# *Preparing Photos for Laser Engraving*

# Lasering Photographs                    November 2008

## Tips for Laser Engraving Photographs

There is a lot of interest in laser engraving photographs, but sometimes users get discouraged when they can't produce the same quality images with their machines that they see on display at trade shows. The following information will provide some strategies for experimenting with photos so that you can become comfortable lasering photos for your clients. Keep in mind that there is no one "correct" method of engraving photos. A lot of it is personal preference learned through experimentation, but there are a few techniques that virtually anyone who laser engraves photos will find useful.

Give these strategies a try. We've tried to break down the process into small, easy to understand concepts, that can be used individually or grouped together. When you're going through the instructions, make your own notes and keep samples that you like so you can refer to them the next time you engrave a photo. These notes and samples will be a great resource to you in the future!

Don't worry about becoming an instant expert. Try one thing at a time. Taken individually, these concepts are pretty easy to follow, and once you understand the individual concepts, putting them together becomes quite easy!

- ➤ **Getting Started** - The first thing you should do if you are new to photo engraving is set aside some quiet time to practice and get familiar with the process. There are probably some concepts here that are new to you, so it will be beneficial to try some of these ideas without distraction.

- ➤ **Different Materials** - A single photo is going to engrave differently from one material to the next. Many users like to use black marble for their photos. Black anodized aluminum, black plastic, clear acrylic, and wood are also popular materials, but they all engrave differently and you will need to compensate for the material.

- ➤ **Artwork** – Not all photos are going to engrave well. Photos that laser best are photos that contain a wide range of light to dark shades and everything in-between. Photos with large areas of a single color typically do not engrave well – especially when working with wood.

- ➢ ***Software*** – Virtually any graphics software has the ability to modify a scanned or digital photo to work with the engraver.  This tutorial addresses only CorelDraw and Corel Photo-Paint version X4, but the principles and tools apply to other packages such as Photoshop, etc.

  There are third party software packages available that are designed specifically for preparing photos for laser engraving: PhotoGrav and CadLink's EngraveLab called PhotoLaser are two of the more popular. These software packages cost $400 to $500 and have some nice features that may make your photo manipulation easier than using Corel alone.

  PhotoGrav or PhotoLaser are designed to make the photo process a matter of a couple of mouse clicks instead of going through the processes listed in this paper.

- ➢ ***Engraving Resolution*** – Most photos look better if they are engraved at lower resolutions than standard engraving projects. Resolutions of 200, 300 or 400 DPI are commonly used. The resolution that you use for engraving is important to know before you start the manipulation process because some of the processes used to manipulate a photograph are resolution dependent. Because of this, and because most users engrave photos at 300 DPI, all of our processes are going to assume that we are going to engrave at 300 DPI. But don't worry too much about this. It's nice to know that there is a difference, but it's also doubtful that you or your customers will be able to tell if you processed a photo at 300 DPI and engraved it at 200 DPI.

- ➢ ***Dot Gain*** - Taken together, the adjustment of the variables discussed above (material, the photo, engraving resolution) can be grouped together and given a term that's familiar in the printing industry – ***dot gain***. What we're really doing when we adjust a photo is just adjusting the number and spacing of the dots to produce an image that is pleasing to the eye. Since different materials handle dots differently, we need to take that into account by adjusting the dot gain Although for laser engraving, we're almost always trying to reduce the number of dots, we almost never try to gain dots.

  If you try to think about processing a photo for laser engraving as reducing the number and spacing of dots it may help make your life easier when engraving photos.

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## *Determining the suitability of a photo for engraving*

There are several considerations that need to be taken into account when determining whether a photo is suitable for engraving:

- o Ideally a photo will show many gradations of color from light to dark.
- o The photo will show good focus and definition of detail.
- o The photo should have good contrast and focus.
- o It should be interesting. By this we mean that it should have a number of different elements to look at. In the photo below the hands break up the face and hair and the face itself is nicely shaded with features that are very distinct.



This photo is excellent for lasering because most of the photo is a gradient pattern of light to dark. There is not much in the way of big blocks of color and there is a lot of detail to make the photo really pop when lasered.

- o In contrast to the photo above, the next photo is not as suitable for engraving.

This photo will only engrave well if the black background is taken out. Leaving the background intact will detract from the engraving by producing a large area that contains nothing to look at.

With that said, this photo can actually be saved with a little processing that we will show later on, but in general, photos with large blocks of uninterrupted color will not engrave well without some manipulation.

## <u>Acquiring a Photo</u>

Either scan an actual photograph, or download a photo from a digital camera.
- o **Scanning Resolution** – Scan your photos at the resolution you plan using for engraving.  If you're going to engrave at 300 DPI there is no reason to scan at a higher resolution.
- o **Color or B/W** – Scan your photos in color mode if possible. You can even scan a black and white photos in most scanning software.  There are subtle advantages to using color that will be explored later.
- o **Digital images** - Make sure you get the highest resolution digital image you can. Low resolution photos from the Internet are almost never suitable for engraving. If you look hard you can occasionally find high resolution graphics on the Internet, but the vast majority of images are low res and too small in size to be useful.
- o **Size** - Get the largest size image available.  Simply stretching a photo in Corel is going to reduce the resolution of the image and if the photo is stretched too far, the photo will become too pixilated to engrave.  We will show how to properly stretch a photo later on.

## *Cropping*

Depending on the photo and the project there are a variety of ways to crop a photo. This part of the tutorial will show several techniques that are commonly used.

The simplest method is to use the ***Crop*** tool in Corel.
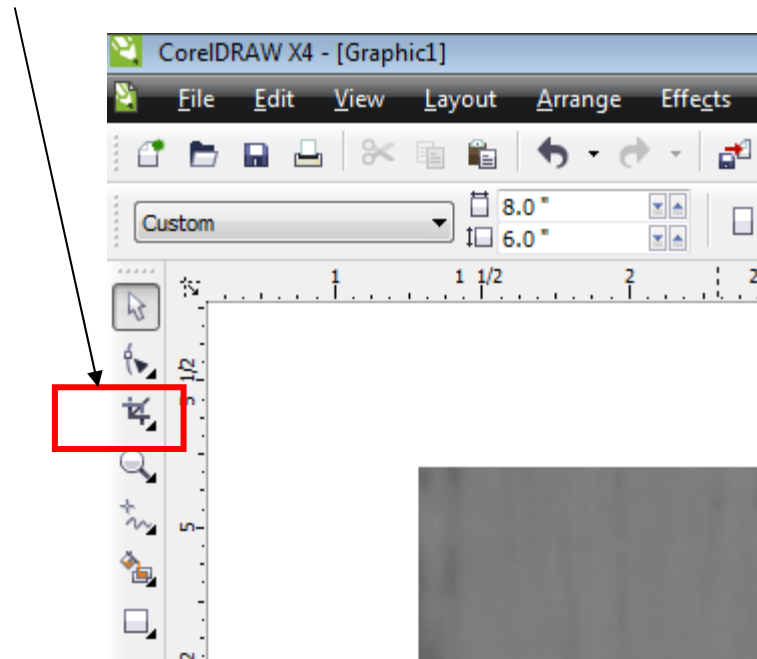


Select the ***Crop*** tool, click and drag your mouse across the area you want to protect and then release your mouse. Double click in the protected area and that's all there is to it. The ***Crop*** tool only allows you to crop a rectangular area, but it is a very useful tool for many applications.

### *Cutout Lab*

Sometimes cropping involves getting rid of an irregular area of the photograph. Corel Photo-Paint provides a very simple tool to do this. Either open Corel Photo-Paint or select the photo in CorelDraw and click on the **Edit Bitmaps** button in Corel:
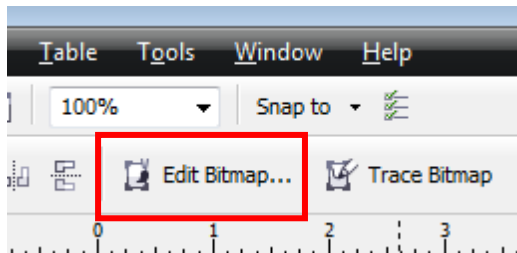


Clicking the **Edit Bitmaps** button takes your photo directly into Corel Photo-Paint.

IN Photo-Paint, go to Image, and then click on **Cutout Lab**.
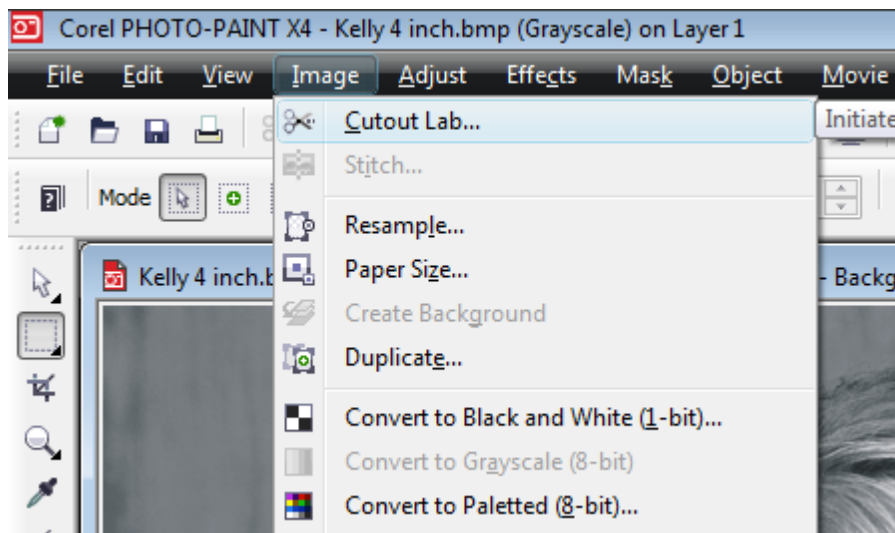
We're going to use a different photo to show how to use *Cutout Lab* to crop out the big dark area of a photo that we know will not engrave well.

Use the *Highlighter Tool* and trace around the outside edge of the area you want to keep. Notice that you can change to size of the *Nib*. This helps to easily define the area you are going to crop.
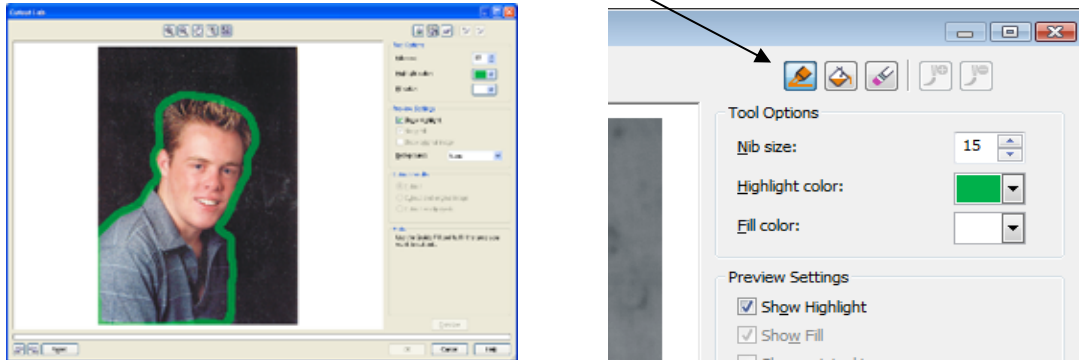
After outlining the photo, use the *Inside Fill* tool and click anywhere inside the area that you want to keep.

*Inside Fill* Tool
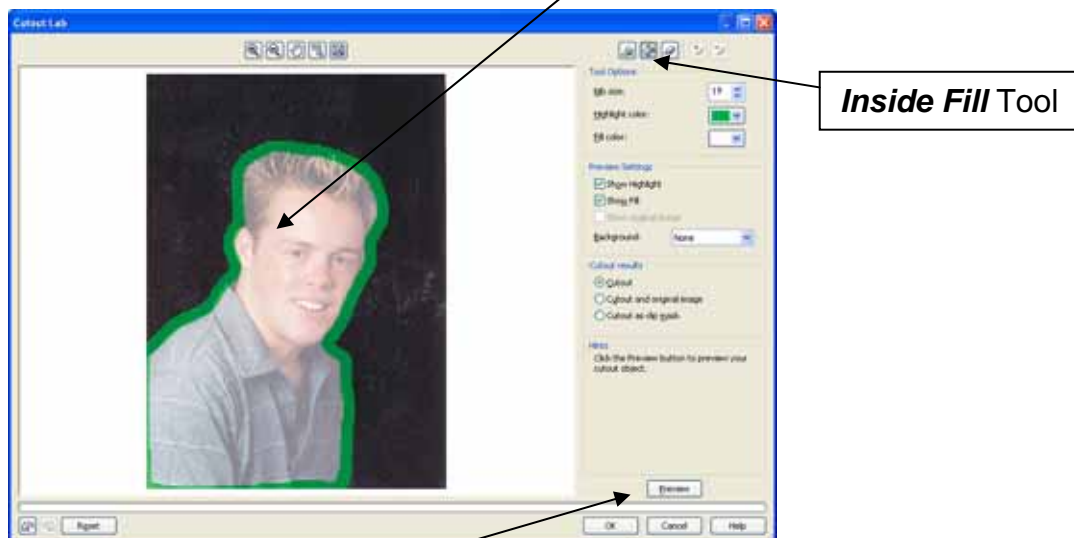
Click on *Preview* to see your results.

After clicking on *Preview* you can use the *Add Detail* tool or the *Remove Detail* tool to fine tune your photo.

After using the Add and Remove fill tools to refine the cutout, the photo looks much better and is ready for use.

Click *Okay* to view the finished photo. Save the finished photo form Photo-Paint and import it into CorelDraw.
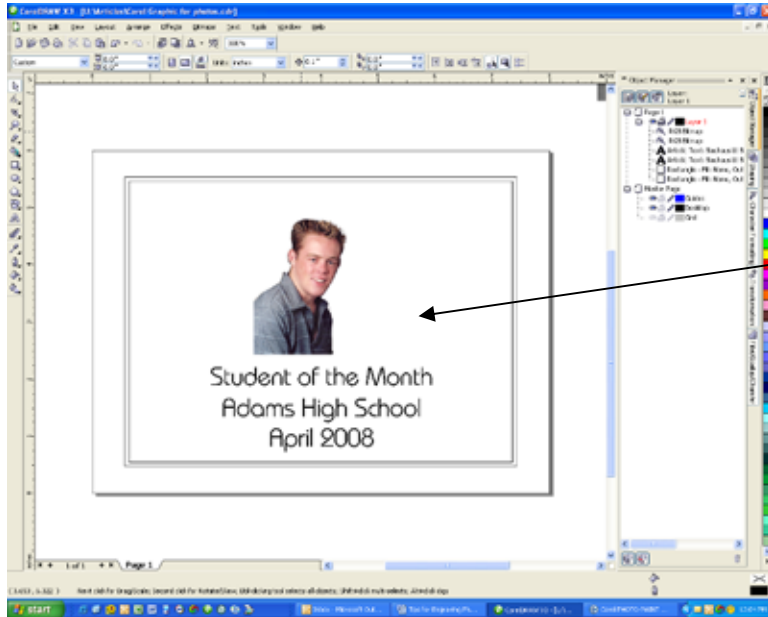
You now have a cropped photo that's ready to use.

### Mask Tools

Photo-Paint offers a number of tools that allow you to crop in many different ways. These tools are called the Mask tools and are found in the **Mask** tool fly out:



The **Mask** tools require a little more effort to use, but it is worth the time to look into them.

You will gain an understanding of how they work when we use the **Ellipse** tool in the next section.
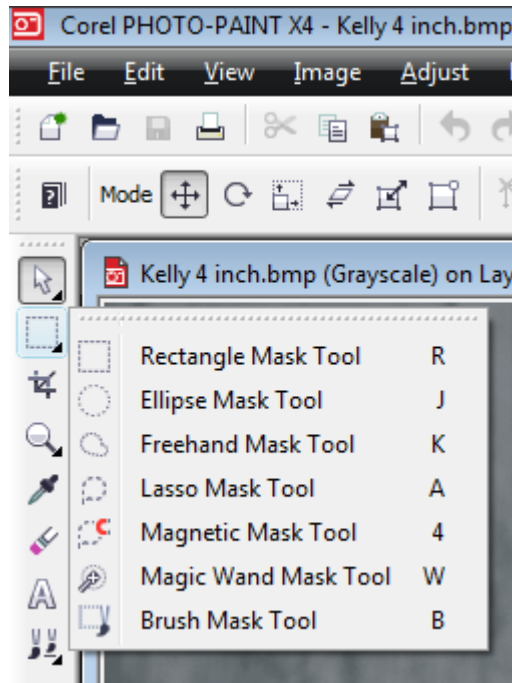
### Creating a Vignette

A vignette is an image that has been cropped in a way that produces a soft feathered edge to the area being cropped. This is a little more involved method of cropping, but the effects created are very pleasing.

It's necessary to carefully follow the order of these next steps. Until you gain an understanding of what the steps do, following them in order will make this a very easy task.

First, open a photo in Photo-Paint, or select a photo in CorelDraw and use the Edit Bitmap button that we used earlier. The next step is to setup Photo-Paint so you can modify the photo.
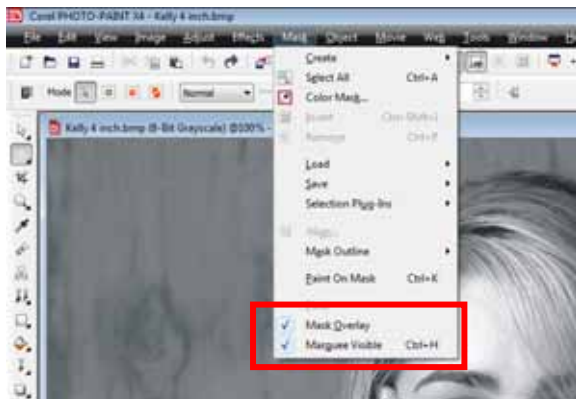


First, Click on the **Mask** menu and make sure both **Mask Overlay** and **Marquee Visible** are activated (they should have a check next to them).
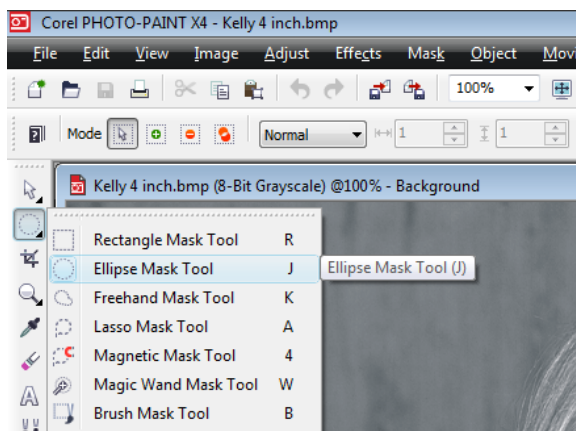


Next, select the **Ellipse Mask** tool from the Tool Bar. Most users use the **Ellipse** because it provides a nice oval with which to frame the face.



With the Marquee tool selected, your marquee tool options will appear. Click on the Normal Mode tool (next to the word Mode).

Set your **Feather Mask** Width to 99.

That's all the set up you have to do.

At this point we're ready to select the area we want to keep and create our vignette. Move your Ellipse Marquee Tool to a starting point on the photo and click and hold down the mouse. Then, drag a circle (ellipse) across the face in the photo. Move your mouse around until the marquee defines the area you want to keep and then release the mouse.

Photo-Paint does not allow you to easily change the selected area. One of the easiest ways to select the area you want is to start from the middle and hold the shift key while you drag your mouse. This will generate a marquee from the center. Practice a couple of times until you get used to it.
When you release your mouse, the mask will show up.



The mask shows up as an orange overlay. It's important to understand that everything under the orange overlay Mask is protected and cannot be modified. This will be important for some applications later on.

Notice that the oval around the face is fuzzy. This is a result of setting the Feather value from the previous page to 99. If you want a sharper edge, you can lower the feather value and redraw the mask, or, if you like where the mask is, go to the **Mask** menu, **Mask Outline**, **Feather** and the Feather dialog box will appear.
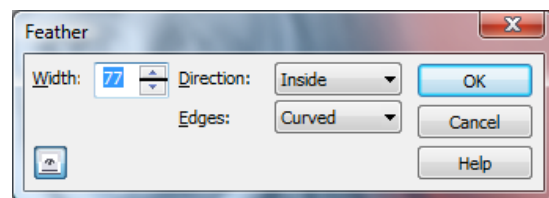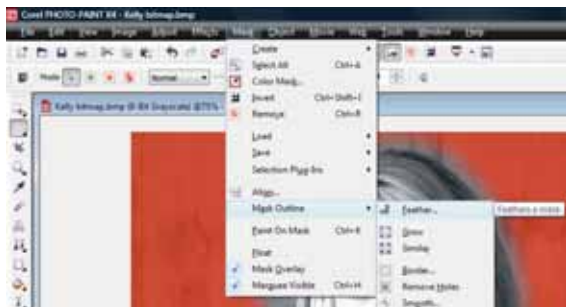
Use the *Feather* box to make adjustments to the mask. Double click on the eye icon to view your changes.
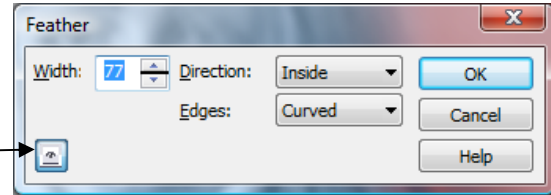


Once you have the vignette the way you want it to look, you're ready to delete the background and save the image.

To delete the background area we need to invert the mask. Remember that everything under the mask is protected. Now we'll protect the face, and delete the background.
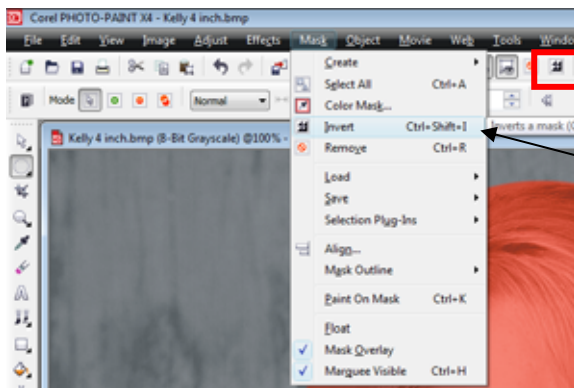


To invert the mask and protect the face, just click on the *Invert Mask* button.

Alternatively, from the *Mask* menu, click on *Invert*.
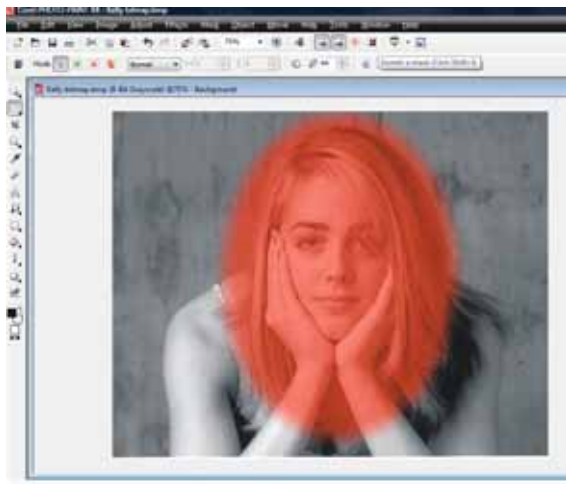


Now the mask shows the area that will become our vignette.

To delete the background, click on the *Fill* tool (the little paint bucket):
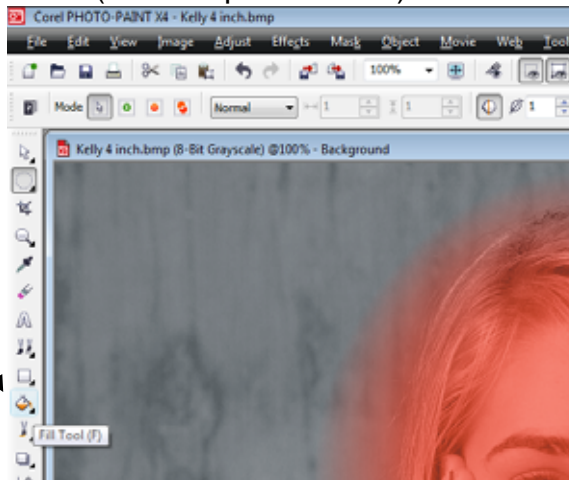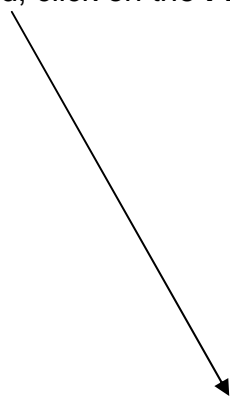
Move the *Fill* tool anywhere on the photo and press the Delete key on your keyboard. Your photo will now look like this:
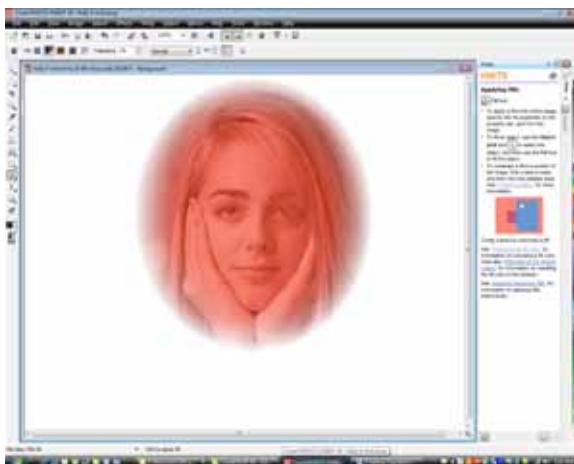
That's it! You have quickly and easily eliminated the background and you now have a lovely photo with soft feathered edges ready for engraving.

You can now save the photo as a .bmp and then import it back into Corel. It's ready for laser engraving!

The only setting you may need to change is when you delete the background.

You may need to change your background color so that when you press the Delete key you create a white background. When you press Delete and it creates a background other than white, press Ctrl Z to undo the Delete.

Double click on the two overlapping squares that are the Background color icon. Don't click on the single square.
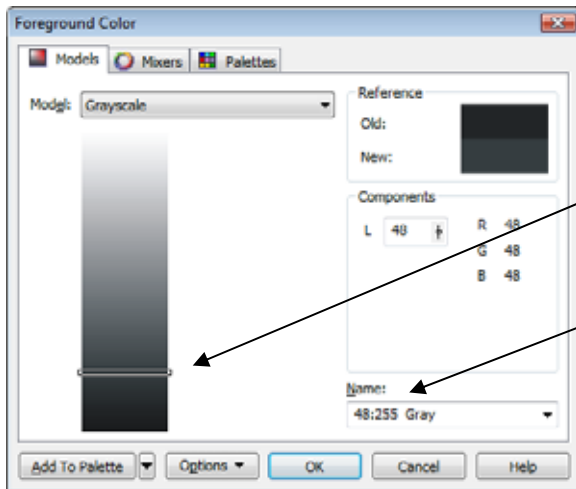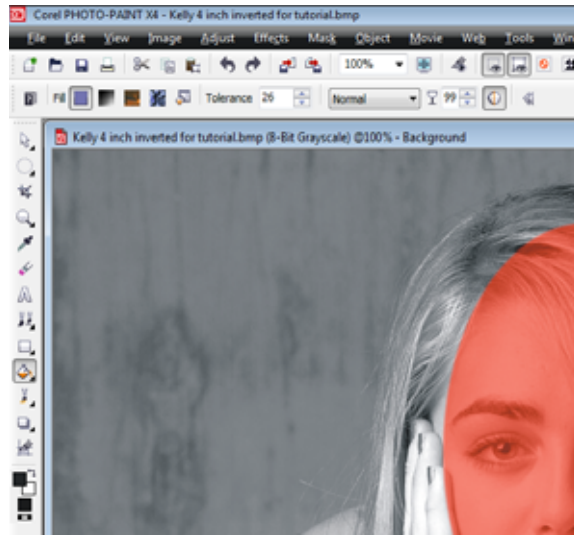
You should get the Foreground Color window. Move the slider bar all the way to the top to change your Background color to White. Once you move the slider bar up to the top, the Name will change to White. Click on OK.

After clicking OK, go back to your photo and then select the *Fill* tool again and press *Delete*. That should give you a white background and you can now save the photo.

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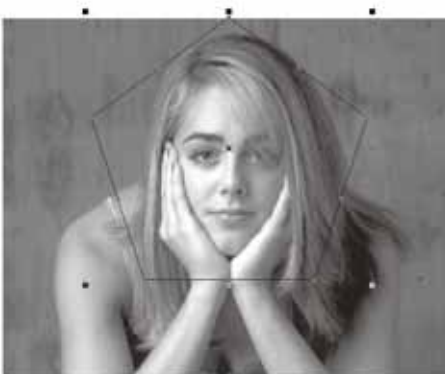
## *Cropping with the Place Inside Container PowerClip tool*

There is one more method of cropping that is popular. This is done in CorelDraw and is very easy to perform.
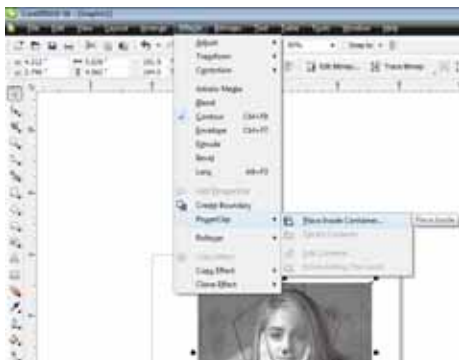
For this example we are going to place a photo in an irregularly shaped object – a pentagon.
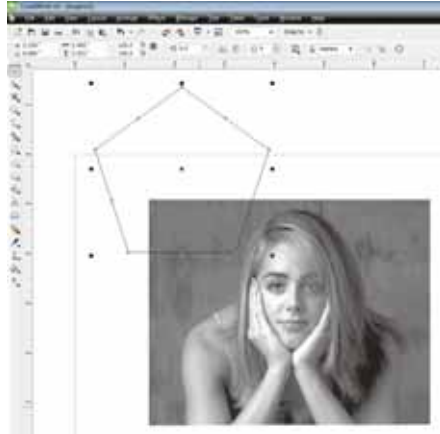


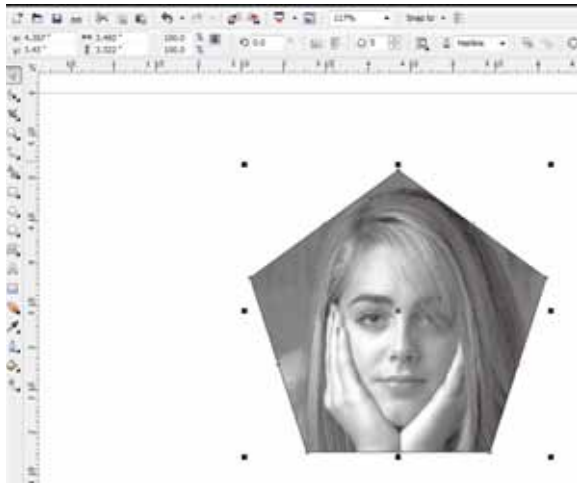First, place the object over the area of the photo that you want inside the object.



Next, select the photo and click on **Effects**, **PowerClip**, **Place Inside Container**



You will see a large black arrow



Use the arrow to click on the outline of the container object. You may have to zoom in to select the container.

You have now cropped a photo inside a container. You can use a container of any shape you can create.

## *Sizing*

Now that you've cropped your photo and it's in the form you want to use, we can now size it.

The photo below was downloaded from a digital camera. This sizing process is useful for any photo whether it was acquired from a camera, was scanned or came from the Internet. We've imported the image below into Corel and we want to engrave this photo onto a plaque. As you can see, it's about the same size as the plaque, so we need to shrink it. For most objects in Corel you would grab one of the corner handles and shrink or expand until it looked good. With a photo we need to take more care.
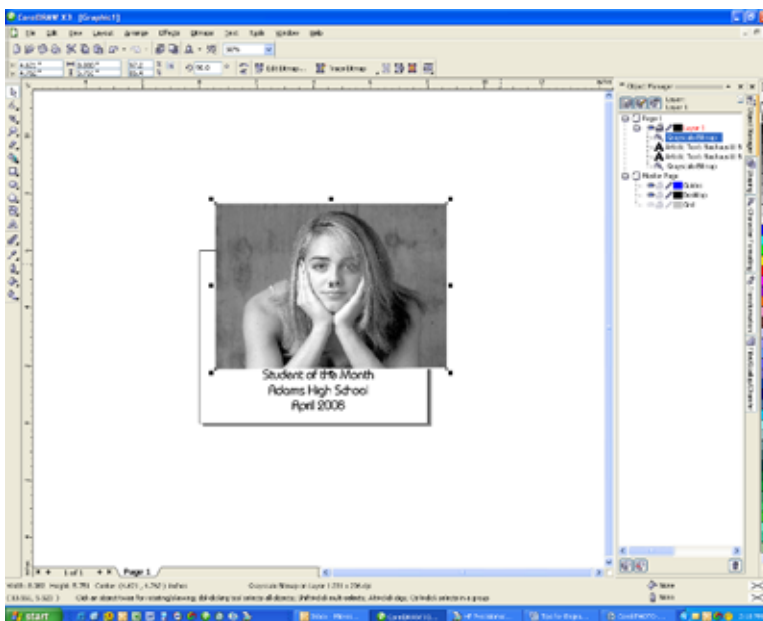


- o Before sizing the photo, make a duplicate of it first and move it to the side. Because we're going to manipulate the photo it's always good to have the original close at hand so we can start over if we want to.

- o Decide on the size the photo needs to be. Select the photo and use one of the corner handles to determine the appropriate size. Make a note of the size you want the photo to be after shrinking and then use Ctrl Z to undo it back to its original size.
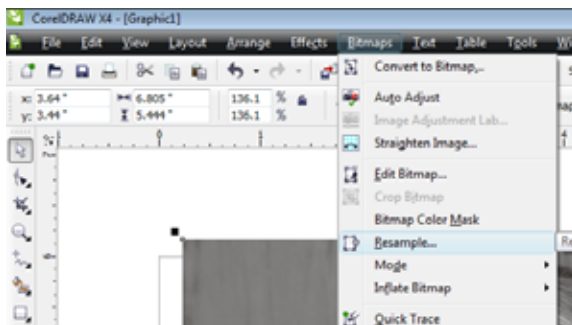
You should be able to see the size and location of the photo in the upper left corner of Corel. The following screen shot from Corel shows that the size we want the photo to be is 3.125" x 2.528".
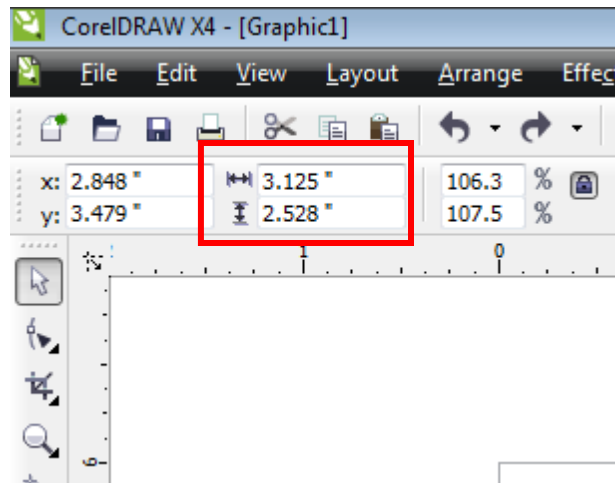


- o We're now ready to size the original photo. Select the original photo and click on **Bitmaps | Resample** in the Corel menu bar.

The **Resample** window comes up and, as you can see, there are two main parameters that can be changed; Size and Resolution.
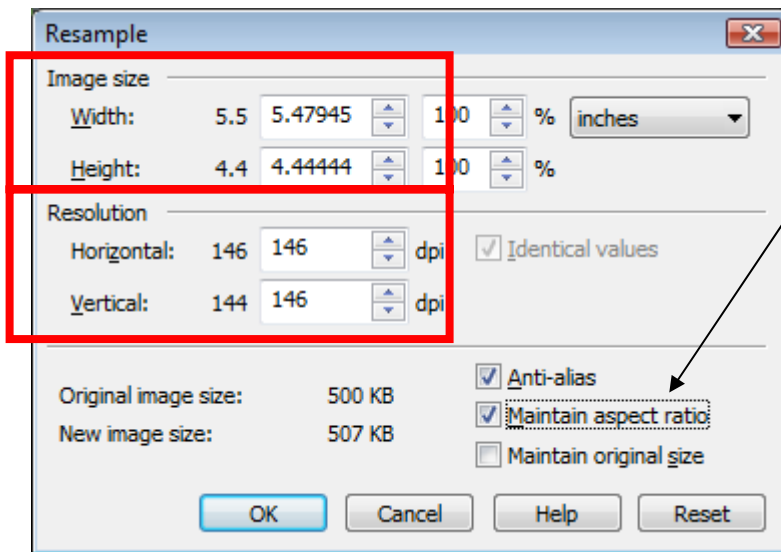


It's usually advisable to make sure **Maintain aspect ratio** is selected. You will see in the next screen shot that this forced the Height to be a very slightly different size, but the difference is so small (0.006 inch) you will never notice it.

Input the size (3.125 x 2.528) that we want the photo to be.

After setting the size, set the resolution. Since we're going to engrave using 300 DPI, set the resolution here to 300 x 300.
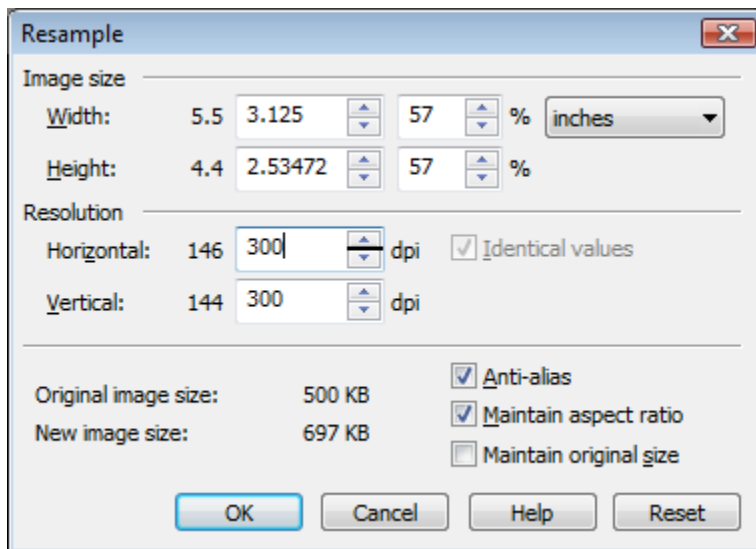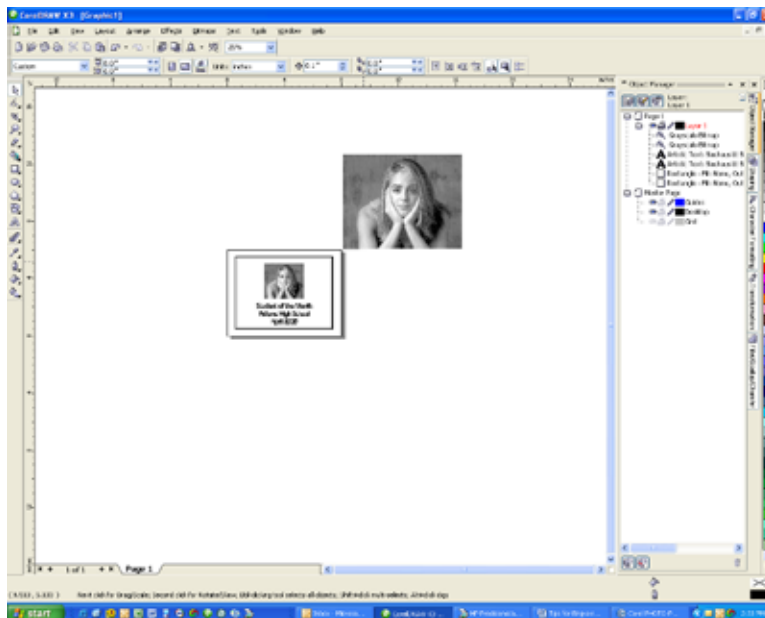


Click OK and you will go back to your Corel Page.

Notice that we now have a photo that fits the plaque with the original photo off to the side.

## Softening the Intensity of a photo

It is frequently the case that the photographs you want to engrave get washed out because they are too intense for the laser. This is because most photos are designed to be exceptionally high quality images and there is a lot more information than can be processed in a 300 DPI engraving.

This process can be performed before or after cropping and sizing with the exception of a photo inside a container. For this one process you will need to soften the photo before placing it in the container.

To soften a photo we want to just lighten it so it doesn't look washed out when engraved. You can do this in Corel or Photo-Paint.

You need to make sure the photo is in the correct format before you can adjust the intensity. In Corel, select the photo and go to **Bitmaps**. If the **Image Adjustment Lab** is grayed out, you will need to click on **Convert to Bitmap**
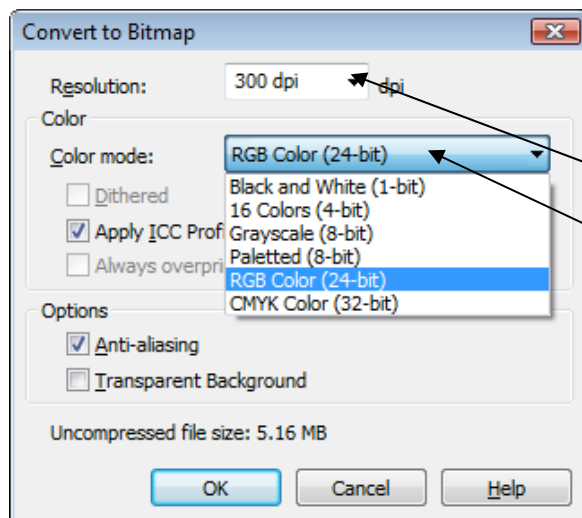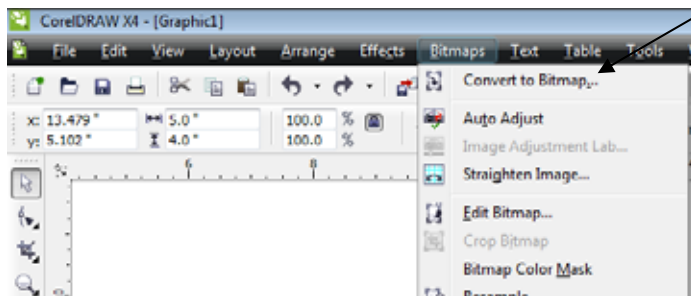




Set the Resolution to 300 DPI and the color mode to RGB Color (24 bit), and then click OK. This will convert your photo to a mode that can be adjusted.

Select the photo again and go back into the **Bitmaps** menu.

Click on **Image Adjustment Lab**.
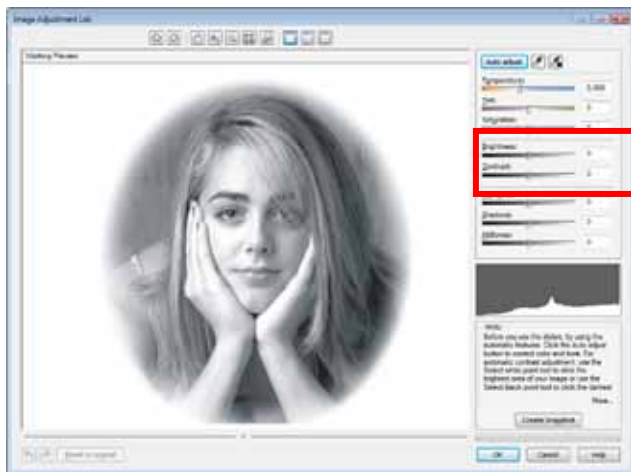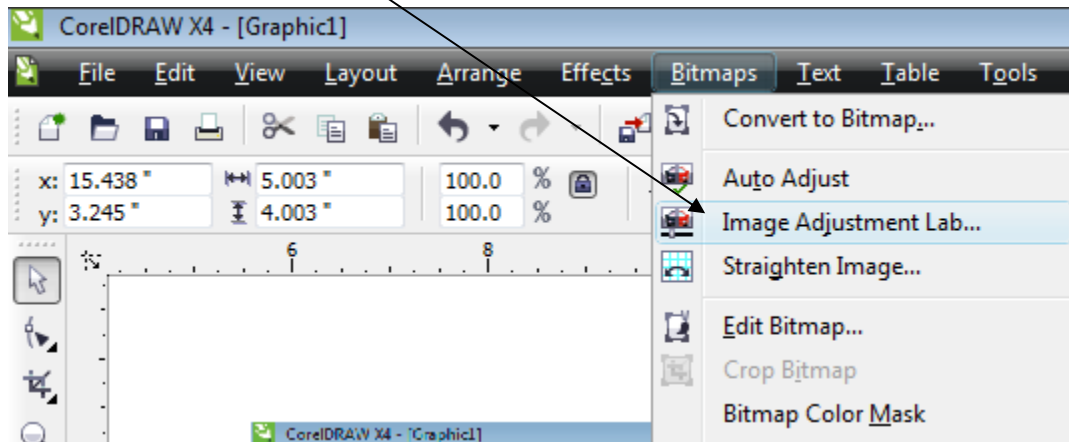




The **Image Adjustment Lab** has a number of settings that can be changed. Usually, just changing the **Brightness** and **Contrast** are enough to soften the photo.

Usually increasing the Brightness (we increased it to 30) and decreasing the Contrast (we decreased it to -20) is all that is needed. The photos below show the before and after effects.



| Before adjustment |
|---|



| After adjustment |
|---|

## Inverting a Photo

If you are engraving a photo on dark material like black marble or black anodized aluminum you are going to need to invert the photo before sending it to the engraver. Inverting is nothing more than converting it into a negative; although this can cause complications if you decide you want to invert the photo after all of your other adjustments have been made.

***It's usually best to invert the photo in the early stages of processing, so take the material you are going to engrave on into account before you begin!***

Many users have difficulty with negatives until they try it out a couple of times, so it's helpful to know how the laser works if you need to think about a negative (inverted) image. The way the laser works is that it fires wherever there is a dot in the artwork. For most engraving materials like wood or acrylic you are creating a dark mark wherever the laser hits the material. On material like black marble you are doing the opposite – you are creating white wherever the laser fires, not dark. Inverting just changes all of the black dots to white and vice-versa.
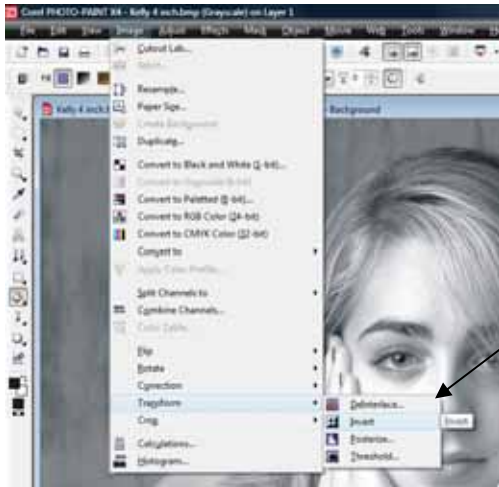
Inverting a photo is quite easy. In Corel, select your photo and then go to **Effects**, **Transform** and *Invert*.
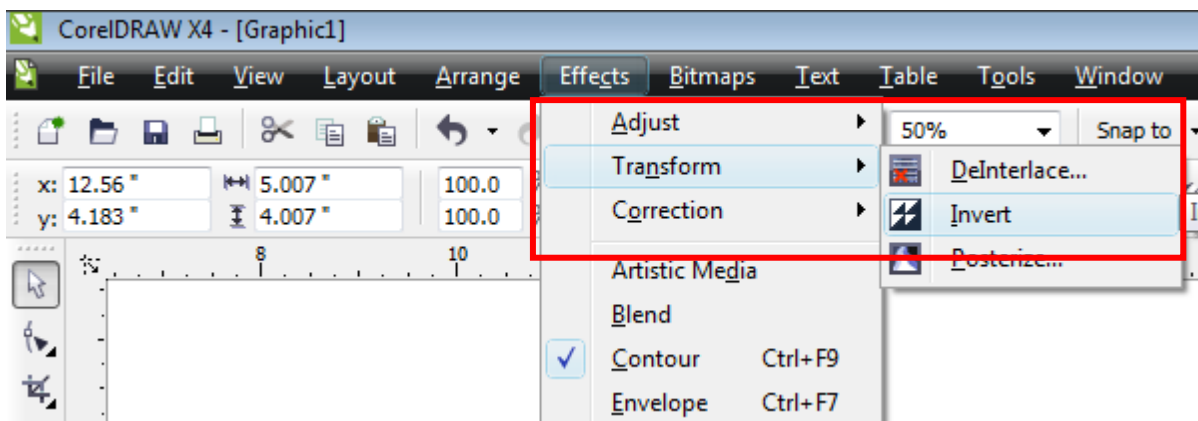
In Photo-Paint go to the **Image** menu, **Transform**, and then **Invert**.





| Before Inverting | After Inverting |
| --- | --- |

As you just saw, inverting is easy if you have not created a vignette or other boundary around the photo. If you have created a boundary you will run into the problem where not only is the photo inverted, the background is inverted as well.

To see what this means, let's look at a photo that was inverted before applying any processes and compare that to one that was inverted after all processes were complete. All of the steps were the same. The only difference was when the image was inverted.
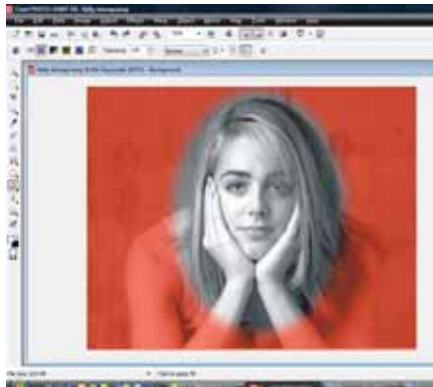


| Inverted before processing | Inverted after processing |
| --- | --- |

As you can see, there is quite a difference. To prevent this from happening is easy if you know you are going to need an inverted image. We will use the vignette to show the process when processing your photo.

In Photo-Paint use the *Mask* tool to create your mask area.



This is where we want to invert the image. To invert, go to the *Image* menu, *Transform*, and then *Invert*.
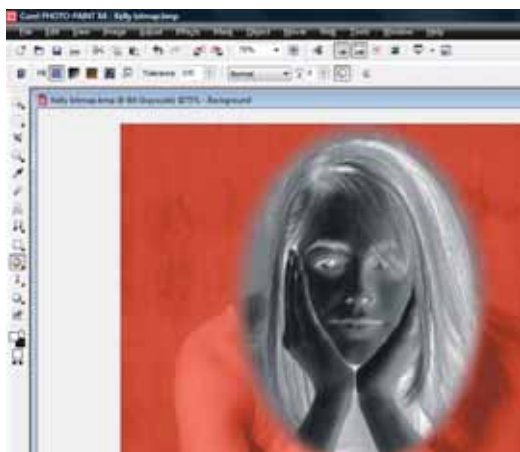




The face has now been inverted.

At this point you will probably want to adjust the intensity of the photo like we did in the previous section. Even though the image is now a negative, the process will be the same.

In the *Image Adjustment Lab*, increase the *Brightness* and decrease the *Contrast*.

Whether your image is a negative or positive, what you're looking for in the *Image Adjustment Lab* is an image that has a lot of gray in it.
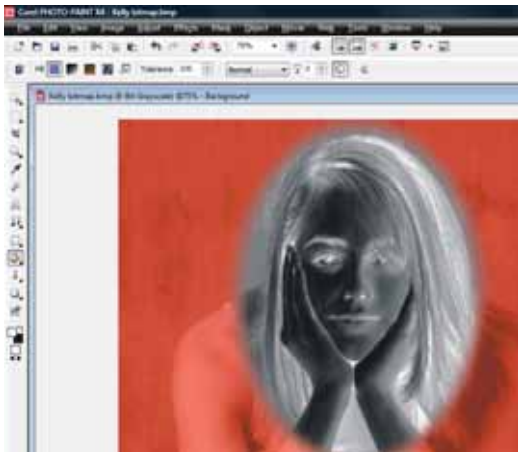


Before modification in Image Adjustment Lab



After modification in Image Adjustment Lab

Notice that there is a lot less black in the photo after modification. The image on the right will engrave onto black marble or anodized aluminum much better than the image on the left.

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At this point, your image is cropped and sized and could be ready to engrave.

The last step is to convert the image into a 1-bit Black and white image.  Converting to a 1-bit black and white modifies the dot pattern that is in the image and makes it more suitable for laser engraving.  Of course, you don't have to convert it, but most people like the converted look on most materials more than the non-converted look.

To convert, click on **Bitmaps | Mode | Black and White (1-bit).**
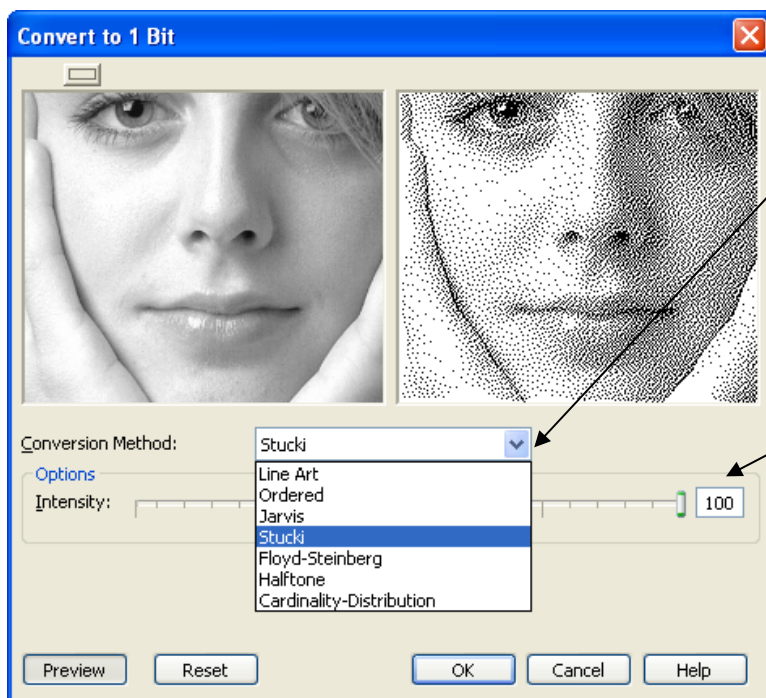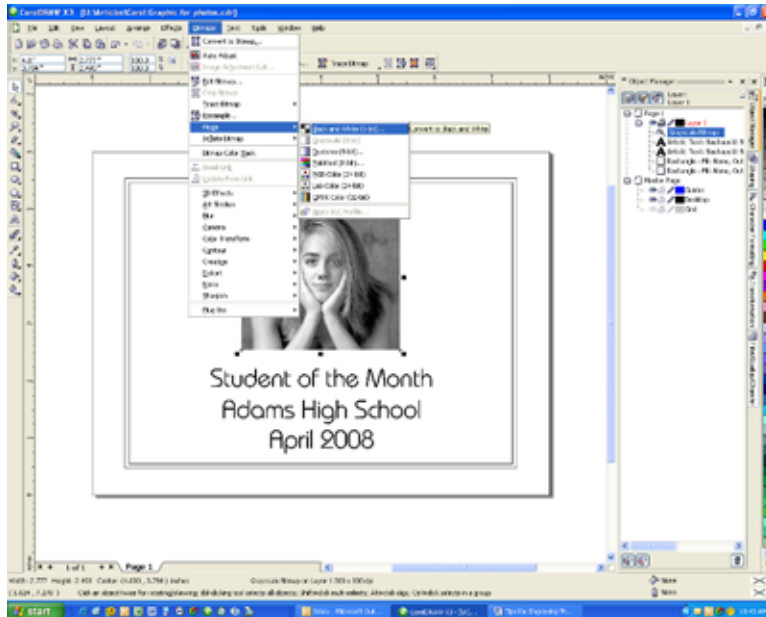




To convert, pull down the ***Conversion Method*** menu and select Stucki or Jarvis. These two are very similar and most users cannot tell the difference. Floyd-Steinberg is also a good choice.

Adjust the intensity after selecting the conversion method. Most photos will look best with an intensity setting between 80 and 100.
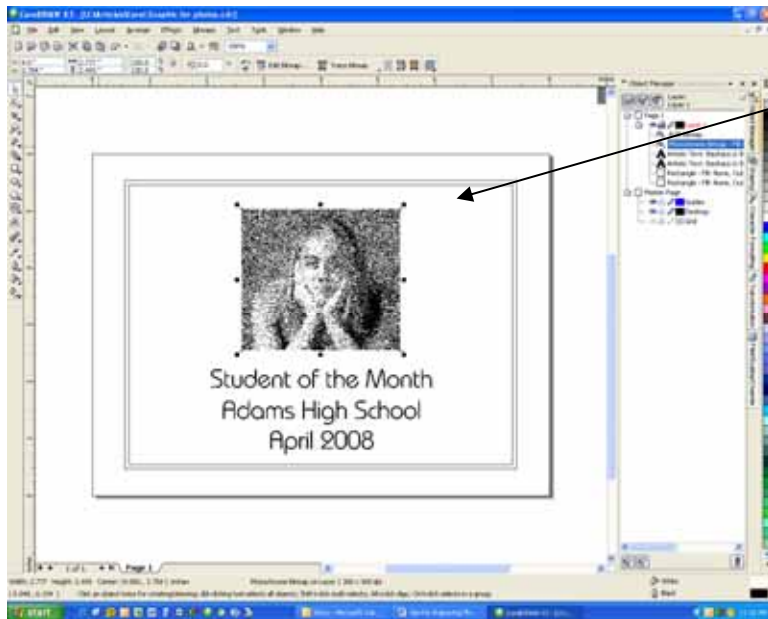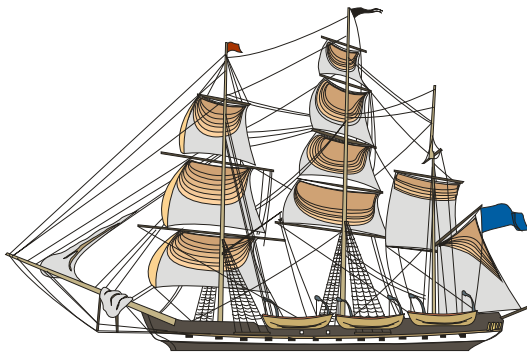
Your final image will look like this and you are ready to engrave.

In addition to using the dithering process on photographs, you can also use it with Clipart. Clipart images that have color or fountain fills can be made more interesting by using the Jarvis, Stucki, or Floyd-Steinberg dithering patterns.

The ship sample that Epilog uses extensively is a good example:



Clipart image before converting with a dithering pattern.
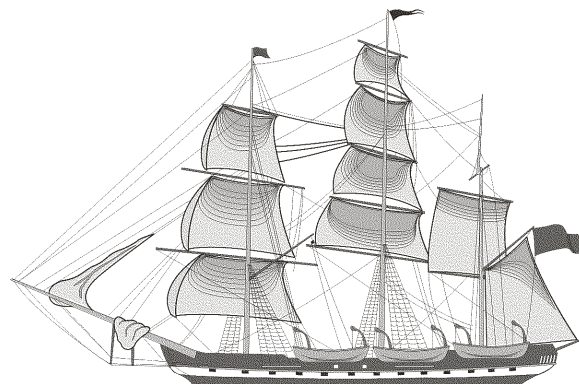
Clipart image after converting to a dithered pattern.

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## <u>*Notes on Printing:*</u>

Once you have processed the photo, you are ready to print. In the Epilog Dashboard print driver there are a couple of settings to pay attention to:

Set your Resolution in the driver so it matches the resolution you used to process your photograph.
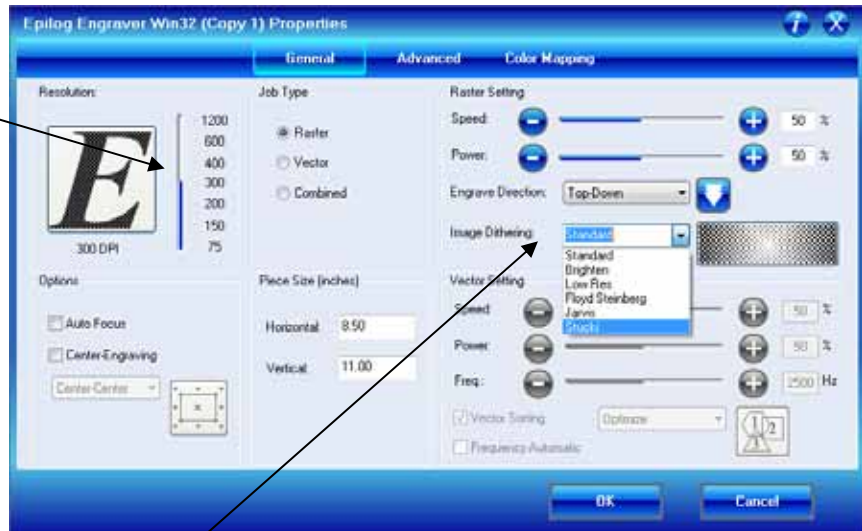


As mentioned earlier in this procedure, the Epilog Dashboard has dithering settings available to use. If you didn't use Corel to dither your photo you can use the Image Dithering settings in the driver. If you did use Corel to dither your photo, there is no need to set the same dithering pattern in the driver.