Rio 4K / 8K
Rio Assist

v4.5.0
New Features Notes

Version History

Document Name: **Rio - v4.5.0 – New Features**

Version	Description	Date	Author
1	Rio – v4.5.0 New Features Notes	19th September 2018	Damon Hawkins

Contents

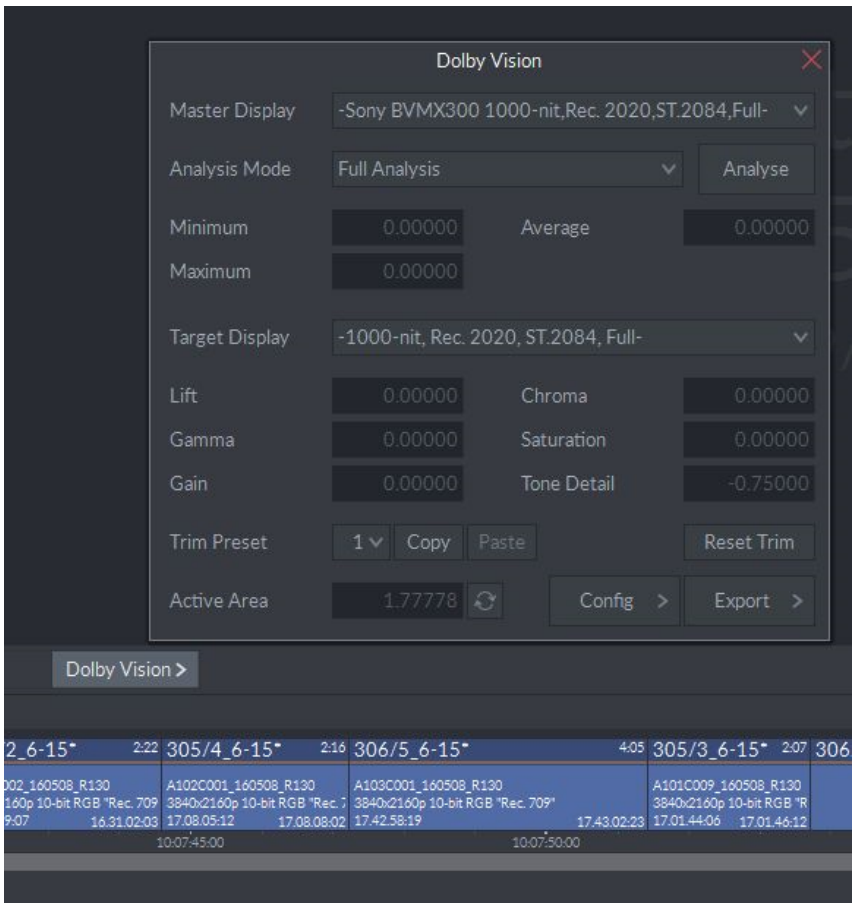
v4.5.0 – New Features Headlines – September 2018

- Dolby Vision
- Production Compression Codec
- Canon v2.2 SDK Update
- Alchemist Respeed Improvements

Dolby Vision

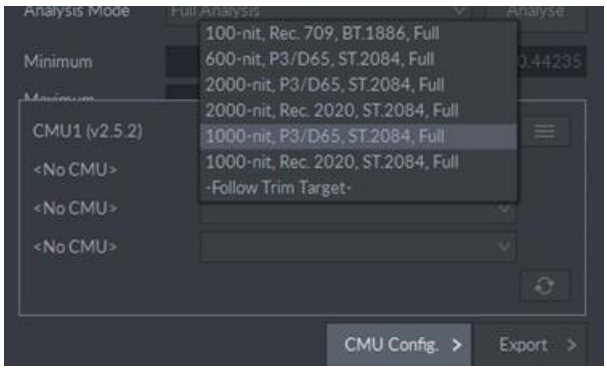
Rio now has the toolset to provide Dolby Vision deliverables. With a Dolby CMU box, timeline trim passes can now easily be made for multiple display devices with all the information stored in a single XML that accompanies the master files. All parameters can be controlled from the Neo panel with frame analysis choices to help expedite the process with long timelines.

In order for Dolby Vision analysis to work properly the graded timeline must be rendered first. A Dolby CMU box must also be present and licensed.



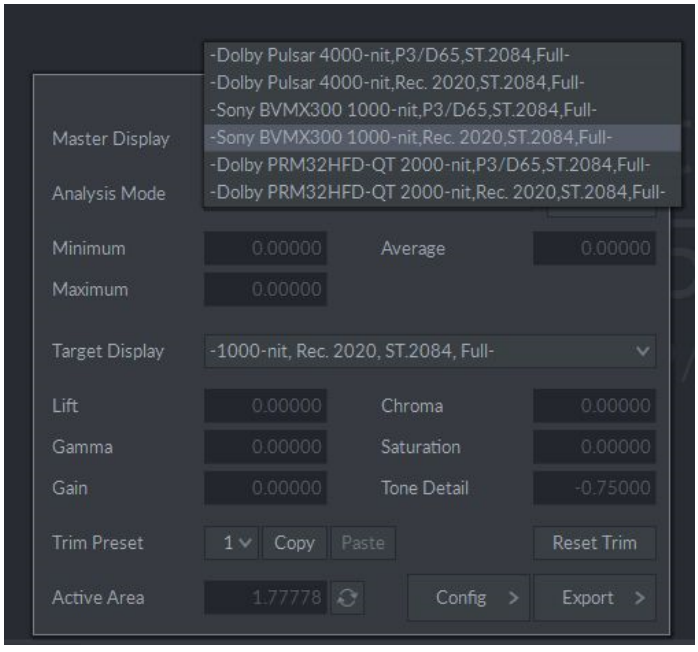
The Dolby Vision menu is always available regardless of whether or not a CMU box is present. When Rio boots up it will try to establish connection with a connected CMU (required to be connected to the same local network as the Rio). This allows the Rio to ask for the display profiles on the CMU during a boot. If this process fails, you will still be able to use the feature but the display profiles will be hard coded, displayed with surrounding hyphens (eg '-Dolby Pulsar 4000nit...-').

You can also attempt the connection again via Config > refresh. A maximum of 4 CMU's can be connected which are displayed in the Config menu once a connection has been established, along with an override setting for what target display each one should use, and access to its web interface via the hamburger menu button.



Getting Started

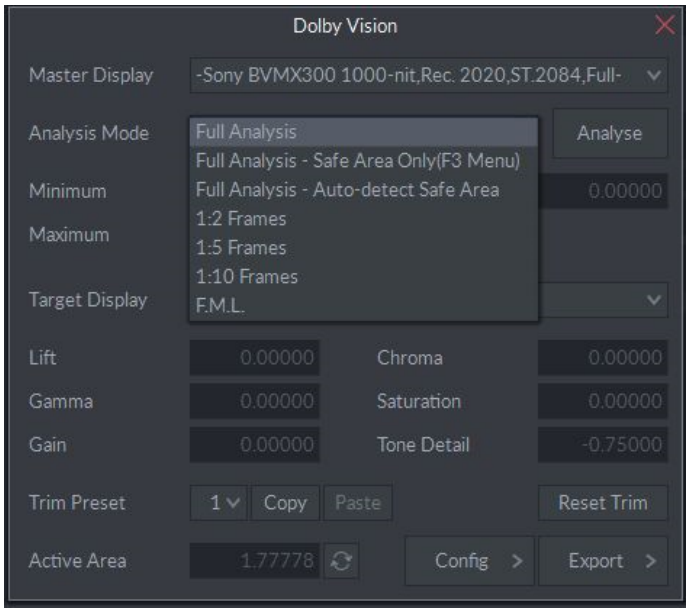
The first thing to do is select the Master Display from the drop down menu. This will be the monitor that is used for the primary grading device.



In order for Dolby Vision to apply the various trim passes in the final deliverable it is first necessary to analyse the existing grade. The timeline must be rendered and only consist of a single video track.

If the edit contains multiple layers/video tracks then these will be flattened when the analysis process is initiated.

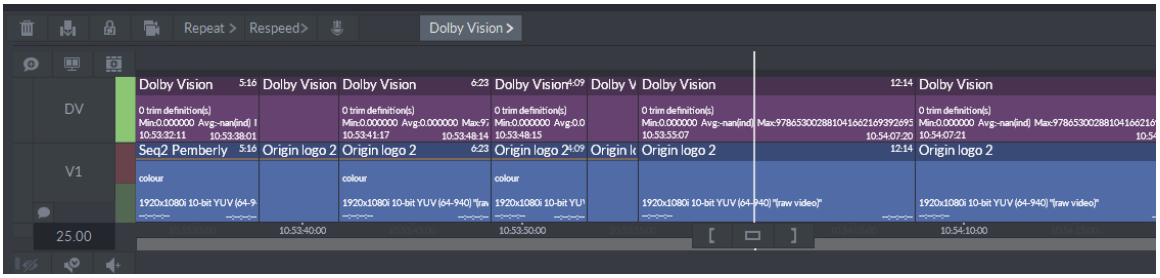
From the Analysis Mode drop down menu there are several choices. Dependent on the content the user can choose one of these for a balance between speed of process and accuracy.



Full Analysis – every frame is analysed
Full Analysis – Safe Area Only (F3 Menu) - Only the designated F3 safe area will be analysed. e.g. If a 2:35 crop is applied then only the active area will be analysed
Full Analysis – Auto detect Safe Area – will use the current frame and attempt to auto detect any full black letter/pillar box
1:2 – Every second frame is analysed
1:5 – Every fifth frame is analysed
1:10 - Every tenth frame is analysed
F.M.L. – The first, middle and last frame of every segment is analysed.

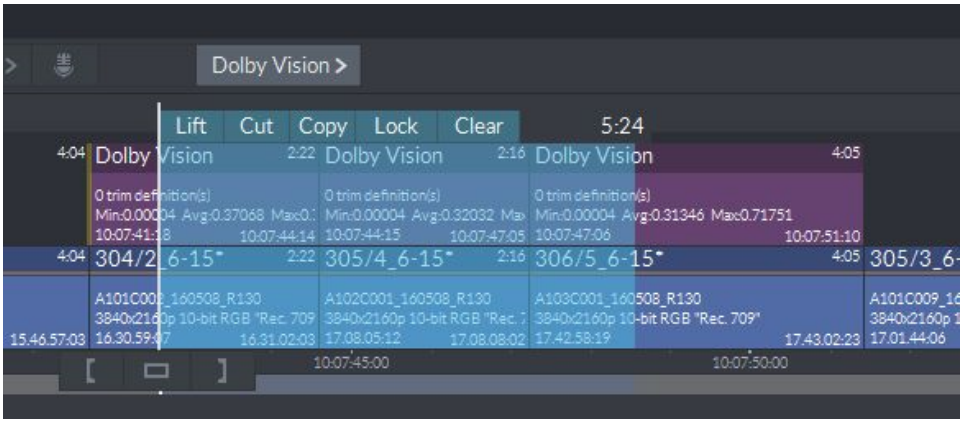
Active area - normally takes on the full image size when you analyse. You can also chose to either manually change this value, or press the 'auto-detect' button next to it (refresh icon). This will look at the pixels of the current frame looking for full black letter/pillar boxing already in the image to work out the active area. Alternatively there are 2 special analysis modes as described above, one that does this auto-detect, and one that takes the crop applied by the ctrl f3 menu.

Once the analysis is complete then a ‘Dolby Vision’ data track is created as shown.



It is also possible to analyse only a section of the timeline. By marking an in / out.

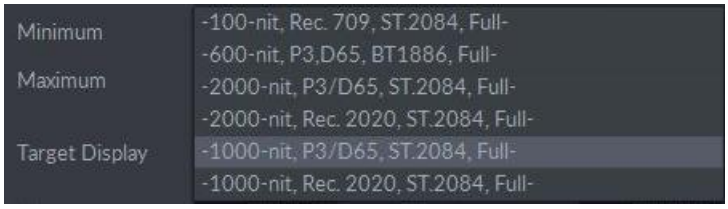
The highlighted frames are analysed per segment, and the results of that are applied to that whole segment. This allows the user to analyse a single/selection of frames instead of the whole thing.



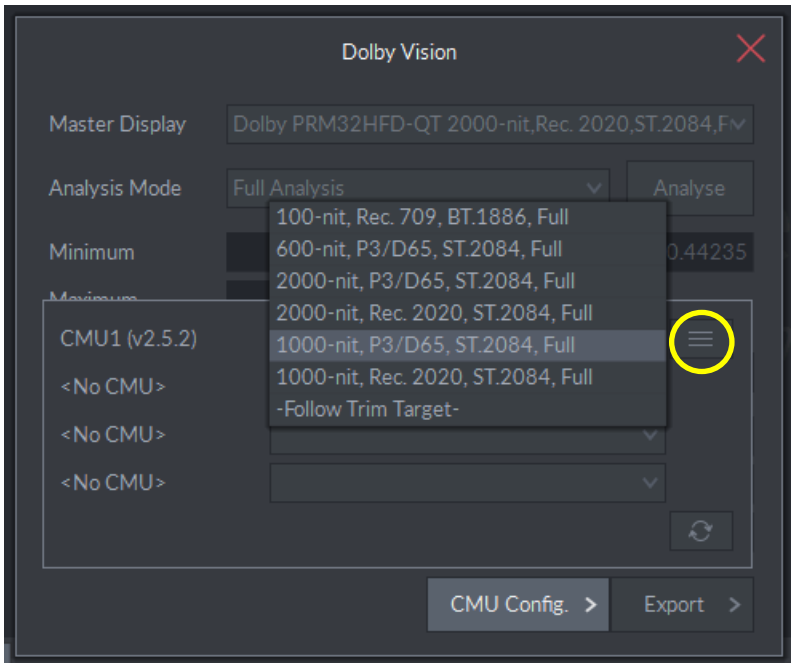
Once the analysis is complete a ‘trim pass’ can then be applied.

The trim pass needs to be applied against a referenced Target Display.

The target displays for any deliverables are available in the drop down menu. Both this and the Master Display lists are populated from the CMU.

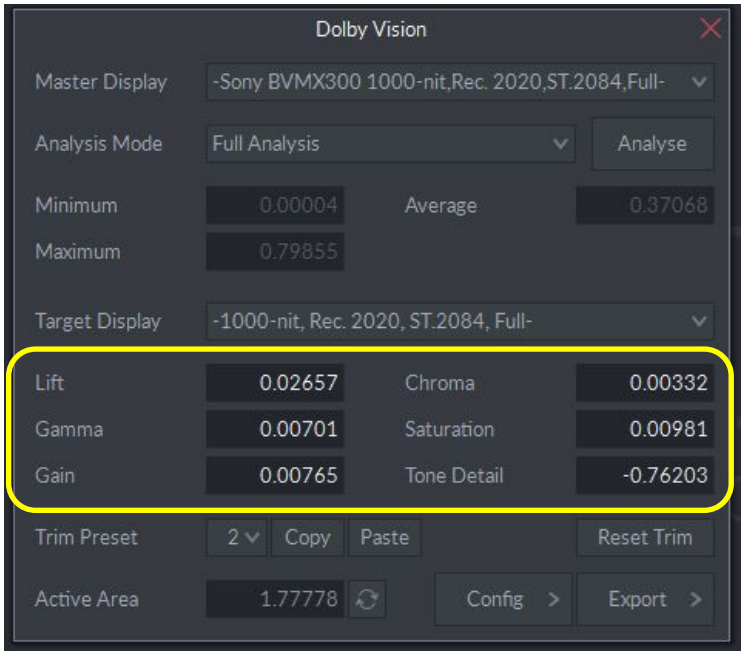


As mentioned previously it is possible to override this by selecting the Target Display directly from the CMU Config box.



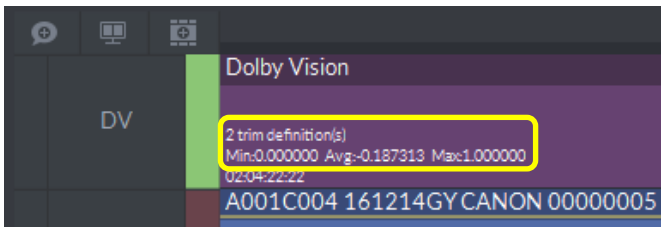
Note:
There is also a settings box in this menu (highlighted) that will call up the CMU web page interface.

With the Target Display selected the Master Display will update and then the trim values adjusted. The trim values apply per segment and are not keyframeable within the segment. The assumption is that the original grade would contain all the dynamics and that the trim pass is simply apply an overall value to the segment.



A trim pass for multiple Target Displays can be made in this way and all will be stored as part of the Dolby Vision data track and subsequently in the final XML file.

The number of trim definitions is displayed on the DV data track.



The trim values can be adjusted using the mouse or pen and are also all mapped to the Neo panel along with the other functions as shown.

The lift, gamma, gain trim functions are also mapped to the appropriate rings with the Chroma, Saturation and Tone Detail mapped to the balls.

Note:

- Re-analysing a timeline will preserve any trims that have already been applied to segments and only alter the min, max, avg values.
- Trims can be reset on current segment, segments within in/out marks (if present), or the entire clip (hold ctrl), with the 'reset trim' button
- Copy and pasting trims. This takes only the 6 trim values for all trims applied to the segment being copied, min max avg are not copied as these values cannot be changed manually. This feature makes use of the preset buttons on the panel, press+hold to copy and, tap to paste.
- SDI output settings should be RGB full range with raw colour space. YUV isn't fully supported by Dolby.

More information is available about Dolby Vision here:
https://www.dolby.com/us/en/technologies/home/dolby-vision.html

Production Compression Codec

Choose to run Rio uncompressed or anything from 2:1 to 6:1 compressed. Once compressed onto disk the codec is lossless across multiple renders.

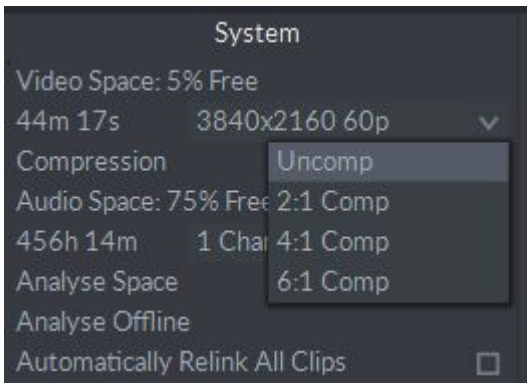
This will mean that customers can get more media onto their existing storage at the same ratios as the compression chosen.

This is a brand new production compression codec from GV. It was originally based on VC2/Dirac with lots of additional technology added by GV engineering. We believe it is the best production codec on the market and completely lossless across multiple render transforms.

It is available on the following products:
Rio Assist
Rio 4K
Rio 8K

Before ingesting any media from tape or importing from file then a selection needs to be made in the F1 menu. This will only apply to any new media brought into the system and not to existing media.

The F1 menu choices are as shown.



Supported Nvidia CUDA Devices

There are restrictions on some legacy Nvidia cards the details of which are in the following charts.

Playout – Rio 4K

	K20 x1			K20 x2			K80 x1 Internal Disk			K80 x1 External Disk		
	2:1 comp	4:1 comp	6:1 comp	2:1 comp	4:1 comp	6:1 comp	2:1 comp	4:1 comp	6:1 comp	2:1 comp	4:1 comp	6:1 comp
4k RGB 16bit 24p	X	X	X	✓	✓	✓	✓	✓	✓	✓	✓	✓
4k RGB 10bit 24p	X	X	X	✓	✓	✓	✓	✓	✓	✓	✓	✓
UHD YUV 10bit 60p	X	X	X	X	X	X	✓	✓	✓	✓	✓	✓
UHD YUV 10bit 30p	X	X	X	✓	✓	✓	✓	✓	✓	✓	✓	✓
HD1080 YUV 10bit 60p	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
HD1080 YUV 10bit 30p	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
HD720 YUV 10bit 60p	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Playout – Rio 8K

	Rio 8k K80 x3		
	2:1 comp	4:1 comp	6:1 comp
SHV 60p	✓	✓	✓
4k RGB 16bit 24p	✓	✓	✓
4k RGB 10bit 24p	✓	✓	✓
UHD YUV 10bit 60p	✓	✓	✓
UHD YUV 10bit 30p	✓	✓	✓
HD1080 YUV 10bit 60p	✓	✓	✓
HD1080 YUV 10bit 30p	✓	✓	✓
HD720 YUV 10bit 60p	✓	✓	✓

Record – Rio 4K

	K20 x1			K20 x2			K80 x1 Internal Disk			K80 x1 External Disk		
	2:1 comp	4:1 comp	6:1 comp	2:1 comp	4:1 comp	6:1 comp	2:1 comp	4:1 comp	6:1 comp	2:1 comp	4:1 comp	6:1 comp
UHD YUV 10bit 60p	X	X	X	✓	✓	✓	✓	✓	✓	✓	✓	✓
UHD YUV 10bit 30p	X	X	X	✓	✓	✓	✓	✓	✓	✓	✓	✓
HD1080 YUV 10bit 60p	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
HD1080 YUV 10bit 30p	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
HD720 YUV 10bit 60p	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Record – Rio 8K

	Rio 8k K80 x3		
	2:1 comp	4:1 comp	6:1 comp
SHV 60p	n/a	n/a	n/a
4k RGB 16bit 24p	✓	✓	✓
4k RGB 10bit 24p	✓	✓	✓
UHD YUV 10bit 60p	✓	✓	✓
UHD YUV 10bit 30p	✓	✓	✓
HD1080 YUV 10bit 60p	✓	✓	✓
HD1080 YUV 10bit 30p	✓	✓	✓
HD720 YUV 10bit 60p	✓	✓	✓

Note:

- Rio 4K with a single K80 will support all formats and frame rates.
- It may be that the 8K record functionality may be improved in future releases.

Canon v2.2 SDK Update

The Canon SDK has been updated to v2.2.

This provides the following additional support:

- Add BT2020 Hybrid Log Gamma colour space and gamma curve.
- Add resize and then debayer modes.
- Display the camera name.
- Retrieve the shooting colour space and gamut modes, only supported for later cameras.
- Remove the 'None' AcesIDT mode, it's unsupported.
- Fix the number of digits for tint, the valid range is [-10.0 ~ 10.0]

Alchemist Respeed Improvements

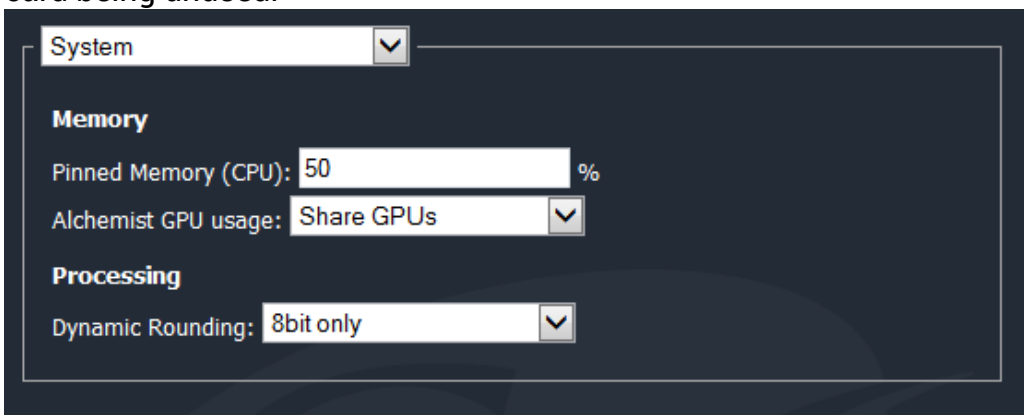
The Alchemist respeed algorithm has been updated providing improved stability and results.

Memory requirements for Alchemist

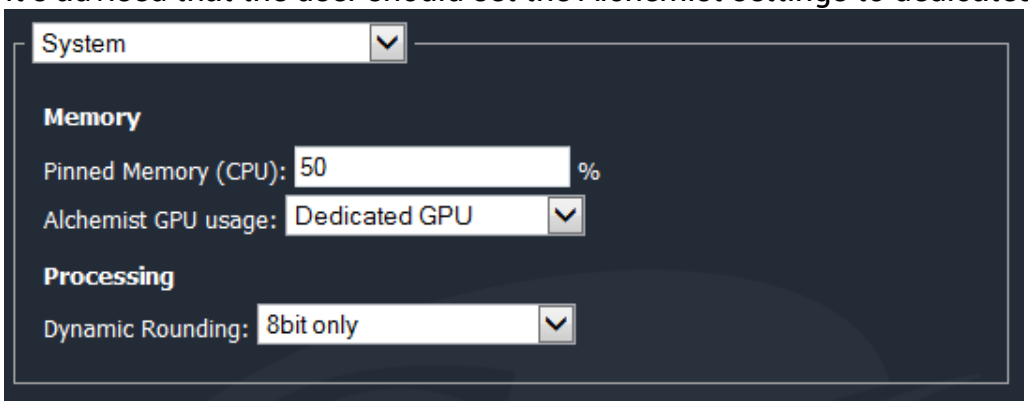
Resolution	Fps	Memory
720 x 486	NA	220 MB
720 x 576	NA	260 MB
1280 x 720	< 40	450 MB
1280 x 720	>= 40	350 MB
1920 x 1080	< 40	700 MB
1920 x 1080	>= 40	600 MB
2048 x 1080	< 40	750 MB
2048 x 1080	>= 40	640 MB
3840 x 2160	NA	2.3 GB
4096 x 2160	NA	2.5 GB
7680 x 4320	NA	8.9 GB
8192 x 4320	NA	9.4 GB

NA – Not applicable, fps has no effect on memory required

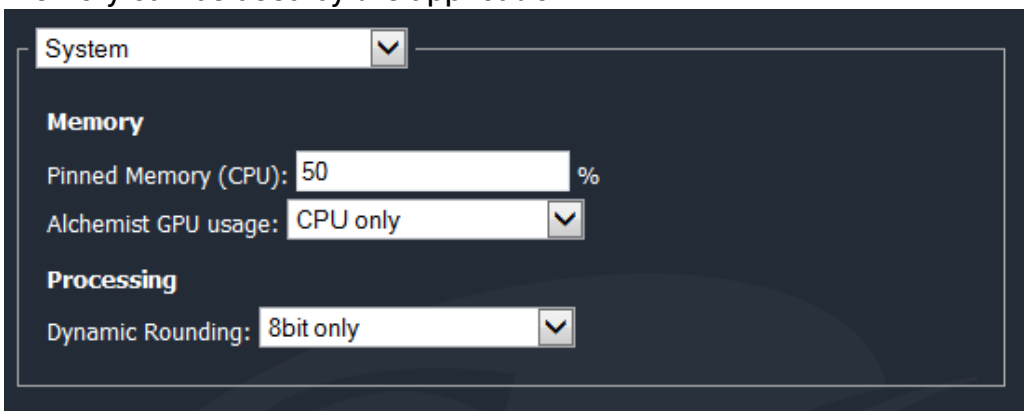
Shared GPU will allocate 50% (not configurable) of all GPU cards for Alchemist use, but Alchemist will only use a single GPU card so this will result in 50% of each additional GPU card being unused.



It's advised that the user should set the Alchemist settings to dedicated:



For Alchemist respeed and revert back to CPU only so that all the GPUs and all the GPU memory can be used by the application:



- Resolutions where the width or height is less than 128 is unsupported
- Insufficient GPU memory will result in Alchemist using the CPU to perform respeed

