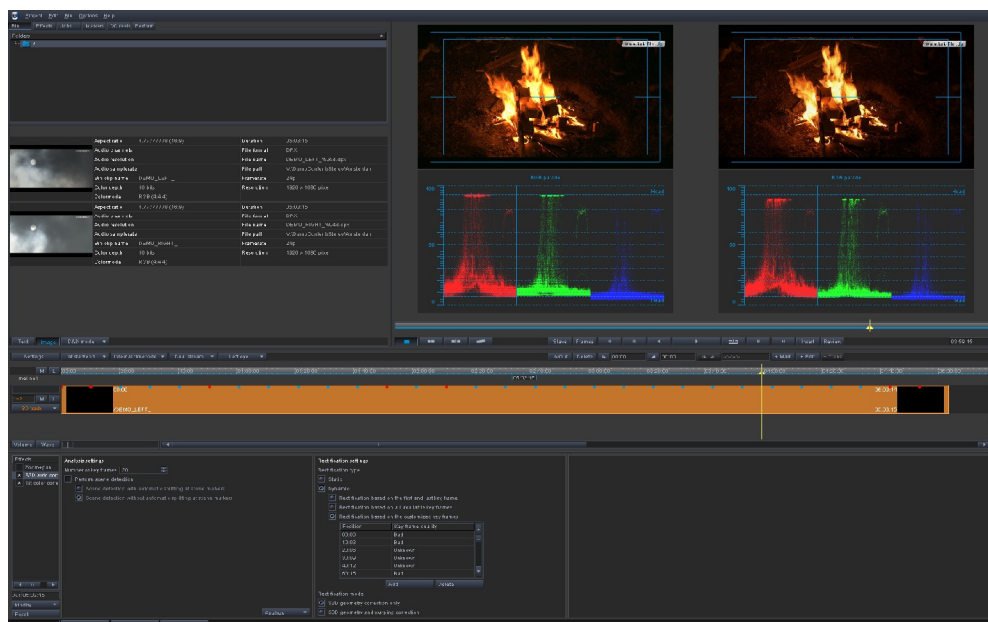


Release of CLIPSTER® V 4.3



The new CLIPSTER® version 4.3 rounds out the DI workstation's 3D functionality portfolio: Among other 3D tools, the stereoscopic analyzer STAN has been added. Furthermore, CLIPSTER® V 4.3 improves working with RAW file formats of different digital cameras in both 2D and 3D workflows.

With the integrated STAN, CLIPSTER® is now able to properly analyze stereo images and correct the stereoscopic geometry automatically. In addition to other 3D features like support of 3D operators, multiple 3D output modes for viewing, 3D analyzing tools and 3D finishing, CLIPSTER® provides a comprehensive toolset for working with stereoscopic material.

Thanks to its sophisticated hardware acceleration, CLIPSTER® enables working in real time as well as versioning and finishing of ARRI ALEXA and RED EPIC® files up to 5K.

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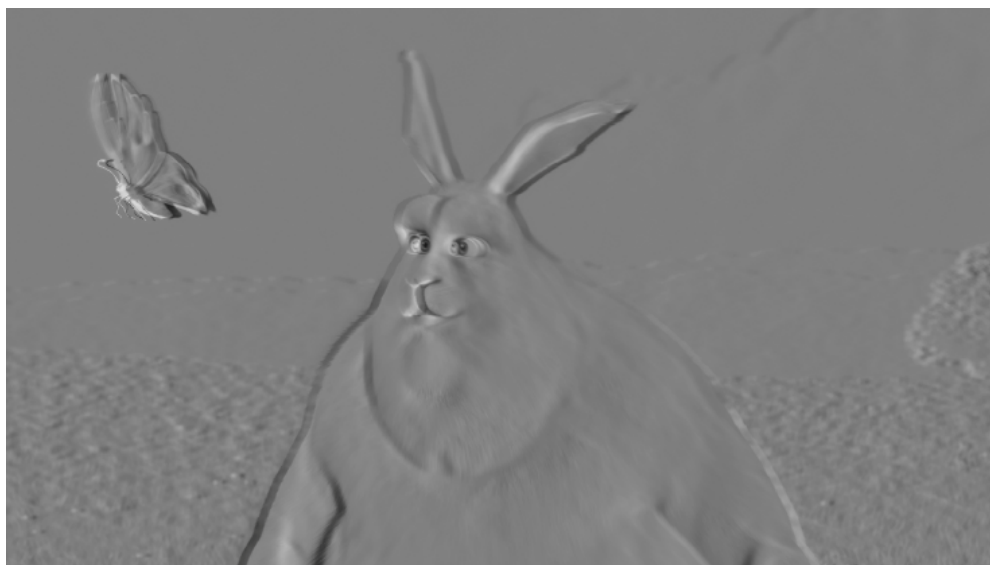
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1.) New 3D Tools

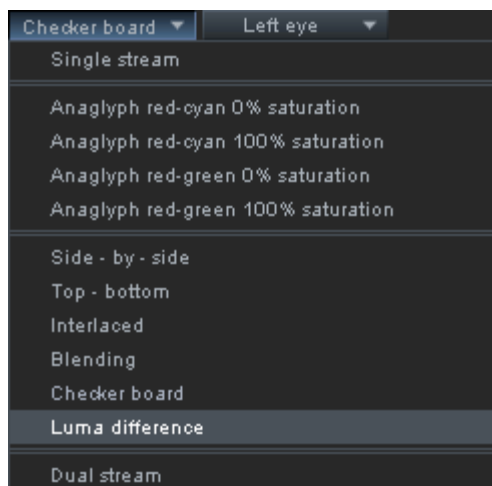
Luma difference

When shooting with two parallel cameras, their view axes are not converging. This means that all objects have negative parallax and 0% parallax for objects is at optical infinity. Everything is “out-of-screen,” but infinity is on the screen plane. To get positive parallaxes, it is necessary to adjust the screen plane within a scene in the post production process, i.e. to quantify the amount of stereo depth in an image in front of and behind the screen plane. One image needs to be shifted in comparison to the other one horizontally. An element will appear on the screen plane when there is no horizontal offset between the two images.

A very useful tool for adjusting the screen plane is the luma difference view. Using luma difference mode, the screen plane or zero parallax can be seen without use of any additional glasses. The zero parallax plane or the screen plane can be found where the element appears very flat, i.e. when contours of an element appear in the form of a thin line. By shifting both images horizontally you can relocate the screen plane further forward. With the activated luma difference mode you can see at any time where the screen plane is currently placed.



Activate the luma difference mode in the combo box *Output mode* that can be found in the edit tool:

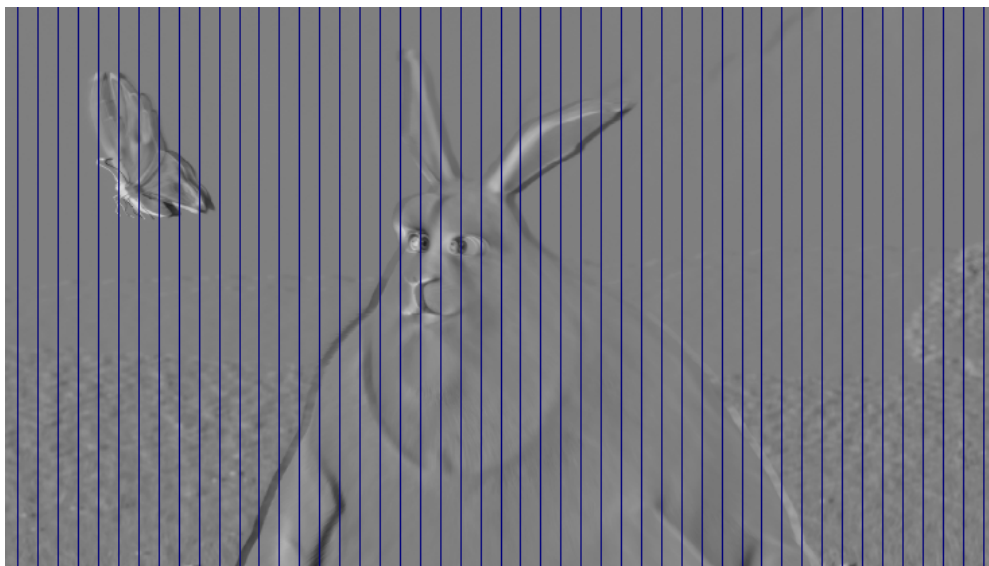


To adjust the screen plane in the scene, activate the settings of the operator *Zoom+pan* by double clicking on the clip or selecting the option *Show → Effect properties* in the context menu of the clip. Use the setting *Vergence settings → X* to shift both images horizontally at the same time. For fine adjusting the *X* value, use the mouse wheel in combination with the pressed Shift button.

Divergence safety area

To create positive parallaxes after shooting with parallel cameras, an image needs to be shifted in relation to other ones horizontally. In doing so, all objects within the scene will be pushed further away from the audience without changing the quantity of depth. This technique is primarily used in order to adapt the 3D image to different screen sizes. Depending on both the width of the source image and the size, there is a certain value for the maximum parallax that should not be exceeded in order to avoid uncomfortable viewing or even divergence of human eyes which may be painful and cause a headache.

With the new option called *Show divergence safety area*, CLIPSTER® provides the possibility to control the maximum parallax in the stereo images. The option can be activated and deactivated in the context menu with a right mouse click on the video overlay. Once it is activated, CLIPSTER® shows vertical lines in the video overlay as in the following image:



The distance between the lines indicates the safe parallax which should not be exceeded in order to avoid negative 3D effects for the viewer. The safe parallax varies depending on horizontal image resolution and screen size. The safe parallax can be calculated as follows:

Horizontal image resolution (px) / Screen size (in) * 2.5

Set up color and distance between the lines in the *Config* dialog on the page *Overlay*.

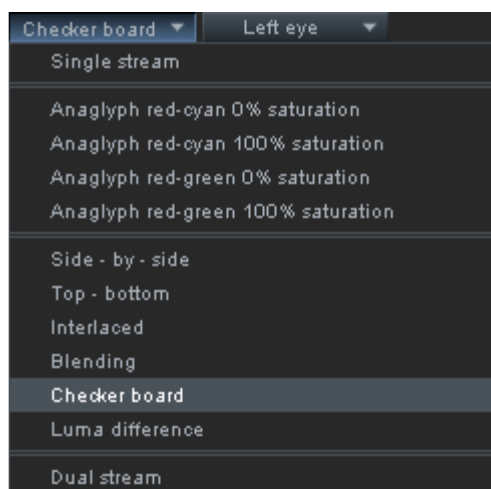
Please keep in mind that the setting *Divergence safety area* must be corrected as soon as either the timeline output resolution changes or the size of the target screen that the 3D material has to be adapted to.

Checker board

With the new 3D output mode called *Checker board*, CLIPSTER® enables users to easily check possible color mismatches or vertical misalignments of two images of a 3D clip:



The 3D output mode *Checker board* can be found in the combo box *Output mode* as shown in the following image:



The square size can be specified in the *Config* dialog on the page *S3D output mode*.

3D histogram

With the *3D histogram*, CLIPSTER® provides another 3D tool that is particularly useful for color correcting stereo images. The *3D histogram* overlaps the histogram of both images in a single diagram and clearly shows whether there is a color mismatch in the stereo image:



The *3D histogram* can be found in the context menu of the video overlay in the category *Analyzer*.

Please keep in mind that for the proper usage of the *3D histogram*, the output mode *Dual stream* must be enabled.

Dual stream improvement

With the output mode *Dual stream*, two video overlays showing two video clips of the 3D material separately are available now.

2.) Stereoscopic Analyzer (STAN)

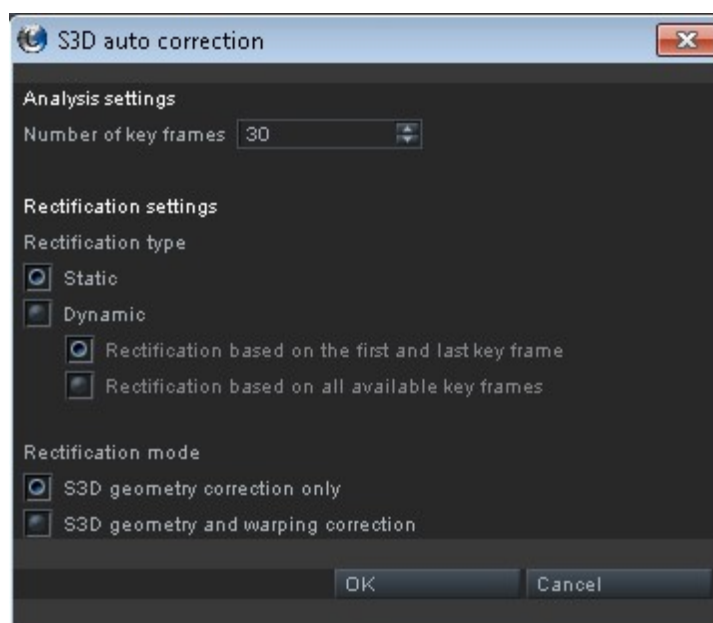
General

The integrated stereoscopic analyzer STAN is able to analyze the stereoscopic content and correct of the stereoscopic geometry automatically.

STAN is integrated in CLIPSTER® and can be purchased as an option. Please contact your sales manager.

Analysis and correction

The correction of the stereo geometry can be applied to single or several clips residing in the stereo video track. To apply a stereo correction to several clips in the timeline, please select clips to be stereo-corrected or define clips to be auto-corrected by setting in and outpoint. Afterwards, select the option *S3D auto correction* in the context menu of the timeline. Optionally select *Auto correction* in the category *S3D* in the context menu of a clip. Once the option has been selected, CLIPSTER® will display a dialog such as the following:



The auto correction consists of two steps: the analysis of the stereo material and the rectification.

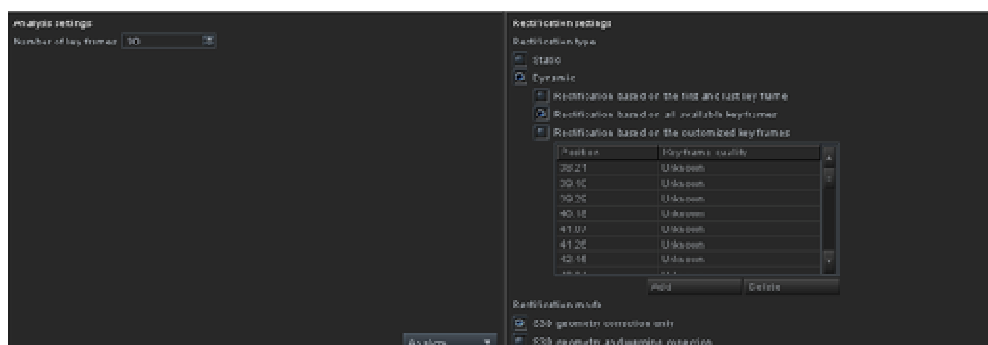
In order to analyze the stereo material, please define a number of frames per clip to be analyzed. Keep in mind that the higher the number of key frames, the longer the analysis will take.

For the rectification of the stereo material, you have to define the method how it should be done. When using the *Static type*, the rectification will be done based on the average of all existing key frames. With the *Dynamic type*, the rectification will be done either by using the first and last key frame or by using all key frames. The dynamic type of rectification is recommended when there is a tracking shot in the scene.

The *Rectification mode* defines what exactly should be corrected in the stereo clip. Keep in mind that the warping correction is not real-time capable and requires pre-rendering. The warping correction of RAW stereo material is particularly time consuming.

Operator

You can also correct the stereo material by using the *S3D auto correction* operator. The operator can be found in the tab *Effects* in the category *DVE* and can be applied to a stereo clip by dragging and dropping it in the *Effects* stack. Keep in mind that the *S3D auto correction* operator will automatically be applied to a clip when confirming the *S3D auto correction* dialog described above.



The settings of the operator *S3D auto correction* are almost the same as those described in the dialog *S3D auto correction*. The only new additional parameter that does not exist in the dialog *S3D auto correction* is a parameter called *Rectification based on the customized key frames*. With this setting, it is possible to manually define the key frames that the rectification should be based on. The table directly under the setting *Rectification based on the customized key frames* lists all the key frames of the affected clip, their position and quality.

The quality of key frames depends on the source material. In some special cases, the information delivered by the analysis is not proper and therefore not useful for the rectification. Such low-quality key frames are labelled *Bad* in the GUI, and can lead to wrong and absolutely useless rectification. Therefore, with the dynamic rectification type, it is recommended to remove the low-quality key frames. In order to do so, please open the operator properties by double clicking the stereo image and select the option *Rectification based on the customized key frames*. In the table directly under the setting you can select and delete the low-quality key frames. The deleted key frames will not be considered during rectification, but will still be visible in the GUI.

Please keep in mind that when selecting an option in the group *Rectification settings*, the update will start immediately. No confirmation is needed. The rectification can only be performed when the key frames are available. The rectification implies the analysis.

3.) ARRIRAW

In its new version 4.3, CLIPSTER® provides a new image processing for ARRIRAW material coming from the ALEXA and D-21 digital cameras. You can choose whether the image processing should be done using the CLIPSTER® hardware or the ARRIRAW SDK. The image processing with the ARRIRAW SDK is not real-time capable since it is done in software. Thanks to the sophisticated DVS hardware acceleration, CLIPSTER® handles the image processing of ARRIRAW files in real time.

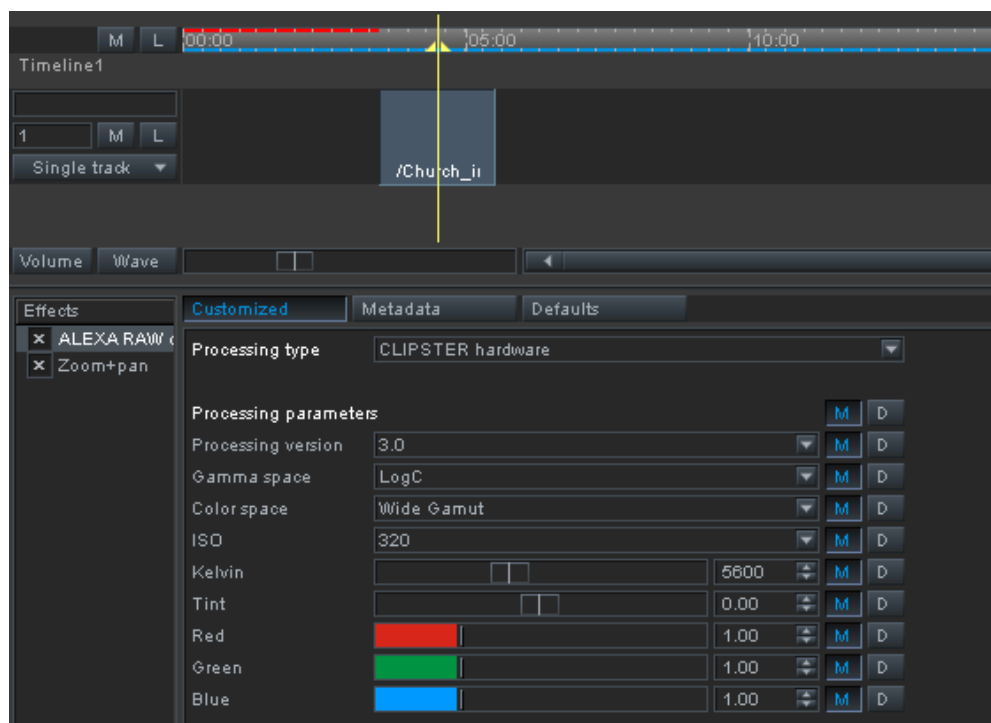
Similar to the RED RAW operator, CLIPSTER® provides a separate ARRIRAW operator for ALEXA and D-21 files. The ALEXA RAW decode operator can be applied to ALEXA files only, whereas the D-21 RAW decode operator can be applied to D-21 files only.

The ARRIRAW decode operator will be automatically applied to a clip as soon as the clip is assembled in the timeline.

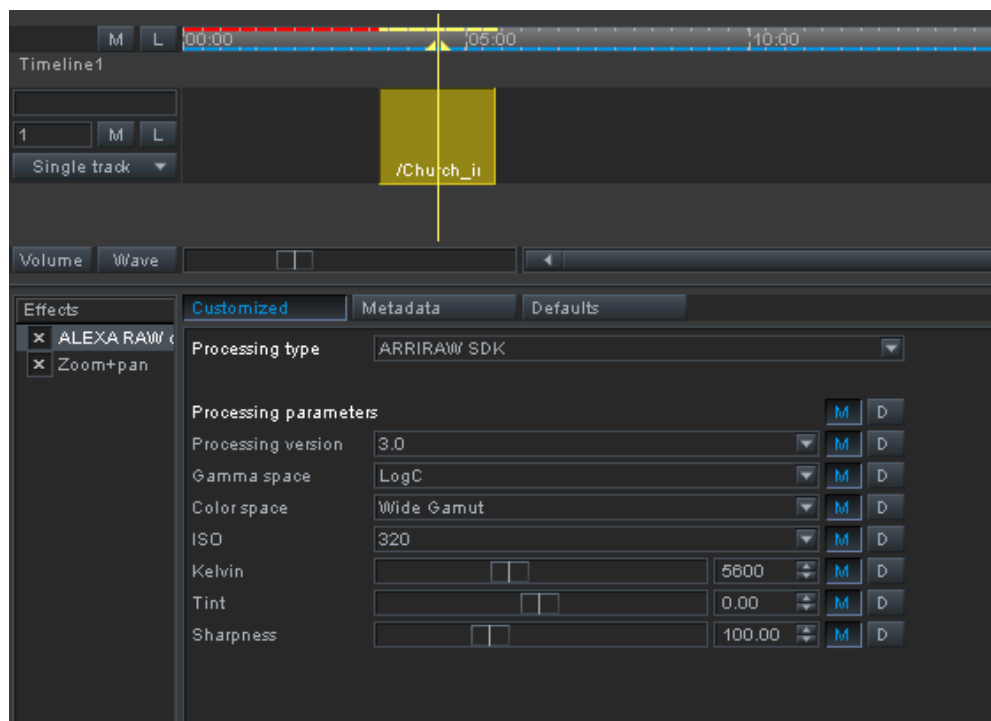
Please note: You cannot apply multiple ARRIRAW decode operators to the same single clip. When loading an operator preset in the *Effects* area, it will not result in another operator. Instead, it will set up the existing operator according to the values saved in the preset.

ALEXA RAW decode operator

The ALEXA ARRIRAW operator contains all parameters which are available in the ALEXA ARRIRAW file format and can be modified by the user in order to affect the image processing. To modify the parameters of the ALEXA ARRIRAW files, please open the operator settings by double clicking the ALEXA clip in the timeline or by selecting the option *Effect properties* which can be found in the context menu in the category *Show*.

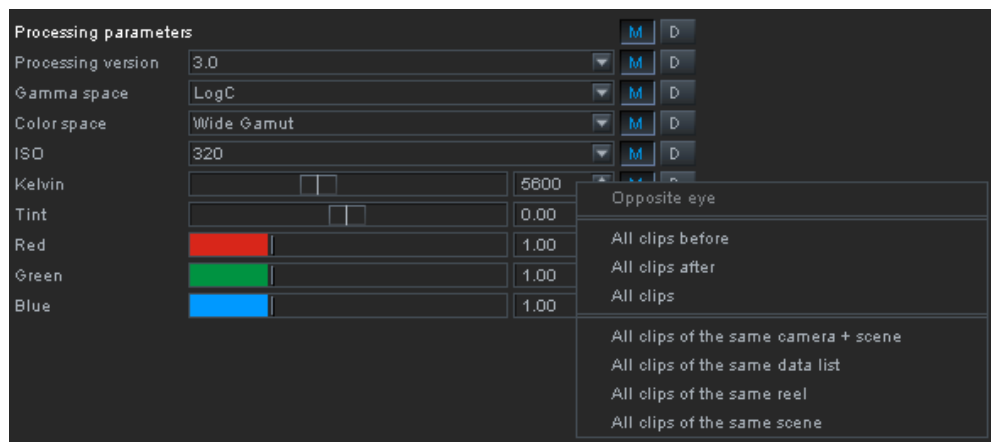


With the setting *Processing type*, you can define whether the image processing should be done by using the CLIPSTER® hardware or the ARRI SDK which is also used in the ARC from ARRI. Please note that the image processing with the ARRI SDK is not real-time capable. Immediately after selecting the option *ARRIRAW SDK*, the affected clip will be colored yellow to indicate that pre-rendering is needed in order to get the specified image processing visible during play.



Per default the ALEXA RAW decode operator will automatically be set up according to the values saved as metadata in the file header. This status will be indicated by a pressed button *M* (*Metadata*). The pressed button *D* (*Default*) indicates a default value that is currently applied to a setting. When neither the *M* nor the *D* button is pressed, the customized value is currently applied.

It is possible to either apply all settings or only some certain settings of the current clip to several clips at the same time. To apply all settings to several clips in the timeline, please use one of the options in the combo box *Modify* that can be found below the *Effects stack*. To apply a single setting to several clips in the timeline, please perform a right mouse click on the setting and select an option offered here. To enable an *M* or *D* button of several clips at the same time, the right mouse click must be performed on the corresponding button directly.



It is possible to create a preset based on the current operator settings and apply it to further clips. To create a preset, please perform a right mouse click on the operator under *Effects* and select the option *Save Preset*. To apply a preset to other clips, please drag and drop the preset into the properties area or perform a right mouse click on the operator under *Effects* and select the option *Load Preset*.

Please note: The parameters provided with the CLIPSTER® hardware and ARRIRAW SDK are slightly different. This is partly due to the fact that the image processing done by using the CLIPSTER® hardware is performed in a different way than the image processing done with the ARRIRAW SDK.

D-21 RAW decode operator

The D-21 RAW decode operator looks similar to the ALEXA RAW decode operator but has different options and values in the GUI elements.

Handling and functionality of the D-21 RAW decode operator are identical to the ALEXA RAW decode operator described above.

Legacy ARRIRAW decode

The Legacy ARRIRAW decode operator reflects the original implementation of the ARRIRAW image processing in CLIPSTER®. Meanwhile, the implementation of the image processing in CLIPSTER® has been changed and results in both the ALEXA and the D-21 RAW decode operators.

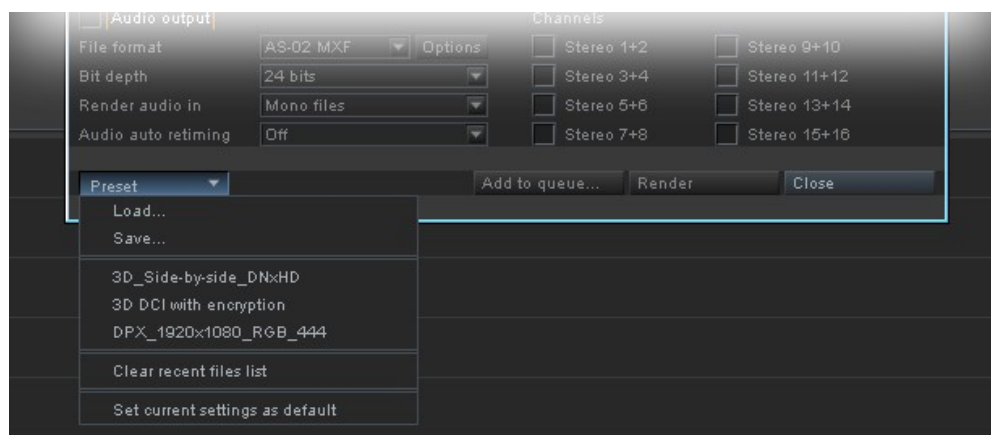
Please note: The Legacy ARRIRAW decode operator will only be used when loading projects created with a CLIPSTER® version that had the original implementation of the ARRIRAW image processing.

4.) Presets for Finalize Dialog and DCI Wizard

In the software version 4.3, it is possible to save the current settings in the finalize dialog or settings of the DCI wizard in form of a preset.

Presets in the finalize dialog

The finalize dialog has been completed with the combo box called *Preset*. The combo box contains options for saving and loading of presets:



To load a preset, use the option *Load...* or select one of the recently used presets that are listed in the combo box.

To save a preset, use the option *Save...* Presets will be saved in XML file format.

To clear the selection list of the combo box, use the option *Clear recent files list*.

To save the currently specified settings as default settings select the option *Set current settings as default*.

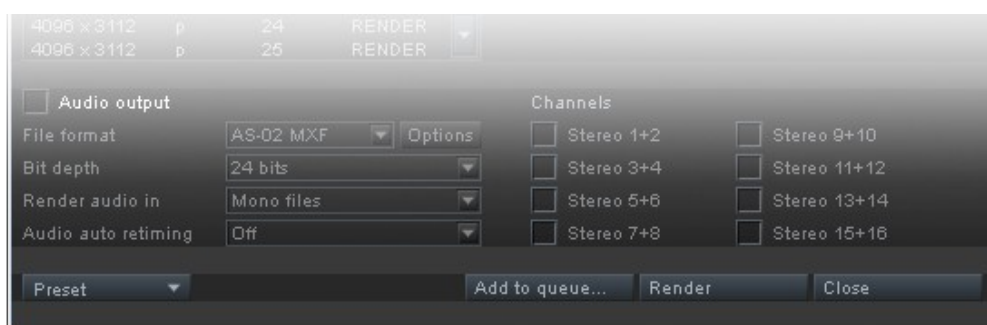
Presets in the DCI wizard

The DCI wizard provides the same functionality as it is available in the finalize dialog described above.

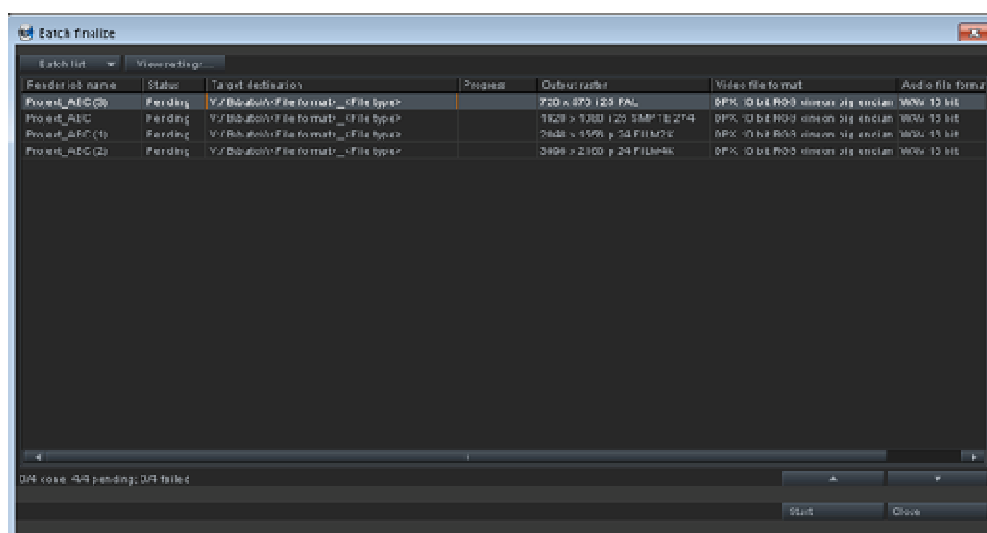
5.) Batch Finalize

The new version of CLIPSTER® provides a feature that allows rendering a list of multiple jobs. Both the finalize dialog and the DCI wizard have been completed with the button *Add to queue...* With this, you can add the specified job to a batch finalize list. Once all jobs are specified and added to the batch list, the batch finalize process can be started. CLIPSTER® will render of one job after another until all jobs are done.

Before adding a job to the batch finalize list, please specify all relevant output settings including the target path and file name. To add the rendering job to a list, press the button *Add to queue...* that is included in both the finalize dialog and the DCI wizard.



Once the button *Add to queue...* has been pressed, the *Batch finalize* dialog will be displayed in the background of the finalize dialog. Closing the finalize dialog will enable the *Batch finalize* dialog. The dialog can also be opened by using the option *Batch Finalize...* in the main menu bar in the category *Project* or by using the shortcut *Ctrl + B*.



The *Batch finalize* dialog shows all currently specified jobs, their status und output settings. It is possible to vary the order of the jobs in the list by dragging and dropping them on the new position or by using the arrow buttons. To delete a single job or several jobs, select them and press the *Delete* button on the key board or select the option *Delete* in the context menu. The combo box *Batch list* provides options that are useful for saving or loading a batch finalize list. The button *View*

settings opens a dialog in which the information displayed in the list can be specified by the user.

Double clicking on a job in the *Batch finalize* dialog will load the corresponding project file and automatically open the finalize dialog or DCI wizard that will show the output settings of the affected job. Here you can check or modify the output settings. Afterwards you can add the job with the modified settings to the batch finalize list by pressing the button *Add to queue...* Please note: Adding a modified job to the batch finalize list will not overwrite the already existing one. The job with "old" output settings must be deleted manually if not needed any longer.

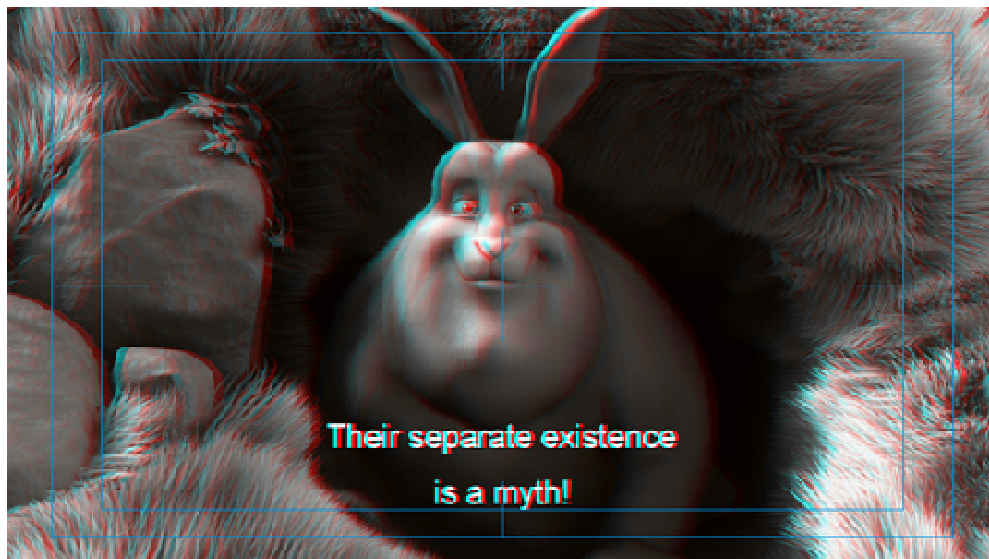
Successfully rendered jobs will be indicated by blue text color, whereas the failed jobs are indicated by red text color. With a right mouse click on a failed job you can display the context menu where the option *Show error message* can be found. With this option, it is possible to show the corresponding warning message providing more details about failed job.

Please note: The batch finalize list is not a part of the project file and therefore will not be saved there. The current setup of the batch finalize list will be stored as a global application setting and thus will still be available when creating a new project or when restarting the application. If you need the current setup of the batch finalize list later on, please save the list by using the option *Save as...* in the combo box *Batch list*.

Please note: Be careful when specifying the target path and file name. The exact same target path and file name causes the overwriting of already existing material.

6.) Automatic Subtitle Depth Estimation

In its current version, CLIPSTER® provides further 3D specific features that makes it possible to define a parallax for 3D subtitling depending on the corresponding source material.



Usually the subtitles for the 3D projects will be delivered as text without any depth information. When creating a 3D project, the 3D information must be added to the subtitles in a separate step. In order to speed up the process of adding depth to the text subtitles, CLIPSTER® automatically analyzes the corresponding stereo content and investigates the suitable parallax for the subtitle.

For this CLIPSTER provides a new function called *Automatic subtitle depth estimation*. To apply this option to a subtitle element, please create a stereoscopic video track and add the XML subtitle. Perform a right mouse click on the XML subtitle and select the option *Automatic subtitle depth estimation* which can be found in the category *S3D*.

The function *Automatic subtitle depth estimation* is intended for the rough automatic setup of the parallax for subtitles. It is recommended to check the resulting parallax afterwards and to correct it manually if needed.

To correct the parallax of a subtitle manually, please activate the properties of the corresponding subtitle operator by double clicking on the subtitle or by selecting the option *Effect properties* which can be found in the category *Show* of the context menu. In the table *Subtitle elements* select one or multiple subtitles whose parallax must be modified. After that, modify the setting *Z position* in the table *Appearance settings* in the category *Position settings*. For the fine adjustment of the *Z value*, use the mouse wheel in combination with the pressed Shift button.

Please note: Every time the parallax in the stereo image or the position of the subtitle changes, the parallax of the subtitle must be checked and possibly readjusted.

7.) Hardware Operating Modes

General

As already announced with the release of the CLIPSTER® version 4.0, there is an additional acceleration hardware available for CLIPSTER's 4th generation to speed up complex jobs for DCI 4K Mastering or RED EPIC® 5K play-out and rendering. This optionally available acceleration hardware is a PCIe board that can be placed into an empty PCIe slot of CLIPSTER®. In its version 4.3, CLIPSTER® provides options that allow easily switching the hardware operating mode by using the GUI. Depending on the upcoming tasks, the user can select the appropriate hardware operating mode in CLIPSTER's user interface.

Depending on the hardware in the system, CLIPSTER® provides different hardware operating modes. The available hardware operating modes can be found in the main task bar in the category *Options* → *Hardware operating mode*.

The following hardware operating modes are being distinguished:

- JPEG2000 mode
- RAW mode
- Mixed mode

Depending on the properties and number of PCIe boards, CLIPSTER® will provide different hardware operating modes:

- With no switchable acceleration hardware board, the option *Hardware operating mode* will not be available in the category *Options*.
- With a single switchable acceleration hardware board, CLIPSTER® will provide the *JPEG2000 mode* and *RAW mode* as hardware operating modes.
- With two switchable acceleration hardware boards, CLIPSTER® will provide the *JPEG2000 mode*, *RAW mode* and *Mixed mode* as hardware operating modes.

Switching the hardware operating mode requires the application to be restarted. Before doing so, CLIPSTER® will ask you to save the project if needed. After that, the restart will be performed. The system configuration according to the selected hardware operating mode will be done automatically and will take a while. As soon as the system configuration is finished, the CLIPSTER® application will restart automatically. The project file saved before will also be loaded automatically. Please do not start the CLIPSTER® application manually during the system configuration.

The CLIPSTER® status bar shows the currently activated hardware operating mode:



| 05:12:22 | Out: HD 1920 × 1080 @ 24sF / YUV 4:2:2 / 10 Bit | JPEG2000 mode

Please note: The possibility of switching the hardware operating mode out of CLIPSTER's user interface is only available when the CLIPSTER® application is running on Windows 7 operating system.

JPEG2000 mode

With the activated JPEG2000 mode and a single switchable acceleration hardware board in the system, you can do the following:

- 4K JPEG2000 encode / decode @ 12 fps
- Stereo 2K JPEG2000 encode / decode @ 24 fps
- 4K RED ONE® decode @ 24 fps
- Stereo 2K RED ONE® decode @ 24 fps
- No processing of EPIC® in hardware

With the activated JPEG2000 mode and two switchable acceleration hardware boards in the system, you can do the following:

- Stereo 2K JPEG2000 encode / decode @ 24 fps
- Stereo 4K JPEG2000 encode / decode to 2K @ 24 fps
- 4K JPEG2000 encode / decode @ 24 fps
- 4K RED ONE® decode @ 24 fps
- Stereo 4K RED ONE® decode to 2K @ 24 fps
- No processing of EPIC® in hardware

RAW mode

With the activated RAW mode and a single switchable acceleration hardware boards in the system, you can do the following:

- EPIC® decode (Please have a look into the performance table below)
- No stereo EPIC® decode
- 4K RED ONE® decode @ 24 fps
- Stereo 2K RED ONE® decode @ 24 fps
- No processing of JPEG2000 in hardware

With the activated RAW mode and two switchable acceleration hardware boards in the system, you can do the following:

- EPIC® decode (Please have a look into the performance table below)
- Stereo EPIC® decode to 2K @ 24 fps
- 4K RED ONE® decode @ 24 fps
- Stereo 4K RED ONE® decode to 2K @ 24 fps
- Stereo 2K RED ONE® decode @ 24 fps
- No processing of JPEG2000 in hardware

Mixed mode

With the activated Mixed mode (that is only available when the system provides two switchable acceleration hardware boards), you can do the following:

- EPIC® decode (Please have a look into the performance table below)
- No stereo EPIC® decode
- 4K RED ONE® decode @ 24 fps
- Stereo 2K RED ONE® decode @ 24 fps
- 4K JPEG2000 encode / decode @ 12 fps
- Stereo 2K JPEG2000 encode / decode @ 24 fps

RED EPIC® 5K play-out and finalize performance

Please note: In general, the performance of the RED EPIC® decoding depends on the complexity (high frequencies) of the video material. The real performance may differ from the values listed below.

Play-out	Source Material	Output Format	Bit Depth	CLIPSTER® Gen 4 (RAW Mode)	CLIPSTER® Gen 4 plus optional HW Accelerator (RAW Mode)
RED EPIC®	5120x2160	1920x1080x24/25	8 bit	✓	✓
		1920x1080x30		✓	✓
	5120x2560	1920x1080x24/25	8 bit	✓	✓
		1920x1080x30		-	✓
	5120x2700	1920x1080x24/25	8 bit	✓	✓
		1920x1080x30		-	✓
	5120x2160	1920x1080x24/25	12 bit	✓	✓
		1920x1080x30		✓	✓
	5120x2560	1920x1080x24/25	12 bit	✓	✓
		1920x1080x30		-	✓
	5120x2700	1920x1080x24/25	12 bit	✓	✓
		1920x1080x30		-	✓
	5120x2160	4096x2160x24	8 bit	✓	✓
		4096x2160x25		✓	✓
	5120x2560	4096x2160x24	8 bit	✓	✓
		4096x2160x25		✓	✓
	5120x2700	4096x2160x24	8 bit	✓	✓
		4096x2160x25		✓	✓
	5120x2160	4096x2160x24	12 bit	✓	✓
		4096x2160x25		✓	✓
RED EPIC® Stereo	5120x2160	1920x1080x24/25	8 bit	-	✓
		1920x1080x30		-	-
	5120x2560	1920x1080x24/25	8 bit	-	✓
		1920x1080x30		-	-
	5120x2700	1920x1080x24/25	8 bit	-	✓
		1920x1080x30		-	-
	5120x2160	1920x1080x24/25	12 bit	-	✓
		1920x1080x30		-	-
	5120x2560	1920x1080x24/25	12 bit	-	✓
		1920x1080x30		-	-
	5120x2700	1920x1080x24/25	12 bit	-	✓
		1920x1080x30		-	-

Finalize into 12 bit DPX	Source Material	Output Format	CLIPSTER® Gen 4 (RAW Mode)	CLIPSTER® Gen 4 plus optional HW Accelerator (RAW Mode)
Autoscale off				
EPIC® 2160 > 2K DPX	5120x2160	2048x1080	~ 20 fps	~ 28 fps
EPIC® 2160 > SD DPX	5120x2160	720x480	~ 20 fps	~ 28 fps
EPIC® 2560 > 4K DPX	5120x2560	4096x2160	~ 16 fps	~ 24 fps
EPIC® 2700 > 4K DPX	5120x2700	4096x2160	~ 16 fps	~ 26 fps
Auto scale fit				
EPIC® 2160 > SD DPX	5120x2160	720x 480	~ 29 fps	~ 54 fps
EPIC® 2160 > 2K DPX	5120x2160	2048x1080	~ 29 fps	~ 42 fps

EPIC® 2560 > 2K DPX	5120x2560	2048x1080	~ 25 fps	~ 48 fps
EPIC® 2700 > HD DPX	5120x2700	1920x1080	~ 25 fps	~ 47 fps
EPIC® 2700 > 2K DPX	5120x2700	2048x1080	~ 25 fps	~ 47 fps

RED EPIC® 5K transcoding

With CLIPSTER® 4.3 it is possible to transcode 5K EPIC® material into 5K DPX files in real time. Please keep in mind that only the first color correction operator will be processed when transcoding 5K EPIC® material to 5K DPX files. All other operators applied to the 5K EPIC® material in the timeline including 3D LUT will be ignored.

Hardware operating mode depending on input and output file format

The following table shows a recommended hardware operating mode depending on the source material in the timeline, target output file format and number of hardware acceleration boards in the system. The first column on the left shows the possible file format of the source material. The first row from the top shows the possible target output format. The combination of a source file format and a target output file format shows the recommended hardware operating mode. The first value indicates the hardware operating mode to be activated when only one switchable hardware accelerating board is available in the system. The second value indicates the hardware operating mode to be activated when two switchable hardware accelerating boards are available in the system.

Source material \ Output file format	Output file format		
	1xJPEG2000 2K	2xJPEG2000 2K or 1xJPEG2000 4K	All but JPEG2000
All but RAW	1/1	1/1	5/5
RED ONE®	1/1	1/1	5/5
EPIC®	2/3	2/3	4/4
ALEXA	1/1	1/1	5/5
JPEG2000	1/1	1/1	1/1

- 1 JPEG2000 mode
- 2 Perform rendering in two steps:
 - render to DPX with activated RAW mode first
 - then render to JPEG2000 with activated JPEG2000 mode
- 3 Mixed mode
- 4 RAW mode
- 5 Any mode

8 bit decoding of EPIC® material

Real-time decoding of EPIC® material at 12 bit color depth is not always possible when only one switchable hardware acceleration board is available in the system. But for certain use cases like preview, the real-time capability during play-out achieved by decoding at low color depth might be more valuable than non real-time decoding at full color depth. Therefore, CLIPSTER® provides an option that allows decoding of EPIC® material at 8 bit color depth and thus enables a real-time playback.

This option can be activated or deactivated in the *Config* dialog on the page *RAW*.

Please note: 8 bit decoding of EPIC® material will be processed only when the EPIC® decode is basically possible with the available hardware in the system and the currently activated hardware operating mode. The 8 bit decoding of EPIC® material is valid only for playback and will not be processed during rendering or when decoding of EPIC® material is being performed by using the software.

While the 8 bit decoding of EPIC® material is being executed, CLIPSTER® will display corresponding information in the status bar as in the following image:

YUV 4:2:2 / 10 Bit | RAW mode | 8bit decoding of EPIC material

Half resolution decode of 4K DCI JPEG2000 material

Real-time DCI decoding of 4K JPEG2000 material is not possible when only one hardware acceleration board is available in the system. But for certain use cases like preview, the real-time capability during play-out achieved by decoding at low resolution might be more valuable than non real-time decoding at full resolution. Therefore, CLIPSTER® provides an option that allows decoding of 4K JPEG2000 material at 2K and thus enables a real-time playback.

This option can be activated or deactivated in the *Config* dialog on the page *JPEG2000 Compression*.

Please note: The half-quality decode will be processed only when the JPEG2000 decode is basically possible with the available hardware in the system and the currently activated hardware operating mode. The half-quality decode is valid only for playback and will not be processed during rendering or when decoding of JPEG2000 material is being performed by using the software.

While the half-quality decode is being executed, CLIPSTER® will display corresponding information in the status bar as in the following image:

1080 @ 24sF / YUV 4:2:2 / 10 Bit | JPEG2000 mode | Half quality decode of 4K JPEG2000 material

Please keep in mind that 4K JPEG2000 material decoded with half-quality resolution will be auto-scaled to 4K.

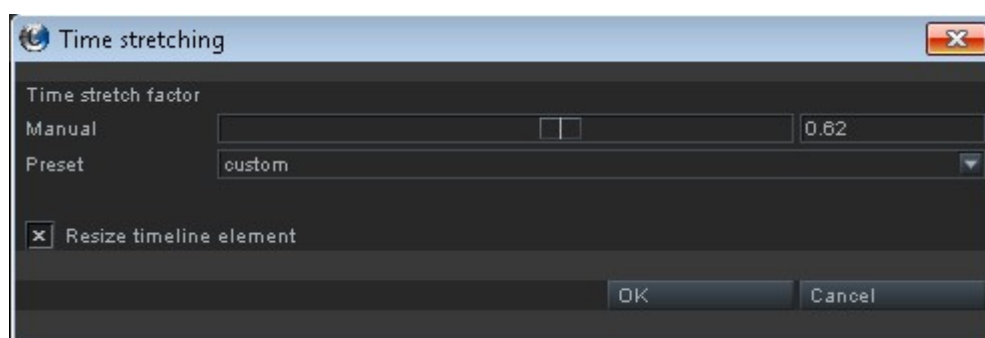
8.) Negative Speed Effects

In its version 4.3, CLIPSTER® supports negative speed effects for both single-frame sequences as well as for container file formats.

Please keep in mind that the real-time capability of the negative speed effects depends on the GOP (group of pictures) size of the container file format.

Support in the timeline

To apply a speed effect to a clip, please select the option *Time stretching* in the context menu which can be called with the right mouse click on the clip. In the dialog *Time stretching* you can specify a speed factor by using the slider or by entering a certain value in the edit box to the right. Values from -3 to +3 are possible.



It is also possible to modify the play speed by using the *Time stretching mode* that can be activated by selecting the option *Time stretching mode* in the context menu of the clip. Keep in mind that the negative speed values cannot be specified when using *Time stretching mode*. To invert the speed defined by trimming the clip in activated *Time stretching mode*, please select the option *Time stretching* in the context menu and enter a minus sign in front of current value in the edit box.

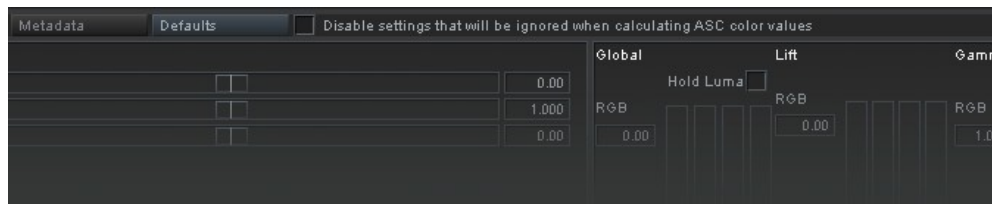
Support in the conforming tool

The support of negative speed values is also available for the conforming tool. With its version 4.3, CLIPSTER® is able to recreate negative speed effects regardless of the type of the source material. The negative speed effects can now be applied to clips which are single frame sequences as well as to the clips which are container file formats.

Keep in mind: It is not possible to change the speed value in the table of the conforming tool. But it is possible to change the speed value after the conforming has been successfully finished. To change the speed value, please use the option *Time stretching* or *Time stretching mode* as described above in the document. Once the speed value of the conformed clip has been changed, the corresponding speed value will be updated in the table of the conforming tool automatically.

9.) Improvements of the ASC Color Correction

Due to the limitations of the ASC color correction, not all parameters of the 1.CC operator can be taken into account when calculating the corresponding ASC color values during the export of the color correction in CLIPSTER®. In order to avoid export of ASC color values not matching the look currently displayed in the video overlay, the 1.CC operator has been extended with the checkbox called *Disable settings that will be ignored when calculating ASC color values* as shown in the following image:



When activated, CLIPSTER® disables all those settings, which will not be taken into account when exporting ASC color values in order to avoid its modification by the user. In case these values have been already modified by the user, they will be set to their default values automatically as soon as the checkbox becomes activated.

10.) JPEG2000

In the CLIPSTER® version 4.3, the support of the JPEG2000 file format has been extended with a possibility to capture into JPEG2000 and with a lossless compression.

JPEG2000 record

Capturing in JPEG2000-based file formats is now available in all of CLIPSTER's capture modes. CLIPSTER® offers the following JPEG2000 compression-based file formats:

- JPEG2000 (*.jp2)
- JPEG2000 Codestream (*.jpc)
- IMF / AS-02 MXF (*.mxf)
- DC MXF 250 (DCI) (*.mxf)
- DC MXF 500 (*.mxf)

Depending on the file format, the following file types are possible:

File types for JPEG2000, JPEG2000 Codestream, IMF/ AS-02 MXF:

- XYZ 12 bit
- RGB 10 bit
- RGB 12 bit
- YUV 8 bit
- YUV 10 bit

File types for DC MXF 250 (DCI):

- XYZ 12 bit

File types for DC MXF 500:

- XYZ 12 bit

- RGB 10 bit
- RGB 12 bit

The settings specifying the JPEG2000 compression, i.e. compression type and bit rate, are contained in the dialog *JPEG2000 encoding parameters* that will be displayed by pressing the button *Options...* The button *Options...* can be found to the right of the combo box *File format*. The button *Options...* will be automatically enabled as soon as the target file format is set to a JPEG2000-based file format.

Please note: the capturing in JPEG2000-based file formats in VTR mode requires an editlag of 14 frames or greater. The editlag value can be setup in the *Config* dialog on the page *Vtr* in the category *Defaults*. The specified value is valid only after the restart of the application.

Please note: The capturing in JPEG2000-based file formats depends on the system power, output resolution and color space. Please take a look at the following table containing the most common output formats:

Raster	File Type	CLIPSTER Gen 4 (JPEG Mode)	CLIPSTER Gen 4 plus optional HW Accelerator (JPEG Mode)
PAL	RGB, XYZ, YUV	✓	✓
NTSC	RGB, XYZ, YUV	✓	✓
1280x720 up to 30 Hz	RGB, XYZ, YUV	✓	✓
1920x1080 up to 30 Hz ¹⁾	RGB, XYZ, YUV	✓	✓
2048x1080 up to 30 Hz ²⁾	RGB, XYZ, YUV	✓	✓
4096x3112 @ 5 Hz	RGB, XYZ, YUV	✓	✓
1920x1080 up to 30 Hz Stereo ³⁾	RGB, XYZ		✓
2048x1080 @ 24 Hz Stereo ³⁾	RGB, XYZ		✓

1) On 16 Core Clipsters only up to 25 Hz for YUV

2) Only 24 Hz for YUV

3) Interleaved capturing is supported on all JPEG2000 formats, dual stream support only for JPEG2000 single file formats

Lossless JPEG2000

The CLIPSTER® version 4.3 supports the lossless compression of JPEG2000 for capturing and finalizing.

Please note: The lossless JPEG2000 compression is not possible when using the file format *DC MXF 250 (DCI)* because of restrictions of the DCI specification.

Please note: The finalizing as well as the capturing performance of the lossless JPEG2000 compression depends on the system power. Capturing is therefore not possible at any resolution. In general, the capturing in all SD formats is supported as well as in 720p on 24 core systems.

11.) DCI Packet

In the CLIPSTER® version 4.3, the DCI Mastering has been improved by adding the following features:

- Trustflag in CPL
- Simultaneously processing of subtitles and burn-ins
- Export of 3D text subtitles in XML file format
- Configurable gamma for DCP play-out
- Rendering of subtitles for supplemental DCPs only when needed
- Support of XYZ output via SDI for DCP play-out
- Hash values for PKL

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