Autodesk®

Flame® 2012 Extension 1

A Discreet® Systems product

with Autodesk® Flare™ 2012 Extension 1

What's New

Autodesk®

Autodesk® Flame® 2012, Autodesk® Flame® Premium 2012, Autodesk® Flare™ 2012, Autodesk® Lustre® 2012, Autodesk® Smoke® 2012, Autodesk® Smoke® for Mac OS® X 2012 software

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Contents

What's New in Gateway Import Workflow

Load Clip Versions into the Gateway Import Node in Batch

You are now able to append versions to Gateway Import nodes when loading a new clip. You can then switch between versions using the "Versions" box. This allows you to create your own source clip versioning of multi-channel sources, from within the application. When loading a new multi-channel clip as a version of an existing Gateway Import clip, the application attempts to preserve all connections and identify all common channels between versions. All common channels will be replaced with the new version, while new channels are appended to the Gateway clip.

To load a clip as a version:

1. Select the Gateway Import node of the clip you want to version.
2. Double-click the Gateway Import node.

   The Gateway Clip library appears.
3. Optional: Create import rules and manage import preferences for the file to import.

   NOTE Global Import options are disabled in a Gateway Import node: clips are always imported as unmanaged media, and include their alpha and other channels within the node.
4. Optional: Set In and Out points using the Preview panel.

5 Select the clip to import.

6 From the Load drop down menu, select Load as Version.

You are returned to Batch and the Gateway Import node is updated with the selected file. The previous clip is now available as a version from the Clip Versions box. You can have as many versions as you need.

Save Import History as an Import Rule

You can now create Import Rules from the Import History menu, allowing you to save the settings from an imported clip as an import rule.

To create a rule from a previously imported clip:

1 In the Clip Library, double-click an imported clip.

The Import History menu opens.

2 In the Rule Name field, enter the name of the new rule.

3 Optional: Click the Clip History box to modify the import preferences, as needed.

4 Click the Save dropdown list and select one of the following options.

Select:	To save the rule:
Save in Project	In the project directory. This rule becomes available to anyone who uses the current project and is identified with the PROJ prefix in the Active Rule box.
Save with User	With the user profile. This rule becomes only available to the current user and is identified with the

Select:	To save the rule:
	USER prefix in the Active Rule box.

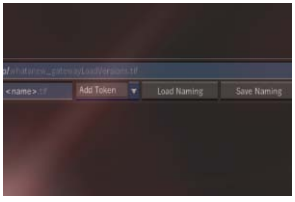
The new rule is now available for future exports.

TIP To apply the camera settings from one R3D file to a series of other files, do the following.

1. In the Import Preferences for the R3D format, enable Colour > Save as User Settings. Enabling Save as User Settings tells the application that you will want to edit the colour settings at a later time; it also makes the same colour settings available to the Rules.
2. Import the reference RED file.
3. Open the Import History of the imported file by double-clicking it.
4. Create a new rule from the Rules menu.

   The new rule, and the colour settings it contains, can now be used to apply the look of the original file to other R3D files.

This tip also works with ARRIRAW files.



Save and Load Batch Export's naming conventions

You can now save and load Naming conventions created in the Batch Export node.

Save and share with other users, or re-use in other export nodes or even other setups. Save time by not requiring the user to type in the entire path with every new setup.

DPX Framerate control

You are now able to override the frame rate found in the DPX header of a file, when using the Timecode From Header option. This is useful in cases where the DPX header contains a frame rate that is inaccurate.

The framerate control is used commonly when the desired frame rate is 23.98, but the DPX header contains a frame rate of 24, and the timecode would be accurate for both frame rates.

Frame or Pixel Aspect Ratio

You can now use the Import Preferences for AVCHD, MXF, P2, QuickTime, and XDCAM to override the aspect ratio stored in the file header, for situations when this information is incorrect. In order to allow you flexibility in how this aspect ratio setting is overridden, different options are offered under the Aspect Ratio section of the Image menu.

Aspect Ratio box Select the aspect ratio of the frames used to import the file and override the aspect ratio stored in the file as specified. You might need to change the aspect ratio as many applications erroneously write a pixel aspect ratio of 1 (a square pixel), even for formats that have non-square pixels (NTSC, PAL). Viewing the clip in the Player with the specified aspect ratio requires that you enable the Use Ratio toggle in the View menu. The Preview panel in the Clip Library always displays the clip with the selected aspect ratio. Also note that the application internally uses a frame ratio, not a pixel ratio. To specify a pixel ratio, you must select either Square Pixels or Enter Pixel Aspect Ratio; Aspect Ratio from Resolution and Aspect Ratio from Header are interpreted as frame ratios.

Aspect Ratio field Set the ratio used to define the frame or pixel aspect. Affects the frame aspect if the Aspect Ratio box is set to Enter Frame Aspect Ratio. Affects the pixel aspect if it is set to Enter Pixel Aspect Ratio.

Display the Absolute Frame in Gateway Import Node

You can now read the file name and frame number for the current frame from the Gateway Import node in Batch. Use it to quickly identify the exact file you are looking at, as well as the absolute source frame of the clip.

Frame field Displays the absolute frame number of the current frame, read from the file displayed in the File Name field. Use it to confirm offsets or identify specific frames.

File Name field Displays the name of the file from where the current frame is being read. Use it to confirm the source of the displayed frames.

Offset To Start Frame

You can now offset one or many Gateway Import nodes in the Batch Timing view, based on their source frame number.

For example, a clip with a start frame of 20, will have an offset of -20 applied so that the source frame number matches the Batch frame number. As this is based on frame number, this can be done using either the file naming or the information stored in the file header for source frame.

Improved Gateway Messaging

You can now more easily identify problems with the Gateway process by reading the extended error messages displayed in the application message bar, or the message log (Ctrl+Alt+F7).

Restarting the Gateway

You can now restart the local Gateway from within the application. Use the Restart button in the Network Panel.

What's New in Compressed Media Support

2

Export: IMX in QuickTime Export

You can now export PAL and NTSC IMX QuickTime files. This includes:

- IMX 30
- IMX 40
- IMX 50

Export: MXF

You can now export MXF files (page 8), using the AVC-Intra, DVCPRO, or DNxHD codecs.

Import: AVC HD Import

You can now import AVC HD (page 9) encoded MTS and M2TS files with audio encoded as Linear PCM.

Import: Support for GoPro HD MP4

You can now import footage from the GoPro (page 9)® camera.

Import: RED Updated Support

You can now import R3D files using RED 4.1. This includes the following.

- Support for new image orientation metadata (page 9) introduced in RED SDK 4.0.
- Support for HDRx clips (page 10).

Export: Supported MXF OP-1a Files

Flame supports the export of MXF OP-1a files (including the timecode) encoded with audio encoded as PCM, 16-Bit or 24-Bit, using any of the following codecs.

CODEC	Comment
DVCPRO	
DVCPRO 50 NTSC	
DVCPRO 50 PAL	
DVCPRO HD	Available in 1080p@25/50, 1080p@24/30/60, 720p@25/50, and 720p@24/30/60.
AVC-Intra 50	
AVC-Intra 100	

CODEC	Comment
DNxHD	The application can export to all the timings and resolutions supported for DNxHD import.

Import: Support for AVC HD Files

Flame supports the import of AVC HD™ media files with the *.mts* or *.m2ts* extensions, with or without audio encoded as Linear PCM.

Import: Support for GoPro HD MP4

GoPro® camera records H.264 files with an .mp4 extension. The following frame rates and resolutions are supported.

Resolution	Ratio	FPS
1920x1080	16x9	25 and 30
1280x960	4x3	25 and 30
1280x720	16x9	25, 30, and 60
848x480	4x3	25, 30, and 60

NOTE Due to the use of variable frame rates in the GoPro 60fps files, the application assigns the timing of the project to those files. So if the project is set at 30fps, 60fps GoPro files are imported at 30fps. To play back 60fps GoPro files correctly, you can use the reformatting tools to apply the correct framerate.

Import: Updated RED Support

RED Flip/Flop

The application supports image orientation metadata introduced in RED SDK 4.0. When working with a stereoscopic camera rig where the camera orientation

has been modified to capture footage, it is possible to set the orientation of the image at the time of the shoot. The application can read this data and automatically present the image in the right orientation, flipping or flopping as required.

NOTE Timelines created with media files with this metadata prior to the extension do not show the media orientation based on this metadata. This may create different results from previous versions. If you created timelines with footage that contains this metadata, the image orientation will be different in the extension.

HDRx Support

You can now import HDRx clips. The Import Preferences > Debayering menu offers a new option, High Dynamic Range, which enables two new menus, Exposure Offset and Highlight Threshold. The Colour > Gamma Curve menu now offers a Scene Linear (16bit fp) option used with High Dynamic Range clips.

HDRx Settings box Select how to import RED HDRx files. You can load either the Primary or the Highlight exposures, or blend the two exposures together. You can also generate a High Dynamic Range clip, which converts the Primary and Highlight exposures into a single 16-bit float image; importing an HDRx clip as High Dynamic Range forces the bit depth of the imported clip to 16 bit floating point, and the Gamma Curve to Scene Linear.

Blend field Set how to blend the two exposures of a RED HDRx clip. With HDRx Settings set to Blend Exposures, this field behaves like the blend in REDCINE-X; the blend also attenuates the artifacts created by the scene operation, which is a blend of the two exposures: -1 shows only the Highlight (X frame), 1 only the Primary (A Frame), and 0 a 50-50 mix.

With HDRx Settings set to High Dynamic Range, Blend also attenuates the artifacts created by scene motions; set to 1 unless you are troubleshooting motion artifacts.

Exposure Offset field Set how much greater the Primary exposure was compared to the Highlight exposure, in units of stops. Only available when HDRx Settings box is set to High Dynamic Range. The Exposure Offset should be set to match the setting on the camera for how many stops separate the Primary and Highlight tracks. This is typically 2 or 3 stops. Enter the same value used to record the footage or you will get bad results.

Highlight Threshold field Set the threshold when pixels from the Highlight exposure are used instead of the over-exposed pixels from the Primary exposure. Only available when HDRx Settings box is set to High Dynamic Range. Set Highlight Threshold last because import options such as ISO or

FLUT lighten or darken the image. Too high and you get clipping (often including a magenta-coloured cast), too low and the midtones and shadows have noise leaking in from the Highlight track.

Setting the Highlight Threshold in HDRx to HDR Clips

RED import options such as ISO, FLUT, Exposure, and white balance change pixel values, and requires the Highlight Threshold to be adjusted accordingly.

Use whichever method works best with your workflow.

Tweaking the Highlight Threshold in Batch:

1. Open the HDRx footage as a High Dynamic Range clip in Batch, using the Gateway Import node.
2. Set the Viewer to use the Linear gamma curve.
3. Lower the exposure in the viewer (`Shift+E`+drag) to see both the content of the highlights (from the X track) and of the shadows (from the A track).
4. Set Highlight Threshold as high as possible without introducing clipping.

Tweaking the Highlight Threshold in the Colour Corrector:

1. Bring the Primary clip into the Colour Corrector.

   You need to have set Colour > Gamma Curve to Scene Linear.
2. Set the Viewer to use the Linear gamma curve.
3. Using the Pixel Info tool, find the clip value for the highlights, and note the lowest of the R, G, and B clip points; Green usually clips first in an HDRx file.
4. Back in the Library, set HDRx Settings to High Dynamic Range.
5. Set the Highlight Threshold to the lowest of the clipping points.
6. Import the footage.

What's New in Interoperability

3

Interoperability with Lustre 2012 Extension 1: Source Grading Workflow

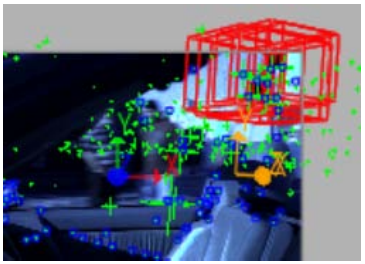
Many workflows require working in parallel between Smoke/Flame and Lustre. For better flexibility, grading the source footage prior to conforming is ideal, but may not be an option for fast-paced projects. Grading source footage post conform requires removing all soft effects and unsupported transitions, but this manual process can be cumbersome.

To accommodate parallel workflows, we introduce the source grading workflow in the Lustre, Smoke, and Flame 2012 Extension 1.

With the source grading workflow, you can:

- Import a timeline into Lustre, without having to render soft effects or transitions,
- Grade the timeline based on the editorial decisions to date, and then
- Send the timeline back to Smoke or Flame for further refinement, preserving soft effects and transitions.

See the Lustre 2012 Extension 1 What's New for complete details of this new workflow.



Point Cloud Interoperability with Maya

The Action FBX camera export has been modified to support the new Point Cloud Objects introduced in version 2012. You are now able to export a Point Cloud Object when exporting an FBX Camera after 3D tracking. Once in Maya, the points become locators, and it's possible to attach 3D objects to any locator for proper setup in the 3D reconstructed world. Once exported back from Maya, and imported into Flame, they are recreated as Point Cloud objects.

If the Point Cloud transformation has been set to either Plane or Centroid transform, an extra axis is created when exporting to FBX, so that this locator can be used in Maya. Once re-imported, the Point Cloud object is set appropriately to the exported transform, and an explicit axis is also created.

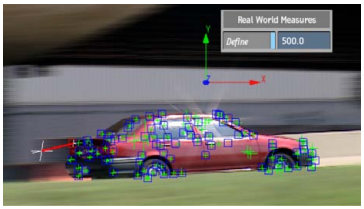
If a 3D object is attached to one of the locators, then an explicit axis is created in addition to the Point Cloud object. This axis carries the position of the locators to which the 3D object was attached.

Note that the workflow requires the explicit creation of a Point Cloud Object from the Analyzer. The Analyzer locators will no longer be exported by default unless they are converted to Action Point Clouds.

FBX Linked Files

You can now link to FBX files instead of importing them. In Action, import an FBX file with FBX Import Type set to Link to Original File and keep a live link to the FBX file. This creates a single FBX Scene node in the Action schematic. Set the FBX Import Type to Create Local Copy to import FBX files as before.

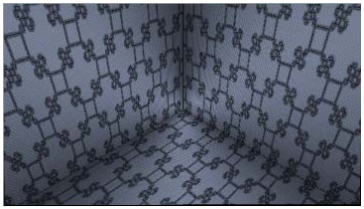
See Working with FBX Scenes Linked to the Original Files (page 16).



Real World Measurements

You are now able to set a distance (in the unit of your choice) between any 2 points of the Action Analyzer point cloud. When a distance is defined between two 3D points of the Action Analyzer, a red line is drawn between the selected points. To set a real world distance in the Analyzer view (F7), go to the Fine Tuning menu, click Define under the new Real World Measures section, and select 2 points. A red line appears, and you can enter a distance expressed in the units of your choice in the value field. The complete Action scene gets scaled instantly.

NOTE When exporting the camera (and the point clouds or axes) through FBX, you can set the Unit of your scene. This will be encoded in FBX, and used when imported in Maya. If you specified a Unit and defined a distance between 2 points, you should choose a Pixels to FBX Scale of 1.000.



UV Map Support

In Action, you are now able to use UV maps generated by 3D applications or Action itself. The U information is coded in the Red channel while the V info is coded in the Green channel of the UV map image. You can also embed object IDs in the blue channel when performing a UV render pass in Maya, allowing you to specify which objects are displaced within the UV map in Action.

See UV Mapping (page 17).

Working with FBX Scenes Linked to the Original Files

When importing an FBX file in an Action schematic, setting FBX Import Type to the option Link to Original File does not create a Geom node like Create Local Copy does, but rather creates an FBX Scene node.

You cannot perform the same operations on an FBX Scene node as on a Geom node.

- You can only parent Axis nodes.
- You cannot parent it to other nodes.
- You cannot select individual components; you always select the entire scene.
- There is only one node in the Priority Editor for the whole scene.

If someone updates the linked FBX file, click Refresh to update the FBX Scene node in Action.

The options available in an FBX Scene node are also different from the ones found in a Geom node.

FBX Scale field Set the factor by which to scale the FBX scene. Does not scale the camera if it has already been extracted using the Extract Camera button.

Extract Camera button Click to extract the FBX camera from the FBX scene, so that you can use it to render out the Action scene (to be able to select it as the result camera). It extracts and creates a new FBX camera node at the scale set in the FBX Scale field. Once extracted, the camera is no longer linked to the FBX scale: changing the FBX scale does not affect the camera. If you need to edit then rescale the camera after changing the FBX Scale, delete the extracted camera and extract a new one.

FBX File Path field Displays the path to the FBX file. Click to replace the currently displayed scene with another one.

Refresh button Click to update the FBX Scene node with the content of the FBX file. Use this if the FBX file has been updated since the import.

Sort button Enable so the 3D models contained in the FBX Scene are drawn according to their normals. Consider using this option if the scene contains semi-transparent 3D models to ensure they are correctly drawn.

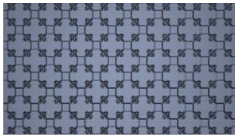
UV Mapping

A UV map is a pass which records the way the pixels of an image should be displaced within the image plane, so that the warped texture looks like the textured geometry from the point of view of the CG camera. The UV map acts as a 2D distortion field, or a pixel look up table, recording where every pixel of an input image texture should be, had it been applied on a geometry filmed by the CG camera. It is a very effective way of faking 3D mappings, without having a single polygon. It is most effective when combined with a Normal map, which can be used to simulate the shading of the actual geometry even though everything is perfectly flat.

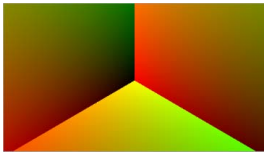
Applying a UV map to surface or geometry, warps its texture according to the defined UV. The U information is coded in the Red channel, while the V information is coded in the Green channel of the UV map image. For each pixel of the UV map, the red or green value corresponds to a given pixel on the unwrapped texture, and it is this pixel that gets displaced at the position of the same pixel in the attached surface or geometry.

Here are a few things to keep in mind when working with UV maps:

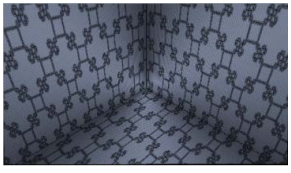
- To avoid pixelation in your imported UV passes, make sure that the UV pass is rendered as a 16-bit floating point image from your 3D application.
- It is a good idea to render UV passes without anti-aliasing to avoid warping on the edges of objects that the UV map is applied to. Since you can also output a UV Map from Flame, make sure that anti-aliasing is not selected in the Render Options section of the Output menu.
- You can embed object IDs in the Blue channel when performing a UV render pass in Maya, allowing you to specify which objects are displaced within the UV map in Action. In Maya, when performing a UV Render Pass, enable *Embed Object ID in Blue Channel*. When disabled, blue channel information is ignored.
- For best results, in the Texture settings of the UV Map menu in Flame, the Fit Method box should be set to Fill, and the Filter box to Nearest.



Flat texture



UV Map

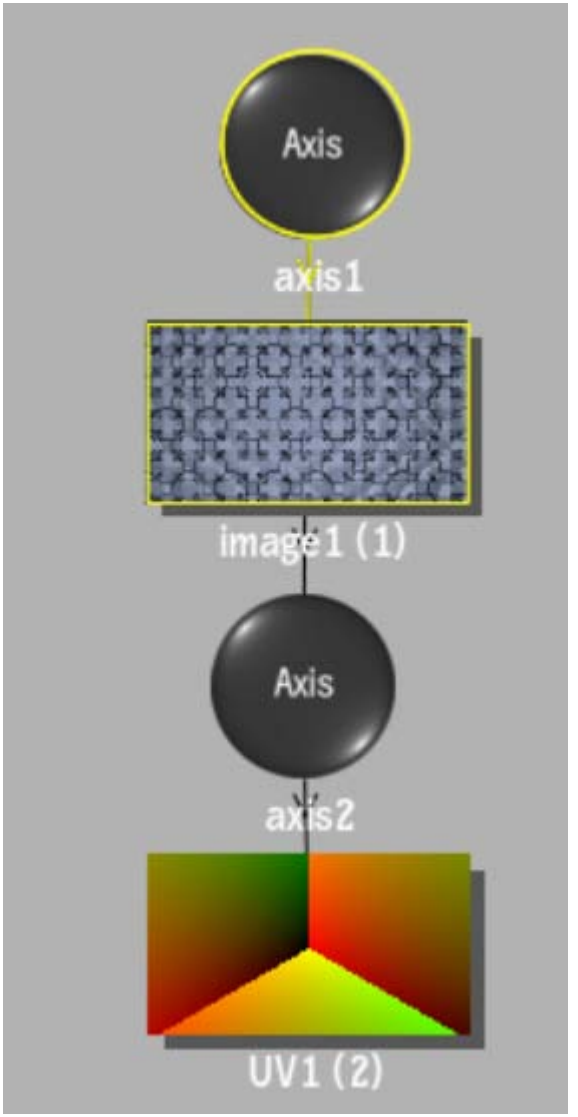


Texture with UV Map applied

To add a UV map:

1. In the schematic, select the surface or 3D geometry to which you want to apply the UV map.
2. Click Media.
3. In the Media menu, select the media you want to use for the UV map.
4. Do one of the following:
   - Drag the UV Map node from the node bin and place it in the schematic.
   - Drag the UV Map node from the node bin and place it where you want it in Result view.
   - Double-click the UV Map node. You do not need to be in Schematic view to add a node in this manner.

   The UV object is added to the schematic with its own parent axis. The new axis is the child of the selected surface or geometry. In Schematic view, the number in brackets next to the name of the UV node indicates the media used for the UV.



To specify different media as the UV source, select the media in the Media menu, then click Apply.

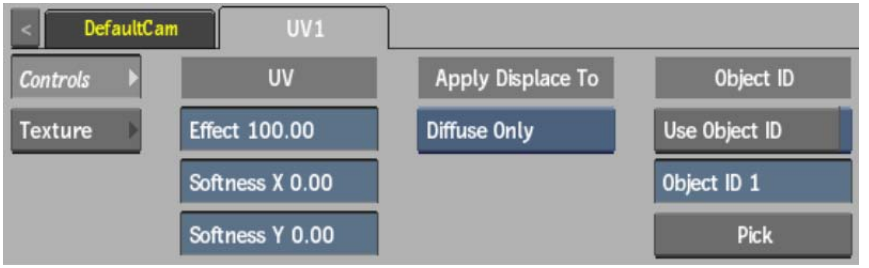
5 Double-click the UV node in the Schematic view, or follow the tab population rules for the Object menu.

The UV menu appears.

UV Menu Settings

The UV menu is divided into two tabbed sections: Controls and Texture.

Controls Tab



Effect field Displays the amount of warp applied to the UV map.

Softness X field Displays the amount of softness along the X axis of the UV map.

Softness Y field Displays the amount of softness along the Y axis of the UV map.

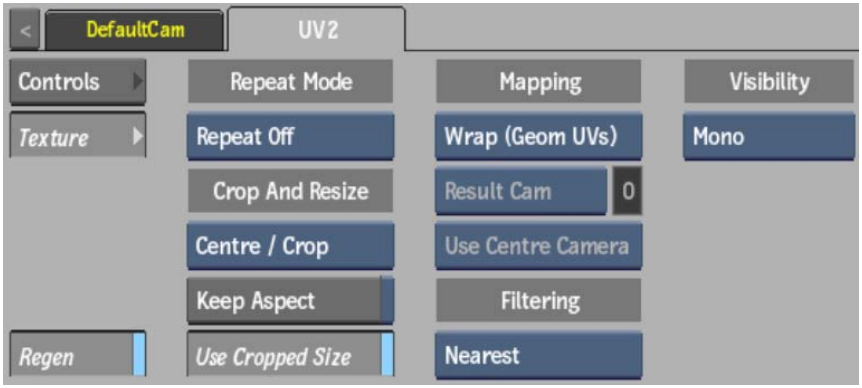
Apply Type box Select which attached maps are affected by the UV map. This setting is also available from the Texture tab.

Use Object ID button Enable to use Object ID info embedded into the blue channel when using a UV map generated by Maya. The object ID allows you to control which objects within the UV map are displaced. In Maya, when performing a UV Render Pass, enable *Embed Object ID in Blue Channel*. When disabled, blue channel information is ignored.

Object ID field Displays the specific blue value corresponding to an object ID.

Pick button Click to display the picker to select an object ID in the image through its blue value.

Texture Tab



Regen button Enable to dynamically refresh the image as changes are made to the UV settings. This setting is also available from the Controls tab.

Repeat Mode box Select how the UV map pattern is repeated on the surface.

Fit Method box Select a fit method option to be applied to the UV map.

Keep Aspect button Enable to preserve the aspect ratio of non-square pixels (not available for the Fill fit method).

Use Cropped Size button Enable to replace the UV map with the cropped size of the UV media. Disable to use the cropped normal media as is.

Mapping box Select the type of texture mapping.

Wrap (Geom UVs) Wrap mapping completely envelops the 3D model with the texture map according to the object's texture coordinates. To use this option, you must import a model that has its own texture coordinates. When using Wrap mode, you can also apply UV mapping settings from the Geometry menu.

Plane Planar mapping applies the map without distorting the front plane of the 3D model, similar to a movie projector casting an image onto a screen. All 3D coordinates of the geometry are mapped to this plane to generate the texture values. Planar mapping positions the lower-left corner of the map on the 3D model's axis. When you apply planar mapping, any surfaces on the 3D model perpendicular to the front plane cause the pixels at the edge of the texture to project along the "sides" of the object.

Perspective Perspective mapping is similar to planar mapping, except that it performs a perspective transformation of the map based on the selected camera's field of view

(FOV). When you select Perspective as the mapping type, the Perspective Camera box becomes active, allowing you to specify the active camera. The FOV of the camera has an impact on the resulting effect of any transform applied to the parent axis of the texture. On stereo cameras, the interaxial distance between left and right cameras also has an effect on the resulting perspective transform.

Projection The texture behaves as if it is projected by the selected camera. Projection mapping is useful as an alternative to projecting textures using the Projector node, especially when it is necessary to project while preserving a specific camera POV.

Camera box Specify which camera's FOV to take into account when using perspective or projection mapping.

Camera field Displays the active perspective or projection camera number.

Stereo Camera Projection box Select whether to use the centre, left, or right camera from a stereo camera rig when projection mapping.

Filter box Select the type of filtering to apply to the map.

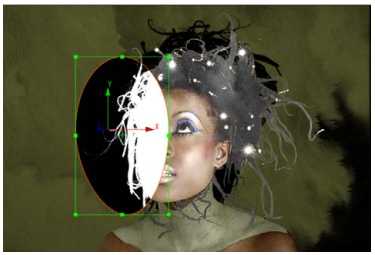
Select:	To apply:
Nearest	No filtering — the pixel of the texture closest to the screen pixel is displayed.
Linear	Basic bilinear filtering.
Anisotropic	Non-proportional filtering between X and Y (faster to process than EWA, but with a lesser quality).
Aniso+Linear	A combination of Anisotropic and Linear filtering.
EWA	A high-quality elliptical weighted average filter to produce enhanced rendering results (slower to process than other filters).
EWA+Linear	A combination of EWA and Linear filtering (offers the most advanced filter processing).

TIP You can set the default filtering type, as well as EWA filtering functionality in the Action Setup menu.

Camera Type box Select the camera type visibility for the map. For example, you can use this setting to apply a Left Eye and Right Eye camera type for two maps that are children of the same surface or geometry in a stereo scene.

What's New in Action

4

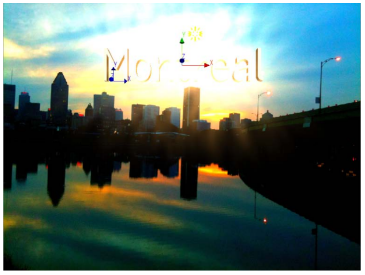


Improvements to the GMask Object

Various improvements have been made to the Action's GMask object in the 2012 Extension 1 release:

- Vertex Animation support: It is now possible to choose between Shape-based or Vertex-based animation for all types of GMask object channels. The new button is located below the Lock button within the GMask Object Mask sub menu. When Shape Animation is selected, all keyframes are grouped into a single channel called "shape." When Vertex Animation is selected, all the keyframes are located on their respective channels.
- GMask Plane: This new object available from the Action Node bin is a single, straight spline that is opaque on one side and transparent on the other. The spline does not have any vertices and cannot be altered, however you can add as many Gradient points as desired. This object can be used to perform a number of tasks, including creating wipe effects or to have better control over reflection effects. It can be oriented in 3D space in the same way you would orient a flat image surface. See GMask Plane (page 32).
- GMask Ellipse and GMask Rectangle: These new creation presets are available from the Action Node bin. They are used to create rectangular or elliptical shapes that can be modified. Once a mask has been finished, it behaves like a regular GMask object that has explicit vertices that can be manipulated and offers all the functions and settings of a normal "free hand" GMask. See Gmask Preset Shapes (page 32).
- The new Edit Box function allows you to make shape transformations to a GMask after it has been finished.

- A new post processing option is available in the Mask menu, which allows you to choose whether to use the mask as a mask or as an occluder when encountering post-processing effects. In addition, you can now include or exclude a Lens Flare, Ray, or Blooming node with the selective GMask link.
- A new tangent mode called Equal Length is available in the Vertices menu that, when enabled, sets tangents on either side of vertices to be the same length (based on the proximity to the next vertex).



Blooming

A new relighting effect is introduced in Action: Blooming. Similar to the workflow of Lens Flares and Rays in Action, a Blooming node is attached to a light in the scene to help define highlight areas that generate a glowing effect. You can also add textures to stamp a blooming node with particular patterns, such as streaks and glints.

See Relighting: Blooming (page 33).

Improvements to the Lens Flare Object

There have been various improvements made to the Lens Flare object:

- Existing Lens Flare presets have been simplified to reduce the number of objects needed to create the same results. Also, new creative lens flare presets, such as car lights and spotlights, have been added.
- Border FX Scale: You now have the ability to scale the borders of the Border FX so that the Border Gain is not necessarily at the edge of the Action resolution gate, but inside or outside of it.
- Additional Pivot controls: You now have In and Out parameters for the Pivot in the Border FX so that it gives better control on the fade in/out of the Pivot Gain.
- Additional Lens Flare controls: New parameters are available in the Lens Flare object itself, as well as in the various texture patterns. These added controls greatly reduce the need to use multiple Lens Flare objects to create different Border FX

per pattern. They also extend the range of effects achievable with Lens Flare, beyond optical flares, and even allow for particle-like effects.

- The Lens Flare Object now offers the same In/Out controls for both Pivot and Box Border FX (these controls were previously only available for the external box border). This provides much better control over boosting effects, or conversely, complete fade-off effects occurring in the optical center.
- Centre X and Y: Allows you to offset the centre of rotation, scale and ratio of the patterns. It also has a Variance and a Seed if there is more than one pattern (number > 1) of the current type.
- Ratio before/after Rotation: Allows you to decide whether the Ratio transformation is done before or after the Rotation transformation. It's especially useful when combined with the Lock To Light feature.
- It is now possible to affect the Centre and Spread transformations using the Border FX settings of a specific pattern. Gain and Variance controls were added for all transformation types as well.

Improvements to the Rays Object

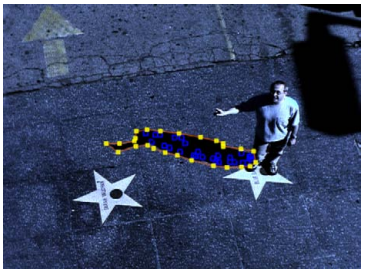
The Rays object can now be completely slave-controlled by the parent light and its parameters. In this mode, the Rays will follow the orientation of the light, its spread and fall-off, creating a visible spot-light effect in Action's 3D space. In order for the light to control the spread, the falloff and the orientation of the Rays, you must disable the Free option under the Pivot of the Rays object. The pivot will no longer control the orientation of the rays. Instead, its relative distance to the light will affect the distribution of intensity within the "cone of light" drawn by the Rays.

If Free is enabled, the pivot point position is completely free and is dictated by Pivot X, Y and Z parameters (as was the case in the previous version).

Improvements to the Media List Workflow

There are various improvements made to the Action's Media List workflow:

- Load Material as Media: It is now possible to add a Media list entry for all the Materials associated with an imported Geometry. To do so, you need to enable Create Media from the Import File Browser's Material Options section before you load the Geometry. This will result in the Texture being added to the Action Media List as well as on your Desktop.
- Load same Clip as Front and Matte from the Library: It is now possible to select the same Clip as Front and Matte when Media is added from the Library. The first selected clip will inherit the mention "Front" within its Clip thumbnail. To select the same clip as the Matte, you need to hold down the `Ctrl+Shift` hotkey while you select the same clip again. The mention "Matte" appears next to "Front". Finally, you need to press the Load button to complete the operation.
- Copy, Clone and Paste improvements: In previous versions it was possible to Copy and Paste Media attributes between entries. This workflow has been improved as it is now possible to select whether you want to copy selected attributes using the Paste FX functionality, or duplicate a Media entry using Clone.

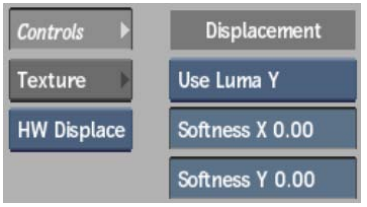


Improvements to the Shape Tracker

The performance of the Shape tracker in the Action GMask object has been improved. It's now faster, more robust, and resistant to occlusions and antagonistic motion.

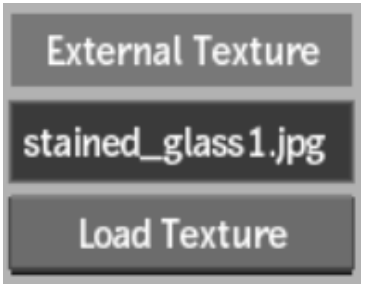
Improvements to the Photoshop Blending Modes

Dissolve, Lighter Color, Darker Color, Vivid Light, and Linear Light have been added to the list of supported Photoshop Blending modes in Action. They are properly set when importing a *.psd* file with layers using them as Blending Modes.



GPU-based Displacement Mapping

Displacement mapping in Action now offers a GPU hardware mode in addition to the already existing software mode (which remains unchanged). In the Displacement menu, a pop-up allows you to switch between HW Displace and the legacy SW Displace. When in HW Displace mode, the UI options are aligned with the controls available in other texture maps. Adjusting the parameters in Hardware Displacement is also faster than in Software, especially when using low resolution values in an image surface (high polygon count).



Diffuse Map: Using an External Texture

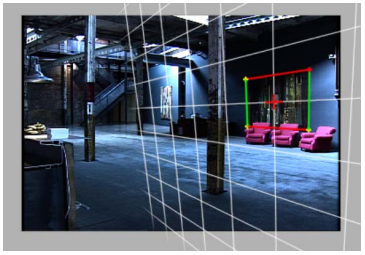
In the Diffuse menu, you can now load an external single-frame image file to be used as the diffuse map texture. This can be especially useful when using a high-resolution image as a diffuse map for 3D objects. This file is not added to the Media list.

2-Sided Lights in Action

In the Surface and Geometry menus in Action, you can enable the new Force 2-Sided button to have lights in your scene light both sides of a surface, or the inside and outside of a geometry (provided that shading is turned on).

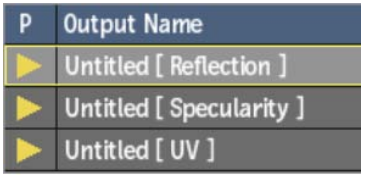
Action Camera Live Target Mode

Action cameras now have a new Parenting Offset option along with Origin and Target: Live Target. Live Target sets the image to the current viewplane distance based on the FOV.



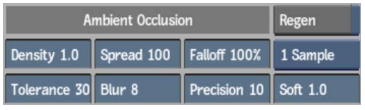
Perspective Grid in Action

Use Action's new Perspective Grid node to help you with perspective alignments in your Action scene. See Action: Perspective Grid (page 37).



New Outputs in Action

You are now able to output the Specular, Reflection, and UV maps of the objects included in an Action output. These new outputs can be found in the Output Options Type box in the Output menu.



Ambient Occlusion in Action

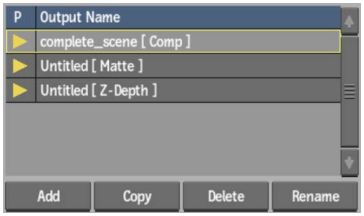
Ambient occlusion refers to the blocking of indirect or diffuse light on an object. It refers to the darker areas of the object, typically creases, cracks and crevices. Ambient occlusion is caused by indirect light's inability

to bounce around and illuminate areas that are blocked by a nearby object that absorbs the light rays. These subtle variations in lighting are visual clues for our eyes to detect surface details and distinctions that would otherwise be washed out and unnoticeable. Ambient occlusion adds realism to your scene by adding shadows in crevices, nooks and crannies, and so on. For each surface point, it calculates how much light is blocked by other geometry.

You are now able to output the ambient occlusion of objects included in an Action output using the AO output type. This output type creates a grayscale output that is dark in areas light cannot reach and bright in areas where it can.

Snap Objects to Surface

A new preference is available in the Action Setup menu. Located in the Snap To Surface section, you have the ability to enable Shift-Snap. When enabled, holding Shift while moving an object that has axis data (transformation data) will force the "Z" parameter of the object to match the depth of the pixel under the cursor. This effectively looks as if the axis is constrained to "glide" on the surface of the underlying objects in the scene.



Action Output Naming Conventions

New preferences in the Action Setup menu allow you to set default naming conventions for your Action outputs.

GMask Plane

You can add a Gmask Plane node to the schematic in order to accomplish specific tasks such as creating wipe effects or having better controls over reflection effects.

To add a GMask Plane node:

1. Do one of the following:
   - Drag the GMask Plane node from the node bin and place it in the schematic.
   - Drag the GMask Plane node from the node bin and place it in Result view.
   - Double-click the GMask Plane node.

A GMask object (called gmask1, by default), with its parent axis, appears in the schematic, and a single straight spline that is opaque on one side and transparent on the other, appears in the image. You can use the manipulator handles to adjust the Gmask Plane, and add as many gradient points to the spline as you want to.

GMask Preset Shapes

You can add a GMask preset node to the schematic. Two preset nodes are available: Ellipse and Rectangle.

To add either a GMask Ellipse or Rectangle node:

1. Do one of the following:
   - Drag the GMask preset node from the node bin and place it in the Schematic view.
   - Drag the GMask preset node from the node bin and place it in Result view.
   - Double-click the GMask preset node.

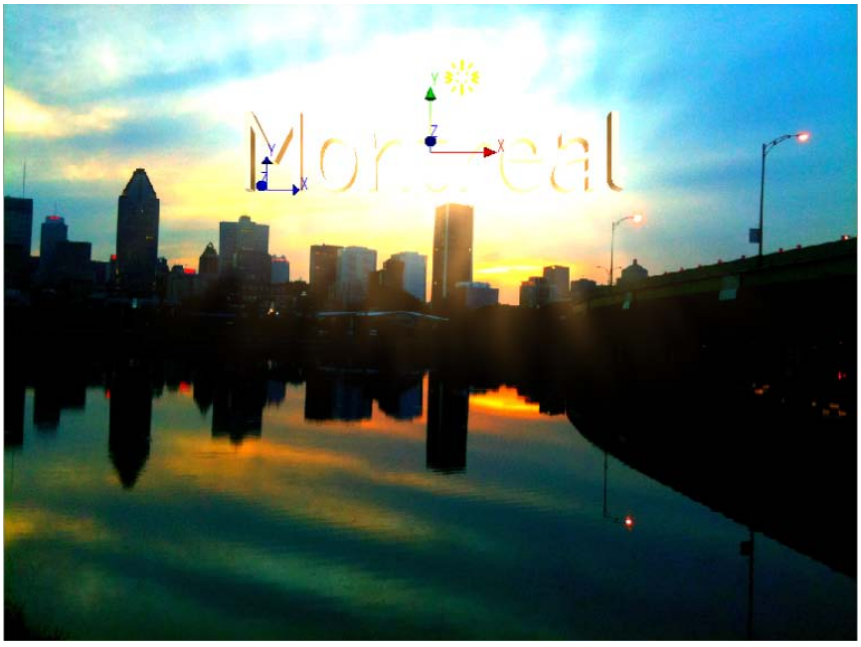
A GMask object (called gmask1, by default), with its parent axis, appears in the Schematic view. Once the GMask preset node has been created, it will have the same functionality and settings as a normal GMask node and can therefor be manipulated in the same ways. When a GMask has been finished,

the user can still make shape transformations to the mask by clicking the Edit Box button.

NOTE The Finish button becomes the Edit Box button once the GMask is finished.

Relighting: Blooming

Attach a Blooming node to a light in the scene to help define highlight areas that generate a glowing effect. You can add textures to stamp a blooming node with particular patterns, such as streaks and glints.



Blooming can affect surfaces and geometries in your Action scene, and you can also use lighting links from the attached lights to selectively include or exclude blooming from objects in the scene.

TIP Use a GMask link to connect a GMask directly to the Blooming node in the schematic. If you then select Use As Occluder in the Post Processing box in the GMask menu, you can create interesting effects by having the GMask occlude only the Blooming effect.

Adding a Blooming Object to a Light

In Action, a blooming node is a child of a light. Multiple lights can be parented to the same Blooming object.

To add a bloom to the scene.

1. Add and position a light to your scene.
2. Do one of the following:
   - Drag the blooming node from the node bin and place it in the schematic.
   - Double-click the blooming node.

   A Blooming object is added to the schematic. In the Result view, you can see the bloom effect.

   If there is only one light in the scene, the blooming node is automatically connected to it. If there are several lights in the scene, select the light in the schematic that you want parented to the blooming node before adding the blooming node. Otherwise, you can parent the blooming node to the light or lights manually in the schematic.
3. Optional: To add a texture component, select the blooming object in the schematic, then double-click a texture node in the Relighting tab of the node bin.
4. To display the Blooming menu, double-click the Blooming object in the schematic, or follow the tab population rules for the Object menu.

Blooming with Texture Components

Similar to the workflow of the Lens Flare, you can add texture components to a blooming node to enhance the effect. When using blooming in Stamping mode, texture components must be attached to see any result.

The Stamping tab of the Blooming menu has global settings for all attached components, but each component texture has its own menu to control settings particular to it.

Be aware of the following when working with texture components attached to a blooming node:

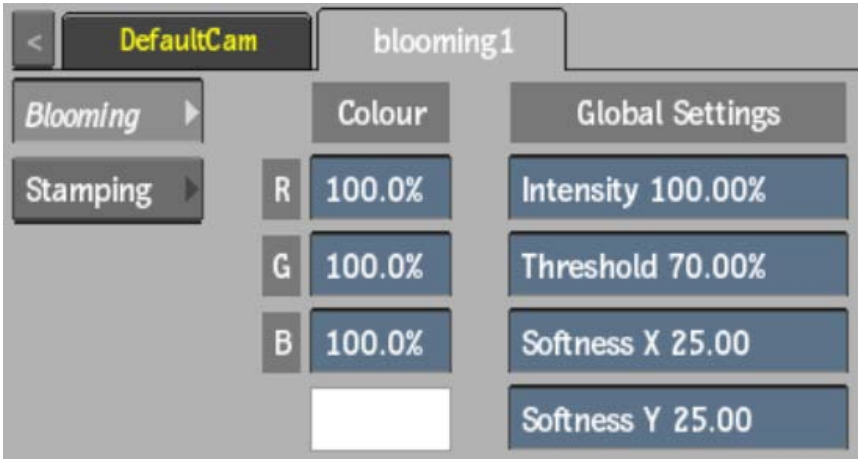
- Each type of component can be added multiple times to a blooming object, each with its own settings.

- Some settings in the Basic tab of the component menu do not affect stamping, such as Number, Position, Variance, and Seed. Only one instance of the texture pattern is used for stamping, so these settings have no effect.
- You can use the Border FX settings for each component to decide how the luminance of the objects that the blooming is affecting modulates the Basics settings (Intensity, Scale, Rotation, and Ratio) of the texture pattern. Centre and Spread are not used for blooming.
- You can re-texture a component using a Diffuse Map with your own texture media applied. To do so, select the component in the schematic, then select the media you want to use from the media list, and double-click the Diffuse Map node in the node bin. In this case, the Pattern settings in the component menu are not applicable, though you can still use the settings in the Basics and Border FX tabs of the component menu, as well as the Diffuse menu settings.

Blooming Menu Settings

The Blooming menu is divided into two tabs, each with its own type of blooming effect, which can work independantly, or in combination with each other.

Blooming Tab



Red Colour field Displays the amount of red in the effect and in any attached components (based on the colour of the attached light).

Green Colour field Displays the amount of green in the effect and in any attached components (based on the colour of the attached light).

Blue Colour field Displays the amount of blue in the effect and in any attached components (based on the colour of the attached light).

Colour pot Displays the colour of the effect and any attached components (based on the colour of the attached light). Click to change the colour.

NOTE The same colour settings are also found in the Stamping tab.

Intensity field Displays the intensity of the effect (multiplied by the intensity of the attached light).

Threshold field Displays the minimum luminance value at which blooming occurs.

Softness X field Displays the amount of softness along the X axis of the blooming effect.

Softness Y field Displays the amount of softness along the Y axis of the blooming effect.

Stamping Tab

For stamping settings to have any effect, you need to attach one or more texture components to the blooming node. In this case, stamping settings are global for all attached components, and each component texture has its own menu that is specific to the texture.

Red Colour field Displays the amount of red in the effect and in any attached components (based on the colour of the attached light).

Green Colour field Displays the amount of green in the effect and in any attached components (based on the colour of the attached light).

Blue Colour field Displays the amount of blue in the effect and in any attached components (based on the colour of the attached light).

Colour pot Displays the colour of the effect and any attached components (based on the colour of the attached light). Click to change the colour.

NOTE The same colour settings are also found in the Blooming tab.

Stamping Intensity field Displays the global stamping intensity of all attached texture components.

Stamping Threshold field Displays the minimun value at which stamping occurs for all attached texture components.

Stamping Softness X field Displays the softness along the X axis for all attached texture components.

Stamping Softness Y field Displays the softness along the Y axis for all attached texture components.

Stamping Attenuation field Displays the smoothing level of the blooming effect. Use to fade out regions that have too much blooming.

Texture Mimimum Size field Displays the minimum size of all attached texture components.

Texture Scale field Displays the size of all attached texture components.

Texture Rotation field Displays the level of rotation of all attached texture components.

Texture Ratio field Displays the aspect ratio of all attached texture components.

Sampling X field Displays the size of the grid along the X axis to affect the number of samples taken to calculate the stamping effect. A higher value yields faster results, but may be less precise.

Sampling Y field Displays the size of the grid along the Y axis to affect the number of samples taken to calculate the stamping effect. A higher value yields faster results, but may be less precise.

Action: Perspective Grid

Use the Perspective Grid node to help you with perspective alignments in your Action scene. Aligning objects to the perspective grid has multiple benefits:

- You can perform a 4-corner pin with a surface or geometry that respects the perspective.

- Aligning the grid establishes the orientation of the plane in 3D space and FOV of the camera that shot the scene.
- Because the Perspective Grid node has an axis-like behaviour, objects attached to it inherit the grid's 2D or 3D transformations.

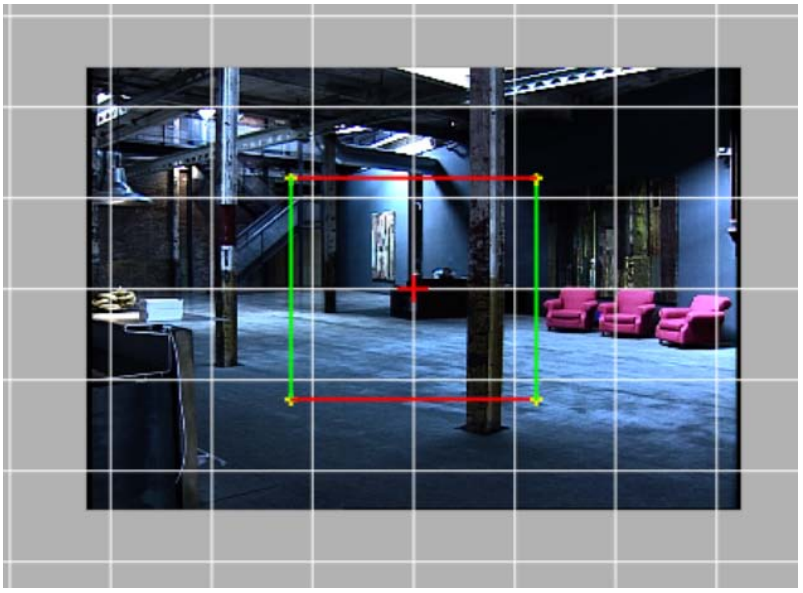
To align an object with a perspective grid:

1. Click Media.
2. In the Media menu, select the media you want to use for the perspective grid (you can change the media later in the Perspective Grid menu).

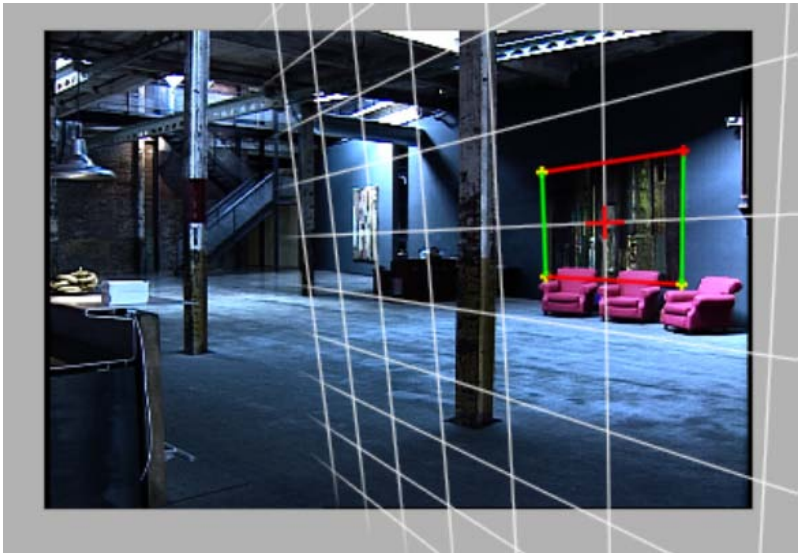
   This media becomes the reference for the perspective grid alignment.
3. Do one of the following:
   - Drag the Perspective Grid node from the node bin and place it in the schematic.
   - Drag the Perspective Grid node from the node bin and place it where you want it in Result view.
   - Double-click the Perspective Grid node. You do not need to be in Schematic view to add a node in this manner.

   The Perspective Grid object is added to the schematic. In the Schematic view, the number in brackets next to the name of the node indicates the media used for the perspective grid reference.

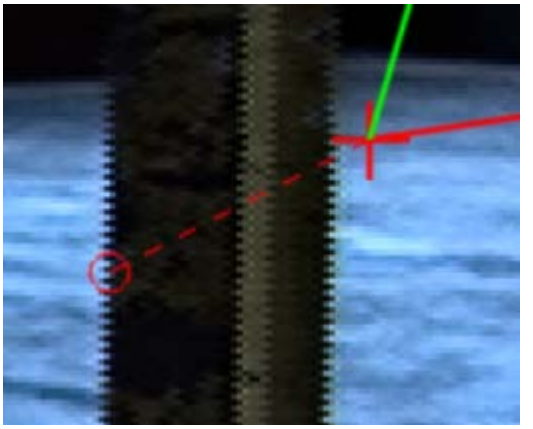
   To specify different perspective grid reference media, select the media in the Media menu, then click Apply, or enter a different media number in the Use Media field of the Perspective Grid menu.
4. With the Perspective Grid object selected in the schematic, select Object view from the View box (or press `F8`) to see the grid and the selected media.



5 While in Object view, drag each of the four corners of the rectangle to the desired location. The grid automatically aligns to the new perspective.



NOTE When dragging one of the corner points of the rectangle, if your desired location can't be computed (for example, if a point goes past another point on the plane), the location is remembered with a dotted line and red circle. Once you move other corners, your original location may now become viable, and the rectangle and grid align properly.



6 Once you are satisfied with the alignment of the perspective grid rectangle, parent an object to the Perspective Grid node. The object inherits the perspective transformation of its parent node. Switch to Result view (F4) to see the complete scene.

NOTE You can also manipulate the perspective grid in the Result view, provided that Lock FOV is not enabled in the Perspective Grid menu, or the perspective grid camera is the same as the Result camera.

Perspective Grid Menu Reference

Use the settings in the Perspective Grid menu to help you perform your alignment.

FOV field This locked field displays the field of view of the active perspective camera. When adjusting the perspective grid, the FOV of the active camera updates automatically (unless Lock FOV is enabled).

Lock FOV button Enable to lock the active perspective camera's field of view.

Lock Position button Enable to lock the active perspective camera's position (and the Zero Parallax field for stereo cameras). If disabled, the position of the camera is recomputed, so that the visual result in Result (F4) view is preserved.

Perspective Camera box Specifies which camera to view the perspective grid in Object view with, and modifies its FOV when working with the perspective grid.

Perspective Camera field This locked field displays the active perspective camera number.

Stereo Camera Perspective box Select whether to use the left or right camera from a stereo camera rig when working with the perspective grid.

Width field This locked field displays the width of the four-point perspective grid rectangle.

Height field This locked field displays the height of the four-point perspective grid rectangle.

Lock Size field Enable to lock the width and height of the perspective grid rectangle. For example, use to lock the dimensions of the grid when animating it, if the feature size you aimed for in the image doesn't change in time.

Use Media field Displays the number of the media associated with the perspective grid. You can change the media number in this field, or select a media entry in the Media List and click Apply.

Z Offset field Displays the amount of offset to apply along the Z axis to make the grid larger or smaller while maintaining the visual result.

Display Grid button Enable to display the grid lines in Result or Object view.

Grid Colour pot Displays the colour of the grid lines. Click to change the colour.

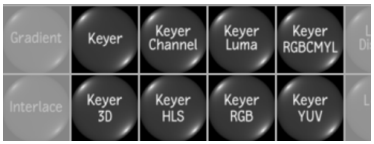
Display Magnifier button Enable to display the magnifier while dragging a corner of the perspective grid rectangle in Object view (F8).

Zoom field Displays the zoom factor of the magnifier. Editable up to 5x.

Reset button Resets the perspective grid settings, but does not reset the active perspective camera settings.

What's New in Batch and Batch FX

5



Improved Node Bin navigation

It is now possible to frame and highlight all the Nodes starting with the same letter by pressing the key corresponding to this first letter on your keyboard while the cursor is sitting over a Batch, BFX, Action, or Modular Keyer Node Bin. For example: pressing "K" while hovering the cursor above the Batch node bin, will automatically highlight and centre all the Keyer nodes.

Back Clip Node in Batch FX and Gap Batch FX

You can now create Gap BFX on the timeline (page 47). Using a new Back clip in BFX, it gives you access to the superior Timeline level, giving access to the media located below the BFX segment you are currently working on.

Batch FX Workflow

It is now possible to copy a Pre BFX to the Editdesk so it can be dropped on another clip.

Adaptive Degradation in Batch and Batch FX

Settings are now available in a new Adaptive Degradation tab of the Batch Setup menu to allow you to temporarily deactivate taxing operations during interactive manipulations on supported nodes. These settings do not affect the final renders. If propagated, nodes in the

Batch pipeline respect the degraded image, and you would need to press Preview to see your results with full settings on. An icon  is displayed in the image window when degradation is active for the selected node. The same icon is also displayed above supported Batch nodes in the schematic that have degradation activated from the NodeSetup menu.

- Use the hotkey `Ctrl+Shift+D` to toggle Batch degrade propagation on or off. For individual nodes that support Adaptive Degradation in Batch (such as Action and Recursive Ops), you can press `Ctrl+D` to activate or deactivate degradation for the current node.
- Use the Synchronize All button in the Node Setup menu of supported nodes to synchronize all nodes of the same type with the degradation settings of the current node.
- New settings for Batch Interactivity appear in the Action node setup menu giving you degradation options in the Batch pipeline for motion blur, software anti-aliasing, and depth of field.

Timewarp Node

The new Timewarp node allows you to change the speed and timing of clips, reverse clips and blend frames.

See Timewarp Node (page 45).

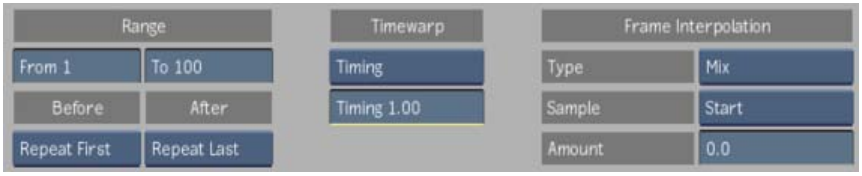
MUX Node

There are new Range settings available for the MUX node, which allow you to set the range of frames that will be impacted by the node and affect the way the frames appear.

Timewarp Node

Timewarps allows you to alter clips by modifying their speed and direction. Use the Timewarp node to change the speed and timing of clips, reverse clips and blend frames. The Timewarp node accepts front and matte clip inputs, and outputs result and matte clips.

Timewarp Node Settings



The following are the Timewarp node settings for the range, timewarp and blending options. The blending options settings change depending on whether Mix, Trails or Motion is selected.

Range Settings

Range from field This field displays the beginning of the range of frames that will be impacted by the time warp effect.

Range to field This field displays the end of the range of frames that will be impacted by the time warp effect.

Range before button Enable this button to select between Repeat First, No Media, Use Black, and Use White. Applied before the set frame range.

Range after button Enable this button to select between Repeat First, No Media, Use Black, and Use White. Applied after the set frame range.

Timewarp Settings

Timewarp button Select between timing and speed. Timing selects the source frame to display at the current frame. Speed displays the timewarp speed.

Timewarp timing/speed field When the Timewarp button is set to speed, this field displays the timewarp speed. When the Timewarp button is set to timing, this field displays the timewarp timing.

Reverse button (not shown) Enable this button to reverse the direction of the clips. This button is only available when speed is selected from the Timewarp button.

Frame Interpolation Settings

Frame Interpolation type button Select an option for blending frames with the timewarp

Frame Interpolation sample button Select whether the speed of the timewarp will be set in relation to the speed at the beginning, middle or end of the timing curve for each frame or field.

Frame Interpolation amount field (Mix) This field displays the mix value for the timewarp. Each result frame is a blend of an equal number of frames from both sides of the given frame.

NOTE The Frame Interpolation settings for Trails and Motion are not shown in the image above.

Frame Interpolation Pre amount field (Trails) This field displays the value to mix the frames that follow the current frame with the current frame.

Frame Interpolation Pre weight field (Trails) This field displays the fall-off value for the pretrail. When the value is 0%, the image in the current frame is at 100% intensity and the first image in the trail is at 0% intensity. When the value is at 100%, there is no fall-off.

Frame Interpolation Post amount field (Trails) This field displays the value to mix the frames that proceeds the current frame with the current frame.

Frame Interpolation Post weight field (Trails) This field displays the fall-off value for the posttrail. When the value is 0%, the image in the current frame is at 100% intensity and the first image in the trail is at 0% intensity. When the value is at 100%, there is no fall-off.

Frame Interpolation Motion Analysis button (Motion) Use this button to select the level of motion analysis accuracy and processing speed. Select Use Full Resolution to process the images at the current resolution. This button is disabled when external input is attached to the node's forward flow and backward flow tabs.

Frame Interpolation motion blur active button (Motion) Enable this button to apply a motion blur to the selected clip.

Frame Interpolation motion blur samples field (Motion) This field displays the number of frames to sample when creating the time warp. The samples include the current frame, and an equal distribution of past and future frames.

Frame Interpolation motion blur shutter field (Motion) This field displays the number of frames for which the shutter stays open. For example, when the shutter value is set to 3, every third frame is as a sample.

Frame Interpolation reference button (Motion) Enable this button to apply the time warp only to objects that do not have the same relative motion as the selected pixel. When enabled, you can edit values in the X and Y fields.

Frame Interpolation reference color pot (Motion) Displays the color of the crosshair that marks the reference point.

Frame Interpolation reference X field (Motion) Displays the horizontal position of the pixel to use as a reference point at the selected frame.

Frame Interpolation reference Y field (Motion) Displays the vertical position of the pixel to use as a reference point at the selected frame.

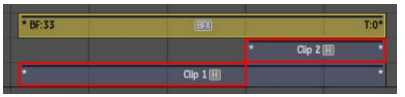
Managing and Working with Gap Batch FX

A Gap Batch FX (or Gap BFX) consists of a Batch FX segment created in a timeline gap which uses as input the top media of the layers below that timeline gap. Inside Batch FX, that input is called the Back clip.

To add an effect without losing your timeline edits:

1. Select a gap over the segment to which to want to add an effect.
   Alternatively, click Layer+ to create a new top layer in the Timeline.
2. Click Pre.
   Batch FX opens, with the Back Clip as the input.
3. Add nodes to create your process tree.
4. Exit Batch FX.
   A BFX is now on the selected gap.

The example above uses the top layer for the placement of the BFX, but a Gap BFX does not have to reside there, it can in any gap where you need it to be. You can even pile Gap BFX upon Gap BFX.



At first, Clip 1 is used as the Back clip. When Clip 2 becomes the top clip of the timeline, it becomes the Back clip.

More About Gap BFX

The input available inside a Gap BFX is the Back clip. That means that if you have three layers composited together, and you add a Gap BFX on top of them, the image available through the Back clip is only the output of the third layer. In other words, you can use Gap BFX instead of Post if your goal is to apply an effect **after** the vertical composition. But you cannot use the Gap BFX workflow to recreate the Post BFX workflow: you cannot split the layers and then use BFX to composite them together.

You do not have access to individual layers inside a Gap BFX.

The Gap BFX does adjust to the destination resolution.

Copying Gap BFX Between Timeline Segments

Copy a BFX from a segment or from a gap.

To copy a BFX between timeline segments or gaps:

1. Press `Ctrl` and drag the BFX indicator to another element, to a selection of elements, or a gap on the timeline.

   If you copy the Gap BFX to a timeline segment (as opposed to a gap), it becomes a Soft Effect BFX.

   TIP You can select the gap (and the applied BFX) instead of only the BFX, and move that gap somewhere else on the timeline. `F`+drag to copy the gap instead of moving it.

Editing Gap BFX on the Timeline

You can perform edits on a Gap BFX as it is treated like any other timeline segment. Operations like:

- Trim
- Slip
- Move
- Add transitions

- Copy

NOTE You can trim a Gap BFX to infinity.

The BF marker that appears on a Gap BFX in the timeline gives the first frame's ranking, with BF:1 indicating the original frame.

Things that cannot be done with a Gap Batch FX:

- You cannot enter a Post Batch FX when a gap is selected.
- You cannot create multiple levels of Batch FX on a gap.

Recognizing the Types of BFX

BFX Icon:	Type of BFX:
	Regular Pre-BFX
	Gap BFX
	Pre-BFX that uses a Back Clip BFX node in the BFX schematic.

About the Back Clip Node In Batch FX

The Back clip node is available in the I/O bin of Batch FX. The Back Clip node does not contain any media; instead, it offers a link to the superior Timeline level, giving access to the topmost media located below the BFX segment you are currently working on.

The Back clip node enables you to create composites and effects in Batch FX without the need to physically bring all the media inside Batch FX, reducing the dependency on the use of Post Batch FX.

On the other hand, the Back Clip node is just a link to media: you cannot access Basic, Resize, RGB LUT, Timeline, Audio. Only the following options are available.

Head Media button Set what media is available before the In Point of the Gap BFX. Select Timeline Level to have the Back Clip read the head media from the segments preceding (and below) the Gap BFX.

Tail Media button Set what media is available after the Out Point of the Gap BFX. Select Timeline Level to have the Back Clip read the tail media from the segments following (and below) the Gap BFX.

What's New in Flame FX

6

Improvements to Bump Displace

- Using the new Bump Displace inputs, it is now possible to use clips from different bit depths as front and displacement inputs.
- It is now possible to select either red, green, blue or luminance channels from the incoming displacement input for which the bump will then be extracted.
- The new Light Threshold parameter allows you to restrict the light exposure by filtering bumps out using their height as the constraint. The higher the light threshold, the fewer bumps are affected, leaving a larger portion of the original unaffected by either light or bump effects.
- The new Hardware Anti-Aliasing section allows you to apply filtering to the effect to offset problematic aliasing, for example when the effect contains a high height value with a low softness value.

Improvements to Damage

- Blotches, Dust and Hairs now have a new Softness parameter allowing their assets to be out of focus.
- A Proportional option has been added to the Size parameter of Grain, Snow and Pixelation.
- Analog, Film and Digital Damage Presets have been added. They can be loaded from the Preset File Browser available on the right side of the Setup Name field.

Improvements to Depth Of Field

- In addition to the existing Basic Blooming mode, you can now choose the new Additive Blooming mode to control the overall visual contribution of Bokeh effects. The Additive Blooming mode allows you to create higher intensity Bokeh patterns from any source image using a Min and Max threshold for highlight segregation.
- The Depth-O-Gram now features built-in histogram manipulations to control how the Depth values get mapped into the supported [0,1] range. Two new numeric fields have been added to perform this task: Z Offset and Z Range. Z Offset allows you to "slide" the histogram information within the [0,1] range and define which value should be considered as 0. Z Range allows you to "contract" or "extend" the histogram information around the 0 value defined with the Z Offset position.
- Depth Of Field now features Z-Depth output, which allows you to propagate the Depth information to other tools of your pipeline. The modifications eventually introduced by the Depth-O-Gram are processed in the output of the node.

Improvements to Glow

A new toggle button has been added in the Matte Output section, which allows you to select between Glow Luma and Blend Matte. The Glow Luma option generates a straight forward luminance conversion of the actual glow effect -- the effect seen when using the Glow Only option in the Result Output. The Blend Matte option outputs the matte used internally to preform the blending of the glow effect over the input image.

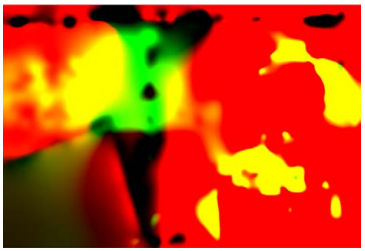
Improvements to Blur

You can now choose between 2 Blooming modes: Basic and the new Additive mode. The Additive Blooming mode allows you to create high intensity bokeh patterns from any source image generating extreme highlight content, which was not possible with the Basic mode.

Improvements to Motif

The Motif tool is now available on the Desktop as a module in the Flame FX2 menu.

A new Triangle ROI mode has been introduced, as well as proportional scaling and a new Softness setting.

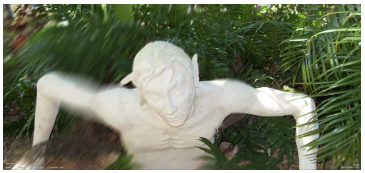


Improvements to Motion Analysis

The Motion Analysis tool is now available on the Desktop as a module in the Flame FX2 menu.

Improvements to Auto Stabilize

The Use Matte button can now be enabled to constrain the Analysis region.

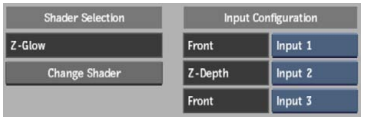


Motion Blur

A brand new GPU-based Motion Blur tool is now available. This tool offers two independent algorithms called Trails and Samples. Here are some of the node's key functionalities:

- Vector Conversion: The Vector Conversion section allows you to handle normalized vector information without having to leave the tool.
- Motion Blur Trails controls: Various settings can be used to balance the motion blur trail so it is located either in between, before or after the feature's movement. The Motion Blur Opacity curve gives full control over the opacity of the trail, allowing you to shape the motion blur trail to your liking.

See Motion Blur (page 55).



Matchbox

Matchbox is an interactive development tool that allows you to run generic OpenGL Shading Language (GLSL) shader code directly in Batch or through the Desktop module, to add specific functionality, or create custom effects. GLSL is a high-level shading language that is part of the OpenGL specification.

The Matchbox node automatically populates the user interface based on the parameters required by the shader, or allows you to design and implement more sophisticated interface elements and naming, through the use of an XML sidecar file.

Included are a number of useful example shaders, that can be used as is, or serve as starting points for you to develop your own tools.

See Matchbox (page 77).

Recursive Ops

The Recursive Ops tool can be used to perform a wide range of recursive, accumulation-based blending effects. The tool is very useful to clean up green screens or perform back plate stitching (in conjunction with Auto-stabilize), as well as a wide range of creative effects by using any combination of the included recursive effects: Distortion, Blur, 2D Transform and Colour Correction.

See Recursive Ops (page 58).

Stylize

The Stylize tool can be used to create a wide range of visual styles on an image sequence, including painting, printing or sketching. The tool offers a collection of 10 core effects that can be stacked and blended together as layers, providing a virtually infinite range of possibilities. The tool ships with over 90 presets grouped in 4 distinct categories: Comic, Paint, Print and Sketch.

See Stylize (page 61).

Motion Blur

Use Motion Blur to simulate the blur created by fast-moving objects.

You can access the Motion Blur Effect in the following ways:

- As a Batch node. This node accepts front, matte and fwd vector clips and outputs a Result, OutMatte, or Forward Vector clip.
- From the Desktop. Select Flame FX2 then click Motion Blur. Choose either Front/Fwd Vector or Front/Matte/Fwd Vector.

Motion Blur provides two independent algorithms: trails and samples. Trails provides a per-pixel motion blur, while samples does sample accumulation. Motion Blur works on the current frame only; it does not require past or future frames.

Vector Input Type Settings

Vector Input Type button Select whether the vector inputs are Absolute or Normalized.

Vector Input Type max dispersion field This field displays the level of motion displacement in the image. Set it to the same value that was set in the 3D application.

Vector Input Type blue channel magnitude button Enable this button to use the blue channel as a magnitude multiplication of the maximum displacement value.

Vector Input Type back as no movement button Enable this button to set black pixels as no movement in the motion vector. When it is enabled, you can set a threshold value for near-black pixels.

Vector Input Type threshold field Displays the level of near-black pixels taken into account in the conversion.

Blur Type Settings

Blur Type button Enable this button to select between trails and samples. Choose trails for a pixel-based motion blur. Choose a sample for an accumulation-based motion blur.

Blur Type amount field This field displays the amount of motion blur applied to the image.

Blur Type softness field This field displays the amount of softness applied to the trails. It is only available when the blur type is trails.

Blur Type samples field This field displays the amount of samples applied to the image. The higher the value, the more samples are used and the smoother the image will be. This field is only available when the blur type is samples.

Blur Type balance field This field displays the amount of blur that either precedes or follows the image. The more positive the number, the more blur precedes the image. The more negative the number, the more blur follows the image.

Artefacts Settings

Artefacts vector softness field This field displays the amount of softness that is applied to reduce the quality of vectors, and therefore solve precision artefacts.

Artefacts post blur field This field displays the amount of global blur applied after other effects have been applied. Use this field conservatively.

Artefacts matte filled field This field displays the amount used to fill in gaps in the matte. This field is best applied after the softness has been adjusted. It is only available when the blur type is set to trails.

Colour Interpolation Settings

Colour Interpolation button Enable this button to verify that the source is already premultiplied, in which case the colour interpolation effect must treat the image differently for the effect to work properly. This button is only functional when there is an input matte.

Motion Opacity Curve

Motion Opacity Curve The Motion Opacity Curve allows you to control the opacity of the trail by shaping it using the curve.

Recursive Ops

Use Recursive Ops to perform a wide range of recursive, animation-based blending effects.

You can access the Recursive Ops Effect in the following ways:

- As a Batch node.
- From the Desktop. Select Flame FX2 then click Recursive Ops.

Recursive Ops uses the processed result of the previous frame and blends it with the current frame using a selected blending mode. It features a built-in colour selection, which will constrain the accumulation effect within that selection. Additionally, it accepts an external matte input which will also condition the way in which the internal blending occurs.

Repeat Mode Settings

Repeat Mode options box Select an option to fill the empty portions of the frame.

Range Settings

Range from field This field displays the beginning of the range of frames that will be impacted by the accumulation effect.

Range to field This field displays the beginning and end of the range of frames that will be impacted by the accumulation effect.

Range before button Select between bypass and cycle. Bypass eliminates the recursive ops effect. Cycle repeats the accumulation effect. This is applied before the set frame range.

Range after button Select between bypass and cycle. Bypass eliminates the accumulation effect. Cycle repeats the recursive ops effect. Applied after the set frame range.

Effects Settings

Effects crumple distortion button Enable this button to active the crumple effect.

Effects amplitude field This field displays the amount of distortion. Increase the value to increase the effect.

Effects octave field This field displays the number of layers summed in the operation, from 0 to 10. Increase the value to increase the fractal effect.

Effects blur button Enable this button to active the blur effect.

Effects amount field This field displays the amount of blur applied to the image.

2D Transform Settings

2D Transform active button Enable this button to activate the 2D transform effect.

2D Transform show icons button Enable this button to display the vertex editing tools in the image window.

2D Transform position X field This field displays the horizontal position of the transformation.

2D Transform position Y field This field displays the vertical position of the transformation.

2D Transform centre X field This field displays the centre point value of the transformation along the horizontal axis.

2D Transform centre Y field This field displays the centre point value of the transformation along the vertical axis.

2D Transform scale X field This field displays the horizontal scale factor.

2D Transform scale Y field This field displays the vertical scale factor.

2D Transform proportional button Enable this button to scale X and Y values proportionally.

2D Transform rotation field This field displays the rotation of the transformation.

Colour Correction Settings

Colour Correction Active button Enable this button to activate the color correction effect.

Colour Correction clamp options box Select a clamping option.

Colour Correction saturation field This field displays the level of color purity in the image.

Colour Correction gamma field This field displays the gamma level.

Colour Correction offset field This field displays a value that modifies all of the colour parameters.

Colour Correction gain red field This field displays the amount of color values in the red channel.

Colour Correction gain green field This field displays the amount of color values in the green channel.

Colour Correction gain blue field This field displays the amount of color values in the blue channel.

Colour Correction gain luminescence field This field displays the amount of luminance value.

Colour Correction proportional button Enable this button to adjust the gain of the color values proportionally.

Blending Settings

Blending options box Select a logical operation that can be used to blend the front clip and the result clip.

Blending transparency field This field displays the percentage of blending when the result is composited on the front clip.

Blending use matte button Enable this button to apply the blur with the areas defined by the matte.

Rendering Settings

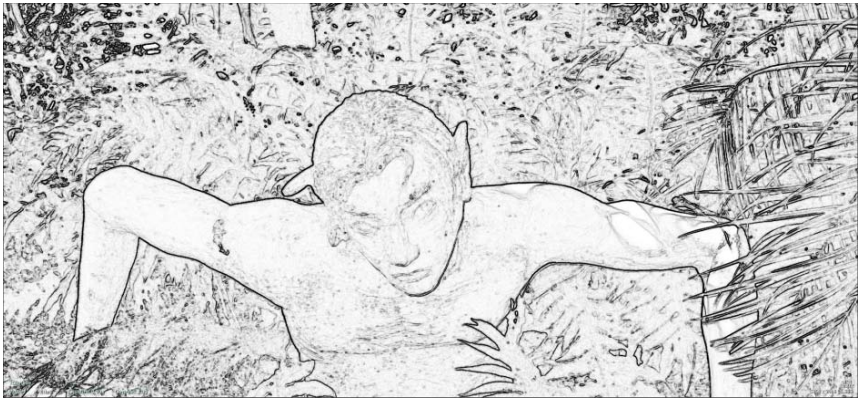
Rendering clamp options box Select a rendering option for color and luminance values in the 16-bit floating point processing pipeline.

Matte Output Settings

Matte Output options box Select input, invert or selective. Choose selective to select the color you wish to keep.

Stylize

Use Stylize to create a wide range of visual styles, including painting, printing and sketching on an image sequence.



You can access the Stylize Effect in the following way:

- From the Desktop. Select Flame FX2 then click Stylize.

Stylize includes a collection of 10 core effects that are stacked and blended together as layers. The core effects fall into four major categories: canvas texture, patterns, colour fillings, and outlines.

Layer Table Settings

Regen button Enable this button to dynamically refresh the image as settings are changed.

Priority up button Use this button to move a layer up in priority in the layer list.

Priority down button Use this button to move a layer down in priority in the layer list.

Solo button Enable this button to hide all other layers except the selected layer.

Seed field This field displays the number used to generate random variations in the stylize effect.

Eye column Turns the layer on or off.

Name column Displays the name of the layer.

Effect column Allows you to select an effect to apply to an image. Each effect has its own set of preferences.

Blend column Allows you to select a blend to apply to an image.

Matte column Allows you to turn the matte on or off. This column is only functional if Front/Matte or Front/Back/Matte has been selected.

Transparency column This column displays the percentage of transparency applied to a layer.

Add button This button adds a layer to the layer list.

Copy button This button copies an existing layer to the layer list.

Delete button This button deletes a layer from the layer list.

Rename button This button renames a layer in the layer list**.**

Reset button This button resets the blend in a layer. The default blend option is Blend

Background colour pot This column displays the background color applied to the image.

Each of the core effects in Stylize has its own settings, which display when an effect is selected. The 10 effects are the following:

- Canvas
- Dots
- Hatch Pattern
- Palette Reduction
- Colour Smudge
- Drawing
- Selective Drawing

- Sketched Outlines
- Scribbled Outlines
- Sharp Outlines

Canvas

The Canvas effect can be used to add different material textures to your effect composition.

Canvas Settings

Canvas Option box Select an option to apply a Canvas effect to the image.

Transparency field This field displays the percentage of transparency applied to the Canvas effect. When this field is set to 100, the Canvas effect is completely transparent. When it is set to 0, the shadow is completely opaque.

Transform Settings

Transform position x field This field displays the position of the canvas along the horizontal axis.

Transform position y field This field displays the position of the canvas along the vertical axis.

Transform scale x field This field displays the change in size of the canvas along the horizontal axis.

Transform scale y field This field displays the change in size of the canvas along the vertical axis.

Transform proportional toggle button This button enables the proportional size change of the canvas along the horizontal (X) and vertical (Y) axes.

Transform rotation field This field displays the angle of rotation of the canvas along the Z-axis. The object is always rotated around its centre point.

Colour Settings

Colour highlights colour pot This colour pot displays the colour applied to the light areas of the Canvas effect.

Colour shadows colour pot This colour pot displays the colour applied to the dark areas of the Canvas effect.

Dots

The Dots effect can be used to create dot print effects based on a colour selective and a tolerance value.

Dots Settings

Dots colour pot This colour pot displays the color applied to the Dots effect.

Dots scale field This field displays the change in size of the Dots effect.

Dots angle field This field displays the change in the angle applied to the Dots effect.

Dots softness field This field displays the change in softness applied to the Dots effect.

Shape Settings

Shape options box Select an option to determine the shape of the Dots effect.

Shape scale field This field displays the change in size of the shape.

Shape angle field This field displays the change in angle of the shape

Shape ratio field This field displays the change in ratio of the shape.

Print on Colour Settings

Print on Colour tolerance field This field displays the percentage of tolerance applied to the colour.

Colour Selection Settings

Colour Selection option box Select an option to apply a colour to the image.

Colour Selection colour pot This colour pot displays the colour applied to the image. It is only functional if you selected User Colour or User Grayscale.

Front Controls Settings

Front Controls blur field This field displays the amount of blur applied to the image.

Hatch Pattern

The Hatch Pattern effect can be used to create print hatch patterns and scan line types of effects based on a colour selective and tolerance value.

Hatch Pattern Settings

Hatch Pattern colour pot This colour pot displays the amount of colour applied to the Hatch Pattern effect.

Hatch Pattern scale field This field displays the change in the size of the Hatch Pattern effect.

Hatch Pattern angle field This field displays the change in the angle applied to the Hatch Pattern effect.

Hatch Pattern softness field This field displays the amount of softness applied to the Hatch Pattern effect.

Shape Settings

Shape threshold field This field displays the amount of colour constraint applied to the shape.

Shape thickness field This field displays the amount of thickness applied to the shape.

Shape variation field This field displays the percentage of variance applied to the shape.

Print on Colour Settings

Print on Colour tolerance field This field displays the percentage of tolerance applied to the colour selection.

Colour Selection Settings

Colour Selection options box Select an option to apply a colour to the image.

Colour Selection colour pot This colour pot displays the colour applied to the image. It is only functional if you select User Colour or User Grayscale from the Colour Selection option box.

Front Controls Settings

Front Controls blur field This field displays the amount of blur applied to the image.

Palette Reduction

The Palette Reduction effect can be used to create a uniform colour filling based on image colour reduction. It also has pattern-based warping capabilities, which allow you to create texture-paint types of effects.

Palette Reduction Settings

Palette Reduction colours field This field displays the number of colours applied to the Palette Reduction effect.

Palette Reduction toggle button Switch between Single Palette and Dynamic Palette. Single Palette displays image stability, while Dynamic Palette displays image transition.

Palette Reduction frame field This field displays the frame selected when Single Palette is enabled**.**

Palette Reduction softness field This field displays the amount of softness applied to the Palette Reduction effect.

Warp Pattern Settings

Warp Pattern options box Select an option to determine the warp pattern applied to the image.

Warp Pattern amount field This field displays the amount of warp pattern applied to the image.

Pattern Transform Settings

Pattern Transform position X field This field displays the position of the pattern along the horizontal axis.

Pattern Transform position Y field This field displays the position of the pattern along the vertical axis.

Pattern Transform scale X field This field displays the change in size of the pattern along the horizontal axis.

Pattern Transform scale Y field This field displays the change in size of the pattern along the vertical axis.

Pattern Transform proportional toggle button This button enables proportional size change of the Palette Reduction effect along the horizontal (X) and vertical (Y) axes.

Pattern Transform rotation field This field Displays the angle of rotation along the Z-axis. The object is always rotated around its centre point.

Front Controls Settings

Front Controls blur field This field displays the amount of blur applied to the image.

Colour Smudge

The Colour Smudge effect is a colour filling tool that can be used to create different emboss effects.

Colour Smudge Settings

Colour Smudge amount field This field displays the amount of Colour Smudge effect applied to the image.

Colour Smudge distortion field This field displays the amount of distortion applied to the Colour Smudge effect.

Emboss Settings

Emboss colour pot This colour pot displays the colour applied to the embossing.

Emboss amount field This field displays the amount of embossing applied to the image.

Emboss softness field This field displays the amount of softness applied to the embossing.

Emboss angle field This field displays the angle applied to the embossing

Anti-Aliasing Settings

Anti-Aliasing toggle button this button enables Anti-Aliasing on the edges of the image.

Anti-Aliasing option box Select an option to determine the size of the samples. This is only functional when anti-aliasing is enabled.

Anti-Aliasing softness field Displays the amount of softness applied to the anti-aliasing. Only functional when anti-aliasing is enabled.

Drawing

The Drawing effect is a colour filling tool that allows you to create stroke effects. The created strokes are based on the source's image pixel colour and can be modified using a wide range of controls.

Paint Strokes Settings

Paint Strokes transparency field This field displays the percentage of transparency applied to the paint strokes.

Paint Strokes style options box Select an option to determine the style of the paint strokes.

Paint Strokes density field This field displays the amount of density applied to the paint strokes.

Paint Strokes length field This field displays the length applied to the paint strokes.

Paint Strokes thickness field This field displays the amount of thickness applied to the paint strokes.

Paint Strokes size proportional button This button enables proportional values to be applied to the length and thickness of the paint strokes.

Paint Strokes orientation field This field displays the orientation applied to the paint strokes.

Paint Strokes edges orientation field This field displays the percentage of orientation applied to just the edges of the paint strokes.

Paint Strokes random strokes button This button enables random variation in length and thickness values applied to the paint strokes.

Paint Strokes variation field This field displays the amount of variance applied to the length of the paint strokes.

Paint Strokes variation field This field displays the amount of variance applied to the thickness of the paint strokes.

Paint Strokes variation field This field displays the amount variance applied to the orientation of the paint strokes.

Paint Strokes disorder field This field displays the amount of random distribution applied to the paint strokes.

Front Channels Settings

Front Channels blur field This field displays the amount of blur applied to the image.

Front Channels hue field This field displays the amount of hue applied to the image.

Front Channels saturation field This field displays the amount of saturation applied to the image.

Front Channels luminescence field This field displays the amount of luminance applied to the image.

Front Channels opacity field This field displays the amount of opacity applied to the image.

Front Channels variation field This field displays the amount of variance applied to the hue.

Front Channels variation field This field displays the amount of variance applied to the saturation.

Front Channels variation field This field displays the amount of variance applied to the luminance.

Selective Drawing

The Selective Drawing effect is a colour filling tool based on a colour selective and tolerance system that allows you to create stroke effects. The created strokes are based on the source's image pixel colour value, but can also have a plain colour mix between the two. The strokes can be modified using a wide range of controls.

Paint Strokes Settings

Paint Stokes transparency field This field displays the percentage of transparency applied to the paint strokes.

Paint Strokes colour pot This colour pot displays the colour applied to the paint strokes.

Paint Strokes front mix field This field displays the amount of colour from the source image that is visible.

Paint Strokes style option box Select an option to determine the style of the paint stroke.

Paint Strokes density field This field displays the amount of density applied to the paint strokes.

Paint Strokes length field This field displays the length applied to the paint strokes.

Paint Strokes thickness field This field displays the amount of thickness applied to the paint strokes.

Paint Strokes size proportional button This button enables proportional values to be applied to the length and thickness of the paint strokes.

Paint Strokes orientation field This field displays the orientation applied to the paint strokes.

Paint Strokes edges orientation field This field displays the percentage of orientation applied to just the edges of the paint strokes.

Paint Strokes random strokes button This button enables random variation in length and thickness values applied to the paint strokes.

Paint Strokes variation field This field displays the amount of variance applied to the length of the paint strokes.

Paint Strokes variation field This field displays the amount of variance applied to the thickness of the paint strokes.

Paint Strokes variation field This field displays the amount variance applied to the orientation of the paint strokes.

Paint Strokes disorder field This field displays the amount of random distribution applied to the paint strokes

Selective Inclusion Settings

Selective Inclusion colour pot This colour pot displays the colours of the selected paint strokes.

Selective Inclusion tolerance field This field displays the percentage of tolerance applied to the selected paint strokes. The higher the percentage, the more the areas of colour is widened.

Selective Exclusion Settings

Selective Exclusion colour pot This field displays the colours of the paint strokes which have not been selected.

Selective Exclusion tolerance field This field displays the percentage of tolerance applied to the paint strokes which have not been selected. The higher the percentage, the more the areas of colour is narrowed.

Selective Global Settings

Selective Global button This button enables the colour or Grayscale options.

Selective Global length field This field displays the percentage of length by which semi-transparent strokes are modified.

Selective Global softness field This field displays the percentage by which the range of transparency of semi-transparent strokes is modified.

Selective Global thickness field This field displays the percentage by which the range of thickness of semi-transparent strokes is modified.

Front Controls Settings

Front Controls blur field This field displays the amount of blur applied to the image.

Front Controls hue field This field displays the amount of hue applied to the image.

Front Controls saturation field This field displays the amount of saturation applied to the image.

Front Controls luminescence field This field displays the amount of luminance applied to the image.

Front Controls opacity field This field displays the amount of opacity applied to the image.

Front Controls variation field This field displays the amount of variance applied to the hue.

Front Controls variation field This field displays the amount of variance applied to the saturation.

Front Controls variation field This field displays the amount of variance applied to the luminance.

Sketched Outlines

Sketch Outlines is an edge detection-based effect that allows you to create sketchy brush strokes and outline effects. The created strokes are based on the source image's pixel colour value, but can also have a plain colour or a mix between the two. The strokes can be modified using a wide range of controls.

Edge Detect Settings

Edge Detect threshold minimum field This field displays the minimum amount of colour restraint applied to the outline edges.

Edge Detect threshold maximum field This field displays the maximum amount of colour restraint applied to the outline edges.

Edge Detect softness width field This field displays amount of softness applied to the width of the edges.

Edge Detect softness gain field This field displays the amount of softness applied to the gain of the edges.

Outline Settings

Outlines transparency field This field displays percentage of transparency applied to outlines.

Outlines colour pot This colour pot displays the colour applied to the outlines.

Outlines front mix field This field displays the percentage of colour from the source image that is visible.

Outlines style options box Select an option to determine the style of the outline.

Outlines density field This field displays the amount of density applied to the outlines.

Outlines length field This field displays the length applied to the outlines.

Outlines thickness field This field displays the amount of thickness applied to the outlines.

Outlines strokes size proportional button This button enables proportional values for the length and thickness of the outlines.

Outlines orientation field This field displays the orientation of the outline.

Outlines follow edges field This field displays the percentage by which the outlines follow their original position.

Outlines random strokes button This button enables random variation in length and thickness values.

Outlines variation field This field displays the amount of variance applied to the length of the outline.

Outlines variation field This field displays the amount of variance applied to the thickness of the outline.

Outlines variation field This field displays the amount of variance applied to the orientation of the outline.

Front Controls Settings

Front Controls blur field This field displays the amount of blur applied to the image.

Front Controls hue field This field displays the amount of hue applied to the image.

Front Controls saturation field This field displays the amount of saturation applied to the image.

Front Controls luminescence field This field displays the amount of luminance applied to the image.

Front Controls opacity field This field displays the amount of opacity applied to the image.

Front Controls variation field This field displays the amount of variance applied to the hue of the image.

Front Controls variation field This field displays the amount of variance applied to the saturation of the image.

Front Controls variation field This field displays the amount of variance applied to the luminance of the image.

Scribbled Outlines

Scribbled Outlines is an edge detection-based effect that allows you to create scribbled brush strokes effects. The created strokes are based on the source image's pixel colour value, but can also have a plain colour or a mixture of the two. This effect also includes hand-drawing tools, such as the amount of pressure given to a tool or determining the length of strokes along the edges.

Edge Detect Settings

Edge Detect threshold minimum field This field displays the minimum amount of colour restraint applied to the outline edges.

Edge Detect threshold maximum field This field displays the maximum amount of colour restraint applied to the outline edges.

Edge Detect softness width field This field displays the amount of softness applied to the width of the edges.

Edge Detect softness gain field This field displays the amount of softness applied to the gain of the edges.

Outlines Settings

Outlines transparency field This field displays percentage of transparency applied to outlines.

Outlines colour pot This colour pot displays the colour applied to the outlines.

Outlines front mix field This field displays the percentage of colour from the source image that is visible.

Outlines style options box Select an option to determine the style of the outline.

Outlines smallest details field This field displays the amount by which the smallest outlines will be filtered out.

Outlines longest outlines field This field displays the amount that the length of the longest strokes will be increased by.

Outlines thickness field This field displays the amount of thickness applied to the outlines.

Outlines strokes size proportional button This button enables proportional change for the Smallest Details, Longest Outlines and Thickness fields.

Outlines straight lines field This field displays the amount of the straightest outlines that are visible.

Outlines pressure field This field displays the amount of variation in the pressure applied to the outlines. The pressure varies with the style of the outline.

Outlines random strokes button This button enables random variation in the outline.

Outlines variation field This field displays the variance applied to the thickness of the outline.

Front Controls Settings

Front Controls blur field This field displays the amount of blur applied to the image.

Front Controls hue field This field displays the amount of hue applied to the image.

Front Controls saturation field This field displays the amount of saturation applied to the image.

Front Controls luminescence field This field displays the amount of luminance applied to the image.

Front Controls opacity field This field displays the amount of opacity applied to the image.

Front Controls variation field This field displays the amount of variance applied to the hue of the image.

Front Controls variation field This field displays the amount of variance applied to the saturation of the image.

Front Controls variation field This field displays the amount of variance applied to the luminance of the image.

Sharp Outlines Settings

Sharp Outlines is an edge detection-based effect that allows you to create precise contour effects. The created contours are based on the source image's pixel colour value, but can also have a plain colour or a mix of the two. The contours can be modified using a wide range of effects. It also has pattern-warping capabilities that allow you to create textured paint effects.

Edge Detect Settings

Edge Detect threshold minimum field This field displays the minimum amount of colour restraint applied to the outline edges.

Edge Detect threshold maximum field This field displays the maximum amount of colour restraint applied to the outline edges.

Edge Detect softness width field This field displays the amount of softness applied to the width of the edges.

Edge Detect softness gain field This field displays the amount of softness applied to the gain of the edges.

Warp Pattern Settings

Warp Pattern option box Select an option to determine the type of warp for the outline.

Warp Pattern amount field This field displays the amount of warp that is applied to the image.

Outlines Settings

Outlines colour pot This field displays the colour applied to the image.

Front Mix field This field displays the percentage of colour from the source image that is visible.

Pattern Transform Settings

Pattern Transform position X field This field displays the position of the pattern along the horizontal axis.

Pattern Transform position Y field This field displays the position of the pattern along the vertical axis.

Pattern Transform scale X field This field displays the change in size of the pattern along the horizontal axis.

Pattern Transform scale Y field This field displays the change in size of the pattern along the vertical axis.

Pattern Transform proportional toggle button This button enables proportional size change of the Palette Reduction effect along the horizontal (X) and vertical (Y) axes.

Pattern Transform rotation field This field Displays the angle of rotation along the Z-axis. The object is always rotated around its centre point.

Front Controls Settings

Front Controls blur field This field displays the amount of blur applied to the image.

Front Controls hue field This field displays the amount of hue applied to the image.

Front Controls saturation field This field displays the amount of saturation applied to the image.

Front Controls luminescence field This field displays the amount of luminance applied to the image.

Matchbox

Matchbox is an interactive development tool that allows you to run generic OpenGL Shading Language (GLSL) shader code directly in Batch or through the desktop module, to add specific functionality, or create custom effects. GLSL is a high-level shading language that is part of the OpenGL specification.

Because of the nature of GLSL fragment shaders, Matchbox works well on image processing effects. You can however, create simulated 3D effects using a number of image processing techniques, like using a Z-depth pass, for example.

The Matchbox node populates the user interface dynamically, based on the parameters required by the shader. You can also design and implement more sophisticated interface elements and naming, through the use of an XML sidecar file. A utility is included to test your shader code and help you create the sidecar XML UI file, if needed.

Re-purposing of existing effects is easy, since Matchbox shaders are simple generic GLSL fragment shader code, with no encryption, and no required customization. Included are a number of useful example shaders, that can be used as is, or serve as starting points for you to develop your own tools. Some of the included example shaders are:

- Vignetting
- Fabric
- Cross Hatching
- NaN Replace
- Switcher
- Ripples
- Twirl
- Warp
- Posterise
- Z-Glow (multipass shader)
- Z-Rays (multipass shader)

- Median Filter (multipass shader)

Accessing Matchbox

You can access the Matchbox effect in the following ways:

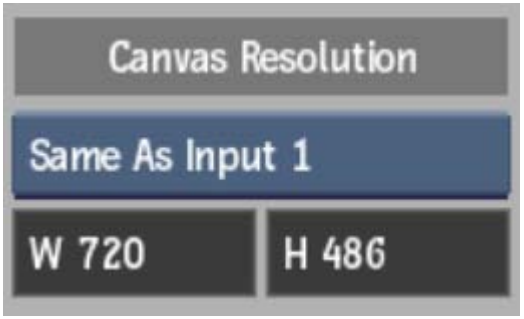
- As a Batch or Modular Keyer node. The node has six physical inputs, but you are not limited to the amount of actual inputs you can use in the effect, since you can use the same image for more than one input.
- From the Flame Desktop. Select Flame FX2, then click Matchbox. The white cursor appears to select the destination, then the Load Shaders browser opens automatically for you to select a *.glsl* file. Once you click Load, you are returned to the Desktop to select the inputs for the chosen shader.
- From the Smoke EditDesk. Select Flame FX2 from the A/V Tools box, then click Matchbox. The white cursor appears to select the destination, then the Load Shaders browser opens automatically for you to select a *.glsl* file. Once you click Load, you are returned to the EditDesk to select the inputs for the chosen shader.

Most of the Matchbox menu is generated dynamically based on the GLSL (and optional XML) code, but there are a few UI elements that are constant.

Name field This locked field displays the name of the current shader.

Change Shader button Click to open the file browser to select a different shader.

Regen button Enable to automatically update the image as settings are changed.



Output Resolution box Select an output resolution for the effect. If you select Custom, settings appear with presets and custom options.

Output Width field This locked field displays the width of the selected output resolution.

Output Height field This locked field displays the height of the selected output resolution.

Creating Your Own Matchbox Effects

A great benefit of working with the Matchbox tool is being able to create your own effects, depending on your particular needs. Creating a Matchbox shader can be as simple as copying and pasting GLSL code snippets, or can be complex multipass effects with multiple inputs and dozens of UI elements. For example, here is the contents of a simple Add effect:

```
uniform sampler2D input1, input2;
uniform float adsk_result_w, adsk_result_h;

void main()
{
   vec2 coords = gl_FragCoord.xy / vec2( adsk_result_w,
adsk_result_h );
   vec3 sourceColor1 = texture2D(input1, coords).rgb;
   vec3 sourceColor2 = texture2D(input2, coords).rgb;

   gl_FragColor = vec4( sourceColor1+sourceColor2, 1.0 );
}
```

Here's a quick high-level workflow to follow when creating Matchbox shaders:

1 Write or copy/paste GLSL fragment shader code.

2 Use the provided command line tool to test the shader.

3 Edit the Shader Description output from the test tool.

4 Package the XML and GLSL code together for use in Flame.

Writing and Testing GLSL Fragment Shader Code

You can repurpose existing fragment shader code, or create an effect specific to your needs. In either case, you can use the *test_shader* utility to validate and debug your code, and optionally help you design user interface elements in a sidecar XML file. The *test_shader* utility also has an extensive Help file that lists the available uniforms (including a number of adsk_ custom uniforms) and XML structure.

The *test_shader* utility can be found in */usr/discreet/<product home>/bin*. To access the Help file, from the bin directory, type `test_shader --help`.

To create and test a fragment shader:

1 Write or copy your fragment shader code in a text editor.

2 Save the file with the extension *.glsl*. For example, here is the contents of a scaling effect:

```
1 uniform float size;
2 uniform sampler2D myInputTex;
3
4 void main (void) {
5         vec4 tex0 = texture2D(myInputTex,
gl_TexCoord[0] * size);
6         gl_FragColor = vec4 (tex0.rgb, 1.0);
7 }
```

3 Run your code through the test utility. For example, `test_shader scale.glsl` produces this result:

```
0(5) : warning C7011: implicit cast from "vec4" to
"vec2"

 XML :
 <ShaderNodeDescription Description="" Name="Preset
Name">
   <Shader Index="1">
      <Uniform RepeatMode="Off"
InterpolationMode="Linear" Type="sampler2D" Tooltip=""
 Name="myInputTex">
```

```
      </Uniform>
      <Uniform DisplayName="size" Type="float"
Name="size">
         <SubUniform Inc="0.01" Max="1000000.0"
Min="-1000000.0" Default="0.0" Row="0" Col="0" Page="0"
 Tooltip="" Name="size">
         </SubUniform>
      </Uniform>
   </Shader>
   <Page Name="Page 1" Page="0">
      <Col Name="Column 1" Col="0" Page="0">
      </Col>
   </Page>
</ShaderNodeDescription>
```

In this case, the first line displays a compilation warning that you might want to fix. In some cases, you'll receive errors that need to be fixed for the shader to work properly in Flame.

4 Fix any errors, and rerun the code through the *test_shader* utility.

5 Optional: Use the XML information in the test_shader output to help you set up the UI of the effect. This can be especially useful if different users are going to be working with these effects.

Simply copy the XML shader node description section of the test output into a new file and save it using the same name, but with an *.xml* extension. In our example, you can edit *scale.xml* to add default values, better names for inputs and other UI elements, and even tooltips to help the user (see the bold sections below):

```
<ShaderNodePreset SupportsAdaptiveDegradation="0"
Description="" Name="Next Generation Scaling">
   <Shader OutputBitDepth="Output" Index="1">
      <Uniform Index="0" NoInput="Error" Tooltip=""
DisplayName="Front" Mipmaps="False"
GL_TEXTURE_WRAP_T="GL_REPEAT"
GL_TEXTURE_WRAP_S="GL_REPEAT"
GL_TEXTURE_MAG_FILTER="GL_LINEAR"
GL_TEXTURE_MIN_FILTER="GL_LINEAR" Type="sampler2D"
Name="myInputTex">
      </Uniform>
      <Uniform ResDependent="None" Max="100.00"
Min="-100.00" Default="0.0" Inc="0.01" Tooltip="Displays
 the percentage of scaling applied to the image." Row="0"
Col="0" Page="0" DisplayName="size" Type="float"
```

```
Name="Scale">
      </Uniform>
   </Shader>
   <Page Name="Page 1" Page="0">
      <Col Name="Effect Settings" Col="0" Page="0">
      </Col>
   </Page>
</ShaderNodePreset>
```

6. Add your .glsl and optional sidecar .xml file to the same directory. The existing shader example files are located in */usr/discreet/<product home>/matchbox*.
7. Try your effect in Smoke or Flame.

Creating Multipass Shaders

In order to build more efficient, complex, or sophisticated effects, you can split your effects into multiple passes. In order to do this, you can separate your effect into multiple .glsl files using advanced adsk_ uniforms. For example, the existing Median Filter preset consists of *MedianFilter.1.glsl* and *MedianFilter.2.glsl*. In this case, when selecting this effect from the Load Shaders browser in Flame, you need to select the root group *MedianFilter.glsl* file to incorporate all of the passes as one effect.

Optional: Creating Browser Proxy Files

Along with the *.glsl* and optional *.xml* files that comprise a fragment shader, you can also create a file that can display a proxy of your effect in the Load Shaders browser. You can use Flame to create a proxy of your effect, but if you don't have access to Flame, or want to create proxies programmatically, you can use the following header (byteswap). The standard width and height of the proxy is 126x92, and the file is RGB 8-bit. Save your proxy files as *.p*, and place them in the same folder as your *.glsl* and *.xml* files of the same name.

```
typedef struct {
        unsigned short Magic;
        float  Version;
        short  Width;
        short  Height;
        short  Depth;
        float  Unused [ 6 ];
} LibraryProxyHeaderStruct;
```

```
#define PROXY_MAGIC 0xfaf0
#define PROXY_VERSION 1.1f
#define PROXY_DEPTH 130
```

What's New in Stereoscopic Workflow

7

Stereo Grid and Dual Image in the Viewport

Three options have been added to the list of Stereo display modes available to a Viewport.

- Left / Right
- Top / Bottom
- Grid

The first two modes were already available as settings for the Dual Image option in the Stereo tool and Real-time Deliverables. Their presentation in a Viewport is identical to these. The new "Grid" mode is a checkerboard pattern made of the Left eye and Right eye images. The Grid size can be modified in the View menu or by using the Shift+T+drag hotkey within the viewport. Use the "Grid" mode to match the Left and Right eyes.

These options are not available to the Player.

Export Stereo clips from Batch

You can now export Stereo Clips using the Batch Export node. The stereo export includes a <polarity> token that allows the user to decide where to include the polarity of the media in the exported path as well as how the polarity is distinguished. The value of the polarity token is defined using the Stereo Naming fields in the General menu of the Preferences.

Stereo naming Preference

You can now set the string that will be used for the Left and Right eye in the event of a Stereo Split or a Batch Export Node Naming Convention Preset. The Stereo Naming settings are located in the Preferences panel.

Side by Side Stereo Capture from Tape

You can now capture stereoscopic footage recorded to tape as side by side images, where one half of the image is the left eye, and the other half is the right eye. Capturing this type of footage results in a clip with a stereoscopic track. See Capturing Side by Side Footage (page 86).

Real-Time Deliverables Stereo Splice

You can now splice together the left and right eyes of a stereoscopic clip and output the result to a VTR as a side by side image. Use the new Dual-Image Splice option in the Real-Time Deliverables menu.

This option is similar to what was available before (Dual Image - Scale), but without the resize. In fact, the two stereoscopic layers must each be exactly half the horizontal resolution of the desired output.

Capturing Side by Side Footage

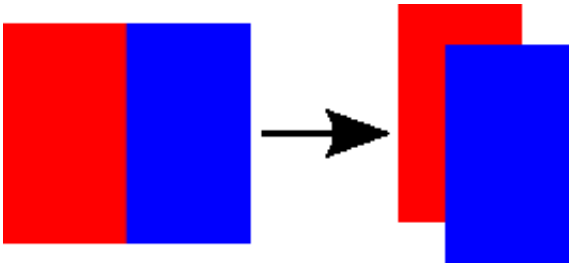
You can capture side by side footage and create a stereoscopic clip.

To capture side by side material as a stereo clip:

1. Open Input Clip.
2. From the Input Type box, select Dual Image - Slice.

3 Capture the clip.

This creates a single clip with a stereo track, with the material half the horizontal resolution of the original footage. The left half of the footage is the Left eye, and the right half of the track is the Right eye.



To capture side by side material as a stereo clip and resize it to full resolution:

1 Open Input Clip.

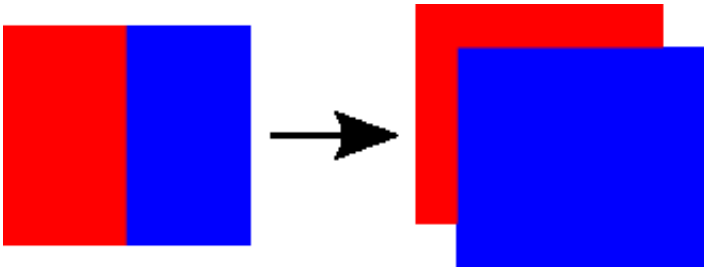
2 From the Input Type box, select Dual Image - Scale.

3 Optional: In the Eng menu (Engineering menu), set the Dual Image Resizing Filter.

The filters go from Triangle (low quality) to Lanczos (high quality). The default is Lanczos, but if there are dropped frames during capture, you will need to use a lower quality filter to get perfect capture.

4 Capture the clip.

This creates a single clip with a stereo track, with the material resized to the full horizontal resolution of the original footage. The left half of the footage is the Left eye, and the right half of the track is the Right eye.



NOTE If you intend to output back to tape side by side stereoscopic material, then consider using the Dual Image - Slice option, therefor working on an image half the horizontal resolution of the target output. Using the Dual Image - Scale introduces resize artefacts that get magnified by the Real-Time Deliverables Dual-Image - Scale option, which will also apply a resize filter to resize each stereoscopic track to half the horizontal resolution.

EDL Capture of Side by Side Footage

If you import an EDL referencing stereoscopic footage recorded as side by side images, and if you use the Dual Image - Slice option in the EDL Import module, the events might not relink to the captured material; this requires you to set a custom resolution.

To set a custom resolution for the captured material in the EDL module:

1. Open the Assembly Options menu.
2. Enable Override Project Res.
3. Set the actual resolution of the captured stereoscopic clip.

   Set the Width to half the horizontal resolution of your project; leave the Height to the full resolution.

Outputting Side by Side Images to VTR

Output the left eye and right eye so that they are adjacent to each other in the same clip.

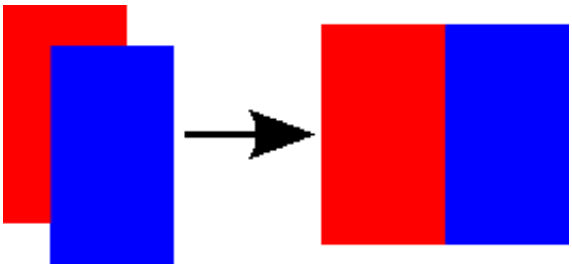
To output a half-sized stereoscopic clip as side by side material to tape:

1. Open the stereoscopic clip in the Player.

The stereoscopic clip must be half the horizontal resolution of the target. So if you are planning to output a 1920x1080 side by side stereoscopic clip, your selected clip must be 960x1080. The Real-Time Deliverable will splice together the Left and Right eye to create a side by side image with a total resolution of 1920x1080.

2. Click the Deliverables tab.
3. Create or select a Real-Time Deliverable template.
4. Select Dual-Image - Splice from the Stereo controls.
5. When ready to output, click the Output Clip button.

   The application creates a clip with a horizontal resolution twice as wide as the selected stereoscopic clip, with the Right eye track as the right half of the clip, and the Left eye track as the left one.

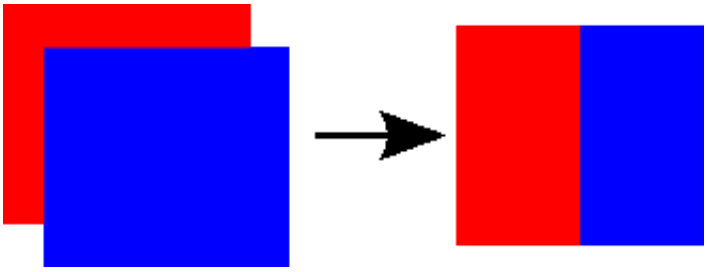


To output a full-sized stereoscopic clip as side by side material to tape:

1. Open the stereoscopic clip in the Player.

   The stereoscopic clip must use the horizontal resolution of the target. So if you are planning to output a 1920x1080 side by side stereoscopic clip, your selected clip must be 1920x1080. The Real-Time Deliverable will scale and splice together the Left and Right eye to create a side by side image with a total resolution of 1920x1080.
2. Click the Deliverables tab.
3. Create or select a Real-Time Deliverable template.
4. Select Dual-Image - Scale from the Stereo controls.
5. When ready to output, click the Output Clip button.

   The application creates a clip as wide as the selected stereoscopic clip, with the Right eye track resized to the right half of the clip, and the Left eye track resized to the left one.



What's New in Miscellaneous

8

DVI Monitoring on Flare

You can now use a DVI output from your graphics card for broadcast monitoring on Autodesk Flare.

During the installation of Flare (INSTALL_FIRST or the Flare software installer), you are asked if you want to use a second monitor as a broadcast monitor.

The installer configures the xorg.conf file for the two monitors assuming that both monitors are of the same resolution.

- If the monitors are the same resolution, you just have to enable the DVI Output in the Flare Preference | Broadcast Monitor menu.
- If the monitors are not the same resolution, you must modify the xorg.conf file after installation.

NOTE The bigger monitor must be configured to display the Flare UI. The smaller monitor must be used for broadcast monitoring.

This is the workflow to set up DVI monitoring on Flare when the two monitors are at different resolutions:

1. Identify the DFP port number that each monitor is plugged into on the graphics card. You can do this from the nvidia-settings window or by searching the xorg log file.
2. Edit the xorg.conf file.
   - Remove the comment from the MetaModes option in the Device Section.

   # Option "MetaModes" "DFP-0: 1920x1200 +0+0, DFP-1: 1920x1200 +1920"
   - Edit the "MetaModes" line to identify the DFP port number of the bigger monitor and the starting pixel for the Flare UI. Flare must start at pixel 0,0. For example, if the larger monitor is plugged into DFP port 4, the entry for that monitor would look like this: DFP-4: 2560x1400 +0+0

- Edit the "MetaModes" line to identify the DFP port number and starting pixel for the second monitor. The starting pixel position for the broadcast monitor is the same value as the x value of the resolution of the bigger monitor. For example, if the smaller monitor is plugged into DFP port 0, and the bigger monitor is 2560x1400, then DFP entry for that monitor would look like this: DFP-0: 1920x1080 +2560+0

3. After you have made the changes to the xorg file, restart your system (or the xserver), start Flare, and enable the DVI Output in the Preference | Broadcast Monitor menu.

HDMI Output on the AJA Kona 3G

You can now use the HDMI output of the AJA Kona 3G card if you select one of the HDMI compatible AJA video raster. You can use the output for Video I/O, but be aware that you could witness a slight delay between the DVI monitor and the AJA HDMI output.

HDMI compatible AJA video rasters

- NTSC
- PAL
- 720/50p
- 720/5994p
- 720/60p
- 1080/2397p
- 1080/24p
- 1080/25p
- 1080/2997p
- 1080/30p
- 1080/5994i
- 1080/60i

HDMI output does have the following limitations.

- You cannot output PsF through HDMI.
- You cannot output stereoscopic material through HDMI.
- You cannot output 1080@60p/50p/59p through HDMI with Flame.
- On Linux, since the broadcast signal is from the SDI board, the HDMI output only works when you are in the Output Clip (VTR) menu. This makes for a less than ideal Broadcast Monitor solution.

- Some HDMI LCD monitors show tearing during playback.

Software Initialisation

Shaders are now loaded on demand instead of being loaded all at once during Flame start up. Therefore, it is normal to experience a small delay when an object that requires a shader is added for the first time.

Improvement to 2D Histogram

A Negative Clamping option is now available in the 2D Histogram.

Python Hooks to Monitor Archiving and Manage Batch Exports

Two new python hooks are available, defined and detailed in /usr/discreet/flame_2012.1/python/hook.py

Python Hook for Archiving

This hook allows you to monitor archive progress, including when segments are complete, and the file paths for file archives.

You can use it to generate checksums for files, and incrementally move segments off to secondary storage during an archive. Or use it to report archive process to a task tracking system, or send an e-mail when the task is complete.

Python Hook for the Batch Export Node

This hook allows you to sanitize and substitute the user entered path with a programmatically designated one.

Use it in environments where the export destination is governed by strict naming conventions, and might require other facility specific operations to be done before the export begins.