

KNOLL

LIGHT FACTORY 2

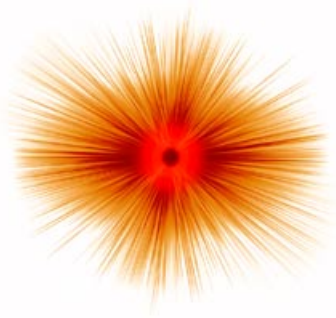
Reference Manual

Mac OS 9.2

Mac OS X 10.2

Windows 2000 SP2

Windows XP Home and Pro



KNOLL LIGHT FACTORY MANUAL

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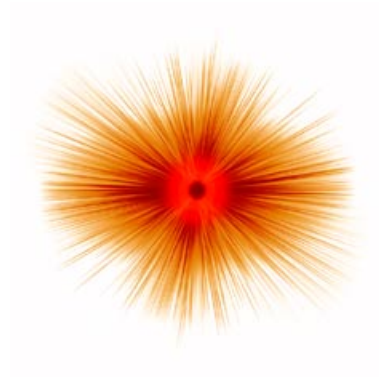
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REFERENCE



WHAT'S NEW IN LIGHT FACTORY 2

With this release of Knoll Light Factory, John Knoll concentrated on adding the two most requested features to the plug-in: native Mac OS X support and 16-bit rendering for After Effects 5.5. With the addition of 16-bit rendering, all of the plug-ins now can render in 16-bit, providing much smoother gradients in elements like Disc and GlowBall.

SUPPORTED SOFTWARE PACKAGES

Thank you for purchasing Knoll Light Factory. This package contains a range of easy-to-use plug-ins for creating realistic light effects and lens flares that you can use in many different types of projects. Light Factory is a plug-in that runs inside a number of different applications or hosts. Knoll Light Factory has been shown to work in the following applications:

Adobe After Effects 5.0 and 5.5

Apple Final Cut Pro 3

Adobe Photoshop 6.0, 7.0

Other applications that correctly support the Adobe After Effects or Adobe Photoshop plug-in API should also support the respective Light Factory plug-in.

Most of the features of Knoll Light Factory are identical across these various applications, though the user interface may look different. These differences are covered in brief in the various application reference sections.

INTRODUCTION TO LIGHTING EFFECTS

Camera lenses are complex devices. Most lenses contain many separate glass elements in order to form a sharp, clear image. While the function of a lens is to bend light onto the exposure surface, all the elements inside a lens reflect a small percentage of the light that strikes them. Anti-reflective coatings on the lens elements minimize these reflections, so that ghost images do not appear in the picture. The anti-reflective coatings reduce the brightness of the reflections to the point that they are too dim to photograph. When a very bright light like the sun or a stadium light is photographed, the reflections themselves are bright enough to show up.

It is a misconception that lens flares are mistakes. Flares are frequently used to create an effect. Directors may test a variety of lenses to find one with a particular look to suit their style or provide a particular effect for a single shot.

Lens flares are the result of photographing bright lights either on film or video. When you think of all the great digital simulation tools available to us today to create realistic images, it is appropriate that we have tools to simulate lens flares as well.

Light Factory provides the tools to design and add extremely realistic lens flares. The individual flare elements can also be used to create vibrant motion graphics effects that go well beyond the typical lens flares found in most applications.

LIGHT FACTORY OVERVIEW

Light Factory is comprised of a number of different plug-ins that you can use depending upon the desired effect and the time you want to put into lens flare design.

Light Factory

Light Factory is the base plug-in. It contains all of the controls and a custom flare editor for building or applying the included flares, allowing you to create and edit your own custom effects.

Light Factory EZ

Light Factory EZ has the same animatable controls as Light Factory, but lacks the custom flare editor. Instead, you can use the Presets pop-up to add one of the dozens of included flares to your project. This is the quickest way to add a lens flare.

Light Factory Spectacular

Light Factory Spectacular is similar to Light Factory but instead of tracking only a single point in a clip for location, it can be used to track an unlimited number of points. This is a great way to add shimmering particle effects to your work.

Individual Effects

Light Factory also includes 19 individual light effect elements as separate plug-ins. By using these separate plug-ins you have keyframable control over the elements, allowing you unlimited motion graphic effects.

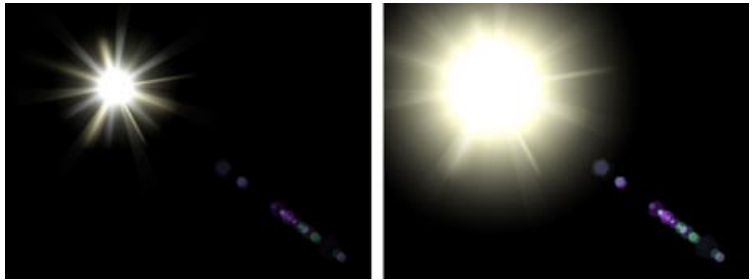
The following sections describe the differences between the plug-ins without addressing the host application though, all of these plug-ins will run in Adobe After Effects. Later chapters will explain how Knoll Light Factory is accessed in each host application.

LIGHT FACTORY

Light Factory is the core plug-in of the Knoll Light Factory suite. Light Factory offers controls that let you create, edit, and animate your own custom light effects. Light Factory offers all of the animatable parameters listed below, no matter which host application you use.

Brightness

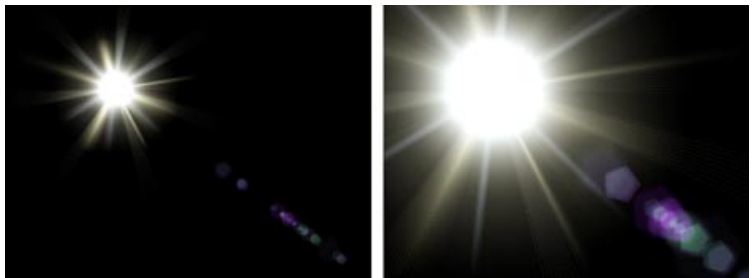
The Brightness slider controls the brightness of the effect. A brightness value of zero is handled as a special case and does not render. You can use this feature to turn the flare on and off during an animation.



Brightness of 100 (default) versus 150

Scale

The Scale value adjusts the size of the individual lens elements. It does not change the position. You can animate the scale to simulate the adjustment of the focal length of a zoom lens.

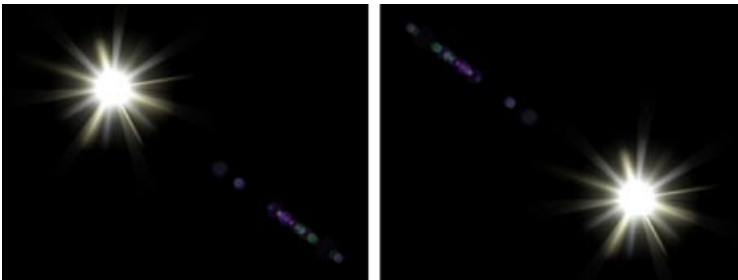


Scale values of 1.0 (default) and 3.0. Note the ray size.

Light Source Location

The position of the light source can be controlled in two ways, either by animating the Light Source Location point control or by specifying a light source location layer.

You can animate the Light Source Location value to place the center of the flare at a precise location on each frame. For example, the image below shows the lens flare at its default location (pixel values 192, 144), and after its position has been moved to 448, 336.

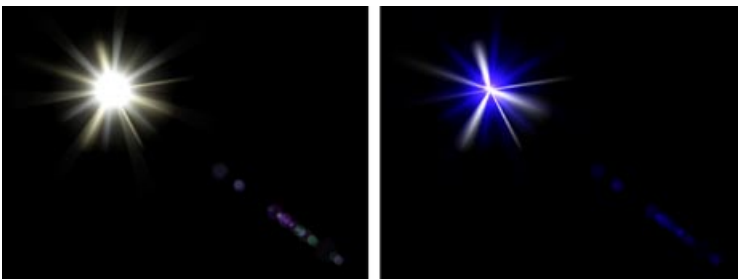


Light Source Location

Color

The color control specifies the color for the light source. To simulate an blue light, set the color to blue.

Only hue and saturation values are used from this color sample. A bright blue and dark blue color will result in the same image. Also, using neutral colors such as dark gray or black will not darken the flare.



Color using white (default) and 100% saturated blue

Angle

These custom elements will appear to shimmer when you animate the Angle settings: Random Fan, Photon Spikeball, PolySpikeBall, and Sparkle. Add different keyframe values at the beginning and end of the flare's appearance to create this effect.



Angle showing 0° (default) and +11°

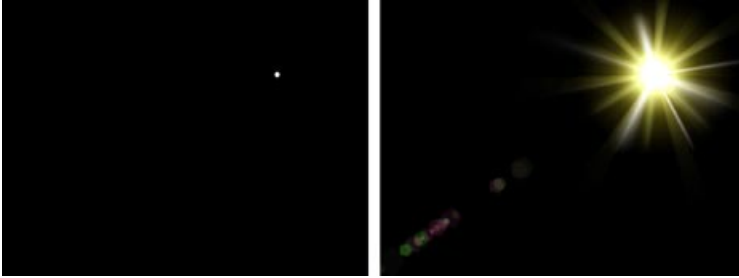


This Angle control is not related to the angle control found in the Lens Editor. The Angle control will not rotate lens elements. However, the element angle value will change the flare spikes when used with the Individual Effects filters.

Location Layer

The Location Layer allows you to set a layer where the Light Factory filter will attempt to extract a position for the filter. This setting will override the Position setting when enabled. When the Location Layer popup menu is set to None, Light Source Location is used to set the position of the effect.

You may be asking, “how does this work?”. Light Factory searches the alpha channel of the layer you set in the pop-up for any non-black pixels and attempts to calculate the average position of these pixels. If you have a small white dot in an otherwise black alpha channel, Light Factory will determine the position of the center of the dot and place the light effect at that location.



Location Layer dot (viewing the alpha channel) and flare

The image on the left shows a sample alpha channel that can be used to position the flare. The image on the right shows the corresponding flare with this image set as the location layer.

This technique works when a single dot appears in an alpha channel, but it will not track multiple dots and attach flares to each—this feature is available in the Light Factor Spectacular filter described in the Light Factory Spectacular section on page 17.

When an alpha channel image used as a location layer contains multiple dots, the plug-in will average the positions of each dot. The location layer does not need to be visible for Light Factory to use it as a positioning layer. If no non-black pixels exist in the alpha channel of the specified layer, the light effect will default to the center of the image.



Obscuration Layer

The Obscuration Layer pop-up menu is used to choose a layer that will obscure or hide the flare, making it appear to pass behind objects in another layer. For example, you could make a flare that represents the sun flickering appropriately as it passes behind tree branches.



No obscuration layer (left) and obscured by plane (right)

The image above is taken from the airplane tutorial, Air Knoll in the Tutorial section, see page 38. On the left, no obscuration layer has been set and the sun appears to be in front of the plane. On the right, the obscuration layer has been set to the diffuse plane layer, a layer that contains an alpha channel that follows the contour of the plane. Because the position of the flare is very close to the edge of the alpha channel, the flare is partially obscured. The Light Factory filter is able to create very realistic simulations of a light passing behind an object using the obscuration layer control.

Obscuration Type

The Light Factory filter offers four options for the information used by the obscuration control.

Alpha is the default obscuration type. Pixels with an alpha value of zero or black let the flare show through. Pixels with an alpha value of white completely obscure the flare. Pixel values between zero and 255 scale the obscuration by a corresponding amount.

Inverse Alpha produces the same result as the alpha choice but white and black are inverted.

RGB modulates the color of the light effect with the corresponding RGB value of the obscuration layer. It is possible to simulate the sun shining through a stained glass window by moving the light flare over the color area.



No obscuration layer (left) and obscuration layer on, type RGB

The RGB color change is added to any color the light effect might have, so a yellow flare passing through a cyan-colored RGB obscuration layer will result in a green flare.

RGB + Alpha type combines the effects of the RGB and alpha types where transparency of the light effects is controlled by the alpha channel and the color is altered by the RGB channels just as in RGB type shown above.

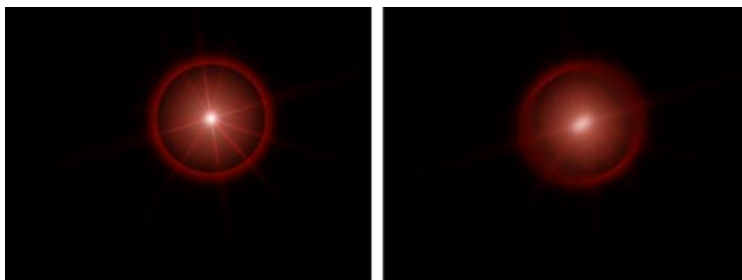


Source Size

Source Size is only used when an obscuration layer is set—the source size does not otherwise change the size of the light source. The Source Size value controls the search area averaging around the current light source position. If the source size value is 2, Light Factory will examine the obscuration layer in a 2-pixel radius around the light source for obscuring values (white or black). This means that if 20% of the pixels inside that radius are obscured, the brightness of the flare will be reduced to 20%.

Motion Blur

Some host applications, such as Adobe After Effects and Pinnacle Systems' Commotion, can simulate motion blur for moving elements in a layer. If the motion blur switch is on in the host application, Light Factory will apply motion blur to the light effect, providing more realistic results in some cases.



Moving flare with motion blur off (left) and on (right)

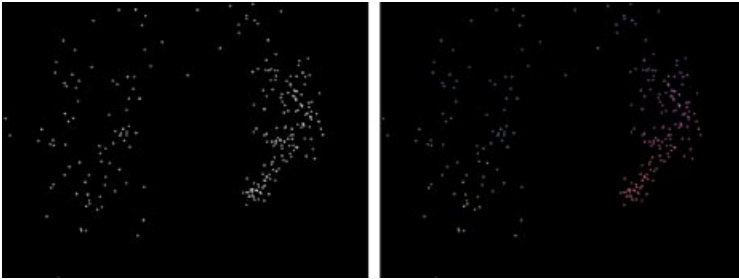
LIGHT FACTORY EZ

Light Factory EZ is a simplified version of the complete Light Factory plug-in described above. Light Factory EZ replaces the custom flare editor (covered later in this section) with a simple Lens Preset pop-up menu. This menu gives you quick access to any one of the custom flares created by John Knoll.

Light Factory EZ is great for those occasions when you need to add a light effect quickly. Just choose one of the Lens presets and you are ready to go!

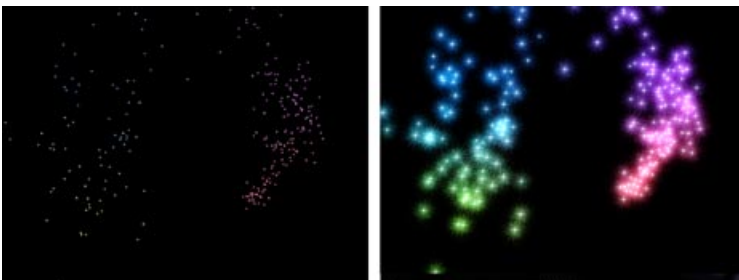
LIGHT FACTORY SPECTACULAR

Light Factory Spectacular is a specialized version of the Light Factory plug-in that applies a custom flare to multiple location points at once. Light Factory Spectacular is particularly well-suited for use with particle systems.



Spectacular Source Layer showing alpha channel (left) and RGB channel (right)

Light Factory Spectacular analyzes the alpha channels of the selected source layer to find a position for each flare. Each white point corresponds to a position value when the light effect is rendered. The RGB channels are analyzed for hue and saturation information and this is used to color the light effect.



Spectacular RGB layer (left) and Spectacular result (right)

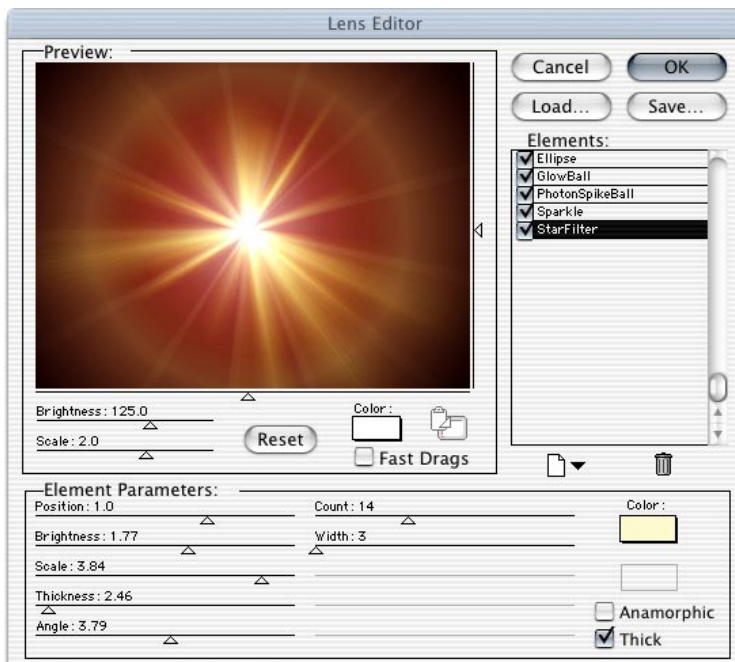
In the example above, we see how the color of each of the small flares corresponds to the color of the dot. In addition, the size of the white area controls the brightness and scale of the light effect—the larger the white dot, the greater the brightness and scale values become.

INDIVIDUAL EFFECTS

The Light Factory, Light Factory EZ and Light Factory Spectacular plug-ins provide an easy way to combine the elements into a light effect. Light Factory also includes each of the individual custom elements as a plug-in, offering greater animation control and the power to create light effects that go beyond flares.

The Element plug-ins offer nearly the same range of features as the Light Factory plug-in. Each light effect has animatable parameters specific to that type of effect.

For example, the group of plug-ins that shimmer as the Angle value change, e.g. the LG Sparkle plug-in offers an angle parameter that you can keyframe. Only flares capable of this shimmer effect offer the angle parameter. The Element Parameters section describes the individual element parameters in greater detail.



Knoll Light Factory Lens Editor in Mac OS X

Under the Options button lies the Lens Editor. This is the heart of Light Factory where you can combine the different elements. No matter which host application you are using, the Lens Editor interface will look similar to the screen shot. The Lens Editor contains three sections: the Preview area, the Elements (i.e., lens primitives) list, and Element Parameter controls.

Preview window

The Preview window shows the combined elements and gives you controls to test the effect of brightness, color, position, and scale changes. The brightness, color, position and scale controls are not linked to the main interface and will not update the corresponding parameters in the main plugin. These controls are provided so that you can better evaluate their effect without leaving the lens editor interface.

Elements List

The column below the Load and Save buttons shows all of the elements currently added to the effect. You can add, copy, delete, rename and reorder the elements using the list view.

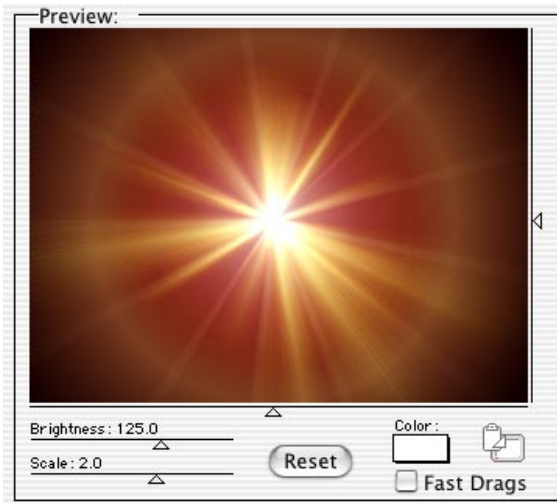
Element Parameters

The area at the bottom of the interface will update as you select an element in the List. The value changes made to each element will be reflected in the preview and in the final application of the light effect.

Each of these three items is explained in greater detail in their own section below.

PREVIEW

The preview window is only for designing the light effect. The control triangles on the right and bottom let you see how the light effect will appear once it is applied. As noted above, you can preview how the lens will respond to color and brightness changes using the global brightness and color sliders but these changes will not be reflected in the main plug-in interface.



Preview area in the Lens Editor

Fast Drags

The Fast Drags check box switches the preview render to half resolution as you drag the position triangles. On older machines, or when working with many primitives, this will make the preview update faster.

Clipboard Display Button

If you have an image on the clipboard, clicking on the Clipboard Display icon will display that image in the preview window but only while you click and hold the mouse on the button. This is useful for matching the flare position to an image.

ELEMENTS LIST

By default Light Factory creates adds the GlowBall, a Poly-Spread, and a StarFilter to the list of elements. You do not need to use this particular set elements or the combination. Feel free to add, modify or delete these elements entirely to create your own effect.



Elements List

Adding Elements

You can quickly generate new light effects by clicking on the Custom Effect popup menu—located below the elements list, it looks like a blank sheet of paper—and selecting a new element type. The new element is added to the Elements list, and selected so it shows its available parameters. You can add up to 100 elements to any single effect. Usually, you will only need 5-10 elements to make up a realistic effect.

Duplicating Elements

You can duplicate an element in the Elements list by dragging it onto the Custom Effect icon.

Deleting Elements

There are two ways to remove an element from the list (and from the effect). Either select the effect and click the trash can icon, or drag and drop the element onto the trash can.

Selecting Elements

You can select an element by clicking on its name in the Elements list. This highlights the name of the element, and makes any specific parameters of that element appear in the Element Parameters section.

Visibility Checkbox

You can use the checkbox next to each name in the element list to turn on and off the use of that element. This is useful for working on copies of an element or comparing two or more similar elements with different parameter values.

Renaming Elements

Each element inherits its name from the element type. To rename an element, double-click it in the list.

Reordering Elements

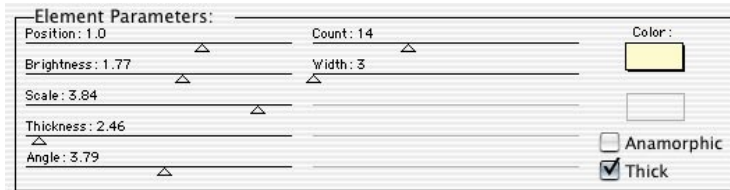
To reorder elements in the list, simply click and drag. A dark line will appear as you drag up and down the list.



The rendering order is not significant and will not change the look of the rendered light effect. Reordering elements is a convenience that you can use to group elements by color, scale or other attribute.

Element Parameters

The Element Parameters section displays the controls for the selected element. If you do not select an element this area of the interface will be blank.



The Elements Parameters area for the Photon SpikeBall

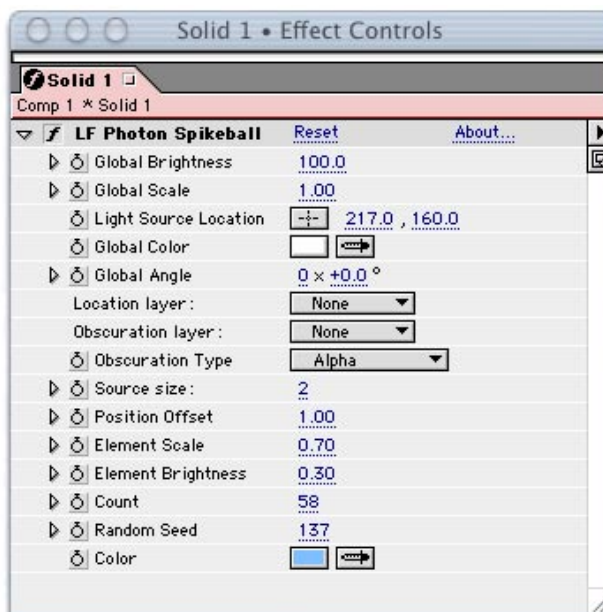
Different elements have different parameters, so only some of the ten sliders will be enabled. Each slider control differs a bit from element to element, so the slider labels will change as you highlight different element types. As you drag the sliders the preview window will update in close to real time.

Use the individual element effect plug-ins when you want to animate the element parameters. You can find more information on these controls in Individual Effects section.



Element Parameters and Individual Effects

The controls listed for each lens primitive in the Element Parameters section are duplicated in the Individual Effects plug-ins. The screen shot for the Element parameter (showing the Photon Spike Ball parameters) above is similar to the animatable controls shown in the Photon Spike Ball effect screen shot on page 24. Each plug-in has the following parameters: brightness, scale, color, location layer, obscuration layer, obscuration type and source size, that are the same as the main Light Factory plug-in. Listed below the source size are the Element-specific parameters, where the specific element controls are usually begin with word “element”.



Photon Spike Ball plug-in

There is no difference in the rendered results whether you use the lens editor or the individual plug-ins to create a light effect. With the individual plug-ins you get the ability to animate all of the values making the individual plug-ins useful for creating shapes such as a disc or a starburst without having to build a simple custom flare.

Other Controls

Load and Save Buttons

Custom lenses can be saved to disk and loaded again for reuse. If you hold down the Option key when you click the Load button, the custom lens file you select will be appended to the end of the current list, rather than replace it. This feature lets you create partial libraries, say of just lens centers, or just reflections, and then combine them with Option-Load.

ELEMENTS

The following is a list of all the Lens primitives or elements available in Light Factory, with a brief description of each. The best way to understand each elements may be to experiment with the settings of each element.

GlowBall

The basic primitive used in most flares and effects. The glow represents the overexposure and light scattering that a bright light source creates when focused through a lens onto an image plane. You can control the color and scale of the glow, as well as the rendering of a characteristic red ring associated with a bright light source. Parameters are available to control the ring scale, brightness and softness.

SpikeBall

Most lenses exhibit at least a little bit of radial streaking from the light source, and the Spikeball simulates this. The lines in the Spikes appear as random lines from the center of the ball. You have control over the scale, brightness, density, color, rotation, and the random seed used to generate the spikes.

StarFilter

Most lenses contain multiple bladed apertures to allow more or less light to pass through the lens, controlling the exposure of the film or video CCD. In most lenses, when the aperture is wide open the opening is perfectly circular, but as the lens is “stopped down,” the opening becomes a smaller polygonal shape. For example, a five-bladed aperture will create an opening with five sides as the lens is stopped down. This is why you often see pentagonal or hexagonal shapes on a lens flare. The aperture also reflects light where the blades intersect, creating a star filter effect. For example, a partially closed five-bladed aperture will reflect five streaks, and result in a ten-point star on the exposed surface. The StarFilter lets you simulate this effect. You can control the size, brightness,

color, number of points, width and rotation.

Polygon Spread

The polygonal opening of a bladed aperture can also cause many polygonal reflections to appear on the exposure surface. The Polygon Spread element creates a number of randomly positioned polygonal reflections, each with a different brightness and random hue. Since these reflections are created randomly, there are three different random seeds used to vary the look. You also can control the scale, brightness, number of sides, quantity, position, and color of the polygons.

Circle Spread

Like Polygon Spread, Circle Spread lets you create a number of randomly sized and positioned circles. The controls are similar to those in the Polygon Spread element. Circle Spread is useful for making the tiny dots and small circles that appear in lens flares.

Elliptical Caustic

The Elliptical Caustic filter simulates a unique distorted reflection observed primarily in Nikon still camera lenses.

Star Caustic

This diamond-shaped caustic is useful for simulating reflections caused by reflective coatings. You will notice that the default values cause a barely visible green shape.

Faded Ring

Faded Ring generates a “rainbow ring” effect that fades out toward the edges of the frame.

Stripe

Stripe renders a tapered line with adjustable color, width, angle, brightness and position. Many anamorphic lenses exhibit a blue horizontal streak through the center, and some

video cameras exhibit a reddish vertical streak through the center.

RandomFan

RandomFan generates an attractive asymmetrical fan of spikes with many radial lines. RandomFan responds to the angle control with a subtle shimmering of the lines.

PolySpikeBall

PolySpikeBall creates an effect similar to RandomFan but with much wider areas of light and dark. The filter tends to render much faster than RandomFan element and this might produce an acceptable alternative much more quickly.

PhotonSpikeBall

As the name implies, this effect generates a “Photon torpedo” effect as seen in several of the science fiction films that John Knoll has worked on over the years.

Aperture Reflection

Most film cameras will exhibit some aperture reflection. In a film camera, the film passes through the movement, where it is exposed to light. The movement has a rectangular hole called the gate. The focused image from the lens shines through the gate and onto the film. In most cameras, this aperture is polished stainless steel, and is highly reflective. When the focused image of a bright light gets close to or slightly outside the edge of frame, the image can reflect off of this shiny surface back into the image causing an aperture reflection.

Note that you will not see the effect unless the light source location is outside the edge of the composition or frame.

Chroma Hoop

Chroma Hoop creates a circle of rainbow lines that streak through the center of the light source. This type of effect is frequently seen on film shot in Super35 format.



Single Polygon

The Single Polygon filter is appropriately named with complete controls for generating a single polygon shape. You can control the position, brightness, color, size, number of sides, softness, rotation, and the degree to which it varies in brightness as it moves from the center of frame to the edge.

Disc

The Disc gives you precise control over the generation of a single circular ramp effect. You can control the position; size; color; brightness; three separate controls for the inner, middle and outer gamma; and taper and center offset controls that change the shape of the disc.

Ellipse

Ellipse is like Disc, except that the shape is elliptical, not perfectly circular. In general, the glow at the light source is circular, and reflected elements are elliptical.

Sparkle

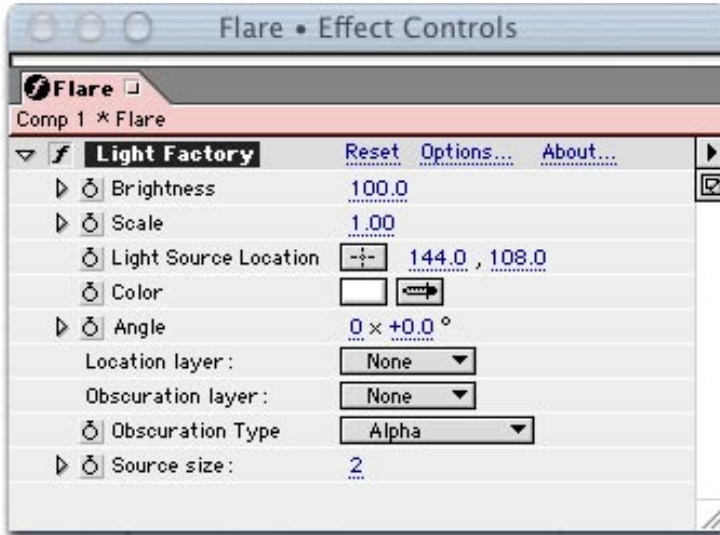
Sparkle generates a number of short linear streaks radially distributed about the center. The streaks change with the angle control by appearing closer or farther from the center of the source location. The Unidirectional checkbox limits the motion to all inward or all outward (depending on what direction the angle control is moving). This effect can simulate the sparkle you see when a laser is pointed into a camera lens.

Chroma Fan

Chroma Fan generates rainbow diffraction patterns. These patterns often appear when a net is used for diffusion over the lens, or when there is fog or mist in the air.

ADOBE AFTER EFFECTS

The following interface appears in After Effects when you apply the Light Factory filter.



Light Factory interface in the Effects Controls window

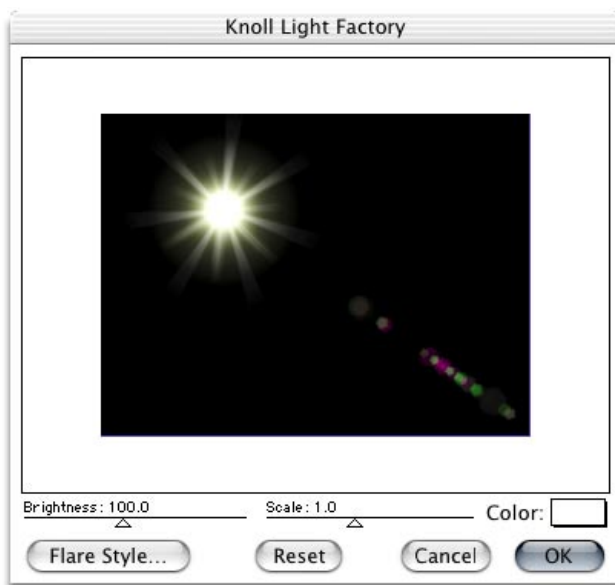
To access the Lens Editor, click the word **Options** at the top of the plug-in between the words **Reset** and **About**. To enter an exact value, click on the number above the slider in the Lens Editor, then enter the desired value.

To access the 16-bit rendering capabilities in *Light Factory*, you will need the *After Effects Production Bundle* version. Simply, Option-click (or Alt-click on Windows) in the Project Window bit-depth control to switch the project rendering to 16-bit mode.



ADOBE PHOTOSHOP

To apply Light Factory to an image in Photoshop, select it from the Knoll Light Factory submenu, located under the Filters menu. The following filter editor appears in Photoshop:



Photoshop Filter Interface in Mac OS X

To access the Lens Editor, click the Flare Style... button. To enter a value, click on the number above the slider, then enter the desired number.



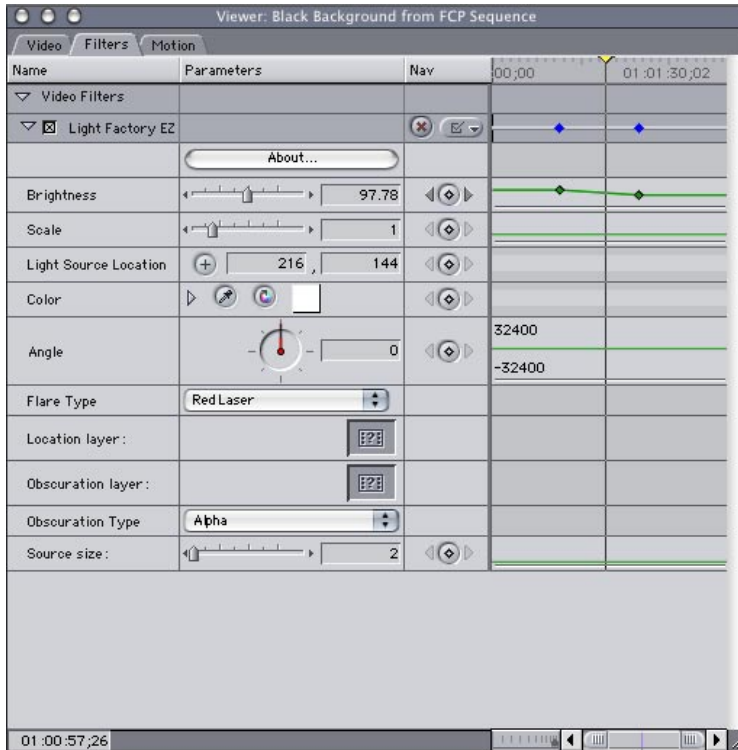
The Photoshop version of *Light Factory* has also been updated to work in 16-bit mode. If you change the image mode to 16-bit, the *Light Factory* filter is still accessible from the Filter menu and will render the flares in 16-bit color space.

Numeric Placement

To place your light effect at a precise coordinates, Option-click (Alt-click on Windows) in the preview window. The position dialog will allow you to specify an X and Y value in pixels.

APPLE FINAL CUT PRO

The Light Factory filter can be applied to a clip in the sequence in Final Cut Pro. You will see the flare appear in the Canvas viewer. To access the plug-in parameters, click the Filters tab in the Viewer. You will be presented with the following interface:



Final Cut Pro Filter interface showing the Light Factory EZ plug-in.

To access the Lens Editor click the Options button.

In Final Cut Pro, you may want to apply the effect to a Slug with a black color. Change the Slug item properties in Final Cut Pro to Screen and you will get the same result as you would in After Effects when Light Factory is applied to a black-colored solid. Since Final Cut Pro does not render in 16-bit mode, there is no way to access this rendering mode inside Final Cut Pro.



ELECTRIC IMAGE

In Electric Image, Light Factory flares are added to a scene by attaching the Lens Flare to a light. The Lens Flare plug-in controls can be accessed from the Flare tab in the Light info window. To access the options, select Knoll Light Factory from the Flare pop-up menu.

ElectricImage Interface

To access the Lens Editor, click the Plug-in Options button. Many of the element parameters are controlled differently in ElectricImage than in other programs. These differences are described below.

Brightness

Brightness can be dependent on the Intensity of the light. The Enable Intensity checkbox in the Flare tab will link the brightness of the flare to the Intensity parameter in the Properties tab. If you uncheck the Enable Intensity control, the light effect will always be rendered at a 100% brightness, no matter what the Intensity parameter is set to.

Color

To set the color or tint of the light effect, change the Light Color parameter in the Properties tab.

Advanced Options

The Obscuration, Distance, and Offscreen controls in the Flare tab are described below.

Enable Obscuration

Like the obscuration layer control in the After Effects version, this control dims or turns off the flare if the light that it is attached to passes behind objects in the scene. You must set the Size parameter in the Properties tab to enable dimming. The default value of zero treats the light as a point, and will simply turn it on and off in the scene.

Enable Distance

When enabled, this control will dim the flare as a light's distance increases in relation to the camera.

Enable Offscreen

When enabled, this control forces a flare to render even when the light source is not visible in the frame. Many of the lens reflections are visible even when a light is not in the camera's field of view, so this control should be turned on in most cases.

Motion Blur

Light effects can be motion-blurred in Electric Image by turning on the MultiFrame blur option in the Render dialog inside the Motion Blur tab. Set the value between 4 and 8 to generate high-quality results.

OTHER ISSUES

What is the meaning of “Position”?

Most of the custom effects have a position parameter. This position is always along a line that passes through both the center of the image and the light source. A position of 1.0 places an element at the light source. A position of 0.0 places an element in the center of frame, and a position of -1.0 places an element on the opposite side of the frame from the light source.

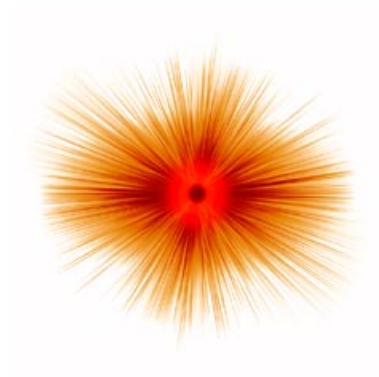
When should you use anamorphic flares?

Anamorphic flares (those with wide elliptical elements rather than circular elements) only happen with anamorphic lenses, and anamorphic lenses are used to shoot wide-screen motion pictures. Super35 and 16mm motion pictures, and film shot with television and video cameras use “flat” lenses. Thus it is not technically correct to use an anamorphic flare in a Super35 film or a television show. Similarly, the blue horizontal stripe seen in many anamorphic flares is an artifact of the way anamorphic lenses are built, so you won’t see them in film shot with flat lenses.

Star filters and polygonal reflections.

There is a relationship between f-stops, polygonal reflections and star filters. A lens that’s “wide open” (f-stop set to its minimum value) usually exhibits circular reflections, but as the aperture closes down, the shape of the aperture changes the reflections to polygons, and a “star filter” usually appears at the source.

TUTORIALS



ABOUT THE TUTORIALS

All the tutorial projects that accompany Knoll Light Factory include:

- A completed Adobe After Effects 5.5 project containing all the original composite elements
- Test renders of each tutorial
- Custom lens flare settings files (Windows versions have a .lfp extension).

Tutorials 1-9

The nine tutorials were originally created and written by John Knoll. The text uses the first person because they were written by John.

Leverage your 3D application

Most of the tutorials included here are a combination of ElectricImage and After Effects work—the elements were rendered in EI, then brought into AE for compositing. By having the individual layers available for tweaking in After Effects you afford yourself much greater control over the composite, and can make subtle changes without the need for time-consuming re-rendering inside a 3D application.

Apply your flares to black solids

As you will see in the tutorials, John Knoll usually applies his light effects to black solids, created as layers within After Effects. Use the screen mode on these solids to composite the light effects into the scene, or use Unmult to generate an alpha channel for the solid. Applying the flares to a black solid instead of the source footage gives you a finer degree of control, as the flares are isolated into their own layer.

Another handy trick is to apply the light effect to a solid that is half the resolution of your comp, then scale the solid 200% to match the size of the original composite. This scaling will soften and add subtlety to the light effect, often making it appear more natural.

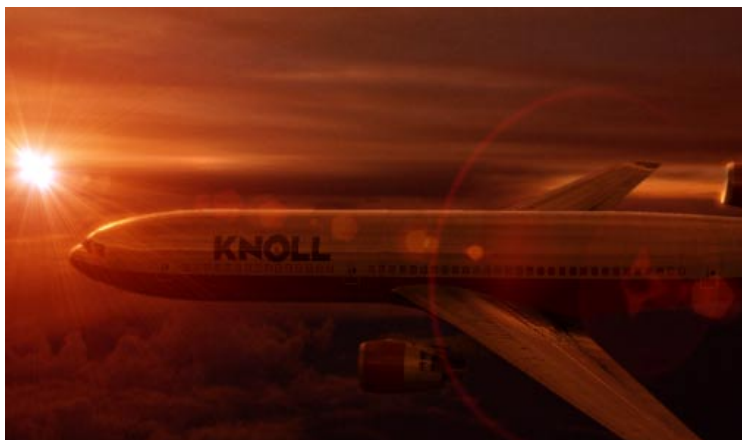
Automatically track the light source position

One of Light Factory's most powerful features is its ability to automatically calculate the position of a light effect by tracking an area of the alpha channel of any clip in the composite. You'll notice several similarly-named elements in the following tutorials (i.e. `suntrack.mov`, etc.) These were generated within ElectricImage by placing a small sphere into the scene— usually in the same location as the light source— and rendering it out as a separate element. The white dot in the alpha channel of this element represents the correct position of the light source throughout the length of the clip. Figuring out this location and animating it by hand in the host application would be incredibly difficult and time-consuming. By setting Light Factory to automatically track the layer, the center point of the white dot in the alpha channel will denote the location of the light effect on that frame, and its position will automatically animate throughout the scene.

Auto-Obscure the light source for realism

The Auto-Obscure feature is a fantastic effect that automatically creates animation in the brightness of your flare by taking into account another layer's alpha, allowing you to simulate a flare going "behind" objects in the scene. As your flare position moves behind obscured areas of an alpha, the flare will automatically dip in brightness as if obscured. As you'll see in the Stained Glass tutorial, you can even have the flare take on color tinting as if moving behind a colored pane of glass.

TUTORIAL 1: AIR KNOLL



In this scene the airplane elements were created from a 3D model of a DC-10 that I downloaded from the Internet. I painted the texture maps in Photoshop, then rendered separate passes in ElectricImage for both the diffuse plane body and the reflections. Doing so allowed me precise control over the final look of the plane, by mixing the two layers together in After Effects.

The movement of the sun is also generated in ElectricImage. I also had EI generate a flare location element, comprised of a white dot representing the position of the sun throughout the camera move. In the Light Factory settings for the composition, you'll notice that the light source is set to automatically track the location layer, and to be obscured by the alpha channel from the airplane element. As you will see, this enables the sun to disappear behind the nose of the plane at the end of the shot.

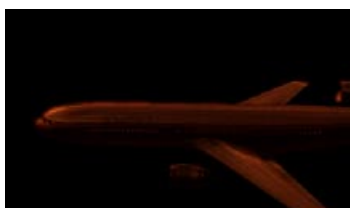
This shot is built by combining the three rendered images of the DC-10 with the flare layer and the sun location layer. Open the *Air Knoll.aep* file to see how the flare disappears

Elements



Background Plate

bg.mov



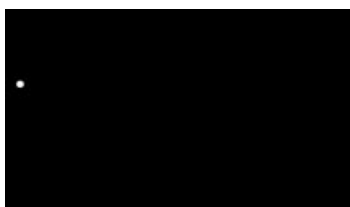
Airplane Reflections

reflections.mov



Airplane Diffuse

plane.diffuse.mov



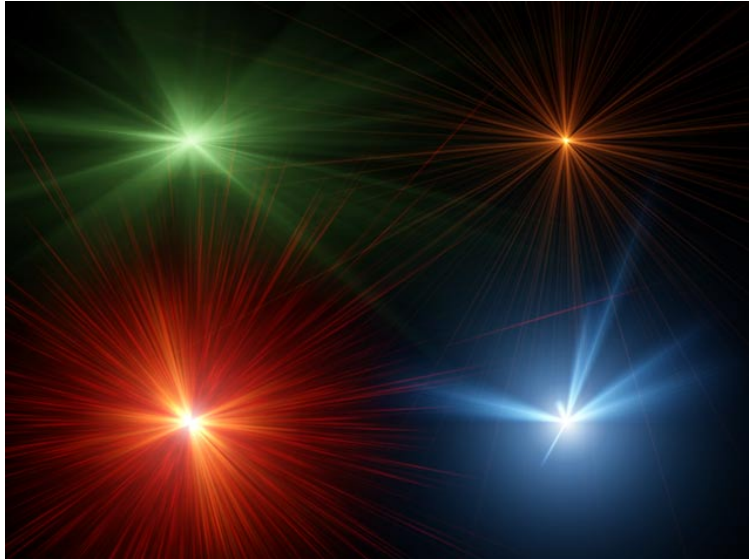
Location Layer

sun.mov

behind the airplane as the sun layer dot moves across the background.

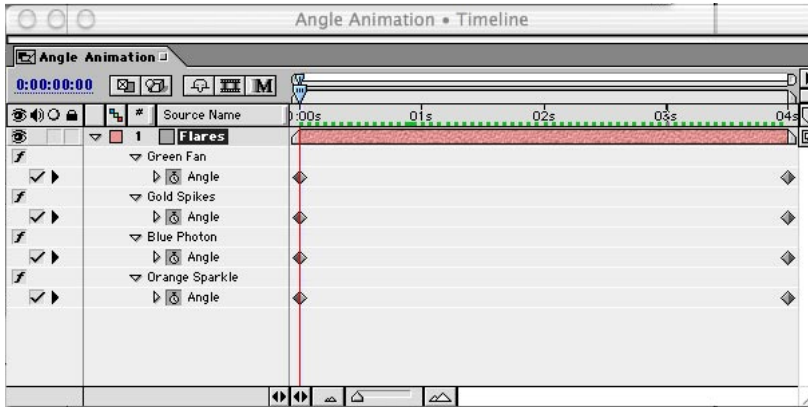
The Elements listed above are combined in the Air Knoll composite. Use the RAM play option in After Effects to preview the shot. If you reveal the Light Factory effect in the Flare Layer, you can see how the flare is set track the sun.mov and is obscured by the Airplane diffuse layer.

TUTORIAL 2: ANGLE ANIMATION



I created this project to illustrate the use of the rotation parameter within Light Factory. When creating light burst elements such as these, or photon torpedo-like effects, it's important to animate the rotation variable of the flare. The rotation adds an incremental random variability to the light source, which simulates atmospheric interference or parallax shifts.

Open the *Angle Animation.aep* file to see the flares in action. Simply do a RAM play and you will see how the Blue Photon and Orange Sparkle flares (the bottom flares in the image above), show great variation as the angle parameter animates.



To see how the different elements react as the angle parameter changes, open the Angle Animation timeline. Click the Flares layer and hit the 'U' key to reveal just the parameters with keyframes. Each of the flares applied to the layer has keyframe animations for the angle parameter with a value of 0 at time 0:00:00:00 and a value of 47.6 at time 0:00:03:29.

Because the four different flares are made up of different flare elements or primitives, their appearance may vary only a little, as is the case with the Gold Spikes flare, or a lot, as with the Blue Photon. The Gold Spikes flare is made by a single spikeball primitive which changes only slightly as the angle parameters vary. The Blue Photon is built to vary greatly as the angle value changes. This causes the rays to change location on every frame.

Experiment with the different values for position, brightness, scale and color to see how the flare appearance can change.

TUTORIAL 3: EXPLOSION

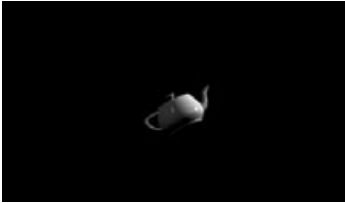


In this composite, *Explosion.aep* you'll notice that all the light and explosion flashes are animated from within Light Factory. The 3D elements from Electric Image include the hapless teapot, the explosion debris, the star field, and a tracker element for automatically tracking the position of the explosion core. There are two black solids in this comp to which I applied the Light Factor filter—one for the photon torpedo, and one for the flash and shock wave of the explosion. The photon torpedo gets its flickering movement from the animation of the angle parameter. If this parameter did not change, the radial shards would appear frozen and would not move.

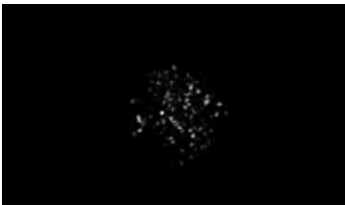
The shock wave consists of a simple disc element, with an animated scale value to simulate an expanding shock wave from the explosion. The explosion flash consists of a simple light effect with a number of brightness keyframes. You'll find that Light Factory is incredibly useful for creating flash and hot-core elements for explosions.

The following elements were used in *Explosion.aep*.

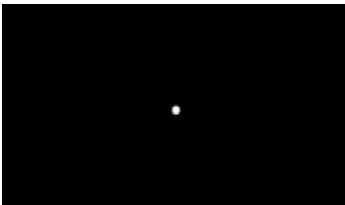
Elements



Teapot
teapot.mov



Explosion
pyro.mov



Teapot Tracker
track.mov



Star Field
stars.mov

TUTORIAL 4: POLICE BAR

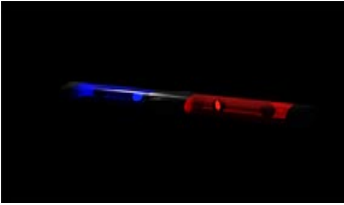


I created this tutorial to demonstrate the extent to which the auto-tracking and auto-obscuration features of Light Factory can be used to automate animation. All animation of the light effects is derived automatically from the source images.

I generated the red and blue light elements in Electric Image by rendering them as one sided objects. As these objects rotate away from camera they do not generate any white pixels in the alpha. Each instance of the light effect uses one of the light elements both for location and obscuration. Since we want to see the light effects only when the light source is visible, we have set the obscure mode to inverse alpha.

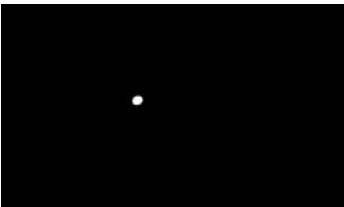
The elements shown on the next page were used to generate the flashing lights of the police bar.

Elements



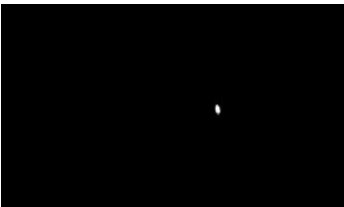
Police Car Bar

bar.mov



Blue Light Tracker

blue.lights.mov



Red Light Tracker

red.lights.mov

TUTORIAL 5: REALLY BIG CORP



I created this shot to illustrate a common problem. Notice that the right most light source emerges from offscreen—right towards the middle of the shot. In order to get the aperture reflection (a custom effect that generates an edge flare as a light source appears from offscreen), I needed to create a black solid that is oversized—bigger than the *reallybig.mov* element.

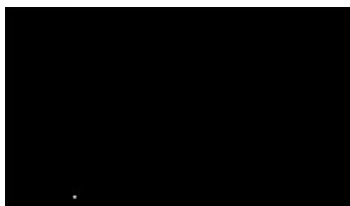
The elements on the next page were used in the creation of Really Big Corp animation. Note that the *Light 1.mov* and the *Light 2.mov* files contain the tracking information in the alpha channel of the movie file.

Elements



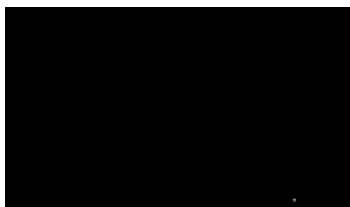
Really Big Corporation

reallybig.mov



Light 1 Tracker

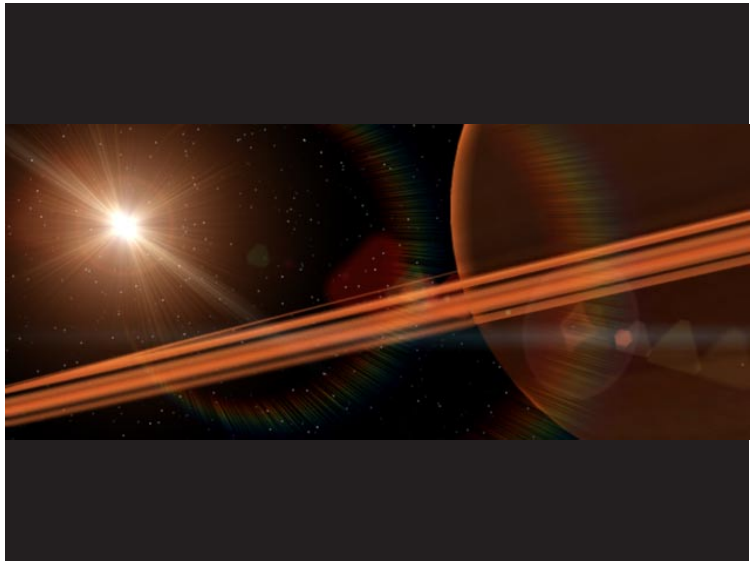
light1.mov



Light 2 Tracker

light2.mov

TUTORIAL 6: SATURN

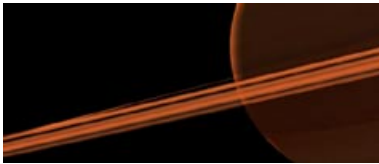


This comp illustrates Light Factory's auto-obscuration and auto-tracking capabilities, but with a little added twist.

In the After Effects project you'll notice a black solid with two Light Factory effects applied. Both light effects use the file *sun.mov* for their screen location, and the alpha channel of *saturn.mov* for obscuration. While the primary light effect uses the alpha channel of *saturn.mov* to control its brightness (to dim the simulated sun as it is obscured by the planet's rings,) notice that the secondary light effect uses the RGB values of the layer to modulate the color of the effect as it moves behind the rings.

The elements on the next page were used in the creation of the Saturn animation.

Elements



Saturn

saturn.mov



Sun Tracker

sun.mov



Stars

stars.mov

TUTORIAL 7: SAUCER



In this project I used Light Factory to generate a hot high-light reflection off of the surface of this shiny UFO. The camera motion of the background element was generated in ElectricImage, as was the cast shadow on the ground, and the three individual passes of the UFO.

By bringing these elements into After Effects as separate layers, I had greater flexibility over the final look of the shot without having to re-render in ElectricImage. The light effects are applied and animated within After Effects using keyframes for the light source position.

The Saucer animation was built from the elements on the next page.

Elements



Background
ground.mov



Saucer Beauty
saucer.beauty.mov



Saucer Grays
gray.movie



Saucer Reflections
saucer.shiny.mov



Shadow on Ground
shadow.mov

TUTORIAL 8: STAINED GLASS



I created this shot to demonstrate the auto-obscuration feature of Light Factory. As with the previous tutorials, I generated several rendered passes in ElectricImage. One of these passes—*suntrack.mov*—represents the position of the light source, and is used to auto-track the position of the light effect. The auto-obscuration is set to RGB, so that as the sun passes behind the stained glass window, the light effect will automatically be tinted to the color of the glass it is passing behind.

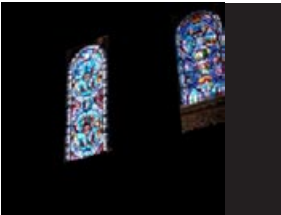
You'll also notice that I created a separate composition in After Effects so that I could add a separate glow pass to the window.

The Stained Glass animation was created from the elements on the next page.

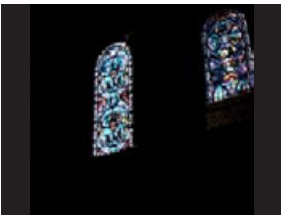
Elements



Cathedral
church.mov



Stained Glass Windows
windows.w.alpha.mov



Windows for Glow
window.mov



Sun Tracker
suntrack.mov

TUTORIAL 9: TREE



This project also uses auto-track and auto-obscuration. The twist here, however, is that the trees are not real, but were in fact generated within Electric Image (with an accompanying alpha channel for obscuration). As the sun effect moves behind the tree, note how effectively the obscuration is generated by Light Factory.

Subtle details like this help to sell a shot as being real, even though when examined without the flare the trees and background look considerably less convincing.

The following elements were used in the creation of Tree.

Elements



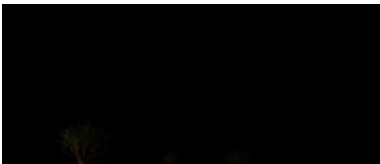
Background Scene

dv.mov



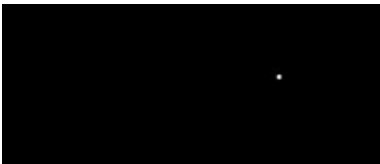
Hero Tree

tree.mov



More Trees

more.trees.mov



Sun Tracker

suntrack.movie