Phoenix
2014
Phoenix User Manual 2014
© 2014 Digital Vision

This publication, or parts thereof, may not be reproduced in any form, by any method, for any purpose.

The software described in this document is furnished under a license agreement. This license is available in the docs/licenses folder once the software is installed. See the appendix for license and legal notification.

DIGITAL VISION MAKES NO WARRANTY, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTIES, OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, REGARDING THESE MATERIALS AND MAKES SUCH MATERIALS AVAILABLE SOLELY ON AN “AS-IS” BASIS. IN NO EVENT SHALL DIGITAL VISION BE LIABLE TO ANYONE FOR SPECIAL, COLLATERAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES IN CONNECTION WITH OR ARISING OUT OF PURCHASE OR USE OF THESE MATERIALS. THE SOLE AND EXCLUSIVE LIABILITY TO DIGITAL VISION, REGARDLESS OF THE FORM OF ACTION, SHALL NOT EXCEED THE PURCHASE PRICE OF THE MATERIALS DESCRIBED HEREIN.

DIGITAL VISION reserves the right to revise and improve its products as it sees fit. This publication describes the state of this product at the time of its publication, and may not reflect the product at all times in the future.

The following are trademarks of DIGITAL VISION:

Nucoda, Nucoda Look, Phoenix Finish, Phoenix Refine, Phoenix Video, Phoenix Touch, Loki, Loki Control, DVO, Clarity, Twister and Valhall.

All other brand names, product names, or trademarks belong to their respective holders.


Title : Phoenix User Manual 2014
Document Revision : UM-2014.1-07
Software Revision : 2014.1
Date : 13/05/2014
# Table of Contents

Welcome .................................................................................................................. 8

Overview .................................................................................................................. 11
  Documentation ........................................................................................................ 11
  New in This Release ............................................................................................... 12
  Product Support ...................................................................................................... 13
  Contacts .................................................................................................................. 13

The User Interface .................................................................................................... 16
  Interface Conventions ............................................................................................ 16
  Main Screens ......................................................................................................... 18
    Project Screen ....................................................................................................... 18
    Project Desktop .................................................................................................... 19
    Project Library ..................................................................................................... 20
  File Browser .......................................................................................................... 20
    Network and Drives ............................................................................................. 21
    Folder Navigation ................................................................................................. 23
    Folder Bookmarks ............................................................................................... 26
    Folder Management .............................................................................................. 28
    File Type Filter .................................................................................................... 28
  Tables ...................................................................................................................... 29

Projects ..................................................................................................................... 33
  Project List ............................................................................................................ 33
  Creating Projects .................................................................................................... 34
    Output Formats ...................................................................................................... 35
    Output Format Attributes .................................................................................... 38
    Project Sources and Proxies ............................................................................... 42
    Project Colour Scaling ......................................................................................... 44
  Attach/Detach Project ............................................................................................ 44
  Opening Projects .................................................................................................... 45
  Delete Project .......................................................................................................... 47
  Recovering a Project ............................................................................................... 47
  Location and Configuration ................................................................................... 49

The Project Library ................................................................................................... 51
  Folders ..................................................................................................................... 51
  Library Contents ..................................................................................................... 53
  Properties and Metadata ......................................................................................... 55
  Library Filters ......................................................................................................... 59
  Cache Management ............................................................................................... 60
  Composition Save and Load ................................................................................... 62
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Importing Material</td>
<td>66</td>
</tr>
<tr>
<td>Importing Media</td>
<td>67</td>
</tr>
<tr>
<td>Import Options</td>
<td>68</td>
</tr>
<tr>
<td>Folder Import</td>
<td>70</td>
</tr>
<tr>
<td>Library Folders</td>
<td>71</td>
</tr>
<tr>
<td>Importing Audio</td>
<td>71</td>
</tr>
<tr>
<td>Importing List Files</td>
<td>72</td>
</tr>
<tr>
<td>List Capture</td>
<td>78</td>
</tr>
<tr>
<td>Capturing Media</td>
<td>80</td>
</tr>
<tr>
<td>Conforming the List</td>
<td>84</td>
</tr>
<tr>
<td>Compositions</td>
<td>86</td>
</tr>
<tr>
<td>Creating Compositions</td>
<td>86</td>
</tr>
<tr>
<td>Composition Elements</td>
<td>88</td>
</tr>
<tr>
<td>Video and Audio Tracks</td>
<td>88</td>
</tr>
<tr>
<td>Media Segments</td>
<td>91</td>
</tr>
<tr>
<td>Audio Segments</td>
<td>92</td>
</tr>
<tr>
<td>Positions and Lengths</td>
<td>96</td>
</tr>
<tr>
<td>Play Heads</td>
<td>97</td>
</tr>
<tr>
<td>Timeline Marks</td>
<td>97</td>
</tr>
<tr>
<td>Bookmarks</td>
<td>98</td>
</tr>
<tr>
<td>Adjustment Segments</td>
<td>101</td>
</tr>
<tr>
<td>Segment Status Colours</td>
<td>102</td>
</tr>
<tr>
<td>BL and AUX Segments</td>
<td>104</td>
</tr>
<tr>
<td>Grouped Shots</td>
<td>105</td>
</tr>
<tr>
<td>Manipulating Compositions</td>
<td>105</td>
</tr>
<tr>
<td>Adding Media</td>
<td>106</td>
</tr>
<tr>
<td>Editing and Selection</td>
<td>108</td>
</tr>
<tr>
<td>Marking Regions</td>
<td>111</td>
</tr>
<tr>
<td>Deleting Media</td>
<td>112</td>
</tr>
<tr>
<td>Ripple Mode</td>
<td>113</td>
</tr>
<tr>
<td>Trim Modes</td>
<td>114</td>
</tr>
<tr>
<td>Cuts</td>
<td>118</td>
</tr>
<tr>
<td>Shots View</td>
<td>120</td>
</tr>
<tr>
<td>Handy Hotkeys</td>
<td>123</td>
</tr>
<tr>
<td>Versions</td>
<td>127</td>
</tr>
<tr>
<td>Adding Versions</td>
<td>128</td>
</tr>
<tr>
<td>Managing Versions</td>
<td>129</td>
</tr>
<tr>
<td>Rendering</td>
<td>133</td>
</tr>
<tr>
<td>Automatic Render Controls</td>
<td>134</td>
</tr>
<tr>
<td>Manual Render Controls</td>
<td>136</td>
</tr>
<tr>
<td>Task Queue</td>
<td>136</td>
</tr>
<tr>
<td>Exporting</td>
<td>139</td>
</tr>
<tr>
<td>Export Media</td>
<td>139</td>
</tr>
<tr>
<td>The Export Browser</td>
<td>140</td>
</tr>
<tr>
<td>File Format and Options</td>
<td>141</td>
</tr>
<tr>
<td>Filename and Number</td>
<td>141</td>
</tr>
</tbody>
</table>
# Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effects</td>
<td></td>
</tr>
<tr>
<td>Global Options</td>
<td>143</td>
</tr>
<tr>
<td>Export Modes</td>
<td>145</td>
</tr>
<tr>
<td>Mxdowm Rec TC</td>
<td>145</td>
</tr>
<tr>
<td>Visible Multi Rec TC</td>
<td>145</td>
</tr>
<tr>
<td>Tracks Multi Rec TC</td>
<td>145</td>
</tr>
<tr>
<td>Visible Multi Src TC</td>
<td>145</td>
</tr>
<tr>
<td>Tracks Multi Src TC</td>
<td>145</td>
</tr>
<tr>
<td>Folder Hierarchy, Presets and Variables</td>
<td>152</td>
</tr>
<tr>
<td>Export File Formats</td>
<td>155</td>
</tr>
<tr>
<td>Export Composition</td>
<td>155</td>
</tr>
<tr>
<td>Scene Detection</td>
<td>160</td>
</tr>
<tr>
<td>Viewer Tools</td>
<td>163</td>
</tr>
<tr>
<td>Head-up Display (HUD)</td>
<td>164</td>
</tr>
<tr>
<td>Grids</td>
<td>166</td>
</tr>
<tr>
<td>Masks</td>
<td>168</td>
</tr>
<tr>
<td>Graphs</td>
<td>170</td>
</tr>
<tr>
<td>Histogram</td>
<td>172</td>
</tr>
<tr>
<td>Audio Waveform</td>
<td>175</td>
</tr>
<tr>
<td>Handy Hotkeys</td>
<td>176</td>
</tr>
<tr>
<td>Comparison Mode</td>
<td>179</td>
</tr>
<tr>
<td>Stereo Multitrack</td>
<td>184</td>
</tr>
<tr>
<td>Setting Up Stereo</td>
<td>184</td>
</tr>
<tr>
<td>Using Stereo</td>
<td>185</td>
</tr>
<tr>
<td>Colour Management</td>
<td>190</td>
</tr>
<tr>
<td>Effects</td>
<td>192</td>
</tr>
<tr>
<td>Colour Correction Layers</td>
<td>193</td>
</tr>
<tr>
<td>Managing Layers and Effects</td>
<td>196</td>
</tr>
<tr>
<td>Applying and Editing Effects</td>
<td>198</td>
</tr>
<tr>
<td>Split Panel View</td>
<td>200</td>
</tr>
<tr>
<td>Adding User and Layer Effects</td>
<td>201</td>
</tr>
<tr>
<td>Transition Effects</td>
<td>205</td>
</tr>
<tr>
<td>Retime</td>
<td>208</td>
</tr>
<tr>
<td>Brightness Regions</td>
<td>210</td>
</tr>
<tr>
<td>Printer Lights</td>
<td>211</td>
</tr>
<tr>
<td>Gamma Matrix</td>
<td>212</td>
</tr>
<tr>
<td>Gamma Matrix</td>
<td>212</td>
</tr>
<tr>
<td>Matrix</td>
<td>214</td>
</tr>
<tr>
<td>Presets</td>
<td>216</td>
</tr>
<tr>
<td>Preset Definition</td>
<td>216</td>
</tr>
<tr>
<td>Preset Layout</td>
<td>216</td>
</tr>
<tr>
<td>Hue Curves</td>
<td>220</td>
</tr>
<tr>
<td>Soft Clip</td>
<td>222</td>
</tr>
</tbody>
</table>
Effect Notes .............................................................. 223
Lens Distort ............................................................ 225
Warper ................................................................. 229
  Warper Introduction ........................................... 229
  Warper Basics .................................................... 230
DVO Effects .......................................................... 236
  Introduction ......................................................... 236
  DVO Stereo Fix .................................................. 240
  DVO Dust ........................................................... 249
  DVO Fix ............................................................. 266
  DVO Flicker ........................................................ 270
  DVO Print Align .................................................. 273
  DVO Scratch ....................................................... 275
  DVO Steady ........................................................ 279
  DVO Alias .......................................................... 288
  DVO Aperture ...................................................... 289
  DVO Brickwall ..................................................... 290
  DVO Clarity ........................................................ 292
  DVO Grain .......................................................... 296
  DVO Regrain ........................................................ 311
  DVO Sharpen ....................................................... 314
  DVO Cross Colour ............................................... 317
  DVO Line Sync .................................................... 318
  DVO Deinterlace ................................................... 320
  DVO Twister ........................................................ 322
  DVO Upscale ........................................................ 325
Shapes ................................................................. 332
  Available Shapes .................................................. 332
  Transforming Shapes .............................................. 333
  Manipulating Shapes ............................................. 335
  Shape Softness .................................................... 337
  Shape Overlay Colour .......................................... 339
  Tracking Shapes .................................................. 340
DVO Tracker .......................................................... 342
  Tracking Basics .................................................... 342
  Using Other Tracks ............................................... 345
  Offset Tracking ..................................................... 346
  Predictive Tracking ............................................... 347
  Reference ............................................................ 348
## Contents

**Appendices**

- Application Preferences .................................................. 435
  - General ........................................................................... 436
  - Capture/Conform ......................................................... 439
  - Rendering ....................................................................... 444
  - Memories ......................................................................... 447

**Video I/O** ........................................................................... 356
- VTR Settings ........................................................................ 357
- Video Capture ....................................................................... 362
  - Capture Live ..................................................................... 364
  - Capture Marked .............................................................. 365
  - Capture List ....................................................................... 366
- Video Layoff .......................................................................... 371
  - Output Controls .............................................................. 374
  - Output List ........................................................................ 378
  - Output Single ..................................................................... 379

**Command Line** .................................................................. 381
- User Login ........................................................................... 383
- Creating a Project ............................................................... 383
  - Project Format Specification ............................................ 384
- Attach and Detach Project .................................................. 389
- Creating a Composition ..................................................... 390
- Importing Clips ..................................................................... 391
- Importing Movies ............................................................... 393
- Importing Folders ............................................................... 394
- Adding a Version .................................................................. 397
- Replacing a Source ............................................................. 398
- Splice and Overwrite Clips .................................................. 399
- Applying a Note to a Shot ................................................... 404
- EDL Import and Conform .................................................... 405
- Capturing and Conforming .................................................. 412
- Generating Local Proxies .................................................... 416
- Exporting Shots .................................................................... 418
- Exporting an EDL ............................................................... 421
- Saving and Loading Compositions ...................................... 422
- Rendering a Composition Cache ........................................ 423
- Running Batch Operations .................................................. 424
- Interactive Mode ................................................................... 426
- Listing Information ............................................................. 426
- Removing Items .................................................................... 428
- Counting and Adding Tracks ............................................... 430
- Testing for a GUI Lock ........................................................ 431

**UM-2014.1-07**
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control Panel</td>
<td>448</td>
</tr>
<tr>
<td>Colour</td>
<td>453</td>
</tr>
<tr>
<td>Monitoring / Video IO</td>
<td>457</td>
</tr>
<tr>
<td>Preferences Assistant</td>
<td>464</td>
</tr>
<tr>
<td>Keycode</td>
<td>469</td>
</tr>
<tr>
<td>Automatic Naming</td>
<td>470</td>
</tr>
<tr>
<td>Effect Identifiers</td>
<td>474</td>
</tr>
<tr>
<td>Effect Selector Configuration</td>
<td>476</td>
</tr>
<tr>
<td>Output Format Configuration</td>
<td>480</td>
</tr>
<tr>
<td>Colour Tool Order</td>
<td>485</td>
</tr>
<tr>
<td>3D LUT File Format</td>
<td>487</td>
</tr>
<tr>
<td>Icon Tools Reference</td>
<td>492</td>
</tr>
<tr>
<td>Format Support</td>
<td></td>
</tr>
<tr>
<td>Image Formats</td>
<td></td>
</tr>
<tr>
<td>DPX</td>
<td>494</td>
</tr>
<tr>
<td>Cineon</td>
<td>494</td>
</tr>
<tr>
<td>TIFF</td>
<td>494</td>
</tr>
<tr>
<td>SGI</td>
<td>494</td>
</tr>
<tr>
<td>JPEG</td>
<td>494</td>
</tr>
<tr>
<td>PIC</td>
<td>494</td>
</tr>
<tr>
<td>MPEG</td>
<td>494</td>
</tr>
<tr>
<td>MXF</td>
<td>494</td>
</tr>
<tr>
<td>EXR</td>
<td>494</td>
</tr>
<tr>
<td>Quicktime</td>
<td>494</td>
</tr>
<tr>
<td>List Formats</td>
<td></td>
</tr>
<tr>
<td>EDL</td>
<td>499</td>
</tr>
<tr>
<td>AAF</td>
<td>499</td>
</tr>
<tr>
<td>CUT</td>
<td>499</td>
</tr>
<tr>
<td>ALE</td>
<td>499</td>
</tr>
<tr>
<td>MXF Formats</td>
<td></td>
</tr>
<tr>
<td>Camera Formats</td>
<td></td>
</tr>
<tr>
<td>Red</td>
<td>506</td>
</tr>
<tr>
<td>ARRI D-21</td>
<td>506</td>
</tr>
<tr>
<td>Silicon Imaging SI-2K</td>
<td>506</td>
</tr>
<tr>
<td>Vision Research Phantom</td>
<td>506</td>
</tr>
<tr>
<td>Audio Formats</td>
<td></td>
</tr>
<tr>
<td>WAV Audio</td>
<td>514</td>
</tr>
<tr>
<td>Audio Interchange Format</td>
<td>514</td>
</tr>
<tr>
<td>OFX Plugins</td>
<td>516</td>
</tr>
<tr>
<td>Configurable Viewer Tools</td>
<td></td>
</tr>
<tr>
<td>Grids Specification</td>
<td>517</td>
</tr>
<tr>
<td>HUDs Specification</td>
<td>519</td>
</tr>
<tr>
<td>Masks Specification</td>
<td>528</td>
</tr>
<tr>
<td>Graphs Specification</td>
<td>528</td>
</tr>
<tr>
<td>Legal Notices</td>
<td>531</td>
</tr>
<tr>
<td>Index</td>
<td>0</td>
</tr>
</tbody>
</table>

© 2014 Digital Vision
Welcome
Welcome to the Phoenix Restoration Environment from Digital Vision!

The Phoenix platform is the perfect solution for film/video archives and content owners who require the best in content restoration, re-mastering and re-purposing. This manual will help you get the most out of the system.

<table>
<thead>
<tr>
<th>Product</th>
<th>Phoenix</th>
</tr>
</thead>
<tbody>
<tr>
<td>Version</td>
<td>2014</td>
</tr>
<tr>
<td>Document Revision</td>
<td>UM-2014.1-07</td>
</tr>
<tr>
<td>Date</td>
<td>13/05/2014</td>
</tr>
</tbody>
</table>
Overview
Welcome to the Phoenix Restoration Environment from Digital Vision.

The Documentation section lists the documentation included with the application and where to locate it.

First Time Users

The User Interface chapter gives an overview of the application environment and GUI, but those who want to jump straight into creating projects may want to skip ahead to the Projects chapter and return to the User Interface section at a later date, after having acquired a feel for the product.

Documentation

Several items of documentation are included, all of which can be accessed via the "Phoenix Docs 2014.1" shortcut that is placed on your desktop by the installation program. You can also access the index page directly from:

C:\Phoenix\2014_1\docs\index.html

Install and Setup Manual

The Setup Manual describes how to install and configure the application. It also details installation and configuration of graphics and video hardware and important considerations for use of the software.

User Manual

This is the user guide that you are currently reading.

Release Notes

The release notes list all the new features, bug fixes and known bugs.
Precision Control Panel Documentation

The Precision Panel documentation includes an User Guide and a Hardware Installation Guide.

Valhall Control Panel Documentation

The Valhall Panel documentation includes an installation guide (giving information on the Valhall environment variables and setup), a user guide, and a quick reference labelled diagram of all the Valhall panel controls.

Hotkeys Reference Guide

The Phoenix hotkeys guide is a labelled keyboard diagram and summary page of all the Hotkeys available in the application. A shortcut to this PDF document is also placed on your desktop by the installation program.

Note that the application itself includes tool-tip labels on buttons and user-interface elements. These will pop up when you hover your mouse over a button and display some explanatory text.

New in This Release

Please see the Features and Benefits document for a description on new features.
Product Support

Product Support is available to all clients with a valid maintenance contract. To contact support, see the Contacts section.

User Forum

Digital Vision runs a web-based user forum at the following address:

http://forum.digitalvision.se

Please consider joining the forum and taking part in wide-ranging discussions with our growing community of users.

Contacts

Stockholm

Digital Vision
Telefonv. 30
126 26 Hägersten
Sweden

t: +46 (0)8 546 182 00
f: +46 (0)8 546 182 09

Linköping

Digital Vision
Ågatan 40
582 22 Linköping
Sweden

t: +46 (0)13 200 100
f: +46 (0)13 200 150

London

Digital Vision
11 Wardour Mews
London W1F 8AN
United Kingdom

t: +44 (0)207 734 8282
f: +44 (0)207 292 6969

Los Angeles

DV Sales and Support
6464 Sunset Blvd
Suite 830
Hollywood
CA 90028
USA

t: +1 818 769 8111
f: +1 818 769 1888

Email Contacts

- support@digitalvision.se
- sales@digitalvision.se
The User Interface
This chapter will give you an overview of the user interface and some basic components of the application.

**Interface Conventions**

The following interface conventions are used for various elements.

**Functional**

A function button performs a single action only.

![Active and available function button.](image)

![Inactive function button.](image)

If a button is not available for selection, it is greyed out.

**Secondary Windows**

The two dots preceding the button name indicate that a new window or dialog will open when pressed.

**Drop-down Menus**

The three vertical dots preceding the button name indicate that this button is a drop-down selection list.

**Numeric Sliders / Data Entry**

Click, hold and drag the mouse left and right in the data field to increment and decrement the data value. You can also click the mouse once in the data field to select, then type in a data value.
Toggle Buttons

Toggle button off.  

Toggle button on.

A group of three toggle buttons, with one enabled.

Radio Buttons

A group of two radio buttons. In a group, only one option can be selected at one time.

Option Buttons

Option button off.  

Option button on.

Information Dialogs

Informational

Informational messages, no user interaction required.

Query

Request for user input.

Warning/Error

Warning or error alert. Sometimes including a request for user intervention.
Main Screens

The application environment is composed of a number of components within which you do the majority of your work. These include the main Project Screen, the Project Desktop and the Project Library.

Project Screen

The Project Screen is the first screen visible when we launch the application. This is where we create and manage our projects and access our global preferences.

See the Creating a Project and Project Management sections of this manual.

The active component screen will be high-lighted orange.

To access the component, press the corresponding button on the main screen:

For the Preferences component, see the appendix Application Preferences.
Project Desktop

The Project Desktop is the main working environment inside your project.

The Project Desktop showing the viewer area and the composition timeline below.

The desktop is composed of three main views:

- The Monitor - in dual monitor mode, this will be displayed on your second monitor
- The Composition Timeline and GUI controls
- The Memories view - for notes, memories and grouped shots

In single-screen mode, the Monitor panel can display the Monitor, the Library or the Memories panel.

Project Desktop showing Memories view
Project Library

The Project Library is where we import and export media, create compositions and manage our project assets.

See the Project Library section of this manual.

File Browser

A sophisticated file browser is used throughout the application. It is used to navigate both local and remote filesystems. You will use the file browser component in many places, including:

- Import and export of media, list files and LUT files.
- Attaching and detaching projects.
- Capturing material from lists.

This section describes the file browser and its various components.
File Browser (Import Media version) showing main functional areas

1. Network and Drives
2. Navigation and Folder hierarchy
3. Folder Bookmarks
4. Folder Management
5. File Type Filter

**Network and Drives**

To the left of the main file browser panels are the panels that allow:

- *Network* folder and *local* folder browsing
- Local *drive* selection or
- Network share selection
Local Drives

When browsing *Local drives*, the available *drive letters* will be shown in the panel below:

![Local drives displaying available drive letters.](image)

You can double-click a drive letter to jump to the root of the drive.

Network

When browsing the *Network*, the panel will show other systems available on the local network:

![Network displays available network systems.](image)

The top-level folder list will display the available *Network Shares* on the selected system:
System Magners has a shared folder "S on Magners".

If the target system (Magners above) requires authentication, you will need to do this before starting the application.

Folder Navigation

Once we have selected a local drive or network share, we navigate the filesystem folders via the central panels.
Full Current Location

The file browser always shows you the **full current location** to your current folder in the box at the top:

![Full current location](image1)

Folder Navigation

The button to the right of the location display lets you quickly go up one folder level:

![Button to move up one folder level](image2)

You can navigate up and down both local and remote folders using the panels in the centre of the window. These panels have two modes of display - *Cascade Mode* (multi-pane) and *Single Mode* (single pane).

- These central panels display **folders only**, never files.

Cascade Mode

In *Cascade Mode*, the central area will show up to three panels. Each panel will display the *folders* that exist:

- In folder above us (left pane)
- In current folder (middle pane)
- In folder below us (right-hand pane)

- The *current* folder is always **highlighted in orange**. Click any folder to make it current.

Enable *Cascade Mode* via the button:
Cascade Mode showing three folders (above and below current)

In **Cascade Mode**, you can jump **backwards (up)** and **forwards (down)** in your location history using the arrow buttons below the panels:

Single Pane Mode

In **Single Pane Mode**, the central area shows a single pane and the folders inside (below) the current folder only.

Folder File Contents

The files within the current folder are displayed in the bottom pane.
Files that exist within the current folder are displayed in a tabular format (see the Tables section for a discussion of table use).

The files displayed can be filtered by file type.

Contiguous file sequences (i.e. no gaps) are compressed to display only the start and end frames i.e.

```
export097738.dpx, export097739.dpx, ..., export097812.dpx
```

is displayed as:

```
export[97738-97812].dpx
```

Use **CTRL+R** to **refresh** the file browser.

Folder Bookmarks

*Folder Bookmarks* let you store a folder location and **jump** to it via a drop-down list.

**Using Bookmarks**

To jump to a previously bookmarked folder, select the bookmark from the bookmarks drop-down list:

![Folder Bookmarks Image]
**Adding Bookmarks**

To add a bookmark for the current folder, or manage bookmarks, press the *Bookmarks* button. A dialog window will open. To add a bookmark for the current folder, press the *Add* button:

![Bookmark dialog](image)

The bookmark will be added to the list and available for use:

![New bookmark in the list](image)

**Delete and rename Bookmarks**

To delete or rename a bookmark, select and jump to it and use the appropriate button:

![Delete and Rename buttons](image)
Folder Management

At the top-right, the file browser displays the name of the current folder.

To the right of the current folder name are the two buttons:

- Rename Current folder
- Create New folder

Rename Current Folder

Type a new name for the folder and press the Rename Folder button.

Create New Folder

Type a new name for the folder and press the Create New Folder button.

* The new folder is created within the current folder.

File Type Filter

The File Type Filter drop-down list lets you limit the display of files in the current folder to the specified file type only.
Use the drop-down list and select the desired filter:

- All files
- aaf
- ari
- cin
- cine

**Tables**

Many areas of the application display information in a *tabular format*, including the library, video I/O screens, capture lists, project list and file browser.

![Tabular display of assets in library](image)

Tables behave in a similar manner throughout the application.

**Selection**

Select items by *left-clicking* with the mouse. Selected items are shown in *orange*.
**Multiple Selection**

To select multiple items:

- **SHIFT + select** to select a *continuous* range
- **CTRL + select** to select *non-continuous* items (as shown in image above)

**Deselection**

To deselect an item, select it with **CTRL + select** again.

**Column Order**

To re-order the columns, click and drag a column title:

![Repositioning a column.]

**Column Sort**

To sort the table display on a column, **click** the column title. Clicking again, reverses the sorting:

![Ordering on Material Name (title changes to italic).]

*Column titles change to *italics* when sorted on the column.*

**Remove Sort**

To remove the sorting, click on another column (or in the library, click on the the *Thumbnail* column title).
Show and Hide Columns

You can show (insert) or hide (remove) a column by using your mouse and a right-click:

**Remove Column**

Right-click the mouse over the column you want to remove and choose Remove Column:

<table>
<thead>
<tr>
<th>Clip Name</th>
<th>Material Name</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Insert Column**

Right-click the mouse in the contents title area where you want to insert the new column and choose the column you want to insert:

<table>
<thead>
<tr>
<th>Clip Name</th>
<th>Insert In</th>
<th>Insert Out</th>
<th>Insert Duration</th>
<th>Insert Components</th>
<th>Insert Colour</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Column Sizing**

You can adjust the width of columns by clicking and dragging the column boundary with your mouse:

Click and drag to stretch Material Name column width out.

<table>
<thead>
<tr>
<th>Material Name</th>
<th>Tape Name</th>
<th>In</th>
</tr>
</thead>
<tbody>
<tr>
<td>A000_C005_062</td>
<td>A000_C005_0622H3</td>
<td>22:31:31:13</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Material Name</th>
<th>Tape Name</th>
<th>In</th>
</tr>
</thead>
<tbody>
<tr>
<td>A000_C005_062H3</td>
<td>A000_C005_0622H3</td>
<td>22:</td>
</tr>
</tbody>
</table>
Projects are used to store and organise your work. This includes the project library containing all your compositions and source material, all your edits and grades specific to each composition, definitions of all the project output formats and all other project state (such as play heads, cached renders, window positions, undo stack etc.).

The Project Screen is the first screen displayed when you launch the application. This is where you create and manage your projects.

Below the project list is an area that displays configuration settings for the currently selected project. To the right of these settings in a group of buttons that let us create, open and perform various other actions with projects.

Whenever you select a project from the project list, the project settings panel will refresh to show you the current settings for the selected project.

### Project List

The top panel lists all available projects:
Projects

Project properties displayed are:

- Project Name
- Status (e.g. Offline, Available)
- Project Location
- Creation Date
- Modification Date

The Project List is displayed as a standard table. For more detail on tables and their use, see the Tables section.

Project Status

<table>
<thead>
<tr>
<th>Project Name</th>
<th>Status</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red Calibrations 001 (day 1)</td>
<td>Offline</td>
<td>C:\Digital Vision\20</td>
</tr>
</tbody>
</table>

The Status field can have two values:

- **Available**: the project is available for use and *exists* at the specified location
- **Missing**: the project folder cannot be located at the specified location

If a needed project is listed as Missing, you will need to locate the project folder or retrieve from backup. Then you can:

A. **Move** project folder back to original location or
B. **Detach** the missing project from the list and then **attach** it from its new location.

Creating Projects

Creating a project consists of defining:

- One or more output (target) formats. **Required**.
- One or more source definitions (e.g. proxies). **Optional**.

The project screen has 3 main panels. At the top, a list of all available projects, along the bottom the project configuration settings, and to the right the project options.
To create a **new project**:

- Type the name of the new project in the project name text field.
- Press the **New Project** button.

Usually, a new project will take its initial settings from the last project selected. To create a completely *fresh project* (with all settings as default), see below.

Now configure the project settings (e.g. output formats, sources, colour space etc.). Once done, press the **Apply Settings** button or just **Open Project**.

If project settings have been changed, **Open Project** will prompt you to apply them before opening.

**Creating a Fresh Project**

Currently, a new project is always created using settings defined from the currently selected project (except for the very first project created). To create a new **fresh project**, follow this procedure:

- Create a **dummy project** (e.g. called "delete me")
- Open this dummy project
- Exit project
- Delete the dummy project
- Exit application

On application restart, no project will be current and the default settings will be used for a **Untitled Project**.

**Output Formats**

In addition to naming your project, the project configuration settings panel along the bottom of the project screen allows you to specify your intended **output format(s)** and any additional **sources** you may want to create:
Defined project output formats are displayed on the left. The project *master* format is the first in the list. The settings for the selected output format is displayed to the right.

Each output format has **independent** settings.

The output formats defined determine the available display, playback, render and output formats for the project. You can modify the output formats defined for the project anytime.

**Master Output Format**

The master format is always shown at the top of the output format list and cannot be deleted.

It is recommended that the master format be defined to match the most common format of the *source material* you will be using inside the project.

Some common formats have been provided for use as quick defaults (e.g. PAL, HD 1080) and these are listed in the *Setup* drop-down menu. Selecting one of these formats will automatically update the frame rate, image size and aspect ratio attributes to the corresponding values for that format.

If you change any of these default values, the setup format will automatically change to being a Custom Setup.
Additional Output Formats

<table>
<thead>
<tr>
<th>Output Formats</th>
<th>2048x1536p (10) 2.350</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1920x1080i (10) 1.778</td>
</tr>
</tbody>
</table>

All additional output formats are listed below the master format and are completely independent of it. To create a new output format:

- Press the New button located below the Output Formats list box. A new format will be created.
- Then configure the output via the Setup drop-down list or edit the individual parameters.

To delete an output format, just select it from the output formats list and press the Delete button.

Editing the Output Formats

To modify an output format:

- Highlight it in the output formats list. The settings displayed on the right switch to the selected format.
- Alter any of the output format attributes.
- Press the Apply Settings button to apply any changes made.

⚠️ You will be warned if you try and move away from the main project screen if any settings have been changed.
Output Format Attributes

Each output format has a set of attributes defined, including:

- **Format Presets**
- **Frame Rate**
- **Colour Channels**
- **Colour Depth**
- **Render Resolution**
- **Viewing Aspect Ratio**
- **Render Options**
- **Conversion** and **Filter** settings
- **Colour Management System** (CMS)

When setting the attributes for your output formats you are defining the different ways that you wish to render material. It does not affect the source material that you will import, which has its own source format.

**Format Presets**

There are a variety of predefined formats available in the preset drop-down list. Selecting a preset will configure the other settings appropriately.

**Format Setup**

You can configure the format settings independently of the preset chosen.

**Frame Rate**

Use the frame rate drop-down list to select the frame rate for the composition timelines created in the project.

If you selected a default setup, it will automatically set its own frame rate, but you can change this. If you do change it, the default setup will change to Custom Setup.

You will be able to see the frame rate of each of your compositions and
media in the project library.

It is possible to create compositions with different frame rates within a single project. The Library/New Composition button always creates a timeline at the frame rate set on the currently selected output format. You can create a composition at a different frame rate by changing the rate of the output format (at the project screen), creating the New Composition, then reverting the output format rate again.

**Colour Channels**

**Default**: RGB

Use this drop-down to select the colour channels to use. This defines the components used in any cache generated. This is an advanced setting. In general, do not change this.

**Component Bit Depth**

**Default**: 10 bit

Use this drop-down to select the bits per component (colour accuracy) that you want the output format to render.

Component Bit Depth is an advanced setting and usually should be left at the default.

**Render Resolution**

The image width and height, in pixels, are set automatically when you choose one of the preset formats from the setup menu. If you want to define a different image size for your output format then simply enter the values into the appropriate text boxes; in doing so, the default format will automatically change itself to Custom Setup.

**Viewing Aspect Ratio**

The aspect ratio for viewing images is set automatically when you choose one of the default formats from the setup menu. If you want to define a different aspect ratio for your output format then simply enter the value into the appropriate text box; in doing so, the default format will automatically change itself to Custom Setup. You will be able to toggle the aspect ratio correction on/off when viewing images.

**Render Options**

**Cache Output**

**Default**: OFF

Enabling Cache Output will cause output caches to be generated (in the
output format) if the source format \textit{differs} from the output. If the source format \textit{matches} the output, an output cache is generated if any \textit{Master} layer effects are added. \textit{Cache Output} can be set independently on any project output format.

Enable this:

- To ensure everything is rendered and ready to lay-off to video.
- On a 10 bit secondary output format when your master format (and sources) are half-float or 16 bit. \textit{Cache Output} will ensure that the secondary format caches are 10 bit which can improve realtime performance.

![This cache is in \textit{addition} to the standard (source-format) cache.]

frame / field rendering

Full support for \textit{interlaced} video formats is included.

Options:

- \textit{frames}
  Progressive format, no fields.
- \textit{fields (f1:f2)}
  Fields, with field order f1:f2 \textbf{[PAL]}
- \textit{fields (f2:f1)}
  Fields with field order f1:f2 \textbf{[NTSC]}

Field settings will enable field edits/cuts in the composition, field viewing, playback and rendering.

Conversion Settings

If your source images are a different resolution to your defined output, you can choose if and how they are scaled and/or cropped for output.

\textbf{None}

Displays the source image in its original size. This may result in a \textit{cropped} or \textit{blanked} image, depending on the difference between the source and output resolution and aspect ratio.

\textbf{Auto Fit}

Scales the source image to the size of the output format.

\textbf{Auto Crop}

Crops the source image and scales it to the size of the output format.

\textbf{Center}

The center of the source image is mapped to the center of the output
format maintaining the source image aspect ratio. This may result in a cropped or blanked image, depending on the difference between the source and output resolution and aspect ratio.

**Filtering**

The *filter type* selects the mechanism used to transform the pixels in the source image to the new output. This mechanism involves calculating the value of an output pixel as an aggregation of contributing source pixels. How the various pixel contributions are weighed defines the filter.

In order of worst to best (or increasing accuracy):

**No Filtering**

Only the source pixel at the center of the projected boundary is sampled. This method is very prone to visible artefacts such as jagged image edges.

**Bilinear Filtering**

The four pixels in the source image that are closest to the center of the projected boundary are sampled. Their weighting is based on the relative proximity to the center of the projected pixel boundary. This produces an accurate colour result but doesn't cut down aliasing as well as Gaussian does. Box and bilinear will produce very similar results for small scale reductions, but due to the nature of the software coding bilinear is generally the fastest of these two options.

**Box Filtering**

All pixels falling within the projected pixel boundary are sampled and their weight is proportional to their area that lies within the projected pixel boundary. Box and bilinear filtering will produce very similar results for small scale reductions, but box can produce better results for larger scale reductions.

**Gaussian Filtering**

All pixels falling within the projected pixel boundary are sampled and weighted using a gaussian filter kernel. This produces better results than the box or bilinear filters in so far as it results in less aliasing, but is slower.

**ZOM Filtering**

Uses a sinc filter and is the best general filter for *up* and *down-scaling*, providing a sharp result without artefacts. *This is the default setting.*

**Lanczos Filtering**

A windowed form of the sinc filter which may give better results in some cases.
## Colour Management System (CMS)

Each defined output format can have an independent colour *Look Up Table* applied (LUT) as part of your *Colour Management System* (CMS).

A variety of LUT formats and CMS systems are supported, including the *Nucoda CMS*, *THX Cinespace* and *Kodak*.

The LUT can be used in two ways:

- As a viewing only LUT. The LUT is not rendered on the final output. The LUT can be selected and toggled on/off inside the project.
- As a rendered LUT on the output. Pressing the *Apply CMS* button marks the selected output format with CMS and burns in the LUT on this format.

Sample CMS LUT files are provided in the folder:

```
C:\Phoenix\2014_1\root\cms
```

## Project Sources and Proxies

<table>
<thead>
<tr>
<th>Sources</th>
<th>Format</th>
<th>Filter</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:1 Source Clip</td>
<td>3.1</td>
<td>Same</td>
</tr>
<tr>
<td>3:1 Proxy</td>
<td></td>
<td>Bilinear Filter</td>
</tr>
</tbody>
</table>

Project *Sources* refer to source material available inside a project and how the source media is presented.

The "1:1 Source Clip" source is always present and refers to your pristine, original source material (imported or captured), at whatever original resolution.

Optionally, you can add one or more *proxy* sources via the *New* button.

**A proxy source will act as a **substitute source** in the project.**

You may decide to add a *proxy* source if:

- Your original sources are located on a slower storage device (e.g. network). In this case, you may wish to add a "1:1 Clone" source to ensure fast access to (local) fast storage.
- Your original sources are large, you may wish to add a "2:1" proxy to
improve rendering speeds and realtime performance.

To add a new source, press the *New* button below the *Sources* list.

**Format**

The *format* and *filter* type of the selected proxy is shown to the right of the *Sources* list.

The format allows you to change the proxy *scale* and *bits per component*.

**Scale**

Set the scale compared to the source media:

- 1:1
- 2:1
- 3:1 etc.

**Bits Per Component**

Set the colour component depth.

<table>
<thead>
<tr>
<th>Format</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Same</td>
<td>Same bit depth as original source media</td>
</tr>
<tr>
<td>8 Bit</td>
<td>Set proxy to 8 bits per component</td>
</tr>
<tr>
<td>10 Bit</td>
<td>Set proxy to 10 bits per component</td>
</tr>
<tr>
<td>16 Bit</td>
<td>Set proxy to 16 bits per component</td>
</tr>
<tr>
<td>Half</td>
<td>Set proxy to half-float bits per component</td>
</tr>
</tbody>
</table>

Proxies are created in the DPX file format except *Half* format, which are created as *EXR* files.

This is an advanced setting. In general, do not change the bits per component but leave as "Same".

**Filter**

For non-1:1 proxy sources, you can apply a *filter* to improve the proxy image quality.

The Filter options are described in the *Filtering* section in [Output Format Attributes](#).
Project Colour Scaling

The default colour scaling is a *per project* setting and is defined via a drop-down list below the proxy setup.

These scaling modes (defined below) affect:

- Video capture and layoff
- Timeline monitoring via SDI – including: Timeline filler, Transitions, Pan/Scan blanking, Fade to Colour
- Colour tool behaviour (black/white pivot points etc.)
- Scene detection

⚠️ **Be very careful with this setting.**

If you change the *scaling* on an existing project, a warning dialog will request confirmation before application of the change. The change will affect SDI monitoring, capture and layoff settings and the mode used in new colour tools. It may also cause a re-render of colour adaptive tools on your timelines.

See the *Colour Scaling* section in the *Install and Setup Manual.*

Attach/Detach Project

**Attach Project**

We can only open and edit projects once they appear in our main project list.

The *Attach Project* button lets you insert an existing project (project folder) into our project list.

Clicking the *Attach Project* button brings up the file browser so that you can select the location of the project (folder) you want to add to the list. Select the project folder and click the OK button, or browse inside it and click OK.

The project will then appear in your project list and you can select it to open.
You should only import projects that were created on the same version of the application software, e.g. v2013.3 projects should not be imported into v2014.1

**Attach/Detach Project**

The **Detach Project** option removes a project from your project list.

**It does not delete the project.**

If you want to open the project again at a later date you need to re-attach it using the **Attach Project** button.

You will not be asked to confirm project detachment.

This is a useful tool for moving a project from one computer to another, or removing a shared project from your project list without affecting users elsewhere.

**Opening Projects**

To open a project, double-click the project on the main project screen, or select it and press the **Open Project** button. On opening the project you will be taken to the **project desktop**.

When you open a project, if any of the project configuration settings for that project have been changed but have not been applied with the **Apply Settings** button you will be asked if you want to apply the new settings at this point. If the changes were unintentional you can say no and they will be discarded.

The open project button will be disabled if there is no project selected or if the selected project has a status of **Offline**. An **Offline** project means that the underlying project data folder is not located in the expected location.

**Warnings**

You may sometimes see a warning when opening a project. This may relate
to a *version mismatch* or to *missing cache renders*.

### Version Mismatch Warning

If you open a project that was created with an earlier application version, you will receive a warning dialog alerting you to this fact.

![Version Mismatch Warning](image)

It is *usually* safe to open a project created with the same Major.Minor version as used currently (i.e. 3.6r1 to 3.6r2). However, projects created in earlier Major.Minor versions may not be safe (e.g. 3.5r7 to 3.6r1).

### Missing Caches

If some (or all) of the rendered cache files cannot be located on disk, you will receive a warning alerting you to this fact.

![Missing Caches](image)

This may occur if:

1. The cache (*cacheRootDir*) volume is unavailable
2. The project has been moved and attached on a different machine
3. After a crash etc.

For case (1), you may wish to press **Cancel** and investigate. For other possibilities, pressing **Yes** will delete the cache references before opening the project (your timelines will need rendering).

![If you remove cache references your project will require re-rendering](image)
Delete Project

Press the Delete Project Button to delete the selected project. This permanently deletes the project and all its contents. You will be asked to confirm the deletion and also asked if you wish to delete the project notes.

To keep the project notes, untick the tickbox before clicking the OK button.

The project notes folder will be left untouched in the notes folder on your media root directory e.g.

C:\Phoenix\2014_1\root\notes\<project name>\n
You can continue to view and use these notes in other projects.

Recovering a Project

Using the Recover Project button, you can revert to a previous version of a project. Select the project you want to roll back in time and press the Recover Project button.

This can be useful if you want to revert to a previous project state beyond your undo stack, or if you are unhappy with the past two hours of work you have done. It can also be used to recover a previous version of a project if the current one has a problem.

A project snapshot is taken every few minutes (every time the project is saved) and then these are rolled up and merged as the day goes on.

On pressing the button, a dialog window will open and allow you to select the desired version to revert back to:
Projects

Recover Project dialog window

Using the From drop-down list, select a previous project revision:

Then press the Recover button to do the recovery. The selected project is copied to a backup folder (timestamped as per the Backup Folder box, see below) and then replaced with the chosen project version.

The selected project will now be as it was at the stated date and time chosen from the drop-down list.

If you are reverting to a previous revision because your current project has a problem, it is best to revert in stages (one by one, newest to oldest) until you find a suitable version.

Backup Project

When you press the Recover button, the current project is backed up (copied) to a folder as named here. The backup is given a timestamp as a suffix. This backup folder is placed beside the current project:

Each backed up project is the entire state of the project.

In the example illustration above, we have:
• **Grandstand EP 01** - This is the current project - the project that opens. This project is actually a revision we have recovered.
• **Grandstand EP 01_2009_04_28_11_46** - This is a backup of the project created when we pressed Recover at 11:46 on 2009-04-28.

Note that recovery can only go back in time. Once you recover a previous version of a project, you cannot use this method to revert to a later version again. To do this, you can rename the appropriate project backup folder to the project name.

### Location and Configuration

Projects are stored in folders located using the `projectRootDir` setting given in the main preference file:

C:\Phoenix\2014_1\root\general.prefs

The project folder will default to a subfolder:

C:\Phoenix\2014_1\rootprojects\

Each project consists on a single folder which can be copied, moved or otherwise archived once a project is complete.

Project folders contain the complete project except for the source media, renders/caches, any proxies or thumbnails. With the source material placed in the expected location (as per project library), or re-conformed/linked elsewhere, all other media can be regenerated.
The Project Library
Keyboard Shortcut : F1

The Project Library is used for a wide variety of tasks, including:

- Importing and exporting media
- Creating composition timelines
- Organising media and timelines
- Viewing and modifying metadata
- Managing render tasks
- Creating proxy sources

In single-screen mode, the Library window replaces the viewer. In dual-screen mode, the Library (and F1) button toggles display of the Memories window.

Library Components

The Library is organised around a central tabular display of your media assets, a list of folders on the left and a row of function and view filter buttons below.

The main areas are shown below:

Folders

To the left of the Library is the folder list. This is a tree view of all folders existing in the library. Folders are created underneath the project root folder.
The Caches folder contains the renders for all project compositions. It cannot be deleted.

**Create New Folder**

This button creates a new folder. New folders are always created as *children* of the *selected* folder. The selected folder is highlighted in *orange* (e.g. folder “02” above).

**Naming Folders**

By default, folders are named *new folder*. To rename a folder:

- Select the folder
- Press the **F2** hot key
- Type the folder name
Delete Folder

To delete a folder, select it and press the delete folder button.

Recurse

The library only displays the contents of the currently selected folder by default. To display the contents of the current folder and all sub-folders, enable the Recurse button.

With the Recurse button off, we only see the contents of the scans folder. With the Recurse button on, we see the contents of the scans folder and folders 001, 002, 003 etc.

Library Contents

The main library view is located to the right of the folder list and shows the contents of the active (orange) folder.

The contents list is tabular, with each row being a single item (shot, timeline, audio file etc.) and each column being a property of the item.
For more detail on tables and their use, see the Tables section.

**Item Types**

Each library item has a type.

**CLIP**

A CLIP is the label for both *image* and *audio* media. For image media, this is source media composed of individual file based frames e.g. DPX or TIFF sequences.

An audio CLIP will have an icon:

![Audio CLIP icon](image)

**COMP**

A composition timeline.

The active composition is shown with a *Status* property set as *Current Edit* and a COMP icon:

<table>
<thead>
<tr>
<th>Thumbnail</th>
<th>Type</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>COMP</td>
<td>Current Edit</td>
</tr>
</tbody>
</table>

Active composition shown as *Current Edit*.

**Editing a Composition**

You can set the selected composition active as Current Edit by:

- Double-clicking it or
- Pressing the *Edit* button

The active composition displayed in your timeline will update.

**Copying the Composition**

You can make a copy of the selected (in orange) composition by pressing the *Copy* button:
The copy will be named using a prefix "Copy of .." and is completely independent of the original (but caches will be shared).

**MOVIE**

This is source media composed of a movie sequence e.g. Quicktime or Red.

**PROXY**

A proxy source (or clone).

A proxy source is grouped with its corresponding source media. An arrow to the left can be expanded to show the proxy or clone.

The proxy scale is shown in the Scale property.

**Item Deletion**

You can delete on or more selected library items by:

- Pressing the *delete* key on your keyboard or
- Pressing the *Delete* button:

**Properties and Metadata**

Press the Properties button to bring up a property editor for the selected library items.

The Properties available depend on the selected item.

Most image sequence types have basic properties, but many movie formats (such as Red, SI-2K etc.) have extended format properties and extra miscellaneous metadata associated with them. Audio clips have their own specific audio properties (including channel routing).
The layout of the Property dialog

**Property Editor Layout**

As can be seen in the illustration above, the Property Editor is composed of a number of panels that describe different aspects of the metadata.

Not all library items will include all metadata and all the panels.

**Basic Properties**

*Basic Properties* are those common to all library types, and include item name, tape name, description, timecode and duration, components and colour space.
Format Properties

Some items have format specific properties we can edit and these are shown in the Format Properties panel. The image below shows the extra properties available for a Red R3D shot.

![Format Properties panel showing extra properties for a Red Camera shot.](image)

Miscellaneous Metadata

The Miscellaneous Metadata panel shows the extra metadata available. This will be the complete display of all item metadata, some of which will overlap with the Format Properties panel.

![A portion of the displayed miscellaneous metadata for a Red shot.](image)

This metadata is shown as a more raw form as found in the original item.
Nucoda Properties

The *Nucoda Properties* are an extra set of metadata fields that can be set on library items.

<table>
<thead>
<tr>
<th>Nucoda Metadata</th>
</tr>
</thead>
<tbody>
<tr>
<td>SourceId</td>
</tr>
<tr>
<td>Take</td>
</tr>
<tr>
<td>Scene 002</td>
</tr>
</tbody>
</table>

Nucoda properties (part).

Available properties include: *SourceId, Take, Scene, Camroll, Slate, Soundroll, Director, ProjectName, DoP, Cameraman, DailiesColorist, DateOfShoot*

These *Nucoda Properties* will be included in any *ALE List* export and facilitate interoperability in a *dailies* environment with products from Avid etc.

Relinking Clips

The *Relink Clips* dialog allows you to change the *source path* (location on disk) for a clip stored in the library. This can be useful if a clip is *moved* on disk and needs to be re-linked to the composition.

Open the clip *Properties* dialog and select the *Change* button to the right of the clip *Source Path* property:

The *Relink Clips* dialog opens and displays the *Before* path (current location used) and the *After* path, the new location we can set. Initially they will be the same.
Open the *File Browser* and navigate to the new path required and select the clip located in the new location. The *After* path will update.

The Status indicator will display *Online* if the selected (After) path is good and the clip is located. If we cannot locate the new path, we display *Offline*.

Once complete, press the *Apply* button:

If you want to *undo* your change and revert to the original *After* path, press the *Revert* button:

**Library Filters**

You can filter the main contents display to show only items matching chosen criteria.

Note that all filters will apply to the contents of the *selected library folder* (and sub-folders if Recurse is enabled).

**All**

Display all items.
**Current**

Display the library item that corresponds to the segment under the active play-head.

**Marked**

Display the library items that correspond to the marked segments.

**Unused**

Display the library items that are not in use in the composition or marked region.

**Comp / Clip / Proxy**

Display compositions / clips / proxies.

---

**Cache Management**

The *Clean Up* button lets you selectively *purge* unused or unwanted *caches* and *proxies*.

![Clean Up dialog]

You can choose to delete any combination of caches, proxies, thumbnails and/or paint mattes.

*Proxies* include any *source caches* (e.g. from MXF). Paint mattes are temporary mattes created using the *Paint* effect or *DVO Fix* paint.
Filters

Select a filter via the drop-down menu:

- **unused only**
  Caches and proxies are deleted if they are not used in any composition.

- **all in project**
  All caches and proxies in project are deleted.

- **all in current composition**
  Caches and proxies are deleted if they are used in active composition.

- **all exclusively in current composition**
  Caches and proxies are deleted if they are only used in active composition.

- **all not in current composition**
  Caches and proxies are deleted if they are not used in active composition.

Available Filters

Age Filter

To perform a clean up based on selected item age, use the age boxes:

- **Older than** 0 Days 0 Hours

Items older than the set age will be deleted.
Composition Save and Load

You can use the *Save* and *Load* buttons (and also *Store* and *Recall*, see below) to easily **copy compositions and clips** between projects. We can copy *image* clips, *audio* clips and *compositions*.

The projects can even be on separate computers as long as any selected sequences have the same file paths on each.

If the paths differ, you can change it by editing the clip *Properties* and pressing the *..Change* button to open the *Relink Clips* dialog.

The *Save* operation (and *Store*, see below) will save all **selected** clips and compositions. If you select a *composition*, we will also save all clips it references.

Any items we *Save* (or *Store*) are copied and the original items are **untouched**. We *Load* (or *Recall*) the copy.

* These copies will have the same metadata (*properties*) as the original items and, because these are copies, we can safely change any metadata without affecting the original.
Save / Load

Save

Pressing the Save button will open a File Browser dialog and let you choose a path and filename for the saved information. This file will have a .content extension added automatically and stores metadata only.

The .content file is a text file.

Load

Pressing the Load button will open a File Browser dialog and let you select a previously saved content file for loading.

You can load this saved content into any project (including the current one) and the result is that a copy of every included clip and composition will be loaded and made available immediately. No conform or re-linking is necessary.

Only metadata is written out to the content file, no actual image sequence data itself. This metadata includes the full path to any sequences stored and these paths can be checked and (if necessary) modified before load in any text editor.
If sequences are *deleted* or *moved* after the paths are stored, then we will fail to locate this media when we load the content.

**Store / Recall**

*Store* and *Recall* work exactly like *Load* and *Save* except **no content file is used** (so no *File Browser* prompt).

*A Store* will save the selected compositions and/or clips. A *Recall* operation will recall whatever this stored "snapshot" contains.

The stored content *persists* until the next *Store* operation, even between application restarts.

*Store* and *Recall* will only work when used with the same version of the application software.

Also see: *Command Line Interface* chapter.
Importing Material
This chapter describes:

- How to get media (both video and audio) into the project library for use
- How to recursively import entire folders automatically
- How to import and conform from list files (e.g. an EDL)
- How to make sure each piece of media we import has the proper metadata attached
- How to manage our media library

We import material into our project via the Library. Switch to the Library module via:

- F1 hotkey or
- Library button

Although we talk about importing in this chapter, the application **does not move or copy media around**. Unlike some applications that make you import to a proprietary storage volume, we create library references to the original media files. Importing large sequences is almost instant in most cases.

The Library Module will appear over the top part of our desktop:

For a complete description of the Library see the Library chapter.

We can get material into the project library in three ways:
• Directly importing media (image or audio)
• Importing material via a list (and then doing a List Capture)
• Capturing media from a tape source - this is covered separately in the VTR section

In the first two cases, you start off by clicking on the ..Import button in the library:

This will launch the file browser and let us browse and load an image sequence or movie, audio or list file.

For supported file formats, see File Format Support.

Importing Media

To import material into the project library:

• Press the Library ..Import button
• Browse to and select the media to import
• Check your import options
• Press browser ..Import button to do the import

Pressing ..Import in the library opens the file browser and allows us to locate and import our source material.

See the File Browser section for detailed instructions on using the browser component.

The file browser collapses contiguous sequences into single rows and shows the start and end frames in square brackets:

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>[90778-90876].dpx</td>
<td>dpx sequence</td>
</tr>
<tr>
<td>[90000-90095].dpx</td>
<td>dpx sequence</td>
</tr>
<tr>
<td>[91082-91186].dpx</td>
<td>dpx sequence</td>
</tr>
</tbody>
</table>

Select a sequence and press the browser Import button to import the selection into the library as a shot.
As shown in the screenshot above, you can import multiple items at once by selecting more than one item (e.g. SHIFT+Click or CTRL+Click) and pressing the . Import button.

Before doing the import, check your import options (see below).

Once you have finished importing your media, click the Close button to close the file browser.

Import Options

For image media, the Import Options dialog lets us select the method used to extract the Timecode and the Tapename from the media imported.

The browser .Options button will open the import Properties dialog:

Set the default settings in the Application Preferences Capture/Conform tab.

It is very important that we ensure (where we can) that we have a proper tapename and timecode associated with our source media.

Timecode
We can extract the **timecode** from the file header (e.g. a DPX format sequence) or from the sequence filename (i.e. sequence numbers are the timecodes).

For ***header*** timecode, you will always use *1st tc header* unless you have a **Red R3D** sequence and wish to use the *second R3D timecode (2nd tc header)*.

The timecode extracted will be placed in the Library *In* column, and will also cause the assignment of the *Out* and *Duration* values.

<table>
<thead>
<tr>
<th>Tape Name</th>
<th>In</th>
<th>Out</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>0001</td>
<td>00:59:30:00</td>
<td>01:09:14:02</td>
<td>00:09:44:02</td>
</tr>
</tbody>
</table>

**Tape Name**

We can extract the **tapename** from the file:

- **Header** - Some file header metadata contains the *tapename* (e.g. DPX)
- **Filename** - A string component of the file path e.g. file name or containing folder name

**Tape Dir Level**

The **Tape Dir Level** sets the folder level from which we take extract the *tapename* when extracting the tapename from the *filename*.

- Level 0 is the file name
- Level 1 is the containing folder
- Level 2 is one folder up etc.

See the appendix chapter *Automatic Naming*.
Folder Import

If you select a folder and press the *Import* button, the folder contents and all sub-folders are imported recursively. We search for image sequences and movies and import those we find automatically.

The *Import Folder Options* dialog allows us to set some import options, such as filters on image format and resolution, material naming convention and automatic sequence timeline splicing.

<table>
<thead>
<tr>
<th>Import Folder - Options</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Filter file format</strong></td>
</tr>
<tr>
<td>☑  dpx</td>
</tr>
<tr>
<td><strong>Filter image size</strong></td>
</tr>
<tr>
<td>1920 1080</td>
</tr>
<tr>
<td><strong>Auto-create library folders</strong></td>
</tr>
<tr>
<td><strong>Import and splice</strong></td>
</tr>
<tr>
<td>File Order</td>
</tr>
<tr>
<td><strong>Import as background task</strong></td>
</tr>
</tbody>
</table>

Options

**Filter file format**

Select to import only files of specified file format.

**Filter image size**

Select to import only files of specified pixel width and height.

**Auto create library folders**

Select to automatically create library folders for the imported media. Folders are created as per the *auto folder settings*.

**Import and splice**

Select this to splice the imported media to the current *composition timeline* automatically. Choose the desired splice *order* from the drop-down menu:

- File order is the order the file sequences are found.
- Timecode order is the order as per the extracted shot timecodes.
Importing Media 71

Import as background task

Select to import as a background task. After pressing Import, you can close the file browser and the importing will continue in the background.

Library Folders

Media you import is placed inside the currently selected library folder (shown highlighted in orange).

The import process can also create library folders automatically, placing each piece of media inside a folder named from the filename, file path or tapename extracted. To configure this, see Automatic Naming in the appendices.

Importing Audio

Import audio material into the library in the same way as image media. In the Library module, press the Import button, browse to the audio media location and select and import.

The audio formats supported are:

- Wave Audio (.wav) - either 44.1 KHz or 48 KHz 16bit stereo
- Broadcast Wave (.bwf)
- Audio Interchange File Format (.aiff, .aif, .aifc)

The default sample rate is 48KHz.

The audio sample rate is configured in the main preference file general.prefs using the audioSampleRate parameter. It cannot be configured through the GUI currently.
Importing List Files

Import a list into the library in the same way as image media.

In the Library module, press the Import button, browse to the list file location, select and import.

* In the case of a list file, you are creating a Composition, not importing shots. Initially, the list created composition will have no media linked to it. To link media to the composition created, see the next section List Capture.

A list file is a formatted text file that defines the basic layout of a composition and relates the source media "events" (defining shots) to the record timeline locations. The source media is defined by a tapename (or reel) and source timecode.

The supported list file formats are:

- EDL - CMX 3600 format
- AAF
- Cut Lists (.ctl, .cut)

For Cut Lists, the supported formats are as per the example files in folder:
C:\Phoenix\2014_1\example_files\

Once the list itself is imported, we will have a new composition. We will then have to capture any required media and conform. See List Capture.

Conforming will "attach" media to the empty composition shots.
List Import Options

When we import a list file, a new dialog opens and lets us set various import options. We can decide whether to import the list creating a new composition, merge it into an existing composition, how to merge any existing grades etc.

Always take a backup copy of your composition before modifying it (e.g. by importing a list "into current composition").

List Import options dialog. The dialog title is the list filename.

Each option is described below.

Import Mode
All events as new composition

A new composition is created from the list file.

* If the list has a "TITLE:" field, this will become the name (Material Name in the Library) of the new composition.

All events into current composition

The list file is added to the active composition on a new video track.

You can also set the imported list events to overwrite a current track by selecting Overwrite existing track and selecting the track to overwrite from the drop-down list:

```
EDL import: Car Commercial Take 1

Import: All events into current composition

☐ Import as audio

☑ Overwrite existing track

Video track 2
```

Record events only to mark current composition

The list record events are used to add cuts only to the currently active composition.

Use the track selector to the right of Overwrite existing track to choose which video track to mark:

```
EDL import: Car Commercial Take 1

Import: Record events only to mark current composition

☐ Import as audio

☑ Overwrite existing track

Video track 3
```

Note that the cuts will be scene cuts. See the Compositions chapter.

Import as audio

☐ Import as audio

This imports the EDL (a normal video EDL) but creates audio events on an audio track, not video.
Overwrite existing track

With an active composition, this will cause the new list events to overwrite the selected video track.

⚠️ The new events from the list will completely replace the selected track.

Merge existing grades from

If you have a graded composition, you can choose to merge these grades into the new imported list. You can create a new composition result (All events as new composition) or merge the grades into the existing composition (All events into current composition).

The grades are taken from the selected video track.

The Match options let us choose the criteria used to match each graded shot with the new shot imported with the list.

**Match source TC**

Use the source timecode when determining the matched shots when merging grades.

**Match record TC**

Use the record timecode when determining the matched shots when merging grades.

⚠️ You can select both Match source TC and Match record TC to have both tried consecutively.

Import material from file paths

Select this to automatically import media specified in the EDL list file.

The EDL should contain media paths per event in the following format:

* FROM FILE: <path>
Conform to material

If the media is available in the library (perhaps pulled in via Import material from file paths), Conform to material will try and conform (i.e. link) the list events to it.

Create ASC CDL layers

If the EDL list we import includes ASC Color Decision List information, selecting this option will create effect layers for the shots.

The ASC CDL information includes:

- **ASC SOP** - *Slope Offset Power* values. Encoded as:
  
  ASC_SOP (SlopeR SlopeG SlopeB) (OffsetR OffsetG OffsetB)
  (PowerR PowerG PowerB)

- **ASC SAT** - *Saturation* value. Encodes as:
  
  ASC_SAT Saturation

Application version 2010.0r1 and before contains a bug such that the ASC lines must not contain a space after the “*” i.e. you must use the syntax *ASC_SOP* (no space between “*” and ‘ASC’). This issue has since been fixed.
Conform to record TC

Selecting Conform to record TC changes the default conforming behaviour and looks to conform (link) our the available media with the list record timecodes.

TC Offset
Set the offset (if any) between the list record timecodes and media we are conforming.

Set positive or negative offsets via the "+" and "-" buttons.

Tape name
Technically, only the source events are associated with a tape. You can associate the record events with a tape by entering it here. It is good practice to always set a tapename here.

Fill record event gaps
If the record events are not all contiguous (timecode) but contain gaps, fill the gaps with filler.

Match name
When using Conform to material, ensure we take account of the tapename we have entered in the Tape name field.

Keep playhead positions
Make sure we do not reset or change the play-head positions.
Once you have imported your list file, we have a composition timeline that has no media linked to the shots.

A shot without media linked to it will display the offline slate in the monitor:

To connect the composition shots to media, we need to:

a) **capture** - find the referenced media and import it to the library.
b) **conform** - link the matching media to the shots.

We do this via a batch operation called *List Capture*. With the composition active (currently edited) click on the ..*List Capture* option in the library:

This will bring up the *List Capture* window:
The *List Capture* window displays an alternative view of the composition timeline, showing each shot as a separate row in a table. Each shot will have a *Status*.

![You will only see the events listed on enabled video tracks.](image)

After initial import, the list will not be linked to any media and each list event will have a *Needed* status.

<table>
<thead>
<tr>
<th>Index</th>
<th>Status</th>
<th>Type</th>
<th>Name</th>
<th>Tape Name</th>
<th>Src In</th>
</tr>
</thead>
<tbody>
<tr>
<td>001</td>
<td>Needed</td>
<td>✔</td>
<td>Master [90000-90020]</td>
<td>Master</td>
<td>01:00:00</td>
</tr>
<tr>
<td>002</td>
<td>Needed</td>
<td>✔</td>
<td>Master [90025-90050]</td>
<td>Master</td>
<td>01:00:01</td>
</tr>
<tr>
<td>003</td>
<td>Needed</td>
<td>✔</td>
<td>Master [90050-90075]</td>
<td>Master</td>
<td>01:00:02</td>
</tr>
</tbody>
</table>

Each event has a *Needed* status after list import.

### Media Event Status

<table>
<thead>
<tr>
<th>Status</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Needed</strong></td>
<td>The media specific to this event is not in the library, or has not been matched to media on disk after searching (<em>Capture</em>).</td>
</tr>
<tr>
<td><strong>Found</strong></td>
<td>The media specific to this event is in the library and has been matched <em>exactly</em> (given capture control criteria).</td>
</tr>
<tr>
<td><strong>Found Multiple</strong></td>
<td>The media for this event is in the library but <em>multiple matches</em> have been found (given capture control criteria). By default, we select the latest for use but you can choose to change this selection.</td>
</tr>
<tr>
<td><strong>Disabled (Needed)</strong></td>
<td>As the <em>Needed</em> status, but the event has been <em>disabled</em> (so no attempt will be made to find or match it).</td>
</tr>
<tr>
<td><strong>Disabled (Found)</strong></td>
<td>As the <em>Found</em> status, but the event has been <em>disabled</em> (so no attempt will be made to conform/link the event to the media found).</td>
</tr>
<tr>
<td><strong>Conformed</strong></td>
<td>The media for this event is found, is in the library and has been <em>linked</em> (conformed) to the event.</td>
</tr>
</tbody>
</table>
Capturing Media

After importing our list, we can proceed to Capture media into our Library via the ..Capture button.

The capture process will examine on-disk file media and compare it with events in our list. Those that match will be loaded into our library and have a status set to Found. Matching can be performed on timecode alone, or on timecode and tapename.

Capture opens a file browser and we choose a starting folder from which to search for media matching our event list. Each piece of media we find has its timecode and tapename extracted as per the settings we have in the Capture Controls. For a discussion of this metadata extraction process, see the Capture/Conform chapter in the appendices.

Capture Controls

The Capture Controls set the mechanisms we use for extracting the timecode and tapename information from material we find on disk.

As we recursively search from the chosen starting folder, the extracted timecode and tapename is compared to each list event and if we find a match, we change the matched event status from Needed to Found.
Any matching material is *loaded* into the library, but not yet linked (\textit{conformed}) to the event.

**Match Name**

If \textit{Match Name} is enabled, the \textit{tapename} is used when testing for a match. With \textit{Match Name} disabled, only timecode will be used.

**Multiple Matches**

Sometimes, we find more than one item of media on disk that matches a shot in the capture list.

When this happens, the \textit{Status} is displayed as \textit{Found Multiple} and an arrow is displayed to the left of the list item. You can select the arrow to open up the rows and view all the matches.

\textbf{The most recent} event is selected by default.

Both shot index 000 and 001 have been matched to multiple media items.

Opening shot 001 to see what media we have matched. Note we matched 5 media items and have selected the latest.

If you want to change the selected match, highlight your choice in the list and press the \textit{Enable Event} button in the \textit{Event Controls} (see below):

© 2014 Digital Vision
Event Controls

Use the Event Controls to:

- Switch the selected event when multiple matches occur.
- Disable events to prevent them being conformed or found.

Disable/Enable Event

When you Disable an event, you prevent it changing status such that:

- A Found event will not conform (link) to material when pressing Conform (it will stay Found)
- A Needed event will not be found (it will stay Needed)

The Disabled state of an event is reset if you close and re-enter the List Capture module.

Enable Event will reverse the disabled state and allow the event to take part in capture and conform operations once again.
Detach Event Material

_Detach Event Material_ will unlink the selected events from their conformed media and change their status from _Conformed_ to _Found_. The media itself remains loaded in the library but the affected events (shots) will go _offline_ because the link to their media has been broken (they become un-conformed).

Match Open Folder

- **Match open library folder only**

If _Match open library folder only_ is selected, we will _restrict_ the media we try and conform (link) to that inside the currently open library folder.

Consolidation

- **Don't consolidate**
- **Consolidate on tape**
- **Consolidate on clip**

Default: Consolidate on tape

Consolidation is the grouping together of _overlapping_ events (generally by timecode) into a single "event" which can be processed (captured) as one. This can minimise the amount of work required to capture the same amount of material. Consolidation reduces the total number of events to capture.

<table>
<thead>
<tr>
<th>Don't consolidate</th>
<th>Ignore potential consolidation and show every event in the list.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consolidate on tape</td>
<td>Consolidate overlapping timecodes within the same tape.</td>
</tr>
<tr>
<td>Consolidate on clip</td>
<td>Consolidate overlapping timecodes within the same clip.</td>
</tr>
</tbody>
</table>

*Without consolidation, a composition that uses the same media more than once, each time using a different set of frames, will appear in the composition capture list multiple times.*
Conforming the List

Conforming will link the *Found* events in your capture list to specific media matched and loaded into the project library. Once conformed, the status of the event changes to *Conformed* and can be considered *locked* (to the specified material).

The event can be considered locked because a re-conform (pressing the *Conform* button in the *List Capture* module) will never detach or attach different media. To un-lock the event, and break the link between the event and its media, use the *Detach Event Material* button (the event will revert to the *Found* state).

Once conformed, you can close the *List Capture* module and return to the project desktop.
Compositions
A composition can be considered a container within which you compose your work. A project can contain an unlimited number of compositions, each of which can contain any number of video and audio tracks and their media segments.

Compositions consists of:

- Video and audio tracks to arrange your media
- Bookmarks
- Edits and transitions
- Shot versions
- Any grading and effects on the shots of tracks
- Play-heads and marks

The composition is the basic building block of any creative work you do.

Creating Compositions

You can create a composition manually, or by importing a supported list file (e.g. EDL) or an AAF file.
Manual Creation

To manually create a composition, press the *New Composition* button in the *Library* screen:

![New Composition button]

This will close any open composition, create and open a new one. The new composition will be named *Untitled* by default but you can name it via the .. *Properties* dialog window or by double-clicking the *Material Name* field and typing a new name:

<table>
<thead>
<tr>
<th>Thumbnail</th>
<th>Type</th>
<th>Material Name</th>
<th>Status</th>
<th>In</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="1" alt="Thumbnail" /></td>
<td>COMP</td>
<td><em>A New Name</em></td>
<td>01:00</td>
<td></td>
</tr>
</tbody>
</table>

Renaming a composition manually by typing in new *Material Name*

The currently viewed (edited) composition has status *Current Edit* in the library.

<table>
<thead>
<tr>
<th>Thumbnail</th>
<th>Type</th>
<th>Material Name</th>
<th>Status</th>
<th>In</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="1" alt="Thumbnail" /></td>
<td>COMP</td>
<td><em>Reel2 Tests</em></td>
<td><em>Current Edit</em></td>
<td>00:5</td>
</tr>
</tbody>
</table>

† The frame rate of the composition is set on creation to the project master format rate.

List Import and Capture

Importing an EDL, AAF or other supported list format will create a new composition with video and audio tracks, media segments and supported effects (e.g. retimes) as per the imported list.

With an EDL, the composition will be named as per the "TITLE" field. Media segments will need to be *conformed* to the timeline.

A composition will also be automatically created when you capture media from a VTR device.
Composition Elements

The main element of a composition is the *timeline*.

This view is where you can arrange your *media segments*, edit segments, add *effects* and control what is displayed in the monitor. This is the default view for a composition and shows you:

- Video and audio tracks
- Media segments
- Play-heads and position indicators
- Timeline marks
- Bookmarks

![Timeline and Shots](image)

Video and Audio Tracks

Video and audio tracks are laid out in horizontal strips in the classic way. An *empty* composition defaults to one video and one audio track. The monitor will display a *mixed-down view* of your timeline.

*A mixed-down view* is the view you see as if viewing the composition from *above*, taking track output *visibility* into account.

A composition is composed of one or more media tracks (image or audio) stacked on top of each other in rows.

Each track has:

- *Per track, independent controls* on the left and
- *Global track controls* above these
Per Track Controls

Per track, a set of track indicators on the left:

**Enabling a Track**

The track enable button allows you to **select** one or more tracks to operate on i.e.

- Delete
- Splice or overwrite media
- Push up or down etc.

*Disabled tracks are still exported* (to file or tape).

**Locking a Track**

Locking a track will prevent any **edit changes** i.e.

- Edits/cuts
- Trimming
- Moving segments
- Track or segment insertion or deletion etc.

* A locked track can still have the **grade** changed.
Track Picture and Sound Output

Toggle the timeline monitor picture and audio output via the toggle buttons.

Tracks with output turned off are not exported (to tape or file).

Global Track Controls

Globally, you can also set the display of track thumbnails, play-heads, audio waveform and set the active play-head position to centred during play-back:

<table>
<thead>
<tr>
<th>Icon</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>![icon]</td>
<td>Centre active play head when playing composition.</td>
</tr>
<tr>
<td>![icon]</td>
<td>Toggle display of composition segment thumbnails.</td>
</tr>
<tr>
<td>![icon]</td>
<td>Toggle display of non-active play heads.</td>
</tr>
<tr>
<td>![icon]</td>
<td>Toggle display of audio waveform inside audio segments. See Audio Segments.</td>
</tr>
</tbody>
</table>

In Shots View mode, the centre active play-head button is removed and the audio waveform button replaced with a button to toggle display of effects layers. See the section Shots View.

Creating and Deleting Tracks

Use the toolbar buttons to add or delete video and audio tracks.
### Media Segments

Media segments are displayed on the timeline with head and tail thumbnails.

* You can toggle the display of thumbnails using the button. See previous section above.

Each media segment on a video track displays the *tape name*, *material name* and any *source offset* (head handles). The *source offset* is given as a *timecode*.

The segment in the diagram above has four seconds and twelve frames of handles at the front of the segment.

Composition segments are *colour-coded*.

### Normal Segment

Segments are displayed in grey.
Active Segment

The active segment lies under the currently active play-head and is displayed in blue. Grades, effects, versions etc. are applied to the active segment unless some other segment is selected.

Selected Segment

A selected segment will be displayed in orange. Any selected segments will take priority over the active segment.

* When one or more segments are selected, your composition timeline scroll-bar will also turn orange to indicate this. This is visible even if the selected segment is off-screen.

Segment Showing Handles

Head and tail handles are shown as yellow bars, indicating the amount of handles available.

Audio Segments

Audio segments are displayed on the timeline on audio tracks A1, A2 etc. The library will display the metadata for each audio segment:
| Components | Number of audio channels in file e.g. 2 chan |
| Depth | Sample bit depth e.g. 16 bits |
| Rate | Sample rate in Hz e.g. 48000 |

If the audio file has extra metadata available, it will be displayed in the Description column:

- Location: C:\media\audio\mult
- Description:
  - $UBITS=10240800
  - $SCENE=SC_01
  - $TAKE=001
  - $TAPE=005
  - $EVENT=001 16
  - $SPEED=023 976-ND
  - $TRK1=mono mix
  - $TRK2=mix down 10 db

## Audio Waveforms

The audio display button toggles the display of the audio waveform. The waveform is overlaid on the audio segments and the output display monitor.

On the timeline segment, the audio channels are shown stacked on top of each other, as shown below.

Audio track with 5 channels as segment waveform
Audio Properties

To view and modify the audio metadata and properties, select the audio clip in the Library and press the Properties button. The audio clip properties window will open. This lets you view and modify metadata such as the audio clip name and description.

Audio Channel Patching

Patching describes the method of switching (and/or affecting) audio signal routing between input and output audio channels. For example, you may want to mute an audio channel, or route the signal in channel 2 to output channel 1.

There are two places in the application that allow audio patching:

1. On an audio clip (file)
2. On a composition timeline

Adjusting the audio patching on an audio clip is specific to this clip only. Adjusting the audio patching on a composition is global, and affects the entire composition.

Audio Clip Patching

The properties dialog for an audio clip includes an audio patch panel section.
The audio clip channels (\textit{In}) are labelled C1, C2, C3 etc., up to a maximum of eight channels. On import, available audio channels are un-muted by default and routed (patched) to the corresponding \textit{Out} channel (i.e. In(C1) to Out(C1) etc.).

Modify the patching of each channel via the \textit{In} channel drop-down menus:

![Audio patching interface]

\textbf{Composition Audio Patching}

You can view and change the audio patching for the entire timeline via the composition \textit{Properties} button in the Library.

The audio patching interface is similar to the interface used for an audio clip (detailed above). However, extra selectors are available for choosing channels from any particular audio track on the composition.
The available audio channels for the composition are in the \textit{In} column and labelled:

- Track : Channel

e.g. "A1:C2" is Audio Track A1, Channel 2.

The menu selector drop-down lists allow patching the available \textit{input} track and channel to an \textit{output} channel:

![Composition audio patching - input selection.]

### Positions and Lengths

Four position position and length indicators are displayed to the right of a display format specification button:

- \textbf{In point} This will be the location of any \textit{Mark In} point, or the composition \textit{start} if no mark in is set.
- \textbf{Out point} This will be the location of any \textit{Mark Out} point, or the composition \textit{end} if no mark out is set.
- \textbf{Duration} In to Out This will be the \textit{composition duration} if no marks are set.
- \textbf{Active play-head} position Play-head selector and indicator buttons are shown below the location of the active play-head. The active play-head is shown in \textit{orange}, the secondary in \textit{yellow}. 

\begin{center}
\begin{tabular}{|c|c|c|c|c|}
\hline
\textbf{Timecode} & 00:59:51.19 & 01:00:32.21 & 00:00:41.02 & 00:59:57.22 \\
\hline
\textbf{In} & A & B & C & D \\
\hline
\textbf{Out} &  &  &  &  \\
\hline
\textbf{Duration} &  &  &  &  \\
\hline
\end{tabular}
\end{center}
Timecode versus Frames

You can choose to display fields as *timecodes* or *frames* via the drop-down button to the left of the indicator boxes:

| Frames     | 89794 | 90821 | 1027 | 89947 |

---

Change indicator display style

Play Heads

Every composition includes four independent play-heads labelled A, B, C and D. There is an *active* play-head, a *secondary* (last-active) play-head and two *auxiliary* play-heads. Multiple play-heads can be used for shot comparison operations.

<table>
<thead>
<tr>
<th>Icon</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>The A play-head. Yellow means it is the <em>secondary</em> head (last active).</td>
</tr>
<tr>
<td>B</td>
<td>The B play-head. Orange means it is the current <em>active</em> head.</td>
</tr>
<tr>
<td>C</td>
<td>The C play-head.</td>
</tr>
<tr>
<td>D</td>
<td>The D play-head.</td>
</tr>
</tbody>
</table>

You can switch between play-heads using the play-head selectors:

A B C D

The selected play-head will become *active* (orange) and the timeline will centre itself on the active play-head. The colour of the indicator buttons update to reflect the play-head status.

Timeline Marks

You can add *marks* to a composition timeline in order to operate on specific regions only:

- Delete only a marked region
• Limit clip insertion to a marked region
• Playback only a marked region etc.

Starting marks are called *In* marks, ending marks are called *Out* marks. The timeline position indicators will reflect any marks set on the timeline.

<table>
<thead>
<tr>
<th>Icon</th>
<th>Hotkey</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="i" /></td>
<td>i</td>
<td>Set mark in</td>
</tr>
<tr>
<td><img src="image" alt="o" /></td>
<td>o</td>
<td>Set mark out</td>
</tr>
<tr>
<td><img src="image" alt="p" /></td>
<td>p</td>
<td>Set mark in to out (mark segment)</td>
</tr>
<tr>
<td><img src="image" alt="CTRL+i" /></td>
<td>CTRL+i</td>
<td>Clear mark in</td>
</tr>
<tr>
<td><img src="image" alt="CTRL+o" /></td>
<td>CTRL+o</td>
<td>Clear mark out</td>
</tr>
<tr>
<td><img src="image" alt="CTRL+p" /></td>
<td>CTRL+p</td>
<td>Clear mark in to out (un-mark segment)</td>
</tr>
</tbody>
</table>

**Bookmarks**

Bookmarks are tags you attach to either an absolute timeline *position* or to individual *segments*. These bookmarks are useful for taking notes for future reference.

**Creating a Bookmark**

There are two types of bookmarks - *timeline* and *segment*. To create a bookmark of either type at the active play-head position, open the bookmark dialog:

**Keyboard**: CTRL + m
**Panel**: CTRL + Book M
Mouse:
You can also use the mouse Right-Click on the timeline timecode row at the top of the composition:

The bookmark dialog window opens:

- The Type drop-down list lets you select a segment or timeline bookmark (see below).
- Add your descriptive text to the Note field.
- Choose a colour for the bookmark.
- Then press the Create button to create the bookmark.

Valhall Control Panel

If you are using the panel you can use ENTER to add a bookmark or use the QUICKNOTES buttons 1-8 to add bookmarks of differing colours.

The panel also allows the addition of bookmarks on the fly during play out. They will update on the timeline once you stop playback. However, note that you cannot change between Timeline and Segment bookmarks while playing back.
Timeline Bookmark

A timeline bookmark is attached to a specific timecode on the composition timeline itself and stays in the same place on the timeline. A timeline bookmark is displayed above the timeline.

Segment Bookmark

A segment bookmark is attached to a specific segment and moves with the segment. A segment bookmark is displayed within the segment.

Listing and Editing Bookmarks

To list your bookmarks, press :

**Keyboard : m**

**Panel : Book M**

A window opens and displays all bookmarks created on the current composition with their types.

You can select a bookmark and edit it, delete or cue to the bookmark location.
Valhall Control Panel

Use the UP/DOWN arrows to navigate and ENTER to cue to the selected bookmark.

Exporting Bookmarks

You can export timeline bookmarks (not segment) using a utility tool called Bookmarks Assistant supplied with the distribution. This is documented in the Bookmarks Assistant appendix.

Adjustment Segments

An adjustment segment is a special kind of segment we can create that has no associated material. This type of segment is “transparent” and any effects we apply to it will be applied to the material we cover on (visible) tracks below.

An adjustment segment is narrower than a normal segment and by default drawn in a grey-green colour:

The adjustment segment (middle) is narrow and a different colour. If active, it will be shown in the usual blue colour.

Effects you apply are only applied to covered segments on tracks below.

Adjustment segments are useful for adjusting a group of shots the same way. You can apply any number of effects to the segment in the normal way.
Creating an Adjustment Segment

To create an adjustment segment, use **marks** to select the timeline area for the segment and then use **splice** or **overwrite** with no library material selected:

- Set a **Mark In** mark
- Set a **Mark Out** mark
- Press **SHIFT + v** (splice) or **SHIFT + b** (overwrite)

Segment Status Colours

Various colour codes are used to identify the cache and render status of timeline segments.

The colours shown below are the defaults. They can be changed by editing the preference file `colour.prefs` in the folder:

```
C:\Phoenix\2014_1\root
```

Cached and Rendered

We mention two types of frames below: **cached** frames and **rendered** frames.

**Cached**

A cache (also known as source cache) is a source sequence that has been cached to our internal format (currently DPX except for float/half float sources). It may be a full size clone (e.g. 1:1 Source Clone, or from R3D, Quicktime or MXF) or a source proxy at 2:1, 3:1 etc. **These caches have no effects applied.**

**Rendered**

A rendered cache is a sequence that has one or more effects applied and has to be rendered.

Colour Coding

**Normal**

N/A
No processing required.

No timeline colour means the segment requires no rendering e.g. no applied effects or no source caching/generation needed.

**Cached**

The first segment above has been *cached* (and note it has no applied effects). This segment may be a cached MXF source (or some other cacheable media) or a generated *proxy* (2:1, 3:1 etc.) and is shown in dark green.

**Rendered**

The second segment has been *rendered* (i.e. it has an applied effect) and is shown in lighter-green.

Note also that the second segment has a lighter colour indicative of an applied effect.

**Uncached**

The first segment needs caching.

This segment may be an MXF source (or other cacheable media) or an ungenerated proxy and is shown in dark red. It has no applied effects.
Unrendered

The second segment needs rendering.

This segment has an applied effect and requires rendering. It is shown in a lighter red.

Caches Missing

Segment has missing caches.

Missing caches are shown in yellow. You will be prompted to fix these (which will render them).

Caches Fragmented

Segment has fragmented caches.

Fragmented caches are shown in bright red. You will be prompted to fix these (which will re-render them).

BL and AUX Segments

BL and AUX segments will conform automatically via an EDL. You can also
manually splice BL or AUX segments using the keyboard:

- **BL**
  \(\text{SHIFT} + \text{CTRL} + \text{b}\) (or \(\text{v}\))
- **AUX**
  \(\text{CTRL} + \text{ALT} + \text{b}\) (or \(\text{v}\))

The actual black-level value used by BL will be taken from the project setting.

The AUX colour will be taken from the general.prefs preference file and will be set once on project creation.

- **The general.prefs setting for AUX colour is auxColour and defaults to black.** Parameters are given for red, green and blue where values are 0.0 to 1.0.

- **BL and AUX segments are never active** (blue). As a result of this, you cannot **start** a **colour dynamic** on these segments, only **end** on one.

## Grouped Shots

You can **group** segments together and apply your grade to the group rather than to each shot individually. A shot that is part of a group (and when that group is current) is shown with a **green triangle** at the end of the segment.

If segment thumbnails are enabled, the thumbnail will cover part of the triangle.

## Manipulating Compositions

Timeline editing tools are found on the **timeline toolbar** at the bottom of the main screen:
You may need to change from the effects to the editing toolbar using the *switch* button:

The following sections relate to both *video* and *audio* material.

# Adding Media

You can manually add shots to the composition timeline by using *drag and drop* from the library or by using the *splice* or *overwrite* tools (from the keyboard or GUI buttons).

Clip insertion will obey the current *ripple mode* and will be inserted at either:

a) The active *play-head* position or  
b) Any *Mark In* location set.

## Splice

**Hotkey:** v

The splice operation is non-destructive, and any clip segments that already exist on the timeline will be shifted along by the length of the media you insert.

The overall length of time used on that track will therefore change by the length of the new media clip that has been added.
**Overwrite**

*Hotkey: b*

This operation will not move existing clip segments out of the way so the overall length of time used on that track will not change. Any existing clip segments will be overwritten.

*Once a media clip has been added to the timeline we refer to it as a media segment. The source clip remains the same but a segment can be edited.*

**Drag and Drop**

You can select one or more library clips and drag them to the composition timeline.

The shots will be placed onto the video track they are dropped on and this is indicated by the track *enabled* light being active.
Editing and Selection

An *edit mode* defines the behaviour of the timeline manipulation tools, including editing, moving, slipping, sliding and selection. There are four modes, the default being a *direct* selection tool.

<table>
<thead>
<tr>
<th>Icon</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Direct Select mode" /></td>
<td>Direct Select mode</td>
</tr>
<tr>
<td><img src="image" alt="Region Zoom mode" /></td>
<td>Region Zoom mode</td>
</tr>
<tr>
<td><img src="image" alt="Move segments mode (segment editing)" /></td>
<td>Move segments mode (segment editing)</td>
</tr>
<tr>
<td><img src="image" alt="Trim mode" /></td>
<td>Trim mode</td>
</tr>
</tbody>
</table>

**Direct Select**

This is the default mode. Use the mouse to *left-click* a segment to select it (it turns orange).

To *select* multiple segments:

- Drag a *selection box* with the mouse (see diagram below)
- Use the **SHIFT** key to *SHIFT-click* multiple segments and all segments in between
- Use the **CTRL** key to *CTRL-click* multiple non-contiguous segments.
Region Zoom

You can use the mouse to drag a selection box around a section of the timeline. On mouse release, the timeline will zoom to fit the selected segments.

Segment Editing

This mode lets you move or copy one or more segments on the timeline.

Select one or more segments as per the direct select mode described above. To move the selected segment(s), we drag with the mouse and to copy we use the keyboard short-cut keys.

Moving Segments

To move segments, select them, press with the left mouse button and drag them to the new location on your timeline. Dragging will obey ripple mode.

If you are not in ripple mode, dragging one or more segments on top of other segments will replace the segments below. In ripple mode, the segments below are pushed out of the way.

The default move mode is snap to cut. The start and end of the dragged segments will snap to any cut points they cross, and allow positioning flush to any other segment (beside, above or below).
Before : two segments selected

During : segments being moved by dragging. A vertical bar and arrow shows the dragged segments snapping to any cuts they cross.

After : segments moved to new position.

To position segments freely, with no snapping to cuts, hold down the CTRL key while dragging.

Copying Segments

Use the keyboard to copy the selected segments to a different location on your timeline.

<table>
<thead>
<tr>
<th>Operation</th>
<th>Key</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copy</td>
<td>c</td>
</tr>
<tr>
<td>Splice</td>
<td>v</td>
</tr>
<tr>
<td>Overwrite</td>
<td>b</td>
</tr>
</tbody>
</table>

Splice will ripple the timeline and ignore ripple mode.

The segments will be inserted at:

- The active play-head location or
- The Mark In point if it exists

If a Mark In and a Mark Out point exists, the segments will be inserted to fit
between them, and clipped if longer.

**Trim Mode**

For discussion of trim mode, see Trim Modes below.

**Marking Regions**

When adding clips to the composition timeline, we take account of any timeline marks set (see Timeline Marks).

**No Marks**

With no marks, a clip is inserted full length at the active play-head position.

**Mark In**

With a Mark In only, a clip is inserted full length at the Mark In position.

**Mark Out**

With a Mark Out only, a clip is inserted at the active play-head position. If the clip extends beyond the Mark Out point, it is truncated.
Mark In and Mark Out

With both a Mark In and a Mark Out, the clip is inserted at the Mark In position. If the clip extends beyond the Mark Out point, it is truncated.

Deleting Media

To delete one or more segments from your timeline, select the segment(s) then:

- Press your keyboard Delete key or
- Press the lift/remove toolbar button

The track does not need to be enabled but must be unlocked:

![Unlock Track]

If you have ripple mode on, you may see timeline segments move to fill the space created. See below.

Removing Marked Regions

To delete a marked region:

a) Set your Mark In and Mark Out points
b) Enable and unlock the track you want to affect:

![Enable Track]
c) Press the Lift Marked button

All media will be removed between the Mark In and Out points on the selected track.
Ripple Mode

*Ripple mode* is a state that affects the behavior of all delete, move and trim operations, it can be toggled on/off via the button on the timeline toolbar:

Any operations performed while ripple mode is **on** are rippled throughout the rest of the timeline so that any gaps created by the operation are closed. If ripple mode is turned **off** then a gap/filler will be left on the track in place of any segments that have been removed or trimmed down. See below.

Ripple mode does **not** apply to *splice* and *overwrite* operations because these operations are inherently rippled (splice) or not (overwrite).

The following example shows the effect of deleting the middle of three segments, with and without *ripple mode* on.

Select the middle segment and press the *delete* key on keyboard:

**Ripple Mode Off**

With ripple mode off, the gap remains.
Ripple Mode On

With ripple mode on, the segment to the right is shifted left and closes the gap.

Trim Modes

A timeline segment can be considered a "window" on the sequence as it exists on disk and there may be frames both before and after those we can see in the monitor window.

Using the trim toolset, we can adjust the portion of the shot we see, including the visible start and end frames.

The start and end portions of a shot we do not see are known as head and tail handles.
**Trim Mode**

You can enable trim mode via a shortcut key or a GUI button:

CTRL + u (this toggles trim mode)

To enter Trim Mode, the timeline area of the GUI has to be in focus. You can focus it by left-clicking once with the mouse.

In trim mode, if a segment has head or tail handles, these will be indicated visually in yellow. Any available shot handles will be shown inside the shot itself:

![Complete Sequence (on disk)](image)

Timeline: Handles Indicated in Yellow

Centre shot has both head (left) and tail (right) handles, shown in yellow.

**Trimming**

In trim mode, handle drag bars will be visible when you move the mouse over them:

![Drag Bar](image)

![Drag Bar Selected](image)

Hover over shot with mouse and handle drag bar appears

Click drag bar to select

You should select the drag bar by left-clicking once (drag bar turns orange) before attempting to trim.
With a drag bar selected, you can trim a shot by:

- **Dragging** with the mouse
- **Using the keyboard shortcut** keys (see below)
- **Typing** in a trim value

The **keyboard shortcuts** are as follows:

<table>
<thead>
<tr>
<th>Key</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;</td>
<td>Trim left one frame</td>
</tr>
<tr>
<td>&gt;</td>
<td>Trim right one frame</td>
</tr>
<tr>
<td>M</td>
<td>Trim left 10 frames</td>
</tr>
<tr>
<td>/</td>
<td>Trim right 10 frames</td>
</tr>
</tbody>
</table>

See the *Hotkeys* guide distributed with the software. Note that these keys refer to the Digital Vision application keyboard and the key names may be different on a normal keyboard.

You can enter a value directly by typing it into a numeric text entry box that appears above the edit mode buttons. Use a *negative* value to trim backwards:

![Number entry box for trim mode](image)

If a shot has head handles, the *offset* (as a timecode) of the first visible frame of the segment is shown on the segment. This is the **Source Offset**:

![Source Offset](image)

If you trim the head of a shot, the source offset will update.

You will not be able to trim a shot beyond the available handles and no change to the shots on the timeline will occur if you type such a value into the trim edit box.
Slip Mode

Slipping allows you to change the range of source frames that are used in a segment, changing the start and end frames, without changing the position of the segment within the timeline or its overall length. This is useful for synchronizing video segments to audio.

Slip Mode: Segment stays fixed on timeline but start and end frames change.

To activate slip mode, select the head and tail trim handles of the same segment. You can do this via the short-cut key:

CTRL + t

Slide Mode

Sliding allows you to adjust the position of a segment within the timeline by sliding it left or right. The tail of the previous clip and the head of the subsequent clip are trimmed automatically to match the repositioned segment and the overall length of the composition stays the same.

Slide Mode: Segment moves along timeline, start and end frames stay fixed.

To activate slide mode, select the trim handles on the segments adjacent to the segment you want to slide i.e. the tail of the preceding segment and the head of the next segment. You can do this via the short-cut key:
CTRL + y

Slide Mode handles outside segment

You can slide the shot by typing a value into the trim edit box or using the keyboard short-cut keys, as described above.

Cuts

A cut (or edit point) splits a timeline segment up into two parts. There are two types of timeline cuts defined, a scene cut and a normal cut.

Scene Cut

A scene cut is a cut inserted manually inside the application via:

- The cut button (or keyboard shortcut)
- The scene detect module
- An EDL used to "cut up" pre-loaded and spliced timeline media.

You cannot trim scene edits.

Normal Cut

A normal cut is an editorial decision and will be created via:

- An EDL
- An AAF file
Normal cuts will (normally) have handles and allow head and tail trimming.

**Creating a Field Edit**

Short-cut: **Shift + c**  
GUI: N/A

In a *field* based project, you can insert an edit on a field boundary. Field edits are displayed with a "stitched" line as shown below:

Field Edit is “stitched”.

You will need to be in *Field Mode* to insert a field edit. This is indicated by the "asterisk" button:

To insert an edit on a field boundary, enable field mode, set the play-head at the desired timecode and use the keyboard short-cut **Shift + c**

Note that the timecode indicator displaying your current location on the timeline has an asterisk (*) appended when you are on a field boundary:

When play-head on a field boundary, location shows a "*".
Toggle Scene Cut to Normal Cut

Short-cut : N/A
GUI:

You can toggle a scene cut to a normal cut (and vice-versa) by pressing the toggle edit button.

Joining Contiguous Segments

Short-cut : N/A
GUI:

You can join two contiguous segments together by selecting them both and pressing the Remove Matched Edit button:

The segments you are joining have to be from the same media source, adjacent to each other in the timeline, and in increasing source time order. Trimmed out frames from either of the segments is allowed, as the underlying material will still exist and the join operation can put the segment back together.

Shots View

The second view we have of the timeline is Shots view. To select Shots view, click the Shots tab or press the F3 short-cut key.

The Shots view shows a video mix-down of the shots in your composition such that we only see the segments that are topmost in the timeline view. We show:

- We show a single frame of each timeline segment.
- An indication of any applied effect layers are placed on top (optionally).
- Gaps in the timeline are shown as black shots.
The two illustrations below show the timeline view and its associated Shots view.

**Timeline view.**

**Shots view of timeline above.**

The frame displayed is from the *middle* of the segment. This is not configurable currently.

### Shots View Switches

To the left of the shots themselves are some buttons that affect the display and ordering of the shots.

**Thumbnails**

This toggles the *size* of the displayed thumbnails.

**Play-heads**

Toggles the display of all play-heads or only the active play-head.
**Effect Bars**

Toggles the display of the effects bars above the shot.

**Src / Rec Switch**

Toggles the display of the shots in *record* timecode order (default) or *source* timecode order.

This will affect **VTR layoff** and is linked to Tapename Sort (below). Set to SRC for a *Source Order (C)* VTR layoff.

**Handles Mode**

Toggles handles mode.

Normally, we can only play the *visible* (non-handle) portion of a segment. In *handles mode*, we can step through and play entire shots, including playing through *head* and *tail* handles. The play-head position will update to show us our position within the shot and accounting for handles.

This requires us to be in *SRC order* view.

**Tapename Sort**

This will sort the shots to be in *tapename* order (then source timecode order). You must be in SRC timecode order (SRC switch enabled).

This will affect **VTR layoff** and is linked to Src/Rec Switch (above). Enabling this results in a *Source Order Tape (C)* VTR layoff.
Effect Indicators

Any applied effects are indicated above the shot using coloured bars: Base layer, CC/FX layer, Master layer and Pan/Scan. If multiple FX or CC layers are present, these are indicated by small boxes in the LY bar:

In the illustration on the right, the shot on the left is the active shot (blue outline).

All effect layers have an applied effect (coloured bars) and there are two CC/FX layers indicated (two boxes on LY bar).

You can toggle the display of the effect indicator bars using the

Marks

Timeline Mark In and Out points will be shown with dotted lines:

Handy Hotkeys

<table>
<thead>
<tr>
<th>icon</th>
<th>hotkey</th>
<th>function</th>
</tr>
</thead>
<tbody>
<tr>
<td>![icon]</td>
<td>TAB</td>
<td>Toggle full-screen mode, i.e. hiding the GUI</td>
</tr>
<tr>
<td>![icon]</td>
<td>ESC</td>
<td>Exit full-screen mode, back to GUI mode</td>
</tr>
<tr>
<td>![icon]</td>
<td>G</td>
<td>Zoom into the active region of the timeline</td>
</tr>
<tr>
<td>Key</td>
<td>Action</td>
<td></td>
</tr>
<tr>
<td>--------</td>
<td>------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>Fit the whole timeline into the viewing area</td>
<td></td>
</tr>
<tr>
<td>+ / -</td>
<td>Zoom timeline in/out</td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>Mouse wheel Zoom timeline in/out</td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>Ctrl + drag mouse left/right Pan the timeline left/right</td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>Ctrl + Shift + drag mouse up/down Zoom tracks in/out, showing bigger/smaller thumbnails</td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>Ctrl + F2 Toggle between standard timeline view and large panel view</td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>Ctrl + HOME Switch to the next play-head making it the active play-head</td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>HOME Jump play-head to the start of the composition</td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>END Jump play-head to the end of the composition</td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>[ or Down Arrow Jump play-head to the start of the previous edit</td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>] or Up Arrow Jump play-head to the start of the next edit</td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>Ctrl+[ or Ctrl+Down Jump play-head to end of the previous segment</td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>Ctrl+] or Ctrl+Up Jump play-head to the end of the segment</td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>Set mark-in point at the play-head position</td>
<td></td>
</tr>
<tr>
<td>O</td>
<td>Set mark-out point at the play-head position</td>
<td></td>
</tr>
<tr>
<td>P</td>
<td>Set mark in and out points around selection</td>
<td></td>
</tr>
<tr>
<td>Ctrl + I</td>
<td>Clear the mark-in point</td>
<td></td>
</tr>
<tr>
<td>Ctrl + O</td>
<td>Clear the mark-out point</td>
<td></td>
</tr>
<tr>
<td>Ctrl + P</td>
<td>Clear the both mark-in and mark-out points</td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>Shift + I Jump play-head to the mark-in point</td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>Shift + O Jump play-head to the mark-out point</td>
<td></td>
</tr>
<tr>
<td>V</td>
<td>Splice a clip onto the active track</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>Insert a clip onto the active track overwriting segments if necessary</td>
<td></td>
</tr>
<tr>
<td>DELETE</td>
<td>Remove selected segments from the timeline</td>
<td></td>
</tr>
<tr>
<td>Hotkey</td>
<td>Action</td>
<td></td>
</tr>
<tr>
<td>-------------</td>
<td>------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td><img src="image" alt="image" /></td>
<td>Remove marked region from the timeline</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>Insert an edit/cut</td>
<td></td>
</tr>
<tr>
<td>Shift + C</td>
<td>Insert a field edit/cut</td>
<td></td>
</tr>
<tr>
<td>Ctrl + C</td>
<td>Remove an edit/cut, rejoining two adjacent segments</td>
<td></td>
</tr>
<tr>
<td>Ctrl + U</td>
<td>Toggles between Direct Select Mode and Trim Mode</td>
<td></td>
</tr>
<tr>
<td>Ctrl + T</td>
<td>Toggles slip mode on/off, when in Trim Mode, and activates the segment trim handles</td>
<td></td>
</tr>
<tr>
<td>Ctrl + Y</td>
<td>Toggles slide mode on/off, when in Trim Mode, and activates the segment trim handles</td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>Trims the active handle back 10 frames.</td>
<td></td>
</tr>
<tr>
<td>&lt;</td>
<td>Trims the active handle back one frame.</td>
<td></td>
</tr>
<tr>
<td>&gt;</td>
<td>Trims the active handle forward one frame.</td>
<td></td>
</tr>
<tr>
<td>/</td>
<td>Trims the active handle forward 10 frames.</td>
<td></td>
</tr>
<tr>
<td>F3</td>
<td>Switch to Shot List View</td>
<td></td>
</tr>
<tr>
<td>Ctrl+F3</td>
<td>Toggle large shots view / standard view</td>
<td></td>
</tr>
</tbody>
</table>
Versions
When adding a media clip to a composition timeline it is possible to add it as a **version** of an existing clip segment instead of as a new segment.

By adding a version you preserve the underlying clip segment in the composition along with all the changes you have made to it (e.g. trimming or effects). Versions therefore allow you to experiment with different clips, or to make gradual changes to a clip segment and save each one as a separate version until you decide which version you want to keep.

A segment containing a version is denoted on the timeline by a triangle in the centre:

![Version Marker and Approved Version](image)

Grey triangles denote the presence of underlying versions in that segment, and a green triangle identifies the **approved version**. Approving a version is simply a mechanism that allows you to differentiate your preferred version from all the others. You can change the approved version at any time.

### Version Controls

The buttons for adding, approving, and deleting versions are on the **timeline toolbar**:

![Timeline Toolbar](image)

- **Add a source (duplicate) version** (for active shot).
  - **Hotkey**: `CTRL + N`
- **Add a grade version** (for active shot).
- **Approve current version.**
Adding Versions

To add a version you have to first determine which segment on the timeline you want to version.

- A single selected segment (orange) takes precedence
- Otherwise, the active segment is versioned

Once you have selected the timeline segment that you want to add a version to you have two choices, you can either:

- add a shot from the library as a new ungraded version (source version), or
- add a duplicate version of the existing timeline segment (grade version)

Add New Source Version

Hotkey: **CTRL + N**

A new shot version is a different shot to the one that is already present in the selected segment of the timeline. It can be the same source media clip, but it is different from the shot on the timeline in that it will not have any grading applied.

To add a new shot version:

1. Select the media clip to add from the library
2. Select the timeline segment to add the version to

3. Press the Add Version button:

⚠️ The media clip that you select to add as a version has to be at least as long as the timeline segment used. You cannot add a media clip to a segment if the clip is shorter than the segment.

Once the new version has been added a triangle will appear in the centre of the segment to denote the presence of underlying versions, and the new version will be the one that appears on top and visible in the viewer.

**Add Duplicate (Grade) Version**

To add a new duplicate grade version:

Select the desired timeline segment

Press the Add Grade Version button:

This will add another version of the same shot, retaining any grading and trimming carried out up to that point. Any selected library clips will be ignored.

As with adding a new version, a triangle will appear in the centre of the segment to denote the presence of underlying versions, and the new version will be the one that appears on top.

**Handy Hotkeys**

<table>
<thead>
<tr>
<th>icon</th>
<th>hotkey</th>
<th>function</th>
</tr>
</thead>
<tbody>
<tr>
<td>🎥</td>
<td>Ctrl + N</td>
<td>Adds a selected clip from the library as a new version</td>
</tr>
<tr>
<td>🎥</td>
<td>none</td>
<td>Adds a duplicate graded version of the shot selected on the timeline</td>
</tr>
</tbody>
</table>

**Managing Versions**

**Viewing Versions**

To view the different versions underlying a segment simply click on the triangle in the middle of the segment. This will open up a drop-down list of all the versions in that segment:
Two versions visible in dropped-down view.

You can change the active version by selecting any other version from the list.

Versions are numbered Version 1 (original), Version 2 etc. To the right of the version number is the Material Name.

**Approving Versions**

If you want to mark a version to denote that it is the preferred version, you can do so by approving it. To do this:

1. Select the version that you want to approve from the versions list so that it is the active version, visible on the timeline
2. Select the segment on the timeline so that it turns orange
3. Press the Approve Version button on the timeline toolbar

The version indicator will change from grey to green to indicate that you are now viewing the approved version:

Green triangle signifies the approved version.

If you later select a non-approved version to view, the indicator will turn back to grey.

You can change the approved version at any time, simply by selecting a different version as the active version and approving it following the steps above. This will set the previously approved version back to unapproved and set the new selection to approved.
Deleting Versions

Hotkey: \texttt{SHIFT + N}

To delete a version at any time:

1. select the version to be deleted so that it is the active version on the timeline
2. select the segment on the timeline so that it turns orange
3. press the \texttt{Delete Version} button on the timeline toolbar:

The active version will be removed from the list and the next version in the list will become the active version. At this point the version numbers will reshuffle to close the number gap created by the deleted version.

If on deleting a version there is only one version left, the triangular version indicator will disappear from the segment and the segment will return to being a regular segment without versions.

\begin{itemize}
  \item Version operations are always applied to the active or selected segment on the timeline, so the active/selected segment must be appropriate for the operation being carried out otherwise no action will be performed.
\end{itemize}
Rendering
Adding effects to segments, or transforming sources for output, will require CPU processing: rendering. This rendering normally happens transparently in the background as you work, and in most circumstances requires no explicit intervention.

*Master layer effects are rendered in *realtime* on the graphics card \texttt{GPU} and do not require system CPU processing.*

You will have to *render* your composition if you:

- Add effect layers or
- Add adjustment segments
- Create and use proxy sources (1:1 Clone, 2:1 etc.)
- Create source caches (for example, from MXF, Quicktime or Red raw files)

**Proxy Source vs Source Cache**

A proxy source and a source cache are technically the same thing but we differentiate them because:

a) A source cache is always 1:1 (equivalent to 1:1 Clone proxy) and
b) A source cache requires no explicit proxy format created on the project. The cache proxy is created automatically and transparently.

Note that (b) is only true if you leave the \texttt{createClone} parameter \texttt{true} (for the relevant file format) in the preference file:

\texttt{C:\Phoenix\2014_1\root\Clip.prefs}
The following buttons control the rendering process in your project:

The automatic render controls toggle between different rendering behaviour, and the manual render controls let you set off specific rendering tasks.

Automatic Render Controls

These controls are automatic in that they are toggled on or off, and affect the render processing from then on.

Render BG

Default: On

With the Render BG button enabled, some resources are devoted to rendering the active composition in the background while you work. This background rendering will only occur if the application is otherwise idle and will pause when a more important workload surfaces (e.g., if you play the timeline, or need interactive response during grading adjustments).

By default, all new projects have the Render BG button enabled.
Render BG can greatly reduce rendering requirements with little impact on your interactive work. It is generally a good idea to leave it enabled.

**Render FG**

*Render FG*

**Default**: On

This will cause *unrendered* portions of the timeline to be *rendered* for display when *playing* timeline. If this button is disabled, playback of unrendered timeline areas will display grey "not generated" frames:

![Render FG](image)

**Cache**

*Cache*

**Default**: Off

The *Cache* button is relevant to composition *playback only*. During timeline playback, any unrendered frames are rendered on-the-fly dynamically for display (if *Render FG* is enabled) but are not normally saved to disk. Enabling the *Cache* button causes any unrendered frames encountered during playback to be saved to disk.

This rendering is identical to that done with *Render BG* enabled or when doing a *Render Output* operation, except it occurs only during timeline playback (of unrendered frames).

Enabling the *Cache* button may affect timeline playback due to the extra work required to save out rendered frames to disk.
Transition

Default: On

The Transition button enables the rendering of transition effects (e.g. dissolves).

Manual Render Controls

These controls are in the project library and let you set off specific render tasks, such as rendering a specific portion of the timeline, or rendering and exporting media.

Render Output

Pressing the Render Output button will start (or queue) a render task for the currently active composition.

Only visible video tracks are rendered (we render a "mix-down").

If you have marked an in-point, we will render from this position until we reach an out-point, or the end of the composition. If there is no in-point, we export the entire composition. If there is a Mark In and Mark Out set, we render any unrendered material lying between them.

Export Media

For a discussion of the Export Media options, see the Exporting section.

Task Queue

Render tasks and their status will appear in the Task Manager. This is accessible via the Library/Tasks button. Tasks are displayed in the Task manager window, with their progress and status:
Render tasks include both Render Output, Render BG and Export Media tasks.

**Suspend Tasks**

The *Suspend* button will suspend all running tasks.

**Delete Tasks**

You can delete one or more tasks by selecting them and pressing the *Delete* button.
Exporting
There are two export options available from the Library:

- **Export Media** renders and exports a composition to a chosen file format (DPX, TIFF, MXF etc.).
- **Export Composition** exports the active composition as a list file e.g. an EDL

**Version 2014.1 also lets you export to an AAF composition via .. Export Media. This requires the composition you export as AAF to have been created from an AAF.**

---

**Export Media**

The **Export Media** button will let you export the active composition to a file (or sequence of files) in your chosen location and in your chosen format.

- **If not already rendered, an export will render all applied effects.**

If you have marked an in-point, we will export media from this position until we reach an out-point, or the end of the composition. If there is no in-point, we export the composition from the start until we reach an out-point or the end of the composition.

See [File Format Support](#) for supported file formats.

From the library, press the **..Export Media** button, this will launch the **export browser** and let you navigate to the desired export location.
The Export Browser

The *Export Browser* consists of a number of separate elements that let you:

- Navigate to the base folder you wish to write the exported frames to
- Choose the desired file *format* and format options
- Choose the *export mode* (default is *record timecode* order, as a single clip)
- Choose any *global options* to set (some depend on export mode chosen)
- Choose the filename (if any - default to numeric names only)

The various component parts of the *Export Browser* are shown below.

Navigate to the desired folder using the standard file browser controls. Set the desired file format, format options (if any), export mode and global options using the controls at the bottom of the browser.
Export Path Preview

A preview of the path and filename we will create using the current settings is displayed at the bottom on the browser window.

The following settings:

<table>
<thead>
<tr>
<th>Current folder</th>
<th>Z:\projects\SH_77TH\exports\van3d\</th>
</tr>
</thead>
<tbody>
<tr>
<td>Filename typed</td>
<td>$c_outputcc..</td>
</tr>
<tr>
<td>Folder Hierarchy set</td>
<td>$c_$o$r</td>
</tr>
</tbody>
</table>

will preview as shown below:

Preview: Z:\projects\SH_77TH\exports\van3d\cyanframe_compl\720x676\cyanframe_outputcc_006000.dpx

File Format and Options

Use the drop-down list to select a file format for your export. Options available for the selected format will be displayed in the **Format Options** panel below:

- dpix
- Mode: big endian
- Depth: current RGB

See [File Format Support](#) for supported file formats.

⚠️ Switching to a different file format will reset the **Global Options** to their **default settings**.

Filename and Number

Name your exported sequence(s) by typing in a name in the text box. This will
be the base name for every exported shot (even when multiple shots are created on export).

- If you do not type in a base name, file names will be numeric only e.g. 007845.dpx
- Numbers are added automatically to exported sequences and correspond to the frame timecodes. The numbers thus depend on the selected export mode (and may be record or source timecodes)
- File extensions are added automatically

**Number Handling**

Frame numbers will be added automatically on export, zero-padded to the specified width (Frame Padding). The frame numbers correspond to the record (Rec) or source (Src) timecode as per the chosen export mode.

Because numbers are added automatically, some care has to be taken if you choose to type in numbers as part of the base file name.

If you type in numbers as part of the base file name:

- **Rec TC** modes use the numbers as the starting timecode/number for every shot created. If shots are exported to multiple folders, every shot in every folder will start at the given number.
- **Src TC** modes ignore any numbers and always use the source timecode for shots created.

A filename entered as test will usually result in a file called test090000.dpx (or similar).
To put another "." before the numerics, enter a filename test.. (note the two dots).
This results in a file called test.090000.dpx.

**Using Variables in File Names**

![Variables Example]

You can also use variables in the file entry box e.g. $t_{graded}$

might expand to a base filename:

newrtt1_graded_

See the [Folder Hierarchy and Variables](#) for a list of variables available.
### Examples

<table>
<thead>
<tr>
<th>Filename</th>
<th>Pad</th>
<th>Sample File Created</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>(nothing typed)</td>
<td>6</td>
<td>078456.dpx</td>
<td></td>
</tr>
<tr>
<td>4883</td>
<td>7</td>
<td>0004883.dpx</td>
<td>A Rec TC export mode</td>
</tr>
<tr>
<td>4883</td>
<td>7</td>
<td>0000096.dpx</td>
<td>A Src TC export mode</td>
</tr>
<tr>
<td>testexport</td>
<td>7</td>
<td>testexport0006734.dpx</td>
<td>Frame Padding = 7</td>
</tr>
<tr>
<td>$c_graded..</td>
<td>0</td>
<td>shot677_graded.89345.dpx</td>
<td></td>
</tr>
</tbody>
</table>

### Global Options

The *Global Options* panel displays options available to all file formats.

![Global Options Panel](image)

### Export Mode

The export *mode* determines how a composition is exported. See *Export Modes* below.

### Frame Padding

Use this slider to choose the width of frame numbers added to exported sequences. Numbers are zero-padded.
Exporting

<table>
<thead>
<tr>
<th>Number</th>
<th>Frame Padding</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>789</td>
<td>0</td>
<td>789</td>
</tr>
<tr>
<td>789</td>
<td>6</td>
<td>000789</td>
</tr>
<tr>
<td>456789</td>
<td>4</td>
<td>456789</td>
</tr>
</tbody>
</table>

**Target**

Export graded material or source (ungraded) only.

- **Target: Output**: Output *graded* material (as per timeline Play Output view)
- **Target: Source**: Output *source* (ungraded) material (as per timeline Play Source view).

**Handle Size**

This sets how many *head* and *tail handles* frames are exported with each shot.

- **Handle size**: 10

You can only set handles when using a *Multi* mode export (see below).

**Caching**

The Cache option lets us choose whether to save (internally) any *cache renders* or *proxies* created as part of a render export process.

<table>
<thead>
<tr>
<th>Cache</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>No internal caches or required proxies are saved in the application data store.</td>
</tr>
<tr>
<td>Proxies</td>
<td>Save any required proxies.</td>
</tr>
<tr>
<td>All</td>
<td>Save both caches and proxies created (if any).</td>
</tr>
</tbody>
</table>
**SMPTE Level Clip**

The *SMPTE Level Clip* toggle button will clip the exported frame colour data to a *SMPTE legal range* (64-940 for 10 bit data).

- This is only available inside a *Linear (SMPTE)* colour space project.

- See the *Colour Scaling* section of the *Setup Manual* for a discussion on colour space and scaling.

**Export Modes**

<table>
<thead>
<tr>
<th>Mode</th>
<th>Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mixdown Rec TC</td>
<td>A single clip is created on export.</td>
</tr>
<tr>
<td>Visible Multi Rec TC</td>
<td>Multiple clips are created on export.</td>
</tr>
<tr>
<td>Tracks Multi Rec TC</td>
<td>A shot is only exported if any part of it is visible.</td>
</tr>
</tbody>
</table>

The export *mode* determines which shots we export, what timecodes we use, how we order the shots and (usually) whether to create any folder structure.

There are five modes:

- **Mixdown Rec TC**
- **Visible Multi Rec TC**
- **Tracks Multi Rec TC**
- **Visible Multi Src TC**
- **Tracks Multi Src TC**

The default is *Mixdown Rec TC* i.e. a single mixed down sequence using record timecodes.

Each mode consists of important keywords that describe how the mode works:

- **Mixdown**
- **Multi**
- **Visible**
Tracks

Shots are exported per **track**. In this mode, clips are exported even when **fully hidden** by other clips.

Src / Rec

Clips are exported in **source** or **record timecode** order. This also affects the **timecodes** used (header and filename).

---

**Track Monitoring**

Every mode obeys track **monitoring**.

An un-monitored track never takes part in any export mode.

---

**Multi-Mode Exporting**

Care needs to be taken when using multi-mode export.

**Multi-mode** exports can cause shots to be **overwritten** on export.

Due to the fact that some shot metadata can overlap (e.g. timecodes, tapenames etc.), it is possible to export in such a way that shots get overwritten.

For this reason, multi-mode exports will **warn** you if you do not use an **event folder** output structure when exporting:

- If you know that your output clips do not overlap, you can press the **OK** button to continue.

See [Folder Hierarchy and Variables](#).

**Mark In/Out Points**

Every mode will take account of any **in** or **out** points marked.

Begin an export from an **In** point.
End the export at any **Out** point (or the end of the composition).
Mixdown Rec TC

Exports as:

- **Single clip** - a flattened, mixed-down contiguous sequence into one folder.
- BL, AUX and filler included in export
- No handles allowed
- **Record** order and timecodes

*Filler will be exported as **black frames** at the **level** defined by **project colour space**.*

**Example**

No folder hierarchy or variables required.

---

© 2014 Digital Vision
Visible Multi Rec TC

Exports as:

- **Multiple clips** created
- No BL, AUX or filler
- Handles allowed. Adjust via *Handle size* slider:
- **Record** order and timecodes
- Clips are only exported if they are **visible** (even partly)

**Example**

Here, we use *event folders* (see *Folder Hierarchy and Variables*) to ensure exported shots do not overlap.

*See *Multi-Mode Exporting* for a description of why multi-mode might cause exports shots to be overwritten sometimes.*
Tracks Multi Rec TC

Exports as:

- **Multiple clips** created
  - No BL, AUX or filler
  - Handles allowed. Adjust via **Handle size** slider:

| Handle size | 10 |

- **Record** order and timecodes
- Clips are exported **even if hidden** by other clips.

**Example**

Here, we use **event folders** (see **Folder Hierarchy and Variables**) to ensure exported shots do not overlap.

See **Multi-Mode Exporting** for a description of why multi-mode might cause exports shots to be overwritten sometimes.
Visible Multi Src TC

Exports as:

- **Multiple clips** created
  - No BL, AUX or filler
  - Handles allowed. Adjust via *Handle size* slider:

```
| Handle size | 10 |
```

- **Source** order and timecodes
- Clips are only exported if they are **visible** (even partly)

**Example**

Here, we use *event folders* (see Folder Hierarchy and Variables) to ensure exported shots do not overlap.

See Multi-Mode Exporting for a description of why multi-mode might cause exports shots to be overwritten sometimes.
Tracks Multi Src TC

Exports as:

- **Multiple clips** created
  - No BL, AUX or filler
  - Handles allowed. Adjust via Handle size slider:
    - Handle size 10
  - **Source** order and timecodes
  - Clips are exported **even if hidden** by other clips.

**Example**

Here, we use **event folders** (see [Folder Hierarchy and Variables](#)) to ensure exported shots do not overlap.

See [Multi-Mode Exporting](#) for a description of why multi-mode might cause exports shots to be overwritten sometimes.
Folder Hierarchy, Presets and Variables

The Folder Hierarchy panel lets you create a folder structure as part of an export process.

The Folder Hierarchy panel does not create filenames, only folders. See the Filenaming section for naming exported files.

Folders are created automatically below the current file browser folder (the "base" folder) and can include shot names, tapenames, project name and many other metadata elements (see the Variables section below).

You can create a folder hierarchy on export by:

- Choose a preset from the drop-down list
- Enter a hierarchy definition in the text box (including variables)

You should consider using a folder hierarchy when doing any multi-mode export (e.g. Visible Multi or Tracks Multi). A multi-mode export may cause exported frames to be over-written. See Export Modes.
Presets

Presets are pre-defined folder structures available in a drop-down list for ease of selection and re-use. When selected, the preset will also be written into the text box and can be edited as required.

A back-slash character (\") delimits folders.

Manual Entry or Edit

You can create your own folder structure by typing in preset variables and other text strings in the Folder Hierarchy text box.

Saving a Preset

Pressing the Save button will add your folder hierarchy definition to the drop-down list.

Deleting a Preset

Presets are stored in a plain text file in the application root folder:

C:\Phoenix\2014_1\root\ExportFolder.prefs

ExportFolderPresets
[
  Preset "$e"
  Preset "$t\$c\$e"
  Preset "$o\$e"
  Preset "$o\$c_\$n\$r"
]

To delete a preset, remove it from this file, save the file and restart the application.
Variables

The following variables are available:

<table>
<thead>
<tr>
<th>Var</th>
<th>Description</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>$n</td>
<td>Material name</td>
<td>NONAME used if material name empty.</td>
</tr>
<tr>
<td>$e</td>
<td>Event number</td>
<td>See below for the event number format.</td>
</tr>
<tr>
<td>$o</td>
<td>Composition name</td>
<td>NOCOMP used if composition name empty.</td>
</tr>
<tr>
<td>$p</td>
<td>Project name</td>
<td></td>
</tr>
<tr>
<td>$r</td>
<td>Resolution.</td>
<td>This will be represented as WidthxHeight in pixels e.g. 2048x1556</td>
</tr>
<tr>
<td>$t</td>
<td>Tape name</td>
<td>NOTAPE used if tape name empty.</td>
</tr>
<tr>
<td>$c</td>
<td>Clip name</td>
<td>NOCLIP used if clip name empty.</td>
</tr>
<tr>
<td>$O</td>
<td>Original material name</td>
<td>NOORIG used if original material name is empty.</td>
</tr>
<tr>
<td>$f</td>
<td>Frame number</td>
<td>Replaced with a numeric frame number zero-padded to specified Frame Padding.</td>
</tr>
</tbody>
</table>

Event Padding

By default, event folders start at 1 and are zero-padded to 4 digits i.e. folders will be named:

```
0001/  
0002/  
.. 
```

You can adjust the start number and default event number padding by editing the export section in the main preference file general.prefs found in the folder C:\Phoenix\2014_1\root:

```
C:\Phoenix\2014_1\rootgeneral.prefs

export{
  eventStart 1
  eventPadding 4
}
```
Export File Formats

Choose a file format to export to, via the format drop-down list at the bottom of the window.

Each available format will offer its own independent set of options via the Options button.

For a full list of supported formats see the appendix Format Support.

Export Composition

This exports the entire composition as a list file (i.e. metadata, not media).

In the Library, press the Export Composition button to open the Export Composition dialog.

Then:

- Use the file browser to navigate to the desired location for the list file
- Choose the list format
- Set list options
- Type a list file name
- Press the Export button
Note that the export ignores:

- Marks
- Track enable
- Track visibility

If you want to export some shots, not the entire composition:

- **copy** the composition (Library/Copy)
- **delete** unwanted shots (with ripple mode off)
- **export** the copy.

You can export a mixdown of all tracks, or a specific track only via the options dialog.

File extensions are added automatically.

**List Format**

Choose the export format from the format selector drop-down list:

- EDL (.edl)
- Cut List (.ctl)
- ALE (.ale)

The supported export list formats are:
See the appendix for a description of the list formats.

**EDL/CTL Options**

The **Options** button is available for the EDL and CTL formats.

This will open a new dialog window and let you set various options for the chosen output list format.

---

**EDL Options**

- **Video Mix Down**: Selecting Video Mix Down will export shots from all tracks with "mixed" down view i.e. shots/cuts as seen from the top track downwards.

- **Solo Video Track**: If you have more than one video track, use this drop-down list to select the track to export.

- **Clip Details**: Add extra metadata to each exported shot (e.g. clip name, file name) e.g.

  * FROM CLIP NAME: A005
  * FROM FILE: T:\media\images\tc.00000.dpx
  * FROM COMMENT: Check this is OK later

  The comment is taken from the shot description column in the Library.

- **Cuts Only**: This option will only export cuts, no retimes or dissolves.

- **CMX Legal**: The CMX Legal option will disallow the creation of illegal CMX EDL files. The is particularly important with regards to the tapename.
A legal CMX tapename will have:

- no spaces
- eight characters or less.

If you disable the CMX Legal option, you will be limited to 36 character tapenames. However, the tapename must still contain no spaces.

When you have adjusted the export properties, close the options dialog and press the Export button on the bottom right of the file browser window.

The export progress report will be shown in the main Library screen or via the library Tasks window.

Output Timecodes

The source and record event timecodes can be output as a timecode or a frame count.

CTL Options

The CTL format has a restricted set of options available (Video Mixdown and Solo Video Track) with the same meanings as for EDL export above.
Scene Detection
The Scene Detect module can perform an automatic detection of scene changes in a contiguous segment, adding scene edits where found. When enabled, the detection will begin from the current location of the active playhead.

**Setup**

To configure scene detection, switch to the **Scene Detect** tab.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensitivity</td>
<td>0.700</td>
</tr>
<tr>
<td>Lead In</td>
<td>5</td>
</tr>
<tr>
<td>Field Boundaries</td>
<td></td>
</tr>
<tr>
<td>Colour: Linear (CGR)</td>
<td></td>
</tr>
</tbody>
</table>

**Parameters**

**Sensitivity**

This numeric slider is for adjusting the sensitivity towards detecting scene changes. The lower the value the less sensitive scene detection is going to be, so changes have to be very obvious to trigger a scene change, whilst the higher the value the more sensitive to changes the scene detector is going to be and smaller amounts of changes will trigger an edit. If this value is too high then edits will be inserted in the middle of a scene, whilst if the value is too low scene changes may be missed.

**Lead In**

This numeric slider is for specifying the minimum number of frames to leave in a segment before the next edit is inserted, with the default set to 5 frames. So at its highest sensitivity setting, the scene detector might be detecting scene changes every frame, but it will only insert an edit every 5 frames.

**Field Boundaries**

If enabled, edits can also be inserted at field boundaries on interlaced material.

When working with interlaced material scene changes sometimes occur between fields as opposed to between frames, so by turning on
this option you allow the scene detector to insert edits where the scene change actually occurs. If this options is turned off, then the edits will be inserted on the frame boundary rather than where the scene change actually takes place.

**Colour**

Scene detection is dependent on the material *colour format* and especially whether the input is *linear* or *logarithmic*. The default setting will be taken from the project colour scaling setting. Setting the incorrect value here may result in incorrect scene change detection.

See *The Setup Manual* for a discussion of colour scaling.

**Panel Audio Notify**

Enabling this will cause an audible notification when a scene change is detected. The sound is produced via the control panel.

**Usage**

Once you have adjusted the settings, switch back to the *Timeline* tab and move the active playhead to the start of the segment you want to divide up.

The video track needs to be *enabled* for scene detection to work.

Turn on the *Scene Detect* button to start the scene detection process:

You will see the edits appearing on the timeline and a progress report will be shown in the *Library* screen:

To stop scene detection at any point just toggle off the scene detect button.
Viewer Tools
The viewer tools menu is opened from the project desktop by:

- Pressing the F12 hot key or
- Clicking the up-arrow button on the bottom-right of the viewer panel as shown below.

The viewer tools pop-up menu contains setup for the following functions:

- compare mode
- head-up display (HUD)
- grids
- masks
- graphs
- histogram
- colour management system (cms)

These functions can be turned on/off from within the menu pop-up window, or from the corresponding icons on the desktop once the settings for each function have been selected via the pop-up menu.
Tool Configuration

The available options are *user configurable* for the following tools:

- HUD
- Grids
- Masks
- Graphs

Head-up Display (HUD)

**Hot key: F7**

The *head up display (HUD)* overlays information about the frame/shot being viewed on top of the displayed frame. The information that is displayed is *user configurable* (content and position).

The display of the HUD can be toggled on/off using the **HUD** button in the viewer options menu or the hot key **S**.

* This is **display only** and is not rendered into any final output.
Options

This drop-down list defines what HUD information to display over the image.

Sample HUD definitions available are:

- location - source and timeline (record) information, in both frames and timecode
- full info all - full information available
- full info BI - full information available inside image area (burnt into image)

Hud Specifications

For the HUD format and specification, see Appendix HUDs Specification.
Grids

Hot key: F8

The grids functionality allows you to apply preset grid overlays to your image. Grids are displayed over the viewed image and are useful for displaying lines, borders, and layout information. This is **display only** and is not rendered into any final output.

Options

This drop-down list defines the grids available to display over the image.
Sample grids included are:

- full border
- 16:9 grid
- 16:9 blank
- 1.85 grid
- 2.35 grid

Grid Specifications

For the Grid format and specification, see Appendix Grids Specification.
Masks

Hot key: F9

Masks crop (black out) rectangular areas of the displayed image.

Press the masks button to activate the picture mask function and then select the mask that you want to apply from the drop-down menu.

This is display only and is not rendered into any final output.

Options

This drop-down list defines which mask to apply to the image.

Sample masks included are:

- user
- 4:3
- 16:9
- 1.85
- 2.35
The user mask allows you to interactively draw your own mask over the image.

In User mask mode, press the mask edit button:

A rectangular overlay will appear over the image with handles on each corner. You can interactively resize the rectangle to create your mask by dragging each of the corners.

Use mouse to drag rectangle corners to resize mask.
Move mask by picking and dragging center point.
Disable Edit Mode
Turn off edit mode to see mask applied to image.

**Mask Specifications**

For the Mask format and specification, see Appendix [Masks Specification](#).

**Graphs**

*Hot key: F10*

The *graph* tool serves three purposes:

- It shows the RGB *response* curves of your shots
- It shows the *value ranges* using dotted lines on the graph (including important value levels)
- It defines how and where the *histogram* graph will be displayed when enabled
This is **display only** and is not rendered into any final output.

## Options

This drop-down list defines available graphs and histograms.

Note that graphs ignore the "hist" and "parade" settings, using only the **location** (e.g. center), **size** (e.g. PAL) and **scaling** information (e.g. cineon).

These options are configured via plain text files (*.graphs) located inside the folder specified inside the `general.prefs` file (variable `monitorGraphDir`).

Named sections inside these files specify the listed options above.

Example graph locations are:

- SW - south-west in image
- Center - center of image

Scaling refers to the dotted-lines overlaid on the graph to indicate important graph data points i.e.

- Cineon - dotted lines at default cineon black and white points (95/685)
- Video - dotted lines at YCrCb SMPTE levels (64/940)
Graph Specifications

For the Graph format and specification, see Appendix Graphs Specification.

Histogram

Hot key: F11

The histogram tool displays a graph of RGB colour information:

- For the entire image or
- A selected area of the image

This can be useful in helping identify how much colour correction is needed.

The button on the left activates the histogram, which will be displayed in the manner and location defined by the current graphs setting.

⚠️ This is display only and is not rendered into any final output.
Options

The available graph positions and types are as per the graphs.

Unlike the Graphs settings, the Histogram settings can be set in a histogram mode (RGB values overlaid) or a parade mode (RGB values separated in columns).

Setup

Graph Setup

<table>
<thead>
<tr>
<th>Action</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Graph]</td>
<td>Toggle display of graph.</td>
</tr>
<tr>
<td>![Reset]</td>
<td>Reset graph active area to default (whole image)</td>
</tr>
<tr>
<td>![Scale]</td>
<td>Set the scale to use for the reported graph values. Values: 8,10,16 bit or 0-1. Default: 10 bit</td>
</tr>
</tbody>
</table>
Area Selection

By default, the histogram will display RGB values related to the entire image.

You can select a region of interest with the mouse interactively.

You can also click anywhere on the image to display information about a single pixel.

Display Modes

Note that you can display graphs (colour curves) and histograms (or parades) simultaneously.
The Audio Waveform button displays the audio segment waveform overlaid on your monitor output. The waveform will update dynamically as the segment plays.
Handy Hotkeys

<table>
<thead>
<tr>
<th>icon</th>
<th>hotkey</th>
<th>function</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F12</td>
<td>Toggles the viewer options panel on/off.</td>
</tr>
<tr>
<td>none</td>
<td>Ctrl + 5</td>
<td>Saves a snapshot of the current image as a reference image</td>
</tr>
<tr>
<td>none</td>
<td>5</td>
<td>Toggles the compare source, between dynamic selection and the reference image</td>
</tr>
<tr>
<td></td>
<td>F6</td>
<td>Turns compare mode on/off</td>
</tr>
<tr>
<td>none</td>
<td>Shift + F6</td>
<td>Changes the compare mode (wipe/dual/cut)</td>
</tr>
<tr>
<td>none</td>
<td>Ctrl + F6</td>
<td>Changes to the next dynamic compare source</td>
</tr>
<tr>
<td></td>
<td>F7</td>
<td>Turns the Head Up Display (HUD) on/off</td>
</tr>
<tr>
<td>none</td>
<td>Ctrl + F7</td>
<td>Changes to the next HUD definition</td>
</tr>
<tr>
<td></td>
<td>F8</td>
<td>Turns Grids on/off</td>
</tr>
<tr>
<td>none</td>
<td>Ctrl + F8</td>
<td>Changes to the next Grid definition</td>
</tr>
<tr>
<td></td>
<td>F9</td>
<td>Turns Masks on/off</td>
</tr>
<tr>
<td>none</td>
<td>Ctrl + F9</td>
<td>Changes to the next Mask definition</td>
</tr>
<tr>
<td></td>
<td>F10</td>
<td>Turns Graph Curves on/off</td>
</tr>
<tr>
<td></td>
<td>F11</td>
<td>Turns Histogram on/off</td>
</tr>
<tr>
<td></td>
<td>Shift + F11</td>
<td>Resets Histogram</td>
</tr>
<tr>
<td>none</td>
<td>Ctrl + F12</td>
<td>Changes to the next Histogram/Graph definition</td>
</tr>
<tr>
<td></td>
<td>Ctrl + F12</td>
<td>Turns CMS on/off</td>
</tr>
</tbody>
</table>
Comparison Mode
Hot key: **F6**

The *compare* function allows you to compare the frame you are viewing against other instances in your timeline, against a reference frame, or against different versions of the frame itself.

**Compare Modes**

The *Compare* options are selected via the drop-down list on the right-hand menu. Show this menu using the **F12** hot key. The options listed inside a project may be a *subset* of the total available because you may want to limit those you can cycle through. The options available in this list is configured in the **Control Panel** preference section.
Comparison Mode

Split mode. You can interactively change the split using the mouse or panel.

Dual mode. Comparison side-by-side.

### Split

Selecting split mode will allow you to wipe between the currently active frame in the viewer and your comparison image. An overlay control will appear in the viewer, separating the two frames. This control can then be manipulated interactively by dragging it in any arbitrary direction, to make comparisons between the two images. It is also possible to adjust the overlay during playback.

### Dual

Selecting dual mode will display two images in the viewer. The currently active frame will appear on the left, and next to it on the right will be your choice of comparison image.

### Cut

Selecting the cut mode will allow you to toggle between the current frame and your comparison image in full size. Only one image will be displayed at a time, determined by pressing the compare button on/off. When the compare button is off you will see the current frame, as normal, and when the compare button is on you will see the comparison image.

A full screen compare can be achieved by taking a snapshot of the current image and moving to a new frame for comparison. Press CTRL + 5 to grab the current image. Holding down the 5 key at any future time will display the snapshot frame in place of the current image in the monitor.
Difference Modes

There are 3 difference modes:

- Diff red
- Diff luma
- Diff monochrome

Each one will show you the difference between the current frame and the comparison frame in the specified colour.

Comparison Image

Once you have selected your compare mode, you can close the viewer tools menu (F12) and bring up the Memories screen to select what we will compare against.

Select the ..Memories button:

Select the Shot button:

Choose a Comparison Target from the drop-down list below Shot:
You can compare against targets:

- **Track** - the track below
- **Head** - the secondary play-head
- **Event** - a selected event
- **Revert** - the previous grade on the shot
- **Source** - the segment source
- **Groups** - a selected group member
Stereo Multitrack
A Stereoscopic mode can be enabled on a per project basis. This allows both the display and the grading of stereo left and right channels.

Setting Up Stereo

For stereo support, you need to:

1. Enable a project setting and
2. Choose your stereo mode (if using an interlaced DVI device).

**DVS Centaurus II Licensing**

You will need the *DVS Centaurus II* license option *Multidevice* to use stereo multitrack mode SDI output. See the *DVS Centaurus II Video* section of the *Setup Manual* for more information.

Project Setting

Stereo is enabled independently per project. To enable stereo on a project, select the project on the main project screen and select the Stereoscopic Output tick-box:

Application Preferences

Two modes of stereo channel output are supported, **SDI video** and **interlaced DVI**.

**SDI**

Output of left and right stereo on **SDI** channels A and B through a *DVS Centaurus II* video board.

You will need to enable your SDI I/O card via:
Preferences / Monitoring/VideoIO : Enable SDI I/O Card

- Enable SDI I/O Card
- SDI Link: YCrCb 422
- Default format: HD 1080p

Interlaced DVI

Output of interlaced stereo through DVI to a supported display device.

If your stereo display device uses an interlaced DVI signal, enable this via:

Preferences / Monitoring/VideoIO : Interlace Stereo DVI Output

- Enable OpenGL readback to Video
- Interlace Stereo DVI Output

*Interlaced Stereo* mode is incompatible with OpenGL readback and will be hidden if read-back is enabled.

Using Stereo

If Stereoscopic Output is enabled for a project, stereo display output will be sent to the configured stereo display device (SDI or DVI) automatically.

Composition tracks V1 and V2 will both be sent to the display device as the left and right stereo channel.

Stereo channel **SDI output order**: 

![Stereo Diagram](image)
Stereo Multitrack

You can reverse this order via the toolbar button:

or by changing the `general.prefs` parameter:

reverseStereoOutput

This parameter is inside the `IOCard` section of the preference file.

Viewing

You can view and compare the two stereo channels by choosing a compare mode between the two tracks. Compare modes are described in the Comparison Mode section.

Multitrack Grading

You can grade both stereo channels at the same time (and apply notes to both channels) by enabling Multitrack Grading.

Switch to Memories mode:

Then, switch to Shots mode and enable Multitrack Grading using the button shown below:
Shots that are grouped into **multitrack mode** are shown with green triangles on their right-hand edge:

Note that **multitrack** mode will only enable (on both tracks) if the two tracks are the **same length**.

The **render indicator** bar also shows the render status of each track separately:

Each track now has an independent render status bar.

Grades will now be applied to both the top and bottom tracks.

A grade will only be applied to a **monitored** track.
Stereoscopic Depth Grading

The Stereoscopic Depth Grading button will cause Pan, Tilt and Rotate Pan/Scan transforms to be applied normally on the top track but in reverse on the track below.

This can easily be seen in the track thumbnails as shown below:

Track thumbnails show that top track has positive pan. This is reversed on the bottom track.
Colour Management
**Hot key**: **CTRL + F12**

The Colour Management System (CMS) lets you apply colour transformations to your shots. These transformations are user configurable and defined in a 3D colour cube file which is loaded into the application on demand, or specified as part of an project output format.

To use a CMS Look Up Table (LUT), you need to define the project LUT type on the main project setup screen.

Some samples colour cubes have been provided.

If CMS was not selected for the output format that you are viewing then the CMS option will appear disabled in the viewer tools menu. To activate the CMS option you can simply exit your project, add CMS to your project configuration, then re-open your project.

Once you have activated the CMS option, you can apply the CMS by pressing the CMS toggle button in the viewer tools menu:

Alternatively, you may have chosen to 'burn-in' the CMS to your output format (via the project configuration options) in which case the CMS will be permanently applied and you will not be able to toggle it on/off.

If you want to change the colour cube that you are using, you can use the CMS Setup button to select a different LUT file.
Effects
A variety of colour correction tools and effects are available, each of which can be applied independently to individual segments on the timeline.

Since each segment can have a different set of effects, the effects tree to the left of the composition editor will always show all the colour correction layers and effects that can be applied to the active segment on the timeline:

As the active segment changes, the effects tree will change to show only the effects corresponding to that segment.

A selected segment is orange, but this does not override the active segment with regards to the effects tree.

By default, only the basic colour correction layers appear in the effects tree. These are the Base layer and the Master layer. Additional colour correction layers and effects can be added using the effects toolbar, which runs along the bottom of the composition editor.

Segments that have had grading/effects applied are differentiated on the timeline from those that haven't by having a lighter segment colour; i.e. segments with effects are whiter than the grey segments without effects.

In addition, if you have thumbnails enabled, the thumbnails in each timeline segment will show the first and last frames of the segment with the effects that have been applied.
The following effects operations will be covered in the next sections:

- colour correction layers
- editing effects
- managing effects layers
- adding user effects
- transition effects

**Colour Correction Layers**

Every segment has two colour correction layers available by default, the *Base* and *Master* layers.

- The *Base* layer is a fixed colour adjustment layer at the beginning of processing
- The *Master* layer is a fixed colour adjustment layer at the end of processing.

The *Base* layer also contains *isolation* effects, whilst the master layer does not.

These layers are displayed in the *effects tree*, and as the *active playhead* changes segment the effects tree updates to list the effects available for the *active segment* on the timeline. To expand an effects layer, click on the arrow toggle button next to the layer name:

You can control the effects that are available in the base and master layers and the order that they appear in the effects tree (which is the order they are processed in) by editing the following lines in the main preference file *general.prefs* (See Appendix Application Preferences):

- `defaultRealTimeEffectIDs` - effects available in *Master* layer
- `defaultSecondaryCCEffectIDs` - effects available in *Base* and *CC Layers*

Not all effects are necessarily available by default, and you can add/remove
effects from either layer by adding/removing the appropriate IDs from the preferences file.

See appendix Effect Identifiers for a list of available effect you can use in these preference settings.

**Effects Layer**

The *Effects* layer, at the top of the effects tree, contains no effects by default. When you [add user effects](#) to a segment they will be listed here.

**Additional Secondary Colour Correction Layers**

Additional colour correction layers can be added to the active segment by pressing the *Add Layer* button on the effects toolbar. This will add the layers to the effects tree. The layers are numbered from 1 according to their position within the effects tree:

These additional layers will have the same set of effects available as the base layer.

You can add an *unlimited* number of secondary colour correction layers and each contains shapes, keys and mattes:
Layers are always added to the **active segment** only, they are not added to selected segments or any other segments.

**Rename** a CC Layer by selecting it and pressing the F2 key.

## Layer Router

It is possible to use the layer **router** (at bottom of every layer) to set various layer specific parameters, including how layers are composited (blended) on top of each other.

The Router has an effect tab containing the parameters available.

It is possible to change the layer opacity, or bypass the layer completely.

### Blend Mode

The layer router includes a **Blend Mode** that controls how the layer is composited over layers below. It has the following settings:

- Over
- Add
- Subtract
- Dodge
- Burn
Managing Layers and Effects

Re-ordering Layers

You can re-arrange any layers and effects that you have added to the effects tree, not including the default 'effects', 'base', or 'master' layers.

Effects are processed top-down as they appear in the effects tree, so by re-ordering effects you are changing the order that they are processed in.

By default, any user effects that you add are placed above the colour correction layers in the 'effects' layer. If you want to be able to place user effects in-between the colour correction layers, you just need to add them as layer effects instead. These two options are covered in the adding effects section.

To re-order a layer:

1. Select the layer (it is highlighted)
2. Hold down the mouse left button and drag the layer up/down the effects tree (an orange guideline appears)
3. Release the mouse button when repositioned correctly.
4. When you've reached the place where you want to place the layer simply let go of it with the mouse. All the other layers will
Managing Layers and Effects 197

automatically shuffle down and be renumbered accordingly.

- You cannot place any effects after the 'master' layer. The master layer is always the last layer in the pipeline.

Renaming Layers

To rename a CC layer:

1. Select the layer (it is highlighted)
2. Press the F2 hot key to edit the layer name
3. Rename the layer and press ENTER when done.

- You cannot rename the Base or Master layers.

Deleting Layers

To delete a layer:

1. Select the layer (it is highlighted)
2. Press the Remove Layer button or the keyboard DELETE key

The effect/layer selected is removed from the active segment, so make sure that your active playhead is positioned over the correct segment when carrying out this operation.

- You cannot delete the Effects layer or the Master layer.

- You can delete the Base (CC layer) but the first CC layer created afterwards will become the new Base layer. If you use CC layers, the first will always be the Base.
You can use the control panel *Undo* button, or press *CTRL+Z* on your keyboard to revert mistakes.

If you have multiple colour correction layers, numbered 1 - N, and you remove one of them, the remaining layers will be renumbered to reflect their position within the effects tree.

### Applying and Editing Effects

The *colour correction layers* in the effects tree are by default inactive and will not be applied to the corresponding segment until you edit the parameters of one of the effects within the layer.

*User effects* and layer effects on the other hand, are often active by default and are applied to the corresponding segment from the moment that they are added.

You can adjust the parameters of any effect, whether active or inactive.

To edit an effect, double-click on the effect name in the effects tree to edit it. The composition editor panel will automatically switch to the *Effects* tab to show the parameters for the chosen effect.

The currently edited *Effect* will be orange.

### View Output

**Hot key : w**

In addition, the view mode will automatically switch to *Play Output*. In this mode, any changes to the effect parameters are rendered automatically and the resulting output image is displayed in the viewer. This output image is the cumulative result of all the effects that have been applied to that segment, i.e. the full effects tree.
View Selected

Hot key: e

You can change the view mode from Play Output to Play Selected by

Using the drop-down list selecting the option from the view mode drop-down list or by holding down the CTRL key when you double-click on an effect to edit it.

In this mode, you will not see the cumulative result of all the effects in the effects tree but will see only the cumulative result up to the effect that you are currently editing.

Further to this, if you are editing an isolation effect, i.e. matte, keyer, shapes, or blur, you will only see the cumulative result of the isolation effects in that particular layer.

In View Selected mode, the effect that you are editing will appear in yellow in the effects tree:

Once an effect has been edited, it appears as bold in the effects tree, as does the layer that it belongs to:
The bold indicator in the effects tree signals that the effect has been edited, not that the effect is active. User effects can be active by default and will not appear bold unless the effect parameters are edited.

You can reset an effect back to its original parameters by selecting the effect, so that it's highlighted, and pressing the Reset Effect button on the effects toolbar. You can also reset an entire layer, which will recursively reset all the effects within the layer.

Split Panel View

Hot key: CTRL + F4

When editing effects it can be useful to view the timeline, or the shot list, at the same time as you're editing the effect parameters. You can do this using the split panel view.

This will switch the composition editor display to an extended panel mode and will split the tabs so that you have the 'timeline' and 'list' tabs available across the top and the 'effects', 'tracker' and 'scene detect' tabs along the bottom:

You can then click on the tabs as normal to change the combination, e.g. to view the shot list and effect parameters:
Adding User and Layer Effects

You can add individual effects to any segment in your composition in addition to the existing colour correction layers. These effects can be added in two ways, as user effects or as layer effects:

**User effects** are added to the *Effects* layer at the top of the effects tree.

Except *Composite* effects which are added at the bottom of the effect tree (below the *Master* layer).

**Layer effects** are added as new layers in the effects tree. These may be *Colour Correction layers* (CC Layer/Base) or *Effect Layers* (FX Layers).

The benefit of layer effects is that you can change the position of the layer within the effects tree and therefore the order that it will be processed in, since effects are processed top-down based on their order in the effects tree. User effects can only be ordered within the effects layer and the position of the effects layer cannot be changed.

As when [adding colour correction layers](#), layer effects are only added to the
active segment. This is because the effects tree of each segment can be different, i.e. have a different number of layers and effects, and layers are added at a specific position within the tree, i.e. under the currently selected layer.

However, User Effects on the other hand are added to all selected segments, and only when no segments are selected is the effect added to the active segment.

The effects available are accessed via the effects list drop-down menu button on the right of the work area panel:

To add an effect you need to select the effect from this list. The selected effect will be shown as the button label once the list is closed. Valid effect addition buttons will be enabled on the effects toolbar.

Next, select the segment(s) that you want to add the effect to.
To select **multiple** effects, hold down the **CTRL** key on the keyboard while clicking them (refer to the section on selecting timeline segments for alternative methods).

By selecting segments you are overriding the active segment, so if you want to also add the effect to the active segment you have to select it. Selected segments are in **orange**.

If any segment is selected on your composition, the scrollbar is also shown as orange.

Changing the scrollbar colour to orange means that you can see if a segment is selected even if it is not visible. This can prevent accidental effect application to the wrong segment.

At the bottom of the main screen are the buttons that control effect addition, deleting and parameter reset.

<table>
<thead>
<tr>
<th>Icon</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Add CC Layer" /></td>
<td>Add CC Layer</td>
</tr>
<tr>
<td><img src="image" alt="Add FX Layer" /></td>
<td>Add FX Layer</td>
</tr>
<tr>
<td><img src="image" alt="Add Inverted CC layer" /></td>
<td>Add Inverted CC layer</td>
</tr>
</tbody>
</table>
| ![Add Composite Layer](image) | Add Composite Layer  
Note that this is active only if a composite effect is chosen |
**User Effects**

Adding the effect as a user effect will add the effect to all the selected segments. The effect will appear in the *Effects* layer of the effects tree:

![Image of adding an effect to all selected segments]

**Layer Effects**

Adding the effect as a layer effect will add the effect only to the active segment, ignoring other selected segments. The effect will appear as a new layer in the effects tree:

![Image of effect applied to active segment only]

The effect layer will have the applied effect, as well as all the isolation effects (‘matte’, ‘keyer’, ‘shapes’, ‘blur’) and ‘router’ which are present in all layers.
Composite Effects

Like an normal Effect, a Composite effect is added to all the selected segments. It appears at the bottom of the effect tree.

Transition Effects

*Transition* effects can be added manually between two adjacent segments on the timeline. An imported EDL may also include transitions between shots.

Enable the *Transition* button - transitions will not be rendered and displayed unless the *Transition* button is enabled.

Select two adjacent segments on the timeline (hold down the CTRL key whilst clicking on the segments) and press the *Insert Transition* button on the timeline toolbar:
Valid Transition

A valid transition will be shown in white, as a diagonal line between the two segments, with a vertical line on the start and end frames.

Invalid Transition

If there is not enough material for the transition as set (insufficient handles), then that part of the transition will be displayed as red:

You can fix an invalid transition by going into trim mode and either:

- Trimming the shot that requires the extra handles for the transition. Once valid, the transition changes from red to white.
- Adjusting the transition itself
A selected transition is displayed as orange.

If the transition is fully valid, i.e. there are sufficient handles in the tail of the first segment and head of the second segment to carry out the transition, then the line denoting the transition will be white, as in the image above. If there are insufficient head or tail overlap frames then the line be red, instead of white, over those frames which have insufficient underlying material.

To make the transition valid, you can either adjust the transition handles, i.e. the start/end frames of the transition, or you can trim the underlying segments to create the necessary handles. For either operation you need to switch to 'Trim Mode', via the button on the shared toolbar, shown in the image above.

Once in trim mode, you can click on the transition handles and drag them with the mouse to increase or decrease the length/duration of the transition.

For trimming. refer to the Trim Modes section.

**Editing the Effect on a Transition**

To edit the parameters of the transition effect you first need to make the transition the active selection.

To do this, place the active playhead in the first segment, positioning it over any of the frames the make up the transition. This will set the underlying segment as the active segment.

Then press the keyboard Page Down key to switch the active selection from the segment to the transition.

Note that the play head flag will change (drop down) to show that you are
Effects

editing the dissolve now :

A blue box will now appear around the transition to show that it is the active selection, and the effects tree panel will change to display the transition effect:

To edit the parameters of the transition effect you simply have to double-click on the effect in the effects tree panel, as when editing any effect.

Retime

The retime effect allows you to change the duration of a shot, either adding or discarding frames as necessary. A retime effect, being time-based, is treated slightly differently to other effects.

A retime effect should added as a plain Effect node at the top of the tree.
Parameters

![Parameter Interface]

Mode

The retime Mode determines the accuracy of the retime calculation for the final output sequence. It can be set as:

- Nearest Neighbour
- Bilinear Interpolate - more accurate

Scale

The Scale determines a percentage retime speed.

**Note** that setting a scale to zero (0) lets you adjust a clip duration manually by stretching it using the cursor.

Frame Pin

The Frame Pin determines which frame in the source stays constant for the output sequence.
Brightness Regions

The Brightness Regions effect allows separate adjustness of the shadows, midtones and highlights.

It is available as a CC Layer, an Effect Layer or a User Effect.

From the Control Panel, the trackballs adjust black, mid and highlight Brightness Regions when the Color panel is set to Brightness Regions.

The thresholds for black, mid and white can be altered from the top menus by pressing B.M or W respectively. The RGB values for black, mid and white can also be adjusted from the top menus by pressing B.M or W a second time. These buttons are on the right of the top menu when Brightness Regions mode is selected.

If you need finer control over the areas affected, you can also use luminance keys.
Printer Lights

Printer Lights are named after the laboratory process of filtering light during the film printing process, to control the colour of the film.

The numeric values displayed in the GUI and on the panels can be calibrated in the Preferences pages, so that they match a local film lab. The number of points per f-stop can also be calibrated.

On the panel, the top menu knobs adjust red green and blue Printer Lights when the Color panel is set to Balance, Color Curves or Brightness Regions and the right hand menu selection is button 1, labeled All.

Printer Lights affect all pixels and produce a very clean correction. They are ideal for balancing raw images, log files or flat transfers. They are also a good way to remove color casts and adjust color temperature offsets.

Density

Density is Printer Lights ganged together and a density reset makes each of the RGB Printer Light values neutral. Density works the same as the Brightness tool in Brightness/ Contrast and is also known as offset in some other systems.

Although Density and Brightness behave the same, they are in fact different controls and occur at different stages of the processing path within a layer. They can be used independently of each other, although Brightness is used less frequently because it does not appear on the control panels. See S Gamma to learn more about Contrast.

This control affects all pixels equally, regardless of luminance, color or position. Its affect is similar to camera exposure and it is useful for adjusting the source image dynamic range to a pleasing level. Since it does not squeeze or stretch the dynamic range it causes no artifacts and is a great control to start grading raw or flat scanned images.

Some use Density to set black levels and others to use it to assign the mid range. Both methods are correct.
Use Density with a *dynamic* to grade a fade to black.

**Gamma Matrix**

The **Gamma Matrix** tool applies a *matrix colour transformation* to your image sequence. A *gamma* correction factor can also be set before and after this transformation is applied. You can define and apply *presets* for both the gamma correction and the colour matrix.

The *gamma function* applied here is based on a standard *power law* mathematical expression.

Compared to a *3D Lookup Table*, the **Gamma Matrix** tool allows for a more precise and efficient way to convert between various colour domains e.g. RGB to/from XYZ or RGB Rec709 to/from RGB DCI-P3 etc.

This tool is not designed to convert between *video* and *film* colour domains (e.g. film look or negative density).

**Enable**

The *Enable* toggle button enables/disables application of the effect. Toggling this off will cause the effect to take no part in the processing chain.

**Gamma**
Switch to the *Gamma* settings using the *Gamma* button.

**Pre/Post Gamma**

A gamma correction can be applied to the sequence *before* (**pre**) and/or *after* (**post**) any colour matrix is applied.

**Pre Gamma**

The *Pre Gamma* slider applies the specified gamma to the image before the colour matrix is applied.

**Post Gamma**

The *Post Gamma* slider applies the specified gamma to the image after the colour matrix is applied.

**Pre/Post Gamma Presets**

Below each gamma slider are *gamma preset* buttons. Press each button to quickly set the specific gamma.

See the *Presets* section for details on configuring and positioning preset buttons.

**Negative Mode**

The *Negative Mode* (*-ve mode*) button lets you choose how to process negative values.
**preserve**

The *preserve* setting leaves negative values as they are.

The processing chain is:

-\(val \rightarrow \text{process} \rightarrow \text{result}\)

**clamp**

The *clamp* setting clamps negative values to zero (0).

The processing chain is:

-\(val \rightarrow 0 \rightarrow \text{process} \rightarrow \text{result}\)

**process**

The *process* setting causes negative values to be processed as if positive.

The processing chain is:

-\(val \rightarrow +\text{val} \rightarrow \text{process} \rightarrow -\text{result}\)

**Clamp at 1.0**

The *Clamp at 1.0* button causes values greater than 1.0 to be clamped to 1.0.

**Preserve Denormals**

The *Preserve Denormals* button enables the use of very small floating point numbers in the processing chain.

*This setting is not needed for most reasonable gamma values. When enabled, the Gamma Matrix tool will take longer to process the sequence.*

**Matrix**
Switch to the *Matrix* settings using the *Matrix* button.

The *Matrix* page consists of three sections:

- *Presets* on the left
- *Matrix settings*
- *Matrix configuration* on the right

### Matrix Presets

Any matrix presets you have defined will be listed in the first column. Pressing any preset button will load the preset values into the matrix.

See the *Presets* section for details on configuring and positioning preset buttons.

### Matrix Settings

The *Red*, *Green*, *Blue* and *Alpha* matrix component values are listed in the central section. You can enter these values *manually* using the value sliders, or activate a *preset* button to load predefined values.

Pressing a preset button (e.g. *Identity Matrix*) will set the matrix values to the preset values.

### Matrix Configuration

The *Matrix Configuration* column contains utility functions that modify the way the colour matrix is interpreted.

#### Preserve Luma

Setting *Preserve Luma* will adjust the resultant matrix such that the *scale* of
each component value stays the same relative to the others, thus keeping the output luminance the same.

**Transpose**

Setting *Transpose* causes the matrix to be *transposed* before being processed.

Note that the matrix settings will not change when *Transpose* is enabled. However, it is transposed *internally* before use.

**Presets**

You can define *presets* for both the gamma settings (pre and post) and the colour matrix settings. These can be made available inside the *Gamma Matrix* tool as preset buttons.

To create and use a preset, you need to do two things:

1. Define the preset and the values it sets.
2. Lay out the preset button in the tool interface.

These operations require the modification of two text files in the application root folder.

**Preset Definition**

**Location**: C:\Phoenix\2014_1\root\ParamPresets.prefs

**File Format**

All presets are defined in the ParamPresets.prefs text file, wrapped inside the ParamPresets tag. The *Gamma Matrix* effect is defined in a section wrapped with the tag GammaMatrix.

Within the GammaMatrix section, define one or more preset sections as shown below.
Each preset has a **unique identifier**, shown above as PresetID1, PresetID2 etc.

These *unique* names are used to reference the preset when placing it as a button in the tool interface (see the Preset Layout section).

By convention, these preset identifiers are named in a style that identifies their usage i.e.

- preGamma16
- postGamma20
- matrixIdentity
- matrixRGBtoXYZ
- etc.

### Pre/Post Gamma Presets

Set pre-gamma and post-gamma using the `preGamma` and `postGamma` declarations within a section:

```plaintext
preGammaID1
{  preGamma <FLOAT>
}

destGammaID2
{  postGamma <FLOAT>
}
```

Where `<FLOAT>` defines a floating point value for the gamma applied e.g.

```plaintext
preGamma188
{  preGamma 1.88
}
```

The above pre-gamma section would be referenced inside the *Layout* file through the identifier "preGamma188".
Matrix Presets

A matrix preset specifies each red, green, blue and alpha column value as follows:

```plaintext
matrixID
{
  red
  {
    red <FLOAT>
    green <FLOAT>
    blue <FLOAT>
    alpha <FLOAT>
  }
  green
  {
    red <FLOAT>
    green <FLOAT>
    blue <FLOAT>
    alpha <FLOAT>
  }
  blue
  {
    red <FLOAT>
    green <FLOAT>
    blue <FLOAT>
    alpha <FLOAT>
  }
  alpha
  {
    red <FLOAT>
    green <FLOAT>
    blue <FLOAT>
    alpha <FLOAT>
  }
  transpose <BOOLEAN>
}
```

Where <FLOAT> defines a floating point value e.g.

```plaintext
matrixTestSample
{
  red
  {
    red 0.782000
    green 0.366000
    blue 0.455000
    alpha 0.000000
  }
  ...
  ... etc.
  ...
  transpose true
}
```

transpose is a <BOOLEAN> and can be set to true or false. If not present, transpose is assumed true.

The above matrix would be referenced inside the Layout file through the identifier "matrixTestSample".
Preset Layout

Location: C:\Phoenix\2014_1\root\ParamLayout.configs

The ParamLayout.configs file arranges various tool interface elements - parameters, pages, buttons etc.

File Format

All layouts are wrapped inside the paramConfigurations tag. The Gamma Matrix effect layout is defined in a section wrapped with the tag GammaMatrix.

Note that each tool (e.g. GammaMatrix, HLS, DvoRegrain etc.) has parameters delimited by square brackets ([,]).

Within the GammaMatrix layout section, specify preset buttons use the syntax:

```
presetButton "<BUTTON NAME>" "<IDENTIFIER>
```

Where `<BUTTON NAME>` will be the button title (text on button) and `<IDENTIFIER>` identifies the button action to use from the preset definition file.

For the GammaMatrix tool, the `<IDENTIFIER>` key has a format:

```
GammaMatrix.<PresetIdentifier>
```

The `<PresetIdentifier>` is the unique name given to the preset (see the Preset Definition section).

Examples

```
paramConfigurations
{
  ...
  ...
  GammaMatrix
  [ ...
    presetButton "Test Matrix" "GammaMatrix.matrixTestSample"
    presetButton "1.88" "GammaMatrix.preGamma188"
    ...
  ]
  ...
}
```

The above produce the following interface buttons:

```
Test Matrix  1.88
```
Hue Curves

Hue Curves is a powerful effect that allows you to modify the hue, lightness or saturation (HLS) of a shot using an interactive graph.

Parameters

Hue / Lightness / Saturation

The Hue, Lightness and Saturation toggle buttons on the left of the graph select how the graph affects the image.

Hist

The Hist button shows or hides the histogram display in the graph window.

You can select (pick) areas of colour from the image using your mouse, and these areas will be displayed on the graph as an aid to graph manipulation.
Add Point / Delete Point

You can Add or Delete points from the graph by toggling these buttons on, and then clicking on the graph. This allows finer manipulation of the area of the image affected by the effect.

Scale

The Scale slider adjusts the scale of the graph shown.

Discussion

*Hue Curves* is the only tool that utilizes the top menu of both the *Color* and the *Image* panels.

The top buttons on the Image panel select one of six preset points on a spectrum. These presets assign the menu controls of the Color panel to red, yellow, green, cyan, blue, or magenta. When the Color panel is set to [Menu 2], labeled *Positive*, the knobs adjust hue, luminance and saturation of the selected color. This tool can isolate and adjust several colors in the same layer.

If Color panel [Menu 3], labeled *Inverse*, is active the selected color is left unchanged and the other 5 points are adjusted.

[Menu 3] *Inverse* makes it very easy to create black and white images with
one color retained. Color panel [Menu 1], labeled All, selects all six points and configures the Hue Curves to work the same as the HLS tool. This might seem redundant but the default processing path puts Hue Curves first in a layer and HLS as last. **Hue Curves All** is useful for creating duotone and split tone effects in one layer, whilst HLS modifies the layer correction as well as the natural color.

### Soft Clip

The **Soft Clip** effect allows full control over black and white point clipping, and threshold values. Each RGB channel can be independently controlled.

#### Parameters

The **Soft Clip** effect has separate white and black modes, chosen via the toggle buttons to the left.

- The **white** mode includes Threshold White settings.
- The **black** mode includes Threshold Black settings.

#### Clip

This setting controls the level of clipping done per RGB channel.

#### Softness

This setting controls the fall-off (softness) in the clipping performed.

#### Threshold White / Threshold Black

These settings control the cut-off values for white/black clipping.

### Discussion

On the control panel, the black and white trackballs adjust soft clips when the Color panel is set to **Clip**. The outer rings adjust a neutral clip and the balls clip the RGB channels separately to cause colour in the peak whites or blacks.
The clips are useful for removing colors introduced by clip settings in a telecine or camera as well as creating color offsets in the highlights and shadows.

Effect Notes

You can store all, or a chosen subset, of the effects on a segment (including any keyframes) using effect Notes.

This is available via the ..Memories button (at the bottom right of main screen).

Storing and Recalling a Note

In Memories/Notes view, store a note for the current shot by pressing the Store button.

To recall a note, press the Recall button. The effects contained within the note will be applied to the current shot.
Notes are placed in the notes library and display a thumbnail.

Hovering your mouse cursor over a note will display the note contents:

Selecting a note will display the note effects in the note effect tree (top-right).
Lens Distort

The *Lens Distort* tool can fix and undo camera lens distortion.

* A number of presets are included for various *GoPro* cameras.

**Presets**

*Presets* are predefined settings organised as easy to apply button actions. A preset exists for some commonly used *GoPro* camera formats e.g. *GoPro Hero at 1280x960* etc.

* Unity
  - *GoPro Hero 1920x1080*
  - *GoPro Hero 1280x960*
  - *GoPro Hero 1280x720*

* Each preset will set up the *Distort* parameters described below.

**Unity**

This removes all correction and disables *Lens Distort*.

* The *Distort* parameter is changed from *Remove Distortion* to *Off*. 
GoPro Hero 1920x1080

This preset is the tool *default*.

This means that when we **reset** the tool, it resets to the default value as per the *GoPro Hero 1920x1080* preset.

Distort Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remove Distortion</td>
<td>A1 -0.289</td>
</tr>
<tr>
<td>Amount</td>
<td>1.000</td>
</tr>
<tr>
<td>Radius</td>
<td>1290.7</td>
</tr>
<tr>
<td>Scale</td>
<td>1.000</td>
</tr>
<tr>
<td>Center X</td>
<td>1024.0</td>
</tr>
<tr>
<td>Center Y</td>
<td>778.00</td>
</tr>
</tbody>
</table>

Application

Choose to **disable** tool, **add** or **remove** distortion. The default is *Remove Distortion*.

The **Off** setting (tool disabled) is equivalent to the *Unity* preset.

**Amount**

The amount of correction to apply (**strength**).
**Radius**

The Radius determines the *distance* before we see distortion.

**Scale**

This scales the source image from its center.

**Center X/ Center Y**

The center point of the distortion. Default to image center point.

**A1 A2 A3 / B1 B2**

These define the lens distortion *coefficients*.

- **A1** deals with the major "fish-eye" style distortion while A2 and A3 are more distant, edge distortion. B1 and B2 deal with distortion considered as pans in Z space (or up and down).

**Channels**

- **Values**: RGB, R, G, B
- **Default**: RGB

Correct distortion in a *single* RGB channel or (by default) all three.
Warper
Warp 4 and Warp 9 are sophisticated image warping tools. They can be used to fix geometric issues and distortion within image sequences.

Both have a broad application but are of particular use when working with Stereoscopic 3D sequences.

The two Warp tools are:

- **Warp 4** The Warp 4 warper is a classic four point warper and allows warping through the manipulation of the four image corner points.
- **Warp 9** The Warp 9 warper extends the Warp 4 warper with extra control points on each side mid-point and the center point.

Both warpers allow warping of all three RGB channels simultaneously, or each channel separately.

**Warper Introduction**

Both warper tools are designed to be useful in a wide variety of situations.

The Warp 9 tool should be particularly useful in two important areas described below. Both areas of specifically relevant to stereoscopic work.

* For most Stereoscopic work, you would use a warp tool directly after the DVO Stereo Fix tool.

**Geometric Correction**

The Warp 9 tool makes geometric correction straightforward. This issue arises due to distortion between the camera lenses or the mirror from the stereo rig and creates a non-uniform vertical mismatch between the left and right eye images.

By correcting to the center of the image, Warp 9 can then adjust each quadrant of the image, adjusting the points in Y whilst leaving the center point unchanged. This provides a much more accurate geometric match as a result.

**Frame Violation**
The *Warp 9* warper makes it very easy to bend the image *forward* or *backwards* in depth. This is done by moving the control points in X only. By moving selected areas you can minimise *frame violation* (where objects are too far forward in space), thus limiting the effect on the rest of the image.

**Warper Basics**

Both *Warp 4* and *Warp 9* warpers share common features.

A warp is created by selecting and moving one or more control points. These can be manipulated and controlled interactively using the *mouse* or the *GUI controls*.

 Owners of a *Precision Panel* can also use it to control the warper tools.

**Control Points**

Control points are placed around the edges of the *source* image.

<table>
<thead>
<tr>
<th>Control Points</th>
<th>Control Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Warp 4</td>
<td>Warp 9</td>
</tr>
</tbody>
</table>

*Warp 4* : *four* warper control points.  
*Warp 9* : *nine* warper control points, including the *central* control point.
Control points change their look when used:

- An unselected control point.
- A selected control point.
- A control point with a mouse cursor proximity indication.

**Mouse Control**

A control point is indicated in red when your mouse cursor is within range.

To select points:

- **Select one control point**:
  Click it with the left mouse button

- **Select multiple control points**:
  Hold down the `SHIFT` key while click selecting points with the left mouse button

- Hold down left mouse button and *drag* to warp image

**Marquee Select**

You can *marquee select* multiple control points by drag selecting them:

Drag select multiple points using the mouse.

**GUI Controls**

Once selected, you can manipulate control points via the GUI controls, using the mouse or keyboard to enter value.
The Warp 4 GUI controls are shown above, and include separate sliders for the X/Y movement of each Warp 4 control point. Four points leading to eight sliders.

The Warp 9 GUI controls are similar but have eighteen sliders corresponding to X/Y for all nine control points.

**Warp 9-as-4**

You can make the Warp 9 tool warp in a similar mode to Warp 4 by selecting a corner point and dragging whilst holding down the ALT key:

Mouse drag top-right point : + ALT :

Normal Warp 9 single point drag and warp behaviour.

Warp 9 warp behaviour with ALT held down.

Note that the warper behaves in a similar way to Warp 4 and as if the mid-points do not exist. The central point stays locked in place however.
The Precision Panel has a 4 Points toggle to enable this mode. In effect, the Warp 9 tool changes to a Warp 4:

Frame Violation

For frame violation issues, the Precision Panel has mode that lets you modify all left points in X, all right points in X, all top points in X etc.

- Use the Left, Top, Right, Bottom buttons to select the row of affected control points
- Then move all the selected points in the X or Y axes using the All Left X or All Left Y, or All Top X, All Top Y etc.

Using Left / All Left X to select and move only one side of the image in the X axis.

Basic Controls

Scale

Values: 0 - >100000 (slider)
Default: 1.000

The Scale slider lets you scale the image from image center.
You may want to hide warper boundary artifacts in some circumstances and the Scale control can push these outside the visible frame.

**Channels**

Values: RGB, R, G, B  
Default: RGB

You can choose to warp only a single RGB channel or (by default) all three.

This can be useful for cases (e.g. stereoscopic sequences) that have distortion that differs in one or more colour channels.

**Reset Selected Points**

This button will reset any selected control points.

This also removes any keyframes associated with the control points.

**Warp 9 Extended Controls**

**Interpolation**

Values: Linear, Bicubic  
Default: Linear

Linear interpolation is faster but less accurate than Bicubic.

**Center Pinning**

Pinning the central control point stops it moving when manipulating other control points and so protects the central part of the image.

Use the Pin Radius to hold a proportion of the central image area steady as you move other control points around.
DVO Effects
DVO stands for Digital Vision Optics, a collection of image processing tools running in software on generic computer platforms. DVO effects are optimised to make use of the latest multithreading, CPU and GPU computer technology.

With the DVO toolset, Digital Vision brings twenty years of experience in developing high performance image processing algorithms to the world of data-centric restoration, digital intermediate and commercial work.

Many DVO effects are available and will be described in this chapter.

**DVO tools are shot based** and require the presence of scene information. Always scene detect pre-conformed media or adjustment tracks that span more than one shot.

**Introduction**

Many DVO tools are available and each can be applied independently to individual timeline segments. A timeline segment can have multiple different effects applied, stacked in various configurations (layers).

**Selecting a DVO Effect**

The individual DVO tools are logically grouped into packages:

- **DVO Restore** - repair and renovate media
- **DVO Enhance** - improve detail and add clarity
- **DVO Video** - tools to process and fix video content
- **DVO Convert** - standards conversion, upscaling and de-interlacing
- **DVO Camera** - tools to process digital camera related content

Each package contains a set of DVO tools available. Choose via the **Effect Toolbox** to the left of the timeline:
The selector displays the groups and effects as a drop-down list:

Applying a DVO Effect

Once you select the DVO effect, you can add it to the active timeline section as:

- Part of the Input FX group
- A new FX Layer

Adding the DVO effect inserts the selected DVO tool at the appropriate place in the Effects Tree to the left of the timeline.

Input FX

Press the Input Fx button to add the selected effect to the Input FX group:
In the example below, the selected effect (here DVO Flicker) is added at the top of the effects stack in the Input FX group.

**Action:**

**Effects Tree Result:**

![Add to Input FX group]

**FX Layer**

Press the **FX Layer** button to add the selected effect to the **FX Layer** group:

![Create new FX Layer]

In the example below, the selected effect (here DVO Flicker) is added to the FX Layer group. An FX Layer gives you extra layer tools such as a Keyer and Shapes.

**Action:**

**Effects Tree Result:**

![Create new FX Layer]

> In *Phoenix Finish* and *Phoenix Video*, only the basic colour correction layer (**Master Layer**) will appear in the **Effects Tree** by default.

The **Effects Tree** will display all effects applied to the **current** timeline segment (segment under play-head). The tree will dynamically update if the current segment changes (such as during play-back).
Additionally, a segment with effects applied is displayed in a different colour to a segment with no effects applied. See the Compositions section.
DVO Stereo Fix

DVO Stereo Fix is an advanced stereo enhancement tool designed to resolve colour matching and geometry alignment issues with stereo sequences. The tool can address problem areas when they appear over the entire image frame (global correction) or in different areas inside a frame (local correction).

The tool will be able to correct most problems automatically but where this is not possible, controls are available that allow straightforward manual correction.

Enabling Stereo Work

Some basic setup is required to use the DVO Stereo Fix tool.

Project

Your project should be enabled for Stereoscopic Output:

Composition

You should have Multi-track Grading enabled inside the project:
A clip with Multi-track enabled will display edge markers as shown below:

Adding the Tool

*DVO Stereo Fix* must be added as an *Input FX* tool:

Overview

The tool has the following basic control layout, with the two primary tool areas being:

- Colour matching controls
- Alignment (geometry) controls
View Controls

Mute
Mutes both the colour match and the align match, as well as any associated border/blanking modes.

The parameters in this section regarding view and orientation remain active i.e. SwapEyes/ViewMode/Mirror/Flip.

This can be used to compare before and after while correcting any necessary mirror/flip.

Swap Eyes
Swaps left and right eye on output.

All parameters referring to either left or right are associated with the source left and right tracks. As such, the actual processing is not affected by swapping eyes on the output.

View Mode

Values: Normal, Blended, Side-By-Side

Default: Normal

This control allows different view modes to be applied on the output and is used mainly for visualisation purposes.

<table>
<thead>
<tr>
<th>Normal</th>
<th>Separate left and right outputs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blended</td>
<td>Blends left and right image, which could be used to verify alignment processing.</td>
</tr>
<tr>
<td>Side-By-Side</td>
<td>Displays left and right images side-by-side with halved horizontal resolution.</td>
</tr>
</tbody>
</table>

If this mode is used to verify colour matching simultaneously, please note that many monitors might have colour reproduction which varies spatially or by viewing angle.
Mirror Controls

The Mirror Controls will automatically determine and correct for a mirrored left or right eye. If required, manual correction can also be set here.

**Auto Mirror**

*Values*: Disable, Left, Right  
*Default*: Right

Automatically determines mirror and flip between left and right eye. If we detect a requirement to mirror or flip, it is applied to the specified eye.

*This automatic correction will follow any manual mirror or flip settings applied to the other eye.*

**Mirror Left**

Manually set left eye to be mirrored.

**Mirror Right**

Manually set right eye to be mirrored.

**Flip Left**

Manually set left eye to be flipped (*vertically*).

**Flip Right**

Manually set right eye to be flipped (*vertically*).
Colour Matching

These controls allow us to correct the colour match between the left and right eyes.

**Colour Match**

- **Values**: to Left, to Right
- **Default**: to Left

Sets colour processing to match the specified eye.

* Setting this to "to Left" will process the right eye to match the left.

**Scene Mode**

- **Values**: Disable, Uniform, Non-Uniform
- **Default**: Non-Uniform

Sets the colour matching mode for a scene such that the scene is analysed and processed equally throughout (all frames). The different modes relate to how colour matching may vary spatially over the image.

* This is unrelated to any spectrum transformation being uniform or non-uniform.

<table>
<thead>
<tr>
<th>Mode</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disable</td>
<td>No colour match processing is performed (on scene basis).</td>
</tr>
<tr>
<td>Uniform</td>
<td>Colour matching is assumed to be spatially uniform.</td>
</tr>
<tr>
<td>Non-Uniform</td>
<td>Colour matching is allowed to be spatially non-uniform. This mode typically works just as well when the colour differences are spatially uniform.</td>
</tr>
</tbody>
</table>
Scene Mode requires proper scene edits as normally one scene will behave very differently to another.

**Frame Mode**

- **Values**: Disable, Uniform, Non-Uniform
- **Default**: Disable

Sets the colour matching mode which is applied per frame individually.

The processing and modes are the same as described above for Scene Mode.

This option can be used as an alternative to Scene Mode processing if it appears that colour differences change on a frame by frame basis. It is recommended that Scene Mode processing be Disabled when used.

**Local Mode**

- **Values**: Disable, Normal
- **Default**: Normal

This option allows for more localised colour match processing than found in Scene or Frame Modes. The Area Size and Sensitivity controls are linked to Local Mode processing.

**Area Size**

- **Values**: X-Small, Small, Medium, Large, X-Large
- **Default**: Medium

The smaller the Area Size is the more locally aggressive it can be considered to be.

**Sensitivity**

- **Values**: 0 - 1023
- **Default**: 64

The Sensitivity parameter is used to control the allowed difference ranges. The values we set correspond to 10 bit levels. The effect of Sensitivity is as a safety measure rather than a processing amount.

To speed up the processing of complete scenes/material, Local Mode processing can be disabled.
**Colour Match Safety**

Values : 0.0 - 1.0  
Default : 0.5

This parameter sets a general safety level for the Scene and Frame Mode colour matching.

*Colour Match Safety* applies to **black levels** as well as the analysis and variability of the **spectrum transform** applied.

This does **not** include **Local Mode**, which uses **Area Size** and **Sensitivity**.

**Alignment**

These controls allow us to correct the alignment (or geometry) between the left and right eyes.

**Align Match**

Values : to Left , to Right  
Default : to Left

Sets alignment processing to match the **specified eye**.

Setting this to "to Left" will process the **right eye** to match the **left**.

**Align Mode**

Values : Disable , Manual , Global , Morph  
Default : Morph

The alignment processing is based on **scene analysis** and frames are processed equally throughout the scene. The alignment can also be set manually or adjusted with a **global offset** (**Manual V-Offset**).

<table>
<thead>
<tr>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Disable</strong></td>
<td>No alignment processing.</td>
</tr>
<tr>
<td><strong>Manual</strong></td>
<td>Set manual global vertical offset (using <strong>Manual V-Offset</strong>).</td>
</tr>
<tr>
<td><strong>Global</strong></td>
<td>Automatic and global adjustment.</td>
</tr>
</tbody>
</table>
Morph | Spatially variable adjustment with linear variability over the image.

Like Scene Mode colour matching, Align Mode requires proper scene edits as normally one scene will behave very differently to another.

Manual V-Offset

Values: 0 - 128
Default: 0

Manual adjustment of the alignment.

Borders

The Borders controls let us correct any effect alignment has on frame borders.

Border correction also depends on the Blanking configuration (see below).

Borders

Values: Disable, Blank, Zoom Source, Zoom Fill
Default: Zoom Source

<table>
<thead>
<tr>
<th>Disable</th>
<th>Disable border processing.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blank</td>
<td>Automatically applies necessary blanking to borders.</td>
</tr>
<tr>
<td>Zoom Source</td>
<td>Automatically zooms the output to the source frame and original blanking. As per the Blanking Mode, this mode takes into account what needs to be excluded regarding the borders and alignment.</td>
</tr>
<tr>
<td>Zoom Fill</td>
<td>Automatically zooms the output to fill the full frame disregarding any original blanking of the source.</td>
</tr>
</tbody>
</table>

Centre

Values: On, Off
Default: On

Centre the result in the frame. This may be necessary for some Border modes.
Blanking

Blanking is closely linked to the Borders control and allows us to control how the frame borders are blanked.

Blank Setup

Values: Auto, Source, Output
Default: Auto

Blank Setup lets us choose if blanking is setup by automatic analysis or manually in relation to the source or the output.

Blanking affects the border processing and and its effect will depend on the Borders mode.

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auto</td>
<td>Use automatic analysis to define the blanking amount.</td>
</tr>
<tr>
<td>Source</td>
<td>Allow manual blanking setup.</td>
</tr>
<tr>
<td>Output</td>
<td>Manually specify blanking completely based on the output alone. This requires you to regard frame effects from the alignment processing manually, as well as the original source frame blanking. This is an Advanced Mode.</td>
</tr>
</tbody>
</table>

Blank Top / Left / Right / Bottom

Manual blanking adjustment to the top, left, right and bottom of the frame. Specified in pixels.
DVO Dust

*DVO Dust* is a fully automatic and highly accurate film dirt, dust and random scratch concealment and video drop-out removal system. It can remove around 90% of visible imperfections without introducing unwelcome artifacts.

*DVO Dust* utilises a pioneering set of processing algorithms and new filters with the Digital Vision Emmy award-winning PHAME motion compensation technology. With manual "dust busting" being very time consuming and expensive, the automation in *DVO Dust* can typically reduce the amount of operator time required by an order of magnitude. This saves enormous amounts of time and money without any compromise in terms of picture quality.

This effect has three groups of parameters:

![Enable](image1)

- **Enable** toggle button allows the complete effect to be turned on or off.

- **Presets**
  - Presets - preset selections for quick dirt removal
  - Processing - specific processing options
  - Setup - additional settings for various processing selections

Basic Settings and Presets

![Enable](image2)

The *DVO Dust* effect provides a number of presets, ranging from *Extra Light* to *Extra Heavy* removal. These work as a very good starting point before moving on to the more advanced controls in the *Processing* and *Setup* tabs. You may not need to use any of the advanced parameters.
Enable Basic

The Enable Basic toggle button allows you to enable/disable basic mode. This mode uses presets to automate and hide much of the effect complexity.

When you edit any of the settings in the processing or setup tabs the basic mode becomes automatically disabled. Similarly, when you select a mode from the basic modes, all settings will be automatically adjusted to fit the selected mode and basic mode will be automatically enabled.

Presets

This is a collection of preset settings (e.g. Extra Light, Heavy etc.) that setup the effect for a predefined level of dust/dirt.

Values: Extra Light, Light, Medium (Default), Heavy, Extra Heavy
Default: Medium

Strength

This slider allows the adjustment of the strength of dust reduction processing to use. It is only available in basic mode.

Range: -5 to +5
Default: 0

Enable White / Enable Black

White/black dirt removal is enabled via the corresponding Enable White/Enable Black toggle buttons.
- **Enable Black** - for black/dark spots
- **Enable White** - for white/light spots

Both can also be enabled at the same time.

**Default**: On

These options also appear in the *Processing* tab and they are linked (changing one location affects the other).

⚠️ Note that if **neither** button is enabled then *DVO Dust* will **not filter** at all!

### Processing Filters

The filters used by the process are very important in determining the final processed quality. *DVO Dust* includes a variety of filter algorithms that can effectively process a wide range of input footage.
Spatial / Temporal / Mixed Filters

Values: Spatial, Mixed 1, Mixed 2, Mixed 3, Mixed 4, Temporal 1, Temporal 2, Copy Prev, Copy Next, Bypass

Default: Mixed 3

The following generic filter groups are defined.

Spatial

All filters named Spatial are filters that work only within the current frame (or field if the material is interlaced), i.e. it has taps only in the current frame. These filters are intended for very small spots.

Mixed

All filters named Mixed have taps in both the current frame and the frame previous to and following the current frame. That is, it has both spatial and temporal taps. All these filters however have more taps in the current frame than in the previous and following frames together (more spatial taps than temporal). These filters are intended for normal spots.

The different Mixed types (Mixed 1,2,3 etc.) change the ratio between spatial and temporal. The larger the number, the more temporal filtering.
Temporal

Filters named *Temporal* have both spatial and temporal taps but with more temporal than spatial. This will enable the *DVO Dust* to remove any size of spots. These filters may need more careful use, to not give unwanted artefacts.

- The filter called *Temporal 2* is a special temporal filter that uses **minimum** amount of information from the current frame. This means that the processed signal will not vary as much as the normal temporal filter in terms of luminance/intensity.

Copy

The *Copy Next* and *Copy Prev* filters should be used for one frame in combination with a *key* area and *Global* mode to replace a big chunk of dirt, a big hole, or a flash frame with information from the next or previous frame.

Bypass

Setting the filter to *Bypass* will leave dirt **unprocessed**.

Use Adaptive Size

When the *Use Adaptive Size* button is enabled, the filter size automatically adjusts during processing according to the size of the dirt found.

Default: On
**Filter Size**

This sets the size of the filter on the current frame, so it is only required for spatial and temporal filters.

Use the numeric slider to define the filter size when adaptive filter sizing is not enabled. The larger the size of the dirt the larger this value should be.

- **Range:** 0 to 15
- **Default:** 7

**Adaptation**

The *Adaptation* toggle button allows you to turn the adaptation processing on/off.

When this button is off, *DVO Dust* works in *global* mode, filtering the whole image with the same fixed filter selected in the *Filter* menu.

![Adaptation Toggle](image)

Note that if the *Adaptation* button is off then none of the adaptation controls above will have an effect.

**Motion**

This numeric slider configures the degree of *motion sensitivity*.

Initially you can set it to 0 (most safety), for maximum motion sensitivity, and then increase it in steps if there isn't enough filtering in moving parts of the picture.

A value of 256 corresponds to no motion adaptation at all, which means that temporal filtering can be applied fully to moving parts of the image.

- **Range:** 0 to 256
- **Default:** 30

**MDC**

The *MDC* (*Motion Detection Current*) toggle button determines whether to look at just the previous and next field/frame, or to look at all of the previous,
current, and next field/frame.

**Default**: On

Having this option on ensures higher sensitivity and reduces artefacts down to a minimum. For maximum filtering, the control may be set to off.

- MDC filter configuration is done inside the **Setup** section.

**Edge**

This controls material edge *protection*.

Edge protection acts as a safety measure and reduces the possibility of false scratch detection. Some material may require this protection e.g. houses at a distance, a forest or material with a slight weave. By turning edge protection on, the built in *edge detector* will affect were DVO Dust filters and it will reduce filtering where it finds edges.

**Default**: On

- Edge protection should normally be left on.

Further controls for defining thresholds for edges are available in the **Setup** tab.

- Edge parameter configuration is done inside the **Setup** section.

**Temporal Adaptation**

Temporal Adaptation acts to exclude falsely detected dust/dirt from being processed. It does this by comparing dirt detected on the current frame with dirt detected on the previous frame (within a sizable window).

This toggle button turns temporal adaptation on/off.

**Default**: Off

The temporal adaptation settings can be found in the **Setup** tab.

**Black / White**

There are two separate and independent parameter groups controlling the processing for Black (dark) and White (light) areas of dust/dirt.
Enable Black / Enable White

White/black dirt removal can be enabled via the corresponding toggle button.

- *Enable Black* - to remove black/dark spots
- *Enable White* - to remove white/light spots

Both can also be enabled at the same time.

**Default:** On

![Note that if neither button is enabled then DVO Dust will not filter at all!]

Use Adaptive

If on, sets white/black contrast to be *adaptive*.

**Default:** On

This will result in the algorithm determining which contrast setting is needed on a pixel-by-pixel basis. When enabled the contrast controls change to give more, or less, effect of the adaptive contrast.

Adptv Threshold

Only applicable if *Use Adaptive* is on.

**Range:** -32 to 31

**Default:** 0

Fixed Threshold

Only applicable if *Use Adaptive* is off.

**Range:** 0 to 63

**Default:** 30

You should lower the thresholds if you have very low contrast white spots on light background, or black spots on dark background, and increase the thresholds if the luminance difference between the spots and the background is less:
set the contrast threshold to a low value

set the contrast threshold to a high value

Contrast Adaptation Limits

<table>
<thead>
<tr>
<th>Adaptation Limits</th>
<th>Low</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>30</td>
<td></td>
</tr>
</tbody>
</table>

The contrast adaptation low and high limit controls only work in the adaptive mode and are used to specify the range of contrast settings that the adaptation is allowed to work in.

The upper limit is normally set to the non-adaptive contrast setting you normally use. If both limits are set to the same value the result is exactly the same as when using non-adaptive contrast.

**Low**

- Range: 0 to 63
- Default: 5

**High**

- Range: 0 to 63
- Default: 30
Other Settings

**Signal**

This selects the signal (channel) within which scratches/dirt will be detected.

- **Values**: Y,U,V,R,G,B,Y+U+V
- **Default**: Y

The adaptation works on *one channel only*, normally 'Y'. By setting the signal to 'R', for example, when only red scratches are visible, the DVO Dust will more precisely detect the dirt, minimizing the risk of affecting actual picture content.

**Motion Estimation**

This drop-down button allows you to choose the motion estimation.

- **Values**: off, normal, best
- **Default**: normal

When enabled, the motion estimation module gives a performance boost, both in dirt detection and concealment. This means that much more aggressive settings can be used without introducing smearing.

**Scene Change**

This drop-down button gives options for how to process the frames surrounding an edit/cut point:

- **Inside** - processes the frame before a cut using only the current and previous frame, and processes the frame after a cut using only the current and next frame. Stays inside the shot.
- **Across** - ignores cuts, use the previous, current, and next frame. Goes across shots.
- **Bypass** - doesn't process the frames before or after a cut.
Values: Inside, Across, Bypass  
Default: inside

Channels

This control is for selecting the channels from which dirt will be removed.

Normally the processing should be set to all channels, but in some cases, especially with small dirt, better results can be achieved by processing only one or two of the channels.

Values: Any combination of R,G and B.  
Default: R,G,B

Setup

View

Turning on the View toggle button will provide an overlay/preview showing detected dirt. The type of overlay can be selected via the View Mode drop-down list:

Default: Off

View Mode
Values: Dirt On Luma, Dirt On Red Input, Dirt On Red Output, Difference
Default: Dirt On Luma

Where:

- **Dirt On Luma** - The detected scratches/dirt are high-lighted on a *monochrome* input picture with lowered luminance.
- **Dirt On Red Input** - The detected scratches/dirt are shown with *red* on the *unprocessed* input signal.
- **Dirt On Red Output** - The detected scratches/dirt are shown with *red* on the *processed* output signal.
- **Difference** - The *difference* between the unprocessed input and the processed output is displayed.

**Colour**

![Colour: Linear (SMPTE)]

The drop-down list will default to the project setting for the input format. You need to set this control according to the material that you are working with. If the footage was shot with a *video* camera, select a *linear* format. If this control is not set correctly the material may not be processed properly.

Default: From Project

**History Required**

![History: 5 frames]

The *DVO Dust* effect is *recursive*.

*Recursive* means the result for any given frame depends on the result of the previous frame(s).

For best results a certain amount of frame *history* needs to be built up, and this numeric slider is used to specify how many frames of history to use.

Range: 0 to 15
Default: 5 frames

**Use Handles**

The *Use Handles* button controls whether the history includes available
handles of a scene/shot. Normally, the history frames accumulated will terminate on a shot edit/event (start/end edit). There may be extra frames available (handles) before or after the start and end edit points of a shot however and these will be included as history if **Use Handles** is set.

* If handles exist, full and precise processing will be available from the first frame of a clip.

**Default:** On

The remaining controls on the *Setup* page are used to optimize the processing further. These controls should only be used by experienced operators with a good understanding of the dirt and scratch concealment process.

**Max Filter**

Enable

In addition to the filter selected in the *Processing* tab, a separate *max filter* can be enabled.

The *Max Filter* will only be used when **Use Adaptive** is enabled in the *Processing* tab.

* This is very useful when you have material with mostly small dirt and the occasional bigger stains.

**Default:** Off

**Filter**

Use this drop-down button to select the max filter with which to process large stains.
Values: Spatial, Mixed 1, Mixed 2, Mixed 3, Mixed 4, Temporal 1, Temporal 2, Copy Prev, Copy Next, Bypass

Default: Temporal 1

When the Max Filter is enabled, the normal filter used for the adaptive filter sizing will take care of the small dirt. When the upper size limit is reached it will automatically switch over to the filter selected here.

The filter used here would typically be a larger temporal filter.

The Max Filter can also be set to Bypass, which will leave big stains unprocessed. These can be processed later by a de-blotcher or 3rd party software.

Size

This specifies the size of the spatial part of the filter (for spatial and mixed filter types).

Use a large value when processing large bits of dirt.

Range: 0 to 15
Default: 3

Motion

Width

Width: 30

MDC Scale: 8

Width

Motion Width is used in combination with the Motion control in the Processing section and defines the motion adaptation behaviour. When motion width is set to 0, the motion setting will be used as a threshold discriminating between moving and non-moving parts. When motion width is set to a non-zero value, the classification will change gradually from “no motion” to “full motion”. Motion width then specifies the size of the transition region.

Range: 0 to 255
Default: 30
### MDC Scale

The **MDC** (Motion Detection Current) toggle button in the Processing section determines whether to look at just the previous and next field/frame, or to look at all of the previous, *current*, and next field/frame.

*Only used if MDC (Motion Detection Current) control enabled in the Processing section.*

The higher the scale setting, the more filtering (less impact of the MDC algorithm).

- **Range:** 0 to 15
- **Default:** 8

### Edge

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Offset</td>
<td>45</td>
</tr>
<tr>
<td>Scale</td>
<td>192</td>
</tr>
</tbody>
</table>

*The Edge settings apply only if Edge protection has been enabled in the Processing tab.*

### Offset

The edge offset acts like a threshold, determining how well-defined edges have to be before the edge control has any effect. The smaller the offset value the sooner the edge control will have an effect.

- **Range:** 0 to 255
- **Default:** 45

### Scale

Edge scale sets the sensitivity of the edge control. The higher the setting the more pronounced the effect of the edge control.

- **Range:** 0 to 255
- **Default:** 192
Temporal

The purpose of temporal adaptation is to exclude falsely detected dirt from processing by comparing it with the previous frame’s detected dirt within a sizable window.

**Strength**

The strength level determines the amount of influence that the previous frame’s detected dirt will have on exclusion of dirt detection in the current frame. A higher value will result in more dirt being excluded and less processing carried out.

- **Range**: 0 to 255
- **Default**: 80

**Trim Size**

The trim size corresponds to a "window" in the previous frame which is searched for dirt to compare against the current frame. The smaller the window (trim size) the more filtering that will be achieved.

- **Range**: 0 to 7
- **Default**: 5

**Hit Growth**

The Hit Growth control is useful when the dirt in the image does not have very well-defined edges.
By increasing the hit growth the processor is told that the dirt is bigger than it actually appears. The result is that the soft edges also are processed.

**Mode**

**Absolute**

*Use Relative* button off.

The hit mask for all sizes of scratches are grown by the same amount as specified with the strength control

- **Range:** 0 to 4
- **Default:** 4

**Relative**

*Use Relative* button on (default)

In relative mode large scratches cause a larger growth.

- **Range:** 0 to 15
- **Default:** 10

The *Absolute* and *Relative* sliders control the amount of hit mask growth for each mode. The higher the value, the larger the area around the scratch that will be processed.
DVO Fix

*DVO Fix* facilitates the repair of specific areas and imperfections in a single frame, such as scratches, hairs and blotches. It also works for repairing larger damage such as punch holes, film tears and full frame reconstruction.

Using a brush or shape tool to select the damage, *DVO Fix* automatically repairs the selected area by comparing it to adjacent frames and applying motion compensation to recreate missing detail plus grain compensation to blend-in the recreated information. In addition to *Auto Fix* and manual *Clone*, an *Auto Clone* mode will automatically reposition and perform a best match of surrounding frames as an alternative to complete regeneration of content.

*DVO Fix* is not enabled by default. It is only enabled once an area to fix has been selected via the *Brush* or the *Rectangle* tool.

**Brush Menu**

<table>
<thead>
<tr>
<th>Size</th>
<th>20.000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rate</td>
<td>10.000</td>
</tr>
</tbody>
</table>

The brush tool appears in the viewer as an oval shape. Use this tool to fix an area by either clicking or clicking *and dragging* the brush.

**Size**

The size tool allows you to resize the brush in order to fix smaller/larger areas.

You can also resize the brush by holding down the *SHIFT* key (on either the keyboard or control panel), the left mouse button and dragging. The brush size will

- **Range**: 0.1 to 5000
- **Default**: 20 pixels
Rate
The rate tool applies to when you drag the brush, affecting how many brush 'stamps' are performed during the dragging motion.

Range: 2 to 1000
Default: 10

Rect Menu
The rectangle tool displays a cross-hair in the viewer, allowing you to draw a rectangle around the area that you want to fix. As soon as the rectangle has been drawn the DVO Fix effect will start processing.

Softness
The softness setting applies to the border outside of the rectangle and allows you to adjust how the outline blends into the surrounding area. This numeric slider takes values between 0-1.

Range: 0 to 1
Default: 0.2

Common Menu
The **Use Handles** button controls whether the tool uses *source handles* when rebuilding the frame. This is important at scene boundaries (edits) because the tool rebuilds using frames before and after the current frame.

Default: On

If this button is on, and we are at a scene boundary (start or end of shot), if we have handles we will use them as part of the rebuilding process.

If there are no handles, or this button is off, no before (or after) frames will (or can) be used at the scene start (or end), and this impacts the DVO Fix result.

Note that a *scene detected* timeline can have no shot handles, so **Use Handles** should be turned off.
Erase

The *Erase* button becomes enabled as soon as a fix is made to the current layer.

**Default:** Off

Turning on the *Erase* button will turn the brush into an *eraser* and applying this to the fixed area of your image will 'undo' previous fixes.

⚠️ You cannot erase changes to a *mixed-down* layer.

Mixdown

The *Mix Down* button becomes enabled as soon as a fix is made to the current layer.

Pressing *Mix Down* will make the changes to the current layer permanent, "burning" them into the image.

⚠️ This tool allows you to apply fixes with different settings to the same area.

Enable Grain

<table>
<thead>
<tr>
<th>Enable Grain</th>
<th>High</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Sharpness</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Saturation</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>
Enable Grain will turn on the grain compensation. This adds grain to the 'fixed' area as appropriate, blending the changes into the scene.

**Default:** Off

*The parameters are the same as for the DVO Regrain effect.*

**Colour**

The drop-down list will default to the project setting for the input format. You need to set this control according to the material that you are working with. If the footage was shot with a video camera, select a linear format. If this control is not set correctly the material may not be processed properly.

**Default:** From Project


DVO Flicker

*DVO Flicker* analyses the image sequence to remove brightness and chrominance fluctuations. These may be caused by varying exposure time, unsynchronised light sources, telecine transfer, aging film stock and/or film chemical related issues.

- Chrominance fluctuations are often termed *chroma breathing*.

The effect is enabled and the colour mode of the input set via the basic setup options:

**Setup**

The main configuration options are described below.

**Mode**

- **Mode: Location Invariant**

This parameter describes the general nature of the flickering. There is one setting current, *Location Invariant*. This is a flicker that occurs globally on a frame and is not isolated to portions within a frame.

- Future releases will include more *Mode* options.

**Temporal Window**

- **Temporal Window: 11**

  - Values: 5, 7, 9, 11
  - Default: 11

The *Temporal Window* specifies how many frames to use for the analysis.

- You should usually leave this at the default value.
Variation Control

Numeric slider, value range 0-1.

Range: 0 to 1
Default: 0.5

The Variation Control parameter sets how precise and controlled we are when we make adjustments for flicker. The higher the value we use, the more care is taken. Lower values allow for larger adjustments (less control).

Lower values (allowing larger adjustments) are best for simple scenes. Larger settings may be required to take better account of more complex and dynamic scenes with more real-world intensity changes (e.g. high-speed pans etc.).

Enhanced Adjust

Values: Off, Low, Medium, High
Default: Medium

This will apply further processing enhancements to deal with small scale variations (both local and global).

The High setting will apply a specialised noise filter and noticeably affect processing speed.

Max Adjust Limitation

Range: 0 to 10
Default: 4

This sets an adjustment limit to the general processing mode. The setting corresponds to a percentage (%) of the full signal.
Black Level Save lets us enable specific processing to preserve black levels in the sequence.

If enabled, the Low and High parameters are used to assign the level of processing performed at the lower (blackest) end of the input sequence. Both Low and High are 10 bit numbers and limited to values between 0 and 100 (out of the full 10 bit range, 1024).

**Low**

- **Range**: 0 to 100
- **Default**: 0

If the input level is less than or equal to the setting for Low, no flicker adjustment is performed and the input signal is untouched.

**High**

- **Range**: 0 to 100
- **Default**: 1

If the input level is greater than or equal to the setting for High, full flicker adjustment is performed.

*In between these values, there is a soft transition between none and full processing.*

**Chroma**

The Chroma button enables the removal of chrominance flicker (i.e. "colour breathing").

*The Chroma toggle removes luminance flicker as well (if present). However, for best performance, leave Chroma off unless you have chrominance flickering to remove.*
DVO Print Align

DVO Print Align uses a fully automatic process to align RGB separation prints, even if the offset varies over time.

**Basic Setup**

Enable

This toggle button allows you to enable/disable the effect. By default, as soon as the effect is added it is applied/enabled.

Colour

The drop-down list will default to the project setting for the input format. You need to set this control according to the material that you are working with. If the footage was shot with a video camera, select a linear format. If this control is not set correctly the material may not be processed properly.

**Default**: From Project

**Controls**

Reference Colour: Green

Fixed Colour: Green

Max Offset 100

Analyze Mode: Normal

Picture Noise: Normal

RCI Margins

Left 0

Top 0

Right 0

Bottom 0

**Reference Colour**

Select the component (Red, Green or Blue) that should be used as the reference.

**Values**: Red, Green, Blue

**Default**: Green
This is normally set to Green as more luminance (detail) is available in the component.

Fixed Colour
Select the component (Red, Green or Blue) to which all other should be locked.

- **Values**: Red, Green, Blue
- **Default**: Green

Normally select the component that is most aligned/stable.

Max Offset
Set the maximum adjustment that can be done in pixels.

- **Range**: 0 - 1000
- **Default**: 100 pixels

Analyze Mode
Determines how extensive an analysis is performed.

- **Values**: Normal, Extended
- **Default**: Normal
  - *Normal* - Works for most types of material
  - *Extended* - For more difficult material and highest safety. Slower.

Picture Noise

- **Values**: Low, Normal, High
- **Default**: Normal

Describes the noise level of the image.

ROI Margins
Sets the region for analysis. For best results in some cases, the frame borders can be included in the analysis. However if picture content is not locked to frame borders, it might be necessary to exclude frame borders using the Region Of Interest control. Individual control for Left/Top/Right/Bottom in pixels (starting from the image edge).

- **Range**: 0 TO 1000
- **Default**: 0
DVO Scratch

*DVO Scratch* processes vertical/continuous scratches.

These are typically those not being detected by dust/dirt removers, which are looking for random defects in the picture. The process is fully automatic and has an advanced detection algorithm with a fill-in result far superior to the normal process of hiding the defect using information from both sides of the scratch.

**Basic Settings**

- **Enable**

  This toggle button allows you to enable/disable the effect. By default, as soon as the effect is added it is applied/enabled.

- **Colour**

  The drop-down list will default to the project setting for the input format. You need to set this control according to the material that you are working with. If the footage was shot with a video camera, select a linear format. If this control is not set correctly the material may not be processed properly.

  **Default**: From Project

**Scratch Detection Parameters**

<table>
<thead>
<tr>
<th>Detect Parameters</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Colour Mode: Y</td>
<td>Scratch Type: White</td>
<td></td>
</tr>
<tr>
<td>Column Aggress.: 0.500</td>
<td>Scratch Width: Normal</td>
<td></td>
</tr>
<tr>
<td>Pixel Aggress.: 0.500</td>
<td>Image Noise Level: 0.300</td>
<td></td>
</tr>
</tbody>
</table>

**Colour Mode**

This determines the image channels detection is undertaken in.

- **Values**: Y, R+G+B, R,G,B
- **Default**: Y

where :
Y

*Luminance* detection only (fastest).

**R+G+B**

Separate detection in R, G and B channels.

Processing of each channel is based on the combined result from the detection.

**R,G,B**

Separate detection in R, G and B channels.

Each detection channel affects the corresponding processing channel.

### Column Aggressiveness

**First** stage detector *aggressiveness*, which determines what columns (and pixels) are selected as scratch candidates to be processed. The *higher* the setting, the more aggressive.

- **Range**: 0.0 - 1.0
- **Default**: 0.5

### Pixel Aggressiveness

**Second** stage detector *aggressiveness*, which is a modifier for pixel selection within the selected columns (from the first stage). The *higher* the setting, the more aggressive.

- **Range**: 0.0 - 1.0
- **Default**: 0.5

### Scratch Type

Used to describe scratch *characteristics*. For moderate scratches, typically choose the specific scratch type evident in the material. In case of very *heavy* scratches, with emphasised edges, it can be advantageous to select *W+B*.

- **Values**: White, Black, W+B
- **Default**: White

- *White* - for white (brighter) scratches.
- *Black* - for black (darker) scratches
- *W+B* - for a mixture of black and white scratches

ℹ️ Do not use *W+B* as a default setting as it will sometimes process too much in the picture.
Scratch Width
Sets the width-profile for scratches.

Values: Thin, Normal, Wide
Default: Normal

If detection/processing is insufficient in areas which have many scratches close by, a Wide setting is recommended.

Image Noise Level
Characterises the level of noise in the image. Image noise will affect the accuracy of detection.

Range: 0.0 - 1.0
Default: 0.3

Processing Parameters

<table>
<thead>
<tr>
<th>Process Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colour Mode: RGB</td>
</tr>
<tr>
<td>Base Strength: 0</td>
</tr>
<tr>
<td>Residual Strength: 0.500</td>
</tr>
</tbody>
</table>

Colour Mode
This determines the colour mode of scratches we detect and process.

Values: RGB, YUV
Default: RGB

where:

- YUV - for monochrome scratches
- RGB - for colour scratches

⚠️ YUV colour mode can not be used in detector mode R,G,B.
Base Strength
Determines base strength of the processing. This affects properties such as smoothness (as might be noticed in wide scratches).

- **Range**: -3 to +3
- **Default**: 0

Residual Strength
Determines the strength of processing the "residuals" e.g. very jagged scratch may need additional processing.

- **Range**: 0.0 - 1.0
- **Default**: 0.5
DVO Steady

*DVO Steady* is used to reduce unsteadiness due to *film weave* during scanning or camera shakes during capture of footage. A two pass solution, including advanced motion estimation, provides better separation of random instability and pan/tilt movements.

DVO Steady can be used for both film and progressive video material.

The two passes are:

- Analyze - data collection
- Processor - actual processing

Analysis

The first pass collects analysis data from the pictures. This is used in the processing stage.

The default settings work with most types of material, so just enable the Analyze control and let the shots be analyzed before processing takes over.

*A key frame* is added for every analyzed frame containing the analysis data. Complete analysis of the selected clip(s) should be done before looking at the result and adjusting the processing parameters.
Mode, Size and Density

Mode

Values: Full, Centre Weighted, Border Weighted, Frame Only
Default: Full

- Full - Complete frame
- Centre Weighted - Complete frame with priority towards centre
- Border Weighted - Complete frame with priority towards borders
- Frame Only - Only analyzes film frame edge (i.e. requires complete frame edges).
  This is further specified by the "Frame Only Border Enable" controls.

Frame Only mode is fastest.

Size

Sets analyzer size, which should be related to image size and motion.

Values: Small, Medium, Large
Default: Medium

Size affects processing time. The larger the size, the more processing required.
### Size Setting

<table>
<thead>
<tr>
<th>Size Setting</th>
<th>Suitable For</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small</td>
<td>SD - low/normal motion</td>
</tr>
<tr>
<td></td>
<td>HD/2K - low motion</td>
</tr>
<tr>
<td></td>
<td>Frame Only mode (any format)</td>
</tr>
<tr>
<td>Medium</td>
<td>SD - normal/high motion</td>
</tr>
<tr>
<td></td>
<td>HD/2K - normal motion</td>
</tr>
<tr>
<td></td>
<td>Default</td>
</tr>
<tr>
<td>Large</td>
<td>HD/2K - high motion</td>
</tr>
<tr>
<td></td>
<td>4K - low/normal motion</td>
</tr>
</tbody>
</table>

### Density

Determines the amount of analysis within the frame.

**Values:** Small, Medium, High  
**Default:** Medium

- **Low** - Lowest safety margin - less accurate  
- **Medium** - Normal safety  
- **High** - Increased safety margin, more accurate

Processing time increases with the density.

### Region of Interest

Set or find active area of picture - the region of interest to be analysed.

**Values:** Disabled, Specific  
**Default:** Specific

- **Disabled** - use complete frame  
- **Specific** - set region of interest via additional parameters below
ROI Size

This is the number of pixels from each edge where the frame (active area) starts.

- **Range**: 0 to 2048
- **Default**: 0 pixels

Only borders which have visible “non-clipped” film frame edges must (can) be used and Region of Interest must be set to include those.

Processing

Processing parameters are applied to the pictures in accordance with the result from the analyze pass.

Basic Setup

Enable

This toggle button allows you to enable/disable the effect. By default, as soon as the effect is added it is applied/enabled.

Colour

The drop-down list will default to the project setting for the input format. You need to set this control according to the material that you are working with. If
the footage was shot with a video camera, select a linear format. If this control is not set correctly the material may not be processed properly.

Default : From Project

**Analyze**

This toggle button enables the analysis function.

- Currently, once analysis is complete, it should be turned off to enable rendering.
- After analysis, if you change any of the processing parameters you will need to re-run the analyse step.

**Peak / XOffs / YOffs**

Once analysis is complete, these display some statistical results.

**Aggressiveness**

<table>
<thead>
<tr>
<th>Aggressiveness</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>5</td>
</tr>
<tr>
<td>Y</td>
<td>5</td>
</tr>
</tbody>
</table>

This parameter determines how aggressive the effect should be in attacking unsteadiness.

- Range : 1 - 10
- Default : 5

Low values are used for fine errors (small and quick) e.g. introduced by a scanner/telecine and does not try correct for slower and larger movements.

High values does not only take care of fine errors but also handles coarse errors (large and slow) like very old material or handheld/shaky cameras.

**Reduction**

<table>
<thead>
<tr>
<th>Reduction</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>100.00</td>
</tr>
<tr>
<td>Y</td>
<td>100.00</td>
</tr>
</tbody>
</table>
Used to set how much the unsteadiness should be decreased, with separate controls for horizontal (X) and vertical (Y) reduction.

- **Range**: 0 - 100
- **Default**: 100%

- **Reduction** is typically set to 100% to achieve maximum correction.

- A bit of residual unsteadiness might be necessary to create a more natural result sometimes e.g. a camera shaking during frame capture resulting in motion blur.

### Max Adjust

<table>
<thead>
<tr>
<th>Max Adjust</th>
<th>20.000</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Y</td>
<td></td>
</tr>
</tbody>
</table>

Sets a maximum limit (in pixels) for how much the process is allowed to adjust the stabilized frames, with separate horizontal (X) and vertical (Y) controls.

- **Range**: 0 - 100
- **Default**: 20 pixels

### Motion Safety

<table>
<thead>
<tr>
<th>Motion Safety</th>
<th>5</th>
</tr>
</thead>
</table>

Adaptively reduces the unsteadiness correction based on motion.

- **Range**: 0 - 10
- **Default**: 5

In high motion sequences, errors are more likely to occur. A high **Motion Safety** setting limits the allowed unsteadiness correction so that any errors will become less obvious.

- A low setting ignores almost all motion.
Quality Safety

Adaptively reduces the unsteadiness correction in accordance with an analyze quality measure recorded during the analyse pass.

- **Range**: 0 - 10
- **Default**: 3

Under certain circumstances, the analysis may be complex and more difficult. This is signaled by a *quality* value.

When the analysis quality is low, errors are more likely to occur. In this case a high setting of the *Quality Safety* control limits the allowed unsteadiness correction in such parts of the material, so that any errors will become less obvious.

*A low setting generally ignores the analysis quality.*

Mask

- **Mode**: Follow Max Adjust
- **Size**: 20
- **Soft Border**
- **Zoom**: Disable

Mode

Determines if and how the (shaking) borders should be masked.

- **Values**: Disable, Follow Max Adjust, Specific
- **Default**: Follow Max Adjust

where:

- *Follow Max Adjust* - Use settings as per *Max Adjust* parameter
- **Specific** - use settings as per **Max Size** parameter

### Size
Sets the mask size for Specific mode.

- **Range**: 0 - 100
- **Default**: 20

### Soft Border
When **Enabled (default)**, creates a soft border where the picture has been clipped.

- ![A soft border can give a more natural look.](image)

### Zoom
Enlarges the picture according to selected mode.

- **Values**: Disable, To Blanking, Fill Screen (Letter/Pillar Boxed), Fill Screen (Full)
- **Default**: Disable

- **Disable** - No zoom - **Default**
- **To Blanking** - Enlarges to specified blanking (see below)
- **Fill Screen (Letter/Pillar Boxed)** - Enlarges picture until either full vertical or full horizontal size is reached.
- **Fill Screen (Full)** - If necessary, makes a cutout to fill the complete frame (i.e. no black borders/blanking)

- ![All modes keep the correct aspect ratio](image)

### Blanking

<table>
<thead>
<tr>
<th>Blanking: Specific</th>
</tr>
</thead>
<tbody>
<tr>
<td>Border Size</td>
</tr>
<tr>
<td>Left 0</td>
</tr>
<tr>
<td>Top 0</td>
</tr>
<tr>
<td>Right 0</td>
</tr>
<tr>
<td>Bottom 0</td>
</tr>
</tbody>
</table>

© 2014 Digital Vision
The *Blanking Mode* determines whether to use a masked or a full image.

Set blanking mode to *Specific* and specify *Blanking Size* if blanking (mattes) should be added to the processed pictures.

- *Disable* - Use complete image
- *Specific* - Apply blanking (mattes) according to Blanking Size controls
- *Default*

**Border Size**

- **Range**: 0 - 2048
- **Default**: 0 pixels

This specifies the number of pixels from each edge of the picture.

**Scene Cut**

- **Scene Cut**
  - **Start**: Medium Safety
  - **End**: Medium Safety

Determines if the first/last frame of a scene/shot should be adjusted (Low/Medium/High Safety) or not (Fixed). Start and End mode are set separately.

* Under certain circumstances (typically for very unsteady material), a *Fixed* setting might look wrong.
DVO Alias takes care of the negative side effects of out-of-band vertical frequencies that show up on-screen as line flicker or “twitter”. This is commonly seen in footage containing venetian blinds or car grills.

Parameters

Enable
This toggle button allows you to enable/disable the DVO Alias effect. By default, as soon as the effect is added it is applied/enabled.

Cutoff Frequency
This controls the amount of filtering and selects for the maximum vertical bandwidth to keep. A setting of 100% equals a full bypass.

You should start at a high value and lower until the flickering has been removed.

Range: 0 to 100
Default: 70%

Colour
The drop-down list will default to the project setting for the input format. You need to set this control according to the material that you are working with. If the footage was shot with a video camera, select a linear format. If this control is not set correctly the material may not be processed properly.

Default: From Project
DVO Aperture

The DVO Aperture tool is a high quality frame-based spatial filter that increases the apparent sharpness of the picture.

This is a critical function when dealing with film scans and compensates for the loss of high frequency information generated in the film scanner. Problems requiring aperture correction arise in a scanning system when the frequency response falls off as the effective wavelength of the detail to be resolved in the image approaches the dimension of the scanning aperture.

The aperture processor normally increases response to high frequency content in the signal, thus adding subjective sharpness to the picture.

Aperture correction should therefore be employed as the last process in the chain.

Parameters

Enable
This toggle button allows you to enable/disable the DVO Aperture effect. By default, as soon as the effect is added it is applied/enabled.

Horizontal / Vertical
Separate controls for the amount of horizontal and vertical aperture correction. Allowed values are from 0 to 100% in increments of 10%.

Values: 0 - 100% (in 10% increments)
Default: 0%

Colour
The drop-down list will default to the project setting for the input format. You need to set this control according to the material that you are working with. If the footage was shot with a video camera, select a linear format. If this control is not set correctly the material may not be processed properly.

Default: From Project
DVO Brickwall

*DVO Brickwall* helps reduce signal entropy making *compression* easier. It provides an extremely sharp cut-off beyond a user defined frequency, enabling you to create an accurately defined spectral content of material for various types of compression pre-processing.

This means that compression artefacts can be reduced and the quality of the compressed image can usually be greatly improved.

Enable

This toggle button allows you to enable/disable the *DVO Brickwall* effect. By default, as soon as the effect is added it is applied/enabled.

Colour

The drop-down list will default to the project setting for the input format. You need to set this control according to the material that you are working with. If the footage was shot with a *video* camera, select a *linear* format. If this control is not set correctly the material may not be processed properly.

**Default**: From Project

Parameters

<table>
<thead>
<tr>
<th>Filter</th>
<th>Cutoff</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type: Rect Sharp Film</td>
<td>Horizontal</td>
</tr>
<tr>
<td>Size: Normal</td>
<td>Vertical</td>
</tr>
<tr>
<td></td>
<td>Sharpness</td>
</tr>
</tbody>
</table>

Filter

**Type**

**Values**: Rect Sharp Film, Rectangular, Circular, Diagonal

**Default**: Rect Sharp Film
**Size**

**Values**: Small, Normal, Large  
**Default**: Normal

**Cutoff**

This numeric slider allows you to precisely control the horizontal filtering of the luminance, as a percentage of the maximum bandwidth. A setting of 100% equals a full bypass.

**Horizontal**

**Range**: 10 to 100  
**Default**: 70

**Vertical**

**Range**: 10 to 100  
**Default**: 70

**Sharpness**

**Range**: 0 to 15  
**Default**: 0
DVO Clarity

*DVO Clarity* is the fifth generation *noise* and *grain* reducer from Digital Vision and is designed to **automate** as much configuration as possible while still producing the highest quality output. The new *DVO Clarity* algorithms are designed to preserve detail and keep the original image sharpness, while being artifact free.

*DVO Clarity* includes:

- Automated *grain characteristic analysis*
- An enhanced *motion estimation* engine
- Detail enhancement
- A new *spatio-temporal filter*

![Enable Toggle](image1)

**Enable**

The *Enable* toggle button allows you to enable/disable the effect. By default, as soon as the effect is added it is applied/enabled.

**Colour**

The drop-down list will default to the project setting for the input format. You need to set this control according to the material that you are working with. If the footage was shot with a *video* camera, select a *linear* format. If this control is not set correctly the material may not be processed properly.

*Default*: From Project
Process

The Process group sets the basic processing parameters for the DVO Clarity algorithms.

**Amount**
- Range: 0 to 100
- Default: 75

The Amount parameter sets the overall level of noise/grain reduction.

**Aggressiveness**
- Range: 0 to 100
- Default: 50

Aggressiveness sets how far and how strongly we attempt to reduce noise/grain taking motion into account. The higher the value the more motion we ignore.

* Care should be taken because at higher settings there is an increased risk of introducing motion artifacts.

Details

The Details group controls the level of detail preservation versus noise/grain reduction performed.

**Base Level**
- Range: More, Less, Auto
- Default: Auto

The Base Level sets the overall bias used for preserving detail. When set to Auto (the default), the algorithm will adapt automatically. Setting this to Less or More will change the overall detail preservation bias such that:
• Less - try and preserve less detail
• More - try and preserve more detail

**Preservation**

- Range: 0 to 100
- Default: 75

Given the Base Level, the Preservation parameter will fine-tune detail preservation. Higher settings preserve more detail.

**Detail Preservation Workflow**

Analyse the shot and note the amount and size of any noise artifacts (e.g. grain size). Based on this and the level of detail in the shot, we can choose settings for the Details parameters.

<table>
<thead>
<tr>
<th>Detail Level</th>
<th>Example Settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low detail</td>
<td>Base Level: Less</td>
</tr>
<tr>
<td>No detail below average noise/grain size</td>
<td>Preservation : 0</td>
</tr>
<tr>
<td>Higher detail</td>
<td>Base Level: More</td>
</tr>
<tr>
<td>Detail observable below average size of noise/grain</td>
<td>Preservation : 100</td>
</tr>
</tbody>
</table>

**Speed and Quality**

- Range: Highest Speed, Highest Quality, Balanced
- Default: Balanced

By default, we try to balance the quality of our output with the amount of processing time we use to produce it. The Speed vs Quality setting lets you adjust this trade-off between quality and processing time used.
Intensity per Channel

The intensity of noise and grain might be very different in the low, mid and high-lights of the picture. As part of the automatic analysis undertaken for each shot, DVO Clarity calculates the intensity distribution of noise/grain in each component (red, green and blue). The calculated distribution is displayed as a graph.

* The graph is calculated per shot.
DVO Grain

Digital Vision DVO Grain algorithm is specifically designed to manage the look of film grain and to reduce unwanted electronic noise in film or video originated material. Uses include restoration, compression pre-processing, and image processing of new feature film, television and commercial material.

The Grain algorithm incorporates the Digital Vision Emmy award-winning PHAME advanced motion estimation technology along with edge-preserving 3-D spatio-temporal filters and temporal (recursive) filters to allow artists to produce clean, sharp pictures and to match the look of film grain from shot-to-shot (including grain matching for underexposed film). The process of adaptively selecting the best mix of spatial and recursive filtering for each pixel is unique to the DVO Grain algorithm.

This effect has four groups of parameters:

The **Enable** toggle button allows the complete effect to be turned on or off.

- Basic mode - basic settings for a quick de-grain
- Processing - specific processing options
- Key - keyed settings for chroma adaptation
- Setup - settings for various processing selections

Basic Settings and Presets

The DVO Grain Basic mode provides simple control of the grain/noise reduction without sacrificing performance. Basic mode is a good starting point before using the more advanced settings in the Processing and Setup tabs (if necessary).
Enable Basic

The *Enable Basic* toggle button allows you to enable/disable *DVO Grain* basic mode.

When you edit any of the settings in the *Processing* or *Setup* tabs basic mode becomes *disabled* automatically. Similarly, when you select a *Mode* from the basic modes, all settings in the *Processing* or *Setup* tabs will be adjusted automatically to fit the selected mode and basic mode will be automatically *enabled*.

Presets

The *Mode* sets a basic preset level of grain reduction:

- **Values**: Default, Film fine (or video), Film medium, Film coarse
- **Default**: Default

*Default* is roughly equivalent to *Film medium*

Strength

The amount of grain/noise reduction is automatically set up in the basic mode. This slider control allows you to tune this, and increase or decrease the amount of grain reduction done.

- **Range**: -2 to 2
- **Default**: 0

Out Mix

The *Out Mix* control determines the *mix* between the processed image (with grain removed) and the input image to give the final output image.
This makes it possible to mix in some of the original grain into the processed picture for a better film look.

**Range:** 0 to 100  
**Default:** 100%

The default value of 100% results in an output with full grain removal, whilst a setting of 0% results in an output equal to the input image.

This control is also available in the *Processing* section and changes here are mirrored there.

**Processing Filters**

Temporal and spatial filters are available on the *Processing* screen.

*DVO Grain* utilizes a process that adaptively selects the best mix of spatial and temporal (recursive) filtering for each pixel.

Start with the *basic* mode enabled, selecting the most appropriate setting. If necessary, adjust the processing by disabling basic mode and continuing to the more advanced settings. In many cases, advanced mode will not be necessary.
Temporal Filtering

The temporal or recursive filtering is the most effective filter in terms of reducing grain/noise.

Temporal Strength

Use the numeric sliders to set the amount/level of temporal recursive filtering in each channel.

- **Range**: 0 to 15
- **Default**: 7

Do not use higher settings than 11-12 except in extreme situations. Also note that both Chroma trim and Pos/Neg trim (see below) will add their values to these set strengths.

Temporal Global

Use this toggle button to turn **Temporal Global** on/off.

- **Default**: Off

The DVO Grain is an **adaptive** grain and noise reducer. This means it disables the temporal/recursive processing of all moving edges within the image to assist in the reduction of motion artifacts.

**Temporal Global** enables filtering of the whole picture regardless of motion for maximum temporal filtering.

Temporal global should normally be set to **Off** and only used in extreme situations, or to create a motion smearing effect.

Enabling **Temporal Global** might cause excessive smearing in the picture.
In addition to the above controls, the motion sensitivity control on the Setup section adapts the temporal filtering in respect to grain size and intensity.

**Spatial Filtering**

<table>
<thead>
<tr>
<th>Spatial Strength</th>
<th>Spatial Size</th>
<th>Spatial Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green</td>
<td>6</td>
<td>Green 5</td>
</tr>
<tr>
<td>Blue</td>
<td>6</td>
<td>Blue 5</td>
</tr>
<tr>
<td>Red</td>
<td>6</td>
<td>Red 5</td>
</tr>
<tr>
<td>Spatial Global</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Edge-preserving spatial filtering complements the adaptive temporal filters by processing grain and noise in portions of the image that are detected as being in motion, while leaving non-moving areas unaffected. The spatial filtering is done before application of the temporal filters and works in unison with DVO Grain’s motion processing.

### Spatial Strength

This is the overall level of spatial filtering applied in each channel. Normally, they should match the temporal strength.

- **Range:** 0 to 15
- **Default:** 7

### Spatial Size

The **Spatial Size** drop-down lists adjust the spatial size of the grain/noise, in pixels, for each channel.

- **Values:** 1,3,5,7,9
- **Default:** 7

Setting R, G, B spatial size equally will give best performance.

### Spatial Threshold

The spatial threshold determines when to filter, depending on the intensity of the surrounding pixels.

- **Range:** 0 to 100
- **Default:** 7
Use the spatial threshold sliders to adjust the setting for each channel.

If there is a high enough intensity/contrast (e.g. an edge) between the grain/noise and surrounding pixels, filtering will **not** occur.

- A low setting will only affect low intensity pixels (flat areas). A high setting will start to affect high intensity pixels (edges)

**Spatial Global**

This enables filtering of the whole picture by switching off the motion adaptation.

Use this toggle button to enable/disable global spatial filtering.

- **Default**: Off

A moderate level of *global spatial* filtering can be used as a *basic* level of grain and noise reduction before using the temporal filtering (also see Global Balance).

- This may cause excessive softening of the picture if the spatial filter is not set up correctly.

- Temporal filtering works in areas with no or little motion. Spatial filtering works in areas of motion. Global enable the filters to work on the entire picture.

- The R, G, B Strength controls should normally be ganged and adjusted together. They typically need to be adjusted by the same amount.

**Optimising the Spatial Filter**

1. Set Spatial Strength, Size and Threshold to their maximum
2. Turn Spatial Global on
3. Adapt the spatial filter to the grain/noise size by decreasing the spatial size settings to as low as possible whilst still resulting in grain/noise being removed
4. Decrease spatial threshold until edges are not affected (a typical setting is between 8-20%)
5. Decrease spatial strength until the desired level of spatial filtering is achieved
6. Decide whether *Spatial Global* should be left on (filtering of the whole picture), or turned off (filtering only in areas with motion).
Starting with enabling *Basic mode* and selecting one of the available preset modes will automatically set up spatial threshold/size.

**Chroma Trim**

<table>
<thead>
<tr>
<th>Chroma Trim</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
</tr>
</tbody>
</table>

The *Chroma Trim* controls are used to adjust the grain/noise reduction on each selected colour. This allows for the boosting or cutting of both the spatial and temporal filter settings within the selected colour.

- **Range**: -8 to 7
- **Default**: 0

The colours 1, 2, 3, are selected via the key tab, as described in the *Chroma Adaptation* section below.

- **Pos/Neg Trim**

Having a temporal strength of 7, setting up chroma adaptation for a red colour and corresponding trim to +2, will set the temporal strength to 7+2=9 for areas in the picture that contain the selected red colour.

**Other**

<table>
<thead>
<tr>
<th>other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pos/Neg Trim</td>
</tr>
<tr>
<td>Out Mix</td>
</tr>
<tr>
<td>Global Balance</td>
</tr>
<tr>
<td>Motion Est Normal</td>
</tr>
</tbody>
</table>

**Pos/Neg Trim**

The *Pos/Neg Trim* control works in conjunction with the Pos/Neg mode controls in the *Setup* section. Having selected the mode and luma thresholds.
in the Setup section, use the Pos/Neg Trim control to adjust the noise reduction levels equally for all RGB channels in highlights (Neg) or lowlights (Pos).

**Range**: 0 to 7  
**Default**: 0

- **Having a temporal strength of 7, setting up neg mode to neg and the pos/neg trim to +2, will set the temporal strength to 7+2=9 for highlights.**

- **Processing is slower using trims. Even if Temporal/Spatial strengths are at 0, Pos/Neg Trim will still add to this and result in processing within highlights or lowlights.**

**Out Mix**

This control is the same as the Out Mix control available in the basic mode tab, and changes here are mirrored there.

**Range**: 0 to 7  
**Default**: 0

**Global Balance**

*Global Balance* allows a combination of the basic level of spatial filtering and motion adaptive spatial filtering.

Maximum filtering according to spatial strength is achieved in areas with motion.

The *Global Balance* slider allows you to set a minimum level of spatial filtering, rather than having the level set entirely based on motion detection. If the slider is set to 0, then parts of the image with no motion will receive no spatial filtering. Increasing the slider increases the spatial filtering of areas with little or no motion.

**Range**: 0 to 100  
**Default**: 50

**Motion Estimation**

DVO Grain is a fully motion compensated noise/grain reducer. This means that much more aggressive settings can be used without introducing smearing.
The motion estimation drop-down button allows you to set the motion estimation to:

**Range:** Off, Normal, Best  
**Default:** Normal

⚠️ The *Best* setting is good for fast motion but is slower than *Normal*. In almost all cases, *Normal* or *Best* should be used.

### Key (Chroma Trim)

The *Key (chroma adaptation)* function can be used to adjust the levels of grain/noise reduction in user selectable colour regions.

⚠️ For example, this feature can be used for greater grain/noise reduction in sensitive areas such as a blue sky, or less noise reduction in skin tones.

Three independent channels of chroma adaptation allows adjustment of noise reduction levels (both spatial and temporal) in the regions of the selected colour.

These selectable colours are labelled 1, 2 and 3.

⚠️ Only colours with a saturation higher than approximately 5% will be detected.

Use the *Key* screen to adjust the hues and widths to isolate the colours in each channel:
Click a colour picker toggle button to enable/disable colour picking from the displayed monitor image:

<table>
<thead>
<tr>
<th>Enable picker</th>
<th>hue 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pick area of colour from image using the mouse</td>
<td></td>
</tr>
</tbody>
</table>

You can also select the selected hue by clicking on the hue bar with the left mouse button and dragging the hue bar left and right:

Drag on hue bar and/or orange box indicators to alter hue selection.

After selecting the colours using the key tab, the corresponding Chroma Trim control in the Processing tab may be used to adjust the grain/noise reduction for each selected colour. Chroma Trim allows for the boosting or cutting of both the spatial and temporal filter settings within the selected colour.

* Even if Temporal/Spatial strengths are at 0, Chroma Trim will still add to that number and resulting in processing within selected colour.
Setup

The Setup screen allows various other effect parameters to be configured.

**Colour**

The drop-down list will default to the project setting for the input format. You need to set this control according to the material that you are working with. If the footage was shot with a *video* camera, select a *linear* format. If this control is not set correctly the material may not be processed properly.

**Default:** From Project

**History Required**

The *DVO Grain* effect is *recursive*.

> *Recursive* means the result for any given frame depends on the result of the previous frame(s).

For best results a certain amount of frame *history* needs to be built up, and this numeric slider is used to specify how many frames of history to use.

**Range:** 0 to 15

**Default:** 5 frames
Use Handles

The **Use Handles** button controls whether the history includes available handles of a scene/shot. Normally, the history frames accumulated will terminate on a shot edit/event (start/end edit). There may be extra frames available (handles) before or after the start and end edit points of a shot however and these will be included as history if **Use Handles** is set.

> If handles exist, full and precise processing will be available from the first frame of a clip.

**Default:** On

The remaining controls on the **Setup** page are used to optimise the processing further. These controls should only be used by experienced operators with a good understanding of the dirt and scratch concealment process.

**Motion Sensitivity**

This drop-down allows you to set the level of sensitivity.

- **Values:** Low, Medium, High
- **Default:** Medium

Motion sensitivity adapts the temporal filtering with respect to grain size and intensity.

- Motion sensitivity has great impact on processing and the type of filter (spatial/temporal) being used.
- It may be better to set **Motion Sensitivity** to **Low** rather than just increasing filter strengths.
Spatial Filter

Spatio - Temporal

Enabling this extends the spatial filter to become a 3D spatio-temporal filter, by including the use of temporal taps. This can enhance the noise reduction achieved.

Default : On

Temporal Mix

The temporal mix controls the balance between the spatial and temporal taps of the spatio-temporal filter.

Values : Low, Medium, High, Full
Default : High

This setting affects the noise reduction achieved by the spatio-temporal filter, with more noise reduction for the higher settings.

For fast motion material and a higher than default spatial filter threshold setting, a high temporal mix setting may increase the probability of artifacts. In such cases, this setting may be lowered. For a lower than default spatial filter threshold setting, the Full setting may be used.

The default setting High should be safe in most circumstances.

Spike

This setting enhances the spatial filter performance by incorporating a spike adaptation.

Values : Off, Narrow, Medium, Wide
Default : Medium

The setting relates to the grain/noise characteristics. A low setting (e.g. Narrow) is suitable for smaller grain and noise sizes and/or less pronounced variations in amplitudes.
A high setting (e.g. **Wide**) is suitable for larger grain/noise and/or more pronounced variations in amplitudes.

> Setting *spike* to **Narrow** in conjunction with setting *Motion Sensitivity* to **High** and *Motion Estimation* (in the **Processing** screen) to **Best** can help avoid motion estimation errors caused by noisy / grainy material.

**Pos/Neg Profile**

The Pos/Neg profile allows the user to select the amount of noise reduction (both spatial and temporal) applied to the highlights or lowlights within the image.

> This function is important when dealing with grainy images in positive or negative film stock. Positive film will generally show more grain in the lowlights whilst Negative film will generally show more noise in the highlights.

**Neg**

- **Values**: Positive, Negative
- **Default**: Positive

Parameters:

- **Positive** - more grain reduction in lowlights
- **Negative** - more grain reduction in highlights (Film mode)

Having selected the mode, you need to set the *Pos/Neg Trim* level on the **Processing** screen. This will adjust the noise reduction levels equally for all RGB channels in highlights (Neg) or lowlights (Pos).
**Luma Thresholds**

The range of luminance values affected by the *Pos/Neg Trim* can be set by two luma thresholds.

**Luma Threshold Low**

- **Range**: 0 to 50
- **Default**: 0% Luma

**Luma Threshold High**

- **Range**: 50 to 100
- **Default**: 100% Luma

These two thresholds determine the point in highlights and lowlights where the Pos or Neg trim is at its maximum.

The effect of the Trim will gradually decrease between these two points.
DVO Regrain

*DVO Regrain* allows you to quickly set up and generate natural looking film grain. The intuitive controls enable you to match almost any type of film stock by setting the grain size and sharpness as well as matching the characteristics of highlight and lowlight intensity behaviour.

![Before](image1.png) ![After](image2.png)

**Enable**

This toggle button allows you to enable/disable the effect. By default, as soon as the effect is added it is applied/enabled.

**Colour**

The drop-down list will default to the project setting for the input format. You need to set this control according to the material that you are working with. If the footage was shot with a *video* camera, select a *linear* format. If this control is not set correctly the material may not be processed properly.

**Default**: From Project
Parameters

<table>
<thead>
<tr>
<th>Size</th>
<th>1</th>
<th>Overall</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sharpness</td>
<td>50</td>
<td>Low</td>
<td>100</td>
</tr>
<tr>
<td>Saturation</td>
<td>50</td>
<td>High</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Midpoint</td>
<td>10</td>
</tr>
</tbody>
</table>

Size

Desired pixel size of the grain.

- **Range**: 0 to 3
- **Default**: 1 pixel

Sharpness

Determines the sharpness of the edges of the grain.

- **Range**: 0 to 100
- **Default**: 50%

Saturation

Determines the colour saturation of the grain.

- **Range**: 0 to 100
- **Default**: 50%

Overall

Overall amount of grain added.

- **Range**: 0 to 400
- **Default**: 100%

Low

Specifies the amount of film grain to be added in low light (dark) areas. The film grain added is in addition to the overall film grain, as specified in Overall Amount (above).

- **Range**: 0 to 400
- **Default**: 100%
High

Specifies the amount of film grain to be added in high light (light) areas. The film grain added is in addition to the overall film grain, as specified in Overall Amount (above).

Range: 0 to 400
Default: 100%

Midpoint

Midpoint Balance controls the amount of the frequency range considered to be high light and low light, and thus affects how the low light and high light amounts are applied.

Range: 0 - 20
Default: 10

※ To treat more of the spectrum as high light, enter a low number. To treat more of the spectrum as low light, enter a positive number. If "10" is entered, the gradual change between low and high lights is completely linear.
DVO Sharpen

*DVO Sharpen* is an advanced sharpening tool that greatly enhances out-of-focus shots. It uses *adaptive* picture analysis and processing to yield excellent results without the common side effects associated with standard algorithms (such as amplified grain, noise, or halos around areas that were already sharp).

**Enable**

This toggle button allows you to enable/disable the *DVO Sharpen* effect. By default, as soon as the effect is added it is applied/enabled.

**Colour**

The drop-down list gives two choices of input colour format, *log* or *video*. You need to set this control according to the material that you are working with. If the footage was shot with a video camera, select *video*. If this control is not set correctly the material may not be processed properly.

**Default : From Project**
Parameters

<table>
<thead>
<tr>
<th>Overall Strength</th>
<th>Low Detail Sharp</th>
<th>Lowlight Trim</th>
<th>Spatial Strength</th>
<th>High Detail Sharp</th>
<th>Highlight Trim</th>
<th>Crispness</th>
<th>Image Noise Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>100</td>
<td>0</td>
<td>100</td>
<td>100</td>
<td>0</td>
<td>150</td>
<td>1</td>
</tr>
</tbody>
</table>

**Overall Strength**
Numeric slider, value range 0-200.

- **Range:** 0 to 200
- **Default:** 100

**Spatial Strength**
Numeric slider, value range 0-200.

- **Range:** 0 to 200
- **Default:** 100

**Crispness**
Numeric slider, value range 0-200.

- **Range:** 0 to 200
- **Default:** 150

**Low Detail Sharpening**
Numeric slider, value range 0-200.

- **Range:** 0 to 200
- **Default:** 100

**High Detail Sharpening**
Numeric slider, value range 0-200.

- **Range:** 0 to 200
- **Default:** 100

**Image Noise Level**
Numeric slider, value range 0-2.
Low Light Trim
Numeric slider, value range -25 - 0.

Range: -25 to 0
Default: 0

High Light Trim
Numeric slider, value range -25 - 0.

Range: -25 to 0
Default: 0
**DVO Cross Colour**

*Cross Colour* (also known as *Chroma Crawling*) is a defect that results from *crosstalk* between the *chrominance* and *luminance* components of a composite video signal (PAL or NTSC). Once a video signal has been in the composite domain, this defect is not easily removed.

**Parameters**

**Enable**

When enabled, *DVO Cross Colour* will process the input as per the settings described below.

**Aggressiveness**

![Aggressiveness](image)

Allows the tuning of the degree of removal.

> If we increase these parameters too much we increase the possibility of introducing *artifacts*.

- **Spatial**
  When the *Temporal* setting is *decreased*, the *Spatial* control may be *increased* instead to remove cross-colour at the expense of slight spatial chroma bleeding.

- **Temporal**
  Increase for maximum cross-colour removal. Reduce if temporal chroma bleeding becomes too intrusive.
DVO Line Sync

Line sync or line jitter is a very common problem with archived analog video tape.

It is typically caused by the lack of (or disturbances with) line synchronization pulses which prevents the video tape recorder from locating the actual start and end of each line. This causes random line displacement (jitter).

The most visible effect is that vertical edges appear to be jagged. The jitter can range from +/-1 pixel to more than +/-5 pixels in severe cases. DVO Line Sync automatically detects and corrects these line displacements as well as any stretching it causes.

Parameters

Enable

When enabled, DVO Line Sync will process the input as per the settings described below.

Detection Strength

Detection Strength controls the degree of jitter detection with a higher number meaning a higher degree of detection.

⚠️ If the Strength parameter is pushed too high, we may correct lines unnecessarily and introduce jitter. Analyse the resulting output before committing to a long render.

⚠️ Note that the processing time is dependent on detected (and processed) lines. The more line sync issues we find, the longer it will take to process.
Processing

Shift
Enables correction of pixel shifting (left/right)

Stretch
Enables correction of stretched/shrunken lines.

Noise Reduction

This is Adaptive Noise Reduction with non-recursive spatio-temporal filtering so ghosting will not occur.

Note that processing time will be considerably higher when active since all lines have to be processed.

NR Enable
Enables Noise Reduction, independent of shift/stretch detection and correction.

NR Strength
Sets the amount of Noise Reduction to perform.
DVO Deinterlace

*DVO Deinterlace* accurately creates progressive frames from interlaced video originated material. The de-interlacer can maintain the fluid motion present in video (e.g. 50p delivery from a 50i source) or create a film look (e.g. 25p delivery from a 50i source).

*DVO Deinterlace* uses advanced *motion adaptation* techniques to preserve sharpness while also avoiding jaggedness typically associated with similar processes.

**Parameters**

**Enable**

When enabled, *DVO Deinterlace* will process the input as per the settings described below.

**Mode**

*Values*: align to f1, align to f2, double rate f1 + f2, double rate f2 + f1

*Default*: align to f1

The *Mode* control sets which field(s) the progressive frame is *aligned to* in terms of motion and content.
align to f1
Keep field 1 and align the missing information in the new frame to the contents of the original field 1

align to f2
Keep field 2 and align the missing information in the new frame to the contents of the original field 2

double rate f1 + f2
Make a complete progressive frame using every single field using the above methods. This doubles the number of frames. Top (f1) field first.

double rate f2 + f1
Make a complete progressive frame using every single field using the above methods. This doubles the number of frames. Bottom (f2) field first.

Half Line Fix

In an analog video signal there may be a visible half lines (unless removed when captured) i.e. half the line is blanked and the rest of the line contains image information. Including the half line when de-interlacing is usually unwanted.

To remove the blanked part, enable Half Line Fix and select the line(s) to address for top (Top Fix Lines) and bottom (Bottom Fix Lines). This will ensure that the blanked part of the line is not visible in the final image.

Data

Values : Linear, Log
Default : From Project

Process using the selected the data format.
DVO Twister

*DVO Twister* is an advanced software *standards conversion* tool.

To use *DVO Twister*, you should set up a project and composition configured for your *target* format.

**Parameters**

**Enable**

This toggle button allows you to enable/disable the *DVO Twister* effect. By default, as soon as the effect is added it is applied/enabled.

**Mode**

The mode option lets you choose the *source* and *target* format for the conversion. Available modes include:

- Mode: 50.00i -> 23.98p
- Mode: 50.00i -> 24.00p
- Mode: 50.00i -> 29.97p
- Mode: 50.00i -> 59.94i
- Mode: 50.00i -> 60.00p
- Mode: 59.94i -> 23.98p
- Mode: 59.94i -> 24.00p
### Processing Mode

**Values:** Narrow, Medium, Wide, Auto  
**Default:** Narrow

The *Processing Mode* affects how motion is detected and selects between three main modes. The *Auto* mode automatically selects the most appropriate setting based on the source and target mode chosen.

*Only has an effect when *Motion Mode* is set to *Motion Comp.**

### Motion Mode

**Values:** Motion Comp, Interpolated, Nearest Frame  
**Default:** Motion Comp

This determines how the images are recreated in the target format.

**Motion Comp**  
This uses motion compensation and is the default. This allows the accurate recreation of fields and frames using the Digital Vision *Phame* motion vector algorithms.

**Interpolated**  
This is a simple method that recreates correct target fields and frames by careful mixing of the input source. This method will often produce a lower quality result than the motion compensated approach (blurs, jerky
motion). Try if Motion Comp fails.

**Nearest Frame**

This uses no processing other than skipping or repeating frames to output the same clip duration.

**Cut Mode**

**Values**: Across Scene, Inside Scene, Inside Scene Frame Aligned  
**Default**: Inside Scene

DVO Twister has an internal **scene detector** and the *Cut Mode* determines how images adjacent to a scene cut are *aligned*.

**Across Scene**

This ignores the cut and *blends* the images. This will not provide in a clean cut but is sometimes preferred as it is the most accurate representation in terms of alignment in time.

**Inside Scene**

This aligns the cut to the nearest video field.

**Inside Scene Frame Aligned**

This aligns the cut to the nearest output video/film frame and so results in the cleanest cut.
DVO Upscale

DVO Upscale provides optimised up-scaling of material and is of specific value when converting from SD to HD.

The algorithm maintains the high quality of edges, including diagonals, and is especially useful for graphics.

Basic Parameters

Enable
The Enable button must be on to enable processing.

Optimisation
Values : Fast, Advanced
Default : Advanced

Optimisation determines the balance between speed and quality. In Advanced mode a special algorithm is used for the high frequency parts of the image to reduce scaling artifacts. In Fast mode this algorithm is disabled to gain speed at the expense of quality.

Mode
Values : P -> P, i -> P, i -> i
Default : P -> P

DVO Upscale has an internal de-interlace function in order to deal with multiple formats.

- P is Progressive
- i is Interlaced
The setting of progressive or interlaced here is not the same as video/image format (e.g. HD 1080i 50). It only describes how pictures were captured and whether to maintain this.

The project must set up to render frames even if the output mode is interlaced. Internally, the effect needs to use a progressive (frame based) format for optimal results when both input and output are interlaced.

**Fill**

**Values:** Auto, Vertical, Horizontal, Both

**Default:** Auto

Controls how the input picture is mapped (scaled) to the output picture.

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Auto</strong></td>
<td>Scales input picture until vertical or horizontal limit of the output picture is reached, without changing aspect ratio.</td>
</tr>
<tr>
<td><strong>Vertical</strong></td>
<td>Fills the output picture vertically without changing aspect ratio. E.g. scaling a SD 4:3 picture to an HD 16:9 output format will result in a pillar-box format.</td>
</tr>
<tr>
<td><strong>Horizontal</strong></td>
<td>Fills the output picture horizontally without changing aspect ratio. E.g. scaling an HD 16:9 picture to a 2k 4:3 picture will result in a letter-box format.</td>
</tr>
<tr>
<td><strong>Both</strong></td>
<td>Fills the output picture both vertically and horizontally. Does not keep the original aspect. Overrides the “Keep Input Aspect” E.g. scaling an SD 16:9 anamorphic to HD 16:9 will result in a full 16:9 format.</td>
</tr>
</tbody>
</table>

**Keep Input Aspect**

Reads clip properties and keeps the input aspect ratio and will also automatically compensate for non-square pixels.

This should normally be enabled, especially when up-converting from standard definition sources (525 or 625).

If the clip has an incorrect aspect ratio you will have to change the clip properties in the library (Library/Properties).
Data

Values: Linear, Log
Default: From project

Set the clip data format.

Other Parameters

Repos

X and Y repositioning after Fill mode is chosen.

Centre

Values: On, Off
Default: On

This centres the scaled image on the output picture. If disabled it maps the scaled image on the output picture from the lower left corner.

Field Order

Values: Follow Clip, f1:f2, f2:f1
Default: Follow Clip

The Field Order parameter sets the input field order in time for interlaced input.

<table>
<thead>
<tr>
<th>Follow Clip</th>
<th>Uses the clip properties (assumed correct).</th>
</tr>
</thead>
<tbody>
<tr>
<td>f1:f2</td>
<td>Assumes top field first.</td>
</tr>
<tr>
<td>f2:f1</td>
<td>Assumes bottom field first.</td>
</tr>
</tbody>
</table>

This setting is independent of the output field order as set in the project properties.
Resize

X and Y scaling after Fill mode is chosen

Sharpen

Adjusts post-scale crispness.

The controls differ between Advanced and Fast modes.

Size

Values: 0.5 - 2.0
Default: 1.5

Adjusts the sharpening radius.

Amount

Values: 0 - 100
Default: 50

In Fast mode, this is the overall sharpness amount. In Advanced mode, the flat area sharpness amount.

Edge

Values: 0 - 100
Default: 50
Advanced mode only

Edge sharpening amount

Texture

Values: 0 - 100

Default: 100

Advanced mode only

Balances flat area texture and sharpening noise.

Recommended settings are 100 for normal images and 0 for graphics. If flat area noise is intrusive a setting lower than 100 will give less noise at the expense of texture definition.

Deinterlace Control

In an analogue video signal there may be a visible half lines (unless removed when captured) i.e. half the line is blanked and the rest of the line contains image information. The last half line is usually unwanted when de-interlacing.

To remove the blanked part, enable Half Line Fix and select the line(s) to address for top (Top Fix Lines) and bottom (Bottom Fix Lines). This will ensure that the blanked part of the line is not visible in the final image.

Blanking

Blanking controls can be used to cover up soft image edges or any other edge related problem.
Shapes
You can use an unlimited number of editable shapes for isolation (mattes) or as an effect themselves.

Shapes are available as separate (user) effects, as part of an Effect Layer and as part of any Colour Correction Layer (CC Layer).

**Available Shapes**

<table>
<thead>
<tr>
<th>Shape</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rectangle</td>
<td>Four points define rectangle. User clicks and drags to set dimensions. Points are not bezier spline style.</td>
</tr>
<tr>
<td>Ellipse</td>
<td>Four points define ellipse. User clicks and drags to set dimensions. Points are bezier spline style.</td>
</tr>
<tr>
<td>Polygon</td>
<td>User clicks to add points (minimum three) and define shape. Straight edges define shape. Points are not bezier spline style.</td>
</tr>
</tbody>
</table>
User clicks to add points (minimum three) and define shape. Points are bezier spline style.

Valhall Control Panel

You can add a shape using the Control Panel using the Image Panel {Iso} menu, and pressing the corresponding shape button e.g. {Ellip}:

You can also use the Image Panel Quick Shape buttons above the trackball (mouse):

The ESC key on the keyboard closes a polygon and bezier shape.

Transforming Shapes

You can move, scale and rotate a shape via the Transform button.

When the Transform button is enabled, the shape is displayed with transform
controls:

Transform controls on shape.

You can use your mouse to scale, move or rotate the shape by dragging an overlay element on-screen interactively.

You can perform the same transformations by using your mouse to modify the Position, Scale and Rotation parameters directly via their sliders:

<table>
<thead>
<tr>
<th>Shape</th>
<th>Position</th>
<th>Scale</th>
<th>Rotation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Move X</td>
<td>-61.001</td>
<td>Scale X</td>
<td>0.517</td>
</tr>
<tr>
<td>Move Y</td>
<td>-200.51</td>
<td>Scale Y</td>
<td>0.612</td>
</tr>
<tr>
<td>Angle</td>
<td></td>
<td>Center</td>
<td>26.092</td>
</tr>
<tr>
<td>Pivot X</td>
<td></td>
<td>Pivot X</td>
<td>232.10</td>
</tr>
<tr>
<td>Pivot Y</td>
<td></td>
<td>Pivot Y</td>
<td>346.00</td>
</tr>
</tbody>
</table>

**Pivot Points**

The Pivot X/Y points define the center of the shape for scaling and rotation. Initially, the pivot points are placed in the exact center of the shape:

You can move the pivot location using the GUI sliders or dragging with the mouse. The shape will rotate around the pivot:
Valhall Control Panel

On the Valhall Panel, you can manipulate and transform shapes (move, rotate, scale etc.) using the Image panel {ISO} menu on button {2} and {3} e.g.

Manipulating Shapes

Shapes are defined by control points. A point is selected when it filled (white) i.e.

- To select multiple points, use CTRL + Click
- To de-select a point, CTRL + Click it again
- To de-select all points, click outside the shape

* You should be in Shape mode (not Transform mode).
Adding Points

To add a point to a shape, enable the *Add Point* button and click on the shape edge.

Points added behave as *bezier* points for all base shape types.

Bezier Control

A bezier shape is a *spline* and is defined by a number of bezier control points.

Each control point has *tangent handles* on each side of the point that allow fine control of the curve of the shape at the point.

The basic ellipse and bezier shapes are defined by *bezier* style points whereas the basic rectangle and polygon shapes are defined by standard non-bezier points. Any points *manually added* to any shape will be a bezier type.

You can access and pull out the *tangent handles* on a *sharp cornered* bezier shape by dragging the corner point while holding down the keyboard *z* key:

**Keyboard**: z + drag (mouse)
Breaking a Shape

You can break a corner of a shape by holding down the keyboard \texttt{SHIFT + CTRL} keys while dragging the point.

To re-join the two points, hold down \texttt{SHIFT+CTRL} and drag one point on top of the other. The two points should snap together when close.

Shape Softness

<table>
<thead>
<tr>
<th>Control</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outer Softness</td>
<td>0</td>
</tr>
<tr>
<td>Inner Softness</td>
<td>0</td>
</tr>
<tr>
<td>Variable Softness</td>
<td></td>
</tr>
<tr>
<td>Del Outer</td>
<td></td>
</tr>
<tr>
<td>Del Inner</td>
<td></td>
</tr>
</tbody>
</table>

Shape softness controls are as follows:

- \textit{Outer Softness} sets the amount of softness to create inside the shape boundary edge.
- \textit{Inner Softness} sets the amount of softness to create outside the shape boundary edge.
- The \textit{Variable Softness} button lets you vary the amount of softness created for different parts of the shape.

Basic bezier shape

Increase Inner Softness
Increase Inner and Outer Softness

Enable Variable Softness

Vary the softness by manipulating the variable softness controls

If viewing shape is difficult - Press the keyboard "p" key to change the shape colour

You may get unwanted artifacts if points and/or handles overlap or cross.

Del Outer / Del Inner

- Del Outer will reset any outside/outer softness variation change
- Del Inner resets any inside/inner softness variation change
Valhall Control Panel

On the Valhall Panel, you can manipulate Inner and Outer Softness using the Image panel {ISO} menu on button {3} e.g.

Shape Overlay Colour

The shape overlay colours are defined in the Shapes section of the file:

C:\Phoenix\2014_1\root\colour.prefs

Two sets of colours are defined: a normal and an alternative set of colours.

The alternative set are tagged with Alt. You can switch between the normal and alternative colours dynamically by pressing the keyboard p key.

Example

Shapes
{
    Outline 255 255 255 255
    Outer 155 155 155 155
    Inner 100 100 100 100
    VariableLink 185 185 185 185
    OutlineAlt 0 0 0 255
    OuterAlt 255 0 0 255
    InnerAlt 255 0 255 255
    VariableLinkAlt 0 0 255 255
}

Be careful editing this file and always create a backup first.
Tracking Shapes

You can attach tracking information to shapes via the \textit{Track Points} button.
DVO Tracker
Version 2009 introduces a sophisticated new tracker called the *DVO Tracker*. The tracker automates the selection of optimal tracking points within a user specified area of a shot.

The *DVO Tracking* controls are available inside every *Shapes* layer and become active when a shape is selected.

DVO Tracker controls inside a Shapes control pane.

### Tracking Basics

Any *Shapes* layer inside a *CC Layer* (including *Base*) or *FX Layer* can be used to create a track for a shot.

Before starting, **familiarise yourself** with the shot you wish to use. Play the shot through and identify the area you wish to track and its behaviour. Pay attention to how the chosen feature moves (including any scaling or rotation), whether it is ever obscured (or partly obscured), whether it stays inside the frame and how other parts of the shot move relative to it.

The tracking process is straightforward:

- Draw a shape around the area you want to track (and affect)
- Press the track control to track forwards or backwards

With the play-head at the required starting frame, we will draw a shape around the feature we wish to track.

In the *Shapes/Shape* menu:

---

© 2014 Digital Vision

UM-2014.1-07
We draw our shape around the feature we wish to track:

![Ellipse shape drawn around our car "feature" we will track](image)

**Shape Tips**

It is often possible to keep the shape simple (rectangle, ellipse). Any matte/mask the track creates will usually be softened such that it properly merges into our shot and does not stand out in an artificial way.

Create the shape to cover the entire feature area of interest with some head-room. Try and extend the shape a bit beyond the feature area.

Once the shape is drawn, the *DVO Tracking* controls are enabled.

![DVO Tracking controls](image)

To track the feature forwards to the end of the shot, press the track forwards button (as shown above).

If the *Feature Points* button is enabled, two or more feature points will appear inside the shape as we start playing the shot, tracking as we go.
Tracking forwards, feature points used appear in green.

While tracking is in progress, the shape is drawn with a thick border. Once tracking is complete (or stopped), the shape reverts to its normal outline.

If the shape turns red, feature points can not be matched in this frame. In the first instance, let the tracker continue because it will attempt to match new points. If this continues to fail:

- Turn on *Image Enhance* and retry.
- Redesign or edit your shape to find better feature patterns

The selected feature tracks until the end of the shot and then stops. The tracking creates a new key-frame for each frame, displayed in the key-frame box at the bottom of the screen.

A key-frame is created for each frame of the shot we track.

We can now use this tracked shape as a mask.
Using Other Tracks

One shot may have any number of effect layers, each including a Shapes layer.

CC Layers 1-2 all contain tracked shapes. Layer 3 (rear window) is new.

The tracking data from any previously tracked shape can be selected and applied to any other shape via the Other Tracked Shapes drop-down list:

Having created a new shape, select Other Tracked Shapes and choose the tracking data you want to apply:

Once chosen, click the Apply button to apply the tracking data to your shape.

The tracking data is applied and track/shape key-frames appear in the key-frame bar at the bottom of the screen. If the shape had any previous tracking data, it will be overwritten.
Offset Tracking

*Offset Tracking* lets you use a different area of a shot for generating the track compared to the position of the shape itself. If a different area of the shot becomes the best candidate for generating the actual tracking data, we can use it by creating an offset shape and positioning it over this better area.

Enabling the *Offset* button will activate a copy of the tracking shape:

The copy is **green**. Initially, it is placed on top of the original shape.

We can switch to the *Transform* menu:

Then move the offset shape to our new preferred position:
Once in place, we can switch back to the *Shape* menu:

![Drag copied shape to a new (offset) position](image_url)

and continue our tracking.

![The tracking data is calculated from the offset shape and applied to the original.](image_url)

The tracking data is calculated from the offset shape and applied to the original.

When the *Offset* button is enabled, the offset shape is used to generate the track. You can set the offset shape to any suitable position in the frame. If a better position becomes apparent, you can re-position it again.

*For an offset shape track calculation to work properly, both the original and the offset shape need to share the same type of motion.*

## Predictive Tracking

Normally, if the tracking calculation fails at some point in a shot, tracking stops. In some cases, it is apparent that the track path could simply carry on as before, the path being extrapolated based on its previous history.
If tracking fails because our tracked feature loses definition or goes out of camera, we can enable *Predict Tracking* at this point.

When we resume tracking, the track path is calculated such that it smoothly continues along the same path as calculated previously.

Reference

The *DVO Tracker* is available to use everywhere we have a *Shapes* layer available. As such, we can draw a shape to define the feature we wish to track and use the result as a *Region of Interest* matte.
Every Shapes parameter pane includes the new DVO Tracker control parameters as shown in the figures below. The DVO Tracker controls become available once a shape is drawn.

Shape controls and new DVO Tracker controls highlighted

**Track Buttons**

These buttons start the tracking process. You can track forwards or backwards in a shot, to the shot end or start (respectively) or a frame at a time.

From left to right we have:

- Track backwards from current frame to start of shot.
Feature Points

The Feature Points button toggles display of the feature points used by the DVO Tracker at each frame.

Feature Points are points inside our shape that are calculated to be good patterns to use when tracking. They are chosen automatically and appear inside the shape we have defined.

Feature Points in green, found inside the defined shape.

*Feature Points* are chosen dynamically on a frame by frame basis. They are not user selectable or editable.

Transform Buttons

These buttons control what transformations are applied to the shape as we track. If the button is off (white), the selected transformation is not applied.

If no transform buttons are enabled, the defined shape will not move or change at all because no transformations will be applied.

From left to right we have:

- Pan X/Y
  - Enable to calculate X/Y (up/down/left/right)
<table>
<thead>
<tr>
<th>pans.</th>
<th>Rotation</th>
<th>Enable to calculate feature rotation.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Scale X</td>
<td>Enable to calculate scale changes in the X-axis.</td>
</tr>
<tr>
<td></td>
<td>Scale Y</td>
<td>Enable to calculate scale changes in the Y-axis.</td>
</tr>
</tbody>
</table>

### Offset Button

![Offset Button]

The *Offset* button creates an *offset* shape from the currently selected shape.

This offset shape can be moved (offset) to a new position in the shot from where new feature points are calculated. The feature points calculated using the offset shape are applied to the original shape. You can re-position an offset shape any number of times in the same shot if required, with any tracking data calculated applied to the original shape. See [Offset Tracking](#).

### Smooth Button

![Smooth Button]

Normally, the *DVO Tracker* will position the transformed shape (x/y, rotation, scale) in single pixel increments. The *Smooth* button will enable *sub-pixel positioning*, and cause the track to be re-computed.

This smoothing effect will be visible by switching to the *Keyframe Editor* tab and viewing the resultant animation graph.

If you turn the *Smooth* button off **before completion**, the smooth process will stop and any smoothing done will be *reset* to its previous state. Once complete, an *undo* operation will also reset the entire track path to its pre-smoothed state.

### Reset Track Points

![Reset Track Points]

These buttons allow you to reset all or some of the key-frames created by the tracking process.
From left to right we have:

| Reset all track key-frames from current position to start of shot. |
| Reset all track key-frames. |
| Reset all track key-frames from current position to end of shot. |

The tracker key-frames are shown below the Shapes panel as *green* diamonds:

![Key-frames shown in green, and current key-frame in blue.](image)

Pressing the reset all left button will result in all key-frames to the left of the play-head being reset (*inclusively*). This results in the following key-frame status:

![Key-frames after reset all left button pressed.](image)

**Image Enhance**

*Image Enhance* will do some image processing on the shot to increase the contrast such that tracking is optimised and a more accurate track calculated. This enhancement is transparent and done in the background (with no visible image changes).

Enabling *Image Enhance* may be necessary for certain type of media, particularly those with lower contrast or high contrast changes.

*Image Enhance* will default to *on* for Log projects.

**Other Shapes**

This drop-down list lets you apply the tracking data from a previously tracked shape in the shot (in another layer) to the current shape. See Using Other Tracks.
Predict Tracking

The *Predict Tracking* toggle button lets you carry on the track even if all tracked feature points have moved outside the image frame and tracking has terminated. Turning *Predict Tracking* on will **extrapolate** the track to the end (or start) of the shot such that the track is contiguous and smoothly extended. See *Predictive Tracking*.

Valhalla Keys

<table>
<thead>
<tr>
<th>Mod</th>
<th>Key</th>
<th>function</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><img src="image" alt="Play Button" /></td>
<td>Track forwards to end of shot</td>
</tr>
<tr>
<td>Shift</td>
<td><img src="image" alt="Pause Button" /></td>
<td>Track backwards to start of shot</td>
</tr>
<tr>
<td>Shift</td>
<td><img src="image" alt="Play Button" /></td>
<td>Track forwards one frame</td>
</tr>
<tr>
<td>Shift</td>
<td><img src="image" alt="Pause Button" /></td>
<td>Track backwards one frame</td>
</tr>
<tr>
<td>Shift</td>
<td><img src="image" alt="Arrow Up Button" /></td>
<td>Scroll up/down &quot;Other Tracked Shapes&quot; menu</td>
</tr>
<tr>
<td>Shift</td>
<td><img src="image" alt="Arrow Down Button" /></td>
<td>Apply tracking from selected &quot;Other&quot; shape to current shape.</td>
</tr>
<tr>
<td>Shift</td>
<td><img src="image" alt="Enter Key" /></td>
<td>Creates or toggles the <em>Offset Shape</em></td>
</tr>
<tr>
<td>Delete</td>
<td><img src="image" alt="Play Button" /></td>
<td>Resets tracking from current frame to end of shot (inclusive)</td>
</tr>
<tr>
<td>Delete</td>
<td><img src="image" alt="Pause Button" /></td>
<td>Resets tracking from current frame to start of shot (inclusive)</td>
</tr>
<tr>
<td>Delete</td>
<td><img src="image" alt="Stop Button" /></td>
<td>Resets all tracking on current shot</td>
</tr>
</tbody>
</table>
Video I/O
You can capture and lay off video via the Library modules:

Capture video

Layoff video

These options will only be enabled when your system has a video I/O board installed.

Audio I/O

Support for 8 channel audio capture and layoff with the following video cards:

- Bluefish Lust - AES/EBU audio
- DVS Centaurus2 - AES/EBU and embedded audio

Video I/O

Capture and layoff modules have similar layouts:

- The monitor and transport controls are situated on the top left
- The settings and control tabs sit below the monitor and transport controls
- The event list and event controls are on the right hand side

Playback/Transport Controls

The playback controls on a VTR deck are more commonly referred to as transport controls. These controls are the same on both the capture and layoff screens:
Timecode Box / Cue

This field displays the current tape position.

If you enter a timecode in the box and press the Cue button, the tape will cue to this location.

VTR Settings

The VTR/Video Capture Settings tab contains a variety of configuration settings - including VTR status, video format used, and audio channels active. The available settings are similar between the capture and layoff modules.

Always check these settings carefully before proceeding with any video I/O.
**VTR Deck Status Feedback**

<table>
<thead>
<tr>
<th>VTR</th>
<th>HDW-F500</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>still</td>
</tr>
<tr>
<td></td>
<td>REC Lock</td>
</tr>
</tbody>
</table>

The four deck status fields are read-only display fields and provide feedback on:

- Model of VTR attached (e.g. HDW-F500)
- Status of the VTR (still, stop, play etc.)
- Reported VTR frame rate
- Record inhibit status (REC Lock).

Note - if the deck and project frame rates do not match you will get a warning message.

This message can be turned off by setting the `general.prefs frameRateWarning` parameter to false.

**Refresh Button**

The status fields should update automatically but you can perform a manual update by pressing the *Refresh* button.

**Video Signal Feedback**

<table>
<thead>
<tr>
<th>SDI Input</th>
<th>HD 1080i 50</th>
</tr>
</thead>
<tbody>
<tr>
<td>SDI Sync</td>
<td>no signal</td>
</tr>
<tr>
<td>SDI Output</td>
<td>HD 1080i 50</td>
</tr>
</tbody>
</table>

The three 'SDI' fields are read-only display fields, providing feedback from the video card.

**SDI Input**

This shows the video format (resolution and frequency) of the video *input* signal.

**SDI Sync**

This shows the reported *sync* signal seen by the video card.
**SDI Output**

This shows the video format (resolution and frequency) of the video output signal.

**Video Format settings**

<table>
<thead>
<tr>
<th>Video capture</th>
<th>Video output</th>
</tr>
</thead>
<tbody>
<tr>
<td>YCrCb 422</td>
<td>YCrCb 422</td>
</tr>
<tr>
<td>Linear (SMPTE)</td>
<td>Linear (SMPTE)</td>
</tr>
<tr>
<td>Default FPS</td>
<td>Blanking 0</td>
</tr>
</tbody>
</table>

**Colour Space control**

The first drop-down button allows you to set the colour space mode for your material.

- YCrCb 422
- RGB 444

**RGB Scaling control**

The second drop-down allows you to set the video scaling mode that the application should apply to the material:

- Linear (SMPTE) - no scaling
- Linear (CGR) - signal is scaled

WARNING: This setting is very important in order to ensure that what you see on your monitor is what you will get on output. For a discussion of Colour Scaling modes, see the Setup Manual.

**FPS control**

| Default FPS | Use 14.98 FPS (2K) | Use 15.00 FPS (2K) | Use 5.00 FPS (4K) |

VTR Capture only.

For certain bandwidth intensive formats we need to specify an optimal capture rate to use.

- Default FPS - the default is the composition frame rate
- Use 14.98 FPS (2K)
- Use 15.00 FPS (2K)
Video I/O

- Use 5.00 FPS (4K)

Blanking

*VTR Output* only

This setting will blank out the top and bottom video lines.

This may be useful to hide any edge artifacts pushed into the video active area by certain effects (e.g. blurs).

Audio I/O

The audio channel buttons give feedback and also act as controls. They will automatically default to show how many audio channels are available (highlighting them in green), after which you can enable/disable them for capture/layoff.

2014.1 currently supports **eight** (8) channels of audio. The buttons for channels 9-16 are visible but disabled (and not used).

Capture Only

Interface

**Options**: AES-EBU or Embedded SDI

This sets the source of the captured audio data.

We support AES/EBU audio with the Bluefish Lust card (AES audio cables)

We support AES/EBU and embedded audio on the DVS Centaurus2 card.

The audio capture path is set separately in the capture Controls tab.

File Storage

**Options**: Broadcast WAV

Bit Depth

**Options**: 16 or 32

Number of bits per sample to capture.
Roll and Trim controls

<table>
<thead>
<tr>
<th>Pre-roll</th>
<th>5</th>
<th>Video Trim</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post-roll</td>
<td>1</td>
<td>Edit Trim</td>
<td>0</td>
</tr>
</tbody>
</table>

**Pre-roll**

How many seconds the deck should allow the tape to roll before capture/layoff starts.

When capturing or laying off the deck will cue to the VTR in point minus the value set in the pre-roll field. No actual capture/layoff takes place during a post-roll.

**Post-roll**

How many seconds the deck should allow the tape to roll for after capture/layoff ends. No actual capture/layoff takes place during a post-roll.

**Video Trim**

This numeric entry field / slider allows you to correct timecode offset errors that might occur when capturing or laying off video.

The Video Trim controls which frame of video is recorded at the edit (in) point and can be used to help fix video routing or system delays.

**Edit Trim**

**VTR Output module only.**

Similar to video trim, it allows you to correct any timecode errors causing the recorded material on tape to be starting at the wrong timecode.

The difference between video trim and edit trim is that the video trim setting will make adjustments to the time when the frames start being sent from disk to tape, i.e. when layoff starts, whilst the edit trim setting makes adjustments to when the deck actually starts recording.

The point at which the deck actually starts recording prior to receiving the video is what can be adjusted using the edit trim control, should you find that the layoff is not ending up at the correct timecode.
Project Settings for Video Output

If you intend to lay off video from your project, make sure you enable the Video Output setting on the project output format. See Cache Output.

Video Capture

The VTR Capture screen is accessible from the library screen via the List Capture button.

This brings up the list capture screen, with two options on the bottom left:

- **Data Capture** - this is the mode used for batch capturing digital media
- **VTR Capture** - this is the mode for capturing media from tape.

For capturing from a VTR deck, press the VTR Capture button.

The Control tab is where the interactive controls for carrying out a video capture are located.
Capture Locations

Prior to attempting any capture you should always review and adjust all the values in the settings tab as appropriate for your material and composition.

**Capture Locations**

- **Video**: S:\nucoda\V3:_capture\projectA\n
- **Audio**: C:\audio\Susumu_Capture\n
**Defaults**: As per `general.prefs` preference file.

Use the tick boxes to choose which data streams to capture - video, audio or both.

The capture paths are shown and can be edited in place, or set via the file browser (click the icon).

- **Video**
- **Audio**

If you change a path here, the new location will be saved to the `general.prefs` preference file.

For optimal performance, the audio and video capture locations should be set to separate disk volumes in order to optimise concurrent disk-writes (and minimise interference). For example, capture video to the S:\ volume and audio to the W:\ volume.

**Deck Status**

The deck status is displayed in a summary line at the bottom of the controls tab.

Information displayed is:

- VTR/deck model,
- Frame rate
- Control status.

If the VTR deck is record inhibited, this will be shown as REC Lock.
Capture Methods

There are three main methods for performing a video capture:

- **Capture Marked** - specify an in and an out point, then capture this marked region.
- **Capture Live** - start recording as the VTR plays
- **Capture List** - import and then capture from a list (e.g. an EDL).

The **Capture Single** operation is discussed as part of the **Capture List** section.

Capture Live

This is the simplest capture method and involves pressing the **Capture Live** button at an appropriate time as the video tape is playing.

* Pre-roll and post-roll settings do not apply during live capture.

When **Capture Live** is pressed, it turns red and the **Stop Capture** button is highlighted. To stop capturing, press the **Stop Capture** button.
If you do a 'Capture Live' without having pressed play, i.e. with no footage being displayed in the viewer, you will capture blank (black) frames for the duration of the capture.

Once capture has stopped, the captured footage will automatically be added to your project library.

**Capture Marked**

Once capture has stopped, the captured footage will automatically be added to your project library.

**Capture Marked**

This capture method will capture the footage defined between the marked in and marked out timecodes.

Specify the *Mark In* and *Out* points by:

- Manually typing in the in and out timecode into the appropriate in/out timecode box or
- Cueing the VTR deck to the *In* timecode and pressing the *Mark In* button, then
- Cueing the VTR deck to the *Out* timecode and pressing the *Mark Out* button

For accurate marking of the In/Out points you can use the *jog frame* buttons to locate the exact frame positions.

Once marked, the duration display field will show the total duration of the marked region, and pressing *Capture Marked* will begin the capture.
During capture, the Capture marked button will turn red and the VTR deck will cue to the pre-roll point before the marked timecode in-point.

Once the mark-in position is reached the capture will commence and at this point the Stop Capture button will become enabled.

Once complete, the capture will stop automatically. You can interrupt the capture at any time by pressing the Stop Capture button.

Once capture has stopped, the captured footage will automatically be added to your project library.

**Capture List**

The Capture List method requires an existing event list.

This list is usually created by importing a list file (such as an EDL) and then capturing and conforming the events. Refer to the section on importing list files for detailed instructions on creating a composition based on a list file.

Once you have imported the list file, the corresponding composition will appear in the Library and the events that need to be captured will appear on the timeline.

No media will exist in the library until it is captured and conformed to this empty timeline.

Inside the capture module, the list events are shown on the right.
Event List

The event list table is composed of a number of fields per event.

The Event List is displayed a standard table. For more detail on tables and their use, see the Tables section.

Each event listed has a status assigned to it. This status will update as the capture proceeds.

Event Status

The status fields are:

- **Needed** - the media for this event has not yet been captured and the event is enabled for capture.
- **Disabled (Needed)** - the media has not yet been captured but you have disabled the capture of this event.
- **Disabled (Found)** - the media has already been captured and you have disabled the event to avoid recapturing it.
- **Capturing** - the media for this event is in the process of being captured.
- **Partial Capture** - part of the media for this event has been captured but not in its entirety.
- **Found** - all the media for this event has been found and captured.
Material

Once an event has been captured *(Found)*, the path to the stored media will be shown in the *Material* column for that event.

Tape Name

Events in the list may need to be captured from *different* tapes, as indicated by the *Tape Name* column. You will be prompted to insert each tape (or to skip it).

This will continue until all the media from the different tapes has been captured.

If you press *Skip Tape*, no media will be captured for this tape and capture will proceed to the next tape (prompt for insert), if there is one. You can capture any skipped tapes later.

Event Controls

The *event controls*, located beneath the *event list*, allow you to refine your list and select specific events prior to capturing:

Enable / Disable Event

To selectively choose to capture events (or not), select single or multiple events from the list and use the *Enable Event* and *Disable Event* buttons prior to pressing *Capture List*.

A disabled event will have a status that displays *Disabled* e.g. Disabled *(Needed)* or Disabled *(Found)*.

You can capture events in "groups", perhaps using a different number of *handles* for each.

Reset Event

This option will reset the selected event(s) to the status of *Needed*, whether or not the media had already been captured. This allows a re-capture of a previously captured event.
Event Handles
This numeric slider specifies whether to capture more frames than the events require i.e. handles. Setting the Event Handles to 5, will capture 5 frames of head and 5 frames of tail for each enabled event.

The addition of handles might be applied in order to capture as much of each media clip as might be later needed and to allow later trimming of the media clip within the composition. Adding handles can also be used to lengthen events in the composition list so that their timecodes overlap with others and various events can be consolidated and captured as a single media clip using the ‘Consolidate Events and Tapes’ function.

Consolidation

Default: Consolidate on tape

Consolidation is the grouping together of overlapping events (generally by timecode) into a single "event" which can be processed (captured) as one. This can minimise the amount of work required to capture the same amount of material. Consolidation reduces the total number of events to capture.

| Don't consolidate | Ignore potential consolidation and show every event in the list. |
| Consolidate on tape | Consolidate overlapping timecodes within the same tape. |
| Consolidate on clip | Consolidate overlapping timecodes within the same clip. |

You can also use consolidate in conjunction with the handles function to increase the length of media required by events that are close in their timecodes but not overlapping. By making them overlap on purpose, the source material can be captured in one go as a single clip.

Capturing the List
When ready, press Capture List to start the capture.

Once capture starts, the Capture List button turns red.
Buttons *Skip Event, Skip Tape* and *Stop Capture* are also enabled now.

In-between capturing each event, whilst the deck scans to find the correct position, these interactive buttons will become disabled.

Once capture is complete (or stopped), you should look at the status of each event in your list to check that it was captured correctly and that the *Material* location is given.

Press *Conform* to complete the capture process and link the captured media in the library to your composition.

**Capturing a Single Event**

To capture a single event, select it in the event list and press *Capture Single*.

This button is only enabled when a single event is selected.

As before, the button will turn red once capture is underway, and the *Stop Capture* button will become enabled:

The event list will show the individual event being captured:

<table>
<thead>
<tr>
<th>Reel</th>
<th>Timecode</th>
<th>Duration</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>006</td>
<td>00:01:37:05-00:01:39:11</td>
<td>2.09s</td>
<td>Needed</td>
</tr>
<tr>
<td>007</td>
<td>00:01:41:28-00:01:44:34</td>
<td>3.06s</td>
<td>Capture</td>
</tr>
<tr>
<td>008</td>
<td>00:01:44:16-00:01:46:14</td>
<td>2.98s</td>
<td>Needed</td>
</tr>
</tbody>
</table>

**Exporting the Events List**

Press *Export List* to export all, or a subset, of the event list.
You can export as a CMX3600 EDL or a CUT style list.

There are three options for export:

- **Export all** - This will export the full list of events as displayed on-screen. You may want to do this if you've altered the original list in some way, e.g., by adding handles or using the consolidate events function.
- **Export found** - This will export a list containing only the events that you captured.
- **Export not found** - This will export a list of all the events that were not captured. This could serve as an easy way to identify which events have yet to be captured.

The list export option is only available in the List Capture screen.

**Video Layoff**

The VTR Layoff screen is accessible from the library screen via the ..List Output button. The layoff module is called List Output and will output the current composition events to video.

There are two tabs - VTR Output Control and VTR/Video Output Settings. The Settings tab has been detailed in the VTR Settings section.

The monitor will switch between displaying the footage on tape during tape playback, and displaying your composition footage during the actual layoff process.

The Control tab is where the interactive controls for carrying out a video layoff are located.
Event List

The events to be output are shown on the right-hand side and correspond to the events on your timeline. The number of events in the list matches the number of events on your timeline. Gaps in the timeline are ignored.

Though gaps in the timeline do not show up in the event list, they will in fact be laid off to tape as black frames for the duration that they occur on the timeline.

Status

Before output, each event is checked and rendered if necessary. This is an automatic process.

- Processing - This means the event is still being checked or rendered.
- Rendered & Found - This means the event is ready for layoff.

Rec In / Rec Out

The Record In time of the first event matches the start time of the composition on the timeline, and the Record Out time of the last event matches the end time of the composition.

These two columns show the Record In and Record Out timecodes of the event as it appears on the composition timeline. These values are used when laying events off in Record Order.

Src In / Src Out

These two columns show the Source In and Source Out timecodes of the source material for that event. These values are used when laying events off
in Source Order.

**Material**

This column shows the location of the rendered material on disk. This may or may not correspond to the location of the source material shown in the library screen.

**Tape Name**

This column shows the tape name corresponding to the source material for that event.

**Event Handles**

If a source order mode (e.g. Source Order Tape) is selected, the Event Handles option is enabled.

![Event Handles](image)

This numeric slider is located directly below the event list, and allows the option of laying-off more frames than each event requires (i.e. adding 'handles'). The handles are added on either side of the event on tape.

The addition of handles might be applied in order to layoff as much of each media clip as might be later needed when re-importing the media as source material for a composition, and to allow later trimming of the media clip within the composition.

**Laying off Sections**

With no marks set, the Output module will select all events for layoff.

To layoff a section of your timeline only, use the timeline Mark In and Mark Out buttons to mark the desired range before pressing _.List Output_.

![Mark In/Out Buttons](image)

The output module will only display and output the marked events.
Output Controls

The VTR Output Controls are shown below.

The *Actions* buttons in the centre perform the specified output operation e.g. *Output List*, *Stop Output* etc.

Status Fields

### VTR

VTR Deck status is shown in the *VTR row*.

If the tape is *record inhibited*, it will show *REC Lock*.

### List

During processing or output, this row will show the list status and output progress.

### Buffer

The Buffer row will display how many frames are buffered and ready for output.

### Output Channels

Use the tick boxes to choose which data streams to output - video, audio or both.
Record Edit Mode

This drop-down list allows you to select the edit mode, which determines how material is written to tape. The following modes are available.

<table>
<thead>
<tr>
<th>Mode</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insert Edit</td>
<td>Each event is recorded at the record in-point timecode. This mode requires a tape pre-striped with the right record timecodes.</td>
</tr>
<tr>
<td>Assemble Edit</td>
<td>This locates the record in-point timecode of the first event and starts recording. From here, timecodes are generated (assembled) as the output proceeds. Only the initial in-point timecode is required (hence only a partially striped tape is necessary).</td>
</tr>
<tr>
<td>Crash Record</td>
<td>This method starts recording at the current tape position, with no pre-roll or post-roll used, and writes out timecodes as it records. This mode will therefore work on a blank tape (no pre-striping required) and is only suitable for laying off contiguous material. The Pad Events option is available here.</td>
</tr>
<tr>
<td>Preview BVB</td>
<td>This mode previews the output. It does not write anything to tape. The preview shows: Black - Output Video - Black.</td>
</tr>
<tr>
<td>Preview VVV</td>
<td>This mode previews the output. It does not write anything to tape. The preview shows: Video - Output Video - Video.</td>
</tr>
<tr>
<td>Review</td>
<td>This mode reviews the output on tape. It does not write anything to the tape.</td>
</tr>
</tbody>
</table>

Pre-striped tapes must be striped at the same frame rate as your composition.

The Actions buttons will change depending on record mode selected.
Timecode Output Order

This drop-down list allows you to select which timecode order is to be used when writing the events to the tape:

<table>
<thead>
<tr>
<th>Source Order TC (C)</th>
<th>Record each event to tape at its original location (i.e. its source timecode), ignoring its location on the composition timeline (record timecode). Event handles: enabled.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source Order Tape (C)</td>
<td>This is the same as Source Order TC except the list is sorted by tape first, then source timecode. Event handles: enabled.</td>
</tr>
<tr>
<td>Record Order (A)</td>
<td>Record each event to tape at its composition (record) timecode location i.e. the same sequential order as your composition timeline and at the same timecodes (unless &quot;Use mark as in point&quot; is set, see below). Event handles: disabled.</td>
</tr>
</tbody>
</table>

Event Handles are enabled for Source Order mode layoffs:

Note that Source Order layoffs will not render transition effects.

When Source Order is selected, the Mark-In/Out values in the Event List will change to show the source timecodes matching the start and end timecodes of the list events. When Record Order is selected the record timecodes are shown instead.

Pad Events In / Out

| Pad Events | In: 00:00:05:00
|           | Out: 00:00:05:00 |

Crash Record only.
Pad Events controls whether padding is to be applied during output. Padding consists of black frames with contiguous timecode being written before and after the events being laid off.

How much padding is written is controlled by the In and Out timecode fields.

The timecode given to the padding will always precede the timecode of the 1st event being laid off, and if a Mark-In Timecode has been supplied the timecode of the padding will precede the Mark-In TC.

Padding can only be carried out in Crash Record mode.

**In / Out Markers**

The In, Out and Duration boxes relate to the in, out and duration times of your event list. Record timecodes or source timecodes are used according to the Timecode Output Order selected.

You can set the In point timecode by:

- Pressing the Set In button (Cue In). This sets the In timecode to the current deck position.
- Erasing and typing in a new timecode via your keyboard.

**Use mark as in point**

Ticking this box will set your layoff in-point to the In timecode set. Your list will be recorded starting at this In timecode.

**Output List**

This button is enabled when there are events in the event list. Pressing it will start off the layoff to tape of all the events in the list.

Unlike the VTR Capture module, you cannot select a group of events for layoff from the event list. All items in the list will be output. To select a sub-section for layoff, see Laying Off Sections.
**Output Single**

This button is enabled whenever a single event is selected/highlighted in the *event list*. Pressing it will layoff that specific event only.

**Stop Output**

This button is only enabled when there a layoff is in progress. Pressing it will halt the layoff.

**Output List**

*Output List* will layoff the entire event list.

**Checking the List**

Before the list is output to video, the events are first checked to ensure they are fully rendered and available.

**Validate Output**

**Default**: On

If Validate Output is enabled, a final output validity check is performed after any rendering is complete.

Once layoff starts, the button will turn red and the *Stop Output* button will become enabled and turn green.

The tape will be scanned for the correct timecode in-point and recording will commence. For a crash record, recording will commence at the tape position.

* All the events shown in the event list will be written to tape.

The layoff can be halted at any time by pressing the *Stop Output* button.
Output Single

Output Single will layoff a **single selected event** only.

Before the layoff starts, the event is rendered (if required) and a final output validation check is performed (if Validate Output is enabled - see [Validate Output](#)).

Once layoff starts, the button will turn red and the **Stop Output** button will become enabled and turn green.

The tape will be scanned for the correct timecode in-point and recording will commence. For a crash record, recording will commence at the tape position.

**Only** the selected event will be output to tape.

The layoff can be halted at any time by pressing the **Stop Output** button.
Command Line
The Command Line Interface (CLI) lets you run application commands without starting up the application interface (GUI). The CLI is therefore useful for automating tasks that do not require an operator to be present.

The CLI supports many of the operations that can be performed interactively using the GUI interface:

- **Project Definition and Creation**
- **Composition Definition and Creation**
- **Importing Clips to the Library**
- **Adding a Version**
- **Splicing or Overwriting Clips to a Composition**
- **EDL Import and Conform**
- **Capturing and Conforming Material**
- **Generating Local Proxies**
- **Rendering a Composition via Export**
- **Rendering a Composition Cache**
- **Running Multiple Operations from a File**
- **Listing Project and Composition Information**
- **Counting and Adding Tracks to Existing Compositions**
- **Testing for a GUI Lock**
- **Project Format Specification**

Be careful to **quote** any strings or paths you use on the command line. In particular, pay attention to any **spaces** in strings or paths or you will see syntax errors i.e.

The argument:

```bash
--format-spec C:\data files\specs\test.spec
```

Will give an error due to the space in the "data files" folder. Quote this to prevent the error:

```bash
--format-spec "C:\data files\specs\test.spec"
```
Conventions

**Required** parameters are given in angled brackets <> i.e.

```bash
--format-spec <path>
```

**Optional** parameters are given in square brackets [] i.e.

```bash
--timecode-header [1|2]
```

**Possible** values are separated with a vertical bar (| as above).

**Splitting Long Lines**

This document sometimes splits long command lines over multiple lines to make the command easier to read. The split is delimited by a *line-continuation character* "\" i.e.

```bash
--export S:\exp\$o\$c..dpx \
   --export-mode single
```

In reality, you would type the above command on a single line only *without* the continuation character :

```bash
--export S:\exp\$o\$c..dpx --export-mode single
```
User Login

---user <username>  Log in as named user

To use the command line interface as a specific user, use the --user option and specify the username to login to the application as.

Command:

$ nucoda_film_master --user steven --list

Projects:
1: test1                - C:\Nucoda\...
2: Check Danger 002     - C:\Nucoda\...
3: Check Danger 003     - C:\Nucoda\...

Without the --user option, the last user we logged in as is used. If we

Creating a Project

---project <name>  Create a new project with the specified name
---format-spec <path>  Use the specified project format specification template

Create a New Project

--project <name>
--format-spec <path>

To create a new project from the command line, create a project format specification file that describes the project. This is the equivalent of setting up the project configuration settings in the GUI.

Specify the name of the project and its format specification file using the command:

Command:

$ film_master --project PROJ1 --format-spec H:\specs\hd-1.txt

INFO Creating new project "PROJ1".

The above command creates a new project "PROJ1" using the definition stored in the file "hd-1.txt".

Project Format Specification

---format-spec <path>

This "format spec" is a text file that defines the elements of the project,
including both outputs and sources. The output and source sections are specified using the section tags:

- [output]
- [source]

The basic format is as follows:

```
<Global Parameters>
[output]
<output sections>
[source]
<source sections>
```

Some global parameters are required. There must be one or more output sections. The first output section will be the master format for the project. There are zero or more source sections (a "1:1 source" will always be created). The '#' symbol starts a comment.

See: [Format Specification definition section](#)

A minimal format specification file would look like:

```
# A minimum basic format specification
colourScaling=cgr

[output]
width=1920
height=1080
fps=25
aspectRatio=16/9
```

A "#" symbol starts a comment.

See the next section for the complete file format definition.

Example format specification files can be found in the folder:

```
C:\Phoenix\2014_1example_files\format_specs
```

**Project Format Specification**

A project is defined using a project format specification file. This file is of the following format:
<Global Parameters>
# one or more output sections
[output]
key=value
...
# zero or more source sections
[source]
key=value
...
Data Types

The various data types we can use in the specification are as shown in the table below.

<table>
<thead>
<tr>
<th>Data Type</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;bool&gt;</td>
<td>A boolean true/false</td>
<td>true, false</td>
</tr>
<tr>
<td>&lt;int&gt;</td>
<td>Integer number</td>
<td>1556</td>
</tr>
<tr>
<td>&lt;float&gt;</td>
<td>Floating point number</td>
<td>29.97</td>
</tr>
</tbody>
</table>

Global Parameters

These parameters appear **outside** an output or source section, at the start of the file. We **underline** required options.

**colourScaling**

**Required**

**Values:** SMPTE CGR FilmLog VideoLog

**Default:**

Project colour scaling mode.

**outputClip**

**Values:** <bool>

**Default:** false

Project output clipping.

Output Section Parameters

These parameters appear inside an output section.

**width**

**Required**

**Values:** <int>

**Default:**

The width (x resolution) of the output format in pixels.
**height**

*Required*

*Values*: <int>

*Default*:

The height (y resolution) of the output format in pixels.

**fps**

*Required*

*Values*: <float>

*Default*:

The frames per second. If no decimal point set, we add a .0 automatically e.g. 29.97, 25

**aspectRatio**

*Required*

*Values*: <int>/<int>

*Default*:

The output format image aspect ratio. Specify as M/N e.g. 1316/1000

**dropFrame**

*Values*: <bool>

*Default*: false

Set if output format is drop-frame.

**videoOutput**

*Values*: <bool>

*Default*: false

Specifies if Video Output is enabled on output format.

**fields**

*Values*: f2:f1 f1:f2 frames

*Default*: frames

Specifies if output format is field based and gives field order.
channels
Values: RGB RGBA
Default: RGB

Colour channels

bitDepth
Values: 8,10,16,half
Default: 10

Output colour depth per colour channel, in bits per pixel.

cconvertMode
Values: none fit crop center
Default: none

Output format conversion from source.

cconvertFilter
Values: none box bilinear gaussian zom lanczos
Default: zom

What conversion filter to use on the source (if convertMode not "none")

applyCms
Values: <bool>
Default: false

Specifies if the Apply CMS toggle is on or off.

Source Section Parameters
These parameters appear inside an input section.

scale
Required

Values: <int>
Default:

Sets the scale of the source/proxy. This integer will divide the width and height to set the proxy size. A scale N gives an "N:1" proxy.
bitDepth
   As output section above.

convertFilter
   As output section above.
   Only applicable if scale > 1.

Notes
   • The key values are case-sensitive.
   • Values are case-insensitive (e.g. use "rgb" or "RGB").

Attach and Detach Project

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>--attach-project &lt;path&gt;</td>
<td>Attach project found at specified path</td>
</tr>
<tr>
<td>--detach-project &lt;name&gt;</td>
<td>Detach named project</td>
</tr>
<tr>
<td>--remove-cache</td>
<td>delete project caches when attaching</td>
</tr>
</tbody>
</table>

Attaching a project makes it available for use by the application and adds it to the list of available projects on the project screen.

Attaching a Project

--attach-project <path>

This command attaches the specified project. The named project is the full path to the project folder.

Command:

$ nucoda_film_master \
   --attach-project D:\archived\project-x
INFO Imported "D:\archived\project-x" (project name is "project-x").

Attach multiple projects by separating them with a space e.g.

   --attach-project D:\project1 "G:\blue sky"

Detaching a Project

--detach-project <name>

This command detaches the named project.
Removing Project Caches

--remove-cache

When attaching projects, specify this argument to have their caches removed after attachment.

Create a Composition

--composition <name>
Name and create a new composition

--num-tracks <N>
Create a composition with N video tracks

Create a New Composition

--composition <name>

The following command creates a new composition named "COMP1" inside project "PROJ1".

Command :

```
$ film_master --project PROJ1 --composition COMP1
INFO Opening project "PROJ1".
INFO Creating new composition "COMP1".
```

If the project does not exist, it will be created. This will require a format specification option.

Create a New Project and New Composition

The following command creates a new project "PROJ2" according to the format specification file "FORMAT". It will then create a new composition named "COMP2" inside the newly created project.
Creating a New Composition with Multiple Video Tracks

--num-tracks <N>

The following command creates a new composition "COMP3" containing 3 video tracks (V1, V2 and V3) inside project "PROJ1".

```
$ film_master --project PROJ1 --composition COMP3 --num-tracks 3
INFO Opening project "PROJ1".
INFO Creating new composition "COMP3".
```

Video tracks can be selected using the --track ID option on the command line, where ID is "V1", "V2" etc.

Importing Clips

```
--import-clip <path> Import clip from specified path
--name <name> Give the clip a library name on import
--description <descr> --clip-description <descr> Give the clip a library description on import
```

Importing a Clip

--import-clip <path>

The following command imports a clip from the specified path into the library of project "PROJ1":

```
$ film_master --project PROJ1 --import-clip M:\images\train\300001.dpx
INFO Opening project "PROJ1".
INFO Found range (300000, 300164).
```

The clip imported above will be given a default name in this case because the filename is numeric only.
The default name will be taken from the two containing directories i.e. "images train". See below.

**Command :**

```
$ film_master --project PROJ1 \
    --import-clip Z:\shots\056\056_001.001.dpx
INFO Opening project "PROJ1".
INFO Found range (1, 15).
```

The clip will be given a name taken from the filename, i.e. "056_001". See below.

* This command only imports one clip. To import multiple clips, see Importing Folders.

* If you perform the same import operation twice, the clip will be imported again. This differs from previous behaviour that expected the option --force-import to be used (this option has been removed).

**Specifying a Clip Name on Import**

`--name <name>`

To specify a clip name in the library on import, use the `--name` option.

**Command :**

```
$ film_master --project PROJ1 \
    --import-clip Z:\shots\002\shot1002.001.dpx \ 
    --name "clip name"
INFO Opening project "PROJ1".
INFO Found range (1, 99).
INFO Set clip name to "clip name".
```

* You can only set the name of an imported clip when you import it, not afterwards.

**Clip Naming Convention**

Unless specified with the `--name` option, the imported clip is named as per the settings in the application preferences Auto Assign Name.

**Specifying a Clip Description on Import**

`--description <description>`
To specify a clip description in the library on import, use the --description option.

**Command:**

```
$ film_master --project PROJ1 --import-clip \\
Z:\shots\1002\shot1002.001.dpx \\
    --description "clip desc"
INFO Opening project "PROJ1".
INFO Found range (1, 99).
INFO Set clip description to "clip desc".
```

The description can only be set on import, not afterwards.

---

**Importing Movies**

```
--import-movie <path>  Import a movie clip from specified path
```

**Importing a Movie**

```
--import-movie <path>
```

This command imports a movie into the named project from the specified path.

Any supported movie format can be imported using this command, including:

- Red R3D
- Quicktime
- MXF wrapped media
- ARRI D21
- Silicon Imaging SI-2K
- Vision Research Phantom

**Command:**

```
$ film_master --project PROJ1 --composition comp1 \\
    --import-movie C:\media\qt\sample.mov
INFO Opening project "PROJ1".
INFO Opening composition "comp1".
```
Importing Folders

---import-folder <path>  Import clips found in named folder (and all sub-folders)
---filter-format <fmt>  Filter clips we import by file format
---filter-res <w> <h>  Filter clips we import by image resolution
---splice-order <file|timecode>  Splice clips found to composition in specified order
---timecode-header [1|2]  Take timecodes from file headers
---timecode-filename  Take timecodes from file names/paths
---tapename-header  Take tapenames from file headers
---tapename-filename <level>  Take tapenames from file names/paths

These options control the import of supported image sequences recursively from a specified folder path.

Importing a Folder

---import-folder <start folder path>

This command imports all supported image files found in the specified folder and any sub-folders (recursively).

Command :

```bash
$ film_master --project code2 \  
   --import-folder Z:\scans\reel4\ 
INFO Opening project "code2" from ...
INFO Batch ... importing directory 0 of 1 (0)
INFO Batch ... importing directory 1 of 5 (20)
...
INFO Batch Import (completed) ... 6 of 6 (100)
```

The command shown above has imported the given folder into the specified project "code2". This is a total of six folders searched, the specified folder itself and five sub-folders :

- z:\scans\reel4\0002\high\
Filtering

We can filter the sequences the command selects to import on image resolution (e.g. choose only HD sequences) and image format (e.g. choose only TIFF sequences).

Filter on Resolution

--filter-res <width> <height>

This option will select only images that match the given resolution (width x height) in pixels.

Command:

```
$ film_master --project code2 \n   --import-folder z:\scans\reel4\ \n   --filter-res 2048 1556
```

INFO Opening project "code2" from ...
INFO Batch ... importing directory 0 of 1 (0)
INFO Batch ... importing directory 1 of 5 (20)
... 
INFO Batch Import (completed) ... 6 of 6 (100)

Shots that match the resolution specified will be loaded into the project library.

Filter on Image Format

--filter-format <extension>

This option will select only image sequences that match the specified file format, given as the common format extension.

Command:

```
$ film_master --project code2 \n   --import-folder z:\scans\reel4\ \n   --filter-format dpx
```

For a list of supported formats and recognised extensions, see File Format Support.

Tapename

--tapename-header
--tapename-filename <level>

These options override the source of the tapename field we extract when importing each sequence found.
If you do not specify these options, the default settings will be used as set up in your preferences.

**Command**

```bash
$ film_master --project code2 \
  --import-folder z:\scans\reel4\ \
  --filter-format tif --tapename-filename 1
INFO Opening project "code2" from ... 
INFO Batch ... importing directory 0 of 1 (0) 
INFO Batch ... importing directory 1 of 5 (20) 
...
INFO Batch Import (completed) ... 6 of 6 (100)
```

**Timecode**

`--timecode-header [1|2]`  
`--timecode-filename`

These options override the source of the *timecode* we extract when importing each sequence found.

Using `--timecode-header` will attempt to extract the sequence timecode from the file *header*. If this does not exist (e.g. the format does not support header timecode), then the *filename* numerics are used to calculate the timecode.

If you do not specify these options, the default settings will be used as set up in your preferences.

**First and Second Timecode**

*This is a Red R3D file specific option argument.*

The `--timecode-header` option takes an *optional* argument 1 or 2. This allows us to specify whether to use the first or second timecode from an R3D file. *With no argument, we default to 1.*

**Command**

```bash
$ film_master --project code2 \
  --import-folder z:\scans\episode5\ \
  --filter-format r3d --timecode-header 2
INFO Opening project "code2" from ... 
INFO Batch ... importing directory 0 of 1 (0) 
INFO Batch ... importing directory 1 of 5 (20) 
...
INFO Batch Import (completed) ... 6 of 6 (100)
```
Splicing to a Composition

--splice-order <file|timecode>

This option imports the shots found from the folder import and also *splices* them to a named composition.

⚠️ The *composition* must be specified via the *--composition* option.

A splice *order (file or timecode)* is required

**file**

This splices the found shots to the timeline in the order they are *found*.

*Note that shots are currently spliced from timecode 00:00:00:00.*

**timecode**

This splices the shots to the timeline in their *timecode* order.

**Command:**

```bash
$ film_master --project code2 --composition comp1 \
    --import-folder z:\scans\episode5\ \
    --filter-format dpix --splice-order timecode
INFO Opening project "code2" from ... 
INFO Opening composition "comp1".
```

Adding a Version

|--add-version <path>  Add a new version of a clip to the composition

**Adding a Clip Version**

--add-version <path>

To add a version to a composition clip, use the *--add-version* command.
Command:

$ film_master --project PROJ1 --composition COMP1
   --add-version M:\images\shots\009\056_009.001.dpx \
   --clip-name VERSION2 --record-in 100

INFO Opening project "PROJ1".
INFO Opening composition "COMP1".
INFO Found range (1, 54).
INFO Set clip name to "VERSION2".
INFO Clip added to composition.

This will import the clip at the specified path (giving it a name "VERSION2"), setting it as a version of the clip at the record position 100.

You need to have at least the same amount of source material in the new version as the old or an error will occur.

Replacing a Source

```
--replace-source <path>
```

Replace source of shot (at frame count) specified by new source

Replacing a Clip Source

```
--replace-source <path>
```

To replace the source of the shot (at specified record-in count) with the new source as specified in the given path.
Replacing a Source

Command:

Command:

```
$ film_master --project PROJ1 --composition COMP1 \
    --replace-source M:\images\shots\009\056_009.001.dpx \
    --record-in 100
```

INFO Opening project "PROJ1".

INFO Opening composition "COMP1".
INFO Found range (1, 54).
INFO Set clip name to "VERSION2".
INFO Clip added to composition.

The source will be replaced.

⚠️ Grades will be retained on the shot.

⚠️ You need to have at least the same amount of source material in the new version as the old or an error will occur.

### Splice and Overwrite Clips

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>--splice [path]</td>
<td>Splice a clip to the composition timeline. If clip path not given, clip name must be.</td>
</tr>
<tr>
<td>--overwrite [path]</td>
<td>Overwrite a clip to the composition timeline. If clip path not given, clip name must be.</td>
</tr>
<tr>
<td>--record-in &lt;N&gt;</td>
<td>Composition timeline record position</td>
</tr>
<tr>
<td>--source-in &lt;N&gt;</td>
<td>Input clip source position offset</td>
</tr>
<tr>
<td>--name &lt;name&gt;</td>
<td>Select name of library clip to operate on</td>
</tr>
<tr>
<td>--length &lt;N&gt;</td>
<td>Consider only this number of input frames</td>
</tr>
<tr>
<td>--track &lt;Vn&gt;</td>
<td>Select video track to operate on</td>
</tr>
</tbody>
</table>

### Splice versus Overwrite

- A splice operation will push any existing clip frames up the timeline from the splice location.
- An overwrite operation will overwrite any existing clip frames from the splice location.

⚠️ If a clip file path is not supplied, it is **required** to supply a clip name (- -name). If you only supply a clip name, it must exist in the project library.
Note that the timeline is assumed to start at 00:00:00:00. Clips will be placed at the end of the timeline (or 00:00:00:00 if timeline empty) unless a record-in point is set with the --record-in option.

Original "alex one" clip (splice to empty composition)

**Command**:
```
$ nucoda_fuse --project PROJ1 --composition COMP1 \
   --name "alex one" \ 
   --splice
```

Result:
```
 not known | alex one : 0
```

If we now:

**Splice Clip**

**Command**:
```
$ nucoda_fuse --project PROJ1 --composition COMP1 \
   --name "train" \ 
   --splice --record-in 0
```

We end up with:
```
 not known | train : 0 | not known | alex one : 0
```

**Overwrite Clip**

**Command**:
```
$ nucoda_fuse --project PROJ1 --composition COMP1 \
   --name "train" \ 
   --overwrite --record-in 0
```

We end up with:
```
 not known | train : 0 | not known | alex one
```

It is best to always set the explicit in point for an overwrite operation using the --record-in option.
Splice/Overwrite By Clip Name

**Command:**

```
$ nucoda_fuse --project PROJ1 --composition COMP1 \
   --name "train" --splice
```

INFO Opening project "PROJ1".
INFO Opening composition "COMP1".
INFO Clip added to composition.

Splice/Overwrite By Clip Path

This will do an import to library followed by a splice.

**Command:**

```
$ nucoda_fuse --project PROJ1 --composition COMP1 \
   --splice M:\shots\004\300000.dpx
```

INFO Opening project "PROJ1".
INFO Opening composition "COMP1".
INFO Found range (300000, 300164).
INFO Clip added to composition.

You might want to give the imported clip a library name and description (possible on first import only).

**Command:**

```
$ nucoda_fuse --project PROJ1 --composition COMP1 \
   --splice Z:\images\300000.dpx --name "train" \
   --description "this is a train clip"
```

INFO Opening project "PROJ1".
INFO Opening composition "COMP1".
INFO Found range (300000, 300164).
INFO Set clip name to "train".
INFO Set clip description to "this is a train clip".
INFO Clip added to composition.

Splice/Overwrite to a Different Video Track

If the composition has more than one video track, we can select the target track using the --track option.

**Command:**

```
$ nucoda_fuse --project PROJ1 --composition COMP1 \
   --splice --name "train" --track V2
```

INFO Opening project "PROJ1".
INFO Opening composition "COMP1".
INFO Clip added to composition.
Splice/Overwrite to a Specific Record Position

We can splice or overwrite to a specific position on the composition timeline using the option `--record-in`.

Original timeline video track with clip "alex one":

```
0   48   96   144  192  240
|not known| alex one: 0
```

Command:

```
$ nucoda_fuse --project PROJ1 --composition COMP1 \
   --overwrite --name "train" --record-in 100
INFO Opening project "PROJ1".
INFO Opening composition "COMP1".
INFO Clip added to composition.
```

After overwrite to frame 100 of clip "train"

```
0   48   96   144  192  240
|not known| alex one: 0 | train| images train : 0 | 1.
```

Splice/Overwrite from a Specific Source Position

There are two methods to splice or overwrite a clip from a specific source position. Explicitly using the `--source-in` option or implicitly using the timecode of the frame of the clip we pass in.

The second implicit method needs the full path of the clip frame to be used not the clip name.

Source-In

We can splice/overwrite from a specific source position by using the option `--source-in`:
Splice and Overwrite Clips

Command:

```bash
$ nucoda_fuse --project PROJ1 --composition COMP1 --overwrite --name "slate" --record-in 100 --source-in 10
INFO Opening project "PROJ1".
INFO Opening composition "COMP1".
INFO Clip added to composition.
```

**Clip Frame**

Instead of using the `--source-in` option to select the first frame of the source to splice, we splice the source clip from the frame we pass in.

If we have a clip:

`008[200-300].dpx`

The following command:

**Command:**

```bash
$ nucoda_fuse --project PROJ1 --composition COMP1 --splice Z:\images\008220.dpx --record-in 100
INFO Opening project "PROJ1".
INFO Opening composition "COMP1".
INFO Clip added to composition.
```

will splice the clip from frame `008220.dpx` i.e. splicing frames `008[220-300].dpx`.

- **This is equivalent to using the option** `--source-in 8220`.

**Splice/Overwrite of Particular Material Lengths**

We can choose to splice or overwrite a particular length of clip using the `--length` option. The following command will splice in the first 10 frames (`--length`) of clip "slate" onto the timeline at frame 100 (`--record-in`).

© 2014 Digital Vision

UM-2014.1-07
**Applying a Note to a Shot**

**Apply Note**

Use the `--set-note` command to apply a note to a shot.

> The note can **only** be applied when the shot is *spliced* or *overwritten* to the composition. See: [Splice and Overwrite Clips](#)

**By Name**

`--set-note NAME`

Apply the named note to the shot. The note must exist in the project notes folder:

> The named note must exist in the specified project.

**Command:**

```
$ nucoda_fuse --project PROJ1 --composition COMP1 \
  --splice --name "slate" \
  --record-in 100 --length 10
INFO Opening project "PROJ1".
INFO Opening composition "COMP1".
INFO Clip added to composition.
```

**By Path**

`--set-note PATH`

**Command:**

```
$ film_master --project PROJ1 \
  --composition comp --name SHOT \
  --splice --record-in 90673 \
  --set-note lowerlevels
INFO Opening project "PROJ1".
INFO Opening project "PROJ1" from "D:\Nucoda\2013_1\proj
INFO Opening composition "comp".
Successfully applied note lowerlevels.
INFO Clip added to composition.
```
Apply the note found at the given path to the shot.

**Command:**

```bash
$ film_master --project PROJ1 \
   --composition comp --name SHOT \
   --overwrite --record-in 90673 \
   --set-note S:\Temp\lowerlevels.note
```

INFO Opening project "PROJ1".
INFO Opening project "PROJ1" from "D:\Nucoda\2013_1\proj INFO Opening composition "comp".
Successfully applied note s:\Temp\lowerlevels.note.
INFO Clip added to composition.

---

## EDL Import and Conform

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>--import-edl &lt;path&gt;</strong></td>
<td>Import EDL or AAF from given path</td>
</tr>
<tr>
<td><strong>--new</strong></td>
<td>Required (one of)</td>
</tr>
<tr>
<td><strong>--add</strong></td>
<td>--new: Create a new composition</td>
</tr>
<tr>
<td><strong>--mark</strong></td>
<td>--add: Operate on existing composition</td>
</tr>
<tr>
<td>**--track-type &lt;v</td>
<td>a</td>
</tr>
<tr>
<td><strong>Default</strong>: v</td>
<td></td>
</tr>
<tr>
<td><strong>--merge-from N</strong></td>
<td>After import, merge grades from track number N</td>
</tr>
<tr>
<td><strong>Requires</strong>: --match</td>
<td></td>
</tr>
<tr>
<td>**--match &lt;source</td>
<td>record</td>
</tr>
<tr>
<td><strong>--track-target N</strong></td>
<td>Specify target track number N</td>
</tr>
<tr>
<td><strong>--import-material</strong></td>
<td>Import EDL or AAF referenced material</td>
</tr>
<tr>
<td><strong>--conform-material</strong></td>
<td>Conform material to composition</td>
</tr>
<tr>
<td><strong>--autoconform</strong></td>
<td>Import and conform EDL or AAF referenced material in one step</td>
</tr>
<tr>
<td><strong>--conform-record-tc</strong></td>
<td>Conform to record timecode (default is source timecode)</td>
</tr>
<tr>
<td><strong>--no-translate</strong></td>
<td>Do not use any EDL tapename translation table</td>
</tr>
<tr>
<td><strong>--strip-extension</strong></td>
<td>Strip clip name extensions (e.g., .mov etc.)</td>
</tr>
<tr>
<td><strong>--lut-layers</strong></td>
<td>Import ASC LUT's and create a CDL base</td>
</tr>
<tr>
<td>layer</td>
<td></td>
</tr>
<tr>
<td>-------</td>
<td></td>
</tr>
<tr>
<td>--cdl-layers</td>
<td>Create an ASC CDL and CDL base layer</td>
</tr>
</tbody>
</table>

**Note**: track numbers are indexed from 1.

Use the `--help-import` option to the application to see some basic usage for the EDL import functionality.

**Importing**

`--import-edl <path> < --new | --add | --mark >`

To import an EDL or AAF list, use the `--import-edl` option with the `path` to the file.

**Requirements**:

- One of the options `--new`, `--add` or `--mark` is required to fully specify the operation. See below.

You can use `--import-edl` with AAF files but most other options in this chapter relate to EDL import only.

**Creating a New Composition**

`--import-edl <path> --new`

This imports the file and creates a new composition in the library with tracks created as required.

No media is imported or linked to a composition automatically. See the `--import-material` and `conform` options below.

**Command**:

```
$ nucoda_film_master --project "PROJ1" \
    --import-edl S:\edl\ttt.edl --new
INFO Opening project "PROJ1" from "D:\Nucoda\2014_1\proj"
INFO ttt.edl imported.
```

**Naming the Composition**

By default, the composition name (material name) is taken from the EDL "TITLE:" line.

Use the `--name` option to name the composition created explicitly.
Command:

```
$ nucoda_film_master --project "PROJ1" \
   --import-edl S:\edl\ttt.edl --new \ 
   --name compname
INFO Opening project "PROJ1" from "D:\Nucoda\2014_1\proj
INFO ttt.edl imported.
```

Adding to an Existing Composition

`--import-edl <path> --add`

The `--add` option will import the named EDL and add it to the named composition.

Requirements:

- Name the composition we are operating on using the `--composition` option.

Command:

```
$ nucoda_film_master --project "PROJ1" \
   --composition "compname" \
   --import-edl S:\edl\ttt-extra.edl --add
INFO Opening project "PROJ1" from "D:\Nucoda\2014_1\proj
INFO Opening composition "compname".
INFO ttt-extra.edl imported.
```

Target Track

`--track-target N`

Use this option to add the imported EDL to the specified track. If this option is not given, the EDL is added to the next available track (which will be created).

⚠️ The imported EDL will overwrite the target track.

Marking an Existing Composition

`--import-edl <path> --mark --track-target N`

The `--mark` option imports the named EDL and places "marks" (scene edits) on the track specified. We place the edits on the target track as per the EDL In/Out record timecode (for each EDL event).

Requirements:

- The `--composition` option is required
- The `--track-target` option is required to specify the target track we mark
Command:

$ nucoda_film_master --project "PROJ1"
   --composition "compname"
   --import-edl S:\edl\ttt-mark.edl \
   --mark --track-target 1

INFO Opening project "PROJ1" from "D:\Nucoda\2014_1\projects\PROJ1".
INFO Opening composition "compname".
INFO ttt-mark.edl marked.

* The target track must exist.

Importing Media and Conforming

--import-material
--conform-material
--autoconform
--conform-record-tc

Importing an EDL creates the basic composition but does not import or link media to the composition. The options described here import actual media to the project library and conform (link) it to the imported EDL.

* These options work on --import-edl only and assume a command-line that includes:

   --import-edl <path> < --new | --add | --mark >

Importing Media

--import-material

Imports any material referenced when importing the EDL.

Command:

$ nucoda_film_master --project "PROJ1"
   --import-edl S:\edl\ttt.edl	--new \
   --import-material

INFO Opening project "PROJ1" from "D:\Nucoda\2014_1\proj
INFO ttt.edl imported.

Material paths are specified per EDL event using a "FROM FILE" syntax as shown below:

<table>
<thead>
<tr>
<th>TITLE: comptest</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 tape-1 V C 05:04:46:13 05:04:56:03 01:03:16:04 01:00:00</td>
</tr>
</tbody>
</table>

* FROM FILE: S:\media\images\mazda-2k\OE5012A\438877.dpx

Each referenced clip is imported into the project library from the specified file path.
Conforming

--conform-material

Conform (link) any material referenced when importing the EDL. The material is assumed to be in the project library unless the option --import-material is also used.

Command:

```
$ nucoda_film_master --project "PROJ1" \\
   --import-edl S:\edl\ttt.edl --new \\
   --import-material --conform-material
INFO Opening project "PROJ1" from "D:\Nucoda\2014_1\proj
INFO ttt.edl imported.
```

Import and Conform in One Step

--autoconform

This will import EDL referenced material into the library and conform (link) it to the composition at the same time.

Command:

```
$ nucoda_film_master --project "PROJ1" \\
   --import-edl S:\edl\ttt.edl --new \\
   --autoconform
INFO Opening project "PROJ1" from "D:\Nucoda\2014_1\proj
INFO ttt.edl imported.
```

The --autoconform option is equivalent to:

```
--import-material --conform-material
```

Conforming to Record Timecode

--conform-record-tc

When conforming composition events, use the record timecode when doing the match.

Merging Grades

--merge-from < N | mixdown >
--match < source | record | clip >

Use these options to import and add a new EDL to an existing composition, preserving existing grades where shots match. You must specify the track you take the grades from and also how to match the shots (thus selecting the correct grades to merge over).
To ensure that any EDL referenced material is imported and conformed, you will also need to use some combination of the conform options above e.g. --autoconf orm

Requirements:

- The --composition option is required to specify the current composition we merge from.
- The --match option is required to specify how to match the shots.
- Use a conform option (e.g. --autoconf orm) to link referenced material.

Choosing Source Track

--merge-from < N | mixdown >

This selects the source track containing the grades to merge or "mixdown" to select the mixed down grades (the "sum" of the grades over all source tracks).

Match Method

--match < source | record | clip >

Required when using --merge-from.

This selects the method to use when matching shots when merging over the grades.

<table>
<thead>
<tr>
<th>Name</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>source</td>
<td>Match via source timecode</td>
</tr>
<tr>
<td>record</td>
<td>Match via record timecode</td>
</tr>
<tr>
<td>clip</td>
<td>Match using clip name</td>
</tr>
</tbody>
</table>

Command:

```bash
$ nucoda_film_master --project "PROJ1" \
  --composition compname \ 
  --import-edl $:\edl\ttt-merge.edl --add \ 
  --autoconform \ 
  --merge-from 1 \ 
  --match record
INFO Opening project "PROJ1" from "D:\Nucoda\2014_1\proj
INFO Opening composition "compname".
INFO ttt-merge.edl imported.
```
Other Options

Tapename Translation
--no-translate

This option disables the automatic tapename translation on import.

Some EDL files contain a tapename translation table. This table can be used to translate illegal tapenames (e.g. containing spaces) to legal ones (e.g. spaces replaced with underscores). Normally we use this translation table to create correct tapenames once imported.

We support two types of translation table: Avid and Final Cut Pro style.

<table>
<thead>
<tr>
<th>Translation Table Type</th>
<th>EDL Line Pattern</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avid style</td>
<td>&gt;&gt;&gt; SOURCE</td>
</tr>
<tr>
<td>Final Cut pro style</td>
<td>FINAL CUT PRO REEL:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Example</th>
</tr>
</thead>
</table>
| TITLE: comptest
001 tape_daily_10 V C 05:04:46:13 05:04:56:03 01:03:16:04 01:03:25:19
* FROM FILE: S:\media\images\mazda-2k\OE5012A\438877.dpx
FINAL CUT PRO REEL: tape daily 10 REPLACED BY: tape_daily |

Stripping Clipname Extensions
--strip-extensions

Remove file extensions on any EDL clipnames (e.g. .mov) before processing EDL.

LUT Layers
--lut-layers

If the EDL contains any ASC LUT definitions, this option will enable processing and creation of a CDL base layer.

CDL Layers
--cdl-layers

If the EDL contains any CDL (Color Decision List) definitions, this option will enable processing and creation of a CDL base layer.
Capturing and Conforming

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>--capture &lt;path&gt;</code></td>
<td>Capture material from top-level path specified</td>
</tr>
<tr>
<td><code>--capture-list</code></td>
<td>Print out the internal capture list created</td>
</tr>
<tr>
<td>`--match-name &lt;0</td>
<td>1&gt;`</td>
</tr>
<tr>
<td><code>--exact-timecode</code></td>
<td>When capturing, expect source clips to match the EDL timecode exactly.</td>
</tr>
<tr>
<td><code>--conform</code></td>
<td>Link timeline to “Found” library clips</td>
</tr>
<tr>
<td><code>--handle-length &lt;N&gt;</code></td>
<td>Capture N handles</td>
</tr>
</tbody>
</table>

Capture versus Conform

Capture

Searches for source material in specified locations (recursively), trying to match items referenced in the EDL/AAF composition and pulling them into the library. In general, whole clips are captured if present (not just the event duration).

Conform

Links library items with the composition timeline (you may wish to use an EDL merely to load material into the library (capture only)).

A conform will always attempt to link the latest library material to the timeline. This means if a later version of a clip is imported or captured, the conform will link to this new version.

Loading the List

`--import <path>`

When we perform a capture operation on a list file created composition, we attempt to match the composition timeline (which reflect the list "events") to actual source material.

Consider the following EDL:

<table>
<thead>
<tr>
<th>Title</th>
<th>Event 1</th>
<th>Event 2</th>
<th>Event 3</th>
<th>Event 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test EDL</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>001</td>
<td>721A V</td>
<td>01:51:25:07</td>
<td>01:51:25:22</td>
<td>01:05:00:00</td>
</tr>
<tr>
<td>002</td>
<td>722A V</td>
<td>02:37:04:21</td>
<td>02:37:06:12</td>
<td>01:05:00:15</td>
</tr>
<tr>
<td>003</td>
<td>721A V</td>
<td>01:52:27:09</td>
<td>01:52:28:13</td>
<td>01:05:02:06</td>
</tr>
<tr>
<td>004</td>
<td>722A V</td>
<td>02:38:05:16</td>
<td>02:38:06:19</td>
<td>01:05:03:10</td>
</tr>
</tbody>
</table>

Load an EDL using the following command:
Command:

$ film_master --project PROJ1 --import C:\edls\test.edl
INFO Opening project "PROJ1".
INFO /edl/test.edl imported.

Results in the composition title "Test EDL" from the EDL "TITLE" parameter.

At this point, we will have a composition called "Test EDL" in the library. Making it active would show us a timeline consisting of four clips (as per EDL) on a single video track. These clips will be Offline if we view them using the application monitor.

Displaying the Capture List

--capture-list

With an EDL loaded, we can view its status using the --capture-list option:

Command:

$ film_master --project PROJ1 --composition "Test EDL" --capture-list
INFO Opening project "PROJ1".
INFO Opening composition "Test EDL".

| Clip                  | Start       | End         | Tape    | Status    |
|------------------------+-------------+-------------+------------+------------|
| 722A.226197-226236     | 02:37:04:21 | 02:37:06:12 | 722A      | Ready      |
| 722A.227656-227683     | 02:38:05:16 | 02:38:06:19 | 722A      | Ready      |

This is our internal representation of the EDL and its current status "Ready".

Capturing

--capture <path>
--match-name <0|1>
--handle-length <N>
To perform the capture, use the `--capture` option, with an argument of a file path to search:

```
Command:
$ film_master --project PROJ1 --composition "Test EDL" --capture Z:\server\shots
```

Our status changes to "Found" and we will have clips (four in this case) loaded into the library. These clips are still offline in the monitor however.

```
Clip                  | Start       | End         | Tape    | Status
------------------------+-------------+-------------+------------+----
722A.[227656-227683] | 02:38:05:16 | 02:38:06:19 |    722A | Found
```

Normally, when searching for source material, we will look at both a clip timecode and its tapename field when attempting to identify a match to the EDL/composition.

### Matching Names

`--match-name <0|1>`

The `--match-name` option lets you specify whether to take a "name" into account when searching for material to conform.

```
The "name" we use is as set in the preferences - and might be clip name, tape name or film name. If we do not specify this option, the settings are taken from the preferences.
```

Our capture operation would then look like:
Command:

```
$ film_master --project PROJ1 --composition "Test EDL" \
    --capture Z:\server\shots \ 
    --match-name 0
```

INFO Opening project "PROJ1".
INFO Opening composition "Test EDL".

<table>
<thead>
<tr>
<th>Clip</th>
<th>Start</th>
<th>End</th>
<th>Tape</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>722A.[227656-227683]</td>
<td>02:38:05:16</td>
<td>02:38:06:19</td>
<td>722A</td>
<td>Found</td>
</tr>
</tbody>
</table>

Handles

```
--handle-length <N>
```

Use this option to specify how many head and tail handles to capture.

Capturing with Exact Timecode

```
--exact-timecode
```

If our EDL looks like the following:

```
TITLE: Test EDL
001 721A V C T1 T2 ....
```

where

- T1 is the source in timecode
- T2 is the source out timecode

And our source clip looks like :

![Diagram of source clip with T1 and T2]

where

- TS is the clip first frame timecode
- TE is the clip last frame timecode

Then :

- Normally, a capture operation would find a match for this source clip because our EDL source in/out timecode is **completely enclosed** within the clip.
- Using **--exact-timecode** will only match during a capture if the EDL source in/out timecode **exactly** matches the source clip i.e. T1 == TS AND T2 == TE.
Command:

$ film_master --project PROJ1 --composition "Test EDL" \
--capture Z:\server\shots \ 
--exact-timecode

Conform

--conform

After the capture stage, we can do a conform. This will link captured material to the composition timeline where the capture status is Found.

Command:

$ film_master --project PROJ1 --composition "Test EDL" \
--conform

INFO Opening project "PROJ1".  
INFO Opening composition "Test EDL".  
INFO Conforming material...

Generating Local Proxies

Command:

--generate-proxies
Specify a range of proxies to generate

Generating Proxies for a Composition

--generate-proxies

Generate all the proxies for specified composition:

Command:

$ film_master --project PROJ1 --composition COMP1 \ 
--generate-proxies

INFO Opening project "PROJ1".  
INFO Opening composition "COMP1".  
INFO Generating proxies for composition...  
INFO gen ... 0 frames of 98 (0%)  
INFO gen ... 1 frames of 98 (1%)  
INFO gen ... 2 frames of 98 (2%)  
...  
INFO gen ... 98 frames of 98 (100%)
Generating Proxies for a Clip

--clip-name N --generate-proxies

To generate proxies for a specific clip in a composition, give the clip name:

**Command:**

```
$ film_master --project PROJ1 --clip-name CLIP2
    --generate-proxies
```

INFO Opening project "PROJ1".
INFO Generating proxies for clip...
INFO Creating new composition "CLIP2".
INFO gen ... generated 0 frames of 15 (0%)
INFO gen ... generated 1 frames of 15 (6%)
INFO gen ... generated 2 frames of 15 (13%)
...
INFO gen ... generated 15 frames of 15 (100%)

Generating Proxies on a Range

--range A B

You can generate proxies for a range of frames using the --range option. This will work on a range of frames within a clip or on a range within a whole composition, depending on usage.

Within a clip:

**Command:**

```
$ film_master --project PROJ1 --clip-name CLIP1
    --range 10 20 --generate-proxies
```

INFO Opening project "PROJ1".
INFO Found clip. Origin is 1.
INFO Generating proxies for clip...
INFO Creating new composition "CLIP1".
INFO gen ... generated 0 frames of 10 (0%)
INFO gen ... generated 1 frames of 10 (10%)
...
INFO gen ... generated 10 frames of 10 (100%)

* If you only give a start frame for the range (e.g. --range 30), then the proxies will be generated from this frame (in the clip) to the end of the clip.

Within a composition:
Command:

```
$ film_master --project PROJ1 --composition COMPl1
   --range 30 50 --generate-proxies
```

INFO Opening project "PROJ1".
INFO Opening composition "COMPl1".
INFO Generating proxies for composition...
INFO gen ... generated 0 frames of 21 (0%)
INFO gen ... generated 1 frames of 21 (4%)
... 
INFO gen ... generated 21 frames of 21 (100%)

If you only give a *start* frame for the range (e.g. `--range 60`), then the proxies will be generated from this frame to the end of the composition.

## Exporting Shots

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>--export &lt;path&gt;</code></td>
<td>Export/render supplied composition to specified path</td>
</tr>
<tr>
<td>`--export-mode &lt;single</td>
<td>multi&gt;`</td>
</tr>
<tr>
<td>`--multi-mode &lt;visible-src</td>
<td>tracks-src</td>
</tr>
<tr>
<td><code>--frame-padding &lt;N&gt;</code></td>
<td>Set with of numeric padding on filenames on export. This will be zero-padded.</td>
</tr>
<tr>
<td><code>--export-handles &lt;N&gt;</code></td>
<td>Export each shot with specified handles <strong>Required when using multi mode export.</strong></td>
</tr>
<tr>
<td>`--smpte-level-clip &lt;true</td>
<td>false&gt;`</td>
</tr>
</tbody>
</table>

## Exporting a Composition

```
--export <path>
--export-mode <single|multi> **REQUIRED**
```

This command will render and export the specified composition (given by the `--composition` parameter) to the specified path.
The <path> argument should be the full path, including the drive letter, filename and extension.

The export mode option is required.

Command:

```bash
$ film_master --project PROJ1 --composition COMP1 \
  --export-mode single \
  --export Z:\jobs\001\graded_m.dpx
INFO Opening project "PROJ1".
INFO Opening composition "COMP1".
INFO export ... exported 0 frames of 60 (0%)
...
INFO export ... exported 60 frames of 60 (100%)
```

Exporting shots on the command line will not generate caches. This is different behaviour to the GUI where you have a choice of caching behaviour when exporting media.

Export Variables

The export path specified with `-export` can contain export variables such as `$o`, `$f` etc.

Example

```bash
--export S:\exports\$o\c_graded..dpx \
  --export-mode single
```

Producing a single file sequence named from the clip name, in a folder named from composition:

GRATED_MASTER\approved.090000.dpx ... approved.092421.dpx

Exporting Numeric Files

To export files with numeric filenames only, use the `$f` (frame number) variable:

```bash
--export S:\exports\e\$f.tiff
```

Produces numeric files in event folders e.g.

0045\008331.tiff

Export Modes

```bash
--export-mode <single|multi> REQUIRED
```
--multi-mode <visible-src|visible-rec|tracks-src|tracks-rec>
--export-handles <N>

You can export your composition as a **single contiguous clip** (single), in **multiple shot chunks** (multi), using **source timecode** (src) or using **record timecode** (rec).

There is one single mode and four types of multi mode, each multi mode laying out the exported shots slightly differently. The four multi modes are:

- --multi-mode visible-src
- --multi-mode visible-rec
- --multi-mode tracks-src
- --multi-mode tracks-rec

⚠️ Because shots might be overwritten if they have **overlapping timecodes**, you should consider the use of an **event folder variable** ($e) when exporting.

⚠️ See the Exporting chapter for a fuller description of Export Modes.

**Example**

The following examples are split over two lines using a line continuation character. In reality, the command would be on a single line only.

```bash
--export S:\export\$e\$c..dpx --export-mode multi \
   --multi-mode visible-rec --export-handles 20
```

Producing multiple event folders, each containing one shot with record order timecodes:

```
0001/NOCLIP.090000.dpx ...
0002/fixed.0090078.dpx ...
```

**Frame Number Padding**

--frame-padding <N>

This sets the numeric padding on exported filenames.

⚠️ Numbers are **zero padded** i.e. 008999.dpx is frame padding of six.

**Shot Handles**
--export-handles <N>

In multi-mode export, set how many handles to export per shot. This is required in multi-mode.

**SMPTE Level Clip**

--smpte-level-clip <true|false>

This setting will clip the exported shot to a SMPTE video level (i.e. 64-940 for 10 bit data).

* This is only applicable to SMPTE colourspace projects.

### Exporting an EDL

```shell
--export-edl <edl file>  # Export supplied composition to specified EDL file
--use-frame-numbers       # Use frame numbers in EDL instead of timecode
```

**Exporting an EDL**

--export-edl <edl file>

This command will export the specified composition (given by the `--composition` parameter) to the specified EDL file.

* The `<edl file>` argument should be the full path, including the drive letter, filename and extension.

```
$ nucoda_film_master --project project-x --composition comptest --export-edl S:\edl1.edl
INFO Opening project "project-x" from "D:\Nucoda\2014_1\projects\project-x".
INFO Opening composition "comptest".
```

**Result**

The output EDL will be standard EDL (CMX) format with timecodes e.g.
Exporting with Frame Numbers

--use-frame-numbers

When exporting an EDL, use --use-frame-numbers to include frame numbers instead of timecodes in the output EDL.

Command :

$ nucoda_film_master --project project-x --composition comptest
   --export-edl S:\edl1.edl --use-frame-numbers

INFO Opening project "project-x" from "D:\Nucoda\2014_1\projects\project-x".
INFO Opening composition "comptest".

Result

The output EDL will be standard EDL (CMX) format with frame numbers e.g.

| TITLE: comptest |
| FCM: PAL |
| 001 tape-1 V C 457163 457403 94904 95144 |
| * FROM CLIP NAME: |
| * FROM FILE: S:\media\images\mazda-2k\OE5012A\438877.dpx |
| * FROM COMMENT: |

Saving and Loading Compositions

| --save-composition <file path> | Save given composition and all referenced source clips to given file. |
| --load-composition <file path> | Load composition and all referenced source clips to given file. |

Save Composition

--save-composition <file path>

This command will save the specified composition (given by the --composition parameter) to the specified file.
The `<file path>` argument should be the full path, including the drive letter, filename and extension. Composition content files saved through the GUI are given an extension .content.

**Command:**  
```
$ nucoda_film_master --project project-x --composition comptest  
--save-composition S:\output\compl.content
```

INFO Opening project "project-x" from "D:\Nucoda\2014_1\projects\project".

**Load Composition**

--load-composition `<file path>`

Load the composition from given composition file into the specified project.

**Command:**  
```
$ nucoda_film_master --project project-x \  
--load-composition S:\new\day\day011.content
```

INFO Opening project "project-x" from "D:\Nucoda\2014_1\projects\project".

The composition file will be loaded and create a composition with the same name and contents as the original (saved) composition.

**Rendering a Composition Cache**

**Command:**  
```
$ film_master --project PROJ1 --composition COMP1 \  
--render-output
```

INFO Opening project "PROJ1".
INFO Opening composition "COMP1".
INFO Rendering output for composition...
INFO render output ... 226 still to render (0)
INFO render output ... 224 still to render (0)
...
INFO render output ... 0 still to render (100)
Running Batch Operations

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>--batch-mode &lt;file&gt;</td>
<td>Run CLI commands from file</td>
</tr>
<tr>
<td>--ops-file &lt;file&gt;</td>
<td>Run some commands from file</td>
</tr>
</tbody>
</table>

Both these options run application commands from the given text file. The advantage of this is that the commands complete much more quickly than if run separately on the command line because the application only needs to startup, initialise and open projects or compositions once.

The "ops-file" command is left for backwards compatibility. The "batch-mode" option is new and much more flexible and powerful. It also supports all CLI commands.

Batch Mode

--batch-mode <file>

Run the command-line commands from the given text file. Each command line should be placed on a separate line of the file and any valid command line is allowed. The application will load the file and run each line as if you were typing them interactively.

You do not need to include the application executable on each batch file line i.e. write batch file lines like:

```
-p TestProject -c Compname --splice <path>
```

Example Batch File

```
--project P --composition C --splice Z:\shots\dpx\056_004.001.dpx
-p P -c Compname --splice Z:\shots\dpx\078_021.001.dpx --record-in 8992
--project ProjectX --import-folder S:\images\testfiles
```

Ops File

--ops-file <file>

This options allows you to take commands to run from a specified text file but is more limited in the commands it supports.
Command:

```
$ nucoda_film_master --project PROJ1 \
   --composition COMP1 \
   --ops-file ops.txt
```

INFO Opening project "PROJ1".
INFO Opening composition "COMP1".
INFO Found range (1, 5).
INFO Clip added to composition.
INFO SPLICE : /server/shots/shot1/clip.00001.dpx (0.03 secs)
INFO Found range (1, 5).
INFO Clip added to composition.
INFO SPLICE : /server/shots/shot2/clip.00001.dpx (0.01 secs)
INFO Found range (1, 3).
INFO Clip added to composition.
...

Commands are read from the file and then run, the project and composition are opening only once. The project will be saved every now and then.

**Supported Commands**

Currently supported commands are:

- `splice`
- `overwrite`
- `add-version`
- `replace-source`

**Command Format**

Each operation will be on a separate line and have the following format:

```
<operation> <path> [record in] [source in] [track]
```

**e.g.**

```
splice Z:\shots\dpx\056_004.001.dpx 100
overwrite Z:\shots\test\011_v1.0001.cin 10 1 V2
replace-source Z:\server\ttt\ttt.0001.cin 95662 - V1
splice \images\test\ttt\ttt.0001.cin 1002 - V2
add-version Z:\server\scene4\78818.cin 67711 211 V3
```

A dash "-" acts as a place-holder.
Interactive Mode

--interactive-mode

Interactive Mode lets you type command-line commands to the application from the Windows CMD prompt interactively. This mode only needs to start the application once and is therefore faster.

Interactive Mode is useful for testing out the command-line.

**Command:**

$ nucoda_film_master --interactive-mode
INFO Set current user to "Default".
Interactive mode. Type --quit to exit.
>
--list
Projects:
1: PROJ1                - D:\Nucoda\2014_1\projects\PROJ1
2: PROJ1.export         - D:\Nucoda\2014_1\projects\PROJ1.export
3: PROJC                - D:\Nucoda\2014_1\projects\PROJC
--p PROJ1 --import-folder S:\media\images\testsequences\timeline_tests\CLIP-A-DIR
INFO Opening project "PROJ1" from "D:\Nucoda\2014_1\projects\PROJ1".
INFO Batch Import (running) : "Importing" - importing directory 0 of 1 (0)
INFO Batch Import (running) : "Importing" - importing directory 1 of 1 (100)
INFO Batch Import (completed) : "Importing" - importing directory 1 of 1 (100)
>
--quit

At the interactive mode prompt (>), you can type any valid command-line command and see the result immediately.

Use --quit to exit interactive mode.

**Listing Information**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>--list</td>
<td>List projects, or compositions within projects.</td>
</tr>
<tr>
<td>--capture-list</td>
<td>List details to list captured material</td>
</tr>
<tr>
<td>--clip-list [s]</td>
<td>List details of clips in composition</td>
</tr>
</tbody>
</table>

Any item listed includes an index. You can use this index when performing remove operations.

**Listing Projects**

--list

To list projects available, use the command --list:
**Listing Compositions**

To list compositions available within a project, use the command:

```
Command:
$ film_master --project PROJ1 --list
```

```
INFO Opening project "et2" from "C:\Phoenix\2014_1\root\projects\et2".
Compositions in project "et2" of "C:\Phoenix\2014_1\root\projects\et2":
1: Comp - imported from C:\Temp\et.edl ...
2: Graded 001 - Tue 16 Feb 2010  16:22:13
3: Check        - Tue 16 Feb 2010  16:22:14
```

**List Captured Material**

```
--capture-list
```

This option lists the status of captured material from the specified composition. It is only relevant if the composition contains list captured material.

```
Command:
$ film_master --project et2 --composition Comp \ --capture-list
INFO Opening project "et2" from "C:\Phoenix\2014_1\root\projects\et2".
INFO Opening composition "Comp".
Clip(s) from composition "Comp" in project "et2" of ..
| Clip       | Start       | End         | Tape     | Status
|------------|-------------|-------------|----------|--------
| blue.[27-127] | 00:00:01:02 | 00:00:05:02 | blue     | Ready  |
| green.[203-272] | 00:00:08:03 | 00:00:10:22 | green    | Ready  |
| purple.[1085-1185] | 00:00:43:10 | 00:00:47:10 | purple   | Ready  |
| yellow.[39-88] | 00:00:01:14 | 00:00:03:13 | yellow   | Ready  |
```

Once captured the shot Status field will change to **Found**.

**List Clips and Associated Material**

```
--clip-list [s]
```
This option lists details of all clips in specified composition, including:

- The clip material name
- The clip date and time of import

If you include the argument "s", the clip .Material GUID is also displayed.

**Command:**

```
$ film_master --project et2 --composition Comp --clip-list
```

Removing Items

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>--remove-project &lt;name&gt;</code></td>
<td>Remove named project</td>
</tr>
<tr>
<td><code>--remove-indexed-project &lt;index&gt;</code></td>
<td>Remove project with index</td>
</tr>
<tr>
<td><code>--remove-composition &lt;name&gt;</code></td>
<td>Remove named composition</td>
</tr>
<tr>
<td><code>--remove-indexed-composition &lt;index&gt;</code></td>
<td>Remove composition with index</td>
</tr>
<tr>
<td><code>--remove-clip &lt;name&gt;</code></td>
<td>Remove named clip</td>
</tr>
<tr>
<td><code>--remove-indexed-clip &lt;index&gt;</code></td>
<td>Remove clip with index</td>
</tr>
</tbody>
</table>

Removal operations cannot be undone. You may wish to backup (copy) your project folder before using them.

Each removal operation can work on the name of an item, or its index. The item index is as returned from a list operation e.g.

**Command:**

```
$ film_master --project et --list
```

To remove the Graded 001 composition, use the command:

```
```
Removing Items

Removing Projects

--remove-project <name>
--remove-indexed-project <index>

To remove a project by:

Name:

Command:

```
$ film_master.exe --project et --remove-project "Check Danger 003"
```

INFO Deleting project "Check Danger 003" from "C:\Phoenix\2014_1\root\projects\Check Danger 003".

Index:

Command:

```
$ film_master.exe --project et --remove-indexed-project 2
```

INFO Deleting project indexed 2 - "Check Danger 002" of "C:\Phoenix\2014_1\root\projects\Check Danger 002".

Removing Compositions

--remove-composition <name>
--remove-indexed-composition <index>

You must specify the project name.

Example:

Command:

```
$ film_master.exe --project et2 --remove-composition Check
```

INFO Opening project "et2" from "C:\Phoenix\2014_1\root\projects\et2".
INFO Deleting composition "Check" from project "et2" of "C:\Phoenix\2014_1\root\projects\et2".

Removing Clips

--remove-clip <name>
--remove-indexed-clip <index>

You must specify the project and the composition.

Example:
Command:

$ film_master.exe --project et2 --composition Comp --remove-clip "tc first"
INFO Opening project "et2" from "C:\Phoenix\2014_1\root\projects\et2".
INFO Opening composition "Comp".
INFO Deleting clip "tc first" from project "et2" of "C:\Phoenix\2014_1\root\projects\et2".

Counting and Adding Tracks

| --count-tracks <video|audio> | Count how many tracks of specified type are in composition |
| --add-track <video|audio>   | Add a new track of specified type to existing composition |

Count Tracks

--count-tracks <video|audio>

This command will count how many tracks of the type specified exist in the named composition.

Command:

$ film_master --project PROJ1 --composition COMP1 --count-tracks video
INFO Opening project "ttt".
INFO Opening composition "COMP1".
INFO Total video tracks : 3

Command:

$ film_master --project PROJ1 --composition COMP1 --count-tracks audio
INFO Opening project "ttt".
INFO Opening composition "COMP1".
INFO Total audio tracks : 2

Add a Track

--add-track <video|audio>

This command will add a track of the type specified to the named composition. The number of the new track added is returned.
We will now have a new track "V4" in the composition "COMP1" above.

Testing for a GUI Lock

--testlock  Test if the GUI has a lock (and therefore GUI is open)

Testing if the GUI is Running

--testlock

This command will test if the GUI is open (and the application is holding a lock file).

Command:

$ film_master --testlock
$ echo $?  
0

Return:

- 0: GUI is not running (no lock)
- 1: GUI is running (lock held)

* This must be the first argument on the command-line.
Appendices
Application Preferences

To access the application preferences, from the main project screen, click the Preferences button.

Here you can adjust the default system-wide preferences.

Changes will apply to all new and existing projects.

Note that many of these settings can be overridden within a project.

The Preferences screen has a subset of screens, selectable via the tabs across the top:

- General preferences
- Capture/Conform preferences
- Colour preferences
- Video/VTR preferences
- Rendering preferences
- Control Panel preferences

Preference File

Preference file location: C:\Phoenix\2011_0\root\general.prefs

The location of the main preference file is displayed at the bottom of the General tab section.

Most preferences are stored in a text file called general.prefs, located in the application ROOT folder.
The ROOT folder is set in the environment variable:

PHOENIX_ROOT_V2014_1

Some application preferences can only be changed by editing the general. prefs file.

**General**

The general preferences screen specifies global configuration settings.

**Location display**

Select whether you want the default location display across your project to show frame numbers or timecodes. Changing the display style will affect the following:

- the timeline timebar
- the current position and in/out duration displays on the GUI and control panel
- the in / out values in the library
- the render progress report

This setting can also be changed from within your project.

**Reference mode**
**Application Preferences**

**Values:** Still store, Live memory  
**Default:** Still store

Select whether comparisons against the *reference frame* should be carried out in *still store* or *live memory* mode.

### Keycode

<table>
<thead>
<tr>
<th>Keycode</th>
<th>Perf per frame</th>
<th>Perf per count</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4</td>
<td>64</td>
</tr>
</tbody>
</table>

A keycode allows the unique identification of any frame on a reel of film. For a film reel, these settings define:

- *Perfs per frame* - how many perforations in one film frame
- *Perf per count* - how many perforations make up one keycode count increment

See Appendix [Keycode](#).

### SAFE mode

[ ] Open projects in SAFE mode

Normally, opening a project automatically selects to edit (and display) your current composition. Selecting *Safe Mode* will not do this, and open a project with *no composition selected*.

- This may be useful if a composition causes errors or problems when opening a project.

- This should be left off in normal use.

### Other Settings

- Warn when playback sync is lost
- Ripple Mode on
- Reset Recall Selection
- Audio notify default
- Auto Keyframe persist on shot change
Warn when playback sync is lost

This controls the display of a warning indicator (red arrow) on your monitor when playback drops below realtime (as defined for currently selected output format). If **off**, this warning will not be shown, even if playback is less than realtime.

![Warning indicator]

⚠ Changing this setting requires an application restart.

Ripple Mode on

Whether **ripple mode** should default to **off** or **on** in new projects.

Reset Recall Selection

Whether the source of a **Recall** action (effects/layers recalled) should reset afterwards, or persist.

Audio notify default

This enables an audio notification (sound event) on event/shot change. **Control panel only**.

Auto Keyframe persist on shot change

This enables the persistence of the **Auto Keyframe** button on shot change.

Preference File Location

Preference file location: C:\Phoenix2011_0\root\general.prefs

The location of the main preference file is displayed at the bottom of the **General** tab section. Most preferences are stored in a text file called **general.prefs**, located in the application ROOT folder.

* The ROOT folder is set in the environment variable PHOENIX_ROOT_V2014_1.
Capture/Conform

The Capture/Conform preferences screen specifies global configuration settings and conventions used when naming and conforming imported and captured material.

See Appendix Extracting Names for more detail on how we extract names from files and folders.

Auto Assign Name

Defines what library Material Name we give imported files/sequences. This name is extracted from the file name and/or folder structure according to rules defined here.

Example folder/file sequence on disk:

three / two / one / clip.0000.dpx

Naming Options

The drop-down choice here modifies the basic name string we calculate via the Folder Up/Adding parameters (see appendix Extracting Names for details on calculating the basic name string).

replace with filename

Uses filename only.
This ignores any file/folder calculations (i.e. folder up/additions).

Material Name : clip

prepend filename

Place filename before the concatenated folders we use.
Material Name: `clip two one`

**append filename**
Place filename *after* the concatenated folders we use.

Material Name: `two one clip`

**ignore filename**
Just use the concatenated folders, no filename.

Material Name: `two one`

See: Appendix Extracting Names for details on the naming rules for the concatenated folder.

**Folder Up**
Which folder we start counting from. The folder containing the imported file/sequence is index 0.

**Adding folders**
How many file/folder levels do we "add" as a name string, to create the final name.

**Auto Create Library Folder**

Defines if we create named folders in the project library automatically on material import.

The names created are extracted from the file name and/or folder structure according to rules defined here.

See: Appendix Extracting Names from File Folders

Example folder/file sequence on disk:

`three / two / one / clip.0000.dpx`

**Naming Options**
The drop-down choice here modifies the basic name string we calculate via the *Folder Up/Adding* parameters (see Appendix Extracting Names for details on calculating the basic name string).
no auto folder
Do not create library folders automatically. Material is imported into current library folder.

Folder : none created

tape name
Name the folder from the tapename extracted on import. The tapename is extracted as per the Conform tape name settings below. This ignores any basic name file/folder calculations (folder up/additions).
If the tapename cannot be determined, the folder is named "NOTAPE".

Folder : one (if we take tape name from filename, 1 folder up)

filename
Name the folder from the file structure on disk.

Folder : three two

filename hierarchical
Name the folder from the file structure on disk. Unlike the filename option, this creates folders/subfolders recursively (whereas filename is flat).

Folder : three / two (folder one is inside two)

See Appendix Extracting Names for an explanation of the rules.

Folder Up
Which folder we start counting from. The folder containing the imported file/sequence is index 0.

Adding folders
How many file/folder levels do we "add" to create the final name.
Start from Selected

☐ Start from selected folder

This sets whether we create the folders under our currently selected library folder. If off, the folders are created under the library root folder.

Capture and Conform

Capture and conform

Match Name

Here we are configuring how we assign and set some other important information when importing/capturing material into our library.

Timecode / Keycode

Capture and conform

Capture timecode

Capture keycode

The Capture timecode/Capture keycode drop-down list specifies where we extract the timecode information from.

The "timecode" can be an actual timecode or a film keycode, and both can uniquely identify a frame in a sequence.

Timecode

A timecode can be extracted from:

- file header (if available)
  The DPX file format has a timecode field. The RED R3D file format contains two timecodes.
- filename (numeric) e.g.
  clip.090000.dpx is timecode 01:00:00:00 @ 25 fps.

1st and 2nd Timecodes

The 2nd timecode is only used for the RED R3D file format (which contain two timecode fields). In all other circumstances, use 1st TC File header.
Keycode

A keycode can only be extracted from a DPX file header. A keycode will give us both the *keycode* field in the project library and the *timecode* field.

See Appendix Keycode.

Assigning Tapename and Conforming

A *tapename* can be automatically assigned to a shot:

- When importing a shot *manually* via the Library file browser
- As part of an *EDL capture/conform process*

We can also choose if we use an EDL tape name, film name or clip name in addition to the timecode for differentiating events during conform.

Tapename

The *tape name* field in the project library is set via the preference parameters to the right of the *Conform ..* drop-down list.

- The *tape name* field can be extracted from:
  - *file header* (if available)
    - This is supported in the DPX file format.
    - If the file format does not support this header field, the library tape name field is blank.
  - *file name*
    - This will be a single folder name at the specified level.
    - A level of 0 (zero) selects the name of the file (e.g. clip).

See Appendix Extracting Names.

Conforming

A basic conform process will compare events/shots on a *timecode basis only*. This method can sometimes result in multiple matches, where we have more than one candidate shot for the same timeline event.
To differentiate these multiple shot matches, we can extend our comparison to include *tape name* (or film name, or clip name).

The extra level of conform differentiation is performed if *Match Name* is enabled.

A drop-down list assigns the method used to differentiate *multiple* event/shot matches in a conform.

- Conform tape name
- Conform film name
- Conform clip name

We take the associated names from the list (EDL, CTL etc.).

**Rendering**

The Rendering preference tab configures global settings used as defaults for various render parameters.

**DPX Export Style**
The default DPX image format used for DPX exports.

**Values**: Big endian, Little endian  
**Default**: Big endian

- Big endian ("cineon" format)  
- Little endian ("OpenGL" format)

A **big endian** DPX file has header magic **SDPX** (ascii). A **little endian** DPX file has header magic **XPDS** (ascii). This specifies the byte-order used in the file and has an impact on DPX compatibility. The default should be most compatible.

### DPX Export Colour Depth

<table>
<thead>
<tr>
<th>DPX Export Colour Depth</th>
<th>Current colour depth RGB</th>
<th>12 bit RGB</th>
<th>10 bit YUV</th>
</tr>
</thead>
</table>

This specifies the default bit depth and colour data format for exported DPX image files.

- **Current colour depth RGB** - **default**. This sets the export bit-depth per channel as per the current output format, and uses RGB colour space.  
- **12 bit RGB** - use 12 bits per channel, RGB.  
- **10 bit YUV** - use 10 bits per channel, YUV.

Leave this at the **default** setting unless you are sure you need to change it.

### Render Tile/Frame Threads

| Render tile threads | 2 |  
| Render frame threads | 1 |

These settings control how many frames we try to render in parallel, and how each frame may be split for further concurrency in the render process.

- Render tile threads - this defines how each individual frame is split (tiled) for rendering in parallel across multiple CPU cores  
- Render frame threads - this defines how many whole frames are rendered in parallel.
These settings are dependent on the system type. See the Install and Configuration Guide for configuration settings for various supported systems.

**Image Memory**

This setting defines a "pool" of memory the application will allocate for storing and rendering image sequences.

Leave this at the **default** setting unless instructed to change it by a Digital Vision engineer.

**Cache Rendering Setup**

**Cache preallocation frames**

- **Values**: text entry
- **Default**: 20

This defines how many frames are *preallocated* for caches before the caches themselves are written to disk. This will help prevent caches getting fragmented.

To **disable** cache preallocation, set to 0 (zero).

**Cache fragmentation test**

- **Default**: on

This test is for *Windows NTFS only*. Do **not** enable on SAN filesystems (e.g. Stornext SNFS).

If turned off, caches will **not** be tested for fragmentation and no fragmentation status will be displayed on the timeline.
Memories

Display Ungraded as Greyscale

- Display ungraded as greyscale

  Default: Off

If on, ungraded shots are shown in greyscale in the Memories Window.

Generate Thumbnails

- Default: First frame
- Values: First frame, Middle frame, Last frame

This option selects the default thumbnail displayed for each event in the Memories view.
Cue Method

Default: Timecode  
Values: First frame, Middle frame, Last frame, Timecode

This option sets which frame we will cue to in a shot using CTRL+Cue on the Media Panel.

CTRL + Cue:
- **First frame**: cues to the first frame of the shot
- **Middle frame**: cues to the middle frame of the shot
- **Last frame**: cues to the last frame of the shot
- **Timecode**: cues to the event thumbnail timecode for the shot i.e. the timecode shown below the Memories/Event itself. This can be set via the Manual update method described in Update Method below.

Update Method

Default: Manual  
Values: Auto, Manual

This option chooses how the Memories event thumbnail is updated:
- **Auto**: Memories thumbnail updates automatically when you grade a shot
- **Manual**: Press Enter on panel to update Memories thumbnail

When your Cue Method is set to Timecode, cueing (CTRL+Cue) will cue to the timecode

Control Panel
The Control Panel tab configures global settings used as defaults for various control panel parameters.

**Trackball Orientation**

See: Colour Preferences

**Modifier Timeout**

Modifer timeout 3

**Default**: 3 seconds

This specifies how long a modifier key will stay active ("locked") before timing out when no other key is pressed.

The modifier keys affected by this setting are:

- Ctrl
- Shift
- Delete
- Event
- Dyn
- All
- Clear

* Setting this to 0 (zero) will disable locking the modifier key, and require both the modifier key and the (action) key to be pressed together.

**Shape Scale Control**

Shape scale control Aspect - Scale

This controls how shapes are scaled using the control panel, and whether scaling happens in X and Y independently or together, with separate aspect ratio control.
The choices relate to the control panel menus visible under *Shapes* on the *Image* panel.

- **Values**: Aspect - Scale, Scale X - Scale Y
- **Default**: Aspect - Scale

- **Aspect - Scale**
  This is the **default**. On the control panel *Shapes* menu, we have an *Aspect* parameter and a *Scale* parameter.

- **Scale X - Scale Y**
  On the control panel *Shapes* menu, we have *Scale X* and *Scale Y* parameters.

### Layer Focus on Shot Change

![Layer focus on shot change](image)

- **Default**: Remember per shot

This option defines the layer focused policy when we jump between shots.

- **Remember per shot**
  The focused layer is **persisted** on a shot by shot basis. Returning to a shot will focus the same layer as focused previously on this shot. If navigating to a shot for the first time, focus is put to the *Layer Focus Default* (see below).

- **Match between shots**
  The focused layer is **persisted between** shots such that we keep the same layer focused on our new shot as was focused on the previous shot.

### Layer Focus Default

![Layer focus default](image)

- **Values**: Effect, Base, Master
- **Default**: Base

This option defines which layer we **focus** after a *Master Reset* on the control panel or the first time we visit a shot.

### Press-hold Timeout

![Press-hold timeout](image)

- **Press-hold timeout**: 1.000
Default: 1 second

This refers to the length of time, in seconds, that you need to hold a button down before it goes into **repeat keystroke** mode.

**Display Timeout**

<table>
<thead>
<tr>
<th>Display timeout</th>
<th>15</th>
</tr>
</thead>
</table>

**Values:** User Set  
**Default:** 15 minutes

How many minutes of inactivity before the panel displays are turned off.

**Display Brightness**

<table>
<thead>
<tr>
<th>Display brightness</th>
<th>255</th>
</tr>
</thead>
</table>

**Values:** User Set (0 - 255)  
**Default:** 255 (brightest)

The brightness of the LED display screens on the panel.

**Key Brightness**

<table>
<thead>
<tr>
<th>Key brightness</th>
<th>255</th>
</tr>
</thead>
</table>

**Values:** User Set (0 - 255)  
**Default:** 255 (brightest)

The brightness of the lights on the panel keys.

**Trackball Timeout**

<table>
<thead>
<tr>
<th>Trackball timeout</th>
<th>200</th>
</tr>
</thead>
</table>

**Default:** 200

This setting controls how fast the trackball "stops".  
**This parameter is deprecated and should not be changed.**

**Trackball Trigger**
Trackball trigger 5

**Default:** 5

This setting controls how fast the trackball "starts". **This parameter is deprecated and should not be changed.**

## Ring Timeout

<table>
<thead>
<tr>
<th>Ring timeout</th>
<th>200</th>
</tr>
</thead>
</table>

**Default:** 200

This setting controls how fast the rings "stop". **This parameter is deprecated and should not be changed.**

## Ring Trigger

<table>
<thead>
<tr>
<th>Ring trigger</th>
<th>1</th>
</tr>
</thead>
</table>

**Default:** 1

This setting controls how fast the rings "start". **This parameter is deprecated and should not be changed.**

## Speed Settings

<table>
<thead>
<tr>
<th>Control Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trackball speed</td>
<td>100</td>
</tr>
<tr>
<td>Ring speed</td>
<td>100</td>
</tr>
<tr>
<td>Knob speed</td>
<td>100</td>
</tr>
<tr>
<td>Wheel speed</td>
<td>100</td>
</tr>
</tbody>
</table>

These speed settings control the overall sensitivity of the panel controls.

- Trackball Speed - the three trackballs on the *Colour* panel.
- Ring Speed - the three rings on the outside of each trackball on the *Colour* panel.
- Knob Speed - the parameter control knobs on the *Colour* and *Image* panels.
- Wheel Speed - the navigation wheel on the *Media* panel and the comparison wheel on the *Image* panel.
Higher values give more sensitivity.

**Fine Sensitivity**

- **Fine sensitivity**

Ticking this box will make the rings and trackballs sensitive to very small changes, without affecting the sensitivity for larger changes. This means tiny changes can be applied via tiny movements of controls.

**Compare Modes**

These parameters are on the next page of the Control Panel settings. Go to the next page by pressing the **More** button.

Enabled (ticked) items are available as compare modes inside the application.

**Colour**

The **Colour preferences screen** specifies global configuration settings controlling colour related controls and display.

**Trackball Orientation**

This specifies the orientation used for the colour-correction trackballs, both on
the control panel and the GUI interface. This configures the colour arrangement on the trackball.

Values: Vector, Offset, Offset 30, Offset 330
Default: Vector

* Offset corresponds to the old Rank system

As you change this setting the trackball image next to the drop-down will update, indicating the current colour orientation:

The Trackball Orientation setting also appears in the Control Panel preferences screen.

**Printer Points Per F-Stop**

| Printer points per f-stop | 8 | Positive |

Range: User set
Default: 8

This setting specifies the number of printer points used to represent an f-stop for the printer lights tool.

Positive

With the Positive setting enabled, the number you enter will add colour. Uncheck Positive to remove colour.

**Printer Neutral**

| Printer neutral | 25 |

Range: User set
Default: 25

This value represents no change in the printer lights settings.
Default Layer Show Mode

Values: Red, Green, Blue, Cyan, Magenta, Yellow, White, Black, Grey, Saturated
Default: Grey

Values: Inside Area, Outside Area
Default: Outside Area

These settings correspond to:
- Show As
- Show Area (In/Out)

in the Router settings for each CC/Effect layer.

Default Keyer Input

Values: Previous, Base, Start
Default: Start

This configures which layer a Keyer effect will use as input and corresponds to the layer Router setting Key Input.

- Start - use input of Base Layer as input
- Base - use output of Base Layer as input
- Previous - use previous layer as input

Compare Diff Threshold

This is the threshold below which compare mode differences will not be registered. A higher value means we are less sensitive to difference.

Range: User set
Default: 5 units

Default Colour Scaling
This parameter controls the default scaling mode used on a **new** project. See [Project Colour Scaling](#). For a discussion of colour scaling modes, see the *Colour Scaling* section in the *Setup Manual*. 
Monitoring / Video IO

The Monitoring/Video IO preference tab configures global settings for display modes, timeline monitoring and video and audio I/O.

Note that changing many of these settings requires an application restart.

Enable Dual Display

If Enable Dual Display is on, the application assumes a two display configuration and configures its screen layout appropriately.

The Enable Dual Display checkbox should be on when using NVIDIA SDI direct output.
DVI Order

Values : UI(1) - Monitor(2), Monitor(1) - UI(2)
Default : UI(1) - Monitor(2)

Use : All dual-display configurations.

This setting controls the orientation of the displays, where :
- UI - the graphical user interface (menus, buttons etc.)
- Monitor - the player, image display

If the dual screen mode you configure is invalid and causes problems, you can always set the general.prefs preference file parameter dualScreenMode to false before restarting.

Monitor Anchor

Values : Centre, Top left
Default : Centre

Use : NVIDIA SDI in extended desktop mode

This setting is only relevant to the extended desktop mode NVIDIA SDI configuration i.e. SDI configured via the NVIDIA control panel. It is used to define the positioning of the NVIDIA SDI output in relation to the primary (UI) output, when the SDI output is a different size to the UI output i.e.
- UI output is HD (1920x1080 pixels)
- SDI output is PAL (720x576 pixels)

Enable NVIDIA SDI Direct Output

These settings relate to the NVIDIA direct SDI monitoring output.

Use : Monitoring via NVIDIA direct SDI
The Enable Dual Display checkbox should be on when using NVIDIA SDI direct output

Enable NVIDIA SDI direct output

SDI Link

YCrCb 422
RGB 444
YCrCb 444
Dual YCrCb 422
12bit YCrCb 422
12bit YCrCb 444

Default format
HD 1080i

Always use default format for monitoring

NVIDIA direct SDI is our term for the application taking direct control of the NVIDIA card SDI monitoring signal. This means that no configuration is needed in the NVIDIA display control panel.

SDI Link

This specifies the default NVIDIA SDI colourspace and format.

Values: YCrCb 422, RGB 444, YCrCb 444, Dual YCrCb 422, 12 bit YCrCb 422, 12 bit YCrCb 444

Default: YCrCb 422

Default Format

This specifies the default NVIDIA SDI video format to use.

Values: PAL, NTSC, 720p, HD 1080i, HD 1080psf, HD 1080p, 2k p, 2k i

Default: HD 1080i
Always use default format for monitoring

- Always use default format for monitoring

When enabled, the monitor is locked to the format set above and will not try and switch to a new format, even if its input changes.

- This is useful if your output monitoring device does not support some output formats and you wish to lock it to a supported format.

Enable OpenGL readback to Video

- Enable OpenGL readback to Video

This setting enables the OpenGL graphics on your display monitor to be sent to the video board output for display in realtime. This includes the colour grading as well as any HUD or graphs displayed.

- This setting is only supported for NVIDIA FX4600 graphics cards (or better) and DVS Centaurus2 video boards.

- OpenGL read-back is not compatible with the Interlaced Stereo DVI setting below. When enabled, the Interlaced Stereo DVI setting will be hidden.

Interlaced Stereo DVI Output

- Interlace Stereo DVI Output

When enabled, Interlaced Stereo DVI Output will convert the DVI signal to a left and right stereo channel mode.

- This stereo mode is supported on display devices like the Zalman ZM-M220W 3D LCD monitor.

- Interlaced Stereo mode is incompatible with OpenGL read-back and will be hidden if read-back is enabled.

Enable SDI I/O Card

Use: Video I/O and Monitoring via video I/O card

These settings relate to your SDI video card (e.g. Centaurus2, Bluefish Lust).
SDI Link
This specifies the default video card SDI colourspace and format.

Values: YCrCb 422, RGB 444, YCrCb 444, Dual YCrCb 422, 12 bit YCrCb 422, 12 bit YCrCb 444
Default: YCrCb 422

Default Format
This specifies the default video card SDI video format to use.

Values: PAL, NTSC, 720p, HD 1080i, HD 1080psf, HD 1080p, 2k p, 2k i
Default: HD 1080i

Always use default format for monitoring
When enabled, the monitor is locked to the format set above and will not try and switch to a new format, even if its input changes.

This is useful if your output monitoring device does not support some output formats and you wish to lock it to something supported.

Priority Format
Use: Frame based project output formats

This setting is only relevant if we are using a progressive (frame) based (non-interlaced) project output format.

If we have a progressive output format (e.g. HD 1080p), this specifies whether we set our video I/O card to output a progressive signal ("p", Match p format) or a progressive segmented fields signal ("psf", Match psf format).
**RS422 COM Port**

Default: 1

This sets the workstation serial (COM) port to use for VTR control.

On a DVW workstation with built-in RS422 ports, this setting is **not used** if the environment variable USE_DVS_VTR_IF is set.

**Output Sync**

This setting specifies the sync signal the video I/O card uses.

<table>
<thead>
<tr>
<th>Internal Sync</th>
<th>External Sync</th>
<th>Bi Level Sync</th>
<th>Tri Level Sync</th>
<th>Bi Level Sync (SD Source)</th>
<th>Tri Level Sync (SD Source)</th>
</tr>
</thead>
</table>

**Values:** Internal Sync, External Sync, Bi Level Sync, Tri Level Sync, Bi Level Sync (SD Source), Tri Level Sync (SD Source)

**Default:** External Sync

where:

- Internal Sync - sync is generated internally and is free-running on layoff
- External Sync - sync on input signal
- Bi Level Sync - used for SD (BB -0.3V)
- Tri Level Sync - used for HD (-0.3V to +0.3V)
- Bi Level Sync (SD Source) - use Bi level sync on HD project
- Tri Level Sync (SD Source) - use Tri level sync on SD project

**Audio Settings**

**Default Audio Capture Bitrate**

This setting specifies the *sample* size for VTR audio capture.
Values: 16 Bit, 32 Bit
Default: 16 Bit

Use Video IO Card as Audio Monitor

This setting will enable the video I/O card as the main audio monitoring device (rather than the computer workstation audio device).

☐ Use Video IO card as audio monitor

This is a Centaurus2 video card option only.

⚠️ This is a DVS Centaurus2 video board option only.
Preferences Assistant

The *Preference Assistant* is a utility tool for display and edit of the *generalprefs* file.

**Run the main application at least once before using this tool.**

Hitting the UPDATE button on any tab will update your *generalprefs* file at that time. If you want to create multiple preferences, first go to the Users section and create a Default *generalprefs* file and then additional user files to update. Also note that the in application preferences will be applied to the current active user preference file.

**Welcome Screen**

On this tab you have the option to look at some system information such as operating system version, MAC Address, Cards and Drivers.
Re-order Master Layer Tools

Re-order or remove colour tools available on your Master layer.

The inactive tools can not be changed and have to remain in the given order.

Re-order CC Layer Tools

As the Master layer tab but operating on the CC Layers.
Re-Order Panel Tools

Re-order or remove tools available on your Control Panel.

> Using None will leave a gap.

Media Locations

Show and set the various media folder locations.

> Avid Mediafiles locations should still be set in general.prefs
Monitoring and Video I/O

Monitor setup with presets for often used configurations. This is a mirror of what is in the Application Preferences.

License

View and update your license file.

Copy the new license string into the text box and press the Update button.
If the string entered starts with "Panel", the rest of the string is taken as the Control Panel "welcome" string e.g.

Panel Grading System

Sets the Control Panel welcome string to Grading System. This is the general.prefs option panel.welcomeString.

Users

The Users tab lets you create separate preference files for multiple users and easily switch between them.

Recommendation:
Once you have set the basic configuration files, use this tool to save the current preference as Default.

Once you have done this you can change the preferences for a new user, update and save as as "User-01" "User-02" etc.

A list of user preferences will be displayed in the Available user box.

To switch to a different user, select the user and press the Install button.

These preference files are saved separately from the application, allowing you to re-install safely without losing preferences.
Keycode

Keycodes are numbers appearing on the edge of film, incrementing once per foot, used to uniquely identify frames for negative cutting. Also known as edgecodes, they are the film equivalent of timecode. The key numbers identify certain traits of the film, including the manufacturer, the stock type, a prefix identifying the roll and a footage count.

A keycode has a format: KZ 12 8506 2190 +05

where:

<table>
<thead>
<tr>
<th>KZ</th>
<th>Manufacturer code - KZ is Kodak</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 8506</td>
<td>Prefix identifies film roll</td>
</tr>
<tr>
<td>2190</td>
<td>The count is 4 digits that increment once per foot (35mm film, 4 perf = 16 x 4 perfs per frame)</td>
</tr>
<tr>
<td>+05</td>
<td>Offset - how many perforations the frame is from the keycode mark</td>
</tr>
</tbody>
</table>

Using the count and offset values we can calculate the frame location, as long as we know how many perforations there are per frame and per count.

* The DPX file format includes keycode in the file header.
Automatic Naming

Some parts of the application assign names to items such as library material or folders based on a set of predefined rules. These rules are defined in the application preferences Capture/Conform tab.

These rules are used for:

- Auto assign name
- Auto create library folder
- Library tape name

Both Auto assign Name and Auto create library folder use the following interface convention when building a filename/folder structure:

i.e. \( M \) folders up, adding \( N \) folders

The settings here control the creation of a name string based on the filename/folder structure on disk. The resulting string can be used as a name, or part of a name, of an item in a project library.

Basic Name String

Consider the example file and folder structure:

\[ \text{five / four / three / two / one / clip.0001.dpx} \]

The filename is "clip" inside folder "one".

Note that the application considers the filename as "clip", ignoring the file numbers (0001) and extension (.dpx).

We start by going:

\( M \) folders up:

\[ \text{five / four / three / two / one / clip.0001.dpx} \]

\[ \begin{array}{cccccccc}
| & | & | & | & | & | & |
5 up & 4 up & 3 up & 2 up & 1 up & 0 up
\end{array} \]

Where we end up, we then:

**add N folders** (such that we try and end up with \( N \) folders):
The result here can be used as a name, or as part of a name.

How we use this resulting basic name, and whether we use it at all, depends on other parameters.

**Auto Assign Name**

The Auto Assign Name parameter in the Capture/Conform preference tab, defines what Material Name we give imported files/sequences inside the project library. This name is extracted from the file name and/or folder structure according to rules defined here.

Once we have our basic name string described above, we determine its use via a drop-down selector of:

- replace with filename - this setting does not use the basic string we calculated above
- prepend filename
- append filename
- ignore filename

These settings control whether we combine our basic string with the actual filename when creating the library material name (apart from the replace with filename setting).

For our first resultant basic string calculated above:

<table>
<thead>
<tr>
<th>Calculation</th>
<th>Basic Name String</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 up, adding 2</td>
<td>four three</td>
<td></td>
</tr>
<tr>
<td>2 up, adding 1</td>
<td>two</td>
<td></td>
</tr>
<tr>
<td>2 up, adding 3</td>
<td>two one</td>
<td>no more folders</td>
</tr>
<tr>
<td>1 up, adding 2</td>
<td>one</td>
<td>no more folders</td>
</tr>
<tr>
<td>0 up, adding 2</td>
<td></td>
<td>empty (no folders)</td>
</tr>
</tbody>
</table>
Choice | Material Name result | Note
--- | --- | ---
replace with filename | clip | Use filename only, ignore above calculation
prepend filename | clip four three
append filename | four three clip
ignore filename | four three | throw filename away

**Auto Assign Library Folder**

This setting defines whether we create named library folders automatically on material import. The folder names are created according to rules defined here.

Once we have our basic *name string* described above, we determine its use via a drop-down selector of:

- no auto folder
- tape name
- filename
- filename hierarchical

- no auto folder
- tape name
- filename
- filename hierarchical

Note that if we choose *no auto folder*, the name calculations detailed below are not used and any imported material is imported into the current folder.

The folder string constructed is only used for the settings *filename* and *filename hierarchical*.

See the chapter on [Capture/Conform preferences](#) for details.

If tape name is selected, a library folder is created and named as per the tape name extracted from the file or its path.
Tape Name

The *tape name* field in the library can be assigned from both the file header and the file path.

If we take the *tape name* from the file path, our choice is a single value extracted from the filename/filepath:

*M folders up* e.g.

Example:

<table>
<thead>
<tr>
<th>5 up</th>
<th>4 up</th>
<th>3 up</th>
<th>2 up</th>
<th>1 up</th>
<th>0 up</th>
</tr>
</thead>
<tbody>
<tr>
<td>five</td>
<td>four</td>
<td>three</td>
<td>two</td>
<td>one</td>
<td>clip.0001.dpx</td>
</tr>
</tbody>
</table>

Result:

<table>
<thead>
<tr>
<th>Folders Up</th>
<th>Tape Name Result</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>clip</td>
<td>Use filename at level 0</td>
</tr>
<tr>
<td>1</td>
<td>one</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>two</td>
<td></td>
</tr>
</tbody>
</table>
Effect Identifiers

Effect Identifiers are unique names for application effects and are used to uniquely specify an effect in the general.prefs preference file.

Master layer

The following table lists the effects available for the master layer and their corresponding IDs in the general.prefs file:

<table>
<thead>
<tr>
<th>Effect Tree Name</th>
<th>Effect ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>saturation</td>
<td>Saturation</td>
</tr>
<tr>
<td>printer</td>
<td>PrinterLights</td>
</tr>
<tr>
<td>lift gamma gain</td>
<td>LiftGammaGain</td>
</tr>
<tr>
<td>balance</td>
<td>Balance</td>
</tr>
<tr>
<td>col curves</td>
<td>DifferentialColorCorrect</td>
</tr>
<tr>
<td>bright contrast</td>
<td>BrightnessContrast</td>
</tr>
<tr>
<td>bright regions</td>
<td>BrightnessRegions</td>
</tr>
<tr>
<td>soft clip</td>
<td>SoftClip</td>
</tr>
<tr>
<td>saturation</td>
<td>Saturation</td>
</tr>
<tr>
<td>pan scan</td>
<td>n/a, always available</td>
</tr>
</tbody>
</table>

Base layer

The following table lists the effects available for the base layer and their corresponding IDs in the general.prefs file:

<table>
<thead>
<tr>
<th>Effect Tree Name</th>
<th>Effect ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>matte</td>
<td>n/a, isolation always available</td>
</tr>
<tr>
<td>keyer</td>
<td>n/a, isolation always available</td>
</tr>
<tr>
<td>shapes</td>
<td>n/a, isolation always available</td>
</tr>
<tr>
<td>matte blur</td>
<td>n/a, isolation always available</td>
</tr>
<tr>
<td>hue curves</td>
<td>HueCurves</td>
</tr>
<tr>
<td>printer</td>
<td>PrinterLights</td>
</tr>
<tr>
<td>lift gamma gain</td>
<td>LiftGammaGain</td>
</tr>
<tr>
<td>balance</td>
<td>Balance</td>
</tr>
<tr>
<td>col curves</td>
<td>DifferentialColorCorrect</td>
</tr>
<tr>
<td>bright contrast</td>
<td>BrightnessContrast</td>
</tr>
<tr>
<td>bright regions</td>
<td>BrightnessRegions</td>
</tr>
<tr>
<td>Effect</td>
<td>Identifier</td>
</tr>
<tr>
<td>------------</td>
<td>---------------</td>
</tr>
<tr>
<td>soft clip</td>
<td>SoftClip</td>
</tr>
<tr>
<td>HLS</td>
<td>HLSColorCorrect</td>
</tr>
<tr>
<td>blur</td>
<td>Blur</td>
</tr>
</tbody>
</table>
Effect Selector Configuration

The *Effect Selector* is the drop-down list that displays all available effects. These can be selected and added to a segment on the current composition.

![Effect Selector drop-down list.](image)

Effects are placed within *Effect Groups*. Above, we see the group *Colour* containing the effects *Channel Mixer*, *Saturation*, *SOP* and other tools.

The order of the top-level effect groups, the effects within each group and the order the effects appear inside a group are controlled by configuration files.

Configuration Files

There are two possible configuration files.

One is the *default* configuration and exists in the application C:\Phoenix\2014_1\root. The other *user* file will override the defaults if you create it and place it in the same folder. By default, this *user* configuration file does not exist.

**Default Configuration File**

<table>
<thead>
<tr>
<th>Name</th>
<th>defaultEffectList.prefs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>C:\Phoenix\2014_1\root</td>
</tr>
</tbody>
</table>

This is the main configuration file for the drop-down list and defines the effect groups and the effects that appear in each group by default.

⚠️ Do not edit or modify this file. It will be **over-written** every application install. If you want to modify the effect selector, edit the *userEffectList.prefs* file.
**User Configuration File**

<table>
<thead>
<tr>
<th>Name</th>
<th>userEffectList.prefs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>C:\Phoenix\2014_1\root</td>
</tr>
</tbody>
</table>

This file does not exist by default.

If it exists, it will over-ride the default settings in the defaultEffectList.prefs file.

An example `userEffectList.prefs` file exists in the `example_files` folder.

**Configuration File Format**

A high-level overview of the file format is shown below:

```plaintext
effectList
[
    // These effects appear in top-level
effects "effect1" "effect2"

    // Multiple "GROUPS" allowed
GROUP
    {
        // As displayed as menu name
        name "NAME"
        // As appearing in sub-menu
        effects "effect1" "effect2"
    }

    // Add more effects to top-level here
    effects "effect3" "effect4"

    / or false. Insert default effects?
    insertDefault true

    // Do not show these effects
    Hidden
    {
        effects "effectA" "effectB"
    }
]
```

Note that the entire `effectList` content is wrapped in **SQUARE ([,])** brackets.

**effects**

List effects to use (to display, or to hide).

- Each is quoted and separated with spaces.
The effect names used are the "effect id". You can list all the "effect id"'s by running the application with the argument --effect-ids e.g.

```
cd \Program Files\Nucoda\2014_1\nucoda_fuse.exe --effect-ids
```

- You can have multiple "effects" lines.
- You can use multiple "effects" tags.
- An "effects" tag at the top-level is displayed at the top-level of the Effect Selector. An "effects" tag in a GROUP is displayed within the named ("name") GROUP.

**Example** :

```
effects "Blur" "ChannelExtract" "Saturation"
```

**GROUP**

A GROUP groups a set of effects together as a unit with a "name".

- The "name" will be displayed in the GUI.
- The listed effects are given inside the "effects" tag within the GROUP.
- You can have multiple GROUP sections.

**Example** :

```
MainEffects
{
  effects "Blur" "ChannelExtract" "Saturation"
}
```

**insertDefault**

This tag will insert the default effects list (in its entirety) where this tag is placed.

- true - Insert the default effects list. The list inserted is as per the defaultEffectList.prefs file and inserted where this tag is placed.
- false - Do not insert the default list of effects. This may have the effect of minimising and simplifying the effects list.

If "insertDefault" is omitted, this is equivalent of "insertDefault true" being added at the end.

**Example** :

```
insertDefault true
```
**Hidden**

Hide the effects set in the "effects" list given.

- This means they do not appear *anywhere* in the Effect Selector, even if placed in a GROUP or a top-level "effects" list.
- This means they cannot be added.

**Example :**

```plaintext
Hidden
{
  effects "FieldSwap" "LiftGammaGain"
}
```

**Example Configuration**

The example shown below will result in an Effect Selector drop-down that looks like:

```
[ effectList
  [
    effects "ChannelExtract" "Saturation"
    My Favorites // This is a comment
    { name "My Favourites"
      effects "DvoClarity" "AGR4" "DvoRegrain"
    }
    effects "Balance" "Saturation"
    Bobs Favorites
    { name "Bob's Favourites"
      effects "Dust+Fix" "Deblotch" "DvoDeflicker"
    }
    insertDefault false
    Hidden
    { effects "FieldDomCorrect" "FieldRemove" "FieldSwap"
  ]
```

```
Channel Extract
Saturation
My Favourites >
  DVO Clarity
  DVO Grain
  DVO Regrain
Balance
Bob's Favourites >
  DVO Dust+Fix
  DVO Fix
  DVO Flicker
```
Output Format Configuration

Every project a main output format defined and may also have one or more secondary formats configured. Available formats appear as a drop-down list on the project screen with a name Setup.

The output formats available can be defined through the use of text configuration files.

Configuration Files

The default configuration file exists in the application C:\Phoenix\2014_1\root.

If a user configuration file exists in the same folder it will override the defaults. This user configuration file does not exists unless you create it.

Default Configuration File

<table>
<thead>
<tr>
<th>Name</th>
<th>defaultOutputFormats.prefs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>C:\Phoenix\2014_1\root</td>
</tr>
</tbody>
</table>

This is the main configuration file for the drop-down list and defines the standard output formats available.

You should not edit or modify this file. It will be over-written by every application install. If you want to modify the format list, edit the userOutputFormats.prefs file.
User Configuration File

<table>
<thead>
<tr>
<th>Name</th>
<th>userOutputFormats.prefs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>C:\Phoenix\2014_1\root</td>
</tr>
</tbody>
</table>

This file does not exist by default.

If it exists, it will over-ride the default settings in the defaultOutputFormats.prefs file.

An example userOutputFormats.prefs file exists in the example_files folder.

Configuration File Format

A high-level overview of the file format is shown below:

```plaintext
outputFormats
{
  // Multiple formats allowed
  FORMATNAME // Must be unique
  {
    name "<Format Name>" // as displayed
    size N N // X Y pixels
    aspect W H // Rational aspect
    fps N N // Rational FPS
    fieldOrder <FIELD ORDER> // See below
    dropFrame <Boolean>
    initial <Boolean> // Optional - see below
  }

  FORMATNAME2 // Must be unique
  {
    name "<Format Name>" // as displayed
    size N N // X Y pixels
    aspect W H // Rational aspect
    fps N N // Rational FPS
    fieldOrder <FIELD ORDER> // See below
    dropFrame <Boolean>
    initial <Boolean> // Optional - see below
  }

  insertDefault <Boolean> // insert default list?
}
```

Note that the entire outputFormats content is wrapped in SQUARE ([,]) brackets.
Definitions

Some configuration file parameters are of a specific type:

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rational</td>
<td>A Rational number is a fraction and is composed of a numerator (top) and a denominator (bottom). Rather than using a floating point number (and decimal places), a rational number can more accurate reflect a parameter such as aspect ratio, or frames per second.</td>
</tr>
<tr>
<td>Boolean</td>
<td>A Boolean value is either true or false.</td>
</tr>
</tbody>
</table>

Sections

**FORMATNAME**

Type: Identifier

Each output format definition is grouped (using curly braces), and named. These names:

- Must be unique
- Must not contain spaces (Only: a-z,A-Z,0-9,_,-)

These names are not related to the user visible name field used inside the format definition and can be different.

Example:

```plaintext
Main_Feature_2800x1800_Test
{
}
```

**name S**

Type: String

This is the user visible display name for the format. It is a string wrapped in double-quotes (""") and can contain spaces.

Example:

```plaintext
name "2800 x 1800 Test"
```
size W H

Type: Rational

The size parameter specifies the pixel width and height as a rational number.

Example:

```
size 2800 1800
```

aspect N M

Type: Rational

The aspect parameter specifies the aspect ratio as a rational number (fraction with a numerator and a denominator).

A 1:1 aspect can always be chosen by setting the aspect values the same as the size values.

Example:

```
aspect 37 20 // 1.85
```

gs N M

Type: Rational

The fps parameter specifies the frames per second as a rational number.

Example:

```
fps 2997 100 // i.e. "29.97"
```

fieldOrder S

Type: String

The fieldOrder parameter specifies how to interpret a frame in the format. It is a string wrapped in double-quotes ("") and can take values:

<table>
<thead>
<tr>
<th>FieldOrder</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>InterlacedUpper</td>
<td>Format uses interlaced frames (fields) with upper field dominant.</td>
</tr>
<tr>
<td>InterlacedLower</td>
<td>Format uses interlaced frames (fields) with lower field dominant.</td>
</tr>
<tr>
<td>Progressive</td>
<td>Format is not field based.</td>
</tr>
</tbody>
</table>
Example:

```plaintext
fieldOrder "Progressive"
```

**dropFrame B**

*Type*: Boolean

The `dropFrame` parameter specifies if the format uses drop-frame timecode (true) or not (false).

Example:

```plaintext
dropFrame false
```

**initial B**

*Type*: Boolean

*This parameter is optional.*

The `initial` parameter specifies that the format it appears in will be selected on application start (for a completely fresh installation).

Example:

```plaintext
initial true
```

**insertDefault B**

*Type*: Boolean

The `insertDefault` parameter can be used in a user configuration file (userOutputFormats.prefs) to load in the default output formats (a specified in the defaultOutputFormats.prefs file) at the location the directive appears.

This parameter must be placed outside any actual format definition section.

Example:

```plaintext
insertDefault true
```
Colour Tool Order

Colour tools are effects such as Keyer, Channel Mixer, RGB Curves and SOP. They exist inside the Master and CC Layers.

The default order of the tools can be changed in both the GUI and the Control Panel by editing the main application preference file general.prefs:

C:\Phoenix\2014_1\root\general.prefs

The recommended way to change the tool order is via the utility program Preferences Assistant. Always make a backup if you choose to edit the general.prefs directly.

GUI Tool Order

Two preference file options set the tool order:

- defaultRealTimeEffectIDs - Master Layer tool order
- defaultSecondaryCCEffectIDs - Base and CC Layer tool order

Format

Note that each option should be on a single line in the preference file.

Some tools must stay in the default position in the layer. These are identified in red.

defaultRealTimeEffectIDs "ChannelMixer" "Saturation"
   "SlopeOffsetPower" "PrinterLights"
   "LiftGammaGain" "Balance" "RGBMLevels"
   "DifferentialColorCorrect" "BrightnessContrast"
   "BrightnessRegions" "RGBMCurves"
   "SoftClip" "Saturation"

defaultSecondaryCCEffectIDs "ChannelMixer" "Saturation"
   "SlopeOffsetPower" "PrinterLights" "LiftGammaGain" "Balance"
   "RGBMLevels" "DifferentialColorCorrect" "BrightnessContrast"
   "BrightnessRegions" "RGBMCurves" "SoftClip" "HueCurves"
   "HLSColorCorrect" "Blur"
Control Panel Tool Order

Two preference file options are in the "panel" section:

- `defaultMasterFX` - Master Layer tool order
- `defaultLayerFX` - Base and CC Layer tool order

**Format**

Note that each option should be on a single line in the preference file.

```plaintext
defaultMasterFX "CMix" "Bal" "ColC" "BReg" "Clip"
"SOP" "Lev" "RGB"
defaultLayerFX "CMix" "Bal" "ColC" "BReg" "HCurv"
"Clip" "SOP" "Lev" "RGB" "None" "HCurv" "HLS"
```

The Valhall Control Panel has space for six options on the display at once. Use the string "None" to designate a space on the panel display.
3D LUT File Format

LUT format v3 extends support to *High Dynamic Range* (HDR) images (e.g. *OpenEXR*) and allows the transformation of extended range inputs. This means LUT data values can exist outside the range 0.0 to 1.0.

Example LUT files are distributed in the folder:

```
C:\Phoenix\2014_1\root\cms\n```

In addition, example C programs are included to generate sample LUT files. These are found in the *Example Code* folder alongside some sample program outputs.

- **v2 format** code example:
  Example Code\Lut3D.cpp
- **v3 format** code example:
  Example Code\Lut3Dv3.cpp

The Nucoda 3D LUT file format is ASCII text with a .cms file extension.

The file is composed of:

- 1D x 3 floating point LUT and a
- 3D x 3 floating point LUT

The LUT file can contain a 1D LUT, a 3D LUT or both. If both, the 1D LUT definition should be *before* the 3D LUT definition.

**Setup**

The following parameters are used in the LUT file before the LUT data is defined:

**TITLE**

*Format : STRING*

LUT title. Use quotes if the title contains spaces.

*Example :*

TITLE "Title of LUT"
NUCODA_3D_CUBE

Format : INT

Integer format version of LUT file.

Example :

NUCODA_3D_CUBE 3

LUT_1D_SIZE

Format : INT

Size of 1D LUT.

Example :

LUT_1D_SIZE 1024

LUT_1D_INPUT_RANGE

Format : FLOAT FLOAT

Minimum and maximum 1D input values allowed: min1D max1D
Optional (defaults to 0.0 1.0).
LUT Format v3 Only

Example :

LUT_1D_INPUT_RANGE 0.0 1.0

LUT_3D_SIZE

Format : INT

Size of 3D LUT.

Example :

LUT_3D_SIZE 17
LUT_3D_INPUT_RANGE

Format: FLOAT FLOAT

Minimum and maximum 3D input values allowed: min3D max3D
Optional (defaults to 0.0 1.0).
LUT Format v3 Only

Example:

LUT_3D_INPUT_RANGE -1.000 4.000

Note that min1D and max1D are the minimum and maximum input values that can be transformed by the 1D LUT. Similarly for the 3D LUT and min3D and max3D input values.

Input values outside these ranges are clipped to these ranges before lookup. There is no constraint on the LUT outputs.

The LUT data is specified after the header setup.

1D LUTS

A single 1D array per R, G and B component.

The LUT values will range between min3D and max3D.

Earlier LUT versions use a different range: v1 is between 0 and M, v2 is normalised between 0 and 1.

In the file this is expanded into a single list of r, g, b triples ....

3D LUTS

The 3D LUT is an MxMxM array.

In the file this is expanded into a single list of r, g, b triples with red the fastest moving axis, then green, then blue.
An example of the RGB values in an EXR pipeline is shown in the diagram below:

**File Format**

**From a sample file included**: lut3d_2xN_noinvert_1D_only.cms

```plaintext
# Lut3D.exe <1D-size> <3D-size> <invert-green> <1d-3d-test>
# see Lut3D.cpp for details on optional arguments

NUCODA_3D_CUBE 2

TITLE "Identity Lut, 1D Only, Version 2 format"

LUT_1D_SIZE 2

0.000000 0.000000 0.000000
1.000000 1.000000 1.000000
```

Comments start a line with ‘//’ or ‘#’ characters.
Format Description

// version, title and sizes of LUTs:

NUCODA_3D_CUBE version-number:int // version number

TITLE "colour-conversion-title:string" // optional title (in quotes)

LUT_1D_SIZE size-of-1D-LUTs:int // call this N
LUT_1D_INPUT_RANGE min1D:float max1D:float // optional

LUT_3D_SIZE number-of-levels-per-axis-in-3D-LUT:int // call this M
LUT_3D_INPUT_RANGE min3D:float max3D:float // optional

// specify 1D LUT: comes directly after the header specifications
red[0]:float green[0]:float blue[0]:float
red[1]:float green[1]:float blue[1]:float
red[2]:float green[2]:float blue[2]:float
...
red[N-1]:float green[N-1]:float blue[N-1]:float

// specify 3D LUT: comes directly after 1D LUT specification
// R lvl 0, G lvl 0, B lvl 0
red[0,0,0]:float green[0,0,0]:float blue[0,0,0]:float
// R lvl 1, G lvl 0, B lvl 0
red[0,0,1]:float green[0,0,1]:float blue[0,0,1]:float
// R lvl 2, G lvl 0, B lvl 0
red[0,0,2]:float green[0,0,2]:float blue[0,0,2]:float
...
red[0,0,M-1]:float green[0,0,M-1]:float blue[0,0,M-1]:float

// red level M-1, green level 0, blue level 0
red[0,1,0]:float green[0,1,0]:float blue[0,1,0]:float
// R lvl 0, G lvl 1, B lvl 0
red[0,1,1]:float green[0,1,1]:float blue[0,1,1]:float
// R lvl 1, G lvl 1, B lvl 0
red[0,1,2]:float green[0,1,2]:float blue[0,1,2]:float
...
red[0,1,M-1]:float green[0,1,M-1]:float blue[0,1,M-1]:float

// red level M-1, green level 1, blue level 0
red[0,2,0]:float green[0,2,0]:float blue[0,2,0]:float
// R lvl 0, G lvl 2, B lvl 0
red[0,2,1]:float green[0,2,1]:float blue[0,2,1]:float
// R lvl 1, G lvl 2, B lvl 0
red[0,2,2]:float green[0,2,2]:float blue[0,2,2]:float
...
red[0,2,M-1]:float green[0,2,M-1]:float blue[0,2,M-1]:float

// red level M-1, green level M-1, blue level 0
red[1,0,0]:float green[1,0,0]:float blue[1,0,0]:float
// R lvl 0, G lvl 0, B lvl 1
red[1,0,1]:float green[1,0,1]:float blue[1,0,1]:float
// R lvl 1, G lvl 0, B lvl 1
red[1,0,2]:float green[1,0,2]:float blue[1,0,2]:float
...
red[1,0,M-1]:float green[1,0,M-1]:float blue[1,0,M-1]:float

// red level M-2, green level M-1, blue level M-1
red[M-1,0,0]:float green[M-1,0,0]:float blue[M-1,0,0]:float
// red level M-2, green level M-1, blue level M-2
red[M-1,0,1]:float green[M-1,0,1]:float blue[M-1,0,1]:float
// red level M-2, green level M-1, blue level M-2
red[M-1,0,2]:float green[M-1,0,2]:float blue[M-1,0,2]:float
## Icon Tools Reference

### File Browser Navigation

<table>
<thead>
<tr>
<th>Icon</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Image" /></td>
<td>User preset directories - Opens the preset directories configuration panel</td>
</tr>
<tr>
<td><img src="image" alt="Image" /></td>
<td>Back to previous directory - Navigate backwards by one folder level</td>
</tr>
<tr>
<td><img src="image" alt="Image" /></td>
<td>Directory rename - Renames the selected folder</td>
</tr>
<tr>
<td><img src="image" alt="Image" /></td>
<td>Add folder - Adds a new folder as a sub directory of the current one</td>
</tr>
<tr>
<td><img src="image" alt="Image" /></td>
<td>Open / Close Panels - Opens/closes the multiple panel display</td>
</tr>
<tr>
<td><img src="image" alt="Image" /></td>
<td>Move panels right - Navigates forwards through multiple panels</td>
</tr>
<tr>
<td><img src="image" alt="Image" /></td>
<td>Move panels left - Navigates backwards through multiple panels</td>
</tr>
</tbody>
</table>

### Library Folders

<table>
<thead>
<tr>
<th>Icon</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Image" /></td>
<td>Add Folder - Creates a new folder in the Library</td>
</tr>
<tr>
<td><img src="image" alt="Image" /></td>
<td>Remove Folder - Removes the selected folder from the library</td>
</tr>
<tr>
<td><img src="image" alt="Image" /></td>
<td>Folder - Depicts a Library folder</td>
</tr>
<tr>
<td><img src="image" alt="Image" /></td>
<td>Caches Folder - Depicts the Caches folder in the library</td>
</tr>
<tr>
<td><img src="image" alt="Image" /></td>
<td>Tree Expand - Expands the Tree branch being viewed</td>
</tr>
<tr>
<td><img src="image" alt="Image" /></td>
<td>Tree Close - Closes the Tree branch being viewed</td>
</tr>
</tbody>
</table>

### Playback Tools

<table>
<thead>
<tr>
<th>Icon</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Image" /></td>
<td>Step Back a frame</td>
</tr>
<tr>
<td><img src="image" alt="Image" /></td>
<td>Jump to previous edit point</td>
</tr>
<tr>
<td><img src="image" alt="Image" /></td>
<td>Play backwards - Toggle, plays backwards, then stops</td>
</tr>
<tr>
<td><img src="image" alt="Image" /></td>
<td>Play forwards - Toggle, plays forwards, then stops</td>
</tr>
<tr>
<td><img src="image" alt="Image" /></td>
<td>Jump to next edit point</td>
</tr>
</tbody>
</table>
Step Forward a frame
Scene Detect - Applies scene detection on next playback

**Viewer Tools**

<table>
<thead>
<tr>
<th>icon</th>
<th>function</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="icon" /></td>
<td>Apply monitor Aspect Ratio correction</td>
</tr>
<tr>
<td><img src="image2" alt="icon" /></td>
<td>Show Video Fields - Shows individual video fields of interlaced footage</td>
</tr>
<tr>
<td><img src="image3" alt="icon" /></td>
<td>Show monitor Overlay tools</td>
</tr>
<tr>
<td><img src="image4" alt="icon" /></td>
<td>View Full Screen</td>
</tr>
<tr>
<td><img src="image5" alt="icon" /></td>
<td>Reference Lock</td>
</tr>
<tr>
<td><img src="image6" alt="icon" /></td>
<td>Compare Mode</td>
</tr>
<tr>
<td><img src="image7" alt="icon" /></td>
<td>Show HUD (Head Up Display)</td>
</tr>
<tr>
<td><img src="image8" alt="icon" /></td>
<td>Show Grid</td>
</tr>
<tr>
<td><img src="image9" alt="icon" /></td>
<td>Show Mask</td>
</tr>
<tr>
<td><img src="image10" alt="icon" /></td>
<td>Edit Mask</td>
</tr>
<tr>
<td><img src="image11" alt="icon" /></td>
<td>Show Graph Curves</td>
</tr>
<tr>
<td><img src="image12" alt="icon" /></td>
<td>Show Histogram</td>
</tr>
<tr>
<td><img src="image13" alt="icon" /></td>
<td>Reset Histogram</td>
</tr>
<tr>
<td><img src="image14" alt="icon" /></td>
<td>Apply CMS</td>
</tr>
<tr>
<td><img src="image15" alt="icon" /></td>
<td>Show monitor output</td>
</tr>
<tr>
<td><img src="image16" alt="icon" /></td>
<td>Show video output</td>
</tr>
</tbody>
</table>

**Shape Transform Tools**

<table>
<thead>
<tr>
<th>icon</th>
<th>function</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image17" alt="icon" /></td>
<td>Translate</td>
</tr>
<tr>
<td><img src="image18" alt="icon" /></td>
<td>Rotate</td>
</tr>
<tr>
<td><img src="image19" alt="icon" /></td>
<td>Scale</td>
</tr>
</tbody>
</table>
Tracker Tools

<table>
<thead>
<tr>
<th>icon</th>
<th>function</th>
</tr>
</thead>
<tbody>
<tr>
<td>🔄 ▶️</td>
<td>Track Forward - Plays through the shot tracking as it goes</td>
</tr>
<tr>
<td>▶️ ▪️</td>
<td>Track Backwards - Plays backwards through the shot tracking as it goes</td>
</tr>
<tr>
<td>▶️ ▶️</td>
<td>Track Step Forward - Tracks forward one frame</td>
</tr>
<tr>
<td>▷️ ▪️</td>
<td>Track Step Backwards - Tracks backward one frame</td>
</tr>
</tbody>
</table>

Format Support
The following sections describe media formats supported by the main application.

Image Formats

DPX
Digital Moving Picture Exchange (SMPTE 268M)
Extensions: .dpx

Read / Write
Optimised for realtime playback

Options:

<table>
<thead>
<tr>
<th>Mode</th>
<th>Big-endian (default) / Little-endian</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depth</td>
<td>10 bit RGB / 12 bit RGB / 10 bit YUV</td>
</tr>
</tbody>
</table>

The DPX format is optimised for realtime playback and includes support for alpha channels. It is the native format for cache renders and source proxies in 10 bit projects (default).
Cineon
Cineon File Format
Extensions: .cin
Read / Write
Options: None
TIFF
Tagged Image File Format
Extensions: tiff tif
Read / Write
Options:

| Bit Depth | 8 / 16 bit |

SGI
SGI Image Format
Extensions: sgi rgb
Read / Write
Options:

| Compression | None / RLE |
| Bit Depth   | 8 / 16 bit |

JPEG
JPEG Image Format
Extensions: jpg jpeg
Read / Write
Options:

| Quality | 0-100% (default: 75) |
PIC
Softimage PIC Format
Extensions : pic

Read / Write
Options :

| Compression | None / RLE |

MPEG
MPEG-1 Video
Extensions : mpg mpeg

Read / Write
Options :

| Width/Height | Slider |
| I-Frame Interval | 0-10 (default : 8) |
| Bitrate (Kbps) | Slider (default : 400 Kbps) |
| Tolerance (%) | Slider |

See the MXF Formats section.

MXF
Material Exchange Format
Extensions : mxf

Read / Write
Options :

| Codec | Availability is output format dependant |
| Avid Project Name | From MXF File / From DV Project / User Set |

See MXF Formats section.
EXR

OpenEXR High Dynamic Range Format
Extensions : exr

Read / Write

Options :

| Compression | None / RLE / ZIP6 / ZIP / PIZ / PXR24 / B44 / B44A |

The EXR format is based on the industry standard OpenEXR format [1]. It is the default cache format for half-float projects.

For optimal performance reading and writing EXR files to/from disk on the Windows NTFS filesystem, EXR frames should be padded to an NTFS volume sector size. This is usually 512 bytes but may be different on some systems (e.g. padding to 4096 or 16384 bytes).

OpenEXR is trademarked by Lucasfilm Ltd.

Quicktime

Apple Quicktime Format
Extensions : mov

Read / Write

Supported as per installed and configured codecs.

Support includes Avid DNxHD.
List Formats

EDL

This is the *Edit Decision List*.  
CMX3600 Standard Format

Support :

- Dissolves
- Retimes
- Black (BL) and AUX (AX) events

EDL export (*Export Composition*) supports both standard CMX3600 format and an **extended EDL format** that includes :

- Long tapenames
- Clipname detail
- File path detail per event.

Comment fields are parsed for *clipname* and event *material* (file path) information.

**Clip Names**

If an event followed by a clip-name specifier e.g.

* FROM CLIP NAME: test_gh56

Then the event is loaded and the clip is created with a clip-name as specified.

**File Load**

If an event is followed with a file path e.g.

* FROM FILE: C:\media\film_cc_scans.007882.dpx

Then the event material will be loaded into the library if we enable the following on EDL import :

*Import material from file paths*
See the Export Composition chapter for details of EDL export options.

**AAF**

This is the *Advanced Authoring Format*. Extensions: aaf

Read / Write (see note below)

Options:

<table>
<thead>
<tr>
<th>Format</th>
<th>See MXF Formats section.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Export to Interplay</td>
<td>Off / On (default: off)</td>
</tr>
</tbody>
</table>

- Exporting an AAF requires the composition to have been created from an imported AAF.

**CUT**

This is a film cut list file.

Extension: .cut

**Format**

We expect a line:

```
The cut list in construction order
```

We expect a line after this (skipping empty lines and comments) that starts with the word:

```
Shot
```

We skip:
lines that start with a string of asterisks (*).
- blank lines.

A Title line becomes the title of the created composition.

This is a fixed format text file with the following fields (index from 0 (zero)):

<table>
<thead>
<tr>
<th>Field</th>
<th>Start</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shot</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>Footage (Rec Start)</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>Length (Rec Length)</td>
<td>14</td>
<td>7</td>
</tr>
<tr>
<td>Keycode</td>
<td>24</td>
<td>10</td>
</tr>
<tr>
<td>In Frame (Src In)</td>
<td>36</td>
<td>7</td>
</tr>
<tr>
<td>Out Frame (Src Out)</td>
<td>46</td>
<td>7</td>
</tr>
<tr>
<td>Roll</td>
<td>57</td>
<td>10</td>
</tr>
</tbody>
</table>

Example CUT File

This is taken from the release distribution and the examples folder:

C:\Phoenix\2014_1\example_files\cut\Title: Cutlist test
**************************************************************
The cut list in construction order:
<table>
<thead>
<tr>
<th>Shot</th>
<th>Footage (Rec Start)</th>
<th>Length (Rec Length)</th>
<th>Keycode</th>
<th>In Frame (Src In)</th>
<th>Out Frame (Src Out)</th>
<th>Roll</th>
</tr>
</thead>
<tbody>
<tr>
<td>001</td>
<td>0000+00</td>
<td>0000+08</td>
<td>KM 16</td>
<td>1825</td>
<td>4582+08</td>
<td>4582+12</td>
</tr>
<tr>
<td>002</td>
<td>0000+08</td>
<td>0000+06</td>
<td>KM 41</td>
<td>2976</td>
<td>3884+00</td>
<td>3884+06</td>
</tr>
<tr>
<td>003</td>
<td>0000+14</td>
<td>0000+05</td>
<td>KU 25</td>
<td>1490</td>
<td>2105+02</td>
<td>2105+07</td>
</tr>
<tr>
<td>004</td>
<td>0001+03</td>
<td>0000+10</td>
<td>KM 18</td>
<td>0863</td>
<td>0044+00</td>
<td>0044+10</td>
</tr>
<tr>
<td>005</td>
<td>0001+13</td>
<td>0000+10</td>
<td>KU 09</td>
<td>8386</td>
<td>2901+07</td>
<td>2902+01</td>
</tr>
<tr>
<td>006</td>
<td>0002+07</td>
<td>0007+12</td>
<td>KM 46</td>
<td>9745</td>
<td>0513+00</td>
<td>0520+12</td>
</tr>
</tbody>
</table>
**************************************************************

ALE

This is the Avid Log Exchange format.
Extensions : ale

The ALE format is export only.

The ALE format is an ascii text format used by Avid editing systems for metadata interchange.

Generate an ALE file for the current composition via the ..Export Composition button. Choose ale as your export format.
The ALE format is ascii text and usually tab-delimited (delimiters are specified in the header). It consists of:

- A *header* containing various global settings (e.g. project format, fps etc.)
- A column specification
- One or more lines encoding metadata for a *shot*

### Header

**Heading**

```
FIELD_DELIM<TAB>TABS
VIDEO_FORMAT<TAB>PAL
FPS<TAB>25
```

### Column Specification

**Column**

```
Name<TAB>FPS<TAB>Project<TAB>Tape<TAB>Start<TAB> ... <TAB>
ASC_SOP
```

### Fields:

- Name
- FPS
- Project
- Tape
- Start
- End
- Duration
- Tracks
- SourceId
- Take
- Scene
- Slate
- Camroll
- Director
- SoundRoll
- ProjectName
- DoP
- Cameraman
- DailiesColorist
- DateOfShoot
- ASC_SAT
- ASC_SOP
Content

Data
<shot1>
<shot2>
...

Each shot includes and encodes the fields as shown above. Each field in each shot is delimited as per the header specification (e.g. usually a TAB).
## MXF Formats

### Read Support

<table>
<thead>
<tr>
<th>Codec</th>
<th>On Avid</th>
<th>Format</th>
<th>Bits</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>DV25</td>
<td>DV 25 MXF</td>
<td>720x576 50i</td>
<td>8</td>
<td>[1]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>720x486 59.94i</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DV50</td>
<td>DV 50 MXF</td>
<td>720x576 50i</td>
<td>8</td>
<td>[1]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>720x486 59.94i</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DVCPRO100</td>
<td>DVCPRO HD MXF</td>
<td>720p 59.94 1080i 50</td>
<td>8</td>
<td>[2]</td>
</tr>
<tr>
<td>MPEG IMX30</td>
<td>MPEG 30 MXF</td>
<td>720x576 50i</td>
<td>8</td>
<td>[3]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>720x486 59.94i</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MPEG IMX 40</td>
<td>MPEG 40 MXF</td>
<td>720x576 50i</td>
<td>8</td>
<td>[3]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>720x486 59.94i</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MPEG IMX 50</td>
<td>MPEG 50 MXF</td>
<td>720x576 50i</td>
<td>8</td>
<td>[3]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>720x486 59.94i</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DNxHD 40</td>
<td>DNxHD 36 MXF</td>
<td>1080p25</td>
<td>8</td>
<td>[5]</td>
</tr>
<tr>
<td>DNxHD 36</td>
<td>DNxHD 36 MXF</td>
<td>1080p 23.98</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1080p 24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DNxHD 115</td>
<td>DNxHD 115 MXF</td>
<td>1080p 23.98</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1080p 24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DNxHD 120</td>
<td>DNxHD 120 MXF</td>
<td>1080i 50</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>DNxHD 145</td>
<td>DNxHD 145 MXF</td>
<td>1080i 59.94</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>720p  59.94</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DNxHD 175</td>
<td>DNxHD 175 MXF</td>
<td>1080p 23.98</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1080p 24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DNxHD 175X</td>
<td>DNxHD 175 X MXF</td>
<td>1080p 23.98</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1080p 24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DNxHD 185</td>
<td>DNxHD 185 MXF</td>
<td>1080i 50</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>DNxHD 185X</td>
<td>DNxHD 185 X MXF</td>
<td>1080i 50</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>DNxHD 220</td>
<td>DNxHD 220 MXF</td>
<td>1080i 59.94</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1080p 29.97</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>720p  59.94</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DNxHD 220X</td>
<td>DNxHD 220 X MXF</td>
<td>1080i 59.94</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1080p 29.97</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>720p  59.94</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2:1 / 3:1</td>
<td>2:1i / 3:1i</td>
<td>PAL / NTSC</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Compressed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uncompressed 1:1</td>
<td>1:1 MXF</td>
<td>720x486</td>
<td>8/10</td>
<td>[4]</td>
</tr>
<tr>
<td></td>
<td>1:1 10b MXF</td>
<td>720x576</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>HD  1920x1080</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
[1] DV25/DV50. For NTSC DV, sample height is actually 480. These formats are DVPRO, not consumer DV (4:2:0).

[2] DVPRO100. The 1080 i50 format is actually sampled 1440x1080.

[3] IMX. Samples are actually 16 lines greater (vertical blanking), making the formats 720x608 and 720x512.


[5] Avid will treat and label DNxHD 40 as DNxHD 36.

**Sony XDCAM**

<table>
<thead>
<tr>
<th>Format</th>
<th>Codec</th>
</tr>
</thead>
<tbody>
<tr>
<td>XDCAM SD</td>
<td>DVCAM 4:1:1/4:2:2 25 Mbps</td>
</tr>
<tr>
<td>XDCAM SD</td>
<td>MPEG IMX 30/40/50 Mbps 4:2:2</td>
</tr>
</tbody>
</table>
Camera Formats

Red
The Red digital camera format.
Read only
Extension: .R3D
See the Red chapter for details.

ARRI D-21
The ARRI D-21 camera is an advanced digital camera from ARRI. The camera has a 3K sensor and generates ARRIRAW data (an uncompressed 12 bit RAW format) as well as a variety of HD output formats.
Read only.
Extension: .ari

* We support the .ari (ARRIRAW) file format only.

Timecode
The timecode can be retrieved from:
- The file header or
- The filename.

Tapename
The tapename is from filename only.

* Care needs to be taken when using a standard EDL due to tapename length and character restrictions.

Resolution
Frames are 2880x2160 pixels native.
LUT

A LUT is important in an ARRI D-21 workflow.

We include a standard set of ARRI LUT files in our cms folder:

C:\Phoenix\2014_1\root\cms\ArriD21-LUTS\

You can also download LUT files directly from ARRI by going to the URL:

http://www.arridigital.com/technical/luts/

Properties

The application exposes the following shot properties via the Library/Properties dialog.

Scale

Set the resolution we decode to.

Options

- 1/1
- 1/2
- 1/4
- 1/8

Decode Quality

Set the RAW camera data decode mechanism.

Options

- Low
- Medium
• High

**Brightness**

*Slider*: -100 to 100

**Contrast**

*Slider*: -100 to 100

**Gamma**

*Gamma correction* used to transform the camera data for display.

*Slider*: -0.1 to 10

**Saturation**

*Slider*: 0 to 2

**Extra Metadata**

All available metadata is also displayed in a raw format:

```
ARI
ByteOrder = LITTLE-END
DeviceName = vfr11T[38fa
DeviceSettings =
FrameNum = 24
FramePerSec = 24
Height = 2160
ImageType = 12 bit in 16 bit LSB
Proj1 = %
Reserved1 = 0, 0, 0, 0, 0, 0, 0, 0, 0
Reserved2 = 0, 0, 0, 0, 0, 0, 0, 0, 0,
TakeNum = 0
TimeCode = 16 39 16 08
Width = 2304
```

**Silicon Imaging SI-2K**

The Silicon Imaging SI-2K camera is an advanced 2K digital cinema compliant camera from Silicon Imaging Inc. The camera records directly to the *CineForm RAW™* format.

Read only.

Extension: .mov

⚠️ We support the SI-2K .mov file format only.
**Timecode**

The *timecode* can be retrieved from:

- The file *header* or
- The *filename*.

**Tapename**

The *tapename* is from *filename only*.

**Properties**

The application exposes the following shot properties via the *Library/Properties* dialog.

**Look File**

The *Look File* option lets you select and enable an SI-2K *CineForm RAW™* LUT file.

*SI-2K Look Files have a *.look* extension.*

To select a LUT, click on the file browser icon, navigate to your LUT file location and press *OK*. To apply the LUT, enable it via the *Look File* toggle:
SI-2K Look File LUTs have to be **installed** before use. See below.

**Decode Resolution**

Set the resolution we decode to.

**Options**

- 1/1
- 1/2
- 1/4

**Decode Quality**

Set the RAW camera data decode mechanism.

**Options**

- Automatic
- Advanced Bilinear
- Advanced Matrix5x5
- Advanced Smooth
- Advanced Detail 1
- Advanced Detail 2
- Advanced Detail 3

**Gamma Curve**

*Gamma correction* used to transform the camera data for display.

**Options**

- Log 90
- Gamma 2.2
- Cineon 1.7
- Cine985 1.7
- Cineon 1.0
- Linear

**Saturation**

Slider: 0 to 4
Extra Metadata

All available metadata is also displayed in a raw format:

```
SI-2K
OUID = FE3E386D-8494-4EF6-9EE5-7F1F8E13D9DC
date = 2020-02-22
time = 15:27:43
frameNumber = 109
shotNumber = 1
sceneNumber = 1
cameraNumber = 1
projectNumber = 1
whiteBalance = 1,270100010001324
cameraModel = Sony Imaging 2k
uncompressedSize = 20
subType = Bayer
framesize = 15,763387
uniqueFrameNum = 0
```

Installing Look File LUTs

SI-2K CineForm RAW™ Look File LUTs have to be compiled and installed before they can be used by the application.

⚠️ If you do not install the .look files before trying to use them, you will get an error "Could not find .cflook file for selected look file."

The Look Files have a .look extension and are installed by a program called LookInstaller.exe.

To install:

- Open a Windows CMD shell: `Start / Run / Cmd`
- Type:
  ```
  LookInstaller <file.look>
  Where <file.look> is your chosen .look file.
  ```

On success, a dialog box opens and displays information e.g.

```
1 LUT file(s) installed or upgraded
LUT CRC(s) 5CC1C06
```

You can now use the installed LUT by selecting it in the Look File file selector in the shot Properties.
The LookInstaller program compiles the .look file and installs it as a .
cflook file to the folder :
C:\Program Files\Common Files\CineForm\LUTs

To use the LUT, you can select either the original .look file or
the installed .look file (in above folder).

Because the files are installed to the same location, the names
have to be unique.

Vision Research Phantom

The Vision Research Phantom camera is an advanced digital camera
supporting both RAW data and various HD output formats.

Read only

Extension : .cine

Timecode

The timecode is from file header only.

Timecode is calculated based on .cine file Trigger Time and
the frame rate.

Tapename

The tapename is created based on :

• <Camera Serial Number> + "CINE" + <6 Digit Date>

This facilitates an easier conform/re-conform in a tape-less work-flow.

Properties

The application exposes the following properties specific to each Phantom
shot via the Library/Properties dialog.
CINE Properties

Options

- CINE
- Custom

Scale

Set the resolution we decode to.

Options

- 1/1
- 1/2
- 1/4
- 1/8

Decode Quality

Set the RAW camera data decode mechanism.

Options

- Low
- Medium
- High

WB Red Gain

Slider : 0 to 2

WB Blue Gain

Slider : 0 to 2

Brightness

Slider : -100 to 100
Contrast
Slider : -100 to 100

Gamma

*Gamma correction* used to transform the camera data for display.
Slider : -100 to 100

Saturation
Slider : -100 to 100

Extra Metadata
All available metadata is also displayed in a raw format:

<table>
<thead>
<tr>
<th>Metadata</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bright</td>
<td>0</td>
</tr>
<tr>
<td>CFA</td>
<td>BayerFlip (rgb)</td>
</tr>
<tr>
<td>Chromatography</td>
<td>linear interpolated color</td>
</tr>
<tr>
<td>CompressionMode</td>
<td>White Calib</td>
</tr>
<tr>
<td>CameraSerial</td>
<td>6748</td>
</tr>
<tr>
<td>CameraVersion</td>
<td>1.683</td>
</tr>
<tr>
<td>Contrast</td>
<td>0</td>
</tr>
<tr>
<td>FirmwareVersion</td>
<td>4.985</td>
</tr>
<tr>
<td>FirstFrameIndex</td>
<td>29</td>
</tr>
<tr>
<td>FrameRate</td>
<td>30</td>
</tr>
<tr>
<td>Gamma</td>
<td>1.0</td>
</tr>
<tr>
<td>Height</td>
<td>576</td>
</tr>
<tr>
<td>ImageHeight</td>
<td>12</td>
</tr>
<tr>
<td>ImageWidth</td>
<td>256</td>
</tr>
<tr>
<td>MetadataCount</td>
<td>4071</td>
</tr>
<tr>
<td>RecordingTimeZone</td>
<td>-7200</td>
</tr>
<tr>
<td>Saturation</td>
<td>0</td>
</tr>
<tr>
<td>SoftwareVersion</td>
<td>6.49</td>
</tr>
<tr>
<td>Temperature</td>
<td>0</td>
</tr>
<tr>
<td>TriggerTime</td>
<td>Thu Apr 24 16:15:57 2008</td>
</tr>
<tr>
<td>WAVGainsB</td>
<td>1</td>
</tr>
<tr>
<td>WAVGainsR</td>
<td>1</td>
</tr>
<tr>
<td>WhiteBalanceGainB</td>
<td>1.27081653</td>
</tr>
<tr>
<td>WhiteBalanceGainR</td>
<td>0.8179859689</td>
</tr>
<tr>
<td>Width</td>
<td>1920</td>
</tr>
</tbody>
</table>

Audio Formats

WAV Audio
Uncompressed WAV audio files.
Extension : .wav

Broadcast WAV Audio
An extension to the WAV file format to include extra metadata.
Extension : .wav .bwf
Audio Interchange Format

The audio interchange format.
Extension: .aiff .aif .aifc

Compressed and uncompressed variants.
OFX Plugins

OFX is an Open Source standard for visual-effect plugins.

We support the full OFX API (Application Programming Interface) and a variety of plugins. Plugin support includes:

- The Foundry - Tinder, Furnace and Keylight
- GenArts - Sapphire (New)
- IMAGICA Corp. of America - Primatte

The OFX API and documentation can be found online:

http://openfx.sourceforge.net/
Configurable Viewer Tools

Viewer tools let you display various pieces of information and guide elements on top of your monitor image. This includes various metadata items, grids/shapes, logos, masks and colour information graphs.

The following viewer tools are *user configurable*:

**Grids**
Overlay lines, rectangles and layout information.

**HUD (head Up Display)**
Overlay text or graphics inside monitor area or image.

**Masks**
Mask/Blank areas of the image.
Graphs

Display a graph or histogram of image colour map.

The displayed information and its position can be customised via one or more specification files. The search path for the specification files is given in the main preference file general.prefs.

Configuration

Grids, HUDs, Masks and Graphs are configured via plain text files searched for in folders specified in the main configuration file general.prefs.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Default</th>
<th>File Extension</th>
</tr>
</thead>
<tbody>
<tr>
<td>monitorMaskDir</td>
<td>monitorMasks/</td>
<td>.masks</td>
</tr>
<tr>
<td>monitorGridDir</td>
<td>monitorGrids/</td>
<td>.grids</td>
</tr>
<tr>
<td>monitorGraphDir</td>
<td>monitorGraphs/</td>
<td>.graphs</td>
</tr>
<tr>
<td>monitorHeadUpDisplayDir</td>
<td>monitorHUDs/</td>
<td>.grids</td>
</tr>
</tbody>
</table>

Each specific parameter specifies a folder from which corresponding specification files will be loaded.

- Multiple specification files per folder will be loaded and aggregated
- Only files with the specified extensions are loaded
- Parameters can be repeated, specifying multiple folders to search
- Specification files located are global and available to all projects

Example

An example general.prefs line that specifies three folders to be searched:

```
monitorGrids "monitorGrids" "\server\testgrids" "C:\Grids"
```

Global Versus Project Specific

Specification files located inside folders described in the general.prefs file will be global and available to all projects.

Specification files can be kept private to a project by placing them inside a corresponding default named folder inside the project folder i.e.
Grids Specification

Overlay lines, rectangles and layout information.

The **HUD specification** also use Grid files (.grids) but with a location set as per the `general.prefs monitorHeadUpDisplayDir` parameter.

**File Specification**

- A grids file must end in the extension `.grids`, e.g. test.grids
- It should be a plain text file

Each specification file specifies *one or more grids*, each identified by **unique name** (a `name` parameter).

**Format**

The grid file format is as follows:

```plaintext
monitorGrids 1.0 -1
{
    monitorGrid 1.0 -1
    {
        <grid specification>
    }
    monitorGrid 1.0 -1
    {
        <grid specification>
    }
    ...
}
```

The *grid specification* section is described below.
NOTE

- Grid specification lines must end with a *semi-colon* `;` character.
- A `#` character at line start delimits a *comment*. Rest of line is ignored.
- Strings should be quoted i.e. "string".
- There should be a *space* between each identifier and before the terminating semi-colon.

Grid Specification

The following identifiers are used.

**name**

```
name "<STRING>" ;
```

This is the name of the grid as shown in the GUI drop-down list. Grid names should be unique.

**units**

```
units "<UNITS>" ;
```

where UNITS are:

- **pixels**  By default the coordinate system is *absolute* image pixels, lower left to top right. Elements are drawn relative to the lower left corner of a pixel.
- **normalised**  Normalised coordinates map the range 0.0..1.0 to the monitor source full image pixel size in x and y.

**unitsImageAspect**

```
unitsImageAspect <FLOAT> ;
```

The normalised region may be mapped to an image aspect extraction of the monitor source full image (pre or post monitor mask).

This is achieved by specifying the target image aspect. Given the monitor source image and aspect ratio, the normalised region will automatically be adjusted for 'letterbox' or 'pillarbox' display of the target aspect ratio.

**unitsObeyMask**

```
unitsObeyMask <INT> ;
```

where INT can be 0 or 1.

The normalised region may be mapped to the visible (post monitor mask) image pixel size in x and y.
**line**

[line] <FLOAT x0> <FLOAT y0> <FLOAT x1> <FLOAT y1> ;

Draws a line from coordinates x0,y0 to coordinates x1,y1 using the current coordinate system and draw style.

**lineWeight**

[lineWeight] <FLOAT> ;

How wide to draw lines, in pixels.

**ellipse**

[ellipse] <INT x0> <INT y0> <INT Rx> <INT Ry> ;

where Rx is X radius and Ry is Y radius.

Draws an ellipse with centre at coordinates (x0,y0) and size 2*Rx by 2*Ry, using the current coordinate system and draw style.

**polygon**

[polygon] <INT x0> <INT y0> .. <INT xN> <INT yN> ;

Draws a multi-point polygon from (x0,y0) to (x1,y1) to .. (xN,yN), using the current coordinate system and draw style. If the draw style is filled and the polygon is convex, it will be filled on the inside.

**rectExtraction**

[rectExtraction] <INT x0> <INT y0> <INT x1> <INT y1> ;

Draws a rectangle from (x0,y0) to (x1,y1) using the current coordinate system and draw style.

If the draw style is *filled* the rectangle will be filled on the outside, up to the outer limit of the monitor source image. This element is intended for use when a solid or semi-transparent 'masking' or 'blanking' region is required.

If the draw style is not filled, an *open* rectangle will be drawn with the current line style.

**text**

[text] <INT x> <INT y> "<STRING>" ;

Draws the specified string at (x,y) using the current coordinate system and draw style.

Note that you can use *text macros*, which will be expanded on display. See below.
textSize

`textSize <FLOAT> ;`

Set the size of text drawn.

color

`color <FLOAT R> <FLOAT G> <FLOAT B> <FLOAT A> ;`

Set the color (Red Green Blue Alpha) for drawing.

fill

`fill "<FILL>" ;`

where FILL is solid or open.

Set the fill mode.

anchor

`anchor "<VERT>" "<HORIZ>" ;`

where:

<table>
<thead>
<tr>
<th>String</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>VERT</td>
<td>bottom, middle, top</td>
</tr>
<tr>
<td>HORIZ</td>
<td>left, center, right</td>
</tr>
</tbody>
</table>

This defines the horizontal and vertical positioning for:

- text elements
- image elements

image

`image <INT x> <INT y> "<PATH>" ;`

where PATH is full path to image file.

Draw specified image at (x,y) using the current coordinate system and draw style.

Images should be in PNG format. The image path can be relative (to specification file) or given as an absolute path.
origin

`origin "<VERT>" "<HORIZ>" ;`

where:

<table>
<thead>
<tr>
<th>String</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>VERT</td>
<td>bottom, top</td>
</tr>
<tr>
<td>HORIZ</td>
<td>left, right</td>
</tr>
</tbody>
</table>

Define the coordinate origin for all drawing operations.

**Macro Expansion**

Macros are available for use with the `text` operator and will be expanded to the associated information.

**Macro Format**

To specify a macro, use a text element e.g.

```
text 20 50 "Name: ##srcName" ;
text 220 80 "Frame: ##recTimeFrames" ;
```

**Available Macros**

<table>
<thead>
<tr>
<th>Macro Text</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>##srcTime</code></td>
<td>Source time (auto-set from project)</td>
</tr>
<tr>
<td><code>##srcTimeFrames</code></td>
<td>Source time in frames</td>
</tr>
<tr>
<td><code>##srcTimeTimecode</code></td>
<td>Source time as timecode</td>
</tr>
<tr>
<td><code>##srcKeycode</code></td>
<td>Source time as keycode (if available)</td>
</tr>
<tr>
<td><code>##srcTape</code></td>
<td>Tape name</td>
</tr>
<tr>
<td><code>##srcFilm</code></td>
<td>Film name</td>
</tr>
<tr>
<td><code>##srcClip</code></td>
<td>Clip name</td>
</tr>
<tr>
<td><code>##srcScene</code></td>
<td>Scene name</td>
</tr>
<tr>
<td><code>##srcName</code></td>
<td>Material Name</td>
</tr>
<tr>
<td><code>##srcDescription</code></td>
<td>Description</td>
</tr>
<tr>
<td><code>##srcLocation</code></td>
<td>Location (path on disk)</td>
</tr>
<tr>
<td><code>##recTime</code></td>
<td>Record time (auto-set from project)</td>
</tr>
<tr>
<td><code>##recTimeFrames</code></td>
<td>Record time in frames</td>
</tr>
<tr>
<td><code>##recTimeTimecode</code></td>
<td>Record time as timecode</td>
</tr>
</tbody>
</table>
## segmentVersion
Version number of segment

### Audio Information

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>#audioName</td>
<td>Audio material name</td>
</tr>
<tr>
<td>#audioOriginator</td>
<td>Audio originator/creator (e.g. Pro Tools)</td>
</tr>
<tr>
<td>#audioTimecode</td>
<td>Audio timecode</td>
</tr>
<tr>
<td>#audioTimeFrames</td>
<td>Audio timecode as frames</td>
</tr>
<tr>
<td>#audioReference</td>
<td>Audio reference as per originator</td>
</tr>
<tr>
<td>#audioChannels</td>
<td>Number of audio channels</td>
</tr>
<tr>
<td>#audioSampleRate</td>
<td>Sample rate of audio</td>
</tr>
</tbody>
</table>

### Miscellaneous

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>#headLength</td>
<td>Length of segment head in frames</td>
</tr>
<tr>
<td>#tailLength</td>
<td>Length of segment tail in frames</td>
</tr>
<tr>
<td>#clipLength</td>
<td>Length of visible segment in frames</td>
</tr>
</tbody>
</table>

## Example Grids

For further examples, see the grids file in folder:

C:\Phoenix\2014_1\root\monitorGrids\ and HUD's in folder:

C:\Phoenix\2014_1\root\monitorHUDs\  

```plaintext
monitorGrid 1.0 -1
{
  name "DV Logo" ;
  units "normalised" ;
  textSize 64.0 ;
  color 1.0 0.0 0.0 0.8 ;
  text 0.1 0.05 "Digital Vision" ;
}
```
monitorGrid 1.0 -1
{
    name "Poly" ;
    units "normalised" ;
    fill "solid" ;
    color 1.0 0.0 0.0 0.33 ;
    lineWeight 3.0 ;
    polygon 0.5 0.0 1.0 0.5 0.5 0.5 ;
}

monitorGrid 1.0 -1
{
    name "Poly2" ;
    units "normalised" ;
    fill "open" ;
    color 0.0 0.0 1.0 1.0 ;
    lineWeight 3.0 ;
    polygon 0.5 0.0 1.0 0.5 0.5 0.5 ;
}

monitorGrid 1.0 -1
{
    name "AS Rect" ;
    units "normalised" ;
    fill "solid" ;
    color 1.0 0.0 0.0 0.33 ;
    rectExtraction 0.25 0.25 0.75 0.75 ;
}
monitorGrid 1.0 -1
{
    name "Center Cross" ;
    lineWeight 3.0 ;
    units "normalised" ;
    color 1.0 1.0 1.0 1.0 ;
    polygon 0.0 0.0 0.0 1.0 1.0 1.0 1.0 0.0 ;
    polygon 0.0 0.0 0.0 0.5 1.0 0.5 1.0 0.0 ;
    polygon 0.0 0.0 0.0 1.0 0.5 1.0 0.5 0.0 ;
}

monitorGrid 1.0 -1
{
    name "Safe Areas" ;
    lineWeight 2.0 ;
    units "normalised" ;
    color 1.0 1.0 1.0 1.0 ;
    polygon 0.05 0.05 0.05 0.95 0.95 0.95 0.95 0.05 ;
    polygon 0.1 0.1 0.1 0.9 0.9 0.9 0.9 0.1 ;
    polygon 0.0 0.0 0.0 1.0 1.0 1.0 1.0 0.0 ;
    lineWeight 3.0 ;
    line 0.45 0.5 0.55 0.5 ;
    line 0.5 0.45 0.5 0.55 ;
    anchor "top" "left" ;
    origin "top" "left" ;
    textSize 20.0 ;
    color 0.9 0.9 0.9 0.9 ;
    text 0.056 0.06 "PICTURE SAFE" ;
    text 0.106 0.11 "TITLE SAFE" ;
}
monitorGrid 1.0 -1
{
  name "Greyscale";
  units "pixels";
  color 1.0 1.0 1.0 1.0;
  anchor "bottom" "left";
  origin "bottom" "left";
  image 0 0 "greyscale2.png";
}

monitorGrid 1.0 -1
{
  name "full info all";
  units "pixelsFullWindow";

  anchor "top" "left";
  origin "top" "left";
  textSize 14.0;
  text 20 20 "##segmentVersion";
  text 20 50 "Name:  ##srcName";
  text 20 80 "Description:  ##srcDescription";
  text 20 110 "Tape Name:  ##srcTape";
  text 20 140 "Keycode:  ##srcKeycode";

  anchor "bottom" "left";
  origin "bottom" "left";
  textSize 14.0;
  ...
  ...

  anchor "top" "right";
  origin "top" "right";
  textSize 14.0;
  text 20 20 "audio:  ##audioName";
  text 20 50 "originator:  ##audioOriginator";
  ...
}

monitorGrid 1.0 -1
HUDs Specification

The Head Up Display (HUD) configuration is the same as for the Grids.

Masks Specification

Mask/Blank areas of the image. This is a view only mode and is not exported or rendered.

2.35 extraction.  
User defined.

File Specification

- A masks file must end in the extension `.masks`, e.g. test.masks
- It should be a plain text file

Each specification file specifies one or more masks, each identified by unique name (a name parameter).

Format

The mask file format is as follows:

```plaintext
monitorMasks 1.0 -1
{
    monitorMask 1.0 -1
    {
        <mask specification>
    }
    monitorMask 1.0 -1
    {
        <mask specification>
    }
    ...
}
```

The mask specification section is described below.
NOTE

- Mask specification lines must end with a *semi-colon* `;` character.
- A `#` character at line start delimits a *comment*. Rest of line is ignored.
- Strings should be *quoted* i.e. "string".
- There should be a *space* between each identifier and before the terminating semi-colon.

Mask Specification

**name**

```
name "<STRING>" ;
```

This is the name of the mask as shown in the GUI drop-down list. Mask names should be unique.

**units**

```
units "<UNITS>" ;
```

where UNITS are:

- **pixels** By default the coordinate system is *absolute* image pixels, lower left to top right. Elements are drawn relative to the lower left corner of a pixel.
- **normalised** Normalised coordinates map the range 0.0..1.0 to the monitor source full image pixel size in x and y.

**unitsImageAspect**

```
unitsImageAspect <FLOAT> ;
```

The normalised region may be mapped to an image aspect extraction of the monitor source full image (pre or post monitor mask).

This is achieved by specifying the target image aspect. Given the monitor source image and aspect ratio, the normalised region will automatically be adjusted for 'letterbox' or 'pillarbox' display of the target aspect ratio.

**rect**

```
rect <INT x0> <INT y0> <INT x1> <INT y1> ;
```

Where:

- (x0,y0) is rectangle bottom-left.
- (x1,y1) is rectangle top-right.

Mask rectangle defined from x0,y0 to x1,y1 using the current coordinate
system. The area outside this rectangle will be blanked.

**User Masks**

A special mask named "User" will also appear in the GUI list. This allows us to set the mask size and position interactively.

![User Mask GUI](image)

**Example Mask Specifications**

```plaintext
monitorMask 1.0 -1
{
    name "1920x1080" ;
    units "pixels" ;
    rect 0 0 1920 1080 ;
}

monitorMask 1.0 -1
{
    name "10% in" ;
    units "normalised" ;
    rect 0.1 0.1 0.9 0.9 ;
}

monitorMask 1.0 -1
{
    name "4:3" ;
    units "normalised" ;
    unitsImageAspect 1.333 ;
    rect 0.0 0.0 1.0 1.0 ;
}
```
Graphs Specification

Display a graph or histogram of image colour map.

File Specification

- A graphs file must end in the extension '.graphs', e.g. test.graphs
- It should be a plain text file

The format used for a Graph file is simpler than that used for Grids and Masks.

Each specification file specifies one or more graphs, each identified by unique name (a GraphID string) and containing a list of drawing instructions.

Graph File Format

```cpp
// This is a comment and ignored
<GraphID 1>
{
    <Graph Specification>
}
<GraphID 2>
{
    <Graph Specification>
}
```

Graph files:

- Do not use semi-colons to terminate lines
- Use C++ style comments (two characters "//" at line start)

Overview

The main elements of the graph are shown below:
Main Parameters

**GraphID**

The *unique* identifier for the graph e.g.

```java
Name0fGraph
{
    ...
}
```

This identifier is not displayed.

⚠️ This identifier must **not** contain any spaces.

**name**

```java
name   "<STRING>"
```

This is the name displayed in the GUI Graph drop-down list e.g.
intervals

intervals <INT>

The intervals parameter defines the total number of solid lines drawn to mark intervals on the graph. See overview diagram above.

black

black <FLOAT>

The black parameter specifies the position of the dashed line representing the black point. See overview diagram above.

It is given in normalised coordinates (0.0 to 1.0).

white

white <FLOAT>

The white parameter specifies the position of the dashed line representing the white point. See overview diagram above.

It is given in normalised coordinates (0.0 to 1.0).

Current Section

The current section is optional.

current

```
{  
  origin "bottom" "left"
  offset 0 0
  size 800 600
  style "parade"
}
```

origin

origin "<STRING V>" "<STRING H>"

This defines the vertical and horizontal positioning of the graph.
Where:

**STRING V**  Vertical alignment.
**Values**: bottom center (or centre) top

**STRING H**  Horizontal alignment
**Values**: left center (or centre) right

**offset**

offset <INT x> <INT y>

This is the (x,y) position of the graph inside the monitor display area.
(0,0) is bottom-left.

**size**

size <INT w> <INT h>

This is the (width,height) in pixels of the graph.

**style**

style "<STRING S>"

Where:

**STRING S**  Style chosen
**Values**: parade fill line

This defines the type of graph to display.

```
parade
```

```
fill
```

```
line
```

**Compare Section**

The compare section is **optional**.

```
compare
{
    origin "bottom" "left"
}
```

If present, this defines the location of the second comparison graph when in compare mode. The origin parameter is as per the current section but refers to the location of the second comparison graph.
Example:

current
{
  origin "bottom" "left"
  ....
}

compare
{
  origin "top" "right"
}

Dual Comparison Mode with Graphs
Legal Notices

The software described in this document is furnished under a license agreement.

This license is available in the docs/licenses folder once the software is installed.

The software may not be reverse assembled and may be used or copied only in accordance with the terms of the license agreement. It is against the law to copy the software on any medium except as specifically allowed in the license agreement.

This product includes software that is copyright 2009, Avid Technology, Inc., its licensors and its licensees. All rights reserved.

This product is manufactured by Digital Vision AB under license to patent pending applications and issued (U.S. and other) patents:

- Canadian Patent Application 2521467
- European Patent Application 04749684.0, published as European patent publication 1629675.

This product includes software that is copyright 2008 RED Digital Cinema.

Digital Vision applications incorporate and are based in part on the work of:

<table>
<thead>
<tr>
<th>Name</th>
<th>URL</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>FFmpeg</td>
<td><a href="http://www.ffmpeg.org">http://www.ffmpeg.org</a></td>
<td>[1]</td>
</tr>
<tr>
<td>Freetype</td>
<td><a href="http://www.freetype.org">http://www.freetype.org</a></td>
<td>[17]</td>
</tr>
<tr>
<td>OpenFX</td>
<td><a href="http://openfx.sourceforge.net/">http://openfx.sourceforge.net/</a></td>
<td>[10]</td>
</tr>
<tr>
<td>License</td>
<td>URL</td>
<td>Notes</td>
</tr>
<tr>
<td>---------</td>
<td>---------------------------------------------------------</td>
<td>---------</td>
</tr>
<tr>
<td>AAF</td>
<td><a href="http://aaf.sourceforge.net/">http://aaf.sourceforge.net/</a></td>
<td>[12]</td>
</tr>
<tr>
<td>libsigc</td>
<td><a href="http://libsigc.sourceforge.net/">http://libsigc.sourceforge.net/</a></td>
<td>[1]</td>
</tr>
<tr>
<td>libsndfile</td>
<td><a href="http://www.mega-nerd.com/libsndfile/">http://www.mega-nerd.com/libsndfile/</a></td>
<td>[1]</td>
</tr>
<tr>
<td>zlib</td>
<td><a href="http://www.zlib.net/">http://www.zlib.net/</a></td>
<td>[15]</td>
</tr>
<tr>
<td>Boost</td>
<td><a href="http://www.boost.org/">http://www.boost.org/</a></td>
<td>[16]</td>
</tr>
<tr>
<td>ACES</td>
<td><a href="http://github.com/ampas/aces-dev">http://github.com/ampas/aces-dev</a></td>
<td>[19]</td>
</tr>
</tbody>
</table>

**Notes**

   Included with product distribution in folder docs/licenses/.


[3] The MIT License

Copyright (c) <year> <copyright holders>

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

[4] Libtiff license

Copyright (c) 1988-1997 Sam Leffler
Copyright (c) 1991-1997 Silicon Graphics, Inc.

Permission to use, copy, modify, distribute, and sell this software and its documentation for any purpose is hereby granted without fee, provided that (i) the above copyright notices and this permission notice appear in all copies of the software and related documentation, and (ii) the names of Sam Leffler and Silicon Graphics may not be used in any advertising or publicity relating to the software without the specific, prior written permission of Sam Leffler and Silicon Graphics.
THE SOFTWARE IS PROVIDED "AS-IS" AND WITHOUT WARRANTY OF ANY KIND, EXPRESS, IMPLIED OR OTHERWISE, INCLUDING WITHOUT LIMITATION, ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

IN NO EVENT SHALL SAM LEFFLER OR SILICON GRAPHICS BE LIABLE FOR ANY SPECIAL, INCIDENTAL, INDIRECT OR CONSEQUENTIAL DAMAGES OF ANY KIND, OR ANY DAMAGES WHATSOEVER RESULTING FROM LOSS OF USE, DATA OR PROFITS, WHETHER OR NOT ADVISED OF THE POSSIBILITY OF DAMAGE, AND ON ANY THEORY OF LIABILITY, ARISING OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THIS SOFTWARE.

[5] libjpeg

See: http://www.ijg.org/files/README

We are releasing this software for both noncommercial and commercial use. Companies are welcome to use it as the basis for JPEG-related products. We do not ask a royalty, although we do ask for an acknowledgement in product literature (see the README file in the distribution for details). We hope to make this software industrial-quality --- although, as with anything that's free, we offer no warranty and accept no liability.

[6] winpcap

See: http://www.winpcap.org/misc/copyright.htm

Copyright (c) 1999 - 2005 NetGroup, Politecnico di Torino (Italy).  
Copyright (c) 2005 - 2009 CACE Technologies, Davis (California).  
All rights reserved.

Portions Copyright (c) 1995, 1996, 1997 Kungliga Tekniska Högskolan (Royal Institute of Technology, Stockholm, Sweden). All rights reserved.  
Portions Copyright (c) 1997 Yen Yen Lim and North Dakota State University. All rights reserved.  
Portions Copyright (c) 1993 by Digital Equipment Corporation.  
Portions Copyright (C) 1995, 1996, 1997, 1998, and 1999 WIDE Project. All rights reserved.  
Portions Copyright (c) 1996 Juniper Networks, Inc. All rights reserved.  
Portions Copyright (c) 2001 Daniel Hartmeier All rights reserved.  
Portions Copyright 1989 by Carnegie Mellon.

License included with product distribution in folder docs/licenses/.

[7] GLEW

The OpenGL Extension Wrangler Library  
Copyright (C) 2002-2008, Milan Ikits <milan ikits@ieee org>  
Copyright (C) 2002-2008, Marcelo E. Magallon <mmagallo@debian org>  
Copyright (C) 2002, Lev Povalahev  
All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

* Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.  
* Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.  
* The name of the author may be used to endorse or promote products derived from this software without specific prior written permission.
THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT OWNER OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

[8] Mesa

Mesa 3-D graphics library
Version: 7.0

Copyright (C) 1999-2007 Brian Paul All Rights Reserved.

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL BRIAN PAUL BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE

[9] Khronos

Copyright (c) 2007 The Khronos Group Inc.

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and/or associated documentation files (the "Materials"), to deal in the Materials without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Materials, and to permit persons to whom the Materials are furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Materials.

THE MATERIALS ARE PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE MATERIALS OR THE USE OR OTHER DEALINGS IN THE MATERIALS.

[10] OFX

From: http://openfx.sourceforge.net/Documentation/Doxygen/ofxCore_8h-source.html
Appendices

Copyright (c) 2003-2004, The Foundry Visionmongers Ltd. All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

* Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
* Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.
* Neither the name The Foundry Visionmongers Ltd, nor the names of its contributors may be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT OWNER OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.


Copyright (c) 2002-2007, Matt Beard, BBC R&D and Metaglue Corporation

See : http://mxflib.cvs.sourceforge.net/viewvc/mxflib/mxflib/COPYING?revision=1.5&view=markup

[12] AAF Public Source License


Included with product distribution in folder docs/licenses/.

[13] OpenEXR

See : http://www.ilm.com/opensource/ilm-bsd-lic.html

Copyright (c) 2002, Industrial Light & Magic, a division of Lucas Digital Ltd. LLC All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

* Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
* Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.
* Neither the name of Industrial Light & Magic nor the names of its contributors may be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR
PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT OWNER OR
CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL,
EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO,
PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR
PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF
LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING
NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS
SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

[14] libpng
See: http://www.libpng.org/pub/png/src/libpng-LICENSE.txt

[15] zlib
See: http://www.zlib.net/zlib_license.html

[16] Boost Software License
See: http://www.boost.org/LICENSE_1_0.txt

Boost Software License - Version 1.0 - August 17th, 2003

Permission is hereby granted, free of charge, to any person or organization obtaining a copy
of the software and accompanying documentation covered by this license (the "Software") to
use, reproduce, display, distribute, execute, and transmit the Software, and to prepare
derivative works of the Software, and to permit third-parties to whom the Software is
furnished to do so, all subject to the following:

The copyright notices in the Software and this entire statement, including the above license
grant, this restriction and the following disclaimer, must be included in all copies of the
Software, in whole or in part, and all derivative works of the Software, unless such copies or
derivative works are solely in the form of machine-executable object code generated by a
source language processor.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR
IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY,
FITNESS FOR A PARTICULAR PURPOSE, TITLE AND NON-INFRINGEMENT. IN NO EVENT
SHALL THE COPYRIGHT HOLDERS OR ANYONE DISTRIBUTING THE SOFTWARE BE
LIABLE FOR ANY DAMAGES OR OTHER LIABILITY, WHETHER IN CONTRACT, TORT OR
OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR
THE USE OR OTHER DEALINGS IN THE SOFTWARE.

[17] Freetype
See: http://www.freetype.org/FTL.TXT

Portions of this software are copyright copyright (c) 2006 The FreeType Project (www.
freetype.org). All rights reserved.

[18] Protocol Buffers (Google)
Copyright 2008, Google Inc.
All rights reserved.

Redistribution and use in source and binary forms, with or without
modification, are permitted provided that the following conditions are
met:

* Redistributions of source code must retain the above copyright
notice, this list of conditions and the following disclaimer.
* Redistributions in binary form must reproduce the above
copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.

* Neither the name of Google Inc. nor the names of its contributors may be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT OWNER OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

Code generated by the Protocol Buffer compiler is owned by the owner of the input file used when generating it. This code is not standalone and requires a support library to be linked with it. This support library is itself covered by the above license.

[19] ACES

License Terms for Academy Color Encoding System Components

Academy Color Encoding System (ACES) software and tools are provided by the Academy under the following terms and conditions: A worldwide, royalty-free, non-exclusive right to copy, modify, create derivatives, and use, in source and binary forms, is hereby granted, subject to acceptance of this license. Performance of any of the aforementioned acts indicates acceptance to be bound by the following terms and conditions:

Copies of source code, in whole or in part, must retain the above copyright notice, this list of conditions and the Disclaimer of Warranty.

Use in binary form must retain the copyright notice (below), this list of conditions and the Disclaimer of Warranty in the documentation and/or other materials provided with the distribution.

* Nothing in this license shall be deemed to grant any rights to trademarks, copyrights, patents, trade secrets or any other intellectual property of A.M.P.A.S. or any contributors, except as expressly stated herein.

* Neither the name "A.M.P.A.S." nor the name of any other contributors to this software may be used to endorse or promote products derivative of or based on this software without express prior written permission of A.M.P.A.S. or the contributors, as appropriate.

* This license shall be construed pursuant to the laws of the State of California, and any disputes related thereto shall be subject to the jurisdiction of the courts therein.

Copyright © 2012 Academy of Motion Picture Arts and Sciences (A.M.P.A.S.). Portions contributed by others as indicated. All rights reserved.

Disclaimer of Warranty: THIS SOFTWARE IS PROVIDED BY A.M.P.A.S. AND CONTRIBUTORS
"AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, AND NON-INFRINGEMENT ARE DISCLAIMED. IN NO EVENT SHALL A.M.P.A.S., OR ANY CONTRIBUTORS OR DISTRIBUTORS, BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, RESITUTIONARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

WITHOUT LIMITING THE GENERALITY OF THE FOREGOING, THE ACADEMY SPECIFICALLY DISCLAIMS ANY REPRESENTATIONS OR WARRANTIES WHATSOEVER RELATED TO PATENT OR OTHER INTELLECTUAL PROPERTY RIGHTS IN THE ACADEMY COLOR ENCODING SYSTEM, OR APPLICATIONS THEREOF, HELD BY PARTIES OTHER THAN A.M.P.A.S., WHETHER DISCLOSED OR UNDISCLOSED.
<table>
<thead>
<tr>
<th>City</th>
<th>Address</th>
<th>Sales and Support</th>
<th>Phone</th>
<th>Fax</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stockholm</td>
<td>Digital Vision</td>
<td></td>
<td>+46 (0)8 546 182 00</td>
<td>+46 (0)8 546 182 09</td>
</tr>
<tr>
<td>Los Angeles</td>
<td>Digital Vision Sales and Support</td>
<td>6464 Sunset Blvd Suite 830 Hollywood CA 90028 USA</td>
<td>+1 818 769 8111</td>
<td>+1 818 769 1888</td>
</tr>
<tr>
<td>Linköping</td>
<td>Digital Vision</td>
<td>Ågatan 40</td>
<td>+46 (0)13 290 100</td>
<td>+46 (0)13 290 150</td>
</tr>
<tr>
<td>London</td>
<td>Digital Vision</td>
<td>11 Wardour Mews</td>
<td>+44 (0)20 7734 8282</td>
<td>+44 (0)20 7292 6969</td>
</tr>
</tbody>
</table>