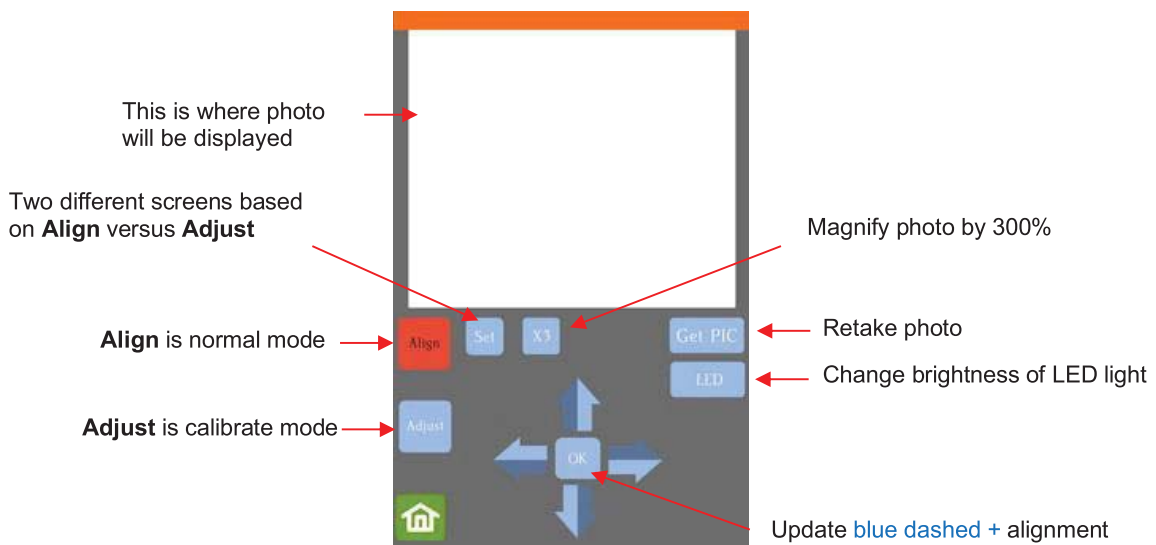
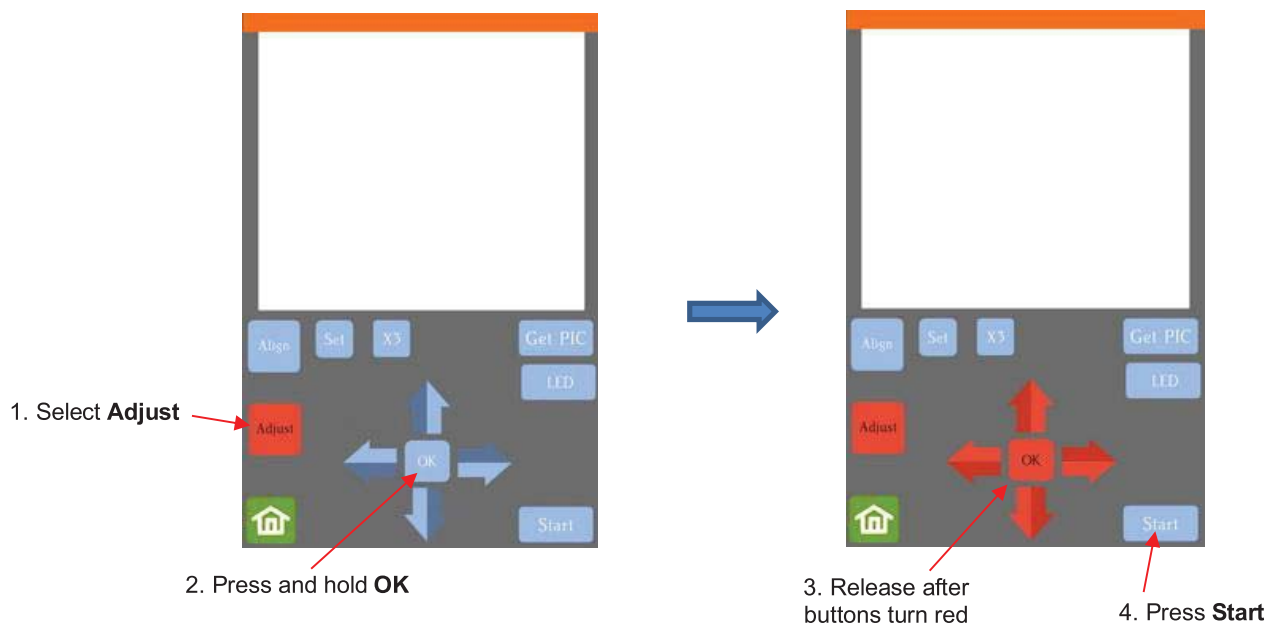
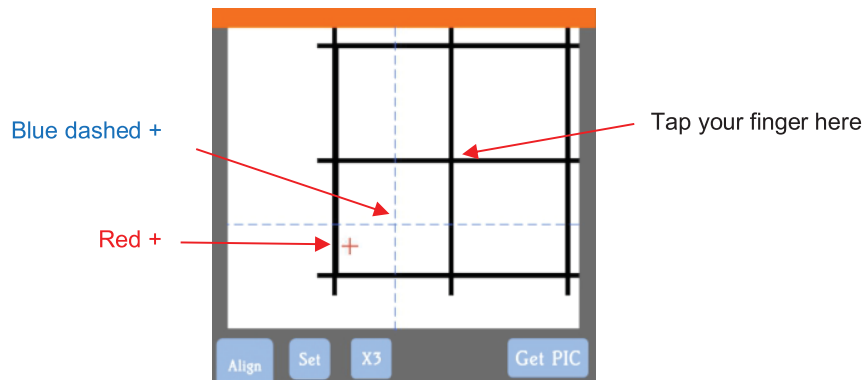




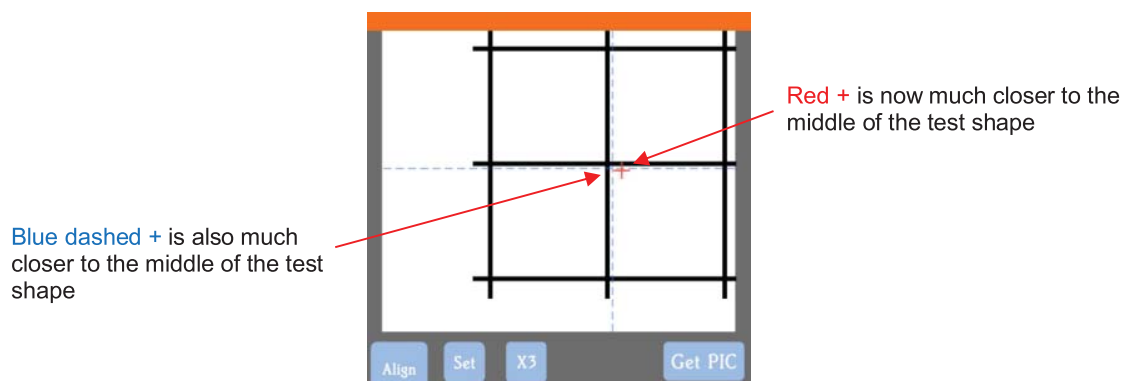
- (6) Press **Adjust** to switch to calibrate mode. Press and hold the **OK** button for several seconds until it and the arrows around it turn red:



- (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 +:

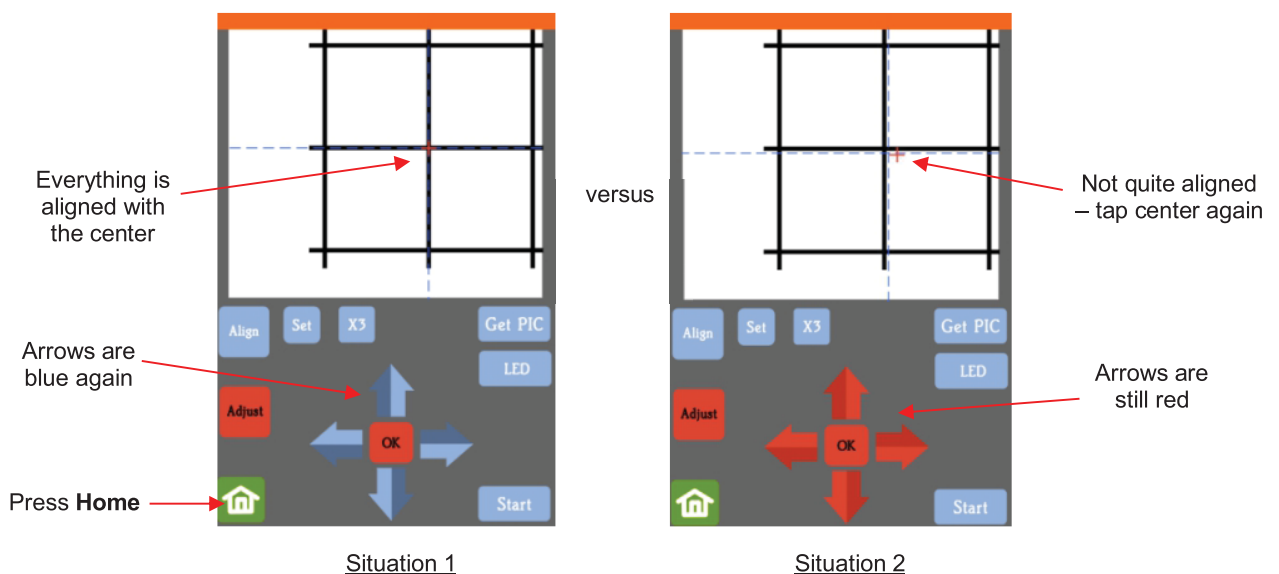


(8) Tap your finger near the middle of the drawn test shape. This will move the red + to that location:

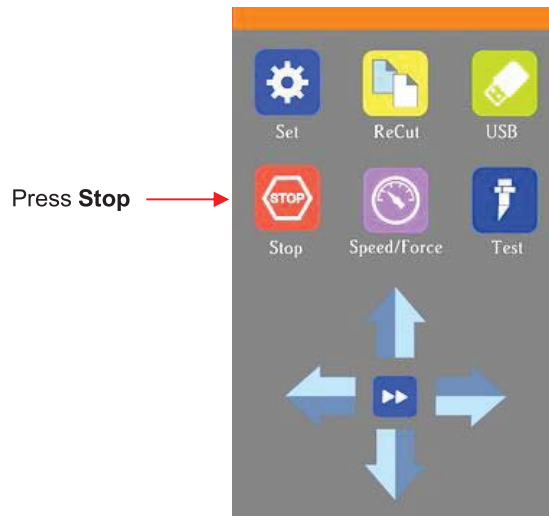


(9) Press **OK**. A new photo will be taken and one of two things will happen:

- ◇ 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.



- (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 SignMaster

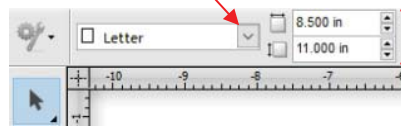
3.04.1 Summary of Steps

- 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 SignMaster) 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 5.01* for details on using the **Trace** function in SignMaster.
 - A contour cut around the outside of the traced image: Refer to *Section 5.01*.
 - Any other vector shapes, either imported or designed in SignMaster: Refer to *Section 5.02*.
 - ◇ Print the project, after selecting reg mark properties, location of project on the page, and printer options.
 - ◇ Perform a test cut so that you know the best cut settings to use for the printed material. 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.

3.04.2 Step-by-Step Simple PNC Project

- (1) While it's not a requirement, it can be helpful in designing if the **Drawing Area** dimensions match the printout size you plan to use. For this tutorial, **Letter** size (8.5" x 11") will be used. But you can use much larger sizes, if you have the ability to print in those dimensions.
- (2) To change the **Drawing Area**, click on the down arrow to open a drop-down menu with many page options or just enter the dimensions directly:

Click here to open menu of page sizes

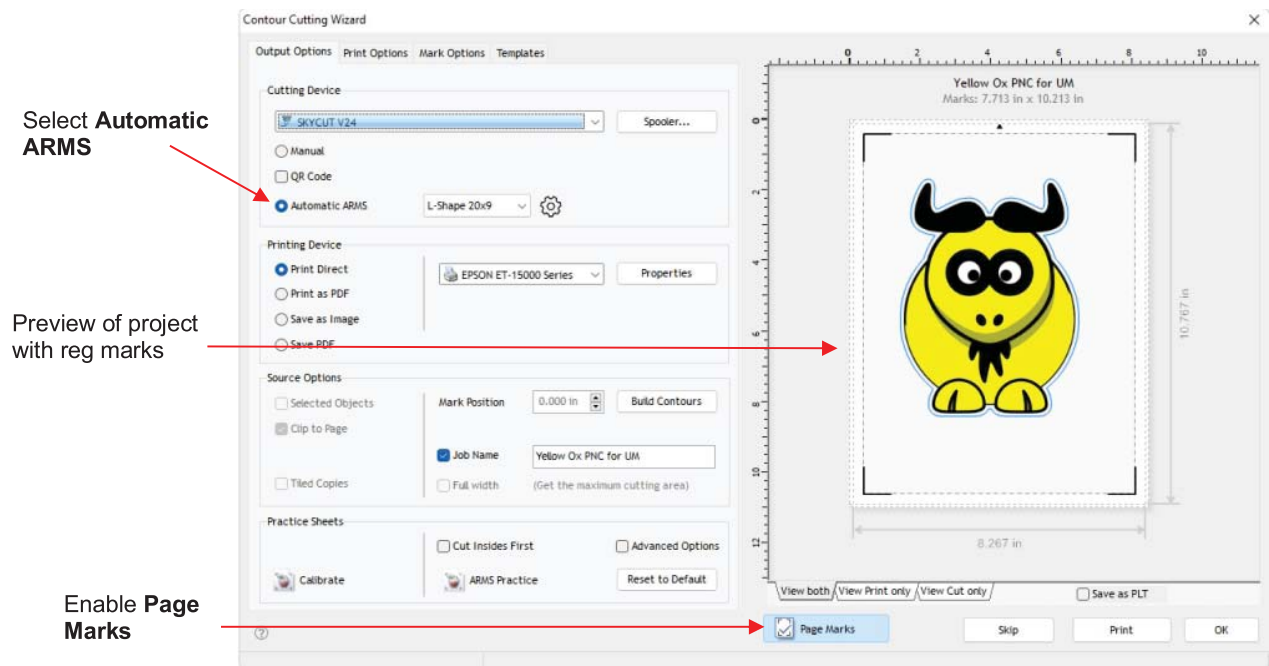


Or change the page dimensions directly here

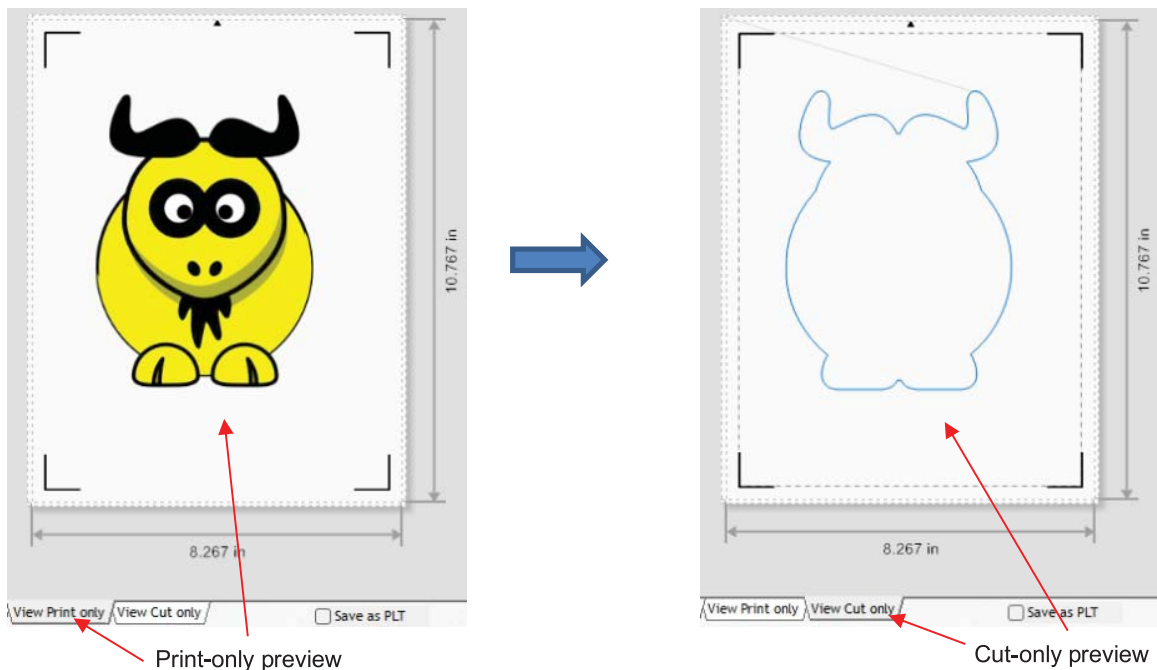
- (3) For a sample project, go to [this link](#) and download the zip. The project used in this tutorial is called *Yellow Ox PNC*. Alternatively, *Section 5.01* presents a tutorial on importing a graphic and adding a contour cut. Note the contour cut around this image:



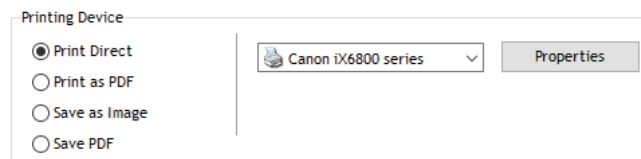
- (4) Click on the **Contour Cutting** icon  and select **Contour Cut Wizard**. The following window opens:



- (5) First, verify that **Automatic ARMS** is selected which means the camera will automatically scan the registration marks.
- (6) Mark the **Page Marks** option which will place the registration marks near the outer edges of the printout. Note that you can also skip this option and set the marks based on the cut lines instead. Refer to *Section 3.08.3*.
- (7) Next, to verify “what will print” versus “what will cut”, click on the other tabs below the preview:

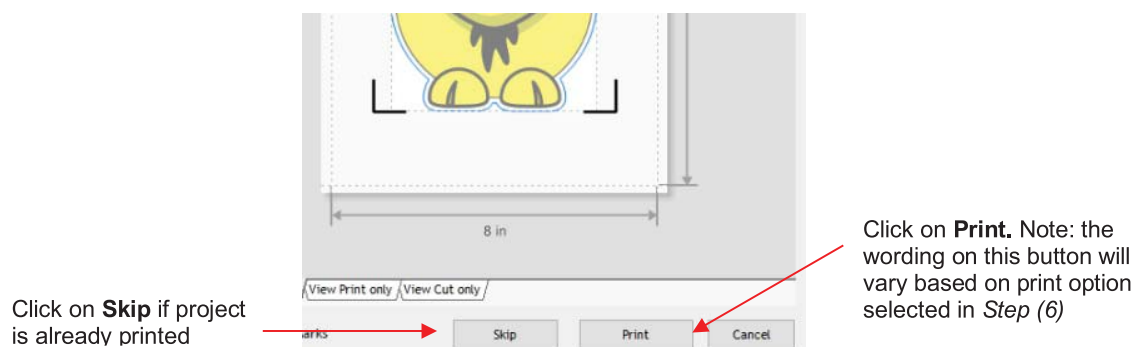


(8) The following options are available for printing:

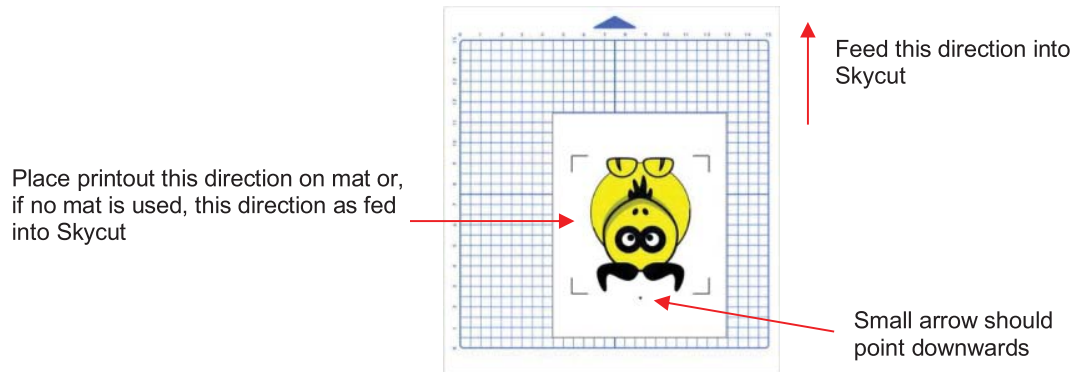


- ◇ **Print Direct** – Select this option if you are printing directly from this window to your own printer. Note that the printer menu and printer properties appear to the right when this option is selected.
- ◇ **Print as PDF** – Select this option to send the file to Adobe Reader to then print to your printer
- ◇ **Save as Image** – Select this option to export your printout as a JPG or TIFF file using the DPI resolution of your choice
- ◇ **Save PDF** – Select this option to export your printout as a PDF file to be saved and printed using a different computer/printer setup (such as taking to a professional printing company)

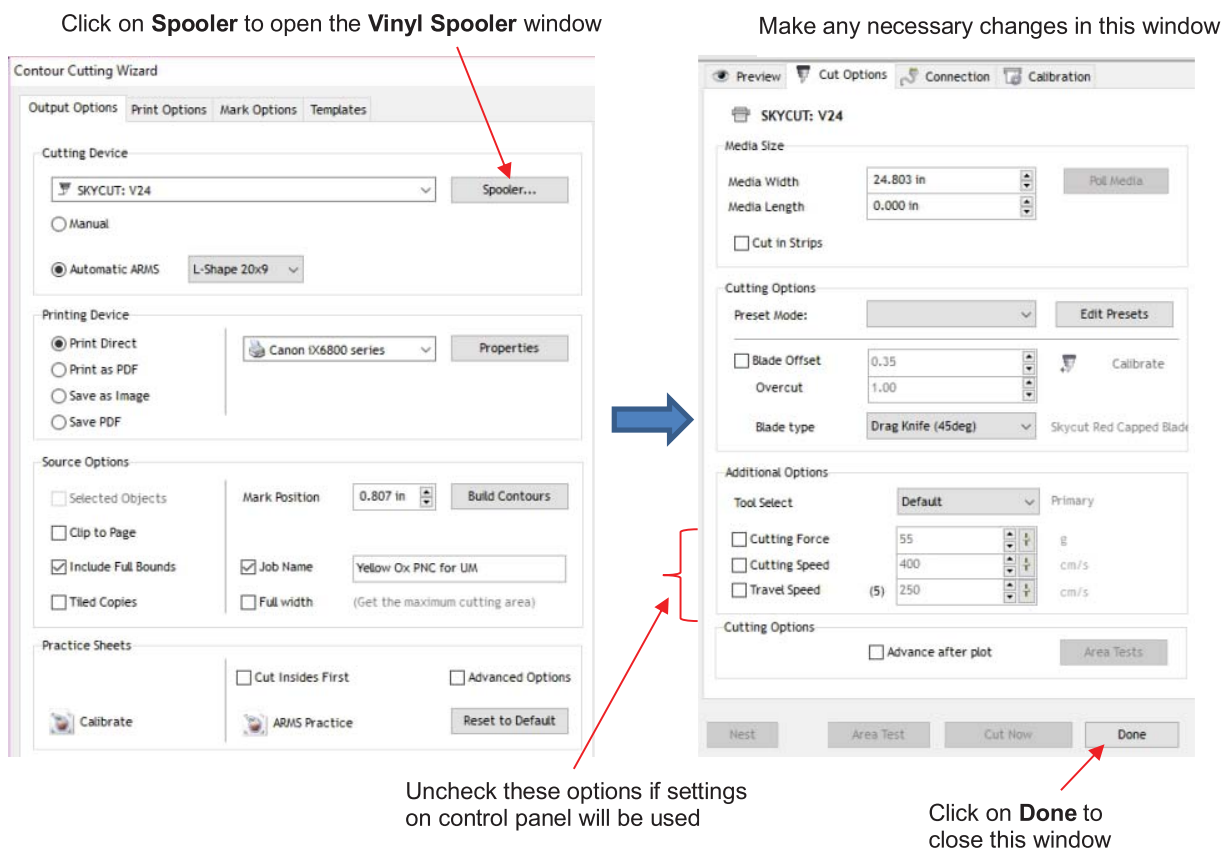
(9) Depending on the print option selected in *Step (6)*, the print button below the **Preview** will vary. Assuming you selected **Print Direct**, you'll see the option to **Print**. Click on it or click on the button in the same location and then complete any popup window options as needed. Note that if you've already printed your project, you will want to click on **Skip** instead:



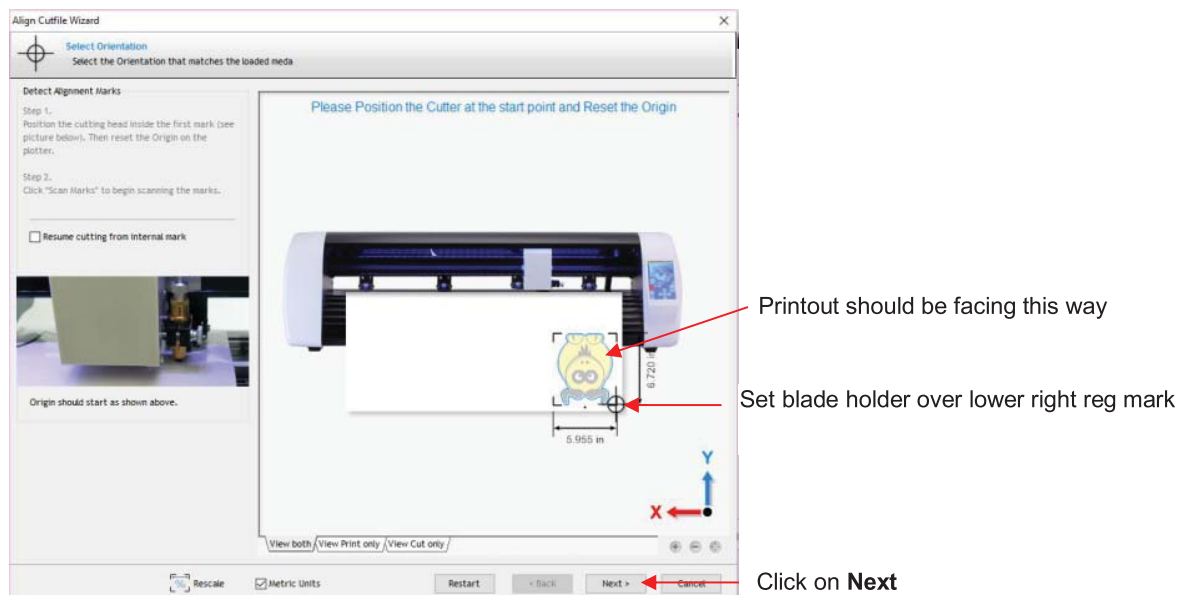
- (10) Place the printout onto the cutting mat or load the printout directly if a cutting mat isn't required. Note that in SignMaster, a print and cut project is loaded "upside down" as shown in the following screenshot. On the printout is a small arrow which is a reminder to load the printout so that the little arrow is facing towards you as you are facing the Skycut:



- (11) Load the mat and/or printout so that it is straight, relative to the cutter. The alignment doesn't need to be absolutely perfect but close enough that it will allow for a faster and, of course, successful detection by the camera. Insert the blade holder and perform a test cut, as needed, adjusting the cut settings.
- (12) Click on the **Spooler** and the **Cut Options** tab. If you want to send the cut settings from SignMaster, adjust the **Force** and **Speeds** accordingly or select a **Preset**. Otherwise, if using the cut settings on the Skycut control panel, turn these off. Click on **Done** after making any changes:



- (13) Back in the **Contour Cutting Wizard** window, the **Print** button should now read **Cut Now**. Click on **Cut Now** and a new **Preview** window opens which indicates the design should be facing downwards:

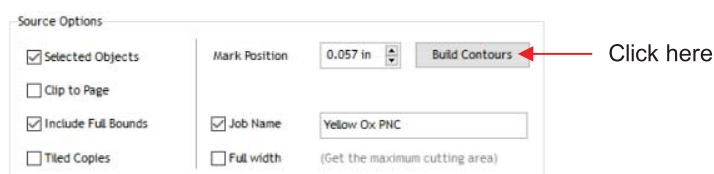


- (14) Click on **Next** and the Skycut's camera will now move over each registration mark and take a photo and make an adjustment. Once it has read all four marks plus the first one a second time, it will proceed to cut out the printed shapes.
- (15) After testing out this process, be sure to check out other sections to understand additional options, such as:
- ◇ Preparing a vector image for a PNC application – *Section 3.05.2*
 - ◇ Adjusting camera calibration settings, if needed – *Section 3.06.1*
 - ◇ How to set up a grid of repeats – *Section 3.07*
 - ◇ Adding additional registration marks to improve accuracy – *Section 3.08*
 - ◇ Performing a PNC using the USB flash drive – *Section 3.09.1*

3.05 Preparing Designs for PNC Applications

3.05.1 Using Raster Images

- Use **File>Import>File** to open a raster image (JPG, BMP, TIFF, PNG, etc.) in SignMaster. To add a contour cut around this image, there are two options:
 - ◇ Add the contour while in the main SignMaster window – this process is covered in *Section 5.01*.
 - ◇ Add the contour after entering the **Contour Cut Wizard** window by clicking on **Build Contours**:



- Using **Build Contours** essentially takes you to the same **Create Cut-Contour** window and the process is the same as presented in *Section 5.01*.
- The advantage of tracing images before entering the **Contour Cut Wizard** window is the ability to edit the tracing and save the file with the tracing in place. An example of editing a trace is covered in *Section 5.01.2*.

3.05.2 Using Vector Images

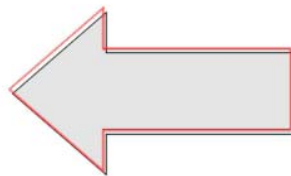
- You can design your own vector images in SignMaster using various design and vectorizing tools. You can also directly import vector files in a variety of common file formats including: AI, DXF, EPS, PDF, PLT, and SVG.
- While vector images are essentially ready-to-cut files, SignMaster will not apply them as contour cuts in print and cut applications without having them assigned as such. Refer to *Section 5.02* for instructions on how to perform a contour cut using a vector image.

3.06 Inaccurate Cuts

- There are several reasons why your print and cut results may not be as accurate as you need:
 - ◇ The calibration needs to be tweaked
 - ◇ The contours around the printed image are not accurate
 - ◇ The cut settings are too aggressive
- The following sections present solutions for each of these.

3.06.1 Tweaking the Calibration Values

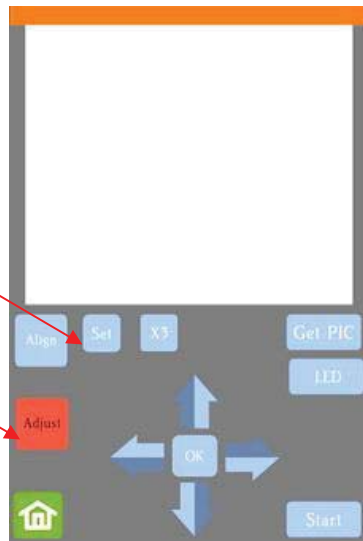
- If you find your print and cut results are slightly off in the same direction with each cut, you can adjust the values being used versus attempting to recalibrate from scratch.
- To do this, go back to an easy-to-cut material like copy paper and use a shape that has both horizontal and vertical lines. 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 SignMaster's **General Power Shapes**  is a good choice because you need both vertical and horizontal lines for measurement.
- After performing the print and cut, use a mm ruler to measure how far away the cut lines are from the printed lines. If you used an arrow, focus only on the horizontal and vertical lines, not the diagonal lines:



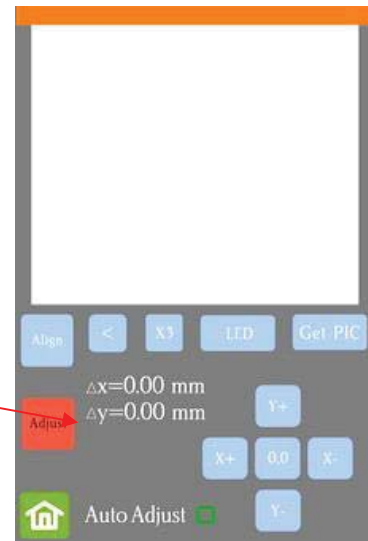
- ◇ In this example, let's say the red cut line is about 0.5 mm too high and about 0.3 mm too far to the left. Thus, you need the cut line to move down and to the right.
- On the control panel, change the **Units** to millimeters by going to **Set>General Settings** and choosing millimeters, as was shown 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**

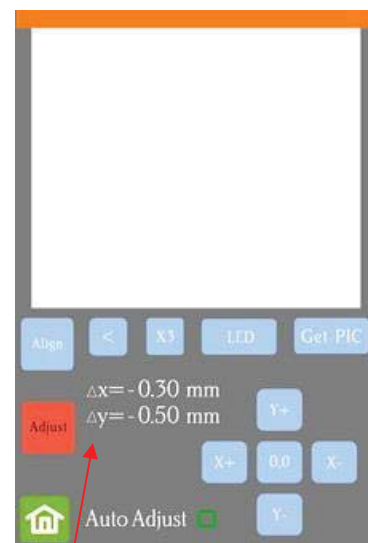
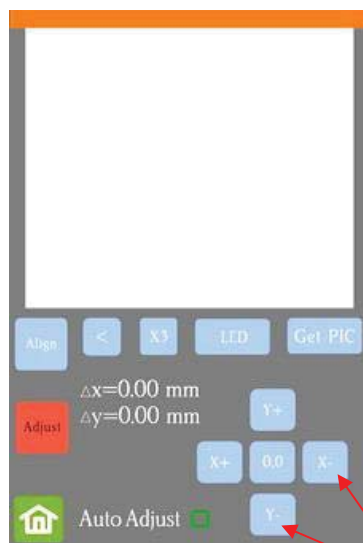
1. Press **Adjust**



Current adjustments are set to 0.00



- Press and hold your finger over Δx and Δy for several seconds until the other **X,Y** buttons light up.
- One at a time adjust Δx and Δy by pressing the **X+**, **X-**, **Y+**, and/or **Y-** buttons in the direction(s) 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 3.09.3* for instructions.

3.06.2 Inaccurate Tracings

- When tracing imported images, the resulting cut lines may not necessarily follow the original image, especially in tight spots. This can result in tiny bits of white appearing, 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. Compare by

looking at the same spots where the cut didn't follow the image perfectly. This could be the cause of the inaccurate PNC. There are several ways of handling this situation:

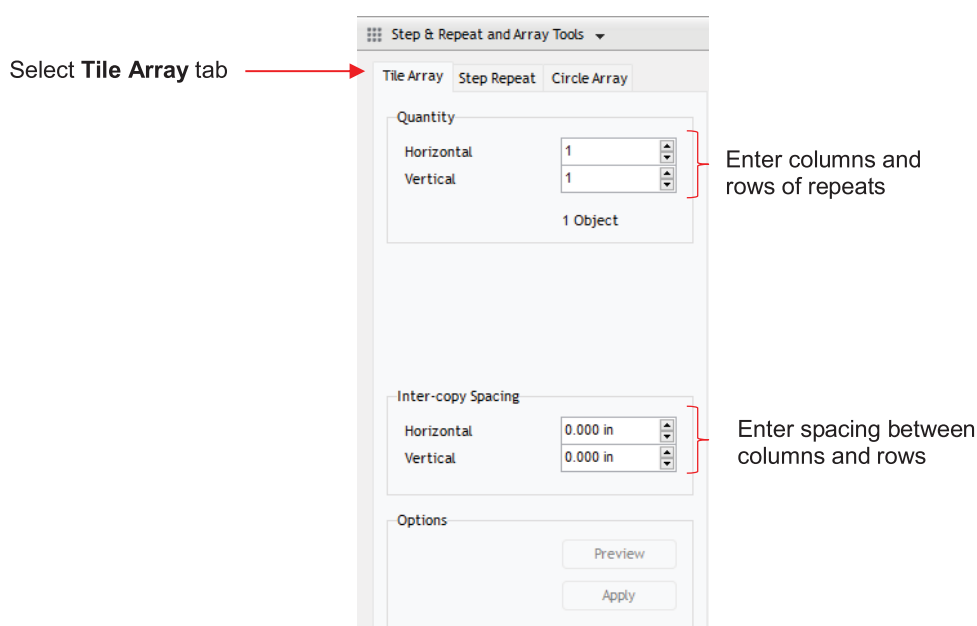
- ◇ Retrace the imported image using a lower **Smoothing** setting (refer to *Section 5.01*). This will result in a tighter fit around the original graphic.
 - ◇ Use the **Node Editing Tools**  to move the trace lines to more closely fit the original graphic.
 - ◇ Create an inset contour cut line to use for cutting instead of the original trace line.
 - ◇ Create a bleed by choosing **Cutting Contour + Bleed** in the **Create Cut Contour** window.
- Another possibility is that the contour cut line was inadvertently shifted from the graphic to be printed. So, check to see if a misalignment may have occurred when you were moving or simply clicking on the design.

3.06.3 Incorrect Cut Settings

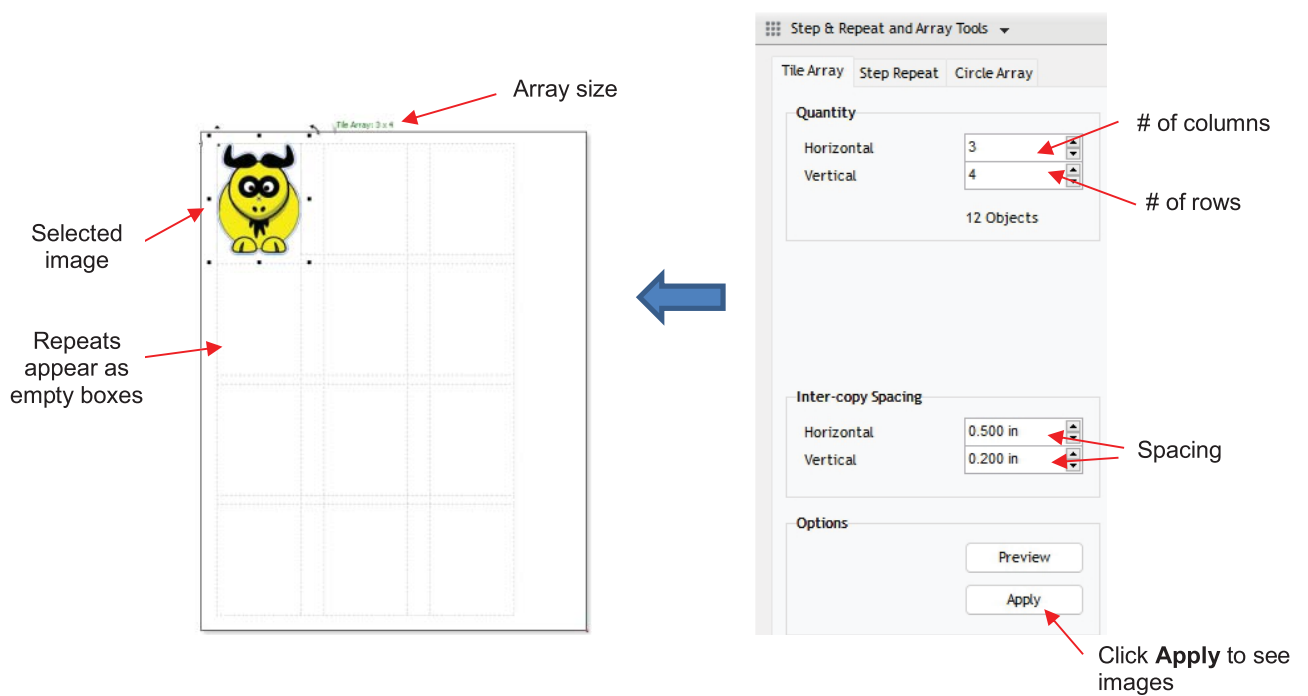
- If a PNC is not precise and the cause is not the calibration nor the alignment of the trace lines, then go through the following check list of other possible causes:
 - ◇ Try slowing down the speed. If the mat is moving numerous times, in and out of the cutter, a slight shifting can occur, especially at high speeds. On the Skycut, try a speed of 7 or lower.
 - ◇ Verify that the pinch wheels are still centered over grit shafts beneath.
 - ◇ Make sure the blade isn't over-extended which can cause it to cut too deeply and drag the cutting mat.
 - ◇ Make sure the bottom of the mat isn't sticky and the pinch wheels and grit shafts are clean and not sticky. Clean with a lint-free cloth and a small amount of isopropyl alcohol or Un-Du.
 - ◇ If the print and cut project contains numerous repeats, use additional registration marks so that additional scans can occur during the cut. Refer to *Section 3.08* for instructions.

3.07 Adding Repeats in Print and Cut Applications

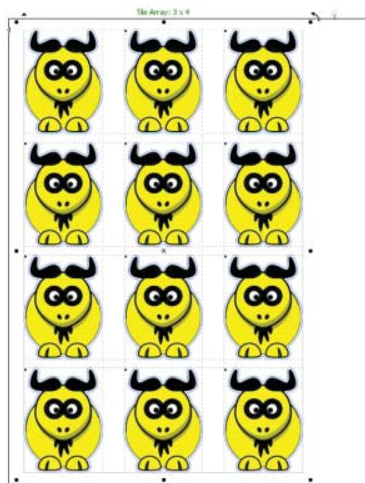
- (1) In the main SignMaster window, select the design and go **Arrange>Tile Array Tools**. The following panel will open with settings for the number of repeats and the spacing between the repeats can be set:



- (2) As you being increasing the **Quantity** and adjusting the **Spacing**, rectangles will appear representing the repeats:



(3) To see the actual images, click on **Apply** if no further changes are required:



3.08 Registration Mark Settings

3.08.1 Adding Intermediate Registration Marks

- Continuing with the same project from the prior section, to access the registration mark options, click on the **Mark Options** tab in the **Contour Cutting Wizard** window and note the following:

Select **Mark Options** tab

Space marks based on distance

Contour Cutting Wizard

Output Options | Print Options | **Mark Options** | Templates

Custom Mark Settings

This section allows you to specify the style of marks used in the detection process. Generally, the more marks you use the more accurate the contour cutting will be at the expense of taking a little longer
 Note: Using larger marks increases the chance of detecting the marks

Mark Adjustment Method

☒ Set target mark spacing ☐ Specify number of marks

Set required mark distance

Horizontal Mark Spacing: 1000.0 mm
 Vertical Mark Spacing: 300.0 mm
 [Reset]

Add more marks

- ◇ **Set target mark spacing:** use this option as a default or if you want to reduce the maximum spacing allowed between marks, thus increasing the number of marks. For example, if **Vertical Mark Spacing** is lowered to 100 mm, in this particular case, a new set of intermediary marks are added:

Custom Mark Settings

This section allows you to specify the style of marks used in the detection process. Generally, the more marks you use the more accurate the contour cutting will be at the expense of taking a little longer
 Note: Using larger marks increases the chance of detecting the marks

Mark Adjustment Method

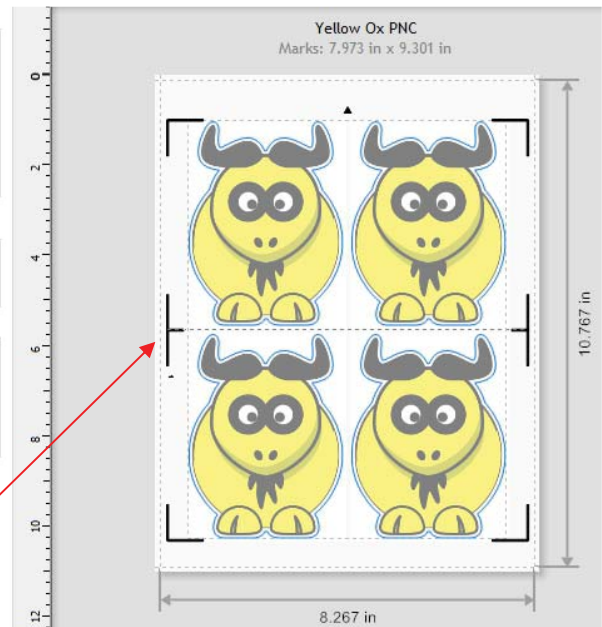
☒ Set target mark spacing ☐ Specify number of marks

Set required mark distance

Horizontal Mark Spacing: 1000.0 mm
 Vertical Mark Spacing: 100.0 mm
 [Reset]

Lower spacing to 100 mm

A new set of marks are added



- ◇ **Specify number of marks:** use this option to force another set of marks to be added:

Custom Mark Settings

This section allows you to specify the style of marks used in the detection process. Generally, the more marks you use the more accurate the contour cutting will be at the expense of taking a little longer

Note: Using larger marks increases the chance of detecting the marks

Mark Adjustment Method

☐ Set target mark spacing
 ☒ Specify number of marks

Extra Mark Options

Number of horizontal marks	1	3.987 in
Number of vertical marks	2	3.100 in

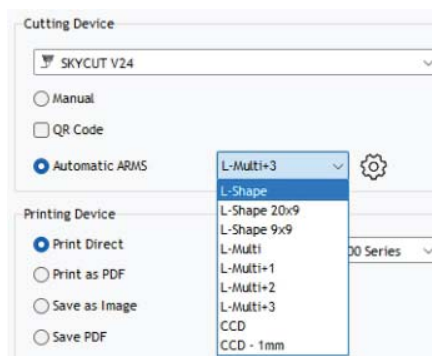
Change from 1 to 2

A new set of marks are added

- With these intermediate marks added, they will be scanned, as well. Thus, in this example shown, the bottom four marks will be scanned and the lower two shapes cut out. Then, the top set of four marks will be read and upper two shapes cut out.

3.08.2 Registration Mark Types and Sizes

- The dropdown menu next to **Automatic ARMS** contains 9 options for the type and size of registration marks that can be used:

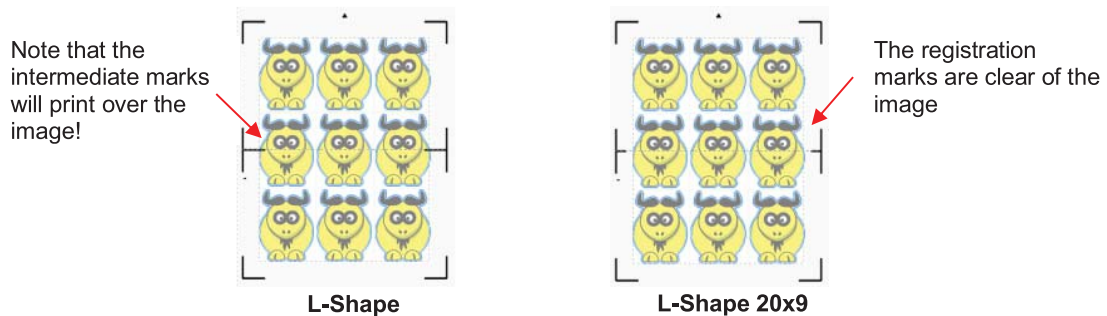


- Important:** At the current time, only the options marked with an **L** (which is the right-angle type mark used in the screenshots so far in this chapter) are applicable to current Skycut cutters:

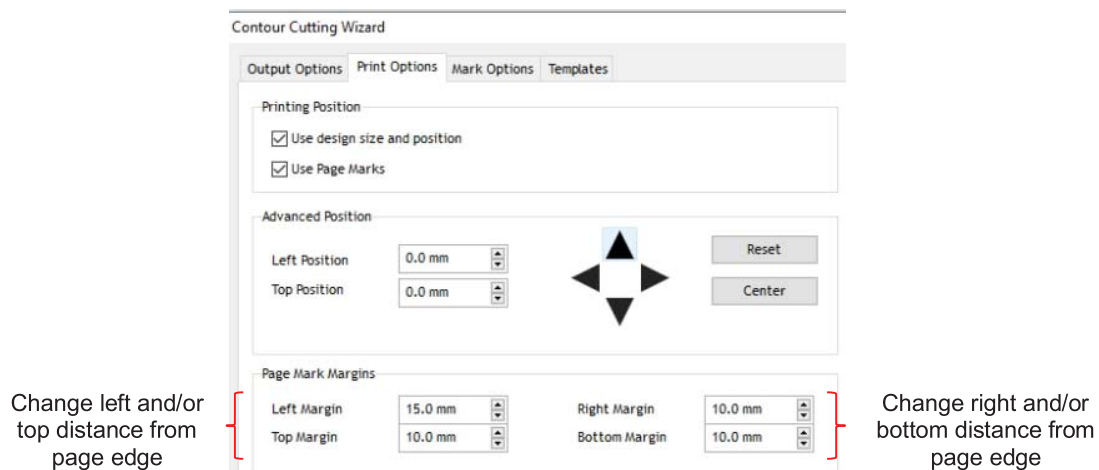
L registration marks



- Note the following description and size for the individual options in the menu:
 - ◇ **L-Shape:** L marks that are 20 mm x 20 mm in size
 - ◇ **L-Shape 20x9:** L marks that are also 20 mm x 20 mm in the four corners. Any intermediate registration marks will be 20 mm x 9 mm in size:

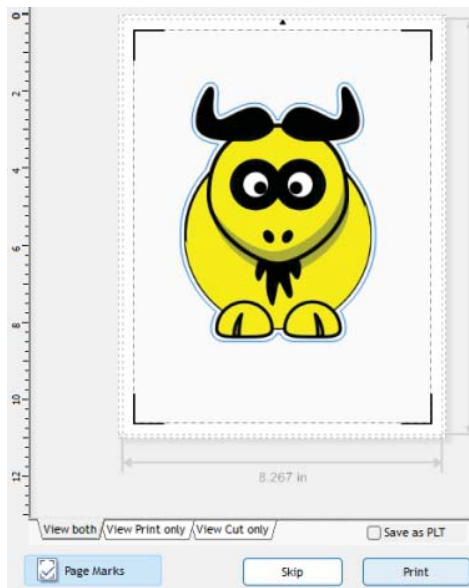


- ◇ **L-Shape 9x9:** L marks that are 9 mm x 9 mm in size
 - ◇ **L-Multi:** Identical to the **L-Shape 20x9** marks but without the little arrow indicating which direction to load the material.
 - ◇ **L-Multi+1, L-Multi+2, L-Multi+3:** Same as **L-Multi** but with additional (1, 2, or 3) sets of reg marks added. These options, however, do not currently work as expected. Instead of scanning AND cutting one section at a time, all marks are read before any cutting begins. Thus, in most situations, you will want to alternative methods for adding additional marks. Refer to *Section 3.08.1*.
- To change the distance of the reg marks from the boundaries of the printout, click on the **Print Options** tab and under **Page Mark Options**, the distance from the page edges can be changed:



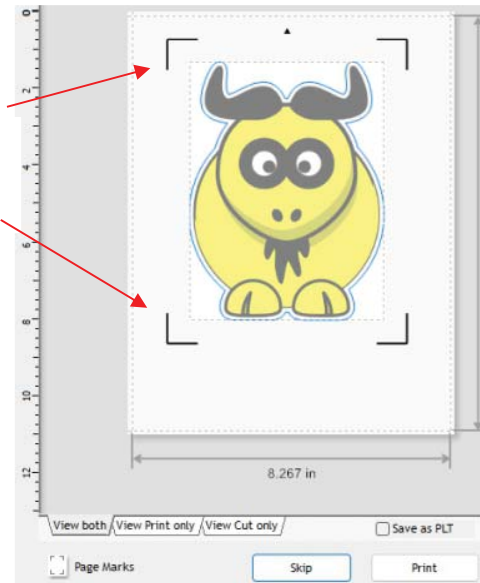
3.08.3 Mark Position (Offset Distance from Design)

- Instead of having the reg marks positioned near the outer edges of the printout, you can elect to have them positioned based on the cut line boundaries of the design. To do this, disable the **Page Marks** option and then the **Mark Position** field will be editable:



Page Marks
enabled

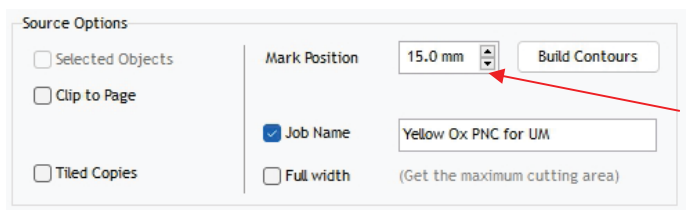
The reg marks have
moved closer to the
design



Page Marks
disabled

versus

- You will also then observe that the **Mark Position** field can now be edited. However, you also need to make sure marks are not too close to anything printed so that the camera doesn't incorrectly attempt to scan the image instead of a registration mark:



Distance of the marks from the
outermost shapes



Mark Position = 15 mm

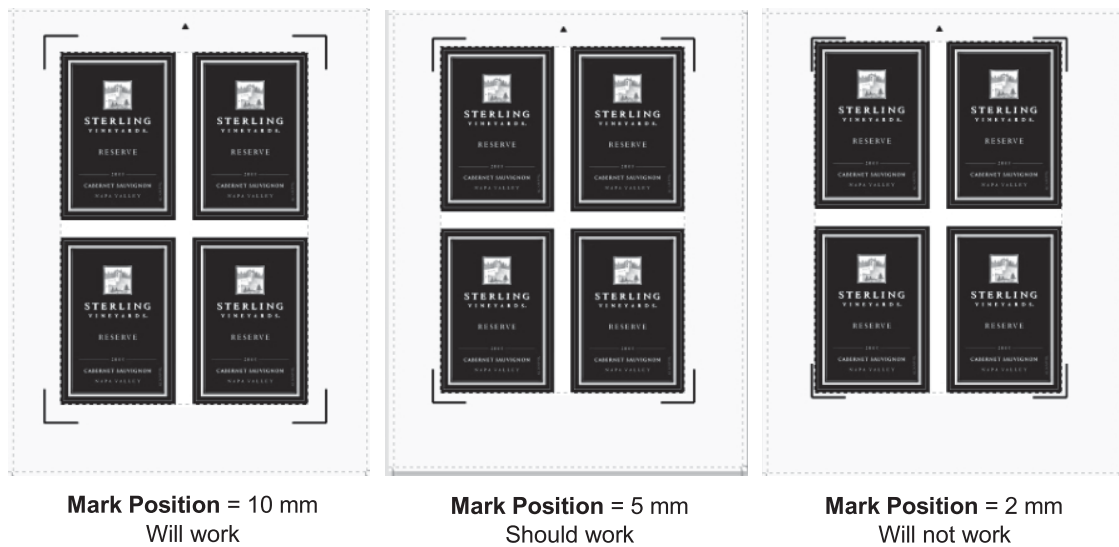


Mark Position = 10 mm



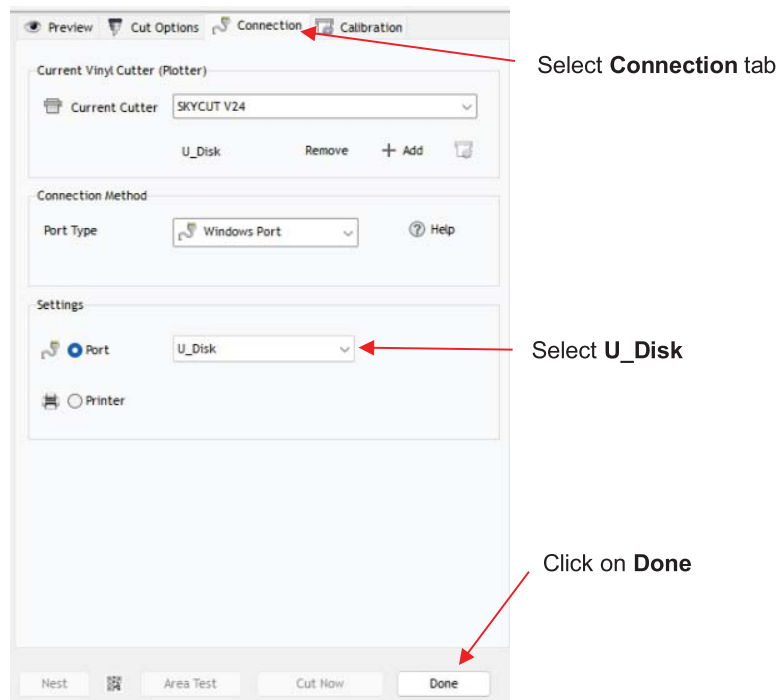
Mark Position = 5 mm

- You can see the movement of the marks towards the image as the **Mark Position** is decreased. Because of the shape of the ox, this shouldn't be an issue with the location of the registration marks relative to the printed image. However, if a design is more rectangular, such as a wine bottle label, then it is much easier to see that it could cause issues if the **Mark Position** is too small:

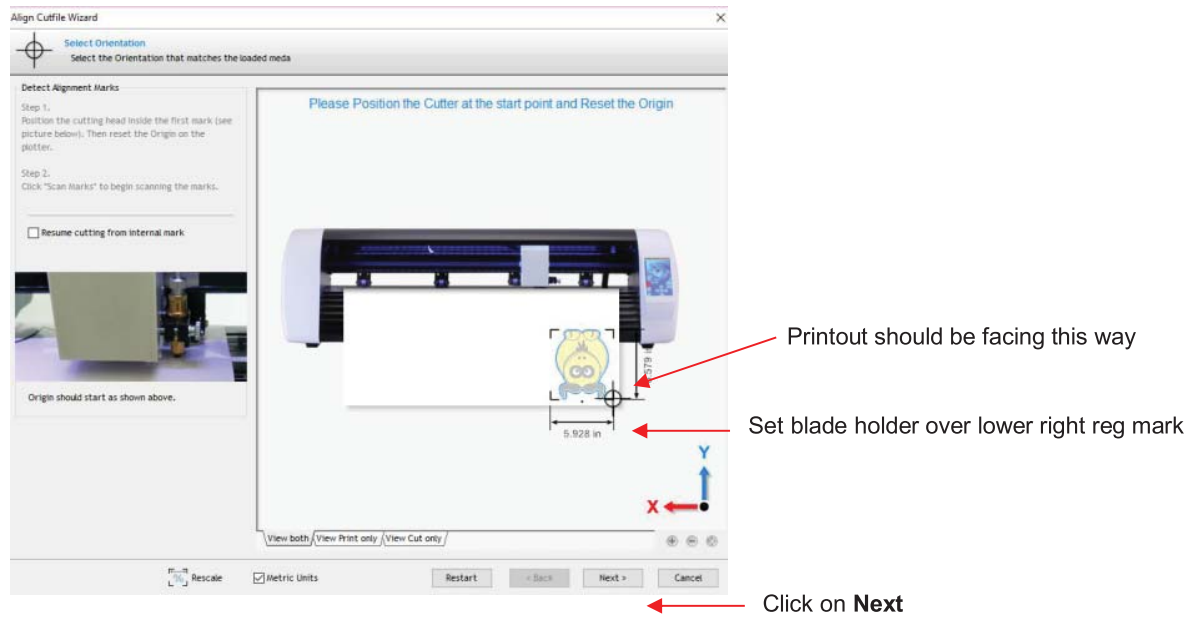


3.09 PNC from USB Flash Drive

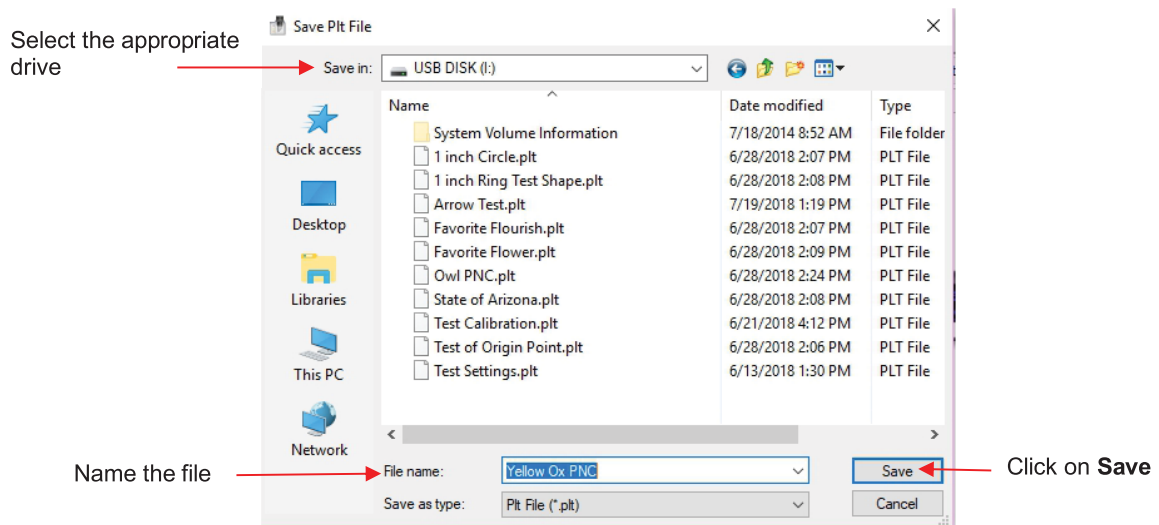
- To perform a print and cut project from the control panel, first perform *Steps (1) – (11)* from *Section 3.04.2*. However, before clicking on **Done** to close the **Vinyl Spooler** window, click on the **Connection** tab and change the **Port** to **U-Disk** from the drop-down menu. Then click on **Done**:



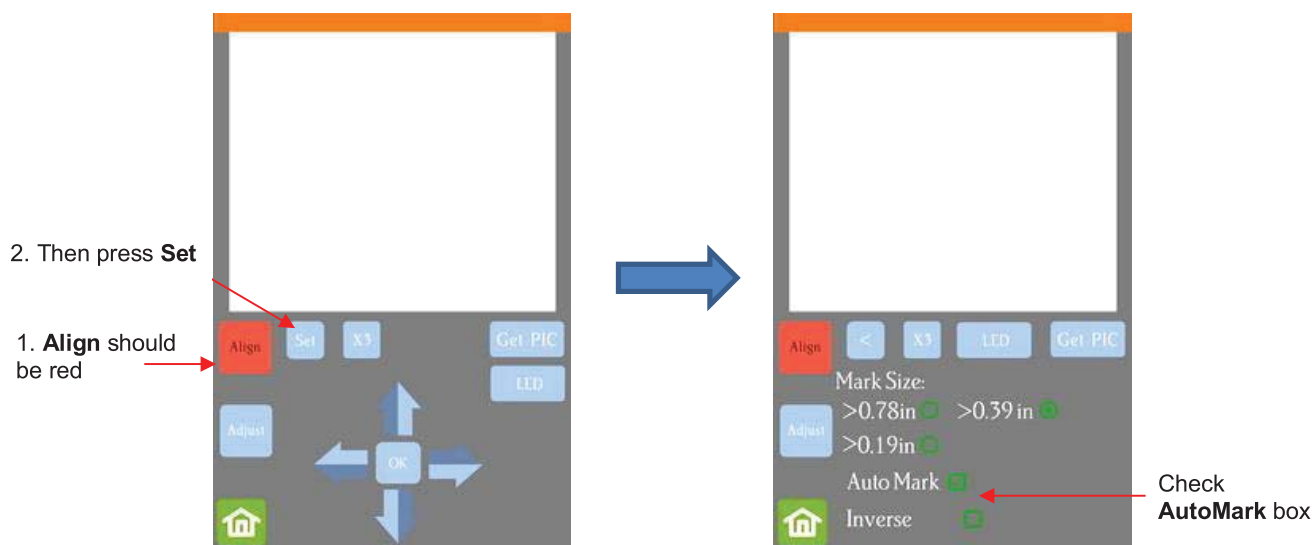
- Back in the **Contour Cutting Wizard** window, proceed as before by clicking on **Cut** and the same **Preview** window opens and again indicates the design should be facing downwards:



- Click on **Next** and the following window will open where you can save the job as a PLT file on a USB flash drive inserted into a port on your computer:

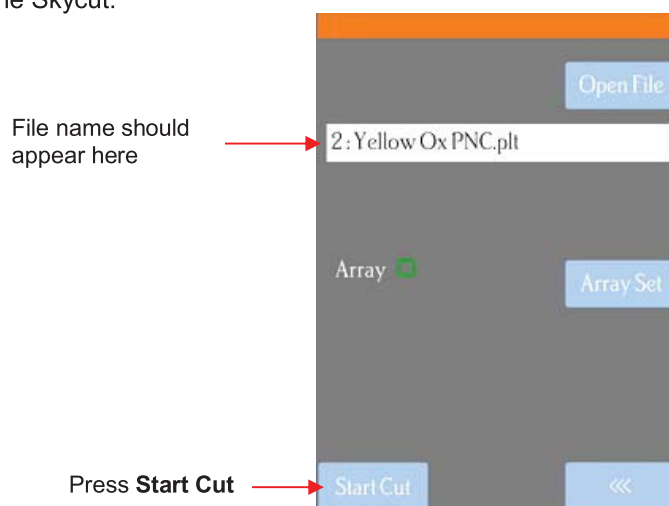


- On the Skycut's control panel, set the **Force** and **Speed**, if you elected not to have them activated in the **Vinyl Spooler** window in *Step 11 in Section 3.04.2*.
- Go to **Set>Camera**. With **Align** selected, press **Set** and the following window will open:



◇ 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 1.12.3* to open the file into the Skycut:



- Click on **Start Cut** and the marks will be scanned by the camera and the shapes cut out.

4. Accessory Tools

4.00 Quick Reference for Chapter 4

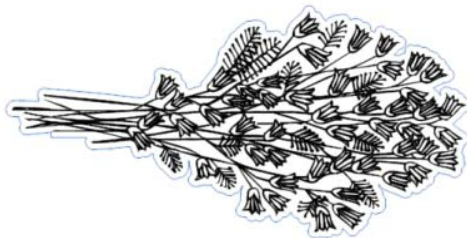
- How to draw with the test pen and cut around the drawing: *Section 4.01.1*
- How to score and cut a fold-up project: *Section 4.02.2*
- How to emboss cardstock: *Section 4.02.3*
- How to engrave a metal tag: *Section 4.03.1*

4.01 Drawing with the Test Pen

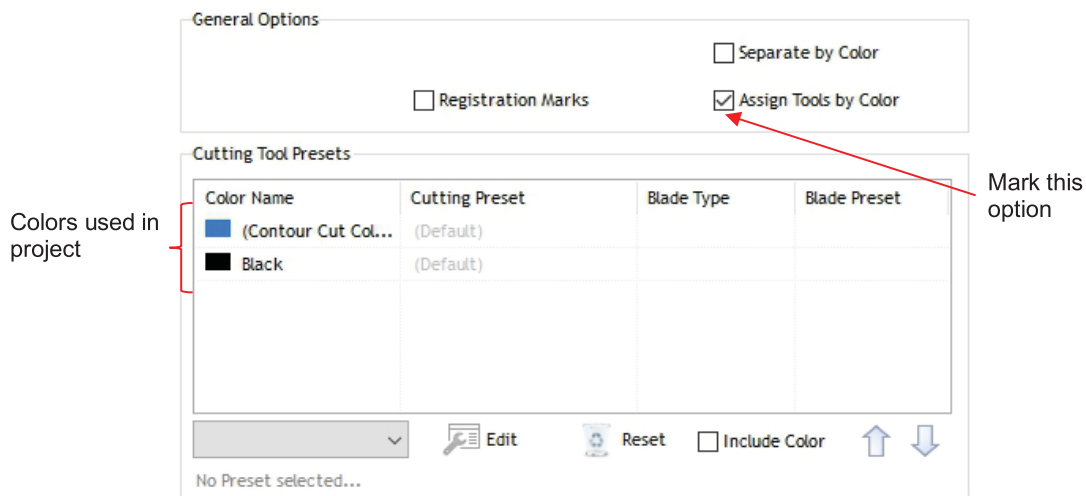
- With the Skycut, you can draw shapes and lettering with the test pen.
- If you wish to fill (i.e., color in) a shape, select the shape and click on the **Plugins** icon  and select **Engraving Module**. Refer to *Section 5.03* for instructions on how to adjust settings to create a line fill.
- Do not 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 35 Post-It note method presented in *Section 2.01.3*.
- Make sure your shapes will not be drawn where any of the pinch wheels travel over the material. Otherwise, the ink might smear.

4.01.1 Draw and Cut

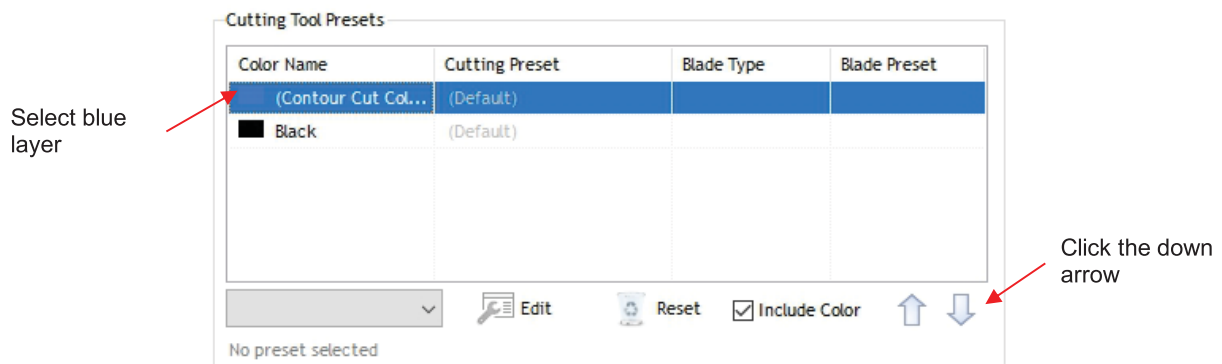
- A draw-and-cut application involves using the test pen to draw shapes and then using the blade holder to cut them out. This rest of this section covers the process.
- In the following example, a design is selected from **General Clipart** and sized for the project. Then a contour is added using the instructions in *Section 5.01*:



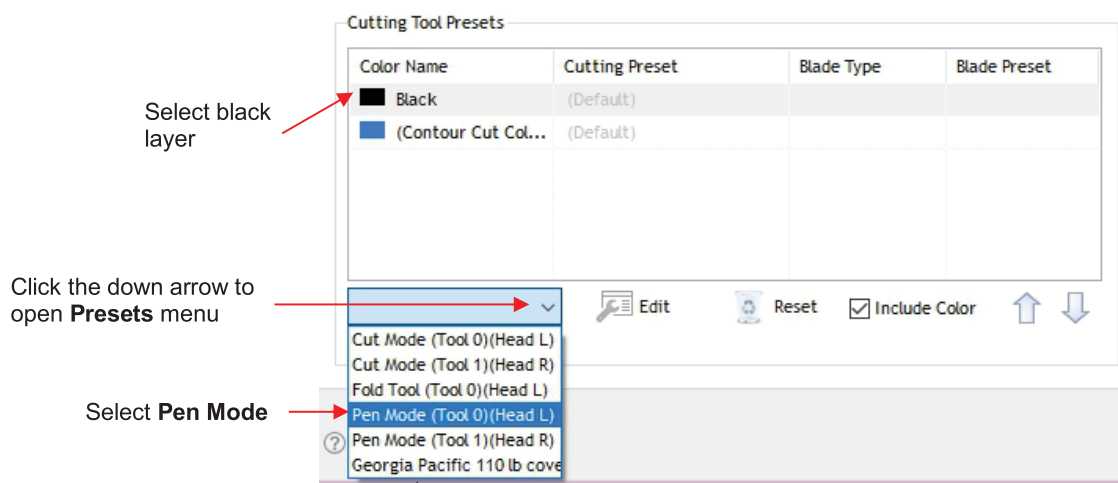
- Note that the contour color (blue) differs from the design's **Fill** color (black). This is important so that the draw and cut can occur separately, providing the opportunity to change out tools.
- Click on the **Cut, Plot, & Engrave Tools** icon and select **Send to Cutter**. In the **Send to be Cut** window, mark the option for **Assign Tools by Color**. You will then see the two colors, blue and black, appear in the **Cutting Tool Presets** list:



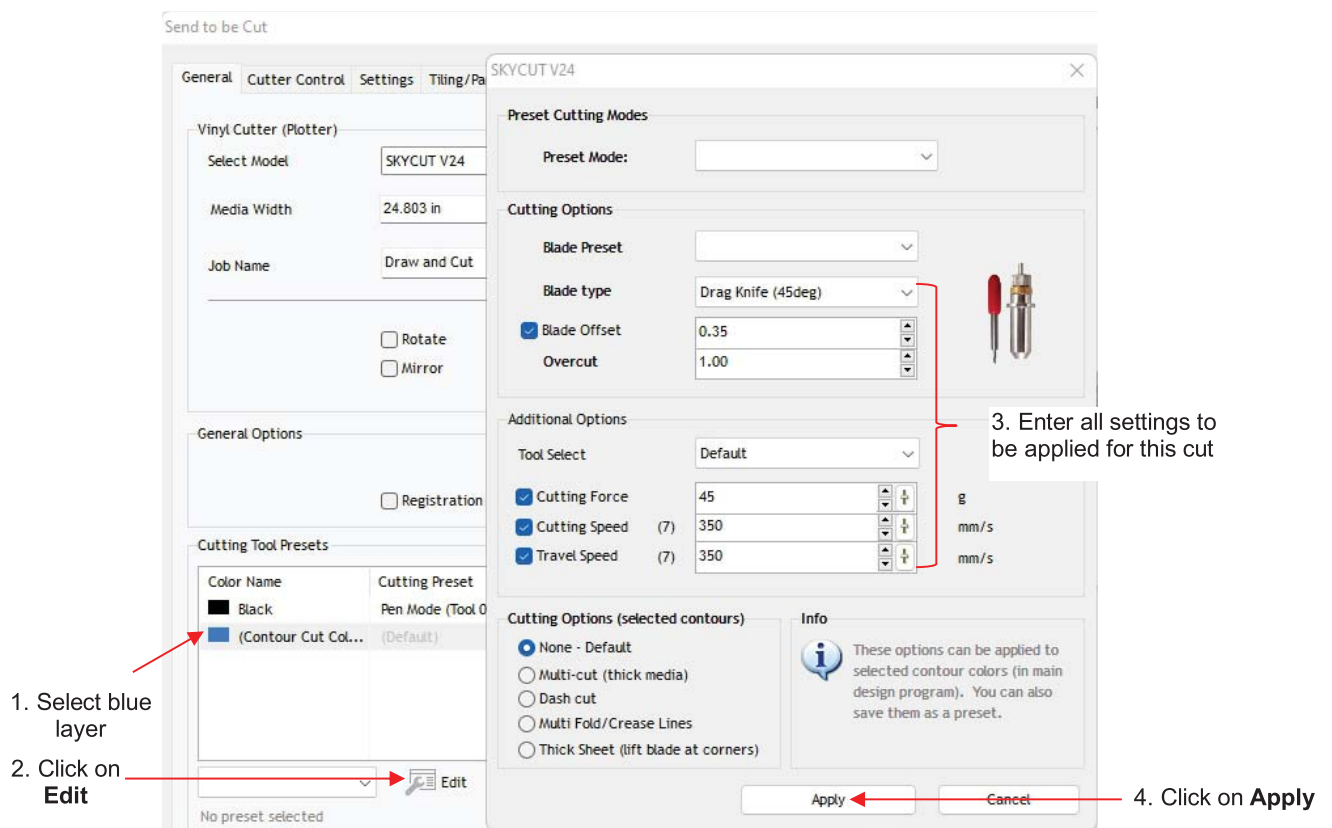
- The layers will be processed in the order shown. However, because it makes more sense to draw first and cut second, the blue layer will be moved down. This is done by selecting the blue layer and clicking on the down arrow below:



- The cut settings for each layer now need to be assigned. If settings have already been entered and saved as **Presets**, you only need to select from the **Preset** menu:

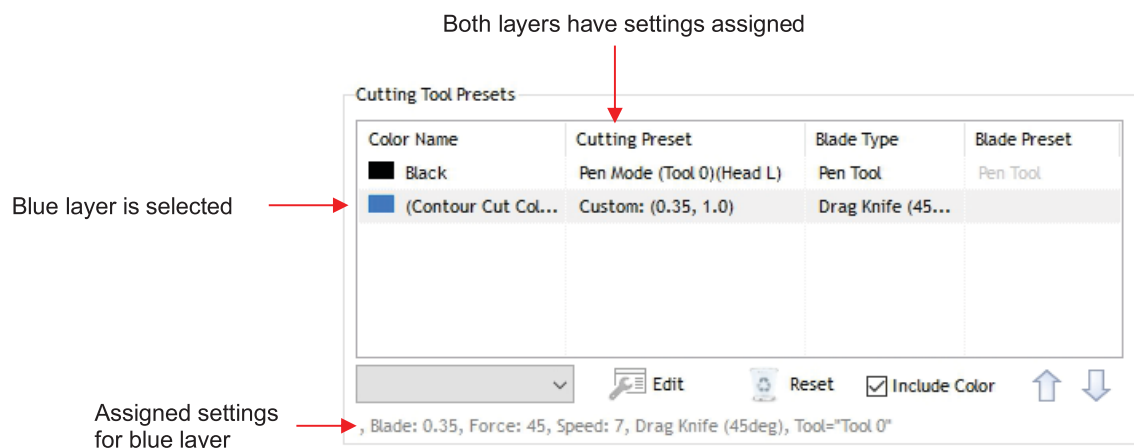


- If you need to enter new settings, which will be done for the contour cut (blue) layer, select that layer and click on **Edit** and the following window opens:

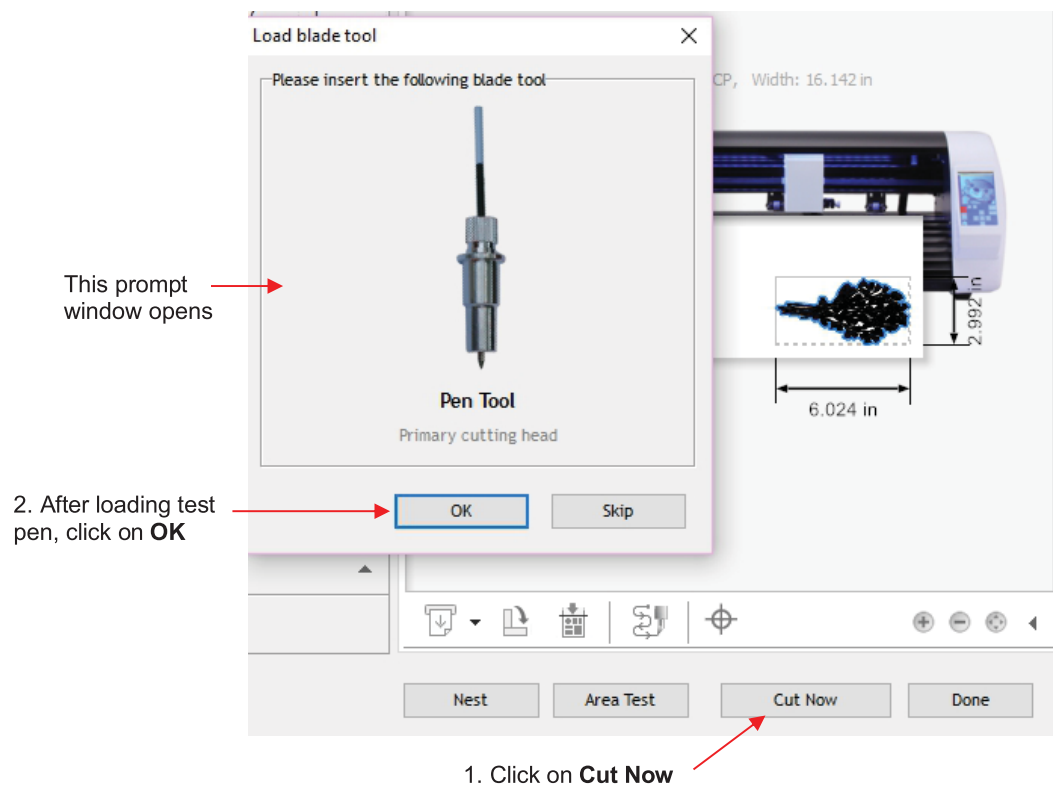


◇ **IMPORTANT:** Note that this window does not allow you to save the settings as a new **Preset**. Thus, if you will be cutting this material often, you might prefer to set up a preset for it using the instructions in *Section 2.04.2*.

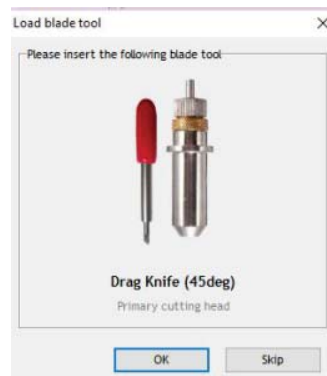
- After clicking on **Apply**, you will see that both colors now have settings assigned. Because the blue layer is still selected, its settings show along the bottom:



- Load the material into the Skycut. Click on **Cut Now** and you will be prompted to load the **Pen Tool**:



- Load the test pen into the Skycut, click on **OK**, and the design will begin drawing. The second prompt window will immediately open:



- As soon as the drawing process has ended, load the blade holder into the Skycut and proceed with the contour cut by clicking on **OK** in the prior window. Once completed, click on **Done** to close the **Send to be Cut** window.

