Snell Advanced Media

User Guide

Utilities

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Conventions Used

Text

<Text>	indicates a specific key press on the QWERTY keyboard.
NN/nn	indicates a value entered on a numeric keypad.
Text/text	indicates either an application menu function or a Windows/SAM installation/system setting.

Symbols

See: Reference to items in other documents

Notes: System, software and workflow points to consider and remember.

Tips: Useful hints and advice when undertaking tasks.

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1. Overview

1.1 Operation

1.1.1 Start the Utility Application

The **Utility** application is opened by pressing the **Utility** box on the Application Bar at the bottom of the menu area.

From the blue scrolling box immediately under favourites at the left of the menu select the utility provider. For Quantel utilities, select **QUtility**.

The blue scroll box immediately below indicates **select:** to indicate that a utility needs to be selected.

Select a utility from the list. Once selected, the menu displays the functions available.

The utility can be turned off by setting the blue scrolling box showing the utility name to **-off-**.

Utilities can also be accessed from within Plug-ins in MLT FX.

See Plug-ins Process in the MLT FX User Guide.

1.1.2 Move Clips to Utility

Any clip can be copied from the Clip Bin, desktop or bank by dragging and dropping it on the **Utility** box, if available on the current system.

To drag a clip from the Clip Bin, press and hold on the clip title (a clip miniature displays), move the cursor over the **Utility** box and release pressure.

To drag a clip from the desktop or bank, press on its image area (anywhere outside its active areas) maintain pressure, move the cursor over the **Utility** box and then release pressure.

After clips have been rendered, a new version can be saved in the library or directly to the bank (using the **to bank** function).

1.1.3 Define the Video Format and Resolution

The blue scrolling box that displays at the bottom of the menu area defines the video format and resolution of the resultant clip that is produced. The default format and resolution set is that of the background layer (ie the first clip dropped onto the desktop).

1.1.4 Work at Different Resolutions

While an effect is being set up, the clip images can display on the desktop at different resolutions. A lower resolution image updates much faster than a full resolution image when a parameter is changed.

The working resolution affects both the displayed image and the final rendered result.

1.1.5 Process and Save Clips

After the parameters of the selected function have been set up, the clip can be rendered by pressing the **Render** box. After the clip has been rendered press the **save** box to save the rendered clip in the library. The word ‘rendered’ is added to the end of the title.

After a clip has been rendered it can be played and re-worked as necessary. Each time the **save** function is used a new version is saved in the library.

The clip is processed as either frame-based or field-based depending on the format of the original source material and the proposed output format.

The **to bank** box in the bottom left corner of the menu next to **save** allows the current clip in its current state to be held in the bank. If the clip has been rendered the bank holds the rendered clip with its history. If the clip has not been rendered then only the background layer is placed in the bank.

2. Quantel Utilities

2.1 Average

The **average** function produces a clip where each frame is a mix of a number of adjacent frames in the source clip. The first frame of the resultant clip is identical to the first frame of the source clip and the last frame of the resultant clip is identical to the last frame of the source clip.

Subsequent frames add proportionate mixes of the following frames while removing a proportion of the first frame. This is repeated until only the last frame is used. The number of frames averaged is indicated in the **step** numeric box displayed when the **average** function is selected.

The average process creates a longer clip than the original.

2.2 Cine Compress

When 3:2 pull-down material is recorded into the system using the I/O application it can be resolved into 24 FPS material at that stage. If, however, this type of material is imported into the system (for example as a series of TARGA files) it will need to be resolved so that editing or processing can be successfully performed on it.

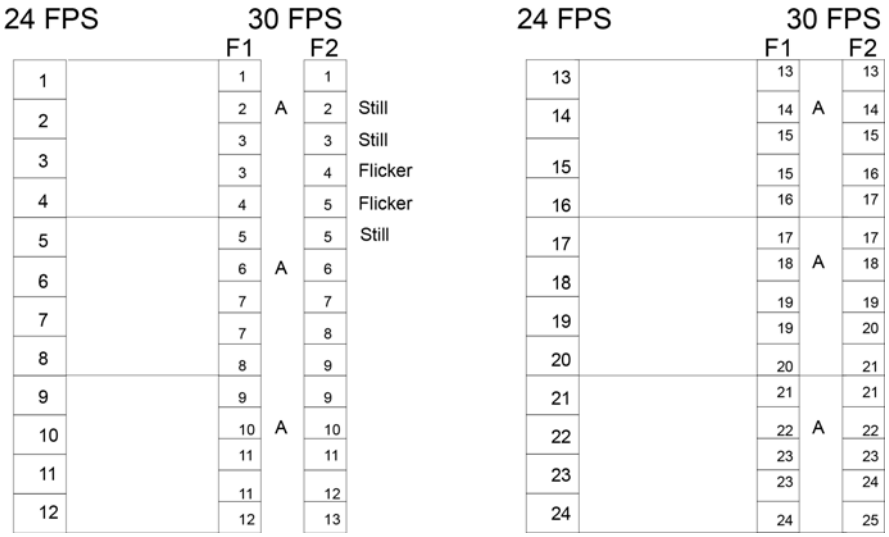
The function of the **Cine_Compress** box is to recover the original 24 FPS film frames from 30 FPS broadcast material which has been processed with 3:2 pull-down.

To do this, it is necessary to identify the three good/two bad sequence. When this has been done, set the offset to the first of the three good frames and render the clip. When rendered, the clip is compressed down to the original film frames.

2.2.1 Working with 3:2 Pull-down Material

When editing this type of material the system allows all clips to be recorded with the same cadence so that they can be simply edited together.

‘Cadence’ is the term used to describe how 3:2 pull-down has been added to film material. The extra field that gets added can go in one of four possible places. The reference frame is referred to as an ‘A frame’.



When working material that originated on film that has been transferred to 60i in 24p by discarding all the extra fields, different shots from different reels may have different cadence (the extra 3:2 fields are not in the same place in the sequence) which makes removing them complicated. The system has cine compress features that allow these difficulties to be overcome.

The 3:2 output from 24p is constant cadence and follows SMPTE recommendations for where the 3:2 extra field should go.

Film material shot at 24 frames per second can be brought into the system using different media and using different techniques. Where film material has been transferred onto 30 FPS video, two out of each five frames in the resultant video contain information from two different film frames. This is recognised by the repeating sequence of still and flickering frames.

To edit 3:2 pull-down material sensibly requires that this type of material is converted back to its original 24 FPS format while it is being recorded into the system and that the in timecode and out timecode are at A frame boundaries. To convert 3:2 pull-down material back into 24 FPS material the correct start point (or A frame) in the frame sequence must be found. The A frame is locked to the timecode value and an offset can be applied to move the timecode A frame position to the correct position in the actual 3:2 pull-down sequence.

The 3:2 pull-down boxes in the **I/O - Record** menu are provided to assist in locating A frames when recording 3:2 pull-down material. These boxes display (beneath the tape timecode box) whenever 3:2 is enabled and represent the still, still, flicker, flicker, still sequence. One of the boxes turns pink to show where in the five frame sequence the current timecode lies, taking into account the A frame offset setting in the <F1> Configuration Window.

See the Record section in the I/O Application Reference for details.

2.3 Cine Expand

When 24 FPS material is played-out from the system at 30 FPS using the I/O application it can be converted to 3:2 pull-down material at that stage. If, however, this type of material needs to be exported from the system (for example, as a series of TARGA files) it will need to be produced first using **Cine_Expand**.

The **Cine_Expand** function has the inverse effect of the **Cine_Compress** function and is used when returning a clip from 24 frames per second film type video to 30 frames per second.

All possible frames are produced in the output clip which expands three frames into five, regardless of phase. To produce the required phase, adjust the offset box. It may also be necessary to delete frames from the beginning and/or end of the resultant clip.

2.4 Cineon

Where material has been originated in Cineon format or where material needs to be converted to Cineon format the **Cineon Utils** is used to convert between log and linear data spaces.

2.4.1 To Cineon

When converting material with linear data to Cineon 10-bit log format for output to film two values need to be set. These match the maximum and minimum film densities of the resultant Cineon format file with the black and white levels of the linear data.

The black level of the linear data is placed at the minimum density level in the resultant Cineon log file. The value in the **Dmin** box selects this specific level (for example, 95).

The white level of the linear data is placed at the maximum density level in the resultant Cineon log file. The value in the **Dmax** box selects this specific level (for example, 685).

The range of linear levels in the source are converted to logarithmic scales with Cineon format red, green and blue data characteristics.

2.4.2 From Cineon

When converting Cineon 10-bit log data to a linear form (eg for inclusion in an HD or SD program) various values need to be set to ensure that the process is performed correctly for the red, green and blue information.

With **Min-Max** selected the following controls are available to match the maximum and minimum film densities of the film to the black and white levels of the resultant linear data:

The values in the **DminR**, **DminB** and **DminG** boxes mark the minimum density level in the Cineon log file (for example, 95) that become the black levels in the resultant linear red, green and blue data.

The values in the **DmaxR**, **DmaxB** and **DmaxG** boxes mark the maximum density level in the Cineon log file (for example, 685) that become the peak white levels in the resultant linear red, green and blue data.

If there is detail present above the chosen **Dmax** value (for example, glare from polished objects, lens flare etc.) the **Roll Off** box can be used to re-scale the white data to fit it within the linear data range instead of clipping it.

The value in the **gamma** box applies a correction to the displayed image to take into account viewing material on different types of monitors.

The range of logarithmic levels between the chosen **Dmin** and **Dmax** values are converted into a linear scale compensating for Cineon format red, green and blue data characteristics.

With **Min-Range** selected the **Dmax** values are replaced with density range values for red, green and blue which set the dynamic range for the resultant linear data.

The range of logarithmic levels from the chosen **Dmin** value through to the **Drange** values are converted into a linear scale compensating for Cineon format red, green and blue data characteristics.

The **Dmin** values need to be selected for each individual project. This is due to the high variation in the lighting, style and processing of the original negative. Underexposed negatives require low values and overexposed negatives require high values. It is unlikely that the **Dmin** values for **R**, **G** and **B** are the same in practice, as this may cause a colour bias in the displayed resultant material. The **RGB Dmin** values should be adjusted to give the correct shadow detail in the resultant linear format material.

2.5 Combine RGB

Where a clip has been separated into individual RGB frames, the **Combine RGB** function allows them to be assembled back into full colour images. Select the required RGB sequence from the blue scrolling box and render the clip.

2.6 DeInterlace

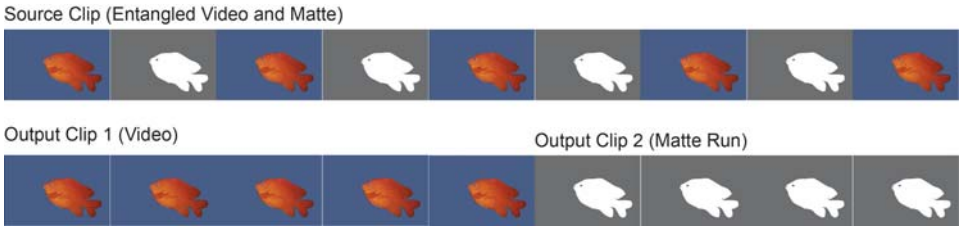
De-interlacing is used when processes are to be performed on static images instead of frames with inter-field movement and where vertical resolution needs to be retained.

The **DeInterlace** function is used to repeat each field to make new frames (the first frame in the clip becomes field 1 repeated and the second frame in the clip becomes field 2 repeated). The image content from the two fields can then be modified separately or exported to another system (for example, as TARGA files) where inter-field movement would cause unpleasant artefacts. After processing has been performed on the material the de-interlaced material can then be re-interlaced using the **Interlace** function.

The rendered clip is twice as long as the original clip.

2.7 Disentangle

The **Disentangle** function is used to divide one clip into two clips (for example, a video clip with associated matte from a 3D system. Every Nth frame of the clip (determined by the number in the space numeric box) starting from the frame specified in the offset box is extracted to create a new clip.



In the case of RGB A material to extract the matte element of the clip consisting of every Nth frame, turn on the **ExtractMatte** box; to extract the remainder of the clip turn off the **ExtractMatte** box. The **space** and **offset** boxes are automatically set if an entangle has already taken place.

2.8 Entangle

The **Entangle** function is used to combine two clips into a single clip (for example, a video clip with associated matte). Set up the required values and place the first clip onto the desktop and the second clip into the **Clip2** box.

The first frame of the second clip is inserted before the first frame of the first clip. Sequential single frames of the second clip are then inserted at the interval specified by the **space** box. The **offset** box specifies where in the clip the first frame of the second clip is inserted.

Where more than two clips are required to be entangled, the **Entangle** must be repeated for each new clip. The value of the **space** box must be incremented for each new clip added.

2.9 Flip

The clip can be flipped horizontally or vertically by turning on the **H flip** or **V flip** boxes.

2.10 Freeze

The **freeze** function allows a frame to be frozen for a set number of frames. Use the **frame** box to select the frame number to be frozen and the **freeze** box to specify the length of the freeze. Setting the **frame** box to 0 will freeze every frame in the clip by the amount set in the **freeze** box. The **offset** box specifies the number of frames from the start of the clip where the freeze starts.

2.11 Integrate

The Integrate process condenses frames in a clip in order to reduce noise when recording stop frame animation, when generating a reference frame or any other similar use.

The integration is achieved by averaging the number of frames defined in the **window** numeric box starting at the first frame. This process is repeated until all of the clip has been used. The **offset** box specifies the start of the first window.

2.12 Interlace

The **Interlace** function allows a clip of de-interlaced material to be re-interlaced. The first frame in the source clip must contain the repeated field 1 and the second frame must contain the repeated field 2 information. This is required when wanting to re-touch a clip of fast-moving field-based material.

During rendering, sequential frames are taken and rebuilt into fields 1 and 2 of a frame. The rendered clip is half as long as the source clip.

2.13 Reversal

The **reversal** function allows the selected clip to be reversed first frame to last. The field relationship is reversed to produce smooth motion.

A reversal results in a clip one frame shorter than the original.

2.14 Separate RGB

Where a video clip needs to be separated into individual RGB channels the **Separate RGB** function can be used. This function separates each frame into a separate luminance-only (greyscale) frame for Red, Green and Blue components.

The first frame in the rendered clip is red followed by green then blue.

2.15 Viper

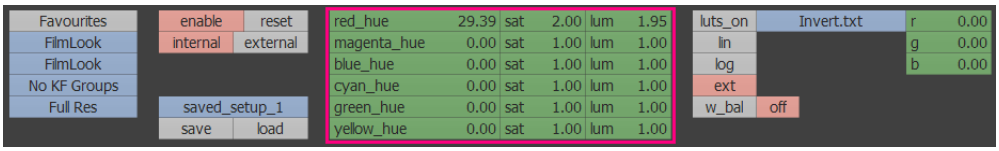
Where material originates from a Viper camera the **Viper** function can be used to convert the data to linear form so that the material can be used with linear HD or SD material. The controls allow the material to be colour matched to remove the inherent green cast produced by this camera type. To adjust the clip turn on the **manual** box and use the colour gain boxes to achieve the desired result.

The **Log Convert** function, when enabled, automatically converts the Viper log data into Cineon log data (between user-defined **DMin** and **DMax** values) with the currently set up colour correction applied. The clip produced can then be exported to a film recorder (as a series of Cineon log files) using the **Export** menu in the I/O Application.

3. FilmLook System

3.1 Overview

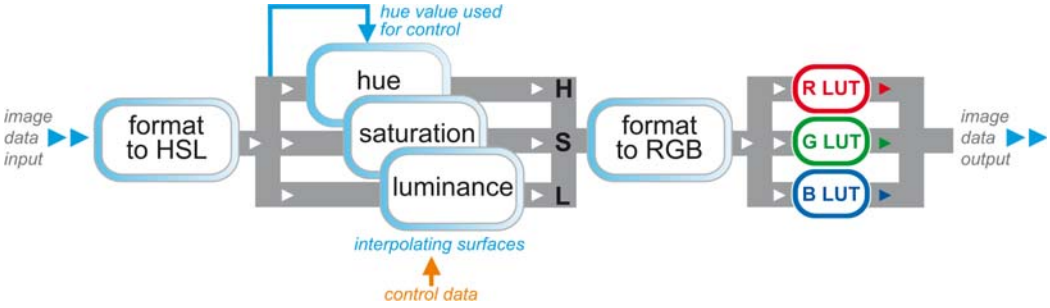
FilmLook is controlled from within the Utility application and provides a set of controls to match the graduation and colour of material in real time. The final viewing method can be video monitor, video projector, or film. The viewing method should be considered in order to avoid problems on a display device that has different properties to the display used during preparation.



There are controls to correct hue, saturation, brightness and gamma so that the system display provides a generally accurate emulation of the final display method. There are some limitations to the correction capability; for example, fully saturated colours in one colour space may not be reproduced accurately in another.

FilmLook does not affect saved media data. The colour effect appears live on the SD and HD monitor outputs but not in the GUI Edit Window.

3.1.1 Output LUT Circuitry



The HD and SD monitor output hardware of Quantel platforms contain programmable hardware to allow the ‘look’ of the output to be controlled. As part of this process, the image data is passed through RGB look up tables (LUTs) to modify the overall gradation from input to output. In the previous diagram these LUTs are represented by the boxes labelled R, G and B.

3.2 Using FilmLook

3.2.1 Open FilmLook

To access FilmLook controls, press the **Utility** tab on the Application Bar.

Select **FilmLook** from the scroll box below **Favourites** on the left of the menu area. Another scroll box displays directly below; select **FilmLook** again.

3.2.2 Toggle the Output LUT

At any time during modification, press the **enable** box in Utility to toggle the live LUT on the output. Alternatively, press the **lut** tick box on the Application Bar.

3.2.3 Modify the Live LUT

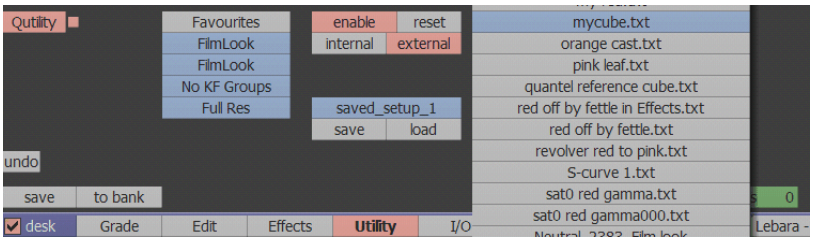
Press the **internal** box to modify the current output LUT. Individual hue, saturation and luminance levels can be modified on the red, magenta, blue, cyan, green and yellow channels of the output video. The red, green and blue gamma can also be changed. Adjust each value using the corresponding bank of green numeric boxes.

When modifying values, visualise the primary and secondary hues as being equally spaced around a circle – so red, yellow, green, cyan, blue and magenta are spaced at 60 degree intervals. Changing a hue value therefore shifts the hue around the circle to another colour, and this colour's saturation and luminance can be modified from 0.5 to 1.5.

The hue, saturation and luminance controls in each colour operate only with minimal interaction with nearby colours and intermediate colours are interpolated. All colours are independent except green; this control acts as a global hue rotate.

3.2.4 Use External LUTs

Press the **external** box and choose the LUT from the scroll box list on the right.



Unless the target folder has been changed via the **UI – Active Cube Folder** setting in the <F1> Configuration Window, 1D LUTs are located in the C:\Data\User\Luts folder; 3D LUTs are in the C:\Data\User\Cubes folder.

3.2.5 Global RGB Gamma Tables

With either the **internal** or **external** menu displayed, the colour adjusted data is linked into three independent tables on the right of the menu area to allow gamma correction.

With the **luts on** box selected, any LUT can be loaded using values calculated by the platform (accessed by the **lin** and **log** boxes), or press **ext** then use the scroll box to select an external LUT.

Preset options are described below and in each case red, green, blue and gain can be controlled:

lin (linear)	A straight-through mode; the gamma value has no effect.
log to print	Image clips held as 10-bit log data representing the full range of the scanned negative can be viewed in a print representation in this mode. The output tables are loaded with a mathematical model of a typically processed print. The green numeric boxes in this case represent printer lights and provide an adjustment of +/- 30 (1.25 stops) from a lab nominal value.
video to print	The output tables are loaded with a soft start and end to give a representation of the look video data generates when output to film. The values in green numeric boxes give some simulation of printer light controls but these cannot be as accurate as for the 'log to print' tables because the user set-ups for this vary between installations.

viper	The Thompson Viper camera produces a log style output which is uncorrected for grey balance and contrast. The three numeric values are used to set-up the grey balance and relative gain between the R, G and B channels.
w bal	With this box on, green numeric boxes control the setting of white balance. These can be used when viewing multiple versions of the image (for example, for output to film and for reproduction on television) to match the look of film dye colours and television phosphor colours.

3.2.5.1 Control Sequence

The logical sequence for setting LUT values is as follows:

1. Modify the gamma tables to provide the appropriate rendition using a monochrome image.
2. Modify the green hue control to balance the green shades.
3. Modify the remaining controls.
4. Save the results for future use. There are separate settings for HD and SD values.

User gamma tables can be defined and loaded automatically to replace the manual controls on system start-up. The format of the file is shown at the end of this chapter (‘1D LUT Example’) and comprises 9 bit input (512 values) of 8 bits each packed into 16 bit words saved in text files (.txt) in the C:\Data\User\Luts or C:\Data\User\Cubes folder.

3.2.6 Save and Load Settings

A maximum of eight sets of menu settings can be stored for HD video and up to eight for SD video. These are selected from the blue scroll box on the left of the menu area.

Press **save** to save the current menu settings to the selected set-up. The **load** box loads the settings from the selected set-up to the menu. The **reset** box resets the current menu settings. Selecting HD or SD from the blue box on the Application Bar automatically selects the HD or SD set of menu settings.

3.2.7 1D LUT Example

A simple 1D LUT could adopt the following form:

table type2
gMax 511
gSize 512
 # lut file data v2 17/11/2003
 # input starting at black and ending at white
#gamma

#r	**g**	**b**
511	**511**	**511**
510	**510**	**510**
509	**509**	**509**
508	**508**	**508**
507	**507**	**507**
506	**506**	**506**
505	**505**	**505**
“		**““**
“		**““**
5	**5**	**5**
4	**4**	**4**
3	**3**	**3**
2	**2**	**2**
1	**1**	**1**
0	**0**	**0**

