

**LESSON 7:
 IMPORTING AND VECTORIZING A BITMAP IMAGE**

In this lesson we'll learn how to import a bitmap logo, transform it into a vector and perform some editing on the vector to clean it up.

The concepts we'll learn are how to:

- ... Import a bitmap image
- ... Transform the bitmap image into a vector image. (The process is called "vectorize".)
- ... Edit the vector image
- ... View the vector image in GravoStyle's filled viewing mode (Figure 7-1)
- ... Correct problems which cause an improper fill.



Figure 7-1 Finished Vectorized Logo

Our job's design specifications are:

- ... Job Filename: Finished Colt Logo.gnh
- ... Logo Filename: Colt Logo.bmp
- ... Plate: 8 inches by 8 inches with a ¼ inch margin

STEP 1: OPEN A NEW JOB AND SET THE MATERIAL DIMENSIONS

We'll open a new job and set the material size to 8 inches by 8 inches and give it a ¼ inch margin all around. We'll make sure the our viewing mode is set to "Wire contours".

STEP 2: IMPORT THE BITMAPPED LOGO

We'll click on "File" and then on "Import". We'll then see GravoStyle's file import dialog window. Figure 7-2 shows this window after we've navigated to the folder containing our logo (Colt Logo.bmp). We'll click on "Open" and the bit-

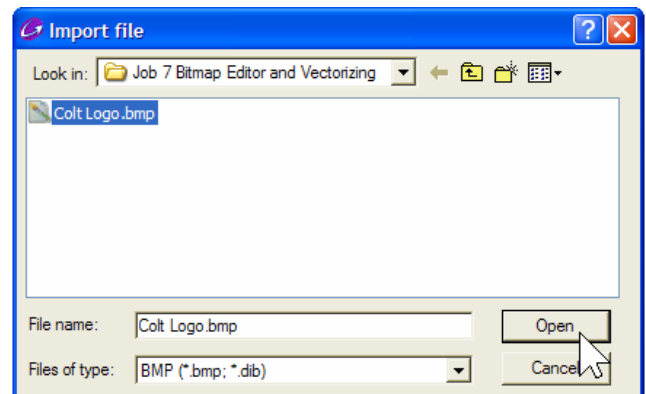


Figure 7-2 File Import Dialog Window

map will appear on our work area (Figure 7-3).

STEP 3: VECTORIZE THE BITMAP

We'll locate the "Vectorize bitmap" tool on the left toolbar (Figure 7-4) and click on it. GravoStyle's "Vectorize" dialog window will pop up (Figure 7-5).



Figure 7-3 bitmap imported

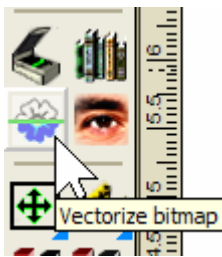


Figure 7-4
Vectorize Tool

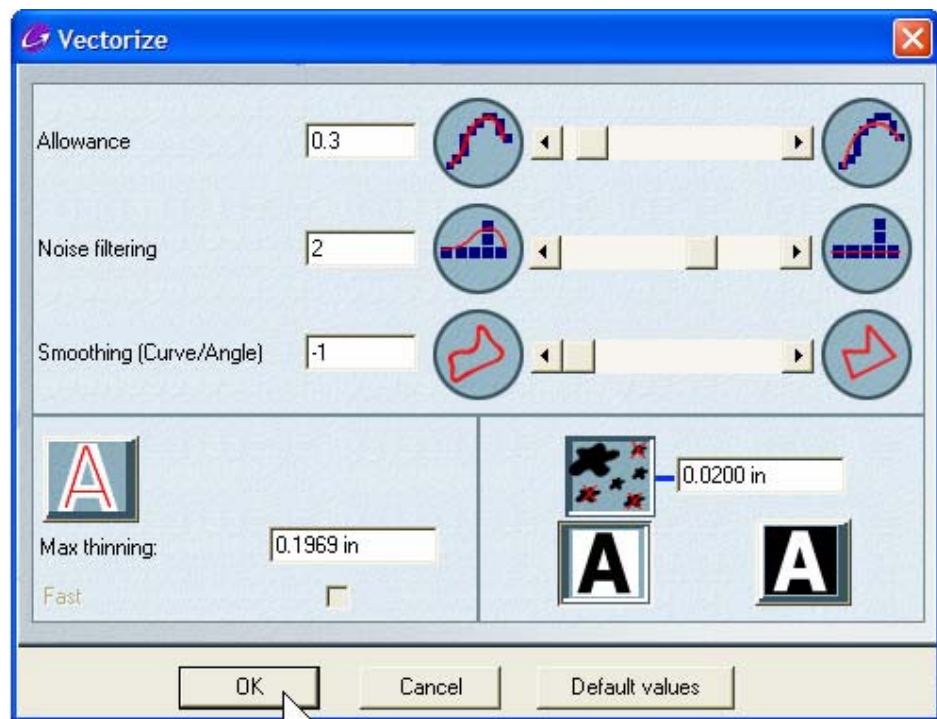


Figure 7-5 Vectorize Dialog Window

The three slider controls at the top tell GravoStyle how faithfully we want the contours of the vector images to follow the outlines of the bitmap, how to handle small departures from the original path of the outlines and how rounded or angular to make the vector paths.

Our experience is that setting these parameters, as shown, at 0.3, 2 and -1 consistently gives the best results. We'll use these values for this job.

The button on the lower left tells GravoStyle how we want to handle thick outlines. Should we just make a single vector line down the center of the outline (button *down*), or should we make vectors that reproduce the entire width of the outline (button *up*). We'll keep the button up for this job. The dialog window at the lower right lets us tell GravoStyle to ignore any discrete parts of the bitmap which are smaller than our specified size. We'll enter 0.020 inches;

anything smaller will be considered to be unwanted noise.

We'll click "OK", and yet another dialog window, labeled "Color reduction" will pop up. We'll ignore this window for now and click on "OK" to proceed.

GravoStyle will now perform the vectorization and we'll see its result in Figure 7-7.



Figure 7-7 Vectorization Complete

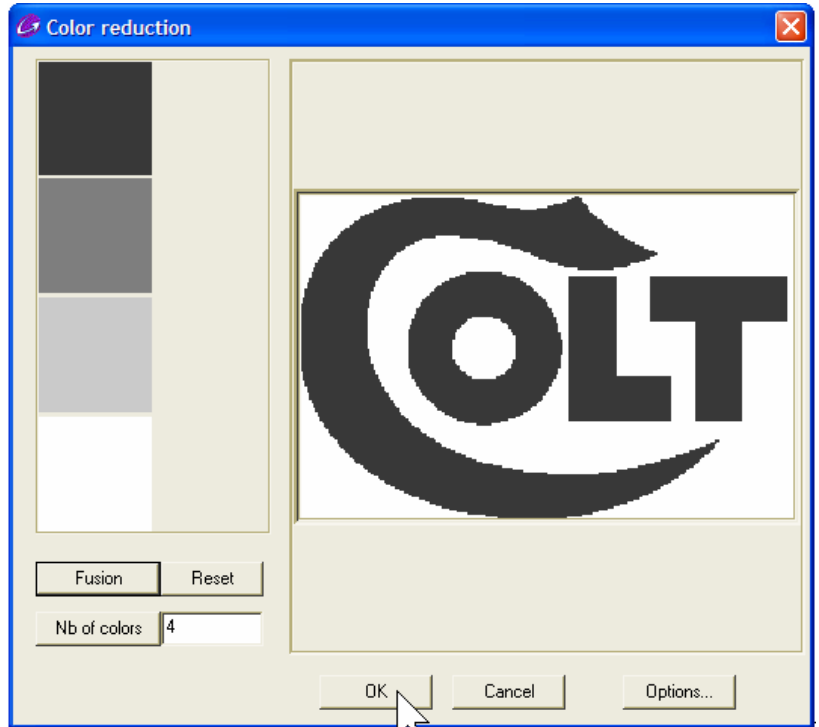


Figure 7-6 Color Reduction Window

STEP 4: TROUBLESHOOT THE LOGO

What we're looking at in Figure 7-7 is *two* objects superimposed. They are the vector contours and the original bitmap image. Which one is on top? It doesn't matter. We'll simply grab the center handle of the shown selection and move it away to separate the vectors from the bitmap (Figure 7-8). We'll then make sure that the *bitmap* is selected and we'll delete it - we have no further use for it.

(In Figure 7-8, we can see that it was the vector image that we dragged - we'll merely unselect it, then select the bitmap and delete the bitmap.)

If we look closely at our vectorized image (we can zoom in with the right mouse button for a closer look) we'll find that there is an unexpected and unwanted border all around it.

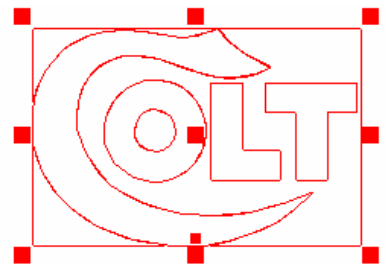


Figure 7-8 Vector and Bitmap Images Separated

We'll explore this:

- ... First, we'll ungroup the logo.
- ... Next, we'll click on each segment of the outside border in turn and drag them away from the rest of the logo. Figure 7-9 shows our job after we've dragged the last border segment away.
- ... Next, we'll select the three segments and delete them.

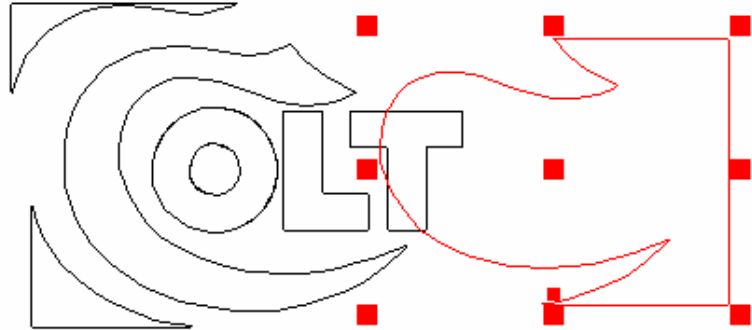


Figure 7-9 Segments of Outside Border Dragged Away

Obviously GravoStyle's saw them as real objects to be vectorized!

When we're done, we'll select all of what's left by pressing "Control-L" on the keyboard. (Control-L is preferred to dragging a selection rectangle all around the logo at this point; we want to make *really* sure that we've selected everything.) We'll proceed as follows:

- ... Let's change to the "Filled contours" view now.



Figure 7-10 Logo Ungrouped, Filled Contours Viewing mode

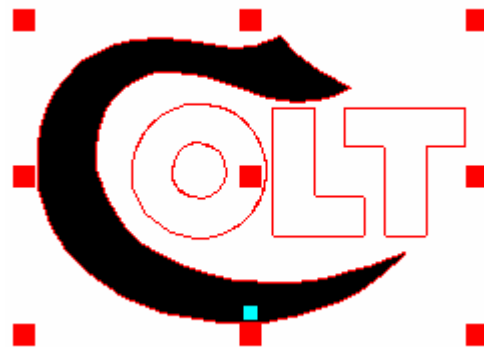


Figure 7-11 Logo Grouped, Filled Contours Viewing mode

... Next, we'll ungroup our selection. This is a matter of good practice; we want to make sure that we start off cleanly for the next step. Our logo will look as it appears in Figure 7-10, with everything filled, including the inside of the letter "O".

- ... Next, we'll group the selection and see the result in Figure 7-11. There's a prob-

lem. Only the “C” is filled!

We’ve previously learned that ungrouping and then regrouping a logo causes GravoStyle to order contours so that they fill correctly. What happened? Let’s investigate.

... First, we’ll once again ungroup the entire logo so that we can deal with individual vector contours.

... We’ll next click on the letter “T” and drag it away. When we do, we’ll find that there were two of them (Figure 7-12). We’ll delete the one we dragged.

... We’ll next drag the letter “L” away, and we’ll find the same thing. We’ll delete the extra “L”.

... We have one more to go. We’ll select the letter “O” and drag and delete it too. ***(Don’t forget - these letters are not text - they’re really a collection of curves and lines that happen to look like text. The outside and the inside circles of the “O” are ungrouped, and therefore separate, contours. We’ll have to select both of them.)***

We’ll now select everything (Control-L), ungroup and then group the logo. The logo is now correctly filled, as shown in Figure 7-15.

in



Figure 7-15 Logo Ungrouped Then Grouped

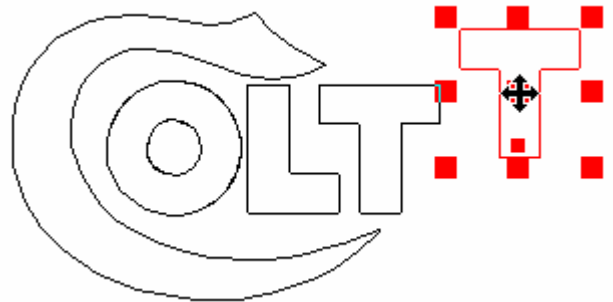


Figure 7-12 Ungrouped Letter “T” Dragged Away

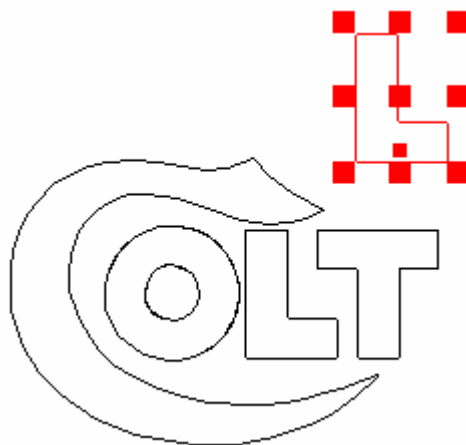


Figure 7-13 Ungrouped Letter “L” Dragged Away

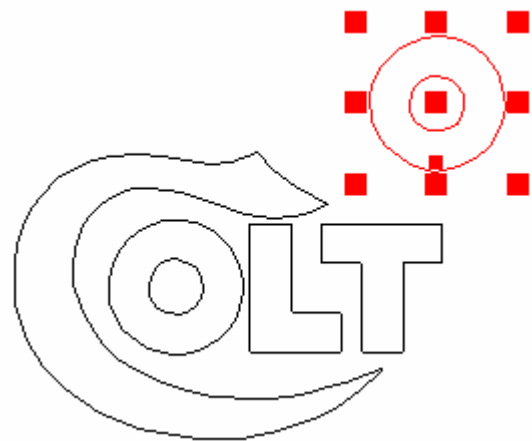
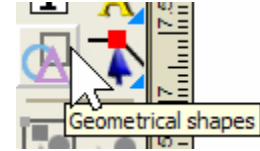


Figure 7-14 Ungrouped Letter “O” Dragged Away

Look Further

When GravoStyle groups a vector object, the program sorts the contours for filling purposes. It starts with the outermost one and marks it for fill until the next inner contour is reached. The fill stops until the next inner contour is reached and then filling resumes. This goes on until all of the object's contours are similarly sorted.

What went wrong with our logo? When GravoStyle does its sorting, it doesn't know how we want it to treat contours that are identical and that are exactly on top of each other. They're certainly two separate contours, but there isn't any space between them to fill.



We can check this, if we want, by clicking on GravoStyle's "Geometrical shapes" tool and selecting, say, the "circle" tool from the pallet that then opens. Draw a circle by clicking anywhere on the work area of the screen and drag the mouse with the left mouse button still held down. When we're through, we can copy the circle and paste it in place by clicking the top toolbar's "Paste" icon. We'll now have two identical circles on top of each other. We can then select both of them group them and view them in GravoStyle's filled contours mode to see if they'll fill.

They won't!

STEP 5: EDIT THE LOGO

Now we'll look critically at the logo, and we'll do this in wire view mode.

The letters "C" and "O" look like they need some work. The two contours of the "O" are not smooth circles and the left side of the "C" is flattened.

These two letters are shown in a zoomed-in view in Figure 7-16.

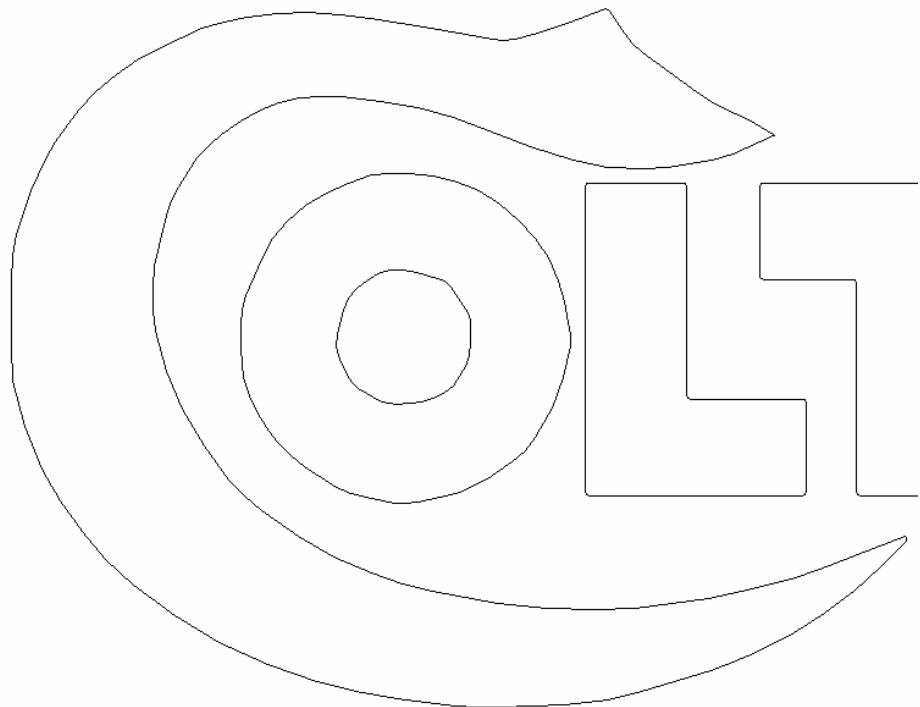


Figure 7-16 Enlarged view of the Letters "C" and "O"

We'll edit the letter "O" first:

... We'll select one of the contours of the "O". (We'll start with the inner one, but it doesn't really matter which one we do first.)

... We'll next click on the "Special effects tools" icon on the left toolbar (Figure 7-17), and the "Special effects" tool pallet will open.

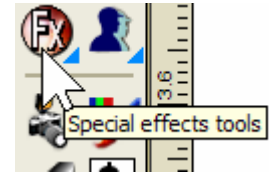


Figure 7-17

Look Further

Notice that the "Special effects" tool is one of nine tools on the left toolbar that have a small blue triangle at the lower right corner of their icons. The triangles signal that a tool pallet will open when these tool icons are clicked.

... We'll click on the tool whose tool tip reads "Convert to Circle/Ellipse/Rectangle" (Figure 7-18).

... A new dialog window titled "Convert to a shape" will open and it will let us convert the selected contour to either a circle, an ellipse or a rectangle. We'll choose the circle by clicking on it's button, and then we'll click "OK" (Figure 7-19).

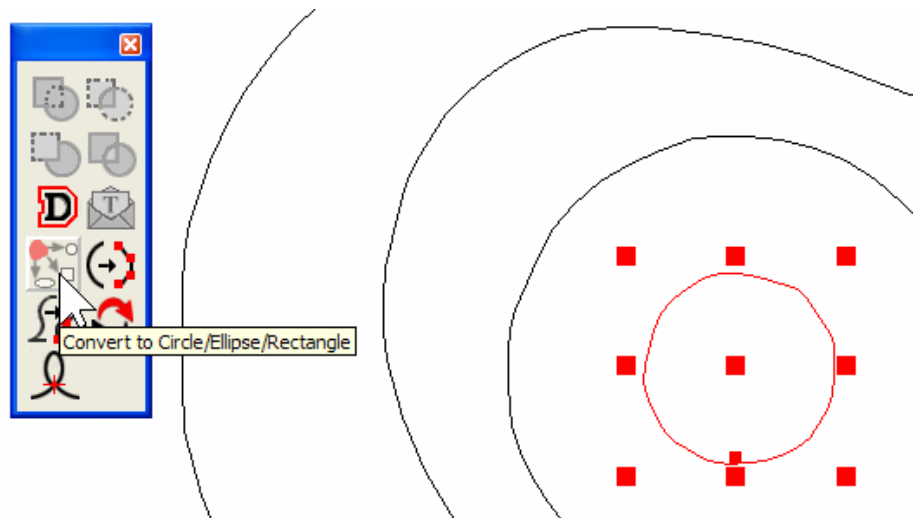


Figure 7-18 "Convert to Circle/Ellipse/Rectangle" Tool

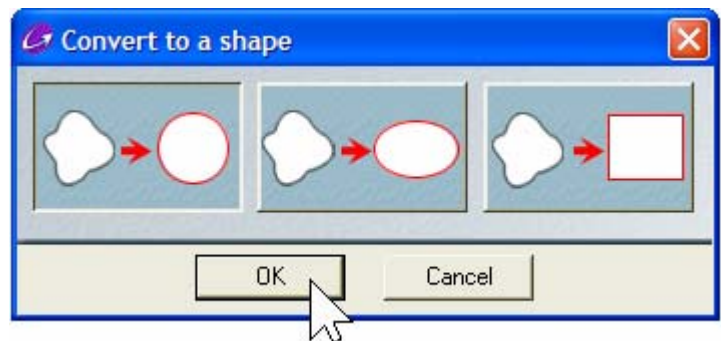


Figure 7-19 "Convert to a shape" Window

The inside of the “O” will now be converted to a perfect circle as shown in Figure 20!

We’ll similarly convert the outer contour of the “O” and the completed letter is shown in Figure 21.

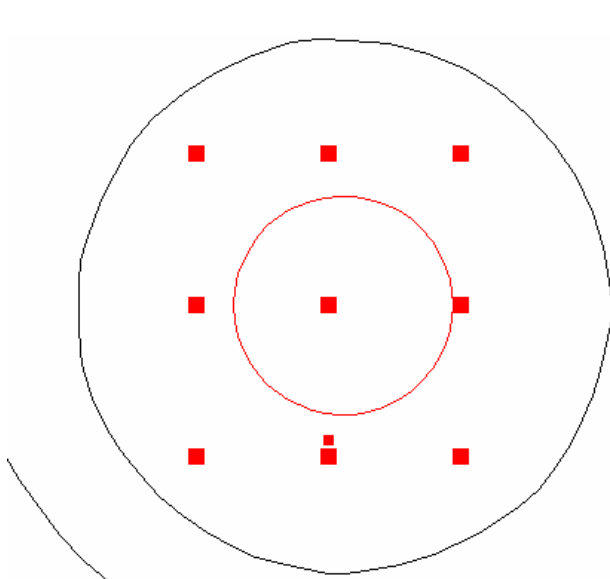


Figure 20 Inside of “O” Converted to Perfect Circle

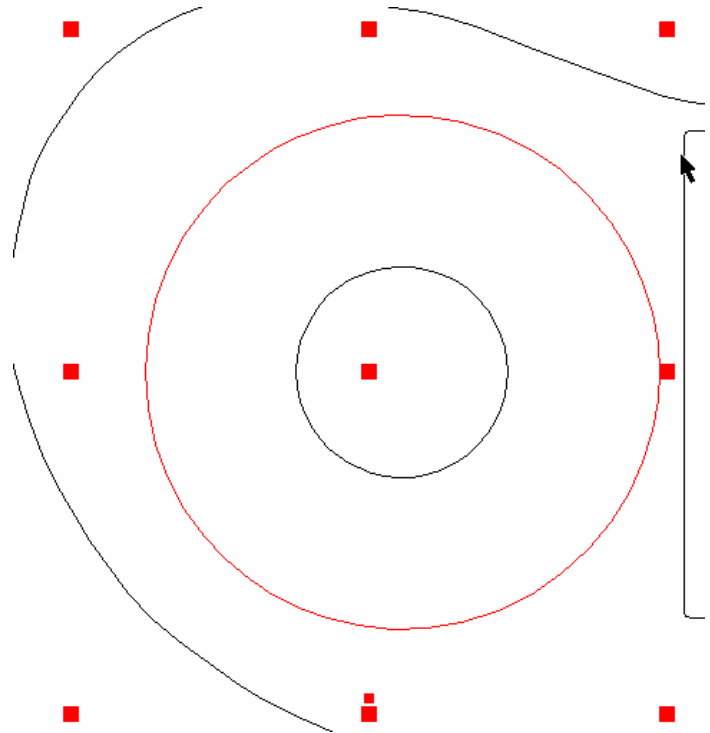


Figure 21 Outside of “O” Converted to Perfect Circle

We’ll now correct the flattened left side of the “C” (Figure 7-22):

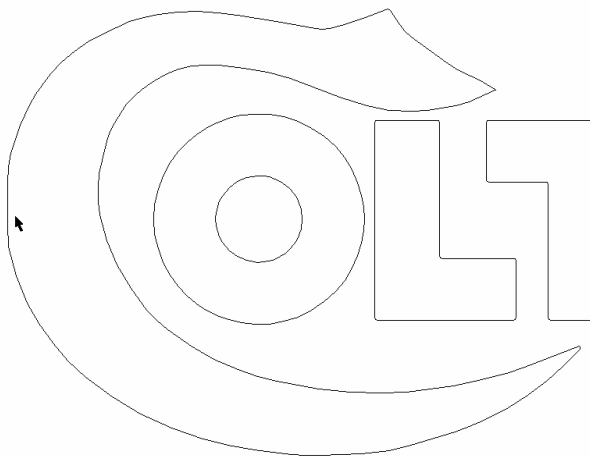


Figure 22 Left Side of “C” Flattened

... We’ll make sure that our logo is entirely ungrouped and select the “C”.

... Next, we’ll click on the “Point mode” tool (Figure 7-23) and open its pallet.

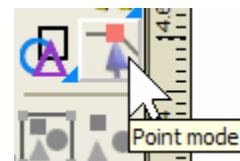


Figure 7-23

Figure 7-24 shows the point editing tool pallet opened. Note that the selected contour (the “C”) is now shown with the points that define its contours and lines.

The point editing pallet has no less than 25 powerful tools that let us edit vector contours in many ways. We’ll just use two of them on this job.

The first tool that we’ll use is the one whose tool tip reads “Convert to arc” (Figure 7-24). This tool lets us select two points on a contour and convert the segment between them to a perfect arc of a circle. Here’s how it works:

... First, we’ll click on the “C’s” contour near one side of the flattened area (Figure 7-25). Notice that the cursor shape has changed, indicating that we’re in point edit mode, and that the cursor now has a small graphic added near its bottom to indicate the function of the tool that we’re now using.

... Next, we’ll click on the other side of the flattened part of the contour (Figure 7-26).

... We’ll notice that an arc now appears between the two points. We can change the arc’s radius by dragging the mouse cursor along the path of the arc. If we go too far, the arc will reverse to the other side of the contour.

... When the arc looks OK, we’ll let go of the mouse button.

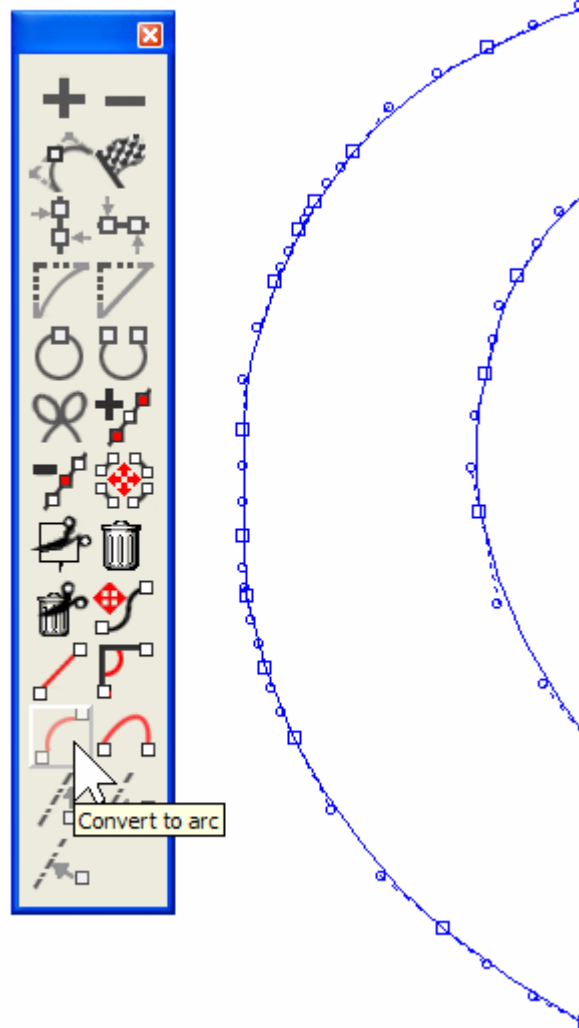


Figure 7-24 Point Editing Tool Pallet

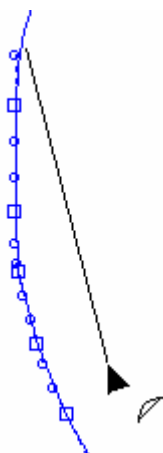


Figure 7-25
 Convert To Arc Tool
 First Point Placed

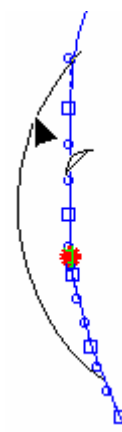


Figure 7-26
 Convert To Arc Tool
 Second Point Placed

... We'll click on the selection tool's arrow to exit the point edit mode so that we can see the result more clearly, and our logo will look as it appears in Figure 7-27.

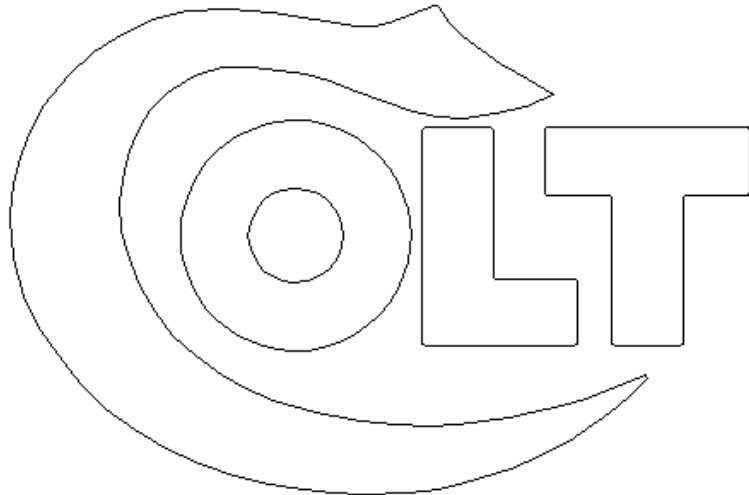


Figure 7-27 Letter "C" Corrected

Look Further

There is a special case which may occur when we use the "Convert to arc" tool. In the figure to the right, the cursor is near a point on the contour on the bottom of the "C". This particular point is different from any of the other points on the contour. It has a small rectangle inside a larger rectangle. This point is called the "Start Point" and it's literally the place on the contour where our cutting tool will begin (and end) the machining of this outline.



The "Convert to arc" and several other point editing tools work with the rule that they will not include the start point in any segment that they are modifying. If we select our two anchor points for these tools so that they bridge the start point, the tool will do its work in an unexpected way. Instead of modifying the smaller segment that we think we chose, the larger length of the contour that does not include the start point will be modified.

How then to apply these tools to a segment that contains the start point? Just hold down the shift key on the keyboard while we select the two points. A red dot will appear in the center of the start point to indicate that all is OK and we can release the shift key when we've selected the second point. When the edit is completed, the start point will be seen to be moved to one side of the modified segment.

We'll now look at the letters "L" and "T". Their corners are slightly rounded, but these corners in the original logo are square. We'll use one of the point editing tools to quickly correct the left corner of the bottom of the "T" (Figure 7-28). Here's how:

- ... We'll zoom in on the bottom-left corner of the "T" and select the contour.
- ... We'll re-enter the point edit mode by clicking on its icon on the left toolbar.
- ... Next, we'll select the tool whose tool tip reads "Convert to angle" (Figure 7-29).
- ... In similar fashion to the "Convert to arc" tool, we'll select two points. Any two near the corner will do (Figure 7-30).

We'll drag the mouse cursor until we see the corner we want (Figure 7-31) and release the mouse button.

Our completed squared corner is shown in Figure 7-32. We can similarly square the remaining corners of the "T" and the "L".

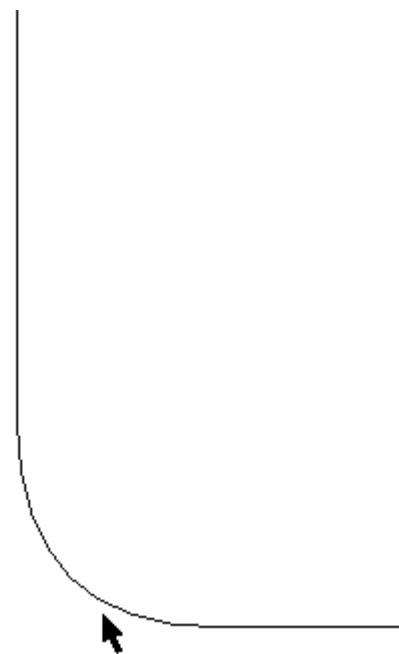


Figure 7-28 Bottom Left Corner of the "T"

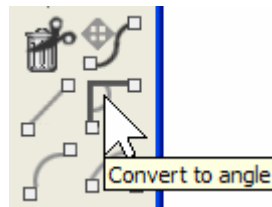


Figure 7-29

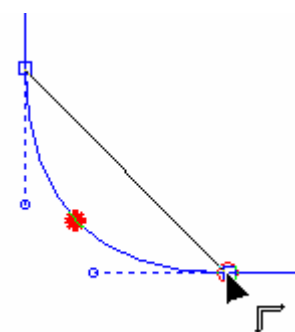


Figure 7-30 Convert to Angle Tool

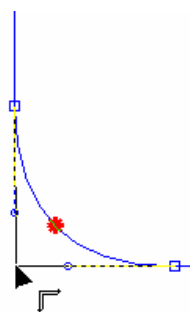


Figure 7-31 Corner Squared Off

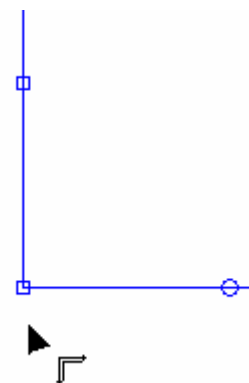


Figure 7-32 Completed Square Corner


Look Further

We can move points on a contour directly with the point edit mode cursor. We have only to grab a point with this cursor and drag it to wherever we want. This is a simple way to edit if our contour has only a few errant points that require changing.


We're now finished and our logo will look and fill as it's shown in Figure 7-1.

REMEMBER TO SAVE YOUR WORK!

Look Further - The following is a reproduction of GravoStyle's help screen for point editing:

Working in Point mode  **Function**


























This mode allows you to retouch a vectorial contour line by editing its **points**.

1.  Click in the **toolbox** to activate the Point mode.
2. **Display 2D XY view for the composition.**

▶ Using the pointer, you can

- » **Select points**
- » **Move a point**
- » **Modify a point's attributes**

• By clicking a tool in the **Points palette**, you can:

Manage points	» Connect/Disconnect two points	» Manage contours
 Add  Delete  Refine a contour  Simplify a contour	 Connect  Disconnect  Auto-connect	 Move  Delete
» Modify the nature of a point	» Produce an angle from a point	» Convert a segment
 Continuous point  Start point	 Rounded  Chamfered	 Into a line  Into an angle  Into the arc of a circle  Into a curve
» Align points	Cut a contour	» Project a point onto a guide
 Vertically  Horizontally	 Cut  Cut and crop  Divide	 horizontally  vertically  orthogonally



WHAT WE'VE LEARNED

In this job we've learned:

- ... How to import a bitmap graphic
- ... How to vectorize a bitmap graphic
- ... Some steps to troubleshoot a vectorized image
- ... How to enter the point edit mode
- ... How to use some of the point edit mode tools
- ... How to use one of the special effects tools