Phoenix

Film and Video Restoration

New Features Guide for 2019.2

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Contents

What's new in Nucoda and Phoenix 2019.2

Reprise License Manager

- Reprise replaces the current license system
- New licenses are placed in the same folder and are a .lic file - the file name does not matter
- Added support for RLM Dongles (additional charge)

DVO Updates

DVO Clarity

- Algorithm update - Improved look, quality and computational precision.
- New features - Both internal (e.g. safety mechanisms) and for user control (Sharpness)
- Improved look relates to a better balanced sharpness:
    - +1 should correspond to previous versions of Clarity, whereas
    - 0 is the new default, and
    - -1 could be recommended for material with heavy grain or just for a softer look.
- The different profiles may also have an effect on grain/noise reduction. Impact/difference obviously depends on other parameters, but should be clear if heavy grain reduction is applied.

DVO Scala

- Release version
- Increased computational precision.
- Performance optimizations.
- AVX2 requirement remains.
- Additional features/parameters for Aspect Ratio, Zoom, Offset, Blanking
- Processing for Half/Float available (automatically selected)

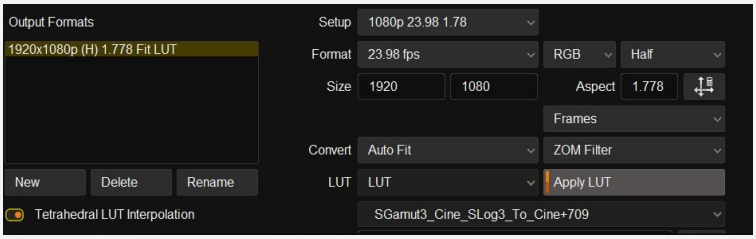
Colour Management and LUT's

To make things clearer for new users we have minimised the use of CMS (Colour Management System)

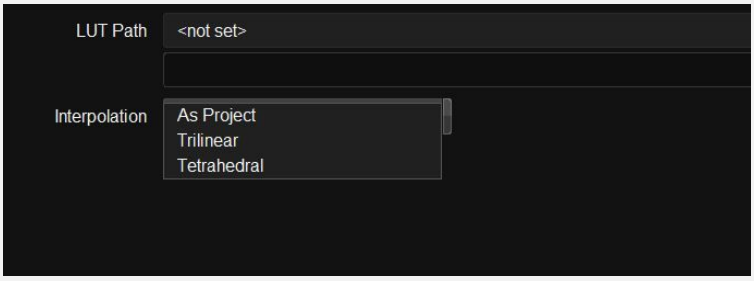
- CMS had been renamed to LUT in Colour Management menu
- No separate CMS or CMS path effects -
- The new LUT effect replaces both (combined version of CMS Path and CMS)
- Apply LUT option (used to be Apply CMS) can now be on any output format

- Tetrahedral LUT support

    - The Tetrahedral LUT option uses a different method of interpolating between LUT point, this could make a difference to combat image banding due to low resolution LUT.

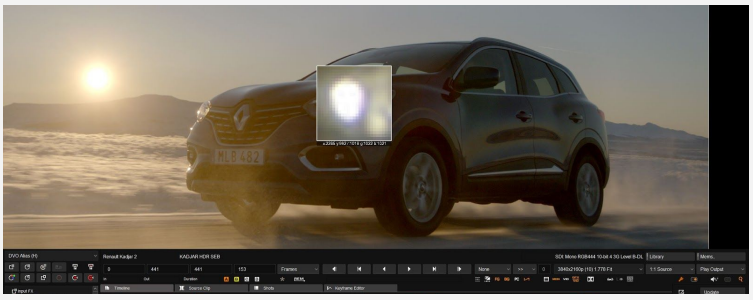


- The Tetrahedral option can be turned on for all LUT;s in the project or on a per LUT basis in the LUT effect.
- It is possible that there could be a small performance hit when using Tetrahedral interpolation.|

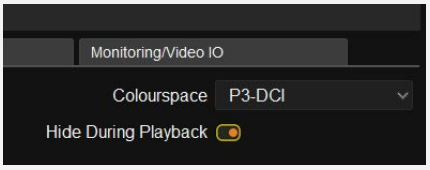


Scopes and Measurement

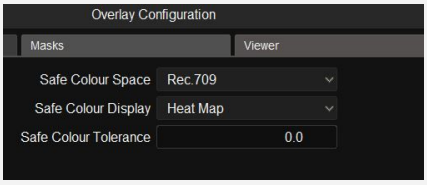
- A magnifying function has been added to the image canvas - use the new magnifier icon to turn on magnify mode,click and hold the left mouse button while on the image canvas for a magnified view - use scroll wheel to zoom in and out of the window.



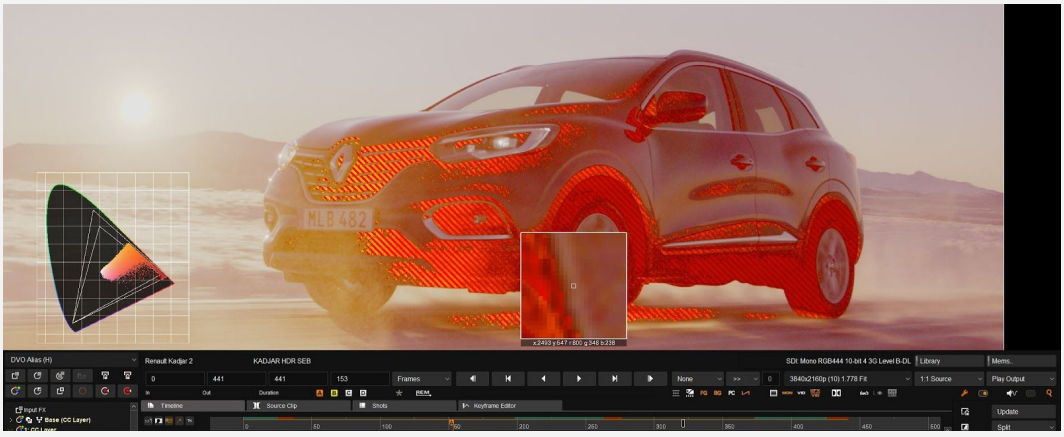
- Gamut Warning when using CIE Scopes
- The gamut warning is accessible from the setup menu
- Turn it on in the “safe colour display” menu and choose how to show the affected areas, Option are Red and Heat Map



- Set the working colour space - it should match the monitor.



- Set the Safe colour space - colour that are outside this gamut will have a waning displayed as Either Red or Heat map, depending on the setting in safe colour display.
- Safe colour tolerance default is 0



EDL

- New EDL commands to create and assign Effect Layers with LUT effect and LUT's
  Please see the **Guide to Matte, EDL and Stereo Enhancements** at the end of this document
- Failed EDL import will attempt to display the line where the error has occurred

Timeline

- Timeline editing functions like Add Scene Edit and Add Edit Cut are now available in Segment Mode
- Restrictions have been removed allowing users to permanently work in segment mode
- ***Change in behaviour -*** In segment mode, to copy a clip, use "d" when you click and drag ("d" replaces "c")
- ***Change in behaviour -*** Timeline editing - remove cuts from clip hotkey is now Alt-C

Memories and Recall

- ***Change in behaviour -*** Copy All Forward/ Backward will not copy Input FX Layer or Dolby Layer -

Export

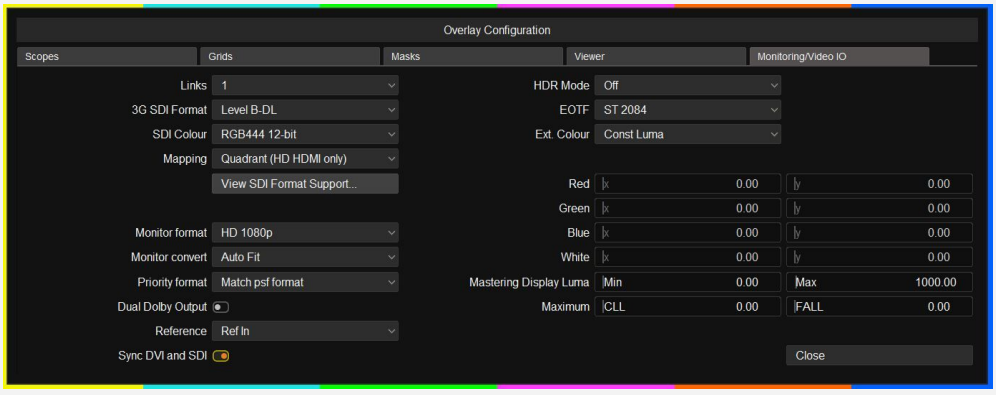
- Frame Padding default can now be set for new projects - in Conform / Edit preferences

Colour Tools

- LGG no longer clips between layers in Half projects

Video I/O and Monitoring

- Support for AJA Driver 15.1.0.2 and Firmware - new AJA SDK **(2018.3 and 2019.1 build are compatible)**
- Dolby HDMI Tunneling (AJA only)
- Monitoring and I/O controls now in the Setup menu in Nucoda .setting are saved per project.
- New projects will use the setting in preferences



- Support for AJA Kona 5 (no 8k or multi 4k at the moment)
- Added 8K support with Blackmagic 8K Decklink
- Support for 12G (Kona 5 and Decklink 8K) - Currently untested

Dolby Vision - Bug Fixes

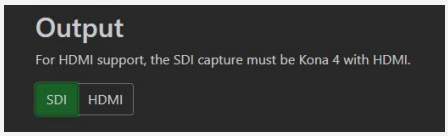
- Changes to XML for keyframes and clips that have not been analysed
- Allow multi select to change Analysis Aspect Ratio on multiple clips
- Support for the3.0.2 eCMU Firmware including HDMI Tunneling

Known Issue with eCMU firmware version 3.0.2

Switching between frame rates does not properly initialise the eCMU video output :

When using 3.0.2 and you are setting up the eCMU you may have to toggle the SDI/HDMI switch in the configuration menu to force the eCMU to lock to the incoming signal

We have worked with Dolby to try and find the issue but we have not been able to resolve it before the release of the 3.0.2 firmware.

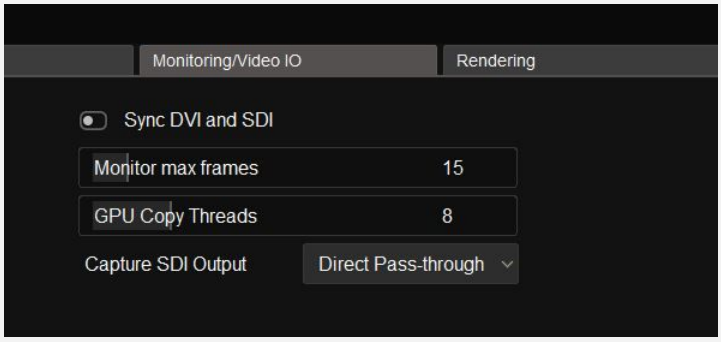


OFX - (Beta) - Fixes have been tested but require user testing

- Support for Sapphire using Mocha from within the Sapphire Plugin using the open Mocha button.
- Support for Mocha Pro - currently the Remove Tool in Mocha causes issues in Nucoda

Monitoring

- The SDI and GUI monitor playback has been synchronized (+-1 frame) - there could be a small performance hit during playback. Can be found in Preferences/Monitoring and IO (second page) and in the setup menu inside Nucoda and Phoenix
- When switching between output formats the Canvas and SDI image will maintain their zoom or fit settings.



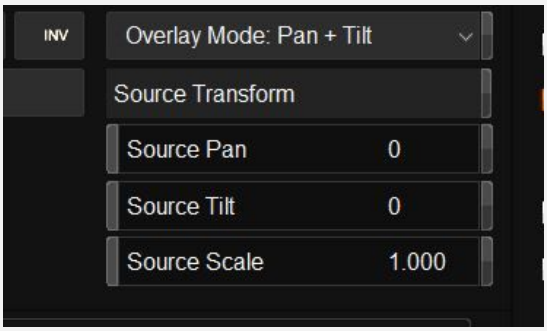
Pan & Scan
New source transform mode and masking based on aspect-ratio

We have made a change to the way Pan & Scan is used in generating masters with different aspect ratios.

The two additions are:

- A drop down menu with a list of common aspect ratios - this is to be used instead of the blanking values to create the masking - this value will be set on all selected clips when updated in the master layer, or if there is a matching Pan & Scan FX layer on every clip.
- This mask will update dynamically and show the correct cropping based on the selected aspect ratio for the output format.

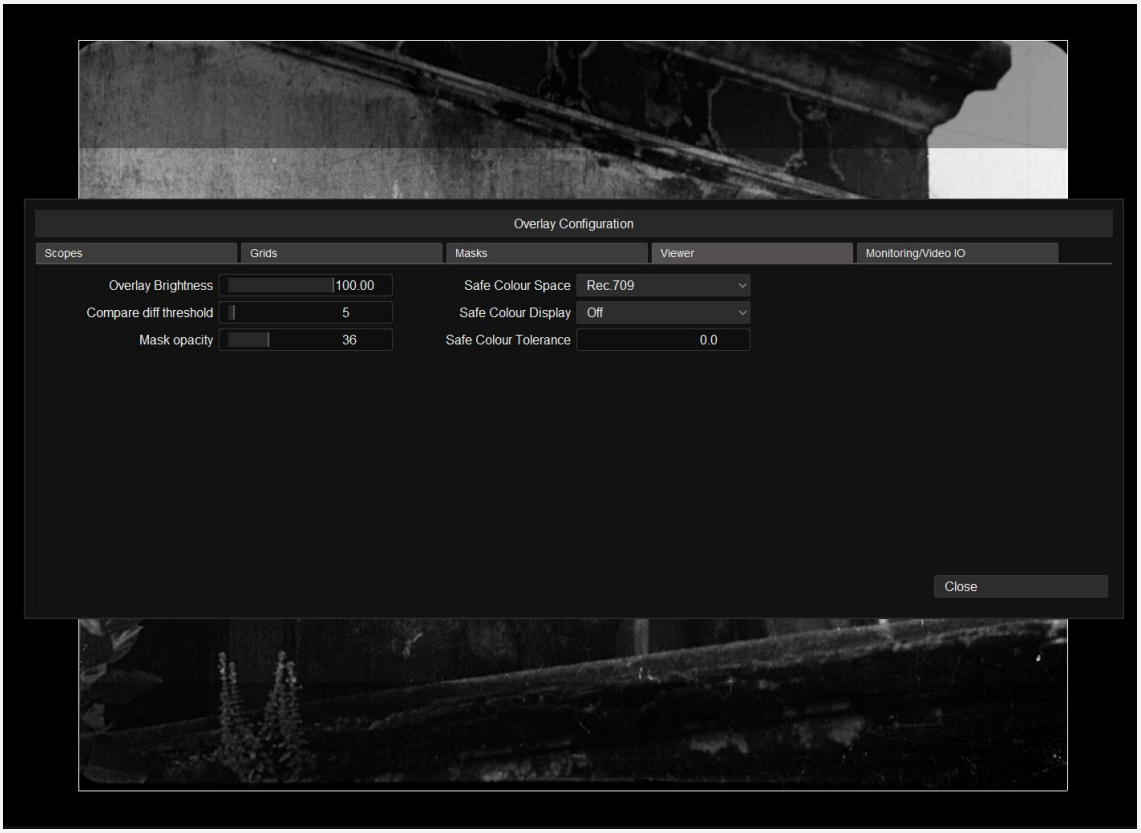
- A new source transform menu - Pan / Tilt and Scale - any transforms made here are applied to the source image and are done before the aspect ratio transform is calculated.



- A typical workflow would be to set up the outputs required with the source format as the main output and then additional output formats for every deliverable.

- In this case the orignal is a 4:3 full aperture frame that needs to be panned and tilted to create the main deliverable which is DCI 4K Flat 1.85 - after that we need the HD 1.7778 version

- Use the transparency option for the masks to make repositioning the image easier, in this case the 1.85 mask is shown as an overlay.



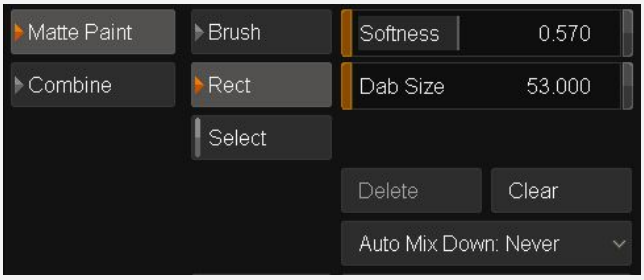
- Once the repositioning is done using the Source Transform tool in Pan & Scan, select the correct aspect ratio for the image from the dropdown in the Pan & Scan tool - select all the clips on the timeline and set the Aspect ratio in the Pan & Scan to 1.85 and set the conversion mode to Auto Crop (you can also do this in the project setup for every output format

- Turn off the mask overlay.

- In DCI 4K Flat the mask will not be visible, however, switching to 1080p 1.7778 will correctly re-calculate the mask for the new resolution and aspect ratio.

Fix, Paint and Matte Paint

Saving the state of the brush tools
In 2019.2 the state of the brushes (size, softness and type) will be stored when they are changed, allowing users to set and keep brush parameters they prefer using. Resetting the parameters must be done using the orange reset buttons next to the values.
Effect reset and Master reset will not affect them.



Sony RAW Format updates

- Support has been added for the latest Sony X-OCN formats including:
- XT Support for all Venice and CineAlta bitstreams
    - Venice X-OCN 4K 2.39:1 LT
    - Venice X-OCN 4K 2.39:1 ST
    - Venice X-OCN 4K 2.39:1 XT
    - Venice X-OCN 6K 2.39:1 LT
    - Venice X-OCN 6K 2.39:1 ST
    - Venice X-OCN 6K 2.39:1 XT
    - Venice X-OCN 6K 16:9 LT
    - Venice X-OCN 6K 16:9 ST
    - Venice X-OCN 6K 16:9 XT

File format support

- V210 archive export added
- H.264 and V210 will read and display correct framerate in library
- Improved playback of camera and Avid generated AVCI files and XAVC 4K
- Fix to XDCAM metadata showing 51Mbit instead of 50Mbit
- Speed up ProRes MXF file playback
- Fix clipped highlights on certain DNG files
- Correct offset TC read from certain Avid created XAVC, AVCI and ProRes MXF media
- Incorrect TC read from some Avid generated AVC-100 and XAVC files

Guide to Matte, EDL and Stereo Enhancements

Revision 3 - April 2019
Nucoda 2016.1 - Index Matte added
Nucoda 2018.3 EXR Extended Mattes
Nucoda 2019.2 Enhanced LUT assignment (not released)

EDL Enhancements - Layer and Matte additions

- In order to simplify workflows where multiple mattes and layers are involved in a production we have added the ability to use extensions to our EDL format to allow the creation of colour and effects layers and to assign mattes to specific layers.
- The purpose of the feature is to allow for the accurate and quick creation of named matte layers and to correctly assign matte sources inside the Nucoda layer stack. In addition to matte assignment the user will also be able to define and add User FX layers, colour layers and locators.
- The commands are added as comments after the main event and are processed automatically when importing the EDL.

Matte Tool - Using mattes from multilayer EXR files

This update to the matte effect allows Nucoda to extract mattes from inside a multilayer EXR file. MAttes can be assigned automatically using the EDL. Please note, only the DataWindow display in the EXR is supported. Please see 2019.1 New Features for a full description of the new EXR Multi matte support

Syntax for EXR Layer additions to the EDL

***NUCODA_LAYER** [layer name] [-effect <effect-id>] [-matte.part.channel]

[layer name] - optional layer name - no spaces allowed

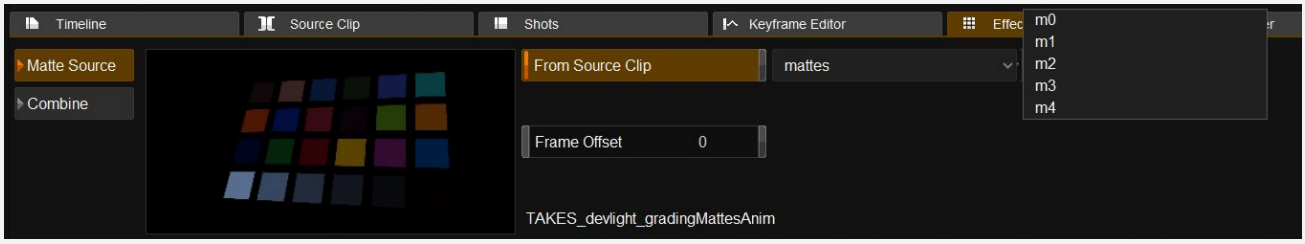
[-effect <effect-id>] - optionally add effect to layer on creation - see end of document for effect ID list.

[-matte part.channel] - Set matte part and channel (this will depend on the EXR file)

This example EDL will:

- Import and place the the main shot on the timeline
- Add a layer called Shirts and set the Matte input to use the Part called CharMatte10 and channel R
- There is no need to specify the filename - if there is no filename we will use the file that was imported to the timeline as the source.

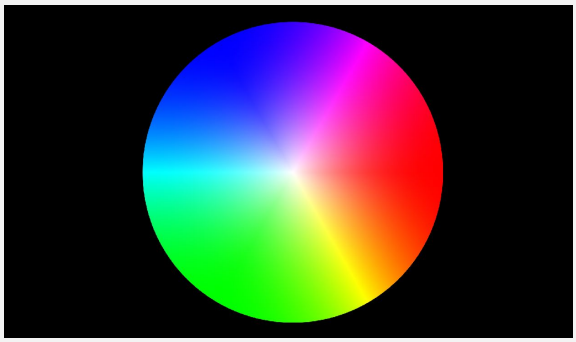
```
TITLE: WIR Mattes
FCM: FILM

001  WIR V     C       00:00:00:01 00:01:07:05 01:00:00:00 01:01:07:04

*FROM FILE: S:\media\EXR-Mattes\wdasMultipartEXRtest\WIR_244.0_011.00_364_main.0001.exr
*NUCODA_LAYER Shirts -matte.part charMatte10.R
*NUCODA_LAYER Noses -matte.part charMatte3.B
```



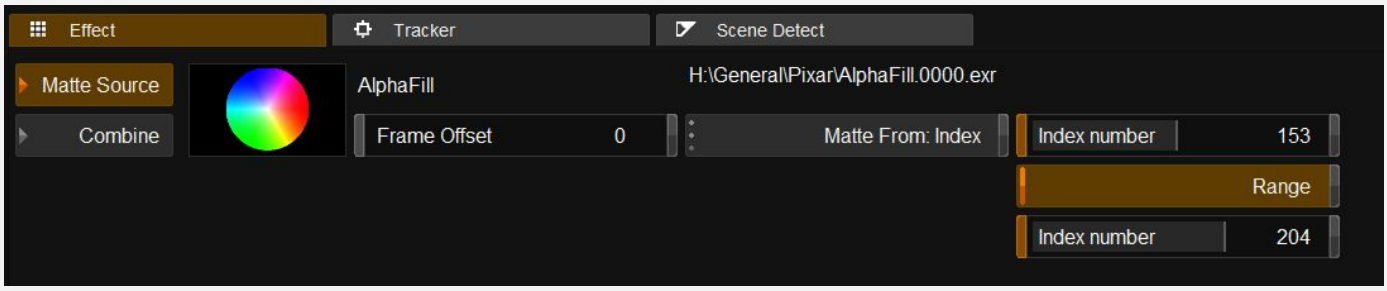
Matte Tool - Using the Index Matte option

This update to the matte effect will let the user specify one or a range of grey scale colours in the image alpha channel to be used as a matte in a layer. Using grayscale index values from 0 to 255 allows the creation of multiple mattes in a single alpha channel.

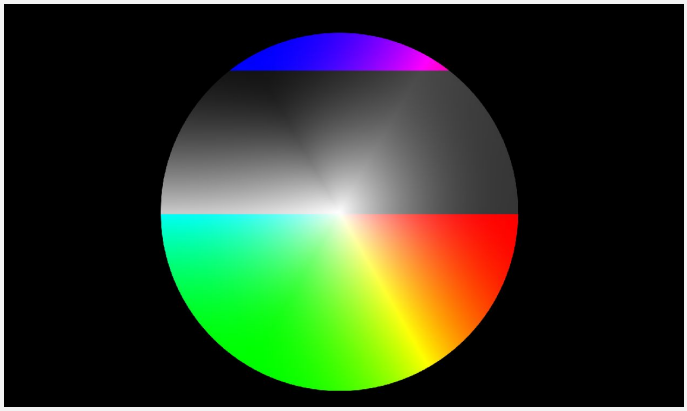
Mattes can be created using a single index value or a range of values.



This EXR image has a colour fill and alongside is the alpha channel containing 5 bars of colour, the index values are 255, 204, 153, 102, 1 from top to bottom.



In the matte effect, the image has been set as its own matte source, the Matte From selection is Index and a single index number or range is selected. Using 153 to 204 as a range results in the following image after being desaturated.



Additions were made to the Nucoda EDL format to facilitate setting the mattes.

Syntax for matte additions to the EDL

***NUCODA_LAYER** [layer name] [-effect <effect-id>] [-lut <path and LUT name>]
[-matte.r|g|b|a <matte file and path>] [-offset <frame-offset>]

[layer name] - optional layer name - no spaces allowed

[-effect <effect-id>] - optionally add effect to layer on creation - see end of this doc for effect list.

[-lut <path and LUT name>] - Adds a LUT Effect in an effects layer and sets the LUT

Example:

* NUCODA_LAYER LUT_Test -lut "D:\example.cms"
* NUCODA_LAYER LUT_Test2 -lut D:\cool.cms -tetrahedral
* NUCODA_LAYER LUT_Test3 -lut "Log to CGR - generic s-curve.cms"
* NUCODA_LAYER LUT_Test3 -lut “f:\Extras\Log to CGR - generic s-curve.cms"

Quotes are not needed if the filename has no spaces. If the filename doesn't contain an “x:\” the path is taken relative to the ImportLutFolder preference, otherwise it's taken as an absolute path.

You can optionally add -tetrahedral or -trilinear to force the interpolation mode (by default it will be "From Project").

The behavior with quotes and absolute/relative paths has also been added for the ASC_Inp and ASC_Out commands.

[-matte.r|g|b|a <matte file and path>] - Set matte file and specify image channel to use

[-matte.i <lowindex> <highindex> <matte file and path>] - Use Index values - please note the both low and high index values must be present - if there is no range set them to equal

[-offset <frame-offset>] - optionally offset the matte (the importer will automatically offset the matte so it starts at the same frame as the clip, but you use this to add an additional offset) This will work around the issue of Mattes starting at the wrong TC when using mixed down media with mattes.

Other available extensions in the EDL

*** FROM FILE:** <file path and filename> to conform media

*** LOC:** <timecode> <locator color> [Locator information] ***Note: This bookmark is a segment bookmark***
Locator colours: BLUE | CYAN | MAGENTA | ORANGE | RED | WHITE | YELLOW

* **00:58:22:00** Timeline Bookmark ***Note: This bookmark will always be red***

*** ASC_Inp** <LUT Name>
LUT is added to Base or Master layer before the Channel Mixer - check colour preferences to choose Base or Saster layer

*** ASC_Inp** <LUT Name>
LUT is added to Base or Master layer before the Channel Mixer - check colour preferences to choose Base or Saster layer

*** ASC_Out** <LUT Name>
LUT is added to Base or Master layer before the Router

*** ASC_SAT** <Saturation Value>
If the ASC_SAT value is before the ASC_SOP values, the SAT values are placed in Saturation in the colour layer. Else it is placed in the HLS tool.

*** ASC_SOP** <(Slope Values) (Offset values) (Power Values)>
Up to 6 decimal places are supported

Matte import EDL Examples - please note that line breaks are not supported

This example EDL will:

- Import and place the the main shot on the timeline
- Create a colour layer named Primary
- Create a User FX layer called Matrix with Gamma Matrix effect in the layer
- Create six separate colour layers each with Mattes set as specified in the EDL using the Red, Green and Blue channels respectively.

```
TITLE: A L-S3D-with-Mattes-DEMO001
FCM: FILM

003  Undead-S3D-LEFT V     C        03:00:08:15 03:00:17:20 03:00:08:15 03:00:17:20

*FROM FILE: S:\Undead\Media\S3D\Left\Undead-S3D-LEFT_259407.dpx
*NUCODA_LAYER Primary
*NUCODA_LAYER Matrix -effect GammaMatrix

*NUCODA_LAYER 6015_v002 -matte.r S:\Undead\Media\VFX\Mattes\mt_003\le\mos_reel03_scn0043_shot6015_v002_mt_003_le.0001.dpx
*NUCODA_LAYER 6015_v002 -matte.g S:\Undead\Media\VFX\Mattes\mt_003\le\mos_reel03_scn0043_shot6015_v002_mt_003_le.0001.dpx
*NUCODA_LAYER 6015_v002 -matte.b S:\Undead\Media\VFX\Mattes\mt_003\le\mos_reel03_scn0043_shot6015_v002_mt_003_le.0001.dpx

*NUCODA_LAYER 6015_v002 -matte.r S:\Undead\Media\VFX\Mattes\mt_003\le\mos_reel03_scn0043_shot6015_v002_mt_004_le.0001.dpx
*NUCODA_LAYER 6015_v002 -matte.g S:\Undead\Media\VFX\Mattes\mt_003\le\mos_reel03_scn0043_shot6015_v002_mt_004_le.0001.dpx
*NUCODA_LAYER 6015_v002 -matte.b S:\Undead\Media\VFX\Mattes\mt_003\le\mos_reel03_scn0043_shot6015_v002_mt_004_le.0001.dpx

*LOC: 03:00:08:15 RED RGB Left + Right Mattes
```

Luma matte example - using the index

This example EDL will:

- Import and place the the main shot on the timeline
- Create a colour layer named Primary
- Add a blue segment bookmark with a comment “Graded”
- Create six separate colour layers each with Mattes set as specified in the EDL using the index numbers and in the last case, a range of indexes to create the matte.

```
TITLE: Pxr
FCM: FILM

001  Alphafill V     C        00:00:00:01 00:00:00:07 03:00:00:01 03:00:00:07

*FROM FILE: H:\Pxr\AlphaFill.0000.exr
*NUCODA_LAYER Primary

*LOC 03:00:00:00 Blue Graded

*NUCODA_LAYER Index_0 -matte.i 0 0 H:\Pxr\AlphaFill.0000.exr
*NUCODA_LAYER Index_51 -matte.i 51 51 H:\Pxr\AlphaFill.0000.exr
*NUCODA_LAYER Index_153 -matte.i 153 153 H:\Pxr\AlphaFill.0000.exr

*NUCODA_LAYER Index_204 -matte.i 204 204 H:\Pxr\AlphaFill.0000.exr
*NUCODA_LAYER Index_255 -matte.i 255 255 H:\Pxr\AlphaFill.0000.exr
*NUCODA_LAYER Index_255 -matte.i 12 255 H:\Pxr\AlphaFill.0000.exr
```

Import EDL...

On importing the **EDL** into Nucoda there are options to import locators and ASC LUT layers, if you need these, make sure to select the options.

The ***NUCODA_LAYER*** options will be imported and created automatically if they are in the EDL, if the media required for the mattes is not available, layers will be created but mattes will not be assigned.

Nucoda and Phoenix effect names

Use the Effect ID as the identifier for adding effects to projects using the extended EDL functions

Effect Name	Effect ID
3:2 Add/Remove	ThreeTwoPulldown
3:2 Auto Remove	ThreeTwoRemove
Balance	Balance
.	Blend
Blend	Blur
Blur	BrightnessContrast
Brightness Contrast (Bright Contrast)	BrightnessRegions
Brightness Regions (Bright Regions)	ChannelAlign
Channel Align	ChannelCombine|
Channel Combine	ChannelExtract
Channel Extract	ChannelMixer
Channel Mixer	CloneColor
Clone Colour	NucodaCMS
CMS	NucodaCMSPath
CMS Path	Color
Colour	ColourSpace
Colour Convert	DiifferentialColorCorrect
Colour Curves (Col Curves)	Composite
Composite	Convert
Convert	Dissolve
Dissolve	DvoAlias
DVO Alias	ApertureCorrection
DVO Aperture	DvoBrickwall
DVO Brickwall	DvoChroma
DVO Chroma	DvoClarity
DVO Clarity	DvoCrossColour
DVO Cross Colour	DvoDeinterlace
DVO Deinterlace	DvoDirtMap
DVO Dirt Map	DvoDropout
DVO Dropout	DvoDust2
DVO Dry Clean	DvoDustO
DVO Dust GT	Deblotch
DVO Fix	ASC3
DVO Dust	DvoDeflicker
DVO Flicker	DvoFrame
DVO Frame	DvoGrainO
DVO Grain GT	AGR4
DVO Grain	DvoLineSync
DVO Line Sync	DvoNoise
	DvoPixel
	DvoRgbAlign_Seq
	DvoRgbAlign
	DvoRegrainRGB

DVO Noise	DvoRegrain
DVO Pixel	DvoSuperZoom
DVO Print Align (Seq)	DvoScratchTarget
DVO Print Align	DvoSharpen
DVO Regrain RGB	DvoSharpen2
DVO Regrain	DvoVariTimeSource
DVO Scala (Demo)	DvoVariTime
DVO Scratch Target	DvoSteady
DVO Sharpen	DvoSteady2
DVO Sharpen	S3DColourAlign2
DVO Speed Source	DvoThreeTwo
DVO Speed	DvoTwister
DVO Steady	DvoUpscale
DVO Steady II	DvoDewarp
DVO Stereo Fix	DvoZoom
DVO Three Two	Fade
DVO Twister	FieldDomCorrect
DVO Upscale	FieldRemove
DVO Warp	FieldSwap
DVO Zoom	GammaMatrix
Fade Colour	HLSColorCorrect
Field Dom Correct	HueCurves
Field Remove	Invert
Field Swap	KelvinTint
Gamma Matrix	Keyer
HLS Colour Correct (HLS)	LensDistort
Hue Curves	RGBMLevels
Invert	LiftGammaGain
Kelvin and Tint (Kelvin Tint)	LinearToLog
Keyer	LogToLinear
Lens Distort	MeshWarper
Levels	Paint
Lift Gamma Gain	PanAndScan
Linear to Log	PQMatrix
Log to Linear	PrinterLights
Mesh Warper	DvoQuadBalance
Paint	DvoReflicker
Pan and Scan (Pan Scan)	Reinterlace
PQ Matrix	Retime
Printer Lights (Printer)	RGBMCurves
Quad Balance	RGBAover
Reflicker	S3DColourAlign
Reinterlace	Saturation
Retime	SlopeOffsetPower
RGB Curves	SoftClip
RGBA Over (Over)	DvoTestPattern
S3D Colour + Align	Warper_4
Saturation	Warper
Slope Offset Power (SOP)	
Soft Clip	
Test Pattern	
Warp 4	
Warp 9	

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