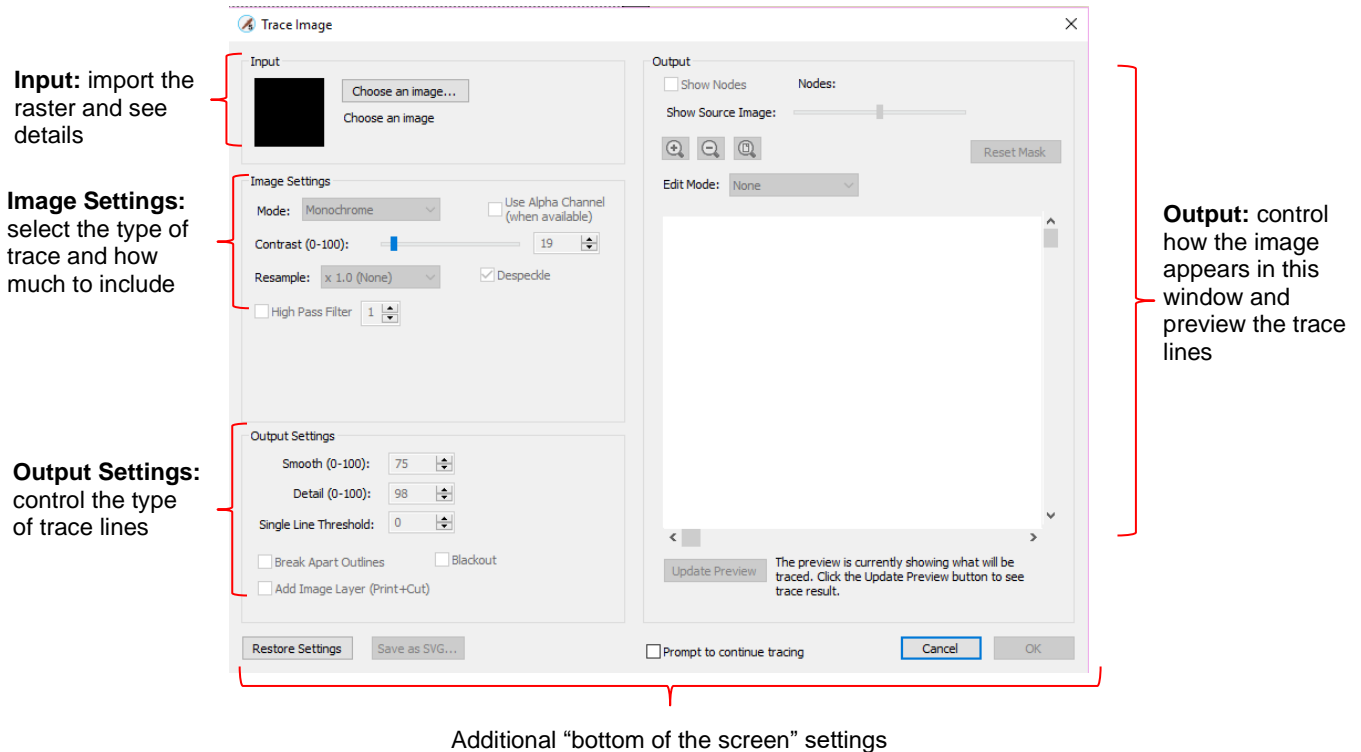
- When you find an image you want to trace, click on it first to bring up a larger version. Then right-click and select **Save image as** from the popup menu. Note: If you use a browser other than Chrome, the popup menu may have slightly different wording for saving a file.
- **IMPORTANT!** Before tracing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

9.03 Trace Function

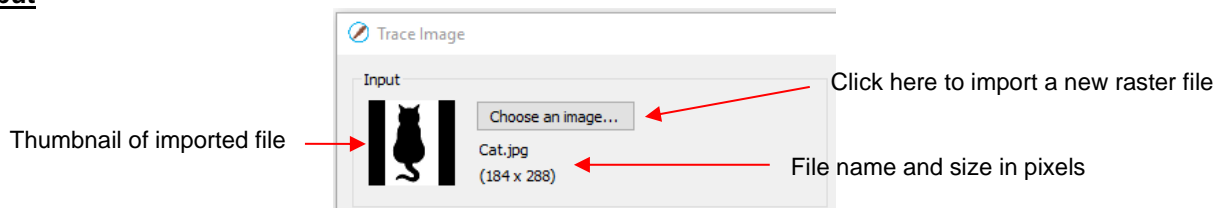
Images used in this tutorial can be [downloaded here](#).

9.03.1 Trace Settings

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



Input



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

- **Image Settings**

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

Increase when a more precise tracing is needed

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

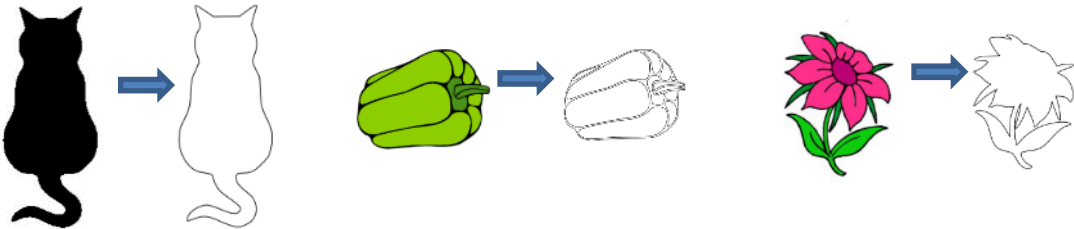
Increase **Contrast**, if needed to control what is included in trace

Ignore tiny specks in the imported image

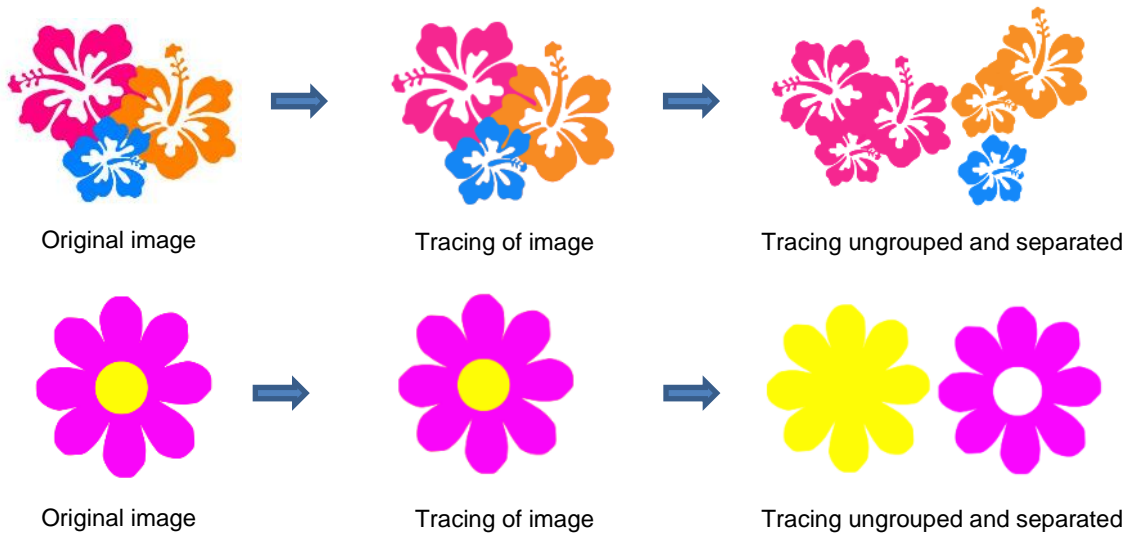
Option to add a **High Pass Filter** setting

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

- **Monochrome:** choose this mode when you only need a black and white trace of the image. (Note: Sections 9.03.2 – 9.03.7 cover **Monochrome** examples in more detail.)



- **Color Layers:** choose this mode for multi-color images where you need separate colors, such as for a paper piecing or layered vinyl project and you want under-layers to use for alignment. Two examples follow which illustrate what is produced when **Color Layers** is chosen. (Note: Section 9.03.9 covers **Color Layers** in more detail.)



- **Single Color:** choose this mode when you want to single out a certain color to be traced or when the multi-color image needs to have colors traced exactly as displayed. This would be a typical choice for an HTV application where you do not want layers of material to overlap. The same examples are used again to demonstrate the difference. (Note: Section 9.03.10 covers **Single Color** in more detail.)



Original image

Tracing of image if only blue is selected



Original image

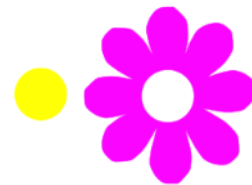
Tracing of image if each color is selected

Colors separated



Original image

Tracing of image if only pink is selected



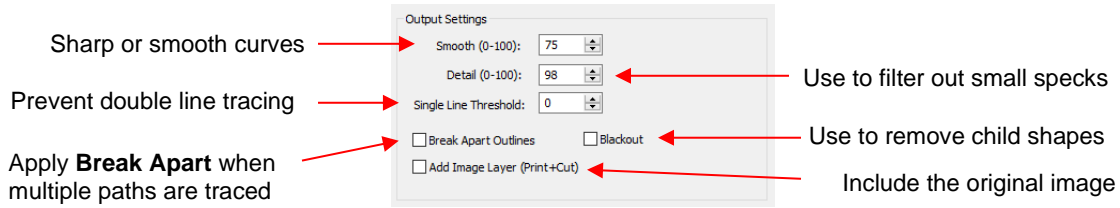
Original image

Tracing of image if each color is selected

Colors separated

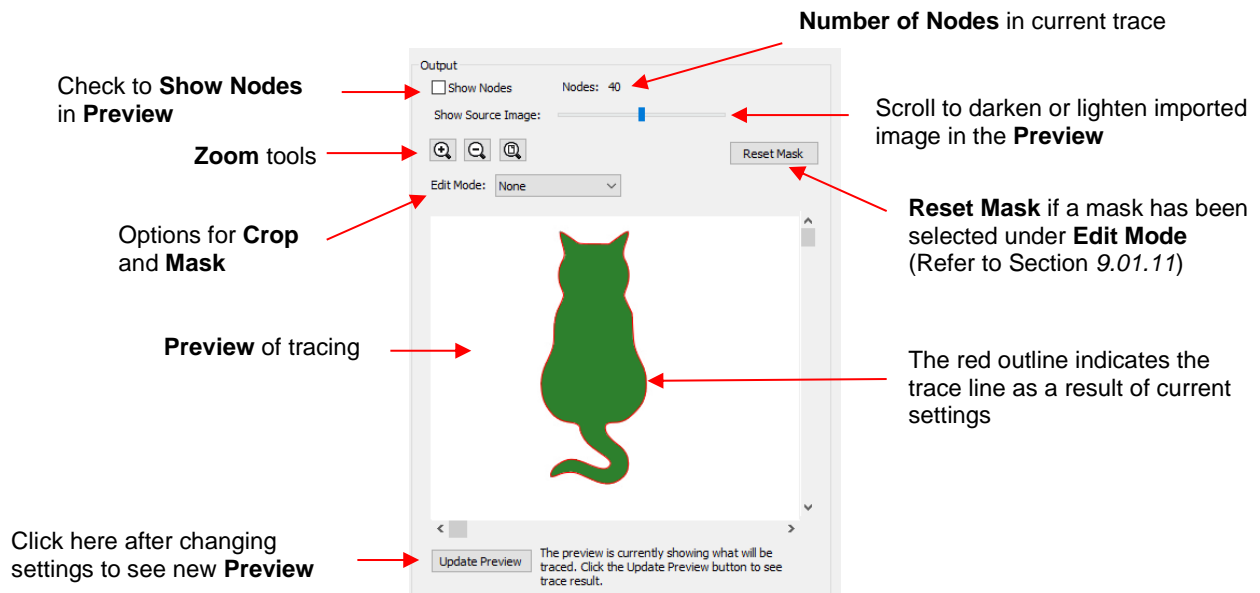
- ◇ Check the **Use Alpha Channel** box if the imported file is a PNG file with a transparent background. The transparent background is easily identified by the trace program requiring very little adjustment to other settings. Refer to *Section 9.03.6*.
- ◇ **Contrast** controls the level of color differentiation included in the trace: lower will include less, higher will include more. Refer to *Section 9.03.2*.
- ◇ **Resample**: choose **x 2.0**, **x 3.0**, or **x 4.0** to increase the pixels in the image which typically provides a more precise tracing of the image. More nodes result but increasing the setting can be especially important in some PNC (print and cut) applications where the cut line needs to precisely follow the printed image. Refer to *Sections 9.03.7* and *9.03.8*.
- ◇ **Despeckle**: mark this option to eliminate the tracing of tiny shapes that are not needed for cutting. Refer to *Section 9.03.4*.
- ◇ **High Pass Filter**: used to improve the tracing of photographs and other challenging images. Refer to *Section 9.03.12*

- **Output Settings**

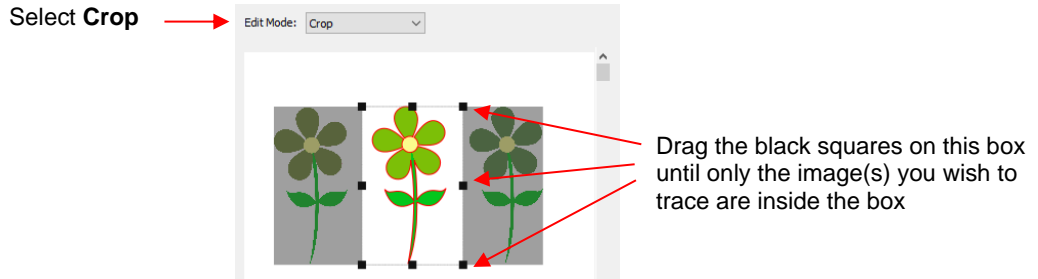


- ◇ **Smooth:** Adjust according to type of image. For example, decrease (make sharper) if tracing a shape with sharp corners like an envelope template. Increase (make smoother) if tracing a shape with soft curves, like a teddy bear. Refer to *Section 9.03.3*.
- ◇ **Detail:** If tiny undesired shapes appear, decrease to filter those shapes out. Refer to *Section 9.03.4*.
- ◇ **Single Line Threshold:** When tracing coloring book images (image with black outlines), use to convert those double lines to single lines. Refer to *Section 9.03.5*
- ◇ **Break Apart Outlines:** Checking the **Break Apart Outlines** box will save a step if different parts of the tracing need to be edited separately or placed on separate layers.
- ◇ **Blackout:** Check this box so that internal shapes (child shapes) are not included in the tracing. Refer to *Section 9.03.5*.
- ◇ **Add Image Layer:** Check this box if a copy of the imported image will be needed, such as for a print and cut application. The result will be two layers grouped: one will be labeled “Print” and the other layer will be labeled “Cut.” Refer to *Section 9.03.7*.

- **Output**

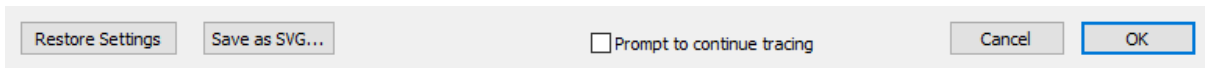


- ◇ Most of the settings in the **Output** section do not affect the final result, with the exception of the **Crop** and **Mask** functions in the **Edit Mode** menu. The other settings only affect the **Preview** so adjust as desired.
- ◇ **Edit Mode: Crop** When you select the **Crop** option, a rectangle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



- ◇ **Edit Mode: Draw Mask** This option allows you to add or subtract parts of the image you want to include or exclude from the trace. Refer to *Section 9.03.11* for details on how to use this function.

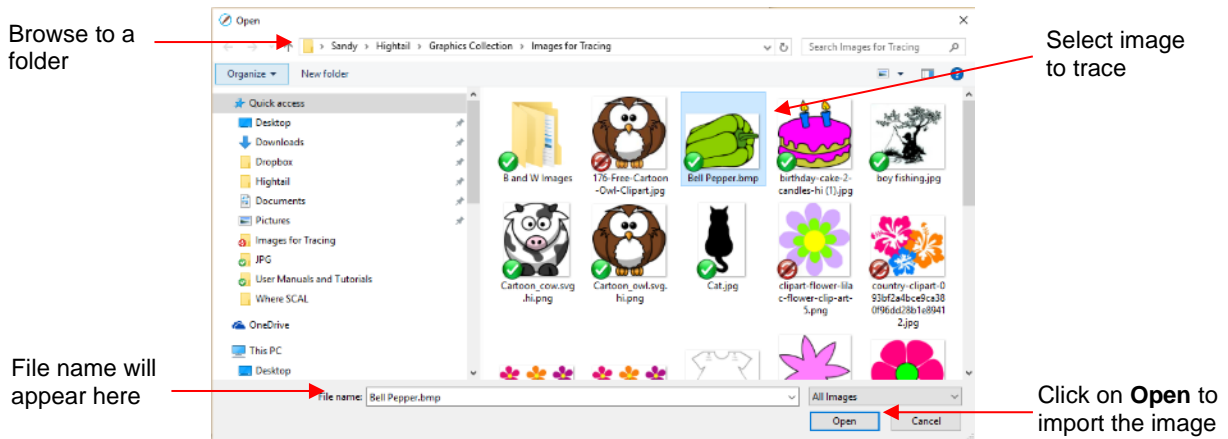
• **Bottom of the Screen Settings**



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

9.03.2 Monochrome Trace of a Colored Image: Effects of Contrast

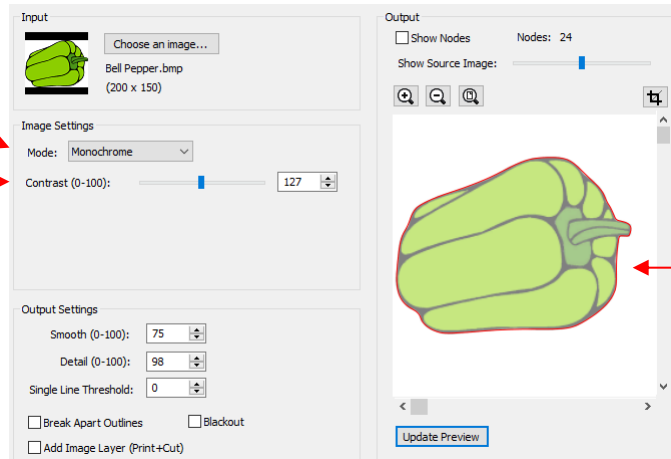
- Start by clicking on **Choose an image** in the **Input** section and then browse to locate the raster file you wish to trace:



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

Monochrome is selected

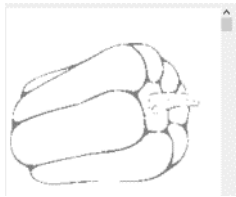
Contrast is at default of 127



Single trace line

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

Contrast set at 5



Too low, parts of the image are not traced

Contrast set at 75



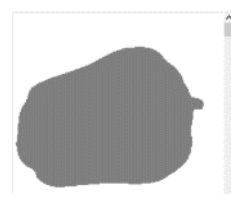
All parts of the image are traced

Contrast set at 100



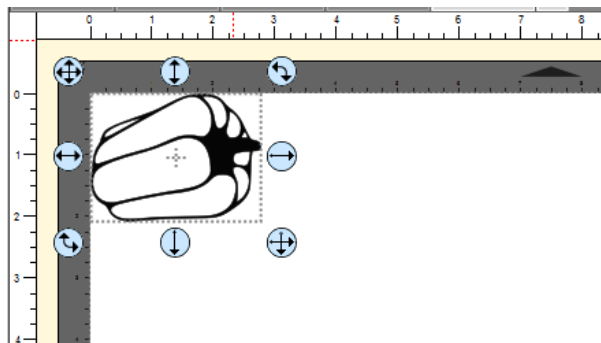
Parts of the internal detail are filled in

Contrast set at 120



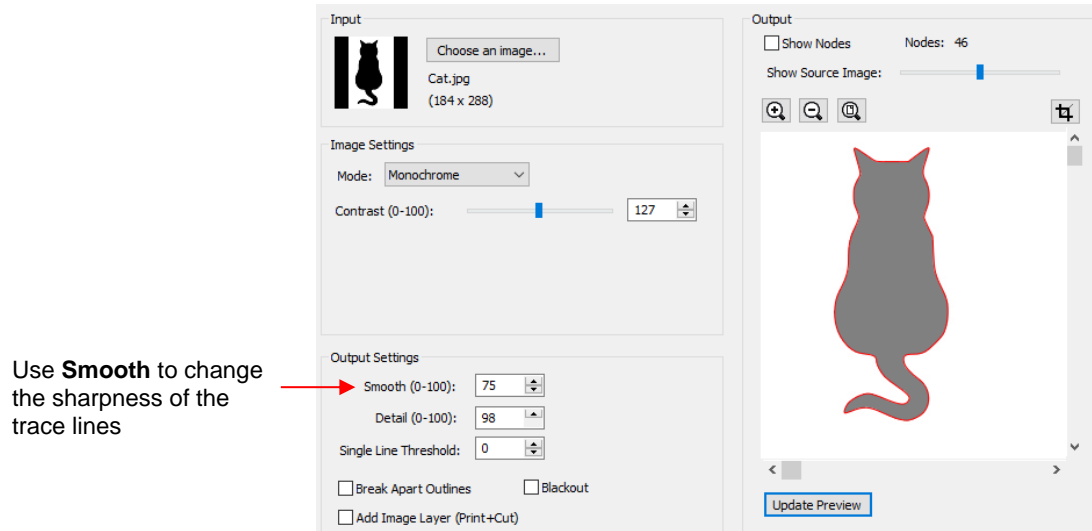
All of the details are filled in: single trace

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

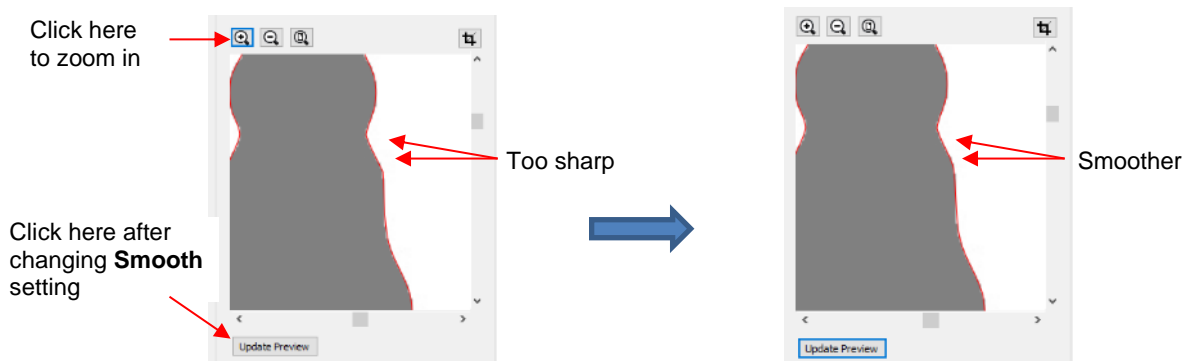


9.03.3 Monochrome Trace of a Silhouette Image: Effects of Smooth

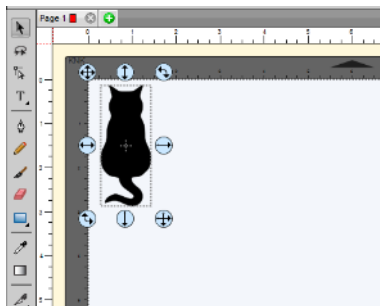
- As mentioned at the end of *Section 9.02*, silhouette images typically offer an easy trace. In this next example, a silhouette cat image is imported into the **Trace Image** window. Because this is a silhouette image, **Monochrome** mode is chosen and the image appears to have traced very well. However, upon a closer look at the right side of the cat, it appears that the neck area is a bit sharp:



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



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

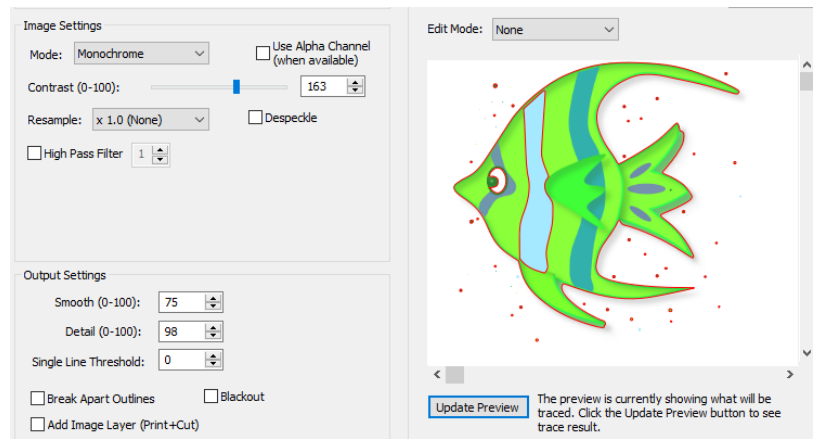


9.03.4 Monochrome Trace of a Detailed Image: Effects of Despeckle and Detail

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

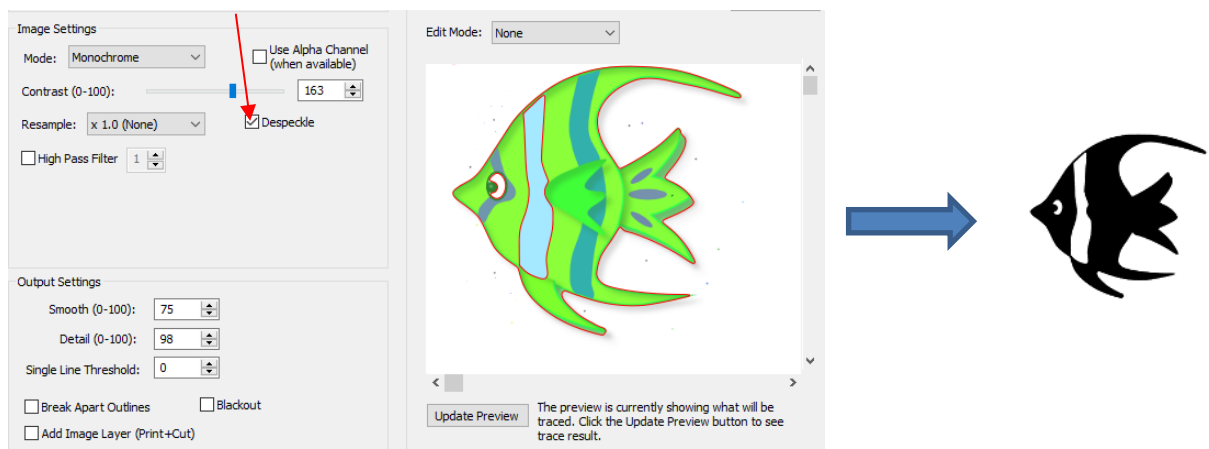
Despeckle

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



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

Check the **Despeckle** option



Detail

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



Detail: 95



Detail: 50



Detail: 25



Detail: 0

◇ Even with **Detail** set at 0, there are still shapes of a certain size in that particular image that will be included in the trace. Again, there are editing tools that can be used in case more of the small shapes need to be removed. Refer to *Section 10.06*.

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



Despeckle: Off

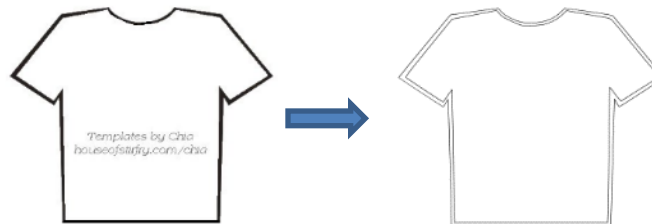


Despeckle: On

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

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

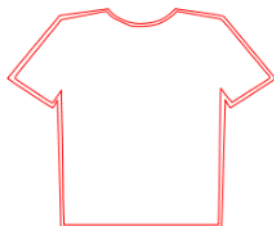
- The **Single Line Threshold** setting is useful when the imported image had a black border around it and you do not want a double line trace. For example, if the following T-shirt image is traced using default settings, two trace lines result: one line is following the outside of the black border while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



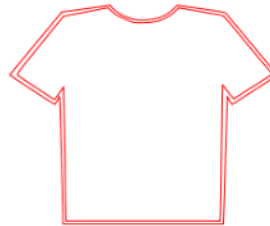
Original image

Trace of image

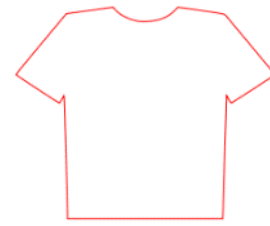
- To have only one trace line, increase the **Single Line Threshold** setting until there is only a single line showing in the **Preview** window:



Single Line Threshold = 0
double line

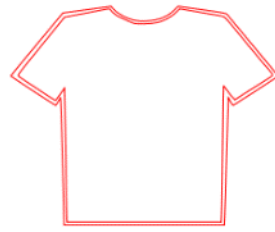


Single Line Threshold = 5
double line

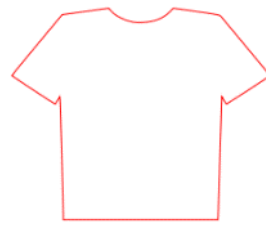


Single Line Threshold = 10
single line

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

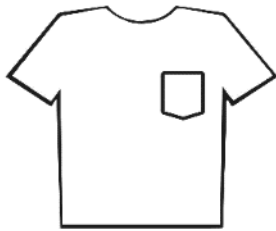


With **Blackout** unchecked

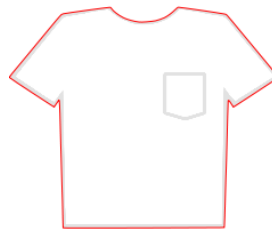


With **Blackout** checked

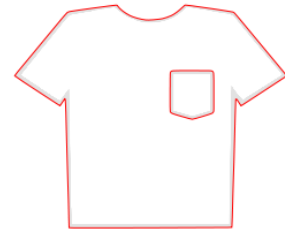
- ◇ However, if the T-shirt had internal details, such as a pocket, then **Blackout** could not be used as the entire pocket would have been ignored. In this situation, **Single Line Threshold** is the better choice:



Original image



Preview of trace with **Blackout** checked



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

9.03.6 Monochrome Trace of a PNG File with a Transparent Background

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

Select **Monochrome**

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

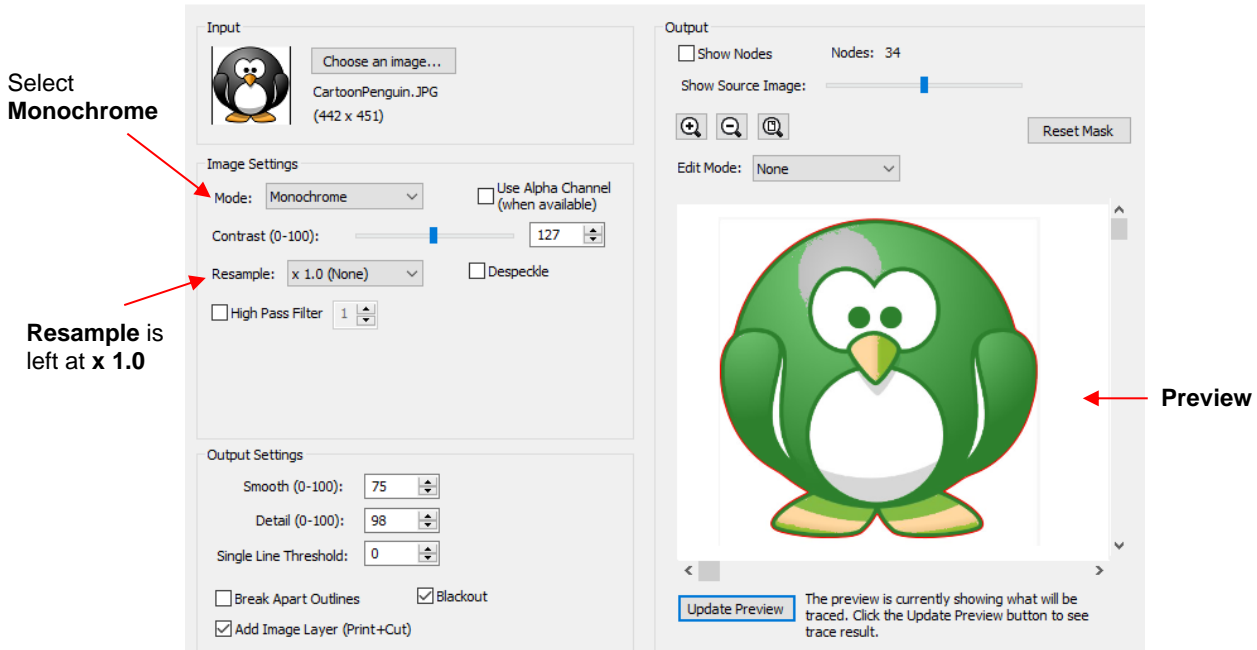
Preview – trace appears and needs no changes to **Contrast**

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

- ◇ **Contrast:** It shouldn't be necessary to adjust this setting because of the transparent background
- ◇ **Smooth:** In some cases, it might be necessary to decrease **Smooth** to get a tighter fit for a print and cut application. Alternatively, you can also create an **Inset** after the trace, when needed. Refer to the **Inset Offset** option in *Section 10.05*.

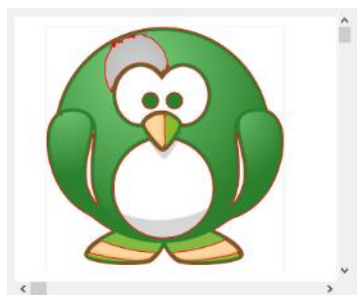
9.03.7 Monochrome Trace for a Print and Cut Application: Effect of Resample

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



- Before clicking on **OK**, note two settings that have also been marked:

- ◇ **Blackout:** apply if there are internal cut lines that are not needed. In this example, only the outside of the penguin needs to be traced. Thus, applying **Blackout** will remove the internal cut lines showing in the **Preview**:



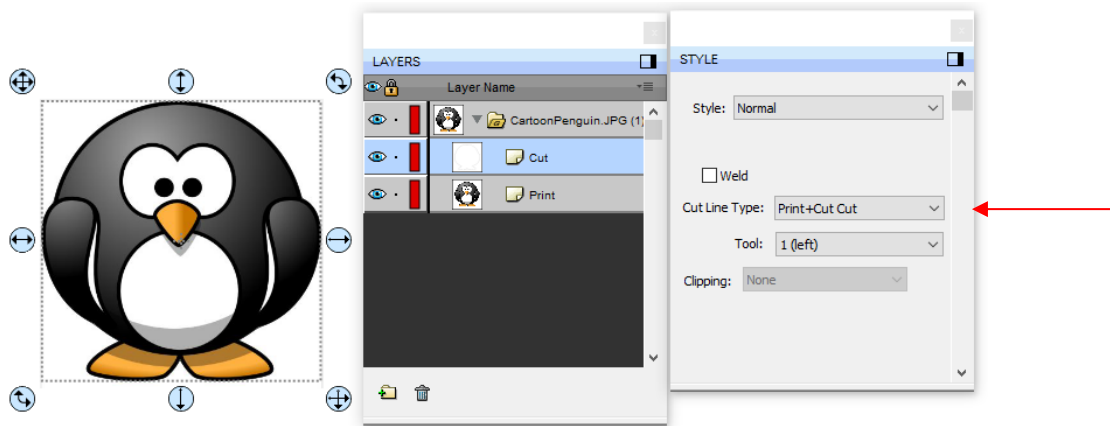
Preview of trace with **Blackout** not checked. Note the internal red lines that would be cut.



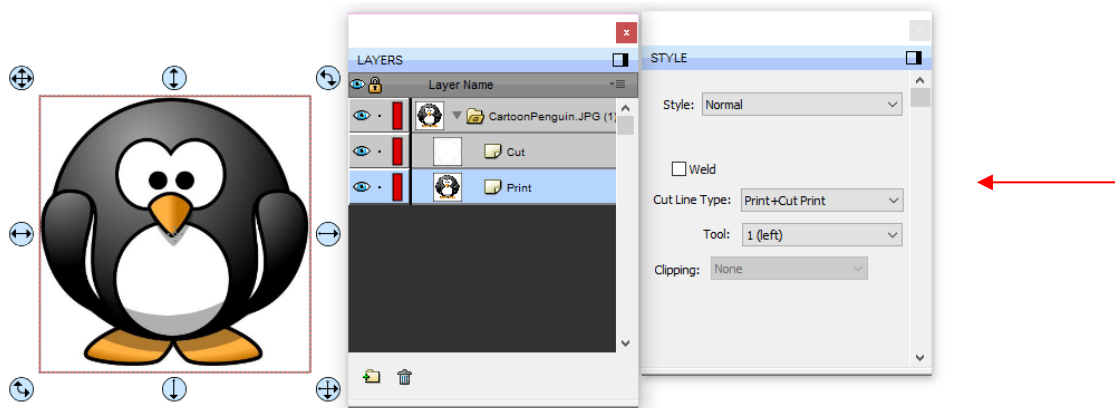
Preview of trace after **Blackout** is checked. The internal red cut lines are removed.

- ◇ **Add Image Layer (Print + Cut):** Mark this box so that the original image is also imported onto the **Cutting Mat**. Note that if you check the **Style Panel** settings on each layer, one will be assigned as **Print + Cut Cut** (layer can only be cut, not printed) and the other will be assigned as **Print + Cut Print** (layer can only be printed, not cut). Click on **OK** and the following layers appear:

Cut Layer Assignment



Print Layer Assignment



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

Select **Monochrome**

Resample is changed to **x 2.0**

Preview

Input
 Choose an image...
 CartoonPenguin.JPG (442 x 451)

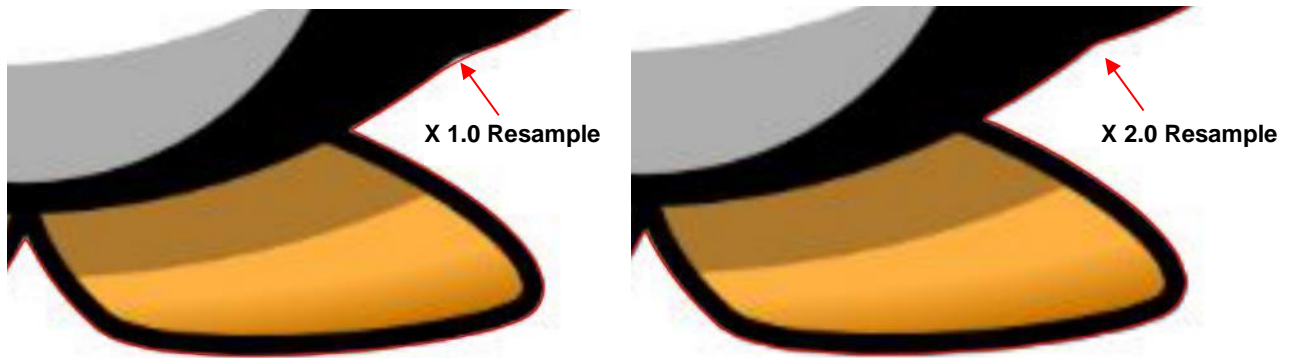
Image Settings
 Mode: Monochrome Use Alpha Channel (when available)
 Contrast (0-100): 127
 Resample: x 4.0 Despeckle
 High Pass Filter 1

Output Settings
 Smooth (0-100): 75
 Detail (0-100): 98
 Single Line Threshold: 0
 Break Apart Outlines Blackout
 Add Image Layer (Print+Cut)

Output
 Show Nodes Nodes: 209
 Show Source Image: [Slider]
 Edit Mode: None
 Reset Mask

Update Preview The preview is currently showing what will be traced. Click the Update Preview button to see trace result.

- If you compare the **Preview** in both cases, there doesn't appear to be a difference in the trace. However, if you select the *Print + Cut Cut* layer on the **Layer Panel** and change the **Stroke** to a bright color and then zoom in closely, you can clearly see places where the **x 2.0 Resample** resulted in a tighter fit:



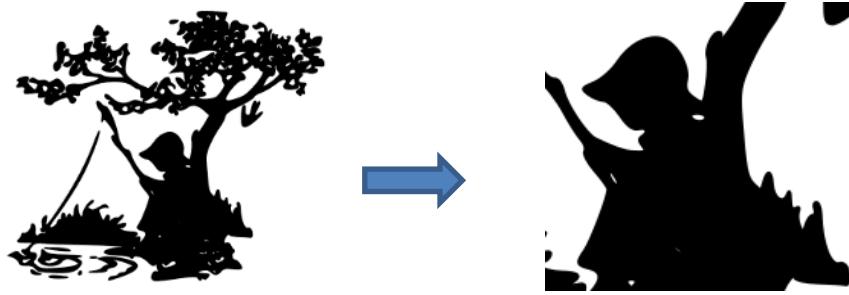
- In *Section 9.03.3*, it was shown how the **Smooth** setting affects the trace line. This setting can also be tested on PNC tracings as a way of getting a better fit, by decreasing the value. Alternatively, you can also create an **Inset** after the trace, if needed, to create a path that will cut just inside the image. Refer to the **Inset Offset** option in *Section 10.05*.

9.03.8 Resample Versus Smooth and the High Pass Filter

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



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



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



X 1.0 (None) Resample



X 2.0 Resample

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



Smooth = 75



Smooth = 70

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



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

- After applying and getting the trace onto the **Cutting Mat**, you'll need to apply **Object>Break Apart** and eliminate some unwanted paths. Alternatively, you can use the **Draw Mask** option to edit while still in the **Trace Image** window. Refer to *Section 9.03.11*.
- ◇ For more details on the **High Pass Filter**, refer to *Section 9.03.12*.

9.03.9 Color Layers Trace

- As mentioned in *Section 9.03.1*, **Color Layers** might be a good mode to choose for a paper piecing or layered vinyl project if you want under-layers present. In this section, a flower that has two shades of pink and two shades of green is chosen:



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

Select **Color layers**

Scroll to select number of colors to identify

Colors identified

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

Preview

Click here after every change

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

Max Colors increased to 6

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



Max Colors = 4 produces 3 layers

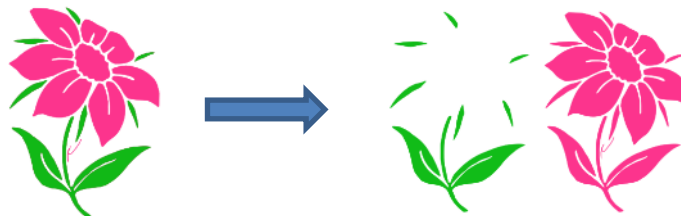


Max Colors = 6 produces 5 layers

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



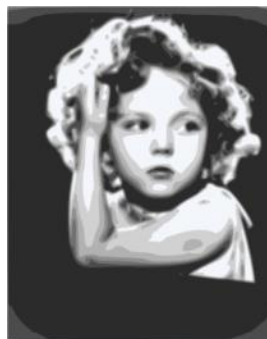
- The result is this:



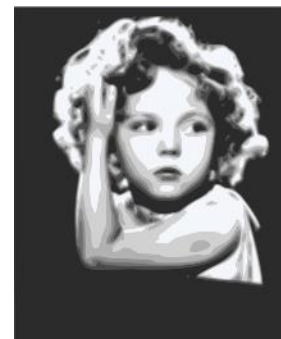
- A useful application for the **Color Layers** trace option is converting a photo (or another image) into a contoured cut project. Thanks to Leslie Merriett for sharing this project:



Original Photo



Color Layers Trace
Max Colors: 7



After darkest layer
expanded to fill
background



After cutting and assembling

9.03.10 Single Color Trace

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

Current color

Select **Single Color**

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

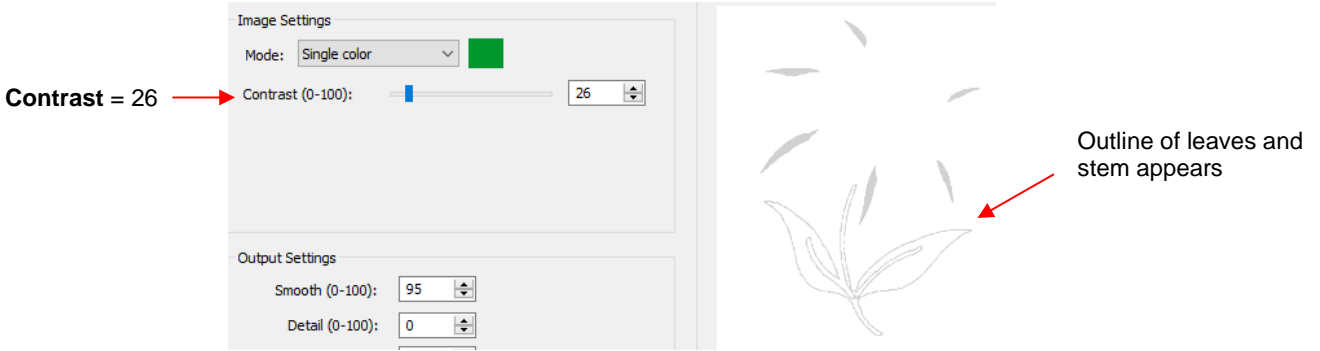
Mark this box

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

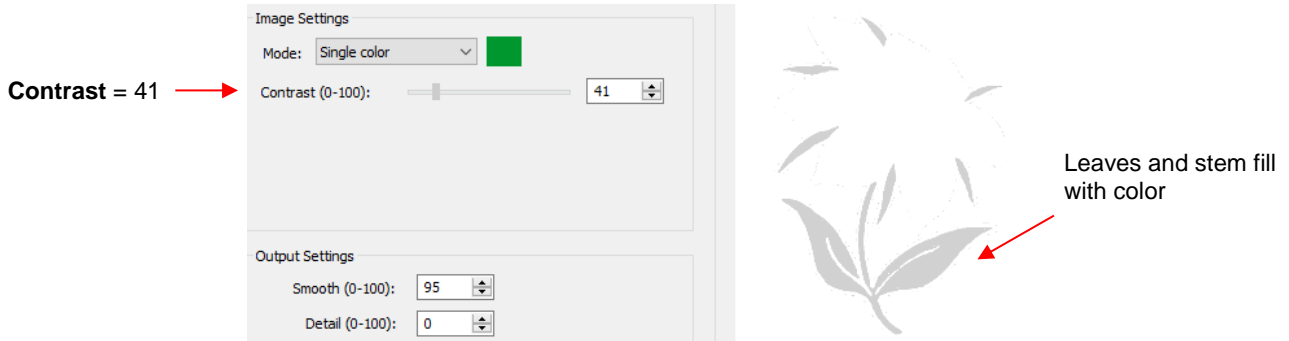
Preview

Click here after every change

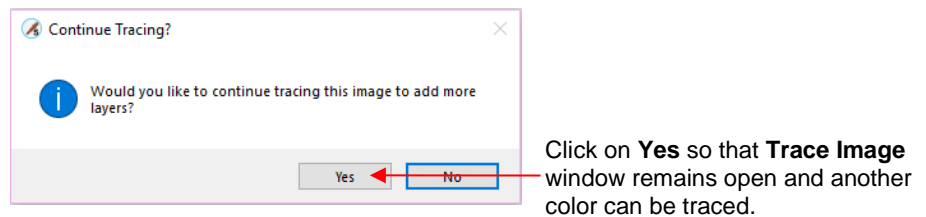
- Mark the option for **Prompt to continue tracing**. After you import each color to the **Cutting Mat**, the **Trace Image** window can be kept open to trace the next color.
- In the screenshot, the initial color identified was a shade of green. In the **Preview**, you can see how many parts of the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



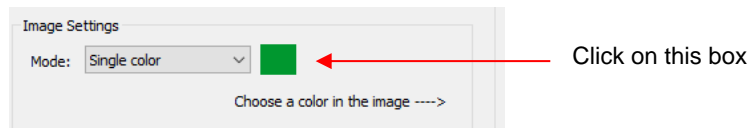
◇ With a **Contrast** of 41, the leaves and stem fill:



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



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



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



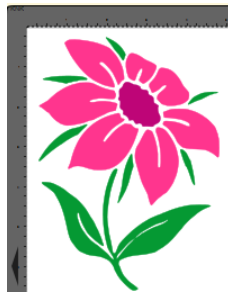
- The process is then repeated whereby the **Contrast** is increased. At a value of 30 more of the same petals are filled out, thus it is recommended to always tweak the **Contrast** some:



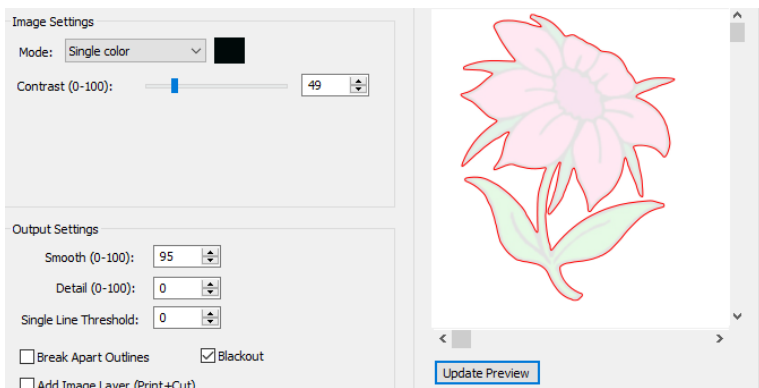
- If the **Contrast** is increased even higher, the center part of the flower gets added. Just as in the case of using **Color Layers**, this is optional.



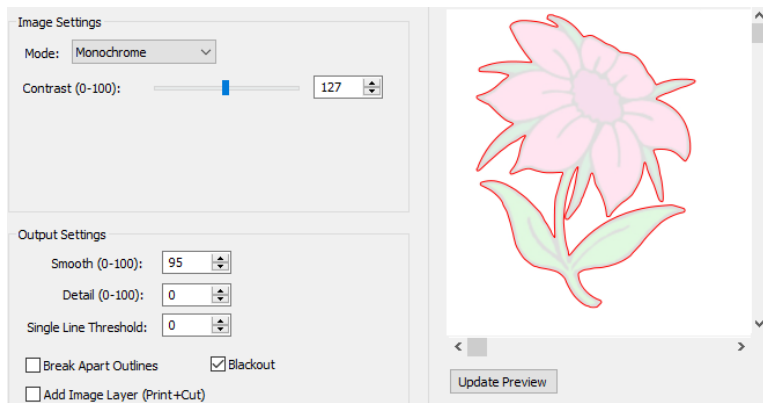
- After deciding on the **Contrast** for pink, click on **OK**. Now, let's assume that you did the petals and center in two parts and you are now at this point:



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



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



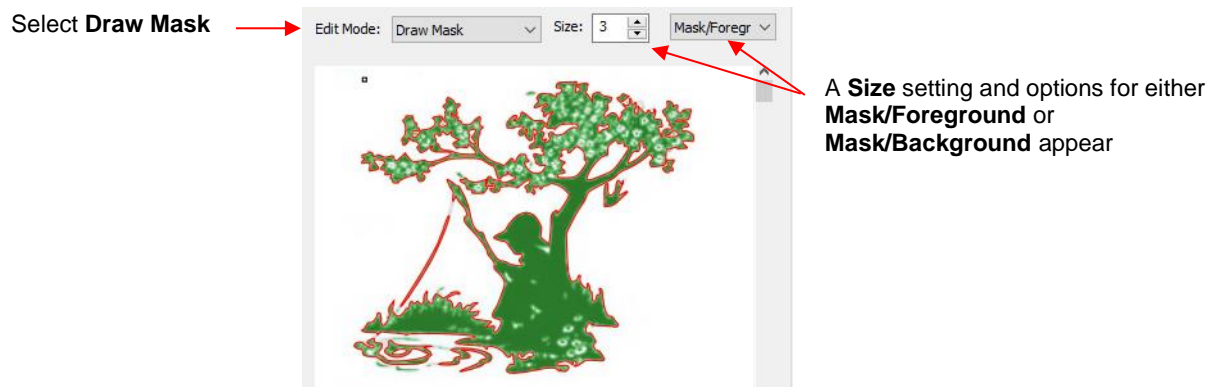
◇ Forgo using the **Trace** window. Select the layers traced so far and use the **Shadow Layer** function to add a black outline. Details of this procedure are covered in *Section 11.05*.

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

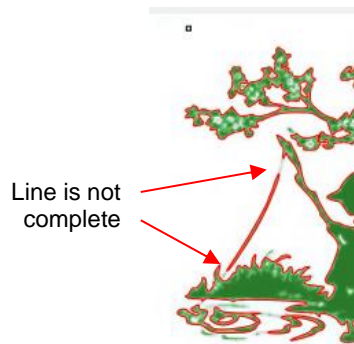


9.03.11 Draw Mask Function

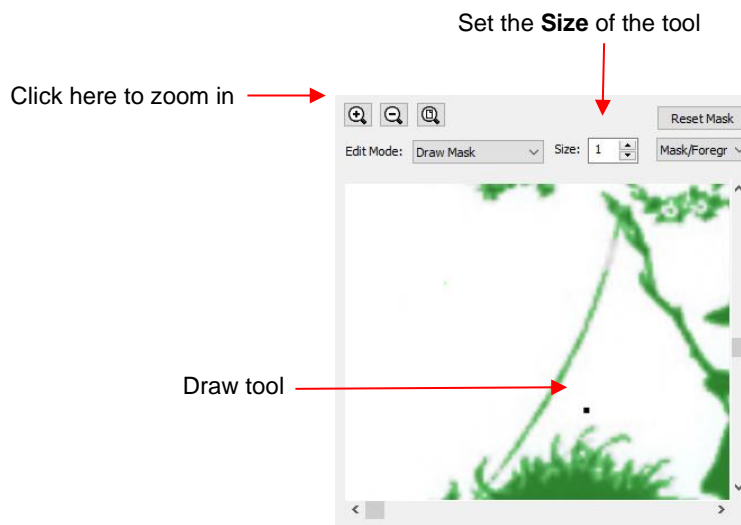
- In the **Output** section of the **Trace Image** window, under **Edit Mode** is a **Draw Mask** option which can be used to erase or add to a trace. With some images, finding the trace optimum settings can be tricky. You'll end up with some parts not quite traced and, perhaps, other parts not needed.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



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



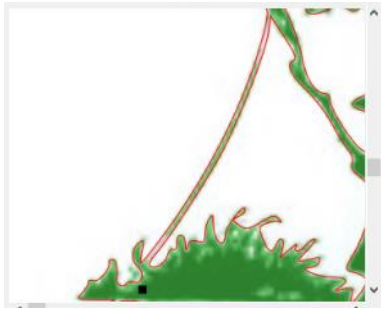
- ◇ Zoom in using the **Zoom In** icon and change the **Size** setting until the circle ~ matches the size of the fishing line. In this instance, the minimum of 1 will work best because the fishing line is so thin:



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

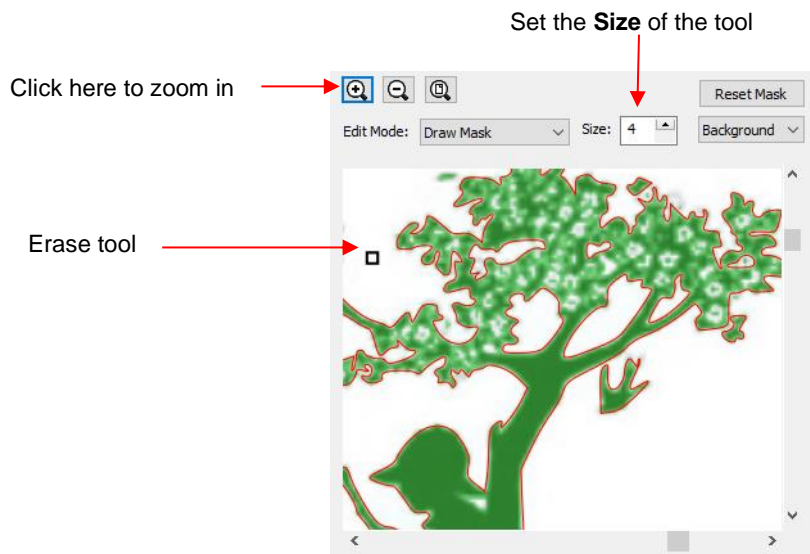


- ◇ Click on **Update Preview**. The added paths will be automatically welded to the part of the fishing line that was traced:

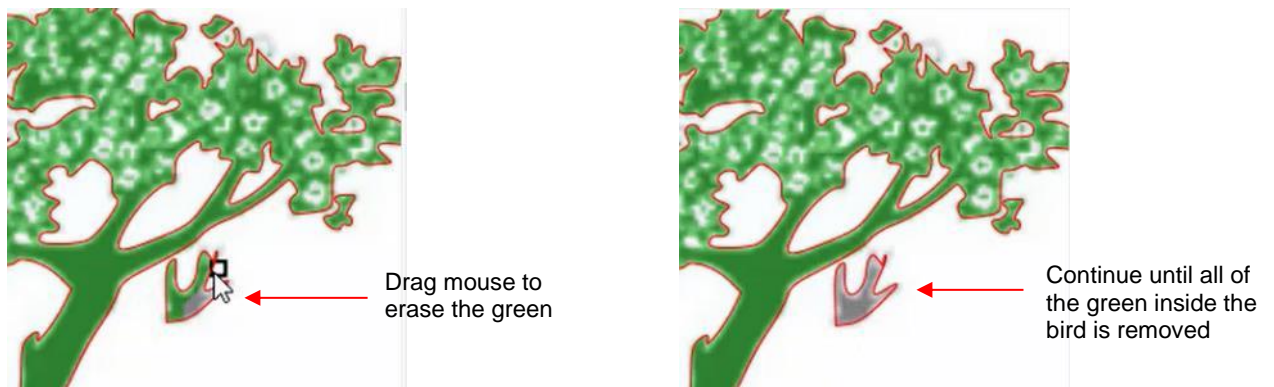


- **Background:** This option allows you to erase anything that's not wanted in the current tracing. For example, the bird just to the right of the tree, can be removed.

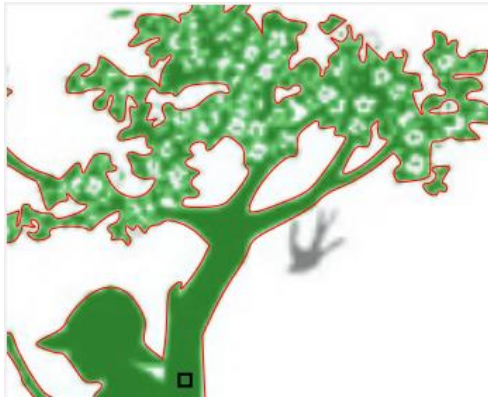
◇ As before, zoom in and set a **Size** for the tool:



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



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



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



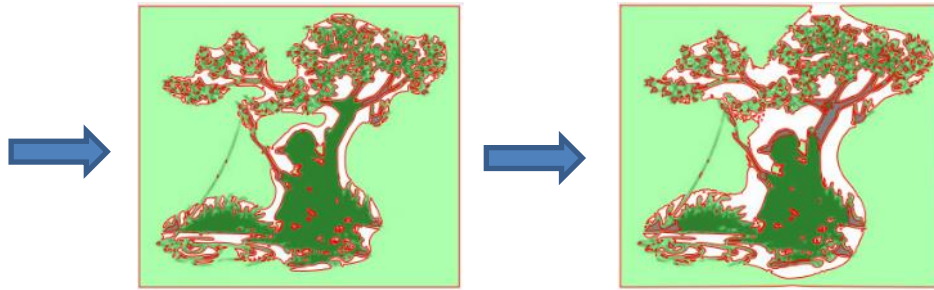
9.03.12 High Pass Filter Application

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

Improved Detail

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

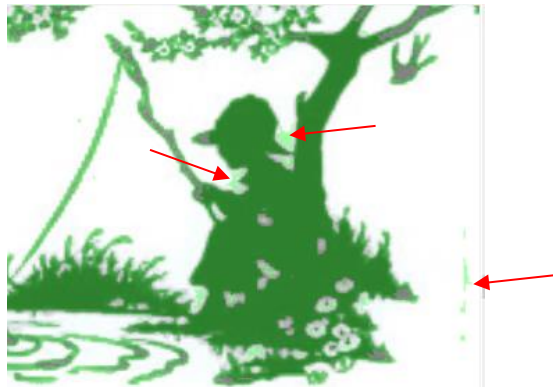




- The first step is to lower the **Contrast** back to the default setting of 127. The **High Pass Filter** setting is then set at 1 and a double trace line appears. As **High Pass Filter** is increased, the internal lines start to diminish:



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



- At this point, you can try adjusting the **Contrast**. However, if you are satisfied with most of the trace lines, you can then use the **Draw Mask** function, from *Section 9.03.11*, to erase these extra unwanted lines and to fill in any areas within the image. The final result:



Converting a Photo to a Digital Stamp

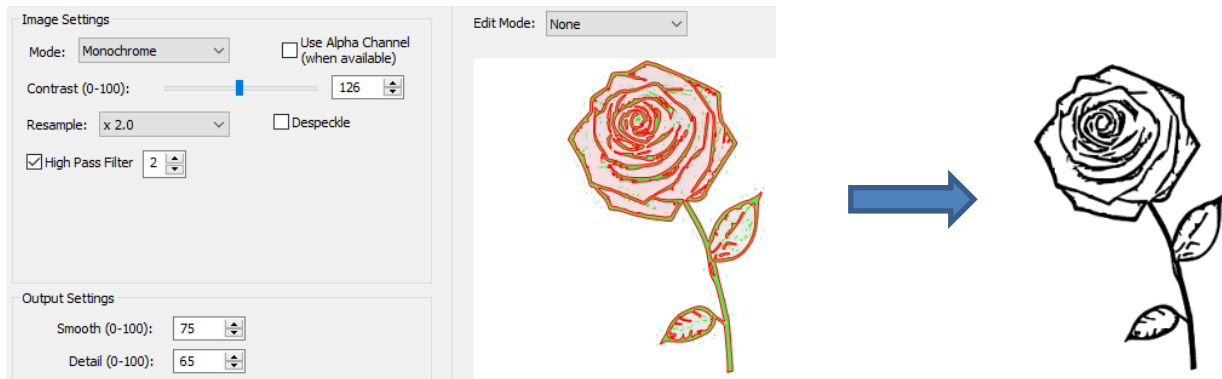
- The **High Pass Filter** setting will allow a much better conversion of a photo to a black and white image. The following photo of a rose will be used as the example:



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




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



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

9.04 Draw Functions

9.04.1 The Draw Tool

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

Drawing Straight Lines

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



Left click once to begin.



Move cursor to where you want to finish the line.



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

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



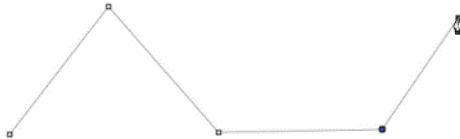
Left click to start and left click at a 2nd location



Move to a 3rd location and left click again.



Move to a 4th location and left click again.

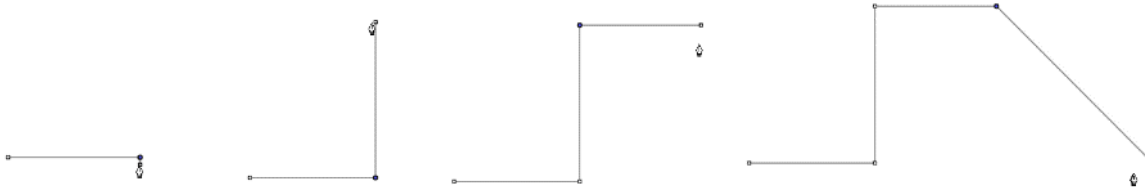


Move to a 5th location and left click again.



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

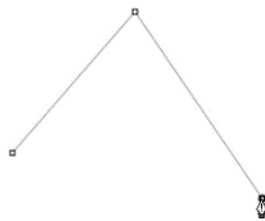
- If you want to draw perfectly vertical lines, perfectly horizontal lines, or lines at a 45° angle, hold the **Shift** key while clicking:



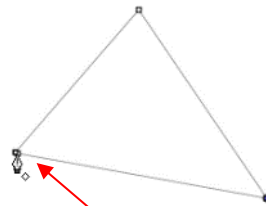
- Note that if you are on a Mac and you draw a 45° diagonal, you need to release the **Shift** key before clicking.
- If are drawing a closed path then, just as the mouse cursor approaches the starting node, a small diamond will appear next to the cursor and you can click one last time to end the process.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



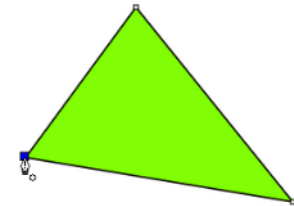
Left click to start and then left click at a 2nd location



Move to a 3rd location and left click again



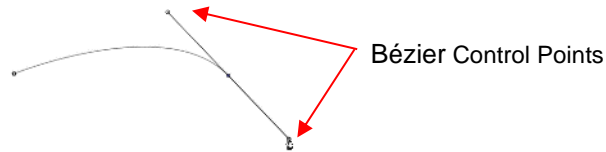
As you approach the start, watch for the cursor change.



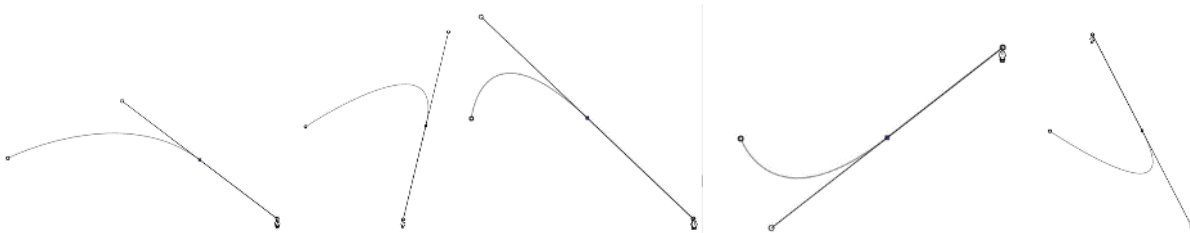
Left click and the shape will close and fill with color

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 10.10*).
- To draw a curve, use your mouse to left-click once where you want to begin the curve. Then, instead of left-clicking, hold the left mouse button down and begin dragging the mouse. Continue holding the left button and notice a second line appears with two circles at either end. These are called Bézier control points:



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



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

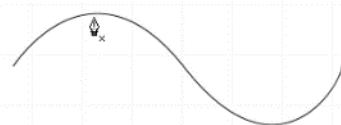


- ◇ Release the left mouse button and press the **Esc** key or press the **Enter** key to stop the drawing process:

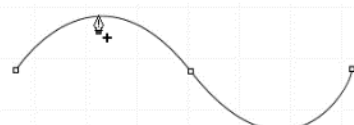


Adding and Deleting Nodes

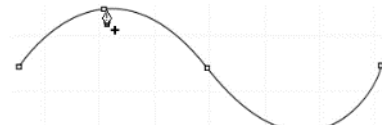
- Zoom in on the curve, select it, and then click on the **Draw Tool** icon.
- To add a node, move the cursor next to the path and watch for the cursor to change. With the cursor right on the path, left-click to add a node:



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



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

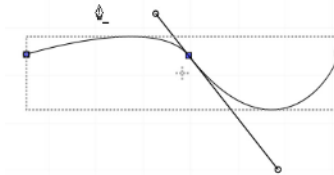


New node has been added

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




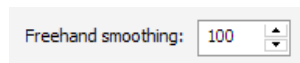
Once the cursor changes and the node turns blue, left click



The node is deleted and the curve will change accordingly

9.04.2 Freehand Drawing

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



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



smoothing: 0



smoothing: 100

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




Freehand tree



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

9.04.3 Brush Drawing

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



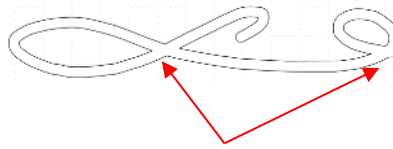
- Select the **Size** you desire and freehand draw:



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



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



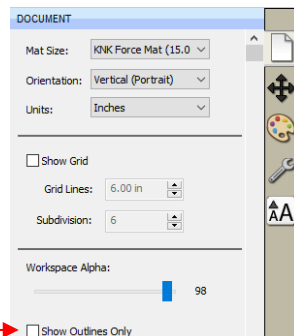
Overlaps automatically removed

9.05 Manual Tracing of an Imported Image

- Sometimes the quality of an image will fail to yield a good auto-trace. It could be that the image is too small or too detailed. If the image is important to you, then manually tracing offers another option for conversion to a vector cut line.
- The easiest way to manually trace a raster graphic is using the **Draw Tool** presented in *Section 9.04.1*. However, instead of trying to create the Bézier curves as you go, it's faster and easier to simply and quickly click, click, click around the image placing a node wherever the path changes directions. Then you can go back and manually move nodes and drag curves to fit the original image. This process is presented in the next few subsections.

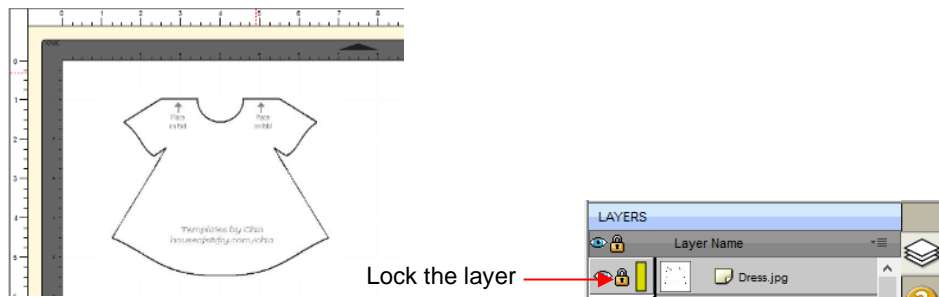
9.05.1 Importing an Image for Manual Tracing

- Since you won't be trying to auto-trace the raster image, use **File>Place Image** to import it onto the **Cutting Mat**. In this tutorial, the *Dress.jpg* file shared at the link in *Section 9.03* will be used.
- While this dress could easily be auto-traced, it provides a great example of how the **Draw Tool** can be used to fit a shape such as this. So, it will be used for the manual tracing example.
- In order to see the image, make sure **Show Outlines Only** is not checked on the **Document Panel**:



Uncheck this option →

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

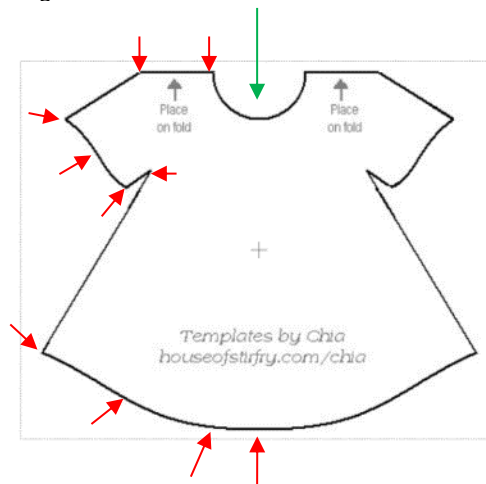


9.05.2 Manual Tracing Using the Draw Tool

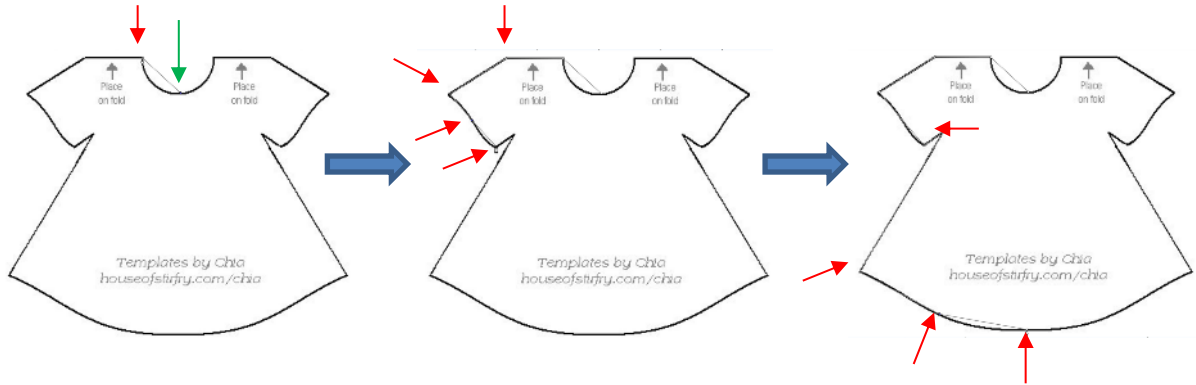
- Make sure you have read *Section 9.04.1* to learn how to comfortably and successfully use the **Draw Tool**.
- Now, the best method for tracing a symmetrical image is to only trace one half. Then you can make a copy of it, mirror the copy, and weld the two together to create a perfectly symmetrical shape. This is what will be done in this case because the dress is symmetrical.
- Before beginning the trace, visually note how many changes in curves and straight lines exist. This will help you understand where to click as you work around the image. But don't overthink it. Remember that you can add nodes, delete nodes and move nodes during the editing process:

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

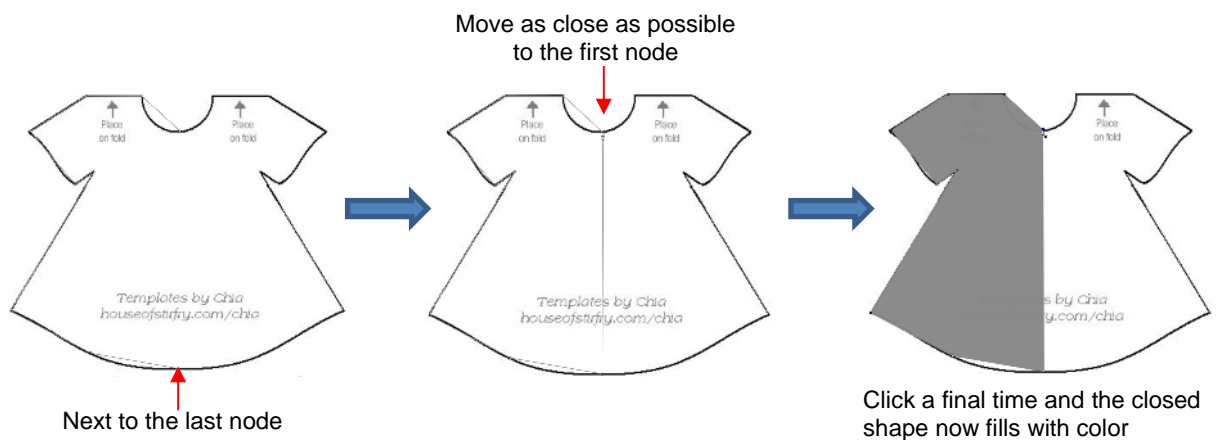
Red arrows indicate where a change in direction or curvature occurs



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




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



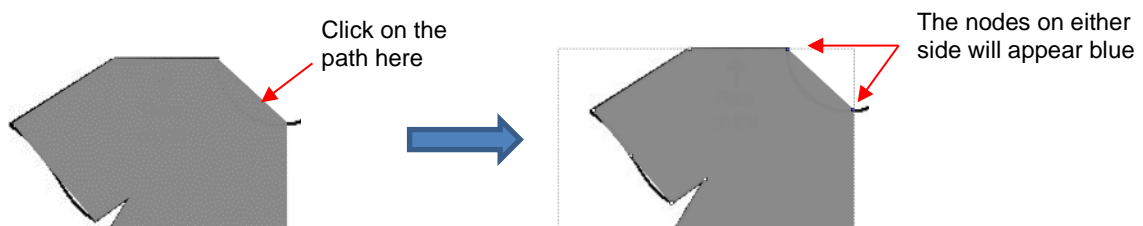
9.05.3 Editing the Trace

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

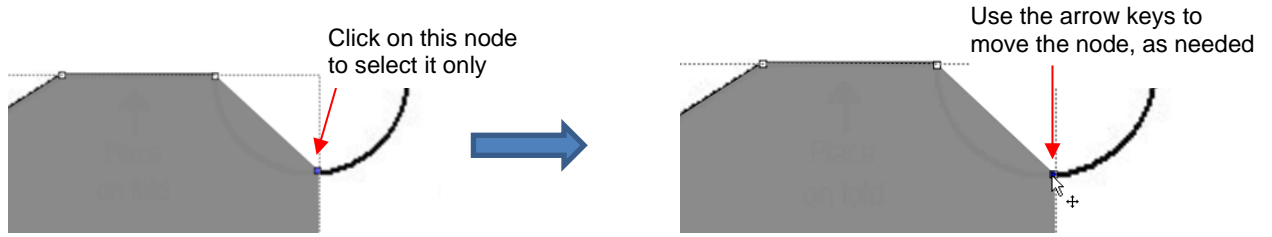
Shape Tool  which is the 3rd icon on the **Tools Panel**. Note that more details about using the **Shape Tool** will be presented in *Section 10.10*. For now, only a portion of this function's capability is needed.

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

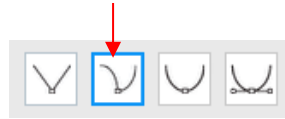
- ◇ With the **Shape Tool** selected, click on the neckline path. The two nodes on either side will be blue:



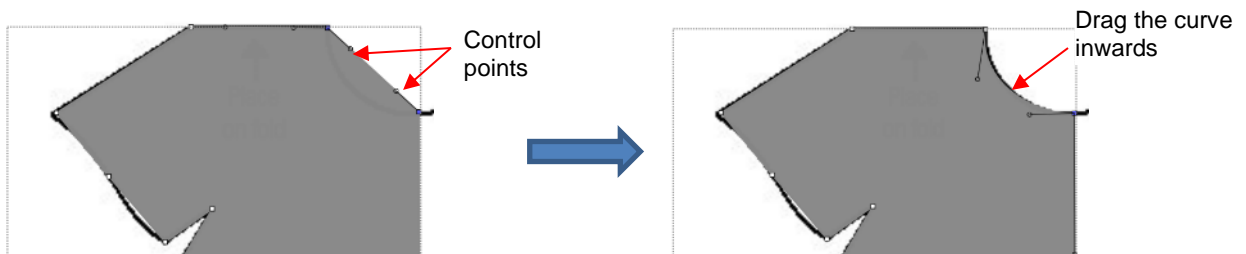
- ◇ If you need to move either node, click on the node to be moved and the other node will turn white. Be very precise in clicking as it is easy to miss the node. If that happens, you will need to click the path again to show the nodes.
- ◇ Once you have the single node highlighted in blue, you can now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



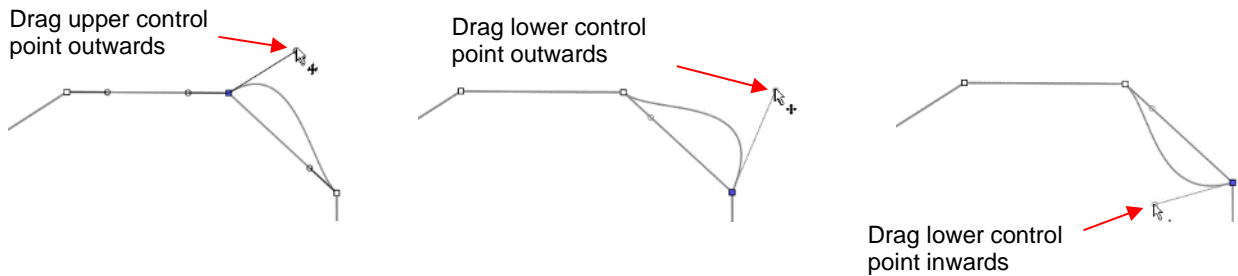
- ◇ Next, click on the second icon on the **Tool Options**:




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



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



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

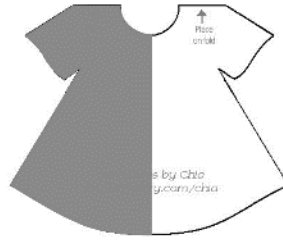
- ◇ Once the neckline is curved, go over to the sleeve and repeat the process for both parts of the sleeve since one side curves inwards and the other side curves outwards. Again, click on the path, click on the 2nd icon on the **Tool Options** , click on the path again and then drag the curve:



Before editing

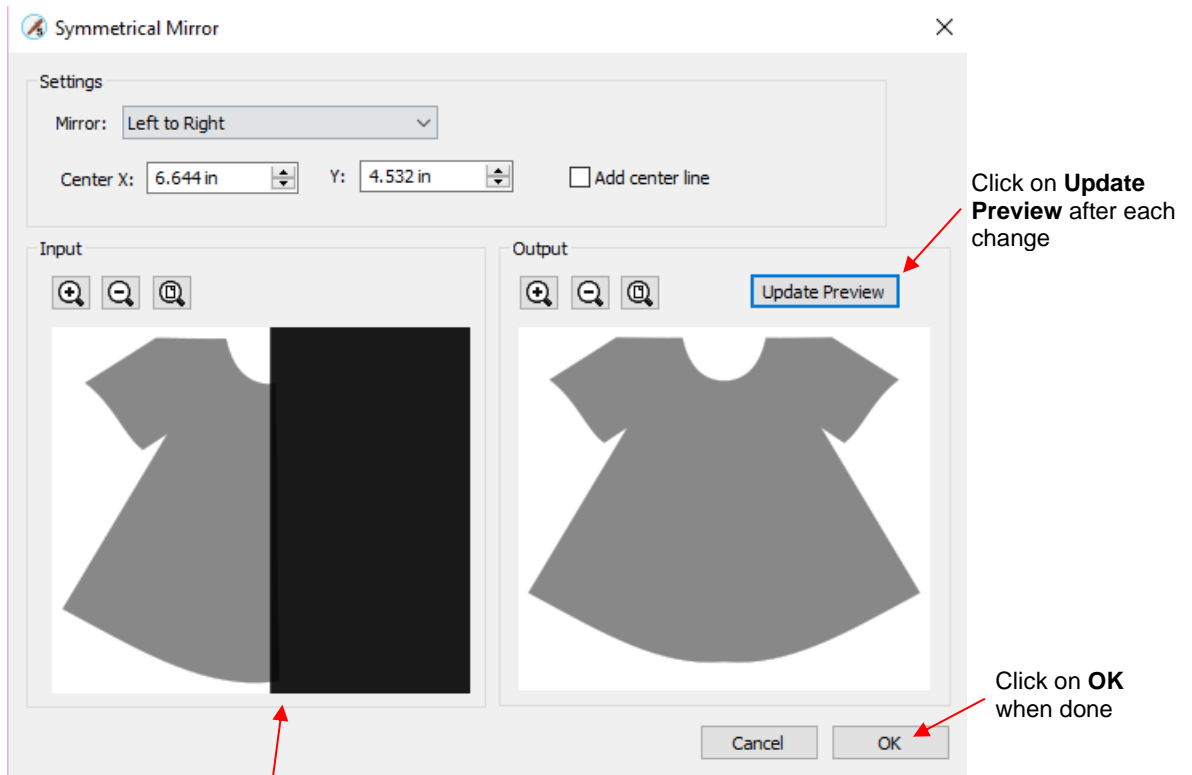
Both parts of the sleeve are reshaped

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



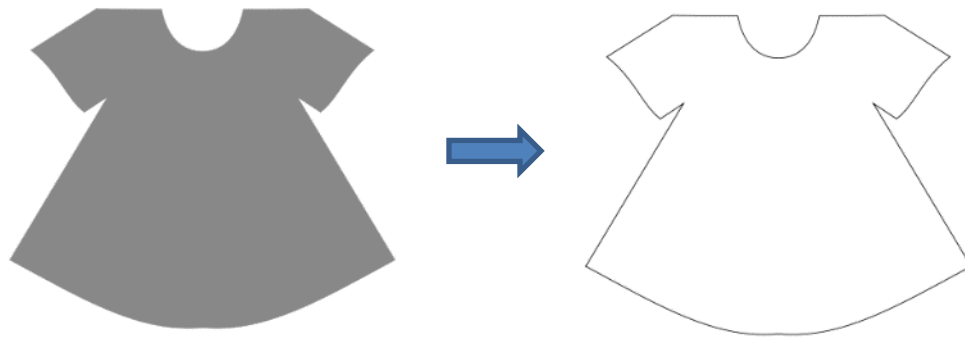
9.05.4 Using Symmetrical Mirror to Complete the Trace

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



Drag black rectangle to desired location (Center X)

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



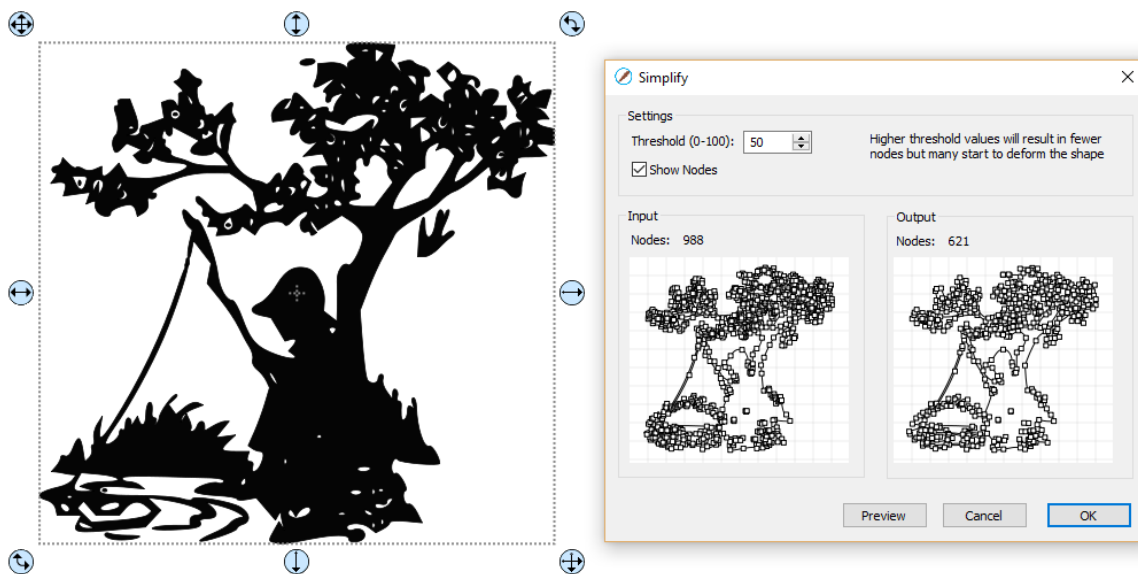
Other applications for **Symmetrical Mirror** are covered in *Section 11.23*.

10. SCAL: Editing

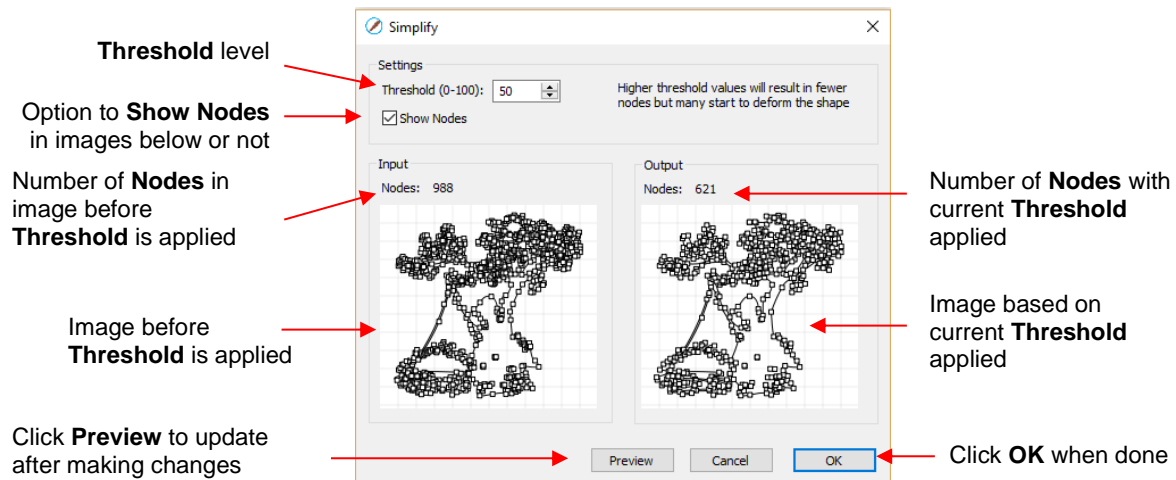
This chapter covers functions that are used to modify shapes in SCAL as well as prepare shapes for cutting. For functions used in designing, refer to *Chapter 7*.

10.01 Simplify

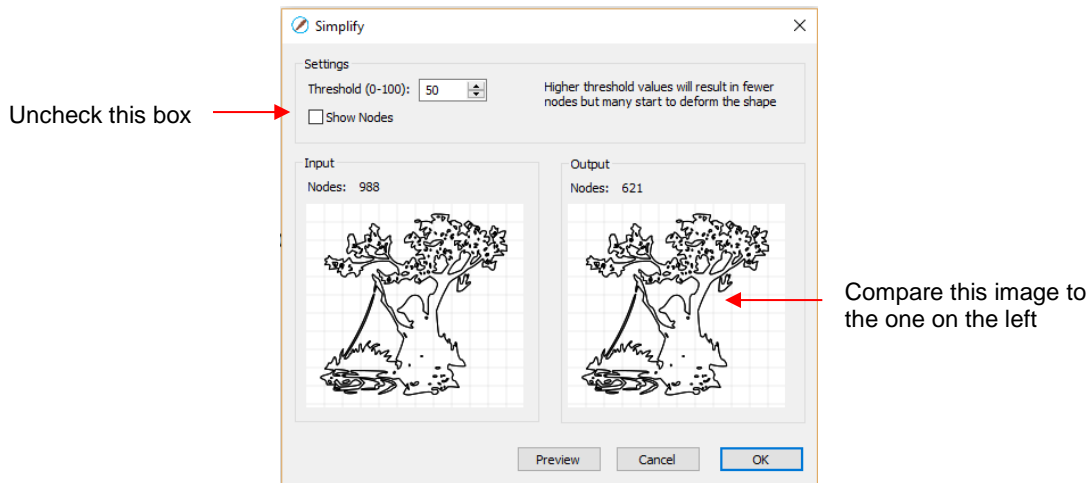
- The purpose of the **Simplify** function is to reduce the number of nodes. This can be important when cutting small vector shapes in which clustering of nodes in tight locations can sometimes lead to poor cutting.
- There are two ways to open the **Simplify** window after selecting a shape:
 - ◇ Right-click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



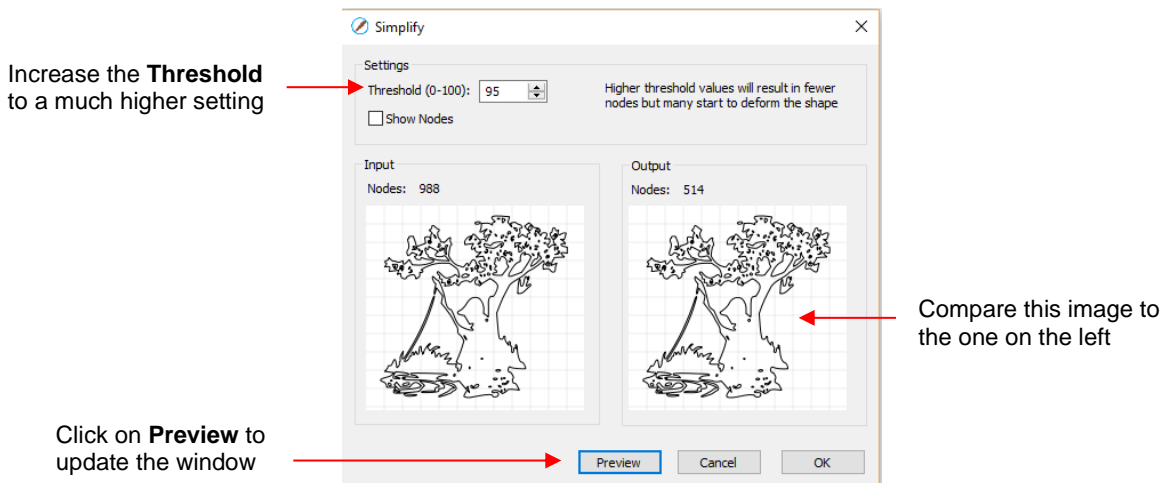
- The **Simplify** window shows the nodes of the selected image in two side-by-side windows: an **Input** and an **Output**, along with the number of **Nodes** in each one. That count is based on the current **Threshold** setting:




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



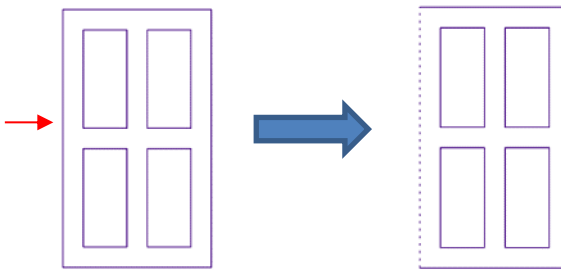
- Try increasing the **Threshold** setting to reduce more nodes. In general, you should be able to use a high Threshold without compromising the image:



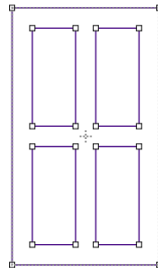
10.02 Split Path

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

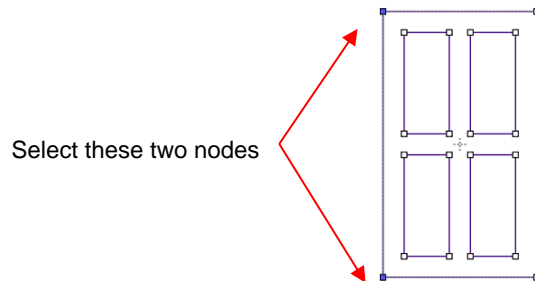
The left side of this paneled door will be separated and made dashed so that the door can be folded to open instead of being cut out




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



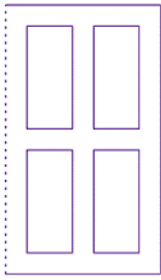
- ◇ Drag your mouse to marquee-select the two nodes on the left side of the window:



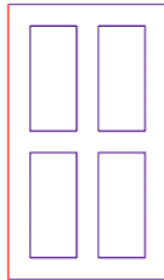
- ◇ Break that path by going to **Path>Split Path**. Then click on the **Select** icon . Now you can separately select that left side line and change to a dashed cut on the **Fill & Stroke Panel**:



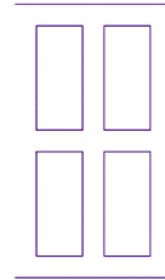
- ◇ The left side of the window will now cut dashed. Alternatively, the left side could have been left solid and scored with an embosser in the cutter or the left side could have been deleted and the fold made by hand:



Left side will cut dashed



Left side will be scored separately

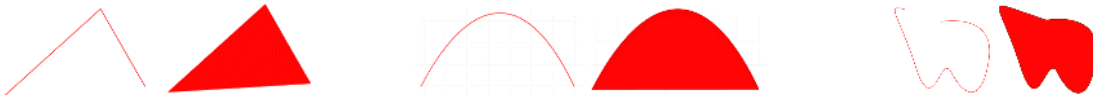


Left side won't cut at all

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

10.03 Close Path

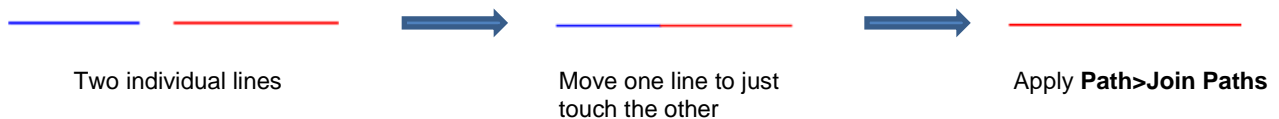
- The **Close Path** function can be applied to any open shape, other than a straight line, to join the start and ending nodes with a straight line:



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

10.04 Join Paths

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

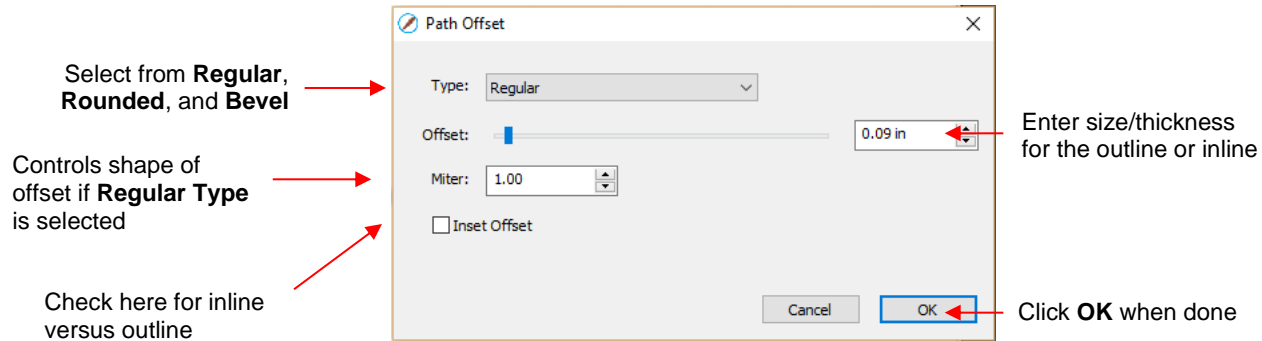


- If you are joining several lines at once, such as these four lines to create a box, then all four lines can be selected at one time and be joined. However, for the new shape to be an actual closed shape, you must then apply **Path>Close Path**:

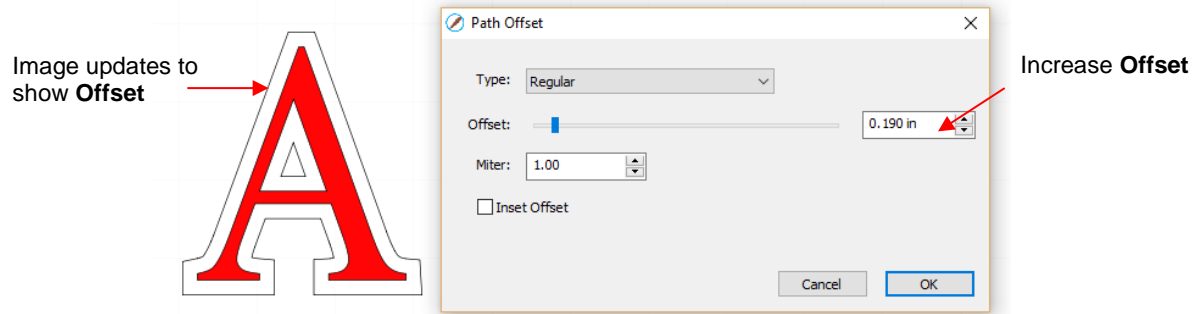


10.05 Path Offset

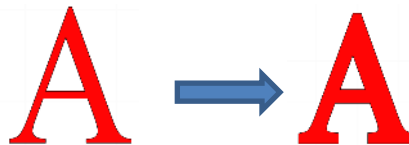
- **Path Offset** creates an outline or inline of a shape and will delete the original upon clicking on **OK**. Note that if you want the original, either make a backup copy or use the **Shadow Layer** function presented in *Section 11.05*.
- To access **Path Offset**, select the shape and go to **Path>Path Offset**:



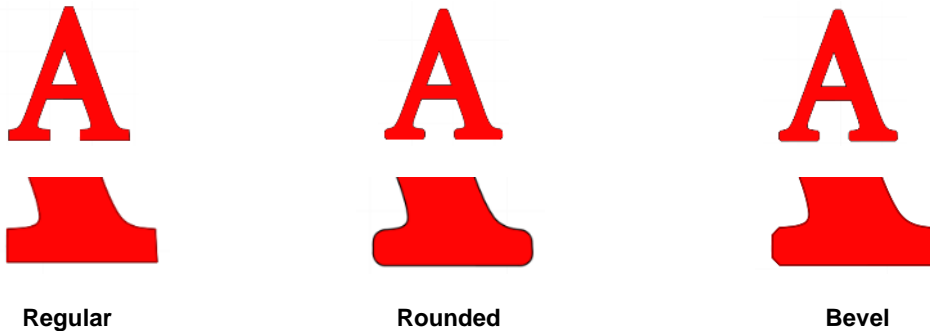
- As you increase the **Offset**, you will begin to see the outline form on your selected shape:



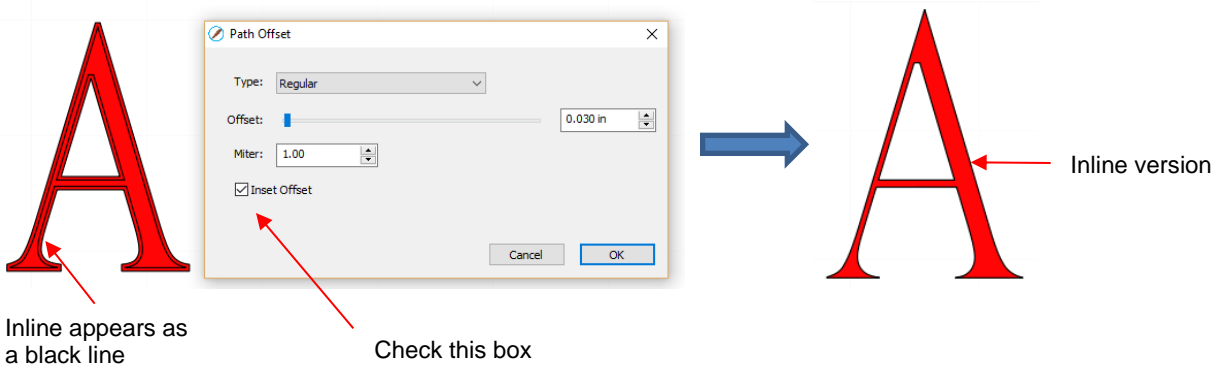
- After clicking on **OK**, the **Offset** will fill with the same color and the original will be deleted:



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



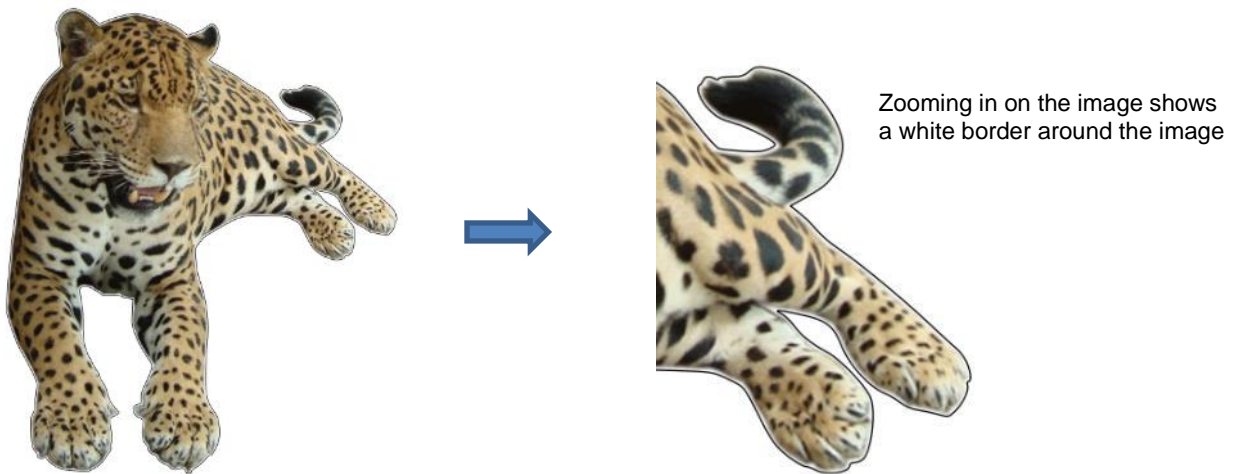
- Note that the first choice, **Regular**, also has a **Miter** setting which should work in the same way as **Miter** affects the **Stroke** (refer to *Section 7.15*). However, at this time, it appears that the **Miter** setting is not working.
- Checking the **Inset Offset** box creates an inline instead of an outline:



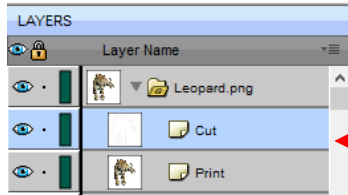
- A practical example of using **Path Offset** is when you have a font that is too thin to cut at the size you need. Applying a very small **Offset** can make the difference in whether or not text can be cut at certain small sizes. In the case below, the 1" lettering was offset by only 0.005":



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



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



Select the **Cut** layer only

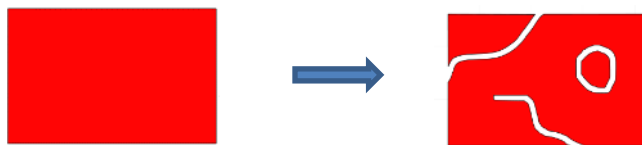
- ◇ Open the **Path Offset** window. Set the **Offset** to a small size, such as 0.03". Be sure to mark the box for **Inset Offset**. The result is a cut line which will eliminate that white border around the image:



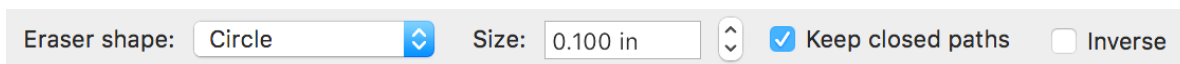
Zooming in on the image shows the cut line is now inside the boundaries of the printed image

10.06 Eraser

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



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



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



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



Keep closed paths checked



Keep closed paths unchecked

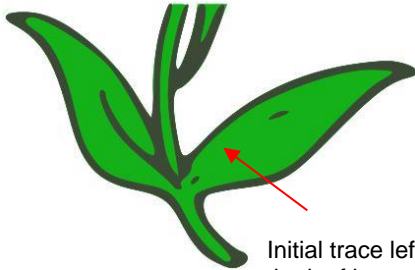


Keep closed paths checked

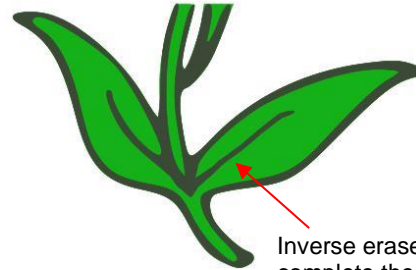


Keep closed paths unchecked

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

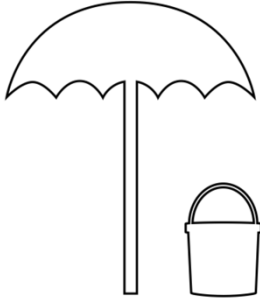


Initial trace left this part of the leaf incomplete

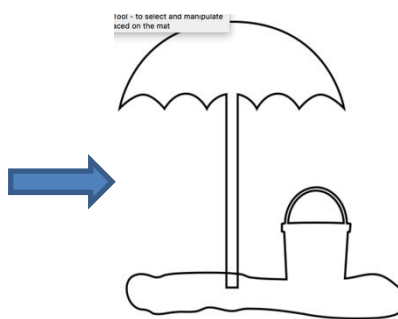


Inverse erase is used to complete the path to better match the other leaf

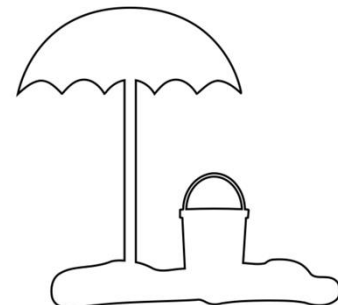
- Note: If you use **Inverse Erase** to connect two or more separate shapes, those shapes should first have **Object>Merge** applied. Otherwise the connection will not become part of the new shapes:



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





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



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

10.07 Knife and Crop

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

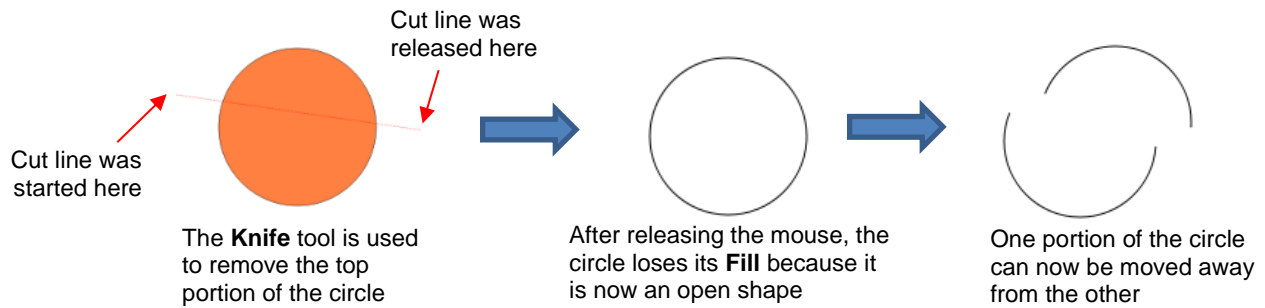
Click and hold this icon



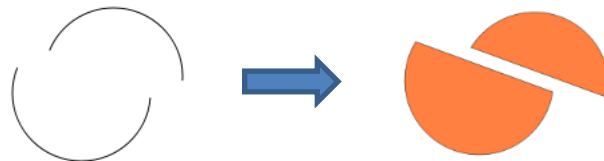
You can now switch to **Crop**, if desired

10.07.1 Using Knife

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

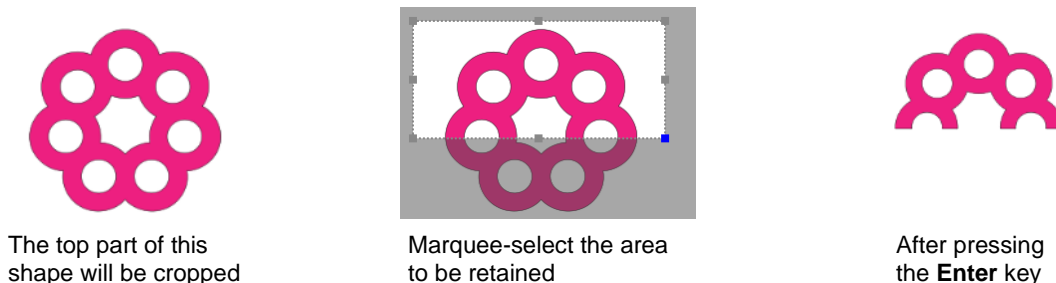


- There are four ways to control the angle of the cut:
 - ◇ Click and hold the left mouse button – you can freely drag the red cut line to cut at any angle (as shown in the screenshot)
 - ◇ Hold the **Shift** key and click and hold the left mouse button and drag left or right: the red cut line will be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

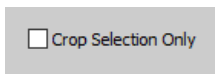


10.07.2 Using Crop

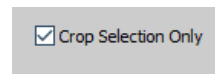
- With the **Crop** tool, you drag the mouse to marquee-select an area to be retained. Then you press the **Enter** key to complete the crop. Everything outside of the selected area will be deleted:



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

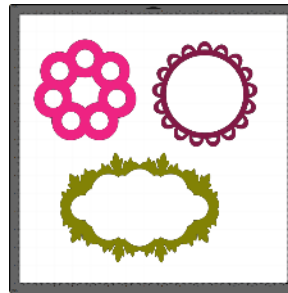


IMPORTANT: If left unchecked, only the marquee-selected part of the shape will be retained. The rest of that shape and every other shape on the page will be deleted, even those that might be hidden or locked!

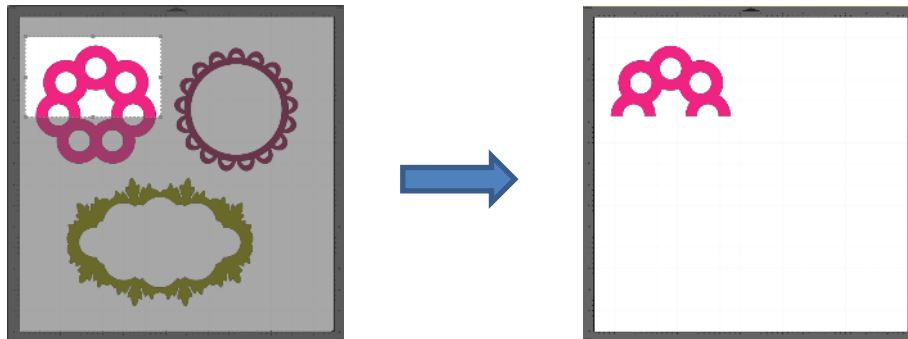


If checked, the marquee-selected part of the selected shape will be retained, as well as all other shapes on the page.

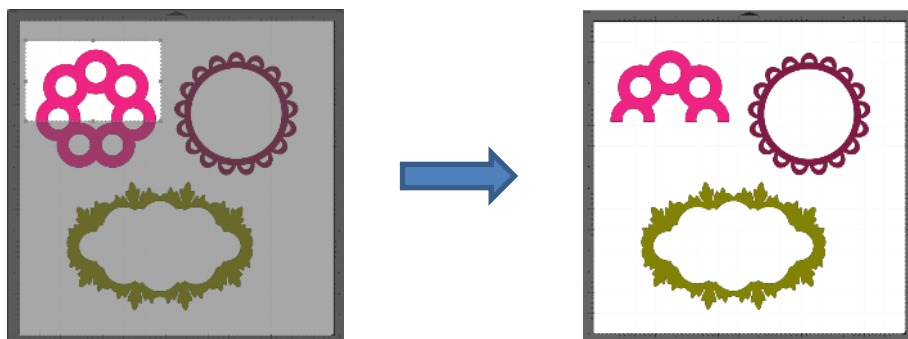
- Here is an example to show what would happen in both cases. The file has three shapes and the top right shape will be cropped just as in the prior screenshot:



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



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



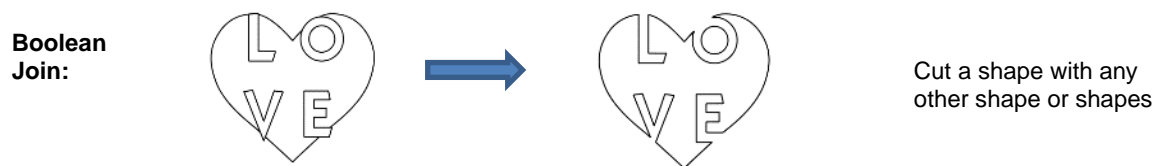
10.08 Which Cutting Tool to Use?

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

- The following table summarizes the capabilities of the various options for cutting shapes. Note that **Boolean Join** has also been added but isn't covered until *Section 11.06* because it is more often used for designing than for editing.


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

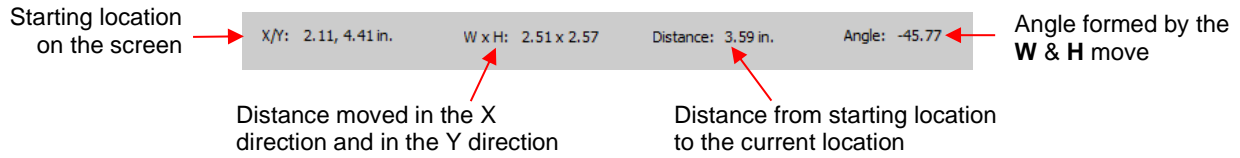
- Here are a few samples to show which functions would be the best choices for making the cut:



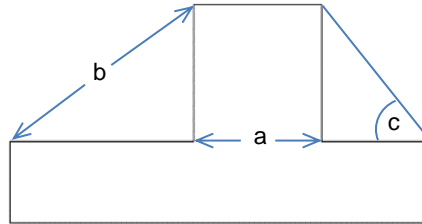
- Knife** and **Split** have the same effect. **Split** is a bit more limiting because there needs to be nodes present in the location where the cut will occur. It might be useful if you are already in the **Shape Tool** mode where you can then select the nodes and apply the **Split**. Otherwise, **Knife**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

10.09 Ruler

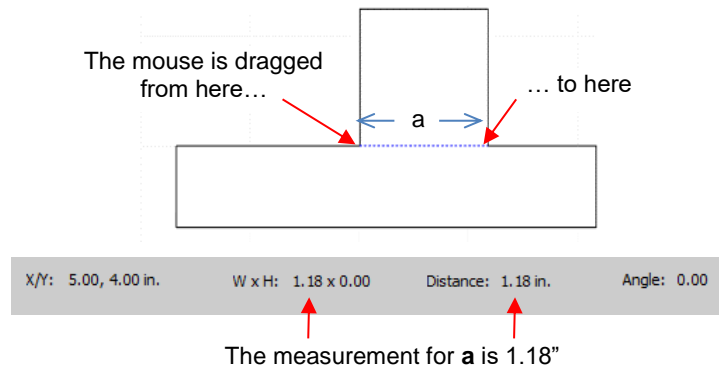
- The **Ruler** function allows you to measure the distance and angle between any two points on the screen. It is accessed by clicking on the second icon from the bottom  on the **Tools Panel**.
- No shapes need to be preselected. Just hold down left mouse button at any location and then drag the mouse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



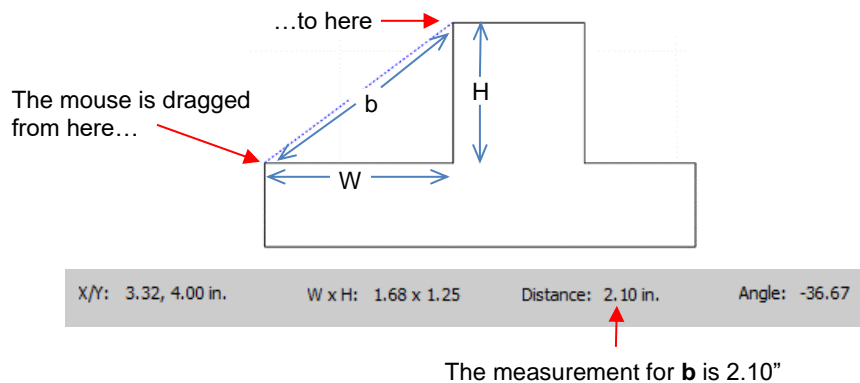
- To better illustrate these variables, the following shape will be used and the various measurements will be determined using the **Ruler**:



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

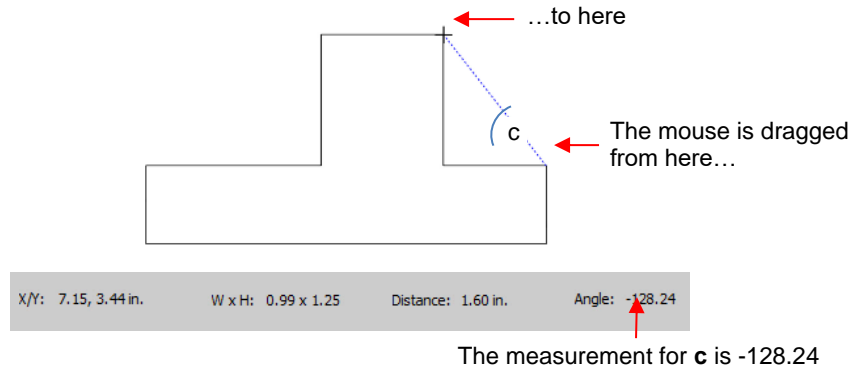


- ◇ **Distance**: This is the actual measurement between the starting location and the ending location. In the prior measurement, **W** is the same as **Distance** because the measurement was a horizontal one. But measuring the length of “b” is not:

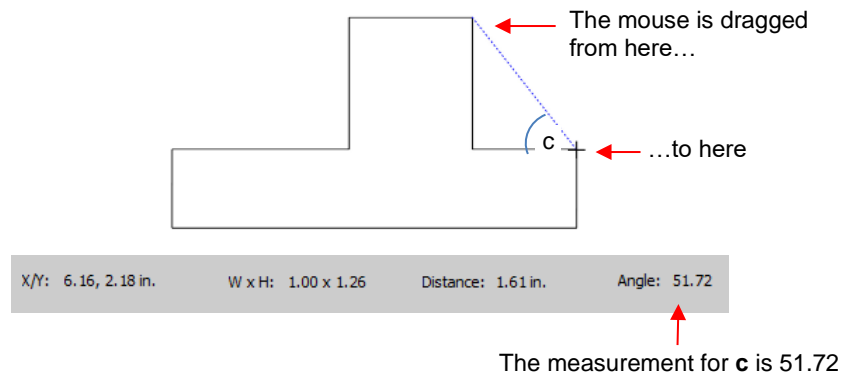


- ◇ **Angle**: This is the angle of the **Distance** line relative to the X axis.


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



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

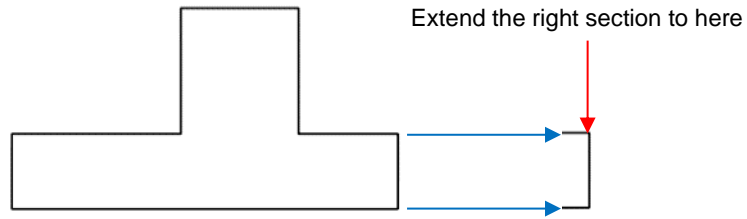


10.10 The Shape Tool - Path and Node Editing

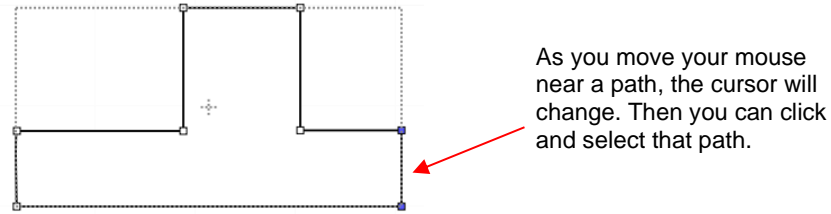
- Path editing involves moving paths as well as reshaping them. This topic was first introduced in *Section 9.05* where you were shown how to draw with the **Draw Tool** and then curve a straight-line path. If you haven’t read *Section 9.05*, please do so before proceeding with the rest of this section.
- To use the **Shape Tool**, click on the third icon  on the **Tools Panel** and then click on a shape. You should see the nodes which currently define that shape. If you do not see any nodes, then most likely you have clicked on a group of shapes. Go to **Object>Ungroup** and then try again.
- Path editing involves dragging path or dragging **Bezier** control points to reshape them. Node editing involves moving nodes and changing the type of node to then form desired curves.
- The most likely mistake you’ll make while learning path and node editing is failing to zoom in close enough so that you can click precisely on paths and nodes. Keep that in mind while experimenting.

10.10.1 Moving a Path

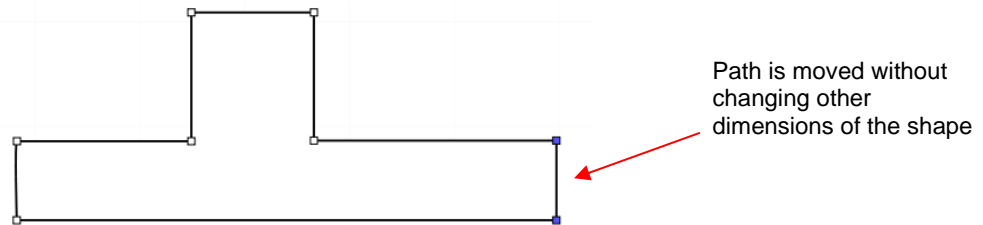
- Sometimes a path needs to be extended without resizing the rest of the shape. For example: let’s say you need to extend the right section of this shape by a few inches:



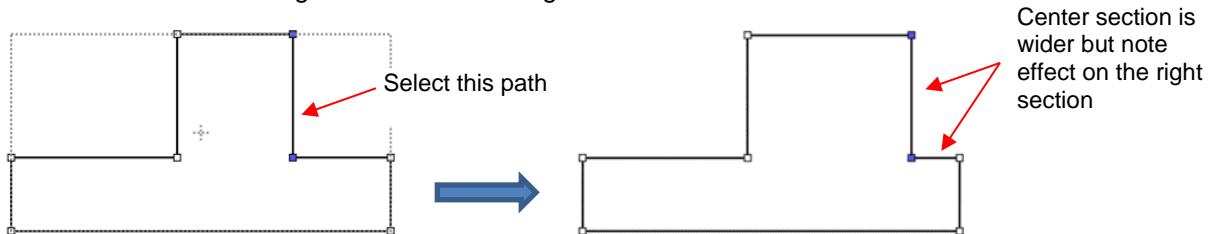
- ◇ Select the **Shape Tool**  on the **Tools Panel** and then click on that path:



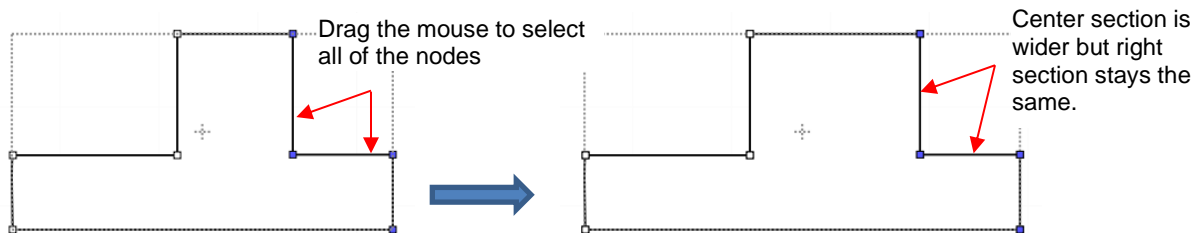
- ◇ You can now use the arrow keys on your keyboard to move that path. Holding the **Shift** key while clicking on an arrow key will move it in larger increments:



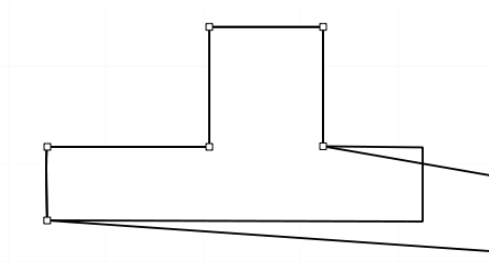
- ◇ If instead, the center section had been widened by selecting the path on its right side, then that would have resulted in shortening the section to the right of it:



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



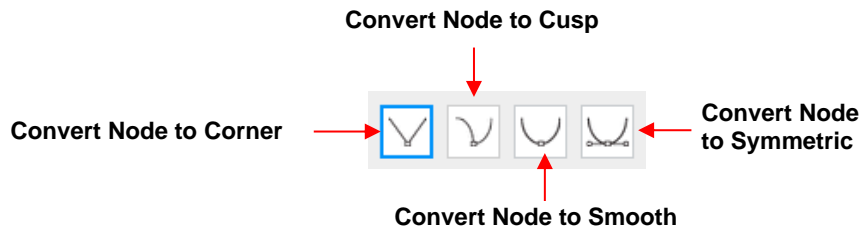
- If the shape is made up of straight line segments, versus curves, you can also drag the segments with your mouse instead of using the keyboard arrows. Note that it can be a bit tricky getting the cursor in the perfect spot to start dragging. However, you won't have the same control if you wish to keep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



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

10.10.2 Reshaping a Path

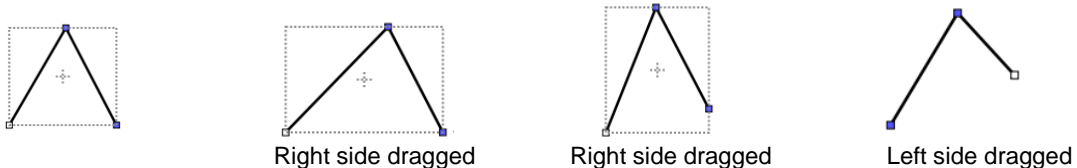
- With the **Shape Tool** selected, you'll observe four icons in the **Tool Options**. The purpose of each option is to convert one or more selected nodes to that type of node:



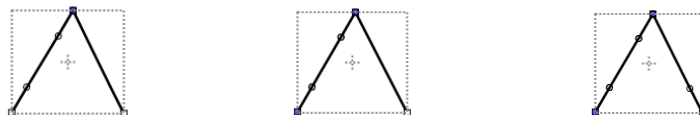
- One or more nodes are highlighted and then the appropriate icon selected. These same four functions can also be accessed by right-clicking and selecting **Path>Convert Node to**.
- To illustrate each one of these options, a simple path with a sharp corner will be used. This shape is already in **Corner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



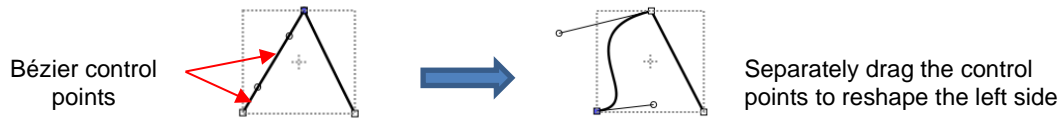
- ◇ **Corner Nodes:** These are the nodes that make up straight-line shapes such as rectangles, squares, triangles, stars, etc. Once selected, the shape will appear as below and either path can be moved as was demonstrated in the prior *Section 10.10.1*.



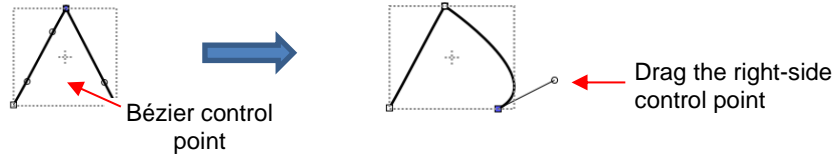
- ◇ **Cusp Nodes:** In this mode the Bézier control points appear and can be moved independently. First note how the paths appear when in this mode, depending on how many of the adjacent nodes are selected:




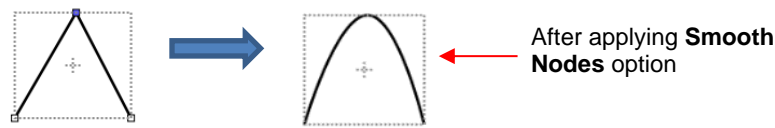
- The dots also freely drag e Top node only selected Bézier create c Left side nodes selected which are nc All three nodes selected; another. You can



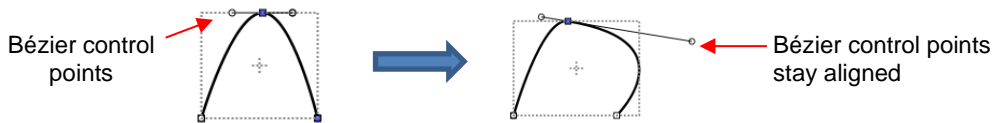
- In the case where there is a single Bézier control point on the right side, you can again drag the control point to create a curve:



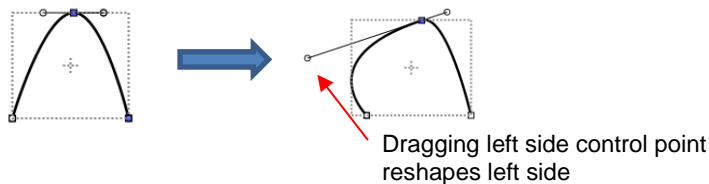
- ◇  **Smooth Nodes:** In this mode the Bézier control points always stay in a straight line. Notice that when you convert to **Smooth Nodes**, the shape immediately forms a curve:




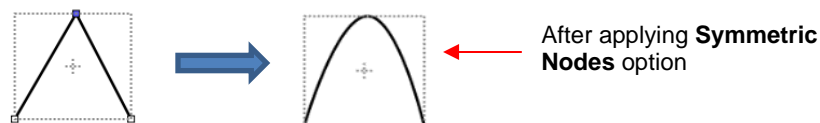
- When the newly formed shape is selected again, the Bézier control points appear in a straight line. If you move one, the other will move as well, in order to maintain that straight line:



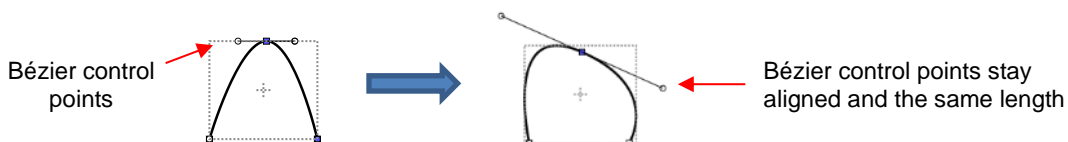
- The left side Bézier control point controls the curve on the left side. Thus, if it had been moved instead this would have resulted:



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



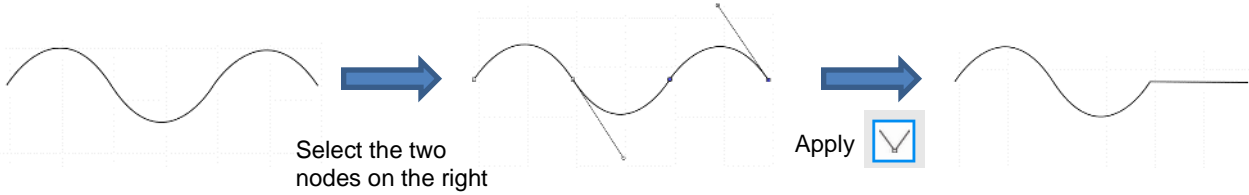
- When the newly formed shape is selected again, the Bézier control points appear in a straight line and the image appears the same as with **Smooth Node** status. However, when you now move one control point, the other will not only maintain that straight line, but also the same length. And the curves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



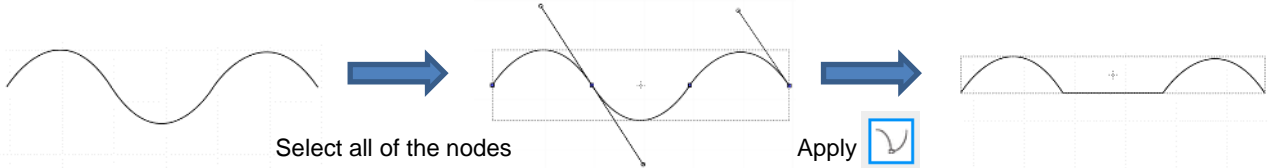
- To further illustrate these options, marquee-select a group of nodes to select more than one path and then click on whichever option you want to apply. The following examples show what occurs when the first two options are applied to curves and the last two options are applied to straight lines:



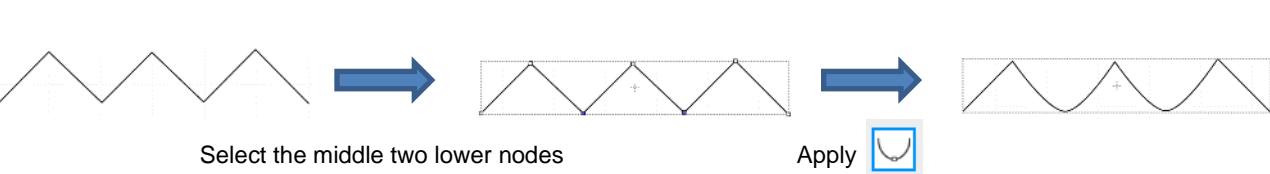
Convert Node to Corner:



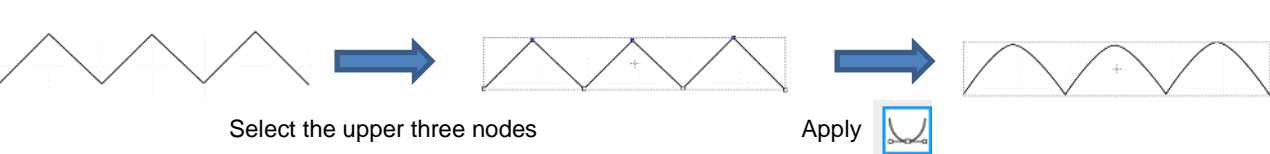
Convert Node to Cusp:



Convert Node to Smooth:

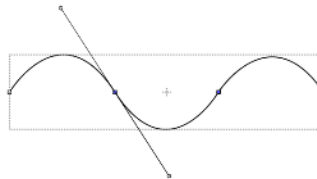


Convert Node to Symmetric:

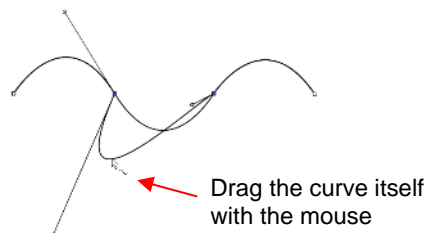


- As was shown in *Section 9.05.3*, you can also drag the path itself to reshape it, if one of the nodes has been converted to **Cusp**, **Smooth**, or **Symmetric**. For example:

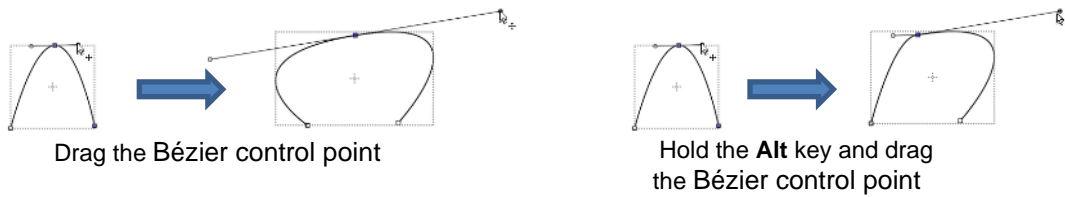
- ◇ The following curve has the lower path selected and the option marked:



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




- You will recall that when a node is in either **Smooth** or **Symmetric** mode, adjusting one Bézier control point will automatically affect the other one and the curves on either side will change. To avoid this, hold the **Alt** key while dragging the control point and the other control point will remain in place:
 - For example, with the following **Smooth** node shape, the same change is made with and without holding the **Alt** key during the adjustment:

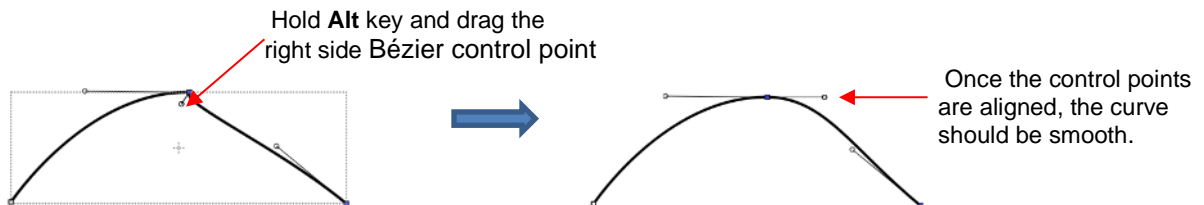



10.10.3 Examples of Smoothing Curves

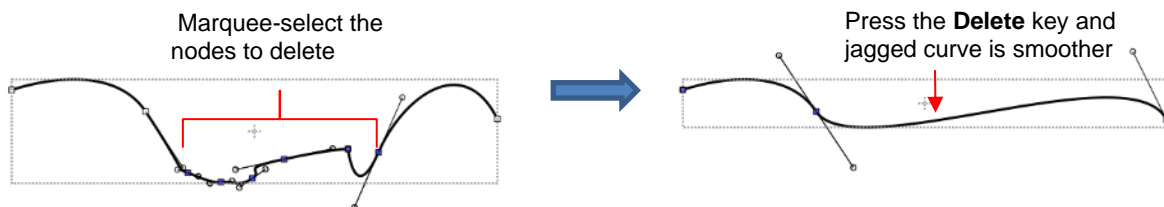
- The last method shown in the prior section can be used to correct kinks in what should be a smooth curve.
 - For example, let's say you want to make the following shape have a nice smooth curve:



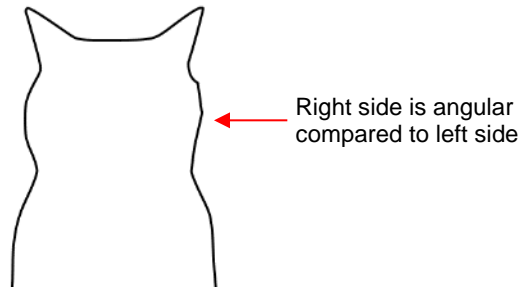
- Using the **Shape Tool**, click on the curve to reveal the node. Then click on the third icon , if needed, so that option will be highlighted. Hold the **Alt** key and drag the Bézier control point that's closest to the curve needing adjustment until the two control points are in a straight line:



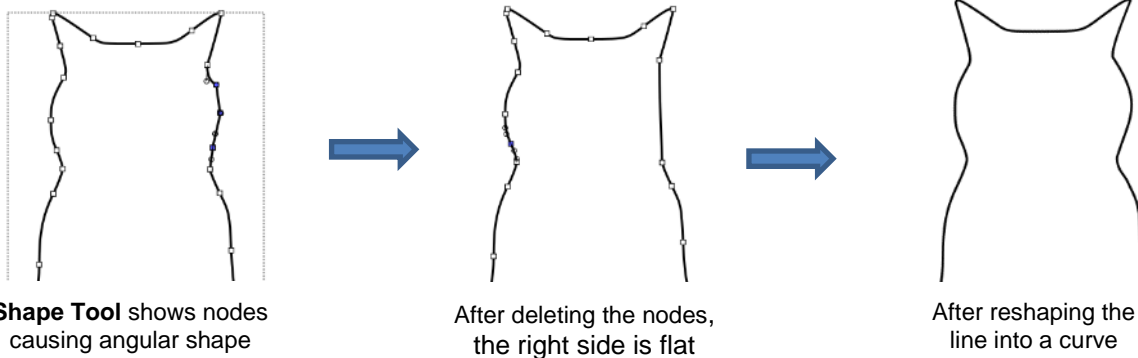
- In *Section 9.04.1*, you were shown how to add or delete nodes while in the **Draw Tool**  mode. Any time you want to add nodes to an existing path, you will need to be in this mode. However, you can delete nodes while in the **Shape Tool** mode. Select a node or marquee-select a group of nodes and press the **Delete** key on your keyboard:



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

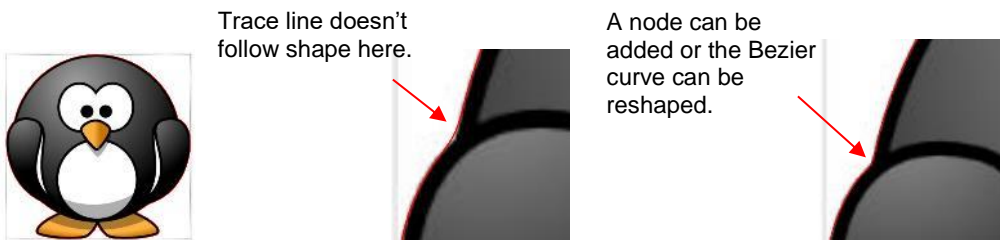


- Using the **Shape Tool**, the nodes causing the angular shape are marquee-selected and deleted. Then the path is reshaped:



10.10.4 Applications for the Shape Tool

- It's not always obvious when the **Shape Tool** might be needed. Here are a few examples to keep in mind:
 - ◇ Editing of pixel traced images: Sometimes a pixel trace will appear to be perfect until, for example, you use it for a print and cut and discover that some of the paths are slightly outside the printed areas of the original image:



- ◇ Manual tracing: As shown in *Section 9.05*, one of the quickest ways to manually trace a raster image is to use the **Draw Tool** and simply click/click/click around the image and then use the **Shape Tool** to create curves and move nodes to more closely align with the original image.
- ◇ Improving a cut: If you have problems with a particular location on a cut shape, examine the nodes in that location. You may find a cluster of nodes or a sharp cusp. Delete those excess nodes, reform the path, and then retest the cut.
- ◇ Modifying poorly designed files: Sometimes you will pick up free files that don't quite cut the way you expected. Examples are often fold-up templates where corners and fold lines do not quite meet. Having the ability to move paths and nodes can correct these kinds of files and provide cleaner and more professional end products.

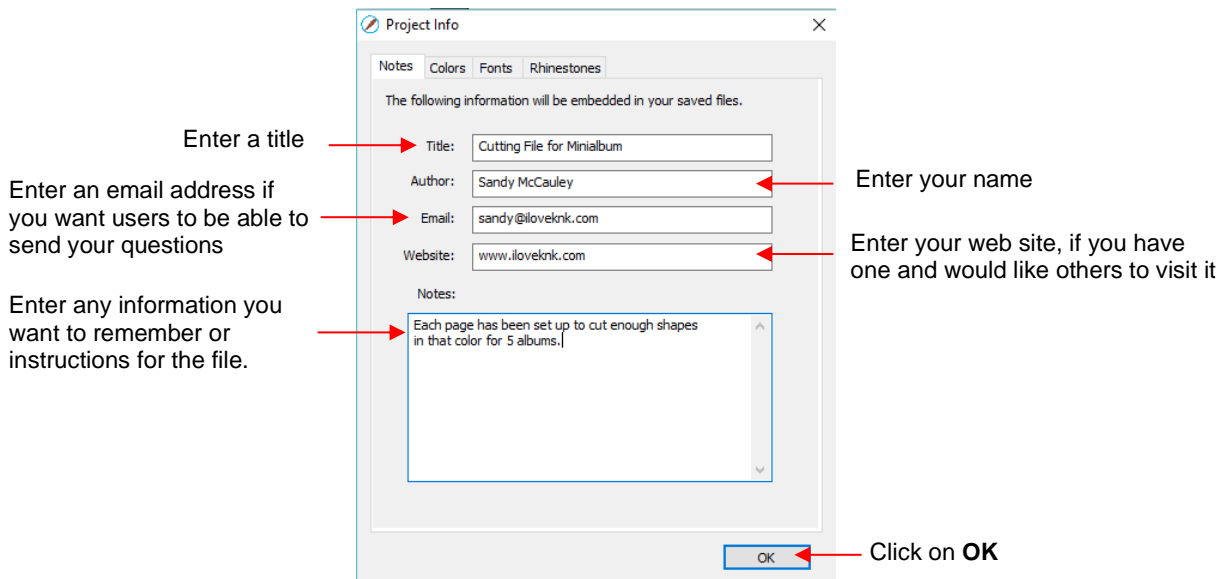
11. SCAL: Designing

11.01 Where Do I Start with Learning to Design?

- SCAL offers some excellent easy-to-use designing tools to assist you in creating whatever you can imagine. The best way to learn these tools is to focus on only one at a time and play with settings. You aren't going to break anything in the software by experimenting and you never know what you might discover!

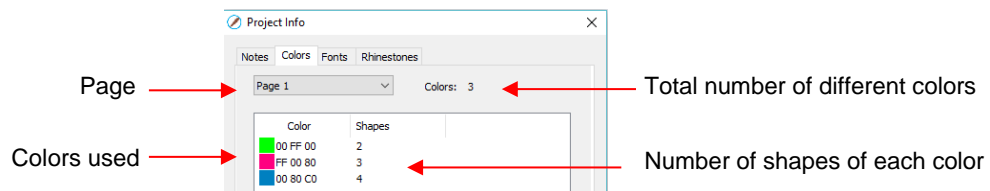
11.02 Project Info

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

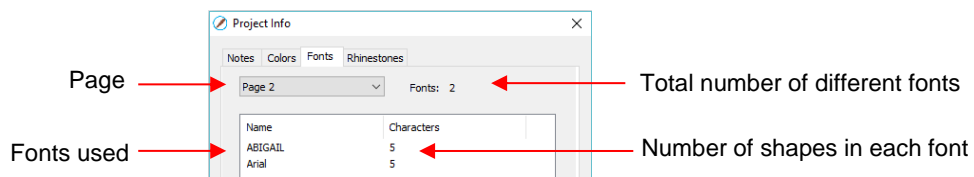


- Note the other tabs in this window: **Colors**, **Fonts**, and **Rhinestones**. These do not require your input. Instead, they automatically track, by **Page**, those elements that are currently present in the file. For example:

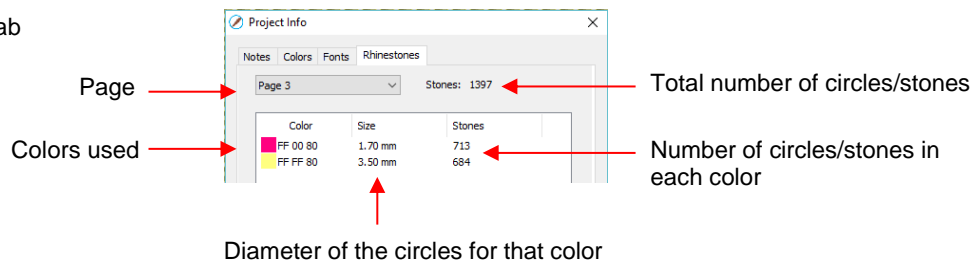
Colors Tab



Fonts Tab



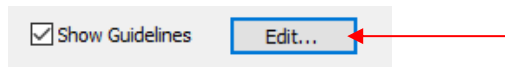
Rhinestones Tab



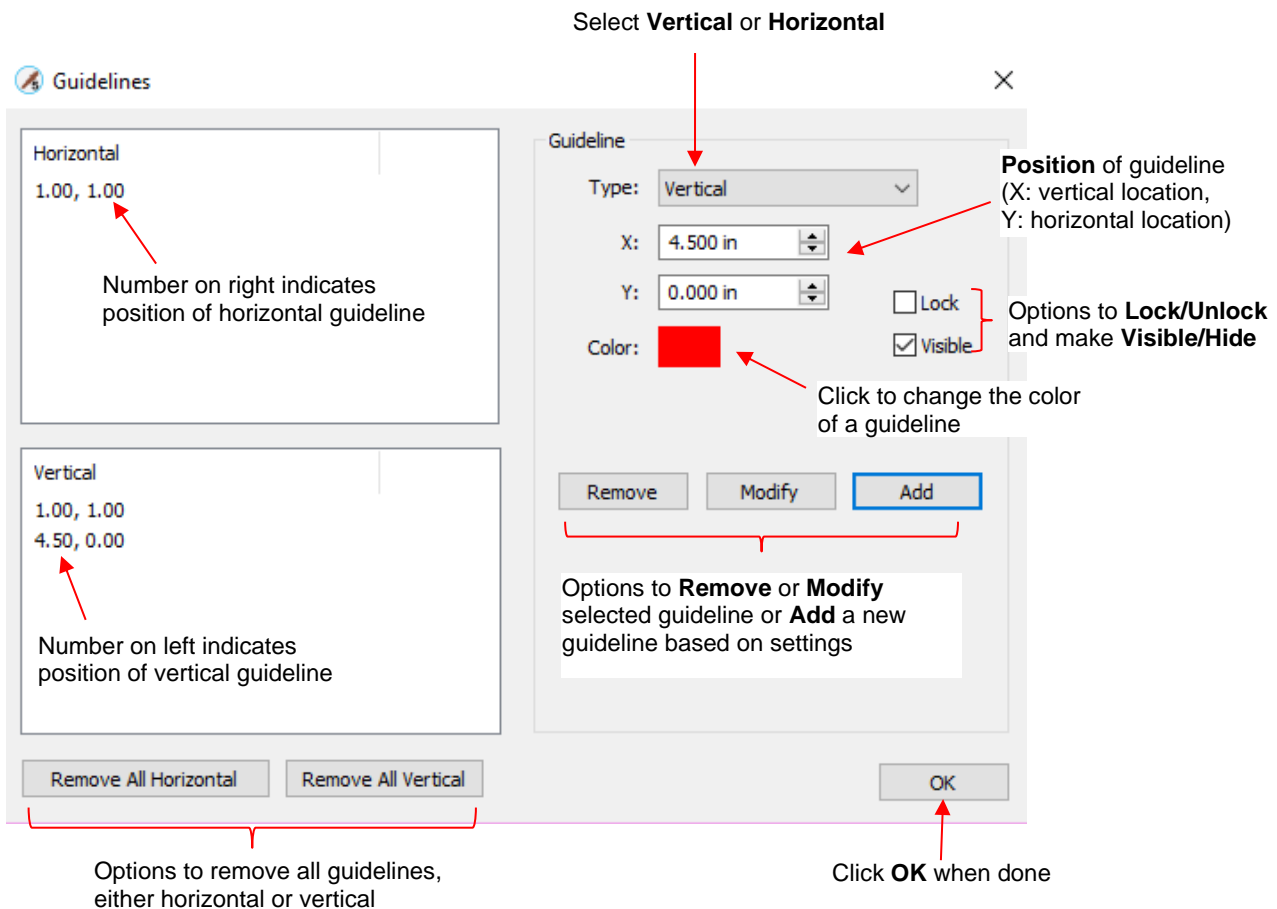
- Note: When changing tabs, such as from **Colors** to **Fonts**, always take note of the **Page** number. It will not automatically update to the page you were just checking. Thus, if you are on *Page 2* when on the **Colors** tab, you may discover you're on *Page 1* on the **Fonts** tab. Simply change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

11.03 Guidelines

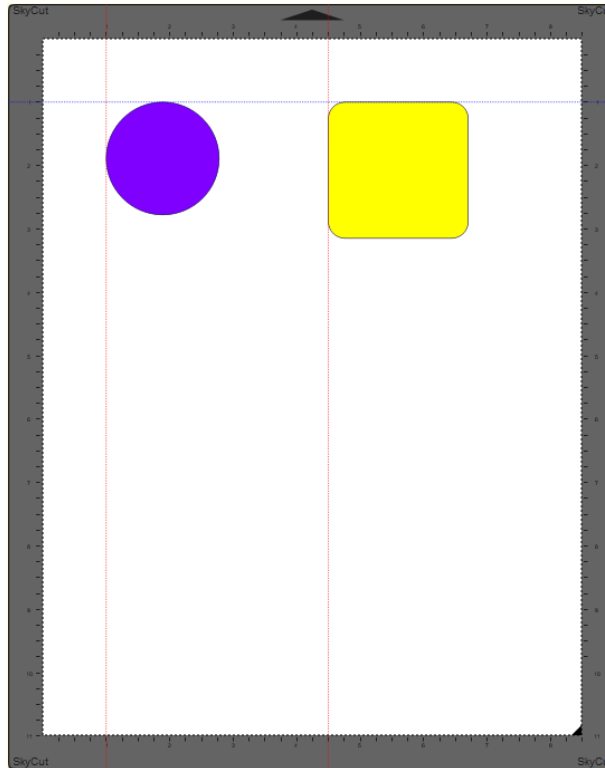
- Guidelines were first introduced in *Section 5.06.5*. It was noted that they can be added to the **Cutting Mat** in two ways:
 - By dragging your mouse from the horizontal or vertical rulers on the screen
 - By manually adding in the **Guidelines Edit** window
- You can toggle guidelines on and off by clicking on the box next to **Show Guidelines** on the **Document Panel**. To open the **Guidelines Edit** window, either go to **View>Guidelines>Edit Guidelines** or click on the **Edit** button next to **Show Guidelines**:



- The following window opens:



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



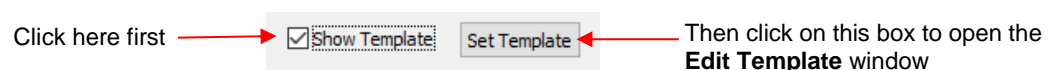
- The ability to show/hide all guidelines, lock/unlock all guidelines and delete (clear) all guidelines is also available under **View>Guidelines**.
- To have shapes snap to the guidelines, go to **View>Snap To>Guidelines** and make sure that option is checked. More about **Snap To** is covered in *Section 5.07*.

11.04 Templates

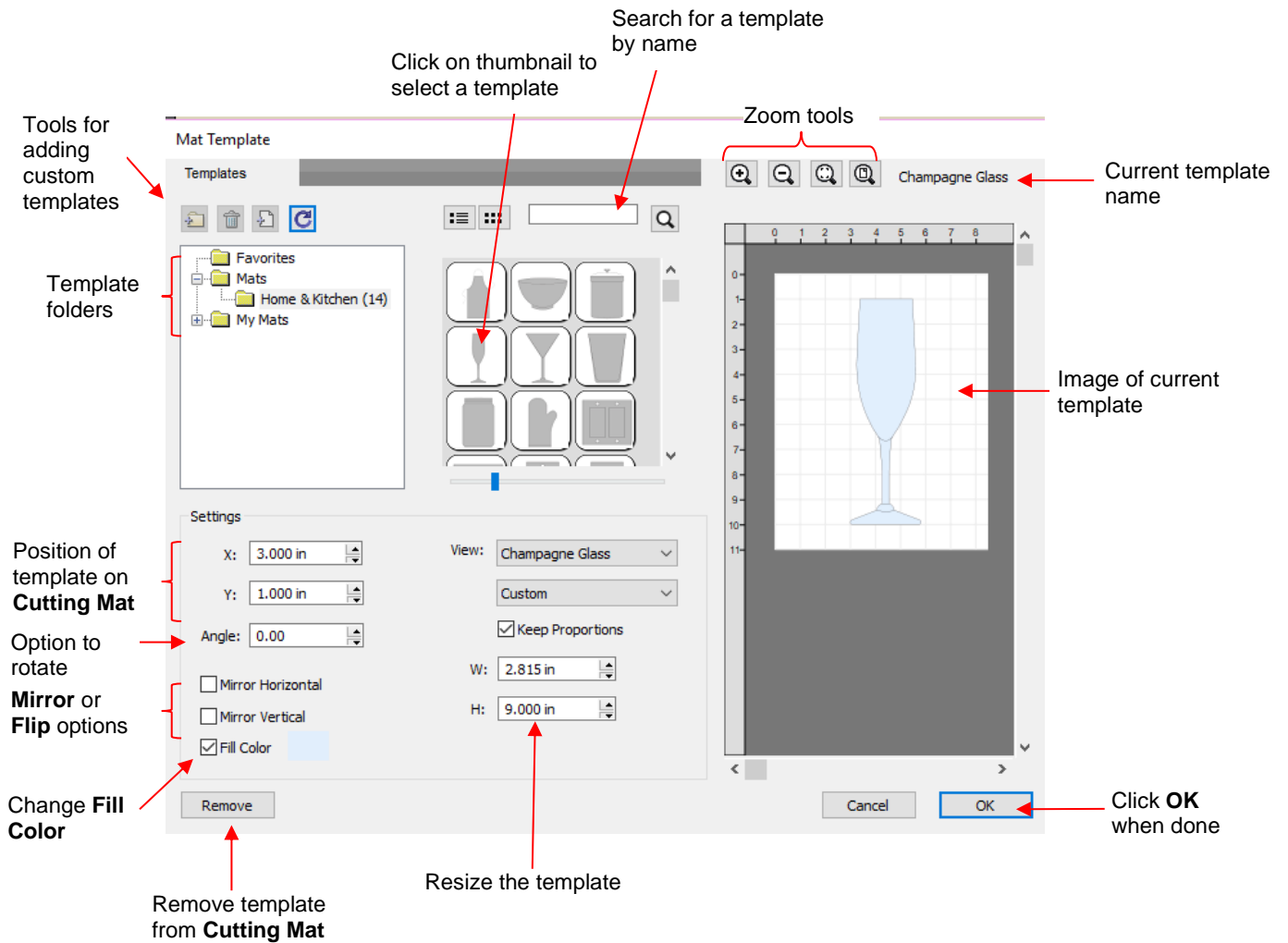
- As was first presented in *Section 5.06.11*, SCAL5 has the ability to add templates to the **Cutting Mat** that are non-selectable shapes to aid in various designing situations.

11.04.1 Mat Template Window

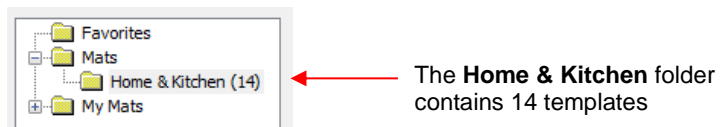
- There are fourteen templates included in SCAL5. However, you can import your own templates if they are in .SVG format or .SCALMAT format.
- To access templates, mark the option for **Show Template** and then click on the **Set Template** button:



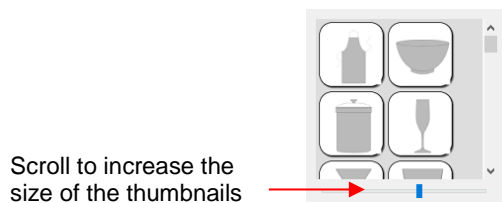
- The following **Mat Template** window opens:



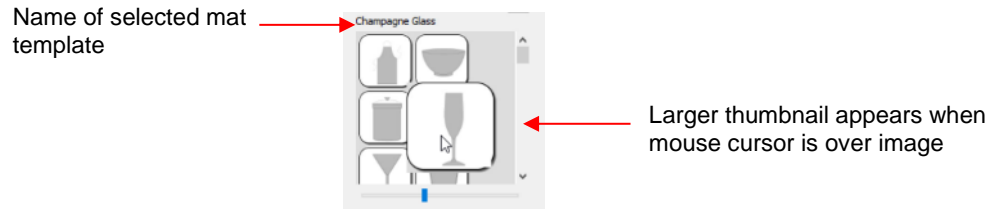
- The **Mat Template** window has a lot in common with the **Shapes** tab in the Library:
 - ◊ The **Mats** folder contains templates that come with SCAL. The number in parentheses indicates how many templates are included in that folder:



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



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



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



- ◇ You can assign templates to a **Favorites** folder for quicker access. To do that, right click on a thumbnail image and select **Add to Favorites**. That popup menu also has two other options:
 - **Delete File**: This option isn't used except when you import your own template files
 - **Reveal File**: Opens the location on your computer where the template file is located
- ◇ You can create your own subfolders and import templates. Details are covered in *Section 11.04.3*.

11.04.2 Template File Settings

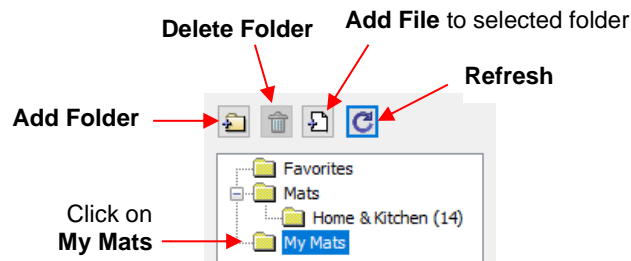
- The right side of the **Mat Template** window has a preview of the selected template on a simulation of the **Cutting Mat**. This preview is useful while customizing the settings.
- Once a template is selected, you have the following settings for customizing:
 - ◇ **Size**: adjust the **W** and **H**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



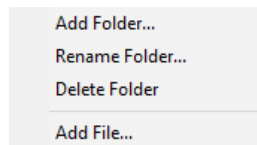
- To replace the template, reopen the **Mat Template** window and select a different template file.
- To remove the template from your **Cutting Mat** either uncheck the **Show Template** option on the **Document Panel** or return to the **Mat Template** window and click on **Remove** button.

11.04.3 Importing Your Own Templates

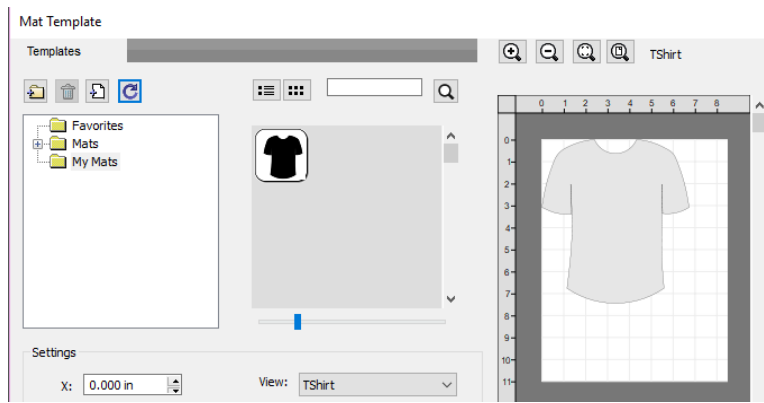
- SVG files can be imported into the **Mat Template** window. If you are designing them in SCAL, use a **DPI** of 72 in the SVG export window and the size of your imported template will match that of your original design.
- Once an SVG file is imported it is saved as a SCALMAT file. These files can be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



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



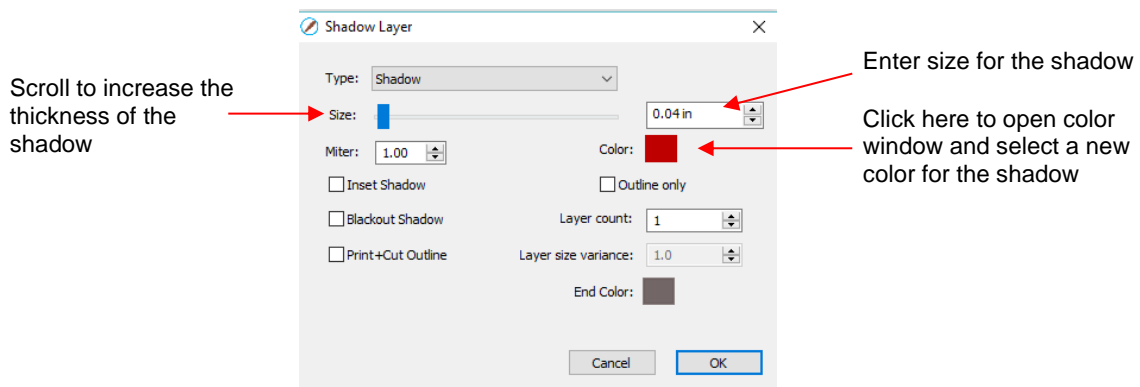
- If you need to delete a folder, first empty it by right clicking on each thumbnail and selecting **Delete File**. Then you will be able right click on the folder name and select **Delete Folder**.
- Sometimes you may need to click on the **Refresh** icon in order to see new folders or to see deleted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



- **IMPORTANT!** As mentioned before, when an SVG file is imported, its file format changes to SCALMAT. This is important to note because this is where a significant difference lies between the **Mat Template** window and the **Library**. Referring back to *Section 6.03.1*, 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.

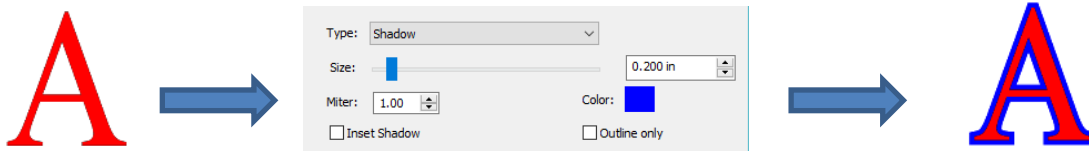
11.05 Shadow Layer

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

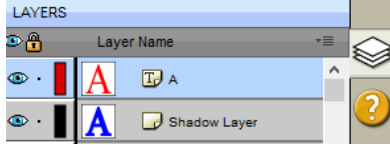


11.05.1 Shadow Layer Settings

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



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



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



Shadow



Shadow (Rounded)



Shadow (Straight)

◇ Note that the first choice, **Shadow**, also has a **Miter** setting which should work in the same way as **Miter** affects the **Stroke** (refer to *Section 7.15*). However, at this time, it appears that the **Miter** setting is not working.

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

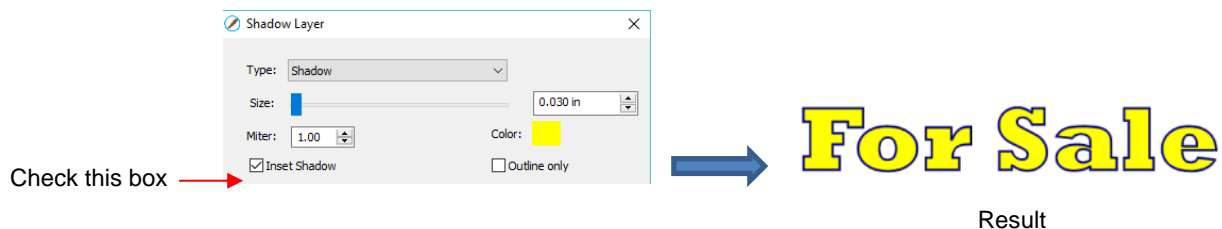
◇ For example, let's say you are going to create a two-color vinyl sign that says "For Sale":

For Sale

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

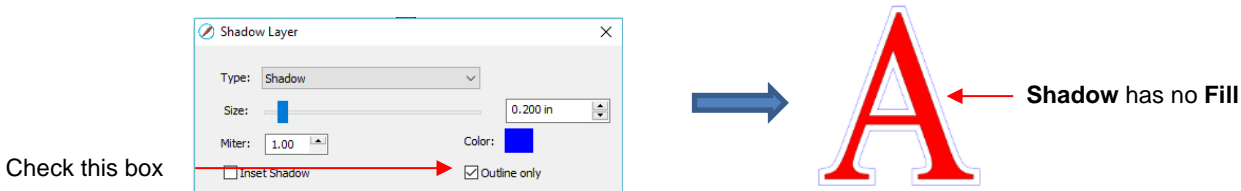
For Sale

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

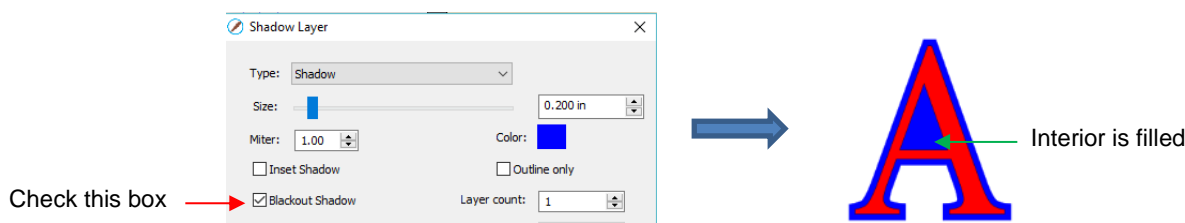


Result

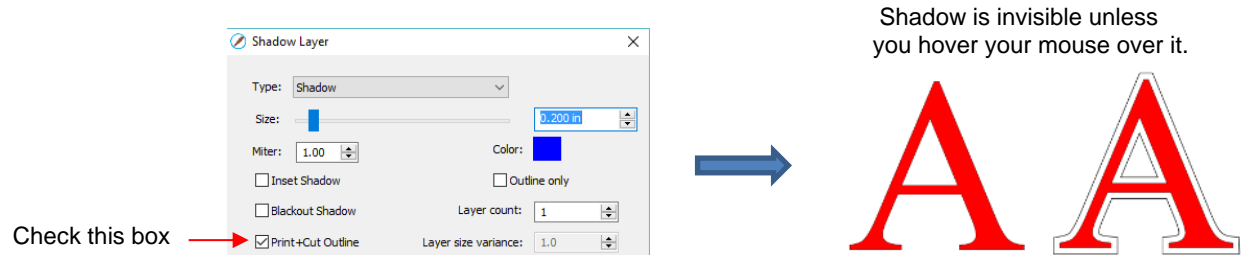
- **Outline only** can be checked to set the **Fill** on the shadow to **None**. The **Stroke** color will be whatever is set in **Color**:



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



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

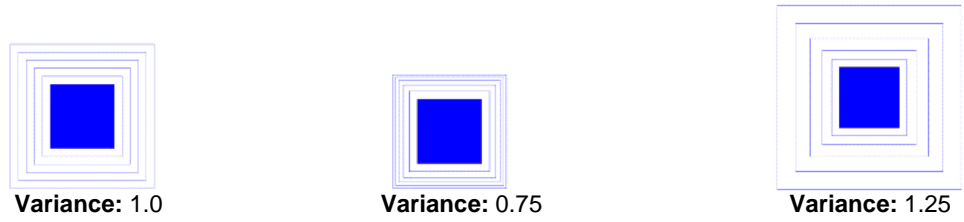


◇ Two print and cut examples for this function are:

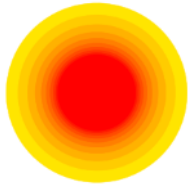
- To add a contour cut around a printed shape
- To cut just inside the boundaries of a printed image (in this case you also use the **Inset Shadow** option)

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

- ◇ **Layer count:** Total number of shadow layers to be created
- ◇ **Layer size variance:** If left at 1.0, the increasing thickness of each layer will be based on the original **Size** of the first shadow. If less than 1, the increasing thickness of each layer will be progressively less than the prior, based on the variance. If greater than 1, the increasing thickness of each layer will be progressively larger based on the variance.
 - For example, a square is used where the original shadow **Size** is 0.25 and the **Layer count** is set to 5. Outline only mode is also chosen so that the individual layers are easier to see. Note the different results when **Layer size variance** is set 1, 0.75 and 1.25:



- ◇ **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:

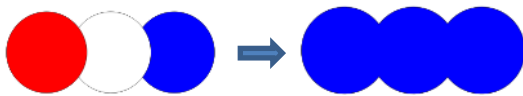


11.06 Boolean Operations

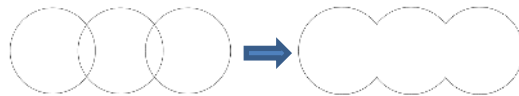
- Under **Path** on the **Menu Bar**, there are five Boolean operations that are very useful when designing cutting files. This section illustrates how each works and provides a practical example for each one.

11.06.1 Union

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

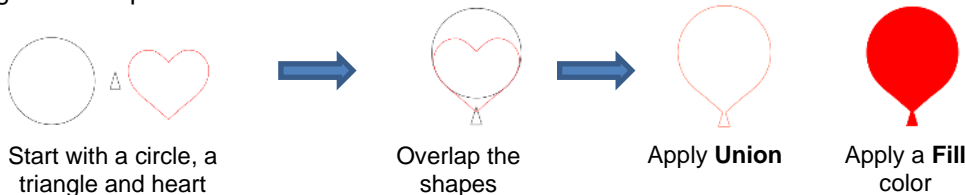


With a **Fill** color: before and after **Union**



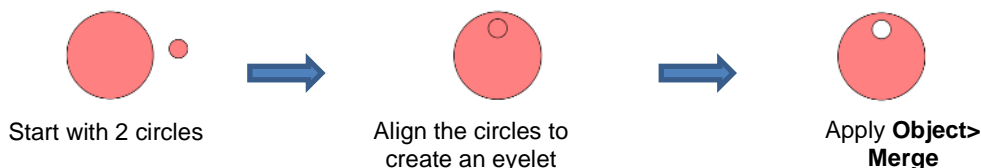
With no **Fill**: before and after **Union**

- To apply this operation, select two or more shapes and use one of the following:
 - ◇ Go to **Path>Union**
 - ◇ Press **Alt+U**
 - ◇ Right-click and select **Path>Union**
- Sections 8.07 – 8.09* showed several examples of the **Union** operation applied to text. Here's an example using basic shapes and the **Union** function to create a balloon:

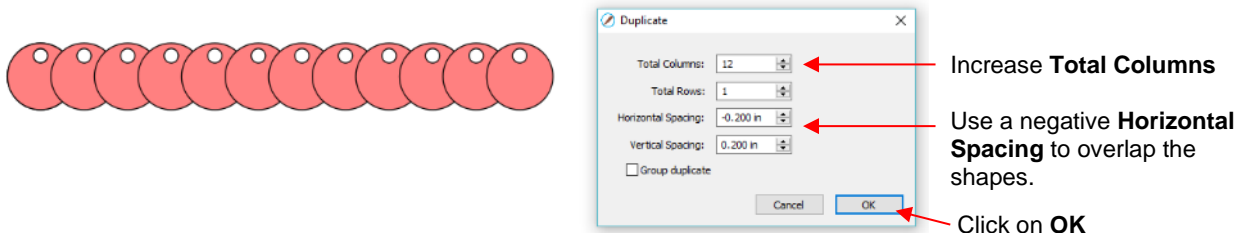


- In this next example, a scalloped border will be designed:

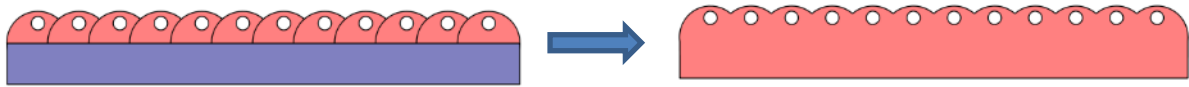
- ◇ Start with two circles that will be used to create an eyelet circle:



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

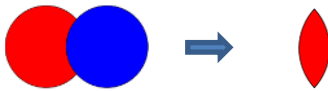


- ◇ Add a long rectangle and align with the pattern of circles. Apply the **Union** function:



11.06.2 Intersection

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



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



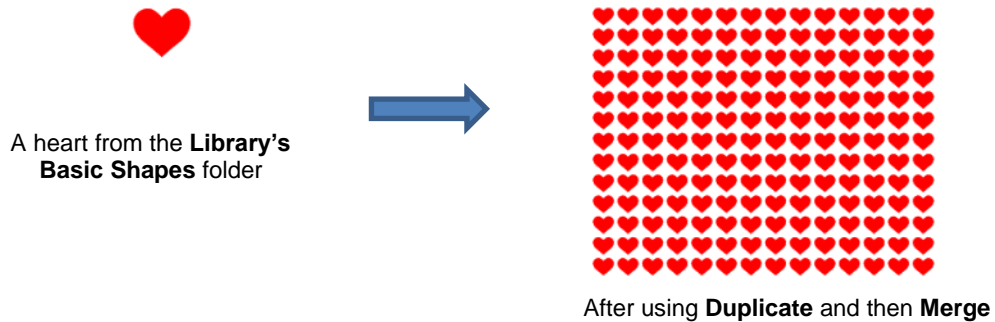
With no **Fill**: before and after **Intersection**

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

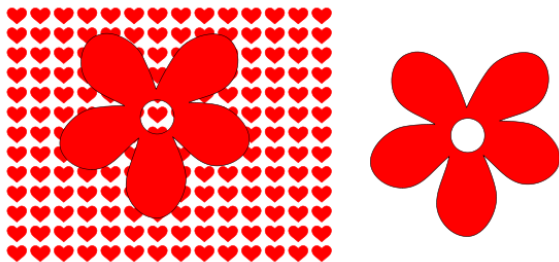
- ◇ Go to **Path>Intersection**
- ◇ Right-click and select **Path>Intersection**

- One example involves filling a shape with a pattern:

- ◇ This pattern was designed by using the **Duplicate** function to create a grid of hearts. Then, by applying **Object>Merge** on the hearts, it is now a single shape:



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



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

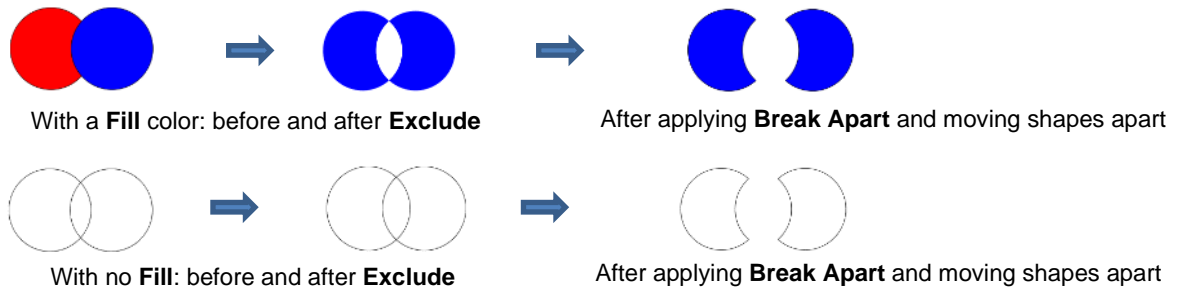


- ◇ Recolor the spare flower white with a red **Stroke**. Then center the pattern with the spare flower. Perfect for a print and cut!



11.06.3 Exclude

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



- To apply this operation, select two shapes and use one of the following:
 - ◇ Go to **Path>Exclude**
 - ◇ Right-click and select **Path>Exclude**
- After applying, use **Object>Break Apart** if you need to move one shape away from the other.
- As an example, use the heart-filled flower from the prior section as a cut design on the front of a greeting card:

- ◇ Start with a rounded rectangle as the card base (refer to *Section 7.01.2*):



- ◇ Add the pattern from *Section 11.06.2*, without the spare flower shape. Arrange the pattern so that it will cut from the front of the card:

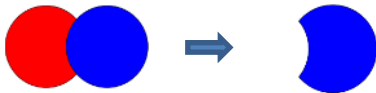


- ◇ Select the card and pattern and apply **Path>Exclude**:



11.06.4 Front Minus Back

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



With a **Fill** color: before and after **Front Minus Back**

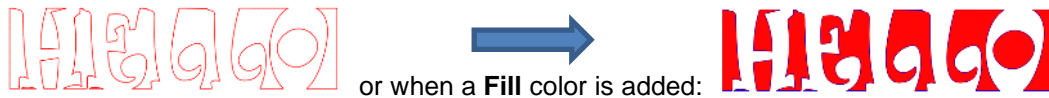


With no **Fill**: before and after **Front Minus Back**

- To apply this operation, select two shapes and use one of the following:
 - ◇ Go to **Path>Front Minus Back**
 - ◇ Right-click and select **Front Minus Back**
- As an example, add the word HELLO to the card designed in *Section 11.06.3*.
 - ◇ Select a font and type out the letters. Add a rectangle (with no **Fill** color) so that the tops and the bottoms of the letters will just overlap the rectangle:



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



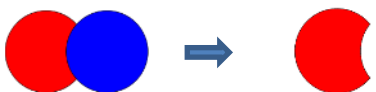
or when a **Fill** color is added:

- ◇ Arrange the greeting on the front of the card designed in *Section 11.06.3*. Select both and apply either **Object>Merge** or **Path>Exclude** so that all internal shapes are cut before the outside card base:



11.06.5 Back Minus Front

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



With a **Fill** color: before and after **Back Minus Front**



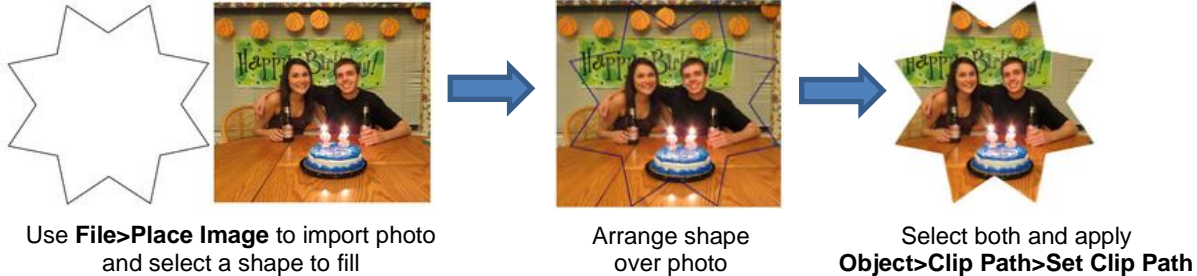
With no **Fill**: before and after **Back Minus Front**

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

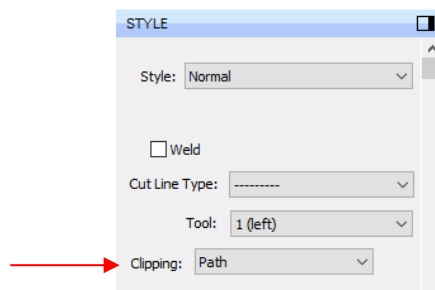
11.07 Clip Path and Clip Mask

11.07.1 Clip Path

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

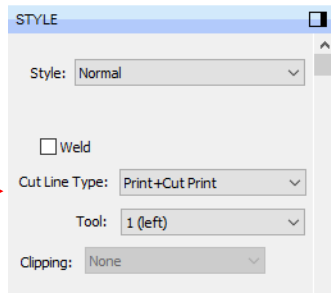


- There are two ways to access the **Clipping** function:
 - ◇ Select both shapes and go to **Object>Clip Path>Set Clip Path**
 - ◇ Select the two layers and, on the **Style Panel**, change **Clipping** from **None** to **Path**:

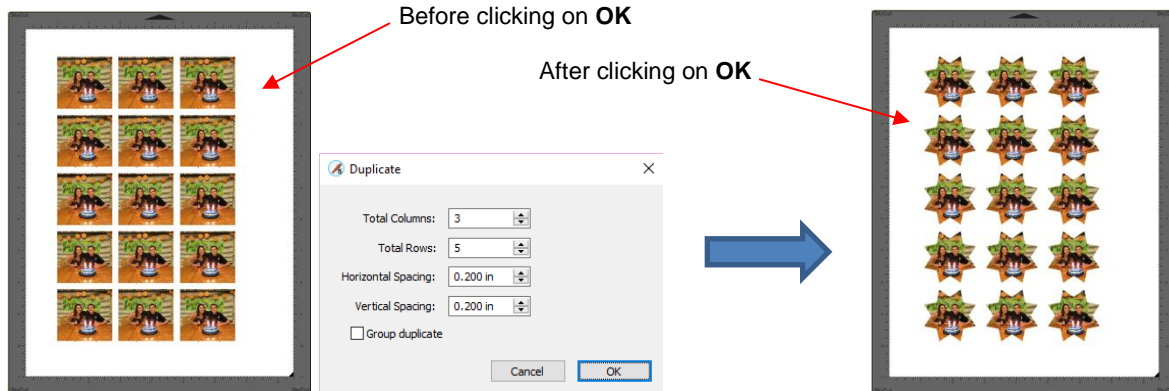


- Unlike other path functions in SCAL (**Union**, **Intersection**, **Exclude**, etc.), the original two shapes are still intact. To restore the original shapes:
 - ◇ Go to **Object>Clip Path>Release Clip Path**
 - ◇ Reset the **Clipping** option to **None** on the **Style Panel**
 - ◇ Note that the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

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

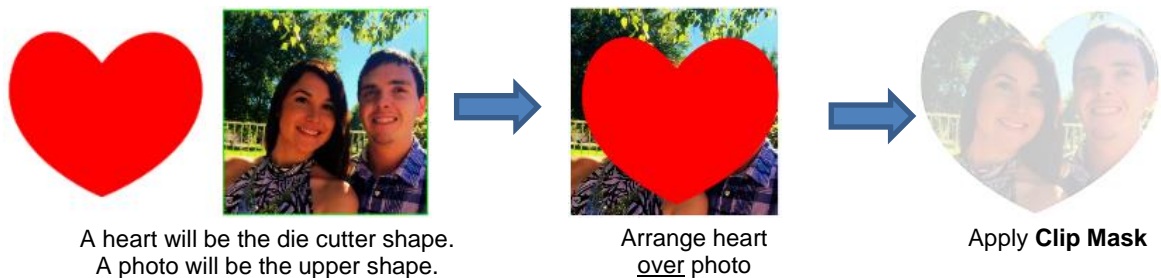


- ◇ When applying the **Duplicate** or **Rotated Duplicate** function on shapes that have **Clip Path** applied, you will initially see the copies in their original “unclipped” format. But once you click on OK, the correct result will appear:

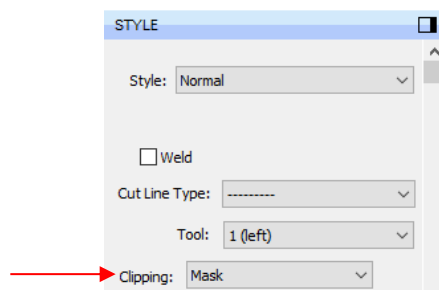


11.07.2 Clip Mask

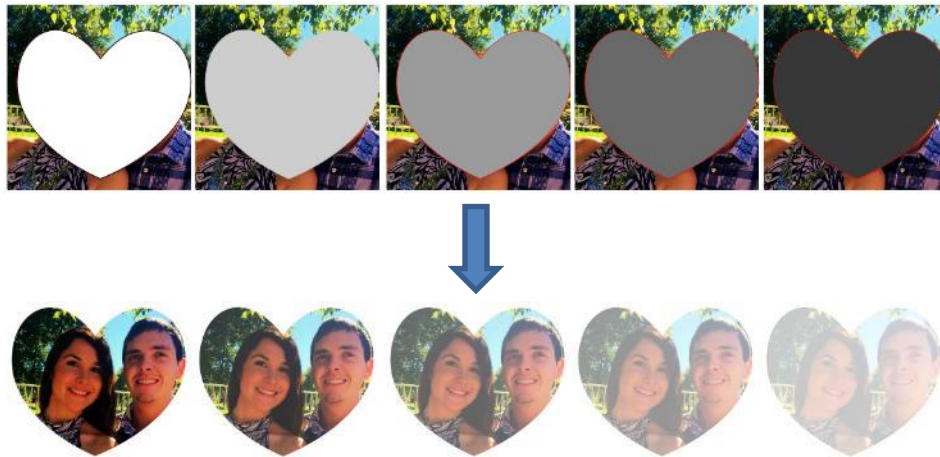
- **Clip Mask** is similar to **Clip Path** except the shape performing the die cut will alter the opacity of the other shape based on its color intensity.
- As with **Clip Path** the die cut shape is placed on top of the other image:



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



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

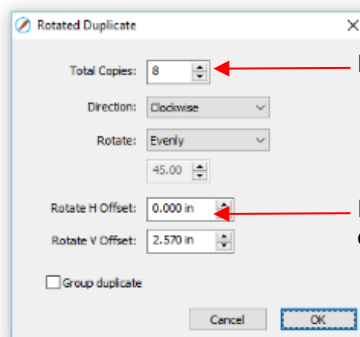


- To restore the original shapes, either:
 - Go to **Object>Clip Mask>Release Clip Mask**
 - Reset the **Clipping** option to **None** on the **Style Panel**
 - Note that the shapes will be grouped, thus you'll need to apply **Object>Ungroup** in order to individually select one of the shapes but not the other.
- The same additional things to note that applied to **Clip Path** also apply to **Clip Mask**. Refer to the last bullet in [Section 7.07.1](#).

11.08 Duplicate Rotated

11.08.1 Duplicate Rotated Settings

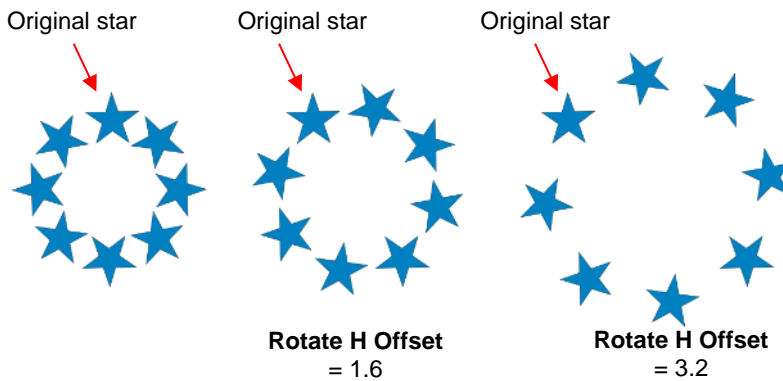
- The **Duplicate Rotated** function allows you to make duplicates arranged in a circle or partial circle pattern.
- To access **Duplicate Rotated**, first select the shape(s) and then use either of the following:
 - Go to **Object>Duplicate Rotated**
 - Press **Ctrl+Shift+D**
- To illustrate how this works, start with a small shape. Select it and then activate the **Duplicate Rotated** function using either of the methods just mentioned. The following window opens:



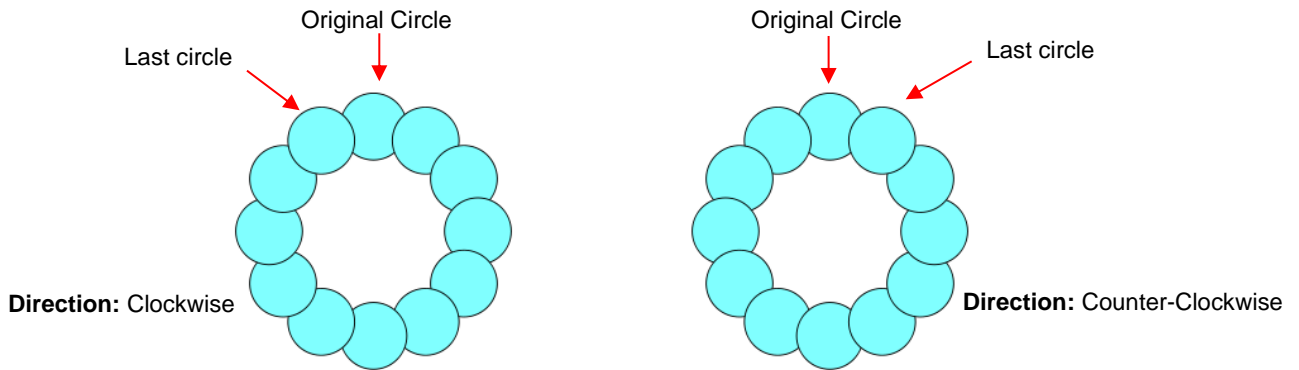
Enter number of copies

Increase to space out the copies

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



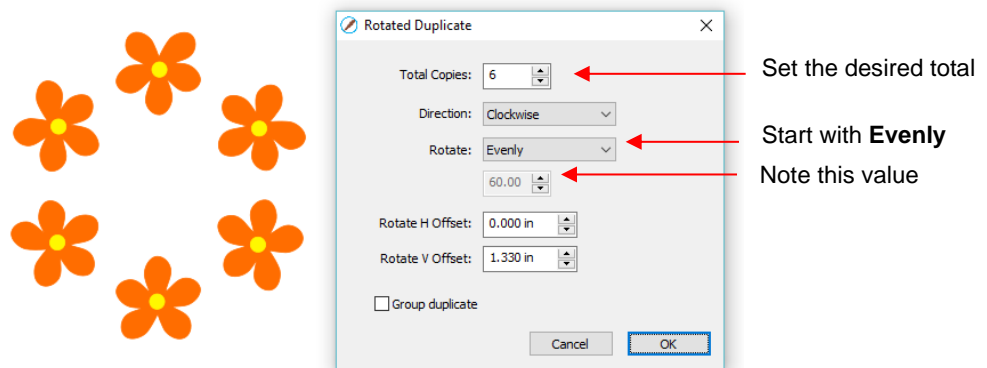
- ◇ Because the stars must spread out in order to keep the original in its same position, one can then decrease the **Rotate V Offset** at the same time as increasing the **Rotate H Offset**, if you need to spread the shapes but keep the design in the current display area of SCAL.
- ◇ The **Direction**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



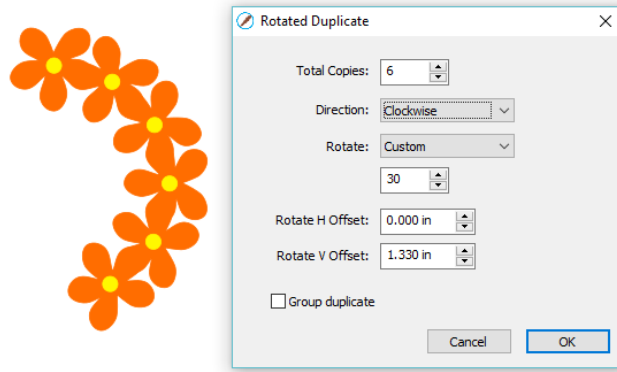
- Does it matter which **Direction** is used? Most likely, it would only matter for display or possibly in a print and cut design.

- ◇ **Rotate** has two options: **Evenly** and **Custom**. With **Evenly** selected, the copies are distributed evenly in a full 360° circle. But let's say you want a semi-circle of shapes:

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



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



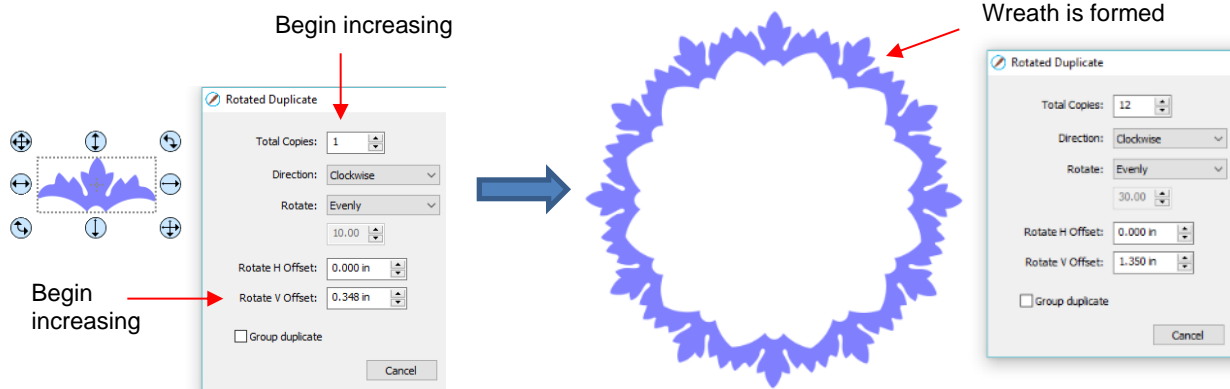
- If you want the shapes to be grouped, mark the **Group duplicate** box. Otherwise leave it unchecked.

11.08.2 Using Duplicate Rotated to Design a Wreath

- Begin with a desired shape. In this example, a shape from the **Library's Swirls** folder will be used.



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



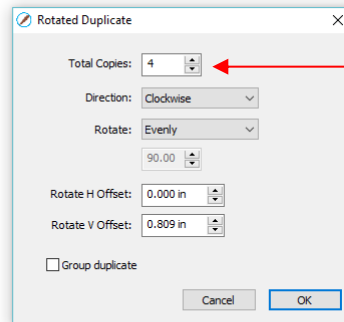
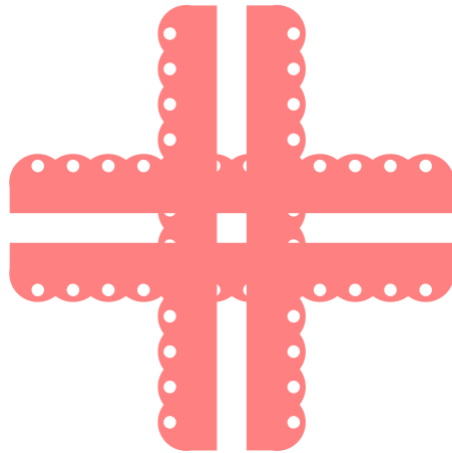
- After creating the pattern, go to **Path>Union** to remove the overlap and the shape is ready to cut.

11.08.3 Using Duplicate Rotated to Design a Frame

- In *Section 11.06.1*, the **Duplicate** and **Union** functions were used to create this scalloped border:

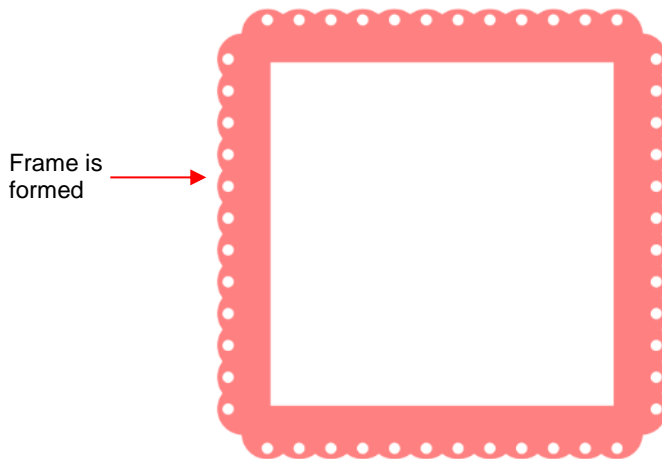


- Select the shape, go to **Object>Duplicate Rotated**, and enter 4 for **Total Copies**:

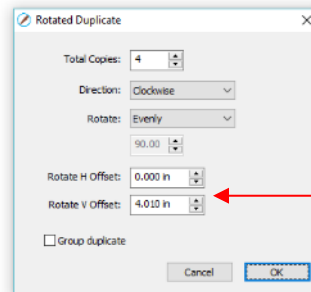


Set Total Copies to 4

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



Frame is formed



Increase V Offset until the four corners look perfect

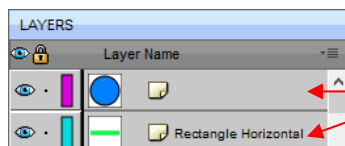
- Click on **OK** and then apply **Path>Union**.

11.09 Object on Path

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



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



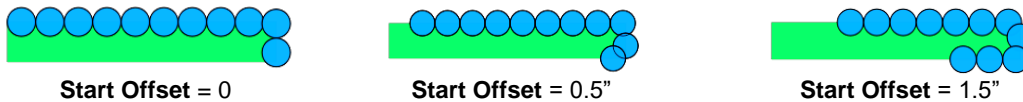
Shape to be repeated should be above the path shape

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

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

- Location of first shape**: Points to the 'Start Offset' field.
- Select either Count or Fill path length**: Points to the 'Repeat' dropdown menu.
- Select Top, Middle or Bottom part of shape to be aligned**: Points to the 'Alignment' dropdown menu.
- If using Count, number of Repeats**: Points to the 'Repeat' field.
- Distance between Repeats**: Points to the 'Spacing' field.
- Distance from that part of the shape to the path**: Points to the 'Offset' field.
- Click here to manually update the preview**: Points to the 'Preview' button.
- Check this box to have the preview update with changes**: Points to the 'Auto Preview' checkbox.
- Click OK when done**: Points to the 'OK' button.

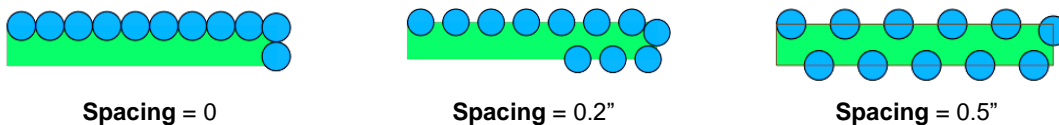
◇ **Start Offset:** This is the distance from the left side of the path to the location of the first shape:



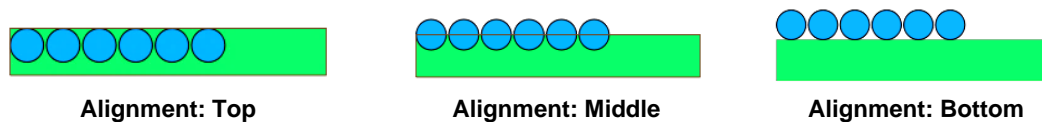
◇ **Repeat:** Choose **Count** if you want to specify how many copies to place along the path. Choose **Fill Path length** if you want the program to automatically fill in the number of repeats that will fill the path using the **spacing** you enter:



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



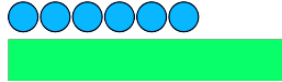
◇ **Alignment:** This refers to the object being repeated. Choose **Top** to have the top of the shape aligned along the path. Choose **Bottom** to have the bottom of the shape aligned along the path. Choose **Middle** to have the center of the shape aligned along the path:



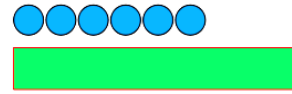
◇ **Offset:** This is how far away from the path you want the repeats to be. For example, if you choose **Bottom** for **Alignment** and then 0.15" or 0.25" for **Offset**, then the bottom of the shapes will be 0.15" or 0.25" above the path:



Offset = 0



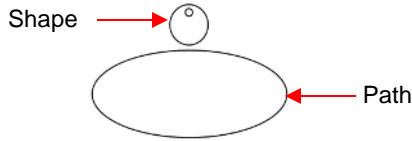
Offset = 0.15"



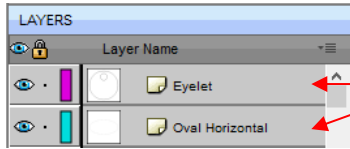
Offset = 0.25"

11.09.1 Designing a Scalloped Oval

- Create an eyelet circle like the one shown in *Section 11.06.1*. Also, use the **Circle** tool to create an oval for the path:

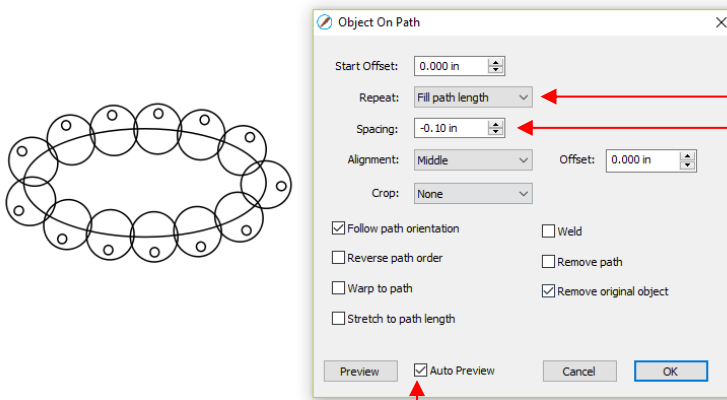


- Before using the **Object on Path** function, make sure the eyelet shape is above the oval path on the **Layers Panel**:



Shape to be repeated should be above the path shape

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

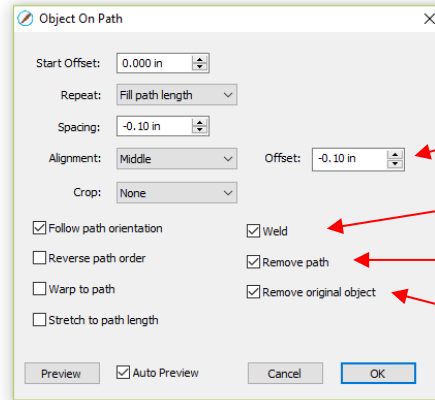
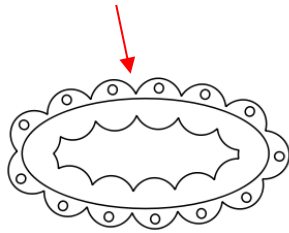


Note the settings used to fill the path and overlap the shapes

Mark this first

- Next the **Offset** can be decreased to soften the scallop. Also a few new settings are noted as shown and described below:

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



Lower the **Offset**

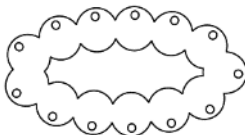
Removes overlap

Removes original path

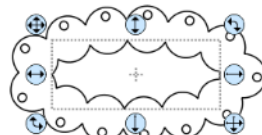
Removes original shape

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

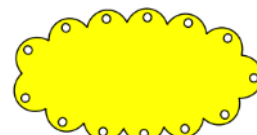
- Click on **OK** and the scalloped oval is mostly complete. To remove the internal scallop, apply **Object>Break Apart**. Carefully select the internal scallop shape and delete. Then marquee-select the remaining scallop border with eyelet circles and apply **Object>Merge**:



After clicking on **OK**



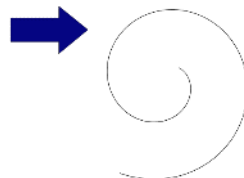
After applying **Break Apart**, select inner scallop



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

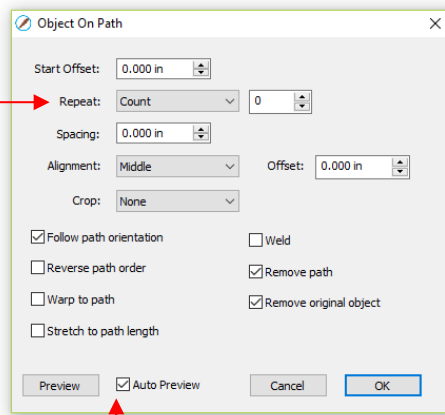
11.09.2 Warp a Shape to a Path

- 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 7.01.7*):

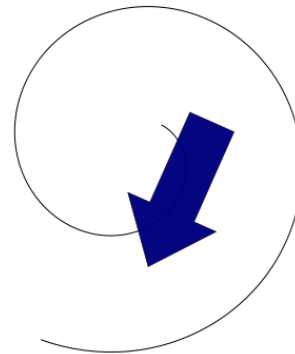


- Verify that the arrow is above the spiral on the **Layers Panel**. Then select both and go to **Effects>Object on Path**. Note that since there is only one shape involved, **Repeat** is left at **Count** and set to 0:

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

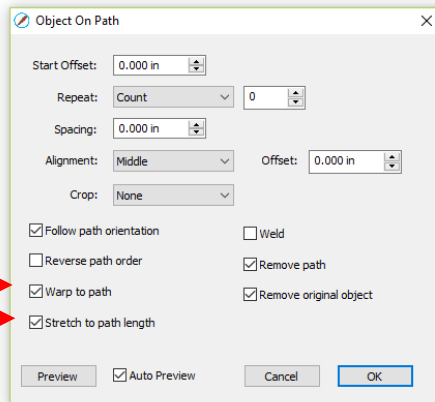


Mark this first



Original arrow appears positioned at start of spiral

- Next, two new settings are applied:

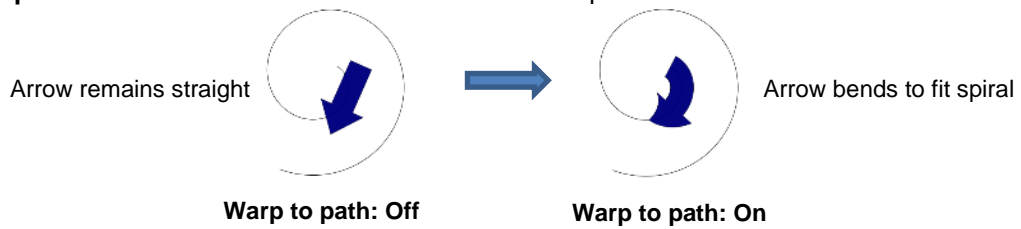


Mark these two options

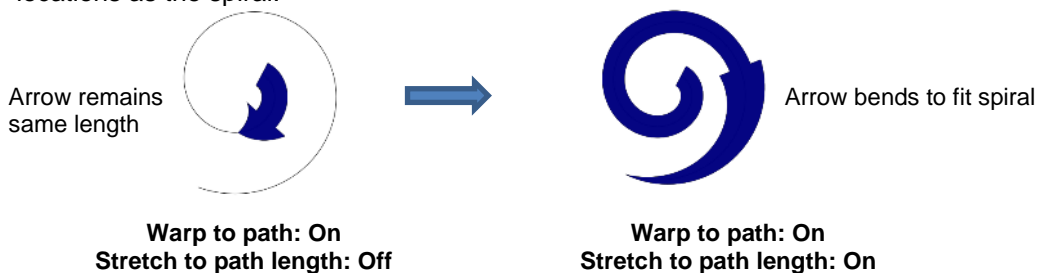


Arrow is now curved and stretched to fit the spiral

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



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

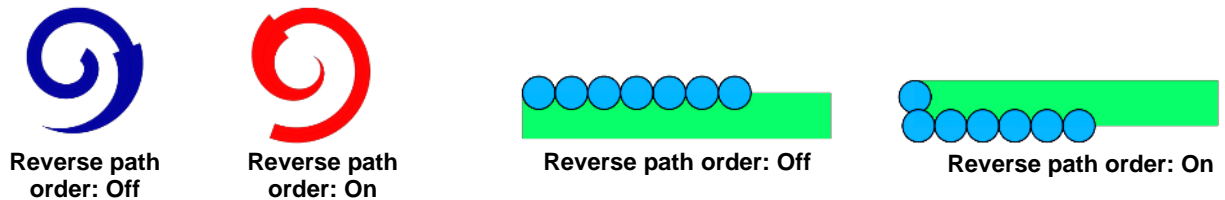


11.09.3 Remaining Settings

- The two remaining settings in the **Object On Path** window are:
 - ◇ **Follow path orientation:** With this setting turned on, the repeats will rotate so that they stay aligned with the path. With the setting turned off, the shapes never rotate:



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



11.10 Wrapper

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



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

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

Add Template will create the cut line for the tumbler

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

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

Click here to see latest changes before accepting

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

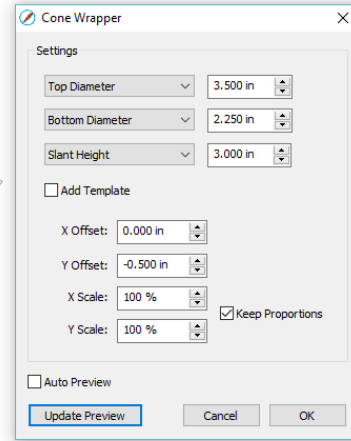
Check this box to have **Y Scale** change automatically with a change to **X Scale** and vice versa.

Click **OK** when done

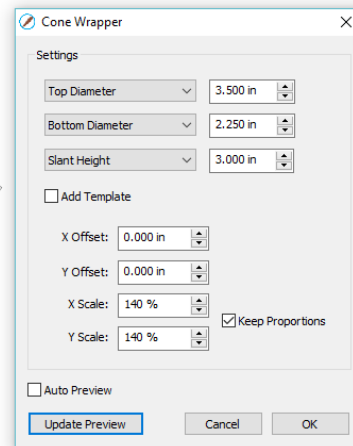
- ◇ Measure the cup: diameter of the top, diameter of the bottom, and length along the side from bottom to top. Enter those as shown in the screenshot. Alternatively, you can measure the radius or the circumference, as well as use the actual vertical height versus the slant height. These other choices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



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



- ◇ Adjust the **X Scale** and/or **Y Scale** to resize the design, if needed. If you want to scale proportionately, mark the **Keep Proportions** box:

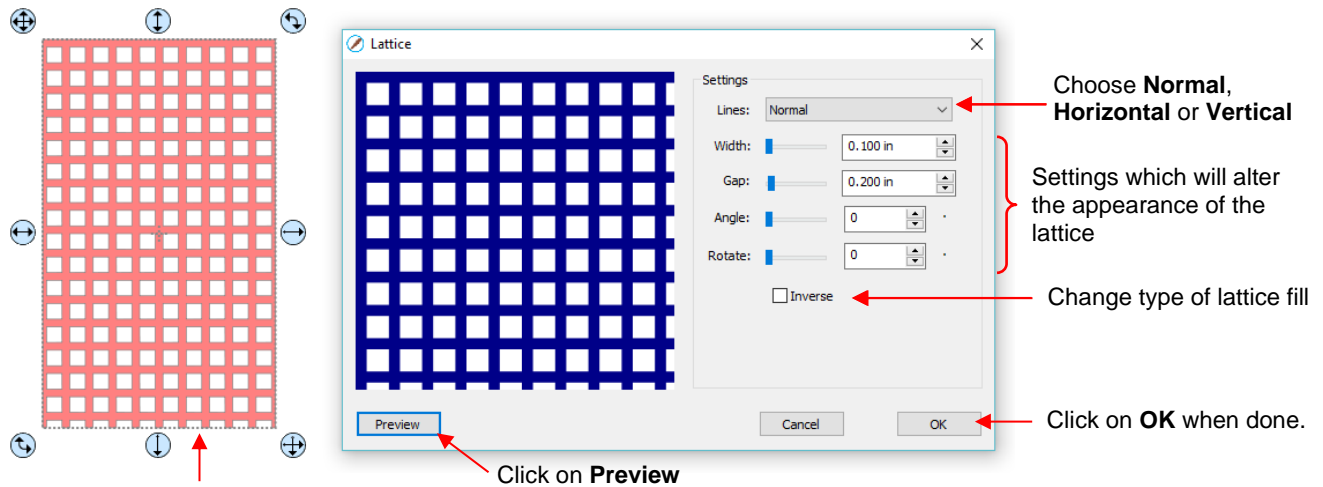


- After clicking on **OK**, the fill color returns to the design and the project is ready for completion:



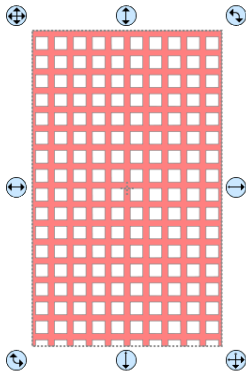
11.11 Lattice

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

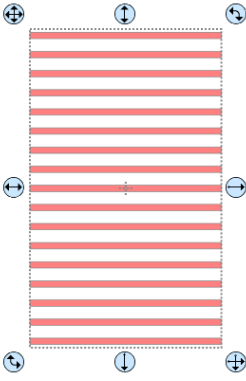


After clicking on **Preview**, selected shape will display lattice based on current settings

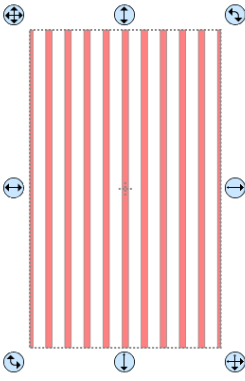
◇ **Lines:** Besides the traditional crisscross pattern, you can also choose to only have horizontal lines or only have vertical lines:



Lines: Normal

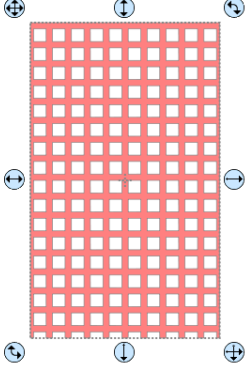


Lines: Horizontal Only

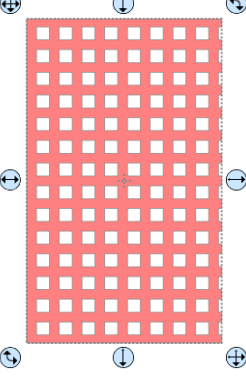


Lines: Vertical Only

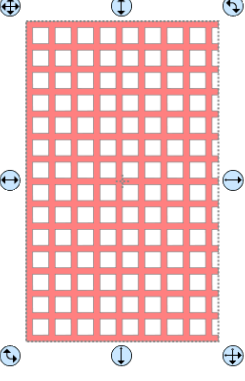
◇ Change **Width** and **Gap** to produce desired appearance. Remember that if the lattice pattern is too small, it might be difficult to cut:



Width: 0.1 in
Gap: 0.2 in

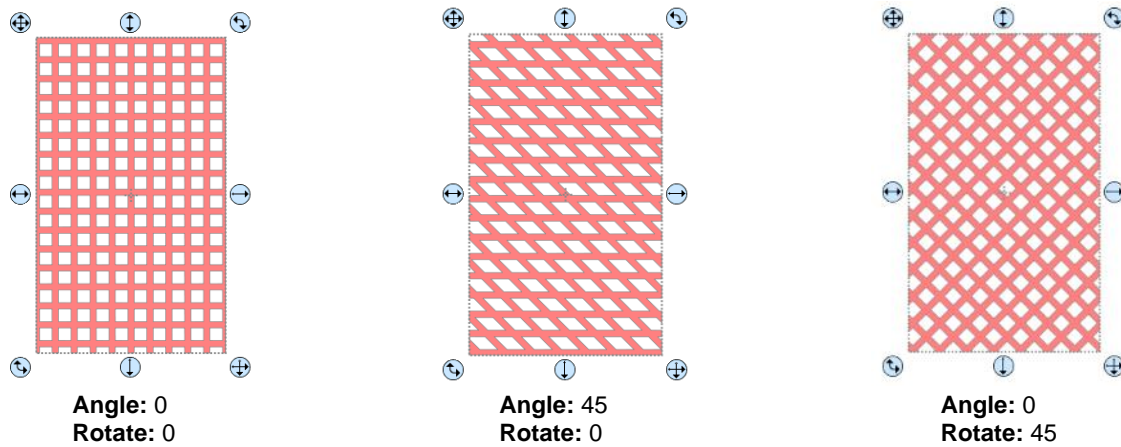


Width: 0.15 in
Gap: 0.2 in

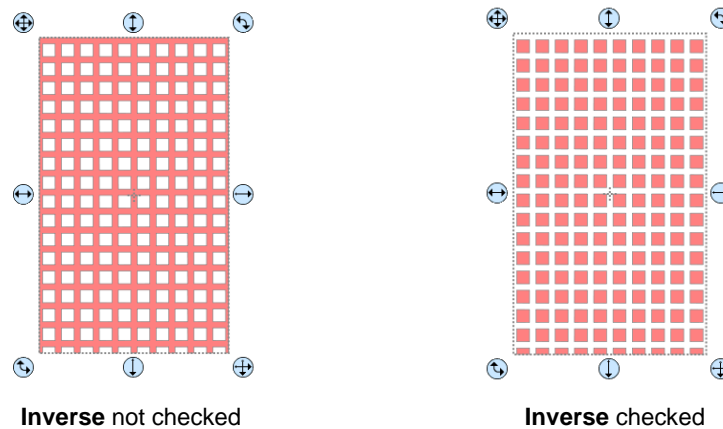


Width: 0.1 in
Gap: 0.25 in

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

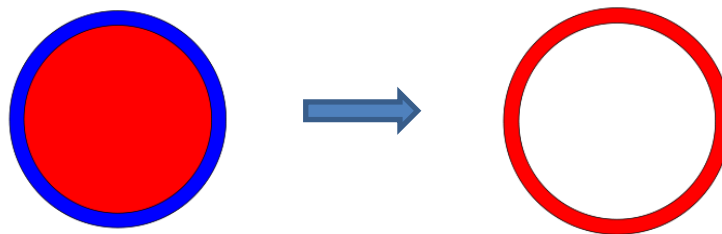


- ◇ **Inverse** is used to create a kind of negative lattice. An example will follow later in this section:

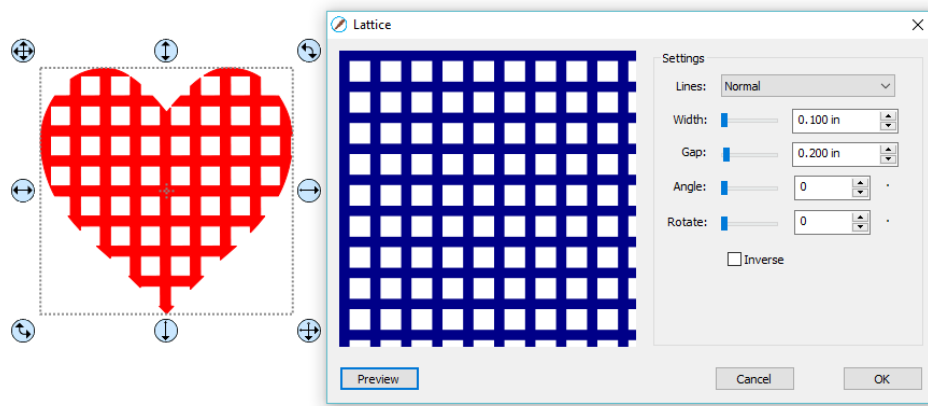


- An example of when **Inverse** would not be checked is when you want to attach/weld a latticed shape to something else. In the following example, a latticed heart is attached to the center of a ring:

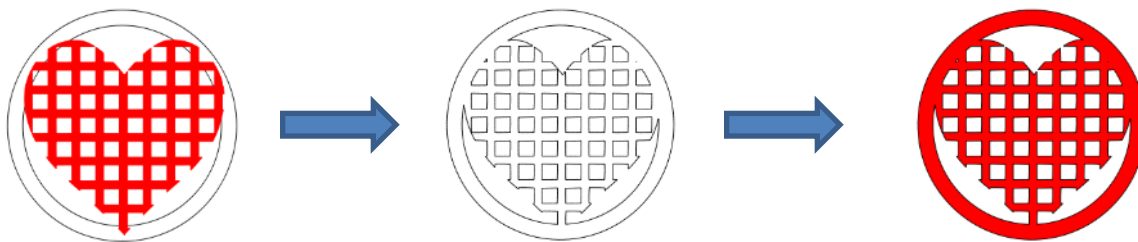
- ◇ A ring is created by applying **Object>Merge** to two centered circles:



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



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



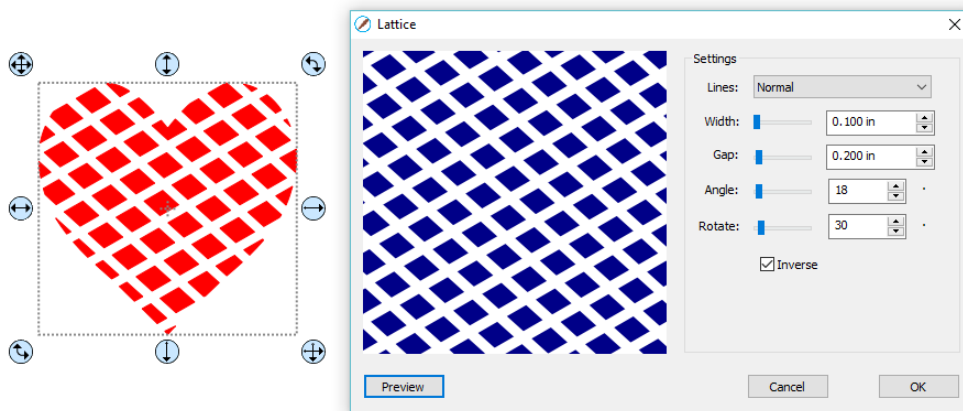
Remove **Fill** from ring to make overlap easier to see

After applying **Path>Union**

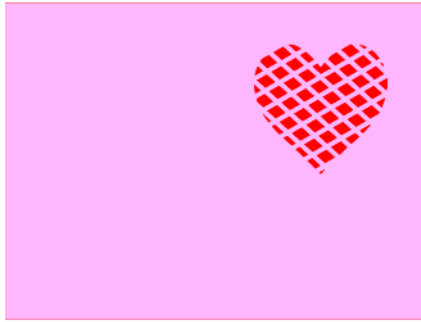
Set **Fill** to red again

- An example of when **Inverse** would be checked is when you want a lattice aperture cut from the front of a greeting card:

◇ Using the same heart as above, make sure **Inverse** is selected:



◇ Arrange the latticed heart over a base greeting card:



- ◇ Select all and go to **Object>Merge**. The card is complete:



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

11.12 Rhinestones

- SCAL's **Rhinestones** feature provides both outlining and horizontal fill of shapes with the size of circles needed for your rhinestones and the desired spacing. After selecting a shape, the feature can be accessed in either of the following ways:
 - ◇ Go to **Effects>Rhinestones**
 - ◇ Right-click and select **Appearance>Rhinestones**

11.12.1 Guidelines for Rhinestone Pattern Design

- There are some guidelines to follow when designing a rhinestone pattern:
 - ◇ In general, you want to size the shape before applying the rhinestone circles. If you later want to resize the design, SCAL does have the ability to regenerate the rhinestone pattern, maintaining the original selected stone size and spacing. But in order to have a good sense of how the design is going to appear on your garment and to make sure the lettering is readable, you want to design close to the target size.
 - ◇ **IMPORTANT:** Always make a backup copy of your design before entering the **Rhinestone** window because the original design will be replaced with the new rhinestone pattern. You might later want to use that same original design but apply a different size rhinestone or create a shadow layer from it, or some other change.
 - ◇ The circle size selected will need to be larger than the stone size you purchase. As a general rule, select a size three numbers larger than your stones. Thus, if you purchased SS10 stones, then in the rhinestone design window, you would select SS13 stones. This larger size will allow the SS10 stones to more easily brush into the holes, saving a lot of time and tedium.

- ◇ When selecting a font to use, be leery of “fancy fonts.” You want the lettering to be readable after it is converted to circles. When in doubt, have someone who doesn’t know the words you’ve used attempt to read the rhinestone design on your monitor or from a printout of the design. If they cannot easily decipher the words, then try a more basic font.
- ◇ If you plan to do a lot of rhinestone applications, create and cut a template with small patterns (~ 15 – 20 circles) in different sizes so that you can test brush your rhinestones to find out the optimum size to use when designing. A difference of just 0.1 or 0.2 mm can affect how easily the stones will brush into a pattern right side up. If the size is too small, the stones will tend to not fall in. If the size is too large, then the ones that land right side up will tend to get flipped over by the brush. Also, stones can vary slightly in size from one manufacturer to the next and also from one color to the next. Further, the size of the cut holes can vary slightly from one template material to the next.

11.12.2 Rhinestone Outline

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



- To apply a rhinestone outline, first make a backup copy of the shape. Then select the shape and go to **Effects>Rhinestones**:

Rhinestone

Stone Size	Pearl Plate	mm	inch
SS 9	PP 19	2.50 - 2.60	0.098 - 0.10
SS 9	PP 20	2.60 - 2.70	0.10 - 0.106
SS 10	PP 21	2.70 - 2.80	0.106 - 0.11
SS 10	PP 22	2.80 - 2.90	0.11
SS 11	PP 23	2.90 - 3.00	0.11 - 0.12
SS 12	PP 24	3.00 - 3.20	0.12 - 0.13
SS 13	PP 25	3.20 - 3.30	0.13
SS 13	PP 26	3.30 - 3.40	0.133
SS 14	PP 27	3.40 - 3.50	0.133 - 0.14

Stone Size: 3.40 mm Fill shape with stones

Stone Spacing: 0.50 mm Stone Count: 268

Adjust spacing to fit path

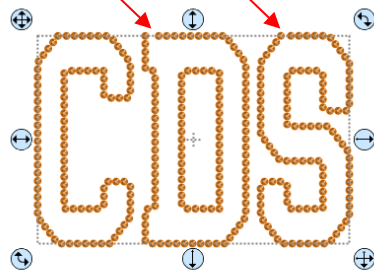
Preview Cancel OK

Annotations:

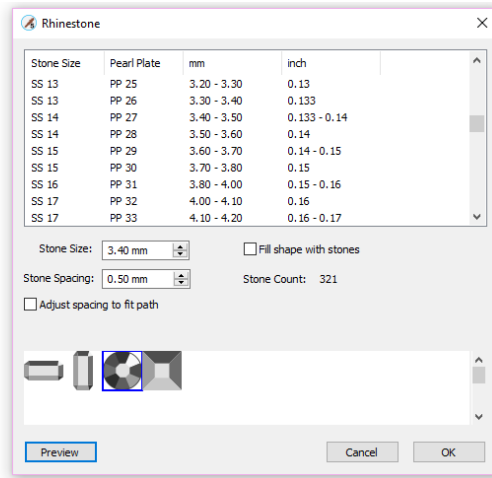
- Select a **Stone Size** but larger than your actual stones
- Stone Size** will update based on what you select in upper window or you can enter a size directly
- Select a spacing for the design: usually between 0.5 and 1.0 mm
- This setting is used to improve spacing
- Option to **Fill** shape versus outline
- Number of stones based on current settings (must click on **Preview** first)
- Click on **Preview** to see effects of settings
- Select the shape of the stones to be used
- Click on **OK** when done.

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

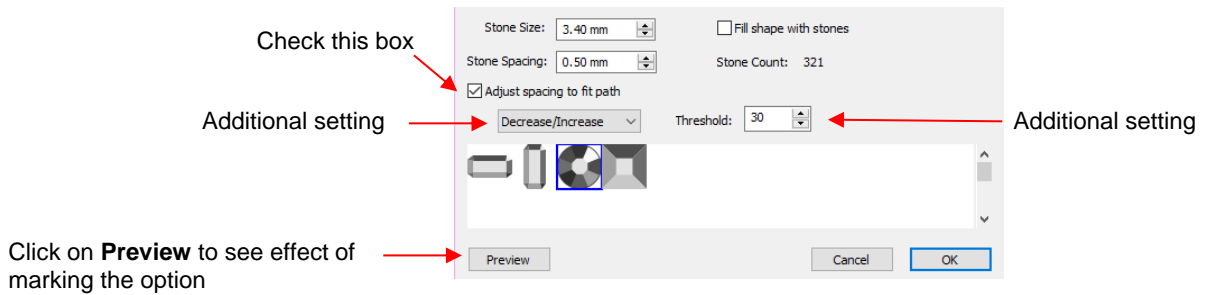
Slight adjustments needed



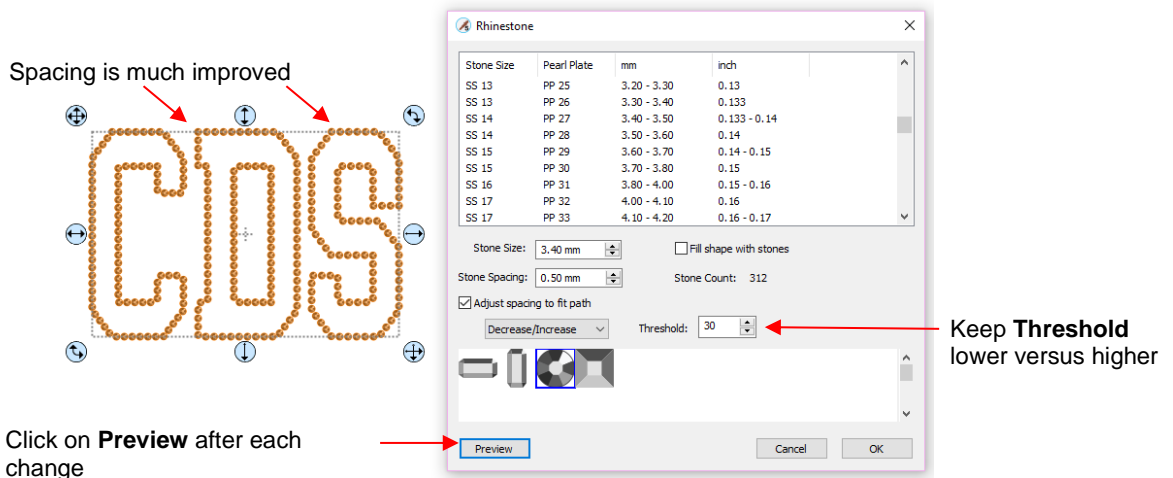
Preview of design



- The preview shows that the spacing is off a bit at the top of the “D” and the “S”. There is an option which can be used to make adjustments. Check the box next to **Adjust spacing to fit path** and additional settings will appear:



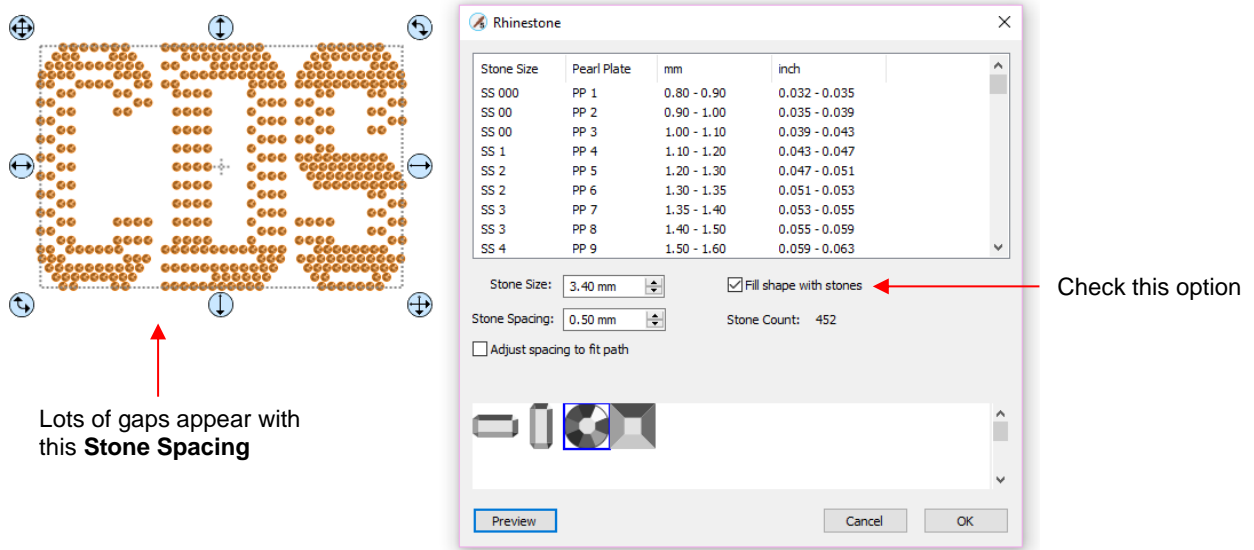
- These settings will require experimenting in order to optimize equal spacing between the stones. Initially, however, just click on **Preview** after marking the box and the spacing should change. This is often all that is required. However, from the drop-down menu, you can also choose to only **Decrease**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



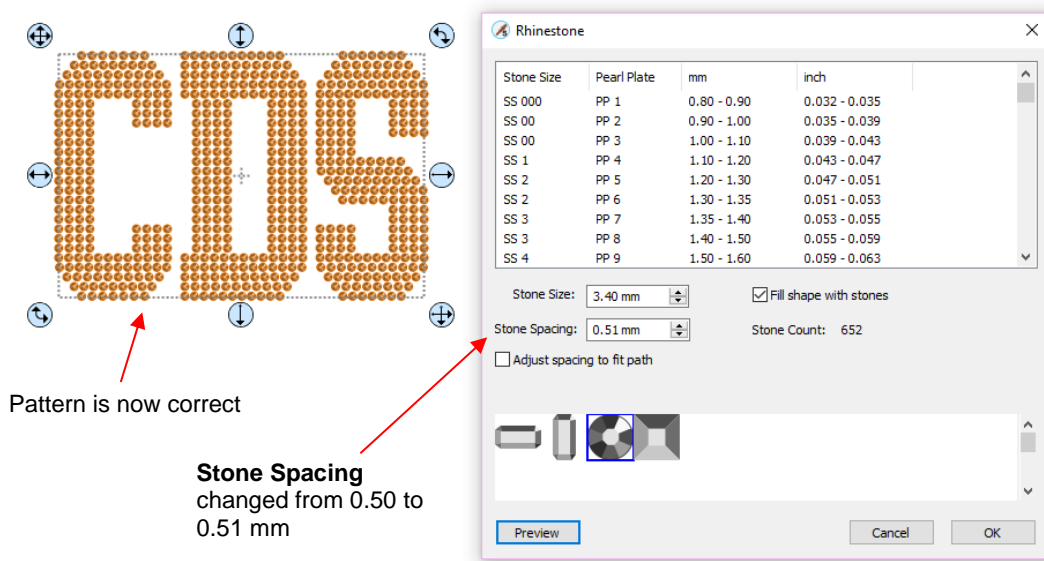
- Note that the higher the **Threshold**, the more increase in spacing you may see. So typically you want to keep that value lower versus higher.
- If additional stone-by-stone editing will be needed, note that the simulation will initially be lost. If you want to restore it, write down the Stone Size before clicking on OK. Also note, however, that the simulation is not needed when cutting the design from your template material. For guidelines on editing, refer to *Section 11.12.4*.

11.12.3 Rhinestone Fill

- Another option in the **Rhinestone** window is **Fill shape with stones**. Instead of outlining the shape, the image will be filled with circles in horizontal rows. In our prior example, the same letters will now appear like this:



- The gaps in the design can be easily corrected by adjusting the **Stone Spacing**. Instead of 0.50, the spacing is increased slightly to 0.51 mm. The result is a complete correction of the spacing and the design looks great:



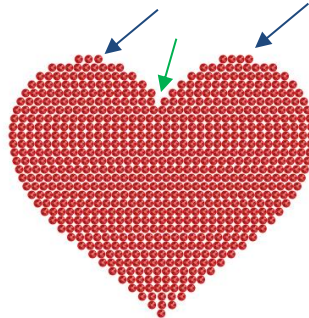
- Also, note the increase in the number of stones as a result of switching to a line fill. Rhinestones are typically sold by the gross and 1 gross equals ~ 144 stones. Thus, this design would require over 5 gross of stones compared to just under 2 gross for the outline version.
- As with the outline option, any stone-by-stone editing will cause a loss of the simulation. If you wish to restore the simulation after editing, write down the Stone Size before clicking on OK. Also note, however, that the simulation is not needed when cutting the design from your template material. For guidelines on editing, refer to the following section.

11.12.4 Editing Rhinestone Designs

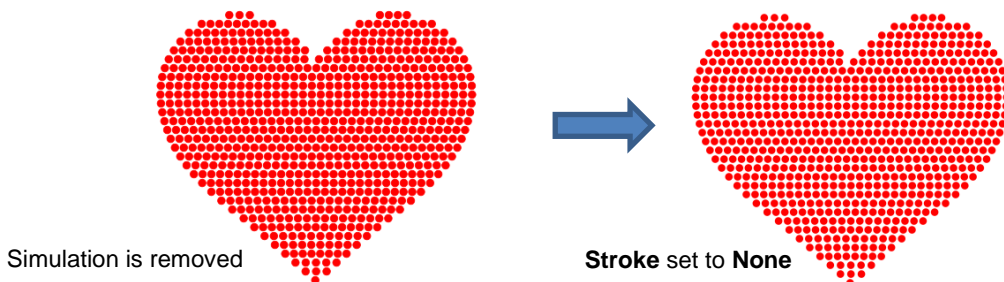
- Before editing, make a backup of the design created by the **Rhinestone** function. As was mentioned earlier you can resize rhinestone designs but if certain editing has occurred, you might or might not get the results you want after editing.
- Rhinestone designs will sometimes need “tweaking” which involves adding, deleting, moving, or re-spacing circles. In the following example, there are two corrections required:

1. The blue arrows indicate the top row on each side does not contain the same number of circles.

2. The green arrow indicates a gap in that row that can easily be corrected.



- The first step is to break the design so that a row of circles or even individual circles can be moved. Select the pattern and apply **Object>Break Apart** or **Ctrl-B**. You may wish to turn off **Stroke** to have a better sense of the actual spacing:



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


Important: Enter same stone size

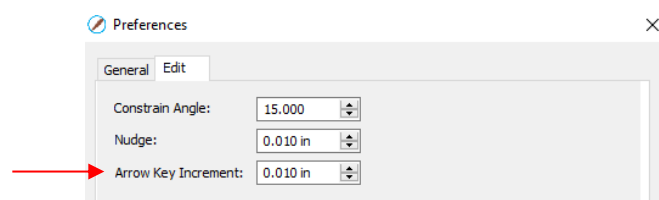
Leave unchecked

Any spacing will suffice

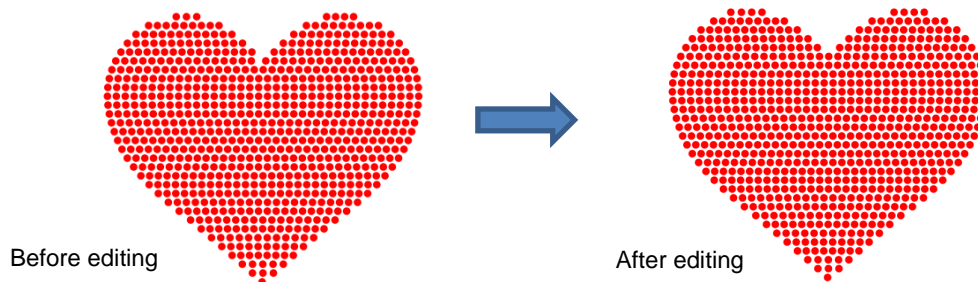
Stone Size	Pearl Plate	mm	inch
SS 000	PP 1	0.80 - 0.90	0.032 - 0.035
SS 00	PP 2	0.90 - 1.00	0.035 - 0.039
SS 00	PP 3	1.00 - 1.10	0.039 - 0.043
SS 1	PP 4	1.10 - 1.20	0.043 - 0.047
SS 2	PP 5	1.20 - 1.30	0.047 - 0.051
SS 2	PP 6	1.30 - 1.35	0.051 - 0.053
SS 3	PP 7	1.35 - 1.40	0.053 - 0.055
SS 3	PP 8	1.40 - 1.50	0.055 - 0.059
SS 4	PP 9	1.50 - 1.60	0.059 - 0.063

- Click on **OK** and the simulation will return. But you will now be able to individually select stones and move them or delete them.

- The following list shows the most common functions applied when editing rhinestone designs:
 - ◇ Use the **Zoom** functions (*Section 5.09*) to move in close for easier selection of individual or small groups of circles
 - ◇ Use the **Lasso Selection** tool  (*Section 7.02.2*) to more easily select a group of circles
 - ◇ To quickly add a circle, hold the **Alt** key and left click once on a circle. A duplicate is created in the same spot.
 - ◇ To delete multiple circles, hold the **Delete** key while clicking on individual circles
 - ◇ Use the **Nudge** arrow keys on the **Position & Size Panel** to move circles to new locations
 - ◇ Alternatively, use the arrow keys on your keyboard to move a circle or row of circles. If needed, change the increment to 0.01" (0.25 mm) by going to **Edit>Preferences** (or, on a Mac, press **Command + ,**). Then click on the **Edit** tab and change the **Arrow Key Increment**, as shown here:



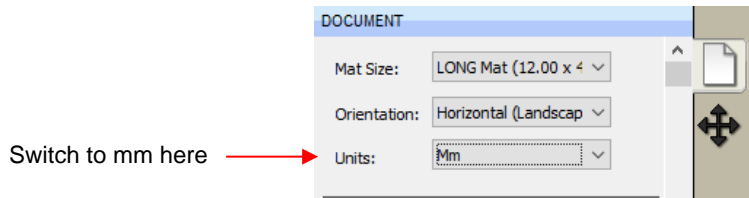
- ◇ To realign a row or column of circles, use the alignment functions covered in *Section 7.18.2*.
- ◇ To respace a row or column of circles, use the spacing functions covered in *Section 7.19.2*.
- In the heart example, an additional heart is added at the top to balance the two sides. Also, the sixth row of circles are selected and **Distribute Center Horizontally** is applied:



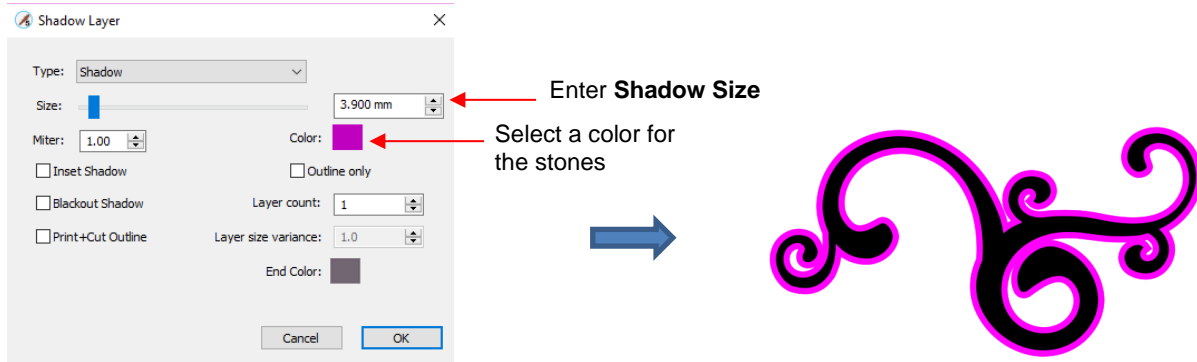
- Sometimes the circles you want to re-space equally may fall closer to a 45° angle versus vertically or horizontally. Select your entire design and rotate until the line of circles is closer to vertical or horizontal. Re-space the circles and then rotate back into place.
- After editing the design,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

11.12.5 Adding an Outline to a Rhinestone Design

- If you want to outline your design, then create the outline first using the **Shadow Layer** function (*Section 11.05*). Choose a **Shadow Size** at least the size of the circles plus the spacing. Otherwise, the stones will overlap. Since rhinestone design programs work in metric, it's easier if you temporarily change the units in SCAL to mm. This setting is on the **Document Panel**:

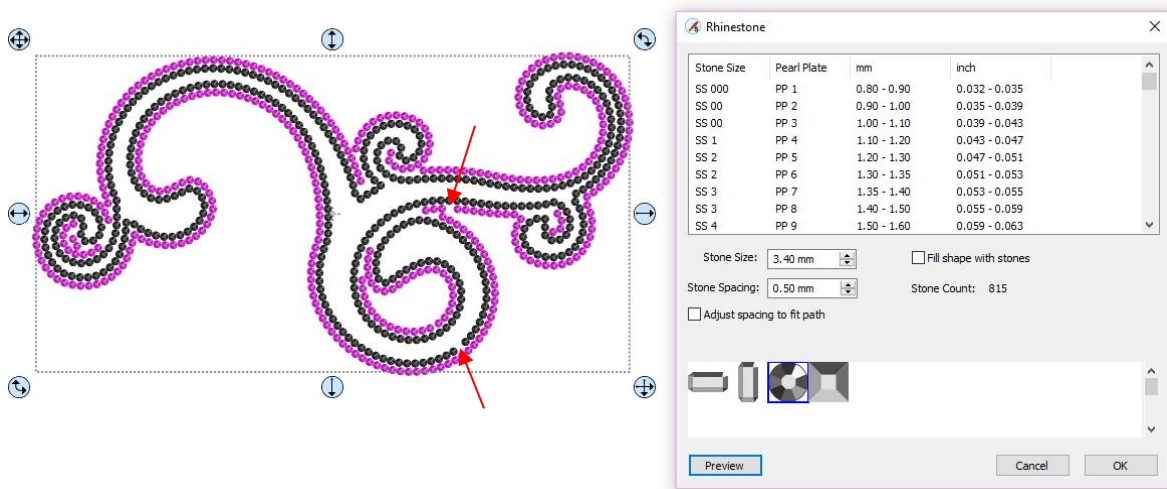


- For the following example, a swirl design from the **Library** is added to the **Cutting Mat** and sized for a T-shirt. The same settings for SS 10 stones will be used - the circles will be 3.4 mm in diameter and the spacing will be 0.5 mm. Thus, the **Shadow Size** needs to be 3.9 mm:

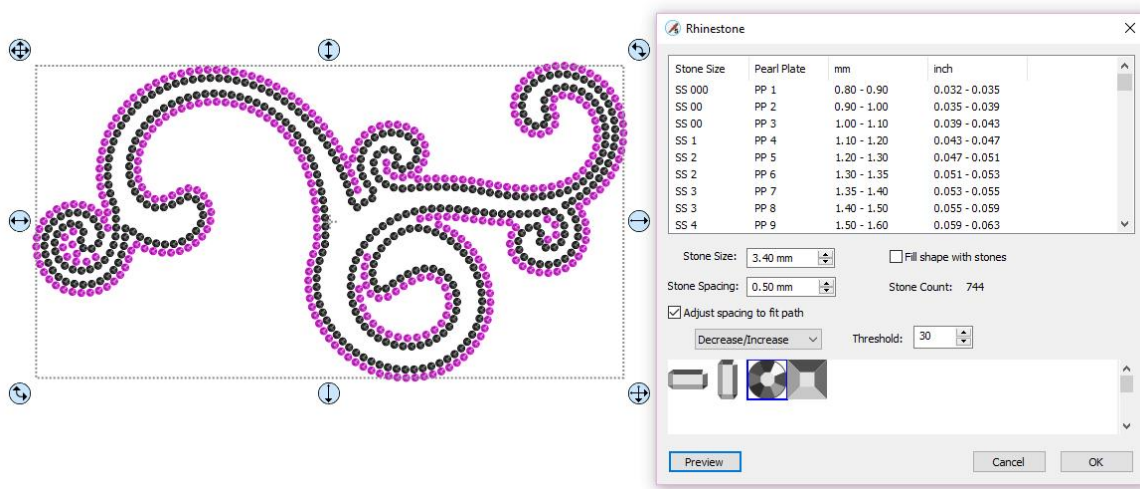


- Note: this was the **Shadow Size** to use if the same size stones are used for both the original design and the shadow layer. At the end of this section, the **Shadow Size** formula is shown for the situation when the stones are not identical in size.

- Next, select the design and the shadow and make a backup copy. Then go to the **Rhinestone** window. Since the same settings will be used for both the original design and the outline, both can have the rhinestone effect applied in the same step:



- The red arrows indicate that the spacing should be adjusted. In this case the **Adjust spacing to fit path** was again used to improve the design:



- However, additional editing is needed to improve the overall look. After removing some of the circles, the final design is ready to cut:



- If the stones are not the same size, the average should be used, plus the spacing:

Shadow Size = (Size of circle for smaller stone + Size of circle for larger stone) / 2 + **Spacing**

◇ Thus, if the circle sizes were 3.4 mm and 4.6 mm, with a desired **Spacing** of 0.5 mm, then:

$$\begin{aligned} \text{Shadow Size} &= (3.4 + 4.6) / 2 + 0.5 \text{ mm} \\ &= 8.0 / 2 + 0.5 \\ &= 4.5 \text{ mm} \end{aligned}$$

◇ Note that this is the same calculation if the outline is using the smaller circles or the larger circles.

11.12.6 Using Purchased Rhinestone Fonts and Designs

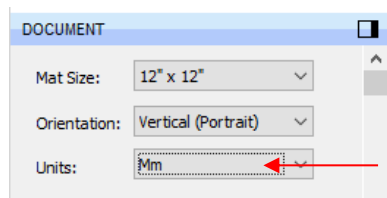
- One of the best investments you can make if you are planning to do a lot of rhinestone applications is to buy files instead of trying to make your own. While the disadvantage is that you will be somewhat limited in the sizing of the final design, the time-saving advantage can make it well worth the cost.
- This section will explain how to properly size a purchased font. The same technique would be used with a design. You can find beautiful rhinestone designs and fonts at the following two web sites:
 - ◇ [Synergy 17](#)
 - ◇ [The Rhinestone World](#)
- The first step with a rhinestone font is to install it the same way you would install any TTF font on your computer. Then open SCAL and the font should appear in your font menu.
- Enter text using the same method with any font. This was presented in *Section 4.04.1*. In this tutorial, the phrase “Irish at Heart” will be typed out in a rhinestone font called *Dreamer*.

Irish at Heart

- If the circles seem too close together, set the **Stroke** to **None** on the **Fill & Stroke panel**:

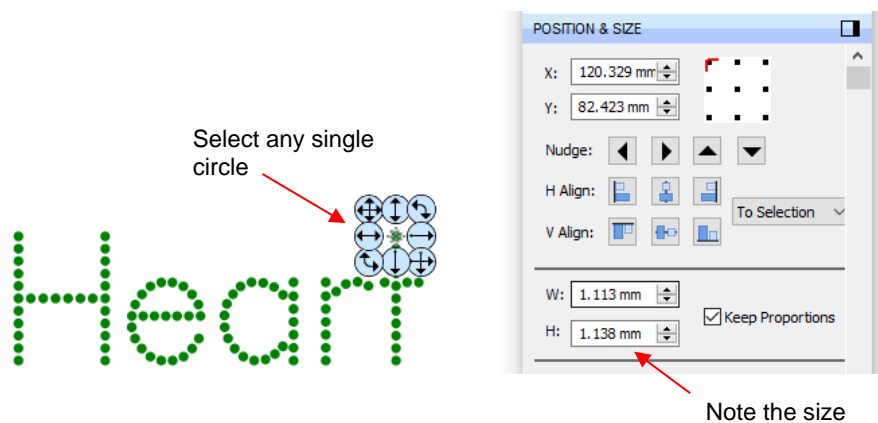
Irish at Heart

- Remember that it's pointless to resize the design. The goal is to scale it so that the circles will be the correct size for the rhinestones you plan to use. Since rhinestone designing typically uses mm for measurement, change the **Units** to **mm**. Later you can switch back to inches, if needed, to know how large the final design will be at the size of rhinestones you'll be using:



Select mm

- To find out what size these circles are, select the text and go to **Object>Break Apart**. Then select just one circle and check the size on the **Position & Size Panel**:



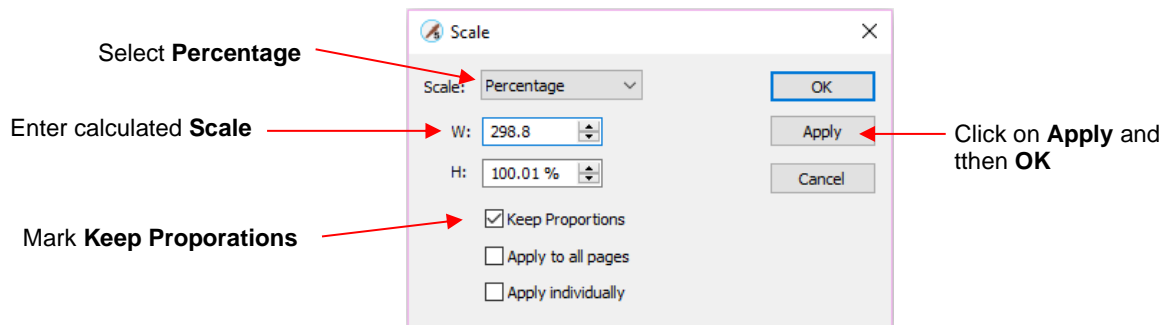
Note the size

- The circle size in this case is 1.138 mm but let's say the size needs to be 3.4 mm in order for the template holes to work with the SS10 rhinestones purchased. The **Scale** factor is always calculated as:

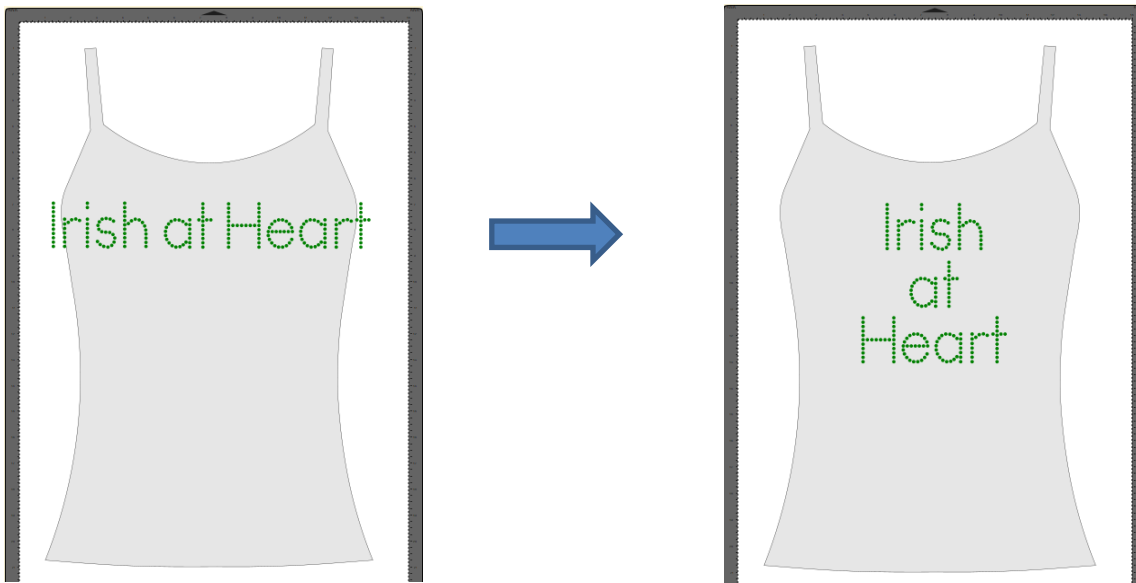
Size Needed divided by **Current Size** multiplied by **100**

◇ Thus, in this case, the **Scale** = 3.4 divided by 1.138 times 100 = 298.8 %.

- To now scale the phrase to the correct size, select all of the wording and go to **Object>Transform>Scale**. In the window that opens, switch to **Percentage**, make sure the **Keep Proportion** option is marked, enter the **Scale** calculated and then click on **Apply**:



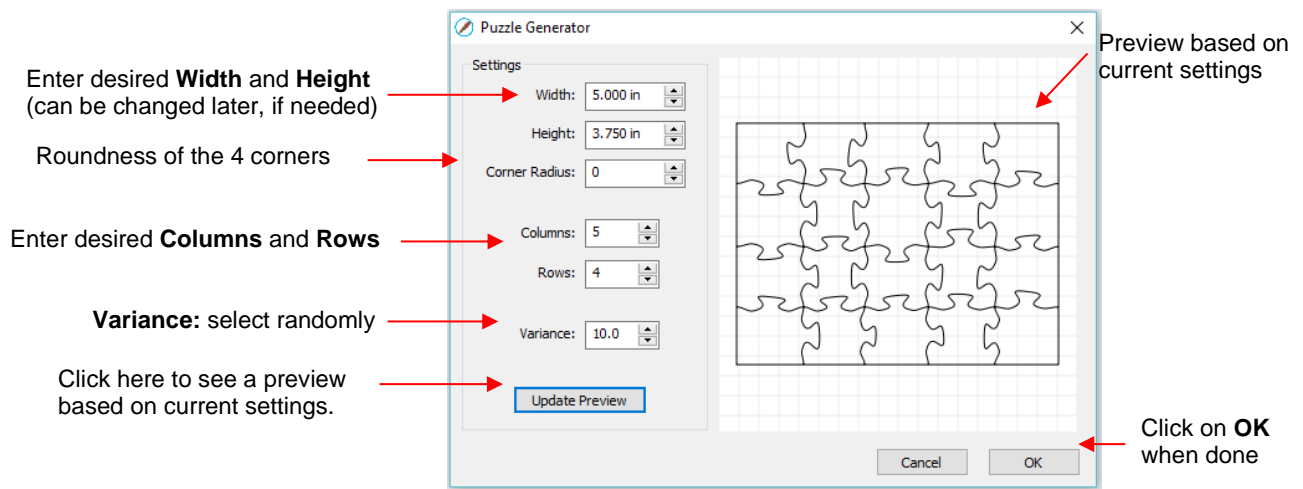
- The text is resized. You can then select a single circle and verify the new size is what you need (3.4 mm in this example) or within several hundredths of a mm.
- If you normally work in inches, switch back to inches to check the final size of your design to make sure it will fit onto your shirt or other medium. In this case, the phrase is now over 12" in width and will not fit onto the shirt in this arrangement. However the words can be arranged in a different manner and the design will work:



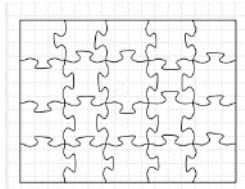
- The other alternative would have been to use size SS8 or size SS6 stones instead.
- Resizing patterns involves the same process. Insert the purchased file, **Break Apart**, determine the size of a circle and then calculated the needed **Scale** factor. Use the **Scale** window to resize the design and determine if it will work with the size of stones you plan to use.

11.13 Jigsaw Puzzle

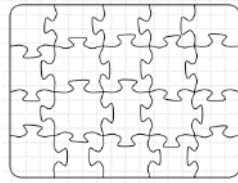
- The **Jigsaw Puzzle** feature will generate a rectangular jigsaw pattern with a number of options from which to choose. To open the window, go to **Effects>Puzzle Generator**:



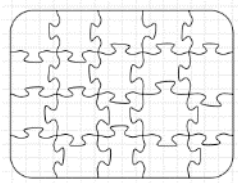
- **Width and Height:** If you plan to apply this puzzle over a specific image, you may want to choose dimensions that correspond to your image. For example, let's assume you have a photo that is 5" x 3.75" and plan to make a print and cut jigsaw puzzle. Enter those dimensions into the **Puzzle Generator**, as shown in the prior screenshot.
- **Corner Radius:** With a setting of 0, the corners of the rectangle are 90°. If you want rounded corners, increase this setting:



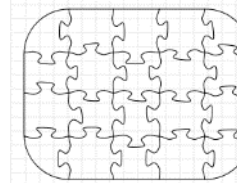
Corner Radius = 0



Corner Radius = 0.25

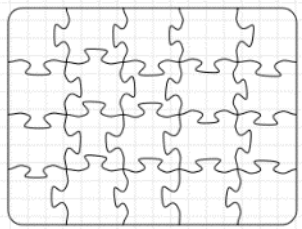


Corner Radius = 0.5

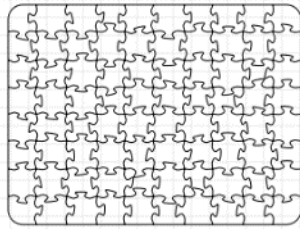


Corner Radius = 1.0

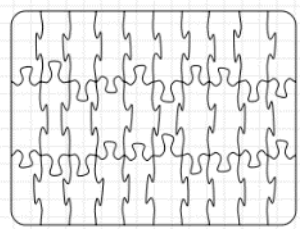
- **Columns and Rows:** To keep the shapes from becoming too distorted, make the number of **Columns** and **Rows** similar to the dimensions. If you want more pieces, then increase the number of **Columns** and **Rows** proportionately. For example, instead of having 5 **Columns** and 4 **Rows**, double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



5 Columns, 4 Rows

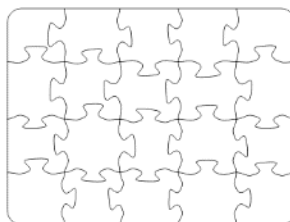


10 Columns, 8 Rows



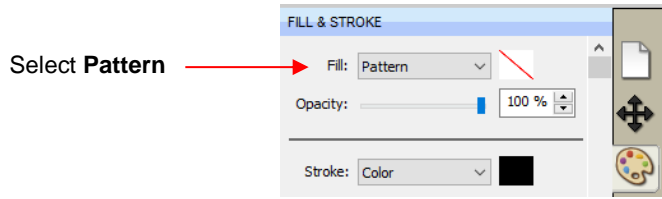
10 Columns, 3 Rows

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

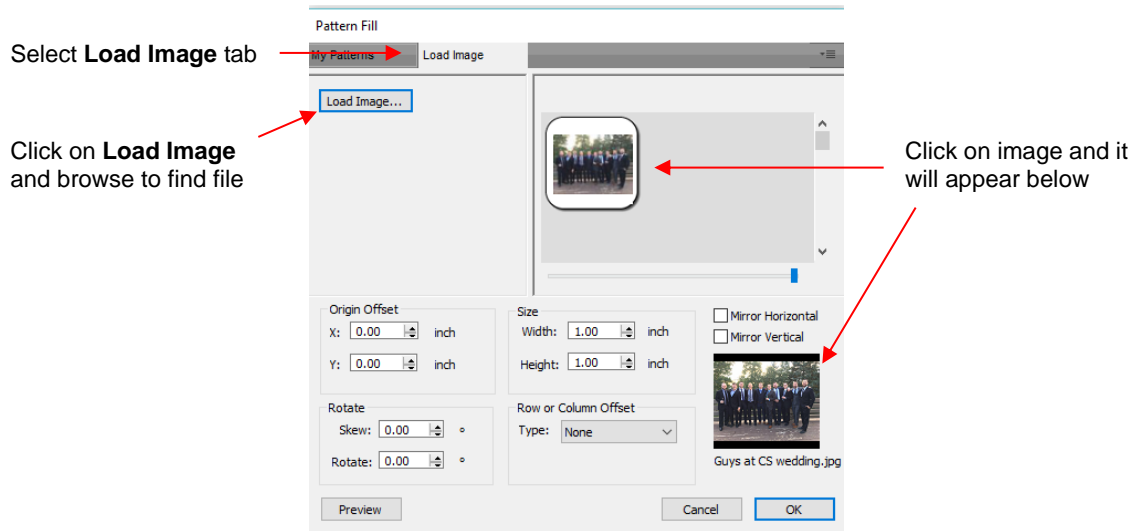


- For a print and cut application:

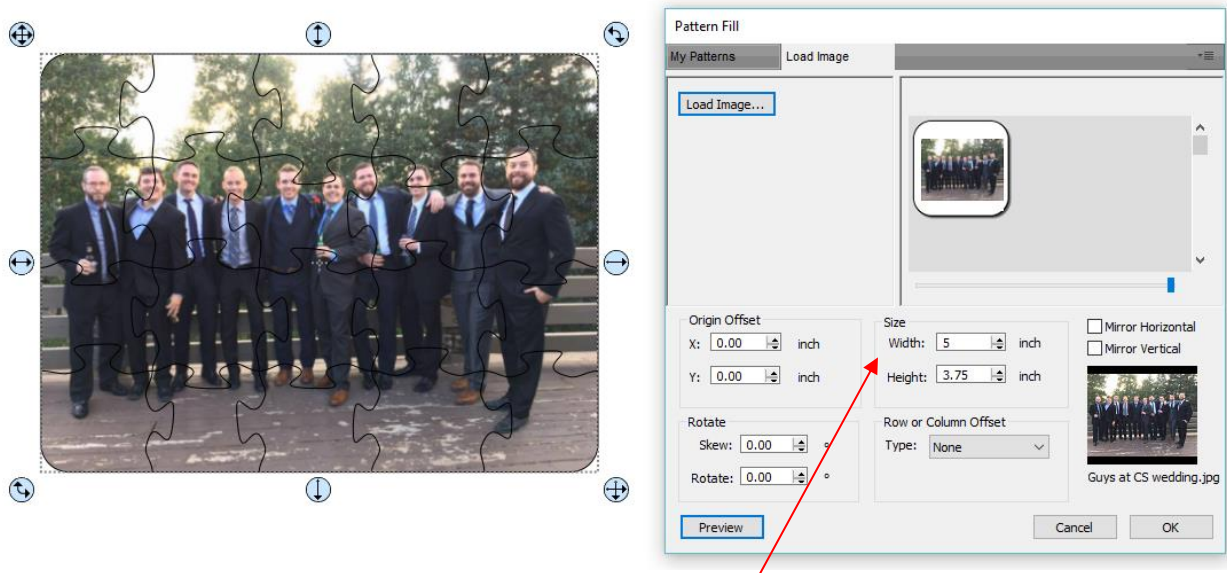
- ◇ Select the shape and, on the **Fill & Stroke Panel**, select **Pattern** from the **Fill** menu:



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



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



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

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



11.14 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:

Check this box to have the preview update with changes

Click here to manually update the preview

Rotate along the 3 axes, as desired

Increase the **Perspective** for 3D effect

Click **OK** when done

◇ X Axis Rotation:

RJM
X: 60

RJM
X: 73

—
X: 90

RJM
X: 120

◇ Y Axis Rotation:

RJM
Y: 60

RJM
Y: 73

|||
Y: 85

RJM
Y: 120

◇ Z Axis Rotation:

RJM
Z: 30

RJM
Z: 60

RJM
Z: 90

RJM
Z: 120

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



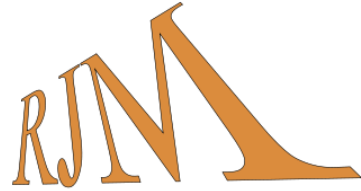
X: 0 Y: -50 Z: 0
Perspective: 65



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



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



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

11.15 3D Extrude (SCAL PRO only)

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



Change X and/or Y Offset

Option to remove overlap from extrusion

Change extrusion color

Option to make extrusion an outline only

Click here to manually update the preview

Option to use Perspective

Enter the thickness of the Perspective

Click OK when done

Check this box to have the preview update with changes

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



X Offset = 0.25
Y Offset = 0



X Offset = 0.35
Y Offset = 0



X Offset = -0.25
Y Offset = 0



X Offset = -0.35
Y Offset = 0

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



X Offset = 0
Y Offset = 0.25



X Offset = 0
Y Offset = 0.35

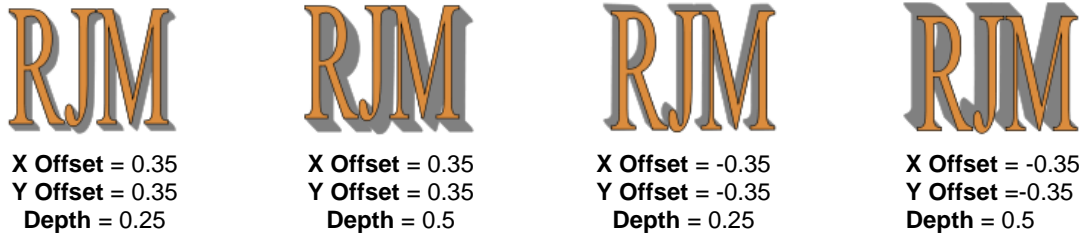


X Offset = 0
Y Offset = -0.25

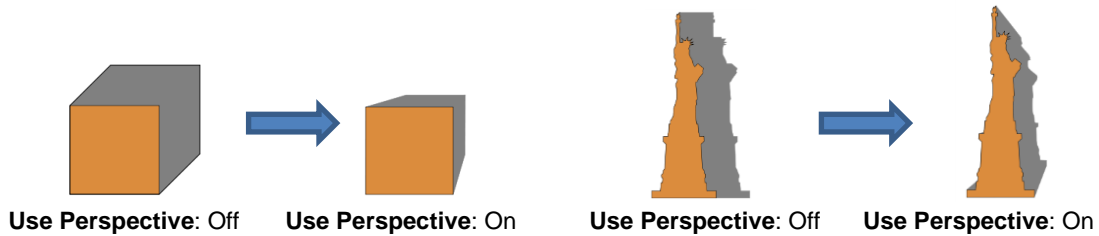


X Offset = 0
Y Offset = 1.0

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

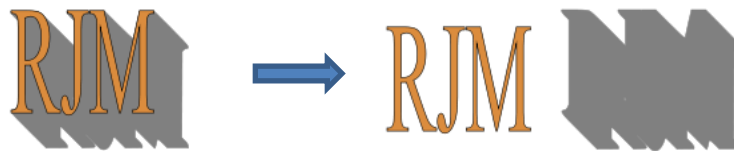


- ◇ **Use Perspective** provides a vanishing point effect:



- ◇ **Remove Foreground:**

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



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



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

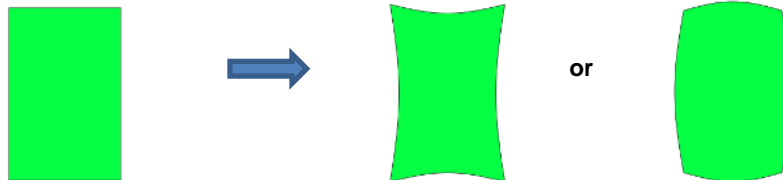


- ◇ **Outline Only:** If you prefer the extrusion not have a **Fill** color, select this option. The outline color will be that of the **Color** you selected in the **3D Extrude** window:



11.16 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**:

Increase or decrease to apply the **Barrel Distortion**

Check this box to have the preview update with changes

Click here to manually update the preview

Click **OK** when done

LUCY

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



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



11.17 Bulge

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

Choose from **Separately**, **Together**, or **Opposite**

Increase to round up, decrease to curve down

Add more customization to the effect of the bulge

Same settings as above, but applied to the **Left** and **Right** sides instead of **Top** and **Bottom**

Check this box to have the preview update with changes

Click here to manually update the preview

Click **OK** when done

The screenshot shows the 'Bulge' dialog box with the following settings:

- Top/Bottom: Separately
- Top Offset: 0.0 in, Bottom Offset: 0.0 in
- Top Curve: 0, Bottom Curve: 0
- Left/Right: Separately
- Left Offset: 0.0 in, Right Offset: 0.0 in
- Left Curve: 0, Right Curve: 0
- Auto Preview: checked

 Red arrows point from the text annotations to the corresponding controls in the dialog box.

- In the top portion of the window are settings for applying **Bulge** to the top or bottom of a shape. The **Top/Bottom** setting allows you to choose if you want to apply the settings in one of three ways:

◇ **Separately:** The **Offset** and **Curve** settings can be different for the top versus the bottom

Top/Bottom: Separately

Top Offset: 0.70 in, Bottom Offset: 1.20 in

Top Curve: 60, Bottom Curve: 0

LUCY

◇ **Together:** The **Offset** and **Curve** settings will be applied equally to both the top and the bottom. In this case the **Bottom Offset** and **Bottom Curve** settings will be grayed out.

Top/Bottom: Together

Top Offset: 0.70 in, Bottom Offset: -0.7 in

Top Curve: 60, Bottom Curve: 60

LUCY

◇ **Opposite:** The **Offset** and **Curve** settings will be applied opposite to one another on the top and the bottom. In this case, the **Bottom Offset** and **Bottom Curve** settings will again be grayed out.

Top/Bottom: Opposite

Top Offset: 0.70 in, Bottom Offset: 0.7 in

Top Curve: 60, Bottom Curve: 60

LUCY

- The **Top Offset** rounds the top side of the shape up or down depending on whether a positive or negative value is applied. The **Bottom Offset** does the same, but applies it to the bottom side of the shape:



Top Offset = 1.0
Bottom Offset = 0



Top Offset = 2.0
Bottom Offset = 0



Top Offset = -0.5
Bottom Offset = 0



Top Offset = 0.0
Bottom Offset = 1.0



Top Offset = 0.0
Bottom Offset = 2.0



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**:



Top Offset = 1.5
Top Curve = 0



Top Offset = 1.5
Top Curve = 50



Top Offset = 1.5
Top Curve = 90



Bottom Offset = 1.5
Bottom Curve = 0



Bottom Offset = 1.5
Bottom Curve = 50



Bottom Offset = 1.5
Bottom Curve = 90

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

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



Separately



Together



Opposite

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



Left Offset = 1.0



Left Offset = - 1.0



Right Offset = 1.0

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

LEO

Left Offset = 1.0
Left Curve = 50

LEO

Left Offset = 1.0
Left Curve = 90

LEO

Right Offset = 1.0
Right Curve = 75

◇ Or just have some fun with it:

FINN

FINN

FINN

FINN

11.18 Canned

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



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

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



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



- The **Diameter** of the cylinder can be increased or decreased, as well. A larger **Diameter**, applied at the same **Angle**, will lessen the roundness, while a smaller **Diameter** will increase it.



Angle = -30
Diameter = 3.0



Angle = -30
Diameter = 7.5



Angle = -30
Diameter = 3.5

11.19 Wave

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



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

Changes the number of peaks → Cycles: 0.1

Changes the height of the peaks → Amplitude: 0.2

Check this box to have the preview update with changes → Auto Preview

Click here to manually update the preview → Update Preview

Click **OK** when done → OK

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



Cycles = 0.5



Cycles = 1.0

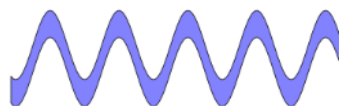


Cycles = 2.0

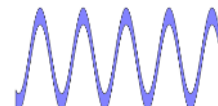
- Increasing **Amplitude** make the peaks higher:



Cycles = 1.0
Amplitude = 0.2



Cycles = 1.0
Amplitude = 0.5



Cycles = 1.0
Amplitude = 1.0

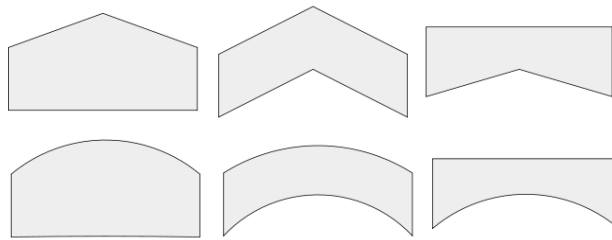
- The **Wave** function can be used on text to achieve this effect:

Twinkle Twinkle Little Star

Twinkle Twinkle Little Star

11.20 Bridge Warp

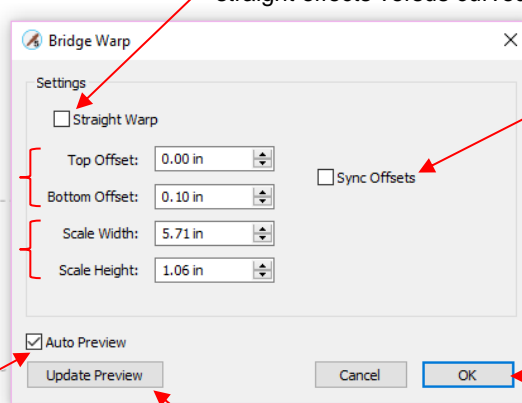
- The **Bridge Warp** function will transform shapes into the following styles:



- For this example the following text will be used:

TEXAS A&M

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



Check this box if you want straight effects versus curved

Option to have both top and bottom change the same

Adjust the amount of warp

Resize the image

Click OK when done

Check this box to have the preview update with changes

Click here to manually update the preview

Settings

- Straight Warp
- Top Offset: 0.00 in
- Bottom Offset: 0.10 in
- Scale Width: 5.71 in
- Scale Height: 1.06 in
- Sync Offsets
- Auto Preview

Update Preview Cancel OK

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



Top Offset = 0.3 in

Top Offset = 0.6 in

Top Offset = 1.0 in

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



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



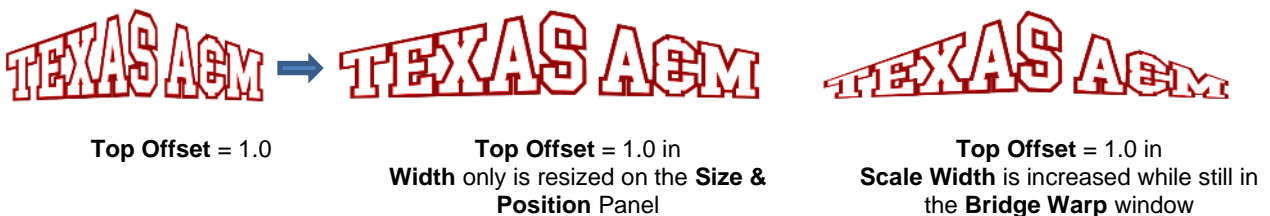
- If the **Sync Offset** option is checked, then both the top and the bottom will be warped together:



- 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:



- ◇ 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

11.21 Drop Shadow

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

INDIANA



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



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

Drop Shadow offset and insets

Change the color of the shadow

Option to have overlap removed from the shadow

Check this box to have the preview update with changes

Click here to manually update the preview

Click **OK** when done

The screenshot shows the 'Drop Shadow' dialog box with the following settings: X Offset: 0.100 in, Y Offset: 0.100 in, Inset: 0.000 in, Color: (dark gray), Remove foreground, Auto Preview. Buttons include 'Update Preview', 'Cancel', and 'OK'.

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



X Offset = 0
Y Offset = 0.3



X Offset = 0.5
Y Offset = 0.3



X Offset = -0.5
Y Offset = 0.3

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



X Offset = 0.3
Y Offset = 0



X Offset = 0.3
Y Offset = 0.3



X Offset = 0.3
Y Offset = -0.3

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



X Offset = 0.5
Y Offset = 0.2
Inset = 0



X Offset = 0.5
Y Offset = 0.2
Inset = 0.1



X Offset = 0.5
Y Offset = 0.2
Inset = 0.2

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



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



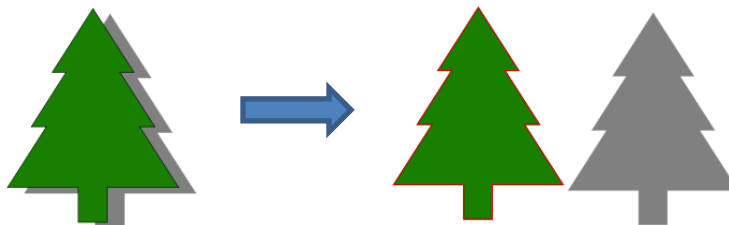
X Offset = -0.4
Y Offset = -0.2
Inset = 0.1



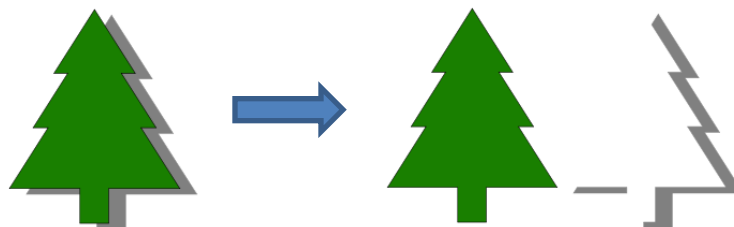
X Offset = 0.6
Y Offset = 0.2
Inset = 0.05

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

◇ Remove foreground not marked:

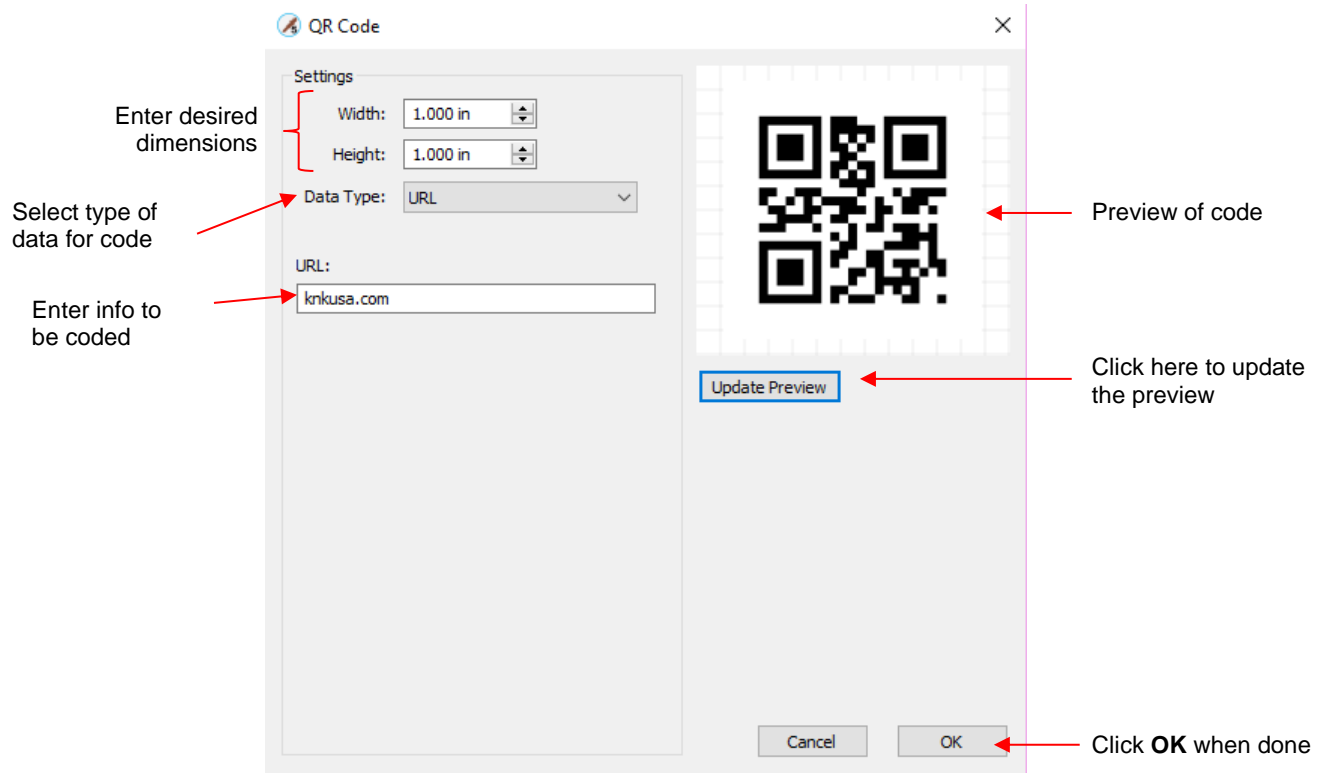


◇ Remove foreground marked:

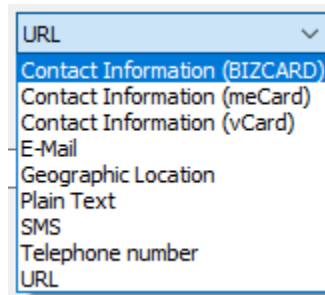


11.22 QR Code

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



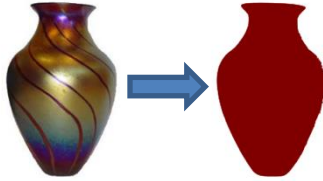
- Enter the dimensions for the code and select the **Data Type**, which includes the following options:



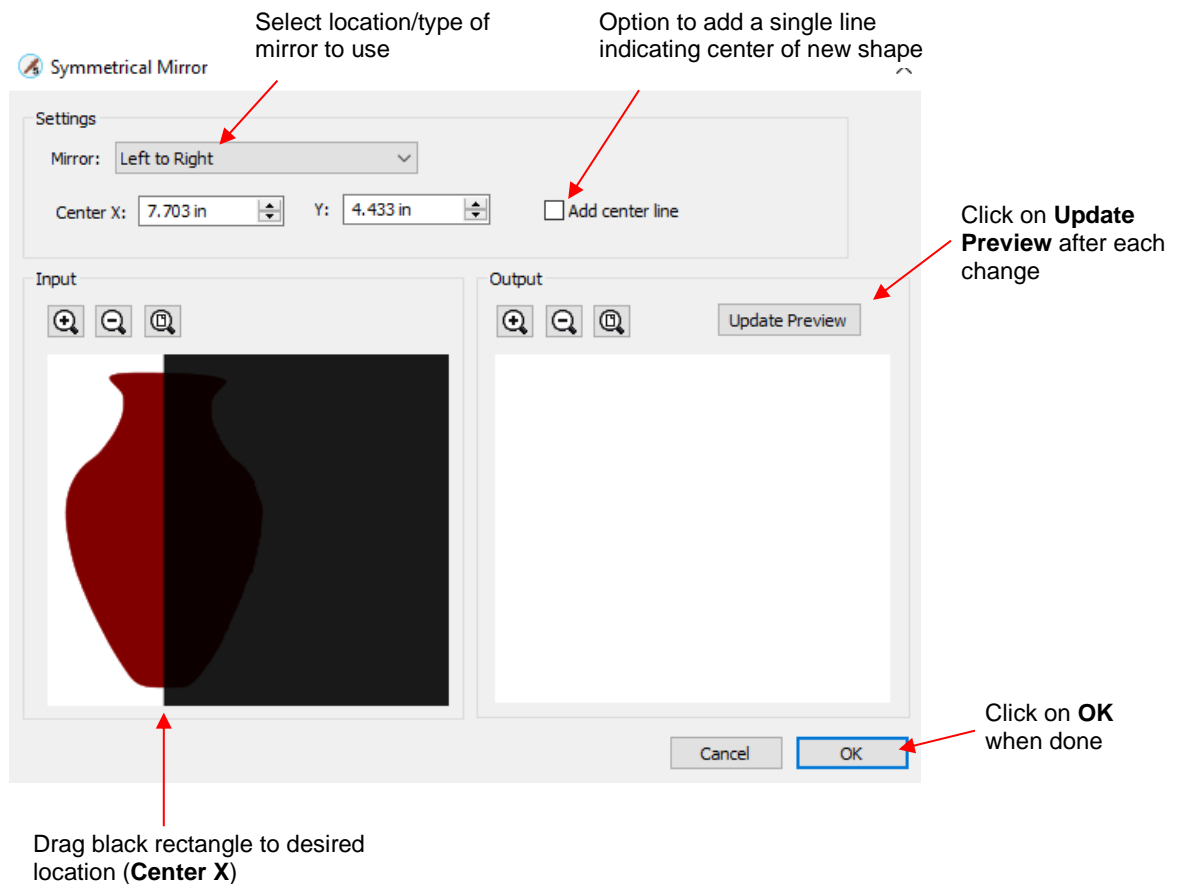
- Each **Data Type** has its own specific fields to complete. In some cases, like the URL option, there is only one field. In a case such as the **Contact Information** options, more data fields are provided.
- **IMPORTANT!** Once data is entered, you must click on **Update Preview** to generate the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

11.23 Symmetrical Mirror

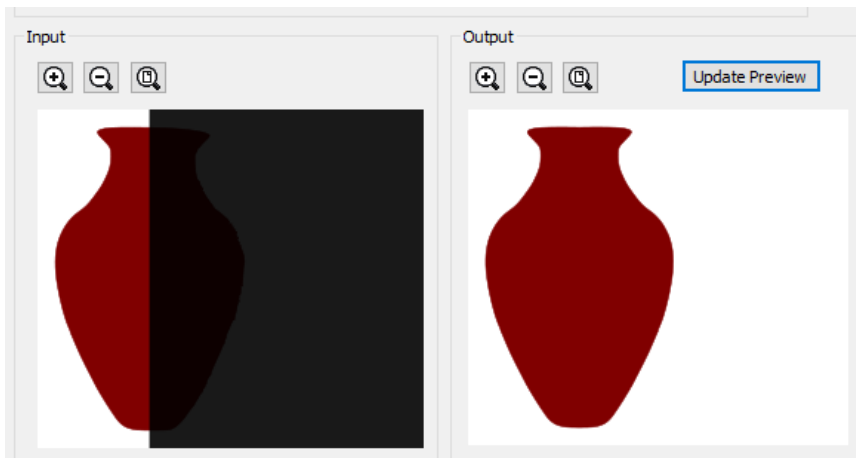
- The **Symmetrical Mirror** function creates a symmetrical copy of a selected shape and welds that copy onto the original.
- For example, when tracing symmetrical images, the resulting trace may not appear perfectly symmetrical when can then appear unbalanced and unappealing. For example, here is a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



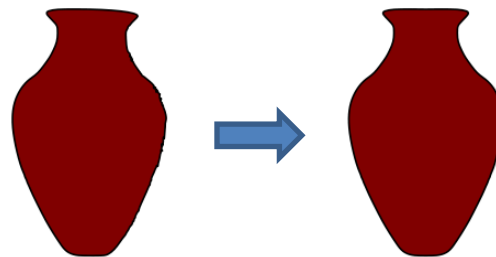
- ◇ Notice how the left side traced nicely but the right side isn't smooth and, overall, the vase doesn't appear symmetrical.
- To use **Symmetrical Mirror** to correct this image, select the traced shape and go to **Effects>Symmetrical Mirror**. The following window opens:



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



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



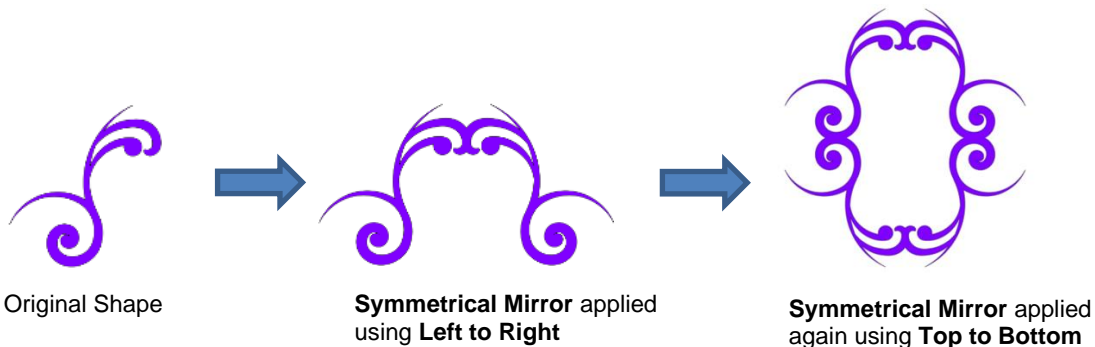
Original Shape

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**:



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



Original Shape

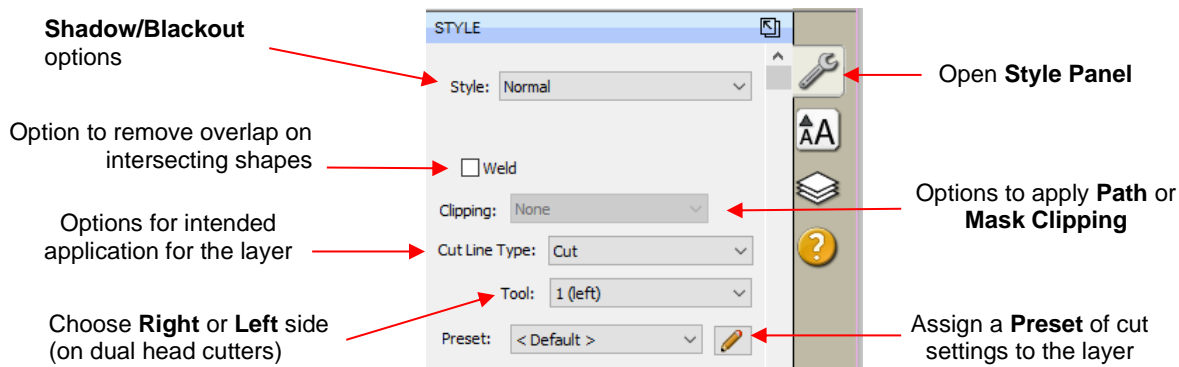
Symmetrical Mirror applied
using **Left to Right**

Symmetrical Mirror applied
again using **Top to Bottom**

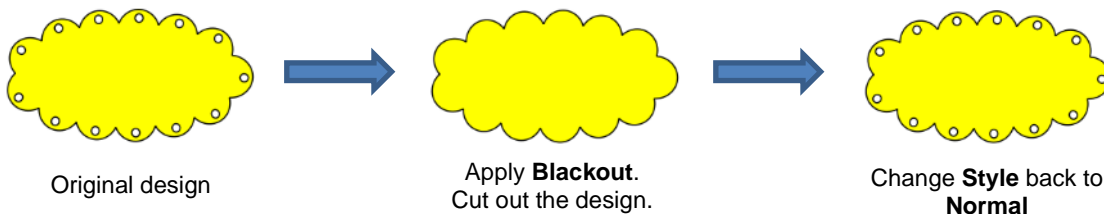
12. SCAL: Output

12.01 The Style Panel


- The **Style Panel** has various settings that are typically, but not necessarily, applied for the purpose of cutting and printing:
 - ◇ Set a contour cut (**Shadow**)
 - ◇ Remove any interior shapes (**Blackout**)
 - ◇ Apply a weld (**Union**) on any overlapping shapes (only applied during printing and/or cutting)
 - ◇ Assign an intended use for the layer (**called Cut Line Type**)
 - ◇ Assign a layer to a particular tool (for cutters with more than one head)
 - ◇ Assign **Presets** to a layer (for **Cut by Layer** applications in SCAL5 Pro)
- To open this panel, click on the **Style** icon on the **Properties Panel**:

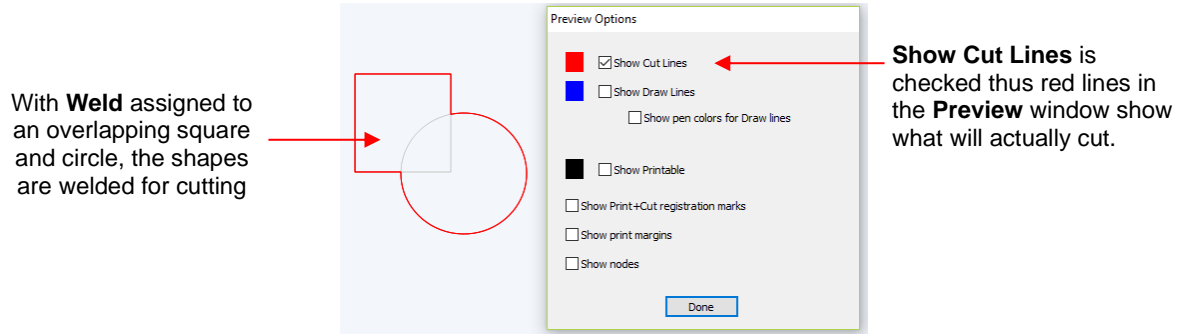


- **Style:** In this menu are various combinations of **Shadow** and **Blackout** applications. Refer to *Section 11.05* for instructions and examples. Note, however, that if you later change your mind and you haven't applied any subsequent changes (such as those in the **Path** menu), then re-selecting **Normal** from the **Style** drop-down menu will restore the original style.
 - ◇ For example, let's say you've applied **Blackout** to a shape and then cut it out. You can now select that same shape and return the style to **Normal**:




- **Weld:** This option applies the **Union** function (refer to *Section 11.04.1*) to any overlapping shapes.
 - ◇ Note that if the shapes are on different layers, the **Weld** option needs to be marked on each layer.

- ◇ As mentioned before, settings in the **Style** window do not become permanent changes to the shapes on the **Cutting Mat**. However, you can verify the **Weld** effect by clicking on the **Preview** icon  on the **Toolbar** (for more details on **Preview**, refer to *Section 12.02*):



- **Clipping**: options are available for either **Clip Path** or **Clip Mask**. Refer to *Section 11.07*. The clipping is only applied during the cutting process.
- **Cut Line Type**: There are five options in this menu:
 - ◇ **Cut**: choose this option for regular cutting. Because this is the default, you don't normally need to select it.
 - ◇ **Pen**: choose this option when using a pen, embosser, engraver, glue pen, rotary tool or other device that doesn't require a blade offset
 - ◇ **Print+Cut Cut**: in print and cut applications, choose this option for the layer that will be cut. It will not be printed.
 - ◇ **Print+Cut Print**: in print and cut applications, choose this option for the layer that will be printed only. It will not appear in the cut window.
 - ◇ **Color layer alignment** (Pro version only): in applications such as vinyl where several layers will be cut from different colors and aligned, choose this option for the layer that has registration shapes that need to be cut from every color along with that color's shapes. These registration shapes can then be used to layer the colors perfectly. Refer to last part of *Section 12.06.3*.
- **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 12.06.7*.

12.02 Preview

- To see what your cutter will cut or what your printer will print, click on the **Preview** icon  on the **Toolbar**. The following window will open. Note that settings applied on the **Style Panel** are reflected in the **Preview** window:

Any lines assigned as **Cut** appear in red

Check this box for a **Print Preview**: refer to *Section 12.03*

Option to show the printing boundaries: refer to *Section 12.03*

Any lines assigned as **Pen** appear in blue

Check this box to show the **Stroke** for that shape

Option to show registration marks in the **Preview**

Option to show the nodes: must have **Show Cut Lines** or **Show Draw Lines** checked, as well.

Preview Options

- Show Cut Lines
- Show Draw Lines
- Show pen colors for Draw lines
- Show Printable
- Show Print+Cut registration marks
- Show print margins
- Show nodes

Done

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

On the **Cutting Mat**:

The rounded rectangle is assigned to **Cut** on the **Style Panel**

The text is assigned to **Pen** on the **Style Panel**

◇ In the **Preview Options** window:

Red and blue lines indicate **Cut** and **Pen** assignments, respectively

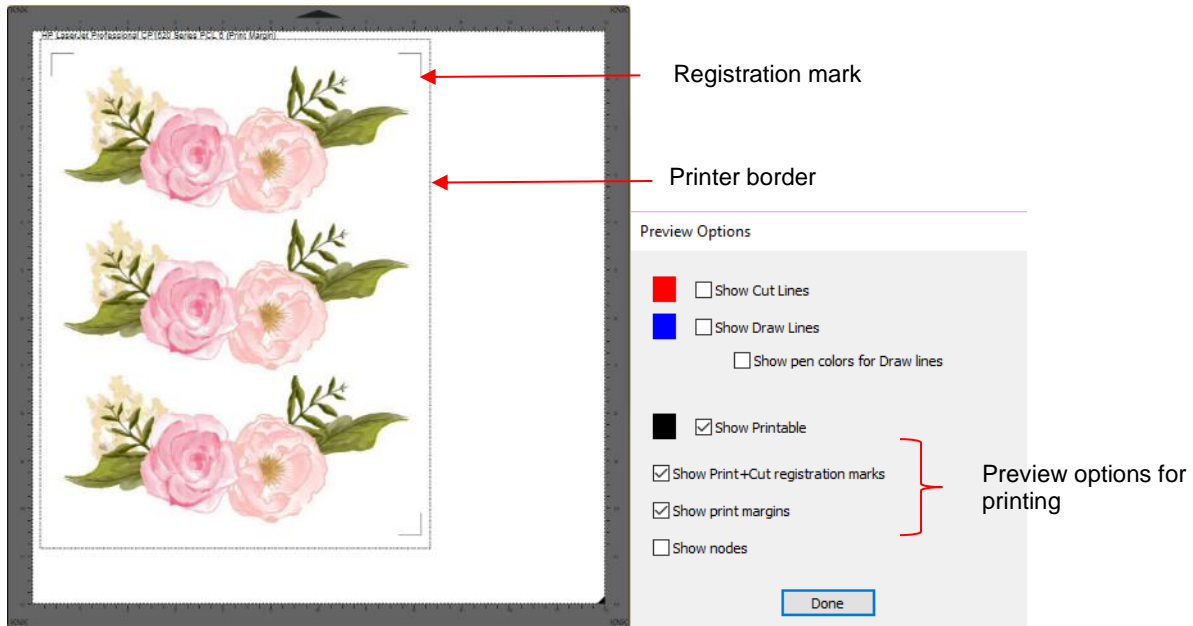
Show Cut Lines and **Show Draw Lines** are both checked

Preview Options

- Show Cut Lines
- Show Draw Lines
- Show pen colors for Draw lines
- Show Printable
- Show Print+Cut registration marks
- Show print margins
- Show nodes

Done

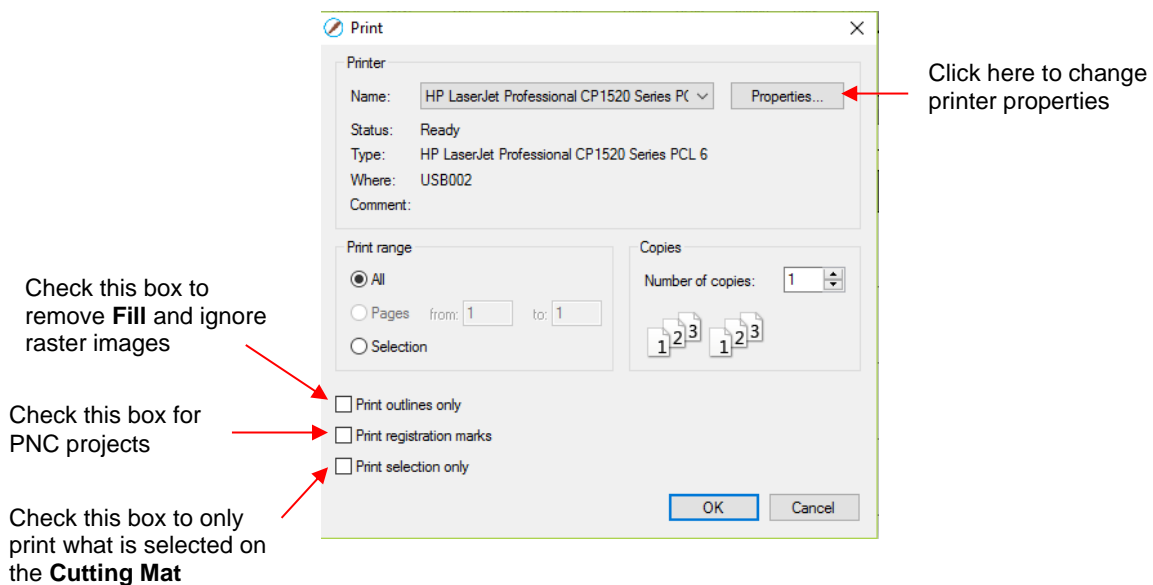
- For print and cut applications (PNC), you might wish to verify what will be printed, along with where it will be printed and where the registration marks will print:




- ◇ **NOTE:** If you mark the option for **Show Print + Cut registration marks** and they do not appear:
 - Verify that you have set up a cutter (refer to *Section 1.01.4*)
 - Verify that the layer(s) with cut lines are not hidden on the **Layers Panel**
 - In the **Cut Settings** window, verify that you have not marked the option for **Cut selection only**

12.03 Printing

- To print from SCAL, go to **File>Print** or press **Ctrl+P**. The following window will open:



- ◇ To set up printer settings, click on the **Properties** button. (Note that you can also access your printer's properties by going to **File>Print Setup** and clicking on **Properties**.) The window which opens should be familiar to you and will not be covered in this user manual.
- ◇ **Print outlines only:** Only vector shapes will be printed. Imported raster images (.JPG, .PNG, .BMP, etc.) will not appear. If you've applied a **Fill** to shapes including colors, gradients, or patterns, then those will not appear either.


- ◇ **Print registration marks:** If your application is a print and cut, then you will want to check this option. Refer to *Chapter 3* for details on PNC calibration and how to set the properties for the registration marks. Also note that if you have not yet set up a cutter (refer to *Section 1.11*), then registration marks will not be sent to the printer.
- ◇ **Print selection only:** This is one way to control what is printed. You will need to select the shapes to be printed prior to entering the **Print** window. Alternatively, you can hide layers on the **Layers Panel** that you do not want printed.
- ◇ If your **Cutting Mat** is larger than the printout dimensions, then make sure the shapes are located in the upper left portion of the **Cutting Mat** or else any shapes outside of the printout boundary will be omitted or cut off. To verify, click on the **Preview** icon  on the **Toolbar** and select **Show Print Margins**.

- For example, let's say you have a PNC application and your shapes are arranged like this on a 12" x 12" **Cutting Mat**:




- ◇ When you click on the **Preview** icon and mark **Show print margins**, you can see that a portion of the cow will not be printed:

This border indicates the printer's current settings for size and orientation



This part of the cow will not be printed




Preview Options


- Show Cut Lines
- Show Draw Lines
 - Show pen colors for Draw lines
- Show Printable
- Show Print+Cut registration marks
- Show print margins
- Show nodes

Done

Check this box so that the original graphic appears



Check this box to see the boundaries of the printer



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



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



Option 2: Rearrange the shapes

12.04 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:

Selected design for weeding

Distance from shape boundary to outside weed rectangle

Weeding

Border Offset: 0.200 in

Weeding options

Preview

Click **OK** when done.

Deletes all internal weeding lines

Instructions

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

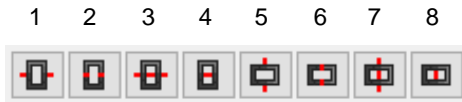
Border Offset: 0.200 in

Border Offset: 0.600 in

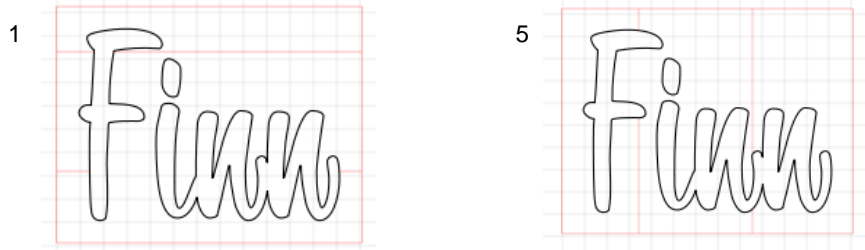
Increasing the **Border Offset** from 0.2 to 0.6

- ◇ **Border Options:** These icons can be used to add additional cut lines inside the outer weed border. Each icon in the following screenshot indicates where the lines will be added but a description and

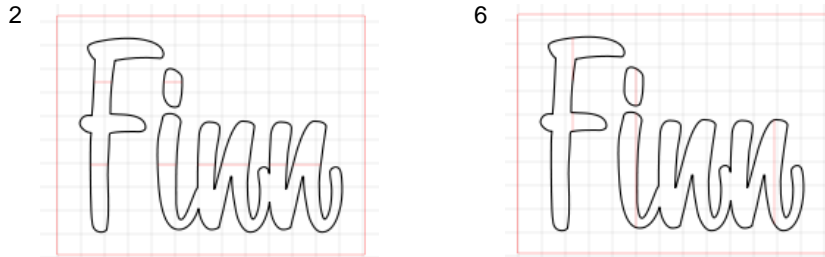
example are also shown. Note that once you select an option, you can click at the desired location on the preview image to add the cut line or lines:



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



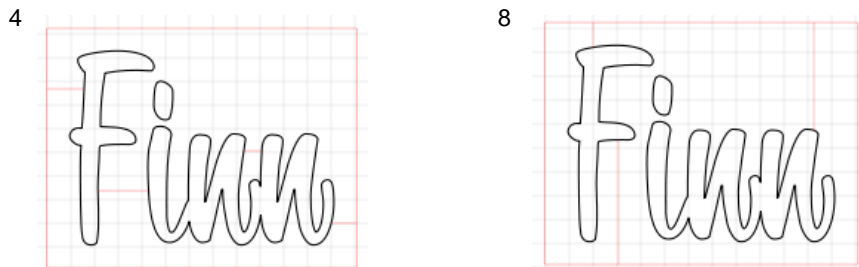
- 2 or 6: Add horizontal or vertical weed cuts inside the shapes (this is used for applications such as glass etching where the outside “waste vinyl” is actually kept and the shapes themselves are weeded out)



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

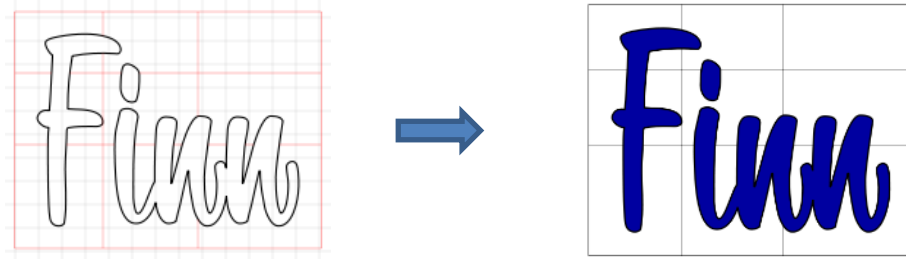


- 4 or 8: Add horizontal or vertical weed cuts anywhere you like

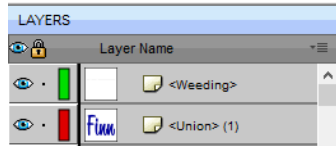


◇ **Reset:** At any point, you can click on **Reset** to remove any of the internal cut lines and begin again.

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



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



12.05 Tiling (SCAL PRO only)

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



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

Manually add tile lines

Column settings

Row settings

Instructions

Delete individual tile lines

Preview based on current settings

Reset to clear settings

◇ **Columns and Rows:** Under both of these you have the following choices:

- **Evenly spaced:** Enter a number and that many columns (or rows) are created, all the same width. For example, you could enter 3 columns and 2 rows:

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

Preview shows the project evenly split into 3 columns and 2 rows

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

Select **Fixed width-** 11" wide **Columns** and 23" long **Rows**

The design is 40" wide and 36" tall.

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

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

- **Custom:** Because the tiling line can sometimes fall into undesirable spots resulting in, for example, slivers or extremely tiny shapes, using **Custom** is another option. With it selected, you can then use the icons above the preview to add cut lines wherever you like:

Add a horizontal tile line →


Add a vertical line inside of a tile

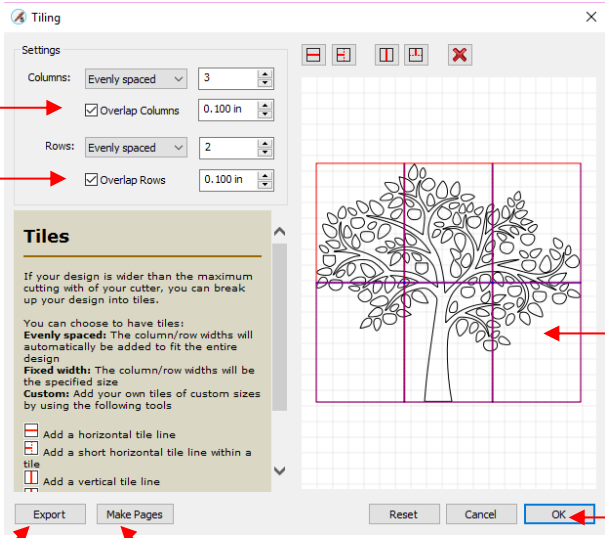
Add a horizontal line inside of a tile

Add a vertical tile line

Select **Custom**

Custom lines are added.

- ◇ To delete any of the lines, click on the **Delete** icon  and then click on the line inside the **Preview** window.
- ◇ **Overlap Columns** and **Overlap Rows**: If you want an overlap created so that each tile slightly overlaps with an adjacent one, check the box and then enter the desired overlap:



Check **Overlap Columns** and/or **Overlap Rows** and enter the desired overlap size

Purple lines indicate an overlap is applied

Click **OK** when done or click on **Make Pages** or select **Export**

Export each tile as a separate SVG file


Click **Make Pages** to place each on its own page in the project

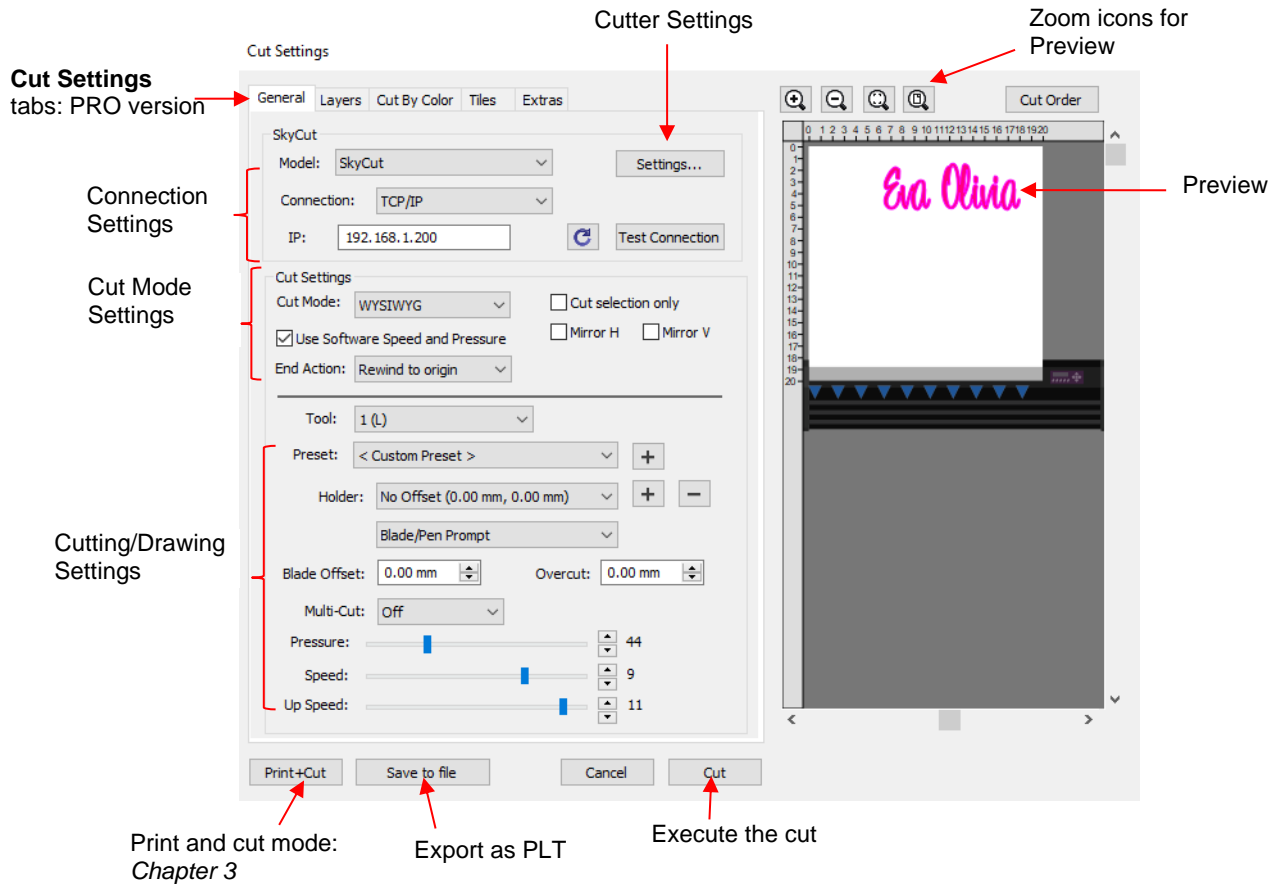
- Once you are satisfied with the settings, you have three options:
 - (1) Click on **OK**. You won't observe any changes on the **Cutting Mat** or on the **Layers Panel**. However, the results of the **Tiling** process will appear once you enter the **Cut Settings** window and click on the **Tiles** tab. Refer to *Section 12.06.4*.
 - (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).

12.06 Cut Settings

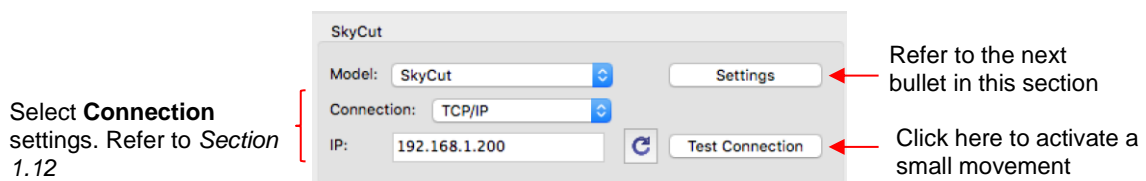
The cut settings vary from one cutter to the next based on the manufacturer of that cutter and its built-in functionality. For this reason, the information presented here will only apply to the brand and model of cutter presented in Chapters 1 and 2.

12.06.1 Cut Window Settings

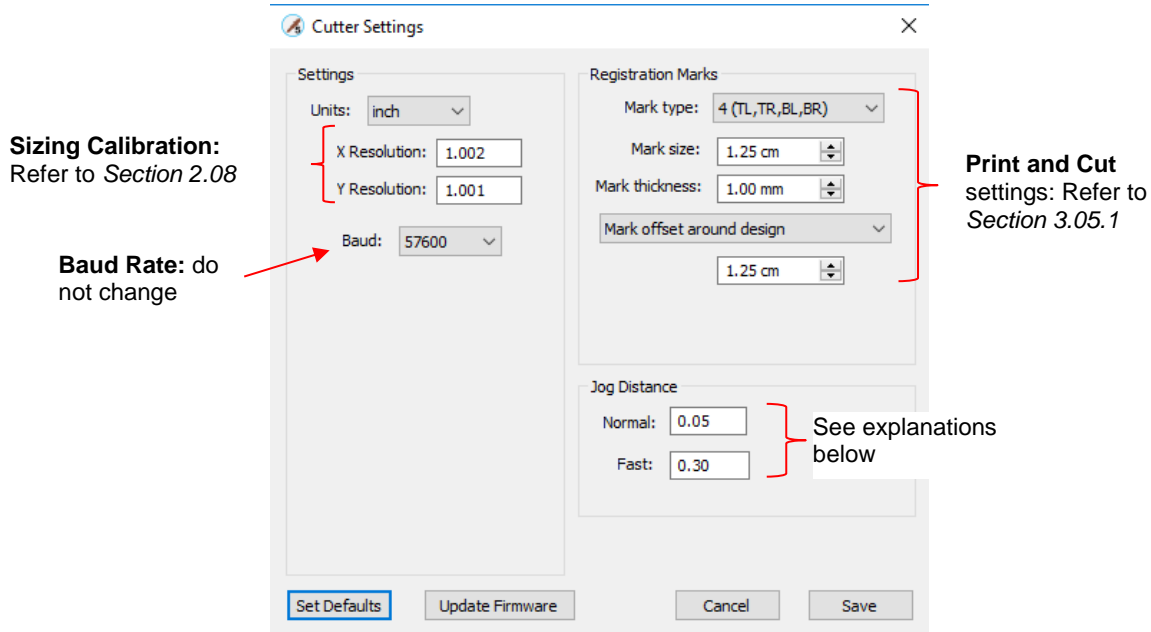
- When you are ready to execute a cut (or draw), the cut window can be opened using either of the following:
 - ◇ Click on the **Cutter** icon  on the **Toolbar**
 - ◇ Go to **Cutter>Cut With Skycut** (or whichever model of cutter you have added)
- The following window will open:



- ◇ **Cut Settings** tabs: The regular version of SCAL will only have the **General** tab. The PRO version has four additional tabs:
 - **Layers** (refer to *Section 12.06.7*)
 - **Cut by Color** (refer to *Section 12.06.3*)
 - **Tiles** (refer to *Section 12.06.4*)
 - **Extras** (refer to *Section 12.06.5*)
- ◇ **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 the SkyCut choose either **USB** or **TCP/IP** (Wi-Fi).

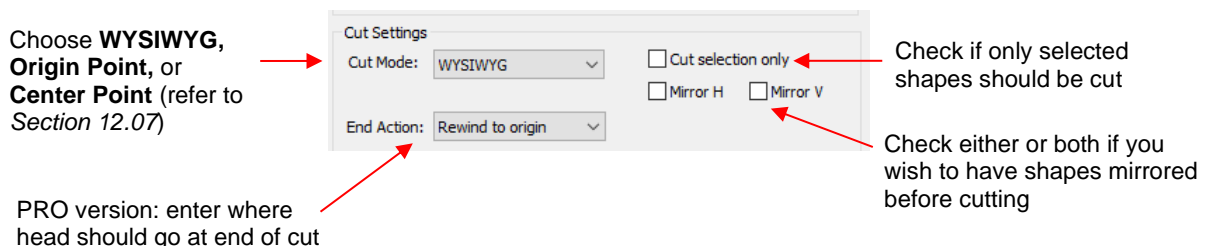


- **Cutter Settings**, which can also be accessed by going to **Cutter>Cutter Settings**, opens a new window with additional settings relevant to that model. For the SkyCut:

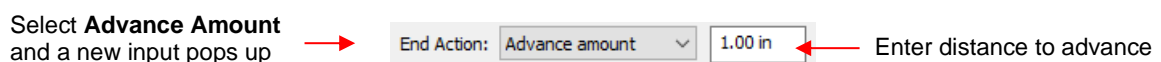


- **Jog Distance:** The following settings apply when moving the head left/right or moving the mat or material in and out of the cutter:
 - **Normal:** the distance the head or mat moves with each arrow key increment
 - **Fast:** the distance the head or mat moves while holding **Shift** with each arrow key increment

◇ **Cut Mode Settings:** This section covers the following:



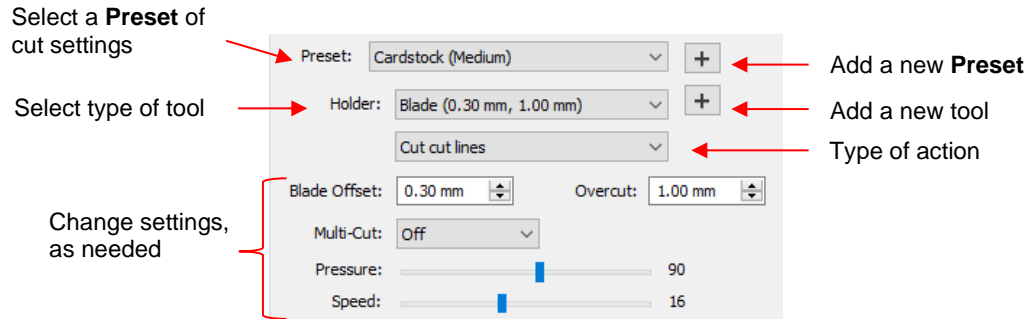
- **Cut Mode:** Refer to *Section 12.07* which covers controlling where shapes will cut.
- **End Action** (PRO version only): controls what happens at the conclusion of the cut. There are three choices:
 - **Rewind to origin:** default setting in which the head returns to the origin set before the cut began
 - **Advance Amount:** when this option is selected, the head moves to the end of the cut, over to the right side, and then advances the mat or rolled material forward based on a value you enter into a new window:



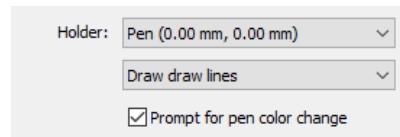
- **Do Nothing:** the head stops at the location where it finished cutting
- **Cut selection only:** If you only want the shapes you have selected on the cutting mat to cut, then mark this box.

- **Mirror H** and **Mirror V**: Use one or the other options to if you want the shapes mirrored for cutting. This is very handy when cutting HTV or embossing. In both cases, you will be flipping over the material once the cutting or embossing is complete.

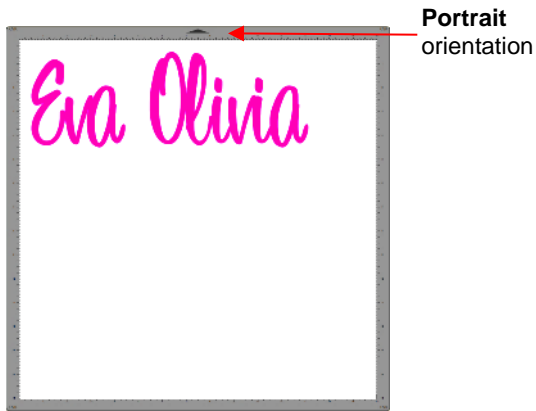
◇ **Cutting/Drawing Settings:** As mentioned earlier, this section will vary from one brand/model of cutter to the next:



- **Preset** is a customizable menu where you can store settings for a particular material or application. Refer to *Section 12.06.2* for directions.
- **Holder** has choices for **Blade** or **Pen**. Like **Preset**, you can enter your own menu choices, such as other blades. Again, refer to *Section 12.06.2*.
 - If you select **Pen** under **Holder**, then **Draw draw lines** is typically selected. There is also a **Prompt for pen color change option**. Marking that option will cause the cutter to pause after each pen color is executed so that a different pen or tool can be mounted:



- ◇ **Blade Offset** controls how sharp corners are handled and the setting should be provided with the blades you use. If set too low, corners will be rounded. If set to high, little bubbles will appear on outside corners and divots will appear on inside corners. Adjust as needed using 0.1 increments.
- ◇ **Overcut** controls the closing of shapes. If left at 0, you will find that fairly large shapes will still be attached to the waste material. In general, a setting of 1.0 mm is sufficient.
- ◇ **Multi-cut** is used when cutting thicker or denser materials where more than one pass is recommended. Each shape is cut the number of passes selected before the blade moves to the next shape to cut.
- ◇ **Pressure** and **Speed** (or other settings for your brand of cutter) should be covered in the user manual provided with your cutter.
- ◇ **Print+Cut:** Clicking on this button opens the **Print and Cut** window. Because this function differs for each cutter, refer to for detailed instructions available for your cutter or read the on-screen instructions.
- ◇ **Save to File:** Click on this button to export and save the cut project as a PLT file onto a USB flash drive. That file can then be directly loaded into the Skycut control panel. Refer to *Section 1.12.4* and *Section 3.07.2*.
- ◇ **Save to File:** Click on this button to export and save the cut project as a PLT file onto a USB flash drive. That file can then be directly loaded into the Skycut control panel. Refer to *Section 1.12.4* and *Section 3.07.2*.
- ◇ **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**:



Cutting Mat in SCAL is set to **Portrait** orientation



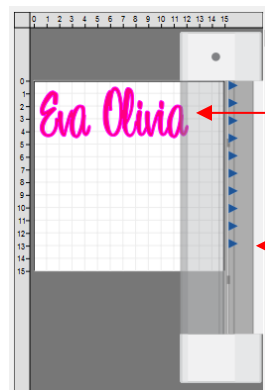
Shapes will cut in the upper left corner of the actual mat, just as shown in the screenshot of the **Cutting Mat**

Mat is fed this direction

- 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:



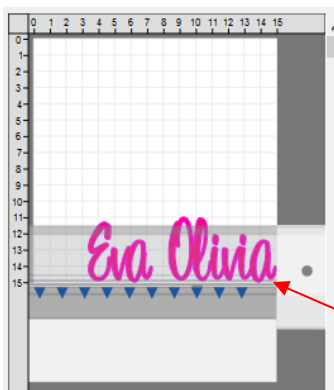
Cutting Mat in SCAL is set to **Landscape** orientation



Shapes will cut sideways (landscape-style) if you are facing the cutter head on

Mat is fed this direction

- In **Origin Point** mode, it doesn't matter where the shapes are located on the **Cutting Mat**, they will cut so as to align with the origin you set:



Portrait



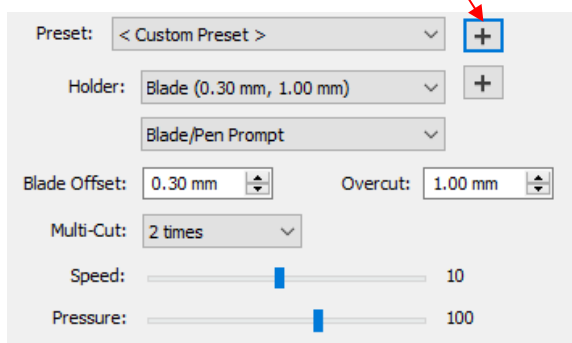
Landscape

- Additional details on controlling where shapes are cut are presented in *Section 12.07*.

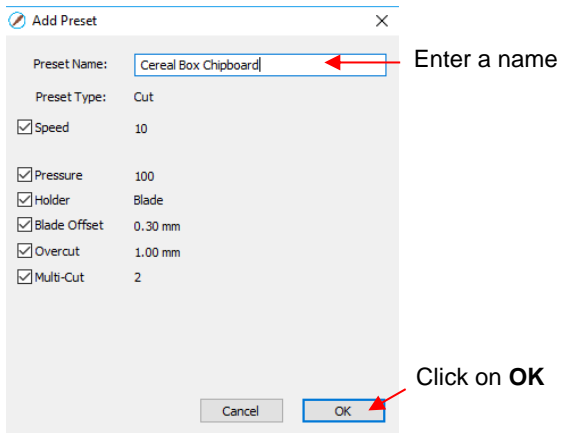
12.06.2 Presets

- **Presets** allow you to save your settings for a particular material or blade type. To do this, enter the settings you wish to save. Then click on the “+” to the right of **<Custom Preset>**:

Enter settings and click here:

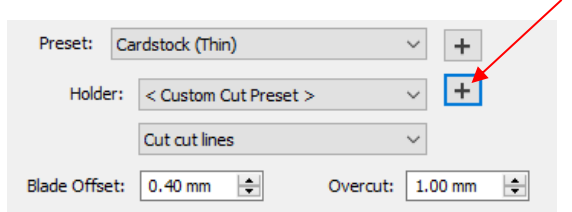
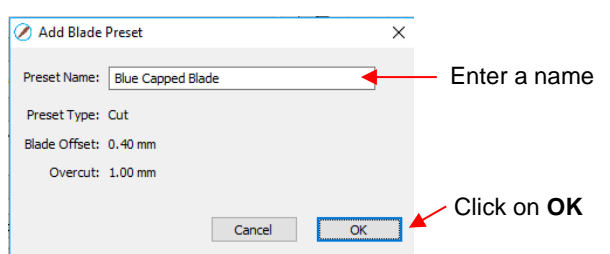


Select which settings to include:



- After clicking on **OK**, the new preset will be found at the bottom of the list.
- In a similar manner, you can also add other **Holders** to your list, which would typically be blades with other **Blade Offset** values. For example:

Enter settings and click here:

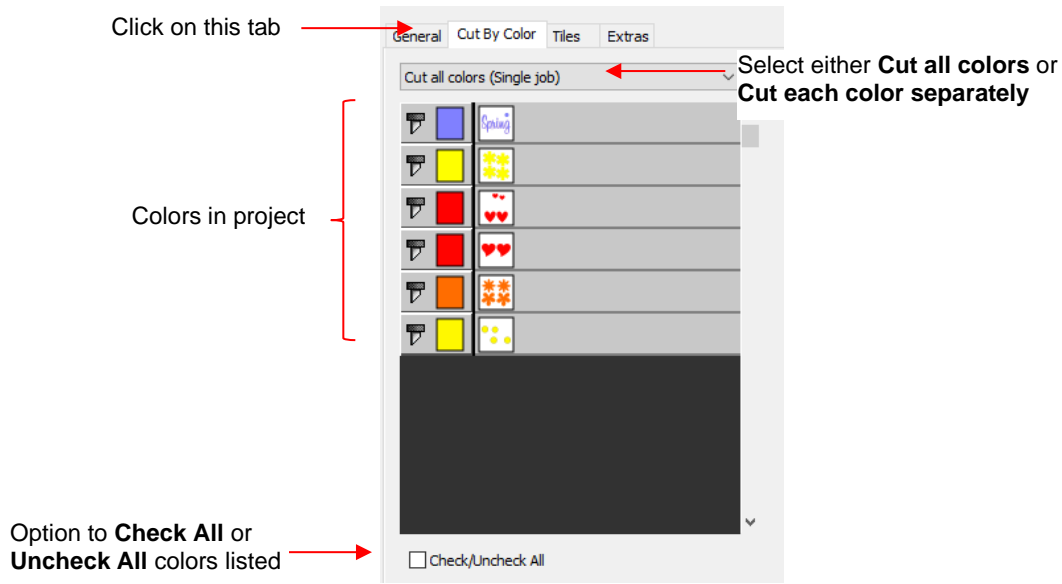



- To delete either type of preset that you personally added, select it from the menu and then a “-” button will appear. Clicking on that button will then remove it from the list:



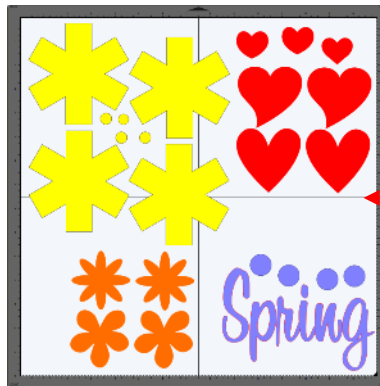
12.06.3 Cut by Color (SCAL PRO only)

- The **Cut by Color** function offers two capabilities:
 - ◇ Turn on and off colors to be cut without the need to hide layers on the **Layers Panel** or pre-select shapes to cut. In fact, you don't even need to ungroup mixed-color groups.
 - ◇ Cut all of the colors at once or have the cutter pause between colors, thus permitting the change out of materials
- To access **Cut by Color**, click on the **Cut by Color** tab in the **Cut Settings** window:



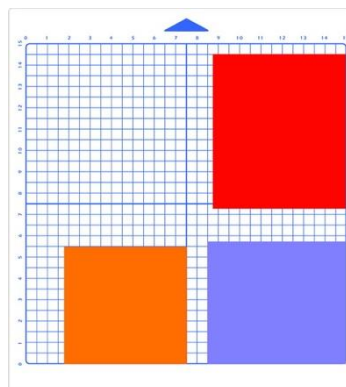
- **Cut all colors (Single job):** In this mode all of the colors marked in this window will be cut at one time.
 - ◇ As an example, here are some shapes laid out on the **Cutting Mat**. Note how the grid is set to divide the mat into four quadrants:


The shapes of each color have been arranged into quadrants on the **Cutting Mat**

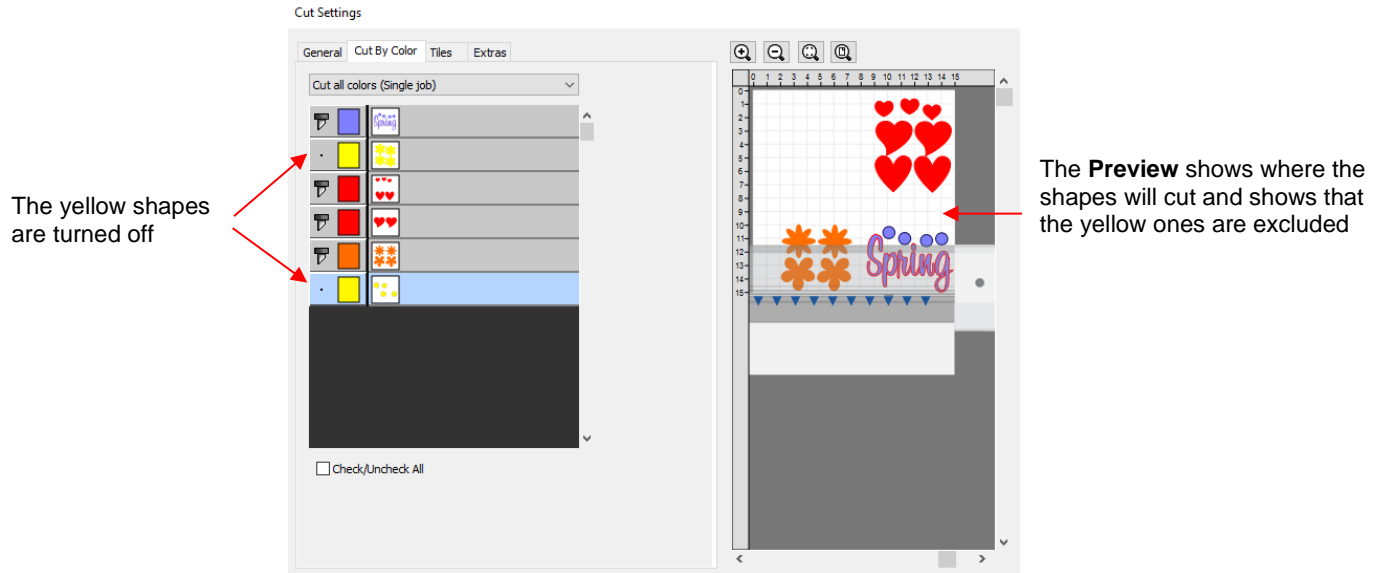


The **Cutting Mat** is divided into quadrants for easier placement of the scraps onto the actual cutting mat

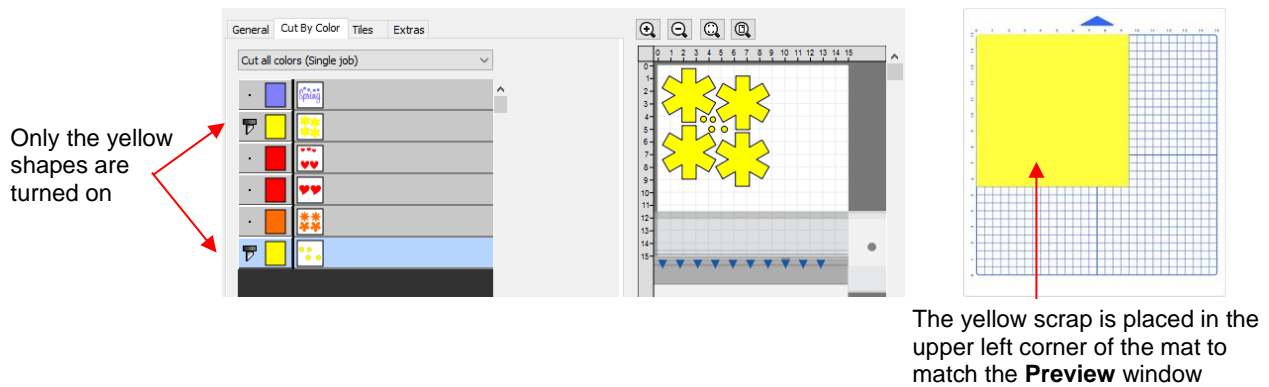
- ◇ Let's say you also have scraps you want to use, however the yellow scrap you plan to use won't fit onto the mat with the other scraps. So, you want to cut lilac, red, and orange first. You place those colors into quadrants on the mat that match the layout on the **Cutting Mat** in SCAL:



- ◇ In the **Cut Settings**, make sure **WYSIWYG** mode is selected and you have the other settings selected. Then select the **Cut by Colors** tab and click on the blade icon  next to the yellow shapes to hide those from cutting:



- ◇ The cut is executed and the red, orange, and lilac shapes are cut. Then the same procedure can be used for the remaining yellow shapes:



- **Cut each color separately (Separate jobs):** In this mode you can also turn on or off colors for cutting. However, SCAL will prompt for each color before executing the cut.

- ◇ As an example, here is a layered design to be cut from vinyl:

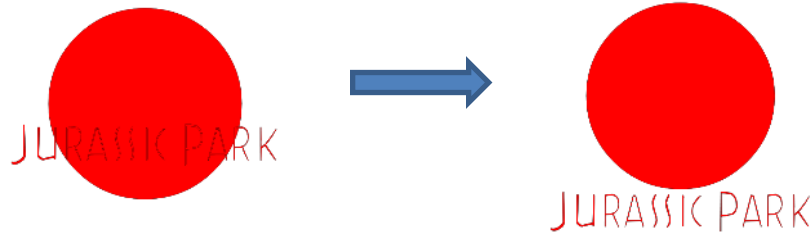


- ◇ Choosing the option to **Cut each color separately** is logical because:

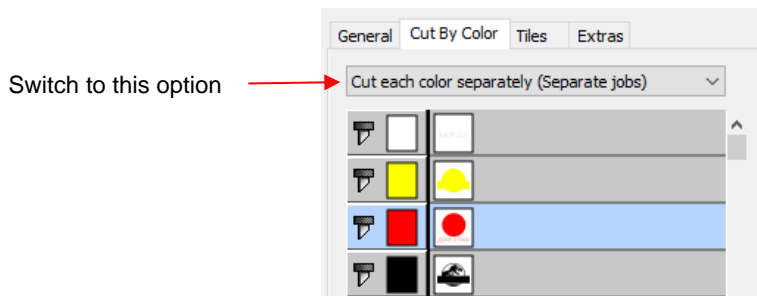
The shapes are arranged on top of one another

The size is so large that the individual colors cannot be placed on the cutting mat to cut all at one time

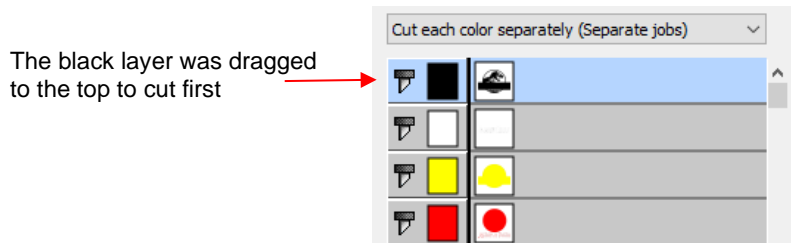
- ◇ However, before sending the project to the cutter, take note of any colors that might have shapes that need to be moved. In this example, the thin red lettering “Jurassic Park” would cut through the background red circle, hence it needs to be moved away:



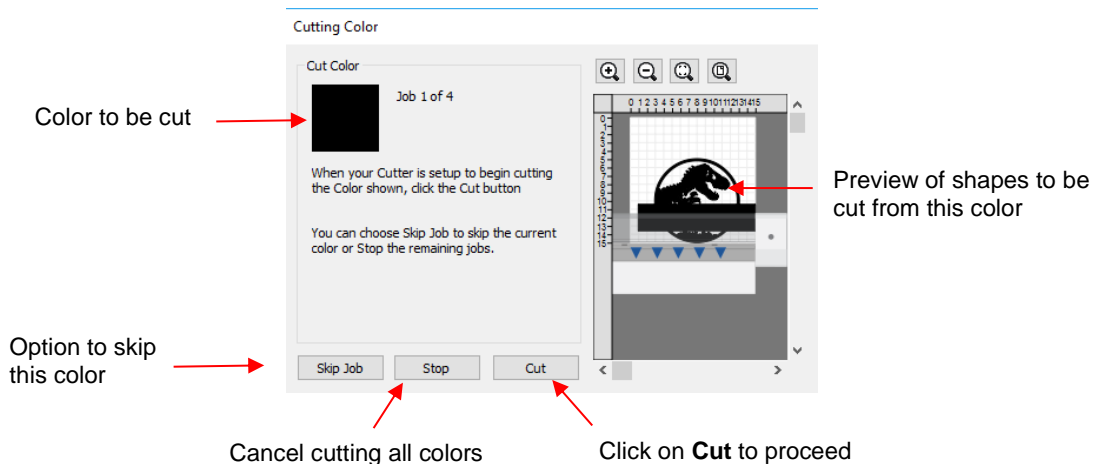
- ◇ In the **Cut Settings**, **Origin Point** should be chosen so that each color is moved to align with the origin and, thus, the material loaded each time in the same location. In the **Cut by Color** tab, the **Cut each color separately** option is chosen:



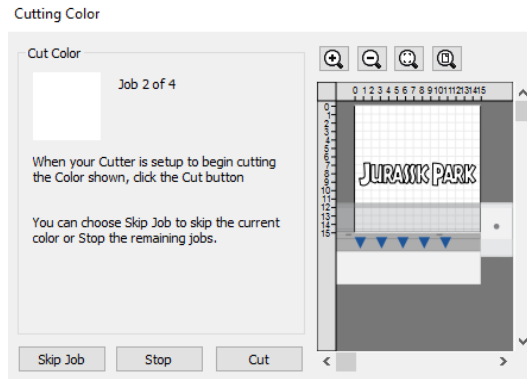
- ◇ Note that you can change the cut order by dragging the colors up or down the menu. For example, let say you already have black vinyl loaded into the cutter and the origin set to cut:



- ◇ Upon selecting **Cut**, the following window opens:



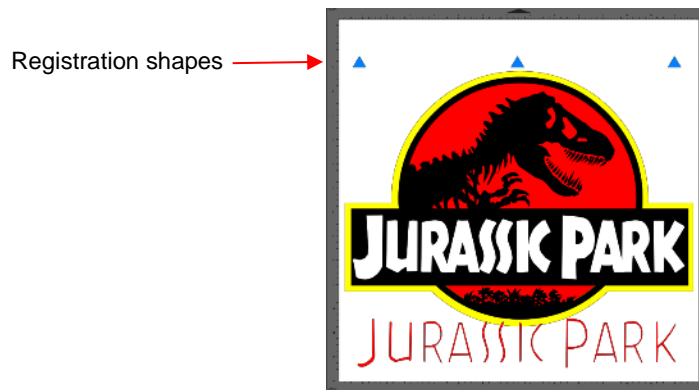
- ◇ If you decide not to cut this color, click on **Skip Job** and the next color in the menu will be selected. If you clicked on **Cut**, then the black shapes are cut out and then this same next color window will open:



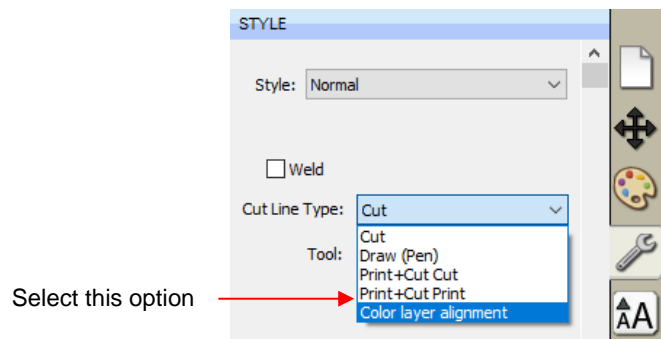
- ◇ And the process continues until all colors have been cut.

- In *Section 12.01*, **Color Layer Alignment** was mentioned as one of the options under **Cut Line Type** on the **Style Panel**. In applications, such as the one just presented, it can be tricky aligning the various colors after cutting. To make the job easier, small registration shapes can be added to the design and cut with every color so that they can then be lined up when layering color.

- ◇ In the *Jurassic Park* example, three small triangles are added and grouped to be on the same layer:

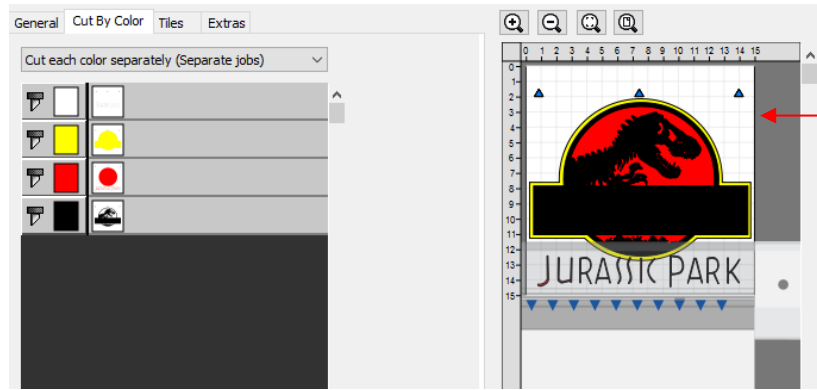


- ◇ The layer is selected and the **Cut Line Type** for this layer is changed to **Color Layer Alignment**:



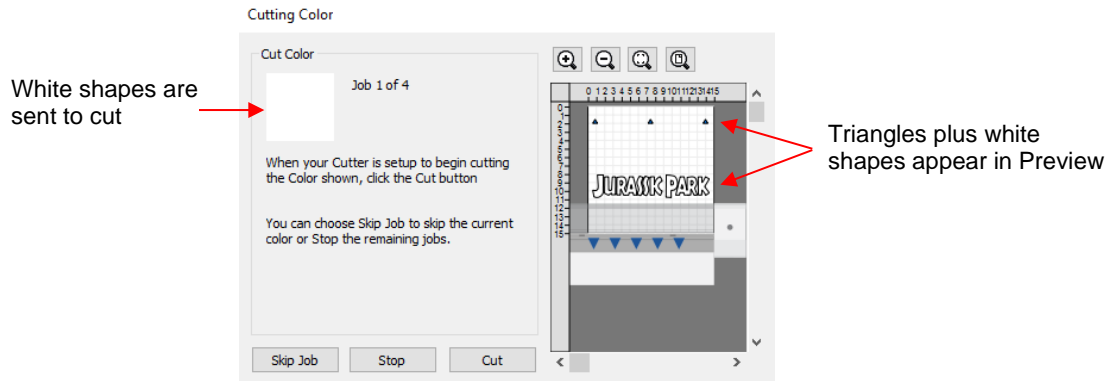
- ◇ When the **Cut by Color** tab is then selected, the registration triangles are not in the menu however they do appear in the **Preview**:

Alignment triangles are not in the menu



Triangles appear here

◇ Then, as each color window opens, the triangles will appear in the **Preview** for that color:

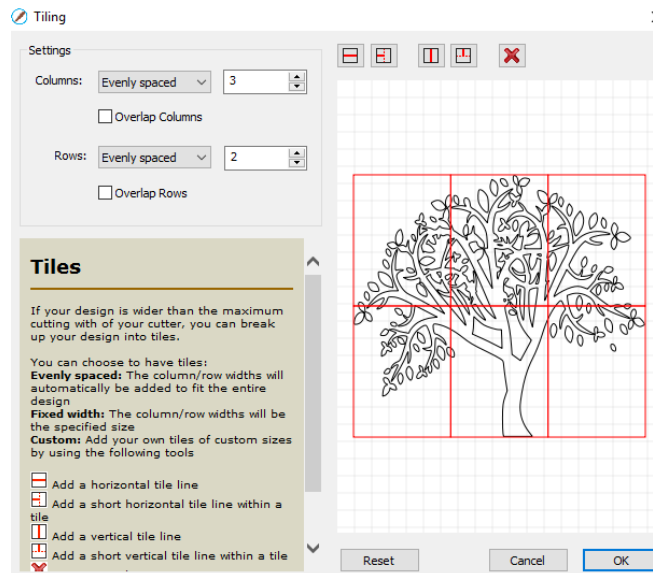


White shapes are sent to cut

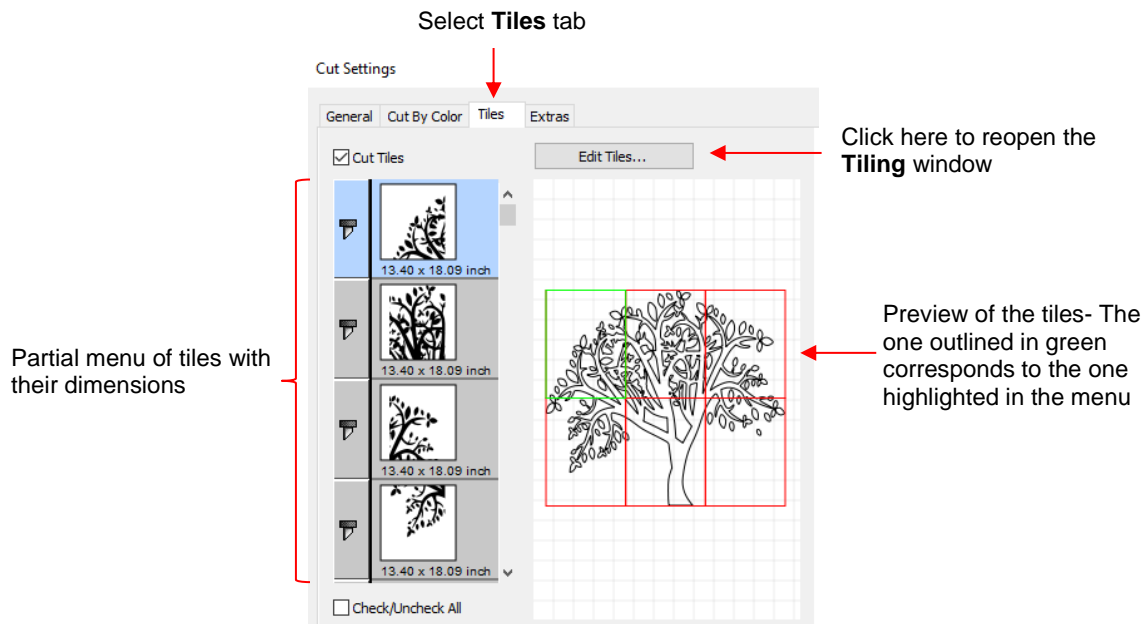
Triangles plus white shapes appear in Preview


12.06.4 Tiles (SCAL PRO only)

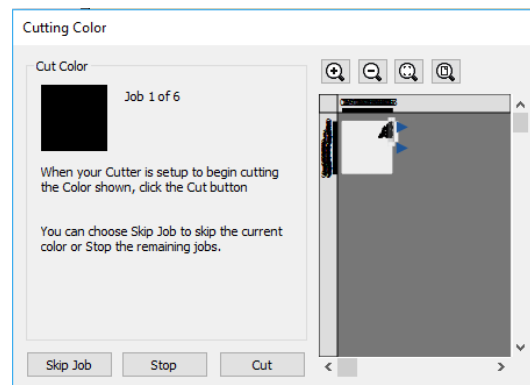
- In *Section 12.05*, you were shown how to use the **Tiling** function to split a design that is too large to cut based on the limits of your cutter:



- After clicking on **OK**, but before sending the design to cut, make the Cutting Mat dimensions fit the design. If any of the design extends beyond the boundaries of grid, those tiles will not cut.
- Open the **Cut Settings** window, click on the **Tiles** tab and check the box next to **Cut Tiles** to then open a menu showing the individual tiles with additional options:



- ◇ **Cut Tiles:** Mark this option first so that the menu and preview appears.
- ◇ **Edit Tiles:** clicking this button will take you back to **Effects>Tiling** in case you need to edit the settings.
- ◇ As with **Cut by Color**, clicking on the blade icon  next to any tile will prevent that tile from cutting. You can also drag tiles up or down in the menu to change the cutting order.
- After you click on **Cut**, be patient. It can take a minute or more for a large and/or detailed design to be processed by the software. Eventually, a window will open showing the first tile to be cut:



- ◇ Just as with **Cut by Color**, you can
 - Click on **Cut** to proceed with cutting that tile. After it is cut the next tile will be selected.
 - Click on **Skip Job** to skip cutting that tile and bring up the next tile
 - Click on **Stop** to cancel all cutting.

12.06.5 Extras (SCAL PRO only)

- The **Extras** feature allows you to duplicate shapes for cutting, without having to set it up on the **Cutting Mat**. To use this feature, click on the **Extras** tab in the **Cut Settings** window:

Select **Extras** tab

Check this box first to then activate other settings

Mark this option to use **Cutting Mat** dimensions or enter actual size of material

Mark **Auto fit** or enter desired numbers of **Columns** and **Rows**

Enter desired **Spacing** for both **Columns** and **Rows**

The **Preview** will update as settings are changed

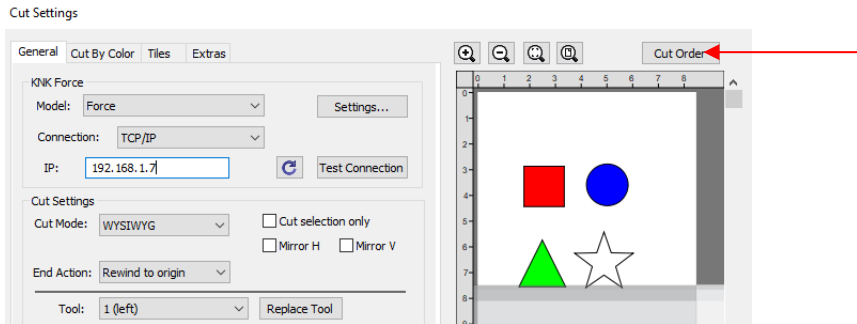
- ◇ **Cut Copies:** Mark this option first so that other settings become editable
- ◇ **Match workspace dimensions:** If your material is the same size as the **Cutting Mat**, then mark this option. Otherwise, enter the **Width** and **Length** of the material to be used. Pay attention to the **Preview** window to make sure you have the orientation correct to match how the material is placed on the cutting mat.
- ◇ **Auto fit columns and rows:** Mark this option if you want as many duplicates as possible cut from the material. Otherwise, enter the desired number of **Columns** and **Rows** to match the number of copies needed.
- ◇ **Spacing:** Adjust the spacing as desired. In general, shapes can be quite close together when cutting from thinner materials, such as vinyl and cardstock. In some cases, such as with a star, you can even use 0 for the **Row Spacing**, since the bottom of the shape is not close to the top of the shape in the row below it:

Row Spacing: 0 Plenty of room between the rows

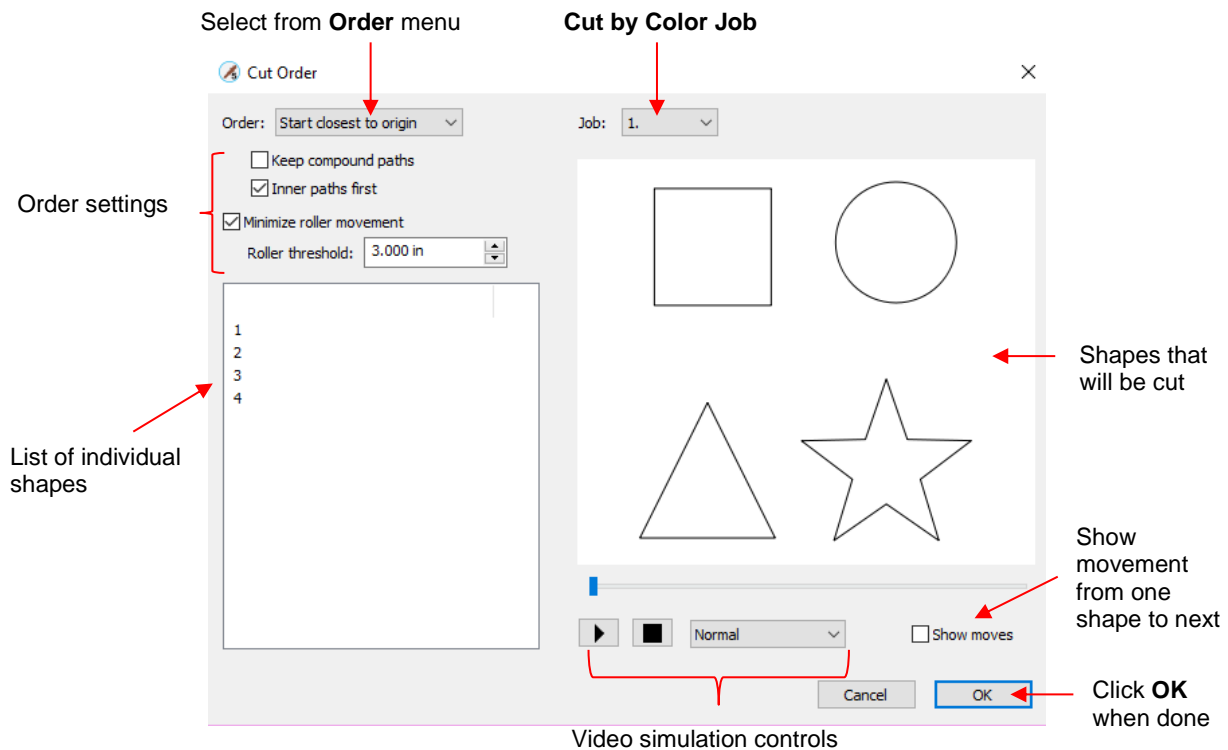
- Make sure you have all of the cut settings made under the **General** tab of the **Cut Settings** window. Once you click on **Cut**, all of the duplicates will be cut out and it appears that using **Cancel**, in the current version of SCAL, will not abort the cut.

12.06.6 Cut Order (SCAL PRO only)

- The **Cut Order** function provides control over the order in which shapes will be cut on your cutter. To access this function, go to the **Cut Settings** window and, in the upper right corner, click on **Cut Order**:




- When you click on **Cut Order**, the following window will open, displaying the shapes that will be cut:

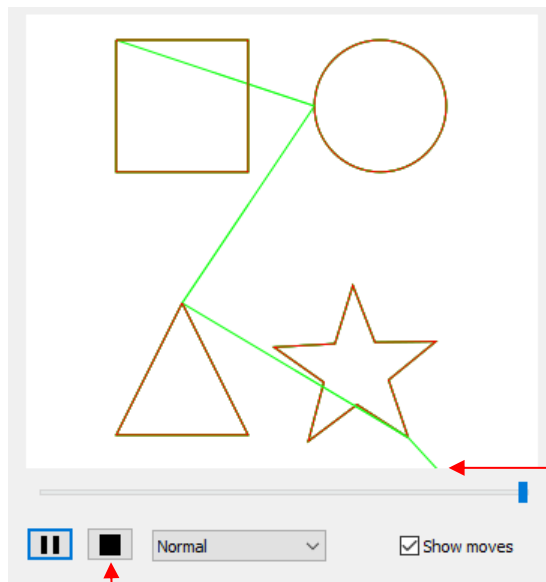


- ◇ **Order** - Select start location preference from the following:
 - **Start closest to origin** – The first shape to cut will be the one closest to the cutter's origin based on where the blade drops down to cut that shape.
 - **Start farthest from origin** – The first shape to cut will be the one farthest from the cutter's origin, again based on where the blade drops down to cut that shape.
 - **Layer order (Back to Front)** – The shapes will cut from bottom to top on the **Layers Panel**
 - **Layer order (Front to Back)** – The shapes will cut from top to bottom on the **Layers Panel**
- ◇ **Keep compound paths** – If two or more shapes have been joined using **Object>Merge**, they will be treated as a single shape in the cutting order.

- ◇ **Inner paths first** – It's almost always desirable to have an inner/child shape cut before an outer/parent shape due to stability of cutting the inner shape. However, that option can be turned off and inner shapes will be treated independently in the cutting order.
- ◇ **Minimize roller movement** – The accuracy of cut location (very important in print and cut applications) can be affected if the material or mat is rolling in and out over long distances throughout the cut. This option is also usually left marked.
- ◇ **Roller threshold** – Select from 0.01 inches to 10 inches based on the maximum roller movement allowed when cutting a series of shapes before advancing the mat/material to the next series. Note that if the **Keep compound paths** option is marked, it will take precedence over **Roller threshold**.
- ◇ **Job** – If **Cut by Color** with **Separate Jobs** has been opted, select each job separately from this menu to set the cut order, as desired.

• A video simulation is available so that you can verify the cut order:

- ◇ Click on the **Play** icon . The shapes will be sequentially highlighted in the order in which they will cut.
- ◇ There are three speeds in which this video can be played: **Slow, Normal, Fast**. As an example, verifying the cut order for a rhinestone pattern is probably best set at **Fast**.
- ◇ Marking the **Show moves** option will draw a green path between the shapes indicating the cut order. It also shows the starting location on each shape and the map will remain displayed at the end of the video:



The green path indicates that the cut order will be: **Star, Triangle, Circle Square**

On a Skycut, the origin is in the lower right corner. Thus, the green path starts from the lower right corner in the **Preview** window.

To replay video, click here first.
Then click the **Play** icon.

- ◇ To replay the video, click the black square icon  first. Then the **Play** icon will return and can be clicked.

12.06.7 Layers (SCAL PRO only)

- There may be occasions where you want certain layers of your project to cut at different settings than other layers. Two examples would be:
 - ◇ Cutting adhesive stickers where by you only want to kiss cut the stickers themselves, but then full cut around groups of them.

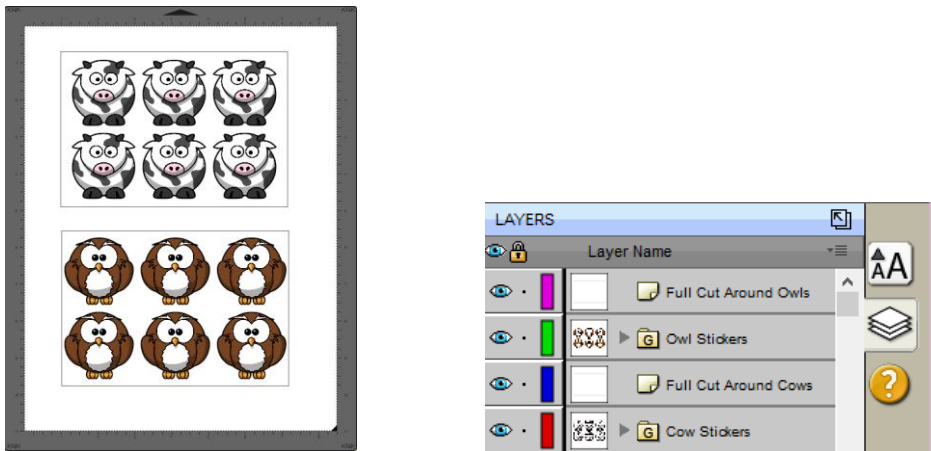
◇ Cutting a thick or dense material whereby you might want the first few passes to be at a lower pressure, followed by a heavier pressure for the last few layers.

• The **Cut by Layer** feature of SCAL5 involves four steps:

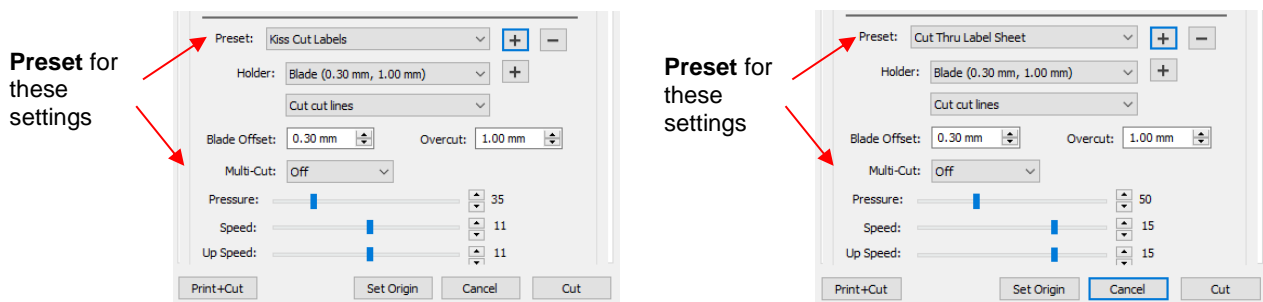
- (1) Create **Presets** for the different settings to be used. This was covered in *Section 12.06.2*.
- (2) On the **Style Panel**, assign a **Preset** to each layer and order layers by **Preset**.
- (3) In the **Cut Order** window (refer to *Section 12.06.6*) change the **Order** to match the **Layers Panel** order you wish to use.
- (4) On the **Layers** tab in the **Cut Settings** window, select which layers will be cut and whether or not there needs to be a pause between cutting the layers to change out a tool.

• Using the first example, cutting adhesive stickers, let's assume that you have two blade holders set to cut out stickers. One has the blade barely exposed so that the stickers will be kiss cut without penetrating the backing sheet and the other blade holder is set to cut through the sticker material and the backing sheet.

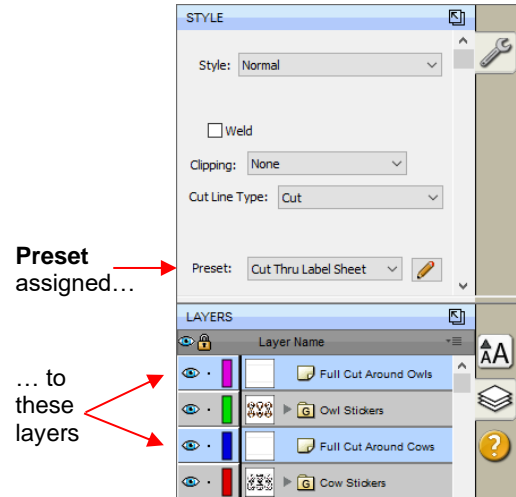
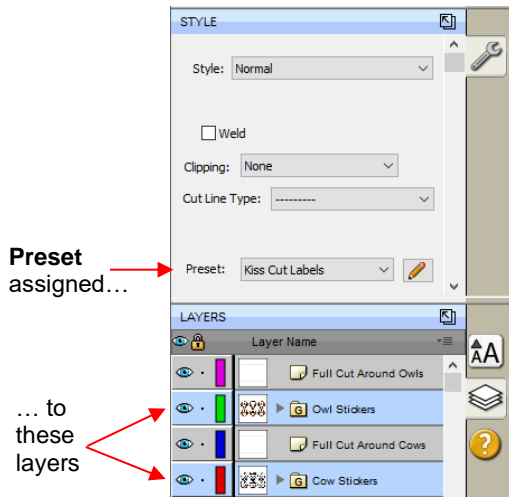
◇ A project is designed with two sets of stickers and outside cuts around each set:



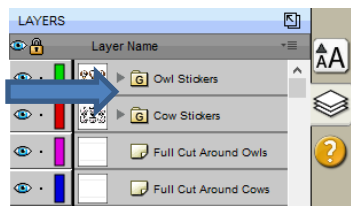
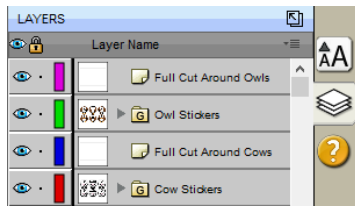
◇ Create two presets in the **Cut Settings** window. (Again, for directions on creating **Presets**, refer to *Section 12.06.2*):



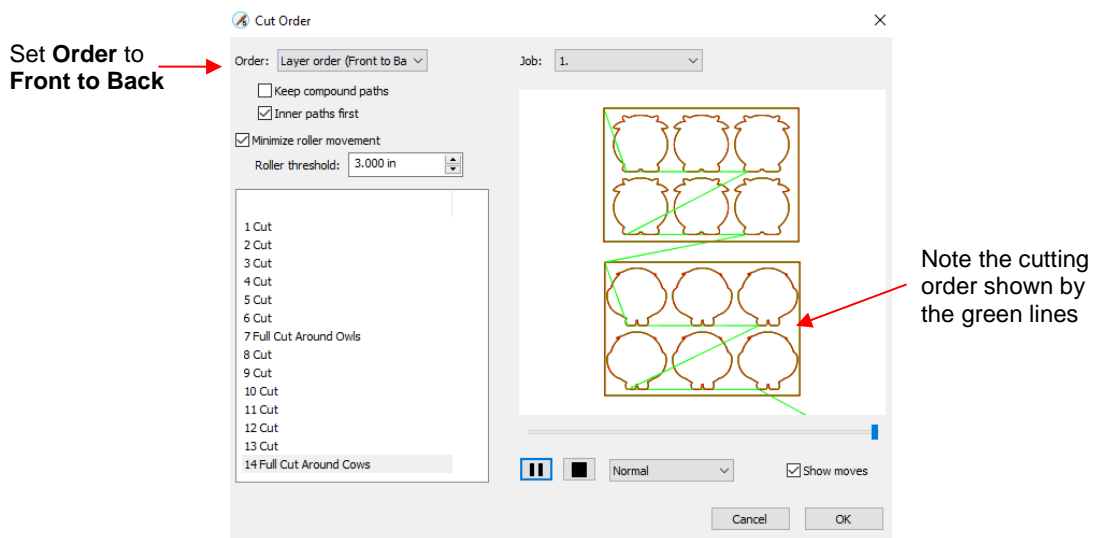
◇ On the **Style Panel**, select each pair of layers and assign the required **Preset** to that pair:



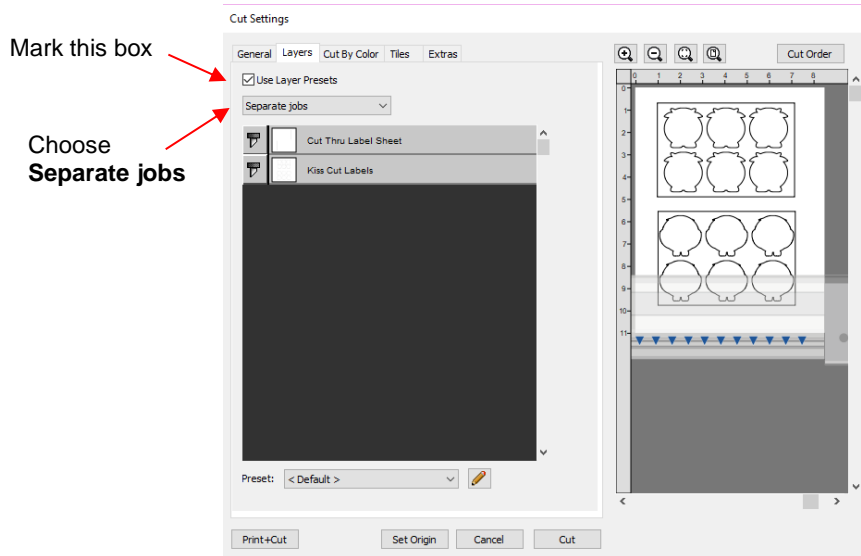
- ◇ Order the layers so that those cutting with the kiss cut blade holder are at the top and the layers with the more-exposed blade holder are at the bottom:



- ◇ Go to the **Cut Settings** window and click on the **Cut Order** tab. In the **Order** menu, select **Front to Back** and the cut order will then be top to bottom on the **Layers Panel**. The video simulation confirms this:



- ◇ Click on **OK** to close the **Cut Order** window. Now click on the **Layers** tab and the following window will open:

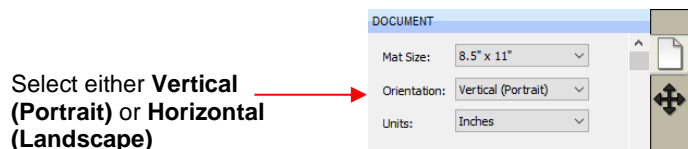


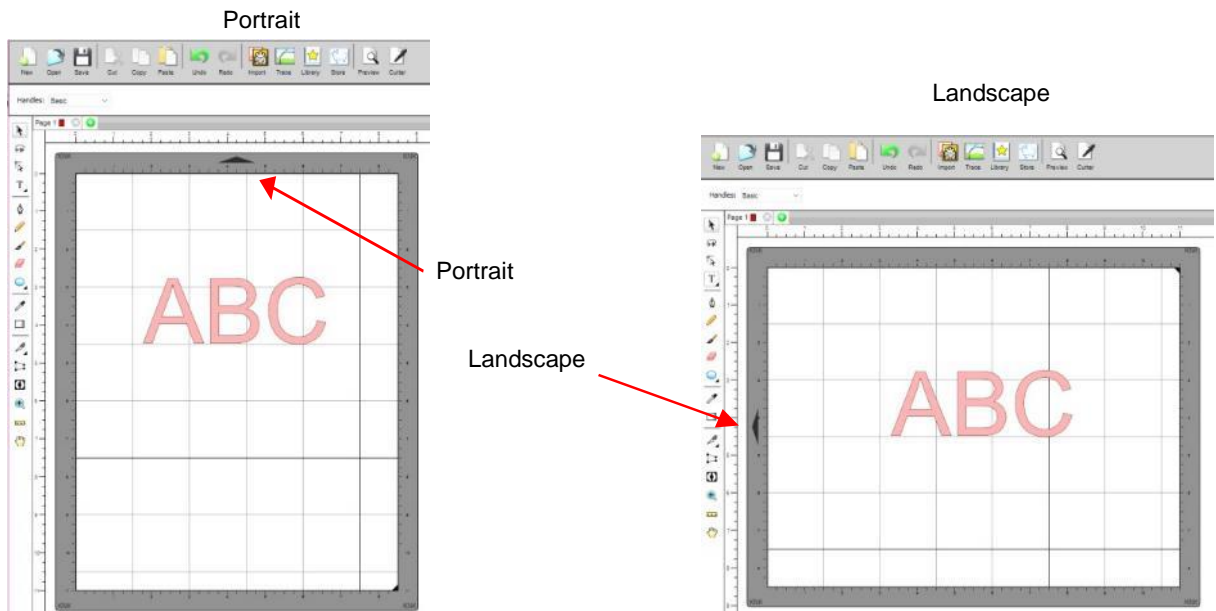
- ◇ Mark the option for **Use Layers Presets** and select **Separate Jobs**. Click on the **Print + Cut** button and the print and cut process can be carried out as normal. Watch for the job prompt windows to pop up and follow all instructions.

12.07 Controlling Where Shapes Will Cut

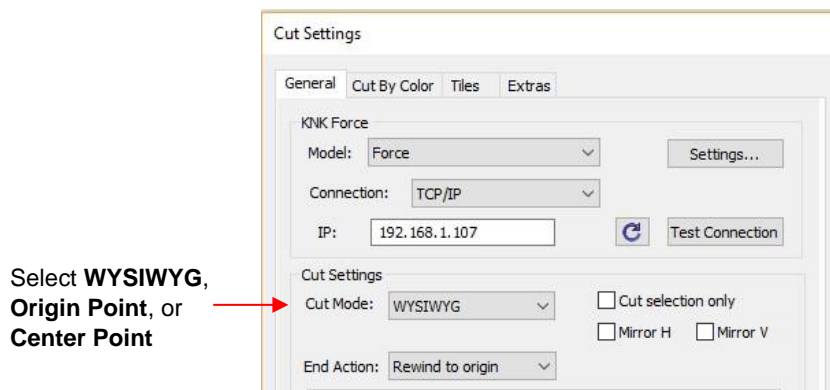
12.07.1 Overview

- There are two **Orientations** for cutting:
 - ◇ **Portrait** – Shapes will cut in the same orientation you see on the **Cutting Mat**
 - ◇ **Landscape** – Shapes will cut 90° clockwise to the orientation you see on the **Cutting Mat**
- There are 4 available **Cut Modes** when cutting to the Skycut:
 - ◇ **WYSIWYG** – Shapes will cut relative to their position on the virtual Cutting Mat
 - ◇ **Origin Point** – Shapes will cut to align with the origin set before cutting
 - ◇ **Center Point** – Shapes will cut to center around the origin set before cutting
 - ◇ **Print and Cut** – Shapes will cut based on manual or automatic alignment with printed registration marks (refer to *Chapter 3*)
- The **Orientation** is set on the **Document Panel**:



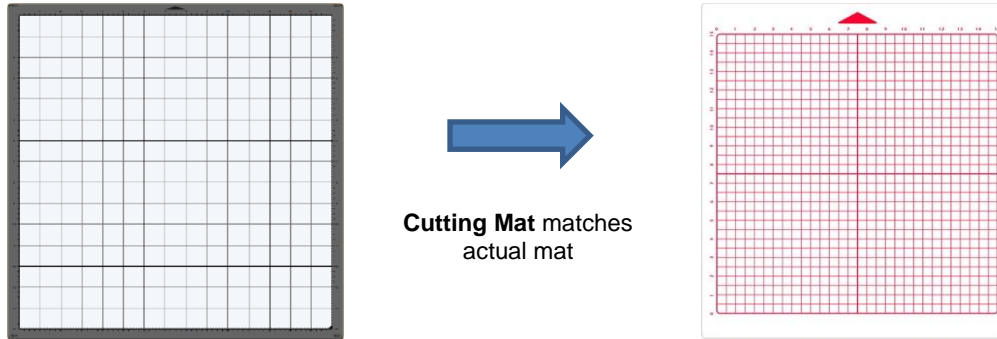


- The choice between **Portrait** and **Landscape** is a personal one – use whichever one makes the most sense to you. For long projects, such as for large vinyl cuts, **Landscape** is usually chosen because the project displays better on the computer monitor. However, you still have the option to use **Portrait**, if desired.
- The **Cut Mode** is set in the **Cut Settings** window:

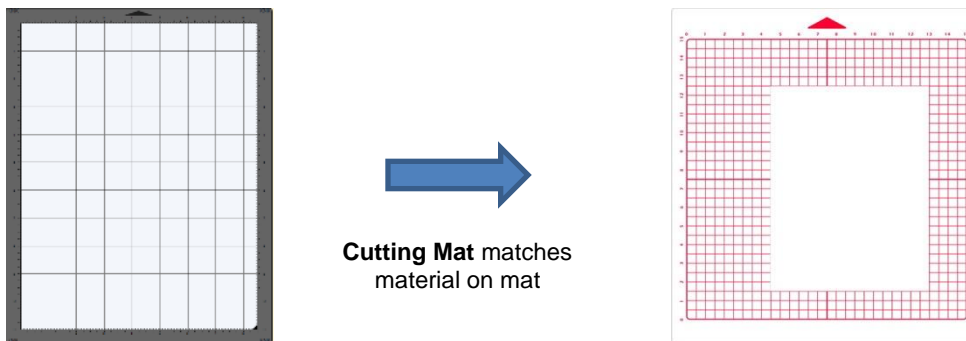


- **IMPORTANT:** All three **Cut Modes** are based on setting an XY origin on the cutter. On the Skycut, this origin is set by moving the blade tip to a chosen location on the mat grid or on the material, depending on the application or your preference.
- The following sections show where shapes will cut based on the possible combinations of **Cut Mode** and **Orientation**. Note that with **WYSIWYG** mode, there will be two options and the one that makes the most sense to you, is the one to use:

- ◇ **Cutting Mat Method:** The virtual **Cutting Mat** is the same dimensions as the actual cutting mat:



- ◇ **Material Method:** Create a custom virtual **Cutting Mat** that matches the dimension of the material to be cut:

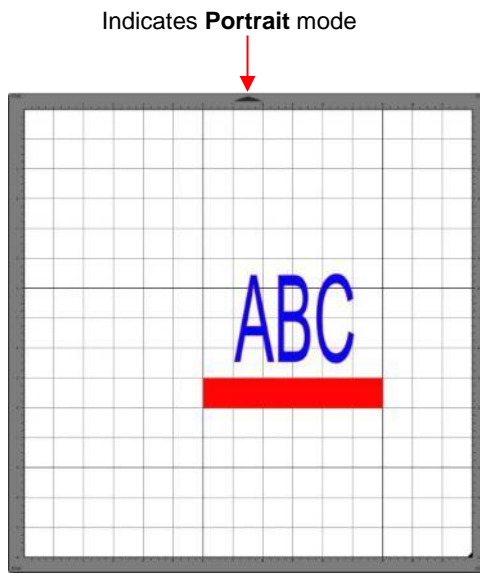


- The best way to learn how these settings affect where shapes cut is to recreate what you see in these screen shots and test them out with the test pen and paper. Eventually, it will all make sense to you and, of course, there's help available if you need it.

12.07.2 Origin Point

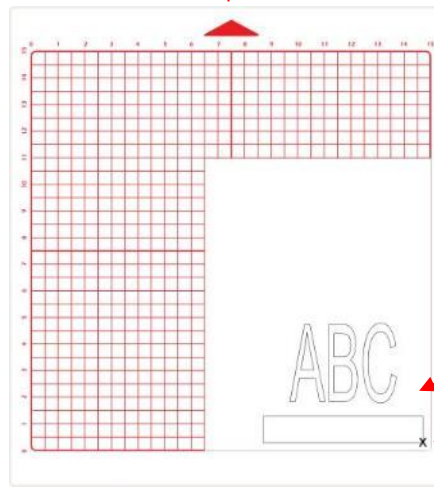
- This is the mode recommended for most applications as it economizes the use of your cutting materials.
- Shapes can be located anywhere on the virtual **Cutting Mat**. The shapes will be moved and aligned to cut with the origin you set on the material. As mentioned earlier, the origin is set using the position of the blade tip and is typically set just inside the lower right corner of the material being cut.
- When more than one shape will be cut, the shape closest to the origin will be cut at the origin and any other shapes will be cut the distance and direction from that shape as positioned on the screen. The following figures show examples of where images will cut. Use the arrow on the **Cutting Mat** as a guide to the direction to insert the actual mat or material into your cutter.

◇ **Origin Point – Portrait Mode**



Location of shapes in SCAL

Feed the mat this direction into the cutter



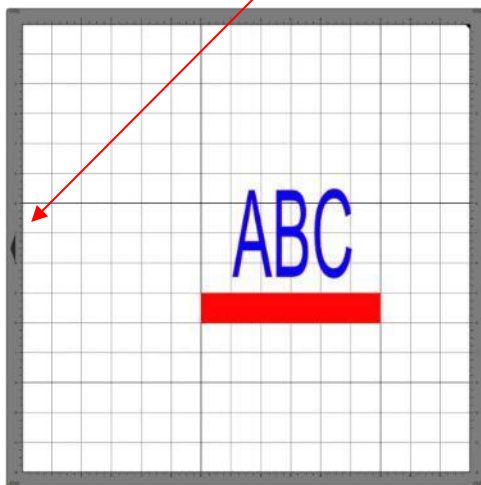
Shapes are cut to align with the origin you set on the cutter

Origin set here

Where shapes will draw or cut on the material

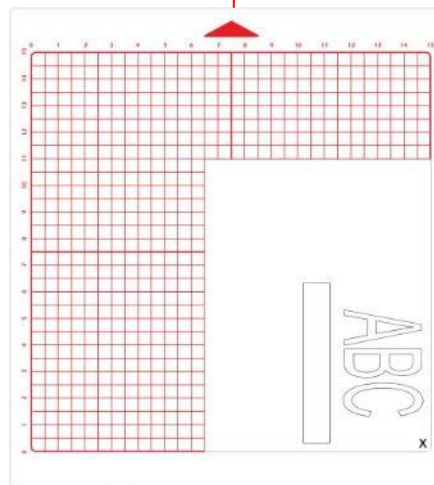
◇ **Origin Point – Landscape Mode**

Indicates **Landscape** mode



Location of shapes in SCAL

Feed the mat this direction into the cutter

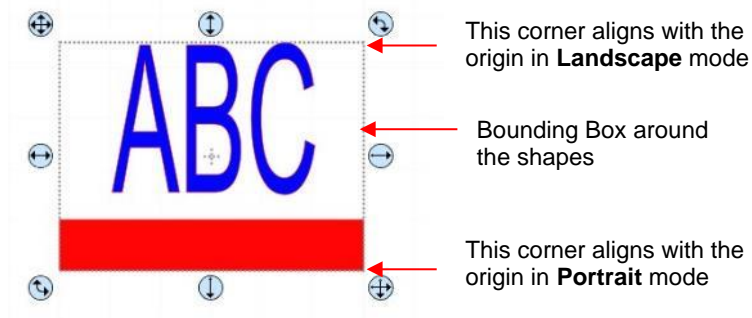


Shapes are cut to align with the origin you set on the cutter

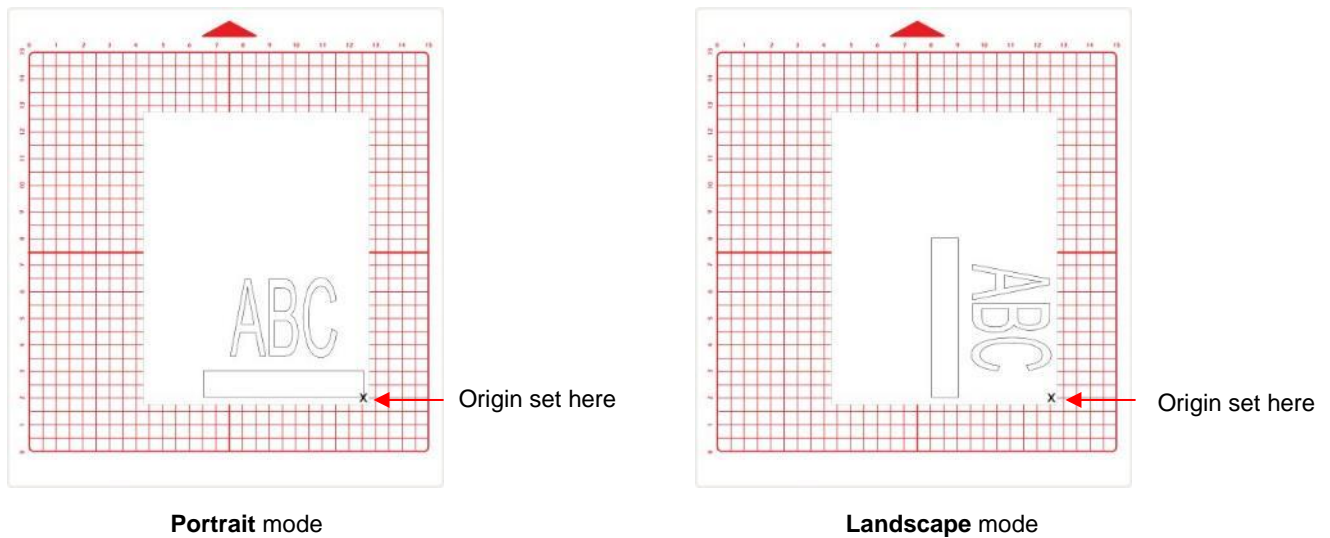
Origin set here

Where shapes will draw or cut on the material

- Note that the alignment is based on the bounding box around the shapes:



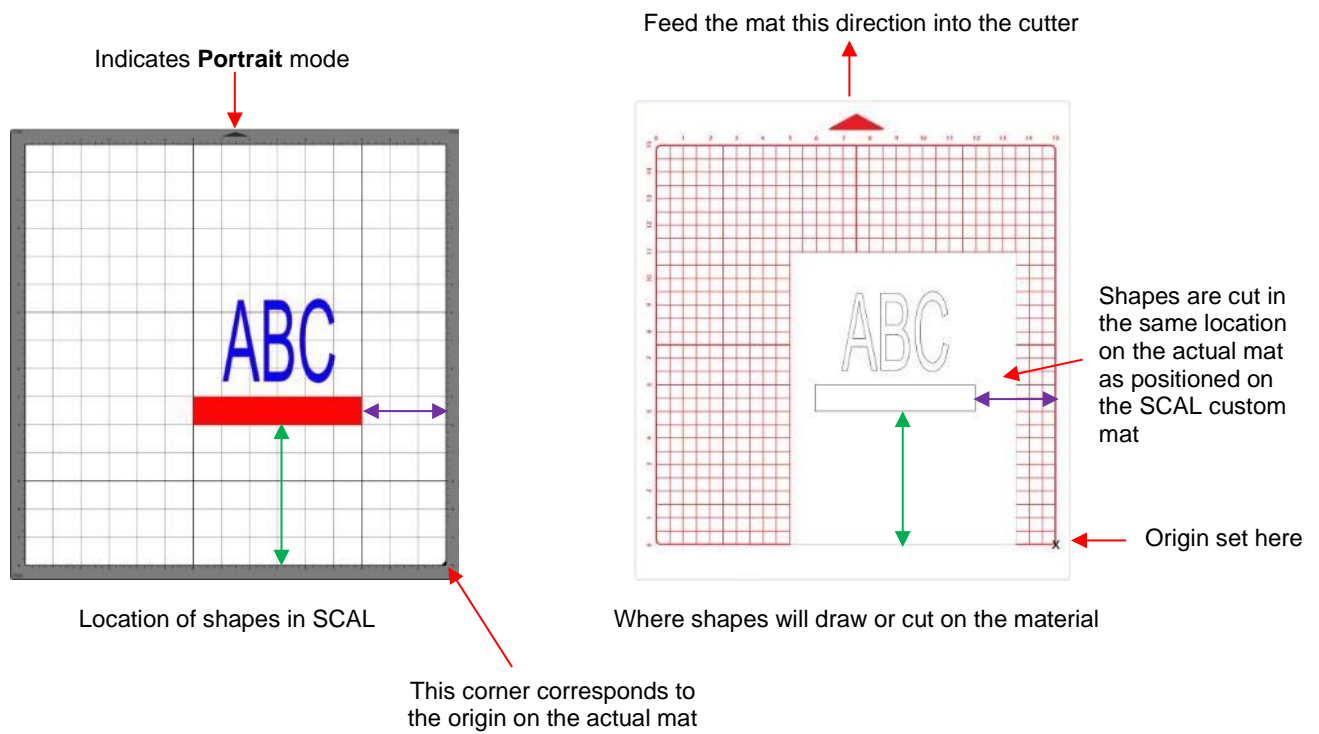
- Also, note that the material can be located anywhere on the cutting mat because you are setting the origin on the material itself. It is usually advisable to set that origin just a little way inside the corner of the material so that you do not inadvertently cut off the edge.



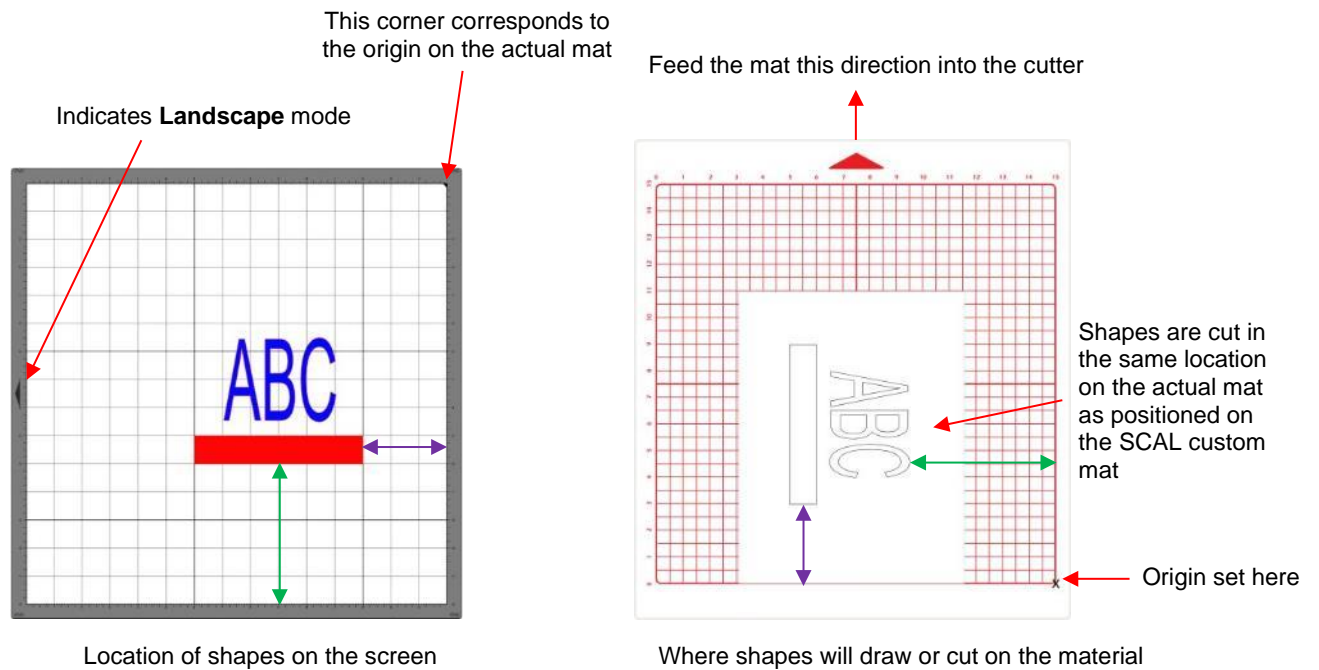
12.07.3 WYSIWYG

- This is the mode recommended when you need to cut shapes in a very specific location relative to the onscreen **Cutting Mat** or when you are utilizing multiple tools in applications such as draw and cut or emboss and cut.
- Shapes are cut based on where they are located on the virtual **Cutting Mat**. There are two methods used:
 - ◇ **Cutting Mat Method:** The virtual **Cutting Mat** dimensions should match those of the grid on the actual cutting mat. The origin is set in the exact lower right corner of the mat's grid. The material needs to be placed on the cutting mat so that it covers the area where the shapes will be cut.
 - ◇ **Material Method:** The virtual **Cutting Mat** dimensions should match those of the material being placed on the actual cutting mat. The origin is set in the lower right corner of the material regardless of where the material is placed on the mat. In the example later on, the material is assumed to be letter size (8.5" x 11").
- In the following diagrams the purple and green arrows are used to indicate the equivalent distances between the shapes and the origin on the virtual **Cutting Mat** and on the actual mat.

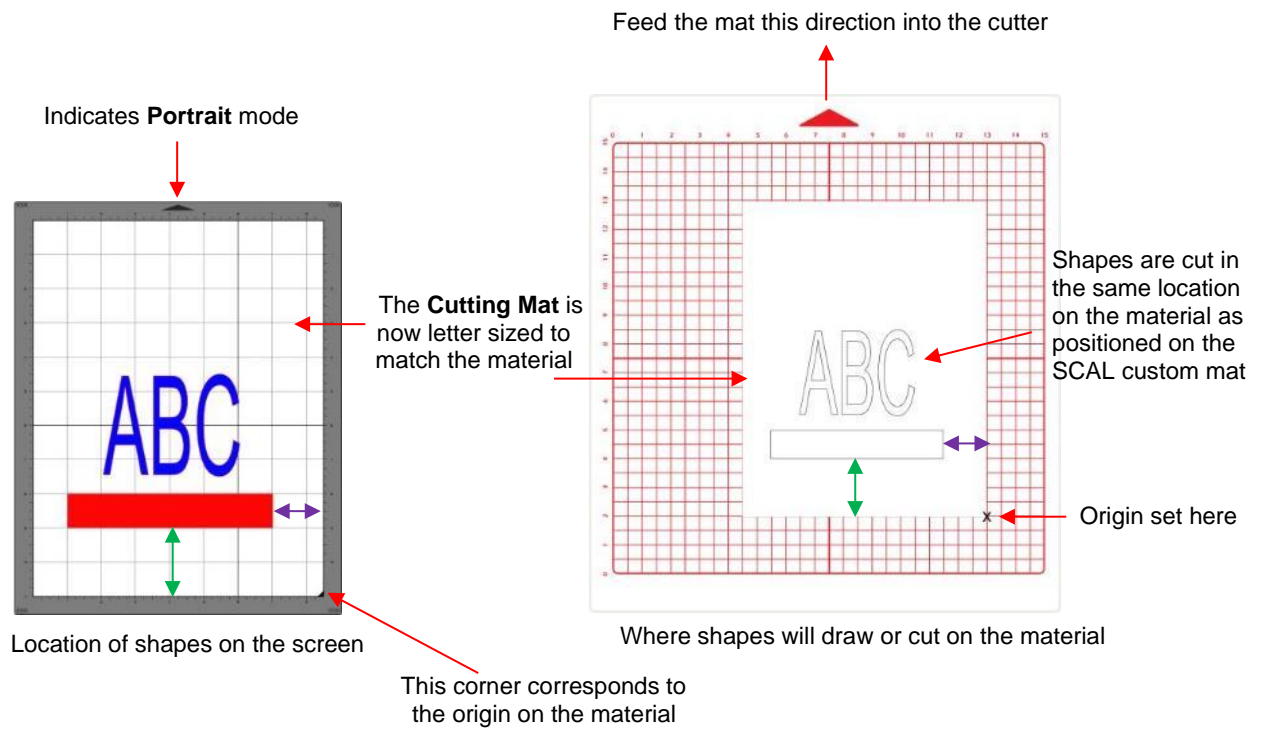
◇ **WYSIWYG – Portrait – Cutting Mat Method**



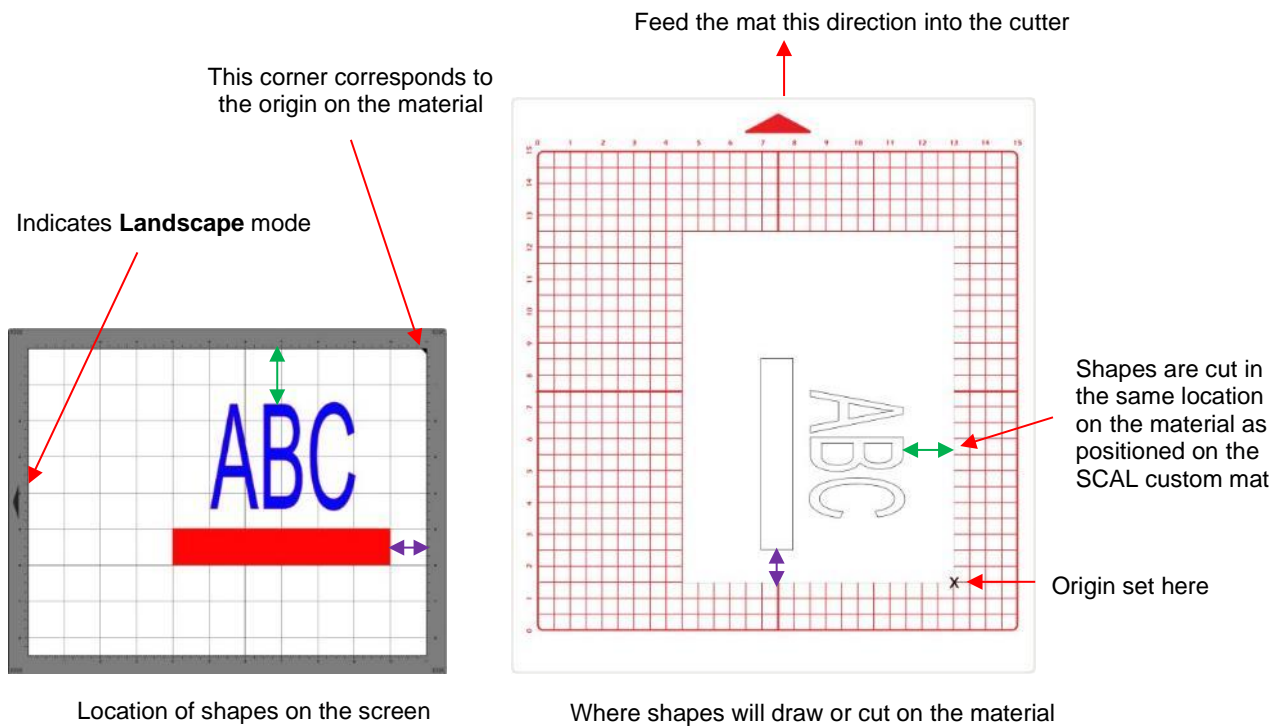
◇ **WYSIWYG – Landscape – Cutting Mat Method**



◇ **WYSIWYG – Portrait – Material Method**



◇ **WYSIWYG – Landscape – Material Method**



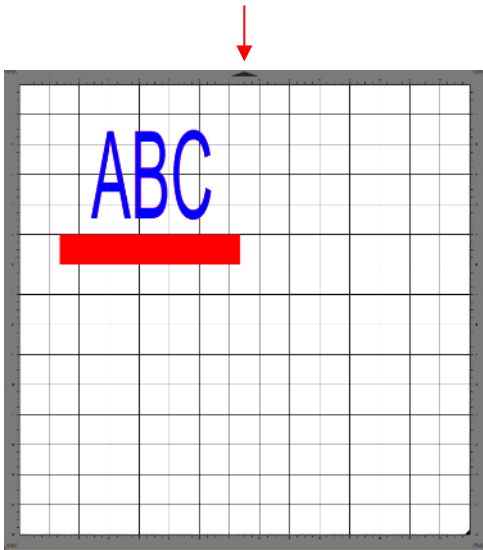
12.07.4 Center Point

- This is a mode not available with most other cutters in SCAL. It was needed for use with the Orbitizer but can also have other useful applications, such as cutting a shape from the center front of a greeting card.

- Shapes can be located anywhere on the virtual **Cutting Mat**. The shapes will be moved and centered around the origin you set on the material. While in the other two cut modes, the origin is typically set just inside the lower right corner of the mat or material, with **Center Point** mode, you want to set the origin in the center of the material or mat:

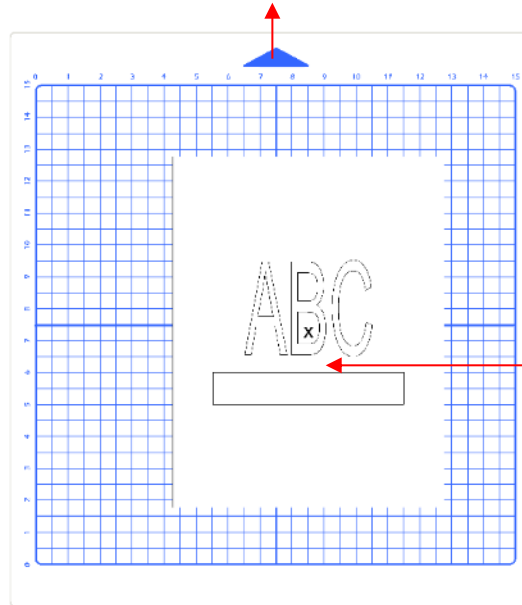
Center Point - Portrait

Indicates **Portrait** mode



Location of shapes in SCAL

Feed the mat this direction into the cutter



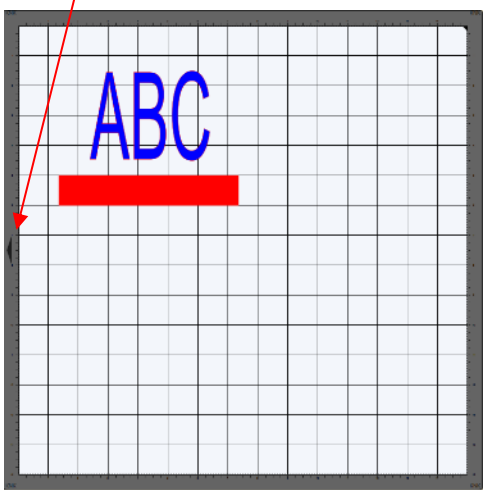
Origin set here

Shapes are centered around the origin you set on the material

Where shapes will draw or cut on the material

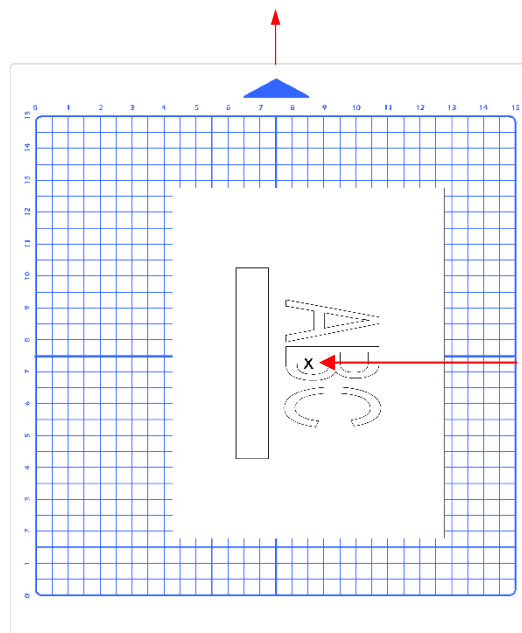
◇ **Center Point – Landscape Mode**

Indicates **Landscape** mode



Location of shapes in SCAL

Feed the mat this direction into the cutter

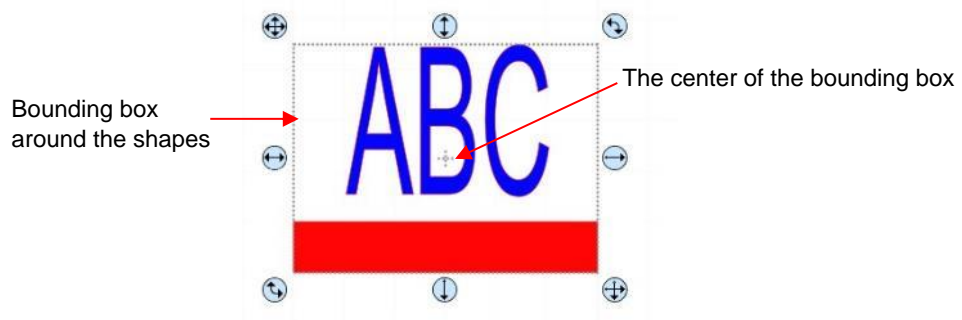


Origin set here

Shapes are centered around the origin you set on the material

Where shapes will draw or cut on the material

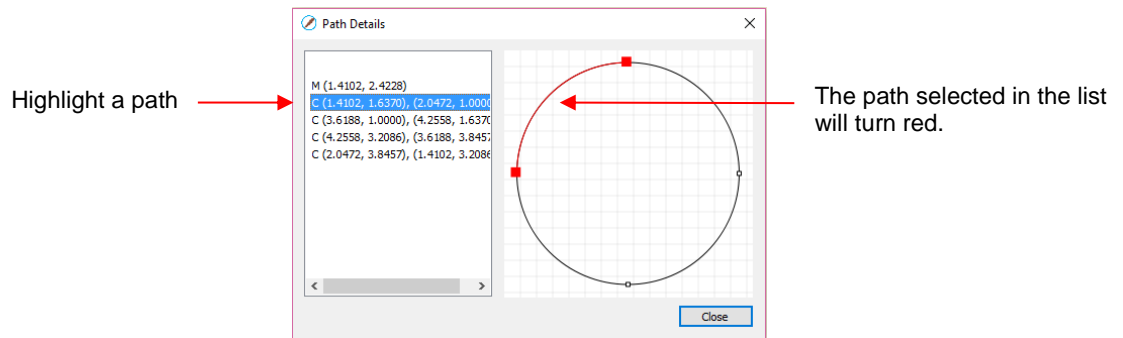
- ◇ Note that the alignment is based on the center of the bounding box around the shapes:



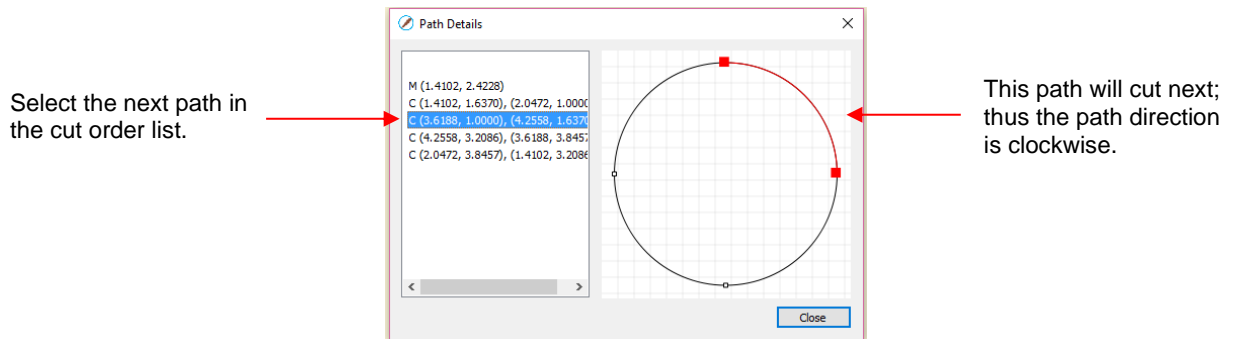
- ◇ Also, note that the material can be located anywhere on the cutting mat because you are setting the origin on the material itself. If you need the centering to be perfect:
 - Measure the material with a ruler to determine the center and mark the center with a pencil dot
 - Use the alignment pin in the blade holder to set the origin. It is far easier to see the tip of the pin than the tip of the blade.

12.08 Path Details and Reverse Path

- Sometimes a cutting issue can be resolved by reversing the direction of a cut. In SCAL, the cut direction (clockwise versus counterclockwise) can be checked using the following steps:
 - ◇ Select the shape, right-click and select **Path>Path Details**.
 - ◇ A window will open. On the left side is a list of the paths in the order they will cut. Click on any path in the list and that path will turn red:



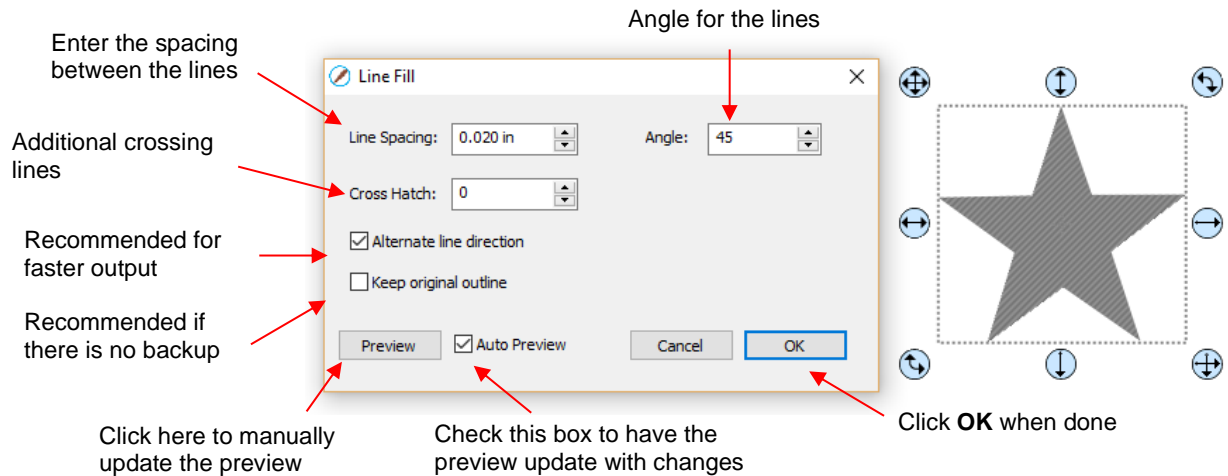
- ◇ Select the next path in the list and you will then be able to determine the direction of the cut:



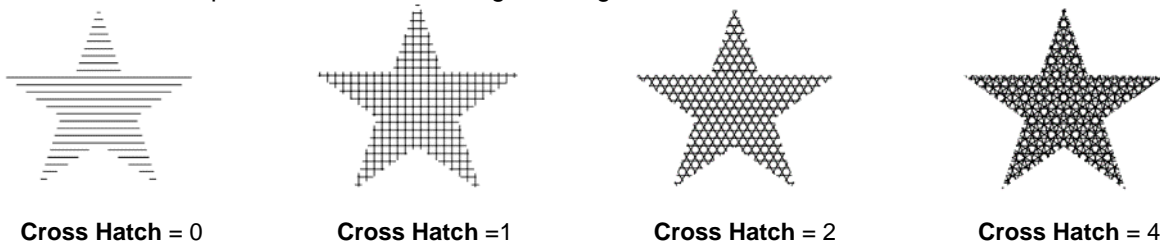
- To reverse the direction of a path, use either of the following after selecting the shape:
 - ◇ Right-click and select **Path>Reverse Path**
 - ◇ Go to **Path>Reverse Path**

12.09 Line Fill

- The **Line Fill** function creates a line or hatch fill pattern, typically used for engraving with an engraving tool. It can also be used for coloring in shapes with a pen or embossing some materials with an embosser.
- To access this function, select a shape and go to **Effects>Line Fill**:



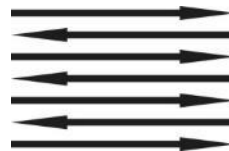
- ◇ **Line Spacing:** This is selected based on the width of the line produced by the tool to be used. If it's too small to accurately measure, use 0.02" or 0.5 mm for a small test shape and then adjust, as needed, to fit the tool and application.
- ◇ **Angle:** Choose an angle for the **Line Fill**. An **Angle** of 0 results in horizontal lines and an **Angle** of 90 results in vertical lines. Note the diagonal pattern in the prior screenshot using an **Angle** of 45.
- ◇ **Cross Hatch:** Increasing **Cross Hatch** adds additional intersecting lines to the pattern which can result in a more complete fill but will take longer to engrave or draw:



- ◇ **Alternate Line Direction:** This controls whether the tool always returns to the same side before dropping down to engrave or draw. In some applications, it may need to be unchecked to provide a more even appearance, however it will take much longer to execute:



Alternate Line Direction: not marked
Tool only travels in one direction



Alternate Line Direction: marked
Tool travels in both directions

- ◇ **Keep Original Outline:** Usually a good idea in case you want to revise your pattern later on. Also, when working with lettering, having the outline improves readability:

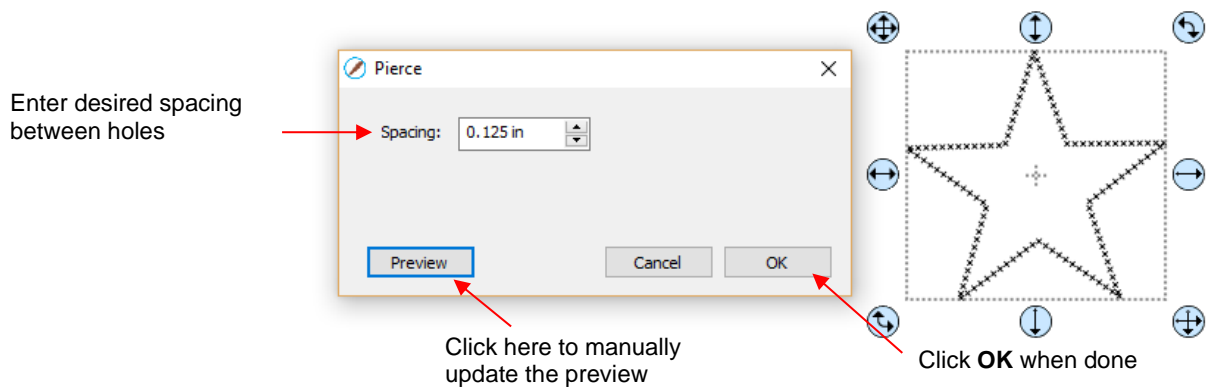
ASU

ASU

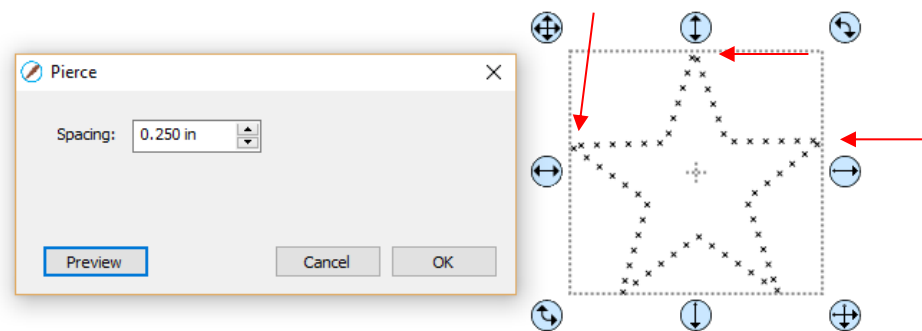
- For more information on using an engraver, refer to *Section 4.03*.

12.10 Pierce

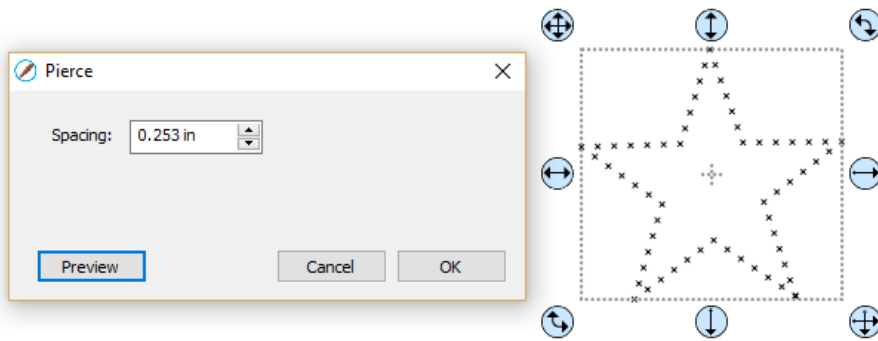
- The **Pierce** function creates holes for punch tools. This can be used to create Pergamum designs and paper embroidery patterns.
- To access this function, select a shape and go to **Effects>Pierce**:



- Note that even though you see “X” shapes on the screen, the cutter head will be making downward punch movements.
- At this time, there is no editing available for a pattern created using the **Pierce** function. If you find that your design has holes that are not evenly spaced, try altering the spacing by tiny increments and clicking on **Preview**.
- ◇ For example, the star shape used above shows uneven spacing when a value of 0.25” is entered. Note how the star has holes too close to one another at the upper points:



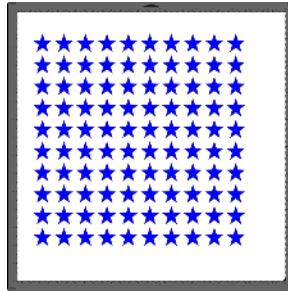
- ◇ Gradually increasing the **Spacing** didn't immediately result in an acceptable pattern until 0.253” was entered. Then the pattern looked even:



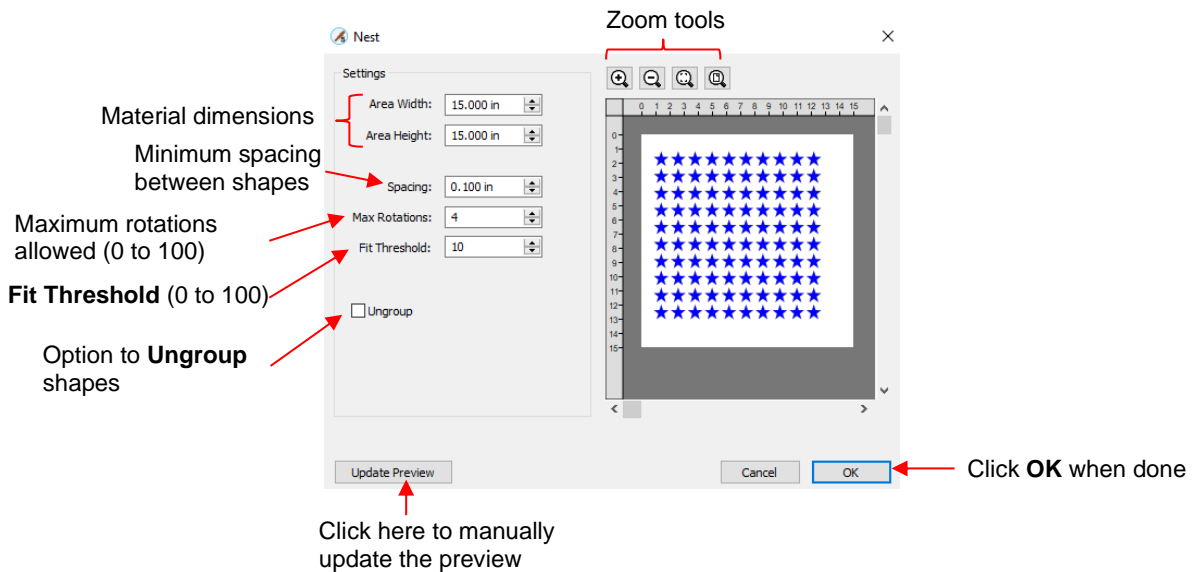
- If you have a shape that has the **Pierce** effect applied and want to remove it (even after the file has been saved and re-opened), select the shape and go to **Object>Remove Effects**.
- If you are unable to get an even pattern, then try using the **Rhinestone** effect instead. Refer to *Section 11.12* and enter the smallest rhinestone circle size available: SS000.

12.11 Nest

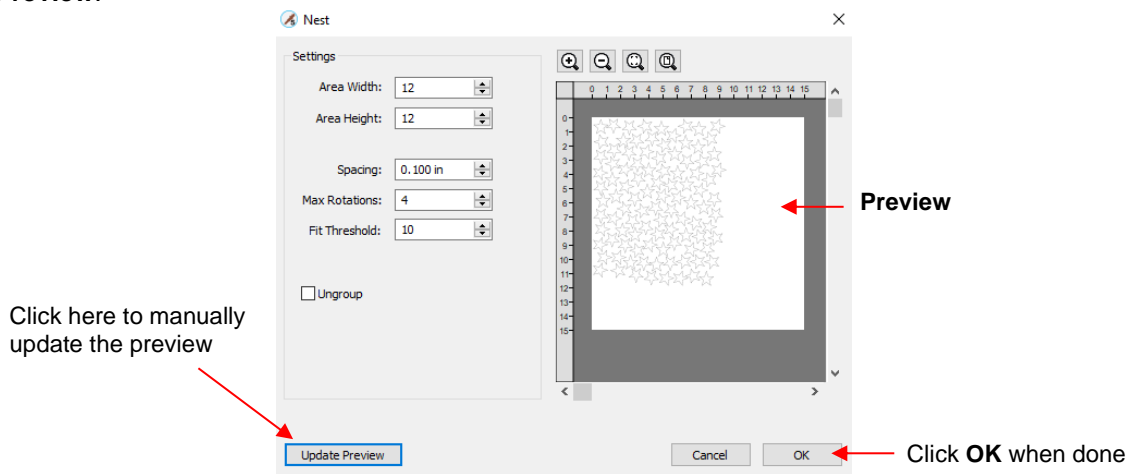
- The **Nest** function rearranges all of the shapes on the current page in an effort to economize the area occupied.
- For example, let's say you want to cut out these 100 stars from a sheet of 12 x 12 cardstock:



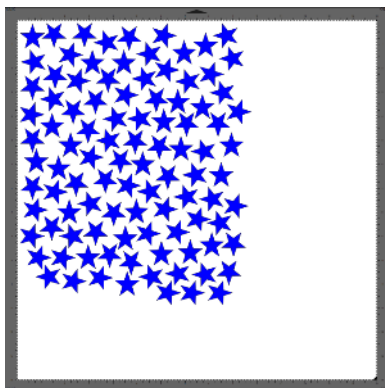
- To access the **Nest** function, go to **Effects>Nest**. The following window opens:



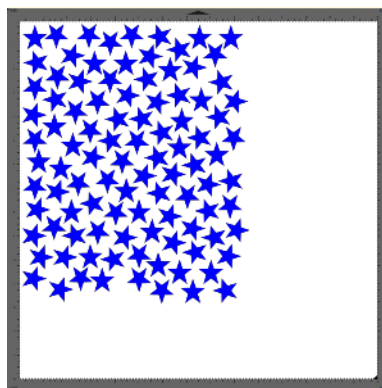
- ◇ **Area Width** and **Area Height**: Enter the dimensions of the material from which you will be cutting so that the nesting will arrange the shapes within that available area, if possible.
- ◇ **Spacing**: Enter the minimum distance allowed between shapes.
- ◇ **Max Rotations**: Shapes will be rotated in an effort to pack them together more closely. The maximum rotations allowed can be set between 0 and 100. However, the more rotations you select, the longer the rendering time for the nesting function. Note: When cutting from a material, such as patterned paper, where the shapes need to be oriented as designed on the **Cutting Mat**, set **Max Rotations** to 0 so that none of the shapes will be rotated during the nesting process.
- ◇ **Fit Threshold**: A setting between 1 and 100, with a higher value attempting to pack the shapes closer together than a lower value. As with **Max Rotations**, the higher the number, the longer the rendering time for the nesting function.
- ◇ **Ungroup**: If any of the shapes are grouped together, but you do not want them treated as a group when nesting, mark this option.
- Clicking on **Update Preview** will perform the nesting process and the resulting arrangement will appear in the **Preview**:



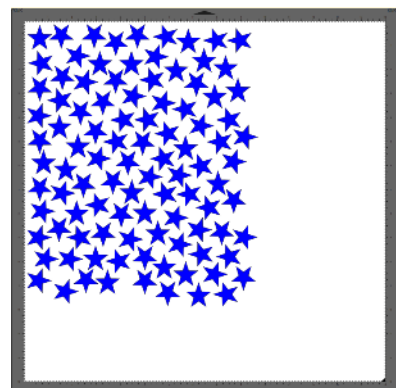
- **IMPORTANT:** Choosing very high values for **Max Rotations** and **Fit Threshold**, when there are many shapes on the page, can lead to freezing of the software. Testing has shown that the amount of space saved may not amount to much compared to more conservative settings:



Max Rotations = 4
Fit Threshold = 10
Area = 113 in²

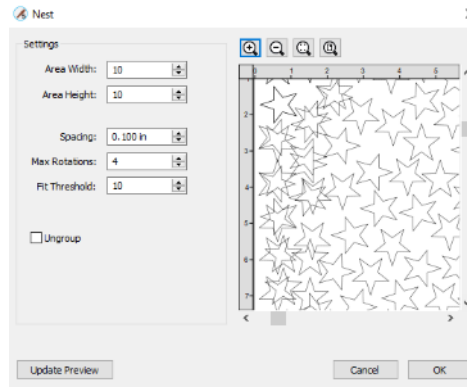
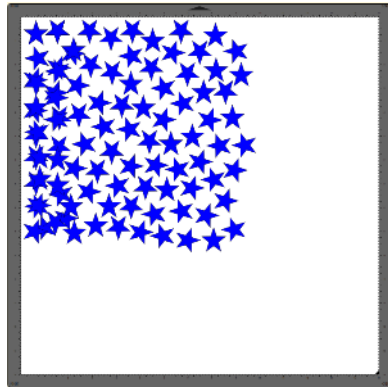


Max Rotations = 12
Fit Threshold = 30
Area = 111 in²



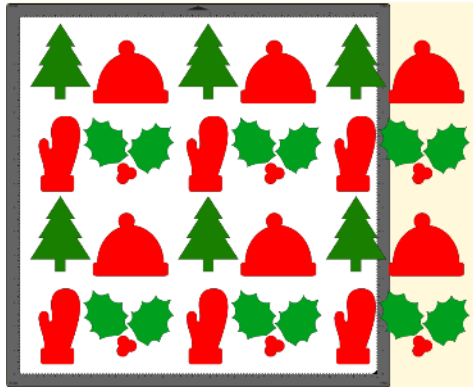
Max Rotations = 36
Fit Threshold = 90
Area = 111 in²

- **IMPORTANT:** Be sure to check the arrangement before cutting to make sure there is no overlap. For example, if the available cardstock had only been 10" x 10", then overlap between the shapes would have occurred:

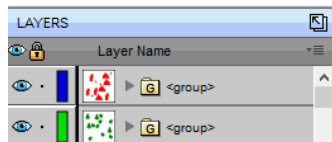


◇ This could also have been caught while still in the **Nest** window by carefully checking the **Preview** and zooming in, as shown above.

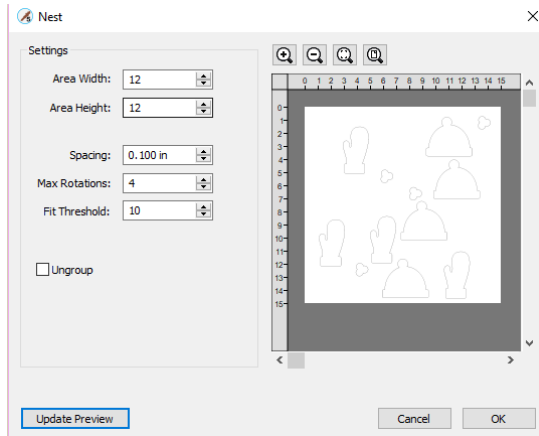
- Nesting isn't restricted to identical shapes. In this next example, Christmas shapes are to be cut from red and green cardstock:



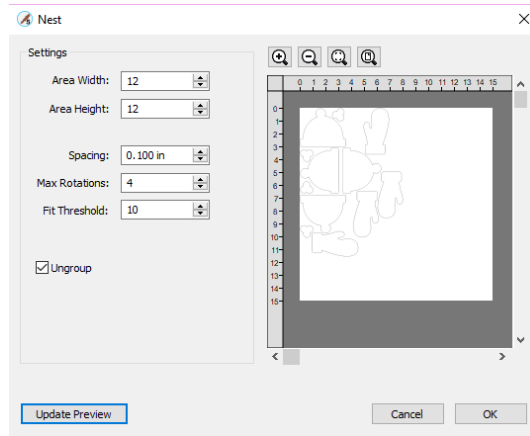
- ◇ Note that the shapes extend beyond the boundary of the **Cutting Mat**. This is not an issue for the **Nest** function.
- ◇ The green shapes are all selected and grouped together on the **Layers Panel**, as are the red shapes:



- ◇ **IMPORTANT:** Even if you were to lock or hide one of the layers, the **Nest** function will attempt to include it. Thus, separate the layers onto their own pages.
- ◇ Taking the red layer onto a new page, in the **Nest** window the dimensions of the cardstock are entered, along with the other settings.
- ◇ **IMPORTANT:** Because the shapes are grouped, the option for **Ungroup** should be marked before clicking on **Update Preview**. Otherwise the group will be treated as a single object and the individual shapes will not be nested at all:

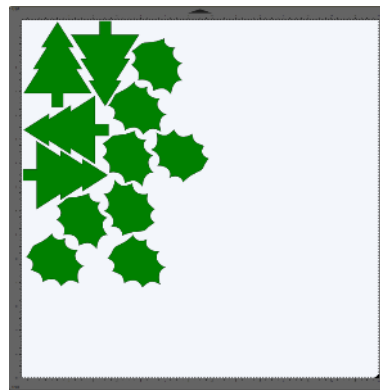
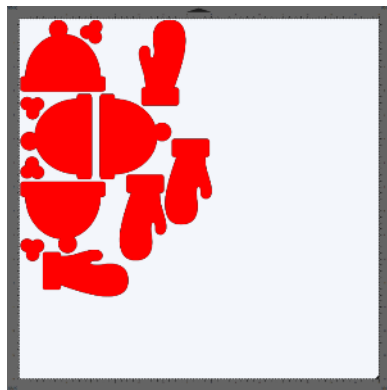


Ungroup not checked:
shapes are not nested



Ungroup checked:
shapes are nested

- ◇ The process is repeated for the green shapes, again making sure there are no other hidden layers and that the **Ungroup** box is checked before applying **Update Preview**. End result: two pages with the red shapes nested on one and the green shapes nested on the other:



Appendix A Shortcuts and Icons in SCAL5

Shortcut

Icon







Description

Menu (m:) and/or Icon (i:) Location

Main Screen and Project Functions


Ctrl+N		Open a new file/project	m:File>New Project i:Toolbar
Ctrl+O		Open an existing .scut file/project	m:File>Open Project i:Toolbar
Ctrl+S		Save a file/project	m:File>Save Project i:Toolbar
Ctrl+Shift+S		Save file/project in new location	m:File>Save Project As
Ctrl+W		Close current project	m:File>Close Project
Ctrl-Shift+W		Close all projects	m:File>Close All Projects
Ctrl+P		Print	m:File>Print
Ctrl+Z		Undo last action	m:Edit>Undo i:Toolbar
Ctrl+Shift+Z		Redo last action	m:Edit>Redo i:Toolbar
		Open Document Panel	i:Properties Panel
		Pop out a panel	i:Properties Panel
		Return panel to Properties Panel	i:Properties Panel
Right click>Mat Size		Change the size of the Cutting Mat	m:Cutter>Mat Size
Right click>Mat Orientation		Toggle between Landscape and Portrait	m:Cutter>Mat Orientation
Right click>Show Rulers		Toggles Rulers on and off	
Right click>Ruler Units		Set units for software: in, cm, mm	m:View>Ruler Units
Alt+F4		Close SCAL	m:File>Exit

Zooming and Panning Tools





Click icon and drag mouse		Zoom in on selected area	i:Tools Panel
Ctrl+ +++ (or right click>Zoom In)		Zoom in	m:View>Zoom In i:Tools Panel>Tool Options
Ctrl+ --- (or right click>Zoom Out)		Zoom out	m:View>Zoom Out i:Tools Panel>Tool Options
Ctrl + Shift + = (or click on Zoom tool and drag mouse)		Zoom to selected shape	m:View>Zoom Selection i:Tools Panel>Tool Options
Ctrl+F		Zoom so cutting mat fits in window	m:View>Fit to Window i:Tools Panel>Tool Options
Alt+roll mouse wheel		Zoom in and out, centered on middle of cutting mat	
Spacebar+drag left mouse button		Pan workspace	i:Tools Panel

Shortcut **Icon** **Description** **Menu (m:) and/or Icon (i:) Location**



Help

		Open Hints window	i:Properties Panel
F1		Open Help window	m:Help>Help



Importing and Exporting

Ctrl+Shift+I		Import a file	m:File>Import i:Toolbar
Ctrl+Shift+E		Export a file (save in a different format)	m:File>Export
Ctrl+Shift+T		Open Trace Image window	m:File>Trace Image i:Toolbar
Ctrl+1		Open the Library window	m:Window>Library i:Toolbar
		Open the eshape store window	m:File>eshape Store i:Toolbar


Selecting and Moving Shapes

Click on shape		Left click on shape to select it	i:Tools Panel
Shift + click on shape		Add additional shapes to selection	
Freely drag mouse around shapes		Lasso select shapes	i:Tools Panel
Ctrl+A (or right click>Select All)		Select all shapes	m:Edit>Select All
Ctrl+Shift+A (or right click>Deselect All)		Deselect all shapes	m:Edit>Deselect All
Right click>Transform>Move		Move a shape to a new location	
















Duplicating Shapes

Alt + drag shape		Creates a duplicate of the shape being dragged	
Alt + click on shape		Creates a duplicate of shape on top of original	
Ctrl+C (or right click>Copy)		Copy to clipboard	m:Edit>Copy i:Toolbar
Ctrl+V (or right click>Paste)		Paste from clipboard	m:Edit>Paste i:Toolbar
Ctrl+Shift+V (or right click>Paste in Place)		Paste in place from clipboard (on top of original)	m:Edit>Paste in Place
Ctrl+Alt+Shift+V		Fill the grid with selection from clipboard	m:Edit>Paste (Auto Fill)
Ctrl+D		Create duplicate copies of selected shape (s)	m:Object>Duplicate
Ctrl+Shift+D		Create duplicate copies in a circular formation	m:Object>Duplicate Rotated






Shortcut**Icon****Description****Menu (m:) and/or Icon (i:) Location****Cutting/Deleting Shapes**

Ctrl+X (or right click>Cut)		Cut to clipboard	m:Cut to clipboard
Del (or right click>Delete)		Delete selected shape(s)	
Hold Del and click on one shape at a time		Deletes each shape as it is left clicked	







Text and Font Icons

		Open Text Panel	i:Properties Panel
		Bold	i:Text Panel
		Italic	i:Text Panel
		Reload installed fonts list	i:Text Panel
		Load a font	i:Text Panel
		Left align text	i:Text Panel
		Center align text	i:Text Panel
		Right align text	i:Text Panel
		Justify text	i:Text Panel
		Add font to Favorites	i:Text Panel i: Library>Fonts tab
		Type text	i:Tools Panel
		Vertical type	i:Tools Panel
		Type on path	i:Tools Panel
		Type on arch	i:Tools Panel
		Stencil Bridge: Connect interior shapes to the outside	i:Tools Panel





Library











Ctrl+1		Open the Library window	m:Window>Library i:Toolbar
		Add folder	i:Library>Shapes tab i:Library>Project tab
		Delete folder	i:Library>Shapes tab i:Library>Project tab
		Add file to selected folder	i:Library>Shapes tab i:Library>Project tab
		Refresh	i:Library>Shapes tab i:Library>Project tab

Shortcut**Icon****Description****Menu (m:) and/or Icon (i:) Location****Library (cont.)**













Shortcut	Icon	Description	Menu (m:) and/or Icon (i:) Location
		Change to List View	i:Library>Shapes tab i:Library>Project tab
		Change to Thumbnail View	i:Library>Shapes tab i:Library>Project tab
		Search on keyword	i:Library>Shapes tab i:Library>Project tab
		Sync with eStore or access Download Manager	i:Library>Shapes tab i:Library>Project tab
		Temporarily open a font	i:Library>Fonts tab
		Add font to Favorites	i:Library>Fonts tab

Manipulating and Coloring Shapes










		Open Position & Size Panel	i:Properties Panel
Right click>Transform>Scale		Resize a selected shape	
Right click>Transform>Rotate		Rotate a selected shape	i:Position & Size Panel
Right click>Transform>Flip Horizontal		Mirror/Horizontally flip a selected shape	i:Position & Size Panel
Right click>Transform>Flip Vertical		Vertically flip a selected shape	i:Position & Size Panel
Ctrl+Shift+Up (or right click>Arrange>Bring to Front)		Bring selected shape to top	m:Object>Arrange>Bring to Front
Ctrl+Up (or right click>Arrange>Bring Forward)		Bring selected shape up one level	m:Object>Arrange>Bring Forward
Ctrl+Down (or right click>Arrange>Send Backward)		Send selected shape down one level	m:Object>Arrange>Send Backward
Ctrl+Shift+Down (or right click>Arrange>Send to Back)		Send selected shape to the bottom	m:Object>Arrange>Send to Back
Ctrl+Alt+L (or right click>Lock)		Lock selected shape	m:Object>Lock
Ctrl+Alt+Shift+L (or right click>Unlock All)		Unlock all shapes	m:Object>Unlock All
Right click>Hide		Hide select shape	m:Object<Hide
Right click>Show All		Show all shapes	m:Object>Show All
Ctrl+G (or right click>Group)		Group selected shapes	m:Object>Group
Ctrl+Shift+G (or right click>Ungroup)		Ungroup selected shapes	m:Object>Ungroup
Ctrl+B (or right click>Break Apart)		Break a shape into all of its individual paths	m:Object>Break Apart
Ctrl+Shift+B		Join selected shapes into a single shape	m:Object>Merge

<u>Shortcut</u>	<u>Icon</u>	<u>Description</u>	<u>Menu (m:) and/or Icon (i:) Location</u>
Manipulating and Coloring Shapes (cont.)			
		Open Fill & Stroke Panel	i:Properties Panel
		Stroke with pointed corners	i:Fill & Stroke Panel
		Stroke with rounded corners	i:Fill & Stroke Panel
		Stroke with beveled corners	i:Fill & Stroke Panel
		Butt end cap	i:Fill & Stroke Panel
		Round end cap	i:Fill & Stroke Panel
		Extended end cap	i:Fill & Stroke Panel
		Copy a Fill and/or Stroke color from one shape to another	i:Tools Panel
		Edit a gradient start and end points	i:Tools Panel
		Distort a shape	i:Tools Panel






Layers Panel






		Open Layers Panel	i:Properties Panel
Right click>Hide		Hide a layer	m:Object>Hide i:Layers Panel
		Show a layer	i:Layers Panel
		Open Layer Options Menu	i:Layers Panel
Right click>Hide all (or click icon > Show/Hide>Hide All Layers)		Hide all layers	m:Layer>Show/Hide>Hide All Layers i:Layers Panel
Right click>Show All (or click icon > Show/Hide>Show All Layers)		Show all layers	m:Layer>Show/Hide>Show All Layers i:Layers Panel
Ctrl+Alt+L (or right click>Lock)		Lock a layer	m:Object>Lock i:Layers Panel
		Unlock a layer	i:Layers Panel
Right click>Lock All (or click icon > Lock/Unlock>Lock All Layers)		Lock all layers	m:Layer>Lock/Unlock>Lock All Layers i:Layers Panel
Ctrl+Alt+Shift+L (or right click>Unlock All) (or click icon > Lock/Unlock>Unlock All Layers)		Unlock all layers	m:Layer>Lock/Unlock>Unlock All Layers i:Layers Panel
Right click>Delete		Delete the selected layer	m:Layer>Delete Current Layer i:Layers Panel
		Create a new layer	m:Layer>Add Layer Folder i:Layers Panel

Shortcut**Icon****Description****Menu (m:) and/or Icon (i:) Location****Designing Tools**




Alt+U (or right click>Path>Union)		Weld selected shapes to remove overlap	m:Path>Union
Right click>Path>Intersection		Apply the Boolean Join intersection to two shapes	m:Path>Intersection
Right click>Path>Exclude		Apply the Boolean Join exclude to two shapes	m:Path>Exclude
Right click>Path>Front Minus Back		Apply the Boolean Join front minus back to two shapes	m:Path>Front Minus Back
Right click>Path>Back Minus Front		Apply the Boolean Join back minus front to two shapes	m:Path>Back Minus Front
		Draw straight lines and Bézier curves	i:Tools Panel
		Freehand draw thin lines	i:Tools Panel
		Freehand draw thick lines	i:Tools Panel
		Draw rectangle or square	i:Tools Panel
		Draw rounded rectangle or rounded square	
		Draw circle or oval	
		Draw triangle	
		Draw polygon	
		Draw star	
		Draw spiral	
		Measure distances and angles on screen	i:Tools Panel
Right click>Appearance>Add Shadow Layer		Add an outline or inline to a selected shape	m:Effects>Shadow Layer
Right click>Appearance>Lattice		Create a lattice design in a selected shape	m:Effects>Lattice
Right click>Appearance>Rhinstones		Create a rhinestone outline or fill on a selected shape	m:Effects>Rhinstones

Editing Tools

		Move or reshape a path or move and edit nodes	i:Tools Panel
		Erase parts of a shape	i:Tools Panel
		Knife: Make thin, straight-line cuts through a shape	i:Tools Panel
		Crop: Drag the mouse to marquee-select an area to be retained	i:Tools Panel
Alt + drag Bezier control point		Only reshape the current path and not adjoining path	i:Tools Panel

<u>Shortcut</u>	<u>Icon</u>	<u>Description</u>	<u>Menu (m:) and/or Icon (i:) Location</u>
Editing Tools (Cont.)			
Right click>Path>Simplify		Reduce the number of nodes in the selected shape	m:Path>Simplify
Right click>Path>Split Path		Break the path between the two selected nodes	m:Path>Split Path i:Tools Panel
Right click>Path>Reverse Path		Reverses the direction the path will cut	m:Path>Reverse Path
Right click>Path>Object to Path		Remove the text, rhinestone or lattice status	m:Path>Object to Path
Right click>Path>Close Path		Close shape by adding a straight line between the start and ending nodes	m:Path>Close Path
Right click>Path>Convert Node to Corner		Convert current selected node to corner	i:Tools Panel>Tool Options
Right click>Path>Convert Node to Cusp		Convert current selected node to cusp	i:Tools Panel>Tool Options
Right click>Path>Convert Node to Smooth		Convert current selected node to smooth	i:Tools Panel>Tool Options
Right click>Path>Convert Node to Symmetric		Convert current selected node to symmetric	i:Tools Panel>Tool Options
Right click>Path>Path Details		Show path to be travelled when shape cuts	

Output

		Open controller window for current default cutter	m:Cutter>Cut with (name of cutter) i:Toolbar
Ctrl+Shift+P		Show preview of cut shapes and/or print shapes	m:Cutter>Preview i:Toolbar
Ctrl+P		Open print window	m:File>Print
		Open Style Panel	i:Properties Panel

Appendix B Troubleshooting FAQ's

B1 Communication Issues

I cannot get the Skycut to power on.

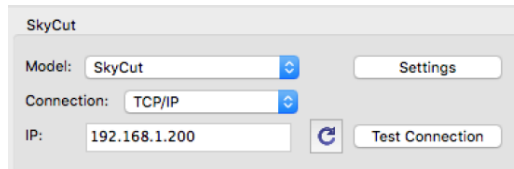
- Make sure the power cable is securely plugged into the adaptor.
 - Make sure the adaptor light is a steady blue light and it is plugged securely into the Skycut.
 - If you still cannot get the Skycut powered on, contact your dealer.
-

I cannot power off the Skycut.

- Press and hold the power button until the light shuts off.
-

I cannot get Wi-Fi to work with my Skycut.

- Set the Skycut close to the router when performing the initial setup presented in *Section 1.12.2*. After establishing communication, you can test how far the Skycut can be located from your router.
- In SCAL's **Cut Settings** window make sure you have selected **TCP/IP** and entered the same **IP address** you selected during setup:



- Make sure your computer is connected to the same router as your Skycut.
 - Verify that SCAL is the selected software on the control panel under **Set>Sys Information**.
 - In SCAL, verify that the **Baud Rate** is set to 115200 under **Cutter>Cutter Settings**.
-

I cannot get USB to work with my Skycut.

- Unplug/replug the USB cable at both the computer and at the Skycut.
- In SCAL's **Cut Settings** window make sure you have selected **USB** under **Connection**:



- Try a different USB port on your computer.
- Verify that SCAL is the selected software on the control panel under **Set>Sys Information**.
- In SCAL, verify that the **Baud Rate** is set to 115200 under **Cutter>Cutter Settings**.
- Try a different USB cable.

*I had to cancel a cut. Now my Skycut is no longer responding when I click on **Cut**.*

- In the **Cut Settings** window, check the setting for **Connection**. For example, it may have reset to **USB** whereas you had your Skycut setup wirelessly and need **TCP/IP** selected.
- Try restarting the Skycut and SCAL.

*My initial testing went fine but now I cannot get my shapes to draw with the test pen. Nothing happens when I click on **Cut**.*

- First check to see if there's a preview of your image on the right side of the **Cut Settings** window:
 - ◇ If there's no image, then check to see if you have **Pen** selected under **Holder** in the **Cut Settings** window. If you do, then go back to the main window, select any layers you wish to draw and, on the **Style Panel**, change the **Cut Line Type** to **Draw (Pen)**.
 - ◇ If the image is showing, check your **Connection** settings.

B2 Operating Issues

The control panel isn't responding very well.

- Press control panel icons with your finger and not your fingernail. You can also use a black rubber stylus.
- Make sure the control panel is clean.

My mat is rotating when the Skycut starts to cut!

- Two pinch wheels need to be gripping the mat. Move the mat either left or right so that it is under two outer pinch wheels and the pinch wheels are aligned under white arrows. Refer to *Section 1.09*.
- Make sure you are not trying to force the blade to cut too deeply and/or too quickly through a thick/dense material like chipboard or craft plastic. Slow the speed, decrease the pressure, and add more passes.

My vinyl isn't feeding evenly while cutting. It starts bunching up on the inside of the end cap.

- Even if you feel the vinyl is aligned properly at the start of the cut, a slight "out of alignment" error will become more pronounced with a long cut. When you first drop the pinch wheels, use the arrow keys to feed the vinyl for the length of the cut to make sure it is feeding straight. If not, then about half-way through the length of the vinyl needed, lift the pinch wheels and realign the vinyl. Continue testing the alignment until you can verify that the vinyl is sufficiently aligned for the entirety of your project.

The pinch rollers are not tight enough to hold the vinyl I'm cutting. The vinyl is slipping and rotating when I start the cut.

- The pinch wheels need to be over grit shafts (the dark gray rough areas along the revolving shaft. The white arrows will help you align the pinch wheels in correct locations. Also, use outside locations versus having, say, one pinch on the far right of the vinyl and a second pinch wheel only in the middle.
-

I hear a terrible stuttering sound when trying to cut chipboard (or other thick dense material).

- That can be a symptom of forcing the blade to cut too deeply and/or too quickly through the chipboard. Slow the speed, decrease the pressure, and add more passes.
-

I'm trying to do a PNC application and the camera can't read the first reg mark. The light turns red and the Skycut starts beeping.

- Make sure the reg mark on the printout is at least 3 inches from the right end cap. Otherwise there isn't enough room for the camera to move to the right to take the photo.
-

I'm trying to do a PNC application. The camera reads the first mark and sometimes the second but not the third.

- Most likely you are not printing at 100% or you have activated **Borderless** printing in your printer properties window. Please refer to this document:

<https://tinyurl.com/b36hfc7>

I'm trying to do a PNC application and the camera can't read the marks.

- Make sure you have calibrated the Skycut's camera. The procedure is covered in *Section 3.03*.
 - On the control panel, go to **Set>Camera** and press **Set**. Make sure the **Auto PNC** option is marked.
 - If using the cutting mat, make sure the printout is aligned fairly straight on the cutting mat and the mat is fairly straight in the cutter.
 - Make sure the blade holder is over the lower right registration mark when starting the cut.
 - Are the registration marks printed dark with no streaking or missing ink?
 - Did you make changes to the reg mark settings under **Cutter>Cutter Settings**? Lowering the **Mark Size**, **Thickness**, and/or **Offset** can make the identification more difficult or even impossible.
-

The Skycut stopped during a cut.

- If the Skycut stops with the head over on the left side of the cutter, you have most likely exceeded the cutting range. Several things to consider:
 - ◇ Check the width (**W**) of your project (or the height **H** if in **Landscape** mode). It cannot exceed 16".
 - ◇ Check how far you are moving the head to the left when setting the origin. If your project is 15" and you moved the head more than 1" to the left, you will send the cut out of range and the cutter will stop.

- ◇ If you are working in **WYSIWYG** mode, move your shapes towards the bottom right of the **Cutting Mat** when working in **Portrait** mode or towards the top right when working in **Landscape** mode. This will then locate your cuts closer to the origin and reduce the likelihood of sending them outside of the cutting range.
 - If the Skycut stops and the head is not located near the left side:
 - ◇ Make sure it's not a communication issue.
 - ◇ You may have exceeded a buffer limit. Try reducing the number of nodes: Refer to *Section 10.01*.
-

B3 Cutting/Drawing Issues

I am getting large lines sliced through all of my cuts.

- Your Sure Cuts a Lot software is still in trial mode. You need to register your copy of SCAL5. Refer to *Section 5.01.2*.
-

My shapes are drawing (cutting) off the material. What am I doing wrong?

- When setting the origin, make sure you are using the tip of the blade as the reference point and set the tip inside the corner of the material (not too close to an outside edge).
 - Check whether your **Cutting Mat** is in **Portrait** or **Landscape** mode. This will change whether your image appears the same way you see it on the screen or rotated 90 degrees relative to the screen.
 - Check which **Cut Mode** is set in the **Cut Settings** window.
 - Details on these various settings are covered in *Section 8.07*.
-

When drawing with the test pen (or cutting with the blade holder), I have extra lines being drawn (or cut).

- Make sure you raise the pen (or blade holder) in the blade holder seat on the Skycut before tightening the screw. The blade holder seat needs to be able to drop the tool down when it reaches the spot to start the shape. Otherwise, the tool tip will be dragging across the material from the origin to where the shape will begin and then back to the origin at the end of the "cut".
 - Make sure you have registered your copy of SCAL. Watermark lines are made in the trial version.
-

I'm drawing with a pen and there are bubbles at the corners.

- For perfect corners when using a pen, turn off **Blade Offset** (set to 0) since you do not need an offset for pens (or other tools like embossers and engravers).
-

My cut started out fine but by the end of the cut, it's not cutting through the material.

- Make sure the blade holder housing doesn't have any bits of material inside of it.
- Make sure the screw on the blade holder seat is tight so that the blade holder isn't slipping upwards during the cut.

- Make sure the cutting mat is clean and sticky and the material is pressed down completely, so that the material remains stabilized during the cut.
 - Make sure the blade isn't cutting too deep into the mat. This can sometimes cause the material to be pulled up and away from the mat as the blade releases from the plastic it is cutting.
 - Try increasing the cutting pressure/force by ~ 5 – 10.
-

My cut is clean in some places but not in others. Why am I not getting consistent cutting?

- Try raising the blade holder in the blade holder seat. If the blade is too close to the material, not enough force is being applied. Refer to *Section 2.01.3, Set the Blade Height Above the Material*.
 - Make sure your material is pressed firmly onto a clean and sticky mat (assuming you are cutting a material such as paper or cardstock).
 - Your material may require two passes if it's not homogenous or if it is heavily textured. Sometimes intricate shapes also cut better with two passes.
 - Also, if the material has been exposed to humidity, then it will become difficult to cut in one pass. You can dry both paper and cardstock using a blow dryer or in a very low-temperature oven.
 - If you are cutting vinyl without a cutting mat, check the cutting strip to make sure it is still in good condition.
-

I have the outside edges of my chipboard completely taped but I'm not getting clean cuts, even after lots of passes.

- Taping the edges prevents shifting of the chipboard but it's not enough for stabilizing. You need to thoroughly press the entire surface of the chipboard onto a clean and sticky mat. Using a brayer is recommended.
-

I am getting a lot of tearing in my cuts.

- A number of things can cause tearing so work through this check list:
 - ◇ Too much blade is exposed. If you see cut lines in your mat or the backing sheet, shorten the blade exposure. You should only be cutting through the material itself.
 - ◇ The blade is chipped. Try a different blade.
 - ◇ The paper is not adhered well to the mat. Make sure the mat is clean, sticky, and the paper is pressed smoothly and evenly on the surface.
 - ◇ You may be using too much cutting force. Try reducing it and doing test cuts.
 - ◇ You may have too many nodes in the shape. Refer to *Section 10.01*.
 - ◇ The material itself may be subject to tearing, especially on intricate cuts. Also, if the cardstock has been exposed to humidity, then the moisture in the material can make it difficult to cut cleanly. You can dry paper and cardstock using a blow dryer or in a very low-temperature oven.
-

I'm cutting very small lettering and the letters are a bit distorted.

- Verify that you are using the correct **Blade Offset**.
 - Try slowing down the cut. Small lettering needs slower speed.
-

My cut shapes are not the same dimensions as what they are set to in SCAL.

- Perform the calibration procedure shown in *Section 2.08*.
-

My shapes are not completely cutting out. They are still attached to the waste part of the material.

- Make sure you have set an appropriate **Overcut** setting.
 - Make sure the mat is not skewing during the cut. This can happen if even one of the pinch wheels is no longer centered under a white arrow. It can also happen if the speed and/or pressure is set too high.
-

My cardstock is not cutting all the way through. I have the blade all the way out and using the maximum force.

- Please refer to *Section 1.07.4*. It's important to only have as much blade exposed as is necessary to penetrate the cardstock. You may also need to raise the blade tip height (*Section 2.01.3*). Reduce your force back to suggested values for the material you are cutting and do a test cut.
 - Do not use more pressure than is needed. If the cardstock is cutting through about 90% of the cut, then turn on **Multi-Cut**. Some cardstocks do better with a second pass at a lower force.
-

I calibrated the camera for print and cut but every cut is off by the same amount.

- Repeat the calibration procedure.
-

I calibrated the camera for print and cut and the cuts start off accurate but, by the end of the cut, there is a lot of error.

- This is called "drift" and can sometimes be corrected by slowing the speed and making sure the cuts aren't so deep that the blade is causing some drag to occur.
 - An alternative solution is to use the **Array Mark** function presented in *Section 3.07.2*.
-

B4 Software Issues

I noticed that some of the settings I see in the screenshots in this manual are not in my version.

- As long as you are staying up to date with SCAL releases, then these are most likely settings only available in the Pro version of SCAL5.
-

*The **Shapes** tab in the **Library** doesn't show any shapes. Do I need to install them separately? I'm on a Mac.*

- This occurs when the user has dragged the Sure Cuts A Lot program to the desktop. It needs to remain in the **Sure Cuts A Lot 5** subfolder inside **Applications**.
-

*I set the **Cut Line Type** to **Draw (Pen)** but my shapes are not being drawn. Nothing is happening.*

- In the **Cut Settings** window, you need to change the **Holder** setting to **Pen**.
-

I installed some fonts inside of SCAL but they are no longer there!

- SCAL allows you to open a font for temporary use but once you close SCAL, it is uninstalled. That's why you also need to convert any text that was created with that font before saving your file. Refer back to Section 8.02.3 for more details.
-

*I'm trying to use the **Pattern Fill** feature to fill some shapes with a digital scrapbooking paper file. The pattern doesn't look right.*

- Most digital scrapbooking papers are designed for 12" x 12" printing. Thus, in the **Pattern Fill** window, set the **Width** and **Height** equal to 12 inches.
-

*I'm doing a PNC project and the registration marks are not printing. I have the option selected in the **Print** settings but I also don't see them under **Preview** or when I turn on the **Show Reg Marks** on the **Document Panel**.*

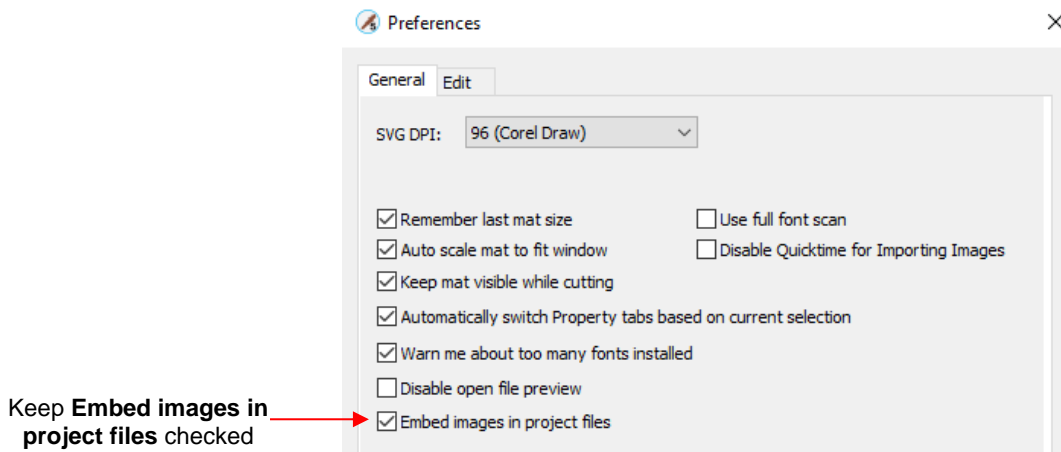
- Go to the **Cut Settings** window and verify that you do not have the option for **Cut Selection Only** checked.
 - Make sure you have the layer that will be cut showing on the **Layers Panel**.
 - Make sure you have a cutter added that has print and cut functionality. Refer to *Section 5.01.4*.
-

Help! I created and saved a file but I can't get it to reopen. It says that it's invalid or corrupt.

- This can happen if you close SCAL before the file has finished saving. Unfortunately, there's no fix.
-

Every time I open a SCUT file where I've previously imported a JPG (or PNG, BMP) image, the image isn't there. How do I fix it so that it will save the image?

- Go to **Edit>Preferences** and make sure the **Embed images** option is marked:



I've read that SCAL is regularly updated but when I click on **Help>Check for Updates**, it always says "You're up to date."

- That feature never seems to work in SCAL. Instead, check this link to download the latest version.

<http://www.craftededge.com/download/download.html>

- Also note that it probably doesn't show the latest version at the web site. For example, in this screenshot, it indicates that 5.000 is the latest version but when the download is made, the version is actually 5.020:

SCAL is suddenly not opening. I get an error message about a problem with the Library.

- This can happen when there's a new file in the **Library** that is invalid for some reason.
 - ◇ On your computer, go to **Documents>Craft Edge**.
 - ◇ There are two personal folders there that are accessed by the **Library: My Projects** and **My Designs**.

- ◇ Copy and paste those two folders to a new location outside of the **Craft Edge** folder.
 - ◇ Delete all files in those two folders that are still in the **Craft Edge** folder.
 - ◇ Verify that you can now open SCAL successfully. If not, start a support ticket at CraftEdge.com. Otherwise, you can now begin copying/pasting back the older files based on their **Modified Date** since it's most likely a newer file in one of those two folders that caused the issue.
-

*I inadvertently dragged part of the **Library** to extend what I can see and now parts of it are missing!*

- Close SCAL and reopen. The **Library**'s window should return to normal.
-

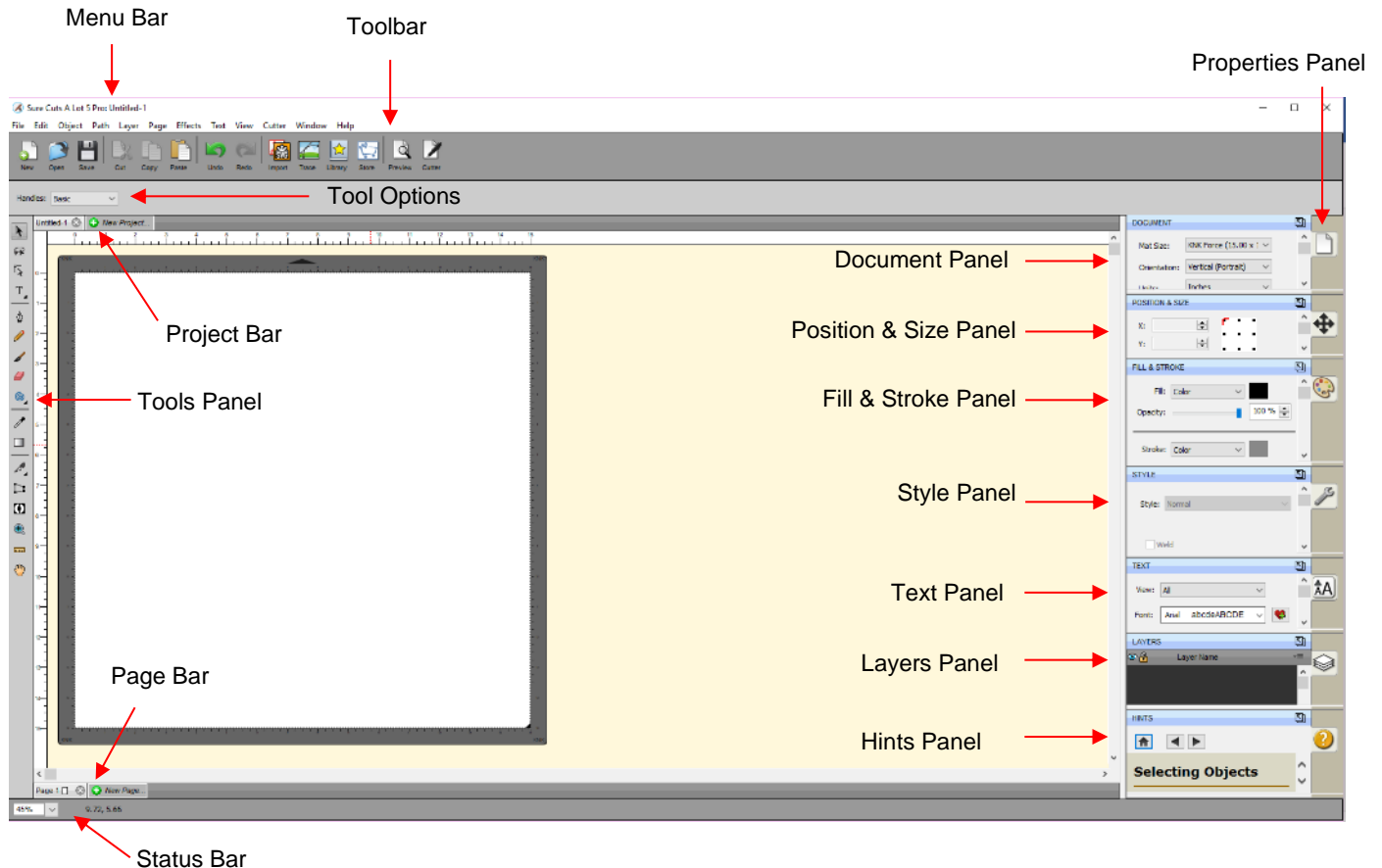
*I dragged the **Library** off the screen and now I can't get it back.*

- Go to **Window>Workspace** and select either **Basic** or **Advanced**.

Appendix C SCAL Details

C1 Screenshot of SCAL Screen

Below is a screen shot of the main screen in SCAL identifying ONLY **Bars** and **Panels**.



C2 Bars

- The bars in SCAL have components positioned left to right. The following sections present the five bars and where to find more information for each item on that bar.

C2.1 Menu Bar

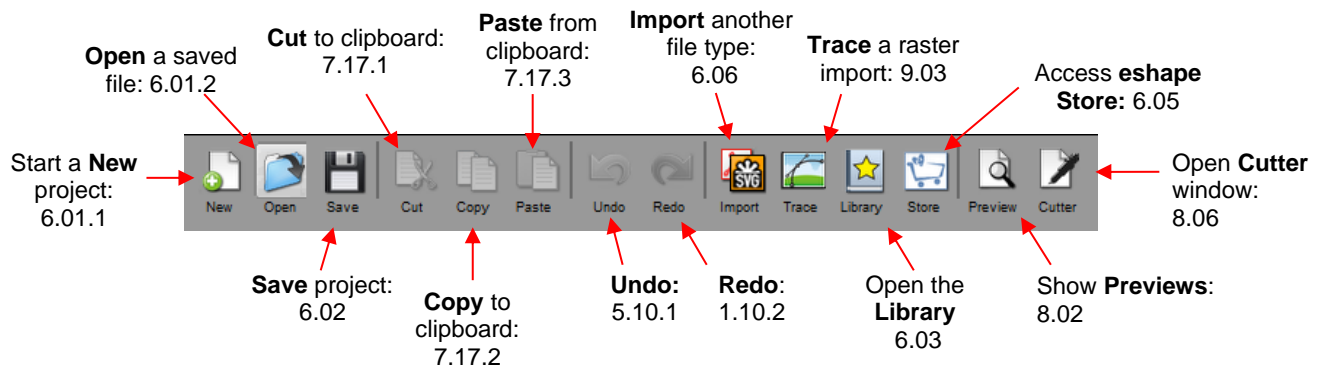
- Like most computer applications, the **Menu Bar** is located at the top of the screen and provides access to most of the functions in the software.

File Edit Object Path Layer Page Effects Text View Cutter Window Help

- Throughout the user manual, a reference such as this: Go to **Path>Simplify** refers to using the **Menu Bar** to access a function. In this case, you would click **Path** on the **Menu Bar** and then click on **Simplify** in the submenu that appears.
- Because there are dozens of submenu options, each one isn't listed with a reference. Instead, it is recommended that you use a search function to locate any given listing within the user manual.

C2.2 Toolbar

- The **Toolbar** is located at the top of the screen, just below the **Menu Bar**.



C2.3 Projects Bar

- The **Projects Bar** is presented in *Section 5.11*.



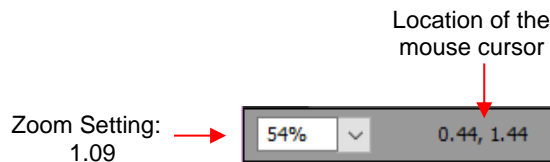
C2.4 Pages Bar

- The **Pages Bar** is presented in *Section 5.11*.



C2.5 Status Bar

- The **Status Bar** is located at the bottom of the screen:



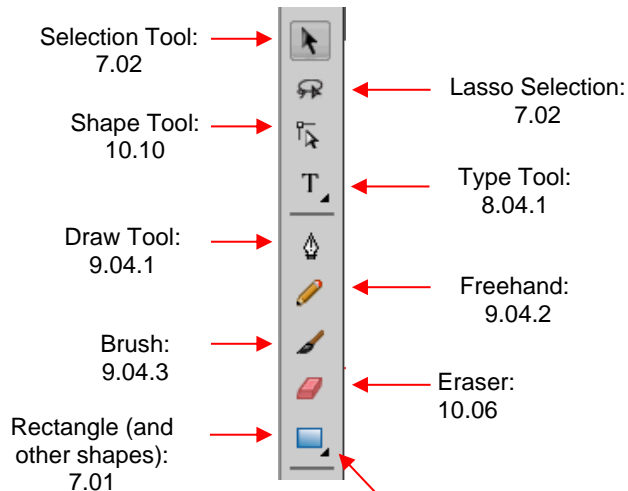
C3 Panels

- The panels in SCAL have components positioned top to bottom. The following sections present the panels and where to find more information for each item on that panel.

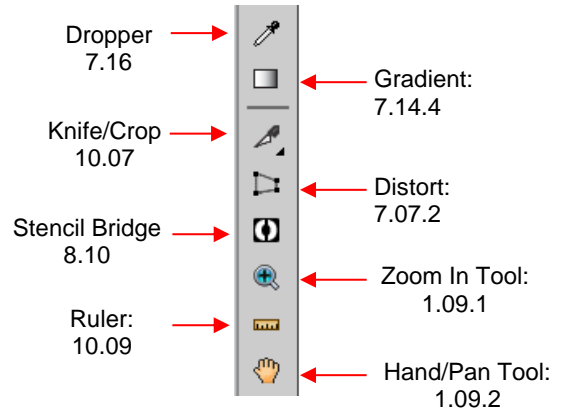
C3.1 Tools Panel

- The **Tools Panel** is located along the left side of the screen:

Upper part



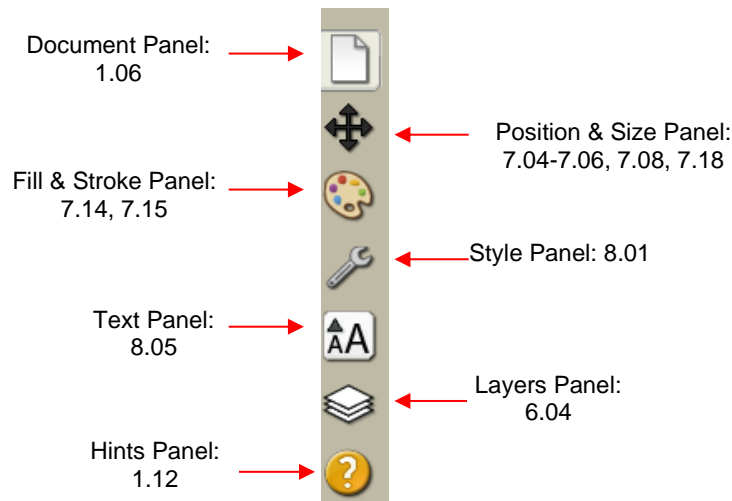
Lower part



Note: Icons with a small black arrow have more options when left mouse button is held down

C3.2 Properties Panel

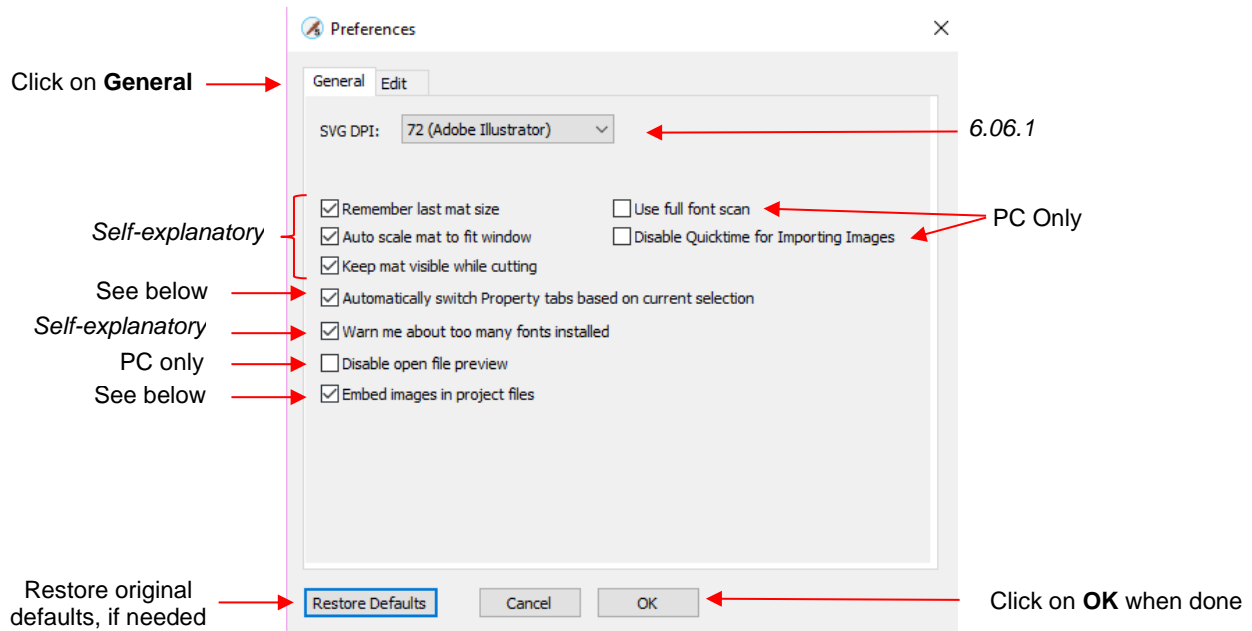
- The **Properties Panel** is located on the right side of the screen and contains 7 subpanels:



C4 Preferences

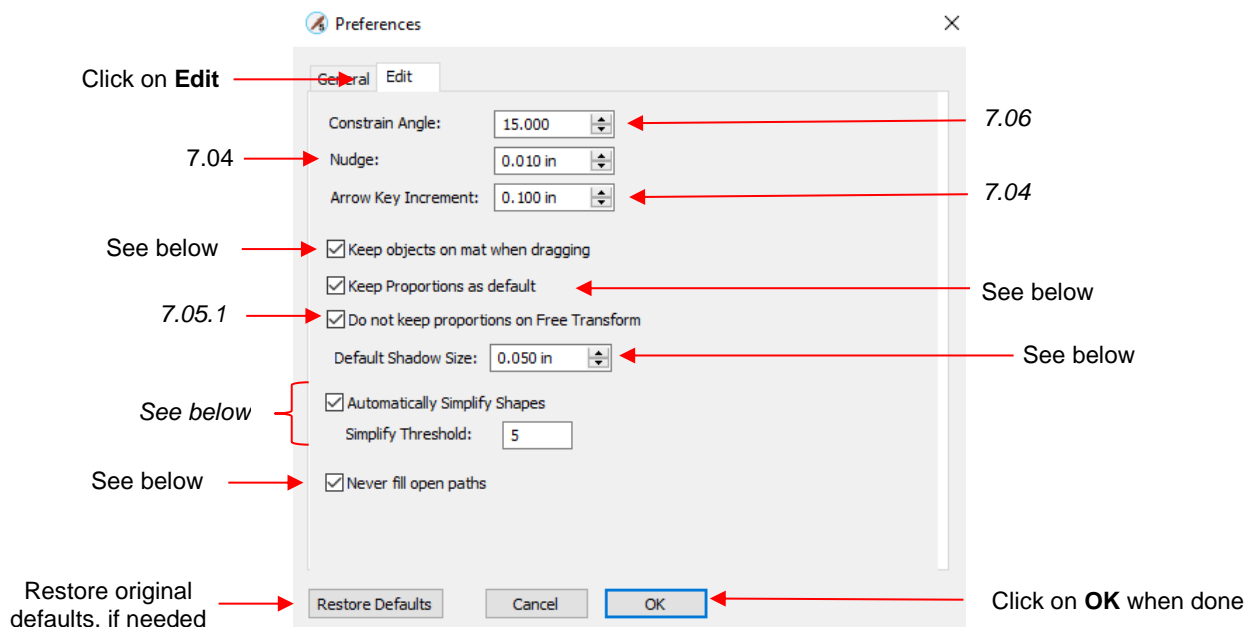
- The following preferences can be found under **Edit>Preferences** (or, on a Mac, press **Command + ,**). If the preference was already presented in other sections, it is noted in the screen shots. For those not previously mentioned, details are presented if they are considered important.

C4.1 Preferences: General Tab

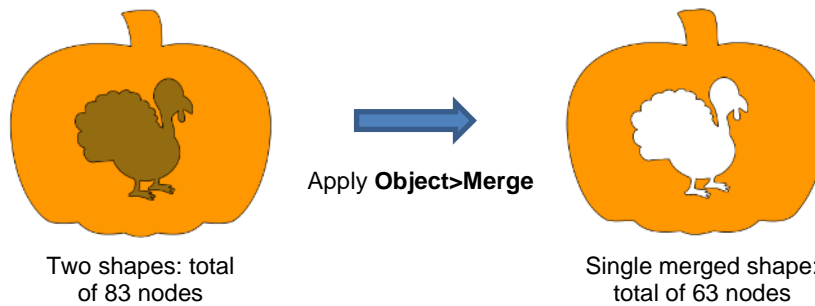


- **Automatically switch Property tabs based on current selection:** with this option turned on, the **Properties Subpanel** related to the task at hand will open. For example, when you select a shape, the **Position & Size Panel** will open. When you click on the **Type Tool**, the **Text Panel** will open.
- **Embed images in project files:** With this option marked, any imported raster images (PNG, BMP, JPG, and GIF) will be retained in the file when the file is saved. Unmarking this option will cause imported raster images to not be saved, thus not present when you reopen a saved file. Thus, when doing print and cut applications, you're most likely going to want that original image saved, so it is highly recommend that this option remain checked.

C4.2 Preferences: Edit Tab

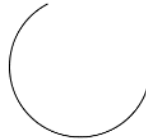


- **Keep objects on mat when dragging:** With this option checked, you cannot drag shapes beyond the outside borders of the **Cutting Mat**. You can, however, move them beyond the **Cutting Mat** by entering the desired X, Y location on the **Position & Size Panel**.
- **Keep Proportions as default:** With this option checked, the **Keep Proportions** setting on the **Position & Size Panel** will automatically be checked when you launch SCAL and will remain checked until you uncheck it. If you choose to uncheck this option, you will need to relaunch SCAL and the **Keep Proportions** setting will be unchecked.
- **Default Shadow Size:** This affects the initial **Size** shown under **Effects>Shadow Layer**.
- **Automatically Simplify Shapes:** With this option checked, nodes will be reduced after certain functions are applied. For example, the following two shapes (pumpkin and turkey) have a total of 83 nodes. If you select them and apply **Object>Merge** so that the inside turkey will cut before the outside pumpkin, the total number of nodes is reduced to 63 because of the **Automatically Simplify Shapes** option being checked.

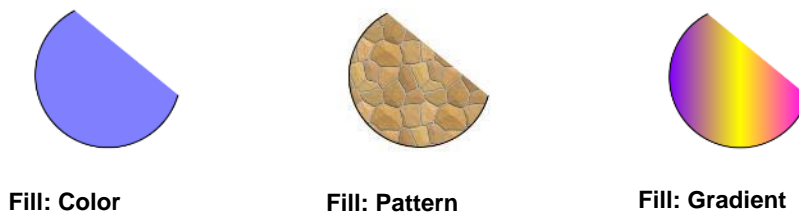


- **Never fill open paths:** Unlike most other vector programs, SCAL offers the ability to fill open shapes by applying an invisible straight line to close the shape. By unchecking this option and selecting a **Fill Color**, **Pattern**, or **Gradient**, the open shapes on your **Cutting Mat** will contain that **Fill**.

◇ For example, here is a circle with a section cut off. The option to **Never fill open paths** is still checked:



◇ The **Never fill open paths** is now unchecked and various **Fills** options applied:

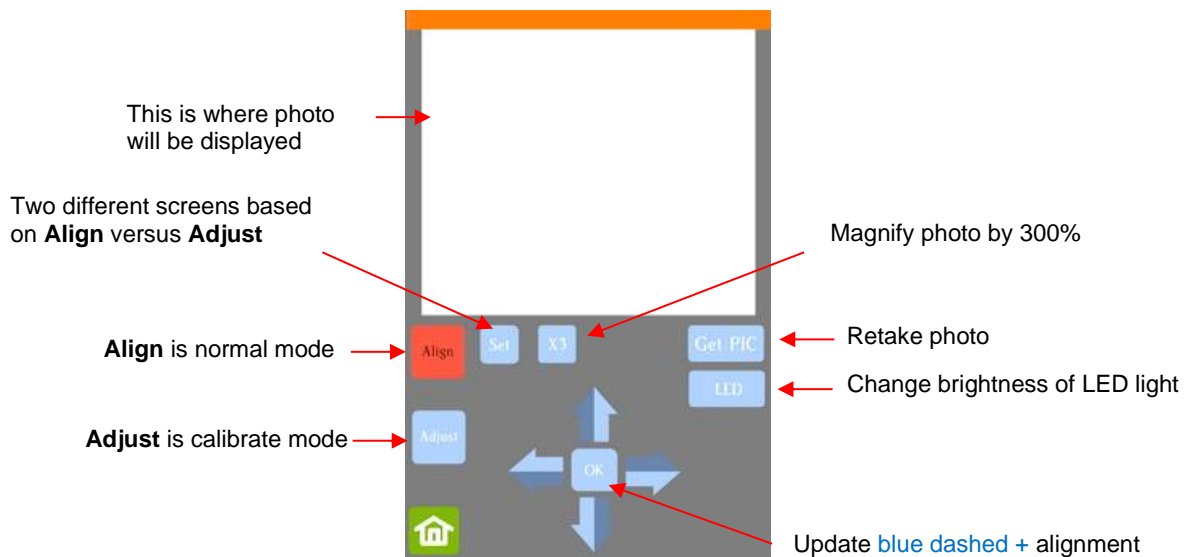


◇ Note that even though the shape appears to be closed, it is not. If you were to cut this shape, it would still be attached to the outside material.

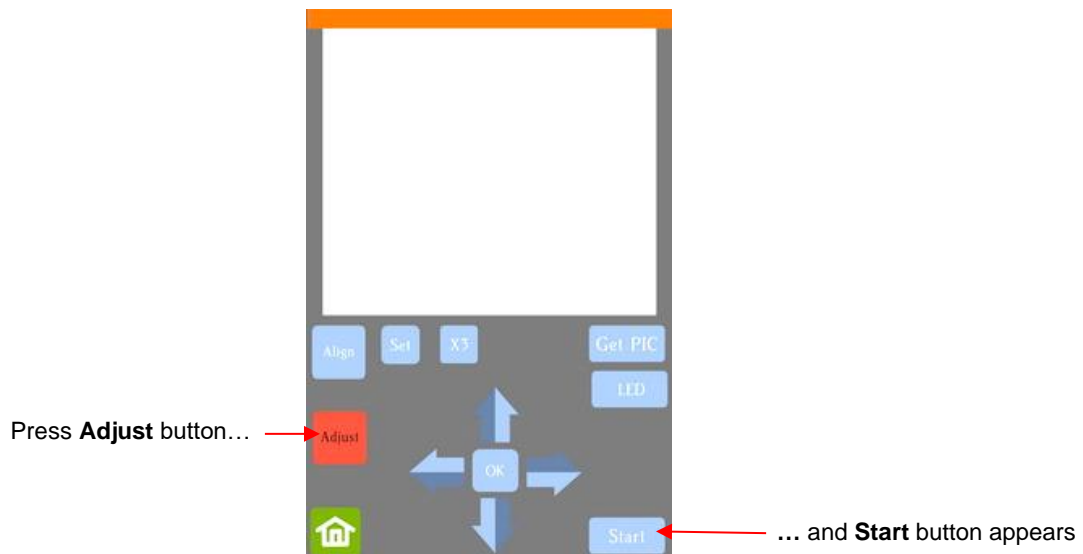
Appendix D Original Camera Calibration

D1 Camera Calibration Procedure **Video**

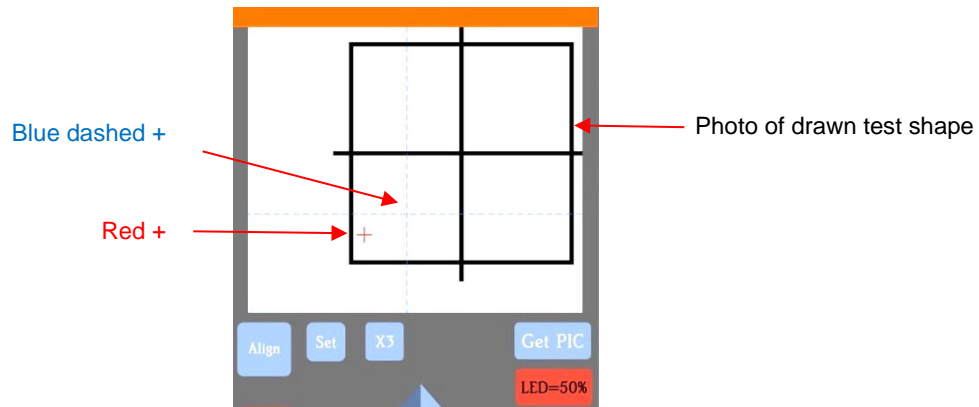
- (1) Insert the test pen into the Skycut. Place a sheet of paper into the Skycut. You can use the cutting mat to hold the paper or insert the paper directly.
- (2) On the control panel, move the test pen over the sheet of paper.
- (3) Select **Speed/Force** and set **SPEED** to ~ 8 and **FORCE** to ~ 30. Click on **Test** to verify that a square is clearly drawn. If it is too faint, increase **FORCE** as needed and repeat.
- (4) Move the pen an inch or two away from the test so that there is room for the calibration shape to be drawn.
- (5) On the **Main Screen**, press **Set** and then **Camera**:



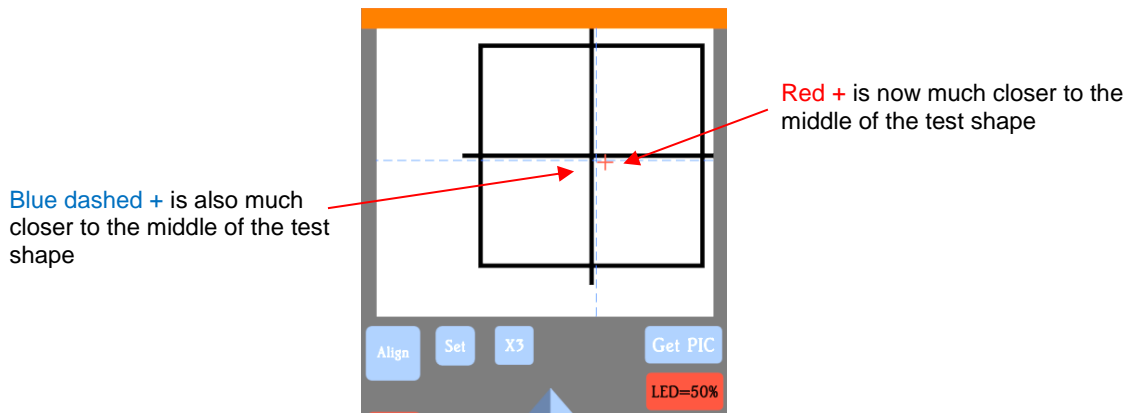
- (6) Press **Adjust** to switch to calibrate mode and a new **Start** button will appear in the lower right corner of the **Camera Screen**:



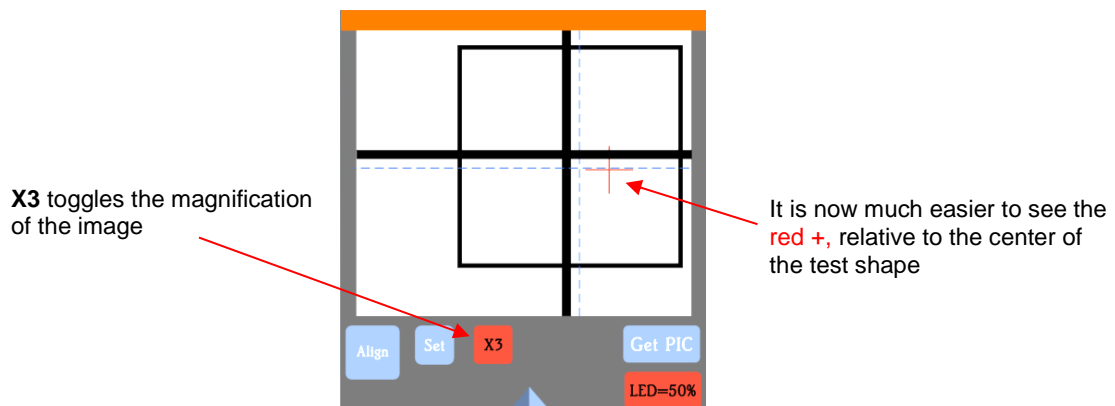
- (7) Press **Start**. The test shape, which is a square with a **+** inside, will be drawn on the paper and the camera will move over the test shape, take a photo, and display the photo on the control panel. If you cannot see the test shape clearly, press the LED button once so that it reads LED 50% and press the **Get PIC** button. You should see three items in the photo: the test shape that was drawn with the pen, a **red +**, and the **blue dashed +**:



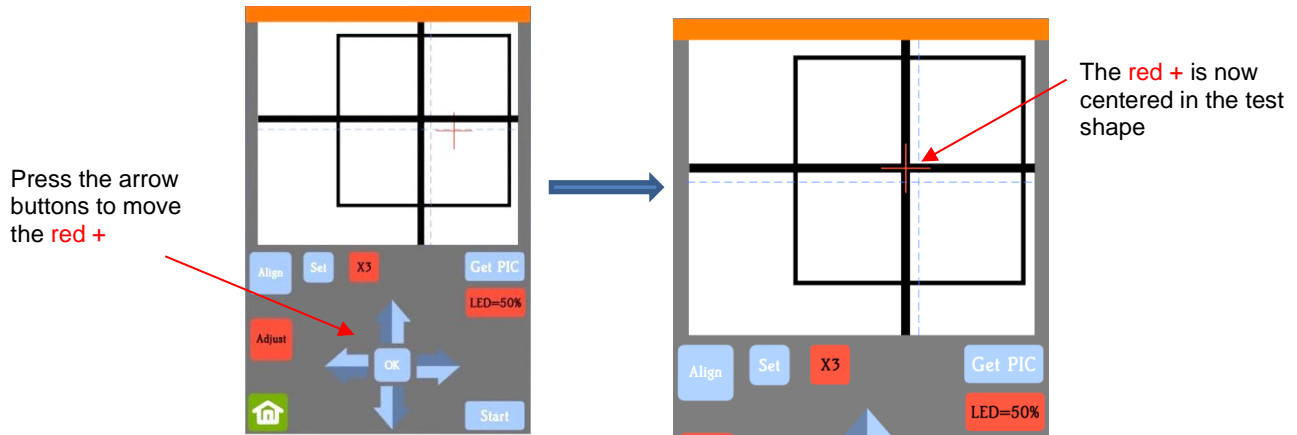
- (8) Tap your finger near the middle of the drawn test shape. This will move the **red +** to that location. Then press **OK**. A new photo will be taken:



- (9) Press **X3** so that a magnified version appears:

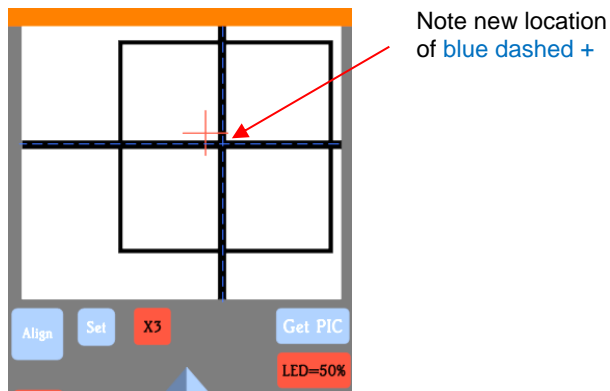


- (10) Use the arrows keys to move the center of the **red +** to the center of the test shape:



(11) Press **OK** and a new photo will be taken. The blue dashed + should now be more closely aligned with the center of the test shape:

IMPORTANT: the red + is intentionally moved away from the test shape with each new photo so that you can more easily see if the blue dashed + is centered.



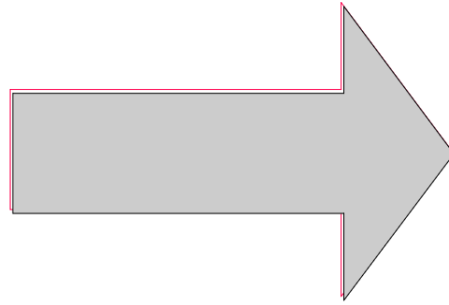
(12) If necessary, repeat *Steps 10 and 11* until the blue dashed + is near-perfectly centered in the test shape.

(13) Press **X3** to return to normal magnification. Click on the **Home** icon to return to the **Main Screen**. Your Skycut is now calibrated for print and cut (PNC) applications.

D2 Tweaking the Calibration Values

IMPORTANT: The following adjustment method only applies if you are on an older firmware version which required you to use the procedure in *Section D1* to calibrate the camera.

- If you find your print and cut results are slightly off in the same direction with each cut, you can adjust the values being used versus attempting to recalibrate from scratch.
- To do this, go back to an easy-to-cut material like copy paper and use a shape that has both horizontal and vertical lines. This makes it easier to know if you need to adjust in the **X** (left-to-right) direction or in the **Y** (up-and-down) direction. The arrow from SCAL's **Library** is a good choice since you can use the head of the arrow to make sure you put the printout onto the mat the same direction as in the software.
- After performing the print and cut, use a mm ruler to measure how far off the cut line is from the printed line. If you used an arrow, focus only on the horizontal and vertical lines, not the diagonal lines:



◇ In this example, let's say the red cut line is about 0.5 mm too high and about 0.3 mm too far to the left. Thus, you need the cut line to move down and to the right.

- On the control panel, change the **Units** to millimeters by going to **Set>General Settings** and choosing millimeters, as was shown in *Section 1.14.2*.
- Go to **Set>Camera** and click on **Adjust**. Then click on **Set** to open the **Adjustment** window:

2. Then press **Set**

1. Press **Adjust**

Current adjustments are set to 0.00

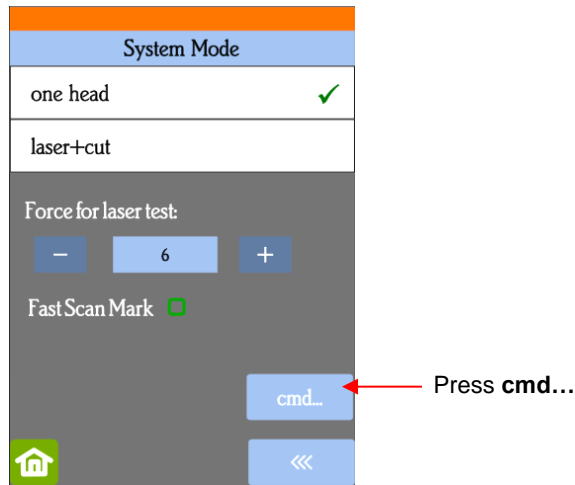
- One at a time adjust Δx and Δy by pressing the buttons in the direction you need the cut line to move.

Use these buttons to adjust the Δx and Δy offsets to these

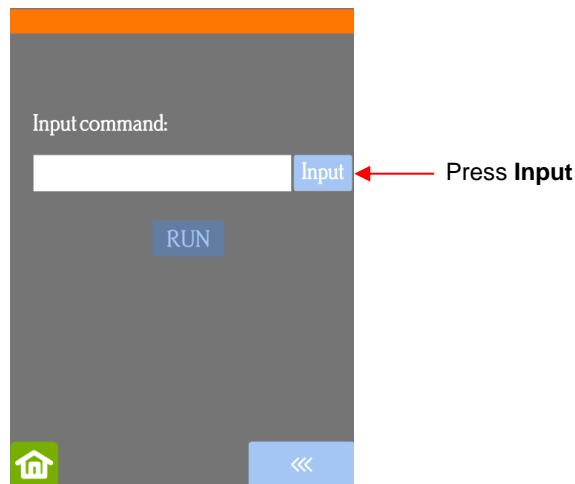
- Once the values are set, press the **Home** button to return to the **Main Screen**. Test again to verify the cut line is better aligned with the printed shape.
- ***Important:*** You can also adjust calibration numbers after a cut has begun! These adjustments will only apply for this particular cut but can be very useful in “saving a cut.” Refer to second part of *Section 3.07.3* for instructions.

Appendix E Activating Commands

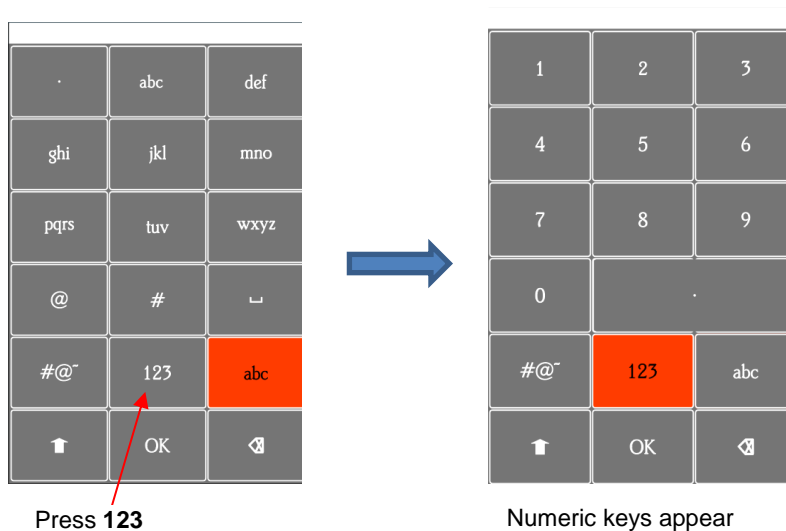
- This section shows you how to activate commands in order to add certain functions to the control panel.
- Go to **Set>Advance settings>System Mode** and press the **cmd...** button:



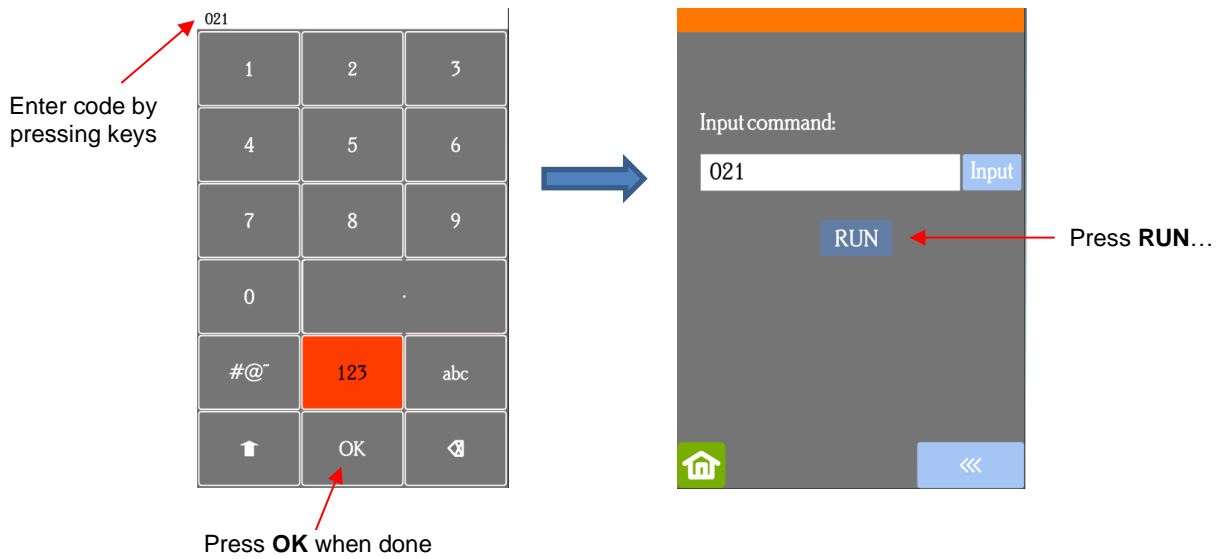
- The following screen opens. Press **Input**:



- The **Input** code is entered in the same way as you entered your **Network** password but since it's a 3-digit code, you'll begin by pressing the **123** button:



- Enter the required **Input** code according to the following:
 - ◇ 021: Activate **Mark Set**
 - ◇ 020: Deactivate **Mark Set**
 - ◇ 031: Activate **Passes Set**
 - ◇ 030: Deactivate **Passes Set**
- After entering the **Input** code you need, click on **OK** and the **Input** screen will return. The word **RUN** will now be highlighted and you can press it. The Skycut will beep once.



- Return to the main screen and press **USB**, the activated button will now appear:

