Phoenix

FILM AND VIDEO RESTORATION

2018.2 NEW FEATURES GUIDE

01:00:24:06 00:00:06:11 01:00:21:04   Timecode

Duration   A B C D   ✳ REM

Shots   Keyframe Editor   Effect   Tracker

Enable   Process   Details   Intensity per channel

Amount   75   Base Level: Auto

Aggressiveness   50   Preservation   75

Speed vs Quality

Balanced

Linear   low   mid

Digital Vision

www.digitalvision.tv

Video card support

AJA Kona 4

Driver 14.01 Included with installer

- Support for the Kona 14.01 driver from AJA
- The SDI format support list has been cleaned up and is much easier to read, a Links column has been added.
- Preference for setting Horizontal and Vertical timing for the Kona - this is in Monitoring I/O, click on the Next button in the bottom right of the menu to access page 2.
- Data Format menu is replaced by 3G SDI Format, the preferred choice is to use Level B, but there is a selection to force the setup to use Level A.
- 4K modes have been removed
- Nucoda will determine the correct video setup based on the amount of links and SDI Colour format. If the selection is not possible Nucoda will fall back to the best available setup.

Support for 2Si:

- 4 x SDI in 10-bit RGB in UHD/4K - Kona SDI Out 1 to 4
- 2 x SDI in 10-Bit YUV422 in 4K/UHD - Kona SDI Out 3 and 4
- ***12 Bit RGB not supported - will fall back to RGB 10-bit (For Dolby Vision use Quadrant Mapping)***
- HDMI output will always map to the main output
- New Mapping menu to select between Quadrant and 2Si

Changes:

- 4K/UHD HDMI is always downconverted to HD in Quadrant mode (Firmware restriction)
- HDMI in 2Si mode will always map to the main output format (Firmware restriction)

BMD Decklink

Nucoda and Phoenix now have support for the Blackmagic Design range of Decklink video cards. Decklink support is limited to monitoring only and does not allow for the ingest or playout of video using the device.

Nucoda was tested with the Decklink 12g Extreme 4K card with HDMI and also using the optional 4 Link SDI Adapter, the HD Mini Monitor was also tested.

All Decklink cards should be supported but have not been tested, only features that are available on the installed card will be exposed in the setup menu.

Please download Desktop Video 10.10 driver from www.blackmagicdesign.com

Known Issues for Decklink

Can not be used for Dolby Vision with VANC
LTC timecode will only display on the image during playback.
Flashing HDMI output in UHD 50p and 60p

Changes to video settings and SDI output settings

We have updated the labels for the SDI output setting to make them easier to understand

- Video SMPTE - working in SMPTE range - ideal for working with scaled Avid Media
- Full Range - working with the full available range 0 -1023
- Cineon Log - Film log working space
- *Video Log - Video log working space (not in general use)*
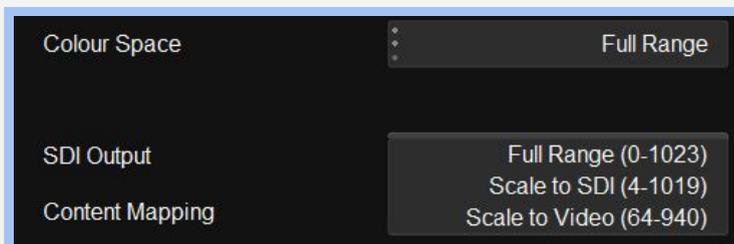- ACES - ACES 2065-1 ACEScc ACEScct

Project SDI Output settings

Video (64 to 940)
SMPTE Levels

Video Legal (64 to 940)
SDI Output is clipped to SMPTE legal levels
To export material with SMPTE Legal levels make sure the SMPTE legal button is set in file export

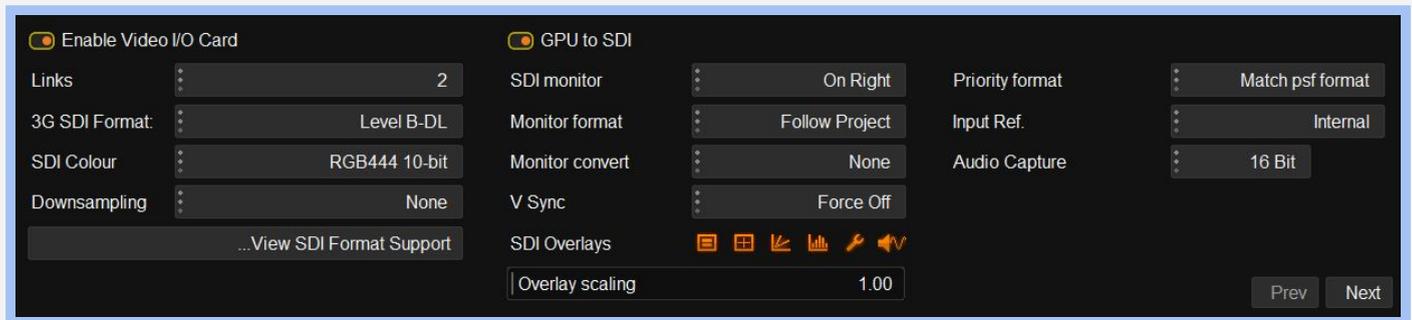**Full Range (0 -1023)**
Default for Full Range

Scale to SDI (4-1019)
This setting scales SDI values (0 to 1023) into range and is required when working in RGB444 12-Bit
Required for working in Dolby Vision

Scale to Video (64-940) Scale the SDI output to SMPTE range
Useful for working in Full Range and monitoring on a display that cannot display full range images. To export material with SMPTE levels from a Full Range project make sure to set the Full --> SMPTE scaling option in file export dialog

Some file formats like DNx will automatically scale the image, ensure you don't double scale the images.

SDI Output configuration

⊙ Enable Video I/O Card		⊙ GPU to SDI			
Links	2	SDI monitor	On Right	Priority format	Match psf format
3G SDI Format:	Level B-DL	Monitor format	Follow Project	Input Ref.	Internal
SDI Colour	RGB444 10-bit	Monitor convert	None	Audio Capture	16 Bit
Downsampling	None	V Sync	Force Off		
...View SDI Format Support		SDI Overlays	🔲 ⊞ 📉 📊 🔧 🔊		
		Overlay scaling	1.00		Prev Next

The configuration of the output format is based on:

- SDI Colour encoding (YUV or RGB)
- Number of available SDI Links
- 3G SDI Format - Level B DL is preferred but can be set to Level A if required

The most important setting for the user is the SDI Colour encoding, during configuration this will only be changed if it is not supported by the requested video standard. The number of links will only be taken into account if there are multiple valid configurations possible with a different number of links.

Example:

If one or four links are specified:
1080 25p RGB 444 will be set up as 1 x SDI link using 3G.

If two links are specified:
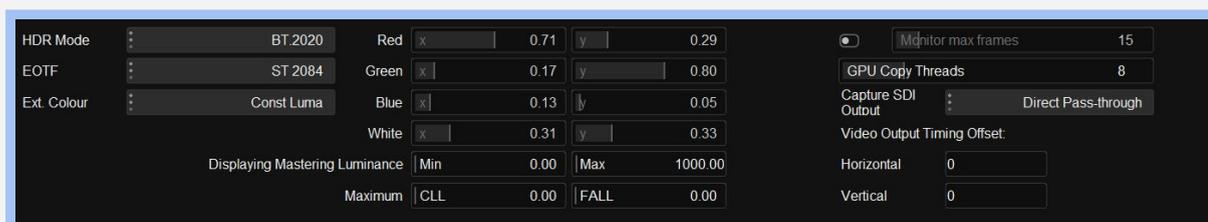1080 25p RGB 444 it will be set up as 2 x SDI links at 1.5G

The SDI configuration is displayed above the timeline, and is colour coded, white indicates that the configuration is exactly as requested, yellow means that a change was made due to an invalid setup option. Red will indicate invalid options.

The monitor format

The monitor format option can be used to always monitor in a particular format, and the monitor convert option will specify how the content is scaled to fit the output.

Monitor format	Follow Project
Monitor convert	None
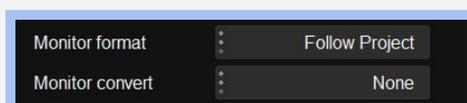
This way the user can set monitoring to always be 1080p and the conversion is set to fit. Regardless of the output format size, it will always be scaled to 1080p

HDR Mode	BT.2020	Red x	0.71	y	0.29	⊙ Monitor max frames	15
EOTF	ST 2084	Green x	0.17	y	0.80	GPU Copy Threads	8
Ext. Colour	Const Luma	Blue x	0.13	y	0.05	Capture SDI Output	Direct Pass-through
		White x	0.31	y	0.33	Video Output Timing Offset:	
	Displaying Mastering Luminance	Min	0.00	Max	1000.00	Horizontal	0
	Maximum	CLL	0.00	FALL	0.00	Vertical	0

Using the next and previous button on the bottom right of the Monitoring I/O tab will switch to a second menu containing additional settings for the installed card. Settings will only be shown if supported by the installed card.

Compressed and Mono Caches

Cache format can now be determined by the user

An option has been added to allow the user to specify the use of compressed caches, or an additional Monochrome DPX option. Using compressed caches can save a significant amount of space but will incur some overhead during caching and playback.

Cache formats can be set on a system and project basis.

In the preferences, under the Rendering tab, you can set the default cache format for all projects:

The default is uncompressed for 8 |10 |16 and Half.
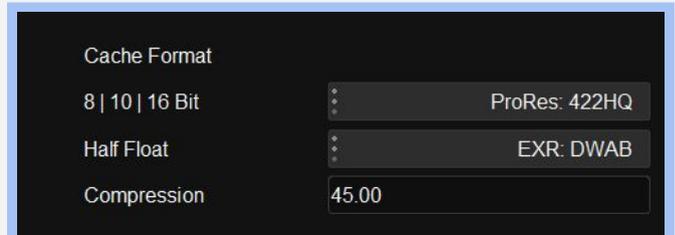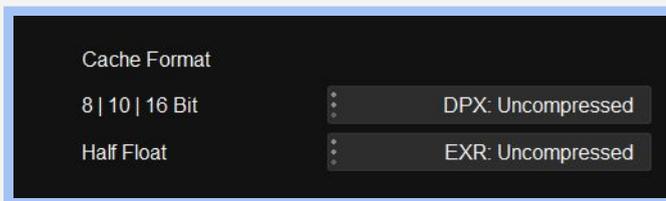
For 8 | 10| and 16 bit media, caches can be created in any of the available Prores formats. These files will be written to disk as .dvc files (Digital Vision Compressed) - these files cannot be read outside Nucoda or Phoenix.


For Half media the choice is DWAA and DWAB (Dreamworks Animation) the default compression is 45 and is a good value, the compression is lossy, but very good and is optimised for playback in real time. UHD playback of compressed EXR sources will have a high CPU overhead.

File size examples:

1920x1080 EXR, DWAB 45 compressed : Average 2mb or less.
3840x2160 EXR, DWAB 45 compressed : Average 3.5mb or less.

Choosing DPX Mono as the cache format is specifically designed for restoration users, this will use a single channel DPX file for caching and will save significant amounts of space.
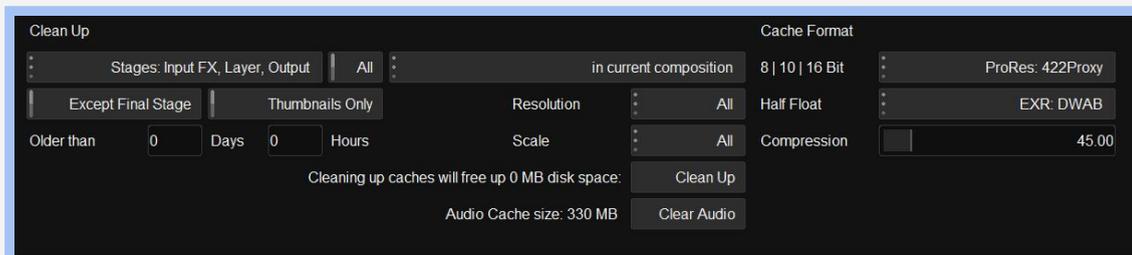

Cache setting for on project level is accessible from the Caches tab on the timeline - these setting are stored per project. It is advisable to clear caches before changing formats. Due to the compression used, the space calculation for formats may sometimes be inaccurate.
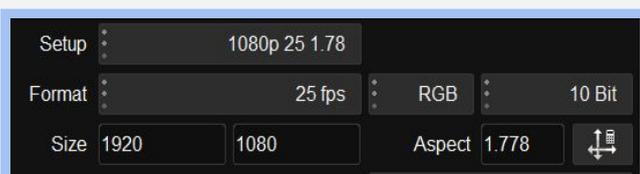
Project settings

While the format of the project will determine the format (8, 10, 16 or Half) of imported media, and therefore the cache format, users can change the media to any bit depth using the media properties, caches for selected clips can be set to half, giving the user the benefit of not clipping between layers when needed.
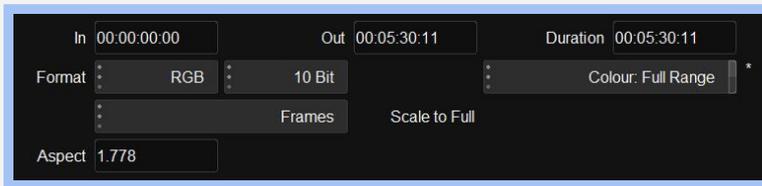

Clip Properties

Although possible, it is not recommended to change the image format while the system is caching as it could cause orphaned caches.

Just a reminder, in order to cache your sources make sure that the Source option is turned on in the Cache Tab, and that the material you want to cache has the Create Clone option set in the Clip properties. Create clone can be set on multiple clips by using Ctrl + Select.

Both Create Clone and Source must be enabled for source caches to be created.
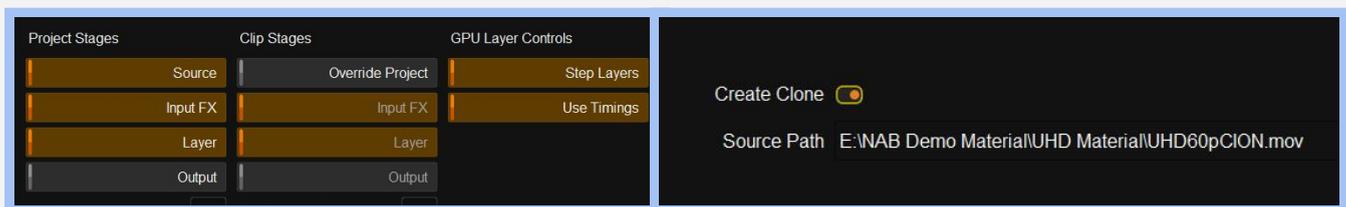
Please remember - the export quality of your project will be same as the quality of your caches, if you want to export at a higher quality you will need to remove your caches and re-render.

OpenEXR 2.2

Added support for DWAA and DWAB compressed file types

The OpenEXR implementation has been updated to version 2.2. Two new compressed codecs have been added DWAA and DWAB (DreamWorks Animation) - these codecs are high quality visually lossless and are designed to be used for realtime playback.

They have a default compression setting of 45 (Range is 0 - 300) that is a good compromise between quality and visual quality. *Please note that in although optimised for real time playback, performance will be dependant on resolution, CPU performance for encoding and decoding The preferred version is DWAB. There is no guarantee that performance will be raltime.*
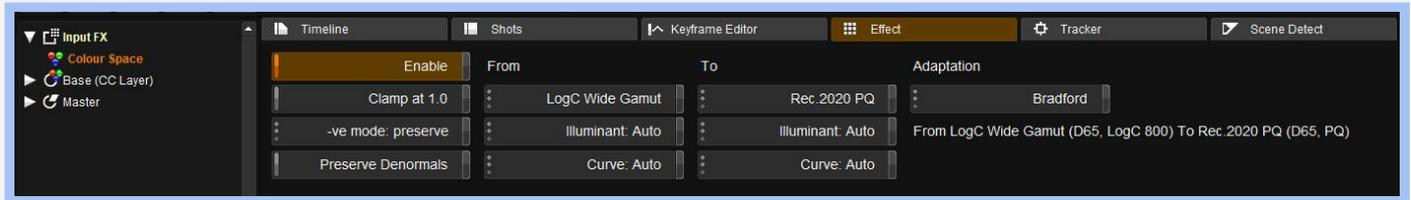
Colorspace conversion Tools

New tools to allow easy conversion between colour spaces

Colour Space Convert

The Colorspace tool has been added to allow for simple accurate conversion between colour spaces. It can be applied as an input effect or user effect. It allows the user to select the input and output from a preset list that can be updated by the user.

The tool uses GPU acceleration and covers all the major colour spaces, illuminants and curves and also has settings for chromatic adaptation. Custom Gamma can also be entered by selecting Gamma in the curve dropdown.

Colour Management -> Colour Convert

Set the current colorspace of the image using the From setting and then select the To colorspace on the output side. The correct conversion will be applied to the material.

Usually, the Illuminant and the Curve setting should be left on auto as they will be specified to match the colour space. Using the dropdown menus you can override the defaults for the Illuminant and Curve

The adaptation setting defaults to Bradford, which is the most commonly used chromatic adaptation. The adaptation setting will only be used if there is a change in the illuminants between the colour spaces, for example in the case of P3 and Rec.709.

Colour Spaces	Curves
ACES_2065-1	ACES cc
ACEScc	ACES cct
ACEScct	PQ
Adobe Wide Gamut RGB	Alexa Log C 800
Alexa Wide Gamut	BT 2020
*CIE RGB	D-Log
Cinema Gamut	Rec 709
P3-DCI	S-Log 2
P3-D65	S-Log 3
P3-D65PQ	Cineon Log
Protune Native	Protune
Rec.709	RED3G10
BT.1886	RED3G10Legacy
Rec.2020	*RED3G12
Rec.2020_PQ	*REDLog
Rec.2020_HLG	V-Gamut
* Red Color	sRGB
* Red Color 2	HLG
* Red Color 3	
* Red Color 4	
*Dragon Color	
Dragon Color 2	
RED Wide Gamut RGB	
S-Gamut	
S-Gamut3	
S-Gamut3.cine	
V-Gamut	
D-Gamut	
XYZ	

Below the adaptation menu there is a colour trail that shows the conversion that was performed - the illuminant and curve is displayed in brackets.

The menu to the left will allow clamping of values above 1.0 and give option on how to handle negative values (clamp, preserve or process). It should not to be used in ACES projects.

The Rec.709 setting assumes Rec.709 Linear Gamma we have added Bt.1886 as option.
The colour spaces and function curves can be edited by the user to create new presets.

Files are located here:

```
C:\Nucoda\2018_2\root\Presets\System\ColourSpaceDefs.txt
C:\Nucoda\2018_2\root\Presets\System\UserMathsFunctions.txt
```

To use PQ or HLG optional Luma value as in the PQ Matrix effect, specify the preference in the file to be:

"Rec.2020 PQ": {
        "primaries": [0.708, 0.292, 0.170, 0.797, 0.131, 0.046],
        "illuminant": "D65",
        "transferFunc": ["PQ (1000)"]
    },

Where the value in brackets after PQ is value in Nits. Default value will just be "transferFunc": ["PQ"]

Source export with rendered transitions

The is a new option when exporting as Source that allows for transitions to be rendered as part of the export. It is available in the export menu as a setting that is exposed when setting source as export.

When selected it is not possible to export with handles.

Tangent Panel updates

We have made the following changes to the Tangent panel support.

Some tool names have been changed and additional characters added to descriptions to make them easier to read, for example:

```
Play ->   Play Forward
Clip -| Go to end of current clip
|-Clip   Go to end of previous clip

<-Knobs-> Cycle through Knob banks
<-Btns->   Cycle through button banks
-> Cue   Cue to
```

- Ball and Ring resets should now work automatically for all Tangent panel models including Wave, Wave 2, CP200 and the new Arc panels
- Selecting  Bezier, Ellipse or Rectangle when not in shapes mode will now set the mode to shapes and create the shape.
- It is now possible to map the Jog/Shuttle command provided in the Tangent mapper, this will have the benefit of being able to use the Jog sensitivity control in the Tangent mapper, as it is not seem as a ring control any longer. The current default is mapped via the Navigation menu.
- Improved description for certain controls
- Control Resets have been removed since resets work by pressing the knobs and additional resets are not needed.
- Added "Shift" controls to the keyer for HSL, HSV, RGB - these controls will allow shifting the value of the control in the same way as using the mouse and dragging the Hue strip.

  Use the Tolerance and Softness controls to set the points on the strip - use the HSL Shift controls to move the Hue strip, relative to the control points

  `<-Hue-> <-Light-> <-Set->        <-Red-> <-Green-> <Blue>        <-Hue-> <-Light-> <-Value->`
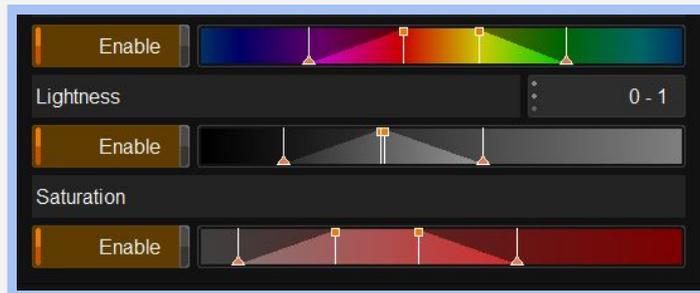
## Update Arri RAW SDK

ARRIRAW_SDK_5.4.3 -This update adds  support for the Alexa LF camera

## Update to RED RAW - IPP2 support

For more information visit:

RED IPP2 Overview
IPP2 Output Transforms and IPP2 Image Pipeline Stages

The addition of the IPP2 image processing features have required some changes in the RED RAW interface in Nucoda. The approach has been to try and mirror what has been done in RedcineX with regards to features that are exposed.

Depending on the chosen Colour Science, certain features will no longer be available to the user.

When importing RED material the Colour Processing should switch based on camera settings, so the menu  will be either in the FLUT or IPP2 depending on the material. This does not mean you have to use the selected option, feel free to change to the other colour pipeline if required.

Another change is that the Colour Space and Colour Curve in the properties will now match the settings in the camera file.
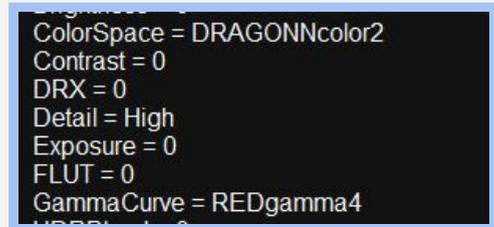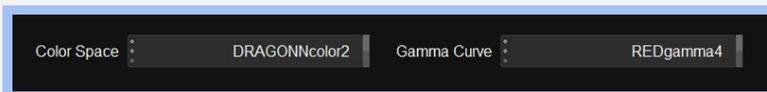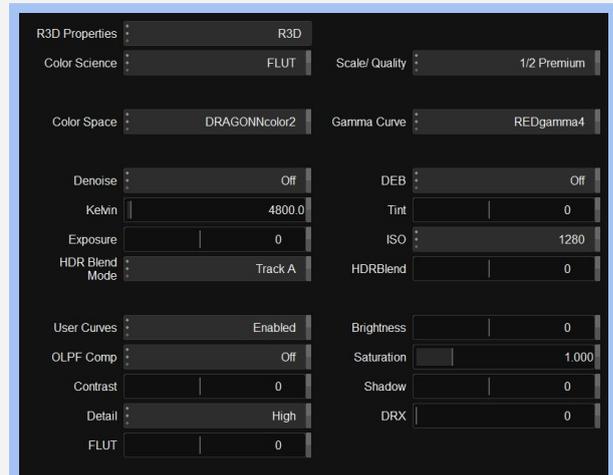




## Colour science menu:

Select: ***Original, FLUT or IPP2***
Colour space,  gamma curve and other controls shown based on the colour science chosen

### Colour science: Original
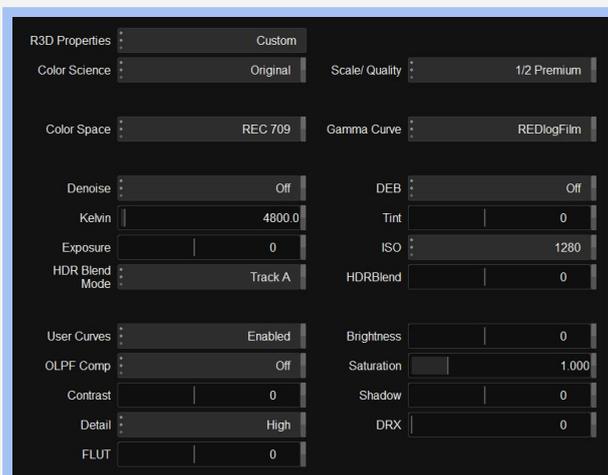


### Colour Science: FLUT



## Colour Science: IPP2

## Image Pipeline: RAW - (IPP2 Stage 1 - Primary RAW development)

Using the RAW image pipeline restricts the output to REDWideGamutRGB and Log3G10
There are minimal other controls available to the user in this mode.

LUT's are available from the RED website or from RedcineX to convert from RAW to various outputs using the Roll Off and Tone map settings available in the creative mode.
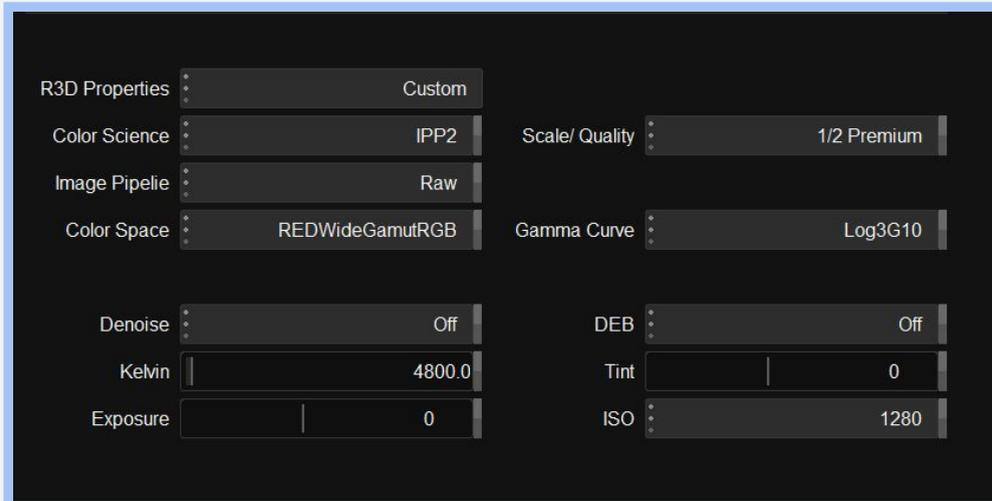


**Colour Science: IPP2**
**Image Pipeline: Creative - (IPP2 Stage 2/3 - Grading and output transforms)**

Using the Creative options allows control over Colour space and Gamma curves, as well as some additional parameters. The roll off and tone map parameters are very useful new options.

It will allow you to develop images using some of the creative and Image transform features available in IPP2. It is not really ideal as a starting point for grading.
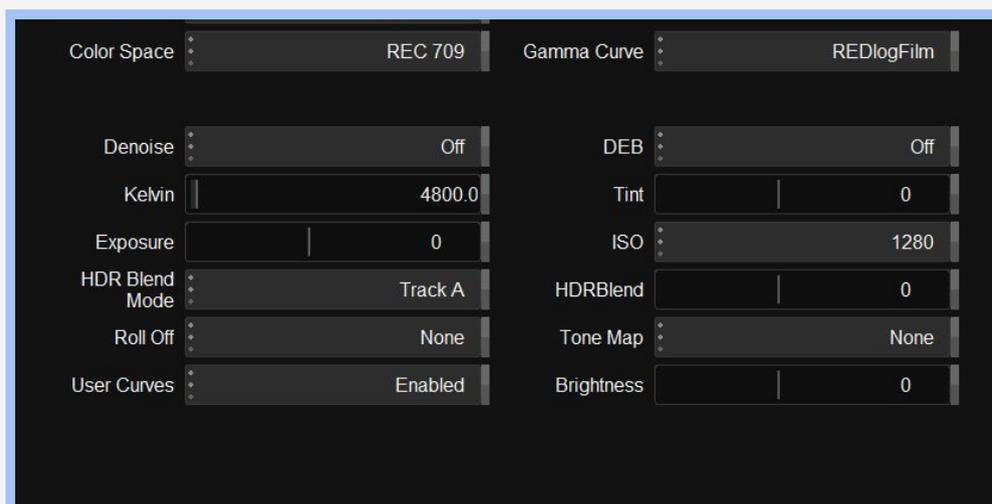
## Importing markers from AAF and EDL

### Markers imported as Segment or Timeline

Nucoda and Phoenix now correctly assigns Segment and Timeline markers when imported from AAF, based on the marker type in the Avid timeline.

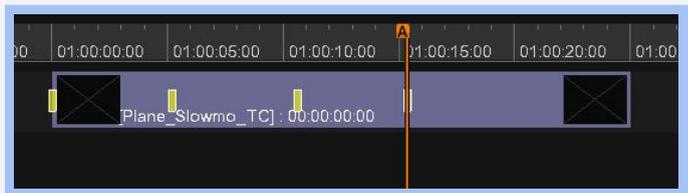For EDL the Avid convention is followed:

* LOC: 01:00:01:14 RED  VIDEO  will add a segment bookmark
* 01:00:03:23 BLUE  - will add a timeline bookmark

### Using markers in AAF to indicate speed changes

If an AAF is imported into the application any speed or variable speed changes that were applied in Avid will be marked on the clip as segment bookmarks. The bookmarks will contain the value of the keyframe at that point.

This will allow the user to easily duplicate speed ramps when using tools like Re:Vision FX Twixtor.