



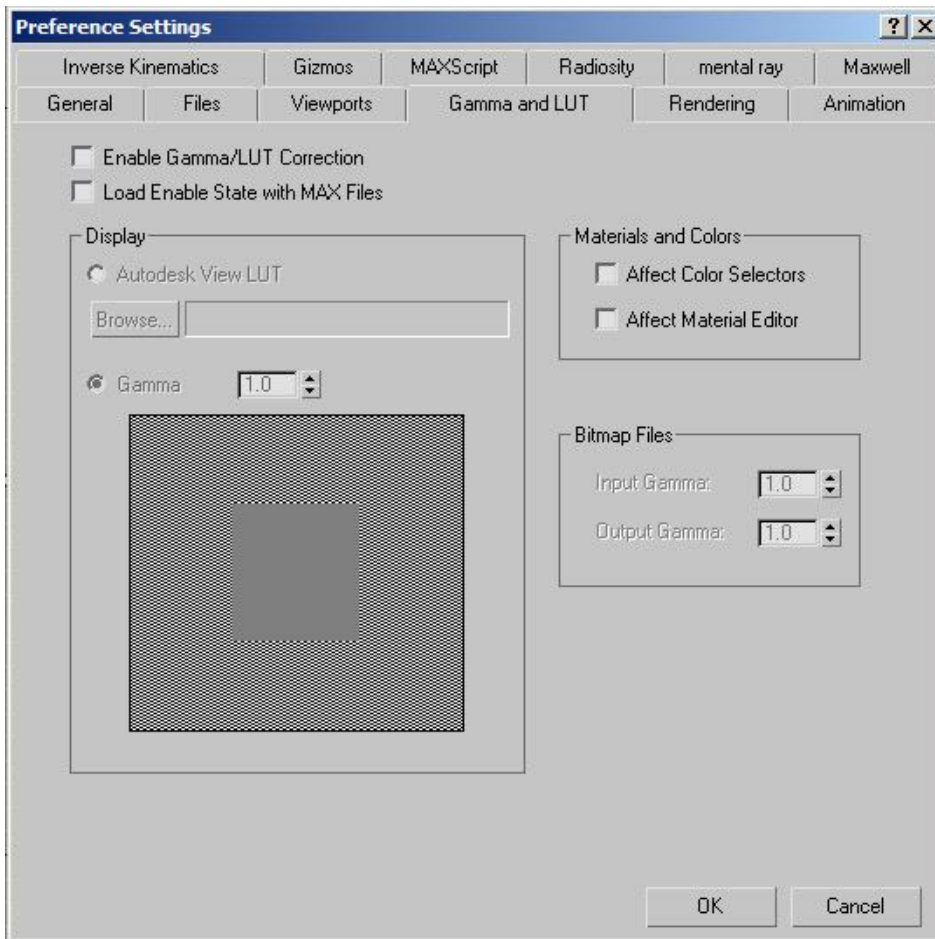
3ds Max Gamma Configurations

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The intention of this document isn't to thoroughly explain what gamma is or isn't. If you're looking for an explanation of what gamma is, you can find that information in the help file of 3ds Max or online. The purpose here is to simply offer a quick visual reference guide to several gamma configurations. In my opinion there's no single best solution to gamma in 3ds Max simply because we all work differently, our monitors are different, gamma on texture maps vary, etc. Therefore the gamma workflow you choose to use should be based on what works best for your particular work flow, not mine.

Jeff Patton

Currently when you install 3ds Max the gamma options are disabled by default. You can access the gamma settings by going to **Customize>Preferences...>Gamma and LUT tab**.



With this default configuration (and no exposure control options enabled) you are using a gamma 1.0 setting for every aspect of your scene. Textures will be loaded in at gamma 1.0, your viewports will display using gamma 1.0, and your rendered output will be saved as gamma 1.0 (linear space). Most monitors display in sRGB color space which means they display as Gamma 2.2. This default 3ds Max gamma configuration is fine if you plan on rendering out to a floating point format and adding your tone mapping/gamma curve in an application outside of 3ds Max.

Keep in mind that gamma 2.2 (sRGB) may not look best on your particular monitor. However, if you plan on sharing your images with people then gamma 2.2 should be the most compatible with most monitors.

So, what does all this mumbo-jumbo have to do with your renders? Up next I'll show you how this relates to your textures.

NOTE: For the rest of this discussion I will assume you are using the mental ray Photographic Exposure control. If you're not using it, your results will vary. If you're using 3ds Max 9 and do not have the photographic exposure control, I provide a typical gamma configuration at the end of this document.

Most of the textures that we use every day in our scenes will have a baked in gamma curve of 2.2. There are exceptions to this theory. These exceptions include: bump maps, displacement maps, and floating point formats such as .hdr/.exr. Your bump maps, displacement maps and floating point images *should* use a linear gamma curve, IE gamma 1.0.

Be forewarned, just because bump maps, displacement maps, and floating point images should be linear (gamma 1.0), doesn't mean they all will be. Personally speaking, I have some .hdr's that have a 2.2 gamma curve baked into them. In fact the .hdr that we are using in our test scenes here at mrmaterials.com has a 2.2 gamma curve baked into it.

Ok, so how will you know if you have a problem with your gamma? In terms of textures, they will probably appear 'washed out' looking in your renders. For example:

Here's a 'typical' texture map provided by: <http://www.arroway.de/en/index.html>



As you'd expect from most texture maps, this particular texture has a baked in gamma 2.2 setting. I've loaded into 3ds Max using a gamma 1.0 setting and here's the resulting render:



Notice how the texture appears less saturated or washed out from the original texture source? Next I'll load this bitmap into 3ds Max using a gamma 2.2 setting:

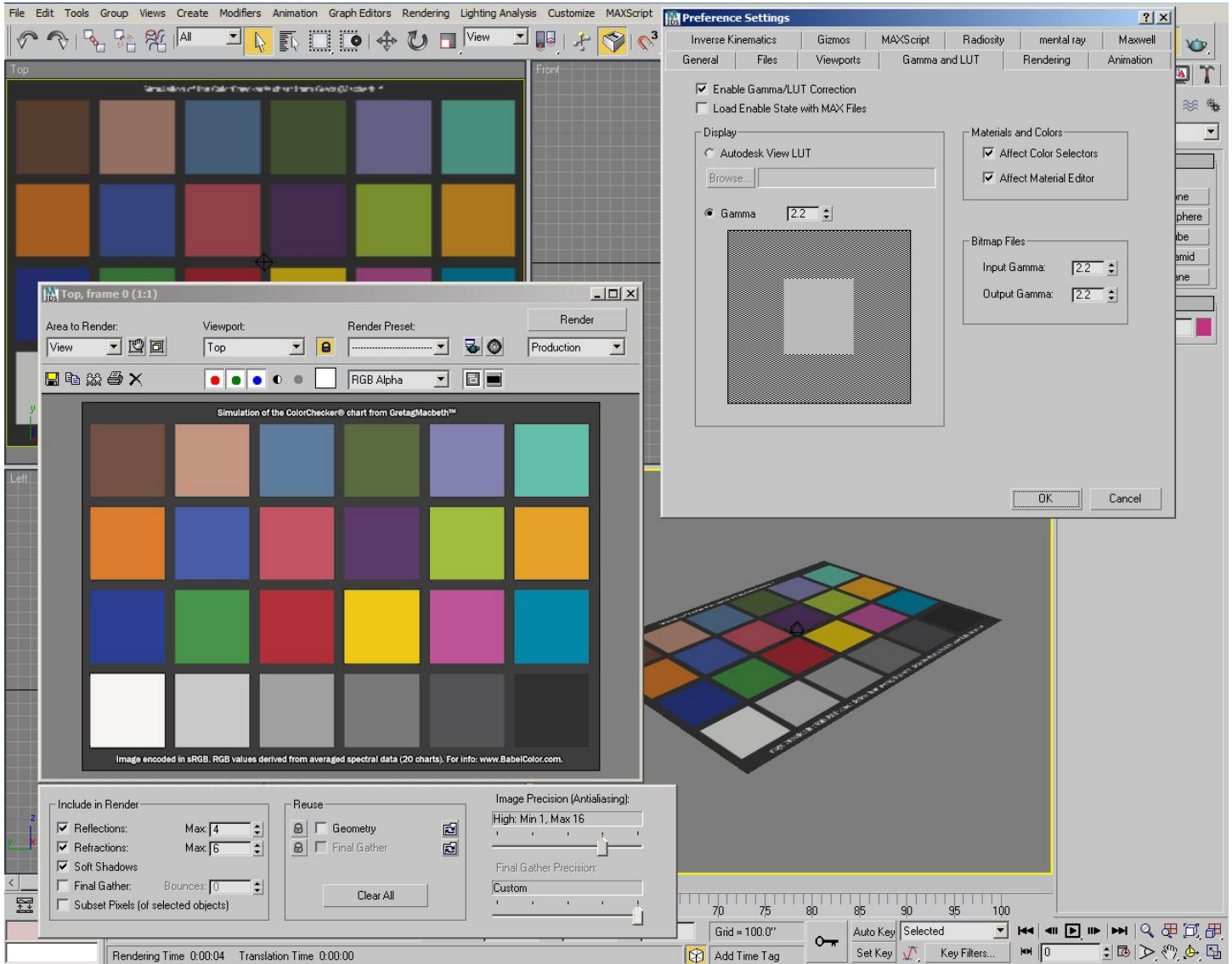


When loaded into the scene using the correct gamma curve (2.2) for this texture, it will closely match the look of the original texture map.

So now you're probably saying "Fine, just shut up and give me the low down on what settings to use". As I mentioned at the top of this document, gamma isn't a "one size fit's all" deal. The settings I'll explain below are simply a few options for you to choose from. Which configuration you choose (if any) will be up to you.

Gamma Configuration A:

- Enable the Gamma/LUT Correction.
- Set the Display gamma and Bitmap input & output gamma all to 2.2
- Enable the Affect Color Selections & Affect Material editor to apply the gamma curve to those items.



Benefits of this setup:

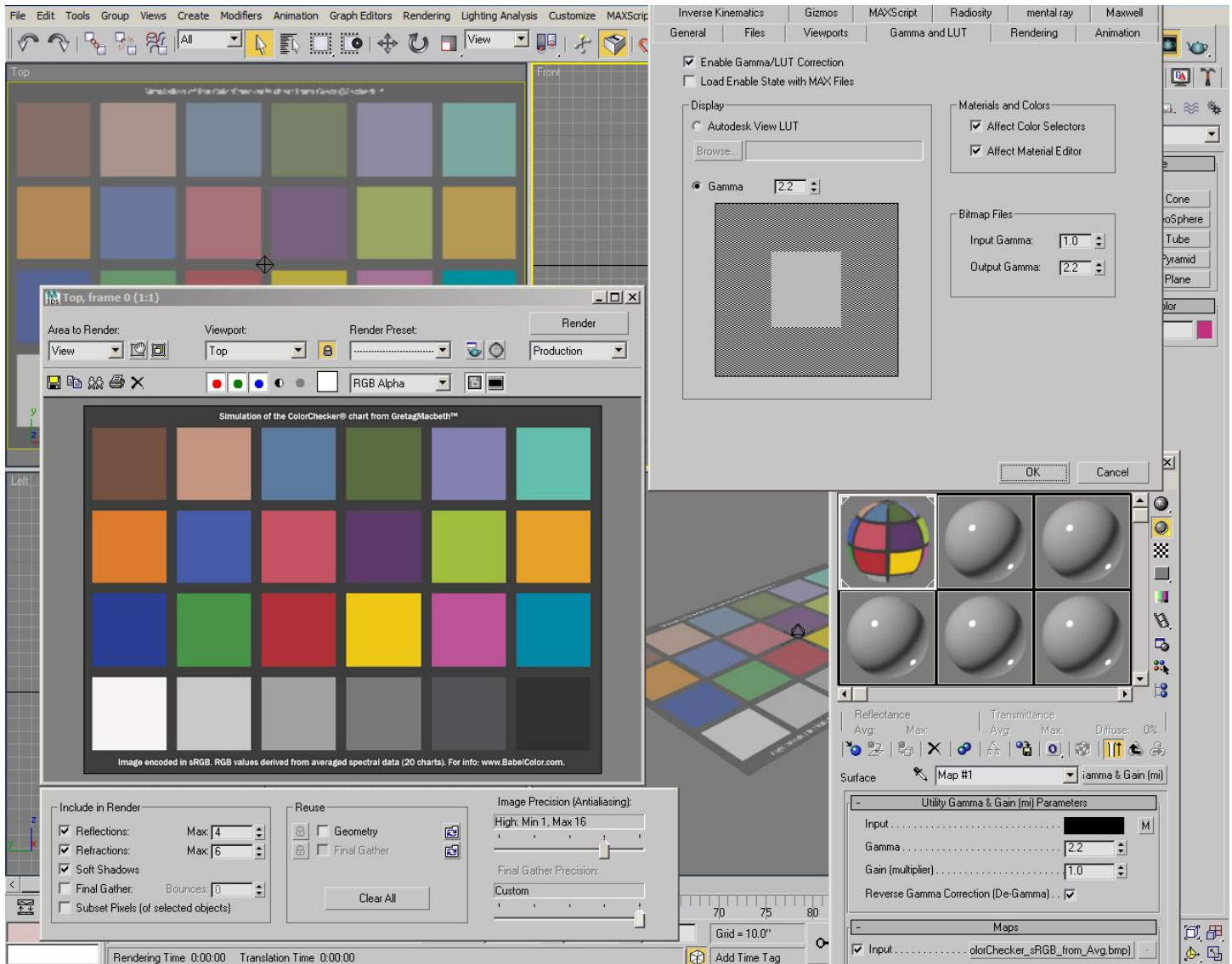
- The viewports properly display the gamma corrected images.
- Most of your textures you use will load correctly into 3ds Max without any additional effort on your part.
- Rendered output will be compatible with most all monitors.

Drawbacks to this setup:

- Bump, displacement, and floating point images will load incorrectly as gamma 2.2. You'll have to manually load them as gamma 1.0.
- When using the mental ray map manager (or DBR) you may encounter a gamma mismatch problem because the mental ray map manager currently uses the global input gamma. When you use local bitmap gamma controls, the map manager ignores those settings.

Gamma Configuration B:

- Enable the Gamma/LUT Correction.
- Set the Display gamma and Bitmap output gamma to 2.2
- Set the Bitmap INPUT gamma to 1.0.
- Enable the Affect Color Selections & Affect Material editor to apply the gamma curve to those items.
- Use the gamma/gain utility shader to locally control the gamma per texture map.



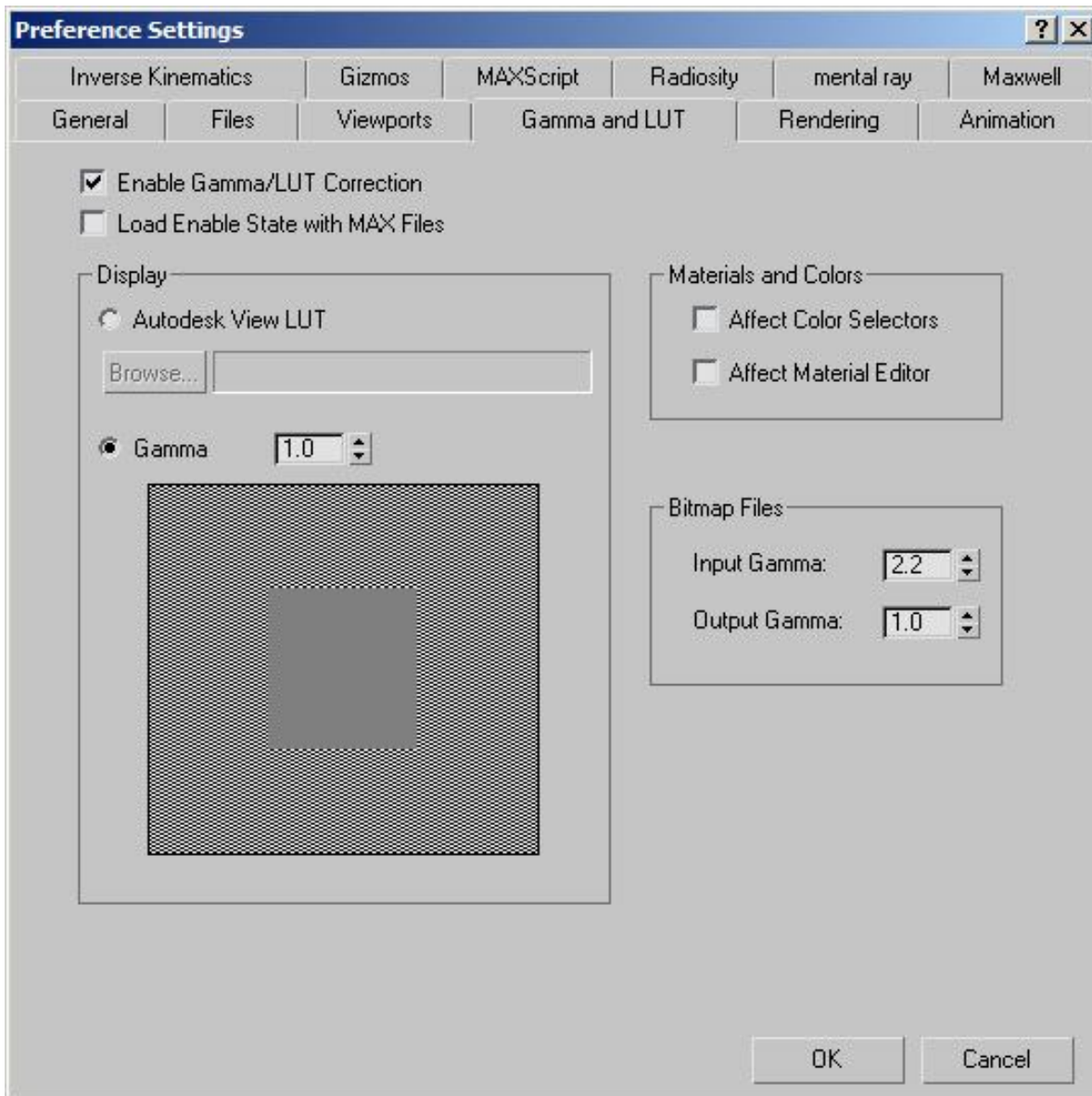
Benefits of this setup:

- Wrapping all your textures inside the gamma/gain utility shader should ensure consistent gamma results when using DBR.
- Using the gamma/gain utility shader gives you a visual verification of the gamma per material.
- You can easily adjust the gamma settings on the gamma/gain shader instead of having to reload the texture map.
- Bump maps, Displacement maps, .HDR's/.EXR's should load correctly as gamma 1.0 without the need for any changes.

Drawbacks to this setup:

- It's an extra step you have to take in the material creation process.
- The textures aren't gamma corrected in the viewports.

In my humble opinion those are the two best options for current versions of 3ds Max when using mental ray and the mr Photographic Exposure Control. Here is a valid gamma configuration if you're using the logarithmic exposure control (3ds Max 9 users):



Note: The logarithmic exposure control 'acts' like a gamma 2.2 setting. So if you're output value is set to 2.2 you'll get a washed out appearance to your renders due to the logarithmic exposure control.

In closing, the gamma settings you choose to use should suit your particular work flow. My main goal when I created this document was to simply show a few valid gamma configurations so you could make an informed decision when it comes to your own gamma settings.

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