Snell Advanced Media

User Guide

Grading

Information and Notices

Copyright and Disclaimer

Contact Details

Customer Support

For details of our Regional Customer Support Offices please visit the SAM web site and navigate to Support/Customer Support Contacts.

https://s-a-m.com/support/247-support/

Customers with a support contract should call their personalized number, which can be found in their contract, and be ready to provide their contract number and details.

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.

Contents

1. MLT FX Colour

1.1 Overview

1.1.1 Introduction

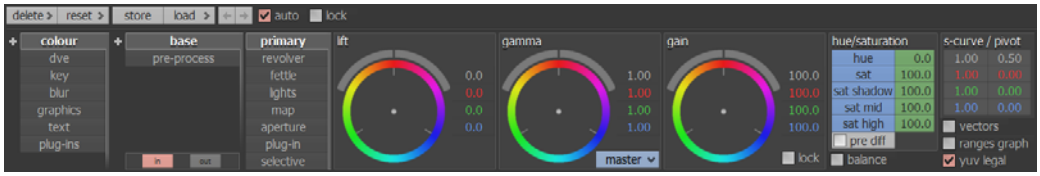
The Edit application's **mlt fx** – **colour** menu enables primary and secondary corrections to be applied on a 2D or stereo 3D multilayer timeline. Colour correct either individual clip segments, video tracks or the whole timeline.

Perform primary (overall) and secondary (specific) keyframed corrections on clip segments as well as cascaded correction using unlimited levels. Specific colours can be manipulated by using GUI swatches and HSL, YUV and RGB graphs. Storyboards and Stillstores can then be used to store, compare and transfer required process parameters to other projects.

This chapter details the colour process in MLT FX. Become familiar with other MLT FX processes and timeline functions beforehand by referring to the MLT FX User Guide and the Timeline Editing User Guide. For Stereo 3D MLT FX functions, see the Stereo 3D User Guide.

1.1.1.1 Open MLT FX

Press the **Edit** tab on the Application Bar to open the Edit application then open an edit or assemble 2D and/or stereo 3D material on the multilayer timeline as required.



Press **mlt fx** in the bottom-left of the menu area followed by **colour** (on a new timeline, this displays automatically at the top of the process list). All the primary and secondary grading functions display in the area on the right.

1.1.1.2 Panel Interaction with MLT FX

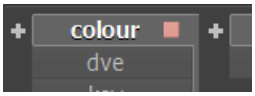
The Neo Nano or the Neo panel can be used in conjunction with Edit and MLT FX. The panel functions interact with the GUI where applicable. For Neo Nano panel functions, see "Neo Nano" on page 54. For Neo panel functions, see "Neo" on page 83.

1.1.2 Using the Process Stack

colour is the top process in the stack in MLT FX and its functions display by default. Press on any other process box (for example, **dve**) to display its associated functions to the right.

1.1.2.1 Enable or Disable a Process

If a change is made within a process, the name displays a small box to the right with a pink highlight.



To toggle the original ungraded media with the current layer's grade, press the small square box to the right of **colour** to disable the process, and the box turns grey. Press the box again to re-enable the process and the box returns to pink (other processes can also be toggled like this). The same can be done for any associated function, for example, to toggle **colour** – **revolver** parameters on/off, press the box next to **revolver**.

1.1.2.2 Duplicate a Process

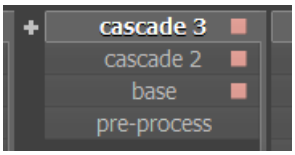
Press on the required process box, for example, **colour**, then hold down <Shift> and slide the cursor up to create a copy of the process and its settings (**colour 2**).

1.1.2.3 Add and Name a New Process, Shape or Cascade

Add a new process by pressing the + box to the top-left of the process stack then selecting a process via the pop-up. The new process now transfers to the stack with a number (for example, **colour 2**, **colour 3** etc.). A scroll bar displays as the stack becomes longer. Double-click on the new item's name and enter a new name in the soft keyboard, if required.

In processes with shapes (**graphics**, **blur**, **colour**, **key**), add a new shape by pressing + to the left of the new shape stack. Press + again to toggle between the existing shape stack and the new shape stack.

Add a new cascade level in the **colour** or **full key** menu by pressing + to the left of the cascade stack.



1.1.2.4 Re-order a Process, Shape or Cascade

Re-order a process by dragging and dropping a name box (for example, **dve**) up or down the stack (the top process is the last process applied). This can also be done to move a cascade within the cascade stack, or to change the level of shapes on-screen by dragging the shape's name up or down through the stack. The shape at the top of the stack is placed in front of other shapes on-screen and the shape at the bottom is behind the others.

1.1.2.5 Delete a Process, Shape or Cascade

Press **delete** on the left of the menu area followed by the item name in the stack to delete it, together with any keyframes. Valid items for deletion display a red outline when hovering over them, after pressing **delete**.

1.1.2.6 Reset a Process or Function

Press **reset** in the GUI, then press a menu function (for example, **revolver**) or a value to reset it to the default on the current track/segment. All keyframes remain in position. Valid items for resetting display an orange outline when hovering over them, after pressing **reset**.

1.1.2.7 Stereo 3D Processes

With stereo timeline media, each process (except the stereo process itself) has two square boxes for the left and right eyes. If a box is not selected, the process is applied to both eyes.

A light-grey box indicates which eye has focus (i.e. is enabled); check this is correct before applying the process. Press a dark-grey box to switch focus to the other eye, or press a light-grey box to enable both eyes.

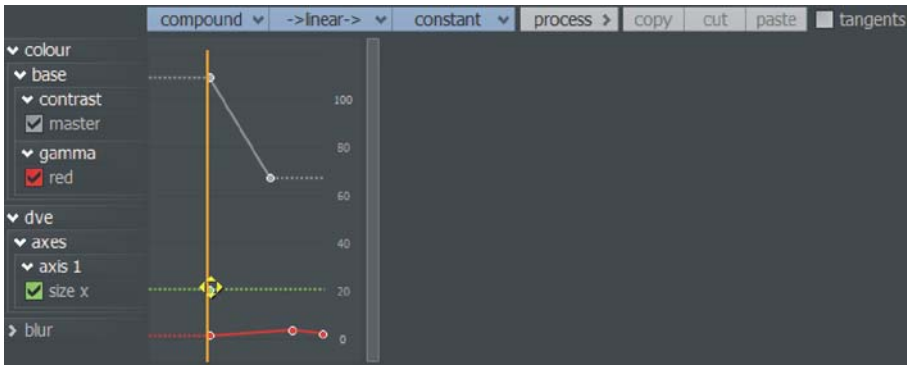
When a process change has been made, hold down on the dark-grey box to move the process to the other eye, or hold down the pink box to apply the process to both eyes.

The Edit Window is split between left and right eyes. Use the eye selectors (L and R boxes) below this window to toggle between different views. Both eyes are on by default (i.e. pink).

See Stereo 3D User Guide for more details.

1.1.3 Use Keyframes for Dynamic Grades

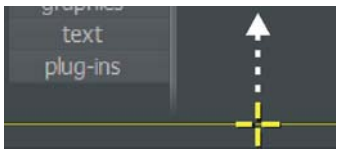
In MLT FX there is a set of keyframe curves for each clip segment, for the whole track, and for the whole timeline.



Keyframes display for each clip segment after a process parameter (for example, **colour**) is changed. Parameters that define the change between each keyframe can then be adjusted using graphs if required. These graphs display the rate of change of each parameter value (size, position, colour etc.) against time.

1.1.3.1 Open the Graph

Open the graph by right-clicking (<Alt> + tap for pens) or dragging-up the yellow dividing line between the timeline and the process menu area. This also determines the vertical scale of the graphs. Right-clicking again returns the graph to its default position.



1.1.3.2 Zoom and View the Graph

Tapping on the timeline ruler expands the current clip segment to fill the width of the screen; this allows graphs to be adjusted more accurately.

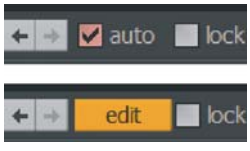
A white bar displays on the timeline ruler to allow scrolling along the whole timeline. Tapping on the white highlight of the timeline ruler returns the display to match the width of the clip segment.

The display of parameters is hierarchical allowing them to be collapsed if required. All keyframes can be seen either altogether, in groups, or individually for each process (for example, **dve**). There are three modes for viewing the keyframes which can be selected from the blue scroll box.

Parameter curves can be hidden by deselecting the corresponding tick box on the left of the graph area. Pressing and holding down on the parameter name toggles a solo view on/off.

1.1.3.3 Create and Edit Keyframes

Tick the **auto** box to automatically insert a keyframe node whenever a parameter is changed. If **auto** is deselected, confirmation is required before any node is inserted, which is done by pressing the orange **edit** box that displays.



With the **auto** box ticked, a parameter change automatically creates a keyframe of the new parameters indicated by a node displaying on the graph. Transitions between the nodes are interpolated on rendering. Nodes are different colours for each parameter – although nodes change to yellow if the **tangents** check box is selected or if a node is selected.

1. To set an initial keyframe (i.e. start point) for a process, select the required timeline point where the change is to start from.
2. Use the process parameter boxes to make the change (for example, **colour** – **primary**).
3. If required, select another frame and make another change within this process, then repeat as necessary, or simply move to the frame to finish on and make the final change.

A keyframe can also be inserted by pressing on the required position on the graph. The timeline cursor moves to this position.

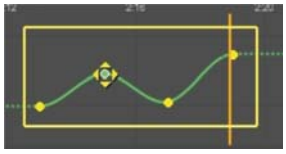
The parameter value can now be changed using the green numeric boxes, or by dragging the node or curve (with **tangents** on) in the graph display.

When transferring colour settings, press insert edit before dropping the setting onto the image area. This applies only the last keyframe values in the settings clip (for example, those for lift, gamma, gain) to the current clip at the cursor position. This is useful to transfer the same colour values from the end of one clip to the start of the next. If insert edit is not pressed, all the keyframe values (and not just the last) are transferred to the clip regardless of cursor position.

1.1.3.4 Select and Move Nodes

Any existing keyframe can be selected then edited by stepping to it using the ← and → boxes (or <Ctrl> + <←> or <→> on the keyboard), then making the required process changes. The keyframe can also be edited using parameter graphs by directly selecting nodes on the parameter's keyframe curve.

Select multiple nodes by dragging a lasso (yellow box) around them. Select or deselect nodes individually by holding down the <Ctrl> key and pressing on them. This makes it much easier to isolate keyframe nodes for moving or copying.



Move a node by placing the cursor on it then dragging it up/down or left/right. Moving a node up or down increases or decreases the value for the selected parameter at the current keyframe. Moving a node left or right changes its position on the timeline. The curve between the nodes changes accordingly to provide the best interpolation between all keyframes.

1.1.3.5 Delete and Copy Nodes

Press the **delete** box in the top-left of the process menu area followed by pressing on the node to delete. Alternatively, drag a lasso around the nodes to delete then press **delete**. To delete all the nodes except the current one press **delete** then tick **keyframe** followed by **all**.

When nodes are selected, the **cut** and **copy** boxes highlight. Choose one of these boxes, then move the timeline cursor to another frame and transfer the cut/copied nodes by pressing the **paste** box.

1.1.3.6 Group Nodes

Groups of keyframe nodes on the graph can be selected (by dragging a lasso around them) and then all moved by the same amount using the box cursor around the lassoed area.

Moving the left or right edges of the yellow box cursor moves the keyframes earlier or later in the parameter effect while the node closest to the opposite edge remains fixed. Moving the top and bottom edges of the yellow box cursor increases or decreases the rate of change between the keyframes while the node closest to the opposite edge remains fixed.

1.1.3.7 Modify the Curve (Tangents)

When the **tangents** box is ticked, the nodes turn yellow and three coloured lines emanate from the node with a ‘handle’ on each end.

Drag a handle to change the shape of the curve (and therefore how smooth the transition is) as follows: drag the yellow line’s handle to change the curve through the current node; drag the pink line’s handle to change the curve entering the node; drag the red line’s handle to change the curve exiting the node.

See MLT FX User Guide for full details of viewing and editing keyframe graphs.

1.2 Apply Colour Cubes

1.2.1 1D and 3D LUT Overview

LUTs (Look Up Tables) consist of data files containing input and output values for red, green and blue that emulate a specific display system. They are used either before grading, for monitor calibration, or to preview the final image output accurately. 1D or 3D LUTs can be used:

1D LUT	Maps the input values of a single RGB component to new values for that component and is useful for basic corrections of gamma, brightness, contrast etc. Select, modify and save any 1D LUT into the C:\Data\User\Luts folder.
3D LUT (‘Colour Cube’)	Provides finer and more complex correction than a 1D LUT, as one RGB component’s input value can affect the other two components. Select, modify and save any cube into the C:\Data\User\Cubes folder.

1.2.2 Using Cubes

Use ‘Cube Builder’ to create, modify, save, then ‘burn-in’ and/or view the cube on output. Use different cubes on different segments and use them with log or linear media in RGB or YUV (all cubes are RGB but convert for YUV media). Each cube can be saved locally as a text file (.txt) in the C:\Data\User\Cubes folder. In addition, IRIDAS ‘look’ (.look) files can be used, then modified and re-saved as text files.

When applying a cube to media before grading, for example, on a tape-based deliverable; the cube effect displays in the GUI display and SDI output during the subsequent grade. Use the pre-process level at the bottom of the GUI Cascade stack to apply/create a cube before grading; this cube is then ‘burnt-in’ when the material is rendered.

Alternatively, a cube such as ‘FilmLook’ can be applied on output after grading, for example, on a film deliverable; the cube effect displays on the SDI output only. This cube is then ‘burnt-in’ when the material is exported via the I/O application, for example.

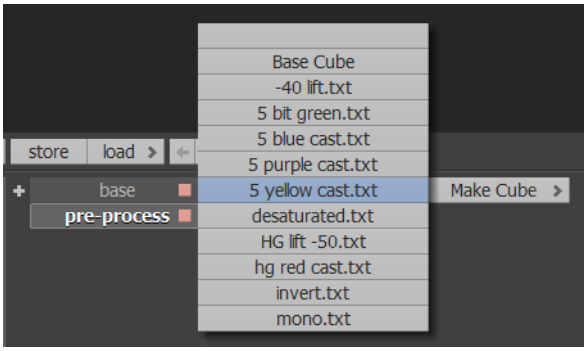
When creating a cube to be used for FilmLook or I/O — Export, avoid confusion by disabling FilmLook on output. Do this by deselecting lut on the Application Bar (this toggles the live LUT).

See Utilities User Guide for details of the FilmLook System.

1.2.3 Pre-process

1.2.3.1 Apply or Remove an Existing Cube

Press the **pre-process** box then select an existing cube from the scroll box.



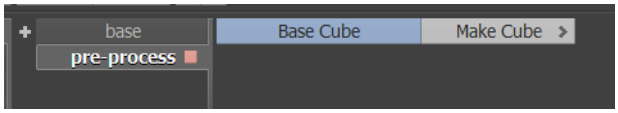
This cube's effect is now visible on the current timeline selection (i.e. segment, track or clip). To display no cube, select the empty entry from the scroll box list.

Apply all of the current cube values to a new cube. Modify any colour parameters on the base Cascade if required, then press Make Cube and rename it via the soft-keyboard.

1.2.3.2 Create a New Cube

Linear RGB or YUV Media

Changes to the base Cascade only are saved in the new cube.



1. Press the **pre-process** box and select **Base Cube** from the scroll box on the right.
2. Use the colour function's primary/secondary tools to set parameters as required for the new cube (if necessary, disable the live output LUT by pressing the **lut** box on the Application Bar).
3. Press **Make Cube** then rename it via the soft-keyboard.
4. Reset the colour process. Press **pre-process** and scroll to the new cube. The cube effect now displays in the GUI display and SDI output. **colour** process parameters for the cube are not indicated in the GUI; all functions display their defaults.

The resultant cube can be loaded, modified and exported via the I/O application.

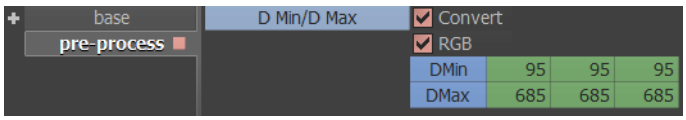
Log Media (DMin/Dmax Menu)

The **DMin/DMax** cube displays automatically in the scroll box only when the clip has log data.

Tick **Convert** to convert log-based material to a linear image.

Although rarely used, at any time the RGB adjustment range can be specified by setting the minimum and maximum density in the **DMin** and **DMax** boxes. The default values correspond with the **RGB DMin** and **RGB DMax** values in the <F1> Configuration Window's **Colour** menu. The minimum value of 95 represents the default black point; the maximum value of 685 represents the default white point.

If there is an imbalance, tick **RGB** then enter separate values for red, green and blue.



These settings are retained when making a subsequent cube then saving it, as described previously for linear material.

When processing log material without a cube applied, operation is as follows:

- Log media is converted to linear referencing the **DMin**/**DMax** values. This is necessary for any colour corrector as the colour maths cannot be applied to log data successfully: the values change but the effect is not correct.
- The colour correction process is applied (lift, gamma, gain, hue etc.).
- If **convert** is off, the final output of the correction is converted back to log media using the same **DMin**/**DMax** values as the original conversion.
- If convert is on, the final output remains as linear media, specified by the **DMin**/**DMax** values.

When a cube is applied to log material, operation changes as follows:

- Log media is converted through the cube to the cube designer's colour space.
- **DMin**/**DMax** values are not applicable and are hidden.
- As the designer's colour space conversion cannot be predicted, it is not possible to convert back to log and maintain accuracy, so the result of any additional colour correction is applied on top of the cube correction and the resultant media is saved to disk.

1.2.4 Select the Active Cube Folder

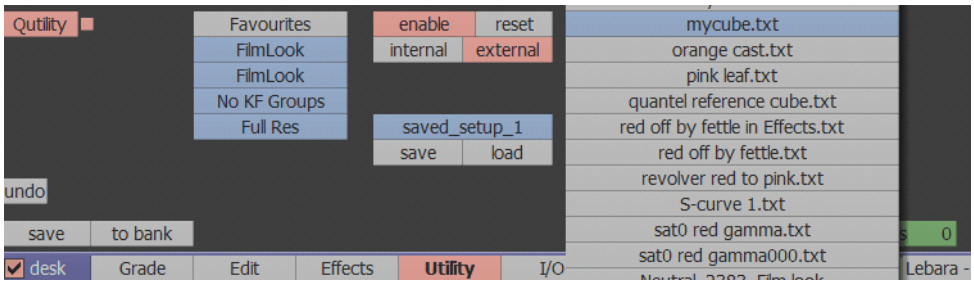
For easier management of cubes in the C:\Data\User\Cubes folder, organise them separately in different project folders and sub-folders, and set a folder as the target for subsequent cubes:

1. In Windows, create multiple folders as required in C:\Data\User\Cubes.
2. Open the <F1> Configuration Window and select **Active Cube Folder** in the **UI** menu.
3. Enter the folder name, 'my project' in the example shown, and close the <F1> window.

The folder selected in the <F1> Configuration Window now becomes current when using and saving cubes. To make a sub-folder current, enter '\\' before the sub-folder entry; for example, 'my project\\project 4' selects the 'project 4' sub-folder within the 'my project' folder.

1.2.5 Select and Toggle the Output LUT

This LUT is output to the monitor or tape and does not affect the original media or the Edit Window image.



Any cube from the C:\Data\User\Cubes folder (or sub-folder) can be selected for output. There are two ways of selecting and toggling the live LUT:

1. Open the Utility application, then select **FilmLook** from the two scroll boxes below Favourites (see screen shot).
2. Select the **external** box and select the cube from the scroll box list.
3. Press **enable** to show the live LUT on the output (this corresponds to the lut tick box on the Application Bar).

Alternatively, continue grading within MLT FX and select a new cube from the scroll box list on the Application Bar (this only displays when **lut** is ticked). Press the **R** box on the left to refresh the list.

At any time during the grade, press the **lut** tick box on the right to toggle the selected live LUT on or off.

1D LUTs can also be selected from the C:\Data\User\Luts folder.

See Utilities User Guide for details of the FilmLook System.

1.3 Primary Grading

1.3.1 Introduction

In **mlt fx** – **colour**, perform primary (overall) corrections on clip segments.

The image range consists of lows, mids and highs which can be adjusted independently using lift, gamma and gain controls. Hue, saturation and colour balance can also be altered to simulate a time of day (night, dawn etc.) or correct colour cast introduced at the time of filming.

When working on the overall video image, it is advisable to start correcting differential low-lights (i.e. whether they need to be darkened or lifted) followed by the highlight gain then the mid-tone gamma. The master hue, balance and general colour of the image can then be considered.

Check any adjustments frequently against the original ungraded clip and other timeline clips — especially when making very subtle corrections. Do this by pressing the small square box next to colour in the process stack to toggle the current layer's **colour** process on/off. Perform any primary changes on the **base** (default) Cascade level. See "Secondary Grading" on page 18 for more details of using Cascades.

Depending on workflow, a LUT can be applied to media on the base Cascade before grading.

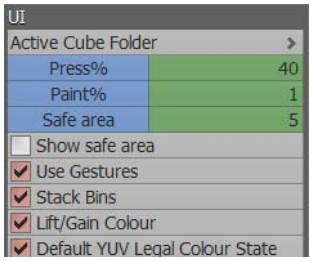
1.3.2 Select Colour Mode

1.3.2.1 <F1> Settings (Lift/Gain Colour)

When the workspace has been launched, choose between two modes which affect the display of the **colour** – **primary** menu in MLT FX:

Press <F1> to display the Configuration Window.

In the **UI** menu, tick the **Lift/Gain Colour** box to enable colour differential controls for lift, gamma and gain (i.e. 'high/low' mode). Ensure this is ticked (i.e. the default) if using a Neo or Neo Nano panel.



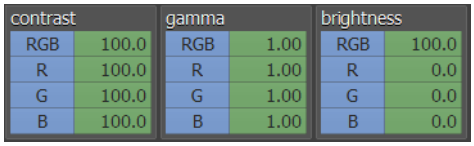
If **Lift/Gain Colour** is not ticked, MLT FX displays menus for contrast, gamma and brightness (i.e. 'classic' mode).

1.3.3 Classic Mode

To set this mode see “Select Colour Mode” on page 12.

In this mode the **colour** – **primary** menu displays menus for contrast, gamma and brightness).

Use the **RGB** boxes to control master values for contrast, gamma or brightness of the current image. The **R**, **G** and **B** boxes control the individual R, G and B values.



Do not select this mode when using a Neo or Neo Nano panel, or the panel roller balls and rings become unavailable.

Other colour functions available in both modes are described in the next section (High/Low Mode).

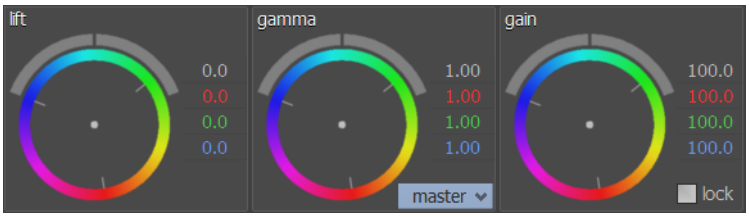
1.3.4 High/Low Mode

To set this mode see “Select Colour Mode” on page 12.

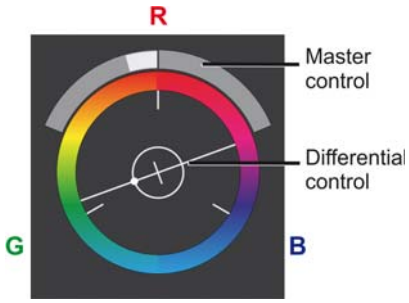
1.3.4.1 Colour Differential and Master Control Functions

In this mode the **colour** – **primary** menu displays lift, gamma and gain colour differential wheels and master control. These mimic the operation of roller balls and rings of Neo and Neo Nano panels.

All RGB values display as coloured numbers to the right of each colour differential wheel. The wheels indicate the arrangement of RGB and any adjustments made.



Each wheel affects colour differential, i.e. each colour component can be adjusted separately. Moving the left wheel via the cursor adjusts the image’s lift (shadows); the middle wheel adjusts gamma (mid-tones); and the right wheel adjusts gain (highlights).



Each wheel has a grey arc over the top. This is the master control; rotating it allows all colour components to be adjusted together.

Deviations from neutral are shown as a white segment on the arc. The grey number to the right indicates the current master value.

1.3.4.2 Lock Lift and Gain

Tick the **lock** box in the GUI (in 'master' mode only), to control lift and gain together by using the left-most colour wheel and master control.

1.3.4.3 Change Colour Differential Wheel Vectors

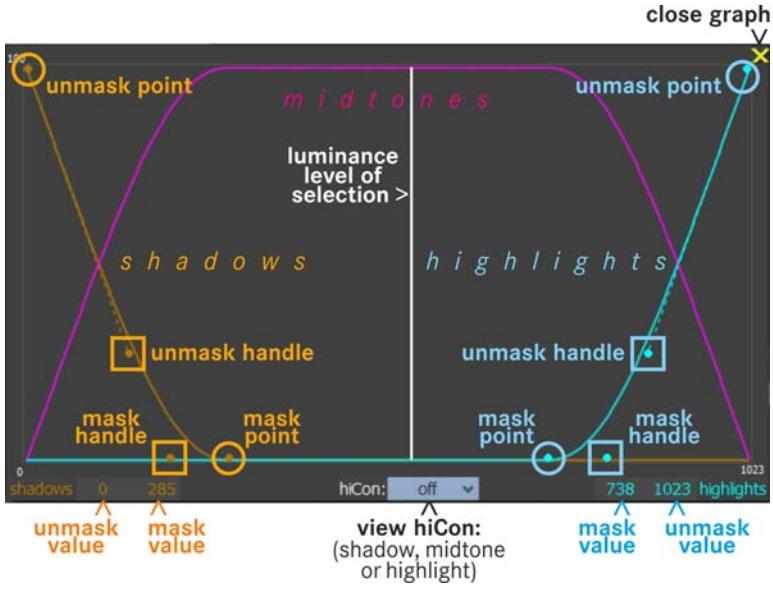
Tick the **vectors** box to change the angle at which colours are distributed around the colour differential wheel via the pop-up. Colour order from left to right is always green, red then blue.

With the top scroll box set to **Low/Mid/High (GRB)** set the angle of these colours to either **90°**; **120°** for an even distribution; or **VScope** so that colours correspond to a vectorscope graticule.

Alternatively, from the top scroll box, select **Custom Angle** then enter a required angle in the numeric box below.

1.3.4.4 Set Custom Ranges via Graph

Define the limits of the lift and gain controls by ticking the **ranges graph** box. A floating graph displays.



To reposition the graph, hold down on a grey area and drag it.

The orange curve on the left affects shadows/lift; the cyan curve on the right affects highlights/gain. The magenta curve indicates mid-tones/gamma but cannot be moved; it moves automatically depending on the shadow/highlight limits.

There are two nodes (dots) on each curve plus two node handles (dots with lines). The cursor changes when it is moved over a node/handle.

On the orange 'shadows' curve, drag the top-left node left/right to move the unmasked (i.e. revealed) limit point; alternatively enter a numeric value in the first **shadows** box. Drag the bottom-right orange node left/right to move the masked (i.e. concealed) limit point; alternatively enter a value in the second **shadows** box. The two dots with dashed lines are handles for each node and can be moved to control the curve through the node; this affects the gradient of unmasked/masked area in between and the mid-tone area.

This is similar for the cyan ‘highlights’ curve, except controls are mirrored on the right of the graph.

A colour’s luminance level can be viewed by selecting it on the image in the Edit Window (for example, a shadow or highlight). A vertical white bar now displays on the graph to show which nodes can be moved for darkening or lightening the image.

Use the hiCon scroll box to toggle between high contrast views of shadows, mid-tones or highlights on the image in the Edit Window.

Press  in the top-right corner of the graph to close it, when finished.

The colour differential wheels/master controls have different modes related to the range graph settings, which can be selected via the scroll box below the gamma control:

master	The default/normal mode (used in previous software versions).
simRange	Changes the colour controls to affect the combined ranges for shadows, mid-tones and highlights, as defined by the graph. The left control (colour wheel/master control) affects the bottom of the shadow area; the middle affects the centre of the mid-tone area; the right affects the top of the highlights area.
shadow	Changes the colour controls to only affect areas of shadow/lift in the image, as defined by the graph. The left control (colour wheel/master control) affects the bottom of the shadow area; the middle affects the centre of the shadow area; the right affects the top of the selection.
midtone	Changes the colour controls to only affect areas of midtones/gamma in the image, as defined by the graph. The left control (colour wheel/master control) affects the bottom of the mid-tone area; the middle affects the centre of the mid-tone area; the right affects the top of the mid-tone area.
highlight	Changes the colour controls to only affect areas of highlights/gain in the image, as defined by the graph. The left control (colour wheel/master control) affects the bottom of the highlight area; the middle affects the centre of the highlight area; the right affects the top of the highlight area.

When any of these parameters are changed, the current active parameters display blue.

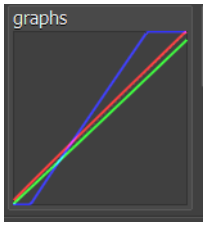
On a Neo or Neo Nano panel the currently active parameters display in white.

Save colour ranges independently of the edit in the Settings Bin, by selecting Colour Ranges from the bin’s save > scroll box.

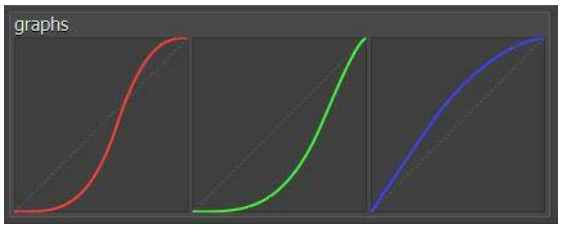
Hue, s-curve and balance are not affected by custom ranges.

1.3.4.5 RGB Graphs

In ‘high/low’ mode, RGB graphs are available to show how the grade has affected the original input colours. The master RGB graph shows the R, G and B channels overlaid on the same graph.



Press on the master RGB graph on the right of the menu area to open individual R, G and B graphs.



Press on any of the three graphs to return to the master graph display.

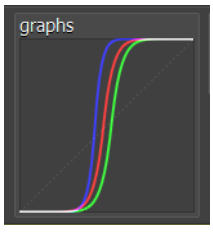
There are three vector lines representing red, green and blue. The bottom-left of the graph represents the low-light range for each colour, the middle of the graph shows the mid-tone range and the top-right represents the highlight range.

For example, if the **lift** function is performed on the blue value, the blue line on the graph lifts/moves up from the bottom-left corner of the graph (because the blacks and lowlights for this colour on the current image are being affected).

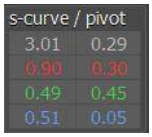
Similarly, a **gamma** adjustment bends the middle of the red, green and/or blue vector lines (i.e. affecting the mid-tones) and a **gain** adjustment moves the red, green and/or blue lines across from the top-right corner (i.e. affecting the highlights).

1.3.4.6 S-curve and Pivot

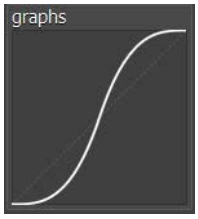
The **s-curve** function allows control of the toe (shadow area) and shoulder (highlight area) of the curve by changing the value in each R, G and B box, while fixing the lift, gamma and gain points.



Changing the white (master) value applies the same amount of s-curve to R, G and B, in addition to any individual values already applied.



By default the s-curve is centred. The **pivot** controls allows the curve to roll more towards the low-lights, or the highlights. Either set individual R, G and B pivot values, or use the white (master) value.

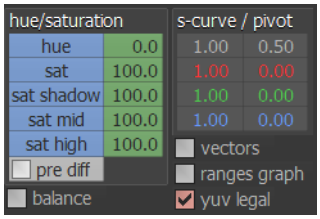


Centred s-curve

Pivoted s-curve
(tending towards highlights)

1.3.4.7 Hue, Saturation and Pre Diff

Change the hue and saturation of the image by changing the values in the hue/saturation menu. Shadow, mid-tone or highlight saturation can also be changed (limits depend on the custom range being used).



The **pre diff** tick box switches the sequence in which the colour controls are applied to the image:

pre diff off (default)	colour mode settings are applied before hue, saturation, and secondary grading functions.
pre diff on	hue, saturation and secondary grading functions are applied before the colour mode settings.

'Pre diff' can be used to create sepia or duo-tone effects. De-saturation of an image in standard mode (i.e. with **pre diff** off) prevents a colour cast being added using the lift, gamma and gain (or contrast, gamma and brightness) controls. With **pre diff** on, the image can be de-saturated before lift, gamma and gain (or contrast, gamma and brightness) controls are used to add a colour cast.

1.3.4.8 YUV Legal

Tick the **yuv legal** box to ensure that any rendered clips have legal YUV levels.

1.3.4.9 Balance

The **balance** function reduces the colour cast of the image when selecting a reference colour on the image in the Edit Window. This colour is then reduced to zero and other RGB lift and gain values shift by relative amounts; these values can then be adjusted more, if required.

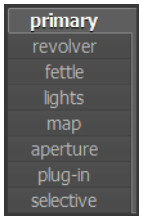
1.4 Secondary Grading

1.4.1 Introduction

Various colour functions can be used in isolation or together to perform secondary (selective) colour corrections so that a specific colour or range of colours is affected without affecting other ranges.

For example, by using the secondary grading functions, the colour of the sky in the image could be modified without affecting the colour of the grass or buildings in the image. Levels of correction can be stacked via the Cascade function, which makes any subsequent corrections easier and allows each level to be compared or disabled. For example, use the first Cascade level to correct the sky, the second level to correct the grass and the third level to correct the buildings, etc.

Secondary correction tools are available by pressing on the menu item; more options for the selected function then display on the right.



revolver This allows input colours to be selected on the current clip and adjusted on the output, while colour matching easily and accurately in HSL mode without using keys. Up to six selective colour corrections can be applied on a single cascade level. ‘Barrels’ are used to place input and output colours into, and any colour selection can be inverted (reversed), if required.

curves In order to make accurate/fine adjustments this function provides various types of YUV, RGB and HSL graphs, allowing custom curves to be modified for individual colour channels.

lights Allows the level of density (brightness) or red, green and blue to be adjusted.

map Allows the image to be modified by the Colour Palette mixing area.

aperture Used to sharpen or defocus/blur the image.

plug-in Use plug-ins to provide different effects on the image.

selective This allows colour correction to be applied to the areas defined by the key channel of the layer or by using colour ranges selected directly from the image itself. Dynamic graphic shapes or text can be used to create a mask (protected area). The key area (or the inverted/reversed area) can then be graded while the non-key area is protected from the grade changes.

1.4.2 Cascades

1.4.2.1 Multiple Level Grading within a Video Layer

Levels of colour correction can be created in a stack on each video layer so that the overall effect ‘cascades’ down through the stack. Starting after the **base** level (use this for primary corrections), create subsequent Cascade levels for secondary corrections by pressing + then perform the corrections on each level in isolation.

For example, use the first level to correct the image's sky, the second level to correct the grass and the third level to correct the buildings, etc.

Stack and rename levels of correction then select a level and easily view and change the parameters. Each level can be deleted, reset, disabled or moved up/down through the stack to change the overall effect. See "Using the Process Stack" on page 3.

Use Cascade levels in the **mlt fx** – **key** process to create complex key areas.

1.4.2.2 Grade Inside or Outside the Key

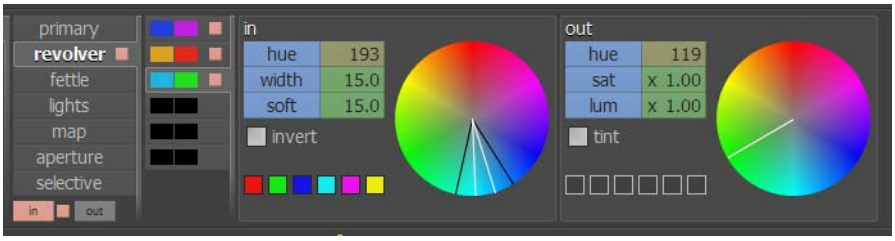
On each Cascade level, toggle between the inside or outside of the current key area before performing a subsequent correction on the active area. Select the **in** or **out** box then perform a grade. The **in** box is enabled by default when a colour change is made.

For example, with the **in** box on (normal mode), perform a de-saturation on the base Cascade. Now create a key, and the de-saturation affects only inside this key area and no other areas. Create another key, enable the **out** box then perform the de-saturation, inside the key area is protected and outside the area is affected.

1.4.3 Revolver

1.4.3.1 Modify a Colour Range without Keys

The **revolver** function is used to select input colours on the current clip and adjust the output, while colour matching easily and accurately in HSL mode without using keys. Up to six selective colour corrections can be applied on a single cascade level.



1.4.3.2 Using Barrels

'Barrels' are used to place input and output colours into, and any colour selection can be inverted (reversed) if required.

Barrels can be reset by pressing **reset** followed by the barrel, or by moving to a different timeline clip to reset all barrels. The square boxes to the right of each filled barrel can be selected to enable or disable these settings on the current image. The six barrels can be saved into the Settings Bin for future use.

The six barrel corrections can be used on a mask created from a shaped graphic.

Barrels display only the hue value of the input and output colours (not saturation and luminance), so barrel colours may display slightly different to the selected image colours.

1.4.3.3 Step 1: Select an Input Colour

To place a source/input colour from the current clip into a barrel, use the in menu functions:

1. Select an empty barrel by pressing on it. The current barrel highlights (empty barrels are black).
2. Select the required input colour by using one, or a combination, of these methods:
   - select a colour on the image using the cursor.
   - select a colour swatch from one of the six pots.
   - select/move a colour on the Colour Wheel.
   - adjust the values in the **hue**, **width** and **soft** boxes.
3. The input hue value (but not saturation or luminance) now displays across the whole barrel. If required, adjust the input colour as follows:

   hue This determines the centre value of hue in the source image.

   width This selects the range of hues about the chosen **hue** value (indicated by the white segment on the Colour Wheel). This controls subtle hue changes when sampling areas of colour on the image.

   soft This softens the transition at the edges of the selected hue range (indicated by the black segment on the Colour Wheel). This controls the blending of hue range at the edges.

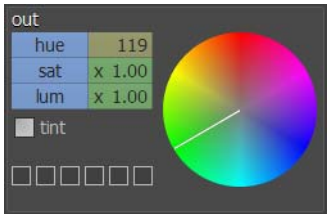
   invert Tick the **invert** box to reverse the input, so affecting all other colour ranges except the input range is subsequently affected.

4. **To use an input colour for a different timeline clip**: select a barrel or a colour from the image then hold down on one of the six input colour swatch pots; this overwrites any existing colour in the pot. Navigate to the required clip, select an empty barrel, then the swatch pot and apply the changes on its input and/or output colours.

   If required, recall all default R, G, B, C, M, Y preset swatches by pressing **reset** then the pot area.

1.4.3.4 Step 2: Select an Output Colour

To select an output colour from the current clip (which then displays in the right half of the current barrel) use the out menu functions:



1. Select the barrel with the required input colour; this barrel highlights.
2. Select the output colour by using one or a combination of these methods:

- select a colour from the Colour Palette by pressing <F2> or swiping the pen off the tablet. Mix or choose a colour from the palette then press <F2> again or swipe to recall the **revolver** menu.
- move the Colour Wheel cursor.
- adjust the values in the **hue**, **sat** and **lum** boxes.

As the output colour values are adjusted, the image updates. The output hue value (but not saturation or luminance) now displays in the right half of the barrel.

3. If required, adjust the output colour as follows:

hue	This sets the new centre value of output hue in the target image.
sat	This sets the new saturation output value in the target image.
lum	This sets the new luminance output value in the target image.
tint	'Rotate' mode (i.e. the default with tint not ticked) allows a hue range to be adjusted on the output values which softens/blends the output; whereas ticking tint provides a sharp single output hue.

4. **To use input/output colours for a different timeline clip**: select a barrel then hold down on one of the six output colour swatch pots; this overwrites any existing input/output colours in the pot (there are no presets). Both the input and output colours are stored in the pot, but only the output colour displays. Navigate to the required clip, select an empty barrel then the swatch pot and apply the changes on its input and/or output colours. If required, empty all pots by pressing **reset** then the pot area.

1.4.4 Curves

1.4.4.1 Modify a Colour Range via Graph Curves

The **curves** function provides various HSL, YUV and RGB graphs from which individual channel curves (i.e. red, green, blue, yellow and cyan) can be modified. In addition, there are master RGB (mrgb) curves which gang together the individual RGB curves.

Control brightness, contrast, hue etc. by independently adjusting the interaction of HSL, YUV, or RGB input and output in the image via different graphs; each graph represents an input and an output colour.

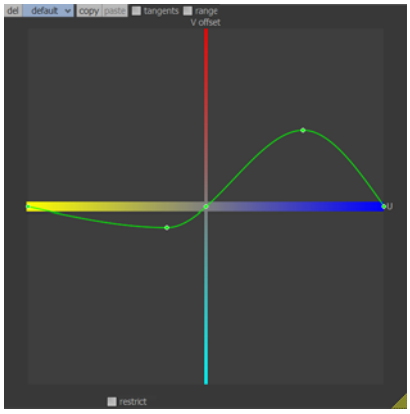
1.4.4.2 Select a Colour Space and Graph Type

Select **curves** then choose a colour space: **mrgb**, **hsl**, **yuv** or **rgb**. Select one of the colour space's graphs in the **curves** area by pressing on a graph miniature. The graph displays on the desktop for modification.

HSL colour space is useful when performing subtle colour changes.

1.4.4.3 Reposition and Resize a Graph

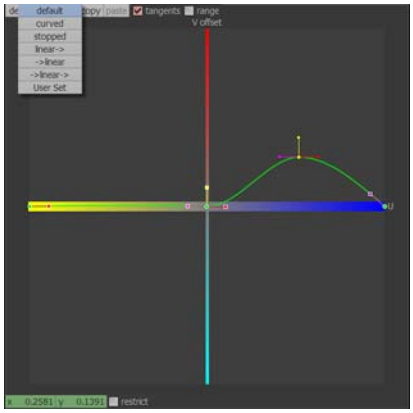
To reposition a graph press on the darker border and drag the graph to the desired position. Do not press in the graph area as this zooms in on the graph.



To resize the whole graph, hover over the bottom right corner of the graph, and a icon displays. Press on the icon and drag the corner of the graph to the required size.

1.4.4.4 Modify a Graph

Each graph indicates the curve of the input colour (the horizontal axis) in relation to the output colour (the vertical axis). As the desktop graph is adjusted, the image in the Edit Window and the graph miniature updates to indicate these changes.



Control nodes (large dots on the line/curve) can be dragged to a different position; nodes added by pressing on the curve; node handles dragged to change the curve; or use control boxes to edit the curve.

To reposition a node:

- Press on a node then drag it to a new position.

To move a node along an axis:

- Hold down and pause on a node to restrict its movement to only the x or y axis, then drag and drop the node at the new position.

To add a node:

- Additional nodes can be used to profile the colour adjustment or to limit its range. On the curve, press on the required position to insert a new node.

In addition, the following graph control boxes are available:

del Deletes the selected node from the curve (press **del** then the required node). All nodes of a curve can be deleted, except the defaults.

default Use this scroll box to select the curve transition through a node (or use **tangents**); **default** provides the smoothest rate of change. Alternatively, select one of the following then press **all**:

- **curved** the rate of change through the curve slows as it enters the node and quickens as it exits the node.
- **stopped** the change stops as it enters the node.
- **linear->** the rate of change through the curve remains constant as it exits the node.
- **->linear** the rate of change through the curve remains constant as it enters the node.
- **->linear->** the rate of change through the curve remains constant as it enters and exits the node: this creates straight lines through all nodes.
- **User Set** the rate of change through the curve is set by user modified tangents on the node.

copy/paste Allows nodes from one graph to be copied and pasted into another graph. Select **copy** and draw a lasso (box) around the nodes to be copied, open another graph then select **paste**.

add 3 pt When tapping on the main UI to find a colour on the curve graph (colour point) that displays the dotted white line, press **add 3 pt** button to create three defaults points on the graph about the position of the white line. This allows easy adjustment of the centre point to control the area of interest. The other two points ‘lock down’ the rest of the graph and prevent it from moving.

tangents Tick this to display tangents that emanate from each node point. Drag the handle on the end of a tangent to modify the curve (or use the **default** scroll box described previously to change the curve through a node).
A yellow tangent affects the curve entering and exiting the node; a magenta tangent affects the curve entering the node; a red tangent affects the curve exiting the node.

range Tick this to show the range of the colour adjustment.

zoom Makes finer adjustments easier. Draw a lasso (box) over the area to zoom; the graph now zooms in and a ticked **zoom** box displays. Deselect this box to return to the original size.

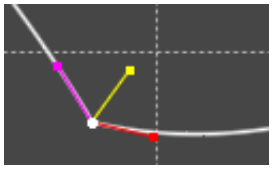
x 0.00.../y 0.00... These two numeric boxes display when a node is selected. Instead of dragging the node, change the required value in this box to move it accurately, or by a small amount.

restrict Tick this to snap the movement of any node to the curve. For example, if the cursor is moved left or right, the node moves left or right but always follows the line of the curve.

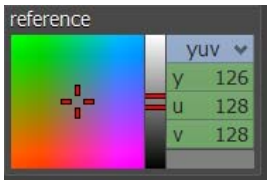
<> 000 This numeric box displays on the first three HSL graphs and allows the curve to be scrolled with its nodes left or right across the graph for easier editing.

1.4.4.5 View Input and Output Colour Points

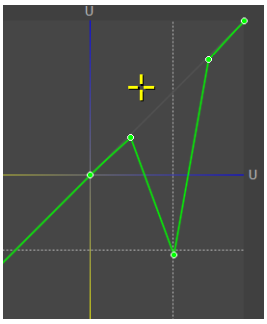
Press on a colour on the image, and it displays referenced on the graph as a vertical dashed line. In the **reference** area, select the required output/target colour which displays on the graph via the horizontal dashed line.



Set the **reference** output colour by choosing a colour space from the blue scroll box, then either press on a colour in the palette, or enter numeric values in the green boxes. Use the slider to affect the colour's luminance. The reference colour displays in the swatch in the bottom-right of this area.



On the corresponding graph add a node either side of the vertical line and one in the middle (or press **add 3 pt**). Drag the middle point to the intersection point (i.e. the target colour). The selected colour on the image changes; nodes may need modifying to adjust all the range required. Positioning of nodes depends on the graph type and the required effect.



1.4.4.6 Use Curves Graphs with Keyframes

Adjustments can be viewed as points on the keyframe graph, which shows the curve of output colour against time. Open this graph by right-clicking or dragging the yellow line below the process stack upwards. Tick the **auto** box to enable keyframes to be inserted automatically whenever a graph parameter is changed.

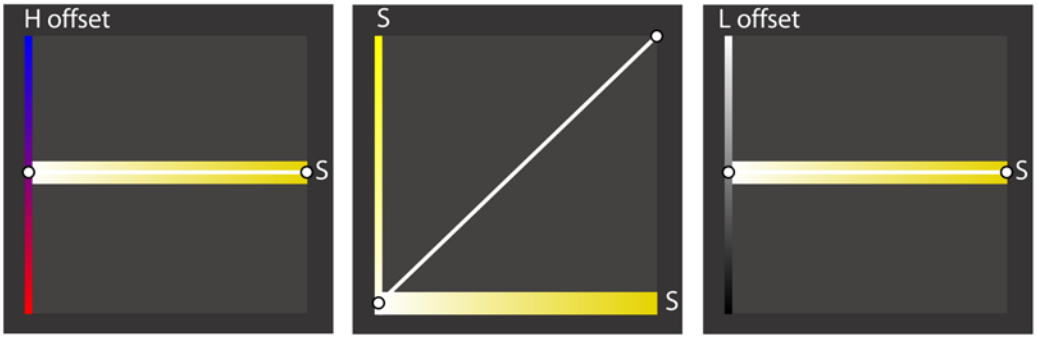
On the keyframe graph, navigate to a specific parameter and select the node or draw a lasso around multiple nodes. The selection now displays in the current **curves** graph where the parameter can be adjusted.

Move a group of **curves** keyframes by lassoing the required nodes then dragging them along the keyframe graph.

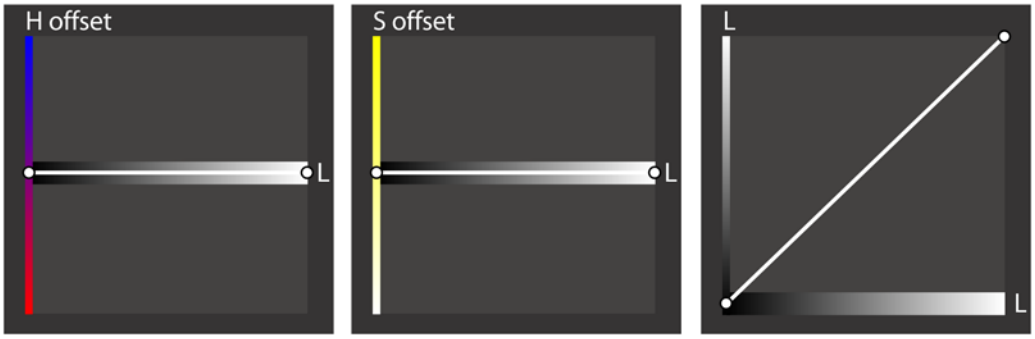
Menu or panel functions such as contrast, bright, lift, gamma or gain can be used with graphs for accurate primary corrections.

1.4.4.7 HSL Graph Types

Hue in vs hue out *Hue in vs saturation out* *Hue in vs luminance out*

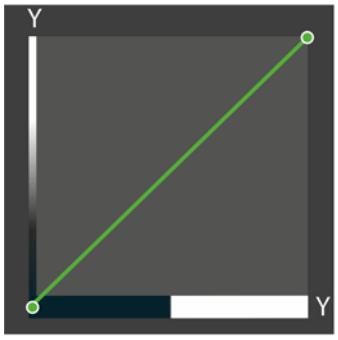


Saturation in vs hue out *Saturation in vs saturation out* *Saturation in vs luminance out*



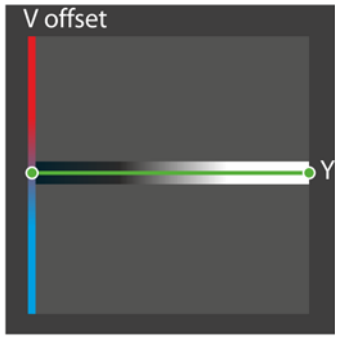
Luminance in vs hue out *Luminance in vs Saturation out* *Luminance in vs luminance out*

1.4.4.8 YUV Graph Types

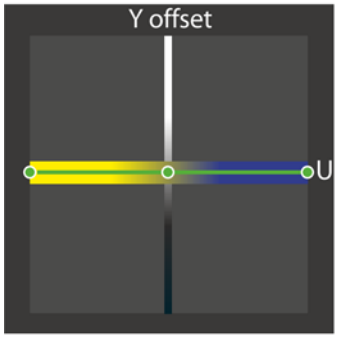


Luminance
Y in vs Y out

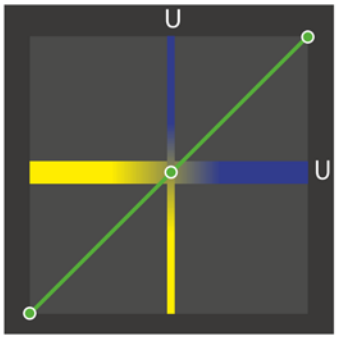
Cast blue/yellow
Y in vs U out



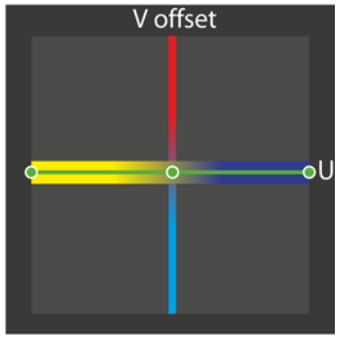
Cast red/cyan
Y in vs V out



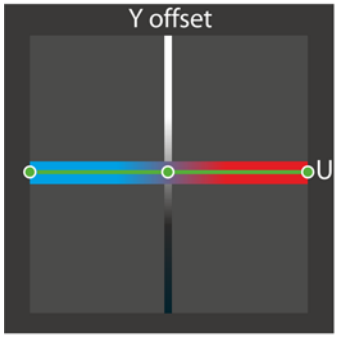
Gain blue/yellow
U in vs Y out



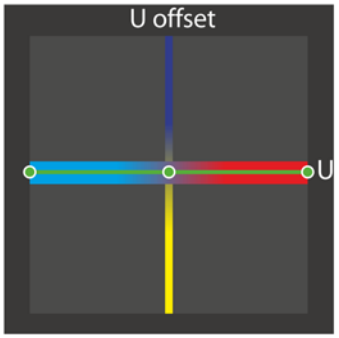
Balance blue/yellow (sat/hue)
U in vs U out



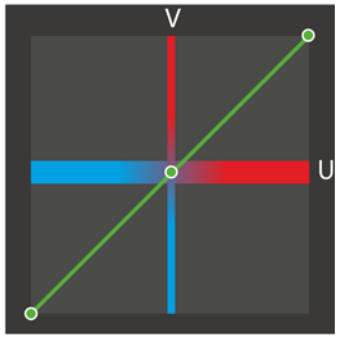
Hue blue/yellow to red/cyan
U in vs V out



Gain red/cyan



Hue red/cyan to blue/yellow



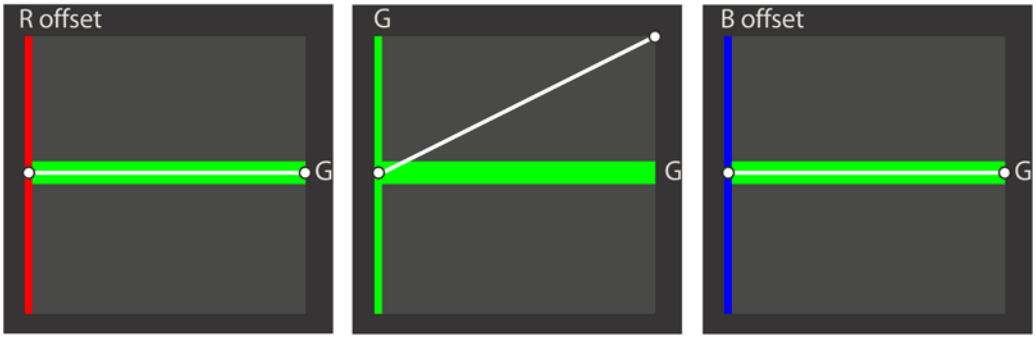
Balance red/cyan (sat/hue)

1.4.4.9 RGB Graph Types

Gain red
R in vs R out

Balance green/red
R in vs G out

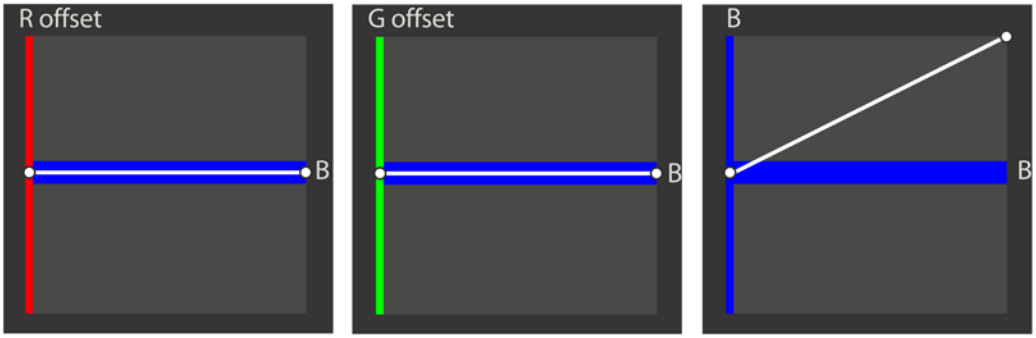
Balance blue/red
R in vs B out



Balance green/red
G in vs R out

Gain green
G in vs G out

Balance blue/green
G in vs B out



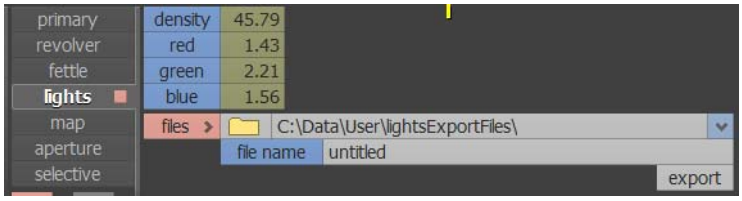
Balance red/blue

Balance green/blue

Gain blue

1.4.5 Lights

The **lights** function (i.e. 'printer lights') allows the level of density (brightness) or red, green and blue to be adjusted. Lights can be set between -50 to +50 on each cascade level and they are also keyframeable enabling the lights to change throughout the clip. A negative value increases the cast of a specific colour as lights are relative to negative film.



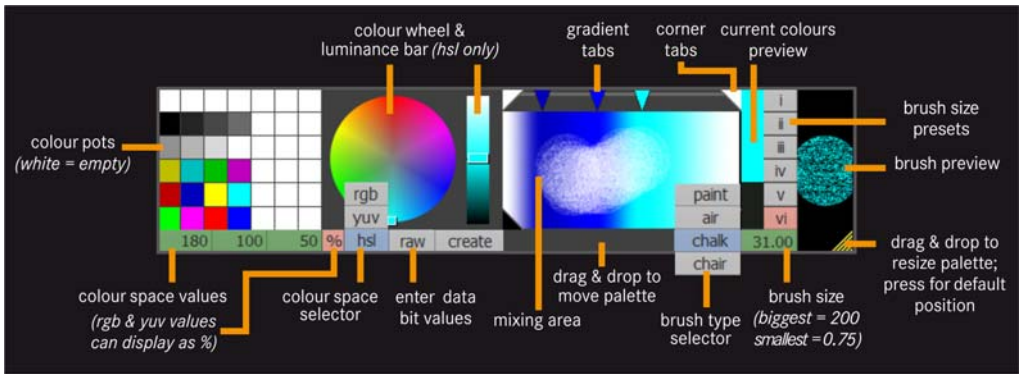
A set of lights can be exported as a text file (.txt) by pressing the **files >** box. A pop-up displays allowing the destination directory/folder to be selected by pressing the down arrow and a field for entering an appropriate file name; press **export** to export the settings. If lights are keyframed, the text file only contains the current frame value before export.

1.4.6 Map

The **map** (colour map) function allows the image to be modified by the Colour Palette mixing area.

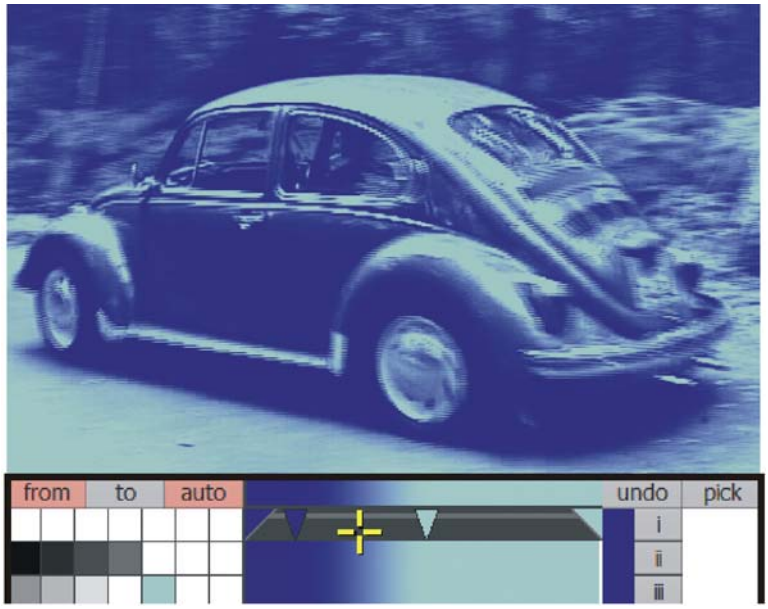
For example, if a graduation from black to white is created in the palette, the map function can be used to turn the image to monochrome. If the graduation is from white to black (or if the **invert** function is used) the image is transformed into a monochrome negative:

1. Press <F2> on the keyboard to toggle the Colour Palette on and off. Alternatively, tick **Palette Swipe** in the <F1> Configuration Window's **UI** menu to toggle the palette whenever the pen is swiped down or across the tablet.



2. Select the **map** function. **from**, **to** and **auto** functions display on the palette (plus **undo** and **pick** functions on the right). The **from** and **to** functions are used to modify the image by the contents of the palette mixing area. The left side of the mixing area affects the low-lights of the image and the right side affects the highlights.

3. Create a two-colour graduation in the palette by dropping a different colour on the top-left and top-right corner tabs (hold down on a tab to load a colour).
4. Press **from**. The image updates with the two colours replacing the original low and high values of the image. The **map** process box in the menu area now enables to indicate a colour map. Press **auto** – **from** to automatically change the image whenever a colour is changed.



5. Reverse the colours by pressing **map** – **invert** if required.
6. Introduce more colours to affect the mid-tones of the image by adding gradient tabs along the top of the mixing area and dragging them until the required effect is achieved. Paint in the mixing area to create a more contrasting image. Press **from** after introducing each colour (if **auto** – **from** is not enabled).
7. Press **to** to transfer the current map on the image back into the palette, if the palette has changed.

The palette can be used in other processes. See 'Using the Colour Palette' in the MLT FX User Guide for full details of palette functions, including mixing colours, colour spaces, saving colours and transferring colours.

1.4.7 Aperture (Defocus)

A positive value in the **amount** box defocuses/blurs the image; a negative value sharpens the image.

Use the **red**, **green** and **blue** tick boxes to defocus or sharpen individual RGB channels. By default they are all ticked.

When sharpening the image, an additional **sharpRad** (radius) box displays that controls the width of sharpness.

1.4.8 Plug-ins

Plug-ins in **colour** work the same way as in MLT FX, but here can be used on individual cascades, with different settings applied to each. Select the clip segment or video track on the timeline to be processed by a plug-in and press **plug-ins**. The **plug-ins** menu displays.

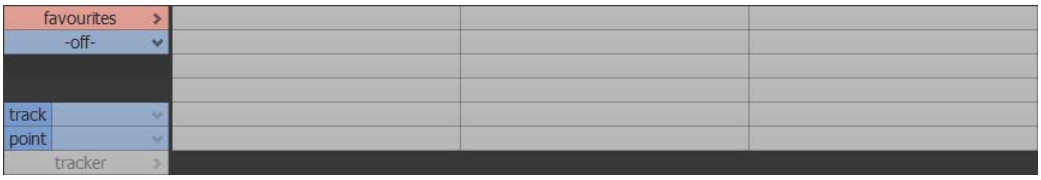
The main (first) clip to be processed by the plug-in is the currently selected clip segment or video track. If the plug-in requires an additional (second) clip, drag and drop a clip from the Clips bin onto the '**no clip selected**' box. This now displays the name of the loaded clip.

1.4.8.1 Important Notice

Only V4.2 plug-ins are compatible with V5.X (or V2.X)software. V4.1 plug-ins ARE NOT compatible; new versions of plug-ins are required BEFORE UPGRADING. Providers are aware of this issue and have provided any support required to enable compatible versions to be produced. SAM is not responsible for the availability of specific plug-ins.

1.4.8.2 Select a Plug-in

Press the **plug-ins** box. The **plug-ins** menu displays.



Select the plug-in provider name from the **-off-** blue scroll box immediately under **favourites**.

Select the required plug-in from the **select:** blue scroll box. The menu for the selected plug-in displays.

See the Plug-ins User Guide for Quantel plug-ins. For other plug-ins see the appropriate provider's documentation.

The plug-in process can be turned off by setting the blue scroll box showing the current plug-in back to **select:** (or by selecting **-off-** from the first blue scroll box).

Current plug-in parameters can be saved into the Settings Bin, if required.

1.4.8.3 Select Tracking Information

Previously defined track information can be applied to a plug-in.

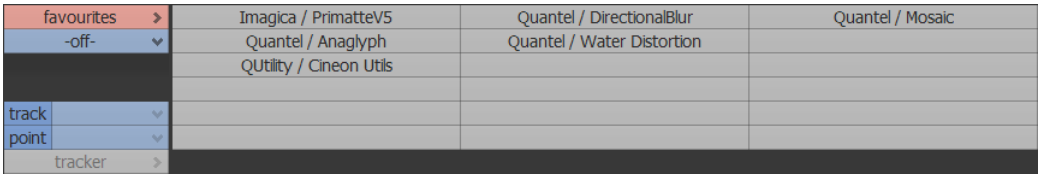
1. Select the required track information name from the **track** blue scroll box.
2. Select the appropriate track point.

See the MLT FX Tracker User Guide for details of how to set up tracking information.

1.4.8.4 Favourites

The favourites area is a store to place frequently used plug-ins so that they can be accessed quickly.

- To add the currently selected plug-in to the favourites area, ensure the **favourites** box is selected, and press and hold the cursor on an empty grey box.

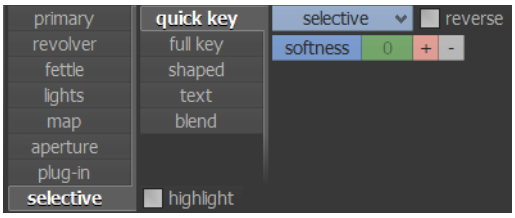


- To select an existing favourite, ensure the **favourites** box is selected, then press the required plug-in title box.
- To remove a plug-in from **favourites**, press **delete** then press on the box containing the plug-in no longer required in the favourites area.

Removing a plug-in from the favourites area does not uninstall the plug-in; it can still be selected from the plug-ins menu.

1.4.9 Selective

The **selective** function allows corrections to be applied to a sampled colour range or vector object keys without affecting other ranges or areas on the image.



Within the **selective** function, the following options to generate a key are available: **quick key**, **full key**, **shaped**, **text** and **blend**. Each of these are covered later in this section.

1.4.9.1 View a Key

Once a key has been created using any of the key options, from any of the key menus, tick the **highlight** box to display the resultant key as either high contrast (hicon), or with the key highlighted and any unselected key areas shown desaturated (monochrome). Hold down the cursor over the highlight box (which turns orange) to set the display type. At any time toggle between this and the original image displays by pressing the box.

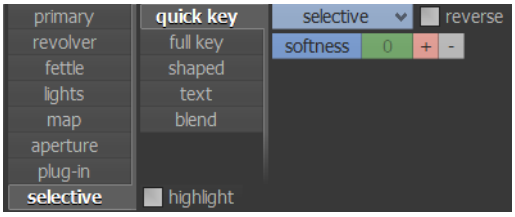
Original Hicon Desaturated

1.4.9.2 Reverse a Key

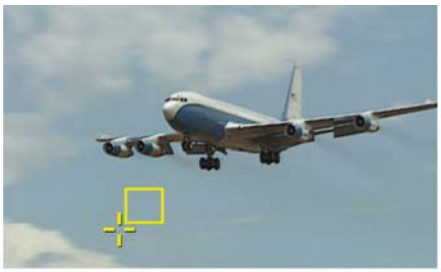
In any of the key menus tick **reverse** (or **invert** in the **text** menu) to reverse the key created by the sampled colour or vector object. This 'masks' the sampled colour range or vector object from subsequent changes, for example, desaturation, while other colours/areas outside the key are affected.

1.4.9.3 Quick Key – Selective

Use this to quickly change a colour range sampled from the image.



1. Press **quick key** then **selective** from the scroll box.
2. Press the + box then press with the cursor or draw a lasso (box) on the image colour range to change (for example, over an area of blue sky). For the initial selection try and include mid-tone ranges and not extreme highlights/shadows of the range. The sampled colour range automatically increases to add a small range of different luminance levels above and below the sampled colour and hues either side.


key colour sample range (eg blue sky)


graded key range (eg desaturate sky)

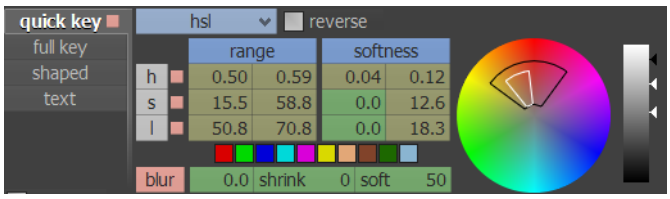
3. If required, use the + box to add more of the colour range to the initial sample; to include more highlights or shadows, for example. If too much is selected, press the - box and draw a lasso over the unwanted range.
4. Change the colour, which affects only the sampled colour area, for example, change the sky to grey (de-saturate it) by entering '0' in the **primary** – **sat** box. Return to the key functions and, if required, tick **reverse** to reverse the key created by the sampled colour (for example, everything except the sky now turns grey).
5. There may be some spill around the edges of the sampled colour and inconsistencies in the density of the key produced. Press the - box then select ranges to be removed from the sample.
6. Change the **softness** value to soften the key edges, if required.
7. If necessary, use the + and - boxes to accurately adjust the key range.

The keys from each sample combine to create the final key through which the colour correction is applied.

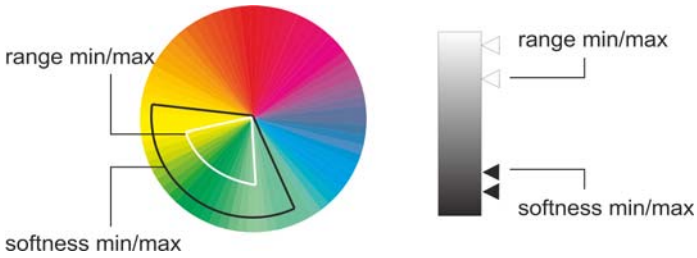
Sampling a very small area may produce poor results if the sampled colour is grainy or poorly lit. Alternatively, sampling large areas may select colours outside the required colour range. Try using different lasso sizes and sample different areas to include the whole luminance range of key colour.

1.4.9.4 Quick Key – HSL

Use this to create a key from the specified range of hues, the specified range of saturation and the specified range of luminance.



1. Press **quick key** then **hsl** from the scroll box. See “Quick Key – Selective” on page 32 for general details of sampling and modifying colour ranges.
2. Press with the cursor or draw a lasso (box) on the image colour range to change, or select one of the ten presets by pressing a swatch pot: these enable standard image colours to be selected which can then be adjusted. To use this new colour on another clip, hold down on a swatch pot (placing it into this pot and overwriting any existing colour). From left to right presets are: red, green, blue, cyan, magenta, yellow, plus skin, earth, grass and sky tones.
3. If required, enter numeric values in the **h**, **s** and **l** left and right **range** boxes to specify minimum/maximum colour ranges. To soften each component, enter minimum/maximum values in the left/right **softness** boxes. Ranges can also be adjusted by dragging the Colour Wheel and Luminance Bar cursors as shown in the following diagram:

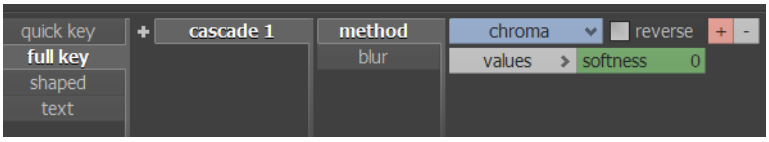


4. Perform the colour correction on the HSL range then, if necessary, adjust the range or softness of the resultant key.
5. To blur the key, press the **blur** box and enter a value in the first numeric box to change the depth of blur. Change the **shrink** value to grow or shrink the edges of the overall key (positive values grow the edges; negative values shrink the edges). Soften the edges of the key by changing the **soft** value.

Select one of the h, s or l boxes then drag the cursor from the range or softness box to adjust both its minimum and maximum values simultaneously.

1.4.9.5 Full Key

Use the **full key** function to create a complex key on the current video track. Do this by adding cascade levels within the key function, then on each key-cascade level, create a simple key using one of the methods from the scroll box.



These levels then combine to produce a single composite key. Multiple key-cascade levels can exist on a single colour-cascade level (the latter is selected by pressing + on the right of the **colour** box).

Press the + box to the left of **cascade 1** to create a new key-cascade level, then when the key is finished, press + to commit this key and start a new key on **cascade 2**.

To edit a key level, select it from the Cascade list then change the required parameters.

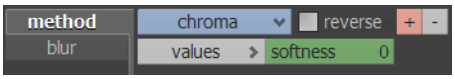
To start creating the key, press **method**, then select the key type (**chroma**, **linear** or **input**) from the scroll box on the right.

Blur

To blur any full key type, press the **blur** box and enter a value in the **amount** numeric box to change the depth of blur. Change the **shrink** value to grow or shrink the edges of the overall key (positive values grow the edges; negative values shrink the edges). Soften the edges of the key by changing the **soft** value.

Chroma

With **method** – **chroma** selected, sample key colours based on the current image's YUV/RGB values.



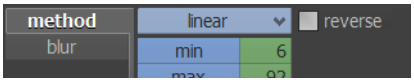
- Do this by drawing a lasso and pressing the + and - boxes. See steps 2 – 7 of "Quick Key – Selective" on page 32.

Components can be adjusted as follows:

values Displays a pop-up allowing the **low** and **high** values for each YUV component to be adjusted independently. Soften the resultant key by adjusting the boxes in the **soft** column.

Linear

With **method** – **linear** selected, create a key by selecting a key threshold range on the image.



- Drag a lasso over the key colour required on the image. Adjust the following to eliminate spill and inconsistencies:

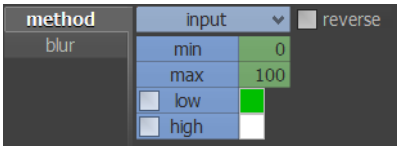
min controls the low threshold of the key; image information below this threshold is ignored.

max controls the high threshold of the key; image information between the **min** and **max** level is the key area.

It may be useful to start with a **min** value of 20 and a **max** value of 80, then make small increments until the required result is achieved. The input key inverts if the **max** value is less than the **min** value.

Input

With **method** – **input** selected, specify the threshold range of the key so that the best area of a sloped edge input key can be selected.



Select the required low and high key colours on the image as follows:

low tick this box then select a 'low' colour reference from the image; this displays in the corresponding swatch pot.

high tick this box then select a 'high' colour reference from the image; this displays in the corresponding swatch pot.

Adjust each colour by changing the **min** and **max** numeric values:

min controls the low threshold of the key; image information below this threshold is ignored.

max controls the high threshold of the key; image information between the **min** and **max** level is the key area.

The input key inverts if the **max** value is less than the **min** value.

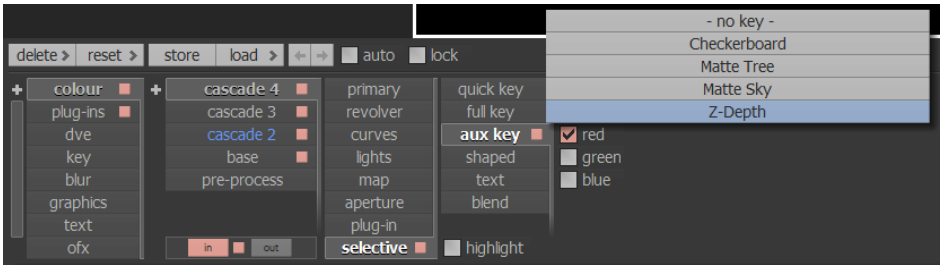
1.4.9.6 Aux Key

One or more auxiliary key clips must be added to a clip on the desktop before they can be selected and used for grading through.

See the Desktop Editing User Guide.

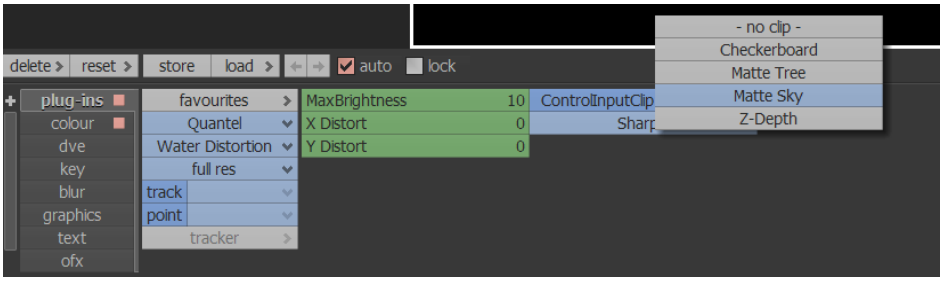
Auxiliary keys can be used to grade through providing further control over the grading process. When using a matte (i.e. black and white), then any of the red, green or blue channels can be selected to grade through. When using a clip as an auxiliary key, a specific colour channel can be selected to grade through - this is useful for channel layers that may have come from an EXR file.

- Select the key from the blue scroll box.



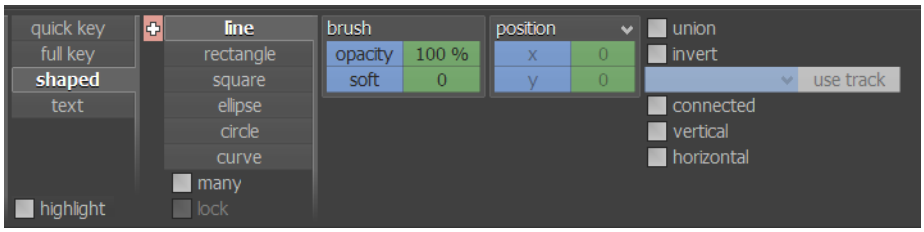
Auxiliary clips can also be used in certain plug-ins where a second control clip is required. The advantage of using auxiliary clips is that they are included in the archive out process.

- Select the appropriate clip from the auxiliary clips listed in blue scroll box.



1.4.9.7 Shaped

Use the **shaped** function to apply colour corrections to vector shaped areas of the image; each shape can be combined with others on a Cascade level and keyframed to produce complex dynamic shapes.



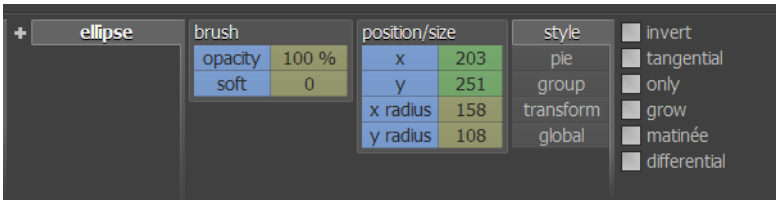
Most options are the same as in the MLT FX **graphics** process or **key** process's **garbage** function:

1. Select the key shape to draw from the list, for example, **ellipse**. The shape sub-menu displays. At any time press + to toggle between the existing shape stack and the new shape stack; each shape displays slightly different modification options.
2. If required, before drawing a shape, tick any available options for the shape:

many	Allows multiple shapes of the same type to be drawn anywhere on the image area. It also allows parallel lines to be drawn (with line plus **horizontal** or **vertical** ticked).
lock	This can only be selected in conjunction with **many**; it allows shapes to be drawn inside/outside each other from one reference point, plus concentric shapes to be created (i.e. with the reference point in the centre of the shape). The first cursor press becomes the 'locked' start point for subsequent shapes. To finish drawing the 'locked' shapes, right-click with the cursor.
union	Combines/welds overlapping shapes. If shapes overlap and union is not selected, the overlap area is used as the key area.
invert	Inverts the key area.
centred	The cursor starting point now represents the centre of the rectangle/square instead of the corner.
gradient	Provides four pots into which up to four colours from the Colour Palette (press <F2> to open it) can be deposited. The subsequent rectangle/square then fills with the graduated colour from each corner. To create a cleaner/simpler graduation, use only two or three colours in the four pots.

tangential	The first cursor press fixes the start of the circle/ellipse and the second cursor press defines both the size and the angle of ellipse (with **tangential** off, an ellipse is aligned to a horizontal or vertical axis).
connected	Joins subsequent lines together.
vertical	Snaps the subsequent line to the vertical axis.
horizontal	Snaps the subsequent line to the horizontal axis.
straight	Draws a ‘curve’ as a straight line.
closed	The first and last line/curve node snap together to form a closed shape.
use track	A tracking path line/curve can be used with multiple points on it that has been created within the MLT FX **Tracker** function.

3. Draw on the image area by pressing the cursor to fix the first point of the key shape then move the cursor and press again to finish drawing. When a key shape has been drawn, in this example an ellipse, it is automatically assigned the name **ellipse** displayed in the first column, and more style options display.



4. Overwrite the name by double-clicking on the name and entering a new one in the soft keyboard.
5. To draw another shape to modify the key, press the + box, select and draw a new shape, then the individual shape stack updates. Each subsequent shape is placed above the previous one and automatically increments (for example, **ellipse 2**, **ellipse 3** and so on) Rename the shapes if required (see step 4).

Once created a shape can be further modified. See the following options:

Brush

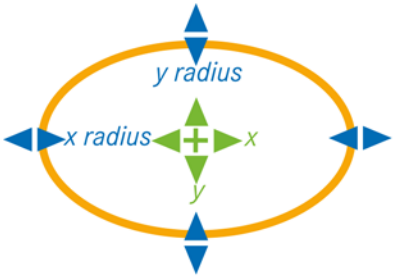
Set the opacity and softness of the key shape by changing the values in the numeric boxes next to the **opacity** and **soft** menu items.

Position and Size

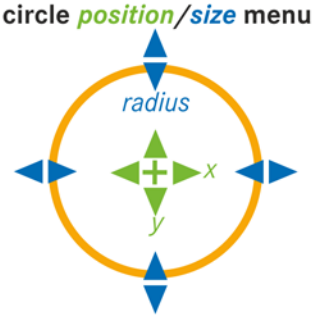
The position and size of the key shape can be edited dynamically by selecting the end points, centre or corners of a shape. Additionally, use the **position**/**size** menu to enter numeric values to resize and/or position a shape. The options available depend on the shape. For rectangles and squares, the **corner** menu can also be toggled on by pressing the **position** menu’s symbol and if a single line is drawn an **end points** menu becomes available by pressing the symbol.

The following diagram shows all position, size, corner and end point menu options.

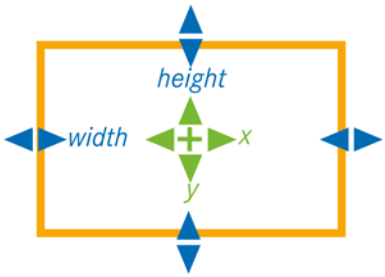
ellipse *position*/*size* menu



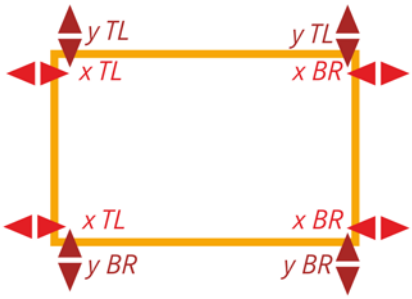
circle *position*/*size* menu



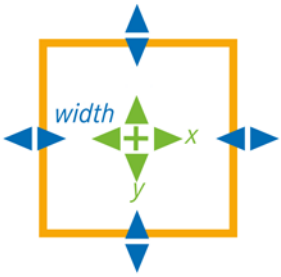
rectangle *position*/*size* menu



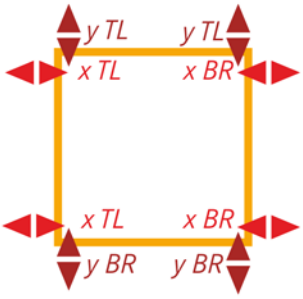
rectangle *corners* menu



square *position*/*size* menu

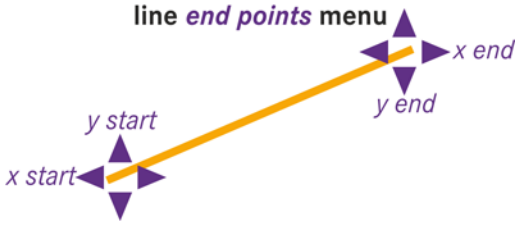


square *corners* menu



line/curve *position* menu

line *end points* menu



Style

Press the **style** box and use the following options to modify the key shape:

only Prevents other shapes being selected by mistake if they overlap each other.

grow Tick this and enter a value in the numeric box to shrink/grow the edges of the overall key (positive values grow the edges; negative values shrink the edges).

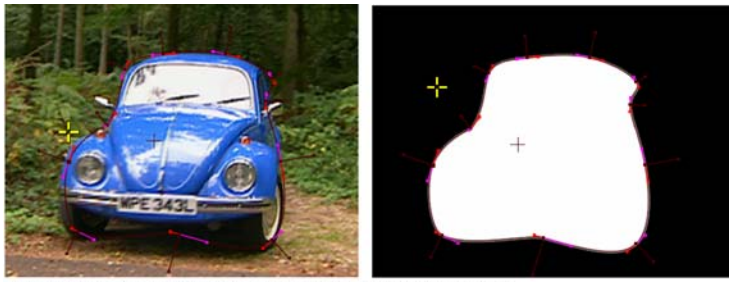
tangents Tick this to display tangents on the connected line/curve that emanate from each node point (when hovering the cursor over the shape). Drag the handle on the end of a tangent to modify the curve. A brown tangent affects the curve entering and exiting the node; a magenta tangent affects the curve entering the node; a red tangent affects the curve exiting the node.

differential Only displays with Stereo 3D media. See “Disparity and Differential (Stereo 3D Only)” on page 41.

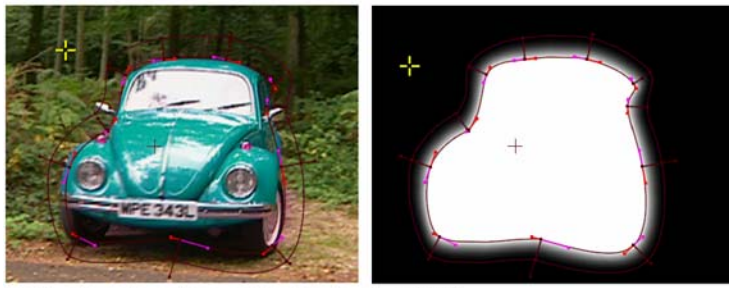
matinée The **style** – **matinée** box allows the edge of the key shape to be feathered (softened) and the level of feather adjusted on specific areas.

Draw a key shape then tick **matinée**. A matinée outline now displays over the existing shape outline. Depending on the shape, either enter a positive/negative value in the single numeric box (to grow/shrink the shape), or vertical and horizontal grow/shrink values in the two boxes.

Keep the cursor positioned over the image area to provide a wireframe display of the two outlines. To display the wireframe constantly select **wire** from the right hand side of the MLT FX menu, and select **always**.



BEFORE: curve drawn around item before matinée applied



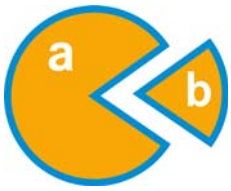
AFTER: after colour change and matinée value of +20

When a colour correction has been performed, increase or decrease specific areas of the matinée effect by selecting a single node or lassoing multiple nodes on the matinée outline then dragging to a new position. This changes the level of feather between the shape and the matinée outlines. The matinée curve can also be modified using the **transform** – **curve** properties floating menu functions. The **m** box in this menu selects all matinée nodes only.

If the original shape outline is modified, the matinée curve moves with it. If the matinée curve is modified, the original shape outline does not move.

Create Pies and Slices

Circles and ellipses can be converted to a pie or a pie slice by selecting the **pie** menu that displays after a shape is drawn.



The **length** value determines how much of the pie/slice displays. By default it displays in degrees. Tick **% display** to view the length as a percentage.

The **offset** value determines where the pie is cut. The closed box transforms the cut as shown in **a** or **b** in the diagram depending on the length value previously set.

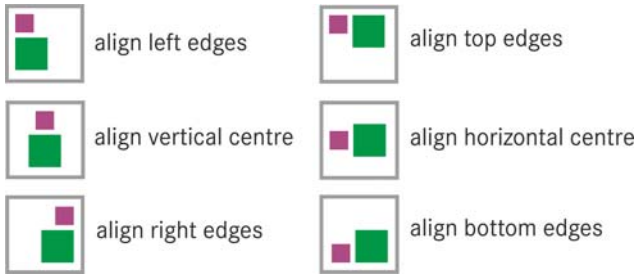
Group and Align

Press the **group** box to group multiple shapes together by selecting them with a lasso (the shape names highlight to indicate those selected), then press **make**. Reposition or resize the group as a single object. Subsequent colour changes affect every shape in the group.

Each group is named, for example, **group**, **group 2**, **group 3** etc., which can be changed by doubleclicking on the name then entering a new one in the soft keyboard.

Press **split** to break the current group back into individual shapes. Remove/add any shape from the current group by selecting **edit** then pressing on a shape.

Drag a lasso around multiple shapes with the **group** menu selected, to display the align menu.



Pressing one of these options aligns the selected shapes accordingly.

Transform

Press **transform** to perform a transformation on a shape:

x/y axis	Drag the shape's + cursor or change the values in the **x axis** and/or **y axis** boxes to move the shape's axis independently of the shape, for example, to rotate around its corner instead of its centre.
angle	Rotates the shape around the x and y axis points; these points can be inside or outside of the shape.
scale	Scales the shape in relation to the x and y axis points.
mirror	Mirrors (reflects) the shape horizontally in relation to the x axis point.
tumble	Tumbles (reflects) the shape vertically in relation to the y axis point.
to curve	See "Convert to Curves" on page 41.

Disparity and Differential (Stereo 3D Only)

With stereo media, a disparity option displays in both the **selective** – **shaped** and **selective** – **text** menus. This controls negative or positive parallax of the vector object, for example, entering -5 pixels applies negative parallax appearing to bring the vector object forward of the screen.

On shapes, use the **style** menu's **differential** tick box with the **disparity** function as follows:

differential on	disparity adjusts each eye equally in opposite directions relative to the position of the original shape.
differential off	disparity adjusts the right eye only. This enables a shape to be drawn accurately around the required area on the left eye, which then remains in position while the right eye disparity is adjusted.

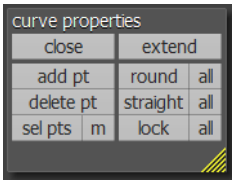
Convert to Curves

With **transform** – **to curve** selected, a basic shape such as a rectangle or circle is converted into a curve, indicated by the prefix 'cv' in the name field (for example, **cv.rectangle**). For example, a circle or ellipse converted into a curve displays four nodes instead of one.

The basic shape can then be modified by moving the extra nodes/tangents that display and adding more nodes, resulting in a more complex shape. Tick **tangents** to see and modify the nodes.

Curve Properties

The **transform** – **curve properties** floating menu displays when a curve or connected line is drawn or a shape has been converted to curves.



Move this menu, if required, by pressing on an empty area of the menu and dragging it to the required position. Press on the yellow triangle on the bottom-right to return it to the default position; press again to toggle between current/default positions.

The **curve properties** menu provides the following functions:

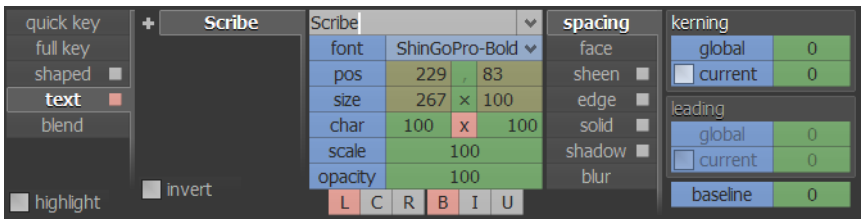
close	Closes the current open curve.
add pt	Press **add pt** then press on the curve to add a new point (node) at this position.
delete pt	Press **delete pt** then press on the curve to delete this point. The curve automatically rejoins and adopts the properties of the nodes either side of the deleted one.
sel pts/ edit sel	Press **sel pts** (select points) then draw a lasso around nodes to select them. The selected nodes can then be moved together, locked, set to **straight** or set to **round**. The **edit sel** (edit selection) box displays to allow individual nodes in the current selection to be deselected, or additional ones to be added.
(m)	This only displays (next to **sel pts**) if **matinée** has been applied. It selects all the nodes on the matinée curve so that this can be moved/edited independently of the original outline.
extend	Allows new nodes to be added to the 'finish' point of an existing curve or shape. Click where required to place the new nodes. Right click to close the shape.
round/all	If the **round** box is enabled after a connected line has been drawn (i.e. with straight lines between each node) press on any node and the line in and out of this node becomes curved. If **all** is selected, all the points on the current curve are set to round.
straight/all	If the **straight** box is enabled after a curve has been drawn (i.e. with curved lines between each node) press on any node and the line in and out of this node becomes straight. If **all** is selected, all the points on the current curve are set to straight.
lock/all	If the **lock** box is enabled after a curve or shape has been drawn, press on any node and it becomes fixed in its current position. If **all** is selected, all nodes on the current curve are fixed in their current positions.

A basic shape (for example, a circle) cannot be converted back into its original form after it has been converted to curves.

Tick Shapes Preview in the <F1> Configuration Window's UI menu to see a wireframe preview of the shape as it is dragged over the image area.

1.4.9.8 Text

Use the **text** function to apply colour corrections to vector text shaped areas of the image. Most options are the same as in the MLT FX **text** process or **key** process's **text** function.



Install Fonts

The fonts used by the workstation are True Type and are installed in the C:\Windows\Fonts folder. These fonts then display in the Fonts Bin on the Application Bar.

Fonts can be loaded into the **text** function's scroll box by opening the Fonts Bin from the Application Bar, then selecting and dragging them from the bin and dropping them on the scroll box. Up to 20 fonts can be held in this list.

A browse display of each font can be selected in the Fonts Bin. The yellow symbol in the top-left corner of the open bin toggles between titles and browse display.

Users are responsible for ensuring that they have the appropriate rights to install and use specific typefaces and fonts.

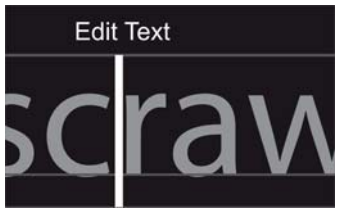
1. Select the font to use from the **font** scroll box.
2. Press the + box to add text.
3. Press in the image area to start the text key. A box displays. This is the 'container' for the text and it resizes as text is entered.
4. Enter text as required, creating a single character, word, line or multiple lines. The text name (in the stack to the right of the + box) and the text entry field next to this update as text is entered. Text can also be entered using the entry field.
5. Press <Return> to create a new line within the same text box. Press <Ctrl> + <Return> to create a new independent text box under the original (the stack on the left of the menu area updates accordingly).
6. Change the font, resize or reposition the text and add colour styles to it.

Modify and Style

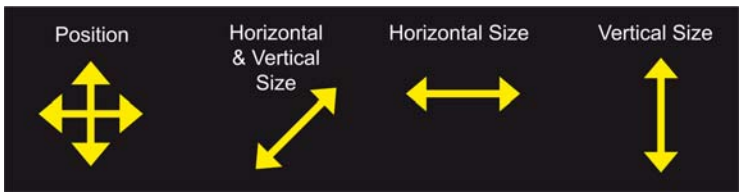
Select a text object by pressing on the required name in the stack next to the + box. Alternatively, press on the text on the image area to select it. The stack name box highlights accordingly.

Change characters and words in the current text box by clicking in the text entry field then drag over the characters to change.

Alternatively, press in between text characters on the image (the 'I' cursor indicates the point of change).

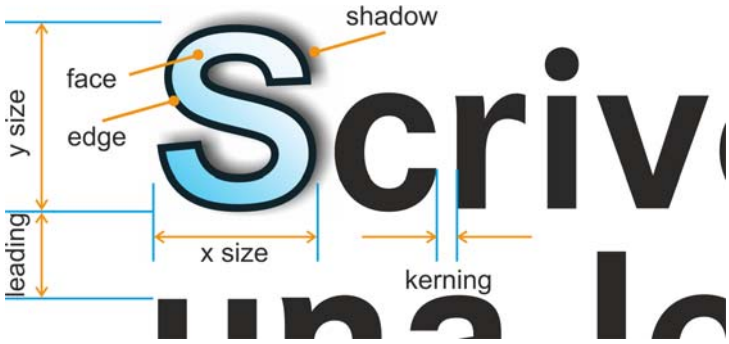


Reposition or resize text manually by hovering one of the yellow cursors over the text box then dragging. Alternatively, use the **pos**, **size** and **scale** menu options.



Use the following menu options to modify and style text:

opacity	Affects the transparency of the text key (0 is transparent).
disparity	Only displays with Stereo 3D media. This controls negative or positive parallax of the text object, for example, entering -5 pixels applies negative parallax appearing to bring the text forward of the screen.
L, C, R	Controls the horizontal alignment of text (left, centre and right). The **grid** function can also be used to align text.
B, I, U	Makes the current text either **bold**, *italic* and/or <u>underlined</u>.



The **spacing** – **kerning** menu affects horizontal spacing between characters:

The value in the green **global** box affects the kerning between all characters in the current text box.

The value in the green **current** box affects the kerning of the currently selected character (i.e. at the cursor position). Ticking the box allows the space to be dragged manually using the 'I' cursor in the text box

The **spacing** – **leading** menu affects vertical line spacing:

The value in the green **global** box affects all the line spacing in the current text box.

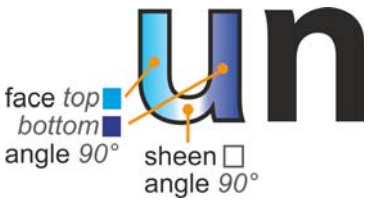
The value in the green **current** box affects the line spacing of the currently selected line (i.e. at the cursor position). Ticking the box allows the space to be dragged manually using the 'I' cursor in the text box.

The **face** menu allows the fill colour of the text to be set:

Set the fill as a single colour, a 2-colour gradient or a 4-colour gradient. Select **one**, **two** or **four** from the **colours** scroll box. Transfer colours from the Colour Palette to the colour pots that display. Toggle the colour palette on/off by pressing <F2> on the keyboard.

With **two** selected, choose the ratio of the two colours by changing the top and **bottom** values then define an **angle** to rotate the colours within the text face.

The **sheen** menu allows a coloured highlight to be applied to the face of the text:



Transfer a highlight colour (the default is white) from the colour palette to the colour pot then specify the **size** and **opacity** of the highlight within the text. The **distance** value controls the highlight's distance from the text edge and the **angle** value controls the rotation of the highlight within the text face.

The **edge** menu allows a coloured outline to be applied to text characters:

The **size** box controls the thickness of the outline and the colour pot defines the outline colour. The **opacity** value controls how transparent the outline is.

The **solid** menu adds an extruded 3D effect behind the text face:

The **size** box defines the depth of the extrusion and the **angle** box defines its angle from the face. The colour pot defines the colour of the extrusion.

The **shadow** menu creates a shadow behind the text:

The **distance** box defines the distance it is positioned from the text; **opacity** defines the shadow's transparency; **angle** defines the shadow's offset position from the text and the **softness** box defines the blur/feathering of the shadow. Enter a **size** value to make the shadow larger or smaller and use the **colour** pot to change the shadow colour.

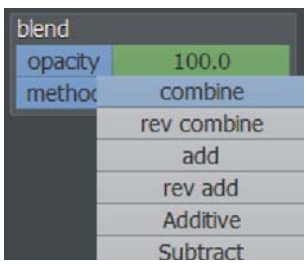
The **blur** menu is used to apply vertical blur on the whole text key.

Some of the previous style options may be difficult to view on the key area; use the hicon/highlight view to see the text key clearly.

1.4.9.9 Blend

The **Blend** function here works in a similar way as in MLT FX, but here is used on individual cascades, with a different blend applied to each.

The modes accessed from the **method** scroll box affect how the cascade levels interact (how they display when one is placed over the other).



The value in the green **opacity** box controls the transparency/opacity of the current cascade level. The value of 100.0 being totally opaque and the value of 0.0 being totally transparent.

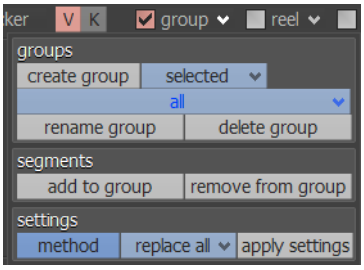
1.5 Apply Group Grades

1.5.1 Grade a Specific Group of Clips

Create a group of clip segments based on specified criteria, for example, originator, source timecode, manual selection etc., then grade this group by setting target cascade levels and methods. Multiple groups can be created, saved and modified within the current session.

1.5.1.1 Group Functions and Display

Tick the **group** box on the top-right of the menu area and press the ▾ on the right to view the menu options.



For easier display with a long timeline, tick the **reel** – **storyboard** boxes.

Clip segments (rendered or unrendered) belonging to the currently selected group are indicated on the timeline with a cyan highlight below the clip name.

On the Storyboard a cyan outline displays around the tile.

By default, all clips are selected (as indicated in the scroll box displaying **all** near the top of the **group** menu).

Toggle the group function at any time via the group tick box.

1.5.1.2 Create a New Clip Group

To create a group:

1. From the scroll box on the top-right, set the group type by selecting one of the following:

   selected manually select segments by pressing on them.

   originator includes all clip segments with the same originator as the selected segment; this displays in the box below. Enter a character limit value in the **limit** box, if required.

   source tc includes all clip segments that share the source timecode of the selected segment.

   rush includes all clip segments from the same source rush.

   highlight this option only displays if the **Highlight changes** box has been ticked in the <F1> Configuration Window. It includes all the clips of the current 'highlight' colour.

2. Press **create group**. Depending on the scroll box selection, the group is automatically made from corresponding clips, or with '**selected**', each clip can now be selected manually from the timeline.
3. Select **rename group** to rename the group. Enter a name via the soft-keyboard.
4. Add or remove clips manually from the group as follows:

   Select the clip on the timeline then press **add to group** or **remove from group** to add/remove the selected clip segment.

   Hold down **add to group** or **remove from group** to enable multiple selection, indicated by the add/move box turning orange. Add/remove multiple clip segments by pressing on them. Press the add/move box to cancel multiple selections.

   Alternatively, use the keyboard to enable multiple selection. Hold down <Shift> then select segments next to each other, or <Ctrl> then select segments anywhere on the timeline. Then press **add to group** or **remove from group** to add/remove all these segments to the group.

1.5.1.3 Modify a Group

To modify an existing group:

1. Scroll to the required group using the long blue box. This list displays **all** (the default) then **Group 1**, **Group 2** etc., unless renamed.
2. Use **add to group** or **remove from group** to modify the contents of the group, press **rename group** to rename it, or press **delete group** to delete the selected group.

1.5.1.4 Apply a Group Grade

The following transfer/target options only display in the scroll box to the right of **method** if a group segment has colour process parameters. Then use this scroll box to specify the application method used for the colour changes on a clip group:

1. Scroll to the required group using the long blue box (or create a group first as described previously).
2. On the timeline, select a group segment and perform the grade.
3. Select which target cascades are to be affected by selecting an option from the scroll box to the right of **method**: ‘base’ options affect the base cascade; ‘top’ options affect the top cascade; ‘all’ options affect all cascades. Choose how the grade is applied using various ‘replace’, ‘add’, ‘insert’ or ‘trim’ options.

Possible combinations are:

Replace all; **top replace**; **base replace**; **replace by name**; **replace all minus base**; **replace pre-process**
applies the grade from the current clip (i.e. all cascades, HSL, shapes etc.) to the other segments in the group in the following ways: to all cascades (with/without base); the top or base cascade only; the cascade which matches the source name; or applies only the pre-process LUT.

Top add; **base add**
applies the grade from the current cascade only and adds it as a top cascade or under the base cascade on all the other segments in the group.

Insert
inserts the graded current cascade at the same cascade level to all clips in the group (this must be at least above the base level).

Top trim; **base trim**; **trim by name**
applies only the change in colour process values to all the segments in the group. ‘Top’ or ‘base’ trims the top or base cascade of the destination segment; ‘by name’ trims the cascade on the destination segment which has the same name as the source cascade.

Trim options are available only when the source segment has colour process parameters for **primary**, **defocus**, **lights** or **ranges** functions. If the destination segment has keyframes, only the change in values in the source segment at the current position is applied to these destination keyframes: source keyframes are not copied.

4. Press **apply settings** to apply the selected group grade. Each applicable timeline segment now has an orange highlight along the top indicating that a process is present and rendering is required. Each applicable Storyboard tile has a graduated blue outline (visible only if the group function is toggled off via the **group** tick box).

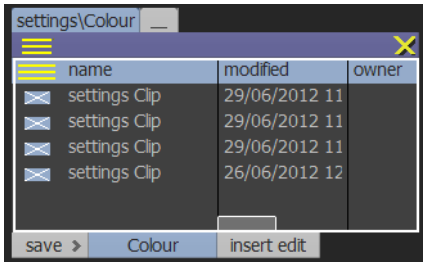
If the current timeline segment is in the current group, the Storyboard ‘orange/cyan’ tile outline becomes graduated yellow.

1.6 Save and Reuse Settings

There are several different methods of saving and transferring MLT FX processes (for example, colour parameters) between projects. These include the Settings Bin, Storyboard and Stillstore.

1.6.1 Settings Bin

Process settings including colour, or colour ranges (curves graphs), can be saved and archived independently of the timeline edit via the Settings Bin, then used on other projects as required.



Open this bin by pressing the **settings** tab on the Application Bar. If **mlt fx** – **colour** is open in the GUI, '**Colour**' displays automatically in the bin's scroll box.

Other settings can be chosen from this box, including **Colour Ranges**, for example, to save curves graphs. Press **save** and enter a name to save the current colour settings.

Apply a setting to a different project by scrolling to the required process in the bin, for example, **Colour**, then dragging the required title from the bin and dropping it on the current clip in the Edit Window.

When transferring **Colour** settings, press **insert edit** before dropping the setting onto the image area. This applies only the last keyframe values in the settings clip (for example, those for **lift**, **gamma**, **gain**) to the current clip at the cursor position. This is useful to transfer the same colour values from the end of one clip to the start of the next. If **insert edit** is not pressed, all the keyframe values (and not just the last) are transferred to the clip regardless of cursor position.

1.6.2 Storyboard

In the Edit application, use the Storyboard reel to assemble and move clips for the current timeline edit, and to navigate through the edit.

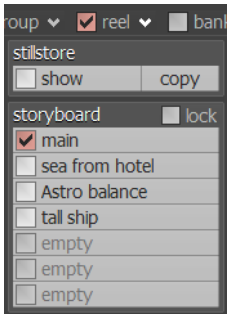
In MLT FX the functionality is slightly different; it allows preview and transfer of single or multiple processes from clips on the Storyboard to the timeline edit, and makes it easy to save different Storyboards during a project which can then be used on other projects.

1.6.2.1 Stereo 3D Storyboard Clips

If the Storyboard contains Stereo 3D clips, the left eye only displays, although both left and right eye processes are stored and can subsequently be applied.

1.6.2.2 Display a Storyboard

To display the Storyboard, select the **reel** tick box on the top-right of the menu area. The first frame of each clip in the current timeline edit (i.e. the main Storyboard) now display as tiles along the reel display. If the timeline is empty, no clips display along the reel.



To display a different Storyboard, press the arrow on the right of **reel** to display more options, then tick a reel to open it.

Scroll along the reel, preview process settings on timeline clips, then apply them, if required.

1.6.2.3 Preview a Process

Hold down the cursor on any tile to preview these settings on the current timeline clip. Release cursor pressure to hide the preview. Only the settings for the current process are previewed.

1.6.2.4 Apply Processes

Each Storyboard clip may contain multiple processes, for example, **colour**, **text** and **dve**. Either selectively apply one of these processes or apply all processes to the current timeline clip:

selective Position the timeline cursor over the required clip, then open a process in the GUI (for example, **colour**). Press on the required Storyboard tile then slide the cursor up to apply this process in its current state (i.e. enabled or disabled) to the timeline clip.

all To apply all processes in their current state (i.e. enabled or disabled) and from within any GUI process, position the timeline cursor over the required clip, hold down <Ctrl> and on the required Storyboard tile, slide the cursor up.

A Storyboard tile containing a Stereo 3D clip only displays the left eye, but both left and right eye processes are stored and subsequently applied.

1.6.2.5 Save, Load and Delete a Storyboard

During a grading project, multiple Storyboards can be saved, as required. These can then be used on other projects. Do this by selecting the **save** box in the bottom-left of the menu area, then select **storyboard** in the pop-up and enter a name. The Storyboard is saved in the Clips Bin and consists of one frame for each segment plus all processes and keyframes, which also makes archiving more efficient.

To load a Storyboard, to preview/transfer processes to the current project, drag the Storyboard from the Clips Bin and drop it either on the reel display area, or over one of the ‘empty’ slots in the Storyboard list. Alternatively, drop it over an existing Storyboard in the list to overwrite the existing entry. The new Storyboard’s name now displays in the list. A maximum of six Storyboards can be loaded in addition to the current ‘main’ Storyboard.

To delete a Storyboard from the reel list only (not the Clips Bin), press **delete** followed by the Storyboard name in the list. It is not possible to delete the ‘main’ Storyboard. To delete a Storyboard from the Clips Bin, select its title in the bin and press **delete** from the column on the right.

1.6.2.6 Display and Lock Options

Deselect **reel** to hide the Storyboard. To disable the current Storyboard but not the reel display, deselect it via its tick box. Tick **reel** and **show** to display the Stillstore.

By default, the Storyboard is 'unlocked' in relation to the timeline edit. In this mode (i.e. the **lock** box is not ticked), the Storyboard tiles initially correspond to the clip segments on the timeline but do not scroll with the timeline automatically. This is useful if, for example, a process from a clip near the end of the Storyboard needs to be applied to a segment on the timeline that is nearer the start. Scroll through the Storyboard using the bar on the right in this mode.

If required, tick the **lock** box to synchronise the 'main' Storyboard with the timeline, so that during navigation they move together. No other Storyboards may be locked in this manner.

1.6.2.7 Timecode Display

Timecodes must be enabled in the <F1> Configuration Window's **Clips** menu first. Press on any Storyboard tile's timecode display to switch between destination timecode, source timecode (src) and time of day (tod).

1.6.2.8 Cursor and Frame Colours

A Storyboard clip that contains the current MLT FX process is indicated by the graduated blue outline around the tile. For example, a blur process is indicated when **blur** is open in the GUI, but not when **dve** is open.

The current timeline cursor position is indicated in the Storyboard by the graduated orange outline around the tile. This obscures any other type of clip outline. This turns to graduated yellow if part of a clip group.

A clip segment that is part of the current group is indicated with a cyan outline around the tile. See "Apply a Group Grade" on page 48.

1.6.2.9 Navigate and Zoom

Press on any Storyboard frame and drag left or right or use the arrow keys to step through the reel.

If the Stillstore and Storyboard are both displayed, the Stillstore displays above the Storyboard. Both the Storyboard and Stillstore have an icon on the top-right of each display which highlights green to indicate which is currently selected/active.

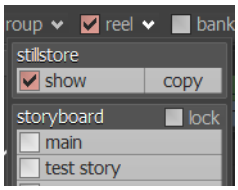
Drag the icon up or down to increase or decrease the area of the display. Press the icon to return to the default size.

In unlocked mode, use the scroll bar on the right to navigate through the contents, and press and hold <Alt> then drag the icon to zoom in/out.

1.6.3 Stillstore

Processes can be selectively or globally applied from the Stillstore to the current timeline clip or transferred from one project to another.

Several different settings can be applied for a process (for example, **colour**) to the same frame of a clip and then, each time a change is made, save the still into the Stillstore and compare them next to each other.



Tick the **reel** box then press the arrow on the right. Below **stillstore** tick **show**. Stills now display above the Storyboard (if enabled) and below the Edit Window.

1.6.3.1 Stereo 3D Stillstore Clips

If the Stillstore contains Stereo 3D clips, the left eye only displays, although both left and right eye processes are stored and can subsequently be applied.

1.6.3.2 Preview a Process

Hold down the cursor on any tile to preview these settings on the current timeline clip. Release cursor pressure to hide the preview. Only the settings for the current process are previewed.

1.6.3.3 Apply Processes

Each Stillstore clip may contain multiple processes, for example, **colour**, **text** and **dve**. Selectively apply one of these processes or apply all processes to the current timeline clip:

selective	Position the timeline cursor over the required clip, then open a process in the GUI (for example, **colour**). Press on the required Stillstore tile then slide the cursor up to apply this process in its current state (enabled or disabled) to the timeline clip.
all	To apply all processes in their current state (enabled or disabled) and from within any GUI process, position the timeline cursor over the required clip, hold down <Ctrl> and on the required Stillstore tile, slide the cursor up.

A Stillstore tile containing a Stereo 3D clip only displays the left eye, but both left and right eye processes are stored and subsequently applied.

1.6.3.4 Save a Set of Stills

To save the current set of stills, press **copy** in the **reel** menu. A Floating Clip displays that can then be dragged to the desktop or saved in the Clips Bin with '**Stillstore Clip**' as the default name.

1.6.3.5 Load Previously Saved Stills

Drag a saved set of stills from the Clips Bin and drop it onto the Stillstore reel display or the **show** box in the **reel** menu.

1.6.3.6 Transfer from Settings Bin to Stillstore

Settings can be dragged from the Settings Bin and inserted anywhere within the current Stillstore for future use. Open the Settings Bin, drag the setting from the bin and then drop it over the required position (indicated by the yellow highlight) on the Stillstore reel. The frame with its settings is now inserted into the Stillstore.

1.6.3.7 Add New Stills

After a process change is made, save the new still to the Stillstore by pressing the + frame on the reel display.

1.6.3.8 Delete Stills

To delete a still, press **delete** then the required still on the reel display. To delete a set of stills, press delete followed by the **show** box on the reel menu.

1.6.3.9 Navigate and Zoom

See “Navigate and Zoom” on page 51.

2. Neo Nano

2.1 Overview

2.1.1 Introduction

The Neo Nano panel provides a compact, portable and ergonomic user interface, in conjunction with a USB keyboard and mouse, for colour grading on various workstations within, or outside of, the main grading suite.

The panel incorporates roller ball controls, and a series of buttons and knobs with context-sensitive OLED displays.

See Neo Nano Installation Guide for panel details and interconnection.

2.1.1.1 Start-up

Start the workstation, then open the Edit application. The panel displays the **Pan + Scan** OLED/rotary knob on the top-right of the panel. Either press this to ‘on’ and change Pan & Scan settings, or open MLT FX and select the colour process, then use the top-left rotary knob to select the required panel mode.

2.1.1.2 Edit Interaction

The panel can be used within the Edit application for various Pan & Scan functions on either mono or stereo media. These functions are off by default, but are made available by pressing the **Pan + Scan** OLED/rotary knob on the top-right of the panel to ‘on’.

2.1.1.3 MLT FX Interaction

The panel is mostly used within the MLT FX – **colour** process. There are various colour and DVE modes available on the panel that fully interact with the MLT FX GUI. When moving between timeline segments, the panel mode changes to the most recent panel mode used on that segment.

2.1.1.4 Stereo 3D Functions

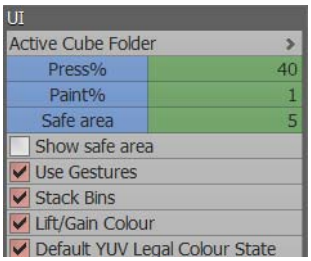
Stereo 3D panel functions such as **vergence** are noted in this guide.

See Stereo 3D User Guide for more details.

2.1.1.5 <F1> Settings

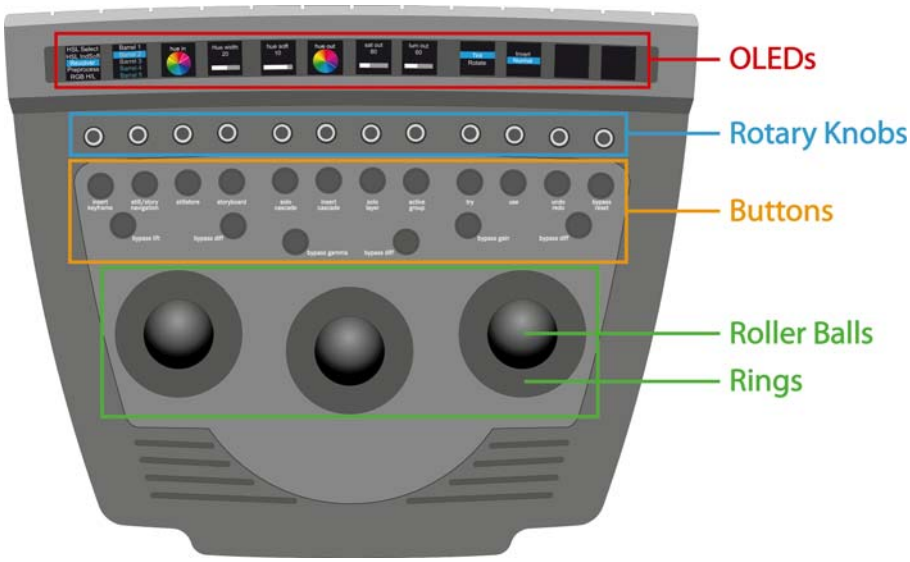
When the software has loaded, press <F1> to display the Configuration Window.

In the **UI** menu, ensure the **Lift/Gain Colour** box is ticked, giving access to all Neo Nano panel controls.



2.1.2 Panel Layout

Many of the panel's controls and displays are context-sensitive, depending on the current panel or GUI mode and on user settings. Panel functions are detailed throughout this chapter.



See "Roller Balls and Rings" on page 58.

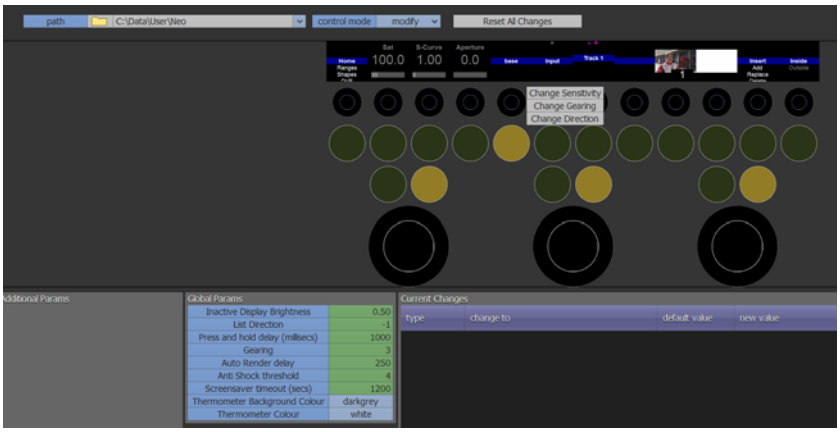
See "Buttons" on page 61.

See "OLEDs and Rotary Knobs" on page 64.

2.1.3 Remap Panel Functions

2.1.3.1 Neo Nano Configuration Window

Panel functions can be remapped to different controls on the panel. Press <Ctrl>+<Shift>+<F11> to display the ‘Neo Nano Configuration’ window.



This window enables user configuration of the panel including: ring/roller ball sensitivity, gearing and direction (available in a pop-up displayed by pressing within the outer ring on any GUI rotary/roller ball); plus mapping of all functions (except the ‘Mode Selector’ rotary) within their individual menus. Global parameters such as display brightness can also be set here.

The ‘Mode Selector’ rotary on the top-left of the panel cannot be remapped.

Remap a function by doing one of the following:

- Select the required function via the GUI and press **Wipe Display** to simply ‘remove’ the item. The function is not actually deleted, but is listed in the **Additional Params** pane on the bottom left of the screen.
- Using the GUI, drag the required function to any new position on the panel. If an existing function is in this position, it is placed in the **Additional Param**s pane and overwritten by the ‘new’ function.
- To copy a function, drag the required item to any new position and press <Ctrl> before dropping it.

A history of the current changes is listed in the **Current Changes** pane on the bottom of the screen. Any item in this list can be ‘undone’ by clicking on the towards the top-right of the item.

The new configuration is saved automatically and recalled on start-up. By default an xml config file is saved in the C:\Data\User\Neo directory with the title Neo NanoConfig.xml.

To rename the config file, click on the C:\Data\User\Neo drop-down menu at the top of the screen and rename the file as required.

Press **Reset All Changes** to return to the default configuration.

After adjusting any item in the **Global Params** menu, reboot the workstation (press <Ctrl>+<F5>). All other remapping adjustments are dynamic and do not require a reboot.

On boot-up Neo Nano tries to locate the config file in the root of any USB devices and then the path above. If the config file cannot be found here, the default configuration is used.

2.1.3.2 Foot Pedal (option)

An optional USB foot pedal can be connected and programmed to mimic any key press - this is often set as the <Ctrl> key.

The foot pedal is sourced and purchased by the customer and is not supported by SAM.

SAM have tested the ‘Savant Elite Single Foot Switch’ which functions properly in conjunction with the panel.

2.2 Roller Balls and Rings

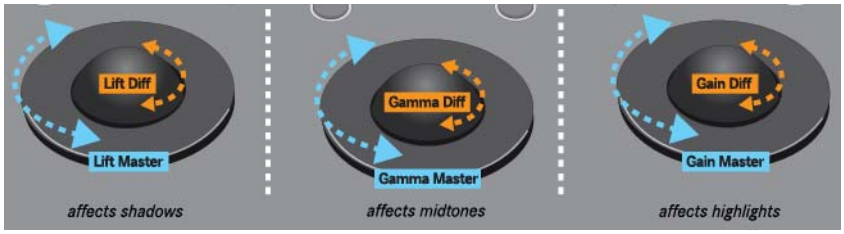
2.2.1 Overview

The three roller balls across the centre of the panel are usually used to adjust lift, gamma and gain differential. Outer rings on each ball provide a master control. There is also roller ball functionality within specific modes such as DVE.

To activate this functionality, ensure that Lift/Gain Colour is ticked in the <F1> Configuration Window's UI menu.

2.2.2 MLT FX

2.2.2.1 Colour Functions



Each roller ball affects colour differential, i.e. each colour component can be adjusted separately. Moving the left ball adjusts the image's lift (shadows); the middle ball adjusts gamma (mid-tones); and the right ball adjusts gain (highlights).

Each roller ball has a ring around the outside. This is the master control; rotating it allows all colour components to be adjusted together.

Use a roller ball's associated 'bypass' buttons to bypass or reset either the master or differential value. See "Colour Bypass/Reset" on page 62.

2.2.2.2 Lock Lift and Gain

Tick the **lock** box in the GUI, to control lift and gain simultaneously using the left ball and ring.

2.2.2.3 Change Roller Ball Vectors

The corresponding ring display in the **mlt fx** – **colour** menu shows roller ball adjustments graphically.

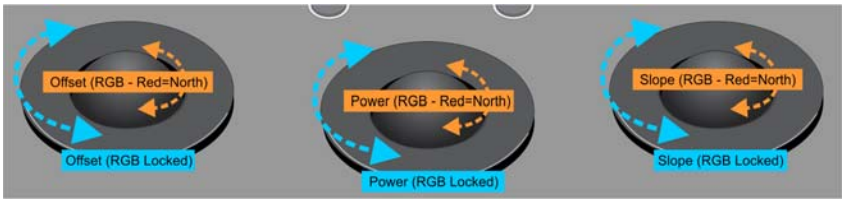
Tick the **vectors** box in the centre of the MLT FX menu area to change the angle at which colours are distributed around the roller ball via the pop-up. Colour order from left to right is always green, red then blue.

With the top scroll box set to **Low/Mid/High (GRB)** set the angle of these colours to either **90°**; **120°** for an even distribution; or **VScope** so that colours correspond to a vectorscope graticule.

Alternatively, from the top scroll box, select **Custom Angle** then enter a required angle in the numeric box below.

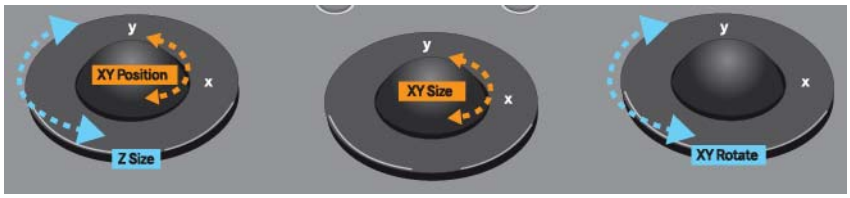
2.2.2.4 Colour Decision List Mapping

When the UI displays the CDL menu, the roller balls and rings do the following:



2.2.2.5 DVE Functions

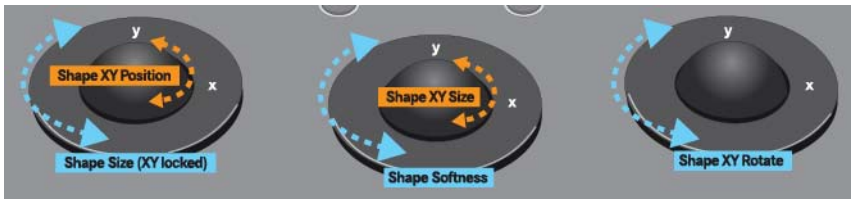
When **DVE** mode is selected on the panel, the roller ball functions change as shown in the diagram. These functions are also available with **mlt fx** – **dve** selected in the GUI.



Alternatively, to remain within the **mlt fx** – **colour** process, hold down <Ctrl> to toggle DVE roller ball functions on temporarily.

2.2.2.6 Shapes Functions

When **Shapes** mode is selected on the panel, the roller ball functions change as shown in the diagram and the GUI automatically opens the **colour** – **selective** – **shaped** menu. These functions are also available with **mlt fx** – **graphics** selected in the GUI.



2.2.2.7 Vergence Functions

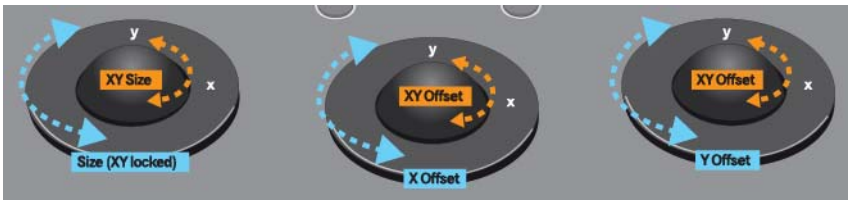
For the following functionality, ensure that stereo media is loaded on the timeline and **stereo** – **vergence** selected in MLT FX. See “Vergence (GUI Menu)” on page 82. All OLEDs and rotary knobs change and the panel rings do the following:

2.2.3 Edit

2.2.3.1 Pan & Scan

With MLT FX closed, turn Pan & Scan on by pressing the **Pan + Scan** panel rotary knob on the top-right to 'on'. The panel OLEDs now display applicable mono or stereo functions, depending on the current clip.

Some of the panel's button functionality now changes, in addition to the following roller ball functionality:



2.2.3.2 3D Control

With Stereo 3D media, a **3D Control** OLED/rotary knob automatically displays. Press this to 'on' which changes functionality as follows:

2.3 Buttons

2.3.1 Overview

Buttons allow functions to be toggled, which may also change the functionality of rotary knobs and the display of the OLEDs.

In general, a button performs the following when pressed or held down:

press	toggle function on/bypass.
hold down	reset function.

2.3.1.1 Illumination and Brightness

In **Home** mode, the brightness of the button rings can be controlled. Hold down <Ctrl> and turn the second rotary knob on the top-left of the panel (use the first knob on the top-left to adjust OLED display brightness).

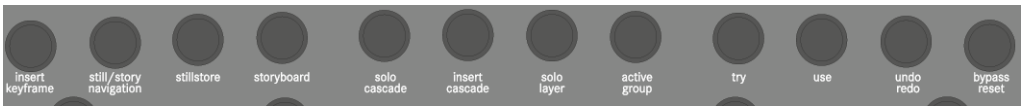
The button's outer ring illuminates to reflect its current status:

white	indicates when the function is on/enabled (via button press).
blue	indicates when the function is off/disabled but available (via button press).
deep yellow	indicates an active group of clips or still/storyboard navigation.

No illumination indicates that the function is not available within the current mode, for example, in **DVE** panel mode, the bypass buttons above the roller balls cannot be used, so they do not illuminate.

2.3.2 Global Functions

These buttons are generally available (when illuminated blue) across various GUI/panel modes.



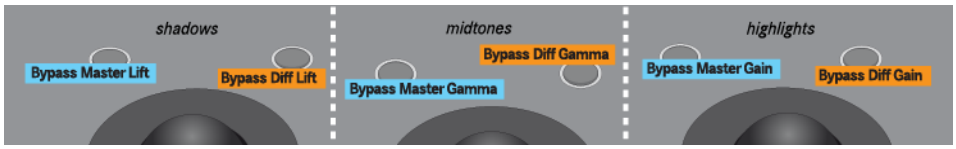
Press a button once to enable it, press again to disable it. The buttons shown in the diagram do the following (from left to right on the panel):

insert keyframe	With the GUI **edit** mode on, this button illuminates as a reminder to manually insert a keyframe when a parameter is changed. Press this button to manually insert a keyframe for all active parameters; press and hold to insert a keyframe for ALL parameters. With the GUI **auto** mode on, a new keyframe is inserted automatically when a parameter is changed.
still/story navigation	Press to toggle rotary knob/OLED display to the Stillstore or Storyboard functions (depending on which was most recently used).
stillstore	Press to open the Stillstore in the GUI. Hold down <Shift> and press this button to delete the whole Stillstore.
storyboard	Press to open the Storyboard in the GUI.
solo cascade	Press to view the selected cascade only. Hold down to reset the current cascade's colour settings. Hold down <Ctrl> and press to rename the current cascade via the pop-up.
insert cascade	Press to add a new Cascade level.
solo layer	Press to view the selected layer only (i.e. 'solo'). The OLED text turns green to indicate this. With stereo media, press <Ctrl> and this button to display extra functionality. See "Apply Eye Processes" on page 68.
active group	Press to toggle through groups (current group is indicated on the GUI timeline). Hold down to create a new group from the current selection.
try	Press to preview the clip with current Stillstore/Storyboard parameters applied. Hold down to extend/prolong the preview.
use	Applies current Stillstore/Storyboard parameters to the clip.
undo/redo	Press to undo the previous action (do this multiple times for multiple undo levels). Hold down to redo the previous action (do this multiple times for multiple redo levels).
bypass/reset	Press to toggle all processes on/off. Hold down to reset the current process.

2.3.3 MLT FX

2.3.3.1 Colour Bypass/Reset

Each roller ball has two associated buttons above, as shown in the diagram.



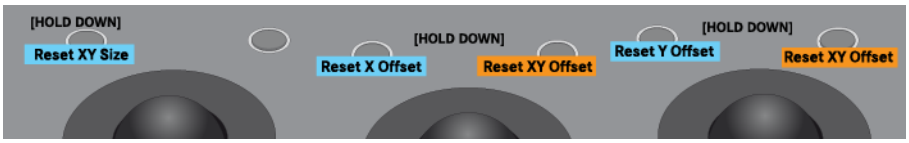
The following can be performed on each button:

press	bypass toggle for master parameters or differential (individual) parameter
hold down	reset master parameters or differential parameter to defaults.

2.3.4 Edit

2.3.4.1 Pan & Scan

With MLT FX closed, turn Pan & Scan on by pressing the **Pan + Scan** panel rotary knob on the top-right to ‘on’. The panel OLEDs now display applicable mono or stereo functions, depending on the current clip. The roller ball functionality changes. See “Roller Balls and Rings” on page 58.



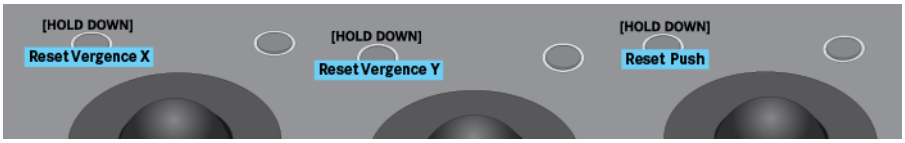
In addition to the panel buttons shown in the diagrams, the following can be performed on a button:

hold down	reset Pan & Scan size/offset.

2.3.4.2 3D Control

With Stereo 3D media, a **3D Control** OLED/rotary knob automatically displays. Press this to ‘on’ which changes button functionality as follows:

hold down	reset vergence/push.



In this mode, the **bypass/reset** button on the right of the panel can also be used as follows:

press	resets Pan & Scan.
hold down	deletes Pan & Scan keyframes.

See ‘Pan & Scan’ in the Desktop Editing User Guide and the Stereo 3D User Guide for more details of GUI functions.

2.4 OLEDs and Rotary Knobs

2.4.1 OLED Overview

The image displays use OLEDs, which provide high quality images visible from any angle. The displays are context sensitive; they indicate the current function of the associated rotary knob.

2.4.1.1 Illumination and Brightness

With **Home** mode selected on the panel, the brightness of the OLED displays can be controlled. Hold down <Ctrl> and turn the first rotary knob on the top-left of the panel (use the second knob on the top-left to adjust button ring brightness).

2.4.2 Rotary Knob Overview

Each rotary knob's function varies according to the current GUI/button selection; this is indicated by the associated OLED directly above. Knobs have an integral light for viewing in low light conditions.

In general, a rotary knob performs the following when turned, pressed or held down:

turn	(anti-clockwise): decrease value/scroll up.
	(clockwise): increase value/scroll down.
press	bypass value (press again to show value).
hold down	reset value to default/delete list item (where permitted).

2.4.2.1 Keyboard Modifiers

Some rotary knobs have extra functionality by holding down <Ctrl>, <Shift> or other modifiers. These are described throughout this chapter where applicable.

2.4.3 Edit

2.4.3.1 Pan & Scan/3D Control Functions

Edit menu: ‘Pan & Scan’. MLT FX must be closed in order to access these panel functions. The rotary knobs and OLEDs are used as follows (from left to right on the panel):

						
turn	adjust x size	adjust y size	adjust x offset	adjust y offset	adjust x vergence*	adjust y vergence*
press						
<Ctrl> + press						
hold down	reset x size	reset y size	reset x offset	reset y offset	reset x vergence*	reset y vergence*

*Panel functions that display automatically with a Stereo 3D clip.

						
turn	adjust push*				apply Pan & Scan to current seg or track	
press				3D panel ring functions on/off*		Pan & Scan panel & GUI functions on/off
<Ctrl> + press						
hold down	reset push*					

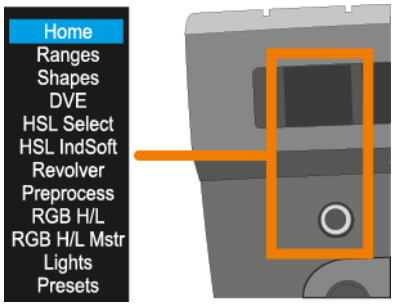
*Panel functions that display automatically with a Stereo 3D clip.

2.4.4 Switch Modes via Panel (MLT FX)

This section describes functions based on the panel functions being in their default mapped positions.

The MLT FX **colour** process must be open in order for these mode options to display in the top-left OLED on the panel.

Turn the '**Mode Selector**' rotary knob on the top-left of the panel to set the required mode (the default is **Home**). The panel controls and OLEDs now change accordingly. This rotary knob cannot be remapped.



Use the rotary knob as follows:

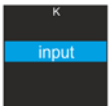
Turn	Move up/down through mode list.
Press	Toggle **Home** (default) mode/most recent mode.
<Ctrl> + Press	Toggle **Presets** mode/most recent mode.
Hold down	Resets all parameters for current mode, except **Ranges** mode, which resets the GUI graph only.

When the MLT FX stereo – vergence menu is selected with stereo timeline media, the 'Mode Selector' rotary temporarily changes to an 'x vergence' control. If the panel is in idle mode, press the 'Mode Selector' to re-activate it.

2.4.5 Home (default)

MLT FX menu: **colour** – **primary** (also available in other colour menus without panel functions assigned, for example, **curves**).

In this mode, the rotary knobs and OLEDs are used as follows (from left to right on the panel):

						
turn	select mode	adjust saturation	adjust s-curve	adjust sharpness/ softness	select cascade	select input cascade
press	home mode /recent mode	saturation off/on	s-curve off/on	aperture off/on	cascade off/on	use key created (K) off/on
<Ctrl> + press	presets mode /recent mode				**+ <Shift>** insert cascade	
hold down	reset mode	reset saturation	reset s-curve	reset aperture	delete current cascade	

						
turn	select track	select group	storyboard/ stillstore wipe up left/wipe down right	rotate wipe	select action for current stillstore item	select inside/ outside area
press	mute track (turns red)/ show track		wipe off/on	vertical wipe/ horizontal wipe	activate action (insert, add, replace or delete)	inside or outside off/on
<Ctrl> + press	toggle track FX/seg FX **+ <Shift>**	rename current group				
hold down	delete current track	delete current group	try still/ storyboard/ current frame	reset vertical		delete inside or outside effect

2.4.6 Select/Enable Eyes

In MLT FX, the ‘track’ OLED indicates numbered mono and stereo timeline tracks that can be toggled through, soloed or deleted via the rotary knob (see previous table). With mono media, the **L** and **R** at the top of the display are greyed-out.

With stereo media in MLT FX, the **L** and **R** at the top illuminate (they are greyed-out with mono media). This allows mute/solo of an eye on the current track by holding down <Shift> then pressing the ‘track’ rotary knob to toggle between **L** , **R**, or **L** and **R** together. Alternatively, hold down <Shift> and <Ctrl> then press the ‘track’ rotary knob to toggle between **L** or **R** only (not **L** and **R** together).

Each **L** or **R** box (below the GUI Edit Window) and on the panel display turns pink when an eye is enabled, and the Edit Window image updates accordingly.

Both eyes display in the Edit Window and on the output by default. Only the left or right eye can be muted; not both together.

2.4.6.1 Apply Eye Processes

With stereo media in MLT FX, processes (for example, **colour**) can be inserted on the left eye, right eye or both eyes via the panel.

Press <Ctrl> and the **solo layer** button to switch the ‘track’ rotary knob to MLT FX 3D mode (press again to return to normal track mode):

Choose the process or menu required either from the panel or by selecting the process in the GUI, for example, **colour**.

Turn the rotary knob to the required track, for example, **Right**, then push and hold it to set the process for only the right eye.

Perform the required process changes; notice the GUI now displays a pink box for the right eye to indicate a change has been made.

While still within the same process (**colour** in this example), choose the left eye via the track selector knob; a second process (**colour 2**) now displays in the GUI above the first one. Perform the changes as required and if necessary create a third process for both eyes.

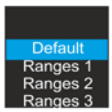
Use the rotary knob to move between processes. If more than three processes are created, only the first **Left**, **Right** or **Both** process in the stack can be selected via the panel knob; to select subsequent processes, for example, **colour 2**, **colour 3,** select the process via the GUI.

See Stereo 3D User Guide for more details of panel and GUI functions.

2.4.7 Ranges

MLT FX menu: **colour** – **primary** (also available in other colour menus without panel functions assigned, for example, **curves**).

In this mode, the rotary knobs and OLEDs are used as follows (from left to right on the panel):

						
turn	select mode	select range (max 12 custom)	enable/ select ranges graph type	adjust range shadow 1 vector	adjust range shadow 4 vector	adjust range highlight 1 vector
press	home mode/ ranges mode	range off/on	graph off/on			
<Ctrl> + press	presets mode/ ranges mode	rename ra. **hold down:** delete ra. **turn:** reorder ra.				
hold down	reset range graph only	save current range	reset current graph	reset range shadow 1	reset range shadow 4	reset range highlight 1

						
turn	adjust highlight 4 vector	select roller ball range mode	adjust range shadow saturation	adjust range mid-tone saturation	adjust range highlight saturation	adjust range hue
press			range shadow saturation off/on	range mid-tone saturation off/on	range highlight saturation off/on	range hue off/on
<Ctrl> + press						
hold down	reset range highlight 4	reset range grade	reset range shadow saturation	reset range mid-tone saturation	reset range highlight saturation	reset range hue

2.4.8 Shapes

MLT FX menu: **colour** – **selective** – **shaped graphics**

In this mode, the rotary knobs and OLEDs are used as follows (from left to right on the panel):

						
turn	select mode	select key mode	select shape interaction	select shape	adjust shape x position	adjust shape y position
press	home mode/ shapes mode		invert shape interaction	all shapes off/on	original shape x position/ current x position	original shape y position/ current y position
<Ctrl> + press	presets mode/ shapes mode			rename shape		
hold down	reset mode			delete current shape	reset shape to original x position	reset shape to original y position

						
turn	adjust shape xy size	adjust square or rectangle width/ ellipse x radius	adjust rectangle height/ ellipse y radius	adjust shape angle	adjust shape opacity	adjust shape softness
press	original shape xy size/ current xy size	original shape width/ current width	original shape height/ current height	original shape angle/ current angle	original shape opacity/ current opacity	original shape softness/ current softness
<Ctrl> + press						
hold down	reset shape to original xy size	reset shape to original width	reset shape to original height	reset shape to original angle	reset shape to original opacity	reset shape to original softness

2.4.9 DVE

MLT FX menu: **colour** – **primary**
dve

In this mode, the rotary knobs and OLEDs are used as follows (from left to right on the panel):

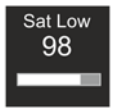
						
turn	select mode	adjust global opacity	adjust global softness			
press	home mode/ DVE mode	global invert off/on	original global softness/ current global softness			DVE off/on
<Ctrl> + press	presets mode/ DVE mode					
hold down	reset mode	reset opacity only	reset global softness			reset DVE

						
turn	adjust x position	adjust y position	adjust x size	adjust y size	adjust xy size	adjust rotation
press	original x position/ current x position	original y position/ current y position	original x size/ current x size	original y size/ current y size	original xy size/ current xy size	original rotation/ current rotation
<Ctrl> + press						
hold down	reset x position	reset y position	reset x size	reset y size	reset xy size	reset rotation

2.4.10 HSL Select

MLT FX menu: **colour** – **selective** – **quick key**

In this mode, the rotary knobs and OLEDs are used as follows (from left to right on the panel):

						
turn	select mode	select key mode	adjust hue centre	adjust hue width	adjust saturation low level	adjust saturation high level
press	home mode/ HSL Select mode	invert selection	hue centre off/on	hue width off/on	saturation low off/on	saturation high off/on
<Ctrl> + press	presets mode/ HSL Select mode					
hold down	reset mode		reset hue centre	reset hue width	reset saturation low	reset saturation high

						
turn	adjust luminance low level	adjust luminance high level	adjust global softness	adjust key blur	grow/shrink key	adjust key softness
press	luminance low off/on	luminance high off/on	original global softness/ current global softness	key blur off/on	key grow off/on	key softness off/on
<Ctrl> + press						
hold down	reset luminance low	reset luminance high	reset global softness	reset key blur	reset key grow	reset key softness

2.4.11 HSL IndSoft

MLT FX menu: **colour** – **selective** – **quick key**

In this mode, the rotary knobs and OLEDs are used as follows (from left to right on the panel):

						
turn	select mode	select key mode	adjust ind. hue centre	adjust ind. hue width	adjust ind. saturation low level	adjust ind. saturation high level
press	home mode/ HSL IndSoft mode	invert selection	ind. hue centre off/on	ind. hue width off/on	ind. saturation low off/on	ind. saturation high off/on
<Ctrl> + press	presets mode/ HSL IndSoft mode					
hold down	reset mode		reset ind. hue centre	reset ind. hue width	reset ind. saturation low	reset ind. saturation high

						
turn	adjust ind. luminance low level	adjust ind. luminance high level	adjust ind. global softness	adjust ind. key blur	grow/shrink key	adjust key softness
press	ind. luminance low off/on	ind. luminance high off/on	ind. original softness/ current softness	ind. key blur off/on	key grow off/on	key softness off/on
<Ctrl> + press						
hold down	reset ind. luminance low	reset ind. luminance high	reset ind. global softness	reset ind. key blur	reset key grow	reset key softness

2.4.12 Revolver

MLT FX menu: **colour** – **revolver**

In this mode, the rotary knobs and OLEDs are used as follows (from left to right on the panel):

						
turn	select mode	select barrel	adjust input hue	adjust hue width	adjust hue soft	adjust output hue
press	home mode/ Revolver mode	current barrel off/on	input hue off/on	hue width off/on	hue soft off/on	output hue off/on
<Ctrl> + press	presets mode/ Revolver mode					
hold down	reset mode	reset current barrel	reset input hue	reset hue width	reset hue soft	reset output hue

						
turn	adjust output saturation	adjust output luminance	select hue range	invert or normal selection		
press	output saturation off/on	output luminance off/on		invert off/on		
<Ctrl> + press						
hold down	reset output saturation	reset output luminance				

2.4.13 Preprocess

MLT FX menu: **colour** – **preprocess**

In this mode, the rotary knobs and OLEDs are used as follows (from left to right on the panel):

						
turn	select mode	select 3D LUT/Cube	adjust minimum density*	adjust maximum density*		
press	home mode/ Preprocess mode		DMin off/on*	DMax off/on*	convert off/on*	
<Ctrl> + press	presets mode/ Preprocess mode					
hold down	reset mode		reset DMin*	reset DMax*		

Scrolling through the list automatically previews the cube effect on the current segment in the Edit Window. When the segment is rendered, the cube is ‘burnt in’.

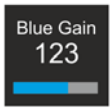
*__DMin/DMax__ and **Convert** options above only display if the clip has log data. Selecting **Convert** converts log-based material to a linear image. Although rarely used, the **DMin/DMax** values can be specified.

2.4.14 RGB H/L

MLT FX menu: **colour** – **primary**

In this mode, the rotary knobs and OLEDs are used as follows (from left to right on the panel):

						
turn	select mode	adjust red lift	adjust green lift	adjust blue lift	adjust red gamma	adjust green gamma
press	home mode/ RGB H/L mode	red lift off/on	green lift off/on	blue lift off/on	red gamma off/on	green gamma off/on
<Ctrl> + press	presets mode/ RGB H/L mode					
hold down	reset mode	reset red lift	reset green lift	reset blue lift	reset red gamma	reset green gamma

						
turn	adjust blue gamma	adjust red gain	adjust green gain	adjust blue gain		
press	blue gamma off/on	red gain off/on	green gain off/on	blue gain off/on		
<Ctrl> + press						
hold down	reset blue gamma	reset red gain	reset green gain	reset blue gain		

2.4.15 RGB H/L Master

MLT FX menu: **colour** – **primary**

In this mode, the rotary knobs and OLEDs are used as follows (from left to right on the panel):

						
turn	select mode	adjust RGB master lift	adjust RGB master gamma	adjust RGB master gain		
press	home mode/ RGB H/L Master mode	RGB master lift off/on	RGB master gamma off/on	RGB master gain off/on		
<Ctrl> + press	presets mod/ RGB H/L Master mode					
hold down	reset mode	reset RGB master lift	reset RGB master gamma	reset RGB master gain		

2.4.16 Lights

MLT FX menu: **colour** – **lights**

In this mode, the rotary knobs and OLEDs are used as follows (from left to right on the panel):

						
turn	select mode	adjust density	adjust red light	adjust green light	adjust blue light	
press	home mode/ Lights mode	density off/on	red light off/on	green light off/on	blue light off/on	
<Ctrl> + press	presets mode/ Lights mode					
hold down	reset mode	reset density	reset red light	reset green light	reset blue light	

A negative value increases the cast of a specific colour when adjusting 'lights', as the controls are relative to negative film.

2.4.17 Presets

MLT FX menu: **colour** – **primary** (also available in other colour menus without panel functions assigned, for example, **curves**).

In this mode, the rotary knobs and OLEDs are used as follows (from left to right on the panel):

						
turn	select mode	select cascade	select revolver	select HSL	select curves	select shape
press	home mode/ presets mode	apply selected cascade	apply selected revolver	apply selected HSL	apply selected curves	apply selected shape
<Ctrl> + press	most recent mode/ presets mode	rename ca. **hold down:** delete ca. **turn:** reorder ca.	rename rev. **hold down:** delete rev.	rename HSL **hold down:** delete HSL	rename fet. **hold down:** delete fet. **turn:** reorder fet.	rename sha. **hold down:** delete sha. **turn:** reorder sha.
hold down	reset mode	add selected cascade to presets	add selected revolver to presets	add selected HSL to presets	add selected curves to presets	add selected shape to presets

A maximum of 12 presets can be saved for each function, for example, Cascade. Revolver and HSL contain some sequential system presets that correspond with those in the GUI; these cannot be re-ordered or deleted.

2.4.17.1 Colour Decision List Controls

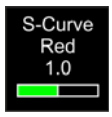
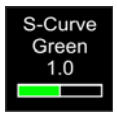
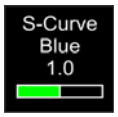
MLT FX menu: **CDL**

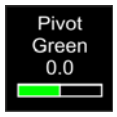
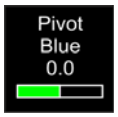
						
turn	adjust offset red	adjust offset green	adjust offset blue	adjust power red	adjust power green	adjust power blue
press	offset red off/on	offset green off/on	offset blue off/on	power red off/on	power green off/on	power blue off/on
<Ctrl> + press						
hold down	reset offset red	reset offset green	reset offset blue	reset power blue	reset power green	reset power blue

						
turn	adjust slope red	adjust slope green	adjust slope blue	adjust sat.		
press	slope red off/on	slope green off/on	slope blue off/on	sat. off/on		
<Ctrl> + press						
hold down	reset slope red	reset slope green	reset slope blue	reset sat.		

2.4.17.2 S-Curve and Pivot Master

MLT FX menu: **S-Curve**

							
turn		adjust s-curve master	adjust s-curve red	adjust s-curve green	adjust s-curve blue		
press		s-curve master off/on	s-curve red off/on	s-curve green off/on	s-curve blue off/on		
<Ctrl> + press							
hold down		reset s-curve master	reset s-curve red	reset s-curve green	reset s-curve blue		

							
turn		adjust pivot master	adjust pivot red	adjust pivot green	adjust pivot blue		
press		pivot master off/on	pivot red off/on	pivot green off/on	pivot blue off/on		
<Ctrl> + press							
hold down		reset pivot master	reset pivot red	reset pivot green	reset pivot blue		

2.4.18 Stillstore and Storyboard

MLT FX menu: any

In any panel mode, press the **still/story navigation** button on the panel to toggle these Stillstore or Storyboard functions (depending which was most recently displayed via the **stilllstore** or **storyboard** panel buttons):

						
turn	select mode	select mode	navigate up/down stillstore or storyboard	navigate left/right stillstore or storyboard		
press	home mode/ recent mode					
<Ctrl> + press	presets mode/ recent mode					
hold down	reset mode					

						
turn			adjust wipe on current storyboard/ stillstore frame	rotate wipe	select action for current stillstore item	select inside/ outside area
press			wipe off/on	vertical wipe/ horiz. wipe	activate action (insert, add, replace or delete)	inside or outside off/on
<Ctrl> / <Shift>			**<Ctrl> + turn:** scale story reel **<Shift> + turn:** scale story tile	**<Ctrl> + turn:** scale stillst. reel **<Shift> + turn:** scale stillst. tile		
hold down			reset wipe	reset to vertical wipe		delete inside or outside effect

2.4.19 Vergence (GUI Menu)

MLT FX menu: **stereo** - **vergence** (open this menu in the GUI and have stereo timeline media).

In this menu, panel ring functions also change.

The rotary knobs and OLEDs are used as follows (from left to right across the panel):

						
turn	adjust x vergence	adjust y vergence	adjust push LR	adjust push L	adjust push R	adjust float LR
press	x vergence off/on	y vergence off/on	push LR off/on	push L off/on	push R off/on	float LR off/on
<Ctrl> + press						
hold down	reset x vergence	reset y vergence	reset push LR	reset push L	reset push R	reset float LR

						
turn		adjust float L	adjust float R	rotate LR	rotate L	rotate R
press		float L off/on	float R off/on	rotate LR off/on	rotate L off/on	rotate R off/on
<Ctrl> + press						
hold down		reset float L	reset float R	reset rotate LR	reset rotate L	reset rotate R

3. Neo

3.1 Overview

3.1.1 Introduction

The Neo panel provides the ultimate colour correction environment. Its simple and uncluttered layout provides fast access to Rio's comprehensive grading toolset. The OLED displays define a wide range of controls and are easy to view from any angle.

The side plates can be swapped, allowing the Neo panel to be configured for left or right handed operation.

See Neo Panel & Server PC Installation Guide for panel details and interconnection.

3.1.1.1 Start-up (via GUI or Panel)

Start the workstation, then:

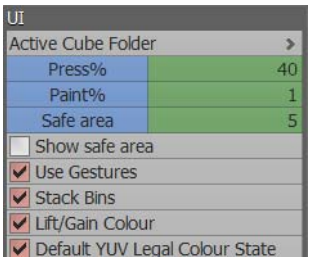
to open Edit	press the **Edit** tab in the GUI, or press the **Edit** button on the right of the panel. The panel now displays the **Pan + Scan** OLED/rotary knob on the top-right of the primary grading area. Press this and change Pan & Scan settings, if required.
to open MLT FX – **colour**	open the Edit application then press **mlt fx** – **colour** in the GUI, or press the **Grade** button on the right of the panel. Default colour functions display.

Hold down <Shift> and press the Grade button to open the Effects menu.

3.1.1.2 <F1> Settings

When the software has loaded, press <F1> to display the Configuration Window.

In the **UI** menu, ensure the **Lift/Gain Colour** box is ticked, giving access to all Neo panel controls.



3.1.1.3 Edit Interaction

The panel can be used within the Edit application for various Pan & Scan functions on either mono or stereo media. These functions are off by default, but available by pressing the **Pan + Scan** OLED/rotary knob on the top-right of the panel to 'on'.

MLT FX must be closed to access these panel functions.

3.1.1.4 MLT FX Interaction

The panel is mostly used within the MLT FX – **colour** process. There are various colour and DVE modes available on the panel that fully interact with the MLT FX GUI. When moving between timeline segments, the panel mode changes to the most recent panel mode used on that segment.

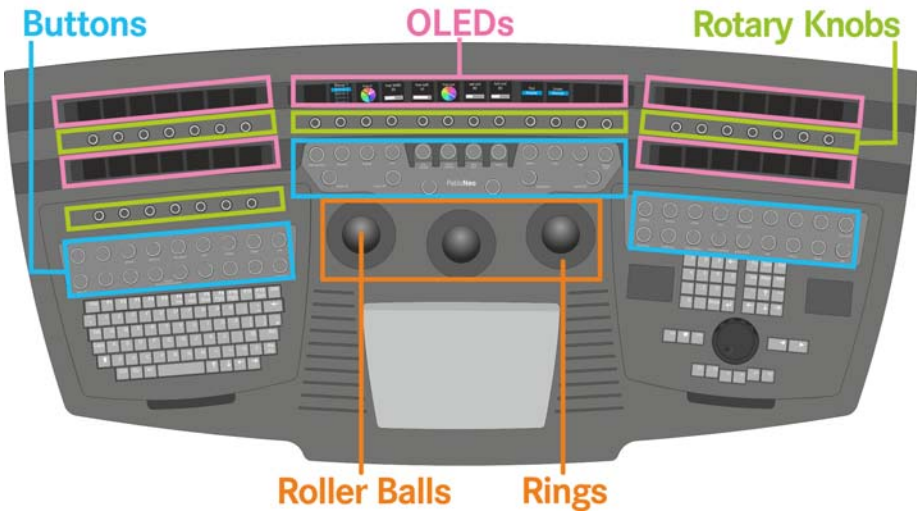
3.1.1.5 Stereo 3D Functions

Stereo 3D panel functions such as **vergence** are noted in this guide.

See Stereo 3D User Guide for more details.

3.2 Panel Layout

Many of the panel's controls and displays are context-sensitive, depending on the current panel or GUI mode and on user settings. Panel functions are detailed throughout this chapter.



See "OLEDs and Rotary Knobs" on page 89.

See "Buttons" on page 89.

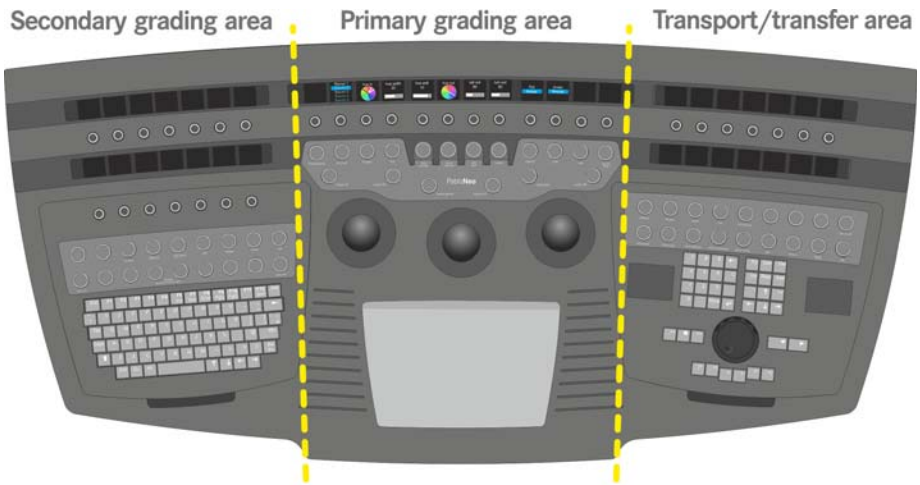
See "Roller Balls and Rings" on page 89.

3.2.1 Control Areas

There are three control areas:

Primary grading	contains the main grading functions, plus tablet and roller balls across the centre of the panel.
Secondary grading	contains secondary grading functions, plus an integral keyboard across the left panel plate.
Transport/transfer	contains clip navigation, reference and transfer functions plus an integral number pad across the right panel plate.

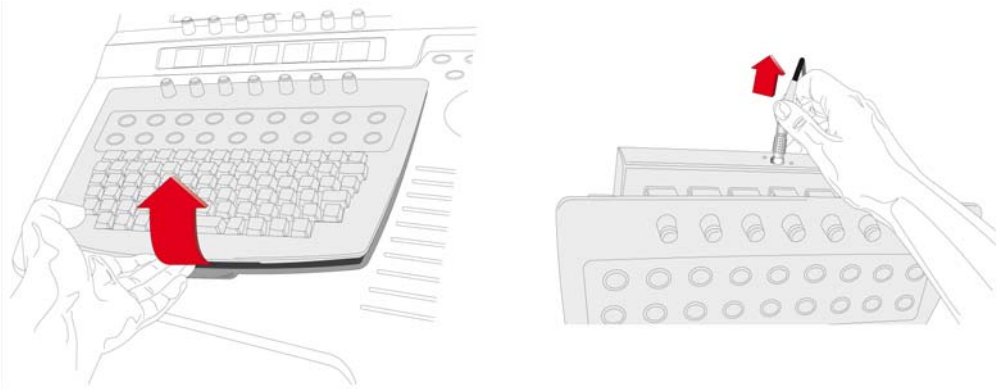
The controls in these areas are detailed throughout this chapter.



3.2.1.1 Swap Side Plates

The secondary grading plate and the transport control plate can be swapped if required. To do this:

1. BEFORE disconnecting the plates, always close the workstation and server PC software and remove the Neo panel and server PC's power connectors.
2. To remove a plate, lift it from the indentation in the base at the front and unplug the cable at the back.



3. Swap the plates over and plug the cables in.
4. Gently place the plates in their new positions, back edge first, ensuring that the cable is inside.
5. Plug the power connectors into the Neo panel and server PC, and power-on.
6. On the workstation, open Windows and go to **Start—Programs—[product and V#]—Settings**.
7. Select **Workstation** from the drop down menu and tick the **Keyboard On Right** box (or leave it blank if the keyboard is on the left) then select **OK** or **Apply** to action the changes.

3.2.2 USB Port (User Settings)

User settings can be saved onto a USB Flash Drive, via the port on the right hand side of the panel.

This port is USB 1.0 and should never be used for connecting to other systems or for transferring large image files. Separate USB ports on the back of the panel are used for connectivity.

See Neo Panel & Server PC Installation Guide for details.

3.2.3 Remap Panel Functions

3.2.3.1 Neo Configuration Window

Panel functions can be remapped to different controls on the panel. Press <Ctrl>+<Shift>+<F11> to display the ‘Neo Configuration’ window.

This window enables user configuration of the panel including: ring/roller ball sensitivity, gearing and direction (available in a pop-up displayed by pressing within the outer ring on any GUI rotary/roller ball); plus mapping of all functions (except the ‘Mode Selector’ rotary) within their individual menus. Global parameters such as display brightness can also be set here.

Remap a function by doing one of the following:

- Select the required function via the GUI and press **Wipe Display** to simply ‘remove’ the item. The function is not actually deleted, but is listed in the **Additional Params** pane on the bottom left of the screen.
- Using the GUI, drag the required function to any new position on the panel. If an existing function is in this position, it is placed in the **Additional Params** pane and overwritten by the ‘new’ function.
- To copy a function, drag the required item to any new position and press <Ctrl> before dropping it.

A history of the current changes is listed in the **Current Changes** pane on the bottom of the screen. Any item in this list can be ‘undone’ by clicking on the towards the top-right of the item.

The new configuration is saved automatically and recalled on start-up. By default an xml config file is saved in the C:\Data\User\Neo directory with the title Neo Config.xml.

To rename the config file, click on the C:\Data\User\Neo drop-down menu at the top of the screen and rename the file as required.

Press **Reset All Changes** to return to the default configuration.

After adjusting any item in the **Global Params** menu, reboot the workstation (press <Ctrl>+<F5>). All other remapping adjustments are dynamic and do not require a reboot.

On boot-up Neo tries to locate the config file in the root of any USB devices and then the path above. If the config file cannot be found here, the default configuration is used.

3.2.3.2 Foot Pedal (option)

An optional USB foot pedal can be connected and programmed to mimic any key press - this is often set as the <Ctrl> key.

The foot pedal is sourced and purchased by the customer and is not supported by SAM.

SAM have tested the ‘Savant Elite Single Foot Switch’ which functions properly in conjunction with the panel.

3.3 Control Type Overview

3.3.1 Roller Balls and Rings

The three roller balls across the centre of the panel are usually used to adjust lift, gamma and gain differential. Outer rings on each ball provide a master control. There is also roller ball functionality within specific modes such as DVE, described later in this chapter.

Use a roller ball's associated 'bypass' buttons to bypass or reset either the master or differential value. See "Colour Bypass/Reset" on page 95.

3.3.2 OLEDs and Rotary Knobs

The image displays use OLEDs, which provide high quality images visible from any angle. The displays are context sensitive; they indicate the current function of the associated rotary knob.

Each rotary knob's function varies according to the current GUI/button selection; this is indicated by the associated OLED directly above. Knobs have an integral light allowing them to be seen in low light conditions. In general, a rotary knob performs the following when turned, pressed or held down:

turn	(anti-clockwise): decrease value/scroll up.
	(clockwise): increase value/scroll down.
press	bypass value (press again to show value).
hold down	reset value to default/delete list item (where permitted).

Some rotary knobs have extra functionality by holding down <Ctrl>, <Shift> or other modifiers. These are described where applicable.

3.3.2.1 Illumination and Brightness

In any panel mode, the brightness of the OLED displays can be controlled. Hold down <Ctrl> and turn the first rotary knob on the top-left of the panel (use the second knob on the top-left to adjust button ring brightness).

3.3.3 Buttons

Buttons allow functions to be toggled, which may also change the functionality of rotary knobs and the display of the OLEDs. In general, a button performs the following when pressed or held down:

press	toggle function on/bypass.
hold down	reset function.

3.3.3.1 Illumination and Brightness

In any panel mode, the brightness of the button rings can be controlled. Hold down <Ctrl> and turn the second rotary knob on the top-left of the panel (use the first knob on the top-left to adjust OLED display brightness).

No illumination indicates that the function is not available within the current mode, for example, in **DVE** panel mode, the bypass buttons above the roller balls cannot be used, so they do not illuminate.

The button's outer ring illuminates to reflect its current status:

white	indicates when the function is on/enabled (via button press).
blue	indicates when the function is off/disabled but available (via button press).
deep yellow	indicates an active group of clips or still/storyboard navigation.
red or orange	keyframe auto/edit (manual) mode.

If there are preset colours displayed in the GUI, for example, for Revolver, these are indicated on the preset panel buttons but can be overwritten with a new colour. See "Save and Use Presets" on page 113.

3.3.4 Jog Wheel

A jog wheel is located in the transport/transfer area. Rotate clockwise to move forwards along the timeline edit, or anticlockwise to move backwards. The outer wheel shuttles; the inner wheel jogs.

3.3.5 Keys

Key characters are illuminated to allow visibility in low light conditions.

3.3.5.1 Letter, Number and Transport Functions

Keyboard	The secondary grading area contains a QWERTY keyboard that can be used for naming cascades, presets or clips etc. The keyboard is also used for modifiers including <Ctrl> and <Shift>: modifier combinations are described throughout this guide with applicable panel functions.
Number pad	This is used for general numeric entry (numbering a cascade or shape etc.) and also for navigation within Stillstore and Storyboard mode.
Transport	Keys surrounding the jog wheel are used to play/stop the current clip, or navigate backwards/forwards along the timeline.

3.3.6 Tablet

The tablet is provided to allow accurate cursor control via a pen.

3.3.7 Glide Pads

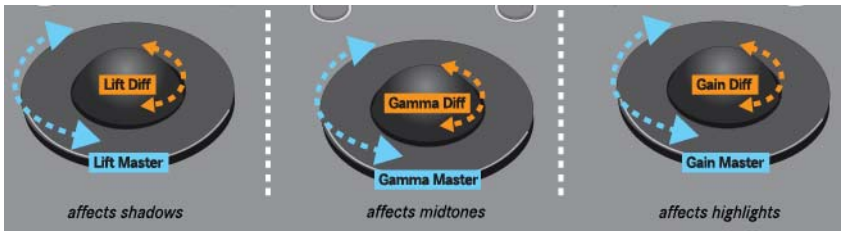
There are two glide pads in the secondary grading area, to the left and right of the number pad. These give finger control of the GUI cursor (similar to a laptop PC). Move a finger across the pad to move the cursor. Tap to select an item. To drag, tap twice and on the second press, hold down and drag. Glide pads are not as accurate as a pen and tablet: they are intended for easy access of GUI menus.

3.4 Primary Grading Area

The primary grading area is fixed over the centre of the panel. It has12 OLEDs and rotary knobs, 18 buttons, 3 roller balls/rings, and a tablet. Functions are described throughout this section.

3.4.1 Roller Ball and Rings - MLT FX

3.4.1.1 Colour Functions



In **mlt fx** - **colour**, each roller ball affects colour differential, i.e. each colour component can be adjusted separately. Moving the left ball adjusts the image's lift (shadows); the middle ball adjusts gamma (mid-tones); and the right ball adjusts gain (highlights).

Each roller ball has a ring around the outside. This is the master control; rotating it allows all colour components to be adjusted together.

Use a roller ball's associated 'bypass' buttons to bypass or reset either the master or differential value. See "Colour Bypass/Reset" on page 95.

Lock Lift and Gain

Tick the **lock** box in the GUI, to control lift and gain simultaneously using the left ball and ring.

Change Roller Ball Vectors

The corresponding ring display in the **mlt fx** – **colour** menu shows roller ball adjustments graphically.

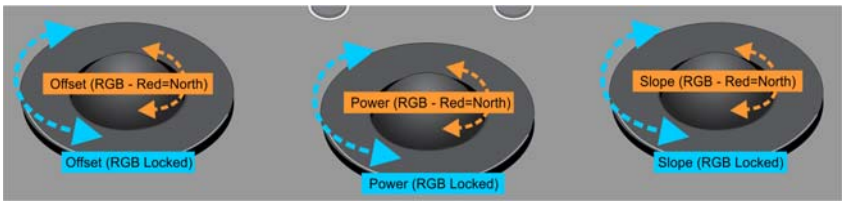
Tick the **vectors** box in the centre of the MLT FX menu area to change the angle at which colours are distributed around the roller ball via the pop-up. Colour order from left to right is always green, red then blue.

With the top scroll box set to **Low/Mid/High (GRB)** set the angle of these colours to either **90°**; **120°** for an even distribution; or **VScope** so that colours correspond to a vectorscope graticule.

Alternatively, from the top scroll box, select **Custom Angle** then enter a required angle in the numeric box below.

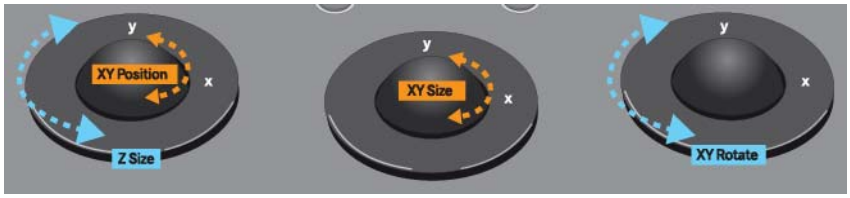
3.4.1.2 Colour Decision List Mapping

When the UI displays the **CDL** menu, the roller balls and rings do the following:



3.4.1.3 DVE Functions

In **mlt fx** - **dve**, the roller balls and rings do the following:

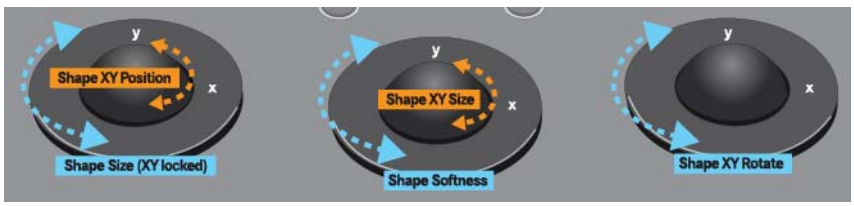


Alternatively, to remain within the **mlt fx** – **colour** process, hold down <Ctrl> to toggle DVE roller ball functions on temporarily.

Hold down the 'DVE' panel button in the secondary grading area to reset DVE parameters.

3.4.1.4 Shapes Functions

In **mlt fx** – **colour** – **selective** – **shaped**, or **mlt fx** – **graphics**, the roller balls and rings do the following:



3.4.1.5 Vergence Functions

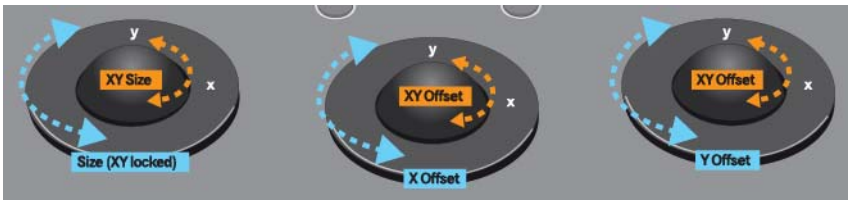
For the following functionality, ensure that stereo media is loaded on the timeline and **stereo – vergence** selected in MLT FX. The panel rings do the following:

3.4.2 Roller Balls and Rings - Edit

3.4.2.1 Pan & Scan

With MLT FX closed, turn Pan & Scan on by pressing the **Pan + Scan** panel rotary knob on the top-right to 'on'. The panel OLEDs now display applicable mono or stereo functions, depending on the current clip.

Some of the panel's button functionality now changes, in addition to the following roller ball functionality:

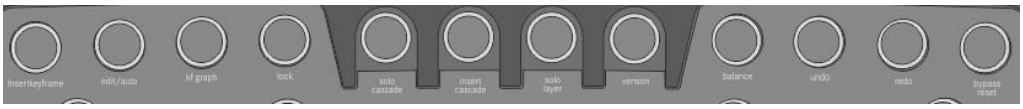


3.4.2.2 3D Control

With Stereo 3D media, a **3D Control** OLED/rotary knob automatically displays. Press this to 'on' which changes functionality as follows:

3.5 Buttons - Global Functions

These buttons are generally available (when illuminated blue) across various GUI/panel modes.



Press a button once to enable it, press again to disable it. The buttons shown in the diagram do the following (from left to right on the panel):

insert keyframe	With the GUI **edit** mode on, this button illuminates as a reminder to manually insert a keyframe when a parameter is changed. Press this button to manually insert a keyframe for all active parameters; press and hold to insert a keyframe for ALL parameters. With the GUI **auto** mode on, a new keyframe is inserted automatically when a parameter is changed.
edit/auto	Toggles keyframe edit/auto mode. In ‘auto’ mode (i.e. button illuminates red), a new keyframe is automatically entered when a process parameter is changed. In ‘edit’ mode (i.e. button illuminates orange) the insert keyframe button illuminates as a reminder to manually insert a keyframe whenever a parameter is changed.
kf graph	Displays a keyframe graph in the GUI.
lock	Locks colour gain and lift together so that any change made to one affects the other. This applies to both master and differential controls.
solo cascade	Press to view the selected cascade only. Hold down to reset the current cascade’s colour settings. Hold down <Ctrl> and press to rename the current cascade via the pop-up.
insert cascade	Press to add a new cascade level.
solo layer	Press to view the selected layer only (i.e. ‘solo’). The OLED text turns green to indicate this. With stereo media, press <Ctrl> and this button to display extra functionality. See “Apply Eye Processes” on page 99.
version	**An Effects function; this is not supported in MLT FX.**
balance	Set white balance. Press once, select colour from the image, and press again to turn off when finished on-screen selection.
undo	Press to undo the previous action (do this multiple times for multiple undo levels).
redo	Press to redo the previous action (do this multiple times for multiple redo levels).
bypass/reset	Press to toggle all processes on/off. Hold down to reset the current process.

3.5.1 Keyframe Navigation

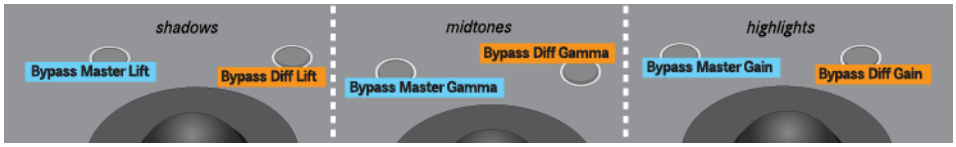
The first four buttons described in the previous section can all be used to control keyframes.

Hold down <Ctrl> and press the start/end segment key (|< or >|) on the right of the panel to step backwards or forwards through each keyframe.

3.5.2 Buttons - MLT FX

3.5.2.1 Colour Bypass/Reset

Each roller ball has two associated buttons above, as shown in the diagram.



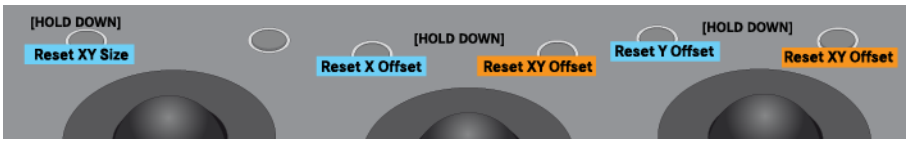
The following can be performed on each button:

press	bypass toggle for master parameters or differential (individual) parameter
hold down	reset master parameters or differential parameter to defaults.

3.5.3 Buttons - Edit

3.5.3.1 Pan & Scan

With MLT FX closed, turn Pan & Scan on by pressing the **Pan + Scan** panel rotary knob on the top-right to ‘on’. The panel OLEDs now display applicable mono or stereo functions, depending on the current clip. The roller ball functionality changes. See “Roller Balls and Rings” on page 89.



In addition to the panel buttons shown in the diagrams, the following can be performed on a button:

hold down	reset Pan & Scan size/offset.

3.5.3.2 3D Control

With Stereo 3D media, a **3D Control** OLED/rotary knob automatically displays. Press this to ‘on’ which changes button functionality as follows:

hold down	reset vergence/push.

In this mode, the **bypass/reset** button on the right of the panel can also be used as follows:

press	resets Pan & Scan.
hold down	deletes Pan & Scan keyframes.

See ‘Pan & Scan’ in the Desktop Editing User Guide and the Stereo 3D User Guide for more details of GUI functions.

3.5.4 OLEDs and Rotary Knobs - Edit

3.5.4.1 Pan & Scan/3D Control Functions

Edit menu: ‘Pan & Scan’. MLT FX must be closed in order to access these panel functions. The rotary knobs and OLEDs are used as follows (from left to right on the panel):

						
turn	adjust x size	adjust y size	adjust x offset	adjust y offset	adjust x vergence*	adjust y vergence*
press						
<Ctrl> + press						
hold down	reset x size	reset y size	reset x offset	reset y offset	reset x vergence*	reset y vergence*

*Panel functions that display automatically with a Stereo 3D clip.

						
turn	adjust push*				apply Pan & Scan to current seg or track	
press				3D panel ring functions on/off*		Pan & Scan panel & GUI functions on/off
<Ctrl> + press						
hold down	reset push*					

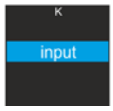
*Panel functions that display automatically with a Stereo 3D clip.

3.5.5 OLEDs and Rotary Knobs - MLT FX

In each of the following modes, the rotary knobs and OLEDs are used as follows (from left to right across the centre of the panel):

3.5.5.1 Colour Default and Lights

MLT FX menu: **colour** – **primary** (also available in other colour menus without panel functions assigned).

						
turn	adjust saturation/ hue*	adjust s-curve	adjust sharpness/ softness	select inside/ outside area	select cascade	select input cascade
press	saturation/ hue off/on*	s-curve off/on	aperture off/on	inside or outside off/on	cascade off/on	use key created (K) off/on
<Ctrl> + press					**+ <Shift>** insert cascade	
hold down	reset saturation hue*	reset s-curve	reset aperture	delete inside or outside effect	delete current cascade	

* In default mode, the **Hue** control moves to the left of **Sat** (i.e. into the panel's secondary grading area) whereas in other modes it is positioned first in the primary grading area.

						
turn	select track		adjust density	adjust red light	adjust green light	adjust blue light
press	mute track (turns red)/ show track		density off/on	red light off/on	green light off/on	blue light off/on
<Ctrl> + press	toggle track FX/seg FX **+ <Shift>**					
hold down	delete current track		reset density	reset red light	reset green light	reset blue light

A negative value increases the cast of a specific colour when adjusting 'lights', as the controls are relative to negative film.

3.5.5.2 Colour Decision List Controls

MLT FX menu: **CDL**

						
turn	adjust offset red	adjust offset green	adjust offset blue	adjust power red	adjust power green	adjust power blue
press	offset red off/on	offset green off/on	offset blue off/on	power red off/on	power green off/on	power blue off/on
<Ctrl> + press						
hold down	reset offset red	reset offset green	reset offset blue	reset power blue	reset power green	reset power blue

						
turn	adjust slope red	adjust slope green	adjust slope blue	adjust sat.		
press	slope red off/on	slope green off/on	slope blue off/on	sat. off/on		
<Ctrl> + press						
hold down	reset slope red	reset slope green	reset slope blue	reset sat.		

3.5.6 Select/Enable Eyes

In MLT FX, the ‘track’ OLED indicates numbered mono and stereo timeline tracks that can be toggled through, soloed or deleted via the rotary knob (see previous table). With mono media, the **L** and **R** at the top of the display are greyed-out.

With stereo media in MLT FX, the **L** and **R** at the top illuminate (they are greyed-out with mono media). This allows mute/solo of an eye on the current track by holding down <Shift> then pressing the ‘track’ rotary knob to toggle between **L** , **R**, or **L** and **R** together. Alternatively, hold down <Shift> and <Ctrl> then press the ‘track’ rotary knob to toggle between **L** or **R** only (not **L** and **R** together).

Each **L** or **R** box (below the GUI Edit Window) and on the panel display turns pink when an eye is enabled, and the Edit Window image updates accordingly.

Both eyes display in the Edit Window and on the output by default. Only the left or right eye can be muted; not both together.

3.5.6.1 Apply Eye Processes

With stereo media in MLT FX, processes (for example, colour) can be inserted on the left eye, right eye or both eyes via the panel.

Press <Ctrl> and the **solo layer** button to switch the ‘track’ rotary knob to MLT FX 3D mode (press again to return to normal track mode):

1. Choose the process or menu required either from the panel or by selecting the process in the GUI, for example, **colour**.
2. Turn the rotary knob to the required track, for example, **Right**, then push and hold it to set the process for only the right eye.
3. Perform the required process changes; notice the GUI now displays a pink box for the right eye to indicate a change has been made.
4. While still within the same process (**colour** in this example), choose the left eye via the track selector knob; a second process (**colour 2**) now displays in the GUI above the first one. Perform the changes as required and if necessary create a third process for both eyes.

Use the rotary knob to move between processes. If more than three processes are created, only the first **Left**, **Right** or **Both** process in the stack can be selected via the panel knob; to select subsequent processes, for example, **colour 2**, **colour 3,** select the process via the GUI.

See Stereo 3D User Guide for more details of panel and GUI functions.

3.5.7 Vergence

MLT FX menu: **stereo** - **vergence** (open this menu in the GUI and have stereo timeline media).

In this menu, panel ring functions also change.

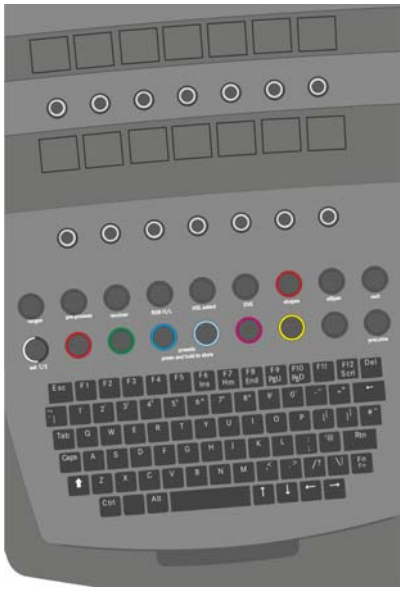
The rotary knobs and OLEDs are used as follows (from left to right across the panel):

						
turn	adjust x vergence	adjust y vergence	adjust push LR	adjust push L	adjust push R	adjust float LR
press	x vergence off/on	y vergence off/on	push LR off/on	push L off/on	push R off/on	float LR off/on
<Ctrl> + press						
hold down	reset x vergence	reset y vergence	reset push LR	reset push L	reset push R	reset float LR

						
turn		adjust float L	adjust float R	rotate LR	rotate L	rotate R
press		float L off/on	float R off/on	rotate LR off/on	rotate L off/on	rotate R off/on
<Ctrl> + press						
hold down		reset float L	reset float R	reset rotate LR	reset rotate L	reset rotate R

3.6 Secondary Grading Area

The secondary grading area is over the left plate of the panel (in the default configuration). It has 14 OLEDs and rotary knobs, 18 buttons and the integral keyboard. Functions are described throughout this section.



3.6.1 Buttons

These buttons are generally available (when illuminated blue) across various GUI/panel modes. Press a button once to enable it: press again to disable it. The buttons do the following (from top-left to bottom-right):

TOP ROW

ranges/curves	displays **Ranges** mode. Press to toggle between GUI curves graphs (with no panel functions) and ranges graphs (has panel rotary knob functions).
preprocess	displays **Preprocess** panel mode (i.e. the pre-process functions below the base cascade).
revolver	displays **Revolver** panel mode. In this mode, bank 1 (see **presets** button) stores the input hue; bank 2 stores both the input and the output hue.
RGB H/L	displays **RGB H/L** (high/low) panel mode.
HSL Select	displays **HSL Select** panel mode.
DVE	displays **DVE** panel mode.
shapes	displays **Shapes** panel mode.
ellipse	creates an ellipse.
rect	creates a rectangle.

BOTTOM ROW

set 1/2	toggles which preset bank is active (1 or 2).
presets (6 buttons)	the six different coloured ‘preset’ buttons allow colour and shape settings to be saved then re-used. Each button can be used in bank 1 and bank 2, resulting in 12 available presets. Toggle each bank via the **set 1/2** button. See “Save and Use Presets” on page 3-32.
preLuma	This switches the sequence in which the colour controls are applied to the image and corresponds with the **pre diff** box in MLT FX. When **preLuma** is off, the lift, gamma and gain values are applied before hue, saturation, Revolver and Curves When **preLuma** is on, hue, saturation, Revolver and Curves are applied before the lift, gamma and gain values.

PreLuma can be used to create sepia or duotone effects. Desaturation of an image in standard mode (i.e. with preLuma off) prevents a colour cast being added using the lift, gamma and gain controls. With preLuma on, the image can be de-saturated before lift, gamma and gain controls are used to add a colour cast.

3.6.2 OLEDs and Rotary Knobs - MLT FX

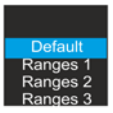
In each of the following modes, the rotary knobs and OLEDs are used as follows (from left to right across the left side of the panel):

3.6.2.1 Ranges/Curves

MLT FX menu: **colour** – **curves**

Panel button: **ranges** (top-left on panel; press to toggle curves/ranges graph

							
turn				adjust range shadow saturation	adjust range mid-tone saturation	adjust range highlight saturation	adjust range hue
press				range shadow saturation off/on	range mid-tone saturation off/on	range highlight saturation off/on	range hue off/on
<Ctrl> + press							
hold down				reset range shadow saturation	reset range mid-tone saturation	reset range highlight saturation	reset range hue

							
turn	select range (max 12 custom)	enable/ select ranges graph type	adjust range shadow 1 vector	adjust range shadow 4 vector	adjust range highlight 1 vector	adjust highlight 4 vector	select roller ball range mode
press	range off/on	graph off/on					current range mode off/on
<Ctrl> + press	rename ra. **hold down:** delete ra. **turn:** reorder ra.						
hold down	save current range	reset current graph	reset range shadow 1	reset range shadow 4	reset range highlight 1	reset range highlight 4	reset range grade

3.6.2.2 Preprocess

MLT FX menu: **colour** – **preprocess**

Panel button: **preprocess** (second top-left on panel)

							
turn				adjust shadow saturation	adjust mid-tone saturation	adjust highlight saturation	
press	bypass 3D LUT	convert on/off*		shadow sat. off/on	mid-tone sat. off/on	highlight sat. off/on	
<Ctrl> + press							
hold down				reset shadow saturation	reset mid-tone saturation	reset highlight saturation	

							
turn	select and show 3D LUT in GUI	adjust minimum density*	adjust maximum density*				
press	display 3D LUT list	DMin off/on*	DMax off/on*				
<Ctrl> + press							
hold down		reset DMin*	reset DMax*				

*__DMin/DMax__ and **Convert** options above only display if the clip has log data. Selecting **Convert** converts log-based material to a linear image. Although rarely used, the **DMin/DMax** values can be specified. See “Apply Colour Cubes” on page 8.

3.6.2.3 RGB Min/Max

RGB Min/Max mode can only be selected if the clip has log data. Select **Convert** to convert log-based material to a linear image. Although rarely used, ranges for individual R, G and B density can be specified. See “Apply Colour Cubes” on page 8.

							
turn	select 3D LUT (RGB Min/Max)	adjust red minimum density	adjust red maximum density	adjust green minimum density	adjust green maximum density	adjust blue minimum density	adjust blue maximum density
press	display 3D LUT list	DMin Red off/on	DMax Red off/on	DMin Green off/on	DMax Green off/on	DMin Blue off/on	DMax Blue off/on
<Ctrl> + press							
hold down		reset Red DMin	reset Red DMax	reset Green DMin	reset Green DMax	reset Blue DMin	reset Blue DMax

Scrolling through the list automatically previews the cube effect on the current segment in the Edit Window. When the segment is rendered, the cube is ‘burnt in’.

Use the rotary knob on the top-right of the panel to select an output LUT then toggle the live LUT on/off via the panel’s ‘luts on/off’ button. See “Transport/Transfer Area” on page 114.

3.6.2.4 Revolver

MLT FX menu: **colour – revolver**

Panel button: **revolver**

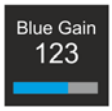
							
turn	invert or normal selection	adjust input hue	adjust hue width	adjust hue soft			
press	invert off/on	input hue off/on	hue width off/on	hue soft off/on			
<Ctrl> + press							
hold down		reset input hue	reset hue width	reset hue soft			

							
turn	select barrel	adjust output hue	adjust output saturation	adjust output luminance	select hue range		
press	current barrel off/on	output hue off/on	output saturation off/on	output luminance off/on			
<Ctrl> + press							
hold down	reset current barrel	reset output hue	reset output saturation	reset output luminance			

3.6.2.5 RGB H/L

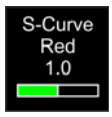
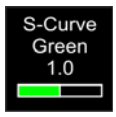
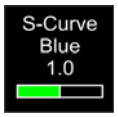
MLT FX menu: **colour** – **primary**

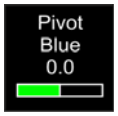
Panel button: **RGB H/L**

								
		Master Lift 10	Master Gam 1.3	Master Gain 122	Red Gain 122	Green Gain 117	Blue Gain 123	
turn		adjust RGB master lift	adjust RGB master gamma	adjust RGB master gain	adjust red gain	adjust green gain	adjust blue gain	
press		RGB master lift off/on	RGB master gamma off/on	RGB master gain off/on	red gain off/on	green gain off/on	blue gain off/on	
<Ctrl> + press								
hold down		reset RGB master lift	reset RGB master gamma	reset RGB master gain	reset red gain	reset green gain	reset blue gain	

								
		Red Gam 1.3	Green Gam 1.0	Blue Gam 1.1	Red Lift -19	Green Lift 10	Blue Lift -8	
turn		adjust red gamma	adjust green gamma	adjust blue gamma	adjust red lift	adjust green lift	adjust blue lift	
press		red gamma off/on	green gamma off/on	blue gamma off/on	red lift off/on	green lift off/on	blue lift off/on	
<Ctrl> + press								
hold down		reset red gamma	reset green gamma	reset blue gamma	reset red lift	reset green lift	reset blue lift	

Panel button: **S-Curve**

							
turn		adjust s-curve master	adjust s-curve red	adjust s-curve green	adjust s-curve blue		
press		s-curve master off/on	s-curve red off/on	s-curve green off/on	s-curve blue off/on		
<Ctrl> + press							
hold down		reset s-curve master	reset s-curve red	reset s-curve green	reset s-curve blue		

							
turn		adjust pivot master	adjust pivot red	adjust pivot green	adjust pivot blue		
press		pivot master off/on	pivot red off/on	pivot green off/on	pivot blue off/on		
<Ctrl> + press							
hold down		reset pivot master	reset pivot red	reset pivot green	reset pivot blue		

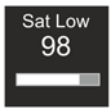
3.6.2.6 HSL Select

MLT FX menu: **colour** – **selective** – **quick key**

Panel button: **HSL Select**

With **Softness** selected via the top-left rotary knob, modify hue, saturation and luminance key parameters together:

							
turn	select softness	adjust global softness		select blur off/on	adjust key blur	grow/ shrink key	adjust key softness
press		global softness off/on			key blur off/on	key grow off/on	key softness off/on
<Ctrl> + press							
hold down		reset global softness			reset key blur	reset key grow	reset key softness

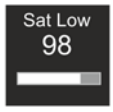
							
turn	select key mode	adjust hue centre (range)	adjust hue width	adjust saturation low	adjust saturation high	adjust luminance low	adjust luminance high
press	invert selection	hue centre off/on	hue width off/on	saturation low off/on	saturation high off/on	luminance low off/on	luminance high off/on
<Ctrl> + press							
hold down		reset hue centre	reset hue width	reset saturation low	reset saturation high	reset luminance low	reset luminance high

3.6.2.7 HSL IndSoft

MLT FX menu: **colour** – **selective** – **quick key; hsl**

Panel button: **HSL Ind Soft**

With **Ind Soft** selected via the top-left rotary knob, modify hue, saturation and luminance key parameters independently:

							
turn	select individual softness	adjust hue softness low	adjust hue softness high	adjust sat. softness low	adjust sat. softness high	adjust lum. softness low	adjust lum. softness high
press		hue softness low off/on	hue softness high off/on	sat. softness low off/on	sat. softness high off/on	lum. softness low off/on	lum. softness high off/on
<Ctrl> + press							
hold down		reset hue softness low	reset hue softness high	reset sat. softness low	reset sat. softness high	reset lum. softness low	reset lum. softness high

							
turn	select key mode	adjust hue range low	adjust hue range high	adjust saturation range low	adjust saturation range high	adjust luminance range low	adjust luminance range high
press	invert selection	hue range low off/on	hue range high off/on	saturation range low off/on	saturation range high off/on	luminance range low off/on	luminance range high off/on
<Ctrl> + press							
hold down		reset hue range low	reset hue range high	reset saturation range low	reset saturation range high	reset luminance range low	reset luminance range high

3.6.2.8 DVE

MLT FX menu: **colour** – **primary; DVE**

Panel button: **dve**

							
turn		adjust x position	adjust y position	adjust x size	adjust y size	adjust xy size	adjust rotation
press	DVE off/on	original x position/ current x position	original y position/ current y position	original x size/ current x size	original y size/ current y size	original xy size/ current xy size	original rotation/ current rotation
<Ctrl> + press							
hold down	reset DVE	reset x position	reset y position	reset x size	reset y size	reset xy size	reset rotation

3.6.2.9 Shapes

MLT FX menu: **colour** – **selective** – **shaped; graphics**

Panel button: **shapes***

							
turn	select shape (or multiple shapes)	adjust shape x position	adjust shape y position	adjust shape xy size	adjust square rect width/ ellipse x radius	adjust rect height/ ellipse y radius	adjust shape softness
press	all shapes off/on	original shape x pos./ current shape x pos.	original shape y pos./ current shape y pos.	original shape xy size/ current xy size	original shape x value/ current x value	original shape y value/ current y value	original shape softness/ current softness
<Ctrl> + press	rename shape						
hold down	delete current shape	reset shape to original x position	reset shape to original y position	reset shape to original xy size	reset shape to original x value	reset shape to original y value	reset shape to original softness

							
turn	select key mode	select shape interaction (with multiple shapes)	adjust shape opacity	adjust global softness	adjust shape grow	adjust shape angle	adjust shape opacity
press		invert shape interaction (with multiple shapes)	global invert	original/ current shape softness	original/ current shape grow	original/ current shape angle	original/ current opacity
<Ctrl> + press							
hold down			reset shape to original opacity	reset shape to original softness	reset shape grow	reset shape to original angle	reset shape to original opacity

* In any mode, press the **ellipse** or **rect** (rectangle) buttons on the panel to create one of these shape types. This automatically opens the GUI and panel shape functions if not already displayed.

3.6.3 Save and Use Presets

From the panel, store Revolver, HSL Select and Shapes settings (without keyframes) plus curves/ranges graphs and cascades, then re-use them later as required. Preset buttons are located above the keyboard and include the **set 1/2 button** and the 6 different 'available preset' coloured buttons on the right. These 6 buttons provide 12 presets—by toggling between 2 'banks'—for each applicable panel mode (for example, Revolver).

Press the **set 1/2** button to toggle between the first or second bank of 6. This button has split illumination, so when bank 1 is active, the left side of this button illuminates and the buttons on the right represent presets 1, 2, 3, 4, 5, 6. Pressing **set 1/2** again illuminates the right side of this button and activates bank 2. The buttons on the right now represent presets 7, 8, 9, 10, 11, 12.

hold down	on any 1 - 12 preset button overwrites any existing preset and stores the current mode's setting/item in this preset.
press	on any 1 - 12 preset button recalls the preset for the current mode.

Unused empty presets usually illuminate blue, unless indicated otherwise throughout this section. Where there are default presets that display in the GUI (for example, in Revolver or HSL Select) these display in bank 1, for example, red, green, blue, cyan, magenta, yellow as shown in the previous diagram. Each default can be overwritten by holding down its panel button, then the GUI and panel button display the new colour.

3.6.3.1 Revolver and HSL Select

In Revolver or HSL Select mode, the two banks store different elements:

bank 1	stores the input hue only, which is indicated by the button illumination.
bank 2	stores both the input and the output hue. When Revolver and HSL colours are stored in bank 2, the button illumination splits and shows the input hue on the left and the output hue on the right.

Areas of the current image that match the preset hue are selected and, if the preset is from bank 2, are replaced with the output hue. Unused presets in bank 2 are illuminated in red for Revolver and in pastel colours for HSL Select: pink, pale green, pale blue, pale cyan, pale magenta, pale yellow.

3.6.3.2 Shapes

In Shapes mode, the preset buttons store a single shape. Holding down <Ctrl> then pressing a preset button recalls that saved shape and displays it in the GUI.

3.6.3.3 Curves/Ranges Graphs

Press the top-left button on the panel to toggle between GUI curves graphs (with no panel functions) and ranges graphs (has panel rotary knob functions).

In 'curves' mode, each preset stores one graph, not multiple graphs.

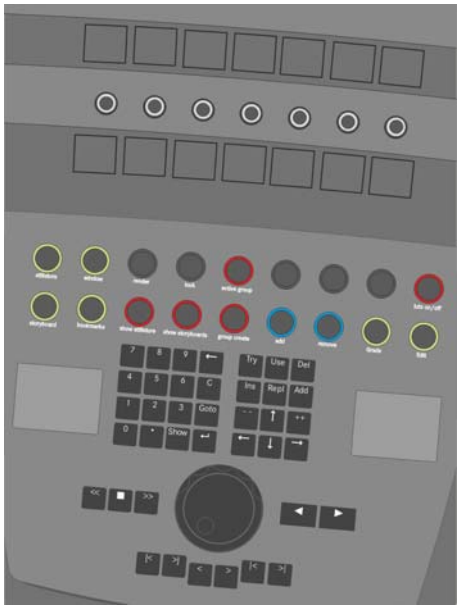
Unused presets illuminate white; used presets illuminate blue.

3.6.3.4 Cascades

With no panel mode selected, the presets can be used to save Cascade levels. Add a new Cascade, for example, '**cascade 3**' and perform the required colour correction, then press and hold the corresponding preset button (in this example press '3' – the third preset button from the left to match Cascade '3'): this saves the Cascade level. Move to a new segment and recall Cascade 3 by pressing on the preset '3' button.

3.7 Transport/Transfer Area

The transport/transfer area is over the right plate of the panel (in the default configuration). It has 14 OLEDs and 7 rotary knobs, 18 buttons, clip navigation/transfer functions including a jog wheel, and an integral number pad. Functions are described throughout this section.



3.7.1 Buttons

These buttons are generally available (when illuminated blue) across various GUI/panel modes. Press a button once to enable it, press again to disable it. The buttons do the following (from top-left to bottom-right):

TOP ROW

stillstore	opens Stillstore panel mode/functions. Hold down to delete the current Stillstore.
window	zooms the current timeline segment to fit the width of the timeline window. This allows accurate parameter adjustment (for example, keyframes) or transport control.
render	renders any unrendered timeline segments. This button's illumination corresponds to the colour of the GUI 'render' box on the right of the timeline: orange indicates unrendered media; purple indicates that the media is currently being rendered; white/grey indicates that no render is necessary. Hold down to toggle the **Auto Render** box on/off in the <F1> Configuration Window **UI** menu.
lock	toggles the GUI reel display lock on/off so that the Storyboard display is locked with the timeline during navigation. The button illuminates green when locked and red when unlocked. This button was previously used in the Effects Stillstore to toggle the clip on the main output - this is not available in the MLT FX Stillstore.
active group	activates/deactivates the group set-up functions.
luts on/off	toggles live output LUT (lookup table) on and off. The default LUT is 'FilmLook'.

BOTTOM ROW

storyboard	opens Storyboard panel mode/functions.
bookmarks	**an Effects function; this is not supported in MLT FX.**
show stillstore	toggles the Stillstore GUI display on/off.
show storyboard	toggles the Storyboard GUI display on/off.
group create	allows a ‘group’ of clips with defined attributes to be created. Press this button, then select a group type, and add/remove clip segments as required.
add	adds a segment to the current clip group. Hold down to enter ‘multiple add’ mode, allowing multiple clips to be added to a group.
remove	removes a segment from the current clip group. Hold down to enter ‘multiple remove’ mode, allowing multiple clips to be removed from a group.
Grade	hold down <Shift> and press this button to display the MLT FX **colour** menu.
Edit	press this to display the Edit application (with MLT FX closed).

3.7.2 Number Pad Functions

The number pad can be used for general numeric entry and also within Storyboard or Stillstore mode (set by pressing either the **storyboard** or **stillstore** button).

<Try>	hold down to preview the selected Storyboard/Stillstore frame’s current process parameters (for example, **colour**). Hold down <Show> then press <Try> to toggle between a preview grade and the active Storyboard/Stillstore frame.
<Use>	copies the selected Storyboard/Stillstore frame’s current process parameters (for example, colour). Hold down <Ctrl> to apply all process parameters (for example, **colour**, **dve**, **text**), regardless of the current process.
<Del>	deletes the current tile.
<Ins>	inserts a new tile before the current position.
<Repl>	replaces the current tile with the current process settings.
<Add>	saves the current process settings into a new tile (i.e. next available).
<Goto>	navigates to the timeline segment number. In Storyboard mode, this also moves the timeline to the highlighted segment number.
<- ->	offsets Storyboard one segment to the left along the timeline.
<++>	offsets Storyboard one segment to the right along the timeline.
<Show>	displays the current Storyboard/Stillstore frame on the main output (for use with wipes). Hold down <Show> then press <Try> to toggle between a preview grade and the active Storyboard/Stillstore frame.

<↵>	(Enter): triggers action on Storyboard/Stillstore number.
<← ↑ ↓ → >	Storyboard/Stillstore tile navigation. In Stillstore mode, a tile can be selected either by navigating using the arrow keys, or by entering the tile number. For example: press <5><3> < ↵ > to make tile 53 active. press <5><3> <Try> to preview tile 53's settings on the current segment.

3.7.3 Transport Functions

The jog wheel and the associated keys are used to move along the timeline.

Jog Wheel?rotate clockwise to move forwards along the timeline edit, or anticlockwise to move backwards. The outer wheel shuttles; the inner wheel jogs.

<<; ■; >>	fast rewind; stop; fast forward.
◀; ▶	reverse play; play.
[<; >]	jump to start; jump to end.
<; >	step back one frame; step forward one frame.
|<; >|	first frame of previous clip segment; first frame of next clip segment.
<Ctrl> + |<; >|	step backwards through keyframes; step forwards through keyframes.

3.7.4 OLEDs and Rotary Knobs – MLT FX

These are used as follows (from left to right across the right side of the panel).

3.7.4.1 Storyboard, Stillstore, Group, LUT

MLT FX menu: any

Panel button: to use Storyboard: **storyboard** and **show storyboard**
to use Stillstore: **stillstore** and **show stillstore**
to display/set-up groups: **active group** and **group create**
to toggle output LUT: **luts on/off**

							
turn	adjust wipe level	adjust wipe angle	adjust storybd. reel	select group type/ select existing group	select group grade cascade and action	*(OLED only; live LUT complete name)*	select live output LUT
press	wipe off/on	toggle vertical or horizontal wipe	open storybd. reel	create new group	apply group grade		
<Ctrl> + press	**<Ctrl> + turn**: scale story reel **<Shift> + turn**: scale story tile	**<Ctrl> + turn**: scale stillst. reel **<Shift> + turn**: scale stillst. tile		rename group			
hold down	reset to vertical wipe	reset to horiz. wipe	delete current reel (except 'Main')	delete current group			refresh LUT list

							
OLED only	*ref/wipe frame; OLED outlined white if wipe on*	*current timeline frame*	*storybd. lock off/on (**lock** button)*	*current group complete name*			

The lock button is not available in the MLT FX Stillstore (was previously used in the Effects Stillstore to toggle the clip on the main output).

3.7.5 Storyboard

To use the Storyboard, press the **storyboard** button (for panel functions) and the **show storyboard** button (for GUI display). See “Storyboard” on page 49.

3.7.5.1 Lock with Timeline

If required, press the **lock** button to synchronise the ‘Main’ storyboard reel (it is not possible to lock a different reel) with the timeline, so that during navigation they move together. Lock status is indicated in the OLED above the button. With **lock on**, an offset can be set between clips so that a process can be applied at regular intervals.

3.7.5.2 Offset the Lock

To offset the lock:

1. Navigate to the required starting segment, using the <← ↑ ↓ → > keys.
2. Press the **lock** button to **on**.
3. Use the <++> and <- -> keys to set the offset; each keypress moves the offset up or down by one segment.

The offset number displays in the bottom-right corner of the ‘**lock**’ OLED and is indicated in the GUI by the magenta cursor.

3.7.5.3 GUI Cursors

The Neo panel provides two types of cursor that display in the GUI. The green corner cursor on the top-left and bottom-right of a tile indicates the current timeline position and has focus when **lock** is **off**. In this mode, the Storyboard does not scroll if a timeline segment near the end of the sequence is selected: to do this, press <Goto> on the number pad (without entering a number).

The magenta corner cursor on the bottom-left and top-right of a tile indicates the timeline lock position and has focus when **lock** is **on**.

3.7.5.4 Edit a Storyboard

To add a clip segment using the panel:

1. Press the **storyboard** button.
2. To position the clip within the Storyboard, navigate to the required tile using the < ← ↑ ↓ → > keys.
3. Press one of the following keys:

<Repl>	replaces the existing clip in the tile at the selected position.
<Add>	adds the new clip in a tile at the end of the Storyboard reel.
<Ins>	inserts the new clip in a tile before the current position.

To remove a clip segment using the panel:

1. Navigate to the unwanted clip using the <←↑ ↓ → > keys.
2. Press <Del>.

3.7.5.5 Preview and Use a Grade

When a Storyboard frame is selected using either the number pad, the <← ↑ ↓ → > keys or the jog wheel, the following are available:

<Try>	previews the selected frame's current process parameters (for example, colour). This can be used in conjunction with <Show>.
<Use>	copies the selected frame's current process parameters (for example, colour). Hold down <Ctrl> to apply all process parameters (for example, colour, dve, text), regardless of the current process.
<Show>	displays the current frame on the main output (for use with wipes). Hold down <Show> then press <Try> to toggle between a preview grade and the active Stillstore/Storyboard frame.

A Stillstore or Storyboard tile containing a Stereo 3D clip only displays the left eye, but both left and right eye processes are stored and subsequently applied.

See the Stereo 3D User Guide for more details.

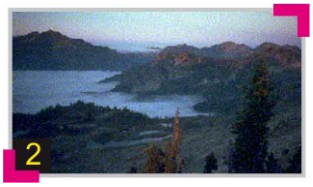
If the active wipe is 2% or less (i.e. minimal) and process parameters are changed, the <Show> key turns off and the white OLED outline is removed. <Show> can be assigned to the optional foot pedal with the <Ctrl>+<Shift>+<s> modifier.

3.7.6 Stillstore

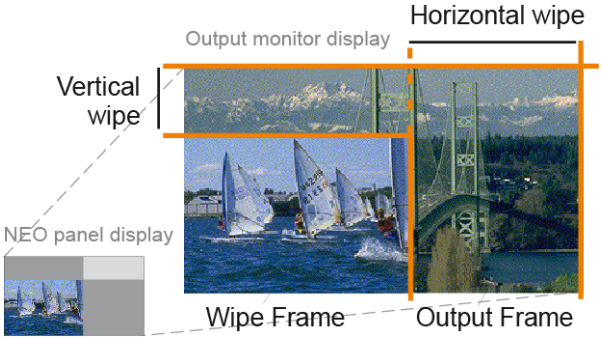
To use the Stillstore, press the **stillstore** button (for panel functions) and the **show stillstore** button (for GUI display). See “Stillstore” on page 52.

3.7.6.1 GUI Cursor

lock must be **off** when using the Stillstore in MLT FX. The magenta corner cursor on the bottom-left and top-right of a tile indicates the wipe frame (i.e. the current Stillstore frame). This can be previewed directly with the current timeline clip then the wipe frame's process parameters applied using the panel functions. Use the <← ↑ ↓ → > keys to navigate through the Stillstore.



Use the wipe rotary knobs to control the amount and angle of wipe.



3.7.6.2 Store a New Still

To store a frame and its process parameters in the Stillstore:

1. Press the **stillstore** button.
2. To position the clip within the Stillstore, navigate to the required tile using the <← ↑ ↓ → > keys.
3. Press one of the following keys:

<Repl>	replaces the contents of the selected Stillstore tile with the new frame and process parameters.
<Add>	adds a new tile at the end of the Stillstore then stores the current frame and process parameters in it.
<Ins>	inserts a new Stillstore tile before the current position then stores the current frame and process parameters in it.

3.7.6.3 Preview and Use a Wipe

Use these functions to preview/apply the wipe frame parameters:

<Try>	previews the wipe's current process parameters (for example, colour) on the output image. This can be used in conjunction with <Show>.
<Use>	copies the wipe's current process parameters (for example, colour) to the output image. Hold down <Ctrl> to apply all process parameters (for example, colour, dve, text), regardless of the current process.
<Show>	displays the wipe on the main output. Hold down <Show> then press <Try> to toggle between a preview grade and the active Stillstore/Storyboard frame. The wipe has focus, so bypassing/resetting the wipe recalls the wipe on the output display. To move focus to the current timeline clip, press <Show> again.

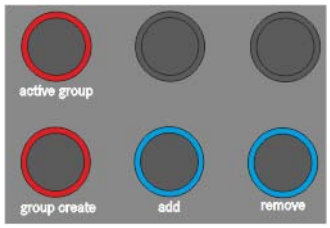
A Stillstore or Storyboard tile containing a Stereo 3D clip only displays the left eye, but both left and right eye processes are stored and subsequently applied.

See the Stereo 3D User Guide for more details.

If the active wipe is 2% or less (i.e. minimal) and process parameters are changed, the <Show> key turns off and the white OLED outline is removed. <Show> can be assigned to the optional foot pedal with the <Ctrl>+<Shift>+<s> modifier.

3.7.7 Create and Modify a Group

The panel provides timeline clip ‘group’ rotary knobs and buttons that allow groups of clip segments to be created and then colour changes applied to any group.



These functions display on the panel in Storyboard/Stillstore mode when the **active group** or **group create** buttons are pressed, or by ticking the **group** box in the GUI.

3.7.7.1 Create a New Clip Group

To create a group using the panel:

1. Press the **group create** button. The fourth rotary knob from the left now displays the following, allowing the group type to be set:

originator	includes all clip segments with the same originator as the selected segment.
source tc	includes all clip segments that share the source timecode of the selected segment.
selected	allows segments to be manually selected.
rush	includes all clip segments from the same source rush.
highlight	this option only displays if the **Highlight changes** box has been ticked in the <F1> Configuration Window: it includes all the clips of the current ‘highlight’ colour.

2. Turn this rotary knob to the required selection for example, **rush**, then press it to create the new group, indicated on the timeline by cyan highlights on group clips (if **selected** is active, select clips manually).
3. Rename the group if required by holding down <Ctrl> plus the list rotary knob. Use the soft-keyboard to enter a name.
4. Add or remove clips to the group via the **add**/**remove** buttons as follows:

   Press **add** or **remove** once to add/remove the selected clip segment.

   Hold down **add** or **remove** to enable multiple selection, then select clip segments by using the transport functions and pressing ↵ (Enter) to add/remove each segment.

   Alternatively, use the keyboard to enable multiple selection. Hold down <Shift> to select segments next to each other, or <Ctrl> to select segments anywhere on the timeline. Then press **add** or **remove** to add/remove all these segments to the group.

3.7.7.2 Modify a Group

To modify an existing group using the panel:

1. Press the **active group** button. The fourth rotary knob from the left now displays a list of existing groups highlighted cyan, for example, all (default status), **Group 1**, **Group 2** etc., unless renamed.
2. Turn this rotary knob to the required group, then do one of the following:

modify group clips	use the **add** and/or **remove** buttons as described previously.
rename group	hold down <Ctrl> with the list rotary knob. Use the soft keyboard to enter a name.
delete group	press the list rotary knob. The selected group is now deleted.

3.7.7.3 Apply a Group Grade

The following transfer/target options only display on the panel if a group segment has colour process parameters. Select an option to specify the application method used for the colour changes on a clip group:

1. Press the **active group** button, then turn the list rotary knob to the required group (or create a group first as described previously).
2. On the timeline, select a group segment and perform the grade.
3. Select which target cascades are affected by turning the rotary knob on the right of the list to the required option: ‘base’ options affect the base cascade; ‘top’ options affect the top cascade; ‘all’ options affect all cascades. Choose how the grade is applied using various ‘replace’, ‘add’, ‘insert’ or ‘trim’ options.

   Possible combinations are:

   Replace all; top replace; base replace; replace by name; replace all minus base; replace pre-process
   applies the grade from the current clip (i.e. all cascades, HSL, shapes etc.) to the other segments in the group in the following ways: to all cascades (with/without base); the top or base cascade only; the cascade which matches the source name; or applies only the pre-process LUT.

   Top add; base add
   applies the grade from the current cascade only and adds it as a top cascade or under the base cascade on all the other segments in the group.

   Insert
   inserts the graded current cascade at the same cascade level to all clips in the group (this must be at least above the base level).

   Top trim; base trim; trim by name
   applies only the change in colour process values to all the segments in the group. ‘Top’ or ‘base’ trims the top or base cascade of the destination segment; ‘by name’ trims the cascade on the destination segment which has the same name as the source cascade.
   Trim options are available only when the source segment has colour process parameters for primary, defocus, lights or ranges functions. If the destination segment has keyframes, only the change in values in the source segment at the current position is applied to these destination keyframes. Source keyframes are not copied.

4. Press the rotary knob to apply the selected group grade.

3.7.8 Preview and Apply LUTs

3.7.8.1 Apply a Pre-process LUT

In **preprocess panel** mode, turn the ‘list’ rotary knob on the left side of the panel to preview each LUT effect on the current clip in the GUI Edit Window, then when the clip is rendered the selection is ‘burnt in’. See “Apply Eye Processes” on page 99.

3.7.8.2 Select an Output LUT

On the right of the panel, press the **luts on/off** button to toggle the current live LUT on or off (this corresponds to the GUI **lut** tick box). This is output to the monitor or tape and does not physically affect the system held media, or the GUI Edit Window image.

Turn the top-right rotary knob to select an output LUT from the list in the OLED. Hold down the knob to refresh the list and include new LUTs.

Longer names display in the OLED with ‘~’ in between the first and last characters; the OLED on the left of the list displays the complete name of the selection.

When creating a cube to be used for FilmLook or I/O — Export, avoid confusion by disabling FilmLook on output. Do this by deselecting lut on the Application Bar (this toggles the live LUT). See “Apply Colour Cubes” on page 8.

See Utilities User Guide for details of the FilmLook System.

