

# ADOBE® AFTER EFFECTS®

Help and tutorials

Color

# Color basics

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Charles Poynton provides an excellent set of resources on [his website](#) regarding color technology and color terminology.

## Color depth and high dynamic range color

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Color depth (or bit depth) is the number of bits per channel (bpc) used to represent the color of a pixel. The more bits for each RGB channel (red, green, and blue), the more colors each pixel can represent.

In After Effects, you can work in 8-bpc, 16-bpc, or 32-bpc color.

In addition to color bit depth, a separate characteristic of the numbers used to represent pixel values is whether the numbers are integers or floating-point numbers. Floating-point numbers can represent a much larger range of numbers with the same number of bits. In After Effects, 32-bpc pixel values are floating-point values.

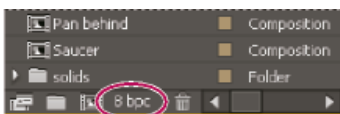
8-bpc pixels can have values for each color channel from 0 (black) to 255 (pure, saturated color). 16-bpc pixels can have values for each color channel from 0 (black) to 32,768 (pure, saturated color). If all three color channels have the maximum, pure-color value, the result is white. 32-bpc pixels can have values under 0.0 and values over 1.0 (pure, saturated color), so 32-bpc color in After Effects is also high dynamic range (HDR) color. HDR values can be much brighter than white.

## Setting the color depth and modifying color display settings

The color depth setting for a project determines the bit depth for color values throughout a project.

To set the color depth for a project, do one of the following:

- Alt-click (Windows) or Option-click (Mac OS) the Project Settings button in the Project panel.
- Choose File > Project Settings or click the Project Settings button in the Project panel, and choose a color depth from the Depth menu.



*Project Settings button in the Project panel*

You can specify a color depth for each render item, which overrides the project color depth when rendering for final output. You can also specify the color depth to use for each output item in the output module settings. (See [Render settings and Output modules and output module settings](#).)

 *To change the format in which color values are shown in the Info panel and in some effect controls, choose an option such as Percent or Web from the Info panel menu. Choosing Auto Color Display automatically switches between 8 bpc, 16 bpc, and 32 bpc, depending on the color depth of the project.*

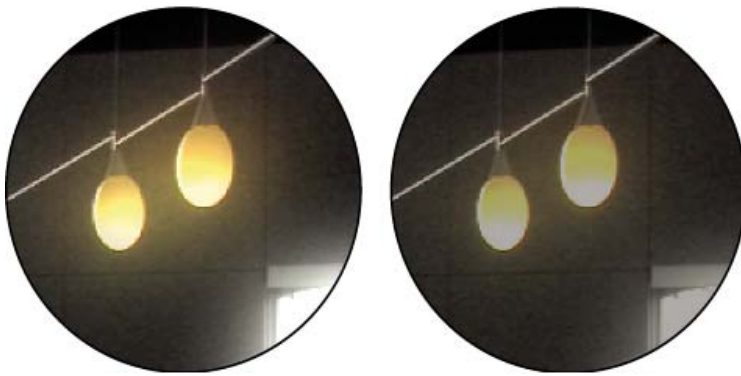
Though many effects can work with all color depths, some effects work only with lower color depths. You can set the Effects & Presets panel to only show effects that work with your current project color depth. (See [Effects and Presets panel](#).)

[This video](#) from the *After Effects CS5: Learn By Video* series provides an introduction to color channels and color bit depth, and it shows how choosing the right color bit depth can often eliminate banding in gradients.

## Comparative advantages of each color depth

The dynamic range (ratio between dark and bright regions) in the physical world far exceeds the range of human vision and of images that are printed on paper or displayed on a monitor. Low dynamic range 8-bpc and 16-bpc color values can represent RGB levels only from black to white, which is only a small segment of the dynamic range in the real world.

High dynamic range (HDR), 32-bpc floating-point color values can represent brightness levels much greater than white, including objects as bright as a flame or the Sun.



*Glow effect and Gaussian Blur effect applied to image in 32-bpc project (left) and 16-bpc project (right)*

Set the project color depth to 32 bpc to work with HDR footage or to work with over-range values—values above 1.0 (white) that aren't supported in 8- or 16-bpc mode. Over-range values preserve the intensity of highlights, which is as useful for synthetic effects such as lights, blurs, and glows as it is for working with HDR footage. The headroom provided by working in 32 bpc prevents many kinds of data loss during operations such as color correction and color profile conversion.

Even if you're using 8-bpc footage and are creating movies in 8-bpc formats, you can obtain better results by having the project color depth set to 16 bpc or 32 bpc. Working in a higher bit depth provides higher precision for calculations and greatly reduces quantization artifacts, such as banding in gradients.

**Note:** Merely increasing the color depth within a project won't eliminate gradients if the output format has a low bit depth. To mitigate banding, After Effects introduces dithering of colors when the colors are converted to 8-bpc colors, including when rendering and exporting to an 8-bpc format. This dithering is not introduced for previews. To force dithering for previews, apply an 8-bpc effect that does nothing—such as the Arithmetic effect with the default values—to an adjustment layer.

Because 16-bpc frames use half the memory of 32-bpc frames, rendering previews in a 16-bpc project is faster, and RAM previews can be longer than in a 32-bpc project. 8-bpc frames use even less memory, but the tradeoff between quality and performance can be obvious in some images at a project color depth of 8 bpc.

### Special considerations for working with high dynamic range color

You can use the HDR Compander effect to compress the dynamic range of a layer with an HDR footage item as its source. In this way, you can use tools that don't support HDR color, such as 8-bpc and 16-bit effects. When you're done, use the HDR Compander to undo the dynamic range compression. The HDR Highlight Compression effect lets you compress the highlight values in an HDR image so that they fall within the value range of a low dynamic range image.

Because we can see only a subset of the luminance values in a real-world scene in an HDR image on a monitor, it is sometimes necessary to adjust the exposure—the amount of light captured in an image—when working with an HDR image. Adjusting the exposure of an HDR image is like adjusting the exposure when photographing a scene in the real world, allowing you to bring detail out of very dark areas or very bright areas. You can use the Exposure effect to change the color values of a layer for final output, or you can just adjust the exposure in a specific viewer for preview purposes.

**Important:** Because some operations—including glows, blurs, and some blending modes—behave differently in 32-bpc mode as compared with 8-bpc or 16-bpc mode, your composition may look significantly different when you switch between high dynamic range and low dynamic range project settings.

### Additional resources about high dynamic range color

Jonas Hummelstrand provides a collection of resources for understanding and using HDR color in After Effects on his [General Specialist website](#).

Chris Meyer explains what floating-point, 32-bpc, HDR color is good for in a video overview on the [Lynda.com website](#).

Kert Gartner provides some visual examples and a brief explanation on his [VFX Haiku website](#) that demonstrate the benefits of working with 32-bpc color.

Andrew Kramer provides a video tutorial on his [Video Copilot website](#) in which he demonstrates the advantages of using 32-bpc color with motion blur.

On his [fnord website](#), Brendan Bolles explains how to use the Color Profile Converter effect and film color profiles to adjust colors and perform tone mapping to make an HDR image appear as if it were shot on motion picture film.

## Select a color or edit a gradient

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In many contexts, you can click an eyedropper button  to activate the eyedropper tool, or you can click a color swatch to open a color picker. If you use the Adobe Color Picker, you can also activate the eyedropper from the Adobe Color Picker dialog box.

If you click a gradient swatch for a stroke or fill in a shape layer, or click Edit Gradient in the Timeline panel, the Adobe Color Picker opens as the Gradient Editor, with additional controls for editing gradients included at the top of the dialog box.

Andrew Devis shows how to modify gradient fills and strokes for shape layers, plus other options, in a video on the [Creative COW website](#).

**Note:** The `sampleImage` expression method is another way to sample color values. Use this method to use color values of specific pixels as input into an expression. (See *Layer General attributes and methods (expression reference)*.)



A. Opacity stop B. Color stop C. Opacity midpoint D. Eyedropper E. New-color rectangle F. Original-color rectangle

## Choose a color picker

❖ Choose **Edit > Preferences > General (Windows)** or **After Effects > Preferences > General (Mac OS)**, and do one of the following:

- To use the color picker provided by the operating system, select **Use System Color Picker**.
- To use the Adobe Color Picker, deselect **Use System Color Picker**.

💡 Jeff Almasol provides the *PickerSwitcher* script on his [redefinery website](#), which toggles the *Use System Color Picker* setting. Use this script when you prefer to use the Adobe Color Picker for certain tasks, but the operating system color picker for others, and want a quick way to change this setting. This script works especially well in conjunction with the *LaunchPad* panel, with which running the *PickerSwitcher* script is as easy as clicking a button. To download the *LaunchPad* script, go to the [After Effects Exchange](#) on the Adobe website.

## Select a color with the eyedropper tool

1. Click the eyedropper button, and move the pointer to the pixel that you want to sample. The color swatch next to the eyedropper button dynamically changes to the color under the eyedropper.
2. Do one of the following:
  - To select the color of a single pixel, click the pixel.
  - To sample the color average of a 5-pixel-by-5-pixel area, **Ctrl-click** (Windows) or **Command-click** (Mac OS) the area.

**Note:** When sampling from within the composition frame of the *Composition* panel, the eyedropper by default ignores the composition background color and samples only straight color channels. To sample color channels premultiplied with the composition background color, press **Shift** as you click with the eyedropper. Shift-clicking with the eyedropper samples colors as they appear in the composition frame in the *Composition* panel.

You can use the *Sampler Sizer Radio* script from the [Leapfrog Productions website](#) to change the area sampled by the eyedropper tool.

💡 Press the **Escape** key to deactivate the eyedropper.

## Select a color with the Adobe Color Picker

1. Click a color swatch to display the Adobe Color Picker.
2. (Optional) To prevent panels from updating with the results of your color selection until you accept the color by clicking **OK**, deselect **Preview** in the Color Picker dialog box. The **Preview** option is not available in all contexts.

**Note:** Selecting **Preview** is convenient for seeing the results of your color selections before you commit them, but it can also decrease performance, as new images are rendered for the preview in the *Composition* panel or *Layer* panel.

3. Select the component you want to use to display the color spectrum:

**H** Displays all hues in the color slider. Selecting a hue in the color slider displays the saturation and brightness range of the selected hue in the color spectrum, with the saturation increasing from left to right and brightness increasing from bottom to top.

**S** Displays all hues in the color spectrum with their maximum brightness at the top of the color spectrum, decreasing to their minimum at the bottom. The color slider displays the color that's selected in the color spectrum with its maximum saturation at the top of the slider and its minimum saturation at the bottom.

**B (in the HSB section)** Displays all hues in the color spectrum with their maximum saturation at the top of the color spectrum, decreasing to

their minimum saturation at the bottom. The color slider displays the color that's selected in the color spectrum with its maximum brightness at the top of the slider and its minimum brightness at the bottom.

**R** Displays the red color component in the color slider with its maximum brightness at the top of the slider and its minimum brightness at the bottom. When the color slider is set to minimum brightness, the color spectrum displays colors created by the green and blue color components. Using the color slider to increase the red brightness mixes more red into the colors displayed in the color spectrum.

**G** Displays the green color component in the color slider with its maximum brightness at the top of the slider and its minimum brightness at the bottom. When the color slider is set to minimum brightness, the color spectrum displays colors created by the red and blue color components. Using the color slider to increase the green brightness mixes more green into the colors displayed in the color spectrum.

**B (in the RGB section)** Displays the blue color component in the color slider with its maximum brightness at the top of the slider and its minimum brightness at the bottom. When the color slider is set to minimum brightness, the color spectrum displays colors created by the green and red color components. Using the color slider to increase the blue brightness mixes more blue into the colors displayed in the color spectrum.

4. Do any of the following:

- Drag the triangles along the color slider, or click inside the color slider to adjust the colors displayed in the color spectrum.
- Click or drag inside the large square color spectrum to select a color. A circular marker indicates the location of the color in the color spectrum.

**Note:** As you adjust the color using the color slider and color spectrum, the numeric values change to indicate the new color. The top rectangle to the right of the color slider displays the new color; the bottom rectangle displays the original color. Click the bottom rectangle to reset the color to the original color.

- For HSB, specify hue (H) as an angle, from 0° to 360°, that corresponds to a location on the color wheel. Specify saturation (S) and brightness (B) as percentages (0–100).
- For RGB, specify component values. You can set colors to under-range and over-range values (outside the range 0.0–1.0) in an HDR project.
- For #, enter a color value in hexadecimal form. This color format is common in web workflows.

## Edit a gradient

A gradient is defined by color stops and opacity stops. Each stop has a location along the gradient and a value for color or opacity. The values between stops are interpolated. By default, the interpolation is linear, but you can drag the opacity midpoint or color midpoint between two stops to alter the interpolation.

- To add a color stop or opacity stop, click below or above the gradient bar in the Gradient Editor dialog box.
- To remove a stop, drag it away from the gradient bar, or select the stop and click Delete.
- To edit the value of a stop, select it and adjust the Opacity value or use the Adobe Color Picker controls beneath the gradient editor controls.
- To choose a gradient type, click the Linear Gradient or Radial Gradient button in the upper-left corner of the Gradient Editor dialog box.

**Note:** Use the Style property to choose a gradient type for the Gradient Overlay layer style.

## Using Adobe Kuler swatches in After Effects

Adobe provides the Swatch You Want script in a package of scripts for After Effects on the After Effects Exchange on the [Adobe website](#). The Swatch You Want script imports and converts Adobe Swatch Exchange (.ase) files for use in After Effects.

Jerzy Drozda, Jr. provides a video tutorial and example project on his [Maltaannon website](#) that show how to copy and paste from the Adobe Kuler desktop application to bring color swatches into After Effects.

Mathias Möhl provides a script on the [After Effects Scripts website](#) with which you can load and use Kuler color themes. Mathias also provides a tutorial on the [AETUTS+ website](#) that demonstrate how to use Kuler with After Effects.

Jorrit Schulte provides a tutorial on the [AETUTS+ website](#) that demonstrates how to make an animation preset for importing and working with Kuler color swatches.

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## Color correction, color grading, and color adjustment

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When you assemble a composition, you often need to adjust or correct the colors of one or more of the layers. Such adjustments can be for any of several reasons. Some examples:

- You need to make it seem as if multiple footage items were shot under the same conditions so that they can be composited or edited together.
- You need to adjust the colors of a shot so that it seems to have been shot at night instead of day.
- You need to adjust the exposure of an image to recover detail from the over-exposed highlights.
- You need to enhance one color in a shot because you will be compositing a graphic element over it with that color.

You need to restrict colors to a particular range, such as the broadcast-safe range.

The terms color correction and color grading are often used interchangeably, though the term color grading is sometimes used to refer distinctly to color adjustments made for creative purposes rather than to correct problems with color. The term color correction is used in the broad, general sense in After Effects.

After Effects includes many built-in effects for color correction, including the Curves effect, the Levels effect, and other effects in the Color Correction effects category. You can also use the Apply Color LUT effect to apply the color mappings in a color lookup table for color correction purposes. (See Color Correction effects and Apply Color LUT effect.)

The Camera Raw plug-in can be used to correct and adjust still images in JPEG, TIFF, and various camera raw formats.

The Synthetic Aperture Color Finesse plug-in included with After Effects includes excellent color-correction tools. After Effects CS6 includes Synthetic Aperture Color Finesse 3. (See Resources for Synthetic Aperture Color Finesse.)

## Additional resources for color correction and adjustment

[This article on the Adobe website](#) collects several video tutorials and other resources for color correction and color grading in After Effects and Premiere Pro.

John Dickinson provides visual aids on his Motionworks website that illustrate how to use the Curves and Levels effects for color adjustments:

- [Curves effect diagram on Motionworks website](#)
- [Levels effect diagram on Motionworks website](#)

[This video](#) from *After Effects CS5: Learn By Video* series shows how to combine motion tracking and roto-scoping to isolate and selectively color-correct an actor's face.

The Rebel CC animation preset is a simple, telecine-style color-correction tool for coloring or grading a movie. This animation preset uses expressions to control the Levels (Individual Controls) effect. To learn more and download the animation preset, see [Stu Maschwitz's ProLost blog](#).

Stu Maschwitz provides a post on his [ProLost blog](#) that discusses color correcting for skin tones, with links to some resources about test setups that show various skin tones on a vectorscope.

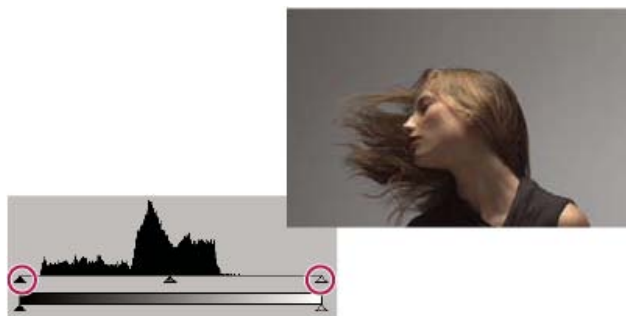
Mark Christiansen provides tips and detailed techniques for color correction, color adjustment, and color matching in the "Color Correction in Adobe After Effects" chapter of [After Effects Studio Techniques](#) on the Peachpit Press website.

Rich Young collects tutorials and presets for bleach bypass, cross-process, and other looks in an article on the [ProVideo Coalition website](#).

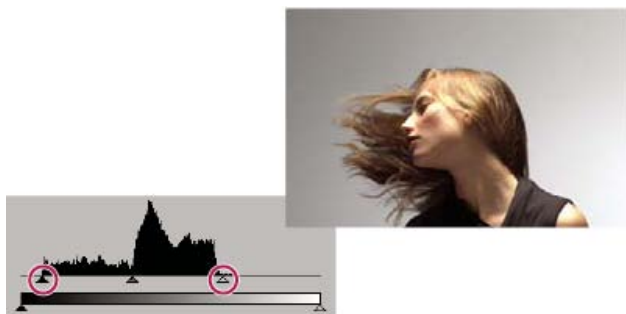
## Using histograms to adjust color

A histogram is a representation of the number of pixels at each luminance value in an image. A histogram that has nonzero values for each luminance value indicates an image that takes advantage of the full tonal range. A histogram that doesn't use the full tonal range corresponds to a dull image that lacks contrast.

A common color-correction task is adjusting an image to spread out the pixel values more evenly from left to right on the histogram, instead of having them bunched up at one end or the other. Applying the Levels effect and adjusting its Input White and Input Black properties in the histogram is an easy and effective way to accomplish this task for many images.



*Histogram for image that does not use full tonal range*



*Input sliders moved so that output uses full tonal range*



Histogram showing highlight clipping



Histogram showing shadow clipping

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## Resources for Synthetic Aperture Color Finesse

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**Important:** *Color Finesse is not included with the free trial version of After Effects. See [Third-party plug-ins included with After Effects](#).*

The Synthetic Aperture Color Finesse plug-in included with After Effects includes excellent color-correction tools. Synthetic Aperture provides tutorials and additional information about using Color Finesse on [their website](#).

Color Finesse installs its documentation in the plug-in's subfolder in the Plug-ins folder. After Effects CS6 includes Synthetic Aperture Color Finesse 3. (See Plug-ins.)

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## Color models and color spaces

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A color model is a way of describing color using numbers so that computers can operate on them. The color model used within After Effects is the RGB color model, in which each color is described in terms of amounts of red, green, and blue light added together to make the color. Other color models include CMYK, HSB, YUV, and XYZ.

A color space is a variant of a color model. A color space is distinguished by a gamut (range of colors), a set of primary colors (primaries), a white point, and a tone response. For example, within the RGB color model are several color spaces, including—in decreasing order of gamut size—ProPhoto RGB, Adobe RGB, sRGB IEC61966-2.1, and Apple RGB. Although each of these color spaces defines color using the same three axes (R, G, and B), their gamuts and tone response curves are different.

Though many devices use red, green, and blue components to record or express color, the components have different characteristics—for example, blue for one camera is not exactly the same as blue for another camera. Each device that records or expresses color has its own color space. When an image moves from one device to another, image colors may look different because each device interprets the RGB values in its own color space.

Color management uses color profiles to convert colors from one color space to another, so colors look the same from one device to another.

### Online resources about color models and color spaces

Adobe provides a white paper on color spaces and color management in After Effects, on the [Adobe website](#).

Charles Poynton provides an excellent set of resources on [his website](#) regarding color spaces, color management, and other color technology.

Christopher Nevison provides an article on the [Colgate University website](#) that explains and describes the uses of the RGB, CMYK, HSL, HSB, and YCbCr color models.

Harry Frank provides a video tutorial on his [graymachine website](#) that shows how and why to use color conversion expressions to convert colors from the RGB color model to the HSL color model when randomly varying colors. The specific example that he shows uses the Radio Waves effect.

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## Gamma and tone response

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The tone response for a color space is the relationship of light intensity to the signal that creates or records (perceives) the light.



The human visual system does not respond linearly to light. In other words, our perception of how bright a light is does not double when twice as many photons hit our eyes in a given time. Similarly, the display elements of a CRT monitor do not emit light that is twice as bright when a voltage twice as great is applied. The relationship of light intensity to signal intensity for a display device is expressed by a power function. The exponent of this power function is called gamma. In general, the relationship of light intensity to signal intensity for an input device is the inverse of the relationship for an output device, though the gamma values may differ for input and output devices to accommodate the difference between scene lighting and lighting of the viewing environment.

**Note:** *Moving the midtone slider (such as the Gamma control for the Levels effect) in a color-correction histogram has the same result as modifying gamma, changing the tone response curve without moving the white point. Modifying the curve in the Curves effect also modifies tone response, but not necessarily with a gamma curve.*

Charles Poynton provides an excellent set of resources on [his website](#) regarding gamma and other color technology.

### Linear tone response: when gamma equals 1

Raising any number to the power of 1 gives the original number as a result. A gamma of 1.0 is used to express the behavior of light in the natural world, outside the context of our nonlinear perceptual systems. A system with gamma of 1.0 is sometimes said to operate in linear light, whereas a system encoded with a gamma other than 1.0 to match the human visual system is said to be perceptual.

If you have enabled color management (by specifying a working color space), you can perform all color operations in linear light by linearizing the working color space. A linearized color space uses the same primaries and white point as the nonlinear version; the tone response curve is just made into a straight line.

 *Many compositing operations, such as combining colors with blending modes, benefit from being performed in a linear color space. For the most natural and realistic blending of colors, work in a linear color space. If you have not enabled color management, you can still perform blending operations using a gamma of 1.0. (See [Linearize working space and enable linear blending](#).)*

### System gamma, device gamma, and the difference between scene and viewing environment

The gamma value for an entire system—from capture, through production, to display in the viewing environment—is the product of the gamma values used for each of the phases in the system. This product is not always 1.0, as it would be if the operations performed for encoding exactly matched (inverted) the operations performed for decoding. One reason for a system gamma other than 1.0 is that a difference often exists between the lighting conditions in which a scene is captured and the lighting conditions in which it is viewed. (Consider that you usually watch a movie in a dim environment, but the scenes aren't normally shot in a dim environment.)

For example, the device gamma for an HD camera is approximately 1/1.9, and the device gamma for an HD display is approximately 2.2. Multiplying these values gives a system gamma of approximately 1.15, which is appropriate for the somewhat dim television viewing conditions of a typical living room. The system gamma for motion picture production is much higher (approximately 1.5–2.5) to accommodate the darker viewing environment of a movie theater. The gamma for the film negative is approximately 1/1.7, and the gamma for the projection film is approximately 3–4.

Color profiles are said to be scene-referred if their tone-response curves are based on the conditions in the typical scene. Color profiles are said to be output-referred if their tone-response curves are based on the conditions in the typical viewing environment.

By default when you use color management, After Effects automatically adjusts the contrast of images when converting between scene-referred color profiles and output-referred color profiles. This automatic conversion (image state adjustment) is based on the gamma values specified in the HDTV video standard.

- To disable this automatic color transformation, deselect **Compensate For Scene-referred Profiles** in the Project Settings dialog box (File > Project Settings).

The **Compensate For Scene-referred Profiles** feature also exists in Adobe Photoshop CS4 and later, but this feature does not exist in other applications. To match the colors in other applications—including After Effects CS3 and earlier—disable this automatic conversion. When you open a project created in After Effects CS3 or earlier, the **Compensate For Scene-referred Profiles** option is deselected.

Each instance of the **Color Profile Converter** effect can also be set to either compensate for scene-referred profiles, not compensate for scene-referred profiles, or use the setting indicated by the project's **Compensate For Scene-referred Profiles** option. (See **Color Profile Converter** effect.)

For an in-depth description of the automatic compensation for scene-referred profiles, see the [Adobe website](#).

For additional information about the compensation for scene-referred profiles, see [this blog post by Todd Kopriva and Peter Constable](#) on the Adobe website.

Trish and Chris Meyer provide an article on the [ProVideo Coalition website](#) that adds some practical information regarding scene-referred and display-referred color profiles.

### QuickTime and gamma in non-color-managed projects

After Effects 7.0 and earlier used QuickTime codecs to decode several kinds of media, and the gamma adjustments performed by QuickTime on Windows were different from the gamma adjustments performed on Mac OS. The gamma adjustments performed by After Effects CS3 and later differ from the gamma adjustments performed by these QuickTime codecs. Gamma adjustments performed by After Effects CS3 and later on Windows are the same as gamma adjustments performed by After Effects CS3 and later on Mac OS. Also, by not using QuickTime codecs, After Effects preserves over-range values in 32-bpc projects.

Select **Match Legacy After Effects QuickTime Gamma Adjustments** in the Project Settings dialog box to accomplish any of the following:

- Avoid color shifts when working with projects created in After Effects 7.0 or earlier
- Match the colors in a project created in After Effects 7.0 or earlier
- Ensure that colors in the Composition panel match colors in QuickTime player

The Match Legacy After Effects QuickTime Gamma Adjustments option is selected by default for projects created in After Effects 7.0 or earlier. You should create new projects without this option selected.

For information on issues related to QuickTime Player and gamma adjustments, go to the [Adobe website](#).

Trish and Chris Meyer provide tips for dealing with gamma issues with QuickTime and H.264 on the [ProVideo Coalition website](#).

More Help topics



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# Color management

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[This video](#) from the *After Effects CS5: Learn By Video* series provides an introduction to color management, both explaining how it works and how to use it.

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## Color management and color profiles

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### Overview of color management

Color information is communicated using numbers. Because different devices use different methods to record and display color, the same numbers can be interpreted differently and appear to us as different colors. A color management system keeps track of all of these different ways of interpreting color and translates between them so that images can look the same regardless of the device used to display them.

In general, a color profile is a description of a device-specific color space in terms of the transformations required to convert its color information to a device-independent color space.

In the specific case of working within After Effects, ICC color profiles are used to convert to and from the working color space in the following general workflow:

1. An input color profile is used to convert each footage item from its color space into the working color space. A footage item may contain an embedded input color profile, or you can assign the input color profile in the Interpret Footage dialog box or interpretation rules file. (See [Interpret a footage item by assigning an input color profile](#).)
2. After Effects performs all of its color operations in the working color space. You assign a working color space (project working space) in the Project Settings dialog box. (See [Choose a working color space and enable color management](#).)
3. Colors are converted from the working color space to the color space of your computer monitor through the monitor profile. This conversion ensures that your composition will look identical on two different monitors, if the monitors have been properly profiled. This conversion does not change the data within the composition. You can choose whether to convert colors for your monitor using the View > Use Display Color Management menu command. (See [Enable or disable display color management](#).)
4. Optionally, After Effects uses a simulation profile to show you on your computer monitor how the composition will look in its final output form on a different device. You control output simulation for each view through the View > Simulate Output menu. (See [Simulate how colors will appear on a different output device](#).)
5. An output color profile for each output module is used to convert the rendered composition from the working color space to the color space of the output medium. You choose an output color profile in the Output Module Settings dialog box. (See [Assign an output color profile](#).)

By default when you use color management, After Effects automatically adjusts colors to compensate for the differences in gamma between scene-referred color profiles and output-referred color profiles. (See [Gamma and tone response](#).)

**Note:** *An alternative approach to color management is to manually apply color transformations using color lookup tables (LUTs). (See [Apply Color LUT effect](#).)*

### Benefits of color management

Color management provides many benefits, including the following:

- The colors in imported images appear as the creators of the images intended.
- You have more control over how colors are blended within your project, for everything from motion blur to anti-aliasing.
- The movies that you create will look as you intend when viewed on devices other than your computer monitor.

If you don't enable color management for your project, then the colors in your composition are dependent on the color characteristics of your monitor: the colors that you see are the colors that your monitor displays based on RGB numbers in your footage items. Because different color spaces use the same RGB numbers to represent different colors, the colors that you see and composite may not be the colors that the creator of

the footage intended. In fact, the colors may be very far from the intended colors.

By setting a working color space for the project (which enables color management), you do two things:

- You define a common color space for compositing and other color operations.
- You control the appearance of colors in your composition.

If a footage item has an embedded color profile (for example, the footage item is a Photoshop PSD file), then the colors intended by the person who created the image can be accurately reproduced in your composition. The color profile contains the information that determines how to convert the RGB numbers in the image file into a device-independent color space; the color profile of the monitor can then be used to determine which RGB numbers in the color space of your monitor represent the colors intended for the footage item. This automatic conversion becomes even more important as you import footage items with many different color profiles, from many different sources.

The color conversion process takes no effort on your part. The colors simply appear on your monitor just like they appeared when the image was created. Your monitor may have a limited gamut compared to the color space that you choose for the working space, and colors can be clipped when displayed on the monitor. However, you still have the full range of color data in your project, and the colors are not clipped internally.

When you are ready to output your composition, you can use color management to transform your colors into the space appropriate for your output media. At this stage, you are preserving the appearance of colors as you intend them to look.

## Color profiles

The file format for color profiles is standardized by the ICC (International Color Consortium), and the files that contain them usually end with the .icc filename extension. After Effects comes with a large number of color profiles for color spaces for common (and some not so common) input and output types.

After Effects loads color profiles from multiple locations, including the following:

- Mac OS: Library/ColorSync/Profiles
- Mac OS: Library/Application Support/Adobe/Color/Profiles
- Windows: WINDOWS\system32\spool\drivers\color
- Windows: Program Files\Common Files\Adobe\Color\Profiles

 You can create a custom ICC profile using Adobe Photoshop. In Photoshop, choose Edit > Color Settings. The RGB and CMYK menus in the Working Spaces area of the Photoshop Color Settings dialog box include options for saving and loading ICC profiles and defining custom profiles.

All color profiles used in a project are saved in the project, so you do not need to manually transfer color profiles from one system to another to open the project on another system.

**Note:** The NTSC (1953) color profile corresponds to obsolete television equipment and should not be used. For standard-definition NTSC television, use one of the SDTV NTSC color profiles.

When you choose a profile—for input, output, or simulation—the motion-picture film profiles do not appear unless your footage is Cineon footage or you select Show All Available profiles. If your footage is Cineon footage, only the motion-picture film profiles appear, unless you select Show All Available Profiles.

## Color management tips

Be sure to read the helpful text in the Interpret Footage, Project Settings, and Output Module Settings dialog boxes. This text helps you to understand the color conversions that will be done as you interpret footage, composite, and output rendered movies.

Make sure that your work environment provides a consistent light level and color temperature. For example, the color characteristics of sunlight change throughout the day, which can alter the way colors appear on your screen, so keep shades closed or work in a windowless room.

## Online resources about color management

[This video](#) from the *After Effects CS5: Learn By Video* series provides an introduction to color management, both explaining how it works and how to use it.

Trish and Chris Meyer provide an overview of color management in an article on the [Artbeats website](#).

For step-by-step instructions on using color management to create movies for the Web, HDTV, motion-picture film, and other common media, go to the [Adobe website](#).

For a video tutorial on color management in After Effects, go to the [Adobe website](#).

Johan Steen provides a detailed article on [his website](#) that explains color management in After Effects. The article also describes how to calibrate and profile a monitor, how to use color management in Photoshop, and how to work in a linear color space.

For information on color profiles, see the [International Color Consortium website](#).

Charles Poynton provides an excellent set of resources on [his website](#) regarding color technology and color terminology.

## Calibrate and profile your monitor

When you calibrate your monitor, the profiling utility lets you save a color profile that describes the color behavior of the monitor. This profile contains information about what colors can be reproduced on the monitor and how the color values in an image must be converted so that colors are displayed accurately. After Effects and your operating system can use this information to ensure that the colors that you see on your monitor look like the colors in the output movies that you create.

**Note:** *Monitor performance changes and declines over time; recalibrate and profile your monitor every month or so. If you find it difficult or impossible to calibrate your monitor to a standard, it may be too old and faded.*

1. Make sure that your monitor has been turned on for at least half an hour, giving it sufficient time to warm up and produce more consistent output.
2. Make sure that your monitor is displaying millions of colors (24 bits per pixel) or higher.
3. If you do not have profiling software that uses a hardware measuring device, remove colorful background patterns on your monitor desktop and set your desktop to display neutral grays. Busy patterns or bright colors surrounding a document interfere with accurate color perception.
4. Do one of the following to calibrate and profile your monitor:
  - For best results, use third-party software and measuring devices. In general, using a measuring device such as a colorimeter along with software can create more accurate profiles because an instrument can measure the colors displayed on a monitor far more accurately than the human eye can.

Most profiling software automatically assigns the new profile as the default monitor profile. For instructions on how to manually assign the monitor profile, see the documentation for your operating system.

- In Mac OS, use the Calibrate utility, located in the System Preferences > Displays > Color tab.

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## Choose a working color space and enable color management

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You turn color management on for a project by choosing a working color space (Working Space) for the project in the Project Settings dialog box. You control color management for each footage item with the Interpret Footage dialog box or interpretation rules file. You control color management for each output item in the Output Module Settings dialog box.

If Working Space is set to None in the Project Settings dialog box, color management is off for the project.

Choosing a working color space is an essential step in managing color in a project. Colors of footage items are converted into the working color space as a common color space for compositing.

For best results, when working with 8-bpc color, match the working color space to the output color space. If you are rendering to more than one output color space, you should set the project color depth to 16 bpc or 32 bpc, at least for rendering for final output. The working color space should match the output color space that has the largest gamut. For example, if you plan to output to Adobe RGB and sRGB, then use Adobe RGB as your working color space, because Adobe RGB has a larger gamut and can therefore represent more saturated colors. To preserve over-range values, work in 32-bpc color for its high dynamic range.

Suggestions for working color space choices:

- SDTV NTSC or SDTV PAL is a good choice if you're making a movie for standard-definition broadcast television, including standard-definition DVD.
- HDTV (Rec. 709) is a good choice if you're making a movie for high-definition television. This color space uses the same primaries as sRGB, but it has a larger gamut, so it makes a good working space for many kinds of work.
- ProPhoto RGB with a linear tone response curve (gamma of 1.0) is a good choice for digital cinema work.
- sRGB IEC61966-2.1 is a good choice if you're making a movie for the Web, especially cartoons.

The color spaces available in After Effects vary based on the color profiles installed on your computer. (See Color profiles.)

1. Choose File > Project Settings.
2. Choose a working color space from the Working Space menu.

Previews sent to an external video monitor are not color managed. The color values sent to the video monitor are from the working color space for the project. To preview video colors, choose a value for Working Space in the Project Settings dialog box that matches the color space of the preview device.

Similarly, colors in a composition sent to Adobe Premiere Pro or Encore using Dynamic Link are in the working color space of the After Effects project.

 *To manage colors in a dynamically linked composition or for video previews, create a new composition and nest your composition within it; then apply the Color Profile Converter effect to the nested composition, with Input Profile set to Project Working Space. For video previews, then set Output Profile to match the color space of the video preview device. (See Color Profile Converter effect.)*

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## Linearize working space and enable linear blending

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If you have enabled color management (by specifying a working color space), you can perform all color operations in linear light by linearizing the working color space. A linearized color space uses the same primaries and white point as the nonlinear version; the tone response curve for the linearized color space is just a straight line. (See Gamma and tone response.)

If you have not enabled color management, you can still perform blending operations using a gamma of 1.0.

By performing operations in a linear color space, you can prevent certain edge and halo artifacts, such as the fringing that appears when high-contrast, saturated colors are blended together. Many color operations benefit from working in a linear color space, including those operations involved in image resampling, blending between layers with blending modes, motion blur, and anti-aliasing.

If you want to use a linearized working color space, do so when you set up the project, instead of switching later. Otherwise, colors chosen in the color picker will change when you switch to a linear working color space, because colors inside After Effects are interpreted to be in the working color space.

**Note:** A linearized working color space works best with higher color depths—16 bpc and 32 bpc—and is not recommended for 8-bpc color.

❖ Choose File > Project Settings, and do one of the following:

- To linearize the working color space, choose Linearize Working Space.
- To blend colors in a linear color space, choose Blend Colors Using 1.0 Gamma. This option affects only blending between layers. The result is that opacity fades, motion blur, and other features that rely on blending modes are affected.

## Additional resources about linear color spaces and linear blending

Stu Maschwitz's ProLost blog has several posts that are useful for learning about how, when, and why to work in a linear color space versus a non-linear color space. In [this post](#), Stu summarizes the reasons and techniques for working in a linear color space and using linear blending.

On the [ProVideo Coalition website](#), Mark Christiansen provides some examples of the results of enabling linear blending, as well as explaining a little more what linear blending means.

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## Interpret a footage item by assigning an input color profile

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You control color management for each footage item using the Interpret Footage dialog box.

The input color profile determines what calculations are performed when converting the colors of a footage item into the working color space for the project. If a working space has not been set—that is, if color management is not on for the project—then you cannot assign an input color profile.

In some cases, files that you import have ICC profiles embedded in them. When you import these files, you can be confident that the colors that you see are as the producer of the footage originally intended. After Effects can read and write embedded color profiles for Photoshop (PSD), TIFF, PNG, and JPEG files.

If a footage item does not have an embedded color profile, you can assign an input color profile using the Interpret Footage dialog box or by adding or modifying a rule in the interpretation rules file (interpretation.rules.txt). After Effects interprets the footage item as if the source footage was created using this color profile, so be certain to assign a profile that matches (or at least approximates) that used to create the source footage.

**Note:** If a source footage item was created by an application that doesn't use color management—such as a movie rendered from a 3D application—the input color profile is essentially the monitor profile of the system on which the image was designed and created.

1. Select a footage item in the Project panel.
2. Choose File > Interpret Footage > Main.
3. In the Color Management tab of the Interpret Footage dialog box, choose a value from the Assign Profile menu.

If you don't see the profile that you want in the Assign Profile menu, select Show All Available Profiles.

4. Read the information in the Description area of the dialog box to confirm that the conversion is the one that you want, and click OK.

Non-RGB footage items (such as CMYK, Y'CbCr, and camera raw images) cannot be assigned an input profile. Their native color space is displayed in the Interpret Footage dialog box. Conversion of non-RGB color values to RGB color values is handled automatically for each format.

If you don't assign an input color profile, and After Effects doesn't have a rule in the interpretation rules file with which to make an interpretation, the colors of the footage item are assumed to be in the working color space of the project.

When color management is enabled, the input color profile for a footage item is shown in the information area at the top of the Project panel.

The Interpret As Linear Light option determines whether the assigned input color profile is interpreted as being linear (gamma equals 1.0). This option also works when color management is turned off for the project. (See Gamma and tone response.)

You can prevent the conversion of colors into the working color space for a single footage item by selecting Preserve RGB in the Color Management tab of the Interpret Footage dialog box. This option preserves RGB numbers; color appearance is not preserved. Turning off color management for a specific footage item is useful when the footage item is not intended for visual display, but is instead intended for use as a control layer—for example, a displacement map.

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## Assign an output color profile

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You control color management for each output item using the Output Module Settings dialog box.

**Important:** When you export to SWF format, you use the *Export* menu, not the *Render Queue* panel, so the output module settings are not available for this output type. If color management is enabled for the project, *After Effects* automatically converts colors from the working color space of the project to the sRGB IEC61966-2.1 color space when exporting to SWF.

The output color profile for a render item determines what calculations are performed when converting the colors of a rendered composition from the working color space of the project to the color space for the output medium. If a project working space has not been set—that is, if color management is not on for the project—then you cannot assign an output color profile.

For example, after creating a movie in an HDTV (Rec. 709) working color space for output to film, you likely want to output to a log-encoded Cineon/DPX color space using a film output color profile. If, on the other hand, you're creating a movie for high-definition television, you should choose an HDTV (Rec. 709) output profile.

The output color profile for a render item is part of an output module and is displayed in the output module group in the *Render Queue* panel. You can assign multiple output modules to one render item, each with its own output color profile, allowing you to create output movies for various media from one rendered movie.

The *Convert To Linear Light* option determines whether the colors are output to a linear color profile (gamma equals 1.0). It is seldom a good idea to output to linear light for 8-bpc or 16-bpc color, so the default setting for *Convert To Linear Light* is *On For 32 bpc*. (See *Gamma and tone response*.)

Some file formats—such as Photoshop (PSD), PNG, TIFF, and JPEG—allow for the embedding of a color profile. If you embed a color profile in an output file, then you can be more certain that programs that use the file will correctly interpret its color information.

*After Effects* chooses a rendering intent based on the output color profile that you choose. For most output types, the rendering intent is relative colorimetric (with black point compensation); for output to film negative, the rendering intent is absolute colorimetric.

You can prevent the conversion of colors from the working color space for a single output item by selecting *Preserve RGB* in the *Color Management* tab of the *Output Module Settings* dialog box. This option preserves RGB numbers; color appearance is not preserved. Turning off color management for a specific footage item is useful when the footage item is not intended for visual display, but is instead intended for use as a control layer—for example, a displacement map.

1. Click the underlined text next to the *Output Module* heading for the render item in the *Render Queue* panel.
2. In the *Color Management* tab of the *Output Module Settings* dialog box, choose a value from the *Output Profile* menu:

**sRGB IEC61966-2.1** For display in web browsers and other web-based environments.

**SDTV NTSC or SDTV PAL** For display on standard-definition television. If the codec that you are using does not adjust luma levels, choose a 16-235 profile to compress luma levels.

**Kodak 5218/7218 Printing Density** For film-out corresponding to the scene capture of Kodak 5218 camera negative film.

If you don't see the profile that you want in the *Output Profile* menu, select *Show All Available Profiles*. This option shows the motion-picture film color profiles.

3. Read the information in the *Description* area of the dialog box to confirm that the conversion is the one that you want, and click *OK*.

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## Enable or disable display color management

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When color management is on, the default behavior is for RGB pixel values to be converted to the color space of your computer monitor from the working color space for the project. Color appearance is preserved; RGB numbers are not preserved. This behavior is adequate for most uses, but you sometimes need to see how the colors are actually going to look when viewed through a system that does not use color management. For example, you may need to see how the colors will appear when viewed in a web browser.

When display color management is off, the RGB color values are sent directly to your monitor, without any conversion through the monitor profile. RGB numbers are preserved; color appearance is not preserved.

When display color management is on for a viewer, a yellow plus sign appears in the *Show Channel And Color Management Settings*  button at the bottom of the viewer.

For each viewer (*Composition*, *Layer*, or *Footage* panel), you can choose whether to manage display colors, which involves the conversion of colors from the working color space to the color space of the monitor.

1. Activate a *Composition*, *Layer*, or *Footage* panel.
2. Do one of the following to toggle between enabling and disabling display color management:
  - Click the *Show Channel And Color Management Settings*  button at the bottom of the viewer, and choose *Use Display Color Management*.
  - Choose *View > Use Display Color Management*.
  - Press *Shift+ /* (on the numeric keypad).

Output simulation settings (including *No Output Simulation*) are remembered.

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## Simulate how colors will appear on a different output device

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Often, you need to preview how a movie will appear on a device other than your computer monitor. One purpose of color management is to ensure that colors look the same on every device, but color management in After Effects can't overcome scenarios like the following:

- An output device for which you're creating your movie has a smaller gamut than the working color space of your project, so the device is unable to represent some colors.
- The colors in your movie are displayed by a device or software that does not use color management to convert colors.

For example, when you are creating a movie using a computer monitor and a high-definition video monitor, you may need to see how the movie will look when transferred to a specific film stock and projected under standard theater viewing conditions.

In such situations, you'll want to preview how colors will appear when they're displayed on a device other than your computer monitor. Output simulation requires display color management.

During output simulation, colors are converted from the working color space for the project to the color space of the monitor through the following flow:

**1. Colors are converted from working color space for the project to output color space.** Colors are converted from the working color space to the color space of the output type using the output color profile (the same profile that will be used for rendering to final output).

**2. Colors are converted from output color space to color space of simulated playback device.** If Preserve RGB is not selected, colors are converted from the output color space to the color space of the presentation medium using the simulation profile. This setting presumes that the simulated device also performs color management and will convert colors for display. Color appearance is preserved; RGB numbers are not preserved.

If Preserve RGB is selected, the color values are not converted in this step. Instead, the numeric RGB color values are preserved and are reinterpreted to be in the color space of the simulated device. One use of this simulation is to see how a movie will look when played back on a device other than the one for which it was intended or a device that does not perform color management.

**Note:** Use Preserve RGB when simulating the combination of a capture film stock and a print film stock.

**3. Colors are converted from color space of simulated playback device to color space of your monitor.** Colors are converted from the presentation device color space to the color space of your computer monitor using the monitor profile.

When you create an output simulation preset, you can choose a profile to use for each of these steps.

 Even if you're using a preset output simulation, you can choose the Custom option in the View > Simulate Output menu after selecting the preset to see a representation of which color conversions and reinterpretations are occurring for that simulation type.

Output simulation applies only to a specific viewer (Composition, Layer, or Footage panel) and works only for previews. Color conversions for output simulation are performed when values are sent to the display. Actual color numbers in the project are not changed.

As with all color space conversions, simulating output decreases performance somewhat, so you may not want to simulate output when performing tasks that require real-time interaction.

**Note:** Merely applying the correct profiles can't compensate for different color gamuts for different devices. For example, common LCD monitors for personal computers do not have the gamut necessary to fully simulate HDTV output.

You can press Shift+/ (on the numeric keypad) to turn display color management on or off. Turning display color management off also turns off output simulation. Simulation settings (including No Output Simulation) are remembered when display color management is off.

## Simulate output for previews

1. Activate a Composition, Layer, or Footage panel.
2. Choose View > Simulate Output, and choose an output type to simulate.

**Note:** Output simulation relies on display color management, which is on by default. If display color management is off, choose View > Use Display Color Management.

**No Output Simulation** Display color management is on, but no conversion is performed to simulate an output type.

**Legacy Macintosh RGB (Gamma 1.8)** Show how colors will appear when displayed by a non-color managed application on a Macintosh computer with a gamma of 1.8—the value used by Mac OS before Mac OS X 10.6. This option is not available if Linearize Working Space is selected.

**Internet Standard RGB (sRGB)** Show how colors will appear when displayed by a non-color managed application with a gamma of 2.2. This option is not available if Linearize Working Space is selected.

**Kodak 5218 To Kodak 2383** Show how colors will appear when output to the Kodak 5218 negative film stock and then projected from Kodak 2383 positive film stock in a theater environment.

**Note:** The DPX Theater Preview and DPX Standard Camera profiles provided by After Effects 7.0 for use with the Proof Colors command have been replaced by the Kodak 2383 and Kodak 5218 profiles used with the Simulate Output command.

**Custom** If you don't see an entry for the output type that you want to simulate, you can create your own output simulation preset by choosing Custom. You can specify a profile to use for each of the conversion or reinterpretation steps.

- To preview how a movie will look if you output the movie to a device and view it on that device, use the same value for Output Profile and Simulation Profile.
- To preview how a movie will look if you output the movie to one device and then view it on another, color-managed device, use different values for Output Profile and Simulation Profile, and deselect Preserve RGB.



- To preview how a movie will look if you output the movie to one device and view it on another device, use different values for Output Profile and Simulation Profile, and select Preserve RGB.

You can choose an output simulation preset for each view. Custom output simulation settings are shared between all views.

 To toggle between no output simulation and the most recently used output simulation, click the Show Channel And Color Management Settings button at the bottom of the viewer and choose Simulate Output.

## Simulate an output type in a movie rendered for final output

Color management for output simulation is only for previews, but you can render a movie with a look that simulates a particular output type. For example, you can render a movie for HDTV that simulates a film appearance, which is especially useful for creating dailies when doing film work.

1. Choose Layer > New > Adjustment Layer to create a new adjustment layer at the top of your composition.
2. Choose Effect > Utility > Color Profile Converter to apply the Color Profile Converter to the adjustment layer.
3. Choose Edit > Duplicate to duplicate the effect.
4. In the Effect Controls panel, set the following options for the first instance of the effect:

**Input Profile** Project Working Space

**Output Profile** The type of output to simulate; for example, a film printing density profile, such as Kodak 5218/7218 Printing Density

**Intent** Absolute Colorimetric

5. In the Effect Controls panel, set the following options for the second instance of the effect:

**Input Profile** The type of playback to simulate; for example, a theater preview profile

**Output Profile** The color space of the output medium; for example HDTV (Rec. 709)

**Intent** Relative Colorimetric

To enable and disable this type of output simulation, you can turn the adjustment layer on and off by selecting and deselecting its Video switch in the Timeline panel.

## Broadcast-safe colors

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Analog video signal amplitude is expressed in IRE units (or volts in PAL video). Values between 7.5 and 100 IRE units are considered broadcast-safe; colors in this range do not cause undesired artifacts such as audio noise and color smearing. (In practice, some spikes over 100 IRE are legal, but for simplicity 100 IRE is considered the legal maximum here.) This range of 7.5-100 IRE is equivalent to a range from black to white of 64-940 in 10-bpc values for Y' in Y'CbCr, which corresponds to 16-235 in 8-bpc values. Therefore, many common video devices and software systems interpret 16 as black and 235 as white, instead of 0 and 255. These numbers don't directly correspond to RGB values.

If you notice that colors of imported footage look wrong—blacks don't look black enough, and whites don't look white enough—make sure that you've assigned the correct input color profile. The common video color profiles included with After Effects include variants that account for these limited ranges, such as the HDTV (Rec. 709) 16-235 color profile, which interprets 16 as black and 235 as white.

**Note:** Some video cards and encoders assume that output is in the range 0-255, so limiting colors in your composition and rendered movie may be redundant and lead to an undesired compression of the color range. If colors of your output movie look dull, try assigning an output color profile that uses the full range of colors.

 If colors look washed out, apply the Levels effect and look at the histogram to see if the lowest and highest color values are at or near 16 and 235. If so, then this footage should be interpreted using one of the 16-235 input color profiles.

You can use the Broadcast Colors effect to reduce luminance or saturation to a safe level, but the best way to limit output colors to the broadcast-safe range is to create your composition to not use colors out of this range. (See Broadcast Colors effect.)

Keep in mind the following guidelines:

- Avoid pure black and pure white values.
- Avoid using highly saturated colors.
- Render a test movie and play it on a video monitor to ensure that colors are represented accurately.

 Rather than using the Broadcast Colors effect to reduce the luminance or saturation of colors, you can use this effect with the Key Out Unsafe or Key Out Safe option. Apply the effect to an adjustment layer at the top of the layer stack to show which parts of the image are outside the broadcast-safe range.

The Color Finesse plug-in included with After Effects includes excellent tools that can help you keep your colors within the broadcast-safe range. For more information, see the Color Finesse documentation in the folder containing the Color Finesse plug-in. (See Color correction, color grading, and color adjustment.)

**Note:** After Effects 7.0 had an Expand ITU-R 601 Luma Levels option in the Interpret Footage dialog box. When opened in After Effects CS3 or later, footage items in projects created with this option are assigned a corresponding profile.

Trish and Chris Meyer provide details about broadcast-safe colors in an article on the [ProVideo Coalition website](#).

More Help topics



## Drawing, painting, and paths

# Paint tools: Brush, Clone Stamp, and Eraser

[Paint tools and paint strokes](#)  
[Brushes and the Brushes panel](#)  
[Paint with the Brush tool](#)  
[Clone Stamp tool](#)  
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## Paint tools and paint strokes

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The Brush tool , Clone Stamp tool , and Eraser tool  are all paint tools. You use each in the Layer panel to apply paint strokes to a layer. Each paint tool applies brush marks that modify the color or transparency of an area of a layer without modifying the layer source.

Each paint stroke has its own duration bar, Stroke Options properties, and Transform properties, which you can see and modify in the Timeline panel. Each paint stroke is, by default, named for the tool that created it, with a number that indicates the order in which it was drawn.

At any time after you draw a paint stroke, you can modify and animate each of its properties using the same techniques that you use to modify the properties and duration of a layer. You can copy paint stroke path properties to and from properties for mask paths, shape layer paths, and motion paths. For even more power and flexibility, you can link these properties using expressions. (See [Creating shapes and masks](#) and [Add, edit, and remove expressions](#).)

**Important:** *To specify settings for a paint stroke before you apply it, use the Paint and Brushes panels. To change and animate properties for a paint stroke after you've applied it, work with properties of the stroke in the Timeline panel.*

Individual brush marks are distributed along each paint stroke—though the marks may appear to merge together to form a continuous stroke with the default settings. Brush settings for each brush in the Brushes panel determine the shape, spacing, and other properties of brush marks; you can also modify these Stroke Options properties for each stroke in the Timeline panel.

In After Effects, paint strokes are vector objects, which means that they can be scaled up without loss of quality. Paint strokes in some applications, such as Photoshop, are raster objects. (See [About vector graphics and raster images](#).)

Groups of paint strokes appear in the Timeline panel as instances of the Paint effect. Each instance of the Paint effect has a Paint On Transparent option. If you select this option, the layer source image and all effects that precede this instance of the Paint effect in the effect stacking order are ignored; the paint strokes are applied on a transparent layer.

 *For some painting, drawing, cloning, and retouching tasks, you may want to take advantage of the sophisticated paint tools provided by Adobe Photoshop. See [Working with Photoshop and After Effects](#).*

**Note:** *The Roto Brush tool shares some features with the paint tools, and you can work with Roto Brush strokes in many of the same ways as paint strokes. For information about the Roto Brush tool and Roto Brush strokes, see [Roto Brush strokes, spans, and base frames](#).*

For a video tutorial on using the paint tools, go to the [Adobe website](#).

Chris and Trish Meyer give tips for using After Effects paint tools, including the Clone Stamp tool, in an article on the [ProVideo Coalition website](#).

## Common operations for paint tools and strokes

- To show paint strokes on selected layers in the Timeline panel, press PP.
- To select paint strokes in the Layer panel, use the Selection tool to click a paint stroke or drag a box around portions of multiple paint strokes.  
 *To momentarily activate the Selection tool, press and hold V.*
- To show only selected paint strokes in the Timeline panel, select paint strokes and press SS.
- To rename a paint stroke, select the paint stroke in the Timeline panel and press Enter on the main keyboard (Windows) or Return (Mac OS); or right-click (Windows) or Control-click (Mac OS) the name and choose Rename.
- To reorder paint strokes within an instance of the Paint effect, drag a Paint stroke to a new location in the stacking order in the Timeline panel.
- To reorder an instance of the Paint effect to interleave it with other effects, drag the effect to a new location in the stacking order in the Timeline panel.
- To target a specific instance of the Paint effect for the addition of new paint strokes, choose from the View menu at the bottom of the Layer panel.
- To hide a paint stroke from view (and from rendered output), deselect the Video switch  for the paint stroke.
- To open or close the Paint panel and Brushes panel when a paint tool is selected, click the Toggle The Paint Panels button .

## Common paint tool settings in the Paint panel

To use the Paint panel, first select a paint tool from the Tools panel.

**Opacity** For Brush and Clone strokes, the maximum amount of paint applied. For Eraser strokes, the maximum amount of paint and layer color removed.

**Flow** For Brush and Clone strokes, how quickly paint is applied. For Eraser strokes, how quickly paint and layer color are removed.

**Mode** How pixels in the underlying image are blended with the pixels painted on by the Brush or Clone stroke. (See Blending mode reference.)

**Channels** Which channels of the layer the Brush stroke or Clone stroke affect. When you choose Alpha, the stroke only affects opacity, so swatches are grayscale. Painting the alpha channel with pure black has the same result as using the Eraser tool.

**Duration** The duration of the paint stroke. Constant applies the stroke from the current frame to the end of the duration of the layer. Single Frame applies the stroke to the current frame only. Custom applies the stroke to the specified number of frames, beginning with the current frame. Write On applies the stroke from the current frame to the end of the duration of the layer and animates the End property of the stroke to match the motion with which the stroke was drawn.

💡 When you have a paint tool active, you can press 1 or 2 (on the main keyboard) to move the current-time indicator forward or backward the number of frames specified by the Duration setting in the Paint panel.

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## Brushes and the Brushes panel

To use the Brushes panel, first select a paint tool from the Tools panel.

### Choose a brush gallery display mode

❖ Choose a display mode from the Brushes panel menu: Text Only, Small Thumbnail, Large Thumbnail, Small List, or Large List.

### Create and manage preset brushes

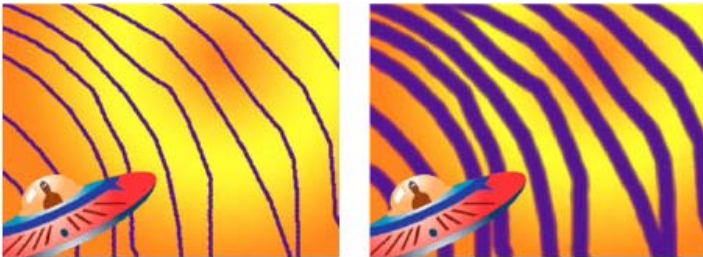
- To create a new preset brush, specify the desired settings in the Brushes panel, and then choose New Brush from the Brushes panel menu or click the Save Current Settings As New Brush button .
- To rename a preset brush, select the brush and choose Rename Brush from the panel menu.
- To delete a preset brush, choose Delete Brush from the panel menu or click the Delete Brush button .
- To restore the default set of preset brushes, choose Reset Brush Tips from the Brushes panel menu. To retain the custom brushes you created, click Append when the dialog box prompts you to replace current brushes with the default brushes.

**Note:** Preset brushes are saved in the preferences file, so they persist between projects.

### Brush properties

💡 Ctrl-drag (Windows) or Command-drag (Mac OS) the brush in the Layer panel to adjust Diameter; release the key and continue to drag to adjust Hardness.

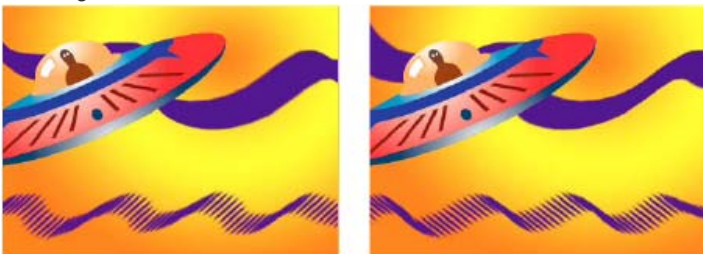
**Diameter** Controls the size of the brush.



Strokes with low Diameter values (left) and high Diameter values (right)

**Angle** The angle by which the long axis of an elliptical brush is rotated from horizontal.

**Note:** Brush angles can be expressed in both positive and negative values. For example, a brush with a 45° angle is equivalent to a brush with a -135° angle.



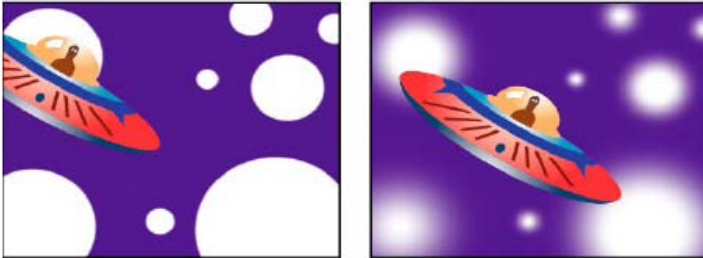
Angled brushes create chiseled strokes: 45-degree brush (left), and -45-degree brush (right).

**Roundness** The ratio between the short and long axes of a brush. A value of 100% indicates a circular brush, a value of 0% indicates a linear brush, and intermediate values indicate elliptical brushes.



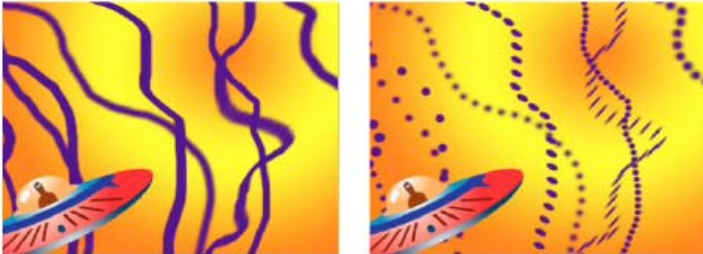
Brush strokes using 100% roundness (left) and varying percentages (right)

**Hardness** Controls the transition of a brush stroke from 100% opaque at the center to 100% transparent at the edges. Even with high Hardness settings, only the center is fully opaque.



Hardness settings at 100% (left) and 0% hardness (right)

**Spacing** The distance between the brush marks in a stroke, measured as a percentage of the brush diameter. When this option is deselected, the speed at which you drag to create the stroke determines the spacing.



Decrease spacing for continuous strokes (left); increase spacing for dashed strokes (right).

**Brush Dynamics** These settings determine how the features of a pressure-sensitive digitizing tablet—such as a Wacom pen tablet—control and affect brush marks. For each brush, you can choose Pen Pressure, Pen Tilt, or Stylus Wheel for Size, Angle, Roundness, Opacity, and Flow to indicate what features of the pen tablet you would like to use to control brush marks. For example, you can vary the thickness of brush marks by setting Size to Pen Pressure and pressing more firmly when drawing some portions of the stroke. If Size is not set to Off, Minimum Size specifies the size of the thinnest brush mark.

## Paint with the Brush tool

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Use the Brush tool to paint on a layer in the Layer panel with the current foreground color.

**Important:** To specify settings for a paint stroke before you apply it, use the *Paint and Brushes* panels. To change and animate properties for a paint stroke after you've applied it, work with the properties of the stroke in the *Timeline* panel.

### Select a color for the Brush tool

Do any of the following with the Brush tool active:

- To select a foreground color with the Color Picker, click the Set Foreground Color button  in the Paint panel.
- To select a foreground color from anywhere on the screen with the eyedropper, select the eyedropper  in the Paint panel and then click to sample the color under the pointer. Ctrl-click (Windows) or Command-click (Mac OS) to sample the average color of a 3-pixel by 3-pixel square.  
💡 You can quickly activate the eyedropper for use within the Layer panel by pressing **Alt** (Windows) or **Option** (Mac OS) when the pointer is in the Layer panel.
- To switch the foreground color with the background color, press **X** or click the Switch Foreground And Background Colors button .
- To reset the foreground color and background color to black and white, press **D**.

**Note:** To change or animate the color of a brush stroke after painting, use the *Color* property in the *Stroke Options* group in the *Timeline* panel.

### Paint with the Brush tool

- Select the Brush tool .
- Choose settings and a brush in the Paint panel and Brushes panel.

3. In the Layer panel, drag with the Brush tool to paint on the layer.

Each time you release the mouse button, you stop drawing a stroke. When you drag again, you create a new stroke. Shift-drag to resume drawing the previous stroke.

### Paint on individual frames with the Brush tool

You can paint on individual frames over a series of frames to create an animation or to obscure unwanted details in your footage.

 *If your output will be interlaced, double the frame rate of your composition before painting on individual frames. (See Frame rate.)*

1. Select the Brush tool.
2. In the Paint panel, choose Custom from the Duration menu, and specify the duration in frames. To paint on each frame, set the Duration value to 1. Set other options in the Paint panel and Brushes panel as desired.
3. In the Layer panel, drag with the Brush tool to paint on the layer.

Each time you release the mouse button, you stop drawing a stroke. When you drag again, you create a new stroke. Shift-drag to resume drawing the previous stroke.

4. Press 2 on the main keyboard to advance the number of frames specified by the Custom duration setting, and then repeat the previous step.

**Note:** To move back the Custom number of frames, press 1 on the main keyboard.

 *If you use a pen tablet, map the keyboard shortcuts to the buttons on your pen to work more efficiently. See the documentation for your pen tablet for instructions.*

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## Clone Stamp tool

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You can use the Clone Stamp tool to copy pixel values from one place and time and apply them at another place and time. For example, you can use the Clone Stamp tool to remove wires by copying from a clear patch of sky, or you can create a herd of cows from one cow in the source footage and offset the copies in time.

The Clone Stamp tool samples the pixels from a source layer and applies the sampled pixel values to a target layer; the target layer can be the same layer or a different layer in the same composition. If the source layer and target layer are the same, the Clone Stamp tool samples paint strokes and effects in the source layer, in addition to the layer source image.

[This video](#) from the *After Effects CS5: Learn By Video* series shows how to combine motion tracking and the Clone Stamp tool to remove an object from a scene.

Angie Taylor provides a tutorial on the [Digital Arts website](#) that shows how to use tracking data and the Clone Stamp tool to apply copies of an object in a scene while matching a camera move.

Eran Stern provides a video tutorial on the [Creative COW website](#) that shows how to use the Clone Stamp tool to create copies of an object and offset them from one another in space and time.

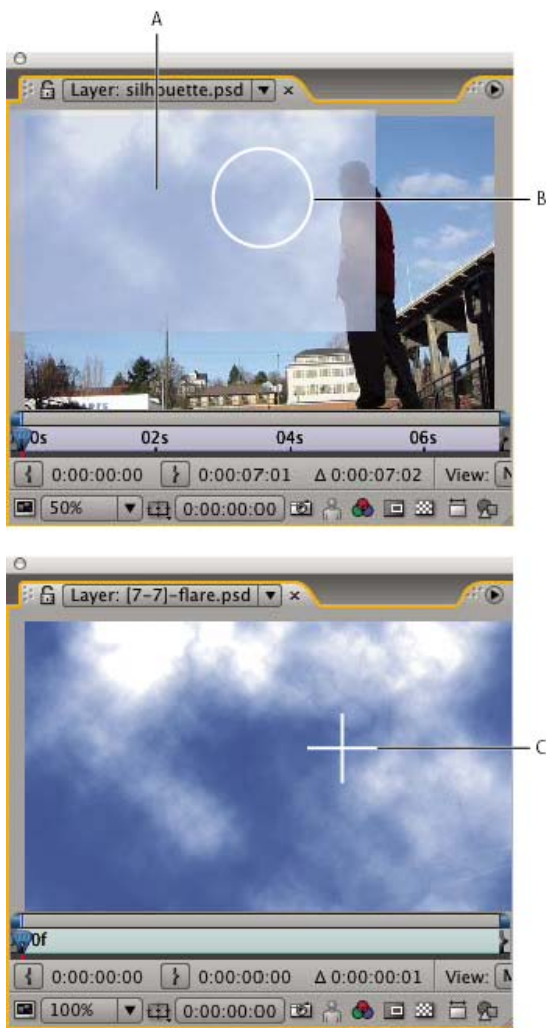
### Use the Clone Stamp tool

As with all paint tools, you use the Clone Stamp tool in the Layer panel.

 *If the source layer and target layer are different layers, open each layer in a different viewer. Press Ctrl+Alt+Shift+N (Windows) or Command+Option+Shift+N (Mac OS) to split and lock the current viewer.*

You can identify what result a stroke will have before you make it by using the clone source overlay, a semi-transparent image of the source layer.





Displaying the clone source overlay while cloning between two different layers

A. Clone source overlay B. Current stroke point C. Current sample point

**Important:** To specify settings for a paint stroke before you apply it, use the Paint and Brushes panels. To change and animate properties for a paint stroke after you've applied it, work with the properties of the stroke in the Timeline panel.

Select **Aligned** in the Paint panel to make the position of the sample point (Clone Position) change for subsequent strokes to match the movement of the Clone Stamp tool in the target Layer panel. In other words, with the **Aligned** option selected, you can use multiple strokes to paint on one copy of the sampled pixels. In contrast, deselecting the **Aligned** option causes the sample point to stay the same between strokes, meaning that you begin painting on pixels from the original sample point each time you drag again to create a new clone stroke.

For example, select **Aligned** to use multiple clone strokes to copy one whole cow—which would be difficult to do in one continuous stroke—and deselect **Aligned** to copy one flower into dozens of places in the target layer to make a field of flowers, using one clone stroke per copy.

Select **Lock Source Time** to clone a single source frame (at composition time **Source Time**); deselect **Lock Source Time** to clone subsequent frames, with a time offset (**Source Time Shift**) between the source frame and the target frame. The clone source time automatically loops back to the starting sample point when the current sampling point goes beyond the end of the duration of the source layer. This looping is especially helpful when you have a lot of frames to repair in the target layer but only a few good frames in the source layer.

1. Open a composition that contains both the source layer and the target layer.
2. Open the source layer in a Layer panel and move the current-time indicator to the frame from which to begin sampling.

**Note:** You can manually manipulate the time and coordinates from which sampling begins by modifying the **Offset**, **Source Time Shift**, **Source Position**, or **Source Time** values in the Paint panel. You can reset them to zero with the **Reset** button.

3. Alt-click (Windows) or Option-click (Mac OS) with the Clone Stamp tool on the source layer in the Layer panel to set the sampling point.
4. Open the target layer in a Layer panel and move the current-time indicator to the frame at which to begin painting the clone stroke.
5. Drag in the target layer to paint on cloned pixel values from the source layer. To help you identify what the Clone Stamp tool is sampling as you apply clone strokes, a crosshair identifies the point being sampled.

Each time you release the mouse button, you stop drawing a stroke. When you drag again, you create a new stroke. Shift-drag to resume drawing the previous stroke.

Click the **Difference Mode** button next to the **Clone Source Overlay** option in the Paint panel or modify the opacity of the overlay to help you better line up elements and see the results of your clone strokes. To temporarily show the clone source overlay, press Alt+Shift (Windows) or Option+Shift (Mac OS). Alt+Shift-drag (Windows) or Option+Shift-drag (Mac OS) to change the position of the source layer.

Each clone stroke includes properties in the Timeline panel that are unique to the Clone Stamp tool and correspond to settings made in the Paint panel before the clone stroke is created:

**Clone Source** The sampled layer.

**Clone Position** The (x, y) location of the sample point within the source layer.

**Clone Time** The composition time at which the source layer is sampled. This property appears only when Lock Source Time is selected.

**Clone Time Shift** The time offset between the sampled frame and the target frame. This property appears only when Lock Source Time is not selected.

After clone strokes have been created, their properties in the Timeline panel can be modified and animated. For example, you can clone a bird flying across the screen by cloning it in one frame, tracking the motion of the bird, and then linking the Clone Position property to the Attach Point property of tracker with an expression.

 You can set a blending mode for clone strokes, just as for other paint strokes. For example, consider using the Darken blending mode to remove light-colored scratches, and using the Lighten blending mode to remove dark-colored blemishes and dust.

## Work with clone presets

Use clone presets to save and reuse clone source settings: Source Layer, Aligned, Lock Source Time, Source Time Shift, Offset, and Source Position values. Clone presets are saved in the preferences file, so they can be reused in other projects. To work with clone presets, first select the Clone Stamp tool.

- To select a clone preset, press 3, 4, 5, 6, or 7 on the main keyboard, or click a Clone Preset button  in the Paint panel.
- To modify a clone preset, select it and adjust the Clone Options settings as desired.
- To copy the settings from one clone preset to another, select the clone preset from which to copy, and Alt-click (Windows) or Option-click (Mac OS) the Clone Preset button for the clone preset to which you want to paste the settings.

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## Eraser tool

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If you use the Eraser tool in Layer Source & Paint or Paint Only mode, it creates Eraser strokes that can be modified and animated. In contrast, using the Eraser tool in Last Stroke Only mode only affects the last paint stroke drawn and does not create an Eraser stroke.

 To temporarily use the Eraser tool in Last Stroke Only mode, Ctrl+Shift-drag (Windows) or Command+Shift-drag (Mac OS).

1. Select the Eraser tool from the Tools panel.
2. Choose settings in the Paint panel.
3. Select a brush in the Brushes panel, and set brush options.
4. Drag through the area you want to erase in the Layer panel.

Each time you release the mouse button, you stop drawing a stroke. When you drag again, you create a new stroke. Shift-drag to resume drawing the previous stroke.

**Note:** If you use a pen tablet, pressing the eraser side of the pen to the tablet temporarily activates the Eraser tool.

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## Animate and edit paint strokes

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You animate a paint stroke by setting keyframes or expressions for its properties. After Effects animates paint stroke properties—even the Path property of a paint stroke—by interpolating values for all frames between keyframes.

By modifying and animating the Start and End properties of a paint stroke, you can control how much of a stroke is shown at any time. For example, by automatically animating the End property from 0% to 100% with the Write On setting, you can make a paint stroke appear to be drawn on over time.

As with all properties, you can link paint stroke properties to other properties using expressions. For example, you can make a paint stroke follow a moving element in your footage by tracking the moving element and then linking the Position property of the paint stroke to the Attach Point property of the tracker.

Rotoscoping is a special case of painting or drawing on individual frames in which some item in the frame is being traced. Often, rotoscoping refers to drawing animated masks rather than paint strokes. (See [Rotoscoping introduction and resources](#).)

Scott Squires provides a pair of movies on his Effects Corner website that show how to rotoscope, both painting and masking:

- [Rotoscoping - Part 1](#)
- [Rotoscoping - Part 2](#)

Eran Stern provides a video tutorial on the [Creative COW website](#) that shows how to animate a set of paint strokes to interpolate between several hand-drawn pictures so that each morphs into the next.

## Animate a paint stroke by sketching with Write On

If you choose Write On from the Duration menu in the Paint panel, the End property is automatically animated to match the motion that you used to draw the stroke.

**Note:** *After Effects also includes a Write-on effect. (See Write-on effect.)*

1. Select a paint tool in the Tools panel.
2. In the Paint panel, choose Write On from the Duration menu.
3. Drag in the Layer panel to apply a paint stroke to the layer.

As you paint, your movements are recorded in real time and determine the rate at which the resulting stroke is drawn to the screen for output. Recording begins when you click within the layer in Layer panel. When you release the mouse button, the current time returns to the time at which you started painting; this behavior is so that you can record more paint strokes for animated playback starting from the same time.

 You can animate the Trim Paths operation on a shape path to accomplish a similar result as animating a paint stroke with Write On. (See *Alter shapes with path operations.*)

## Animate a paint stroke path

1. Select a paint tool in the Tools panel.
2. In the Paint panel, choose Single Frame, Constant, or Custom from the Duration menu.
3. In the Layer panel, drag to create a paint stroke.
4. Using the Selection tool, select the paint stroke.  
 To momentarily activate the Selection tool, press and hold V.
5. Press SS to show the selected paint stroke in the Timeline panel.
6. Click the triangle next to the paint stroke name to expand its list of properties.
7. Click the stopwatch for the Path property to create an initial Path keyframe.
8. Drag the current-time indicator to another time.
9. While the stroke is still selected, drag in the Layer panel using a paint tool to create a paint stroke. A second Path keyframe appears in the Timeline panel.

By creating a stroke while a stroke is selected, you replace the selected stroke, which is sometimes referred to as stroke targeting.

 If you are not satisfied with the way that the path is interpolated, consider creating your path as a mask, using Smart Mask Interpolation to fine-tune the interpolation, and then copying the Mask Path property keyframes to the paint stroke Path property. (See *Animate a mask path with Smart Mask Interpolation.*)



*After Effects interpolates a paint stroke (center) between two different shapes created with the same brush (left and right).*

More Help topics



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# Overview of shape layers, paths, and vector graphics

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[About vector graphics and raster images](#)

[About paths](#)

[About shapes and shape layers](#)

[Groups and render order for shapes and shape attributes](#)

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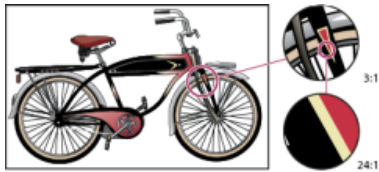
## About vector graphics and raster images

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Vector graphics are made up of lines and curves defined by mathematical objects called *vectors*, which describe an image according to its geometric characteristics. Examples of vector graphics elements within After Effects include mask paths, shapes on shape layers, and text on text layers.

Raster images (sometimes called *bitmap images*) use a rectangular grid of picture elements (pixels) to represent images. Each pixel is assigned a specific location and color value. Video footage, image sequences transferred from film, and many other types of images imported into After Effects are raster images.

Vector graphics maintain crisp edges and lose no detail when resized, because they are resolution-independent. This resolution-independence makes vector graphics a good choice for visual elements, such as logos, that will be used at various sizes.



Example of a vector graphic at different levels of magnification

Raster images each consist of a fixed number of pixels, and are therefore resolution-dependent. Raster images can lose detail and appear jagged (*pixelated*) if they are scaled up.



Example of a raster image at different levels of magnification

Some images are created as vector graphics in another application but are converted to pixels (*rasterized*) when they are imported into After Effects. If a layer is continuously rasterized, After Effects reconverts the vector graphics to pixels when the layer is resized, preserving sharp edges. Vector graphics from SWF, PDF, EPS, and Illustrator files can be continuously rasterized.

Aharon Rabinowitz's "What are Raster and Vector Graphics?" video tutorial—part of the [Multimedia 101 series](#) on the Creative COW website—provides a general introduction to raster images and vector graphics.

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## About paths

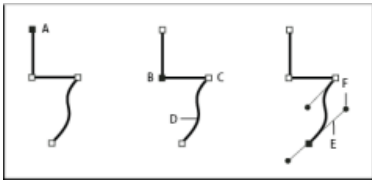
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Several features of After Effects—including masks, shapes, paint strokes, and motion paths—rely on the concept of a *path*. Tools and techniques for creating and editing these various kinds of paths overlap, but each kind of path has its own unique aspects.

A path consists of *segments* and *vertices*. Segments are the lines or curves that connect vertices. Vertices define where each segment of a path starts and ends. Some Adobe applications use the terms *anchor point* and *path point* to refer to a vertex.

You change the shape of a path by dragging its vertices, the *direction handles* at the end of the *direction lines* (or *tangents*) of each vertex, or the path segment itself.

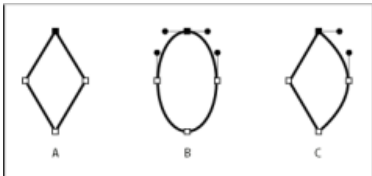
As a path exits a vertex, the angle and length of the outgoing direction line for that vertex determine the path. As the path approaches the next vertex, the path is less influenced by the outgoing direction line of the previous vertex and more influenced by the incoming direction line of the next vertex.



Components of a path

**A.** Selected vertex **B.** Selected vertex **C.** Unselected vertex **D.** Curved path segment **E.** Direction line (tangent) **F.** Direction handle

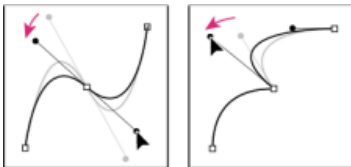
Paths can have two kinds of vertices: corner points and smooth points. At a *smooth point*, path segments are connected as a smooth curve; the incoming and outgoing direction lines are on the same line. At a *corner point*, a path abruptly changes direction; the incoming and outgoing direction lines are on different lines. You can draw a path using any combination of corner and smooth points. If you draw the wrong kind of point, you can change it later.



Points on a path

**A.** Four corner points **B.** Four smooth points **C.** Combination of corner and smooth points

When you move a direction line for a smooth point, the curves on both sides of the point adjust simultaneously. By contrast, when you move a direction line on a corner point, only the curve on the same side of the point as the direction line is adjusted.



Adjusting the direction lines on a smooth point (left) and a corner point (right)

A path can either be open or closed. An open path has a beginning point that is not the same as its end point; for example, a straight line is an open path. A closed path is continuous and has no beginning or end; for example, a circle is a closed path.

You can draw paths in common geometric shapes—including polygons, ellipses, and stars—with the shape tools, or you can use the Pen tool to draw an arbitrary path. Paths drawn with the Pen tool are either manual Bezier paths or RotoBezier paths. The main difference between RotoBezier and manual Bezier paths is that direction lines are calculated automatically for RotoBezier paths, making them easier and faster to draw.

When you use the shape tools (Rectangle, Rounded Rectangle, Ellipse, Polygon, or Star) to draw a shape path on a shape layer, you can create one of two kinds of paths: a parametric shape path or a Bezier shape path. (See [About shapes and shape layers](#).)

You can link mask paths, paint stroke paths, and Bezier shape paths using expressions. You can also copy and paste between mask paths, paint stroke paths, Bezier shape paths, motion paths, and paths from Adobe Illustrator, Photoshop, and Adobe Fireworks. (See [Creating shapes and masks](#).)

For shape paths, you can use the Merge Paths path operation (similar to the Pathfinder effects in Adobe Illustrator) to combine multiple paths into one path. (See [Merge Paths options](#).)

When you want text or an effect to follow a path, the path must be a mask path.

A path itself has no visual appearance in rendered output; it is essentially a collection of information about how to place or modify other visual elements. To make a path visible, you apply a stroke to it. In the case of a mask path, you can apply the Stroke effect. In the case of a path for a shape layer object, the default is for a path to be created with a stroke property group (attribute) after the path property group in the Timeline panel.

A color or gradient applied to the area inside the area bounded by a path is a *fill*.

**Note:** To specify the size of Bezier direction handles and vertices for masks and shapes, choose *Edit > Preferences > General (Windows)* or *After Effects > Preferences > General (Mac OS)*, and edit the *Path Point Size* value.

## About shapes and shape layers

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Shape layers contain vector graphics objects called *shapes*. By default, a shape consists of a path, a stroke, and a fill. (See [About paths](#) and [Strokes and fills for shapes](#).)

You create shape layers by drawing in the Composition panel with the shape tools or the Pen tool. (See [Creating shapes and masks](#).)

Shape paths have two varieties: *parametric* shape paths and *Bezier* shape paths. Parametric shape paths are defined numerically, by properties that you can modify and animate after drawing, in the Timeline panel. Bezier shape paths are defined by a collection of vertices (path points) and segments that you can modify in the Composition panel. You work with Bezier shape paths in the same way that you work with mask paths. All mask paths are Bezier paths.

You can modify a shape path by applying *path operations*, such as Wiggle Paths and Pucker & Bloat. You apply a stroke to a path or fill the area defined by a path with color by applying *paint operations*. (See [Shape attributes](#), [paint operations](#), and [path operations for shape layers](#).)

Shape paths, paint operations, and path operations for shapes are collectively called *shape attributes*. You add shape attributes using the Add menu in the Tools panel or in the Timeline panel. Each shape attribute is represented as a property group in the Timeline panel, with properties that you can animate, just as you do with any other layer property. (See [About animation, keyframes, and expressions](#).)

The color bit depth of a shape layer is the same as the project as a whole: 8, 16, or 32 bpc. (See [Color depth and high dynamic range color](#).)

Shape layers are not based on footage items. Layers that are not based on footage items are sometimes called *synthetic* layers. Text layers are also synthetic layers and are also composed of vector graphics objects, so many of the rules and guidelines that apply to text layers also apply to shape layers. For example, you can't open a shape layer in a Layer panel, just as you can't open a text layer in a Layer panel.

 You can save your favorite shapes as animation presets. (See [Save an animation preset](#).)

## Online resources for shape layers

For a video tutorial introducing shape layers, visit the [Adobe website](#).

Trish and Chris Meyer provide an introduction to shape layers in a PDF excerpt from the “Shape Layers” chapter of their book [Creating Motion Graphics with After Effects \(5th Edition\)](#). Trish and Chris Meyer also provide a video introduction to shape layers on the [ProVideo Coalition website](#) and tips about shape layers on the [ProVideo Coalition website](#).

You can download additional animation presets that take advantage of per-character 3D text animation from the [After Effects Exchange](#) on the Adobe website.

Chris Zwar provides an animation preset on [his website](#) that creates a target cross-hair using a single shape layer, with a wide variety of custom properties that make controlling and modifying the cross-hair animation easy and obvious.

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## Groups and render order for shapes and shape attributes

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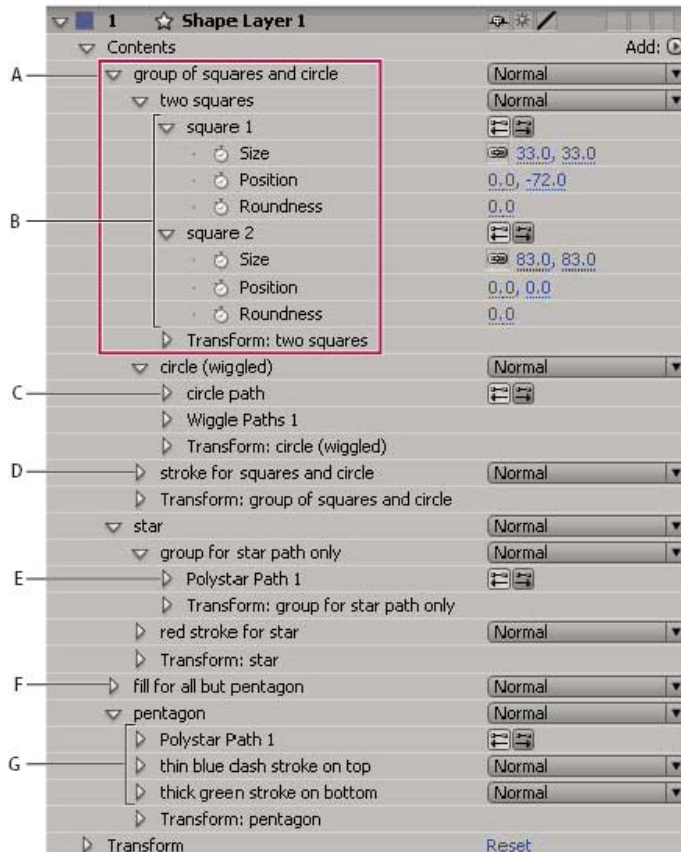
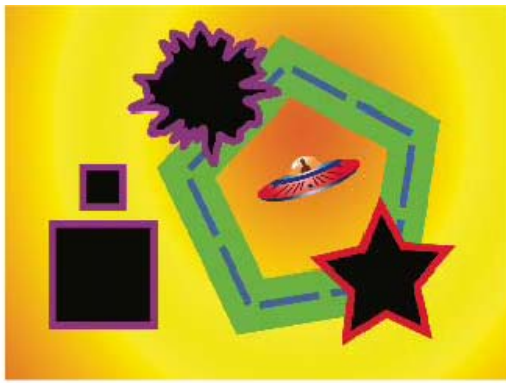
Though the default is for a shape to consist of a single path, a single stroke, and a single fill—arranged from top to bottom in the Timeline panel—much of the power and flexibility of shape layers arises from your ability to add and reorder shape attributes and create more complex compound shapes.

You can group shapes or shape attributes that are at the same grouping level within a single shape layer.

A *group* is a collection of shape attributes: paths, fills, strokes, path operations, and other groups. Each group has its own blending mode and its own set of transform properties. By assembling shapes into groups, you can work with multiple shapes simultaneously—such as scaling all shapes in the group by the same amount or applying the same stroke to each shape. You can even place individual shapes or individual shape attributes within their own groups to isolate transformations. For example, you can scale a path without scaling its stroke by grouping the path by itself.

When you add a shape attribute using the Add menu in the Tools panel or Timeline panel, the attribute is added within the group that is selected. You can drag groups and attributes to reorder them in the Timeline panel. By reordering and grouping shapes and shape attributes, you can affect their rendering order with respect to other shapes and shape attributes.





**A.** Two shapes in a group **B.** Two paths in a compound shape **C.** Circle path with Wiggle Paths applied **D.** One stroke applied to all paths above it **E.** Star path in a group by itself **F.** One fill applied to all paths above it **G.** One path with two strokes

### Render order for shapes within a shape layer

The rules for rendering a shape layer are similar to the rules for rendering a composition that contains nested compositions:

- Within a group, the shape at the bottom of the Timeline panel stacking order is rendered first.
- All path operations within a group are performed before paint operations. This means, for example, that the stroke follows the distortions in the path made by the Wiggle Paths path operation. Path operations within a group are performed from top to bottom. (See *Alter shapes with path operations*.)
- Paint operations within a group are performed from the bottom to the top in the Timeline panel stacking order. This means, for example, that a stroke is rendered on top of (in front of) a stroke that appears after it in the Timeline panel. To override this default behavior for a specific fill or stroke, choose *Above Previous In Same Group* for the Composite property of the fill or stroke in the Timeline panel. (See *Strokes and fills for shapes*.)

Path operations and paint operations apply to all paths above them in the same group.

### Transform properties for shape groups and shape paths

Each group has its own Transform property group. This Transform property group is represented in the Timeline panel with a property group named Transform: [group name] and in the Composition panel as a dashed box with handles. You can group a path by itself and transform only the path using its new Transform property group.



Introducing an additional Transform property group for a single path is useful, for example, for creating complex motion—such as spinning about one anchor point while also revolving along an orbit. The transformations of a group affect all shapes within the group; this behavior is the same as the behavior of layer parenting. (See [Parent and child layers](#).)

Each shape path also has intrinsic properties that affect the position and shape of the path. For parametric shape paths, these properties (such as Position and Size) are parameters visible in the Timeline panel. For Bezier shape paths, these properties are defined for each vertex but are contained within the Path property. When you modify a Bezier path using the free-transform bounding box, you modify these intrinsic properties for the vertices that constitute that path. (See [About shapes and shape layers](#).)

### Group shapes or shape attributes

- Select one or more shapes or shape attributes, and do one of the following:
  - Choose Layer > Group Shapes.
  - Press Ctrl+G (Windows) or Command+G (Mac OS).

When you group shapes, the anchor point for the group is placed in the center of the bounding box for the group.

### Ungroup shapes or shape attributes

- Select a single group, and do one of the following:
  - Choose Layer > Ungroup Shapes.
  - Press Ctrl+Shift+G (Windows) or Command+Shift+G (Mac OS).

### Create an empty shape group

- Choose Group (Empty) from the Add menu in the Tools panel or in the Timeline panel.
- [Continuously rasterize a layer containing vector graphics](#)
- [Add, edit, and remove expressions](#)



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# Creating shapes and masks

## Creating masks

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[Create a mask from channel values with Auto-trace](#)  
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## Creating masks

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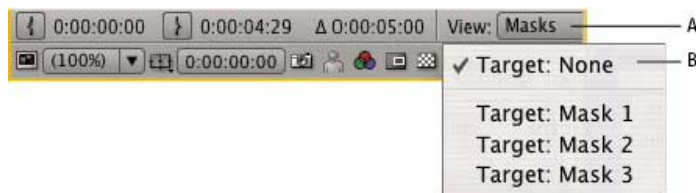
You can create one or more masks for each layer in a composition using any of the following methods:

- Draw a path using the shape tools or Pen tool. Drawing a mask path is similar to drawing a shape path. (See [Create a shape or mask by dragging with shape tools](#) and [Create a Bezier shape or mask using the Pen tool](#).)
- Specify the dimensions of the mask path numerically in the Mask Shape dialog box. (See [Create a rectangular or elliptical mask numerically](#).)
- Convert a shape path to a mask path by copying the shape's path to the Mask Path property.
- Convert a motion path to a mask path. (See [Create a mask or shape from a motion path](#).)
- Trace color or alpha channel values to create a mask using the Auto-trace command. (See [Create a mask from a channel with Auto-trace](#).)
- Paste a path copied from another layer or from Adobe Illustrator, Photoshop, or Fireworks. (See [Copy a path from Illustrator, Photoshop, or Fireworks](#).)
- Convert a text layer to one or more editable masks on a solid-color layer by using the Create Masks From Text command. (See [Create shapes or masks from text characters](#).)

When you create masks on a layer, the mask names appear in the Timeline panel outline in the order in which you create the masks. To organize and keep track of your masks, rename them.

 To rename a mask, select it and press **Enter** (Windows) or **Return** (Mac OS), or right-click (Windows) or **Control-click** (Mac OS) the mask name and choose **Rename**.

When creating additional masks for one layer in the Layer panel, make sure that the Target menu in the Layer panel is set to **None**; otherwise, you replace the targeted mask instead of creating a new mask. You can also lock a mask to prevent changes to it.



Menu selections to specify a mask to target in the Layer panel

A. View menu B. Target menu

When creating or editing masks, look in the Info panel for information such as the mask name and the number of vertices in the mask.

 To create a mask that you can move independently of the primary layer that it's masking, create the mask on a separate white solid layer, and use that solid layer as a track matte for the primary layer. Then use parenting to make the solid layer a child of the primary layer, so that the mask moves with the primary layer as if it were applied directly. Because the solid layer is a child layer, it can also be animated independently of its parent. You can use motion tracking to make the solid layer (and therefore the mask) follow moving objects in the primary layer. (See [Convert a layer into a track matte](#) and [Parent and child layers](#).)

## Create a rectangular or elliptical mask numerically

1. Select a layer in the Composition panel, or display a layer in the Layer panel.
2. Choose Layer > Mask > New Mask. A new mask appears in the Composition or Layer panel with its handles at the outer edges of the frame.
3. Choose Layer > Mask > Mask Shape.
4. Select Reset To, choose Rectangle or Ellipse from the Shape menu, and specify the size and location of the bounding box for the mask.

## Create a mask from channel values with Auto-trace

You can convert the alpha, red, green, blue, or luminance channel of a layer to one or more masks by using the Auto-trace command. Auto-trace creates as many Bezier masks as necessary to outline the specified channel values in the layer. Auto-trace creates masks with the smallest number of vertices possible while conforming to the settings that you choose. You can modify a mask created with Auto-trace as you would any other mask, and you can link its path to other path types, such as shape paths on a shape layer, using expressions.

When you apply Auto-trace, affected layers are automatically set to Best Quality to ensure accurate results.

 *To reduce the number of masks created by Auto-trace, apply a keying effect to the layer to isolate your subject before applying Auto-trace.*

1. In the Timeline panel, do one of the following:
  - To create mask keyframes at a single frame, drag the current-time indicator to the desired frame.
  - To create mask keyframes across a range of frames, set a work area that spans that range.

2. Select one or more layers.

3. Choose Layer > Auto-trace.

4. Select one of the following:

**Current Frame** Creates mask keyframes at only the current frame.

**Work Area** Creates mask keyframes for frames within the work area.

5. Set any of the following options:

**Invert** Inverts the input layer before searching for edges.

**Blur** Blurs the original image before generating the tracing result. Select this option to reduce small artifacts and to smooth jagged edges in the tracing result. Deselect this option to closely trace details in a high-contrast image. Specify the radius, in pixels, of the area used for the blurring operation. Larger values result in more blur.

**Tolerance** How far, in pixels, the traced path is allowed to deviate from the contours of the channel.

**Threshold** Specifies, as a percentage, the value that a pixel's channel must have for that pixel to be considered part of an edge. Pixels with channel values over the threshold are mapped to white and are opaque; pixels with values under the threshold are mapped to black and are transparent.

**Minimum Area** Specifies the smallest feature in the original image that will be traced. For example, a value of 4 removes features smaller than 2 pixels wide by 2 pixels high from the tracing result.

**Corner Roundness** Specifies the roundness of the mask curve at vertices. Enter a higher value for smoother curves.

**Apply To New Layer** Applies the mask to a new solid the same size as the selected layer. This control is automatically selected for layers that have Collapse Transformations enabled—it creates a new layer the same size as the composition that contains the layer.

**Preview** Select to preview the mask results and the results of the various options of the Auto-trace command.

## Creating shapes and shape layers

You create a shape layer by drawing in the Composition panel with a shape tool or the Pen tool. You can then add shape attributes to existing shapes or create new shapes within that shape layer. By default, if you draw in the Composition panel when a shape layer is selected, you create a new shape within that shape layer, above the selected shapes or group of shapes. If you draw in the Composition panel using a shape tool or Pen tool when an image layer other than a shape layer is selected, you create a mask.

 *Press F2 to deselect all layers before drawing in the Composition panel to create a new shape layer.*

You can create shapes and shape layers using any of the following methods:

- Draw a path using the shape tools or Pen tool. Drawing a mask path is similar to drawing a shape path. (See [Create a shape or mask by](#)

[dragging with shape tools](#) and [Create a Bezier shape or mask using the Pen tool.](#))

- Convert a text layer to shapes on a shape layer by using the Create Shapes From Text command. (See [Create shapes or masks from text characters.](#))
- Convert a mask path to a shape path.
- Convert a motion path to a shape path. (See [Create a mask or shape from a motion path.](#))
- Paste a path copied from another layer or from Adobe Illustrator, Photoshop, or Fireworks. (See [Copy a path from Illustrator, Photoshop, or Fireworks.](#))
- Create a new, empty shape layer by choosing Layer > New > Shape Layer.

In most cases, a new shape has a fill and a stroke that correspond to the Fill and Stroke settings in the Tools panel at the time that the shape is drawn. You can use the same controls in the Tools panel to change these attributes for a selected shape after it has been drawn. Shapes created from text are created with fills and strokes that match the fills and strokes of the original text.

**Note:** To draw a mask on a shape layer, click the Tool Creates Mask  button in the Tools panel with a shape tool or Pen tool active. For more information about creating masks, see [Creating masks](#).

Aharon Rabinowitz provides a video tutorial on the [Creative COW website](#) that shows how to combine multiple paths into a single compound shape using the Merge Paths path operation.

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## Vector Art Footage-to-Shape Conversion (CS6)

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In previous versions of After Effects you could import an Illustrator (.ai), EPS (.eps), or PDF (.pdf) file, however you could not modify the file. In After Effects CS6, you can create a shape layer from a vector art footage layer, and then modify it.

With the ability to bevel and extrude objects in After Effects CS6, you can extrude the artwork (for example, extruded logos), as well. See [Extruding text and shape layers](#).

To convert a vector art footage layer to shape layer:

- Choose Layer > Create Shapes from Vector Layer. A matching shape layer will appear above the footage layer, and the footage layer will be muted.

The following issues are known:

- Not all features of Illustrator files are currently preserved. Examples include: opacity, images, and gradients.
- Converted shapes ignore PAR overrides specified in the Interpret Footage dialog box.
- Gradients and unsupported types may show as 50% gray shapes.
- Files with thousands of paths may import very slowly without feedback.
- The menu command works on a single selected layer at a time.
- If you import an Illustrator file as a composition (i.e., several layers), you cannot convert all of those layers in one pass. However, you can import the file as footage, and then use the command to convert the single footage layer to shapes.

[In this video](#) by Todd Kopriva and video2brain, see how to quickly convert vector graphics from Illustrator to shape layers and animate the paths in After Effects CS6. This process is much simpler than previous versions of After Effects.

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## Create a shape or mask by dragging with shape tools

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The shape tools are the Rectangle , Rounded Rectangle , Ellipse , Polygon , and Star  tools.

 To activate and cycle through the shape tools, press Q.

A polygon is a star without an Inner Radius or Inner Roundness property, so the name of the shape created for a polygon or a star is the same: *polystar*.

You can create a mask by dragging with a shape tool on a selected layer in the Composition panel or Layer panel. You can create a shape by dragging with a shape tool on a selected shape layer in the Composition panel. If you drag with a shape tool in the Composition panel with no layer selected, you create a shape on a new shape layer.

**Note:** To draw a mask on a shape layer, click the Tool Creates Mask  button in the Tools panel with a shape tool active.

When you create a shape by dragging with a shape tool in the Composition panel, you create a parametric shape path. To instead create a Bezier shape path, press the Alt (Windows) or Option (Mac OS) key before you click to begin dragging. You can release the key before you complete the drag operation. All mask paths are Bezier paths. (See [About shapes and shape layers](#).)

*Dragging* starts when you click in the Composition panel or Layer panel to begin drawing, and ends when you release the mouse button. Pressing modifier keys at different times during a single dragging operation achieves different results:

- To reposition a shape or mask as you are drawing, hold the spacebar or the middle mouse button while dragging.
- To scale a circle, ellipse, square, rounded square, rectangle, or rounded rectangle around its center while drawing, hold the Ctrl (Windows) or Command (Mac OS) key after you begin dragging. Don't release the key until you have released the mouse button to finish drawing.
- To cancel the drawing operation, press Esc.

**Note:** Each shape tool retains the settings of the most recent drawing operation with that tool. For example, if you draw a star and modify the number of points to be 10, then the next star that you draw will also have 10 points. To reset settings for a tool and create a shape with the default settings, double-click the tool in the Tools panel. (See [Create a shape or mask the size of the layer.](#))

## Draw rectangles, rounded rectangles, squares, and rounded squares

1. Select the Rectangle tool  or the Rounded Rectangle tool , and do one of the following:
  - To draw a rectangle or rounded rectangle, drag diagonally.
  - To draw a square or rounded square, Shift-drag diagonally.
2. (Optional) If drawing a rounded rectangle or rounded square, do the following before releasing the mouse button:
  - To increase or decrease the corner roundness, press the Up Arrow key or the Down Arrow key, or roll the mouse wheel forward or backward.
  - To set corner roundness to the minimum or maximum, press the Left Arrow key or the Right Arrow key.
3. Release the mouse button to finish drawing. If drawing a square or rounded square, release the Shift key after releasing the mouse button.

**Note:** Squares are created to be square according to the pixel aspect ratio of the composition. If the pixel aspect ratio of the composition is not 1, then squares only appear square in the Composition panel if the Toggle Pixel Aspect Ratio button  is selected at the bottom of the Composition panel.

## Draw ellipses and circles

1. Select the Ellipse tool , and do one of the following:
  - To draw an ellipse, drag diagonally.
  - To draw a circle, Shift-drag diagonally.
2. Release the mouse button to finish drawing. If drawing a circle, release the Shift key after releasing the mouse button.

**Note:** Circles are created to be circular according to the pixel aspect ratio of the composition. If the pixel aspect ratio of the composition is not 1, then circles only appear circular in the Composition panel if the Toggle Pixel Aspect Ratio button  is selected at the bottom of the Composition panel.

## Draw polygons and stars

1. Select the Polygon tool  or the Star tool , and do one of the following:
  - Drag to scale and rotate the polygon or star as you draw it.
  - Shift-drag to scale the polygon or star as you draw it, preventing rotation.
2. (Optional) Do the following before releasing the mouse button:
  - To add or remove points, press the Up Arrow key or the Down Arrow key, or roll the mouse wheel forward or backward.
  - To increase or decrease the outer roundness, press the Left Arrow key or the Right Arrow key.
  - To keep the inner radius of a star constant as you move the mouse to increase the outer radius, hold the Ctrl (Windows) or Command (Mac OS) key.
  - To increase or decrease the inner roundness of a star, press the Page Up key or the Page Down key.
3. Release the mouse button to finish drawing. If Shift-dragging to prevent rotation, release the Shift key after releasing the mouse button.

## Create a Bezier shape or mask using the Pen tool

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You can create a Bezier mask using the Pen tool on a selected layer in the Composition panel or Layer panel. You can create a shape with a Bezier path using the Pen tool on a selected shape layer in the Composition panel. If you draw with the Pen tool in the Composition panel with no layer selected, you create a shape on a new shape layer.

Creating a RotoBezier path is similar to creating a manual Bezier path. The primary difference is that direction lines for vertices and curvature for path segments are automatically calculated.

## Create a manual Bezier path using the Pen tool

1. With the Pen tool selected and the RotoBezier option deselected in the Tools panel, click in the Composition panel where you want to place the first vertex.

- Click where you want to place the next vertex. To create a curved segment, drag the direction line handle to create the curve that you want.

 To reposition a vertex after you've clicked to place it but before you've released the mouse button, hold the spacebar while dragging.

The last vertex that you add appears as a solid square, indicating that it is selected. Previously added vertices become hollow, and deselected, as you add more vertices.

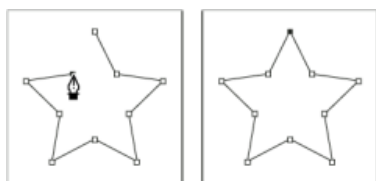
- Repeat step 2 until you are ready to complete the path.
- Complete the path by doing one of the following:
  - To close the path, place the pointer over the first vertex and, when a closed circle icon appears next to the pointer , click the vertex.

**Note:** You can also close a path by double-clicking the last vertex or choosing *Layer > Mask And Shape Path > Closed*.

- To leave the path open, activate a different tool, or press F2 to deselect the path.

## Draw straight manual Bezier path segments with the Pen tool

The simplest path that you can draw with the Pen tool is a straight line, made by clicking with the Pen tool to create two vertices. By continuing to click, you create a path made of straight line segments connected by corner points.



Clicking with Pen tool creates straight segments.

- Place the Pen tool where you want the straight segment to begin, and click to place a vertex. (Do not drag.)
- Click again where you want the segment to end. (Shift-click to constrain the angle between segments at the corner point to a whole multiple of 45°.)
- Continue clicking to set vertices for additional straight segments.

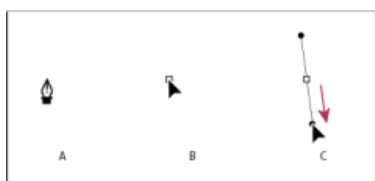
## Draw curved manual Bezier path segments with the Pen tool

You create a curved path segment by dragging direction lines. The length and direction of the direction lines determine the shape of the curve.

 Shift-drag to constrain the angle of the direction lines to whole multiples of 45°. Alt-drag (Windows) or Option-drag (Mac OS) to modify only the outgoing direction line.

- Place the Pen tool where you want the curve to begin, and hold the mouse button down.
 

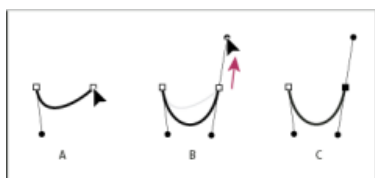
A vertex appears, and the Pen tool pointer changes to an arrowhead.
- Drag to modify the length and direction of both direction lines for a vertex, and then release the mouse button.



Drawing the first vertex in a curved path

A. Placing the Pen tool B. Starting to drag (mouse button pressed) C. Dragging to extend direction lines

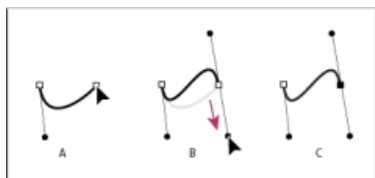
- Place the Pen tool where you want the curved segment to end, and do one of the following:
  - To create a C-shaped curve, drag in the direction opposite from the direction that you dragged the previous direction line, and then release the mouse button.



Drawing the second vertex in a curved path

A. Starting to drag B. Dragging away from previous direction line, creating a C curve C. Result after releasing mouse button

To create an S-shaped curve, drag in the same direction as the previous direction line, and then release the mouse button.



Drawing an S curve

**A.** Starting to drag **B.** Dragging in same direction as previous direction line, creating an S curve **C.** Result after releasing mouse button

4. Continue dragging the Pen tool from different locations to create a series of smooth curves.

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## Create a shape or mask the size of the layer

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1. Select the destination for the new mask or shape:
  - To create a shape on an existing shape layer, select the shape layer.
  - To create a shape on a new shape layer with the dimensions of the composition, deselect all layers by pressing F2.
  - To create a mask, select a layer in the Timeline panel, Layer panel, or Composition panel. To create a mask on a shape layer, select Tool Creates Mask  in the Tools panel with a shape tool active.
  - To replace a mask path, select the mask in the Timeline panel, Layer panel, or Composition panel.
  - To replace a shape path, select the shape path (not the group) in the Composition panel or Timeline panel.
2. In the Tools panel, double-click the Rectangle , Rounded Rectangle , Ellipse , Polygon , or Star  tool.

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## Create shapes or masks from text characters

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The Create Shapes From Text command extracts the outlines for each character, creates shapes from the outlines, and puts the shapes on a new shape layer. You can then use these shapes as you would any other shapes.

The Create Masks From Text command extracts the outlines for each character, creates masks from the outlines, and puts the masks on a new solid-color layer. You can then use these masks as you would any other masks.

 *Some font families, such as Webdings, include characters that are graphical images, rather than text. Converting text from these font families can be a good way to get started with simple graphical elements in shape layers.*

### Create shapes from text

1. Select the text to convert to shapes:
  - To create shapes for all characters in a text layer, select the text layer in the Timeline panel or Composition panel.
  - To create shapes for specific characters, select the characters in the Composition panel.
2. Do one of the following:
  - Choose Layer > Create Shapes From Text.
  - Right-click (Windows) or Control-click (Mac OS) the layer or text and choose Create Shapes From Text from the context menu.

The Video switch  for the text layer is turned off.

The new shape layer is created at the top of the layer stacking order. The new layer contains one shape group for each selected character, plus fill and stroke properties that match the fills and strokes of the text.

For characters that consist of compound paths—such as *i* and *e*—multiple paths are created and combined with the Merge Paths path operation.

Effects, masks, layer styles, and keyframes and expressions for properties in the Transform property group of the text layer are copied to the new shape layer or solid-color layer.

### Create masks from text

1. Select the text to convert to masks:
  - To create masks for all characters in a text layer, select the text layer in the Timeline panel or Composition panel.
  - To create masks for specific characters, select the characters in the Composition panel.
2. Do one of the following:
  - Choose Layer > Create Masks From Text.



Right-click (Windows) or Control-click (Mac OS) the layer or text and choose Create Masks From Text from the context menu.

The Video switch  for the text layer is turned off.

The new solid-color layer is created at the top of the layer stacking order.

For characters that consist of compound paths—such as *i* and *e*—multiple masks are created and combined with the Subtract mask mode.

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## Copy a path from Illustrator, Photoshop, or Fireworks

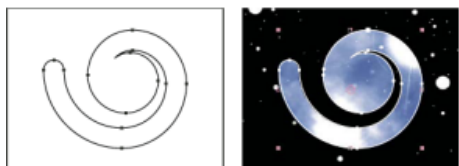
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You can copy a path from Illustrator, Photoshop, or Fireworks and paste it into After Effects as a mask path or shape path.

To make the data copied from Illustrator compatible with After Effects, the AICB option must be selected in the Files & Clipboard section of the Adobe Illustrator Preferences dialog box.

For a path imported from Photoshop to be scaled correctly, the Photoshop document must have a resolution of 72 dpi. 72 dpi is the Resolution setting of documents created in Photoshop using a Film & Video preset.

**note:** You can also use a copied Illustrator, Photoshop, or Fireworks path as an After Effects motion path. See [Create a motion path from a mask, shape, or paint path](#) for more information.



Path drawn in Adobe Illustrator (left) and pasted into After Effects as a mask (right)

1. In Illustrator, Photoshop, or Fireworks, select an entire path, and then choose Edit > Copy.
2. In After Effects, do one of the following to define a target for the paste operation:
  - To create a new mask, select a layer.
  - To replace an existing mask path or shape path, select its Path property.

**Note:** To paste a path as a shape path, you must select the Path property of an existing shape in a shape layer. This selection tells After Effects what the target of the paste operation is; if the target isn't specified in this way, After Effects assumes that the target is the entire layer and therefore draws a new mask. If there is no Path property—perhaps because the shape layer is empty—then you can draw a placeholder path with the Pen tool and then paste the path from Illustrator into the placeholder path.

3. Choose Edit > Paste.

If you paste multiple paths into a shape path, the first path goes into the shape path, and the remaining paths are pasted into new mask paths. This behavior is because the paths other than the first one don't have a clearly defined target, so they are added to the entire layer as masks.

 To paste multiple paths into multiple shape paths simultaneously, first create and select multiple placeholder shape paths in After Effects. Trish and Chris Meyer provide details of this technique, plus related tips and tricks on the [ProVideo Coalition website](#).

Andrew Devis shows how to use paths from Illustrator as motion paths in After Effects in [this video on the Creative COW website](#).

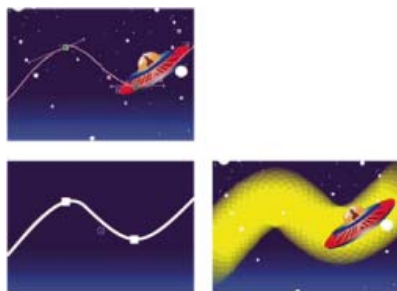
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## Create a mask or shape from a motion path

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You can copy position keyframes, anchor point keyframes, or an effect control point's position keyframes and paste those keyframes into a selected mask path or shape path. When you create mask paths or shape paths from motion paths, make sure that you copy keyframes from a single Position property only—do not copy the keyframes of any other property.

 Draw a motion path with Motion Sketch and then paste the path into a mask path or shape path.

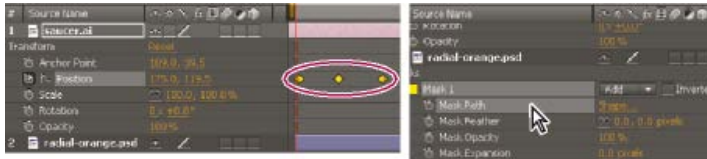


The motion path of the spaceship (top) is copied to the background layer (lower-left) and used by the Vegas effect (lower-right).

**Note:** When copying between a mask path to a motion path, keep in mind that the mask path's values are expressed in the coordinate system of the layer (layer space), whereas the motion path's values are expressed in the coordinate system of the composition (composition space). This difference may cause the pasted path to be offset, requiring you to reposition the path after pasting it. (See [Coordinate systems: composition space and layer space](#).)

### Create a mask path from a motion path

1. In the Timeline panel, click the name of the Position property or Anchor Point property from which you want to copy the motion path. (This selects all keyframes. To select only some of the keyframes of a motion path, Shift-click them.)
2. Choose Edit > Copy.
3. To create a new mask, select the layer on which to create the mask, and choose Layer > Mask > New Mask.
4. In the Timeline panel, click the name of the Mask Path property for the mask into which to paste the keyframes from the motion path.
5. Choose Edit > Paste.



Selecting and copying Position keyframes (left); then pasting them in the selected Mask Path property (right)

### Create a shape path from a motion path

1. In the Timeline panel, click the name of the Position property or Anchor Point property from which you want to copy the motion path. (This selects all keyframes. To select only some of the keyframes of a motion path, Shift-click them.)
2. Choose Edit > Copy.
3. To create a new shape layer, press F2 to deselect all layers, then click in the Composition panel with the Pen tool to create a single-point Bezier path.
4. Press SS to reveal the Path property for the shape. Click the name of the Path property into which to paste the keyframes from the motion path.
5. Choose Edit > Paste.

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## Duplicate a shape group while transforming

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When a shape group is selected in group selection mode, you can duplicate the group while moving, rotating, or scaling it in the Composition panel.

- Hold the Alt (Windows) or Option (Mac OS) key as you drag to transform a group.

The pointer changes to a duplication pointer (↻ or ↻→) as you hold the key and place the pointer near the group transform box.

- [Keying overview and tips](#)
- [Shape layers \(keyboard shortcuts\)](#)
- [Preparing and importing Illustrator files](#)
- [Drawing](#)
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# Managing and animating shape paths and masks

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You animate mask paths and shape paths in much the same way that you animate other properties: set keyframes for the Mask Path or Path property, set paths at each keyframe, and After Effects will interpolate between these specified values.

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## Rotoscoping introduction and resources

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*Rotoscoping* (or just *roto* in casual usage) is the drawing or painting on frames of a movie, using visual elements in the movie as a reference. A common kind of rotoscoping is tracing a path around an object in a movie and using that path as a mask to separate the object from its background. This allows you to work with the object and the background separately, so you can do things like apply different effects to the object than to its background or replace the background.

**Note:** *After Effects* includes the Roto Brush tool, which can be used to accomplish many of the same tasks as conventional rotoscoping, but in far less time. For information about using the Roto Brush tool, see [Roto Brush and Refine Matte](#).

 If a background or foreground object is a consistent, distinct color, you can use color keying instead of rotoscoping to remove the background or object. If the footage was shot with color keying in mind, color keying is much easier than rotoscoping. (See [Keying introduction and workflow](#).)

Rotoscoping in After Effects is mostly a matter of drawing masks, animating the mask path, and then using these masks to define a matte. Many additional tasks and techniques make this job easier, such as using motion tracking on the object before you begin drawing masks, and then using the motion tracking data to make a mask or matte automatically follow the object.

## Rotoscoping tips

- Immediately after beginning to draw a mask, press Alt+Shift+M (Windows) or Option+Shift+M (Mac OS) to turn on keyframing for that mask and set a keyframe. This way, you won't edit a mask frame-by-frame for several minutes (or longer) and then realize that you lost all of your work on previous frames because you forgot to click the stopwatch to make the mask path animated.
- Draw your masks on a white solid layer with its Video (eyeball) switch off, above the (locked) footage layer. This way, you run no risk of accidentally moving the footage layer when you manipulate the mask, and you can also much more easily apply tracking data to the mask. (You apply the tracking data to the invisible solid layer that holds the mask.) This also means that you don't lose your cached RAM preview frames each time you manipulate the mask. (See [Toggle visibility or influence of a layer or property group](#) and [Lock or unlock a layer](#).)
- Turn on the Preserve Constant Vertex Count preference. (See [Designate the first vertex for a Bezier path](#).)

Note: Preserve Constant Vertex Count When Editing Masks is called "Preserve Constant Vertex and Feather Count when Editing Masks", in After Effects CS6.

- When possible, transform (rotate, scale, move) the whole mask or a subset of the mask vertices instead of moving the vertices individually. This is both for efficiency and to avoid the chatter that comes from inconsistent movement across frames. (See [Move vertices in free-transform mode](#).)
- Manual motion tracking is less time-consuming than manual rotoscoping. The more effort you spend getting good tracking data for various parts of your scene and object, the less time you'll spend drawing and fine-tuning masks. (See [Tracking and stabilizing motion](#).)
- In After Effects CS6, use the variable-width mask feather feature for more control when feathering objects.

## Online resources about rotoscoping

[This video](#) from the *After Effects CS5: Learn By Video* series shows how to combine motion tracking and rotoscoping to isolate and selectively

color-correct an actor's face.

Scott Squires provides a pair of movies on his Effects Corner website that show how to rotoscope, both painting and masking:

- [Rotoscoping - Part 1](#)
- [Rotoscoping - Part 2](#)

Chris and Trish Meyer provide some tips on animating masks, including using Smart Mask Interpolation, on the [ProVideo Coalition website](#).

Alejandro Pérez provides a script on the [AE Enhancers forum](#) with which you can use tracking data to position individual mask vertices.

Mathias Möhl provides the KeyTweak script on [his website](#), with which you can modify many keyframes on a property simultaneously. With KeyTweak, you can modify a few keyframes manually, and the script modifies the remaining keyframes in between accordingly. KeyTweak is especially useful for Mask Path keyframes in a rotoscoping workflow.

Rich Young provides several resources for rotoscoping on his [After Effects Portal website](#).

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## View mask paths and shapes

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- To view mask paths for selected layers in the Timeline panel, press M.
- To view selected masks or shapes in the Timeline panel, press SS (press the S key twice).
- To view mask and shape paths in the Composition panel, click the Toggle Mask And Shape Path Visibility button  at the bottom of the Composition panel.
- To view mask paths in the Layer panel, choose Masks from the Layer panel View menu.
- To hide a mask path while showing others, lock the mask by selecting its Lock switch  in the Timeline panel, and then choose Layer > Mask > Hide Locked Masks.
- To isolate selected masks and hide others, choose Layer > Mask > Lock Other Masks, and then choose Layer > Mask Hide Locked Masks.

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## Select shape paths, shapes, and shape groups

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You can select shape layers and their components at any of four levels of selection, referred to as *selection modes*:

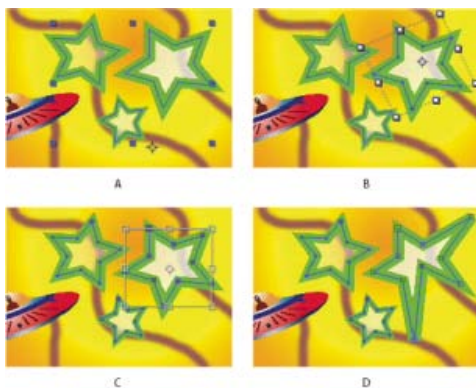
**Layer selection mode** The entire shape layer is selected. Transformations apply to the transform properties for the layer, in the Transform property group that is at the same level as the Contents property group.

**Group selection mode** An entire shape group is selected. Transformations apply to the transform properties for the group, in the Transform property group within the shape group in the Timeline panel.

**Free-transform mode** Multiple vertices on one or more Bezier paths are selected. A free-transform bounding box is shown around the vertices in the Composition panel. By operating on this box, you can move multiple vertices with a single transformation. Transformations apply to the vertices themselves, which are contained within the Path property in the Timeline panel.

**Path-editing mode** Only vertices are selected. In this mode, you can perform path-editing operations, such as adding vertices to a path and moving individual vertices.

 When a pen tool is active, path-editing mode is active. To remain in path-editing mode, select the Pen tool; press V or Ctrl (Windows) or Command (Mac OS) to temporarily activate the Selection tool as needed.



Selection modes for shapes on shape layers

A. Layer selection B. Group selection C. Free-transform D. Path editing

For information on selecting masks, see [Select masks, segments, and vertices](#).

 Press **Ctrl+A** (Windows) or **Command+A** (Mac OS) with a shape vertex selected to select all vertices on that path. Press again to select all shapes. Press again to select all layers.

### Select a shape layer

- Click the layer name or layer duration bar in the Timeline panel.
- Using the Selection tool, click within the layer bounds in the Composition panel.
- To deselect all shapes on a layer but leave the shape layer selected, click within the layer bounds but outside all shape paths.

### Select a shape group in group selection mode

- Using the Selection tool, double-click a member of the group in the Composition panel. Each time that you double-click, you descend another level in the group hierarchy.
- To activate the Direct Selection tool , hold **Ctrl** (Windows) or **Command** (Mac OS) with the Selection tool selected. Click a shape in the Composition panel with the Direct Selection tool to directly select that shape's group, regardless of how deeply nested the shape is in the group hierarchy.
- To select a group that is contained within the same group as the group that is already selected, click the group to select.
- To add a group to a selection, Shift-click it. You can combine the Shift key with double-clicking and with the Direct Selection tool to add more deeply nested groups to the selection.

### Select paths and vertices in path-editing mode

 To specify the size of Bezier direction handles and vertices for masks and shapes, choose **Edit > Preferences > General** (Windows) or **After Effects > Preferences > General** (Mac OS), and edit the **Path Point Size** value.

- To select a vertex, click the vertex with the Selection tool. To add vertices to the selection, Shift-click them.
- To select a path segment, click the segment with the Selection tool. To add segments to the selection, Shift-click them.
- To select an entire path, Alt-click (Windows) or Option-click (Mac OS) a segment or vertex of the path with the Selection tool, or select any portion of the path and press **Ctrl+A** (Windows) or **Command+A** (Mac OS).
- To select vertices by dragging, select a path or portion of a path to enter path-editing mode, and then drag with the marquee-selection tool  to draw a marquee-selection box around the vertices to select. To add vertices to the selection, hold down the Shift key as you draw additional marquee-selection boxes.

### Select all points on a path and enter free-transform mode

- Double-click a path segment while in path-editing mode or in group selection mode for a single shape.
- Select the Path property in the Timeline panel and press **Ctrl+T** (Windows) or **Command+T** (Mac OS).

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## Select masks, segments, and vertices

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Unlike layers, masks can have more than one level of selection. You can select a mask as a whole path, which is appropriate when you want to move or resize a mask. However, if you want to change the path of a mask, select one or more points on it. Selected points appear solid, and unselected points appear hollow.

 To specify the size of Bezier direction handles and vertices for masks and shapes, choose **Edit > Preferences > General** (Windows) or **After Effects > Preferences > General** (Mac OS), and edit the **Path Point Size** value.

### Select or deselect masks in the Layer or Composition panel

- To select a vertex on a mask, click the vertex with the Selection tool . To add vertices to the selection, Shift-click them.
- To select a mask segment, click the segment with the Selection tool. To add segments to the selection, Shift-click them.
- To select an entire mask, Alt-click (Windows) or Option-click (Mac OS) a segment, vertex, or handle of a mask with the Selection tool, or select any portion of the mask and choose **Edit > Select All** or press **Ctrl+A** (Windows) or **Command+A** (Mac OS). To add masks to the selection, Alt+Shift-click (Windows) or Option+Shift-click (Mac OS) them.
- To select masks by dragging, select a mask or portion of a mask to enter mask editing mode and then drag with the Selection tool to draw a marquee-selection box completely around the vertices or masks that you want to select. To add masks or vertices to the selection, hold down the Shift key as you draw additional marquee-selection boxes.
- To select all masks on a layer, select a mask on the layer, and choose **Edit > Select All** or press **Ctrl+A** (Windows) or **Command+A** (Mac OS).
- To deselect all masks, press **Ctrl+Shift+A** (Windows) or **Command+Shift+A** (Mac OS).
- To select an adjacent mask on a layer, press **Alt+accent grave (`)** (Windows) or **Option+accent grave (`)** (Mac OS) to select the next mask, or **Shift+Alt+accent grave (`)** (Windows) or **Shift+Option+accent grave (`)** (Mac OS) to select the previous mask.

- To deselect a mask, click anywhere other than on the mask.
- To remove a vertex or segment from a selection, Shift-click the vertex or segment.

 To use the Selection tool when the Pen tool is selected, hold down Ctrl (Windows) or Command (Mac OS).

## Select masks in the Timeline panel

1. Click the right arrow next to a layer name to expand it.
2. Click the right arrow next to the Masks heading to expand it, revealing all masks on that layer.
3. Do any of the following:
  - To select one mask, click its name.
  - To select a contiguous range of masks, Shift-click the names of the first and last masks in the range.
  - To select discontinuous masks together, Ctrl-click (Windows) or Command-click (Mac OS) the names of any masks you want to include.

**Note:** You can select only whole masks in the Timeline panel. To select individual vertices on a mask, use the Composition or Layer panel.

## Lock or unlock masks

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Locking a mask prevents you from selecting it in the Timeline, Composition, and Layer panels or setting it as a target in the Layer panel. Use this feature to avoid unwanted changes to the mask.

1. In the Timeline panel, expand the Masks property group.
2. In the A/V Features column, click the box underneath the Lock icon  next to the mask you want to lock or unlock. A mask is locked and cannot be selected when its Lock switch is selected—that is, when the Lock icon appears in the box.

**Note:** To unlock multiple masks at one time, select one or more layers and choose Layer > Mask > Unlock All Masks.

 To isolate selected masks and hide others, choose Layer > Mask > Lock Other Masks, and then choose Layer > Mask Hide Locked Masks.

## Move vertices in free-transform mode

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You can scale and rotate an entire mask or shape path (or selected vertices in one or more paths) using the Free Transform Points command. When you use this command, a *free-transform bounding box* surrounds the selected vertices, and an anchor point appears in the center of the bounding box to mark the anchor point for the current transformation. You can scale and rotate the selected vertices by dragging the bounding box or its handles. You can also change the reference point from which the vertices are rotated or scaled by moving the bounding box anchor point. The free-transform bounding box handles and anchor point exist independently of the handles and anchor point for the layer.

**Note:** When you animate rotation using Free Transform Points, the vertices of the mask are interpolated in a straight line from keyframe to keyframe. For this reason, the results may be different from what you expect.

1. Display the layer containing the paths that you want to transform in the Composition or Layer panel.
2. Using the Selection tool, do one of the following:
  - To transform any number of vertices, select the vertices that you want to transform and choose Layer > Mask And Shape Path > Free Transform Points.
  - To transform an entire mask or shape path, select it in the Timeline panel and choose Layer > Mask And Shape Path > Free Transform Points.
3. To move the anchor point of the bounding box, place the Selection tool over the bounding box anchor point  until the Selection tool changes to a move anchor point icon . Drag to position the anchor point.
4. Do any combination of the following:
  - To move the path or selected vertices, position the pointer inside the bounding box and drag.
  - To scale the path or selected vertices, position the pointer on a bounding box handle and, when the pointer changes to a straight, double-sided arrow , drag to a new size. Hold down Shift as you drag to constrain the scale. Hold down Ctrl (Windows) or Command (Mac OS) as you drag to scale around the anchor point of the bounding box.
  - To rotate the path or selected vertices, position the pointer just outside the free-transform bounding box and, when the pointer changes to a curved double-sided arrow , drag to rotate.
5. To exit free-transform mode, press Esc, Enter (Windows), or Return (Mac OS).

## Convert a path between manual Bezier and RotoBezier

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You can convert any manual Bezier mask path or manual Bezier shape path to a RotoBezier path. If the manual Bezier path has direction handles that have been adjusted, this conversion changes the shape of the path, because After Effects calculates the curvature of RotoBezier segments automatically.

The conversion of a RotoBezier path to a manual Bezier path does not change the shape of the path.

1. Select a mask in the Layer, Composition, or Timeline panel, or select a shape path in the Composition or Timeline panel.
2. Choose Layer > Mask And Shape Path > RotoBezier.

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## Modify a Bezier mask path or shape path

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You can change a Bezier mask path using the Selection tool and pen tools in the Layer or Composition panel. You can change a Bezier shape path using the Selection tool and pen tools in the Composition panel.

The pen tools—Add Vertex, Delete Vertex, and Convert Vertex tools—are grouped with the Pen tool in the Tools panel. To reveal these tools in the Tools panel, click and hold the Pen tool in the Tools panel.

 *In most cases, the appropriate pen tool becomes active when you place the Pen tool pointer in a particular context. For example, the Delete Vertex tool becomes active when you place the Pen tool pointer over an existing vertex, and the Add Vertex tool becomes active when you place the Pen tool pointer over a path segment. To manually activate and cycle through these tools, press G.*

When modifying a path, make sure that you click only existing vertices or segments; otherwise, you may create a new path instead.

### Move, add, or delete a vertex

- Do one of the following:
  - To move a vertex, drag the vertex with the Selection tool .

 *To temporarily switch from the Pen tool to the Selection tool, press V or Ctrl (Windows) or Command (Mac OS).*

- To add a vertex to a mask, use the Add Vertex tool  to click the segment between two existing vertices.
- To delete a vertex from a mask, use the Delete Vertex tool  to click the vertex.

### Adjust a path segment

- Do one of the following with the Selection tool:
  - Drag a vertex.
  - Drag the direction handles extending from an adjoining smooth vertex.
  - Drag a curved segment.

 *Dragging a curved segment on a RotoBezier mask also moves the vertices.*

### Toggle a vertex between a smooth point and a corner point

- Click the vertex with the Convert Vertex tool .

 *To activate the Convert Vertex tool when the Pen tool is selected, hold down Alt (Windows) or Option (Mac OS).*

### Adjust the tension of a RotoBezier mask

1. If you want to adjust the tension of more than one vertex simultaneously, then select them.
2. Using the Convert Vertex tool , drag a vertex.

 *To activate the Convert Vertex tool when the Pen tool is selected, hold down Alt (Windows) or Option (Mac OS).*

The Adjust Tension pointer  appears as you drag a vertex of the RotoBezier mask.

Clicking a vertex instead of dragging sets the vertex to a corner point (100% tension); clicking again sets the vertex to a smooth point (33% tension). Dragging up or to the right decreases the tension of the selection, increasing the curve of adjacent path segments; dragging down or to the left increases the tension of the selection, decreasing the curve of adjacent path segments.

 *To view the tension value of a vertex, look in the Info panel as you adjust the tension.*

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## Change a mask path numerically

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1. Select the mask.
2. In the Timeline panel, expand the Mask properties.
3. Next to the Mask Path property, click the underlined word, and specify the changes in the Mask Shape dialog box.

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## Designate the first vertex for a Bezier path

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To animate a path, After Effects designates the topmost vertex at the initial keyframe as the *first vertex* and numbers each successive vertex in



ascending order from the first vertex. After Effects then assigns the same numbers to the corresponding vertices at all successive keyframes. After Effects interpolates the movement of each vertex from its initial position at one keyframe to the position of the correspondingly numbered vertex at the next keyframe. At any time during an animation, you can designate another vertex as the first vertex; this causes After Effects to renumber the vertices of the path. Renumbering vertices causes path animation to change, because After Effects then maps the new vertex numbers to the corresponding old vertex numbers still saved at successive keyframes.

When copying a closed path into a motion path, the vertex designated as the first vertex of the closed path is used as the beginning of the motion path. All motion paths are open paths.

Some shape path operations, such as Trim Paths, also use the first vertex as input to determine how to modify the path.

**Note:** By default, when you add a vertex to a path, the new vertex appears on the path throughout the duration of the path but reshapes the path only at the time at which it was added. When you delete a vertex from a path at a specific point in time, the vertex is deleted from the path throughout the duration of the path. Prevent After Effects from adding and deleting vertices throughout the duration of the path by choosing *Edit > Preferences > General (Windows)* or *After Effects > Preferences > General (Mac OS)*, and deselecting *Preserve Constant Vertex Count When Editing Masks*.

*Note:* *Preserve Constant Vertex Count When Editing Masks* is called "Preserve Constant Vertex and Feather Count when Editing Masks", in After Effects CS6.

1. Create an animated path.
2. In the Timeline panel, move the current-time indicator to the point where you want to designate a new first vertex.
3. Select the vertex to designate as the first vertex.
4. Choose *Layer > Mask And Shape Path > Set First Vertex*.

**Note:** The vertex designated as the first vertex appears slightly larger than the other vertices in the Composition panel.

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## Animate a mask path with Smart Mask Interpolation

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Smart Mask Interpolation provides a high level of control for creating mask path keyframes and smooth, realistic animation. After you select the mask path keyframes to interpolate, Smart Mask Interpolation creates intermediate keyframes based on settings you provide. The Info panel displays the progress of the interpolation and the number of keyframes created.

1. Choose *Window > Mask Interpolation*.
2. Select at least two adjacent mask path keyframes.
3. Set options in the Mask Interpolation panel, and then click *Apply*.

**Note:** To interrupt the interpolation process, press *Esc*. The Info panel indicates that the process has been interrupted and reports the number of keyframes created.

**Keyframe Rate** Specifies the number of keyframes that Smart Mask Interpolation creates per second between the selected keyframes. For example, a value of 10 creates a new keyframe every 1/10 of a second. Choose *Auto* to set the keyframe rate equal to the composition frame rate, which appears in parentheses. Create more keyframes for smoother animation; create fewer keyframes to reduce render time.

**Note:** Regardless of the keyframe rate you choose, Smart Mask Interpolation always adds keyframes at the frame just after the first mask path keyframe and at the frame just before the second mask path keyframe. For example, if you interpolate between keyframes at 0 seconds and 1 second in a 30-fps composition with a keyframe rate of 10 keyframes per second, mask path keyframes are added at frame numbers 1, 3, 6, 9, 12, 15, 18, 21, 24, 27, and 29.

**Keyframe Fields** Doubles the keyframe rate. When this option is selected, and Keyframe Rate is set to the composition frame rate, a keyframe is added at each video field. Select this option for animated masking for interlaced video. If this option is not selected, the mask may slip off the object that you are attempting to key out. For more information about fields in interlaced video, see [Interlaced video and separating fields](#).

**Use Linear Vertex Paths** Specifies that vertices in the first keyframe move along a straight path to their corresponding vertices in the second keyframe. Leave this option unselected if you want some vertices to interpolate along curved paths; for example, when the desired interpolation involves rotating parts. If this option is not selected, Smart Mask Interpolation creates a natural path for the mask.

**Bending Resistance** Specifies how susceptible the interpolated mask path is to bending instead of stretching. A value of 0 specifies that, as the mask path animates, it bends more than it stretches; a value of 100 specifies that the mask path stretches more than it bends.

**Quality** Specifies how strictly Smart Mask Interpolation matches vertices from one keyframe to another. A value of 0 specifies that a particular vertex in the first keyframe matches only the same-numbered vertex in the second keyframe. For example, the tenth vertex in the first keyframe must match the tenth vertex in the second keyframe. A value of 100 means that a vertex in the first keyframe can potentially match any vertex in the second keyframe. Higher values usually yield better interpolations; however, the higher the value, the longer the processing time.

**Add Mask Path Vertices** Specifies that Smart Mask Interpolation adds vertices to facilitate quality interpolations. In general, Smart Mask

Interpolation works best when the mask paths have dense sets of vertices. Also, a vertex on the first mask path cannot match the middle of a curve or straight-line segment on the second mask path, so sometimes you must add vertices before matching to produce the desired result. Smart Mask Interpolation does not modify the original keyframes. Only the new mask path keyframes computed by Smart Mask Interpolation have additional vertices.

The value you set specifies how finely the input mask paths are subdivided. Pixels Between Vertices specifies the distance, in pixels, between vertices on the larger perimeter mask path after subdivision. Total Vertices specifies the number of vertices on the interpolated mask paths. Percentage Of Outline specifies that a vertex is added at each indicated percent of the mask path outline length. For example, a value of 5 means that a vertex is added at each successive segment of the outline that represents 5% of the total perimeter. To use only the vertices that were on the path at the first frame, do not select this option.

**Note:** Smart Mask Interpolation may add vertices at existing vertex locations even if Add Mask Path Vertices is not selected. If two vertices on one mask path match a single vertex on the other, the single vertex is duplicated at the same location so that the segment between the two vertices shrinks to that location.

**Matching Method** Specifies the algorithm that Smart Mask Interpolation uses to match vertices on one mask path to vertices on the other. Auto applies the matching algorithm for curves if either of the two selected keyframes has a curved segment; otherwise, it applies the polylines algorithm. Curve applies the algorithm for mask paths that have curved segments. Polyline applies the algorithm for mask paths that have only straight segments.

**Note:** The mask path keyframes added by Smart Mask Interpolation are polylines when Polyline Matching Method is selected, regardless of whether the input mask paths contained curved segments.

**Use 1:1 Vertex Matches** Specifies that Smart Mask Interpolation creates a vertex on one mask path that matches the same-numbered vertex on the other mask path. On each of the input mask paths, Smart Mask Interpolation matches the first vertices, the second vertices, the third vertices, and so forth. If the two paths have unequal numbers of vertices, this action may produce undesirable results.

**First Vertices Match** Specifies that Smart Mask Interpolation matches the first vertices in the two mask path keyframes. If not selected, Smart Mask Interpolation searches for the best first-vertex match between the two input mask paths.

**Note:** To ensure good results, make sure that the first vertices of the input mask paths match, and then select First Vertices Match.

## Additional resources about animating masks with Smart Mask Interpolation

Chris and Trish Meyer provide some tips on animating masks, including using Smart Mask Interpolation, on the [ProVideo Coalition website](#).

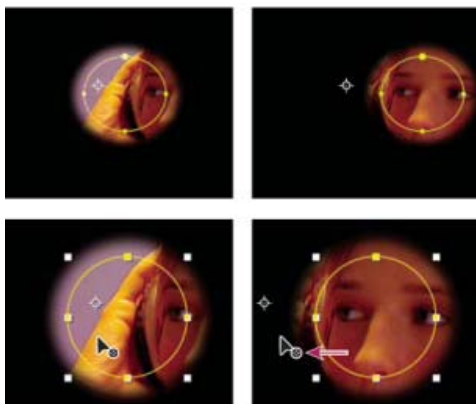
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## Move a mask or pan a layer behind a mask

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You can adjust the area that is visible through a mask by either moving the mask in the Layer or Composition panel or panning (moving) the layer behind the mask in the Composition panel. When you move a mask, the Position values of the masked layer remain constant, and the mask moves in relation to other objects in the Composition panel.

When you use the Pan Behind (Anchor Point) tool to pan a layer behind a mask, the position of the mask remains constant in the Composition panel but changes in the Layer panel. The Position values of the masked layer change in relation to the composition. As you pan past the edges of the layer frame, the Mask Path values on the layer also change. Using the Pan Behind (Anchor Point) tool saves steps; without it, you would have to change the Position and Mask Path properties of the masked layer manually. You can animate a layer panning behind another layer by setting keyframes for the Position and Mask Path properties of the masked layer.



When you use the Pan Behind (Anchor Point) tool in the Composition panel, After Effects automatically makes two adjustments. In the Layer panel, the mask is moved in relation to its layer (top), and in the Composition panel, the layer is moved in relation to the composition (bottom).

## Move a mask

1. Select the mask or masks you want to move.
2. In the Composition panel, drag the mask or masks to a new location. To constrain the movement of the mask or masks to horizontal or vertical, hold down Shift after you start dragging.

## Pan a layer behind its mask

1. Select the Pan Behind (Anchor Point) tool in the Tools panel.
  2. Click inside the mask area in the Composition panel and drag the layer to a new position.
- [Keyframe interpolation](#)



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# Shape attributes, paint operations, and path operations for shape layers

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## Adding attributes to shape layers

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After a shape layer has been created, you can add attributes—paths, paint operations, and path operations—by using the Add menu in the Tools panel or in the Timeline panel.

By default, the new attributes are inserted into the selected shape group or groups according to the following rules:

- New paths are added below existing paths and groups.
- New path operations—such as Zig Zag and Wiggle Paths—are added below existing path operations. If no path operations are present, new path operations are added below existing paths.
- New paint operations—strokes and fills—are added below existing paths and above existing strokes and fills.

To override these rules and place a new attribute at the end of the group, below all attributes, hold the Alt (Windows) or Option (Mac OS) key as you click to choose an item from the Add menu.

The Repeater operation is always added at the end of the group.

## Strokes and fills for shapes

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Andrew Devis shows how to modify gradient fills and strokes for shape layers, plus other options, in a video on the [Creative COW website](#).

Strokes and fills for shapes are paint operations that add colored pixels to a path or to the area defined by a path. A stroke or a fill can consist of a solid color, or it can use a gradient of colors. Strokes can be continuous, or they can consist of a periodic series of dashes and gaps. Each stroke and fill has its own blending mode, which determines how it interacts with other paint operations in the same group.

By default, paint operations within a group are performed from the bottom to the top in the Timeline panel stacking order. This means, for example, that a stroke is rendered on top of (in front of) a stroke that appears after it in the Timeline panel. To override this default behavior for a specific fill or stroke, choose Above Previous In Same Group for the Composite property for the fill or stroke in the Timeline panel.

**Note:** When you add a stroke or fill using the Add menu in the Tools panel or Timeline panel, the paint operation is added below existing paths and above existing strokes and fills. To place a new stroke at the end of the group, hold the Alt (Windows) or Option (Mac OS) key as you click to choose an item from the Add menu.

New shapes are created with fill and stroke properties depicted by the swatch buttons next to the underlined Fill and Stroke text controls in the Tools panel. You can also modify the fill colors, stroke colors, fill type, and stroke type for selected shapes using these controls. The Fill and Stroke controls are only visible in the Tools panel when a shape layer is selected or a drawing tool is active.

If multiple shapes are selected, with different fill or stroke properties, then the swatch button next to the Fill or Stroke control contains a question mark. You can still modify the fill and stroke properties using these controls, and the corresponding properties for all selected shapes are set to the same value.

Fills and strokes can be any of four types:

**None** No paint operation is performed.

**Solid color** The entire fill or stroke consists of one color.

**Linear gradient** The fill or stroke consists of colors and opacity values defined by a linear gradient and then mapped onto the composition along a single axis from the Start Point to the End Point.

**Radial gradient** The fill or stroke consists of colors and opacity values defined by a linear gradient, which are mapped onto the composition along a radius extending outward from the Start Point at the center to the End Point at the circumference of a circle. You can offset the starting point by modifying the Highlight Length and Highlight Angle values.

 You can animate and interpolate gradients by adding keyframes to the Colors property and using the Color Picker in Gradient Editor mode to add, modify, and remove color stops and opacity stops. You can also save gradients as animation presets. (See [Save an animation preset](#).)

The colors of strokes and fills for shape layers are not rendered as high-dynamic range colors. Color values under 0.0 or over 1.0 are clipped to fall within the range of 0.0 to 1.0.

### Choose stroke or fill type and blending options

- To choose a fill type or stroke type for new shapes, or set the blending mode or opacity for a fill or stroke for new shapes, click the underlined Fill or Stroke text control in the Tools panel. To cycle through fill types or stroke types for existing shapes, select the shapes before using these controls.
- To cycle through fill types or stroke types for new shapes, Alt-click (Windows) or Option-click (Mac OS) the swatch button next to the underlined Fill or Stroke text control in the Tools panel. To choose a fill type or stroke type for existing shapes, select the shapes before using these controls.

### Choose a solid color or edit a gradient for a stroke or fill

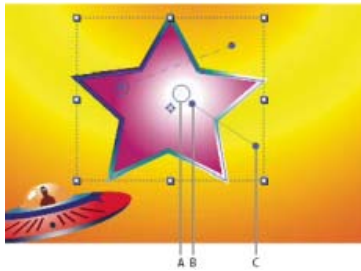
- To choose a solid color or gradient for fills or strokes for new shapes, click the swatch button next to the underlined Fill or Stroke text control in the Tools panel. To choose a solid color or gradient for fills or strokes for existing shapes, select the shapes before using the controls.

### Modify the color mapping for a gradient

A gradient is a range of color and opacity values that you can customize in the Gradient Editor dialog box. You can also customize how those colors are applied to a stroke or fill by modifying the Start Point and End Point, which determine the direction and scale of the gradient. For example, you can modify these points to stretch the colors of a gradient over a larger area, or orient a linear gradient so that colors fade from top to bottom instead of from left to right. For a radial gradient, you define the center of gradient, its radius, and the offset of a highlight.

By default, when you create a shape path by drawing with the Pen tool, the control points for the gradient are placed in the center of the layer. You can adjust these points after you finish drawing.

You can modify the Start Point, End Point, Highlight Angle, and Highlight Length properties in the Timeline panel. You can also modify these properties directly in the Composition panel.



Controls for mapping gradient colors in Composition panel

A. Highlight control point B. Start Point C. End Point

1. Select the group in which the gradient is contained.
2. With the Selection tool active, drag the Start Point, End Point, or Highlight controls in the Composition panel.

The Selection tool turns to a gradient control pointer  or  when placed over a gradient control.

### Set stroke width

- To set stroke width for new shapes in pixels (px), drag the underlined Stroke Width control (which is located to the right of the Stroke controls in the Tools panel), or click the control and enter a value in the box. To set the stroke width for existing shapes, select them before using the Stroke Width control.

### Create a dashed stroke

You create a dashed stroke by adding any number of dashes and gaps to the Dashes property group for the stroke. The dashes and gaps in this property group are repeated as many times as necessary to cover the entire path. The Offset property determines at what point on the path the stroke begins.

 *Animate the Offset property to create a moving trail of dashes, like the lights on a marquee.*

1. Expand the property group for a stroke in the Timeline panel.
2. Click the Add A Dash Or Gap  button to add a dash and gap to one cycle of the dashed-line pattern. You can add up to three dashes for each stroke pattern.
3. Modify the Dash and Gap properties to make the dashes and gaps the lengths that you want.

### Line Cap options for strokes

The Line Cap property for a dashed stroke determines the appearance of the ends of the stroke segments (dashes).

**Butt Cap** The stroke ends at the end of the path.

**Round Cap** The stroke extends beyond the end of the path for a number of pixels equal to the stroke width in pixels. The cap is a semicircle.

**Projecting Cap** The stroke extends beyond the end of the path for a number of pixels equal to the stroke width in pixels. The end is squared off.

### Line Join options for strokes

The Line Join property for a stroke determines the appearance of the stroke where the path suddenly changes direction (turns a corner).

**Miter Join** A pointed connection. The Miter Limit value determines the conditions under which a beveled join is used instead of a miter join. If the miter limit is 4, then when the length of the point reaches four times the stroke weight, a bevel join is used instead. A miter limit of 1 causes a bevel join.

**Round Join** A rounded connection.

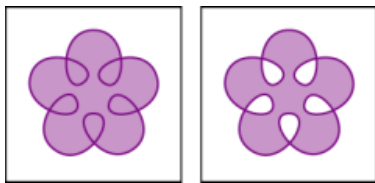
**Bevel Join** A squared-off connection.

### Fill rules for shapes

A fill operation works by painting color in the area defined as inside a path. Determining what is considered *inside* a path is easy when the path is something simple, like a circle. However, when a path intersects itself, or when a compound path consists of paths enclosed by other paths, determining what is considered *inside* is not as easy.

After Effects uses one of two rules to determine what is considered *inside* a path for the purpose of creating fills. Both rules count the number of times that a straight line drawn from a point crosses the path on its way out of the area surrounded by a path. The nonzero winding fill rule considers path direction; the even-odd fill rule does not.

After Effects and Illustrator use the nonzero winding fill rule as the default.



Self-intersecting path with Fill Rule set to Non-Zero Winding Fill Rule (left) compared with Even-Odd Fill Rule (right)

**Even-odd fill rule** If a line drawn from a point in any direction crosses the path an odd number of times, then the point is inside; otherwise, the point is outside.

**Nonzero winding fill rule** The crossing count for a line is the total number of times that the line crosses a left-to-right portion of the path minus the total number of times that the line crosses a right-to-left portion of the path. If a line drawn in any direction from the point has a crossing count of zero, then the point is outside; otherwise, the point is inside.

 A more intuitive way to think of the nonzero winding rule is to think of a path as a loop of string. A point is considered outside the path if you can put your finger at that point and then pull the string away without it being caught, wrapped around your finger.

Because the nonzero winding fill rule takes path direction into account, using this fill rule and reversing the direction of one or more paths in a compound path is useful for creating holes in compound paths.

 To reverse the direction of a path, click the Reverse Path Direction On button for the path in the Timeline panel.

## Alter shapes with path operations

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Path operations are similar to effects. These live operations act nondestructively on a shape's path to create a modified path that other shape operations (such as fills and strokes) can apply to. The original path is not modified. Because path operations are live, you can modify or remove them at any time. Path operations apply to all paths above them in the same group; as with all shape attributes, you can reorder path operations by dragging, cutting, copying, and pasting in the Timeline panel.

1. In the Composition panel or Timeline panel, select the shape group into which to add the path operation.
2. Choose a path operation from the Add menu in the Tools panel or the Timeline panel:

**Merge Paths** Combines paths into a compound path. (See [Merge Paths options](#).)

**Offset Paths** Expands or contracts a shape by offsetting the path from the original path. For a closed path, a positive Amount value expands the shape; a negative Amount value contracts it. The Line Join property specifies the appearance of the path where offset path segments come together. A bevel join is a squared-off connection. A miter join is a pointed connection. The miter limit determines the conditions under which a beveled join is used instead of a miter join. If the miter limit is 4, then when the length of the point reaches four times the stroke weight, a bevel join is used instead. A miter limit of 1 causes a bevel join.

**Pucker & Bloat** Pulls the vertices of a path outward while curving the segments inward (Pucker), or pulls the vertices inward while curving the segments outward (Bloat).

**Repeater** Creates multiple copies of a shape, applying a specified transformation to each copy. (See [Using the Repeater to replicate shapes.](#))

**Round Corners** Rounds corners of paths. Higher Radius values cause greater roundness.

**Trim Paths** Animate the Start, End, and Offset properties to trim a path to create results similar to results achieved with the Write-on effect and the Write On setting for paint strokes. If the Trim Paths path operation is below multiple paths in a group, then you can choose to have the paths trimmed simultaneously or treated as a compound path and trimmed individually.

Aharon Rabinowitz provides a video tutorial on the [Creative COW website](#) that shows how to use the Trim Paths operation to animate a dashed line following a path on a map.

**Twist** Rotates a path more sharply in the center than at the edges. Entering a positive value twists clockwise; entering a negative value twists counterclockwise.

**Wiggle Paths** Randomizes (wiggles) a path by converting it into a series of jagged peaks and valleys of various sizes. The distortion is auto-animated, meaning that it changes over time without the need to set any keyframes or add expressions.

Several properties for this path operation behave the same as properties of the same name for the Wiggly selector for text animation. (See Wiggly selector properties.) The Correlation property specifies the amount of similarity between the movement of a vertex and that of its neighbors; smaller values create more jagged results, as the position of a vertex depends less on the position of its neighbors. The Correlation property is similar to Correlation for the Wiggly selector, except that the Wiggle Paths version specifies the correlation between neighboring vertices instead of neighboring characters. Set the maximum length for segment paths using an absolute or relative size. Set the density of jagged edges (Detail) and choose between soft edges (Smooth) or sharp edges (Corner).

 *Animate the Size property to fade the wiggling up or down. To smoothly accelerate or decelerate the wiggling, set Wiggles/Second to a constant value of 0, and animate the Temporal Phase property.*

**Wiggle Transform** Randomizes (wiggles) any combination of the position, anchor point, scale, and rotation transformations for a path. Indicate the desired magnitude of the wiggle for each of these transformations by setting a value in the Transform property group that is contained in the Wiggle Transform property group. The wiggled transformations are auto-animated, meaning that they change over time without the need to set any keyframes or add expressions. The Wiggle Transform operation is especially useful following a Repeater operation, because it allows you to randomize the transformations of each repeated shape separately. (See [Using the Repeater to replicate shapes.](#))

Several properties for this path operation behave the same as properties of the same name for the Wiggly selector for text animation. (See Wiggly selector properties.) The Correlation property specifies the amount of similarity between the wiggled transformations of a repeated shape and its neighbor within a set of repeated shapes. Correlation is only relevant if a Repeater operation precedes the Wiggle Transform operation. When Correlation is 100%, all repeated items are transformed in the same way; when Correlation is 0%, all repeated items are transformed independently.

 *When randomizing repeated shapes keep the following in mind: If the Wiggle Transform path operation precedes (is above) the Repeater path operation, then all of the repeated shapes will be wiggled (randomized) in the same way. If the Repeater path operation precedes (is above) the Wiggle Transform path operation, then each of the repeated shapes will be wiggled (randomized) independently.*

Chris Meyer provides a video tutorial on the [ProVideo Coalition website](#) that shows how to use the Wiggle Transform path operation. This tutorial explains why you must use multiple instances of the Wiggle Transform path operation if you want to wiggle multiple properties independently.

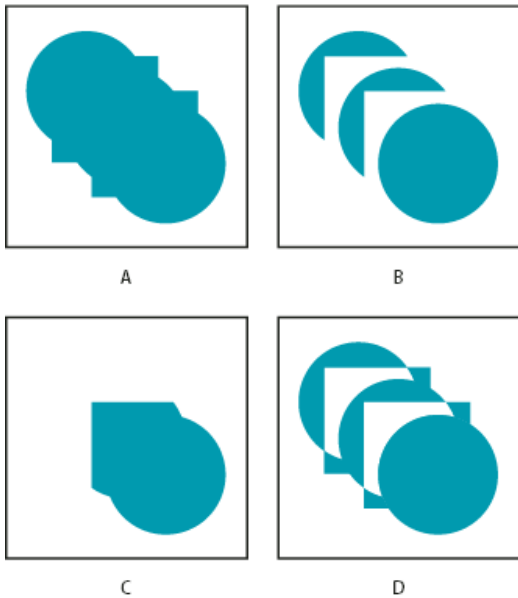
Andrew Devis shows how to use the Wiggle Transform path operation in a video on the [Creative COW website](#).

**Zig Zag** Converts a path into a series of jagged peaks and valleys of uniform size. Set the length between peaks and valleys using an absolute or relative size. Set the number of ridges per path segment, and choose between wavy edges (Smooth) or jagged edges (Corner).

## Merge Paths options

The Merge Paths path operation takes all of the paths above it in the same group as input. The output is a single path that combines the input paths. The input paths are still visible in the Timeline panel, but they are essentially removed from the rendering of the shape layer, so they don't appear in the Composition panel. A fill and stroke are added after the Merge Paths property group in the Timeline panel if a fill and stroke are not already present; otherwise, the output path wouldn't be visible.





*Merge Paths options*

**A.** Add for all shapes **B.** Subtract for squares **C.** Intersect for squares **D.** Exclude Intersections for squares

Aharon Rabinowitz provides a video tutorial on the [Creative COW website](#) that shows how to combine multiple paths into a single compound shape using the Merge Paths path operation.

The Merge Paths path operation has the following options, each of which performs different calculations to determine the output path:

**Merge** Merges all input paths into a single compound path. This option is the default used for shapes created from text characters made up of multiple paths, like the letter e, when using the Create Shapes From Text command.

**Add** Creates a path that encompasses the union of the areas of the input paths.

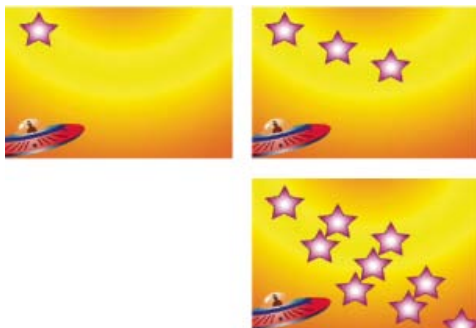
**Subtract** Creates a path that encompasses only the areas defined by the topmost path, subtracting the area defined by underlying paths.

**Intersect** Creates a path that encompasses only the areas defined by intersections between all input paths.

**Exclude Intersections** Creates a path that is the union of the areas defined by all input paths, minus the areas defined by intersections between all input paths.

### Using the Repeater to replicate shapes

The Repeater path operation creates virtual copies of all paths, strokes, and fills above it in the same group. The virtual copies are not represented by separate entries in the Timeline panel, but they are rendered in the Composition panel. Each copy is transformed according to its order in the set of copies and the values of the properties in the Transform property group for that instance of the Repeater.



*Original shape (upper-left), one instance of the Repeater operation applied (upper-right), and two instances of the Repeater operation applied (lower-right)*

If the original shape is numbered 0, the next copy is numbered 1, and so on, then the result of the Repeater is to apply each transformation in the Transform property group  $n$  times to copy number  $n$ .

Consider the example of the Repeater applied to a shape with the Copies value set to 10 and the Position property in the Transform property group for the Repeater set to (0.0, 8.0). The original shape remains in its original position, (0.0, 0.0). The first copy appears at (0.0, 8.0), the second copy appears at (0.0, 16.0), the third copy appears at (0.0, 24.0), and so on, until the ninth copy at (0.0, 72.0), for a total of ten shapes.

You can apply multiple instances of the Repeater within the same group. In other words, you can repeat the Repeater. Using multiple instances of the Repeater is an easy way to create a grid of virtual copies of a single shape: just set the Position property for one instance of the Repeater to

modify the horizontal values, and another instance to modify vertical values.

The Offset property value is used to offset the transformations by a specific number of copies. For example, if the Copies value is 10 and the Offset value is 3, then the original shape is transformed by 3 times the amount specified in the Transform property group, and the last copy is transformed by 12 times the amount specified in the Transform property group.

💡 *Animating the Offset property is a good way to easily create interesting results.*

The Composite option determines whether copies are rendered above (in front of) or below (behind) the copies that precede them.

Use the Start Opacity value to set the opacity of the original shape, and the End Opacity value to set the opacity for the last copy. Opacity values for copies in between are interpolated.

If you place the Repeater after a path, above the fill and stroke property groups for a shape, then the set of virtual copies is filled or stroked as a compound path. If you leave the Repeater below the fill and stroke, then each copy is filled and stroked individually. The difference is most apparent with gradient fills and strokes.

💡 *Add a Wiggle Transform path operation after a Repeater operation to randomize (wiggle) the position, scale, anchor point, or rotation of the repeated copies within an instance of the Repeater. If the Wiggle Transform path operation precedes (is above) the Repeater path operation, then all of the repeated shapes will be wiggled (randomized) in the same way. If the Repeater path operation precedes (is above) the Wiggle Transform path operation, then each of the repeated shapes will be wiggled (randomized) independently.*

Eran Stern provides a video tutorial on the [Creative COW website](#) that shows how to use the Repeater operation.

Chris Zwar provides an example project on [his website](#) that uses the Card Dance effect and a shape layer with the Repeater operation to simulate a halftone color separation for any image or video.

- [Select a color or edit a gradient](#)

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Text

# Creating and editing text layers

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## About text layers

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You can add text to a composition using text layers. Text layers are useful for many purposes, including animated titles, lower thirds, credit rolls, and dynamic typography.

For a video tutorial on animating text, go to the [Adobe website](#).

You can animate the properties of entire text layers or the properties of individual characters, such as color, size, and position. You animate text using text animator properties and selectors. 3D text layers can optionally contain 3D sublayers, one for each character. (See [Animate text with text animators](#) and [Per-character 3D text properties](#).)

Text layers are *synthetic layers*, meaning that a text layer does not use a footage item as its source—though you can convert text information from some footage items into text layers. Text layers are also vector layers. As with shape layers and other vector layers, text layers are always continuously rasterized, so when you scale the layer or resize the text, it retains crisp, resolution-independent edges. You cannot open a text layer in its own Layer panel, but you can work with text layers in the Composition panel.

After Effects uses two kinds of text: *point text* and *paragraph text*. Point text is useful for entering a single word or a line of characters; paragraph text is useful for entering and formatting the text as one or more paragraphs.



Vertical and horizontal point text (left), and paragraph text in a bounding box (right)

You can copy text from other applications such as Adobe Photoshop, Adobe Illustrator, Adobe InDesign, or any text editor, and paste it into a text layer in After Effects. Because After Effects also supports Unicode characters, you can copy and paste these characters between After Effects and any other application that also supports Unicode (which includes all Adobe applications).

Text formatting is included in the Source Text property. Use the Source Text property to animate formatting and to change the characters themselves (for example, change the letter *b* to the letter *c*).



Sequential frames in which Source Text has been animated

## Best practices for creating text and vector graphics for video

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Text that looks good on your computer screen as you are creating it can sometimes look bad when viewed in a final output movie. These differences can arise from the device used to view the movie or from the compression scheme used to encode the movie. The same is true for other vector graphics, such as shapes in shape layers. In fact, the same problems can occur in raster images, but the small and sharp details of vector graphics cause the problems most often.

Keep in mind the following as you create and animate text and vector graphics for video:

- You should always preview your movie on the same kind of device that your audience will use to view it, such as an NTSC video monitor. (See [Preview on an external video monitor](#).)
- Avoid sharp color transitions, especially from one highly saturated color to its complementary color. Sharp color transitions are difficult for many compression schemes—such as the compression schemes in MPEG and JPEG standards—to encode. These compression schemes can cause visual noise near sharp transitions. For analog television, the same sharp transitions can cause spikes outside the allowed range for the signal, also causing noise.
- When text will be over moving images, make sure that the text has a contrasting border (such as a glow or a stroke) so that the text is still readable when something the same color as the fill passes behind the text.
- Avoid thin horizontal elements, which can vanish from the frame if they happen to be on an even scan line during an odd field, or vice versa. The height of the horizontal bar in a capital *H*, for example, should be three pixels or greater. You can thicken horizontal elements by increasing font size, using a bold (or faux bold) style, or applying a stroke. (See [Formatting characters with the Character panel](#).)
- When animating text to move vertically—for scrolling credits, for example—move the text vertically at a rate in pixels per second that is an even multiple of the field rate for the interlaced video format. Such a rate of movement prevents a kind of twitter that can come from the text movement being out of phase with the scan lines. For NTSC, good values include 0, 119.88, and 239.76 pixels per second; for PAL, good values include 0, 100, and 200 pixels per second.

 Apply the *Autoscroll - Vertical animation* preset in the *Behaviors* category to quickly create a vertical text crawl (for example, a credit roll).

- To avoid the risk of twitter that comes with vertical motion, thin graphical elements, and fields, consider presenting credits as a sequence of blocks of text separated by transitions, such as opacity fades.

Fortunately, many problems with text in video and compressed movie formats can be solved with one simple technique: Apply a blur to the text layer. A slight blur can soften color transitions and cause thin horizontal elements to expand. The *Reduce Interlace Flicker* effect works best for the purpose of reducing twitter; it applies a vertical directional blur but doesn't blur horizontally, so it degrades the image less than other blurs.

Philip Hodgetts provides tips on the [Creative COW website](#) for getting the best results when creating text or vector graphics for video.

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## Scripts and expressions for working with text

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Christopher Green provides a script (`crg_Text_from_File.jsx`) on [his website](#) that creates one or multiple text layers based on the contents of a text file. You can either create one text layer from all of the text, or you can create one layer for each line in the text file. The script also provides options for leading and other spacing.

Todd Kopriva provides an example script on the [Adobe website](#) that demonstrates the text formatting features available through the scripting interface.

Salahuddin Taha provides a script on the [After Effects Scripts website](#) that enables entry of Arabic text (which flows from right to left).

Michael Cardeiro provides a script on the [After Effects Scripts website](#) that makes multiple versions of your compositions using information from a spreadsheet or database. The script goes through your spreadsheet line by line, making a new version of your composition with text layers in the composition receiving text from the spreadsheet automatically.

The [After Effects Scripts website](#) provides many scripts for working with text. Paul Tuersley provides a script on the [After Effects Scripts website](#) that allows you to search for and edit text layers throughout your After Effects project, create your own text style presets, and apply them to multiple layers.

Paul Tuersley provides a script on the [AE Enhancers forum](#) for importing Substation Alpha (SSA) karaoke files and automatically creating animated text layers from them.

Jeff Almasol provides a script on his [redefinery website](#) for editing the source text of text layers.

Jeff Almasol provides a script on his [redefinery website](#) that converts various plain text punctuation into their “smart” typographical representations (for example, *(c)* is converted to the copyright symbol, ©).

Jeff Almasol provides a script on his [redefinery website](#) that sets keyframes for the *Source Text* property of a text layer and sets the values to text from a text file; the keyframes are placed at times specified by layer markers on the text layer.

For examples of expressions for the *Source Text* property, see [Writing expressions for source text](#) and [MarkerKey attributes \(expression reference\)](#).

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## Enter point text

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When you enter point text, each line of text is independent—the length of a line increases or decreases as you edit the text, but it doesn't wrap to the next line.

The small line through the type tool pointer  marks the position of the text *baseline*. For horizontal text, the baseline marks the line on which the text rests; for vertical text, the baseline marks the center axis of the characters.

When you enter point text, it is created using the properties currently set in the Character panel. You can change these properties later by selecting the text and modifying settings in the Character panel.

1. Do one of the following to create a text layer:
  - Choose Layer > New > Text. A new text layer is created and an insertion point for the Horizontal Type tool appears in the center of the Composition panel.
  - Double-click a Type tool. A new text layer is created and an insertion point for the appropriate type tool appears in the center of the Composition panel.
  - Select the Horizontal Type tool  or the Vertical Type tool , and then click in the Composition panel to set an insertion point for the text.

**Note:** The pointer for a type tool changes depending on whether it is over a text layer in the Composition panel. When the pointer is not directly over a text layer, it appears as a new text pointer ; click to create a new text layer. Shift-click always creates a new text layer.

2. Enter text characters by typing. Press Enter on the main keyboard (Windows) or Return (Mac OS) to begin a new line.

**Note:** You can also choose Edit > Paste to paste text that you have copied from any application that uses Unicode characters. Text receives the formatting of the first character in the text layer into which it is pasted.

3. To end text-editing mode, press Enter on the numeric keypad, select another tool, or press Ctrl+Enter (Windows) or Command+Return (Mac OS).

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## Enter paragraph text

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When you enter paragraph text, the lines of text wrap to fit the dimensions of the bounding box. You can enter multiple paragraphs and apply paragraph formatting.

You can resize the bounding box at any time, which causes the text to reflow within the adjusted rectangle.

When you enter paragraph text, it has the properties set in the Character and Paragraph panels. You can change these properties later by selecting the text and modifying settings in the Character and Paragraph panels.

1. Select the Horizontal Type tool  or the Vertical Type tool .
2. Do one of the following in the Composition panel to create a text layer:
  - Drag to define a bounding box from a corner.
  - Alt-drag (Windows) or Option-drag (Mac OS) to define a bounding box around a center point.

**Note:** The pointer for a type tool changes depending on whether it is over a text layer in the Composition panel. When the pointer is not directly over a text layer, it appears as a new text pointer ; drag to create a new text layer. Shift-drag always creates a new text layer.

3. Enter text by typing. Press Enter on the main keyboard (Windows) or Return (Mac OS) to begin a new paragraph. Press Shift+Enter on the main keyboard (Windows) or Shift+Return (Mac OS) to create a soft carriage return, which begins a new line without beginning a new paragraph. If you enter more text than can fit in the bounding box, the overflow icon  appears on the bounding box.

**Note:** You can also choose Edit > Paste to paste text that you have copied from any application that uses Unicode characters. Text receives the formatting of the first character in the text layer into which it is pasted.

4. To end text-editing mode, press Enter on the numeric keypad, select another tool, or press Ctrl+Enter (Windows) or Command+Return (Mac OS).

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## Select and edit text in text layers

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You can edit text in text layers at any time. If you set the text to follow a path, designate it as a 3D layer, transform it, or animate it, you can still continue to edit it. Before you can edit text, you must select it.

 To disable the Path Options property group for a text layer, click the visibility (eyeball) switch for the Path Options property group. Temporarily disabling the Path Options property group can make editing and formatting text easier.

The pointer for a type tool changes, depending on whether it is over a text layer in the Composition panel. When the pointer for a type tool is directly over a text layer, it appears as the edit text pointer ; click to place the insertion point in the existing text.

- To select text with a type tool, do one of the following:
  - To select a range of text, drag over the text.
  - To select a range of text, click, move the pointer, and then Shift-click.
  - To select a word, double-click it. To select a line, triple-click it. To select a paragraph, quadruple-click it. To select all text in a layer, quintuple-click anywhere in the text.
- To use the arrow keys to select text, hold down Shift and press the Right Arrow or Left Arrow key. To use the arrow keys to select words, hold down Shift+Ctrl (Windows) or Shift+Command (Mac OS) and press the Right Arrow or Left Arrow key.

 To select all text in a text layer and activate the most recently used type tool, double-click the text layer in the Timeline panel.

## Online resources for selecting and editing text in text layers

Jeff Almasol provides a script on his [redefinery website](#) for editing the source text of text layers.

Jeff Almasol provides a script on his [redefinery website](#) that converts various plain text punctuation into their “smart” typographical representations (for example, (c) is converted to the copyright symbol, ©).

Jeff Almasol provides a script on his [redefinery website](#) that sets keyframes for the Source Text property of a text layer and sets the values to text from a text file; the keyframes are placed at times specified by layer markers on the text layer.

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## Resize a text bounding box

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1. With a type tool active, select the text layer in the Composition panel to display the bounding box handles.
2. Position the pointer over a handle—the pointer turns into a double arrow —and do one of the following:
  - Drag to resize in one direction.
  - Shift-drag to maintain the proportion of the bounding box.
  - Ctrl-drag (Windows) or Command-drag (Mac OS) to scale from the center.

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## Move a text layer

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You can drag with the move pointer  in the Composition panel to move a text layer. To activate the move pointer without leaving text editing mode, move the type tool away from the text in the Composition panel; when you see the move pointer , drag to move the text. You can also hold down the Ctrl (Windows) or Command (Mac OS) key to momentarily activate the move pointer.

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## Convert point or paragraph text

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**Note:** When you convert paragraph text to point text, all characters outside the bounding box are deleted. To avoid losing text, resize the bounding box so that all text is visible before conversion.

1. Using the Selection tool , select the text layer.

**Note:** You can't convert the text layer if it's in text-editing mode.

2. Using a type tool, right-click (Windows) or Control-click (Mac OS) anywhere in the Composition panel, and choose Convert To Paragraph Text or Convert To Point Text.

When you convert from paragraph text to point text, a carriage return is added at the end of each line of text, except the last line.

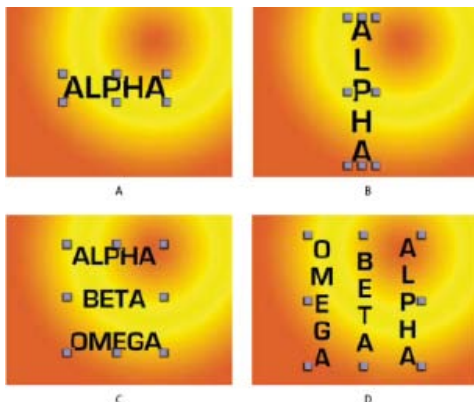
 To display the bounding box of paragraph text and automatically select a type tool, double-click the text layer in the Timeline panel.

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## Change the direction of text

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Horizontal text flows from left to right; multiple lines of horizontal text lie from top to bottom. Vertical text flows from top to bottom; multiple lines of text lie from right to left.



**A.** Horizontal point text **B.** Horizontal point text converted to vertical **C.** Horizontal paragraph text **D.** Horizontal paragraph text converted to vertical

1. Using the Selection tool , select the text layer.



**Note:** You can't convert text in text-editing mode.

2. Using a type tool, right-click (Windows) or Control-click (Mac OS) anywhere in the Composition panel, and choose Horizontal or Vertical.

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## Convert text from Photoshop to editable text

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Text layers from Photoshop retain their style and remain editable in After Effects.

If you imported the Photoshop document as merged layers, then you must first select the layer and choose Layer > Convert To Layered Comp to decompose the imported Photoshop document into its layers.

1. Add the Photoshop text layer to your composition and select it.
2. Choose Layer > Convert To Editable Text.

The layer becomes an After Effects text layer and no longer uses the Photoshop text layer as its source footage item.

If the layer contains layer styles, the layer styles are converted to editable layer styles as if the Layer > Layer Styles > Convert To Editable Styles command had been used on the layer before converting the text to editable text.

- [Examples and resources for text animation](#)
- [Apply an effect or animation preset](#)
- [Formatting characters with the Character panel](#)
- [Formatting paragraphs with the Paragraph panel](#)
- [Type](#)
- [Preparing and importing Photoshop files](#)
- [Layer styles](#)

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# Formatting characters and the Character panel

## Fonts

Spacing between characters and lines: non-breaking spaces, kerning, tracking, and leading

Text fills and strokes

Text scale and baseline shift

Change the case of text

Format text as superscript or subscript

Chinese, Japanese, and Korean text

Smart quotes

Use the Character panel to format characters. If text is selected, changes you make in the Character panel affect only the selected text. If no text is selected, changes you make in the Character panel affect the selected text layers and the text layer's selected Source Text keyframes, if any exist. If no text is selected and no text layers are selected, the changes you make in the Character panel become the new defaults for the next text entry.

- To display the Character panel, choose Window > Character; or, with a type tool selected, click the panel button  in the Tools panel.

 To open the Character and Paragraph panels automatically when a type tool is active, select Auto-Open Panels in the Tools panel.

- To reset Character panel values to the default values, choose Reset Character from the Character panel menu.

**Note:** You open the panel menu by clicking the panel menu button  in the upper-right tab of the panel.

 After Effects doesn't provide a character style for underlining text, but you can underline text with a variety of other graphical elements. Possibilities include using a shape layer containing a path with a stroke, applying a stroke to an open mask, using the Write-on Effect, and using an animated series of tightly spaced (kerned) underscore or dash characters. For a discussion of why underlining is considered bad typographic form and how you can create underlines in After Effects, see [this post](#) on the Creative COW After Effects forum.

## Fonts

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A font is a complete set of characters—letters, numbers, and symbols—that share a common weight, width, and style. In addition to the fonts installed on your system in the standard location for your operating system, After Effects uses font files in this local folder:

**Windows** Program Files\Common Files\Adobe\Fonts

**Mac OS** Library/Application Support/Adobe/Fonts

If you install a Type 1, TrueType, OpenType, or CID font into the local Fonts folder, the font appears in Adobe applications only.

If the formatting for a character specifies a font that is unavailable on your computer system, another font will be substituted, and the missing font name will appear in brackets. Font substitution sometimes occurs when you open a project on Mac OS that was created on Windows, because the set of default fonts differs between the two operating systems.

When you select a font, you can select the font family and its font style independently. The font family (or typeface) is a collection of fonts sharing an overall design; for example, Times. A font style is a variant version of an individual font in the font family; for example, regular, bold, or italic. The range of available font styles varies with each font. If a font doesn't include the style you want, you can apply faux styles—simulated versions of bold, italic, superscript, subscript, all caps, and small caps styles. If more than one copy of a font is installed on your computer, an abbreviation follows the font name: (T1) for Type 1 fonts, (TT) for TrueType fonts, or (OT) for OpenType fonts.

The font size determines how large the type appears in the layer. In After Effects, the unit of measurement for fonts is pixels. When a text layer is at 100% scale value, the pixel values match composition pixels one-to-one. So if you scale the text layer to 200%, the font size appears to double; for example, a font size of 10 pixels in the layer looks like 20 pixels in the composition. Because After Effects continuously rasterizes text, the resolution remains high when you increase the scale values.

**Note:** When choosing fonts and styles from the menus in the Character panel, press Enter (Windows) or Return (Mac OS) to accept an entry, or press Esc to exit the menu without applying a change.

For information about what fonts are installed with After Effects CS5, see these pages on the Adobe website:

- [Useful Details About Creative Suite 5 \(CS5\) Fonts](#)
- [Fonts included with Adobe Creative Suite 5 Applications](#)

You can use the Adobe Font Finder on the [Adobe website](#) to browse and search fonts by various characteristics.

## Choose a font family

- Click in the Font Family menu box, and begin typing the name. Continue typing until the desired font family name appears.
- To choose the previous or next font family in the menu, place the pointer over the Font Family menu box and use your mouse scroll wheel;

or click in the Font Family menu box, and press the Up Arrow or Down Arrow.

- Click the arrow to the right of the Font Family menu box, and press the key for the first letter of the font family name. Press the key again to advance through the font families with names that begin with that letter.

### Choose a font style

- Choose from the Font Style menu in the Character panel.
- If the font family you chose does not include a bold or italic style, you can click the Faux Bold button **T** or the Faux Italic button *T* in the Character panel to apply a simulated style.

### Choose a font size

❖ Enter or select a new value for Size **T** in the Character panel.

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## Spacing between characters and lines: non-breaking spaces, kerning, tracking, and leading

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Leading is the spacing between lines of text. Kerning is the process of adding or subtracting space between specific letter pairs. Tracking is the process of creating an equal amount of spacing across a range of letters. Positive kerning or tracking values move characters apart (increasing the spacing from the default); negative values move characters closer together (reducing the spacing from the default).

**Note:** When you open a project that was last saved in After Effects 6.0, text in the project may lie differently than in After Effects 6.0 because of improvements in kerning behavior.

Tracking and manual kerning are cumulative, so you can first adjust individual pairs of letters and then tighten or loosen a block of text without affecting the relative kerning of the letter pairs.

**Note:** Values for kerning and tracking affect Japanese text, but normally these options are used to adjust the aki (spacing) between Roman characters.

### Create a non-breaking space

If a set of characters is set to be non-breaking, the characters animate together as if they were a single word.

1. Select the characters you want to prevent from breaking.
2. Choose No Break from the Character panel menu.

**Note:** You open the panel menu by clicking the panel menu button  in the upper-right tab of the panel.

### Specify leading

❖ In the Character panel, do one of the following:

- Choose the desired leading from the Leading menu .
- Select the existing leading value, and enter a new value.
- Drag the underlined leading value.

### Specify kerning

You can automatically kern type using metrics kerning or optical kerning. Metrics kerning uses kern pairs, which are included with most fonts. Kern pairs contain information about the spacing of specific pairs of letters such as LA, To, Tr, Ta, Tu, Te, Ty, Wa, WA, We, Wo, Ya, and Yo. After Effects uses metrics kerning by default so that specific pairs are automatically kerned when you import or type text. Some fonts include robust kern-pair specifications.

For fonts for which metrics kerning provides inadequate results, or for two different typefaces or sizes in a line, you may want to use the optical kerning option. Optical kerning adjusts the spacing between adjacent characters based on their shapes.

You can also use manual kerning to adjust the space between two letters.

Alan Shisko provides an article and video tutorial about kerning on his [Motion Graphics 'n Such blog](#).

- To use the built-in kerning information for a font, choose Metrics from the Kerning menu  in the Character panel.
- To adjust kerning manually, click between two characters with a type tool, and set a numeric value for Kerning  in the Character panel.

**Note:** If a range of text is selected, you can't manually kern the characters. Instead, use tracking.

### Specify tracking



Tracking set to default value of 0 (left), Tracking set to -50 (center), and Tracking set to 200 (right)

❖ To specify tracking, set a numeric value for Tracking  in the Character panel.

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## Text fills and strokes

For text, a fill is applied to the area inside the shape of an individual character; a stroke is applied to the outline of the character. After Effects applies a stroke to a character by centering the stroke on the character's path; half of the stroke appears on one side of the path, and the other half of the stroke appears on the other side of the path.

The Character panel lets you apply both color fill and color stroke to text, control the stroke width, and control the stacking position of the fill and stroke. You can change these properties for individual, selected characters; selected Source Text keyframes; all text in a layer; or all text across multiple selected layers.

You can also control the compositing order of the fill and stroke for a text layer using the All Fills Over All Strokes or All Strokes Over All Fills options, which override the Fill Over Stroke or Stroke Over Fill properties of individual characters.

**Note:** For text that has per-character 3D properties, you cannot control the order of stroke and fill operations between characters; the Fill & Stroke menu in the More Options property group in the Timeline panel is unavailable, and the All Fills Over All Strokes and All Strokes Over All Fills options in the Character panel do nothing.

### Add a stroke (outline) to text

1. Select the characters to which you want to add a stroke.
2. Set a stroke size with the Stroke Width  property in the Character panel.
3. Set the stroke color with the Stroke Color control in the Character panel.
4. Choose one of the following in the Character panel to control the position of the stroke:  
**Stroke Over Fill, Fill Over Stroke** The stroke of only selected text appears over or behind the fill.

**All Strokes Over All Fills, All Fills Over All Strokes** Strokes appear over or behind fills in the entire text layer.

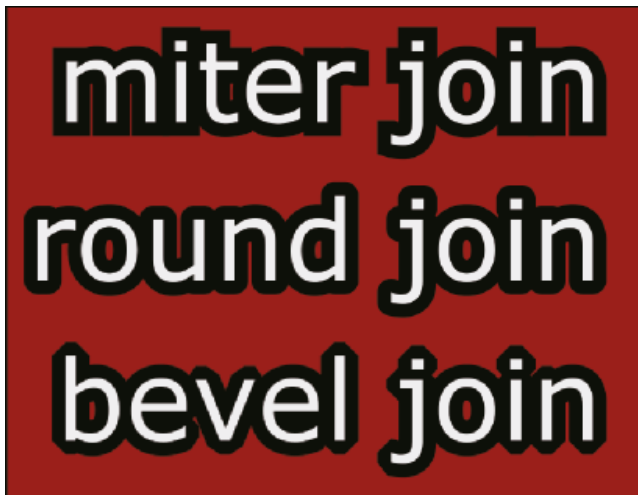
### Change text fill or stroke color

The text you enter gets its color from the Fill Color and Stroke Color controls in the upper-right corner of the Character panel. Select text to change its color after the text has already been entered.

- To set fill or stroke color using the color picker, click the Fill Color or Stroke Color control. To set fill or stroke color using the eyedropper, click the eyedropper button  and then click anywhere on the screen to sample the color.
- To swap colors for fill and stroke, click the Swap Fill And Stroke button .
- To remove fill or stroke, click the No Fill Color button or No Stroke Button. Only one of these buttons is available, depending on whether the Fill Color or Stroke Color box is forward.
- To set the fill or stroke to black or white, click the Set To Black  or Set To White  button.
- To bring the Fill Color or Stroke Color box forward, click it.

### Change text stroke line join

The line join type for a stroke determines the shape of the stroke when two segments of the stroke intersect. You set the line join type for a text stroke with the Line Join setting in the panel menu of the Character panel, which you open by clicking the panel menu button  in the upper-right tab of the Character panel.



❖ Choose Miter, Round, or Bevel from the Line Join menu.

### Blend overlapping characters in a text layer

1. In the Timeline panel, expand the text layer and the More Options group.

2. Choose a blending mode from the Inter-Character Blending menu.

**Note:** To blend a text layer with the layers beneath it, specify a blending mode from the Modes column in the Timeline panel.

Inter-character blending is not available for text layers with per-character 3D properties.

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## Text scale and baseline shift

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Horizontal scale and vertical scale specify the proportion between the height and width of the text. Unscaled characters have a value of 100%. You can adjust scale to compress or expand selected characters in both width and height.

Baseline shift controls the distance that text appears from its baseline, either raising or lowering the selected text to create superscripts or subscripts.

- To adjust scale, enter a new percentage for Horizontal Scale  or Vertical Scale  in the Character panel, or drag the underlined value.
- To specify baseline shift, set a value for Baseline Shift  in the Character panel. A positive value moves horizontal text above and vertical text to the right of the baseline; a negative value moves text below or to the left of the baseline.

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## Change the case of text

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You can enter or format text as uppercase characters, either all caps or small caps. When you format text as small caps, After Effects uses the small caps designed as part of the font, if they are available. If the font does not include small caps, After Effects generates faux small caps.

**Note:** Small Caps formatting does not change characters that were originally typed in uppercase.

- Click the All Caps button  or the Small Caps button  in the Character panel.
- Choose All Caps or Small Caps from the Character panel menu.

**Note:** You open the panel menu by clicking the panel menu button  in the upper-right tab of the panel.

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## Format text as superscript or subscript

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Superscript characters are reduced in size and shifted above the text baseline; subscript characters are reduced in size and shifted below the text baseline. If the font does not include superscript or subscript characters, After Effects generates faux superscript or subscript characters.

- Click the Superscript button  or the Subscript button  in the Character panel.
- Choose Superscript or Subscript from the Character panel menu.

**Note:** You open the panel menu by clicking the panel menu button  in the upper-right tab of the panel.

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## Chinese, Japanese, and Korean text

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After Effects provides several options for working with Chinese, Japanese, and Korean (CJK) text. Characters in CJK fonts are often referred to as double-byte characters because they require more than one byte of information to express each character.

 To display CJK font names in English, choose Show Font Names In English from the Character panel menu. You open the panel menu by clicking the panel menu button in the upper-right tab of the panel.

### Adjust tsume

Tsume reduces the space around a character by a specified percentage value. The character itself is not stretched or squeezed as a result. When tsume is added to a character, spacing around both sides of the character is reduced by an equal percentage.

1. Select the characters you want to adjust.
2. In the Character panel, enter or select a percentage for Tsume . The greater the percentage, the tighter the compression between characters. At 100% (the maximum value), no space exists between the character's bounding box and its em box.

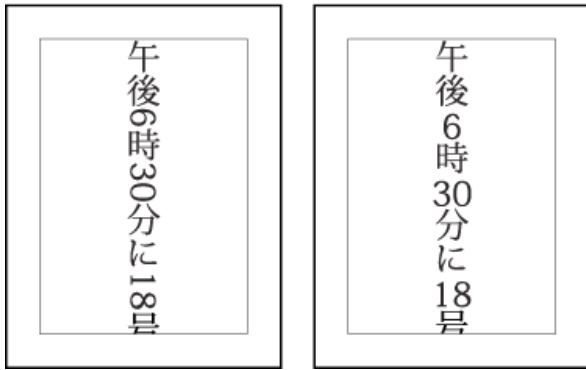
### Specify how leading is measured

1. Select the paragraphs you want to adjust.
2. Choose Top-To-Top Leading or Bottom-To-Bottom Leading from the Paragraph panel menu. A check mark indicates which option is selected.

**Note:** You open the panel menu by clicking the panel menu button  in the upper-right tab of the panel.

### Use tate-chuu-yoko

Tate-chuu-yoko (also called kumimoji and renmoji) is a block of horizontal text laid out within a vertical text line.



Original layer (left) and after tate-chuu-yoko is applied (right)

1. Select the characters that you want to rotate.
2. Choose Tate-Chuu-Yoko from the Character panel menu. (A check mark indicates that the option is turned on. To turn off the option, choose Tate-Chuu-Yoko again.)

**Note:** You open the panel menu by clicking the panel menu button  in the upper-right tab of the panel.

Using tate-chuu-yoko does not prevent you from editing and formatting text; you can edit and apply formatting options to rotated characters as you do to other characters.

## Smart quotes

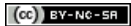
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Smart quotes, or printer's quotation marks, use a curved left or right quotation mark instead of straight quotation marks.

❖ To use smart quotes, choose Use Smart Quotes from the Character panel menu.

**Note:** You open the panel menu by clicking the panel menu button  in the upper-right tab of the panel.

More Help topics



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# Formatting paragraphs and the Paragraph panel

## Align and justify text

### Indent and space paragraphs

### Hanging punctuation for Roman fonts

### Text composition methods

A paragraph is any range of text with a carriage return at the end. Use the Paragraph panel to set options that apply to entire paragraphs, such as the alignment, indentation, and leading (line spacing). For point text, each line is a separate paragraph. For paragraph text, each paragraph can have multiple lines, depending on the dimensions of the bounding box.

If the insertion point is in a paragraph or text is selected, changes you make in the Paragraph panel affect only paragraphs that are at least partially selected. If no text is selected, changes you make in the Paragraph panel affect the selected text layers and the text layer's selected Source Text keyframes, if any exist. If no text is selected and no text layers are selected, the changes you make in the Paragraph panel become the new defaults for the next text entry.

- To display the Paragraph panel, choose Window > Paragraph; or, with a type tool selected, click the panel button  in the Tools panel.

 To open the Character and Paragraph panels automatically when a type tool is active, select Auto-Open Panels in the Tools panel.

- To reset values in the Paragraph panel to the default values, choose Reset Paragraph from the Paragraph panel menu.

**Note:** You open the panel menu by clicking the panel menu button  in the upper-right tab of the panel.

## Align and justify text

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You can align text to one edge of a paragraph (left, center, or right for horizontal text; top, center, or bottom for vertical text) and justify text to both edges of a paragraph. Alignment options are available for both point text and paragraph text; justification options are available only for paragraph text.

- To specify alignment, in the Paragraph panel, click an alignment option:
  -  Aligns horizontal text to the left, leaving the right edge of the paragraph ragged.
  -  Aligns horizontal text to the center, leaving both edges of the paragraph ragged.
  -  Aligns horizontal text to the right, leaving the left edge of the paragraph ragged.
  -  Aligns vertical text to the top, leaving the bottom edge of the paragraph ragged.
  -  Aligns vertical text to the center, leaving both the top and bottom edges of the paragraph ragged.
  -  Aligns vertical text to the bottom, leaving the top edge of the paragraph ragged.
- To specify justification for paragraph text, in the Paragraph panel, click a justification option:
  -  Justifies all horizontal lines except the last, which is left-aligned.
  -  Justifies all horizontal lines except the last, which is center-aligned.
  -  Justifies all horizontal lines except the last, which is right-aligned.
  -  Justifies all horizontal lines including the last, which is force-justified.
  -  Justifies all vertical lines except the last, which is top-aligned.
  -  Justifies all vertical lines except the last, which is center-aligned.
  -  Justifies all vertical lines except the last, which is bottom-aligned.
  -  Justifies all vertical lines including the last, which is force-justified.

## Indent and space paragraphs

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Indentation specifies the amount of space between text and the bounding box or line that contains the text. Indentation affects only the selected paragraph or paragraphs, so you can easily set different indentations for paragraphs.

- To indent paragraphs, enter a value in the Paragraph panel for an indentation option:



**Indent Left Margin** Indents text from the left edge of the paragraph. For vertical text, this option controls the indentation from the top of the paragraph.

**Indent Right Margin** Indents text from the right edge of the paragraph. For vertical text, this option controls the indentation from the bottom of the paragraph.

**Indent First Line** Indents the first line of text in the paragraph. For horizontal text, the first line indent is relative to the left indent; for vertical text, the first line indent is relative to the top indent. To create a first line hanging indentation, enter a negative value.

- To change space above or below paragraphs, enter a value in the Paragraph panel for Space Before  and Space After .

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## Hanging punctuation for Roman fonts

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Hanging punctuation controls whether punctuation marks fall inside or outside the margins. If hanging punctuation is turned on for Roman fonts, then periods, commas, single quotation marks, double quotation marks, apostrophes, hyphens, em dashes, en dashes, colons, and semicolons appear outside the margins.

❖ To enable or disable hanging punctuation for Roman fonts, choose Roman Hanging Punctuation from the Paragraph panel menu.

**Note:** You open the panel menu by clicking the panel menu button  in the upper-right tab of the panel.

**Note:** When you use Roman Hanging Punctuation, any double-byte punctuation marks available in Chinese, Japanese, and Korean fonts in the selected range do not appear outside the margins.

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## Text composition methods

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The appearance of text on the page depends on a complex interaction of processes called text composition. Using the word spacing, letter spacing, and glyph spacing options you've selected, After Effects evaluates possible line breaks and chooses the one that best supports the specified parameters.

After Effects offers two composition methods, which you choose from the Paragraph panel menu.

**Note:** You open the panel menu by clicking the panel menu button  in the upper-right tab of the panel.

**Adobe Single-line Composer** Offers a traditional approach to composing text one line at a time. This option is useful if you prefer to have manual control over how lines break. If spacing must be adjusted, the Single-line Composer first tries to compress, rather than expand text.

**Adobe Every-line Composer** Considers a network of breakpoints for a range of lines and thus can optimize earlier lines in the paragraph to eliminate especially unattractive breaks later on. Working with multiple lines of text results in more even spacing and fewer hyphens. The Every-line Composer approaches composition by identifying possible breakpoints, evaluating them, and assigning a weighted penalty based on these principles:

- Highest importance is given to evenness of letter and word spacing. Possible breakpoints are evaluated and penalized according to how much they deviate from optimal spacing.
- After breakpoint penalty values are identified for a range of lines, they are squared, magnifying the bad breakpoints. The composer then uses the good breakpoints.



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# Animating text

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## About text animation

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Animating text layers is useful for many purposes, including animated titles, lower thirds, credit rolls, and dynamic typography.

As with other layers in After Effects, you can animate entire text layers. However, text layers offer additional animation features with which you can animate the text within the layers. You can animate text layers by using any of the following methods:

- Animate the Transform properties, as you would any other layer, to change the entire layer, not its text contents.
- Apply text animation presets. (See [Text animation presets](#).)
- Animate the source text of the layer, so that the characters themselves change to different characters or use different character or paragraph formats over time. (See [Select and edit text in text layers](#) and [Writing expressions for source text](#).)
- Use text animators and selectors to animate many properties of individual characters or a range of characters. (See [Animate text with text animators](#).)

 *To smooth the edges and movement of animated text, enable motion blur for the text layer. See [Motion blur](#) for more information.*

For a video tutorial on animating text, go to the [Adobe website](#).

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## Text animation presets

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Browse and apply text animation presets as you would any other animation presets. You can browse and apply animation presets in After Effects using the Effects & Presets panel or Adobe Bridge. To open the Presets folder in Adobe Bridge, choose Browse Presets from the Effects & Presets panel menu or from the Animation menu. (See [Apply an effect or animation preset](#) and [Animation presets](#).)

 *A great way to see how advanced users use After Effects is to apply an animation preset, and press U or UU to reveal only the animated or modified layer properties. Viewing the animated and modified properties shows you what changes the designer of the animation preset made to create the animation preset.*

### Tips, notes, and caveats for text animation presets

The text animation presets were created in an NTSC DV 720x480 composition, and each text layer uses 72-point Myriad Pro. Some preset animations move the text on, off, or through the composition. The animation preset position values may not be appropriate for a composition that is much larger or smaller than 720x480; for example, an animation that is supposed to start outside the frame may start inside the frame. If the text isn't positioned as expected or the text disappears unexpectedly, adjust the position values for the text animator in the Timeline panel or Composition panel.

After you apply a 3D Text animation preset, you may need to rotate the layer or add a camera to rotate around the layer to see the results of the 3D animation.

Text animation presets in the Paths category automatically replace the source text with the name of the animation preset and change the font color to white. These animation presets may also change other character properties.

The Fill And Stroke category of animation presets contains presets that may change the fill color and stroke properties of the preset that you apply. If the animation preset requires a stroke or fill color, the animation works only if you have assigned one to your text.

### Additional online resources for animation presets

You can download additional animation presets that take advantage of per-character 3D text animation from the [After Effects Exchange](#) on the Adobe website.

For a list of animation presets included with After Effects CS5, see [Animation preset list](#).

## Animate text with text animators

Animating text with animators and selectors consists of three basic steps:

- Add an animator to specify which properties to animate.
- Use a selector to specify how much each character is affected by the animator.
- Adjust the animator properties.

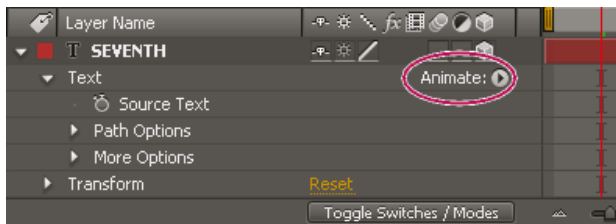
**Note:** To always affect all characters in the layer, delete the default selector. In this case, animating a text layer is not much different from animating any other layer.

Usually, you don't need to set keyframes or expressions for the animator properties. It's common to only set keyframes or expressions for the selector and specify only the ending values for the animator properties.

1. Select a text layer in the Timeline panel, or select the specific characters that you want to animate in the Composition panel.
2. Do one of the following:
  - Choose Animation > Animate Text and then choose a property from the menu.

**Note:** The Enable Per-Character 3D menu item does not add an animator. It adds 3D properties to the layer and to the individual characters, for which you can then add animators.

- Choose a property from the Animate menu, located in the Switches/Mode column of the Timeline panel.



Animate menu

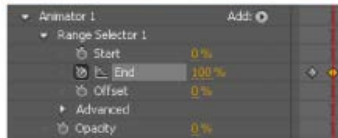
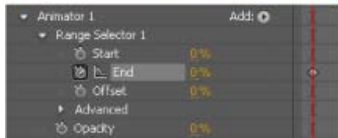
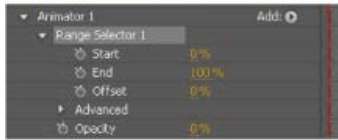
3. In the Timeline panel, adjust the animator property values. Often, you simply set the property that you want to animate to its ending value and then use the selectors to control everything else.
4. Expand the Range Selector property group and set keyframes for Start or End properties by clicking the stopwatch for the property and doing one of the following:
  - Set the values for Start and End in the Timeline panel.



You may find it easier to think in terms of numbers of characters than percentages for the Start and End properties of a range selector. To show these properties in numbers of characters (including spaces), choose Index for Units in the Advanced property group of a range selector.

- Drag the selector bars in the Composition panel. The pointer changes to the selector movement pointer  when it is over the middle of a selector bar.
5. To refine the selection, expand Advanced and specify options and values as desired.

For example, to animate opacity gradually from the first character to the last, you can add an animator for Opacity, set the Opacity value (in the Animator property group) to 0, and then set keyframes for the End property of the default selector to 0% at 0 seconds and 100% at a later time.



*Animating the opacity of a text layer using the Opacity animator and the End property*

You can create elaborate animations using several animators and several selectors, each of which adds its influence to the text animation.

## Text animator properties

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Animator properties work much like other layer properties, except that their values only influence the characters that are selected by the selectors for the animator group. Choose **Enable Per-Character 3D** to add 3D properties to a text layer; this command does not add properties to an animator group.

- To add an animator group to a text layer, select the text layer in the Timeline panel, and choose a property from the **Animation > Animate Text** menu or from the **Animate** menu for the layer in the **Switches/Modes** column in the Timeline panel. A new animator group, along with a default selector and the chosen animator property, appears in the Timeline panel.
- To add a new animator property to an existing animator group, select the animator group in the Timeline panel, and choose the property from **Animation > Animate Text** menu or from the **Add** menu for the animator group in the Timeline panel. The new animator property appears within the same group as the existing animator property and shares the existing selectors.
- To delete an animator property or animator group, select it in the Timeline panel and press **Delete**.
- To remove animators from a text layer, select the text layer in the Timeline panel, and choose **Animation > Remove All Text Animators**.
- To copy an animator group, select it in the Timeline panel and choose **Edit > Copy**. To paste the animator group, select a layer and choose **Edit > Paste**.
- To rename an animator group, make sure that it is the only thing selected, and then press **Enter** (Windows) or **Return** (Mac OS); or right-click (Windows) or **Control-click** (Mac OS) the name and choose **Rename**.
- To reorder an animator group, drag it to a new location in the stacking order in the Timeline panel.

## Animator properties

**Anchor Point** Anchor point for the characters: the point about which transformations—such as scaling and rotation—are performed. (See [Text anchor point properties](#).)

**Position** The position of the characters. You can specify values for this property in the Timeline panel, or you can modify it by selecting it in the Timeline panel and then dragging the layer in the Composition panel using the Selection tool, which changes to a move tool  when positioned over text characters. Dragging with the move tool does not affect the z (depth) component of Position.

**Scale** The scale of the characters. Because scale is relative to the anchor point, changes to the z component of Scale have no apparent result unless the text also has an Anchor Point animator with a nonzero z value.

**Skew** The slant of the characters. The Skew Axis specifies the axis along which the character is skewed.

**Rotation, X Rotation, Y Rotation, Z Rotation** If per-character 3D properties are enabled, you can set the rotation about each axis individually. Otherwise, only Rotation (which is the same as Z Rotation) is available.

**All Transform Properties** All of the Transform properties are added at once to the animator group.

**Line Anchor** The alignment for the tracking in each line of text. A value of 0% specifies left alignment, 50% specifies center alignment, and 100% specifies right alignment.

**Line Spacing** The space between lines of text in a multiline text layer.

**Character Offset** The number of Unicode values to offset selected characters. For example, a value of 5 advances the characters in the word five steps alphabetically, so the word *offset* becomes *tkxjy*.

**Character Value** The new Unicode value for selected characters, replacing each character with one character represented by the new value. For example, a value of 65 replaces all of the characters in a word with the 65th Unicode character (A), so the word *value* becomes *AAAAA*.

**Character Range** Specifies limits on the character. This property appears whenever you add the Character Offset or Character Value property to a layer. Choose Preserve Case & Digits to keep characters in their respective groups. Groups include uppercase Roman, lowercase Roman, digits, symbols, Japanese katakana, and so forth. Choose Full Unicode to allow for unlimited character changes.

**Blur** The amount of Gaussian blur to be added to the characters. Horizontal and vertical blur amounts can be specified separately.

## Text selectors

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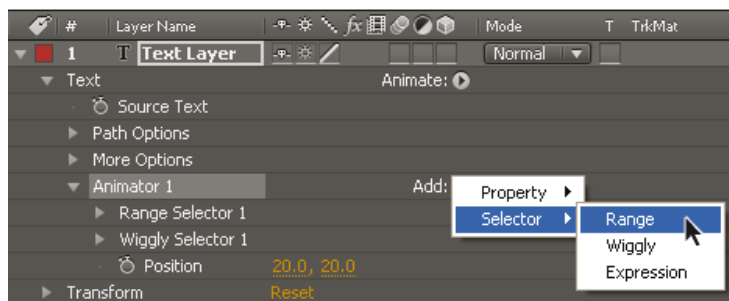
Each animator group includes a default range selector. You can replace the default selector, add additional selectors to an animator group, and remove selectors from a group.

Selectors are a lot like masks: You use selectors to specify which part of a range of text you want to affect, and by how much. You can use multiple selectors and specify a Mode setting for each one to determine how it interacts with the text and with other selectors in the same animator group. If you have only one selector, Mode specifies the interaction between the selector and the text—Add is the default behavior; and Subtract inverts the influence of the selector.

 *If you delete all selectors from an animator group, the values of the animator properties apply to all characters in the layer. This technique is useful because properties of the text specified by the Character panel cannot otherwise be animated (except by using Hold keyframes on the Source Text property itself).*

Use a Wiggly selector to vary a selection within a specified amount over time. Use expression selectors to use expressions to dynamically specify how much you want characters to be affected by an animator property.

- To add a selector using the Timeline panel, select an animator group in the Timeline panel and choose Selector from the Add menu for the animator group, or choose Animation > Add Text Selector. Choose Range, Wiggly, or Expression from the submenu.
- To add a selector using the Composition panel, select a range of characters in the Composition panel, right-click (Windows) or Control-click (Mac OS) the text, and choose Add Text Selector from the context menu. Choose Range, Wiggly, or Expression from the submenu.
- To delete a selector, select it in the Timeline panel and press Delete.
- To rename a selector, make sure that it is the only thing selected, and then press Enter (Windows) or Return (Mac OS); or right-click (Windows) or Control-click (Mac OS) the name and choose Rename.
- To copy a selector, select it in the Timeline panel and choose Edit > Copy. To paste the selector, select a layer and choose Edit > Paste.
- To reorder a selector, drag it to a new location in the stacking order in the Timeline panel.



Adding a new range selector to an animator group

## Common selector properties

**Mode** Specifies how each selector combines with the text and with selector above it, similar to how multiple masks combine when you apply a mask mode. For example, if you want to wiggle only a specific word, use a range selector on that word and then add a Wiggly selector and set it to Intersect mode.

**Amount** Specifies how much the range of characters is affected by animator properties. At 0%, the animator properties do not affect the

characters. At 50%, half of each property value affects the characters. This option is useful for animating the result of animator properties over time. Using an expression selector, you can use expressions to dynamically set this option.

**Units and Based On** The units for Start, End, and Offset. You can use either the percentage or index units and base the selection on the characters, characters excluding spaces, words, or lines. If you select Characters, After Effects counts spaces and effectively pauses the animation between words as it animates the spaces between words.



*Original (left) and with VEN selected by the range selectors, Based On set to Character, Shape set to Triangle, and Scale set to 40% (right)*

### Range selector properties

Range selectors include the following properties, in addition to properties common with other selectors:

**Start and End** The beginning and end of the selection. You can modify the Start and End properties by dragging the selector bars in the Composition panel when the selector is selected in the Timeline panel.

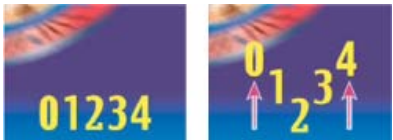
**Offset** The amount to offset the selection from the selection specified by the Start and End properties. To set Offset in the Composition panel while you edit the Start or End values, Shift-click the Start or End selector bars with the Selection tool.

**Shape** Controls how characters are selected between the Start and End of the range. Each option modifies the selection by creating transitions between selected characters using the chosen shape. For example, when animating the y Position values of text characters using Ramp Down, the characters gradually move at an angle from the lower left to the upper right. You can specify Square, Ramp Up, Ramp Down, Triangle, Round, and Smooth.

Using different Shape options, you can greatly change the appearance of an animation.



*Original (left) and after selecting the entire word, setting Based On to Characters, animating the y Position value so that the word is at the bottom of the frame, and setting Shape to Ramp Down (right)*



*Setting Shape to Triangle*

**Smoothness** Determines the amount of time the animation takes to transition from one character to another when you use the Square shape.

**Ease High and Ease Low** Determines the speed of change as selection values change from fully included (high) to fully excluded (low). For example, when Ease High is 100%, the character changes more gradually (eases into the change) while it is fully to partially selected. When Ease High is -100%, the character changes quickly while it is fully to partially selected. When Ease Low is 100%, the character changes more gradually (eases into the change) while it is partially selected to unselected. When Ease Low is -100%, the character changes quickly while it is partially selected to unselected.

**Randomize Order** Randomizes the order in which the property is applied to the characters specified by the Range selector. (By contrast, when you use the Wiggly selector, the value of the animator property is randomized.)

**Random Seed** Calculates the randomized order of a range selector when the Randomize Order option is set to On. When Random Seed is zero, the seed is based on its animator group. If you want to duplicate an animator group and retain the same randomized order as in the original animator group, set Random Seed to a value other than zero.

### Wiggly selector properties

The Wiggly selector includes the following properties, in addition to properties common with other selectors:

**Max Amount and Min Amount** Specifies the amount of variation from the selection.

**Wiggles/Second** How many variations from the set selection occur per second.

**Correlation** Correlation between variations for each character. At 100%, all characters wiggle by the same amount at the same time, and at 0%, all characters wiggle independently.

**Temporal and Spatial Phase (revolutions + degrees)** The variation of wiggle, based on the phase of your animation in time (temporal) or per character (spatial).

**Lock Dimensions** Scales each of the dimensions of the wiggled selection by the same value. This option is useful when wiggling the Scale property.

**Random Seed** See [Randomness and random seeds](#).

Jonathan Fowler provides a video tutorial on [his website](#) that shows how to use the Wiggly Selector to randomly animate (offset) characters to create a fluctuating string of binary digits (1s and 0s).

## Expression selector properties

Expand the Expression Selector property group and the Amount property group to reveal the expression field in the Timeline panel. By default, the Amount property begins with the expression `selectorValue * textIndex/textTotal`.

Expression selectors allow you to express the selector values for each character. The expression is evaluated once per character. Each time it is evaluated, the input parameter `textIndex` is updated to match the index of the character.

💡 Apply the Text Bounce or Inch Worm animation preset to a text layer to see how expression selectors can be used. To see all expressions on a layer, select the layer and press **EE**.

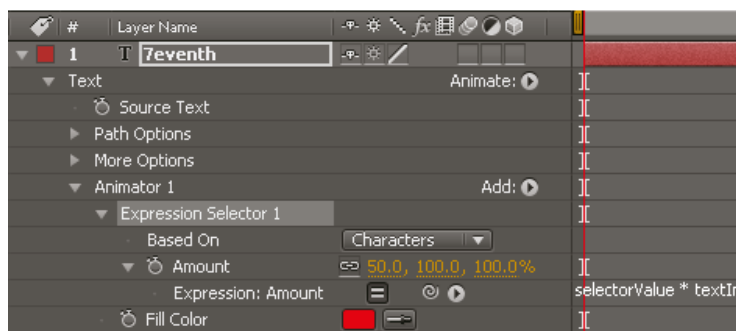
In addition to the expression elements you use elsewhere, you can use the following attributes to animate selections in any number of interesting ways:

**textIndex** Returns the index of the character, word, or line.

**textTotal** Returns the total number of characters, words, or lines.

**selectorValue** Returns the value of the previous selector. Think of this value as the input from the selector above the expression selector in the stacking order.

**Note:** The attributes `textIndex`, `textTotal`, and `selectorValue` can be used only with the expression selector. Using them elsewhere results in a syntax error.



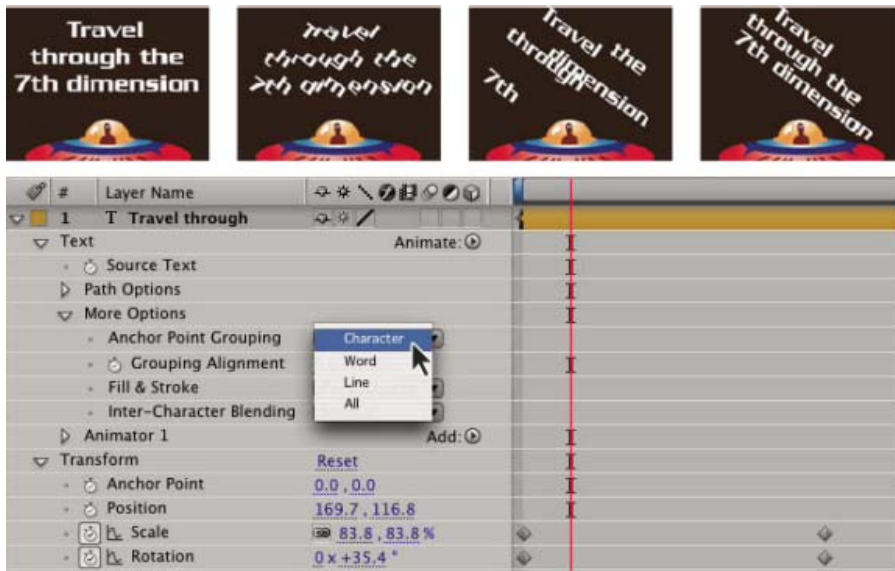
Fill color changes randomly using an expression animator.

## Text anchor point properties

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Text animators animate character position, rotation, and size-related properties relative to an anchor point. You can use the text property, Anchor Point Grouping, to specify whether the anchor point used for transformations is that of each character, each word, each line, or the entire text block. In addition, you can control the alignment of the anchor points of the characters relative to the anchor point of the group with the Grouping Alignment property.





Original text, then rotated and with Grouping Alignment set to Character, Word, and Line

1. Expand the text layer in the Timeline panel, and expand the More Options property group.
2. Do any of the following:
  - Choose how to group the character anchor points from the Anchor Point Grouping menu.
  - Lower the Grouping Alignment values to move each anchor point up and to the left.
  - Raise the Grouping Alignment values to move each anchor point down and to the right.

To center the anchor point in a string of capital letters, try a Grouping Alignment value of 0%, -50%. To center the anchor point in a string of lowercase letters, or if you're using both lowercase and uppercase letters, try 0%, -25%.

When you select certain properties in the Timeline panel for a text animation, anchor points are shown in the Composition panel. These properties include Anchor Point Grouping, Grouping Alignment and the animator properties Anchor Point, Position, Scale, Rotation (including per-character 3D versions: X Rotation, Y Rotation, Z Rotation).

## Per-character 3D text properties

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You can move, scale, and rotate individual characters in three dimensions using 3D animator properties. These properties become available when you enable per-character 3D properties for the layer. Position, Anchor Point, and Scale gain a third dimension; and two additional Rotation properties (X Rotation and Y Rotation) become available. The single Rotation property for 2D layers is renamed to Z Rotation.

3D text layers have an auto-orientation option, Orient Each Character Independently, which orients each character around its individual anchor point to face the active camera. Selecting Orient Each Character Independently enables per-character 3D properties for the text layer if they aren't already enabled. (See [Auto-Orientation options](#).)

Enabling per-character 3D properties causes each character in the text layer to behave like an individual 3D layer within the text layer, which behaves like a precomposition with collapsed transformations. Per-character 3D layers intersect with other 3D layers following the standard rules for 3D precompositions with collapsed transformations. (See [How render order and collapsed transformations affect 3D layers](#).)

A text layer itself automatically becomes a 3D layer when you enable 3D properties for its characters. Therefore, a text layer becomes a 3D layer when a per-character 3D property is added to the layer—whether by copying and pasting the Y Rotation property from another layer or applying a 3D Text animation preset.

A per-character 3D layer is designated by a special icon in the Switches column.

Inter-character blending and the Fill & Stroke options in the More Options property group are not available for per-character 3D layers.

Per-character 3D layers can decrease rendering performance. When you convert a layer from per-character 3D to 2D, the animator properties and dimensions specific to per-character 3D layers are lost. Re-enabling per-character 3D will not restore values for these properties.

- To enable per-character 3D animator properties for a text layer, select the layer and choose Enable Per-character 3D from the Animation > Animate Text menu or from the Animate menu for the layer in the Timeline panel.
- To disable per-character 3D animator properties for a text layer and convert the layer to a 2D layer, click the Per-character 3D switch for the layer in Switches column in the Timeline panel.
- To disable per-character 3D animator properties for a text layer but keep it as a 3D layer, choose Enable Per-character 3D to deselect it.

## Online resources for per-character 3D text animation

You can download additional animation presets that take advantage of per-character 3D text animation from the [After Effects Exchange](#) on the

Adobe website.

Trish and Chris Meyer introduce per-character 3D text animation in a video on the [ProVideo Coalition website](#).

Eran Stern provides a video tutorial on the [Creative COW website](#) that demonstrates how to use per-character 3D text animation to animate text along a path in the shape of a 3D tornado.

Angie Taylor provides a tutorial on the [Digital Arts website](#) that shows how to use per-character 3D text animation together with a common workaround for simulating extruded 3D text.

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## Creating and animating text on a path

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When you have a mask on a text layer, you can make the text follow the mask as a path. You can then animate the text along that path, or animate the path itself. You can use open or closed masks to create paths for text. After you create the path, you can modify it at any time. When using a closed mask as a text path, make sure to set the mask mode to None.

 *To disable the Path Options property group for a text layer, click the visibility (eyeball) switch for the Path Options property group. Temporarily disabling the Path Options property group can make editing and formatting text easier.*

### Position text along a mask path

1. Create a text layer and enter text.
2. With the text layer selected, use the Pen tool or a mask tool to draw a mask in the Composition panel.
3. In the Timeline panel, expand the Path Options property group for the text layer and select the mask from the Path menu. The text automatically uses the alignment specified in the Paragraph panel.
4. To reposition the text on the path, change the text margins using the First Margin and Last Margin properties in the Timeline panel, or do one of the following in the Composition panel:
  - Drag the left margin control , center margin control , or right margin control  to move text along the path.
  - Shift-drag any margin control to snap the control to the mask vertices.

**Note:** Select a property in the Text property group in the Timeline panel to see the margin controls in the Composition panel. The text alignment determines which controls are available.



Changing the Last Margin of path text in the Composition panel

### Text path properties

Use the Path Options properties to specify a path and alter the way that individual characters appear on the path—perpendicular to the path, aligned to the left or right, reversed, and so on. Animating Path Options properties is an easy way to animate text along a path.

**Reverse Path** Reverses the direction of the path.

**Perpendicular To Path** Rotates each character so that it is perpendicular to the path.

**Force Alignment** Positions the first character at the beginning of the path (or at the specified First Margin location), positions the last character at the end of the path (or at the specified Last Margin location), and evenly spaces the remaining characters between the first and last characters.

**First Margin** Specifies the position of the first character in pixels, relative to the start of the path. First Margin is ignored when text is right-aligned and Force Alignment is Off.

**Last Margin** Specifies the position of the last character in pixels, relative to the end of the path. Last Margin is ignored when text is left-aligned and Force Alignment is Off.

- [About animation, keyframes, and expressions](#)
- [Apply an effect or animation preset](#)
- [Examples and resources for text animation](#)
- [Expression basics](#)
- [Example: Animate characters with per-character 3D properties](#)

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# Extruding text and shape layers (CS6)

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[Monitoring and changing the composition renderer](#)

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## About beveled and extruded text and shape layers

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In computer graphics, an extruded object is one that appears to be three-dimensional. This 3D appearance is most apparent when moving the object, or moving a camera around the object. Bevel is the control over the edges for an extruded object.

In After Effects CS6, you can create beveled and extruded text and shape layers by working in a Ray-traced 3D composition. This is a new composition that uses a new Ray-traced renderer. See [The Ray-traced 3D renderer](#).

In order to work with beveled and extruded text and shape layers, work in a Ray-traced 3D composition. See [Creating a Ray-traced 3D composition](#).

Ray-traced 3D compositions are rendered on either qualified NVIDIA GPUs or all CPU cores installed in your computer. If you do not have a qualified GPU, CPU rendering will occur automatically. GPU rendering is preferable since the performance is much faster, and the quality is better.

- For more information, see [The Ray-traced 3D renderer](#).
- [See this page](#) on the Adobe website for a full list of qualified video cards that are capable of rendering a Ray-traced 3D composition.

Depending on your hardware and complexity of your composition, objects within Ray-traced 3D compositions can be difficult to manipulate. If you are having a difficult time manipulating objects in the Ray-traced 3D composition, you can use Fast Previews. Fast Previews mode is ideal to use for roughing in, and experimenting with extruded text and shape layer animations.

- For details, see [Fast Previews \(CS6\)](#).

 *If your computer supports Ray-traced 3D rendering on the GPU and CPU, you can force rendering to occur on the CPU (for example, if you are using a headless environment.). For more information, see [Setting preferences for OpenGL, and the GPU](#).*

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## The Ray-traced 3D renderer

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The new Ray-traced renderer is now available as a composition renderer. It is separate from the existing Advanced 3D (now called Classic 3D) composition renderer that has been the default renderer in previous versions. The Ray-traced 3D renderer is a radical departure from the existing scanline renderer. It can handle reflections, transparency, index of refraction, environment maps, in addition to the existing material options.

Existing capabilities like soft shadows, motion blur, depth-of-field blur, intra-character shadowing, projection of an image onto a surface with any light type, and intersection of layers are supported. 2D layer backdrops at the bottom of the stacking order are visible, and you can look through translucent objects to see them.

[In this video](#) by Todd Kopriva and video2brain, learn how to use the Ray-traced 3D renderer to render extruded text and shape layers. We experiment with a text element to show the advantages and disadvantages of various quality settings.

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## Limitations of the Ray-traced 3D renderer

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The following features are not rendered by the Ray-traced 3D renderer:

- Blending modes
- Track mattes

Layer styles

- Masks and effects on continuously rasterized layers, including text and shape layers
- Masks and effects on 3D precomposition layers with collapsed transformations
- Preserve Underlying Transparency

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## Additional features of a Ray-traced 3D composition

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Features of a Ray-traced 3D composition also include:

- [Bending footage and composition layers](#)
- Additional material options (reflection, index of refraction, transparency)
- Environment layer support

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## Creating a Ray-traced 3D composition

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It is necessary to work in a Ray-traced 3D composition for extruded text and shapes, bendable layers, and associated features. You can create a Ray-traced 3D composition, or turn an existing composition into a Ray-traced 3D composition. To create a Ray-traced 3D composition, do the following:

1. Create a new composition.
2. Open the Composition Settings dialog box for the composition.
3. Click the Advanced tab, then set the Rendering Plug-in (now called Renderer) to Ray-traced 3D.

To turn an existing composition into a Ray-traced 3D composition, omit the first step.

Your composition is now a Ray-traced 3D composition that allows for extruded text and shapes.

For more information about the Advanced composition settings, ray-tracing quality, and anti-alias filtering, see [Advanced Composition Settings \(CS6\)](#).

**Note:** In a Ray-traced 3D composition, camera layers no longer have *Iris Diffraction Fringe*, *Highlight Gain*, *Highlight Threshold*, and *Highlight Saturation* properties.

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## Previewing Ray-traced 3D compositions

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When previewing 3D Ray-traced compositions, you can choose a different Fast Previews mode to achieve a more suitable workflow. See [Fast Previews \(CS6\)](#).

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## Monitoring and changing the composition renderer

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With the addition of the new Ray-traced renderer, a Current Renderer button has been added to the upper-right corner of the Composition panel to make it easier to tell which composition renderer ("Classic 3D" or "Ray-traced 3D") is in use, and to modify renderer settings. This button appears only when there are 3D layers, including cameras and lights, in the composition.

**To change the composition renderer:** Click the button to open the Advanced tab of the Composition Settings dialog box.

**To modify the current renderer's options:** Ctrl-click (Windows) or Cmd-click (Mac) the button.

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## Creating beveled and extruded text and shape layers

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In the Ray-traced renderer, 3D text and shape layers can have an extrusion or bevel. For a beveled and extruded text or shape layer, do the following:

1. Create a Ray-traced 3D composition
2. Create a new text or shape layer
3. Enable the 3D for the layer
4. Adjust controls for bevel and extrusion

To control their appearance, use these properties in the layer's Geometry Options section in the Timeline panel:

- **Bevel Style:** The form of the bevel. Options are None (default), Angular, Concave, and Convex.
- **Bevel Depth:** The size in pixels (horizontally and vertically) of the bevel.
- **Hole Bevel Depth:** The size of bevel for inner parts of a text character, such as the hole in an "O". It's expressed as a percentage of the Bevel Depth.
- **Extrusion Depth:** The pixel thickness of the extrusion. The side (extruded) surface is perpendicular to the front surface.

These new 3D objects are based on the geometry of swept surfaces, which is a radical departure from the pixel-based text and shapes in the Classic 3D renderer. As such, masking, effects, and track mattes don't make sense when applied to geometry. The geometrical properties of text and shapes are preserved, so character styles like kerning, font size, and subscript are supported.

The following issues are known:

- Fill or stroke gradients are not supported on 3D shape layers.
- Even-odd winding in shapes does not currently work properly. You might need to use a Merge Paths operator instead.
- Shapes with self-intersecting paths might not be filled correctly. Also, objects with compound paths containing multiple nested holes might not render correctly.

See [this video tutorial by Learn by Video](#) to learn how to extrude shapes and how to add lights to emphasize the depth of extruded shapes.

For information about extruding shapes, see [this video tutorial](#) created by Ian Robinson and Lynda.com

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## Beveled and extruded vector artwork

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In After Effects CS6, you can create a shape layer from a vector art footage layer, and then modify the shape layer. Once a vector layer has been converted into a shape layer, you can bevel and extrude it.

For more information about creating shape layers from vector artwork, see [Vector Art Footage-to-Shape Conversion \(CS6\)](#).

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## Bending a footage layer

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In the Ray-traced renderer, 3D footage and nested composition layers have the following geometry options for curving them around a vertical axis:

- **Curvature:** The amount of bend (as a percentage). It defaults to 0% (no bend), but can go between -100% and 100% to simulate video walls or the flapping of wings.
- **Segments:** The smoothness of or number of facets in the bend, with a lower number producing a coarser look with wider facets.

Masks and effects can be applied, but these types of layers cannot be beveled or extruded. Also, masks and effects will be ignored on collapsed 3D composition layers.

In [this video](#), Todd Kopriva and video2brain show you how to bend and curve 2D layers in 3D space. You can use this technique to create a curved backdrop.

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## New material options

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Materials are used for the surfaces of 3D objects, and material options are the properties for the surfaces that dictate how the objects interact with light. After Effects CS6 has several new material options properties, and new ways to apply materials to extruded text and shape layers.

The Material Options section for a layer in the Timeline panel now contains the following new properties:

- **Appears in Reflections:** Indicates if the layer appears in other reflective layers' reflections.
  - The On and Off options control if the reflection appears, but the layer itself is visible.
  - The Only option is like the On option that it is reflected but the layer itself is invisible.
- **Reflection Intensity:** Controls how much of other reflective 3D objects and the environment map appears on this object.
  - Reflections get slightly brighter and the material becomes more mirror-like based on the viewing angle, based on the Reflection Rolloff property value. Reflections when viewing a surface at a glancing angle will be brighter than when viewing directly at the surface. Reflections are also more energy conserving in that diffusion is automatically decreased per pixel as the glancing angle decreases (that is, closer to viewing across the surface than straight on it).
  - In addition, you can control the glossiness of the reflection (from blurry to nearly mirror-like) by adjusting the Specular Shininess property.
- **Reflection Sharpness:** Controls the sharpness or blurriness of reflections.
  - Higher values produce sharper reflections whereas lower values make them blurrier.
  - Increase the Ray-tracing Quality to at least 3 if you cannot see the result of this setting.
- **Reflection Rolloff:** For a reflective surface, controls the amount of Fresnel effect (that is, the intensity of reflections at glancing angles).
- **Transparency:** Controls the material's transparency, and is separate from the layer's Opacity setting (but Opacity does factor into the object's transparency).
  - You can have a fully transparent surface but still get reflections and specular highlights to appear.
  - If the layer opacity is lowered, it would reduce the overall appearance. Also, the layer's alpha is honored, so if alpha is 0 the ray misses it completely.
- **Transparency Rolloff:** For a transparent surface, controls the amount of transparency relative to the viewing angle. Transparency will be the specified value when viewing directly at a surface and more opaque when viewing at a glancing angle (for example, along the edges of a

curved object if looking directly at it).

- **Index of Refraction:** Controls how light bends through 3D layers, and hence how objects behind a semitransparent layer appear. For a list of indexes, see [http://en.wikipedia.org/wiki/List\\_of\\_refractive\\_indices](http://en.wikipedia.org/wiki/List_of_refractive_indices).
- These properties are applied to all surfaces of a 3D text or 3D shape layer, but you can override them with text animators or shape operators.

The materials Intensity, and Shininess have been updated, and renamed to be Specular Intensity, and Specular Shininess, respectively. For information about existing material options, see [Material Options properties](#).

**Note:** the Ray-traced 3D renderer uses an energy-conserving shader that adjusts direct lighting components (diffuse and ambient) and transparency based on reflection intensity and transparency, and specular intensity based on reflection rolloff. Specifically:

- Reflection Intensity is calculated with rolloff (Reflection Rolloff)
- Transparency is calculated with rolloff (Transparency Rolloff)
- Specular Intensity is calculated with rolloff (Reflection Rolloff)
- Diffuse and Ambient are reduced by  $(100\% - \text{Reflection Intensity}) * (100\% - \text{Transparency})$
- Transparency is then reduced by  $(100\% - \text{Reflection Intensity})$

For example:

- if Reflection Intensity is 50% and Transparency 100%, Diffuse and Ambient will become 0% ( $\text{value} * (100 - 50) * (100 - 100) / 100$ ). Specular Intensity is reduced by the Reflection Rolloff amount. Transparency will drop to 50% ( $100\% * (100 - 50) / 100$ ).
- If Reflection Intensity is 50% and Transparency 50%, Diffuse and Ambient will become 25% of their existing values, and Specular Intensity is reduced by the Reflection Rolloff amount. Transparency will drop to 25%.
- If Reflection Intensity is 100%, Diffuse, Ambient, and Transparency will become 0%. Specular Intensity will be reduced by the Reflection Rolloff amount.

Some existing Material Options have new names: Specular is now Specular Intensity, and Shininess is now Specular Shininess.

**Note:** Color is not included in the material definition. A text or shape layer gets its color from the Character panel (for text) or shape operators (for shapes). However, you can override material properties by using the existing text animator and shape operator support. For 3D text layers, the Fill Color, Stroke Color, and Stroke Width options in the Animate pop-up menu get replaced with Front, Back, Bevel, and Side submenus of material options.

For 3D shape layers, the Gradient Fill and Gradient Stroke shape operators get replaced with Front, Back, Bevel, and Side submenus of material options. However, because the fill or stroke defines the geometry for a shape layer, the Fill and Stroke shape operators are still available in case you want to add them.

**Note:** Fill and stroke gradients for shape layers are ignored at this time.

[This video tutorial](#) by Todd Kopriva and video2brain, looks at the new and changed material options for extruded 3D layers. Manipulate the reflectiveness, shininess, and transparency of a text object, and also add animators.

[In this video tutorial by Learn by Video](#), see how a 3D layer's material options can help to create a sense of depth and realism.

To target specific geometry for changing properties of a beveled and extruded object, and to get advice about specular highlights, [see this video tutorial](#) by Chris and Trish Meyer and Lynda.com

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## Environment layer

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In the Ray-traced renderer, you can use a 3D footage, or nested composition layer, as a spherically mapped environment around the scene. This environment map layer will be seen on reflective objects.

To set a footage or nested composition layer as an environment layer: Choose Layer > Environment Layer. The layer turns into a 3D layer, a small "globe" icon appears next to its name, and the following reduced set of properties (under "Options") appears in the Timeline panel:

- **Orientation and X/Y/Z Rotation:** Rotates the backdrop environment and how it appears in reflections, which can be helpful to hide the seam between edges of the layer.
- **Opacity:** Controls the opacity of the environment as a backdrop, but not in reflections.
- **Appears in Reflections:** Controls how the environment map is used in the scene. You can have the environment appear in reflective objects in addition to seeing it as a backdrop (On), appear only in reflective objects and not as a backdrop (Only), or only as a backdrop and not in reflections (Off).

Although you can set any footage or nested composition layer as an environment layer, like cameras, the topmost visible (non-muted) environment layer at the current time will be used. Also, environment layers, being used in reflections, won't appear in Fast Draft mode. Any semi-transparent regions in the environment layer will show the composition's background color in the backdrop, but not in reflections.

 *Similar to adjustment lights, you can enable the Adjustment Layer switch for an environment layer so it appears only in 3D reflective layers below it in the layer stacking order.*

**Note:** If you parent an environment layer to a layer with negative scale, the orientation will be flipped (as expected).

[This video](#) by Todd Kopriva and video2brain demonstrates the use of environment layers. You will learn how to make a 2D layer into an



environment layer to be used as a backdrop and source of reflections in 3D scenes.

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# Examples and resources for text animation

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[Example: Animate text as a timecode display](#)

For a video tutorial on animating text, go to the Adobe website at [Adobe website](#).

Chris and Trish Meyer provide a video tutorial on the [ProVideo Coalition website](#) about entering, editing, formatting, and typesetting text.

Chris and Trish Meyer provide a video tutorial on the [Focal Press website](#) that demonstrates and explains text animation.

John Dickinson provides an overview of animation presets, including text animation presets, in a two-part tutorial on his Motionworks website. This two-part tutorial also demonstrates how to use text animators and selectors to create your own text animations or modify the animations created by animation presets:

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

John Dickinson provides a video tutorial on his [Motionworks website](#) that demonstrates animation of the Source Text property.

Harry Frank provides a tutorial on animating text with text animators on the [Digital Arts Online website](#).

Aharon Rabinowitz provides a video tutorial on the [Creative COW website](#) that shows a few ways to make 3D extruded text in After Effects, using duplicate layers or the Shatter effect.

In the "After Effects Text Tips" series of video tutorials on the [Creative COW website](#), Aharon Rabinowitz demonstrates how to use multiple text animators to create and fine-tune complex text animations.

Steve Holmes provides a tutorial on the [Layers Magazine website](#) that uses three text animators and per-character 3D text animation to create a text animation.

Colin Braley provides a tutorial and example project on [his website](#) that show how to use an expression on the Source Text property to animate text to overcome some of the limitations of the Numbers effect.

Eran Stern provides a set of video tutorials on the Creative COW website that show how to use the text animation features to create a variety of simple animations, including some that use punctuation and other non-alphanumeric symbols as simple vector graphics elements:

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

Eran Stern provides a video tutorial on the [Creative COW website](#) that demonstrates how to use per-character 3D text animation to animate text along a path in the shape of a 3D tornado.

Rhys Enniks provides a video tutorial on [his website](#) in which he uses expressions and multiple text animators and range selectors to animate text as if it is being typed onto a computer screen.

Angie Taylor provides a tutorial on the [Digital Arts website](#) that shows how to use per-character 3D text animation together with a common workaround for simulating extruded 3D text.

Eran Stern provides a video tutorial [on the Artbeats website](#) that shows how to use the After Effects text animation system as a particle system.

Rich Young collects [several resources and tutorials](#) for creating extruded 3D text in After Effects.

[On the ProVideo Coalition website](#), Chris & Trish Meyer provide several tips for animating text in After Effects.

Toby Pitman shows tricks for using shape layers to animate text [on the MacProVideo website](#).

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## Example: Animate characters with per-character 3D properties

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This example illustrates how you can easily animate individual characters in 3D so that each character steps out of line and takes a bow.

1. Create a new composition.
2. Create a new text layer with the word ovation.

3. Choose Animation > Animate Text > Enable Per-character 3D.
4. Choose Animation > Animate Text > Position.
5. Choose Animation > Animate Text > Rotation.
6. In the Timeline panel, in the Animator group, set the X Rotation property to 45, and set the Position value to (0.0, 0.0, -100.0).
7. Expand Range Selector 1.
8. Click the stopwatch icon for the Offset property to set an initial keyframe with the value at 0 seconds.
9. Set the Offset property value to -15%.
10. Set the End property value to 15%.
11. Move the current-time indicator to 10 seconds, and set the Offset value to 100%.
12. Press the R key to show the Rotation properties for the entire layer.
13. Set the Y Rotation value for the layer to -45, rotating the entire layer so that you can more easily see the 3D motion of the characters.
14. Preview the composition.

---

## Example: Offset characters

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This example illustrates how you can easily animate random characters so that they gradually form a legible word or phrase by specifying a Character Offset value and animating the range selector.



*Animating the offset values for the characters in the word Galaxy*

1. Create a new composition.
2. Create a new text layer with the word Galaxy.
3. Choose Animation > Animate Text > Character Offset.
4. In the Timeline panel, set the Character Offset value to 5.
5. Expand Range Selector 1.
6. Click the Start stopwatch to set an initial keyframe at 0 seconds and set the value to 0%.
7. Move the current-time indicator to 5 seconds and set the Start value to 100%.
8. Set Character Alignment to Center.
9. Preview the composition.

---

## Example: Animate characters with the Wiggly selector

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This example demonstrates how easy it is to animate the position of individual characters. It also shows how the Wiggly selector can create a dramatic change to the animation simply by adding it to the layer.



Animating the color and position of the characters in the word Galaxy

1. Create a new composition.
2. Create a new text layer with the word Galaxy and set the color to blue in the Character panel.
3. Choose Animation > Animate Text > Position.
4. In the Timeline panel, drag the y value of the Position property to the left until all of the characters are out of the frame.
5. Expand Range Selector 1.
6. Click the Start stopwatch and leave it at 0% at 0 seconds; then move the current-time indicator to 5 seconds and set Start to 100%.
7. Preview the composition.
8. Collapse the Animator 1 group.
9. Make sure that nothing is selected except the text layer name in the Timeline panel, and choose Fill Color > Hue from the Animate menu. A new animator group, Animator 2, appears in the Timeline panel.
10. Set Fill Hue to  $1x+0.0$ .
11. Expand the Range Selector 1 for Animator 2.
12. Click the Start stopwatch and leave it at 0% at 0 seconds; then move the current-time indicator to 5 seconds and set Start to 100%.
13. Preview the animation. The colors change now as they drop from the top of the screen, but they all use the same color and end up the same, original color.
14. With Fill Hue selected, choose Selector > Wiggly from the Add menu.
15. Expand the Wiggly Selector 1 property and choose Add from the Mode menu.
16. Preview the composition.

**Note:** If you add the Fill Hue property to Animator 1 and then add the Wiggly selector, both the position and the colors wiggle, instead of just the colors.

## Example: Animate text tracking

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This example shows you how easy it is to isolate characters when tracking a line of text. Using the Tracking and Line Anchor animator properties, you can easily move all but one or a few characters.



Animating the tracking values for the characters 3579 (left and center) so that only the 7 in the middle remains (right)

1. Create a new composition.
2. Create a new text layer and type 3579.
3. With the text layer selected, click the Center Text button in the Paragraph panel.
4. Choose View > Show Grid.
5. In the Timeline panel, select the text layer and choose Animation > Animate Text > Tracking.
6. Make sure that Before & After is specified in the Track Type menu.
7. Click the Tracking Amount stopwatch and leave the value 0 at 0 seconds.
8. Move the current-time indicator to 5 seconds and drag the Tracking Amount value until all characters are off the screen.
9. Preview the animation.
10. With the current-time indicator at 0, take a snapshot of the Composition panel. You will use this snapshot, and the grids, to determine the original location of the number 7 at the end of the animation.
11. Move the current-time indicator to 5 seconds.
12. Click the Show Snapshot button.
13. In the Timeline panel, select Animator 1 and choose Line Anchor from the Add menu.
14. Drag the Line Anchor value until the 7 is positioned in approximately its original position in the center of the Composition panel.
15. Click the Show Snapshot button in the Composition panel to see the exact location of the 7 in its original location. Adjust the Line Anchor value to position the character in the original location.
16. Preview the animation.

## Example: Use selectors to animate specific words

This example shows how to use selectors to limit an animation to a specific word.



Animating the skew values in the characters in the word Speeding

1. Create a new composition.
2. Create a new text layer with the words Speeding Saucer.
3. Choose Animation > Animate Text > Skew.
4. In the Timeline panel, set the Skew value to 35.
5. Expand Range Selector 1.
6. Make sure the current-time indicator is at 0 seconds and click the End stopwatch.
7. In the Composition panel, drag both selector bars to the left side of the S in Speeding.
8. Move the current-time indicator to 2 seconds and drag the right selector bar to the right side of the g in Speeding.
9. Preview the composition.

## Example: Create a write-on animation

You can easily create the appearance of writing on the screen by using the Opacity animator property.



Writing text on using the Opacity property

1. Create a new composition.
2. Create a text layer with the characters 01234.
3. Choose Animation > Animate Text > Opacity.
4. Set Opacity to 0%.
5. Expand the Range Selector 1 and click the stopwatch icon for Start.
6. In the Composition panel, drag the start selector to the left edge of the text (the value will be at 0).
7. Move the current-time indicator to 5 seconds and drag the start selector in the Composition panel to the right edge of the text (the value will be 5).
8. Preview the composition.  
**Note:** By default, the Smoothness property is set to 100%. To create a typewriter appearance, expand the Advanced property and set Smoothness to 0%.

## Example: Animate text with multiple selectors

This example uses the selectorValue parameter in an Expression selector with the Wiggly selector to make a string of characters flash on and off randomly.

1. Create a new composition.
2. Create a new text layer.
3. In the Timeline panel, choose Opacity from the Animate menu for the text layer.
4. Expand the text layer and its animator in the Timeline panel.
5. Select the Range Selector and delete it.
6. Choose Add > Selector > Wiggly next to the Animator property group for the text layer.
7. Choose Add > Selector > Expression. If the Wiggly selector doesn't come before the Expression selector, drag the Wiggly selector above the Expression selector.
8. Expand the Expression Selector.

- Expand the Amount property to reveal the expression. The following expression appears by default:

```
selectorValue * textIndex/textTotal
```

- Replace the default expression text with the following expression:

```
r_val=selectorValue[0];  
if(r_val < 50)r_val=0;  
if(r_val > 50)r_val=100;  
r_val
```

- Set the opacity to 0%, and preview the composition.

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## Example: Animate text position with expressions

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This example uses the textIndex and textTotal attributes with the wiggle expression to animate a line of text.

- Create a new composition.
- Create a new text layer.
- Expand the text layer in the Timeline panel to view the text properties. Add a Position animator group from the Animate menu.
- Delete the default Range selector, Range Selector 1.
- Add an Expression selector by selecting the Add menu, then choosing Selector > Expression. Expand the Expression selector to reveal its options.
- Expand the Amount property to reveal the expression. The following expression appears by default:

```
selectorValue * textIndex/textTotal
```

- Replace the default expression with the following expression:

```
seedRandom(textIndex);  
amount=linear(time, 0, 5, 200*textIndex/textTotal, 0);  
wiggle(1, amount);
```

The linear method is used in this example to ramp down the maximum wiggle amount over time.

- Set the vertical position value. The greater the value, the more the characters wiggle.
- Preview your composition.

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## Example: Animate text as a timecode display

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❖ With no layers selected in the Timeline panel, double-click the Current Time Format animation preset in the Effects & Presets panel. (You can locate the animation preset by typing its name in the Contains field in the Effects & Presets panel.)

A new text layer is created, with an expression on the Source Text property that makes the text show the current time in the time display format set for the project.

You can use other expressions in the Global category to display time in another format.

💡 *To see the expressions on a layer, select the layer and press EE.*

More Help topics



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# Transparency and compositing



# Compositing and transparency overview and resources

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## Compositing overview

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To create a composite from multiple images, you can make parts of one or more of the images transparent so that other images can show through. You can make portions of a layer transparent using any of several features in After Effects, including the following:

- Roto Brush tool (See [Roto Brush and Refine Matte](#).)
- masks (See [About masks and Rotoscoping introduction and resources](#).)
- mattes (See [Track mattes and traveling mattes](#).)
- painting on the alpha channel (See [Paint with the Brush tool](#).)
- the Preserve Underlying Transparency layer option (See [Preserve underlying transparency during compositing](#).)
- keying effects (See [Keying](#).)

To make an entire layer uniformly transparent or semi-transparent, modify its Opacity property.

Layers can also be composited together without modifying the transparency of the layers themselves. For example, you can use blending modes or some of the Channel effects to blend image data from multiple layers into a composite. (See [Blending modes and layer styles and Channel effects](#).)

After Effects also includes the mocha shape for After Effects (mocha shape AE) plug-in, which converts paths from mocha-AE into mattes in After Effects. (See [Resources for Imagineer mocha shape for After Effects](#).)

Adobe Photoshop is an excellent application for performing many compositing tasks, including defining areas of transparency using its selection and painting tools. You can use Adobe Photoshop together with After Effects for optimum efficiency and best results when doing compositing work.

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## Online resources for compositing

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Aharon Rabinowitz provides an introduction to compositing, “What is Compositing?”—part of the [Multimedia 101 series](#) on the Creative COW website.

Mark Christiansen provides a detailed overview of compositing—covering masks, mattes, blending modes, and alpha channels—in a chapter from his *After Effects Studio Techniques* book posted on the [Adobe Press website](#).

Richard Harrington provides a set of video tutorials on the [Photoshop for Video website](#) in which he demonstrates how to prepare an image in Photoshop for animation in After Effects using the Puppet tools. He shows how to use several of the Photoshop selection and painting tools to define areas of transparency and create a layered composite image.

Chris and Trish Meyer provide a tutorial on the [Artbeats website](#) that demonstrates how to create a light wrap, so that a foreground element blends in more convincingly with a background.

Rich Young collects tutorials and resources for creating light wraps on the [After Effects Portal website](#).

Rich Young collects [resources and tutorials](#) for various methods of creating vignettes.

Rich Young collects resources for sky replacement on the [ProVideo Coalition website](#).

Chris Zwar provides tips on color keying and compositing on [his website](#).

Jeff Foster provides free sample chapters from his book *The Green Screen Handbook: Real World Production Techniques*. The sample chapters cover basic compositing, color keying, garbage mattes, hold-out mattes, and how to avoid common problems with greenscreen shots. For more information, see the [Adobe website](#).

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## Compositing fire, explosions, muzzle flashes

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Mark Christiansen provides tips and detailed techniques for creating and compositing fire, explosions, muzzle flashes, bullet hits, and energy blasts in the “Pyrotechnics: Creating Fire, Explosions, and Energy Phenomena in After Effects” chapter of [After Effects Studio Techniques](#) on the Peachpit Press website.

## Compositing fog, smoke, and clouds

Mark Christiansen provides tips and detailed techniques for creating and compositing fog, smoke, mist, rain, and snow in the “Climate: Air, Water, Smoke, Clouds in After Effects” chapter of [After Effects Studio Techniques](#) on the Peachpit Press website.

Daniel Broadway provides tips for compositing fog or mist into a scene on [his website](#).

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# Alpha channels, masks, and mattes

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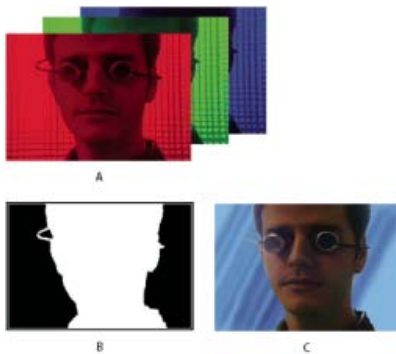
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## About alpha channels and mattes

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Color information in After Effects is contained in three channels: red (R), green (G), and blue (B). In addition, an image can include an invisible fourth channel, called an *alpha channel*, that contains transparency information. Sometimes, such an image is referred to as an *RGBA* image, indicating that it contains an alpha channel.



*Channels at a glance*

**A.** Separated color channels **B.** Alpha channel represented as a grayscale image **C.** Composite using all four channels with a background showing through transparent areas

Many file formats can include an alpha channel, including Adobe Photoshop, ElectricImage, FLV, TGA, TIFF, EPS, PDF, and Adobe Illustrator. AVI and QuickTime (saved at a bit depth of Millions Of Colors+), can also contain alpha channels, depending upon the codec (encoder) used to generate the images stored in these containers. For Adobe Illustrator EPS and PDF files, After Effects automatically converts empty areas to an alpha channel.

When specifying the color depth for an output image, the plus sign (as in Millions Of Colors+) denotes an alpha channel. Similarly, choosing to output to 32 bits per pixel implies an output depth of 8 bits per channel for each of four channels: RGBA.

Some programs can store multiple alpha channels in one image, but After Effects only interprets the fourth channel as an alpha channel.

**Note:** The term *alpha channel* technically refers to the fourth (A) channel in an *RGBA* image file, regardless of whether that channel is used for communicating transparency information. However, since that fourth channel is used so often to communicate transparency information, the terms *alpha* and *transparency* have become nearly synonymous in common usage. It's important to remember, though, that this connection is essentially

arbitrary. Some formats may use other channels for transparency information, and other formats may use the fourth channel for something other than transparency information.

The Knoll Unmult plug-in can be used to create an alpha channel from the dark areas of a layer. This works well for a layer with a light effect (such as a lens flare or fire) that you want to composite on top of another layer. For information, see the [Red Giant Software website](#).

When you view an alpha channel in the Composition panel, white indicates complete opacity, black indicates complete transparency, and shades of gray indicate partial transparency.

A *matte* is a layer (or any of its channels) that defines the transparent areas of that layer or another layer. White defines opaque areas, and black defines transparent areas. An alpha channel is often used as a matte, but you can use a matte other than the alpha channel if you have a channel or layer that defines the desired area of transparency better than the alpha channel does, or in cases where the source image doesn't include an alpha channel.

Aharon Rabinowitz provides an introduction to alpha channels, "What is an Alpha Channel?"—part of the [Multimedia 101 series](#) on the Creative COW website.

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## About masks

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A *mask* in After Effects is a path that is used as a parameter to modify layer attributes, effects, and properties. The most common use of a mask is the modification of an alpha channel of a layer, which determines the transparency of the layer at each pixel. Another common use of a mask is as a path along which to animate text. (See [Creating and animating text on a path](#).)

For more information on paths in general, see [About paths](#).



*Default behavior for a drawn mask (left); same mask inverted (right)*

Closed-path masks can create transparent areas for a layer. Open paths cannot create transparent areas for a layer but are useful as parameters for an effect. Effects that can use an open or closed mask path as input include Stroke, Path Text, Audio Waveform, Audio Spectrum, and Vegas. Effects that can use closed masks (but not open masks) as input include Fill, Smear, Reshape, Particle Playground, and Inner/Outer Key.

A mask belongs to a specific layer. Each layer can contain multiple masks.

You can draw masks in common geometric shapes—including polygons, ellipses, and stars—with the shape tools, or you can use the Pen tool to draw an arbitrary path.

In most ways, drawing mask paths is the same as drawing shape paths on shape layers, though the editing and interpolation of mask paths have a few additional features. You can link a mask path to a shape path using expressions, which allows you to bring the benefits of masks into shape layers, and vice versa. See [Creating shapes and masks](#) and [Editing and animating shape paths and masks](#).

The position of a mask in the stacking order in the Timeline panel affects how it interacts with other masks. You can drag a mask to different positions within the Masks property group in the Timeline panel.

The Mask Opacity property for a mask determines the influence that a closed mask has on the alpha channel of the layer inside the mask area. A Mask Opacity value of 100% corresponds to an interior area that is completely opaque. The area outside the mask is always completely transparent. To invert what is considered inside and what is considered outside for a specific mask, select Invert next to the mask name in the Timeline panel.

## Online resources about masks

Trish and Chris Meyer provide an introduction to masks in a PDF excerpt from the "Creating Transparency" chapter of their book [After Effects Apprentice: Real-World Skills for the Aspiring Motion Graphics Artist](#).

[This sample chapter](#) from the *After Effects CS5 Classroom in a Book* on the Peachpit Press website shows how to create, use, and modify masks.

Chris and Trish Meyer provide tips about drawing and using masks in [this article on the ProVideo Coalition website](#).

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## Copy, cut, save, reuse, and delete masks

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You can reuse masks in other layers and compositions, which is especially useful for Bezier masks you've spent a long time perfecting. Mask paths are stored inside a composition in a project file.

 *Mathias Möhl provides the [CopyMask2Layers script](#), with which you can copy masks from one layer to others while preserving the masks' position and shape.*

## Copy, cut, duplicate, or paste a mask

**Note:** When working with a mask path—rather than the entire mask, including its other properties—select the Mask Path property. This is especially important when transferring mask paths to shape paths, motion paths, and so on.

- To copy or cut selected masks to the clipboard, choose Edit > Copy or Edit > Cut.
- To duplicate selected masks, choose Edit > Duplicate.
- To paste a mask onto a layer, select the layer and then choose Edit > Paste. If a mask is selected, this operation replaces the selected mask.

## Save a mask

1. In the Timeline panel for the composition containing the layer and mask you want to save, expand the layer and its mask properties.
2. Do one of the following:
  - To save an animated mask, select the mask keyframes you want to save.
  - To save a nonanimated mask, select the mask.
3. Copy the mask or keyframes, and paste the mask or keyframes to a new layer. The new layer can be a simple solid.

 Create a project with compositions just for storing complex masks. When you want to use a mask from another project, import that project into your current project.

**Note:** You can also save masks as animation presets. (See [Animation presets](#).)

## Reuse a mask

1. Open the composition containing the mask you want to reuse. If you saved the mask in another project, import the project and then open the composition containing the mask.
2. In the Timeline panel, expand the layer and mask properties for the mask.
3. Select the mask or keyframes.
4. Copy the mask or keyframes, and paste the mask or keyframes to the layer to which you want to apply the mask.

## Delete masks

- To delete one mask, select the mask in the Timeline panel and press Delete.
- To delete all masks, select the layer containing the masks you want to remove and choose Layer > Masks > Remove All Masks.

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## Control mask path color

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To help you identify and work with masks, the Composition and Layer panels outline a mask path with color, and the Timeline panel displays that same color next to the name of the mask. By default, After Effects uses the color yellow for all masks. To make each mask more distinctive, you can manually change the color of a mask using the Timeline panel, or you can set After Effects to cycle through mask colors for new masks.

## Change mask path color

1. Select the mask in the Timeline panel.
2. Click the color swatch to the left of the mask name, pick a new color, and click OK.

## Cycle through colors for mask paths

1. Choose Edit > Preferences > Appearance.
2. Select Cycle Mask Colors.

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## Mask modes

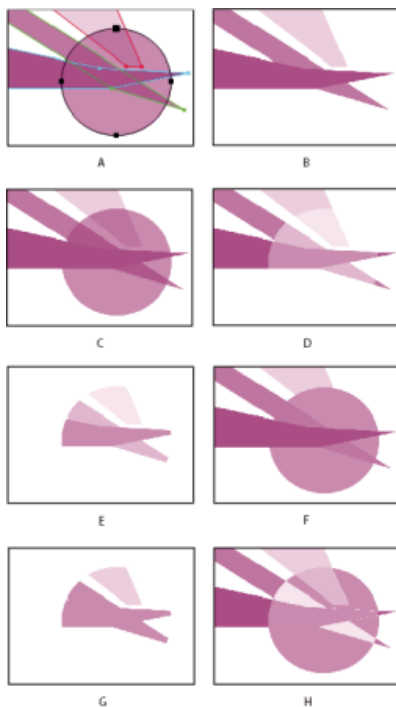
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Blending modes for masks (*mask modes*) control how masks within a layer interact with one another. By default, all masks are set to Add, which combines the transparency values of any masks that overlap on the same layer. You can apply a mode to each mask, but you can't animate the mode of a mask—that is, you can't set keyframes or expressions for a mask mode property to make it change over time.

You choose a mask mode for a mask from the menu next to the mask name in the Timeline panel.

The first mask that you create interacts with the alpha channel of the layer. If that channel doesn't define the entire image as opaque, then the mask interacts with the layer frame. Each additional mask you create interacts with masks located above it in the stacking order in the Timeline panel. The results of mask modes vary depending on the modes set for the masks higher in the stacking order. Mask modes only operate between masks on the same layer.

Using mask modes, you can create complex compound masks with multiple transparent areas. For example, you can set a mask mode that combines two masks and sets the opaque area to the areas where the two masks intersect.



Compound masks that result when different modes are applied to the circle mask. The masks in this illustration have different Mask Opacity values.

**A.** Original masks **B.** None **C.** Add **D.** Subtract **E.** Intersect **F.** Lighten **G.** Darken **H.** Difference

**None** The mask has no direct influence on the alpha channel of the layer. This option is useful when you are only using the path of the mask for an effect such as Stroke or Fill, or if you are using the mask path as the basis for a shape path.

**Add** The mask is added to the masks above it in the stacking order. The influence of the mask is cumulative with the masks above it.

**Subtract** The influence of the mask is subtracted from the masks above it. This option is useful when you want to create the appearance of a hole in the center of another mask.

**Intersect** The mask is added to the masks above it in the stacking order. In areas where the mask overlaps the masks above it, the influence of the mask is cumulative with the masks above it. In areas where the mask does not overlap with the masks above it, the result is complete opacity.

**Lighten** The mask is added to the masks above it in the stacking order. Where multiple masks intersect, the highest transparency value is used.

**Darken** The mask is added to the masks above it in the stacking order. Where multiple masks intersect, the lowest transparency value is used.

**Difference** The mask is added to the masks above it in the stacking order. In areas where the mask does not overlap the masks above it, the mask operates as it would alone on the layer. In areas where the mask overlaps the masks above it, the influence of the mask is subtracted from the masks above it.

## Expand or contract the edges of a mask

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To expand or contract the area influenced by a mask, use the Mask Expansion property.

Mask expansion affects the alpha channel but not the underlying mask path; the mask expansion is essentially an offset that determines how far, in pixels, from the mask path the influence of the mask on the alpha channel extends.

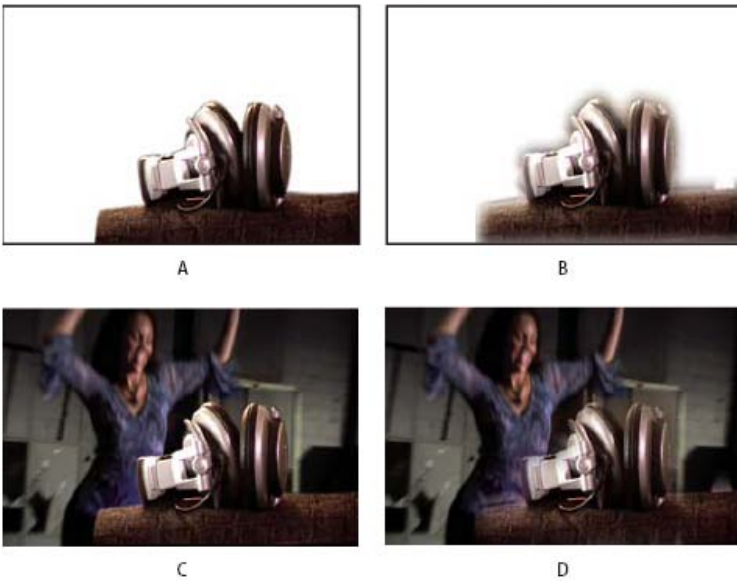
1. In the Timeline panel, expand the Mask properties of the layer you want to adjust.
2. Drag the underlined value for Mask Expansion.

Todd Kopriva provides a visual aid and further explanation regarding mask expansion—and why it creates rounded corners—on his blog on the [Adobe website](#).

## Soften (feather) the edges of a mask

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Feathering softens the edges of a mask by fading it from more transparent to less transparent over a user-defined distance. Using the Mask Feather property, you make mask edges hard-edged or soft-edged (feathered). By default, the feather width straddles the mask edge, half inside, and half outside. For example, if you set the feather width to 25, the feathering extends 12.5 pixels inside the mask edge and 12.5 pixels outside it.



Results for different Mask Feather values

**A.** Masked layer with 5-pixel feather **B.** Masked layer with 40-pixel feather **C.** Result with 5-pixel feather **D.** Result with 40-pixel feather

You can also extend or contract the mask edges using the Mask Expansion property to control where the mask feathering appears. (See [Expand or contract the edges of a mask.](#))

Mask feathering takes place only within the dimensions of the layer. Therefore, the path of a feathered mask should always be slightly smaller than the layer area and should never move to the very edge of the layer. If a mask feather extends beyond the layer area, the feathered edge ends abruptly.

1. To display the Mask Feather property for selected layers, press F.
2. (Optional) To constrain horizontal and vertical feather amounts to change proportionally, select the Constrain Proportions switch  next to the Mask Feather property.
3. Modify the Mask Feather property as you would any other property—by dragging the underlined value or clicking the underlined value and entering an amount in the text input field.

**Note:** Because the mask feather causes the opacity values to vary according to a Gaussian distribution, the area influenced by the feather actually extends beyond the number of pixels specified. The magnitude of the feather's influence beyond the specified feather range is very small. This gradual, Gaussian fall-off appears more natural than would a linear fall-off.

## Variable-width mask feathering (CS6)

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Earlier versions of After Effects had the ability to add a feathered edge to a closed mask, but the width (extent) of the feather was the same around the mask. A new Mask Feather tool (available in the same tool menu as the Pen tool) has been added to let you define points along a closed mask that should have varying widths.

[This video](#) by Todd Kopriva and video2brain introduces the new variable-width mask feathering feature. Assign multiple feather points to an object to show how those feather points interact to create interesting effects.

### To create a feather point:

A selected feather point has a small black dot at its handle.

Feather points define both the outer feather boundary and inner feather boundary. If no feather extent handles are inside the mask, the inner feather boundary is the mask path. The mask feather extends from the inner to the outer feather boundary.

### To select multiple feather points:

Using the Selection or Mask Feather tool, Shift-click the feather points' extent handles.

### To toggle the selection of a feather point:

Shift-click the feather point.

### To move a feather point, do either of the following:

- Using the Selection or Mask Feather tool, drag the feather extent handle.  
You can move multiple selected feather points in unison by dragging one of them, and scale multiple feather extents by dragging one of the feather extent handles.  
You can "sweep" feather points around corner points on a mask.
- With the Mask Feather tool active, press Left or Right Arrow to move the feather along the path, or the Up or Down Arrow to lengthen or



shorten the feather's width.

You can move multiple selected feather points, and move longer distances/widths by holding down the Shift key.

#### To snap a feather point to the mask path:

Drag the feather extent handle across the mask path. It will stop at the mask path.

#### To control the falloff of the feather:

Choose Layer > Mask > Feather Falloff, and then select one of the following:

- Smooth (default)
- Linear

#### To adjust the tension (smoothness or curvature) of a feather boundary through a feather point:

Hold down the Alt (Windows) or Option (MacOS) key while dragging from a feather extent handle to adjust the tension. The Info panel shows the current tension for a handle.

#### To set Hold interpolation for a feather point (for constant feather radius up to the next feather point):

Hold down the Alt (Windows) or Option (MacOS) key while dragging from a feather extent handle to adjust the tension. The Info panel shows the current tension for a handle.

#### To set Hold interpolation for a feather point (for constant feather radius up to the next feather point):

Enable the Hold option from the context menu above the feather point. The feather point handle changes to be pointy in the direction of constant radius.

#### To quickly create a feathered edge for a specific mask segment:

Hold down the Shift key as you click the mask segment (between vertices, not above them). The pointer changes to indicate that you are in this mode. Drag from the segment to adjust the extent. Note the following behavior:

- If just two mask vertices are selected, the feathered edge will be the contiguous segments between them.
- If both vertices of the clicked segment are selected (that is, the segment is selected), the feathered edge will expand to include contiguous selected segments.
- If all or no vertices on the mask are selected, or if the first two conditions don't apply, the feathered edge will be only the clicked segment.

#### To delete a feather point:

Using the Selection or Mask Feather tool, select a feather extent handle, then press Delete. You can delete multiple selected feather points.

**Note:** The pointer changes to selection mode instead of delete vertex mode when over a mask vertex.

#### Video tutorial: Mask Feather tool



In this video tutorial, reTooled.net shows you how to use the Mask Feather tool to control variable-width mask feathering in After Effects CS6.... [Read More](http://www.retooled.net/?p=307)

<http://www.retooled.net/?p=307>



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#### Tips for variable-width mask feathering (Mask Feather tool)

- Temporarily switch between Pen and Mask Feather tools by holding down the 'G' shortcut.

You can turn this behavior off in Edit > Preferences > General (Windows), or After Effects > Preferences > General (Mac OS).

- View information about the number of feather points on a mask, a feather extent's length, position, and tension, and feather falloff setting in the Info panel.
- Hide the feather boundaries for a specific view by deselecting the "Mask Feather Boundaries" option in the View Options dialog box. You can still interact with the boundaries (for example, adding new feather points) where they would've been drawn.
- Control feather point counts across Mask Path keyframes by using the "Preserve Constant Vertex and Feather Count when Editing Masks" option in General preferences.
- Change the value of a feather point's tension, radius, and corner angle from a dialog box by using the commands in the context menu for a feather point.  
Hold down the Ctrl (Windows) or Cmd (Mac OS) key when hovering over a mask vertex to switch to Selection tool behavior.

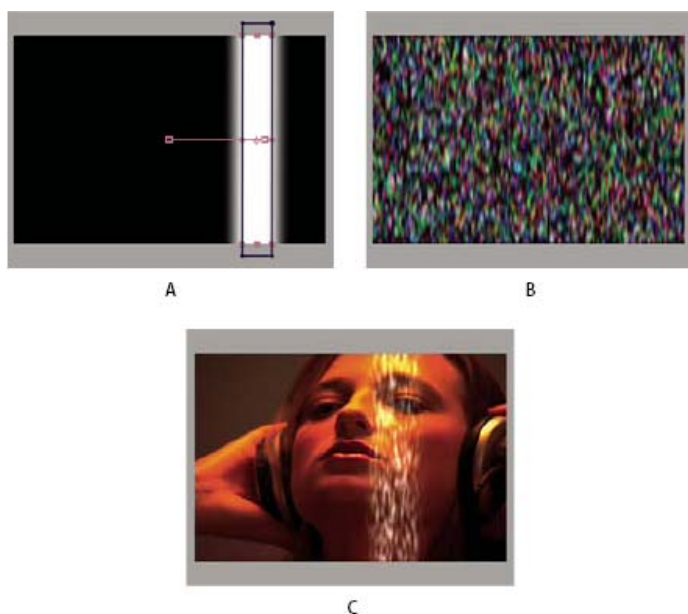
- Hold down the Ctrl (Windows) or Cmd (MacOS) key when hovering over a tangent handle to switch to the Convert Vertex tool.

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## Track mattes and traveling mattes

When you want one layer to show through holes defined by another layer, set up a track matte. For example, you can use a text layer as a track matte for a video layer to allow the video to only show through the shapes defined by the text characters. The underlying layer (the *fill layer*) gets its transparency values from the values of certain channels in the track matte layer—either its alpha channel or the luminance of its pixels.

Defining the transparency of a layer based on the luminance of the track matte's pixels is useful when you want to create a track matte using a layer without an alpha channel or a layer imported from a program that can't create an alpha channel. In both cases—using alpha channel mattes and using luminance mattes—pixels with higher values are more transparent. In most cases, you use a high-contrast matte so that areas are either completely transparent or completely opaque. Intermediate shades should appear only where you want partial or gradual transparency, such as along a soft edge.



### Traveling matte

**A.** Track matte layer: a solid with a rectangular mask, set to Luma Matte. The mask is animated to travel across the screen. **B.** Fill layer: a solid with a pattern effect. **C.** Result: the pattern is seen in the shape of the track matte. This is then composited over an additional image layer.

A track matte only applies to the layer directly beneath it. To apply a track matte to multiple layers, first precompose the multiple layers, and then apply the track matte to the precomposition layer.

After Effects preserves the order of a layer and its track matte after you duplicate or split the layer. Within the duplicated or split layers, the track matte layer remains on top of the fill layer. For example, if your composition contains layers A and B, where A is the track matte and B the fill layer, duplicating or splitting both of these layers results in the layer order ABAB.

If you animate the position or other transformations of the track matte layer, it's called a *traveling matte*. If you want to animate the track matte and fill layers using identical settings, consider precomposing them.

## Convert a layer into a track matte

The TrkMat menu shares a column with the blending modes menu. To show the TrkMat menu, make sure that the Modes column is visible. (See [Columns](#).)

1. In the Timeline panel, drag the layer to use as the track matte directly above the layer to use as the fill layer.
2. Define transparency for the track matte by choosing one of the following options from the TrkMat menu for the fill layer:

**No Track Matte** No transparency created; next layer above acts as a normal layer.

**Alpha Matte** Opaque when alpha channel pixel value is 100%.

**Alpha Inverted Matte** Opaque when alpha channel pixel value is 0%.

**Luma Matte** Opaque when the luminance value of a pixel is 100%.

**Luma Inverted Matte** Opaque when the luminance value of a pixel is 0%.

If you choose an option other than No Track Matte, After Effects converts the next layer above into a track matte, turns off the video of the track

matte layer, and adds a track matte icon  next to the name of the track matte layer in the Timeline panel.

**Note:** Although the video is turned off for the matte layer, you can still select the layer to reposition, scale, or rotate it. Select the layer in the Timeline panel, and then drag the center (indicated by a circle with an X) of the layer in the Composition panel.

Using a track matte is similar to using the Preserve Underlying Transparency option, which causes a layer to get its transparency from the transparency of the composite of the layers below it in the layer stacking order. (See [Preserve underlying transparency during compositing](#).)

### Tips for working with track mattes

- Use the Levels effect to increase the contrast between light and dark parts of the matte layer. This reduces the problem of having a lot of mid-range values, which translate to partial transparency. (Usually, mattes are most useful when they define areas as entirely transparent or entirely opaque, except at the edges.)
- To use a channel other than the alpha channel of the matte layer as a matte, use one of the Channel effects (such as the Shift Channels effect) to route the desired channel's value into the alpha channel.
- To animate a track matte to move with the layer that it's matting, make the track matte a child of the layer that it's matting. (See [Parent and child layers](#).)

### Online resources about track mattes

Trish and Chris Meyer provide an introduction to mattes in a PDF excerpt from the “All About Track Mattes” chapter of their book [Creating Motion Graphics with After Effects \(4th Edition\)](#).

Harry Frank provides a video tutorial on his [graymachine website](#) in which he demonstrates how to use effects on track matte layers to create custom fade-on transitions.

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## Preserve underlying transparency during compositing

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The Preserve Underlying Transparency option causes a layer to get its transparency from the transparency of the composite of the layers below it in the layer stacking order. In other words, the opaque areas of the layer with this option selected appear only when positioned over opaque areas in underlying layers. This behavior is similar to the behavior of a track matte, except that a track matte can only be a single layer and a track matte must be above the layer in the layer stacking order. (See [Track mattes and traveling mattes](#).)

This option is useful for creating results such as glints or light reflecting off a polished surface.

The behavior of a layer with the Preserve Underlying Transparency option selected is similar to the behavior of a clipping mask in Adobe Photoshop.

- Select the T option in the Modes column for the layer.

Aharon Rabinowitz provides a short video tutorial about the Preserve Underlying Transparency option on the [Creative COW website](#).

Tim Clapham provides an explanation and demonstration on [his website](#) of the Preserve Underlying Transparency switch.

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## Resources for Imagineer mocha shape for After Effects

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After Effects includes Imagineer Systems mocha for After Effects (mocha-AE), a stand-alone planar tracking application that can export tracking data for use in compositions in After Effects. (See [Resources for mocha for After Effects \(mocha-AE\)](#).)

After Effects also includes the mocha shape for After Effects (mocha shape) plug-in, which converts paths from mocha-AE into mattes in After Effects.

**Note:** The free trial version of Adobe After Effects software does not include some features that depend upon software licensed from parties other than Adobe. For example, mocha shape for After Effects, and some effect plug-ins are available only with the full version of Adobe After Effects software. (See [Setup and installation](#).)

You don't apply the mocha shape effect to a layer directly. Rather, you copy path data to the clipboard in the mocha-AE application and then paste it onto a layer in After Effects. The paths from mocha-AE are converted to instances of the mocha shape effect to create a matte.

The [Imagineer website](#) provides several video tutorials and other resources for learning to use mocha-AE and mocha shape with After Effects.

Chris and Trish Meyer provide tips about mocha-AE and mocha shape, including tips about variable-width feather, in an article on the [ProVideo Coalition website](#).

- [Alpha channel interpretation: premultiplied or straight](#)
- [Split a layer](#)
- [Set Matte effect](#)



# Keying

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[Keying introduction and resources](#)

[Use a garbage matte](#)

[Use a hold-out matte](#)

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## Keying introduction and resources

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**Note:** When a background is not of a consistent and distinctive color, you can't remove the background with keying effects. Under these conditions, you may need to use rotoscoping—the manual drawing or painting on individual frames to isolate a foreground object from its background. (See [Rotoscoping introduction and resources](#).)

### About keying: color keys, luminance keys, and difference keys

Keying is defining transparency by a particular color value or luminance value in an image. When you key out a value, all pixels that have colors or luminance values similar to that value become transparent.

Keying makes it easy to replace a background, which is especially useful when you work with objects too complex to mask easily. When you place a keyed layer over another layer, the result forms a composite, in which the background is visible wherever the keyed layer is transparent.

You often see composites made with keying techniques in movies, for example, when an actor appears to dangle from a helicopter or float in outer space. To create this effect, the actor is filmed in an appropriate position against a solid-color background screen. The background color is then keyed out and the scene with the actor is composited over a new background.

The technique of keying out a background of a consistent color is often called bluescreening or greenscreening, although you don't have to use a blue or green screen; you can use any solid color for a background. Red screens are often used for shooting non-human objects, such as miniature models of cars and space ships. Magenta screens have been used for keying work in some feature films renowned for their visual effects. Other common terms for this kind of keying are color keying and chroma keying.

Difference keying works differently from color keying. Difference keying defines transparency with respect to a particular baseline background image. Instead of keying out a single-color screen, you can key out an arbitrary background. To use difference keying, you must have at least one frame that contains only the background; other frames are compared to this frame, and the background pixels are made transparent, leaving the foreground objects. Noise, grain, and other subtle variations can make difference keying very difficult to use in practice.

### Keying effects, including Keylight

After Effects includes several built-in keying effects, as well as the Academy Award-winning Keylight effect, which excels at professional-quality color keying. (See [Keying effects and Matte effects](#).)

For information on the Keylight effect, see its documentation in the folder in which the Keylight plug-in is installed, or on the [Foundry website](#).

Keylight is not included with the trial version of After Effects CS5. (See [Third-party plug-ins included with After Effects](#).) Keylight is included in the trial version of After Effects CS5.5 and later.

**Note:** Though the color keying effects built into After Effects can be useful for some purposes, you should try keying with Keylight before attempting to use these built-in keying effects. Some keying effects—such as the Color Key effect and the Luma Key effect—have been superseded by more modern effects like Keylight.

For a video tutorial on keying with Keylight, go to the [Adobe website](#).

Mark Christiansen provides tips and techniques for using Keylight in an excerpt from his book [After Effects Studio Techniques: Visual Effects and Compositing](#) on the Peachpit Press website. In an excerpt from the “Color Keying in After Effects” chapter of [After Effects Studio Techniques](#), Mark Christiansen provides detailed tips and techniques for color keying, including advice on which keying effects to avoid and how to overcome common keying challenges.

For a step-by-step tutorial demonstrating the use of the Color Difference Key effect, the Matte Choker effect, the Spill Suppressor effect, and garbage masks, see the “Keying in After Effects” chapter of the [After Effects Classroom in a Book](#) on the Peachpit Press website.

Jeff Foster provides free sample chapters from his book *The Green Screen Handbook: Real World Production Techniques*. The sample chapters cover basic compositing, color keying, garbage mattes, hold-out mattes, and how to avoid common problems with greenscreen shots. For more information, see the [Adobe website](#).

Rich Young collects more tips and resources for keying [on his After Effects Portal website](#).

[Tips on color keying and compositing](#) from experienced compositor, Chris Zwar.

Chris & Trish Meyer shares [tips & resources for color keying](#) with Keylight and other effects.

**Note:** Keep in mind that generating a high-quality key can require the application of multiple keying effects in sequence and careful modification

of their properties, especially if the footage was shot without considering the requirements of the compositor.

## Shooting and acquiring footage for keying

Keying footage that was not acquired correctly is much more difficult than is keying footage that was acquired with keying in mind. For best results, use Adobe OnLocation™ to monitor color and lighting as you acquire footage for color keying.

For tips on shooting footage so that color keying is easier and more successful, see Jonas Hummelstrand's [General Specialist website](#).

Alex Lindsay provides an article on the [ProVideo Coalition website](#) about setting up and lighting a green background in preparation for color keying work. In part two of his greenscreen primer on the [ProVideo Coalition website](#), Alex Lindsay provides detailed information about cameras, codecs, and capture systems to use when acquiring footage for color keying.

- Light your color screen uniformly, and keep it free of wrinkles.
- Start with the highest-quality materials you can gather, such as film that you scan and digitize.
- Use uncompressed footage (or, at least, files with the least possible amount of compression). Many compression algorithms, especially the algorithms used in DV, HDV, and Motion JPEG, discard subtle variations in blue—which may be necessary to create a good key from a bluescreen. Use footage with the least color subsampling possible—for example, 4:2:2 rather than 4:2:0 or 4:1:1. (For information about color subsampling, see the [Wikipedia website](#) and the [Adobe website](#).)

Robbie Carman and Richard Harrington provide an excerpt on the [Peachpit website](#) from their book *Video Made On A Mac* that demonstrates how to plan, shoot, key, and composite a greenscreen shot.

## Tips for keying with After Effects

- Noise and compression artifacts can cause problems for keying, especially difference keying. Often, applying a slight blur before keying can reduce noise and compression artifacts enough to improve keying results. For example, blurring the blue channel for DV footage can smooth out noise in a bluescreen.  
  
The KeyerforDV animation preset available through the [AE Enhancers forum](#) automates the process of blurring the blue and green channels before keying DV footage.
- Use a garbage matte to roughly outline your subject so that you don't have to waste time keying out parts of the background far from the foreground subject. (See [Use a garbage matte](#).)
- Use a hold-out matte to roughly protect areas that are of a similar color to the background from being keyed out. (See [Use a hold-out matte](#).)
- To help you view transparency, temporarily change the background color of the composition, or include a background layer behind the layer you are keying out. As you apply the keying effect to the layer in the foreground, the composition background (or a background layer) shows through, making it easy to view transparent areas. (See [Composition settings](#).)
- For evenly lit footage, adjust keying controls on only one frame. Choose the most intricate frame of the scene, one involving fine detail such as hair and transparent or semitransparent objects, such as smoke or glass. If the lighting is constant, the same settings you apply to the first frame are applied to all subsequent frames. If lighting changes, you may need to adjust keying controls for other frames. Place keyframes for the first set of keying properties at the start of the scene. If you are setting keyframes for one property only, use Linear interpolation. For footage that requires keyframes for multiple interacting properties, use Hold interpolation. If you set keyframes for keying properties, you may want to check the results frame by frame. Intermediate keying values may appear, producing unexpected results.
- To key well-lit footage shot against a color screen, start with the Color Difference Key. Add the Spill Suppressor to remove traces of the key color, and then use one or more of the other Matte effects, if necessary. If you are not satisfied with the results, try starting again with the Linear Color Key.
- To key well-lit footage shot against multiple colors or unevenly lit footage shot against a bluescreen or greenscreen, start with the Color Range key. Add the Spill Suppressor and other effects to refine the matte. If you are not completely satisfied with the results, try starting with or adding the Linear Color Key.
- To key dark areas or shadows, use the Extract Key on the Luminance channel.
- To make a static background scene transparent, use the Difference Matte Key. Add the Simple Choker and other effects as needed to refine the matte.
- After you have used a key to create transparency, use Matte effects to remove traces of key color and create clean edges.
- Blurring the alpha channel after keying can soften the edges of the matte, which can improve compositing results.

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## Use a garbage matte

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A garbage matte (or junk matte) removes unneeded portions of the scene, resulting in a rough area that contains only the subject that you want to keep. When you are working with a poorly lit or uneven color screen (for example, a bluescreen or greenscreen), sketching a garbage matte around the subject can greatly reduce the amount of work that you have to do in keying out the background. However, if you spend a lot of time making a perfect garbage matte that exactly outlines the subject—essentially rotoscoping—you lose the time-saving advantage of keying.

1. Create a mask to roughly outline a subject.

2. Apply one or more keying effects to mask out the remainder of the background.
3. Apply Matte effects as necessary to fine-tune the matte.

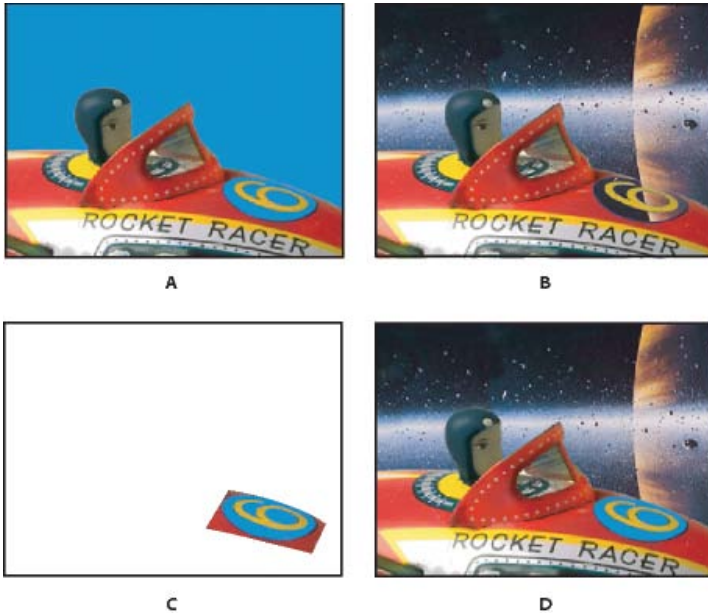
Aharon Rabinowitz provides a video tutorial on the [Creative COW website](#) that shows how to create a super-tight garbage matte using Auto-trace.

## Use a hold-out matte

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Use a hold-out matte (also known as a hold-back matte) to patch a scene to which a keying effect has been applied.

A hold-out matte is a masked-out portion of a duplicate of a layer that you have keyed. The duplicate is masked to include only the area of the image that contains the key color that you want to preserve as opaque. The hold-out matte is then placed directly on top of the keyed layer.



Example of using a hold-out matte

**A.** Original bluescreen image. The background for the number is also blue. **B.** After keying, the background for the number is also transparent. **C.** Hold-out matte containing the part of the image you want to remain opaque. **D.** When the hold-out matte is placed on top of the keyed image, the background for the number is now opaque.

1. Duplicate the layer containing the color screen.
2. Apply keying effects and Matte effects to the original layer to create transparency.
3. On the duplicate layer, create masks to mask out everything in the image except the area that you want to preserve.
4. Make sure that the copy (the hold-out matte) is positioned directly on top of the keyed layer.  
**Note:** Don't change Transform properties of only one of the layers after making the duplicate; keep the layers moving together. Consider parenting one to the other. (See Parent and child layers.)

More Help topics

[Maintaining consistent color for background keying](#)



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# Roto Brush and Refine Matte

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[Online resources for the Roto Brush tool and Refine Matte effect](#)  
[Roto Brush and Refine Matte overview and workflow](#)  
[Tips for working with the Roto Brush tool](#)  
[Roto Brush strokes, spans, and base frames](#)  
[Roto Brush effect and Refine Matte effect reference](#)  
[Freezing \(caching, locking, and saving\) Roto Brush segmentation](#)  
[Layer panel view options](#)

Separating a foreground object, such as an actor, from a background is a crucial step in many visual effects and compositing workflows. When you've created a matte that isolates an object, you can replace the background, selectively apply effects to the foreground, and much more.

Conventionally, segmentation of a moving image into foreground and background elements has been accomplished through rotoscoping—defining mattes by manually drawing Bezier curves (masks) on most frames, with some interpolation. (See [Rotoscoping introduction and resources](#).)

The Roto Brush tool provides an alternative, faster workflow for this segmentation and creation of a matte.

With the Roto Brush tool, you draw strokes on representative areas of the foreground and background elements, and then After Effects uses that information to create a segmentation boundary between the foreground and background elements. The strokes that you make on one area inform After Effects about what is foreground and what is background in adjacent areas and on adjacent frames. Various techniques are used to track regions across time, and this information is used to propagate segmentation forward and backward in time so that each stroke that you make is used to improve the results on nearby frames. Even if an object moves or changes shape from one frame to the next, the segmentation boundary adapts to match the object.

After you have created a segmentation boundary, you use the Refine Matte properties to improve the matte. The Refine Matte effect is also available separately for the improvement of mattes created using features other than the Roto Brush tool.

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## Online resources for the Roto Brush tool and Refine Matte effect

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For a collection of video tutorials and resources about the Roto Brush tool, see [this article on the Adobe website](#).

For a video that demonstrates the use of the Roto Brush tool to quickly create a matte for selective color correction, see the [Adobe website](#).

For a video that demonstrates the use of the Refine Matte properties in the Roto Brush effect to improve a matte, see the [Adobe website](#).

John Dickinson provides a video tutorial on the [Motionworks website](#) that demonstrates the Roto Brush tool.

Chris & Trish Meyer share tips on the Roto Brush tool on the [ProVideo Coalition website](#).

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## Roto Brush and Refine Matte overview and workflow

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1. Activate the Roto Brush tool by pressing Alt+W (Windows) or Option+W (Mac OS).
2. Open the layer that you want to work on in the Layer panel.  
**Note:** *Double-clicking a layer in the Timeline panel when the Roto Brush tool is active opens the layer in the Layer panel.*
3. Preview the movie in the Layer panel to find a frame in which the greatest amount of the foreground object is in the frame and in which the separation between the foreground and background is as clear as possible.  
The frame on which you draw your first stroke is the base frame. (See [Roto Brush strokes, spans, and base frames](#).)
4. Drag in the Layer panel to draw a foreground stroke on the object that you want to define as a foreground object. When you are drawing a foreground stroke, the Roto Brush tool's pointer is a green circle with a plus sign in the middle.  
**Note:** *Draw the stroke down the center of the object, not along the edge. (See [Tips for working with the Roto Brush tool](#).)*  
The magenta outline that appears around the foreground object in Alpha Boundary view mode is the segmentation boundary, the rough line that separates the foreground from the background. You can also view the segmentation using other view modes. (See [Layer panel view options](#).)
5. Alt+drag (Windows) or Option+drag (Mac OS) to draw a background stroke on the area that you want to define as the background. When you are drawing a background stroke, the Roto Brush tool's pointer is a red circle with a minus sign in the middle.
6. Repeat the steps of drawing foreground and background strokes on the base frame until the segmentation is as precise and complete as possible. You should make the segmentation on the base frame as good as possible; the segmentation of other frames is based on the segmentation defined on the base frame.



Try for a segmentation boundary that is within a couple of pixels of your desired edge. You can modify properties in the Roto Brush effect, such as Smooth, to refine the initial segmentation further. (See Roto Brush effect and Refine Matte effect reference.)

 You can resize the Roto Brush tool's tip to make finer strokes. Broad strokes are best for initial work, but fine strokes are useful for details. (See Roto Brush strokes, spans, and base frames.)

7. Press Page Down to move forward one frame.

After Effects uses motion tracking, optical flow, and various other techniques to propagate the information from the base frame to the current frame to determine where to draw the segmentation boundary.

8. If the segmentation boundary that After Effects calculates for the current frame is not where you want it to be, then you can make corrective strokes to teach After Effects what is foreground and what is background. Draw foreground strokes and background strokes as needed to correct the segmentation. Corrective strokes propagate in one direction, away from the base frame.

**Note:** You can also modify properties in the Propagation property group to affect how After Effects propagates the segmentation information from previous frames to the current frame. (See Roto Brush effect and Refine Matte effect reference.)

9. Repeat the steps of moving one frame at a time and making corrective strokes until you have created a segmentation boundary for the entire duration that you want to segment.
10. Select the Refine Matte option in the Roto Brush effect properties in the Effect Controls panel and modify properties in the Matte property group as needed. (See Roto Brush effect and Refine Matte effect reference.)
11. When you are done, click the Freeze button in the lower-right corner of the Layer panel to cache, lock, and save the Roto Brush segmentation information. (See Freezing (caching, locking, and saving) Roto Brush segmentation.)

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## Tips for working with the Roto Brush tool

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- When drawing strokes to define a foreground object with the Roto Brush tool, begin by drawing strokes along the center of the object's features. For example, draw a stroke along the skeleton rather than along the outline of an arm. Unlike conventional rotoscoping, which requires precise manual definition of boundaries, using the Roto Brush tool works by defining representative regions. After Effects can then extrapolate from those regions to determine where the boundaries are. Before you draw a stroke along a boundary to attempt to get a precise segmentation, be sure that you've drawn foreground strokes down the center of the object and made at least some rough background strokes on the other side of the boundary.
- If you draw a Roto Brush stroke over the wrong area of the image, undo that stroke. (See Undo changes.) However, if After Effects misinterprets your stroke and includes or excludes too much of the image, don't undo; further teach Roto Brush by drawing additional strokes to include or exclude regions.
- Work with resolution set to Full when using the Roto Brush tool. Fast Previews modes, such as Adaptive Resolution, don't work well with the Roto Brush tool, because switching resolutions requires a full recalculation of the segmentation information. For this reason, Fast Previews modes are turned off when you draw a Roto Brush stroke. This setting is shared by the Composition and Layer panels. (See Resolution.)
- Use the Roto Brush tool in a composition with a frame rate set to match the frame rate of the layer's source footage item. A warning banner appears at the bottom of the frame in the Composition panel if the frame rate of the composition doesn't match the frame rate of the layer's source footage item. (See Frame rate.)
- When you've gotten everything as good as you can with the Roto Brush effect, you can touch up the matte further using other compositing features in After Effects—such as by painting on the alpha channel. (See Compositing and transparency overview and resources.)

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## Roto Brush strokes, spans, and base frames

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### Base frames, Roto Brush spans, and corrective strokes

When you first draw a Roto Brush stroke, the frame on which you are drawing becomes a base frame. The segmentation information (the information about what is defined as foreground and what is defined as background) is propagated forward and backward through time—20 frames forward and 20 frames backward. The range of frames thus influenced by this base frame is its Roto Brush span. Little arrows in the span bar in the Layer panel show the direction in which the information is being propagated. If you draw a corrective stroke anywhere where the arrows point to the right, the information from that stroke is propagated forward; if you draw a corrective stroke anywhere where the arrows point to the left, information from that stroke is propagated backward. If you draw a stroke anywhere outside of a Roto Brush span, then you create a new base frame and span.

You can work your way forward a frame at a time from a base frame, making corrective strokes, and you don't have to worry about your strokes changing results on frames that you've already worked on. You can do the same thing going backward from a base frame.

The influence of each corrective stroke propagates forward or backward to affect all frames in that direction within the span, regardless of when the stroke is made. For example, if the base frame is at frame 10, you make a corrective stroke at frame 20, and then you make a corrective stroke at frame 15, then frame 20 will be affected by both of these corrective strokes—just as if you had made the corrective strokes in the other order.

Each time that you make a stroke within a span, the span grows, unless it can't because the span in which you're drawing is adjacent to another span.

- To manually change a span duration, drag either end of a span.
- To delete a span, right-click (Windows) or Control-click (Mac OS) a span and choose Remove Span.
- To delete all spans, delete the instance of the Roto Brush effect.

When you move to a frame within a span, After Effects must calculate how the stroke information from the other frames in the span affects the frame to which you've moved. The Info panel shows the message "Roto Brush propagating" as this calculation is being performed. This information is cached, so this propagation doesn't need to happen every time that you move to a frame. Green bars in a span indicate frames with cached information. Choosing Edit > Purge Image Caches purges Roto Brush caches, too.

### Roto Brush tool, Roto Brush strokes, and similarities to paint tools and strokes

The Roto Brush tool is similar in many ways to the paint tools, though it also has several important differences.

When the Roto Brush tool is selected, controls in the Paint panel are disabled. Roto Brush strokes have a duration of one frame, though their influence propagates forward or backward within a span.

You can change the brush size (Diameter) for the Roto Brush tool in the same way that you change it for the paint tools. You can use the Diameter control in the Brushes panel or Ctrl-drag (Windows) or Command-drag (Mac OS) in the Layer panel. Other controls in the Brushes panel do affect the Roto Brush tool, with the exception of Hardness.

You can copy Roto Brush Path properties, and paste them into masks, shapes, and instances of the Paint effect, just like you can with other kinds of paths. If you copy an individual stroke, the Roto Brush span information is not copied; however, if you copy the entire Roto Brush effect instance, it includes the Roto Brush span (and base frame) information.

You can use expressions on the Roto Brush effect's Path property in the same manner as the Paint effect's Path property.

When drawing a stroke with the Roto Brush tool, a new stroke is created even if another stroke is selected. This differs from the stroke replacement functionality for the paint tools.

Roto Brush strokes are in a Strokes property group within the Roto Brush property group in the Timeline panel.

Many keyboard shortcuts that work with paint strokes and paint tools also work with Roto Brush strokes and the Roto Brush tool. (See Paint tools (keyboard shortcuts).)

- Press 1 or 2 on the main keyboard to move earlier and later (backward or forward) one frame.
- Press PP to show paint strokes, Roto Brush strokes, and Puppet pins.
- Press Ctrl+A (Windows) or Command+A (Mac OS) to select all strokes on current frame.

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## Roto Brush effect and Refine Matte effect reference

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The Roto Brush effect properties in the Propagation property group affect segmentation between foreground and background and how that segmentation information is used for contiguous frames in a span. Other properties of the Roto Brush effect affect the matte that is generated based on the initial segmentation. The Refine Matte effect includes all of the properties of the Roto Brush effect outside of the Propagation property group (except for Invert Foreground/Background).

**Propagation** Properties in the Propagation property group (except for View Search Region) affect all Roto Brush calculations. Any change to these properties requires a recalculation and propagation of the segmentation information from a base frame. Also, the results on a base frame itself are not affected by changes to these properties; therefore, it's best to change these properties when the current-time indicator is a frame or two away from a base frame, so that you can see the result of the changes.

**Search Radius** The radius of the area within which After Effects searches when looking for pixels that match from one frame to the next. You can change how the search radius adapts to regions with more or less motion using the Motion Threshold and Motion Damping properties. If the search radius is too small, some motion may be missed; if the search radius is too large, extraneous motion may be detected.

**Motion Threshold and Motion Damping** These two properties control how the search region is constrained based on motion. Change Motion Threshold to set the motion level below which is considered no motion, where the search region will shrink to nothing. Motion Damping affects the remaining areas that are considered to be in motion. As you increase Motion Damping, the search region is tightened, with slow-moving areas tightening more than fast-moving areas. Constraining the search region in areas with little motion can reduce edge chatter in these regions. Constraining the search region too much will cause the automatic boundary detection to fall off the edge of the object.

**View Search Region** Renders the search region as yellow, and the foreground and background as a grayscale image (with the background dimmer than the foreground). The value of this property affects the rendered output of the Roto Brush effect, not just an intermediate stage of the effect's operation. Its main use is to help you pick values for Search Radius, Motion Threshold, and Motion Damping.

**Note:** For frames other than the base frame, viewing the search region shows the area that will be searched on the current frame, based on segmentation results of the previous frame. So, for frames other than the base frame, adding a stroke on a frame does not change the search region shown for that frame.

**Edge Detection** Choose whether to favor the segmentation boundary calculated for the current frame in isolation or the segmentation calculated based on the previous frame when determining the edge between foreground and background. The Balanced option considers the current frame and surrounding frames equally. Foreground objects with colors that match the background will usually benefit from

Favor Predicted Edges.

**Use Alternate Color Estimation** Subtly changes the process by which the Roto Brush effect determines what is foreground and what is background. Sometimes checking it helps with segmentation; sometimes it doesn't.

**Invert Foreground/Background** Inverts which strokes are considered foreground strokes and which strokes are considered background strokes in the segmentation phase of the Roto Brush effect.

**Smooth** Increasing this value reduces the sharpness of the curves in the segmentation boundary by smoothing *along* the edge. Leave this number low when isolating a object with sharp features, such as hair.

**Feather** Softness of the segmentation boundary. This property does nothing if Smooth is 0. In contrast to Smooth, Feather applies *across* the edge.

**Choke** The amount of choking (contraction) of the matte relative to the value of the Smooth property. The result is very similar to that of the Choke property in the Matte Choker effect, but the value is given from -100% to 100% (instead of -127 to 127).

**Reduce Chatter** Increase this property to reduce erratic changes to edges from one frame to the next. This property determines how much influence the current frame should have when performing a weighted average across adjacent frames to make the matte edges not move erratically from one frame to the next. If the Reduce Chatter value is high, the chatter reduction strong, and the current frame is considered less. If the Reduce Chatter value is low, the chatter reduction is weak, and the current frame is considered more. If the Reduce Chatter value is 0, only the current frame is considered for matte refinement.

💡 *If the foreground object isn't moving, but the matte edges are moving and changing, increase the value of the Reduce Chatter property.*

If the foreground object is moving, but the matte edge isn't moving, decrease the value of the Reduce Chatter property.

**Use Motion Blur** Check this option to render the matte with motion blur. The high quality option is slower, but generates a cleaner edge. You can also control the number of samples and the shutter angle, which have the same meaning as they do in the context of motion blur in the composition settings. (See Motion blur.)

**Decontaminate Edge Colors** Check this option to decontaminate (clean) the color of edge pixels. The background color is removed from foreground pixels, which helps to fix halos and the contamination of motion-blurred foreground objects with background color. The strength of this cleaning is determined by Decontamination Amount.

**Extend Where Smoothed** Only functional when Reduce Chatter is greater than 0 and Decontaminate Edge Colors is selected. Edges that are moved in order to reduce chatter are cleaned.

**Increase Decontamination Radius** Amount (in pixels) by which to increase the radius value for the cleaning of edge colors, in addition to any cleaning that covers feather, motion blur, and extended decontamination.

**View Decontamination Map** Shows which pixels will be cleaned by decontamination of edge colors (white pixels in the map).

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## Freezing (caching, locking, and saving) Roto Brush segmentation

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When the View menu in the Layer panel is set to Roto Brush, a Freeze button appears in the lower-right corner of the Layer panel. Click this button to cache and lock segmentation for all Roto Brush spans for the layer within the composition work area. This preserves the matte and saves it with the project, preventing the Roto Brush effect from recalculating the segmentation when you open the project again or make changes.

If After Effects has already calculated Roto Brush segmentation information for a frame when you click the Freeze button, then this information is cached. If the segmentation has not been calculated for a frame within a Roto Brush span, then After Effects must calculate the segmentation before freezing.

Frames with frozen (cached and locked) segmentation information are represented by blue bars in the Roto Brush span view in the Layer panel.

**Note:** *If you click Stop in the Freezing Roto Brush dialog box, After Effects stops adding frames to the cache, but Roto Brush segmentation is still locked with the segmentation information cached up until the point that you clicked Stop.*

To unfreeze Roto Brush segmentation, click the Freeze button again.

When Roto Brush segmentation is frozen, you can place the pointer over the Freeze button to see a tooltip that tells you when the cached information was created.

When Roto Brush segmentation is frozen, the pointer for the Roto Brush tool has a slash through it.

The information that is cached and locked is the result of Roto Brush strokes and the properties in the Propagation property group of the Roto Brush effect. Making changes to any of these items (for example, by drawing new Roto Brush strokes or modifying properties in the Propagation property group) has no influence on the result of the Roto Brush effect until you unfreeze segmentation. The properties in the Matte property group are not frozen.

Frozen Roto Brush segmentation information is cached and locked while the application is running, and the cached information is saved with the project.

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## Layer panel view options

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You can choose these view modes from the Show Channel menu in the Layer panel, by clicking the buttons in the Layer panel, or by using keyboard shortcuts. You can use the controls at the bottom of the Layer panel to change the color and opacity of the overlays used in Alpha Boundary and Alpha Overlay mode.

**Alpha** Shows alpha channel of layer (Alt+4 or Option+4).

**Alpha Boundary** Shows source layer with foreground and background unchanged, with segmentation boundary overlaid as colored outline (Alt+5

or Option+5).

**Note:** *Alpha Boundary view mode is turned off when the View menu in the Layer panel is changed to anything other than Roto Brush.*

**Alpha Overlay** Shows source layer with foreground unchanged and background overlaid with a solid color (Alt+6 or Option+6).

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## Effects and animation presets

# Effects and animation presets overview

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## Animation presets overview and resources

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For a video tutorial on applying and working with effects and animation presets, go to the [Adobe website](#).

With animation presets, you can save and reuse specific configurations of layer properties and animations, including keyframes, effects, and expressions. For example, if you created an explosion using several effects with complex property settings, keyframes, and expressions, you can save all of those settings as a single animation preset. You can then apply that animation preset to any other layer.

Many animation presets don't contain animation; rather, they contain combinations of effects, transform properties, and so on. A behavior animation preset uses expressions instead of keyframes to animate layer properties.

Animation presets can be saved and transferred from one computer to another. The filename extension for an animation preset is .ffx.

After Effects includes hundreds of animation presets that you can apply to your layers and modify to suit your needs, including many text animation presets. (See [Text animation presets](#).)

You can browse and apply animation presets in After Effects using the Effects & Presets panel or Adobe Bridge. To open the Presets folder in Adobe Bridge, choose Browse Presets from the Effects & Presets panel menu or from the Animation menu.

 A great way to see how advanced users use After Effects is to apply an animation preset, and press U or UU to reveal only the animated or modified layer properties. Viewing the animated and modified properties shows you what changes the designer of the animation preset made to create the animation preset.

## Downloading, installing, and moving animation presets

The animation presets that are installed with After Effects are in the Presets folder located in the Program Files\Adobe\Adobe After Effects CS5\Support Files (Windows) or Applications/Adobe After Effects CS5 (Mac OS) folder. Animation presets that you create are saved by default in the Presets folder located in My Documents\Adobe\After Effects CS5 (Windows) or Documents/Adobe/After Effects CS5 (Mac OS).

You can add a single new animation preset or an entire folder of new animation presets to either of the Presets folders.

When After Effects starts, it searches both of the Presets folders and their subfolders for installed presets and adds them to the Effects & Presets panel. After Effects ignores the contents of folders with names that begin and end in parentheses; for example, the contents of the folder (archived\_animation\_presets) are not loaded.

**Note:** Animation presets appear in the Effects & Presets panel only if they are located in one of the Presets folders or a subfolder of one of the Presets folders. If you move a preset to a new folder, place a shortcut (Windows) or an alias (Mac OS) of that folder in the Presets folder.

Animation presets are loaded and initialized only when the Effects & Presets panel is shown. If the Effects & Presets panel is closed or hidden behind another panel, the animation presets are not initialized.

After Effects CS5 can use animation presets created by After Effects 6.0 and later versions.

## Save an animation preset

1. Select any combination of properties (for example, Position and Scale) and property groups (for example, Paint and Transform). If you are selecting only effects, you can select them in the Effect Controls panel.
2. Choose Save Animation Preset from the Animation menu or from the Effects & Presets panel menu.
3. Specify a name and location for the file, and then click Save.

For the animation preset to appear in the Effects & Presets panel, it must be saved in the Presets folder.

**Note:** If the animation preset does not appear in the Effects & Presets panel, choose *Refresh List* from the Effects & Presets panel menu.

## Online resources for animation presets

You can download additional animation presets—including a set of animation presets that make use of shape layers and per-character 3D text animation—from the [Adobe After Effects Exchange](#).

 If you apply an animation preset from the Animation Presets > Shapes > Backgrounds category, you can see a custom *Animated Shape Control* effect in the Effect Controls panel. This custom effect is a specialized expression control effect that was created specifically for these animation presets. You can copy and paste this effect to other layers, or you can save it as an animation preset itself so that you can apply it elsewhere.

You can also download animation presets from many After Effects community websites, such as the [AE Enhancers forum](#).

For a list of animation presets included with After Effects CS5, see Animation preset list.

Chris and Trish Meyer provide an in-depth look at animation presets—including behaviors and text animation presets—in a PDF excerpt from their book *Creating Motion Graphics with After Effects* on [their website](#).

Andrew Kramer provides many animation presets on his [Video Copilot website](#).

Chris Zwar provides an animation preset on [his website](#) that creates a target cross-hair using a single shape layer, with a wide variety of custom properties that make controlling and modifying the cross-hair animation easy and obvious. This is an excellent example of how to use animation presets to create elements that can be used and reused by others.

Rob Schofield provides a custom effect (a multi-part, packaged animation preset) on the [AETUTS+ website](#) that distributes and animates 3D layers. This custom effect works especially well for animations that involve a large number of 3D layers dispersing or converging. In the video tutorial accompanying the custom effect, Rob explains the installation of custom effects.

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## Effects overview and resources

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After Effects includes a variety of effects, which you apply to layers to add or modify characteristics of still images, video, and audio. For example, an effect can alter the exposure or color of an image, add new visual elements, manipulate sound, distort images, remove grain, enhance lighting, or create a transition.

Effects are sometimes mistakenly referred to as filters. The primary difference between a filter and an effect is that a filter permanently modifies an image or other characteristic of a layer, whereas an effect and its properties can be changed or removed at any time. In other words, filters operate destructively, and effects operate non-destructively. After Effects uses effects exclusively, so changes are non-destructive. A direct result of the ability to change the properties of effects is that the properties can be changed over time, or animated.

**Note:** Path operations on shape layers, such as *Zig Zag* and *Pucker & Bloat*—which you apply through the shape layer's *Add* menu—are called effects in Adobe Illustrator, but they function differently from other effects in After Effects.

You browse and apply effects using the Effects & Presets panel. You modify effect properties using the Effect Controls panel or Timeline panel or by moving effect control points in the Layer panel or Composition panel.

You can apply multiple instances of the same effect to a layer, rename each instance, and set the properties for each instance separately.

For a video tutorial on applying and working with effects and animation presets, go to the [Adobe website](#).

Chris and Trish Meyer provide a video on the [Focal Press website](#) that introduces effects and animation presets and shows how to use the Effects & Presets panel. Chris & Trish Meyer give tips on applying and using effects in an article on the [ProVideo Coalition website](#).

**Note:** If you open a project that uses an effect for which After Effects has not loaded the plug-in, a warning dialog box appears, and instances of the effect have *Missing*: at the beginning of its name in the Timeline panel and Effect Controls panel. To show all instances of missing effects in the Timeline panel for the active composition, press *FF*.

## Effect plug-ins

All effects are implemented as plug-ins, including the effects that are included with After Effects. Plug-ins are small software modules—with filename extensions such as .aex, .pbk, and .pbg—that add functionality to an application. Not all plug-ins are effect plug-ins; for example, some plug-ins provide features for importing and working with certain file formats. The Photoshop Camera Raw plug-in, for example, provides After Effects with its ability to work with camera raw files. (See Plug-ins.)

Many effect plug-ins are written in C/C++; increasingly, many image-manipulation effect plug-ins are written in the Adobe Pixel Bender language.

Because effects are implemented as plug-ins, you can install and use additional effects that parties other than Adobe provide, including effects that you create yourself. You can add a single new effect or an entire folder of new effects to the Plug-ins folder, which is located by default in one of these folders:

- (Windows) Program Files\Adobe\Adobe After Effects CS5.5\Support Files
- (Mac OS) Applications/Adobe After Effects CS5.5

When After Effects starts, it searches the Plug-ins folder and its subfolders for all installed effects and adds them to the Effect menu and to the Effects & Presets panel. After Effects ignores the contents of folders with names that begin and end in parentheses; for example, the contents of the folder (archived\_effects) are not loaded.



After Effects comes with several third-party plug-ins, including Foundry Keylight, Synthetic Aperture Color Finesse, Digieffects FreeForm, Imagineer mocha shape, fford ProEXR, and Cycore FX (CC) (CS5.5, and earlier), CycoreFX HD (CC)(CS6) plug-ins. These plug-ins are installed by default with the full version of Adobe After Effects software. Some of these plug-ins are not included with the trial version of Adobe After Effects. (See Third-party plug-ins included with After Effects.).

**Note:** *Digieffects FreeForm is not included with After Effects CS6.*

After Effects CS6 includes Synthetic Aperture Color Finesse 3.

The installers for some plug-ins install their documentation in the same directory as the plug-ins themselves.

The EXtractoR and IIdentifier plug-ins from fford software are included with After Effects to provide access to multiple layers and channels of OpenEXR files. See ProEXR plug-ins, IIdentifier and EXtractoR.

### Animating effects

You animate effect properties in the same way that you animate any other properties—by adding keyframes or expressions to them. In most cases, even effects that rely on animation for their normal use require that you set some keyframes or expressions. For example, animate the Transition Completion property of a Transition effect or the Evolution setting of the Turbulent Noise effect to turn a static effect into a dynamic effect.

### Color depth

Many effects support processing of image color and alpha channel data at a depth of 16 or 32 bits per channel (bpc). Using an 8-bpc effect in a 16-bpc or 32-bpc project can result in a loss of color detail. If an effect supports only 8 bpc, and your project is set to 16 bpc or 32 bpc, the Effect Controls panel displays a warning icon ⚠ next to the effect name. You can set the Effects & Presets panel to list only the effects that support the color depth of the current project. (See Color depth and high dynamic range color.)

### Render order

The order in which After Effects renders masks, effects, layer styles, and transform properties—called the render order—may affect the final result of an applied effect. By default, effects appear in the Timeline panel and Effect Controls panel in the order in which they were applied. Effects are rendered in order from top to bottom in this list. To change the order in which effects are rendered, drag the effect name to a new position in the list. (See Render order and collapsing transformations.)

### Adjustment layers

To apply an effect to only a specific portion of a layer, use an adjustment layer.

An effect applied to an adjustment layer affects all layers below it in the layer stacking order in the Timeline panel. (See Create an adjustment layer.)

Andrew Kramer provides a video tutorial on his [Video Copilot website](#) in which he shows how to use an adjustment layer to apply an effect to only a short duration and to only specific portions of a movie.

### Expression Controls effects

Expression Controls effects do not modify existing layer properties; rather, these effects add layer properties that expressions can refer to. (See Expression Controls effects.)

### Preventing edge clipping with the Grow Bounds effect

Because an effect is applied to a layer, the results of some effects are constrained to within the bounds of the layer, which can make the effect appear to end abruptly. You can apply the Grow Bounds effect to a layer to temporarily extend the layer for the purpose of calculating the results of other effects. This process is not necessary for newer effects, which tend to be 32-bpc effects.

### Managing effects and effect properties with scripts

Paul Tursley provides a script on the [AE Enhancers forum](#) with which you can search compositions for effects and turn them on or off.

Paul Tursley provides a script on the [AE Enhancers forum](#) that makes synchronizing changes to effect properties on multiple layers easier.

### Effects applied with tools

Some effects—including the Puppet effect, the Paint effect, and the Roto Brush effect—are applied to a layer with a tool, rather than being applied directly in the same manner as other effects. (See Animating with Puppet tools, Paint tools and paint strokes, and Transparency, opacity, and compositing.)

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## Resources for Cycore FX (CC) effects

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**Note:** *The Cycore FX (CC) effect plug-ins are not included with the trial version of After Effects. See Third-party plug-ins included with After Effects.*

CycoreFX HD (1.7.1) is included in the installation of After Effects CS6. There is 16-bpc support in all effects, and 32-bpc (float) support in 35 effects. Included are 12 additional plug-ins. CycoreFX HD plug-ins have support for motion blur, lights, more controls, and options.

[This video](#) by Todd Kopriva and video2brain introduces the new Cycore effects and improved color bit depth. You will learn how to apply a couple of these effects and see what it means to use different bit depths.

Documentation—including tutorials and example projects—for the Cycore FX (CC) plug-ins is available on the [Cycore website](#).

Alan Shisko provides a video tutorial on the [ProVideo Coalition website](#) that demonstrates the use of the CC Repetile effect.

Bob Donlon provides a pair of tutorials about the CC Particle Systems II effect on the Adobe website:

- [simulating fire](#)
- [simulating fireworks](#)

Eran Stern provides a video tutorial on [his website](#) that demonstrates the CC Particle System II and CC Mr. Mercury effects.

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## Compound effects and control layers

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Several effects rely on a control layer (or layer map) as input. These compound effects use the pixel values of the control layer to determine how to affect the pixels of the layer that the effect is applied to (the destination layer). In some cases, the effect uses the brightness values of the pixels in the control layer; in some cases, the effect uses the individual channel values of the pixels in the control layer.

For example, the Displacement Map effect uses the brightness values of a control layer to determine how far to shift pixels of the underlying layer, and in which direction. The Shatter effect can use two control layers—one to customize the shapes of the shattered pieces and one to control when specific parts of the destination layer explode.

The compound effect ignores effects, masks, and transformations of a control layer. To use the results of effects, masks, and transformations on a layer, precompose the layer and use the precomposition layer as the control layer.

It is common to use a control layer that is not itself visible—that is, its Video switch  is off.

Most compound effects include a Stretch Map To Fit option (or a similarly named option), which temporarily stretches or shrinks a control layer to the dimensions of the destination layer. This provides a pixel in the control layer corresponding to each pixel in the destination layer. If you deselect this option, the calculations for the compound effect are performed as if the control layer is centered on the destination layer at its original size.

You can create control layers by drawing or painting in an image-editing program, such as Adobe Photoshop.

Chris and Trish Meyer explain compound effects and how to work with them on the [ProVideo Coalition website](#).

Tips for creating control layers:

- For many compound effects, neutral gray pixels in the control layer correspond to null operations. Therefore, a neutral gray solid layer is a good starting point for creating a control layer.
- Apply the Turbulent Noise effect to a layer and precompose it to create a good control layer for turbulent or atmospheric results.
- You can create a control layer by precomposing a white solid layer, a black solid layer, and a mask on the top layer that determines which areas are white and black. Increasing the feather of a mask softens the transition between black and white values.
- The contrast between adjacent pixel values determines how smoothly the values change across the surface of the control layer. To create smooth changes, paint using a soft or anti-aliased brush, or apply gradients. To create abrupt changes, avoid intermediate shades, using a few widely spaced shades, such as 50% gray, black, and white.

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## Effects with a Comp Camera attribute

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Some effects can use the camera and lights within the same composition. These effects include Card Dance, Card Wipe, and Shatter. Some of these effects always use the composition camera, whereas others include light and camera options in the Effect Controls panel.

**Note:** *The Live Photoshop 3D effect behaves as an effect with a Comp Camera attribute. This effect only appears on a layer when the layer is a 3D object layer from a PSD file. In After Effects CS6, the Convert to Live Photoshop 3D command has been removed. (See 3D object layers from Photoshop.)*

When you apply an effect with a Comp Camera attribute to a 2D layer, the effect can track the camera and light positions within the composition and render a 3D image on the 2D layer that it is applied to. The results of the effect appear to be three-dimensional; however, the layer with the Comp Camera attribute applied remains a 2D layer and consequently has the following characteristics:

- 3D layers above and below it in the Timeline panel cannot intersect with each other or cast shadows on each other.
- It cannot intersect with 3D layers or cast or accept shadows.

**Note:** *The image is rendered on the layer, not the composition, so make sure that you apply these effects to layers that are the same size as the composition and are exactly centered in the composition.*

Chris and Trish Meyer provide an article on the [ProVideo Coalition website](#) that explains how to use a simple set of expressions to orient a layer with a Comp Camera effect so that it integrates with other 3D layers in a composition.

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## Effect Controls panel

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When you apply an effect to a layer, the Effect Controls panel opens, listing the effect you applied and controls to change the property values for the effect. You can also work with effects and change most effect property values in the Timeline panel. However, the Effect Controls panel has

more convenient controls for many kinds of properties, such as sliders, effect control point buttons, and histograms.

The Effect Controls panel is a viewer, which means that you can have Effect Controls panels for multiple layers open at once and can use the viewer menu in the tab of the panel to select layers.

- To open or close the Effect Controls panel for the selected layer, press F3.
- To select an effect, click it. To select the next or previous effect in the stacking order, press the Down arrow key or the Up arrow key, respectively.
- To expand or collapse selected effects, press the Right Arrow key or Left Arrow key, respectively.
- To expand or collapse a property group, click the triangle to the left of the effect name or property group name.
- To expand or collapse a property group and all of its children, Ctrl-click (Windows) or Command-click (Mac OS) the triangle.
- To expand or collapse all property groups for selected effects, press Ctrl+` (accent grave) (Windows) or Command+` (accent grave) (Mac OS).
- To reset all of the properties of an effect to their default values, click Reset at the top of the entry for the effect in the Effect Controls panel.
- To duplicate selected effects, choose Edit > Duplicate, or press Ctrl+D (Windows) or Command+D (Mac OS).
- To move an effect to a different place in the rendering order, drag the effect up or down in the effect stack.
- To set the properties of an effect to the properties used in an animation preset, choose from the Animation Presets menu at the top of the entry for the effect in the Effect Controls panel.
- To show the Animation Presets menu in the Effect Controls panel, select Show Animation Presets in the panel menu.
- To modify the range of an effect property, right-click (Windows) or Control-click (Mac OS) the underlined property value for the control and choose Edit Value from the context menu.

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## Effects and Presets panel

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Browse and apply effects and animation presets with the Effects & Presets panel. An icon identifies each item in the panel by type. Numbers within the icons for effects indicate whether the effect works on a maximum of 8, 16, or 32 bits per channel.

You can scroll through the list of effects and animation presets, or you can search for effects and animation presets by typing any part of the name in the search box at the top of the panel.

The options that you choose in the Effects & Presets panel menu determine which items are shown:

**Show Effects For All Color Depths** Shows effects that work with any color depth, not only the effects that work with the depth of the current project.

**Show Effects** Shows all available effects.

**Show Animation Presets** Shows all animation presets, including animation presets saved by you in the Presets folder.

The panel organizes effects and animation presets according to the option that you select from the panel menu: Categories, Explorer Folders (Windows) or Finder Folders (Mac OS), or Alphabetical.

Use the following commands in the panel menu to manage your effects and animation presets:

**Reveal In Explorer (Windows) or Reveal In Finder (Mac OS)** Opens the folder that contains the effect or animation preset selected in the Effects & Presets panel.

**Refresh List** Updates the list of effects and animation presets.

Chris and Trish Meyer provide a video on the [Focal Press website](#) that introduces effects and animation presets and shows how to use the Effects & Presets panel.

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## Apply an effect or animation preset

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Chris & Trish Meyer give tips on applying and using effects in an article on the [ProVideo Coalition website](#).

- To apply an effect or animation preset to a single layer, drag the effect or animation preset from the Effects & Presets panel to a layer in the Timeline, Composition, or Effect Controls panel.  
**Note:** When you're dragging an effect or animation preset onto a layer in the Composition panel, the name of the layer under the pointer is shown in the Info panel. If you release the mouse button while dragging an animation preset when the pointer is not over a layer, a new layer is created to hold the animation preset. If you release the mouse button while dragging an effect when the pointer is not over a layer, nothing happens.
- To apply an effect or animation preset to one or more layers, select the layers, and then double-click the effect or animation preset in the Effects & Presets panel.
- To apply an effect to one or more layers, select the layers, and then choose Effect > [category] > [effect].
- To apply a recently used or saved animation preset to one or more layers, select the layers, choose Animation > Recent Animation Presets, and then choose the animation preset from the list.
- To apply the most recently applied animation preset to one or more layers, select the layers, and then press Ctrl+Alt+Shift+F (Windows) or Command+Option+Shift+F (Mac OS).
- To apply the most recently applied effect to one or more layers, select the layers, and then press Ctrl+Alt+Shift+E (Windows) or

Command+Option+Shift+E (Mac OS).

- To apply an animation preset to one or more layers using Adobe Bridge, select the layers, choose Animation > Browse Presets, navigate to the animation preset, and then double-click it.
- To apply the effect settings from an animation preset to the current instance of an effect, choose the animation preset name from the Animation Presets menu for the effect in the Effect Controls panel.
- To copy effects from one layer to one or more layers, select the effects in the Timeline panel or Effect Controls panel, choose Edit > Copy, select the target layers, and choose Edit > Paste.

**Note:** Applying an effect or animation preset to a layer selects the layer.

By default, when you apply an effect to a layer, the effect is active for the duration of the layer. However, you can make an effect start and stop at specific times or make the effect more or less intense over time by using keyframes or expressions or by applying the effect to an adjustment layer.

Animation presets are applied at the current time.

 To see what changes have been made by applying an animation preset to a layer, select the layer and press UU to show modified properties or press U to show properties with keyframes or expressions.

## Delete or disable effects and animation presets

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After you've applied effects to a layer, you can temporarily disable one or all of the effects on the layer so that you can concentrate on another aspect of your composition. Effects that are disabled are not rendered, either for previews or for final output. However, in the Render Queue panel, you can specify that the composition is rendered for final output with all effects on, regardless of which effects are rendered for previews in the Composition panel. Disabling an effect does not delete the keyframes created for any of the effect properties; all keyframes remain until the effect is deleted from the layer.

You can't disable an animation preset or delete it from a layer as a unit. You can, of course, individually delete or disable the effects, keyframes, and expressions that it comprises.

- To delete one effect from a layer, select the effect name in the Effect Controls panel or Timeline panel, and press Delete.
- To delete all effects from one or more layers, select the layers in the Timeline or Composition panel and choose Effect > Remove All or press Ctrl+Shift+E (Windows) or Command+Shift+E (Mac OS).

**Note:** This command eliminates all keyframes for the deleted effects. If you choose Remove All accidentally, immediately choose Edit > Undo Delete Effect or Edit > Undo Remove All Effects to restore the effects and keyframes.

- To temporarily disable one effect, select the layer in the Effect Controls or Timeline panel, and then click the Effect switch  to the left of the effect name.
- To temporarily disable all effects on a layer, click the Effect switch  in the Switches column for the layer in the Timeline panel.



Effect switch in the Effect Controls panel and Effect switch in the Timeline panel

**A.** The Effect switch in the Effect Controls panel turns a specific effect on or off. **B.** The Effect switch for an effect in the Timeline panel also turns a specific effect on or off. **C.** The Effect switch in the Switches column of the Timeline panel turns all effects on a layer on or off.

## Remove an effect or animation preset

You can remove an effect or animation preset from the folder in which After Effects searches for these items, preventing it from being loaded and from being shown in the Effects & Presets panel or Effect menu.

1. Select the effect or animation preset in the Effects & Presets panel.
2. Choose Reveal In Explorer (Windows) or Reveal In Finder (Mac OS) from the panel menu.
3. Move the effect (.aex) or animation preset (.ffx) file out of the Plug-ins or Presets folder.
4. Choose Refresh List from the Effects & Presets panel menu to update the list of animation presets in the panel.

The list of effects is only updated when the application starts.

 *Rather than removing effects or animation presets entirely, consider creating a subfolder in the Plug-ins or Presets folder for effects or animation presets that you seldom use. After Effects ignores the contents of folders with names that begin and end with parentheses, such as (archive\_folder).*

## Effect control points

Some effects have effect control points, which determine how the effect affects the layer. For example, the Advanced Lightning effect has two effect control points—Origin and Direction—which specify where the lightning begins and in which direction it points.

Effect control points are in layer space for layers that are not continuously rasterized and for which transformations are not collapsed. If a layer is continuously rasterized or has collapsed transformations, then effect control points are in composition space. (See [Coordinate systems: composition space and layer space](#) and [Render order and collapsing transformations](#).)

Vector layers (including shape layers and text layers) are always continuously rasterized, so their effect control points are always in composition space. (See [Continuously rasterize a layer containing vector graphics](#).)

Null object layers, solid-color layers, and other layers based on source footage items by default have effect control points in layer space.

### View an effect control point

- To view an effect control point in the Layer panel, choose the effect name from the View menu at the bottom of the Layer panel.
- To view an effect control point in the Composition panel, select the effect name in the Timeline panel or Effect Controls panel.  
**Note:** To view effect control points in the Composition panel, select *Show Layer Controls* in the View menu and select *Effect Controls* in View Options (View > View Options).

### Move an effect control point

- In the Composition panel or Layer panel, drag the effect control point .
- In the Effect Controls panel, click the effect control point button ; then, in the Composition or Layer panel, click where you want the effect control point.
- In the Timeline or Effect Controls panel, drag or enter values for the x and y coordinates for the effect control point as you would to modify any other property.

## Randomness and random seeds

Because true randomness is not repeatable, many effects simulate randomness by using a calculation that generates seemingly random results for each value of a Random Seed property. Multiple instances of the same effect give the same results if all of their settings—including the Random Seed property values—are the same. This allows you to get predictable, deterministic results, while still achieving the appearance of randomness.

Changing the Random Seed value doesn't make things more or less random; it only makes them seem random in a different way.

You can add randomness to any property with the expressions in the Random Numbers category.

## Animation preset list

This section provides a list of animation presets included with the full version of After Effects CS5, and later.

**Note:** Animation presets marked with an asterisk (\*) are included in the package of additional animation presets provided by Adobe on the [Adobe After Effects Exchange](#). These additional animation presets use shape layers and the per-character 3D text animation features introduced in After Effects CS3.

For information about using, browsing, and previewing animation presets, see [Animation presets overview](#) and [resources](#).

## Backgrounds

- Apparition
- Blocks
- Cinders
- Circuit
- Cosmic Power
- Creepy
- Curtain
- Deep Tissue
- Fog Lights
- Germs
- Green Crystals
- Indigestion
- Infection
- Lightning Bend
- Magma
- Orb
- Pixels
- Racing Rectangles
- Red Speed
- River
- Rose Light
- Silk
- Smoke Rising
- Sweeping Curves

## **Behaviors**

- Autoscroll - horizontal
- Autoscroll - vertical
- Drift Over Time
- Fade In Over Layer Below
- Fade In+Out - frames
- Fade In+Out - msec
- Fade Out Over Layer Below
- Opacity Flash - layer markers
- Opacity Flash - random
- Rotate Over Time
- Scale Bounce - layer markers
- Scale Bounce - random
- Wiggle - gelatin
- Wiggle - position
- Wiggle - rotation
- Wiggle - scale
- Wiggle - shear
- Wigglerama

## **Image - Creative**

- Bloom - brights+darks
- Bloom - brights
- Bloom - crystallize
- Colorize - blue wash
- Colorize - gold dip
- Colorize - infrared
- Colorize - moonshadows
- Colorize - red hand tint
- Colorize - royal purple
- Colorize - sepia
- Colorize - sky blue
- Colorize - sky orange
- Colorize - sunset gradient
- Contrast - luminance
- Contrast - saturation
- Dimension - bevel+shadow
- Dimension - glow+shadow
- Grayscale
- Inset Video - framed
- Inset Video - torn edges
- Left Third - scoop mask NTSC
- Left Third - scoop mask PAL
- Lower Third - scoop mask NTSC
- Lower Third - scoop mask PAL
- Lower Third Holdout - darken
- Lower Third Holdout - saturate
- Mood Lighting - amorphous
- Mood Lighting - digital
- Mood Lighting - streaks
- Vignette Lighting

## **Image - Special Effects**

- Bad TV 1 - warp
- Bad TV 2 - old
- Bad TV 3 - weak
- Cracked Tiles
- Embossed Multiple Exposure
- Light Leaks - layer markers
- Light Leaks - random
- Motion Registration Errors
- Night Vision

## **Image - Utilities**

- Compress-Expand Dynamic Range



- Crop Edges
- Flip + Flop
- Flip
- Flop
- Invert Alpha
- Keying - blue blur
- Keying - green blur
- Levels - computer to video
- Levels - video to computer
- Reduce DV blockiness
- Sample Image Expression

## Shapes

### Backgrounds

- Box Swarm
- Kaleidoscopic
- Nerve Net - Circular
- Nerve Net - Linear
- Nerve Net - Penta

### Backgrounds 2\*

- Autumn Leaves\*
- Blue Hibiscus\*
- Butterfly Resolve\*
- Fabric of Space\*
- Floral Explosion\*
- Jellyfish Web\*
- Sharps\*

### Elements

- 60s Text Bar
- Chasing Line - Boxes
- Chasing Line - Dots
- Marquee Chasers
- Mod Boxes
- Ring Chart
- Wireframe Worm

### Elements 2\*

- Box Grid\*
- Crosshatch Focus\*
- Deconstructionist\*
- Deploy\*
- Geo Logo\*
- Graph Paper\*
- Honeycomb\*
- Iris Flare\*

- Kaleidorganic\*
- Kaleidoscopic Seaweed\*
- Light Bulb Sign\*
- Mandathorns\*
- Neon Flower\*
- Protection\*
- Pulsing Snake\*
- Radar Stopwatch\*
- Spiral Magic\*
- Swoop\*
- Tunnel Drain\*
- Woven Celtic\*
- Woven Springs\*

#### **Lower Thirds\***

- LT\_blue double slant+anim\*
- LT\_blue double-still\*
- LT\_dashed underscore-still\*
- LT\_double bubble-still\*
- LT\_fade bar-still\*
- LT\_neutral gradient+anim\*
- LT\_neutral gradient-still\*
- LT\_red skew glow+anim\*
- LT\_slant underscore-still\*
- LT\_underhook-still\*

#### **Sprites - Animated**

- Alien Face - animated
- Circular - cellular division
- Dancing Knot
- Mandala - animated
- Phase Scope
- SpiroMandala
- TwinkleStar

#### **Sprites - Animated 2\***

- Pulsing Circles\*
- Spiralgear\*
- Sunflower - animated\*

#### **Sprites - Still**

- Alien Calligraphy
- Alien Face
- Box - dashed lines
- Bullseye
- Circular - half round
- Circular - tri dash

Crosshair - brackets

- Crosshair - round
- Crosshair - square
- Fan Blades
- Flower Power
- Gear
- Holy Light
- Indian Sun
- Mandala
- RayStar-4
- RayStar-8
- Rounded Bracket - beveled
- Rounded Bracket - double
- Seaside Daisy
- Tri Cog

#### **Sprites - Still 2\***

- Spiral\*
- Sunflower - still\*

#### **Symbol Families\***

- Braille\* (numbers, letters, punctuation, contractions, and fragments)
- I Ching\* (hexagrams and trigrams)
- Pictograms\*
- Schematic\* (antennas, batteries, capacitors, diodes, grounds, inductors, logic symbols, resistors, transformers, transistors, tubes)

#### **Sound Effects**

- Blaster
- Busy
- CallAdobe
- DialTone-US
- DTMF
- PhoneCompany
- RingingPhone-US

#### **Synthetics**

- Blue Bars
- Cells
- Digital
- Ethereal
- Gold Ambiance
- Lightning - Horizontal
- Lightning - Vertical
- Mosaic
- Orange Streaks
- Smoke - Drifting
- Starburst Spin

## Text

### 3D Text

- 3D Basic Position Z Cascade
- 3D Basic Position Z Typeon
- 3D Basic Rotate X Cascade
- 3D Basic Rotate Y Cascade
- 3D Bouncing In Centered
- 3D Fall Back Scale & Skew
- 3D Fall Back Scramble & Blur
- 3D Flip In Rotate X
- 3D Flip Out Rotate X
- 3D Flip Up Reflection
- 3D Flutter In From Left
- 3D Flutter In Random Order
- 3D Flutter Out From Right
- 3D Fly Down & Unfold
- 3D Fly Down Behind Camera
- 3D Fly Down Random & Rotate Y
- 3D Lines Zoom In
- 3D Rain Down Words & Colors
- 3D Random Spike Tumble
- 3D Resolve Position
- 3D Rotate around Circle
- 3D Rotate in by Character
- 3D Rotate out by Word
- 3D Scramble in Position Z
- 3D Spiral Down & Unfold
- 3D Spiral Rotate In by Line
- 3D Spiral Rotate Out by Line
- 3D Swing Around on Path
- 3D Tumble Words Forward
- 3D Twist & Color Characters

### 3D Text 2\*

- 3D Blur Flip Up Random\*
- 3D Character Lineup\*
- 3D Falling Like Leaves\*
- 3D Flip Over Heels\*
- 3D Fumble Up\*
- 3D Ghost Landing\*
- 3D Pop Forward Fadeout\*
- 3D Pop Forward Unblur\*
- 3D Take a Bow\*
- 3D Triple Twist XYZ\*

- 3D Tumble X and Turn\*
- 3D Twisty Ribbons\*
- 3D Unsteady Swing\*
- 3D Words Jump in XYZ\*
- 3D Words Wiggles in XYZ\*

#### **Animate In**

- Center Spiral
- Characters Shuffle In
- Decoder Fade In
- Drop In By Character
- Espresso Eye Chart
- Fade Up And Flip
- Fade Up Characters
- Fade Up Lines
- Fade Up Words
- Fly In From Bottom
- Fly In With A Twist
- Pop Buzz Words
- Raining Characters In
- Random Fade Up
- Random Shuffle In
- Random Word Shuffle In
- Slow Fade On
- Smooth Move In
- Spin In By Character
- Spin In By Word
- Straight In By Character
- Straight In By Word
- Straight In Multi-Line
- Stretch In Each Line
- Stretch In Each Word
- Twirl On Each Line
- Twirl On Each Word
- Typewriter
- Wipe In To Center

#### **Animate Out**

- Encoder Fade Out
- Fade Out By Character
- Fade Out Slow
- Raining Characters Out
- Random Fly Off
- Random Word Fly Off
- Slide Off Right By Character
- Slide Off Right By Word

- Stretch Out Each Line
- Stretch Out Each Word
- Twirl Off Each Line
- Twirl Off Each Word

### **Blurs**

- Blur By Word
- Bullet Train
- Evaporate
- Foggy
- Jiggy
- Transporter

### **Curves and Spins**

- Bloom Flower
- Clockwise Entry
- Counter Rotate
- Dust Devil
- Lasso Tumble
- Lasso
- Musical Chairs
- Newton
- Pinwheel
- Radial Flare
- Retrograde
- Rotate
- Somersault
- Spin Fast
- Spiral Exit
- Spiral In
- Spirograph
- Swoopy Entry
- Tea Leaves
- Tire Rim
- Whirl In

### **Expressions**

- Buzz Words
- Current Time Format
- Dictionary
- Frame Number
- Inch Worm
- Text Bounce

### **Fill and Stroke**

- Chasing Strokes
- Fill Color Wipe

#### Flicker Color - scale

- Flicker Color
- Flicker Green
- Inflammation
- Pulse Blue
- Pulse Orange
- Pulsing Strokes
- Rotate Hue
- Sliding Color Flicker
- Stroke Ease Down
- Wiggly Stroke Width By Line
- Wiggly Stroke Width

#### Graphical

- Bars Blinky
- Bars Lime
- Blue Note
- Cut Shapes
- Exchange
- Green Dots
- Hazard
- Red Circles
- Scratchy Film
- Snowflakes
- White Trim
- Yellow Boxes

#### Lights and Optical

- Blue Flash
- Broadway
- Bubble Pulse
- Emerge
- Exposure
- Flash
- Flicker Exposure
- Fluctuate
- Fluorescent Light
- Office Light
- Overlay
- Pulse Exposure
- Shadows
- Silhouettes
- Sonar Ping
- Spin Flash
- Word Flash

#### Mechanical

- Algorithm Loop
- Algorithm
- Automation
- Bad Reception
- Doppler
- Electro Magnet
- Helicopter
- Insert Text
- Kinematic
- Mechanical
- Pistons
- Rack & Pinion
- Roadtrip
- Scale Bounce
- Screen Roll
- Stairstep
- Submarine
- Underscore
- Warp 9.8

#### **Miscellaneous**

- Angle Fly-In
- Back Flip
- Blow Away
- Bounce In
- Bungee
- Chaotic
- Clay Pigeons
- Dot.Com
- Elbow Room
- Explosion
- Hop, Skip, And A Jump
- Pendulum
- Punching Bag
- Question
- Rattle
- Roll Bounce
- Sequential Jump
- Six-Shooter
- Slide Bounce
- Slip In Out
- Smokey
- Squeeze
- Superhero
- Swing Up



- Twisty Ribbons
- Vanishing Point
- Wiggly Lines
- Yo-Yo

#### **Multi-Line**

- Alphabet Soup
- Contract - Expand
- Currents
- Data Packet
- Data Stream
- Dealer
- Encryption
- Fly In By Characters
- Fly In By Words
- Front - Back
- Frontside - Backside
- Ideas
- Incoming
- Jetstream 2
- Jetstream
- Multi-Line Flip
- Outgoing - Incoming
- Pneumatic
- Production
- Stack Right Left
- Weekdays
- Word Processor
- Zippy

#### **Organic**

- Autumn
- Boiling
- Boomerang
- Bounce Diagonal
- Chewing Gum
- Climber
- Dip-Bounce
- Double-Helix
- Drop Bounce
- Fish Bait
- Flutter
- Flying Formation
- Horsefly
- Hummingbird
- Insect Wipe

- Insects
- Labrador
- Leapfrog
- Loose Line
- Ocean Tide
- Quiver
- Ripple
- Rubber Floor
- Rubber
- Sea-Sick
- Shuffle
- Simmer
- Slice And Dice
- Sprouts
- Tag Team
- Wheatfield
- Wind Current
- Wobble

#### **Paths**

- 360 Loop
- Antelope
- Ants
- Back Stage
- Balance
- Balloon Man
- Balloon
- Bouncing
- Bubble Pop
- Bump And Slide On
- Centipede
- Circuit Board
- Conveyor Belt
- Double Spiral
- Down And Out
- Downhill Slide Off
- Downhill Slide On
- Frenzy
- Hurdles
- Karate Chop
- Loop On And Off
- Lyrical
- Organism
- Paper Clip
- Pipes

Raquetball

- Rat Nest
- Reel To Reel
- Rope Bridge
- Serpent
- Slippery Slope
- Spiral Long
- Spiral
- Springy
- Squirmy
- Stairwell
- Symmetry
- Tchotchke
- Walk Of Stars
- Zig-Zag

#### **Rotation**

- Drip Down
- Flip Up
- Full Rotation
- Loopy Loop
- Random Rotation
- Rotate Chars
- Rotate Per Word
- Spin In
- Swirly Rotation
- Whirlwind

#### **Scale**

- Large Scale
- Let's Dance
- Scale Down Word
- Scale Down
- Scale Up Word
- Scale Up
- Wiggly Scale Wipe
- Zoom Away
- Zoom Forward

#### **Tracking**

- Contract
- Decrease Tracking
- Extend
- Increase Tracking
- Magnify
- Spasm
- Stretchy

## Transform

- Separate XYZ Position

See Separate dimensions of Position to animate components individually.

## Transitions

### Transitions - Dissolves

- Block Dissolve - digital
- Block Dissolve - random
- Block Dissolve - scanlines
- Boxes - concentric NTSC
- Boxes - concentric PAL
- Boxes - random NTSC
- Boxes - random PAL
- Boxes - stroked NTSC
- Boxes - stroked PAL
- Dissolve - blobs
- Dissolve - dither
- Dissolve - ripple
- Dissolve - sand
- Dissolve - unmelt
- Dissolve - vapor
- Fade - dip to black
- Fade - flash to white
- Fade - overexposed
- Ovals - concentric NTSC
- Ovals - concentric PAL
- Ovals - random NTSC
- Ovals - random PAL

### Transitions - Movement

- Card Wipe - 2D fractured
- Card Wipe - 3D pixelstorm
- Card Wipe - 3D swing
- Fly to Inset
- Slide - drop
- Slide - straight
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- Slide - variable
- Stretch & Blur
- Stretch & Slide
- Stretch - diagonal bottom
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- Stretch - horizontal
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#### Transitions - Wipes

- Band Wipe - build NTSC
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- Band Wipe - crossing NTSC
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- Band Wipe - zigzag NTSC
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- Barn Doors
- Checker Wipe - NTSC
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- Clam Shell
- Clock Wipe
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- Iris - points
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- Iris - square
- Iris - star unfold
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- Iris - sunburst
- Linear Wipe
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- Paint On - PAL
- Radial Wipe - bottom
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# Effect list

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**Note:** Effects marked as third-party effects are not available with the trial version of Adobe After Effects software. However, After Effects CS5.5 and later does include the Keylight effect in the trial version. For information about these effects, see *Third-party plug-ins included with After Effects*.

---

## 3D Channel effects

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- 3D Channel Extract effect
- Depth Matte effect
- Depth Of Field effect
- Fog 3D effect
- ID Matte effect

Third-party effects:

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- IDentifier effect
- ID Matte

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## Blur & Sharpen effects

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Third-party effects:

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## Channel effects

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Third-party effects:

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- CC Flo Motion effect
- CC Griddler effect



CC Lens effect

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Third-party effects:

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- mocha shape

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- Cineon Converter effect
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- CC Overbrights effect (CS6)

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## Obsolete effects

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Effects in the Obsolete category are retained for compatibility with projects created with previous versions of After Effects. When updating projects or creating new projects, you should use alternative effects and techniques rather than effects in the Obsolete category.

- Basic 3D effect  
Use 3D layers instead. See 3D layers.
- Basic Text effect  
Use text layers instead. See Creating and editing text layers.
- Lightning effect  
Use the Advanced Lighting effect instead. See Advanced Lightning effect.
- Path Text effect  
Use text layers instead. See Creating and animating text on a path.



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# 3D Channel effects

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About 3D Channel effects, including ProEXR effects

3D Channel Extract effect

Depth Matte effect

Depth Of Field effect

Fog 3D effect

ID Matte effect

Third-party effects in this category included with After Effects:

- ExtractoR effect
- Identifier effect
- ID Matte

See Third-party plug-ins included with After Effects.

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## About 3D Channel effects, including ProEXR effects

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The 3D Channel effects work on 2D layers—specifically, 2D layers with 3D information in auxiliary channels. The sources of these 2D layers are image sequences that represent 3D scenes that have been rendered out of a 3D application.

Use 3D Channel effects to integrate 3D scenes into 2D composites and to modify those 3D scenes. You can import 3D image files saved in RLA, RPF, Softimage PIC/ZPIC, and Electric Image EI/EIZ formats. For PIC and EI files, the 3D channel information is in the ZPIC and EIZ files, respectively. You don't import ZPIC and EIZ files, but as long as they're in the same folder with the PIC and EI files, you have access to their 3D channels using the 3D Channel effects. The 3D Channel effects don't affect other types of files.

3D Channel effects read and manipulate the additional channels of information, including z-depth, surface normals, object ID, texture coordinates, background color, unclamped RGB, and material ID. You can layer 3D elements along the z axis, insert other elements in a 3D scene, blur areas in a 3D scene, isolate 3D elements, apply a foggy effect with depth, and extract 3D channel information for use as parameters in other effects.

If you convert a layer with a 3D Channel effect to 3D and view the layer from anywhere but the front and center, it doesn't appear as expected.

 *To display depth and other channel values for a pixel in the Info panel, apply a 3D Channel effect, and then—with the effect selected—click the pixel in the Composition panel or Layer panel using the Selection tool.*

Lutz Albrecht provides a two-part document on the [Adobe website](#) about integrating 3D applications with After Effects. These articles cover the creation of UV maps, mattes, and channels from various 3D applications, including Maxon Cinema 4D, NewTek Lightwave, and Luxology modo. The articles then show you how to use RE:Vision Effects RE:Map and fnord ProEXR plug-ins to use that data in After Effects.

Dave Scotland provides a pair of tutorials on the CG Swot website in which he demonstrates how to create RPF files in a 3D application and how to use RPF files in After Effects. The [first part](#) explains the RPF format and how to create RPF files in 3DS Max. The [second part](#) shows how to use the Object ID and Z depth information in an RPF file within After Effects, using the ID Matte, Depth of Field, Depth Matte, and Fog 3D effects.

Chris & Trish Meyer give tips on using the 3D Channel effects in an article on the [ProVideo Coalition website](#).

## Using channels in OpenEXR files

3D Channel effects can make use of the channels in OpenEXR files—such as a depth channel—if the channels have been tagged. Unlike some other formats, like RPF, in which a specific set of channels is defined to always represent specific properties of a scene, the OpenEXR format is an arbitrary collection of channels with no inherent meaning. The R, G, B, and A channels are reserved to represent red, green, blue, and alpha values, but other channels can be used for any other characteristics. To map channel names to the values of a specific type for use by other effects, you can use a file with the name OpenEXR\_channel\_map.txt. If this file is in the same folder as the OpenEXR format plug-in, the OpenEXR plug-in will use the information in this file to tag channels when it imports an OpenEXR file.

An OpenEXR\_channel\_map.txt file is not included with After Effects, but you can download one as part of the ProEXR package from the [fnord software website](#). The sample OpenEXR\_channel\_map.txt file available from the fnord software website includes documentation describing its use.

The ProEXR package from the fnord software website also includes the ProEXR Comp Creator plug-in. This plug-in can create a layer from each of the channels of an OpenEXR file. For example, the layers can represent the output from a set of render passes from a 3D application.

## ProEXR plug-ins, Identifier and ExtractoR

The ExtractoR and Identifier plug-ins from fnord software are included with After Effects to provide access to multiple layers and channels of OpenEXR files.

Documentation for fnord ProEXR plug-ins is available in a PDF document on the [fnord software website](#), which includes links to a sample multi-channel EXR file and an After Effects project that uses it. The instructions in the fnord document regarding the removal of the OpenEXR plug-ins don't apply to After Effects CS5.

## 3D Channel Extract effect

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The 3D Channel Extract effect makes auxiliary channels visible as either grayscale or multichannel color images. You can then use the resulting layer as a control layer for other effects. For example, extract the depth information in a 3D channel image file and then use it as an influence map in the Particle Playground effect, or extract values from the unclamped RGB channel to produce a matte that generates glowing highlights.

 *To display 3D channel values for a pixel in the Info panel, apply the 3D Channel Extract effect, choose the channel from the 3D Channel menu in the Effect Controls panel, and then click the pixel in the Composition panel or Layer panel using the Selection tool.*

This effect works with 8-bpc color.



Original (left), with 3D Channel Extract applied using Texture UV (right)

 Much of the following information is based on information provided by Lutz Albrecht, who also provides a two-part document on the [Adobe website](#) about integrating 3D applications with After Effects:

**White Point, Black Point** The value that is mapped to white or black.

**3D Channel** The channel to extract from the 3D image:

**Z-Depth** Represents the distance of a given shaded pixel from the camera. White represents the greatest distance; black pixels are closest to the camera. Effects such as the Lens Blur effect can use this information to generate depth-of-field effects. When you apply the channel directly as a luma matte, you get fog. This channel is anti-aliased.

**Note:** For best results, match the White Point and Black Point settings of the effect with the near and far settings of your camera in the 3D application that generated the 3D image.

**Object ID** Each object can be assigned a separate ID value in the 3D application. You can use a map generated using this channel to selectively apply effects to certain objects in a 3D scene—for example, to apply selective color adjustments. This channel is not anti-aliased.

**Texture UV** This channel contains the mapping coordinates of the textures of your object, mapped to the red and green channels. This channel is not anti-aliased.

This channel can be used to check your UV maps or as input for the Displacement Map effect.

**Surface Normals** This channel maps the direction vector of each point on the surface of an object to the RGB channels. The vectors are relative to the camera. Third-party plug-ins can use this channel as the basis for dynamic relighting and relief rendering. This channel is anti-aliased.

**Coverage** The behavior for this channel varies for various 3D applications. It is used to mark areas near the edges and contours of objects to provide information about their anti-aliasing and overlap behavior.

**Background RGB** This channel contains all RGB pixel values of the background without any foreground objects. It is mostly used to store dynamic environmental effects unique to 3D programs such as skies or backgrounds generated from procedural textures. This channel is anti-aliased.

**Unclamped RGB** This channel contains the colors from the 3D application as they were presented to the 3D application's renderer before it applied exposure and gamma adjustments. This channel is anti-aliased.

**Material ID** Each material can be assigned a separate ID value in the 3D application. You can use a map generated using this channel to selectively apply effects to certain materials in a 3D scene. This channel is not anti-aliased.

## Depth Matte effect

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The Depth Matte effect reads the depth information in a 3D image and slices the image anywhere along the z axis. For example, you can remove a background in a 3D scene, or you can insert objects into a 3D scene.

 *To insert a layer into a 3D scene, apply the Depth Matte effect to the layer containing the 3D scene, set the Depth property to the depth at which you want to insert the new layer, duplicate the 3D scene layer, select Invert for the 3D scene layer on top, and place the new layer between the two 3D scene layers in the layer stacking order in the Timeline panel.*

This effect works with 8-bpc, 16-bpc, and 32-bpc color.



Original (upper-left), with effect applied (lower-left), and with effect applied and Invert Alpha selected (lower-right)

**Depth** The z-axis value at which to slice the image. Everything with a depth value less than this Depth value is matted out.

To determine the depth of an object, click it in the Composition panel or Layer panel using the Selection tool while the effect is selected.

**Feather** The amount of feather along the edges of the matte.

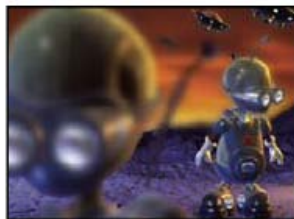
**Invert** Select to matte out everything with a depth greater than the Depth value. Deselect to matte out everything with a depth less than the Depth value.

## Depth Of Field effect

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The Depth Of Field effect simulates a camera that's focusing at one depth (focal plane) in a 3D scene, blurring objects at other depths. This effect uses the depth information from the auxiliary channel of an imported file representing a 3D scene. To use the depth information that After Effects calculates for a camera layer, see [Create a camera layer and change camera settings](#).

This effect works with 8-bpc, 16-bpc, and 32-bpc color.



Original (upper-left), and with Depth Of Field applied using different Focal Plane values (lower-left and lower-right)

**Focal Plane** The distance along the z axis of the focal plane from the camera.

To show the depth of an object in the Info panel, click the object in the Composition panel or Layer panel using the Selection tool while the effect is selected.

**Maximum Radius** How much blur is applied to objects outside the focal plane.

**Focal Plane Thickness** Determines what depths are in focus on either side of the focal plane.

**Focal Bias** The higher the value, the more quickly elements drop out of focus with increasing distance from the focal plane.

Dave Scotland provides a video tutorial on the [CG Swot website](#) in which he shows how to use the Depth Of Field effect, even with a 3D file that has been rendered without optimal depth settings.

## Fog 3D effect

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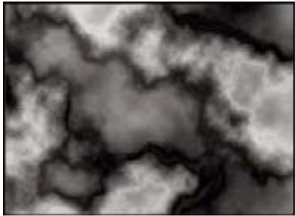
The Fog 3D effect simulates fog by behaving as though a scattering medium is in the air that makes objects look more diffuse as they get more distant along the z axis.

This effect works with 8-bpc, 16-bpc, and 32-bpc color.

**Note:** As with all effects in the 3D Channel effects category, the Fog 3D effect depends on depth information from image sequence files of the



kind rendered out of a 3D application. For general information on 3D Channel effects, see *About 3D Channel effects, including ProEXR effects*. For information about simulating fog in After Effects, see *Compositing fog, smoke, and clouds*.



Original (upper-left), Gradient Layer (lower-left), and with Fog 3D applied (lower-right)

**Fog Start Depth** Where along the z axis the diffuse scattering begins.

 To determine the depth of an object, click it in the Composition panel or Layer panel using the Selection tool while the effect is selected.

**Fog End Depth** Where along the z axis the diffusion reaches its maximum.

**Scattering Density** Determines how quickly the scattering occurs. The higher the value, the more dense the fog appears from its starting point.

**Foggy Background** Creates a foggy background (default). Deselect to create transparency at the back of the 3D scene for compositing on top of another layer.

**Gradient Layer** (Optional) A grayscale layer to use as a control layer, the luminance values of which apply to fog density. For example, use the Turbulent Noise effect to create a swirling control layer for atmospheric fog. Make sure that the dimensions of the gradient layer are at least as great as the dimensions of the 3D scene layer.

**Layer Contribution** How much the gradient layer affects the fog density.

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## ID Matte effect

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Many 3D programs tag each element in a scene with a unique Object ID. The ID Matte effect uses this information to create a matte that excludes everything in the scene except the element you want.

This effect works with 8-bpc, 16-bpc, and 32-bpc color.



Original (upper-left), with ID Matte applied using the near alien as the ID Selection (lower-left), and composited over a new background (lower-right)

**Aux. Channel** Isolate elements based on Object ID or Material ID.

**ID Selection** The ID value for an object.

 To determine the ID of an object, select the ID type from the Aux. Channel menu in the Effect Controls panel, and click the object in the Composition panel or Layer panel using the Selection tool while the effect is selected. If Object ID is selected for Aux. Channel, ID Selection automatically updates to the Object ID for the object you click.

**Feather** The amount of feather along the edges of the matte.

**Invert** Inverts the selection. Select to matte out the object specified by ID Selection. Deselect to matte out everything but the object (default).

**Use Coverage** Creates a cleaner matte by removing the colors stored behind the object from the pixels along the edge of the matte. This option works only if the 3D image contains a coverage channel that stores information about the colors behind objects.

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# Audio effects

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[Stereo Mixer effect](#)  
[Tone effect](#)

Trish and Chris Meyer provide tips about audio effects on the [ProVideo Coalition website](#).

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## Backwards effect

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The Backwards effect reverses the audio of a layer by playing the audio from the last frame to the first frame. The frames remain in their original order in the Timeline panel. Select Swap Channels to swap left and right channels.

Harry Frank and Aharon Rabinowitz provide a video tutorial on the [All Bets Are Off website](#) that shows how to use the Backwards effect and the Reverb effect to create a creepy reverse echo result.

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## Bass & Treble effect

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The Bass & Treble effect boosts (increases) or cuts (decreases) the low frequencies (bass) or the high frequencies (treble) of the audio. For greater control, use the Parametric EQ effect.

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## Delay effect

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The Delay effect repeats audio after a specified amount of time. This effect simulates sound bouncing off a surface, such as a wall.

To simulate the acoustic ambience of a room, use the Reverb effect.

**Delay Time** Time between the original sound and its echo, in milliseconds.

**Delay Amount** Volume of the first delayed audio, as a fraction of the original.

**Feedback** Amount of the echo that is fed back into the delay line to create subsequent echoes.

**Dry Out, Wet Out** The amounts of the original (dry) sound and delayed (wet) sound in the final output. Values of 50% are commonly used.

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## Flange & Chorus effect

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Flange is an audio effect caused by mixing the original audio with a copy that is delayed by a varying amount that cycles over time. The frequency of the copy is also offset by an amount related to the delay. Chorus uses a larger delay, to make one voice or instrument sound like many.

The default settings for the Flange & Chorus effect are for flange. To create a chorus result, use values something like the following: 40 for Voice Separation Time (or higher for a greater chorus result), 4 for Voices, 0.1 for Modulation Rate, 50% for Modulation Depth, and 90 for Voice Phase Change, with Stereo Voices selected.

**Voice Separation Time** The time in milliseconds that separates each voice. Each voice is a delayed version of the original sound. Use values of 6 or lower for flange, and higher values for chorus.

**Voices** The number of voices in the processed (wet) audio.

**Modulation Rate** The rate in Hz at which the modulation cycles.

**Modulation Depth** The amount of modulation.

**Voice Phase Change** The modulation phase difference in degrees between each subsequent voice. Divide 360 by the number of voices to find the optimum value.

**Invert Phase** Inverts the phase of the processed (wet) audio, emphasizing more of the high frequencies; not inverting the phase emphasizes more of the low frequencies.

**Stereo Voices** Alternates assignment of voices to one of the two channels so that the first voice appears in the left channel, the second in the right channel, the third in the left, and so on. To hear stereo voices, preview or render in stereo.

**Dry Out, Wet Out** The amounts of the original (dry) sound and delayed (wet) sound in the final output. Values of 50% are commonly used.

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## High-Low Pass effect

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The High-Low Pass effect sets a limit above or below which frequencies can pass. High Pass allows frequencies above the limit and blocks frequencies below. Conversely, Low Pass allows frequencies below the limit and blocks frequencies above. Use High-Low Pass to do the following:

- Enhance or attenuate (reduce) a sound. For example, using High Pass can reduce traffic noise, which often is concentrated at low frequencies, while minimally affecting a voice recording. Using Low Pass can remove high-frequency sounds, such as static and buzzing.
- Change the focus from one sound to another over time. For example, in audio that contains both music and voice, you can fade out the music while gradually bringing in the voice.
- Protect equipment from potentially damaging frequencies.
- Direct certain frequencies to specific equipment. For example, use Low Pass to isolate sounds intended for a subwoofer.

💡 *To check the frequencies that you filter out, switch to the opposite Filter Options value and preview audio.*

**Cutoff Frequency** All frequencies below (High Pass) or above (Low Pass) are removed. If the unwanted sound changes over time, animate this property.

💡 *To identify the frequencies of unwanted sound, use the Audio Spectrum effect.*

**Dry Out, Wet Out** The amounts of the original (dry) sound and delayed (wet) sound in the final output. Common values for removing frequencies are 0% for Dry Out and 100% for Wet Out.

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## Modulator effect

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The Modulator effect adds both vibrato and tremolo to audio by modulating (varying) the frequency and amplitude.

**Modulation Type** The type of waveform to use. Sine produces smoother modulation. Triangle produces more abrupt modulation.

**Modulation Rate** The rate in Hz of the modulation.

**Modulation Depth** The amount of frequency modulation.

**Amplitude Modulation** The amount of amplitude modulation.

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## Parametric EQ effect

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The Parametric EQ effect emphasizes or attenuates specific frequency ranges. Parametric EQ is useful for enhancing music, such as boosting low frequencies to bring up bass.

If you have audio with an unwanted sound (such as a beep from a forklift in the background), you can isolate and cut the frequency range of the beep to attenuate the sound.

Using this effect, you can enhance up to three different bands of audio. As you adjust controls, a frequency-response graph indicates the combined equalization curve you create; band 1 is red, band 2 is green, and band 3 is blue. You may find it easier to specify controls if you determine in advance the frequency-response curve you want.

💡 *To identify the frequencies of unwanted sound, use the Audio Spectrum effect.*

**Band Enabled** Activates an equalization band and its controls.

**Frequency** The center of the frequency band to modify.

**Bandwidth** The width of the frequency band to modify.

**Boost/Cut** The amount by which to boost (increase) or cut (decrease) the amplitude of the frequencies inside the specified band. Positive values boost; negative values cut.

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## Reverb effect

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The Reverb effect simulates a spacious or acoustically live interior by simulating random reflections of a sound off a surface.

Harry Frank and Aharon Rabinowitz provide a video tutorial on the [All Bets Are Off website](#) that shows how to use the Backwards effect and the Reverb effect to create a creepy reverse echo result.

**Reverb Time** The average time, in milliseconds, between the original audio and the reverberated audio.

**Diffusion** Specifies how much the effect scatters the original audio. More diffusion can make the audio sound farther from the microphone.

**Decay** Specifies the amount of time it takes for the effect to subside. A higher value simulates a larger space.

**Brightness** Specifies the amount of detail preserved from the original audio. High brightness simulates a room with live (highly reflective) acoustics.

**Dry Out, Wet Out** The amounts of the original (dry) sound and delayed (wet) sound in the final output. Values of 50% are commonly used.

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## Stereo Mixer effect

The Stereo Mixer effect mixes the left and right channels of audio and pans the entire signal from one channel to the other.

**Invert Phase** Inverts the phase of both channels of the stereo signal. Use this control to prevent two sounds at the same frequency from canceling each other out.

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## Tone effect

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The Tone effect synthesizes simple audio tones to create sounds, such as the low rumble of a submarine, a telephone ringing in the background, sirens, or a laser blast. You can have up to five tones for each instance of the Tone effect, to create a chord. When you apply this effect to a layer with audio, the dry (original, unprocessed) audio is ignored, and only the tone plays.

You can also apply the Tone effect to a layer that has no audio, such as a solid layer, to synthesize audio.

**Note:** *The Tone effect doesn't generate audio on a placeholder layer; for the effect to generate audio, replace the placeholder with a footage item.*

**Waveform Options** Specifies the type of waveform to use. Sine waves produce the purest tones. Square waves produce the most distorted tones. Triangle waves have elements of both sine waves and square waves but are closer to sine waves. Saw waves have elements of both sine waves and square waves but are closer to square waves.

**Frequency** Frequency in Hz. To turn off a tone, set its frequency to 0.0.

**Level** Changes the amplitude of all tones in this instance of the effect. To avoid clipping and popping, use a Level value that is no greater than 100 divided by the number of frequencies you use. For example, if you use all five frequencies, specify 20%.

**Note:** *To avoid clicks at the end of a tone, set a keyframe for the desired Level value at the frame immediately before the end of the tone, and then set a keyframe for a Level value of 0.0 at the end of the tone. This technique works well for any audio that you end abruptly.*

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# Blur and Sharpen effects

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## About Blur & Sharpen effects

[Bilateral Blur effect](#)

[Box Blur effect](#)

[Camera Lens Blur effect \(CS5.5\)](#)

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[Reduce Interlace Flicker effect](#)

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[Unsharp Mask effect](#)

Third-party effects in this category included with After Effects:

- CC Cross Blur effect (CS6)
- CC Radial Blur effect
- CC Radial Fast Blur effect
- CC Vector Blur effect

See Third-party plug-ins included with After Effects.

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## About Blur & Sharpen effects

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In general, blur effects sample the area around a pixel and assign to the pixel a new value that is the average of the sampled values. Increased blurriness is the result of increasing the size of the sample, whether the size is expressed as a radius or a length.

Some blur effects have a Repeat Edge Pixels option. Select this option to make the blur algorithm operate as if the pixel values beyond the edge of the layer are the same as the values of the edge pixels. This option keeps edges sharp, preventing them from darkening and becoming more transparent—the result of being averaged with a lot of zeroes. Deselect this option to make the blur algorithm operate as if the pixel values beyond the edge of the layer are zero.

**Note:** *Film grain and noise are removed from an image when you blur it. To make the image look more realistic, you may want to add noise back to the image so that it doesn't look retouched. (See Noise and Grain effects.)*

Stu Maschwitz compares the Box Blur, Fast Blur, and Gaussian Blur effects in a post on his [ProLost blog](#).

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## Bilateral Blur effect

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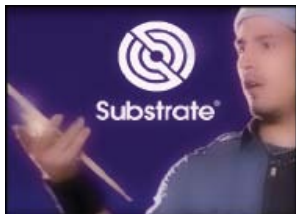
The Bilateral Blur effect selectively blurs an image so that edges and other details are preserved. Areas with high contrast—where pixel values differ by a large amount—are blurred less than areas of low contrast.

The primary difference between the Bilateral Blur effect and the Smart Blur effect is that edges and details are still blurred a small amount by the Bilateral Blur effect. The result is a softer, dreamier look than that achieved by the Smart Blur effect with equivalent settings.

The result of the Bilateral Blur effect is very similar to the result of the Surface Blur filter in Adobe Photoshop.

Eran Stern provides a demonstration of the Bilateral Blur effect on the [Motionworks website](#).

This effect works with 8-bpc, 16-bpc, and 32-bpc color.



*The Bilateral Blur effect preserves the details in the logo and face.*

**Threshold** The radius of the blur is automatically decreased in areas where an edge or other prominent detail feature exists. The Threshold value determines how the Bilateral Blur effect decides what areas contain features to be preserved and what areas should be blurred by the full amount. A lower Threshold value causes more fine details to be preserved. A higher Threshold value causes a more simplistic result, with fewer details preserved.

**Radius** A larger radius for a blur means that more pixels are averaged together to determine each pixel value, so increasing the Radius value increases the blurriness.

**Colorize** When Colorize is not selected, the Bilateral Blur effect operates on one value for each pixel: its luminance value, which is a weighted average of its R, G, and B color channel values. The result is a monochromatic image.

When Colorize is selected, the Bilateral Blur effect operates on each color channel individually. The result is a color image.

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## Box Blur effect

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Box Blur is similar to Fast Blur and Gaussian Blur, but Box Blur has the added advantage of an Iterations property, which allows you to control the quality of the blur.

Stu Maschwitz compares the Box Blur, Fast Blur, and Gaussian Blur effects in a post on his [ProLost blog](#).

This effect works with 8-bpc, 16-bpc, and 32-bpc color.

**Iterations** How many times the blur is sequentially applied to the image. A value around 3 gives a blur similar in quality to Fast Blur. A higher number of iterations creates smoother transitions between colors and increases the blur, but it also increases the render time. The default value creates boxy results.

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## Camera Lens Blur effect (CS5.5)

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The effect is a replacement for the Lens Blur effect. The effect has a larger blur radius (500), and is much faster than the Lens Blur effect. The Camera Lens Blur effect also does not disable Render Multiple Frames Simultaneously multiprocessing, as its predecessor did.

For details, tutorials, and resources about the Camera Lens Blur effect, camera depth-of-field settings, and camera commands new in After Effects CS5.5 and later, see [this article on the Adobe website](#).

This effect works with 8-bpc, 16-bpc, and 32-bpc color.

**Note:** *Descriptions of the Camera Lens Blur effect's properties also apply to the camera layer's Camera Options properties group with the same (or similar) names.*

**Iris Properties** Iris properties include Shape, Roundness, Aspect Ratio, Rotation, and Diffraction Fringe.

**Diffraction Fringe** Creates a halo around the edge of an iris that simulates light bending, concentrating around the edge of the iris blades. When set to 100, a natural normal halo that is based on the area represented in the shape of the blur is visible. At 500, all the energy of the blur is pushed from inside the blur to the ring/halo. This effect, in essence, emulates a catadioptric lens.

**Blur Map** A control layer can be used as a blur map to affect Camera Lens Blur effect properties.

**Layer** Layer to use as the blur map.

**Channel** Luminance, color, or alpha channel for the blur map.

**Blur Focal Distance** The value from the control layer that corresponds to zero blurring. The difference between the Blur Focal Distance value and a value from the control layer dictates the amount of blurriness for the corresponding area on the layer with the effect applied.

**Highlight** Modifies color values of the pixels that are above the threshold. Higher highlight values produce the best results for getting a good blooming blur/glow effect.

**Gain** The amount of energy fed into pixels that are above the threshold. Depending on how bright a pixel is above the threshold, the pixel value is increased in brightness by this relative amount.

**Threshold** The luminosity limit on what is boosted by Gain. Pixels much brighter than the threshold are boosted more than those pixels slightly above it. Setting the threshold to 0 boosts any pixel with a brightness higher than 0. Setting it to 1 effectively eliminates any highlight (unless the image contains overbrights).

**Saturation** The amount of color retained in the boosted pixel. Setting it to 0 pushes the boosted colors toward white (what the old Lens Blur effect used to do). Setting to 100 attempts to retain as much color as possible. This saturation of the highlights is especially noticeable in situations with colored lights (like a city scape at night), in which the colors create a multicolored tapestry of bokeh.

**Edge Behavior** See About Blur & Sharpen effects for information about how Repeat Edge Pixels options are treated in blur effects.

**Use Linear Working Space** Produces a result similar to a project set to a linearized working color space. Check this property (or set it from the project settings) to see realistic bokeh effects from your images.

**Note:** *In addition to enabling the Use Linear Working Space check box, be sure to work in 32-bpc color. Working with a lower color bit depth causes quantization.*

### Forward and backward compatibility

If the Camera Lens Blur effect is added to an After Effects CS5.5 and later project, and then saved as an After Effects CS5 project (see Save and back up projects in After Effects CS5.5 and After Effects CS6.), a warning appears stating that the effect is missing. Projects created in After

Effects CS5 or earlier using the Lens Blur effect retains that effect when opened in After Effects CS5.5 and later. However, you cannot directly apply the Lens Blur effect in After Effects CS5.5 or later.

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## Channel Blur effect

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The Channel Blur effect individually blurs the red, green, blue, or alpha channels of a layer.

**Note:** *If you have noise or artifacts primarily in one color channel—such as MPEG compression artifacts in the blue channel of DV footage—use Channel Blur to clean up the noise in that channel, leaving the other channels sharp.*

This effect works with 8-bpc, 16-bpc, and 32-bpc color.

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## Compound Blur effect

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The Compound Blur effect blurs pixels in the effect layer based on the luminance values of a control layer, also known as a blur layer or blurring map. By default, bright values in the blur layer correspond to more blurring of the effect layer, while dark values correspond to less blurring; select Invert Blur for light values to correspond to less blurring.

This effect is useful for simulating smudges and fingerprints, or changes in visibility caused by atmospheric conditions such as smoke or heat, especially with animated blur layers such as those generated with the Turbulent Noise effect.

This effect works with 8-bpc, 16-bpc, and 32-bpc color.



Original (upper-left), blur layer (lower-left), and result (lower-right)

**Maximum Blur** The maximum amount, in pixels, that any part of the affected layer can be blurred.

**Stretch Map To Fit** Stretches the control layer to the dimensions of the layer to which it is applied; otherwise, the control layer is centered on the effect layer.

Steve Holmes provides a video tutorial on the [Artbeats website](#) that demonstrates the use of the Compound Blur effect.

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## Directional Blur effect

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The Directional Blur effect gives a layer the illusion of motion.

Andrew Kramer provides a video tutorial on his [Video Copilot website](#) in which he demonstrates the use of the Directional Blur effect to make a gun slide look as if it is moving quickly.

This effect works with 8-bpc, 16-bpc, and 32-bpc color.



Original (left), and with effect applied (right)

**Direction** The direction of the blur. The blur is applied equally on either side of the center of a pixel; therefore, a setting of 180° and a setting of 0° produce the same results.

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## Fast Blur effect

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When layer quality is set to Best, Fast Blur is a close approximation of Gaussian Blur.

Stu Maschwitz compares the Box Blur, Fast Blur, and Gaussian Blur effects in a post on his [ProLost blog](#).

This effect works with 8-bpc, 16-bpc, and 32-bpc color.



*Original (left), and with effect applied (right)*

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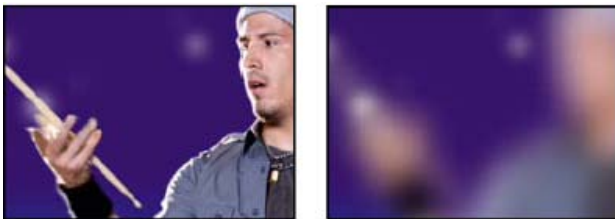
## Gaussian Blur effect

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The Gaussian Blur effect blurs and softens the image and eliminates noise. The quality setting of the layer doesn't affect Gaussian Blur.

Stu Maschwitz compares the Box Blur, Fast Blur, and Gaussian Blur effects in a post on his [ProLost blog](#).

This effect works with 8-bpc, 16-bpc, and 32-bpc color.



*Original (left), and with effect applied (right)*

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## Lens Blur effect

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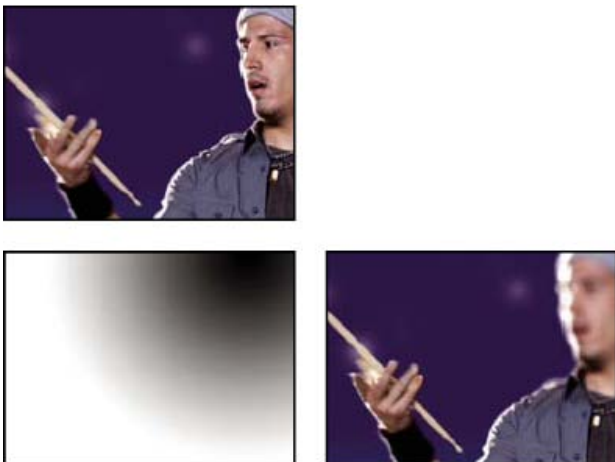
The Lens Blur effect simulates the blurring of objects not in the focal plane of a camera. The appearance of the blur depends on the control layer used as a depth map and the iris settings for the simulated camera aperture.

In After Effects CS5.5 and later, the Lens Blur effect has been replaced by the Camera Lens Blur effect. (See Camera Lens Blur effect (CS5.5).)

Richard Bird provides a video tutorial on the [AETUTS+ website](#) that shows how to use the Lens Blur effect to create a tilt-shift result.

Andrew Kramer provides a video tutorial on his [Video Copilot website](#) that demonstrates how to use the Lens Blur effect to create the look of a shallow depth of field.

This effect works with 8-bpc and 16-bpc color.



*Original (upper-left), Depth Map layer (lower-left), and result (lower-right)*

**Depth Map Layer** The control layer from which the depth map is taken.

**Depth Map Channel** The channel of the control layer to use as the depth map. Pixels with low values correspond to low depth (near the camera); pixels with high values correspond to high depth (far from the camera). Select Invert Depth Map to invert this relationship.

**Blur Focal Distance** Depth of the focal plane, where pixels are in focus.

**Iris Shape** The polygon to use as the iris shape.

**Iris Blade Curvature** The roundness of the edges of the iris.

**Iris Rotation** The rotation of the iris.

**Iris Radius** The size of the iris. Increase this value for greater blur.

**Specular Threshold** All pixels with a brightness value greater than Specular Threshold are treated as specular highlights.

**Specular Brightness** Brightness of specular highlights.

**Noise controls** Film grain and noise are removed when you blur an image. To make the image look more realistic, you may want to add noise back to the image so that it doesn't look retouched. To add noise, set Noise Amount, and choose a noise type from the Noise Distribution menu. To add noise without affecting the color in your image, choose Monochromatic Noise.

**Stretch Map To Fit** Stretches the control layer to the dimensions of the layer to which it is applied; otherwise, the control layer is centered on the affected layer.

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## Radial Blur effect

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The Radial Blur effect creates blurs around a point, simulating the result of a zooming or rotating camera.

You can specify the level of anti-aliasing applied at Best quality; no anti-aliasing is applied at Draft quality. At Draft quality, the blur appears somewhat grainy. You may prefer the draft results for special effects, but the grain may flicker on interlaced displays.

This effect works with 8-bpc, 16-bpc, and 32-bpc color.



Original (left), and with effect applied (right)

**Type** Spin blurs in arcs around the Center point, as if the camera were rotating; Amount specifies degrees of rotation. Zoom blurs radially outward from the center point; Amount specifies the length of the blur.

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## Reduce Interlace Flicker effect

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The Reduce Interlace Flicker effect reduces high vertical frequencies to make images more suitable for use in an interlaced medium (such as NTSC video). For example, images with thin horizontal lines can flicker when broadcast. Reduce Interlace Flicker applies a vertical directional blur to soften horizontal edges to reduce the flickering.

This effect works with 8-bpc, 16-bpc, and 32-bpc color.

**Note:** Flicker may result from fields that haven't been separated.

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## Sharpen effect

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The Sharpen effect increases the contrast where color changes occur. The quality setting of the layer doesn't affect Sharpen.

This effect works with 8-bpc, 16-bpc, and 32-bpc color.



Original (left), and with effect applied (right)

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## Smart Blur effect

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The Smart Blur effect blurs an image while preserving lines and edges within the image. For example, you can use the Smart Blur effect to smoothly blur shaded areas while retaining crisp outlines of text and vector graphics.



Original (left), and with effect applied (right)

This effect works with 8-bpc and 16-bpc color.

**Radius** How far the filter searches for dissimilar pixels to blur.

**Threshold** How different the values of pixels should be before they are eliminated.

**Mode** What parts of the image receive the blur. Normal specifies that the blur be applied to the entire selection, whereas Edge Only and Overlay Edge specify that the blur be applied only to the edges of color transitions. Where significant contrast occurs, Edge Only applies black-and-white edges, and Overlay Edge applies white.

## Unsharp Mask effect

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The Unsharp Mask effect increases the contrast between colors that define an edge.

Chris and Trish Meyer provide instructions on the [ProVideo Coalition website](#) for using the Unsharp Mask effect with the CC Composite effect to sharpen an image without creating undesired color halo artifacts.

This effect works with 8-bpc, 16-bpc, and 32-bpc color.



Original (left), and with effect applied (right)

**Radius** The distance from the edge at which pixels are adjusted for contrast. If you specify a low value, only pixels near the edge are adjusted.

**Threshold** The greatest difference between adjacent pixels for which contrast isn't adjusted. A lower value produces a greater result. A value that is too low causes contrast for the entire image to be adjusted and can generate noise or cause unexpected results.

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# Channel effects

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## Additional resources about Channel effects

[Arithmetic effect](#)  
[Blend effect](#)  
[Calculations effect](#)  
[Channel Combiner effect](#)  
[Compound Arithmetic effect](#)  
[Invert effect](#)  
[Minimax effect](#)  
[Remove Color Matting effect](#)  
[Set Channels effect](#)  
[Set Matte effect](#)  
[Shift Channels effect](#)  
[Solid Composite effect](#)

Third-party effects in this category included with After Effects:

- CC Composite effect

See Third-party plug-ins included with After Effects.

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## Additional resources about Channel effects

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Satya Meka provides the Separate RGB effect plug-in on the [After Effects Scripts website](#). This effect—which was written with Pixel Bender—offsets, scales, and rotates each color channel of an image separately.

Chris Forrester provides a video tutorial on [his website](#) that shows how to use the Channel Mixer, Shift Channels, and Set Matte effects to create mattes from color ID passes from 3D applications. He also provides an animation preset that sets up the parameters in the Channel Mixer effect for the use of an RGBCMY color ID pass.

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## Arithmetic effect

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The Arithmetic effect performs various simple mathematical operations on the red, green, and blue channels of an image.

This effect works with 8-bpc color.

**Operator** The operation to perform between the value you specify for each channel and the existing value of that channel for each pixel in the image:

**And, Or, and Xor** Apply bitwise logical operations.

**Add, Subtract, Multiply, and Difference** Apply basic math functions.

**Max** Set the channel value of the pixel to the greater of the specified value and the original value of the pixel.

**Min** Set the channel value of the pixel to the lesser of the specified value and the original value of the pixel.

**Block Above** Set the channel value of the pixel to zero if the original value of the pixel is greater than the value specified; otherwise, leave the original value.

**Block Below** Set the channel value of the pixel to zero if the original value of the pixel is less than the value specified; otherwise, leave the original value.

**Slice** Set the channel value of the pixel to 1.0 if the original value of the pixel is above the specified value; otherwise, set the value to zero. In both cases, the values for the other color channels are set to 1.0.

**Screen** Multiplies the complements of the channel values, and then takes the complement of the result. The result color is never darker than either input color.

**Clip Result Values** Prevents all functions from creating color values that exceed the valid range. If this option isn't selected, some color values may wrap around.

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## Blend effect

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The Blend effect blends two layers using one of five modes.

You can blend layers more easily and quickly using blending modes, but you can't animate blending modes. The advantage of using the Blend effect is that you can animate it. (See [Blending modes and layer styles](#).)

This effect works with 8-bpc and 16-bpc color.

John Dickinson explains the use of the Blend effect in an entry in the A-Z series on the [Motionworks website](#).

**Blend With Layer** The layer to blend with (the secondary or control layer).

**Note:** To use a layer as a control layer for the Blend effect but not show the layer in the rest of the composition, deselect the control Video switch  for the control layer. (See Layer switches and columns in the Timeline panel.)

**Mode** Blending mode:

- Color Only colorizes each pixel in the original image based on the color of each corresponding pixel in the secondary image.
- Tint Only is similar to Color Only but tints pixels in the original image only if they're already colored.
- Darken Only darkens each pixel in the original image that is lighter than the corresponding pixel in the secondary image.
- Lighten Only lightens each pixel in the original image that is darker than the corresponding pixel in the secondary image.
- Crossfade causes the original image to fade out while the secondary image fades in.

**Note:** You can create a crossfade without applying an effect by animating the Opacity property of one layer on top of another. However, this technique doesn't work if the frontmost layer has any transparent portions (which allow the other layer to show through, even when at full opacity). The Crossfade mode creates a proper crossfade between two layers, even if both have transparent regions.

**Blend With Original** The transparency of the effect. The result of the effect is blended with the original image, with the effect result composited on top. The higher you set this value, the less the effect affects the layer. For example, if you set this value to 100%, the effect has no visible result on the layer; if you set this value to 0%, the original image doesn't show through.

**If Layer Sizes Differ** Specifies how to position the control layer. The quality setting of the layer affects Blend only if Stretch To Fit is selected and if the layers are of different sizes. Stretching at Best quality is much smoother.

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## Calculations effect

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The Calculations effect combines channels of one layer with the channels of a second layer.

This effect works with 8-bpc and 16-bpc color.

**Input Channel** The channel to extract and use as input to the blending operation. RGBA displays all channels normally. Gray converts all color channel values for a pixel to the luminance value of the original pixel. Red, Green, or Blue converts all color channel values for a pixel to the value of the selected color channel for the original pixel. Alpha converts all channels to the value of the alpha channel for the original pixel.

**Invert Input** Inverts the layer (subtracts each channel value from 1.0) before the effect extracts the specified channel information.

**Second Layer** The control layer with which Calculations blends the original layer.

**Second Layer Channel** The channel to be blended with the input channels.

**Second Layer Opacity** The opacity of the second layer. Use a setting of 0% for the second layer to have no influence on the output.

**Invert Second Layer** Inverts the second layer (subtracts each channel value from 1.0) before the effect extracts the specified channel information.

**Stretch Second Layer To Fit** Stretches the second layer to the dimensions of the original layer before blending. Deselect to center the second layer on the original layer.

**Preserve Transparency** Ensures that the alpha channel of the original layer isn't modified.

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## Channel Combiner effect

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The Channel Combiner effect extracts, displays, and adjusts channel values for a layer.

**Note:** You can use this effect to view any channel as a grayscale image by choosing the channel from the From menu and choosing Lightness Only from the To menu.

This effect works with 8-bpc color.

Chris and Trish Meyer provide instructions on the [ProVideo Coalition website](#) for using the Channel Combiner effect with the Levels effect to affect only the luma (detail) information in an image—or, conversely, to only affect the color information in an image.

**Use 2nd Layer** Retrieve values from Source Layer, which can be any layer in the composition.

**From** Which values to use as input; the first several items in the menu are multichannel combinations of input and output options, so they don't require you to set a To value.

- Saturation Multiplied uses the saturation value multiplied by the lightness value, where lightness is the minimum distance to black or white. For example, a dark or light blue pixel has a lower value than a bright or pure blue pixel. This option represents the most common view of the saturation value of a pixel.
- Min RGB uses the lowest value among the red, green, and blue channel values.
- Max RGB uses the highest value among the red, green, and blue channel values.

**To** The channels to which to apply the values. Choose Red Only, Green Only, and Blue Only to apply the value to one channel only and set the other color channels to zero. Choose Alpha Only to apply the value to the alpha channel and set the color channels to 1.0. When you select Hue Only, the applied hue value is combined with 50% lightness and 100% saturation. When you select Lightness Only, the applied lightness value is

combined with 0% saturation, which then gives the hue no influence. When you select Saturation Only, the applied saturation values are combined with 0% hue and 50% lightness.

**Invert** Inverts (subtracts from 1.0) the output channel values.

**Solid Alpha** Makes the alpha channel value 1.0 (complete opacity) throughout the layer.

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## Compound Arithmetic effect

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The Compound Arithmetic effect mathematically combines the layer to which it is applied with a control layer. The Compound Arithmetic effect is intended only to provide compatibility with projects created in earlier versions of After Effects that use the Compound Arithmetic effect. Using blending modes is usually more effective than using the Compound Arithmetic effect.

This effect works with 8-bpc color.

**Second Source Layer** The layer to use with the current layer in the given operation.

**Operator** The operation to perform between the two layers.

**Operate On Channels** The channels to which the effect is applied.

**Overflow Behavior** How the effect remaps values that fall outside the grayscale range of 0-255.

**Clip** Values above 255 are mapped to 255. Values below 0 are mapped to 0.

**Wrap** Values above 255 and below 0 are wrapped back around into the 0-255 range. For example, a value of 258 wraps around to 2, a value of 256 wraps around to 0, and a value of -3 wraps around to 253.

**Scale** The maximum and minimum values are remapped to 255 and 0, and intermediate values are stretched or compressed to fit within this range.

**Stretch Second Source To Fit** Scales the second layer to match the size (width and height) of the current layer. If this option is deselected, the second layer is placed at the current size of its source, aligned with the upper left corner of the source layer.

**Blend With Original** The transparency of the effect. The result of the effect is blended with the original image, with the effect result composited on top. The higher you set this value, the less the effect affects the layer. For example, if you set this value to 100%, the effect has no visible result on the layer; if you set this value to 0%, the original image doesn't show through.

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## Invert effect

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The Invert effect inverts the color information of an image.

This effect works with 8-bpc, 16-bpc, and 32-bpc color.



*Original (left), and with effect applied (right)*

**Channel** Which channel or channels to invert. Each group of items operates in a particular color space, inverting either the entire image in that color space or only a single channel.

**RGB/Red/Green/Blue** RGB inverts all three of the additive color channels. Red, Green, and Blue each invert an individual color channel.

**HLS/Hue/Lightness/Saturation** HLS inverts all three of the calculated color channels. Hue, Lightness, and Saturation each invert an individual color channel.

**YIQ/Luminance/In Phase Chrominance/Quadrature Chrominance** YIQ inverts all three NTSC luminance and chrominance channels. Y (luminance), I (in-phase chrominance), and Q (quadrature chrominance) each invert an individual channel.

**Alpha** Inverts the alpha channel of the image. The alpha channel isn't a color channel; it specifies transparency.

**Blend With Original** The transparency of the effect. The result of the effect is blended with the original image, with the effect result composited on top. The higher you set this value, the less the effect affects the layer. For example, if you set this value to 100%, the effect has no visible result on the layer; if you set this value to 0%, the original image doesn't show through.

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## Minimax effect

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The Minimax effect assigns each channel of a pixel the minimum or maximum value for that channel found within a specified radius.

This effect can be used to enlarge or reduce a matte. For example, a white solid area surrounded by black shrinks one pixel on each side using Minimum and a radius of 1.

The quality setting of the layer doesn't affect Minimax.

This effect works with 8-bpc and 16-bpc color.

**Operation** Minimum assigns each channel of a pixel the minimum value for the specified channel within the specified radius. Maximum assigns each channel of a pixel the maximum value. Minimum Then Maximum performs the Minimum operation and then the Maximum operation.



Maximum Then Minimum performs the Maximum operation and then the Minimum operation.

**Direction** The axis along which to scan for values. Horizontal & Vertical scans all directions.

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## Remove Color Matting effect

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The Remove Color Matting effect removes color fringes (halos) from layers with premultiplied color channels. Halos often occur when an area of partial transparency retains the color of the original background and is composited into a context with a different background color. Use this effect in conjunction with effects that create transparency—such as keying effects—to achieve more control over the appearance of areas of partial transparency. (See Alpha channel interpretation: premultiplied or straight.)

This effect works with 8-bpc, 16-bpc, and 32-bpc color.



Original (left), and with Remove Color Matting effect applied (right)

Use Background Color to specify the new background color. To allow this effect to generate color values outside the range 0.0-1.0 when working in 32-bpc color, deselect Clip HDR Values.

The Remove Color Matting effect was previously known as the Unmultiply effect. The old name refers to the fact that this effect functions by unpremultiplying color channels—removing the result of the background color being premultiplied with the color channels of the layer in areas of partial transparency. This functionality differs from Knoll Unmult and other effects that synthesize an alpha channel from the color channels in an image.

Aharon Rabinowitz provides a video tutorial on the [Creative COW website](#) that describes how and when to use the Remove Color Matting effect.

Todd Kopriva provides a post on the [Adobe website](#) that describes the use of the Remove Color Matting and Shift Channels effects to remove black backgrounds from images.

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## Set Channels effect

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The Set Channels effect copies channels from control layers (source layers) to the red, green, blue, and alpha channels of the effect layer. For example, you can take the luminance values of the pixels of a control layer and use them as the blue values for the pixels of the effect layer.

This effect works with 8-bpc and 16-bpc color.

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## Set Matte effect

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The Set Matte effect replaces the alpha channel (matte) of a layer with a channel from another layer above it for the creation of traveling matte results. The Set Matte effect is intended only to provide compatibility with projects created in earlier versions of After Effects that use the Set Matte effect.

This effect works with 8-bpc and 16-bpc color. In After Effects CS6, this effect works in 32-bit color.



Original (upper-left), matte layer (lower-left), and result (lower-right)

Sometimes, it's easier and faster to create traveling mattes by using a track matte instead of using the Set Matte effect. However, using the Set Matte effect provides some advantages over defining a layer as a track matte layer. The layer used as the matte with the Set Matte effect can be

anywhere in the layer stacking order, unlike a track matte layer, which must be directly above the matted layer in the layer stacking order. Also, one layer can be used as the matte for multiple layers with the Set Matte effect. (See Track mattes and traveling mattes.)

**Take Matte From Layer** The layer to use as the replacement matte.

**Use For Matte** The channel to use for the matte.

**Invert Matte** Inverts the transparency values of the matte.

**Stretch Matte To Fit** Scales the selected layer to match the size of the current layer. If Stretch Matte To Fit is deselected, the layer designated as the matte is centered in the first layer.

**Composite Matte With Original** Composites the new matte with the current layer, rather than replacing it. The resulting matte allows the image to show through only where the current matte and the new matte both have some opacity.

**Premultiply Matte Layer** Premultiplies the new matte layer with the current layer.

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## Shift Channels effect

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The Shift Channels effect replaces red, green, blue, and alpha channels in the image with values from other channels.

This effect works with 8-bpc, 16-bpc, and 32-bpc color.

**Take Channel From** The channel to use as a source.

Todd Kopriva provides a post on the [Adobe website](#) that describes the use of the Remove Color Matting and Shift Channels effects to remove black backgrounds from images.

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## Solid Composite effect

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The Solid Composite effect offers a quick way to create a composite of a new color solid behind the original source layer.

This effect works with 8-bpc, 16-bpc, and 32-bpc color.

**Source Opacity** The opacity of the source layer.

**Color** The color of the solid.

**Opacity** The opacity of the solid.

**Blending Mode** The blending mode used to combine the layer and the solid color.

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# The rolling shutter repair effect (CS6)

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A common problem for DSLR and other CMOS sensor-based cameras is that they typically have a lag time between scanning lines of video. Since not all parts of the video are recorded at the same time, this can cause Digital cameras with CMOS sensors often have a rolling shutter, which captures a frame of video one scan line at a time. Due to time lag between scan lines, not all parts of the image are recorded at exactly the same time. If the camera is moving or subject is moving, the rolling shutter can cause distortions.

In After Effects CS6, the Rolling Shutter Repair effect (available in the Distort effect category) can be used to remove these distortion artifacts.

After applying the effect, the following properties are available:

**Rolling Shutter Rate:** Specifies the percentage of the frame rate which is the scan time. DSLRs seem to be in the 50-70% range, and iPhone is close to 100%. Adjust this value until distorted lines become vertical.

**Scan Direction:** Specifies the direction that the rolling shutter scan takes place. Most cameras scan top-to-bottom of the sensor, but of course you can mount a camera upside down or rotate a camera completely in the case of a smart phone.

## Advanced section:

**Method:** Indicates if optical-flow analysis and pixel-motion retiming will be used to generate the unwarped frames (Pixel Motion), or if a sparse point-tracking and warping method should be used (Warp).

**Detailed Analysis:** Performs a more detailed point-analysis in the warp. Available when using the Warp method.

**Pixel Motion Detail:** Specifies how detailed the optical-flow vector field computation should be. Available when using the Pixel Motion method.

**Note:** *Although the Warp Stabilizer effect has a rolling shutter repair effect within it, the standalone version has more controls. There are also times when you want to repair a rolling shutter problem, but you do not need to stabilize the shot.*

[This video](#) by Todd Kopriva and video2brain introduces the new Rolling Shutter Repair feature. Use the effect to correct the distortion from a moving camera phone video.



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# Color Correction effects

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## Auto Color and Auto Contrast effects

Auto Levels effect  
Black & White effect  
Brightness & Contrast effect  
Broadcast Colors effect  
Change Color effect  
Change To Color effect  
Channel Mixer effect  
Color Balance effect  
Color Balance (HLS) effect  
Color Link effect  
Color Stabilizer effect  
Colorama effect  
Curves effect  
Equalize effect  
Exposure effect  
Gamma/Pedestal/Gain effect  
Hue/Saturation effect  
Leave Color effect  
Levels effect  
Levels (Individual Controls) effect  
Photo Filter effect  
PS Arbitrary Map effect  
Selective Color effect  
Shadow/Highlight effect  
Tint effect  
Tritone effect  
Vibrance effect

For general information about color correction and color adjustment, including links to tutorials and other resources, see [Color correction](#), [color grading](#), and [color adjustment](#).

Third-party effects in this category included with After Effects:

- CC Color Neutralizer effect (CS6)
- CC Color Offset effect
- CC Kernel effect (CS6)
- CC Toner effect

See [Third-party plug-ins included with After Effects](#).

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## Auto Color and Auto Contrast effects

[To the top](#)

The Auto Color effect adjusts the contrast and color of an image after analyzing the shadows, midtones, and highlights of the image. The Auto Contrast effect adjusts the overall contrast and mixture of colors. Each effect maps the lightest and darkest pixels in the image to white and black, and then redistributes the intermediate pixels. The result is that highlights appear lighter and shadows appear darker.

Because Auto Contrast and Auto Color don't adjust channels individually, they don't introduce or remove color casts.

The Auto Levels effect uses many of the same controls as the Auto Color and Auto Contrast effects.

 *A quick way to remove (or at least reduce) the flicker caused by fluctuations in exposure and color from one frame to the next is to apply the Auto Color effect. This is useful, for example, in reducing the flicker of old film or for correcting for the flickering color of a light source.*

These effects work with 8-bpc and 16-bpc color.

**Temporal Smoothing** The range of adjacent frames, in seconds, analyzed to determine the amount of correction needed for each frame, relative to its surrounding frames. If Temporal Smoothing is 0, each frame is analyzed independently, without regard for surrounding frames. Temporal Smoothing can result in smoother looking corrections over time.

**Scene Detect** If selected, frames beyond a scene change are ignored when surrounding frames are analyzed for temporal smoothing.

**Black Clip, White Clip** How much of the shadows and highlights are clipped to the new extreme shadow and highlight colors in the image.

Setting the clipping values too high reduces detail in the shadows or highlights. A value in the range from 0.0% to 1% is recommended. By default, shadow and highlight pixels are clipped by 0.1%—that is, the first 0.1% of either extreme is ignored when the darkest and lightest pixels in the image are identified. The lowest and highest values within the range after clipping are then mapped to output black and output white. This method ensures that input black and input white values are based on representative rather than extreme pixel values.

**Snap Neutral Midtones (Auto Color only)** Identifies an average nearly neutral color in the frame and then adjusts the gamma values to make the color neutral.

**Blend With Original** The transparency of the effect. The result of the effect is blended with the original image, with the effect result composited on top. The higher you set this value, the less the effect affects the layer. For example, if you set this value to 100%, the effect has no visible result on the layer; if you set this value to 0%, the original image doesn't show through.

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## Auto Levels effect

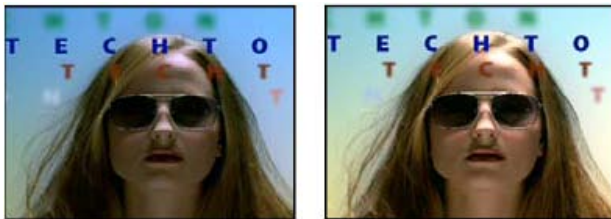
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The Auto Levels effect maps the lightest and darkest values in each color channel in the image to white and black, and then redistributes the intermediate values. As a result, highlights appear lighter and shadows appear darker. Because Auto Levels adjusts each color channel individually, it may remove or introduce color casts.

See Auto Color and Auto Contrast effects for explanations of the controls for this effect.

💡 A quick way to remove (or at least reduce) the flicker caused by fluctuations in exposure from one frame to the next is to apply the Auto Levels effect. This is useful, for example, in reducing the flicker of old film.

This effect works with 8-bpc and 16-bpc color.



Original (left), and with effect applied (right)

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## Black & White effect

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The Black & White effect converts a color image to grayscale, providing control over how individual colors are converted.

This effect works with 8-bpc and 16-bpc color.

Decrease or increase the property value for each color component to convert that color channel to a darker or lighter shade of gray.

To tint the image with a color, select Tint and click the color swatch or eyedropper to specify a color.

The Black & White effect is based on the Black & White adjustment layer type in Photoshop.

Richard Harrington provides a video tutorial on the [Creative COW website](#) that demonstrates the use of the Black & White effect.

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## Brightness & Contrast effect

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The Brightness & Contrast effect adjusts the brightness and contrast of an entire layer (not individual channels). The default value of 0.0 indicates that no change is made. Using the Brightness & Contrast effect is the easiest way to make simple adjustments to the tonal range of the image. It adjusts all pixel values in the image at once—highlights, shadows, and midtones.

This effect works with 8-bpc, 16-bpc, and 32-bpc color.

Rich Young collects tutorials and resources about the Brightness & Contrast effect and alternatives to it on his [After Effects Portal website](#).

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## Broadcast Colors effect

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**Note:** The Color Finesse plug-in included with After Effects includes excellent tools that can help you keep your colors within the broadcast-safe range. For more information, see the Color Finesse documentation in the Color Finesse subfolder in the Plug-ins folder. (See Plug-ins.)

The Broadcast Colors effect alters pixel color values to keep signal amplitudes within the range allowed for broadcast television.

Use the Key Out Unsafe and Key Out Safe settings for How To Make Color Safe to determine which portions of the image the Broadcast Colors effect affects at the current settings.

**Note:** A more reliable way to keep colors within the broadcast-safe range for your output type is to use color management features to set the output color profile accordingly, such as to SDTV (Rec. 601 NTSC). This method ensures that color values in the range 0.0–1.0 in your working color space are converted to broadcast-safe values. (See Broadcast-safe colors.)

This effect works with 8-bpc color.

**Broadcast Locale** The broadcast standard for your intended output. NTSC (National Television Standards Committee) is the North American standard and is also used in Japan. PAL (Phase Alternating Line) is used in most of Western Europe and South America.

**How To Make Color Safe** How to reduce signal amplitude:

**Reduce Luminance** Reduces the brightness of a pixel by moving it toward black. This setting is the default.

**Reduce Saturation** Moves the color of a pixel toward a gray of similar brightness, making the pixel less colorful. For the same IRE level, reducing saturation alters the image more noticeably than does reducing luminance.

**Maximum Signal Amplitude (IRE)** The maximum amplitude of the signal in IRE units. A pixel with a magnitude above this value is altered. The default is 110. Lower values affect the image more noticeably; higher values are more risky.

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## Change Color effect

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The Change Color effect adjusts the hue, lightness, and saturation of a range of colors.

This effect works with 8-bpc and 16-bpc color.

**View** Corrected Layer shows the results of the Change Color effect. Color Correction Mask shows a grayscale matte that indicates the areas of the layer that will be changed. White areas in the color correction mask are changed the most, and dark areas are changed the least.

**Hue Transform** The amount, in degrees, to adjust hue.

**Lightness Transform** Positive values brighten the matched pixels; negative values darken them.

**Saturation Transform** Positive values increase saturation of matched pixels (moving toward pure color); negative values decrease saturation of matched pixels (moving toward gray).

**Color To Change** The central color in the range to be changed.

**Matching Tolerance** How much colors can differ from Color To Change and still be matched.

**Matching Softness** The amount that the effect affects unmatched pixels, in proportion to their similarity to Color To Change.

**Match Colors** Determines the color space in which to compare colors to determine similarity. RGB compares colors in an RGB color space. Hue compares the hues of colors, ignoring saturation and brightness—so bright red and light pink match, for example. Chroma uses the two chrominance components to determine similarity, ignoring luminance (lightness).

**Invert Color Correction Mask** Inverts the mask that determines which colors to affect.

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## Change To Color effect

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The Change To Color effect (formerly Change Color HLS effect) changes a color you select in an image to another color using hue, lightness, and saturation (HLS) values, leaving other colors unaffected.

Change To Color offers flexibility and options unavailable in the Change Color effect. These options include tolerance sliders for hue, lightness, and saturation for exact color matching, and the ability to select the exact RGB values of the target color that you want to change to.

Carl Larsen provides a video tutorial on the [Creative COW website](#) that demonstrates the use of the Change To Color effect to remove color fringes caused by chromatic aberration.

This effect works with 8-bpc and 16-bpc color.



Original image (upper-left), with saturation removed in the planet (lower-left), and with light green changed to yellow in the planet (lower-right)

**From** The center of the color range to change.

**To** The color to change matched pixels to.

 To animate a color change, set keyframes or expressions for the To color.

**Change** Which channels the effect affects.

**Change By** How to change colors. Setting To Color performs a direct change of affected pixels to the target color. Transforming To Color transforms affected pixel values toward the target color, using HLS interpolation; the amount of change for each pixel depends on how close the color of the pixel is to the From color.

**Tolerance** How much colors can differ from the From color and still be matched. Expand this control to reveal separate sliders for Hue, Lightness, and Saturation values.

**Note:** Use the View Correction Matte option to better identify which pixels are matched and affected.

**Softness** The amount of feather to use for the edges of the correction matte. Higher values create smoother transitions between areas affected by the color change and unaffected areas.

**View Correction Matte** Shows a grayscale matte that indicates the amount to which the effect affects each pixel. White areas are changed the most, and dark areas are changed the least.

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## Channel Mixer effect

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The Channel Mixer effect modifies a color channel using a mix of the current color channels. Use this effect to make creative color adjustments not easily done with the other color adjustment tools: Create high-quality grayscale images by choosing the percentage contribution from each color channel, create high-quality sepia-tone or other tinted images, and swap or duplicate channels.

**[output channel]-[input channel]** The percentage of the input channel value to add to the output channel value. For example, a Red-Green setting of 10 increases the value of the red channel for each pixel by 10% of the value of the green channel for that pixel. A Blue-Green setting of 100 and a Blue-Blue setting of 0 replaces the blue channel values with the green channel values.

**[output channel]-Const** The constant value (as a percentage) to add to the output channel value. For example, a Red-Const setting of 100 saturates the red channel for every pixel by adding 100% red.

**Monochrome** Uses the value of the red output channel for the red, green, and blue output channels, creating a grayscale image.

This effect works with 8-bpc and 16-bpc color.

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## Color Balance effect

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The Color Balance effect changes the amount of red, green, and blue in the shadows, midtones, and highlights of an image.

Preserve Luminosity preserves the average brightness of the image while changing the color. This control maintains the tonal balance in the image.

This effect works with 8-bpc and 16-bpc color.

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## Color Balance (HLS) effect

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The Color Balance (HLS) effect alters the hue, lightness, and saturation of an image. This effect is intended only to provide compatibility with projects created in earlier versions of After Effects that use the Color Balance (HLS) effect. For new projects, use the Hue/Saturation effect, which operates the same as the Hue/Saturation command in Adobe Photoshop. You can convert a movie to grayscale by setting the Saturation to -100.

This effect works with 8-bpc and 16-bpc color.

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## Color Link effect

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The Color Link effect colorizes one layer with the average pixel values of another layer. This effect is useful for quickly finding a color that matches the color of a background layer.

This effect works with 8-bpc color.

John Dickinson provides a video tutorial on his [Motionworks website](#) in which he demonstrates the use of the Color Link effect to blend a foreground layer with a background layer.

**Source Layer** The layer from which to sample colors. If you choose None, the layer to which the effect is applied is used as the source layer, taking into account any masks and other effects applied to the layer. If you choose the name of the layer from the menu, the source layer without masks and effects is used.

**Sample** Specifies what values are sampled and what operation is performed on them.

**Clip** The percentage of pixels to ignore at the extreme channel values. This clipping is useful for reducing the influence of noise or other nonrepresentative pixels.

**Stencil Original Alpha** The effect places a stencil of the original alpha channel of the layer over the new value.

**Opacity** The opacity of the effect. The result of the effect is blended with the original image, with the effect result composited on top. The lower you set this value, the less the effect affects the layer. For example, if you set this value to 0%, the effect has no visible result on the layer; if you set this value to 100%, the original image doesn't show through.

**Blending Mode** The blending mode to use to combine the effect result with the original layer. These blending modes aren't available when averaging alpha channel values in the layer.

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## Color Stabilizer effect

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The Color Stabilizer effect samples the color values of a single reference frame, or pivot frame, at one, two, or three points; it then adjusts the

colors of other frames so that the color values of those points remain constant throughout the duration of the layer. This effect is useful for removing flicker from footage and equalizing the exposure of footage with color shifts caused by varying lighting situations.

 Use this effect to remove the flicker common to time-lapse photography and stop-frame animation.

You can animate the effect control points that define the sample areas to track objects for which you want to stabilize colors. The greater the difference in color values between the sample points, the better the effect works.

This effect works with 8-bpc and 16-bpc color.

**Set Frame** Sets the pivot frame. Display the frame that has the area of brightness or color that you want to match, and click Set Frame.

**Stabilize** What to stabilize:

**Brightness** Brightness is stabilized using one sample point (Black Point).

**Levels** Color is stabilized using two sample points (Black Point and White Point).

**Curves** Color is stabilized using all three sample points (Black Point, White Point, and Mid Point).

**Black Point** Place this point on a dark area to stabilize.

**Mid Point** Place this point on a midtone area to stabilize.

**White Point** Place this point on a bright area to stabilize.

**Sample Size** Radius, in pixels, of sampled areas.

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## Colorama effect

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The Colorama effect is a versatile and powerful effect for converting and animating colors in an image. Using the Colorama effect, you can subtly tint an image or radically change its color palette.

Colorama works by first converting a specified color attribute to grayscale and then remapping the grayscale values to one or more cycles of the specified output color palette. One cycle of the output color palette appears on the Output Cycle wheel. Black pixels are mapped to the color at the top of the wheel; increasingly lighter grays are mapped to successive colors going clockwise around the wheel. For example, with the default Hue Cycle palette, pixels corresponding to black become red, while pixels corresponding to 50% gray become cyan.

This effect works with 8-bpc and 16-bpc color.

Guy Chen provides an example on the [After Effects Exchange](#) on the Adobe website that uses the Fractal Noise effect to generate the base noise (in this case for the turbulent surface of the Sun) and then colorizes the noise with the Colorama effect.

Andrew Kramer provides a video tutorial on his [Video Copilot website](#) that demonstrates the use of the Colorama effect to create a procedural matte as a first step in replacing a sky.

### Input Phase controls

**Get Phase From** The color attribute to use as input. Choose Zero to use a color attribute from another layer.

**Add Phase** The second layer to use as input. To use only this layer as input, select Zero for Get Phase From; otherwise, both the Add Phase layer and the layer to which the effect is applied are used. You can choose the layer to which the effect is applied to add a second input attribute from the same layer.

**Add Phase From** The color attribute from the second layer to use as input.

**Add Mode** How input values are combined:

**Wrap** Adds the values of the two attributes for each pixel. Values above 100% are wrapped around the cycle again. For example, a sum of 125% wraps around to 25%.

**Clamp** Adds the values of the two attributes for each pixel. Values above 100% are clipped to 100%.

**Average** Averages the values of the two attributes for each pixel. Because the average of two values that are each in the range 0% to 100% is never over 100%, wrapping and clamping by this operation are never necessary. Average is therefore the safest option for predictable output.

**Screen** Screens the second layer over the original layer; the brighter areas in the second layer brighten the first layer, and the darker areas in the second layer are discarded. Screen mode is especially useful for compositing fire, lens flares, and other lighting effects.

**Phase Shift** The point on the Output Cycle wheel at which the mapping of the input colors begins. A positive value moves the starting point clockwise around the Output Cycle wheel.

 Animate Phase Shift to cycle colors around the wheel.

### Output Cycle controls

**Use Preset Palette** Presets for the Output Cycle. The top palettes are designed for quick color correction and adjustment tasks. The bottom choices offer a variety of built-in color palettes for creative results.

**Output Cycle** Customize the output color palette by altering the colors and locations of the triangles on the Output Cycle wheel. The triangles specify the location on the color wheel where a specific color occurs. The color between triangles is smoothly interpolated, unless Interpolate Palette is deselected. Each Output Cycle can have 1-64 triangles.

- To change the location of a triangle, drag the triangle. Shift-drag to snap the triangle to 45-degree increments. At the top of the wheel, the triangle snaps to either the start position or end position depending on whether you drag from the left or right.
- To add a triangle, click in or near the wheel, and select a color from the color picker. Click slightly to the left of the top arrows for the end



color, and slightly to the right for the start color.

- To duplicate a triangle, Ctrl-drag (Windows) or Command-drag (Mac OS) the triangle.
- To delete a triangle, drag it away from the wheel.
- To change the opacity, select a triangle on the color wheel and then drag the attached triangle above the opacity slider. Make sure that Modify Alpha is selected if you want the opacity information to affect your output.

**Note:** When you animate the Output Cycle, the position and color of a triangle are interpolated between keyframes. For best results, make sure that all keyframes have the same number of Output Cycle triangles.

**Cycle Repetitions** How many iterations of the Output Cycle the input color range is mapped to. The default value of 1 maps the input range to one iteration of the Output Cycle, from input black at the top of the Output Cycle wheel, clockwise to input white at the top of the Output Cycle wheel. A value of 2 maps the input range to two iterations of the Output Cycle. Use this option to create a simple palette and repeat it many times throughout a gradient.

**Interpolate Palette** Colors between triangles are interpolated smoothly. When this option is deselected, output colors are posterized.

## Modify controls

Modify controls specify which color attributes the Colorama effect modifies. For subtle refinement of images, choose the same color attribute for Input Phase and Modify. For example, choose Hue from both menus to simply adjust Hue.

**Modify** The color attribute to modify.

**Modify Alpha** Modifies alpha channel values.

**Note:** If you apply Colorama to a layer with an alpha channel, and the Output Cycle doesn't contain alpha information, the anti-aliased edges of the layer may appear pixelated. To smooth the edges, deselect Modify Alpha. If Modify Alpha is selected and the Output Cycle contains alpha information, the output is affected even if you've selected None from the Modify menu. Using this method, you can adjust the levels of only the alpha channel without also changing the RGB information.

**Change Empty Pixels** The influence of the Colorama effect extends to transparent pixels. (This setting works only if Modify Alpha is selected.)

## Pixel Selection, Masking, and other controls

These controls determine which pixels the effect affects. For the Matching controls for Pixel Selection to work, Matching Mode must be set to anything other than Off.

**Matching Color** The center of the range of colors of pixels that the Colorama effect modifies. To select a specific color in the image using the eyedropper, turn off the Colorama effect temporarily by clicking its Effect switch  in the Effect Controls panel.

**Matching Tolerance** How far a color can be from Matching Color and still be affected by the Colorama effect. When Matching Tolerance is 0, the Colorama effect only affects the exact color selected for Matching Color. When Matching Tolerance is 1, all colors are matched; this value essentially turns off Matching Mode.

**Matching Softness** How smoothly the matched pixels blend into the rest of the image. For example, if you have an image of a person wearing a red shirt and blue pants, and you want to change the color of the pants from blue to red, subtly adjust Matching Softness to spread the matching from the blue in the pants into the shadows of the pants folds. If you adjust it too high, the matching spreads to the blue of the sky; if you adjust it even higher, the matching spreads to the red shirt.

**Matching Mode** What color attributes are compared to determine matching. In general, use RGB for high-contrast graphics and Chroma for photographic images.

**Mask Layer** The layer to use as a matte. Masking Mode specifies what attribute of the Mask Layer is used to define the matte. The matte determines which pixels of the layer to which the effect is applied are affected by the effect.

**Composite Over Layer** Shows modified pixels composited on top of the original layer. Deselect this option to show only modified pixels.

**Blend With Original** The transparency of the effect. The result of the effect is blended with the original image, with the effect result composited on top. The higher you set this value, the less the effect affects the layer. For example, if you set this value to 100%, the effect has no visible result on the layer; if you set this value to 0%, the original image doesn't show through.

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## Curves effect

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The Curves effect adjusts the tonal range and tone response curve of an image. The Levels effect also adjusts tone response, but the Curves effect gives you more control. With the Levels effect you make the adjustments using only three controls (highlights, shadows, and midtones). With the Curves effect, you can arbitrarily map input values to output values using a curve defined by 256 points.

You can load and save arbitrary maps and curves to use with the Curves effect.

This effect works with 8-bpc, 16-bpc, and 32-bpc color.

When you apply the Curves effect, After Effects displays a graph in the Effect Controls panel that you use to specify a curve. The horizontal axis of the graph represents the original brightness values of the pixels (input levels); the vertical axis represents the new brightness values (output levels). In the default diagonal line, all pixels have identical input and output values. Curves displays brightness values from 0 to 255 (8 bit) or 32768 (16 bit), with shadows (0) on the left.

John Dickinson provides visual aids on his [Motionworks website](#) that illustrate how to use the Curves effect for color adjustments.

## Use the Curves effect

1. Choose Effect > Color Correction > Curves.
2. If the image has more than one color channel, choose the channel you want to adjust from the Channel menu. RGB alters all channels using a single curve.
3. Use the Bezier tool and the Pencil tool to modify or draw a curve. (To activate a tool, click the Bezier button or the Pencil button )

 To smooth the curve, click the *Smooth* button. To reset the curve to a line, click the *Line* button.

The curve type is determined by the last tool used to modify it. You can save arbitrary map curves modified by the Pencil tool as .amp (Photoshop lookup) files. You can save curves modified by the Bezier tool as .acv (Photoshop spline) files.

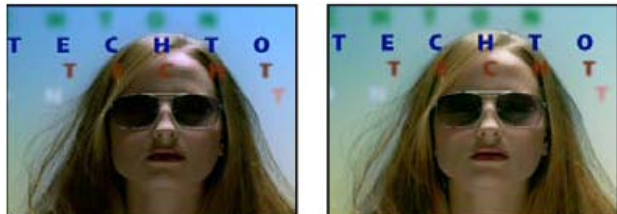
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## Equalize effect

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The Equalize effect alters the pixel values of an image to produce a more consistent brightness or color component distribution. The effect works similarly to the Equalize command in Adobe Photoshop. Pixels with 0 alpha (completely transparent) values aren't considered, so masked layers are equalized based on the mask area.

This effect works with 8-bpc color.



Original (left), and with effect applied (right)

**Equalize** RGB equalizes the image based on red, green, and blue components. Brightness equalizes the image based on the brightness of each pixel. Photoshop Style equalizes by redistributing the brightness values of the pixels in an image so that they more evenly represent the entire range of brightness levels.

**Amount To Equalize** How much to redistribute the brightness values. At 100%, the pixel values are spread as evenly as possible; lower percentages redistribute fewer pixel values.

---

## Exposure effect

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Use the Exposure effect to make tonal adjustments to footage, either to one channel at a time or to all channels at once. The Exposure effect simulates the result of modifying the exposure setting (in f-stops) of the camera that captured the image. The Exposure effect works by performing calculations in a linear color space, rather than in the current color space for the project. The Exposure effect is designed for making tonal adjustments to high-dynamic range (HDR) images with 32-bpc color, but you can use the effect on 8-bpc and 16-bpc images.

This effect works with 8-bpc, 16-bpc, and 32-bpc color.

**Master** Adjust all channels simultaneously.

**Individual Channels** Adjust channels individually.

**Exposure** Simulates the exposure setting on the camera that captures the image, multiplying all light intensity values by a constant. The units for Exposure are f-stops.

**Offset** Darkens or brightens the shadows and midtones with minimal change to the highlights.

**Gamma Correction** The amount of gamma correction to use for adding an additional power-curve adjustment to the image. Higher values make the image lighter; lower values make the image darker. Negative values are mirrored around zero (that is, they remain negative but still get adjusted as if they were positive). The default value is 1.0, which corresponds to no additional adjustment.

**Bypass Linear Light Conversion** Select to apply the Exposure effect to the raw pixel values. This option can be useful if you manage color manually using the Color Profile Converter effect.

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## Gamma/Pedestal/Gain effect

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The Gamma/Pedestal/Gain effect adjusts the response curve independently for each channel. For pedestal and gain, a value of 0.0 is completely off, and a value of 1.0 is completely on.

The Black Stretch control remaps the low pixel values of all channels. Large Black Stretch values brighten dark areas. Gamma specifies an exponent describing the shape of the intermediate curve. The Pedestal and Gain controls specify the lowest and highest attainable output value for a channel.

This effect works with 8-bpc color.

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## Hue/Saturation effect

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The Hue/Saturation effect adjusts the hue, saturation, and lightness of individual color components in an image. This effect is based on the color



wheel. Adjusting the hue, or color, represents a move around the color wheel. Adjusting the saturation, or purity of the color, represents a move across its radius. Use the Colorize control to add color to a grayscale image converted to RGB, or to add color to an RGB image.

This effect works with 8-bpc, 16-bpc, and 32-bpc color.

**Channel Control** The color channel you want to adjust. Choose Master to adjust all colors at once.

**Channel Range** The definition of the color channel chosen from the Channel Control menu. Two color bars represent the colors in their order on the color wheel. The upper color bar shows the color before the adjustment; the lower bar shows how the adjustment affects all of the hues at full saturation. Use the adjustment slider to edit any range of hues.

**Master Hue** Specifies the overall hue of the channel chosen from the Channel Control menu. Use the dial, which represents the color wheel, to change the overall hue. The underlined value displayed above the dial reflects the number of degrees of rotation around the wheel from the original color of a pixel. A positive value indicates clockwise rotation; a negative value indicates counterclockwise rotation. Values range from –180 to +180.

**Master Saturation, Master Lightness** Specify the overall saturation and lightness of the channel chosen from the Channel Control menu. Values range from –100 to +100.

**Colorize** Adds color to a grayscale image converted to RGB, or adds color to an RGB image—for example, to make it look like a duotone image by reducing its color values to one hue.

**Colorize Hue, Colorize Saturation, Colorize Lightness** Specify the hue, saturation, and lightness of the color range chosen from the Channel Control menu. After Effects displays only the sliders for the Channel Control menu choice.

### Adjust colors with the Hue/Saturation effect

1. Choose Effect > Color Correction > Hue/Saturation.
2. From the Channel Control menu, choose which colors to adjust:
  - Choose Master to adjust all colors at once.
  - Choose a preset color range for the color you want to adjust, and then use the sliders for that color range.
3. For Hue, type a value or drag the dial.
4. For Saturation, type a value or drag the slider. The color shifts away from or toward the center of the color wheel, relative to the beginning color values of the selected pixels.
5. For Lightness, type a value or drag the slider.

### Colorize an image or create a monotone result

1. Choose Effect > Color Correction > Hue/Saturation.
2. Select Colorize. The image is converted to the hue of the current foreground color. The lightness value of each pixel doesn't change.
3. Drag the Colorize Hue dial to select a new color if desired.
4. Drag the Colorize Saturation and Colorize Lightness sliders.

### Modify the range of Hue/Saturation effect adjustments

1. From the Channel Control menu, choose an individual color. (By default, the range of color selected when you choose a color component is 30° wide, with 30° of fall-off on either side. Setting the fall-off too low can produce dithering in the image.)
2. Do any of the following:
  - Drag one or both of the white triangles to adjust the amount of feather without affecting the range.
  - Drag one or both of the vertical white bars to adjust the range. Increasing the range decreases the fall-off, and vice versa.

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## Leave Color effect

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The Leave Color effect desaturates all colors on a layer except colors similar to the color specified by Color To Leave. For example, a movie of a basketball game could be decolorized except for the orange of the ball itself.

John Dickinson provides an example of using the Leave Color effect on his [Motionworks website](#).

This effect works with 8-bpc color.

**Amount To Decolor** How much color to remove. 100% causes areas of the image dissimilar to the selected color to appear as shades of gray.

**Tolerance** The flexibility of the color-matching operation. 0% decolors all pixels except pixels that exactly match Color To Leave. 100% causes no color change.

**Edge Softness** The softness of the color boundaries. High values smooth the transition from color to gray.

**Match Colors** Determines whether RGB values or HSB values are compared. Choose Using RGB to perform more strict matching that usually decolors more of the image. For example, to leave dark blue, light blue, and medium blue, choose Using HSB and choose any shade of blue as Color To Leave.

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## Levels effect

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The Levels effect remaps the range of input color or alpha channel levels onto a new range of output levels, with a distribution of values determined by the gamma value. This effect functions much the same as the Levels adjustment in Photoshop.

This effect works with 8-bpc, 16-bpc, and 32-bpc color.



Original (left), and with effect applied (right)

John Dickinson provides visual aids on his [Motionworks website](#) that illustrate how to use the Levels effect for color adjustments.

Chris and Trish Meyer provide instructions on the [ProVideo Coalition website](#) for using the Channel Combiner effect with the Levels effect to affect only the luma (detail) information in an image—or, conversely, to only affect the color information in an image.

By choosing Alpha from the Channel menu, you can use the Levels effect to convert completely opaque or completely transparent areas of a matte to be semitransparent, or to convert semitransparent areas to be completely opaque or completely transparent. Because transparency is based on the monochrome alpha channel, the controls for this effect refer to complete transparency as black and complete opacity as white.

- Use Output Black Level of 0 and Input Black Level greater than 0 to convert a range of semitransparent areas to be completely transparent.
- Use Output White Level of 1.0 and Input White Level less than 1.0 to convert a range of semitransparent areas to be completely opaque.
- Use Output Black Level greater than 0 to convert a range of completely transparent areas to be semitransparent.
- Use Output White Level less than 1.0 to convert a range of completely opaque areas to be semitransparent.

**Note:** The Levels (Individual Controls) effect functions like the Levels effect but allows you to adjust the individual color values for each channel, so you can add expressions to individual properties or animate one property independently of the others. (See Levels (Individual Controls) effect.) **Channel** The channels to be modified.

**Histogram** Shows number of pixels with each luminance value in an image. (See Color correction, color grading, and color adjustment.)

💡 Click the histogram to alternate between showing colorized versions of the histograms for all color channels and only showing the histogram for the channel or channels selected in the Channel menu.

**Input Black and Output Black** Pixels in the input image with a luminance value equal to the Input Black value are given the Output Black value as their new luminance value. The Input Black value is represented by the upper left triangle below the histogram. The Output Black value is represented by the lower left triangle below the histogram.

**Input White and Output White** Pixels in the input image with a luminance value equal to the Input White value are given the Output White value as their new luminance value. The Input White value is represented by the upper right triangle below the histogram. The Output White value is represented by the lower right triangle below the histogram.

**Gamma** The exponent of the power curve that determines the distribution of luminance values in the output image. The Gamma value is represented by the middle triangle below the histogram.

**Clip To Output Black and Clip To Output White** These controls determine the results for pixels with luminance values that are less than the Input Black value or greater than the Input White value. If clipping is on, pixels with luminance values less than the Input Black value are mapped to the Output Black value; pixels with luminance values above the Input White value are mapped to the Output White value. If clipping is off, the resulting pixel values can be less than the Output Black value or greater than the Output White value and the Gamma value affects.

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## Levels (Individual Controls) effect

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The Levels (Individual Controls) effect functions like the Levels effect but allows you to adjust the individual color values for each channel. As a result, you can add expressions to individual properties or animate one property independently of the others. To see each control individually, click the arrow next to the channel color to expand it.

For information on the controls for this effect, see Levels effect.

This effect works with 8-bpc, 16-bpc, and 32-bpc color.



Original (left), and with effect applied (right)

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## Photo Filter effect

The Photo Filter effect mimics the technique of putting a colored filter in front of the camera lens to adjust the color balance and color temperature of the light transmitted through the lens and exposing the film. You can choose a color preset to apply a hue adjustment to an image, or you can specify a custom color using the color picker or the eyedropper.

You can use the Photo Filter effect controls to do the following:

- To use a color preset for the filter color, choose an option from the Filter pop-up menu.
- To select a custom color for the filter color, click the color swatch for the Color control to select a color using the color picker, or click the eyedropper and click a color anywhere on the computer screen.
- To set the amount of color applied to the image, adjust Density.
- To ensure that the image isn't darkened by the effect, select Preserve Luminosity.

 *To retain Photo Filter adjustment layers created in Photoshop, import the Photoshop file into your After Effects project as a composition rather than as footage. If you changed your default Photoshop color settings, After Effects may not be able to exactly match the color of the Photo Filter.*

This effect works with 8-bpc and 16-bpc color. In After Effects CS6, this effect works in 32-bit color.

Chris and Trish Meyer demonstrate the Photo Filter effect in a video tutorial on the [ProVideo Coalition website](#).

**Warming Filter (85) and Cooling Filter (80)** Color conversion filters that tune the white balance in an image. If an image was photographed with a lower color temperature of light (yellowish), the Cooling Filter (80) makes the image colors bluer to compensate for the lower color temperature of the ambient light. Conversely, if the photo was taken with a higher color temperature of light (bluish), the Warming Filter (85) makes the image colors warmer to compensate for the higher color temperature of the ambient light.

**Warming Filter (81) and Cooling Filter (82)** Light balancing filters for minor adjustments in the color quality of an image. The Warming Filter (81) makes the image warmer (yellow), and the Cooling Filter (82) makes the image cooler (blue).

**Individual Colors** Apply a hue adjustment to the image depending on the color preset you choose. Your choice of color depends on how you use the Photo Filter command. If a photo has a color cast, you can choose a complement color to neutralize the color cast. You can also apply colors for special color effects or enhancements. For example, the Underwater color simulates the greenish-blue color cast common to underwater photography.

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## PS Arbitrary Map effect

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The PS Arbitrary Map effect is intended only to provide compatibility with projects created in earlier versions of After Effects that use the Arbitrary Map effect. For new work, use the Curves effect.

The PS Arbitrary Map effect applies a Photoshop arbitrary map file to a layer. An arbitrary map adjusts the brightness levels of an image, remapping a specified brightness range to darker or brighter tones. In the Curves window in Photoshop, you can create an arbitrary map file for the entire image or for individual channels.

This effect works with 8-bpc and 16-bpc color.

You can import and apply an arbitrary map file with Options in the Effect Controls panel. When loaded into After Effects, the specified arbitrary map is applied to the layer or to one or more channels of the layer, depending on how it was created. If you don't select an arbitrary map, After Effects applies the default map (linear distribution of brightness) to the layer. Although you can't import .acv or Photoshop spline files into the After Effects PS Arbitrary Map effect, you can convert these files in Photoshop to create files that are compatible with the After Effects Curves effect.

 *To convert .acv and Photoshop spline files, load the .acv file (Windows) or the Photoshop spline file (Mac OS) in the Curves dialog box, click the Pencil tool, and then save the file as an .amp file (Windows) or Photoshop lookup file (Mac OS).*

**Phase** Cycles through the arbitrary map. Increasing the phase shifts the arbitrary map to the right (as viewed in the Curves dialog box); decreasing the phase shifts the map to the left.

**Apply Phase Map To Alpha** Applies the specified map and phase to the alpha channel of the layer. If the specified map doesn't include an alpha channel, After Effects uses the default map (linear distribution of brightness) for the alpha channel.

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## Selective Color effect

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Selective color correction is a technique used by scanners and separation programs to change the amount of process colors in each of the primary color components in an image. You can modify the amount of a process color in any primary color selectively—without affecting the other primary colors. For example, you can use selective color correction to decrease the cyan in the green component of an image while leaving the cyan in the blue component unaltered.

**Note:** *The Selective Color effect is provided in After Effects primarily to ensure fidelity with documents imported from Photoshop that use the Selective Color adjustment layer type.*

Even though Selective Color uses CMYK colors to adjust an image, you can use it on RGB images.

This effect works with 8-bpc and 16-bpc color.

Choose from one of two values from the Method menu:

**Relative** Changes the existing amount of cyan, magenta, yellow, or black by its percentage of the total. For example, if you start with a pixel that is 50% magenta and add 10%, 5% is added to the magenta (10% of 50% = 5%) for a total of 55% magenta. (This option cannot adjust pure specular white, which contains no color components.)

**Absolute** Adjusts the color in absolute values. For example, if you start with a pixel that is 50% magenta and add 10%, the magenta ink is set to a total of 60%.

**Note:** The adjustment is based on how close a color is to one of the options in the Colors menu. For example, 50% magenta is midway between white and pure magenta and receives a proportionate mix of corrections defined for the two colors.

The color that is affected is the color chosen in the Colors menu.

The Details property group provides an alternate interface for adjusting colors and matches the properties shown in the Timeline panel.

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## Shadow/Highlight effect

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The Shadow/Highlight effect brightens shadowed subjects in an image and reduces the highlights in an image. This effect doesn't darken or lighten an entire image; it adjusts the shadows and highlights independently, based on the surrounding pixels. You can also adjust the overall contrast of an image. The default settings are for fixing images with backlighting problems.

This effect works with 8-bpc and 16-bpc color.



Original (left), and with effect applied (right)

**Auto Amounts** If this option is selected, the Shadow Amount and Highlight Amount values are ignored, and amounts are used that are automatically determined to be appropriate for lightening and restoring detail to the shadows. Selecting this option also activates the Temporal Smoothing control.

**Shadow Amount** The amount to lighten shadows in the image. This control is active only if you deselect Auto Amounts.

**Highlight Amount** The amount to darken highlights in the image. This control is active only if you deselect Auto Amounts.

**Temporal Smoothing** The range of adjacent frames, in seconds, analyzed to determine the amount of correction needed for each frame, relative to its surrounding frames. If Temporal Smoothing is 0, each frame is analyzed independently, without regard for surrounding frames. Temporal Smoothing can result in smoother-looking corrections over time.

**Scene Detect** If this option is selected, frames beyond a scene change are ignored when surrounding frames are analyzed for temporal smoothing.

**Blend With Original** The transparency of the effect. The result of the effect is blended with the original image, with the effect result composited on top. The higher you set this value, the less the effect affects the clip. For example, if you set this value to 100%, the effect has no visible result on the clip; if you set this value to 0%, the original image doesn't show through.

Expand the More Options category to reveal the following controls:

**Shadow Tonal Width and Highlight Tonal Width** The range of adjustable tones in the shadows and highlights. Lower values restrict the adjustable range to only the darkest and lightest regions, respectively. Higher values expand the adjustable range. These controls are useful for isolating regions to adjust. For example, to lighten a dark area without affecting the midtones, set a low Shadow Tonal Width value so that when you adjust the Shadow Amount, you're lightening only the darkest areas of an image. Specifying a value that is too large for a given image may introduce halos around strong dark to light edges. The default settings attempt to reduce these artifacts. These halos may occur if the Shadow or Highlight Amount value is too large; they can also be reduced by decreasing these values.

**Shadow Radius and Highlight Radius** The radius (in pixels) of the area around a pixel that the effect uses to determine whether the pixel resides in a shadow or a highlight. Generally, this value should roughly equal the size of the subject of interest in the image.

**Color Correction** The amount of color correction that the effect applies to the adjusted shadows and highlights. For example, if you increase the Shadow Amount value, you bring out colors that were dark in the original image; you may want these colors to be more vivid. The higher the Color Correction value, the more saturated these colors become. The more significant the correction that you make to the shadows and highlights, the greater the range of color correction available.

**Note:** If you want to change the color over the whole image, use the Hue/Saturation effect after applying the Shadow/Highlight effect.

**Midtone Contrast** The amount of contrast that the effect applies to the midtones. Higher values increase the contrast in the midtones alone, while concurrently darkening the shadows and lightening the highlights. A negative value reduces contrast.

**Black Clip, White Clip** How much of the shadows and highlights are clipped to the new extreme shadow and highlight colors in the image. Setting the clipping values too high reduces detail in the shadows or highlights. A value in the range from 0.0% to 1% is recommended. By default, shadow and highlight pixels are clipped by 0.1%—that is, the first 0.1% of either extreme is ignored when identifying the darkest and lightest pixels in the image, which are then mapped to output black and output white. This method ensures that input black and input white values are based on representative rather than extreme pixel values.

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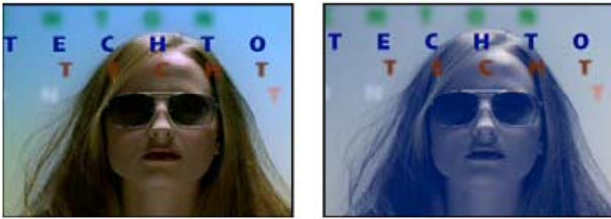
## Tint effect

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The Tint effect tints a layer by replacing the color values of each pixel with a value between the colors specified by Map Black To and Map White To. Pixels with luminance values between black and white are assigned intermediate values. Amount To Tint specifies the intensity of the effect.

For more complex tinting, use the Colorama effect.

This effect works with 8-bpc, 16-bpc, and 32-bpc color.



Original (left), and with effect applied (right)

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## Tritone effect

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The Tritone effect alters the color information of a layer by mapping bright, dark, and midtone pixels to colors that you select. The Tritone effect is like the Tint effect, except with midtone control.

This effect works with 8-bpc, 16-bpc, and 32-bpc color.

**Blend With Original** The transparency of the effect. The result of the effect is blended with the original image, with the effect result composited on top. The higher you set this value, the less the effect affects the layer. For example, if you set this value to 100%, the effect has no visible result on the layer; if you set this value to 0%, the original image doesn't show through.

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## Vibrance effect

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The Vibrance effect adjusts saturation so that clipping is minimized as colors approach full saturation. Colors that are less saturated in the original image are affected by the Vibrance adjustments more than are colors that are already saturated in the original image.

The Vibrance effect is especially useful for increasing saturation in an image without over-saturating skin tones. The saturation of colors with hues in the range from magenta to orange is affected less by Vibrance adjustments.

This effect works with 8-bpc and 16-bpc color.

To affect less-saturated colors more than more saturated colors and protect skin tones, modify the Vibrance property. To adjust the saturation of all colors equally, modify the Saturation property.

The Vibrance effect is based on the Vibrance adjustment layer type in Photoshop.

More Help topics

 [Convert a color image to black and white](#)

 [Make selective color adjustments](#)

 [Adjust color saturation using Vibrance](#)



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# Distort effects

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## [Additional resources for Distort effects](#)

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[Bezier Warp effect](#)  
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[Turbulent Displace effect](#)  
[Twirl effect](#)  
[Warp effect](#)  
[Warp Stabilizer effect \(CS5.5 and later\)](#)  
[Wave Warp effect](#)

You can use each of the Distort effects to distort (morph) an image.

Third-party effects in this category included with After Effects:

- CC Bend It effect
- CC Bender effect
- CC Blobbyize effect
- CC Flo Motion effect
- CC Griddler effect
- CC Lens effect
- CC Page Turn effect
- CC Power Pin effect
- CC Ripple Pulse effect
- CC Slant effect
- CC Smear effect
- CC Split effect
- CC Split 2 effect
- CC Tiler effect

See Third-party plug-ins included with After Effects.

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## **Additional resources for Distort effects**

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Aharon Rabinowitz provides a project on his [All Bets Are Off website](#) that demonstrates the use of the CC Page Turn effect to tear a piece of paper.

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## **Resources for Digieffects FreeForm**

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**Note:** *Digieffects FreeForm is not included with the free trial version of After Effects. See [Third-party plug-ins included with After Effects](#).*

Digieffects FreeForm is an effect that distorts 2D layers in 3D space, using displacement maps and meshes that you define, control, and animate. Documentation for Digieffects FreeForm is available on the [Digieffects website](#).

Digieffects also provides a library of tutorials and example projects on their website:

- [FreeForm tutorials](#)
- [FreeForm example projects](#)

Chris Bobotis of Mettle Communications provides tutorials and examples for FreeForm on [his website](#).

Toolfarm hosts a Digieffects forum on [Toolfarm website](#), where expert users of FreeForm post tutorials and answer questions.

Todd Kopriva provides links to additional resources for Digieffects FreeForm on the [Adobe website](#).

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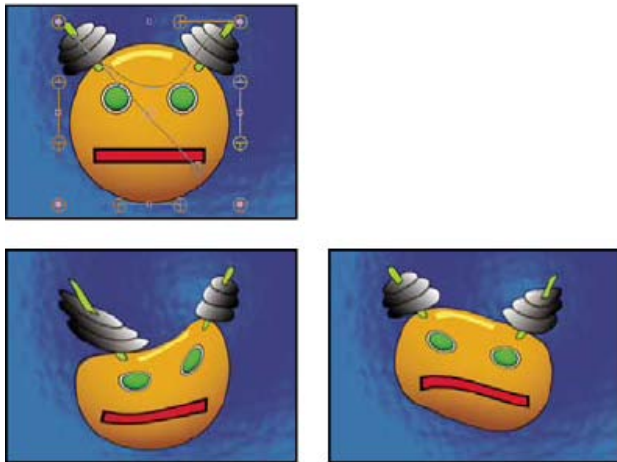
## Bezier Warp effect

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The Bezier Warp effect shapes an image using a closed Bezier curve along the boundary of a layer. The curve consists of four segments. Each segment has three points (a vertex and two tangents).

Andrew Kramer provides a video tutorial on his [Video Copilot website](#) that demonstrates the use of the Bezier Warp effect.

This effect works with 8-bpc and 16-bpc color.



*Original (upper-left) and with variations of Bezier Warp applied (lower-left and right)*

The positions of the vertices and tangents determine the size and shape of a curved segment. Dragging these points reshapes the curves that form the edge, thus distorting the image. For example, you can use Bezier Warp to reshape one image to fit another, as in wrapping a label around a jar. Bezier Warp is also useful for correcting lens aberrations, such as the fisheye effect (barrel distortion) that can occur with a wide-angle lens; using Bezier Warp, you can bend the image back to achieve an undistorted look. By animating the effect and choosing a high quality setting, you can create fluid visual effects, such as a jiggling gelatin dessert or a fluttering flag.

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## Bulge effect

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The Bulge effect distorts an image around a specified point, making the image appear to bulge toward or away from the viewer, depending on the options you select.

Eran Stern explains how to use the Bulge effect in a video tutorial on the [Motionworks website](#).

This effect works with 8-bpc and 16-bpc color.



Original (upper-left), and with variations of Bulge applied (lower-left and right)

**Horizontal Radius and Vertical Radius** The width and height of the distorted area, in pixels. You can also set the radius values by dragging the selection handles in the layer.

**Bulge Height** The apparent depth of the bulge. Positive values push the bulge toward the viewer. Negative values pull the bulge away from the viewer.

**Taper Radius** The shallowness of the sides of the bulge. A taper radius of 0 produces a steep, pronounced bulge.

**Antialiasing** The amount of edge smoothing (blending of colors) at the boundaries of the bulge. Anti-aliasing is applied only when the layer quality is set to Best.

**Pin All Edges** Prevents the edges of the layer from bulging.

## Corner Pin effect

[To the top](#)

The Corner Pin effect distorts an image by repositioning each of its four corners. Use it to stretch, shrink, skew, or twist an image or to simulate perspective or movement that pivots from the edge of a layer, such as a door opening. You can also use it to attach a layer to a moving rectangular region tracked by the motion tracker. You can move the corner pins in the Composition panel, the Timeline panel, or the Effect Controls panel.

This effect works with 8-bpc, 16-bpc, and 32-bpc color.



Original image (upper-left), corner moved (lower-left), and final image (lower-right)

The [AE Enhancers forum](#) describes and links to an animation preset from Donat van Bellinghen for scaling a set of Corner Pin effect points.

The CC Power Pin effect—one of the Cycore FX plug-ins included with After Effects—provides some additional features. For information, see the [Cycore website](#).

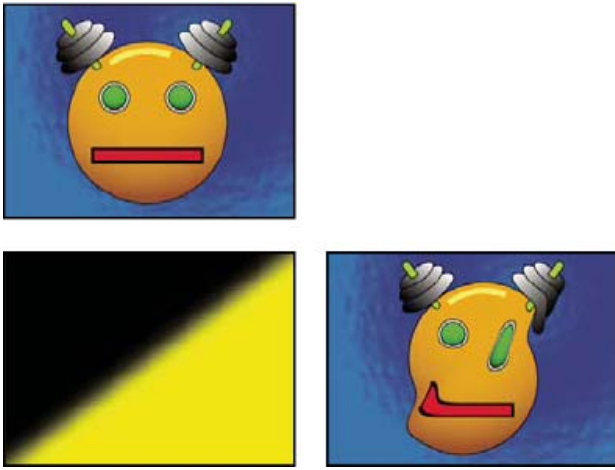
## Displacement Map effect

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The Displacement Map effect distorts a layer by displacing pixels horizontally and vertically based on the color values of pixels in the control layer specified by the Displacement Map Layer property. The type of distortion created by the Displacement Map effect can vary greatly, depending on the control layer and options you select.

This effect works with 8-bpc, 16-bpc, and 32-bpc color.





*Original (upper-left), displacement map (lower-left), and displaced image (lower-right)*

The displacement is determined from the color values of the displacement map. The color values range from 0 to 255. Each value is converted into a scale ranging from -1 to 1. The displacement amount is calculated by multiplying the converted value by the maximum displacement amount you specify. A color value of 0 produces maximum negative displacement ( $-1 \times \text{maximum displacement}$ ). A color value of 255 produces maximum positive displacement. A color value of 128 produces no displacement.

The effect uses the control layer specified by Displacement Map Layer, without considering any effects or masks. If you want to use the control layer with its effects, precompose it. If the control layer isn't the same size as the layer to which the effect is applied, it is centered, stretched, or tiled depending on the setting for Displacement Map Behavior.

Select Expand Output to allow the results of the effect to extend beyond the original boundaries of the layer to which it's applied. Select Wrap Pixels Around to copy pixels displaced outside the original layer boundaries to the opposite side of the layer; that is, pixels pushed off the right side appear on the left side, and so on.

### Online resources for the Displacement Map effect

Rick Gerard provides additional explanation and an example project for the Displacement Map effect on [his website](#).

Eran Stern provides a video tutorial on the [Creative COW website](#) that shows how to use the Displacement Map effect with a text layer and some smoke footage to create a smoky text title sequence.

Trish and Chris Meyer explain how to use blending modes, layer styles, and the Displacement Map effect to make text blend in to appear to be part of a surface in the PDF article "Writing on the Wall" on the [Artbeats website](#).

Chris Zwar provides an example project on [his website](#) that uses the Displacement Map effect, the Turbulent Displace effect, the Texturize effect, and a combination of Blur and Color Correction effects to create a transition in which an image appears as a watercolor image washed onto a rough piece of paper.

Robert Powers provides a video tutorial on the [Slippery Rock NYC website](#) that shows how to create and use a depth matte and use it as a control layer for the Displacement Map effect. The result is then used by the 3D Glasses effect to create a stereoscopic image.

## Liquify effect

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The Liquify effect lets you push, pull, rotate, enlarge, and shrink areas in a layer. Several Liquify tools distort the brush area when you hold down the mouse button or drag. The distortion is concentrated at the center of the brush area, and the effect intensifies as you hold down the mouse button or repeatedly drag over an area.

You can limit the area of a layer you distort by using Freeze Area Mask. Use the Reconstruction mode to lessen or undo distortions you've created.

The Liquify effect can extend beyond the boundaries of the target layer. This extension is useful when the target layer is smaller than the composition.

This effect works with 8-bpc and 16-bpc color.



Original (upper-left), and with variations of Liquify applied (lower-left and right)

Andrew Kramer provides a video tutorial on his [Video Copilot website](#) that demonstrates the use of the Liquify effect to distort (morph) a human face into the face of a demon.

### Mask properties

**Freeze Area Mask** Determines the area of the image in which mask opacity and feather settings affect the distortion. Areas outside the mask are distorted; areas within the mask are distorted according to Mask Opacity and Mask Feather settings.

**Mask Opacity** Determines how the distortion affects the area within the mask. If Mask Opacity is set to 100%, the distortion doesn't affect the area within the mask; if it's set to 50%, the area within the mask is somewhat affected. If you set Mask Opacity to 100%, make sure to feather the mask to prevent jagged edges on the mask.

**Mask Feather** The width of the feather used to blend pixels between the masked area and the nonmasked area.

### Tools

**Warp** Pushes pixels forward as you drag.

**Turbulence** Smoothly scrambles pixels. This setting is useful for creating fire, clouds, waves, and similar effects.

**Twirl Clockwise** Rotates pixels clockwise as you hold down the mouse button or drag.

**Twirl Counterclockwise** Rotates pixels counterclockwise as you hold down the mouse button or drag.

**Pucker** Moves pixels toward the center of the brush area as you hold down the mouse button or drag.

**Bloat** Moves pixels away from the center of the brush area as you hold down the mouse button or drag.

**Shift Pixels** Moves pixels perpendicular to the stroke direction.

**Reflection** Copies pixels to the brush area.

**Clone** Copies the distortions from around a source location to the current mouse location. Set the source location by Alt-clicking (Windows) or Option-clicking (Mac OS) the source point.

**Reconstruction** Reverses distortions or applies them in different ways.

### Distort an image with the Liquify effect

1. Select the layer, and choose Effect > Distort > Liquify.
2. In the Layer panel, create a mask to freeze areas of the image, and then set mask properties.
3. In the Effect Controls panel do the following:
  - Choose the mask you created from the Freeze Area Mask pop-up menu.
  - Specify a brush size and brush pressure. A low brush pressure makes changes occur more slowly, so it's easier to stop them at exactly the right moment.
  - Specify a turbulent jitter to control how tightly the Turbulence tool scrambles pixels.
  - Select View Mesh under the View Options control.
  - Set a distortion mesh offset if desired.
  - Drag the Distortion Percentage slider to specify the amount of distortion.
4. Use the tools to distort the preview of the image.
5. Use the Reconstruction tool to fully or partially reverse the distortions or to change the image in new ways.

### Undo distortions with the Liquify effect

Use the Reconstruction tool and its modes to reverse distortions or redo them in new ways.

1. Select the Reconstruction tool, and then choose a mode from the Reconstruction Mode pop-up menu:

**Revert** Changes unfrozen areas back to their predistorted state.

**Displace** Reconstructs unfrozen areas to match the displacement at the starting point for the reconstruction. You can use Displace to move all or part of the preview image to a different location.

**Amplitwist** Reconstructs unfrozen areas to match the displacement, rotation, and overall scaling that exist at the starting point.

**Affine** Reconstructs unfrozen areas to match all local distortions that exist at the starting point, including displacement, rotation, horizontal and vertical scaling, and skew.

2. Drag the area to restore. The restoration occurs more quickly at the brush center.

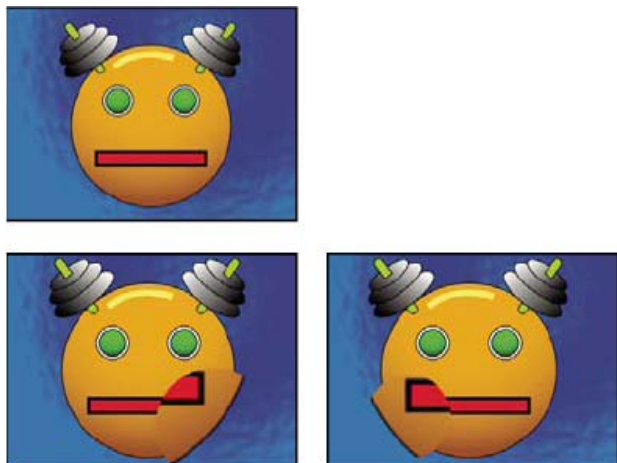
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## Magnify effect

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The Magnify effect enlarges all or part of an image. This effect can act like a magnifying glass placed over an area of the image, or you can use it to scale the entire image far beyond 100% while maintaining resolution.

This effect works with 8-bpc color.



Original (upper-left), and with variations of Magnify applied (lower-left and right)

**Shape** The shape of the magnified area.

**Center** The center point of the magnified area.

**Magnification** Percentage by which to scale the magnified area.

**Link** How the Magnification setting affects the size and edge feathering of the magnified area. Setting Link to any value other than None disables the Resize Layer option.

**None** The size and edge feathering of the magnified area don't depend on the Magnification setting.

**Size To Magnification** The radius of the magnified area is equal to the Magnification value (a percentage) times the Size value.

**Size & Feather To Magnification** The radius of the magnified area is equal to the Magnification value (a percentage) times the Size value. The thickness of the edge feather is equal to the Magnification value times the Feather value.

**Size** The radius of the magnified area, in pixels.

**Feather** The amount of edge feather, in pixels.

**Opacity** The opacity of the magnified area, as a percentage of the opacity of the original layer.

**Scaling** The type of scaling used to magnify the image:

**Standard** This method maintains sharpness in the image but produces pixelated edges at higher values.

**Soft** Uses spline algorithms. If you scale the image beyond 100%, Soft reduces edge pixelation and maintains image quality. Soft works well at large magnification amounts.

**Scatter** Creates scatter or noise in the image as the image enlarges.

**Blending Mode** The blending mode used to combine the magnified area with the original layer. The None option displays transparent pixels around the magnified area.

**Resize Layer** If Resize Layer is selected, the magnified area can extend beyond the boundaries of the original layer.

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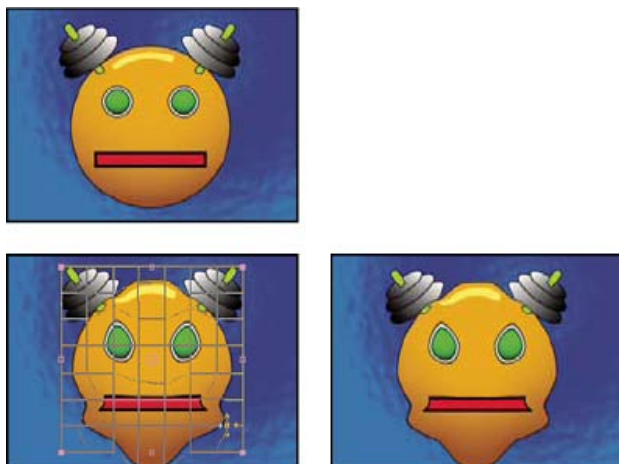
## Mesh Warp effect

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The Mesh Warp effect applies a grid of Bezier patches over a layer, which you can manipulate to distort areas of an image. Each corner of a patch includes a vertex and two to four tangents (points that control the curvature of the line segment that makes up the edge of the patch). The number of tangents depends on whether the vertex is in a corner, on an edge, or inside the grid. By moving the vertices and tangents, you can manipulate the shape of the curved line segment. The finer the grid, the tighter the adjustments you can make to the area of the image inside the patch.

The Mesh Warp effect is commonly used to morph a pair of images to create a transition from one image to another.

This effect works with 8-bpc and 16-bpc color.



Original (upper-left), with distortion mesh (lower-left), and with Mesh Warp applied (lower-right)

 To select multiple vertices, Shift-click the vertices.

**Rows, Columns** Specify up to 31 patches vertically (Rows) or horizontally (Columns). For broader distortion, use fewer patches. For finer control, use more. Drag the vertices and tangents to change the grid shape. The image follows the grid shape according to the elasticity setting and the boundary created by the adjacent patch.

**Quality** Specifies how closely the image follows the shape defined by the curve. The higher the quality value, the more closely the image follows the shape. Higher quality settings require more rendering time.

**Distortion Mesh** Click the stopwatch to animate the distortion over time.

**Note:** Each patch becomes a boundary for the distortion. For example, when you stretch a patch, the area of the image in the patch stretches, squishing the area of the image in the adjacent patch. The boundary of the adjacent patch protects the image inside it from being squished to zero. In other words, you can't push an image out of its patch.

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## Mirror effect

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The Mirror effect splits the image along a line and reflects one side onto the other.

**Reflection Center** The position of the line about which the reflection occurs.

**Reflection Angle** The angle of the line about which the reflection occurs. An angle of 0° reflects the left side onto the right. An angle of 90° reflects the top onto the bottom.

This effect works with 8-bpc and 16-bpc color.

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## Offset effect

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The Offset effect pans the image within a layer. Visual information pushed off one side of the image appears on the opposite side. One use of the Offset effect is to create a looping background from a layer. At Best quality, the offset is performed with subpixel precision.

Lloyd Alvarez provides a simple expression on the [AE Enhancers forum](#) that you can apply to the Shift Center To property to simulate a poorly timed film projector.

**Shift Center To** The new position of the center point of the original image.

**Blend With Original** The transparency of the effect. The result of the effect is blended with the original image, with the effect result composited on top. The higher you set this value, the less the effect affects the layer. For example, if you set this value to 100%, the effect has no visible result on the layer; if you set this value to 0%, the original image doesn't show through.

This effect works with 8-bpc and 16-bpc color.

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## Optics Compensation effect

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Use the Optics Compensation effect to add or remove camera lens distortion. Elements composited with mismatched lens distortion cause anomalies in the animation. For example, tracked objects in a distorted scene don't match the scene area because linear objects don't follow the distortion of the scene.

This effect works with 8-bpc, 16-bpc, and 32-bpc color.

**Field Of View (FOV)** The field of view (FOV) of the distorted footage. The FOV is relative to the size of the source layer and the selected FOV Orientation. The distortion amount is relative to FOV. No general rule defines what FOV value applies to different lenses. Zooming in reduces the FOV, and zooming out increases it. Consequently, if footage includes different zoom values, you'll need to animate the FOV value.

**Reverse Lens Distortion** Reverses the lens distortion. For example, to remove wide-angle lens distortion, set Field Of View to 40.0 and select

Reverse Lens Distortion. Selecting Reverse Lens Distortion enables the Resize control.

**FOV Orientation** The axis on which the Field Of View value is based. This setting is useful when matching computer-generated elements to the rendered view angle.

**View Center** Specifies an alternate center point of view. This setting is useful when using custom lenses that aren't centered. However, in most cases, this control should be left untouched.

**Optimal Pixels** Maintains as much pixel information as possible through the distortion. When selected, FOV values are no longer reversible.

**Resize** Resizes the layer when the applied distortion stretches the layer beyond its boundaries. To use this control, first select Reverse Lens Distortion, and then choose an option. Off doesn't resize the layer. Max 2X resizes the layer to a maximum of twice the original width and height. Max 4X resizes the layer to a maximum of four times the original width and height. Unlimited resizes the layer as far as it is stretched. This option may require a large amount of memory.

### Add and match lens distortion with Optics Compensation

To match FOV values, layers must be the same size. However, if you select Resize, you can apply Optics Compensation again and reverse the distortion using the same value (reversed). You can then apply another effect between the two instances of Optics Compensation.

If you resize a layer using Optics Compensation and then precompose it into a larger composition, you cannot reverse the distortion using the same value until you enlarge the precomposed layer to accommodate the expanded layer.

1. Select the layer with the distortion, and choose Effect > Distort > Optics Compensation.
2. In the Effect Controls panel, adjust the FOV until a distorted edge or line appears straight. Note the FOV value.
3. Select the computer graphic layer you want to distort, and apply Optics Compensation to it using the FOV value from step 2.
4. Select Reverse Lens Distortion.
5. Remove Optics Compensation from the footage layer.

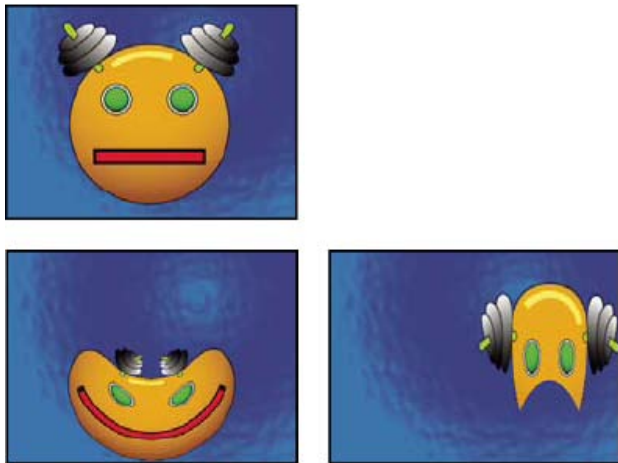
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## Polar Coordinates effect

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The Polar Coordinates effect distorts a layer by transposing each pixel in the (x,y) coordinate system of the layer to the corresponding position in the polar coordinate system, or the reverse. This effect produces unusual and surprising distortions that can vary greatly depending on the image and the controls you select. The standard coordinate system specifies points by measuring the horizontal distance (x axis) and the vertical distance (y axis) from the origin. Each point is specified as (x,y). The polar coordinate system specifies points by measuring the length of a radius from the origin (r) and its angle from the x axis ( $\theta$ ). Each point is specified as (r,  $\theta$ ).

This effect works with 8-bpc, 16-bpc, and 32-bpc color.



Original (upper-left), and with variations of Polar Coordinates applied (lower-left and right)

Stu Maschwitz provides an example project on his [ProLost blog](#) that uses the Fractal Noise effect and Colorama effect to create the corona of the Sun and then uses the Polar Coordinates effect to wrap the line of noise around into a circle.

**Interpolation** Specifies the amount of distortion. At 0%, no distortion occurs.

**Type of Conversion** The conversion process to use:

**Rect To Polar** Moves pixels by using (x,y) coordinates from each pixel as (r,  $\theta$ ) coordinates. For example, an (x,y) coordinate of (2,3) becomes a polar coordinate with a radius of 2 and a degree of 3. Horizontal lines distort into circles, and vertical lines into radial lines.

**Polar To Rect** Moves pixels by using the (r,  $\theta$ ) coordinates from each pixel as the (x,y) coordinates. For example, polar coordinates of radius 10 and 45° become (x,y) coordinates of (10,45).

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## Reshape effect

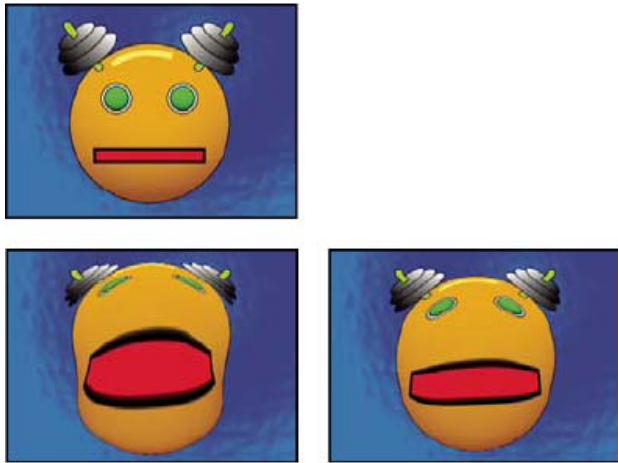
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The Reshape effect transforms one shape into another shape on the same layer, dragging the underlying image with it. The image is distorted to fit the shape of the new area. You create or import up to three masks to define the area you want to distort: the source mask, the destination

mask, and the boundary mask (optional).

Chris Zwar provides a tutorial on the [Creative COW website](#) that demonstrates the use of the Reshape effect to morph one face into another. This tutorial provides many useful tips regarding the use and editing of correspondence points.

This effect works with 8-bpc and 16-bpc color.



Original including three masks (upper-left), and with variations of Reshape applied (lower-left and right)

By default, After Effects assigns the masks a function (source, destination, or boundary) based on the order in which you create or import them. You can also specify different masks. Use a closed path for each mask. All three masks must be on the layer to which you apply the Reshape effect, although you can copy masks from another layer.

**Source Mask** The mask that contains the image area you want to reshape. If not specified, After Effects uses the second mask created as the Source mask. In the Composition and Layer panels, a red outline defines the source mask.

**Destination Mask** The mask that determines the shape of the final image. If not specified, After Effects uses the third mask created as the Destination mask. In the Composition and Layer panels, a yellow outline defines the destination mask.

**Boundary Mask** Specifies what part of the image is reshaped. Anything outside the boundary isn't altered. If not specified, After Effects uses the first mask created as the Boundary mask. In the Composition and Layer panels, a blue outline defines the boundary mask.

**Percent** The amount of reshaping. This value is useful for creating partial distortions that increase over time.

**Elasticity** Specifies how closely the image follows the shape defined by the curve. Stiff acts like cold rubber, allowing the image to distort the least amount. Super Fluid acts like hot rubber, allowing the image to distort in a fluid fashion. The other settings fall between. The more fluid elasticity settings require more rendering time. If the final image doesn't follow the curve as expected, use the following elasticity guidelines:

- In general, use the stiffest setting possible that doesn't create a polygonal image. Use a higher elasticity setting if the final image looks polygonal but the curves are smooth.
- Use Stiff, Less Stiff, or Below Normal if the source and destination masks are similar in shape and have low curvature (few curved segments that change direction radically).
- Use Normal, Absolutely Normal, or Above Average if the source and destination masks are dissimilar and have mild curvature.
- Use Loose, Liquid, or Super Fluid if the masks are very dissimilar and have extreme curvature.

**Correspondence Pairs** Shows the number of points on the source mask that are associated with, or mapped to, points on the destination mask. These points appear in the Composition panel and control the interpolation of the distortion through space. To precisely control the distortion, you can add, delete, or move the points on either mask.

You move the correspondence points with the Selection tool, and you add and remove correspondence points with the Add Vertex and Delete Vertex tools, which you activate by holding the Alt (Windows) or Option (Mac OS) key. You can only manipulate correspondence points when the effect instance is selected in the Effect Controls panel.

A mask can have an unlimited number of correspondence points, but the more correspondence points it has, the longer the effect takes to render. If the distortion appears twisted, try adding more correspondence points at distinguishing points along the masks. (If the arc lengths of the curves between correspondence points are too different, twisting may result.)

**Interpolation Method** Specifies how After Effects determines the distortion of each video or animation frame in the interval between keyframes or if no keyframes exist.

**Discrete** Requires no keyframes because it calculates the distortion at each frame. Discrete produces the most accurate results but requires more rendering time.

**Linear** (Default) Requires two or more keyframes and performs a straight-line interpolation between the keyframes. Linear produces steady changes between keyframes and sharp changes at keyframes.

**Smooth** Requires three or more keyframes and approximates the distortion using cubic curves, producing distortions with graceful motion.

## Use the Reshape effect



1. Open the layer in a Layer panel.
2. Create or import the source, destination, and boundary masks into the layer.  
 *Name each mask so that you can easily recognize it in the Mask menu in the Effect Controls panel.*
3. In the Timeline panel, choose None from the Mode menu for each mask.
4. Position the boundary mask to specify the area of the image that will remain unaltered. Areas within the boundary mask are distorted; areas outside the mask remain unaltered. Keep the boundary mask as far as possible from the source and destination masks to avoid foldovers.
5. Scale and position the source mask over the image.
6. Scale and position the destination mask to indicate the final shape. Distortions work best if the source and destination masks are in approximately the same location.
7. Make the Composition or Timeline panel active, select the layer, and then choose Effect > Distort > Reshape.
8. From the Mask menus, choose the source, destination, and boundary masks.
9. Adjust the Percent control, and choose an option for Elasticity.
10. In the Composition panel, add, delete, or move correspondence points on the masks to control the distortion:
  - To add a point, Alt-click (Windows) or Option-click (Mac OS) the mask.
  - To delete a point, Alt-click or Option-click the point.
  - To move a point, drag it to a new location.
  - To change the interpolation of a pair of points, Shift-click a point. Smooth interpolation works best with round masks, while linear interpolation works best with angular masks. You can combine smooth and linear interpolation in the same composition.
11. Choose an interpolation method, and preview the distortion. If Linear or Smooth produces undesired results, add more keyframes. If Discrete produces undesired results, choose another method.

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## Ripple effect

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The Ripple effect creates the appearance of ripples in a specified layer, moving away from a center point in concentric circles. The effect is similar to dropping a stone in a pond. You can also specify that ripples move toward the center point.

Animate ripples at a constant speed using the Wave Speed control. This control doesn't require keyframes for animation. Animate ripples at varying speeds by creating keyframes for the Ripple Phase control.

This effect works with 8-bpc and 16-bpc color.

**Radius** Controls the distance the ripples travel from the center point. The Radius value is a percentage of the image size. If the center of the ripple is the center of the layer and the radius is set to 100, the ripples travel to the edge of the image. A value of 0 produces no ripples. Like ripples in water, ripples in the layer become smaller as they travel farther from the center.

 *To create a single-wave ripple, set Radius to 100, Wave Width to a value in the range from 90 to 100, and Wave Height as desired.*

**Center Of Ripple** Specifies the center of the effect.

**Type Of Conversion** Specifies how the ripples are created. Asymmetric produces more realistic-looking ripples; asymmetric ripples include lateral motion and produce more distortion. Symmetric produces motion that travels only outward from the center point; symmetric ripples produce less distortion.

**Wave Speed** Sets the speed at which the ripples travel outward from the center point. When you specify a wave speed, the ripples are automatically animated at a constant speed (without keyframes) across the time range. A negative value makes the ripples move toward the center, and a value of 0 produces no movement. To vary wave speed over time, set this control to 0, and then create a keyframe for the Ripple Phase property of the layer.

**Wave Width** Specifies the distance, in pixels, between wave peaks. Higher values produce long, undulating ripples, and low values produce many small ripples.

**Wave Height** Specifies the height of the ripple wave. Taller waves produce greater distortion.

**Ripple Phase** Specifies the point along the waveform at which a wave cycle begins. The default value of 0° starts the wave at the midpoint of its downward slope; 90° starts it at the lowest point in the trough; 180° starts it at the midpoint of the upward slope, and so on.

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## Smear effect

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Using the Smear effect, you define an area within an image and then move that area to a new location, stretching, or smearing, the surrounding part of the image with it. Use masks to define the area you want to distort.

This effect works with 8-bpc and 16-bpc color.

To use Smear, first create or import two masks: the source mask and the boundary mask. You can create masks on the layer in After Effects or use masks created in Adobe Illustrator. To use a mask created in Illustrator, copy the mask and paste it into a layer in After Effects. Masks must be closed to work with Smear; if a mask is an open trace, After Effects closes it when you select it. Both masks must be on the same layer as the footage to which you apply the Smear effect, although you can copy masks from another layer.

When you move the source mask within the image, Smear stretches the portion of the image inside the boundary mask to follow the edges of the source mask. The boundary mask tries to protect the image outside it from being stretched. Both the original position of the source mask (set in

the Layer panel) and the offset position of the source mask are displayed in the Composition panel. A light red outline indicates the first position of the source mask; a dark outline indicates the new position.

You can animate the position, size, and rotation of the source mask as it moves to its offset position. You can also animate the original position of the source mask in the Layer panel.

Processing can take up to several minutes with certain settings. Computation time increases as the source mask gets closer to the boundary mask. Processing is interrupted when you click a control.

**Source Mask** Specifies a mask as the source mask. By default, After Effects selects the second mask you create or import for the layer as the source mask.

**Note:** *You must specify both a boundary mask and a source mask to create a distortion.*

**Boundary Mask** Specifies a mask as the boundary mask. By default, After Effects selects the first mask you create or import as the boundary mask.

**Mask Offset** Specifies a destination position for the source mask. The offset is a position specified by x and y coordinates, which appear to the right of the Offset button. To set an offset location, click the Offset button, and then click the image in the desired location. To set the offset position numerically, type a new value for each axis. When you don't need the precision provided by Mask Offset, you can simply drag the source mask offset in the Composition panel.

**Note:** *Unwanted undulations may occur if the source mask is close to the boundary mask during animation.*

**Mask Rotation** Rotates the source mask around its center point, between 0° and 360°.

**Mask Scale** Scales the source mask (at its offset position) larger or smaller, in relation to its original position.

**Percent** Specifies what percentage of the smear is performed. For example, when Percent is set to 50%, Smear performs half of the smear you have specified by moving, scaling, and rotating the source mask. This value doesn't affect the location of the original and offset positions of the source mask; it affects only the percentage of the effect that is performed.

**Elasticity** Specifies how closely the image follows the shape defined by the curve. Stiff distorts the least, while Super Fluid distorts the most. In general, use the stiffest setting possible that doesn't create polygonal images.

**Interpolation Method** Specifies a method for the interpolation that Smear performs between keyframes. Linear requires two or more keyframes and performs a straight-line interpolation between the keyframes. Discrete produces animations in which the distortions change at keyframes. Smooth requires three or more keyframes and approximates the distortion using cubic curves, producing distortions with graceful motion. If you need further precision in the animation between keyframes, add more keyframes. For example, a distortion representing a 90-degree rotation between two keyframes appears as a folding of the image. To make this distortion more fluid, add a keyframe for every 10°.

## Use the Smear effect

1. Open the layer in a Layer panel.
2. Create or paste the masks to use as the boundary mask and the source mask.
3. Position the boundary mask to specify the area of the layer you don't want Smear to affect.
4. Scale and position the source mask over the area you want to move.
5. Make the Composition panel active, and choose Effect > Distort > Smear.
6. Enter a Percent value to specify the amount of smear applied.
7. In the Composition panel, move the source mask to its destination position by dragging it or by using the Mask Offset value.
8. Use the Mask Rotation control to rotate the source mask, and use the Mask Scale control to scale it.
9. Drag the Percent slider as needed, and choose a setting for Elasticity.

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## Spherize effect

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The Spherize effect distorts a layer by wrapping a region of the image onto a sphere. The quality setting of the layer influences the Spherize effect. Best quality samples the displaced pixels to subpixel precision; Draft quality samples to the nearest whole pixel.

This effect works with 8-bpc and 16-bpc color.

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## Transform effect

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The Transform effect applies two-dimensional geometric transformations to a layer. This effect supplements the transform properties available for each layer in the Timeline panel. Anchor Point, Position, Rotation, Scale, and Opacity properties function much the same as the layer transform properties in the Timeline panel.

You can specify the shutter angle for motion blur for this layer independently of the shutter angle for the composition. (Motion blur must be enabled for the layer and for the composition for this to be relevant.)

**Note:** *This effect is relative to the input layer. Therefore, to make a layer rotate around the upper left corner, open the layer in the Layer panel, choose Transform from the Layer panel menu, and then move the anchor point and the position to the upper left corner.*

This effect works with 8-bpc and 16-bpc color.

**Skew** Skew amount.

**Skew Axis** The axis about which skew occurs.



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## Turbulent Displace effect

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The Turbulent Displace effect uses fractal noise to create turbulent distortions in an image. For example, use it to create flowing water, funhouse mirrors, and waving flags.

Rhys Enniks provides a demonstration of the Turbulent Displace effect in part 2 of his “Rain over water” tutorial on [his website](#).

This effect works with 8-bpc, 16-bpc, and 32-bpc color.

**Displacement** The type of turbulence used. Turbulent Smoother, Bulge Smoother, and Twist Smoother each perform the same operations as Turbulent, Bulge, and Twist, except that the Smoother options create smoother warps and take longer to render. Vertical Displacement warps the image vertically only. Horizontal Displacement warps the image horizontally only. Cross Displacement warps the image both vertically and horizontally.

**Amount** Higher values cause more distortion.

**Size** Higher values cause larger areas of distortion.

**Offset (Turbulence)** Determines the portion of the fractal shape that is used to create the distortion.

**Complexity** Determines the level of detail in the turbulence. Lower values cause smoother distortions.

**Evolution** Animating this setting results in changes of the turbulence over time.

**Note:** *Although the Evolution value is set in units called revolutions, it's important to realize that these revolutions are progressive. The Evolution state continues to progress infinitely at each new value. Use the Cycle Evolution option to return the Evolution setting to its original state at each revolution.*

**Evolution Options** Evolution Options provide controls that render the effect for one short cycle and then loop it for the duration of the layer. Use these controls to pre-render turbulence elements into loops, and thus speed up rendering time.

**Cycle Evolution** Creates a loop that forces the Evolution state to return to its starting point.

**Cycle** The number of revolutions of the Evolution setting that the fractal cycles through before it repeats. The amount of time between Evolution keyframes determines the timing of the Evolution cycles.

**Note:** *The Cycle control affects only the state of the fractal, not geometrics or other controls, so you can get different results with different Size or Offset settings.*

**Random Seed** Specifies a value from which to generate the fractal noise. Animating this property results in flashing from one set of fractal shapes to another (within the same fractal type), which is not usually the result that you want. For smooth transition of the fractal noise, animate the Evolution property.

**Note:** *Create new turbulence animations by reusing previously created Evolution cycles and changing only the Random Seed value. Using a new Random Seed value alters the noise pattern without disturbing the Evolution animation.*

**Pinning** Specifies which edges to pin so that the pixels along those edges aren't displaced.

**Resize Layer** Enables the distorted image to expand past the original bounds of the layer.

### Create a seamless loop using Turbulent Displace

1. Set two keyframes for the Evolution control, using full revolutions only.
2. Adjust the time between keyframes, and the number of Evolution revolutions until you're satisfied with the appearance of the displacement.
3. Select Cycle Evolution.
4. Set a value for Cycle that's evenly divisible by the number of revolutions that you set for Evolution.
5. In the Timeline panel, move the current-time indicator to the time where the cycle completes. For example, if the Cycle value is 2, find the frame where the Evolution value is 2 revolutions.
6. Move the current-time indicator back one frame, to prevent a duplicate frame in the seamless loop.
7. Press the right bracket key (]) to trim the layer Out point to the current time.
8. Pre-render this layer, and import it into the project.
9. Set this prerendered footage item to loop. (See Loop a footage item.)

**Note:** *If you set keyframes for any of the other controls, you must return them to their initial settings at the point on the Timeline panel where the cycle begins to repeat. Otherwise, these properties don't loop.*

---

## Twirl effect

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The Twirl effect distorts an image by rotating a layer around its center. The image is distorted more sharply in its center than at the edges, causing a whirlpool result at extreme settings. Because distortion in this effect is significant, After Effects uses special anti-aliasing techniques to produce the highest-quality image. As a result, the Twirl effect can be especially slow to render.

This effect works with 8-bpc, 16-bpc, and 32-bpc color.

**Angle** How far to twirl the image. Positive angles twirl the image clockwise; negative angles twirl it counterclockwise. For a whirlpool result, animate the angle.

**Twirl Radius** How far the twirl extends from the twirl center. This value is a percentage of width or height of the layer, whichever is greater. A value of 50, for example, produces a twirl that extends to the edges of the layer.

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## Warp effect

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Use Warp to distort or deform layers. The warp styles work much like the Warp effects in Adobe Illustrator and Warp Text in Adobe Photoshop.

This effect works with 8-bpc and 16-bpc color.



*Warping a layer*

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## Warp Stabilizer effect (CS5.5 and later)

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Warp Stabilizer is a new option for stabilizing unsteady footage. For details see [Stabilize motion with the Warp Stabilizer effect \(CS5.5 and later\)](#).

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## Wave Warp effect

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The Wave Warp effect produces the appearance of a wave traveling across an image. You can produce a variety of different wave shapes, including square, circular, and sine waves. The Wave Warp effect is automatically animated at a constant speed across the time range (without keyframes or expressions). To vary speeds, set keyframes or expressions.

This effect works with 8-bpc and 16-bpc color.

**Wave Type** The shape of the wave.

**Wave Height** The distance, in pixels, between wave peaks.

**Wave Width** The size of the wave in pixels.

**Direction** The direction the wave travels across the image. For example, a value of 225° makes the waves travel diagonally from upper right to lower left.

**Wave Speed** The speed (in cycles per second) at which the waves travel. A negative value reverses the wave direction, and a value of 0 produces no movement. To vary wave speed over time, set this control to 0, and then set keyframes or expressions for the Phase property.

**Pinning** Which edges to pin so that the pixels along those edges aren't displaced.

**Phase** The point along the waveform at which a wave cycle begins. For example, 0° starts the wave at the midpoint of its downward slope, and 90° starts it at the lowest point in the trough.

**Antialiasing** Sets the amount of anti-aliasing, or edge smoothing, to perform on the image. In many cases, lower settings produce satisfactory results; a high setting can greatly increase rendering time. Anti-aliasing is performed only if the layer quality setting is Best.

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# Generate effects

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Third-party effects in this category included with After Effects:

- CC Glue Gun effect
- CC Light Burst 2.5 effect
- CC Light Rays effect
- CC Light Sweep effect
- CC Threads effect (CS6)

See Third-party plug-ins included with After Effects.

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## 4-Color Gradient effect

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The 4-Color Gradient effect produces a four-color gradient. The gradient is defined by four effect points, the positions and colors of which can be animated using the Positions & Colors controls. The gradient is composed of four solid-color circles blended together, each with an effect point as its center.

This effect works with 8-bpc and 16-bpc color.

**Blend** Higher values create more gradual transitions between colors.

**Jitter** The amount of jitter (noise) in the gradient. The jitter, which reduces banding, affects only those areas where banding could occur.

**Opacity** The opacity of the gradient, as a fraction of the Opacity value for the layer.

**Blending Mode** The blending mode to use in combining the gradient with the layer.

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## Advanced Lightning effect

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The Advanced Lightning effect creates simulations of electrical discharges. Unlike the Lightning effect, Advanced Lightning doesn't self-animate. Animate the Conductivity State or other properties to animate the lightning.

The Advanced Lightning effect includes the Alpha Obstacle feature, with which you can make the lightning go around designated objects.

Chris Zwar provides a detailed description on [his website](#) of how he used the Advanced Lightning effect to simulate blood vessel capillaries.

Eran Stern provides a video introduction to the Advanced Lightning effect on the [Motionworks website](#).

This effect works with 8-bpc color.

**Lightning Type** Specifies the characteristics of the lightning.

**Note:** The type determines the nature of the Direction/Outer Radius contextual control. In the Breaking type, the branches are focused toward the

*Direction point as the distance between Origin and Direction increases.*

**Origin** Specifies the point of origin for the lightning.

**Direction, Outer Radius** This control changes depending on the Lightning Type:

**Not In Use** The Direction or Outer Radius control is not available if Lightning Type is Vertical.

**Outer Radius** Specifies the distance that the lightning travels from its origin. This control is enabled if Omni or Anywhere is selected as the lightning type. Use it to terminate the lightning at a defined distance from the origin.

**Direction** Specifies the direction that the lightning travels. This control is enabled if any of the following lightning types are selected: Direction, Strike, Breaking, Bouncy, and Two-Way Strike.

**Conductivity State** Changes the path of the lightning.

**Core Settings** These controls adjust various characteristics of the core of the lightning.

**Glow Settings** These controls adjust the glow of the lightning.

**Note:** *To disable the glow, set Glow Opacity to 0. This setting can speed up rendering time greatly.*

**Alpha Obstacle** Specifies the influence of the alpha channel of the original layer on the path of the lightning. When Alpha Obstacle is greater than zero, the lightning attempts to wrap itself around opaque areas of the layer, seeing them as an obstacle. When Alpha Obstacle is less than zero, the lightning tries to stay inside the opaque areas, avoiding the transparent areas. The lighting can cross the boundaries between opaque and transparent areas, but Alpha Obstacle values further from zero cause the crossing to happen less often.

**Note:** *If Alpha Obstacles is set to a value other than 0, it's not always possible to preview the correct result in less than full resolution; full resolution may reveal new obstacles. Be sure to check the result in full resolution before final rendering.*

**Turbulence** Specifies the amount of turbulence in the lightning path. Higher values result in a more complex strike containing more branches and forks, and lower values produce simpler strikes with fewer branches.

**Forking** Specifies what percentage of a branch is forked. Turbulence and Alpha Obstacle settings influence forking.

**Decay** Specifies the amount of continuous decay or dissipation of the lightning strength and influences where the opacity of the forks begins to fade.

**Decay Main Core** Decays the main core along with its forks.

**Composite On Original** Composites the lightning with the original layer using the Add blending mode. When deselected, only the lightning is visible.

**Complexity** Specifies the complexity of the turbulence in the lightning.

**Min. Forkdistance** Specifies the minimum pixel distance between new forks. Lower values create more forks in the lightning. Higher values result in fewer forks.

**Termination Threshold** Specifies the level at which a path terminates, based on resistance in the atmosphere and possible alpha collision. At lower values, the path terminates more easily when encountering resistance or alpha obstacles. At higher values, the path more persistently moves around alpha obstacles.

**Note:** *Increasing Turbulence or Complexity values causes resistance to increase in some areas. These areas change as conductivity changes. Increasing the Alpha Obstacle value causes resistance to increase at alpha edges.*

**Main Core Collision Only** Calculates collisions only on the main core. The forks aren't affected. This control is relevant only if you select Alpha Obstacle.

**Fractal Type** Specifies the type of fractal turbulence used to create the lightning.

**Core Drain** Specifies the percentage by which the core strength is drained when creating a new fork. Increasing this value reduces the opacity of the core where new forks appear. Because forks draw their strength from the main core, decreasing this value reduces the opacity of the forks as well.

**Fork Strength** Specifies the opacity of the new fork. This amount is measured as a percentage of the Core Drain value.

**Fork Variation** Specifies the amount of variation in the opacity of the fork and determines how much the fork opacity deviates from the amount set for Fork Strength.

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## Audio Spectrum effect

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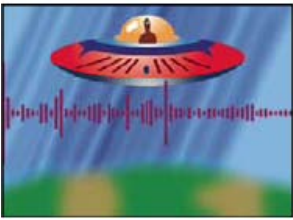
Apply the Audio Spectrum effect to a video layer to display the audio spectrum of a layer that contains audio (and optionally video). The effect displays the magnitude of audio levels at frequencies in the range that you define using Start Frequency and End Frequency. This effect can display the audio spectrum in several different ways, including along a mask path.

Jerzy Drozda, Jr. provides a demonstration of the Audio Spectrum effect on the [Motionworks website](#).

**Note:** *Audio Spectrum uses the audio source footage without time-remapping, effects, stretch, or levels. To display the spectrum with such effects, precompose the audio layer before applying the Audio Spectrum effect.*

 *To prevent other masks on the layer from clipping the output of the Audio Spectrum effect, set their mask modes to None. (See Mask modes.)*

This effect works with 8-bpc, 16-bpc, and 32-bpc color.



Original (upper-left), and with effect applied (lower-left and right)

**Audio Layer** The audio layer you want to use as input.

**Start Point, End Point** Specifies the position at which the spectrum starts or ends if Path is set to None.

**Path** The mask path along which to display the audio spectrum.

**Use Polar Path** The path starts from a single point and appears as a radial graph.

**Start Frequency, End Frequency** The lowest and highest frequencies, in hertz, to display.

**Frequency Bands** The number of frequency bands into which to divide displayed frequencies.

**Maximum Height** Maximum height, in pixels, of a displayed frequency.

**Audio Duration** Duration of audio, in milliseconds, used to calculate the spectrum.

**Audio Offset** Time offset in milliseconds used to retrieve the audio.

**Thickness** Thickness of the bands.

**Softness** How feathered or blurry the bands appear.

**Inside Color, Outside Color** Inside and outside colors of the bands.

**Blend Overlapping Colors** Specifies that overlapping spectrums are blended.

**Hue Interpolation** If the value is greater than 0, the frequencies displayed rotate through the hue color space.

**Dynamic Hue Phase** If selected, and the Hue Interpolation is greater than 0, the Start color shifts to the maximum frequency in the range of displayed frequencies. This setting allows the hue to follow the fundamental frequency of the spectrum displayed as it changes.

**Color Symmetry** If selected, and the Hue Interpolation is greater than 0, the start and end colors are the same. This setting allows color continuity on closed paths.

**Display Options** Specifies whether to display frequency as Digital, Analog Lines, or Analog Dots.

**Side Options** Specifies whether to display the spectrum above the path (Side A), below the path (Side B), or both (Side A & B).

**Duration Averaging** Specifies that audio frequencies are averaged to reduce randomness.

**Composite On Original** If selected, displays the original layer with the effect.

## Audio Waveform effect

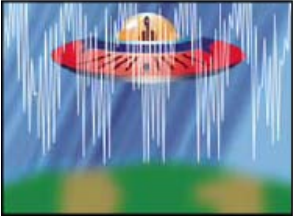
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Apply the Audio Waveform effect to a video layer to display the audio waveform of a layer that contains audio (and optionally video). You can display the audio waveform in several different ways, including along an open or closed mask path.

**Note:** Audio Waveform uses the audio source footage without time-remapping, effects, stretch, or levels. To display the spectrum with such effects, precompose the audio layer before applying the Audio Waveform effect.

 To prevent masks on the layer from clipping the output of the Audio Waveform effect, set their mask modes to None. (See Mask modes.)

This effect works with 8-bpc, 16-bpc, and 32-bpc color.



Original (upper-left), and with effect applied (lower-left and right)

**Audio Layer** The audio layer you want to display as a waveform.

**Start Point, End Point** The position at which the waveform starts and ends, if Path is set to None.

**Path** If set to None, the audio waveform is displayed along the path of the layer.

**Displayed Samples** Number of samples to display in the waveform.

**Maximum Height** Maximum height, in pixels, of a displayed frequency.

**Audio Duration** Duration of audio, in milliseconds, used to calculate the waveform.

**Audio Offset** Time offset, in milliseconds, used to retrieve the audio.

**Thickness** The thickness of the waveform.

**Softness** How feathered or blurry the waveform appears.

**Inside Color, Outside Color** The inside and outside colors of the waveform.

**Waveform Options** Mono combines the left and right channels of the audio layer. Nonstereo audio layers play as Mono.

**Display Options** Digital displays each sample as a single vertical line connecting the minimum and maximum source sample. This option simulates the display used on digital equipment. Analog Lines displays each sample as a line connecting the previous and next sample from either the minimum or maximum audio source sample. This option simulates the retracing seen in the display of an analog oscilloscope. Analog Dots displays each sample as a dot representing either the minimum or maximum audio source sample.

**Composite On Original** Composites the audio waveform with the original layer using the Add blending mode. When deselected, only the audio waveform is visible.

## Beam effect

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The Beam effect simulates the movement of a beam, such as a laser beam. You can make the beam shoot, or you can create a wandlike beam with a stationary start or end point. The beam looks best when motion blur is enabled and the shutter angle is set to 360.

John Dickinson provides a video tutorial and example project on the [Motionworks website](#) that demonstrate the use of the Beam effect.

This effect works with 8-bpc, 16-bpc, and 32-bpc color.



Original (left), and with a simulated beam (right)

The Length control specifies the length of the beam based on a percentage of the Time specified. For example, a setting of 100% means that the visible beam length is at its maximum when the Time control is 50%. Time specifies the time of the beam's travel from start to end as a percentage. The 3D Perspective control uses 3D perspective based on start and end thickness if Time is animated.

## Cell Pattern effect

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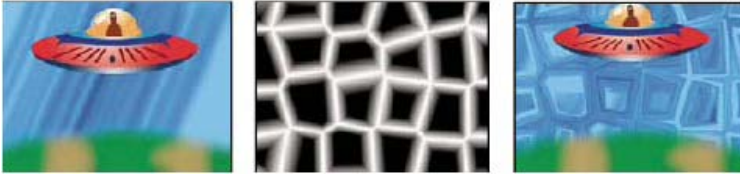
The Cell Pattern effect generates cellular patterns based on cellular noise. Use it to create static or moving background textures and patterns. The patterns can be used in turn as textured mattes, as transition maps, or as a source for displacement maps.

John Dickinson provides an example project on the [Motionworks website](#) that demonstrates the use of the Cell Pattern effect in a seamlessly looping background animation.

Richard Harrington provides additional information and examples for using the Cell Pattern effect on [his website](#).



This effect works with 8-bpc color.



Original image (left); the Cell Pattern effect creates a displacement map (center), which is used as a displacement map for the Displacement Map effect (right).

**Cell Pattern** The cell pattern to use. HQ denotes high-quality patterns that render with more definition than their unmarked counterparts. Mixed Crystals is available only as a high-quality option.

**Note:** The Static Plates option is identical in appearance to the Plates option. However, when evolving, the static plates retain a uniform lightness value, whereas the plates shift the lightness of the cell pattern.

**Invert** Inverts the cell pattern. Black areas become white, and white areas become black.

**Contrast/Sharpness** Specifies the contrast of the cell pattern when you use the Bubbles, Crystals, Pillow, Mixed Crystals, or Tubular cell pattern. The control specifies sharpness for any of the Plate or Crystallize options.

**Note:** The option chosen from the Overflow menu affects the contrast.

**Overflow** How the effect remaps values that fall outside the grayscale range of 0-255. Overflow isn't available if sharpness-based cell patterns are chosen.

**Clip** Values above 255 are mapped to 255. Values below 0 are mapped to 0. Contrast amount controls how much of the image falls outside the range 0-255; higher contrast amounts result in a mostly black or white image, with less gray. Therefore, less subtle cellular detail appears at higher contrast settings.

**Soft Clamp** Remaps grayscale values to fall inside the 0–255 range. Contrast appears reduced; cells are mostly gray with few areas of pure black or white.

**Wrap Back** Values above 255 or below 0 are reflected back into the 0-255 range. For example, a value of 258 ( $255+3$ ) is reflected to 252 ( $255-3$ ), and a value of -3 is reflected to 3. With this setting, Contrast values above 100 increase complexity and detail.

**Disperse** How randomly the pattern is drawn. Lower values cause more uniform or gridlike cell patterns.

**Note:** If you set the Disperse value above 1.0, set the layer to Best quality to avoid artifacts.

**Size** The size of the cells. The default size is 60.

**Offset** Determines the portion of the fractal shape used to create the pattern.

**Tiling Options** Choose Enable Tiling to create a pattern built of repeating tiles. Cells Horizontal and Cells Vertical determine how many cells wide and how many cells high each tile is.

**Evolution** Animating this setting results in changes of the pattern over time.

**Note:** Although the Evolution value is set in units called revolutions, it's important to realize that these revolutions are progressive. The Evolution state continues to progress infinitely at each new value. Use the Cycle Evolution option to return the Evolution setting to its original state at each revolution.

**Evolution Options** Evolution Options provide controls that render the effect for one short cycle and then loop it for the duration of your clip. Use these controls to pre-render cell pattern elements into loops, and thus speed up rendering time.

**Cycle Evolution** Creates a loop that forces the Evolution state to return to its starting point.

**Cycle** The number of revolutions of the Evolution setting that the cell pattern cycles through before it repeats. The amount of time between Evolution keyframes determines the timing of the Evolution cycles.

**Note:** The Cycle control affects only the state of the cell pattern, not geometrics or other controls, so you can get different results with different Size or Offset settings.

**Random Seed** Specifies a value from which to generate the cell pattern. Animating this property results in flashing from one cell pattern to another (within the same cell pattern type), which is not usually the result that you want. For smooth transition of the cell pattern, animate the Evolution property.

**Note:** Create new cell pattern animations by reusing previously created Evolution cycles and changing only the Random Seed value. Using a new Random Seed value alters the cell pattern without disturbing the Evolution animation.

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## Checkerboard effect

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The Checkerboard effect creates a checkerboard pattern of rectangles, half of which are transparent.

This effect works with 8-bpc color.

**Anchor** The point of origin of the checkerboard pattern. Moving this point offsets the pattern.

**Size From** How the dimensions of the rectangles are determined:

**Corner Point** The dimensions of each rectangle are the dimensions of the rectangle with opposite corners defined by the Anchor and Corner points.

**Width Slider** The height and width of a rectangle are equal to the Width value, meaning that the rectangles are squares.

**Width & Height Sliders** The height of a rectangle is equal to the Height value. The width of a rectangle is equal to the Width value.

**Feather** Thickness of the edge feather within the checkerboard pattern.

**Color** The color of the nontransparent rectangles.

**Opacity** The opacity of the colored rectangles.

**Blending Mode** The blending mode to use to composite the checkerboard pattern on top of the original layer. These blending modes work identically to the ones in the Timeline panel, except for the default None mode, which renders the checkerboard pattern only.

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## Circle effect

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The Circle effect creates a customizable solid disk or ring.

This effect works with 8-bpc color.

**Edge** None creates a solid disk. The other options all create rings. Each option corresponds to a different set of properties that determine the shape and edge treatment of the ring:

**Edge Radius** The difference between the Edge Radius property and the Radius property is the thickness of the ring.

**Thickness** The Thickness property sets the thickness of the ring.

**Thickness \* Radius** The product of the Thickness property and the Radius property is the thickness of the ring.

**Thickness & Feather \* Radius** The product of the Thickness property and the Radius property is the thickness of the ring. The product of the Feather property and the Radius property is the feather of the ring.

**Feather** The thickness of the feather.

**Invert Circle** Inverts the matte.

**Blending Mode** The blending mode used to combine the shape and the original layer. These blending modes behave like the blending modes in the Timeline panel, except for None, which displays only the shape, without the original layer.

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## Ellipse effect

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The Ellipse effect draws an ellipse.

This effect works with 8-bpc, 16-bpc, and 32-bpc color.

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## Eyedropper Fill effect

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The Eyedropper Fill effect (formerly the Color Picker effect) applies a sampled color to the source layer. This effect is useful for quickly picking a solid color from a sample point on the original layer or picking a color value from one layer and using blending modes to apply this color to a second layer.

This effect works with 8-bpc color.

**Sample Point** The center of the sampled area.

**Sample Radius** The radius of the sampled area.

**Average Pixel Color** Which color values are sampled:

**Skip Empty** Samples the average RGB color values, excluding the color values of transparent pixels.

**All** Samples the average of all RGB color values, including color values of transparent pixels.

**All Premultiplied** Samples the average of all RGB color values, premultiplied with the alpha channel.

**Including Alpha** Samples the average of all RGB color and alpha channel values. This setting results in the sampled color also containing the average transparency of the sampled pixels.

**Maintain Original Alpha** Maintains the alpha channel of the original layer. If you choose Including Alpha in the Average Pixel Color menu, the original alpha is stenciled over the sampled color.

**Blend With Original** The transparency of the effect. The result of the effect is blended with the original image, with the effect result composited on top. The higher you set this value, the less the effect affects the layer. For example, if you set this value to 100%, the effect has no visible result on the layer; if you set this value to 0%, the original image doesn't show through.

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## Fill effect

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The Fill effect fills specified masks with a specified color. If you want to add both a stroke and a fill to a closed path, the order in which you apply the stroke and fill determines the visible width of the stroke: If the fill is applied before the stroke, the full stroke brush size is visible; if the stroke is applied before the fill, the fill appears on top of the stroke, obscuring the half of the stroke that falls inside the path.

This effect works with 8-bpc color. In After Effects CS6, this effect works in 32-bit color.

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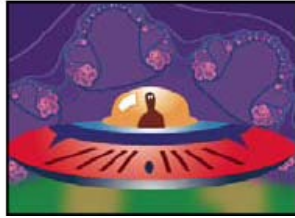
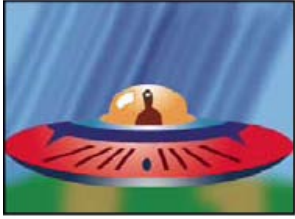
## Fractal effect

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The Fractal effect renders the Mandelbrot or Julia set, creating colorful textures. When you first apply the effect, the picture you see is the classic sample of the Mandelbrot set; the set is the area that is colored black. Any pixel outside the set is colorized, depending on how close it is to the set.



This effect works with 8-bpc and 16-bpc color.



*Spaceship layer (upper-left) composited over layer with Mandelbrot fractal with Lightness Gradient palette (lower-left) and Julia fractal (lower-right)*

**Set Choice** Specifies the set used. Mandelbrot is the typical Mandelbrot set. Mandelbrot Inverse is the Mandelbrot set mathematically inverted. Julia always changes depending on the center point from the Mandelbrot set and can produce the set of all possible Julia sets. Julia Inverse is the inverse of the Julia set. To see a Julia set, you may want to set the magnification to a negative value, because these sets tend to fill up the complex plane outside the normal boundary. Mandelbrot Over Julia is the same as Mandelbrot, except that it changes when the Julia center point changes. Mandelbrot Inverse over Julia is the same as Mandelbrot Inverse, except that it changes when the Julia center point changes.

**Mandelbrot, Julia** Specify the settings for the specified set. X (Real) and Y (Imaginary) specify the pixels at the center of the image for either the Mandelbrot or Julia set. Magnification specifies the magnification of the effect. Escape Limit specifies how many times the calculation looks for a color for a given pixel before it assigns the color black. It also sets the maximum number of line segments the Selection tool can use when tracing the path of a point. Higher numbers require longer render times.

**Color** Specifies the color of the effect:

**Overlay** Displays a ghosted version of the opposite set. For example, when viewing the Julia set, use this control to display a ghosted version of the Mandelbrot set. When you select Overlay, a white cross hair with a black drop shadow appears so you can see the exact point at the center of the opposite set. This control is useful because the Julia set depends on the center point of the Mandelbrot set.

**Transparency** Specifies whether black pixels are transparent. If you choose Solid Color from the Palette menu, this control specifies whether everything inside or outside the set is transparent.

**Palette** Specifies the palette to use when drawing the set. Lightness Gradient creates a gradient that ranges from black to white, passing through the hue specified by the Hue control. Then it applies the same gradient eight more times, each time using the hue 45° away on the color wheel. The Cycle Steps control specifies the number of colors in the gradient. Hue Wheel uses all the color from the Hue color wheel, with maximum brightness and saturation. Black And White uses alternating bands of black and white. Solid Color turns everything transparent except the inside of the set, which uses the color specified by the Hue control. Select Transparent to get the opposite result.

**Hue** Specifies the hue for solid colors and the starting hue for color gradients. This control works well for creating smooth color changes or for cycling through the palette. Cycle Steps specifies the number of bands of different color that appear before the cycle starts over. Cycle Offset specifies where, other than the beginning, a cycle starts.

**Edge Highlight** Highlights the edges between color bands. This control requires low-quality mode. If you want to use high-quality edge highlighting, use the Find Edges effect instead.

**High Quality Settings** Specify the oversampling settings for the effect:

**Oversample Method** Specifies the method used to oversample the effect: Edge Detect-Fast-May Miss Pixels performs a simple edge detection and oversamples only those pixels. This option is the fastest, especially in areas with a lot of solid color, such as black, and it generally produces results indistinguishable from Brute Force. Brute Force-Slow-Every Pixel oversamples every pixel in the image. It is slow but precise.

**Oversample Factor** Specifies the amount of oversampling to perform. For example, a value of 4 specifies that each pixel is sampled 16 times (4x4=16) and that the average color is used. Higher values produce better quality output but require longer render times.

### Use tools with the Fractal effect

When the Fractal effect is selected in the Effect Controls panel, you can use After Effects tools in the following way. (If you don't want the Fractal tools active, deselect the effect before using tools.)

- Use the Selection tool to see if the path of a point lies within the set. If the path leads out of the bounded rectangle (-2, -2, 2, 2), it has gone into infinity; in such a case, the starting-point color is based on how many line segments it takes to reach infinity. If the path ends within the rectangle, it's colored black.
- Use the Zoom tool to zoom in or out on a particular point, or hold down Ctrl (Windows) or Command (Mac OS), click and hold the Magnifying tool over the center of the image, and navigate from the center. For example, to zoom straight in, stay in the center; to move up, drag up a little and then quickly move back to the center.
- Use the Hand tool to pan the image. Press Ctrl (Windows) or Command (Mac OS) to pan the opposite fractal. For example, when viewing the Julia set, press Ctrl (Windows) or Command (Mac OS) to pan the Mandelbrot set and see how the Julia set depends on the center point of

the Mandelbrot set.

- Use the arrow keys to pan the center point by 1 pixel. Press Shift as you press an arrow key to adjust the point by 10 pixels. Press Ctrl (Windows) or Command (Mac OS) as you press an arrow key to adjust the center point of the opposite set.

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## Grid effect

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Use the Grid effect to create a customizable grid. Render this grid in a solid color or as a mask in the alpha channel of the source layer. This effect is good for generating design elements and mattes within which other effects can be applied.

John Dickinson provides a video tutorial on his [Motionworks website](#) that demonstrates the use of the Grid effect.

This effect works with 8-bpc color.

 Use Grid with the Advanced Lightning effect to create lightning forks that follow a grid pattern.

**Anchor** The point of origin of the grid pattern. Moving this point offsets the pattern.

**Size From** How the dimensions of the rectangles are determined:

**Corner Point** The dimensions of each rectangle are the dimensions of the rectangle with opposite corners defined by the Anchor and Corner points.

**Width Slider** The height and width of a rectangle are equal to the Width value, meaning that the rectangles are squares.

**Width & Height Sliders** The height of a rectangle is equal to the Height value. The width of a rectangle is equal to the Width value.

**Border** The thickness of the grid lines. A value of 0 causes the grid to disappear.

**Note:** The anti-aliasing of the grid borders may cause the visible thickness to vary.

**Feather** The softness of the grid.

**Invert Grid** Inverts the transparent and opaque areas of the grid.

**Color** The color of the grid.

**Opacity** The opacity of the grid.

**Blending Mode** The blending mode to use to composite the grid on top of the original layer. These blending modes work identically to the ones in the Timeline panel, except for the default None mode, which renders the grid only.

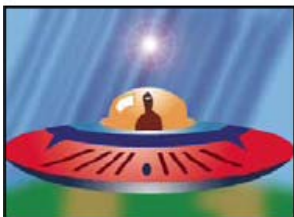
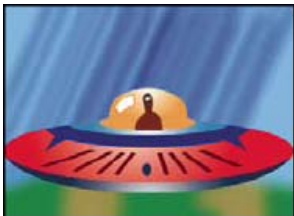
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## Lens Flare effect

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The Lens Flare effect simulates the refraction caused by shining a bright light into the camera lens. Specify a location for the center of the flare by clicking anywhere inside the image thumbnail or by dragging its cross hair.

This effect works with 8-bpc color.



Single lens flare (lower-left) and multiple lens flares (lower-right)

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## Paint Bucket effect

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The Paint Bucket effect (formerly Basic Fill effect) is a nondestructive paint effect that fills an area with a solid color. It works much like the Paint Bucket tool in Adobe Photoshop. Use the Paint Bucket effect for coloring cartoon-type outlined drawings or replacing areas of color in an image.

This effect works with 8-bpc color.

**Fill Point** The effect fills an area that contains the Fill Point. The area is determined by analyzing pixels that neighbor the Fill Point and expanding the fill area by adding matching pixels. How far the fill color spreads depends upon the Tolerance setting, as well as the option you choose from the Fill Selector menu.

**Fill Selector** Which values to operate on:

**Color & Alpha** Specifies that the effect fills the RGB and alpha channels of the fill area with the new color.

**Straight Color** Specifies that the effect fills only the RGB channels of the fill area with the new color.

**Transparency** Specifies that the effect fills only the transparent areas near the fill point. You must set a fill point in a transparent area for this option to work.

**Opacity** Specifies that the effect fills only the opaque areas near the fill point. You must set a fill point in an opaque area for this option to work.

**Alpha Channel** Specifies that the effect fills either the opaque or transparent areas in the whole image, depending upon the alpha channel value at the point you set the fill point.

**Tolerance** How far the color values of a pixel can be from the Fill Point color values and still match. Higher values expand the range of pixels that the effect fills.

**View Threshold** Shows what pixels match—that is, which pixels are within the Tolerance value of the color values of the Fill Point pixel. This option is especially useful in tracking leaks. If a small gap exists, the color can flow over and fill areas not intended to be filled.

**Stroke** How the effect treats the edges of the filled area:

**Antialias** Anti-aliases the edges of the filled area.

**Feather** Creates a feathered edge for the filled area. Feather Softness values create a more gradually disappearing edge.

**Spread** Expands the area of the fill color. The Spread Radius value indicates the number of pixels the fill color extends beyond the edge of the fill area.

**Choke** Contracts the area of the fill color. The Spread Radius value indicates the number of pixels the fill color shrinks from the edge of the fill area.

**Stroke** Confines the fill to only the border of the selected area. The Stroke Width value indicates the width of the stroke, in pixels.

**Color** The fill color.

**Opacity** Opacity of the filled area.

**Blending Mode** The blending mode to use to composite the result of the effect on top of the original layer. All of these blending modes operate like the blending modes in the Timeline panel, except for Fill Only. Use Fill Only to show only the fill.

**Note:** If you apply multiple instances of Paint Bucket to a layer, be sure not to set more than one to use the Fill Only blending mode. If you set more than one instance to use this blending mode, only the first application of the effect is shown.

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## Radio Waves effect

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The Radio Waves effect creates radiating waves from a stationary or animated effect control point. You can use this effect to generate pond ripples, sound waves, or intricate geometric patterns. Use the Reflection control to make the shapes bounce off the sides of the layer. You can also use Radio Waves to create realistic wave displacement maps that work well with the Caustics effect.

Satya Meka provides a video tutorial and some tips for using the Radio Waves effect on [his website](#). Satya demonstrates animation of the mask that the radio wave shape is based on. He also demonstrates that you can get smooth, organic contours (rather than discrete waves) by using a very high value for Frequency, together with carefully chosen Fade-in Time and Fade-out Time settings.

This effect works with 8-bpc color.



Polygon wave type with square stroke profile (lower-left), and Image Contour wave type with Sine stroke profile (lower-right)

**Producer Point** The point from which the waves appear.

**Parameters Are Set At** Specifies whether parameters can be animated for individual waves. Birth specifies that each wave maintains the same parameter settings over time. Each Frame specifies that the waves change as the parameters change. For example, if you create a star wave with an animated rotation property, select Birth to offset each star from the previous one to create a twisting tunnel, or select Each Frame to make all the stars rotate in unison as the rotation property changes.

**Render Quality** Controls the quality of the output. Radio Waves creates smooth, anti-aliased shapes by rendering high-resolution versions of the shapes and then scaling them down by oversampling. For example, to create a 100x100-pixel image, it may generate a 400x400-pixel image and then scale it down using 4x oversampling. Oversampling provides high-quality results but results in long render times. This option works only with Best quality mode.

**Wave Type** What to base the wave shape on.

**Polygon** What kind of polygon to use for the wave shape. These controls are available if Polygon is chosen for Wave Type.

**Sides** Three sides create a triangle, four create a square, and so on. Size values above 64 result in a smooth circle. You can also approximate a circle by setting Sides to 3, Curve Size to 1, and Curvyness to about 0.62.

**Curve Size** Specifies how much of each side is curved at each point.

**Curvyness** Specifies how extreme the curve is at each point of the wave.

**Star** Specifies that the polygon is shaped like a star. To change the number of points on the star, change the number of sides.

**Star Depth** Specifies the angles of a star by controlling the distance between inner points and the center of the star.

**Mask** Specifies the mask used to create a wave. This control is available if you choose Mask from the Wave Type pop-up menu.

## Image Contour controls

You can base the wave shape on the contours of an image by choosing Image Contours for Wave Type.

**Source Layer** The layer to use as input for the creation of the image contours. Select an animated layer to emit moving shapes. A well-defined outline, high-contrast grayscale layer, or alpha channel works well as a source. The Radio Waves effect detects edges and converts sources into outlines.

**Source Center** Specifies the center point of the shape, relative to the source layer. For example, if you isolate a shape that is positioned in the left half of the frame, the shape radiates to the left by default; you can move the source center anywhere on the layer.

**Value Channel** The color attributes of the source layer used to define the image contours.

**Invert Input** Inverts the chosen value channel option.

**Value Threshold** Specifies the threshold for the chosen value channel. It determines the percentage value at which everything below it or above it is mapped to either white or black. This control can make a big difference in the shape of the wave.

**Pre-Blur** Smooths out the value channel before the value threshold is sampled. If you have a high-contrast image, such as white on black, and you want the wave to follow the edges very closely, set this option to 0.

**Tolerance** Defines how tightly the wave conforms to the layer. A high setting results in sharp corners; a low value can make the wave shape more sensitive to noise.

**Contour** Specifies the shape in the source layer that you want to use as the emitted wave. Contour numbers the shapes by their order in the frame from top to bottom, left to right. The shape in the upper-left corner is number 1.

## Wave Motion controls

Wave Motion controls specify how the wave emits from the center point.

**Frequency** Specifies the number of waves per second flowing out of the producer point.

**Expansion** Specifies the speed at which the wave travels from the producer point once it is born. This option doesn't affect the number of waves per second.

**Orientation** Specifies the rotation of the shape at birth around its center point. To animate the rotation, use the Spin control.

**Direction** Specifies the initial direction of a wave if Velocity is greater than 0. By default, particles are emitted from the producer point in an expanding radial pattern.

**Velocity** Specifies the speed at which the wave moves in the specified direction.

**Spin** Controls the continued rotation of a shape after it is born.

**Lifespan (sec)** Specifies the time, in seconds (including the fade-in and fade-out times), that the wave exists.

 *To prevent waves from abruptly disappearing when their lifetime ends, use the Fade Out Time control.*

**Reflection** Specifies whether the waves bounce off the edges of the layer and back into the scene. This option is effective for generating displacement maps for use as water ripples.

## Stroke controls

Stroke controls specify the appearance of the stroke of a wave.

**Profile** Controls the appearance of the stroke that defines the shape. The outline of the shape is animated in the wave that emanates from the effect point. The quality of the stroke is defined as a 3D wave type.

**Color** Specifies the color of the stroke.

**Opacity** Specifies the maximum possible opacity of the stroke. The actual opacity of the stroke takes into account this setting in conjunction with the Fade-in Time and Fade-out Time controls.

**Fade-in Time** Specifies the amount of time it takes the wave to fade into view. Fade-in Time is measured in seconds and begins with 0 opacity at birth. For example, if the Lifespan is 3 seconds and Fade-in Time is 1 second, the stroke is completely transparent at birth and fades smoothly to full opacity at 1 second.

**Fade-out Time** Specifies the amount of time it takes the wave to fade out of view. Fade-out Time is measured backward in time from the end of the Lifespan. If the Lifespan is 3 seconds and Fade-out Time is 1 second, the wave begins to fade out at 2 seconds. If the sum of Fade-in Time and Fade-out Time is greater than the Lifespan value, the intersection point of the two fades is calculated so that the wave doesn't reach full transparency. If either Fade-in Time or Fade-out Time is longer than the Lifespan, that amount is truncated to equal the Lifespan.

**Start Width** Specifies the width of the shape at its birth. End Width specifies the width of the shape at the end of its lifespan.

## Ramp effect

The Ramp effect creates a color gradient. You can create linear or radial ramps, and vary the position and colors of the ramp over time. Use the Start Of Ramp and End Of Ramp properties to specify the start and end positions. Use the Ramp Scatter control to disperse the ramp colors and eliminate banding.

This effect works with 8-bpc, 16-bpc, and 32-bpc color.

**Note:** *Ramps often don't broadcast well; severe banding occurs because the broadcast chrominance signal doesn't contain sufficient resolution to reproduce the ramp smoothly. The Ramp Scatter control dithers the ramp colors, eliminating the banding apparent to the human eye.*

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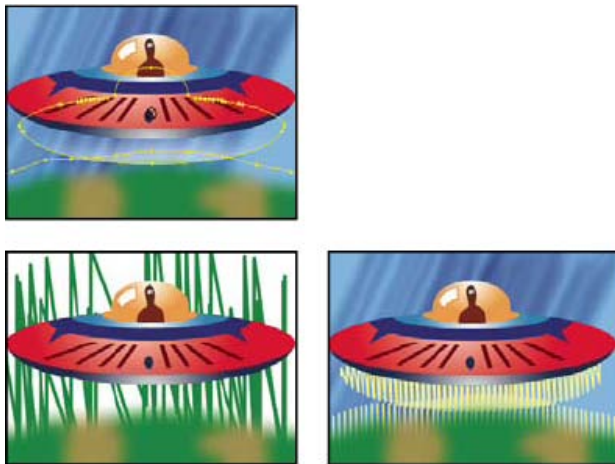
## Scribble effect

The Scribble effect creates the appearance of hand-drawn artwork by filling or stroking a closed mask.

For example, the Scribble effect can simulate fills that look like marker, crosshatching, or textiles. It fills a mask with a single zigzagging line that crisscrosses the path. Some paths, because of their geometry, cannot be filled with a single line. The Scribble effect breaks these paths into several simpler paths, each of which it then fills with a zigzagged stroke.

Aharon Rabinowitz provides a tutorial on the [Creative COW website](#) that shows how to use Auto-trace with the Scribble effect to create a stylized animated fill from video footage or from Illustrator graphics.

This effect works with 8-bpc color.



Masks (upper-left), Scribble applied to outside edges (lower-left), and Scribble applied to inside edges with Composite on Original (lower-right)

**Scribble** Single Mask scribbles a specified mask on the layer; All Masks scribbles all masks on the layer; All Masks Using Modes combines the masks using their modes and then scribbles the resulting shape.

**Mask** The mask to use if Scribble is set to Single Mask.

**Fill Type** Controls whether the fill is drawn inside the path or creates a scribble along the path. Left Edge draws the fill along the left edge of the path; Right Edge draws the fill along the right edge of the path. The left and right edges of a path are determined by the direction in which the path is drawn. When using the Left Edge or Right Edge fill types on masks that have tight curves, you get best results by making the Edge Width less than the radius of the curve.

**Edge Options** Options for the edge of the scribble if Fill Type is set to an edge.

**Edge Width** Controls the width of the edge.

**End Cap** Controls the ends of scribble lines. Use Round for stroked lines with semicircular ends; use Butt for stroked lines with squared ends; and use Projecting for stroked lines with squared ends that extend half the line width beyond the end of the line, making the weight of the line extend equally in all directions around the line. This option is enabled only if Fill Type is set to Centered Edge.

**Join** Specifies how the corners of a scribble line appear. Use Round for stroked lines with rounded corners; use Bevel for stroked lines with squared corners; and use Miter for stroked lines with pointed corners.

**Miter Limit** Controls when the effect switches from a miter (pointed) join to a bevel (squared-off) join. Specify a value in the range from 1 to 500. For example, if the value is set to the default of 4, the effect switches from a miter to a bevel join when the length of the point reaches four times the stroke weight. A miter value of 1 results in a bevel join. It's enabled if Join is set to the Miter option.

**Start/End Apply To** Specifies how changes to the Start and End options for the effect in the Timeline panel are applied; Scribble Result affects the scribble in the order in which it is drawn, and Mask Path follows the path of the mask to create more continuous drawing in or out of the scribble.

**Angle** Specifies the angle of the scribbled stroke.

**Stroke Width** Specifies the width of the stroke. Specify a value from 0.1 to 50.

**Stroke Options** Specify the curviness, spacing, and overlap of the scribbled line.

**Curviness** Controls the amount of curve at the end of each scribbled stroke. Specify a value between 0° and 100°.

**Curviness Variation** Determines the amount of variance the curviness values can have at each end point. Specify a value between 0% and 100%. A value of 0 gives the scribble sharp corners, while a value of 100 makes the scribble loopy.



**Spacing and Spacing Variation** The number of pixels between lines and zigzags. Setting a value equal to the stroke width value makes the lines fall next to each other.

**Path Overlap** Determines whether the scribble ends at the path, inside the path, or outside the path. Specify 0 to make it end at the path, negative values to make it end inside, and positive values to make it end outside. Path Overlap Variation determines how much each stroke can vary from the value specified for Path Overlap.

**Start, End** Where the drawn stroke starts and ends, as a percentage of the distance from the beginning of the total stroke.

**Fill Paths Sequentially** Enabled if Scribble is set to All Masks. If this control is selected, the start and end values apply to the combined length of the scribbles for all masks. If it isn't selected, the start and end values apply independently to the scribble for each mask.

**Wiggle Type** Specifies an animation style: Static keeps the scribble constant over time; Jumpy changes from one scribble to the next abruptly; and Smooth changes from one scribble to the next smoothly.

**Wiggles/Second** Controls how frequently a new scribble is generated when the Wiggle Type control is set to Smooth or Jumpy.

**Composite** On Transparent replaces the original image with the scribble. On Original Image composites the scribble on the original image. Reveal Original Image shows the original image through the scribble.

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## Stroke effect

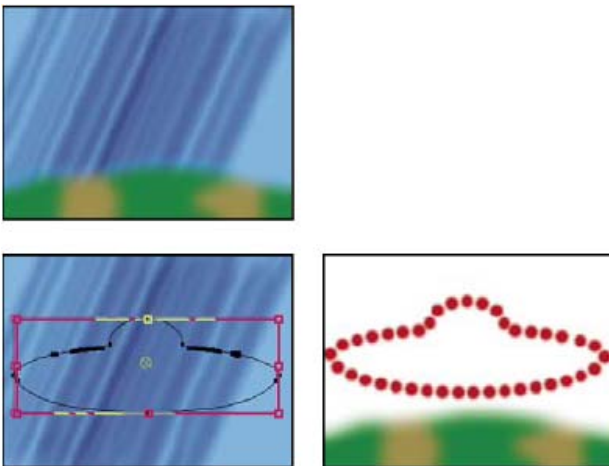
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The Stroke effect creates a stroke or border around the path defined by one or more masks. You can also specify stroke color, opacity, and spacing, as well as brush characteristics. Specify whether the stroke appears on top of the image, on a transparent image, or if it reveals the original alpha channel. To use a path created in Illustrator, copy the path and paste it into a layer in After Effects.

This effect works with 8-bpc color.

Andrew Kramer provides a video tutorial on his [Video Copilot website](#) that demonstrates the use the Stroke effect to reveal an image as if it is being written by hand on a wall.

Steve Holmes provides a tutorial on the [Layers Magazine website](#) that shows how to create and prepare vines, swirls, and flourishes in Illustrator and then import, reveal, and animate them in After Effects using the Stroke effect.



Original (upper-left), with mask (lower-left), and with effect applied (lower-right)

**Brush Hardness** Specifies the edge quality of the stroke, between hard and soft.

**Spacing** Specifies the spacing between stroke segments.

**Paint Style** Specifies whether the stroke is applied to the original layer or to a transparent layer.

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## Vegas effect

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The Vegas effect generates running lights and other path-based pulse animations around an object. You can outline just about anything, surround it with lights or longer pulses, and then animate it to create the appearance of lights chasing around the object.

This effect works with 8-bpc color.

John Dickinson provides an example on his [Motionworks website](#) of an EKG (electrocardiogram) simulation created using the Vegas effect.

**Stroke** What to base the stroke on: Image Contours or Mask/Path.

**Image Contours** If Image Contours is chosen from the Stroke menu, you specify what layer to take the image contours from and how to interpret the input layer.

**Input Layer** The layer whose image contours are used. High-contrast, grayscale layers, and alpha channels work well and are easy to work with.

**Invert Input** Inverts the input layer before creating the stroke.

**If Layer Sizes Differ** Determines how to adjust the layers if the size of the input layer differs from the size of the layer to which Vegas is applied. Center centers the input layer in the composition at its original size. Stretch To Fit scales the input layer to match the layer to which Vegas is applied.

**Channel** The color attribute of the input layer used to define the contours.

**Threshold** The percentage value at which everything below or above is mapped to either white or black. This property is important in determining the location of the edges that the effect strokes.

**Pre-Blur** Smooths out the input layer before the threshold is sampled. Set this option to 0 if you have a high-contrast image and want the stroke to follow the edges very closely.

**Tolerance** Defines how tightly the stroke conforms to the input layer. A high value results in sharp corners, while low values can make the stroking sensitive to noise.

**Render** Specifies whether to apply the effect to a selected contour or to all contours in the layer.

**Selected Contour** Specifies the contour to use when Selected Contour is selected from the Render menu. Contours are numbered from upper-left to lower-right; the contour with the highest point is number 1, the second highest point is number 2, and so on.

**Shorter Contours Have** Specifies whether shorter contours have fewer segments. By default, the effect breaks each contour into the same number of segments. For example, if you apply the effect to the letter R, the outside contour may look fine with 32 segments, but the inside contour may be almost solid. To resolve this issue, select Fewer Segments.

**Mask/Path** The mask or path to use for the stroke. You can use either closed or open masks.

**Segments** Specifies the number of segments used to create each stroked contour. For example, if the effect is applied to the word Vegas and Segments is set to 10, the outline of each of the letters, plus the inner contours of e, g, and a, are broken into 10 segments.

**Length** Determines the length of the stroke of a segment in relation to its maximum possible length. For example, if Segments is set to 1, the maximum length of a stroke is one complete trip around the object outline. If Segments is set to 3, the maximum length of a segment is 1/3 of the total outline, and so on.

**Segment Distribution** Determines the spacing of the segments. Bunched puts the segments together like boxcars in a train: The shorter the segment length, the shorter the overall length of the train. Even spaces the segments evenly around the contour.

**Rotation** Animates the segments around the contour. For example, to create the appearance of running lights, start with a large number of segments set to 50% of their length, and then animate Rotation to move the lights around the shapes.

**Random Phase** Specifies that the stroke starting point is different for each contour. By default, the effect strokes a contour beginning at its highest point on the screen. In the event of a tie, it starts at the leftmost highest point.

**Blend Mode** Determines how the stroke is applied to the layer. Transparent creates the effect on a transparent background. Over places the stroke over the existing layer. Under places the stroke behind the existing layer. Stencil uses the stroke as an alpha channel mask, filling the stroke with the pixels of the original layer.

**Color** Specifies the color of the stroke, unless Stencil is chosen for Blending Mode.

**Width** Specifies the width of the stroke in pixels. Fractional values are supported.

**Hardness** Determines how sharp or blurry the edges of the stroke are. A value of 1 creates a slight blur; a value of 0.0 blurs the line so that few solid areas of color remain.

**Start, End Opacity** Specify the opacity at the beginning or end of the stroke.

**Mid-point Opacity** Specifies the opacity of the midpoint of the stroke. This control works in terms of relative opacity, not absolute opacity. Setting it to 0 makes the change in opacity smooth from the start point to the end point, as if there were no midpoint at all.

**Mid-point Position** Specifies the location of the midpoint within a segment: Lower values move the midpoint closer to the beginning; higher values move the midpoint closer to the end. Use this control to move the midpoint opacity from the center of the stroke.

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## Write-on effect

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The Write-on effect animates strokes on a layer. For example, you can simulate the action of hand-writing of cursive text or signatures.

**Note:** *A convenient way to animate Brush Position is to use Motion Sketch to create Position keyframes on a new solid layer and then use an expression on the Brush Position property to link it to the Position property on the new solid layer. (See Sketch a motion path with Motion Sketch and Add, edit, and remove expressions.)*

This effect works with 8-bpc color.

Other methods of animating paint strokes and text are also available. For example, you can animate text by using the type tools and text animators, and you can animate a paint stroke applied with a paint tool. Paint strokes can have a Write-on Duration setting, which you can use to create similar results as with the Write-on effect. You can also animate shape paths for a similar result with the Trim Paths operation. (See Animating text, Animate and edit paint strokes, and Shape attributes, paint operations, and path operations for shape layers.)

**Brush Position** The position of the brush. Animate this property to create a stroke.

**Stroke Length (secs)** The duration, in seconds, of each brush mark. If this value is 0, the brush mark has unlimited duration. Use a single, constant, nonzero value to create a snakelike movement of the stroke. Animate this value to make the stroke expand and contract.

**Brush Spacing (secs)** The time interval, in seconds, between brush marks. Smaller values produce smoother paint strokes but take more time to render.

**Paint Time Properties and Brush Time Properties** Specifies whether paint properties and brush properties are applied to each brush mark or to the entire stroke. Choose None to apply values at each time to all brush marks in the stroke. Choose a property name for each brush mark to retain the value for that property at the time that the brush mark was drawn. For example, if you choose Color, then each brush mark keeps the color specified by the Color value at the time that the mark was drawn.

**Paint Style** How the paint stroke interacts with the original image:

**On Original Image** Paint stroke appears over original image.

**On Transparent** Paint stroke appears over transparency; the original image doesn't appear.

**Reveal Original Image** The original image is revealed by the paint stroke.

More Help topics

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# Keying effects

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[Color Difference Key effect](#)

[Color Key effect](#)

[Color Range effect](#)

[Difference Matte effect](#)

[Extract effect](#)

[Inner/Outer Key effect](#)

[Linear Color Key effect](#)

[Luma Key effect](#)

[Spill Suppressor effect](#)

After Effects includes several built-in keying effects, as well as the Academy Award–winning Keylight effect, which excels at professional-quality color keying. For information on the Keylight effect, see its documentation in the folder in which the Keylight plug-in is installed. (See Plug-ins.)

**Note:** *Though the color keying effects built into After Effects can be useful for some purposes, you should try keying with Keylight before attempting to use these built-in keying effects. Some keying effects—such as the Color Key effect—have been superseded by more modern effects like Keylight.*

For information about keying in general, including links to tutorials and other resources, see [Keying introduction and resources](#).

Third-party effects in this category included with After Effects:

- Keylight effect
- CC Simple Wire Removal effect

See [Third-party plug-ins included with After Effects](#).

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## Color Difference Key effect

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**Note:** *Though the color keying effects built into After Effects can be useful for some purposes, you should try keying with Keylight before attempting to use these built-in keying effects. Some keying effects have been superseded by more modern effects like Keylight.*

For information about keying in general, including links to tutorials and other resources, see [Keying introduction and resources](#).

The Color Difference Key effect creates transparency from opposite starting points by dividing an image into two mattes, Matte Partial A and Matte Partial B. Matte Partial B bases the transparency on the specified key color, and Matte Partial A bases transparency on areas of the image that don't contain a second, different color. By combining the two mattes into a third matte, called the alpha  $\alpha$  matte, the Color Difference Key creates well-defined transparency values.

The Color Difference Key produces high-quality keying for all well-lit footage items shot against a bluescreen or greenscreen and works especially well with images that contain transparent or semitransparent areas, such as smoke, shadows, or glass.

This effect works with 8-bpc and 16-bpc color.

### Use the Color Difference Key effect

1. Select the layer that you want to make partially transparent, and choose **Effect > Keying > Color Difference Key**.

**Note:** *To use any of the eyedroppers in the Layer panel, choose Color Difference Key from the View menu in the Layer panel.*

2. In the Effect Controls panel, choose **Matte Corrected** from the View menu. To view and compare the source image, both partial mattes, and the final matte at the same time, choose **[A, B, Matte] Corrected, Final** from the View menu. Other views available in the View menu are described in step 10.
3. Select the appropriate key color: To key out a bluescreen, use the default blue color. To key out a nonblue screen, select a key color in one of the following ways:
  - Thumbnail eyedropper: Select and then click in the Composition panel or the original thumbnail image on an appropriate area.
  - Key Color eyedropper: Select and then click in the Composition or Layer panel on an appropriate area.
  - Key Color swatch: Click to select a color from the specified color space.

**Note:** *The eyedropper tools move the sliders accordingly. Use the sliders in step 9 to fine-tune the keying results.*

4. Click the  $\alpha$  matte button to display the final combined matte in the matte thumbnail.
5. Select the Black eyedropper, and then click inside the matte thumbnail on the lightest area of black to specify transparent regions. The transparency values in the thumbnail and Composition panel are adjusted.
6. Select the White eyedropper, and then click inside the matte thumbnail on the darkest area of white to specify opaque regions. The opaque

values in the thumbnail and the Composition panel are adjusted.

 *To produce the best possible key, make the black and white areas as different as you can so that the image retains as many shades of gray as possible.*

7. Select a matching accuracy from the Color Matching Accuracy menu. Choose Faster unless you use a screen that isn't a primary color (red, blue, or yellow). For those screens, choose More Accurate, which increases rendering time but produces better results.
8. To further adjust transparency values, repeat steps 5 and 6 for one or both of the partial mattes. Click the Partial Matte B button or the Partial Matte A button to select a partial matte, and then repeat the steps.
9. Adjust transparency values for each partial matte and for the final matte by dragging one or more of the following sliders in the Matte Controls section:
  - Black sliders adjust the transparency levels of each matte. You can adjust the same levels using the Black eyedropper.
  - White sliders adjust the opaque levels of each matte. You can adjust the same levels using the White eyedropper.
  - Gamma sliders control how closely the transparency values follow a linear progression. At a value of 1 (the default), the progression is linear. Other values produce nonlinear progressions for particular adjustments or visual effects.
10. When adjusting individual mattes, choose from the View menu to compare the mattes with and without adjustments:
  - Choose Uncorrected to view a matte without adjustments.
  - Choose Corrected to view a matte with all adjustments.
11. Before closing the Effect Controls panel, select Final Output from the View menu. Final Output must be selected for After Effects to render the transparency.

 *To remove traces of reflected key color from the image, apply Spill Suppressor using Better For Color Accuracy. If the image still has a lot of color, apply the Simple Choker or Matte Choker effect.*

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## Color Key effect

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**Note:** *Though the color keying effects built into After Effects can be useful for some purposes, you should try keying with Keylight before attempting to use these built-in keying effects. Some keying effects have been superseded by more modern effects like Keylight.*

For information about keying in general, including links to tutorials and other resources, see [Keying introduction and resources](#).

The Color Key effect keys out all image pixels that are similar to a specified key color. This effect modifies only the alpha channel of a layer.

This effect works with 8-bpc and 16-bpc color.

### Key out a single color with the Color Key effect

1. Select the layer that you want to make partially transparent, and choose Effect > Keying > Color Key.
2. In the Effect Controls panel, specify a key color in one of two ways:
  - Click the Key Color swatch to open the Color dialog box and specify a color.
  - Click the eyedropper, and then click a color on the screen.
3. Drag the Color Tolerance slider to specify the range of color to key out. Lower values key out a smaller range of colors near the key color. Higher values key out a wider range of color.
4. Drag the Edge Thin slider to adjust the width of the border of the keyed area. Positive values enlarge the mask, increasing the transparent area. Negative values shrink the mask, decreasing the transparent area.
5. Drag the Edge Feather slider to specify the softness of the edge. Higher values create a softer edge but take longer to render.

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## Color Range effect

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**Note:** *Though the color keying effects built into After Effects can be useful for some purposes, you should try keying with Keylight before attempting to use these built-in keying effects. Some keying effects have been superseded by more modern effects like Keylight.*

For information about keying in general, including links to tutorials and other resources, see [Keying introduction and resources](#).

The Color Range effect creates transparency by keying out a specified range of colors in either the Lab, YUV, or RGB color space. You can use this key on screens that consist of more than one color or on bluescreens or greenscreens that have been unevenly lit and contain different shades of the same color.

This effect works with 8-bpc color.



Poorly lit greenscreen (upper-left) and background layer (lower-left) are combined using Color Range Key (lower-right).

## Use the Color Range effect

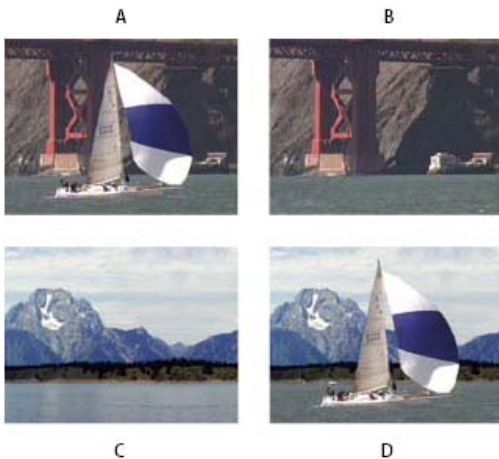
1. Select the layer that you want to make partially transparent, and choose Effect > Keying > Color Range.
2. Choose Lab, YUV, or RGB from the Color Space menu. If you have trouble isolating the subject using one color space, try using a different one.
3. Select the Key Color eyedropper, and then click in the matte thumbnail to select the area that corresponds to a color in the Composition panel you want to make transparent. Typically, this first color is the one that covers the largest area of the image.  
**Note:** To use the eyedroppers in the Layer panel, choose Color Range from the View menu in the Layer panel.
4. Select the plus eyedropper, and then click other areas in the matte thumbnail to add other colors or shades to the range of colors keyed out for transparency.
5. Select the minus eyedropper, and then click areas in the matte thumbnail to subtract other colors or shades from the range of colors keyed out.
6. Drag the Fuzziness slider to soften the edges between transparent and opaque regions.
7. Use the sliders in the Min and Max controls to fine-tune the color range you selected with the plus and minus eyedroppers. The L, Y, R sliders control the first component of the specified color space; the a, U, G sliders control the second component; and the b, V, B sliders control the third component. Drag the Min sliders to fine-tune the beginning of the color range. Drag the Max sliders to fine-tune the end of the color range.

## Difference Matte effect

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The Difference Matte effect creates transparency by comparing a source layer with a difference layer, and then keying out pixels in the source layer that match both the position and color in the difference layer. Typically, it's used to key out a static background behind a moving object, which is then placed on a different background. Often the difference layer is simply a frame of background footage (before the moving object has entered the scene). For this reason, the Difference Matte effect is best used for scenes that have been shot with a stationary camera and an unmoving background.

This effect works with 8-bpc and 16-bpc color.



Difference Matte Key effect

A. Original image B. Background image C. New background image D. Final composite image

## Use the Difference Matte effect

1. Select a motion footage layer as the source layer.
2. In the source layer, find a frame that consists only of background, and save the background frame as an image file. (See [Render and export a single frame of a composition.](#))
3. Import the image file into After Effects, and add it to the composition.

The imported image becomes the difference layer. Make sure that its duration is at least as long as the duration of the source layer.

**Note:** If the shot doesn't contain a full background frame, you may be able to assemble the full background by combining parts of several frames in After Effects or Photoshop. For example, you can use the Clone Stamp tool to take a sample of the background in one frame, and then paint the sample over part of the background in another frame.

4. Turn off the display of the difference layer by clicking the Video switch in the Timeline panel.
5. Make sure that the original source layer is selected, and then choose **Effect > Keying > Difference Matte**.
6. In the Effect Controls panel, choose **Final Output** or **Matte Only** from the View menu. (Use the **Matte Only** view to check for holes in the transparency. To fill undesired holes after you complete the keying process, see [Close a hole in a matte.](#))
7. Select the background file from the **Difference Layer** menu.
8. If the difference layer isn't the same size as the source layer, choose one of the following controls from the **If Layer Sizes Differ** menu:  
**Center** Places the difference layer in the center of the source layer. If the difference layer is smaller than the source layer, the rest of the layer fills with black.

**Stretch To Fit** Stretches or shrinks the difference layer to the size of the source layer. Background images may become distorted.

9. Adjust the Matching Tolerance slider to specify the amount of transparency based on how closely colors must match between the layers. Lower values produce less transparency; higher values produce more transparency.
10. Adjust the Matching Softness slider to soften the edges between transparent and opaque areas. Higher values make matched pixels more transparent but don't increase the number of matching pixels.
11. If the matte still contains extraneous pixels, adjust the **Blur Before Difference** slider. This slider suppresses noise by slightly blurring both layers before the comparison is made.

**Note:** The blurring occurs only for the comparison and doesn't blur final output.

12. Before closing the Effect Controls panel, make sure to select **Final Output** from the View menu to ensure that After Effects renders the transparency.

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## Extract effect

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The Extract effect creates transparency by keying out a specified brightness range, based on a histogram of a specified channel. It's best used to create transparency in an image shot against a black or white background or against a background that is dark or bright but consists of more than one color.

**Note:** The controls for this effect are similar to the controls of the Extract effect in Adobe Premiere Pro, but the purpose and results of the effect are different.

This effect works with 8-bpc and 16-bpc color.

## Use the Extract effect

In the Effect Controls panel, the Extract effect displays a histogram for a channel specified in the Channel menu. The histogram displays a representation of the brightness levels in the layer, showing the relative number of pixels at each level. From left to right, the histogram extends from the darkest (a value of 0) to the lightest (a value of 255).

Using the transparency control bar beneath the histogram, you can adjust the range of pixels that are made transparent. The position and shape of the bar in relation to the histogram determine transparency. Pixels corresponding to the area covered by the bar remain opaque; pixels corresponding to the areas not covered by the bar are made transparent.

1. Select the layer you want to make partially transparent, and choose **Effect > Keying > Extract**.
2. If you are keying out bright or dark areas, choose **Luminance** from the Channel menu. To create visual effects, choose **Red**, **Green**, **Blue**, or **Alpha**.
3. Adjust the amount of transparency by dragging the transparency control bar in the following ways:
  - Drag the upper right or upper left selection handles to adjust the length of the bar and to shorten or lengthen the transparency range. You can also adjust the length by moving the White Point and Black Point sliders. Values above the white point and below the black point are made transparent.
  - Drag the lower right or lower left selection handles to taper the bar. Tapering the bar on the left affects the softness of transparency in the darker areas of the image; tapering it on the right affects the softness in the lighter areas. You can also adjust the softness levels by adjusting **White Softness** (lighter areas) and **Black Softness** (darker areas).

**Note:** To taper the edges of the transparency control bar, first shorten the transparency bar.

- Drag the entire bar left or right to position it under the histogram.

## Inner/Outer Key effect

**Note:** Though the color keying effects built into After Effects can be useful for some purposes, you should try keying with Keylight before attempting to use these built-in keying effects. Some keying effects have been superseded by more modern effects like Keylight.

For information about keying in general, including links to tutorials and other resources, see [Keying introduction and resources](#).

The Inner/Outer Key effect isolates a foreground object from its background.

This effect works with 8-bpc and 16-bpc color.

### Use the Inner/Outer Key effect

To use the Inner/Outer key, create a mask to define the inside and outside edge of the object you want to isolate. The mask can be fairly rough—it doesn't need to fit exactly around the edges of the object.

In addition to masking a soft-edged object from its background, Inner/Outer Key modifies the colors around the border to remove contaminating background colors. This color decontamination process determines the contribution of the background to the color in each border pixel, and then removes that contribution—thus removing the halo that can appear if a soft-edged object is matted against a new background.

1. Select the border of the object that you want to extract by doing one of the following:
  - Draw a single closed mask near the border of the object; then select the mask from the Foreground menu and leave the Background menu set to None. Adjust the Single Mask Highlight Radius to control the size of the border around this mask. (This method works well only on objects with simple edges.)
  - Draw two closed masks: an inner mask just inside the object, and an outer mask just outside the object. Make sure that any fuzzy or uncertain areas of the object lie within these two masks. Select the inner mask from the Foreground menu and the outer mask from the Background menu.

**Note:** Make sure that the mask mode for all masks is set to None.
2. If you want, move the masks around to find the location that provides the best results.
3. To extract more than one object, or to create a hole in an object, draw additional masks and then select them from the Additional Foreground and Additional Background menus. For example, to key out a person's hair blowing in the wind against a blue sky, draw the inner mask inside the head, draw the outer mask around the outside edge of the hair, and then draw an additional mask around the gap in the hair where you can see sky. Select the additional mask from the Additional Foreground menu to extract the gap and remove the background image.
4. Create additional open or closed masks to clean up other areas of the image, and then select them from the Cleanup Foreground or Cleanup Background menu. Cleanup Foreground masks increase the opacity along the mask; Cleanup Background masks decrease the opacity along the mask. Use the Brush Radius and Brush Pressure options to control the size and density of each stroke.
 

**Note:** You can select the Background (outer) mask as a Cleanup Background mask to clean up noise from the background portions of the image.
5. Set Edge Thin to specify how much of the border of the matte is affected by the key. A positive value moves the edge away from the transparent region, increasing the transparent area; a negative value moves the edge toward the transparent region and increases the size of the foreground area.
6. Increase the Edge Feather values to soften edges of the keyed area. High Edge Feather values take longer to render.
7. Specify the Edge Threshold, which is a soft cutoff for removing low-opacity pixels that can cause unwanted noise in the image background.
8. Select Invert Extraction to reverse the foreground and background regions.
9. Set Blend With Original to specify the degree to which the resulting extracted image blends with the original image.

## Linear Color Key effect

**Note:** Though the color keying effects built into After Effects can be useful for some purposes, you should try keying with Keylight before attempting to use these built-in keying effects. Some keying effects have been superseded by more modern effects like Keylight.

For information about keying in general, including links to tutorials and other resources, see [Keying introduction and resources](#).

Linear keys create a range of transparency across an image. A linear key compares each pixel in the image to the key color you specify. If the color of a pixel closely matches the key color, it becomes completely transparent. Pixels that don't match as well are made less transparent, and pixels that don't match at all remain opaque. The range of transparency values, therefore, forms a linear progression.

The Linear Color Key effect uses RGB, hue, or chroma information to create transparency from a specified key color.

This effect works with 8-bpc, 16-bpc, and 32-bpc color.

### Apply the Linear Color Key effect

In the Effect Controls panel, the Linear Color Key effect displays two thumbnail images; the left thumbnail image represents the unaltered source image, and the right thumbnail image represents the view you've selected in the View menu.

You can adjust the key color, the matching tolerance, and the matching softness. The matching tolerance specifies how closely pixels must match

the key color before they start becoming transparent. The matching softness controls the softness of edges between the image and the key color.

You can also reapply this key to preserve a color that was made transparent by the first application of the key. For example, if you key out a medium-blue screen, you may lose some or all of a light-blue piece of clothing your subject is wearing. You can bring back the light-blue color by applying another instance of the Linear Color Key and choosing Keep This Color from the Key Operation menu.

1. Select a layer as the source layer, and then choose Effect > Keying > Linear Color Key.
2. In the Effect Controls panel, choose Key Colors from the Key Operation menu.
3. Choose a color space from the Match Colors menu. In most cases, use the default RGB setting. If you have trouble isolating the subject using one color space, try using a different color space.
4. In the Effect Controls panel, choose Final Output from the View menu. The view you choose appears in the right thumbnail and in the Composition panel. To see other results, work in one of the other views:

**Source Only** Shows the original image without the key applied.

**Matte Only** Shows the alpha channel matte. Use this view to check for holes in the transparency. To fill undesired holes after you complete the keying process, see Close a hole in a matte.

5. Select a key color in one of the following ways:
  - Select the Thumbnail eyedropper, and then click an appropriate area in the Composition panel or the original thumbnail image.
  - Select the Key Color eyedropper, and then click an appropriate area in the Composition or Layer panel.
  - To preview transparency for different colors, select the Key Color eyedropper, hold down the Alt key (Windows) or Option key (Mac OS), and move the pointer to different areas in the Composition panel or the original thumbnail image. The transparency of the image in the Composition panel changes as you move the pointer over different colors or shades. Click to select the color.
  - Click the Key Color swatch to select a color from the specified color space. The selected color becomes transparent.

**Note:** The eyedropper tools move the sliders accordingly. Use the sliders in steps 6 and 7 to fine-tune the keying results. To use eyedroppers in the Layer panel, choose Linear Color Key from the View menu in the Layer panel.
6. Adjust matching tolerance in one of the following ways:
  - Select the Plus (+) or the Minus (-) eyedropper, and then click a color in the left thumbnail image. The Plus eyedropper adds the specified color to the key color range, increasing the matching tolerance and the level of transparency. The Minus eyedropper subtracts the specified color from the key color range, decreasing the matching tolerance and the level of transparency.
  - Drag the matching tolerance slider. A value of 0 makes the entire image opaque; a value of 100 makes the entire image transparent.
7. Drag the Matching Softness slider to soften the matching tolerance by tapering the tolerance value. Typically, values under 20% produce the best results.
8. Before closing the Effect Controls panel, make sure to select Final Output from the View menu to ensure that After Effects renders the transparency.

## Preserve a color after applying Linear Color Key

1. In the Effect Controls panel or Timeline panel, turn off any current instances of keys or matte effects by deselecting the Effect option to the left of the key name or tool name. Deselecting the option causes the original image to appear in the Composition panel so that you can select a color to preserve.
2. Choose Effect > Keying > Linear Color Key. A second set of Linear Color Key controls appears in the Effect Controls panel below the first set.
3. In the Effect Controls panel, choose Keep Colors from the Key Operation menu.
4. Select the color you want to keep.
5. In the first application of the Linear Color Key effect, choose Final Output from the View menu in the Effect Controls panel, and then turn other instances of the Linear Color Key effect back on to examine the transparency. You may need to adjust colors or reapply the key a third time to get the results you need.

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## Luma Key effect

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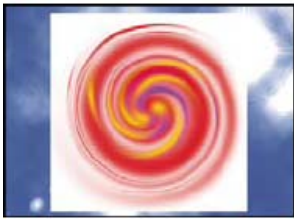
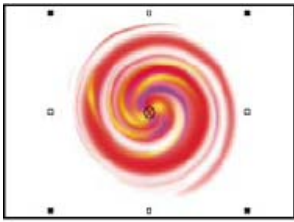
For information about keying in general, including links to tutorials and other resources, see Keying introduction and resources.

The Luma Key effect keys out all the regions of a layer with a specified luminance or brightness. The quality setting of the layer doesn't influence the Luma Key effect.

Use this effect if the object from which you want to create a matte has a greatly different luminance value than its background. For example, if you want to create a matte for musical notes on a white background, you can key out the brighter values; the dark musical notes become the only opaque areas.

This effect works with 8-bpc and 16-bpc color.





White background of original (upper-left and lower-left) is removed using Luma Key and composited over underlying layer (lower-right).

### Key out a luminance value with the Luma Key effect

1. Select the layer that you want to make partially transparent, and choose Effect > Keying > Luma Key.
2. Select a Key Type to specify the range to be keyed out.
3. Drag the Threshold slider in the Effect Controls panel to set the luminance value you want the matte to be based on.
4. Drag the Tolerance slider to specify the range of values to be keyed out. Lower values key out a smaller range of values near the threshold. Higher values key out a wider range of values.
5. Drag the Edge Thin slider to adjust the width of the border of the keyed area. Positive values make the mask grow, increasing the transparent area. Negative values shrink the mask.
6. Drag the Edge Feather slider to specify the softness of the edge. Higher values create a softer edge but take longer to render.

### Spill Suppressor effect

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The Spill Suppressor effect removes traces of the key color from an image with a screen that's already been keyed out. Typically, the Spill Suppressor is used to remove key color spills from the edges of an image. Spills are caused by light reflecting off the screen and onto the subject.

 If you're not satisfied with the results from using the Spill Suppressor, try applying the Hue/Saturation effect to a layer after keying, and then decrease the saturation value to de-emphasize the key color. (See Hue/Saturation effect.)

This effect works with 8-bpc and 16-bpc color. In After Effects CS6, this effect works in 32-bit color.



Original greenscreen (upper-left) leaves green glow when keyed out (lower-left). Spill Suppressor removes glow (lower-right).

### Use the Spill Suppressor effect

1. Select the layer, and choose Effect > Keying > Spill Suppressor.
2. Choose the color you want to suppress in one of the following ways:
  - If you already keyed out the color with a key in the Effect Controls panel, click the Color To Suppress eyedropper, and then click the screen color in the Key Color swatch for the key.
  - In Spill Suppressor, click the Key Color swatch and choose a color from the color wheel.

**Note:** To use the eyedropper in the Layer panel, choose Spill Suppressor from the View menu in the Layer panel.

3. From the Color Accuracy menu, choose Faster to suppress blue, green, or red. Choose Better to suppress other colors, because After Effects may need to analyze the colors more carefully to produce accurate transparency. The Better option may increase rendering time.
4. Drag the Suppression slider until the color is adequately suppressed.

More Help topics

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# Matte effects

## Matte Choker effect Simple Choker effect

For information on the Refine Matte effect and the Roto Brush effect, see Roto Brush effect and Refine Matte effect reference.

Third-party effects in this category included with After Effects:

- mocha shape effect

See Third-party plug-ins included with After Effects.

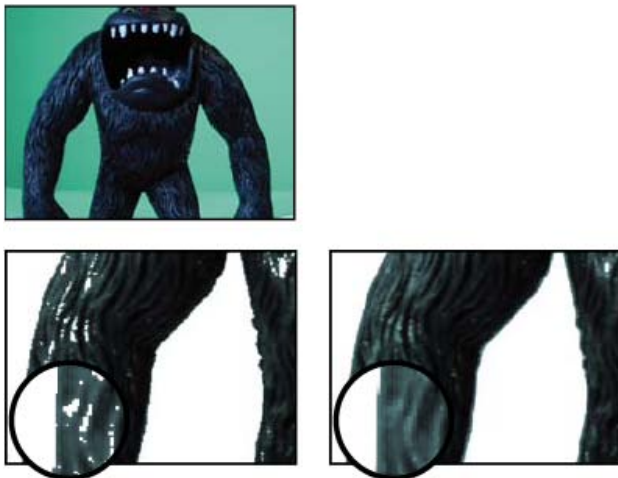
## Matte Choker effect

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The Matte Choker effect repeats a sequence of choking and spreading the matte to fill undesired holes (transparent areas) in opaque regions. The repetition is necessary because the entire matte must be choked and spread; the spreading fills the hole, but the edges of the matte must be choked back to preserve the matte shape.

The process of choking and spreading occurs in two stages, each with its own set of identical controls. Typically, stage two does the opposite of stage one. After a specified number of back-and-forth adjustments (which Matte Choker handles automatically), the hole is filled.

This effect works with 8-bpc and 16-bpc color.



Original (upper-left) shows areas of unwanted transparency after using Color Key (lower-left) that are removed with Matte Choker (lower-right).

 You can use the Matte Choker effect to only blur the alpha channel. To use this effect as an alpha-channel blur, set Gray Level Softness to 100%.

### Close a hole in a matte

1. Select the layer, and choose Effect > Matte > Matte Choker.
2. Set stage-one controls (the first three properties) to spread the matte as far as possible without altering its shape, as follows:  
**Geometric Softness** Specifies (in pixels) the largest spread or choke.  
**Choke** Sets the amount of choke. Negative values spread the matte; positive values choke it.  
**Gray Level Softness** Specifies how soft to make the edges of the matte. At 0%, the matte edges contain only fully opaque and fully transparent values. At 100%, the matte edges have a full range of gray values but may appear blurred.
3. Set stage-two controls (the next three properties) to choke the matte by the same amount as the amount by which you spread it in stage one.
4. (Optional) Use the Iterations property to specify how many times After Effects repeats the spread-and-choke sequence. You may need to try a few different settings so that the sequence is repeated as many times as necessary to close any unwanted holes.

## Simple Choker effect

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The Simple Choker effect shrinks or expands the edges of a matte in small increments to create a cleaner matte. The Final Output view displays

the image with the effect applied, and the Matte view provides a black-and-white view of the image with black areas indicating transparency and white areas indicating opacity. Choke Matte sets the amount of choke. Negative values spread the matte; positive values choke it.

This effect works with 8-bpc, 16-bpc, and 32-bpc color.



*Original (upper-left) contains unwanted edges after keying (lower-left) that are removed with Simple Choker (lower-right).*

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# Noise and Grain effects

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[Remove Grain effect](#)

[Turbulent Noise effect](#)

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## Work with Grain effects

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Almost every digital image captured from the real world contains grain or visual noise caused by the recording, encoding, scanning, or reproduction processes and by the equipment used to create the image. Examples include the faint static of analog video, compression artifacts from digital cameras, halftone patterns from scanned prints, CCD noise from digital image sensors, and the characteristic speckle pattern of chemical photography, known as film grain.

Noise isn't necessarily bad; it's often added to images to create a mood or tie elements together, such as adding film grain to a computer-generated object to integrate it into a photographed scene. However, noise can be unwanted for aesthetic reasons. Archival footage or high-speed photography may appear unpleasantly grainy; digital compression artifacts or halftone patterns may mar an image; or noise may interfere with technical processes such as bluescreen compositing.

Technical reasons also exist for reducing noise. For example, compression algorithms usually achieve smaller file sizes if the input material is less noisy, so noise reduction is a valuable preprocessing step for work such as DVD creation and video streaming.

The Add Grain, Match Grain, and Remove Grain effects allow you to manipulate grain that appears more or less evenly over an entire image. Grain effects can't correct image problems that affect only a few pixels, such as dust, salt and pepper noise, or analog video dropouts.

The Add Grain effect generates new grain from nothing; it doesn't take samples from existing grain. Instead, parameters and presets for different types of film can be used to synthesize different types of grain.

The Remove Grain and Match Grain effects use a two-step process to manipulate grain without affecting the edges, sharpness, or highlights of an image. First, the grain is sampled, either automatically or manually; second, the grain is analyzed and portrayed by a mathematical model, which the effect uses to add, remove, or match the grain.



*Three types of grain effects: matching (upper-left), adding (lower-left), and removing (lower-right)*

## Apply a grain effect

Each grain effect is applied with default settings and is displayed in Preview viewing mode, which has a preview region framed by a white border and centered on the image. The preview region displays the results of the grain effect on a portion of your image, for speed and comparison purposes. The grain effects are almost fully automatic but also offer many controls to achieve precise results. You can also selectively apply the

grain effects to portions of your image using the extensive Blend With Original features provided with each effect.

1. Select the layer, and choose Effect > Noise & Grain > [effect].
2. Choose a viewing method from the Viewing Mode control in the Effect Controls panel:  
**Preview** Displays the current settings of the applied effect in a 200x200-pixel area.

**Blending Matte** Shows the current color matte or mask, or the combination of both, which results from the current settings of the Blend With Original controls group.

**Final Output** Renders the full active frame, using the current settings of the effect.

3. Adjust the controls for the effect in the Effect Controls panel.  
The preview region in the Composition panel reflects any changes you make.
4. Choose Final Output from the Viewing Mode control.

### Apply a grain effect to a selected area

The Blend With Original controls group lets you precisely apply a grain effect to a particular area of an image by masking and matting the desired area. You can choose between two selection techniques or use a combination of both:

**Color Matching** Excludes any area of the image that matches a selected color. By inverting the matte, you can also selectively process such an area.

**Masking Layer** Uses any layer in the current composition as a mask to selectively process or exclude an area of the current layer or track.

When any grain effect is first applied, the Amount value of the Blend With Original controls group is set to 0%; this value determines the percentage of blending between the original image and the processed version. At 0%, no blending occurs and the selected effect is applied to the entire image at full strength; at 100%, white areas of the blending matte are unchanged from the original image.

Any mask or matte works in a similar way: The white pixels in it exclude that area of the original image from processing by the grain effect; the black pixels process normally. At 100% Amount, the white areas fully blend with the original so that they are completely excluded from the processing. This behavior remains true when the match is inverted. Regardless of the Amount value, the black areas of the matte or mask are always processed. The Amount slider affects only the areas under the white pixels in the matte or mask. It affects only how each grain effect treats the white areas of the matte or mask.

1. Apply a grain effect to the image.
2. Do any of the following in the Effect Controls panel:
  - To create a matte around the area to which you want to apply or exclude the grain effect, use the Color Matching controls in the Blend With Original controls group.
  - To mask the current layer with another layer or track, use the Masking Layer controls.
3. Adjust the Blur Matte value to soften the matte and to produce a softer transition between the affected and unaffected areas of the image.
4. If you're using both a color matte and a layer mask, choose one of the following from the Combine Match And Mask Using menu:  
**Screen** Makes the matte white wherever either the mask or the color match is white.  
**Multiply** Makes the matte white where both of the inputs are white.
5. Reduce the Amount value to let more of the original image show through the grain.
6. Choose Final Output from the Viewing Mode control.

### Generate a color-matching matte

When a grain effect is first applied, a neutral gray color is used to generate a default color-matching matte, so that in most images a visible matte appears. The Color Matching group of controls uses color matching to precisely define a matte. The matte isolates portions of the image where the layer that uses the grain effect is blended with the input.

1. Apply a grain effect to the image.
2. To select a color to exclude from or restrict to the effect, do one of the following adjacent to the Matching Color control in the Blend With Original and Color Matching controls groups:
  - Click the color swatch and select a color in the Color Picker dialog box.
  - Click the eyedropper  and click a color anywhere on the screen.
3. Do one of the following:
  - To prevent the grain effect from affecting the selected color, make sure that the Invert Match control is deselected.
  - To restrict the grain effect to the selected color, leaving the rest of the image unaffected, select Invert Match.
4. If you want to exclude colors that are similar to the matching color, increase the Matching Tolerance value, which sets a threshold for color matching. As the value increases, the matte includes pixels with colors increasingly different from the matching color.
5. Choose an option from the Match Color Using control if you want to change the default criterion (RGB) used to determine that a color is similar to the matching color.

- Adjust the Matching Softness controls to determine the width of the transition band between completely matched and completely unmatched pixels or how smoothly the affected areas blend with the original image.
- Select Invert Match if you want to invert the matte so that the white areas become black and the black areas become white. (The matching color is black in the matte and is processed by the grain effect regardless of the Amount setting. The inversion doesn't affect any other settings.)
- If you're using both a color matte and a layer mask, choose one of the following from the Combine Match And Mask Using menu:  
**Screen** Makes the matte white wherever either the mask or the color match is white.  
**Multiply** Makes the matte white where both of the inputs are white.
- Choose Final Output from the Viewing Mode control.

## Generate a layer matte

In some cases, you may want to use a different layer or track as a mask for the layer that uses a grain effect. This type of mask allows unlimited control over exactly which parts of an image are modified and by how much.

- Apply a grain effect to the image.
- In the Effect Controls panel, choose the layer that you want to use as a mask from the Mask Layer control in the Blend With Original and Masking Layer controls groups.
- Choose a masking mode from one of the standard track matte mode options.
- If the masking layer is a different size than the current layer, choose one of the following from the If Mask Size Differs pop-up menu in the Masking Layer controls:  
**Center** Centers the masking layer over the current layer.  
**Stretch To Fit** Resizes the masking layer to match the dimensions of the current layer.
- If you're using both a color matte and a layer mask, choose one of the following from the Combine Match And Mask Using menu:  
**Screen** Makes the matte white wherever either the mask or the color match is white.  
**Multiply** Makes the matte white where both of the inputs are white.
- Choose Final Output from the Viewing Mode control.

## Change the preview region

You can use the Preview Region controls group to change the position or the size of the preview region for a grain effect.

Because adding or removing grain can affect sharpness of detail, you may want to preview an area of fine detail, such as a human face or some text. When you remove grain with the Remove Grain effect, a best practice is to preview an area where the grain is most clearly visible or most objectionable, such as a large expanse of solid color.

You'll achieve the best results by experimenting, applying small increments to each of several controls in the Effect Controls panel, and viewing the results in the Composition panel after every adjustment.

- After applying a grain effect, click the Center button  in the Preview Region group of controls in the Effect Controls panel.  
A cross hair is centered in the Composition panel.
- In the image, click the desired center of the preview region.  
The preview region redraws, centered in the new position.
- To change the dimensions of the preview region, change the Width and Height values in the Effect Controls panel to the desired size, in pixels. (Larger preview regions can result in slower rendering.)
- Select Show Box if you want to outline the preview region in color. If you want to change the outline color, next to Box Color do one of the following:
  - Click the color swatch and select a color in the Color Picker dialog box.
  - Click the eyedropper button, and click a color anywhere on the screen.
- View the results:
  - To view the fine detail of the noise structure, zoom into the preview region.
  - To examine the noise in each channel independently, click the corresponding color channel icon in the Composition panel.
  - To increase the interaction speed and RAM preview duration, use the Region Of Interest feature in the Composition panel to reduce the area that's processed. (See Region of interest (ROI).)
  - To retain an image of the current frame in its current state, click Take Snapshot  in the Composition panel. You can then click Show Snapshot  to view the most recent snapshot instead of the active composition, and to toggle between the current and previous states of the preview region. This technique is extremely useful for evaluating subtle adjustments. (See Snapshots.)
  - To compare the preview region with and without the grain effect, click the Effect switch  next to the name of the grain effect in the Effect Controls panel to temporarily disable the effect. Click Take Snapshot  in the Composition panel, click the Effect switch again to

re-enable the effect, and then click and hold down Show Snapshot  to display the snapshot of the image without the effect.

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## Work with noise samples in Grain effects

Noise sampling is the first and most important step in removing noise from an image or in matching the noise of one image in another image. Normally, this process is entirely automatic. For fine control, you can switch to Manual mode and adjust the samples using the Sampling controls group in the Effect Controls panel.

A noise sample should be a solid block of uniform color that clearly displays the noise pattern present in the image. The objective is to extract samples of pure noise, without any image features that the algorithm could misconstrue as grain. For example, extract samples from a piece of sky, a background wall, or an area of flesh tone. All samples should be selected from the normal range of the film, DV, or video stock. Avoid underexposed or overexposed areas lacking in information, especially areas where pixel values have been clipped to pure black or white. Within this normal exposure range, it's best to select samples with various RGB values and colors—for example, one sample from a bright area, one from a dark area, and one from an area with midtones.

The number of samples in automatic mode is high to ensure that the algorithm has enough good noise data, even if finding good samples in a particular image is difficult. In addition, automatic mode may override the number of samples you've set if the effect can't find enough good samples. You can vary the size of the samples in either automatic or manual mode; however, increasing sample size doesn't guarantee better results, especially if the resulting samples include more substantial variations in RGB values. Sample size should be reduced if a particular image doesn't contain sufficiently large areas of constant color values. Conversely, increasing the sample size may give better results if the image contains large featureless areas.

### Manually reposition noise samples

Automatic grain or sample selection generally gives acceptable results for the Match Grain or Remove Grain effect, but you can choose to manually position and resize each sample or change the sample number. For example, you may want to reposition samples if the automatic sampling selected a uniform area that is underexposed or overexposed and that lacks information about grain structure.

Noise samples for the Match Grain and Remove Grain effects are always extracted from the source layer without regarding any effects or masks already applied to the layer; this method results in more accurate sampling. If you want the samples to include the existing effects, precompose or pre-render the source layer with the effects and then apply the grain effect to the resulting source layer.

Avoid sample areas with the following characteristics: sharp edges, color gradients, highlights, textures such as grass or water ripples, fine detail such as hair or tree leaves, and overexposed or underexposed areas lacking in information.

1. In the Effect Controls panel, choose Noise Samples from the Viewing Mode menu.

The samples appear as small white squares (24x24 pixels) overlaid on the source image.

2. Choose Manual from the Sample Selection pop-up menu in the Sampling controls group.
3. To remove the least desirable samples from the image, try reducing the Number Of Samples value.
4. To move a noise sample, do one of the following:
  - Click the point parameter  for the noise sample in the Noise Sample Points controls group. A cross hair appears in the composition, centered on that sample. Click the desired location in the Composition panel to place the sample.
  - Using the Selection tool , drag the sample point in the Composition panel to the desired location.
  - Enter the desired horizontal and vertical coordinates in the Effect Controls panel.

**Note:** The number of sample points that are enabled corresponds to the current value of the Number Of Samples.

5. Repeat for each sample point you want to move.

### Change the sampling source frame

By default, the Remove Grain and Match Grain effects take noise samples from the first frame of the layer, but you can choose to sample the noise from a different frame. Changing the frame may be useful if large lighting or exposure variations occur between frames within the layer.

1. Decide which frame you want to sample; make sure that the project settings Display Style is set to Frames, numbering from zero. The number of the current frame then appears in blue in the upper-left corner of the Timeline panel. Enter that frame number as the Source Frame value in the Sampling controls group.
2. Choose Noise Samples from the Viewing Mode menu.

The selected frame appears in the Composition panel, and its automatic samples appear on the image.

### Change the noise sample box color

You can set the viewing mode for the Remove Grain or Match Grain effect to Noise Samples to see the areas sampled by the effect. Sampled areas are automatically framed with a white outline. If you prefer, you can change the color of these noise sample boxes.

❖ Next to the Sample Box Color control in the Sampling controls group, do one of the following:

- Click the color swatch, and select a color in the Color Picker.

- Click the eyedropper, and click a color anywhere in the application window.

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## Working with added or matched grain

The Add Grain effect creates new grain or noise in an image by building the grain from nothing or by basing the properties of the grain on presets. The Match Grain effect also creates new grain in an image but by matching the grain in a different image. Both effects share several controls in the Effect Controls panel that let you control the color, tonal range, blending mode, and animation properties of the grain.

### Adjusting the tones of added or matched grain

The precise grain pattern present in any frame of film isn't uniform throughout the frame but may depend on the tonal values of the content at each pixel. For example, in chemical film grain, the sizes of the silver halide crystals vary with the exposure level.

The Add Grain and Match Grain effects let you reproduce these subtle changes in grain patterns across areas of an image by using the Shadows, Midtones, Highlights, and Midpoint controls in the Application controls group. These controls let you define how much grain is added to each tonal area and also to each channel in the image. For example, you can add more grain to overexposed areas of the blue channel to give an image of sky a grainier look.

You can use the Application controls group for the Add Grain or Match Grain effect to do the following:

- To define how much grain is added to each tonal area in an image, adjust the Shadows, Midtones, and Highlights values.
- To define the midpoint of the tonal range of the image for grain application purposes, adjust the Midpoint slider. By default, this slider is centered at 0.5, which represents the middle of the range of pixel values—127 for 8-bpc images and 16384 for 16-bpc images.
- For even finer control, use the Channel Balance controls to adjust the grain in the shadow, midtone, and highlight areas independently for each channel.

### Animating added or matched grain

By default, the grain or noise generated by the Add Grain and Match Grain effects moves at the same speed as the source material to accurately simulate realistic noise. Slowing down the noise processes may be useful for aesthetic effect or to keep the added noise from buzzing and drawing attention to itself. These effects have an internal randomizer that changes the positions of the noise pixels between frames. But you can also change the appearance of the noise between layers on the same frame while keeping every other parameter constant.

You can use the Animation controls group for the Add Grain or Match Grain effect to do the following:

- To specify the frame rate of the added grain, as a multiple of the destination frame rate, adjust the Animation Speed value in the Animation controls group in the Effect Controls panel. At higher Animation Speed values, the lifespan of the grains is lower. At the default value of 1, the grain moves at the same rate as the frames. At lower values, the grain changes more slowly, which can be useful for giving the appearance of film grain. At zero, the grain is stationary over time.
- To use interpolation to create smooth transitions between the generated noise frames, select Animate Smoothly. This control matters only if Animation Speed is less than 1.
- To change the appearance of the noise between layers on the same frame, adjust the Random Seed value. Each Random Seed value represents one of 100 possible variations in the appearance; changing the value doesn't make the results more or less random.

### Blending and adjusting the color of added or matched grain

You can adjust the color, saturation, and blending behavior of the grain generated by the Add Grain or Match Grain effect.

Several factors can affect the apparent color of the grain that these effects generate, including the following:

- The color value of the underlying pixel in the source image.
- The Saturation value of the noise.
- The Tint Color and Tint Amount values, if you have modified these settings from the defaults.
- The Blending Mode value in the Application controls group.
- The amount of noise applied, if any, to each channel individually using the Channel Intensities controls group.

Using the Color controls group in the Effect Controls panel, you can adjust any of the following:

**Monochromatic** Gives the added noise a single tint. By default, the tones are black and white, but you can change the Tint Color to make it a gradient of any color. (The Saturation and Channel Intensities controls aren't available if Monochromatic is selected.)

**Tint Amount** Controls the depth and intensity of the color shift.

**Tint Color** Controls the color the added noise shifts toward.

**Saturation** Controls the amount and vividness of the color.

The Blending Mode in the Application controls determines how the color value of the generated noise combines with the color value of the underlying source layer at each pixel:

**Film** Makes the generated grain appear embedded in the image. This mode affects darker colors more than lighter ones, just as the grain in a film negative appears.

**Multiply** Multiplies the color values of the noise and the source. However, the result may be either lighter or darker than the original, because the



noise may have either a positive or negative value.

**Add** Combines the color values of the pixel in the source with the noise. However, the result isn't always lighter than the original because the noise created by grain effects can have either a positive or negative value.

**Screen** Multiplies the inverse brightness values of the noise and the source. The effect is like printing from a multiple exposure on a negative. The result is always brighter than the original.

**Overlay** Combines the behavior of Film and Multiply: Both shadows and highlights get less grain, while midtones get a full application of grain.

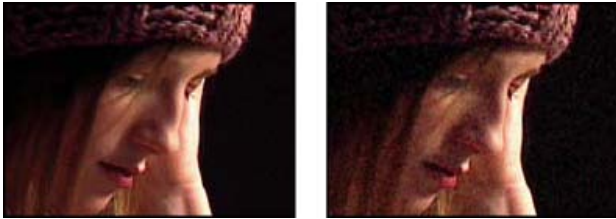
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## Add Grain effect

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The Add Grain effect generates new noise from nothing and does not take samples from existing noise. Instead, parameters and presets for different types of film can be used to synthesize many different types of noise or grain. You can modify virtually every characteristic of this noise, control its color, apply it to the image in several ways, even animate it or apply it selectively to only a part of your image.

This effect works with 8-bpc and 16-bpc color.



Original (left), and with effect applied (right)

The distribution of the added noise over the color channels does affect the overall color of the resulting image. With a dark background, the noise tends to add to the image visually, so a red tint or more noise in the red channel gives a reddish hue to the image. With a bright background, the noise tends to subtract from the image visually, so a red tint or more noise in the red channel gives a cyan color. The result also depends on the Blending Mode control in the Application controls group.

**Note:** The actual grain of your image may vary from the film presets, because of factors such as exposure and scanning resolution.

You can use the controls for the Add Grain effect to do the following:

- To reproduce the grain of a particular film or photographic stock, choose the film type from the Preset menu for the Add Grain effect in the Effect Controls panel.
- To adjust the intensity and size of the applied grain and introduce a blur, adjust the Tweaking controls group for the Add Grain effect in the Effect Controls panel.
- To modify the color of the added noise, adjust the Color controls.
- To define how the color value of the generated noise combines with the color value of the underlying destination layer at each pixel, choose a Blending Mode in the Application controls group.
- To define how much grain is added to each tonal area in your image and the midpoint, adjust the Shadows, Midtones, Highlights, and Midpoint values in the Application controls group.
- To animate the added grain, adjust the properties in the Animation controls group.
- To apply the effect to the entire image, choose Final Output from the Viewing Mode menu.

### Tweaking controls for Grain effects

The Match Grain and Add Grain effects share a group of Tweaking controls. You can use these controls to modify the intensity and size of the noise and to introduce a blur, all of which can be done across the three channels or individually for each channel. You can also change the aspect ratio of the applied grain.

**Note:** The values of the Tweaking controls are relative to the noise sampled in the source layer: a value of 1.0 leaves that property of the source noise unchanged, while higher and lower values alter the applied noise.

Adjust any of the following controls in the Tweaking controls group:

**Intensity** Controls the amount of variation in brightness and color strength between pixels in the generated noise, which determines the visibility of the noise. Increasing the value does not change the position or size of each grain but makes the grain appear to pop more; lower values give a more subtle muted appearance.

**Channel Intensities** Controls the contrast between pixels in the generated noise separately for each channel. For example, you may want to add more grain to the blue channel to emulate film.

**Size** Adjusts the size of the generated grain in pixels.

**Channel Size** Adjusts the size of the generated grain in pixels independently for each channel.

**Softness** Sets the amount of softness in the grain.

**Aspect Ratio** Controls the ratio of the width of the generated grain over a constant height of 1; this setting is useful for emulating the effect of anamorphic lenses or for aesthetic effects. A value higher than 1 stretches the grain horizontally; values smaller than 1 squash it horizontally.



## Dust & Scratches effect

The Dust & Scratches effect reduces noise and defects by changing dissimilar pixels within a specified radius to be more like their neighboring pixels. To achieve a balance between sharpness of the image and hiding defects, try various combinations of Radius and Threshold settings.

This effect works with 8-bpc and 16-bpc color.



*Original image with scratches (upper-left), enlarged view of scratches (lower-left), and scratches removed with loss of clarity (lower-right)*

**Radius** How far the effect searches for differences among pixels. High values make the image blurry. Use the smallest value that eliminates the defects.

**Threshold** How different pixels can be from their neighbors without being changed by the effect. Use the highest value that eliminates the defects.

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## Fractal Noise effect

The Fractal Noise effect uses Perlin noise to create grayscale noise that you can use for organic-looking backgrounds, displacement maps, and textures, or to simulate things like clouds, fire, lava, steam, flowing water, or vapor.

This effect works with 8-bpc, 16-bpc, and 32-bpc color.

The Evolution controls create subtle changes in the shape of the fractal noise. Animating these controls results in smooth changes of the noise over time, creating results that resemble, for example, passing clouds or flowing water.

Chris Zwar provides an article on the [Creative COW website](#) that explains how the Fractal Noise effect works, including many details and images regarding the inner workings of the effect.

Stu Maschwitz provides an example project on his [ProLost blog](#) that uses the Fractal Noise effect to create the corona of the Sun.

Harry Frank provides an animation preset on the [AE Freemart website](#) that uses Fractal Noise to create a star field.

Maltaannon (Jerzy Drozda, Jr.) provides a video tutorial on the [Creative COW website](#) that shows how to use the Fractal Noise effect to create a star field and then use a star field as a skybox to provide a distant backdrop in a 3D world.

The Turbulent Noise effect is essentially a modern, higher-performance implementation of the Fractal Noise effect. The Turbulent Noise effect takes less time to render, and it's easier to use for creating smooth animations. The Turbulent Noise effect also more accurately models turbulent systems, with smaller noise features moving more quickly than larger noise features. The primary reason to use the Fractal Noise effect instead of the Turbulent Noise effect is for the creation of looping animations, since the Turbulent Noise effect doesn't have Cycle controls.

**Note:** *Because the controls for the two effects are nearly identical, you can use most instructions and tutorials created for the Fractal Noise effect to instead guide your use of the Turbulent Noise effect. (See Turbulent Noise effect.)*

### Controls

**Fractal Type** The fractal noise is created by generating a grid of random numbers for each noise layer. The Complexity setting specifies the number of noise layers. The Fractal Type setting determines the characteristics of this grid.

**Noise Type** The type of interpolation to use between the random values in the noise grid.

**Invert** Inverts the noise. Black areas become white, and white areas become black.

**Contrast** The default value is 100. Higher values create larger, more sharply defined areas of black and white in the noise, generally revealing less subtle detail. Lower values result in more areas of gray, softening or muting the noise.

**Overflow** Remaps color values that fall outside the range of 0–1.0, using one of the following options:

**Clip** Remaps values so that any value above 1.0 is displayed as pure white, and any value below 0 is displayed as pure black. The Contrast value influences how much of the image falls outside this range. Higher values result in a mostly black and/or white image with less gray area. Therefore, higher contrast settings display less subtle detail. When used as a luma matte, the layer has sharper, better-defined areas of transparency.

**Soft Clamp** Remaps values on an infinite curve so that all values stay in the range. This option reduces contrast and makes noise appear

gray with few areas of pure black or pure white. When used as a luma matte, the layer contains subtle areas of transparency.

**Wrap Back** Remaps triangularly, so that values above 1.0 or below 0 fall back into the range. This option reveals subtle detail when Contrast is set above 100. When used as a luma matte, the layer reveals more detailed textured areas of transparency.

**Allow HDR Results** No remapping is performed. Values outside the range of 0-1.0 are preserved.

**Transform** Settings to rotate, scale, and position the noise layers. The layers appear as if they are at different depths if you select Perspective Offset.

**Complexity** The number of noise layers that are combined (according to the Sub Settings) to create the fractal noise. Increasing this number increases the apparent depth and amount of detail in the noise.

**Note:** *Increasing Complexity results in longer rendering times. If appropriate, try reducing the Size rather than increasing Complexity to achieve similar results and avoid longer rendering. A trick to increase apparent complexity without increasing rendering time is to use a negative or very high Contrast or Brightness setting and choose Wrap Back for Overflow.*

**Sub Settings** The fractal noise is generated by combining layers of noise. The Sub Settings control how this combination occurs and how the properties of the noise layers are offset from one another. Scaling successive layers down creates finer details.

**Sub Influence** How much influence each successive layer has on the combined noise. At 100%, all iterations have the same amount of influence. At 50%, each iteration has half as much influence as the previous iteration. A value of 0% makes the effect appear exactly as if Complexity is 1.

**Sub Scaling, Rotation, and Offset** The scale percentage, angle, and position of a noise layer relative to the previous noise layer.

**Center Subscale** Calculates each noise layer from the same point as the previous layer. This setting can result in the appearance of duplicated noise layers stacked on top of each other.

**Evolution** Uses progressive revolutions that continue to change the image with each added revolution. This method is unlike typical revolutions that refer to a setting on the dial control for which the result is the same for every multiple of 360°. For Evolution, the appearance at 0° is different from the appearance at 1 revolution, which is different from the appearance at 2 revolutions, and so on. To return the Evolution setting to its original state (for example, to create a seamless loop), use the Cycle Evolution option.

You can specify how much the noise evolves over a period of time by animating Evolution. The more revolutions within a given amount of time, the more rapidly the noise changes. Large changes in the Evolution value over a short period of time may result in flashing.

To create a seamless loop, use Cycle Evolution, and set Evolution keyframes at full revolutions with no degrees—partially completed revolutions may interrupt the loop.

**Evolution Options** Options for Evolution.

**Cycle Evolution** Creates a cycle of Evolution that loops over the set amount of time. This option forces the Evolution state to return to its starting point, creating a smooth progressive cycle, a nonrepeating cycle, or a loop segment.

To ensure that a cycle completes full revolutions, choose a Cycle value that either matches or is evenly divisible by the number of revolutions set for Evolution.

**Cycle (in Revolutions)** Specifies the number of revolutions that the noise cycles through before it repeats. The amount of time between Evolution keyframes determines the speed of these Evolution cycles. This option affects only the evolution of the noise, not Transform or other controls. For example, if you view two identical states of noise with different Size or Offset settings, they don't appear the same.

**Note:** *Cycle is available only if Cycle Evolution is selected.*

**Random Seed** Sets a random value from which to generate the noise. Animating the Random Seed property results in flashing from one set of noise to another (within that fractal type), which is usually not the result that you want. For smooth animation of noise, animate the Evolution property.

 *You can easily create new fractal noise animations by reusing previously created Evolution cycles and changing only the Random Seed value. Using a new Random Seed value alters the noise pattern without disturbing the Evolution animation.*

 *Instead of animating Evolution over the entire composition, save rendering time by prerendering and looping one short Evolution cycle for the duration you want.*

**Opacity** Opacity of the noise.

**Blending Mode** The blending operation between the fractal noise and the original image. These blending modes are identical to the ones in the Modes column in the Timeline panel, with the following exceptions:

**None** Renders the fractal noise only and does not composite on the original layer.

**Hue** Renders the fractal noise as hue values instead of grayscale. The Saturation and Lightness of the original layer are maintained. If the original layer is grayscale, nothing happens.

**Saturation** Renders the fractal noise as saturation values instead of grayscale. The Hue and Lightness of the original layer are maintained. If the original layer is grayscale, nothing happens.

## Create a seamless loop using Fractal Noise

1. Select a layer in the Timeline panel, and choose Effect > Noise & Grain > Fractal Noise.
2. Set two keyframes for Evolution.
3. Adjust the time between keyframes and the number of Evolution revolutions until you are satisfied with the animation of the noise.
4. Select Cycle Evolution.
5. Set a value for Cycle.

The evolution completes the number of revolutions you specify for Cycle in the amount of time determined by the distance between

Evolution keyframes. Determine the Cycle value by considering how much of this cycle you need to render before it repeats. Choose the shortest length appropriate for your project to save rendering time.

Initially, the last frame of a cycle is identical to the first frame. To create a seamless loop, skip the last frame by setting the Out point of the layer one frame before the last frame of the cycle:

6. Move the current-time indicator to the time where the cycle completes. For example, if the Cycle is set to 2, locate the frame when the Evolution value is 2.  
**Note:** If you set keyframes for other Fractal Noise controls, return them to their initial settings where the cycle begins to repeat in the timeline, or the controls don't loop.
7. Move the current-time indicator back one frame.
8. Trim the Out point of the layer to this frame.
9. Pre-render this layer, and import the pre-rendered movie into your project.
10. Select the imported footage item in the Project panel, and choose File > Interpret Footage. Then set Loop to the number of loops required for the duration of the layer in the project.

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## Match Grain effect

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The Match Grain effect matches the noise between two images. This effect is especially useful for compositing and in bluescreen/greenscreen work. The Match Grain effect only adds noise and can't remove it, so if the destination is already noisier than the source, an exact match is not possible. In this case, you can first use the Remove Grain effect to clean up the destination and then apply the Match Grain effect to the result to get a perfect match.

The Match Grain effect uses noise sampling as its starting point. Basically, entire frames of new noise are synthesized to match the noise samples. You can modify the noise in many ways before the effect is applied to the new image, such as duplicating the noise from an image but making the noise larger and redder before applying the noise to another image.

The Match Grain effect shares some controls with the Add Grain effect. (See Add Grain effect.)

**Note:** The Match Grain effect samples the noise on the frame in the source layer that corresponds to the first frame in the destination layer. If the source layer is not present at that frame, or if the noise samples contain transparent areas, no noise is sampled or applied.

This effect works with 8-bpc and 16-bpc color.

### Match noise or grain between images

1. Make sure that the source and the destination layers are in the same composition.
2. Select the destination layer to which you want to add grain.
3. Choose Effect > Noise & Grain > Match Grain.
4. Choose a layer from the Noise Source Layer control in the Effect Controls panel to specify the source layer from which you want to sample the grain. (The Noise Source Layer control lists only layers that are in the Timeline panel.) The grain is automatically sampled and applied to the preview region on the destination layer. If you need an automatic match, you can skip the remaining steps.
5. If there already is significant noise in the destination layer before choosing a noise source layer and this causes a grain mismatch, adjust the Compensate For Existing Noise slider to avoid grain build-up.
6. Do any of the following:
  - To adjust the intensity and size of the applied grain and to introduce a blur, adjust the Tweaking controls.
  - To modify the color of the added noise, adjust the Color controls.
  - To determine how the color value of the generated noise combines with the color value of the underlying destination layer at each pixel, choose a Blending Mode in the Application controls group.
  - To define how much grain is added to each tonal area in your image and the midpoint, adjust the Shadows, Midtones, Highlights, and Midpoint values in the Application controls group.
7. If you want to change the effect view, choose any of the following from the Viewing Mode menu in the Effect Controls panel:  
**Noise Samples** Shows the areas that have been sampled to extract the current noise model. Selecting the source layer causes it to appear in the Composition panel, with its noise sample squares displayed. **Compensation Samples** Shows the noise samples that have been automatically extracted from the destination image. **Preview** Displays the current settings of the applied effect in a 200x200 pixel area. **Blending Matte** Shows the current color matte or mask, or the combination of both, which results from the current settings of the Blend With Original controls group. **Final Output** Renders the full active frame, using the current settings of the effect.
8. Animate the added grain, if desired.
9. Choose Final Output from the Viewing Mode control.

### Compensate for existing noise when matching noise

If you're trying to match the grain between images with the Match Grain effect, and your destination layer already has its own visible grain, a grain mismatch or grain build-up may occur. To prevent these problems, the Compensate For Existing Noise control extracts a noise model from both the source and the destination and then modifies the noise from the source to account for the noise already present in the destination, before

applying it to the destination.

To use this control automatically, set the Compensate For Existing Noise slider to 100%. You can then view the noise samples in the destination layer by choosing Compensation Samples in the Viewing Mode menu. You can also reposition the samples in the destination image by setting Sampling Mode to Manual, which makes the Compensation Sample Points available for manual repositioning.

1. Apply the Match Grain effect to the destination layer.
2. In the Effect Controls panel, adjust the Compensate For Existing Noise value under the Match Grain effect as needed. The noise in the source layer and the noise in the destination layer are sampled, and their difference is calculated, so that only enough noise to match the destination layer to the source layer is applied to the destination.
3. To modify the noise samples, choose Noise Samples from the Viewing Mode menu, change the Sampling > Sample Selection control to Manual, and then expand the Compensation Sample Points. The current value of Number Of Samples determines how many points are available.
4. To reposition each sample point, do any of the following:
  - Drag each sample point in the Composition panel to a new location.
  - Enter new x and y coordinates adjacent to the sample point under the Compensation Sample Points controls in the Effect Controls panel.
  - Click the point parameter  for the Compensation Sample Point in the Effect Controls panel, and then click where you want to move the point in the Composition panel.
5. Choose Final Output from the Viewing Mode control.

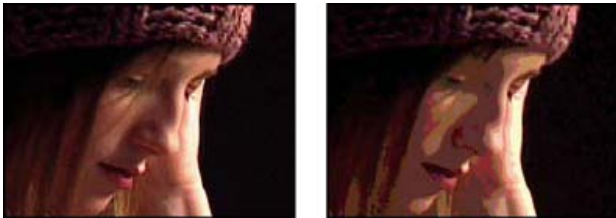
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## Median effect

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The Median effect replaces each pixel with a pixel that has the median color value of neighboring pixels with the specified Radius. At low Radius values, this effect is useful for reducing some types of noise. At higher Radius values, this effect gives an image a painterly appearance.

This effect works with 8-bpc and 16-bpc color.



*Original (left), and with effect applied (right)*

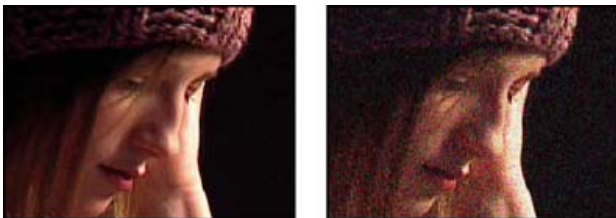
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## Noise effect

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The Noise effect randomly changes pixel values throughout the image.

This effect works with 8-bpc, 16-bpc, and 32-bpc color.



*Original (left), and with effect applied (right)*

**Amount Of Noise** The amount of noise to add.

**Noise Type** Use Color Noise adds random values to the red, green, and blue channels individually. Otherwise, the same random value is added to all channels for each pixel.

**Clipping** Clips color channel values. Deselecting this option causes more apparent noise. This control does not work in a 32-bpc project.

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## Noise Alpha effect

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The Noise Alpha effect adds noise to the alpha channel.

This effect works with 8-bpc color.

**Noise** The type of noise. Unique Random creates equal amounts of black and white noise. Squared Random creates high-contrast noise. Uniform Animation creates animated noise, and Squared Animation creates animated high-contrast noise.

**Amount** The magnitude of the noise.

**Original Alpha** How to apply the noise to the alpha channel:

**Add** Produces equal amounts of noise in the transparent and opaque areas of the clip.

**Clamp** Produces noise in the opaque areas only.

**Scale** Increases the amount of noise proportionate to the level of opacity and produces no noise in 100% transparent areas.

**Edges** Produces noise only in partially transparent areas, such as the edge of the alpha channel.

**Overflow** How the effect remaps values that fall outside the grayscale range of 0-255:

**Clip** Values above 255 are mapped to 255. Values below 0 are mapped to 0.

**Wrap Back** Values above 255 or below 0 are reflected back into the 0-255 range. For example, a value of 258 (255+3) is reflected to 252 (255-3), and a value of -3 is reflected to 3.

**Wrap** Values above 255 and below 0 are wrapped back around into the 0-255 range. For example, a value of 258 wraps around to 2, a value of 256 wraps around to 0, and a value of -3 wraps around to 253.

**Random Seed** An input value to the random number generator for the noise. This control is active only if you choose Uniform Random or Squared Random.

 *To produce flashing noise, animate the Random Seed control. To create smoothly animated noise, animate the Noise Phase value.*

**Noise Phase** Specifies the placement of noise. This control is active only if you choose Uniform Animation or Squared Animation.

**Noise Options (Animation)** How noise is animated.

**Cycle Noise** Produces a cycle of noise that plays through once in the specified amount of time.

**Cycle** Specifies the numbers of revolutions of the Noise Phase that the noise cycles through before it repeats (available only when Cycle Noise is selected).

Alter the timing of the Noise Phase keyframes to adjust the speed of the Noise Phase cycles.

 *To save time animating the Noise Phase value, use the Cycle Noise option to create a seamless noise loop. Then, render the layer, and re-import it as a new source footage item.*

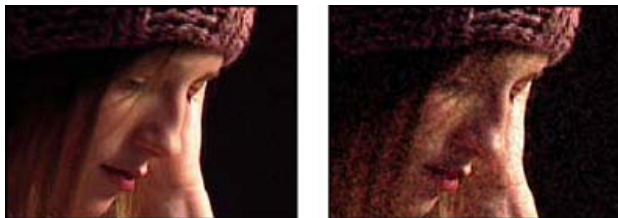
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## Noise HLS effect and Noise HLS Auto effect

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The Noise HLS and Noise HLS Auto effects add noise to the hue, lightness, and saturation components of an image. The noise generated by the Noise HLS Auto effect is automatically animated noise; you choose the speed of the animation. To animate the Noise HLS effect, use keyframes or expressions. Controls for these effects are the same except for the Noise Phase or Noise Animation Speed control, which controls noise animation.

These effects work with 8-bpc color.



Original (left), and with effect applied (right)

**Noise** The type of noise. Uniform produces uniform noise. Squared creates high-contrast noise. Grain produces grainlike noise similar to film grain.

**Hue** The amount of noise added to hue values.

**Lightness** The amount of noise added to lightness values.

**Saturation** The amount of noise added to saturation values.

**Grain Size** This control is active only for the Grain type of noise.

**Noise Phase (Noise HLS only)** An input value to the random number generator for the noise. When you set keyframes for Noise Phase, the effect cycles through the phases to create animated noise. Greater value differences between keyframes increase the speed of the noise animation.

**Noise Animation Speed (Noise HLS Auto only)** The speed of the noise animation. To accelerate or decelerate the noise animation, animate this property.

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## Remove Grain effect

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To remove grain or visual noise, use the Remove Grain effect. This effect uses sophisticated signal processing and statistical estimation techniques in an attempt to restore the image to how it would look without the grain or noise. While many techniques, such as applying a mild Gaussian Blur effect or the Median effect, reduce the visibility of noise in an image, the tradeoff is an unavoidable loss of sharpness and highlights. The Remove Grain effect, in contrast, differentiates fine image detail from grain and noise and preserves the image detail as much as possible.

The Remove Grain effect provides several options to precisely balance the reduction in noise and the amount of sharpness retained in the image. Additionally, the Remove Grain effect can analyze the differences between frames to further improve noise reduction and sharpness; since this



process operates over time, it is called temporal filtering.

**Note:** Good degrading depends on good noise sampling. The results of the automatic sampling depend on the image content and noise type. You can also change the number, size, and position of the samples to get the best results for a particular image.

The Temporal Filtering controls of the Remove Grain effect use a statistical algorithm to blend the current frame with previous and next frames. These controls are especially effective in removing compression artifacts from DV or video footage.

To properly evaluate the results of this filter, the result must be viewed in real time, either with a RAM preview or by viewing a movie rendered to a file.

 To increase the speed of the Remove Grain effect preview, adjust the Remove Grain controls in order in the Effect Controls panel. Specifically, the most efficient workflow is to find effective degrading settings first and to adjust the last three controls last.

This effect works with 8-bpc and 16-bpc color.

## Remove noise or grain from an image

1. Select the layer, and choose **Effect > Noise & Grain > Remove Grain**.
2. Adjust any of the following using the Noise Reduction Settings controls group:
  - To adjust the overall amount of noise in the image, adjust the Noise Reduction value.
  - To adjust the amount of noise on each channel individually, adjust the Red, Green, and Blue Noise Reduction values in the Channel Noise Reduction controls.  
 The blue channel often has the most pronounced grain in a chemical film-based image. Try reducing the noise in only the blue channel to retain all image detail in the other two channels.
3. Adjust the Passes value to control the maximum noise radius that can be detected:
  - If your grain is large and chunky, try increasing the Passes value. A higher number of passes reduces larger-sized noise.
  - If your render time is longer than desired because your file size is large, try lowering the number of passes to reduce the memory usage and render time.  
**Note:** Once the optimum number of passes is applied, additional passes have no effect.
4. Choose one of the following from the Mode pop-up menu:  
**Multichannel** Degrains all channels of a color image together, which generally produces the best results on color images. This mode takes advantage of correlations between channels to improve the accuracy of the denoising process. **Single Channel** Degrains each channel independently. Use this mode for a monochromatic image or if Multichannel causes objectionable color artifacts.
5. Adjust any of the following in the Fine Tuning controls group to improve the balance between noise reduction and retained sharpness:  
**Chroma Suppression** Suppresses some of the chroma from the noise to clean up the image. If the noise is colorful, increasing this control can help remove it. Setting the amount too high may strip some chroma from the image itself. (Chroma Suppression has no effect on grayscale images and isn't available if the Noise Reduction Settings Mode is Single Channel.) **Texture** Controls the amount of low-level noise that passes through to the output. This setting is especially useful to reduce objectionable artifacts or to retain finely textured areas such as wood grain or brick. Lower values result in a smoother, possibly artificial-looking result. Higher values may leave the output unchanged from the input. **Noise Size Bias** Controls how the noise reduction process responds to variations in noise size within the same image. The default value of zero treats all sizes equally. Negative values leave larger residual noise and more aggressively remove smaller-sized grain. Positive values leave smaller noise and more aggressively remove noise of larger size. **Clean Solid Areas** Controls the extent to which adjacent pixels with low variations in value are smoothed out by the noise reduction process. This setting is helpful for large areas of solid color that need to be as clean as possible. Settings that are too high can smooth out nearly solid areas of the image, resulting in an artificial appearance.
6. Adjust the Unsharp Mask controls to return subtle edge detail that the degrading removed.
7. Use the Temporal Filtering controls to perform interframe noise reduction.
8. To change the effect view, choose any of the following from the Viewing Mode pop-up menu:  
**Noise Samples** Shows the areas that have been sampled to extract the current noise model. **Preview** Displays the current settings of the applied effect in a 200x200 pixel area. **Blending Matte** Shows the current color matte or mask, or the combination of both, which results from the current settings of the Blend With Original controls group.
9. Choose Final Output from the Viewing Mode control.

## Add temporal filtering to a layer

1. Apply the Remove Grain effect to your image.
2. Place the Remove Grain preview region over the area of the image that has the most subtle changes from frame to frame or that has the most moving image detail.
3. Select Enable in the Temporal Filtering controls.
4. Adjust the Amount value to 100%.
5. Create a RAM preview of the composition or render and export it.
6. If you see unwanted streaking or blurs around moving objects, reduce the Motion Sensitivity value, and then preview or render it again.
7. Try the following techniques if you want to improve the results:

- To quickly reduce noise in a movie that has a lot of buzzing noise, set the Noise Reduction value to zero and the Temporal Filtering Amount to 100%, and render the movie.
- To speed up previews, apply temporal filtering to your layer after all the settings for a single frame have been adjusted.
- To retain effects on a layer and also apply temporal filtering to it, precompose the selected layer (choose Layer > Precompose), and then apply the Remove Grain effect to that layer.

## Sharpen an image with Unsharp Mask controls

The Remove Grain effect contains Unsharp Mask controls, which increase the contrast of edges and fine details to help restore some of the sharpness that may have been lost during the grain reduction process.

❖ Do any of the following:

- Increase the Unsharp Mask controls Amount value to obtain acceptable sharpening without generating undesirable artifacts or bringing back too much grain.
- Increase the Threshold value to remove any unwanted artifacts that resulted from the sharpening.
- Adjust the Radius to change the area over which Unsharp Mask finds details.
- Adjust the Noise Reduction value until the image begins to lose sharpness; then decrease the value a little, and then apply the Unsharp Mask controls to sharpen the image.

## Turbulent Noise effect

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The Turbulent Noise effect uses Perlin noise to create grayscale noise that you can use for organic-looking backgrounds, displacement maps, and textures, or to simulate things like clouds, fire, lava, steam, flowing water, or vapor.

The Turbulent Noise effect is essentially a modern, higher-performance implementation of the Fractal Noise effect. The Turbulent Noise effect takes less time to render, and it's easier to use for creating smooth animations. The Turbulent Noise effect also more accurately models turbulent systems, with smaller noise features moving more quickly than larger noise features. The primary reason to use the Fractal Noise effect instead of the Turbulent Noise effect is for the creation of looping animations, since the Turbulent Noise effect doesn't have Cycle controls.

**Note:** *Because the controls for the two effects are nearly identical, you can use most instructions and tutorials created for the Fractal Noise effect to instead guide your use of the Turbulent Noise effect. (See Fractal Noise effect.)*

The Evolution controls create subtle changes in the shape of the noise. Animating these controls results in smooth changes of the noise over time, creating results that resemble, for example, passing clouds or flowing water.

This effect works with 8-bpc, 16-bpc, and 32-bpc color.

### Controls

**Fractal Type** The fractal noise is created by generating a grid of random numbers for each noise layer. The Complexity setting specifies the number of noise layers. The Fractal Type setting determines the characteristics of this grid.

**Noise Type** The type of interpolation to use between the random values in the noise grid.

**Invert** Inverts the noise. Black areas become white, and white areas become black.

**Contrast** The default value is 100. Higher values create larger, more sharply defined areas of black and white in the noise, generally revealing less subtle detail. Lower values result in more areas of gray, softening or muting the noise.

**Overflow** Remaps color values that fall outside the range of 0–1.0, using one of the following options:

**Clip** Remaps values so that any value above 1.0 is displayed as pure white, and any value below 0 is displayed as pure black. The Contrast value influences how much of the image falls outside this range. Higher values result in a mostly black and/or white image with less gray area. Therefore, higher contrast settings display less subtle detail. When used as a luma matte, the layer has sharper, better-defined areas of transparency.

**Soft Clamp** Remaps values on an infinite curve so that all values stay in the range. This option reduces contrast and makes noise appear gray with few areas of pure black or pure white. When used as a luma matte, the layer contains subtle areas of transparency.

**Wrap Back** Remaps triangularly, so that values above 1.0 or below 0 fall back into the range. This option reveals subtle detail when Contrast is set above 100. When used as a luma matte, the layer reveals more detailed textured areas of transparency.

**Allow HDR Results** No remapping is performed. Values outside the range of 0-1.0 are preserved.

**Transform** Settings to rotate, scale, and position the noise layers. The layers appear as if they are at different depths if you select Perspective Offset.

**Complexity** The number of noise layers that are combined (according to the Sub Settings) to create the noise. Increasing this number increases the apparent depth and amount of detail in the noise.

**Note:** *Increasing Complexity results in longer rendering times. If appropriate, try reducing the Size rather than increasing Complexity to achieve similar results and avoid longer rendering. A trick to increase apparent complexity without increasing rendering time is to use a negative or very high Contrast or Brightness setting and choose Wrap Back for Overflow.*

**Sub Settings** The noise is generated by combining layers of noise. The Sub Settings control how this combination occurs and how the properties of the noise layers are offset from one another. Scaling successive layers down creates finer details.

**Sub Influence** How much influence each successive layer has on the combined noise. At 100%, all iterations have the same amount of influence. At 50%, each iteration has half as much influence as the previous iteration. A value of 0% makes the effect appear exactly as if Complexity is 1.

**Sub Scaling** The scale percentage of a noise layer relative to the previous noise layer.

**Evolution** Uses progressive revolutions that continue to change the image with each added revolution. This method is unlike typical revolutions that refer to a setting on the dial control for which the result is the same for every multiple of 360°. For Evolution, the appearance at 0° is different from the appearance at 1 revolution, which is different from the appearance at 2 revolutions, and so on.

You can specify how much the noise evolves over a period of time by animating Evolution. The more revolutions within a given amount of time, the more rapidly the noise changes. Large changes in the Evolution value over a short period of time may result in flashing.

#### Evolution Options

**Turbulence Factor** The amount by which the speed of smaller noise features differs from the speed of larger noise features. A value of 0 makes the movement of the noise resemble the noise generated by the Fractal Noise effect, in which smaller noise features move at the same speed as larger noise features. A larger value makes the multiple layers of noise appear to roil in a manner more like that of natural turbulence in a fluid.

**Random Seed** Sets a random value from which to generate the noise. Animating the Random Seed property results in flashing from one set of noise to another (within that fractal type), which is usually not the result that you want. For smooth animation of noise, animate the Evolution property.

 *You can easily create new noise animations by reusing previously created Evolution cycles and changing only the Random Seed value. Using a new Random Seed value alters the noise pattern without disturbing the Evolution animation.*

**Opacity** The opacity of the noise.

**Blending Mode** The blending operation between the noise and the original image. These blending modes are identical to the ones in the Modes column in the Timeline panel, with the following exceptions:

**None** Renders the fractal noise only and does not composite on the original layer.

**Hue** Renders the fractal noise as hue values instead of grayscale. The Saturation and Lightness of the original layer are maintained. If the original layer is grayscale, nothing happens.

**Saturation** Renders the fractal noise as saturation values instead of grayscale. The Hue and Lightness of the original layer are maintained. If the original layer is grayscale, nothing happens.

For a description of each blending mode, see Blending mode reference.



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# Obsolete effects

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[Basic 3D effect](#)  
[Basic Text effect](#)  
[Lightning effect](#)  
[Path Text effect](#)

Effects in the Obsolete category are retained for compatibility with projects created with previous versions of After Effects. When updating projects or creating new projects, you should use alternative effects and techniques rather than effects in the Obsolete category.

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## Basic 3D effect

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If you are working on a project that was created in an older version of After Effects and the Basic 3D effect is applied to one or more layers, you can continue to use the Basic 3D effect; otherwise, use the 3D layer switch to convert layers to 3D layers. (See 3D layers.)

This effect works with 8-bpc color.

The Basic 3D effect manipulates a layer in 3D space.

The quality setting of the layer affects Basic 3D. Draft quality calculates pixel location to the nearest integer value; Best quality calculates pixel location to the subpixel level.

**Swivel** Controls horizontal rotation (rotation around a vertical axis). You can rotate past 90° to see the back side of the image, which is the mirror image of the front.

**Tilt** Controls vertical rotation (rotation around a horizontal axis).

**Distance To Image** The distance from the image to the viewer.

**Specular Highlight** Adds a glint of light that reflects off the surface of the layer. The light source for the specular highlight is always above, behind, and to the left of the viewer. Because the light comes from above, the image must be tilted backward to see this reflection. The specular highlight can be viewed only at Best quality. When Draw Preview Wireframe is selected, the specular highlight is indicated by a red plus sign (+) if it isn't visible on the layer (that is, if the center of the highlight doesn't intersect the layer) and a green plus sign (+) if the highlight is visible.

**Preview** Draws a wireframe outline of the 3D image. The wireframe outline renders quickly. To see the final results, deselect Draw Preview Wireframe when you finish manipulating the wireframe image. The preview wireframe is drawn only at Draft quality; when you switch to Best quality, the image content is drawn. This way, you won't accidentally render a Best quality movie in Preview mode.

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## Basic Text effect

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If you are working on a project that was created in an older version of After Effects and the Basic Text effect is applied to one or more layers, you can continue to use the Basic Text effect; otherwise, use text layers for greater control over text formatting and text animation. (See Creating and editing text layers.)

The Basic Text effect places text on an existing layer—unlike text created on text layers or imported text created in Adobe Photoshop or Adobe Illustrator, either of which becomes its own layer.

This effect works with 8-bpc color.

**Note:** *The width and height of text aren't constrained by the dimensions of the layer; the layer dimensions merely define the visible region of the text.*

**Position** The position of the text on the layer.

**Note:** *The Alignment setting in the Basic Text dialog box affects the behavior of the Position point. The point always positions the vertical center of the text relative to the layer. However, if the text is left-aligned, the point positions the left edge; if the text is center-aligned, the point positions the center; and if the text is right-aligned, the point positions the right edge.*

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## Lightning effect

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If you are working on a project that was created in an older version of After Effects and the Lightning effect is applied to one or more layers, you can continue to use this effect; otherwise, use the Advanced Lightning effect. (See Advanced Lightning effect.)

This effect works with 8-bpc color.

**Start Point, End Point** Where the lightning begins and ends.

**Segments** The number of segments that form the main lightning bolt. Higher values produce more detail but reduce the smoothness of motion.

**Amplitude** The size of undulations in the lightning bolt as a percentage of the layer width.

**Detail Level, Detail Amplitude** How much detail is added to the lightning bolt and any branches. For Detail Level, typical values are in the range

2–3. For Detail Amplitude, a typical value is 0.3. Higher values for either control are best for still images but tend to obscure animation.

**Branching** The amount of branching (forking) that appears at the ends of bolt segments. A value of 0 produces no branching; a value of 1.0 produces branching at every segment.

**Rebranching** The amount of branching from branches. Higher values produce treelike lightning bolts.

**Branch Angle** The angle between a branch and the main lightning bolt.

**Branch Seg. Length** The length of each branch segment as a fraction of the average length of the segments in the lightning bolt.

**Branch Segments** The maximum number of segments for each branch. To produce long branches, specify higher values for both Branch Seg. Length and Branch Segments.

**Branch Width** The average width of each branch as a fraction of the width of the lightning bolt.

**Speed** How fast the lightning bolt undulates.

**Stability** How closely the lightning follows the line defined by the start and end points. Lower values keep the lightning bolt close to the line; higher values create significant bouncing. Use Stability with Pull Force to simulate a Jacob's Ladder effect and cause the lightning bolt to snap back to a position along the start line after it has been pulled in the Pull Force direction. A Stability value that is too low doesn't allow the lightning to be stretched into an arc before it snaps back; a value that is too high lets the lightning bolt bounce around.

**Fixed Endpoint** Determines whether the end point of the lightning bolt remains fixed in place. If this control isn't selected, the end of the bolt undulates around the end point.

**Width, Width Variation** The width of the main lightning bolt and how much the width of different segments can vary. Width changes are randomized. A value of 0 produces no width changes; a value of 1 produces the maximum width changes.

**Core Width** The width of the inner glow, as specified by the Inside Color value. Core Width is relative to the total width of the lightning bolt.

**Outside Color, Inside Color** The colors used for the outer and inner glows of the lightning bolt. Because the Lightning effect adds these colors on top of existing colors in the composition, primary colors often produce the best results. Bright colors often become much lighter, sometimes becoming white, depending on the brightness of colors beneath.

**Pull Force, Pull Direction** The strength and direction of a force that pulls the lightning bolt. Use the Pull Force value with the Stability value to create a Jacob's Ladder appearance.

**Random Seed** An input value for the random noise generator that is the basis of the Lightning effect. If the random movement of the lightning interferes with another image or layer, enter a new value for Random Seed until you find one that works for you.

**Blending Mode** The blending mode to use to composite the lightning on top of the original layer. These blending modes work identically to the ones in the Timeline panel.

**Rerun At Each Frame** Regenerates the lightning at each frame. To make the lightning behave the same way at the same frame every time you run it, don't select this option. Selecting this option increases rendering time.

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## Path Text effect

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If you are working on a project that was created in an older version of After Effects and the Path Text effect is applied to one or more layers, you can continue to use the Path Text effect; otherwise, use text layers for greater control over text formatting and text animation. (See Creating and animating text on a path.)

The Path Text effect lets you animate text along a path. You can define a path as a straight line, a circle of any diameter, or a Bezier curve. You can also import a path created in another application, such as Adobe Photoshop or Adobe Illustrator. The Path Text effect can work with nonsquare pixels, adjusting both character shape and path shape accordingly.

This effect works with 8-bpc color.

**Note:** If you use Adobe Type Manager (ATM) and large text looks blocky or doesn't otherwise render properly, increase the Character Cache Size in the ATM control column.

When changing the shape of a Bezier path over time, make sure to create initial keyframes for all four path control points; moving a control point without an initial keyframe doesn't move it over time. You may find it easier to animate a path by modifying the motion paths of individual control points in the Layer panel.

**Note:** Handles appear in the Composition panel only if the effect is selected in the Effect Controls panel and if you aren't animating text along a mask or path.

If you want to move a Bezier path across the composition, and you don't want to change its shape, animate the layer rather than the path. If you want to stretch, shrink, or wag one side of the Bezier path while keeping the other half in the same position, move a tangent-vertex pair together. To do so, create keyframes for both by dragging the outer circle of the appropriate vertex.

**Note:** When animating the control points of a Bezier path, don't confuse the Bezier path shape with the Bezier spatial interpolation of the keyframes. Like keyframes for other position controls, keyframes for the vertex or tangent of a Bezier path can be set to either linear or Bezier. You specify default spatial interpolation in General Preferences. You can specify spatial interpolation for individual keyframes by choosing Animation > Keyframe Interpolation.

You can apply motion blur to motion that you create with the Path Text effect. Blurring occurs on each character. Like motion blur for layers, blurring for characters is more visible when movement is quick. For example, blurring is pronounced when you choose negative jitter values, which produce jumpy motion.

## Path Options controls

**Shape Type** Defines the shape of the path. The Path Text effect name must be selected in the Effect Controls panel to make the path visible in the Composition panel.

**Bezier** Shapes text along a Bezier curve, defined by four control points (Vertex 1/Circle Center, Tangent 1/Circle Point, Tangent 2, and Vertex 2). Characters that don't fit on the path are placed off the end in a straight line.

**Circle** Shapes text around the circumference of a circle, defined by two control points (Tangent 1/Circle Point, and Vertex 1/Circle Center). If the text is longer than the circumference of the circle, the text overlaps itself. If an arbitrary path is chosen and if the path is closed, this property forms the text around the path, as opposed to looping it.

**Loop** Shapes text around the circumference of the circle, defined by two control points (Vertex 1/Circle Center, and Tangent 1/Circle Point). If text is longer than the circumference of the circle, it flows off the Tangent 1 point in a straight line. You can also use margin controls to make text enter or exit a circle in a straight line.

**Line** Shapes text in a straight line, defined by two control points (Vertex 1/Circle Center, and Vertex 2). As with the Bezier path, the distance between the two control points doesn't affect the spacing of the text, unless alignment is set to Force.

**Control Points** Specify the points on the path.

**Tangent 1/Circle Point** Specifies the following points: starting tangent for a Bezier curve, diameter of a circle and starting or ending point of text (depending on the specified alignment), and diameter of a loop and the point where text enters.

**Vertex 1/Circle Center** Specifies the starting vertex for a Bezier curve, center of a circle or loop, and starting or ending point for text on a line (depending on the specified alignment).

**Tangent 2** Specifies the ending tangent of the Bezier curve. The line between Tangent 2 and Vertex 2 specifies the slope of the curve at its ending point. For circles or loops, Tangent 2 is ignored.

**Vertex 2** Specifies the ending vertex of a Bezier curve and the angle of a line. For circles or loops, Vertex 2 is ignored.

**Custom Path** Specifies an arbitrary path. You can use a mask created in the Layer panel or in Adobe Illustrator.

**Reverse Path** Reverses the path.

## Character controls

**Size** Size of the characters.

**Tracking** Average distance between characters.

**Kerning** Controls the horizontal distance between two characters. If you change the text, specified kerning is preserved for all unchanged character pairs. You cannot use the Undo command to undo kerning changes. To change horizontal spacing between characters over time, use Kerning Jitter Max or create keyframes for Tracking.

**Kerning Pair** Specifies the pair of characters to kern. Click the arrow to move among the pairs.

**Kerning Value** The amount of kerning to apply.

**Orientation** Specifies the orientation or rotation values of each character.

**Character Rotation** Each character is rotated by the specified number of degrees from its current angle. The center of rotation is on the point where the character intersects the path. Perpendicular To Path changes the initial angle of the characters.

**Perpendicular To Path** Rotates each character so that it's perpendicular to the path. If Perpendicular To Path is deselected, characters always remain upright (unless rotated by Character Rotation).

**Vertical Writing** Rotates each character so it's vertical along the path.

**Rotate Roman Characters** Rotates Roman characters vertically along the path; if Rotate Roman Characters isn't selected, only non-Roman characters are rotated.

**Horizontal Shear** Slants characters left or right, similar to italics. The slant is based on the point where the character intersects the path. To slant characters from their centers, set Baseline Shift to make the path go through the centers of the characters.

**Horizontal Scale, Vertical Scale** Resize the characters by the specified percentage in the horizontal and vertical directions. Text is scaled from the initial rasterization size, specified for Size. Setting the scaling percentage greater than 100 may result in blurred edges. For best results, set Size to a point size that doesn't require scaling beyond 100% to achieve the largest desired text size. For example, to increase the text size from 44 to 88 points, set Size to 88 and specify a starting value for both Vertical and Horizontal Scale at 50%; then increase both scale values to 100% if you want the text displayed at 88 points.

## Paragraph controls

**Alignment** Specifies the horizontal alignment of the text on the specified path.

**Left** Places the first character at the position specified by Left Margin; all other characters are drawn relative to it. Right Margin is ignored.

**Right** Places the last character at the position specified by Right Margin; all other characters are drawn relative to it. Left Margin is ignored.

**Center** Centers the text between Left Margin and Right Margin.

**Force** Places the first character at the position specified by Left Margin and the last character at the position specified by Right Margin, spacing all other characters evenly between. Tracking is ignored.

**Left Margin, Right Margin** Specify the margins. Left Margin specifies the position of the first character in pixels, relative to the starting point; Right Margin specifies the position of the last character, relative to the ending point. In path shapes, the starting point for Bezier curves and lines is Vertex 1, and the starting point for circles and loops is Tangent 1. The ending point for Bezier curves and lines is Vertex 2, and the ending point for circles and loops is Tangent 1. To move text across the path shape that you've defined, create keyframes or expressions for the Left or Right margins (depending on the specified alignment). Positive values move the text to the right; negative values move it to the left.

**Line Spacing** Specifies the space between lines of characters.

**Baseline Shift** Specifies the distance in pixels between the path and the bottom of the characters. Depending on the path shape, text may appear

to be better spaced if the path passes through the centers of the characters. You can set Baseline Shift to a negative value so that the centers of characters lie on the path.

## Advanced controls

**Visible Characters** The number of characters that appear at the current time. Animate Visible Characters to display one or more characters at a time to create the appearance of typing characters. Positive values specify the number of visible characters from the beginning of the text to the end. Negative values specify the number of visible characters from the end of the text to the beginning. Remember that spaces are characters, too.

You can also use this control with Fade Time to fade in characters. When Fade Time is 0, the next character appears when the value of Visible Characters is halfway to the next whole number. For example, the second character appears when the value of Visible Characters is 1.5, the third character appears when the value is 2.5, and so on. A Fade Time value of 0 produces the appearance of typing characters.

**Note:** *Visible Characters doesn't alter the positions of characters defined by the path and other controls.*

**Fade Time** Specifies a range of time over which a particular character is partially visible. Fade Time works in conjunction with Visible Characters. If Fade Time is 0, each letter appears fully opaque at the appropriate Visible Characters value. If Fade Time is 100%, a particular character is displayed with greater and greater opacity as the value of Visible Characters increases between whole numbers. The exact opacity of the character is equal to the fractional part of the Visible Characters value. For example, the eighth character is displayed at 10% opacity if the value of Visible Characters is 7.10 and Fade Time is 100%; the same character is displayed at 60% opacity if the value of Visible Characters is 7.60, and so on.

For Fade Time values between 0% and 100%, the opacity of the character is defined as a range across the halfway point between whole-number values of Visible Characters. For example, if Fade Time is 20%, the eighth character begins to appear at a Visible Character value of 7.40 and is fully opaque at 7.60. If Fade Time is set to 60%, the same character begins to appear at a value of 7.20 and is fully opaque at 7.80.

**Mode** The blending mode used if characters overlap.

**Jitter Settings** Specify the maximum amount of deviation added randomly to baseline, kerning, rotation, or scale. Higher values produce greater deviations. Positive values produce smooth motion; negative values produce jumpy motion. Movement is created without keyframes or expressions, although you can use keyframes or expressions to change the maximum values.

A specific jitter value generates the same seemingly random motion for identical text and settings. If a composition contains duplicate animated text, you can generate different motion for each instance of the text by changing a setting but making the change invisible. For example, you could add a space to a second instance of text, and then adjust the kerning so that the space isn't visible. This method creates an invisible change that generates different motion.

You can specify the following Jitter options:

**Baseline Jitter Max** Sets a maximum distance, in pixels, that characters are randomly moved above or below the path after Baseline Shift is applied.

**Kerning Jitter Max** Sets a maximum distance, in pixels, that characters are randomly moved apart from one another along the horizontal axis after kerning and tracking are applied.

**Rotation Jitter Max** Sets a maximum amount, in degrees, that characters are randomly rotated after Character Rotation is applied.

**Scale Jitter Max** Sets a maximum amount, as a percentage, that characters are randomly scaled after Horizontal Scale and Vertical Scale are applied. For best results, characters should not scale greater than 100%.

## Move vertices, circle centers, and tangents

- To move the Vertex 1/Circle Center and the Tangent 1/Circle Point together, drag the outer circle of the Vertex 1/Circle Center.
- To move only the Vertex 1/Circle Center, drag its cross hair.
- To automatically snap the Tangent 1/Circle Point on top of the Vertex 1/Circle Center, select the Pen tool and then click the outer circle of Tangent 1 (Windows) or Command-click the outer circle (not the cross hair) of Tangent 1 (Mac OS).
- To snap the Tangent 1/Circle Point to increments of 45° from the Vertex 1/Circle Center, Shift-drag the outer circle of Tangent 1.
- To move Vertex 2 and Tangent 2 together, drag the outer circle of Vertex 2.
- To move only Vertex 2, drag its cross hair.



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# Perspective effects

[3D Glasses effect](#)

[Bevel Alpha effect](#)

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[Drop Shadow effect](#)

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- CC Cylinder effect
- CC Environment effect (CS6)
- CC Sphere effect
- CC Spotlight effect

Third-party effects in this category included with After Effects:

See Third-party plug-ins included with After Effects.

## 3D Glasses effect

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The 3D Glasses effect creates a single 3D image by combining a left and right 3D view. You can use images from 3D programs or stereoscopic cameras as sources for each view.

For more information about stereoscopic 3D, see [Cameras, lights, and points of interest](#).

The method you use to create the combined images dictates how you view them. For example, you can use 3D Glasses to create an anaglyphic image, which is an image containing two slightly different perspectives of the same subject that are tinted contrasting colors and superimposed on each other. To create an anaglyphic image, first combine views and tint each one a different color. Then, use 3D glasses that have either red and green lenses or red and blue lenses to view the resulting image stereoscopically.

In After Effects CS5, this effect works with 8-bpc color. In After Effects CS5.5 and later, the effect works in 8-bpc, 16-bpc, or 32-bpc color.



*Original (left), and with effect applied (right)*

Robert Powers provides a video tutorial on the [Slippery Rock NYC website](#) that shows how to create and use a depth matte and use it as a control layer for the Displacement Map effect. The result is then used by the 3D Glasses effect to create a stereoscopic image.

To avoid problems with flipped views, keep in mind the following guidelines:

- Use the same vertical dimensions for the composition and source images. A one-pixel difference produces the same result as moving the position one pixel vertically.
- Make sure that the Position values for the layer are whole numbers (such as 240 instead of 239.7).
- If the left and right view images are interlaced, de-interlace them before using 3D Glasses to avoid field mismatch.
- Because 3D Glasses creates interlaced frames, don't select an interlace option in the Render Settings dialog box.

Ghost effects occur if the luminance values of one color exceed the luminance values of another color to such an extent that you can see the first color through the wrong lens of anaglyph glasses. For example, an excessive red luminance value becomes visible through the blue lens. If you adjust the Balance value, test the results on the final output media. If you set the Balance value too high, a reversed shadow may appear.

When you work with red and blue images, the blue color in glasses with red and blue lenses is actually cyan, not blue. Red and cyan are complementary colors, producing the best separation because they filter each other out more efficiently. When you work with red and green images, it may appear that the green isn't as bright as the red. However, viewing the images with red and green lenses produces an even result because green has a higher luminance value than red.

**Left View, Right View** The layer to use as the left or right view. You only need to apply 3D Glasses to one layer in a composition. If you use a second layer, make sure that the two layers are the same size. The second layer doesn't need to be visible in the composition.

**Convergence Offset (Scene Convergence in CS5.5 and later)** The amount that the two views are offset. Use this control to affect where 3D

elements appear, either in front of, or behind the screen. Any areas that are aligned (left and right views, for example) show the object in precisely the same spot on the screen. Anything in front of those areas in z space will protrude from the screen. Anything behind those areas will be visible behind the screen when looking at the scene through stereo glasses.

You can also use Convergence Offset (Scene Convergence) to realign uncalibrated camera views of rendered material, such as, photos or images rendered from 3D programs. These are generally misaligned and require a negative Convergence Offset value. If the original footage was shot with correct convergence, changing this value isn't necessary. Keyframing this value may result in erratic animation.

**Note:** *There is improved (truer) handling of edge pixels when using Scene Convergence in After Effects CS5.5 and later. Previously, edge pixels were duplicated to fill to the edge, but that is no longer done. To eliminate vacant edges, scale the layer.*

**Vertical Alignment (CS5.5 and later)** Controls the vertical offset of the left and right views relative to each other.

**Units (CS5.5 and later)** Specifies the unit of measure (Pixels or % of Source) for the Scene Convergence and Vertical Alignment values when the 3D View is set to something other than Stereo Pair or Over Under.

**Swap Left-Right** Swaps the left and right views. It will also swap views for other 3D View modes.

**3D View** How the views are combined.

**Stereo Pair (Stereo Pair (Side by Side) in CS5.5 and later)** Scales both layers to fit side by side within the bounding box of the effect layer. Select Swap Left-Right to create cross-eyed vision. Selecting Stereo Pair disables Convergence Offset.

**Over Under (CS5.5 and later)** Scales both layers to fit one view on top of the other within the bounding box of the effect layer. Select Swap Left-Right to create cross-eyed vision. Selecting Stereo Pair (Side by Side) disables Screen Convergence.

**Interlace Upper L Lower R** Takes the upper (first) field from the Left View layer, and the lower (second) field from the Right View layer, and combines them into a sequence of interlaced frames. Use this option if you want to view the results with polarized or LCD shutter glasses. Select Swap Left-Right to switch fields.

**Difference (CS 5.5)** Shows a Difference blending mode for the images, useful for setting where the screen will be in the image. If you scene convergence in this mode, different parts of the image (located in z space) will turn black. These black areas are what will be directly seen on the screen. Anything in front of those areas will protrude from the screen. Anything behind it will be visible behind the screen when looking at the scene through stereo glasses.

**Red Green LR** Tints the Right View layer red, and the Left View layer green using the luminance values of each layer.

**Red Blue LR** Tints the Right View layer red and the Left View layer blue (cyan) using the luminance values of each layer.

**Balanced Red Green LR** Performs the same operation as Red Green LR but also balances the colors to reduce shadows or ghosting effects caused by one view showing through the other. Setting a high value reduces the overall contrast.

**Balanced Red Blue LR** Performs the same operation as Red Blue LR but also balances the colors to reduce shadows or ghosting effects.

**Balanced Colored Red Blue** Converts the layer into a 3D view using the RGB channels of the original layer. This option maintains the original colors of the layer but may produce shadows and ghosting effects. To reduce these effects, adjust the balance or desaturate the image, and then apply 3D Glasses. If you use CG images, raise the black level of both views before applying the effect.

**Balance** Specifies the level of balance in a balanced 3D view option. Use this control to reduce shadows and ghost effects. The default balance that 3D Glasses sets when you select the Balanced Colored Red Blue option is the ideal value: If you set Balance to 0.0, 3D Glasses creates no 3D depth, and if you set Balance too high, 3D Glasses produces a highly saturated output.

## Backward and forward compatibility

- After Effects CS5 projects using 3D Glasses that are opened in After Effects CS5.5 and later will use a hidden version of the legacy 3D Glasses effect, but will include the new options and properties previously described. The only difference is that the 3D View options (Difference and Over Under) will appear at the bottom of the menu, instead of in its first section.
- Creating a new project in After Effects CS5.5 and later that uses the new 3D Glasses effect, using the Save A Copy As CS5 command, and then opening the saved After Effects CS5 project will cause the effect to be missing in the layer it was previously applied to.
- Opening an After Effects CS5 project containing the 3D Glasses effect in After Effects CS5.5 and later, using the Save A Copy As CS5 command, and then opening the saved After Effects CS5 project will display a warning: 'Effect control conversion required in effects "3D Glasses". Some effects controls will be reset.' The original After Effects CS5 effect will be applied and working, but some properties, such as Convergence Offset and Balance will be reset to their default values.

Rich Young collects [resources for stereoscopic 3D](#) on the After Effects Portal website.

Angie Taylor has a Workshop available on Stereoscopic 3D workflow for motion graphic design. [Here are some free movies](#) available to watch online.

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## Bevel Alpha effect

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The Bevel Alpha effect gives a chiseled and lighted appearance to the alpha boundaries of an image, often giving 2D elements a 3D appearance. If the layer is completely opaque, then the effect is applied to the bounding box of the layer. The edge created by this effect is softer than the edge created by the Bevel Edges effect. This effect works especially well for elements with text in the alpha channel.

For some purposes, the Bevel And Emboss layer style is preferable to the Bevel Alpha effect. For example, use the Bevel And Emboss layer style rather than the Bevel Alpha effect if you want to apply different blending modes to the highlights and shadows of a bevel. (See Layer styles.)

This effect works with 8-bpc and 16-bpc color.





Original (left), and with effect applied (right)

## Bevel Edges effect

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The Bevel Edges effect gives a chiseled and lighted 3D appearance to the edges of an image. Edge locations are determined by the alpha channel of the source image. Unlike Bevel Alpha, the edges created with this effect are always rectangular, so images with nonrectangular alpha channels don't produce the proper appearance. All edges have the same thickness. At Best quality, edge thickness is interpolated for smooth visual results.

For some purposes, the Bevel And Emboss layer style is preferable to the Bevel Edges effect. (See Layer styles.)

This effect works with 8-bpc color.



Original (left), and with effect applied (right)

## Drop Shadow effect

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The Drop Shadow effect adds a shadow that appears behind the layer. The alpha channel of the layer determines the shape of the shadow.

When you add a drop shadow to a layer, a soft-edged outline of the alpha channel of the layer appears behind it, as if a shadow is cast on the background or underlying objects.

Drop Shadow can create a shadow outside the bounds of the layer. The quality setting of the layer affects the subpixel positioning of the shadow and the smoothness of the soft edges of the shadow.

For some purposes, the Drop Shadow layer style is preferable to the Drop Shadow effect. (See Layer styles.)

This effect works with 8-bpc and 16-bpc color. In After Effects CS6, this effect works in 32-bit color.



Original (left), and with effect applied (right)

To render the shadow without the image, select Shadow Only.

**Note:** To apply a drop shadow to a layer that rotates, rotate the layer using the Transform effect and then apply the Drop Shadow effect. You can also use nesting, precomposing, or an adjustment layer to achieve this result. If you don't use one of these methods, the shadow rotates with the layer.

## Radial Shadow effect

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The Radial Shadow effect creates a shadow from a point light source over the layer it's applied to, rather than from an infinite light source (as with the Drop Shadow effect). The shadow is cast from the alpha channel of the source layer, allowing the color of that layer to influence the color of the shadow as light passes through semitransparent areas. You can use this effect to make a 3D layer appear to cast a shadow onto a 2D layer.

This effect works with 8-bpc color.



Original (left), and with effect applied (right)

**Shadow Color** The color of the shadow.

**Note:** The colors of the layer may override this option if you choose Glass Edges from the Render control menu. See the Render and Color Influence controls for more information.

**Opacity** The opacity of the shadow.

**Light Source** The location of the point light source.

💡 Copy and paste position keyframes or expressions from a control point for another effect (for example, Lens Flare) to quickly create a shadow that matches the light source for another effect.

**Projection Distance** The distance from the layer to the surface on which the shadow falls. The shadow appears larger as this value increases.

**Softness** The softness of the edges of a shadow.

**Render** The type of shadow:

**Regular** Creates a shadow based on the Shadow Color and Opacity values, regardless of semitransparent pixels in the layer. (If Regular is chosen, the Color Influence control is disabled.)

**Glass Edge** Creates a colored shadow based on the color and opacity of the layer. If the layer contains semitransparent pixels, the shadow uses both the color and transparency of the layer. This option creates the appearance, for example, of sun shining through stained glass.

The more transparent the pixels in the layer are, the closer the shadow color matches the colors of the layer. If the layer contains no semitransparent pixels, Glass Edge has little result.

**Note:** Anti-aliased edges produce colors in a shadow edge when you choose Glass Edge, even if the layer is fully opaque. The colors of a layer shine through these anti-aliased edges, and the Shadow Color fills the center of the shadow.

**Color Influence** The fraction of the color values of the layer that appear in the shadow. At 100%, the shadow takes on the color of any semitransparent pixels in the layer. If the layer contains no semitransparent pixels, Color Influence has little result, and the Shadow Color value determines the color of the shadow. Decreasing the Color Influence value blends the colors of the layer in the shadow with the Shadow Color. Increasing Color Influence reduces the influence of the Shadow Color.

**Shadow Only** Select to render only the shadow.

**Resize Layer** Select to allow the shadow to extend beyond the original boundaries of the layer.



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# Simulation effects

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## Common Lighting controls and Material controls

[Card Dance effect](#)

[Caustics effect](#)

[Foam effect](#)

[Particle Playground effect](#)

[Shatter effect](#)

[Wave World effect](#)

Third-party effects in this category included with After Effects:

- CC Ball Action effect
- CC Bubbles effect
- CC Drizzle effect
- CC Hair effect
- CC Mr. Mercury effect
- CC Particle Systems II effect
- CC Particle World effect
- CC Pixel Polly effect
- CC Rainfall effect (CS6)
- CC Scatterize effect
- CC Snowfall effect (CS6)
- CC Star Burst effect

**Note:** Existing projects with CC Rain and CC Snow will still render, but are obsolete effects. CC Rainfall and CC Snowfall are the newer versions.

See Third-party plug-ins included with After Effects.

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## Common Lighting controls and Material controls

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Several of the Simulation effects have some common controls. The Card Wipe effect also shares many controls with the Card Dance effect.

### Lighting controls

**Light Type** Specifies which type of light you want to use. Distant Source simulates sunlight and casts shadows in one direction, where all the light rays strike the object from virtually the same angle. Point Source is similar to a light bulb and casts shadows in all directions. First Comp Light uses the first light layer in the composition, which can use a variety of settings.

**Light Intensity** Specifies the power of the light. The higher the value, the brighter the layer. Other lighting settings affect the overall light intensity as well.

**Light Color** Specifies the color of light.

**Light Position** Specifies the position of the light in x,y space. To position the light interactively, Alt-drag (Windows) or Option-drag (Mac OS) the effect point for the light.

**Light Depth** Specifies the position of the light in z space. Negative numbers move the light behind the layer.

**Ambient Light** Distributes light over the layer. Increasing this value adds an even illumination to all objects and prevents shadows from being completely black. Setting Ambient Light to pure white and setting all other light controls to 0 makes the object fully lit and eliminates any 3D shading from the scene.

### Material controls

The Material controls specify reflection values.

**Diffuse Reflection** Gives objects form-defining shading. Shading depends on the angle at which the light strikes the surface and is independent of the position of the viewer.

**Specular Reflection** Takes into account the position of the viewer. It models the reflection of the light source back to the viewer. It can create the illusion of shininess. For realistic effects, you can animate this control by using higher and higher values to mask the transition from filtered to

nonfiltered versions of the layer.

**Highlight Sharpness** Controls shininess. Shiny surfaces produce small, tight reflections, whereas duller surfaces spread the highlight into a larger region. Specular highlights are the color of the incoming light. Because light is typically white or off-white, broad highlights can desaturate an image by adding white to the surface color.

💡 In general, use the following process to adjust lighting: Set *Light Position* and *Diffuse Reflection* to control the overall light level and shading in a scene. Then adjust *Specular Reflection* and *Highlight Sharpness* to control the strength and spread of highlights. Finally, adjust *Ambient Light* to fill in the shadows.

## Card Dance effect

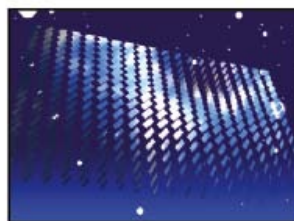
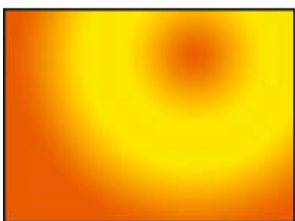
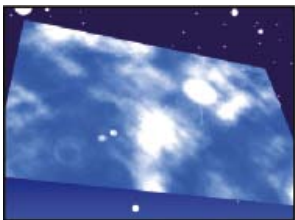
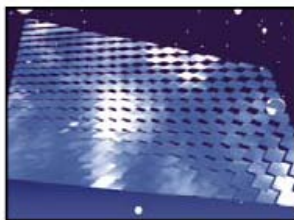
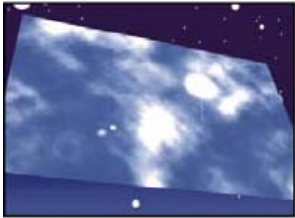
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**Note:** For information on properties shared by several of the *Simulation* effects, see *Common Lighting controls* and *Material controls*.

This effect creates the appearance of card choreography by dividing layers into numerous cards and then controlling all geometric aspects of the cards by using a second layer. For example, Card Dance can simulate an extruded pin sculpture, a crowd doing the wave, or letters floating on the surface of a pond.

Chris Zwar provides an example project on [his website](#) that uses the Card Dance effect and a shape layer with the Repeater operation to simulate a halftone color separation for any image or video.

This effect works with 8-bpc color.



Original (upper-left), and with rotation adjusted using *Camera Position* controls (lower-left) and *Corner Pin* controls (lower-right)

Original (left), gradient layer (center), and with Card Dance applied (right)

Apply Card Dance to the layer to use for the front of the cards. To set the view, use the rotation or perspective controls, or match the perspective of the effect in any scene by corner-pinning.

For example, select a vertical grayscale gradient layer (black on top, white on bottom) from the Gradient Layer 1 menu, and then select Intensity 1 from the X Rotation Source menu. Card Dance uses the intensity of the gradient to animate the x-axis rotation of the cards. It assigns a numeric value to the center pixel of each card on the gradient layer, based on the intensity of the pixel. Pure white equals 1, pure black equals -1, and 50% gray equals 0. Card Dance then multiplies that value by the X Rotation Multiplier value and rotates each card that amount. If X Rotation Multiplier is set to 90, the cards in the top row rotate almost 90° backward, the cards in the bottom row rotate almost 90° forward, and cards in middle rows rotate by lesser amounts. Cards in the 50% gray area don't rotate at all.

If you want half of the cards in a layer to come in from the right, and the other half to come in from the left, create a gradient layer that is half black and half white. Set the gradient as the source for X Position, and set X Position Multiplier to 5, and animate it to 0. The cards in the black area initially appear at the left, and the cards in the white area initially appear at the right.

## Rows, Columns, Layer, and Order controls

**Rows & Columns** Specifies the interaction of the numbers of rows and columns. Independent makes both the Rows and Columns sliders active. Columns Follows Rows makes only the Rows slider active. If you choose this option, the number of columns is always the same as the number of rows.

**Rows** The number of rows, up to 1000.

**Columns** The number of columns, up to 1000, unless Columns Follows Rows is selected.

**Note:** Rows and columns are always evenly distributed across a layer, so unusually shaped rectangular tiles don't appear along the edges of a layer—unless you use an alpha channel.

**Back Layer** The layer that appears in segments on the backs of the cards. You can use any layer in the composition; its Video switch  can even be turned off. If the layer has effects or masks, precompose the layer first.

**Gradient Layer 1** The first control layer to use to make the cards dance. You can use any layer. Grayscale layers produce the most predictable results. The gradient layer acts as a displacement map for animating the cards.

**Gradient Layer 2** The second control layer.

**Rotation Order** The order in which the cards rotate around multiple axes when using more than one axis for rotation.

**Transformation Order** The order in which the transformations (scale, rotation, and position) are performed.

## Position, Rotation, and Scale controls

Position (X, Y, Z), Rotation (X, Y, Z), and Scale (X, Y) specify the transformation properties you want to adjust. Because Card Dance is a 3D effect, you can control these properties separately for each axis of the cards. However, because the cards themselves are still 2D, they have no inherent depth—hence the absence of z scaling.

**Source** Specifies the gradient layer channel you want to use to control the transformation. For example, select Intensity 2 to use the intensity from Gradient Layer 2.

**Multiplier** The amount of transformation applied to the cards.

**Offset** The base value from which the transformation begins. It is added to the transformation value (a card's center pixel value times the Multiplier amount) so that you can start the transformation from some place other than 0.

## Camera System and Camera Position controls

**Camera System** Specifies whether to use the effect's Camera Position properties, the effect's Corner Pins properties, or the default composition camera and light positions to render 3D images of the cards.

**X Rotation, Y Rotation, Z Rotation** Rotate the camera around the corresponding axis. Use these controls to look at the cards from the top, side, back, or any other angle.

**X, Y Position** Where the camera is positioned along the x and y axes.

**Z Position** Where the camera is positioned along the z axis. Smaller numbers move the camera closer to the cards, and larger numbers move the camera away from the cards.

**Focal Length** The zoom factor. Smaller numbers zoom in.

**Transform Order** The order in which the camera rotates around its three axes, and whether the camera rotates before or after it is positioned using the other Camera Position controls.

## Corner Pins controls

Corner Pinning is an alternative camera control system. Use it as an aid for compositing the result of the effect into a scene on a flat surface that is tilted with respect to the frame.

**Upper Left Corner, Upper Right Corner, Lower Left Corner, Lower Right Corner** Where to attach each of the corners of the layer.

**Auto Focal Length** Controls the perspective of the effect during the animation. When Auto Focal Length is deselected, the focal length you specify is used to find a camera position and orientation that place the corners of the layer at the corner pins. If this isn't possible, the layer is replaced by its outline, drawn between the pins. When Auto Focal Length is selected, the focal length required to match the corner points is used, if possible. If not, it interpolates the correct value from nearby frames.

**Focal Length** Overrides the other settings if the results you've obtained aren't what you need. If you set the Focal Length to something that doesn't correspond to what the focal length would be if the pins were actually in that configuration, the image may look unusual (strangely sheared, for example). But if you know the focal length that you are trying to match, manually setting Focal Length is the easiest way to get correct results.

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## Caustics effect

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**Note:** For information on properties shared by several of the Simulation effects, see *Common Lighting controls and Material controls*.

This effect simulates caustics—reflections of light at the bottom of a body of water, created by light refracting through the surface of the water. The Caustics effect generates this reflection and creates realistic water surfaces when used with Wave World and Radio Waves.

Eran Stern provides a video tutorial on the [Creative COW website](#) in which he demonstrates how to use the Caustics effect with the Wave World effect.

**Note:** The Caustics effect ignores masks and alpha channels on the layer to which it is applied. You can precompose the layer with the effect and apply the mask to the precomposition layer, or you can precompose the layer with the mask and apply the effect to the precomposition layer, depending on what result you want to achieve. (See *Precomposing, nesting, and pre-rendering*.)

This effect works with 8-bpc color.



Original (upper-left), and with Bottom set to the text layer (lower-left) and Water Surface set to the whirl layer with Surface Opacity set to 0% (lower-right)

 To get the most realistic results from Caustics, render the Bottom layer separately, with Render Caustics enabled and Surface Opacity at 0. Then precompose, and use the resulting layer as the Bottom layer for another Caustics effect with Render Caustics off. With this process you can offset, scale, or otherwise manipulate the Bottom layer in the precomposed composition, and thus simulate lighting that doesn't come from straight overhead.

### Bottom controls

The Bottom controls specify the appearance of the bottom of the body of water:

**Bottom** Specifies the layer at the bottom of the body of water. This layer is the image that is distorted by the effect, unless Surface Opacity is 100%.

**Scaling** Makes the bottom layer larger or smaller. If the edges of the bottom layer show, because of the refraction of the light through the waves, scale up the bottom layer. Scaling down is useful for tiling a layer to make a complex pattern.

**Repeat Mode** Specifies how a scaled-down bottom layer is tiled. Once uses only one tile, basically turning tiling off. Tiles uses the traditional tiling method of abutting the right edge of one bottom layer tile to the left edge of another bottom layer tile. This option works well if the bottom layer contains a repeating pattern, like a logo, that needs to read a certain way. Reflected abuts each edge of a bottom layer tile to a mirrored copy of the tile. This option can eliminate a hard edge where the two tiles meet.

**If Layer Size Differs** Specifies how to handle the bottom layer when it is smaller than the composition.

**Blur** Specifies the amount of blur applied to the bottom layer. To make the bottom sharp, set this control to 0. Higher values make the bottom appear increasingly blurry, especially where the water is deeper.

### Water controls

**Water Surface** Specifies the layer to use as the surface of the water. Caustics uses the luminance of this layer as a height map for generating a 3D water surface. Light pixels are high, and dark pixels are low. You can use a layer created by using the Wave World or Radio Waves effect; precompose the layer before using it with Caustics.

**Wave Height** Adjusts the relative height of the waves. Higher values make the waves steeper and the surface displacement more dramatic. Lower values smooth the Caustics surface.

**Smoothing** Specifies the roundness of the waves by blurring the water surface layer. High values eliminate detail. Low values show imperfections in the water surface layer.

**Water Depth** Specifies depth. A small disturbance in shallow water moderately distorts the view of the bottom, but the same disturbance in deep water distorts the view greatly.

**Refractive Index** Affects the way the light bends as it passes through the liquid. A value of 1 does not distort the bottom. The default value of 1.2 accurately simulates water. To add distortion, increase the value.

**Surface Color** Specifies the color of the water.

**Surface Opacity** Controls how much of the bottom layer is visible through the water. If you want a milky effect, increase the Surface Opacity and Light Intensity values; a value of 0 results in a clear liquid.

 Set Surface Opacity to 1.0 to perfectly reflect a sky later. With a suitable texture map, you can use this technique to create the effect of liquid mercury.

**Caustics Strength** Displays the caustics, the concentrations of light on the bottom surface, caused by the lensing effect of the water waves. This control changes the way everything looks: The dark spots of the waves get much darker, and the light spots get much lighter. If you don't set a value for this control, the effect distorts the bottom layer when the waves pass over it, but it doesn't render the lighting effect.

### Sky controls

**Sky** Specifies the layer above the water. Scaling makes the sky layer larger or smaller. If the edges of the sky layer show, scale the layer up. Scaling down is useful for tiling a layer to make a complex pattern.

**Repeat Mode** Specifies how a scaled-down sky layer is tiled. Once uses only one tile, basically turning tiling off. Tiles uses the traditional tiling method of abutting the right edge of one layer tile to the left edge of another layer tile. This option works well if the layer contains a repeating pattern, like a logo, that needs to read a certain way. Reflected abuts each edge of a layer tile to a mirrored copy of the tile. This option can eliminate a hard edge where the two tiles meet.

**If Layer Size Differs** Specifies how to handle the layer when it is smaller than the composition. Intensity specifies the opacity of the sky layer. Convergence specifies how close the sky and the bottom or water layer appear, controlling the extent to which the waves distort the sky.

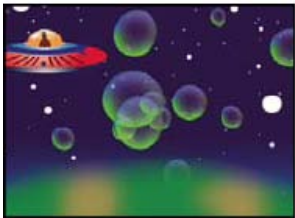
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## Foam effect

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This effect generates bubbles that flow, cling, and pop. Use the controls for the effect to adjust attributes for the bubbles such as stickiness, viscosity, life span, and bubble strength. You can control exactly how the foam particles interact with each other and with their environment, and specify a separate layer to act as a map, controlling precisely where the foam flows. For example, you can have particles flow around a logo or fill a logo with bubbles.

This effect works with 8-bpc color.



Original (upper-left), with Foam applied (lower-left), and with a robot layer used as the Bubble Texture Layer (lower-right)

You can also substitute any image or movie for bubbles. For example, you can create swarms of ants, flocks of birds, or crowds of people.

**Note:** On a frame-by-frame basis, Foam renders quickly, but the slightest adjustment in the initial settings is likely to result in very different output a few seconds into the simulation. When making adjustments to Physics controls, the farther into the simulation you are, the longer the adjustments take to render, because each adjustment results in the simulation being recalculated all the way back to the beginning. Not every frame takes this long to calculate; once Foam adjusts to the change, rendering speeds up again.

### View controls

**Draft** Displays the bubbles without fully rendering them. Using Draft mode is a fast way to preview the behavior of the bubbles. Draft mode is the only way to preview the universe edges, the Flow Map alignment, and the Producer location, orientation, and size. Blue ellipses represent bubbles. A red ellipse represents the Producer Point. A red rectangle represents the bubble universe.

**Draft + Flow Map** Displays the Draft view wireframe superimposed over a grayscale representation of the flow map, if selected.

**Rendered** Displays the final output of the animation.

### Producer controls

The Producer controls specify the location where the bubbles originate, as well as the speed at which they are generated:

**Producer Point** The center of the area from which the bubbles can be produced.

**Producer X Size, Producer Y Size** Adjust the width and height of the area from which the bubbles can be produced.

**Producer Orientation** Adjusts the rotation (orientation) of the area from which the bubbles can be produced. Producer Orientation has no noticeable effect when Producer X Size and Producer Y Size are identical.

**Zoom Producer Point** Specifies whether the producer point and all of its associated keyframes remain relative to the universe (selected) or to the screen (unselected) when you zoom in or out on it. For example, if you set a position for Producer Point in the upper-left corner of the layer and then zoom out on that layer, the producer point stays in the upper-left corner of the screen if you don't select Zoom Producer Point. If you select Zoom Producer Point, the point moves with the universe as it is zoomed out, and the point ends up closer to the center of the screen.

**Production Rate** Determines the rate at which bubbles are generated. This control does not affect the number of bubbles per frame. Rather, the rate is the average number of bubbles generated every 30th of a second. Higher numbers yield more bubbles.

💡 If a large number of bubbles appear in the same point at the same time, some may pop. If you want a lot of foam, increase the values for Producer X Size and Producer Y Size so that the bubbles don't immediately pop each other.

### Bubbles controls

**Size** Specifies the average size for adult bubbles. Size Variance, Bubble Growth Speed, and Random Seed also affect the size of a bubble in any particular frame.



**Size Variance** Specifies the range of possible bubble sizes. This control uses the Size value as the average and creates smaller-than-average and larger-than-average bubbles by using the range you specify here. For example, a default bubble Size of 0.5 and default Size Variance of 0.5 generate bubble sizes ranging from 0 to 1 ( $0.5 - 0.5 = 0$  and  $0.5 + 0.5 = 1$ ).

**Lifespan** Specifies the maximum life of a bubble. This value is not absolute; if it were, the bubbles would all pop after the same lifespan, as if they were hitting a wall. Rather, this value is a target lifespan; some bubbles pop early, and others may last until the end.

**Bubble Growth Speed** Specifies how fast a bubble reaches full size. When a bubble is released from the producer point, it generally starts out rather small. If you set this value too high and you specify a small producer area, the bubbles pop each other, and the effect generates fewer bubbles than expected.

**Strength** Influences how likely a bubble is to pop before it reaches its Lifespan limit. Lowering the Strength for a bubble makes it more likely to pop early in its life, when forces like wind and flow maps act upon it. Lower values are good for soap bubbles. The highest value is recommended for flocking animations.

 *Set this value low, and set Pop Velocity high to create chain reactions of popping bubbles.*

## Physics controls

The Physics controls specify the motion and behavior of the bubbles:

**Initial Speed** Sets the speed of the bubble as it is emitted by the producer point. The other Physics parameters affect this speed.

 *Low Initial Speed values in conjunction with the default producer size don't affect the results much because the bubbles bounce off each other. For more control over initial speed, increase the values for Producer X Size and Producer Y Size.*

**Initial Direction** Sets the initial direction in which the bubble moves as it emerges from the producer point. Other bubbles and other Physics controls also affect the direction.

**Wind Speed** Sets the speed of the wind that pushes the bubbles in the direction specified by Wind Direction.

**Wind Direction** Sets the direction in which the bubbles blow. Animate this control to create turbulent wind effects. Wind affects bubbles if Wind Speed is greater than 0.

**Turbulence** Applies small random forces to the bubbles, making them behave chaotically.

**Wobble Amount** Randomly changes the shape of bubbles from perfectly round to a more natural elliptical shape.

**Repulsion** Controls whether bubbles bounce off each other, stick to each other, or pass through each other. At a value of 0, bubbles don't collide; they pass through each other. The higher the Repulsion value, the more likely bubbles are to interact with each other when they collide.

**Pop Velocity** Controls how popping bubbles affect each other. When a bubble pops, it affects other bubbles around it by leaving a hole that other bubbles can fill, pushing other bubbles away, or popping other bubbles. The higher the value, the more popping bubbles affect one another.

**Viscosity** Specifies the rate at which bubbles decelerate after being released from the producer point, and controls the speed of the flow of the bubbles. A high Viscosity value creates resistance as the bubbles get farther away from the producer point, causing them to slow down. If Viscosity is set high enough, the bubbles stop. The thicker the substance, the higher the Viscosity. For example, if you want to create the effect of bubbles traveling through oil, set Viscosity fairly high, so that the bubbles meet resistance as they travel. To create the effect of bubbles floating in air, set Viscosity fairly low.

**Stickiness** Causes bubbles to clump together and makes them less vulnerable to other Physics controls like Wind Direction. The higher the Stickiness, the more likely the bubbles are to form clusters and cling. Use Stickiness and Viscosity to create a bubble cluster.

## Zoom and Universe Size controls

**Zoom** Zooms in or out around the center of the bubble universe. To create large bubbles, increase the Zoom value instead of the Size value because large bubble sizes can be unstable.

**Universe Size** Sets the boundaries of the bubble universe. When bubbles completely leave the universe, they pop and are gone forever. By default, the universe is the size of the layer. Values greater than 1 create a universe that stretches beyond the borders of the layer. Use higher values to make bubbles flow in from outside the frame, or make it possible to zoom out and bring them back into the picture. Using a value lower than 1 clips the bubbles before they reach the edge of the layer. For example, when you want to confine bubbles to a specific area, such as inside a mask shape, set Universe Size a little larger than the mask size to remove all the extra bubbles and speed up the rendering process.

## Rendering controls

The Rendering controls specify the appearance of the bubbles, including their texture and reflection:

**Blend Mode** Specifies the relative transparency of bubbles as they intersect. Transparent blends the bubbles smoothly together, allowing you to see the bubbles through each other. Solid Old On Top makes a younger bubble appear to be underneath an older bubble and eliminates transparency. Use this setting to simulate bubbles flowing toward you. Solid New On Top makes younger bubbles appear to be on top of older bubbles and also eliminates transparency. Use this setting to make bubbles appear as if they are flowing downhill.

**Bubble Texture** Specifies the bubble texture. Use a preset texture, or create your own. To see the texture, make sure that View is set to Rendered. To create your own texture, select User Defined, and from the Bubble Texture Layer menu, choose the layer you want to use as the bubble.

**Note:** *The preset bubble textures are prerendered 64x64 images. If you zoom in above 64x64, the bubble appears blurry. To avoid this blurriness, use a higher-resolution custom bubble.*

**Bubble Texture Layer** Specifies the layer you want to use as the bubble image. To use this control, choose User Defined from the Bubble Texture menu. If you want the layer to appear only as a bubble, turn off the video switch for the layer in the Timeline panel.

**Note:** *You can use any file type that After Effects supports. If you plan on zooming in or using a large bubble size, make sure that the resolution of the layer is high enough to avoid blurring. Remember, the item doesn't have to be a normal bubble. You can make blood cells, starfish, insects, space aliens, or flying monkeys. If it's a layer in your composition, it can be a bubble.*

**Bubble Orientation** Determines the direction that the bubble rotates. Fixed releases the bubble from the producer right side up and keeps it that way. Use this control if the bubble has built-in highlights and shading, as all of the preset bubbles do. Physical Orientation buffets and spins bubbles around by the forces on them, creating a chaotic scene. Bubble Velocity faces the bubble in the direction of its motion. This setting is the most useful for flocking-style animations.

**Environment Map** Specifies the layer that is reflected in the bubbles. If you want to use this layer only for the reflection, turn off the video switch for a layer.

**Reflection Strength** Controls how much of the selected Environment Map is reflected in the bubbles. The higher the value, the more the reflection obscures the original bubble texture. Reflections appear only on opaque pixels, so bubbles with high amounts of transparency, such as the Spit preset, don't reflect much.

**Reflection Convergence** Controls how much your Environment Map is distorted as it is mapped onto the bubbles. A value of 0 projects the map flat on top of all of the bubbles in the scene. As the value increases, the reflection distorts to account for the spherical shape of each bubble.

## Flow Map controls

The Flow Map controls specify the map that the flow of the foam follows:

**Flow Map** Specifies the layer used to control the direction and speed of the bubbles. Use a still image layer; if you select a movie as the flow map layer, only the first frame is used. A flow map is a height map based on luminance: White is high, and black is low. White is not infinitely high; if a bubble travels fast enough, it can travel past a white obstacle. Make sure that the map is a little blurry; sharp edges can create unpredictable results. For example, to make bubbles flow through a canyon, create a flow map with a white canyon rim, a black canyon, and blurry gray walls. Use wind to blow the bubbles in the direction you want them to flow, and the walls of the canyon contain them. You can also use a gentle gradient on the floor of the canyon to control the flow direction.

**Note:** *If the bubbles don't follow the map, use the Simulation Quality control. Also, try blurring the flow map a little to make sure that it does not have excessively abrupt edges.*

**Flow Map Steepness** Controls the difference between white and black as they are used to determine steepness. If the bubbles are ricocheting randomly off the flow map, decrease this value.

**Flow Map Fits** Specifies whether the flow map is relative to the layer or to the universe. The flow map resizes itself to fit whichever you specify. This control is useful when you want to enlarge the universe but the flow map is designed for a particular layer, or when you want the bubbles to start outside the frame and be affected by the flow map as they arrive in the frame.

**Simulation Quality** Increases the precision, and therefore the realism, of the simulation. However, the higher the value, the longer the composition takes to render. Normal generally produces good results and takes the least amount of time to render. High returns better results but takes longer to render. Intense increases the rendering time but produces more predictable bubble behavior. Use this option if the bubbles aren't following the flow map. It often solves problems of erratic behavior that can occur with small bubbles, high bubble speeds, and steep slopes.

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## Particle Playground effect

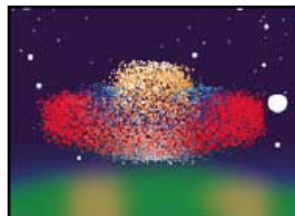
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The Particle Playground effect lets you animate a large number of similar objects independently, such as a swarm of bees or a snow storm. Use the Cannon to create a stream of particles from a specific point on the layer, or use the Grid to generate a plane of particles. The Layer Exploder and Particle Exploder can create new particles from existing layers or particles. You can use any combination of particle generators on the same layer.

David Van Brink provides a video walkthrough and downloadable example project on the [omino website](#) that show several things that you can do with the Particle Playground effect, including how to use the Kinetic Friction ephemeral property mapper.

Brian Peterson provides a tutorial on the [Videomaker website](#) that shows how to use the Particle Playground effect to create a flock of birds.

This effect works with 8-bpc color.



Particles shooting out of the spacecraft layer (upper-left), text characters used as particles shooting out of a ray gun (lower-left), and Layer Exploder used on spacecraft layer (lower-right)

Start by creating a stream or plane of particles, or by exploding an existing layer into particles. Once you have a layer of particles, you can control their properties, such as speed, size, and color. You can replace the default dot particles with images from an existing layer to create, for example,



an entire snowstorm from a single snowflake layer. You can also use text characters as particles. For example, you can shoot words across the screen, or you can create a sea of text in which a few letters change color, revealing a message.

Use Cannon, Grid, Layer Exploder, and Particle Exploder controls to generate particles. Use Layer Map controls to specify a layer in place of each default dot particle. Use Gravity, Repel, and Wall controls to influence overall particle behavior. Use Property Mapper controls to influence particle properties. Use Options to set options, including options for substituting text characters in place of dots.

**Note:** Because of the complexity of Particle Playground, you may experience long computation, preview, and render times.

## Use Particle Playground

1. Select the layer on which you want particles to exist, or create a new solid layer.
2. Choose Effect > Simulation > Particle Playground. The layer becomes an invisible layer in which only the particles are visible. Animating the layer in the Timeline panel animates the entire layer of particles.
3. Set up a particle generator to determine how particles are created. You can shoot a stream of particles from the Cannon, generate a flat plane full of particles from the Grid, or use the Layer Exploder to create particles from an existing layer. If you've already created particles, you can apply the Particle Exploder to explode them into more new particles.
4. Select your particles. By default, Particle Playground creates dot particles. You can replace the dots with a layer already in the composition or with text characters you specify.
5. Specify the overall behavior of some or all particles. Use Gravity to pull particles in a specified direction, Repel to push particles apart from or toward one another, or Wall to contain or exclude particles from a certain area.
6. Use a layer to specify the behavior of individual particles. You can modify controls that change particle motion, such as speed and force, and controls that change particle appearance, such as color, opacity, and size.

The Particle Playground effect renders with anti-aliasing when the layer to which it is applied is set to Best quality. It also applies motion blur to moving particles when both the Motion Blur layer switch and the Enable Motion Blur composition switch are on.

When you use a layer as a source for particles, Particle Playground ignores any changes you've made to that layer within that composition, such as changing the Position values. Instead, it uses the layer in its original state. To keep changes for a layer when you use it as a particle source, precompose the layer and use the precomposition layer as the control layer. (See Compound effects and control layers.)

## Particle content and particle generators

Particle Playground can generate three kinds of particles: dots, a layer, or text characters. You can specify only one kind of particle per particle generator.

Create particles by using the Cannon, the Grid, the Layer Exploder, and the Particle Exploder. The Grid creates particles in an organized grid format with straight rows and columns. The exploders create particles randomly, like firecracker sparks.

The particle generators set the attributes of particles at the moment they are created. After creation, Gravity, Repel, Wall, Exploder, and Property Mapper controls influence particle behavior. For example, if you want particles to stick to grid intersections, you might use the Static Friction option in the Persistent Property Mapper to hold particles in place. Otherwise, as soon as particles are created, they begin moving away from their original grid positions.

## Cannon controls

The Cannon is on by default; to use a different method to create particles, first turn off the Cannon by setting Particles Per Second to zero. The Cannon creates particles in a continuous stream.

**Position** Specifies the (x,y) coordinates from which particles are created.

**Barrel Radius** Sets the size of the barrel radius for the Cannon. Negative values create a circular barrel, and positive values create a square barrel. For a narrow source, such as a ray gun, specify a low value. For a wide source, such as a school of fish, specify a high value.

**Particles Per Second** Specifies how often particles are created. A value of 0 creates no particles. A high value increases the density of the particle stream. If you don't want the Cannon to fire continuously, set keyframes for this control so that the value is 0 at the times when you don't want to create any particles.

**Direction** Sets the angle at which particles are fired.

**Direction Random Spread** Specifies how much each particle's direction deviates randomly from the cannon direction. For example, specifying a 10-degree spread sprays particles in random directions within  $\pm 5^\circ$  of the cannon direction. For a highly focused stream, such as a ray gun, specify a low value. For a stream that widens quickly, specify a high value. You can specify up to  $360^\circ$ .

**Velocity** Specifies the initial speed of particles in pixels per second as they emanate from the Cannon.

**Velocity Random Spread** Specifies the amount of random velocity of particles. A higher value results in more variation in the velocity of particles. For example, if you set Velocity to 20 and Velocity Random Spread to 10, particles leave the Cannon at velocities ranging from 15 to 25 pixels per second.

**Color** Sets the color of dots or text characters. This control has no effect if you use a layer as the particle source.

**Particle Radius** Sets the radius of dots, in pixels, or the size of text characters in points. This control has no effect if you use a layer as the particle source.

## Grid controls

The Grid creates a continuous plane of particles from a set of grid intersections. The movement of Grid particles is completely determined by the

Gravity, Repel, Wall, and Property Mapper settings. By default, the Force control of Gravity is on, so Grid particles fall toward the bottom of the frame.

With the Grid, a new particle appears on every frame at each grid intersection. You can't adjust this frequency, but if you want to turn off the Grid or make the Grid stop generating particles at specific times, set the Particle Radius/Font Size control to 0, or use keyframes to animate the value of the Particles Across and Particles Down controls. To make more particles appear in each frame, increase the values for Particles Across and Particles Down.

**Note:** By default, the Cannon is on and the Grid is off. If you are using the Grid and want to stop the Cannon from generating particles, turn off the Cannon by setting its Particles Per Second value to 0.

**Position** Specifies the (x,y) coordinates of the grid center. When a grid particle is created, it is centered over its grid intersection, regardless of whether it is a dot, a layer, or a text character. If you're using text characters as particles, the Use Grid option in the Edit Grid Text dialog box is on by default, placing each character on its own grid intersection, so normal character spacing, word spacing, and kerning do not apply. If you want text characters to appear at the grid position with normal spacing, use a text alignment other than the Use Grid option.

**Width, Height** Specify the dimensions of the grid, in pixels.

**Particles Across, Particles Down** Specify the number of particles to distribute horizontally and vertically across the grid area. Particles are generated only when the value is 1 or more.

**Note:** If the Width, Height, Particles Across, and Particles Down controls are not available, the Use Grid option has been turned off in the Edit Grid Text dialog box.

**Color** Sets the color of dots or text characters. This control has no effect if you use a layer as the particle source.

**Particle Radius/Font Size** Sets the radius of dots in pixels or the size of text characters in points. This control has no effect if you use a layer as the particle source.

## Layer Exploder and Particle Exploder

The Layer Exploder explodes a layer into new particles, and the Particle Exploder explodes a particle into more new particles. In addition to explosion effects, the exploders are also handy for simulating fireworks or for rapidly increasing the number of particles.

The following guidelines can help you control particles resulting from an explosion:

- A layer is exploded once for each frame. By default, this creates a continuous shower of particles for the duration of the composition. If you want to start or stop a layer explosion, animate the Radius of New Particles control by using keyframes so that its value is zero at times when you don't want particles to be created.
- If the source of the layer is a nested composition, you can set different Opacity values or In and Out points for the layers within the nested composition to make the exploding layer transparent at different points in time. The Layer Exploder does not create particles where the source of the layer is transparent.
- To change the position of the exploding layer, precompose the layer with its new position (use the Move All Attributes Into The New Composition option), and then use the precomposed layer as the exploding layer.
- When you explode particles, the new particles inherit the position, velocity, opacity, scale, and rotation of the original particles.
- After layers or particles explode, Gravity, Repel, Wall, and Property Mapper controls influence the movement of particles.

 *Some Persistent Property Mapper and Ephemeral Property Mapper options can make explosions more realistic. For example, change Opacity to make the resulting particles fade out, or change the Red, Green, and Blue color channels to make resulting particles change color as they appear to cool.*

**Explode Layer** (Layer Exploder only) Specifies the layer you want to explode. To make the video disappear the moment the particles appear, either turn off the video for the layer or trim the Out point of the layer.

**Radius Of New Particles** Specifies the radius of the particles resulting from the explosion. This value must be smaller than the radius of the original layer or particle.

**Velocity Dispersion** Specifies, in pixels per second, the maximum speed of the range within which Particle Playground varies the velocity of the resulting particles. High values create a more dispersed or cloudlike explosion. Low values keep the new particles closer together and can make the exploded particles resemble a halo or shockwave.

**Affects** Specifies which particles the Layer Exploder and Particle Exploder affect.

## Layer Map controls

By default, the Cannon, Grid, Layer Exploder, and Particle Exploder create dot particles. To replace the dots with a layer in the composition, use the Layer Map. For example, if you use a movie of a single bird flapping its wings as a particle source layer, After Effects replaces all dots with an instance of the bird movie, creating a flock of birds. A particle source layer can be a still image, a solid, or a nested After Effects composition.

A multiframe layer is any layer with a source that varies over time, such as a movie or a composition. When you map new particles to a multiframe layer, use the Time Offset Type control to specify how you want to use the frames of the layer. For example, use Absolute to map an unchanging image onto a particle, or use Relative to map an animating sequence of frames onto a particle. You can randomize both Absolute and Relative across particles.

**Note:** When you choose a layer for Layer Map, Particle Playground ignores any changes that you made to that layer within that composition. Instead, it uses the layer in its original state. To keep transformations, effects, masks, rasterization options, expressions, or keyframe changes for a layer when you use it as a particle source, precompose the layer.

**Use Layer** Specifies the layer you want to use as the particles.

**Time Offset Type** Specifies how you want to use the frames of a multiframe layer. For example, if you are using a layer of a bird flapping its wings and you choose Relative for Time Offset Type with a Time Offset of 0, the flapping wings for all the instances of the bird are synchronized. While this may be realistic for a marching band, it is not realistic for a flock of birds. To make each bird start flapping its wings from a different frame in the layer, use Relative Random.

**Relative** Starts playing the layer at a frame based on the Time Offset you specify, relative to the current time of the effect layer; then advances in step with the current time of the Particle Playground layer. If you specify a Time Offset of 0, all particles show the frame that corresponds to the current time of the effect layer. If you choose a Time Offset of 0.1 (and your composition is set to 30 fps), each new particle displays the frame that is 0.1 seconds after the previous particle's frame. Regardless of the Time Offset you specify, the first particle always displays the frame of the source layer that corresponds to the current time of the effect layer.

**Absolute** Displays a frame from the layer based on the Time Offset you specify, regardless of the current time. Choose Absolute when you want a particle to show the same frame of a multiframe source layer for its entire lifespan, instead of cycling through different frames as the effect layer advances in time. For example, if you choose Absolute and specify a Time Offset of 0, every particle shows the first frame of the source layer for its entire lifespan. If you want to show a frame other than the first frame, move the layer earlier in time until the frame you want to show corresponds to the In point of the Particle Playground layer. If you specify a Time Offset of 0.1, for example, each new particle displays a frame that is 0.1 second after the frame of the previous particle (or every third frame of a 30-fps animation).

**Relative Random** Starts playing the layer from a frame chosen at random, within the range between the current time of the effect layer and the Random Time Max you specify. For example, if you choose Relative Random and specify a Random Time Max of 1, each particle starts playing from a layer frame chosen at random from between the current time and 1 second after the current time. If, for another example, you specify a negative Random Time Max value of - 1, the Random Time Max is before the current time, so that the range within which new particles start playing advances as the current time advances. However, the range is always between the current time and one second earlier than the current time.

**Absolute Random** Takes a frame at random from the layer, by using a time in the range from 0 to the Random Time Max you specify. Choose Absolute Random when you want each particle to represent a different single frame of a multiframe layer. For example, if you choose Absolute Random and specify a Random Time Max of 1, each particle shows a layer frame from a random time between 0 seconds and 1 second into the duration of the layer.

**Time Offset** Specifies the frame from which to start playing sequential frames from the layer.

**Affects** Specifies which particles the Layer Map controls affect.

### Replace default Cannon particles with text

You can use text characters as particles. For example, you can type a message that the Cannon shoots across the frame. You can also change the attributes of any three sets of characters. For example, you can make some of the characters larger or brighter than others.

1. In the Effect Controls panel, click Options.
2. Click Edit Cannon Text.
3. Type text in the box, and then set the following options:
  - For Font/Style, choose the font and style for Cannon characters.
  - For Order, click to specify the sequence in which characters exit the Cannon. The sequence is relative to the character order typed in the box. For example, if the Cannon Direction is set to 90° (making it point to the right), English text must exit the Cannon last letter first to be in readable order. Therefore, select Right to Left.
  - For Loop Text, select to continuously generate the characters you typed. Deselect to generate only one instance of the characters.
4. Click OK to close the Edit Cannon Text dialog box, and then click OK to close the Particle Playground dialog box.
5. Click the right-facing triangle next to Cannon so that it points downward.
6. Click the Font Size value, type a value of 10 or greater, and press Enter (Windows) or Return (Mac OS).

If you want to stop replacing default particles with text, delete all text from the box in the Edit Cannon Text dialog box.

### Replace default Grid particles with text

1. In the Effect Controls panel, click Options, and then click Edit Grid Text.
2. Set the following options:
  - For Font/Style, choose the font and style for Grid characters.
  - For Alignment, click Left, Center, or Right to position text in the box at the Position specified in the Grid control, or click Use Grid to position each letter in the text on consecutive grid intersections.
  - For Loop Text, select to repeat the characters you typed until all the grid intersections contain one character. Grid intersections are specified by the Particle Across and Particle Down controls. Deselect to generate only one instance of the text. (This option is available only if you select Use Grid alignment.)
3. Type text in the box. If Use Grid alignment is selected and you want to skip a grid intersection, type a space. To force the next character down to the next grid row, press Enter (Windows) or Return (Mac OS).
4. Click OK to close Edit Grid Text, and then click OK to close the Particle Playground dialog box.
5. Click the right-facing triangle next to Grid so that it points downward.

6. Click the Font Size value, type a value of 10 or greater, and press Enter (Windows) or Return (Mac OS).

If you want to stop replacing default particles with text, delete all text from the box in the Edit Grid Text dialog box.

## Using Selection Text values to differently affect subsets of text

You can differently affect only certain subsets of text particles by specifying Selection Text values. To open the Particle Playground options dialog box, click Options at the top of the Particle Playground entry in the Effect Controls panel. (This is the same place where you can specify the text used by the Grid or Cannon emitters.) Then enter text in one or more of the Selection Text fields, and click OK. After doing this, you can then choose one of the Selection Text sets from the Character menu under one of the Affects property groups. For example, you can make gravity only affect the letter e by entering e in Selection Text 1 and then choosing Selection Text 1 in Gravity > Affects > Characters.

**Note:** *The string matching is case-sensitive, and it does include punctuation marks and other symbols.*

 *As with all text features, consider using this feature with symbol fonts, like wingdings.*

## Changing a particle over its lifespan

Some controls affect the particle from birth: Cannon, Grid, Layer Exploder, and Particle Exploder. Others affect the particle after birth and over the course of its lifespan: Gravity, Repel, Wall, Persistent Property Mapper, and Ephemeral Property Mapper. To have full control over particle movement and appearance, you must balance these controls.

For example, if you want to use the Cannon to shoot sparks that fade over time, it may seem that you need only animate the Color control of the Cannon. However, using this method, you change only the color of each new particle as it's created. To control the color for the lifespan of particles, create a layer map and use one of the Property Mappers to alter the color channels of the particles.

The following list covers common particle behavior and how you can influence it.

**Speed** At particle creation, particle velocity is set by the Cannon and the exploders; Grid particles have no initial speed. After particle creation, use the Force control in the Gravity and Repel control groups. You can also influence the speed of individual particles by using a layer map to set values for the Speed, Kinetic Friction, Force, and Mass properties in the Property Mappers.

**Direction** At particle creation, the Cannon includes particle direction; the Layer Exploder and Particle Exploder send new particles in all directions; and Grid particles have no initial direction. After particle creation, direction can be influenced by the Direction control in the Gravity control group or by specifying a Boundary (mask) in the Wall control group. You can also influence the direction of individual particles by using a layer map to set values for the Gradient Force, X Speed, and Y Speed properties in the Property Mappers.

**Area** Use a Wall mask to contain particles to a different area or to remove all barriers. You can also restrict particles to an area by using a layer map to set values for the Gradient Force property in the Property Mappers.

**Appearance** At particle creation, the Cannon, Grid, Layer Exploder, and Particle Exploder set particle size unless you replace the default dots with a layer map. The Cannon and Grid set the initial color, while the Layer Exploder and Particle Exploder take color from the exploded dot, layer, or character. The Options dialog box affects the initial appearance of text. After particle creation, you can use the Property Mappers to set values for Red, Green, Blue, Scale, Opacity, and Font Size.

**Rotation** At particle creation, the Cannon and Grid set no rotation; the Particle Exploder takes rotation from the exploded dot, layer, or character. Use Auto-Orient Rotation to make particles rotate automatically along their respective trajectories. For example, a particle can point up as it climbs an arc, and point down as it descends. Rotation isn't easily visible for a dot particle. It is easier to observe only when you replace the dot particle with text characters or a layer. After particle creation, use a layer map to set values for the Angle, Angular Velocity, and Torque property in the Property Mappers.

**Note:** *To select Auto-Orient Rotation, click Options for the Particle Playground effect in the Effect Controls panel.*

## Gravity controls

Use Gravity controls to pull existing particles in a direction you specify. Particles accelerate in the direction of gravity. Apply in a vertical direction to create falling particles, such as rain or snow, or rising particles, such as champagne bubbles. Apply in a horizontal direction to simulate wind.

**Force** Specifies the force of gravity. Positive values increase the force, pulling particles more strongly. Negative values reduce the force.

**Force Random Spread** Specifies a range of randomness for the Force. At zero, all particles fall at the same rate. At a higher value, particles fall at slightly different rates. Although pure gravity accelerates all objects equally, increasing the Force Random Spread value can produce more realistic results with subjects such as leaves falling through air, where enough air resistance exists to vary the rates of descent of the leaves.

**Direction** Specifies the angle along which gravity pulls. The default is 180°, which simulates the real world by pulling particles toward the bottom of the frame.

**Affects** Specifies a subset of the layer's particles to which Gravity applies.

## Repel controls

Repel controls specify how nearby particles repel or attract each other. This feature simulates adding a positive or negative magnetic charge to each particle. You can specify which particles, layers, or characters are the repelling force and which are repelled.

**Note:** *If you want to repel an entire layer of particles away from a specific area, use the Property Mapper controls, Wall or Gradient Force.*

**Force** Specifies the repel force. Greater values repel particles with more force. Negative values result in particle attraction.

**Force Radius** Specifies the radius (measured in pixels) within which particles are repelled. Another particle must be within this radius to be repelled.

**Repeller** Specifies which particles act as the repellers or attractors to another subset you specify by using the Affects control.

**Affects** Specifies a subset of the layer's particles to which repulsion or attraction applies.

## Wall controls

Wall controls contain particles, limiting the area within which particles can move. A wall is a closed mask that you create by using a mask tool, such as the Pen tool. When a particle hits the wall, it bounces off at a velocity based on the force with which it hit.

**Boundary** Specifies the mask to use as the wall. You can create a new mask by drawing one on the effect layer.

## Affects controls

Many Particle Playground controls include Affects controls. Affects controls specify which particles the encompassing control affects. For example, the Affects controls within the Particle Exploder controls specify which particles the Particle Exploder affects.

**Particles From** Specifies the particle generator or combination of particle generators whose particles you want to affect.

**Selection Map** Specifies the layer map that influences which particles are affected.

**Note:** *The simulation space is not bounded by the dimensions of the layer to which Particle Playground is applied. You may need to use a selection map that is larger than the Particle Playground layer so that the selection map affects dots that are not visible.*

**Characters** Specifies the characters you want to affect. This control applies only if you are using text characters as the particle type.

**Older/Younger Than** Specifies the age threshold, in seconds, above or below which you want to affect a particle. Positive values affect older particles, and negative values affect younger particles. For example, a value of 10 means that as soon as a particle reaches 10 seconds, it changes to the new value.

**Age Feather** Specifies the age range in seconds within which the Older/Younger Than value is feathered, or softened. Feathering creates a gradual, rather than abrupt, change. For example, if you set Older/Younger Than to 10 and Age Feather to 4, about 20% of particles start changing when they're 8 seconds old, 50% change when they're 10 seconds old (the Older/Younger Than value), and the remainder change by the time they're 12 seconds old.

## Use Particle Playground Property Mapper controls

You can control specific properties of individual particles by using a layer map and either the Persistent Property Mapper or the Ephemeral Property Mapper. You can't alter a specific particle directly, but you can use a layer map to specify what happens to any particle that passes over a specific pixel in the layer. Particle Playground interprets the brightness of each layer map pixel as a specific value. The Property Mapper associates a specific layer map channel (Red, Green, or Blue) with a specific property, so that as a particle passes over a certain pixel, the brightness value at that pixel modifies the property.

A particle property can be modified in either a persistent or an ephemeral way:

- A persistent change to a particle property retains the most recent value set by a layer map for the remaining lifespan of the particle, unless the particle is modified by another control such as Repel, Gravity, or Wall. For example, if you use a layer map to modify particle size and you animate the layer map so it exits the frame, the particles keep the last size value set by the layer map after it exits the frame.
- An ephemeral change to a particle property causes the property to revert to its original value after each frame. For example, if you use a layer map to modify particle size and you animate the layer map so that it exits the frame, each particle returns to its original size value as soon as no layer map pixels correspond to it. Similarly, if you apply an operator such as Add, each time a particle passes over a different layer map pixel, the value of the layer map pixel is added to the original value of the particle.

In both the Persistent and Ephemeral Property Mappers, you can control up to three particle properties independently by using a single RGB image as a layer map. Particle Playground achieves this independent three-component control by extracting brightness values separately from the red, green, and blue channels in the image. You don't have to use all three channels if you want to modify only one property. To change only one property or change up to three properties using the same values, use a grayscale image as the layer map because the RGB channels are identical.

In combination with keyframes or expressions, the Property Mappers provide complete control over individual particle properties in space and time. Using layer maps, you can change particle properties at any location within a frame. By applying keyframes or expressions to Property Mapper options and animating a layer map, you can control how particle properties change.

1. For Use Layer As Map, choose a layer map to use as the source for values that modify particle values. The layer map must be part of the composition.
2. To apply the effect to a subset of particles, specify the Affects controls as necessary.
3. Choose a property for each of the Map Red To, Map Green To, and Map Blue To controls. You don't have to map properties to all of the color channels. For example, if you want to change scale over an image map, you can map the color red to scale without setting other properties.
4. Specify the minimum and maximum values you want the layer map to produce for each Map To group. Min is the value to which a black pixel is mapped, and Max is the value to which a white pixel is mapped. The complete tonal distribution between Min and Max is then scaled proportionally.
5. If using the Ephemeral Property Mapper, you can apply an operator to the value of a particle property and the value of the corresponding layer map pixel.

**Note:** *Because particle properties use many kinds of units, such as pixels, degrees, and seconds, you may want to compress or expand the range of values from the layer map so that all the resulting values are usable in the measurement system of a specific particle property. First, use the Min and Max controls, which define the range of values to use from the layer map. If further adjustment is necessary and you're using the Ephemeral Property Mapper, use the Operator control and choose a mathematical operator to amplify, attenuate, or limit the effect of a layer map.*

In both the Persistent and Ephemeral Property Mappers, you can use the alpha channel of a layer map to make more subtle changes to the value of a particle property. For example, particles over a layer-map pixel in which the alpha channel value is 255 are fully affected, while lower values affect particles less. Layer-map pixels that are completely transparent have no effect on particle properties.

When you choose any of the following properties, Particle Playground copies the value from the layer map (that is, the layer selected in the Use Layer as a Map menu) and applies it to the particle.

**None** Modifies no particle property.

**Red, Green, Blue** Copy the value of the red, green, or blue channel of a particle within a range of 0.0–1.0.

**Kinetic Friction** Copies the amount of resisting force against a moving object, typically within a range of 0.0–1.0. Increase this value to slow down or stop moving particles, as if braking.

**Static Friction** Copies the amount of inertia that holds a stationary particle in place, typically within a range of 0.0–1.0. At zero, a particle moves when any other force, such as gravity, is present. If you increase this value, a stationary particle requires more of another force to start moving.

**Angle** Copies the direction in which the particle points, in degrees relative to the particle's original angle. The angle is easily observable when a particle is a text character or a layer without radial symmetry.

**Angular Velocity** Copies the velocity of particle rotation in degrees per second. This setting determines how fast a particle rotates around its own axis.

**Torque** Copies the force of particle rotation. The angular velocity of a particle is increased by a positive torque and is increased more slowly for particles of greater mass. Brighter pixels affect angular velocity more forcefully; if enough torque is applied against angular velocity, the particle starts spinning in the opposite direction.

**Scale** Copies the scale value of a particle along both the x and y axes. Use this control to stretch a particle proportionally. A value of 1.0 scales the particle to its full size; a value of 2.0 scales it 200%, and so on.

**X Scale, Y Scale** Copy the scale value of a particle along the x or y axis. Use these properties to stretch a particle horizontally or vertically.

**X, Y** Copy the position of a particle along the x or y axis in the frame, in pixels. A value of zero specifies a position at the left of the frame (for X) or at the top of the frame (for Y).

**Gradient Velocity** Copies the velocity adjustment based on areas of a layer map on both the x and y planes of motion.

**X Speed, Y Speed** Copy the horizontal speed (x-axis velocity) or vertical speed (y-axis velocity) of a particle in pixels per second.

**Gradient Force** Copies the force adjustment based on areas of a layer map on both the x and y planes of motion. The pixel brightness values in the color channel define the resistance to particle force at each pixel, so the color channel acts like a layer map of hills and valleys that decrease or increase particle force. In the layer map, areas of equal brightness result in no adjustment, similar to flat land. Lower pixel values represent less resistance to a particle's force, similar to a downhill grade. Higher pixel values represent more resistance to a particle's force, similar to an uphill grade. For best results, use a soft-edged layer map image.

 *If you are using a layer map for Gradient Force where flat areas equal no adjustment, and you are using the Min and Max controls (not the Min or Max operators) to set the range of values for Gradient Force, set them to positive and negative values of the same number (for example, -30 and +30). This ensures that the middle of the range remains centered at zero.*

**X Force** Copies the coercion along the x axis of motion. Positive values push a particle to the right.

**Y Force** Copies the coercion along the y axis of motion. Positive values push a particle down.

**Opacity** Copies the transparency of a particle, where zero is invisible, and 1 is solid. Adjust this value to fade particles in or out.

**Mass** Copies the particle mass, which interacts with all properties that adjust force, such as Gravity, Static Friction, Kinetic Friction, Torque, and Angular Velocity. It takes greater force to move particles with a larger mass.

**Lifespan** Copies the elapsed length of time a particle exists, in seconds. At the end of its lifespan, the particle is removed from the layer. The default lifespan is effectively immortal.

**Character** Copies the value that corresponds to an ASCII text character, making it replace the current particle. Applies only if you're using text characters as particles. You can specify which text characters appear by painting or drawing shades of gray on the layer map that correspond to the ASCII characters you want. A value of zero produces no character. For US English characters, use values in the range 32–127. The range of possible values can accommodate Japanese characters. For more information about the ASCII character values for a font you're using, see the documentation for the font, use a utility such as Character Map (Windows), or contact the font manufacturer.

**Note:** *If you simply want to make certain characters spell a message, it's much easier to type the text directly in the Options dialog box. The Character property is more useful as a secret message effect in which you scramble text characters.*

**Font Size** Copies the point size of characters. Applies only if you're using text characters as particles. Increase this value to make characters larger.

**Time Offset** Copies the Time Offset value used by the Layer Map. Applies only if you used the Layer Map control to specify a multiframe layer (such as a movie) as a particle source.

**Scale Speed** Copies the scale of a particle. Positive values expand the particle, and negative values shrink the particle. Particles expand or shrink by a percentage per second.

## Min and Max controls for Property Mappers

When the overall range of layer map brightness values is too wide or narrow, use Min and Max to stretch, compress, or shift the range of values produced by the layer map. The following examples describe when you may want to adjust Min and Max:

- You want to set the smallest font size for your text to 10 points and the largest size to 96 points. Set the Min value to 10 and the Max value to 96.
- You set the initial color of a particle and then use a layer map to change particle colors. If you find that the color changes aren't dramatic enough, you can lower the Min value and raise the Max value to increase the contrast of the color changes.
- You set the initial velocity of a particle and then use a layer map to affect the X Speed value. However, you find that the difference between the fastest and slowest particles is too great. By raising the Min value and lowering the Max value for the layer map channel that is mapped to the X Speed value, you narrow the resulting range of particle speeds.
- You use a layer map to affect the Scale property of particles and find that the smallest particles aren't small enough while the largest resulting particles are too large. In this case, the entire output range needs to be shifted down; lower both the Min and Max values.
- You have a layer map that modifies particles in the opposite direction from the one you want. Swap the Min and Max values, which has the same result as inverting the layer map.

**Note:** The alpha channel of the layer map is used as the selection map for the Persistent and Ephemeral Property Mappers.

## Operator controls for the Ephemeral Property Mapper

When you use the Ephemeral Property Mapper controls, Particle Playground replaces the value of a particle's property with the value represented by the layer map pixel at the particle's current location. You can also amplify, attenuate, or limit the resulting values by specifying a mathematical operator and then using both the value of a particle's property and its corresponding layer map pixel value.

**Set** Replaces the value of a particle property by the value of the corresponding layer map pixel. For example, to replace the value of a particle property with the brightness value of the corresponding pixel on the layer map, use Set. This operator is the most predictable and is the default.

**Add** Uses the sum of the value of a particle property and the value of the corresponding layer map pixel.

**Difference** Uses the absolute value of the difference of the value of a particle property and the brightness value of the corresponding pixel on the layer map. Because it takes the absolute value of the difference, the resulting value is always positive. This operator is useful when you want to limit values to only positive values. If you're trying to model realistic behavior, the Difference operator may not be ideal.

**Subtract** Starts with the value of a particle property and subtracts the value of the brightness value of the corresponding pixel on the layer map.

**Multiply** Multiplies the value of a particle property by the brightness value of the corresponding pixel on the layer map and uses the result.

**Min** Compares the brightness value of the layer map to the value of the particle property and uses the lower value. To limit a particle property so that it is less than or equal to a value, use the Min operator and set both the Min and Max controls to that value. If you use a white solid as a layer map, you need only set the Max control to that value.

**Max** Compares the brightness value of the layer map to the value of the particle property and uses the higher value.

 To amplify existing values of properties, try applying the Add operator with positive values or the Multiply operator with values above 1.0. To attenuate (tone down) property value changes, try applying the Multiply operator using values in the range 0.0–1.0.

## Control layers for Particle Playground

Particle Playground can use a control layer to control a particle property, such as opacity. For general information about creating and using control layers, see Compound effects and control layers.

Regardless of the color depth of the image that you use as a control layer, Particle Playground always uses its red, green, and blue channels as if each were an 8-bpc grayscale image. If you create a control layer using colors, the Property Mapper property groups in Particle Playground can extract the brightness values from each RGB color channel separately.

The alpha channel in a control layer modifies the color values in the control layer before Particle Playground uses the control layer's pixel values. Areas where the alpha channel value is 0 (transparent areas of a control layer) don't affect particle values. Areas where the alpha channel has a value greater than 0 (semitransparent and opaque areas of a control layer) affect the particle value to a degree proportional to the value of the alpha channel. When you use the Persistent and Ephemeral Property Mapper property groups, the range set for the Min and Max controls also affects the value applied to a particle.

Particle Playground can extract brightness values separately from the red, green, and blue channels in an image. If you want to create different layer maps for each channel, use a program that can edit individual color channels, such as Adobe Photoshop, and then paint or paste each layer map into its own channel. Save the control layer as an RGB image in a format After Effects can import. The image may look unusual when viewed in RGB mode, because it's intended to be used as a single hidden layer containing three different layer maps, not as a visible image layer.

 If you already have three separate images, you can combine them into a single RGB file by using the Set Channels effect. Set Channels can load each image into its own channel in a combined file, making it suitable for use as an RGB layer map.

## Improving performance with Particle Playground

Keep in mind the following when working with the Particle Playground effect:

- When you're generating a Particle Playground effect, keep an eye on the Info panel to see how many particles are being produced. If an



effect contains more than 10,000 particles, it can greatly slow rendering. If you notice performance problems, set Particles Per Second and/or Particles Down to relatively low values (in the range 1–100).

- The Grid and Layer Exploder generate particles on every frame, which may generate too many particles for the effect you're creating and slow down rendering. To avoid continuous particle generation, animate these controls to decline to zero over time: Layer Exploder, Radius of New Particles, Grid Width and Height, Particle Radius, and Font Size. Then Particle Playground generates new particles only at the start of a sequence.
- When you apply a Particle Playground effect to a layer, the particle positions aren't limited to the bounds of that layer. To control particles that you can't see or that appear near the edge of the image, use a Selection or Property Map that's larger than the area of the Particle Playground layer. Also, note that After Effects takes the alpha channel of an image map into account. If you want transparent areas of your map to affect the particles, precompose the map layer with a black solid behind it.

To specify field rendering with a Particle Playground effect, select Enable Field Rendering in the Particle Playground options dialog box. Then Particle Playground calculates the simulation at double the frame rate of the current composition, which is what field rendering requires.

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## Shatter effect

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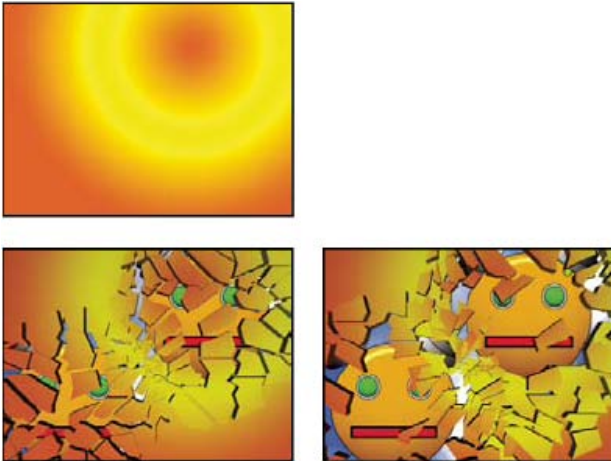
**Note:** For information on properties shared by several of the Simulation effects, see *Common Lighting controls and Material controls*.

The Shatter effect explodes images. Use the controls for the effect to set explosion points and adjust the strength and radius. Anything outside the radius doesn't explode, leaving portions of the layer unaltered. You can choose from a variety of shapes for the shattered pieces (or create custom shapes) and extrude the pieces to give them bulk and depth. You can even use a gradient layer to precisely control the timing and order of an explosion. For example, you can import a logo and use Shatter to blow a logo-shaped hole in a layer.

Brian Maffitt provides more than two hours of video explanation and tutorials for the Shatter effect in [a series of videos from Total Training](#). The interface has changed since these videos were created, but the information is still valuable.

**Note:** To reverse the temporal direction of the Shatter effect (that is, have the pieces come together instead of fly apart), apply the effect, precompose the layer, and then time-reverse the precomposition layer.

This effect works with 8-bpc color.



Original (upper-left), and as Shatter is applied over time to reveal another layer (lower-left and right)

### Online resources about the Shatter effect

Aharon Rabinowitz provides a video tutorial on the [Creative COW website](#) that shows how to make 3D extruded text in After Effects using the Shatter effect.

Rick Janusz provides a video tutorial on the [Forging Fire website](#) that shows how to use the Shatter effect to create an extruded 3D object from a 2D element.

Chris and Trish Meyer provide an article on the [ProVideo Coalition website](#) that explains how to use a simple set of expressions to orient a layer with the Shatter effect so that it integrates with other 3D layers in a composition.

Andrew Kramer provides a video tutorial on his [Video Copilot website](#) that demonstrates the use of the Shatter effect to make a planet explode.

Lloyd Alvarez provides a video tutorial on the [AETUTS+ website](#) that demonstrates the use of the Shatter effect with a custom shatter map to cause a person to disintegrate.

### View controls

The View control specifies exactly how a scene appears in the Composition panel by using the following views:

**Rendered** Displays the pieces with textures and lighting—as they will look at final output. Use this view when rendering the animation.

**Wireframe Front View** Displays the layer from a full-screen, straight-on camera angle with no perspective. Use this view to adjust effect points and other parameters that are hard to see from an angle. In addition, the outlines of the shatter map are visible so you can precisely position,

rotate, and scale the shatter pattern. It's handy to toggle between this view and the perspective view you use for the scene.

**Wireframe** Displays the correct perspective of the scene, so you can quickly set up the camera the way you like it and fine-tune the Extrusion Depth.

**Wireframe Front View + Forces** Displays the wireframe front-view representation of the layer, plus a blue representation of each force sphere.

**Wireframe + Forces** Displays the wireframe view, plus a blue representation of the force spheres. This view includes camera controls, so you can position everything precisely in 3D space.

## Render control

The Render control renders the whole scene (the default), the unshattered layer, or the shattered pieces independently. For example, if you want to apply the Glow effect only to shattered pieces and not to the portions of the layer that remain intact, create the explosion and duplicate the layer. Next, for the back layer, choose Layer from the Render menu, and for the front layer, choose Pieces. Then apply the Glow effect to the front layer.

## Shape controls

Shape controls specify the shape and appearance of the shattered pieces.

**Pattern** Specifies the preset pattern to use for the exploded pieces.

**Custom Shatter Map** Specifies the layer you want to use as the shape of the exploded pieces.

**White Tiles Fixed** Prevents pure white tiles in a custom shatter map from being exploded. You can use this control to force certain parts of a layer to remain intact.

 *Use this control when your shatter map uses images or letters such as O: Set the portion you don't want to blow out, such as the centers of the O and the background, to pure white and set the rest to another pure color.*

**Repetitions** Specifies the scale of the tile pattern. This control works only in conjunction with the preset shatter maps, which all seamlessly tile. Increasing this value increases the number of pieces on the screen by scaling down the size of the shatter map. Consequently, the layer breaks into more and smaller pieces. Animating this control is not recommended, as it can cause sudden jumps in the number and size of shatter pieces.

**Direction** Rotates the orientation of a preset shatter map, relative to the layer. As with Repetitions, animating this control results in sudden jumps in the animation and is not recommended.

**Origin** Precisely positions a preset shatter map on the layer. This option is useful if you want to line up portions of an image with specific shattered pieces. Animating this control results in sudden jumps in the animation and is not recommended.

**Extrusion Depth** Adds a third dimension to the exploded pieces. The higher the value, the thicker the pieces. In Rendered view, this effect isn't visible until you start the shatter or rotate the camera. As you set this control higher, the pieces may pass through each other. While this is generally not a problem in full-speed animations, it may become visible when the pieces grow thick and move slower.

## Force 1 and Force 2 controls

Force 1 and Force 2 controls define the blast areas by using two different Forces.

**Position** Specifies the current center point of the blast in (x,y) space.

**Depth** Specifies the current center point in z space, or how far in front of or behind the layer the blast point is. Adjust Depth to determine how much of the blast radius is applied to the layer. The blast radius defines a sphere, and the layer is basically a plane; therefore, only a circular slice of the sphere intersects the plane. The farther away the layer is from the center of the blast, the smaller the circular slice. When pieces explode, they fly away from the force center. Depth determines which way the pieces fly: Positive values cause the pieces to explode forward, toward the camera (assuming the default camera settings of 0, 0, 0); negative values cause pieces to blow backward, away from the camera. To see the result of the Depth setting, use the Wireframe + Force Sphere view.

**Radius** Defines the size of the blast sphere. The radius is the distance from the center of a circle (or sphere) to the edge. By adjusting this value, you can fine-tune exactly which pieces explode. Changing this value can vary the speed and completeness of the explosion. Animating it from small to large generates an expanding, shockwave explosion.

**Note:** *To begin the shattering at a time other than layer time zero, animate the Radius property, not the Strength property. Pieces inside the force sphere defined by the Radius property are pulled outside the frame by gravity even if Strength is set to 0. Use Hold keyframes on the Radius property with the value 0 until the time when you want the shattering to start.*

**Strength** Specifies the speed at which the exploded pieces travel—how hard they are blown away from or sucked back into the blast point. A positive value blows the pieces away from the blast point; a negative value sucks the pieces into the blast point. The greater the positive value, the faster and farther they fly away from the center point. The greater the negative value, the faster the pieces launch themselves toward the center of the force sphere. Once the pieces are launched, the force sphere no longer affects them; the Physics settings take over. A negative Strength value does not suck the pieces into a black hole; instead, the pieces fly through each other and back out the other side of the sphere. Setting Strength low causes the pieces to break up into shapes, creating cracks in the layer, but it doesn't blow the pieces apart. If gravity is set to anything other than 0, the pieces are pulled in the direction of gravity after they break up.

**Note:** *A shatter piece is made up of vertices (points or dots that define the corners of the shape), edges (lines that connect the dots), and planes (walls of the shape). Shatter determines when a shape has come in contact with a force sphere based on when a vertex comes in contact with the sphere.*

## Gradient controls

Gradient controls specify the gradient layer used to control the timing of an explosion and the pieces that the blast affects.

**Shatter Threshold** Specifies which pieces in the force sphere shatter according to the corresponding luminance of the specified gradient layer. If Shatter Threshold is set to 0%, no pieces in the force sphere shatter. If it is set to 1%, only the pieces in the force sphere corresponding to white

(or nearly white) areas on the gradient layer shatter. If it is set to 50%, all the pieces in the force sphere corresponding to white-to-50%-gray areas on the gradient layer shatter. If it is set to 100%, all pieces in the force sphere shatter. Because there are 256 shades of gray (including black and white), each percentage point represents approximately 2.5 shades of gray.

Animating Shatter Threshold influences the timing of the explosion. If you leave it set to 0%, the layer never explodes. However, if you set a Shatter Threshold keyframe at 50%, the pieces of your layer in the force field that correspond to areas of your gradient layer that range from white to 50% gray explode. If you then animate Shatter Threshold up to 100%, the remaining pieces in the force sphere explode.

**Gradient Layer** Specifies the layer to use to determine when specific areas of the target layer shatter. White areas shatter first; black areas shatter last. Shatter determines which pixels correspond to which pieces by subdividing the layer into pieces, each with a center point or balance point. If you superimpose the shatter map over the gradient layer, the gradient layer pixels that are precisely under each balance point control the explosion.

**Note:** Some shapes have a balance point that falls outside the actual area of the shape—for example, the letters C and U. When designing a gradient layer in such a situation, avoid using grayscale versions of letters. Instead, use larger shapes that cover the balance point of each character.

**Invert Gradient** Inverts the pixel values in the gradient. White becomes black, and black becomes white.

## Physics controls

Physics controls specify the way the pieces move and fall through space.

**Rotation Speed** Specifies the speed at which pieces rotate around the axis set by the Tumble Axis control, allowing you to simulate different rotation speeds for different materials. In nature, similarly shaped pieces spin at different speeds based on their mass and air friction. For example, a brick spins faster than Styrofoam.

**Tumble Axis** Specifies the axis that the pieces spin around. Free spins the pieces in any direction. None eliminates all rotation. X, Y, and Z spin the pieces only around the selected axis. XY, XZ, and YZ spin the pieces only around the selected combination of axes.

**Note:** Any application of z-axis rotation appears only when a second force hits the layer. The pieces do not rotate from the first blast if only z-axis rotation is selected.

**Randomness** Affects the initial velocities and spins generated by the force sphere. When this control is set to 0, pieces fly directly away from the center point of a blast (assuming a positive force). Since real explosions are rarely orderly, Randomness allows you to vary things a little bit.

**Viscosity** Specifies how fast pieces decelerate after being blown apart. The higher the Viscosity value, the more resistance the pieces encounter as they move and spin. If Viscosity is set high enough, the pieces quickly come to a stop. To replicate an explosion in water or sludge, set Viscosity to a high value. In air, set it to a medium value, and for an explosion in space, set it low, or to 0.

**Mass Variance** Specifies the theoretical weight of the pieces as they explode. For example, a large piece is heavier than a small piece and therefore does not fly as far or as fast when it encounters the blast. The default setting of 30% for Mass Variance gives a realistic approximation of this law of physics. Setting Mass Variance to 100% greatly exaggerates the difference between the behavior of large versus small pieces. Setting it to 0% makes all pieces behave the same, regardless of their size.

**Gravity** Determines what happens to the pieces after they break up and blow apart. The higher the gravity setting, the faster the pieces are sucked in the direction set by Gravity Direction and Gravity Inclination.

**Gravity Direction** Defines the direction in (x,y) space that the pieces travel when affected by gravity. The direction is relative to the layer. If Gravity Inclination is set to -90 or 90, Gravity Direction has no effect.

**Gravity Inclination** Determines the direction in z space that the pieces travel once they explode. A value of 90 explodes the pieces forward, relative to the layer. A value of -90 explodes them backward, relative to the layer.

## Textures controls

Textures controls specify the texture of the pieces.

**Color** Specifies the color of the piece as defined by the Front Mode, Side Mode, and Back Mode menus. This color may or may not be visible depending on the Mode settings: When a Mode setting is Color, Tinted Layer, Color + Opacity, or Tinted Layer + Opacity, the selected color is factored into the appearance of the piece.

**Opacity** Controls the opacity of the corresponding Mode setting. A Mode setting must be Color + Opacity, Layer + Opacity, or Tinted Layer + Opacity for the opacity to affect the appearance of the piece. You can use the Opacity control in conjunction with texture maps to create the look of semitransparent materials.

**Front Mode, Side Mode, Back Mode** Determine the appearance of the front, sides, and back of the pieces. Color applies the selected color to the applicable side of the piece. Layer takes the layer chosen in the corresponding Layer menu and maps it to the applicable side of the piece. Tinted Layer blends the chosen layer with the selected color; the effect is similar to viewing the layer through a colored filter. Color + Opacity combines the selected color and the Opacity amount. With Opacity at 1, the applicable side is given the selected color. With Opacity at 0, the applicable side is transparent. Layer + Opacity combines the chosen layer and the Opacity amount. With Opacity at 1, the chosen layer is mapped to the applicable side. With Opacity at 0, the applicable side is transparent. Tinted Layer + Opacity combines the tinted chosen layer and the Opacity amount. With Opacity at 1, the tinted chosen layer is mapped to the applicable side. With Opacity at 0, the applicable side is transparent.

**Note:** If you apply Shatter to a layer containing an alpha channel that you want to use for transparency, use the same texture (or at least another layer with an identical alpha channel) for the front, sides, and back of the pieces to make all sides transparent.

**Front Layer, Side Layer, Back Layer** Specify the layer to be mapped onto the corresponding side of the piece. Front Layer maps the chosen layer to the front of the piece. Back Layer maps the chosen layer backward to the layer. If Layer is chosen for both Front Mode and Back Mode, and the same layer is specified for each, each shattered piece has the same pixel information on both sides. Side Layer maps an extrusion of the chosen layer to the extruded sides of the piece, as if the chosen layer is also mapped to the front and back, and the layer has been sliced through.

**Note:** If you choose a layer with an effect applied, the effect does not show up in the texture unless you precompose the layer. However, if you

select None, the layer to which you have applied Shatter, along with any effects that occur before Shatter, is used as the texture map, with no precomposing required.

## Camera System and Camera Position controls

**Camera System** Whether to use the effect's Camera Position properties, the effect's Corner Pins properties, or the default composition camera and light positions to render 3D images.

**X Rotation, Y Rotation, Z Rotation** Rotate the camera around the corresponding axis. Use these controls to look at the cards from the top, side, back, or any other angle.

**X, Y Position** Where the camera is positioned in (x,y) space.

**Z Position** Where the camera is positioned along the z axis. Smaller numbers move the camera closer to the cards, and larger numbers move the camera away from the cards.

**Focal Length** The zoom factor. Smaller numbers zoom in.

**Transform Order** The order in which the camera rotates around its three axes, and whether the camera rotates before or after it is positioned using the other Camera Position controls.

## Corner Pins controls

Corner pinning is an alternative camera control system. Use it as an aid for compositing the result of the effect into a scene on a flat surface that is tilted with respect to the frame.

**Upper Left Corner, Upper Right Corner, Lower Left Corner, Lower Right Corner** Where to attach each of the corners of the layer.

**Auto Focal Length** Controls the perspective of the effect during the animation. If this option is deselected, the focal length you specify is used to find a camera position and orientation that place the corners of the layer at the corner pins, if possible. If not, the layer is replaced by its outline, drawn between the pins. If this option is selected, the focal length required to match the corner points is used, if possible. If not, the correct value is interpolated from nearby frames.

**Focal Length** Overrides the other settings if the results you've obtained aren't what you need. If you set the Focal Length to something that doesn't correspond to what the focal length would be if the pins were actually in that configuration, the image may look unusual (strangely sheared, for example). But if you know the focal length that you are trying to match, this option is the easiest way to get correct results.

## Creating a custom shatter map

All layers in After Effects are represented as an RGBA image, including black-and-white images. The Shatter effect calculates the luminance threshold of each channel to create a custom shatter map. Shatter calculates the 50% luminance threshold of each channel, creating an image composed of only eight colors: red, green, blue, yellow, magenta, cyan, white, and black. These eight colors become possible combinations of the channels set either all the way on (255) or all the way off (0). The shatter layer splits along the edges of these different colored sections.

When designing custom shatter maps, you can find it useful to manually set a threshold for each channel of the image at 50% (you can use the Curves effect to do so). When you set the threshold, you can see how the image will be broken into pieces. Alternatively, you can create custom shatter maps by drawing an image using only the eight colors listed above, with no intermediate shades or anti-aliasing.

**Note:** Use the Colorama effect to posterize the colors of an image to these eight colors. Turn off Interpolate Palette in the Colorama effect controls. See Colorama effect.

The alpha channel determines whether a shattered piece exists. A white alpha channel value results in a shattered piece, and a black alpha channel value results in no piece. Using an alpha channel, you can make a tile map with holes in it or generate simple 3D models like extruded text.

**Note:** The custom shatter map determines the shapes of the pieces a layer shatters into, but not when the pieces shatter. The timing is determined by the Force controls and can be further controlled by a gradient layer.

The [Toolfarm website](#) provides a tutorial that shows how to create a custom shatter map for some real-world bricks.

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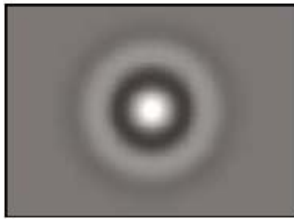
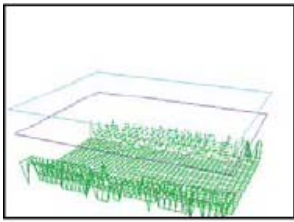
## Wave World effect

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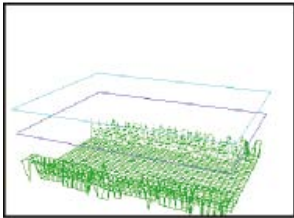
Use this effect to create a grayscale displacement map for use with other effects such as Caustics or Colorama. This effect creates waves based on a simulation of the physics of liquids. Waves emanate from an effect point, interact with each other, and realistically reflect off their environment. Use Wave World to create a top-down view of a logo, with waves reflecting off the logo and the sides of the layer.

Eran Stern provides a video tutorial on the [Creative COW website](#) in which he demonstrates how to use the Caustics effect with the Wave World effect.

This effect works with 8-bpc color.



Wireframe view (upper-left), Height Map view (lower-left), and resulting image (lower-right). Result is used as Water Surface source for Caustics effect example.



Wireframe view (left), Height Map view (center), and resulting image (right). Result is used as Input Phase for Colorama effect example.

To understand how this effect works, consider the following information about the physics of waves: A wave consists of a peak and a trough. The amplitude of a wave is the height, or distance, between the peak and trough. The wavelength is the distance from one peak to the next. Frequency is the number of waves per second passing a fixed point.

## View controls

View controls specify the method used to preview the Wave World effect. Choose one of the following views:

**Height Map** Displays the highest points as bright pixels and the lowest points as dark pixels. Use this view when creating a displacement map.

**Wireframe Preview** Provides a visual depiction of how the wave is being created. The grayscale output represents a height map: White represents the highest possible wave, and black represents the lowest. The two rectangular outlines represent these two extremes: The cyan rectangle represents pure white, and the violet rectangle represents pure black. The green grid represents the ground layer; it is flat by default but can be distorted by using a grayscale image. The white grid represents the surface of the water.

## Wireframe controls

Wireframe controls fine-tune the appearance of the wireframe model. These controls don't affect the grayscale output.

**Horizontal Rotation** Rotates the wireframe preview around the horizontal axis (right and left). As you adjust this control, the distortion of the wireframe model keeps the entire wireframe model in full view.

**Vertical Rotation** Rotates the wireframe preview around the vertical axis (up and down).

**Vertical Scale** Distorts the wireframe preview vertically so that you can see heights more easily. It doesn't affect the grayscale output.

## Height Map controls

Height Map controls specify the appearance of the height map.

**Note:** While adjusting Brightness and Contrast, keep the wave surface layer between the cyan and violet rectangles. If a peak pokes through the cyan rectangle, it clips at pure white. If a trough pokes through the bottom of the violet rectangle, it clips at pure black. If you want to create a displacement map, try to avoid clipping because it shows up as flat peaks and valleys, which look unnatural.

**Brightness** Adjusts the overall height of the water surface. Adjusting it brightens or darkens the overall grayscale output. If you use Wave World for displacement, this control moves the surface of the water up or down.

**Contrast** Changes the difference between the grays of the peaks and troughs, making the difference more or less extreme. Lower values even

out the grays, and higher values create a wider range from black to white (until clipping occurs).

**Gamma Adjustment** Controls the slope of the waves in relation to the Brightness. Results are visible only in Height Map view. Higher values result in rounder peaks and narrower valleys, while lower values result in smoother valleys and pointier peaks.

**Render Dry Areas As** Specifies how the water surface is rendered when a dry area exists. Dry areas are created when a portion of the ground layer rises above the surface of the water. You can manipulate the dry area by using the Steepness control.

This control is useful for compositing a Wave World effect into a scene. For example, you can use a precomposed Wave World scene with transparency as a displacement map for the Caustics effect, and as a track matte for the effect layer.

**Transparency** Controls the clarity of the water by adjusting how opaque the alpha channel is in shallower areas. For example, you can easily see to the bottom of a pool filled with fresh water, but you can see only an inch or two into a pool filled with coffee. This control is most useful when compositing a Wave World effect into another scene. For example, you can use a Wave World composition as a source layer for Caustics, and also as a track matte for the effect layer.

## Simulation controls

The Simulation controls specify the resolution of the water surface and ground grids.

**Grid Resolution** Specifies the number of horizontal and vertical divisions that make up the wave surface and ground grids. Higher values greatly increase the precision of the simulation but require more memory and increase rendering time.

**Grid Res Downsamples** Reduces the internal simulation resolution when the output resolution decreases, increasing the rendering speed. However, the result may cause the output to look very different.

**Wave Speed** Specifies how fast waves travel away from their starting point.

**Damping** Specifies how quickly the energy of a wave is absorbed by the liquid it travels through. The higher the value, the quicker the wave energy is absorbed, and the shorter the distance the wave travels.

**Wave Speed, Damping** Specify the apparent viscosity of the liquid, and the apparent size of the body of liquid. For example, waves in water move faster and farther than waves in honey; waves in a sink move much faster and fade out much more quickly than waves in a lake.

**Note:** *Wave World is optimized for small- to medium-sized bodies of water—anything from a teacup to a small lake. Large bodies of water, like an ocean, include swells or wide, stable waves with no apparent slowdown. Even at the lowest settings, Wave World cannot generate swells because the waves fade out relatively quickly.*

**Reflect Edges** Specifies how waves bounce off the edges of the layer and back into the scene.

**Pre-roll (seconds)** Specifies when the waves start moving. By default, the effect starts with a still surface without waves or ripples. Use this control to start the waves moving before the layer begins. The settings at the first frame of the effect are applied to the layer during the pre-roll.

## Ground controls

The Ground controls specify the appearance of the ground layer.

**Ground** Specifies the layer that appears at the bottom of the water. If you use an animated layer for the ground, Wave World samples only the first frame. Wave World determines the intersection of the water surface with the edge of the ground, computes the waves bouncing off the shore, and properly adjusts the speed of the waves depending on the depth. The brightness of the layer determines the ground surface: White represents higher elevation, and black represents lower elevation.

**Steepness** Adjusts the steepness of the ground by expanding and contracting the height of the displaced wireframe. The mesh is locked at the black level, so it always grows up from the bottom. In other words, you cannot adjust the bottom of a canyon to be deeper; instead, you can adjust the rim to be higher. To make the canyon deeper, combine a higher Steepness setting with a lower Height setting.

**Height** Controls the distance between the water surface and the deepest possible point of the ground. Use this control to make the body of water deeper or shallower. When you change the depth of the water, the waves behave accordingly: They move faster in deep water and slower in shallow water. (Adjusting the Height control when using the wireframe preview may appear to lower the ground level, but the wireframe camera always moves with the water level.)

**Wave Strength** Controls how big the resulting waves are when the ground height or steepness is animated. A value of 0 results in no waves.

**Note:** *You can create a pulsing wave effect by animating the steepness of the ground so that the ground pokes through the water, producing waves. Then use the Wave Strength control to intensify the effect.*

## Producer 1 and Producer 2 controls

The Producer controls specify the point at which the waves begin.

**Type** Specifies the type of producer. Ring creates a wave as if a stone were dropped into a pond; waves radiate outward in circles (or ellipses, depending on the size settings of the effect point). Line creates waves that emanate from the producer position in a line instead of an ellipse. This setting is useful for creating waves that look as though they were generated from much farther away. The waves are produced perpendicular to the edges of the line. The length of the line is based on the Height/Length setting.

**Position** Specifies the location of the center of the wave producer.

**Height/Length** Specifies the (vertical) height of a Ring producer and adjusts the length of a Line producer.

**Width** Specifies the (horizontal) width of the producer area.

**Angle** Specifies the angle of the wave producer area for the Line and Ring types. This control sets the orientation of the line and thus controls the initial direction of the waves, which emanate from either side of the line, perpendicular to its length.

**Amplitude** Controls the height of the produced wave. Higher values create more dramatic waves but may result in clipping, which you can repair by using the Brightness and Contrast controls.

**Frequency** Controls how many waves are produced per second. A value of 1 has the effect of waves surfacing once every second.

**Phase** Specifies where in the wave phase the wave begins. For example, with the default setting of  $0^\circ$ , the first disturbance in the liquid is a convex wave (projecting upward from the surface of the water). With Phase set to  $180^\circ$ , the first disturbance in the liquid is a concave wave.

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# Stylize effects

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[Threshold effect](#)

Third-party effects in this category included with After Effects:

- CC Block Load effect (CS6)
- CC Burn Film effect
- CC Glass effect
- CC Kaleida effect
- CC Mr. Smoothie effect
- CC Plastic effect (CS6)
- CC RepeTile effect
- CC Threshold effect
- CC Threshold RGB effect

See Third-party plug-ins included with After Effects.

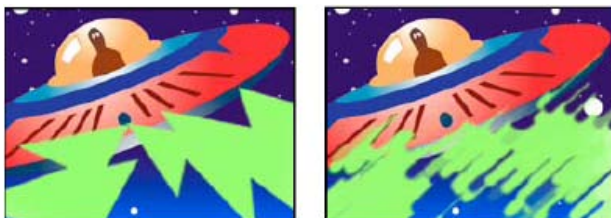
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## Brush Strokes effect

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The Brush Strokes effect applies a rough painted look to an image. You can also use this effect to achieve a pointillist style by setting the length of the brush strokes to 0 and increasing the stroke density. Although you specify the direction of strokes, they're scattered randomly by a small amount to give a more natural result. This effect alters the alpha channel, as well as the color channels; if you masked out a portion of the image, the brush strokes paint over the edges of the mask.

This effect works with 8-bpc color.



*Original (left), and with effect applied (right)*

**Stroke Angle** The direction in which the strokes are made. The image is effectively shifted in this direction, potentially causing some clipping at the layer boundaries. Applying the Grow Bounds effect before the Brush Strokes effect effectively extends the boundaries of the layer to prevent this clipping.

**Brush Size** The size of the brush in pixels.

**Stroke Length** The maximum length of each stroke, in pixels.

**Stroke Density** Higher densities result in overlapping brush strokes.

**Stroke Randomness** Creates nonuniform strokes. The more randomness, the more the strokes vary from the brush and stroke settings you've specified.

**Paint Surface** Specifies where brush strokes are applied:

**Paint On Original Image** Puts the strokes on top of the unmodified layer. This setting is the default.

**Paint On Transparent** Causes only the strokes themselves to appear, leaving the layer transparent between the strokes.

**Paint On White/Paint On Black** Applies strokes over a white or black background.

**Blend With Original** The transparency of the effect. The result of the effect is blended with the original image, with the effect result composited on top. The higher you set this value, the less the effect affects the layer. For example, if you set this value to 100%, the effect has no visible result on the layer; if you set this value to 0%, the original image doesn't show through.

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## Cartoon effect

The Cartoon effect simplifies and smooths the shading and colors in an image and adds strokes to the edges between features. The overall result is to decrease contrast in areas with low contrast and increase contrast in areas with high contrast. The result can be an image that resembles a sketch or cartoon, or the result can be more subtle. You can use the Cartoon effect to simplify or abstract an image for stylistic purposes, to call attention to areas of detail, or to obscure the poor quality of the original footage.

An advantage that the Cartoon effect has over some other effects and techniques that provide a similar result is the superior temporal coherence that the Cartoon effect provides. This means that the result of applying the Cartoon effect does not vary greatly from one frame to the next if the two frames are very similar.

This effect works with 8-bpc, 16-bpc, and 32-bpc color.

The Cartoon effect works in three stages:

1. It smooths the image and removes minor variations with a blurring operation similar to that used by the Bilateral Blur effect. Modify the Detail Radius and Detail Threshold properties to control this phase.
2. It finds edges in the image and applies a stroke to them, similar to the Find Edges effect. Modify properties in the Edge and Advanced property groups to control how the edges are determined and how the strokes are drawn.
3. It reduces the variations in luminance and color in the image, simplifying the shading and coloring. Modify properties in the Fill property group to control this quantization (posterization).

 *Begin with Render set to Fill Only, and first achieve the result that you want for the colors of the image. Next, choose either Edges or Fill & Edges, and establish the basic appearance that you want for the edges. Use the properties in the Advanced property group to fine-tune the appearance after you've established the basic appearance using the other controls.*

As with any other properties, you can animate the properties of the Cartoon effect. Settings that work well for one part of a scene may not be optimal for another part of a scene. For example, you may want fewer colors and thicker edge strokes for a close-up of a face than for an action scene with many subjects and a lot of detail.

 *Before applying the Cartoon effect, consider either setting the composition to a lower frame rate or using the Posterize Time effect on the layer if you're trying to make a movie look like a cartoon. Consider that cartoons have much lower frame rates than live action footage.*

For a video tutorial about the Cartoon effect, go to the [Adobe website](#).

Chris Meyer provides a video tutorial about the Cartoon effect in the [After Effects CS4 New Creative Techniques series](#) on the Lynda.com website.



Original layer based on video footage item



*Cartoon effect applied with Render set to Fill*



*Cartoon effect applied with Render set to Edges*



*Cartoon effect applied with Render set to Fill & Edges*

### **Cartoon effect properties**

**Render** Fill, Edges, or Fill & Edges. Determines which operations to perform and which results to display.

**Detail Radius** The radius for the blurring operation that is used to smooth the image and remove details before the operation to find edges. A larger radius for a blur means that more pixels are averaged together to determine each pixel value, so increasing the Detail Radius value increases the blurriness.

**Detail Threshold** The blur operation that the Cartoon effect performs is similar to that used by the Bilateral Blur effect. (See Bilateral Blur effect.) The radius of the blur is automatically decreased in areas where an edge or other prominent detail exists. The Detail Threshold value determines how the Cartoon effect decides what areas contain features to be preserved and what areas should be blurred by the full amount. A lower Detail

Threshold value causes more fine details to be preserved. A higher Detail Threshold value causes a more simplistic cartoon-like result, with fewer details preserved.

**Fill** The luminance values in the image are quantized (posterized) according to the settings of the Shading Steps and Shading Smoothness properties. If the Shading Smoothness value is 0, then the result is very similar to a simple posterization, with sharp transitions between values. A higher Shading Smoothness value causes the colors to blend together more naturally, with more gradual transitions between posterized values, preserving gradients.

The smoothing phase considers the amount of detail that exists in the original image so that areas that are already smooth (such as the gradient of a sky) are not quantized unless that Shading Smoothness value is low.

**Edge** These properties determine the basics of what is considered an edge and how the stroke applied to an edge appears.

**Threshold** Determines how different two pixels must be for the Cartoon effect to consider them to be one either side of an edge. Increase the Threshold value to cause more areas to be identified as edges.

**Width** The thickness of the stroke that is added to the edge.

**Softness** Increase this value to soften the transition between the edge's stroke and the surrounding colors.

**Opacity** The opacity of the stroke applied to the edge.

**Advanced** Advanced settings related to edges and performance.

**Edge Enhancement** Positive values sharpen the edges; negative values spread the edges. The enhancement distorts the entire image by warping pixels toward or away from the edges, which has the result of sharpening or spreading the edges.

**Edge Black Level** When this property is 0, only the pixels that have been identified as being part of an edge receive a stroke; when Render is set to Edges, the image is white except in areas with a pure black stroke. Increase the Edge Black Level property by a small amount to add shades of gray in the Edges phase of rendering. Increase this property by a larger amount to approach a result that resembles white strokes on a black background.

**Edge Contrast** The contrast in the grayscale representation of the edges.

**Performance** If your computer includes a display card with a GPU that supports OpenGL, the Cartoon effect can use the GPU to accelerate its processing.

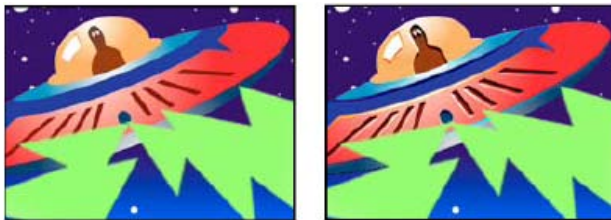
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## Color Emboss effect

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The Color Emboss effect works like the Emboss effect, without suppressing the original colors of the image.

This effect works with 8-bpc and 16-bpc color.



Original (left), and with effect applied (right)

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## Emboss effect

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The Emboss effect sharpens the edges of objects in an image and suppresses colors. The effect also highlights the edges from a specified angle. The quality setting of the layer influences the Emboss effect by controlling the Relief setting. Relief is calculated at the subpixel level in Best quality and rounded off to the pixel level in Draft quality.

This effect works with 8-bpc and 16-bpc color.



Original (left), and with effect applied (right)

**Direction** The direction from which the highlight source shines.

**Relief** The apparent height of the embossing, in pixels. The Relief setting actually controls the maximum width of highlighted edges.

**Contrast** Determines the sharpness of the image.

**Blend With Original** The transparency of the effect. The result of the effect is blended with the original image, with the effect result composited on top. The higher you set this value, the less the effect affects the clip. For example, if you set this value to 100%, the effect has no visible result on the clip; if you set this value to 0%, the original image doesn't show through.

## Find Edges effect

The Find Edges effect identifies the areas of an image that have significant transitions and emphasizes the edges. Edges can appear as dark lines against a white background or colored lines against a black background. With the Find Edges effect applied, images often look like sketches of the original.

**Invert** Inverts the image after the edges are found. If Invert isn't selected, edges appear as dark lines on a white background. If selected, edges appear as bright lines on a black background.

This effect works with 8-bpc color.

## Glow effect

The Glow effect finds the brighter parts of an image and then brightens those pixels and surrounding pixels to create a diffuse, glowing aura. The Glow effect can also simulate overexposure of brightly lit objects. You can base the glow on either the original colors of the image or on its alpha channel. Glows based on alpha channels produce diffuse brightness only at the edges of the image, between the opaque and transparent regions. You can also use the Glow effect to create a gradient glow between two colors (A and B colors) and to create multicolor effects with looping.

Rendering the Glow effect at Best quality can change the appearance of the layer. This change is especially true if you use Adobe Photoshop arbitrary maps to color the glows. Be sure to preview at Best quality before you render the effect.

 *Glows tend to be brighter and more realistic in 32-bpc projects, because the high dynamic range in a 32-bpc project prevents the color values of the glow from being clipped. Consider working in 32-bpc color for this reason, even if footage items don't contain high-dynamic range color values.*

Chris Meyer provides a basic overview of the parameters of the Glow effect in a video tutorial on the [Lynda.com website](#).

This effect works with 8-bpc, 16-bpc, and 32-bpc color.



Original (left), and with effect applied (right)

**Glow Based On** Determines whether glow is based on color values or transparency values.

**Glow Threshold** Sets a threshold as a percentage brightness to which the glow isn't applied. A lower percentage produces glow on more of the image; a higher percentage produces glow on less of the image.

**Glow Radius** The distance, in pixels, that the glow extends out from the bright areas of the image. Larger values produce diffuse glows; smaller values produce glows with sharp edges.

**Glow Intensity** The brightness of the glow.

**Composite Original** Specifies how to composite the effect results with the layer. On Top places the glow on top of the image, using the blending method selected for Glow Operation. Behind places the glow behind the image, creating a backlighting result. None separates the glow from the image.

 *To reduce the layer to the glow only, choose None for Composite Original and None for Glow Operation. To achieve a glow effect for text that knocks out (blocks) all layers below it, choose Silhouette Alpha for Glow Operation. These glow effects are more noticeable if the image has a feathered edge.*

**Glow Colors** The colors of the glow. A & B Colors creates a gradient glow using the colors specified by Color A and Color B controls.

**Color Looping** The shape of the gradient curve to use if A & B Colors is selected for Glow Colors.

**Color Loops** Creates multicolor ringing in the glow, if you select two or more loops. A single loop cycles through the gradient (or arbitrary map) specified for Glow Colors.

**Note:** You can create an arbitrary map (.amp) file by applying the Curves effect, selecting the pencil icon, then clicking the save (floppy disk) icon. Use an arbitrary map file in the Glow effect by clicking the Options link, then selecting the .amp file.

**Color Phase** Where in the color cycle to begin color loops. By default, color loops begin at the origin of the first loop.

**A & B Midpoint** The midpoint specifies the balance between the two colors used in the gradient. Lower percentages use less of the A color. Higher percentages use less of the B color.

**Color A, Color B** The color of the glow if you choose A & B Colors for Glow Colors.

**Glow Dimensions** Specifies whether the glow is horizontal, vertical, or both.

## Mosaic effect

The Mosaic effect fills a layer with solid-color rectangles, pixelating the original image. This effect is useful for simulating low-resolution displays and for obscuring faces. You can also animate it for a transition. At Best quality, the edges of the rectangles are anti-aliased.

This effect works with 8-bpc and 16-bpc color.





Original (left), and with effect applied (right)

**Horizontal/Vertical Blocks** The number of blocks in each row and column.

**Sharp Colors** Gives each tile the color of the pixel in the center of the corresponding region in the original image. Otherwise, each tile is given the average color of the corresponding region in the original image.

## Motion Tile effect

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The Motion Tile effect replicates the source image across the output image. When you change the placement of the tiles, it uses motion blur to accentuate the movement if motion blur is enabled.

This effect works with 8-bpc color.

Carl Larsen provides a tutorial on the [Creative COW website](#) that shows how to use the Motion Tile effect to create a whip-pan transition between two layers.

**Tile Center** The center of the main tile.

**Tile Width, Tile Height** Dimensions of tiles as a percentage of the input layer dimensions.

**Output Width, Output Height** Dimensions of the output image as a percentage of the input layer dimensions.

**Mirror Edges** Flips adjacent tiles to form mirror images. If Phase is set to 0, selecting this option causes the edges of the layer to be mirrored with the surrounding tiles.

**Phase** The horizontal or vertical offset of the tiles.

**Horizontal Phase Shift** Offsets tiles horizontally instead of vertically.

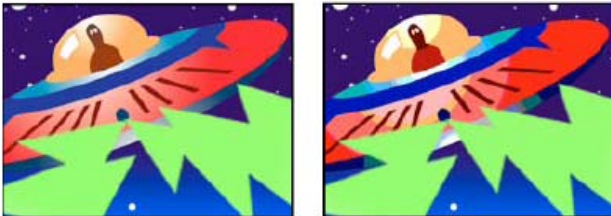
## Posterize effect

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The Posterize effect posterizes colors; the number of colors is reduced and gradual color transitions are replaced by abrupt color transitions. You specify the number of tonal levels (or brightness values) for each channel in an image. The Posterize effect then maps pixels to the closest matching level. For example, choosing two tonal levels in an RGB image gives you two tones for red, two tones for green, and two tones for blue. Values range from 2 to 255.

**Level** The number of tonal levels for each channel.

This effect works with 8-bpc, 16-bpc, and 32-bpc color.



Original (left), and with effect applied (right)

## Roughen Edges effect

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The Roughen Edges effect makes an alpha channel rough and can add color to simulate rust and other kinds of corrosion. This effect gives rasterized text or graphics a naturally rough look, like the look of old typewriter text.

This effect works with 8-bpc color.



Original (left), and with effect applied (right)

**Edge Type** What kind of roughening to use.

**Edge Color** The color to apply to the edge for Rusty Color or Roughen Color, or to the fill for Photocopy Color.

**Border** How far, in pixels, the effect extends inward from the edge of the alpha channel.

**Edge Sharpness** Low values create softer edges. High values create sharper edges.

**Fractal Influence** The amount of roughening.

**Scale** The scale of the fractal used to calculate the roughness.

**Stretch Width or Height** The width or height of the fractal used to calculate the roughness.

**Offset (Turbulence)** Determines the portion of the fractal shape that is used to create the roughness.

**Complexity** Determines the level of detail in the roughness.

**Note:** Increasing complexity results in longer rendering times. Reduce the Scale value rather than increasing Complexity to achieve similar results.

**Evolution** Animating this setting results in changes of the roughness over time.

**Note:** Although the Evolution value is set in units called revolutions, it's important to realize that these revolutions are progressive. The Evolution state continues to progress infinitely at each new value. Use the Cycle Evolution option to return the Evolution setting to its original state at each revolution.

**Evolution Options** Evolution Options provide controls that render the effect for one short cycle and then loop it for the duration of your layer. Use these controls to pre-render your roughen elements into loops, and thus speed up rendering time. Use the following controls to create a smooth, progressive, nonrepeating loop:

**Cycle Evolution** Creates a loop that forces the Evolution state to return to its starting point.

**Cycle** The number of revolutions of the Evolution setting that the fractal cycles through before it repeats. The amount of time between Evolution keyframes determines the timing of the Evolution cycles.

**Note:** The Cycle control affects only the state of the fractal, not geometrics or other controls, so you can get different results with different Size or Offset settings.

**Random Seed** Specifies a value from which to generate the roughness texture. Animating this property results in flashing from one set of fractal shapes to another within the same fractal type. For smooth transition of the roughness, use the Evolution control.

**Note:** Create new roughness animations by reusing previously created Evolution cycles and changing only the Random Seed value. Using a new Random Seed value alters the noise pattern without disturbing the Evolution animation.

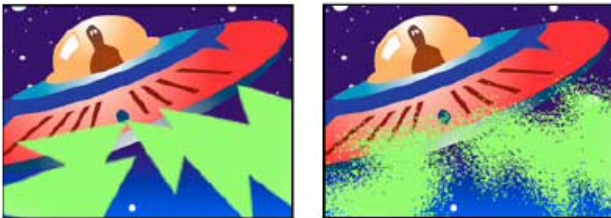
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## Scatter effect

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The Scatter effect scatters the pixels in a layer, creating a blurry or smeared appearance. Without changing the color of each individual pixel, the Scatter effect redistributes the pixels randomly, but in the same general area as their original positions.

This effect works with 8-bpc and 16-bpc color.



Original (left), and with effect applied (right)

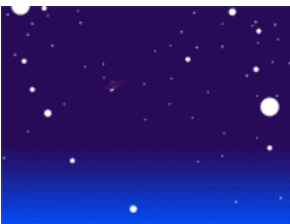
**Grain** The direction in which to scatter the pixels—horizontally or vertically. Select None to scatter pixels in all directions.

**Scatter Randomness** Specifies whether scattering changes at each frame. To animate scattering without keyframes or expressions, select the Randomize Every Frame option.

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## Strobe Light effect

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Strobe Light effect applied

The Strobe Light effect performs an arithmetic operation on a layer or makes the layer transparent at periodic or random intervals. For example, every 5 seconds the layer could become completely transparent for one-tenth of a second, or the colors of a layer could invert at random intervals.

This effect works with 8-bpc color.

**Strobe Color** The color of the strobe light.

**Blend With Original** The transparency of the effect. The result of the effect is blended with the original image, with the effect result composited on



top. The higher you set this value, the less the effect affects the layer. For example, if you set this value to 100%, the effect has no visible result on the layer; if you set this value to 0%, the original image doesn't show through.

**Strobe Duration (secs)** How long, in seconds, each strobe lasts.

**Strobe Period (secs)** The time, in seconds, between the start of subsequent strobes.

**Random Strobe Probability** The probability that the strobe operation applies to any given frame.

**Strobe** Choose Makes Layer Transparent for each strobe to make the layer transparent. Choose Operates On Color Only to use the operation specified by Strobe Operator.

**Strobe Operator** The operation to use for each strobe.

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## Texturize effect

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The Texturize effect gives a layer the appearance of having the texture of another layer. For example, you could make the image of a tree appear as if it had the texture of bricks, and control the depth of the texture and the apparent light source. At Best quality, the texture layer is positioned and scaled with subpixel precision.

Chris Zwar provides an example project on [his website](#) that uses the Displacement Map effect, the Turbulent Displace effect, the Texturize effect, and a combination of Blur and Color Correction effects to create a transition in which an image appears as a watercolor image washed onto a rough piece of paper.

This effect works with 8-bpc color.



*Original layers (left), and with whirl layer applied as the texture (lower-right)*

**Texture Layer** The source of the texture.

**Light Direction** The angle at which light hits the texture.

**Texture Contrast** The magnitude of the result.

**Texture Placement** How the texture layer is applied to the effect layer:

**Tile Texture** Applies the texture repeatedly.

**Center Texture** Positions the texture in the middle.

**Stretch Texture To Fit** Stretches the texture to the dimensions of the effect layer.

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## Threshold effect

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The Threshold effect converts grayscale or color images to high-contrast, black-and-white images. Specify a certain level as a threshold; all pixels lighter than the threshold convert to white and all pixels darker convert to black.

This effect works with 8-bpc and 16-bpc color.



*Effect applied with threshold settings of 44 (left), 70 (center), and 200 (right)*



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# Text effects

[Numbers effect](#)  
[Timecode effect](#)

## Numbers effect

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The Numbers effect generates random or sequential numbers in different formats, such as decimal number, dates, and timecode—even the current date and time (at render time). You can use the Numbers effect to create counters of various kinds. The maximum offset for sequential numbers is 30,000.

This effect works with 8-bpc color.

The following options and values are available in the Font Style dialog box: Font, Style, Direction, and Alignment. To open this dialog box again, click Options at the top of the entry for the effect in the Effect Controls panel.

**Type** The numbering system:

**Number** Decimal numbers.

**Number [Leading Zeros]** Decimal numbers with five digits to the left of the decimal point.

**Timecode [30], Timecode [25], and Timecode [24]** Standard non-drop-frame timecode formats (XX:XX:XX:XX) using the stated frame rate. The timecode types use the current time of the layer as the base.

**Time** Hours and minutes. If you also select Current Time/Date, the Value/Offset/Random Max value is ignored. If you select Random, the time is bounded by 0 (12:00 AM) and the slider value.

**Numerical Date, Short Date, and Long Date** If you don't also select Current Time/Date, the Value/Offset/Random Max is the number of days since January 1, 1995 (0 on the slider corresponds to January 1, 1995). If you do select Current Time/Date, Value/Offset/Random Max is the number of days since the current date (0 on the slider corresponds to the current date). If you select Random, the date is bounded by 0 (either the current date or January 1, 1995) and the slider value.

**Note:** *Leap years are considered.*

**Hexadecimal** Base-16 numbers (digits from 0 to F). Hexadecimal numbers increment by 0x1 for every 0.0000125 that the Value/Offset/Random Max value increases, and increments by 0x10000 for every 1.0 that the Value/Offset/Random Max value increases. If you select Random, the number is bounded by 0 and the Value/Offset/Random Max value.

**Random Values** Random values limited by the Value/Offset/Random Max value. If Value/Offset/Random Max is 0, values are random across their maximum possible range.

**Value/Offset/Random Max** Varies based on the chosen type and whether Random Values is selected.

**Decimal Places** Specifies the number of places to the right of the decimal point.

**Current Time/Date** Select for time and date numbers to be based on the current time and date.

**Position** The position of the numbers on the layer.

**Display Options** Specifies the use of a fill or stroke or a combination of both on the text. Fill Only fills the characters with a color. Stroke Only strokes the edges of the characters with a color. Fill Over Stroke overlaps the fill color onto the stroke color. Stroke Over Fill overlaps the stroke color onto the fill color.

**Size** Size of the characters.

**Tracking** Average distance between characters.

**Proportional Spacing** Numbers use proportional spacing instead of monospacing.

**Composite On Original** Text is composited on top of the original image. If Composite On Original isn't selected, the original image isn't visible.

### Alternatives to using the Numbers effect

Use text layers for greater control over text formatting and text animation. (See [Creating and editing text layers](#).)

 *Apply the Current Time Format animation preset to a text layer to show the current time in the format corresponding to the time display setting for the project.*

Colin Braley provides a tutorial and example project on [his website](#) that show how to use an expression on the Source Text property to animate text to overcome some of the limitations of the Numbers effect.

For a similar example, see [Example: Animate text as a timecode display](#).

## Timecode effect

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The Timecode effect creates a text overlay that displays timecode or frame number information on a layer. This effect doesn't modify timecode embedded from external sources, such as QuickTime.

Use text layers for greater control over text formatting and text animation. (See [Creating and editing text layers](#).)

 *Apply the Current Time Format animation preset to a text layer to show the current time in the format corresponding to the time display setting for the project. (See [Example: Animate text as a timecode display](#).)*

This effect works with 8-bpc color.

For details, tutorials, and resources about source timecode and Timecode effect changes in After Effects CS5.5, [see this post on the After Effects Region of Interest blog](#).

**Display Format** Specifies whether timecode is displayed in the SMPTE format, in frame numbers, or in feet and frames of 35mm or 16mm film.

**Time Source (CS5.5 and later)** The source used for the effect.

**Layer Source** Timecode is displayed according to the timecode from the source footage of the layer.

**Composition** Timecode is displayed according to the timecode from the composition.

**Custom** Allows access to the settings in the Custom section, the previous behavior of the effect. These are Time Units, Drop Frame and Starting Frame.

**Time Units** Frame rate in frames per second (fps) to be used by this instance of the Timecode effect. This setting affects only the numbers displayed by the Timecode effect; it has no influence on composition frame rate or the frame rate of the source footage item for the layer.

**Drop Frame** Select Drop Frame to generate drop-frame timecode or deselect it to generate non-drop-frame timecode.

**Starting Frame** The frame number assigned to the first frame of the layer.

**Text Position** The position of the text overlay, in composition space.

**Text Size** The size of text, in points.

**Text Color** The color of the text.

**Show Box (CS5.5 and later)** Specifies whether the colored box behind the timecode value will display or not.

**Box Color (CS5.5 and later)** The color of the box behind the timecode value.

**Opacity (CS5.5 and later)** The opacity of the box behind the timecode value.

**Composite on Original (CS5.5 and later)** Specifies whether the box will be composited on the original or a transparent layer.

## Alternatives to using the Timecode effect

Use text layers for greater control over text formatting and text animation. (See [Creating and editing text layers](#).)

 *Apply the Current Time Format animation preset to a text layer to show the current time in the format corresponding to the time display setting for the project.*

Colin Braley provides a tutorial and example project on [his website](#) that show how to use an expression on the Source Text property to animate text to overcome some of the limitations of the Timecode effect.

For a similar example, see [Example: Animate text as a timecode display](#).



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# Time effects

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[Echo effect](#)

[Posterize Time effect](#)

[Time Difference effect](#)

[Time Displacement effect](#)

[Timewarp effect](#)

Third-party effects in this category included with After Effects:

- CC Force Motion Blur effect
- CC Time Blend effect
- CC Time Blend FX effect
- CC Wide Time effect

See Third-party plug-ins included with After Effects.

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## Echo effect

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The Echo effect combines frames from different times in a layer. The Echo effect has a variety of uses, from a simple visual echo to streaking and smearing effects.

The results of this effect are visible only if the layer contains change across time, such as motion in a layer based on a video footage item. This effect does not create echoes of motion created by moving the layer itself within the composition. To create echoes of motion created by moving the layer within the composition, precompose the layer, move all attributes into the new composition, and apply the Echo effect to the precomposition layer.

This effect works with 8-bpc, 16-bpc, and 32-bpc color.



*Echo effect*

David Van Brink provides a blog post and sample project on his [omino website](#) that show how to use the Echo effect, the Particle Playground effect, and the loopOut expression to animate a swarm of stylized swimming bacteria.

**Echo Time (seconds)** The time, in seconds, between echoes. Negative values create echoes from previous frames; positive values create echoes from upcoming frames.

**Number of Echoes** The number of echoes. For example, if the value is 2, the result is a combination of three frames: the current time, the current time + Echo Time, and the current time + (2 \* Echo Time).

**Starting Intensity** The opacity of the first image in the echo sequence.

**Decay** The ratio of the opacity of an echo to the opacity of the echo preceding it in the echo sequence. For example, if Decay is 0.5, then the opacity of the first echo is half of the Starting Intensity; the second echo is half of that, or one quarter of the Starting Intensity.

**Echo Operator** The blending operation used to combine the echoes.

**Add** Combines the echoes by adding their pixel values. If the starting intensity is too high, this mode can quickly overload and produce streaks of white.

**Maximum** Combines the echoes by taking the maximum pixel values from all of the echoes.

**Minimum** Combines the echoes by taking the minimum pixel values from all of the echoes.

**Screen** Emulates combining the echoes by sandwiching them optically. This mode is similar to Add, but it doesn't overload as quickly.

**Composite In Back** Causes the image from the current time to appear in back, with each echo appearing successively farther forward in the composite.

**Composite In Front** Causes the image from the current time to appear in front, with each echo appearing successively farther back in the composite.

**Blend** Averages the echoes.

## Posterize Time effect

The Posterize Time effect locks a layer to a specific frame rate. It's useful on its own as a special effect, but it also has more subtle uses. For example, 60-field-per-second video footage can be locked to 24 frames per second (and then field rendered at 60 fields per second) to give a filmlike look. Also, nested compositions can be locked to a given frame rate. This effect is sometimes called Strobe in hardware devices.

Animating the value of the Frame Rate slider can give unpredictable results. For this reason, the only interpolation method allowed for the frame rate is Hold.

This effect works with 8-bpc, 16-bpc, and 32-bpc color.



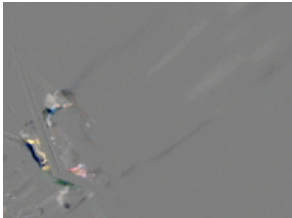
Posterize Time effect

**Note:** Another way to accomplish much the same result as applying the Posterize Time effect to a layer is to precompose the layer, change the frame rate for the precomposition in the Composition Settings dialog box, and set Preserve Frame Rate When Nested Or In Render Queue for the precomposition on the Advanced tab. This method causes the precomposition to retain its own frame rate, and not inherit those settings from the containing composition.

## Time Difference effect

The Time Difference effect calculates the color difference between two layers and is a useful aid in color correction; use it to extract color differences when matching a clean background plate with foreground footage. It's also good for creating mattes to be used to apply trails of smoke, fire, or echoing effects. After you apply the Time Difference effect to locate color differences in footage, you can use Color Correction effects to apply the color corrections.

This effect works with 8-bpc color.



Time Difference effect

 Use Time Difference with Particle Playground to shed particles only from moving sections.

**Target** Specifies the layer to be compared to the effect layer. The Video switch for the comparison layer doesn't need to be on (unless you select the source layer as the Target).

**Time Offset** The relative time in the comparison layer, in seconds, where the layers are compared. If this control is set to 0.00, the comparison occurs at the current time. To compare the effect layer to a point 3 seconds into the comparison layer, for example, change the Time Offset value to 3. When you select the underlined offset value, you can enter the specific frame offset value in the format frames/frame rate. After Effects automatically calculates the value. For example, enter 3/30 to offset three frames forward in a 30-fps composition. The calculated value is 0.1, or 10% of the total time.

**Contrast** Adjusts the comparison result. This control can be especially helpful in fine-tuning color corrections.

**Absolute Difference** Displays the result of the comparison as an absolute value. Any area of the comparison layer that isn't different from the effect layer is represented by black, and any amount of difference is represented as brighter than black. If this option is unselected, compared areas with no difference are represented as gray.

**Alpha Channel** Specifies how the alpha channel is calculated.

**Original** Uses the alpha channel of the effect layer.

**Target** Uses the alpha channel of the target layer.

**Blend** Blends the alpha channels of the target layer and the effect layer.

**Max** Uses the more opaque of the alpha channels.

**Full On** Sets the alpha channel to completely opaque.

**Lightness Of Result** Uses the lightness of the RGB difference as alpha.

**Max Of Result** Uses the highest values of the RGB difference as alpha.

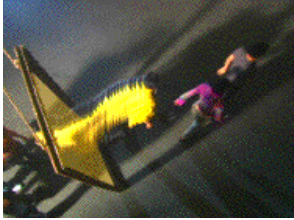
**Alpha Difference** Calculates differences in the alpha channels of the effect layer and target layer in the same way in which RGB difference is calculated.

**Alpha Difference Only** Calculates only the differences in the alpha channels. RGB is set to white.

## Time Displacement effect

The Time Displacement effect distorts the image by shifting pixels across time, producing a wide variety of effects. For example, the traditional slit-scan technique, which captures different stages of a moving image across time, can be simulated using the Time Displacement effect.

This effect works with 8-bpc and 16-bpc color.



*Time Displacement effect*



*Displacement map layer*

Like the Displacement Map effect, the Time Displacement effect uses a displacement map, but it bases the movement of pixels in the layer on luminance values in the map. Pixels in the layer that correspond to bright areas in the displacement map are replaced by pixels in the same position but at a specified number of seconds forward in time. Likewise, pixels in the layer that correspond to dark areas in the displacement map are replaced by pixels at a specified number of seconds backward in time. You can use any layer as a displacement map, though using a grayscale image lets you more easily see brightness levels and predict how pixels will be displaced.

The Time Displacement effect automatically replaces pixels across time without keyframes or expressions. However, you can animate other properties to vary the effect over time.

To better understand how pixels are displaced in time, think of the displacement occurring in steps, as follows:

1. After Effects overlays the displacement map layer on top of the effect layer (the layer you're distorting). If the dimensions of the displacement map are different from the dimensions of the effect layer, you can specify whether the map is centered or stretched to fit.
2. You specify a maximum displacement amount, in seconds.
3. After Effect uses the luminance value of each pixel in the displacement map to calculate the displacement of the corresponding pixel in the effect layer, based on the maximum displacement amount.

In grayscale images, the luminance value range extends from 0 to 255, and it's converted to a scale ranging from -1 to 1. A luminance value of 0 produces maximum backward displacement, meaning that pixels at the current time are replaced by pixels from a previous time. A luminance value of 255 produces maximum positive displacement, meaning that pixels at the current time are replaced by pixels at a future time. A luminance value of 128 produces no displacement. For other values in grayscale displacement maps, you can calculate the displacement amount, in seconds, using the following equation:

$$\text{Displacement amount in seconds} = \text{maximum\_displacement\_time} * (2 * (\text{luminance\_value} - 128) / 256)$$

4. After Effects displaces each pixel in the image by replacing a pixel in the image at the current time with the pixel in the same position at another time. The other time is the displacement amount in seconds for the pixel, calculated in step 3.

Suppose you specified 2 seconds as the maximum time displacement. After Effects finds the luminance value of each pixel in the displacement map, and then it replaces the corresponding pixels at the current time with pixels from another time based on the maximum time of 2 seconds. A luminance value of 255 in the displacement map replaces that pixel with the pixel 2 seconds ahead in the same position. A luminance value of 42 replaces that pixel with the pixel 1.34 seconds behind in the same position.

**Time Displacement Layer** Specifies the layer to use as the displacement map.

**Max Displacement Time (sec)** Sets the maximum time, in seconds, from which pixels are replaced, before or after the current time. Only luminance values of 0 or 255 (maximum darkness and maximum brightness) produce the maximum time displacement. All other luminance values produce time displacements of less than the maximum time.

**Time Resolution (fps)** Sets the number of frames per second in which to replace pixels. Typically, this value shouldn't be greater than the frame rate of the affected layer. Increasing Time Resolution can greatly increase rendering time.

**Stretch Map To Fit** Resizes the Time Displacement Layer to match the dimensions of the layer you're distorting. If this option isn't selected, the time displacement layer is centered in the composition.

### Apply the Time Displacement effect

1. In the Composition panel, display both the layer you want to distort and the displacement map layer.



2. Hide the displacement map layer by clicking the Video switch in the Timeline panel.
3. In the Composition panel, select the layer you want to distort.
4. Choose Effect > Time > Time Displacement.
5. Choose a displacement map from the Time Displacement Layer menu, which lists all layers in the composition. Grayscale maps are recommended.

**Note:** *After Effects uses the layer you select in its original form, without any masking, effects, or transformations you may have applied. If you want to use the layer with those alterations included in the displacement map, precompose that layer using the Move All Attributes into the New Composition option. (See Precompose layers.)*

6. Adjust the Time Displacement controls.

## Timewarp effect

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The Timewarp effect gives you precise control over a wide range of parameters when changing the playback speed of a layer, including interpolation methods, motion blur, and source cropping to eliminate unwanted artifacts. You can use the Timewarp effect to create simple slow-motion or fast-motion results or more complex retiming. The Timewarp effect works independently of the Frame Blending switch in the Timeline panel.

**Note:** *The Timewarp effect does not work on fields for interlaced footage. To use the Timewarp effect on a layer with an interlaced footage item as its source, double the frame rate in the composition settings. When you render to final output, modify your render settings in the Render Queue panel to set the frame rate appropriate for the output type.*

The Timewarp effect is based on Kronos, a component of the Furnace software package from The Foundry. For detailed documentation on motion vectors and motion estimation parameters, see the Furnace documentation (in PDF) on the [Foundry website](#).

This effect works with 8-bpc and 16-bpc color. In After Effects CS6, this effect works in 32-bit color.



Timewarp effect

 You can use the Timewarp effect to add motion blur within a video layer without changing the layer's speed. Apply the Timewarp effect, set Speed to 100, enable motion blur within the effect, and use the manual shutter control features to adjust the motion blur.

### Method options

When changing frame rates, image information must be created (interpolated) for the frames that lie between the original frames of an image. The Method setting determines how interpolated frames are generated:

**Whole Frames** Duplicates the last frame shown.

**Frame Mix** Creates a new frame by blending existing frames.

**Pixel Motion** Creates a new frame by analyzing the pixel movement in nearby frames and creating motion vectors. Motion vectors represent the movement of a pixel or block of pixels from one frame to the next. Images between frames are interpolated using these vectors.

### Adjust Time By controls

Choose Speed to specify a time adjustment as a percentage. Choose Source Frame to specify a time adjustment by identifying which source frame is to play at which time. If you choose Source Frame for Adjust Time By, then you must animate the Source Frame property to do anything other than freeze on one frame. You can animate the Speed property, too, to change the time-remapping factor over time.

By default, Speed is set to 50, for a reduction in speed to 50%. This setting creates new frames one quarter of a frame interval and three quarters of a frame interval from an original frame, rather than using one original frame and one newly generated frame. Original frames are deliberately excluded from the time-remapped series of frames in order to avoid the pulsing that would otherwise be seen on every other frame for a half-speed slowdown.

### Tuning controls for Pixel Motion interpolation

**Vector Details** Determines how many motion vectors are used during interpolation. The more vectors used, the longer the rendering time. A value of 100 produces one vector per pixel. If the layer has fast-moving motion, it may look better with a lower Vector Details setting.

**Smoothing** These controls affect the sharpness of the image:

**Build From One Image** Generates the final output from the closest single frame, as opposed to the closest two frames. The result is a sharper image, but jerkier motion.

**Correct Luminance Changes** Equalizes the luminance between frames before calculating motion.

**Filtering** The quality of the filtering used to build the interpolated image. Extreme greatly increases rendering time. The Filtering option affects only the sharpness of the final image; use Normal until you're ready for final rendering.

**Error Threshold** Determines the precision of pixel matching from one frame to the next. A higher value results in fewer motion vectors and more

blending.

**Note:** *If you see edge tearing in the image, try increasing the Error Threshold for more blending. If the image has heavy grain, try decreasing the Error Threshold so the low-level motion of the grain is ignored.*

**Block Size** Adjusts the size of the blocks used to calculate the vectors.

**Weighting** Controls the weighting of the red, green, and blue channels in calculations used to analyze the image. For example, setting Red Weight and Green Weight to zero means that only the blue channel is analyzed for motion.

#### **Motion Blur controls**

**Shutter Angle** Determines the intensity of motion blur. The shutter angle is measured in degrees, simulating the exposure caused by a rotating shutter. Simulated exposure time is determined by dividing the shutter angle by the frame rate times 360°. For example, a shutter angle of 90° causes an exposure of 1/96 of a second per frame:  $90^\circ / (360^\circ * 24 \text{ fps})$ .

**Shutter Samples** Controls the quality of the motion blur. A higher value results in a smoother motion blur.

#### **Matte, warp, and crop controls**

**Matte Layer** The layer to use as a matte for defining the foreground and background areas of the image. White areas in the matte represent the foreground, black areas represent the background, and gray attenuates between foreground and background.

**Matte Channel** The channel to use as a matte.

**Warp Layer** Allows you to warp the layer to which the effect is applied by applying the motion vectors from the layer that you choose.

**Show** Controls the portion of the layer to be time-remapped.

**Source Crops** If the image contains unwanted pixels or artifacts at the edges, use Source Crops controls to specify image boundaries. Pixels from the boundaries are repeated to fill the area beyond the boundaries to the edges of the layer.

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# Transition effects

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[Online resources about transitions and Transition effects](#)

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[Linear Wipe effect](#)

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[Venetian Blinds effect](#)

Third-party effects in this category included with After Effects:

- CC Glass Wipe effect
- CC Grid Wipe effect
- CC Image Wipe effect
- CC Jaws effect
- CC Light Wipe effect
- CC Line Sweep effect (CS6)
- CC Radial ScaleWipe effect
- CC Scale Wipe effect
- CC Twister effect
- CC WarpoMatic effect (CS6)

See Third-party plug-ins included with After Effects.

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## Online resources about transitions and Transition effects

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For an example of how to use animation presets to create custom transitions, see [this entry](#) in Stu Maschwitz's ProLost blog. From this page, you can download the Film Burn animation preset, which adds film-like flicker to layers and adds a film burn transition to the ends of the durations of layers.

Chris Zwar provides an example project on [his website](#) that uses the Displacement Map effect, the Turbulent Displace effect, the Texturize effect, and a combination of Blur and Color Correction effects to create a transition in which an image appears as a watercolor image washed onto a rough piece of paper.

Carl Larsen provides a tutorial on the [Creative COW website](#) that shows how to use the Motion Tile effect to create a whip-pan transition between two layers.

Dave Scotland provides a video tutorial on the [CG Swot website](#) that uses the Fractal Noise effect to create a transition between still images.

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## About Transition effects and the Transition Completion property

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All Transition effects but the Iris Wipe effect have a Transition Completion property. When this property is 100%, the transition is complete, and the underlying layers show through; the layer to which the effect is applied is entirely transparent. You typically animate this property from 0% to 100% over the time of the transition.

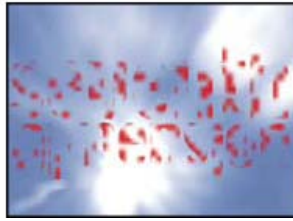
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## Block Dissolve effect

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The Block Dissolve effect makes a layer disappear in random blocks. The width and height of the blocks, in pixels, can be set independently. At Draft quality, the blocks are placed with pixel precision and have sharply defined edges; at Best quality, the blocks can be positioned with subpixel precision and have soft edges.

This effect works with 8-bpc and 16-bpc color.



Original (upper-left), and with effect applied (lower-left and right)

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## Card Wipe effect

**Note:** For information on properties shared by the Card Wipe and Card Dance effects, see *Common Lighting controls and Material controls*.

This effect simulates a group of cards displaying a picture and then flipping to display another picture. Card Wipe provides control over the number of rows and columns of cards, the flip direction, and the transition direction (including the ability to use a gradient to determine flip order). You can also control randomness and jitter to make the effect appear more realistic. By varying the rows and columns, you can also create venetian blind and Chinese lantern effects.

The Card Wipe effect shares many controls with the Card Dance effect.

This effect works with 8-bpc color.



Original (upper-left), and with effect applied (lower-left and right)

### Basic controls

**Transition Width** The width of the area that actively changes from the original to the new image.

**Back Layer** The layer that appears in segments on the backs of the cards. You can use any layer in the composition; its Video switch  can even be turned off. If the layer has effects or masks, precompose the layer first.

**Rows & Columns** Specifies the interaction of the numbers of rows and columns. Independent makes both the Rows and Columns sliders active. Columns Follows Rows makes only the Rows slider active. If you choose this option, the number of columns is always the same as the number of rows.

**Rows** The number of rows, up to 1000.

**Columns** The number of columns, up to 1000, unless Columns Follows Rows is selected.

**Note:** Rows and columns are always evenly distributed across a layer, so unusually shaped rectangular tiles don't appear along the edges of a layer, unless you're using an alpha channel.

**Card Scale** The size of the cards. A value smaller than 1 scales the cards down, revealing the underlying layer in the gaps. A value greater than 1 scales the cards up, creating a blocky mosaic as they overlap each other.

**Flip Axis** The axis around which each card flips.

**Flip Direction** The direction in which the cards flip around their axes.

**Flip Order** The direction in which the transition occurs. You can also use a gradient to define a custom flip order: Cards flip first where the gradient is black and last where the gradient is white.

**Gradient Layer** The gradient layer to use for the Flip Order. You can use any layer in the composition.

**Timing Randomness** Randomizes the timing of the transition. If this control is set to 0, the cards flip in order. The higher the value, the more random the order in which the cards flip.

**Camera System** Whether to use the effect's Camera Position properties, the effect's Corner Pins properties, or the default composition camera and light positions to render 3D images of the cards.

### Camera Position controls

**X Rotation, Y Rotation, Z Rotation** Rotate the camera around the corresponding axis. Use these controls to look at the cards from the top, side, back, or any other angle.

**X, Y Position** Where the camera is positioned in x,y space.

**Z Position** Where the camera is positioned along the z axis. Smaller numbers move the camera closer to the cards, and larger numbers move the camera away from the cards.

**Focal Length** The distance from the camera to the image. Smaller numbers zoom in.

**Transform Order** The order in which the camera rotates around its three axes, and whether the camera rotates before or after it's positioned using the other Camera Position controls.

### Corner Pins controls

Corner Pinning is an alternative camera control system. Use it as an aid for compositing the result of the effect into a scene on a flat surface that is tilted with respect to the frame.

**Upper Left Corner, Upper Right Corner, Lower Left Corner, Lower Right Corner** Where to attach each of the corners of the layer.

**Auto Focal Length** Controls the perspective of the effect during the animation. If Auto Focal Length is unselected, the focal length you specify is used to find a camera position and orientation that place the corners of the layer at the corner pins, if possible. If not, the layer is replaced by its outline, drawn between the pins. If Auto Focal Length is selected, the focal length required to match the corner points is used, if possible. If not, it interpolates the correct value from nearby frames.

**Focal Length** Overrides the other settings if the results you've obtained aren't what you need. If you set the Focal Length to something that doesn't correspond to what the focal length would be if the pins were actually in that configuration, the image may look unusual (strangely sheared, for example). But if you know the focal length that you are trying to match, this control is the easiest way to get correct results.

### Jitter controls

Adding jitter (Position Jitter and Rotation Jitter) makes this transition more realistic. Jitter works on the cards before, during, and after the transition occurs. If you want the jitter to happen only during the transition, start with the Jitter Amount at 0, animate it up to the desired amount during the transition, and then animate it back down to 0 at the completion of the transition.

**Position Jitter** Specifies the amount and speed of jitter at the x, y, and z axes. X, Y, and Z Jitter Amount specify the amount of extraneous movement. The X, Y, and Z Jitter Speed values specify the speed of jitter for each Jitter Amount option.

**Rotation Jitter** Specifies the amount and speed of rotation jitter around the x, y, and z axes. X, Y, and Z Rotation Jitter Amount specify the amount of rotational jitter along an axis. A value of 90° makes it possible for a card to rotate up to 90° in either direction. The X, Y, and Z Rot Jitter Speed values specify the speed of rotational jitter.

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## Gradient Wipe effect

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The Gradient Wipe effect causes pixels in the layer to become transparent based on the luminance values of corresponding pixels in another layer, called the gradient layer. Dark pixels in the gradient layer cause the corresponding pixels to become transparent at a lower Transition Completion value. For example, a simple grayscale gradient layer that goes from black on the left to white on the right causes the underlying layer to be revealed from left to right as Transition Completion increases.

This effect works with 8-bpc and 16-bpc color.



Original (upper-left), and with effect applied (lower-left and right)

The gradient layer can be a still image or a moving image. The gradient layer must be in the same composition as the layer to which you apply Gradient Wipe.

You can create gradient layers in many ways, such as using the Ramp effect or creating them in Photoshop or Illustrator.

**Transition Softness** The degree to which the transition is gradual for each pixel. If this value is 0%, pixels in the layer to which the effect is applied are either completely opaque or completely transparent. If this value is greater than 0%, pixels are semitransparent at the intermediate stages of the transition.

**Gradient Placement** How the pixels of the gradient layer are mapped to the pixels of the layer to which the effect is applied:

**Tile Gradient** Uses multiple tiled copies of the gradient layer.

**Center Gradient** Uses a single instance of the gradient layer in the center of the layer.

**Stretch Gradient To Fit** Resizes the gradient layer horizontally and vertically to fit the entire area of the layer.

**Invert Gradient** Inverts the influence of the gradient layer; lighter pixels in the gradient layer create transparency at a lower Transition Completion value than do darker pixels.

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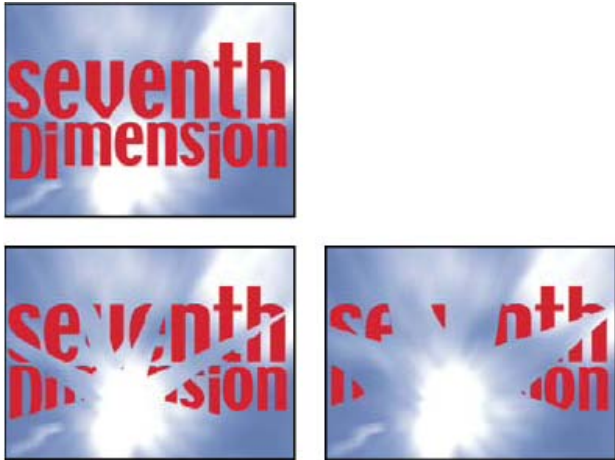
## Iris Wipe effect

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The Iris Wipe effect creates a radial transition that reveals an underlying layer. Specify the number of points used to create the iris using a range of 6 to 32 points, and specify whether an inner radius is used. If Use Inner Radius is selected, you can specify values for both Inner Radius and Outer Radius; the iris isn't visible if Outer Radius, Inner Radius, or both are set to 0. The iris is roundest if both Outer Radius and Inner Radius are set to the same value.

The Iris Wipe effect is the only Transition effect that doesn't have a Transition Completion property. To animate the Iris Wipe effect to expose the underlying layers, animate the Radius properties.

This effect works with 8-bpc and 16-bpc color. In After Effects CS6, this effect works in 32-bit color.



Original (upper-left), and with effect applied (lower-left and right)

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## Linear Wipe effect

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The Linear Wipe effect performs a simple linear wipe of a layer in a specified direction. At Draft quality, the edge of the wipe isn't anti-aliased; at Best quality, the edge of the wipe is anti-aliased and the feather is smooth.

**Wipe Angle** The direction that the wipe travels. For example, at 90° the wipe travels from left to right.

This effect works with 8-bpc and 16-bpc color. In After Effects CS6, this effect works in 32-bit color.



Original (upper-left), and with effect applied (lower-left and right)

In a video tutorial on the [Artbeats website](#), Steve Holmes demonstrates the use of non-animated instances of the Linear Wipe effect to crop a layer from various angles with softly feathered edges.

## Radial Wipe effect

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The Radial Wipe effect reveals an underlying layer using a wipe that circles around a specified point. At Best quality, the edges of the wipe are anti-aliased.

**Start Angle** The angle at which the transition starts. With a start angle of 0°, the transition starts at the top.

**Wipe** Specifies whether the transition moves clockwise or counterclockwise, or alternates between the two.

This effect works with 8-bpc and 16-bpc color. In After Effects CS6, this effect works in 32-bit color.



Original (upper-left), and with effect applied (lower-left and right)

## Venetian Blinds effect

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The Venetian Blinds effect reveals an underlying layer using strips of specified direction and width. At Draft quality, the strips are animated with pixel precision; at Best quality, the strips are animated with subpixel precision.

This effect works with 8-bpc and 16-bpc color.





*Original (upper-left), and with effect applied (lower-left and right)*

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# Utility effects

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[Apply Color LUT effect](#)  
[Cineon Converter effect](#)  
[Color Profile Converter effect](#)  
[Grow Bounds effect](#)  
[HDR Compander effect](#)  
[HDR Highlight Compression effect](#)

Third-party effects:

- CC Overbrights effect (CS6)

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## Apply Color LUT effect

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Apply the Apply Color LUT effect to a layer to transform the colors of the layer according to a color lookup table (LUT). LUTs are sometimes used to perform manual color correction or color management tasks.

**Note:** *In general, within After Effects, color management is performed using a standard workflow using ICC profiles, not color LUTs. (See [Color management](#).)*

This effect works with 8-bpc, 16-bpc, and 32-bpc color.

When you apply the effect, you are prompted to choose a .3dl or .cube LUT file. You can also change the LUT loaded into an instance of the Apply Color LUT effect by clicking Choose LUT in the effect's controls.

In After Effects CS5 (with the 10.0.1 update installed) and later, the Apply Color LUT effect can use .3dl files with floating-point values or 3DMESH/Mesh keywords, or those saved from an ASSIMILATE SCRATCH system (i.e., that have SCRATCH in the comments at the top of the file). For more information about changes and fixes regarding color LUTs in After Effects 10.0.1, see the [After Effects region of interest](#) blog.

In After Effects CS6, there is added support for overrange IRIDAS .cube files, IRIDAS .look files, and cineSpace .csp files.

A LUT can be visualized as a three-dimensional coordinate system (a 3D cube), with each axis representing color transformations for the range of all values for a color channel. Points along each axis define the color transformations for each color channel. After Effects can read and use 3D LUTs that have all three axes the same length (same number of points), with each axis containing 64 or fewer points. For example, After Effects can read and use a 17x17x17 3D LUT.

 You can create LUTs using commands in the File > Export menu—such as Autodesk > Smoke (3dl)—in the full interface of the Color Finesse plug-in.

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## Cineon Converter effect

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The Cineon Converter effect provides a high degree of control over color conversions of Cineon frames, but in most cases you should convert the colors in a Cineon file using color management features. (See Cineon and DPX footage items.)

This effect works with 8-bpc, 16-bpc, and 32-bpc color.

To use the Cineon Converter effect, import a Cineon file and leave it in its default state; After Effects either condenses the colors to 8 bpc or expands them to 16 bpc or 32 bpc, depending on the mode you work in. You can then apply the Cineon Converter effect to the file and precisely adjust the colors while interactively viewing the results in the Composition panel. You can set keyframes or expressions to adjust for changes in tone over time—use keyframe interpolation and ease handles to precisely match the most irregular lighting changes. Consider using other Color Correction effects to perform these corrections instead. (See Color Correction effects.)

The 10 bits of data available in each Cineon channel for each pixel make it easier to enhance an important range of tones while preserving overall tonal balance. By carefully specifying the range, you can create a version of the image that faithfully resembles the original.

**Note:** *Each computer monitor has unique display characteristics that affect your perception of color. For best results when evaluating tonal balance, use the Info panel in After Effects to see the true color values of pixels as you move the pointer over them.*

Pete O'Connell provides an article on the [Creative COW website](#) that describes the use of the Cineon Converter effect.

**Conversion Type** How the Cineon file is converted. Log To Linear converts an 8-bpc logarithmic non-Cineon layer that you plan to render as a Cineon sequence. Linear To Log converts a layer containing an 8-bpc linear proxy of a Cineon file into an 8-bpc logarithmic file so that its display characteristics are consistent with the original Cineon file. Log To Log detects an 8-bpc or 10-bpc logarithmic Cineon file when you plan to render it as an 8-bpc logarithmic proxy.

**Note:** *For compatibility, obsolete versions of each option appear if you open a project that uses an earlier version of the Cineon Converter effect.*

**10 Bit Black Point** The black point (minimum density) for converting a 10-bpc logarithmic Cineon layer.

**Internal Black Point** The black point used for the layer in After Effects.

**10 Bit White Point** The white point (maximum density) for converting a 10-bpc logarithmic Cineon layer.

**Internal White Point** The white point used for the layer in After Effects.

**Gamma** Increase or decrease Gamma to lighten or darken midtones, respectively.

**Highlight Rolloff** The rolloff value used to correct bright highlights. If adjusting the brightest areas makes the rest of the image appear too dark, use Highlight Rolloff to adjust these bright highlights. If highlights appear as white blotches, increase Highlight Rolloff until details are visible. An image with high contrast may require a high rolloff value.

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## Color Profile Converter effect

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The Color Profile Converter effect converts a layer from one color space to another by specifying input and output profiles.

In most cases, you should use automatic color management features to convert from one color space to another, rather than using the Color Profile Converter to manually do the conversions. (See Color management.)

**Important:** *In general, you should either work with color management features or use the Color Profile Converter—not both.*

The profiles you select are embedded in the project, so you can use them even if you transfer the project to a computer that doesn't have the same profiles. When converting from one color space to another, you can specify how After Effects handles the color conversion by selecting a rendering intent. You can also choose whether to linearize the input or output profile.

This effect works with 8-bpc, 16-bpc, and 32-bpc color.

To convert the color profile of the layer, select a color profile from the Input Profile menu. Select Project Working Space to use the profile specified in the project settings (File > Project Settings). To linearize the input profile, select the Linearize Input Profile option. Then select an output profile from the Output Profile menu. To linearize the output profile, select the Linearize Output Profile. In the Intent menu, select a rendering intent.

Rendering intent options determine how source colors are adjusted. For example, colors that fall inside the destination gamut may remain unchanged, or they may be adjusted to preserve the original range of visual relationships when translated to a smaller destination gamut.

The result of choosing a rendering intent depends on the graphical content of an image and on the profiles used to specify color spaces. Some profiles produce identical results for different rendering intents.

When specifying a rendering intent, you can choose to use black point compression. Black point compression ensures that the shadow detail in the image is preserved by simulating the full dynamic range of the output device.

The following rendering intents are available for the Color Profile Converter effect:

**Perceptual** Attempts to preserve the visual relationship between colors so it's perceived as natural to the human eye, even though the color values themselves may change. This intent is suitable for images with many of out-of-gamut colors.

**Saturation** Attempts to produce vivid colors in an image at the expense of color accuracy. This rendering intent is suitable for images, such as graphic logos, in which bright saturated colors are more important than the exact relationship between colors.

**Relative Colorimetric** Compares the extreme highlight of the source color space to the extreme highlight of the destination color space and shifts all colors accordingly. Out-of-gamut colors are shifted to the closest reproducible color in the destination color space. This rendering intent preserves more of the original colors in an image than Perceptual. This rendering intent is used by default throughout After Effects.

**Absolute Colorimetric** Leaves colors that fall inside the destination gamut unchanged. Out-of-gamut colors are clipped. No scaling of colors to the destination white point is performed. This intent aims to maintain color accuracy at the expense of preserving relationships between colors.

Use the Scene-ref. Profile Compensation control to determine whether each instance of the Color Profile Converter effect compensates for scene-referred profiles:

**On** Compensates for scene-referred profiles.

**Off** Doesn't compensate for scene-referred profiles.

**Use Project Setting** Uses the setting indicated by the project's Compensate For Scene-referred Profiles option.

For an explanation of scene-referred profiles, see System gamma, device gamma, and the difference between scene and viewing environment.

**Note:** *If you open an After Effects 7 project that uses DPX Scene and DPX Theater color profiles in the Color Profile Converter effect, After Effects CS5 does not automatically update these profiles to the new equivalent profiles (Kodak 5218/7218 Printing Density and Kodak 2383 Theater Preview). Instead, the profiles are listed as Embedded. You can convert your project by manually assigning the new profiles in After Effects CS5. However, if the same profiles were assigned to the footage or selected in Proof Colors in After Effects 7, they are automatically updated to the new profiles in After Effects CS5. (Proof Colors has been replaced by Output Simulation.)*

On his [fnord website](#), Brendan Bolles explains how to use the Color Profile Converter effect and film color profiles to adjust colors and perform tone mapping to make an HDR image appear as if it were shot on motion picture film.

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## Grow Bounds effect

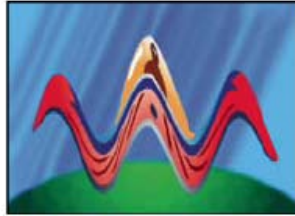
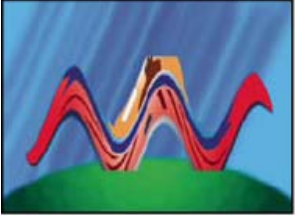
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The Grow Bounds effect increases the layer size for the effect that directly follows it. This effect is most useful with layers that have Collapse Transformations / Continuously Rasterize enabled, because they render using a buffer that's the size of the composition. For example, if you apply Drop Shadow to a text layer that's partially out of the composition frame, the shadow is clipped because only the portion of the text that's in the composition frame casts a shadow. Applying the Grow Bounds effect before the Drop Shadow effect prevents the shadow from being cut off. The number of pixels you specify increases the height and width of the layer buffer.

**Note:** *You should not need to use this effect when working with effects that work with 32-bpc color, because these effects have been updated to*

automatically compensate for layer size.

This effect works with 8-bpc, 16-bpc, and 32-bpc color.



Original (upper-left); the Wave Warp effect is constrained by dimensions of layer (lower-left); Grow Bounds effect fixes problem (lower-right).

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## HDR Compander effect

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The HDR Compander (compressor/expander) effect gives you a way to work with tools that don't support high-dynamic-range color—such as 8-bpc and 16-bpc effects—without sacrificing the high dynamic range of footage.

The HDR Compander effect works by first compressing the highlight values in the HDR image so that they fall within the range of an 8-bpc or 16-bpc (low-dynamic-range) image, and then expanding the values back to the 32-bpc range.

Apply the HDR Compander effect to a layer once in the effect stack above low-dynamic-range effects, and once below low-dynamic-range effects.

Because the first instance of the HDR Compander effect compresses the range of values through sampling, some precision is lost. For this reason, use the HDR Compander effect only if you accept the tradeoff of some precision in values for the sake of high dynamic range.

This effect works with 8-bpc, 16-bpc, and 32-bpc color.

### Apply the HDR Compander effect

1. Apply the HDR Compander effect to a layer in a 32-bpc project.
2. Select Compress Range for Mode.
3. Set Gain to the maximum value to be represented in the compressed range—that is, the highest white value in the image. Don't set Gain too high; the more of the 16-bpc value that you use for highlights, the more compressed the midtones (the majority of the pixels) will be, and the more data is lost in this process.
4. Set Gamma. Gamma affects the distribution of values in the range, allowing more precision in specific areas of the range.
5. Apply whatever low-dynamic-range effects you choose to the layer.
6. Apply another instance of the HDR Compander effect to the layer. Make sure that the second instance of HDR Compander is ordered after (below) any 8-bpc or 16-bpc effects you've applied.
7. Select Expand Range for Mode for the second instance of the HDR Compander effect.
8. Set Gain and Gamma to the same values as set in the first instance of the HDR Compander effect.

 A more convenient way to use the HDR Compander effect is to apply the Compress-Expand Dynamic Range animation preset. This animation preset consists of an expression and two instances of the HDR Compander effect: The first instance has Compress Range selected, and the second has Expand Range selected. The expression automatically sets the Gain and Gamma for the second instance to be the same as that which you set for the first instance. Insert whatever low-dynamic-range effects you choose between these two instances of the HDR Compander effect.

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## HDR Highlight Compression effect

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The HDR Highlight Compression effect compresses the color values in a high -dynamic-range image so that they fall within the value range of a low-dynamic-range image.

Adjust the amount of compression by setting the Amount property for the effect. If the Amount value is set to 100%, color values are compressed so that no pixel has any channel value outside the low dynamic range of 0.0–1.0. At Amount settings less than 100%, the effect can still bring some detail into the visible range from highlight and shadow regions.

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## Markers

# Layer markers and composition markers

## Composition markers

### Layer markers

#### Web links, chapter links, cue points, and markers

#### Scripts and utilities for working with markers

#### Online resources about markers

Use composition markers and layer markers to store comments and other metadata and mark important times in a composition or layer. Composition markers appear in the time ruler for the composition, whereas layer markers each appear on the duration bar of a specific layer. Both kinds of markers can hold the same information.

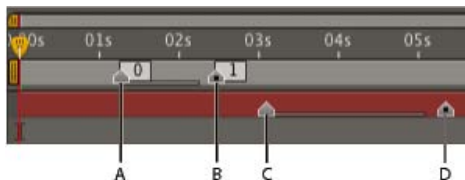
Markers can refer to a single point in time or to a duration.

Composition markers in After Effects correspond to sequence markers in Adobe Premiere Pro. Layer markers in After Effects correspond to clip markers in Adobe Premiere Pro.

When you render a composition that contains markers, the markers can be converted to web links, chapter links (chapter points), or cue points, depending on the output format and values that you set in the marker dialog box. Markers can also be exported as XMP metadata. (See XMP metadata.)

The default comment for a composition marker is a number, whereas the default comment for a layer marker is nothing.

A marker that contains link or cue point data has a small dot in its icon.



**A.** composition marker with duration of 1 second **B.** composition marker with cue-point data **C.** layer marker with duration of 2 seconds **D.** layer marker with cue-point data

 **Markers make it easier to align layers or the current-time indicator with specific points in time:** When you drag a keyframe, the current-time indicator, or a layer duration bar in the Timeline panel, hold down Shift to snap these items to markers.

You can add markers during a RAM preview or audio-only preview, which allows you to place markers at significant points in the audio track of a layer.

- To view or edit a data for a marker, double-click the marker, or right-click (Windows) or Control-click (Mac OS) the marker and choose Settings.
- To move a marker to a different time, drag the marker or double-click it and enter a time in the dialog box.
- To automatically create layer markers for a layer based on the temporal metadata in the layer's source file, select the Create Layer Markers From Footage XMP Metadata preference in the Media & Disk Cache preferences category. This preference is on by default.
- To synchronize layer markers on a precomposition layer to corresponding composition markers for the source composition, right-click (Windows) or Control-click (Mac OS) a layer marker and choose Update Markers From Source. This command also removes any markers that you have added to the layer.

**Note:** If the layer uses a file (rather than a composition) as its source, this command restores the layer markers to those representing the temporal XMP metadata for the source file.

If you add one composition to another, the original composition becomes nested as a layer in the containing composition. All of the composition markers from the nested composition become layer markers in the timeline of the containing composition. These markers are not linked to the original composition markers. Changes that you make to the composition markers in the original composition do not affect layer markers in the nested composition. For example, if you remove one of the original composition markers, the corresponding layer marker for the nested composition remains in place.

Scripts and expressions can read and use data stored in markers. Because XMP metadata for source footage items can be converted to layer markers, expressions and scripts can work with XMP metadata.

## Composition markers

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Composition markers appear as small triangles in the time ruler in the Timeline panel. You can have any number of composition markers in a



composition.

If you remove a numbered composition marker, the other markers remain numbered as they were. If you change the comment from the default number, that number may be reused by a composition marker created later.

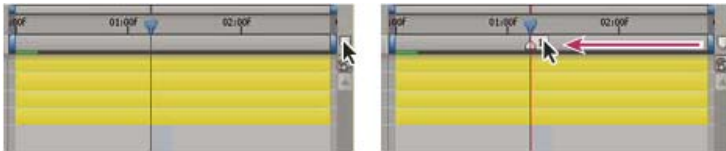
There can be at most one composition marker beginning at each time. If you add or move a composition marker to start at the same point in time as another composition marker, the added or moved marker replaces the other marker.

 For alternative keyboard shortcuts, see *Markers (keyboard shortcuts)*.

- To add a blank composition marker at the current time, make sure that no layer is selected, and choose Layer > Add Marker or press \* (multiply) on the numeric keypad.

**Note:** Pressing \* during a RAM preview or audio-only preview adds a marker at the current time without interrupting the preview.

- To add a composition marker at the current time and open the marker dialog box, make sure that no layer is selected, and press Alt+\* (Windows) or Option+\* (Mac OS) on the numeric keypad.
- To add a composition marker from the bin, drag the marker from the Comp Marker Bin  button.



Dragging a composition marker from the bin.

- To add a numbered composition marker at the current time, press Shift + a number key (0–9) on the main keyboard.  
**Note:** If the number you press is already used by another composition marker, After Effects does not create a new marker. Instead, it moves the existing marker with that number to the new position.
- To remove a composition marker, drag the marker to the Comp Marker Bin button or Ctrl-click (Windows) or Command-click (Mac OS) the marker.
- To lock all composition markers on a composition, right-click (Windows) or Control-click (Mac OS) a marker on the composition, and choose Lock Markers.

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## Layer markers

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Layer markers appear as small triangles on the duration bar of a layer. You can have any number of layer markers on a layer.

Layer markers are retained when you render and export a movie to a QuickTime container.

 For alternative keyboard shortcuts, see *Markers (keyboard shortcuts)*.

- To add a layer marker to selected layers at the current time, choose Layer > Add Marker or press \* (multiply) on the numeric keypad.  
**Note:** Pressing \* during a RAM preview or audio-only preview adds a marker at the current time without interrupting the preview.
- To add a layer marker at the current time and open the marker dialog box, press Alt+\* (Windows) or Option+\* (Mac OS) on the numeric keypad.
- To remove a layer marker, Ctrl-click (Windows) or Command-click (Mac OS) the marker.
- To remove all layer markers from selected layers, right-click (Windows) or Control-click (Mac OS) a marker, and choose Delete All Markers.
- To lock all layer markers on a layer, right-click (Windows) or Control-click (Mac OS) a marker on the layer, and choose Lock Markers.
- To replace all layer markers with markers containing temporal metadata from the source file for the layer, right-click (Windows) or Control-click (Mac OS) a layer marker and choose Update Markers From Source.

**Note:** In After Effects CS6, adding a layer marker no longer deselects other objects (masks, and effects, for example).

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## Web links, chapter links, cue points, and markers

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You can associate a Uniform Resource Locator (URL) with a marker to create an automatic link to the site at that address. After Effects embeds this information within certain kinds of movies, including SWF movies. When these movies are played in a web browser, the embedded URL is recognized, initiating a jump to the specified URL. You can target a specific frame in the site. For example, you can have specific web pages open when an instructional video reaches specific points in the movie. (See *Render and export a composition as a SWF file*.)

**Note:** The web link functionality depends on the media player allowing the instructions to be sent to the web browser. For information about the use of web links, see the documentation for the version of the media player that you're using.

You can also associate a chapter reference point with a marker. Chapter links are similar to chapters used in CD-ROM and DVD discs. Like the chapters of a book, a chapter link divides a movie into segments. Chapter links are supported in QuickTime and Windows Media movies. Chapter markers are only exported if the Chapter field of the marker is not blank.

 Adobe Encore can read chapter references in After Effects layer markers when you export to the MPEG-2 file format or use Dynamic Link. To be compatible with DVD format, make sure that markers are at least 15 frames apart.

Cue points in FLV and F4V files can each have any number of parameters, each with a name and a value. You can only add three parameters using the marker dialog box. To work with more than three parameters, use the scripting interface.



 To convert selected properties to cue point parameters in layer markers, choose **File > Scripts > Convert Selected Properties To Markers.jsx**. This script adds a layer marker on the layer at the same time as each keyframe for each selected property. The markers' cue point parameters indicate the name of the property and its value at that time. If the selected property has an expression, a marker is created for each frame, with the values sampled at each frame.

To create a web link, chapter link, or cue point from a marker, do the following:

1. Double-click a marker to open the marker dialog box.
2. Enter information in the appropriate boxes in the marker dialog box:
  - To create a web link, enter a Uniform Resource Locator in the URL box in the Chapter And Web Links area of the marker dialog box. To activate a specific frame in a site, enter the filename of the frame for Frame Target.
  - Enter the chapter name and number (if available) in the Chapter box in the Chapter And Web Links area of the marker dialog box.
  - Enter a name for the cue point, and names and values for any parameters. Select Event or Navigation to determine what kind of cue point to create.

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## Scripts and utilities for working with markers

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Paul Tuersley provides a script on the [AE Enhancers forum](#) for splitting layers at layer markers.

Lloyd Alvarez provides scripts on the After Effects Scripts website that do the following:

- [Magnum, the Edit Detector](#) automatically detects edits in a footage layer and places a layer marker at each edit (or splits the layer into a separate layer for each edit).
- [Zorro, the Layer Tagger](#) allows you to tag layers and then select, shy, and solo layers according to their tags. The tags are appended to comments in the Comments column in the Timeline panel and can also be added as layer markers.
- [Layer Marker Rename and Number](#) renames and numbers all markers on selected layers.
- [Layer Marker Batch Editor](#) edits marker attributes on all selected layers, including Flash cue point attributes.

Jeff Almasol provides scripts on his redefinery website that do the following:

- [rd\\_CopyMarkers](#) copies layer markers from one layer to any number of other layers.
- [rd\\_KeyMarkers](#) creates new layer markers (either on the selected layer or on a new null layer) with comments that provide information about keyframes at the same times.
- [rd\\_MapTextFileToMarkers](#) sets keyframes for the Source Text property of a text layer and sets the values to text from a text file. The keyframes are placed at times specified by layer markers on the text layer.
- [rd\\_MarkerNavigator](#) creates a panel that makes navigating to markers and viewing their comments and other values very convenient.
- [rd\\_RemoveMarkers](#) automatically removes markers from selected layers based on specified criteria (e.g., all markers in work area).
- [rd\\_Scooter](#) creates a panel with controls for moving various combinations of items in time, including layer In point, layer Out point, layer source frames, keyframes, and markers.
- [rd\\_CountMarkers](#) shows the number of markers on the selected layer.

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## Online resources about markers

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To view video tutorials on working with markers, cue points, and XMP metadata go to the Adobe website:

- [Converting metadata and markers to cue points](#): video tutorial demonstrating using Soundbooth, Flash Professional, and After Effects to create and use cue points.
- [Using markers and cue points](#): video overview of markers in Premiere Pro and After Effects.
- On [his blog](#) on the Adobe website, Michael Coleman provides a demonstration of how to convert tracking data in After Effects into cue point data for use in Flash.

More Help topics

 [Sharing markers with After Effects, Encore, and Flash](#)

 [Chapter points](#)





# XMP metadata

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## About XMP metadata

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Metadata is—in the simplest sense—data about data. In practical terms, metadata is a set of standardized information about a file, such as author name, resolution, color space, copyright, and keywords applied to the file. For example, most cameras attach some basic information to video files, such as date, duration, and file type. Other metadata can be entered as shot-list information in OnLocation or at the capture stage in Adobe Premiere Pro. You can add additional metadata with properties such as location, author name, and copyright. Because you can share, view, and use this metadata across Adobe Creative Suite applications, you can use this information to streamline your workflow and organize your files.

The Extensible Metadata Platform (XMP) is the metadata standard used by Adobe applications. Metadata that is stored in other formats—such as Exif, IPTC (IIM), GPS, and TIFF—is synchronized and described with XMP so that it can be more easily viewed and managed. For example, adjustments made to images with Adobe Camera Raw are stored as XMP metadata. The XMP standard is based on XML.

A metadata schema is a collection of properties specific to a given workflow. The Dynamic Media schema, for example, includes properties such as Scene and Shot Location that are tailored for digital video projects. Exif schemas, by contrast, include properties tailored to digital photography, such as Exposure Time and Aperture Value. More general properties, such as Date and Title, appear in the Dublin Core schema. To see a tool tip with information about a specific schema or property, place the pointer over it in the Metadata panel. You can create your own schemas using commands in the Metadata panel, and you can import schemas and share them with others as XML files.

Metadata is divided into two general categories: static metadata and temporal metadata. Static metadata is metadata that applies to an entire asset. For example, the copyright and author information for a video clip apply to the entire clip. Temporal metadata is metadata that is associated with a specific time within a dynamic media asset. Beat markers from Soundbooth and the metadata generated by the Speech Search feature in Soundbooth and Premiere Pro are examples of temporal metadata.

Adobe Story also converts information from a screenplay (script) into XMP metadata that can automate the creation of shooting scripts, shot lists, and more.

**Note:** *To start the Adobe Story service from within After Effects, choose File > Go To Adobe Story.*

You can view static XMP metadata for a file in Adobe Bridge.

After Effects scripts and expressions can read and use data stored in markers. Because XMP metadata for source footage items can be converted to layer markers, expressions and scripts can work with XMP metadata. Scripts can also operate on the XMP metadata for a file outside of the After Effects context, both for the automation of common tasks and for creative uses.

XMP metadata included in an F4V or FLV file can be read and used by ActionScript, so you can use XMP metadata to add interactivity to a video playing in Flash Player. One application of this feature is searching within an FLV file for temporal metadata, which can allow the user to begin playback at a specific word of dialog or at some other time associated with a specific temporal metadata element.

 *To selectively add and remove (thin) XMP metadata for a file, use export templates and the Metadata Export dialog box in Adobe Media Encoder.*

## Speech Search and XMP metadata

The Speech Search feature in Adobe Premiere Pro and Adobe Soundbooth provides the ability to convert speech in a video or audio asset to text metadata. Each word is stored as a metadata element at the corresponding time in the timeline.

When a file with Speech Search metadata is imported into After Effects and used as the source for a layer, each word appears in a layer marker at the corresponding time. (This assumes that the Create Layer Markers From Footage XMP Metadata is selected. See Working with XMP metadata in After Effects.)

## Embedding XMP metadata versus including XMP metadata in sidecar files

In most cases, XMP metadata for a file is stored in the file itself. If it isn't possible to write the information directly into the file, XMP metadata is stored in a separate file called a sidecar file, with the filename extension .xmp. For information on which file formats After Effects can write XMP metadata directly into, see XMP metadata in After Effects.

In most cases, XMP metadata remains with the file even when the file is converted to a different format—for example, from PSD to JPG. XMP metadata is also retained when files are placed in a document or project in an Adobe Creative Suite application.

## Online resources about XMP metadata

Go to the [XMP Developer Center](#) section of the Adobe website for the XMP specification, information on integrating XMP metadata with your software and workflow, the XMP SDK (software development kit), and forums about XMP metadata.

To view video tutorials on working with markers and XMP metadata go to the Adobe website:

- [www.adobe.com/go/lnvid4104\\_xp](http://www.adobe.com/go/lnvid4104_xp)
- [www.adobe.com/go/lnvid4111\\_xp](http://www.adobe.com/go/lnvid4111_xp)
- [www.adobe.com/go/lnvid4112\\_xp](http://www.adobe.com/go/lnvid4112_xp)
- [www.adobe.com/go/vid0094](http://www.adobe.com/go/vid0094)

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## XMP metadata in After Effects

For an introduction to XMP metadata, see About XMP metadata.

When After Effects imports a file with associated XMP metadata, you can view the static metadata in the Metadata panel, convert the temporal metadata to layer markers, use the metadata to facilitate your work within After Effects, and include the metadata in output files.

The After Effects scripting interface provides additional tools for using and interacting with XMP metadata.

### Importing files with XMP metadata into After Effects

After Effects can import XMP metadata from many formats, including the following:

- camera formats: AVCHD, HDV, P2, XDCAM, XDCAM EX
- image formats: GIF, JPEG, PNG, PostScript, TIFF
- common multimedia container formats: FLV, F4V, QuickTime (MOV), Video for Windows (AVI), Windows Media (ASF, WAV)
- authoring formats: InDesign documents, Photoshop documents (PSD), other native document formats for Adobe applications
- MPEG formats (MP3, MPEG-2, MPEG-4)
- SWF

When you import a file that contains XMP metadata, After Effects shows a “Reading XMP metadata from footage” status message while it reads the metadata from the source file.

One especially useful piece of metadata about each asset is its unique ID number, a value that distinguishes the asset from all others at all stages of the workflow. The unique ID value enables the application to recognize a file as being the same file as one encountered before, even if the filename has changed. One advantage of these unique ID values is that each application can use this information to manage cached previews and conformed audio files, preventing additional rendering and conforming.

The ID values used by XMP are Globally Unique Identifiers (GUIDs), 16-byte random numbers that are commonly used to ensure uniqueness of values.

XMP ID values are written to source files when they are imported into After Effects if the Write XMP IDs To Files On Import preference is selected in the Media & Cache preferences category. This preference setting affects other Adobe applications, too; see the helpful text in the Preferences dialog box for details. If a file already has an XMP ID, then After Effects doesn’t write a new one, and no change is made. Files created by recent versions of Adobe applications will, in general, already have an XMP ID.

The Write XMP IDs To Files On Import preference is on by default.

**Important:** *The Write XMP IDs To Files On Import preference only controls whether unique ID values are automatically written to files when they are imported. This preference does not control whether XMP metadata is written to a file under other circumstances, such as when you edit metadata in the Metadata panel.*

**Note:** *Because writing the ID to a file is considered a modification, the modification date of a source file may be updated the first time the file is imported.*

## Working with XMP metadata in After Effects

### The Metadata panel

In After Effects, the Metadata panel (Window > Metadata) shows static metadata only. Project metadata is shown at the top of the panel, and Files metadata is shown at the bottom. Temporal metadata is visible in After Effects only as layer markers.

Project metadata is shown in the Metadata panel as soon as you open the panel. You can add and change information in any of the metadata categories. This information shows up in Bridge when the project file is selected and is also embedded in files rendered and exported using the render queue when the Include Source XMP Metadata output module option is selected.

To see Files metadata in the Metadata panel, you must first select a file in the Project panel. You can then add or change information in any of the metadata categories. If you select multiple files, then changes that you make will be made in all of the selected files. Any changes made to source file metadata are immediately written to the source files.

To change which metadata categories and fields are shown in the Metadata panel, choose Project Metadata Display Preferences or Files Metadata Display Preferences from the Metadata panel menu.

### Conversion of XMP metadata to layer markers

When you create a layer based on a footage item that contains XMP metadata, the temporal metadata can be converted to layer markers.

❖ To enable the automatic conversion of XMP metadata to layer markers, select the Create Layer Markers From Footage XMP Metadata preference in the Media & Disk Cache preferences category.

During this conversion, After Effects shows a “Reading XMP markers from footage” status message.

These layer markers are fully editable, just as any other layer markers. (See Layer markers and composition markers.)

Changes made to the layer markers based on the source file’s XMP metadata do not affect the XMP metadata in the source file.

💡 *To restore the layer markers for a layer to those read from the layer’s source’s XMP metadata, right-click (Windows) or Control-click (Mac OS) any marker on the layer and choose Update Markers From Source. This command also removes any markers that you have added to the layer. You can use this command to manually create layer markers from XMP metadata if you did not have the Create Layer Markers From Footage XMP Metadata preference selected when you created the layer.*

For information on using expressions together with the contents of layer markers, see MarkerKey attributes (expression reference).

### Exporting XMP metadata from After Effects

When you render and export a composition, you can write XMP metadata to the output file that includes all of the XMP metadata from the sources for that composition. This includes all of the composition markers and layer markers in the composition, all of the XMP metadata from the source files on which the layers in the composition are based, comments from the Comments columns in the Timeline panel and Project panel, and the project-level XMP metadata for the project in which the composition is contained. XMP metadata from nested compositions is recursively processed and included in the output.

To write all of the XMP metadata to the output file, select Include Source XMP Metadata in the output module settings for the output file. If Include Source XMP Metadata is deselected, the only XMP metadata that is written to the output file is a unique ID. (See Output modules and output module settings.)

**Note:** *When Include Source XMP Metadata is on, in some cases, rendering and exporting can take a long time because of the time that it takes to read and assemble XMP metadata from the source files. For this reason, the option is off by default.*

In addition to storing XMP metadata in After Effects project (.aep, .aepx) files and source documents used by Adobe applications (for example, .psd), After Effects can write XMP metadata directly into the files for many container formats, including the following:

- FLV and F4V
- QuickTime (.mov)
- Video for Windows (.avi)
- Windows Media (.wmv)
- some MPEG formats (.mpg, .m2v, .mp4)

**Note:** *XMP metadata is written to sidecar (.xmp) files for some MPEG formats.*

For files of other types, the Include Source XMP Metadata option is unavailable.

When you render and export a file and include the source XMP metadata in the output file, XMP metadata is written to an output file before the first frame of the composition is rendered. If the Render Details section of the Render Queue panel is open, After Effects shows a “Gathering XMP Metadata from Sources” status message while it compiles the metadata from the sources used in the composition being rendered.

XMP metadata that is written to a file is inserted in an XML data structure separate from the audio and video data itself. You can view this plain-text XML data just as you view any other plain-text data, and you can use and manipulate it with scripts of various kinds.

**Note:** *After Effects writes startTimecode and altTimecode values into XMP metadata. You can view these values in the Start Timecode and Alternate Timecode fields in the Dynamic Media schema in the Metadata panel.*

### Re-importing XMP metadata into After Effects

When you import a file into After Effects that has been rendered and exported from After Effects using the Include Source XMP Metadata option, all of the XMP metadata that was written to the output file is available as layer markers when the file is used as the source for a layer in a composition. This XMP metadata is not visible in the Metadata panel.

**Note:** *When you import a file that contains XMP metadata and use that file as the source for a layer, After Effects filters redundant XMP metadata. This prevents an accumulation of duplicate markers when you use a file in After Effects that was rendered and exported out of the same project—for example, when pre-rendering a piece of a project.*

### Video tutorials about markers and XMP metadata

To view video tutorials on working with markers and XMP metadata go to the Adobe website:

- [www.adobe.com/go/lnvid4104\\_xp](http://www.adobe.com/go/lnvid4104_xp)
- [www.adobe.com/go/lnvid4111\\_xp](http://www.adobe.com/go/lnvid4111_xp)

- [www.adobe.com/go/Invid4112\\_xp](http://www.adobe.com/go/Invid4112_xp)
- [www.adobe.com/go/vid0094](http://www.adobe.com/go/vid0094)

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## About file, clip, and project XMP metadata

For the most part, Adobe video and audio applications deal with XMP metadata very similarly. Some small distinctions exist, however, reflecting the unique workflow stage that each application addresses. When using applications in tandem, an understanding of these slightly different approaches can help you get the most out of metadata.

Adobe OnLocation and Encore provide one set of metadata properties for all assets. However, Adobe Premiere Pro, After Effects, and Soundbooth divide the Metadata panel into separate sections for different asset types.

**Adobe Premiere Pro** Separates metadata in these sections:

**Clip** Displays properties for clip instances you select in the Project panel or Timeline panel. This metadata is stored in project files, so it appears only in Adobe Premiere Pro.

**File** Displays properties for source files you select in the Project panel. This metadata is stored directly in the source files, so it appears in other applications, including Adobe Bridge.

**After Effects** Separates metadata in these sections:

**Project** Displays properties for the overall project. If you select Include Source XMP Metadata in the Output Module Settings dialog box, this information is embedded into files you output from the Render Queue.

**Files** Displays properties for source files you select in the Project panel. (If you select a proxy, properties for the actual file appear.) For After Effects, both Project and File properties are stored directly in files, so you can access this metadata in Adobe Bridge.

**Soundbooth** Separates metadata in these sections:

**File** Displays properties for the currently displayed audio or ASND file. This metadata is stored directly in such files, so it appears in other applications. (Adobe Bridge, however, does not display metadata for ASND files.)

**Clip** Displays properties for multitrack clips you select in the Editor panel. This metadata is stored in the containing ASND file, so it appears only in Soundbooth.

 *Adobe Premiere Pro and Soundbooth also provide a Speech Analysis section with metadata that appears only in those applications.*

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## Show or hide XMP metadata

To optimize the Metadata panel for your workflow, show or hide entire schemas or individual properties, displaying only those that you need.

1. From the options menu  for the Metadata panel, select Metadata Display.
2. To show or hide schemas or properties, select or deselect them from the list.

## Save, switch, or delete metadata sets

If you use multiple workflows, each requiring different sets of displayed metadata, you can save sets and switch between them.

1. From the options menu  for the Metadata panel, select Metadata Display.
2. Do any of the following:
  - To save a customized set of displayed metadata, click Save Settings. Then enter a name, and click OK.
  - To display a previously saved set of metadata, select it from the menu.
  - To delete a previously saved set of metadata, select it from the menu, and click Delete Settings.

## Create schemas and properties

If you have a unique, customized workflow that the default metadata options don't address, create your own schemas and properties.

1. From the options menu  for the Metadata panel, select Metadata Display.
2. Click New Schema, and enter a name.
3. In the list, click Add Property to the right of the schema name.
4. Enter a property name, and select one of the following for Type:

**Integer** Displays whole numbers that you drag or click to change.

**Real** Displays fractional numbers that you drag or click to change.

**Text** Displays a text box (for properties similar to Location).

**Boolean** Displays a check box (for On or Off properties).



## Edit XMP metadata

In Adobe video applications, similarly named properties are linked in the Metadata and Project panels. However, the Metadata panel provides more extensive properties and lets you edit them for multiple files simultaneously.

**Note:** *Instead of a Project panel, Soundbooth uses the Files panel.*

1. Select the desired files or clips.
2. In the Metadata panel, edit text or adjust values as needed.

If you selected multiple items, the panel displays properties as follows:

- If a property matches for all items, the matching entry appears.
- If a property differs, <Multiple Values> appears. To apply matching values, click the text box, and type.

More Help topics

 [Export and thin XMP metadata](#)

 [Viewing and editing XMP metadata](#)

 [Work with metadata in Adobe](#)

 [Organizing and logging shots](#)

 [Managing metadata](#)



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Memory, storage, performance

# Memory and storage (CS5.5, and earlier)

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## Memory (RAM) usage in 64-bit After Effects

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- [Memory & Multiprocessing preferences](#)
- [Memory pool shared between After Effects, Premiere Pro, Encore, and Adobe Media Encoder](#)
- [Memory & Multiprocessing Details dialog box](#)
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- [Storage requirements for output files](#)
- [Caches: RAM cache, disk cache, and media cache](#)
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## Memory (RAM) usage in 64-bit After Effects

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### Advantages of a 64-bit application and 64-bit address space

The maximum amount of RAM that a 32-bit application can use is 4 GB, which is much less than the amount of RAM that can be installed in modern computers and addressed by 64-bit operating systems. After Effects CS4 was a 32-bit application, and it was only able to use more than 4 GB of RAM by starting separate instances (processes) of the After Effects CS4 application to render multiple frames simultaneously. After Effects CS5 is a 64-bit application, so each process can use all of the RAM addressed by 64-bit Windows Vista, Windows 7, and Mac OS operating systems.

The ability of After Effects to use large amounts of RAM per process provides several advantages:

- You can render much larger compositions—both for preview and for final output—with larger frame sizes and larger source files.
- RAM previews can be much longer.
- You can work with higher color bit depths without encountering memory limitations.
- After Effects can cache more items, which reduce the frequency with which frames and components of frames are re-rendered.

### Memory & Multiprocessing preferences

Set memory and multiprocessing preferences by choosing **Edit > Preferences > Memory & Multiprocessing** (Windows) or **After Effects > Preferences > Memory & Multiprocessing** (Mac OS).

As you modify settings in the Memory & Multiprocessing dialog box, After Effects dynamically updates helpful text in the dialog box that reports how it will allocate and use memory and CPUs.

The RAM Reserved For Other Applications preference is relevant whether or not **Render Multiple Frames Simultaneously** is selected. The settings in the After Effects Multiprocessing category are relevant only if **Render Multiple Frames Simultaneously** is selected.

Todd Kopriva provides information about optimum memory and processor settings on the [Adobe website](#).

**RAM Reserved For Other Applications** Increase this value to leave more RAM available for the operating system and for applications other than After Effects and the application with which it shares a memory pool. (See [Memory pool shared between After Effects, Premiere Pro, Encore, and Adobe Media Encoder](#).) If you know that you will be using a specific application along with After Effects, check its system requirements and set this value to at least the minimum amount of RAM required for that application. Because performance is best when adequate memory is left for the operating system, you can't set this value below a minimum baseline value.

### Render multiple frames simultaneously

 For a video tutorial about using **Render Multiple Frames Simultaneously** multiprocessing in After Effects, see the [video2brain website](#).

After Effects can start additional processes of the After Effects application to run in the background to assist the main foreground application with the rendering of frames for RAM previews or final output. These background processes have the name AfterFX.exe (Windows) or aeselflink (Mac OS).

In this form of multiprocessing, each background process renders its own frame and runs on a separate processor core (CPU). The number of processes used to render multiple frames simultaneously is never more than the number of processors.

**Note:** On many computer systems, After Effects CS5 can use the virtual (logical) processor cores created by hyperthreading for various forms of multiprocessing, including Render Multiple Frames Simultaneously multiprocessing. After Effects CS4 and earlier could only use the physical cores for Render Multiple Frames Simultaneously multiprocessing.

The number of background processes that can run on your computer also depends on the total amount of installed system RAM and the amount of RAM that is assigned to the After Effects application.

The amount of RAM required for each background process varies depending on your system configuration and compositions.

**Note:** When the RAM cache (the RAM available for storing RAM preview frames) is nearly full, the background processes cease rendering and go into a low-memory-usage state, and the foreground process starts rendering—as if Render Multiple Frames Simultaneously were off. This means that the rendering of a RAM preview will be fast at first, and then the speed will step down as rendering switches to only one processor core.

Using the Render Multiple Frames Simultaneously multiprocessing feature does not speed up the rendering of all compositions. The rendering of some compositions is *memory-intensive*, such as when you are working with very large background plates that are several thousands of pixels tall and wide. The rendering of some compositions is *bandwidth-intensive* (*I/O-intensive*), such as when you are working with many source files, especially if they are not served by a fast, local, dedicated disk drive. The Render Multiple Frames Simultaneously multiprocessing feature works best at improving performance when the resource that is most exercised by the composition is CPU processing power, such as when applying a *processor-intensive* effect like a glow or blur.

Because antivirus software operates by monitoring every read and write operation, such software can decrease rendering speed, especially with the Render Multiple Frames Simultaneously preference selected.

**Note:** After Effects can also use multiple threads to accelerate rendering of a single frame. This form of multiprocessing doesn't depend on the Render Multiple Frames Simultaneously preference.

**RAM Allocation Per Background CPU** Specifies the minimum amount of RAM that will be allocated to each background process, each of which runs on its own CPU (processor core). Setting this value lower can allow more CPUs to be used simultaneously with a limited amount of RAM. However, if you set this value too low for the kinds of frames that you are rendering, then the background processes will fail to render frames at all, and only the foreground process will be used to render frames. For example, you should not set this value to low value of 0.75 GB if you are rendering frames with the pixel dimensions of high-definition television or digital cinema.

 The optimum amount of RAM to allocate for each of the background processes varies according to project settings (such as color bit depth), composition settings (such as pixel dimensions of the composition frame), and what effects are applied. For a typical standard-definition television project, at least 1 GB per background process is recommended. For a typical project with HDTV-sized compositions, at least 2 GB per background process is recommended for optimum performance. Start with these settings, but run some tests with your own computer systems and projects to determine the best settings for your specific needs. Digital cinema projects and projects with larger frame sizes require even more RAM per background process for optimum performance.

**CPUs Reserved For Other Applications** Set this value to a number other than 0 to prevent After Effects from using all of the CPUs (processor cores) in your computer system. For example, if you have a computer with 8 CPUs, setting this value to 2 leaves 6 CPUs for After Effects.

 In many cases, performance is improved by using fewer than the maximum number of processors for Render Multiple Frames Simultaneously multiprocessing, even when you have enough RAM for all of the processors. After Effects is a multi-threaded application that can also use other forms of multiprocessing beyond just Render Multiple Frames Simultaneously multiprocessing, and it is possible for the processors to become “overscheduled” if these threads are competing for the same resources as the background processes used for rendering with Render Multiple Frames Simultaneously multiprocessing. Therefore, the best approach is to begin by using a small number of processors for Render Multiple Frames Simultaneously multiprocessing; and then increase the number of processors used until you find the optimum number for your computer system and compositions.

### When After Effects temporarily disables multiprocessing with Render Multiple Frames Simultaneously

If After Effects can't use background processes to render multiple frames simultaneously, a message appears in the Info panel, and After Effects uses only the main foreground process to render all frames. These messages include the following:

- “Insufficient RAM. Multiprocessing is off.”
- “Incompatible effect or expression. Multiprocessing is off.”
- “Incompatible preview mode. Multiprocessing is off.”
- “Incompatible composition. Multiprocessing is off.”

In general, the reasons for After Effects temporarily disabling Render Multiple Frames Simultaneously multiprocessing fall into these categories:

- The rendering of a single frame requires more RAM than is available to the individual background processes.
- The project uses OpenGL for rendering of previews or final output. The Render Multiple Frames Simultaneously multiprocessing feature works by using background processes on multiple CPU processor cores to render frames, whereas rendering with OpenGL works by moving processing to the GPU. (See [Render with OpenGL](#).)

- The composition uses an effect that relies on GPU processing. These effects are generally effects implemented with Pixel Bender.
- The composition contains a live Photoshop 3D layer. (See Using 3D object layers from Photoshop.)
- The composition uses an effect with a temporal component that renders much more quickly when the rendering process has access to a cache of previous frames. These effects include some effects with a Temporal Smoothing option.
- The composition uses an effect with a temporal component that requires frames to be rendered in strictly sequential order.

If a composition uses any of the following effects, the composition will not be rendered with the Render Multiple Frames Simultaneously multiprocessing feature:

- Auto Color
- Auto Contrast
- Auto Levels
- Cartoon
- Lens Blur
- Particle Playground
- Shadow/Highlight

**Note:** Some third-party effects—such as CC Time Blend and RE:Vision Effects Video Gogh—are also incompatible with the Render Multiple Frames Simultaneously multiprocessing feature.

### Memory pool shared between After Effects, Premiere Pro, Encore, and Adobe Media Encoder

After Effects shares a memory pool with Adobe Media Encoder, Premiere Pro, and Encore. This is indicated in the Memory & Multiprocessing preferences panel by the icons for each of these applications at the top of the panel. The icons are dimmed for the applications that are not running.

A memory balancer prevents swapping of RAM to disk by dynamically managing the memory allocated to each of the applications. Each application registers with the memory balancer with some basic information: minimum memory requirements, maximum memory able to be used, current memory in use, and a priority. The priority has three settings: low, normal, and highest. Highest is currently reserved for After Effects and Premiere Pro, when it is the active application. Normal is for After Effects in the background or Adobe Media Encoder in the foreground. Low is for background servers of Premiere Pro or Adobe Media Encoder in the background.

**Note:** An example of a practical result of the shared memory pool is that starting Premiere Pro will decrease the amount of RAM available to After Effects for RAM previews; quitting Premiere Pro will immediately free RAM for After Effects and extend the possible duration of RAM previews.

### Memory & Multiprocessing Details dialog box

The Memory & Multiprocessing Details dialog box contains additional information about installed RAM and current and allowed RAM usage. It also includes a multicolumn table listing processes related to Adobe Media Encoder, After Effects, Premiere Pro, and Encore. The table includes information about each process, such as ID, Application Name, Minimum Needed Memory, Maximum Usable Memory, Maximum Allowed Memory, Current Memory, and Current Priority.

To open the dialog box, choose Edit > Preferences > Memory & Multiprocessing (Windows) or After Effects > Preferences > Memory & Multiprocessing (Mac OS), and click the Details button at the bottom of the preferences dialog box.

You can copy the information to the clipboard with the Copy button.

### Memory (RAM) requirements for rendering

Memory requirements for rendering of a frame (either for previews or for final output) increase with the memory requirement of the most memory-intensive layer in the composition.

After Effects renders each frame of a composition one layer at a time. For this reason, the memory requirement of each individual layer is more relevant than the duration of the composition or the number of layers in the composition when determining whether a given frame can be rendered with the available memory. The memory requirement for a composition is equivalent to the memory requirement for the most memory-intensive single layer in the composition.

The memory requirements of a layer increase under several circumstances, including the following:

- Increasing the project's color bit depth
- Increasing the composition resolution
- Using a larger source image
- Enabling color management
- Adding a mask
- Adding per-character 3D properties

- Precomposing without collapsing transformations
- Using certain blending modes, layer styles, or effects, especially those involving multiple layers
- Applying certain output options, such as 3:2 pulldown, cropping, and resizing
- Adding shadows or depth-of-field effects when using 3D layers

After Effects requires a contiguous block of memory to store each frame; it cannot store a frame in pieces in fragmented memory. For information about how much RAM is required to store an uncompressed frame, see [Storage requirements for output files](#).

**Note:** For tips on decreasing memory requirements and increasing performance, see *Improve performance by simplifying your project*.

## Purging memory (RAM)

Occasionally, After Effects may display an alert message indicating that it requires more memory to display or render a composition. If you receive an out-of-memory alert, free memory or reduce the memory requirements of the most memory-intensive layers, and then try again.

**Note:** Free memory immediately with one or more of the commands in the *Edit > Purge* menu.

## Troubleshooting memory issues

**Error: “Unable to allocate enough memory to render the current frame....”**

Either decrease the memory requirements for the rendering of this frame, or install more RAM.

**Error: “Unable to allocate [n] MB of memory....”**

Either decrease the memory requirements for the rendering of this frame, or install more RAM.

**Error: “Image buffers of size [width]x[height] @ [depth] bpc ([n] GB) exceed internal limits...”**

Decrease the memory requirements for the rendering of this frame.

**Note:** The maximum amount of memory that one frame can occupy is 2 GB.

**Error: “Memory allocation of [n] GB exceeds internal limits...”**

Decrease the memory requirements for the rendering of this frame.

**Note:** The maximum size for any single memory allocation is 2 GB.

## Online resources about memory and multiprocessing

For a video that demonstrates some of the advantages of a 64-bit After Effects application and how to allocate memory to After Effects and other applications, see the [Adobe website](#).

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## Storage requirements for output files

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Use the following formula to determine the number of megabytes required to store one uncompressed frame at full resolution:

$(\text{height in pixels}) \times (\text{width in pixels}) \times (\text{number of bits per channel}) / 2,097,152$

**Note:** The value 2,097,152 is a conversion factor that accounts for the number of bytes per megabyte ( $2^{20}$ ), the number of bits per byte (8), and the number of channels per pixel (4).

Some example frame sizes and memory requirements, in megabytes (MB) per frame:

- DV NTSC (720x480) frame in an 8-bpc project: 1.3 MB
- D1/DV PAL (720x576) frame in an 8-bpc project: 1.6 MB
- HDTV (1920x1080) frame in a 16-bpc project: 16 MB
- 4K digital cinema (4096x2304) frame in a 32-bpc project: 144 MB

Because video is typically compressed during encoding when you render to final output, you can't just multiply the amount of memory required for a single frame by the frame rate and composition duration to determine the amount of disk space required to store your final output movie. However, such a calculation can give you a rough idea of the maximum storage space you may need. For example, one second (approximately 30 frames) of uncompressed standard-definition 8-bpc video requires approximately 40 MB. A feature-length movie at that data rate would require more than 200 GB to store. Even with DV compression, which reduces file size to 3.6 MB per second of video, this storage requirement translates to more than 20 GB for a typical feature-length movie.

It is not unusual for a feature-film project—with its higher color bit depth, greater frame size, and much lower compression ratios—to require terabytes of storage for footage and rendered output movies.

## Caches: RAM cache, disk cache, and media cache

As you work on a composition, After Effects temporarily stores some rendered frames and source images in RAM, so that previewing and editing can occur more quickly. After Effects does not cache frames that require little time to render. Frames remain uncompressed in the image cache.

After Effects also caches at the footage and layer levels for faster previews; layers that have been modified are rendered during the preview, and unmodified layers are composited from the cache.

When the RAM cache is full, any new frame added to the RAM cache replaces a frame cached earlier. When After Effects renders frames for RAM previews, it stops adding frames to the image cache when the cache is full and begins playing only the frames that could fit in the RAM cache.

Green bars in the time ruler of the Timeline, Layer and Footage panels mark frames that are cached to RAM. Blue bars in the Timeline panel mark frames that are cached to disk.

**Layer Cache Indicators (CS5.5 and later)** Layer cache indicators allow you to visualize cached frames on a per-layer basis. This is helpful when trying to determine which layers are cached in a composition.

Enable the Layer Cache Indicators option by selecting it in the Timeline panel menu. The Show Cache Indicators option must be enabled in the menu to see the indicators.

Once Layer cache indicators are enabled they will be visible underneath each layer in the composition. Each layer becomes slightly narrower to allow for the indicators. Like Timeline, Layer, and Footage panels, cache indicators may appear as one of the following colors:

- Green: frames are cached into RAM
- Blue: frames are cached to disk

 *Showing the cache indicators decreases performance slightly.*

The RAM cache is automatically purged when you quit After Effects.

In After Effects CS6, you can choose to purge the RAM cache, or the RAM cache and the disk cache from the Edit > Purge menu.

### Disk cache

After Effects can store rendered items to your hard disk when the RAM cache is full during standard previews. Blue bars in the time ruler of the Timeline, Layer and Footage panels mark frames that are cached to disk.

**Note:** *The disk cache is not used for RAM previews. It is only used for standard previews. (See Use standard preview to play video.)*

In After Effects CS5.5 and later, Disk Cache is enabled by default.

For disk cache preferences, and to enable, or disable disk caching:

- Choose Edit > Preferences > Media & Disk Cache (Windows) or After Effects > Preferences > Media & Disk Cache (Mac OS), and select, or deselect Enable Disk Cache.

Disk cache preferences allow you to select a folder to contain your cache.

- Click the Choose Folder button, and then click OK (Windows) or Choose (Mac OS).

To empty the disk cache:

- Click the Empty Disk Cache button.

**Note:** *Even when disk caching is enabled, each frame must be able to fit into a contiguous block of RAM. Enabling the disk cache doesn't help with limitations regarding inadequate RAM to hold or render a single frame of your composition.*

For the best performance with disk caching, select a folder that's on a different physical hard disk than your source footage. If possible, the folder should be on a hard disk that uses a different drive controller than the disk that contains your source footage. A fast hard drive or SSD with as much space allocated as possible is recommended for the disk cache folder. The disk cache folder can't be the root folder of the hard disk.

As with the RAM cache, After Effects only uses the disk cache to store a frame if it's faster to retrieve a frame from the cache than to rerender the frame.

The Maximum Disk Cache Size setting specifies the number of gigabytes of hard disk space to use. In After Effects CS6, the default disk cache size is set to 10% of the volume's total size, up to 100 GB. In After Effects CS5.5, this amount is 20 GB, by default. Because of this, many more frames are eligible for disk caching than in previous versions.

**Note:** *In After Effects CS5.5, the application checks to make sure that you have 10 GB free above what is set in Preferences > Media & Disk Cache. After Effects warns you if there is not enough room for the disk cache.*

**Note:** *Roto Brush frames are not persistently cached.*



## Media cache

When After Effects imports video and audio in some formats, it processes and caches versions of these items that it can readily access when generating previews. Imported audio files are each conformed to a new .cfa file, and MPEG files are indexed to a new .mpgindex file. The media cache greatly improves performance for previews, because the video and audio items are not reprocessed for each preview.

**Note:** When you first import a file, you may experience a delay while the media is being processed and cached.

A database retains links to each of the cached media files. This media cache database is shared with Adobe Media Encoder, Premiere Pro, Encore, Soundbooth, so each of these applications can each read from and write to the same set of cached media files (Note: Adobe Audition CS5.5 does not share the media cache database). If you change the location of the database from within any of these applications, the location is updated for the other applications, too. Each application can use its own cache folder, but the same database keeps track of them all.

- Choose Edit > Preferences > Media & Disk Cache (Windows) or After Effects > Preferences > Media & Disk Cache (Mac OS), and do one of the following:
  - Click one of the Choose Folder buttons to change the location of the media cache database or the media cache itself.
  - Click Clean Database & Cache to remove conformed and indexed files from the cache and to remove their entries from the database. This command only removes files associated with footage items for which the source file is no longer available.

**Note:** Before clicking the Clean Database & Cache button, make sure that any storage devices that contain your currently used source media are connected to your computer. If footage is determined to be missing because the storage device on which it is located is not connected, the associated files in the media cache will be removed. This removal results in the need to reconform or re-index the footage when you attempt to use the footage later.

 Cleaning the database and cache with the Clean Database & Cache button does not remove files that are associated with footage items for which the source files are still available. To manually remove conformed files and index files, navigate to the media cache folder and delete the files. The location of the media cache folder is shown in the Conformed Media Cache preferences. If the path is truncated, click the Choose Folder button to show the path.

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# Improve performance

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## Improve performance before starting After Effects

### Improve performance by optimizing memory, cache, and multiprocessing settings

### Improve performance using Global Performance Cache (CS6)

### Improve performance by simplifying your project

### Improve performance by modifying screen output

### Improve performance when using effects

You can improve performance by optimizing your computer system, After Effects, your project, and your workflow. Some of the suggestions here improve performance not by increasing rendering speed but by decreasing time that other operations require, such as opening a project.

 *By far, the best way to improve performance overall is to plan ahead, run early tests of your workflow and output pipeline, and confirm that what you are delivering is what your client actually wants and expects. (See [Planning your work](#).)*

For a series of free video tutorials about improving performance with After Effects and Premiere Pro, see the [video2brain website](#).

For additional resources about optimizing computer systems and After Effects for performance, see [this article on the Adobe website](#).

Lloyd Alvarez provides the BG Renderer script on the [After Effects Scripts website](#), which allows you to render and export compositions in the background while you continue to work in After Effects.

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## Improve performance before starting After Effects

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- Make sure that you've installed the current version of After Effects, including any available updates. To check for and install updates, choose Help > Updates. For more information about updates, go to the [Downloads](#) section of the Adobe website.
- Make sure that you've installed the latest versions of drivers and plug-ins, especially video card drivers. To download updates for drivers and plug-ins, go to the provider's website.
- Make sure that your system has enough RAM. Optimum performance is achieved with computer systems with at least 2 GB of installed RAM per processor core. See the documentation for your operating system and computer for details on how to check the amount of installed RAM and how to install RAM.
- Quit applications that are not necessary for your work. If you run applications other than those with which After Effects shares a memory pool, and you don't allocate adequate memory to other applications, performance can be greatly reduced when the operating system swaps RAM to the hard disk. (See Memory (RAM) usage in 64-bit After Effects.)

For more information about improving performance by stopping software not necessary for your work, see [this video on the video2brain website](#).

- Stop or pause resource-intensive operations in other applications, such as video previews in Adobe Bridge.
- Make sure that your system includes a display card that supports OpenGL 2.0 or later. Though After Effects can function without it, OpenGL accelerates various types of rendering, including rendering to the screen for previews. See [Render with OpenGL](#).
- In After Effects CS6, OpenGL and the GPU are important for new features, such as Ray-Traced 3D rendering on the GPU, Fast Draft previews, faster blitting to the screen, and a GPU enhanced Cartoon effect. For more information. See [Render with OpenGL](#).
- On Windows, disable the Aero compositing mode. Hardware acceleration of panels and OpenGL features perform better in After Effects when Windows is operating in Basic mode. For information, see the [Microsoft website](#).
- When possible, keep the source footage files for your project on a fast local disk drive. If your source footage files are on a slow disk drive (or across a slow network connection), then performance will be poor. Ideally, use separate fast local disk drives for source footage files and rendered output. For more information, see [this video on the video2brain website](#).
- A separate fast disk (or disk array) to assign the disk cache folder to, is ideal. Because of their speed, SSDs work well for this function.

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## Improve performance by optimizing memory, cache, and multiprocessing settings

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- Allocate adequate memory for other applications. See Memory & Multiprocessing preferences.
- Use multiple processors to render multiple frames simultaneously by selecting the Render Multiple Frames Simultaneously preference. See Memory & Multiprocessing preferences.
- Enable caching frames to disk for standard previews by selecting the Enable Disk Cache preference. In After Effects CS6, assign as much space as possible to the Disk Cache folder (on a separate fast drive) for best performance. See Disk cache.
- Begin by using only a small number of processor cores (for example, four on a computer system with eight processor cores) for Render Multiple Frames Simultaneously multiprocessing, and then increase the number of processors used until you find the optimum number for

your computer system and compositions. See [Memory & Multiprocessing preferences](#).

Todd Kopriva provides more information about optimum memory and processor settings on the [Adobe website](#).

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## Improve performance using Global Performance Cache (CS6)

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- Import projects from After Effects CS5.5 and earlier into After Effects CS6 to take advantage of the Global Performance Cache. For details, see [Disk Cache](#).
  - Persistent disk cache improves performance by retaining frames stored in the disk cache between sessions, saving rendering time as you work on a project or other projects that might use the same cached frames.
  - Use Cache Work Area In Background to fill the disk cache for a composition's work area while continuing to work. This technique is useful when you do not expect to make changes to a downstream composition, or precomposition. This feature works with multiple compositions, as well.

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## Improve performance by simplifying your project

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By simplifying and dividing your project, you can prevent After Effects from using memory and other resources to process elements that you are not currently working with. Also, by controlling when After Effects performs certain processing, you can greatly improve overall performance. For example, you can avoid repeating an action that needs to happen only once, or you can postpone an action until it is more convenient for you.

- Delete unused elements from your project. See [Remove items from a project](#).
- Divide complex projects into simpler projects, and then recombine them before you render the finished movie. To recombine projects, import all of the projects into a single project. See [Import an After Effects project](#).
- Before rendering, put all of your source footage files on a fast, local disk—not the one that you're rendering and exporting to. A good way to do this is with the Collect Files command. See [Collect files in one location](#).
- Pre-render nested compositions. Render a completed composition as a movie so that After Effects doesn't rerender the composition every time it is displayed. See [Pre-render a nested composition](#).
- Substitute a low-resolution or still-image proxy for a source item when not working directly with that item. See [Placeholders and proxies](#).
- Lower the resolution for the composition. See [Resolution](#).
- Isolate the layer you're working on by using the Solo switch. See [Solo a layer](#).

For more information about improving performance by isolating what you're working on, see [this video on the video2brain website](#).

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## Improve performance by modifying screen output

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You can improve performance in many ways that don't affect how After Effects treats your project data, only how output is drawn to the screen as you work. Although it is often useful to see certain items and information as you work, After Effects uses memory and processor resources to update this information, so be selective in what you choose to display as you work. You will likely need to see different aspects of your project at different points in your workflow, so you may apply the following suggestions in various combinations at various stages.

- Turn off display color management and output simulation when not needed. See [Simulate how colors will appear on a different output device](#). The speed and quality of color management for previews are controlled by the Viewer Quality preferences. See [Viewer Quality preferences](#).
- Enable hardware acceleration of previews, which uses the GPU to assist in drawing previews to the screen. Choose Edit > Preferences > Display (Windows) or After Effects > Preferences > Display (Mac OS), and select Hardware Accelerate Composition, Layer, And Footage Panels.
- Close unneeded panels. After Effects must use memory and processor resources to update open panels, which may slow the work that you are doing in another panel.
- Create a region of interest. If you are working on a small part of your composition, limit which portion of the composition is rendered to the screen during previews. See [Region of interest \(ROI\)](#).
- Deselect Show Cache Indicators in the Timeline panel menu to prevent After Effects from displaying green and blue bars in the time ruler to indicate cached frames. See [Caches: RAM cache, disk cache, and media cache](#).
- Deselect the Show Rendering Progress In Info Panel And Flowchart preference to prevent the details of each render operation for each frame from being written to the screen. See [Display preferences](#).
- Hide Current Render Details in the Render Queue panel by clicking the triangle beside Current Render Details in the Render Queue panel. See [Information shown for current render operations](#).
- Press Caps Lock to prevent After Effects from updating Footage, Layer, or Composition panels. When you make a change that would otherwise appear in a panel, After Effects adds a red bar with a text reminder at the bottom of the panel. After Effects continues to update panel controls such as motion paths, anchor points, and mask outlines as you move them. To resume panel updates and display all changes, press Caps Lock again.

**Note:** Pressing Caps Lock suspends updates (disables refresh) of previews in viewers during rendering for final output, too, although no red reminder bar appears.

- Lower the display quality of a layer to Draft. See [Layer image quality and subpixel positioning](#).
- Select Draft 3D in the Timeline panel menu, which disables all lights and shadows that fall on 3D layers. It also disables the depth-of-field blur for a camera.
- In After Effects CS6, use fast draft mode while laying out and previewing a ray-traced 3D composition by selecting an option other than "Off" from the Fast Previews button.
- Deselect Live Update in the Timeline panel menu to prevent After Effects from updating compositions dynamically. See [Preview modes and Fast Previews preferences](#).
- Display audio waveforms in the Timeline panel only when necessary. See [Showing properties and groups in the Timeline panel \(keyboard shortcuts\)](#).
- Disable pixel aspect ratio correction by clicking the Toggle Pixel Aspect Ratio Correction  button at the bottom of a Composition, Layer, or Footage panel. The speed and quality of pixel aspect ratio correction and other scaling for previews are controlled by the Viewer Quality preferences. See [Viewer Quality preferences](#).
- Deselect Mirror On Computer Monitor when previewing video on an external video monitor. See [Preview on an external video monitor](#).
- Hide layer controls, such as masks, 3D reference axes, and layer handles. See [Show or hide layer controls in the Composition panel](#).
- Lower the magnification for a composition. When After Effects displays the Composition, Layer, and Footage panels at magnifications greater than 100%, screen redraw speed decreases. (See [Zoom an image for preview](#).)
- Set the Resolution/Down Sample Factor value of the composition to Auto in the Composition panel, which prevents the unnecessary rendering of rows or columns of pixels that aren't drawn to the screen at low zoom levels. See [Resolution](#).

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## Improve performance when using effects

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Some effects, such as blurs and distortions, require large amounts of memory and processor resources. By being selective about when and how you apply these effects, you can greatly improve overall performance.

- Apply memory-intensive and processor-intensive effects later. Animate your layers and do other work that requires real-time previews before you apply memory-intensive or processor-intensive effects (such as glows and blurs), which may make previews slower than real time.
- Temporarily turn off effects to increase the speed of previews. See [Delete or disable effects and animation presets](#).
- Limit the number of particles generated by particle effects. See [Simulation effects](#).
- Rather than apply the same effect with the same settings to multiple layers, apply the effect to an adjustment layer. When an effect is applied to an adjustment layer, it is processed once, on the composite of all of the layers beneath it. See [Create an adjustment layer](#).



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# GPU (CUDA, OpenGL) features in After Effects CS6

## OpenGL, the GPU, and After Effects CS6

OpenGL is a set of standards for high-performance processing of 2D and 3D graphics on the graphics processing unit (GPU) for a wide variety of applications. For After Effects CS6 users, OpenGL provides fast rendering for previews (Fast Draft mode). After Effects CS6, also provides acceleration to display certain interface elements, and for ray-traced 3D rendering. Unlike previous versions of After Effects, the GPU plays a major role in After Effects CS6.

In After Effects CS6, OpenGL accelerates workflow by offering a faster graphics pipeline. One process that was slower in previous versions of After Effects was transferring pixels to the screen in a process called block transfer, or "blitting." In After Effects CS6, the GPU now handles this functionality (in a process referred to as OpenGL Swap Buffer) much more efficiently. For system requirements for OpenGL Swap Buffer, see Features Support Levels. For more information, [see the following video](#).

## Article: GPU (CUDA, OpenGL) features in After Effects CS6



After Effects CS6 has many new and changed features that make use of the GPU (graphics processing unit) on your graphics card. This article describes those features in detail.... [Read More](#)

<http://blogs.adobe.com/toddkopriya/2012/05/gp...>



by **Todd Kopriva**

<http://blogs.adobe.com/tod...>

Todd Kopriva is the Product Manager for Customer Advocacy and Community Engagement for digital video products at Adobe.

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## Setting preferences for OpenGL, and the GPU

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In After Effects CS6, OpenGL supports the drawing of interface items, such as, composition, footage, and layer panels. Other drawing functions like grids, guides, rulers, and bounding boxes are now operated by OpenGL, as well. This feature is also known as the "Hardware BlitPipe."

To enable OpenGL support for drawing interface items, click the Hardware Accelerate Composition, Layer, and Footage Panels checkbox in Edit > Preferences > Display (Windows), or After Effects > Preferences > Display (Mac OS).

You can access information about the GPU, and OpenGL in the GPU Information dialog box. Choose Edit > Preferences > Previews (Windows), or After Effects > Preferences > Previews (Mac OS), you have access to the GPU Information dialog box. Click the GPU Information button to launch the GPU information dialog box. In this dialog box, see information about the OpenGL capabilities for your installed GPU. The information helps you determine the [feature support levels](#) for your GPU. You can also see if CUDA is available on your GPU, and which version that is installed.

**Note:** In After Effects CS6, the OpenGL-related checkboxes are now removed from Preferences > Previews as the previous OpenGL renderer has been removed.

Fast Draft mode has replaced the original OpenGL renderer. To enable Fast Draft, click the Fast Previews button on the Composition panel, and choose Fast Draft. Fast Draft causes slight appearance differences in the Composition panel, best suited for quick previewing. Fast Draft is useful for setting up, and previewing a composition for later rendering in ray-traced 3D.

**Note:** If your GPU is not supported or you have an old driver, ray-traced 3D compositions render on the CPU using all physical cores. If you have a GPU-supported configuration in a headless environment (for example, a render farm), you can force ray-traced 3D compositions to render on the CPU by setting the Ray-tracing option in the GPU Information dialog box. Renders done on the CPU match renders done on the GPU.

**Note:** The OpenGL Info button is now called the GPU Information button.

## Hardware considerations for OpenGL, the GPU, and After Effects CS6

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In After Effects CS6, and when working with ray-traced 3D compositions, it is important to have the proper hardware installed in your computer to work smoothly. An NVIDIA video display card that has on-board CUDA technology is required for working with ray-traced 3D compositions with GPU acceleration.

## Requirements for GPU/OpenGL features (ray-traced 3D and Fast Draft)

The following GPU and OpenGL-based features in After Effects CS6 require that features be categorized based on the capabilities of your GPU:

- Ray-traced 3D renderer
- Rendering on the GPU
- Fast Draft previews mode
- Faster blitting to the screen (OpenGL SwapBuffer)
- Cartoon effect's "Use OpenGL When Available"
- Hardware Accelerate Composition, Layer, and Footage Panels" preference

## Feature support levels

There are three tiers or levels, from lowest to highest requirements, of support:

### Level 1: For OpenGL SwapBuffer:

This level simply requires a GPU that can do OpenGL 1.5, or greater, with Shader Model 3.0, or greater. Most ATI and NVIDIA cards, and the Intel HD Graphics 3000 chipset (available in the MacBook Air, Mac Mini, various Windows machines, etc.) and 4000 (Windows only at this time) are supported. If your GPU does not support these requirements, software OS blitting like CS5.5 occurs, and there are improvements for software blitting in After Effects CS6, as well.

### Level 2: For Fast Draft previews, Hardware BlitPipe, and Cartoon GPU acceleration:

Includes Level 1 features. This level requires OpenGL 2.0, or greater (with Shader Model 4.0, or greater, on Windows), and 256 MB, or greater, of texture memory. Most ATI and NVIDIA cards released in the past five years, plus the Intel HD Graphics 3000/4000, support this level.

If your GPU does not support these requirements, these features will be disabled:

- Fast Draft mode
- The "Hardware Accelerate Composition, Layer, and Footage Panels" preference.
- The Cartoon effect's "Use OpenGL When Available" option (the Cartoon effect then runs on the CPU).

### Level 3: For Ray-traced 3D rendering on the GPU:

Includes Level 1 & 2 features (for machines with attached monitors). This level requires a supported NVIDIA GPU and 512 MB, or greater, of texture memory. For a current list of supported GPUs, [see the Adobe website](#).

## Install GPU drivers

Before working with After Effects CS6 and CUDA features, install the latest video driver for your NVIDIA GPU:

**Windows:** Install the latest WHQL-certified driver for your GPU: <http://www.nvidia.com/page/drivers.html>

**Mac OS:** Install the NVIDIA CUDA driver (v4.0.50 or later): <http://www.nvidia.com/object/mac-driver-archive.html>

You can update the CUDA driver via the CUDA panel in System Preferences or by going to the [NVIDIA website](#).

**Note:** *If your GPU is not supported or you have an old driver, ray-traced 3D compositions render on the CPU using all physical cores. If you have a GPU-supported configuration in a headless environment (for example, a render farm), you can force ray-traced 3D compositions to render on the CPU by setting the Ray-tracer option in the GPU Information dialog box (available from Previews preferences). Renders done on the CPU match renders done on the GPU.*

**Note:** *Mac 10.6.8 only: If you use a Quadro 4000 GPU, install the Quadro 4000 driver for Mac. For more information, see this [blog post](#).*

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# Memory and storage (CS6)

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## Memory (RAM) usage in 64-bit After Effects

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## Memory (RAM) usage in 64-bit After Effects

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### Advantages of a 64-bit application and 64-bit address space

The maximum amount of RAM that a 32-bit application can use is 4 GB, which is much less than the amount of RAM that can be installed in modern computers and addressed by 64-bit operating systems. After Effects CS4 was a 32-bit application, and it was only able to use more than 4 GB of RAM by starting separate instances (processes) of the After Effects CS4 application to render multiple frames simultaneously. After Effects CS5, CS5.5, and CS6 are 64-bit applications, so each process can use all of the RAM addressed by 64-bit Windows Vista, Windows 7, and Mac OS operating systems.

The ability of After Effects to use large amounts of RAM per process provides several advantages:

- You can render much larger compositions—both for preview and for final output—with larger frame sizes and larger source files.
- RAM previews can be much longer.
- You can work with higher color bit depths without encountering memory limitations.
- After Effects can cache more items, which reduce the frequency with which frames and components of frames are re-rendered.

### Memory & Multiprocessing preferences

Set memory and multiprocessing preferences by choosing **Edit > Preferences > Memory & Multiprocessing (Windows)** or **After Effects > Preferences > Memory & Multiprocessing (Mac OS)**.

As you modify settings in the Memory & Multiprocessing dialog box, After Effects dynamically updates helpful text in the dialog box that reports how it will allocate and use memory and CPUs.

The RAM Reserved For Other Applications preference is relevant whether or not **Render Multiple Frames Simultaneously** is selected. The settings in the After Effects Multiprocessing category are relevant only if **Render Multiple Frames Simultaneously** is selected.

Todd Kopriva provides information about optimum memory and processor settings on the [Adobe website](#).

**RAM Reserved For Other Applications** Increase this value to leave more RAM available for the operating system and for applications other than After Effects and the application with which it shares a memory pool. (See [Memory pool shared between After Effects, Premiere Pro, Encore, and Adobe Media Encoder](#).) If you know that you will be using a specific application along with After Effects, check its system requirements and set this value to at least the minimum amount of RAM required for that application. Because performance is best when adequate memory is left for the operating system, you can't set this value below a minimum baseline value.

### Render multiple frames simultaneously

 For a video tutorial about using **Render Multiple Frames Simultaneously** multiprocessing in After Effects, see the [video2brain website](#).



After Effects can start additional processes of the After Effects application to run in the background to assist the main foreground application with the rendering of frames for RAM previews or final output. These background processes have the name AfterFX.exe (Windows) or aeselflink (Mac OS).

In this form of multiprocessing, each background process renders its own frame and runs on a separate processor core (CPU). The number of processes used to render multiple frames simultaneously is never more than the number of processors.

**Note:** On many computer systems, After Effects CS5, and later can use the virtual (logical) processor cores created by hyperthreading for various forms of multiprocessing, including Render Multiple Frames Simultaneously multiprocessing. After Effects CS4 and earlier could only use the physical cores for Render Multiple Frames Simultaneously multiprocessing.

The number of background processes that can run on your computer also depends on the total amount of installed system RAM and the amount of RAM that is assigned to the After Effects application.

The amount of RAM required for each background process varies depending on your system configuration and compositions.

**Note:** When the RAM cache (the RAM available for storing RAM preview frames) is nearly full, the background processes cease rendering and go into a low-memory-usage state, and the foreground process starts rendering—as if Render Multiple Frames Simultaneously were off. This means that the rendering of a RAM preview will be fast at first, and then the speed will step down as rendering switches to only one processor core.

Using the Render Multiple Frames Simultaneously multiprocessing feature does not speed up the rendering of all compositions. The rendering of some compositions is *memory-intensive*, such as when you are working with very large background plates that are several thousands of pixels tall and wide. The rendering of some compositions is *bandwidth-intensive* (*I/O-intensive*), such as when you are working with many source files, especially if they are not served by a fast, local, dedicated disk drive. The Render Multiple Frames Simultaneously multiprocessing feature works best at improving performance when the resource that is most exercised by the composition is CPU processing power, such as when applying a *processor-intensive* effect like a glow or blur.

Because antivirus software operates by monitoring every read and write operation, such software can decrease rendering speed, especially with the Render Multiple Frames Simultaneously preference selected.

**Note:** After Effects can also use multiple threads to accelerate rendering of a single frame. This form of multiprocessing doesn't depend on the Render Multiple Frames Simultaneously preference.

**RAM Allocation Per Background CPU** Specifies the minimum amount of RAM that will be allocated to each background process, each of which runs on its own CPU (processor core). Setting this value lower can allow more CPUs to be used simultaneously with a limited amount of RAM. However, if you set this value too low for the kinds of frames that you are rendering, then the background processes will fail to render frames at all, and only the foreground process will be used to render frames. For example, you should not set this value to low value of 0.75 GB if you are rendering frames with the pixel dimensions of high-definition television or digital cinema.

 The optimum amount of RAM to allocate for each of the background processes varies according to project settings (such as color bit depth), composition settings (such as pixel dimensions of the composition frame), and what effects are applied. For a typical standard-definition television project, at least 1 GB per background process is recommended. For a typical project with HDTV-sized compositions, at least 2 GB per background process is recommended for optimum performance. Start with these settings, but run some tests with your own computer systems and projects to determine the best settings for your specific needs. Digital cinema projects and projects with larger frame sizes require even more RAM per background process for optimum performance.

**CPUs Reserved For Other Applications** Set this value to a number other than 0 to prevent After Effects from using all of the CPUs (processor cores) in your computer system. For example, if you have a computer with 8 CPUs, setting this value to 2 leaves 6 CPUs for After Effects.

 In many cases, performance is improved by using fewer than the maximum number of processors for Render Multiple Frames Simultaneously multiprocessing, even when you have enough RAM for all of the processors. After Effects is a multi-threaded application that can also use other forms of multiprocessing beyond just Render Multiple Frames Simultaneously multiprocessing, and it is possible for the processors to become “overscheduled” if these threads are competing for the same resources as the background processes used for rendering with Render Multiple Frames Simultaneously multiprocessing. Therefore, the best approach is to begin by using a small number of processors for Render Multiple Frames Simultaneously multiprocessing; and then increase the number of processors used until you find the optimum number for your computer system and compositions.

**Note:** In After Effects CS6, if Render Multiple Frames Simultaneously is off, the RAM allocation is still available for the Cache Work Area in Background feature.

#### When After Effects temporarily disables multiprocessing with Render Multiple Frames Simultaneously

If After Effects can't use background processes to render multiple frames simultaneously, a message appears in the Info panel, and After Effects uses only the main foreground process to render all frames. These messages include the following:

- “Insufficient RAM. Multiprocessing is off.”
- “Incompatible effect or expression. Multiprocessing is off.”
- “Incompatible preview mode. Multiprocessing is off.”
- “Incompatible composition. Multiprocessing is off.”

In general, the reasons for After Effects temporarily disabling Render Multiple Frames Simultaneously multiprocessing fall into these categories:

- The rendering of a single frame requires more RAM than is available to the individual background processes.
- The project uses OpenGL for rendering of previews or final output. The Render Multiple Frames Simultaneously multiprocessing feature works by using background processes on multiple CPU processor cores to render frames, whereas rendering with OpenGL works by moving processing to the GPU. (See GPU features in After Effects CS6.)
- The composition uses an effect that relies on GPU processing. These effects are generally effects implemented with Pixel Bender.
- The composition contains a live Photoshop 3D layer. (See Using 3D object layers from Photoshop.). Note that live Photoshop 3D layers are not supported in After Effects CS6.
- The composition uses an effect with a temporal component that renders much more quickly when the rendering process has access to a cache of previous frames. These effects include some effects with a Temporal Smoothing option.
- The composition uses an effect with a temporal component that requires frames to be rendered in strictly sequential order.

If a composition uses any of the following effects, the composition will not be rendered with the Render Multiple Frames Simultaneously multiprocessing feature:

- Auto Color
- Auto Contrast
- Auto Levels
- Cartoon
- Lens Blur
- Particle Playground
- Shadow/Highlight

**Note:** Some third-party effects—such as CC Time Blend and RE:Vision Effects Video Gogh—are also incompatible with the Render Multiple Frames Simultaneously multiprocessing feature.

If you are working in a ray-traced 3D composition in After Effects CS6, the composition will not be rendered with the Render Multiple Frames Simultaneously multiprocessing feature.

## Memory pool shared between After Effects, Premiere Pro, Encore, and Adobe Media Encoder

After Effects shares a memory pool with Adobe Media Encoder, Premiere Pro, and Encore. This is indicated in the Memory & Multiprocessing preferences panel by the icons for each of these applications at the top of the panel. The icons are dimmed for the applications that are not running.

A memory balancer prevents swapping of RAM to disk by dynamically managing the memory allocated to each of the applications. Each application registers with the memory balancer with some basic information: minimum memory requirements, maximum memory able to be used, current memory in use, and a priority. The priority has three settings: low, normal, and highest. Highest is currently reserved for After Effects and Premiere Pro, when it is the active application. Normal is for After Effects in the background or Adobe Media Encoder in the foreground. Low is for background servers of Premiere Pro or Adobe Media Encoder in the background.

**Note:** An example of a practical result of the shared memory pool is that starting Premiere Pro will decrease the amount of RAM available to After Effects for RAM previews; quitting Premiere Pro will immediately free RAM for After Effects and extend the possible duration of RAM previews.

## Memory & Multiprocessing Details dialog box

The Memory & Multiprocessing Details dialog box contains additional information about installed RAM and current and allowed RAM usage. It also includes a multicolumn table listing processes related to Adobe Media Encoder, After Effects, Premiere Pro, and Encore. The table includes information about each process, such as ID, Application Name, Minimum Needed Memory, Maximum Usable Memory, Maximum Allowed Memory, Current Memory, and Current Priority.

To open the dialog box, choose Edit > Preferences > Memory & Multiprocessing (Windows) or After Effects > Preferences > Memory & Multiprocessing (Mac OS), and click the Details button at the bottom of the preferences dialog box.

You can copy the information to the clipboard with the Copy button.

## Memory (RAM) requirements for rendering

Memory requirements for rendering of a frame (either for previews or for final output) increase with the memory requirement of the most memory-intensive layer in the composition.

After Effects renders each frame of a composition one layer at a time. For this reason, the memory requirement of each individual layer is more relevant than the duration of the composition or the number of layers in the composition when determining whether a given frame can be rendered with the available memory. The memory requirement for a composition is equivalent to the memory requirement for the most memory-intensive single layer in the composition.

The memory requirements of a layer increase under several circumstances, including the following:

- Increasing the project's color bit depth
- Increasing the composition resolution
- Using a larger source image
- Enabling color management
- Adding a mask
- Adding per-character 3D properties
- Precomposing without collapsing transformations
- Using certain blending modes, layer styles, or effects, especially those involving multiple layers
- Applying certain output options, such as 3:2 pulldown, cropping, and resizing
- Adding shadows or depth-of-field effects when using 3D layers

After Effects requires a contiguous block of memory to store each frame; it cannot store a frame in pieces in fragmented memory. For information about how much RAM is required to store an uncompressed frame, see [Storage requirements for output files](#).

**Note:** For tips on decreasing memory requirements and increasing performance, see *Improve performance by simplifying your project*.

### Purging memory (RAM)

Occasionally, After Effects may display an alert message indicating that it requires more memory to display or render a composition. If you receive an out-of-memory alert, free memory or reduce the memory requirements of the most memory-intensive layers, and then try again.

You can free memory immediately with commands from the Edit > Purge menu:

- All Memory
- Image Cache Memory

**Note:** In After Effects CS6, the Edit > Purge submenu commands were renamed to clarify that the commands don't affect disk-cached frames.

In After Effects CS6, the Edit > Purge > Video Memory command has been removed.

### Troubleshooting memory issues

**Error: "Unable to allocate enough memory to render the current frame...."**

Either decrease the memory requirements for the rendering of this frame, or install more RAM.

**Error: "Unable to allocate [n] MB of memory...."**

Either decrease the memory requirements for the rendering of this frame, or install more RAM.

**Error: "Image buffers of size [width]x[height] @ [depth] bpc ([n] GB) exceed internal limits..."**

Decrease the memory requirements for the rendering of this frame.

**Note:** The maximum amount of memory that one frame can occupy is 2 GB.

**Error: "Memory allocation of [n] GB exceeds internal limits..."**

Decrease the memory requirements for the rendering of this frame.

**Note:** The maximum size for any single memory allocation is 2 GB.

### Online resources about memory and multiprocessing

For a video that demonstrates some of the advantages of a 64-bit After Effects application and how to allocate memory to After Effects and other applications, see the [Adobe website](#).

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## Storage requirements for output files

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Use the following formula to determine the number of megabytes required to store one uncompressed frame at full resolution:

$(\text{height in pixels}) \times (\text{width in pixels}) \times (\text{number of bits per channel}) / 2,097,152$

**Note:** The value 2,097,152 is a conversion factor that accounts for the number of bytes per megabyte ( $2^{20}$ ), the number of bits per byte (8), and the number of channels per pixel (4).

Some example frame sizes and memory requirements, in megabytes (MB) per frame:

- DV NTSC (720x480) frame in an 8-bpc project: 1.3 MB

- D1/DV PAL (720x576) frame in an 8-bpc project: 1.6 MB
- HDTV (1920x1080) frame in a 16-bpc project: 16 MB
- 4K digital cinema (4096x2304) frame in a 32-bpc project: 144 MB

Because video is typically compressed during encoding when you render to final output, you can't just multiply the amount of memory required for a single frame by the frame rate and composition duration to determine the amount of disk space required to store your final output movie. However, such a calculation can give you a rough idea of the maximum storage space you may need. For example, one second (approximately 30 frames) of uncompressed standard-definition 8-bpc video requires approximately 40 MB. A feature-length movie at that data rate would require more than 200 GB to store. Even with DV compression, which reduces file size to 3.6 MB per second of video, this storage requirement translates to more than 20 GB for a typical feature-length movie.

It is not unusual for a feature-film project—with its higher color bit depth, greater frame size, and much lower compression ratios—to require terabytes of storage for footage and rendered output movies.

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## Caches: RAM cache, disk cache, and media cache

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As you work on a composition, After Effects temporarily stores some rendered frames and source images in RAM, so that previewing and editing can occur more quickly. After Effects does not cache frames that require little time to render. Frames remain uncompressed in the image cache.

After Effects also caches at the footage and layer levels for faster previews; layers that have been modified are rendered during the preview, and unmodified layers are composited from the cache.

When the RAM cache is full, any new frame added to the RAM cache replaces a frame cached earlier. When After Effects renders frames for RAM previews, it stops adding frames to the image cache when the cache is full and begins playing only the frames that could fit in the RAM cache.

Green bars in the time ruler of the Timeline, Layer and Footage panels mark frames that are cached to RAM. Blue bars in the Timeline panel mark frames that are cached to disk.

**Layer Cache Indicators (CS5.5 and later)** Layer cache indicators allow you to visualize cached frames on a per-layer basis. This is helpful when trying to determine which layers are cached in a composition.

In After Effects CS5.5, enable the Layer Cache Indicators option by selecting it in the Timeline panel menu.

In After Effects CS6, enable the Layer Cache Indicators option by pressing Ctrl (Windows) or Command (Mac), and then choose Show Cache Indicators in the Timeline panel menu.

The Show Cache Indicators option must be enabled in the menu to see the indicators.

Once Layer cache indicators are enabled they will be visible underneath each layer in the composition. Each layer becomes slightly narrower to allow for the indicators. Like Timeline, Layer, and Footage panels, cache indicators may appear as one of the following colors:

- Green: frames are cached into RAM
- Blue: frames are cached to disk

 *Showing the cache indicators decreases performance slightly.*

The RAM cache is automatically purged when you quit After Effects.

In After Effects CS6, you can choose to purge the RAM cache, or the RAM cache and the disk cache from the Edit > Purge menu.

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## The global performance cache

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In After Effects CS6, disk cache, and other performance enhancements are referred to as the global performance cache, bringing major improvements to workflow. The Global Performance Cache consists of these features:

**Global RAM cache:** RAM cache is still available, even after you perform a function that would have erased it in past versions of After Effects.

**Persistent disk cache:** Frames cached to disk are still available, even after closing After Effects.

**Cache work area in background:** It is now possible to cache the work area of multiple compositions in the background.

**Faster graphics pipeline:** OpenGL now enhances the way interface items are drawn, including overlays.

For more information about the global performance cache, see the blog post entitled, "[GPU \(CUDA, OpenGL\) features in After Effects CS6](#)" on the After Effects Team blog.

[In this video](#) by Todd Kopriva and video2brain, learn about the global performance cache and persistent disk cache, and see how these features make rendering and re-rendering layers much quicker and easier in After Effects CS6.

**Note:** *The disk cache is not used for RAM previews. It is only used for standard previews. (See [Use standard preview to play video](#).)*

**Global RAM cache** In After Effects CS6, RAM caching is vastly improved over previous versions. Global RAM Cache, offers these advantages:

- Cached frames are restored after an undo/redo.
- Cached frames are restored when a composition or layer is returned to a previous state, such as turning a layer's visibility off then back on.
- Reusable frames are recognized anywhere on the timeline (e.g., when using loop expressions, time remapping, or copy/paste of keyframes), not just adjacent frames.
- Reusable frames are recognized on duplicated layers or duplicated compositions;
- Cache is not automatically destroyed by a render queue render at anything other than Current Settings.

In After Effects CS5.5 and later, Disk Cache is enabled by default. For disk cache preferences, and to enable, or disable disk caching:

- Choose Edit > Preferences > Media & Disk Cache (Windows) or After Effects > Preferences > Media & Disk Cache (Mac OS), and select, or deselect Enable Disk Cache.

Disk cache preferences allow you to select a folder to contain your cache.

- Click the Choose Folder button, and then click OK (Windows) or Choose (Mac OS).

To empty the disk cache:

- Click the Empty Disk Cache button.

**Note:** *Even when disk caching is enabled, each frame must be able to fit into a contiguous block of RAM. Enabling the disk cache doesn't help with limitations regarding inadequate RAM to hold or render a single frame of your composition.*

For the best performance with disk caching, select a folder that's on a different physical hard disk than your source footage. If possible, the folder should be on a hard disk that uses a different drive controller than the disk that contains your source footage. A fast hard drive or SSD with as much space allocated as possible is recommended for the disk cache folder. The disk cache folder can't be the root folder of the hard disk.

As with the RAM cache, After Effects only uses the disk cache to store a frame if it's faster to retrieve a frame from the cache than to rerender the frame.

The Maximum Disk Cache Size setting specifies the number of gigabytes of hard disk space to use. In After Effects CS6, the default disk cache size is set to 10% of the volume's total size, up to 100 GB. In After Effects CS5.5, this amount is 20 GB, by default. Because of this, many more frames are eligible for disk caching than in previous versions.

**Note:** *In After Effects CS5.5, and later, the application checks to make sure that you have 10 GB free above what is set in Preferences > Media & Disk Cache. After Effects warns you if there is not enough room for the disk cache.*

## Global RAM cache

In After Effects CS6, RAM caching is vastly improved over previous versions. Global RAM Cache, offers these advantages:

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- Cached frames are restored when a composition or layer is returned to a previous state, such as turning a layer's visibility off then back on.
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- Reusable frames are recognized on duplicated layers or duplicated compositions;
- Cache is not automatically destroyed by a render queue render at anything other than Current Settings.

[In this video by Learn by Video](#) you'll see how the RAM and disk caches are used to save time, and how you can render compositions in the background so that you don't need to wait for a preview to be rendered before you can resume work.

## Persistent disk cache

Once you save a project in After Effects CS6, frames in the disk cache will be retained even after you close the project or quit After Effects. This protocol is called persistent disk cache.

In After Effects CS6, the disk cache is no longer emptied at the end of a session. With the persistent disk cache feature, frames stored in the disk cache is retained between sessions. This saves rendering time as you work on a project or other projects that use the same cached frames.

Upon opening a project, the disk cache is scanned looking for frames matching those in the project, and makes them available for use. The disk cache contains frames from all projects you've opened in the same or earlier sessions, so disk-cached frames from one project will be retrieved for reuse in other projects that need those same frames. As the cache is scanned, blue marks gradually fill in on your timeline.

**Note:** *Because previous versions of After Effects didn't store everything on disk needed for this feature, resave CS5.5 and earlier projects in CS6 to experience persistent caching.*

**Note:** *Roto Brush frames are not persistently cached.*

## Cache work area in background

In After Effects CS6, you can fill the disk cache for a composition's work area (or multiple work areas in the same or multiple compositions) while continuing to work. When you do not expect to make changes to a composition, especially if it is used in downstream compositions, you can render the frames to the disk cache in the background. Normally, the application tries to identify appropriate expensive-to-render frames that should be placed in the disk cache, but this command will force those frames to be rendered to the disk cache for quicker retrieval next time they are needed.

1. To cache to a composition to disk in the background:

Make sure that disk caching is enabled in Edit > Preferences > Media & Disk Cache (Windows) or Premiere Pro > Preferences > Media & Disk Cache (MacOS).

**Note:** For best results, use a large disk cache on a fast drive that is different from the source footage drive. SSD drives work well for disk caching.

2. Set the work area for the frames to cache to disk.
3. Choose Composition > Cache Work Area in Background, or use the keyboard shortcut Ctrl + Enter (Windows) or Cmd + Enter (MacOS).

To cancel cache work area in background, choose Composition > Cancel Cache Work Area in Background.

The project is saved to a temporary file on disk, and then a background instance of After Effects is launched to render it. Rendering progress appears in the Info panel. Rendered frames appear as blue cache marks because they are in the disk cache. Layer caches and nested compositions will only get disk cached if worthwhile (expensive enough to render).

You can queue different sections of the same composition or different compositions or from even a different project, but only one work area is being rendered at a time in the background.

**Note:** Note: If you make a change to a queued work area, the existing render continues to use its previous settings. Blue cache indicators will not reappear until you undo back to that state.

#### To cache multiple compositions in the background:

1. Set the work area in each composition you want to cache.
2. Select the compositions in the Project panel.
3. Do one of the following:
  - Choose Composition > Cache Work Area in Background
  - Press Ctrl+Enter (Windows) or Cmd+Enter (MacOS)
  - Choose Cache Work Area in Background from the contextual menu

#### To cancel the current and all pending background cache renders:

- Choose Composition > Cancel Caching Work Area in Background.

If multiple background jobs are running, the number of jobs will appear as part of the menu command.

#### Media cache

When After Effects imports video and audio in some formats, it processes and caches versions of these items that it can readily access when generating previews. Imported audio files are each conformed to a new .cfa file, and MPEG files are indexed to a new .mpgindex file. The media cache greatly improves performance for previews, because the video and audio items are not reprocessed for each preview.

**Note:** When you first import a file, you may experience a delay while the media is being processed and cached.

A database retains links to each of the cached media files. This media cache database is shared with Adobe Media Encoder, Premiere Pro, Encore, Soundbooth, so each of these applications can each read from and write to the same set of cached media files (Note: Adobe Audition CS5.5 does not share the media cache database). If you change the location of the database from within any of these applications, the location is updated for the other applications, too. Each application can use its own cache folder, but the same database keeps track of them all.

- Choose Edit > Preferences > Media & Disk Cache (Windows) or After Effects > Preferences > Media & Disk Cache (Mac OS), and do one of the following:
  - Click one of the Choose Folder buttons to change the location of the media cache database or the media cache itself.
  - Click Clean Database & Cache to remove conformed and indexed files from the cache and to remove their entries from the database. This command only removes files associated with footage items for which the source file is no longer available.

**Note:** Before clicking the Clean Database & Cache button, make sure that any storage devices that contain your currently used source media are connected to your computer. If footage is determined to be missing because the storage device on which it is located is not

connected, the associated files in the media cache will be removed. This removal results in the need to reconform or re-index the footage when you attempt to use the footage later.

 Cleaning the database and cache with the Clean Database & Cache button does not remove files that are associated with footage items for which the source files are still available. To manually remove conformed files and index files, navigate to the media cache folder and delete the files. The location of the media cache folder is shown in the Conformed Media Cache preferences. If the path is truncated, click the Choose Folder button to show the path.

## Faster graphics pipeline

A faster graphics pipeline enhances the Global Performance Cache by drawing interface items much more quickly. Previously, the operating system handled this. In After Effects CS6, OpenGL handles these tasks. For more information, see [Render with OpenGL \(CS6\)](#).

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## Expressions and automation

# Plug-ins

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## Installing and loading plug-ins

### Third-party plug-ins included with After Effects

### C/C++ plug-ins and the After Effects SDK

### Pixel Bender effect plug-ins and the Pixel Bender Toolkit

### Where to find more plug-ins for After Effects

Plug-ins are small software modules—with filename extensions such as .aex, .pbk, .pbg, and .8bi—that add functionality to an application. After Effects effects are implemented as plug-ins, as are some features for importing and working with certain file formats. The Photoshop Camera Raw plug-in, for example, provides After Effects with its ability to work with camera raw files.

**Important:** *Because After Effects CS5 and later is a 64-bit application, only 64-bit plug-ins can run in After Effects CS5 and later. Plug-ins created for previous, 32-bit versions of After Effects will not run in After Effects CS5 and later. To inquire about availability of 64-bit versions of plug-ins, contact the plug-in vendor or provider.*

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## Installing and loading plug-ins

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You can obtain plug-ins for After Effects and other Adobe products from Adobe or other vendors. For specific instructions for installing a plug-in, see its documentation.

When After Effects starts, it loads plug-ins from several folder, including the Plug-ins folder. If a plug-in doesn't come with an installer or with specific instructions for its installation, then you can usually install the plug-in by placing it in the Plug-ins folder.

By default, the Plug-ins folder is in the following location:

- (Windows) Program Files\Adobe\Adobe After Effects CS6\Support Files
- (Mac OS) Applications/Adobe After Effects CS6

**Note:** *The Plug-ins folder located in the same location as After Effects CS6 as it is in After Effects CS5.5, and earlier.*

Several plug-ins come with After Effects and are automatically installed in the Plug-ins folder.

 *When loading plug-ins, After Effects ignores the contents of folders with names that begin and end in parentheses; for example, the contents of the folder (archived\_effects) are not loaded.*

After Effects also loads plug-ins from a MediaCore folder, which is intended to hold plug-ins shared between After Effects and Premiere Pro. Some third-party plug-in installers install their plug-ins in this folder. In general, unless specifically instructed to do so, you don't install plug-ins in the MediaCore folder. If you install a plug-in in this folder that is not supported by one or more of the applications that read from this folder, you may encounter errors or other problems.

**Note:** *(Mac OS) Some third-party plug-in installers incorrectly install their plug-ins into the Mac OS X Package for After Effects. To reveal these plug-ins, Control-click the After Effects application icon in the Finder and choose Show Package Contents. You can then move the plug-ins into the After Effects Plug-ins folder.*

When exchanging After Effects projects between computer systems, make sure that the plug-ins that the project depends on are installed on both systems. Similarly, if you are rendering a composition with multiple computers on a network, make sure that all plug-ins used in the composition are installed on all rendering computers.

 *On Mac OS, press Command+Option+Shift+Help to generate a list of all plug-ins loaded into After Effects (including version numbers). For information on using this command on Windows or with a Macintosh keyboard that doesn't have a Help button, see [Todd Kopriva's blog on the Adobe website](#).*

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## Third-party plug-ins included with After Effects

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After Effects comes with several third-party plug-ins. These plug-ins are installed by default with the full version of Adobe After Effects software. Some of these plug-ins are not included with the trial version of Adobe After Effects software. For details of the free 30-day trial version of After Effects CS5.5 and later, see [this article on the Adobe website](#).

**Foundry Keylight** (included with the After Effects CS5.5 and later trial version. Not included with the After Effects CS5 trial version.) Keylight installs its documentation in the plug-in's subfolder in the Plug-ins folder. For more information, see [Keying effects, including Keylight](#).

**Synthetic Aperture Color Finesse** (Not included with the trial versions of After Effects CS5 or After Effects CS5.5.) Color Finesse installs its documentation in the plug-in's subfolder in the Plug-ins folder. For more information, see [Resources for Synthetic Aperture Color Finesse](#).

After Effects CS6 includes Synthetic Aperture Color Finesse 3.

**fnord ProEXR** (Included with the trial version of After Effects CS5 and After Effects CS5.5.) Documentation for ProEXR plug-ins is available in a

[PDF document on the fnord website](#). For more information, see About 3D Channel effects, including ProEXR effects.

**Digieffects FreeForm** (Not included with the trial versions of After Effects CS5 or After Effects CS5.5.) Documentation for the FreeForm AE plug-in is available on the [Digieffects website](#). For more information, see Resources for Digieffects FreeForm.

**Note:** *Digieffects FreeForm is no longer included with After Effects CS6.*

**CycoreFX (CC)** (Not included with the trial version of After Effects CS5 or After Effects CS5.5.) Documentation for Cycore FX plug-ins is available on the [Cycore website](#). In After Effects CS5.5, and earlier. For more information, see Resources for Cycore FX (CC) effects.

**CycoreFX HD** CycoreFX HD (1.7.1) is included in the installation of After Effects CS6. There is 16-bpc support in all effects, and 32-bpc (float) support in 35 effects. Included are 12 additional plug-ins. CycoreFX HD plug-ins have support for motion blur, lights, more controls, and options.

[In this video](#) by Todd Kopriva and video2brain, the new Cycore effects and improved color bit depth are shown. Learn how to apply a couple of these effects and see what it means to use different bit depths.

**Imagineer mocha shape AE** (Not included with the trial version of After Effects CS5 or After Effects CS5.5.) Documentation for the mocha shape for After Effects (mocha shape AE) plug-in is available on the [Imagineer website](#). For more information, see Resources for Imagineer mocha shape for After Effects.

**Note:** *Unlike the similarly named mocha shape for After Effects (mocha shape AE), Imagineer mocha-AE is not a plug-in; it is a separate, standalone planar tracker application. For more information, see Resources for mocha for After Effects (mocha-AE).*

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## C/C++ plug-ins and the After Effects SDK

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Many plug-ins for After Effects are written in the C/C++ programming language using the After Effects SDK. Effect plug-ins written with C/C++ have the filename extension .aex. For information on developing plug-ins for After Effects with the C/C++ SDK, go to the [After Effects Developer Center](#) section of the Adobe website.

Kas Thomas provides a tutorial on the [MacTech website](#) that shows step by step how to write an After Effects plug-in.

To ask questions about writing plug-ins with the C/C++ SDK for After Effects, go to the [After Effects SDK user-to-user forum](#).

Satya Meka provides an overview of the different ways to develop effect plug-ins for After Effects on [his website](#).

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## Pixel Bender effect plug-ins and the Pixel Bender Toolkit

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Increasingly, many effect plug-ins for After Effects are written in the Adobe Pixel Bender language. Pixel Bender is designed to improve the performance of image-processing operations by taking advantage of multiple processor cores; multiprocessing for Pixel Bender effect plug-ins does not rely on the Render Multiple Frames Simultaneously option being selected.

**Note:** *Support for Pixel Bender (.pbk, .pbg) plug-ins has been removed in After Effects CS6. Existing projects that use them appear as missing effects. Using the File > Save As > Save a Copy As CS5.5 command allows the plug-ins to work when opened in CS5.5.*

Effect plug-ins written with Pixel Bender have the filename extension .pbk (for single-kernel effects) or .pbg (for multiple-kernel effects).

The Pixel Bender language is also used to write effects and filters for use with other Adobe software, including Flash and Photoshop.

For more information about Pixel Bender effect plug-ins and the Pixel Bender Toolkit, go to the [Pixel Bender section](#) of the Adobe website.

Tom Beddard provides several Pixel Bender plug-ins and supporting materials on his subblue website, including a [Droste effect](#) and [Fractal Explorer effect](#).

Satya Meka provides an in-depth introduction to Pixel Bender on [his website](#).

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## Where to find more plug-ins for After Effects

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For information on plug-ins available for After Effects, go to the [After Effects plug-in page](#) on the Adobe website and the [Toolfarm website](#).

To exchange plug-ins, scripts, projects, and other useful items with other After Effects users, go to the [After Effects Exchange](#) on the Adobe website.

The [After Effects Scripts + After Effects Plug-ins website](#) provides plug-ins, including many written with Pixel Bender.

For other sources of plug-ins, see [After Effects community resources](#) on the Adobe website.

More Help topics



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# Scripts

## Loading and running scripts

### Scripts included with After Effects

### Writing and modifying scripts

### Where to find additional useful scripts

A script is a series of commands that tells an application to perform a series of operations. You can use scripts in most Adobe applications to automate repetitive tasks, perform complex calculations, and even use some functionality not directly exposed through the graphical user interface. For example, you can direct After Effects to reorder the layers in a composition, find and replace source text in text layers, or send an e-mail message when rendering is complete.

After Effects scripts use the Adobe ExtendScript language, which is an extended form of JavaScript, similar to Adobe ActionScript. ExtendScript files have the .jsx or jsxbin filename extension.

For a description of the scripting capabilities available with After Effects, see the After Effects Scripting Guide on the [After Effects Developer Center](#) section of the Adobe website. For a detailed list of changes in After Effects scripting from After Effects CS3 to After Effects CS5.5 and later, see the [Adobe website](#).

For scripting changes, and a new scripting guide for After Effects CS6, [see this post](#) on the After Effects Region of Interest blog.

## Loading and running scripts

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When After Effects starts, it loads scripts from the Scripts folder. By default, the Scripts folder is in the following location for After Effects CS5:

- (Windows) Program Files\Adobe\Adobe After Effects CS5\Support Files
- (Mac OS) Applications/Adobe After Effects CS5

**Note:** The path for After Effects CS5.5 and later differs in the version number portion of the path.

Several scripts come with After Effects and are automatically installed in the Scripts folder.

Loaded scripts are available from the File > Scripts menu. If you edit a script while After Effects is running, you must save your changes for the changes to be applied. If you place a script in the Scripts folder while After Effects is running, you must restart After Effects for the script to appear in the Scripts menu, though you can immediately run the new script using the Run Script File command.

Scripts in the ScriptUI Panels folder are available from the bottom of the Window menu. If a script has been written to provide a user interface in a dockable panel, the script should be put in the ScriptUI folder. ScriptUI panels work much the same as the default panels in the After Effects user interface.

**Note:** The default is for scripts to not be allowed to write files or send or receive communication over a network. To allow scripts to write files and communicate over a network, choose Edit > Preferences > General (Windows) or After Effects > Preferences > General (Mac OS), and select the Allow Scripts To Write Files And Access Network option.

- To run a loaded script, choose File > Scripts > [script name].
- To run a script that has not been loaded, choose File > Scripts > Run Script File, locate and select a script, and click Open.
- To stop a running script, press Esc.
- To run a script from the command line, call afterfx.exe from the command line. Use the -r switch and the full path of the script to run as arguments. This command does not open a new instance of the After Effects application; it runs the script in the existing instance.

Example (for Windows):

```
afterfx -r c:\script_path\example_script.jsx
```



You can use this command-line technique—together with the software that comes with a customizable keyboard—to bind the invocation of a script to a keyboard shortcut.

Jeff Almasol provides a set of scripts that includes the Launch Pad script, which creates a docking panel from which you can run any other scripts that you have installed. The same package of Jeff's scripts includes KeyEd Up, a script with which you can modify keyboard shortcuts. For information, see the [Adobe After Effects Exchange](#) on the Adobe website.

Sebastien Perier provides instructions on [his website](#) for assigning keyboard shortcuts to scripts so that you can run a script with a single keystroke. This technique relies on the KeyEd Up script.

Jeff Almasol provides a script that creates a simple console panel. The console panel includes a text area in which you can enter ExtendScript commands to be evaluated. There is no capturing of errors or messages; this console is only a simple way of entering commands without having

to create a script first. For information, see [Jeff Almasol's redefinery website](#).

 On the [AE Scripts website](#), Lloyd Alvarez offers a tip on how to run .jsxbin scripts if you don't have access to the Scripts or ScriptUI Panels folder.

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## Scripts included with After Effects

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After Effects provides several prewritten scripts to assist you in performing common tasks, and to provide a basis for you to modify and create your own scripts.

 Run the sample script *Demo Palette.jsx* to get an idea of what sorts of things you can do with scripts.

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## Writing and modifying scripts

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You can write your own scripts for use in After Effects by using the script editor, which is part of the ExtendScript Toolkit. The ExtendScript Toolkit provides a convenient interface for creating, debugging, and testing your own scripts. Sometimes, all that you need to do is make a slight modification to an existing script to make it do what you want; such slight modifications can often be performed with little knowledge of computer programming and scripting languages.

❖ To start the script editor, choose File > Scripts > Open Script Editor.

A tutorial on the [AE Enhancers forum](#) leads the reader step by step through the creation of a script.

Jeff Almasol provides a set of scripting utilities—such as useful functions—to facilitate the creation of your own scripts on his [redefinery website](#).

David Torno provides [a list of matchnames for After Effects scripts](#).

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## Where to find additional useful scripts

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To exchange scripts, projects, and other useful items with other After Effects users, go to the [After Effects Exchange](#) on the Adobe website.

Dan Ebberts provides scripting tutorials and useful scripts in the [scripting section of his MotionScript website](#).

Lloyd Alvarez provides a collection of useful scripts on his [After Effects Scripts website](#).

The [AE Enhancers forum](#) provides example scripts and useful information about scripting (as well as expressions and animation presets) in After Effects.

Jeff Almasol provides a collection of useful scripts on his [redefinery website](#).

Dale Bradshaw provides scripts and tricks on his [Creative Workflow Hacks website](#).

The [nabscripts website](#) provides many useful scripts.

Mathias Möhl provides useful scripts—including MochaImport, KeyTweak, and Tracker2Mask—on his [AExtensions website](#). Mathias also provides video tutorials explaining the use of the scripts.

Christopher Green provides many useful scripts on [his website](#).



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# Automation

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After Effects and other Adobe software with which it's integrated provide many different means for automating various processes.

You can automate animation and image processing within After Effects with expressions, scripts, and plug-ins. You can automate rendering with aerender, network rendering, and post-render actions. You can also automate some tasks using workflow automation scripts in Adobe Bridge. Because you can exchange data easily between Photoshop and After Effects, you can use macros, actions, droplets, and scripts in Photoshop to automate the processing of images for use in After Effects.

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[Automate tasks in Adobe](#)



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# Expression basics

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[Expression errors](#)

Many of the examples in this section are based on examples provided by Dan Ebberts. Dan Ebberts also has an excellent collection of example expressions and tutorials for learning how to work with expressions on his [MotionScript website](#).

The [AE Enhancers forum](#) provides many examples and much information about expressions, as well as scripts and animation presets.

Chris and Trish Meyer provide a simple video overview of expressions on the [ProVideo Coalition website](#).

Chris and Trish Meyer provide a [series of articles about expressions on the ProVideo Coalition website](#). These articles contain many useful examples.

Chris and Trish Meyer share tips about expressions from their book [\\_Creating Motion Graphics\\_ on the ProVideo Coalition website](#).

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## About expressions

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When you want to create and link complex animations, but would like to avoid creating tens or hundreds of keyframes by hand, try using expressions. An expression is a little piece of software—much like a script—that evaluates to a single value for a single layer property at a specific point in time. Whereas scripts tell an application to *do* something, an expression says that a property *is* something.

With expressions, you can create relationships between layer properties and use the keyframes of one property to dynamically animate other layers. For example, you can use the pick whip to link path properties, so a mask can take its path from a brush stroke or a shape layer object.

The expression language is based on the standard JavaScript language, but you do not need to know JavaScript to use expressions. You can create expressions by using the pick whip or by copying simple examples and modifying them to suit your needs.

**Note:** Two sources of example expressions are the Expression Sampler template project (File > Browse Template Projects) and the animation presets in the Behaviors category (Animation > Browse Presets).

Animation presets can include expressions, or even consist entirely of an expression. Animation presets that use expressions instead of keyframes are sometimes called behaviors.

After you add an expression to a property, you can continue to add or edit keyframes for the property. An expression can take the value of a property as determined by its keyframes and use that as input to generate new, modified values. For example, the following expression on the Rotation property of a layer adds 90 degrees to the value of the Rotation property, in addition to the keyframed motion:

```
value + 90
```

Some methods—such as wiggle—operate directly on the keyframed property values. (See Property attributes and methods (expression reference).)

The following expression on the Position property of a layer preserves the keyframed motion of the layer and causes it to wiggle a little:

```
wiggle(10, 10)
```

**Note:** Using the wiggle expression is often much faster and easier than using the Wiggler.

When you are animating text, you can use the Expression selector to specify how much you want an animator property to affect each text character. You can add one or more Expression selectors to an animator group, and that animator group can contain one or more properties.

---

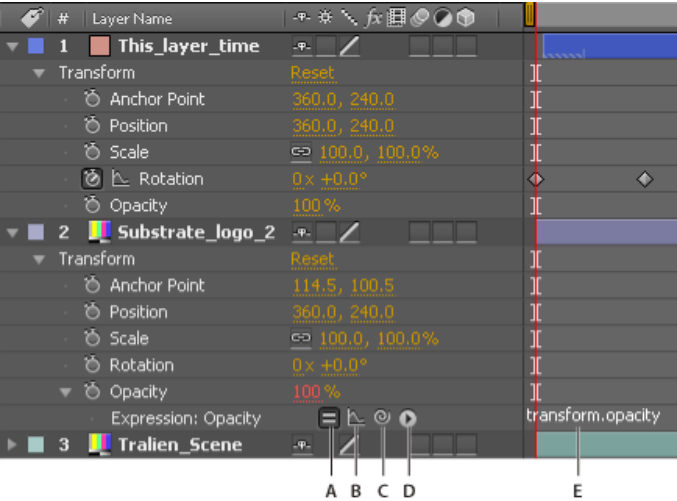
## Add, edit, and remove expressions

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You can enter entire expressions yourself, by manually typing them or by using the Expression Language menu; or you can create an expression with the pick whip or paste it from an example or other property.



You can do all of your work with expressions in the Timeline panel, though it is sometimes more convenient to drag the pick whip to a property in the Effect Controls panel. You enter and edit expressions in the expression field, a resizable text field in the time graph. The expression field appears alongside the property in layer bar mode; the expression field appears at the bottom of the Graph Editor in Graph Editor mode. You can write an expression in a text editor and then copy it into the expression field. When you add an expression to a layer property, a default expression appears in the expression field. The default expression essentially does nothing—it sets the property value to itself, which makes tweaking the expression yourself easy.



Expression interface in the Timeline panel in layer bar mode

A. Enable Expression switch B. Show Post-Expression Graph button C. Pick whip D. Expression Language menu E. Expression field

While you are editing an expression, previews of all kinds are suspended; a red bar appears at the bottom of panels that are waiting for you to exit text-editing mode.

The values for a property that contains an expression appear in red or pink type.

A good way to begin working with expressions is to create a simple expression with the pick whip and then adjust the behavior of the expression using simple math operations, such as those listed in the following table:

| Symbol | Function                                                                    |
|--------|-----------------------------------------------------------------------------|
| +      | add                                                                         |
| -      | subtract                                                                    |
| /      | divide                                                                      |
| *      | multiply                                                                    |
| *-1    | perform opposite of original, such as counterclockwise instead of clockwise |

For example, you can double the result by typing `*2` at the end of the expression; or you can halve the result by typing `/2` at the end of the expression.

As you develop comfort editing expressions, you can combine these simple operations—and more. For example, you can add `/360*100` to the end of an expression to change its range from 0-360 to 0-100. This change would be useful if you wanted to convert the values of a 360-degree dial to a slider that is measured in percentages.

The Expression Language menu in the Timeline panel contains language elements specific to After Effects that you can use in an expression. This menu is helpful for determining valid elements and their correct syntax; use it as a reference for available elements. When you choose any object, attribute, or method from the menu, After Effects automatically inserts it in the expression field at the insertion point. If text is selected in the expression field, the new expression text replaces the selected text. If the insertion point is not in the expression field, the new expression text replaces all text in the field.

The Expression Language menu lists arguments and default values. This convention makes it easy to remember which elements you can control when you write an expression. For example, in the language menu, the wiggle method in the Property category appears as `wiggle(freq, amp, octaves=1, amp_mult=.5, t=time)`. Five arguments are listed in the parentheses following wiggle. The `=` in the last three arguments indicates that using those arguments is optional. If you specify no values for them, they default to 1, .5, and the current time, respectively.

**Important:** You must replace the argument names written by the Expression Language menu with actual values.

Paul Tuersley provides a script on the [AE Enhancers forum](#) that automatically adds wiggle, smooth, and loop expressions to selected properties. Using this script is a good way for a beginner to experiment with expressions.

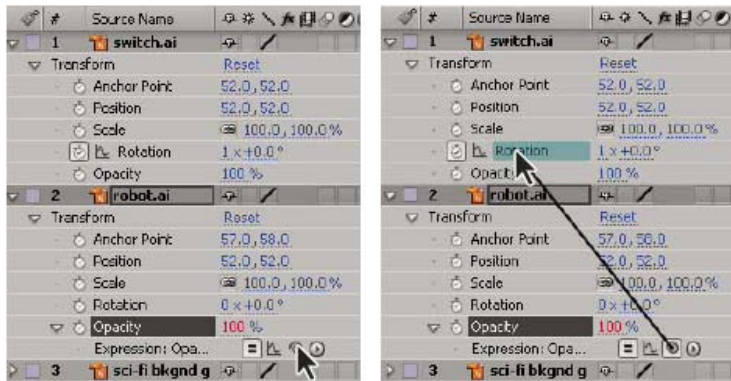
Jeff Almasol provides a script that automatically processes expressions, making specified changes. For example, the script can be used to automatically remove or enable disabled expressions. For more information, see Jeff Almasol's [redefinery website](#).

## Add, disable, or remove an expression

- To add an expression to a property, select the property in the Timeline panel and choose Animation > Add Expression or press Alt+Shift+= (Windows) or Option+Shift+= (Mac OS); or Alt-click (Windows) or Option-click (Mac OS) the stopwatch button  next to the property name in the Timeline panel or Effect Controls panel.
- To temporarily disable an expression, click the Enable Expression switch . When an expression is disabled, a slash appears through the switch .
- To remove an expression from a property, select the property in the Timeline panel and choose Animation > Remove Expression, or Alt-click (Windows) or Option-click (Mac OS) the stopwatch button next to the property name in the Timeline panel or Effect Controls panel.

## Edit an expression with the pick whip

If you are not familiar with JavaScript or the After Effects expression language, you can still take advantage of the power of expressions by using the pick whip. You simply drag the pick whip  from one property to another to link the properties with an expression, and the expression text is entered in the expression field at the insertion point. If text is selected in the expression field, the new expression text replaces the selected text. If the insertion point is not in the expression field, the new expression text replaces all text in the field.



Drag the pick whip to a property to create a link to the value of the property.

You can drag the pick whip to the name or value of a property. If you drag to the name of a property, the resulting expression displays all the values as one. For example, if you drag the pick whip to the name of the Position property, an expression like the following appears:

```
thisComp.layer("Layer 1").transform.position
```

If you drag the pick whip to one of the component values of the Position property (such as the y value), an expression like the following appears, in which both the x and y coordinates of the property are linked to the y value of the Position property:

```
temp = thisComp.layer("Layer 1").transform.position[1];  
[temp, temp]
```

If the layer, mask, or effect that you drag the pick whip to does not have a unique name in its local context, After Effects renames it. For example, if you have two or more masks named "Mask" on the same layer, and you drag the pick whip to one of them, After Effects renames it "Mask 2".

The format of expressions created by the pick whip is determined by the Expression Pick Whip Writes Compact English preference (Edit > Preferences > General (Windows) or After Effects > Preferences > General (Mac OS)). By default, the pick whip creates compact English expressions, which use the names for properties as they appear in the Timeline panel for the properties within an expression. Because these names are coded into the application and never change, these expressions can work when After Effects is running in another language. Any property names that you can change are enclosed in double quotation marks and remain the same in any language. If you don't plan on sharing your projects across languages, you can deselect this preference. This preference does not affect effect names or effect properties.

Here is an example in compact English:

```
thisComp.layer("Layer 1").transform.position
```

Here is the same expression, not in compact English:

```
thisComp.layer("Layer 1")("Transform")("Position")
```

**Note:** Because the default is to use compact English, this document uses compact English in most examples and illustrations.

1. Drag the pick whip to another property in the Timeline panel or Effect Controls panel.
2. Optionally, modify the default expression in the expression field.

**Note:** If you use the pick whip to create an expression to refer to a layer, and that layer has the same name as another layer in the same

composition, then the targeted layer's name changes. The new layer name is the old layer name with a numeral at the end. This change is necessary to ensure that the expression unambiguously refers to a single layer in the composition.

## Edit an expression manually

1. Click in the expression field to enter text-editing mode.  
**Note:** When you enter text-editing mode, the entire expression is selected. To add to the expression, click within the expression to place the insertion point; otherwise, you will replace the entire expression.
2. Type and edit text in the expression field, optionally using the Expression Language menu.  
 To see more of a multiline expression, drag the bottom or top of the expression field to resize it.
3. To exit text-editing mode and activate the expression, do one of the following:
  - Press Enter on the numeric keypad.
  - Click outside the expression field.

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## Example: Use the expression language reference to write an expression

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Follow along with this example to learn how to use the After Effects expression language reference to write expressions. The expression created in this example links the Position property of Solid 2 to the Position property of Solid 1, with the movement of Solid 2 offset by 2 seconds from the movement of Solid 1.

1. Create two solid layers: Solid 1 and Solid 2.
2. Animate the Position property values for Solid 1 using keyframes. (See About animation, keyframes, and expressions.)
3. Select the Position property for Solid 2 and choose Animation > Add Expression or Alt-click (Windows) or Option-click the stopwatch  button for the property. The following expression appears by default:

```
transform.position
```

4. Type the following directly over transform.position:

```
thisComp
```

5. The element thisComp is a global attribute whose value is a Comp object representing the current composition. To determine what can follow thisComp in your expression, look up the return value for thisComp under Global objects, attributes, and methods (expression reference).

Note that thisComp returns a Comp object. Next, look at Comp attributes and methods (expression reference) to see which attributes and methods you can use with a Comp object. One option is layer(index). The index, or number, inside the parentheses specifies the layer that you want to use. For this example, we assume that Solid 1 is the first layer in your composition. To retrieve values from the first layer in the active composition, type .layer(1) at the end of the expression, to get the following:

```
thisComp.layer(1)
```

6. Again, look at the expression elements reference to see that layer(index) returns a Layer object. Look at Layer General attributes and methods (expression reference), and find the element you want to use. For example, if you want to get the values of the Position property for the layer, type .position at the end of the expression to get the following:

```
thisComp.layer(1).position
```

7. From Layer General attributes and methods (expression reference), you can see that the position attribute returns a property. Look up Property attributes and methods (expression reference) and notice that you can add a time factor to the expression. To add a specific time, such as current time plus 2 seconds, type .valueAtTime(time+2) at the end of the expression to get the following:

```
thisComp.layer(1).position.valueAtTime(time+2)
```

8. From Property attributes and methods (expression reference), notice that the valueAtTime method returns a Number or Array. When an expression returns a Number, Array, or Boolean (true or false), you cannot add further attributes or methods to the expression (if you want, however, you can add arithmetic operators, such as +, -, \*, and /).

---

## Show expressions and the expression graph

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In Graph Editor mode, the single expression field appears as a resizable box at the bottom of the Graph Editor and shows only the expression for the selected property. To show multiple expression fields simultaneously, the Timeline panel must be in layer bar mode.



💡 To toggle between layer bar mode and Graph Editor mode, press Shift+F3.

- To show only properties with expressions, select one or more layers, and then press EE.
- To show the expression field in the Graph Editor, choose Show Expression Editor from the Choose Graph Type And Options  menu at the bottom of the Graph Editor. When you add a new expression to a property, the expression editor is shown, regardless of this setting.

💡 To resize the expression field, drag its bottom edge up or down.

- To see how an expression changes the value or velocity graph, click the Show Post-Expression Graph button  while showing the value or velocity graph in the Graph Editor.

The dimly colored graph displays the value or velocity before the expression is applied, and the brightly colored graph displays the value or velocity after the expression is applied. Turning on the graph overlay for the Position property also changes the motion path display in the Composition panel so that you can see the expression-affected path.

💡 You can use the search field in the Timeline panel to search expressions as well as other components of a property. If the search string appears in an expression, the property and its containing property groups and layer are shown in the filtered set of search results.

---

## Writing expressions for source text

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The Source Text property of a text layer is interpreted by expressions as a JavaScript String. You can use the pick whip to retrieve the source text from another text layer; however, only the style of the first character of the destination layer is used.

For more information on the JavaScript String object, consult a JavaScript reference resource.

You can use "\r" in a string expression to start a new line of text. For example, to copy the original text from one layer onto the same layer and repeat it in all uppercase characters on a new line, use the following expression:

```
text.sourceText + "\r" + text.sourceText.toUpperCase()
```

Adding a text layer to a composition and adding an expression to its Source Text property can be a great way to examine the property values of other layers. For example, the following expression on a Source Text property reports the name and value of the Opacity property for the next layer in the layer stacking order:

```
thisComp.layer(index + 1).name + "\rOpacity = " + thisComp.layer(index + 1).opacity.value
```

The following example reports the name of the footage item used as the source of the topmost image layer in the stacking order at the current time that has its Video switch set.

```
source_footage_name = "";
for (i = 1; i <= thisComp.numLayers; i++){
    if (i == index) continue;
    my_layer = thisComp.layer(i);
    if (! (my_layer.hasVideo && my_layer.active)) continue;
    if (time >= my_layer.inPoint && time < my_layer.outPoint){
        try{
            source_footage_name = my_layer.source.name;
        }catch(err1){
            source_footage_name = my_layer.name
        }
        break;
    }
}
source_footage_name
```

Aharon Rabinowitz provides a video tutorial and example expressions on [Red Giant TV](#) that show how to animate a video game score with the Source Text property and a Slider effect (an Expression Controls effect).

Harry Frank provides a tutorial on his [graymachine website](#) that shows how to use expressions to read data from an external text file.

---

## Add comments to an expression

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If you write a complex expression and intend for you or someone else to use it later, you should add comments that explain what the expression does and how its pieces work.

- Type // at the beginning of the comment. Any text between // and the end of the line is ignored. For example:

```
// This is a comment.
```

For examples of this type of comment, see Expression example: Fade opacity of a 3D layer based on distance from camera.

- Type `/*` at the beginning of the comment and `*/` at the end of the comment. Any text between `/*` and `*/` is ignored. For example:

```
/* This is a
   multiline comment. */
```

For examples of this type of comment, see [Save and reuse expressions](#).

---

## Save and reuse expressions

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Once you have written an expression, you can save it for future use by copying and pasting it into a text-editing application or by saving it in an animation preset or template project. However, because expressions are written in relation to other layers in a project and may use specific layer names, you must sometimes modify an expression to transfer it between projects.

You can define your own functions within expressions using normal JavaScript function syntax. In this example, a function is defined that calculates the average of two values, and the last line uses this function:

```
function average(a, b)
{
    return (a + b) / 2;
}
average(position, thisComp.layer(1).position);
```

**Note:** You must define each function fully within each expression in which it is used. There is no global library of functions that you can add to. If you want to save an expression for use in another project, you should add comments to the expression. (See [Add comments to an expression](#).) You should also use variables so that you can change a value in one place rather than having to change it in several places.

For example, this expression has a multiline comment at the beginning that explains what the expression does and a short comment after a variable is declared and initialized that tells what the variable is for:

```
/* This expression on a Source Text property reports the name
   of a layer and the value of its Opacity property. */

var myLayerIndex = 1; // layer to inspect, initialized to 1, for top layer

thisComp.layer(myLayerIndex).name + ": \rOpacity = " + thisComp.layer(myLayerIndex).opacity.value
```

You can save an animation preset that includes an expression and reuse it in other projects, as long as the expression does not refer to properties that don't exist in the other projects. When you save a preset in which a property has an expression but no keyframes, only the expression is saved. If the property has one or more keyframes, the saved preset contains the expression along with all keyframe values.

You can copy an expression from a layer property, with or without the keyframes for the property.

- To copy an expression and keyframes from one property to other properties, select the source layer property in the Timeline panel, copy the layer property, select the target layer properties, and paste.
- To copy an expression from one property to other properties without copying keyframes, select the source property, choose **Edit > Copy Expression Only**, select the target properties, and paste.

 Copying an expression without keyframes is useful when you want to simultaneously copy multiple expressions and paste them onto one or more new layers, or when you want to copy one expression and paste it onto more than one layer.

**Note:** As with pasting keyframes and other items, you can often paste the item into the target layer and rely on **After Effects** to determine which property should be the target of the paste operation. For example, this works for copying **Position** properties from one layer to another, but you must select the target property yourself if you are pasting an expression from a **Position** property into a **Scale** property.

Paul Tursley provides the [pt\\_ExpressEdit](#) script for managing and editing expressions.

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## Expression Controls effects

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Use an Expression Controls effect to add a control that you can use to manipulate the values of one or many properties by linking the property to the control using expressions. A single control can affect several properties at once.

The names for the Expression Control effects indicate what type of property control they provide: Angle Control, Checkbox Control, Color Control, Layer Control, Point Control, Slider Control. After Effects CS5.5 and later includes a 3D Point Control, as well.

 If you apply an animation preset from the **Animation Presets > Shapes > Backgrounds** category, you can see a custom **Animated Shape Control** effect in the **Effect Controls** panel. This custom effect is a specialized expression control effect that was created specifically for these animation presets. You can copy and paste this effect to other layers, or you can save it as an animation preset itself so that you can apply it elsewhere.

You apply Expression Controls effects to a layer in the same ways that you apply other effects, such as dragging the effect onto the layer from the **Effects & Presets** panel.

You can apply Expression Controls effects to any layer; however, it is useful to apply them to a null layer, which you can simply use as a controlling layer. You then add expressions to properties on other layers to take input from that control. For example, you can add the Slider Control effect to a null layer (Null 1), and then apply this expression to the Position properties of multiple layers:

```
position+[0,10*(index-1)*thisComp.layer("Null 1").effect("Slider Control")("Slider")]
```

In this example, as you drag the slider, each layer with this expression moves. The layers with greater index numbers (layers toward the bottom in the Timeline panel) are shifted more than the layers with lower index numbers, at 10-pixel intervals. You can set keyframes for the slider on the null layer, and all of the other layers animate accordingly.

It is often useful to rename each instance of an Expression Control effect to indicate its use. For example, renaming an instance of the Color Control effect to sky color makes it easier to tell what the effect is controlling. You can rename each instance of an Expression Control effect just as you rename any other effect: select it in the Timeline panel or Effect Controls panel and press Enter on the main keyboard (Windows) or Return (Mac OS).

 *To modify the range of a control, right-click (Windows) or Control-click (Mac OS) the underlined property value for the control and choose Edit Value from the context menu.*

## Additional resources about Expression Controls effects

Jerzy Drozda, Jr. (Maltaannon) provides a simple explanation and demonstration of the Angle Control effect and Expression Controls effects in general on the [Motionworks website](#).

Aharon Rabinowitz's three-part "After Effects Expression Controls" series of video tutorials on the [Creative COW website](#) introduces the Expression Controls effects and shows some basic examples of their uses.

Harry Frank provides a clock project on his [graymachine website](#), in which the movements of the hands are connected to an Angle Control effect on a null layer that controls the time.

Todd Kopriva provides instructions for using the sampleImage method and the Point Control effect to monitor colors for a specified point during color correction on his [After Effects Region of Interest blog](#).

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## Convert an expression to keyframes

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In some situations, it's useful to convert an expression to keyframes. For example, if you want to freeze the values in an expression, you can convert the expression to keyframes and then adjust the keyframes accordingly; or, if an expression takes a long time to evaluate, you can convert it to keyframes so that it renders more quickly. When you convert an expression to keyframes, After Effects evaluates the expression, creating a keyframe at every frame, and then disables the expression.

❖ In the Timeline panel, select the property on which the expression is written and choose Animation > Keyframe Assistant > Convert Expression To Keyframes.

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## The expression language

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The After Effects expression language is based on JavaScript 1.2, with an extended set of built-in objects. After Effects uses only the core standard JavaScript 1.2 language, not the web browser-specific extensions. After Effects contains its own set of extension objects—such as Layer, Comp, Footage, and Camera—that you can use to get most of the values in an After Effects project.

Though the expression language is based on a scripting language, a subtle but important difference exists between a script and an expression: Whereas a script tells an application to *do* something, an expression says that a property *is* something.

For more information about JavaScript, see a JavaScript reference resource.

When creating expressions, keep in mind the following:

- The value of an expression is the value of the last statement evaluated.
- JavaScript is a case-sensitive language.
- Semicolons are required to separate statements or lines.
- Spaces between words are ignored, except within a string.

In JavaScript, a value stored in an object is called a property. However, After Effects uses the term property to refer to layer components as defined in the Timeline panel. For this reason, After Effects refers to JavaScript properties as either methods or attributes. In general practice, the difference between a method and an attribute is that a method usually does something to create its output (return) value, whereas an attribute simply refers to an existing value to determine its output (return) value. You can tell a method from an attribute most easily by looking for the parentheses following the method name, which surround any input arguments to the method.

An object is an item that can contain other objects, attributes, and methods. Compositions, layers, and footage items are examples of objects. Specifically, compositions, layers, and footage items are global objects, which means that they can be referred to in any context without reference to some higher-level object.

## Accessing attributes and methods

You use the expression language to access attributes and methods of layer properties. To access a value, use a chain of object references separated by the period (.) operator. To chain object references past the layer level (for example, to refer to effect properties, masks, or text animators), you can also use parentheses. For example, to link the Opacity property in Layer A to the Blurriness property of the Gaussian Blur effect in Layer B, enter the following expression in the expression field for the Opacity property for Layer A:

```
thisComp.layer("Layer B").effect("Gaussian Blur")("Blurriness")
```

Reading this expression from left to right, you progress from the higher-level, containing object down to the specific property:

- The global object used refers to the current composition: `thisComp`.
- A specific layer object within that composition is referred to by its name: `layer("Layer B")`.
- A specific effect object within that layer is referred to by its name: `effect("Gaussian Blur")`.
- A specific effect property within that effect is referred to by its name: `("Blurriness")`.

For the *n*th component of a multidimensional property, like the *y* component of an effect control point, append [*n*] at the end, like this:

```
thisComp.layer("Layer B").effect("Advanced Lightning")("Origin")[1]
```

The default object for an expression is the property on which the expression is written, followed by the layer containing the expression; therefore, you do not need to specify the property. For example, a wiggle expression written on the Position property of a layer can be either of the following:

```
wiggle(5, 10)  
position.wiggle(5, 10)
```

You do need to include the layer and property when retrieving them from outside the layer and property on which the expression is written. For example, an expression written on the Opacity property of Layer B, linking it to the Rotation property of Layer A would look like this expression:

```
thisComp.layer("Layer A").rotation
```

 To see more examples of how this works, use the *pick whip* to link one layer property to another, and look at the expressions it creates. Jeff Almasol provides a script on his [redefinery website](#) with which you can determine how to refer to any property in expressions.

## Arrays and multidimensional properties

An Array is a type of object that stores an ordered set of numbers. An Array is represented as a list of numbers separated by commas and surrounded by brackets, as in this example:

```
[10, 23]
```

You can assign an Array object to a variable, making it easy to refer to array values in other areas of the expression. For example:

```
myArray = [10, 23]
```

The dimension of an Array object is the number of elements in the array. The dimension of `myArray` is 2. Different properties in After Effects have different dimensions depending on the number of value arguments they have. In the expression language, the values of properties are either single values (Number objects) or arrays (Array objects).

The following table provides examples of some properties and their dimensions:

| Dimension | Property                                                                                                    |
|-----------|-------------------------------------------------------------------------------------------------------------|
| 1         | Rotation °<br>Opacity %                                                                                     |
| 2         | Scale [x=width, y=height]<br>Position [x, y]<br>Anchor Point [x, y]<br>Audio Levels [left, right]           |
| 3         | Scale [width, height, depth]<br>3D Position [x, y, z]<br>3D Anchor Point [x, y, z]<br>Orientation [x, y, z] |
|           |                                                                                                             |



You can access the individual elements of an Array object by using brackets and an index number to indicate which element you want. The elements in an Array object are indexed starting from 0. Using the previous example, `myArray[0]` is 10 and `myArray[1]` is 23.

The following two expressions are equivalent:

```
[myArray[0], 5]
[10, 5]
```

The Position property arrays are indexed as follows:

- `position[0]` is the x coordinate of position.
- `position[1]` is the y coordinate of position.
- `position[2]` is the z coordinate of position.

Colors are represented as four-dimensional arrays [red, green, blue, alpha]. In projects with a color depth of 8 bpc or 16 bpc, each value in a color array ranges from 0 (black) to 1 (white). For example, red can range from 0 (no color) to 1 (red). So, [0,0,0,0] is black and transparent, and [1,1,1,1] is white and completely opaque. In projects with a color depth of 32 bpc, values under 0 and over 1 are allowed.

If you use an index that is greater than the index of the highest-dimension component in an Array object, After Effects returns an error. For example, `myArray[2]` causes an error, but `position[2]` returns the z coordinate of Position.

Many of the properties and methods in the After Effects expression language take Array objects as arguments or return them as values. For example, `thisLayer.position` is an Array object that is either two-dimensional or three-dimensional depending on whether the layer is 2D or 3D.

If you want to write an expression that keeps the y value of an animation of Position but fixes the x value at 9, you would use the following:

```
y = position[1];
[9,y]
```

The following is even more succinct:

```
[9, position[1]]
```

This is an important point, so let's look at one more example. If you want to combine the x position value from Layer A with the y position value from Layer B, you would use the following:

```
x = thisComp.layer("Layer A").position[0];
y = thisComp.layer("Layer B").position[1];
[x,y]
```

You can create an expression that refers to just one value within the array of a 2D or 3D property. By default, the first value is used, unless you specify otherwise. For example, if you drag the pick whip from the Rotation property of Layer A to Scale property of Layer B, the following expression appears:

```
thisComp.layer("Layer B").scale[0]
```

By default, this expression uses the first value of the Scale property, which is width. If you prefer to use the height value instead, drag the pick whip directly to the second value instead of the property name, or change the expression as follows:

```
thisComp.layer("Layer B").scale[1]
```

Conversely, if you drag the pick whip from the Scale property of Layer B to the Rotation property of Layer A, After Effects automatically creates a variable, assigns the one-dimensional Rotation property value to it, and then uses that variable for both dimensions of the Scale property:

```
temp = thisComp.layer(1).transform.rotation;
[temp, temp]
```

## Vectors

In After Effects, many properties and methods take or return vectors. After Effects refers to an array as a vector if it represents either a point or direction in space. For example, After Effects describes position as returning a vector.

However, though a function like `audioLevels` does return a two-dimensional value (the left and right channel levels), it is not called a vector because it does not represent a point or direction. Some functions in After Effects accept vector arguments, but they are generally only useful when the values passed represent a direction. For example, `cross(vec1, vec2)` computes a third vector that is at right angles to the input vectors. The cross product is useful when `vec1` and `vec2` are two vectors representing directions in space, but not if they just represent two arbitrary collections of numbers.

## Indices and labels

Indexing for Layer, Effect, and Mask elements in After Effects starts from 1. For example, the first layer in the Timeline panel is layer(1).

Generally, it is best to use the name of a layer, effect, or a mask instead of a number to avoid confusion and errors if the layer, effect, or mask is moved, or if the arguments are changed during product updates and upgrades. When you use a name, always enclose it in straight quotes. For example, the first of these expressions is easier to understand than the second expression, and the first expression will continue to work even if you change the order of effects:

```
effect("Colorama").param("Get Phase From")
effect(1).param(2)
```

## Expression time

Time within an expression is always in composition time (not layer time) and is measured in seconds. The default time for any expression is the current composition time at which the expression is being evaluated. The following expressions both use the default composition time and return the same values:

```
thisComp.layer(1).position
thisComp.layer(1).position.valueAtTime(time)
```

To use a relative time, add an incremental time value to the time argument. For example, to get the Position value 5 seconds before the current time, use the following expression:

```
thisComp.layer(1).position.valueAtTime(time-5)
```

Default time references to properties in nested compositions use the original default composition time, not remapped time. However, if you use the source function to retrieve a property, the remapped time is used.

For example, if the source of a layer in the containing composition is a nested composition, and in the containing composition you have remapped time, when you get the position values of a layer in the nested composition with the following expression, the position values use the default time of the composition:

```
comp("nested composition").layer(1).position
```

However, if you access layer 1 using the source function, the position values use the remapped time:

```
thisComp.layer("nested composition").source.layer(1).position
```

**Note:** If you use a specific time in an expression, After Effects ignores the remapped time.

Because expressions operate on time in units of seconds (not frames), you sometimes need to use time conversion methods to convert time values to perform operations on frames. (See Time conversion methods (expression reference).)

## Expression errors

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If an expression cannot be processed, After Effects displays a message explaining the error and automatically disables the expression. A yellow warning icon ⚠ appears next to the expression; click the warning icon to view the error message again.

 To show expressions that have errors, select one or more layers, right-click (Windows) or Control-click (Mac OS) a selected layer in the Timeline panel, and choose Reveal Expression Errors from the context menu.

Some expressions rely on the names of layers or properties in your project; if you change the name of a layer or property that is involved in an expression, After Effects attempts to update the expression to use the new name. However, in some complex cases, After Effects is unable to automatically update the expression, in which case the expression may produce an error message, and you must update the expression yourself.

**Important:** If you are running After Effects in a language other than the one for which an expression was written, or if you have changed the names of items (such as layers, effects, or other property groups), then the expression may not work until you modify the expression to use the new names or the strings that match the language in which you are running After Effects. Because the examples in this document were created for the default state of After Effects running in English, some examples in this document will not work without such modification.

**Note:** The arguments for some After Effects effects have changed from the arguments in previous versions. If you have existing expressions that use argument index references rather than argument names, you may need to update the expressions to use argument names.

Precomposing multiple layers can also cause expressions that refer to a property of one of the layers to produce an error, requiring you to update these expressions to refer to the layer within the new composition. This is especially a concern with expressions that use thisComp instead of referring to a composition by its name. (See About precomposing and nesting.)

 Jeff Almasol provides a script on his [redefinery website](#) with which you can replace instances of thisComp with explicit references to a composition's name.

More Help topics



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# Expression language reference

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[Time conversion methods \(expression reference\)](#)  
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[Interpolation methods \(expression reference\)](#)  
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[Property attributes and methods \(expression reference\)](#)  
[Key attributes and methods \(expression reference\)](#)  
[MarkerKey attributes \(expression reference\)](#)

Use the After Effects expression elements along with standard JavaScript elements to write your expressions. You can use the Expression Language menu at any time to insert methods and attributes into an expression, and you can use the pick whip at any time to insert properties.

If an argument description contains an equal sign (=) and a value (such as `t=time` or `width=.2`), then the argument uses the included default value if you don't specify a different value.

Some argument descriptions include a number in square brackets—this number indicates the dimension of the expected property or Array.

Some return-value descriptions include a number in square brackets—this number specifies the dimension of the returned property or Array. If a specific dimension is not included, the dimension of the returned Array depends on the dimension of the input.

The [W3Schools JavaScript reference website](#) provides information for the standard JavaScript language, including pages for the JavaScript Math and String objects.

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## Global objects, attributes, and methods (expression reference)

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**comp(name)** Return type: Comp.

Argument type: name is a String.

Retrieves another composition by name.

**footage(name)** Return type: Footage.

Argument type: name is a String.

Retrieves a footage item by name.

**thisComp** Return type: Comp.

Represents the composition containing the expression.

**thisLayer** Return type: Layer, Light, or Camera.

Represents the layer containing the expression. Because `thisLayer` is the default object, its use is optional. For example, you can start an expression with `thisLayer.width` or `width` and get the same result.

**thisProperty** Return type: Property.

Represents the property containing the expression. For example, if you write an expression on the Rotation property, you can start an expression with `thisProperty` to refer to the Rotation property.

**time** Return type: Number.

Represents the composition time, in seconds, at which the expression is being evaluated.

**colorDepth** Return type: Number.

Returns the project color depth value. For example, `colorDepth` returns 16 when the project color depth is 16 bits per channel.

**posterizeTime(framesPerSecond)** Return type: Number.  
Argument type: framesPerSecond is a Number.

The framesPerSecond value becomes the frame rate from which the rest of the expression operates. This expression allows you to set the frame rate for a property to be lower than the frame rate of the composition. For example, the following expression updates the property value with a random value once per second:

```
posterizeTime(1);  
random()
```

**value** Return type: Number, Array, or String.  
Represents the value at the current time for the property containing the expression.

---

## Time conversion methods (expression reference)

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**timeToFrames(t = time + thisComp.displayStartTime, fps = 1.0 / thisComp.frameDuration, isDuration = false)** Return type: Number.  
Argument type: t and fps are Numbers; isDuration is a Boolean.

Converts the value of t, which defaults to the current composition time, to an integer number of frames. The number of frames per second is specified in the fps argument, which defaults to the frame rate of the current composition (1.0 / thisComp.frameDuration). The isDuration argument, which defaults to false, should be true if the t value represents a difference between two times instead of an absolute time. Absolute times are rounded down toward negative infinity; durations are rounded away from zero (up for positive values).

**framesToTime(frames, fps = 1.0 / thisComp.frameDuration)** Return type: Number.  
Argument type: frames and fps are Numbers.

The inverse of timeToFrames. Returns the time corresponding to the frames argument, which is required. It doesn't have to be an integer. See timeToFrames for explanation of the fps argument.

**timeToTimecode(t = time + thisComp.displayStartTime, timecodeBase = 30, isDuration = false)** Return type: String.  
Argument type: t and timecodeBase are Numbers; isDuration is a Boolean.

Converts the value of t to a String representing timecode. See timeToFrames for an explanation of the t and isDuration arguments. The timecodeBase value, which defaults to 30, specifies the number of frames in one second.

**timeToNTSCTimecode(t = time + thisComp.displayStartTime, ntscDropFrame = false, isDuration = false)** Return type: String.  
Argument type: t is a Number, ntscDropFrame and isDuration are Booleans.

Converts t to a String representing NTSC timecode. See timeToFrames for an explanation of the t and isDuration arguments. If ntscDropFrame is false (the default), the result String is NTSC non-drop-frame timecode. If ntscDropFrame is true, the result String is NTSC drop-frame timecode.

**timeToFeetAndFrames(t = time + thisComp.displayStartTime, fps = 1.0 / thisComp.frameDuration, framesPerFoot = 16, isDuration = false)** Return type: String.  
Argument type: t, fps, and framesPerFoot are Numbers; isDuration is a Boolean.

Converts the value of t to a String representing feet of film and frames. See timeToFrames for an explanation of the t, fps, and isDuration arguments. The framesPerFoot argument specifies the number of frames in one foot of film. It defaults to 16, which is the most common rate for 35mm footage.

**timeToCurrentFormat(t = time + thisComp.displayStartTime, fps = 1.0 / thisComp.frameDuration, isDuration = false)** Return type: String.  
Argument type: t and fps are Numbers; isDuration is a Boolean.

Converts the value of t to a String representing time in the current Project Settings display format. See timeToFrames for a definition of all of the arguments.

An optional ntscDropFrame argument was added to the timeToCurrentFormat() function in After Effects CS5.5 and later. Default: ntscDropFrame = thisComp.ntscDropFrame.

 If you want more control over the look of timecode in your footage, use the timeToCurrentFormat method or other timeTo methods to generate the timecode instead of using the Timecode or Numbers effect. Create a text layer, add an expression to the Source Text property, and enter timeToCurrentFormat() in the expression field. With this method, you can format and animate the timecode text. In addition, the timecode uses the same display style defined by the current project settings.

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## Vector Math methods (expression reference)

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Vector Math functions are global methods that perform operations on arrays, treating them as mathematical vectors. Unlike built-in JavaScript methods, such as Math.sin, these methods are not used with the Math prefix. Unless otherwise specified, Vector Math methods are lenient about dimensions and return a value that is the dimension of the largest input Array object, filling in missing elements with zeros. For example, the expression add([10, 20], [1, 2, 3]) returns [11, 22, 3].

[JJ Gifford's website](#) provides explanations and examples that show how to use simple geometry and trigonometry with expressions.

Chris and Trish Meyer provide additional information about vector math methods and arrays in an article on the [ProVideo Coalition website](#).

**add(vec1, vec2)** Return type: Array.

Argument type: vec1 and vec2 are Arrays.

Adds two vectors.

**sub(vec1, vec2)** Return type: Array.

Argument type: vec1 and vec2 are Arrays.

Subtracts two vectors.

**mul(vec, amount)** Return type: Array.

Argument type: vec is an Array, amount is a Number.

Multiplies every element of the vector by the amount.

**div(vec, amount)** Return type: Array.

Argument type: vec is an Array, amount is a Number.

Divides every element of the vector by the amount.

**clamp(value, limit1, limit2)** Return type: Number or Array.

Argument type: value, limit1, and limit2 are Numbers or Arrays.

The value of each component of value is constrained to fall between the values of the corresponding values of limit1 and limit2.

Chris and Trish Meyer provide additional information about the clamp method in an article on the [ProVideo Coalition website](#).

**dot(vec1, vec2)** Return type: Number.

Argument type: vec1 and vec2 are Arrays.

Returns the dot (inner) product of the vector arguments.

**cross(vec1, vec2)** Return type: Array [2 or 3].

Argument type: vec1 and vec2 are Arrays [2 or 3].

Returns the vector cross product of vec1 and vec2. Refer to a math reference or JavaScript guide for more information.

**normalize(vec)** Return type: Array.

Argument type: vec is an Array.

Normalizes the vector so that its length is 1.0. Using the normalize method is a short way of performing the operation `div(vec, length(vec))`.

**length(vec)** Return type: Number.

Argument type: vec is an Array.

Returns the length of vector vec.

**length(point1, point2)** Return type: Number.

Argument type: point1 and point2 are Arrays.

Returns the distance between two points. The point2 argument is optional. For example, `length(point1, point2)` is the same as `length(sub(point1, point2))`.

For example, add this expression to the Focus Distance property of a camera to lock the focal plane to the camera's point of interest so that the point of interest is in focus:

```
length(position, pointOfInterest)
```

**lookAt(fromPoint, atPoint)** Return type: Array [3].

Argument type: fromPoint and atPoint are Arrays [3].

The argument fromPoint is the location in world space of the layer you want to orient. The argument atPoint is the point in world space you want to point the layer at. The return value can be used as an expression for the Orientation property, making the z axis of the layer point at atPoint. This method is especially useful for cameras and lights. If you use this expression on a camera, turn off auto-orientation. For example, this expression on the Orientation property of a spot light makes the light point at the anchor point of layer number 1 in the same composition: `lookAt(position, thisComp.layer(1).position)`

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## Random Numbers methods (expression reference)

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**Note:** The wiggle method—which is used to randomly vary a property value—is in the Property attributes and methods category. (See Property attributes and methods (expression reference).)

**seedRandom(offset, timeless=false)** Return type: none.

Argument type: offset is a Number, timeless is a Boolean.

The random and gaussRandom methods use a seed value that controls the sequence of numbers. By default, the seed is computed as a function of a unique layer identifier, the property within the layer, the current time, and an offset value of 0. Call seedRandom to set the offset to something

other than 0 to create a different random sequence.

Use `true` for the `timeless` argument to not use the current time as input to the random seed. Using `true` for the `timeless` argument allows you to generate a random number that doesn't vary depending on the time of evaluation.

The `offset` value, but not the `timeless` value, is also used to control the initial value of the `wiggle` function.

For example, this expression on the `Opacity` property sets the `Opacity` value to a random value that does not vary with time:

```
seedRandom(123456, true);  
random()*100
```

The multiplication by 100 in this example converts the value in the range 0–1 returned by the `random` method into a number in the range 0–100; this range is more typically useful for the `Opacity` property, which has values from 0% to 100%.

**random()** Return type: Number.

Returns a random number in the range 0–1.

In After Effects CS6, the behavior of `random()` is changed to be more random when layer ids are close together. The `wiggle()` expression is not affected.

**random(maxValOrArray)** Return type: Number or Array.

Argument type: `maxValOrArray` is a Number or Array.

If `maxValOrArray` is a Number, this method returns a number in the range from 0 to `maxValOrArray`. If `maxValOrArray` is an Array, this method returns an Array with the same dimension as `maxValOrArray`, with each component ranging from 0 to the corresponding component of `maxValOrArray`.

**random(minValOrArray, maxValOrArray)** Return type: Number or Array.

Argument type: `minValOrArray` and `maxValOrArray` are Numbers or Arrays.

If `minValOrArray` and `maxValOrArray` are Numbers, this method returns a number in the range from `minValOrArray` to `maxValOrArray`. If the arguments are Arrays, this method returns an Array with the same dimension as the argument with the greater dimension, with each component in the range from the corresponding component of `minValOrArray` to the corresponding component of `maxValOrArray`. For example, the expression `random([100, 200], [300, 400])` returns an Array whose first value is in the range 100–300 and whose second value is in the range 200–400. If the dimensions of the two input Arrays don't match, higher-dimension values of the shorter Array are filled out with zeros.

**gaussRandom()** Return type: Number.

Returns a random number. The results have a Gaussian (bell-shaped) distribution. Approximately 90% of the results are in the range 0–1, and the remaining 10% are outside this range.

**gaussRandom(maxValOrArray)** Return type: Number or Array.

Argument type: `maxValOrArray` is a Number or Array.

When `maxValOrArray` is a Number, this method returns a random number. Approximately 90% of the results are in the 0 to `maxValOrArray` range, and the remaining 10% are outside this range. When `maxValOrArray` is an Array, this method returns an Array of random values, with the same dimension as `maxValOrArray`. 90% of the values are in the range from 0 to `maxValOrArray`, and the remaining 10% are outside this range. The results have a Gaussian (bell-shaped) distribution.

**gaussRandom(minValOrArray, maxValOrArray)** Return type: Number or Array.

Argument type: `minValOrArray` and `maxValOrArray` are Numbers or Arrays.

If `minValOrArray` and `maxValOrArray` are Numbers, this method returns a random number. Approximately 90% of the results are in the range from `minValOrArray` to `maxValOrArray`, and the remaining 10% are outside this range. If the arguments are Arrays, this method returns an Array of random numbers with the same dimension as the argument with the greater dimension. For each component, approximately 90% of the results are in the range from the corresponding component of `minValOrArray` to the corresponding component of `maxValOrArray`, and the remaining 10% are outside this range. The results have a Gaussian (bell-shaped) distribution.

**noise(valOrArray)** Return type: Number.

Argument type: `valOrArray` is a Number or an Array [2 or 3].

Returns a number in the range from -1 to 1. The noise is not actually random; it is based on Perlin noise, which means that the return values for two input values that are near one another will also tend to be near one another. This type of noise is useful when you want a sequence of seemingly random numbers that don't vary wildly from one to the other—as is usually the case when animating any apparently random natural motion. Example: `rotation + 360*noise(time)`

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## Interpolation methods (expression reference)

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For all of the Interpolation methods, the argument `t` is often time or value, though it can have other values, instead. If `t` is time, the interpolation between values happens over a duration. If `t` is value, then the expression maps one range of values to a new range of values.

For additional explanations and examples of the Interpolation methods, see [JJ Gifford's website](#).

Chris and Trish Meyer provide additional information and examples for these methods in an article on the [ProVideo Coalition website](#).



Ian Haigh provides a script on [After Effects Scripts website](#) that you can use to easily apply advanced interpolation method expressions—such as bounces—to properties.

Andrew Devis provides a [pair of video tutorials](#) on the Creative COW website that show in detail how to use the linear expression method along with the Convert Audio To Keyframes command.

**linear(t, tMin, tMax, value1, value2)** Return type: Number or Array.

Argument type: t, tMin, and tMax are Numbers, and value1 and value2 are Numbers or Arrays.

Returns value1 when t <= tMin. Returns value2 when t >= tMax. Returns a linear interpolation between value1 and value2 when tMin < t < tMax.

For example, this expression on the Opacity property causes Opacity values to ramp linearly from 20% to 80% over the time from 0 seconds to 6 seconds:

```
linear(time, 0, 6, 20, 80)
```

This method—like all of the Interpolation methods—can also be used to convert from one range of values to another. For example, this expression on the Opacity property converts the Opacity values from the range 0%-100% to the range 20%-80%:

```
linear(value, 0, 100, 20, 80)
```

**linear(t, value1, value2)** Return type: Number or Array.

Argument type: t is a Number, and value1 and value2 are Numbers or Arrays.

Returns a value that linearly interpolates from value1 to value2 as t ranges from 0 to 1. Returns value1 when t <= 0. Returns value2 when t >= 1.

**ease(t, value1, value2)** Return type: Number or Array.

Argument type: t is a Number, and value1 and value2 are Numbers or Arrays.

Similar to linear with the same arguments, except that the interpolation eases in and out so that the velocity is 0 at the start and end points. This method results in a very smooth animation.

**ease(t, tMin, tMax, value1, value2)** Return type: Number or Array.

Argument type: t, tMin, and tMax are Numbers, and value1 and value2 are Numbers or Arrays.

Similar to linear with the same arguments, except that the interpolation eases in and out so that the velocity is 0 at the start and end points. This method results in a very smooth animation.

**easeIn(t, value1, value2)** Return type: Number or Array.

Argument type: t is a Number, and value1 and value2 are Numbers or Arrays.

Similar to ease, except that the tangent is 0 only on the value1 side and interpolation is linear on the value2 side.

**easeIn(t, tMin, tMax, value1, value2)** Return type: Number or Array.

Argument type: t, tMin, and tMax are Numbers, and value1 and value2 are Numbers or Arrays.

Similar to ease, except that the tangent is 0 only on the tMin side and interpolation is linear on the tMax side.

**easeOut(t, value1, value2)** Return type: Number or Array.

Argument type: t is a Number, and value1 and value2 are Numbers or Arrays.

Similar to ease, except that the tangent is 0 only on the value2 side and interpolation is linear on the value1 side.

**easeOut(t, tMin, tMax, value1, value2)** Return type: Number or Array.

Argument type: t, tMin, and tMax are Numbers, and value1 and value2 are Numbers or Arrays.

Similar to ease, except that the tangent is 0 only on the tMax side and interpolation is linear on the tMin side.

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## Color Conversion methods (expression reference)

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Harry Frank provides a video tutorial on his [graymachine website](#) that shows how to use these color conversion methods to change the color of the waves produced by the Radio Waves effect.

**rgbToHsl(rgbaArray)** Return type: Array [4].

Argument type: rgbaArray is an Array [4].

Converts a color in RGBA space to HSLA space. The input is an Array of normalized red, green, blue, and alpha channel values, all in the range of 0.0 to 1.0. The resulting value is an Array of hue, saturation, lightness, and alpha channel values, also in the range of 0.0 to 1.0. Example:

```
rgbToHsl.effect("Change Color")("Color To Change")
```

**hslToRgb(hslaArray)** Return type: Array [4].

Argument type: hslaArray is an Array [4].

Converts a color in HSLA space to RGBA space. This conversion is the opposite of the conversion performed by the rgbToHsl method.

## Other Math methods (expression reference)

Chris and Trish Meyer provide additional information about these methods in an article on the [ProVideo Coalition website](#).

**degreesToRadians(degrees)** Return type: Number.

Argument type: degrees is a Number.

Converts degrees to radians.

**radiansToDegrees(radians)** Return type: Number.

Argument type: radians is a Number.

Converts radians to degrees.

## Comp attributes and methods (expression reference)

**layer(index)** Return type: Layer, Light, or Camera.

Argument type: index is a Number.

Retrieves the layer by number (order in the Timeline panel). Example: `thisComp.layer(3)`

**layer(name)** Return type: Layer, Light, or Camera.

Argument type: name is a String.

Retrieves the layer by name. Names are matched according to layer name, or source name if there is no layer name. If duplicate names exist, After Effects uses the first (topmost) one in the Timeline panel. Example:

```
thisComp.layer("Solid 1")
```

**layer(otherLayer, relIndex)** Return type: Layer, Light, or Camera.

Argument type: otherLayer is a Layer object, and relIndex is a Number.

Retrieves the layer that is relIndex layers above or below otherLayer. For example, `thisComp.layer(thisLayer, 1).active` returns true if the next layer down in the Timeline panel is active.

**marker** Return type: MarkerProperty.

**Important:** You cannot access a composition marker by marker number. If you have a project created in a previous version of After Effects that uses composition marker numbers in expressions, you must change those calls to use `marker.key(name)` instead. Because the default name of a composition marker is a number, converting the reference to use the name is often just a matter of surrounding the number with quotation marks.

**marker.key(index)** Return type: MarkerKey.

Argument type: index is a Number.

Returns the MarkerKey object of the marker with the specified index. The index refers to the order of the marker in composition time, not to the name of the marker. For example, this expression returns the time of the first composition marker:

```
thisComp.marker.key(1).time
```

**marker.key(name)** Return type: MarkerKey.

Argument type: name is a String.

Returns the MarkerKey object of the marker with the specified name. The name value is the name of the marker, as typed in the comment field in the marker dialog box, for example, `marker.key("1")`. For a composition marker, the default name is a number. If more than one marker in the composition has the same name, this method returns the marker that occurs first in time (in composition time). The value for a marker key is a String, not a Number. For example, this expression returns the time of the composition marker with the name "0":

```
thisComp.marker.key("0").time
```

**marker.nearestKey(t)** Return type: MarkerKey.

Argument type: t is a Number.

Returns the marker that is nearest in time to t. For example, this expression returns the time of the composition marker nearest to the time of 1 second:

```
thisComp.marker.nearestKey(1).time
```

This expression returns the time of the composition marker nearest to the current time:

```
thisComp.marker.nearestKey(time).time
```

**marker.numKeys** Return type: Number.

Returns the total number of composition markers in the composition.

**numLayers** Return type: Number.

Returns the number of layers in the composition.

**activeCamera** Return type: Camera.

Returns the Camera object for the camera through which the composition is rendered at the current frame. This camera is not necessarily the camera through which you are looking in the Composition panel.

**width** Return type: Number.

Returns the composition width, in pixels.

Apply the following expression to the Position property of a layer to center the layer in the composition frame:

```
[thisComp.width/2, thisComp.height/2]
```

**height** Return type: Number.

Returns the composition height, in pixels.

**duration** Return type: Number.

Returns the composition duration, in seconds.

**ntscDropFrame** Return type: Boolean.

Returns true if the timecode is in drop-frame format. (After Effects CS5.5 and later.)

**displayStartTime** Return type: Number.

Returns the composition start time, in seconds.

**frameDuration** Return type: Number.

Returns the duration of a frame, in seconds.

**shutterAngle** Return type: Number.

Returns the shutter-angle value of the composition, in degrees.

**shutterPhase** Return type: Number.

Returns the shutter phase of the composition, in degrees.

**bgColor** Return type: Array [4].

Returns the background color of the composition.

**pixelAspect** Return type: Number.

Returns the pixel aspect ratio of the composition.

**name** Return type: String.

Returns the name of the composition.

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## Footage attributes and methods (expression reference)

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To use a footage item from the Project panel as an object in an expression, use the global footage method, as in `footage("file_name")`. You can also access a footage object using the source attribute on a layer whose source is a footage item.

**width** Return type: Number.

Returns the width of the footage item, in pixels.

**height** Return type: Number.

Returns the height of the footage item, in pixels.

**duration** Return type: Number.

Returns the duration of the footage item, in seconds.

**frameDuration** Return type: Number.

Returns the duration of a frame in the footage item, in seconds.

**ntscDropFrame** Return type: Boolean.

Returns true if the timecode is in drop-frame format. (After Effects CS5.5 and later.)

**pixelAspect** Return type: Number.

Returns the pixel aspect ratio of the footage item.

**name** Return type: String.

Returns the name of the footage item as shown in the Project panel.

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## Layer Sub-objects attributes and methods (expression reference)

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**Note:** For After Effects CS6, the Expression language menu, the "Layer Sub-objects", "Layer General", "Layer Properties", "Layer 3D", and "Layer

*Space Transforms" have been arranged into a "Layer" submenu.*

**source** Return type: Comp or Footage.

Returns the source Comp or source Footage object for the layer. Default time is adjusted to the time in the source. Example:  
source.layer(1).position

**sourceTime(t = time)** Return type: Number.

Returns the layer source corresponding to time t. (After Effects CS5.5 and later.)

**effect(name)** Return type: Effect.

Argument type: name is a String.

After Effects finds the effect by its name in the Effect Controls panel. The name can be the default name or a user-defined name. If multiple effects have the same name, the effect closest to the top of the Effect Controls panel is used. Example:

```
effect("Fast Blur")("Blurriness")
```

**effect(index)** Return type: Effect.

Argument type: index is a Number.

After Effects finds the effect by its index in the Effect Controls panel, starting at 1 and counting from the top.

**mask(name)** Return type: Mask.

Argument type: name is a String.

The name can be the default name or a user-defined name. If multiple masks have the same name, the first (topmost) mask is used. Example:

```
mask("Mask 1")
```

**mask(index)** Return type: Mask.

Argument type: index is a Number.

After Effects finds the mask by its index in the Timeline panel, starting at 1 and counting from the top.

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## Layer General attributes and methods (expression reference)

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**width** Return type: Number.

Returns the width of the layer, in pixels. It is the same as source.width.

**height** Return type: Number.

Returns the height of the layer, in pixels. It is the same as source.height.

**index** Return type: Number.

Returns the index number of the layer in the composition.

**parent** Return type: Layer, Light, or Camera.

Returns the parent Layer object of the layer, if it has one. Example: position[0] + parent.width

**hasParent** Return type: Boolean.

Returns true if the layer has a parent or false if it doesn't.

Use the hasParent attribute to determine if a layer has a parent layer. You can use this attribute even if the layer has no parent layer at present. For example, the following expression indicates that the layer to which you apply it wiggles based on the position of the parent. If the layer has no parent, then it wiggles based on its own position. If the layer is given a parent later, then the behavior of the layer changes accordingly:

```
idx = index;  
if (hasParent) {  
    idx = parent.index;  
}  
thisComp.layer(idx).position.wiggle(5,20)
```

**inPoint** Return type: Number.

Returns the In point of the layer, in seconds.

**Note:** In general, the value of outPoint is greater than the value of inPoint. However, if a layer is reversed in time, the value of inPoint is greater than the value of outPoint. Similarly, the value of startTime can be greater than the value of inPoint.

**outPoint** Return type: Number.

Returns the Out point of the layer, in seconds.

**startTime** Return type: Number.

Returns the start time of the layer, in seconds.

**hasVideo** Return type: Boolean.

Returns true if the layer has video, or false if it doesn't.

**hasAudio** Return type: Boolean.

Returns true if the layer has audio or false if it doesn't.

**active** Return type: Boolean.

Returns true if the Video switch  is on for the layer and the current time is in the range from the In point of the layer to the Out point of the layer; false otherwise.

**enabled** Return type: Boolean.

Returns true if the Video switch  is on for the layer; false otherwise.

**audioActive** Return type: Boolean.

Returns true if the Audio switch  is on for the layer and the current time is in the range from the In point of the layer to the Out point of the layer; false otherwise.

**sampleImage(point, radius = [5, 5], postEffect=true, t=time)** Return type: Array [4].

Argument type: point is an Array [2], radius is an Array [2], postEffect is a Boolean, and t is a Number.

Samples the color and alpha channel values of a layer and returns the average alpha-weighted value of the pixels within the specified distance of the point as an array: [red, green, blue, alpha]. If postEffect is true, the sampled values are for the layer after masks and effects on that layer have been rendered; if postEffect is false, the sampled values are for the layer before masks and effects have been rendered. The input value point is in layer space; the point [0,0] is the center of the top-left pixel in the layer. The input value radius specifies the horizontal and vertical distance from the sample center to the edges of the sampled rectangle. The default value samples one pixel.

**Note:** The postEffect parameter refers to effects applied directly to the layer, not to effects applied indirectly, such as with an adjustment layer.

This example samples a rectangle 4 pixels wide and 3 pixels high, centered around a point 100 pixels down and to the right of the upper-left corner of the layer:

```
thisComp.layer(1).sampleImage([100, 100], [2, 1.5])
```

Dan Ebberts provides an example of how to use the sampleImage method on his [MotionScript website](#).

The [AE Enhancers forum](#) provides an expression that uses the sampleImage method to measure a text layer or shape layer and determine its effective bounding box.

Todd Kopriva provides instructions for using the sampleImage method and the Point Control effect to monitor colors for a specified point during color correction on his [After Effects Region of Interest blog](#).

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## Layer Properties attributes and methods (expression reference)

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When you add masks, effects, paint, or text to a layer, After Effects adds new properties to the Timeline panel. There are too many of these properties to list here, so use the pick whip to learn the syntax for referring to them in your expressions.

**anchorPoint** Return type: Property [2 or 3].

Returns the anchor point value of the layer in the coordinate system of the layer (layer space).

**position** Return type: Property [2 or 3].

Returns the position value of the layer, in world space if the layer has no parent. If the layer has a parent, returns the position value of the layer in the coordinate system of the parent layer (in the layer space of the parent layer).

**scale** Return type: Property [2 or 3].

Returns the scale value of the layer, expressed as a percentage.

**rotation** Return type: Property.

Returns the rotation value of the layer in degrees. For a 3D layer, it returns the z rotation value in degrees.

**opacity** Return type: Property.

Returns the opacity value for the layer, expressed as a percentage.

**audioLevels** Return type: Property [2].

Returns the value of the Audio Levels property of the layer, in decibels. This value is a 2D value; the first value represents the left audio channel, and the second value represents the right. The value is not the amplitude of the audio track of the source material. Instead, it is the value of the Audio Levels property, which may be affected by keyframes.

**timeRemap** Return type: Property.

Returns the value of the Time Remap property, in seconds, if Time Remap is enabled.

**marker.key(index)** Return type: MarkerKey.

Argument type: index is a Number.

Returns the MarkerKey object of the layer marker with the specified index.

**marker.key(name)** Return type: MarkerKey.

Argument type: name is a String.

Returns the MarkerKey object of the layer marker with the specified name. The name value is the name of the marker, as typed in the comment field in the marker dialog box, for example, marker.key("ch1"). If more than one marker on the layer has the same name, this method returns the marker that occurs first in time (in layer time). The value for a marker key is a String, not a Number.

This expression on a property ramps the value of the property from 0 to 100 between two markers identified by name:

```
m1 = marker.key("Start").time;  
m2 = marker.key("End").time;  
linear(time, m1, m2, 0, 100);
```

**marker.nearestKey(t)** Return type: MarkerKey.

Argument type: t is a Number.

Returns the layer marker that is nearest in time to t. For example, this expression returns the time of the marker on the layer nearest to the time of 1 second:

```
marker.nearestKey(1).time
```

This expression returns the time of the marker on the layer nearest to the current time:

```
marker.nearestKey(time).time
```

**marker.numKeys** Return type: Number.

Returns the total number of markers on the layer.

**name** Return type: String.

Returns the name of the layer.

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## Layer 3D attributes and methods (expression reference)

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**orientation** Return type: Property [3].

Returns the 3D orientation value, in degrees, for a 3D layer.

**rotationX** Return type: Property.

Returns the x rotation value, in degrees, for a 3D layer.

**rotationY** Return type: Property.

Returns the y rotation value, in degrees, for a 3D layer.

**rotationZ** Return type: Property.

Returns the z rotation value, in degrees, for a 3D layer.

**lightTransmission** Return type: Property.

Returns the value of the Light Transmission property for a 3D layer.

**castsShadows** Return type: Property.

Returns a value of 1.0 if the layer casts shadows.

**acceptsShadows** Return type: Property.

Returns a value of 1.0 if the layer accepts shadows.

**acceptsLights** Return type: Property.

Returns a value of 1.0 if the layer accepts lights.

**ambient** Return type: Property.

Returns the ambient component value as a percentage.

**diffuse** Return type: Property.

Returns the diffuse component value as a percentage.

**specular** Return type: Property.

Returns the specular component value as a percentage.

**shininess** Return type: Property.

Returns the shininess component value as a percentage.

**metal** Return type: Property.

Returns the metal component value as a percentage.

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## Layer Space Transforms methods (expression reference)

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Use layer space transform methods to transform values from one space to another, such as from layer space to world space. The “from” methods transform values from layer space to the named space (composition or world). The “to” methods transform values from the named space (composition or world) to layer space. Each transform method takes an optional argument to determine the time at which the transform is computed; however, you can almost always use the current (default) time.

Use “Vec” transform methods when transforming a direction vector, such as the difference between two position values. Use the plain (non-“Vec”) transform methods when transforming a point, such as position. Composition (comp) and world space are the same for 2D layers. For 3D layers, however, composition space is relative to the active camera, and world space is independent of the camera.

Chris and Trish Meyer provide additional information about these methods in an article on the [ProVideo Coalition website](#).

**toComp(point, t=time)** Return type: Array [2 or 3].

Argument type: point is an Array [2 or 3], and t is a Number.

Transforms a point from layer space to composition space.

**fromComp(point, t=time)** Return type: Array [2 or 3].

Argument type: point is an Array [2 or 3], and t is a Number.

Transforms a point from composition space to layer space. The resulting point in a 3D layer may have a nonzero value even though it is in layer space. Example: `fromComp(thisComp.layer(2).position)`

**toWorld(point, t=time)** Return type: Array [2 or 3].

Argument type: point is an Array [2 or 3], and t is a Number.

Transforms a point from layer space to view-independent world space. Example:

```
toWorld.effect("Bulge")("Bulge Center")
```

Dan Ebberts provides an expression on his [MotionScript website](#) that uses the `toWorld` method to auto-orient a layer along only one axis. This is useful, for example, for having characters turn from side to side to follow the camera while remaining upright.

Carl Larsen provides a pair of video tutorials on the Creative COW website in which he explains the basics of parenting and then uses an expression involving the `toWorld` method to trace the path of an animated child layer:

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

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.

**fromWorld(point, t=time)** Return type: Array [2 or 3].

Argument type: point is an Array [2 or 3], and t is a Number.

Transforms a point from world space to layer space. Example: `fromWorld(thisComp.layer(2).position)`

See Expression example: Create a bulge between two layers for an example of how this method can be used.

**toCompVec(vec, t=time)** Return type: Array [2 or 3].

Argument type: vec is an Array [2 or 3], and t is a Number.

Transforms a vector from layer space to composition space. Example: `toCompVec([1,0])`

**fromCompVec(vec, t=time)** Return type: Array [2 or 3].

Argument type: vec is an Array [2 or 3], and t is a Number.

Transforms a vector from composition space to layer space. Example (2D layer):

```
dir=sub(position, thisComp.layer(2).position);  
fromCompVec(dir)
```

**toWorldVec(vec, t=time)** Return type: Array [2 or 3].

Argument type: vec is an Array [2 or 3], and t is a Number.

Transforms a vector from layer space to world space. Example:

```
p1 = effect("Eye Bulge 1")("Bulge Center");  
p2 = effect("Eye Bulge 2")("Bulge Center");  
toWorld(sub(p1, p2))
```

**fromWorldVec(vec, t=time)** Return type: Array [2 or 3].

Argument type: vec is an Array [2 or 3], and t is a Number.

Transforms a vector from world space to layer space. Example: `fromWorld(thisComp.layer(2).position)`

**fromCompToSurface(point, t=time)** Return type: Array [2].

Argument type: point is an Array [2 or 3], and t is a Number.



Projects a point located in composition space to a point on the surface of the layer (zero z-value) at the location where it appears when viewed from the active camera. This method is useful for setting effect control points. Use with 3D layers only.

---

## Camera attributes and methods (expression reference)

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Camera objects have the same attributes and methods as Layer objects, except for source, effect, mask, width, height, anchorPoint, scale, opacity, audioLevels, timeRemap, and all of the material properties.

**pointOfInterest** Return type: Property [3].

Returns the point of interest values of a camera in world space.

**zoom** Return type: Property.

Returns the zoom values of a camera in pixels.

Here's an expression for the Scale property of a layer that maintains the relative size of the layer in frame while changing the z position (depth) of a layer or the Zoom value of a camera:

```
cam = thisComp.activeCamera;
distance = length(sub(position, cam.position));
scale * distance / cam.zoom;
```

**depthOfField** Return type: Property.

Returns 1 if the Depth Of Field property of a camera is on, or returns 0 if the Depth Of Field property is off.

**focusDistance** Return type: Property.

Returns the focus distance value of a camera, in pixels.

**aperture** Return type: Property.

Returns the aperture value of a camera, in pixels.

**blurLevel** Return type: Property.

Returns the blur level value of a camera as a percentage.

**active** Return type: Boolean.

Returns true if the camera is the active camera for the composition at the current time: the Video switch  for the camera layer is on, the current time is in the range from the In point of the camera layer to the Out point of the camera layer, and it is the first (topmost) such camera layer listed in the Timeline panel. Returns false otherwise.

---

## Light attributes and methods (expression reference)

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Light objects have the same attributes and methods as Layer objects, except for source, effect, mask, width, height, anchorPoint, scale, opacity, audioLevels, timeRemap, and all of the material properties.

**pointOfInterest** Return type: Property [3].

Returns the point of interest values for a light in world space.

**intensity** Return type: Property.

Returns the intensity values of a light as a percentage.

**color** Return type: Property [4].

Returns the color value of a light.

**coneAngle** Return type: Property.

Returns the cone angle of a light, in degrees.

**coneFeather** Return type: Property.

Returns the cone feather value of a light as a percentage.

**shadowDarkness** Return type: Property.

Returns the shadow darkness value of a light as a percentage.

**shadowDiffusion** Return type: Property.

Returns the shadow diffusion value of a light, in pixels.

David Van Brink provides an instructional article and sample project on his [omino pixel blog](#) that show how to use expressions with lights.

---

## Effect attributes and methods (expression reference)

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**active** Return type: Boolean.

Returns true if the effect is turned on (the Effect switch  is selected).

**param(name)** Return type: Property.

Argument type: name is a String.

Returns a property within an effect. Effect control points are always in layer space. Example:

```
effect("Bulge").param("Bulge Height")
```

**param(index)** Return type: Property.

Argument type: index is a Number.

Returns a property within an effect. Effect control points are always in layer space. For example, effect("Bulge").param(4) returns the Bulge Height property.

---

## Mask attributes and methods (expression reference)

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**Note:** You can link Mask Path properties to other path properties (paths in a shape layer and brush strokes), but the properties are not accessible for direct numerical manipulation through expressions.

**maskOpacity** Return type: Property.

Returns the opacity value of a mask as a percentage.

**maskFeather** Return type: Property.

Returns the feather value of a mask, in pixels.

**maskExpansion** Return type: Property.

Returns the expansion value of a mask, in pixels.

**invert** Return type: Boolean.

Returns true if the mask is inverted or false if it is not.

---

## Property attributes and methods (expression reference)

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**value** Return type: Number, Array, or String.

Returns the value of a property at the current time.

**valueAtTime(t)** Return type: Number or Array.

Argument type: t is a Number.

Returns the value of a property at the specified time, in seconds.

For example, to have a property value for each frame chosen randomly from a set of four values, set your four values as keyframes at 0, 1, 2, and 3 seconds, and then apply the following expression to the property:

```
valueAtTime(random(4))
```

**Note:** Dan Ebberts provides more examples and techniques for using the `valueAtTime` and `velocityAtTime` methods on his [MotionScript website](#).

**velocity** Return type: Number or Array.

Returns the temporal velocity value at the current time. For spatial properties, such as Position, it returns the tangent vector value. The result is the same dimension as the property.

**velocityAtTime(t)** Return type: Number or Array.

Argument type: t is a Number.

Returns the temporal velocity value at the specified time.

**speed** Return type: Number.

Returns a 1D, positive speed value equal to the speed at which the property is changing at the default time. This element can be used only for spatial properties.

**speedAtTime(t)** Return type: Number.

Argument type: t is a Number.

Returns the spatial speed value at the specified time.

**wiggle(freq, amp, octaves=1, amp\_mult=.5, t=time)** Return type: Number or Array.

Argument type: freq, amp, octaves, amp\_mult, and t are Numbers.

Randomly shakes (wiggles) the value of the property.

freq value is the frequency in wiggles per second.

amp value is the amplitude in units of the property to which it is applied.

octaves is the number of octaves of noise to add together. This value controls how much detail is in the wiggle. Make this value higher than the default of 1 to include higher frequencies or lower to include amplitude harmonics in the wiggle.

amp\_mult is the amount that amp is multiplied by for each octave. This value controls how fast the harmonics drop off. The default is 0.5; make it closer to 1 to have the harmonics added at the same amplitude as the base frequency, or closer to 0 to add in less detail.

t is the base start time. This value defaults to the current time. Use this parameter if you want the output to be a wiggle of the property value sampled at a different time.

Example: position.wiggle(5, 20, 3, .5) produces about 5 wiggles per second with an average size of about 20 pixels. In addition to the main wiggle, two more levels of detailed wiggles occur with a frequency of 10 and 20 wiggles per second, and sizes of 10 and 5 pixels, respectively.

This example, on a two-dimensional property such as Scale, wiggles both dimensions by the same amount:

```
v = wiggle(5, 10);
[v[0], v[0]]
```

This example, on a two-dimensional property, wiggles only along the y axis:

```
freq = 3;
amp = 50;
w = wiggle(freq, amp);
[value[0], w[1]];
```

Paul Tuersley provides a script on the [AE Enhancers forum](#) that automatically adds wiggle, smooth, and loop expressions to selected properties.

Dan Ebberts provides an example expression and a detailed explanation on his [MotionScript website](#) that shows how to use the time parameter of the wiggle method to create a looping animation.

Kert Gartner provides a video tutorial on the [VFX Haiku website](#) that shows how to add organic motion to images using the wiggle expression method on Puppet pins.

**temporalWiggle(freq, amp, octaves=1, amp\_mult=.5, t=time)** Return type: Number or Array.

Argument type: freq, amp, octaves, amp\_mult, and t are Numbers.

Samples the property at a wiggled time. The freq value is the frequency in wiggles per second, amp is the amplitude in units of the property to which it is applied, octaves is the number of octaves of noise to add together, amp\_mult is the amount that amp is multiplied by for each octave, and t is the base start time. For this function to be meaningful, the property it samples must be animated, because the function alters only the time of sampling, not the value. Example: scale.temporalWiggle(5, .2)

**smooth(width=.2, samples=5, t=time)** Return type: Number or Array.

Argument type: width, samples, and t are Numbers.

Smooths the property values over time, converting large, brief deviations in the value to smaller, more evenly distributed deviations. This smoothing is accomplished by applying a box filter to the value of the property at the specified time. The width value is the range of time (in seconds) over which the filter is averaged. The samples value is the number of discrete samples evenly spaced over time; use a larger value for greater smoothness (but decreased performance). Generally, you'll want samples to be an odd number so that the value at the current time is included in the average. Example: position.smooth(.1, 5)

**loopIn(type="cycle", numKeyframes=0)** Return type: Number or Array.

Loops a segment of time that is measured from the first keyframe on the layer forward toward the Out point of the layer. The loop plays from the In point of the layer. The numKeyframes value determines what segment is looped: The segment looped is the portion of the layer from the first keyframe to the numKeyframes+1 keyframe. For example, loopIn("cycle", 3) loops the segment bounded by the first and fourth keyframes. The default value of 0 means that all keyframes will loop.

You can use keyframe-looping methods to repeat a series of keyframes. You can use these methods on most properties. Exceptions include properties that can't be expressed by simple numeric values in the Timeline panel, such as the Source Text property, path shape properties, and the Histogram property for the Levels effect. Keyframes or duration values that are too large are clipped to the maximum allowable value. Values that are too small result in a constant loop.

| loop type | result                                                                                                                                                                                              |
|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| cycle     | (default) Repeats the specified segment.                                                                                                                                                            |
| pingpong  | Repeats the specified segment, alternating between forward and backward.                                                                                                                            |
| offset    | Repeats the specified segment, but offsets each cycle by the difference in the value of the property at the start and end of the segment, multiplied by the number of times the segment has looped. |
| continue  | Does not repeat the specified segment, but continues to animate a property based on the velocity at the first or last keyframe. For example, if the last keyframe of a Scale property of a layer is |

100%, the layer continues to scale from 100% to the Out point, instead of looping directly back to the Out point. This type does not accept a keyframes or duration argument.

Todd Kopriva provides an example project on [his blog](#) that demonstrates the use of the loopIn and loopOut methods, and all of the loop types.

Paul Tuersley provides a script on the [AE Enhancers forum](#) that automatically adds wiggle, smooth, and loop expressions to selected properties.

**loopOut(type="cycle", numKeyframes=0)** Return type: Number or Array.

Loops a segment of time that is measured from the last keyframe on the layer back toward the In point of the layer. The loop plays until the Out point of the layer. The segment to loop is determined by the specified number of keyframes. The numKeyframes value sets the number of keyframe segments to loop; the specified range is measured backward from the last keyframe. For example, loopOut("cycle", 1) loops the segment bounded by the last keyframe and second-to-last keyframe. The default value of 0 means that all keyframes will loop. See the entry for loopIn for more information.

David Van Brink provides an instructional article and sample project on his [omino pixel blog](#) that show how to use the Echo effect, the Particle Playground effect, and the loopOut method to animate a swarm of stylized swimming bacteria.

**loopInDuration(type="cycle", duration=0)** Return type: Number or Array.

Loops a segment of time that is measured from the first keyframe on the layer forward toward the Out point of the layer. The loop plays from the In point of the layer. The segment to loop is determined by the specified duration. The duration value sets the number of composition seconds in a segment to loop; the specified range is measured from the first keyframe. For example, loopInDuration("cycle",1) loops the first second of the entire animation. The default of 0 means that the segment to loop begins at the layer Out point. See the entry for loopIn for more information.

**loopOutDuration(type="cycle", duration=0)** Return type: Number or Array.

Loops a segment of time that is measured from the last keyframe on the layer back toward the In point of the layer. The loop plays until the Out point of the layer. The segment to loop is determined by the specified duration. The duration value sets the number of composition seconds in a segment to loop; the specified range is measured backward from the last keyframe. For example, loopOutDuration("cycle", 1) loops the last second of the entire animation. The default of 0 means that the segment to loop begins at the layer In point. See the entry for loopIn for more information.

**key(index)** Return type: Key or MarkerKey.

Argument type: index is a Number.

Returns the Key or MarkerKey object by number. For example, key(1) returns the first keyframe.

**key(markerName)** Return type: MarkerKey.

Argument type: markerName is a String.

Returns the MarkerKey object with this name. Use only on marker properties.

**nearestKey(t)** Return type: Key or MarkerKey.

Returns the Key or MarkerKey object nearest to a designated time.

**numKeys** Return type: Number.

Returns the number of keyframes on a property. Returns the number of markers on a marker property.

**Note:** If you use the Separate Dimensions command to separate the dimensions of the Position property into individual components, the number of keyframes changes, so the value returned by this method changes.

**propertyGroup(countUp = 1)** Return type: Group.

Returns a group of properties relative to the property on which the expression is written. For example, if you add the propertyGroup(1) expression to the Rotation property of a brush stroke, the expression targets the Transform property group, which contains the Rotation property. If you add propertyGroup(2) instead, the expression targets the Brush property group. This method lets you establish name-independent relationships in the property hierarchy. This method is especially useful when duplicating properties that contain expressions.

The numProperties method for propertyGroup returns the number of properties in the property group.

This example returns the number of properties in the group that contains the property on which the expression is written:

```
thisProperty.propertyGroup(1).numProperties
```

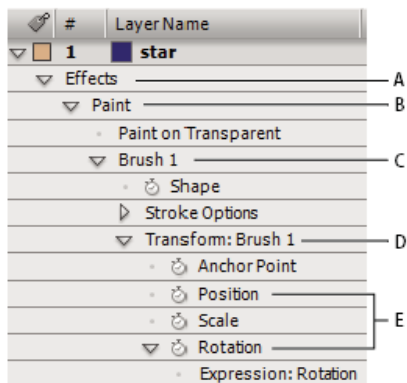
**propertyIndex** Return type: Number.

Returns the index of a property relative to other properties in its property group, including property groups within masks, effects, text animators, selectors, shapes, trackers, and track points.

**name** Return type: String.

Returns the name of the property or property group.

**Example: Animating with the propertyGroup method and propertyIndex attribute**

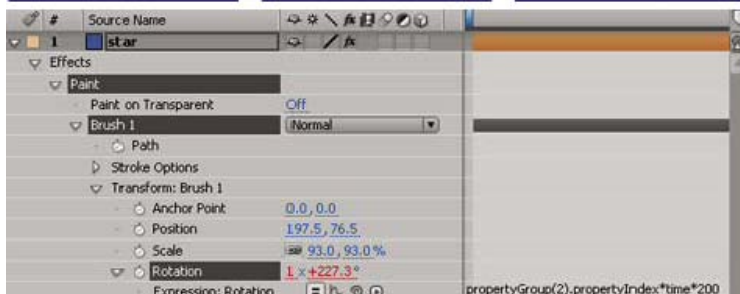


Values of propertyGroup relative to Position property of a brush stroke

A. propertyGroup(4) B. propertyGroup(3) C. propertyGroup(2) D. propertyGroup(1) E. Position propertyIndex value is 2; Rotation propertyIndex value is 4.

In this example, the propertyGroup method for each brush stroke targets the Brush property group because that group is two property groups up from the Rotation property. The propertyIndex attribute in each Brush stroke then returns a unique value for each Brush stroke. The resulting value is then multiplied by the time and 200 and applied to each rotation value, rotating each brush stroke differently, creating swirling paint strokes:

```
propertyGroup(2).propertyIndex * time * 200
```



Animating a brush stroke with an expression

## Key attributes and methods (expression reference)

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When you access a Key object, you can get time, index, and value properties from it. For example, the following expression gives you the value of the third Position keyframe: `position.key(3).value`.

The following expression, when written on an Opacity property with keyframes, ignores the keyframe values and uses only the placement of the keyframes in time to determine where a flash should occur:

```
d = Math.abs(time - nearestKey(time).time);
easeOut(d, 0, .1, 100, 0)
```

**value** Return type: Number or Array.

Returns the value of the keyframe.

**time** Return type: Number.

Returns the time of the keyframe.

**index** Return type: Number.

Returns the index of the keyframe.

## MarkerKey attributes (expression reference)

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You can access values for composition markers and layer markers using the same methods. Access layer markers through the `thisLayer.marker` object; access composition markers through the `thisComp.marker` object.

For the purpose of expressions, markers are a special type of Key object, so you can use methods such as `nearestKey(time)` to access markers,

and markers also have time and index attributes. The index attribute is not the number (name) of the marker; it is the keyframe index number, representing the order of the marker in the time ruler.

Expressions have access to all of the values for a marker that you can set in the Composition Marker or Layer Marker dialog box. This expression on the Source Text property of a text layer displays the time, duration, index, comment (name), chapter, URL, frame target, and cue point name for the layer marker nearest the current time, and whether the marker is for an event cue point:

```
m = thisLayer.marker.nearestKey(time);
s = "time:" + timeToCurrentFormat(m.time) + "\r" +
    "duration: " + m.duration + "\r" +
    "key index: " + m.index + "\r" +
    "comment:" + m.comment + "\r" +
    "chapter:" + m.chapter + "\r" +
    "URL:" + m.url + "\r" +
    "frame target: " + m.frameTarget + "\r" +
    "cue point name: " + m.cuePointName + "\r" +
    "Event cue point? " + m.eventCuePoint + "\r";
for (param in m.parameters){
    s += "parameter: " + param + " value: " + m.parameters[param] + "\r";
}
s
```

Because the XMP metadata in a footage item can be converted into layer markers for a layer based on that item, expressions can interact with XMP metadata. For information, see [XMP metadata in After Effects](#).

Dan Ebberts provides a tutorial on the [After Effects Developer Center](#) that includes an example of using XMP metadata with expressions.

**duration** Return type: Number.

Duration, in seconds, of marker.

**comment** Return type: String.

Contents of Comment field in marker dialog box.

**chapter** Return type: String.

Contents of Chapter field in marker dialog box.

**url** Return type: String.

Contents of URL field in marker dialog box.

**frameTarget** Return type: String.

Contents of Frame Target field in marker dialog box.

**eventCuePoint** Return type: Boolean.

Setting for cue point type in marker dialog box. True for Event; false for Navigation.

**cuePointName** Return type: String.

Contents of cue point Name field in marker dialog box.

**parameters** Return type: associative array of String values.

Contents of Parameter Name and Parameter Value fields in marker dialog box.

For example, if you have a parameter named “background color”, then you can use the following expression to access its value at the nearest marker:

```
thisComp.marker.nearestKey(time).parameters["background color"]
```

More Help topics



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# Expression examples

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## Online resources for expression examples

Expression example: [Make a layer revolve in a circle](#)

Expression example: [Rotate the hands of a clock](#)

Expression example: [Position one layer between two others](#)

Expression example: [Create a trail of images](#)

Expression example: [Create a bulge between two layers](#)

Expression example: [Fade opacity of a 3D layer based on distance from camera](#)

Expression example: [Make a 3D layer invisible if facing away from camera](#)

Expression example: [Flip layer horizontally if facing away from camera](#)

Expression example: [Animate scale at each layer marker](#)

Expression example: [Start or stop wiggle at specific time](#)

Expression example: [Match camera focal plane to another layer](#)

Many of the examples in this section are based on expressions provided by Dan Ebberts.

---

## Online resources for expression examples

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Dan Ebberts provides example expressions and tutorials for learning how to work with expressions on his [MotionScript website](#). For example, Dan provides an excellent [page about collision detection](#).

Trish and Chris Meyer provide a [series of articles about expressions on the ProVideo Coalition website](#). These articles contain many useful examples.

Colin Braley provides a tutorial and example project on [his website](#) that show how to use expressions to make one layer repel others in a natural-seeming manner.

The AE Enhancers forum provides many examples and much useful information about expressions, as well as scripts and animation presets. In [this post on the AE Enhancers forum](#), Paul Tuersley provides a tutorial and example project that show how to use expressions to animate several layers in a swarm.

Rick Gerard provides an example on [his website](#) that demonstrates rolling a square object along a floor so that the sides stay in contact with the floor plane.

Carl Larsen provides a video tutorial on the [Creative COW website](#) that demonstrates how to use expressions and parenting to relate the rotation of a set of wheels to the horizontal movement of a vehicle.

Marcus Geduld provides some examples from his book, *After Effects Expressions*, on the Focal Press website. In the ["String Manipulation"](#) section, Marcus shows how to use basic JavaScript to manipulate the text in the Source Text property of a layer. He even shows how to use an array of strings so that a layer's Source Text property can be set to a specific word from a list. In the ["Physical Simulations"](#) section, Marcus shows how to use expressions for orbits, bounces, jiggles, and collision detection.

Chris Zwar provides an example project on [his website](#) for automatically arranging still images or videos into a grid (like a video wall). You can easily adjust position and spacing with sliders that are connected to a system of expressions. There are three compositions in the project—one for stills, one for videos, and one to create an auto-storyboard in which a video is sampled at user-defined intervals and aligned into a grid.

[JJ Gifford's website](#) provides several example projects that demonstrate how to use expressions.

Rhys Enniks provides a video tutorial on [his website](#) in which he uses expressions and multiple text animators and range selectors to animate text as if it is being typed onto a computer screen.

Maltaannon (Jerzy Drozda, Jr.) provides a video tutorial on [his website](#) that shows how to use expressions to create a volume meter using the results of the Convert Audio To Keyframes command.

Harry Frank provides a tutorial on his [graymachine website](#) that shows how to use expressions to read data from an external text file.

---

## Expression example: Make a layer revolve in a circle

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You can create an expression without using properties from other layers. For example, you can make a layer revolve in a perfect circle.

1. Select a layer, press P to reveal its Position property in the Timeline panel, and Alt-click (Windows) or Option-click (Mac OS) the stopwatch to the left of the property name.
2. Enter the following in the expression field:

```
[(thisComp.width/2), (thisComp.height/2)] + [Math.sin(time)*50, -Math.cos(time)*50]
```



## Expression example: Rotate the hands of a clock

You can use the pick whip to link rotation values between layers to animate the hands on a clock—as the hour hand moves from hour to hour, the minute hand rotates the full circumference of the clock face. This type of animation would take a long time to create if you had to set each keyframe for both hand layers, but with the pick whip, you can do it in a matter of minutes.

1. Import or create two long, narrow solid-color layers: an hour hand and a minute hand. (See [Solid-color layers and solid-color footage items](#).)
2. Set the anchor points at the ends of the layers. (See [Layer anchor points](#).)
3. Move the layers so that the anchor points are at the center of the composition. (See [Move layers in space](#).)
4. Set Rotation keyframes for the hour hand. (See [Set or add keyframes](#).)
5. Select the Rotation property for the minute hand and choose Animation > Add Expression.
6. Drag the pick whip to the Rotation property for the hour hand. The following expression appears:

```
thisComp.layer("hour hand").rotation
```

7. To make the minute hand rotate 12 times as fast as the hour hand, add \*12 at the end of the expression as follows:

```
thisComp.layer("hour hand").rotation*12
```

Guy Chen provides a simple project on the [After Effects Exchange](#) on the Adobe website that takes this idea further, connecting the rotation of the minute hand and hour hand of a clock to the rotation of the second hand.

Harry Frank provides a clock project on his [graymachine website](#), in which the movements of the hands are connected to an Expression Controls (Angle Control) effect on a null layer that controls the time. (See [Expression Controls effects](#).)

## Expression example: Position one layer between two others

This example expression positions and maintains one layer at a balanced distance between two other layers.

1. Start with three layers. (See [Creating layers](#).)
2. Animate the positions of the first two layers in the Timeline panel. (See [Motion paths](#).)
3. Select the third layer, press P to reveal the Position property, and Alt-click (Windows) or Option-click (Mac OS) the stopwatch  button to the left of the property name.
4. Enter the following in the expression field:

```
(thisComp.layer(1).position + thisComp.layer(2).position)/2
```

## Expression example: Create a trail of images

This example expression instructs a layer to be at the same position as the next higher layer in the Timeline panel, but delayed by a specified amount of time (in this case, 0.5 seconds). You can set similar expressions for the other geometric properties.

1. Start with two solid-color layers that are scaled to approximately 30% of the composition size. (See [Solid-color layers and solid-color footage items](#).)
2. Animate the position of the first layer. (See [Motion paths](#).)
3. Select the second layer, press P to reveal the Position property, and Alt-click (Windows) or Option-click (Mac OS) the stopwatch  button to the left of the property name.
4. Enter the following in the expression field:

```
thisComp.layer(thisLayer, -1).position.valueAtTime(time - .5)
```

5. Duplicate the last layer five times by selecting it and pressing Ctrl+D (Windows) or Command+D (Mac OS) five times.

All layers follow the same path, and each is delayed 0.5 seconds from the previous.

Dan Ebberts provides more examples and techniques for creating trails of images on his [MotionScript website](#).

## Expression example: Create a bulge between two layers

This example expression synchronizes the Bulge Center argument of the Bulge effect in one layer with the position of another layer. For example, you can create an effect that looks like a magnifying glass moving over a layer, with the contents under the magnifying glass bulging as the lens (that is, the overlying layer) moves. This expression uses the fromWorld method, which makes the expression work correctly regardless of whether you move the magnifying glass layer or the underlying layer. You can rotate or scale the underlying layer, and the expression stays intact.

You can also use other effects, such as Ripple, with this expression.

1. Start with two layers. Make one layer a magnifying glass or similar object with a hole in the middle and name it Magnifier. (See Creating layers.)
2. Animate the position of the magnifying glass layer. (See Motion paths.)
3. Apply the Bulge effect to the other layer. (See Apply an effect or animation preset.)
4. Select the Bulge Center property of the Bulge effect in the Timeline panel and choose Animation > Add Expression, or Alt-click (Windows) or Option-click (Mac OS) the stopwatch  button for the property.
5. Select the default expression text and type the following:

```
fromWorld(thisComp.layer("Magnifier").position)
```

---

## Expression example: Fade opacity of a 3D layer based on distance from camera

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❖ Apply the following expression to the Opacity property of a 3D layer:

```
startFade = 500; // Start fade 500 pixels from camera.
endFade = 1500; // End fade 1500 pixels from camera.
try{ // Check whether there's a camera.
    C = thisComp.activeCamera.toWorld([0,0,0]);
}catch(err){ // No camera, so assume 50mm.
    w = thisComp.width * thisComp.pixelAspect;
    z = (w/2)/Math.tan(degreesToRadians(19.799));
    C = [0,0,-z];
}
P = toWorld(anchorPoint);
d = length(C,P);
linear(d,startFade,endFade,100,0)
```

The fade starts at a distance of 500 pixels from the camera and is complete at 1500 pixels from the camera. The linear interpolation method is used to map distance values to opacity values.

---

## Expression example: Make a 3D layer invisible if facing away from camera

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❖ Apply the following expression to the Opacity property of a 3D layer:

```
if (toCompVec([0, 0, 1])[2] > 0 ) value else 0
```

Dan Ebberts explains this expression on his [MotionScript website](#).

---

## Expression example: Flip layer horizontally if facing away from camera

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❖ Apply the following expression to the Scale property of a 3D layer:

```
if (toCompVec([0, 0, 1])[2] > 0 ) value else [-value[0], value[1], value[2]]
```

---

## Expression example: Animate scale at each layer marker

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❖ Apply the following expression to a Scale property to make a layer wobble at each marker:

```
n = 0;
t = 0;
if (marker.numKeys > 0){
    n = marker.nearestKey(time).index;
    if (marker.key(n).time > time) n--;
}
if (n > 0) t = time - marker.key(n).time;

amp = 15;
freq = 5;
decay = 3.0;

angle = freq * 2 * Math.PI * t;
scaleFact = (100 + amp * Math.sin(angle) / Math.exp(decay * t)) / 100;
```

```
[value[0] * scaleFact, value[1] / scaleFact];
```

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## Expression example: Start or stop wiggle at specific time

You can use any expression in place of the wiggle expression used here, to begin and end the influence of any expression at a specific time.

- Apply the following expression to a property to wiggle it beginning at time 2 seconds:

```
timeToStart = 2;  
if (time > timeToStart){  
    wiggle(3,25);  
}else{  
    value;  
}
```

- Apply the following expression to a property to stop wiggling it at time 4 seconds:

```
timeToStop = 4;  
if (time > timeToStop){  
    value;  
}else{  
    wiggle(3,25);  
}
```

- Apply the following expression to a property to start wiggling it at time 2 seconds and stop wiggling it at time 4 seconds:

```
timeToStart = 2;  
timeToStop = 4;  
  
if ((time > timeToStart) && (time < timeToStop)){  
    wiggle(3,25);  
}else{  
    value;  
}
```

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## Expression example: Match camera focal plane to another layer

❖ Apply the following expression to the Focus Distance property of a camera layer to have its focus distance match the distance to the anchor point of a layer named "target":

```
target = thisComp.layer("target");  
V1 = target.toWorld(target.anchorPoint) - toWorld([0,0,0]);  
V2 = toWorldVec([0,0,1]);  
dot(V1,V2);
```

Dan Ebberts explains this expression example in detail on his [Motionscript website](#).

More Help topics



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## Rendering and Exporting

# Basics of rendering and exporting

---

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## Rendering and exporting overview

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Rendering is the creation of the frames of a movie from a composition. The rendering of a frame is the creation of a composited two-dimensional image from all of the layers, settings, and other information in a composition that make up the model for that image. The rendering of a movie is the frame-by-frame rendering of each of the frames that make up the movie. For more information on how each frame is rendered, see [Render order](#) and [collapsing transformations](#).

Though it is common to speak of rendering as if this term only applies to final output, the processes of creating previews to show in the Footage, Layer, and Composition panels are also kinds of rendering. In fact, it is possible to save a RAM preview as a movie and use that as your final output. (See [Preview video and audio](#).)

After a composition is rendered for final output, it is processed by one or more output modules that encode the rendered frames into one or more output files. This process of encoding rendered frames into files for output is one kind of exporting.

**Note:** Some kinds of exporting don't involve rendering and are for intermediate stages in a workflow, not for final output. For example, you can export a project as an Adobe Premiere Pro project by choosing **File > Export > Adobe Premiere Pro Project**. The project information is saved without rendering. In general, data transferred through Dynamic Link is not rendered.

A movie can be made into a single output file (such as a movie in an F4V or FLV container) that contains all of the rendered frames, or it can be made into a sequence of still images (as you would do when creating output for a film recorder).

Aharon Rabinowitz provides an introduction to rendering in his "What is Rendering?" video tutorial—part of the Multimedia 101 series on the [Creative COW website](#).

## The Render Queue panel

The primary way of rendering and exporting movies from After Effects is through the Render Queue panel. (See [Render and export with the Render Queue panel](#).)

**Important:** You do not need to render a movie multiple times to export it to multiple formats with the same render settings. You can export multiple versions of the same rendered movie by adding output modules to a render item in the Render Queue panel.

In the Render Queue panel, you can manage several render items at once, each with its own render settings and output module settings. Render settings determine such characteristics as output frame rate, duration, resolution, and layer quality. Output module settings—which are applied after render settings—determine such post-rendering characteristics as output format, compression options, cropping, and whether to embed a link to the project in the output file. You can create templates that contain commonly used render settings and output module settings.

Using the Render Queue panel, you can render the same composition to different formats or with different settings, all with one click of the **Render** button:

- You can output to a sequence of still images, such as a Cineon sequence, which you can then transfer to film for cinema projection.
- You can output using lossless compression (or no compression) to a QuickTime container for transfer to a non-linear editing (NLE) system for video editing.
- You can output to H.264 or another highly compressed format for playback on mobile devices such as mobile phones or the Apple iPod.
- You can output to MPEG-2 for playback from DVD.

**Note:** To transfer the output rendered from After Effects to film or video, you must have the proper hardware for film or video transfer, or have access to a service bureau that can provide transfer services.

## The Adobe Media Encoder

After Effects uses an embedded version of the Adobe Media Encoder to encode most movie formats through the Render Queue panel. When you manage render and export operations with the Render Queue panel, the embedded version of the Adobe Media Encoder is called automatically. The Adobe Media Encoder appears only in the form of the export settings dialog boxes with which you specify some encoding and output settings. (See Encoding and compression options for movies.)

**Important:** *The embedded version of the Adobe Media Encoder used to manage export settings within After Effects output modules does not provide all of the features of the full, stand-alone Adobe Media Encoder application. For information about the full, stand-alone Adobe Media Encoder application, see Adobe Media Encoder Help.*

John Dickinson provides a video tutorial on the [Adobe website](#) that demonstrates the use of Adobe Media Encoder with After Effects and Premiere Pro.

## The File > Export menu

You use commands in the File > Export menu to render and export SWF files and XFL files for use in Flash Player or Flash Professional, respectively. (See Rendering and exporting for Flash Professional and Flash Player.)

## Choosing formats and output settings

After Effects provides various formats and compression options for output. Which format and compression options you choose depends on how your output will be used. For example, if the movie that you render from After Effects is the final product that will be played directly to an audience, then you need to consider the medium from which you'll play the movie and what limitations you have on file size and data rate. By contrast, if the movie that you create from After Effects is an intermediate product that will be used as input to a video editing system, then you should output without compression to a format compatible with the video editing system. (See Planning your work.)

Aharon Rabinowitz provides an article on the [Creative COW website](#) about planning your project and deciding what formats and settings to use for final output.

Keep in mind the fact that you can use different encoding and compression schemes for different phases of your workflow. For example, you may choose to export a few frames as full-resolution still images (for example, TIFF files) when you need approval from a customer about the colors in a shot; whereas you may export the movie using a lossy encoding scheme (for example, H.264) when you need approval for the timing of the animation.

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## Supported output formats

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**Important:** *The trial version of After Effects CS5 doesn't include some features that depend on third-party software components that are only included in the full version of After Effects. The import and export of some formats are not supported in the trial version: AVC-Intra, AVCHD, HDV, MPEG-2, MPEG-2 DVD, MPEG-2 Blu-ray, and XDCAM. **The trial version of Adobe After Effects CS5.5 and later includes all codecs that are in the full version.** For more information on the limitations of the trial version, see the [Adobe website](#).*

You can add the ability to export other kinds of data by installing plug-ins or scripts provided by parties other than Adobe. For example, Paul Tuersley provides a script on the [AE Enhancers forum](#) with which you export After Effects composition data as Cinema 4D project data. Mark Christiansen provides an article on the [ProVideo Coalition website](#) that links to scripts and plug-ins for exporting from After Effects for use in Cinema 4D, Maya, Lightwave, and other 3D applications. (See Plug-ins.)

Unless otherwise noted, all image file formats are exported at 8 bits per channel (bpc).

### Video and animation formats

- 3GPP (3GP)
- FLV, F4V
- H.264 and H.264 Blu-ray
- MPEG-2
- MPEG-2 DVD
- MPEG-2 Blu-ray
- MPEG-4
- MXF OP1a (After Effects CS5.5 and later)

Export support for additional video codecs in an MXF OP1a wrapper: (After Effects CS6)

- AVC-Intra Class 50 720
- AVC-Intra Class 100 720
- AVC-Intra Class 100 1080
- XDCAM EX 35 NTSC 1080 (4:2:0)
- XDCAM EX 35 PAL 1080 (4:2:0)
- QuickTime (MOV)

- SWF
- Video for Windows (AVI; Windows only)
- Windows Media (Windows only)

 *To create an animated GIF movie, first render and export a QuickTime movie from After Effects. Then import the QuickTime movie into Photoshop Extended and export the movie to animated GIF using Save For Web & Devices.*

### Video project formats

- Adobe Premiere Pro project (PRPROJ)
- XFL for Flash Professional (XFL)

### Still-image formats

- Adobe Photoshop (PSD; 8, 16, and 32 bpc)
- Bitmap (BMP, RLE)
- Cineon (CIN, DPX; 16 bpc and 32 bpc converted to 10 bpc)
- Maya IFF (IFF; 16 bpc)
- JPEG (JPG, JPE)
- OpenEXR (EXR)
- PNG (PNG; 16 bpc)
- Radiance (HDR, RGBE, XYZE)
- SGI (SGI, BW, RGB, 16 bpc)
- Targa (TGA, VBA, ICB, VST)
- TIFF (TIF; 8, 16, and 32 bpc)

### Audio-only formats

- Audio Interchange File Format (AIFF)
- MP3
- WAV

## Render and export with the Render Queue panel

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Use the Render Queue panel to render compositions, apply render settings and output module settings, and obtain information on the rendering process.

When you place a composition into the Render Queue panel, it becomes a render item. You can add many render items to the render queue, and After Effects can render multiple items in a batch, unattended. When you click the Render button in the upper-right corner of the Render Queue panel, all items with the status of Queued are rendered and output in the order in which they are listed in the Render Queue panel.

When rendering of a render item is complete, it remains in the Render Queue panel with its status changed to Done until you remove the item from the Render Queue panel. You cannot rerender a completed item, but you can duplicate it to create a new item in the queue with the same settings or with new settings. You can also drag an output module to the Project panel to import the finished movie or a placeholder into the project for use as a footage item. (See Import footage items.)

 *When working with multiple render items, it is often useful to add comments in the Comment column in the Render Queue panel. If the Comment column is not visible, right-click (Windows) or Control-click (Mac OS) a column heading, and choose Columns > Comment.*

You can select, duplicate, and reorder render items using many of the same keyboard shortcuts that you use for working with layers and other items. See General (keyboard shortcuts).

### Render and export a movie using the render queue

1. Select the composition from which to make a movie in the Project panel, and then do one of the following to add the composition to the render queue:
  - Choose Composition > Add To Render Queue.
  - Drag the composition to the Render Queue panel.

 *To create a new composition from a footage item and immediately add that composition to the render queue, drag the footage item from the Project panel to the Render Queue panel. This is a convenient way to convert a footage item from one format to another.*

2. Click the triangle next to the Output To heading in the Render Queue panel to choose a name for the output file based on a naming



convention, and then choose a location; or click the text next to the Output To heading to enter any name. (See Specify filenames and locations for rendered output.)

3. Click the triangle to the right of the Render Settings heading to choose a render settings template, or click the underlined text to the right of the Render Settings heading to customize the settings. (See Render settings.)
4. Choose a Log type from the Log menu.

When a log file has been written, the path to the log file appears under the Render Settings heading and Log menu.

5. Click the triangle to the right of the Output Module heading to choose an output module settings template, or click the underlined text to the right of the Output Module heading to customize the settings. You use the output module settings to specify the file format of the output movie. In some cases, a format-specific dialog box opens after you choose a format, in which you can specify format-specific settings. (See Output modules and output module settings and Encoding and compression options for movies.)

When an output name and location have been set, and render settings and an output module have been selected, the entry in the Render column automatically becomes selected (shown by a check mark) and the status changes to Queued. The status Queued means that the render item is in the render queue.



*Press Caps Lock before you start rendering to prevent the Composition panel from displaying rendered frames. By not updating the Composition panel, After Effects requires less time to process simple render items with many frames.*

6. Click the Render button in the upper-right corner of the Render Queue panel.

 *After an item has been rendered, you can import the finished movie as a footage item by dragging its output module from the Render Queue panel into the Project panel. (See Import footage items.)*

Rendering a composition into a movie can take a few seconds or many hours, depending on the composition's frame size, quality, complexity, and compression method. As After Effects renders the item, you are unable to work in the program. An audio alert indicates when rendering is complete.

## Render item statuses

Each render item has a status, which appears in the Status column in the Render Queue panel:

**Unqueued** The render item is listed in the Render Queue panel but is not ready to render. Confirm that you have selected the desired render settings and output module settings, and then select the Render option to queue the render item.

**Queued** The render item is ready to render.

**Needs Output** An output filename has not been specified. Choose a value from the Output To menu, or click the underlined Not Yet Specified text next to the Output To heading to specify a filename and path.

**Failed** After Effects was unsuccessful in rendering the render item. Use a text editor to view the log file for specific information on why the rendering was unsuccessful. When a log file has been written, the path to the log file appears under the Render Settings heading and Log menu.

**User Stopped** The rendering process was stopped.

**Done** The rendering process for the item is complete.

## Manage render items and change render statuses

- To select the source composition for a render item in the Project panel, right-click (Windows) or Control-click (Mac OS) the render item and choose Reveal Composition In Project from the context menu.
- To remove a render item from the render queue (change its status from Queued to Unqueued), deselect its entry in the Render column. The item remains in the Render Queue panel.
- To change the status of a render item from Unqueued to Queued, select its entry in the Render column.
- To remove a render item from the Render Queue panel, select the item and press Delete, or choose Edit > Clear.
- To rearrange items in the Render Queue panel, drag an item up or down the queue. A heavy black line appears between render items, indicating where the item will be placed. You can also reorder selected render items by choosing Layer > Arrange, and then choosing Bring Render Item Forward, Send Render Item Backward, Bring Render Item To Front, or Send Render Item To Back.
- To move selected render items up (earlier) in the render queue, press Ctrl+Alt+Up Arrow (Windows) or Command+Option+Up Arrow (Mac OS). To move selected render items down (later), press Ctrl+Alt+Down Arrow (Windows) or Command+Option+Down Arrow (Mac OS).
- To move selected render items to the top of the render queue, press Ctrl+Alt+Shift+Up Arrow (Windows) or Command+Option+Shift+Up Arrow (Mac OS). To move selected render items to the bottom (end) of the render queue, press Ctrl+Alt+Shift+Down Arrow (Windows) or Command+Option+Shift+Down Arrow (Mac OS).
- To duplicate a render item, right-click (Windows) or Control-click (Mac OS) the render item and choose a command from the context menu:
  - To render with the same filename, choose Duplicate With File Name.
  - To render with a new filename, choose Duplicate, click the underlined filename next to Output To, enter a new filename, and click Save.

## Pause or stop rendering

If the disk to which an output module is writing runs out of space, After Effects pauses the render operation. You can clear additional disk space and then resume rendering and exporting.

- To pause rendering, click Pause. To resume rendering, click Continue.

While rendering is paused, you cannot change settings or use After Effects in any other way.

- To stop rendering with the purpose of starting the same render over again, Alt-click (Windows) or Option-click (Mac OS) Stop.

The render item for which rendering was stopped is assigned the status User Stopped, and a new item with the status of Queued is added to the Render Queue panel. The new item uses the same output filename and has the same duration as the original render item.

- To stop rendering with the purpose of resuming the same render, click Stop.

The render item for which rendering was stopped is assigned the status User Stopped, and a new item with the status of Unqueued is added to the Render Queue panel. The new item uses an incremented output filename and resumes rendering at the before frame at which rendering was stopped—so the first frame of the new item is the last successfully rendered frame of the stopped item.

## Information shown for current render operations

Basic information about the current batch of renders is shown at the bottom of the Render Queue panel:

**Message** A status message.

**RAM** Memory available for the rendering process.

**Renders Started** The time at which the current batch of renders was started.

**Total Time Elapsed** The rendering time elapsed (not counting pauses) since the current batch of renders was started.

 *To view more information about the current render operation, click the triangle to the left of the Current Render heading. The Current Render pane collapses (closes) after a short time. To expand the pane so that it does not collapse after a time-out period, Alt-click (Windows) or Option-click (Mac OS) the triangle next to the Current Render heading. To view details of a completed render, review the log file. When a log file has been written, the path to the log file appears under the Render Settings heading and Log menu.*

## Rerender a previously rendered item

1. Select the render item.
2. Do one of the following:
  - To render with the same filename, choose Edit > Duplicate With File Name.
  - To render with a new filename, choose Edit > Duplicate, click the underlined filename next to Output To, enter a new filename, and click Save.
3. Click Render.

## Change the render-complete sounds

A chime plays when all items in the render queue have been rendered and exported; a different sound plays if a render operation fails. You can change the render-complete sounds by replacing files named rnd\_okay.wav and rnd\_fail.wav in the sounds folder. The sounds folder is in the following location:

- (Windows) Program Files\Adobe\Adobe After Effects CS5\Support Files
- (Mac OS) Applications/Adobe After Effects CS5/Adobe After Effects CS5/Contents/Resources

 *Control-click the Adobe After Effects CS5 application package and choose Show Contents to open the Adobe After Effects CS5 application package and show the Contents directory.*

## Online resources for rendering and exporting with the render queue

Lloyd Alvarez provides a script on his [After Effects Scripts website](#) that takes items that are ready to render in the render queue and sends them to render in the background using arender.

Jeff Almasol provides a script on his [redefinery website](#) that renders and exports each of the selected layers separately. You might find this script useful if layers represent different versions of an effect or different parts of an effect that you want to render as separate “passes” for flexibility in how they get composited.

Christopher Green provides a script (Queue\_Comp\_Sections.jsx) on [his website](#) with which you can use multiple guide layers to designate multiple time spans to be rendered and exported separately through the render queue.

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## Collect files in one location

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The Collect Files command gathers copies of all of the files in a project or composition into a single location. Using this command is a useful step before rendering, for archiving, or for moving a project to a different computer system or user account.

When you use the Collect Files command, After Effects creates a new folder in which it saves a new copy of the project, copies of the footage files, proxy files as specified, and a report describing the files, effects, and fonts necessary to re-create the project and render the compositions.

After you collect files, you can continue making changes to a project, but be aware that those changes are stored with the original project and not with the newly collected version.

Carl Larsen demonstrates the use of the Collect Files command and the Consolidate All Footage command in a video tutorial on the [Creative](#)

[COW website](#) that shows how to organize, consolidate, and archive project files and footage.

1. Choose File > Collect Files.
2. In the Collect Files dialog box, choose an appropriate option for Collect Source Files.  
**All** Collects all footage files, including unused footage and proxies.

**For All Comps** Collects all footage files and proxies used in any composition in the project.

**For Selected Comps** Collects all footage files and proxies used in compositions currently selected in the Project panel.

**For Queued Comps** Collects all footage files and proxies used directly or indirectly in any of the compositions with a Queued status in the Render Queue panel.

**None (Project Only)** Copies the project to a new location without collecting any source footage.

3. Select other options, as appropriate:

**Generate Report Only** Selecting this option does not copy the files and proxies.

**Obey Proxy Settings** Use this option with compositions that include proxies to specify whether you want the copy to include the current proxy settings. If this option is selected, only the files used in the composition are copied. If this option is not selected, the copy contains both proxies and source files, so you can later change proxy settings in the collected version.

**Note:** If you choose *For Queued Comps* in the *Collect Source Files* dialog box, *After Effects* uses the proxy settings from the render settings, not the composition.

**Reduce Project** Removes all unused footage items and compositions from the collected files when the following options are chosen in the Collect Source Files menu: For All Comps, For Selected Comps, and For Queued Comps.

**Change Render Output To** Use to redirect the output modules to render files to a named folder in the collected files folder. This option ensures that you have access to your rendered files when you're rendering the project from another computer. Rendering status must be valid (Queued, Unqueued, or Will Continue) for the output modules to render files to this folder.

**Enable 'Watch Folder' Render** You can use the Collect Files command to save projects to a specified watch folder and then initiate watch-folder rendering over a network. After Effects also includes a render control file called [project name]\_RCF.txt, which signals to watching computers that the project is available for rendering. After Effects and any installed render engines can then render the project together across a network. (See Set up watch-folder rendering.)

**Maximum Number Of Machines** Use to specify the number of render engines or licensed copies of After Effects that you want to allocate to render the collected project. Below this option, After Effects reports how many items in the project will be rendered using more than one computer.

**Note:** If rendering time is unusually long, you may have set *Maximum Number Of Machines* too high, and the network overhead required to track rendering progress among all computers is out of proportion to the time spent actually rendering frames. The optimal number depends on many variables related to the network configuration and the computers on it; experiment to determine the optimal number for your network.

4. To add your own information to the report that will be generated, click Comments, enter your notes, and click OK. The comments appear at the end of the report.
5. Click Collect. Name the folder and specify a location for your collected files.

Once you start the file collection, After Effects creates the folder and copies the specified files to it. The folder hierarchy is the same as the hierarchy of folders and footage items in your project. The new folder includes a (Footage) folder and may include an output folder (if you selected Change Render Output To).

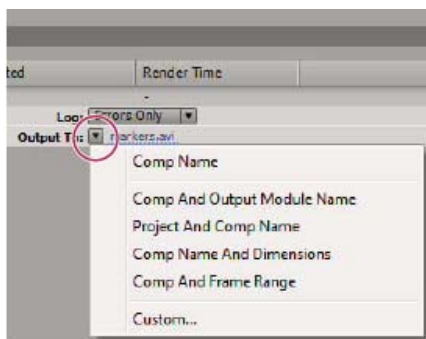
The names of these folders appear in parentheses to signal to any attending render engines that they should not search these folders for projects.

David Torno provides a script on the [After Effects Scripts website](#) that exports specified information about a project.

## Specify filenames and locations for rendered output

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 You can locate a previously rendered item or check the destination of a queued render item by expanding the Output Module group in the Render Queue panel and clicking the underlined file path, or by right-clicking (Windows) or Control-clicking (Mac OS) the Output Module heading.



Click the triangle to open the Output To menu, or click the underlined text to enter a destination.

## Specify the filename and location for a single render item

- To manually enter a filename and destination folder, click the underlined text next to the Output To heading.
- To name a file using a file naming template, click the triangle next to the Output To heading, and choose a template from the menu.

## Create and use a custom file naming template

You can use custom templates to name the output according to properties of the composition and project.

 To make a file naming template the default template, hold down **Ctrl** (Windows) or **Command** (Mac OS) as you choose the template from the Output To menu.

1. In the Render Queue panel, choose Custom from the Output To menu.
2. If you want to base the new file naming template on an existing template, choose the existing template from the Preset menu.
3. Click in the Template box where you want to insert a file naming rule, and do any of the following:

- To add a preset property to the filename, choose the property from the Add Property menu.
- Enter text in the Template box.

**Note:** Make sure that the insertion point is outside the square brackets ([ ]) of preset properties.

4. Do any of the following:
  - To save the file naming template as a preset for future use in the Output To menu, click the Save button . In the Choose Name dialog box, enter a name for the file naming template, and click OK.
  - To always use the selected file naming template, select Default.
  - To apply the selected file naming template to the current Output Module, click OK.

## Name output files automatically

The Use Default File Name And Folder preference ensures that all compositions added to the render queue are automatically assigned a unique output filename (except for files created by saving RAM previews, which still use the composition name). When this option is selected, each render item is assigned the same folder name as the previous render item until you change the path. If a composition is rendered more than once, After Effects adds a number to the filename (for example, composition\_name\_1).

**Note:** Avoid using high-ASCII or other extended characters in filenames for projects to be used on different platforms or rendered using a watch folder.

1. Choose **Edit > Preferences > Output** (Windows) or **After Effects > Preferences > Output** (Mac OS).
2. Select **Use Default File Name And Folder**.

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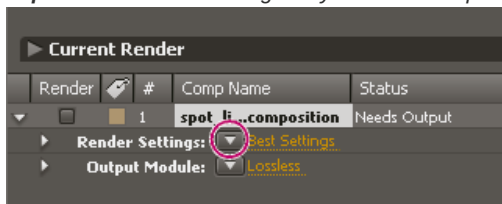
## Render settings

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Render settings apply to each render item and determine how the composition is rendered for that specific render item. By default, the render settings for a render item are based on the current project settings, composition settings, and switch settings for the composition on which the render item is based. However, you can modify the render settings for each render item to override some of these settings.

Render settings apply to the root composition for a render item, as well as all nested compositions.

**Important:** Render settings only affect the output of the render item with which they're associated; the composition itself is not affected.



Click the triangle to open the Render Settings menu, or click the underlined text to open the Render Settings dialog box.

## Change render settings

- To change render settings for a render item, click the underlined render settings template name next to the Render Settings heading in the Render Queue panel, and choose settings in the Render Settings dialog box.
- To apply a render settings template to selected render items, click the triangle next to the Render Settings heading in the Render Queue panel, and choose a template from the menu. You can choose a custom render settings template or one of the preset render settings templates:

**Best Settings** Often used for rendering to final output.

**Draft Settings** Often appropriate for reviewing or testing motion.

**DV Settings** Similar to Best Settings, but with Field Rendering turned on, set to Lower Field First.

**Multi-Machine Settings** Similar to Best Settings, but with Skip Existing Files selected to enable multi-machine rendering.

**Note:** The default render settings template is assigned to a render item when it is created. To change which render settings template is the default, hold down Ctrl (Windows) or Command (Mac OS) as you choose a render settings template from the menu.

## Create, edit, and manage render settings templates

You perform the following tasks in the Render Settings Templates dialog box. To open the Render Settings Templates dialog box, choose Edit > Templates > Render Settings, or click the triangle next to the Render Settings heading in the Render Queue panel and choose Make Template.

- To make a new render settings template, click New, specify render settings, and click OK. Enter a name for the new template.
- To edit an existing render settings template, choose a template from the Settings Name menu, click Edit, and specify render settings.

**Note:** Changes to an existing template do not affect render items that are already in the render queue.

- To specify a default render settings template to be used when rendering movies, individual frames, pre-rendered movies, or proxies, choose a template from a menu in the Defaults area of the Render Settings Templates dialog box.
- To save all currently loaded render settings templates to a file, click Save All.
- To load a saved render settings template file, click Load, select the render settings template file, and then click Open.

## Render settings reference

Each of these settings overrides composition settings, project settings, or layer switch settings.

**Log** You can choose how much information After Effects writes to a render log file. If you choose Errors Only, After Effects only creates the file if errors are encountered during rendering. If you choose Plus Settings, a log file is created that lists the current render settings. If you choose Plus Per Frame Info, a log file is created that lists the current render settings and information about the rendering of each frame. When a log file has been written, the path to the log file appears under the Render Settings heading and Log menu.

**Quality** The quality setting to use for all layers. (See Layer image quality and subpixel positioning.)

**Resolution** Resolution of the rendered composition, relative to the original composition dimensions. (See Resolution.)

**Note:** If you render at reduced resolution, set the Quality option to Draft. Rendering at Best quality when reducing resolution produces an unclear image and takes longer than Draft quality.

**Disk Cache** Determines whether the disk cache preferences are used during rendering. Read Only writes no new frames to the disk cache while After Effects renders. Current Settings (default) uses the disk cache settings defined in the Media & Disk Cache preferences. (See Disk cache.)

**Use OpenGL Renderer (CS5.5, and earlier)** Determines whether OpenGL is used for rendering. (See Render with OpenGL.)

**Note:** In After Effects CS6, the Use OpenGL Renderer function has been removed.

**Proxy Use** Determines whether to use proxies when rendering. Current Settings uses the settings for each footage item. (See Placeholders and proxies.)

**Effects** Current Settings (default) uses the current settings for Effect switches . All On renders all applied effects. All Off renders no effects.

**Solo Switches** Current Settings (default) uses the current settings for Solo switches  for each layer. All Off renders as if all Solo switches are off. (See Solo a layer.)

**Guide Layers** Current Settings renders guide layers in the top-level composition. All Off (the default setting) does not render guide layers. Guide layers in nested compositions are never rendered. (See Guide layers.)

**Color Depth** Current Settings (default) uses the project bit depth. (See Color depth and high dynamic range color.)

**Frame Blending** On For Checked Layers renders frame blending only for layers with the Frame Blending switch  set, regardless of the Enable Frame Blending setting for the composition. (See Frame blending.)

**Field Render** Determines the field-rendering technique used for the rendered composition. Choose Off if you are rendering for film or for display on a computer screen. (See Interlaced video and separating fields.)

**3:2 Pulldown** Specifies the phase of 3:2 pulldown. (See Introduce 3:2 pulldown.)

**Motion Blur** Current Settings uses the current settings for the Motion Blur layer switch  and the Enable Motion Blur composition switch. On For Checked Layers renders motion blur only for layers with the Motion Blur layer switch set, regardless of the Enable Motion Blur setting for the composition. Off For All Layers renders all layers without motion blur regardless of the layer switch and composition switch settings. (See Motion blur.)

**Time Span** How much of the composition to render. To render the entire composition, choose Length Of Comp. To render only the part of the composition indicated by the work-area markers, choose Work Area Only. To render a custom time span, choose Custom. (See Work area.)

**Frame Rate** The sampling frame rate to use when rendering the movie. Select Use Comp's Frame Rate to use the frame rate specified in the Composition Settings dialog box, or select Use This Frame Rate to use a different frame rate. The actual frame rate of the composition is unchanged. The frame rate of the final encoded movie is determined by the output module settings. (See Frame rate.)

**Skip Existing Files** Lets you rerender part of a sequence of files without wasting time on previously rendered frames. When rendering a sequence of files, After Effects locates files that are part of the current sequence, identifies the missing frames, and then renders only those frames, inserting them where they belong in the sequence. You can also use this option to render an image sequence on multiple computers. (See Render a still-image sequence with multiple computers.)

**Note:** The current image sequence must have the same name as the existing image sequence, and the starting frame number, frame rate, and time span must be the same. You must render to the folder that contains the previously rendered frames.

Shoaib Khan provides a video tutorial on the [MaxAfter website](#) that shows how to use the Skip Existing Files option to avoid needing to rerender an entire movie when correcting a simple mistake in a rendered image sequence.

## Output modules and output module settings

Output module settings apply to each render item and determine how the rendered movie is processed for final output. Use output module settings to specify file format, output color profile, compression options, and other encoding options for final output.

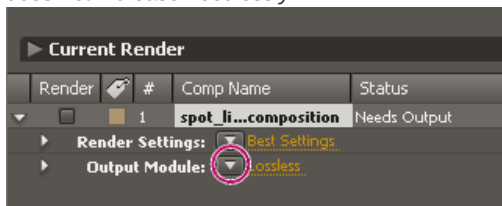
You can also use output module settings to crop, stretch, or shrink a rendered movie; doing this after rendering is often useful when you are generating multiple kinds of output from a single composition.

Output module settings are applied to the rendered output that is generated according to the render settings.

For some formats, an additional dialog box opens when you choose the format in the Output Module Settings dialog box. You can modify these settings and use settings presets to specify format-specific options, such as compression options.

You can apply multiple output modules to each render item, which is useful when you want to make more than one version of a movie from one render. For example, you can automate the creation of a movie and its alpha matte, or you can create high-resolution and low-resolution versions of a movie.

**Note:** Before rendering, check the Audio Output settings in the Output Module Settings dialog box to ensure that they are correct. To render audio, Audio Output must be selected. If your composition does not include audio, do not select Audio Output, so that the size of the rendered file does not increase needlessly.



Click the triangle to open the Output Module Settings menu, or click the underlined text to open the Output Module Settings dialog box.

In After Effects CS5.5 and later, you can set the output module of multiple render queue items at the same time. Select the render queue items, and then choose an output module template from the Output Module Settings menu for one of the items.

You can drag an output module to the Project panel to import the finished movie or a placeholder into the project for use as a footage item. (See Import footage items.)

Andrew Kramer provides a video tutorial with tips for working with proxies, output modules, and output module templates on the [Video Copilot website](#).

## Change output module settings

- To change output module settings for a render item, click the underlined output module settings template name next to the Output Module heading in the Render Queue panel, and choose settings in the Output Module Settings dialog box.
- To apply an output module settings template to selected render items, click the triangle next to the Output Module heading in the Render Queue panel, and choose a template from the menu.

You can choose a custom output module settings template or one of the preset output module settings templates. Several templates are provided, including the Lossless template for creating movies for transfer to video, film, or an NLE system.

**Note:** The default output module settings template is assigned to a render item when it is created. To change which output module template is the default, hold down **Ctrl** (Windows) or **Command** (Mac OS) as you choose an output module template from the menu.

To change output module settings for multiple output modules at once, select the output modules and then choose an output module template. The template is applied to all selected output modules.

## Create, manage, and edit output module templates

You perform the following tasks in the Output Module Templates dialog box. To open the Output Module Templates dialog box, choose **Edit > Templates > Output Module**, or click the triangle next to the Output Module heading in the Render Queue panel and choose **Make Template**.

- To make a new output module settings template, click **New**, specify output module settings, and click **OK**. Enter a name for the new template.
- To edit an existing output module settings template, choose a template from the Settings Name menu, click **Edit**, and specify output module settings.

**Note:** Changes to an existing template do not affect render items that are already in the render queue.

- To specify a default output module settings template to be used when processing movies, individual frames, RAM previews, pre-rendered movies, or proxies, choose a template from a menu in the Defaults area of the Output Module Templates dialog box.
- To save all currently loaded output module templates to a file, click **Save All**.
- To load a saved output module template file, click **Load**, select the output module template file, and then click **Open**.

## Add output modules to and remove output modules from render items

- To add a new output module with default settings to a single render item, click the plus sign to the left of the Output To heading of the last output module for the render item.



- To remove an output module from a render item, click the minus sign to the left of the Output To heading of the output module.
- To add a new output module with default settings to selected render items, choose Composition > Add Output Module.
- To duplicate selected output modules, press Ctrl+D (Windows) or Command+D (Mac OS).

## Output module settings

For information on using controls in the Color Management area of the Output Module Settings dialog box, see [Assign an output color profile](#).

**Format** Specifies the format for the output file or sequence of files.

**Include Project Link** Specifies whether to include information in the output file that links to the source After Effects project. When you open the output file in another application, such as Adobe Premiere Pro, you can use the Edit Original command to edit the source project in After Effects.

**Include Source XMP Metadata** Specifies whether to include XMP metadata in the output file from the files used as sources for the rendered composition. XMP metadata can travel all the way through After Effects from source files, to footage items, to compositions, to rendered and exported files. For all default output module templates, Include Source XMP Metadata is deselected by default. (See [Exporting XMP metadata from After Effects](#).)

**Post-Render Action** Specifies an action for After Effects to perform after the composition is rendered. (See [Post-render actions](#).)

**Format Options** Opens a dialog box in which you specify format-specific options.

**Channels** The output channels contained in the output movie. After Effects creates a movie with an alpha channel if you choose RGB+Alpha, implying a depth of Millions of Colors+. Not all codecs support alpha channels.

**Note:** *All files created with a color depth of Millions of Colors+, Trillions of Colors+, or Floating Point + have labeled alpha channels; information describing the alpha channel is stored in the file. Therefore, you do not have to specify an alpha interpretation each time you import an item created in After Effects.*

**Depth** Specifies the color depth of the output movie. Certain formats may limit depth and color settings.

**Color** Specifies how colors are created with the alpha channel. Choose from either Premultiplied (Matted) or Straight (Unmatted). (See [Alpha channel interpretation: premultiplied or straight](#).)

**Starting #** Specifies the number for the starting frame of a sequence. For example, if this option is set to 38, After Effects names the first frame [file\_name]\_00038. The Use Comp Frame Number option adds the starting frame number in the work area to the starting frame of the sequence.

**Resize** Specifies the size of your output movie. Select Lock Aspect Ratio To if you want to retain the existing frame aspect ratio when resizing the frame. Select Low Resize Quality when rendering tests, and select High Resize Quality when creating a final movie. (See [Scaling a movie down and Scaling a movie up](#).)

**Crop** Used to subtract or add rows or columns of pixels to the edges of the output movie. You can specify the number of rows or columns of pixels to be added or subtracted from the top, left, bottom, and right sides of the movie. Use positive values to crop, and use negative values to add rows or columns of pixels. Select Region Of Interest to export only the region of interest selected in the Composition or Layer panel. (See [Region of interest \(ROI\)](#).)

 *By adding one row of pixels to the top and subtracting one row from the bottom of a movie, you can change the field order.*

**Audio Output** Specifies the sample rate, sample depth (8 Bits or 16 Bits), and playback format (Mono or Stereo). Choose a sample rate that corresponds to the capability of the output format. Choose an 8-bit sample depth for playback on the computer, and a 16-bit sample depth for CD and digital audio playback or for hardware that supports 16-bit playback.

**Note:** *The specifications for some formats impose limits on audio parameters. In such cases, audio options may be unavailable for modification in the Output Module Settings dialog box. Also, audio options for some formats are set in the export settings dialog box for that format. For example, to set audio output options for Windows Media, click Format Options in the Output Module Settings dialog box.*

## Warning for mismatch in frame rate or dimensions

Some formats (for example, the Blu-ray formats) enforce constraints on frame dimensions and frame rate.

If you choose such a constrained output format, and your composition, its render settings, or its output module settings don't match the constraints, then After Effects shows a yellow warning icon  and the message "Settings mismatch" at the bottom of the Output Module Settings dialog box.

Click the warning icon to see a detailed message that describes how the output file will be modified to meet the format constraints. You can go back and change composition settings, render settings, and output module settings if you don't want After Effects to make the changes automatically in the output module.

For more information about output module constraints and the warnings for mismatches in frame rate, dimensions, and pixel aspect ratio, see the [Adobe website](#).

## Encoding and compression options for movies

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Compression is essential for reducing the size of movies so that they can be stored, transmitted, and played back effectively. Compression is achieved by an encoder; decompression is achieved by a decoder. Encoders and decoders are known by the common term codec. No single codec or set of settings is best for all situations. For example, the best codec for compressing cartoon animation is generally not efficient for compressing live-action video. Similarly, the best codec for playback over a slow network connection is generally not the best codec for an intermediate stage in a production workflow. For information on planning your work with final output in mind, see [Planning your work](#).

 *For more information about encoding and compression options, see ["FAQ: What is the best format for rendering and exporting from After Effects?"](#).*

After Effects uses an embedded version of the Adobe Media Encoder to encode most movie formats through the Render Queue panel. When you



manage render and export operations with the Render Queue panel, the embedded version of the Adobe Media Encoder is called automatically. The Adobe Media Encoder appears only in the form of the export settings dialog boxes with which you specify some encoding and output settings.

**Important:** *The embedded version of the Adobe Media Encoder used to manage export settings within After Effects output modules does not provide all of the features of the full, stand-alone Adobe Media Encoder application. For information about the full, stand-alone Adobe Media Encoder application, see Adobe Media Encoder Help.*

For most output formats, you can specify format-specific encoding and compression options. In many cases, a dialog box opens and presents these options when you choose a format to export to or click the Format Options button in the Output Module settings dialog box. (See Output modules and output module settings.)

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## QuickTime (MOV) encoding and compression settings

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1. In the Render Queue panel, click the underlined name of the output module.
2. Choose QuickTime from the Format menu.
3. Click Format Options in the Video Output section.
4. In the QuickTime Options dialog box, choose a codec and set options according to the specific codec and your needs:  
**Quality** A higher Quality setting produces better image quality but results in a bigger movie file.

**Key Frame Every** In QuickTime terminology, the term key frames refers to something different from the change-over-time keyframes placed in the After Effects Timeline panel. In QuickTime, key frames are frames that occur at regular intervals in the movie. During compression, they are stored as complete frames. Each intermediate frame that separates them is compared to the previous frame, and only changed data is stored. Using key frames greatly reduces movie size and greatly increases the memory required to edit and render a movie. Shorter intervals between key frames enable faster seeking and reverse playback, but can significantly increase the size of the file.

**Frame Reordering** Some codecs allow for frames to be encoded and decoded out of order for more efficient storage.

**Note:** *For more information on key frames and frame reordering in QuickTime, see the [Apple website](#).*

5. Click OK.
6. Specify other settings in the Output Module Settings dialog box.

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## Post-render actions

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You can use post-render actions to automate simple tasks that occur after a composition is rendered.

A common example of the use of post-render actions is with pre-rendering: Choosing Composition > Pre-render adds the selected composition to the render queue and sets the Post-Render Action option to Import & Replace Usage.

**Note:** *You choose Post-Render Action options in the Output Module group, so be aware that changing the Output Module template could also change the Post-Render Action option. (See Output modules and output module settings.)*

1. Expand the Output Module group in the Render Queue panel by clicking the arrow to the left of the Output Module heading.
2. Choose one of the following from the Post-Render Action menu:  
**None** Performs no post-render action. This option is the default.

**Import** Imports the rendered file into the project as a footage item when the rendering is complete.

**Import & Replace Usage** Imports the rendered file into the project and substitutes it for the specified item. Drag the pick whip to the item to replace in the Project panel to specify it.

 *Use the Import & Replace Usage option to create a chain of dependent render items. For example, you can set one render item to use a watch folder and multiple computers to create a still-image sequence, and then the next render item can render a single movie file from that still-image sequence. (See Network rendering with watch folders and render engines.)*

**Set Proxy** Sets the rendered file as a proxy for the specified item. Drag the pick whip to the item in the Project panel item to specify it.

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## Render with OpenGL

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OpenGL is a set of standards for high-performance processing of 2D and 3D graphics on the graphics processing unit (GPU) for a wide variety of applications. For After Effects CS5.5, and earlier users, OpenGL provides fast rendering for previews and final output by moving rendering from the CPU to the GPU on the display card. Sometimes, performance improvements due to processing on the GPU are referred to as hardware acceleration.

To use OpenGL in After Effects, you'll need a display card that supports OpenGL 2.0.

In After Effects CS6, OpenGL and the GPU are important for new features, such as Ray-Traced 3D rendering on the GPU, Fast Draft previews, faster blitting to the screen, and a GPU enhanced Cartoon effect. There is now a categorization of features based on the GPU installed in your system.

- **Level 1:** For OpenGL SwapBuffer: Requires a GPU that has OpenGL 1.5 (or greater) with Shader Model 3.0 (or greater). If your GPU does not support these requirements, software OS blitting takes place.

- Level 2: For Fast Draft previews, Hardware BlitPipe, Cartoon effect GPU enhancements, and Level 1 features: Requires a GPU with OpenGL 2.0 (or greater) with Shader Model 4.0, (or greater on Windows. 256 (or more) MB of texture memory is required. If your GPU does not support these requirements, these features will be disabled. Most cards in systems currently in use will support Level 2 feature support.
- Level 3: For Ray-traced 3D rendering on GPU, with Level 1 and 2 features: Requires a supported NVIDIA GPU and 512 (or greater) MB of texture memory.

**Note:** Ray-traced 3D rendering will take place on the CPU using all physical cores will take place if your GPU is not supported or the video driver is not updated.

For Quadro 4000 drivers and CUDA drivers for MacOS, see this [blog post](#).

For a full list of supported display cards for After Effects CS6, and their feature support levels, see the [Adobe website](#).

For information regarding specific OpenGL hardware, go to the After Effects section of the [Adobe website](#).

On Windows, disable the Aero compositing mode. Hardware acceleration of panels and OpenGL features perform better in After Effects when Windows is operating in Basic mode. For information, see the [Microsoft website](#).

**Important:** (After Effects CS5.5, and earlier) Because not all features of a composition can be rendered with OpenGL—and because some features that can be rendered with OpenGL are rendered with different results—you may only want to use OpenGL rendering to accelerate previews and to provide faster rendering for non-final results.

For information about rendering for previews with OpenGL in After Effects CS5.5, and earlier, see Preview modes and Viewer Quality preferences.

**Note:** In After Effects CS5.5, and earlier, you cannot use the Render Multiple Frames Simultaneously multiprocessing feature while also using OpenGL to render RAM previews or render for final output. The Render Multiple Frames Simultaneously feature works by using background processes on multiple CPU processor cores to render frames. (See Memory & Multiprocessing preferences.)

OpenGL in After Effects CS5.5, and earlier, can render the following features:

- Shadows, except point light shadows (Colored shadows appear gray.)
- Lights (eight maximum)
- Masks
- Alpha channels
- Track mattes
- Intersecting layers
- Transformations for 2D and 3D layers
- GPU-accelerated effects, including Bevel Alpha, Bilateral Blur, Box Blur, Brightness & Contrast, Channel Blur, Color Balance, Color Balance (HLS), Curves, Directional Blur, Drop Shadow, Fast Blur, Find Edges, Fractal Noise, Gaussian Blur, Hue/Saturation, Invert, Noise, Radial Blur, Ramp, Sharpen, Tint, and Turbulent Noise
- All blending modes except Dissolve and Dancing Dissolve
- Layer styles
- Metal property settings for 3D layers
- Cone feather settings for light layers
- 2D motion blur
- Adjustment layers
- Anti-aliasing
- Depth-of-field blur
- Nested compositions

**Note:** In After Effects CS5.5, and earlier, OpenGL is not used to render a nested composition if the precomposition layer has a mask or a non-GPU-accelerated effect applied to it.

**Important:** In After Effects CS5.5, and earlier, use caution when enabling the OpenGL renderer in a network rendering environment. Inconsistencies may arise if differences exist in the sets of features that the OpenGL cards in the network support.

When OpenGL in After Effects CS5.5, and earlier, does not support a feature, it simply renders without using that feature. For example, if your layers contain shadows and your OpenGL hardware does not support shadows, the output will not contain shadows.

- To enable OpenGL for rendering final output in After Effects CS5.5, and earlier, click the underlined text next to Render Settings in the Render Queue panel, and select Use OpenGL Renderer.

**Note:** In After Effects CS6, the Use OpenGL Renderer function has been removed.

- In After Effects CS5.5, and earlier, to enable OpenGL for rendering previews, choose Edit > Preferences > Previews (Windows) or After Effects > Preferences > Previews (Mac OS), and select Enable OpenGL. To also allow OpenGL to render at a lower resolution to maintain rendering speed while rendering complex compositions for previews, select Enable Adaptive Resolution With OpenGL.
- In After Effects CS5.5, and earlier, to see what features your OpenGL card supports, choose Edit > Preferences > Previews (Windows) or

After Effects > Preferences > Previews (Mac OS), and click OpenGL Info.

- In After Effects CS5.5, and earlier, to modify the amount of texture memory, choose Edit > Preferences > Previews (Windows) or After Effects > Preferences > Previews (Mac OS), click OpenGL Info, and enter a value for Texture Memory of no more than 80% of the installed video RAM (VRAM) on your video card.

In After Effects CS6, the OpenGL renderer from After Effects CS5.5, and earlier, has been removed. OpenGL implemented in After Effects CS6 is used for a number of features, from previewing footage, to ray-traced 3D compositions. For details, see, "[GPU \(CUDA, OpenGL\) features in After Effects CS6.](#)"

More Help topics

 [Encoding and exporting](#)



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# Rendering and exporting for Flash Professional and Flash Player

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## Export a composition as an XFL file to Flash Professional

### Render and export a composition as a SWF file

### Render and export a composition as an FLV or F4V file

You can render and export movies from After Effects as movies that can play in Adobe Flash Player. SWF files play natively in Flash Player, whereas an FLV or F4V file must be contained in (or linked to from) a SWF file to play in Flash Player. You can also export compositions to Flash Professional as XFL files.

[This video](#) from the *After Effects CS5: Learn By Video* series provides an overview of exporting to the various formats for Flash Professional and Flash Player, and demonstrates the use and common issues with each.

## XFL

XFL files are representations of compositions that can be opened in Flash CS4 Professional or later. XFL files are essentially the XML equivalent of FLA files.

## SWF

SWF files are small files that play in Flash Player. They are often used to deliver animated vector graphics (such as cartoons), audio, and other data types over the Internet. SWF files also allow viewer interaction, such as clicking to follow a web link, control animation, or provide input to a rich internet application (RIA). SWF files are the output created from FLA files.

## FLV and F4V

FLV and F4V files contain only pixel-based (rasterized) video, not vector graphics, and they aren't interactive. FLA files can contain and refer to FLV and F4V files, which are then embedded or linked in SWF files that play in Flash Player.

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## Export a composition as an XFL file to Flash Professional

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You can export a composition from After Effects to the XFL format for further modification and use in Flash CS4 Professional or later. For example, you can use ActionScript in Flash Professional to add interactive animation to each of the layers from an After Effects composition.

When you export a composition as an XFL file, After Effects attempts to export individual layers and keyframes, preserving as much information for direct use in Flash Professional as it can. If After Effects can't export an element of a composition as unrendered data in an XFL file, the element is either ignored or rendered into a PNG or FLV item, depending on whether you choose to ignore unsupported features.

For a video tutorial on exporting to XFL format, go to the [Adobe website](#).

## About XFL files

XFL files are essentially the XML equivalent of FLA files. An XFL file is a compressed archive folder that contains a Library folder and an XML document (DOMDocument.xml) that describes the FLA file. The Library folder contains the assets referred to by the XML file. When you open an XFL file in Flash Professional, it extracts these items from the XFL file and uses them to build a FLA document. You save the document from Flash Professional as a new FLA file; you do not change the XFL file with Flash Professional.

 *If you want to examine or manually edit the contents of an XFL file, you can open the compressed archive file in the same manner as any other .zip file. Changing the filename extension to .zip is not necessary, but it may make extracting the files for this manual examination more convenient.*

[This video](#) from the *After Effects CS5: Learn By Video* series demonstrates export to XFL.

## Exporting a composition to XFL format

1. To export the selected composition as an XFL file, choose File > Export > Adobe Flash Professional (XFL).
2. In the Adobe Flash Professional (XFL) Settings dialog box, choose what After Effects will do with layers with unsupported features:

**Ignore** Layers with unsupported features are not included in the XFL output.

**Rasterize To** Layers with unsupported features are rasterized. This means that the layers are rendered to a bitmap format (an FLV file or a sequence of PNG images). Vectors are not preserved. This preserves the appearance of the layer when the XFL file is used in Flash Professional. When rasterizing to a PNG sequence, identical adjacent frames are rasterized only once, to a single PNG file that is referenced multiple times.

3. (Optional) Click the Format Options button and modify the settings used for creating PNG sequences or FLV files.

If you click Format Options when FLV is chosen in the Format menu, the export settings dialog box opens. Though you can modify such

items as the bit rate, in general you won't need to change many settings in this dialog box. Changes that you make in this dialog box persist and are used for subsequent export operations, so be careful about what you change.

If you make a change to the format options that you would like to undo, click the Reset To Defaults button in the Adobe Flash Professional (XFL) Settings dialog box.

4. In the Export As Adobe Flash Professional (XFL) dialog box, choose a location for the output files.

As the composition is being processed, a dialog box shows the progress of the export operation.

When After Effects creates an XFL file, it also saves a report ([XFLfile\_name] report.html) to the same folder as the XFL file. The report indicates the following:

- whether layers with unsupported features were rasterized or ignored
- whether each source item was rasterized ("rendered") or passed through ("linked")
- whether each layer was rasterized ("rendered") or converted to a native Flash object

## Working in Flash Professional with a FLA document created from an XFL file

The Library panel in Flash Professional is similar to the Project panel in After Effects. When Flash Professional creates a FLA document from an XFL file, it creates symbols, folders, and video clips and organizes them in the Library panel. Each item in the Library panel has a unique name—even if they are based on items with identical names in After Effects—so that these items can be manipulated using ActionScript. This requirement for unique naming causes After Effects to append underscore characters and numerals to many names when creating the XFL file.

When Flash Professional builds a FLA document from an XFL file that includes FLV files, the FLV files are embedded in the timeline in Flash. Often, a more efficient way to construct a FLA document is to move the video files to an external location referenced by the SWF file to stream the video. You can unembed FLV files as appropriate within Flash Professional, by deleting the video and importing it again using the FLVPlayback component.

**Note:** In After Effects, the composition's timeline begins at frame 0. In Flash Professional, the timeline begins at frame 1. This difference causes the After Effects composition timeline and the corresponding Flash timeline to appear to be offset from one another by one frame.

In After Effects, a composition can have pixel aspect ratios other than 1.0 (square pixels). Flash Professional only supports a pixel aspect ratio of 1.0. When a composition is exported to XFL format, the FLA document is a square-pixel document with a different number of pixels so that the appearance of the document in Flash Professional matches the appearance of the composition in After Effects. Scale values in the XFL file preserve the appearance of the layers.

## How features and data are preserved when exporting a composition to XFL format

When a composition is exported as an XFL file, After Effects goes through multiple stages, attempting at each stage to export the maximum amount of information from layers and their source files.

If the composition uses PNG, JPEG, and FLV files as the sources for its layers, these source files are included in the XFL output (passed through) unless the layers use features that force After Effects to transcode the source files or rasterize the layers for export to XFL.

**Note:** Transcoding is the conversion of a source file from one format to another format, such as from GIF to PNG. Rasterizing is the conversion of a layer to a bitmap image, incorporating all of the model information—such as vectors and keyframes—into a flattened, pixel-based image for each frame.

### Stage 1: Source files are passed through unchanged, if possible.

For a layer's source file to be passed through to the XFL file, the layer must meet these requirements:

- The layer has a source footage item, and that footage item uses a PNG or JPEG sequence or FLV file as its source. (The layer is not a text layer, camera layer, light layer, or shape layer.)
- The source footage item's frame rate matches the composition's frame rate.
- The layer's source is not trimmed.
- The layer does not extend before the first frame or after the last frame of the composition work area.
- The layer has no properties other than Position, Anchor Point, Opacity, Scale, and Rotation. Because effects add properties to layers, this requirement also means that the layer has no effects applied.
- The layer does not have motion blur, frame blending, or time-remapping applied.
- The layer does not have a track matte.
- There is no adjustment layer above the layer.
- Layers above do not use blending modes other than Normal.
- The layer does not have the Preserve Transparency option set, nor does any layer above it.
- The layer is not a 3D layer.

### Stage 2: Remaining source files are converted to PNG sequences or FLV files, if possible.

If the only reason that a layer's source file can't be passed through to the XFL file is that it doesn't use a PNG sequence, JPEG sequence, or FLV

file as its source, then the layer's source is transcoded or rasterized to a PNG sequence or FLV file, which is included in the XFL file. In this case, the layer's Position, Opacity, Scale, and Rotation keyframes are preserved and converted to keyframes in the XFL output. If multiple layers use the same source in After Effects and meet all of the other pass-through requirements listed above, they will also share a common source in the document created in Flash Professional. Precompositions can be rasterized as source items.

The XFL file created from a composition preserves the animation information for the layers in the composition. Keyframes for the Position, Opacity, Scale, and Rotation properties are converted to keyframes in Flash Professional, with one keyframe per frame for each animated property. Only 2D Position (x and y) keyframes and 2D (z) Rotation keyframes are converted.

In After Effects, the Anchor Point property can be animated, but the transformation point in Flash Professional can't be animated. In Flash Professional, the transformation point is located at the top-left corner of the symbol. Keyframe animations of transform properties (including Anchor Point) in After Effects are converted to animations based around the transformation center in the exported XFL file.

### **Stage 3: Remaining layers are rasterized as individual layers, if possible.**

If a layer doesn't meet the requirements for its source file to be passed through, transcoded, or rasterized as a source item, then the layer itself must be rasterized as a layer. Rasterizing a layer means that all of its keyframe information is lost—all of the information is contained in the rasterized image frames themselves.

To be rasterized as an individual layer, a layer must meet these requirements:

- The layer is either based on a video footage item (including a solid) or is a shape layer or text layer. (The layer is not a camera layer, light layer, or audio-only layer.)
- There is no adjustment layer above the layer.
- Layers above do not use blending modes other than Normal.
- The layer does not have a track matte.
- The layer does not have the Preserve Transparency option set, nor does any layer above it.
- The layer is not a 3D layer.

### **Stage 4: Remaining layers are rendered and rasterized together in bins.**

If a layer doesn't meet the requirements for rasterization to an individual layer, then it is rendered and rasterized together with other layers in a group (bin). Bins of layers that are rasterized together are generally 3D layers, layers that are composited together with blending modes, track mattes, and layers affected by an adjustment layer.

## **Limitations of exporting a composition to XFL format**

When Flash Professional opens an XFL file, it must load all of the assets into memory. After Effects warns you when you export a composition for which the assets will consume more than 580 MB. Similarly, After Effects warns you if the amount of time that an XFL file will take to open in Flash Professional is very large because the number of frames in a PNG sequence is greater than 1,050. You can still export a composition to XFL format if it exceeds these limits, but you may not be able to open the XFL file with Flash Professional.

 *To prevent the long load times related to sequences with a large number of PNG files, consider pre-rendering layers based on PNG sequences to FLV format.*

After Effects relies on the embedded version of the Adobe Media Encoder to create FLV files. The Adobe Media Encoder can't create FLV files with pixel dimensions greater than 1920x1080.

When you export a composition to the XFL format from a 32-bpc project, the rendering of colors with values under 0 and over 1 does not produce results that preserve the appearance of the composition in After Effects. You should only work in an 8-bpc or 16-bpc project when creating a composition that you intend to export to Flash Professional in XFL format.

Audio is not exported to the XFL file.

---

## **Render and export a composition as a SWF file**

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SWF files are small files that play in Flash Player. They are often used to deliver animated vector graphics (such as cartoons), audio, and other data types over the Internet. SWF files also allow viewer interaction, such as clicking to follow a web link, control animation, or provide input to a rich internet application (RIA). SWF files are the output created from FLA files.

While rendering and exporting a movie to a SWF file, After Effects maintains vector graphics as vector objects as much as possible. However, raster images, blending modes, motion blur, some effects, and the contents of nested compositions cannot be represented as vectors in the SWF file and are rasterized.

You can choose to ignore these unsupported items so that the SWF file includes only the After Effects features that can be converted into native SWF elements, or you can choose to rasterize frames that contain unsupported features and add them to the SWF file as JPEG-compressed bitmap images, which may reduce the efficiency of the SWF file.

Audio is encoded in MP3 format and added to the SWF file as an audio stream.

When After Effects creates a SWF file, it also saves a report ([SWFfile\_name]R.htm) to the same folder as the SWF file. The report also contains a link to the SWF file so that you can preview the output using the Flash Player plug-in. Open the report in a browser to view the SWF file and see

which items in the composition are unsupported.

The exported SWF file includes each unchanged item in the After Effects composition once, and then references it for each use. If a layer is used in multiple frames, each use refers to the same object, even if the layer's transform properties (such as Position) are animated. However, if the content of the layer changes—for example, if a mask on the layer is animated or if the source footage item for the layer is video—a new object is created for each frame in which the layer is visible. If multiple layers in the composition share the same source footage item, the source is added once and is then referenced for every additional layer that shares the source. If the source is an Illustrator file, a SWF movie clip is created and referenced. Text characters are added as vectors once and then referenced on all subsequent frames, unless you choose Fill Over Stroke from the Fill And Stroke options menu; in that case, the characters are added as vectors on every frame.

**Note:** If color management is enabled for the project, then colors are converted from the working color space of the project to the sRGB IEC61966-2.1 color space for output. This output color space is appropriate for movies shown in a web browser. (See *Color management*.)

1. Select the composition you want to export, and then choose File > Export > Adobe Flash Player (SWF).
2. Enter a filename (making sure to include the .swf extension) and location, and then click Save.
3. Specify options as appropriate, and then click OK.

Chris Jackson provides tips for rendering and exporting SWF files from After Effects in an excerpt from his book *Flash + After Effects* on the [Focal Press website](#).

## SWF export settings

**JPEG Quality** Specifies the quality of rasterized images. The higher the quality, the larger the file. (If you select Rasterize for Unsupported Features, the JPEG Quality setting is used for all JPEG-compressed bitmap images exported to the SWF file, including bitmap images generated from composition frames or Adobe Illustrator files.)

**Unsupported Features** Specifies whether to rasterize features that SWF format doesn't support. Choose Ignore to exclude unsupported features, or choose Rasterize to render all frames that contain unsupported features as JPEG-compressed bitmap images and include them in the SWF file. If you choose Rasterize, the SWF exporter rasterizes source files for each layer in the composition (except layers that use Illustrator files or solids as the source footage) and nested compositions with Collapse Transformations enabled.

**Audio Bit Rate** The bit rate of the exported audio. Choose Auto to get the lowest bit rate available for the specified Sample Rate and Channels settings. Higher bit rates increase file size. Audio in a SWF file is in MP3 format.

**Loop Continuously** Specifies that the exported SWF file loops continuously during playback. If you plan to specify looping by writing HTML code to control Flash Player, deselect Loop Continuously.

**Prevent Editing** Creates a SWF file that can't be modified by applications such as Flash Professional.

**Include Object Names** Includes layer, mask, and effect names in the file, for use as input to ActionScript programs. Selecting this option increases file size. Rasterized objects are not named.

Each mask is exported as a separate SWF object, the name of which is the layer name followed by the mask name. If all masks use Difference mode, all masks are exported as one SWF object, and the name is the layer name. Each text character is exported as a separate SWF object.

**Flatten Illustrator Artwork** Splits all overlapping objects into non-overlapping pieces. When you select this option, you don't need to convert Illustrator text to outlines before exporting. (This option supports source files from Illustrator 9.0 or later.)

Flattening Illustrator artwork has advantages and disadvantages. When you flatten Illustrator artwork, text is exported to SWF format properly, so you don't need to convert text to outlines. Overlapping objects are removed, so composited layers appear the same in both After Effects and the SWF file. End caps, joins, and transparency groups are exported properly, and artwork outside crop marks, which is not visible in the SWF file, is not included. However, SWF files don't necessarily become smaller. In addition, the flattening process may introduce unsupported objects that are then ignored or rasterized, and white fringes may appear around some objects. The process can be slow, memory-intensive, and possibly ineffective for complex Illustrator artwork.

**Include Layer Marker Web Links** Makes layer markers behave as web links. The Include Layer Marker Web Links option adds web links and a Get URL action to the SWF file by using information from layer markers. This option also adds a frame label to each SWF frame that has a layer marker. You can specify how the browser opens the web link with standard target commands (for example, \_blank). (See Web links, chapter links, cue points, and markers.)

## Target commands for web links in a SWF file

**\_blank** Loads the web link into a new browser window.

**\_parent** Loads the web link into the parent frame of the frame in which the current file is playing.

**\_self** Loads the web link into the current frame.

**\_top** Loads the web link into the top frame in the current window.

**\_level0** Loads another SWF file into level 0. The current file typically plays at level 0; another file loaded into level 0 usually replaces the current file. The URL must refer to another SWF file.

**\_level1** Loads another SWF file into level 1 if the URL refers to another SWF file.

## Supported features for SWF format export

**Layers** After Effects text layers are exported to SWF format as vector graphics. The following layer types and layer switches aren't supported: track mattes, 3D layers, 3D cameras, 3D lights, adjustment layers, shape layers, Preserve Transparency, Collapse Transformations, and motion blur. The Fill Over Stroke character option and the Blur animator property aren't supported, and only Normal blending mode is supported. Nested compositions aren't supported and are rasterized.

**Masks** Only masks with Add mask mode or Difference mask mode are supported; multiple masks in a layer must use the same mask mode. If



Add mode is specified, partial opacity and the Inverted option are also supported. Mask feather is not supported. The result of overlapping masks with Add mode and partial opacity may appear differently in the SWF file than in After Effects. (See Mask modes.)

**Effects** Path Text, Audio Waveform, and Audio Spectrum are supported for output to SWF format.

All Path Text options are supported, except the following: Composite On Original, Fill Over Stroke, and Difference mode.

Lines drawn by the Audio Spectrum and Audio Waveform effects are converted to vectors. The following unsupported features are ignored: Outside Color (only Inside Color is used), Softness, and Composite On Original. In addition, only uniformly thick lines are included in the SWF file. For example, if you select the Use Polar Path option in Audio Spectrum, lines become thicker farther from the center in After Effects, but in the SWF file the lines remain at the same thickness.

The waveforms may increase the SWF file size, so decrease the Displayed Samples value in the Audio Waveform effect or the Frequency Bands value in the Audio Spectrum effect, or decrease the frame rate to make the SWF file smaller.

**Resolution** SWF files are always created at full resolution (size of composition); JPEG-compressed bitmap images are rendered at full resolution.

**Adobe Illustrator files** Only stroked paths and filled paths in CMYK or RGB color spaces are supported.

Layers that have Illustrator source files are converted to corresponding SWF items if the layer does not contain masks or have Collapse Transformations enabled. Illustrator layers that contain masks or have Collapse Transformations enabled are rasterized. The SWF file maintains the Illustrator crop marks. Artwork outside the crop marks is included in the SWF file even though it's not visible, thereby increasing the file size.

The SWF export report lists information for unsupported features in Illustrator files for the first frame in which the Illustrator file is visible. Unsupported features are ignored or rasterized (depending on whether you've selected Ignore or Rasterize Unsupported Features) on all frames in which the footage is visible.

---

## Render and export a composition as an FLV or F4V file

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FLV and F4V files contain only pixel-based (rasterized) video, not vector graphics, and they aren't interactive.

The FLV and F4V formats are container formats, each of which is associated with a set of video and audio formats. FLV files generally contain video data that is encoded using the On2 VP6 video codec and audio data encoded using an MP3 audio codec. F4V files generally contain video data that is encoded using an H.264 video codec and the AAC audio codec.

**Note:** *After Effects CS4 and earlier also provided the option to encode video data in FLV files using the Sorenson Spark video codec.*

You can play a movie in an FLV or F4V container file in many different ways, including the following:

- Import the file into the Flash Professional authoring application and publish the video in a SWF file.
- Play the movie in the Adobe Media Player (AMP).
- Preview the movie using Adobe Bridge.

 *After Effects markers can be included as cue points in an output FLV or F4V file. To transfer keyframes or global property values into the Flash Professional authoring application from After Effects, run the `Convert Selected Properties To Markers.jsx` script before rendering and exporting an FLV or F4V file.*

You render and export a movie to the FLV or F4V container format using the render queue, just as you do with other formats. (See [Render and export a movie using the render queue](#).)

To include the alpha channel in the FLV output, use the On2 VP6 codec and select Encode Alpha Channel in the Video tab of the export settings dialog box. After Effects premultiplies channels with black when encoding transparency in FLV files. (See [Alpha channel interpretation](#): premultiplied or straight.)

When you render and export a composition to the F4V or FLV format from a 32-bpc project, the rendering of colors with values under 0 and over 1 does not produce results that preserve the appearance of the composition in After Effects. To avoid unexpected results, you can work in an 8-bpc or 16-bpc project when creating a composition that you intend to render and export to F4V or FLV format. Alternatively, you can work in a 32-bpc project, render and export the composition to another format, and then convert the output file to F4V or FLV.

### Online resources about FLV and F4V formats

[This video](#) from the *After Effects CS5: Learn By Video* series demonstrates export to FLV and F4V formats.

Jan Ozer provides technical details and tips in "Encoding options for H.264 video" on the [Adobe Developer Connection](#) website for encoding video using the H.264 video codec.

Kush Amerasinghe provides an overview of H.264 and F4V in "H.264 for the rest of us" on the [Adobe Developer Connection](#) website.

Robert Reinhardt provides information about video for Flash Player in some sample chapters from his book *Video with Adobe Flash CS4 Professional Studio Techniques* on the Peachpit website. In the ["Compression primer"](#) chapter, he explains in detail the advantages and disadvantages of the On2 VP6 and H.264 video codecs.

More information about FLV and F4V formats—including the F4V specification—is available on the [Adobe Developer Connection website](#).

Fabio Sonnati provides recommendations for settings for H.264 (F4V) movies for mobile devices on the [Adobe Developer Connection website](#).

More Help topics



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# Rendering and exporting still images and still-image sequences

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[Render and export a single frame of a composition](#)

## Rendering and exporting a sequence of still images

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You can export a rendered movie as a sequence of still images, in which case each frame of the movie is output as a separate still-image file. When you render one movie using multiple computers on a network, the movie is always output as a still-image sequence. Many 3D animation programs accept sequences of still images. Sequences of PNG files are often a good choice for transfer of visual elements from After Effects to Flash Professional.

If you are creating a movie for transfer to film, you will need to create a sequence of still images that you can then transfer to film using a film recorder.

Creating a sequence of PSD files is a good way to transfer frames to Photoshop for touchup and editing. You can then import the image sequence back into After Effects.

When specifying the output filename for a still-image sequence, you actually specify a file-naming template. The name that you specify must contain pound signs surrounded by square brackets ([#####]). As each frame is rendered and a filename created for it, After Effects replaces the [#####] portion of the name with a number indicating the order of the frame in the sequence. For example, specifying mymovie\_[#####].tga would cause output files to be named mymovie\_00001.tga, filmout\_00002.tga, and so on.

The maximum number of frames in a still-image sequence is 32,766.

## Render and export a single frame of a composition

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You can export a single frame from a composition, either as an Adobe Photoshop (PSD) file with layers intact or as a rendered image. This is useful for editing files in Adobe Photoshop, preparing files for Adobe Encore, creating a proxy, or exporting an image from a movie for posters or storyboards.

The Photoshop Layers command preserves all layers from a single frame of an After Effects composition in the resulting Photoshop file. Nested compositions up to five levels deep are preserved in the PSD file as layer groups. The PSD file inherits the color bit depth from the After Effects project.

In addition, the layered Photoshop file contains an embedded composite (flattened) image of all the layers. This feature ensures that the file is compatible with applications that don't support Photoshop layers; such applications display the composited image and ignore the layers.

A layered Photoshop file saved from After Effects may look different from the frame viewed in After Effects if the frame uses features that Photoshop doesn't support. For example, if the frame contains a blending mode that isn't available in Photoshop, a blending mode that most resembles it is substituted in the layer, but the embedded composite image (viewable only by applications that don't support Photoshop layers) looks the same. Alternatively, you can render the frame using the Composition > Save Frame As > File command to export a flattened and rendered version of the file to the PSD format.

PSD files generated by Save Frame As > Photoshop Layers have the sRGB IEC61966-2.1 ICC color profile embedded if color management is disabled for the project (the project's working color space is set to None). If color management is enabled for the project (the project's working color space is set to something other than None), then PSD files generated by Save Frame As > Photoshop Layers have the color profile embedded that corresponds to the project's working color space. (See [Color management and color profiles](#).)

1. Go to the frame that you want to export so that it is shown in the Composition panel.
2. Do one of the following:
  - To render a single frame, choose Composition > Save Frame As > File. Adjust settings in the Render Queue panel if necessary, and then click Render.
  - To export a single frame as an Adobe Photoshop file with layers, choose Composition > Save Frame As > Photoshop Layers.

 *To change the default output settings for the Save Frame As > File command, change the settings for the Frame Default render settings template (See [Create, edit, and manage render settings templates](#).)*

More Help topics





# Automated rendering and network rendering

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[Render a still-image sequence with multiple computers](#)

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## Automating rendering with aerender

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The executable file aerender (aerender.exe on Windows) is a program with a command-line interface with which you can automate rendering. The executable file is located in the same folder as the primary After Effects application. The default locations:

- Windows: \Program Files\Adobe\Adobe After Effects CS5\Support Files
- Mac OS: /Applications/Adobe After Effects CS5

You can use the aerender application to perform rendering operations on multiple computers as part of a render farm, or you can use the aerender application on a single computer as part of a batch operation.

You use the program by entering the command aerender on the command line (or in a batch script), followed by a series of optional arguments. Some of the arguments are simple options that take no arguments of their own (for example, -reuse), whereas others take arguments of their own (for example, -project project\_path).

 Enter the command aerender -help to show usage information.

The version and build number of the application are written to standard output (stdout).

The render may be performed either by an already running instance of After Effects or by a newly started instance. By default, aerender starts a new instance of After Effects, even if one is already running. To instead use the currently running instance, use the -reuse argument.

This example command tells After Effects to render frames 1 through 10 of Composition\_1 in project\_1.aep to a numbered sequence of Photoshop files using a multi-computer render:

```
aerender -project c:\projects\project_1.aep -comp "Composition_1" -s 1 -e 10  
-RStemplate "Multi-Machine Settings" -OMtemplate "Multi-Machine Sequence"  
-output c:\output\project_1\frames[####].psd
```

To render just Composition\_1 to a specified file, enter this command:

```
aerender -project c:\projects\project_1.aep -comp "Composition_1" -output c:\output\project_1\project_1.avi
```

To render everything in the render queue with current settings in the project file, enter this command:

```
aerender -project c:\projects\project_1.aep
```

| Argument        | Description                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| -help           | Print usage message.                                                                                                                                                                                                                                                                                                                                                                                                                   |
| -version        | Display the version number of aerender to the console. Does not render.                                                                                                                                                                                                                                                                                                                                                                |
| -v verbose_flag | verbose_flag specifies the kind of messages reported:<br>ERRORS : Reports only fatal and problem errors.<br>ERRORS_AND_PROGRESS : (default) Reports errors and progress of rendering.                                                                                                                                                                                                                                                  |
| -reuse          | Reuse the currently running instance of After Effects (if found) to perform the render. When an already running instance is used, aerender saves preferences to disk when rendering has completed, but does not quit After Effects. If this argument is not used, aerender starts a new instance of After Effects, even if one is already running. It quits that instance when rendering has completed, and does not save preferences. |

|                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>-mem_usage image_cache_percentmax_mem_percent</code> | image_cache_percent specifies the maximum percentage of memory used to cache already rendered images and footage. max_mem_percent specifies the total percentage of memory that After Effects can use. For both values, if installed RAM is less than a given amount (n gigabytes), the value is a percentage of the installed RAM, and is otherwise a percentage of n. The value of n is 2 GB for 32-bit Windows, 4 GB for 64-bit Windows, and 3.5 GB for Mac OS.                                                                                                                               |
| <code>-project project_path</code>                         | project_path is a file path or URI specifying a project file to open. If this argument is not used, aerender works with the currently open project. If no project is specified and no project is open, the result is an error.                                                                                                                                                                                                                                                                                                                                                                   |
| <code>-comp comp_name</code>                               | comp_name specifies a composition to render. If the composition is in the render queue already, then the first instance of that composition in the render queue is rendered. If the composition is in the project but not in the render queue, then it is added to the render queue and rendered. If this argument is not used, aerender renders the entire render queue; in this case, only the <code>-project</code> , <code>-log</code> , <code>-output</code> , <code>-v</code> , <code>-mem_usage</code> , and <code>-close</code> arguments are used, and all other arguments are ignored. |
| <code>-s start_frame</code>                                | start_frame is the first frame to render. If this argument is not used, aerender uses the start frame in the file.                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <code>-e end_frame</code>                                  | end_frame is the last frame to render. If this argument is not provided, aerender uses the end frame in the file.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <code>-i increment</code>                                  | increment is the number of frames to advance before rendering a new frame. A value of 1 (the default) causes normal rendering of all frames. Higher values render a frame and use it increment times in output, and then skip ahead increment frames to begin the cycle again. Higher values result in faster renders but choppy motion.                                                                                                                                                                                                                                                         |
| <code>-OMtemplate output_module_template</code>            | output_module_template is the name of a template to apply to the output module. If the template does not exist, using this argument causes an error. If this argument is not used, aerender uses the template already defined for the output module.                                                                                                                                                                                                                                                                                                                                             |
| <code>-RStemplate render_settings_template</code>          | render_settings_template is the name of a template to apply to the render item. If the template does not exist, using this argument causes an error. If this argument is not used, aerender uses the render template already defined for the item.                                                                                                                                                                                                                                                                                                                                               |
| <code>-output output_path</code>                           | output_path is a file path or URI specifying the destination for the final output file. If this argument is not used, aerender uses the path defined in the project file.                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <code>-log log_file_path</code>                            | log_file_path is a file path or URI specifying the location of the log file. If this argument is not used, aerender uses standard output (stdout).                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <code>-sound sound_flag</code>                             | If sound_flag is ON, a sound is played when rendering is complete. Default is OFF.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <code>-close close_flag</code>                             | close_flag specifies whether or not to close the project when rendering is complete, and whether or not to save changes:<br><br>DO_NOT_SAVE_CHANGES : (default) The project is closed without saving changes.<br><br>SAVE_CHANGES : The project is closed and changes are saved.<br><br>DO_NOT_CLOSE : The project is left open if using an already-running instance of After Effects. (New instances of After Effects must always quit when done.)                                                                                                                                              |
| <code>-rqindex index_in_render_queue</code>                | -rqindex works just like -comp, except that it won't create a render item from the composition automatically.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

|                           |                                                                                                                                                                                      |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| -mp                       | Additional processes may be created to render multiple frames simultaneously, depending on system configuration and preference settings. (See Memory & Multiprocessing preferences.) |
| -continueOnMissingFootage | The render operation continues even if a source footage item is missing.                                                                                                             |

Lloyd Alvarez provides a script on his [After Effects Scripts website](#) that takes items that are ready to render in the render queue and sends them to render in the background using aerender.

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## Network rendering with watch folders and render engines

You can render one or more compositions from a project using multiple computers over a network in a fraction of the time that a single computer would require. Network rendering involves copying the project and source files to a networked folder, and then rendering the project. (A network of computers used together to render a single composition is sometimes called a render farm.) You can set this up to work with render-only versions of After Effects called render engines.

You install render engines in the same manner as the full version of the application. You run the render engine using the Adobe After Effects Render Engine shortcut in the Adobe After Effects CS5 folder. (See Setup and installation.)

After Effects CS5.5 had to be serialized on render-only machines (e.g., in a render farm) due to licensing issues. In After Effects CS6, you can now run aerender or use Watch Folder in a non-royalty bearing mode, so serialization not required.

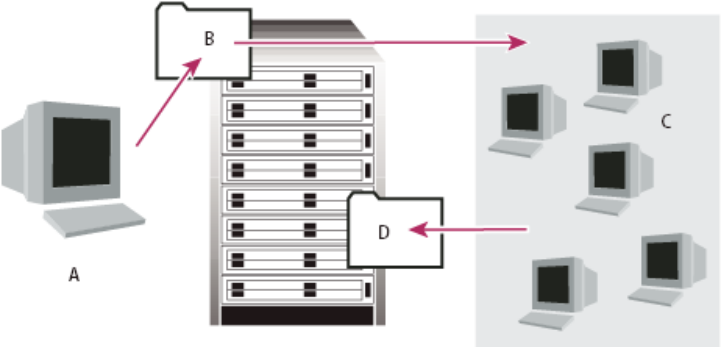
To enable non-royalty bearing mode: Place a blank file named ae\_render\_only\_node.txt into one of the following locations, depending on the user account type:

1. Install After Effects on the render-only machine.
2. Place a blank file named ae\_render\_only\_node.txt into one of the following locations, depending on the user account type:
  - Mac locations:  
/Users/<username>/Documents/  
/Users/Shared/Adobe/
  - Windows locations:  
C:\Users<username>\Documents  
C:\Users\Public\Documents\Adobe

You cannot use a watch folder and multiple render engines to simultaneously render a single movie file. However, you can use multiple render engines to render a movie as a sequence of still-image files. You can then use a post-render action to create a single movie file from that still-image sequence. (See Post-render actions.)

When you have multiple render engines on multiple computers monitoring a watch folder, they cooperate to achieve optimal efficiency. If your queued render items are set to Skip Existing Files (a Render Settings option), the render engines all work on a single render item at once—no render engine renders any frame another render engine has already worked on. If this option is not selected, each render engine handles a render item itself.

Rhys Enniks provides a video tutorial on [his website](#) that demonstrates the use of multiple computers on a network to render a composition with a watch folder.



Computer with full version of After Effects (A) saves a project and all source files to a folder (B) on a server. Computers with the render engine installed (C) open the project and render a still-frame sequence to a designated output folder (D) on the server.

### Network considerations

When working with multiple render engines on multiple computers, keep in mind the following guidelines:



- When possible, identify folders using absolute file paths so that the paths are correctly identified for all render engines. Identifying folders using absolute file paths may mean mapping network drives to a particular drive letter on all computers (for example, H:\renders\watch\). Avoid using relative paths (for example, \renders\watch).
- Each Macintosh computer monitoring the watch folder must have a unique name. Because the default names of computers are often identical, you should rename your computers to not use the default name.
- Make sure that all servers and clients (computers monitoring the watch folder) have hard drives with unique names.
- Do not use the same computer to serve a watch folder and to run After Effects in Watch Folder mode. Use a dedicated server that's accessible to all render engines to serve your watch folder.
- Do not render to or initiate Watch Folder mode on the root of a volume or a shared folder that appears as the root when viewed from another computer. Specify a subfolder instead. Also, avoid using high-ASCII or other extended characters and slashes in filenames. For multiple-computer rendering, After Effects includes the Multi-Machine sample template that you can use as a starting point.

 *When rendering across a network that includes volumes using different network or operating systems, such as Windows, Mac OS, Novell, and UNIX, make sure that you specify output files using a file-naming convention that's compatible with all rendering or destination volumes.*

### Project considerations

Make sure that you install all fonts, effects, and encoders (compressors) used in the project on all computers monitoring the watch folder. If a computer monitoring the watch folder can't find fonts, effects, or encoders used in a project, the render fails.

When you install an After Effects render engine on a computer, it contains all the plug-ins included with After Effects. If a composition uses a plug-in from another manufacturer, the plug-in must be present on all computers that will render the composition. However, support for network rendering varies among plug-in manufacturers. Before you set up a network to render effects created by third-party plug-ins, see the documentation for your plug-ins or contact the plug-in manufacturers and get answers to the following questions:

- Does the license agreement for the plug-in allow installing multiple copies on a network for the purposes of rendering?
- Are there any other limitations or tips that apply to using the plug-in for network rendering?

### Collect Files folder considerations

When you use the File > Collect Files command, files relevant to a project are copied to a single folder. This folder includes a copy of the project file, a render control file (RCF), and other files, depending on the options you choose in the Collect Files dialog box. If you save the Collect Files folder to a networked computer other than a server, don't run a render engine on that computer. Avoid saving the Collect Files folder to a local disk, the root level of a disk (such as C: in Windows or the Macintosh HD in Mac OS), or a shared folder, all of which can signify different locations to each render engine. All render engines must interpret the path in the same way.

 *Once the collected files appear in the watch folder, all monitoring render engines start rendering automatically. If you prefer, you can use the Collect Files command to store compositions and their source footage to a specified location and then initiate the watch-folder rendering process later. Doing so renders the projects in alphabetical order, rather than the order in which they were saved to the location.*

### Set up watch-folder rendering

1. Install the After Effects render engine on as many computers as you want to involve in network rendering. (For information on installing After Effects as a render engine, see Setup and installation.)  
**Note:** *If rendering time is unusually slow, you may be rendering to too many computers, and the network overhead required to track rendering progress among all computers is out of proportion to the time spent actually rendering frames. The optimal number depends on many variables related to the network configuration and the computers on it; experiment to determine the optimal number for your network.*
2. Create a watch folder called AE Watch Folder on a computer that's accessible to all of the After Effects render engines on your network.
3. In each render engine, choose File > Watch Folder, and select the watch folder that you've created.
4. Create your projects and compositions, and set them up in the render queue with the render settings and output modules you want to use. (All render items in the project must have output names; otherwise the Enable Watch Folder Render option in the Collect Files dialog box isn't available.)
5. Choose File > Collect Files to copy completed projects to your specified watch folder. Once you choose Collect Files, After Effects copies the project or composition and all source files to the watch folder.  
**Note:** *After Effects can't copy source files that are larger than 2 GB using the Collect Files command: you must copy them manually to the (Footage) folder in the Collect Files folder.*
6. Choose For Queued Comps from the Collect Source Files menu (unless you're manually moving source files), and then select Change Render Output To. This option creates a folder on the networked server for rendered files—all of the render engines need access to this folder to complete their rendering tasks.
7. Select Enable Watch Folder Render, click Collect, and name the Collect Files folder.
8. Save the Collect Files folder to a networked computer, preferably to a networked server.
9. Monitor the progress of the render engines by using a web browser to view HTML pages saved in the watch folder. After Effects generates these pages automatically when the rendering begins. Click the Reload button in your browser to see the updated status. These HTML pages describe any errors that occur.

After Effects renders the item to the specified destination folder. When After Effects finishes rendering all of the queued items in a given project, it closes that project without saving it and then scans the watch folder for new projects to render. Because it doesn't save the

project, After Effects ignores any Post-Render Actions in the Output Module settings dialog box that specify to import the item when it is rendered.

## Track dependencies of a watch-folder render

You can track render dependencies when you render over a network by setting Post-Render Action options. When you set these options, After Effects confirms that all of the items that it needs to render are ready and available. For example, if one item depends on another to render, and the first has not finished rendering or has received an error, the second does not render.

You can use this process to render a single QuickTime or AVI movie from a watch-folder render. The movie is actually created on only one computer.

**Note:** *This procedure assumes that you have already created a multiple-computer watch-folder.*

1. In the Render Queue panel, drag the output module to the Project panel. After Effects creates a placeholder for that item's output.
2. Drag the placeholder back to the Render Queue panel.
3. Set the render settings and output module settings for the placeholder, and click Render.

## Start in watch-folder mode

Watch-folder mode applies only to rendering from a folder on your local computer.

- To start After Effects in watch-folder mode automatically, save a project with the filename Watch This Folder.aep. After Effects watches the folder containing the project if you open that project.
- To start After Effects in watch-folder mode when you start your computer, create a shortcut (Windows) or alias (Mac OS) to the Watch This Folder.aep project and move it to your Startup folder (Windows) or your Startup Items folder (Mac OS). After Effects watches the folder containing the project if you open that project.
- (Windows only) To start After Effects in watch-folder mode from the command line, choose Start > Run, and then enter the following, modifying the application path to the exact name of the folder in which you installed After Effects, and replacing C:\[temp] with the path to your watch folder: "C:\Program Files\Adobe\Adobe After Effects CS5\Support Files\afterfx.exe" -wf C:\[temp]

 *To start the After Effects render engine rather than the full version of After Effects, use the -re option with the command.*

**Note:** *You can also use this command line in batch files.*

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## Render a still-image sequence with multiple computers

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Although the preferred method of rendering for multiple computers is using the Watch Folder feature, you can also use multiple computers and multiple copies of After Effects to render a composition across a network. You can use multiple computers to render only still-image sequences; you cannot use multiple computers to render a single movie.

When you render a still-image sequence with multiple computers, rendering in each copy of After Effects starts at approximately the same time. By specifying that each copy skip existing frames or frames in progress, multiple computers can render the project simultaneously, writing the still-image sequence to a single folder.

You can use any number of computers for rendering; in general, the more computers, the faster the rendering. However, if too many computers are used across a busy network, network traffic may slow down the entire process. You can detect network slowdown by observing the time spent in the Compressing & Writing stage in the Current Render section of the Render Queue panel.

**Note:** *Adobe does not provide technical support for general network configuration; consult your network administrator.*

Aharon Rabinowitz provides a video tutorial on the [Creative COW website](#) that goes through and explains the steps for rendering a still-image sequence with multiple computers.

1. Install After Effects on each computer that will be used to render the project. Make sure that you have the same fonts installed on each computer.  
**Note:** *Do not share plug-ins across a network. Make sure that you have a copy of the plug-ins folder on each computer that is running After Effects. When using third-party plug-ins, also be sure that the same plug-ins are available on all computers and that you have sufficient licenses for the plug-ins.*
2. Open the project on one computer, select the composition, and then choose Composition > Add To Render Queue.
3. Specify a sequence format in the Output Module area, and specify a folder in the Output To area. This folder must be available for all the computers that are rendering.
4. In the Render Queue panel, select Skip Existing Files in the Render Settings section so that multiple computers do not render the same frames. Do not use multiple output modules for one render item when using Skip Existing Files.
5. Save the project on the computer where you opened it in step 2.
6. On each computer that will be rendering, open and save the project. Saving the project ensures that After Effects records the new relative paths to each computer in the following step.
7. Unless the network can handle large file transfers rapidly, copy the project file and all its source footage to each rendering computer.
8. Open the Render Queue panel on each computer and click Render. You do not need to start rendering on each computer simultaneously, but to ensure equal workloads, start them at approximately the same time. As each computer finishes rendering a frame, After Effects searches the Output folder for the next unrendered frame and starts rendering again.

9. You can stop and start any computer at any time. However, if you stop a computer without starting it again, the frame that it was rendering may not be finished. If one or more computers stop during rendering, starting any one computer ensures that all frames in the sequence get rendered.

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## Segment settings

Segment settings are in the Output preferences category.

 Choose *Edit > Preferences > Output (Windows)* or *After Effects > Preferences > Output (Mac OS)*.

After Effects can render sequences and movie files into segments that are limited to a specified number of files or by file size. This is useful when preparing a movie for a medium such as CD-ROM, for which file or folder size may need to be limited to chunks of 650 MB or less. Use the Segment Video-only Movie Files At value to set the maximum size for segments in megabytes. Use the Segment Sequences At value to set the maximum number of still-image files in a folder.

If you are exporting a movie that is larger than the maximum file size for your hard disk formatting scheme, then you can set the Segment Video-only Movie Files At value to a value under this maximum. Hard disks formatted for Windows can be formatted using the FAT, FAT32, or NTFS scheme. The maximum file size in the FAT scheme is 2 GB, and the maximum file size in the FAT32 scheme is 4 GB. The maximum size for a file for NTFS is very large (approximately 16 terabytes), so you are unlikely to reach this limit with a single movie.

Only movies that do not contain audio can be segmented. If an output module includes audio, the Segment Video-only Movie Files At preference is ignored for that item.

The Segment Sequences At preference is ignored for any render item for which Skip Existing Files is selected in the render settings. (See Render settings reference.)

**Note:** *After Effects won't render and export a segmented movie to the root directory (e.g., C:\). To render and export a segmented movie, choose an output directory other than the root directory. (See Specify filenames and locations for rendered output.)*

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# Converting movies

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## Convert footage items between video formats

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You can use After Effects to convert one kind of video to another. When converting video, keep in mind the following guidelines:

- Changes in resolution may result in a loss of picture clarity, especially when up-converting from a standard-definition format to a high-definition format.
  - Changes in frame rate may require the use of frame blending to smooth out the interpolated frames. For longer footage items, the use of frame blending can result in very long render times.
1. Import the footage you're converting into a composition using the preset of the format you're converting to. Example: if you're converting NTSC to PAL, add your NTSC footage item to a composition with the appropriate PAL composition settings preset.
  2. Select the layer with the footage to be converted and choose Layer > Transform > Fit To Comp Width (or Fit To Comp Height).  
**Note:** For converting between two formats with the same frame aspect ratio, either of these two Fit commands does the same thing; if the frame aspect ratios differ (for example, going from 4:3 to 16:9), fitting to width or height chooses between cropping or letterboxing the resulting image.
  3. Do one of the following:
    - If your footage has no scene cuts, choose Layer > Frame Blending > Pixel Motion. Pixel Motion provides the best results for interpolation of frames, but may require long rendering times.
    - If your footage has scene cuts, or if you want to sacrifice quality for shorter rendering times, choose Layer > Frame Blending > Frame Mix.
  4. Choose Composition > Add To Render Queue.
  5. In the Render Queue panel, next to Render Settings, choose the appropriate preset from the menu. For example, if you're converting to DV footage, select DV Settings from the menu.
  6. In the Render Queue panel, next to Output Module, choose the appropriate output module preset from the menu, or choose Custom to enter custom settings. For example, if you're converting to DV PAL, choose the D1/DV-PAL output module preset with the audio sampling rate that you require.
  7. Click the name of the output module preset that you chose in step 6 to select additional Format Options.
  8. Specify a name and destination for the output file using the controls to the right of the Output To heading in the Render Queue panel. (See Specify filenames and locations for rendered output.)
  9. Click the Render button to render your movie.

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## Convert DV footage from PAL to NTSC using pulldown

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Because After Effects can easily convert film (24 fps) to video (29.97 fps) using 3:2 pulldown, you can perform a clean PAL-to-NTSC transfer by setting up 25-fps PAL video to act like 24-fps film. This lets you apply 3:2 pulldown to the footage when converting to 29.97 fps. This technique works especially well for progressive (noninterlaced) PAL video.

1. Create a new composition with the DV NTSC or DV NTSC Widescreen preset.
2. Import your DV PAL footage into the new composition.
3. Select the layer with the DV PAL footage, and choose Layer > Transform > Fit To Comp Width (or Fit To Comp Height).
4. Do one of the following:
  - To preserve audio synchronization but slightly lower the pitch, choose Layer > Time > Time Stretch, and then enter 95.904 in the Stretch Factor box.
  - To preserve audio pitch but not synchronization, or for clips without audio, right-click (Windows) or Control-click (Mac OS) the footage item in the Project panel, select Interpret Footage > Main, select Conform To Frame Rate, and then enter 23.976 in the Conform To

Frame Rate box.

5. Choose Composition > Add To Render Queue.
6. Choose Custom from the Render Settings menu.
7. In the Render Settings pane, enable Field Rendering (choose the field order required by your output type), select any option from the 3:2 Pulldown menu, and then click OK.
8. Choose the output type from the Render Queue Output Module menu (for example, Microsoft DV NTSC 32 kHz).
9. Specify a name and destination for the output file using the controls to the right of the Output To heading in the Render Queue panel. (See Specify filenames and locations for rendered output.)
10. Click the Render button to render your movie.

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## Scaling a movie down

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Several methods exist for producing a reduced-size movie from your composition, each with tradeoffs between speed and quality:

**Nest the composition** Create a new composition at the smaller dimensions, and nest the large composition inside it. For example, if you create a 640x480 composition, place it in a 320x240 composition. Use the Fit To Comp command to scale the composition to fit the new smaller composition size: Press Ctrl+Alt+F (Windows) or Command+Option+F (Mac OS), and then collapse transformations by choosing Layer > Switches > Collapse. The resulting composition rendered at full resolution and best quality will have excellent image quality, better than if you had rendered using a reduced resolution.

**Resize the composition** This method produces the highest quality reduced-size movie but is slower than nesting. For example, if you create a 640x480 composition and render it at full resolution, you can set the Resize value in the Output Module Settings dialog box to 50% to create a 320x240 movie. For a composition rendered at full resolution, the image quality is excellent when the Resize Quality is set to High.

**Note:** Do not use resizing to change the vertical dimensions of a movie when field rendering is on. Resizing vertically mixes the field order, which distorts motion. Use either cropping or composition nesting if you need to vertically resize a field-rendered movie.

**Crop the composition** This method is ideal for reducing the size of a movie by a few pixels. Use the Crop options in the Output Module Settings dialog box. Remember that cropping cuts off part of the movie, so objects centered in the composition may not appear centered unless the movie is cropped evenly on opposite edges.

**Note:** In some special cases, After Effects will automatically crop rather than scale when creating an output movie with dimensions that don't match the dimensions of the composition. For example, when creating a 720x480 movie with a pixel aspect ratio of 0.91 or 1.21 from a 720x486 composition, After Effects will crop instead of scale.

**Crop to a region of interest** To render just a portion of the composition frame, define a region of interest in the Composition panel. Then, select the Region Of Interest option in the Output Module Settings dialog box before rendering. (See Region of interest (ROI).)

**Note:** Cropping an odd number of pixels from the top of a field-rendered movie reverses the field order. For example, if you crop one row of pixels from the top of a movie with Upper Field First field rendering, the field-rendering order then becomes Lower Field First. Remember that if you crop pixels from the top of the movie, you need to add to the bottom row of the movie to maintain the original size. If you don't mind losing one scan line, this technique gives you a way to output two movies from one render, each with a different field order.

**Render the composition at a reduced resolution** This method is the fastest for creating reduced-size movies. For example, if you create a 640x480 composition, you can set the composition resolution to one half, reducing the size of the rendered composition to 320x240. You can then create movies or images at this size. The reduced resolution reduces the sharpness of the image and is best used for creating preview or draft movies.

**Note:** When rendering at reduced resolution, set the quality of the composition to Draft. Rendering at Best quality while reducing resolution does not produce a clean image and takes longer to render than rendering at Draft quality.

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## Scaling a movie up

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Increasing the size of the output from a rendered composition reduces the image quality of a movie and is not recommended. If you must enlarge a movie, to maintain highest image quality, enlarge a composition that was rendered at full resolution and highest quality using one of the following methods:

**Nest the composition** Create a new composition at the larger dimensions and nest the smaller composition inside it. For example, if you create a 320x240 composition, you can place it in a 640x480 composition. Resize the composition to fit the new larger composition size, and then collapse transformations by choosing Layers > Switches > Collapse. The resulting composition rendered at full resolution and best quality will have better image quality than if you had resized the movie. However, this method also renders slower than if you created a composition and resized it.

**Note:** To create a draft movie with specific dimensions, use both the Resize option and reduced resolution in the rendered composition.

**Resize the composition** For example, if you create a 320x240 composition and render it at full resolution, you can set the Resize value in the Output Module Settings dialog box to 200% to create a 640x480 movie. For a composition rendered at full resolution, the image quality is usually acceptable.

**Note:** Do not use resizing to change the vertical dimensions of a movie with field rendering. Resizing vertically mixes the field order, which distorts any motion. Use either cropping or composition nesting if you need to vertically resize a field-rendered movie.

**Crop the composition** To enlarge a movie by a few pixels, increase the size using negative values for the Crop options in the Output Module Settings dialog box. For example, to increase the size of a movie by 2 pixels, enter -2 in the Cropping section of the Output Module Settings dialog box. Remember that negative cropping adds to one side of a movie, so objects originally centered in the composition may not appear centered when the movie is cropped.

**Note:** Adding an odd number of pixels to the top of a field-rendered movie reverses the field order. For example, if you add one row of pixels to the top of a movie with Upper Field First field rendering, the field-rendering order then becomes Lower Field First. Remember that if you add pixels to the top of the movie, you need to crop from the bottom row of the movie to maintain the original size.

 Adobe Photoshop provides fine control over resampling methods used for scaling of images. For fine control of resampling, you can export frames to Photoshop to change the image size and then import the frames back into After Effects.

For a list of plug-ins that provide high-quality scaling—including some designed to create high-definition images from standard-definition sources—see the [Toolfarm website](#).

For a script that scales multiple compositions simultaneously, see the [AE Enhancers forum](#).

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## Create a composition and render source footage items simultaneously

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You can simultaneously create a composition from source footage and prepare it for rendering. This process is useful when you want to change some characteristic of the source footage, such as frame rate or compression method, and have that rendered version available in your project.

**Note:** In After Effects CS6, the *Composition > Make Movie* command has been removed. Use the *Add to Render Queue* command instead.

1. Drag one or more footage items from the Project panel to the Render Queue panel, or select the footage items in the Project panel and do one of the following:
  - Choose Composition > Add to Render Queue.
  - For After Effects CS5.5, and earlier, press Ctrl+Shift+/ (Windows) or Command+Shift+/ (Mac OS).
  - For After Effects CS6, you can also press Ctrl+M (Windows) or Command+M (Mac OS).

**Note:** If the *Use System Shortcut Keys* option is enabled in General preferences (Mac OS), the shortcut is Ctrl+Cmd+M.

2. After Effects creates both a new item in the render queue and a new composition in the Project panel for each footage item.
3. Adjust the render settings as desired, and click Render.

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## Introduce 3:2 pulldown

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If you are creating output for film that's been transferred to video, or if you want to simulate a film look for animation, use 3:2 pulldown. Footage items that were originally film transferred to video and had 3:2 pulldown removed when imported into After Effects can be rendered back to video with 3:2 pulldown reintroduced. You can introduce 3:2 pulldown by choosing one of five different phases. (See Remove 3:2 or 24Pa pulldown from video.)

**Note:** It is important to match the phase of a segment that had 3:2 pulldown removed if it will be edited back into the video footage it came from.

1. In the Render Queue panel, select the render item and then click the underlined text next to the Render Settings heading.
2. For Field Render, choose a field order.
3. For 3:2 Pulldown, choose a phase.
4. Select other settings as appropriate, and then click Render.

Chris and Trish Meyer provides an overview of 3:2 pulldown in an article on the [Artbeats website](#).

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## Test field-rendering order

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When you render a composition containing separated footage, set the Field Rendering option to the same field order as your video equipment. If you field-render with the incorrect settings, the final movie may appear too soft, jerky, or distorted. A simple test can determine the order in which your video equipment requires fields.

**Note:** The field order might get altered if you change the hardware or software of your production setup. For example, changing your device control software or VCR after setting the field order can reverse your fields. Therefore, any time you change your setup, test the field-rendering order.

The test takes about 15 minutes and involves creating two movie versions of the same composition (one rendered with Upper Field First and one with Lower Field First), and then playing the movies to see which choice looks right.

1. Create a simple composition with the correct frame size and frame rate. Choose an NTSC or PAL preset in the Composition Settings dialog box, and make the composition at least 3 seconds long.
2. Within the composition, make a layer that is a small rectangular solid. The layer can be any color as long as it contrasts sharply with the composition background. You may want to add a title (such as "Upper Field First") to the solid to make identification of the movie easier.
3. Apply some fast movement to the solid using keyframes in its Position property. Set keyframes from the upper-left of the Composition panel to the lower-right for 1 second.
4. Save the project, and then drag the composition to the Render Queue panel.
5. Click the underlined Render Settings name, and then choose Upper Field First from the Field Render menu.
6. Click OK, and then click Render to make the movie.
7. In the composition, change the color of the solid in the Composition panel, and add a new title, such as "Lower Field First", to identify it.

8. Render the composition again, choosing Lower Field First from the Field Render menu in the Render Settings dialog box.
9. Record both movies to the same device.
10. Play both movies.

One movie will look distorted and have jumpy horizontal motion or shape distortion during vertical motion. The other movie will play back smoothly, with sharply defined edges. Use the field order for the smooth-playing movie whenever you render movies with that particular hardware configuration.

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# Export an After Effects project as an Adobe Premiere Pro project

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You can export an After Effects project as an Adobe Premiere Pro project without rendering.

**Note:** *After Effects projects saved as Adobe Premiere Pro projects cannot be opened by all versions of Adobe Premiere Pro.*

When you export an After Effects project as an Adobe Premiere Pro project, Adobe Premiere Pro uses the settings from the first composition in the After Effects project for all subsequent sequences. Keyframes, effects, and other properties are converted in the same way as when you paste an After Effects layer into an Adobe Premiere Pro sequence. (See [Importing from After Effects and Adobe Premiere Pro](#).)

1. Choose File > Export > Adobe Premiere Pro Project.
2. Specify a filename and location for the project, and click Save.

**Note:** *You can also import Adobe Premiere Pro projects and sequences into After Effects, copy and paste between After Effects and Premiere Pro, and use [Dynamic Link](#) to exchange data between After Effects and Premiere Pro.*

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