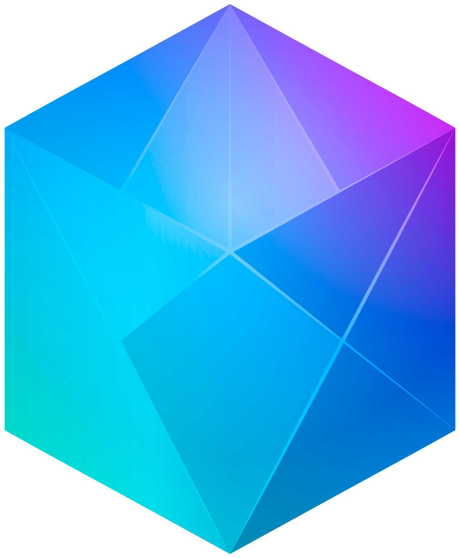
HitFilm Ignite Pro 2017 user guide



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1 Introduction

Thank you for using HitFilm Ignite. These plugins are designed to augment and enhance your video software.

The HitFilm Ignite installer will detect all available hosts on your computer. Compatible hosts include:

- Adobe Premiere Pro CC
- Adobe After Effects CC
- Apple Final Cut Pro X
- Apple Motion
- Vegas Pro 14
- Sony Catalyst Edit
- DaVinci Resolve 12
- NUKE
- Grass Valley EDIUS Pro 8
- Grass Valley EDIUS Workgroup 8
- Avid Media Composer

Please note that some plugin functionality and availability will vary based on the capabilities of the host platforms.

2 360° Video

These tools are designed specifically for working with 360° video.

360° Text [Layer Only]

360° Video Transform

On 360° video, this can be applied to adjust the position of the video layer without losing its wraparound appearance. It can also be used effectively on wraparound environment maps.

Applying this to an ordinary layer will create unusual results.

> *This effect was called Environment Map Transform in previous versions of HitFilm.*

360° Video Viewer [Layer Only]

Apply this effect oto a 360° video layer to wrap the layer onto a spherical shape for viewing. for This wraps the selected layer onto a spherical shape.

When placed as the bottom layer in a 3D composite shot, this creates a convincing, wrap-around background for 3D shots.

Examples would be a sky background for a cityscape or plane shot, or a space nebula for a spaceship fly-by.

The environment map viewer will automatically update as the camera is panned in all directions.

> *This effect was called Environment Map Viewer in previous versions of HitFilm.*

3 Blurs

The Blurs folder contains all of the blur-related effects.

> *Some blurs include a **Clamp to edge** property, which ensures that the effect extends to the edge of the frame.*

Bilateral blur

Smooths images for a softer, untextured appearance, while retaining fine edge detail.

Diffuse

Creates a soft focus appearance.

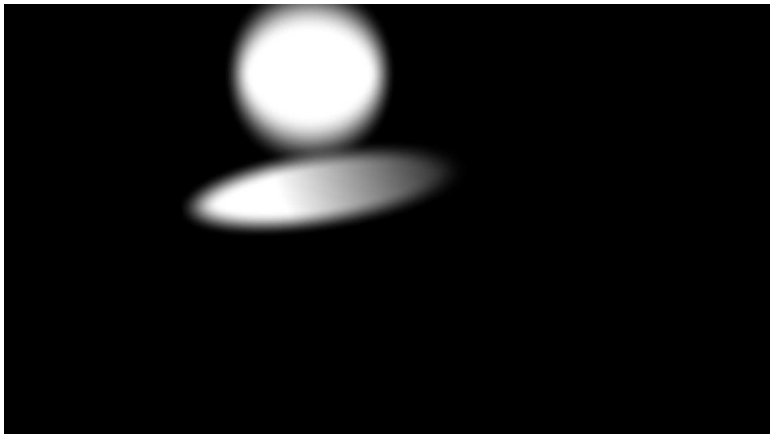
Lens blur

The lens blur is designed to more closely mimic the depth of field bokeh effects created by real lenses. It can be used in conjunction with a depth map to selectively blur different areas of the frame to different degrees.

Here's an example of lens blur in action:

Here is the original frame:

Note how the face remains in sharp focus while the rotest of the image becomes progressively more blurred. This is based upon a simple depth map created by hand in side HitFilm using some planes and masks:



The circle at the top keeps the face in focus, while the left-to-right gradient oval causes her arm to become progressively more blurred. The rest of the image, being black, is fully blurred.

Lens blur can be heavily customized.

- **Source Layer** can be optionally used to apply a depth map, as shown in the example above.
- You can use various **channels** from the source layer as the depth map, such as luminance and alpha.
- **Radius** adjusts the strength of the blur.
- **Focal Distance** is used to rack focus based on the depth map, adjusting which point on the map is in focus. This is analogous to changing focus on your camera.
- **Focal Range** defines the depth of field. A larger focal range will cause more of the frame to remain in focus, while a small focal range will cause a shallower area to remain in focus.
- **Specular Threshold** and **Brightness** are for customizing the visibility of the iris bokeh. Lower threshold and higher brightness will make the bokeh more obvious. The bokeh shape can be further customized in the **Iris** section.

The iris section can be used to switch between multiple primitive shapes. These can then be rotated and warped using the **curvature**, **pinch** and **shift** options to create custom shapes.

Motion blur

This uses optical flow techniques to identify movement in a layer and apply artificial motion blur. This can be very useful for animation or for adding exaggerated motion blur to a live action shot.

Radial blur

Creates a circular shaped blur.

The center of the blur can also be moved using the control point in the Viewer.

Zoom blur

A blur emanating out from a central point.

The center of the blur can also be moved using the control point in the Viewer.

4 Channel

Channel effects are used to manipulate the channels in a layer, such as RGB or luminance.

Channel blur

Blurs channels individually. Useful for creating the impression of chromatic aberration.

Channel mixer

Used to mix the color channels together. The red channel can have some of the blue channel introduced to it, for example.

Channel swapper

Replaces channels with other channels. For example, you can have a layer's alpha (transparency) set to correspond to its red values, or its saturation. This is useful for both color grading and compositing.

Channel time shift

Moves red, green and blue channels backwards or forwards in time individually.

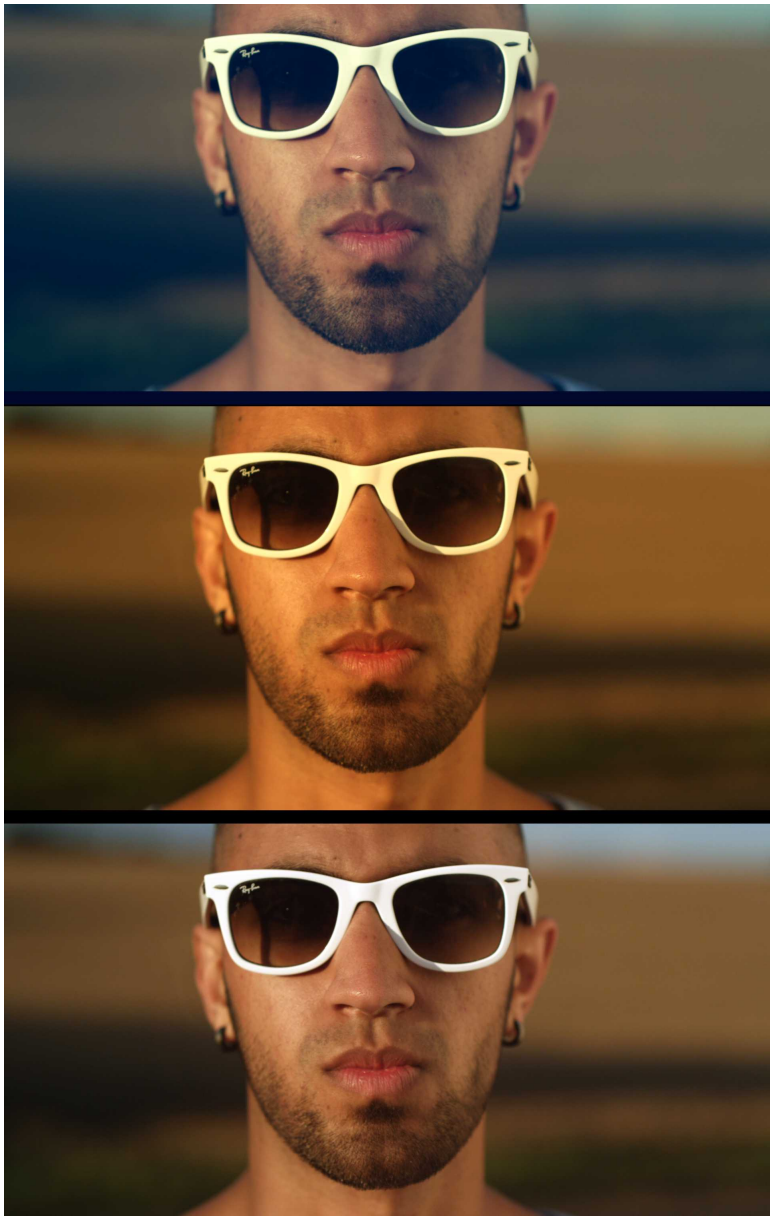
5 Color Correction

Color correction effects are designed to enhance the visual quality of layers by adjusting their colors. Color correction is intended for the initial color manipulation and for fixing problems.

Auto color, contrast & levels

These effects automatically adjust the layer's color, contrast or levels.

The image below shows the different results of auto color, auto contrast and auto levels from top to bottom:



By default the auto grading effects update on each frame, which can cause fluctuations in the layer's appearance as the contents of the frame change.

By activating the **Select frame** property you can manually choose a frame to use as the source for the automatic adjustment, which will be used for the duration of the layer.

Color temperature

Use to warm or cool your layer.

Crush blacks & whites

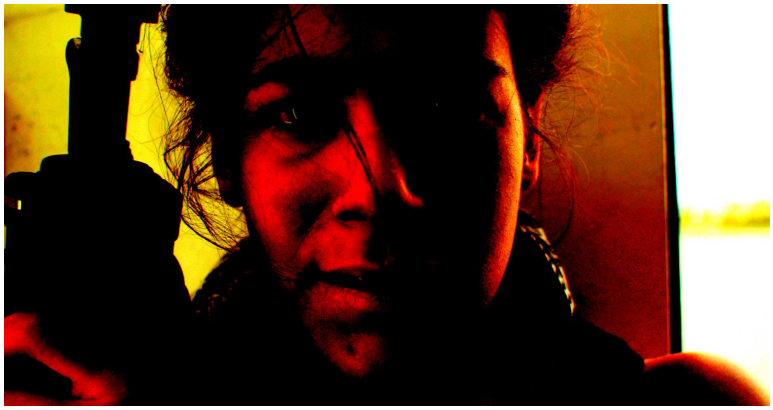
An alternative to simply altering the contrast, this enables you to change the black and white points separately for finer control.

Custom gray

This creates a grayscale image while providing finer control over how that image is generated. This is useful for creating specific black and white looks, as each RGB channel can be emphasized to a lesser or greater degree when creating the result, providing fine control over contrast.

Hotspots

A quick and easy way to isolate the bright areas of your layer.



Pro skin retouch

Apply realistic and subtle post-production make-up to your actors, with fine control over skin color, detection thresholds, skin treatment and highlight glow.

Skin retouching has three distinct sections:

- **Skin Detection**, used to define the area to be processed. This area is called the skin matte.
- **Skin Treatment**, for adjusting the amount of processing.
- **Glow**, for adding a subtle glow to the skin area.

The view menu is used to switch between the final result, the skin matte and the source skin in isolation. Switching between these view modes makes it easier to adjust the skin detection settings.

Item	Description
Skin Color	Sets the base color for skin detection. This should be adjusted based on the subject's skin color.

Brightness Threshold	Limits the skin detection based on brightness.
Chroma Threshold	The skin detection is performed in the YUV color space. The chroma threshold defines the distance around the selected color used to create the detection circle.
Softness	Feathers the edge of the skin matte.
Elliptical Deformation	Adjusts the shape of the YUV detection circle into an ellipse, which is a more optimized shape for skin detection.
Blur Selection	Blurs the resulting skin matte.
Smooth	Smoothes the skin by applying a blur.
Edge Threshold	The skin treatment attempts to retain edge detail while smoothing the skin. The edge threshold determines how much detail is retained.
Saturation	Adjusts the color intensity of the skin. A subtle saturation boost often creates a healthy appearance.
Exposure	Easily highlight underlit skin.
Brightness	Strength of the glow.
Threshold	Applies a threshold to the skin. Higher thresholds reduce the amount of skin used to generate the glow.
Radius	Higher radius will create a softer, more diffuse glow.
Colorize	The glow can be influenced towards a specific color.
View	Switch between the final result, the skin matte and the source skin. Note that this view mode will affect final rendering.

White balance

If your video was shot with incorrect white balance, this effect can help to correct the problem. Use the color pipette to select a part of the video that should be white and the layer will be corrected.

In the example below, the white balance has been set to the wall behind the actress. The top image is the original, with an overly warm, yellowish appearance, while the bottom image shows the corrected white balance.

6 Color Grading

Color grading effects are for giving your project a unique visual style.

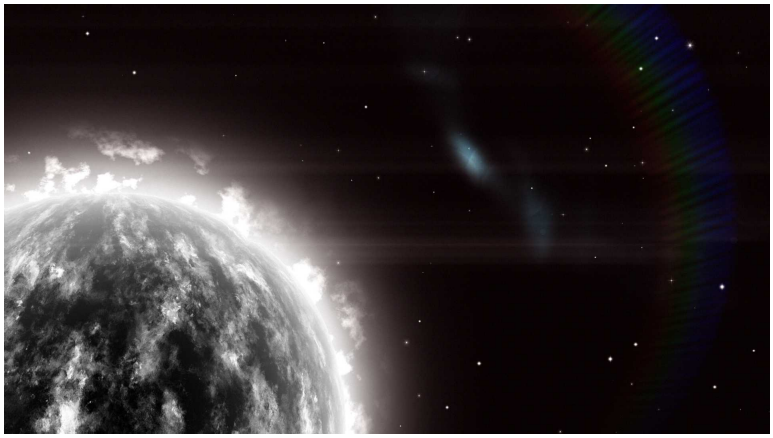
Bleach bypass

Simulates the harsh, high contrast look of bleach bypass film processing. Often used for war movies.

Color vibrance

This effect is ideal for adding color to greyscale, procedural effects such as particles and textures.

Here's a grayscale planet created using a combination of fractal noise and sphere effects inside HitFilm:



Here's the same shot with color vibrance applied:

Color vibrance is particularly effective at retaining detail in bright areas without creating excessive bloom.

The strength of the **vibrancy** and the **luminance preservation** can be adjusted, as can the **color** and **phasing** of the effect.

Day for night

A quick way to convert a shot filmed in the day to having the appearance of being filmed at night.

Applies a gradient based on the **Horizon** property, with separate controls for the **near** and **far** areas.

Duo tone

Creates a two tone look based on two specified colors.

Threshold is used to adjust the location color split in the image's brightness scale, while softness is used to adjust the overall contrast.

Grading transfer

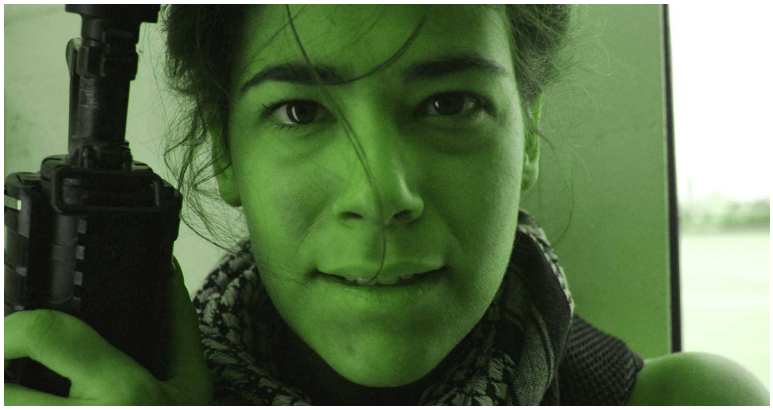
Matches the look of a layer to another layer. This is a quick way to grade based on an existing source.

The transferred grade can then be further customized, either globally or specific to the shadows, mid-tones and highlights.

Brightness shift affects how much of the source's brightness is transferred, while **chrominance shift** affects how much of the source's color is transferred.

Hue colorize

Applies a new hue to the layer,.



Hue shift

Moves the entire color spectrum of the layer through different hues.

LUT

LUT files are used to transform color values, which helps to ensure accurate color correction across multiple software and hardware setups. The LUT effect can import .cube LUT files.

LUT also provides a powerful way to provide a one-click grade, simulating specific film stocks and processing techniques. Applying a LUT to flat footage can produce high quality results very quickly.

Take a look at this comparison:

On the left is the original footage, which was purposely shot to be 'flat', providing a neutral starting point for the grade.

The middle image is using a LUT designed to mimic the look of KODACHROME film. The only additional alteration I've made is to slightly reduce the saturation. In about 10 seconds I went from a basic flat look to a highly dramatic and filmic grade. Find out more about KODACHROME and grab the LUT here.

The image on the right is using a Kodak 2393 emulation LUT, Again, I'm achieving a good film look with literally a couple of clicks, and note how different this look is to the KODACHROME. You can download several film emulation LUTs and find some great behind-the-scenes info here.

Shadows & highlights

Provides fine control over the contrast and sharpness of a layer.

Three strip color

Simulates the three strip color film process commonly used in the early days of color film, resulting in richer, deeper colors.

Two strip color

Simulates the two strip color film process. More information on the process can be found in this article on Wikipedia.

Vibrance

Adds pop to your image, emphasizing edge detail by increasing local contrast.

Vignette

Adds a colored overlay to the edges of the layer. You can customize the color, shape and softness of the vignette.

Vignette exposure

This alternate vignette effect adjusts the exposure of the edges of the frame, instead of applying an overlay. This can produce a subtler and more natural vignetting result.

The vignette can also be pushed brighter, which creates a halo effect or can be used to reduce the effects of unwanted vignetting in the source footage.Color grading effects are for giving your project a unique visual style.

7 Distort

The Distort effects are used to change the shape and behaviour of a layer.

Bulge

Creates the illusion of a bulging shape pushing through the layer.

You can choose from multiple shapes and adjust the size and shape of the bulge.

Chromenator

Creates the appearance of liquid metal.

Derez (VGHS)

Custom-built for Freddie Wong's Video Game High School web series. Creates a digital glitching appearance.

Displacement

Shifts the pixels in particular directions according to the displacement source. This can create excellent invisibility and other distortion effects.

You can select the source layer and source channels, plus adjust the strength of the displacement.

Energy Distortion

Distorts your footage based on a procedurally generated fractal pattern. You can adjust the appearance of the distortion using the controls.

- **Distortion:** Adjusts the intensity of the distortion applied to the layer.
- **Scale:** Sets the scale of the distortion
- **Diffusion Bias:** Set the amount of the image that is affected by diffusion blurring. Increasing the setting will make the blur more prevalent.
- **Diffusion Strength:** Sets the strength of the blur in the areas affected by diffusion
- **Distortion Rotation:** Sets the angle in which the distortion is applied.
- **Distort Single Axis:** Enabling this option applies the distortion in a single direction. The specific angle used can be set with the Distortion Rotation setting above.

Animation

By default the Energy Distortion is animated. You can set the details of the movement within the effect here.

- **Wind Direction:** Sets the direction of the movement
- **Wind Speed:** Sets the speed of the movement along the axis determined in the Wind Direction, by altering the position of the noise. Higher values will create more movement in the distortion.
- **Noise Speed:** Sets the speed of the movement of the fractal noise the distortion is based on. This speed alters the shape of the noise, while the Wind Speed property affects its position.

Noise

- **Seed:** Acts as a randomizer for the shape of the noise. Each seed value sets a unique starting shape for the procedurally generated noise.
- **Interpolation:** Provides options for how the noise is interpolated. **Linear** Interpolation uses the simplest path to connect points in the rectilinear grid the effect is based on. Cubic interpolation uses smoother paths to interpolate the grid. Neither option is better than the other, they just provide different options for the effect.

Transform

Multiple layers of fractal noise are combined to create the final noise that the distortion is based on. The Transform controls adjust the primary noise, while the Sub Settings alter the sub levels of noise that add detail to the distortion.

- **Position:** Sets the position of the primary fractal noise the distortion is based on.

- **Use Layer:** You can select another layer on your timeline, to parent the position of the distortion to that layer
- **Rotation:** Sets the rotation of the primary fractal noise
- **Axis Scale X:** Alters the aspect ratio of the primary fractal noise by changing its scale along the X axis. Higher values will stretch the distortion horizontally.
- **Axis Scale Y:** Alters the aspect ratio of the primary fractal noise by changing its scale along the Y axis. Higher values will stretch the distortion vertically.

Sub Settings

- **Sub Levels:** Sets the number of sub levels that are used to calculate the distortion. Higher levels create greater detail in the distortion.
- **Influence:** Controls the intensity with which the sub levels alter the primary noise.
- **Scale:** Sets the scale of the sub levels, thus impacting the size of the detail added by the additional sub levels.
- **Rotation:** Alters the angle of the sub levels which are laid over the primary noise.
- **Offset:** Sets the position of the sub levels in relation to the primary noise position.
- **Center Subscale:** Enabling this option links the center of all subscale layers, so they stay aligned when offset using the above control.

Fluid Distortion

Distorts your footage based on a procedurally generated fractal pattern. You can adjust the appearance of the distortion using the controls.

- **Distortion:** Adjusts the intensity of the distortion applied to the layer.
- **Scale:** Sets the scale of the distortion
- **Diffusion Bias:** Set the amount of the image that is affected by diffusion blurring. Increasing the setting will make the blur more prevalent.
- **Diffusion Strength:** Sets the strength of the blur in the areas affected by diffusion
- **Distortion Rotation:** Sets the angle in which the distortion is applied.

- **Distort Single Axis:** Enabling this option applies the distortion in a single direction. The specific angle used can be set with the Distortion Rotation setting above.

Animation

By default the Fluid Distortion is animated. You can set the details of the movement within the effect here.

- **Wind Direction:** Sets the direction of the movement
- **Wind Speed:** Sets the speed of the movement along the axis determined in the Wind Direction, by altering the position of the noise. Higher values will create more movement in the distortion.
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Heat Distortion

Applies automatic heat distortion with built-in displacement and diffusion. The behavior can be adjusted for faster or slower movement.

- **Scale:** Sets the scale of the distortion
- **Distortion:** Adjusts the intensity of the distortion applied to the layer.
- **Diffusion Bias:** Set the amount of the image that is affected by diffusion blurring. Increasing the setting will make the blur more prevalent.
- **Diffusion Strength:** Sets the strength of the blur in the areas affected by diffusion
- **Distortion Rotation:** Sets the angle in which the distortion is applied.
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Animation

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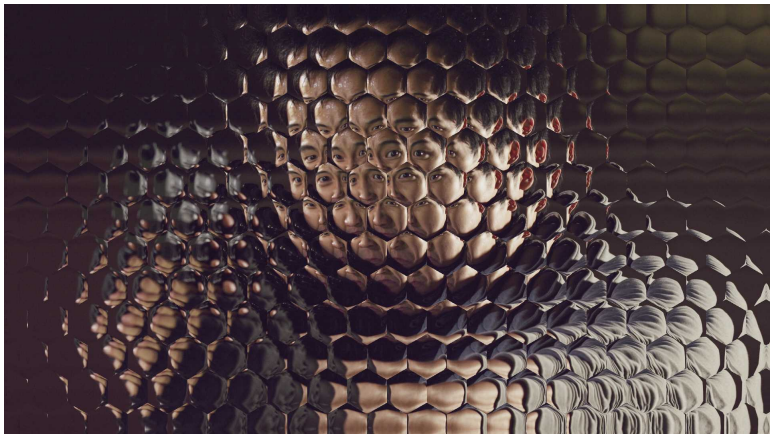
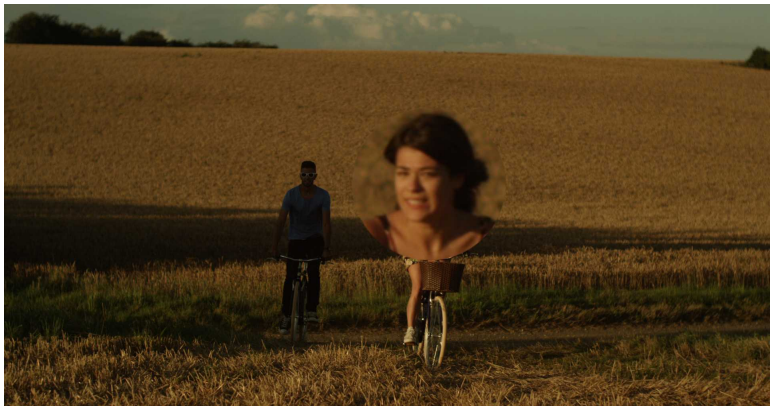
Insect vision

Creates the tiled appearance of a multi-faceted insect eye.



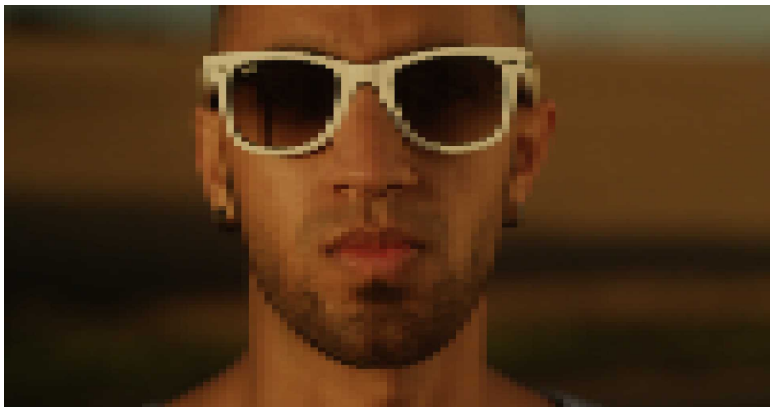
Magnify

Zooms in on a specific area of the layer. The shape, size and position of the magnification can all be changed.



Mosaic

Creates a tiled, mosaic appearance by reducing the number of distinct pixels in the layer.



Smoke Distortion

Distorts your footage based on a procedurally generated fractal pattern. You can adjust the appearance of the distortion using the controls.

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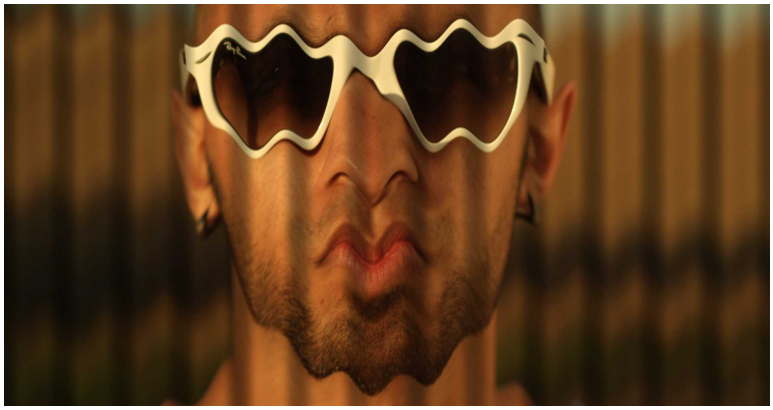
Twirl

Twists the layer around the effect's center point.

Waves

Creates a corrugated effect. You can also choose another layer as the displacement source and alter the lighting on the bright and dark sides of the wave.



Witness protection

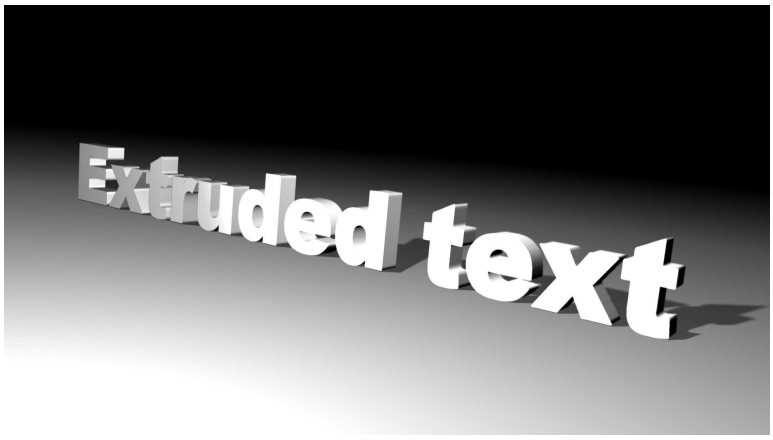
This is a quick way to obscure an item within a shot, such as a face, number plate or product logo. You can choose between blur or pixelate styles.

8 Generate

The Generate effects are used to create new visual elements. These can be applied to layers like any other effect.

3D extrusion

Extruding creates the appearance of 3D depth in a flat 2D layer. This is often used to enhance titles but can be used on any layer.



In compatible hosts 3D extrusion can use the 3D lights in your scene. The material behavior of the extrusion can be adjusted in the **Illumination** property group.

Another layer can be used as an environment map for extruded text. This is effective for creating reflective text or for inheriting some of the lighting in a background plate.

Audio spectrum & waveform

Generate spectrum or waveform patterns based on an audio layer.

> *Requires a layer containing audio to function correctly.*

The appearance of the spectrum and waveforms can be heavily customized, while behavior is determined via the **audio input** controls.

Auto volumetrics

Generates volumetric lighting effects which can be positioned in 3D. The volumetric rays are based on a source layer.

Often the most effective way to apply auto volumetrics is to a simple plane layer. You can then specify a separate source layer in the **Light source** properties. Applying the effect to a separate plane provides greater flexibility when moving a 3D camera, as the rays can emanate away from the layer boundaries of the source itself.

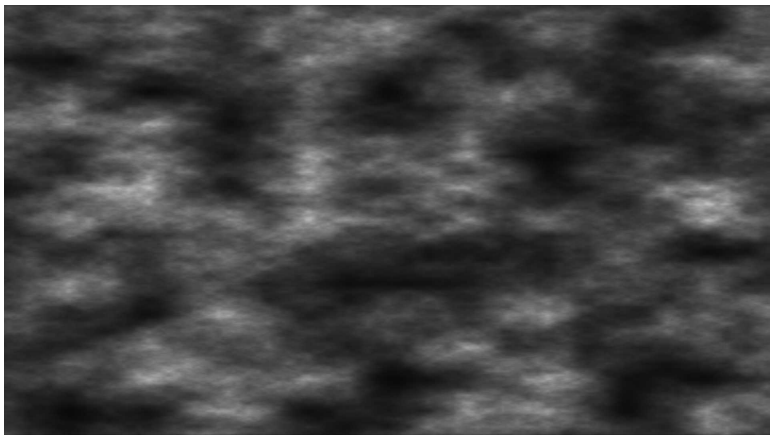
The light position determines the angle of the rays. You can also link the light position to another layer, such as a light or point layer.

Caustics

Simulates the distortion caused by viewing through a body of water.

Clouds

Generates a moving, randomly generated cloud texture.

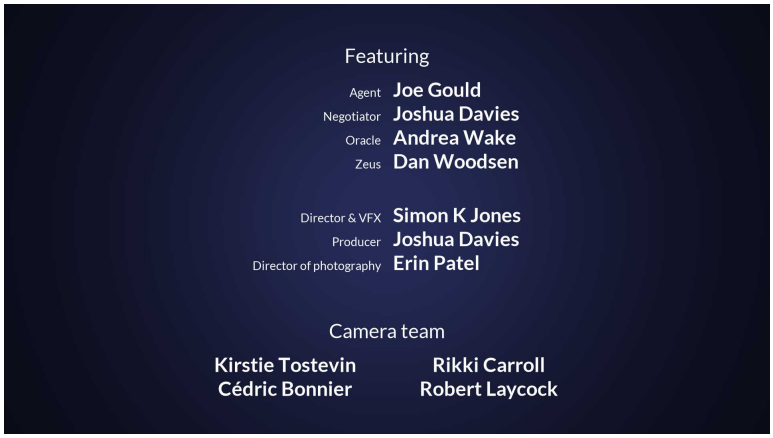


Drop shadow

Adds a drop shadow to the layer. You can change the scale, distance and appearance of the shadow, or choose to render the shadow without the layer.

End credits crawl

Creates scrolling end credits with automatic formatting and animation, designed to mimic classic feature film credits.

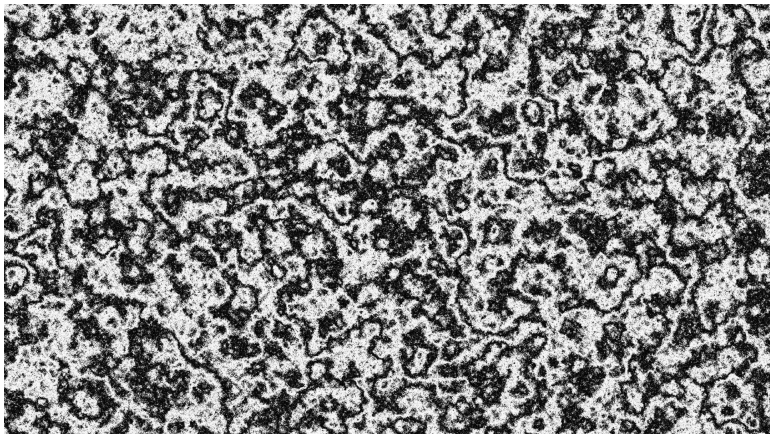


The effect is split into multiple design elements and automatically reflows text and adjusts the layout depending on the copy you provide. Formatting and layout for element titles, role descriptions and names can be adjusted independently, giving you a lot of flexibility within the core framework.

If you omit titles or roles, the layout will be automatically updated to still make sense. For example, removing roles will reflow the names into a multi-column layout by default, which is useful for crediting a large stunt or VFX team who all share the same role.

Fractal noise

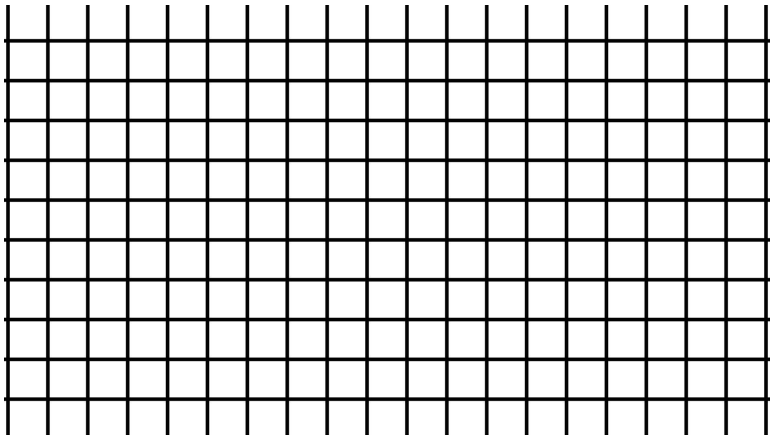
Generates a range of textures using procedural methods.



Each fractal method includes a range of properties for customizing the appearance of the effect.

Grid

Creates a grid pattern. You can adjust the spacing and size of the grid lines.



Heat distortion

Applies automatic heat distortion with built-in displacement and diffusion.

The behavior can be adjusted for faster or slower movement.

Letterbox

The fastest and easiest way to add letterboxing to your movie. Presets enable you to quickly pick from standard film aspect ratios.

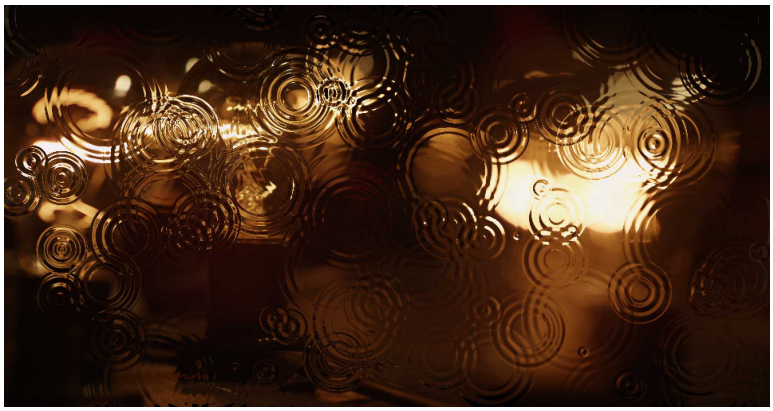
Lightswords

See Lightswords.

Pond ripple

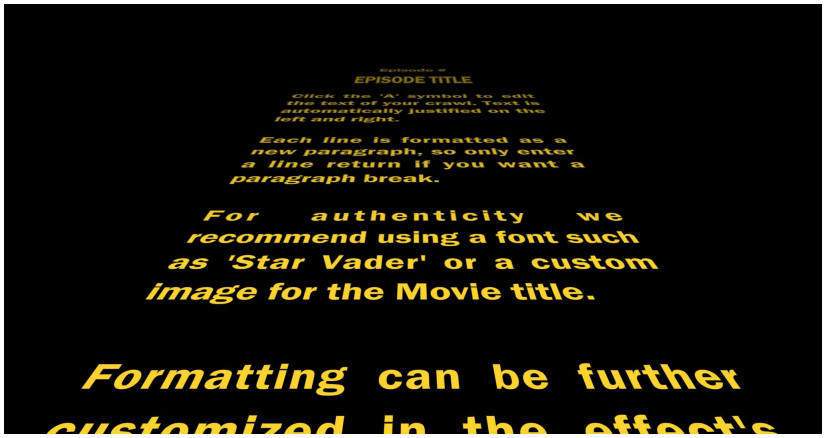
Creates ripples which expand and distort the layer.

The size and behavior of the ripples can be adjusted.



Pulp Sci-fi title crawl

An instant way to get perfect Star Wars and Flash Gordon-style openings, complete with separate sections for the teaser, main title and the crawl itself.



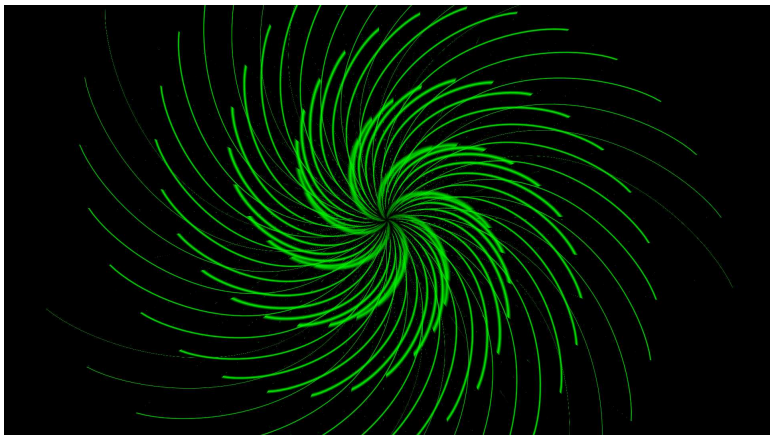
The text is entered into the Teaser, Movie Title, Episode Number, Episode Title and Text Crawl properties. Clicking the font 'A' symbol opens a new window for editing the Movie Title and Text Crawl text.

The formatting and animation of the teaser, movie title and text crawl can be adjusted in separate property groups, with the text reflowing automatically to suit the classic pulp look.

The Movie Title can also be switched to use an image instead of text. This can be useful for creating a more authentic appearance when recreating movie logos.

Radio waves

Creates geometric shapes that can be warped and animated. Shapes can be heavily customized.



Reflection

A quick and easy way to create a reflection of the layer.

Sphere

Creates a sphere that reflects its surroundings.

The sphere can be heavily customized with separate layers for the optional surface texture and environment map.

The **refractive index** property can be used to accurately simulate refraction from real world materials. A list of common refractive indices can be found on Wikipedia.

Split screen masking

Provides a quick way to set up various split screen layouts. Numerous screen layout presets are included which can then be further customized.

Cuts determine how many slots are available for input.

Input layers/frames is used to link different layers into the effect.

Border changes the separation between cuts.

Tile

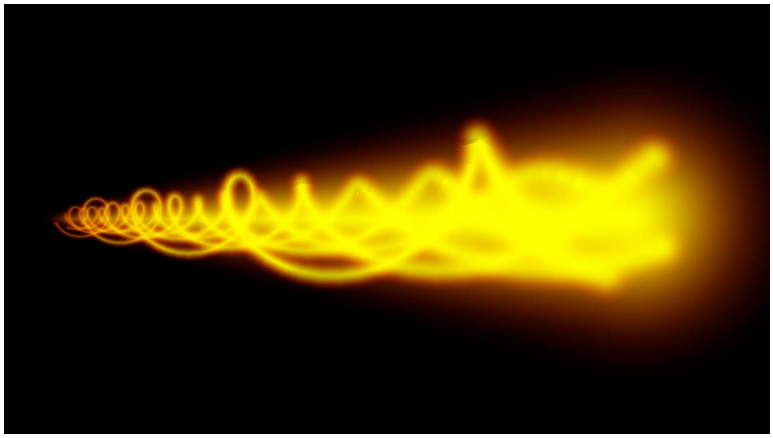
A quick and easy way to tile the layer without needing to create duplicates.

Timecode

Generates a counter showing the current position in time of the layer or timeline.

8.1 Animated lasers

Designed to create laser bolts which fire from one point to another. The lasers can be constructed from multiple lines, which can be further manipulated into spirals, expanding the effect to also be useful in motion graphics animation.



The laser has two **position** points. These interact with the **Location** property, with the laser animating between the two points as the location is increased.

The effect has built-in controls positioning on the X and Y coordinates, plus a slider for depth.

Number of Beams alters the complexity of the beam. Up to 10 separate beams can be added to the effect, each with their own appearance and spiral settings, building up visually exciting shapes which animate together.

Beam properties

Each beam can be colored, with key properties such as brightness, width, length adjusted as required.

Tail Scale causes the beam to taper at its end.

Color Shift moves the overall color of the beam towards either the Core Color or the Glow Color. Tail Color Shift does the same but just for the tail end of the beam.

The **Brightness** and **Color Mix Noise** properties introduce a noise texture, breaking up the solidity of the beam.

Spiral properties

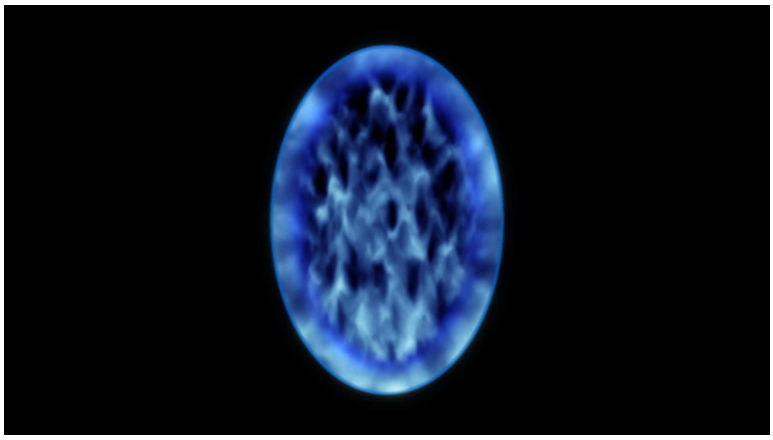
Each beam has associated Spiral properties. These are used to twist the beam's straight line into curving spirals.

Increasing the **Radius** warps the line into a spiral shape. **Path Angle** increases the number of spirals.

Each individual beam can be rotated, or the entire combined shape can be rotated in the **Global Controls**.

8.2 Dimension rift

Instantly create a wormhole-style rift in space!



The Dimension Rift effect has several built-in features for easily creating authentic portals:

- Automatically displace the background video as the portal opens
- A layer can be selected to be visible through the portal
- Pre-animated opening, closing and connecting of portals with controllable animation speed
- Fine control over 3D wave surface
- Create custom shapes

Applying the rift

The Dimension Rift effect can be applied directly onto a video or image layer. This will enable it to displace and warp the background as the portal opens, but you will not be able to rotate and position it in 3D, because it is locked to the host layer.

For more flexibility it is recommended that the effect is added to a separate plane layer. This plane layer can then be transformed in 3D, which will also transform the dimension rift. Even when applied to a separate plane layer, the effect can still warp the desired source layer. See the Wall Image property, detailed below.

Wall image

As described above, when applying the effect you may want it to be able to warp a different layer to the host. The Wall Image property is used to define the layer which should be warped.

For example, take an example of a composite shot containing two layers: a live action video clip and a 3D plane. The Dimension Rift is applied to the 3D plane, which is then positioned in 3D space so that the portal is applied to a wall. The Wall Image property is set to the video layer, so that as the portal opens it warps the video.

Shape

The Dimension Rift defaults to a classic oval shape. This can be customized in the Shape group.

The **From Mask** option can be used to select a separate layer to use as the shape. For example, an image or embedded composite shot containing an alpha channel. This makes it easy to create your own custom shapes.

View

This is what is seen through the portal, when it is open.

With the **Image** set to None, the view through the portal is simply a hole cut through the host layer. Setting the Image to another layer will composite that layer inside the portal. Note that it will only be visible if the **Connection** property is increased above 0.00.

The position, depth (Z), rotation and scale of the selected Image can be adjusted as required. Increasing the Z depth will create a greater sense of parallax movement if you move the portal in 3D.

Appearance & Animation

These settings are used to adjust the outline and interior elements of the portal, and how they animate over time.

The Sparks setting is used when the expansion and connection properties are adjusted.

Optional layers

Specific elements of the effect can be turned on and off, which can be useful when creating more complex composites. This lets you render elements individually, providing finer control.

Colors

The Primary color is used on the side of the dimension rift closest to camera. The Secondary color can be glimpsed through the portal when it is open, and represents the portal on the 'other side'. This can be set to be a different color.

Expansion & Connection

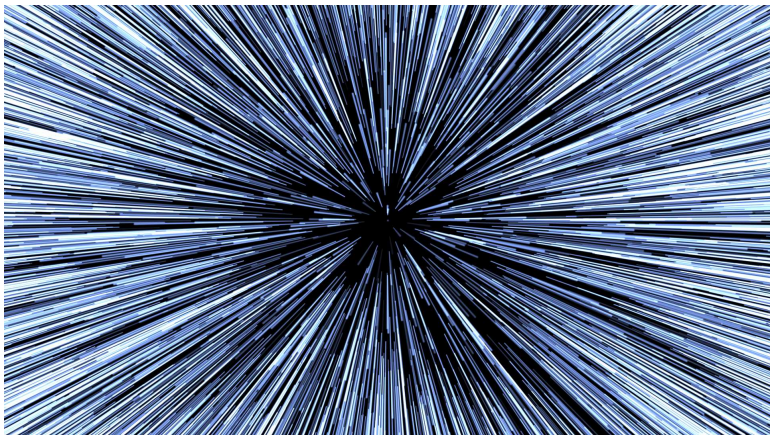
The behavior of the dimension rift is controlled with these properties.

Expansion animates the portal appearing/disappearing on a surface. This includes displacement warping as it expands, as long as you have selected a **Wall Image**.

With Connection set to 0.00, the portal will be closed, with a rippling, water-like surface. Increasing the Connection will dissolve the rippling surface to reveal the View, as set in the **View** properties.

8.3 Hyperdrive

Jumping to lightspeed is as easy as dusting crops with this effect, which generates a spray of streaking stars, complete with built-in animation and customization.



The overall animation is driven by the **Progress** property. At 0% the stars have not yet appeared, and at 100% they have completed their animation past camera.

The color **Temperature** can be adjusted and **Variation** can be added for a less uniform look.

The **Number** and **Size** of stars can be adjusted, while the **Seed** can be used to generate different renderings of the effect.

Star Blend determines how the star streaks interact with each other. Add blend tends to look best, with stars intensifying where they overlap.

Blend with source changes how the effect is blended with the host layer. When set to None, the stars will be rendered onto transparency, with the host layer no longer visible, which makes it easy to overlay them onto other layers. Alternatively On Top can be used to composite directly onto the host layer.

8.4 Lightswords

HitFilm provides the most efficient and high quality method for creating lightsword effects, reducing the rotoscoping requirements and automating key visual elements such as the motion blur 'streak'.

There are six lightsword effects, depending on the needs of your VFX shot.

- Lightsword Ultra (2-Point Auto) provides a rapid method requiring the placing of a point on the hilt and a point on the blade tip. Once these points are rotoscoped to the movement of the lightsword blade, HitFilm will automatically calculate the appropriate motion blur based on the speed at which the blade is moving. The Ultra version of the effect integrates a variety of distortion types into the effect, which can be used to alter the core shape, to alter the glow shape, and to distort the appearance of the background through the effect.
- Lightsword Ultra (4-Point Manual) allows precise positioning, with two points defining the edges of the hilt and two points defining the edges of the blade tip. Precisely positioning each corner gives you full control over the exact shape of the blade on every frame. This can be useful for artificially enhancing the motion blur of the blade movement, to create the classic 'fanning' effect. The Ultra version of the effect integrates a variety of distortion types into the effect, which can be used to alter the core shape, to alter the glow shape, and to distort the appearance of the background through the effect.
- Lightsword (Glow Only) applies the effect's custom glow behavior to any layer, without providing an interface for easy lightsword generation. This is useful for creating other neon and laser effects. The Ultra version of the effect integrates a variety of distortion types into the effect, which can be used to alter the core shape, to alter the glow shape, and to distort the appearance of the background through the effect.
- The three non-Ultra versions of the effects perform a similar roles, but with a simplified set of controls that does not include distortion.

The effects share the same general properties:

Hilt & tip

The hilt and tip positions can be set inside the effect, or linked to reference layers via the Position menu. This makes it possible to link the shape to auto-tracked points.

The width of the hilt and tip can be set separately, which can be useful for creating perspective on the blade or creating tapered shapes.

Extension

The lightsword extension can be animated to create the 'ignition' animation, whereby the lightsword blade extends out of the hilt, or contracts back in.

Core

The core is the central part of the effect which directly covers the prop blade.

- **Width:** The Width of the core can be adjusted, as a percentage of the width values set in the Tip and Hilt controls above.
- **Color:** The core Color should generally be set sightly off white, in the direction of the color that will be used for the glow.
- **Feather:** The edges of the core can be softened with the Feather control.
- **Stability:** Lowering the Stability causes the core shape to fluctuate in size.

Distortion

The Core Distortion controls allow you to procedurally alter the shape of the core to create a variety of animated results.

- **Distortion:** Controls the strength of distortion that is applied to the core.
- **Type:** There are four types of distortion available, each of which gives a different result. They are Energy Distortion, Heat Distortion, Liquid Distortion, and Smoke Distortion.
- **Noise:** The noise that defines the shape of the distortion can be modified using these properties. They correspond to the controls in the standalone Distortion effects.
- **Animation:** The movement of the noise that defines the shape of the distortion can be modified using these properties. They correspond to the controls in the standalone Distortion effects.
- **Blend on Top:** enabling this option will apply the glow above the core, potentially altering the core's color.
- **Use in Glow:** enabling this option will adaptively shift the shape of the glow of the effect to match the distortion of the core shape.

Flicker [Ultra Only]

The Flicker controls will affect the movement of the overall effect.

- **Amount:** Controls the amount of flicker applied to the effect.
- **Probability:** Adjusts how regular the flicker is. Higher probability settings will make a more regular flicker.
- **Frequency:** Adjusts the timing between the flickering, Higher values will increase the speed of the flicker.

- **Seed:** Changing the seed will randomize the pattern of the flicker.

Inner Glow

Two glows are built-in to the effect. This makes it possible to create an intense inner glow, with a low width so that it is close to the core, and a wider, diffuse, less bright outer glow.

- **Width:** The width of the inner glow can be adjusted, in pixels.
- **Color:** The inner glow color should generally be set to a bright, vibrant color.
- **Alpha:** adjusts the transparency of the inner glow layer.
- **Stability:** lowering the stability causes the glow shape to fluctuate in size.
- **Flicker:** sets the intensity of brightness flicker applied to the glow. This does not alter the shape of the glow.
- **Falloff:** alters the range over which the glow edges are feathered. Lower numbers will create a harder edge to the glow.
- **Mask:** controls whether masks applied to the layer affect the glow. **Disable** will allow the glow to naturally wrap around the mask edges, for a softer result. **Enable** will cut the glow off exactly at the edge of the mask. **Invert** will reveal the glow outside the mask, while removing it inside.

Distortion

The Inner Glow Distortion controls allow you to procedurally alter the shape of the inner glow to create a variety of animated results.

- **Distortion:** Controls the strength of distortion that is applied to the core.
- **Type:** There are four types of distortion available, each of which gives a different result. They are Energy Distortion, Heat Distortion, Liquid Distortion, and Smoke Distortion.
- **Noise:** The noise that defines the shape of the distortion can be modified using these properties. They correspond to the controls in the standalone Distortion effects.
- **Animation:** The movement of the noise that defines the shape of the distortion can be modified using these properties. They correspond to the controls in the standalone Distortion effects.

Outer Glow

Two glows are built-in to the effect. This makes it possible to create an intense inner glow, with a low width so that it is close to the core, and a wider, diffuse, less bright outer glow.

- **Width:** The width of the outer glow can be adjusted, in pixels.
- **Color:** The outer glow color can be set to a similar color to the inner glow color, for a traditional look, or to an entirely different color to create a gradient in the glow.
- **Alpha:** adjusts the transparency of the inner glow layer.
- **Stability:** lowering the stability causes the core shape to fluctuate in size.
- **Flicker:** sets the intensity of brightness flicker applied to the glow. This does not alter the shape of the glow.

- **Falloff:** alters the range over which the glow edges are feathered. Lower numbers will create a harder edge to the glow.
- **Mask:** controls whether masks applied to the layer affect the glow. **Disable** will allow the glow to naturally wrap around the mask edges, for a softer result. **Enable** will cut the glow off exactly at the edge of the mask. **Invert** will reveal the glow outside the mask, while removing it inside.

Distortion

The Inner Glow Distortion controls allow you to procedurally alter the shape of the inner glow to create a variety of animated results.

- **Distortion:** Controls the strength of distortion that is applied to the core.
- **Type:** There are four types of distortion available, each of which gives a different result. They are Energy Distortion, Heat Distortion, Liquid Distortion, and Smoke Distortion.
- **Noise:** The noise that defines the shape of the distortion can be modified using these properties. They correspond to the controls in the standalone Distortion effects.
- **Animation:** The movement of the noise that defines the shape of the distortion can be modified using these properties. They correspond to the controls in the standalone Distortion effects.

Path interpolation

During rapid movement the hilt and tip will fan out, creating a trail. Path interpolation is used to create a natural curve along the hilt and tip ends.

Reducing the scale to zero will remove all interpolation, resulting in straight lines drawn at the hilt and tip ends of the blade. Increasing the scale will create interpolation and curved ends.

The Hilt and Tip angles can be used to further customize the interpolated curve at each end of the shape.

Motion Persistence

The 2-point Auto version automatically creates the streaking of a fast-moving lightsword based on the movement of the points. The appearance of the streaking can be customized to match the source footage.

HitFilm automatically attempts to create a natural trail shape based on the movement of the hilt and tip points, based on the expected behaviour of a blade in motion.

The duration of the trail is determined by the motion persistence. Increasing the value will cause the trail to remain visible for more frames, thus creating a larger trail. Reducing the value will create a smaller trail.

Note that motion persistence is restricted by the Auto Scale Persistence properties, if Auto Scale is activated (see below).

Persistence Shift

Persistence Shift adjusts the interpolation in time. This adjusts the trail to be either in front (1.0), behind (0.0) or in the middle (0.5) of the control point positions. At the default of 0.0 this means that

on frames containing fast moving blades you should position the control points on the leading edges of the blade.

Auto Scale Persistence

Auto Scale provides additional control over the generation of the persistence trail, determining when the trail is generated. These settings can be used to match the trail to the natural motion blur found in your footage, which may vary depending on your camera settings.

The Speed and Swing thresholds can be used to restrict the activation of motion persistence. Below the thresholds, the shape will be drawn without the trail. This ensures that the blade does not look indistinct when being moved slowly. As soon as the speed and swing thresholds are exceeded, the trail will be generated according to the motion persistence setting.

The Minimum Persistence property generated a trail even if the thresholds are not met. Setting this to 0.0 ensures the blade shape is defined solely by the core, hilt and tip properties. Raising the value will generate a blur trail even during minor movements.

Disabling Auto Scale Motion switches to only using the Motion Persistence property. Therefore the trail will always be generated even during small movements. A high Motion Persistence value combined with Auto Scale turned off will create a long, unnatural trail. Increasing the motion persistence over 180 can create extreme streaking. This isn't suitable for lightsabers but can be an interesting effect in its own right.

Distortion

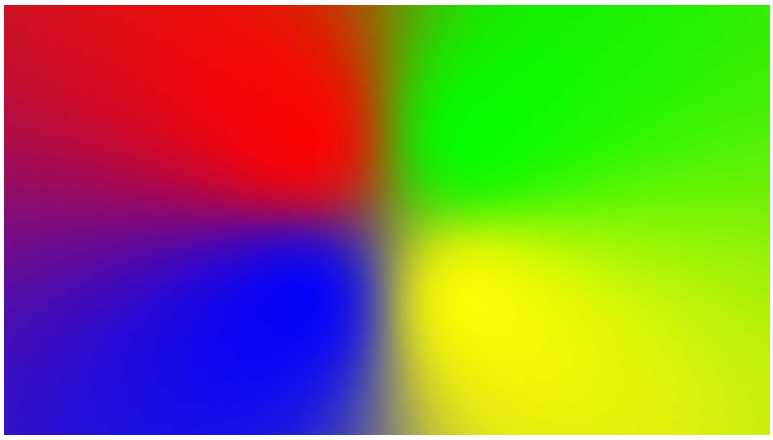
A noisy, irregular edge can be applied to the shape by increasing Distortion. If Distortion is reduced to 0 the edge will be regular and smooth.

9 Gradients & fills

A range of gradients and fills are provided. These can be extremely useful when used in conjunction with other effects, such as **color map** or **shatter**.

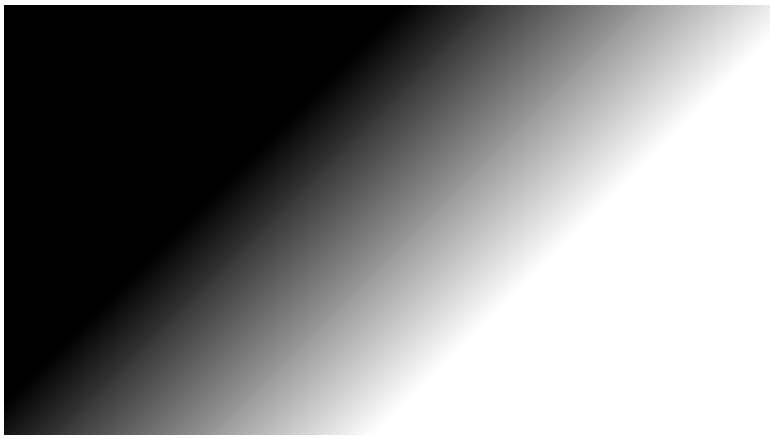
4-point color gradient

Generates a 4-color gradient. The colors and mixing of the colors can be changed, as can the position of the gradient points.



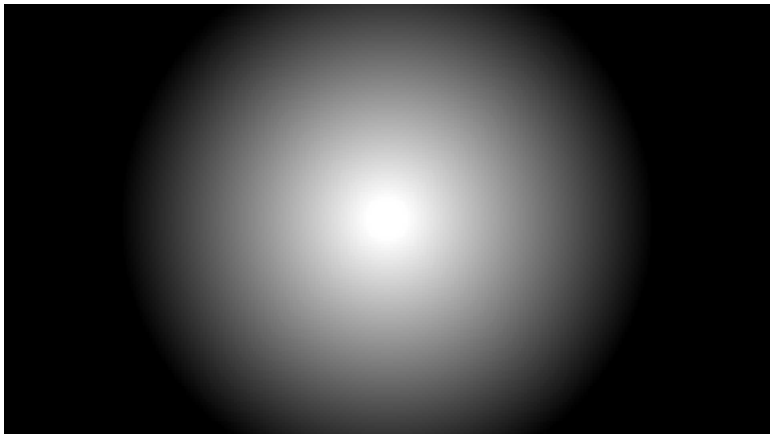
Color gradient

Creates a 2-point gradient of color.



Radial gradient

Creates a circular color gradient. The size, position and shape of the gradient can all be tweaked.



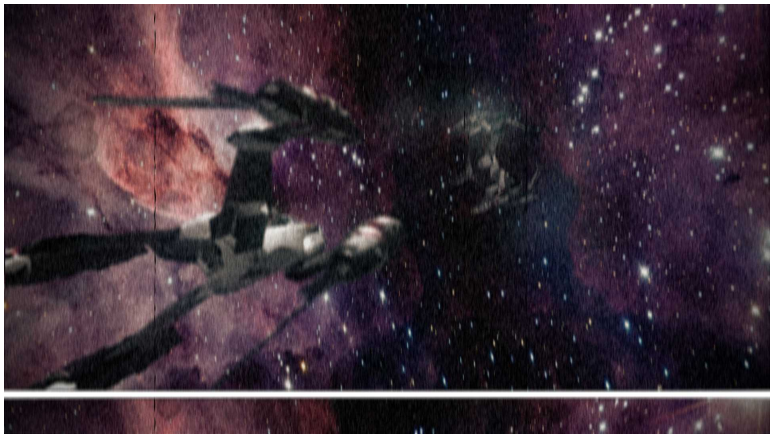
10 Grunge

The grunge effects are a set of effects for creating the appearance of old or damaged video.

Film damage

Simulates the problems caused by a poorly projected film, including grain, stains, dust and scratches, frame shake and flickering.

You can control each of the elements individually to get the exact look you want.



Film grain

Generates a realistic grain based on 8mm, 16mm or 32mm film stock.

Flicker

Introduces a random flickering to the layer. The behaviour of the flicker can be finely customized.

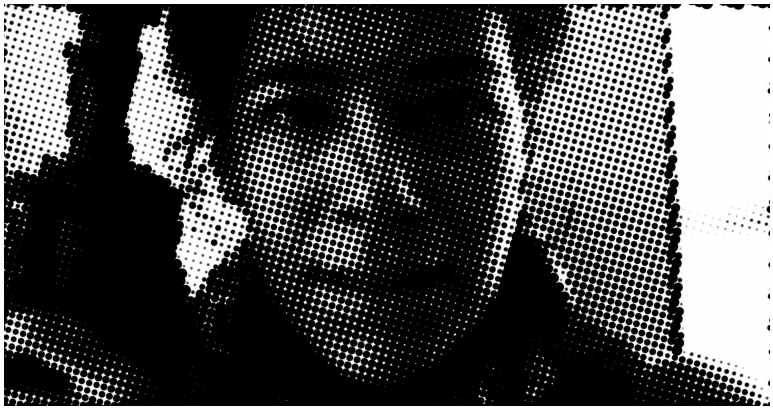
Grain

This effect provides fine control over the size of the grain.

Half tone

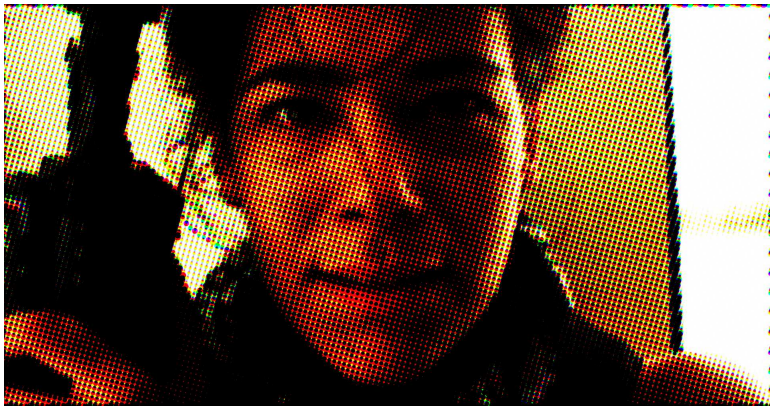
Turns the layer into a half tone image, similar to black and white newspaper print.

You can adjust the composition of the half tone dots.



Half tone color

A color variation of the **Half tone** effect.



Jitter

Creates glitches in video playback order, shuffling the order of frames.

Lens dirt

Simulates dirt on the camera lens and in-lens reflection.

The dirt element can be procedurally generated from various **seed** values, or you can use another layer as the dirt source.

The in-lens reflection flaring can be generated from the applied layer or from another source.

Threshold and **intensity** determine the visibility of the lens dirt. Higher thresholds will restrict the effect to brighter areas of the frame.

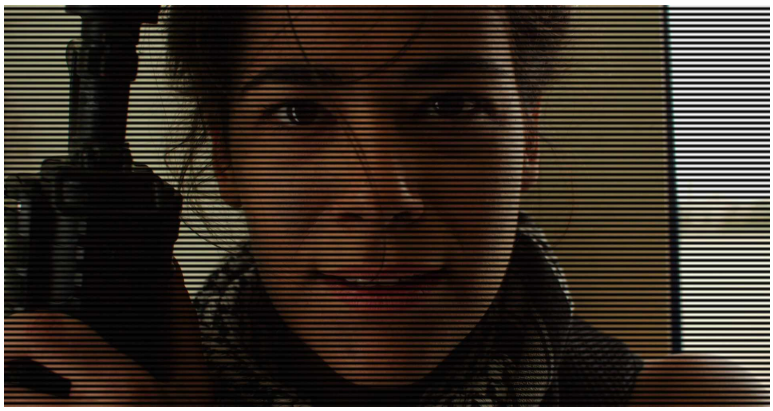
The blur and pivot angle properties adjust the visual style of the flaring. For realistic results these should be kept relatively high.

Noise

The basic noise effect provides a fixed-size noise.

Scan lines

Creates scan lines as seen on some monitor displays when filmed.



Shake

Adds artificial camera shake to the layer. This can be useful for adding shake to explosive effects, or for adding a sense of a handheld camera to a tripod shot.

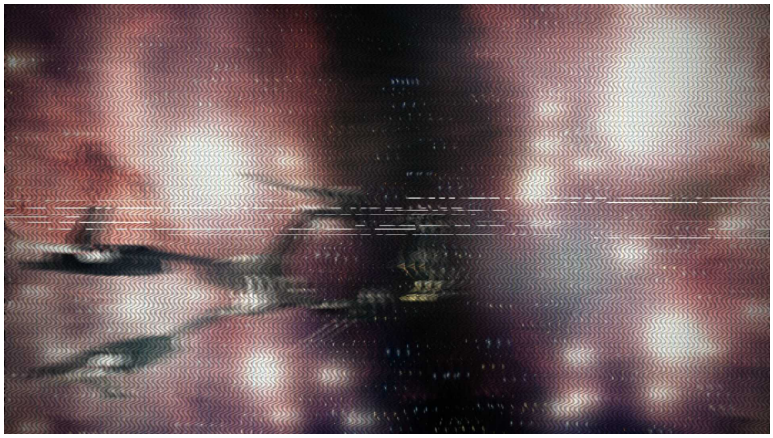
Stutter

Reduces the number of frames used during playback of the layer, creating the impression of the video momentarily freezing.

TV damage

Simulates the appearance of a badly tuned television signal.

Each element can be customized individually to create the exact look you want.



11 Keying

HitFilm includes several effects for keying your layers.

> *Keying is the term used for automatically removing parts of an image or video, usually by identifying a specific color.*

Chroma key

This advanced keyer provides fine control over your keying.

See Chroma key for full details.

Chroma UV blur

The UV blur can be essential depending on the way your video camera stores its data.

After keying some video you may notice a pixellated 'stepping' around the edge of the key. If this occurs, add a chroma UV blur **before** the key itself. This will help to smooth out the edge.

Color difference key

This is a simpler keyer than the **chroma key** effect and is used for removing green screen and blue screen backgrounds from video and images.

The **View matte** option is a quick way to see the layer's alpha channel, making it easier to identify areas where the key needs to be cleaned up.

Demult

Quickly key out the background from stock footage shot on black and generate an embedded alpha channel. Very useful for compositing smoke, explosions and similar.

Difference key

Keys areas of a layer based on differences with another layer.

Hue & RGB key

This effect keys the layer based on a color of your choice. You can pick between using the hue or RGB values.

The **View matte** option is a quick way to see the layer's alpha channel, making it easier to identify areas where the key needs to be cleaned up.

You may get better results using the **Chroma key**.

Luminance key

This effect keys the layer based on its brightness. This can be particularly useful for sky replacement.

11.1 Chroma Key

This effect provides professional quality removal of any color from a source with precision control over edge detail, edge color correction and advanced spill replacement.

Item	Description
View	Source - shows the original unkeyed layer. Status - shows a black and white matte. This makes it easy to see at a glance which areas are not fully opaque. This mode does not show gradients of transparency. Matte - shows a greyscale matte. This provides an accurate view of opaque and transparent areas. Despill mask - displays the despill mask, if one is being used. Despill map - shows the area being spill suppressed. Result - shows the final composited result. Note that the View menu will affect final output.
Adaptive Color	This method is particularly effective when working with uneven green screens. Even slight changes in tone or brightness across your green screen can cause keying complications. Adaptive color aims to improve results in such cases and can be particularly effective with fine detail areas such as lace and hair. Note that when adaptive color is activated the Gain setting will have a minimal effect. Key adjustments should be made primarily using the Clip Foreground and Clip Background settings.
Color	Defines the color to be keyed.
Gain	Gain is the base sensitivity of the chroma key. This is best used for the initial background removal. It should be adjusted until the subject is isolated, though you don't want to push the gain too far as you will start to lose edge detail.
Balance & Hue Balance	These two settings adjust the emphasis of the chroma key, affecting the range of colors that are affected. In practical use, it is usually best to try them at the minimum and maximum values to see which best suits your image.

Pre-Blur	Applies a blur to the footage prior to keying. This can help with lower resolution footage.
Clip Background	Crushes the black point of the matte, so that more parts of the image are removed. If parts of your green screen are still visible this should be used to remove them.
Clip Foreground	Clips the white point of the matte, returning detail to the foreground. If parts of your subject are semi-transparent, you should reduce the clip foreground to make it fully opaque.
Clip Rollback	After adjusting the clip foreground you may want to return some of the semi-transparency to the outer edges of your foreground. This helps to create a softer edge, although increasing this setting too much will cause an undesirable band of semi-transparency around the edge.
Gamma	Adjusts the strength of the key. This can be useful for adjusting the fine detail at the edges of the key, particularly around hair and semi-transparent areas.
Erode/Expand	This works in a similar way to the standalone Erode White filter and can be used to expand or erode the alpha matte. If you need to add or remove pixels from the edge of the key this can be very useful.
Despot Foreground/Background	Aims to remove holes in the background or foreground. Used subtly this can improve overall keying quality without affecting edge detail.
Softness	Blurs the alpha, creating a softer edge to the key.
Bias	Performs a white balance using the selected color, prior to applying the key.
Subtract Background Color	Increasing the subtract setting removes the background color (for example, green if you're using a green screen) from the semi-transparent areas of the image. This can be very effective for reclaiming the correct color in semi-transparent areas, such as glass.
Recover Edge Color	A thin dark line can sometimes be seen on the keyed edges of white clothing or pale skin. The recover setting can counter this problem by adjusting the colors of the outer pixels. Rather than using their actual color, instead they will take on the color of the pixels further inside the foreground. Best used subtly.

Expansion Region Color: Method	If the Expand setting is used, this determines the content of the expansion region. The default despilled source usually provides best results.
Retain/Remove Mask	Separate layers can be specified as additional masks to aid with the overall keying. Retain masks identify areas the key should ignore, while remove masks identify areas that should definitely be removed.

The chroma key effect also includes built-in spill suppression.

Even a perfectly shot clip can still suffer from color spill. This is when the green or blue of the screen is reflected on the subject. While this is often difficult to see in the original image, once it has been composited it becomes extremely obvious, resulting in unwanted color fringing around edges.

Item	**Description**
Amount	Varies the strength of the spill suppression.
Hue Range/Balance/Hue Balance	Expands or contracts the spill suppression area. Best adjusted while in the despill map view mode.
Spill Replacement	Spill replacement aims to replace the unwanted spill with a new spill color.
Luminance Change	Varies the luminance adjustment based on the replacement color.
Source Layer	A specific layer can be selected for spill replacement. This then updates the replacement color as the selected layer changes.
Color	A color can be selected manually for spill replacement.
Blur	When using a source layer for spill replacement, the layer can be blurred for a subtler effect.
Despill Mask	A specific layer can be used to manually define areas to be spill suppressed.
From	Selects the despill mask layer.
Color Dist Max	Adjusts the range of color to be suppressed.
Softness	Blurs the despill mask.

Color correction is integrated into the chroma key effect, enabling you to color correct the foreground, background and edge of your key.

Item	**Description**
Enable	Turns the color correction features on and off.
Edge Resize	The edge area can be blurred and enlarged.

Foreground/Edge/Background	Each area's strength, hue, saturation and lightness can be individually adjusted.

12 Matte enhancement

After keying a layer you may need to perform further adjustments to achieve high quality results. The matte enhancement effects are designed for this purpose.

Alpha brightness & contrast

The brightness and contrast of a layer's alpha channel can be adjusted to tweak the edges of a composite.

Crush blacks & whites alpha

Similar to the normal **Crush blacks & whites** effect but only affects the alpha channel. Crushing the blacks can remove lingering areas of your keyed area, while clamping the white can help to fill transparent areas in your subject.

Erode white

The erode effect gradually removes the edge of a layer's alpha channel.

Invert alpha

Inverts the layer's alpha channel.

Light wrap

You can often improve composites using light wrap, which enables light from another layer to bleed onto the keyed layer.

> *If you have transformed or added effects to the light wrap source layer, you will need to convert it to an embedded composite shot for the light wrap to take those changes into account.*

Matte cleaner

After keying a layer you can use the matte cleaner to tidy up the composite.

- **Smooth** - makes the edge of the key smoother.
- **Feather** - makes the edge of the key softer.
- **Choke** - shrinks the edge of the key.

The **View matte** option is a quick way to see the layer's alpha channel, making it easier to identify areas where the key needs to be cleaned up.

Remove color matting

When using stock footage, this effect can be used to reduce dark areas in the composited element.

Most effective when used after stock has been composited using the **channel swapper**.

Set matte

Enables you to use channels from another layer on the current layer. This can be particularly useful if you want to use the alpha channel from another layer.

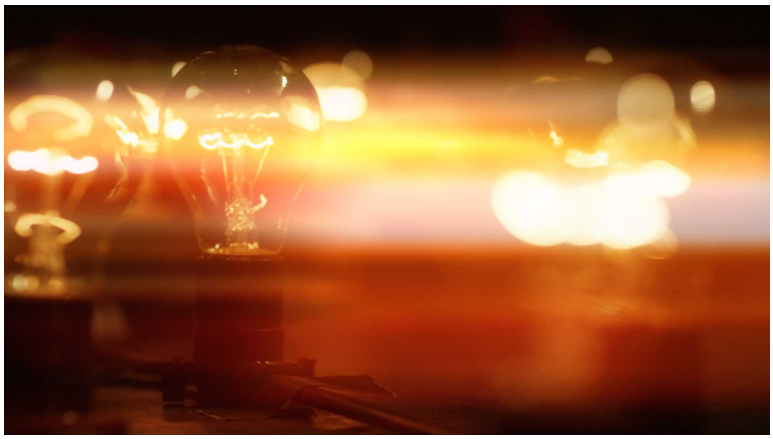
Spill removal

When working with green screen and blue screen you can sometimes find slight color fringing around the edge of a key after the screen has been removed. The spill removal effect removes or reduces this color fringing.

13 Lights & Flares

Anamorphic lens flare

Simulates the use of an anamorphic lens, creating broad flares based on the source layer.



The **threshold** determines how much of the source layer produces flaring. The resultant effect can be adjusted with the **intensity** property.

The **blur flare** property creates a less distinct flare, which can often look more realistic.

Additional streaks can be added using the **number of streaks** property, with each streak individually customizable.

Auto light flares

The auto light flares effect shares many properties with the **light flares** effect. The primary difference is that auto light flares identifies bright areas in the layer and applies light flares automatically, adjusting intensity and scale based on the source.

The **Hotspot** property group is different in auto light flares, providing control over where the light flares appear.

Threshold sets how bright a pixel has to be for a light flare to be drawn. At high thresholds, flares will only appear on the brightest parts of the layer. Lowering the threshold will produce more light flares on less bright areas.

Max flares determines how many flares can be drawn.

Flare appearance can be adjusted as with the standard **light flares** effect.

Gleam

Creates the impression of rays of light shining out from a central point.

The appearance of the rays can be heavily customized.

The general appearance of the rays is determined by its properties, rather than by its interaction with the layer itself. In this respect it differs from the **Light rays** effect.

Glow

Adds a glowing aura to bright areas of the layer.

Per Channel Intensity properties enable you to shift the glow color.

Advanced options provide further customization of the glow's appearance, including creating a specific color gradient.

Light flares

Generates a wide variety of realistic lens flares and lights. Each flare type can be heavily customized to create a limitless variety of alternatives.

Flares are made up of a hotspot, rays and unique tertiary elements. Each part can be adjusted individually.

The positioning of a flare is determined by its **hotspot** and its **pivot**. The pivot point is used for automatically animating the rays and additional elements, while the hotspot is used for the position of the main flare itself.

Below are two examples of light flares, both created starting with the **chromatic halo** type to show the level of possible customization:

Light leak

Generates an evolving pattern of color gradients, simulating unwanted light leaking into the camera during shooting.

Light rays

Though similar in immediate appearance to **Gleam**, Light rays generates a more realistic illusion of light emitting from a central point.

Used in conjunction with a 3D point, light rays can be used to create realistic volumetric lighting

effects as in this 3D model shot:

Light streaks

Creates a range of light streaks based on the source layer. Ideal for creating the kind of lens aberrations caused by anamorphic lenses.

Neon glow

Creates a glowing edge around a layer's alpha channel. This is particularly useful for effects such as lasers and lightsabers.

14 Particles & simulation

Each effect in this category has a dedicated section in the manual:

- Atomic particles - 3D, array-based particle system with audio integration.
- Blood spray - splatter simulation.
- Fire - realistic flame simulation.
- Gunfire - 3D muzzle flash generator.
- Lightning & electricity - realistic electrical animation.
- Shatter - break a layer into 3D chunks.

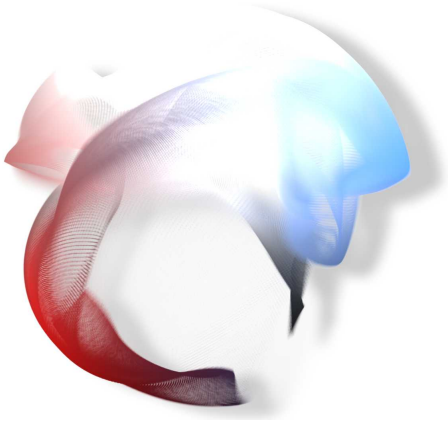
14.1 Atomic particles

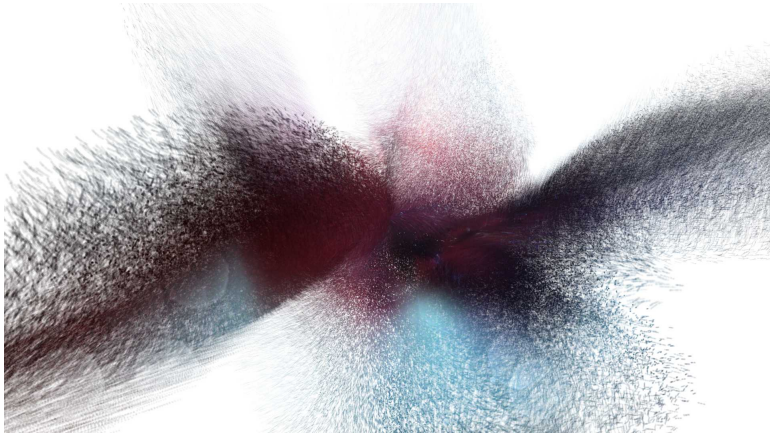
Atomic particles are array-based, which means they use regimented grids of particles.

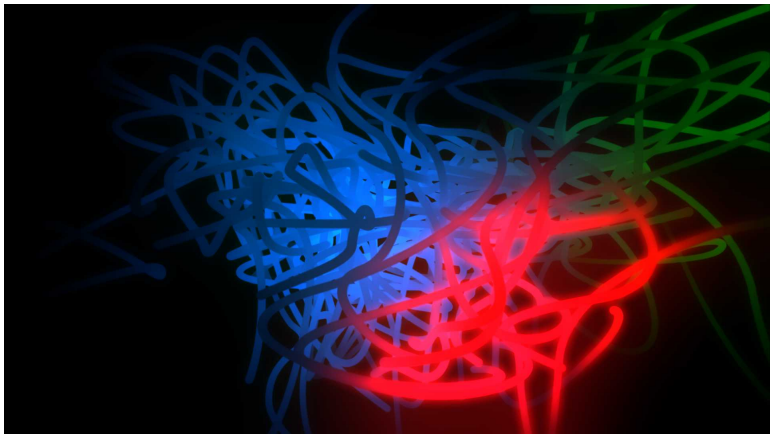
Although applied as a 2D effect, atomic particles are simulated in 3D and can be rotated around using a 3D camera. They also interact with HitFilm's 3D lighting system.

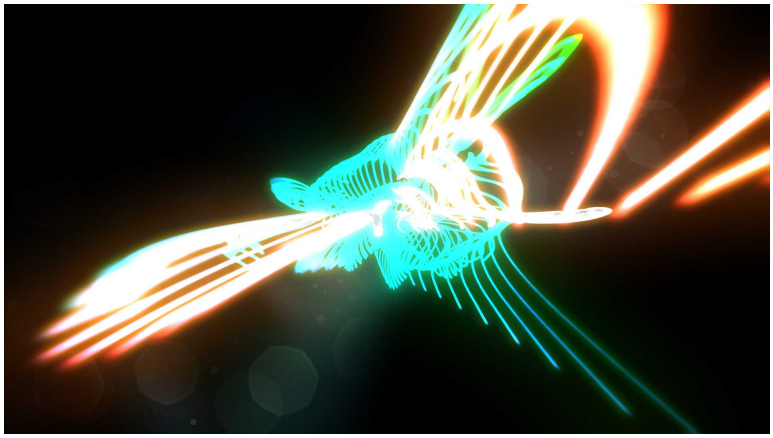
Examples of atomic particles

There are countless uses for atomic particles effects. Below are a few simple examples, all created very quickly and easily:









Particle placement

This property group determines the initial positioning and layout of the particle grid that forms the foundation of any atomic particle effect.

3D model render mode

If atomic is applied to a 3D model layer this option becomes available.

Screen space applies atomic to the 3D model as if it were a 2D layer, simply atomizing the rendered, flattened frame.

Project texture atomizes the 3D model according to its 3D geometry. This mode 'bakes in' lighting into the atomized version.

Model textures atomizes the 3D model according to its 3D geometry. It uses the 3D model's source textures, prior to the model being illuminated in the scene.

Position & rotation

The position properties determine the location in 3D space of the particle grid.

For greater control the particle grid can be linked to another layer in the composite shot, including a 3D point layer.

Atomic and 3D cameras

Atomic particles is a 2D effect, although it generates 3D rendered content. It can be adjusted to exist in 3D space using this technique:

1. Create a new point layer.
2. Set the point layer's **dimension** to 3D.
3. Apply the Atomic particles effect to a layer and explore the **Particle placement -> Position** property group.
4. Set the **Transform From** option to link to the point layer created in step 1.

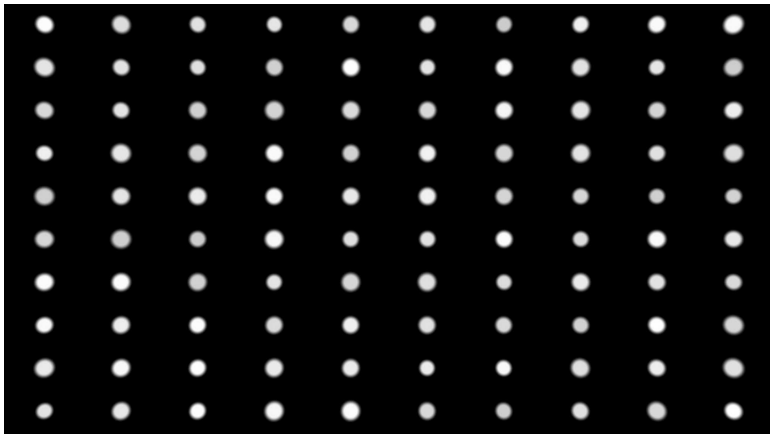
The atomic particles will inherit 3D position data from the point layer. 3D cameras can then be moved in and around the atomic particle cloud in 3D.

Number of particles

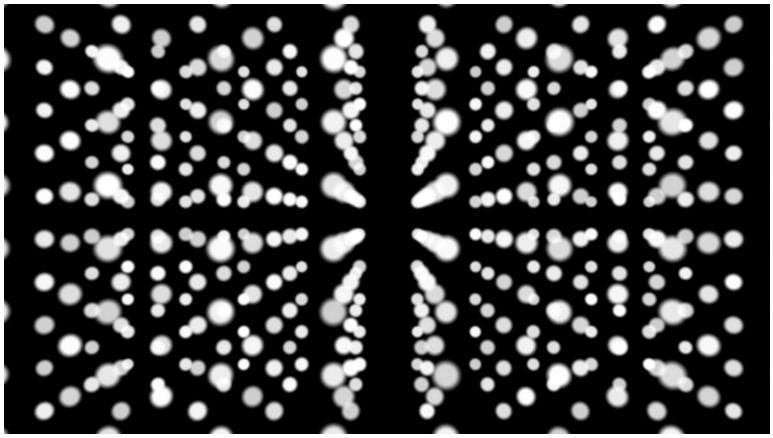
The particle grid can be adjusted to have more or less individual particles. The particle grid is made up of multiple layers (**Z**) of horizontal (**X**) and vertical particles (**Y**).

> *When first using atomic particles it can be easier to understand the system by reducing the X and Y values so that you can easily make out the individual particles.*

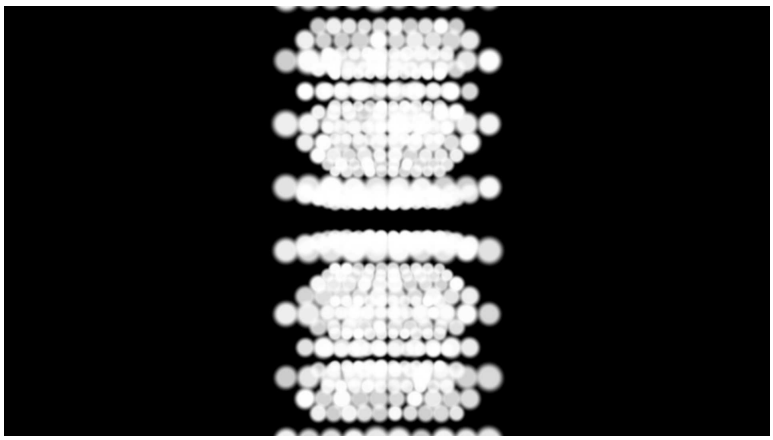
This is a particle grid of 10x10x1:



Increasing the number of Z layers to 5 gives depth to the particle grid:



The spread of particles can be adjusted using the **scale** properties, to make particles closer together or farther apart:

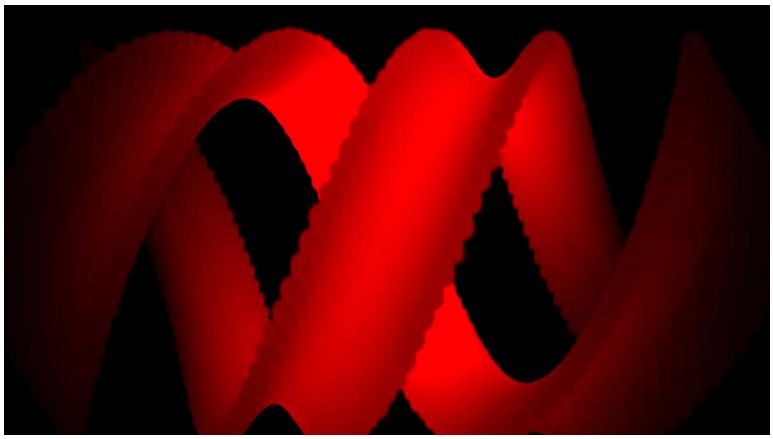


The **twist** property spins each vertical column of particles, creating a corkscrew appearance:

Depth sort changes the accuracy of the particle rendering. Turned off the rendering is fastest, but particles may not be represented accurately in 3D space.

Here is an example effect without depth sorting:

Here is the same effect with depth sorting **on**:



The second example shows a much more accurate representation of the particles in 3D space. Note the crossover point of the two strands at the top-left of the image and the peak of the curve at the top right, both of which are more accurately rendered with depth sorting on.

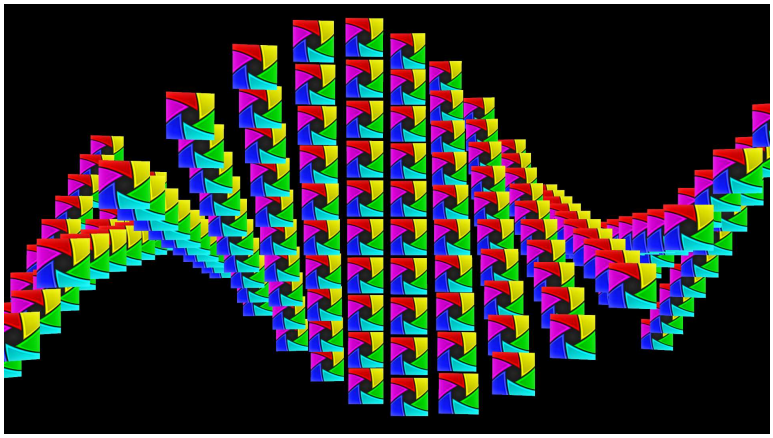
Turning depth sort to **on** can slow down rendering times.

Particle appearance

The appearance properties determine the **size**, **shape** and **opacity** of the particles.

The **shape** menu can be used to change the particle shape to that of another layer, which is defined in the **source** menu.

This can be used to create a grid of particles using a product logo, for example:

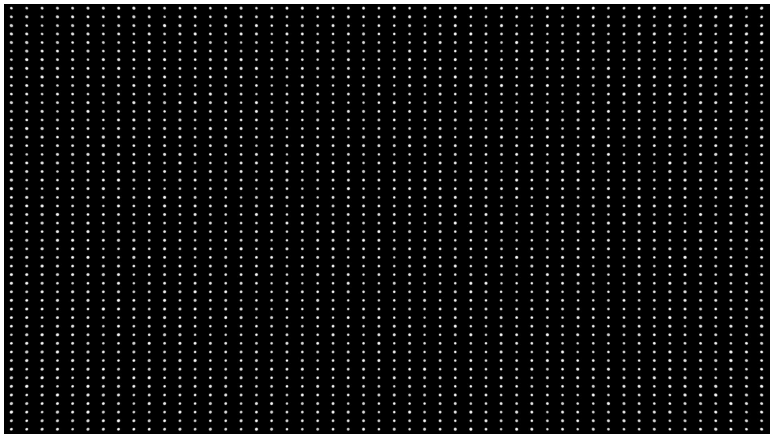


Embedded composite shots can also be used as particle shapes, enabling the use of animated shapes.

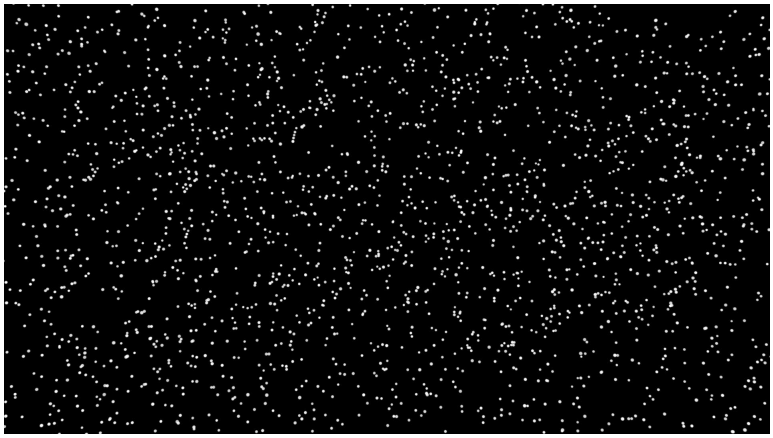
Disperse

Dispersing particles randomizes the position of the particles.

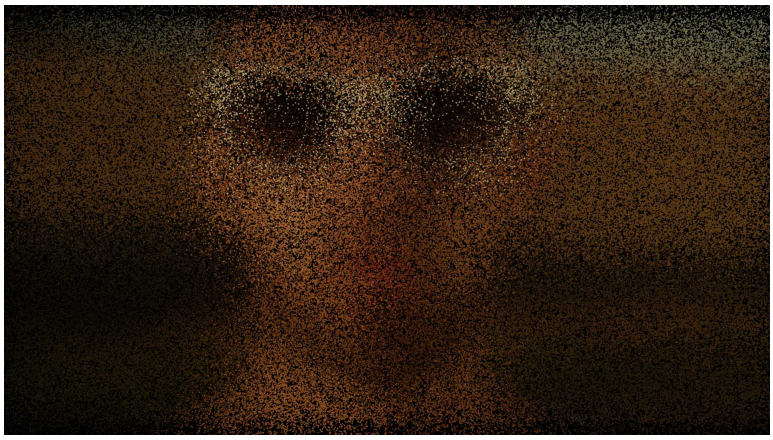
Here is a particle grid with no dispersal:



Here is the same effect with an increase **dispersal amount:**



This can have interesting effects when applied to video or image layers:



Layer

By default the dispersal happens uniformly across the layer.

The **layer** option can be used to alter the strength of the dispersal by location.

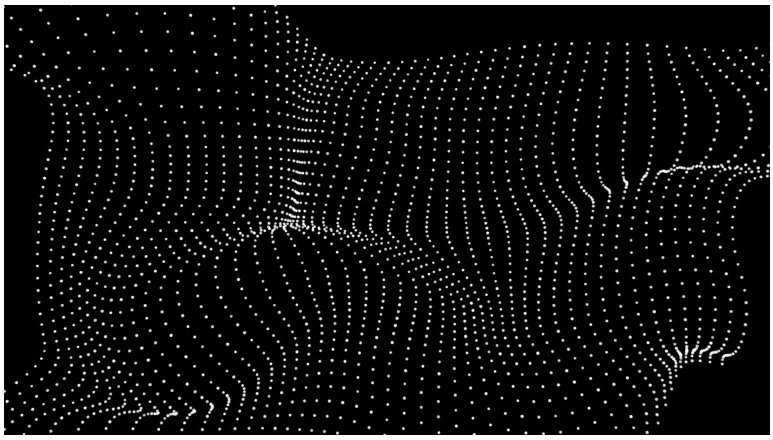
Applying this gradient layer:

Results in the dispersal being most prominent towards the bright side of the gradient:

Fractal

Warping the atomic grid using the fractal controls creates organic shapes and introduces animation.

Displace alters the atomic grid to produce a folded result, best imagined as undulating cloth:



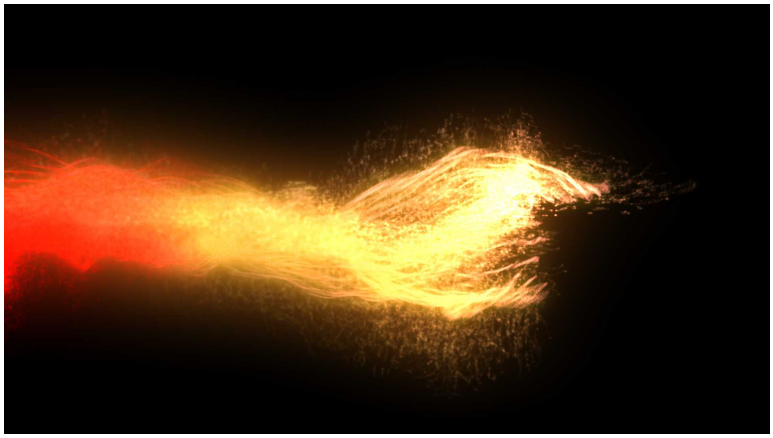
Disperse and **size** work similarly to the standard dispersal and size properties but also create fractal animation, retaining the sense of a connected grid.

The **wavelength** and **iterations** properties determine the strength of the overall fractal warp. A higher **wavelength** will result in a more uniform, less detailed transformation. Low **interations** will create smoother patterns, with higher iterations creating noisier results.

The **speed** of the fractal animation can be adjusted.

Flow

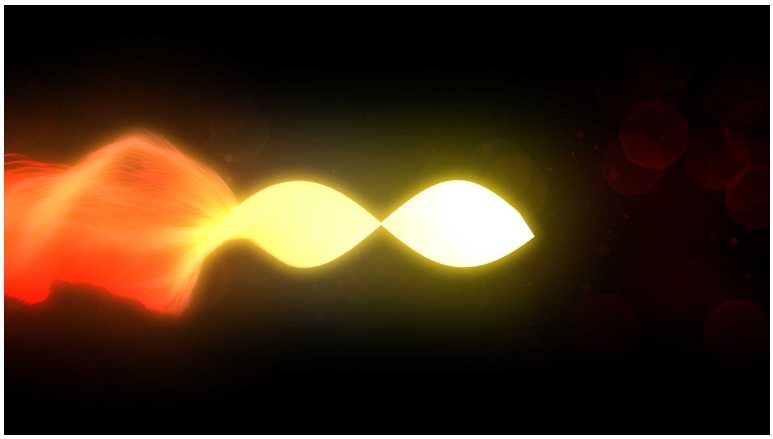
Adjusting the **flow** will give the impression that the particles are moving in a particular direction. This is most evident with larger numbers of particles:



Layer

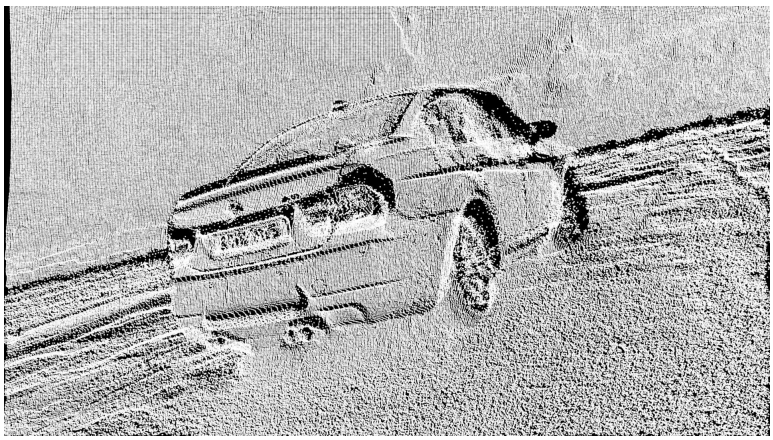
The fractal settings can also be driven by a separate layer, in the same way to dispersal. A layer such as a color gradient can then be used to adjust the intensity of the fractal warping.

In the example below, a simple gradient has been used to alter the fractal shape, resulting in less fractal warping at the right side of the frame and more at the left:



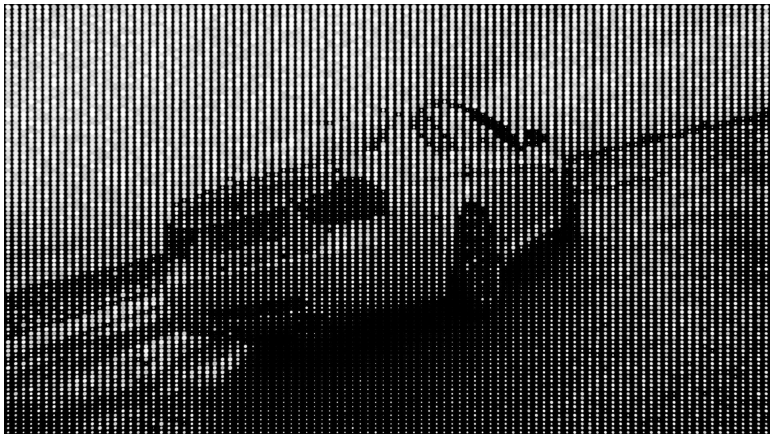
Displacement

The position of individual particles in the grid can be affected by another layer. In the example below a video layer of a car has been used to displace the atomic particles, revealing the layer's shape:



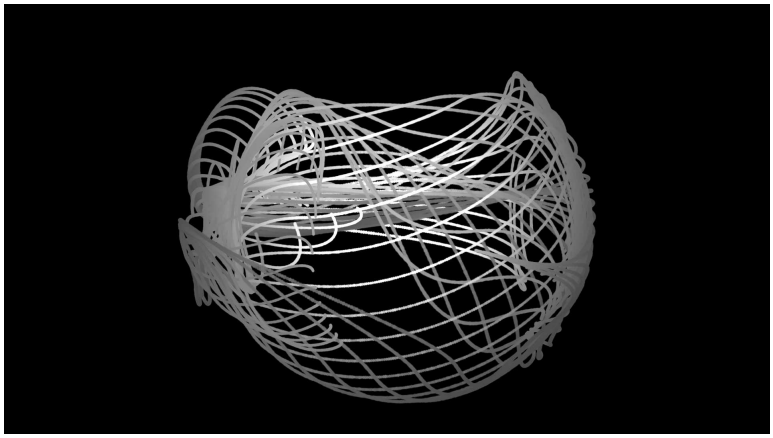
Size

The size of particles can also be linked to another layer. In this example the size of the particles is affected by the car layer, with darker areas creating smaller particles;



Spherical warp

The particle grid can be warped by a sphere force, either attracting or detracting the particles. This can be used to wrap the particle grid into a spherical shape:



Audio interaction

Atomic particles animation can be driven by an audio layer.

The **audio layer** must first be chosen. This can be any layer on the timeline that includes audio.

Before the audio affects the particle animation it must first be mapped to particular properties.

There are four mapping slots and you can use as many as you want.

Mapping slots

The **Map to** property determines which property the audio interacts with.

Frequency, **range** and **threshold** adjusts how the audio interacts with the particles.

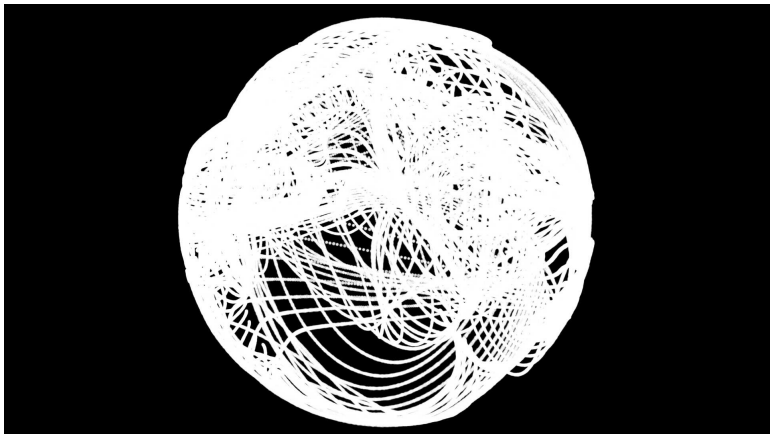
Audio interaction works on top of the other atomic particles properties, so you will also need to adjust the corresponding property group to enable audio interaction. For example, if you choose

Fractal as your map to option, you will also need to adjust some of the **fractal** properties.

Illumination

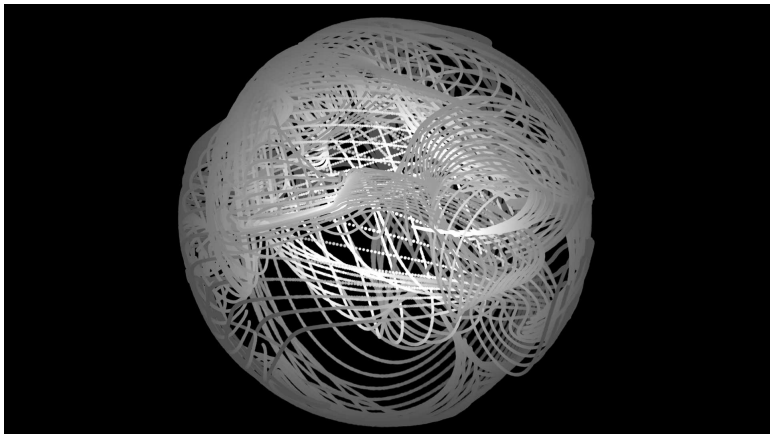
By default an atomic particles grid is lit only by its own specified color. The illumination properties can be used to enable full 3D lighting.

To illustrate the difference, here is an example with the **Illumination Type** set to **none:**



While the spherical shape is evident, there is no distinction between strands that are closer to the camera and those that are further away.

Here is the same shot with the **Illumination Type** set to **Comp lights**, with a single point light (with falloff) in the center of the shape:



By using the 3D light for illumination, it is possible to perceive depth in the atomic shape.

Comp lights will use all available lights in a scene.

Selected lights can be used to choose specific lights.

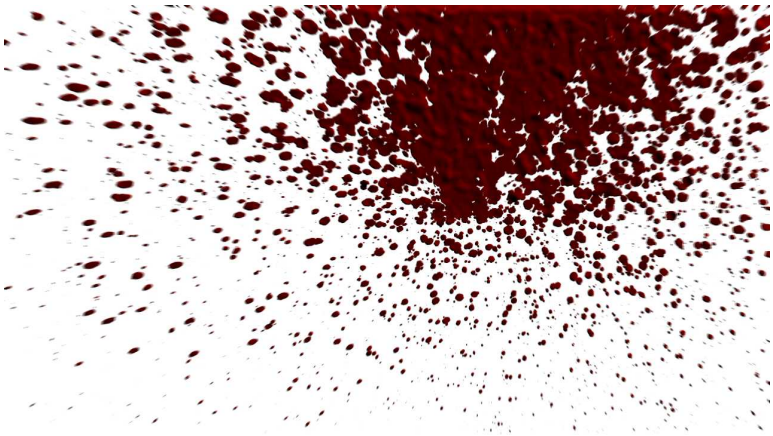
The **material** property group provides the same properties as found in standard 3D layers.

Motion blur

Motion blur can be turned on or off. Using the **Comp settings** option will match the motion blur found in the rest of the composite shot.

14.2 Blood spray

Creates a spray of blood that jets out from the center point. The effect can also simulate the blood impacting on a surface.



Particle generation

These properties determine when the spray begins, its duration and its total density.

A longer **duration** will result in a thinner spray unless the **number of particles** is also increased.

Particle birth properties

The angle, speed and size of the spray are set using these properties.

Simulation

By default the spray is pulled down by **gravity**. The strength of this gravity can be adjusted.

The collision plane can be used to simulate the effect of the spray hitting a flat surface.

Appearance

The color of the spray is set here. The spray has two colors, which are used to create the illusion of depth.

Illumination

The illusion of depth can be adjusted using the illumination properties.

Motion blur

The blood spray effect can receive automatic motion blur.

14.3 Fire

The Fire effect creates procedurally generated flames. There are numerous settings to control the behaviour and appearance of the fire.

Fire regions

There are three definable regions for the fire: **flammable region**, **blocking region** and **burn direction**. If you leave these blank the fire will use the entire layer as its source (excluding transparent areas).

If you select a layer and channel for any of the regions or the direction the fire will be influenced by those elements. This way you can use layers such as gradients to further control the fire's behaviour.

Simulation

- **Seed** - creates a different random variety of fire.
- **Iterations** - more iterations will create a more realistic simulation of the fire's movement.
- **Pre-start** - by default the fire starts on the first frame of the layer. This enables you to start the fire before the first frame.
- **Flammable end** - determines when the fire is no longer visible.
- **Source scale** - changes the size of the fire source elements.
- **Source variation** - adjusts how often the fire changes formation. Low variation will create a smoother, less volatile fire.
- **Source fill** - changes the density of the fire.
- **Movement** - changes the length of the flames.
- **Source noise** - adjusts the random density of the flammable region.
- **Source intensity** - adjusts the density of the flammable region.
- **Reload maps** - activating this property creates a more realistic simulation when the flammable

region is animated.

- **Source position** - moves the entire fire simulation. When combined with 2D tracking this can create more realistic composites into videos with moving cameras.

Wind

Wind can be applied to the fire to push the flames in a particular direction.

Appearance

The **color** and **blend** method of the fire can be altered here.

The **temperature** settings change the intensity of the fire. A lower low temperature will reveal more detail in the flame.

14.4 Gunfire

HitFilm's gunfire effect uses a highly customized version of the particle simulator and is the best tool available for creating CG muzzle flashes. There are many benefits to creating your muzzle flashes in HitFilm:

- No need to use dangerous and expensive blank-firing weapons.
- You can shoot silently in areas that might not normally allow gunfire.
- Complete artistic control over the look and behaviour of your weapons.
- You are no longer limited to re-using the same muzzle flash stock footage.

> ***Important:*** *Even if you're not using blank-firing weapons during shooting, always make sure you have notified the police and informed local residents prior to filming. Don't assume that the presence of a camera is enough to let people know you're making a movie.*

Gunfire can be moved using the standard Transform properties. For realistic positioning, the gunfire origin should be positioned at the end of the gun barrel.

Appearance

- **Textures** - choose a texture for use in the effect. Several built-in textures suitable for muzzle flashes are provided, or you can select a specific layer.
- **Preview** - toggles between textures and preview particles.
- **Blend** - changes how the textures blend together. Add will usually give the best results.
- **Colorize** - this overrides the texture's original colors with the **Color** property.
- **Color** - changes the gunfire's color when you have **Colorize** deactivated.
- **Color variation** - introduces random variation to the chosen color when you have **Colorize** deactivated.
- **Active** - turns the entire muzzle flash on and off.
- **Rate of fire** - percentage chance of the muzzle flash appearing on the current frame. 100 ensures the muzzle flash is always visible. Lower values are useful for creating the appearance of automatic weapons fire, without needing to manually keyframe the **Active** property.
- **Seed** - this is used to generate random variations of the muzzle flash shape. Keyframing the seed will ensure that your muzzle flash is different each time it appears, while retaining its basic shape.
- **Blur strength** - changes the amount of blur applied when motion blur is turned on.

Core flare

The core flare is the central part of the muzzle flash and is projected directly out of the front of the barrel.

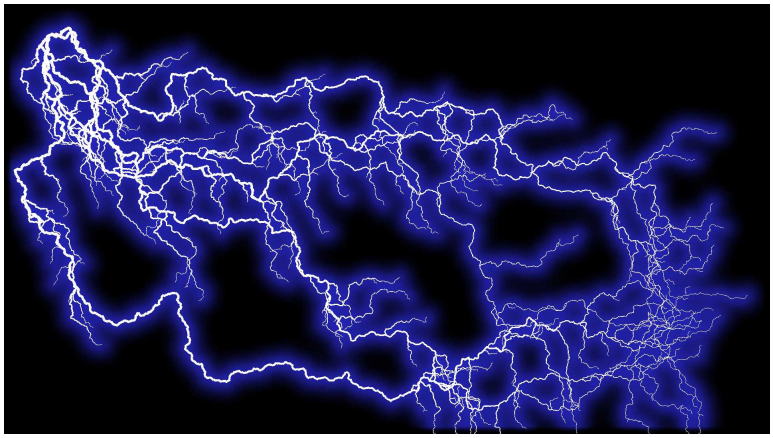
- **Active** - turns the core flare on and off.

- **Scale** - the size of the particles that form the core flare.
- **Barrel gap** - the distance between the core flare and the barrel.
- **Length** - the length of the core flare.
- **Length taper** - changes the weighting of the length of the core flare.
- **Radius** - the radius of the core flare.
- **Radius taper** - changes the weighting of the radius of the core flare.
- **Jitter** - creates a more dispersed and randomized appearance.
- **Intensity** - creates a brighter core flare.
- **Primary number** - the number of particles that make up the main part of the core flare.
- **Secondary number** - the number of particles that make up the **jitter** part of the core flare.

Side flares

- **Active** - turns the side flares on and off.
- **Scale** - the size of the particles that form the side flares.
- **Number of flares** - adjusts how many side flares are visible.
- **Barrel gap** - the distance between the side flares and the barrel.
- **Barrel angle** - the angle of the side flares in relation to the barrel.
- **Barrel rotation** - all side flares can be rotated around the gun barrel.
- **Length** - the length of the side flares.
- **Length taper** - changes the weighting of the length of the side flares.
- **Radius** - the radius of the side flares.
- **Radius taper** - changes the weighting of the radius of the side flares.
- **Jitter** - creates a more dispersed and randomized appearance.
- **Intensity** - creates brighter side flares.
- **Primary number** - the number of particles that make up the main part of the side flares.
- **Secondary number** - the number of particles that make up the **jitter** part of the side flares.

14.5 Lightning & electricity



HitFilm's lightning generator can create a limitless variety of electrical effects.

Lightning consists of several main elements:

- The **core** is the solid color center of the effect, most commonly white.
- The **glow** is the softer color around the edge of the effect.
- **Trunks** are the primary lines used to draw the lightning.
- **Branches** are created along trunks, adding detail to the effect.
- **Twigs** are created along branches, adding fine detail to the effect.

You can adjust the number of trunks, branches and twigs in the effect using the relevant property groups. Changing these will drastically alter the appearance of the effect.

Wave & twitch

The wave and twitch properties determine the shape of the lightning.

- **Wave** creates a more undulating, curved line.
- **Twitch** increases the number of twists and turns in the line.

Start & end

The **start** and **end** groups control the overall dimensions and animation of the lightning.

The **Growth** property is used to give the appearance of a lighting strike, causing the lightning to extend and travel down its length.

Animation

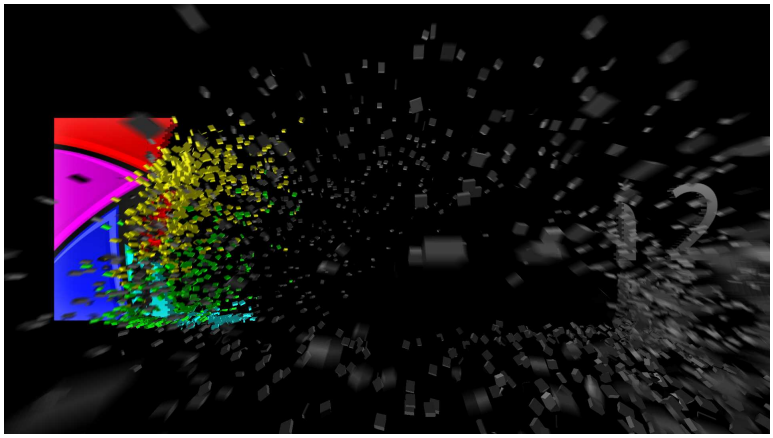
- **Speed** - the speed of the lightning's movement.
- **Jitter** - how often the lightning regenerates to a completely new position.

- **Scale** - how much the lightning moves from its central position.

14.6 Shatter

The Shatter effect is used to break a layer into 3D chunks.

Here is the HitFilm logo being shattered:



Although applied as a 2D effect, shatter can be explored in 3D.

Position

The effect's position in 3D space is determined by these properties. The effect can also be parented to another layer using the **Transform From** property.

Shatter in 3D

Shatter is added to a layer as a 2D effect. It can be adjusted to exist in 3D space using this technique;

1. Create a new point layer.
2. Set the point layer's **dimension** to 3D.
3. Apply the shatter effect to a layer and explore the **Position** property group.
4. Set the **Transform From** option to link to the point layer created in step 1.

The shatter effect will inherit 3D position data from the point layer. 3D cameras can then be moved in and around the shatter pieces in 3D.

Pattern

Determines the shape of the shatter pieces.

The **Type** can be set to the preset **brick** and **hex** shapes, or to a **custom** shape.

The **Size** property alters the size and number of individual **brick** or **hex** pieces.

The custom shape by default will use the layer itself as the shape. This will break a layer into its component pieces, with shapes and sizes defined by the layer's composition.

Custom maps

You can also select another layer on the timeline as a **custom map**. This will then use that layer to define the breaking points and shapes.

The **fixed color** property specifies a color in the custom map which will remain unshattered.

The **Threshold** property adjusts the detail of the shatter. Lower thresholds will result in finer shatter pieces.

> *Low thresholds can reduce performance.*

Extrusion adjusts the depth of shatter pieces.

Physics

The physics property group defines the behaviour of the shatter.

Forces

The force defines the point at which the shatter takes place. The force can be small or large, as defined by the **Radius** property.

The **Strength** of shatter impact can be adjusted.

The force's **Position** can be altered or linked to another layer on the timeline.

Gravity

After the shatter pieces are created by the Force they are then affected by gravity, which pulls the pieces in a direction as defined by the **XY Direction** and **Z Direction** properties.

The Shatter effect can also include a simulated floor for the shatter pieces to land on. The relative height of this floor is defined by the **Floor Distance** property.

Simulation

The behaviour of the shatter pieces is defined by the **Simulation** properties.

Timing

The **timing** properties are used to alter the beginning and end of the shatter effect within the applied layer.

Appearance

The front, back and sides of the shatter pieces can be colored and textured individually using the Appearance properties.

Render

The **Render** properties can be used to alter what is rendered during a shatter effect and the overall quality.

Depth of field for the Shatter effect can also be activated here.

Motion blur

Motion blur can be applied to the Shatter effect, using the **Comp settings** or the effect's own setup.

Illumination

The shatter pieces can be illuminated by 3D lights in the composite shot. You can choose to use either all lights with the **Comp lights** option, or select specific lights.

15 Scene

The scene effects are designed to enhance the 3D compositing environment.

Environment Map Transform

Can be used on a wraparound environment map to adjust its position without losing its wraparound appearance.

> *Applying this to an ordinary layer will create unusual results.*

Environment map viewer

This wraps the selected layer onto a spherical shape.

When placed as the bottom layer in a 3D composite shot, this creates a convincing, wrap-around background for 3D shots.

Examples would be a sky background for a cityscape or plane shot, or a space nebula for a spaceship fly-by.

The environment map viewer will automatically update as the camera is panned in all directions.

Parallax

The parallax effect creates the illusion of 3D depth in a 2D layer.

In this example parallax has been used to apply a cracked concrete texture to some text:

The **height map** is used to determine the depth effect.

When set to **None** the host layer's own texture will be used for the parallax effect. You can also choose a different layer to use as the height map.

The **Blur Height Map** property can be used to create a softer, smoother parallax effect.

> *The parallax effect is most effective when combined with HitFilm's 3D lights.*

Projector

Camera projection can be used to project a camera's view onto a layer. This can be used for object removal, converting still images into 3D scenes and projecting 2D effects onto 3D angles.

Projection From - The source layer to be projected to the current layer.

Camera - The camera that is used for the projection.

Layer Opacity - Opacity multiplier for the projected image.

Blend - The blend mode used to composite the projected layer onto the current layer

16 Stylize

The stylize effects offer more extreme color grading options. They often combine multiple techniques into a single effect.

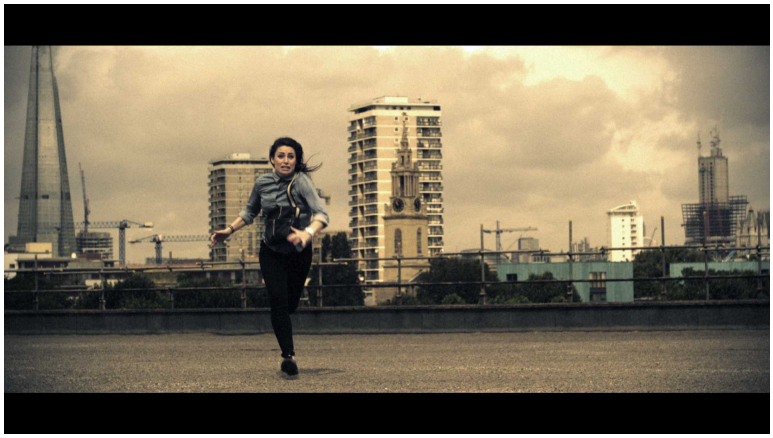
Cartoon

Creates the appearance of a cartoon drawing, with smoothed colors and lines drawn over edges.

You can heavily customize the appearance of the edge lines and the fill.

Cine style

Using an s-curve shift, cine style creates a cinematic, Hollywood-style look. It is a fast method for achieving a professional, high quality finish. While it offers a rapid grade, it still provides controls for fine tuning the appearance.

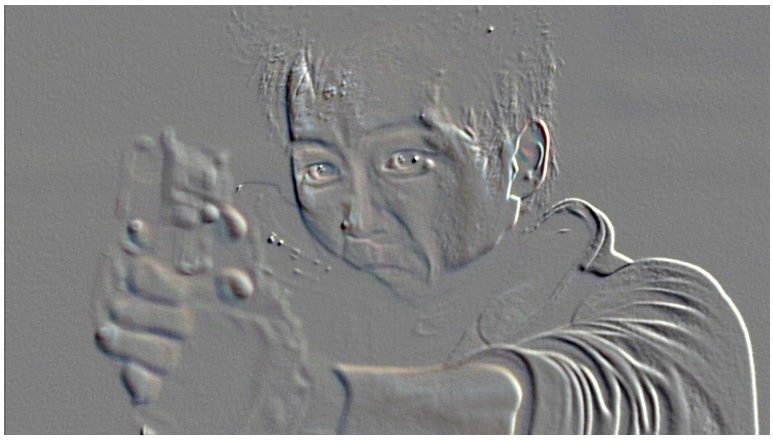


Cine style includes built-in grain, vignette and letterboxing features. These can be turned on or off depending on the desired look.

The **s-curve** property adjusts the contrast, while the **color adjustment** properties determine the effect of the color shift. The defaults push towards the orange-and-teal palette popular in Hollywood blockbuster filmmaking.

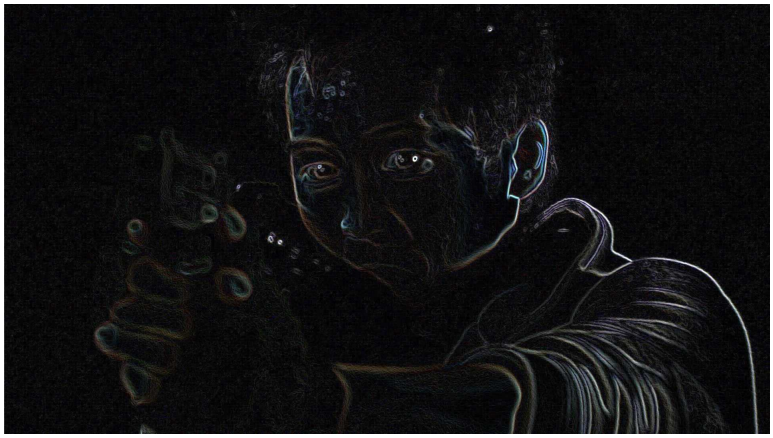
Emboss

Creates the illusion of a ridged image, based on the source layer, similar to clay imprint.



Find edges

Reduces the layer to only showing edge areas.



Glow darks

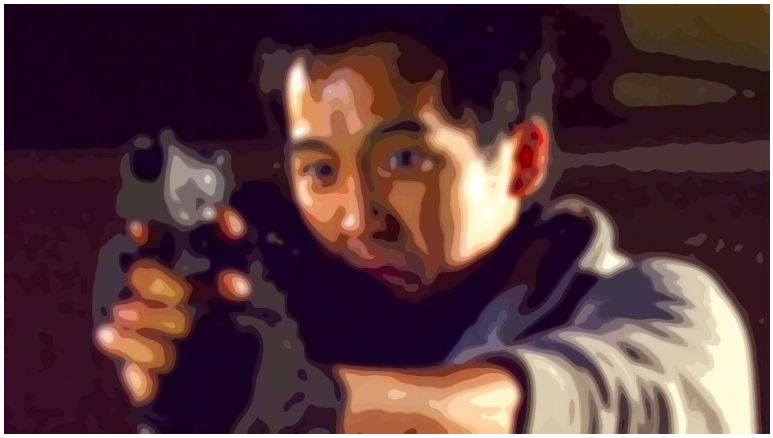
Functions in a similar way to a standard glow but affects dark areas rather than light areas.

Leave color

Desaturates the layer except for the chosen color.

Posterize

Reduces the color detail in the layer to create blocks of color.



Solarize

Creates the appearance of a film negative that has been exposed to light during development.

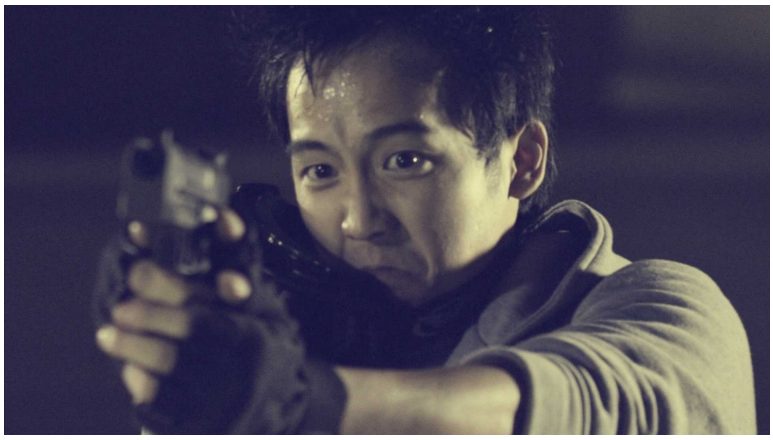
Threshold

Reduces the layer to just two colors. You can specify the colors and the threshold changes the emphasis of the effect.

Tint

Tints the layer, shifting dark and light areas towards your specified colors.

The Amount to Tint property can be used to create subtle or extreme effects.



17 Temporal

Temporal effects alter layers based on time.

Echo

Creates repeated versions of the layer, offset in time, which are blended onto the current frame.

- **Echo Time** - the time difference between each echo.
- **Decay** - each subsequent echo will be less visible.

Motion trails

Adds a fake motion blur based on the movement of the layer.

Speed

Changes the playback speed of the layer.

> *The speed effect does not change the duration of the layer on the timeline. If you reduce the speed of the layer you will not be able to see any frames which are not played before the end of the layer.*

Time displacement

Displaces the layer based on time. You can displace using the layer itself or another layer.

The Black Time Shift and White Time Shift values specify where in time the displacement source is from.

Time reverse

Plays the layer in reverse frame order.

18 Video Clean-up

These effects provide useful tools for improving the quality of your video footage and fixing common issues.

Clone stamp

The clone stamp is useful for duplicating or removing specific parts of a layer. Combined with HitFilm's feature tracking this is a very powerful feature.

A separate layer can be used as a **clone mask**, defining the area to clone. Using a simple plane is usually the easiest way to do this, as the plane can be easily resized and positioned if necessary.

The clone source can be from the applied layer or from another layer, as defined by the **Clone From** property.

The **Source** and **Target** positions can then be specified, or linked to other layers. This enables the cloning to be linked to points containing tracking data.

Denoise

See Denoise.

Grain removal

Basic grain removal.

Rolling shutter

Some capture methods used by video cameras produce an effect called rolling shutter. This is particularly common with DSLR cameras. Rolling shutter can be identified by a wobbling, jelly-like instability in the frame during rapid movement.

The rolling shutter effect is designed to counteract rolling shutter, correcting the video and minimizing the effects of rolling shutter.

Shutter direction is used to define whether the camera uses a vertical or horizontal shutter. Consult your camera's specifications for more information.

Correction

The **correction** property is used to specify the amount of time it takes for the camera's shutter to travel across the frame.

In the case of cameras using a vertical shutter, this is defined as the time it takes in frames to capture from the top row of the image to the bottom row.

Positive values indicates the vertical shutter is travelling from top to bottom, while negative values are for bottom to top. You should consult the specifications of your camera to find the **correction** value to use.

Shutter sync

This property determines which part of the rolling shutter frame should be used to fix the image.

- -0.5 will use the frame at the beginning of the vertical shutter capture, as defined by the **correction** property.
- 0.0 will use the frame halfway through the vertical shutter capture. This is usually best as it will result in the minimum amount of distortion.
- 0.5 will use the frame at the end of the vertical shutter capture, as defined by the **correction** property.

Optical flow

Rolling shutter works by tracking the movement of every pixel in the frame using optical flow techniques.

The **View** menu can be used to observe the accuracy of the optical flow track.

Different videos may require adjustments to the optical flow properties. Adjusting the **Window size** and **Sigma** properties tend to yield the best results.

18.1 Denoise

Professional noise reduction is possible with the denoise effect.

Core workflow

After the effect is applied to a noisy layer a highlight box will be displayed in the Viewer. This can be adjusted using the two control points.

This box should be positioned over a noisy area of the frame. This will provide the effect with input to analyze the video. Ideally select a flat region with mid-level brightness.

Click the Analyze button to analyze the selected area.

Some noise will be removed immediately.

To further refine, change the **View** setting to **Analysis Box**.

Move the control points so that the analysis box is over darker noisy area.

Click the **Analyze Brightness** button in the **Analyze** control group.

This will analyze the difference in the noise levels, between the brightness of the original analysis and the brightness of the new analysis region.

This will refine the noise removal.

The process can be further improved by increasing the number of frames used during the analysis. The more frames it uses, the more time it will take to render, but usually with superior results.

Controls

- **Analyze button -** Only visible when image has not yet been analysed. Uses the selected analysis area, to analyse the noise of the image.
- **Frames -** The number of frames used to remove the noise. It should be kept at ‘1’ if applied to an image.

View modes

- **Result** - shows the result of the noise reduction
- **Analysis Box** - shows the region that will be used for analysis if one of the analysis button is pressed
- **Frequency Y** - shows how much the brightness changes at the selected frequency level
- **Frequency U** - shows how much the u color changes at the selected frequency level
- **Frequency V** - shows how much the v color changes at the selected frequency level

Frequency View Options Group

Only visible if the selected View is one of the frequency options.

Level - The frequency level to be viewed.

Contrast - Allows you to change the contrast of the displayed frequency. Sometimes the changes in frequency are too subtle to see. This control allows you to increase the contrast, to help you to see it.

Analyse Brightness

Used when noise amount varies depending on the brightness.

Updates the threshold values in the 'Threshold - Brightness' control group.

Re-Analyse

Discards the original analysis that was performed and re-analyzes with the currently selected analysis area.

Threshold

The controls under this group help the plugin to identify what is and isn't noise, by manually adjusting the threshold values.

Brightness - The controls under this group, allow you to change the threshold values dependent on the brightness of the image. If, for example, not enough noise is being removed from dark areas, just increase the threshold of the '0' slider. If the problem is in the white areas, adjust the '100' slider. The sliders act like a graph, adjusting one will cause the nearby sliders to also be adjusted.

Channel - These controls allow you to change the noise threshold depending on the YUV channel.

Frequency - This allows you to change the noise threshold depending on the frequency of the data. It is easier to edit these slider if viewing the correct frequency: simply change the view to one of the frequencies; then change the frequency options level to correspond with the frequency slider.

Keep Edges - This slider sometimes helps to bring more of the edges back. But as the value is increased, more of the noise might be brought back as well.

Removal Amount

These controls allow you to adjust how much of the noise is removed.

Y controls how much noise is removed from variations in brightness, of the image. By default it is set at 80%, as removing all of the noise from the brightness tends to not look as good.

U/V controls how much noise is removed from variations in colour.

Frequency controls how much noise is removed dependent on the frequency of the data.

19 Warp

These effects stretch and push your layers into new shapes.

Bezier warp

Provides the ability to distort the layer and fold it into new shapes.

It is generally easier to use the Viewer controls.

Fisheye warp

See Fisheye warp.

Spherical warp

Creates the appearance of a fisheye lens, as if wrapping the layer around a concave or convex surface.

Lens distort & undistort

Can be used to simulate lens distortion or remove unwanted distortion (such as from fisheye camera lenses).

Perspective warp

Simulates rotating the layer in 3D.

Polar warp

Wraps the layer into a circular shape.

Quad warp

Adds quad controls to the layer so that you can change its shape by moving its corners.

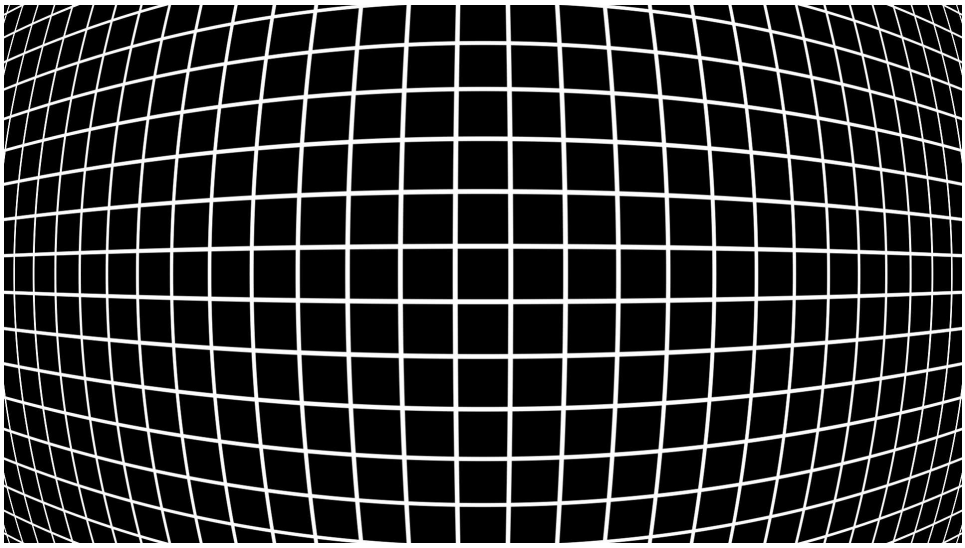
Vortex displacement warp

Similar to the **Twirl** distort effect but with additional displacement and vortex controls for pinching and stretching the affected area.

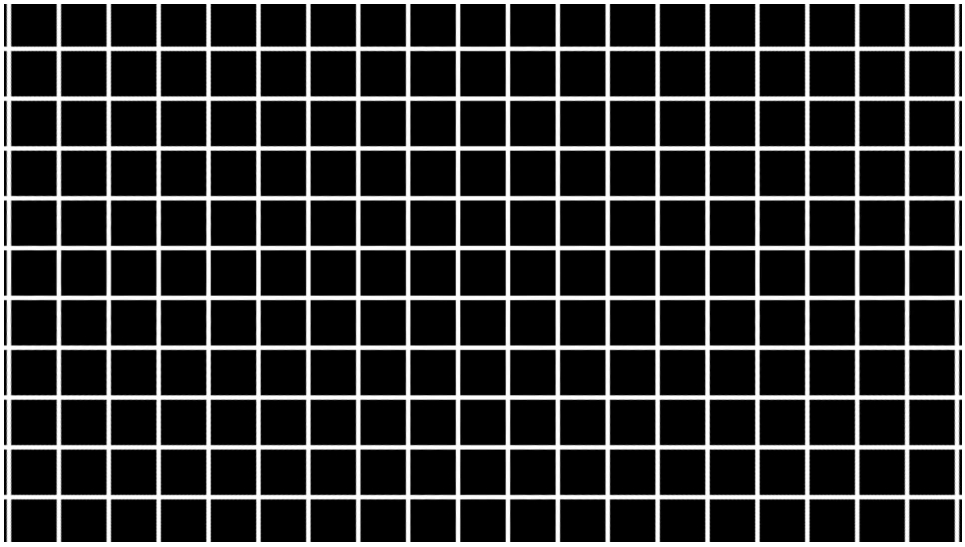
19.1 Fisheye warp

Adds or removes fisheye lens distortion. Several presets are provided specifically for use with GoPro cameras, making it simple to composite layers naturally into GoPro footage or to adjust GoPro footage to match traditional lenses.

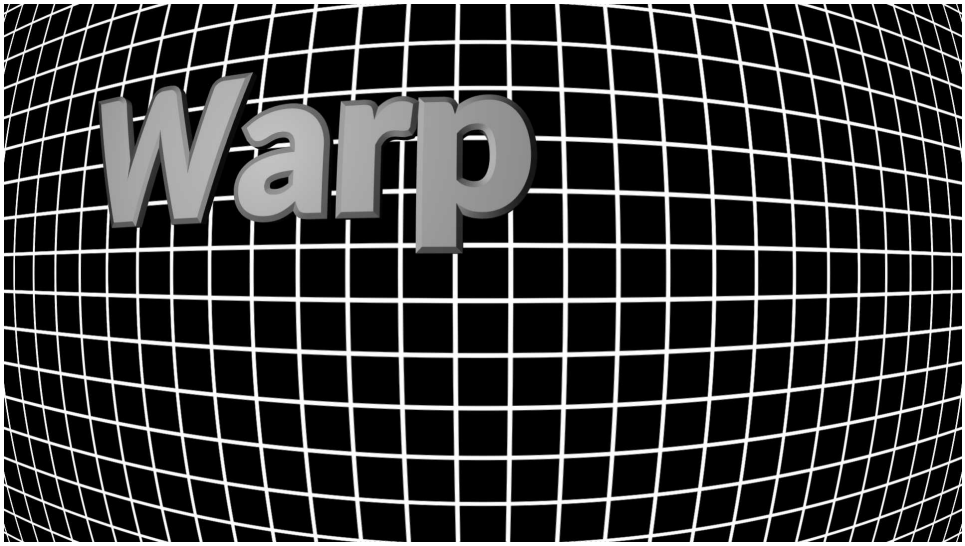
Here is a grid representing the natural curvature of a GoPro HERO4:



Here is the exact same image with the curvature removed using the fisheye warp:



The effect can also be used applied to other layers, so that they can be composited realistically into fisheye footage:

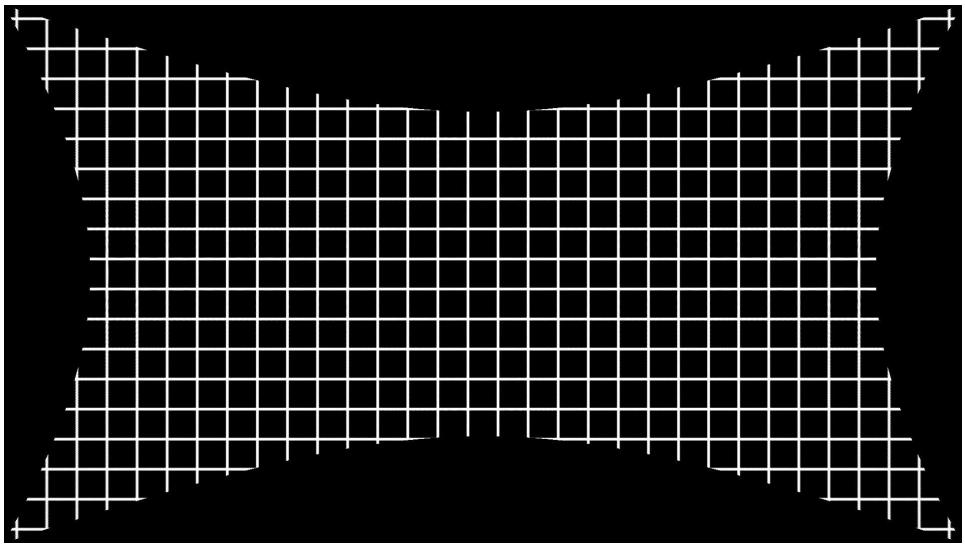


The **FOV** property adjusts the amount of distortion and **Center** adjusts the distortion's center - ordinarily you will want to leave the Center at 0,0.

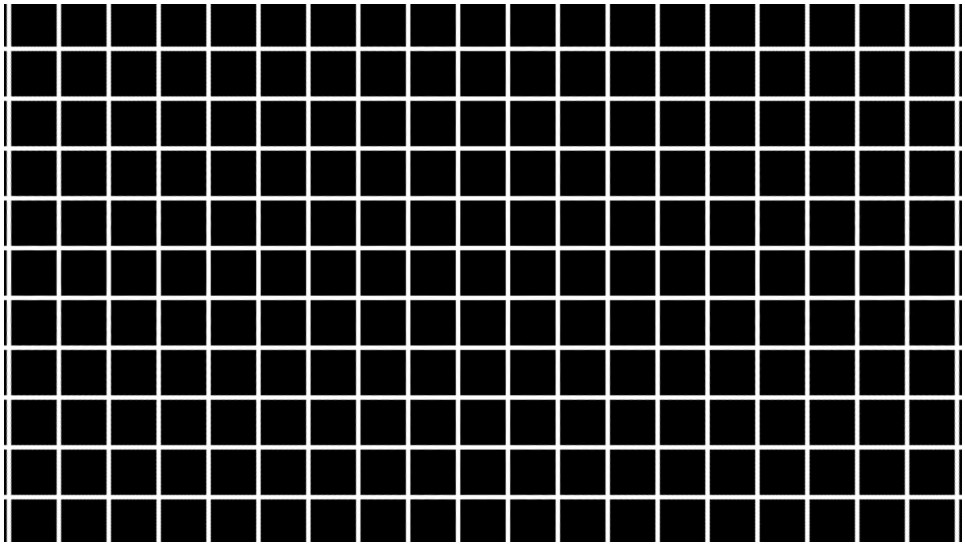
Scale anchor

When the layer is adjusted this controls how it is scaled.

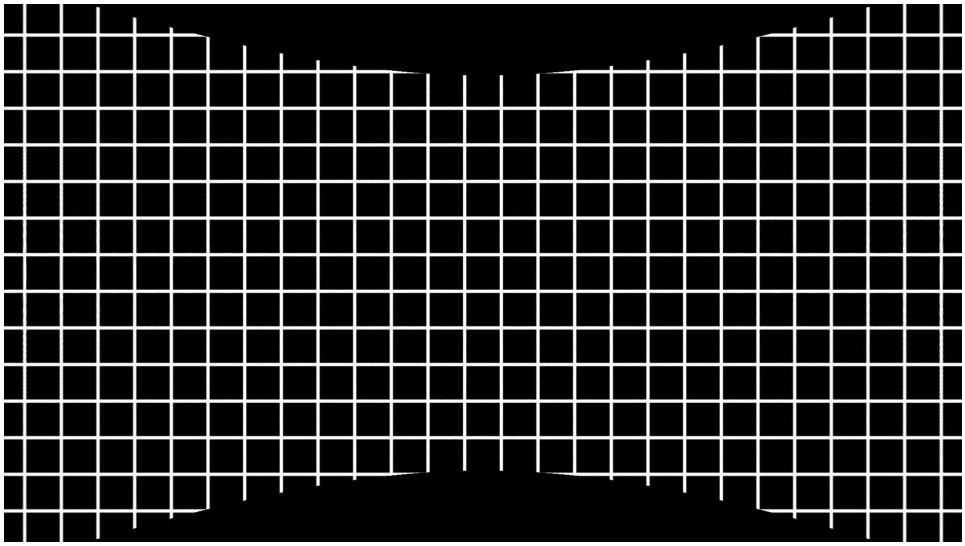
Corner maintains the corners of the image, scaling from the sides so that all the image is retained but some black areas are introduced:



Height scales the image so that the frame is filled vertically while some areas are cropped:



Width scales the image so the frame is filled horizontally, while some black areas are introduced at the top and bottom:

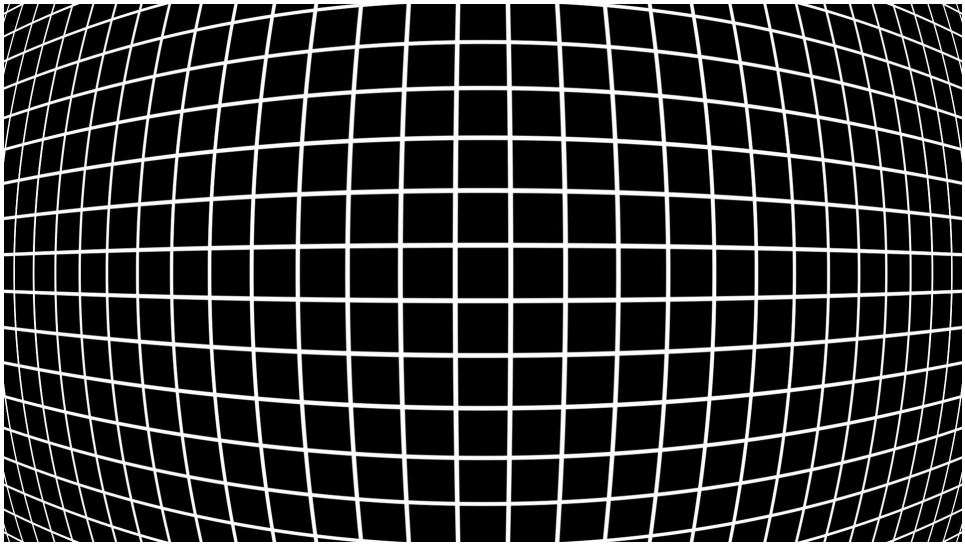


Layer resize

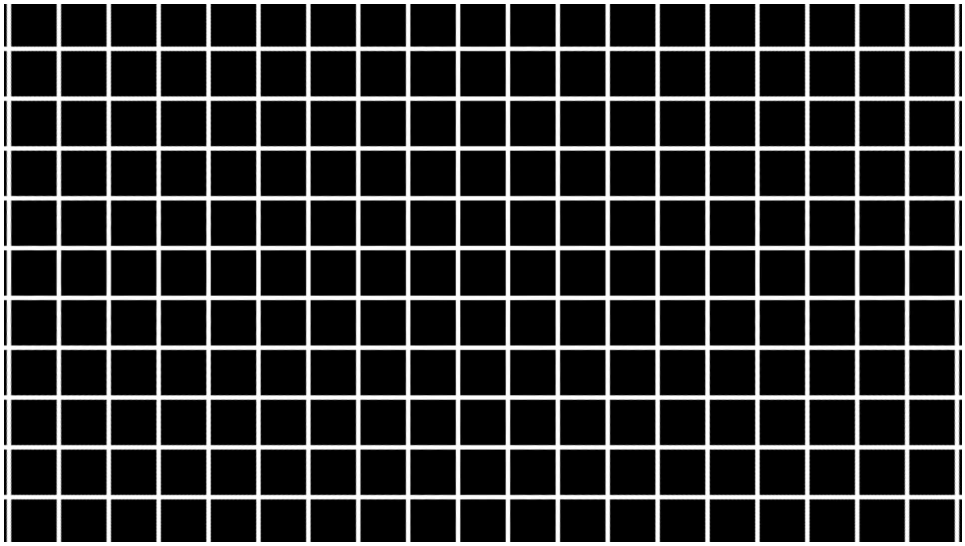
When the warp is applied some parts of the original frame are likely to be cropped outside of the frame. This is a natural and expected side effect of removing fisheye distortion.

If you are removing the distortion so that you can then apply other elements before re-distorting back to the original look this can lead to potential problems. For example, rewarping the unwarped grid results in lost areas around the edge due to the cropping:

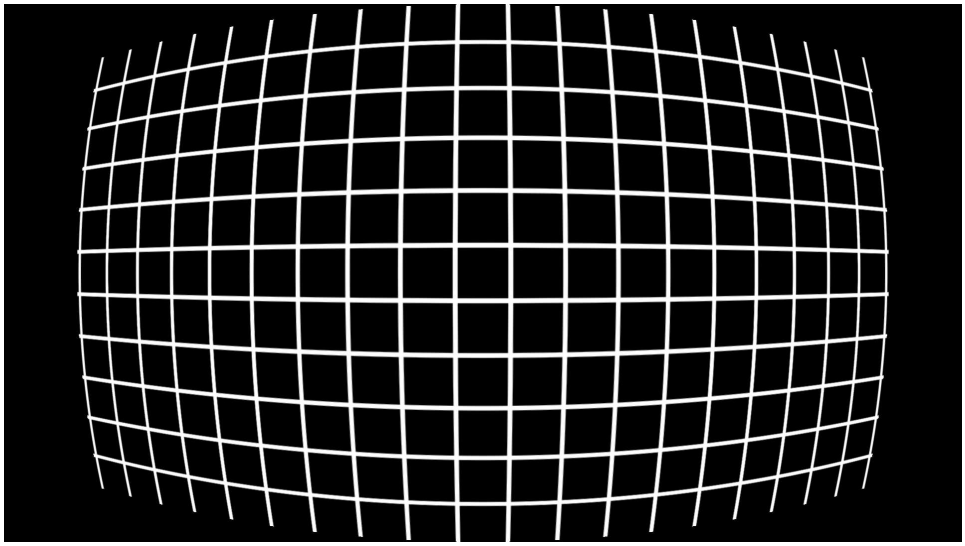
Original:



Fisheye removed:

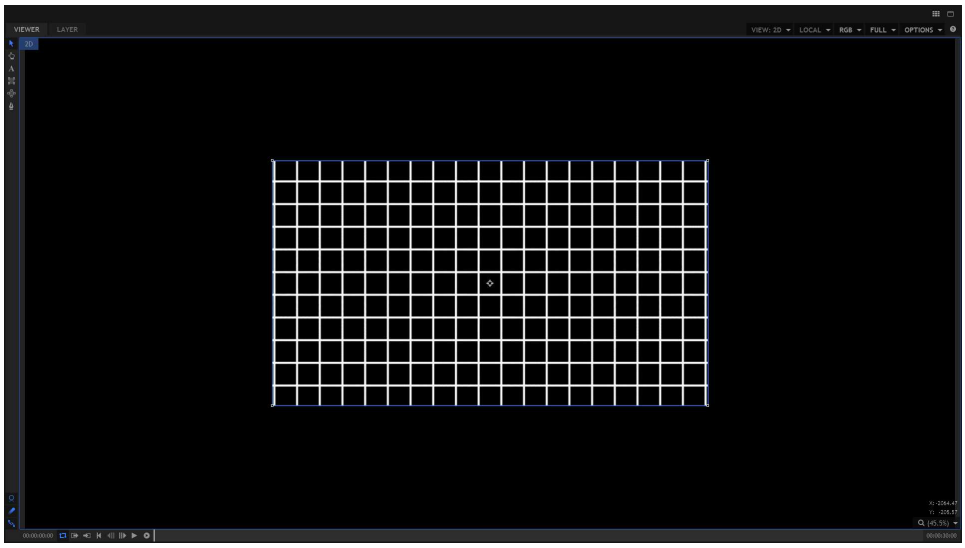


Fisheye reapplied using a reverse fisheye warp effect:



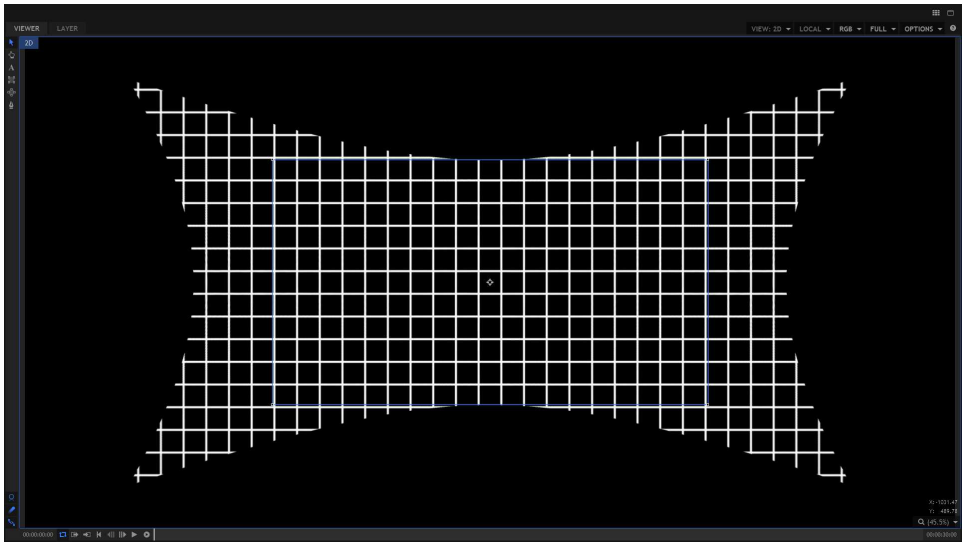
This can be countered using the Layer Resize options.

Take a look at this expanded view, with the Layer Resize set to None:



You can see that the undistorted grid is kept within the layer's boundaries.

Here is the same layer with the Layer Resize set to Grow:



Grow lets the layer expand beyond its boundaries, meaning that none of the original frame is lost. When this version is then redistorted using a second fisheye warp set to Reverse, the entire contents of the original are recovered.

Note that layer growth is not supported in all hosts.

Wrap

The various wrap options determine what happens if the effect produces empty areas of frame. Tile, Reflect and Blur Reflect fill in the empty areas using various techniques.

Endnotes 2... (after index)

Back Cover