MAPS

Bitmap 2D Map

Material Editor ▸ Material/Map Browser ▸ Maps ▸ Standard ▸ Bitmap

A *bitmap* is an image produced by a fixed matrix of colored pixels, like a mosaic. Bitmaps are useful for creating many kinds of materials, from wood grains and wall surfaces to skin and feathers. You can also use an animation or video file instead of a bitmap to create an animated material.

Bitmaps shown in Material Editor sample slots

When you assign the Bitmap map, the Select Bitmap Image File dialog opens automatically. Use this dialog to specify a file or sequence as the bitmap image. See Image File Formats for a list of the supported bitmap types and their controls.

You can create a Bitmap by dragging a supported bitmap file from Windows Explorer into the Slate Material Editor. 3ds Maxcreates a Bitmap node with the file loaded into it.

Animated Bitmaps

The Bitmap map can synchronize the frames of a bitmap sequence to the age of particles to which the map is applied. With this effect, each particle displays the complete sequence when it is born, starting at the first frame, rather than being assigned whichever frame is current. You accomplish this by doing the following:

- Turn on Sync Frames to Particle Age.
- When using Particle Flow, assign the material containing the Bitmap map to a Material Dynamic operator.

Procedures:To crop an image:

1. On the Cropping/Placement group, turn on Apply to see the results of cropping in the material preview (and in shaded viewports, if Show Map In Viewport is active).

2. Turn on Crop.
3. Click View Image to display the bitmap.

   A frame window appears, displaying the image surrounded by a region outline (a dashed line at the outer edges of the image, with handles on the sides and corners).
4. Specify a cropping region by adjusting the spinners at the top of the window, or by dragging the region outline.

To place an image:

1. In the Cropping/Placement group, turn on Apply to see the results of cropping in the material preview (and in shaded viewports if Show Map In Viewport is active).
2. Turn on Place.
3. Click View Image.

   A frame window appears, displaying the image surrounded by a region outline (a dashed line at the outer edges of the image, with handles on the sides and corners).
4. Move the image by adjusting the spinners at the top of the window, or by dragging the region outline.

   The reduced image becomes a "decal": The Diffuse color is visible around the image.

To use the alpha channel that is part of the bitmap:

1. Assign the map to the Opacity component.

   (You can assign a copy or instance of this map to other components, such as Diffuse, as well.)
2. Go to the parameters for the Opacity map.
3. In the Bitmap Parameters rollout ➤ Alpha Source group, choose Image Alpha.

   This option is not available if the bitmap does not have an alpha channel.
4. In the Bitmap Parameters rollout ➤ Mono Channel Output group, choose Alpha.

   This option is not available if the bitmap does not have an alpha channel.

   Now the bitmapped material will have the transparency specified by the alpha channel. This will appear in production renderings. Transparency does not appear in viewports or ActiveShade renderings.

To create an alpha channel based on intensity:

- In the Bitmap Parameters rollout ➤ Alpha Source group, turn on RGB Intensity.

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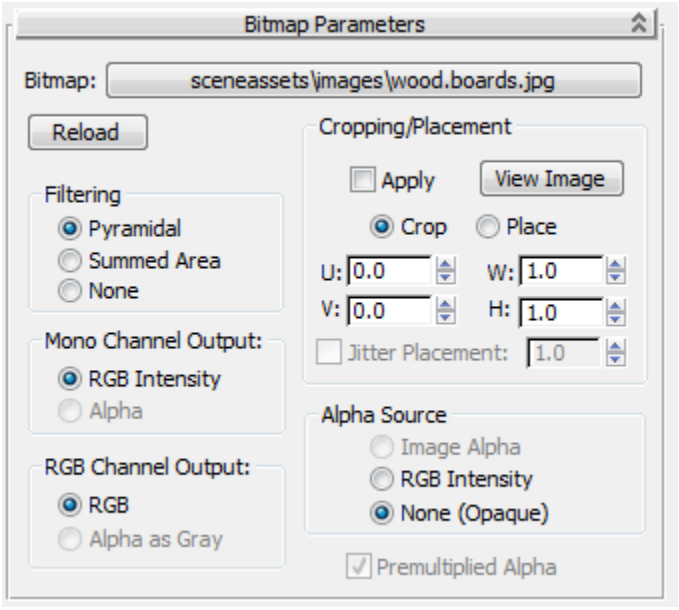
3ds Max creates an alpha channel. Full-intensity areas of the image are opaque, zero-intensity areas are transparent, and intermediate colors become partially transparent.

To use a completely opaque bitmap:

- In the Bitmap Parameters rollout ➤ Alpha Source group, turn on None (Opaque).

  3ds Max ignores the bitmap's alpha channel, if one is present, and does not create a new one.

Interface



Bitmap Parameters rollout-

Bitmap-Selects the bitmap using the standard file browser. After selection, the full path name appears on this button.

Reload-Reloads the bitmap file using the same name and path. You don't need to use the file browser to reload the bitmap after you've updated it in your paint program.

Clicking reload for any instance of the map updates the map in all sample slots and in the scene.

Filtering group

Filtering options let you select the method of pixel averaging used in antialiasing the bitmap.

- **Pyramidal-**(The default.) Requires less memory and is adequate for most purposes.
- **Summed Area-**Requires much more memory, but yields generally superior results.
- **None-**Turns off filtering.
-

Cropping/Placement group

The controls in this group let you crop the bitmap or reduce its size for custom placement. Cropping a bitmap means to reduce it to a smaller rectangular area than it originally had. Cropping doesn't change the scale of the bitmap.Placing a bitmap lets you scale the map and place it anywhere within its tile. Placing can change the bitmap's scale, but shows the entire

bitmap. The four values that specify the placement and size of the cropping or placement region are all animatable.

Cropping and placement settings affect the bitmap only as it's used for this map and any instances of the map. They have no effect on the bitmap file itself.

Apply-Turn on to use the cropping or placement settings.

View Image-Opens a window that shows the bitmap surrounded by a region outline with handles at its sides and corners. To change the size of the crop area, drag the handles. To move the region, position the mouse cursor inside it and drag.

To see the results of editing the region, turn on Apply (see preceding). This shows changes in the region as you make them.

The bitmap window has U/V and W/H (width/height) controls on its toolbar. Use these to adjust the location and size the image or crop area.

When Place is chosen, dragging the region area handles changes the scale of the bitmap (hold down **Ctrl** to preserve the bitmap's aspect ratio), and dragging the image changes its location within the tile area.

The UV/XY button at the right of the window toolbar lets you switch between using UV or XY coordinates in the toolbar spinners (Default=UV). .

- **Crop**Makes cropping active.
- **Place**Makes placement active.

U/V-Adjusts the bitmap location.

W/H-Adjusts the width and height of the bitmap or crop area.

Jitter Placement-Specifies the amount of random offset. At 0, there is no random offset. Range = 0.0 to 1.0

When Place is turned on, the size and position specified by the spinners or editing window are ignored. 3ds Maxthen chooses a random size and tile position for the image.

Alpha Source group

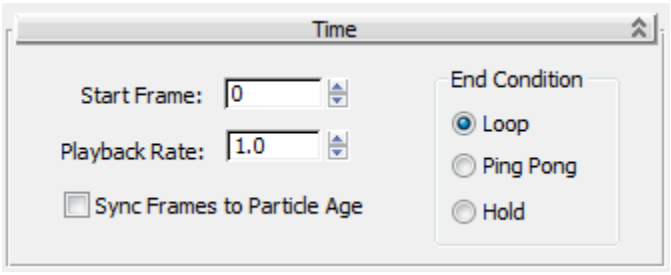
Controls in this group determine the source of the Output alpha channel in terms of the input bitmap.

- **Image Alpha**Uses the image's alpha channel (disabled if the image has no alpha channel).

- **RGB Intensity**Converts the colors in the bitmap to grayscale tonal values and uses them for transparency. Black is transparent and white is opaque.
- **None (Opaque)**Does not use transparency.

Premultiplied Alpha-Determines how alpha is treated in the bitmap. When turned on, the default, premultiplied alpha is expected in the file. When turned off, the alpha is treated as non-premultiplied, and any RGB values are ignored.

> **Tip**If you apply an alpha image as a Diffuse map, for example, and it doesn't decal correctly, the bitmap file probably contains non-premultiplied alpha; the RGB values are maintained separately from the alpha values. To correct this, turn off Premultiplied Alpha.



Time rollout-These controls let you change the start time and speed of animation (AVI or MOV) files used as animated texture maps. They make it easier to use sequences of images as maps in scenes, because you can control the timing very precisely

Start Frame-Specifies the frame where the playback of the animated map will begin.

Playback Rate-Lets you speed up and slow down the rate that the animation is applied to the map (for example, 1.0 is normal speed, 2.0 is twice as fast, .333 is 1/3 as fast).

Sync Frames to Particle Age-When on, 3ds Max synchronizes the frames of a bitmap sequence to the age of particles to which the map is applied. With this effect, each particle displays the sequence from the start when it is born, rather than being assigned whichever frame is current. Default=off.

> When using Particle Flow, assign the material containing the Bitmap map to a Material Dynamic operator. For more details and a procedure, see Material Dynamic Operator.

2D Maps

2D maps are two-dimensional images that are typically mapped onto the surface of geo-metric objects or used as environment maps to create a background for the scene. The simplest 2D maps are bitmaps; other kinds of 2D maps are generated procedurally. Procedural maps are generated entirely within 3ds Max and rely on a set of parameters you set for their look. Images brought in the way the pool ball's color and reflection maps were brought in are not procedural. They are bitmaps—that is, raster image files. Maps category in the Material/Map browser to see the available 2D maps.

Bitmap As you've already seen, a bitmap is an image file that you load into 3ds Max. It can be a photo, a scan, or any image that is readable by 3ds Max.

Checker A procedural map, the checker map is a checkerboard pattern that is generated in 3ds Max. Its parameters in the Material Editor, which are shown here, control the look of the checkerboard. A sphere is also shown with a checker applied to its color.

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- **Coordinates Rollout (2D)-**In the Coordinates rollout, by adjusting coordinate parameters, you can move a map relative to the surface of the object to which it is applied and achieve other effects.
- **Noise Rollout (2D)-** You can add a random noise to the appearance of your material. Noise perturbs the UV mapping of pixels by applying a fractal noise function.
- **Autodesk Bitmap for Autodesk Materials-** The Autodesk Bitmap is a simple bitmap type that is provided with many of the Autodesk Materials.
- **Bitmap 2D Map-**A *bitmap* is an image produced by a fixed matrix of colored pixels, like a mosaic. Bitmaps are useful for creating many kinds of materials, from wood grains and wall surfaces to skin and feathers. You can also use an animation or video file instead of a bitmap to create an animated material.
- **Camera Map Per Pixel Map-** The Camera Map Per Pixel map lets you project a map from the direction of a particular camera. It is meant as an aid to 2D matte painting: You can render a scene, adjust the rendering using an image-editing application, then use this adjusted image as a matte that is projected back onto the 3D geometry.
- **Checker Map-** The Checker map applies a two-color checkerboard pattern to the material. The default checker map is a pattern of black and white squares. Checker maps are 2D procedural maps. The component checkers can be either colors or maps.
- **Gradient Map-** Gradients shade from one color to another. You specify two or three colors for the gradient; 3ds Max interpolates intermediate values. Gradient maps are 2D maps.
- **Gradient Ramp Map-** Gradient Ramp is a 2D map similar to the Gradient map. It shades from one color to another. In this map, however, you can specify any number of colors or maps for the gradient. There are a variety of controls, making highly customized gradients possible. Almost any parameter of Gradient Ramp can be animated.
- **Normal Bump Map-**The Normal Bump map lets you use a texture-baked Normals map (see Baked Texture Elements). Typically you assign it to a material's Bump component, Displacement component, or both. Using the map for Displacement can correct edges that otherwise look unrealistically smooth; however, this adds faces to the geometry.
- **Substance Map-** Achieve a vast range of materials with this library of Substance parametric textures. These dynamic, resolution-independent 2D textures have small memory and disk space footprints, making them useful for exporting to games engines via the Allegorithmic Substance Air middleware offering; integration is currently provided for Unreal ® Engine 3 game engine, Emergent's Gamebryo ® game engine, and Unity. Alternatively, you can use Render to Texture to bake textures to bitmaps for use with certain renderers.

- **Swirl Map-** Swirl is a 2D procedural map that generates patterns similar to the swirls in two-flavor ice creams. Like other two-color maps, either color can be replaced with other maps, so it's possible to swirl marble with wood, for example.
- **Tiles Map-** Using the Tiles procedural map, you can create brick or stacked tiling of colors or maps. A number of commonly defined architectural brick patterns are available, or you can design custom patterns.
- **Vector Displacement Map-** The Vector Displacement map enables displacement of meshes in three dimensions, in contrast with previous methods that permit displacement only along surface normals. Like the Normal map, the Vector Displacement map uses a full spectrum of color to work its effects, as opposed to a grayscale image.
- **Vector Map-** With the Vector map, you can apply vector-based graphics, including animations, as textures for objects.

3D Maps:-

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3D maps are patterns generated procedurally in three dimensions. For example, Marble has a grain that goes through the assigned geometry. If you cut away part of an object with marble assigned as its texture, the grain in the cutaway portion matches the grain on the object's exterior.

- **Coordinates Rollout (3D)-**By adjusting coordinate parameters, you can move a map relative to the volume of the object to which it is applied.
- **Cellular Map-**The Cellular procedural map generates a pattern that's useful for a variety of visual effects, including mosaic tiling, pebbled surfaces, and even ocean surfaces.
- **Dent Map-**Dent is a 3D procedural map. During scanline rendering, Dent creates a random pattern based on fractal noise. The effect of the pattern depends on the map type.
- **Falloff Map**-The Falloff map generates a value from white to black, based on the angular falloff of the face normals on the surface of the geometry.
- **Marble Map-**The Marble map produces a marbled surface with colored veins against a colored background. A third color is automatically generated.
- **Noise Map-**The Noise map creates random perturbation of a surface based on the interaction of two colors or materials.
- **Particle Age Map-**The Particle Age map is for use with particle systems. Typically you assign the Particle Age map as a Diffuse Color map, or in Particle Flow with the Material Dynamic operator. It alters the color (or map) of a particle based on the particle's life. The particles in a system begin as one color. At a specified age, they begin changing (by interpolation) to a second color, and then they change again to a third color before they die out.

- **Particle MBlur Map-**The Particle MBlur (Motion Blur) map is for use with particle systems. The map alters the opacity of the leading and trailing ends of particles based on their rate of motion. The map is usually applied as an opacity map, but you can use it as a diffuse map for special effects.
- **Perlin Marble Map-**The Perlin Marble map generates a marble pattern using the Perlin Turbulence algorithm. This map is an alternative to Marble, which is also a 3D material.
- **Smoke Map-**Smoke is a 3D map that generates amorphous, fractal-based turbulent patterns. It's primarily designed for animated Opacity maps to simulate the effects of smoke in a beam of light, or other cloudy, flowing effects.
- **Speckle Map**-Speckle is a 3D map that generates a speckled surface pattern that's useful as a Diffuse Color map or Bump map to create granite-like and other patterned surfaces.

- **Splat Map**-Splat is a 3D map that generates a fractal surface pattern that is useful as a Diffuse Color map for creating a pattern similar to spattered paint.
- **Stucco Map**-Stucco is a 3D map that generates a surface pattern that is useful as a Bump map to create the effect of a stuccoed surface.
- **Waves Map**-Waves is a 3D map that creates watery or wavy effects. It generates a number of spherical wave centers and randomly distributes them over a sphere. You can control the number of wave sets, the amplitude, and the speed of the waves. This map works effectively as both a diffuse and bump map at the same time. It can also be useful in combination with an opacity map.
- **Wood Map**-Wood is a 3D procedural map that renders a wavy grain-like pattern throughout the volume of an object. You can control the direction, thickness, and complexity of the grain.

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Using a Reflection map

You can use three kinds of Reflection maps: basic, automatic, and flat-mirror.

- A basic Reflection map creates the illusion of chrome, glass, or metal by applying a map to the geometry so that the image looks like a reflection on the surface.
- An automatic Reflection map does not use mapping coordinates, but instead looks outward from the center of the object and maps what it “sees” onto the surface.

  Another way to generate reflections automatically is to assign a Raytrace map to be the reflection map.
- A flat-mirror Reflection map is applied to a series of coplanar faces and reflects objects facing it, exactly like a real mirror.

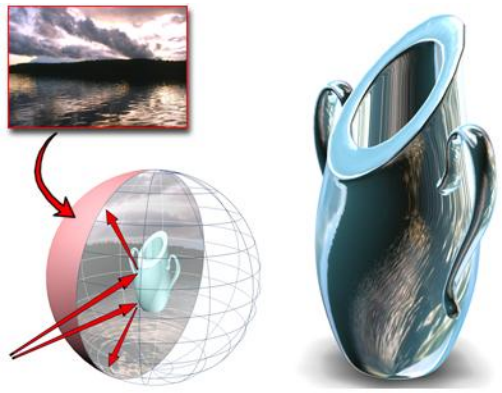
The most common use of Reflection maps in a realistic scene is to add just a touch of reflection to an otherwise non-reflective surface. By default, Reflection map strength is 100 percent, as it

is for other maps. For many kinds of surfaces, however, reducing the strength gives the most realistic result. A polished table top, for example, primarily shows a wood grain; the reflections are secondary.

Reflection maps don't need mapping coordinates because they're locked to the world coordinate system, not to the geometry. The illusion of a reflection is created because the map doesn't move with the object, but with changes in the view, as do real reflections.

Reflection maps look more realistic if you increase the Glossiness and Specular Level values in the Basic Parameters rollout. They are also affected by the diffuse and ambient color values. The darker the color, the stronger the mirror effect.

Even when the Amount spinner is at 100, the Reflection map is tinted by the ambient, diffuse, and specular colors.



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To create an automatic refraction:

1. Click the map button labeled Refraction.

   3ds Max opens the Material/Map Browser.

2. Choose Maps ➤ Standard ➤ Reflect/Refract, and then click OK.

   Alternatively, you can use the Slate Material Editor to wire a Reflect/Refract map node to the Refraction component.

3. On the parent materials' Maps rollout, adjust the Amount to control how refractive the material is.

   At a Refraction Amount of 100 percent, the material is extremely refractive, regardless of the material's Opacity setting. At a Refraction Amount of 0 percent, the map is turned off.

When the Amount is less than 100 percent, both the Reflect/Refract map and the Opacity setting control transparency.

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To assign a bitmap as a refraction map:

1. In the Maps rollout, click the Refraction map button.

   3ds Max opens the Material/Map Browser.

2. Choose Maps ➤ Standard ➤ Bitmap, and then click OK.

   Alternatively, you can use the  Slate Material Editor to wire a Bitmap node to the Refraction component.

   3ds Max opens a file dialog.

3. Use the file dialog to choose the bitmap file.

4. On the parent materials' Maps rollout, adjust the Amount to control how refractive the material is.

   For bitmapped refractions, you don't necessarily want to reduce the map Amount.

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