

Vector Graphics

and

Arcade Artwork

**A Step-by-Step Guide
by
Frostillicus**



Introduction

This document is intended to provide basic working knowledge of Adobe Illustrator for the purpose of producing arcade artwork such as control panel overlays and marquees. Obviously, the techniques can be applied for other uses, but I will use arcade artwork as an example. I will touch on Photoshop very briefly. Since Adobe products are what I use all day at work, I can only write this tutorial around them; though I'm sure Paint Shop Pro(Photoshop equivalent) and CorelDraw(Illustrator equivalent) will work just as well.

It is intended for either a total beginner or maybe intermediate user of graphics programs. There are many ways to get things done in these programs, these are just the ways I use.

I use Illustrator 10, though this should work with previous versions, as well.

Also, I'm not responsible for anything that may happen to you, your computer, your dog, cat or marriage, etc, as a result of you reading or using this document, blah blah blah. Ok, on with the stuff....

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Good Luck!

Arcade Art?

Why This Tutorial?

You have heard the story countless times: I have been interested in emulation for a few years now, and like most people discovered MAME and Daphne and a slew of other great programs that recreate that arcade experience. And then I discovered Build Your Own Arcade Controls (www.arcadecontrols.com), an entire community of fellow arcade-lovers who also happen to build their own custom arcade cabinets. I browsed through the examples section, back then there were not many, but from what I glimpsed people took 2 approaches to 'building a cab':

1. They would get an actual arcade game like Defender or Joust and gut it - install a PC and keyboard hack and call it a day. Sometimes the original artwork was saved, most often it was painted over or wasn't restored. This is usually sad, but if it happens to a cab that was converted more than 3 times already, it's no big deal (it has since lost all sense of identity).
2. They would construct a new cabinet using MDF, wood, particle board, or whatever. Then they would paint it or laminate it - usually black. The result is a huge new cabinet with a lot of space on the sides, marquee, control panel for custom artwork.

Sometimes the custom artwork would look cool, sometimes it looked...not so cool.

My logic is this: if you spend wads of \$\$\$ on hardware, make a huge mess in the garage, spend countless hours researching and testing, finally wiring it up and finishing the whole thing off with 3 coats of paint, then why would you NOT want to expend the same amount of energy for the artwork as you did for the rest of the cab? The answer is: you're too busy playing ;)

But, if you could stop playing for a few hours here and there, you could make some real awesome artwork, in my opinion. Just like original Pac-Mans or Joust, the basic design doesn't have to be super-complicated, just of a good quality (no ugly pixelation).

I hope you learn something from this document, it's been an ongoing project for me - I feel I had to do something bigger than answering posts on a board in return for all the great programs, utilities, and help I have received so far with my cabinet projects. I think this could be useful to beginners. Since I have a degree in graphic design, and I do this stuff to pay the bills, there was a natural progression to this tutorial. In the future I hope to start a library of vectorized popular shapes (game characters) for others to use, but for now I'll settle for just showing someone how to do it.

This tutorial deals with and advocates using vector graphics to produce the majority of your artwork, because in the long run it is the easiest and most efficient method.

Arcade Art?

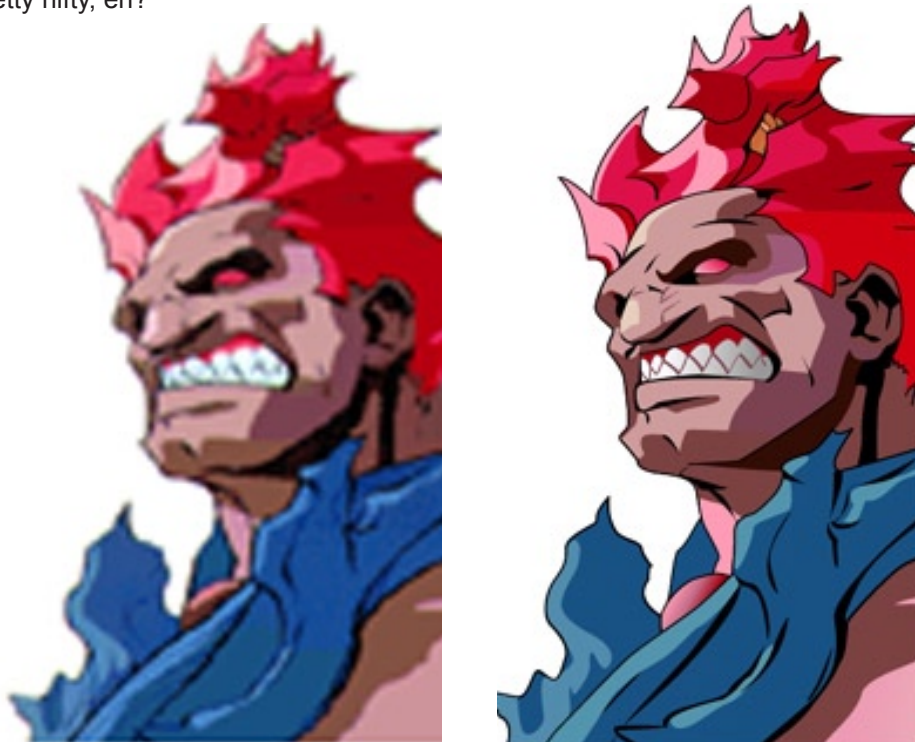
What is Illustrator and How Does it Differ from Photoshop?

Illustrator is a *vector* graphics program. Photoshop is a *raster* graphics program.

Most people are familiar with raster images, such as JPEG, TIFF, BMP, and GIF. These images are basically a collection of dots(pixels) arranged in such a way that when viewed at the correct size they appear to be a clean, photo-realistic image. However, if you zoom into or resize a raster image too big, you see the effects of *pixelation*. Zoom in or resize far enough and each little pixel looks like a tiny box. Pretty ugly. The upside of raster images is they provide more detail within the image itself, and are in the main formats people are used to(JPEG, TIFF, BMP, GIF, etc). The downside is that they are relatively hard to modify, and, of course, the largest problem is resolution. A low-resolution image found on the web will not look acceptable blown up to 10 inches high at 3 times the resolution.

Vector images, on the other hand, have no boundaries such as resolution. They are not made up of dots, but of lines. Specifically, they are made of mathematical formulas for lines that form shapes, each of which can be filled or not with a color. Each shape is able to be modified independent of the others. The number of shapes included within an image is limited only by the patience of the artist. On average, a large vector graphic has a much smaller file size compared to the same image that is a raster graphic. The number one reason to use vector shapes is that they can be enlarged or shrunk to any size without losing any quality whatsoever. For example, if you create a vector image (which is actually a collection of shapes grouped together) in Illustrator for your control panel and it is 2in x 2in, you can then scale it up to 20in x 20in for the sideart and it will look identical to the original smaller one. And vice versa; create large and scale down. No pixelation occurs since you are not dealing with pixels. You can take these large or small shapes and just copy and paste them into a raster-editing program full size at whatever resolution you want without losing any quality. This tutorial will cover this.

Left: a raster image of Akuma enlarged to arcade artwork proportions, note the pixelation and blurry effects of rescaling.
Right: That same image only as a vector image. I think you can see the difference. Imagine the one on the right on the side of your cab - pretty nifty, eh?



Making Vectors

Plan it or Face the Abyss

Ok, you decide to make your own artwork to give your cab that extra something. It is all about the look. What might you do? You might jump into photoshop or illustrator and start making shapes - adding effects, filters, any other canned thing you can find - pasting and cutting your way long into the night. You wake up next morning in a daze, drooling on the keyboard and staring at the monstrosity on the screen you thought was so cool at 2am. Ewwwww. You wasted a whole night!

Maybe not that bad, but you see the point. With a little planning, some thumbnails, or quick sketches you can avoid all kinds of stress and pitfalls. That's a basic rule of design. I bet you did that with your cabinet in the beginning: "Hmm...let's see, the control panel will be laid out like this *scribble scribble* and the monitor will be at this angle here....*scribble scribble*". Do it for the overlays, marquees. It helps.

Mark out a top-down view of your control panel, to scale, on a sheet of letter-sized paper. Sketch in the major parts like joysticks or trackballs you want...now it's time for some questions:

1. Are we going old school classic here? Joust, Donkey Kong, Battlezone, Pac-Man? Or are we going for the latest Neo-Geo SNK vs Capcom Marvel in Tights Alpha 2 Champion World Wheaties Edition? Or something else perhaps? Something new and different?
2. Will you be adding text? Like small instructional labels for each button? Too much text can really clutter it all up (I like none or very very few words, just START and PLAYER1, etc). I don't think people need to be told it's a trackball, do you?
3. What will the major color(s) be? Try to coordinate it with the rest of your cabinet if possible, and especially the marquee or bezel if you make one.
4. Do you like a lot of stuff going on? Does the prospect of staring at 20 fighting chars doing their own thing on your control panel make your obsessive compulsive disorder twitch? Maybe you'd prefer a minimalistic approach - a simple border with subtle designs in the background.

These are just a few things to consider. Try to picture the finished art in your head, that's a big help - though can be difficult for some people. Keep in mind that great designs are all coordinated over the entire cab, meaning the marquee relates to the side-art which relates to the control panel, etc. I like to limit my designs to only one or maybe 2 major focus points, and let the rest of the design support those images(like 2 fighter characters on the panel instead of 30 and a huge title).

But, of course, it all comes down to what YOU prefer. Listen to constructive criticism, but in the end, do what YOU want - it is your cab after all. If you are happy with it that is all that matters, there will always be someone picking it apart just for the sake of picking it apart. I usually do more than one, and let others recommend the best one to use, but I make the final decision.

Making Vectors

Finding Usable Artwork

When you come up with that perfect design it is time to hunt down images to use with it. Depending on what you want, and how your arcade system is setup, you may already have some useful images to draw inspiration from.

Look through the marquees, control panels, and cabinets section of your mame folder - they are good resources assuming you have downloaded the image packs. The flyers folder does not really apply here, as most flyers for arcades use either photos of people playing the cab or some wildly complicated illustration with flying text that wouldn't really look good on a cab in the first place.

If you are looking for fighting characters, try www.gamegen.com. They have a bunch and that is where I pulled Akuma from.

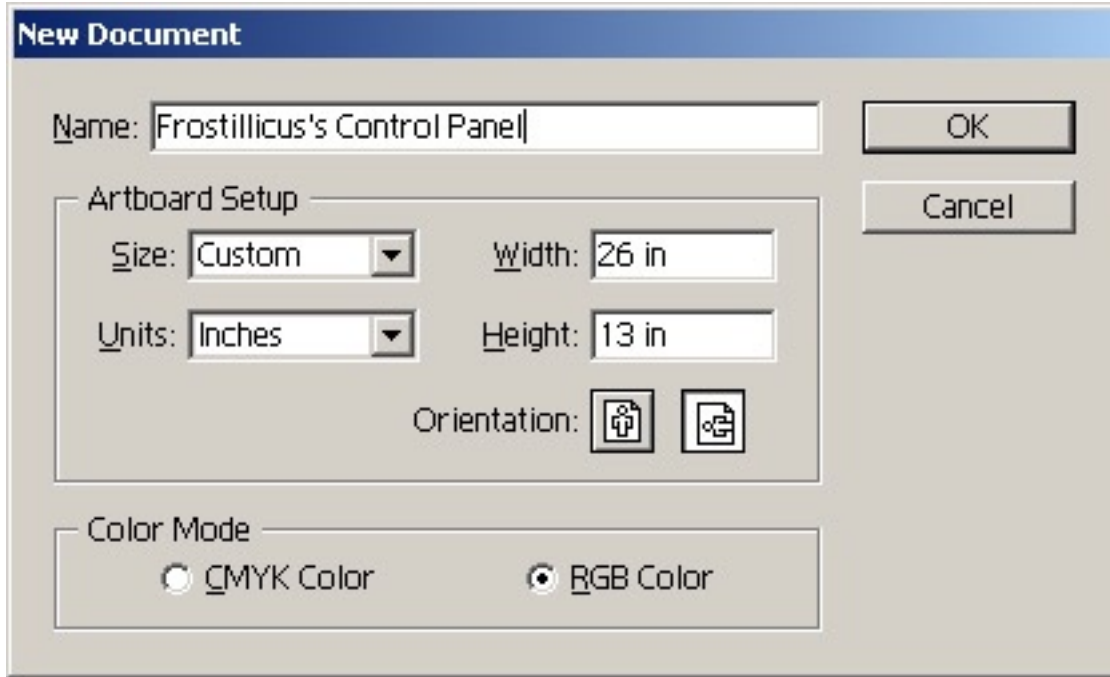
Do a google search for what you want - or try some 'museum' sites like Killer List Of Videogames(KLOV.com). There are a ton of fan sites devoted to Atari, Namco, SNK stuff, Sports games, etc. Just look around the web - you will find something.

You can also make your own, though this of course is a bit more involved, and you need some drawing skills.

Making Vectors

Setting up the Document

Time to get down to the nitty-gritty of creating the actual artwork. Open Illustrator and click 'New' in the File menu. You need to have the finished dimensions of your control panel handy. Name the new document, select Custom, type in the actual final width and height of your control panel. Make sure you select RGB and NOT CMYK. See below:



But Frosty, you may say, I know it should be in CMYK because that's what it prints as!! Relax, yes of course I know you will print it as CMYK, but selecting that now limits your range of colors and it is so much easier to work with RGB. You can always downgrade it later, but once you convert it to CMYK the bright, vibrant colors of RGB won't come back. Besides, you may want to use this on your website, in which case you should ALWAYS pick RGB.

Then hit OK. You should see a huge rectangle called the *artboard*. You might also see some weird dotted lines in the shape of another, smaller rectangle - that is *page tiling*. What appears in that dotted-line box is what would be printed right now if you decide to print. We are not going to print it right now so go the View menu and select Hide Page Tiling. It should go away.

You should also have some rulers showing - again go to View menu, and select Show Rulers. If they are not in inches, you can change that by going to Edit menu..Preferences....Units and Undo...change whatever is in the General box to inches and hit OK.

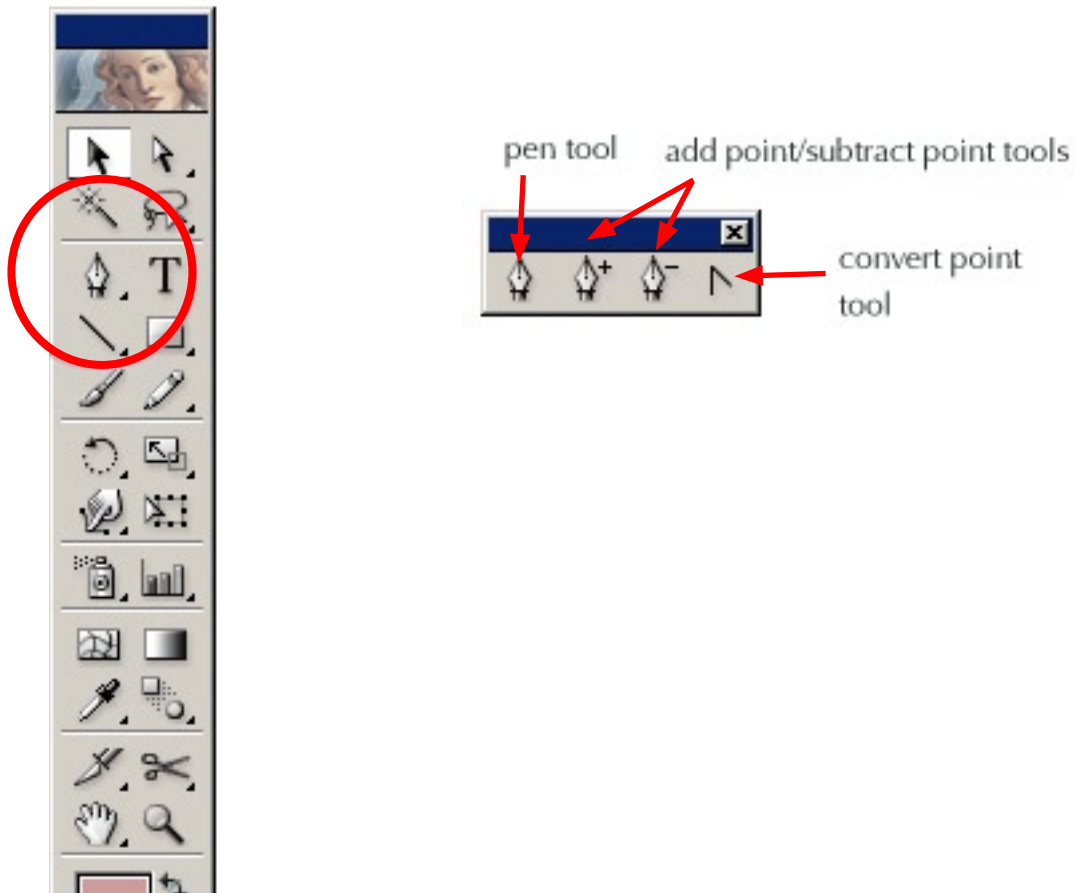
I like to save at this point: File...Save as.... Name it, hit OK. You will see a dialog box pop up asking what version you want to save it as. For us, don't change anything and just hit OK.

Now we are good to go!

Making Vectors

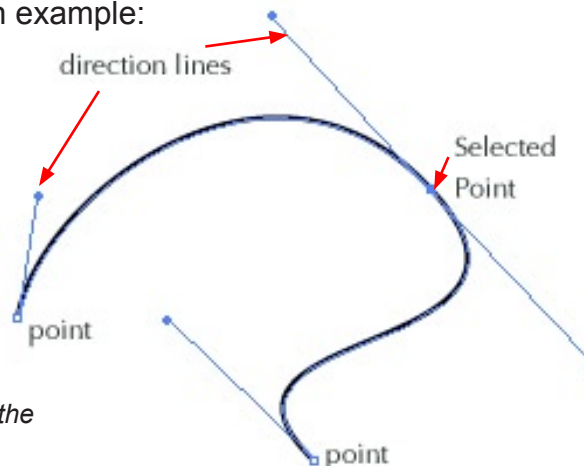
The Mighty Pen Tool

Ah, the mighty pen. Truly the only worthwhile tool in Illustrator. Click it's picture and hold it for a second, and then click on the little arrow at the end to tearoff the pen-select mini-menu from the toolbar.



The pen tool is THE main tool you will use to make points. 2 points connected make up a line(also called a *spline*). Shapes are made up of a bunch of lines. How you control the curves of the shape depends on how you control the points.

The points are also known as *anchor* points. There are 2 kinds: *Bezier* and *Corner*. Bezier is a term used a lot in drawing programs - it is a system of creating curves by manipulating *direction lines* attached to each point. Here is an example:

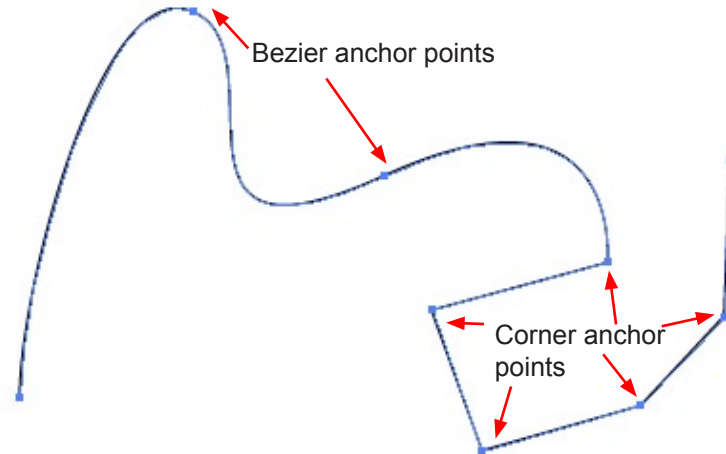


Note the Selected point is solid blue, the unselected points are outlined in blue

Making Vectors

The Mighty Pen Tool (continued)

The two types of anchor points, again, are Bezier and Corner. Both are similar yet are used in different situations. Here are the two types on one line:



Going from left to right:

See how the first line on the left curves smoothly into the top bezier anchor point, then curves smoothly into the next line without any harsh angle between the two? Then compare it to the corner anchor points, which just jump into different directions without a smooth transition.

Corner anchor points have no direction lines - bezier's do, they just aren't shown for this illustration. The one point that looks half bezier/half corner point is actually a corner point with no direction lines. It may look like a curve at that point, but it's just the curve leftover from the previous bezier point to the left.

So how do we make them? It's quite simple. Select your regular pen tool by either clicking the Pen Tool button or by typing a 'P' on the keyboard. Get used to keyboard shortcuts it will save you ENORMOUS amounts of time. There aren't many.

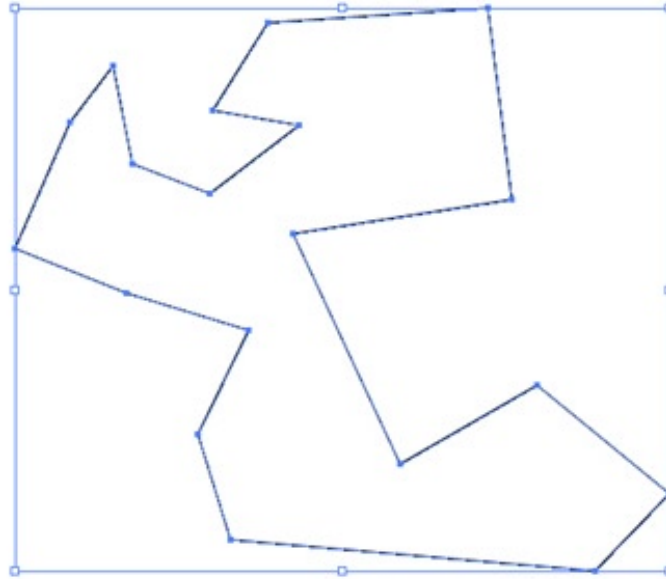
Click on the artboard, but don't drag it. Then move elsewhere and click again - repeat this until you have a weird angular shape on the artboard. When you are done clicking, hover over the original point until the pen tool gets a little 'o' next to it - this means if you click here it will close the shape. Get in the habit of closing your shapes, it makes life very easy when you have a bunch of them.

Making Vectors

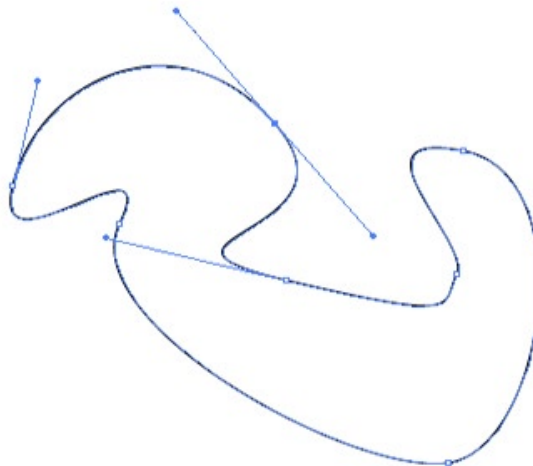
The Mighty Pen Tool (continued)

Click on the shape with the black arrow (the *Selection Tool*), you should get a *bounding box* around the shape. This box is useful for quick resizing, quick rotating, and knowing what you have selected. The white arrow is the *Direct Selection Tool*, which only selects one point or line at a time depending on which you click on. That's a handy tool to move just one point over a little or adjust one line slightly.

So far we have this:



Now let's create a smooth curvy shape. Hit P again and click and drag the mouse until you get a small direction line. Let up and move the mouse elsewhere. Now click and drag again. You should have made a nice curve. The direction lines always point in the direction the curve will start off from the point. And the longer it is the longer the initial curve will be. Perhaps the best way to illustrate this is by selecting one point on the curve. Select a point with the white arrow (it'll turn solid blue, all the other points will be filled with white), and drag it around. You can edit point location with the white arrow. See the direction lines? Try grabbing the ends of one and moving it around. It's tricky; you may have to reselect the point a few times before you get it. You have to be exactly at the end of a direction line to move it.



Making Vectors

The Mighty Pen Tool (continued)

Experiment with moving the points around, this is useful for adjusting position after you made a large shape. Moving one point means you do not have to redraw the entire shape. Notice how the curves react to you pulling and pushing the direction lines?

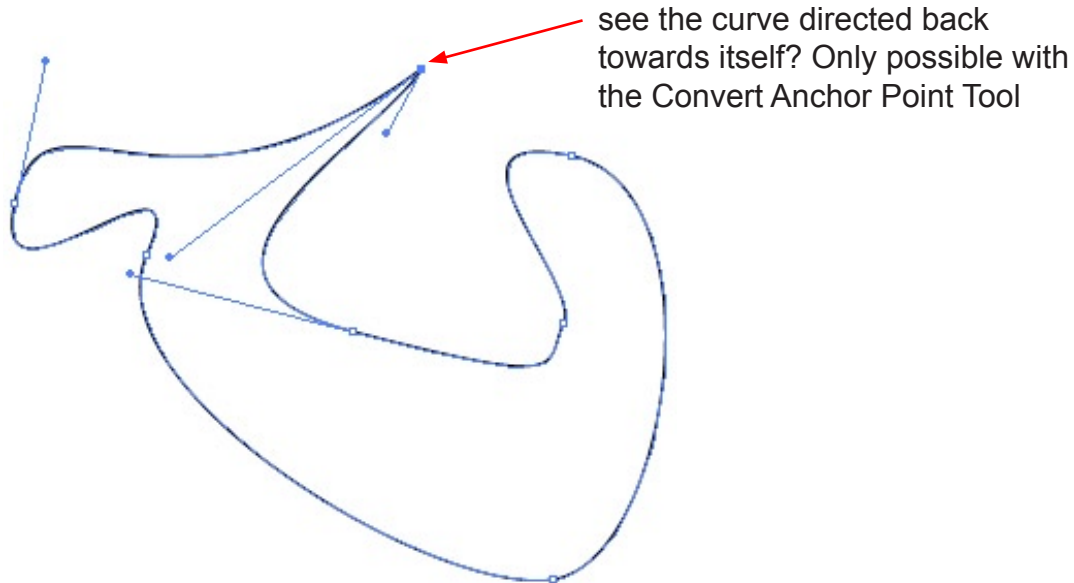
If a line segment is between 2 bezier anchor points, then each point's direction lines can affect the curve, sometimes to weird results. You can actually turn a curve into a small loop by pulling the direction lines out too far.

Let's say you want to take one of those bezier points and change it into a corner point. This is often the case when tracing artwork. And vice versa - you might have forgotten to click AND drag and might have just clicked instead - thereby creating a corner point instead of a bezier point.

No problem! Select the point you want to change with the white arrow(*Direct Selection Tool*), then hit P for your Pen tool. Now, hold down ALT, and the tool should change to a 2-sided triangle. This is the *Convert Anchor Point Tool*. Simply click on the selected point and it will immediately lose its direction lines. It probably won't be a right angle because of the other points next to it aren't perfectly aligned. Now click and drag that same point with the *Convert Anchor Point Tool*. It converts it to a Bezier anchor point complete with direction lines.

Now here's the best part: With that same bezier point, and the pen tool temporarily changed to the Convert Anchor Point Tool(hold down ALT still), click and drag one of the direction lines. See how you can move just one direction line instead of both at once? That was the limitation of the Direct Selection Tool(white arrow). Using the Convert Anchor Point Tool is very very handy to make very thin ends to shapes, since you can turn the same point back in on itself.

Here is what I mean:



Making Vectors

Tracing Akuma

Ok so now we know how to make shapes, and how to convert points back and forth between anchor and corner points. The great thing about the pen tool is that while it is selected, just by holding down ALT it temporarily changes to the Convert Anchor Point Tool, and by holding down CTRL it temporarily changes to the Direct Selection Tool. This is much faster than moving up to the toolbar every time. Plus you can move, arrange, and tweak curves as you make them, instead of making a shape then going over each point in detail.

A few pointers, though, before we begin the task of Akuma. If, while drawing with the pen tool, you quickly switch to the Direct Select tool to move a point, make sure you click on the last point you made first before continuing the line. Also, try not to use a lot of outlines and strokes. Keep the shapes to a fill and nothing else. This is because when the finished shape is resized, the stroke value can stay the same, so you would have to go in and manually change each stroke.

Speaking of strokes and fills, let's start with AKUMA. This is a pretty tough beginning character, so if you can do Akuma, you can do anything. I chose to use Akuma for a few reasons: A) Fighting characters seem to be pretty popular these days, and B) I wanted to show how complex it can look as opposed to a simple Donkey Kong or Pac-Man char. Here is the original gif:



Go to File...Place...and select the picture to place on the artboard. It will be pretty tiny compared to the whole artboard. Now select the picture with the black arrow(selection tool) and find the transparency menu on the right side of the screen(or hit shift+F10). Change the image to around 40-60% so we can work on top of it without getting lost. Now hit CTRL+2 to lock it. You can also select Object..Lock, but CTRL+2 is quicker. To unlock, hit CTRL+ALT+2. Let's keep it locked.

Find your layers palette(or hit f7) and Create a New Layer on top of Akuma. We will start with his hair - double click the layer name and type in HAIR.

Start tracing the whole outline of the hair on the new layer. Don't worry about being incredibly precise right now, you're just starting out. Take your time and don't forget to click and drag in the direction you want the next curve to go. When you get to a sharp acute angle, hold down ALT and adjust the direction line of the point to face in the direction you want the next line to go. Continue all around the hair, I naturally move clockwise, but that is just personal preference. Close it off by clicking on the first point and fill it in with a red that looks like Akumas.

Making Vectors

Tracing Akuma (continued)

It should look like this so far:



Good job, looks good! Now, with the hair selected, hit CTRL+3 to hide it. Now we will make the darkest red shapes within his hair to give it some shadowy definition. I see three different levels of red plus some bright pink highlights in the front (pink highlights? a scrunchie? I thought this guy was a badass?). You need to break them up in to groups of the same color. Trace the dark red using the same techniques and go slow if you need to. The important thing is to adjust the shape as close to the drawing below it possible, and use the CTRL and ALT keys with your pen tool to accomplish this.

After awhile it should look like this:



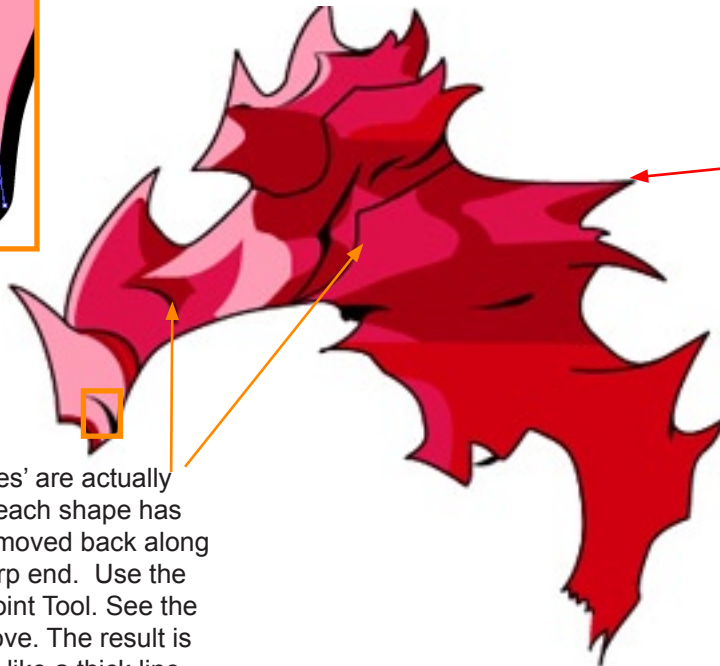
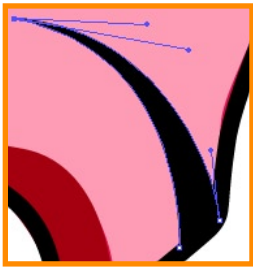
Making Vectors

Tracing Akuma (continued)

Now repeat the process for the medium red color in his hair and the very bright spots of pink in the front of his hair. It should look like this after you unhide all the hair (CTRL + SHIFT +3):



Well, that looks good, but if you add a black outline to only the outside, and a bunch of black shapes that *look* like lines, the hair will be almost done. Try that, and remember to hide what you just did so you can see the reference drawing on the bottom layer. Show all is CTRL+ALT+3. So add the lines and you should have this:



To make a simple black outline, I copied the very first single big shape, then pasted it in the front. Get rid of it's fill and add a 3 or 4 point stroke to it. Keep the shapes with strokes to a minimum, as well as single lines with no fill. They are a pain to adjust later on. Unlike a shape, the stroke size does not increase/decrease as you scale the image.

All these black 'lines' are actually shapes, the tip of each shape has it's direction lines moved back along itself to give a sharp end. Use the Convert Anchor Point Tool. See the exploded view above. The result is a shape that *looks* like a thick line, but without the hassle of strokes and outlines.

Making Vectors

Tracing Akuma (continued)

Add his fabulous little Gucci suede scrunchie in case you forget it later.



Now select all the hair shapes and hit CTRL+G to group them (CTRL+SHIFT+G ungroups them). Make a new layer and call it FACE. Lock the Hair layer by clicking on the empty box next the eyeball on the layers palette. A little lock should appear. Now hide the Hair. I like to lock and hide stuff just to be safe. Also save it often (CTRL + S). Move shapes between layers by selecting the shape and dragging the little tiny square that appears within the layer palette to a different layer.

Click this box to hide/unhide the whole layer (see the eyeball?)

Click this box lock/unlock the whole layer (a lock appears when it's locked)

Click this arrow to expand the layer and show the individual shapes contained within the layer (also called sub-layers)



When you have a shape or multiple shapes selected, a small box appears on their respective layer(s). Click and drag this little box to a new layer to move the shapes up or down the levels.

Click this empty circle to automatically select everything on that layer. Pretty handy, eh?

As you can see, the layer palette and the sub-layers are extremely useful in organizing your drawing.

Making Vectors

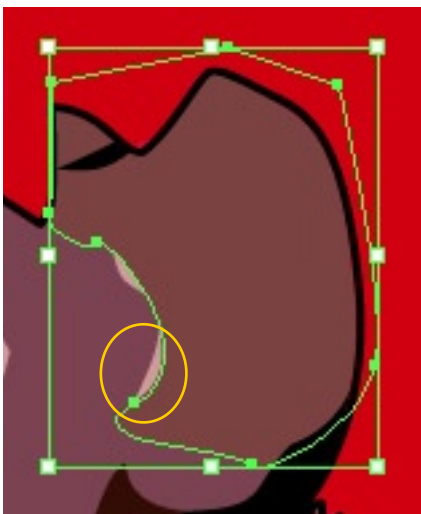
Tracing Akuma (continued)

Even though this *looks* precise, the key to doing this quickly is to only focus on the visible areas. Use the layers and overlap the shapes to save yourself some time. Here's an example using the hair and face:

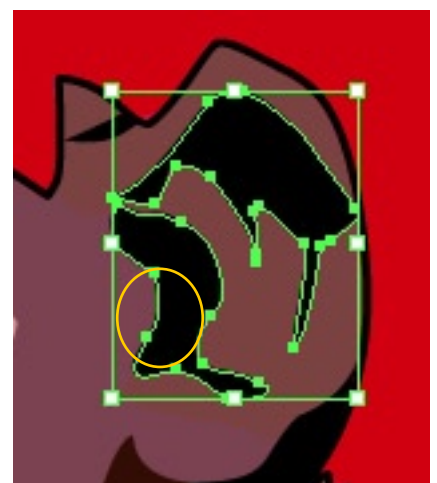
The blue outlines are the hair, and the green make up parts of the face. Note the green forehead shape that runs through the hair - that was quickly made. I didn't have to precisely line up the forehead shape with the hair, simply because the hair is on a higher layer - and it can cover the uneven forehead shape perfectly.



Drawing the big shapes first, then gradually refining the section by placing smaller shapes on top is not only the easiest way to do it, but the cleanest. By making the shapes overlap in this manner, you do not have to worry about any white space that might show through between shapes if you don't *exactly* line them up.



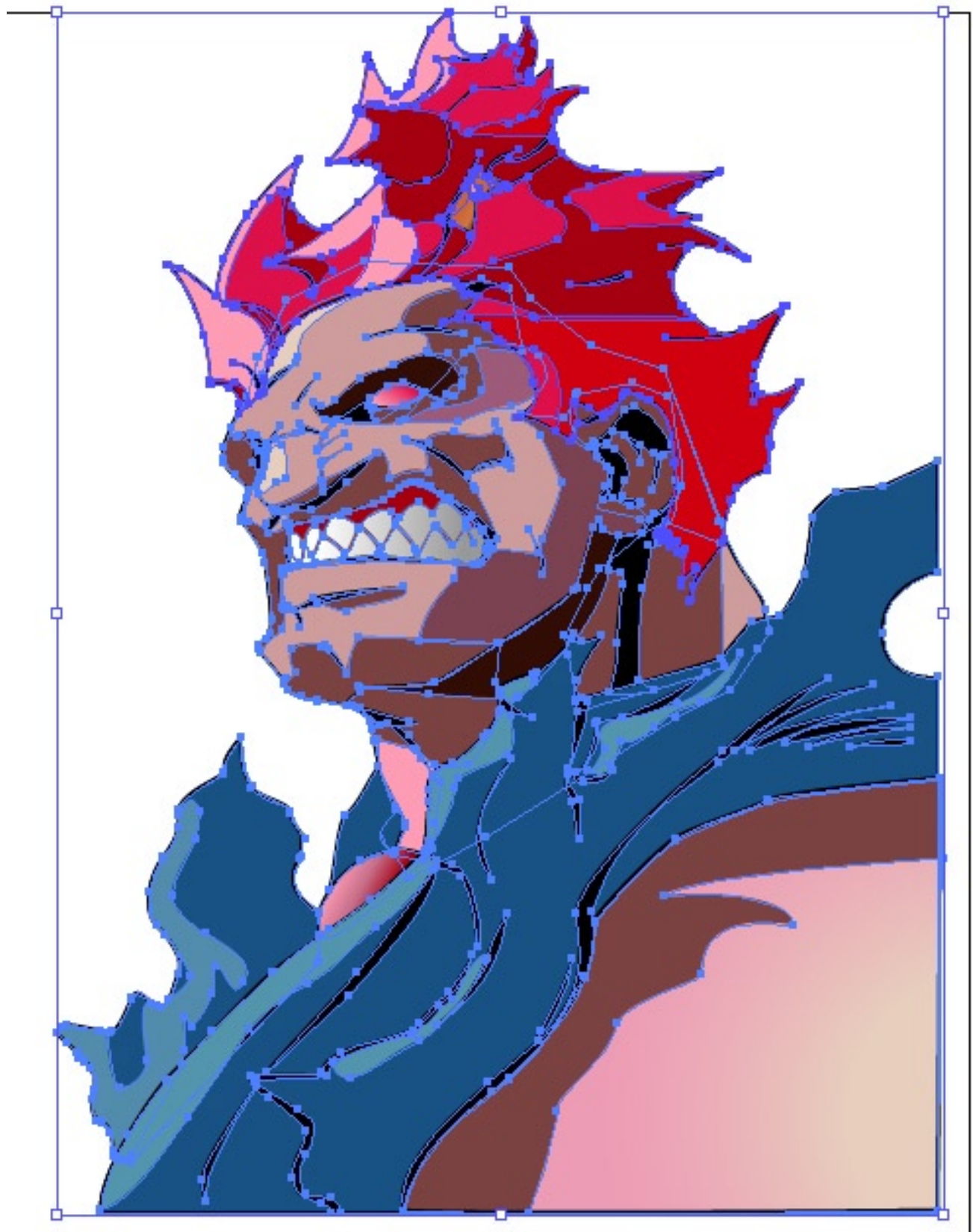
I did the same thing with the ear. It is made up of one big brown shape, with a few little black shapes on top. Note how easy it is to cover up imperfections with a shape on top (see circle outline).



Making Vectors

Tracing Akuma (continued)

The finished Akuma in outlines, all on one layer and ready to be scaled and positioned.



Making Vectors

Color Matching

It might be important to you to get the colors to match the original as closely as possible. What I like to do is make a list of the major colors and put them in categories before I even start drawing:

- Hair - pink highlights -
- Hair - light red -
- Hair - med red -
- Hair - dark red -
- Face - Light skin -
- Face - med skin -
- Face - dark skin -
- Face - darkest skin -

Then I open the original reference drawing in a program like Photoshop as an RGB image and hovered the cursor over a specific area. The Info palette shows Red Green and Blue color information which I then write down on my list.

- Hair - pink highlights - R255 G156 B181
- Hair - light red - R222 G16 B74
- Hair - med red - R209 G0 B16
- Hair - dark red - R165 G0 B16
- etc etc etc

Then just type these numbers into the color panel in Illustrator into their respective RGB slots. Once that is done I switch to the Swatches palette, make sure the new color is selected, and click on the Make New Swatch along the bottom edge of the Swatch Palette. You can name it if you want.

Of course, you could just eyeball it, and you will get satisfactory results. That would be quicker if you end up dealing with a lot of colors. But it is good practice to make a swatch of whatever color you create so you can consistently and easily use that for either the rest of the panel or some other artwork later on.

Making Vectors

Finishing Up Akuma

I won't go through the whole character with you. Maybe the next version of this tutorial.

Here are some useful tips:

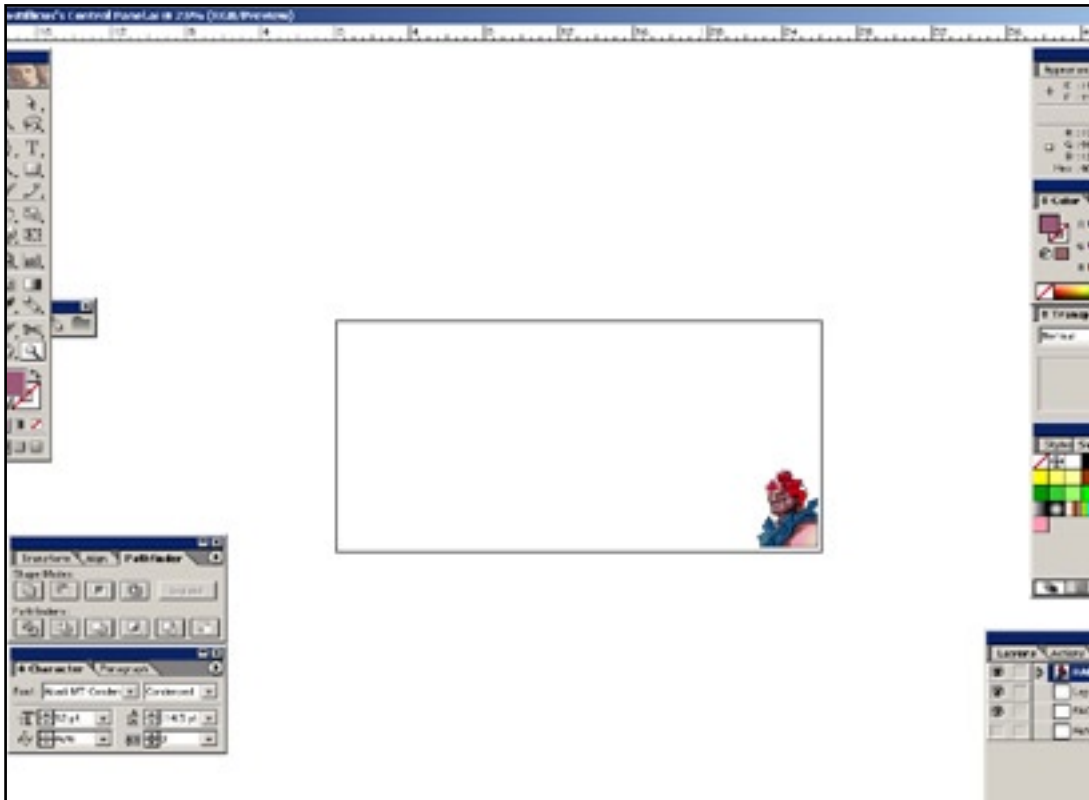
1. Use keyboard shortcuts. This is almost required if you want to do these things quickly.
2. Get the hide and lock features down when making shapes.
3. Also experiment with the Object...Arrange.. menu if you want to bring shapes forward or backwards.
4. Make no more than 4 or 5 layers. Too many layers gets confusing and hard to work with. I had layers of HAIR, FACE, BLUE SHIRT, SHOULDER, and FACIAL FEATURES. It's okay to make some temporary layers but delete them after you finish with them.
5. Again, don't use strokes. It's okay for the very outside, but it's a big pain to change each shapes stroke when you resize.

If you look at my finished character, you will see I used a few *gradients* (smooth transitioning between 2 or more colors in a shape). You can see a big one on the shoulder, and a few on the teeth and eyes. Gradients can add a little dimension to your drawing, but use them sparingly. The drawing can look a little weird if you use too many gradients. For information on gradients, see the help file (F1).

Creating the Finished Piece

Resizing the Drawing

Your screen might look like this, Akuma might be a little small and down in the corner:



First off, I like to do a Save As... and save this file something like large_akuma.ai in case I screw something up. I can always reload the original and try again.

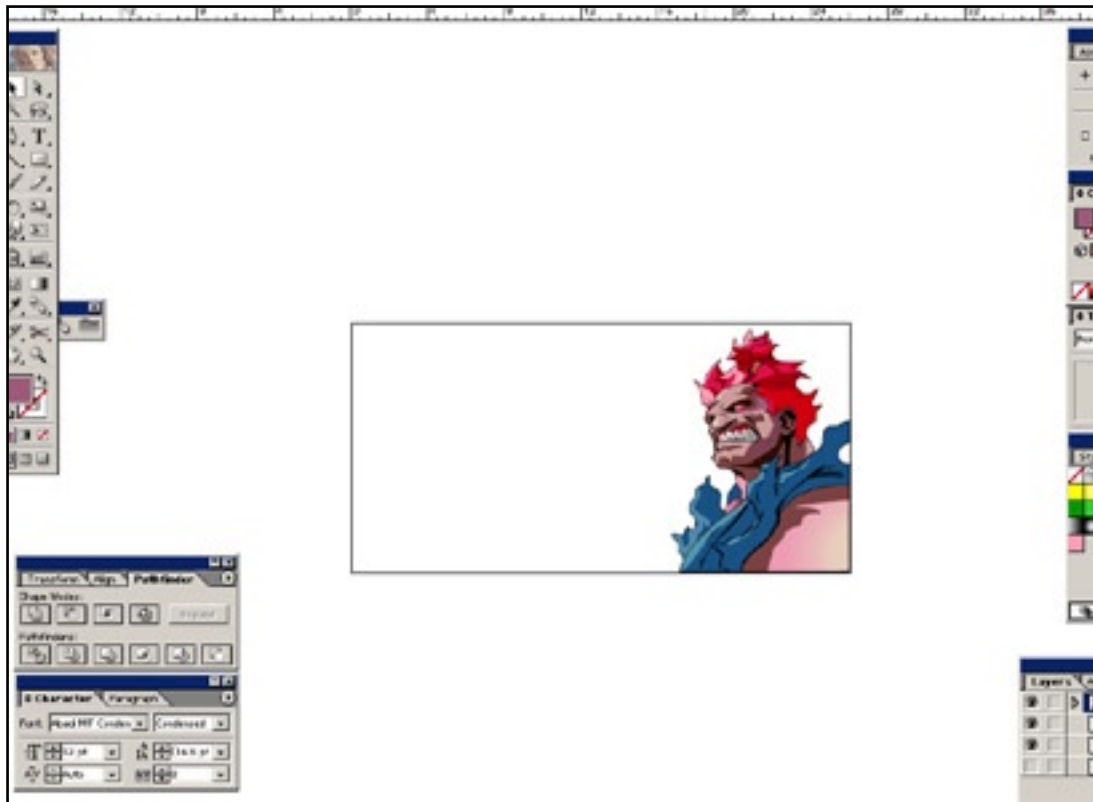
Now group everything together, if you have not already. Grouping everything together forces everything onto one layer. You can delete the original reference drawing, too. Don't forget to unlick it first.

By now you should be familiar with the bounding box that automatically surrounds a shape when you select one with the Selection Tool (black arrow). Hold down the SHIFT key and click and drag a corner of the bounding box to the desired size. Holding the SHIFT key down forces the shape to always keep the same proportions. Try resizing without SHIFT, and you'll see what I mean. Also, if you rotate an object, holding SHIFT down will force it to rotate in increments of 45degrees. Very handy if you need things at right angles.

Creating the Finished Piece

Resizing the Drawing(continued)

Now your screen will look like this:



Akuma is now at the correct size for your control panel overlay. Obviously you can make him bigger or smaller, but let's go with this size for now. You might have to thicken some outlines around his face or hair if you used a 1 point stroke: just use the Direct Select Tool (white arrow) and click on the desired outline. Then increase the stroke amount to 3 or 4 depending on your taste. Also on the stroke palette, you can adjust the type of connecting joint each shape has. There are three buttons for three different types of joints - Miter, Round, or Bevel. I usually pick Round. This defines how lines are joined together on the shape. Zoom into the outline of the hair and try each one out - you will see a subtle difference in corner appearances.

At this point you have a full-color vector image of Akuma, ready to be used as a hi-res graphic for your control panel overlay. First I will demonstrate a simple Illustrator overlay just using this graphic and some text.

Creating the Finished Piece

Simple Illustrator Control Panel Overlay

Select the whole Akuma, copy, and paste him onto the artboard. Now make a new layer called BACKGROUND and move the newly copied Akuma onto the new layer. Drag the word BACKGROUND so it is the last level in the stack. It should look like this:



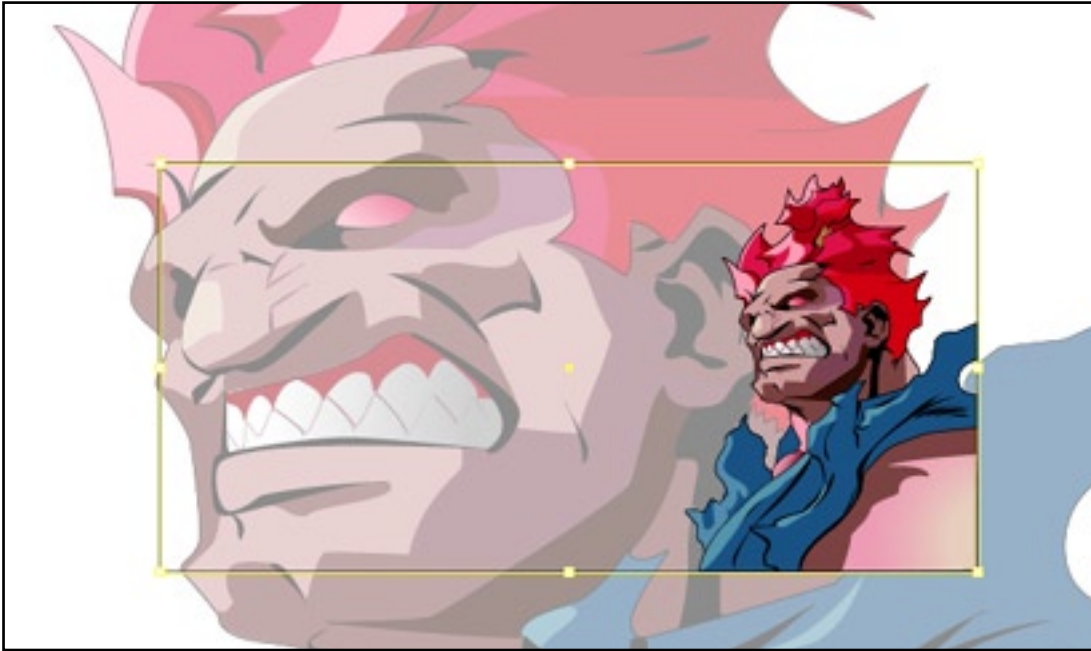
Lock the top layer so we won't mess it up, and now resize the background Akuma to be HUGE, covering the entire artboard. Adjust its transparency to 45%. It should look like this so far:



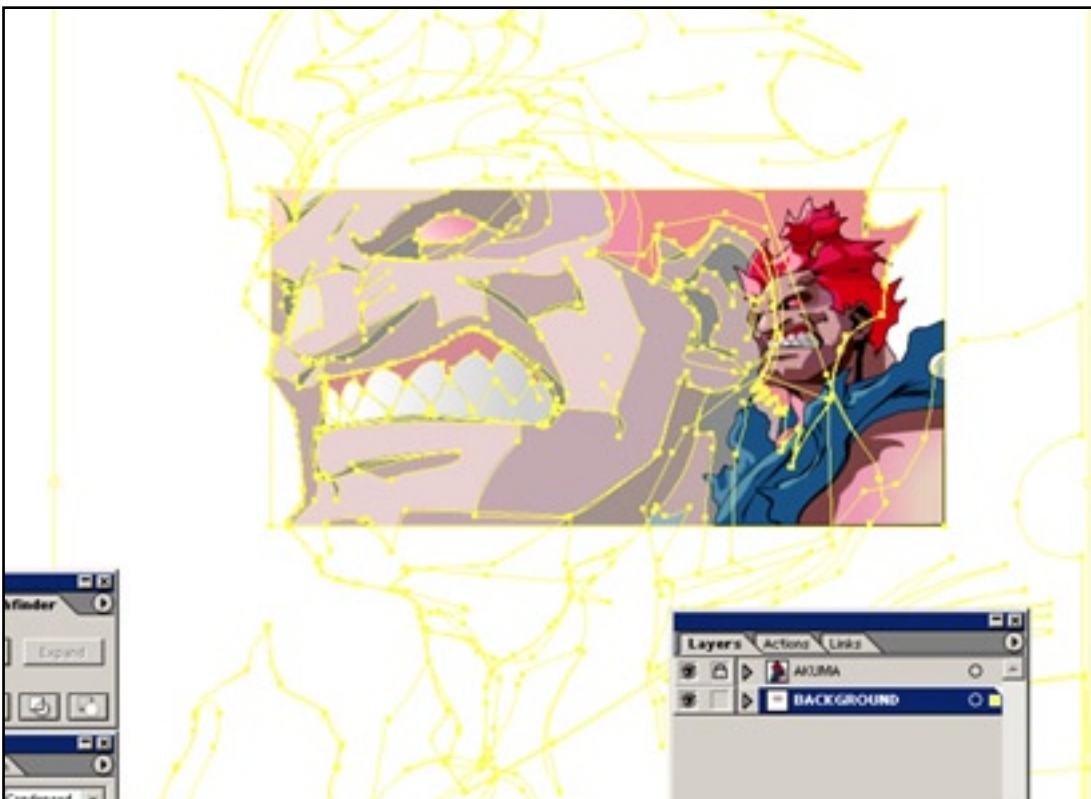
Creating the Finished Piece

Simple Illustrator Control Panel Overlay (continued)

Now we are going to mask off the outside parts of the background Akuma so we can focus on the artboard. Create a rectangle by selecting the rectangle tool and clicking once on the artboard. Make the rectangle 26in wide by 13in tall, the same dimensions as our control panel and artboard.



Now select the rectangle and the large Akuma and go to Object...Clipping Mask...Make (CTRL + 7). If all goes well you have something like this:

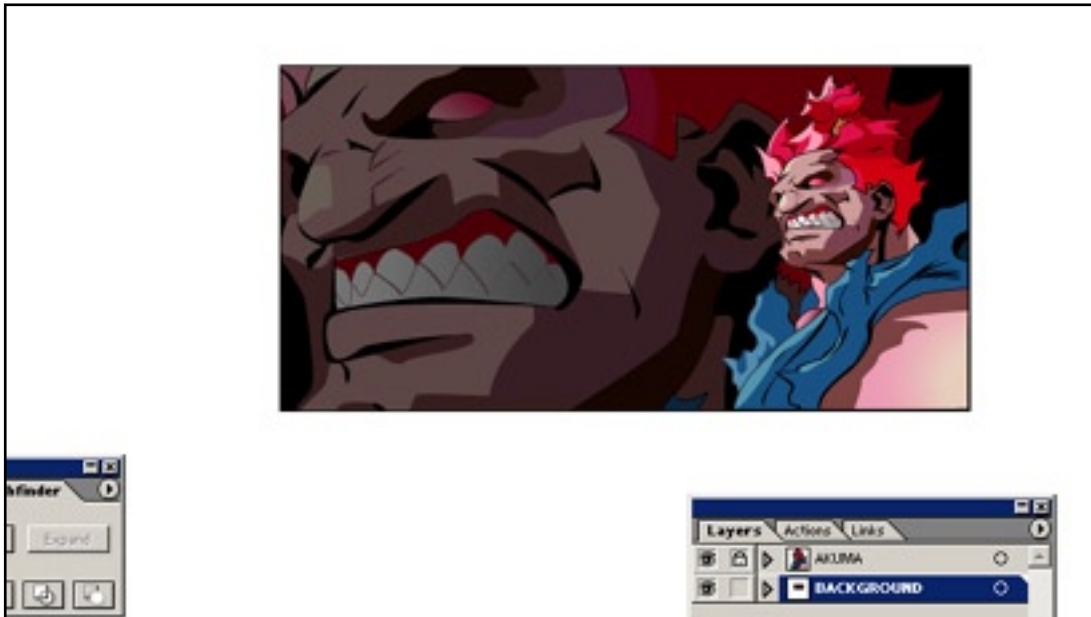


Creating the Finished Piece

Simple Illustrator Control Panel Overlay (continued)

Excellent. You are starting to see the finished piece. The rectangle acts as a mask that allows only that portion of the large Akuma to show, kind of like a window.

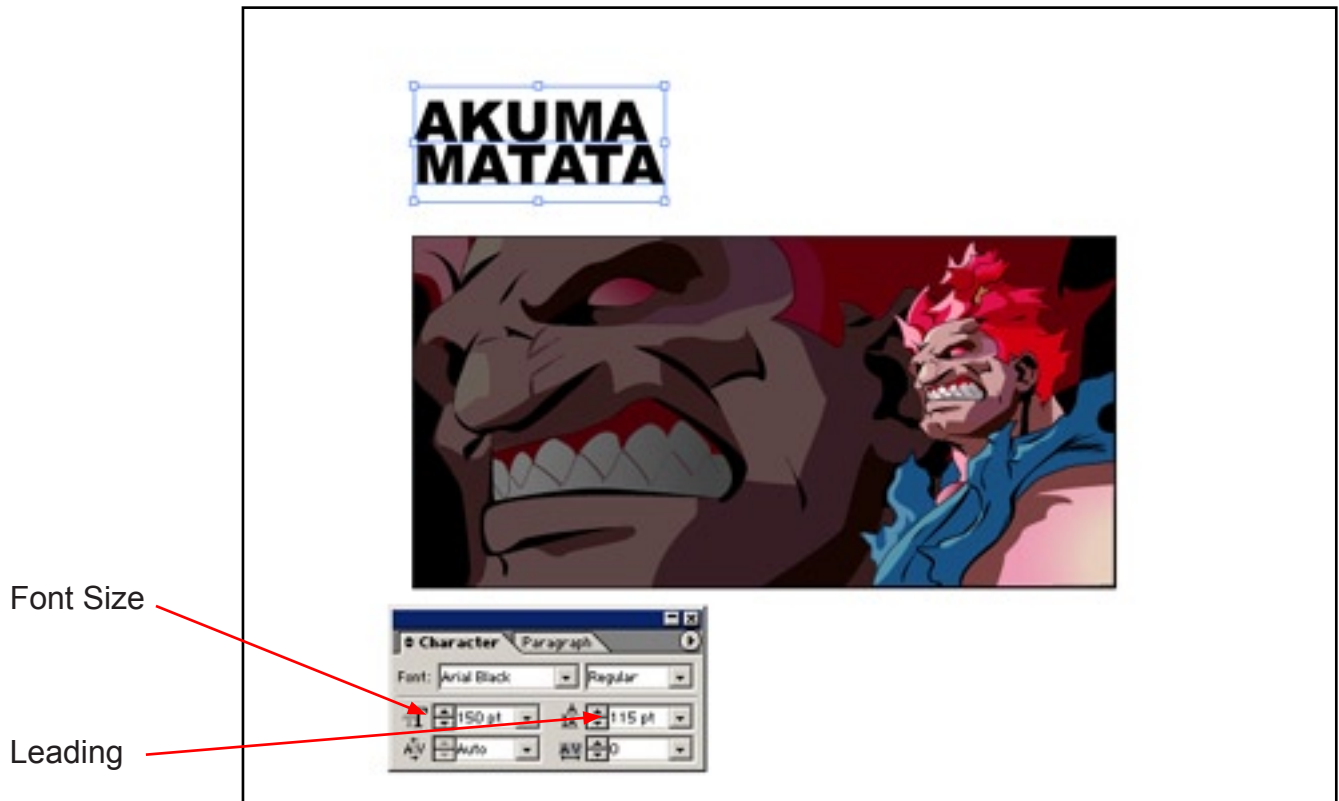
Now create another rectangle 26in wide and 13in tall and fill it with all black. Position it directly over the artboard and go to Object...Arrange...Send to Back. This will create a black background - it can be any color you want I just picked black since it goes with most cabinets. Try to pick a really dark color at least, not a bright one.



Creating the Finished Piece

Simple Illustrator Control Panel Overlay (continued)

At this point we will add some text using the text tool and give it a cool name. First, find your Character palette (CTRL + T). Select ARIAL BLACK text and make change the point size to 150pt and the leading to 115pt - you may have to type it into the box. Now click on the Type tool (it looks like a 'T') and click once on the white space outside the artboard. Now type:



“Akuma Matata... It means no worries....For the rest of your days.... “

The text is kind of small, so let's convert the type to outlines before we resize it. This is crucial - ALWAYS convert all type to outlines before taking it to the printers. You do this because if you use a crazy font the printer does not have and you have NOT converted to outlines, then it will substitute some awful, boring, plain font for your cool one. That's not an issue if you use Create Outlines.

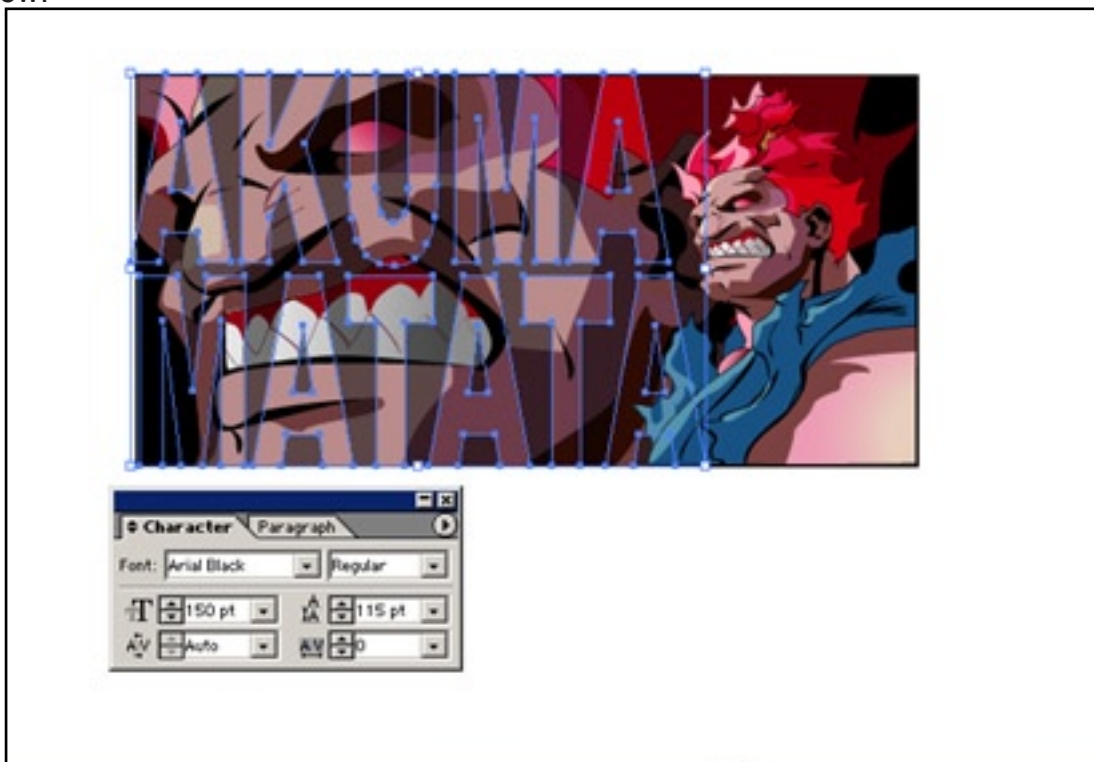
Creating the Finished Piece

Simple Illustrator Control Panel Overlay (continued)

Anyway, to do that, select the text using the Select Tool. Go to Type...Create Outlines. Now the text is just a group of shapes. Position it in the lower left of the artboard and resize it until it just starts to hide behind the smaller Akuma.



Change the text fill to pure white. If you keep it black the next part will not work. That white text looks a little too overpowering, so at the transparency palette, select Overlay from the drop down menu. Actually experiment with the different options in transparency to find one you like. Picking anything other than Normal forces the selection to behave differently depending on what is underneath it. I like Overlay for now:



Creating the Finished Piece

Simple Illustrator Control Panel Overlay (continued)

Hey it looks pretty good to me. If the type is still a little too overpowering you can adjust the transparency - essentially toning down the effect. From here you can add some joystick arrows, change the background, add another character, etc. I also recommend creating outlines of joysticks and buttons to scale so you can line them up on the overlay. There are some already pre-made, or grab the schematics for them from the manufacture site. All you need is the overall 'footprint' of each part. One handy thing to do is to draw a tiny crosshair where you want the center of each button, joystick hole, etc to be and then just use the printed overlay as the template for when you cut the control panel itself. Just lay the finished overlay on top of the wood and stick a pen or icepick through each crosshair, and bingo - instant perfect markings for the location of your controls!

My finished overlay for this tutorial ended up looking like this:



The text I added just to provide a design. It does not have to be completely readable, but breaks up the big Akuma nicely, I think. You do not need to read control panels, that's what instruction cards are for. This would look good with some red and blue joysticks, I think. And check out the file size - pretty small, isn't it? It is only 357Kb on my hard drive, and this will print sharper (depending on the printer) than a 300 dpi raster image in photoshop, where the file size could easily top 150MB or more!

The file size is so small because, as I mentioned earlier, there is no pixel information being stored here. It is all just shapes and lines, as opposed to a JPEG or TIFF (or any raster image) which needs to store per pixel information.

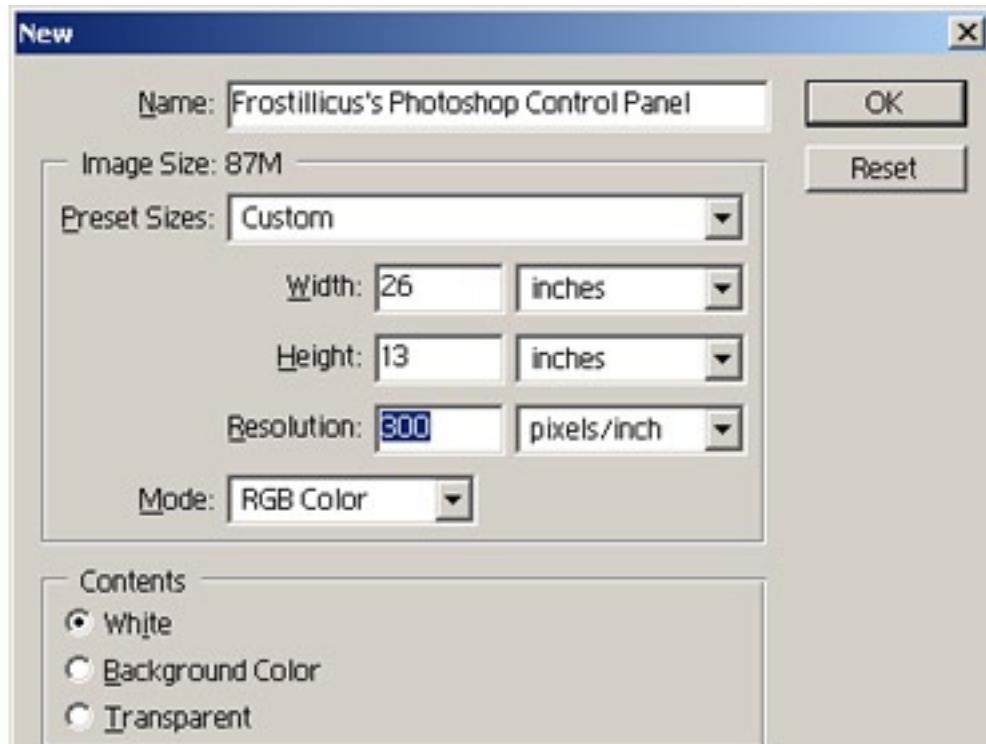
I will talk later about how to get this to a printer, but first let us suppose you wanted to import this drawing or part of this drawing into Photoshop....

Creating the Finished Piece

Importing into Photoshop

Perhaps the most popular way to create overlays, marquees, etc is in a program like photoshop. I myself usually end up there, drawing shapes and characters in Illustrator but then importing them into Photoshop to add some effects and filters.

Here is the easiest possible way to do this. Open Photoshop along with Illustrator. In Photoshop, select File...New...and change all the values to what you see below.



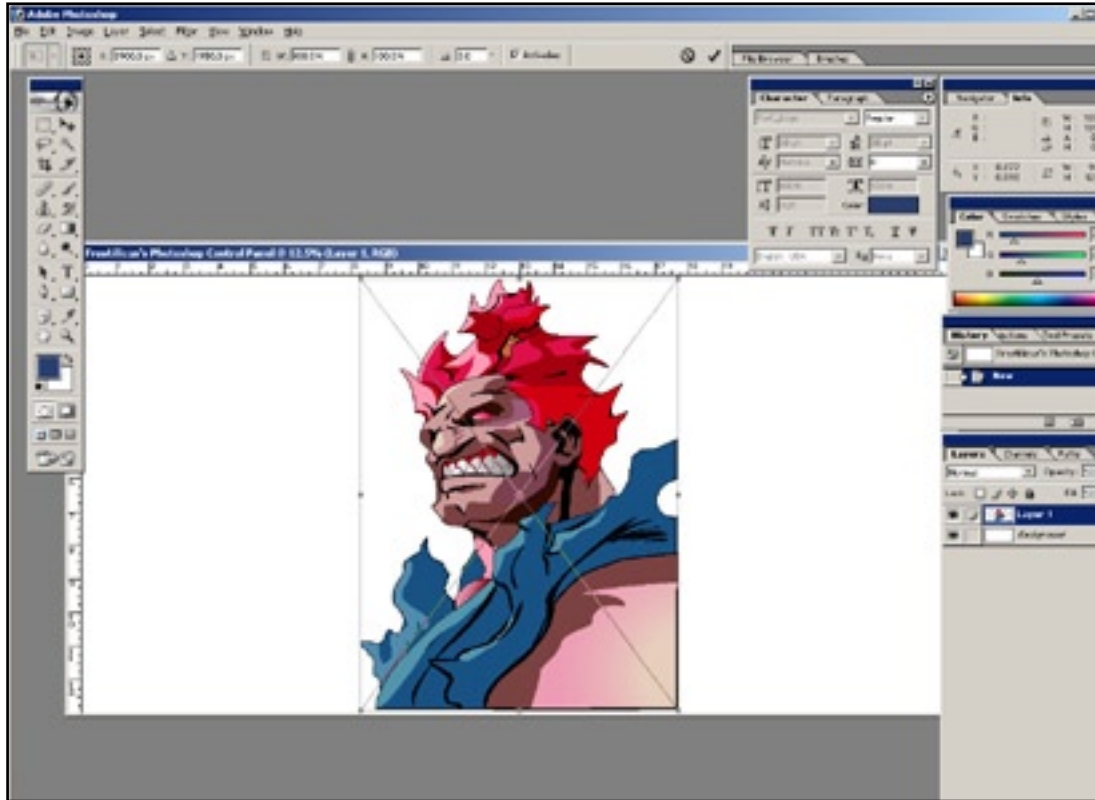
The reason I picked 300 dpi is *that is all you need*. You might hear talk of 600 dpi, 150dpi, etc, but go with 300. Why not go higher? Because that is overkill. I use 300dpi at work and with our printer I can see no pixelation whatsoever. It is very sharp. People advocate higher resolutions because they think the printer will benefit, when in fact it makes no difference at all. If you feel you *must* use 600 dpi, keep in mind that the file size will increase exponentially. It will be probably around 1GB for something like this. 600 dpi x 26 in x 13 in is a lot of pixels.

Select RGB, for the same reasons I mentioned above. The printer will convert it automatically for you - and they will have much better ways of doing it than you. A professional printer can achieve a much higher color range for CMYK than you can, so keep that in mind.

Creating the Finished Piece

Importing into Photoshop (continued)

We now have a huge blank Photoshop workspace, time to stick Akuma in there. Go back to Illustrator and select just Akuma. Hit Copy (CTRL + C). Now switch over to Photoshop and hit Paste (CTRL + V). A pop-up box asks if you want to paste it as Pixels or a Path or a Shape Layer. We want the default- Pixels. Hit OK and you should now see Akuma in a black bounding box with an X through him, like this picture here:



This bounding box means Photoshop has not converted the vector image into a raster image yet. This means you can resize him as much as you want. Hold down SHIFT and drag a corner of the box around to see what I mean. When you have him at the desired size, hit ENTER. Now he is permanently at that size. From here, you can always shrink him, but do not enlarge him. If you need a bigger Akuma just copy and paste a new one and go from there. If you shrink him then enlarge him after you've imported him it defeats the whole reason we are doing this, which is to achieve a very sharp piece of artwork.

Zoom into 100% (double-click the magnifying glass) and you will see what this will look like if you were to print it out and stick your nose against it.

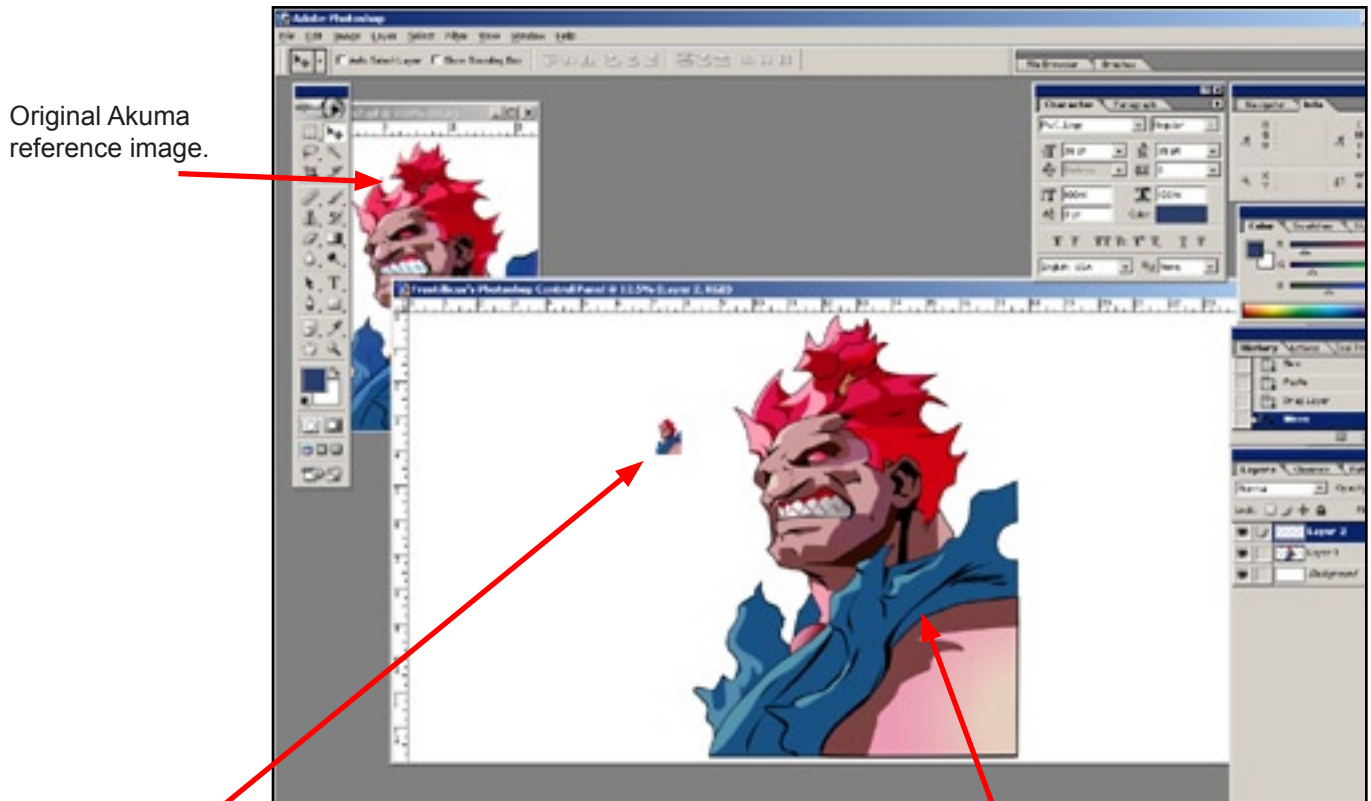
Creating the Finished Piece

Importing into Photoshop (continued)

Just for fun, let us import the original piece of reference artwork of Akuma. Remember how I said web-art just plain stinks for arcade artwork proportions?

Open the original Akuma into Photoshop. The original image was a GIF, which means it has a color mode of Indexed Color. We need to change this. Go to Image...Mode...and select RGB Color.

Now hit 'V' or select the Move Tool from the toolbar (looks like 4 arrows) and drag the original Akuma onto the new large overlay. It should look like this:



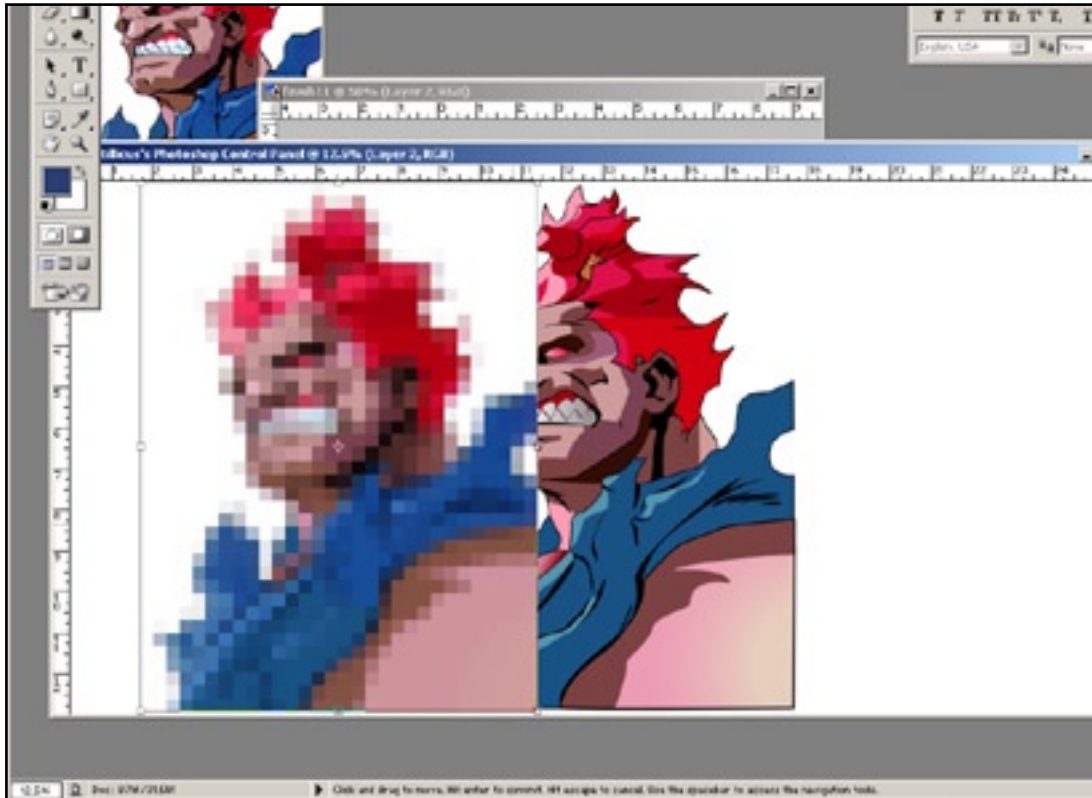
Original Akuma reference image dragged onto the new overlay. It appears much smaller because the new overlay is at a much higher resolution.

Imported vector shape from Illustrator. Photoshop automatically renders the shape to the correct resolution - all you have to do is make sure it is the right size in inches when you import it.

Creating the Finished Piece

Importing into Photoshop (continued)

That's pretty small - we need to resize it to the large proportions it needs to be to match the other Akuma. When you dragged it onto the new overlay, Photoshop automatically created a new layer for it - it's probably called Layer 2. Make sure its layer is selected and hit CTRL + T (Free Transform). Now a little bounding box will appear around it. Hold SHIFT and drag a corner so it is the same size as the other Akuma. As it grows, you can see the original pixels stretching to accommodate the new size:



Hit ENTER and it will complete the Free Transform. You will see a feature called *Interpolation* as soon as you hit ENTER. Interpolation is Photoshop's way of making things bigger without degrading a lot of quality - but it never really works well. Basically, when you resized the little Akuma, Photoshop had to create a bunch of new pixels to fill in the gaps and to round out the boxes you see above. But it just guesses, though it's some good guessing. The result is pretty blurry, even zoomed out. Zoom in and you see what the final, printed overlay would look like with your nose pressed up against it:



Resized original Akuma

Imported vector Akuma

Creating the Finished Piece

Saving It All for Printing

The time has come to save it and package it all up for printing. Your awesome overlay in Illustrator has some very simple options in terms of file format.

The easiest is to make a copy of the native .AI file and give that to the printer, but you need to make they have Illustrator and the correct version. A widely used format is called EPS (Encapsulated PostScript), which is a sort of general-use vector format. Saving a file as an EPS allows it to be easily imported into other programs, in case they do not support direct .AI file importing. An EPS will be a bigger file than and .AI.

To save as an EPS, go to File...Save a Copy...EPS...and just use the default settings.

Another option is a high resolution PDF (Portable Document Format). Everyone can read PDF's. Go to File...Save a Copy...Adobe PDF. In the pop up box select Acrobat 5 File Compatibility instead of 4, and all the other options below. Then from the pull-down menu select Compression and uncheck all boxes. Hit OK and look at the results. It might look bad initially, but zoom into it at 1200% and see how sharp it is. Acrobat Reader has issues when displaying vector PDF's, but they print okay.

If you want a raster image to take to the printer, select File...Export. Then pick TIFF, name it, and hit OK. For the pop-up box, select 300 dpi and LZW compression. You can try Anti-Alias, but usually the program will not allow it on such a large-sized document. Make sure the Color Model drop-down menu says RGB, and that you select IBM PC Byte Order over Macintosh. Then wait 20 minutes because it could take that long to export it. The file size will be huge.

What I would do is to save it as the first 3 formats, stick them on a CD, and take that to the printer - letting them figure out which one to use best with their system. A raster version is not really needed.

But what about Photoshop? Save it as a TIFF again at 300dpi. File....Save as....TIFF. Save it as a copy without layers to decrease the file size. Any good printer should be able to handle a TIFF, which has a better quality to the other formats, such as JPEG and BMP. Try not to give the printer anything other than an AI, EPS, PDF or TIFF, if possible. I'd suggest PSD (Photoshop native files) but they are REALLY huge.

Also, if you added text in Photoshop, saving the file as a TIFF will render the text so you do not need to bring the fonts with you to the printer. Though to be on the safe side, I would bring everything. You never know, and you do not want to drive all the way home for some silly font.

Printing

Where to Print? What Kind of Paper?

Find a place that has a large-format printer that prints at 300-600dpi. The most popular by far is Kinko's, though you are paying for convenience.

(old info)I must say, my experiences with Kinko's have been pretty good. Some people complain and rant about them, but usually that is because they were not clear about what they wanted. There is the occasional idiot worker, but you get that anywhere. They have good printers, which is all that matters to me.

(edit Mar 24 03) OKAY that last paragraph is BS. Recently I had a really bad experience with Kinko's and I was VERY clear as to what I wanted. They print well - I'd recommend regular paper, and then get it laminated even if it's going under lexan. It looks pretty good, but originally they printed it out too large. What idiots. So I cannot under good faith recommend them if there are alternatives.

There might be some local printer in town, though the chances of them having a *good* large-format printer is small. Look in the yellow pages and call around. Get prices per foot on different kinds of paper, and ask what file format they accept. See if you can get a small sample first.

There are 3 standard types of paper: Regular matte paper, Glossy paper, and a fabric-like vinyl which technically isn't paper. Steer clear of matte, you will get brighter color on glossy paper. Vinyl is pretty good, too. Glossy is the most expensive, though not always the best choice.

Will you laminate your overlay and glue it on the control panel? Or will you put a piece of Lexan or Plexiglass over top of it? You should protect it somehow, because watches, rings, fingernails, etc have a tendency to scratch off ink.

For side-art, some places can print directly to a self-adhesive vinyl, which makes applying to the cabinet easy. Though you only get one chance to do it right. Some places can print right onto plexiglass (marquees, for example), though good results can be had by sandwiching paper between 2 sheets of plexi or regular glass. Remember for marquees, design some very light areas for the marquee to shine through - don't just have an all-black looking marquee.

If you can afford it, or do it yourself (in which case you probably do not need this tutorial), you can get good results with screen printing. That is the process original marquees were made with. It is usually not practical for just one or two, so I will not get into it.

Finally, another option is to create your own set of large stencils! Much like Joust side-art, you can create 3-4 large stencils which you then mask over your cabinet and spray paint. That would be pretty cool! And they would be re-usable, too.

Appendix A

Common Misconceptions

Some people just want to believe the wrong thing when it comes to vector programs, graphics, whatever - especially if they apply or are useful for creating arcade artwork.

Common misconception #1:

Q: You'll never produce arcade-quality artwork using vector graphics, there just isn't enough detail!

A: My answer to this is to ask, What is 'enough' detail? If what you are looking for are giant photographs stuck to your cabinet or a photo-realistic picture of Don Bluth on the control panel, then maybe you should rethink your conceptual designs. I show examples on the next page of classic arcade artwork, none of which are photographic in nature, but are clearly made up of individual shapes of solid color. Even something as complex as asteroids side-art can be reproduced in Illustrator given enough time. Which leads me to #2....

Common misconception #2:

Q: It'll take forever to do that! I don't have that much time. Who does?

A: Well, it will take a bit of time in the beginning, but once you master the basics and keyboard shortcuts, you'll be flying through each image. And I wouldn't recommend doing a huge marathon vector session. Anything worthwhile will take some time to create, look how long you spent on your cabinet. Plus, once someone makes a quality vectorized image of a game character it can then be made available to everyone! Think of it not as a lot of work, but as a contribution to others!

Common misconception #3:

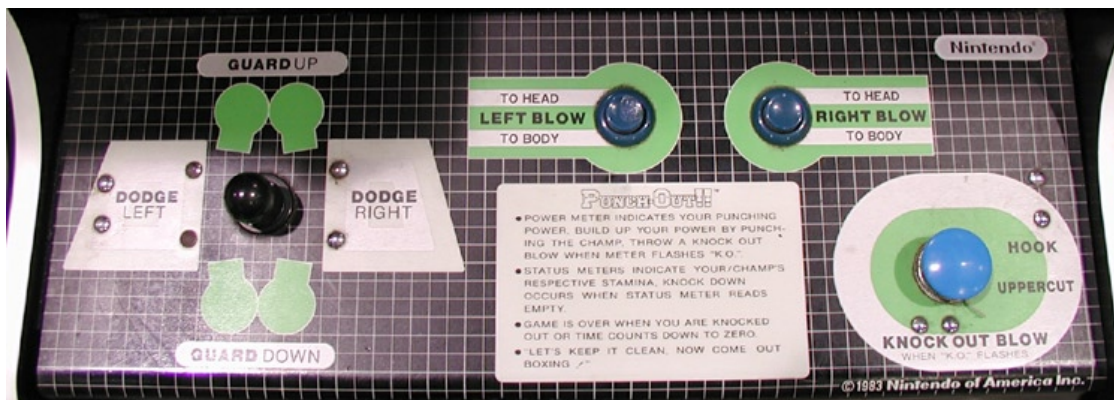
Q: Isn't there a huge learning curve with Illustrator? And why would you think anyone could do this?

A: There is a learning curve, but taken in steps it is not that bad. It's all relative - have you ever tried using AutoCad or 3D Max? Now they have some huge learning curves. It might seem overwhelming but we mostly just focus on ONE tool (the pen), that's all you really need. I would like to think anyone can do this, because this tutorial basically is about tracing. No artistic ability required, though creating original artwork is always encouraged.

Appendix B

Arcade Art Examples

I got these following examples from the control panels image selection available in mame. All of these are able to be reproduced as vector images without losing anything, though some would take more time than others (like double dragon at the bottom). Note how you can break down each image into shapes. For example, donkey kong is basically a brown shape of fur, with a face and chest of light brown. All outlined in black. Add 2 eyes and you're basically done.

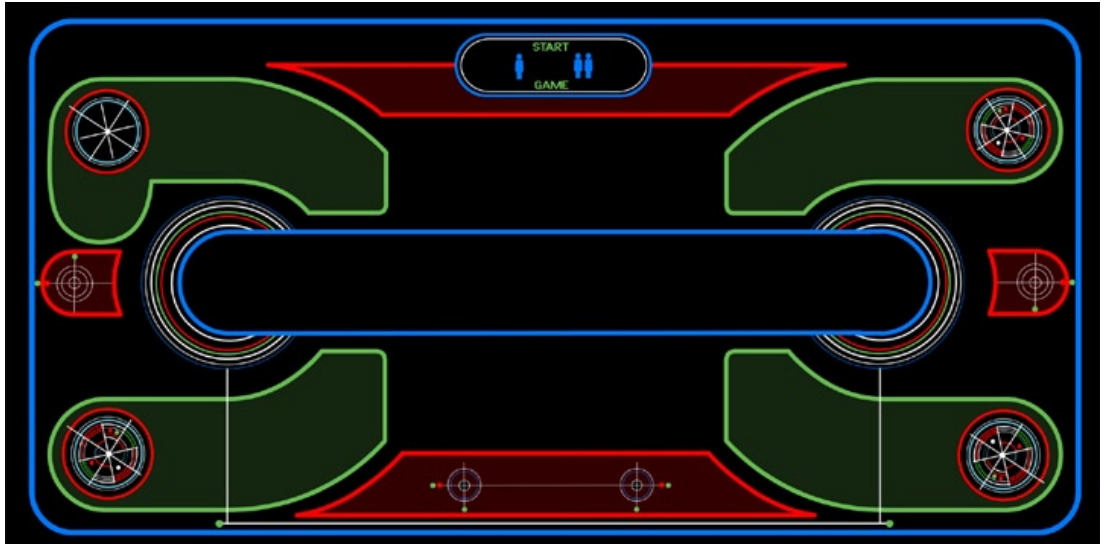


Appendix C

Vector Art Examples

Here are some recent control panel overlays I've done for my cabinet, I've used vector shapes in all of them, some more than others. Each design is based on what controls will be on it - analog, rotary joysticks, and fighting. I am not trying to toot my own horn here, just demonstrating what some finished custom artwork can look like.

Almost entirely drawn in Illustrator, it was inspired by TRON. Spinner on the left, trigger joystick on right, and trackball in the center.



Shapes and text in Illustrator, filters and gradients in Photoshop. Inspired by Assault. 2 rotary joysticks, some buttons, and 2 trigger sticks in the middle.



Characters in Illustrator, background effects in Photoshop. A basic fighting panel layout of buttons and 2 joysticks.



Good Luck!

Final Thoughts and Credits

I hope this tutorial inspires you to go that extra mile for your cabinet artwork. Take your time and try not to feel overwhelmed - the results are really worth it. Hey how long are you gonna have your cabinet? Probably a long time, so make it good looking enough that you and the significant other will be proud to show it off to friends and family! Thanks go out to Saint for having a killer site (www.arcadecontrols.com), the whole MAME dev team, everyone who ever helped me with questions regarding software, hardware and controls. Of course, Adobe makes the best. graphics. programs. ever. Don't forget to share some pics of your work with others!