

# Quantel Rio Rio Assist

## V3.0 rev 1 New Feature List

**Note:**

This is a major release and requires a database schema change. After installation the first run up will migrate the base, desk and dict folders automatically creating a back-up of the original ones. A new V3.0 license is required to run this software. This is free to any customer with a support contract and can be obtained through your local SAM office or by calling the Helpdesk.

Floating point processing uses a lot of CUDA memory. For 4k workflows where float processing is required then it is recommended that existing customers have a minimum of at least two Tesla K20s.

Existing archives from previous software versions will come in and use 'source colour processing' as the default. To maintain existing compatibility clips should be viewed on output and rendered at Rec709 and 2.2 gamma. If they were originally flagged as 'log' then Rec709 and Cineon Log should be chosen to avoid any color transformations. See page 5 for more details.

If you have any questions please contact Damon Hawkins  
[damon.hawkins@s-a-m.com](mailto:damon.hawkins@s-a-m.com)

**V3.0 rev 1 – New Features – November 2015**

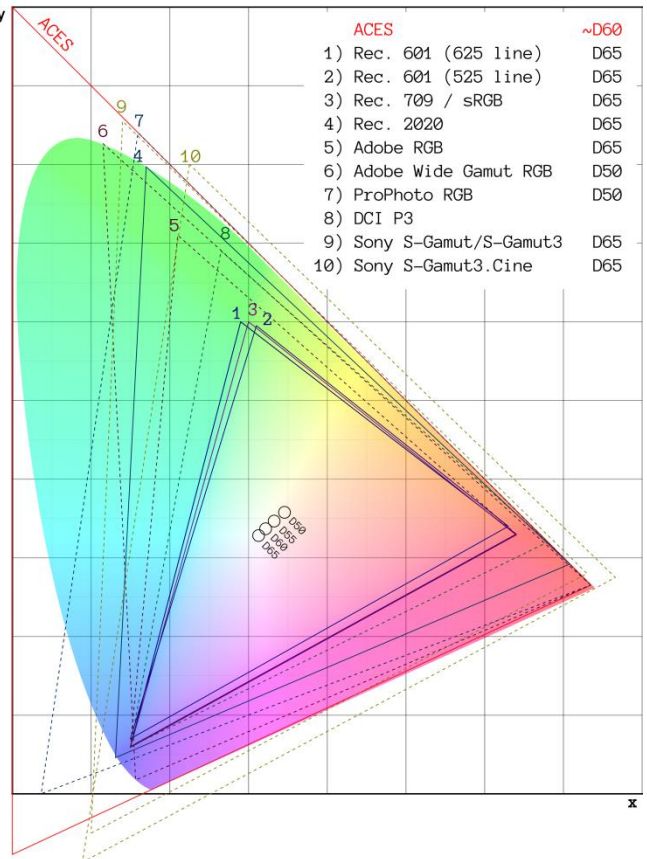
- Wide Color Gamut (WCG) support with Native Color space on disk
- High Dynamic Range transfer curve support
- 32-bit full float / 16-bit half float processing
- MLTFX render format changes
- Archive changes to support floating point processing
- 60p timeline and conform improvements
- OFX Plugin overlays
- Canon HDR monitor support
- Sony BVE 9100 EDL support
- S-Curve pivot point mapped to panel
- Curves – MRGB graph changes
- 32 Channel audio support
- DNxHD RGB 4:4:4 support
- ARRI 5.1 SDK
- New – Rio Connect
- Rio Assist –Pablo PA gets additional features and re-named

### Wide Color Gamut (WCG) support with Native Color space on disk

Rushes and edits can now be stored in the library in the color space of choice. The color space of an edit will be indicated from the first segment/frame. The color space of a rush can also be changed by selecting the attributes as shown below. The color space attributes of a rush/clip in the library are metadata flags that will determine how any particular pixel's coordinates will be converted to the output and also processed in MLTFLX. As a result any changes made will affect how the image looks on the output, but would not affect any data on disk.

| name                    | size           | Rec. 601 (625 line)      | colour space             |
|-------------------------|----------------|--------------------------|--------------------------|
| 1C019_120923_R33F.089   | 48x15          | Rec. 601 (525 line)      | Arri LogC-Wide Gamut     |
| beyond Wonderland - CCR | 20x10          | Rec. 709                 | Rec. 709                 |
| 6_C001_0628AB           | 96x20          | Rec. 2020                | Rec. 709                 |
| 98_F65RAW-SQ_500SL_Cf   | 96x20          | CIE RGB                  | Rec. 709                 |
| 98_F65RAW-SQ_500SL_Cf   | 96x20          | CIE XYZ                  | Sony S-Gamut3.Cine/S-Log |
| elQuad                  | 00x13          | DCI P3                   | Sony S-Gamut3.Cine/S-Log |
| me delete 1             | 00x13          | DCI P3 (D60)             | Rec. 2020                |
| me rename               | 00x13          | DCI P3 (D65)             | Rec. 2020                |
| me owner - CCR          | 20x10          | DCI X'Y'Z'               | ACES2065-1               |
| me category             | 48x15          | Adobe (1998) RGB         | Rec. 709                 |
| me add category         | 00x13          | Adobe Wide Gamut RGB     | Rec. 601 (625 line)      |
| me description          | 00x13          | ColorMatch               | Rec. 709                 |
| me colour               | 96x20          | Arri LogC-Wide Gamut     | Rec. 709                 |
| me originator           | 00x13          | Canon Cinema Gamut/C-Log | Rec. 2020                |
| me sourceTC             | dom            | Sony S-Gamut/S-Log       | REDcolor3                |
| me keycode              | aspect         | Panasonic V-Gamut/V-Log  | DCI P3                   |
| me attributes           | colour space   | ACES2065-1               | sRGB                     |
| me clear history        | transfer curve | ACESproxxy               | DCI X'Y'Z'               |
| me clear versions       | levels         | REDspace                 | Rec. 709                 |
| me clear highlights     | 96x20          | REDcolor                 | Rec. 709                 |
| me unrender             | 40x20          | REDcolor2                | DCI P3 (D60)             |
| me trim tails           | 40x20          | REDcolor3                | Rec. 709                 |
| me split segs           | 20x10          | REDcolor4                | Rec. 709                 |
| me remount              | 20x10          | DRAGONcolor              | Rec. 709                 |
| V-102GS_T001_C075_060   | 48x10          | DRAGONcolor2             | Rec. 709                 |
| V-102GS_T001_C075_060   | 44x3160_25.00  | Rec. 709                 | REDcolor3                |

CIE 1931 xy Chromaticity Diagram



Conform

AAF Out

Archive In

Archive Out

DCP In

DCP Out

**Import**

Export

soft mount

stop on error

start import

clip details

name A001\_L001\_0406VR

owner

cat

fps 23.98

scan progressive

video attributes

format custom

size 5120 x 2700

pixel aspect 1 : 1

resize to same as source

flip  horizontal  vertical

colour RGB 16 bit float

colour space Rec. 2020

transfer curve 2.2 Gamma

B/W level 0 1

lookup table none

The same color space and transfer curve choices (see below) can also be set under the video attributes in the Import menu.

Please note that this also automatically reflects the choices made in any of the file import debayer menus, but only if the transfer curves are available<sup>1</sup>. These are available for Sony F65, RED, ARRI, Canon RAW, Cinema DNG and Cineform.

<sup>1</sup>RED do not make available the profile of their REDgamma curves and so these cannot be implemented and a gamma of 2.2 will be assumed.

As the debayer sizing is now reflected correctly under video attributes, the resizing widget is disabled for RED, ARRI, Canon RAW, Cineform and F65.

video attributes

format 4K x 2K

size 4096 x 2048

pixel aspect 1 : 1

resize to same as source

flip  horizontal  vertical

colour RGR 16 bit float

colour space REDcolor3

transfer curve REDlog

B/W level 0 1

lookup table none

audio attributes

timecode

originator from file A001\_C001\_080527

sourceTC from file 11:15:38:16

keycode

source details

General Colour FLUT HDR Metadata

include audio

Decode mode Full res. High

Colour version Original colour space

Gamma curve REDlog

Colour space REDcolor3

Image detail High

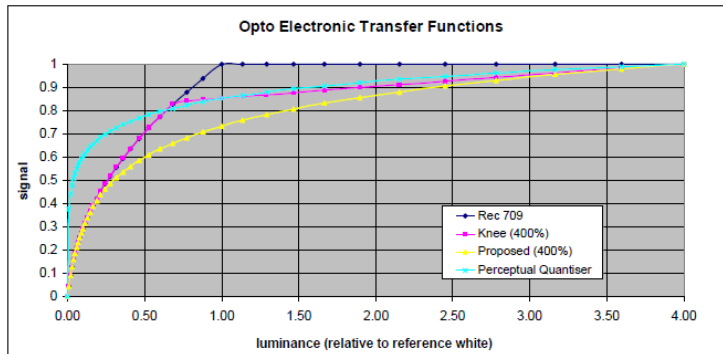
OLPF Off

Denoise Off

reset from file

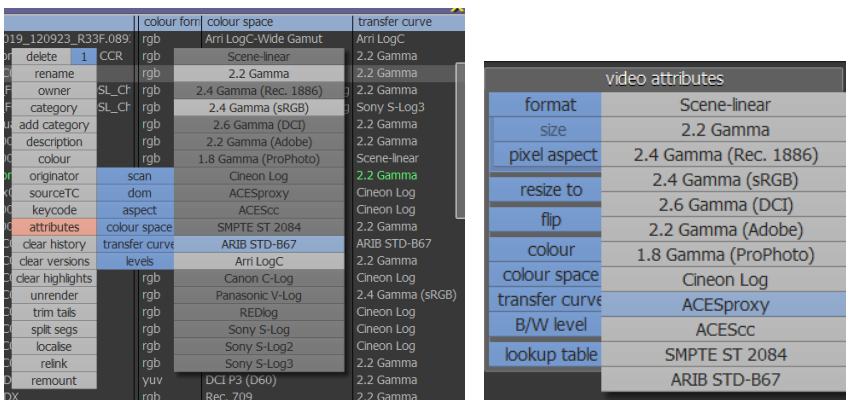
### High Dynamic Range transfer curve support

In order to be able to work in High Dynamic Range it is necessary to be able to map and grade the luminance of any clip against a gamma or “transfer curve” (OETF) and also output with a transfer curve so that it can be mapped within any HDR monitor curve (EOTF – Electro Optical Transfer Function). This way the detail in both the black and whites areas of the image can be displayed.

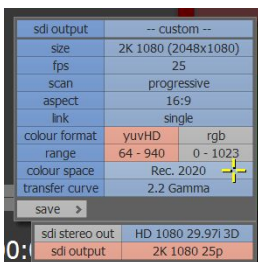


BBC OETF proposal (Dolby uses the PQ curve)

As with the color space there are a range of transfer curves that can be chosen in the attribute's and file import menus. The highlighted ones in the library are the preferred choices for the currently selected color space.



It is recommended that the color space and transfer curve of rushes in the library are set at ingest so that they may be displayed correctly on the output. In the case of a conform this may mean group selecting all the rushes and then setting the color space and transfer curve in the library prior to a conform of the final edit.



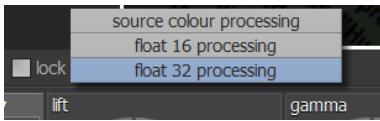
Both the colour space and transfer curve can also be set in the video output menu. Previously the default had always been Rec709 and 2.2 Gamma and now there is a choice depending on the display device. It is of course important to make sure that the output display matches what is being rendered to disk otherwise any deliverable may look different to the graded result.

**Note:**

Clips in Edit and on the Desktop show RAW data and in MLTFX are shown converted to 709 color space.

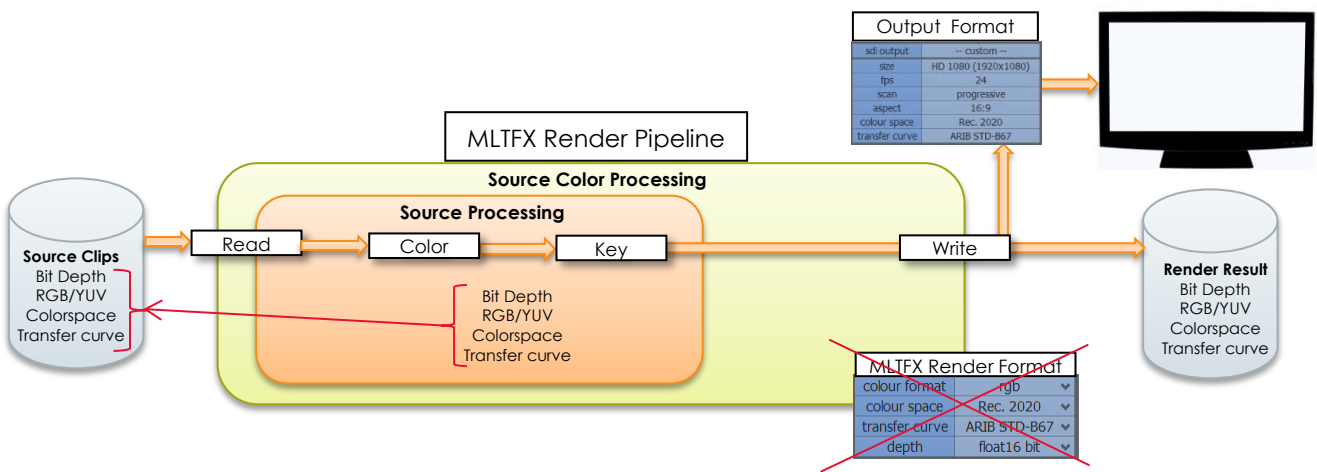
### 32-bit full float / 16-bit half float processing

When working in MLTFX there is a choice of how media can be processed internally.

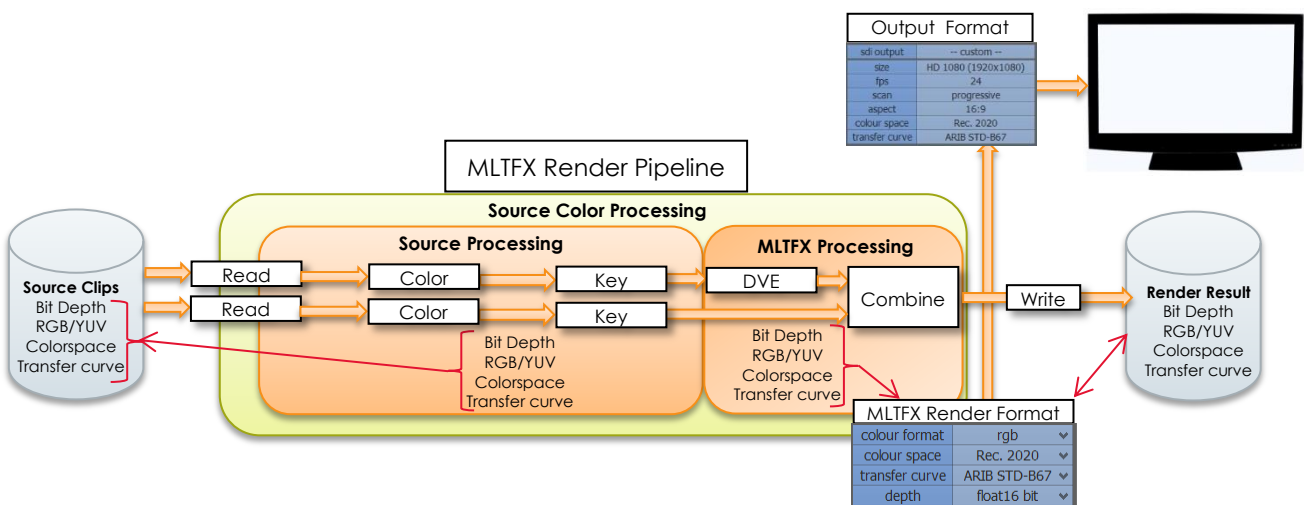


**Source colour processing** – this is for archive compatibility and to preserve the current way of working. Internal processing will be done using the native color space and transfer curve of the current segment. This will be in 16-bit integer, 16-bit half float or 32-bit full float depending on the bit depth of the rush. 8 and 10-bit clips will always be processed in 16-bit integer just as they are now.

**Note:** This method processes using the native transfer curve of the rush and so the ballistics of the color corrector may feel different. Also because all processing is now done in CUDA at a higher precision than previously with the color cube there may be very slight color differences when restoring older archives.

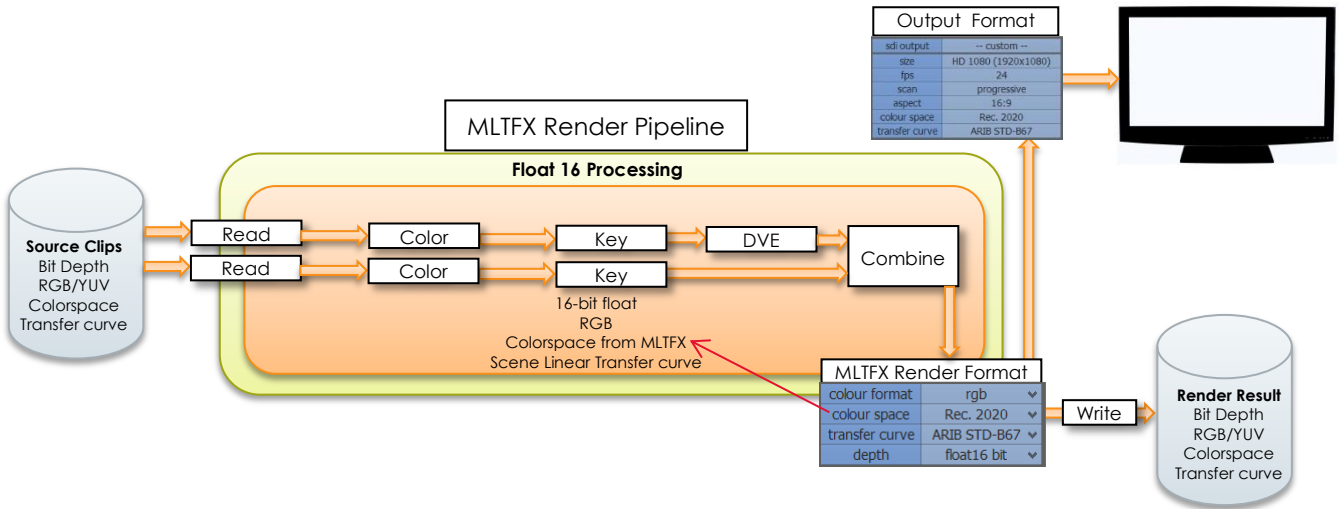


When there is no DVE and no Combine involved then the MLTFX render format is ignored and the clip/rush is processed and rendered to its native format.

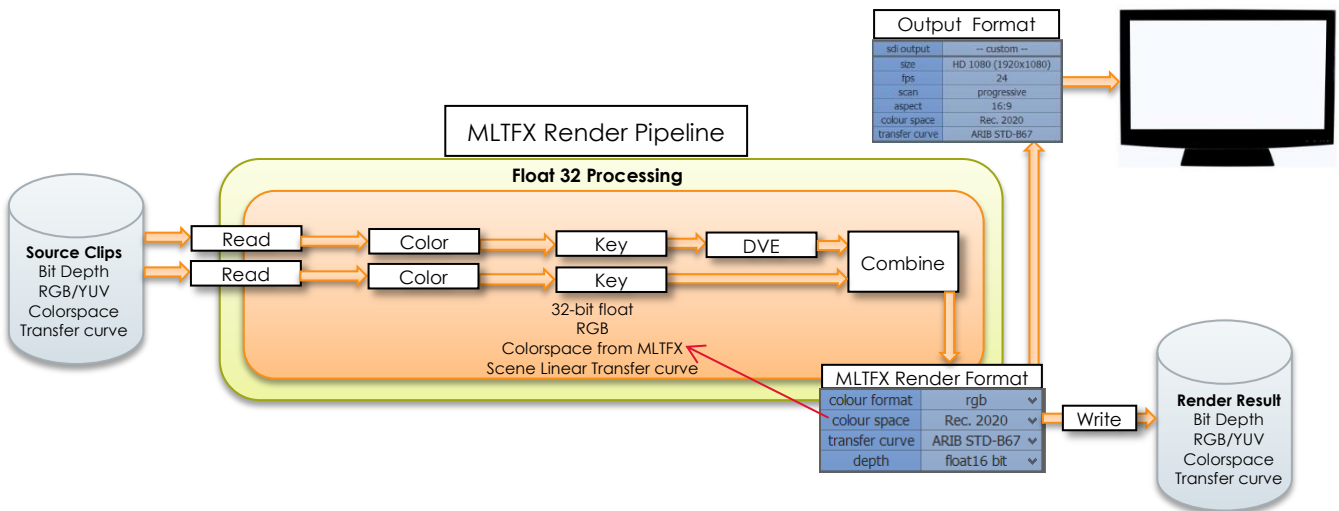


When the DVE or any Combine is involved (fade to black, key, mix pixel aspect ratio transition) then the final processing and render result is controlled by the MLTFX render format.

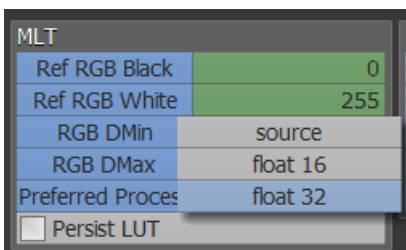
**Float 16 processing** – this will always process in 16-bit (half) float using scene linear in the color space as set by the render format.



**Float 32 processing** – this will always process in 32-bit (full) float using scene linear in the color space as set by the render format.



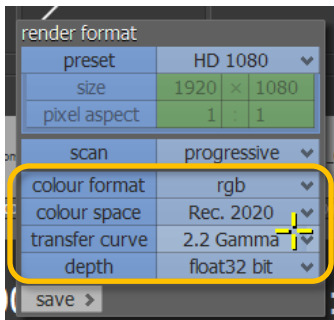
These settings are always stored with the clip and will be remembered as part of the history when a clip is taken back into MLTFX. When any new clip without history is taken into MLTFX then the default processing method can be set in the F1 menu as shown.



The default at boot up of the F1 setting is 'source'.

### MLTFX render format changes

The MLTFX render format box has been expanded to include color space and transfer curve. When 'float 16 processing' or 'float 32 processing' are selected in MLTFX then the color format, color space, transfer curve and depth parameters will always be written to disk on any render.



With 'source color processing' the behaviour will be as before with the MLTFX render format only invoked with a DVE, combine or mix pixel aspect ratio transition.

Scan type and resolution will only be invoked with a DVE, combine or mix pixel aspect ratio transition regardless of the processing method chosen.

12-bit integer is also supported in V3.0.

### Note:

Clips rendered to 16-bit half float and 32-bit full float can only be exported as EXR files. If another file format is selected and a float clip dropped into the Export menu then an error message will be displayed.

EXR files will always export in the clips native colorspace and so there is no longer a Colorspace option in the EXR export menu.

Only the EXR format is supported for floating point plane size export.

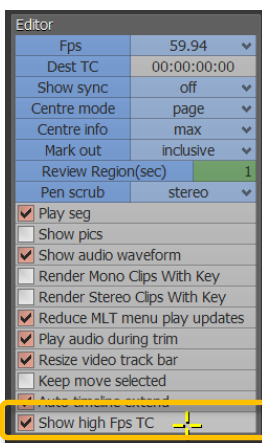
If the first frame or segment of the clip is integer then it will export ok to other formats.

### Archive changes to support floating point processing

It is important that all floating point data is preserved when archiving out. To maintain this data any rushes that originated as float or were rendered to float will be archived out as EXR files. Integer based rushes will continue to be archived out as DPX files. This means that a timeline that contains a mix of floating point and integer rushes will archive out as EXR and DPX files as required.

### 60p timeline and conform improvements

There are offline systems that now output a 60fps timecode count, rather than a 30fps timecode count. Quantel Rio will now support a 60fps edl in Conform. Also when exporting as DPX files from a 60p timeline the timecode in the file header will now be at 60fps and not at a 30fps count as it was previously.



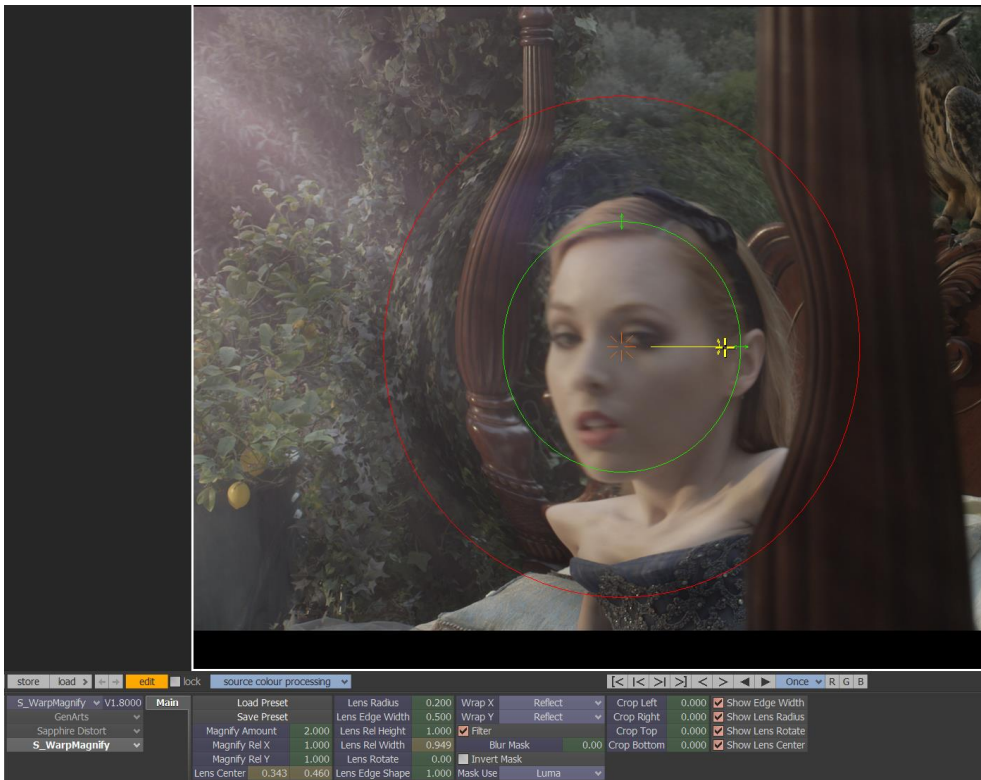
In the F1 menu there is a 'Show high Fps' that when checked will display 50/60fps timecode count on the timeline and in the library rather than the 30fps with a 1/2 count. This also means that any timecode navigation/calculation on the timeline will work with a 60fps count.

10:00:25:58 dur 00:00:48:57

10:00:25:29<sup>1</sup> dur 00:00:48:28<sup>2</sup>

### OFX Plugin overlays

The OFX plugins now support the use of on screen overlays where available.



### Canon HDR monitor support

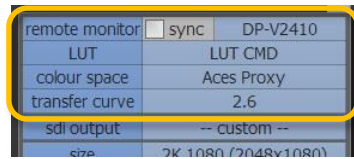
The Canon DP-V3010 and DP-V2410 monitors feature an Ethernet connection that supports remote adjustment of its display properties. This control is now supported through the video out interface. There can only be one network connected controller to the monitor so if the standard Canon supplied controller occupies the port the monitor remote service will be ignored.

In order to affect control and for the menu to appear the IP address of the monitor needs to first be set in the Settings menu as shown.





This will then show the additional menu in video out dialogue as shown.



LUT – This has been reserved for future development and is currently not active.

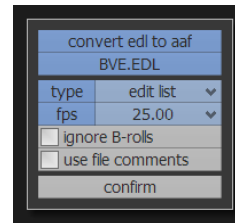
Colour Space – will remotely switch the color space of the monitor provided it is supported.

Transfer Curve – will remotely switch the monitor transfer curve provided it is supported and loaded.

Sync – if this box is checked then the color space and transfer curve will follow that as set in the video out menu below.

### Sony BVE 9100 EDL support

Some customers have requested support for the older Sony BVE EDL format. This is now supported in the same way as CMK EDLs are supported. A dialogue box will appear when dragged into the Conform menu as shown. This will then convert to an AAF.



As this is an older tape based format there are some limitations:

### EDL translation limitations

1. All tape machine specific data is ignored. Data beyond column 100 is identified as such and is removed.
2. Wipe codes are not supported. Sony BVE 9100 tape machine wipe codes are not SMPTE compliant and the internal reference, in addition to not being widely used, is unavailable.
3. Sony BVE 9100 format is not validated. The file is read, identified as Sony format, by inclusion of the index line, and then expectations are in place with regards to column layout.

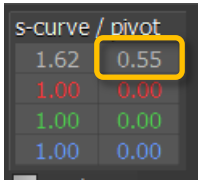
### BVE 9100 Support Limitations

9100 support limitations. These limitations are mostly the result of not catering to special tape functionality:

1. Edit Modes ASMBL and ASSY1 are not supported
2. Edit Types C, W and D are the only types supported
  - a. Excluded: KB, KBF, MBF, FM, KI, KO, M, MB, MA, MVD
3. GPI Data Line is not supported
4. Learn Data Line is not supported
5. Validation of Sony EDL rules is not performed. The software will attempt to translate into valid CMX3600 where errors will be detected
6. Sony to SMPTE wipe codes are not translated as there is currently no available reference documentation
7. Data from column 100 is erased prior to processing as they are tape specific.

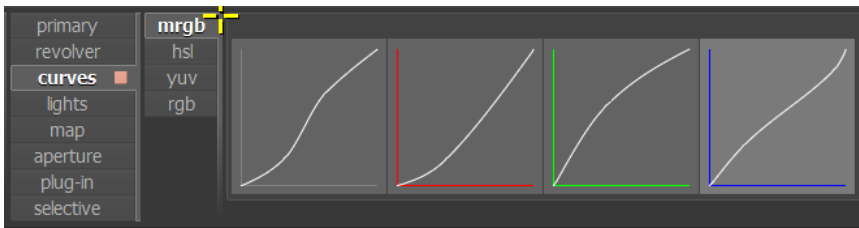
### S-Curve pivot point mapped to panel

The S-Curve pivot point can now be adjusted from the Neo panel by holding down the control key and adjusting the S-Curve rotary.



### Curves – MRGB graph changes

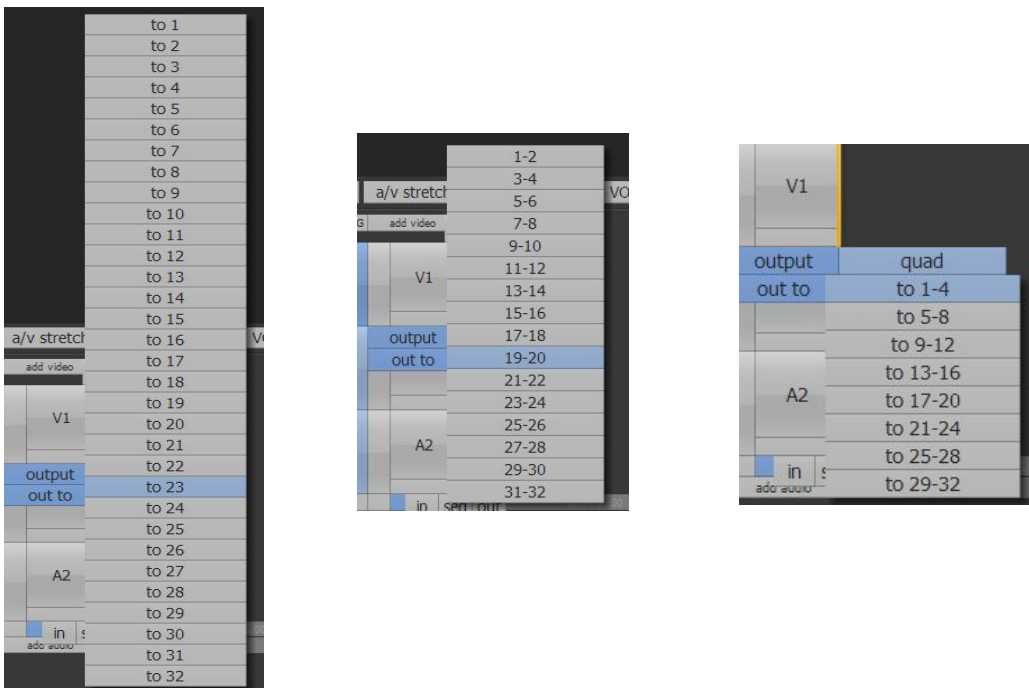
The Master RGB curves are now displayed as L graphs to make them easier to use.



### 32 Channel audio support (AJA Kona 4 / Corvid 88 cards only)

There is now 32 channel audio support. This is embedded via SDI 1 and SDI 2 (16 channels each) on the AJA cards. As this requires two SDIs, 32 channel audio is only supported for UHD, 4k and 8k. The embedded SDI audio i/o is not supported on the older eVidio2 cards or AJA Corvid Ultra and so is primarily for Quantel Rio 8k and new Quantel Rio 4k machines sold.

The timeline will still only support 16 physical tracks but 32 channel audio can be mapped as mono, stereo or quad.



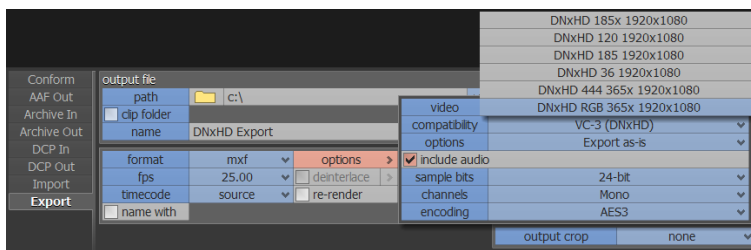
Mono output mapping can only be for selective tracks due to the 16 physical track limitation.

**DNxHD RGB 4:4:4 support (VC-3 MXF OP-1a)**

There are 5 additional DNxHD formats that our codec now supports.

These are:

| Compression ID | Scan | Width | Height | Byte Count | Sampling        |
|----------------|------|-------|--------|------------|-----------------|
| 1244           | i    | 1440  | 1080   | 606208     | YUV 422         |
| 1256           | P    | 1920  | 1080   | 1835008    | RGB 444/YUV 444 |
| 1258           | P    | 960   | 720    | 212992     | YUV 422         |
| 1259           | P    | 1440  | 1080   | 417792     | YUV 422         |
| 1260           | i    | 1440  | 1080   | 417792     | YUV 422         |



Details may be found in SMPTE ST 2019-1:2014.

**ARRI 5.1 SDK**

The new SDK offers the following new features:

- New white balance coefficients and colour matrixes for Alexa 65
- Support for 4K, Quad HD, 2K and HD scale modes for 5120 x 2880 resolutions (Alexa 65)
- Support for 4K, Quad HD, 2K and HD scale modes for 4320 x 2880 resolutions (Alexa 65)
- Bug fixes in look processing, scaling formats

**New – Rio Connect Collaborative Workflow Engine**

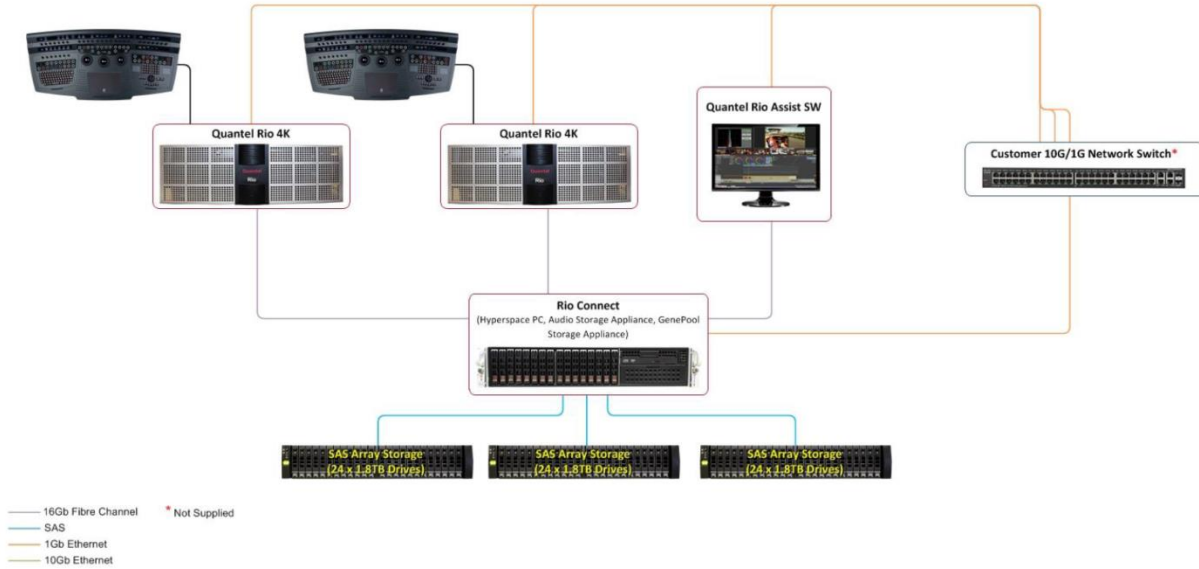
This a new lower cost entry platform for connecting two or more Quantel Rios on Shared Workspace (previously known as Genetic Engineering 2 – GE2)

The Redundant Hyperspace PC, Audio Storage Appliance and GenePool Storage Appliance have now combined into a single 2U Workstation. Video and Audio can use the same fibre channel (1.6GB/s) which allows up to 8 clients to connect to the same workspace.

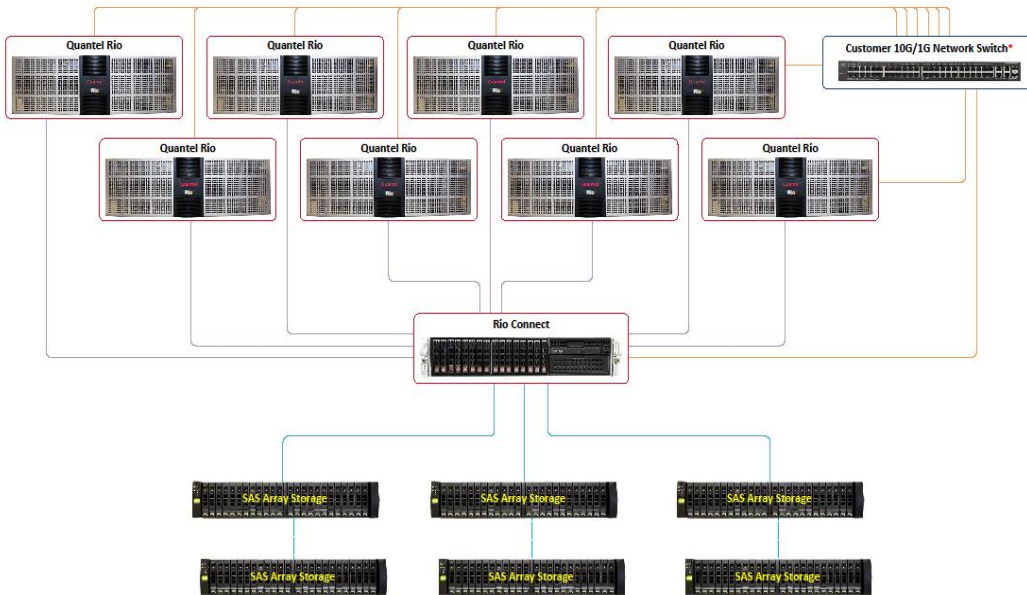
- All capable of realtime 2k 16-bit @30fps (or 10-bit @60fps) with arrays 3 wide
- Realtime 4k reduces the number of clients
- Can also be a mix of Rio 4k, Rio 2k and Rio Assist
- Disk arrays are supported up to 3 wide and 3 deep
- Larger capacity 36TB arrays

With arrays 3 wide maximum bandwidth is 4,200MB/s to be shared amongst the clients.

### Example Rio Connect system – small



### Example Rio Connect System – Large



- Instantly share clips and projects
- No media copied
- Can be any mix of Rio Assist, Rio 2k and Rio 4k
- 4200MB/s max bandwidth shared between clients
- System shown above would easily allow all 8 clients to playback 2k 16-bit @30fps

### Rio Assist – Pablo PA gets additional features and re-named

Pablo PA gets additional functionality and renamed to Rio Assist

- Utilities and Scribe now included
- Video out with AJA Kona 4 support
  - Up to 2k (2048x1080) output
- Neo Nano support