USER MANUAL

Boris
CONTINUUM
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v e r s i o n   1 . 0

Boris Continuum Version 1.0

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Contents

Introduction

Boris Continuum is a package of 23 effects designed to complement and enhance the functionality provided by Boris AE 3.0. The package includes:

- A number of **particle-based filters** that allow you to quickly create effects such as snow, rain, and sparks, plus a full Particle System that provides in-depth control over individual particles (including custom shapes) as well as the overall shape and movement of the system.

- Several **time-based filters** that can be used to automatically generate loops and sequences, adjust a layer's frame rate, create frame blending, and randomize parameter values over time.

- A **Trails filter** that creates, composites, and animates trails and video feedback behind a source layer as it animates. This filter also applies recursive effects and geometric transformations to the trails.

- Several filters based on a procedural noise generator that produce continuous, auto-animated, organic effects and transitions including **Fire, Burnt Film, and Stars**.

- Three useful **compositing filters** that can be used to blend layers and fine-tune the output using a variety of controls.

- Two **Z Space** filters that allow you to intersect multiple planes in 3D space, add true 3D lights and shadows, and group objects in containers to perform global parameter adjustments and animations.

- An improved DVE filter can be used to transform a plane in 3D space, apply motion blur, and add three different types of lights to the effect.

Using the Manual

This manual includes detailed descriptions of every filter available in Boris Continuum.

Formatting Conventions

Several formatting conventions are used in this manual to highlight parameter descriptions. The first time a parameter is mentioned in the text, the parameter name appears in **bold** print. The first time a menu choice is mentioned in the text, the menu choice is *italicized*. Subsequent references to parameters and menu choices appear as plain text.

Icons

Throughout the User Manual, four icons are used to denote sections of special interest.

Indicates warnings about procedures that might produce unwanted effects, are very memory-intensive, or cannot be easily undone.

Accompanies useful notes about a parameter, filter, or procedure. These notes can help you better understand how to use Boris Continuum.

Denotes a reference to another part of the manual in the text. Check the indicated sections for further information.

Accompanies creative ideas and techniques for using Boris Continuum to produce specific effects.

Computer Experience

This manual assumes that you that you understand your computer's operating system at a fundamental level and are familiar with basic computer functions such as mouse-pointing, clicking, dragging, scrolling, and choosing commands from menus. You should also know how to select and edit text and how to create, open, and save documents and folders. Consult the documentation provided with your computer if you are not familiar with these terms and functions.

Host Application Experience

This manual assumes that you have installed the host application software on your system and that you are proficient enough in the host application to perform basic-level program tasks.

Release Notes

The Release Notes contain valuable, up-to-date information on new features, supported host applications and operating systems, and known limitations. The Release Notes are located on the Boris Continuum CD-ROM.

Technical Support

If you encounter questions or difficulties that are not covered in this manual visit the Boris FX Technical Forum at http://www.borisfx.com/support, and look for the link for your host application and operating system. You can also contact Boris FX Technical Support by calling (617) 451-9900 or e-mailing techsupport@artelsoft.com.

GETTING STARTED

Chapter 1
Getting Started

The User Interface

This section provides information on using the After Effects user interface with Boris Continuum and describes several features used by Continuum not found in After Effects.

Group Headers

Each Continuum filter has a number of parameter controls which are categorized into groups. Groups of parameters appear under a text header set off by underlines (for example, "_PixelChooser_").

The illustration below includes 8 parameter groups—Production, Movement, Appearance, Custom Shape, Camera, Attractors, Interaction, and Animation. The Custom Shape group has been expanded, revealing the parameters within.
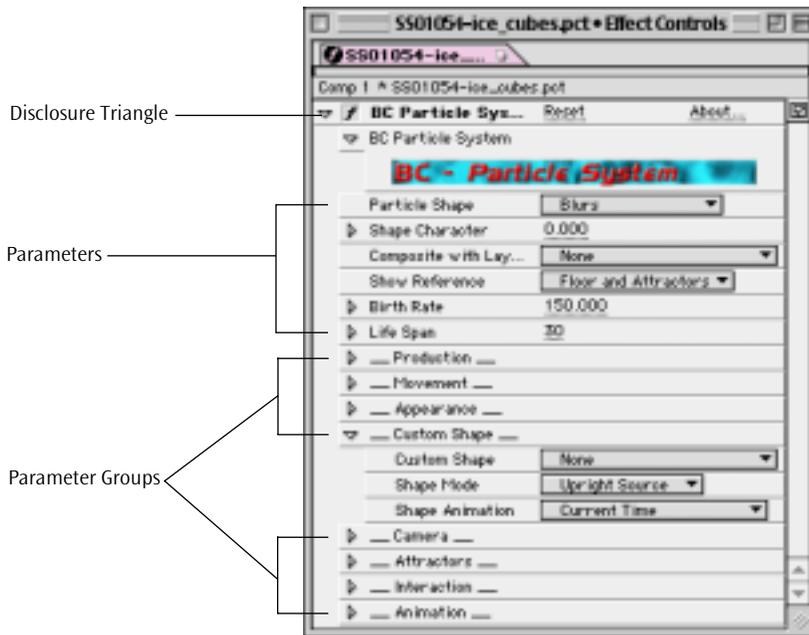
Clicking on the disclosure triangle to the left of a text header expands the parameter group, revealing its contents. Click the triangle a second time to close the group.

Locks

Some parameters' values can be locked together in order to keep their values equal when one setting is adjusted. For example, Scale X and Scale Y controls are locked by default in order to preserve the object's aspect ratio. A lock option appears before each set of parameters that can be locked together. Generally, the value of the second parameter is locked to the first.

When the lock checkbox is selected, adjusting the first locked parameter also adjusts the second locked parameter. In addition, adjusting the second parameter has no effect on either parameter when the lock is selected.

Lock Scale	☑ Lock
▷ X Scale	100.0
▷ Y Scale	100.0

When the lock checkbox is deselected, you can adjust each parameter independently.

Lock Scale	☐ Lock
▷ X Scale	100.0
▷ Y Scale	200.0

Lock checkboxes are animatable parameters.

Layer Menus and Precomposing

Many of the filters include layer menus which enable you to use information from other layers in your composition to control some aspect of the filter applied to the source layer. The layer menu includes choices corresponding to each layer in the composition, in addition to a *None* setting. When None is selected, the menu has no effect on the filter.

Blend Layer	√ None
	1. balloon.pct
	2. church.pct
	3. field.pct

It is important to note that the filter uses the chosen layer's source media without any effects and/or geometric transformations that were applied to the layer in the composition. If you would like to use the transform the chosen layer and have the transformations affect the source layer, you need to precompose:

1   First, place the source media in a second composition and apply the desired effects and/or transformations.
2   Drag the second composition into the original composition.

3   If you have already applied effects and geometrics to a layer, you can use the Precompose command (in the Layer menu) to move the layer and its effects into a new composition.

4   Select the composition in the layer menu.

Menu choices cannot be animated.

Point Controls

Many Boris Continuum filters use point controls to specify locations along the X and Y axis in the

Position XY   320.0 , 240.0

source image. If the effect is selected in the Effect Controls Window, the Composition window includes a position point icon for each point control parameter.

There are several different ways to enter and edit point control values:

- Click on the cross-hair and click the mouse at the desired location in the Composition window.
- Click on the cross-hair, adjust the location with the arrow keys, and press Return or Enter.
- Click on the numerical values and enter new values in the dialog box.
- Select the appropriate effect in the Effect Controls Window, and drag the position point corresponding to the point control that you want to adjust.

Color Controls

Color controls are used to choose a color for some attribute of a filter or object, such as a light source, border, or text face. Click the color chip to access the system color picker, or use the eyedropper to choose a color from the screen.

Color Light 1

Color Chip   Eyedropper
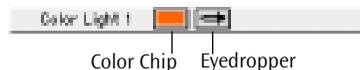
The PixelChooser

Many filters in Boris Continuum have a group of PixelChooser parameters. The PixelChooser uses the source image's color or luma information to select which pixels to filter. For example, you can use the PixelChooser to apply a filter to only the brightest or

darkest areas of an image, depending on the luma values you set. You can also select another image or clip to use as a Mask Layer, and use that image's color or luma information to selectively filter the source image.

The PixelChooser also provides region controls that can be used to specify which region in the source image is filtered. You can apply a filter to any rectangular or oval-shaped region and animate the size of the region to create wipes between the source and filtered images.

The PixelChooser is described in detail in Chapter 8, "The PixelChooser". See page 209 for more information.

COLOR FILTERS

Chapter 2
Color Filters

BC Boost Blend

Boost Blend is a compositing filter that blends two independent layers in a composition and adjusts contrast in the blended pixels. Unlike most transfer modes, Boost Blend adjusts the mix only where the source and blend layers are different. Boost Blend is especially useful when you composite an image over itself and do not want the transfer mode to affect areas where the blended pixels are identical to the source pixels. This filter also contains a PixelChooser which provides additional control over the selection of pixels to adjust.

General Parameters

Blend Layer chooses any layer in the composition to blend with the source layer (the layer to which Boost Blend is applied). The illustrations below show the source layer and the blend layer used in the examples in this section.

Source layer

Blend layer

Mix Back controls the opacity of the source and blend layers in the composite image. Increasing the Mix Back value increases the opacity of the blend layer. At a Mix Back value of 100, the blend layer is completely opaque and the source layer is completely

transparent. Decreasing the Mix Back value decreases the opacity of the blend layer. At a value of –100, the blend layer is completely transparent and the source layer is completely opaque.

Mix Back= –60
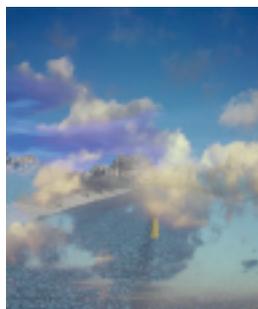
Mix Back=0

Mix Back=60

Mix Back is not affected by the PixelChooser.

Boost Mode controls how the layers are blended together in the composite. Each option uses a slightly different algorithm to adjust the contrast in the blended output, and some algorithms use **Extra 1** and **Extra 2** to adjust the output.

The differences between the various Boost Modes can be very subtle or quite pronounced, depending on your footage and the Extra 1 and Extra 2 settings. Try each Boost Mode setting to see which works best.

• *Exponential* blends the layers by subtracting an offset value from each pixel's color channels, exponentiating the value, adding the results, and then adding back the offset. When you use this mode, Extra 1 controls the exponent that is used in the calculations, and Extra 2 sets the offset value that is subtracted. Adjusting Extra 1 and Extra 2 using the Exponential mode can produce extreme posterization effects, as shown in the example at right.

- *Equal Power Pos.* is an algorithm modeled on the audio concept of an equal power crossfade. This algorithm emphasizes the light pixels in the blend, which can be useful when blending dark images. Extra 1 and Extra 2 have no effect when Equal Power Pos. is selected.

- *Equal Power Neg.* is similar to Equal Power Pos., but it uses the difference between the pixels' channel values and 255 in computing the output contrast. This algorithm emphasizes the dark pixels in the blend, which can be useful when blending lighter images. Extra 1 and Extra 2 have no effect when Equal Power Neg. is selected.

- *Bias* increases the contrast of pixels whose color channel values are furthest from the Extra 2 value. The output is left unchanged if Extra 1 is set to 0.

- *Off* blends the two images equally by making them both 50% opaque, and does not affect the contrast of the blended output. This mode is useful for comparing the results of the other algorithms to an effect in which the contrast is unchanged.

Boost Mix mixes the selected Boost Mode with the *Off* Boost Mode (see the description of the Off Boost Mode in the preceding section). When Boost Mix is set to 100, the selected Boost Mode and the Extra 1 and Extra 2 settings are used. Setting Boost Mix to 0 produces an equal blend of the source and blend layers with no contrast adjustments. Intermediate values produce varying degrees of contrast adjustment in the blended output.

The **PixelChooser** parameters allow you to apply the filter selectively using region controls or the source image's channel values. For more information, see "The PixelChooser" on page 209. Note that the PixelChooser does not affect the Mix Back parameter in this filter.

BC Composite

Composite offers a variety of options for compositing one layer over another. This filter also offers a PixelChooser for greater creative control.

Mix Layer chooses any layer in the composition to composite with the source layer. The illustrations below show the source layer and the mix layer used in the examples in this section.

Source layer

Mix Layer

Mix Behind mixes the chosen mix layer behind the source layer. Changes to this setting are only visible if the source layer is partially transparent. Increasing this value increases the opacity of the mix layer.

Mix In Front mixes the mix layer in front of the source layer. Increasing this value increases the opacity of the mix layer.
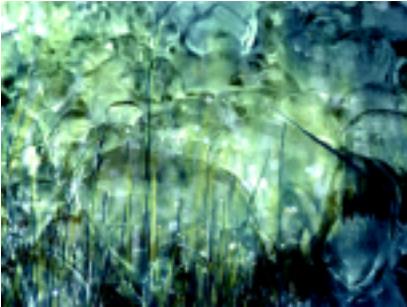
Mix In Front=40

Mix In Front=60

If both Mix Behind and Mix In Front are used, the Mix Layer is first composited behind the source. The Apply Mode, Apply Mix and Apply Mix From settings are then used to composite the Mix Layer over the initial composite of the source and the Mix Layer.

Brightness adjusts the brightness of the composite image. Increasing positive values lighten the composite, while decreasing negative values darken the composite.

Brightness= –25

Brightness=0

Brightness=25

Contrast adjusts the contrast in the composite image. Increasing this value increases contrast, while decreasing this value decreases contrast.

Contrast= –25   *Contrast=0*   *Contrast=25*

Apply Mode controls how the source and mix layers are composited.

Normal   *Scale Screen*   *Lightness*

For descriptions of all the possible Apply Modes, see "Apply Modes" on page 217.

Apply Mix blends the Apply Mode setting with the **Apply Mix From** setting. The resulting mixed mode is used to composite the mix layer over the original source media. For example, if Apply Mode is set to *Lighten* and Apply Mix From is set to *Normal*, then Apply

Mix blends the Lighten and Normal apply modes. In this case, an Apply Mix setting of 0 uses the Normal apply mode, and an Apply Mix setting of 100 uses the Lighten apply mode. An Apply Mix setting of 50 blends the two apply modes equally.

You can use Apply Mix to soften the effect of a given apply mode, or to animate from one apply mode to another over time.

The **Alpha Channel** setting determines which information is used to create the output alpha. *Original* uses the source layer's alpha as the output alpha. *Composite* creates a composite alpha channel in which pixels that are opaque in either the source or the mix layer are opaque. *Mix Layer* uses the mix layer's alpha as the output alpha.

Mix Back allows you to quickly create transitions between the source layer, composite image, and mix layer without having to adjust multiple parameters. When Mix Back is – 100, the source layer is completely opaque. As Mix Back approaches 0, the composite image becomes increasingly opaque. At 0, the composite image is completely opaque. Increasing Mix Back above 0 makes the mix layer increasingly opaque, and at a value of 100, the mix layer is completely opaque.

The **PixelChooser** parameters allow you to apply the filter selectively using region controls or the source image's channel values. For more information, see "The PixelChooser" on page 209.

BC Super Blend

Super Blend is a compositing filter that allows you to superimpose up to five layers, then adjust and animate the view through each layer. If you imagine the composition as a series of layers of paint applied to a background layer, Super Blend enables you to move in and out of the composition by adjusting the distance between the viewer's eye and the background, the thickness of the layers, and the distance separating each layer. This filter also offers a PixelChooser for greater creative control.
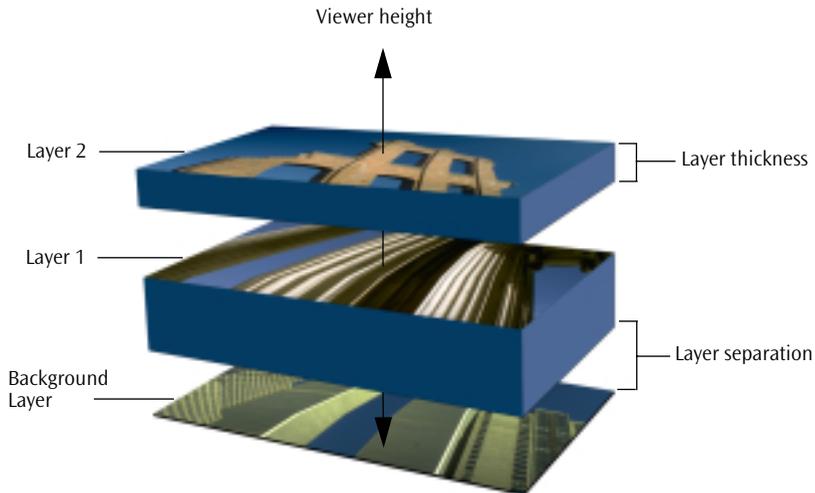
General Parameters

Viewer Height sets the distance between the viewer's "eye" and the background layer in the composition. At the default value of 0, the viewer is placed just above the background layer and below all of the other layers in the composition. Thus only the background layer is visible. As Viewer Height increases, the viewer's eye moves through each successive layer. At a value of 100, only the topmost layer is visible.

Selecting **Normalize Height to Layers** scales the Viewer Height by the sum of the Layer Separation and Layer Thickness (see "Layer 1-5 Parameters" below) values for all of the active layers so that the total height of the effect equals 100 units. If Normalize Height

is deselected, then the Viewer Height is measured in the same absolute units as Layer Separation and Layer Thickness, and the total height of the effect may be taller or shorter than 100 units.

For example, when Normalize Height is selected, a Viewer Height of 100 always places the viewer immediately above the topmost layer. When Normalize Height is deselected, a Viewer Height value of 100 does not necessarily place the viewer above the last layer. Instead, the location of the viewer in relation to the layers depends on the number of layers, the distance between the individual layers, and the thickness of each layer.

Background controls the appearance of the background layer.

- *Source Layer* uses the layer to which Super Blend is applied as the background layer.
- *Transparent* makes the background transparent.

Mix with Original blends the source and filtered images. Use this parameter to animate the effect from the unfiltered to the filtered image without adjusting other settings, or to reduce the effect of the filter by mixing it with the source image.

Layer 1-5 Parameters

Select **Layer 1 On** to include the layer in the effect. Leave this option deselected to exclude the layer from the effect.

The **Layer 1** menu allows you to select any layer in your composition to use as Layer 1.

Separation Layer 1 sets the vertical distance between Layer 1 and the layer below. For example, if Separation Layer 1 is 10, when Viewer Height is 10 or less, the Background Layer is visible. When Viewer Height is greater than 10, Layer 1 is visible.

Opacity Layer 1 scales the opacity of the layer. At an Opacity Layer 1 value of 100, the layer is completely opaque. At a value of 0, Layer 1 is completely transparent.

Thickness Layer 1 determines the thickness of Layer 1. For example, if Thickness Layer 1 is 5 and Separation Layer 1 is 10, when Viewer Height is 10 or less the background is visible. When Viewer Height is between 10 and 15, the viewer is "inside" Layer 1. The opacity of the layer increases as the Viewer Height approaches 15. When Viewer Height is greater than 15, Layer 1 is fully visible and its opacity is determined solely by the Opacity Layer 1 setting.

Apply Mode Layer 1 controls how Layer 1 is composited with the layers below.

For descriptions of all the possible Apply Modes, see "Apply Modes" on page 217.

Apply Mix Layer 1 controls the mix of the specified Apply Mode Layer 1 with the *Normal* apply mode. If the Apply Mode Layer 1 is Normal, Apply Mix Layer 1 has no effect. If Apply Mix Layer 1 is 0, Apply Mode Layer 1 has no effect. Increase Apply Mix Layer 1 to blend the Apply Mode Layer 1 setting with the Normal apply mode.

The Layer 2-5 Parameters function in the same manner as the Layer 1 parameters, but apply to the additional layers in the composition.

Height Maps Parameters

The Height Maps parameters allow you to apply up to three independent height maps to vary the viewer's height from point to point in the image. You can choose a different source layer for each height map. The filter uses the source map layer's alpha, luma, or color channels to determine the viewer height for each pixel in the composite.

For example, this image shows the relative height of each source layer before height maps are applied.

Layer 3
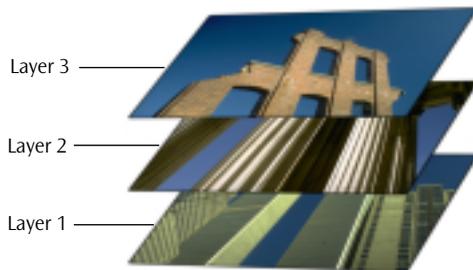
Layer 2

Layer 1

This gradient is applied as a Height Map Layer, and its luma channel used as the Map Channel.
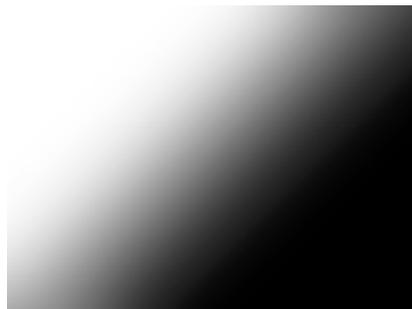
Higher luma channel values (white areas) in the Map Layer place the viewer's eye higher in the composite. Lower luma values (black areas) place the viewer's eye lower in the composite.

The Height Maps control only the relative viewer height across the image, meaning you can still move Viewer Height up and down to adjust how much of each layer is visible in the composite. For example, increasing Viewer Height displays more of the topmost image (Layer 3) and none of the bottom-most image (Layer 1).

Select **Use Height Maps** to turn the height maps on and enable the height map controls.

Select **Mask with Height Maps** to mask the output of the filter with a composite of the alpha channels in all three height maps.

Source 1 Map selects which layer in the composition is used to generate Map 1. If *None* is selected, the map is not used, and the other Map 1 parameters have no effect.

Channel Map 1 chooses which channel in the Source 1 Map is used to create Map 1.

If Luma or one of the RGB color channels is chosen, the height offsets in the map are scaled by the alpha values in the Source 1 Map layer.

The height map is created by comparing each pixel's Channel Map 1 value and the **Reference Map 1** value. The difference between the 2 values in each pixel scales the Viewer Height at that pixel.

- When Map 1 Reference is *Black*, each pixel's channel value is compared to a value of 0. In this case, the channel values directly scale the Viewer Height.

- When Map 1 Reference is *Gray*, 128 is subtracted from each pixel's channel value, and the Viewer Height is scaled by the result.
- When Map 1 Reference is *White*, each pixel's channel value is subtracted from 255, and the Viewer Height is scaled by the result.

Amount Map 1 determines the direction and amount of displacement applied equally to all height values in the map. Positive values increase the Viewer Height, while negative values decrease the Viewer Height.

The remaining controls in this section adjust **Map 2** and **Map 3**. These parameters function identically to the corresponding Map 1 controls described above.

The **PixelChooser** parameters allow you to apply the filter selectively using region controls or the source image's channel values. For more information, see "The PixelChooser" on page 209.

PARTICLES FILTERS

Chapter 3
Particles Filters

BC Comet

BC Comet creates an auto-animated comet that streaks across the screen. The comet is compromised of particles whose sizes, shapes, and colors can be adjusted. You can also set the length and speed of the effect, adjust the camera perspective, position the starting and ending points of the comet, and apply a gravitational force to adjust the comet's movement.

When you play the effect or preview it to RAM, the comet's position automatically animates from the source point to the destination point.

**Source XY** sets the comet's source point on the X and Y axis.

Source Z sets the comet's source point on the Z axis. Negative values move the source point closer to the viewer, while positive values move the source point farther away.

Destination XY sets the comet's destination point on the X and Y axis.

Destination Z sets the comet's destination point on the Z axis. Negative values move the destination point closer to the viewer, while positive Source Z values move the destination point farther away.

Completion Time determines how long it takes for the head of the comet to move from the source to the destination points. This value is scaled as a percentage of the total effect duration. For example, suppose the effect duration is 60 frames. When Completion Time is set to 25, the comet travels from the source to the destination points in 15 frames, or 25% of 60 frames. When Completion Time is 50, the comet takes 30 frames to move from its source to it destination, and so on.

Particle Density controls the density of the individual particles which comprise the comet. Use low Particle Density values to create a less-distinct mass, or higher values to create a dense ball.
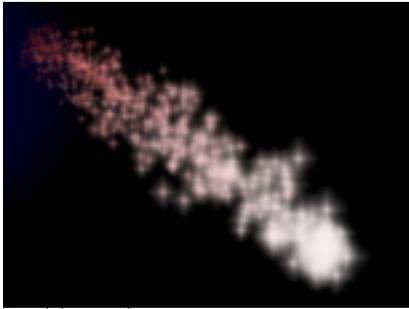

Particle Density=30
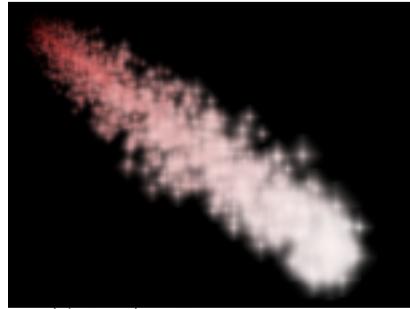
Particle Density=75

Select **Composite on Alpha** to composite the comet over a transparent background. Deselect this option to use the filtered layer as the background for the effect.

Blur adds a slight blur to the comet, which can be useful for softening the edges of the particles which comprise the comet. Increasing this value increases the amount of the blur, while decreasing this value reduces the amount of blur applied.

Gravity allows you to apply a second force to the movement of the comet. Increasing this value pulls the comet increasingly strongly in the direction of the **Gravity Angle** as it moves from its source to destination points.

Air Resistance adjust the amount of air resistance pushing against the comet. Increasing the Air Resistance value causes particles to be pushed more closely toward the center of the comet.
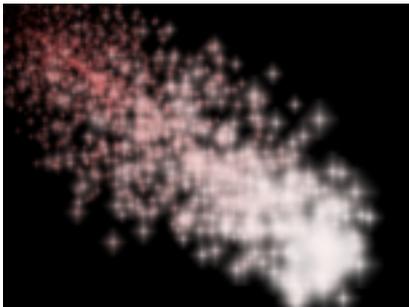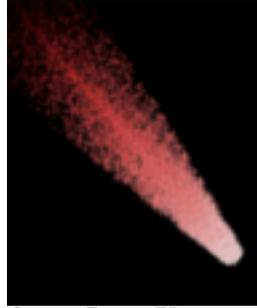

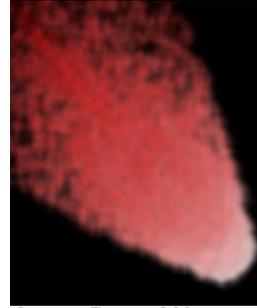*Air Resistance=65*
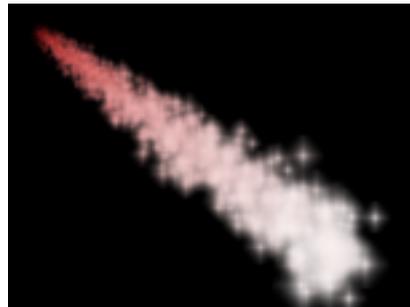
Air Resistance=85

Camera Zoom moves the entire comet toward and away from the viewer. At a value of 0, the comet is infinitely far away and becomes invisible. Increasing this value brings the comet closer to the viewer.

Camera Zoom=25   *Camera Zoom=75*   *Camera Zoom=200*

Particles Parameters

Particle Shape lets you choose the shape of the generated particles that comprise the comet. The choices are *Reference Boxes, Pixel Streaks*, *Pixel Trails*, *Antialiased Lines*, *Blurs* (blurred colored circles), *Bubbles* (open circles), *Shaded Spheres*, *Wide Sparkles*, *Long Sparkles*, *Round Noise*, and *Pointers*.

Particle Character adjusts the look of the particles. The effect of this setting depends on the which Particle Shape is chosen.

- With Reference Boxes, Wide Sparkles, and Pointers, increasing positive Particle Character values stretch the particles horizontally, while decreasing negative values stretch the particles vertically.
- With Pixel Streaks, Pixel Trails, and Antialiased lines, increasing positive Particle Character values lengthen the particles, while decreasing negative values shorten them.
- With Blurs, increasing positive Particle Character values soften the edges of the particles, while decreasing negative values create harder edges.
- With Bubbles, increasing positive Particle Character values enlarge the size of the transparent area in the center of the particles, while decreasing negative values shrink this area.
- With Shaded Spheres, increasing positive Particle Character values increase the opacity of the shaded edges of the particles, while decreasing negative values decrease the opacity of the shading.

- With Long Sparkles, increasing positive Particle Character values lengthen the four points of the sparkles, while decreasing negative values shorten the points.
- With Round Noise, increasing positive Particle Character values increase the resolution of the noise, while decreasing negative values decrease the resolution.

The **Particle Lifespan** parameter determines how long each particle lasts before it decays. Increasing this value makes the particles last longer, while decreasing this value makes the particles last a shorter length of time.

Compositing controls how the particles are composited on each other when they overlap.

- *Normal* treats each particle as a separate object, and particles closest to the viewer overlap particles behind them.
- *Additive* causes particle colors to mix together as the particles intersect
- *Somewhat Additive* blends the Normal and Additive modes.
- *Averaging* takes the average of the colors of the particles as they intersect.

The other controls in this section select the color, brightness, and opacity of the generated particles, and are divided into three groups. The **Start** settings affect the particles as they are produced at the source, the **End** settings affect the particles as they reach their final destinations, and the **Midpoint** settings allow you to affect particles differently between the Start and End points. If all these options are used, the effect creates a gradient between Start, Midpoint, and End settings.

Each of the three groups contains the following parameters.

Color selects colors for the Start, Midpoint, and End ranges of the effect.

Brightness Variance controls the range of brightness values among the particles. Increasing Brightness Variance creates a comet in which some particles are bright and others are dim, and increases the disparity between the brightest and dimmest particles. Leaving this parameter at the default setting of 0 ensures that all particles will have the same brightness value.

Opacity sets the opacity level of the particles. A value of 100 makes all particles in the range completely opaque, and a value of 0 makes all particles completely transparent (invisible). You can set different Opacity values in the Start and End ranges to create effects in which particles stream outward from the source and disappear.

Size controls the size of the particles. Note that the Size parameter has no effect on Particle Shapes that are line shapes (Pixel Streaks, Pixel Trails, and Antialiased Lines), but does affect the size of all two-dimensional Particle Shapes (Blurs, Bubbles, Shaded Spheres, 2D Boxes, and Sparkles).

In addition to the Opacity and Size parameters, there is a **Use Midpoint** checkbox. Turning this checkbox off enables you to use Midpoint color and brightness settings that are different from Start and End settings.

For example, suppose you have a stream of particles whose colors change from red at the source, to yellow, to blue at the end. You have also set Opacity to 75% at the start, and 25% opaque at the end. With the Use Midpoint checkbox on, you would have to adjust the Midpoint Opacity to 50% in order to create a smooth Opacity gradient. With this checkbox turned off, the effect would interpolate between the Start and End Opacity settings to create a smooth gradient.

Midpoint Location moves the Midpoint along the gradient between the Start and End values. A value of 0 places the Midpoint close to the generation point, and particles reach the Midpoint color, size, and opacity values soon after birth. A value of 100 places the Midpoint nearer the End point, and particles reach the Midpoint Color, Size, and Opacity values toward the end of their life span.

Midpoint Variance increases the range of Midpoint Location values among the particles. With a Midpoint Variance setting of 0, all particles reach the Midpoint settings at the same location. As you increase the Midpoint Variance value, the Midpoint Location varies more from particle to particle. Therefore, at higher values, some particles reach the Midpoint settings early on, while others reach the Midpoint settings near the end of their life span.

Opacity Boost affects the opacity levels of the entire comet, after individual Start, Midpoint and End opacity values are taken into account. This slider provides a means of adjusting and animating the opacity of the effect as a whole without changing individual parameters for each range.

Size Variance sets the range of particle sizes for the comet, after individual Start, Midpoint, and End size values are taken into account. A Size Variance value of 0 ensures that all particles conform to the chosen Size values for their ranges. Increasing Size Variance creates more disparity between the smallest and largest particles in each range.

Production Parameters

Particle Velocity determines the amount of force with which particles move away from the center of the comet as the comet moves.
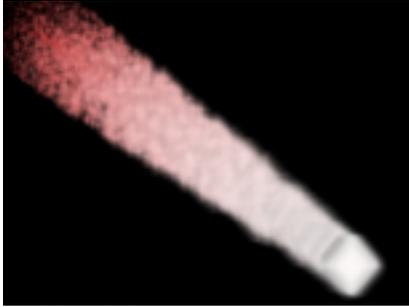

Particle Velocity=10
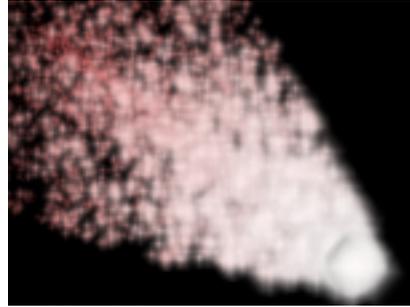
Particle Velocity=35

Particle Velocity Variance controls the range of possible Particle Velocity values among the particles in the comet. Leaving this parameter at the default setting of 0 ensures that all particles will have the same Particle Velocity value. Increasing this value creates a wider range of possible Particle Velocity values that can appear in the effect.

Tumble, **Spin** and **Rotate** move the comet around the X-, Y- and Z-axis, respectively.

Spread affects the overall tightness of the comet as it moves from the source to the destination point. Decreasing this value brings the particles closer to the source, while increasing it spreads out the particles and causes them to flow farther from the source.
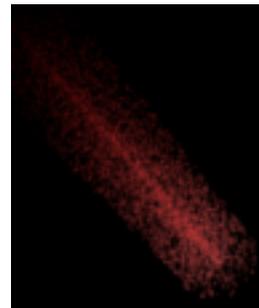
Increasing **Delay** from the default value of 0 causes particles within a certain distance of the comet's head to remain invisible. Delay can be used to create a comet with no visible production center, since particles do not show up until they have dispersed to some extent.
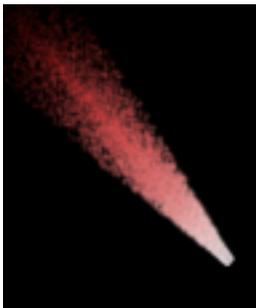
Delay=0
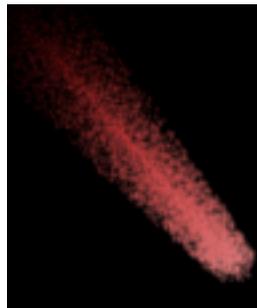
Delay=30

Delay=60

Options Parameters

Start on Frame allows you to start the auto-animated effect a number of frames past the first frame of the filtered layer. For example, setting Start on Frame to 20 starts the animation twenty frames past the beginning of the filtered layer. Therefore, if the head of the layer occurs at frame 60 in the composition, the particle effect begins at frame 80 in the composition.

Time Scale allows you to adjust the timing of the effect by stretching time out or speeding it up. Decreasing Time Scale below the default value of 100 stretches time out. Thus, the effect appears to take place in slow motion, with particles taking more time to reach their destination or die out. Time scale values greater than 100 speed time up, causing the comet to move more quickly.

Increasing **Precision** increases the accuracy of particle movement, which can be helpful when creating complex effects. Higher values increase rendering times proportionately.

Optimize Algorithm helps speed up rendering times without affecting the apparent quality of the image. Deselect this option if there are "jumps" in the render.

Random Seed determines which value is input to the random number generator used by the filter. Adjust this value when you like the overall effect but want to adjust the random configuration of the particles.

BC Particle System

BC Particle System is an auto-animated particle generator that provides in-depth control over individual particles as well as the overall shape and movement of the system. This filter offers extensive options for adjustment, enabling you to create a wide variety of useful effects. You can control the size, shape, color, velocity, and movement properties of the particles; adjust the size and shape of the particle production area; set points which attract or repulse the particles as they move through space; control the camera perspective of the effect; adjust the way particles interact with the edges of the effect; and customize the animation of the effect.

Particle Shape chooses the shape of the generated particles. The choices are *Reference Boxes, Pixel Streaks*, *Pixel Trails*, *Antialiased Lines*, *Blurs* (blurred colored circles), *Bubbles* (open circles), *Shaded Spheres*, *Wide Sparkles*, *Long Sparkles*, *Round Noise*, and *Pointers*.
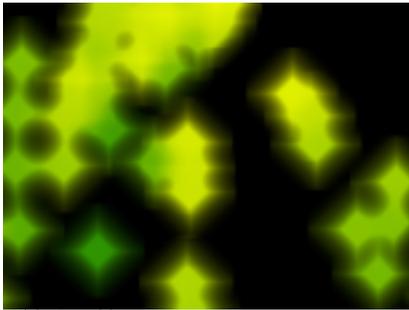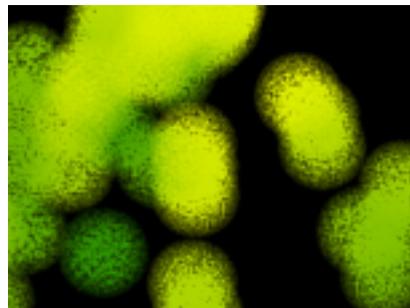

Wide Sparkles
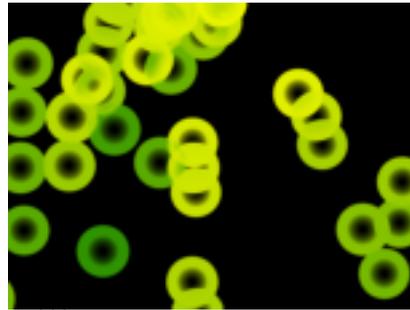
Bubbles

Reference Boxes

Round Noise

Shape Character adjusts the appearance of the particles. The effect of this setting depends on which Particle Shape is chosen.

- With Reference Boxes, Wide Sparkles, and Pointers, increasing positive Shape Character values stretch the particles horizontally, while decreasing negative values stretch the particles vertically.
- With Pixel Streaks, Pixel Trails, and Antialiased lines, increasing positive Shape Character values lengthen the particles, while decreasing negative values shorten them.
- With Blurs, increasing positive Shape Character values soften the edges of the particles, while decreasing negative values create harder edges.
- With Bubbles, increasing positive Shape Character values enlarge the size of the transparent area in the center of the particles, while decreasing negative values shrink this area.
- With Shaded Spheres, increasing positive Shape Character values increase the opacity of the shaded edges of the particles, while decreasing negative values decrease the opacity of the shading.
- With Long Sparkles, increasing positive Shape Character values lengthen the four points of the sparkles, while decreasing negative values shorten the points.
- With Round Noise, increasing positive Shape Character values increase the resolution of the noise, while decreasing negative values decrease the resolution.

The **Composite with Layer** menu allows you to composite the particle system over any layer in the composition, or to retain an alpha background by selecting the *None* option.

Show Reference determines which onscreen position controls are visible. Choose *Floor Only*, *Floor and Attractors*, *Attractors Only*, or *None*.

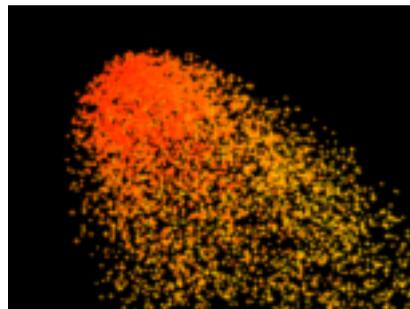The Floor and Attractors are described in "Interaction Parameters" on page 58 and "Attractors Parameters" on page 56, respectively.

Birth Rate controls the number of particles produced over a constant time.
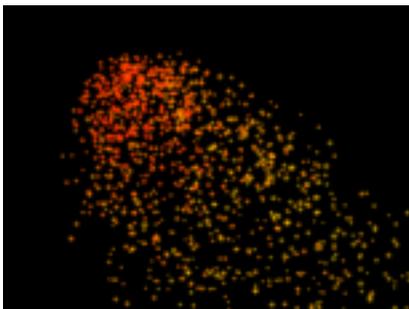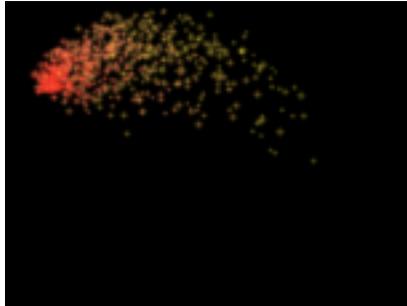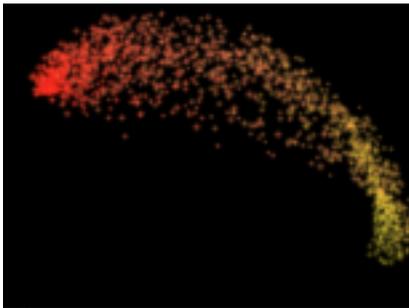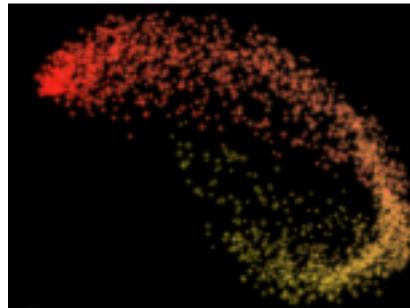

Birth Rate 50

Birth Rate 250

The **Life Span** parameter determines how long each particle lasts before it decays. You can use longer life spans to create trailing effects, as in the examples below.

Life Span 15

Life Span 30

Life Span 60

Production Parameters

Production Boundary allows you to set a boundary for the particle production area using the alpha channel from any layer in your composition. Particles are only generated within the region that corresponds to the opaque portion of the Production Boundary layer's alpha channel. If the chosen layer has no alpha, this setting has no effect.

Center XY sets the coordinates of the particle source point.

Center Z controls the apparent depth of the particle system. Higher values move the system closer to the viewer, while lower values move the system farther away.

Width and **Height** stretch the particle source along the horizontal and vertical axis, respectively. Increasing one of these parameters stretches the source in one dimension and creates a particle source that is a straight line. Increasing both causes the source to

be stretched in two dimensions and creates a particle source that is a plane. When the particle source is a plane, the particles appear to be generated randomly within the space, rather than flowing out from a specific point or line.
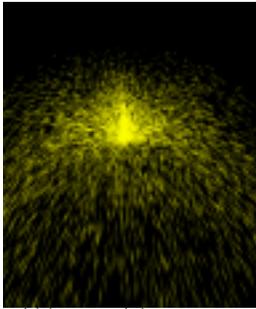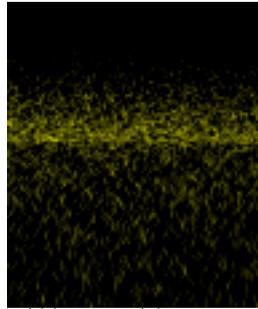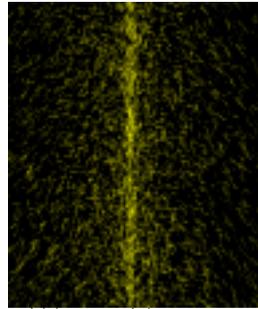

*Width=0, Height=0*   *Width=50, Height=0*   *Width=0, Height=50*

Depth controls the movement of the particles in Z-space. Decreasing Depth from the default value of 0 makes the particles appear to be nearing the viewer as they flow out from the source. As a result, particles appear to grow in size as they approach the viewer. Increasing Depth makes the particles appear to be moving away from the viewer as they flow out from the source. In this case, particles appear to shrink as they move away from the source.

Position Randomness varies the positions of the particles. Higher values create a wider range of possible particle positions, while lower values create a narrower range of possible positions. Setting Position Randomness to 0 creates a grid of particles.

Initial Velocity controls the velocity of the particles as they leave the source. A high Initial Velocity value gives particles more momentum as they leave the source, meaning that they travel farther in the initial direction before they decay or are affected by factors such as gravity or attractors. At the default values, the particles leave a point and move upward until gravity begins to pull them down. Increasing the Velocity value allows the particles to achieve more height before falling. Decreasing Velocity causes the particles to have less momentum, therefore causing them to fall more quickly.

Tumble, **Spin** and **Rotate** move the particle flow around the X-, Y- and Z-axis, respectively. Note that these parameters only affect the direction of particles as they leave the source, but do not affect the particle system as a whole. Try adjusting these parameters while the Floor is displayed, then compare these parameters with Camera Tumble, Camera Spin, and Camera Rotate (see page 54) which move the entire system as they are adjusted.

Spread Amount affects the overall tightness of the particle pattern as the particles leave the source. Decreasing this value brings the particles closer to the source as they descend, while increasing it spreads the particles out and causes them to flow farther from the source.
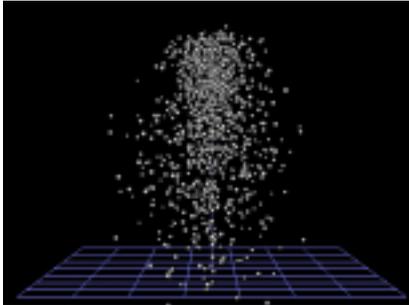
Spread Amount=35
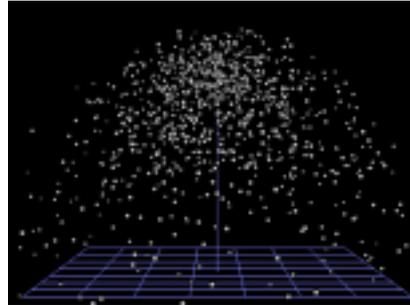
Spread Amount=150

Spread Mode controls for the overall shape of the particle system.

- The default selection, *3D*, generates particles which flow out through a cone-shaped region in all directions.
- *Fountain* is similar to 3D, but adds more particles flowing straight upward in the manner of water droplets flowing from a fountain.
- *Flat Fan* sprays particles out in a two-dimensional fan shape on two opposite sides of the source.
- *Sine Cannon* shoots particles out of a generator being swung in a circle around the source point.
- *Circular* sprays particles out from the edges of a circle.
- *Spiral* creates particles that spiral around a central source, much like hurricane winds spiralling around the eye of the storm.

The best way to see what each of these Spread Modes does is to select one option, then use the Camera controls (described on page 54) to look at the particle pattern it creates in all three dimensions. To do so, hold down the Option key (on Macintosh) or the Alt key (on Windows) while you tumble, spin, or rotate the camera.

Spread Character can be used to fine-tune the shape of the particle system created by the selected Spread Mode. The effect of this parameter depends on which Spread Mode is selected.

- In the 3D and Fountain Spread Modes, Spread Character alters the shape of the cone through which the particles flow.
- In Flat Fan mode, Spread Character decreases the randomness of the particles and making them spray out from the source point in a more ordered manner.
- In Circular mode, Spread Character causes more particles to spread toward the center of the circle rather than only spraying out from the edges.
- In Sine Cannon mode, Spread Character affects the speed of the swinging generator.
- In Spiral mode, Spread Character makes the spiral pattern tighter or wider.

Movement Parameters

Gravity applies a secondary force to the particles' movement as they flow outward from the source. Gravity can either counteract or strengthen the particles' initial velocity. By default the **Gravity Angle** is set to 180° (straight down) in order to simulate the effect of gravity in nature, but the strength and direction of the Gravity can be adjusted to produce other effects (such as wind) as well.

Increasing the **Air Resistance** value adds resistance to the particles, and causes them to decelerate as they disperse.

Velocity Variance varies the speeds of individual particles. Increasing this value creates a wider range of possible particle velocities. Leaving this parameter at the default setting of 0 ensures that all particles will travel at exactly the same speed.

The **Amplitude** parameter controls the shape of the particle's paths as they leave the source point. At the default value of 0, the particles follow a straight line. Positive values cause the particles to follow a sinosidal (sine wave) path. Negative values cause the particles to follow a negative sinosidal path, meaning that the wave dips before it peaks. The amplitude, or height, of the wave increases as the Amplitude value moves away from zero. More extreme Amplitude values produce increasingly erratic particle paths which make the system appear more chaotic.

Amplitude Variance adjusts the range of possible Amplitude settings among individual particles in the system. A high Amplitude Variance value produces a wider range of wave heights among the individual particle paths, creating greater a disparity between the highest and lowest waves. An Amplitude Variance of 0 ensures that all particle paths have the same Amplitude setting.

Frequency adjusts the frequency of the sine wave, and therefore the number of waves that the particles create over the course of their life span. A Frequency value of 0 produces no wave motion, so particles travel in a straight line until affected by gravity or other factors. More extreme Frequency values produce very wavy particle paths which make the system appear more chaotic.

Frequency Variance adjusts the range of possible Frequency settings among individual particles in the system. A high Frequency Variance produces a larger range of wave frequencies among the particle paths, creating a greater disparity between the fastest and slowest waves. A Frequency Variance of 0 ensures that all particle paths have the same Frequency setting.

Appearance Parameters

Color Reference Layer chooses any layer in your composition to use as a source for particle colors. At the default setting, *None*, the source image is used.

Compositing determines how the particles are composited on each other when they overlap.

- *Normal* treats each particle as a separate object, so particles closest to the viewer overlap particles behind them.
- *Additive* causes particle colors to mix together where the particles intersect
- *Somewhat Additive* blends the Normal and Additive modes.
- *Averaging* takes the average of the colors of the particles as they intersect.

Normal   *Additive*   *Somewhat Additive*   *Averaging*
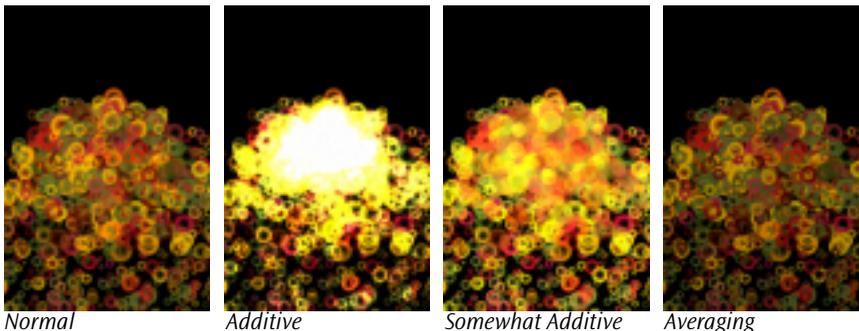
The following controls determine the color, brightness, and opacity of the generated particles, and are divided into three groups. The **Start** settings affect the particles as they are produced at the source, the **End** settings affect the particles as they reach their final

destination or decay point, and the **Midpoint** settings allow you to affect particles differently between the Start and End points. If all these options are used, the effect creates a gradient between Start, Midpoint, and End settings.

Each of the three groups contains the following parameters.

The **Color** pull-down menus offer several means by which the particles' color is derived.

- *Source Point* causes each particle to use the color of the source layer at the point where the particle originates. If the effect's source coordinates correspond to a red region in the source layer, the particle is red.
- *Source Update* causes each particle to use the color of each point on the source image that the particle passes through. If the particle passes from a blue region in the source to a red region, the particle's color will change from blue to red.
- *Source within System* is similar to Source Point, except that Source within System picks colors from the source based on the particles' positions relative to the particle system instead of relative to the source layer.
- *Random Source* causes the particles use the color of a randomly chosen point in the source image.
- *Random Source 2* uses another randomly chosen color from the source image as the particle color.
- *Custom Color* sets the particle color to the color you have chosen with the Custom Color control.

Brightness Variance controls the range of possible brightness values among the particles. Increasing Brightness Variance creates a system in which some particles are bright and others are dim, and increases the disparity between the brightest and dimmest particles. Leaving this parameter at the default setting of 0 ensures that all particles will have the same brightness value.

Custom Color allows you to select colors for the Start, Midpoint, and End ranges of the effect. Note that you must set the Color menu (described above) to *Custom Color* in order to use this parameter.

Opacity sets the opacity level of the particles. A value of 100 makes all particles in the range completely opaque, and a value of 0 makes all particles completely transparent (invisible). You can set different Opacity values in the Start and End ranges to create effects in which particles stream outward from the source and disappear.

Size adjusts the size of the particles. Note that the Size parameter has no effect on Particle Shapes that are line shapes (Pixel Streaks, Pixel Trails, and Antialiased Lines), but does affect the size of all two-dimensional Particle Shapes (Blurs, Bubbles, Shaded Spheres, 2D Boxes, and Sparkles).

In addition to the Opacity and Size parameters, there is a **Use Midpoint** checkbox. Turning this checkbox off enables you to use Midpoint color and brightness settings that are different from Start and End settings.

For example, suppose you have a stream of particles whose colors change from red at the source, to yellow, to blue at the end. You have also set Opacity to 75% at the start, and 25% opaque at the end. With the Use Midpoint checkbox on, you would have to adjust the Midpoint Opacity to 50% in order to create a smooth Opacity gradient. With this checkbox turned off, the effect would interpolate between the Start and End Opacity settings to create a smooth gradient.

Midpoint Location moves the Midpoint along the gradient between the Start and End values. A value of 0 places the Midpoint close to the generation point, and particles reach the Midpoint Color, Size, and Opacity values soon after birth. A value of 100 places the Midpoint nearer the End point, and particles reach the Midpoint Color, Size, and Opacity values toward the end of their life span.

Midpoint Variance increases the range of Midpoint Location values among the particles. With a Midpoint Variance setting of 0, all particles reach the Midpoint settings at the same location. As you increase the Midpoint Variance value, the Midpoint Location varies more from particle to particle. Therefore, at higher values, some particles reach the Midpoint settings early on, while others reach the Midpoint settings near the end of their life span.

When **Sparkle Fade** is selected, the particles' opacities vary as the effect progresses, creating a sparkling particle effect. Leave this option deselected to maintain the opacity of the particles throughout the effect.

If Sparkle Fade is selected, **Sparkle Fade Speed** determines the rate at which the particles' opacities change. When Sparkle Fade is deselected, Sparkle Fade Speed has no effect.

System Opacity affects the opacity levels of the entire particle system, after individual Start, Midpoint and End opacity values are taken into account. This slider provides a means of adjusting and animating the opacity of the effect as a whole without changing individual parameters for each range.

System Size Variance sets the range of particle sizes for the entire particle system, after individual Start, Midpoint, and End size values are taken into account. A Size Variance value of 0 ensures that all particles conform to the chosen Size values for their ranges. Increasing Size Variance creates more disparity between the smallest and largest particles in each range.

Custom Shape Parameters

These parameters allow you to use another layer to create a custom particle shape.

To use a custom shape, place the layer or composition you want to use in the composition you are working with. Then select this layer in the **Custom Shape** menu.

Shape Mode controls the orientation of the particles as they fall and the color of the particles. The choices fall into two groups, the Source modes and the Color modes. The *Source* modes use the colors in the Custom Shape layer for the particles colors. The *Color* modes use the settings specified by the Appearance parameters to color the particles. Each group has three options, Upright, Weighted, and Tilting.

- *Upright* applies the orientation of the Custom Shape layer to the particles.
- *Weighted* makes the custom shape "bottom-heavy" so that it falls bottom-first as it follows its path. This has an effect somewhere between Upright and Tilting.
- *Tilting* randomly rotates the shape slowly as it falls.

Shape Animation determines how the layer information is used to create the custom particle shape when the Custom Shape layer changes or animates over time.

- *Current Time* uses the particle shape at the custom shape layer's current time regardless of the particle's birth time or life span. Therefore, the particles' animation is synchronized with the animation of the custom shape layer.
- *Starting at Particle Birth* causes each particle to begin its life using the first frame of the custom shape layer and then animate. The particles all animate in the same way, but the movement is staggered since some particles start later than others. This option takes more rendering time than the others.
- *First 15 Frames* creates particle shapes that are chosen randomly from the first 15 frames of the Custom Shape layer and remain constant throughout the particle's lifespan.

Camera Parameters

Camera View turns on and off the virtual camera. It can be helpful to turn the camera off when adjusting the positioning controls.

Camera Zoom moves the entire particle system toward or away from the viewer. At a value of 0, the system is infinitely far away and becomes invisible. Increasing the Camera Zoom value brings the system closer to the viewer. Note that unlike the Depth parameter described in the Movement section, Camera Zoom moves the whole system in Z space and does not affect the depth of the particles as they flow out from the source.

Field of View adjusts the angular width of the camera's lens. Higher values exagerrate the perspective, distorting the effect. Lower values reduce the perspective, creating a flater effect.

Camera Tumble, **Camera Spin**, and **Camera Rotate** move the camera around the particle system (including the Floor) on the X, Y, and Z axis respectively. Adjusting these parameters creates the appearance of the entire system rotating in 3D space.

Increasing **Angle Subtlety** causes camera adjustments to have a less pronounced effect, allowing you to fine-tune camera movements.

**Pivot Point** sets the point around which the camera tumbles, spins, or rotates.

• *World Center* uses the center of the entire system as the camera's pivot point.
• *Camera* uses the camera's own center as the camera's pivot point.

**Floor Follows** determines how the floor moves in relation to the camera and the particles' point of origin.

• *Pivot Point* positions the floor relative to the camera, enabling you to see the effect of pivoting the camera in space.
• *Horizontally with Producer* keeps the floor attached to the point of origin, but allows you to change the distance between the two by moving the point of origin up or down.
• *Producer Point* keeps the floor attached to the particles' point of origin.

Point Positioning Ignore Camera determines whether the point controls (including the source point and any attractor points) are affected by the movement of the camera. Selecting this option allows you to alter the perspective view of the particle system while retaining the locations of all position points. Deselecting this option causes the entire system, including the attractor and source position points, to move with the camera.

This example shows a particle system with no camera movement applied. Particles are drawn toward an attractor point in the upper right-hand corner.
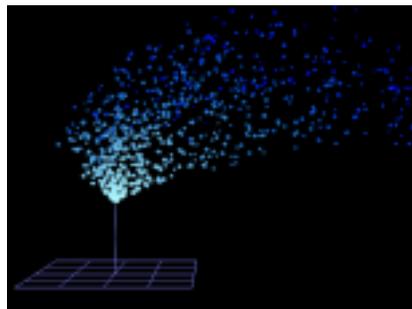
In this example, the camera is spun with Point Positioning Ignore Camera deselected; therefore, the generation and attractor points spin along with the camera. Notice that the apparent position of the attractor point has changed and particles are drawn toward the upper left-hand corner.
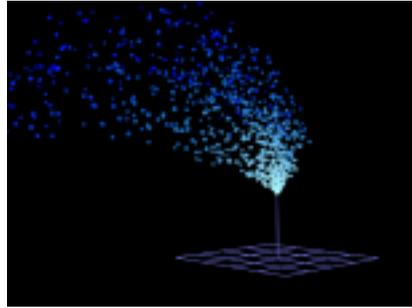
Here, the camera is spun with Point Positioning Ignore Camera selected. In this case, the attractor acts on the particle system after the camera has moved. Thus, the apparent position of the attractor remains constant while the camera view spins.
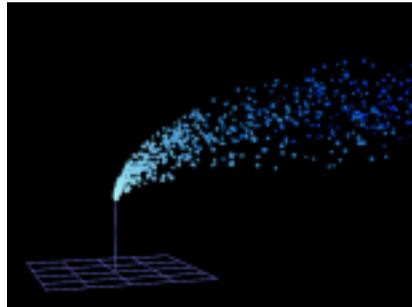
Translate X, **Translate Y**, and **Translate Z** set the location of the virtual camera on the X, Y, and Z axis, respectively. These controls can be used to make minor adjustments to the apparent position of the particle system. Translate X, Y, and Z can also be used to move the viewer through the effect in 3D space.

Translation After Camera Rotate determines whether the Translate X, Y, and Z adjustments are applied to the camera before or after Camera Tumble, Spin, and Rotate. When Translation After Camera Rotate is selected, Translate X, Y, and Z position the camera along the X, Y, and Z axis of the effect. When this option is deselected, the Translate controls position the camera on its own X, Y, and Z axis. For example, suppose Camera Rotate is set to 90. If Translation After Camera Rotate is selected, increasing Translate X moves the camera toward the right of the screen. If this option is deselected, increasing Translate X moves the camera towards the top of the screen.

Attractors Parameters

These parameters allow you to add up to two points of attraction or repulsion to the particle system and to control the strength of these points.

Each attractor has an **Power** control which determines the strength of the attractor on the particles. Positive values pull particles toward the attractor point, while negative values push particles away, making the point a repulsor. The strength of the attraction or repulsion increases as the Power value moves away from 0.

This example shows a particle effect in which the source point is placed near the bottom left corner, and an attractor point is place in the top right corner.

Gravity has been set to 0, and Power has been set to 25.
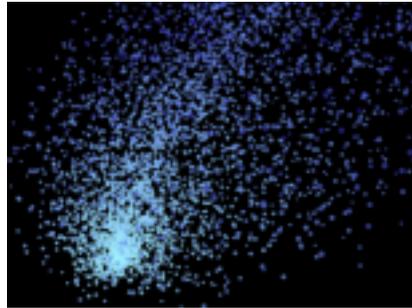
Here Power is increased to 100, so the attractor point exerts a stronger pull on the particles.
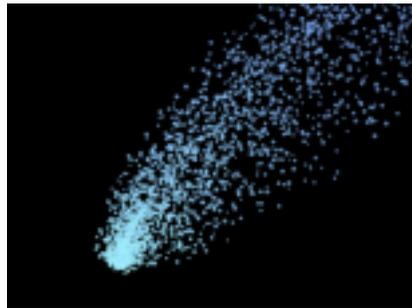
In this example, Power value is set to –15, making the attractor point a weak repulsor which pushes particles away.
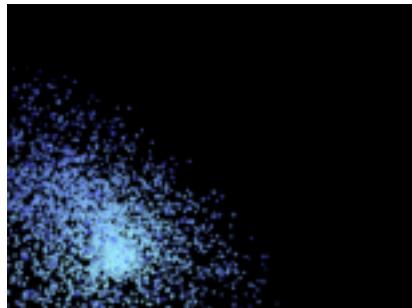
The attractor affects particles in a circular- or ring-shaped region centered around the attractor point. **Radius** sets the radius of the outer edge of the region. **Falloff Radius** sets the radius of the inner edge. By setting Falloff Radius to a value lower than the Radius value you can create a ring shaped affected region around the attractor point.

Gradient controls the relative strength of the attractor throughout the affected region (whose size is determined by the Radius and Falloff Radius). When Gradient is 0, all points in the affected region are affected equally by the attractor. Increasing positive values concentrate the strength of attractor toward the center of the region. Decreasing negative values concentrate the strength of the attractor towards the outer edges of the region.

Attractor XY and Attractor Z set the location of the attractor point on the X, Y, and Z axis, respectively.

Attractor 2D Mode ignores the depth and Z positioning of the attractors. When this option is selected, the attractors affect particles in only two dimensions.

Interaction Parameters

The **Floor Properties** determines how the particles interact with the floor as they hit it. Choose *Ignore* if you are using the floor purely as a visual reference, and do not want its presence to affect the particles' behavior at all. The remaining settings create effects in which the particles interact with the floor.

- *Stick* causes particles to stick to the floor and accumulate.
- *Slide* causes particles to slide outward across the floor as they hit.
- *Bounce* causes particles to bounce off the floor as they hit.

Floor Height adjusts the distance between the floor and the particles' generation point.

If Floor Properties is set to Bounce, you can adjust the height of the bouncing particles with the **Bounce Friction** control. Reducing Bounce Friction allows the particles to bounce higher. Increasing Bounce Friction slows the particles down, causing them to bounce lower.

Bounce Friction also affects particles bouncing off the Interaction Layer (see below).

Render chooses which particles in the system are displayed and rendered. You may opt to render the *Complete System* (all particles), *Above Floor* (only particles above the floor), or *Below Floor* (only particles that fall below the floor).

Interaction Layer allows you to choose any layer in your composition for the particles to interact with.

Layer Mode determines how the particles interact with the chosen Interaction layer.

- *Stick* causes the particles to stick to areas corresponding to portions of the Interaction Layer with high values in the chosen Layer Use Channel.
- *Fall* causes the particles to briefly stick to areas corresponding to portions of the Interaction Layer with high values in the chosen Layer Use Channel, then slide off.
- *Slide* causes the particles to slide off of areas corresponding to portions of the Interaction Layer with high values in the chosen Layer Use Channel.
- *Bounce* causes the particles bounce off of areas corresponding to portions of the Interaction Layer with high values in the chosen Layer Use Channel. When this option is selected, Bounce Friction adjusts the height of the bouncing particles.

Layer Use Channel sets the channel in the Interaction Layer used to interact with the particles according to the Layer Mode setting.

Layer Edges determines how the edges of the Interaction Layer interact with the particles.

- *None* treats the edges of the interaction layer like transparent areas.
- *Solid* treats the edges of the interaction layer like opaque areas.

Floor Size adjusts the size of the floor.

Floor Grid Resolution sets the number of grid squares in the floor. A value of 5 creates a grid that measures 5x5 squares, or 25 squares. A value of 10 creates a grid that measures 10x10 squares, or 100 squares, and so on.

Floor Color sets the color of the floor.

Animation Parameters

The **Start on Frame** parameter has two functions, depending on whether the **Manual Animation** checkbox is selected or deselected.

- With the Manual Animation checkbox deselected, Start on Frame allows you to start the beginning of the auto-animated effect a number of frames past the start of the layer to which it is applied. Setting Start on Frame to 20 starts the animation twenty frames past the beginning of they layer. Therefore, if the head of the layer occurs at frame 60 in the composition, the particle effect begins at frame 80 in the composition.

- With the Manual Animation checkbox selected, Start on Frame allows you to manually animate the effect. In this case, a value of 0 represents zero frames into the effect, 15 represents 15 frames into the effect, and so on. Note that selecting the Manual Animation option locks the effect to the selected Start on Frame value. You may then animate the Start on Frame value in order to pause, slow down, or speed up the effect, or to animate the effect forward and backward in time.

Time Limit sets the duration particle production period. Setting this value to 10 causes particle production to occur for ten frames and then stop, and so on. This parameter can be useful in creating explosion effects, such as fireworks, in which particles are produced for only a very short time and then disperse for the remainder of the effect.

Time Scale allows you to adjust the timing of the effect by stretching time out or speeding it up. Decreasing Time Scale below the default value of 100 stretches time out. Thus, the effect appears to take place in slow motion, with particles taking more time to reach their destination or die out. Time scale values greater than 100 speed time up, causing the comet to move more quickly.

Selecting the **Reverse Time** option reverses the animation of the effect, whether it is automatically or manually animated. With Reverse Time selected, particles move toward the generation point and disappear rather than emitting from the source point and dispersing.

Increasing **Delay** from the default value of 0 causes particles within a certain distance of the production area to remain invisible. Delay can be used to create effects with no visible production center, since particles do appear until they have dispersed to some extent.

Increasing **Precision** increases the accuracy of particle movement, which can be helpful when creating effects with strong attractor points. Higher values increase rendering times proportionately.

Random Seed determines which value is input to the random number generator used by the effect. Adjust this setting if you like the general appearance of the effect but want to change the random arrangement of the particles.

You can also animate Random Seed instead of animating particle movement to produce a randomly shifting particle effect. However, animating Random Seed while the particles are moving may create jumps in the effect, and is not recommended.

Partial Render allows you to define a region in Z space in which particles are rendered. **Farthest Z** determines the location of the far end of the region, while **Closest Z** determines the location of the near end of the region.

Optimize Algorithm helps speed up rendering times without affecting the apparent quality of the image. Deselect this option if there are jumps in the render.

Animate Production Boundary improves quality if the Production Boundary is animated.

Animate Production Boundary is a memory-intensive feature. For this reason, you may want to use lower Lifespan values when this option is selected.

Animate Interaction Layer improves quality if the Interaction Layer is animated.

Animate Interaction Layer is a memory-intensive feature. For this reason, you may want to use lower Lifespan values when this option is selected.

BC Rain

BC Rain is an auto-animated filter which generates realistic rain effects. You can composite the rain over any layer in your composition. The filter allows you to determine the density, speed, direction, and color of the droplets, and to control the apparent depth of the effect.

Source image

Filtered image

Rain Amount determines the density of the droplets in the effect. Increasing Rain Amount creates more droplets, and decreasing Rain Amount creates fewer droplets.

Rain Amount=10

Rain Amount=250

Rain Angle sets the angle between the droplets' direction of motion and the vertical axis.

Rain Angle= –25   *Rain Angle=0*   *Rain Angle=25*

Rain Speed determines the speed of the droplets as they move across the screen. Increasing this value makes the droplets move faster, while decreasing this value makes the droplets move slower.

Rain Depth controls the apparent depth of the effect. Increasing this value creates the illusion of greater depth by varying the lengths of the droplets. Decreasing this value creates droplets that are increasingly uniform in length, simulating a narrow band of rain.

Blur adjusts the amount of blur applied to each droplet. Increase this value to increase the amount of blur.

Select **Composite on Alpha** to composite the rain over a transparent background. Deselect this option to use the filtered layer as the background for the effect.

Pan XY adjusts the perspective view of the effect. Move this point to change the position of the viewer's eye in relation to the effect. This parameter can be motion tracked to align the rain with a shaky or moving camera.

The **Composite Layer** menu allows you to choose any layer in your composition to use as the background of the effect. The default setting, *None*, composites the rain over a transparent background, revealing the layer below the filtered layer in the timeline.

If you want the effect to be composited over the layer to which the filter is applied, select the filtered layer in the Composite Layer Menu.

Composite Depth controls the apparent depth of the chosen composite layer. Increasing values move the composite layer closer to the viewer, while decreasing values move the layer farther from the viewer. This setting has no effect if Composite Layer is set to None.

Composite Depth= –200

Composite Depth=200

Random Seed determines which value is input to the random number generator used by the effect. Adjust this value when you like the overall effect but want to adjust the random configuration of the droplets.

Raindrops Parameters

Color sets the color of the droplets.

Size controls the size of the droplets. Higher values create longer droplets, while lower values create shorter droplets.

Size= –35

Size=35

Opacity determines the opacity of the droplets. Higher values create increasingly opaque droplets, while lower values create increasingly transparent droplets.

Brightness Variance varies the opacity of the raindrops. Increase this setting to create a wider range of droplet opacities.

System Parameters

Particle Lifespan determines how long each droplet lasts before it disappears.

Particle Lifespan=20
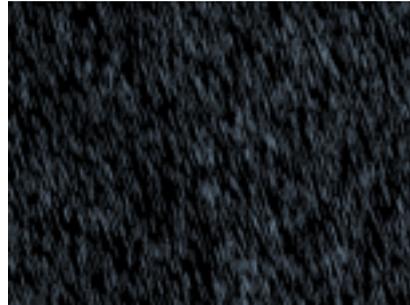
Particle Lifespan=80

If the rain effect stops short of the bottom of the image in a frame, increase Particle Lifespan to extend the effect to the bottom of the screen.

Generation Width adjusts the width of the rain production region. Increasing this value spreads out the individual droplets, reducing the density of the effect. Decreasing this value places the droplets closer together, creating a more dense effect.
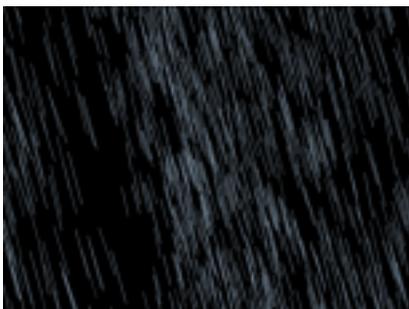
Generation Width=10
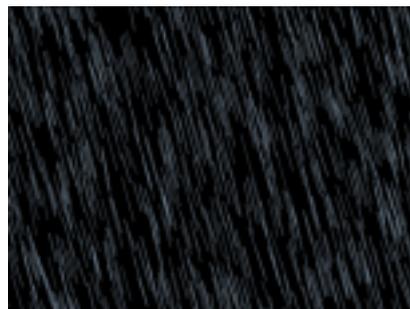
Generation Width=500

The Rain filter creates an image by tiling a series of images. Changing the **Tile Width** value adjusts the width of each individual image, which can be useful if tiling becomes noticeable in the output. Increasing Tile Width creates wider tiles, while decreasing this value creates narrower tiles. At extreme Tile Width settings, the tiles may not fully overlap.
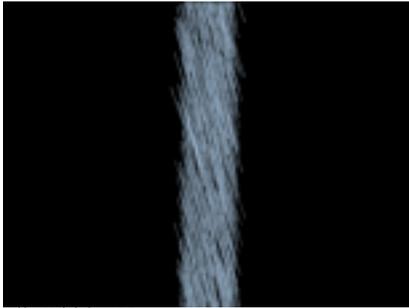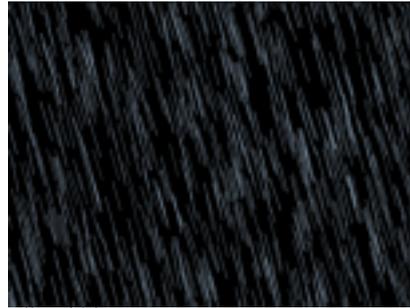
Tile Width=10

Tile Width=100

Speed Variance varies the speed of each droplet. Increase this setting to create a wider range of droplet speeds.

Direction Variance varies the angle of motion of each droplet. Increase this setting to create a wider range of droplet directions.

Direction Variance=0

Direction Variance=25

Interaction Parameters

Splash on Layer chooses a layer in the composition to use as a reflection map. When raindrops hit the edge of the reflection map, they bounce off.

Layer Use Channel chooses the channel of the reflection layer that determines how the raindrops bounce. For example, if *Alpha* is used, the droplets bounce off the boundaries of the reflection layer's alpha channel.

Splash Angle sets the angle at which the raindrops bounce off the reflection map.

Splash Height determines how high the raindrops bounce.

Fallthrough Percent sets the probability that individual droplets will pass through edges in the interaction layer. At the default value of 0, all droplets bounce off of the first edge in the layer that they strike. As Fallthrough Percent increases, more droplets fall beyond the first edge and bounce off edges below it.

Fallthrough Max determines the maximum number of edges in the interaction layer a droplet call fall past without bouncing. For example, if Fallthrough Max is 1, droplets can bounce off either the first edge or the second. If Fallthrough Max is 2, droplets can bounce off the first, second, or third edges. If Fallthrough Percent is 0, Fallthrough Max has no effect.

If you select **Splash on Ground**, the rain stops moving and bounces up when it reaches the chosen **Ground Height**. Increase Ground Height to move the ground towards the bottom of the frame, or decrease this value to move the ground level towards the top of the frame. To see a grid representing the ground, select **View Ground**.

The **PixelChooser** parameters allow you to apply the filter selectively using region controls or the source image's channel values. For more information, see "The PixelChooser" on page 209.

BC Snow

BC Snow is an auto-animated snow generator which can composite snow over a sky color or an image layer. The filter offers extensive options for customizing the effect and allows you to create drifts or make flakes pile up along the edges of an alpha channel.

Source image

Filtered image

Snow Amount controls the density of the snow. Increasing this value creates more snowflakes, while decreasing this value creates fewer snowflakes.


Snow Amount=10
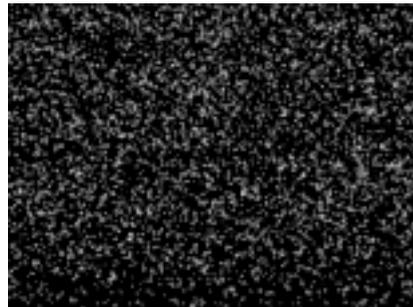
Snow Amount=200

Snow Angle sets the angle between the snowflakes' direction of motion and the vertical axis.

Snow Speed determines the speed of the snowflakes as they move across the screen. Increasing this value makes the snowflakes move faster, while decreasing this value makes the snowflakes move slower.

Snow Depth controls the apparent depth of the effect. Increasing this value creates the illusion of greater depth. Decreasing this value creates the illusion of shallower depth.
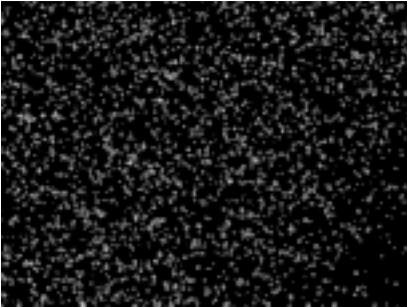
Snow Depth=0
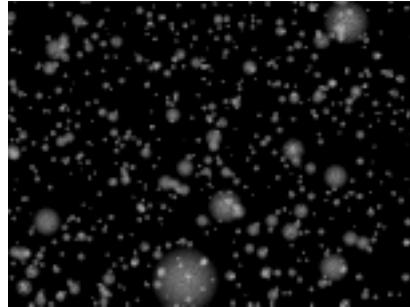
Snow Depth=1000

Select **Composite on Alpha** to composite the snow over a transparent background. Deselect this option to use the filtered layer as the background for the effect.

Pan XY adjusts the perspective view of the effect. Move this point to change the position of the viewer's eye in relation to the effect. This parameter can be motion tracked to align the rain with a shaky or moving camera.

The **Composite Layer** menu allows you to choose any layer in your composition to use as the background of the effect. The default setting, *None*, composites the snow over a transparent background, revealing the layer below the filtered layer in the timeline.

If you want the effect to be composited over the layer to which the filter is applied, select the filtered layer in the Composite Layer Menu.

Composite Depth controls the apparent depth of the chosen composite layer. Increasing values move the composite layer closer to the viewer, while decreasing values move the layer farther from the viewer. This setting has no effect if Composite Layer is set to None.

Composite Depth= −200

Composite Depth=200

Random Seed determines which value is input to the random number generator used by the effect. Adjust this value when you like the overall effect but want to adjust the random configuration of the droplets.

Snowflakes Parameters

Color sets the color of the snowflakes.

Size controls the size of the snowflakes. Higher values create larger snowflakes, while lower values create smaller snowflakes.

Size=5

Size=40

Size Variance varies the size of the snowflakes, creating a wider range of flake sizes in the effect. Positive values create snowflakes larger than or equal to the chosen snowflake Size. Negative values create snowflakes smaller than or equal to the chosen Size.
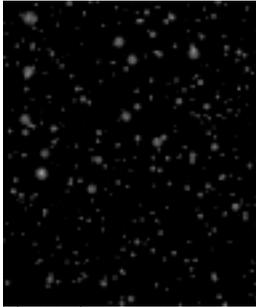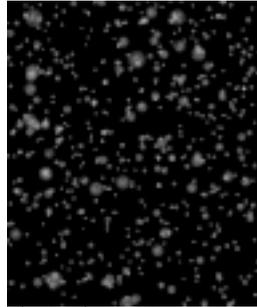
Size Variance= −100   *Size Variance=0*   *Size Variance=100*
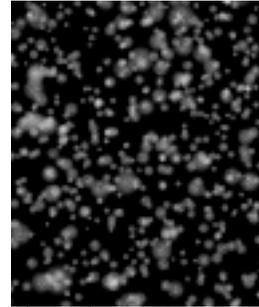
Character adjusts the appearance of the snowflakes. Higher values produce more detailed snowflakes, while lower values produce more blurred snowflakes.

Opacity determines the opacity of the snow. Higher values create more opaque snow, while lower values create more transparent flakes.

System Parameters

Particle Lifespan determines how long each snowflake lasts before it disappears.

Generation Width adjusts the width of the snow production region. Increasing this value spreads out the individual snowflakes, reducing the density of the effect. Decreasing this value places the flakes closer together, creating a more dense effect.

The Snow filter creates an image by tiling a series of images. Changing the **Tile Width** value adjusts the width of each individual image, which can be useful if tiling becomes noticeable in the output. Increasing Tile Width creates wider tiles, while decreasing this value creates narrower tiles. At extreme Tile Width settings, the tiles may not fully overlap.
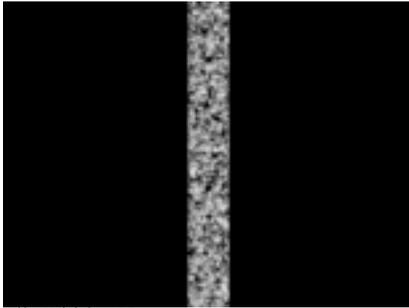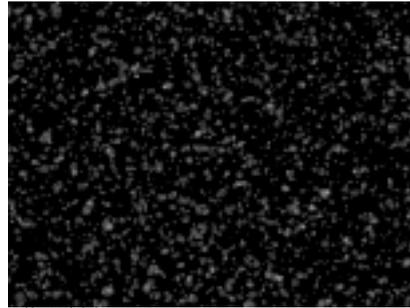
Tile Width=10

Tile Width=100

Speed Variance varies the speed of the snowflakes. Increase this value to create a wider range of snowflake speeds.

Direction Variance varies the angle of motion of the snowflakes. Increase this setting to create a wider range of snowflake directions.

Chaos Parameters

The Chaos parameters create a more random pattern of falling snow, which can help produce a more natural effect.

The **Amplitude** parameter controls the shape of the snowflakes' paths as they leave the source point. At the default value of 0, the flakes follow a straight line. Positive values cause the flakes to follow a sinosidal (sine wave) path. Negative values cause the flakes to follow a negative sinosidal path, meaning that the wave dips before it peaks. The amplitude, or height, of the wave increases as the Amplitude value moves away from zero. More extreme Amplitude values produce increasingly erratic flake paths which make the effect appear more chaotic.

Amplitude Variance adjusts the range of possible Amplitude settings among individual snowflakes in the effect. A high Amplitude Variance value produces a wider range of wave heights among the individual flake paths, creating greater a disparity between the highest and lowest waves. An Amplitude Variance of 0 ensures that all flake paths have the same Amplitude setting.

Frequency adjusts the frequency of the sine wave, and therefore the number of waves that the flakes create over the course of their life span. A Frequency value of 0 produces no wave motion, so flakes travel in a straight line. More extreme Frequency values produce very wavy flake paths which make the effect appear more chaotic.

Frequency Variance adjusts the range of possible Frequency settings among individual flakes in the effect. A high Frequency Variance produces a larger range of wave frequencies among the flake paths, creating a greater disparity between the fastest and slowest waves. A Frequency Variance of 0 ensures that all snowflake paths have the same Frequency setting.

Interaction Parameters

The **Stick to Layer** menu allows you to choose any layer in your composition to use as a map to determine where the snow accumulates in the effect. **Layer Use Channel** determines which channel of this layer will be used to create the map. In the examples below, an alpha channel is used as an interaction layer.
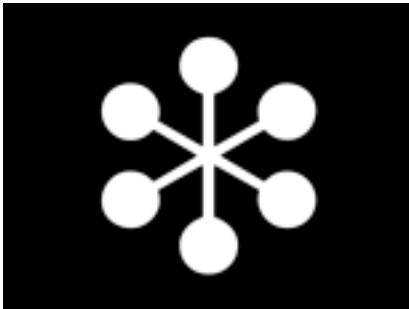
Interaction alpha matte

Filtered image

Some snow will always be piled on the edges of the interaction layer, even in the first frame of the effect. If you would like the snow to gradually build up over the course of the effect, try animating Snow Amount from 0 to the desired amount.

Fallthrough Percent sets the probability that individual flakes will pass through edges in the interaction layer. At the default value of 0, all snowflakes stick to first edge in the layer that they strike. As Fallthrough Percent increases, more snowflakes fall beyond the first edge and stick to edges below it.
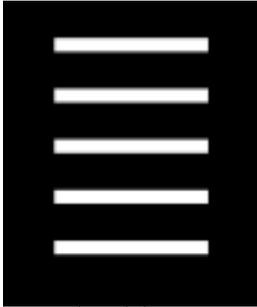
*Interaction alpha matte*   *Fallthrough Percent=0*   *Fallthrough Percent=50*

Fallthrough Max determines the maximum number of edges in the interaction layer a snowflake call fall past without sticking. For example, if Fallthrough Max is 1, snowflakes can stick to either the first edge or the second. If Fallthrough Max is 2, snowflakes can stick to the first, second, or third edges. If Fallthrough Percent is 0, Fallthrough Max has no effect.
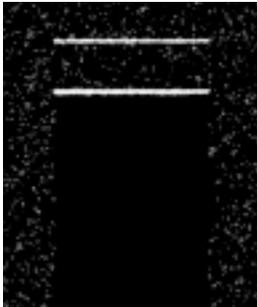
Fallthrough Max=1   *Fallthrough Max=2*   *Fallthrough Max=6*
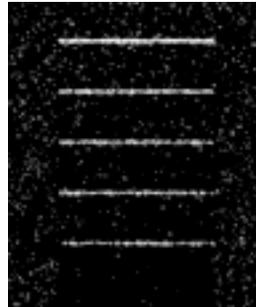
If you select **Stick to Ground**, the snowflakes stops moving and begin accumulating when they reach the chosen **Ground Height**, creating the appearance of snow piling up on the ground. Increase Ground Height to move the ground towards the bottom of the frame, or decrease this value to move the ground level towards the top of the frame. To see a grid representing the ground, select **View Ground Level**.
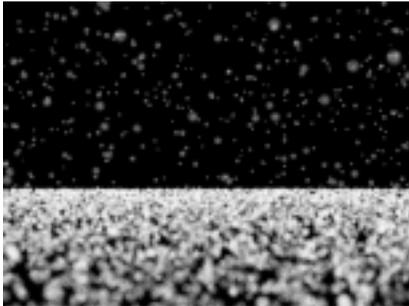

Ground Level=50
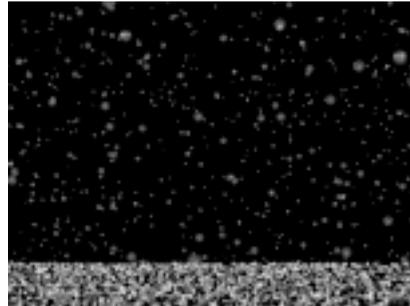
Ground Level=150

The **PixelChooser** parameters allow you to apply the filter selectively using region controls or the source image's channel values. For more information, see "The PixelChooser" on page 209.

BC Sparks

BC Sparks generates auto-animated sparks that shoot from a point and disperse. The sparks' sizes, shapes, and colors can be adjusted. You can also adjust the speed of the sparks, apply a gravitational force, and add an interaction layer.
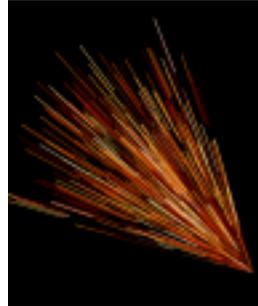
Spark Shape chooses the shape of the sparks. Choose *Streaks*, *Pixel Streaks*, or *Lines*.
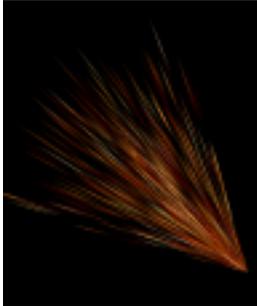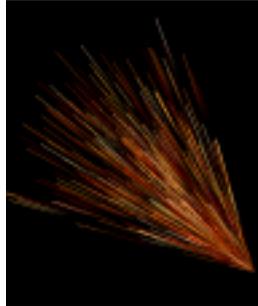

Streaks   *Pixel Streaks*   *Lines*

Spark Velocity determines the speed with which the sparks emanate from the producer point. Increasing this value causes the sparks to move faster, while decreasing this value causes the sparks to move slower.
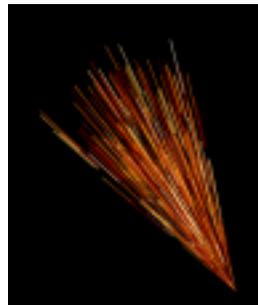
Amount controls the number of individual sparks that appear in the effect. Increase this value to add more sparks to the effect; decrease this value to reduce the number of sparks in the effect.
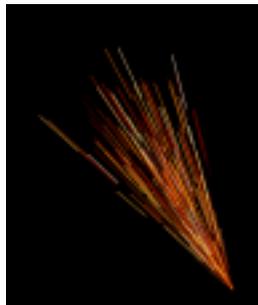

*Amount=20*   *Amount=100*   *Amount=300*

Producer XY and **Producer Z** set the location of the producer point on the X, Y, and Z axis, respectively.

Select **Composite on Alpha** to composite the sparks over a transparent background. Deselect this option to use the filtered layer as the background for the effect.
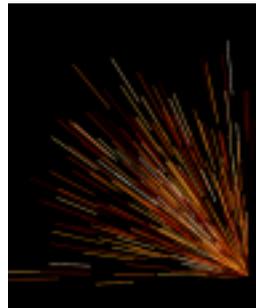
Spread affects the overall tightness of the spark pattern as the sparks leave the source. Decreasing this value brings the sparks closer to the source. Increasing this value spreads out the sparks and causes them to flow farther from the source.
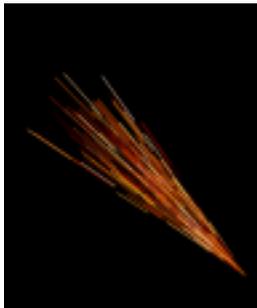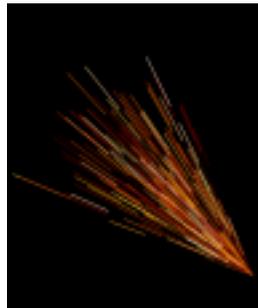
Spread=25   *Spread=50*   *Spread=100*

**Spread Mode** controls the overall shape of the spark effect.

- The default selection, *3D,* generates sparks which flow out through a cone-shaped region in all directions.
- *Fountain* is similar to 3D, but adds more sparks flowing straight upward in the manner of water droplets flowing from a fountain.
- *Flat Fan* sprays sparks out in a two-dimensional fan shape on two opposite sides of the source.
- *Sine Cannon* shoots sparks out of a generator being swung in a circle around the source point.
- *Circular* sprays sparks out from the edges of a circle.
- *Spiral* creates sparks that spiral around a central source, much like hurricane winds spiralling around the eye of the storm.

Spread Character can be used to fine-tune the shape of the spark system created by the selected Spread Mode. The effect of this parameter depends on which Spread Mode is selected.
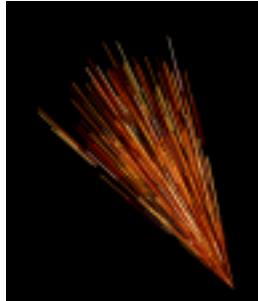
- In the 3D and Fountain Spread Modes, Spread Character alters the shape of the cone through which the sparks flow.
- In Flat Fan mode, Spread Character decreases the randomness of the sparks and making them spray out from the source point in a more ordered manner.

- In Circular mode, Spread Character causes more sparks to spread toward the center of the circle rather than only spraying out from the edges.
- In Sine Cannon mode, Spread Character affects the speed of the swinging generator.
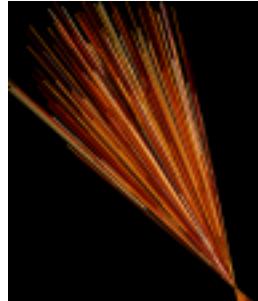- In Spiral mode, Spread Character makes the spiral pattern tighter or wider.

Spark Size Adjustment adjusts the size of the sparks. Negative values produce shorter sparks, while positive values produce longer sparks.
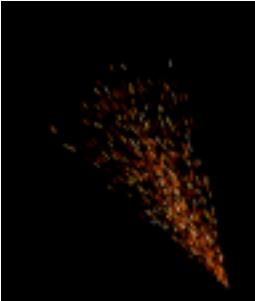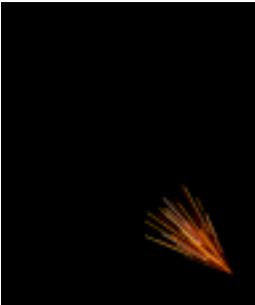

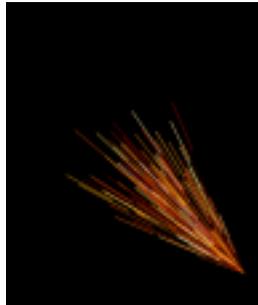*Spark Size Adjustment=–90*   *Spark Size Adjustment=0*   *Spark Size Adjustment=25*
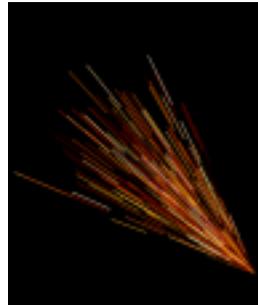
The **Spark Lifespan** parameter determines how long each spark lasts before it decays.

*Spark Lifespan=3*   *Spark Lifespan=4*   *Spark Lifespan=5*

## Orientation Parameters

Tumble, **Spin** and **Rotate** rotate the producer point around the X, Y, and Z axis, respectively.

Production Area Parameters

Width and **Height** stretch the spark source along the horizontal and vertical axis, respectively. Increasing one of these parameters stretches the source in one dimension and creates a spark source that is a straight line. Increasing both causes the source to be stretched in two dimensions and creates a spark source that is a plane. When the spark source is a plane, the sparks appear to be generated randomly within the space, rather than flowing out from a specific point or line.
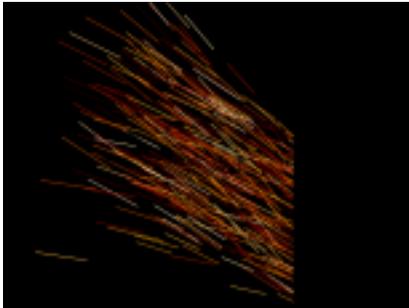
Height=20
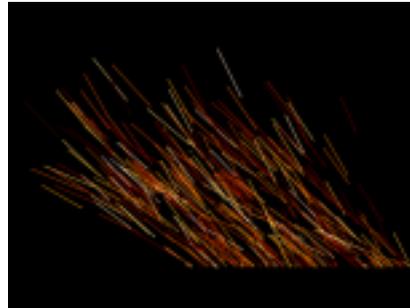
Width=20

Depth controls the movement of the sparks in Z-space. Decreasing Depth from the default value of 0 makes the sparks appear to be nearing the viewer as they flow out from the source. As a result, sparks appear to grow in size as they approach the viewer. Increasing Depth makes the sparks appear to be moving away from the viewer as they flow out from the source. In this case, sparks appear to shrink as they move away from the source.

Color Parameters

The controls in this section select the color and opacity of the generated sparks. The **Start** settings affect the sparks as they are produced at the source, and the **End** settings affect the sparks as they reach their final destination or decay point. The **Midpoint** controls control the how quickly the sparks move from the Start to the End settings.

Each of the two groups contains the following parameters.

The **Color Mode** pull-down menus offer several means by which the sparks' colors are derived.

- *Source Point* causes each spark to use the color of the source layer at the point where the spark originates. If the effect's source coordinates correspond to a red region in the source layer, the spark is red.

- *Source Update* causes each spark to use the color of each point on the source image that the spark passes through. If the spark passes from a blue region in the source to a red region, the spark's color will change from blue to red.
- *Source within System* is similar to Source Point, except that Source within System picks colors from the source based on the sparks' positions relative to the spark system instead of relative to the source layer.
- *Random Source* causes the sparks use the color of a randomly chosen point in the source image.
- *Random Source 2* uses another randomly chosen color from the source image as the spark color.
- *Custom Color* sets the spark color to the color you have chosen with the Custom Color control.

Color allows you to select colors for the Start, Midpoint, and End ranges of the effect. Note that you must set the Color menu (described above) to *Custom Color* in order to use this parameter.

Color Reference Layer chooses any layer in your composition to use as a source for spark colors. At the default setting, *None*, the source image is used.

Brightness Variance controls the range of possible brightness values among the sparks. Increasing Brightness Variance creates a system in which some sparks are bright and others are dim, and increases the disparity between the brightest and dimmest sparks. Leaving this parameter at the default setting of 0 ensures that all sparks will have the same brightness value.

Opacity sets the opacity level of the sparks. A value of 100 makes all sparks in the range completely opaque, and a value of 0 makes all sparks completely transparent (invisible). You can set different Opacity values in the Start and End ranges to create effects in which sparks stream outward from the source and disappear.

Midpoint Location moves the Midpoint along the gradient between the Start and End values. A value of 0 places the Midpoint close to the generation point, and sparks begin changing to their End Color and Opacity values soon after birth. A value of 100 places the Midpoint nearer the End point, and sparks remain at the Start Color, Size, and Opacity values until close to the end of their life span.

Midpoint Variance increases the range of Midpoint Location values among the sparks. As you increase the Midpoint Variance value, the Midpoint Location varies more from spark to spark.

Overall Opacity affects the opacity levels of the entire spark system, after individual Start, Midpoint and End opacity values are taken into account. This parameter provides a means of adjusting and animating the opacity of the effect as a whole without changing individual parameters for each range.

Reflection Parameters

Reflect off Layer chooses a layer in the composition to use as a reflection layer. When sparks hit an edge in the reflection layer, they bounce off.

Layer Use Channel chooses the channel in the reflection layer that determines how the sparks bounce. For example, if *Alpha* is used, the sparks bounce off boundaries in the reflection layer's alpha channel.

Layer Edges determines how the outer edges of the reflection layer interact with the sparks.

- *None* treats the edges of the reflection layer like transparent areas.
- *Solid* treats the edges of the reflection layer like opaque areas.

Bounce Friction sets the amount of friction applied to the sparks as they bounce off the reflection layer. Reducing Bounce Friction allows the sparks to bounce higher. Increasing Bounce Friction slows the sparks down, causing them to bounce lower.
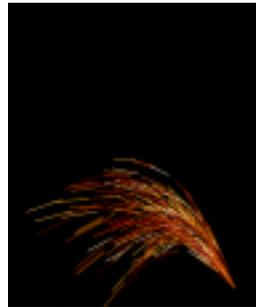
Forces Parameters

Gravity allows you to apply a second force to the movement of the comet. Increasing this value pulls the sparks increasingly strongly in the direction of the **Gravity Angle** as they leave the source point.
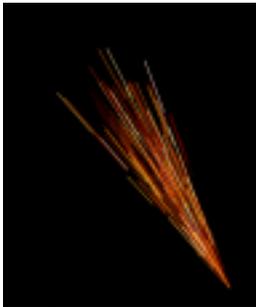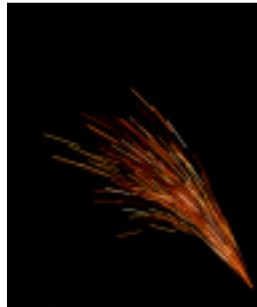
Gravity=0   *Gravity=400*   *Gravity=700*

Air Resistance adds resistance to the effect, decreasing the sparks' velocities. Increase Air Resistance to slow down the sparks, or decrease Air Resistance to increase the sparks' speed.

Velocity Variance varies the speeds of individual sparks. Increasing this value creates a wider range of possible spark velocities. Leaving this parameter at the default setting of 0 ensures that all sparks will travel at exactly the same speed.

Options Parameters

The **Start on Frame** parameter has two functions, depending on whether the Manual Animation checkbox is selected or deselected.

- **With the Manual Animation checkbox deselected**, Start on Frame lets you start the beginning of the auto-animated effect a number of frames past the start of the layer to which it is applied. Setting Start on Frame to 20 starts the animation twenty frames past the beginning of they layer. Therefore, if the head of the layer occurs at frame 60 in the composition, the spark effect begins at frame 80 in the composition.

- **With the Manual Animation checkbox selected**, Start on Frame lets you manually animate the effect. In this case, a value of 0 represents zero frames into the effect, 15 represents 15 frames into the effect, and so on. Note that selecting the Manual Animation option locks the effect to the selected Start on Frame value. You may then animate the Start on Frame value in order to pause, slow down, or speed up the effect, or to animate the effect forward and backward in time.

Time Scale allows you to adjust the timing of the effect by stretching time out or speeding it up. Decreasing Time Scale below the default value of 100 stretches time out. Thus, the effect appears to take place in slow motion, with sparks taking more time to reach their destination or die out. Time scale values greater than 100 speed time up, causing the comet to move more quickly.

Increasing the **Delay** parameter from the default value of 0 causes sparks to remain invisible until they reach a certain distance from the source point. This can be used to create effects with no visible production center, since sparks do not show up until they have dispersed to some extent.

Increasing **Precision** increases the accuracy of spark movement, which can be helpful when creating complex effects. Higher values increase rendering times proportionately.

Optimize Algorithm helps speed up rendering times without affecting the apparent quality of the image. Deselect this option if there are "jumps" in the render.

Random Seed determines which value is input to the random number generator used by the filter. Adjust this value when you like the overall effect but want to adjust the random configuration of the sparks.

The **PixelChooser** parameters allow you to apply the filter selectively using region controls or the source image's channel values. For more information, see "The PixelChooser" on page 209.
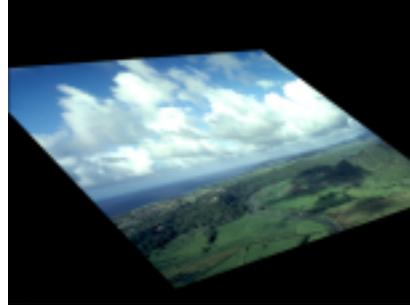
PERSPECTIVE FILTERS

Chapter 4
Perspective Filters

BC DVE

DVE models the source image on a two-dimensional plane which can be rotated around the X, Y, and Z axis and positioned in 3D space. DVE also provides options for adding motion blur, adjusting camera perspective, and adding up to three independent lights to the effect.

Source image

Filtered image

Source selects the layer in the composition used to create the effect.

It is recommended that DVE be applied only to layers that are the same size as the composition. If you want to apply DVE to a layer that is smaller or larger than the composition, create a new solid that is the same size as the composition, apply DVE to the solid, and select the desired layer from the Source menu.

If the source layer is opaque, selecting **Source Opaque** can improve render times by rendering only the RGB color channels and not the alpha channel. Leave this option deselected if the source is partially or fully transparent.

Geometry Parameters

X Scale and **Y Scale** change the size of the layer along the X and Y axis, respectively. These parameters are scaled as percentages of the layer's original width and height. Thus, an X Scale value of 200 produces an layer twice as wide as the original layer. Select **Lock Scale** to keep the X and Y Scale values in proportion.

Position XY sets the X and Y coordinates of the center point of the layer.

Position Z adjusts the apparent depth of the layer. Decreasing negative values move the layer closer to the viewer, while increasing positive values move the layer farther away from the viewer. Very low Position Z values move the plane behind the viewer, making it invisible.
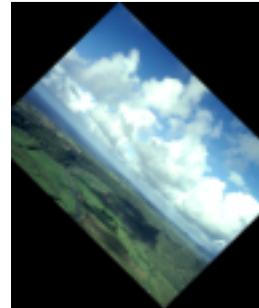
Tumble, **Spin**, and **Rotate** move the layer around the X, Y, and Z axis respectively. Tumble, Spin, and Rotate can be animated over values greater than 360° in order to make the layer complete more than one full revolution.

*Tumble*   *Spin*   *Rotate*

Camera/Pivot Parameters

When **Pivot Lock to Center** is selected, the layer tumbles, spins, and rotates around its own center. If this option is deselected, you can set an external pivot point around which to tumble, spin, or rotate the layer.

Pivot XY and **Pivot Z** set the X, Y, and Z coordinates of the pivot point. If Pivot Lock to Center is selected, moving the pivot point has no effect.

Camera XY sets the horizontal and vertical position of the focal point of the camera (the point on the image plane at which the camera is pointed).
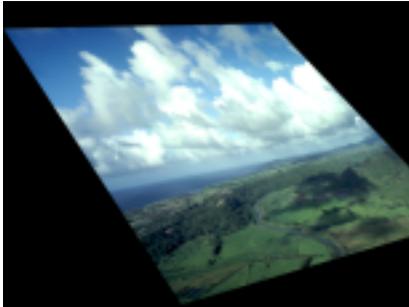
Camera XY=10,10

Camera XY=630,470

Camera Z sets the model camera's distance from the layer. Decreasing this setting places the camera closer to the layer, exaggerating the perspective on portions of the layer that are closest to the camera.

Camera Z=0.5

Camera Z=5

Motion Blur Parameters

Select **Motion Blur On** to turn Motion Blur on.

Motion Blur is an especially memory-intensive feature. For this reason it is particularly useful to use a lower resolution and/or Draft preview mode when creating an effect with motion blur.

The **Motion Blur** setting determines how many times the effect samples between the time the "shutter" opens and the time it closes in composing the render. Increasing the number of samples creates a smoother blur but increases render and preview time proportionately. Choose *Rough*, *Medium*, *Smooth*, or *Smoothest*. Rough uses the fewest samples, while Smoothest uses the most.

The **Shutter Angle** parameter refers to the workings of a conventional film camera. Normally the shutter is open to 180°, meaning that the shutter is open for half of each frame. Increasing the angle will keep the shutter open longer, creating a wider blur. Decreasing the angle produces a thinner blur.

Shutter Angle=45

Shutter Angle=225

Selecting **Adaptive Motion Blur** causes the effect to take fewer samples when the source is moving more slowly. Turning this checkbox on usually does not have a visible effect on the render output, but will improve rendering speed.

## Light 1, Light 2, and Light 3 Parameters

The parameters in these sections allow you to apply up to three different lights to the effect. Each section contains parameters which control the corresponding light source. These parameters function identically for each source.

Ambient Light adjusts the brightness of the image. The default setting of 100 does not add or subtract ambient light from the source image. Decreasing this value darkens the image before other lights is applied. Ambient light illuminates or darkens the image evenly, and is unaffected by any other lighting parameters.

Select **Light On** to turn on the corresponding light source. Deselect this option to turn off the light.

The **Light Type** setting determines whether the light source is a diffuse specular light, a spotlight, or a light sweep.
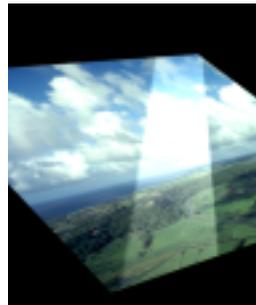
- *Diffuse-Specular* combines both focused (specular) and diffuse light. You can use this Light Type to create the appearance of a shiny surface lit by a point light source.
- *Spotlight* simulates the look of a traditional theatrical spotlight.
- *Light Sweep* creates a linear band of light that sweeps across the layer.
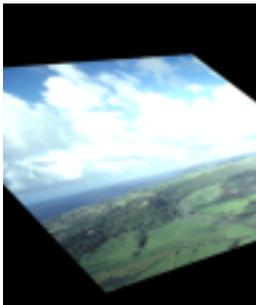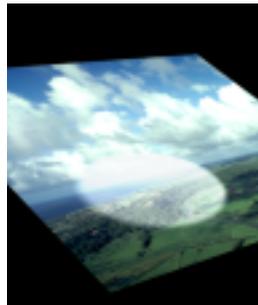

Diffuse-Specular   *Spotlight*   *Light Sweep*

Each of the three light types is controlled by a slightly different group of parameters. The following chart indicates which parameters are used by each light type.

Parameter Name	Diffuse-Specular	Spotlight	Light Sweep
Source XY	X	X	X
Source Z	X	X	X
Target XY	X	X	X
Width	——	X	X
Intensity	X	X	X
Specular	X	——	——
Color	X	X	X
Falloff	——	X	X
Sweep Angle	——	——	X
Point at Source	——	X	X
Apply Mode	X	X	X
Apply Mix	X	X	X

Source XY sets the location of the light source on the horizontal and vertical axis.

Source Z controls the distance between the light source and the image plane. Decreasing this value moves the light source farther from the image, while increasing this value moves the light closer to the image. Changing the Source Z setting allows you to focus the light or to spread it out over a larger area.
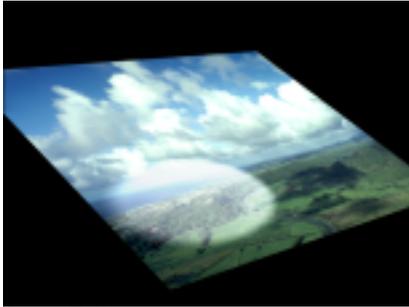
Source Z=0
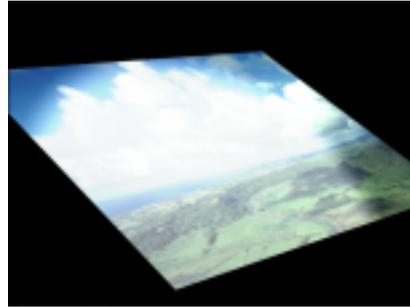
Source Z=3

Target XY sets the X and Y coordinates for the point at which the light is aimed.

Width controls the width of the light beam.

Intensity controls the intensity of the light source. Increasing this value creates a brighter light.
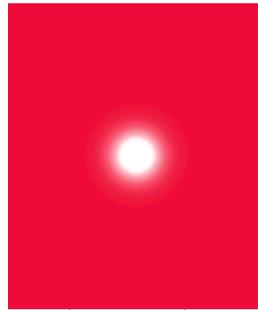
> When using the Diffuse-Specular Light Type, Intensity controls the intensity of the diffuse light on the image and has no effect on the intensity of the specular light. Increasing the Intensity value increases the size of the lit region and makes the center of the lit area look increasingly bright.

Specular determines the amount of specular light applied to the image. Increasing this value increases the amount of light at the center of the lit region.
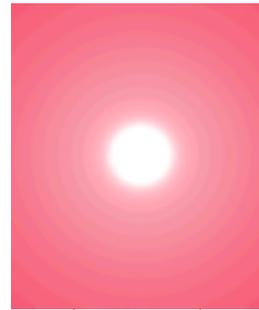
The following illustrations demonstrate the effect of adjusting Intensity and Specular.
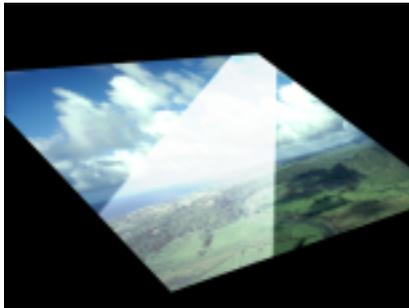

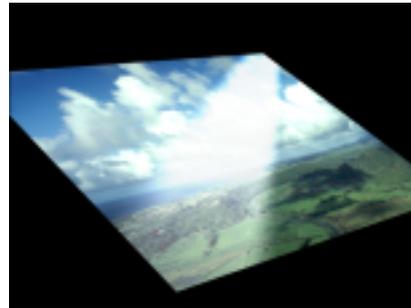*Intensity=50, Specular=0*   *Intensity=0, Specular=400*   *Intensity=50, Specular=400*

Color controls the color of the Light source.

Falloff adjusts the amount of falloff on the edges of the lit region. Increasing this value adds more falloff, softening the edges of the lit region. Decreasing this value reduces the amount of falloff, creating harder edges on the lit region.

Falloff=5   *Falloff=50*

Sweep Angle sets the angle between the beam of light and the horizontal axis.

If you select **Point at Source**, the Target point coordinates are set relative to the undistorted source, so that the light follows the source as it animates.

Apply Mode controls how the light is composited with the source image.

For descriptions of all the possible Apply Modes, see "Apply Modes" on page 217.

Apply Mix controls the mix of the specified Apply Mode with the *Normal* apply mode. If the L 1 Apply Mode is Normal, Apply Mix has no effect. If Apply Mix is 0, Apply Mode has no effect. Increase Apply Mix to blend the Apply Mode setting with the Normal apply mode.

BC Z Space Filters

Normally, if you create an effect with multiple DVE layers, each layer is rendered separately. The layer that is placed topmost in the timeline overlaps all other layers, no matter how the layers are moved or rotated in the composition. The Z Space filters allow you to create effects using multiple DVE layers ("Z Planes") which can interact and intersect in 3D space. In a Z Space effect, each plane's apparent depth, or position on the Z axis, determines how the plane interacts with other planes. The plane that appears closest to the viewer in Z space covers planes that are farther away in Z space, regardless of their order in the timeline.

Normal DVE planes

DVE planes in Z Space

Boris Continuum contains two Z space filters, **Z Space I** and **Z Space II**. Both filters provide a number of Z Planes which can be independently animated and/or transformed. Each plane offers controls which allow you to scale, position, and rotate the plane. The Z Planes can be nested within a container which allows you to globally scale, position, and rotate multiple planes. In addition, both filters provide controls for adding one or more background planes, shadows, and/or motion blur to the effect.

Z Space I and Z Space II Features

Z Space I and Z Space II differ only in the specific array of planes and controls that each filter provides.

The following table summarizes the differences between the two filters.

Feature	Z Space I	Z Space II
Full Z Planes with Pivot controls	3	2
Modified Z Planes without Pivot controls	0	3
Background Planes	1	3
Spotlights	2	0

The sections that follow describe parameters that are used in one or both of the Z Space filters. Parameters common to both filters function in the same way in each filter.

Viewing Selected Planes

View determines which portion of the effect is displayed in the Comp window. Choose *Effect* to view the entire effect. Choose *Plane 1*, *Plane 2*, *Plane 3*, or *Background* to view only the corresponding plane.

If View is set to a plane which does not have a source layer assigned to it, the Comp window displays a transparent layer.
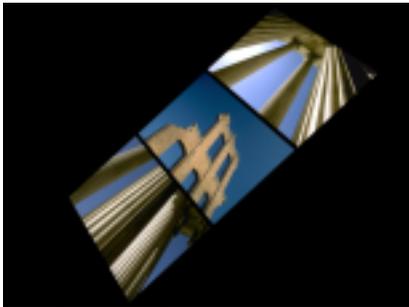
Container Parameters

The Z Space filters use a **container** to group and arrange Z Planes in 3D space. When you add planes to a container, you can animate each plane independently (using the Plane parameters), then apply parameters and animations globally to all the planes within the container (using the Container parameters). The container preserves the spatial relationship between the objects within it as you reposition and rotate the container.
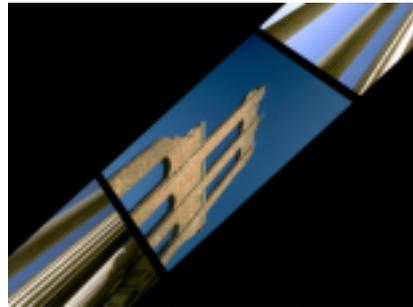
This illustration shows three Z Planes in a 3D container. Each plane has been scaled down and positioned independently.
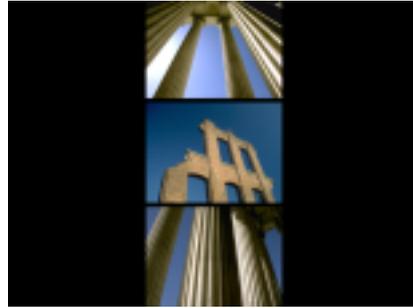
When you scale or rotate the container, all three planes are scaled and rotated as well, yet the spatial relationship between the three tracks remains constant.
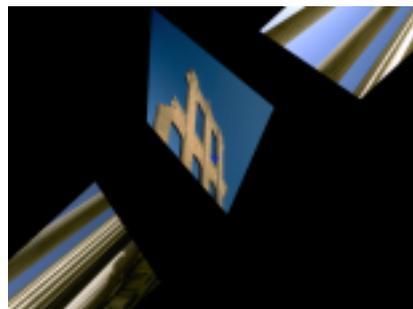

Container rotated

Container rotated and stretched

You can still adjust any individual Z Plane by making changes to the corresponding group of Plane parameters (see "Plane Parameters" on page 106).

In the example at right, Plane 2 (the facade) has been tumbled forward.

You can control which planes are in the container using the Link menu in each Plane parameter section. For more information on the Link menu, see page 106. You can also choose whether the background plane is inside the container using the Link Background menu, described on page 107.

X Scale Container and **Y Scale Container** adjust the size of the container along the X and Y axis respectively. These parameters are scaled as percentages of the container's original width and height. Thus, an X Scale setting of 200 produces a container twice as wide as the original. Select **Lock Scale Container** to keep these values in proportion, or deselect this option to adjust the X and Y Scale independently.

Position XY Container sets the horizontal and vertical location of the container.

Position Z Container adjusts the apparent depth of the container. Decreasing negative values move the container closer to the viewer, while increasing positive values move the container farther away from the viewer. Very low Position Z values move the container behind the viewer, making it invisible.

Tumble Container, **Spin Container**, and **Rotate Container** move the container around the X, Y, and Z axis, respectively. Tumble, Spin, and Rotate can be animated over values greater than 360° in order to make the container undergo more than one full revolution.

Container tumbled   *Container spun*   *Container rotated*

When **Pivot Container Lock to Center** is selected, the container tumbles, spins, and rotates around its own center. If this option is deselected, you can set an external pivot point around which to tumble, spin, or rotate the container.
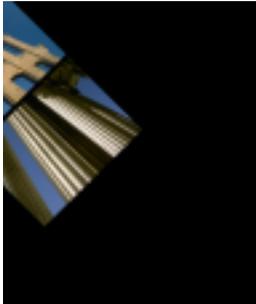
Container rotated around center

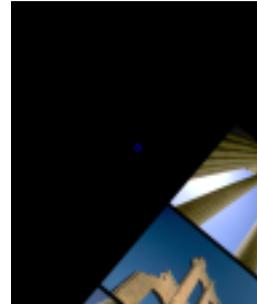*Rotate=–45°*   *Rotate=0°*   *Rotate=45°*

Container rotated around independent pivot point in lower left corner

Rotate=–45°   *Rotate=0°*   *Rotate=45°*

Pivot XY Container and **Pivot Z Container** set the X, Y, and Z coordinates of the pivot point. If Pivot Container Lock to Center is selected, moving the pivot point has no effect.

The **Motion Blur** menu allows you to turn motion blur on and off and to control the smoothness of the blur. *Off* turns motion blur off. The remaining options, *Rough*, *Medium*, *Smooth*, and *Smoothest*, produce motion blur of varying degrees of smoothness. Increasing smoothness produces a higher quality blur but increases rendering and preview times proportionately.

Motion Blur=Rough

Motion Blur=Smoothest

Motion Blur is a very processor-intensive feature. You might want to turn motion blur off while you work, then enable it just before rendering.

Shutter Angle refers to the workings of a conventional film camera. Normally, the shutter is open to 180°, meaning that the shutter is open for half of each frame. Increasing the angle keeps the shutter open longer, creating a wider blur. Decreasing the angle produces a thinner blur.


Shutter Angle=180

Shutter Angle=300

Shadows Parameters

Parameters in this section enable you to add true 3D cast shadows to the Z Space effect. These shadows are more realistic than simple drop shadows because the cast shadows change as the objects casting or receiving the shadows are transformed. In the following examples, notice that the shadow falls differently on the background plane as the plane is rotated in 3D space.
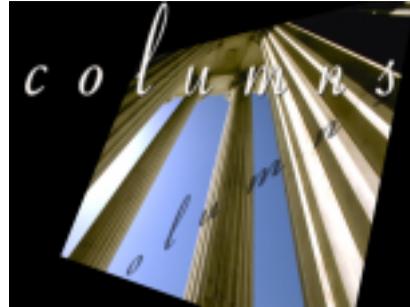
Each plane has a separate Shadows control that determines whether that plane casts and/or receives shadows. For example, if you want a text track to cast shadows on all other planes, but do not want the text to be shadowed by other planes, you can set the text track to cast shadows but not receive shadows. For more information on this feature, see "Shadows" on page 106.

The **Shadows** menu turns shadows on and off and adjusts the quality of the shadows. *Off* turns off the shadows. The remaining three choices turn shadows on and provide three different rendering algorithms.

- *Faster #1* and *Faster #2* render shadows more quickly but a lower quality. Experiment with these two settings to find the algorithm that looks better for your effect.
- *Better* increases rendering time, but produces a better-looking shadow.

If Shadow Softness is 0, Faster #1, Faster #2, and Better all produce the same quality. For more information on Shadow Softness, see page 105.

Shadow Intensity controls the opacity of the shadows. A Shadow Intensity value of 100 creates completely opaque shadows, and a Shadow Intensity value of 0 makes the shadows completely transparent.

Shadow Color sets the color of the shadows.

Shadow Elevation sets the elevation of the synthetic light source used to produce shadows. A high elevation value produces a shadow that falls directly behind the plane casting the shadow. Decrease Shadow Elevation to offset the shadow farther from the plane casting the shadow. Negative Shadow Elevation values cause the plane to cast a shadow in front of itself in Z space so that the plane is partially covered by its own shadow.

Shadow Elevation=60

Shadow Elevation=25

Shadow Direction sets the angle between the beam of light and the horizontal axis. The plane casts a shadow in the direction opposite that of the of the light beam. For example, if the light hits the plane from the right, the plane casts a shadow to the left.
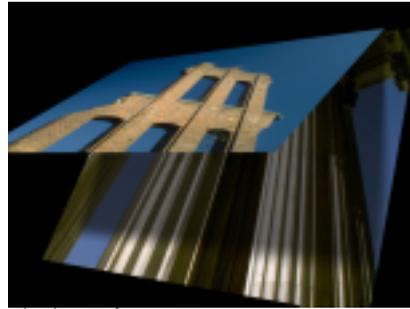

Shadow Direction=−135

Shadow Direction=−45

Shadow Softness controls the softness of the edges of the shadows. A setting of 0 produces a sharply defined shadow with hard edges. Increasing Shadow Softness produces shadows with softer edges.

Shadow Softness=15

Shadow Softness=50

When **Lights Casts Shadows** is selected, the positioning of the Z planes affects how applied light hits the planes. For example, suppose there are 2 Z Planes in an effect, one on top of the other. If Lights Casts Shaodws is selected, a light source positioned above both planes lights the top plane and perhaps part of the bottom plane, but the top plane obstructs some of the light falling on the bottom plane. This creates a more natural lighting effect. If this option is deselected, the light falls on both planes, and the top plane does not act as an obstruction.

Lights Casts Shadow on

Lights Casts Shadow off

For more information on the lighting controls, see "Spotlight 1 and Spotlight 2 Parameters" on page 109.

Plane Parameters

These parameters apply geometric transformations to the corresponding Z plane in the effect.

The **Z Source** menu selects which layer in the composition is used as the source for the corresponding Z Plane. Choose *None* to remove the plane from the effect.

The **Link** menu determines how the plane is grouped with the other elements of the effect.

- *Free* places the plane outside the container.
- *In Container* places the plane inside the container.
- *In Plane 1* links the plane to Plane 1. This link functions like a second container that can be also nested inside the main container. Thus, any changes made to Plane 1 also affect any Z Planes whose Link menus are set to In Plane 1.

X Scale and **Y Scale** adjust the size of the plane along the X and Y axis respectively. These parameters are scaled as percentages of the plane's original width and height. Thus, a X Scale setting of 200 produces a plane twice as wide as the original plane. Select **Lock Scale** to keep the X and Y Scale values in proportion.

Opacity scales the opacity of the Z plane. When Opacity is 100, the plane is completely opaque. As Opacity decreases, the plane becomes increasingly transparent, and at value of 0, the plane is completely transparent.

Position XY sets the X and Y coordinates of the center point of the plane.

Position Z adjusts the apparent depth of the plane. Decreasing negative values move the plane closer to the viewer, while increasing positive values move the plane farther away from the viewer. Very low Position Z values move the plane behind the viewer, making it invisible.

Tumble, **Spin**, and **Rotate** move the plane around the X, Y, and Z axis, respectively. Tumble, Spin, and Rotate can be animated over values greater than 360° in order to make the plane complete more than one full revolution.

When **Pivot Plane Lock to Center** is selected, the plane tumbles, spins, and rotates around its own center. If this option is deselected, you can set an external pivot point around which to tumble, spin, or rotate the plane.

Pivot XY and **Pivot Z** set the X, Y, and Z coordinates of the pivot point. If Pivot Plane Lock to Center is selected, moving the pivot point has no effect.

Shadows determines whether the plane casts and/or receives shadows.

- *Cast Only* causes the plane to cast shadows on other planes but not to receive them.

- *Receive Only* causes the plane to receive shadows cast by other planes but not to cast any of its own.
- *Cast and Receive* causes the plane to both cast and receive shadows.
- *Off* causes the plane to neither cast nor receive shadows.

Lights determines which of the two spotlights light the plane. Choose *Light 1*, *Light 2*, *Lights 1 and 2*, or *Off*.

Ambient Light adjusts the brightness of the plane. The default setting of 100 does not add or subtract ambient light from the source image. Decreasing this setting darkens the plane before any other light is applied. Ambient light illuminates or darkens the plane evenly, and is unaffected by any other lighting parameters.

Lights and Ambient Light are only available in Z Space I, because Z Space II does not contain Spotlight controls.

Background Parameters

These parameters adjust the corresponding Background plane. Background planes are similar to Z Planes but have fewer controls.

Source Background determines which layer in the composition is used as the background plane. Choose *None* to eliminate the background from the effect.

The **Link Background** menu allows you to control how the background plane is grouped with the other elements of the effect.

- *Background* places the background plane outside of the main container, and causes the background plane's size to remain the same regardless of its depth. This allows you to position the background plane as far away in Z space as you need to without having to adjust the scale of the plane.
- *Free* places the background plane outside of the main container.
- *In Container* places the background plane inside the main container.
- *In Layer 1* links the background plane to Z Plane 1. This link functions like a second container that can be nested inside the main container. Thus any changes made to Plane 1 also affect any background planes whose Link Background menus are set to In Layer 1.

X Scale Background and **Y Scale Background** change the size of the background plane along the X and Y axis, respectively. These parameters are scaled as percentages of the plane's original width or height. Thus, an X Scale Background setting of 200 produces a plane twice as wide as the original plane. Select **Lock Scale Background** to keep the X and Y Scale Background values in proportion.

Opacity Background scales the opacity of the background plane. When Opacity Background is 100, the plane is completely opaque. As Opacity Background decreases, the plane is increasingly transparent, and at value of 0, the plane is completely transparent.

Position XY Background sets the X and Y coordinates of the center point of the plane.

Position Z Background adjusts the apparent depth of the plane. Decreasing negative values move the plane closer to the viewer, while increasing positive values move the plane farther away from the viewer. Very low Position Z values move the plane behind the viewer, making it invisible.

Rotate Background rotates the background plane around the Z axis.

Shadows Background determines whether the plane casts and/or receives shadows.

- *Cast Only* causes the plane to cast shadows on other planes but not to receive them.
- *Receive Only* causes the plane to receive shadows cast by other planes but not to cast any of its own.
- *Cast and Receive* causes the plane to both cast and receive shadows.
- *Off* causes the plane to neither cast nor receive shadows.

Lights Background determines which of the two spotlights affect the plane. Choose *Light 1*, *Light 2*, *Lights 1 and 2*, or *Off*.

Ambient Light Background adjusts the brightness of the plane. The default setting of 100 does not add or subtract ambient light from the source image. Decreasing this setting makes the plane darker before the other light is applied. Ambient light illuminates or darkens the plane evenly, and is unaffected by any other lighting parameters.

Lights Background and Ambient Light Background are only available in Z Space 1, because Z Space II does not contain Spotlight controls.

Spotlight 1 and Spotlight 2 Parameters

In Z Space I, Spotlight 1 and Spotlight 2 Parameters allow you to add two independent spotlights to the effect. The Spotlight 1 Parameters control Light 1, and the Spotlight 2 Parameters control Light 2. Z Space II does not provide any spotlight controls.

Select **Spotlight On** to turn on the corresponding light source. Deselect this option to turn off the light.

Source XY sets the horizontal and vertical location of the light source.

Source Z sets the apparent depth of the light source. Decreasing negative values move the source closer to the viewer, while increasing positive values move the source farther away from the viewer.

Target XY sets the horizontal and vertical location of the point on the image plane at which the spotlight is aimed.

Width controls the width (in degrees) of the beam of light. Changing the Width is analogous to altering the placement of a physical spotlight within its enclosure.

Intensity sets the intensity of the light.

Color sets the color of the light.

Falloff controls the softness of the edges of the lit region. Increase Falloff to soften the transition between the lit and unlit regions.

Apply Mode controls how the light is composited with the effect.

For descriptions of all the possible Apply Modes, see "Apply Modes" on page 217.

Apply Mix controls the mix of the specified Apply Mode with the *Normal* apply mode. If the Apply Mode is Normal, Apply Mix has no effect. If Apply Mix is 0, Apply Mode has no effect. Increase Apply Mix to blend the Apply Mode setting with the Normal apply mode.

RENDER FILTERS

Chapter 5
Render Filters

BC Burnt Film

BC Burnt Film simulates the look of holes burning through a layer of film to reveal another image. This filter provides control over the appearance of the burned edges and the burn rate, and allows you to use a custom alpha mask to set the shape of the burn holes.

Burnt Film transition

Time 00:00:01:00   *Time 00:00:02:00*

Burn Amount sets the amount of burn applied to the source image. A setting of 0 does not affect the source image. A setting of 1 burns the source out completely, revealing layers below it. To create a burnt film transition, animate Burn Amount from 0 to 1 over the duration of the effect.

Burn Color seys the color of the burnt edges.

Flare Color sets the color of the inside edges of the burn holes. These edges are partially transparent.

Char Color sets the color of the "charred" edges—that is, the outside edges of the burn holes. These edges have not yet burned through, and are completely opaque.
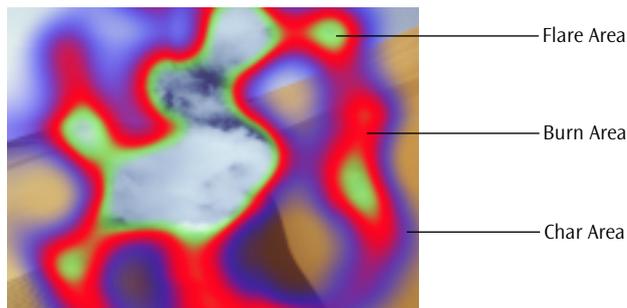
Flare Amount sets the width of the inside edges of the burn holes.

Char Amount sets the width of the "charred" edges.

Position controls the pattern of the burn holes at a given point by moving through the procedural noise from which the effect is generated. The best way to use this parameter is to hold down the Option key (on Macintosh) or the Alt key (on Windows) as you move the crosshair. This allows you to navigate through the underlying noise pattern to find a pattern that you like.

Lock Scale locks the Y Scale value to the X Scale setting and preserves the aspect ratio of the burn pattern. When this option is selected, adjusting Y Scale has no effect. Deselect this option to adjust the X and Y Scale values independently.

X Scale determines the scale of the burn pattern along the horizontal axis. Increasing this setting stretches the burn pattern out horizontally.

Y Scale determines the scale of the burn pattern along the vertical axis. Increasing this setting stretches the burn pattern out vertically.
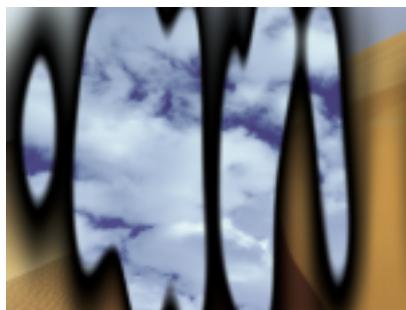
X Scale=400, Y Scale=50 *X Scale=50, Y Scale=400*

Layer Function determines how the effect uses the map layer.

- *None* ignores the map layer.
- *Alpha Layer* creates a burn pattern in the shape of the map layer's alpha channel.
- *Luma Gradient* uses the map layer's luma values to determine when burning occurs. Light areas in the map layer burn first, followed by successively darker areas.

Map Layer chooses the layer to use as the map layer. You can choose any layer within the composition to act as the map layer, and use Layer Function to create a burn pattern from the map layer's alpha or luma channel.


Swirl mask

Swirl mask used as Map Layer

Alpha Layer Level controls the degree to which the burn pattern conforms to the alpha channel in the map layer. At a setting of 0, the burn pattern does not conform to the alpha channel at all, and resembles an effect that does not use a map layer. At a setting of 1, the burn pattern conforms exactly to the alpha channel used as the map layer.

Alpha Layer Level=0.3
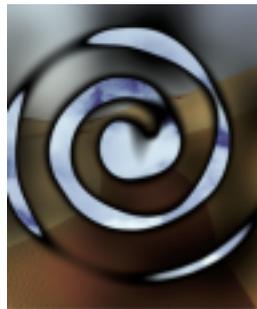
Alpha Layer Level=0.6

Alpha Layer Level=0.9

Blend softens edges in the channel used as the map layer. A value of 0 produces burn holes with very sharp edges. Increase this value to soften the edges of the burn holes and make the effect look more natural.

Choke expands or tightens the opaque areads in the map layer's alpha channel (or the black areas in the map layer's luma channel), thereby altering the size of the burned area. Positive Choke values shrink these areas, making the burn holes larger. Negative values of Choke expand these areas, making the burn holes smaller.

BC Clouds

BC Clouds is a realistic clouds generator. The clouds can act as a filter on a layer or generate a sky with clouds and a horizon color. Three different types of clouds automatically animate using the Direction, Angle and Speed you set without using keyframes.

Clouds Parameters

Cloud Direction sets the direction of cloud movement. This value represents the angle between the direction of motion and the horizontal axis.

Cloud Speed determines the speed at which the clouds move in the specified Cloud Direction. The clouds auto-animate at the chosen speed, but you can make a stationary cloud effect by setting Cloud Speed to 0.

X Scale and **Y Scale** determine the horizontal and vertical size of the clouds. **Select Lock Scale** to lock the Y Scale value to the X Scale, or deselect this option to adjust each parameter independently.
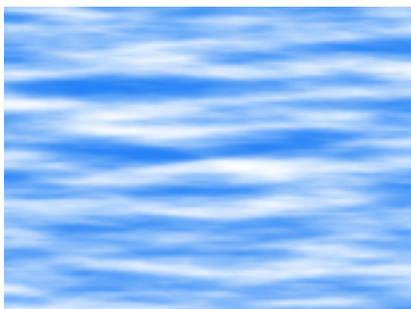
X Scale=400, Y Scale=50
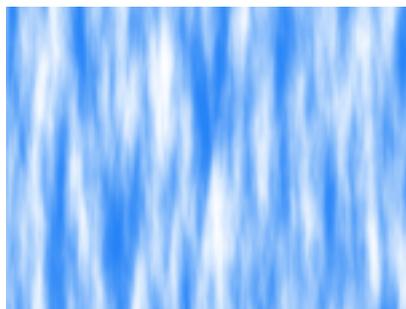
X Scale=50, Y Scale=400

Billow Speed determines the rate at which the clouds surge or rotate inward on themselves.

Opacity controls the opacity of the clouds, or the overall image. If Sky Type (see below) is set to Color, Opacity affects the whole image. If Sky Type is set to Composite on Original or Alpha, this setting affects the opacity of the clouds only.

Cloud Type sets the general appearance of the cloud patterns. There are some inherent shape and size differences between the three different Cloud Types: *Airy, Puffy* and *Wispy*. For this reason, you may want to adjust the Scale and Billow Speed settings slightly when switching between the various Cloud Types

Airy clouds   *Puffy clouds*   *Wispy clouds*

The **Sky Type** setting determines how the filter applies the clouds.

- When Sky Type is set to *Composite on Original*, the filter composites clouds over the source image, which remains visible through the clouds.
- *Color* composites clouds over the Sky Color.
- *Alpha* composites the clouds over a transparent layer. This enables you to adjust the clouds without altering the background image.

Cloudiness controls the density of clouds in the sky. Cloudiness is scaled as a percentage between 0 and 100. A value of 0 produces a sky with no clouds. Increasing the Cloudiness value adds more clouds to the sky.

Cloud Color sets the color of the clouds.

When the **Use Horizon** option is selected, the resulting sky is a gradation from the Sky Color at the top of the screen to the Horizon Color at the bottom.

Clouds with horizon

Horizon Color sets the color of the horizon. If Use Horizon is not selected, the Horizon Color has no effect.

 Try applying the Clouds filter twice to the same image to combine two different types of clouds within the effect. Use the eyedroppers to set the sky and horizon colors to the same values as the first Clouds filter, then set the second filter's Sky Type to Composite on Original and decrease the opacity about 50% to make both outputs visible. This technique allows you to mix clouds of different sizes, colors, and shapes to achieve a more natural, less regular assortment of clouds.

Map Layer allows you to choose any layer in the composition to use as mask for the clouds. The clouds conform to the opaque regions in the Map Layer's alpha channel.

Boris mask

Clouds with Boris mask used as Map Layer

Blend blurs the alpha channel. You can use Blend to feather edges in the mask or to reduce pixilation caused by Choke.

Choke adjusts the size of the opaque regions in the matte. Increasing positive Choke values enlarge the opaque regions, while decreasing negative values shrink the opaque regions.

Boris Clouds can also be used to create wisps or billows of smoke as in the illustration below.

1   First, precompose a mask in After Effects. Create a new solid, open the preview window, then use the Path tool to draw your mask. In the Time Layout window, open the Masks track and set both masks to *Add*. Your mask should now be opaque where you want the smoke to appear, as in the illustration to the right.

2   Open a new composition (Comp 2), and drag the mask composition (Comp 1) into the timeline.
3   Create a new solid in Comp 2 and apply Boris Clouds. Select the mask composition in the Clouds filter's Map Layer menu.
4   Set Sky Color to black and increase Blend to about 60 to blend the edges in the alpha channel.

This illustration show the finished effect. Try experimenting with Cloud Direction, Cloud Speed, and Billow Speed to adjust the animation of the effect. You can also animate the shape of the mask over time.
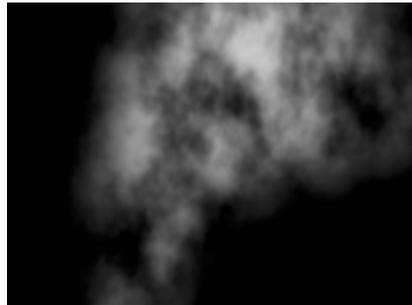
BC Fire

BC Fire is an auto-animated procedural fire effect which offers control over flame width and height, color, and movement, and allows you to generate smoke. This filter can use the alpha channel in any other layer as a Map Layer, allowing you to create fire effects which conform to a pre-composed image or logo.

General Parameters

Fire Appearance determines which portions of the fire effect are visible in the filtered image. *Fire and Smoke* displays both the fire and the smoke in the effect, *Fire Only* displays only the fire, and *Smoke Only* displays only the smoke.

Fire and Smoke

Fire Only

Smoke Only

Fire Type controls the general appearance of the fire effect. There are some inherent shape and size differences between the three different Fire Types: *Regular*, *Stringy*, and *Bubbly*. You may want to compensate for these differences by adjusting the Scale, Texture Scale, Speed, and Fire Detail settings when switching between the various Fire Types.
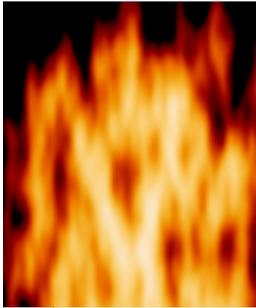
Regular   *Stringy*   *Bubbly*

Fire Direction sets the angle between the horizontal axis and the direction of the flames.

Fire Speed controls how fast the flames move in the selected Fire Direction.

Fire Texture Speed sets the billowing speed of the auto-animated flame. As Fire Texture Speed increases, the texture of the flames changes more quickly.

Fire Position sets the location of the center of the fire effect.

Texture Position controls the texture of the fire at a given point by moving through the procedural noise pattern from which the effect is generated. The best way to use this parameter is to hold down the Alt key (on Windows) or the Option key (on Macintosh) while you drag the crosshair around the preview window. This allows you to navigate through the underlying noise pattern to find a pattern you like.

X Scale and **Y Scale** stretch out the flame along the X and Y axis, respectively. You can lock the Y Scale value to the X Scale value by selecting the **Lock Scale** option.

X Scale=1.0

X Scale=3.0

Texture X Scale sets the scale of the flame texture along the horizontal axis. Increasing this value stretches individual wisps of fire out and creates fewer wisps. Decreasing this value makes each wisp thinner and creates more wisps. **Texture Y Scale** operates similarly but affects the flame texture along the vertical axis. You can lock the Texture Y Scale value to the Texture X Scale value by selecting **Lock Texture Scale**.

Texture X Scale=20
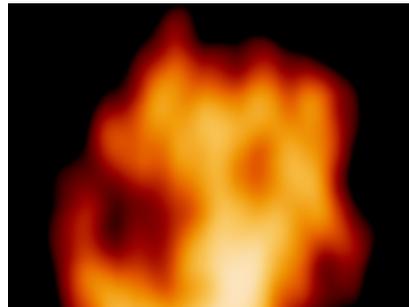
Texture X Scale=100

Fire Detail controls the level of detail in the flame texture. At a value of 0, the flame is a simple gradient with soft edges. As this value increases, the texture becomes finer, and the flame takes on a rougher gradient, creating the illusion of increasing distance between the viewer and the fire.

Fire Detail=20

Fire Detail=80

Fire Strength determines the overall temperature and brightness of the fire. Increasing this parameter causes the High Fire Color to predominate.
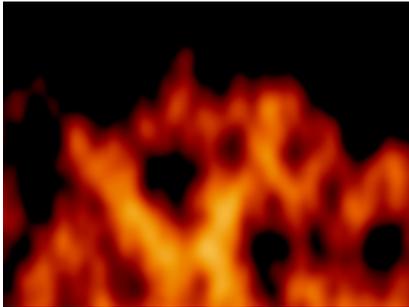
Fire Strength=20
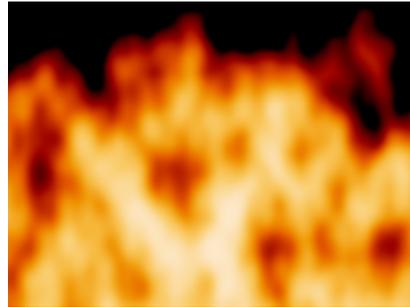
Fire Strength=100

For more information on the High Fire Color parameter, see "Color Parameters" on page 126.

Opacity determines the opacity of the flame. A value of 100 makes the flame completely opaque, and a value of 0 makes the flame completely transparent.

Shape Parameters

Fire Width adjusts the width of the fire effect in relation to the screen, without affecting the X and Y Scale or the Texture Scale. Increasing Fire Width extends the range of the effect to cover more of the screen.

Fire Height functions similarly to Fire Width but adjusts the vertical height of the flames above the Fire Position point.

Fire Height=20

Fire Height=100

Fire Base adjusts the distance between the base of the flames and the Fire Position point. When Fire Base is 0, the base of the flames is located at the Fire Position point. Increasing Fire Base moves the flame base below the Fire Position.

Fire Height Cutoff affects the shape of the top of the fire. A setting of 0 cuts the top of the flame off in a straight line. As you increase this value, the top of the fire becomes more jagged.
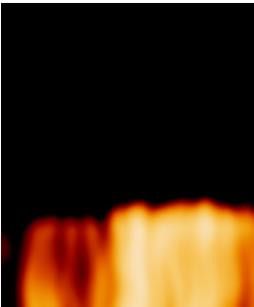
Fire Height Cutoff=10

Fire Height Cutoff=50
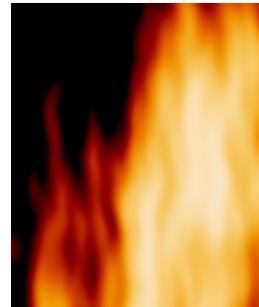
Fire Height Cutoff=90

Fire Bottom Cutoff functions similarly to Fire Height Cutoff, except that it affects the shape of the base of the flames.

Edge Softness blends the edges of the flames with the background.

Color Parameters

The Fire filter uses a color map to determine how to apply color to the texture map (the procedural noise) used to create the effect. The color map is a gradient which maps between the selected Fire Colors.

Bias controls the overall position of the texture on the color map. Changing Bias moves the texture's high and low points through the color map.
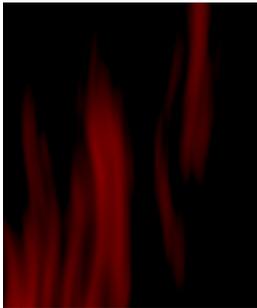
Bias=25 *Bias=50* *Bias=75*

Gain controls the sensitivity of the color map to changes in texture. As Gain increases, pixels similar in texture move further apart on the color map. As Gain decreases, pixels similar in texture move closer together on the color map.

Gain=25 *Gain=50* *Gain=75*

Fire Color Type determines which colors are used to generate the color map.

- When Fire Color Type is set to *Regular*, the color map uses default colors that create flames that move from deep brown to red-orange to light yellow as the temperature increases.
- *Gas* uses default colors that create blue flames that look similar to those on a gas stove.
- Selecting the *Custom* option allows you to override the default color maps and create flame effects using up to three custom colors as described below.

Low Fire Color, **Medium Fire Color**, and **High Fire Color** select custom colors for the cool, medium, and high flame temperatures, respectively. If Fire Color Type is set to Regular or Gas, changing the Low, Medium, and High Fire Colors has no effect.

Middle Color Position sets the relative position of the Middle Fire Color along the color gradient used to create the custom color map. Higher values move the Middle Fire Color closer to the High Fire Color, while lower values move the Middle Fire Color towards the Low Fire Color.

Smoke Parameters

Smokiness adjusts the amount of smoke produced by the flames.

Smoke Spreading Angle determines the width of the column of the smoke as it rises.

Smoke Spreading Angle=10   *Smoke Spreading Angle=50*   *Smoke Spreading Angle=90*

Smoke Color sets the smoke color.

Smoke Opacity adjusts the opacity of the smoke. A setting of 100 makes the smoke completely opaque, while a setting of 0 makes the smoke completely transparent.

Smoke Texture X Scale sets the sclae of the smoke along the horizontal axis. Increasing this value stretches individual wisps of smoke out and creates fewer wisps. Decreasing this value makes each wisp thinner and creates more wisps. **Smoke Texture Y Scale** operates similarly but affects the smoke texture along the vertical axis. You can keep these two values in proportion by selecting **Lock Smoke Texture Scale**.

Smoke Texture X=400, Smoke Texture Y=50

Smoke Texture X=50, Smoke Texture Y=400

Wind Parameters

Wind Speed deflects the flame either to the right (for positive values) or to the left (for negative values) in order to simulate the affect of wind on the flames. A value of 0 creates no wind. As the value moves away from 0 the amount of deflection increases.

Wind Speed= −80

Wind Speed=60

Wind Variance controls the range of Wind Speed values that are used in the effect. When Wind Variance is 0, the wind moves at the specified wind speed. Increasing Wind Variance causes the wind to move at an increasingly wider range of speeds.

Wiggle Amount adds a wave pattern to the flame motion. Increasing this value makes the wave distortion more pronounced.

Wiggle Frequency determines the number of wiggle waves that can appear in the effect at any given time. High Wiggle Frequency values produces many small waves, while low values produce a few large waves.

Wiggle Frequency 25

Wiggle Frequency 75

Map Layer Parameters

Map Layer allows you to choose any layer in the composition to use as mask for the fire. The flames conform to the opaque regions in the map layer's alpha channel.This is useful for creating effects in which an image or logo appears to be burning. The map layer can be a still or moving image or gradient—any media with an alpha channel can be used. The example below shows the Boris FX logo used as a map layer.
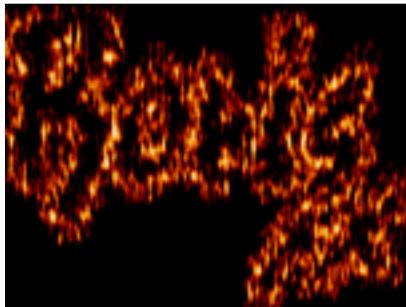
Fire effect with "Boris FX" map layer

When using a map layer, you may need to adjust the Fire Base and Fire Height so that the boundaries of the flames include the appropriate portions of the map layer.

The **Composite with Map Layer** checkbox allows you to composite the fire over the map layer. Select this option if you want to see the map layer image as it is burning. Deselect this option if you want the flames to follow the outline of the map layer's alpha channel, but you want to see only fire and not the map layer media itself.

If you select **Fire on Edge Only**, flames appear only around the edges of the opaque regions in the map layer. If this option is deselected, the entire opaque region contains flames.

Blend blurs the edges in the map layer's alpha channel smooth the transitions between opaque and transparent areas.

Choke expands or contracts the alpha matte. Increasing positive Choke values make the opaque areas in the alpha matte larger, and decreasing negative Choke values make the opaque areas smaller.

Selecting **Composite on Original** composites the fire on filtered layer. When this option is deselected, the effect is composited over an alpha channel.

Composite on Original off

Composite on Original on

BC Stars

BC Stars is an auto-animated star generator which can composite stars over a sky color or an image layer. This filter provides control over the size, density, movement and color of the stars, and allows you to add galaxies. Stars can also use the alpha channel in any other layer as a map layer, allowing you to create skies in which stars fill a pre-composed image or logo..
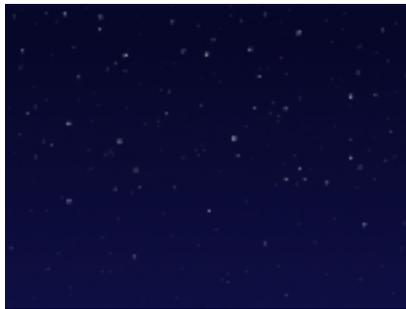
BC Stars

Selecting **Multiple Layer** composites three layers of stars over one another. The star layers move at different speeds in order to create a sense of depth.

Pattern sets the position of the star map. Adjusting this parameter changes the random configuration of the stars. To find a star pattern you like, hold down the Option key (on Macintosh) or the Alt key (on Windows) while you move the Pattern position point on-screen. The Comp window updates to show the changing star arrangement.

Move Type determines how the stars move.

- *Side* causes the stars to move in the direction set by the Direction control.
- *Forward* causes the stars to move forward, approaching the viewer. Forward is only functional when Multiple Layer is selected.
- *Backward* moves the stars backward, away from the viewer. Backward is only functional when Multiple Layer is selected.

Speed sets the speed of the stars at which the stars move. Setting Speed to 0 creates a stationary effect. Increasing the Speed value makes the stars move more quickly.

Direction controls the stars' direction of movement when Move Type is set to Side. The Direction setting represents the angle between the stars' direction of motion and the vertical axis. Therefore, at a Direction value of 0, the stars move upward. At a Direction value of 90, the stars move to the right.

Density sets the density of the stars without affecting their size. Decreasing Density spaces the stars farther apart, whereas increasing Density packs stars closer together.

Density=35

Density=75

Maximum Size sets the maximum star size in the layer, and **Minimum Size** sets the minimum star size in the layer. The stars' sizes fall in the range set by the Minimum Size and Maximum Size values. Therefore, creating a large discrepancy between the Minimum and Maximum Size values produces a wide range of star sizes. Setting the Minimum and Maximum Size values closer together produces more uniform star sizes.

Twinkle determines the degree to which stars flicker off and on as they move. Increasing the Twinkle value causes the stars to flicker more, whereas decreasing Twinkle causes the stars to flicker less.

Lock Scale locks the Scale Y value to the Scale X value in order to preserve the aspect ratio of the star pattern. Deselect this option if you want to adjust the Scale X and Scale Y values independently.

Scale X sets the horizontal scale of the star pattern. Increase Scale X to stretch the stars out horizontally.

Scale X=50
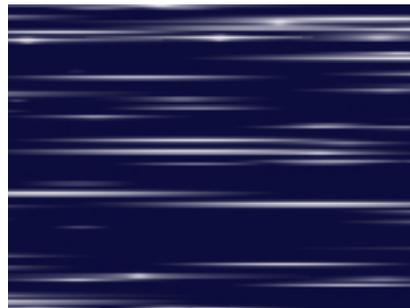
Scale X=3000

Scale Y sets the vertical scale of the star pattern. Increase Scale Y to stretch the stars out vertically.
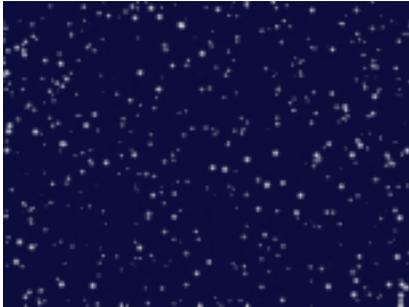
Scale Y=50
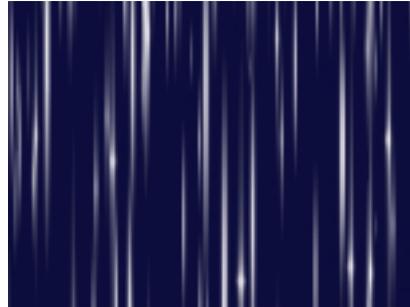
Scale Y=3000

Sky Type chooses how the stars are composited.

- *Composite on Original* composites the stars over the filtered layer.
- *Color* composites the stars over the chosen **Sky Color**.
- *Alpha* composites the stars over an alpha channel.

Star Color sets the color of the stars.

Add Galaxies adds galaxies to the star pattern.
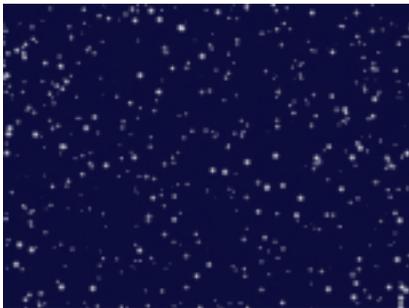
Add Galaxies off

Add Galaxies on

Galaxy Density determines how closely the galaxies are packed together. Increasing the Galaxy Density value places galaxies closer together and adds more galaxies to the sky. Decreasing Galaxy Density moves galaxies further apart and adds fewer galaxies to the sky.

Galaxy Density=15
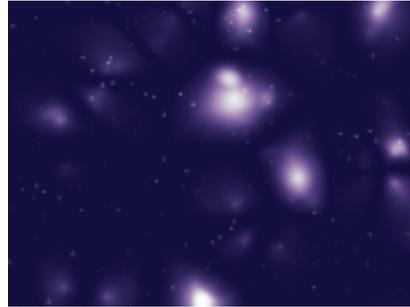
Galaxy Density=40

Galaxy Size determines the size of the galaxies. Increase the Galaxy Size value to create larger galaxies; decrease this value to create smaller galaxies.

Galaxy Size=30

Galaxy Size=100

Add Shining Stars changes some of the stars from round- to diamond-shaped.
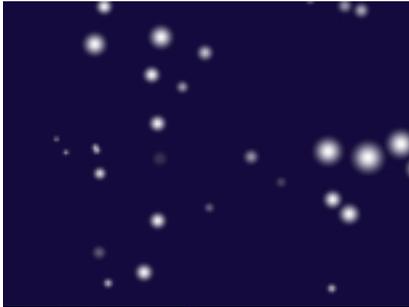
Add Shining Stars off
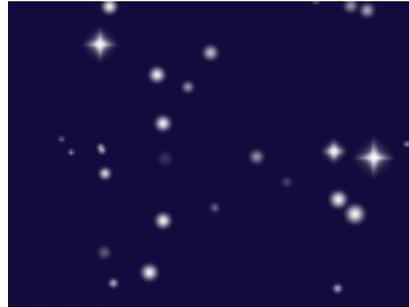
Add Shining Stars on

Map Layer allows you to choose any layer in the composition to use as mask for the effect. The stars conform to the opaque regions in the map layer's alpha channel.

The remaining parameters affect only the map layer. If there is no map layer chosen, adjusting these parameters has no effect.

If you select **Use Map Alpha**, the filter uses the alpha channel in the map layer as it is, preserving the full range of transparencies. If this option is not selected, the filter uses the alpha channel in the map layer but treats each pixel as if it were either fully opaque or fully transparent. Pixels that are 50% to 100% opaque in the map alpha are treated as 100% opaque (fully opaque), while pixels that are 0% to 49% opaque in the map alpha are treated as 0% opaque (fully transparent).
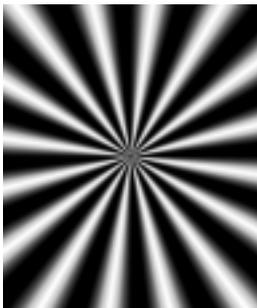
Map layer alpha channel
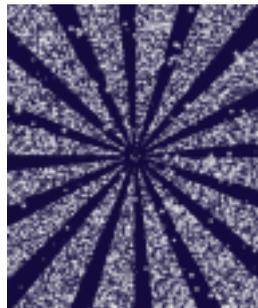
Use Map Alpha off
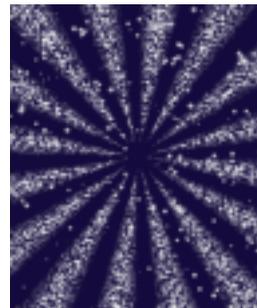
Use Map Alpha on

Density on Alpha Layer controls the density of the stars within the opaque regions of the map layer's alpha channel. Increasing this value packs the more stars in the region, while decreasing this value creates fewer stars in the region.
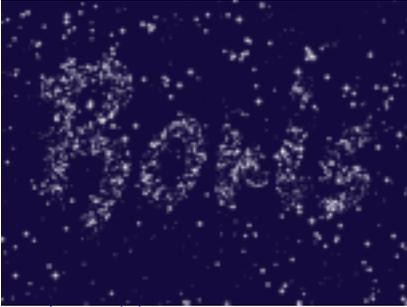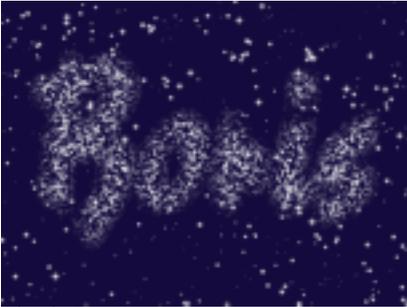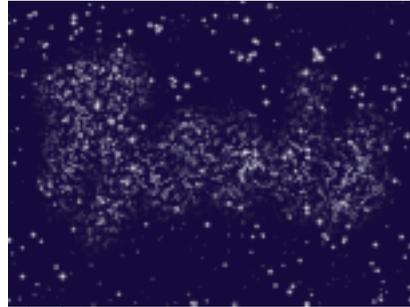

Density on Alpha Layer=25

Density on Alpha Layer=75

Blend adjusts the softness of the edges in the map layer's alpha channel. Increasing this value softens the edges of the opaque areas in the matte.

Blend=25

Blend=50

Choke contracts or expands the edges of the opaque regions in the alpha channel. Positive Choke values expand the opaque regions, while negative Choke values contract them.

Choke= –100

Choke=0

Choke=100

TEXT FILTERS

Chapter 6
Text Filters

BC 3D Text

BC 3D Text allows you to create and manipulate text in true 3D space. You can independently adjust the bevels, extrusions, and front and back faces of the text; control the lighting; and map media to each of the faces. Additional parameters enable you to simulate different textures on the text, including metallic, glass, and mirrored surfaces.

When you apply the filter, a dialog appears allowing you to choose a font and type in your text. You can also select Left, Center, or Right alignment in this window. You can type text directly into the edit field, or you can paste text previously copied from another source. To make a change to the text later, click Options.

General Parameters

Extrusion controls the thickness of the extruded sides.

Tracking controls the global spacing of the characters in the effect. Increasing Tracking moves the characters further apart, while decreasing Tracking moves the characters closer together. Negative Tracking values can cause the characters to overlap.

Leading controls the vertical spacing between lines of text. Positive values push lines further apart; negative values bring lines closer together.

The **Kerning** controls adjust the spacing between individual characters.

Click on the left or right arrow button to choose which pair of letters you want to adjust. The selected pair of letters appears in the preview window between the arrows. The middle set of double arrows control the amount of space between the selected characters. The final set of single arrows also adjust the spacing between the selected pair of letters, but these parameters provide finer control for more detailed adjustments.

Preview of selected characters

C ick to fine-tune spacing between selected characters

Click to select characters to adjust

Click to adjust spacing between selected characters
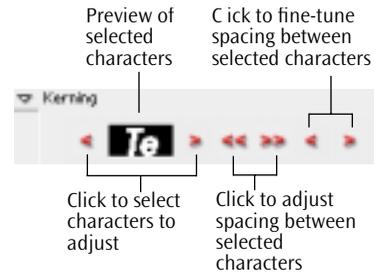
Bevel Amount determines the thickness of the bevels on the front and back faces of the text.

Bevel Type controls the shape of the bevels.

- *Straight* creates straight bevels.
- *Convex* creates bevels that curve outward.
- *Concave* creates bevels that curve inward.

Position adjusts the horizontal and vertical location of the text.

Distance adjusts the apparent depth of the text. Increasing positive Distance values move the text farther away from the viewer. Decreasing negative values move the text closer to the viewer.

Lock Scale locks the Scale Y value to the Scale X value in order to preserve the aspect ratio of the text pattern. Deselect this option if you want to adjust the Scale X and Scale Y values independently.

Scale X and **Scale Y** change the size of the text along the X and Y axes respectively. These parameters are scaled as percentages of the text's original width or height. Thus, a Scale X setting of 200 produces text twice as wide as the original text.

Opacity sets the opacity of the text.

Tumble, Spin, and Rotate move the text around the X, Y, and Z axis, respectively. Tumble, Spin, and Rotate can be animated over values greater than 360° in order to make the text complete more than one full revolution.

3D Text tumbled over X-axis

3D Text spun over Y-axis

Pivot Parameters

If you select **Pivot Lock to Center**, the text tumbles, spins, and rotates around its own center point. If you deselect this option, the text tumbles, spins, and rotates around the point defined by the Pivot XY and Pivot Z settings.

Pivot XY and **Pivot Z** set the location of the pivot point along the X, Y, and Z axis, respectively. Changing these settings has no effect if Lock to Center is selected.

Camera & Lights Parameters

Camera XY sets the horizontal and vertical position of the focal point of the camera (the point on the image plane at which the camera is pointed).

Camera X=20, Camera Y=40

Camera X=500, Camera Y=400

Camera Z sets the depth of the camera's focal point relative to the camera and the object. Decreasing this value makes the portions of the object closest to the camera appear more exaggerated. Increasing this value creates a more subtle perspective effect.

Camera Z=0.5

Camera Z=10

Ambient Light adjusts the brightness of the text. Decrease this value to darken the text before adding lights.

Ambient Light=25

Ambient Light=50

Ambient Light=100

The **Light 1**, **Light 2**, and **Light 3** controls interact with the Diffuse Amount and Specular Amount values (described in "Faces Parameters" on page 147) to apply up to three independent lights to the text. These parameters function in the same way for each of the three light sources.

Light XY Position sets the location of the light source in space by moving the light parallel to the image plane along the X and Y axes.

Light Z Position controls the distance between the light source and the image plane. Negative Light Z Position values place the light behind the text and move the light away from the viewer. Positive Light Z Position values bring the light source closer to the viewer. Increasing Light Z Position makes the light less focused on one point and more diffused.

Light Z Position= −1

Light Z Position=0
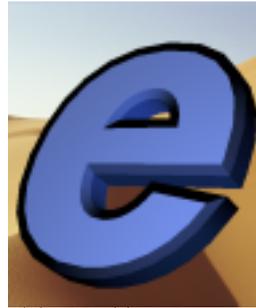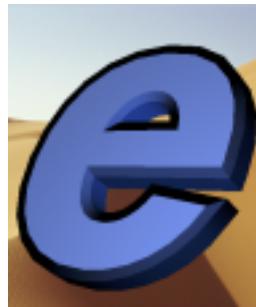

Light Z Position=1

Light Color sets the color of the light.

The **Light Amount** value is multiplied by the Diffuse Amount and Specular Amount values to determine the intensity of the light source.

Light Amount=25
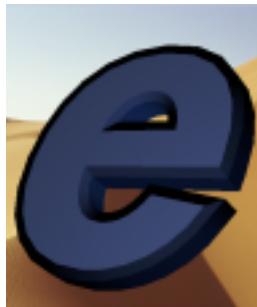
Light Amount=50

Light Amount=75

Faces Parameters

Diffuse Amount controls the amount of diffuse light applied to the text. Increasing this value adds diffuse light to the effect. Diffuse light simulates the effect of lighting a matte surface from a point source, creating a lit region in which no point is more intensely lit than any other.

Diffuse Amount=0   *Diffuse Amount=50*   *Diffuse Amount=100*

Specular Amount controls the amount of specular light applied to the text. Increasing this value increases the intensity of the specular light. Specular light simulates the effect of lighting a glossy surface from a point source, creating a small spot of intense light whose size can be varied.

Specular Amount=0   *Specular Amount=50*   *Specular Amount=100*

The diffuse and specular light emanates from the 3 light sources (which are set using the Light 1, Light 2, and Light 3 controls described on page 145) in amounts proportionate to each light source's Light Amount value.

Specular Falloff controls the size of the region lit by the specular light. Decrease this value to broaden the area and soften its edges, or increase this value to focus the specular light.

Specular Falloff=1   *Specular Falloff=10*   *Specular Falloff=100*
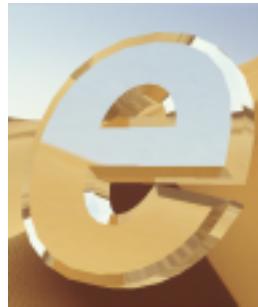
Reflectivity controls the intensity of the reflected image on the faces of the text.
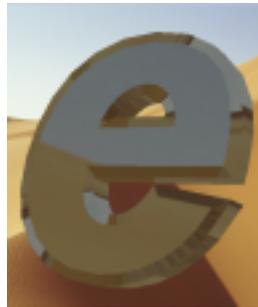
Reflectivity=0   *Reflectivity=50*   *Reflectivity=100*

Reflection Map Layer allows you to choose any layer in the composition to map to all faces of the text. By choosing the background image as the Reflection Map Layer, you can simulate the appearance of a mirrored surface on the text.

Front Face Color sets the color of the front face of the text.

Front Face Specular Color sets the color of the specular highlight on the front face of the text. If Specular Amount is 0, this setting has no effect.

Front Face Map Layer allows you to choose any layer in your composition to map to the front face of the text.

Clouds image

Clouds image mapped to front face of text

> The Front Face Color, Front Face Specular Color, and Front Face Map Layer controls function identically to the corresponding controls for the **Bevel**, **Extrusion**, and **Back Face** of the text.

Front/Back Textures determines how the Front and Back Face Map Layers are applied if they are not the same size as the text layer.

- *Stretch To Fit* stretches the Map Layer to cover the front or back face of the text. This option distorts the Map Layer image.
- *Complete* centers the Map Layer on the front or back face, then uses the chosen Front or Back Face Color to fill in the rest of the face.
- *Cropped* enlarges the Map Layer to the width of the text layer before mapping the image to the front or back face of the text. This option does not distort the Map Layer image, but it does enlarge it.

If the Map Layers are the same size as the text layer, or if the Map Layer menus are set to *None*, the Front/Back Textures setting has no effect.

Options Parameters

Front Face Visibility, **Bevel Visibility**, **Extrusion Visibility**, and **Back Face Visibility** determine whether or not each face of the text appears in the effect. Deselect these options to hide the corresponding faces.

Extrusions hidden

Front Face hidden

When **Polygon Culling** is selected, the filter only renders the parts of the effect that are visible. Leaving this option selected can significantly reduce render times, but can sometimes produce noise or artifacts at the edges.

Wireframe displays the text as a solid color outline. This quick preview can be useful for precisely tracking the movement of animated text. Deselect this option to view the completed effect.

Text displayed as wireframe

Even if you have chosen Composite on Original, selecting Wireframe hides the text layer's background media, revealing the layer below. In the example above, the layer below the text layer is a black solid.

Selecting **Back Bevel** creates bevels on both the front and back faces of the text. Leaving this option deselected only creates bevels on the front of the text. If the back face of the text is not visible in your effect, leaving this option deselected can reduce render and preview time.

Final Quality sets the quality of the text. Choose *Faster* or *Better*.

Anti-Aliasing Oversampling controls the amount of anti-aliasing that is applied to the text. *4x4* produces 16 levels of grey per pixel, *8x8* produces 64 levels of grey per pixel, and *16x16* produces 256 levels of grey per pixel. The default setting, 4x4, is generally adequate for most text applications.

Curve Smoothness controls the smoothness of the curves in the text. Increasing Curve Smoothness produces smoother curves, but increases render time. Decreasing this value speeds up rendering but produces rougher curves.

Curve Smothness=0　　　*Curve SMoothness=3*　　　*Curve Smoothness=20*

If the text is very small you can use a relatively low Curve Smoothness value without any apparent loss of visual quality. As the size of the text increases, rough curves become more noticeable. For this reason, you should increase Curve Smoothness if you increase Scale X and Y and animate Curve Smoothness along with the Scale values.

Composite on Original composites the text over the filtered layer. If you deselect this option, the text is composited over an alpha channel, revealing the layers below.

Using Lighting and Faces Parameters to Create Textures

The Lighting and Faces parameters provide several options for simulating different textures on the faces of the text.

Hard Matte Surfaces

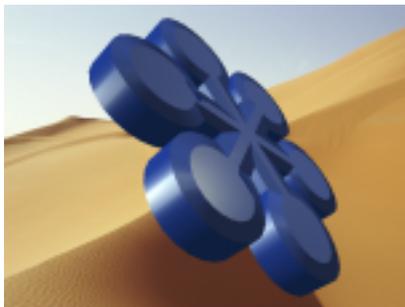Use this technique to simulate a hard, matte surface, such as textured plastic, wood, or concrete.
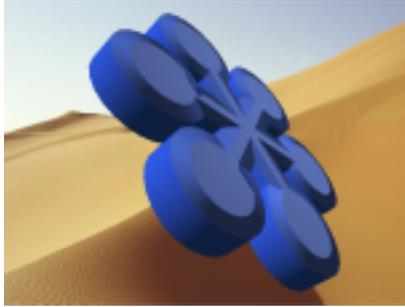
1. Set Ambient Light and Specular Amount to 0. Then set Diffuse Amount to 100.
2. Set Light 1 Amount to 100.

You might need to adjust the Light 1 position so that the light shines on the desired face of the text. You can add Light 2 and Light 3 to highlight different faces of the text simultaneously. For a warmer light, use a soft yellow color instead of white for each light color setting.

Hard Glossy Surfaces

Use this technique to simulate a hard, glossy surface, such as smooth plastic or glazed ceramic.

1. Set Ambient Light to 0. Then set Diffuse Amount to about 25 and Specular Amount to around 75.

2   Set Light 1 Amount to 100.

3   Set each face's Specular Color to white.

4   Increase Specular Falloff to at least 25.

You might need to move Light 1 around so that the specular highlights are visible. If necessary, you can also increase the Specular Amount and adjust Specular Falloff to achieve the desired effect. For a warmer light, use a soft yellow color instead of white for each light color setting.

Metallic Surfaces

Use this technique to simulate a smooth metallic surface.
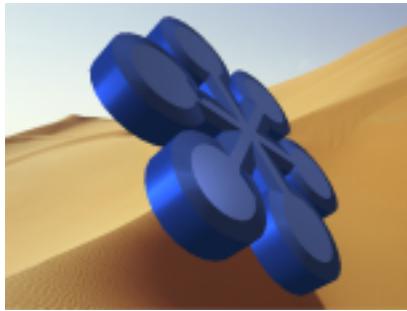
1   Set Ambient Light to 0. Then set Diffuse Amount to about 25 and Specular Amount to around 75.

2   Set Light 1 Amount to 100.

3   Use the eyedropper to set each face's Specular Color to the corresponding face color or a slightly lighter shade of the same color.

4   Increase Specular Falloff to at least 25.

You might need to move Light 1 around so that the specular highlights are visible. If necessary, you can also increase the Specular Amount and adjust Specular Falloff to achieve the desired effect.

Mirrored Surfaces

Use this technique to simulate a mirrored surface.
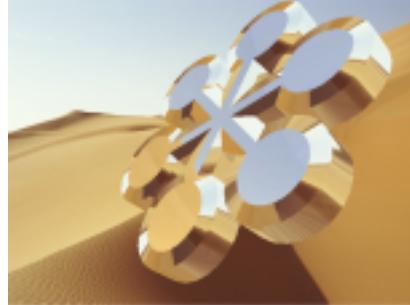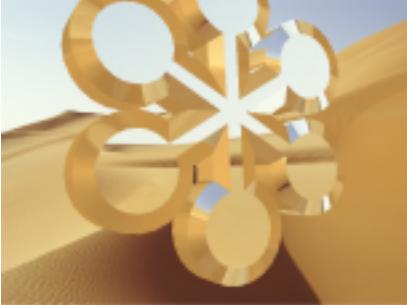
1   Set Ambient Light and Diffuse Amount to 0. Then set Specular Amount to around 25.
2   Set the Reflection Map Layer to the background layer. If Composite on Original is on, use the layer the filter has been applied to. If this option is off, set Reflection Map Layer to the underlying layer.
3   Set Reflectivity to 100 and increase Specular Falloff to 25 or more.

Glassy Surfaces

Use this technique to simulate a clear glass surface.
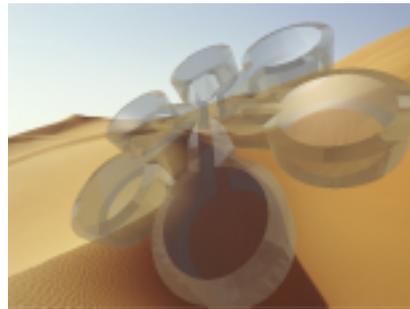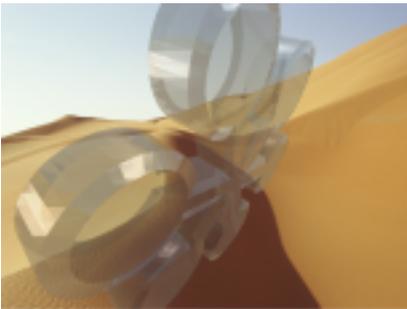
1   Set Ambient Light to about 25, Diffuse Amount to 0 and Specular Amount to 100.

2   Set the Reflection Map Layer menu to the background layer. If Composite on Original is on, use the layer the filter has been applied to. If this option is off, set Reflection Map Layer to the underlying layer.

3   Increase Reflectivity to about 15, and set Specular Falloff to 15. Then decrease Opacity to about 50.

You might need to move Light 1 around so that the specular highlights are visible. If necessary, you can also adjust Specular Falloff and Reflectivity to achieve the desired effect.

c h a p t e r   7

TIME FILTERS

Chapter 7
Time Filters

BC Jitter

BC Jitter allows you to vary one or more attributes of a source layer over time, such as size, position, opacity, brightness, or contrast. Additional controls choose the type of variance used for the jittering and allow you to view color-coded graphs of the jittered parameter values.

Creating a Jitter Effect

The filter has four basic groups of controls that are used to jitter attributes of the source layer. The following steps outline the recommended usage of this filter.
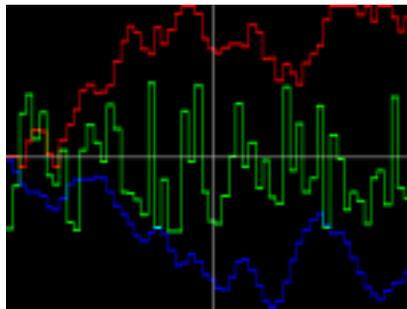
1   Create a solid that is the same size as the composition, and apply BC Jitter to this layer. Import the source footage you want to use, and set the **Source** pop-up to the source footage. These steps allow you to move small layers around without clipping, and to move larger layers around without rendering pixels that will not be visible in the composition.

2   Use the **Geometry** parameters to adjust or animate basic geometric attributes of the source layer, and use the **Insert 1, 2,** and **3** parameters to apply up to three additional effects to the source.

3   Use the **Jitter 1, 2,** and **3** parameters to create up to three different jitter curves. The curves represent the variation of a parameter value over time. Select **View Jitter Curves** while you adjust the Jitter parameters to see the affects your adjustments have on the parameters.

4   Apply each Jitter curve to up to three parameters using the **Destination 1, 2,** and **3** controls. For example, you could use the same variance pattern to affect the source image's scale, opacity, and contrast.

5   Adjust the impact of each Jitter curve on the destination parameter using the **Amount 1, 2,** and **3** controls. Amount affects the intensity, rather than the shape, of the applied Jitter curve.

General Parameters

The parameters in this section select the source layer and allow you to view the Jitter curves as you make adjustments to them. These curves plot the values of the jittered parameter over time.

View Jitter Curves displays a graph of the effect of the jitter over time. If one of the Jitter Shape controls is set to Off, that jitter is inactive and its curve does not appear on the graph.

The vertical axis on the graph represents the current time in the composition. The horizontal axis represents the base parameter value (set by the Source or Insert parameter values) before it is jittered. The red curve represents Jitter 1, the green curve represents Jitter 2, and the blue curve represents Jitter 3.

Curve View determines how the jitter curves are represented on the graph.

- *Curves* displays curves showing the amount of jitter at each frame or at selected frames of the effect.
- *Curves Over Layer* displays the jitter curves over the rendered layer. This mode allows you to simultaneously preview the jitter curves and the rendered output, which can be useful for making adjustments to the effect.
- *Curves Over Comp* displays the jitter curves over all other layers in the composition.

Time View controls the time range shown on the graph.

- *Full Effect* displays the jitter curves from the start to the end of the effect.
- *16, 8, 4, and 2* display the curves for the given number of seconds after the frame specified by Scroll Curves.

Scroll Curves selects the first frame in the effect that is displayed when Time View is set to 16, 8, 4, or 2. This parameter has no effect if Time View is set to Full Effect.

Source selects the layer in the composition used to create the effect.

If you apply Jitter to media that is smaller than the composition size, you may be unable to change the XY position of the filtered layer without cropping portions of the image. Instead, create a solid of the same size as the composition and apply Jitter to the solid. Then select the desired layer in the Source menu. This technique allows you to position the media without clipping.

Geometry Parameters

The Geometry parameters adjust the source layer's position, size, rotation, and opacity.

Lock Scale locks the Scale Y to the Scale X value, preserving the aspect ratio of the source image as scale adjustments are made. Deselect Lock Scale to adjust Scale X and Y independently.

Scale X sets the horizontal scale of the source layer. The Scale X value is expressed as a percentage of the source layer's original width.

Scale Y sets the vertical scale of the source layer. The Scale Y value is expressed as a percentage of the source layer's original height.

Position sets the horizontal and vertical position of the source layer.

Position Z sets the apparent depth of the source layer. Increasing positive values move the source further away from the viewer, and decreasing negative values draw the source closer to the viewer.

Tumble, **Spin**, and **Rotate** move the source layer around the X, Y, and Z axis respectively. Tumble, Spin, and Rotate can be animated over values greater than 360° in order to make the layer complete more than one full revolution.

When **Pivot Lock to Center** is selected, the layer tumbles, spins, and rotates around its own center. If this option is deselected, you can set an external pivot point around which to tumble, spin, and rotate the layer.

Pivot XY and **Pivot Z** set the X, Y, and Z coordinates of the pivot point. If Pivot Lock to Center is selected, moving the pivot point has no effect.

Opacity scales the opacity of the source layer. When Opacity is 0, the layer is completely transparent. As the Opacity value increases, the layer becomes increasingly opaque, and at a value of 100, the layer is completely opaque.

Insert 1, 2, and 3 Parameters

Each of these parameter groups can be used to apply a simple effect to the source image. The parameters function in the same way in each section.

Effect selects which effect is applied. Each effect can be adjusted with the **Amount** and **Parameter** controls. Several effects use the **Color** parameter as well. These controls behave differently depending on which effect is selected.

- *Off* applies no additional effect to the source layer.
- *Bright-Contrast* adjusts the brightness and contrast of the source layer. When Bright-Contrast is chosen, Amount adjusts brightness, and Parameter adjusts contrast.
- *Hue-Sat* adjusts the hue and saturation of the source layer. Amount adjusts the hue angle, and Parameter adjusts the saturation.

- *Black & White* mixes the source image with a black and white copy of itself. Amount controls the mixture of the images. Increasing Amount values replace the colored image with the black and white copy, and at a value of 100, the image is completely black and white. Negative Amount values have no effect. Parameter has no effect when Black & White is selected.

- *Black & Color* mixes the source image with a copy of itself that is tinted black and the chosen Color. Amount controls the mixture of the images. Increasing Amount values replace the original source image with the tinted copy, and at a value of 100, the source is completely tinted. Negative Amount values have no effect. Parameter has no effect when Black & Color is selected.

- *Color & White* mixes the source image with a copy of itself that is tinted the chosen Color and white. Amount controls the mixture of the images. Increasing Amount values replace the original source image with the tinted copy, and at a value of 100, the source is completely tinted. Negative Amount values have no effect. Parameter has no effect when Color & White is selected.

- *Colorize* mixes the source image with a solid of the chosen Color. Amount controls the mixture of the source image and the colored solid. Increasing Amount values replace the original source image with the colored solid, and at a value of 100, the source is entirely replaced by the colored solid. Negative Amount values have no effect. Parameter has no effect when Colorize is selected.

- *Blur* applies a blur to the source image. Amount controls the amount of blur applied. Negative Amount values have no effect. Parameter controls the amount of blur in each direction. Increasing positive Parameter values increase the amount of horizontal blur, while decreasing negative values increase the amount of vertical blur. When Parameter is at 0, the image is blurred equally in both directions.

- *Choke* shrinks or expands the opaque areas in the source image's alpha channel. Increasing positive Amount values increase the size of the opaque regions, while decreasing negative values decrease the size of the opaque regions. When Choke is selected, Parameter has no effect.

- *Radial Wipe* creates a wipe effect which keys out (makes transparent) a portion of the source image. The image is keyed out outside of a circle whose diameter is controlled by the Amount. When Amount is 0, the image is left unchanged. Increasing this value decreases the diameter of the circular opaque region, removing more of the image. At a value of 100, the entire source image is keyed out. Negative Amount values have no effect. Parameter adjusts the softness of the edges of the opaque region. When Parameter is 0, the edges are completely hard. Increasing this value increasingly blends the edges with the background. Negative Parameter values have no effect.

- *Key Out Dark* keys out the darker pixels in the source image, making them transparent. Amount controls the value of the key threshold. Increasing this value raises the threshold, increasing the range of luminosities that are keyed out. Increasing Parameter increases the softness of the edges of the opaque regions in the image. Negative Parameter values have no effect.
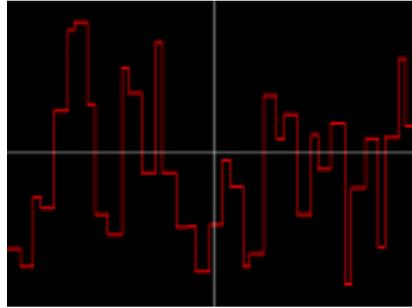- *Key Out Light* keys out the lighter pixels in the source image, making them transparent. Amount controls the value of the key threshold. Increasing this value lowers the threshold, increasing the range of luminosities that are keyed out. Increasing Parameter increases the softness of the edges of the opaque regions in the image. Negative Parameter values have no effect.
- *Key Out Color* keys out pixels whose channel values are similar to those of the chosen Color. Amount controls the width of the range of similar values that are keyed out. As Amount increases, a wider range of colors similar to the Color are keyed out. Increasing Parameter increases the softness of the edges of the opaque regions in the image. Negative Parameter values have no effect.
- *Key In Color* keys out pixels whose channel values are dissimilar to those of the chosen Color. Amount controls the width of the range of dissimilar values that are keyed out. As Amount increases, a wider range of colors dissimilar to the Color are keyed out. Increasing Parameter increases the softness of the edges of the opaque regions in the image. Negative Parameter values have no effect.

Jitter 1, 2, and 3 Parameters

The Jitter 1, 2, and 3 parameters create three different jitter curves, each of which can be applied to up to three parameters. Jitter 2 and Jitter 3 parameters function similarly to Jitter 1 parameters, which are described in this section.
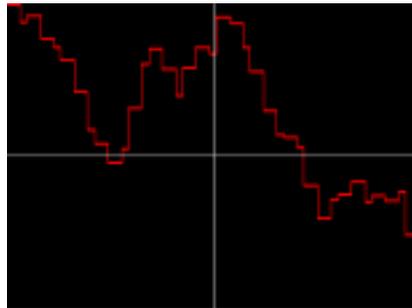
The only difference between the three Jitter parameters sections is that each Jitter can be applied to Jitter parameters below it. That is, Jitter 3 can be applied to Jitters 1 and 2, Jitter 2 can be applied to Jitter 1, and Jitter 1 cannot be applied to other Jitters.

Shape Jitter 1 sets the shape of the Jitter curve. The best way to understand how these shapes affect the jittered parameters is to select View Jitter Curves to see the shape of the curve over time. The curves can be modified in various ways using the **Timing Jitter 1** and/or **Master Jitter 1** settings
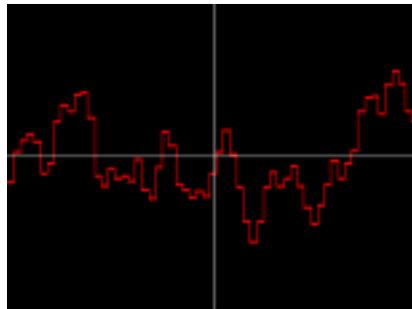
- *Noise Jumps* causes the noise to jump to a new value in increments set by the Timing Jitter 1 setting.


- *Random Walk* causes the noise to start at 0, then add a new random number in increments set by the Timing Jitter 1 setting.


- *Smooth Noise* creates a new noise value every frame, then smooths the curve that is created. Timing Jitter 1 adjusts the width of the curve smoothness.

- *Smooth Walk* creates a Random Walk curve, then smooths the result. Timing Jitter 1 adjusts the width of the curve smoothness.

- *Constant* adds the Master Jitter 1 value to the base parameter value set by the Source and Insert settings, creating a static effect.

- The remaining choices all produce regular waves of varying shapes. Most of these choices have fairly descriptive names. The *Spectrum* choices are all variations on the sine wave (the curve at right is an example of a Spectrum wave). For each of these choices, Timing Jitter 1 adjusts the frequency of the wave, and Master Jitter 1 adjusts the amplitude (height) of the wave.

Master Jitter 1 adjusts the intensity of the jitter by scaling all of the other jitter parameters. For this reason, each Shape Jitter 1 curve responds slightly differently to Master Jitter 1. When Master Jitter 1 is 0, no jitter is created.
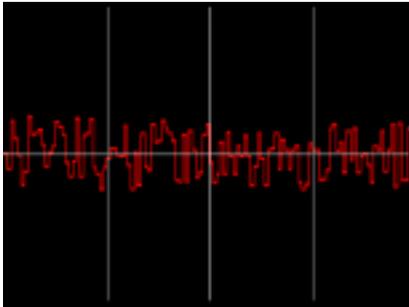
Master Jitter 1=25
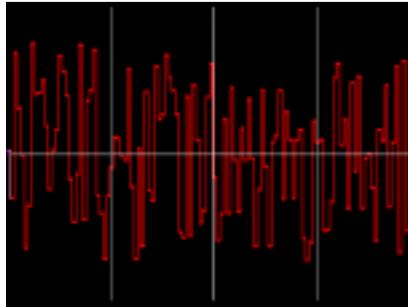
Master Jitter 1=75

Random Seed Jitter 1 sets the value that is input to the random number generator used to generate noise. Adjust this value when you like the overall effect but want to adjust the random configuration of the jitter curve.

Frame Offset Jitter 1 offsets the position of the jitter curve by the specified number of frames. Adjusting this value allows you to control which point on the curve corresponds to a given frame.

Destination 1 Jitter 1 selects which parameter is affected by the jitter. **Destination 2 Jitter 1** and **Destination 3 Jitter 1** allow you to choose two more parameters to jitter.

- *Scale* jitters both the X and Y Scale.
- *Motion* jitters the motion of the layer in the X, Y, and Z directions simultaneously. If Motion is selected, the Jitter Amount is proportionate to the layer's speed, so when the layer is still, no jitter is applied.
- *XY Wobble* jitters the layer in the direction perpendicular to the layer's direction of motion in the X and Y planes. For example, if the layer is moving horizontally, XY Wobble jitters the layer vertically. If XY Wobble is selected, the Jitter Amount is proportionate to the layer's speed, so when the layer is still, no jitter is applied.
- *Angular Motion* jitters Tumble, Spin, and Rotate in amounts proportionate to each parameters rate of change. When Tumble, Spin, or Rotate is constant, the parameter is not affected by the jitter.
- *Insert 1 Red*, *Insert 1 Green*, and *Insert 1 Blue* affect the respective color channel in the chosen Insert 1 Color. The *Insert 2* and *Insert 3 Red*, *Green*, and *Blue* choices function in the same way but affect the Insert 2 and Insert 3 Colors, respectively.
- The remaining choices affect the parameter of the same name.

BC Looper

BC Looper allows you to quickly create looped effects. You can animate the number and duration of loops, offset the loops automatically, and create fades and dissolves between the looped clips.

Creating a Loop Effect

You can apply BC Looper directly to the layer you want to loop; however, the duration of the looped effect is then limited to the duration of the filtered layer. To create a looped effect that is longer than the duration of the source media, follow the steps below.

1   Create a solid the same size as the layer or precomp to be looped.
2   Apply BC Looper to the solid layer.
3   Choose the layer you want to loop in the Loop Layer menu.
4   Adjust the other parameters as needed.

Animating BC Looper Parameters

All parameters in BC Looper can be animated. However, in this filter animation is slightly different than in normal filters because BC Looper renders loops, rather than frames, as its basic unit. Therefore, the properties of the first loop are set by the parameter settings at the start of the effect. Value changes that occur through animation are ignored until the start of the second loop, at which point the new parameter values take effect. Subsequent parameter changes are ignored until the start of the third loop, and so on. This pattern allows all parameters to produce predictable results when animated.

General Parameters

Loop Layer chooses a layer in the composition to loop.

Start Frame sets the frame in the Loop Layer to be used as the beginning of the looped clip. For example, if you set Start Frame to 10, the loop begins on the 10th frame of the Loop Layer.

Loop Length determines how many frames are in each loop. For example, if you set Loop Length to 30, each looped clip lasts exactly 30 frames.

Increment automatically offsets the start frame of the each loop. For example, if the Start Frame is 10 and Increment is 2, the effect begins on frame 10 in the first loop, on frame 12 in the second loop, on frame 14 in the third loop, and so on.

Loop Mode determines how the filter plays successive loops.

- *Normal* plays each loop forwards only. For example, if Loop Length is 4, the filter plays frames 0, 1, 2, 3, 0, 1, 2, 3, and so on.
- *Reset after N Cycles* plays each loop in the same manner as Normal does, but resets the Increment value to 0 after the number of loops specified by **Reset Cycles**.
- *Back and Forth* plays the loop forward and then backwards, but only plays the end frames once. For example, if Loop Length is 4, the filter plays frames 0, 1, 2, 3, 2, 1, 0, 1, 2, 3, 2, and so on.
- *BF Repeat Ends* plays the loop forward and backwards, repeating the end frames. For example, if Loop Length is 4, the filter plays frames 0, 1, 2, 3, 3, 2, 1, 0, 0, 1, and so on.

If you apply Looper to a layer with an alpha channel, selecting **Mask with Own Alpha** masks the Loop Layer with the source layer's alpha channel. Leave this option deselected if you do not want to mask the Loop Layer.

Note that the source alpha channel is not looped when used as a mask.

Fade Parameters

When Loop Mode is set to Normal, the parameters in this section can be used to create dissolves and fades.

If Loop Mode is not set to Normal, parameters in this section have no effect.

The **Fade** menu creates dissolves and fades by blending the transitions between each loop.

- When Fade is set to *Cross Fade*, the end of each loop fades out as the beginning of the next loop fades in, creating dissolves between each loop. When Cross Fade is chosen, **Overlap** sets the number of frames in which the outgoing and incoming loops overlap. Negative Overlap values create a gap between the outgoing and incoming loops.

- When Fade is set to *Fade In–Fade Out*, the end of each loop fades out before the succeeding loop begins to fade in. When Fade In–Fade Out is selected, the **Fade In** value determines the duration (in frames) of each loop's fade in, and **Fade Out** specifies the duration of each loop's fade out.
- When Fade is set to *None*, the end of each loop cuts directly to the beginning of the next loop.

Frame Curve Parameters

The Frame Curve Parameters are preview controls which enable you to view a curve that graphs the frame in the Loop Layer used to render each frame in the loop effect.

Select **View Curve** to display the time curve in the Comp window. Deselect this option to view the effect.

This illustration shows a frame curve for a loop effect. The vertical blue line represents the current time. The X axis represents time (measured in frames), and the Y axis represents the source frame number. In this effect, Start Frame is 0, Loop Length is 30, and Mode is set to Normal. The first frame in the effect corresponds to frame 0 in the source. This point is represented by the far left point on the curve. As the effect progresses and the source frame increases, the curve climbs. When the effect reaches frame 30 in the source, it loops back to frame 0, and the curve drops precipitously.

In this example, Start Frame has been increased to 10, moving the curve upwards. Since each loop begins on frame 10, the curve never reaches the bottom of the Y axis.
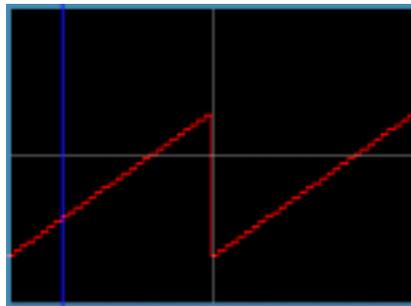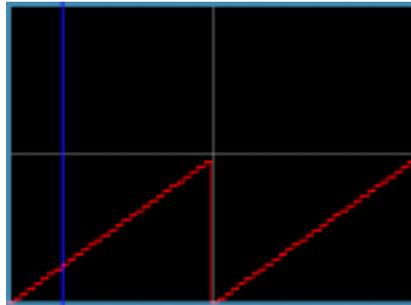
In this example, Mode is set to Back & Forth. This creates a smoother curve pattern because the frame number does not drop to the Start Frame value each time the effect loops.
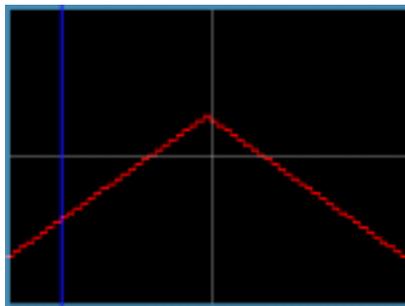
The **Composite Curves** menu allows you to composite the curve over the Loop Layer or the completed effect.

- *Curves* composites the curve over a black background.
- *Curves Over Layer* composites the curve over the Loop Layer.
- *Curves Over Comp* composites the curve over the entire composition.

Input Time View controls the scale of the X axis in the frame curve. *Full Effect* scales the X axis to the untrimmed length of the filtered layer. *16*, *8*, *4*, and *2* scale the X axis to the corresponding number of seconds centered around the CTI.

Output Time View controls the scale of the Y axis in the frame curve. *Full Effect* scales the Y axis to the untrimmed length of the filtered layer. *First 16*, *First 8*, *First 4*, and *First 2* scale the Y axis to the corresponding number of seconds starting from the frame specified by Scroll Curves.

Scroll Curves selects the first frame in the effect that is displayed when Output Time View is set to First 16, First 8, First 4, or First 2. This parameter has no effect if Output Time View is set to Full Effect.

BC Posterize Time

BC Posterize Time can be used to create strobe effects by altering the frame rate of the source media and adjusting the length of time for which each frame is displayed. You can also use apply modes and the PixelChooser to mix the time-posterized output with the original in various ways.

Frame Separation determines which frames in the source media are displayed and the duration each frame is held. For example, if Frame Separation is set to 10, every tenth frame (frame 0, 10, 20, and so on) is displayed for 10 frames for the duration of the clip. Increasing Frame Separation reduces the number of frames from the source media that are displayed and increases the length of time that each frame stays on-screen. When Frame Separation is 1, the sequence plays at its normal frame rate.

Select **Lock to Whole Numbers** to round Frame Separation values to the nearest whole number.

Time Width mixes the time-posterized output with the source image by alternately outputting some frames at their normal frame rate and outputting other frames at the time-posterized frame rate (determined by the Frame Separation value).The Time Width value is expressed as a percentage in which 0 represents the normal frame rate and 100 the time-posterized rate. For example, if Frame Separation is 10 and Time Width is set to 50, the first 5 frames play at their normal frame rate, followed by 5 frames played at the time-posterized frame rate. This creates the appearance of real-time motion alternating with strobe motion.

Time Falloff creates dissolves between the source frames and the time-posterized frames when Time Width is used. Increasing Time Falloff increases the number of frames in each dissolve, smoothing the transitions between real-time motion and strobe motion.

Apply Mode selects the apply mode used to composite the time-posterized output over the original source media.

For descriptions of all the possible Apply Modes, see "Apply Modes" on page 217.

Apply Mix blends the Apply Mode setting with the **Apply Mix From** setting. The resulting mixed mode is used to composite the time-posterized output over the original source media. For example, if Apply Mode is set to *Lighten* and Apply Mix From is set to *Normal*,

then Apply Mix blends the Lighten and Normal apply modes. In this case, an Apply Mix setting of 0 uses the Normal apply mode, and an Apply Mix setting of 100 uses the Lighten apply mode. An Apply Mix setting of 50 blends the two apply modes equally.

You can use Apply Mix to soften the effect of a given apply mode, or to animate from one apply mode to another over time.

Mix with Original blends the filtered output with the original source image. Use this parameter to scale down or animate the effect of the filter without adjusting individual parameters.

The **PixelChooser** parameters allow you to apply the filter selectively using region controls or the source image's channel values. For more information, see "The PixelChooser" on page 209.

BC Sequencer

BC Sequencer allows you to create a looping sequence up to 10 steps long. Each step is comprised of a clip from one of the layers in the composition. The source layer, start frame, length, and velocity of each step clip can be controlled and animated independently.

Creating a Sequence Effect

You can apply BC Sequencer directly to the layer you want to sequence, however, the duration of the effect is then limited to the duration of the source media. To create a sequence effect that is longer than the duration of the source media, follow the steps below.

1   Create a solid that is the same size as all of the layers or precomps that you wish to include in the sequence. **Note that the filter will resize all layers to conform to the size of the filtered layer.**
2   Apply BC Sequencer to the solid.
3   Set Steps Used to the number of steps you want to appear in the sequence.
4   Choose the layer that you want to appear first in the sequence in the Step 1 Layer menu. Follow the same procedure for each remaining step.
5   Adjust the remaining parameters as needed.

General Parameters

Steps Used sets the number of steps that are included in the sequence. For example, if Steps Used is set to 3, the sequencer loops steps 1, 2, and 3 and ignores the Step 4-10 settings.

Global Increment allows you to offset the start frame of each step in each successive loop of the sequence. Each step is offset by the same amount. For example, suppose the Global Increment is set to 2, step one begins on frame 10, and step 2 on frame 20. In the second loop the first step begins on frame 12, and step 2 on frame 22. In the third loop, the first step begins on frame 14 and the second on frame 24, and so on.

If you select **Auto Increment Steps**, each step in the sequence will automatically be offset by the same number of frames as its Length (see below) with each successive loop. For example, suppose step 1 is 15 frames long and step 2 is 20 frames long. When Auto Increment is selected, in the second loop of the sequence step one begins playing 15 frames after the specified Start Frame Step 1(see below) and step 2 begins 20 frames after the specified Start Frame Step 2.

Step 1-10 Parameters

The parameters in these sections control the corresponding steps in the sequence.

Layer selects a layer in the composition to use as the step in the sequence.

Start Frame determines which frame in the chosen Layer is used as the first frame in the clip.

Length sets the length, in frames, of the step clip.

Velocity controls the frame rate of the step clip. This value is expressed as a percentage of the composition's frame rate. For example, if the frame rate of the composition is 30 fps and Velocity is 50, the step's frame rate is 15 fps.

Selecting **Frame Blending** enables frame blending in the step.

Status determines whether the step appears in the sequence.

- *On* causes the step to appear in the sequence.
- *Off* removes the step from the sequence, reducing the total number of steps in the effect.
- *Gap* makes the sequence transparent for the duration of the step.

Increment allows you to offset the step's Start Frame incrementally with each successive loop of the sequence. This value is added to the Global Increment value (which offsets all of the steps by the same amount) to determine the total offset for the step. For example, if the Start Frame Step 1 is 10, Global Increment is 2, and Increment Step 1 is 1, on the first loop, the first step in the sequence begins on frame 10. After the remaining steps play, the sequence loops and starts playing from the beginning again. On this second loop, the first step begins on frame 13. On the third loop, the first step begins on frame 16, and so on.

Order allows you to rearrange the steps in the sequence, placing them in a different order. This parameter is especially useful if you need to insert a new step in the middle of a sequence. Each step's default Order value corresponds the step number, i.e., Order Step 1 is 1, Order Step 2 is 2, and so on. If you change a step's Order value, the position of the step in the sequence changes. For example, suppose you have created a sequence 6 steps long and decide to insert a new step between Steps 3 and 4. You can use the Step 7 Parameters to create the new step, then set Order Step 7 to 3.5 to insert the new step in the sequence between steps 3 and 4.

Frame Curve Parameters

The Frame Curve Parameters are preview controls which enable you to view a curve that graphs the frame in each Step Layer used to render each frame in the sequence.

Select **View Curve** to display the time curve in the Comp window. Deselect this option to view the effect.

The illustration below shows a frame curve for a 3 step sequence. The vertical blue line represents the current time. The X axis represents time (measured in frames), and the Y axis represents the source frame number. In this effect, each step's Start Frame is 0 and each step's Step Length is 10. The first frame in the effect corresponds to frame 0 in Step 1. This point is represented by the far left point on the first red curve. As the effect progresses and the source frame in Step 1 increases, the curve climbs. When the effect reaches frame 10 in the Step 1 source, Step 2 starts playing. Step 2 is followed by Step 3. Because the sequence is 3 steps long, after Step 3 it loops back to Step 1.
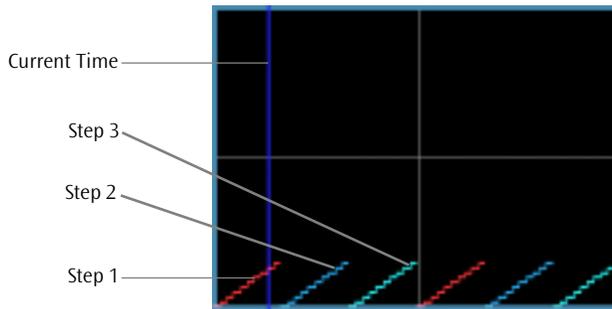
In this example, Start Frame Step 1 is increased to 10, moving the Step 1 curves upwards along the Y axis.
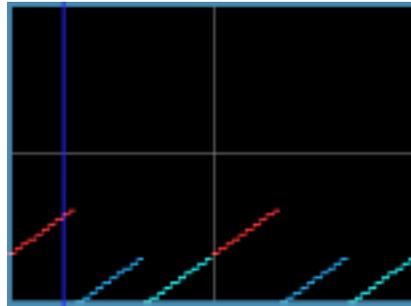
In this example, Length Step 1 is increased to 20, lengthening the Step 1 curves.
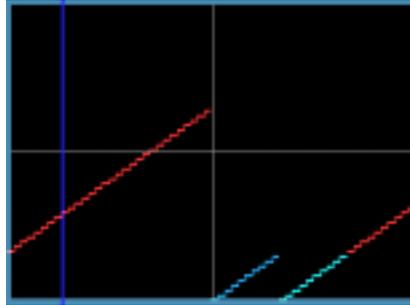
The **Composite Curve** menu allows you to composite the curve over a black background or the completed effect.

- *Curves* composites the curve over a black background.
- *Curves Over Layer* composites the curve over the sequence.
- *Curves Over Comp* composites the curve over the entire composition.

If the source layer is opaque, Curves Over Layer and Curves Over Comp produce the same result.

Input Time View controls the scale of the X axis in the frame curve. *Full Effect* scales the X axis to the untrimmed length of the filtered layer. *16*, *8*, *4*, and *2* scale the X axis to the corresponding number of seconds centered around the CTI.

Output Time View controls the scale of the Y axis in the frame curve. *Full Effect* scales the Y axis to the untrimmed length of the filtered layer. *First 16*, *First 8*, *First 4*, and *First 2* scale the Y axis to the corresponding number of seconds starting from the frame specified by Scroll Curves.

Scroll Curves selects the first frame in the effect that is displayed when Output Time View is set to First 16, First 8, First 4, or First 2. This parameter has no effect if Output Time View is set to Full Effect.

BC Temporal Blur

Temporal Blur blurs the image over time by averaging two or more source frames to produce each output frame. This filter includes a PixelChooser, which allows you to selectively blur only a portion of the source image.

In the following example, the willow leaves move from left to right across the screen. When Temporal Blur is added, several frames preceding and following the source frame are blended to create blurred movement.

Source image

Filtered image

Amount (Frames) sets the width of the blur in frames. For example, if Amount is set to 5, the current frame is averaged with the following five frames to produce the output frame.

Amount=1.0
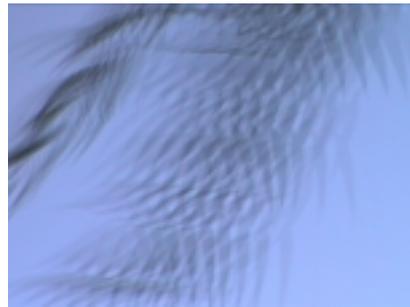
Amount=3.0

Selecting **Lock to Whole Frames** locks the Amount value to a whole number of frames, which prevents partial frames from being averaged into the output. Selecting this option can improve render time and may produce a cleaner output if you want the blur to render only a few distinct frames.

If Amount is animated, Lock to Whole Frames will cause jumps in the animation.

Frame Separation sets the separation between the frames that are averaged in the blur computation. For example, if Frame Separation is set to 3, then the render for each frame uses the current frame averaged with every third frame thereafter (therefore, the render for frame 0 would average frames 0, 3, 6, and so on).
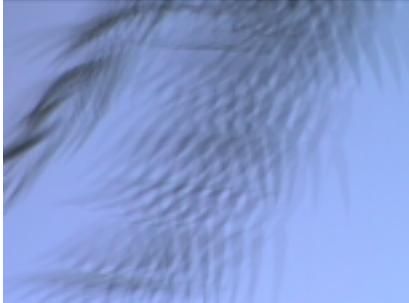
Frame Separation=1

Frame Separation=3

Frame Offset offsets the source image used to create the blur at the current time position. For example, if Frame Offset is 10, Frame 10 is used to compute the blur that is output at Frame 0.

Try using Mix with Original with Frame Offset to produce an effect in which the blur is offset from the source image. In the examples below, Frame Offset is set to –6, so the blurred image lags 6 frames behind the source.

Frame Offset=0

Frame Offset= –6

Blur Direction chooses which frames are used to compute the blur for the source frame.

- *Bidirectional* blurs the source frame with both the preceding and following frames to produce the blurred output.

- *Later Frames* blurs the source frame with the following frames to produce the blurred output.

- *Earlier Frames* blurs the source frame with the preceding frames to produce the blurred output.

Blur Shape sets the shape of the blur over time.

- *Gaussian* gives the most "weight" (prominence in the averaged output) to the source frame and less weight to frames further away from the source in time in computing the blur.

- *Flat* gives an equal amount of weight to each frame used in computing the blur.

When Blur Shape is Gaussian, **Blur Falloff** determines the number of frames that are added to the Amount value in computing the Blur. When Blur Falloff is 0, the effect uses only the frames specified by the Amount value. Increasing Blur Falloff averages additional frames in the blur, creating a softer blur. This parameter has no effect if Blur Shape is set to Flat.

Blur Falloff=0
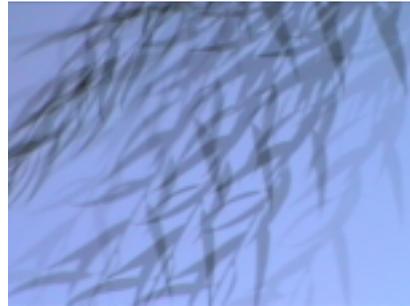
Blur Falloff=50

Increasing Blur Falloff increases rendering time. Also, animating Blur Falloff may produce jumps in the effect.

Spread determines how frames used in computing the blur are weighted when using the Gaussian Blur Shape. Increasing Spread weights frames that are farther away in time from the source frame, adding less weight to frames close to the source frame. This parameter has no effect if Blur Shape is set to Flat.

Blur Threshold reduces the effect of the blur using the following method. First, the filter compares each blurred channel with the corresponding source channel. If the difference between the two is less than the Blur Threshold value, the source channel is used in the

output and is not affected by the blur. If the difference is greater than the Blur Threshold value, the filter reduces the difference by the Blur Threshold value before outputting the channel.

Blur Threshold=0   *Blur Threshold=25*

The Bias parameters allow you to weight pixels based on their channel values or contrast level.

Bias Type chooses which kind of bias to use in weighting pixels. *Channel* weights pixels according to their channel values. *Contrast* weights pixels based on the difference between their channel values and 128.

Bias Channel selects the channel whose values are used in weighting pixels. The choices are *Luma*, *Alpha*, *Red*, *Green*, and *Blue*.

Bias Amount controls the amount of bias applied to pixels.

- If Bias Type is set to Channel, increasing positive Bias Amount values add more weight to pixels whose Bias Channel values are the highest. Decreasing negative values add more weight to pixels whose Bias Channel values are lowest.
- If Bias Type is set to Contrast, increasing positive Bias Amount values add weight to pixels whose Bias Channel value are furthest from 128 (closest to 0 and 255). Decreasing negative values add more weight to pixels whose Bias Channel values are closest to 128.

Apply Mode selects the apply mode used to composite the blurred output over the original source media.

For descriptions of all the possible Apply Modes, see "Apply Modes" on page 217.

Apply Mix blends the Apply Mode setting with the **Apply Mix From** setting. The resulting mixed mode is used to composite the output over the original source media. For example, if Apply Mode is set to *Lighten* and Apply Mix From is set to *Normal*, then Apply Mix blends the Lighten and Normal apply modes. In this case, an Apply Mix setting of 0 uses the Normal apply mode, and an Apply Mix setting of 100 uses the Lighten apply mode. An Apply Mix setting of 50 blends the two apply modes equally.

You can use Apply Mix to soften the effect of a given apply mode, or to animate from one apply mode to another over time.

Mix with Original blends the filtered output with the original source image. Use this parameter to scale down or animate the effect of the filter without adjusting individual parameters.

Mix with Original=0   *Mix with Original=30*

The **PixelChooser** parameters allow you to apply the filter selectively using region controls or the source image's channel values. For more information, see "The PixelChooser" on page 209.

BC Trails

BC Trails creates motion trails, video echoes, and video feedback effects which can be combined in a variety of ways.

Source image
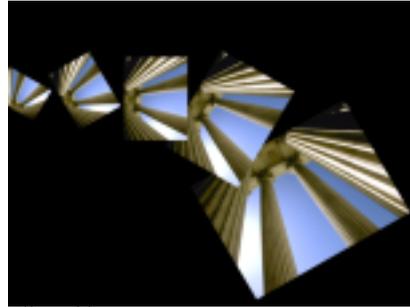
Filtered image

Creating a Trails Effect

If you apply BC Trails to media that is smaller than the composition size, you may be unable to change the XY position of the filtered layer without cropping portions of the image. To compensate, follow the steps below.

1   Create a solid the same size as the composition.
2   Apply BC Trails to the solid layer.
3   Select the desired layer in the Soure Layer menu.
4   Adjust the other parameters as needed.

Source Layer selects the layer in the composition used to create the effect.

Source Geometry Parameters

The Source Geometry parameters adjust the source's size and position and rotate the source around the X, Y, and Z axis.

Scale X Source and **Scale Y Source** adjust the size of the source along the X and Y axis respectively. These parameters are scaled as percentages of the source's original width or height. Thus, a Scale X setting of 200 produces a source twice as wide as the original source. Select **Lock Scale** to keep the Scale X and Y values in proportion.

Position Source sets the X and Y coordinates of the center point of the source.

Position Z Source adjusts the apparent depth of the source. Decreasing negative values move the source closer to the viewer, while increasing positive values move the source farther away from the viewer.

Tumble Source, **Spin Source**, and **Rotate Source** move the source around the X, Y, and Z axis, respectively. Tumble, Spin, and Rotate can be animated over values greater than 360° in order to make the source complete more than one full revolution.

When **Pivot Source Lock to Center** is selected, the source tumbles, spins, and rotates around its own center. If this option is deselected, you can set an external pivot point around which to tumble, spin, and rotate the source.

Pivot XY Source and **Pivot Z Source** set the X, Y, and Z coordinates of the pivot point. If Pivot Source Lock to Center is selected, moving the pivot point has no effect.

Trails Parameters

The Trails parameters add motion trails to the effect and provide a variety of options for adjusting the trails' behavior and appearance.

Frame Separation sets the distance between each motion trail and the adjacent trail and/or source image. This value meausres the number of frames between each trail and the frame from which the trail is created. For example, if Frame Separation is 2, the current time is frame 10 (Time 00:00:00:10), and there are 3 trails in the effect, the first motion trail is created from frame 8, the seond from frame 6, and the thrid from frame 4. Increasing this value spreads the trails further apart, while decreasing this value moves them closer together.
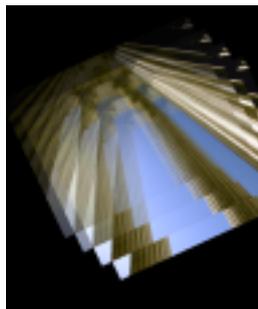
Frame Separation=2   *Frame Separation=4*   *Frame Separation=8*

Trail Count determines the number of trails that are visible in the effect.

Trails Before Start determines whether or not the effect displays trail frames that are created before the first frame of the source layer. When *Off* is chosen, no trails are displayed until after the first frame in the source layer. When *On* is chosen, the first frame in the source layer is used as the trail image for trails created before the first frame in the source layer.

Trail Intensity adjusts the opacity of the trails. At a value of 100, the first trail is completely opaque. At a value of 0, the first trail is completely transparent.

The first motion trail is always the most opaque, but you can increase the number of fully opaque trails by using Trail Intensity values greater than 100.

Trail Intensity=50

Trail Intensity=100
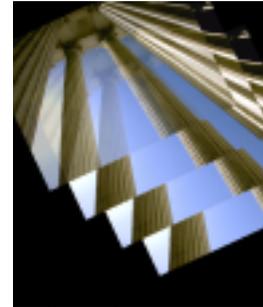
Trail Intenisty=150

When **Auto Fade** is selected, the trails automatically fade evenly so that the first trail is entirely opaque and the last trail is almost entirely transparent.

When Auto Fade is deselected, **Manual Fade** sets the ratio of the opacity of each trail to the opacity of the following trail.
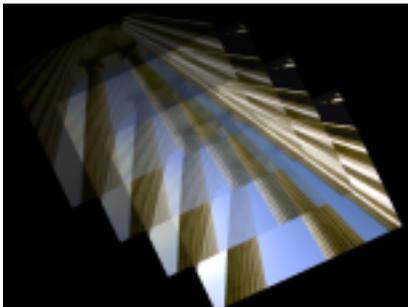
Manual Fade=50
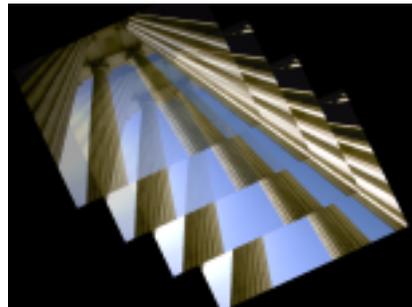
Manual Fade=75

Animation determines how the trails animate in relation to the animation of the source layer. When *Source Time* is selected, each trail animates according to its source frame.When *Current Time* is selected, each trail animates according the parameter values at the current frame. For example, suppose Frame Separation is 2 and the current time is Time 00:00:00:08 (frame 8). When Animation is set to Source Time, the first trail in the effect corresponds to frame 6 in the source layer, the second trail to frame 4, and so on. If Animation is set to Current Time, all of the trails in the effect correspond to frame 8 in the source layer.

Trails Geometry Parameters

The Trails Geometry Parameters allow you to manipulate the trails independently from the source layer. These parameters affect all of the trails equally.

Each of the parameters in this section adjust the trails in relation to the source layer as manipulated by the controls in the Source Parameters section, not in relation to the original source image. For example, if you decrease the Scale Source, the scale of all of the trails is also decreased. Decreasing the Scale Trails value further reduces the size of the trails, but does not affect the scale of the source layer.

Scale Trails controls the size of the trails in relation to the size of the source layer.
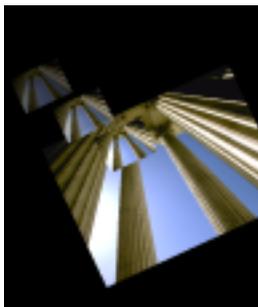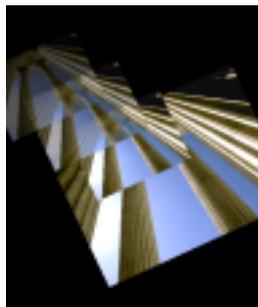
Scale Trails=25 *Scale Trails=50* *Scale Trails=100*
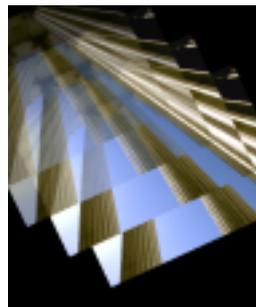
Position Trails sets the XY position of the trails.

Tumble Trails, **Spin Trails**, and **Rotate Trails** rotate the trails around the X, Y, and Z axis respectively.
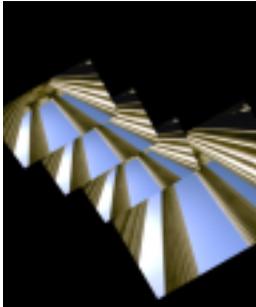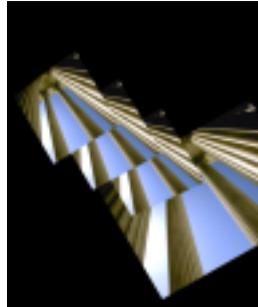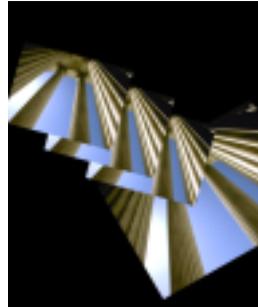

Tumble Trails *Spin Trails* *Rotate Trails*

When **Pivot X Offset**, **Pivot Y Offset**, and **Pivot Z Offset** are all at 0 (the default settings), the trails tumble, spin, and rotate around their own centers. Changing these values displaces the trails' centers of rotation along the X, Y, and Z axis, respectively.

Trail Feedback Parameters

These controls produce feedback effects and are applied recursively to each successive trail—once to the first trail, twice to the second trail, three times to the third, and so on.

The Feedback, Geometry, and Source Parameters have a cumulative effect on the trails. For example, if Source Rotation is 5, Rotate Trails is 30, and Rotate Feedback is 10 degrees, the source layer is rotated 5 degrees, the first trail is rotated 45 degrees [5 + 30 + (1 x 10)], the second trail 50 degrees [5 + 30 + (2 x 10)], the third trail 60 degrees [5 + 30 + (3 x 10)] and so on.

Scale Feedback adjusts the sizes of the trails. Increasing this value creates successively larger trails, while decreasing this value creates successively smaller trails.

Displacement Feedback affects the XY position of the trails. Increasing this value moves the trails away from their original positions along the chosen **Displacement Angle Feedback**.
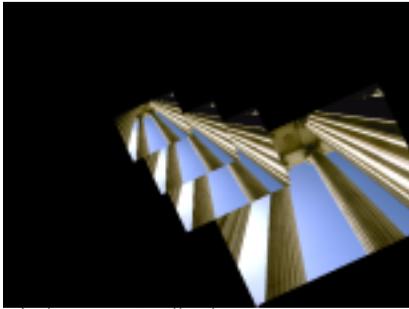
Displacement Feedback=0
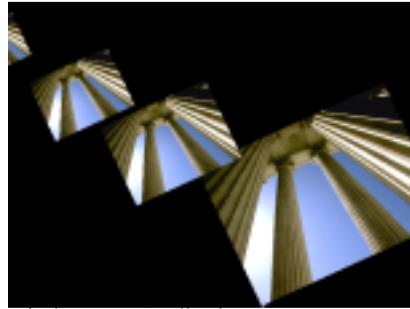
Displacement Feedback=15

Position Z Feedback displaces the trails along the Z axis. Increasing positive values move successive trails further away from the viewer. Decreasing negative values move successive trails closer to the viewer.

Tumble Feedback, **Spin Feedback**, and **Rotate Feedback** rotate the trails around the X, Y, and Z axis respectively.
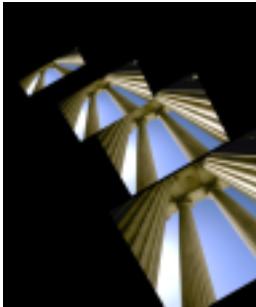
Tumble Feedback
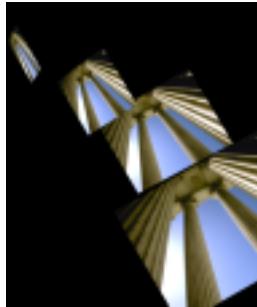
Spin Feedback
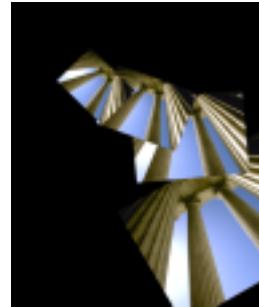
Rotate Feedback

When **Pivot X Offset**, **Pivot Y Offset**, and **Pivot Z Offset** are all at 0 (the default settings), the trails tumble, spin, and rotate around their own centers. Changing these values displaces the successive trails' centers of rotation along the X, Y, and Z axis, respectively.
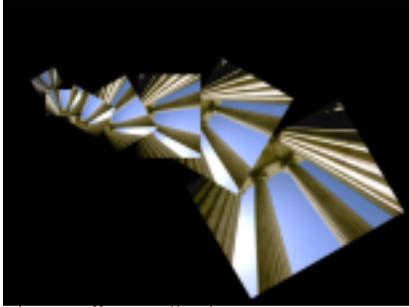
Pivot X Offset Feedback=0
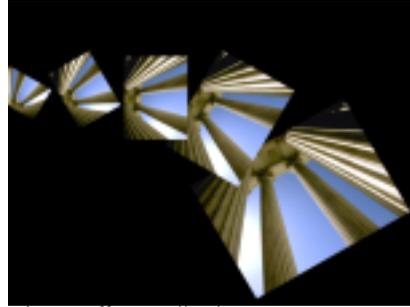
Pivot X Offset Feedback= –0.02

Insert 1-3 Parameters

The parameters in these sections allow you to apply up to 3 of a variety of simple effects to one or more of the trails.

Effect Insert selects which effect is inserted in the trail. Each effect can be adjusted with the **Amount** and **Parameter** controls. Several effects use the **Color** parameter as well. These controls behave differently depending on which effect is selected.

- When Effect is set to *Off*, no effect is applied and none of the other parameters in this section have any effect.
- *Brightness* allows you to adjust the brightness and contrast of the trail. When Brightness is chosen, Amount adjusts brightness, and Parameter adjusts contrast.
- *Contrast* allows you to adjust the contrast and brightness of the trail. When Contrast is selected, Amount adjusts contrast, and Parameter adjusts brightness.
- *Hue* changes the hue and saturation of the trail. Amount adjusts the hue angle, and Parameter adjusts the saturation.
- *Saturation* changes the saturation and hue of the trail. Amount controls the saturation, and Parameter adjusts the hue angle.
- *Black & White* mixes the trail image with a black and white copy of itself. Amount controls the mixture of the trail images. Increasing Amount values replace the colored image with the black and white copy, and at a value of 100, the trail is completely black and white. Negative Amount values have no effect. Parameter has no effect when Black & White is selected.

- *Black & Color* mixes the trail image with a copy of itself that is tinted black and the chosen Color. Amount controls the mixture of the trail images. Increasing Amount values replace the original trail image with the tinted copy, and at a value of 100, the trail is completely tinted. Negative Amount values have no effect. Parameter has no effect when Black & Color is selected.

- *Color & White* mixes the trail image with a copy of itself that is tinted the chosen Color and white. Amount controls the mixture of the trail images. Increasing Amount values replace the original trail image with the tinted copy, and at a value of 100, the trail is completely tinted. Negative Amount values have no effect. Parameter has no effect when Color & White is selected.

- *Colorize* mixes the trail image with a solid of the chosen Color. Amount controls the mixture of the trail image and the colored solid. Increasing Amount values replace the original trail image with the colored solid, and at a value of 100, the trail is entirely replaced by the solid. Negative Amount values have no effect. Parameter has no effect when Colorize is selected.

- *Invert* inverts the trail image. When Invert is selected, neither Amount nor Parameter have an effect. If Status is Recursive (see Status description on page 195), only the odd-numbered trails are inverted.

- *Blur* applies a blur to the trail image. Amount controls the amount of blur applied. Negative Amount values have no effect. Parameter controls the amount of blur in each direction. Increasing positive Parameter values increase the amount of horizontal blur, while decreasing negative values increase the amount of vertical blur. When Parameter is at 0, the image is blurred equally in both directions.

- *Choke* shrinks or expands the opaque areas in the trail image's alpha channel. Increasing positive Amount values increase the size of the opaque regions, while decreasing negative values decrease the size of the opaque regions. When Choke is selected, Parameter has no effect.

- *Radial Wipe* creates a wipe effect which keys out (makes transparent) a portion of the trail image. The image is keyed out outside of a circle whose diameter is controlled by the Amount. When Amount is 0, the image is left unchanged. Increasing this value decreases the diameter of the circular opaque region, removing more of the image. At a value of 100, the entire trail image is keyed out. Negative Amount values have no effect. Parameter adjusts the softness of the edges of the opaque region. When Parameter is 0, the edges are completely hard. Increasing this value increasingly blends the edges with the background. Negative Parameter values have no effect.

- *Key Out Dark* keys out the darker pixels in the trail image, making them transparent. Amount controls the value of the key threshold. Increasing this value raises the threshold, increasing the range of luminosities that are keyed out. Increasing Parameter increases the softness of the edges of the opaque regions in the image. Negative Parameter values have no effect.
- *Key Out Light* keys out the lighter pixels in the trail image, making them transparent. Amount controls the value of the key threshold. Increasing this value lowers the threshold, increasing the range of luminosities that are keyed out. Increasing Parameter increases the softness of the edges of the opaque regions in the image. Negative Parameter values have no effect.
- *Key Out Color* keys out pixels whose channel values are similar to those of the chosen Color. Amount controls the width of the range of similar values that are keyed out. As Amount increases, a wider range of colors similar to the Color are keyed out. Increasing Parameter increases the softness of the edges of the opaque regions in the image. Negative Parameter values have no effect.
- *Key In Color* keys out pixels whose channel values are dissimilar to those of the chosen Color. Amount controls the width of the range of dissimilar values that are keyed out. As Amount increases, a wider range of colors dissimilar to the Color are keyed out. Increasing Insert 1 Parameter increases the softness of the edges of the opaque regions in the image. Negative Parameter values have no effect.
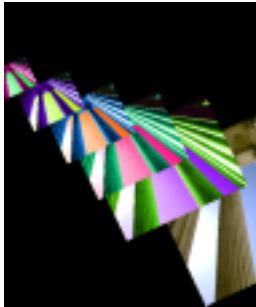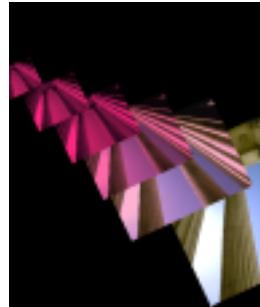
Brightness   *Hue*   *Black & Color*
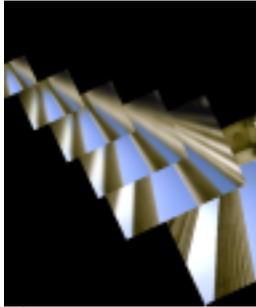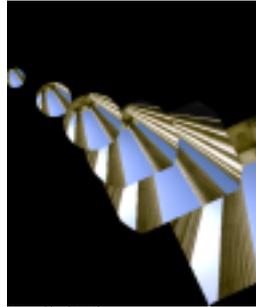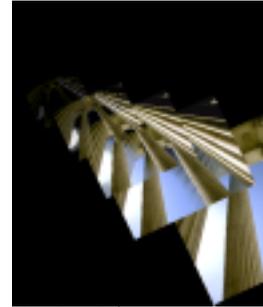
Blur *Radial Wipe* *Key Out Color*

Start determines on which trail the Insert effect begins. Choose *Source* to begin the effect on the source.

End determines on which trail the Insert effect ends. Choose *Never* to apply the effect to the Start trail and all subsequent trails.

Status determines how the effect is applied to the trails in the range specified by Start and End.

- When Status is *Off*, the effect is not applied and the other Insert parameters have no effect.
- *Single* applies the effect equally to each trail in the range.
- *Recursive* applies the effect to each trail in the range and increases the intensity of the effect on each successive trail by increasing the Amount value. Note that the Parameter value is applied equally to all of the trails and is not affected by the recursive progression.

Jitter Curves Parameters

The Jitter parameters enable you to vary up to six different attributes of the Trails effect.

Use the Jitter Curves parameters to view the jitter curves as you make adjustments to them. These curves plot the values of the jittered parameters over time.

View Jitter Curves displays a graph of the effect of the jitter over time. If one of the Jitter Shape controls is set to Off, that jitter is inactive and its curve does not appear on the graph.

The vertical axis on the graph represents the current time in the composition. The horizontal axis represents the base parameter value (set by the Source or Insert parameter values) before it is jittered. The red curve represents Jitter 1, the green curve represents Jitter 2, and the blue curve represents Jitter 3.

Curve View determines how the jitter curves are represented on the graph.

- *Curves* displays curves showing the amount of jitter at each frame or at selected frames of the effect.
- *Curves Over Layer* displays the jitter curves over the rendered layer. This mode allows you to simultaneously preview the jitter curves and the rendered output, which can be useful for making adjustments to the effect.
- *Curves Over Comp* displays the jitter curves over all other layers in the composition.

Time View controls the time range shown on the graph.

- *Full Effect* displays the jitter curves from the start to the end of the effect.
- *16*, *8*, *4*, and *2* display the curves for the given number of seconds after the frame specified by Scroll Curves.

Scroll Curves selects the first frame in the effect that is displayed when Time View is set to 16, 8, 4, or 2. This parameter has no effect if Time View is set to Full Effect.

Jitter 1 and Jitter 2 Parameters

The Jitter 1 and 2 parameters allow you to create two different jitter curves, each of which can be applied to up to three parameters. The Jitter 2 parameters function similarly to the Jitter 1 parameters, which are described in this section.

The only difference between the two Jitter parameter sections is that Jitter 2 can be applied to the Jitter 1 parameters.

Shape Jitter 1 sets the shape of the jitter curve. The best way to understand how these shapes affect the jittered parameters is to select View Jitter Curves to see the shape of the curve over time. The curves can be modified in various ways using the **Timing Jitter 1** and/or **Master Jitter 1** settings.

- *Noise Jumps* causes the noise to jump to a new value in increments set by the Timing Jitter 1 setting.

- *Random Walk* causes the noise to start at 0, then add a new random number in increments set by the Timing Jitter 1 setting.

- *Smooth Noise* creates a new noise value every frame, then smooths the curve that is created. Timing Jitter 1 adjusts the width of the curve smoothness.

- *Smooth Walk* creates a Random Walk curve, then smooths the result. Timing Jitter 1 adjusts the width of the curve smoothness.

- *Constant* adds the Amount Jitter 1 value to the base parameter value, creating a static effect.
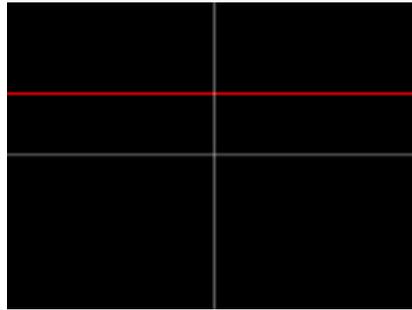
- The remaining choices all produce regular waves of varying shapes. Most of these choices have fairly descriptive names. The *Spectrum* choices are all variations on the sine wave (the curve at right is an example of a Spectrum wave). For each of these choices, Timing Jitter 1 adjusts the frequency of the wave, and Amount Jitter 1 adjusts the amplitude (height) of the wave.
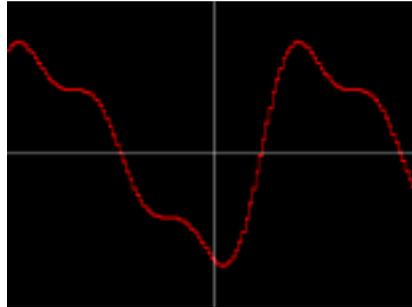
Try using the Constant shape to manipulate a trail or sequence of trails without affecting the other trails. Using Constant will not jitter the parameter value for the trail, but allows you to adjust any parameter of the trail up or down.

Random Seed Jitter 1 sets the value that is input to the random number generator used to generate noise. Adjust this value when you like the overall effect but want to adjust the random configuration of the jitter curve.

Frame Offset Jitter 1 offsets the position of the jitter curve by the specified number of frames. Adjusting this value allows you to control which point on the curve corresponds to a given frame.

Start Jitter 1 determines on which trail Jitter 1 begins. Choose *Source* to begin the jitter on the source.

End Jitter 1 determines on which trail Jitter 1 ends. Choose *Never* to apply the effect to the Start Jitter 1 trail and each subsequent trail.

Mode Jitter 1 determines how Jitter 1 is applied to the trails in the range specified by Start Jitter 1 and End Jitter 1.

- When Mode Jitter 1 is *Off,* Jitter 1 is not applied and the other Jitter 1 parameters have no effect.
- *Constant* applies Jitter 1 equally to each trail in the range.
- *Fade Up* applies Jitter 1 to each trail in the range and increases the intensity of the Jitter on each successive trail.
- *Fade Down* applies Jitter 1 to each trail in the range and decreases the intensity of the Jitter on each successive trail.
- *Fade Up-Down* applies Jitter 1 to each trail in the range and increases the intensity of the Jitter on each successive trail until the middle trail is reached, then decreases the intensity to the end of the range.

Destination 1 Jitter 1 selects which parameter is affected by Jitter 1. The **Destination 2 Jitter 1** and **Destination 3 Jitter 1** menus allow you to choose two more parameters to jitter.

- When *Off* is selected, the corresponding destination is not used.
- *Scale* affects both the X and Y Scale values.
- *Insert 1 Red*, *Insert 1 Green*, and *Insert 1 Blue* affect the corresponding color channel in the chosen Insert 1 Color. The *Insert 2* and *Insert 3 Red*, *Green*, and *Blue* choices function in the same way but affect the Insert 2 and Insert 3 Colors, respectively.
- The remaining choices affect the parameter of the same name.

Amount 1 Jitter 1, **Amount 2 Jitter 1**, and **Amount 3 Jitter 1** adjusts the intensity of the three jitters by scaling all of the other jitter parameters. For this reason, each Shape curve responds slightly differently to Amount. When Amount Jitter 1 is 0, no jitter is created for the Destination 1 Jitter 1.
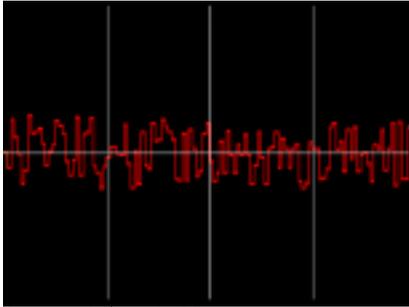
Amount 1 Jitter 1=25
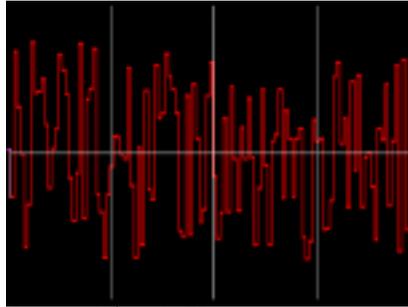
Amount 1 Jitter 1=75

Composite Parameters

These parameters provide a number of different options for controlling how the effect is composited.

The **Apply Mode** setting determines how the trails and source layer are composited over objects below them in the timeline.

For descriptions of all the possible Apply Modes, see "Apply Modes" on page 217.

Apply Mix blends the Apply Mode setting with the **Apply Mix From** setting. The resulting mixed mode is used to composite the effect. For example, if Apply Mode is set to *Lighten*, and Apply Mix From is set to *Normal*, then Apply Mix blends the Lighten and Normal apply modes. In this case, an Apply Mix setting of 0 produces the Normal apply mode, and an Apply Mix setting of 100 produces the Lighten apply mode. An Apply Mix setting of 50 blends the two apply modes equally.

Use Apply Mix to soften the effect of a given apply mode, or animate Apply Mix to blend from one apply mode to another over time.

Use Apply Settings determines which elements are affected by the Apply Mode and Apply Mix settings.

- *Trails and Composite* applies the settings to both the trails and the source layer.
- *Trails Only* applies the settings to the trails only, leaving the source layer unaffected.
- *Composite Only* applies the settings to the source layer only.
- *Ignore* disregards the settings and applies the effect normally to both the trails and the source layer.
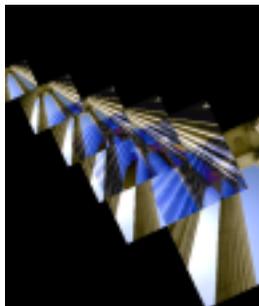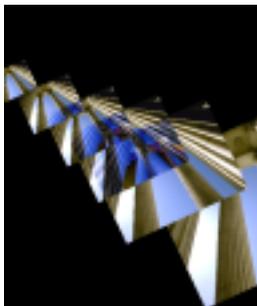
Trails and Composite   *Trails Only*   *Composite Only*
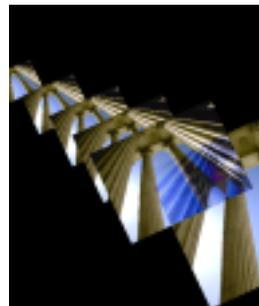
The **Composite Trails** setting controls how the trails overlap the source layer in the filtered output. *In Front* composites the trails in front of the source layer. *Behind* composites the trails behind the source layer. *Trails Only* composites the trails only, removing the source layer from the effect.
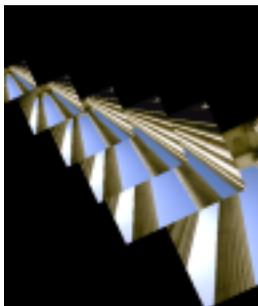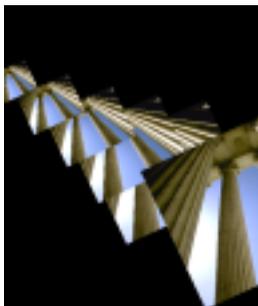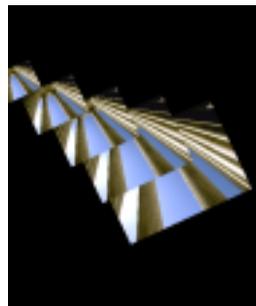
In Front   *Behind*   *Trails Only*

Render Order determines how the trails overlap each other in the filtered output. Choose *Oldest in Front* to place each successive trail in front of the previous trail. Choose *Youngest in Front* to place each successive trail behind the previous trail.
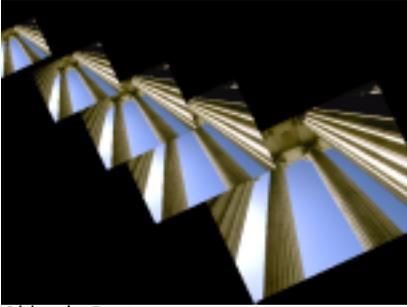
Oldest in Front
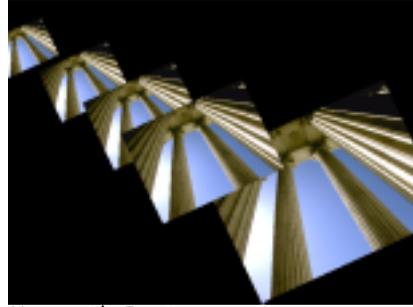
Youngest in Front

Source Opacity adjusts the opacity of the source layer in the filtered output and does not affect the trails. This value is scaled as a percentage in which a value of 100 leaves the source image fully opaque, and a value of 0 makes the source fully transparent.

BC Velocity Remap

BC Velocity Remap allows you to adjust and animate the frame rate of a video image and to blend adjacent frames to create smoother motion effects.

Creating a Velocity Remap Effect

You can apply BC Velocity Remap directly to the layer you want to affect, however, the duration of the effect is then limited to the duration of the source media. To create a Velocity Remap effect that is longer than the duration of the source media, follow the steps below.

1   Create a new solid that is the same size as the desired source layer.
2   Apply Velocity Remap to the solid.
3   Choose the desired layer in the Source Layer menu.

General Parameters

Source Layer selects which layer in the composition is affected by the filter.

Velocity adjusts the velocity of the source layer. This value is expressed as a percentage of the composition's frame rate. If Velocity is 100, the source moves at the normal frame rate—that is, at the composition's frame rate. If Velocity is 50, the source moves half as fast as the composition frame rate. If Velocity is 0, the source becomes a static image.

Source Start determines which frame in the Source Layer used as the first frame in the effect.

Select **Frame Blending** to enable frame blending throughout the effect.

The **Frame Blending Mode** determines how adjacent frames are mixed when frame blending is performed. Several of the modes are adjusted by the **Boost Extra 1** and **Boost Extra 2** parameters, whose function varies depending on which mode is used. The Frame Blending Mode, Blur Amount (see below), and Boost Extra 1 and 2 settings have no effect when Frame Blending is off.

- When *Fast* is selected, the first frame fades out as the second frame fades in simultaneously. All pixels are affected equally, regardless of their channel values. Boost Extra 1 and Boost Extra 2 have no effect when Fast is selected.
- *Fast Opaque Source* causes the second frame to fade in over the first frame. All pixels are affected equally, regardless of their channel values. Boost Extra 1 and Boost Extra 2 have no effect when Fast Opaque Source is selected.

- *Temporal Blur* averages two or more source frames to produce each output frame. When this option is selected, Blur Amount determines how much blur is applied.
- *Boost Exponential* blends the color channels in the adjacent frames by subtracting an offset value from each pixel, exponentiating the value, adding the results, and then adding back the offset. When you use this mode, Boost Extra 1 controls the exponent that is used in the calculations, and Boost Extra 2 sets the offset value that is subtracted.
- *Boost Equal Power Pos.* is an algorithm modeled on the audio concept of an equal power crossfade. This algorithm emphasizes the light pixels in the blend, which can be useful when working with darker images. Boost Extra 1 and Boost Extra 2 have no effect when Boost Equal Power Pos. is selected.
- *Boost Equal Power Neg.* is similar to Boost Equal Power Pos., but Boost Equal Power Neg. emphasizes the dark pixels in the blend. This can be useful when working with lighter images. Boost Extra 1 and Boost Extra 2 have no effect when Boost Equal Power Neg. is selected.
- *Boost Bias* blends adjacent frames by increasing the contrast of pixels whose channel values are furthest from Boost Extra 2 value. The contrast is weighted by the Boost Extra 1 value, and therefore is left unchanged if Extra 1 is set to 0.

When Frame Blending is set to Temporal Blur, **Blur Amount** sets the width of the blur in frames. For example, if Blur Amount is set to 5, the current frame is averaged with the following five frames to produce the output frame. When Blur Amount is 0, no Frame Blending is performed.

Boost Mix mixes the chosen Frame Blending Mode with the Fast Frame Blending Mode. When Boost Mix is set to 100, the selected Frame Blending Mode (and the Extra 1 and Extra 2 settings where applicable) are used. When Boost Mix is set to 0, the Fast mode is is used. Intermediate values mix the chosen mode with the Fast mode to varying degrees.

Frame Curve Parameters

The Frame Curve Parameters are preview controls which enable you to view a curve that graphs the frame in the Source Layer used to render each frame in the effect.

Select **View Curve** to display the time curve in the Comp window. Deselect this option to view the effect.

This illustration shows a frame curve for a Velocity Remap effect. The vertical blue line represents the current time. The X axis represents time (measured in frames), and the Y axis represents the source frame number. In this effect, Source Start is 0 and Velocity is 0. The first frame in the effect corresponds to frame 0 in the source. This point is represented by the far left point on the curve. As the effect progresses and the source frame increases, the curve climbs.
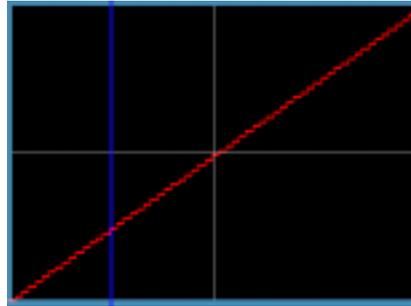
In this example, Source Start is increased to 10, moving the curve upwards along the Y axis. The curve is cut off on the far right side because the Y axis is not tall enough to show the last 10 frames of the effect. The scale of the Y axis can be changed using the Output Time View parameter.
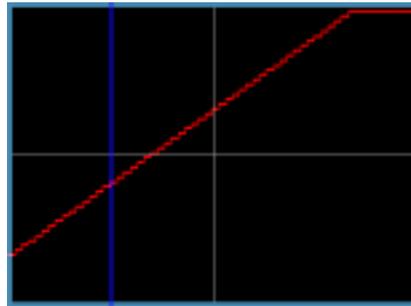
In this example, Velocity is increased to 200, creating a steeper curve.
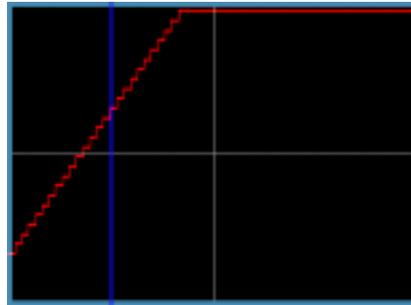
The **Composite Curves** menu allows you to composite the curve over the Source Layer or the entire composition.

- *Curves* composites the curve over a black background.
- *Curves Over Layer* composites the curve over the Source Layer.
- *Curves Over Comp* composites the curve over the entire composition.

If the source layer is opaque, Curves Over Layer and Curves Over Comp produce the same result.

Input Time View controls the scale of the X axis in the frame curve. *Full Effect* scales the X axis to the untrimmed length of the filtered layer. *16*, *8*, *4*, and *2* scale the X axis to the corresponding number of seconds centered around the CTI.

Output Time View controls the scale of the Y axis in the frame curve. *Full Effect* scales the Y axis to the untrimmed length of the filtered layer. *First 16*, *First 8*, *First 4*, and *First 2* scale the Y axis to the corresponding number of seconds starting from the frame specified by Scroll Curves.

Scroll Curves selects the first frame in the effect that is displayed when Output Time View is set to First 16, First 8, First 4, or First 2. This parameter has no effect if Output Time View is set to Full Effect.

THE PIXELCHOOSER

Chapter 8
The PixelChooser

Overview

The PixelChooser is included in many BC filters and provides several methods to selectively filter an image. You can use the PixelChooser to create a matte between filtered and unfiltered pixels, either by specifying a geometric region or by using the image's luma or color information.

The examples in this chapter were created using the PixelChooser in the Composite filter. The following illustrations show the source image and Mix Layer used in these examples.

Source image

Mix Layer

See "BC Composite" on page 26 for more information on this filter.

In this example, the PixelChooser selects pixels based on the source image's Blue channel. Therefore, the Composite filter is applied only to pixels whose Blue value is highest. In this case, the Composite filter's Mix In Front value is 100, so the Mix Layer replaces the source image in the blue pixels.

In this example, the PixelChooser's region controls are used to specify a rectangular area in which to apply the filter.

In this example, both the channel controls and region controls are used to select pixels. When the PixelChooser is selecting pixels based on both their channel values and their location on the screen, pixels are chosen only if they fully meet both selection criteria.

The PixelChooser performs the same basic operations in most filters:

- The PixelChooser looks at each pixel in the image. It decides what to do with each pixel based on its location and/or the channel values in that pixel.
- If the PixelChooser decides that a pixel not does meet the selection criteria, the source pixel is copied to the output and left undistorted. Unselected pixels are black in the mask.
- If the PixelChooser decides that a pixel fully meets the selection criteria, the filtered pixel replaces the source pixel in the output. Selected pixels are white in the mask.
- If the PixelChooser decides that a pixel partially meets the selection criteria, a mix of the source pixel and filtered pixel appears in the output. Partially selected pixels are gray in the mask.

General Parameters

Mask Layer selects the layer in the composition which is used to make the mask. If *None* is selected, the mask is created from the source image. If another layer is selected, that layer's source media is used to create the mask.

Note that in creating the mask, the PixelChooser disregards any effects or transformations that are applied to the Mask Layer and uses the layer's source media.

Invert Mask inverts the mask, but it does not affect the pixels selected by the Region of Interest controls.

View Pixels Chosen displays the mask created between the filtered and unfiltered pixels in black and white. The black pixels in the mask represent unselected pixels, and the white pixels represent selected pixels.

Region of Interest Parameters

These controls allow you to specify an area in which to apply a filter.

The PixelChoosers in the Rain and Snow filters do not offer region controls.

Region of Interest determines the shape of the region affected by the filter.

- *All* filters all pixels in the image, regardless of their location.
- *Inside Rectangle* and *Outside Rectangle* filter the image inside or outside a rectangle-shaped region, respectively.

Inside Rectangle

Outside Rectangle

- *Inside Oval* and *Outside Oval* filter the image inside or outside a oval-shaped region, respectively.

Inside Oval
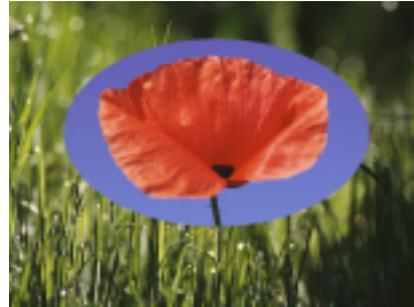
Outside Oval

Region Top-Left and **Region Bot-Right** set the locations of the upper left and lower right corners of the region. If Region of Interest is set to Inside Rectangle or Outside Rectangle, these points are the corners of the rectangle. If Region of Interest is set to Inside Oval or Outside Oval, these points are the corners of a rectangle in which the oval is inscribed.

Increasing **Region Blend** softens the edges of the region.

Region Blend=0

Region Blend=40

Channels Parameters

These parameters allow you to filter an image based on the values in one or more of its color channels.

Make Mask From determines which channel in the filtered layer or the mask layer is used to create a mask.

- *All* filters all pixels in the image, regardless of their channel values.

- *Luma* selects pixels according to their Luminance values.
- *Red*, *Green*, and *Blue* select pixels according to their corresponding RGB color channel values.
- *Alpha* selects pixels according to their Alpha channel values.
- *Hue*, *Saturation*, and *Lightness* select pixels according to their corresponding HSL color channel values.
- *RGB Diff*, *HSL Diff, Hue Diff*, and *Chroma Diff* choose pixels based on the difference between their channel values and the channel values of the chosen **Color**. RGB Diff uses RGB values in calculating differences, HSL Diff uses HSL values, Hue Diff uses only the Hue values (in HSL color space), and Chroma Diff uses Hue and Saturation values (in HSL colorspace).

Black Mask Level controls the number of pixels in the mask that are treated as pure black (fully unselected). Increasing Black Mask Level pushes darker gray pixels to black.

Black Mask Level=0

Black Mask Level=127

White Mask Level controls the number of pixels in the mask that are treated as pure white (fully selected). Decreasing Input White pushes lighter gray pixels to white.

White Mask Level=0

White Mask Level=127

APPENDIX

Appendix
Apply Modes

Many effects use Apply Modes to apply the filtered output (or the light or some other aspect of the effect) to the source image. The Apply Modes control the blending of the two images, giving the effects many additional creative possibilities. The Apply Mode menu may contain any or all of the apply modes described in the following table.

Apply Mode	Effect
Normal	Applies the light or filter directly to the source image, and the filtered pixels replace the source pixels.
Lighten	Compares the color channels values in the original pixels and in filtered pixels, and chooses the lighter (higher) value for each channel in each pixel. If a pure red pixel is applied to a pure blue pixel, the result will be pure magenta.
Darken	Compares the color channels values in the original pixels and in filtered pixels, and chooses the darker (lower) value for each channel in each pixel. If a pure red pixel is applied to a pure blue pixel, the result will be black.

Apply Mode	Effect
Multiply	Applies the light or effect to the source as if it were a transparency placed over the source. The resulting image is darker than either. If a pure red pixel is applied to a pure blue pixel, the result will be black. If a 50% gray pixel is applied to another 50% gray pixel, the result will be 25% gray.
Screen	Applies the light or effect to the source as if a photographic double image was taken of the light or effect and the source. The resulting image is lighter than either the light or effect or the source. If a pure red pixel is applied to a pure blue pixel with Screen, the result will be magenta. If a 50% gray pixel is applied to another 50% gray pixel with Screen, the result will be 75% gray.
Difference	Outputs the difference between the light or filtered color and the source color for each channel. Difference modes can produce some very striking colors and create glow effects when used with Blurs. Difference modes can also exacerbate the noise in noisy video sources. Difference can generate non-Color Safe output.
Lighter	Uses the lighter of the source and filtered colors for each pixel for all channels. If a dark green pixel is composited with light red, the result will be light red.
Darker	Uses the darker of the source and light or filtered colors for each pixel for all channels. If a dark green pixel is applied to a light red pixel, the result will be dark green.
Scale Multiply	A useful variation of Multiply that produces a brighter image than the standard Multiply. This is often the most realistic Apply Mode for light effects.
Scale Screen	A useful variation of Screen that produces a darker and less washed-out image than the standard Screen.
Difference X 2	A variation of Difference that produces a more intense effect than the standard Difference. The enhanced difference modes can be particularly effective in creating glows with the Blur effects.
Difference X 4	A variation of Difference that produces an even more intense effect than Difference X 2. The enhanced difference modes can be particularly effective in creating glows with the Blur effects.

Apply Mode	Effect
Add	Includes the light or filtered output with the source. The resulting color values are clipped at white.
Subtract	Removes the light or effect from the source. This can produce intense and unpredictable colors and make the image appear noisy.
Overlay	Puts the light or effect over the source. The result of an Overlay is brighter than the result of a Multiply and darker than the result of a Screen.
Soft Light	Simulates shining a diffuse light (whose color is the light color or filtered output) on the source image. Most of the detail in the final output comes from the source image.
Hard Light	Simulates shining a harsh light (whose color is the light color or filtered output) on the source image. The source image and the light or filtered output contribute roughly equal amounts of detail to the final output.
Hue	Creates a result color for each pixel that takes its Hue value from the light color or filtered output, and takes the Lightness and Saturation values from the source image.
Saturation	Takes the Saturation of each pixel from the light color or filtered output, and takes the Lightness and Hue from the source image.
Color	Takes the Color for each pixel from the light color or filtered output, and takes the Lightness from the source image.
Lightness	Takes the Lightness for each pixel from the light color or filtered output, and its Color from the source image.
Transparency	Used in Light filters and other lighting effects. Increases transparency in lit regions.
Opacity	Used in Light filters and other lighting effects. Increases opacity in lit regions. If the image is fully opaque, Opacity has no effect.
Boost Expo 1	Blends the color channels in the source and filtered pixels by subtracting an offset value from each pixel, exponentiating the value, adding the results, and then adding back the offset.

Apply Mode	Effect
Boost Expo 2	Similar to Boost Expo 1, except that this mode uses offset and exponent values different from those used by Boost Expo 1.
Boost Eq Power +	Uses an algorithm modeled on the audio concept of an equal power crossfade. This algorithm emphasizes the light pixels in the blend of the source and filtered pixels, which can be useful when working with darker images.
Boost Eq Power –	Similar to Boost Eq Power +, but uses the difference between the channel value and 255 in computing the contrast. This algorithm emphasizes the dark pixels in the blend of the source and filtered pixels, which can be useful when working with lighter images.
Boost Bias	Bias increases the contrast of the pixels whose channel values are the highest.

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