Laser Cutter Tutorial - Name Tags   **by: Scott Swaaley**

This tutorial is a bare-bones attempt to introduce you to Adobe Illustrator and its use as a design tool for laser cutting.

Notes: I am using Adobe Illustrator CS3 on a Windows XP machine for this tutorial.

Part 1 - Making a Negative Space Nametag
1. Download the illustrator template from my digital portfolio. The file is available here: PLS6.150 Template.ait
2. Open the template to launch Adobe Illustrator and to start a new document based on the template. Save the file, ensuring that it's name and location are known to you.
   Notes: Don't accidentally save the file into your downloads folder.
3. When the template opens, please read the background information contained within the template. *Note: Although you should initially keep the information there for reference, all of this text must be deleted (or hidden) before sending your file to the laser cutter.*
4. Before beginning work, we need to verify some settings within Illustrator. First, navigate to *File > Document Setup* and verify that *Units* are set to *Inches* then click *OK.* Next, navigate to *Edit > Preferences > Units & Display Performance* and ensure that *General & Stroke* are set to *Inches* and that *Type* is set to *Points* then click OK.[1]
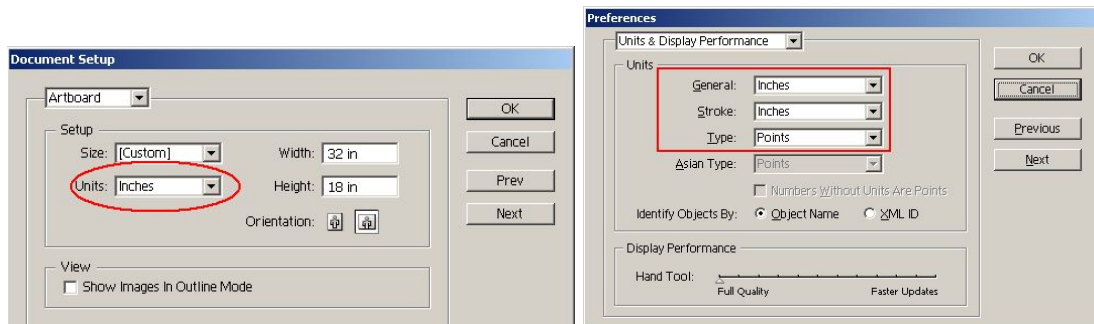

5. Select the *Type Tool* by clicking the [T.] icon on the toolbar or by using the shortcut "T". With the *Type Tool* now selected, single-click a blank area within the workspace to display a blinking text cursor (do not click and drag using the *Type Tool*). Select a font size of *48pt* and type your name in **capital letters**. When you are finished typing, select the *Selection Tool* by hitting the *esc* key.
   Note: It is best to use a simple font for this first project. Myriad Pro should be the default.
6. Now, before we move on with the project I'm going to introduce you to *Fill* and *Stroke*, two very important concepts that help us assign color to our shapes and designs. The term *Fill* is used to designate the area contained within a shape. The term *Stroke* is used to designate either the outline of a shape or a simple line. On the bottom of the toolbar are two overlapping squares (shown below) which we use to select whether we want to modify *Fill* or *Stroke*.

[1] In Illustrator CS6 the '*Units & Display Performance*' option is just called 'Units'
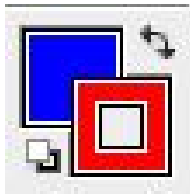
The lower-right square represents Stroke. The upper-left square represents Fill. In addition to identifying your current color choices, it also allows you to select which you currently have selected for editing by clicking on it. Whichever square is in front is selected (the red Stroke, in this case).
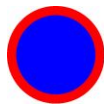

This circle is a shape that is defined by the those color choices with a blue Fill and red Stroke.

Illustrator also gives us the option to assign *None* as a color for a *Fill* or *Stroke*, thereby making it invisible. This becomes especially important as our shapes start to overlap each other. For example, here are three examples of our circle. The middle circle is the same as above. The left circle has a *Fill* of *None*, while the right circle has a *Fill* of *White*.
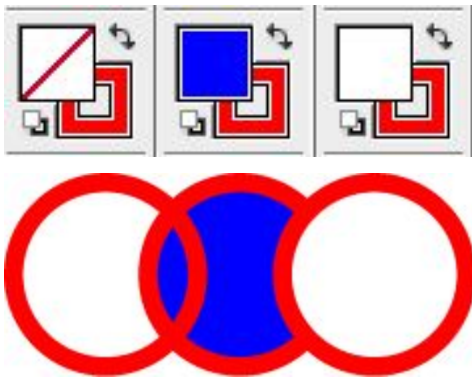
7. Using what you learned above, we will now assign colors to your name. Select your name with the *Selection Tool* then select *Stroke* to be edited by clicking the lower-right square as described above. Although illustrator has a plethora of coloring options, we will not be using them. All of our color selections must be made from a *Swatch* preset into the template. Locate the swatch and select *Red* as the *Stroke* color.
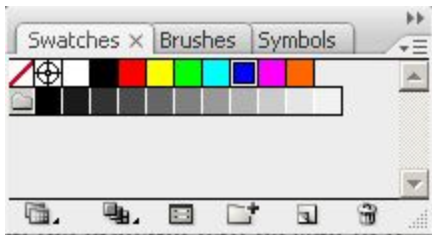
 To access the swatch, click the icon on the right of the screen or go to *Window > Swatches*. This will bring up a swatch that looks like this. Note: These are the only colors that you want to use for making laser cutter files. In fact, 95% of your projects will only use *Red*, *Blue*, and some shade of *Grey*.

Once the *Stroke* of your text is *Red*, make the *Fill* of your text *None* . At this point your text should look something like this. A red outline with a transparent interior.

8. Next, I will introduce you to *Stroke Weight* which describes the thickness of the stroke. Although *Stroke Weight* can be used for different artistic styles, it's most important use is to communicate with the laser cutter. By making the *Stroke Weight* of your name equal to 0.001", this tells the laser cutter "Hey, this line is something special, pay attention!" In fact, by combining this special *Stroke Weight* (0.001") with the special color we already selected (Red), we are telling the laser cutter to *Cut* on that line. If the same *Stroke Weight* was *Blue*, then the laser cutter would etch a very thin line into the material. Anything else would just be translated to a form of grey and engraved into the material (the darker the grey, the deeper the engrave).

9. In order to change the *Stroke Weight* of your name, select *Stroke* to be edited by clicking the lower-right square as described above. Then select *Stroke Weight* from the toolbar or go to *Window > Stroke*. In the *Stroke* window, type *"0.001 in"* and press enter.
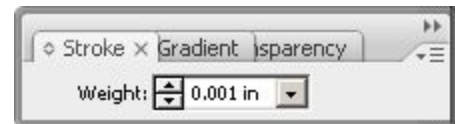
10. At this point you could print your file to the laser cutter and it would cut out the individual letters of your name but we're trying to make a name sign so there are a few more steps.

    Start by using the *Rectangle Tool* to click and drag a box around your name. Use what you've already learned to set the *Fill = None, Stroke Color = Red, and Stroke Weight = 0.001"*. Note: By clicking and holding over the *Rectangle Tool*, you can also select other basic shapes.
    <image>

11. In order to perfectly center your name within the rectangle, select both your name and the rectangle by holding shift then selecting each. Once both are selected, release shift, and left-click your name once more. Although you won't see anything happen with the last left-click, you are telling Illustrator that you would like your name to stay stationary.

    Click both *Horizontal Align* then *Vertical Align* on the toolbar or find them in *Windows>Align*. Your name should now be perfectly centered in the rectangle.

Your finished work should look something like this with all *Fill = None*, all *Stroke Color = Red*, and all *Stroke Weight = 0.001"*.

Part 2 - Making an Engraved Name Tag

12. Duplicate your above work by selecting both your name and the rectangle, holding down the *Alt* key, then dragging your selection to a blank area of the page.
13. On your new duplicate, select your name and set its *Fill = Black* and *Stroke Color = None*.

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Your finished work should something like this.

Part 3 - Making a Hanging Name Tag

14. Duplicate the name tag you made in Step 2.
15. Now, using the new duplicate, we are going to make things a bit more interesting. Go ahead and revert to how your project was at the end of part one. Select the rectangle then click and drag the little white box on the top-center of the rectangle to lower the top of the box until it just barely overlaps all of your letters.

Notice how each letter of your name overlaps the rectangle. However, if we were to cut it like this, then the rectangle, tops of the letters, and bottoms of the letters would all come out as separate pieces. In order to make them a single contiguous piece, we must *Add* them together.

16. Select both your name and the rectangle, navigate to *Windows > Pathfinder*, and click *Add to Shape Area* 🔲 on the *Pathfinder* toolbar[2]. This operation will join your name and the rectangle into a single contiguous shape, as shown below.

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[2] In Illustrator CS6 - this requires you to hold down the alt key while clicking the 'unite' mode.

That's it! You're done! You now have the tools and know-how to create three different styles of name tag and can move on to creating your own custom projects!