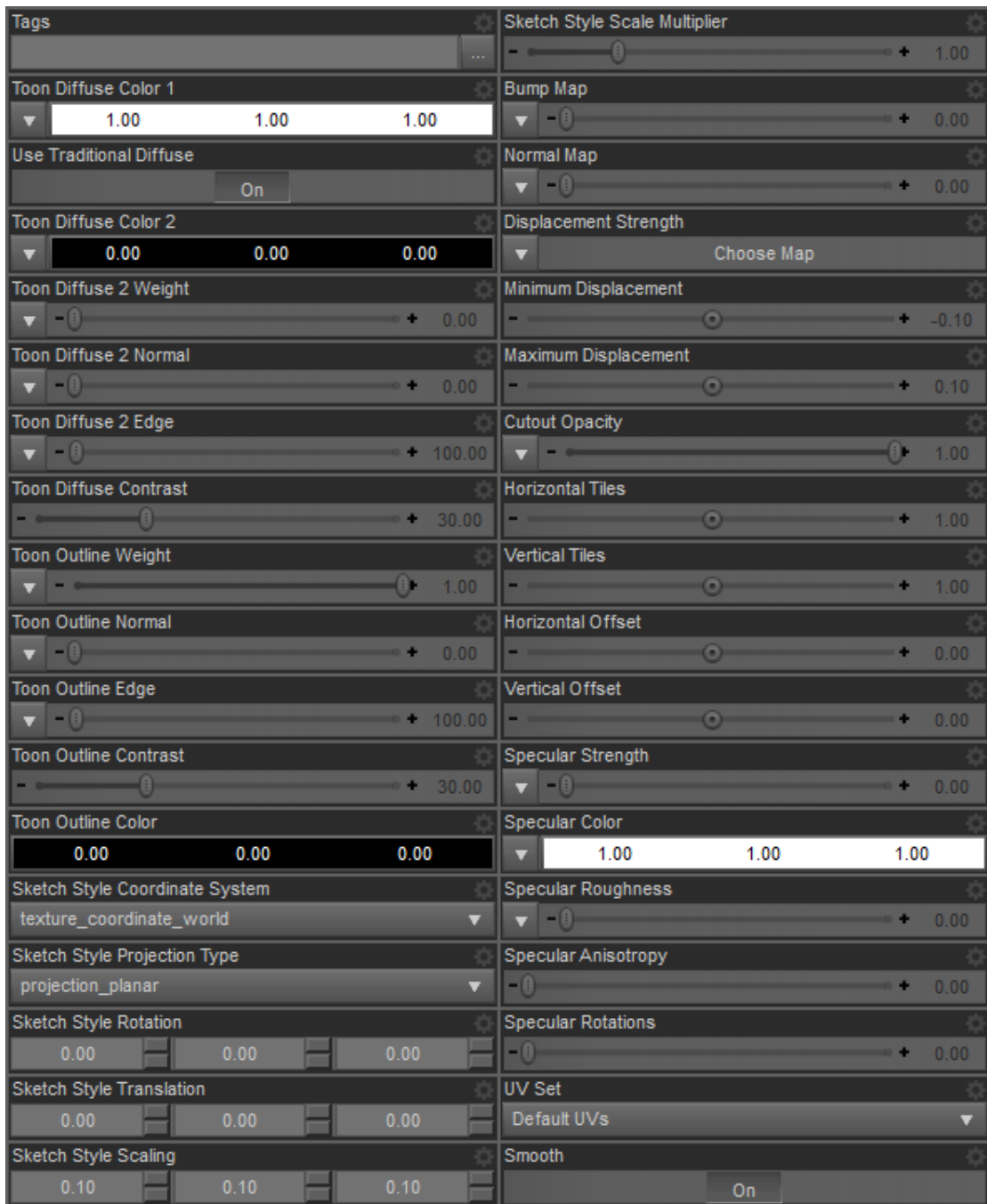
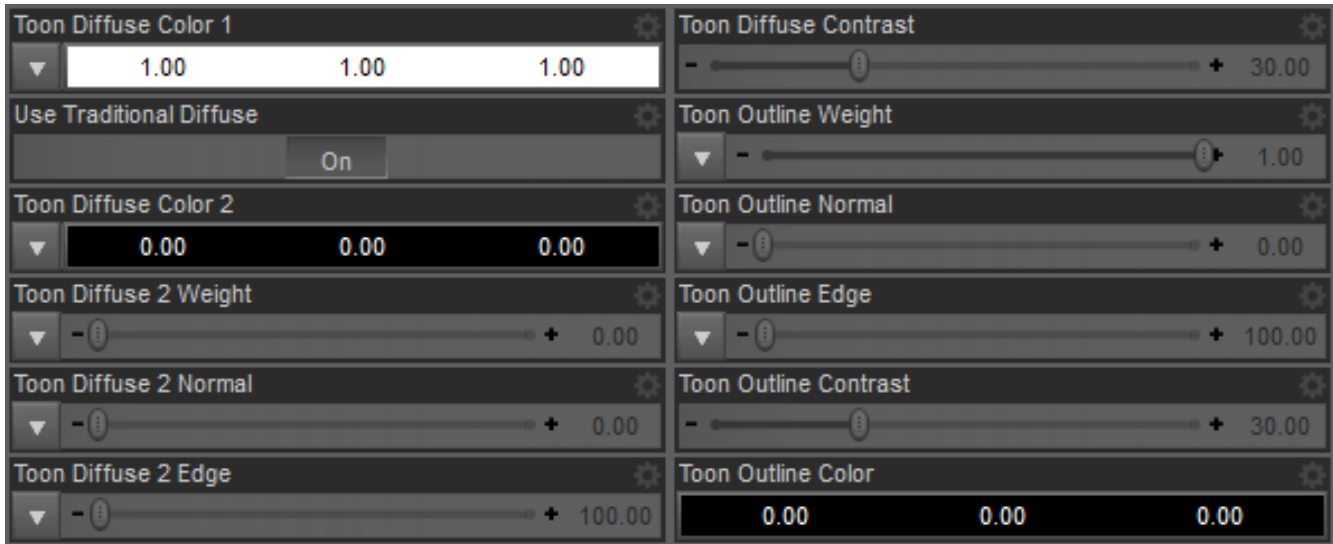


# Iray Toon Shader Overview

The Iray Toon Shader is a customer shader for Iray that introduces effects meant to mimic styles you may find in comic books or cartoons. When you apply the shader it will replace your existing shader (! Iray Uber Base etc) and load a new set of values for you to edit however you want. Most notably the new values let you control “Outline” and “Sketch Style” settings. “Outline” adds a line that's usually black in color around the outside edges of your model to simulate pen strokes artists typically create in hand drawn illustrations. “Sketch Style” settings let you select and adjust numerous options for how the outline and shading works, allowing you to add details like pencil strokes and cross hatching. This overview will cover the new values you'll find in the shader and teach you exactly what they do.



# Outline Adjustments

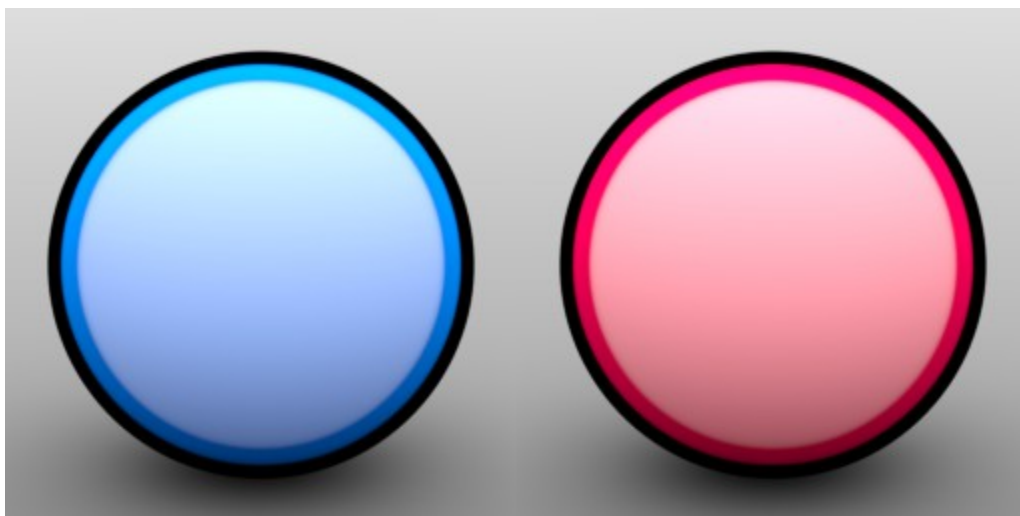


There are two different layers of outline that you can modify with slightly different uses. Having the two layers lets you do things like secondary outlines (a red outline inside a black outline etc). The values shown in the image above are what you can use to change how both of these outlines work.

**Toon Diffuse Color 1** – This is your base diffuse texture which works the same as other shaders

**Use Traditional Diffuse** – When this is on the shader uses only *Toon Diffuse Color 1* for diffuse colors and textures. When enabled *Toon Diffuse Color 2*, *Toon Diffuse 2 Weight*, *Toon Diffuse 2 Normal*, *Toon Diffuse 2 Edge* and *Toon Diffuse Contrast* settings will have no effect

**Toon Diffuse Color 2** – This is the color / texture that will be used for the first layer of outline. You can see the difference between blue and pink colors when used in *Toon Diffuse Color 2* below

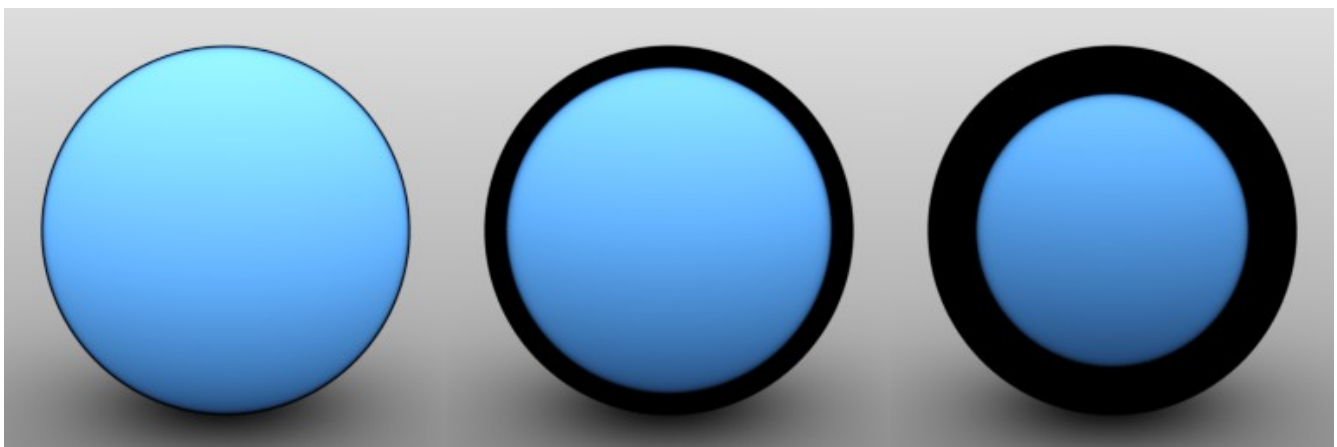


**Toon Diffuse 2 Weight** – This changes the weight (strength) of the effects produced by the first layer of outline. It works the same as something like “Glossy Layered Weight” in the !Iray Uber Base shader. Textures loaded for draw style settings will usually be placed here as it affects both the outline and surface normal, producing things like “Sketch” effects on the whole surface instead of just edges

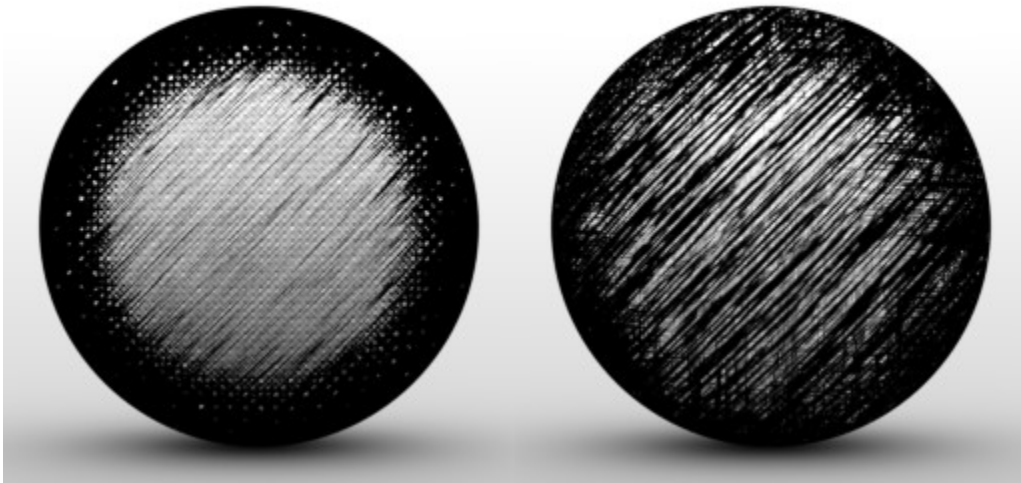
**Toon Diffuse 2 Normal** – This value affects how much color / texture from *Toon Diffuse Color 2* will be produced on the surface normal of your object, which is typically the parts of the object facing the camera. The example below shows three different strengths of *Toon Diffuse 2 Normal* and how the outside edge colors begin to fill in the rest of the object



**Toon Diffuse 2 Edge** – This basically translates to the thickness of the outline in the first layer. The higher this value the thicker the outline will be on the surface. Outline thickness will also be affected by *Toon Diffuse Contrast* in ways mentioned in that value's description. You can see the difference between three *Toon Diffuse 2 Edge* strengths below



**Toon Diffuse Contrast** – This value will change the contrast between your *Toon Diffuse 2 Normal* and *Toon Diffuse 2 Edge* values. In most cases it will appear to work similarly to *Toon Diffuse 2 Edge* but it is needed to produce smoother gradients in from the outside edge. To create smooth gradients you will need a very low *Toon Diffuse 2 Edge* value along with low *Toon Diffuse Contrast*. You'll see more obvious differences between *Toon Diffuse 2 Edge* and *Toon Diffuse Contrast* when working with textured draw styles to produce fully shaded surfaces. Below is an example of the difference between a surface with high contrast and one with lower contrast (with low contrast on the right).



**Toon Outline Weight** – Similar to *Toon Diffuse 2 Weight*, this changes the weight (strength) of the outline effects. This value however is specific to the second layer of outline which will draw over the first layer. Textures loaded for draw style settings will usually be placed here as well in order to unify the draw style between all outline and shading values. You can load a different draw style texture here than *Toon Diffuse 2 Weight* to produce some unique mixed medium effects. Both of the options in the above example show mixed draw style textures.

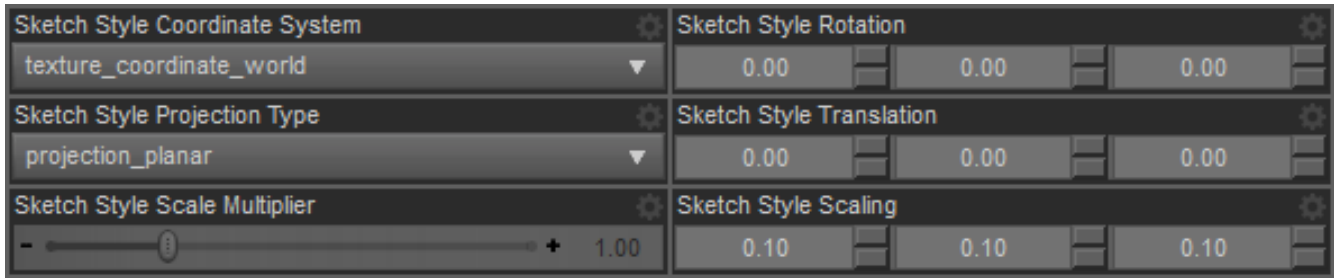
**Toon Outline Normal** – This behaves the same as *Toon Diffuse 2 Normal* in every way except that it is restricted to the second layer of outline and affected by *Toon Outline Color*.

**Toon Outline Edge** - This behaves the same as *Toon Diffuse 2 Edge* in every way except that it is restricted to the second layer of outline and affected by *Toon Outline Color*.

**Toon Outline Contrast** - This behaves the same as *Toon Diffuse Contrast* in every way except that it is restricted to the second layer of outline.

**Toon Outline Color** – Similar to *Toon Diffuse 2 Color* this is the color that will be used for the second layer of outline. This value will not accept a texture map however. Most often than not this will be set to black and texture detail is better suited in *Toon Outline Weight* or *Toon Outline Edge*. Any sort of colored texture edges can be achieved by using a texture map in *Toon Diffuse Color 2*.

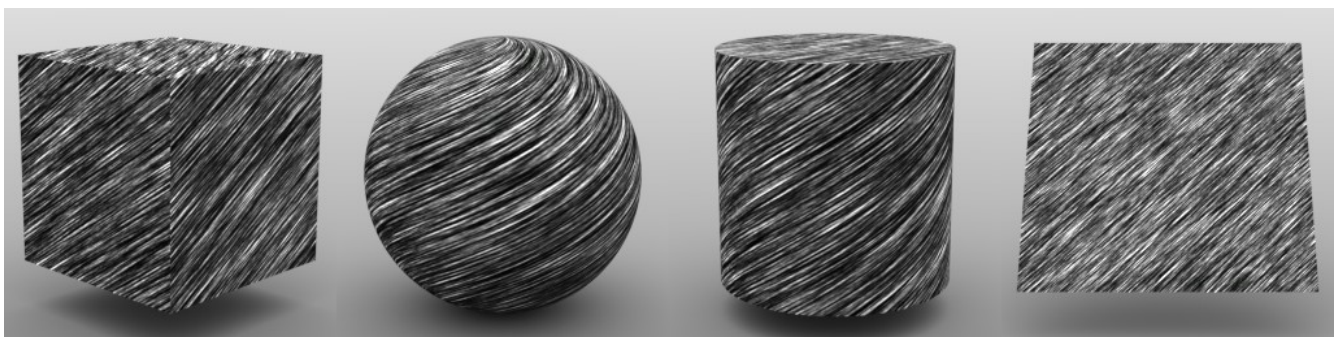
# Sketch Style Adjustments



For the sketch styles to apply universally to surfaces without the requirement of specific UV mapped textures it uses some projection mapping which can be altered by the above values. The values here apply to all texture maps in all previously covered settings excluding *Toon Diffuse Color 1*.

**Sketch Style Coordinate System** – This drop down menu contains three options for how the texture space is calculated. The options here are UVW, Object and World. UVW uses the object's UV mapping to map the draw style textures and will behave the same as applying the texture to diffuse channels of other shaders. Object uses the XYZ and scale values specific to the object separate from world space (scene settings) when determining how to apply the image using projection type. World considers the XYZ and scale of the object within the scene before sending that mapping information to projection. Default value is World and shouldn't really need any changing.

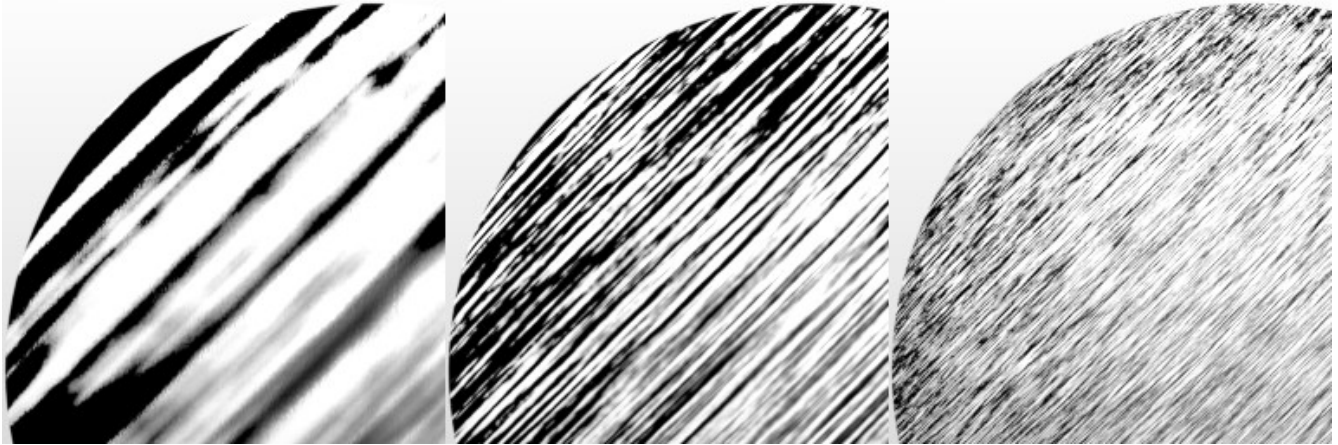
**Sketch Style Projection Type** – This tells the renderer how to project the textures being used for draw styles. There are numerous options here that produce different results, with the most notable being Cubic, Spherical, Cylindrical and Planar. Each one of these settings corresponds to a specific geometric shape which may help you visualize how it maps. Cubic = Cube, Spherical = Sphere, Cylindrical = Cylinder and Planar = Plane. By creating primitives for each of these within Daz studio and applying one of the draw style textures to it's diffuse you can visualize how these apply.



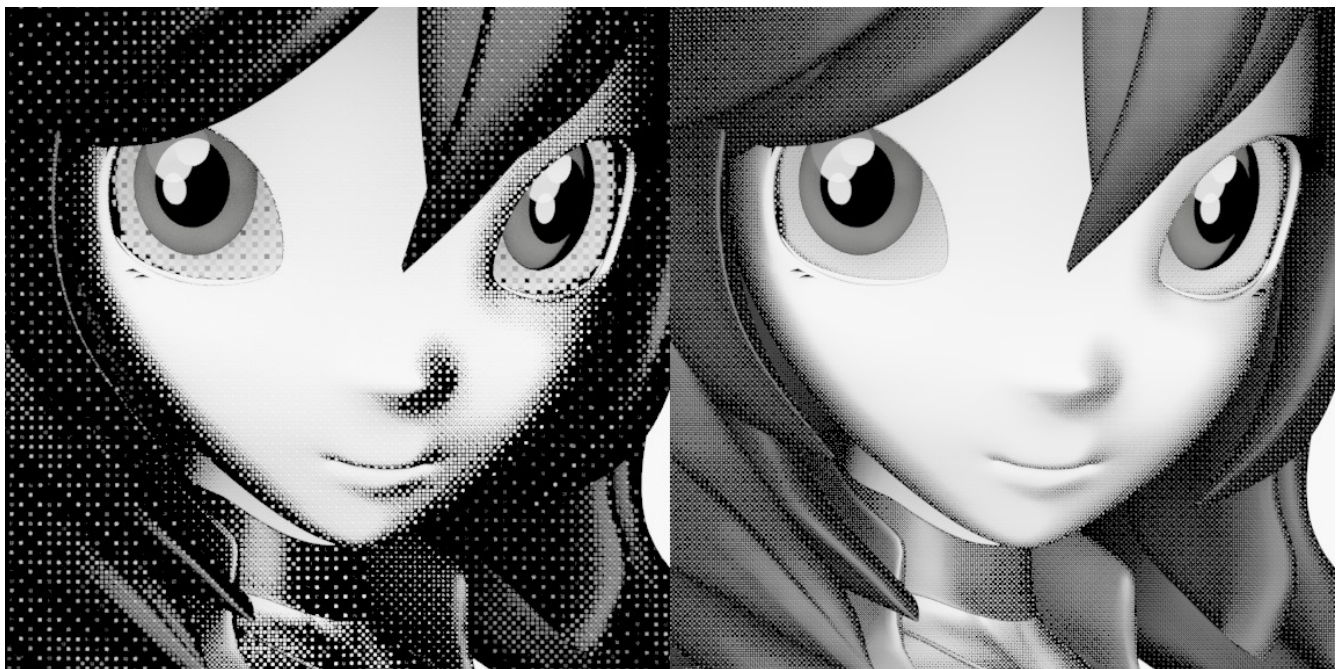
Imagine your these primitives “shrink wrapping” their textures around your object. They all produce visible seams somewhere (spheres and cylinders have pinched poles while cubes put seams at XYZ intersects etc). Planar is used as the default because it produces no seams when used with specific camera angles and looks the best with minimal setups, but the other settings may also be useful.



**Sketch Style Rotation, Translation and Scaling** – These values are probably pretty self explanatory. They serve as ways to manually adjust the draw style texture's position and orientation etc when it is mapped to your objects. Each value works on XYZ axes. Since the textures being projected are 2D the Z value will likely go unused as it will either do nothing or produce some strange results. Scaling will probably be used most, as it allows you to reduce or increase the size of your texture details. Doing this is a good way to naturally lighten or darken the effect as you can see in the example below.



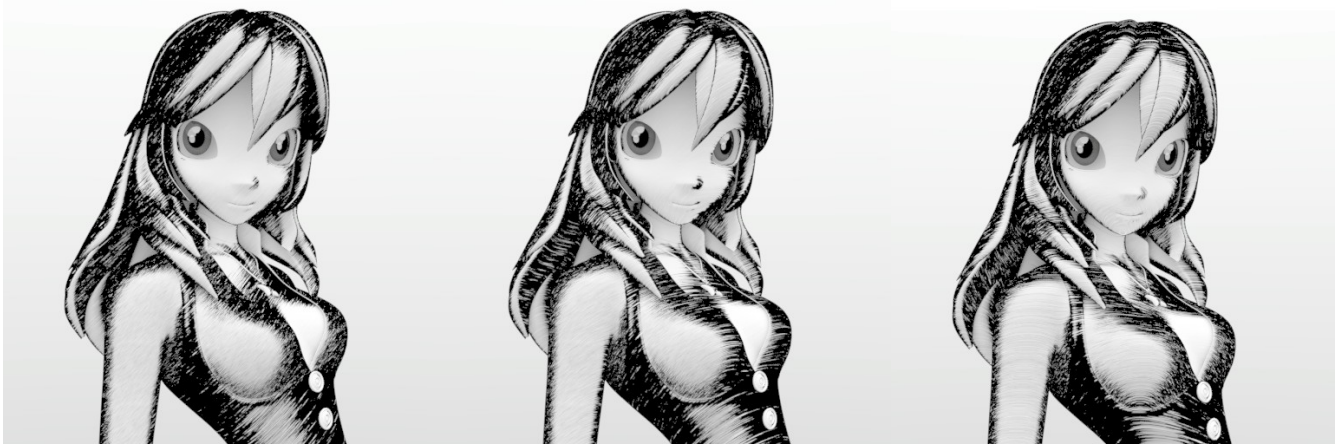
**Sketch Style Scale Multiplier** – This is a secondary scale value that adjusts all of your XYZ values at the same time. Having a secondary value means that you can adjust numerous materials with different *Sketch Style Scaling* values at the concurrently. When your object or scene has scale values set for different materials, selecting them all and using *Sketch Style Scale Multiplier* will be a much easier way to adjust overall scale than adjusting individual values. The following example uses different scale settings to create separate shades which were all scaled simultaneously.



# Limitations Of Sketch Styles

As mentioned the textures for sketch styles are applied through projection mapping. This process is something that has its limitations as no one option can provide completely seamless results in every situation. With the default setting of Planar the texture map is going to be projected straight at your object on the Z axis. When you load Victoria the Z axis is her front and back, so the draw style texture maps perfectly to her when she is viewed from both the front and back. If you move the camera to view her from the side you may start to see seams appear. The issue is more obvious with certain draw style textures, while other textures may show little to no issue at all. The following two examples illustrate this with two different draw style textures.

Star when viewed at 0, 45 and 90 degree angles in relation to the Z axis with Sketch draw style (the issue only alters the direction of texture and may actually be useful)



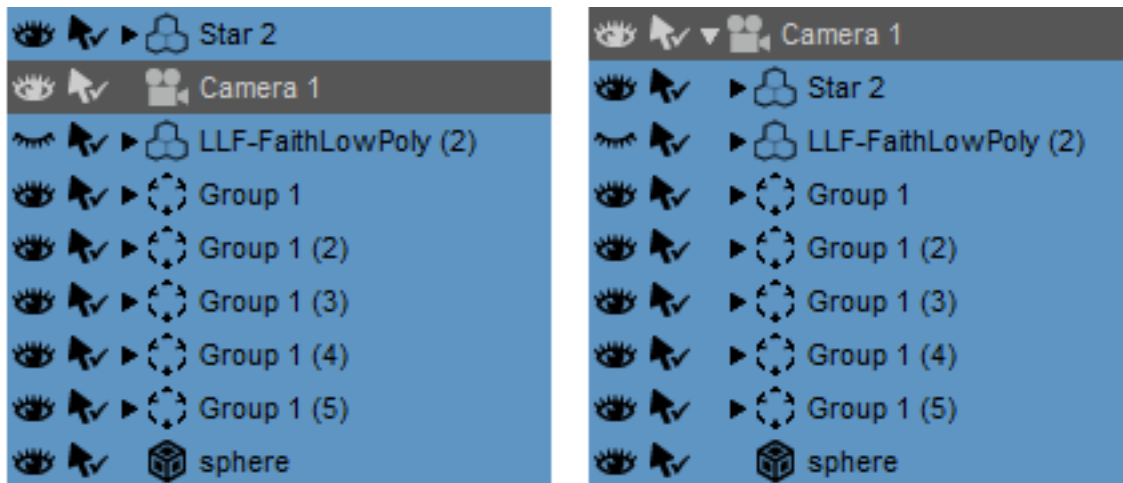
Star when viewed at 0, 45 and 90 degree angles in relation to the Z axis with Crosses draw style (the issue appears as distorted textures where it stretches across the perpendicular angle)



You may want to consider building your scene with the camera direction in mind, making sure your camera's angle is close to in line with the Z axis. If you already have a scene build however there's a couple quick and easy ways you can fix the issue.

**Adjust The Sketch Style Rotation** – The *Sketch Style Rotation* value changes the direction and orientation your texture is being projected from. These values can be altered to give you a perfectly mapped render regardless of your camera's location and direction with a bit of tweaking. In the above examples, when the scene is rotated 90 degrees on Y (right most example) a value of 1.5 on Y in *Sketch Style Rotation* (the middle value) produced perfect results. So if your camera is at a -90 degree Y angle in your scene you would use -1.5 Y in *Sketch Style Rotation*, if it's 45 degrees you would use 0.75. If your camera has an orientation something like 32x 84y 123z it may be easier to create a sphere as reference and gradually adjust values until it looks the way you want, or use another method to fix.

**Parent To Camera And Restore** – What may be an easier way to fix things is to just parent your entire scene to the camera you're using and zero out the camera's orientation / location. You can do this by selecting everything but your camera in the scene tab, then dragging it over your camera to parent it



After the rest of your scene is parented to your camera all you have to do is select your camera and load the camera restoration preset I've included in the set. All this does is set the rotation values for your camera to 0 so the angle is the same as the one used for projection. If you're using HDRI or Sun-Sky for your lighting keep in mind that using this method won't rotate those lighting effects along with the rest of your scene, so you would need to readjust those to restore previous lighting. Any mesh lights contained in your scene when parenting to your camera should work perfectly.