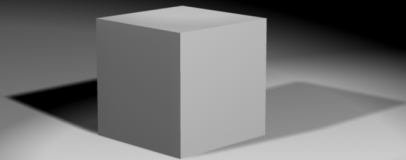


1

Lighting

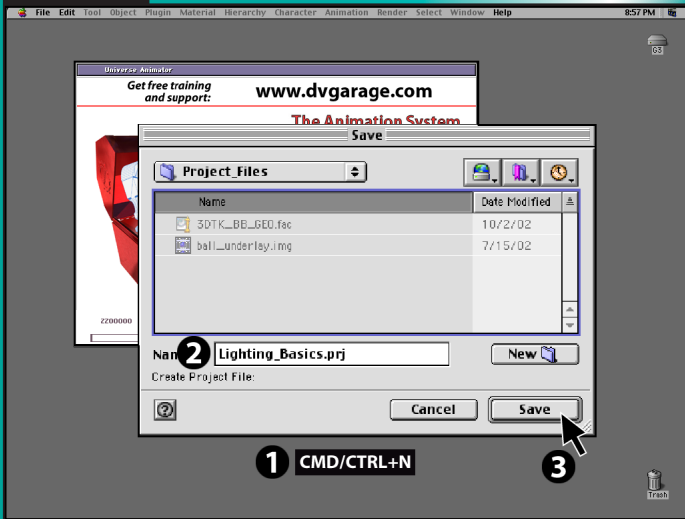


Lighting is an in-depth art of its own that needs a lot of practice and experimentation. In this first tutorial, we will give you an overview of the types of lights and some of the basics of lighting for setting up your models. We will walk through adding a light, moving a light and opening up the Light Info window. We will briefly talk about the different types of lights and, finally, talk about a basic lighting set up.



Overview





Launch Electric Image Animator.

Press [**CMD/CTRL+N**] to start a new project file.

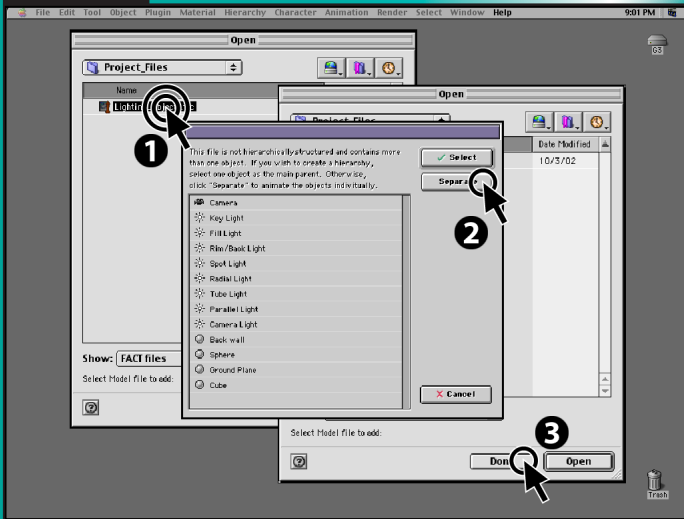
Name this project "Lighting_Basics.prj"

[**CLK**] the Save button, or press [**RTRN**].

Note: Macintosh keyboard commands are indicated in **red**.

Windows keyboard commands are indicated in **blue**. Some files may need to be manually located while loading.





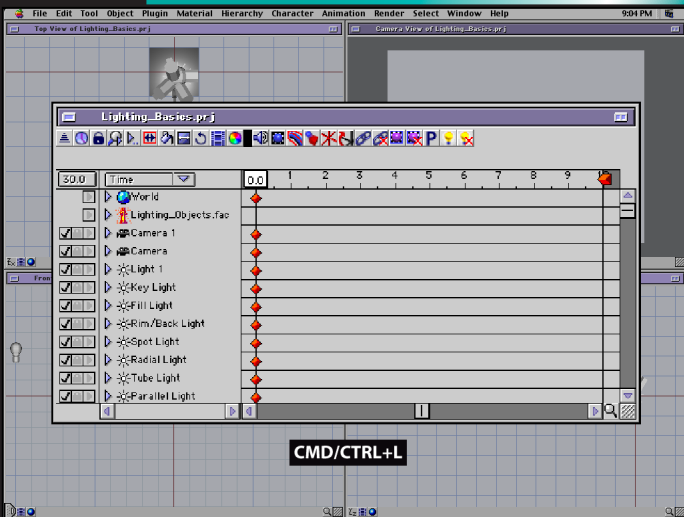
After saving, you will be prompted to load your FACT files into this new project.

Locate the **Lighting_Objects.fac** file and **[CLK]** Open.

You will then be asked to create a hierarchy of the objects contained in this FACT file. Since we want them separate, **[CLK]** the Separate button.

If there were any more models to add, you could continue adding them into the project, but for this exercise, there are no more models to add, so **[CLK]** the Done button





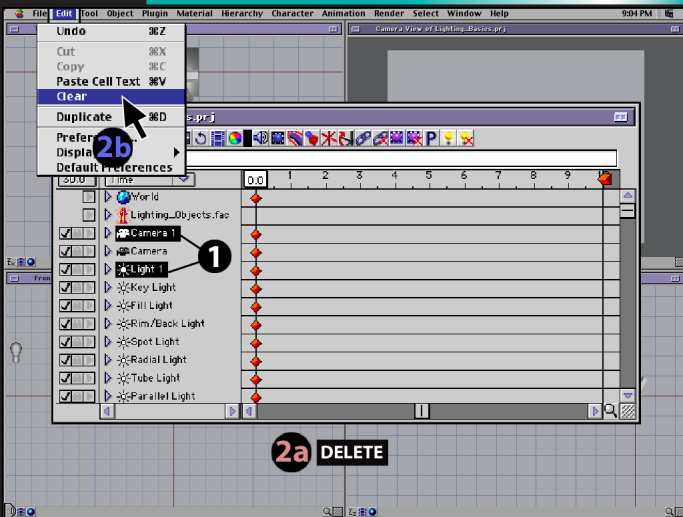
Animator then generates the scene loosely based on the size of the FACT file we loaded.

But before we proceed, we need to remove two unwanted elements: a Camera and a Light.

Open the Project window, [**CMD/CTRL+L**]

Animator defaults to adding a Light and a camera into every new Project file. Since our FACT file contained a prebuilt camera and light, we do not need the default Camera and Light in our scene. But before we delete the camera, we need to switch our viewing angle from the default camera (camera 1) to the 'Camera' for this scene...





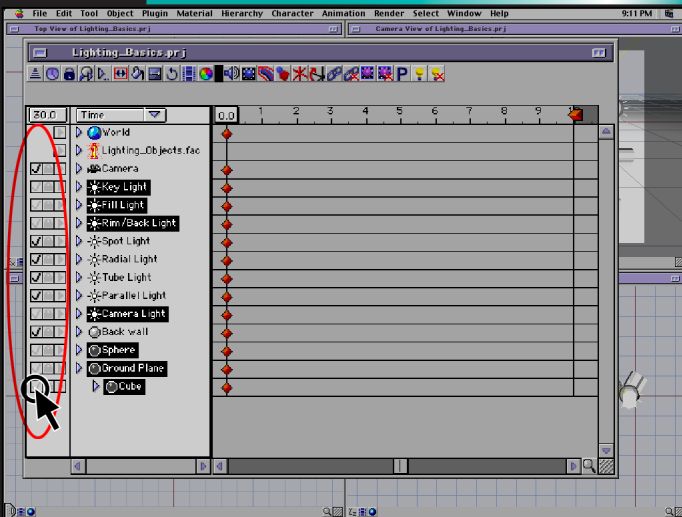
Press [**CMD/CTRL+L**] to open the Project Window.

In the Project window, [**CLK**] on Camera 1 and [**SHIFT+CLK**] on Light 1 and press the [**DELETE**] button.

You should only see the following in the Project window : World, Lighting_Object.fac, Camera, Key Light, Fill Light, Rim/Back Light, Spot Light, Radial Light, Tube Light, Parallel Light, Camera Light, Back Wall, Sphere, Ground Plane, and Cube.

Now onto the exercise....



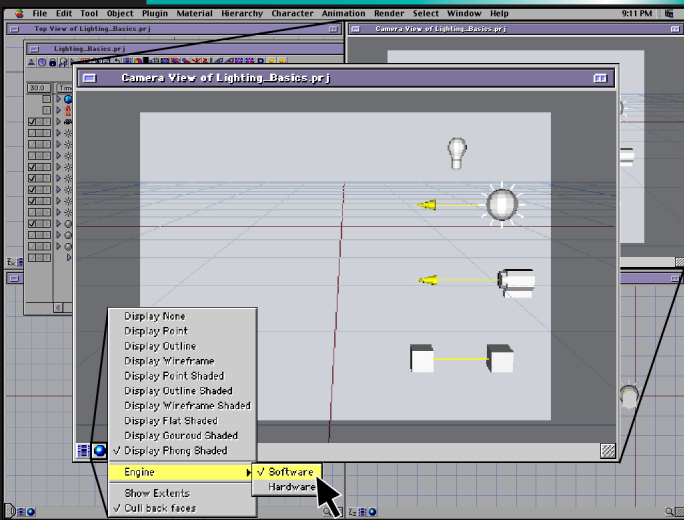


Turn off the visibility of the following objects and Lights:

- Key Light
- Fill Light
- Rim/Back Light
- Camera Light
- Sphere
- Ground Plane
- Cube

Note: You should now see 4 light sources and their light patterns on the "Back Wall" object. If you do, proceed to Step 8; if you don't, proceed to the next step.





If you do not see a Phong Shaded preview in the Camera view window, hopefully the following steps will correct that:

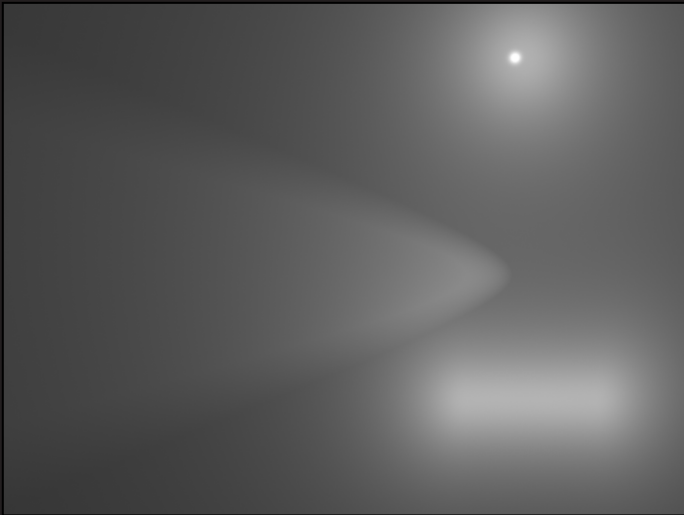
[CLK+HOLD] on the blue material ball in the lower left of the Camera window.

Make sure that the Display Phong Shaded option is selected, and that the Cull back faces is unchecked.

In the same menu, select Engine then Software.

Note: You should now be able to see the lights, and their light patterns, if not check the settings again and if the problem persists, check out our user forums.

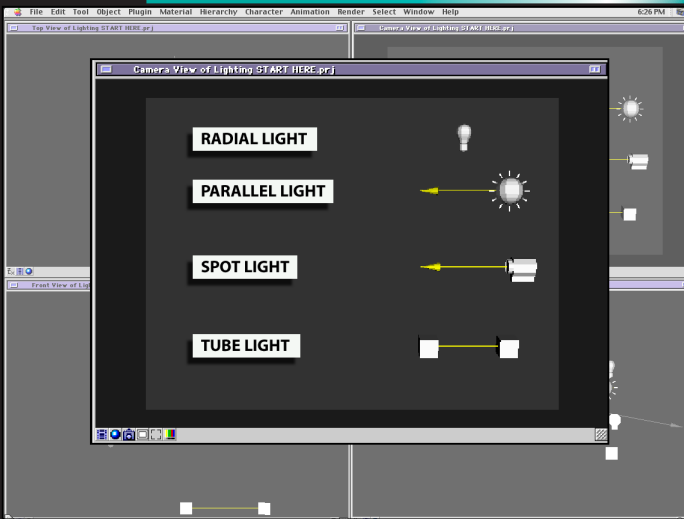




In the following steps we will walk you through Lighting in Electric Image.

Note: The background color for this project needs to be a dark gray so that our lights can stand out more. If, for whatever reason, your background color is not a dark gray, please change it in the Preferences option under the Edit menu at the top of the screen.

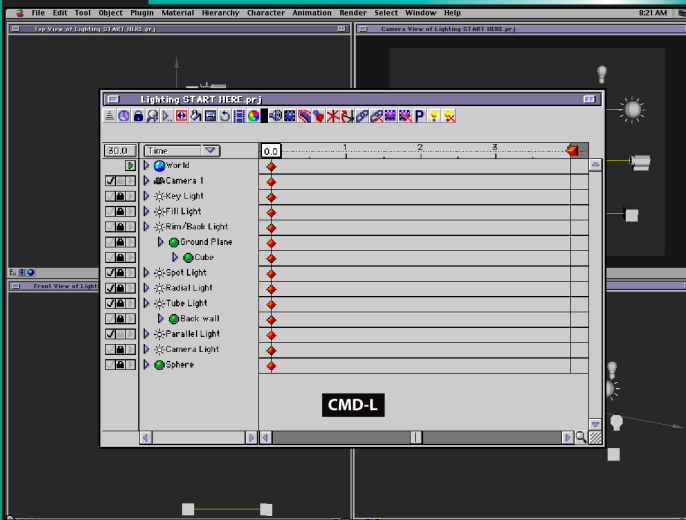




In the Camera View window, there are four objects that represent light sources. From the top down, they are: Radial Light, Parallel Light, Spot Light, Tube Light.

Electric Image actually has six light sources. The remaining two lights are specialized lights which affect the scene on a global scale. They are Camera Light and Ambient Light.



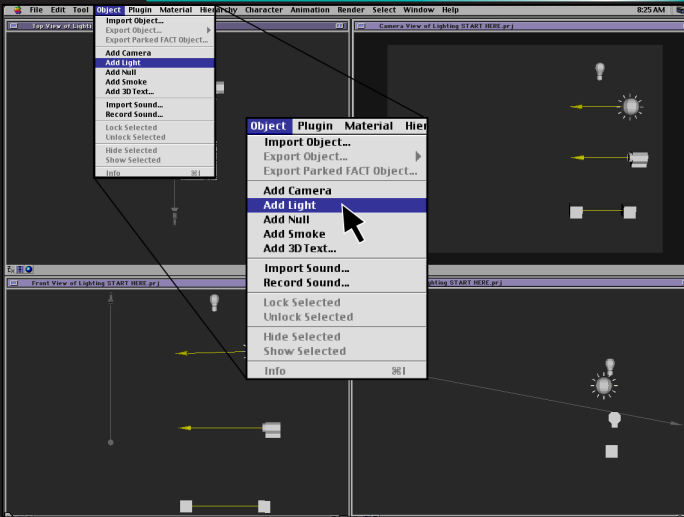


When creating a new Project file, EI automatically inserts one light into the scene. This can be seen in the Project window **[CMD/CTRL+L]**.

Our Project file, as you can see here has been modified so the default light isn't in this file. While the one light is sufficient for starting a project, eventually more lights will need to be added to a scene.

Close the Project Window **[CMD/CTRL+W]**.





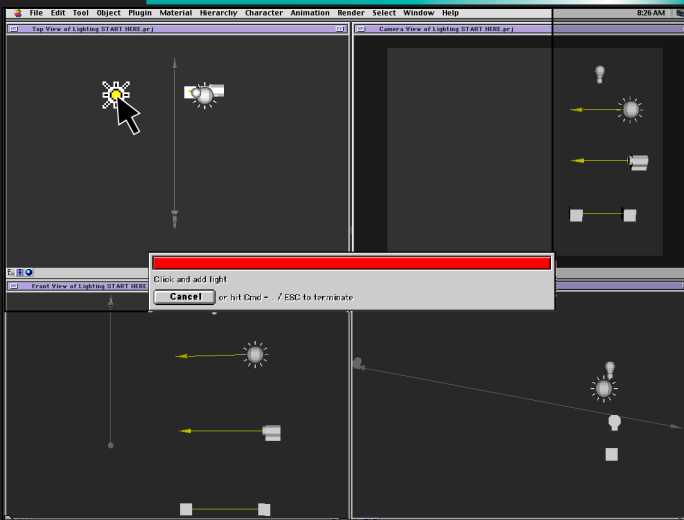
In the menu bar, select "Object" then select "Add Light"

Note: A warning dialog box will open up insisting that you either Add a light or cancel out of the action.



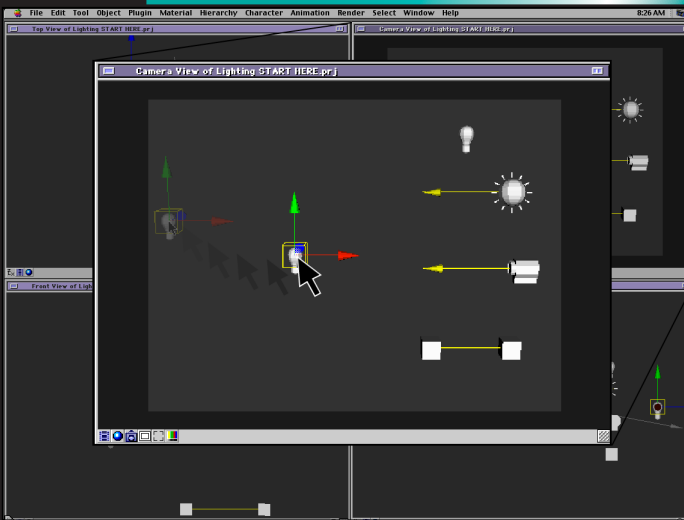
12

Adding a Light



In the Top View window, **[CLK]** next to the left of the Camera's Reference Pointer, to add a light to the scene.

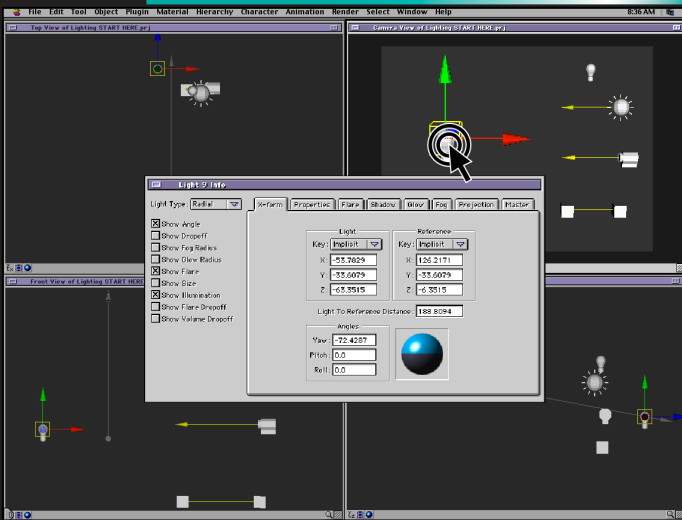




[CLK+DRG] the light icon in any window and position it so it's visible in the Camera View window.

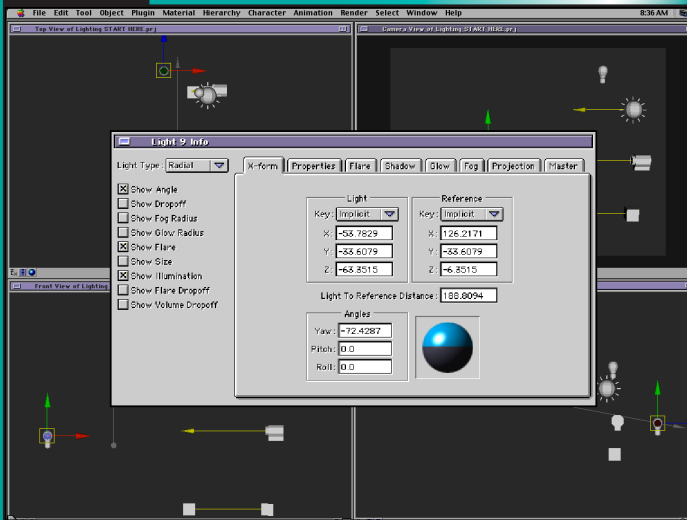
Note: This movement of a light only applies to a radial light. Moving a spot light, parallel light and a tube light is slightly different and will be discussed in upcoming steps





To change the properties of the light, **[DBL+CLK]** on the light that was just added to the Camera View window.

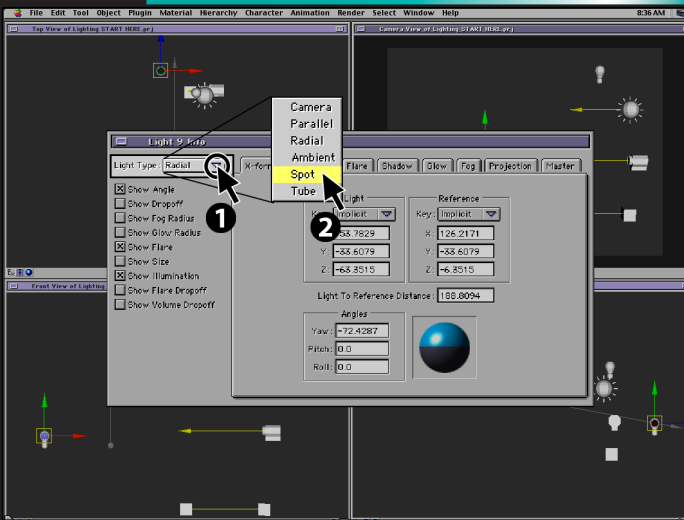




This is where we have complete control of the light source.

This is where the type of light is set, the attributes are changed, or changes are made in parameters for animation purposes. It is also possible to set what this light illuminates or doesn't illuminate.



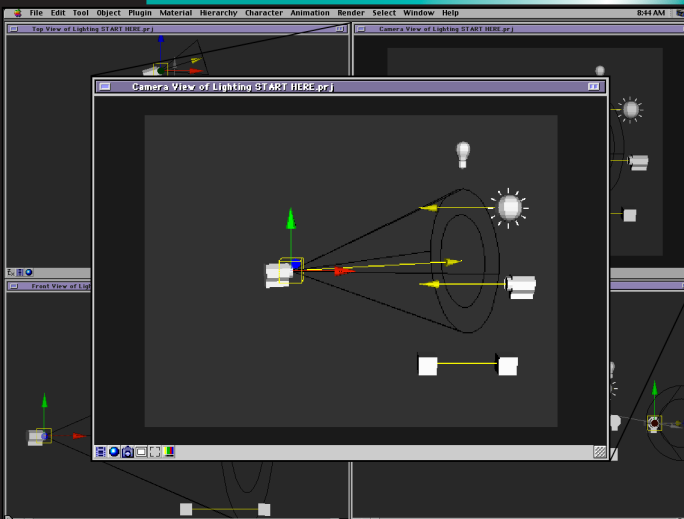


The Light Type Option is in the Light Info window. This is where the light options are set.

[CLK] on the pop up menu next to LightType to locate the six light choices mentioned earlier. Currently the option is on a default setting, Radial Light.

Highlight the Spot option and let go of the mouse.

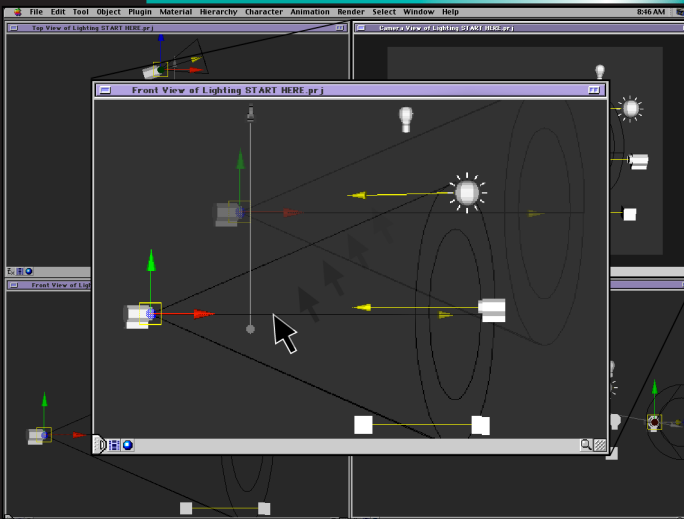




Close the Light Info Window [**CMD/CTRL+W**].

Note: The light icon changed in the Camera View window. Instead of a circle with lines around it (meaning that the light emanates everywhere) it now has a circle with a long line attached and an arrow at the end of the line pointing in the direction of the light beam.

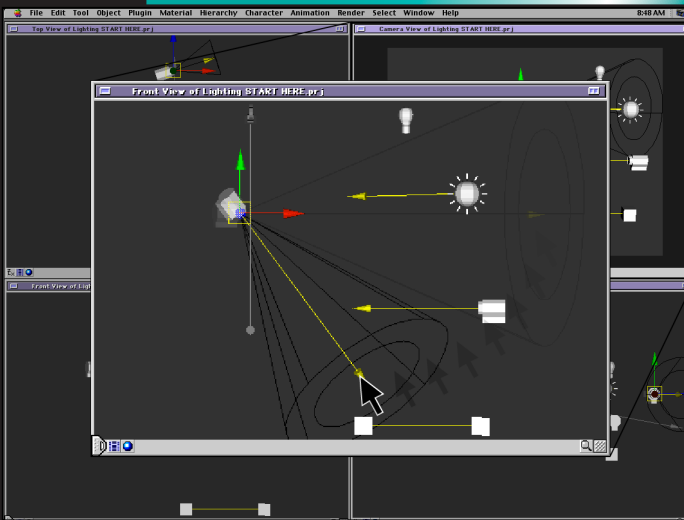




Moving a Spot light is slightly different from moving a Radial light. To move the light in its entirety, **[CLK+DRG]** on the line that connects the triangle cone and light body together.

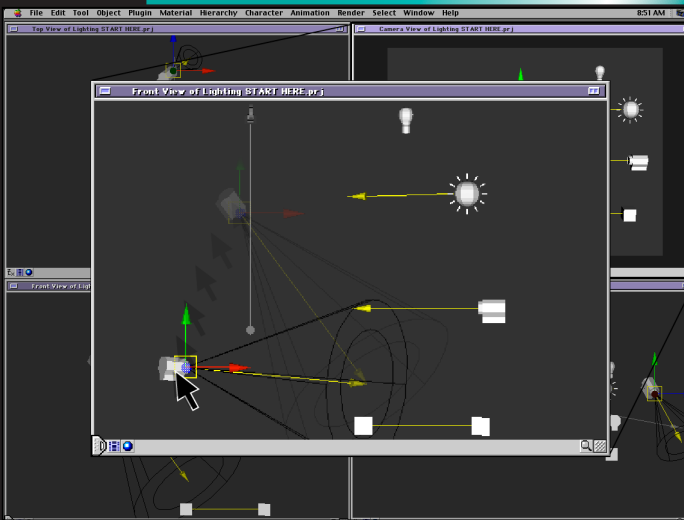
Note: Parallel and Tube Lights are moved in the same manner as a spot light.





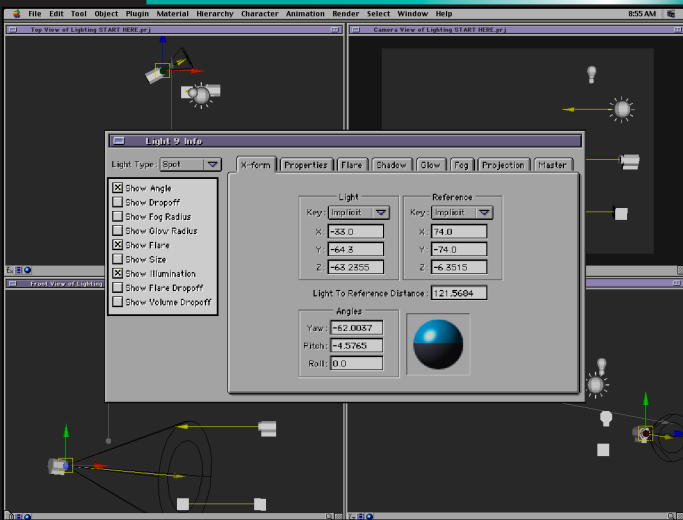
[CLK+DRG] on the yellow triangle cone to move the light's reference point (what the light is aimed at) independently from the light source (the light body).





[CLK+DRG] on the light body to move the source of the light itself while keeping the reference point fixed on the object.

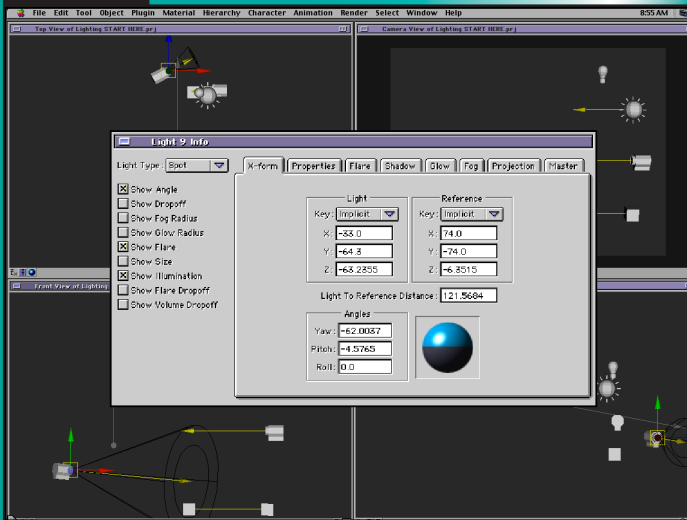




[DBL+CLK] on the Light Body to open the Light Info window.

In the Light Info window, underneath the Light Type is a set of options for viewing different functions of the light source. For now, make sure that Show Angle and Show Flare are selected.

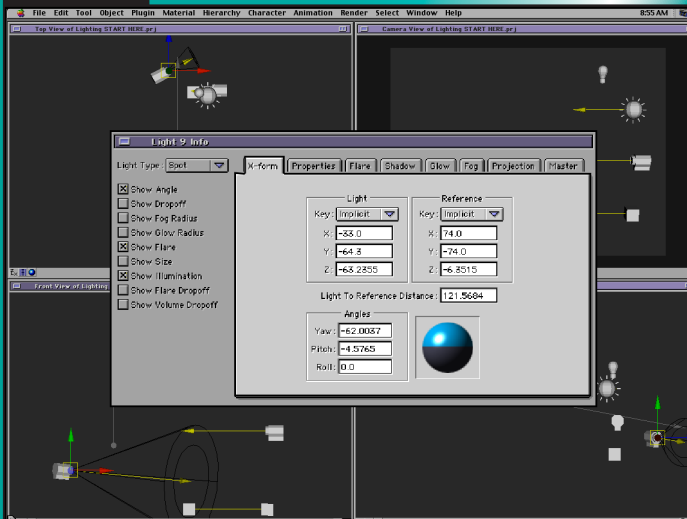




The rest of the light properties lie in the tabbed section of the window.

Not all of the properties are covered in detail in this tutorial. However, this tutorial does provide a brief description of each property and where it is located.

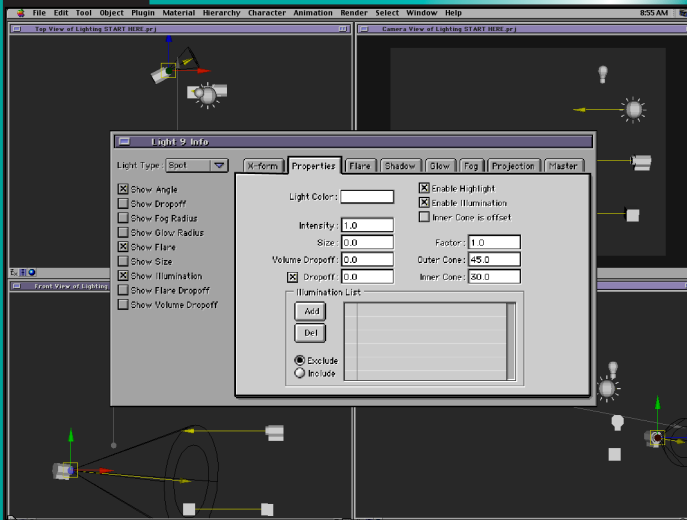




[CLK] on the X-Form tab. This tab has all of the “physical” attributes of the light. The Light section describes where the light resides numerically in 3D space.

The Reference section is where in 3D space the light radiates to, which is tied into the Light To Reference Distance section. The Angles section is how the light is aimed at the reference object.

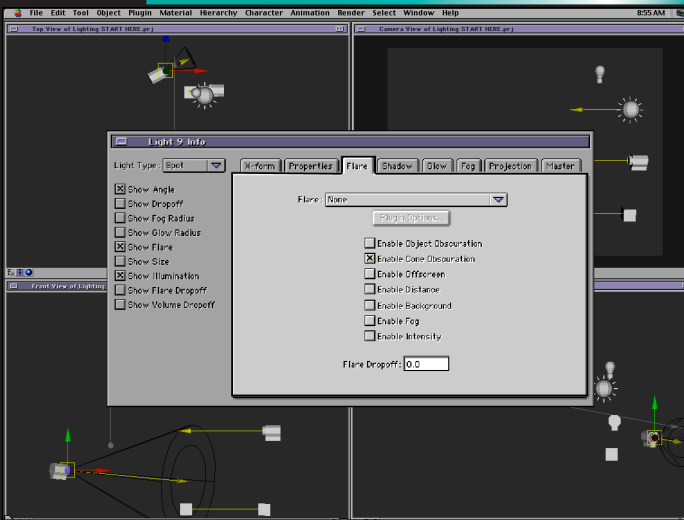




[CLK] on the Properties tab.

This is the main area where the actual setup of a light takes place. This is where you specify the color of the light, the intensity of the light, the dropoff and if needed, what this light will or will not illuminate.

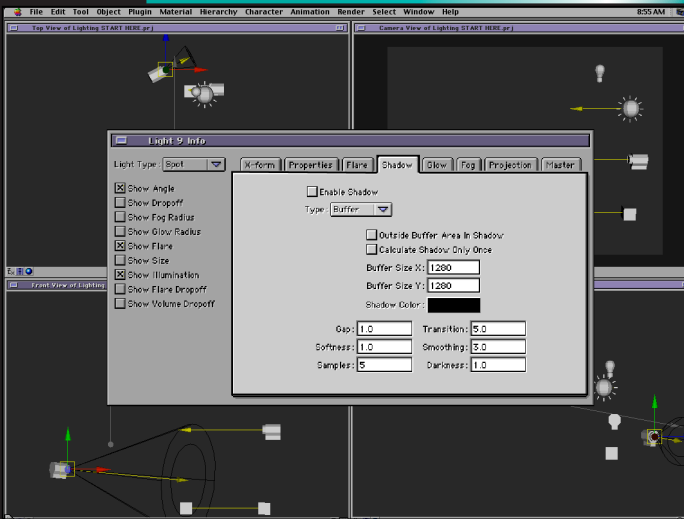




The Flare Tab sets the lens flares and light flares for the light. This always defaults to None.

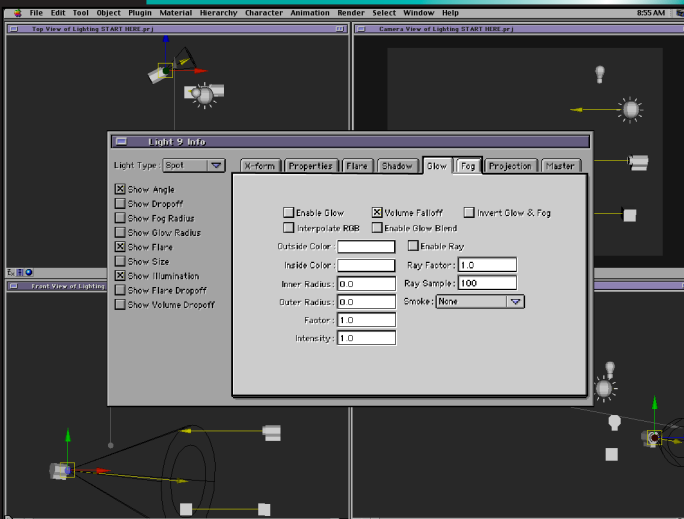
Note: Turning this on may increase rendering times.





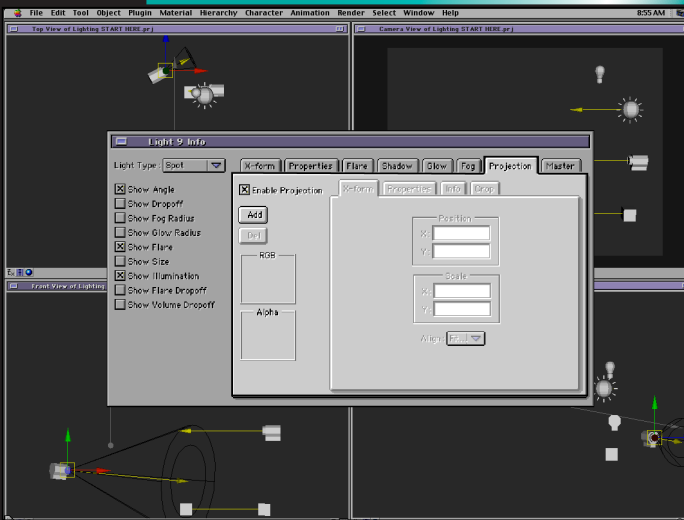
[CLK] on the Shadow tab. This tab is where the light source is specified to enable shadows. It defaults to off, saving rendering time, but makes images look flat and unappealing. For an object to cast a shadow, this is the first and last stop for shadow control.





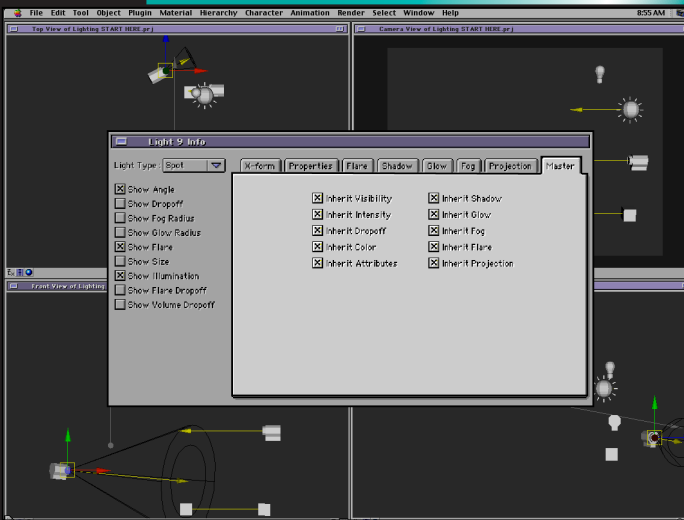
A light source in 3D space is not visible as it is in reality. You make the light source visible with glow and fog lights. The Glow and Fog tabs, is where you set the light to interact in 3D space. A Glow light interacts with the 3D space in that it allows the background elements to show through. A Fog light obscures the background elements.





The Projection tab allows the light source to be used like a slide projector. An image can be projected to create an illusion of something off screen that is not really there.

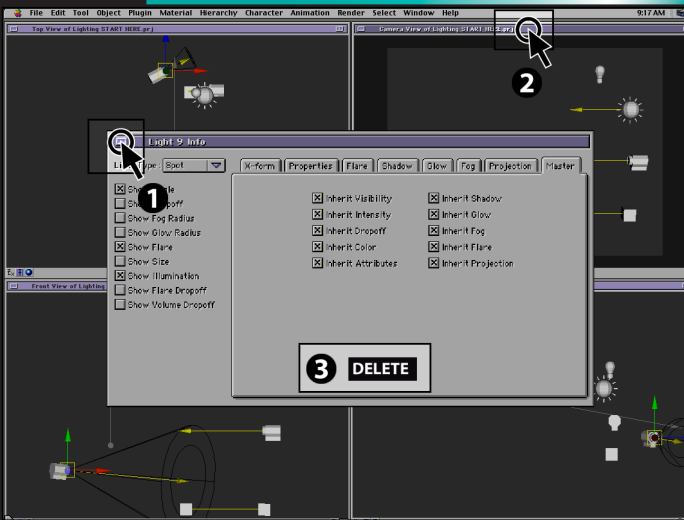




This Tab allows this light attribute to be controlled by a Master Material Light.

Note: This Function is not enabled in the 3DTK version, but is fully functional in the full Universe version of EI.



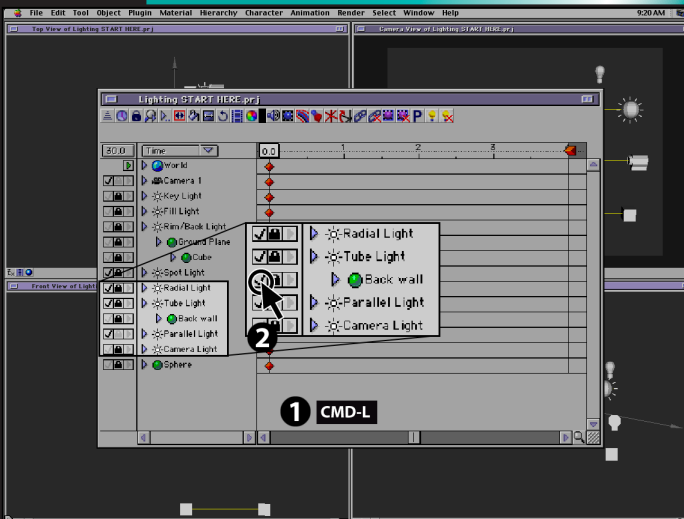


[CLK] on the button in the title bar on the left side to close the Light Info window.

While the Light is highlighted, [CLK] on the Camera View title bar and then press the [DELETE] key on the keyboard to delete the newly added light.

That was a brief walk through of the tabs and what they do. Next is an overview of the types of lights and their uses.

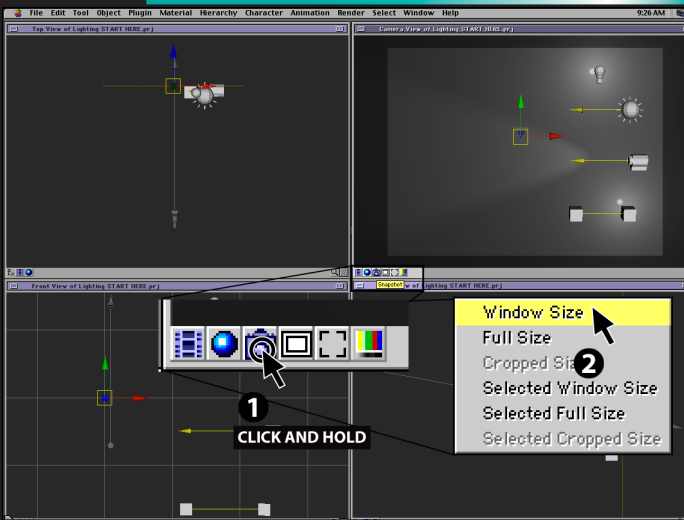




[**CMD/CTRL**+**L**] to open the Project window.

Make sure that the first box to the far left of the Back Wall name is checked. We want the visibility on for the next step.



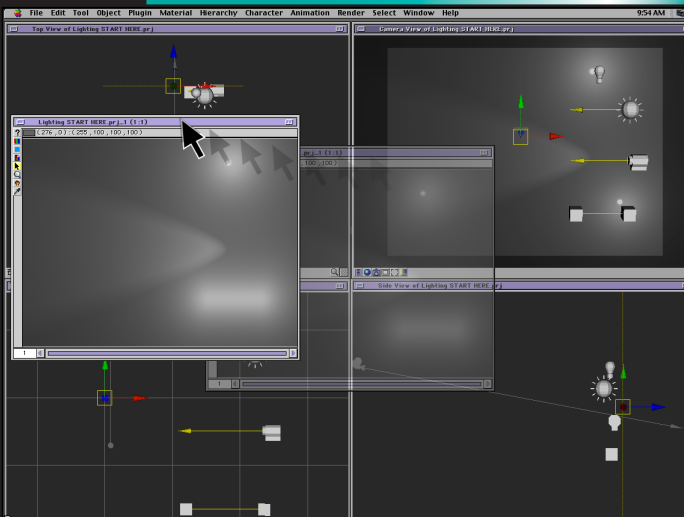


Close the Project window.

[CLK] on the Still Camera icon in the Camera View Window in the Camera Tool palette located in the bottom left of the window.

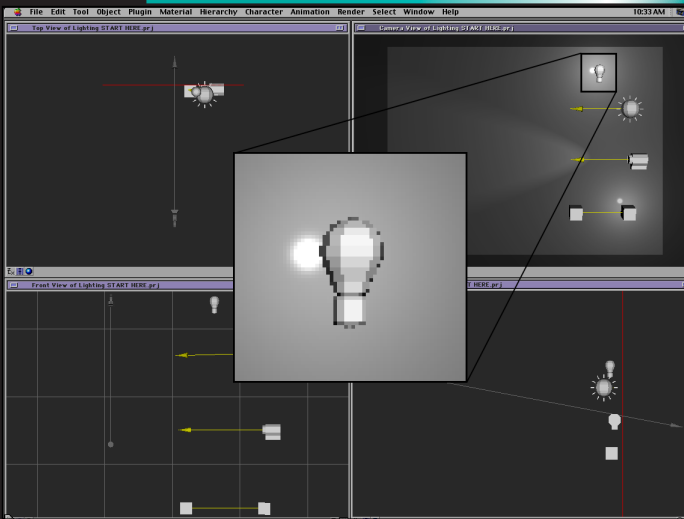
Choose Window Size in the pop up menu.





[CLK] on the title bar of the render window and drag this window below the Camera View window.

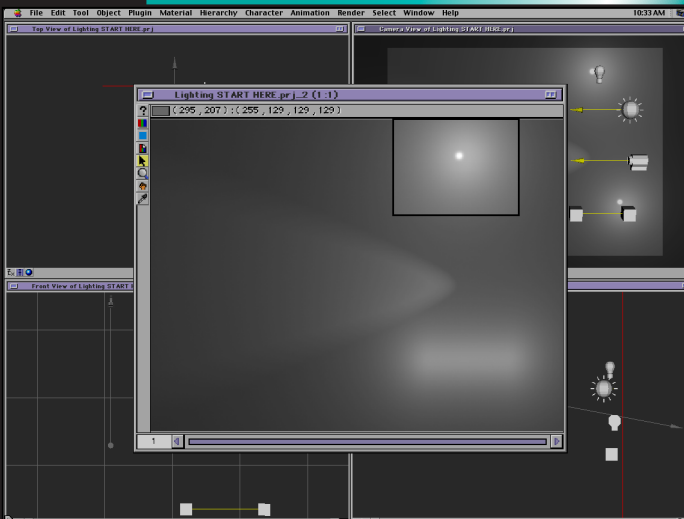




In the Camera View window, the top icon is a Radial light.

Radial lights are used mainly for a general fill light. This light is similar to a real world light bulb.

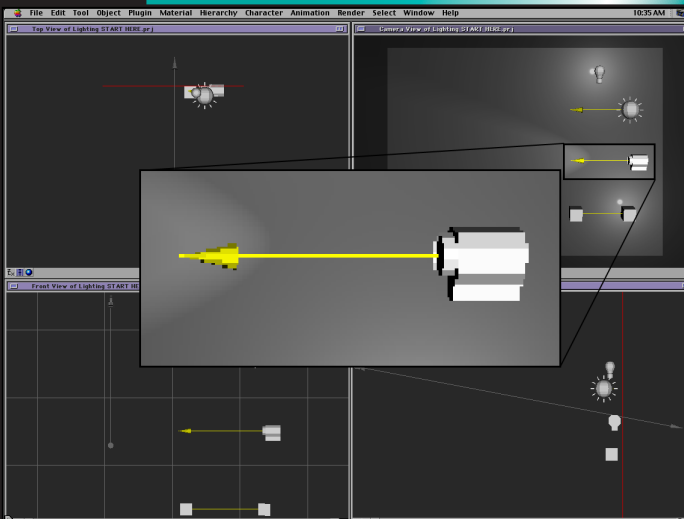




In the rendered image, notice the light pattern from this type of light. The light emanates everywhere from the light source.

Note: We left the highlight on for this light and the others so that you can see how the light source behaves with the falloff of the light.

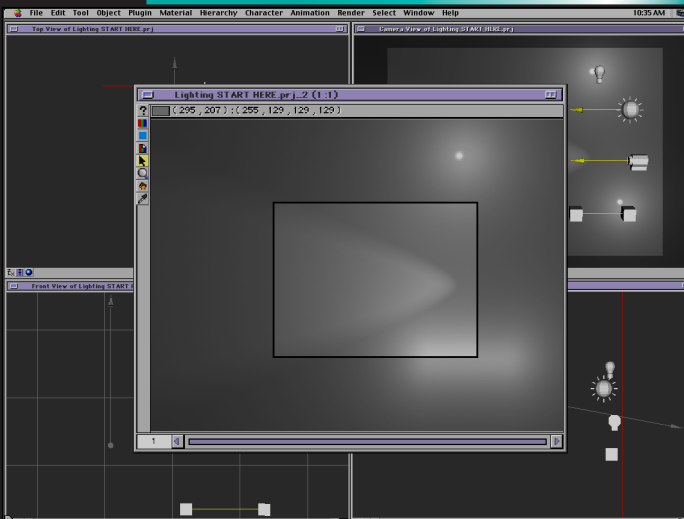




In the Camera View window, the third light type down is the Spot light.

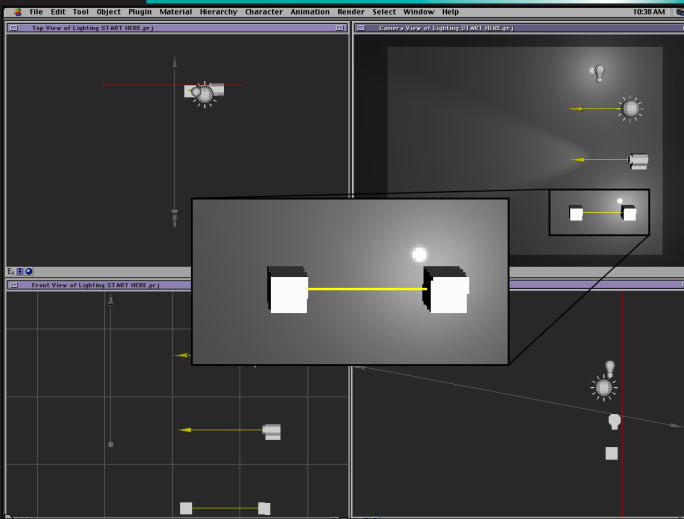
The Spot light is the most widely used light source in 3D. It allows the user the greatest amount of control over location, direction and shadows.





Notice the light pattern a spot light gives off in the rendered image.

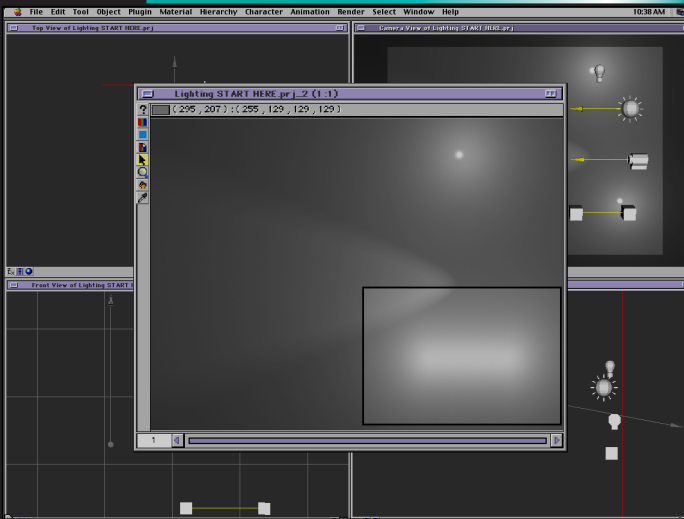




The bottom icon is a Tube light.

This light is very similar to a neon style of light or a florescent tube light, hence the name.

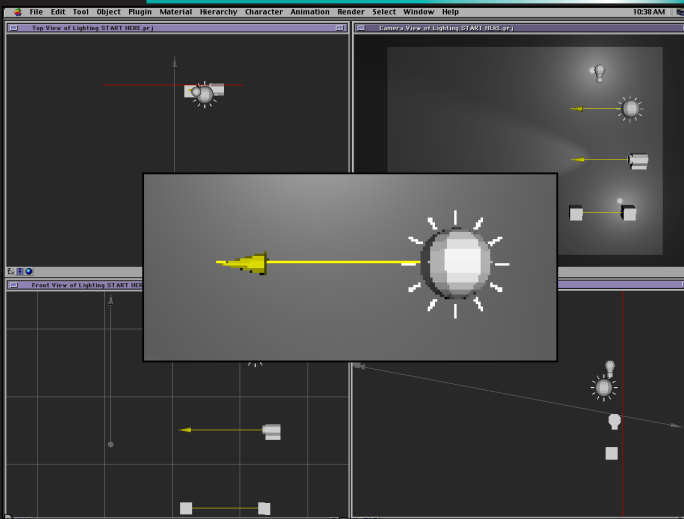




Notice the type of light pattern the tube light gives off in the rendered image view.

When finished close the rendered view image.

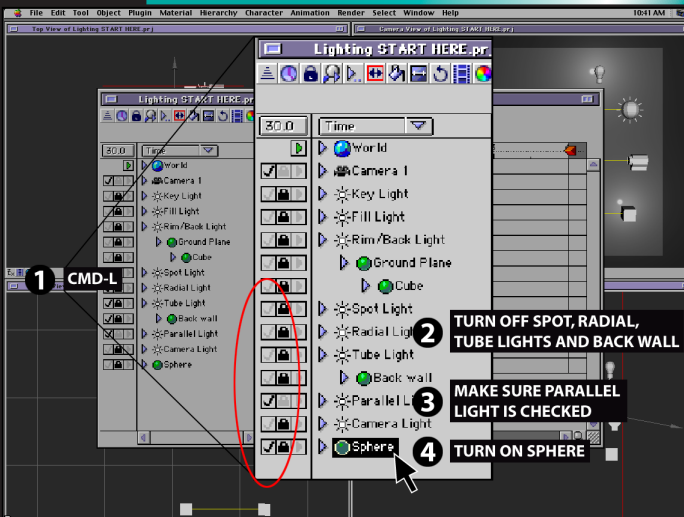




The second icon down from the top is a Parallel light.

A parallel light is different from the other lights in that the icon just represents the direction of the light.





To illustrate Parallel light, open up the Project window [**CMD/CTRL+L**] and turn off the following: Spot Light, Radial Light, Tube Light and Back wall.

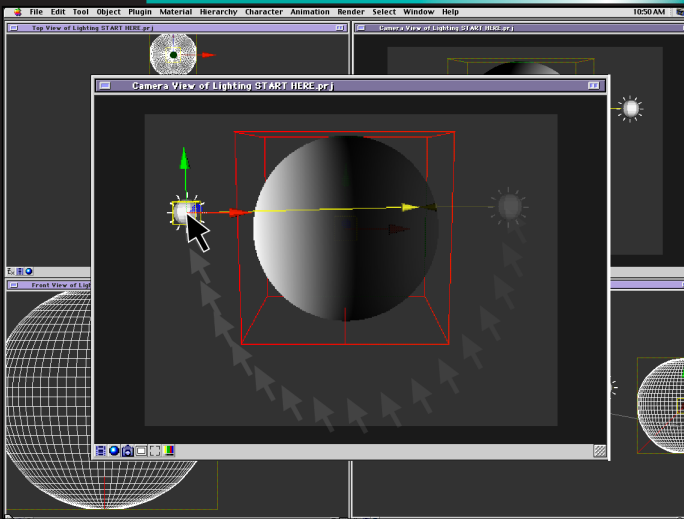
Turn on the sphere.

Make sure Parallel Light in the Project window is checked.

Note: If you do not see a shaded object in the Camera View window, follow the troubleshooting instructions in step 7.

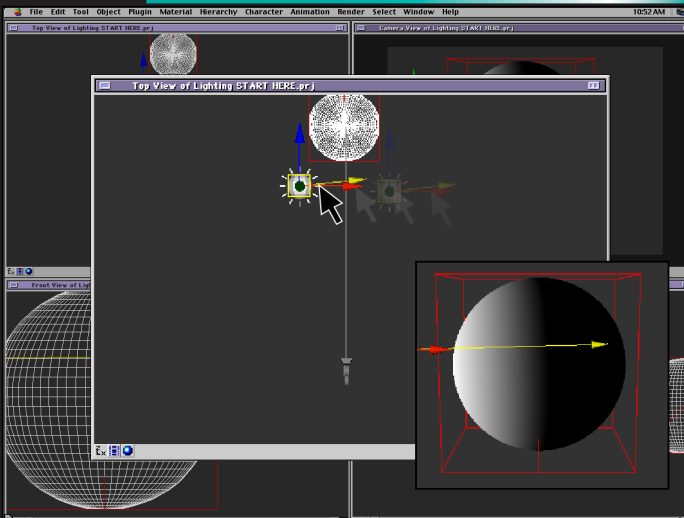
Close the Project Window [**CMD/CTRL+W**]





In the Camera View window, **[CLK+DRG]** the parallel light circle around the sphere and watch the pattern of light on the sphere.



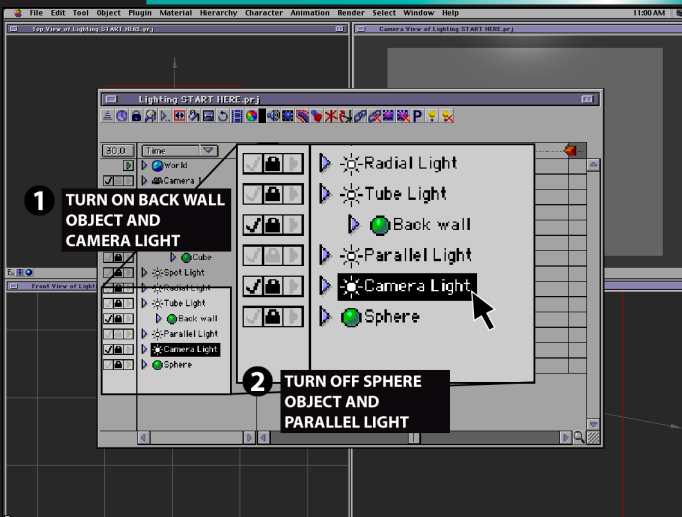


Still in the Top View window, **[CLK+DRG]** the reference line to the opposite side of the sphere.

Again notice the light pattern on the sphere.

This light is best used to light large vast scenes where you need to simulate sunlight. This light projects an array of light in one direction from no fixed position.





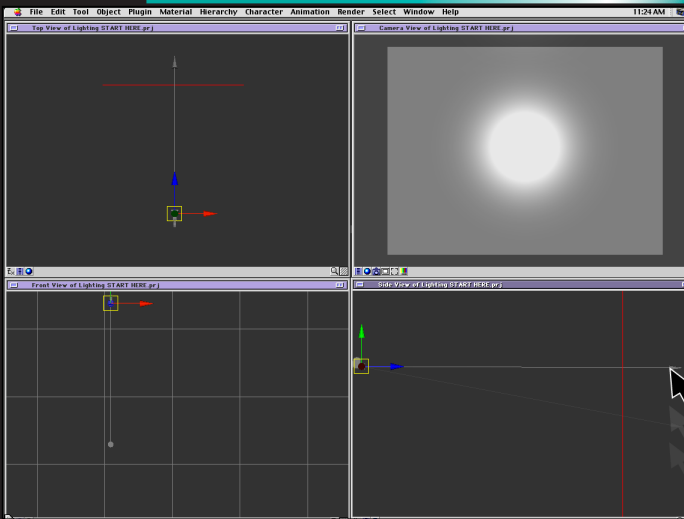
In the Project window, turn on the Back wall object and the Camera Light.

Turn off the Sphere object and the Parallel Light.

Close the Project Window.

Note: If you see black in the Camera View window, open the Info window for the Camera Light ([**DBL+CLK**] on it) and change the Light Type from Camera to another light. Wait a second, then set it back to Camera. You should then see something in the Camera View window.



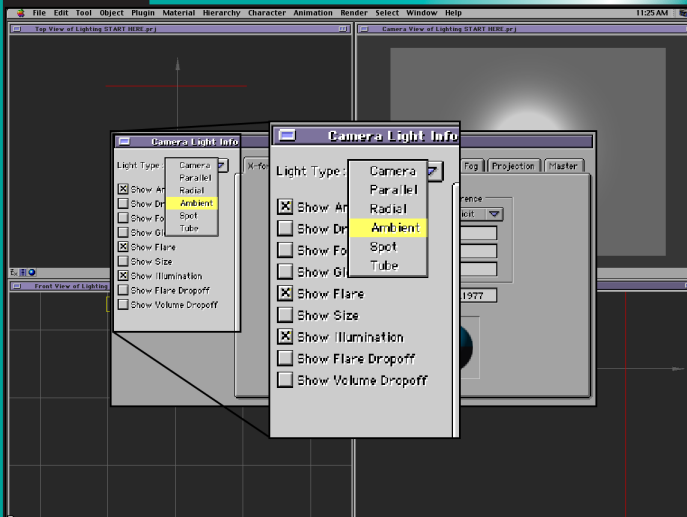


In the Side View window, **[CLK+DRG]** the reference cone for the camera upward so that the reference line is a parallel with the blue z-axis indicator.

In the Camera window, notice the light pattern on the wall. As you were moving the reference marker, you probably noticed that the light hit on the wall came into view. This light follows the camera around so that everything and anything in front of the camera is illuminated.

Press **[CMD/CTRL+Z]** to undo the camera movement.

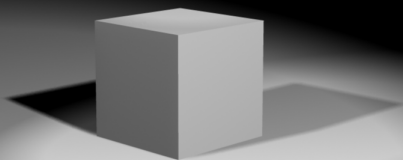




We do not have a demonstration of ambient light.

This light is rarely used. When applied, this light boosts the overall level of light in a scene. Unfortunately, in doing so, it flattens out the scene by washing out shadows (which is usually unwanted)





In the following section, we will do a walk through the creation of a basic, 3-Point lighting set up.



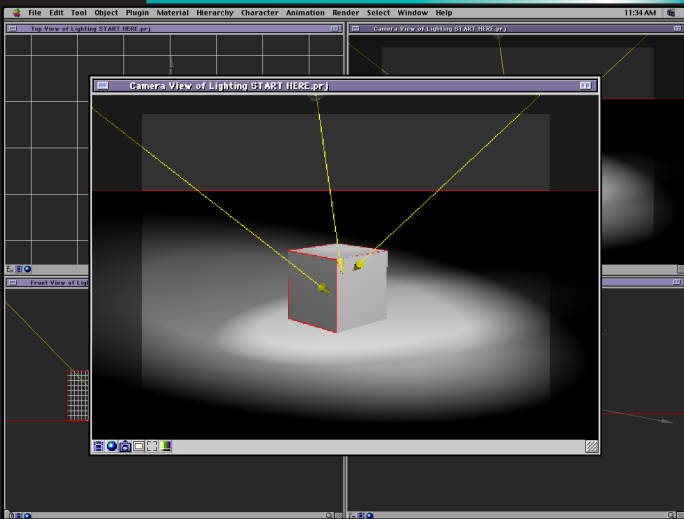
1 TURN VISIBILITY OFF OF ALL OBJECTS AND LIGHTS**2** TURN VISIBILITY ON FOR: KEY LIGHT, RIM/BACK LIGHT, GROUND PLANE AND CUBE

In the Project window, turn off the visibility of all objects and lights.

Turn on the visibility of the following: Key Light, Fill Light, Rim/Back Light, Ground Plane and Cube.

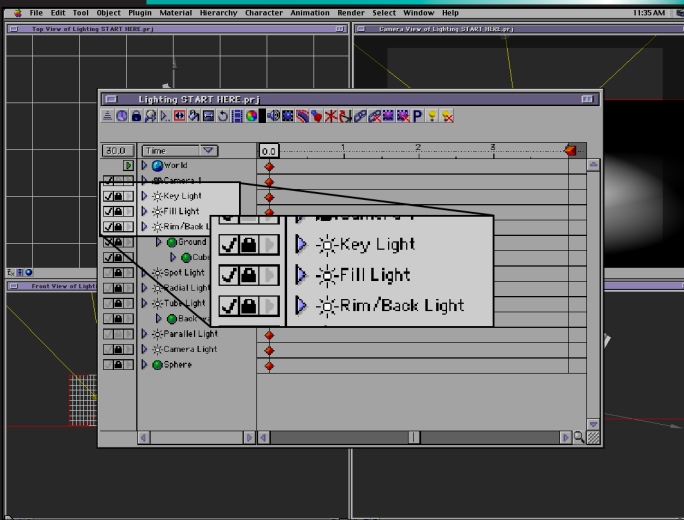
Note: If you do not see a shaded object in the Camera View window, follow the troubleshooting instructions in steps 7.





In this simple scene in the Camera View window, there are three lights that provide illumination. This type of lighting arrangement is called a 3-Point Lighting set up.



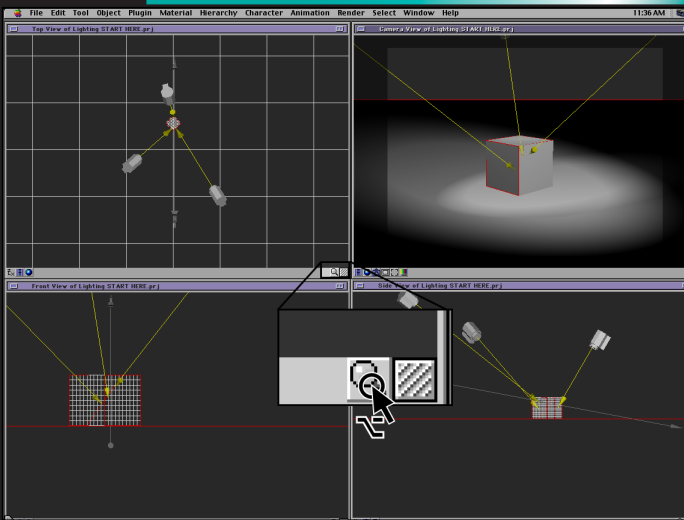


The three lights are all spotlights. The Key Light is the main source of light. The other two lights, the Fill and the Rim light provide support for the Key light.

The Fill light complements the Key light by lighting up some dark shadow areas that may be unappealing at times.

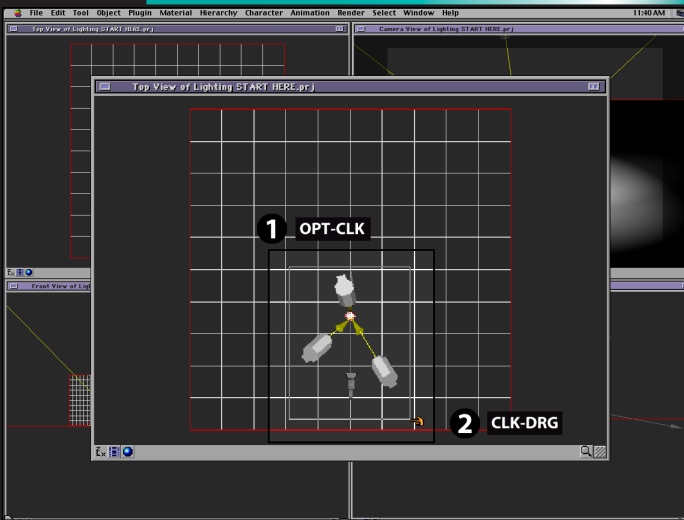
The Rim light gives a little separation of the foreground subject from the background.





In the Top View window, **[F+CLK]** on the zoom out button located in the lower right of the window.

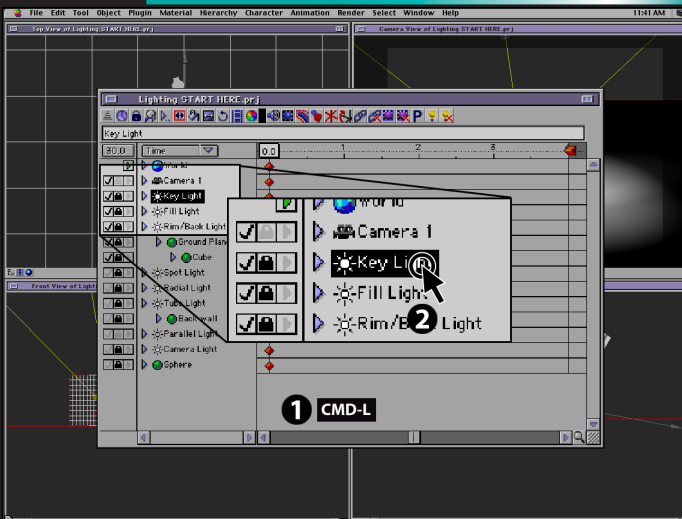




Press the **[OPT]** key in the Top View window. The cursor turns into a pointy finger.

[CLK+DRG] a rectangle around the lights and camera in the bottom half of the screen.

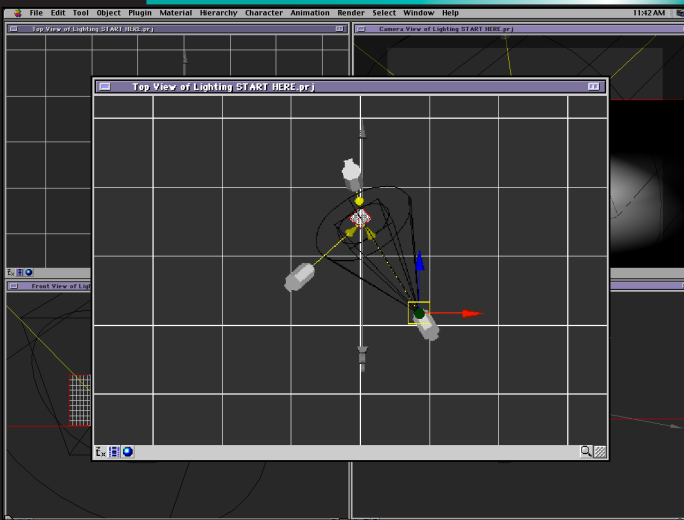




Select **[CMD/CTRL+L]** and **[CLK]** on the Key Light in the Project window.

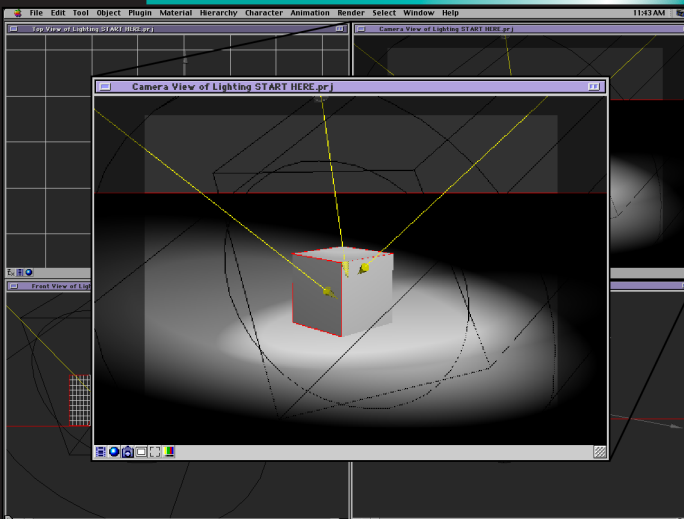
Position the Project window so the Top View window and the Camera View window are visible.





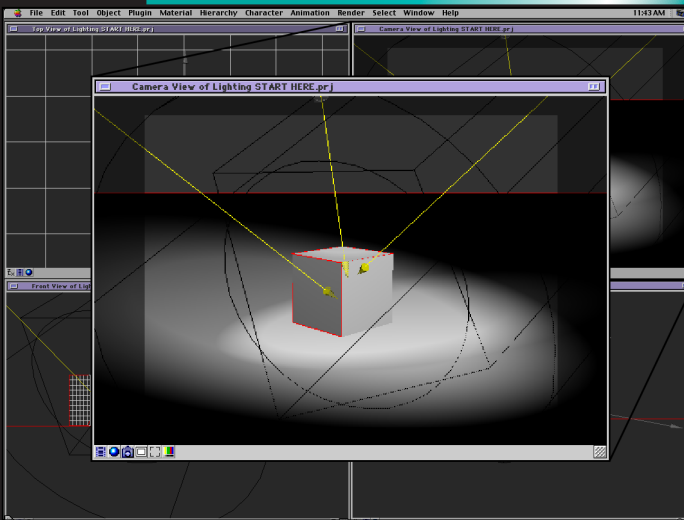
In the Top View window, notice the placement of the Key light. The Key light is usually offset to one side of the camera and above the object.





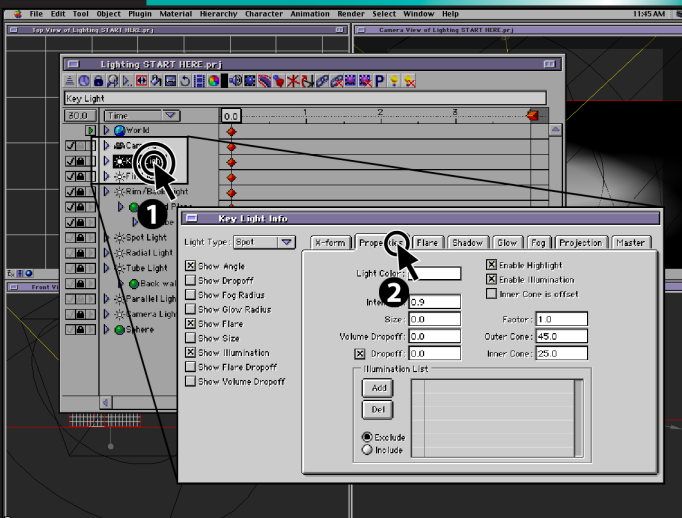
In the Camera View window, notice the two circles encompassing the box. These two circles represent the inner and outer cone of the spotlight.





The inner cone contains the main concentration of light. The outer cone represents the fall off of this light. These are inherent traits of spotlights. These cones allow the user to flood or spot the light, just like in the real world .

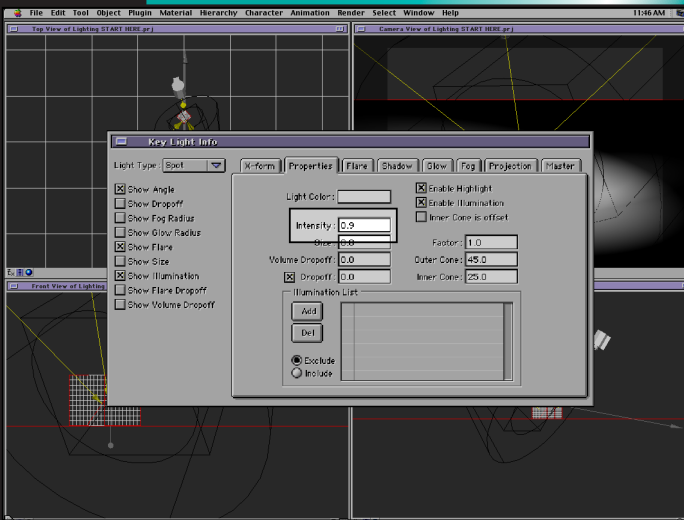




[DBL+CLK] the Key Light to open the Light Info window for this light.

[CLK] on the Properties tab.

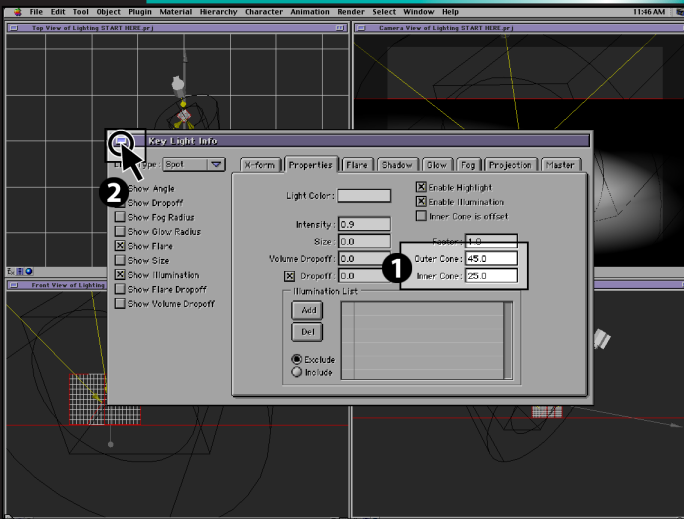




Within the Properties tab, notice that the intensity for this light is at 0.9 (90%).

Note: The key light is usually set somewhere between 75% to 95% intensity. It is rarely set at full intensity or above, unless it is designed for a specific effect.

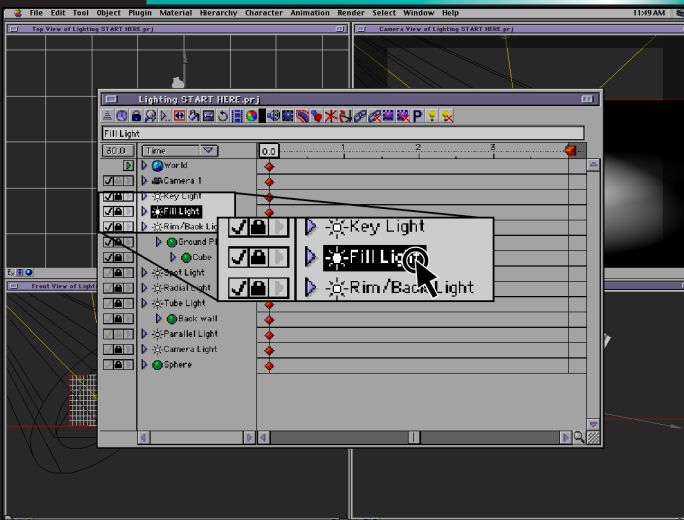




You can also change the inner and outer cone sizes within this tab.

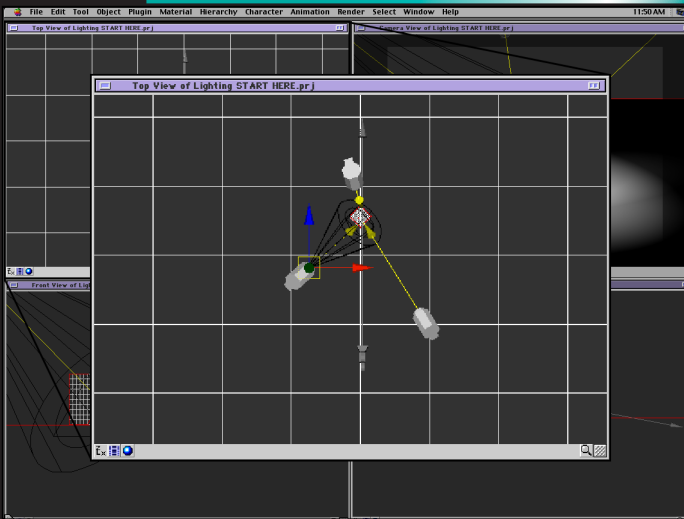
Close the Light Info window.





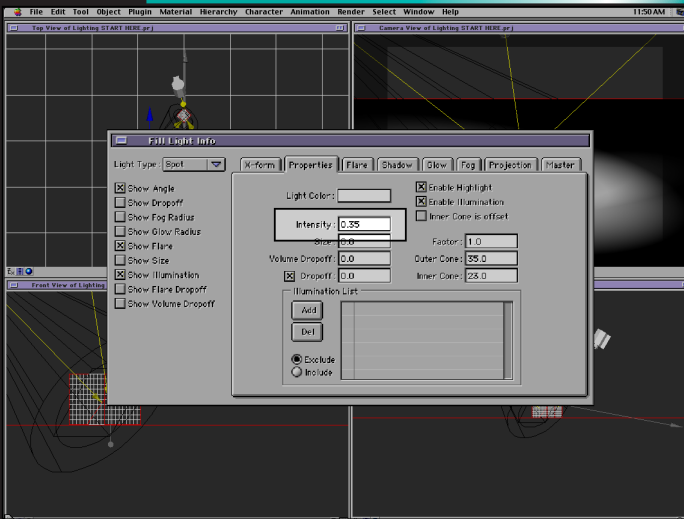
In the Project window, **[CLK]** on the Fill light.





Notice in the Top View window the placement of the Fill light. As stated before, this light complements the Key light and fills in the side of the object that is not receiving full illumination from the Key Light.

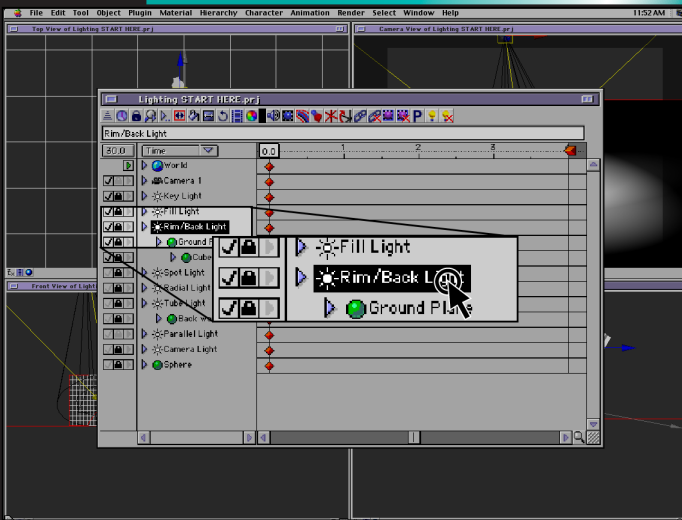




The fill light is usually set somewhere between 25%-40% intensity.

It is extremely rare for this light to equal the intensity of the Key light, and it can never be brighter than the Key light or else the roles become reversed.

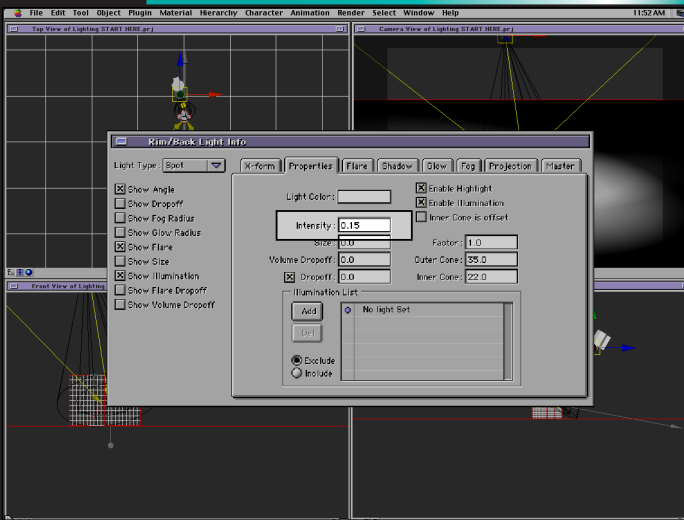




[CLK] on the Rim/Back Light.

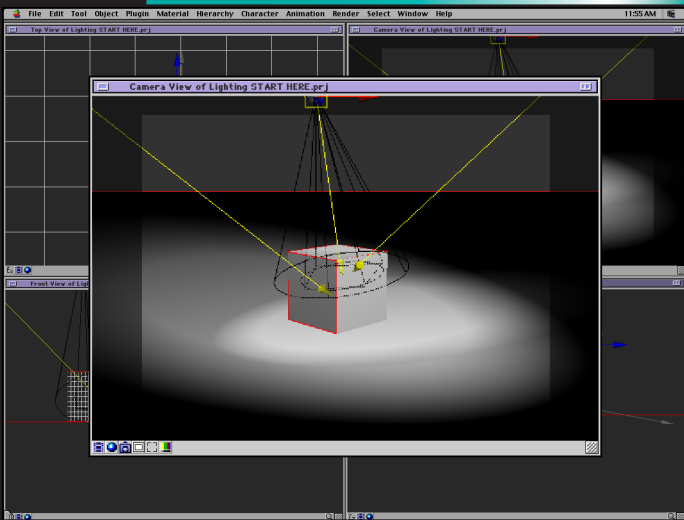
This light just adds a little pop to separate the foreground subject matter from the background.





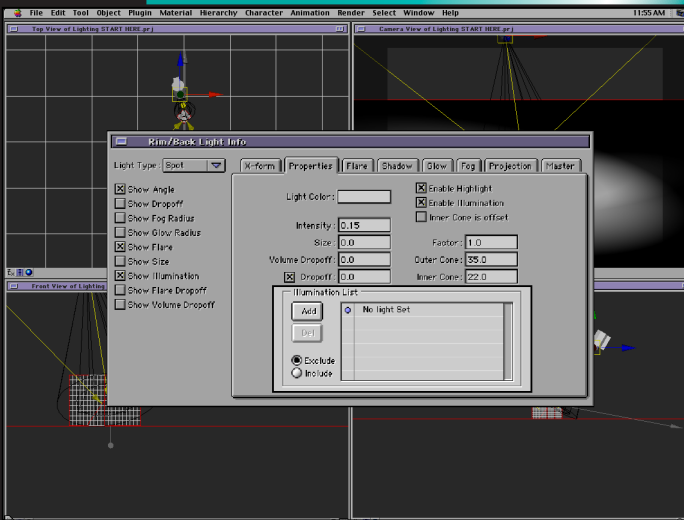
This light is usually around 15%-35% of full intensity. Open up the Light Info window for this light and notice that the intensity is set to 0.15.





In the Camera View window, notice that this light also has a narrow spotlight so that the light can be concentrated on just the back edge of the foreground subject matter.

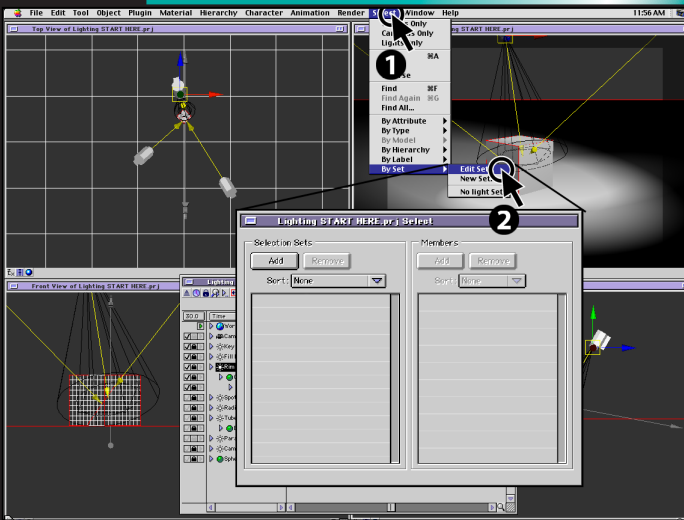




One powerful feature for lighting is controlling what the light illuminates or should not illuminate. This is where Selection Sets come in handy. Notice in our render that there is some light spilling on the Ground Plane from our rim light.

Let us fix that really quick...

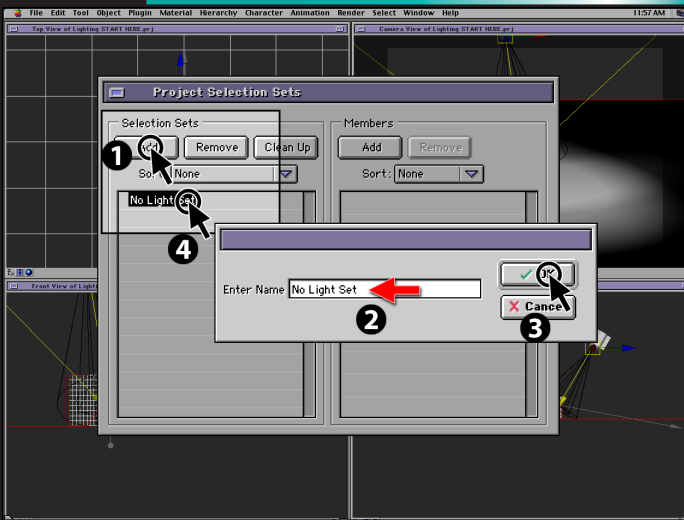




Under the main menu bar, choose **Select > By Set**, then select the **Edit Sets** option.

Note: You could have also selected the **New set** option which would do the same thing that we are about to do.



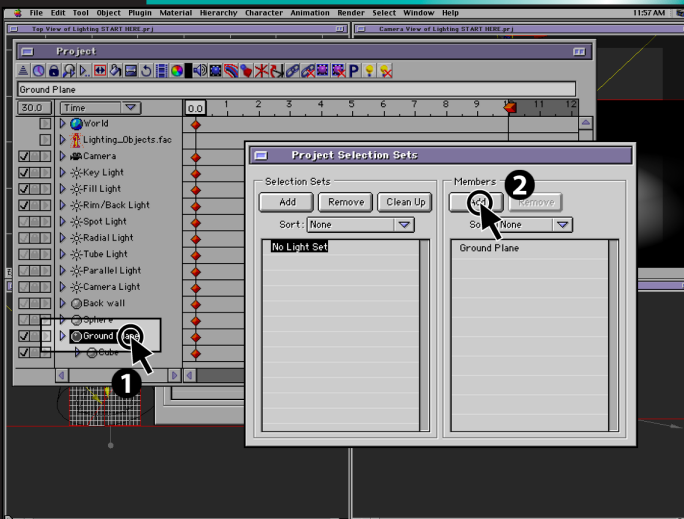


[CLK] on the Add button under the Selection Sets column on the right of the dialog box.

Name this set “No Light Set” and [CLK] OK.

[CLK] on this set to highlight it.



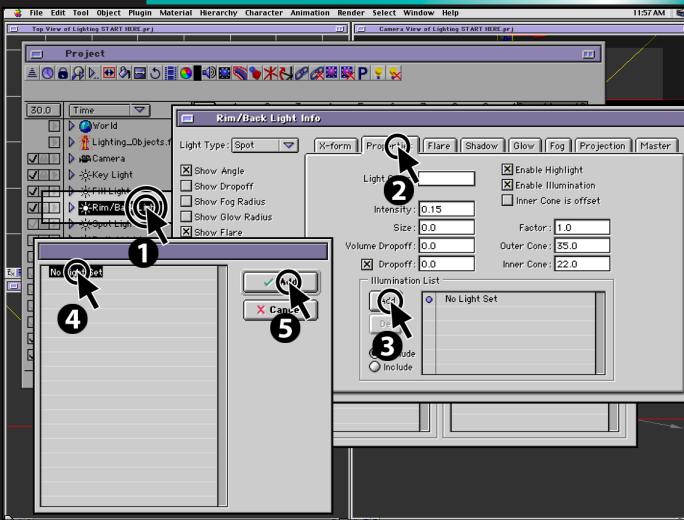


Move the Selection Set window to the side, don't close it, and bring the Project window to the forefront.

Select the Ground Plane object.

Bring the Selection Set window forward. When an object is selected, in the right hand column the Add button under the Members column becomes activated. We can now add this object (and any more if need be) to this set. **[CLK]** the add button to add this object to this set.





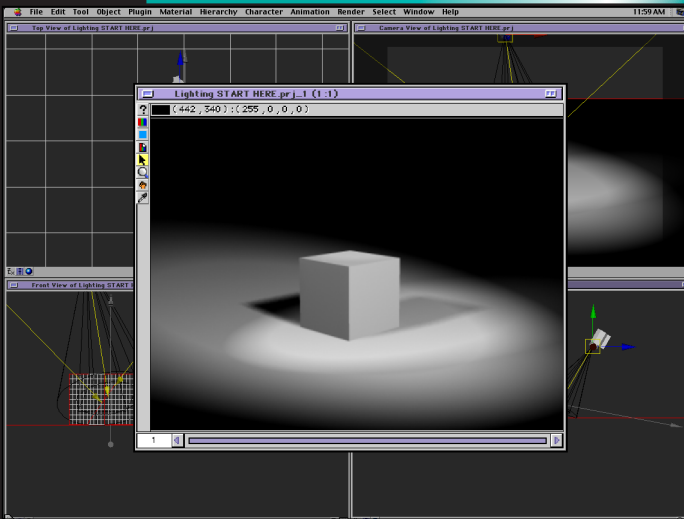
In the Project window, **[DBL+CLK]** on the Rim/Back Light, and **[CLK]** on the Properties tab.

Under the Illumination List (this is where you add Selection Sets) **[CLK]** on the Add button.

Select the "No Light Set" and **[CLK]** OK.

Render out a test render. As you can see, the spill is gone. It is really easy to create Selection sets. The hard part is planning ahead. Over time it is easier to identify what works best, but grouping objects in ways that work best for you is the recommended solution.





There are no hard and fast rules for lighting. The parameters that we have outlined will point you in the right direction, and if you start with a basic lighting set up, you really can't go wrong. But learn from the real world. Look and observe through pictures and images that we see. Step outside and look at how the sunlight, moonlight or artificial light illuminates everything or nothing. Pay attention to shadows. Although we have not really discussed it here, shadows add volume and a sense of belonging to your renderings. Contrast and Composition are the key. The best resources are photography and motion picture books that cover Lighting. Study them and then apply those principles to your work.

