

3D layers

Note: The content in this article applies in general to the Classic 3D renderer. For information on the Ray-traced 3D renderer, see and watch [this video tutorial](#).

3D layers overview and resources

When you make a layer a 3D layer, the layer itself remains flat, but it gains additional properties: Position (z), Anchor Point (z), Scale (z), Orientation, X Rotation, Y Rotation, Z Rotation, and Material Options properties. Material Options properties specify how the layer interacts with light and shadows. Only 3D layers interact with shadows, lights, and cameras.



Individual characters within text layers can optionally be 3D sublayers, each with their own 3D properties. A text layer with Enable Per-character 3D selected behaves just like a

precomposition

that consists of a 3D layer for each character. All camera and light layers have 3D properties.

By default, layers are at a depth (z-axis position) of 0. In After Effects, the origin of the coordinate system is at the upper-left corner; x (width) increases from left to right, y (height) increases from top to bottom, and z (depth) increases from near to far. Some video and 3D applications use a coordinate system that is rotated 180 degrees around the

x axis

; in these systems, y increases from bottom to top, and z increases from far to near.

You can transform a 3D layer relative to the coordinate space of the composition, the coordinate space of the layer, or a custom space by selecting an axis mode.

You can add effects and masks to 3D layers, composite 3D layers with 2D layers, and create and animate camera and light layers to view or illuminate 3D layers from any angle. When rendering for final output, 3D layers are rendered from the perspective of the active camera. (See [Create a camera layer and change camera settings](#).)

All effects are 2D, including effects that simulate 3D distortions. For example, viewing a layer with the Bulge effect from the side does not show a protrusion.

As with all masks, mask coordinates on a 3D layer are in the 2D coordinate space of the layer.

Convert 3D layers

When you convert a layer to 3D, a depth (z) value is added to its Position, Anchor Point, and Scale properties, and the layer gains Orientation, Y Rotation, X Rotation, and Material Options properties. The single Rotation property is renamed Z Rotation.

When you convert a 3D layer back to 2D, the Y Rotation, X Rotation, Orientation, and Material Options properties are removed, including all values, keyframes, and expressions. (These values cannot be restored by converting the layer back to a 3D layer.) The Anchor Point, Position, and Scale properties remain, along with their keyframes and expressions, but their z values are hidden and ignored.

Convert a layer to a 3D layer

Select the 3D Layer switch  for the layer in the Timeline panel, or select the layer and choose Layer > 3D Layer.

Convert a text layer to a 3D layer with per-character 3D properties enabled

Choose Animation > Animate Text > Enable Per-Character 3D, or choose Enable Per-Character 3D from the Animate menu for the layer in the Timeline panel.

Convert a 3D layer to a 2D layer

Deselect the 3D Layer switch for the layer in the Timeline panel, or select the layer and choose Layer > 3D Layer.

Show or hide 3D axes and layer controls

3D axes are color-coded arrows: red for x, green for y, and blue for z.

- To show or hide 3D axes, camera and light wireframe icons, layer handles, and the point of interest, choose View > Show Layer Controls.

 *If the axis that you want to manipulate is difficult to see, try a different setting in the Select View Layout menu at the bottom of the Composition panel.*

- To show or hide a set of persistent 3D reference axes, click the Grid And Guides Options button  at the bottom of the Composition panel, and choose 3D Reference Axes.

Chris and Trish Meyer provide a video tutorial on the [ProVideo Coalition website](#) that demonstrates the use of the 3D axis layer controls.

Move a 3D layer

1 Select the 3D layer that you want to move.

2 Do one of the following:

- In the Composition panel, use the Selection tool  to drag the arrowhead of the 3D axis layer control corresponding to the axis along which you want to move the layer. Shift-drag to move the layer more quickly.
- In the Timeline panel, modify the Position property values.

 *Press P to show Position.*

- To move selected layers so that their anchor points are at the center in the current view, choose Layer > Transform > Center In View or press Ctrl+Home (Windows) or Command+Home (Mac OS).

Rotate or orient a 3D layer

You can turn a 3D layer by changing its Orientation or Rotation values. In both cases, the layer turns around its anchor point. The Orientation and Rotation properties differ in how the layer moves when you animate them.

When you animate the Orientation property of a 3D layer, the layer turns as directly as possible to reach the specified orientation. When you animate any of the X, Y, or Z Rotation properties, the layer rotates along each individual axis according to the individual property values. In other words, Orientation values specify an angular destination, whereas Rotation values specify an angular route. Animate Rotation properties to make a layer turn multiple times.

Animating the Orientation property is often better for natural, smooth motion, whereas animating the Rotation properties provides more precise control.

Rotate or orient a 3D layer in the Composition panel

- 1 Select the 3D layer that you want to turn.
- 2 Select the Rotation tool , and choose Orientation or Rotation from the Set menu to determine whether the tool affects Orientation or Rotation properties.
- 3 In the Composition panel, do one of the following:
 - Drag the arrowhead of the 3D axis layer control corresponding to the axis around which you want to turn the layer.
 - Drag a layer handle. Dragging a corner handle turns the layer around the z axis; dragging a left or right center handle turns the layer around the y axis; dragging a top or bottom handle turns the layer around the x axis.
 - Drag the layer.

 *Shift-drag to constrain your manipulations to 45-degree increments.*

Rotate or orient a 3D layer in the Timeline panel

- 1 Select the 3D layer that you want to turn.
- 2 In the Timeline panel, modify the Rotation or Orientation property values.

 *Press R to show Rotation and Orientation properties.*

Online resources about rotating and orienting 3D layers

Donat Van Bellinghen provides some expressions on the [AE Enhancers forum](#) for placing and orienting a 3D layer in the plane defined by three points.

Axis modes

Axis modes specify on which set of axes a 3D layer is transformed. Choose a mode in the Tools panel.

Local Axis mode  Aligns the axes to the surface of a 3D layer.

World Axis mode  Aligns the axes to the absolute coordinates of the composition. Regardless of the rotations you perform on a layer, the axes always represent 3D space relative to the 3D world.

View Axis mode  Aligns the axes to the view you have selected. For example, suppose that a layer has been rotated and the view changed to a custom view; any subsequent transformation made to that layer while in View Axis mode happens along the axes corresponding to the direction from which you are looking at the layer.

Differences between the axis modes are only relevant when you have a 3D camera in a composition.

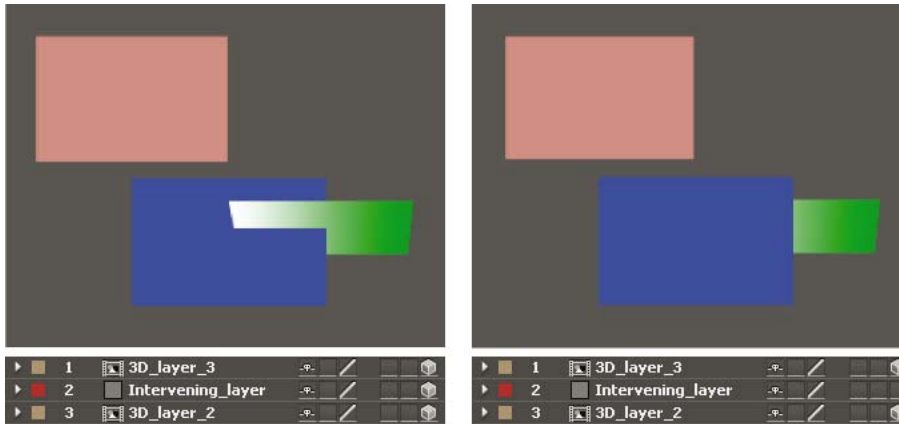
Note: The Camera tools always adjust along the local axes of the view, so the action of the Camera tools is not affected by the axis modes.

Angie Taylor explains [3D axis modes](#) in this tutorial.

3D layer interactions, render order, and collapsed transformations

The positions of certain kinds of layers in the layer stacking order in the Timeline panel prevent groups of 3D layers from being processed together to determine intersections and shadows.

A shadow cast by a 3D layer does not affect a 2D layer or any layer that is on the other side of the 2D layer in the layer stacking order. Similarly, a 3D layer does not intersect with a 2D layer or any layer that is on the other side of the 2D layer in the layer stacking order. No such restriction exists for lights.



Just like 2D layers, other types of layers also prevent 3D layers on either side from intersecting or casting shadows on one another:

- An adjustment layer
- A 3D layer with a layer style applied
- A 3D precomposition layer to which an effect, closed mask (with mask mode other than None), or track matte has been applied
- A 3D precomposition layer without collapsed transformations

A precomposition with collapsed transformations (Collapse Transformations switch  selected) does not interfere with the interaction of 3D layers on either side—as long as all of the layers in the precomposition are themselves 3D layers. Collapsing transformations exposes the 3D properties of the layers that compose the precomposition. Essentially, collapsing transformations in this case allows each 3D layer to be composited into the main composition individually, rather than creating a single 2D composite for the precomposition layer and compositing that into the main composition. The tradeoff is that this setting removes your ability to specify certain layer settings for the precomposition as a whole—such as blending mode, quality, and motion blur.

Shadows cast by continuously rasterized 3D layers (including text layers) are not affected by effects applied to that layer. If you want the shadow to show the results of the effect, then precompose the layer with the effect.



To ensure that the shadow remains where expected on a 3D layer with a track matte, precompose the 3D layer and the track matte layer together (but don't collapse transformations), and then apply the shadow to the precomposition.

Effects on continuously rasterized vector layers with 3D properties are rendered in 2D and then projected onto the 3D layer. This projection does not occur for compositions with collapsed transformations.

More Help topics[Per-character 3D text properties](#)[Importing and using 3D files from other applications](#)[3D layers](#)[Cameras, lights, and points of interest](#)[Layer 3D attributes and methods \(expression reference\)](#)[Layer switches and columns in the Timeline panel](#)[Show or hide layer controls in the Composition panel](#)[Selecting and arranging layers](#)[Layer properties](#)[Coordinate systems: composition space and layer space](#)[Render order and collapsing transformations](#)[Precompose layers](#)[Continuously rasterize a layer containing vector graphics](#)[Preparing and importing Photoshop files](#)[Effects with a Comp Camera attribute](#)

Cameras, lights, and points of interest

Create a camera layer and change camera settings

You can view 3D layers from any angle and distance using camera layers. Just as it's easier in the real world to move cameras through and around a scene than it is to move and rotate the scene itself, it's often easiest to get different views of a composition by setting up a camera layer and moving it around in a composition.

You can modify and animate camera settings to configure the camera to match the real camera and settings that were used to record footage with which you're compositing. You can also use camera settings to add camera-like behaviors—from depth-of-field blur to pans and dolly shots—to synthetic effects and animations.

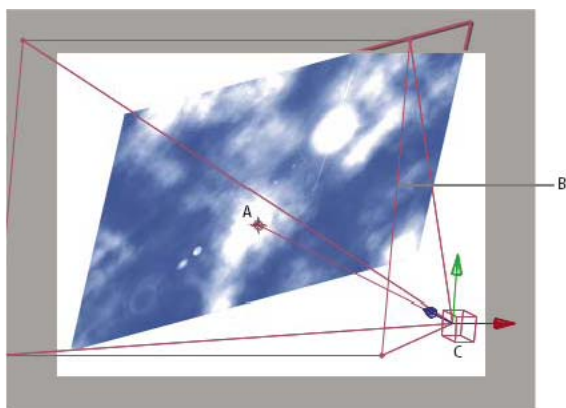
Cameras affect only 3D layers and 2D layers with an effect with a Comp Camera attribute. With effects that have a Comp Camera attribute, you can use the active composition camera or lights to view or light an effect from various angles to simulate more sophisticated 3D effects.

You can choose to view a composition through the active camera or through a named custom camera. The active camera is the topmost camera in the Timeline panel at the current time for which the Video switch  is selected. The active camera view is the point of view used for creating final output and nesting compositions. If you have not created a custom camera, then the active camera is the same as the default composition view.

All cameras are listed in the 3D View menu at the bottom of the Composition panel, where you can access them at any time.

Layers and properties

It's often easiest to adjust a camera when using one of the custom 3D views. You can't—of course—see the camera to manipulate it when you're looking through the camera itself.



A Point of interest B Frame C Camera

Create a camera layer

Choose Layer > New > Camera, or press Ctrl+Alt+Shift+C (Windows) or Command+Option+Shift+C (Mac OS).

Note: By default, new layers begin at the beginning of the composition duration. You can instead choose to have new layers begin at the current time by deselecting the Create Layers At Composition Start Time preference (Edit > Preferences > General (Windows) or After Effects > Preferences > General (Mac OS)).

Change camera settings

You can change camera settings at any time.

Double-click the camera layer in the Timeline panel, or select the layer and then choose Layer > Camera Settings.

Note: By default, the Preview option in the Camera Settings dialog box is selected. This option shows the changes in the composition as you make them in the Camera Settings dialog box.

Camera settings

You can change camera settings at any time by double-clicking the layer in the Timeline panel or selecting the layer and choosing Layer > Camera Settings.



Select Preview in the Camera Settings dialog box to show results in the Composition panel as you modify settings in the dialog box.

Note: The three things that affect depth of field are focal length, aperture, and focus distance. Shallow (small) depth of field is a result of long focal length, short focus distance, and a larger aperture (smaller F-stop). A shallower depth of field means a larger depth-of-field blur result. The opposite of a shallow depth of field is deep focus—meaning a smaller depth-of-field blur because more is in focus.

Camera properties relating to camera lens blur and shape include Iris Shape, Iris Rotation, Iris Roundness, Iris Aspect Ratio, Iris Diffraction Fringe, Highlight Gain, Highlight Threshold, and Highlight Saturation.

Type One-Node Camera or Two-Node Camera. A one-node camera orients around itself, whereas a two-node camera has a point of interest and orients around that point. Making a camera a two-node camera is the same as setting a camera's auto-orientation option (Layer > Transform > Auto-Orient) to Orient Towards Point Of Interest. (See [Auto-Orientation options](#).)

Name The name of the camera. By default, Camera 1 is the name of first camera that you create in a composition, and all subsequent cameras are numbered in ascending order. You should choose distinctive names for multiple cameras to make it easier to distinguish them.

Preset The type of camera settings you want to use. The presets are named according to focal lengths. Each preset is meant to represent the behavior of a 35mm camera with a lens of a certain focal length. Therefore, the preset also sets the Angle Of View, Zoom, Focus Distance, Focal Length, and Aperture values. The default preset is 50mm. You can also create a custom camera by specifying new values for any of the settings.

Zoom The distance from the lens to the image plane. In other words, a layer that is the Zoom distance away appears at its full size, a layer that is twice the Zoom distance away appears half as tall and wide, and so on.

Angle Of View The width of the scene captured in the image. The Focal Length, Film Size, and Zoom values determine the angle of view. A wider angle of view creates the same result as a wide-angle lens.

Depth Of Field Applies custom variables to the Focus Distance, Aperture, F-Stop, and Blur Level settings. Using these variables, you can manipulate the depth of field to create more realistic camera-focusing effects. (The depth of field is the distance range within which the image is in focus. Images outside the distance range are blurred.)

Focus Distance The distance from the camera to the plane that is in perfect focus.



Add this expression to the Focus Distance property to lock the focal plane to the camera's point of interest so that the point of interest is in focus: `length(position, pointOfInterest)`

Lock To Zoom Makes the Focus Distance value match the Zoom value.

Note: If you change the settings of the Zoom or Focus Distance options in the Timeline panel, the Focus Distance value becomes unlocked from the Zoom value. If you need to change the values and want the values to remain locked, then use the Camera Settings dialog box instead of the Timeline panel. Alternatively, you can add an expression to the Focus Distance property in the Timeline panel: Select the Focus Distance property, and choose Animation > Add Expression; then drag the expression pick whip to the Zoom property. (See [Expression basics](#).)

Aperture The size of the lens opening. The Aperture setting also affects the depth of field—increasing the aperture increases the depth of field blur. When you modify Aperture, the values for F-Stop change to match it.

Note: In a real camera, increasing the aperture also allows in more light, which affects exposure. Like most 3D compositing and animation applications, After Effects ignores this result of the change in aperture values

F-Stop Represents the ratio of the focal length to aperture. Most cameras specify aperture size using the f-stop measurement; thus, many photographers prefer to set the aperture size in f-stop units. When you modify F-Stop, Aperture changes to match it.

Blur Level The amount of depth-of-field blur in an image. A setting of 100% creates a natural blur as dictated by the camera settings. Lower values reduce the blur.

Film Size The size of the exposed area of film, which is directly related to the composition size. When you modify Film Size, the Zoom value changes to match the perspective of a real camera.

Focal Length The distance from the film plane to the camera lens. In After Effects, the position of the camera represents the center of the lens. When you modify Focal Length, the Zoom value changes to match the perspective of a real camera. In addition, the Preset, Angle Of View, and Aperture values change accordingly.

Units The units of measurement in which the camera setting values are expressed.

Measure Film Size The dimensions used to depict the film size.

Note: For best results, work in 32-bpc with Linearize Working Space selected in the project settings.

Camera Commands

After Effects has camera commands that can be used separately or with the Create Stereo 3D Rig function. To use the camera commands, select a camera layer, and then choose Layer > Camera.

Link Focus Distance to Point of Interest Creates an expression on the selected camera layer's Focus Distance property, setting the property's value to the distance between the camera and its point of interest.

Link Focus Distance to Layer Creates an expression on the selected camera layer's Focus Distance property to be the distance between the camera's position and another layer. This method allows the focus to follow the other layer automatically.

Set Focus Distance to Layer Sets the value of the Focus Distance property at the current time to the distance at the current time between the camera and the selected layer.

Online resources about cameras

For a video tutorial that shows how to create and modify a camera and use the Camera tools, see the [Adobe website](#).

Dale Bradshaw provides a script and sample project for automating the rigging of a camera on the [Creative Workflow Hacks website](#).

Mark Christiansen provides tips and detailed techniques for working with cameras in the “Virtual Cinematography in After Effects” chapter of [After Effects Studio Techniques](#) on the Peachpit Press website. This chapter includes information about matching lens distortion, performing camera moves, performing camera projection (camera mapping), using rack focus, creating boke blur, using grain, and choosing a frame rate to match your story-telling.

Trish and Chris Meyer provide a tutorial for using 3D layers, lights, and cameras in a PDF excerpt from their book *After Effects Apprentice* on the [Focal Press website](#).

Richard Harrington provides a video tutorial on the [Creative COW website](#) that shows how to use the Camera tools and camera views in After Effects to create a camera move with 3D layers. (This tutorial is the second in a two-part series. [Part 1](#) concentrates on working with photographs to isolate and create sky in Photoshop for use in After Effects.)

Andrew Kramer provides a two-part video tutorial on his Video Copilot website that demonstrates basic camera mapping and camera projection. In this tutorial, he shows how to project an image onto 3D layers using lights and light transmission properties.

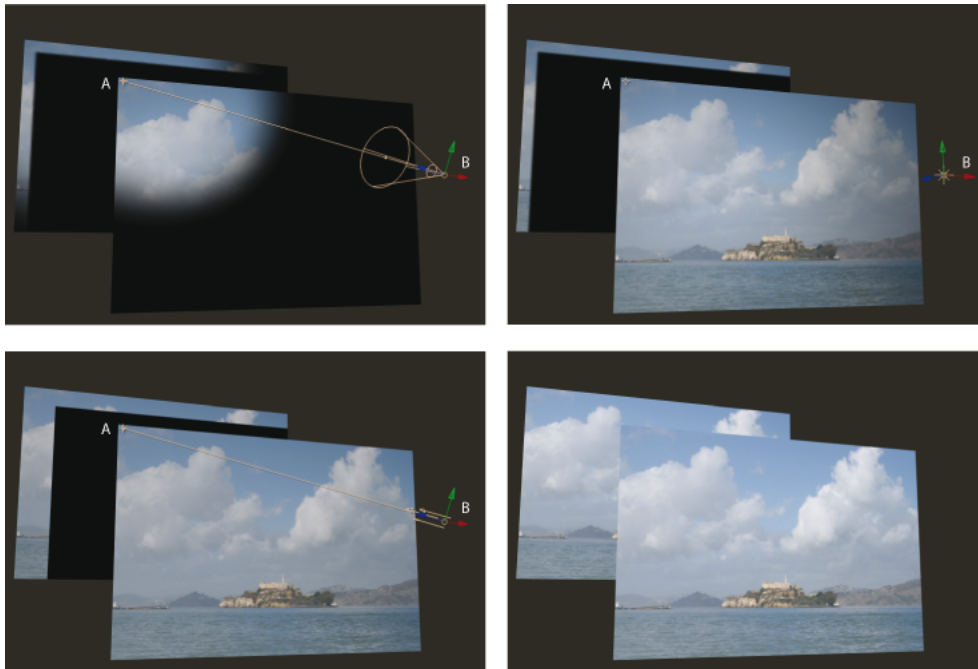
- [part 1](#)
- [part 2](#)

Create a light and change light settings

A *light* layer can affect the colors of the 3D layers that it shines on, depending on the light's settings and the Material Options properties of the 3D layers. Each light, by default, points to its *point of interest*.

Lights can be used to illuminate 3D layers and to cast shadows. You can use lights to match lighting conditions of the scene into which you are compositing or to create more interesting visual results. For example, you can use light layers to create the appearance of light streaming through a video layer as if it were made of stained glass.

You can animate all of the settings for a light, except for the light type and the Casts Shadows property.



A Point of interest B Light icon

You can specify which 3D layers a light affects by designating the light as an adjustment layer: place the light in the Timeline panel above the layers on which you want it to shine. Layers that are above a light adjustment layer in the layer stacking order in the Timeline panel do not receive the light, regardless of the positions of the layers in the Composition panel.

Create a light

Choose Layer > New > Light, or press Ctrl+Alt+Shift+L (Windows) or Command+Option+Shift+L (Mac OS).

Note: By default, new layers begin at the beginning of the composition duration. You can instead choose to have new layers begin at the current time by deselecting the *Create Layers At Composition Start Time* preference (Edit > Preferences > General (Windows) or After Effects > Preferences > General (Mac OS)).

Change light settings

Double-click a light layer in the Timeline panel or select the layer and choose Layer > Light Settings.

 Select *Preview* in the *Light Settings* dialog box to show results in the Composition panel as you modify settings in the dialog box.

Light settings

Light Type Parallel emits directional, unconstrained light from an infinitely distant source, approximating the light from a source like the Sun. Spot emits light from a source that is constrained by a cone, like a flashlight or a spotlight used in stage productions. Point emits unconstrained omnidirectional light, like the rays from a bare light bulb. Ambient creates light that has no source but rather contributes to the overall brightness of a scene and casts no shadows.

Note: Because the position in space of an Ambient light does not affect its influence on other layers, an Ambient light does not have an icon in the Composition panel.

Intensity The brightness of the light. Negative values create nonlight. Nonlight subtracts color from a layer. For example, if a layer is already lit, creating a directional light with negative values also pointing at that layer darkens an area on the layer.

Color The color of the light.

Cone Angle The angle of the cone surrounding the source of a light, which determines the width of the beam at a distance. This control is active only if Spot is selected for Light Type. The cone angle of a Spot light is indicated by the shape of the light icon in the Composition panel.

Note: In After Effects CS6 or later, a selected spot light's cone can be extended to the point of interest.

Cone Feather The edge softness of a spotlight. This control is active only if Spot is selected for Light Type.

Falloff The type of falloff for a parallel, spot, or point light. Falloff describes how a light's intensity is lessened over distance.

For details, tutorials, and resources about light falloff, see [this article on the Adobe website](#).

Falloff types include the following:

None Illumination does not decrease as the distance between the layer and the light increases.

Smooth Indicates a smooth linear falloff starting at the Falloff Start radius and extending the length specified by Falloff Distance.

Inverse Square Clamped Indicates a physically accurate falloff starting at the Falloff Start radius and decreasing proportionally to the inverse square of the distance away.

Radius Specifies the radius of falloff from a light. Inside this distance, the light is a constant light. Outside this distance, the light falls off.

Falloff Distance Specifies the distance a light falls off from a light.

Casts Shadows Specifies whether the light source causes a layer to cast a shadow. The Accepts Shadows material option must be On for a layer to receive a shadow; this setting is the default. The Casts Shadows material option must be On for a layer to cast shadows; this setting is not the default.



Press **Alt+Shift+C** (Windows) or **Option+Shift+C** (Mac OS) to toggle Casts Shadows for selected layers. Press **AA** to show Material Options properties in the Timeline panel.

Shadow Darkness Sets the darkness of the shadow. This control is active only if Cast Shadows is selected.

Shadow Diffusion Sets the softness of a shadow based on its apparent distance from the shadowing layer. Larger values create softer shadows. This control is active only if Casts Shadows is selected.

Online resources about lights

Eran Stern provides a video tutorial on the [Creative COW website](#) that demonstrates the use of lights as adjustment layers, to precisely control which layers are affected by which lights.

Chris and Trish Meyer provide tips about shadows and lights in 3D in an article on the [ProVideo Coalition website](#).

Trish and Chris Meyer provide a tutorial for using 3D layers, lights, and cameras in a PDF excerpt from their book After Effects Apprentice on the [Focal Press website](#).

Chris and Trish Meyer provide a tutorial on the [Artbeats website](#) that demonstrates how to use lights and 3D layers to project a video onto other layers, such as onto a wall.

Adjust a 3D view or move a camera, light, or point of interest

Camera layers and light layers each include a Point Of Interest property, which specifies the point in the composition at which the camera or light points. By default, the point of interest is at the center of the composition. You can move the point of interest at any time.

A one-node camera ignores the point of interest. (See [Camera settings](#).)

To make a light ignore its point of interest, select an option other than Orient Towards Point Of Interest in the light's Auto-Orientation options. (See [Auto-Orientation options](#).)

Note: As with all properties, you can also modify a camera or light's properties directly in the Timeline panel.

Move a camera, light, or point of interest with the Selection and Rotation tools

- 1 Select a camera or light layer.
- 2 Using the Selection or Rotation tool, do one of the following:
 - To move the camera or light and its point of interest, position the pointer over the axis you want to adjust, and drag.
 - To move the camera or light along a single axis without moving the point of interest, Ctrl-drag (Windows) or Command-drag (Mac OS) the axis.
 - To move the camera or light freely without moving the point of interest, drag the camera icon  or light icon .
 - To move the point of interest, drag the point of interest icon .

Move or adjust a camera or working 3D view with the Camera tools

You can adjust the Position and Point Of Interest properties of a camera layer by using the Camera tools in the Composition panel.

You can also use the Camera tools to adjust a *working 3D view*, a 3D view that is not associated with a camera layer. You can think of 3D views as being virtual cameras through which you can view and preview a composition. The working 3D views include the custom views and the fixed orthographic views (Front, Left, Top, Back, Right, or Bottom). The working 3D views are useful for placing and previewing elements in a 3D scene. If you use a Camera tool to adjust a working 3D view, no layer property values are affected.

After you've modified a 3D view, you can reset it by choosing View > Reset 3D View.

You can't use the Orbit Camera tool on the fixed orthographic views.

For information on choosing and using 3D views, see [Choose a 3D view](#).

- 1 In the 3D View menu at the bottom of the Composition panel, choose the camera or 3D view to adjust.
- 2 Activate a Camera tool.

You can activate a Camera tool by selecting it in the Tools panel or pressing C to cycle through the Camera tools. The easiest way to switch between the various Camera tools is to select the Unified Camera  tool and use the buttons on a three-button mouse.

Orbit Camera Rotates the 3D view or camera by moving around the point of interest. (To temporarily activate the Orbit Camera tool when the Unified Camera Tool is selected, hold the left mouse button.)



Shift-dragging with the Unified Camera tool selected temporarily activates the Orbit Camera tool and constrains rotation to one axis.

Track XY Camera Adjusts the 3D view or camera horizontally or vertically. (To temporarily activate the Track XY Camera tool when the Unified Camera Tool is selected, hold the middle mouse button.)

Track Z Camera Adjusts the 3D view or camera along the line to the point of interest. If you are using an orthographic view, this tool adjusts the scale of the view. (To temporarily activate the Track Z Camera tool when the Unified Camera Tool is selected, hold the right mouse button.)

- 3 Drag in the Composition panel. You can continue a drag operation outside the panel after you've begun dragging within the panel.

After you've modified a 3D view, you can reset it by choosing View > Reset 3D View.

Move or adjust a camera or working 3D view to look at layers

You can also move a camera or adjust a 3D view to look at selected layers or all layers. After Effects changes the point of view and direction of view to include the layers that you have selected.

- To adjust a 3D view or move a camera to look at selected layers, choose View > Look At Selected Layers.
- To adjust a 3D view or move a camera to look at all layers, choose View > Look At All Layers.

For keyboard shortcuts for these commands, see [3D layers](#).

Tips and online resources for moving and animating cameras and lights

Before moving a camera, choose a view other than Active Camera. If you use Active Camera view, you are looking through the camera, which makes it harder to manage.

By default, a camera's wireframe is only visible when the camera is selected. To always show the camera wireframe, set the view options for the Composition panel (View > View Options). (See [Show or hide layer controls in the Composition panel](#).)

When working with a camera or light layer, create a null object layer and use an expression to link the Point Of Interest property of the camera or light to the Position property of the null layer. Then, you can animate the Point Of Interest property by moving the null object. It is often easier to select and see a null object than it is to select and see the point of interest.

In After Effects, there is a camera command, "Create Orbit Null." This parents the selected camera layer to a new null layer. The new null layer is renamed, based on the camera's name appended with Orbit Null

Trish and Chris Meyer show you how to use the Create Orbit Null camera command [in this video tutorial](#) on Adobe TV.

For a video tutorial that shows how to create and modify a camera and use the Camera tools, see the [Adobe website](#).

Trish and Chris Meyer provide a video tutorial on the [ProVideo Coalition website](#) that demonstrates the use of the Camera tools to adjust cameras and 3D views.

Trish and Chris Meyer provide a tutorial for using 3D layers, lights, and cameras in a PDF excerpt from their book After Effects Apprentice on the [Focal Press website](#).

Mark Christiansen provides tips and detailed techniques for working with cameras in the "Virtual Cinematography in After Effects" chapter of [After Effects Studio Techniques](#) on the Peachpit Press website. This chapter includes information about matching lens distortion, performing camera moves, performing camera projection (camera mapping), using rack focus, creating boke blur, using grain, and choosing a frame rate to match your story-telling.

Richard Harrington provides a video tutorial on the [Creative COW website](#) that shows how to use the Camera tools and camera views in After Effects to create a camera move with 3D layers. (This tutorial is the second in a two-part series. [Part 1](#) concentrates on working with photographs to isolate and create sky in Photoshop for use in After Effects.)

Rich Young provides a set of expressions on his [AE Portal website](#) that use the toWorld method link a camera and light to a layer with the CC Sphere effect.

Andrew Devis of Creative Cow has created a 3 tutorial series on Animating a Camera:

- [Animating a Camera 1: Camera Difficulties](#)
- [Animating a Camera 2: Simple Rig](#)
- [Animating a Camera 3: Controllers & Point of View](#)

[This video from video2brain](#) demonstrates the command to create a new camera orbit null.

Material Options properties

3D layers have Material Options properties, which determine how a 3D layer interacts with light and shadow.

Casts Shadows Specifies whether a layer casts shadows on other layers. The direction and angle of the shadows are determined by the direction and angle of the light sources. Set Casts Shadows to Only if you want the layer to be invisible but still cast a shadow.



Use the Only setting and a nonzero Light Transmission setting to project the colors of an invisible layer onto another layer. Steve Holmes provides a video tutorial on the [Artbeats website](#) in which he demonstrates how to use layers with Cast Shadows set to Only to cast shadows of specific shapes within a 3D scene.

Light Transmission The percentage of light that shines through the layer, casting the colors of the layer on other layers as a shadow. 0% specifies that no light passes through the layer, casting a black shadow. 100% specifies that the full values of the colors of the shadow-casting layer are projected onto the layer accepting the shadow.



Use partial light transmission to create the appearance of light passing through a stained glass window.

Accepts Shadows Specifies whether the layer shows shadows cast on it by other layers. There is an “Only” option in the Accepts Shadows for when you want to render only a shadow on a layer.

Accepts Lights Specifies whether the color of a layer is affected by light that reaches it. This setting does not affect shadows.

Ambient Ambient (nondirectional) reflectivity of the layer. 100% specifies the most reflectivity; 0% specifies no ambient reflectivity.

Diffuse Diffuse (omnidirectional) reflectivity of the layer. Applying diffuse reflectivity to a layer is like draping a dull, plastic sheet over it. Light that falls on this layer reflects equally in all directions. 100% specifies the most reflectivity; 0% specifies no diffuse reflectivity.

Specular Specular (directional) reflectivity of the layer. Specular light reflects from the layer as if from a mirror. 100% specifies the most reflectivity; 0% specifies no specular reflectivity.

Shininess Determines the size of the specular highlight. This value is active only if the Specular setting is greater than zero. 100% specifies a reflection with a small specular highlight. 0% specifies a reflection with a large specular highlight.

Metal The contribution of the layer color to the color of the specular highlight. 100% specifies that the highlight color is the color of the layer. For example, with a Metal value of 100%, an image of a gold ring reflects golden light. 0% specifies that the color of the specular highlight is the color of the light source. For example, a layer with a Metal value of 0% under a white light has a white highlight.