CORTEX

Cortex User Manual

Version 5.6

Dated April 1st, 2024

For use with all Cortex Editions. All modules and features will be covered in this manual. Please refer to the Cortex Editions section to determine which modules and features are available in your software package.

FILM

What's New in CORTEX v5.6?

New Features

1. Automated Watch folders to trigger render events. **(SEE NEW TIPS AND TRICKS)**
2. Import / Export QC comments and markers, .CSV, .XML (import).
3. Exported Dolby Vision XML now contains target displays from all events.
4. Latest Dolby Atmos version upgraded and supported.
5. Automatically import and validate IMF after creation.
6. Expanded DCP agency ratings.
7. DCP render mode selection.
8. Refined time-to-complete values for render events.
9. Render path length check before render.
10. AS-11 insertion metadata editing.
11. Dead pixel algorithm improvement.
12. New HDR Gamut analysis report.
13. Thumbnails now included in a detailed QC report.
14. Latest Nagra NexGuard support provided to licensed users.

V5.6 Release Notes: TIPS and TRICKS

Watch Folders

Render Watch Folder

A Windows folder(s) can be set up for automation, to serve as the source location for a Cortex render. The render will launch once triggered by the presence of either a complete source file or image sequence folder that is no longer changing in size.

To create a new Render Watch folder:

1. Click the [New] button at the top of the UI from any of the Cortex Tools other than the Copy Tool.
2. Choose Automation in the drop-down menu.
3. Define a unique name
4. Choose Render for AUTOMATION TYPE.
5. Click the […] button for WATCH FOLDER to browse to a folder to be the Watch Folder for media input.

Note that you may right-click in the folder selection window and create a new folder if needed.

6. Click the [Select Folder] button.
7. Click the […] button for REPORTS FOLDER to browse to a folder to be the Reports Folder for reports output. Note that you may right-click in the folder selection window and create a new folder if needed.
8. Click the [Select Folder] button.
9. Select the desired DELIVERABLES in the list. (Note that a Deliverable Configuration must first be defined for this step.)
10. Click the [Create] button.

This will create a watch folder automation task for rendering that will remain active as long as Cortex is running the Job that contains it. To view the status and activity of the watch folder(s), navigate to the Render Tool and view it as an automation task that permanently resides in the column: IN PROGRESS (REEL OPEN)

QA Analysis Watch Folder

A Windows folder(s) can be set up for automation, to serve as the source location for a Cortex QA Tool. The analysis will launch once triggered by the presence of either a complete source file or image sequence folder that is no longer changing in size.

To create a new QA Analysis Watch Folder:

1. Click the [New] button at the top of the UI from any of the Cortex Tools other than the Copy Tool.
2. Choose Automation in the drop-down menu.
3. Define a unique name
4. Choose Analysis for AUTOMATION TYPE.
5. Click the […] button for WATCH FOLDER to browse to a folder to be the Watch Folder for media input.

Note that you may right-click in the folder selection window and create a new folder if needed.

6. Click the [Select Folder] button.
7. Click the […] button for REPORTS FOLDER to browse to a folder to be the Reports Folder for reports output. Note that you may right-click in the folder selection window and create a new folder if needed.
8. Click the [Select Folder] button.
9. Choose the desired Analysis tasks to be performed when new media triggers this watch folder. Select each analysis sub-type using the check-box on each tab, and select analysis parameters and report details in each sub-tab.
10. Click the [Create] button.

This will create a watch folder automation task for analysis that will remain active as long as Cortex is running the Job that contains it. To view the status and activity of the watch folder(s), navigate to the Render Tool and view it as an automation task that permanently resides in the column: IN PROGRESS (REEL OPEN)

Other TIPS and TRICK - Coming Soon

Table of Contents

Welcome

MTI Film has created a family of applications, known as Cortex, that host a suite of tools designed to assist a variety of users to accomplish critical work-product. DITs and Dailies Personnel, Assistant Editors, Transcoding Operators, IMF, DPP, and DCP creators, and anyone interested in file based workflows will find Cortex to be their go-to application. Each Cortex software edition can interact with all other editions via the Cortex Manifest, allowing metadata to be conveyed from one system to another. Cortex Enterprise can be networked with other Enterprise systems via a shared database, facilitating concurrent Workflows and distributed rendering.

Cortex Editions

FEATURES	DIT	DIT+	DAILIES	ENTERPRISE	QC
Project Manager / Deliverables Templates	✓	✓	✓	✓	✓
Playback All Camera & Codec Formats	✓[1]	✓[2]	✓	✓	✓
SDI & HDMI Output up to 4K	✓	✓	✓	✓	✓
Background Transcoding/Rendering (see note 3)		✓[3]	✓	✓	
Copy & Archive Tool with MD5 Checksum or XXHash*	✓	✓	✓	✓	
Color Tool - ASC CDL / ACES Support	✓	✓	✓	✓	✓
Color Tool - Universal Color LUTs Export/Import	✓	✓	✓	✓	✓
Color Tool - Hybrid View with Edit Timeline or Sync Tool	✓	✓	✓	✓	
Color Tool - Dolby Vision™ Level 1 Analysis/Metadata/Software CMU**				✓	
Color Tool - Color Space Conversions	✓	✓	✓	✓	✓
Color Gamut Diagram	✓	✓	✓	✓	✓
Color Trace			✓	✓	
Sync Tool - Automatic / Manual	✓	✓	✓	✓	
Cortex Manifest Data Tracking	✓	✓	✓	✓	✓
Traceback Media and Metadata			✓	✓	
VFX / EDL Pulls			✓	✓	
Edit Tool - Edit Functions, Slates, EDL Conform			✓	✓	✓
Edit Tool – IMF, AS11, AS02, DCP Creation/Packaging				✓	✓[4]
Edit Tool - Dolby Vision™ IMF and Metadata Editing**				✓	✓[4]
Edit Tool - ProRes Insert Editing				✓	✓[4]
QA Tool - Dead Pixel Detection	✓[5]	✓[5]	✓	✓	✓
QA Tool - Dead Pixel Correction				✓	
QA Tool - HDR & SDR Scopes / Color Gamut Diagram				✓	✓

FEATURES - Continued	DIT	DIT+	DAILIES	ENTERPRISE	QC
QA Tool - Video Analysis with Graphs and Reports				✓	✓
QA Tool - Editorial Comments pinned to Timeline with Report				✓	✓
MTI HQ UpRes	✓	✓	✓	✓	
MTI – Samsung UpRes				✓	
Loudness Monitoring				✓	✓
Cortex Share for Multiple Users				✓	✓
OPTIONS			DAILIES	ENTERPRISE	QC
Dolby Vision™ - Level 1 Analysis /Metadata Track Editing/Software CMU**				✓	
Dolby Atmos® support for IMF, DCP and general compositions	Included w/ Dolby Vision™			✓	
Dolby Digital™ Audio - Includes 5.1, 7.1, DolbyE, & Loudness Correction				✓	✓
Loudness Correction				✓	
DVD - Automatically Authored			✓	✓	
Blu-ray - Automatically Authored			✓	✓	
HEVC			✓	✓	✓
Annual CORTEX 24-Hour Site Support			✓	✓	

1. DIT is not licensed to read H.264, DVCPro/HD or MPEG2 codecs
2. DIT+ is not licensed to read DVCPro/HD or MPEG2
3. DIT+ encodes ProRes, DnxHD, and H.264 up to 1920 x 1080
4. QC can create IMF, AS-02, DPP, DCP packages, and Compositions but not render them
5. DIT and DIT+ detect dead pixels on source clips only, not compositions with edits

* The Copy/Archive tool supports up to 3 destinations including LTFS LTO with MD5 Checksum or XXHash and multiple reports.
** Available with MTI's Dolby Vision™ Option

Getting Started

Installing Cortex

Hardware Requirements

- Windows 10 or 11 x64
- 64 GB RAM Minimum
- CPUs:
    - Intel or AMD Threadripper CPUs where clock speed is as high as possible
    - Minimum 2 x 6-core >3 GHz recommended for best rendering performance and playback of some CPU-intensive codecs
- Recommended GPUs:
    - 2 to 4 - GeForce GTX 3080 ti

If 2, when possible, a 3rd GPU, i.e. GeForce 1650 for UI use only.

- Video Cards:
    - AJA Kona 4 or 5
    - BMD Decklink series

Download The Installer

You can access the latest Cortex installer on our Forum at forum.mtifilm.com

Download the installer file and double-click it to begin installation.

All Cortex editions share a single installer. Your feature set is enabled by licensing.

Prerequisites - Check with MTI FILM support for latest updates

Cortex requires that the following prerequisites are installed on the system before Cortex can be installed. The Cortex Installer will scan your system, determine which prerequisites are missing and link you to the download(s). An internet connection is required.

- Entity Framework 4.1 Update 1
- QuickTime 7.7.1
- Intel IPP v7.1 Runtime
- Visual C++ 2005 SP1 Redistributable
- Visual C++ 2008 SP1 Redistributable
- Visual C++ 2010 SP1 Redistributable
- Visual Studio 2012 Redistributable
- .NET Runtime 4.5
- Java SE Runtime Environment 8u60

Installation Wizard

The Setup Wizard will guide you through the installation process. Simply click Next on each screen to install using default settings.

Take a moment to read and agree to the Cortex End User License Agreement.

Upgrade Older Version

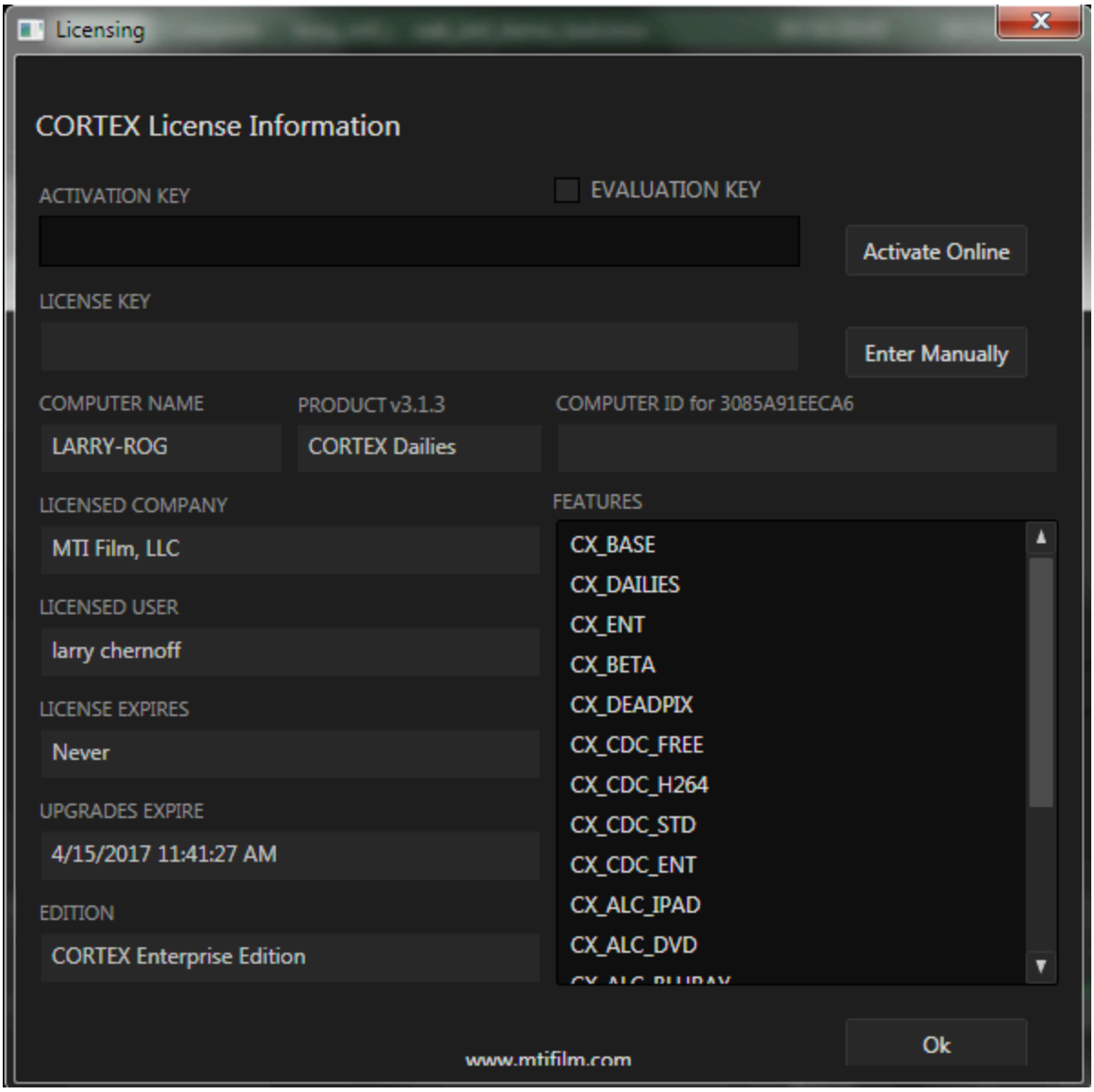
Unless you are just testing a new version, it's generally recommended that you choose 'Yes, remove older versions':

- Yes, replace older version.
  This will upgrade your existing version to this new version.
  The old version will no longer be accessible

- No, install side by side with other versions.
  This will create a separate directory for the
  new version, leaving your old version intact. You will be able to run either version using individual menu and Desktop shortcuts.

Licensing and Activation

The Licensing window will open automatically the first time you run Cortex.
You can open this window from the Licensing utility button in the upper right of Cortex.
Depending on the Edition, the Features box displays the options available. Ignore the CORTEX Dailies under
NOTE: The Product as this field does not display the complete actual licensed version of CORTEX.



How To License CORTEX

1. If you do not already have an Activation Key, contact your Reseller or MTI Film Support. You will receive an email containing your Activation Key as a text string.
2. Copy the entire Activation Key text.
3. If you are running a Demo/Eval version of Cortex, be sure to check the Evaluation Key checkbox
4. Paste the Activation Key text into the Activation Key box in the Licensing module.
5. Click Activate Online (Note: you must be connected to the internet to complete this step).
6. After a moment, the Licensing module will populate the rest of the form with the information received from MTI Film's Licensing server.
7. Click OK and Cortex will launch.

How does this work?

When you enter your Activation Key, the software connects to MTI Film's licensing server to complete activation of your license. Once a license has been activated, it is tied to a single machine and can not be moved or re-used on a different computer

Upgrades and Support

All Cortex editions come with one year of Upgrades & Support included. For Additional information, requesting help and accessing our knowledge base, you can access MTI Film's Support resources by registering on our Forum at forum.mtifilm.com, which also includes the most up-to-date version of the software.

The Cortex Keyboard Stickers

MTI FILM makes an optional, backlit, custom keyboard with all the hot keys labels. For existing keyboard owners, MTI Film recommends the Cortex Keyboard Stickers for greater efficiency and interaction with the application. It's best to purchase the keyboard stickers when ordering the software. The stickers can be applied to any American style QWERTY keyboard.

Cameras, Codecs, and Outputs supported by Cortex

Supported Cameras & Recorders

- ARRI Alexa 65
- ARRI Alexa LF, LF Mini, S35
- ARRI Alexa ARRIRAW
- ARRI Alexa ARRIRAW MXF
- ARRI Alexa ProRes & DNxHD
- Blackmagic Cinema
- Canon 5D & 7D
- Canon C300
- Canon C500 RAW
- Convergent Design Gemini
- Convergent Design NanoFlash
- GoPro
- Panasonic P2 AVC-Intra
- Panasonic P2 DVCProHD
- Panasonic Varicam 35
- Panavision DXL M
- Phantom Gold and Flex
- RED One, Scarlet, Epic, Weapon
- RED Rocket-X support
- Sony F3 & F5
- Sony F55 & F65
- Sony VENICE 2 and Burano
- Sony XDCAM EX3

Supported File Codecs

- Apple ProRes
- Apple ProRes XQ
- Apple ProRes RAW
- ARRI DNxHD (VC3 Op1a)
- AS-11
- Avid DNxHD (Op-Atom)
- Avid DNxHR
- Avid DNxHR MOV/MXF OP-1a
- Avid MXF 1-to-1
- Blackmagic Raw
- Cineform
- CinemaDNG
- DPX
- DVCProHD
- EXR
- H.264 / AVC / XAVC
- H.265 / HEVC
- JPEG2000
- MPEG2 / XDCAM
- RED R3D
- Sony SRMaster
- TIFF
- XAVC

Supported Output Formats

- AS02**
- AS11
- Avid DNxHD (all bitrates)
- Avid MXF 1-to-1
- Avid DNxHR
- Apple ProRes 422, 4444
- Apple ProRes 4444 XQ
- Blu-ray (automatically authored with chapters)*
- DCP
- DPX
- DPP
- DVD (automatically authored with chapters)*
- H.264 (QuickTime / MP4)
- HEVC*
- IMF**
- JPEG (QuickTime / JPG)
- JPEG2000*
- MPEG1
- MPEG2
- OpenEXR
- TIFF
- XAVC
- XDCAM

* Available as add on options

** IMF, AS02, AS11, DCP, and DPP - Enterprise only

First a Few Definitions:

Clip

A clip is a source file that consists of video and/or audio, metadata (i.e. subtitles, Dolby Vision™, etc.) or any standalone file recognized by Cortex.

Composition

A Composition is a grouping of clips that have been organized into a timeline. Clips contained in the timeline are interchangeably defined as Events, Segments, or Shots, which refer to either a whole or part of a clip. The Composition icon is placed before the composition name in the Sidebar.

Deliverable

A Deliverable is a codec type that consists of a configuration of properties as defined by the user in the Deliverable dialog. Properties such as Codec, Bit Rate, Name, Print Status, Resolution, Framing, Color properties, and Audio configuration, etc. help define the Deliverable.

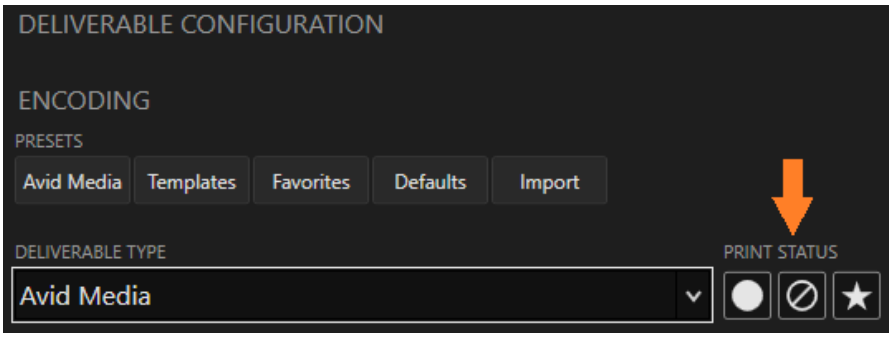
Print Status

Each Deliverable contains a property called the Print Status. Upon import, every clip is assigned a default Print Status of "Circled". There are three statuses:

1. Circled - meaning "Yes, Print this clip"
2. Non-Circled - meaning "No, do not print this clip"
3. Starred - meaning this clip is important so "Yes, Print this clip"

The Print Status of the Deliverable, therefore, acts as a filter through which all clips or segments contained in a reel flow, which determines whether they will be rendered into the Deliverable.

Since the default state of the Print Status is "Circled", it is generally inconsequential unless the Deliverable is part of a Workflow, such as Dailies, that requires deliverables to discriminate which clips contained in a reel will be included in the render.



File per Clip

Any Deliverable that has its "Packaging" property set to File per clip will begin rendering clips immediately upon being added to the reel. If the clip is modified while the reel is still "Open", the clip will be re-rendered.

File per Reel

A few deliverable types require the whole reel rendered once it is “Closed” to ensure its complete continuity. This means that every clip intended to be in the reel has been added and that the reel is closed by the user.

Clips Reel 

A Clips Reel is a collection of one or more clips intended to be transcoded to one or more Deliverables. Clips added to the reel can be assigned a Print Status. The Clips Reel icon is placed before the composition name in the Sidebar.

Composition Reel 

The Composition Reel is a collection of one or more composition events. All events added to the reel will be rendered. The Composition Reel icon appears before the composition name in the Sidebar.

Open Reel

An Open Reel is one where clips are still being added to it or where clips contained in it require modification. In order for a clip in a reel to be modified, the reel must be open. If the reel is closed, the clip can be “Duplicated” for modification leaving the one contained in the reel as is. Reels can be reopened if there is a need to modify a clip. Once modified, the clip will be re-rendered.

Closed Reel

A Closed Reel precludes any changes to be made to any clip contained in the reel. If the reel is closed and a clip that is contained in the reel is selected, all tool modules are disabled including Marks In/Out.

One to One Render

One to One renders one source to one Deliverable at a time.

One to Many Render

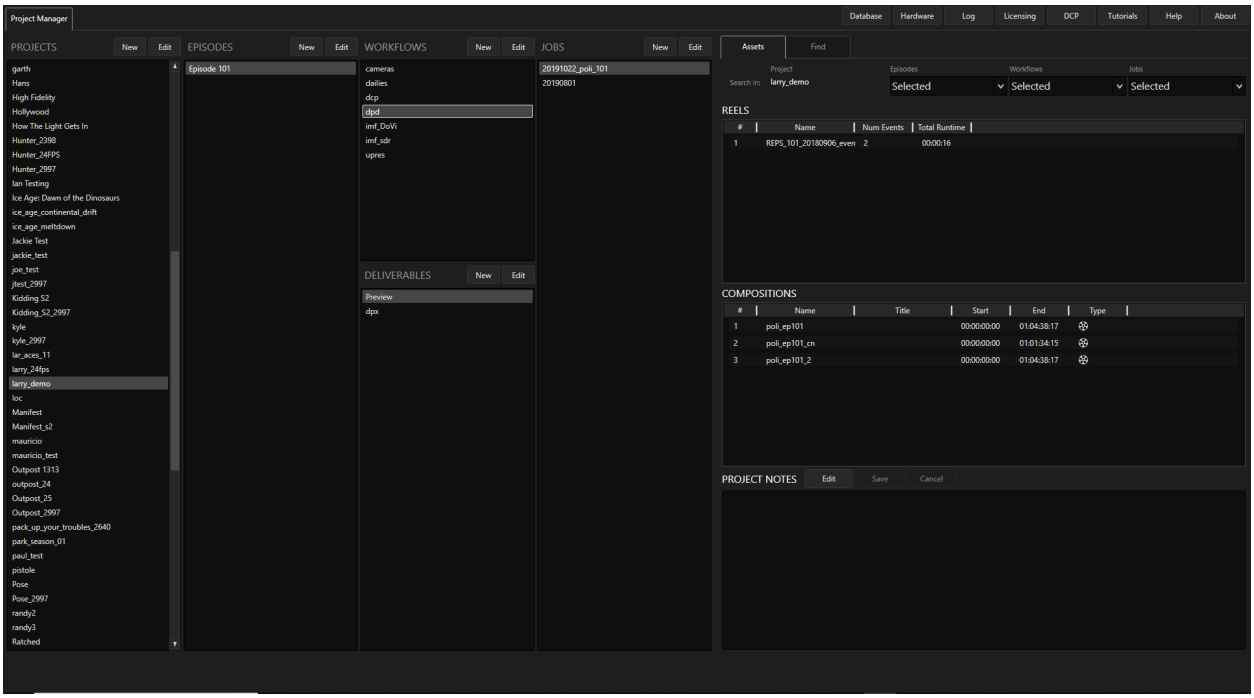
One to Many renders one source to many Deliverables simultaneously. When viewed in the Render Monitor Tool, each Deliverable of the Many group will have an asterisk in front of it.

Cortex Application Overview

The Project Manager

The Project Manager is where you create, organize, and maintain projects, episodes, Workflows, Deliverables and Jobs. There are two project types, Advanced and Basic. The Advanced view is used for Episodic Television or Feature Films. The Basic view is used for one-off or generic transcoding jobs.

The Project Manager - Advanced View

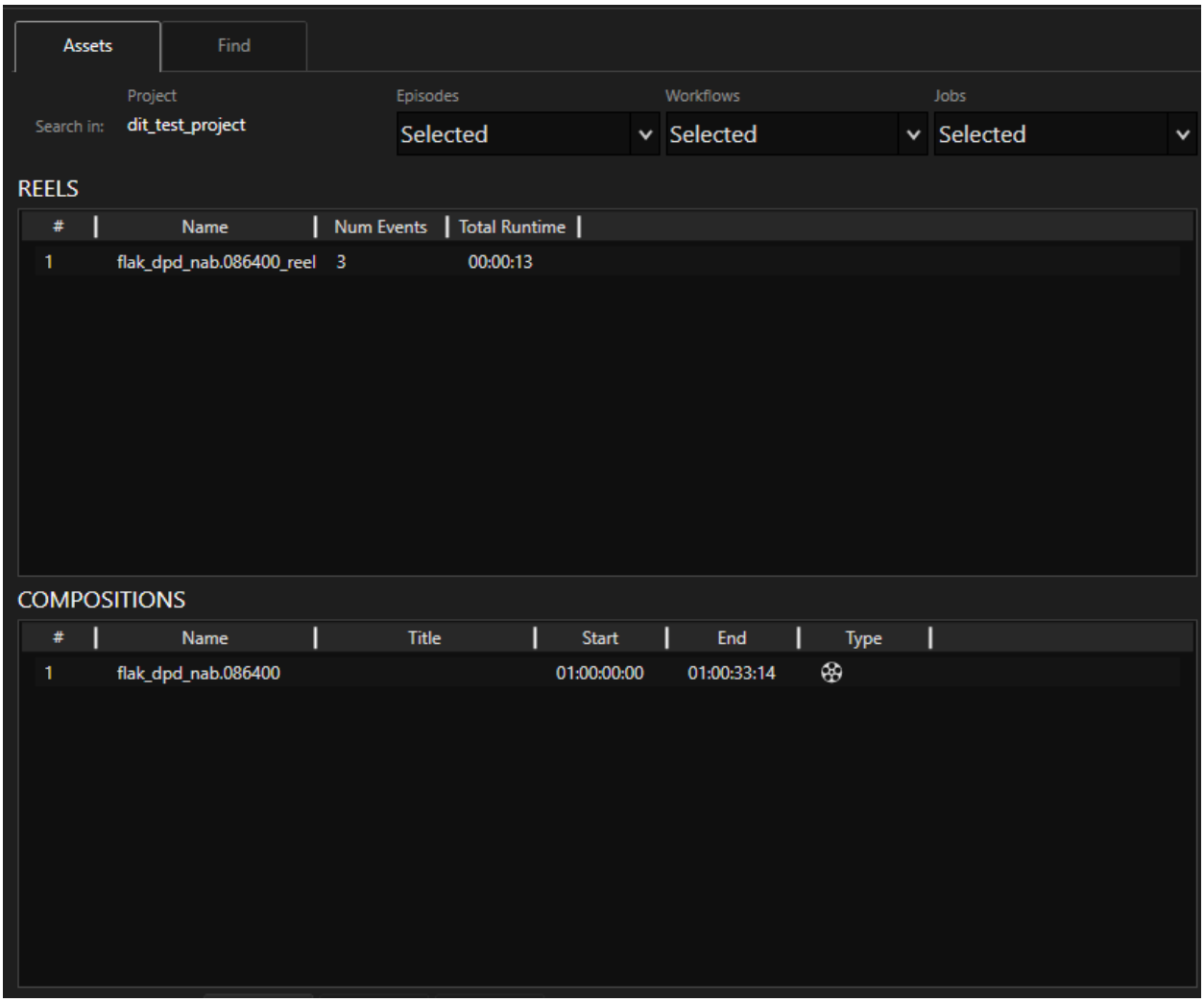


The Project Manager is divided into several sections below.

- Assets Tab
- Find Tab
- Project Notes

Assets Tab

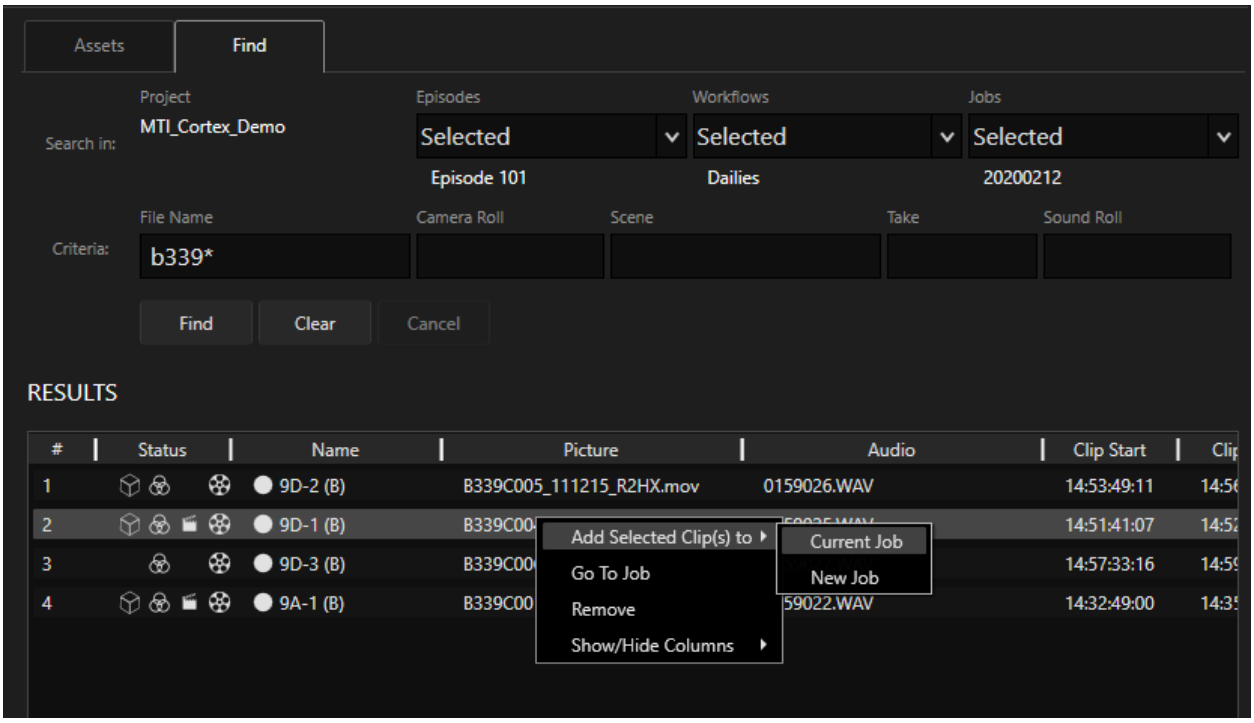
The Assets Tab provides a view into the contents of each job including reels and compositions.



Find Tab

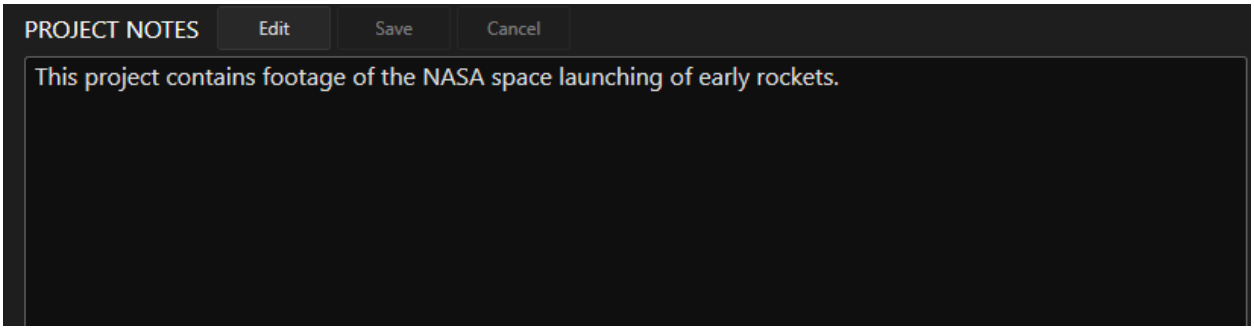
Using the Find Tab, you can search for media contained in Cortex Jobs. Enter search criteria at the top of the tab, click the Find button to return the results, and then Right-click on any clip for a Context Menu. Select clips to add to the Current or New job. Select a single clip to Go To Job or Remove the selected clip(s). Use the Show/Hide Columns to customize the view. To set new search criteria, press the Clear button.

To clear the Results list, click the Clear button on the lower right of the tab.



Project Notes

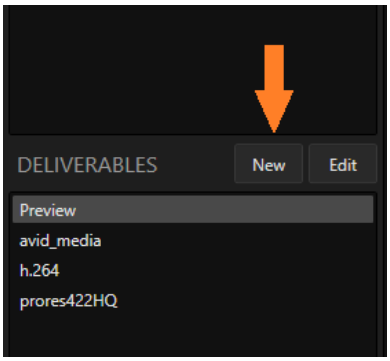
The Project Notes section provides for entering freestyle text relating to the project.

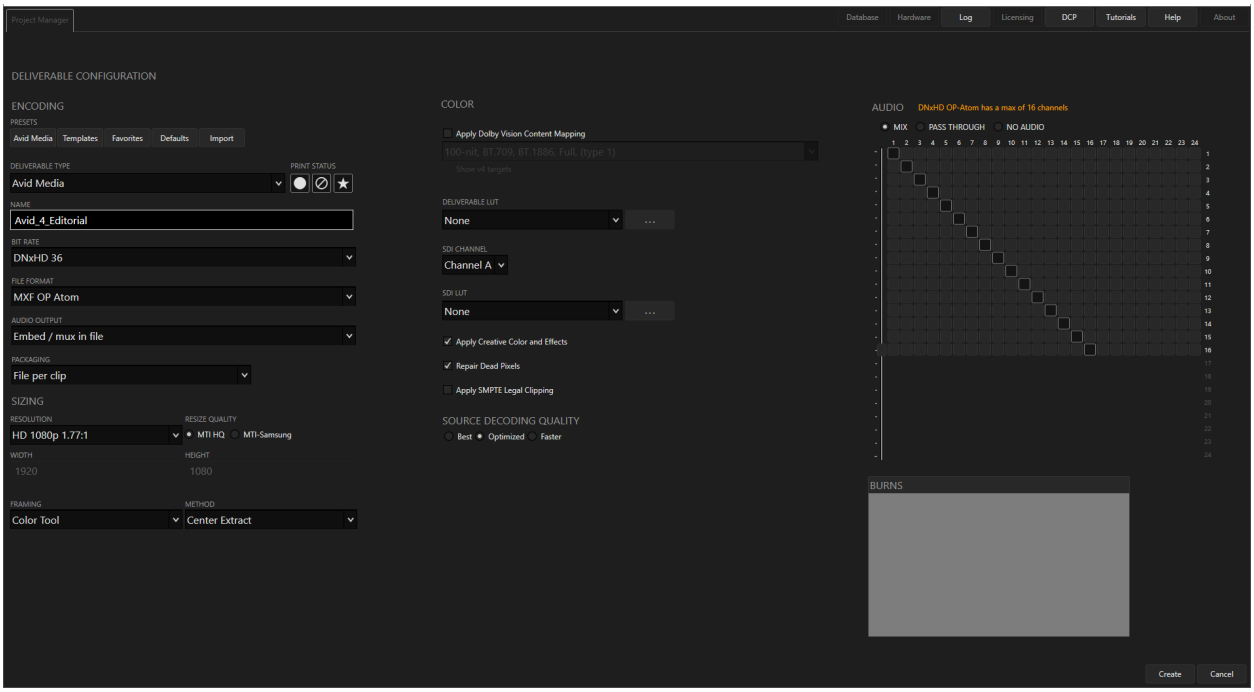


Deliverable Configuration Editor

Clicking the New button at the top of the Deliverables column opens the Deliverable Configuration Editor. This is where you choose the various settings for each Deliverable including:

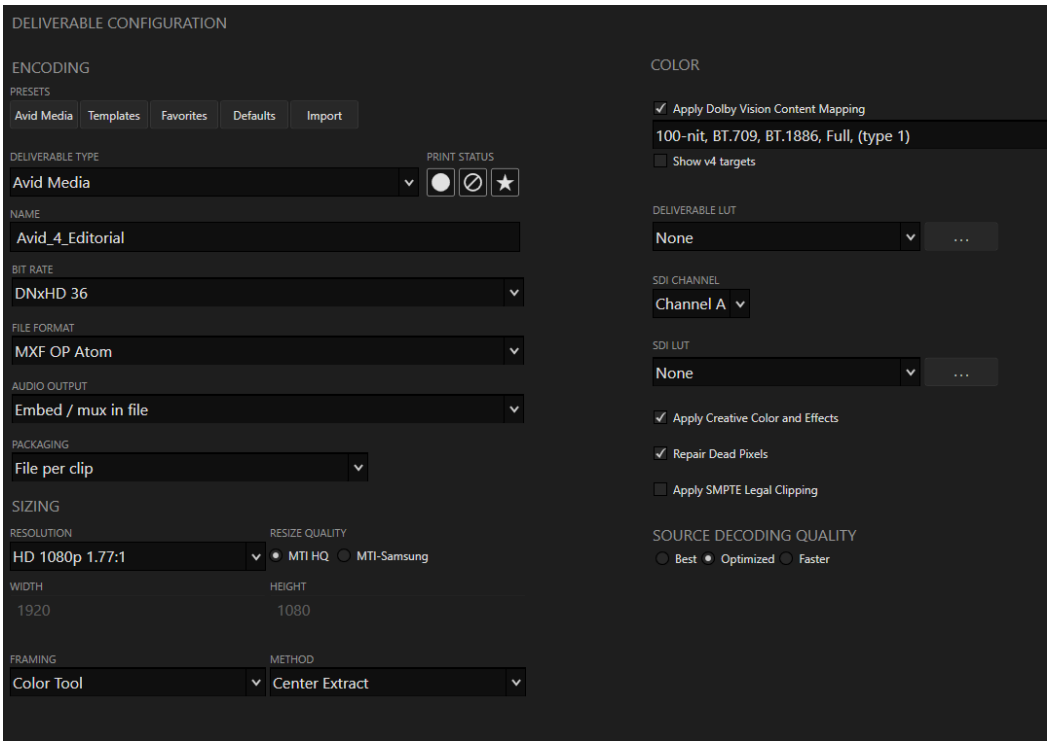
- File format
- Codec
- Bit rate
- Packaging
- Resolution
- Color properties
- Audio Mix
- Burn Windows
- Head Formatting





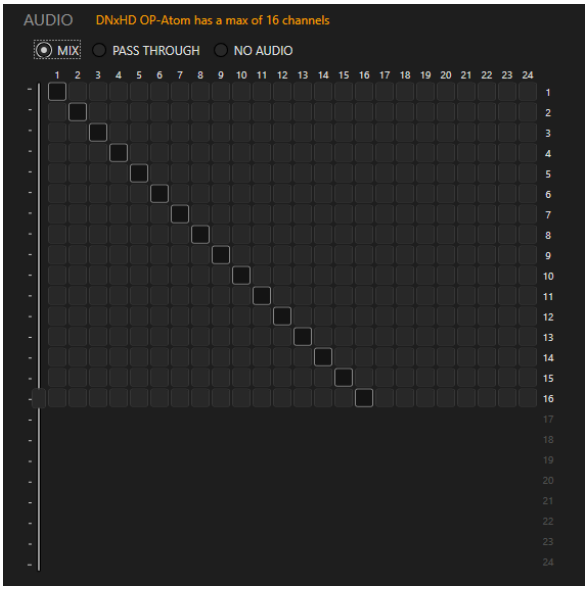
Codec and Color Properties

After choosing a codec, enter the parameters for the encoding and color properties that accurately serve the Deliverable, and name it so it can be easily recognizable in the project manager page.



Audio Matrix

The Audio section allows for each Deliverable to have its own configuration of channel assignments.



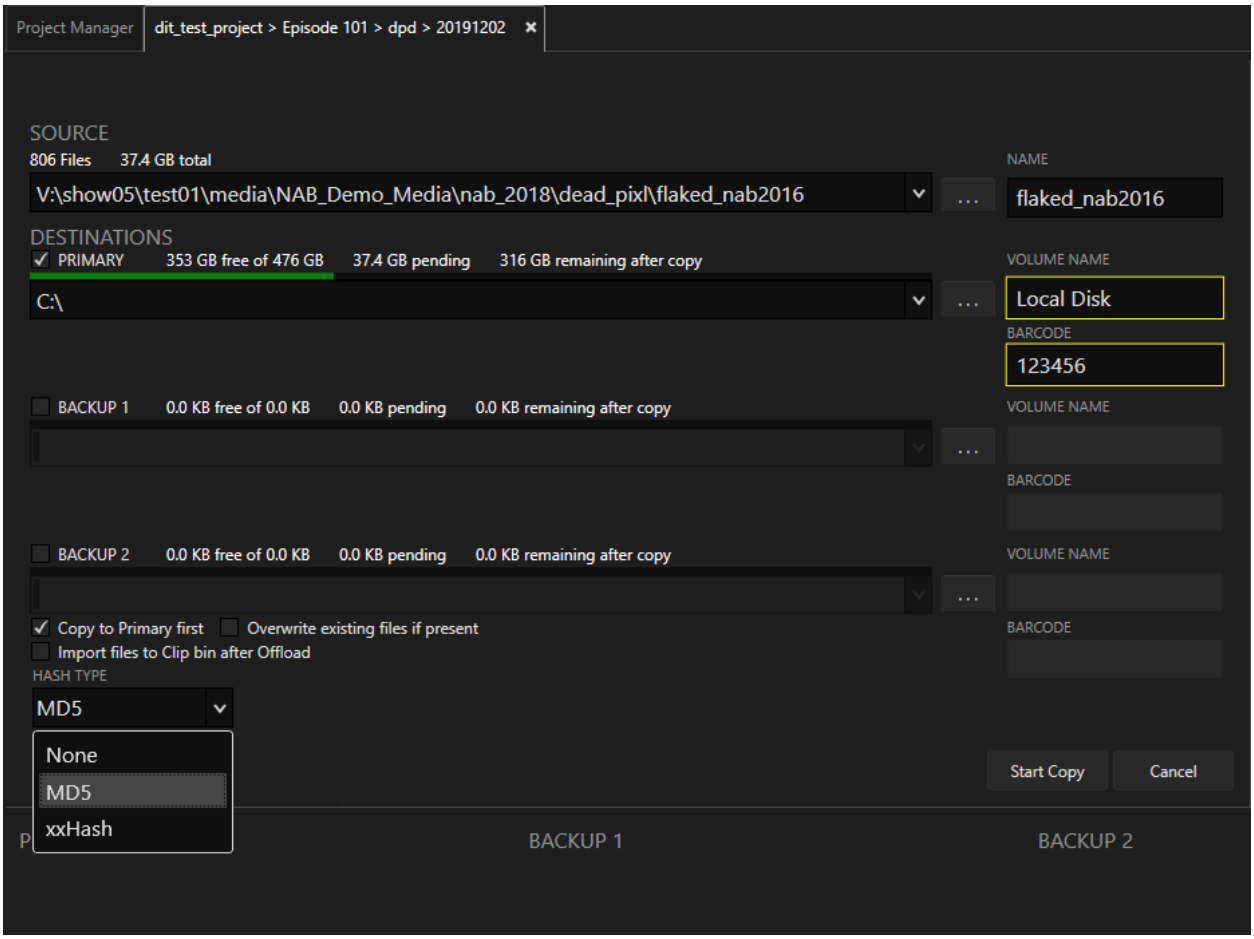
Burns Canvas

The Burns Canvas provides a flexible graphical display of metadata that can be formatted to suit each user's requirements.

Cortex Tools - Brief Overview

The Copy Tool

The Copy Tool has a simple interface to create an unlimited number of Copy and Archive Tasks and concurrently run up to three at a time. Each Copy Task has a single source (for example, a camera card) and up to three target destinations. The target destinations can include a combination of internal storage, shared storage, attached storage, shuttle drives or LTFS LTO drives. Archive Tasks can have up to two target destinations, which are usually LTFS LTO drives.



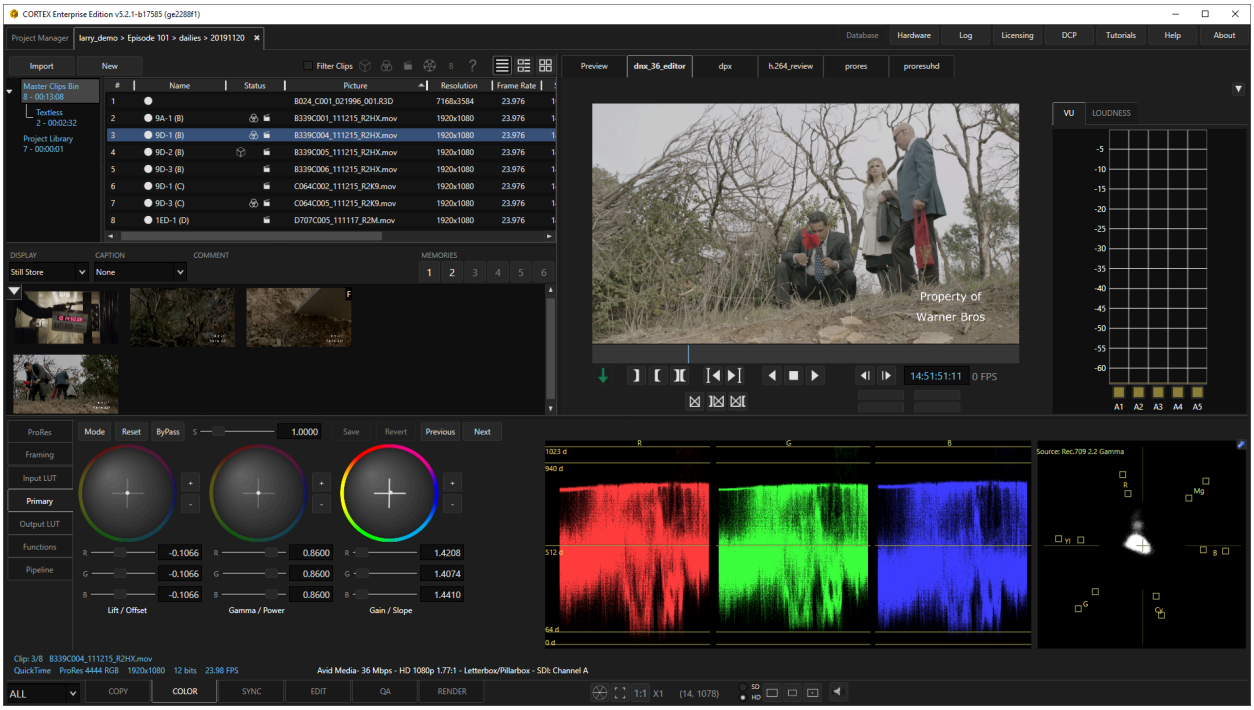
Each Task can generate optional MD5 or xxHash Checksums for verification. These checksums will be available in any Manifest file created from the job.

In addition, Cortex also offers MHL Verification (Media Hash List), which works similarly to the Copy and Archive Tasks. If a folder contains the MHL file, Cortex will validate the list against the media contained in the folder.

The Color Tool

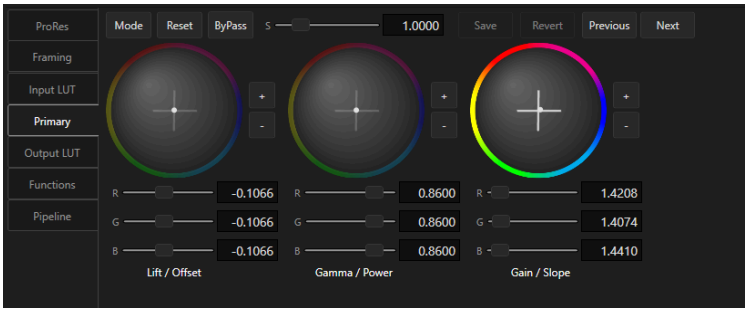
The Color Tool provides tabs for different image processing functions:

- Source Decoding Parameters
- Framing
- Input LUT
- Primary Color Correction
- Output LUT
- Functions - includes modules for Aperture, Grain, MTI Samsung Resize settings, Dolby Vision™ L1 Analysis
- Pipeline - maps the color pipeline from start to end



Primary Color Corrector

Primary color correction can be operated in two modes: Lift Gamma Gain or Printer Lights. Values can be adjusted using the UI, keyboard shortcuts or a tactile panel. All values are converted to industry standard ASC CDL-SOP / Saturation. Currently, the Tangent Wave (1 & 2), Tangent Element, and Nucoda Precision panels are supported. 3rd party Stills, LUTs and CDLs can be imported via the Image Stores..

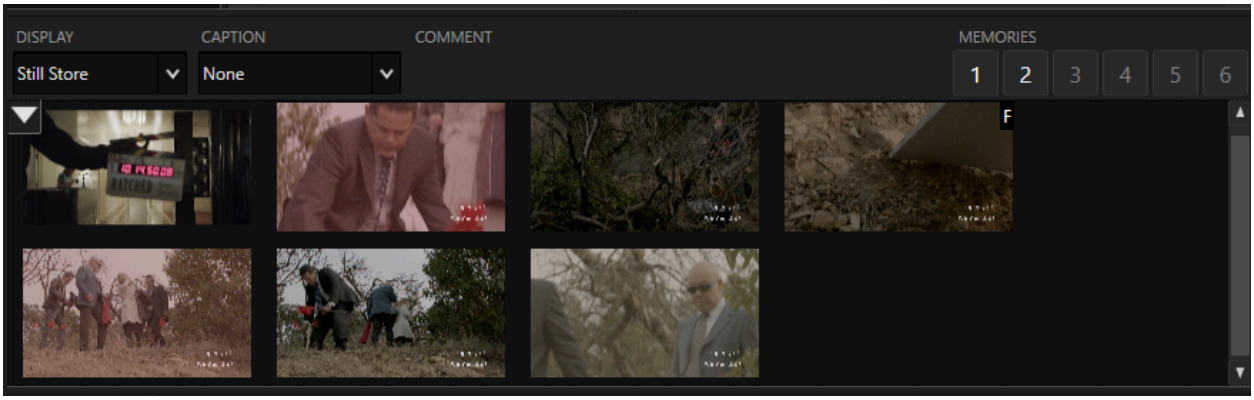


The Image Stores

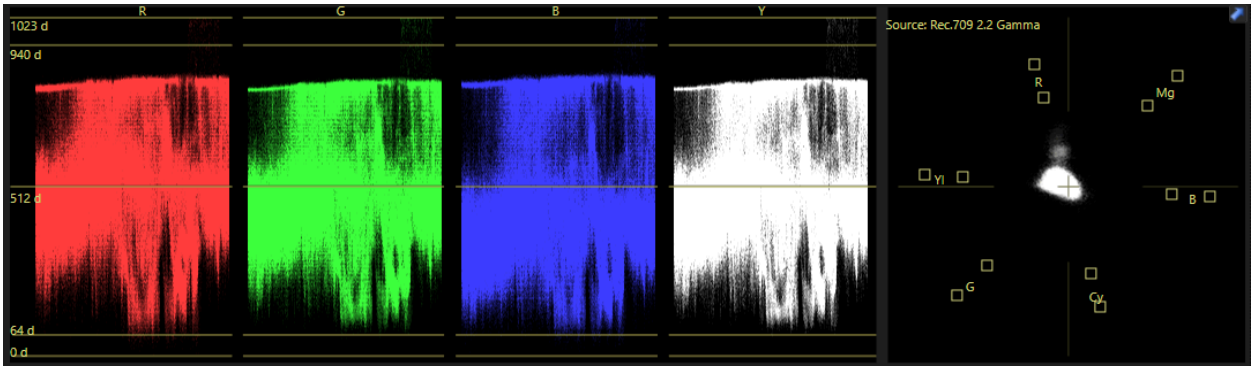
The Image Stores provide different options for capturing, importing, working with and exporting stills. There are 6 stores including:

1. Still Store - for user captured stills
2. Timeline
3. Favorites
4. Imported Stills
5. Imported CDLs
6. LUTs

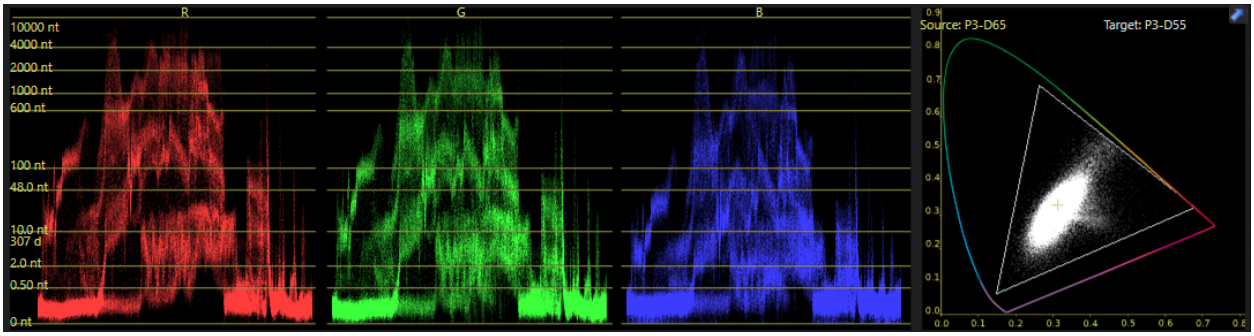
The Imported Stills, Imported CDLs and LUTs stores can be used to import industry standard files.



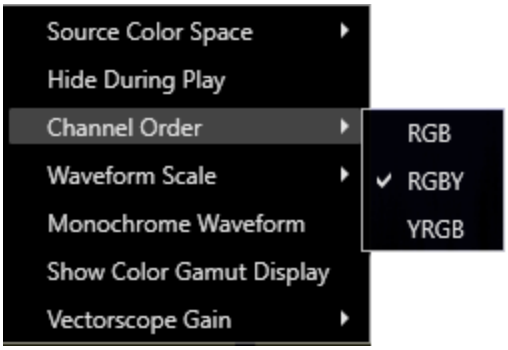
Waveform, Vectorscope, Color Gamut Display

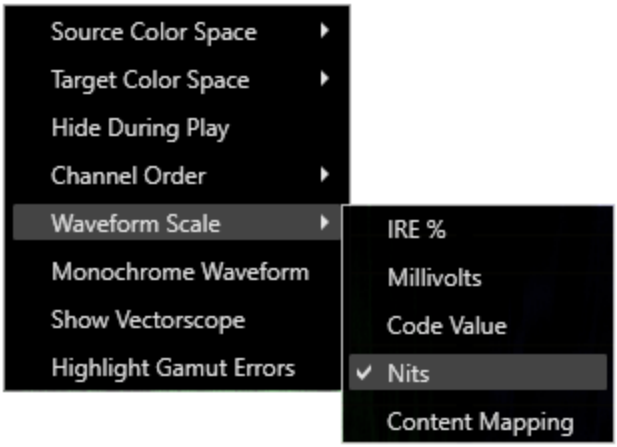


A waveform monitor and vectorscope provide additional feedback for color correction under different viewing conditions. The vectorscope can be replaced with a Color Gamut Display (seen below).



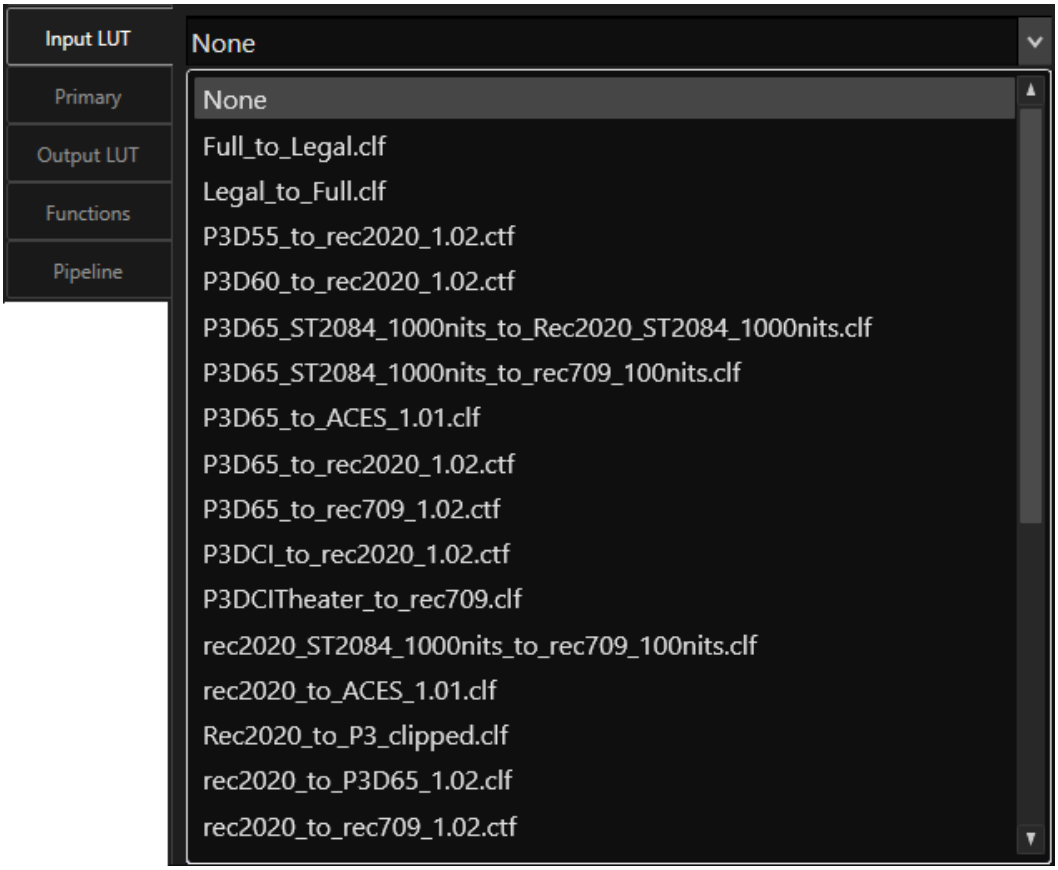
Right-clicking on the waveform will present a Context Menu with a variety of view options.





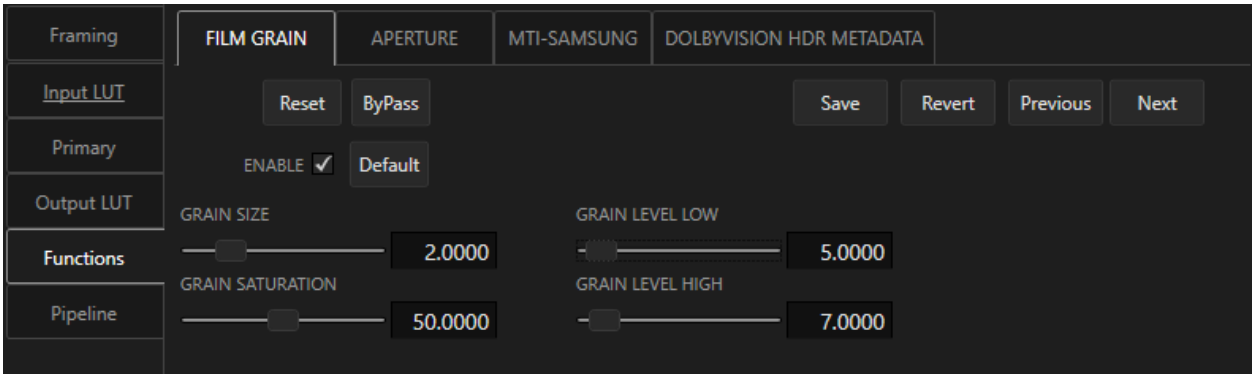
LUTs

Cortex provides a number of included LUTs ranging from simple rescaling to more complex colorspace transforms.



Functions

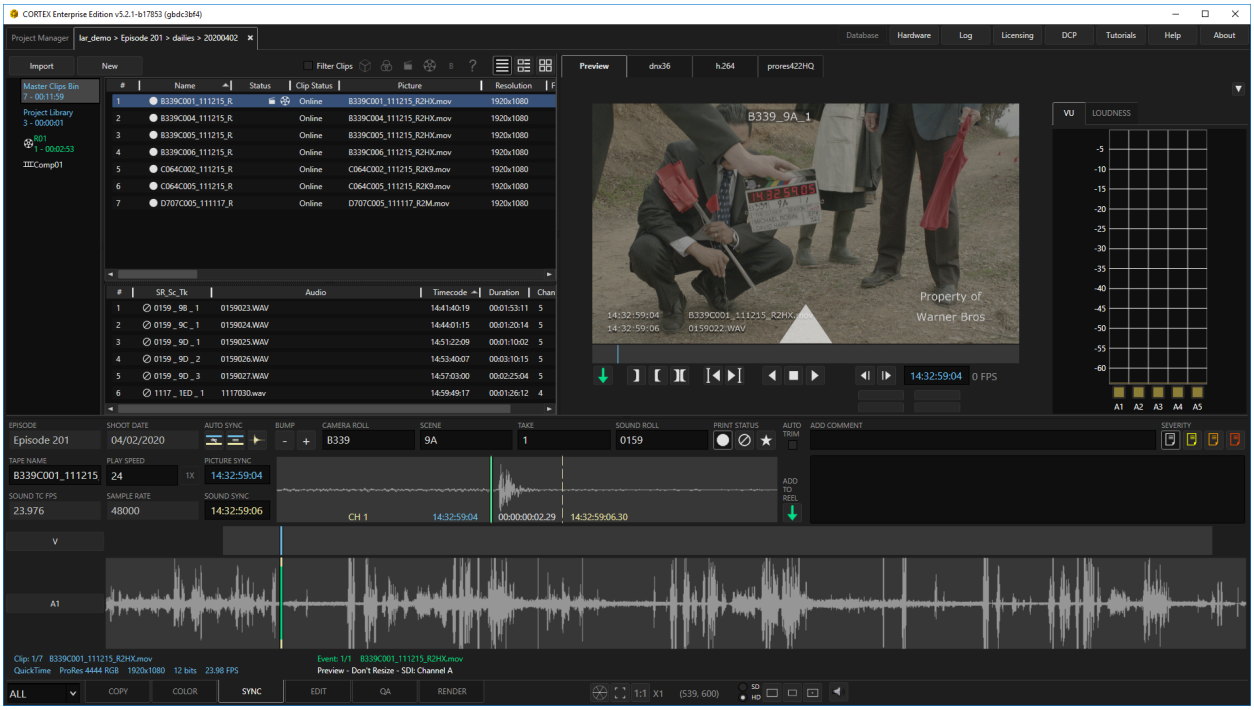
In addition to color correction, the Color Tool offers several image processing modules, which can be enabled clip by clip, or for compositions on a shot by shot basis.



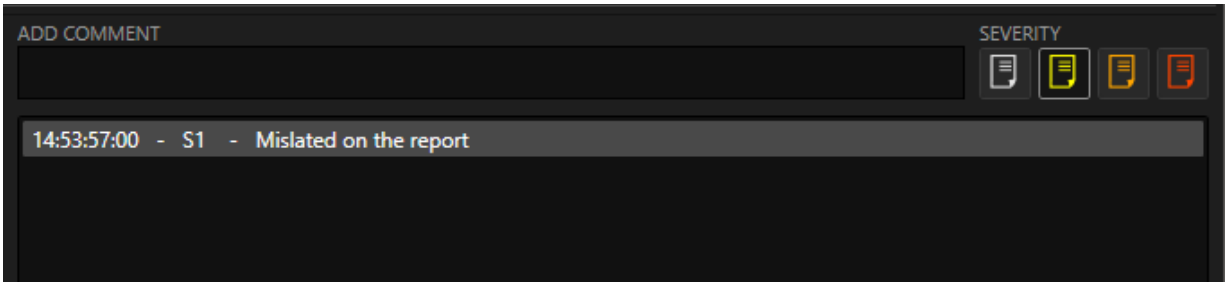
1

The Sync Tool

The Sync tool provides an interface for synchronizing audio and picture clips as well as viewing, adding, and modifying metadata for each clip.



Multiple comments for “Discrepancies” can be assigned to each clip with 4 different “Severity” ratings. Comments are included in the Cortex PDF Report along with their timecode locations. Standard ALEs, AAF, Final Cut and Cortex Manifest reports can also be exported for dailies. Severity ratings include:



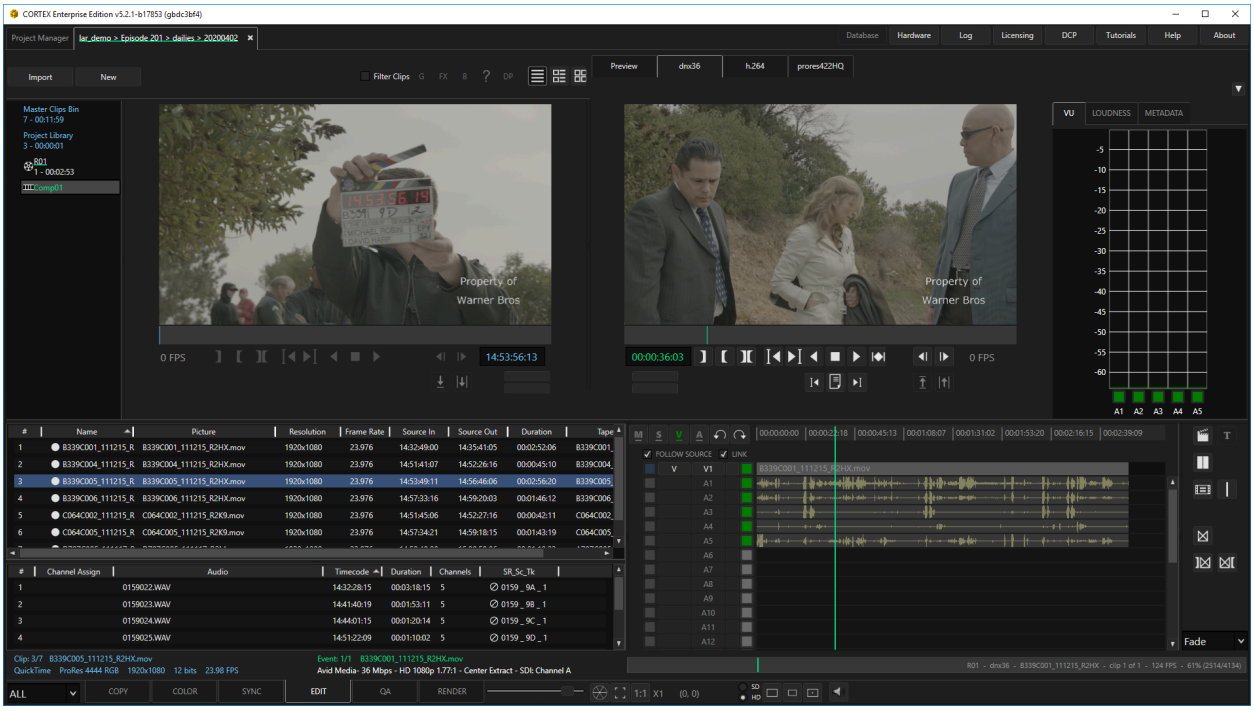
0. Comment Only
1. Severity 1
2. Severity 2
3. Severity 3

Comments made for clips in the Sync Tool are different from comments made in a composition, which is explained later in the Edit Tool.

1

The Edit Tool

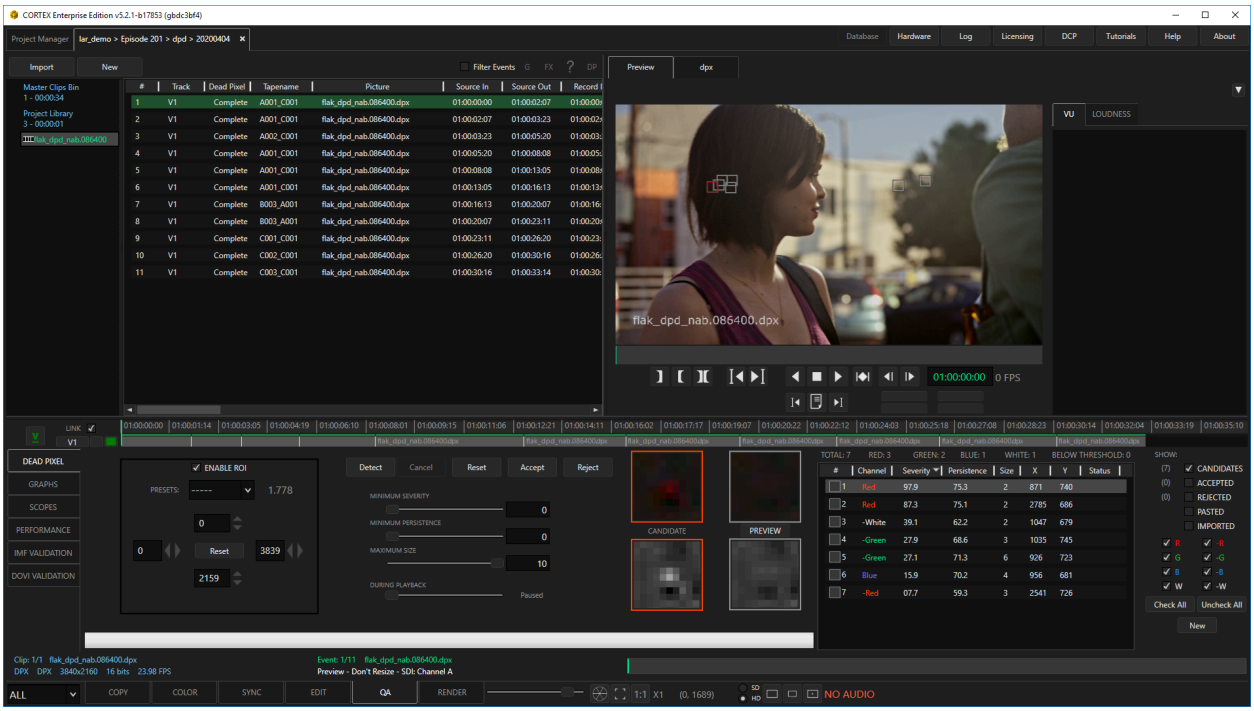
The Edit Tool in Cortex is a non-linear edit utility. Containing familiar edit functions such as Overwrite, Insert, Lift, and Extract, it can be used for a variety of reasons including on-set preview of shot assemblies, trimming sections of a rendered file, inserting or removing black between acts, replacing slates, and conforming a cuts-only CMX 3600 EDL or AAF. Three-point and drag and drop edits are supported as well as Gap and Ripple trims.



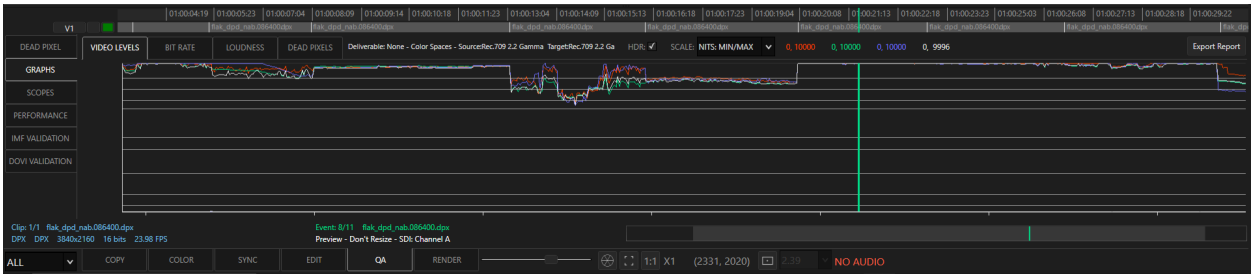
The Edit Tool is also used to assemble IMF, AS11, DPP, and DCP compositions prior to rendering.

The QA Tool

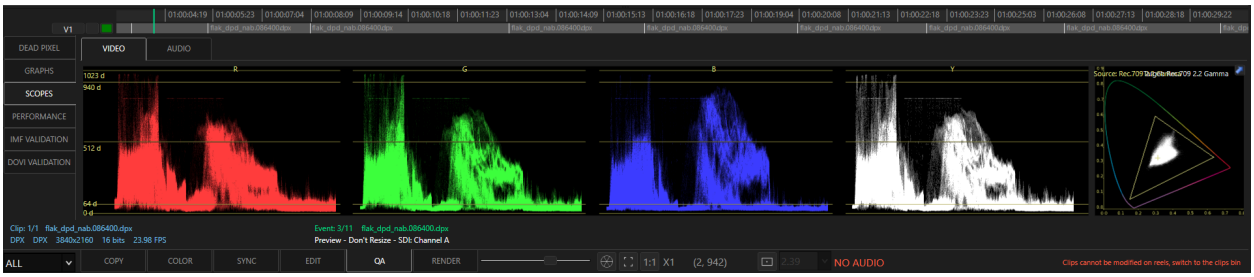
The QA Tool provides functionality for Dead Pixel Detection & Correction, Graphical Analysis of video levels for SDR, HDR, and Audio Loudness with corresponding reports that itemize discrepancies based upon user defined thresholds. The QA Tool also provides statistical feedback of hardware and software performance, validates Cortex and 3rd party IMF packages, and Dolby Vision™ metadata.



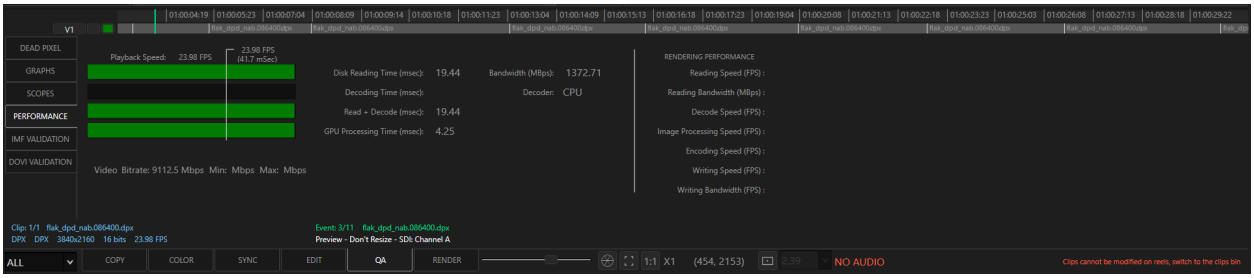
The Dead Pixel Module



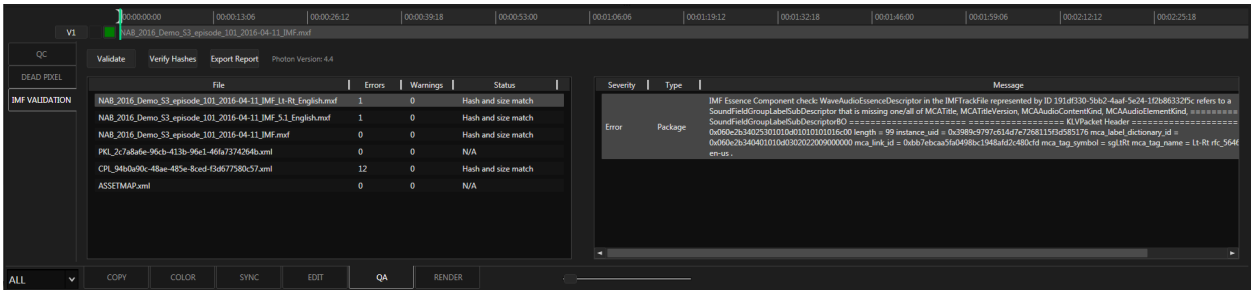
The Graphs Module for Video and Audio Metrics



The Scopes Module. Also included are VU and Loudness Meters.



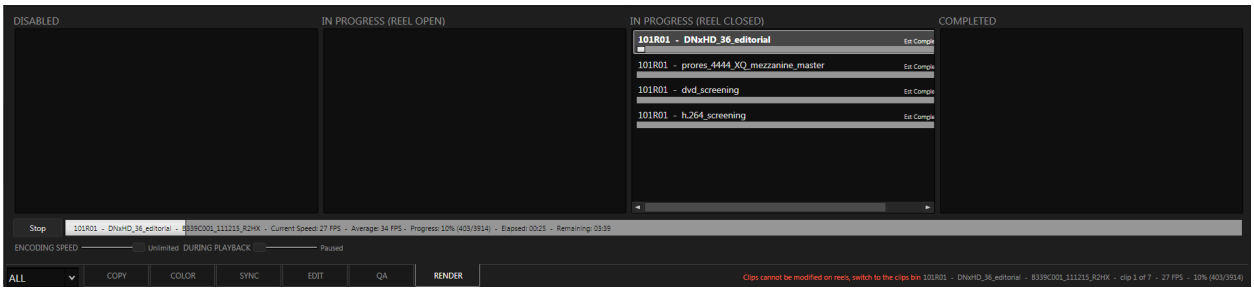
The Performance Module.



IMF and Dolby Vision™ Metadata Validation.

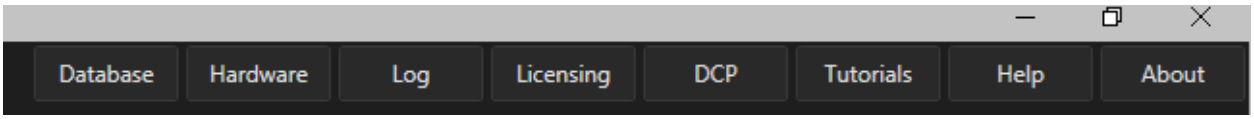
The Render Monitor Tool

The Render Monitor Tool allows you to monitor the progress and manage the priorities of the background encoding of all Deliverables.



Utility Tools

Along the top bar of Cortex are a series of utility based tools.



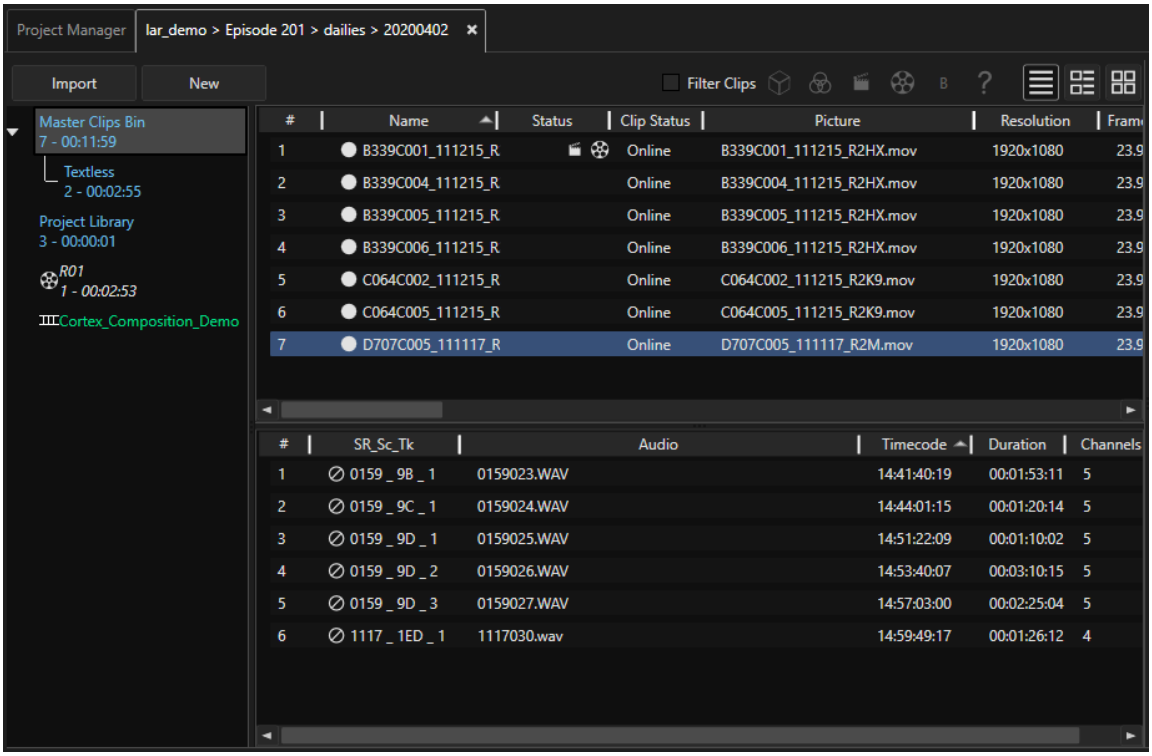
These utilities include the ability to select a Cortex Database, adjust hardware settings, review error and general information logs, copy your DCP certificate, link to our Cortex Tutorials, access Function and Keyboard Shortcut Help, and review information about Cortex.

Bins & the Media Player

Bins

Along the left side of the UI, the Sidebar displays the Master Clips Bin, Sub-Bins, Project Library, Reels and Compositions. Imported media is stored in the Master Clips Bin. The Project Library contains Bars, Black, and user created slates. Clips can also be added to the Project Library for easy access to media that recurs throughout the project. Sub-Bins contain clips that were copied from the Master Clips Bin though they still exist in the Master Clips Bin.

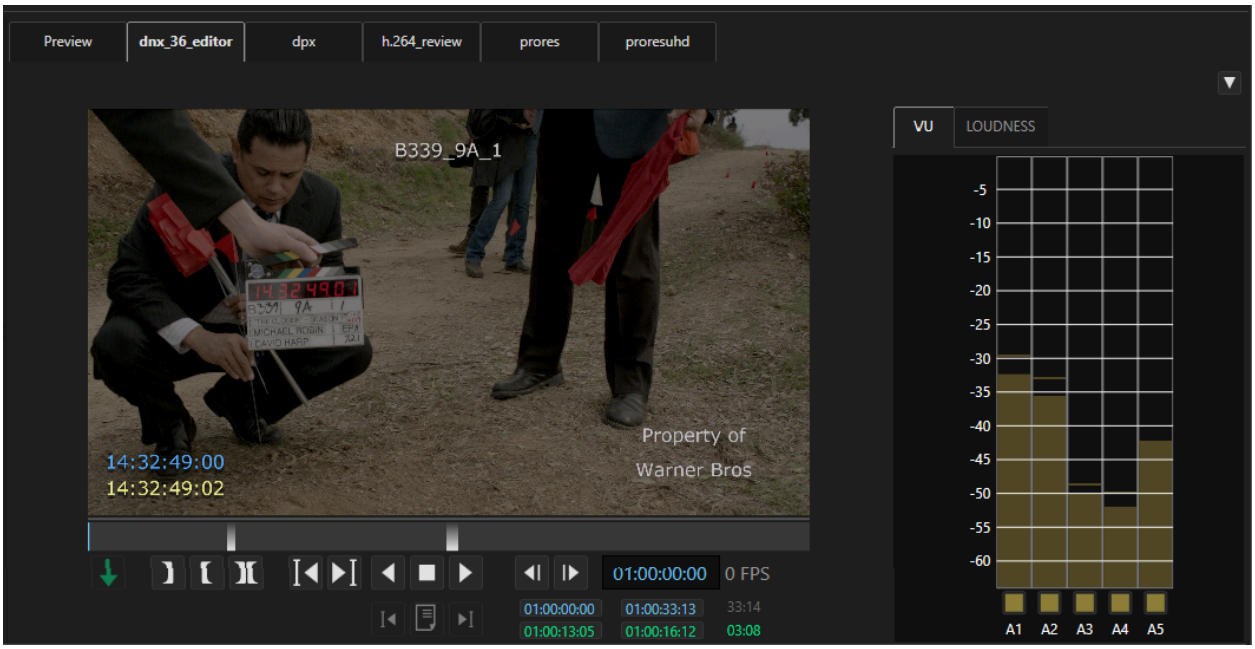
The Sync & Edit tools also display audio clips in their own bin.



The Media Player

In all tools, except the Edit Tool where there are two players, a Single Media Player switches between playing source files or the composition depending on which is focused. A single click on a clip or composition event will focus and load the media ready to play.

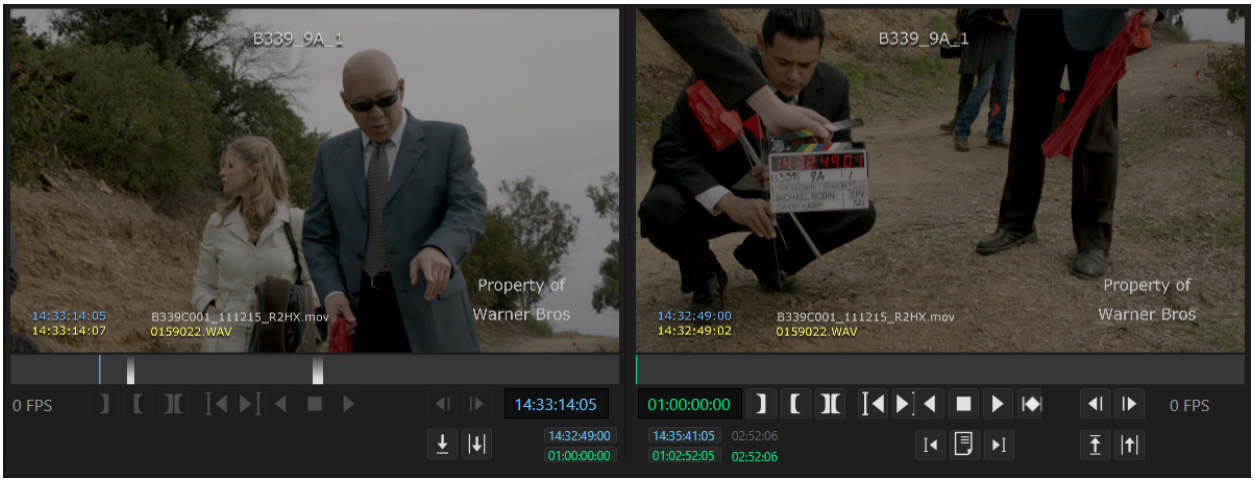
The Deliverable Tabs located above the Media Player provide the ability to select different previews of the output.



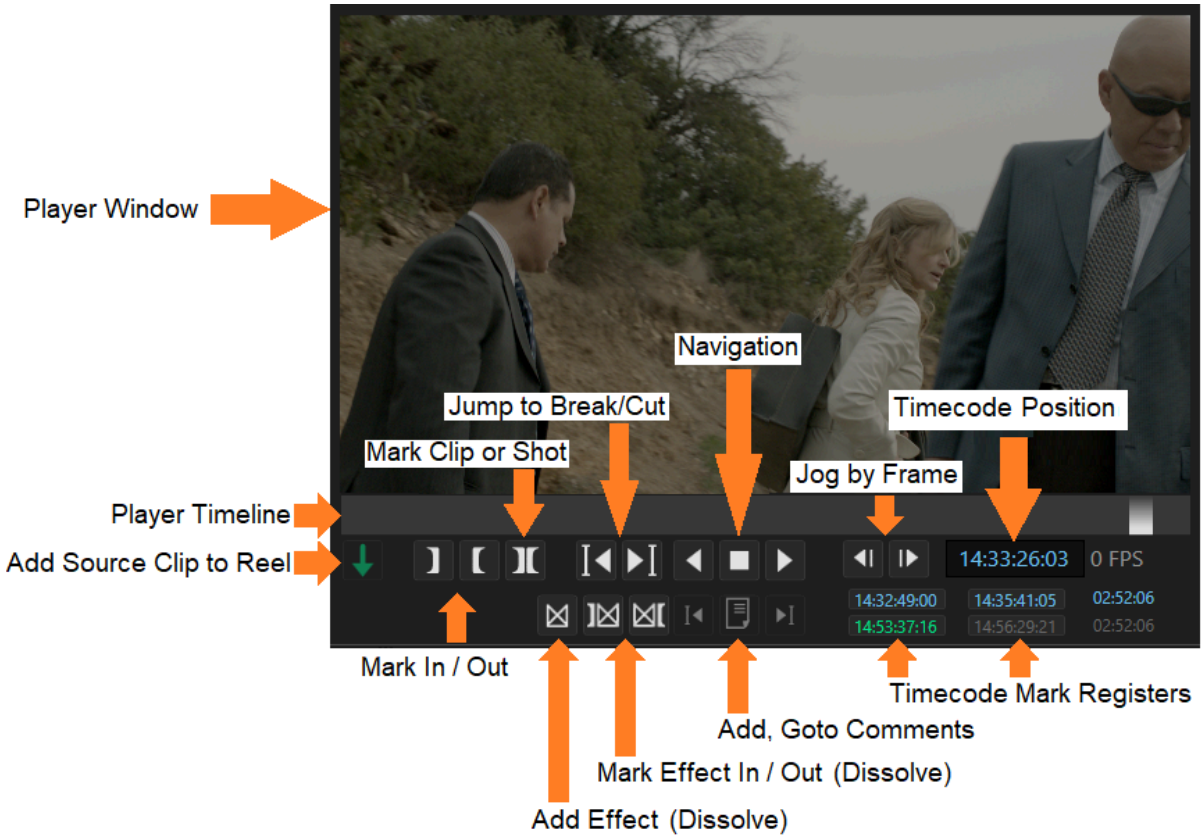
When playing a source clip with audio, the VU meter bars are yellow. When playing a composition with audio, the VU meter bars are green.

The Edit Tool Media Players

The Source on the left. The Composition (Record) on the right.



Parts of the Source Single Media Player



The Player Window is where the video portion of a clip is displayed. The aspect ratio of the display is determined by the Deliverable Configuration as explained in the How to Create a Deliverable Configuration in the Project Manager section below.

Zooming the Picture

Using the mouse, hover over the picture:

1. Scroll up to zoom in and down to zoom out.
2. Press the / key on the numberpad in every tool except the Sync Tool (where it is used to enter a picture timecode). Shift+/ to zoom out.

In either case, double click the picture to zoom out completely.

Note: This method of zooming does not affect the framing of the picture and is only for viewing.

The Player Timeline

The Player Timeline shows the full length of a source clip or composition segment. If a color dissolve(s) has been added, it appears as a shaded area on the timeline.

Add Source Clip to Clip Reel 

If a Clip Reel has been created and a source clip is loaded in the player, pressing the Add Source Clip to Reel button will add the clip to the reel. The button is only visible when a source clip is loaded. It will only be enabled when a source clip is loaded and a Clip Reel has been created; otherwise it appears dim green.

Mark In and Out 

The Mark In and Out buttons are used to mark both source and composition timecode positions.

Mark Clip or Segment (Shot) 

The Mark Clip or Segment button is used to mark an entire source clip or a segment within two breaks in a composition. For compositions, the track that is enabled will determine the marked segment. If a video and audio track are enabled, the mark will default to the video track.

Go to Previous/Next Clip or Break/Cut 

Depending on which is focused, a clip or composition, the “Go to” buttons will either go to clips or breaks/cuts. Breaks and cuts are only found on a composition timeline. A Break reflects a cut generated by the import of an EDL or where a shot has been split by manually adding a Break. It is represented as a white vertical line. A Cut is a point at which two clips of media are joined editorially within the Cortex Edit Tool. It is represented as a black vertical line.

Navigation 

The three navigation buttons are, from left to right, Play Reverse, Stop, and Play Forward. Pressed once, the play speed is real time, pressed 2x doubles the speed, and press 3x sets the speed to fast forward or fast reverse.

Jog by Frame 

Press once per frame either forward or reverse.

Timecode Position and Mark Registers

When a video source clip is loaded, the Timecode Position display is blue. When a composition is loaded, the timecode display is green. When an audio source clip is loaded in both the Sync or Edit tools, it will be yellow.

Mark In and Out points are also displayed in their corresponding color. The marks, once entered, follow the clip and are displayed in the timecode mark registers whenever the clip is loaded into the player.

Left click on any register to jump to the corresponding location.

Right click on any register to copy the timecode entry.

Add Dissolve or Effect 

The Add Effect button is used in both the Color and Edit tools. In the Color Tool, it is the Add Dissolve command. In the Edit Tool, it is referred to as the Add Effect command.

Mark IN Dissolve or Effect 

When a Dissolve or Effect is added to a clip or composition segment, the Mark Effect IN is defaulted to the timecode position where the dissolve or effect was added. Once the dissolve or effect has been given an Mark Effect Out and, therefore, a duration, the in point can be adjusted by clicking the Mark Effect In button.

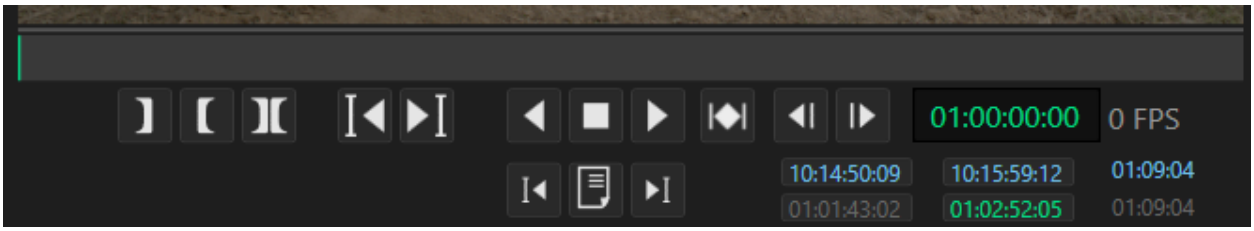
Mark OUT Dissolve or Effect 

The Mark Effect Out determines the duration of a dissolve or effect after being added. The duration can be adjusted by the Mark Effect Out as long as it does not cause an overlap of like dissolves or effects. A color dissolve and effect, however, are permitted to overlap each other.

Add and Go to Comments 

The Add and Go to Comments array of buttons are used to create and place comments in a composition timeline for QC or other user defined purposes. The comments can be exported as a QC .pdf report. Since the Edit Tool has its own composition player, the buttons and commands are always available for use. In the other tools, the Add and Go to Comments buttons are only enabled when a composition is loaded into the player, otherwise they are dimmed.

Parts of the Composition Single Media Player

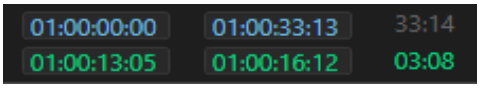


When in a single media player tool, the only differences between the Source and Composition Media Players are that the composition player has a Segment Play Mode button  that limits play from cut to cut within a segment while the Source Player has an Add Source Clip to Reel button  , which is only available when the source player is active since only source clips can be added to a Clip Reel.

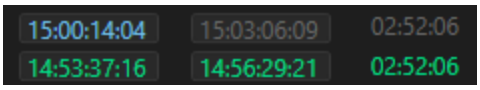
Examples of Marks

Note: When In and Out marks are present in both the source and composition timecode registers, the duration always defaults to the composition. If a timecode and/or duraton is displayed in grey, it means that the timecode and/or duration was calculated based on the other timecode registers' duration.

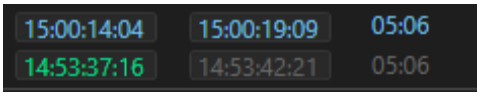
Source timecodes are shown in blue. Composition timecodes are shown in green.



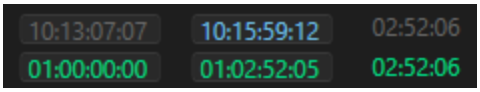
Both the source and composition In and Out are marked, therefore the composition takes precedence.



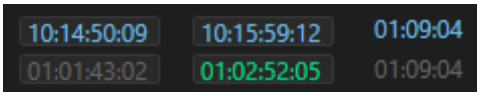
This represents a 3 point edit where the source Out mark is determined by the duration of the composition marks.



This represents a 3 point edit where the composition Out mark is determined by the duration of the source marks.



This represents a 3 point edit where the source In mark is determined by the duration of the composition marks.



This represents a 3 point edit where the composition In mark is determined by the duration of the source marks.

Media Player Shortcut Keys

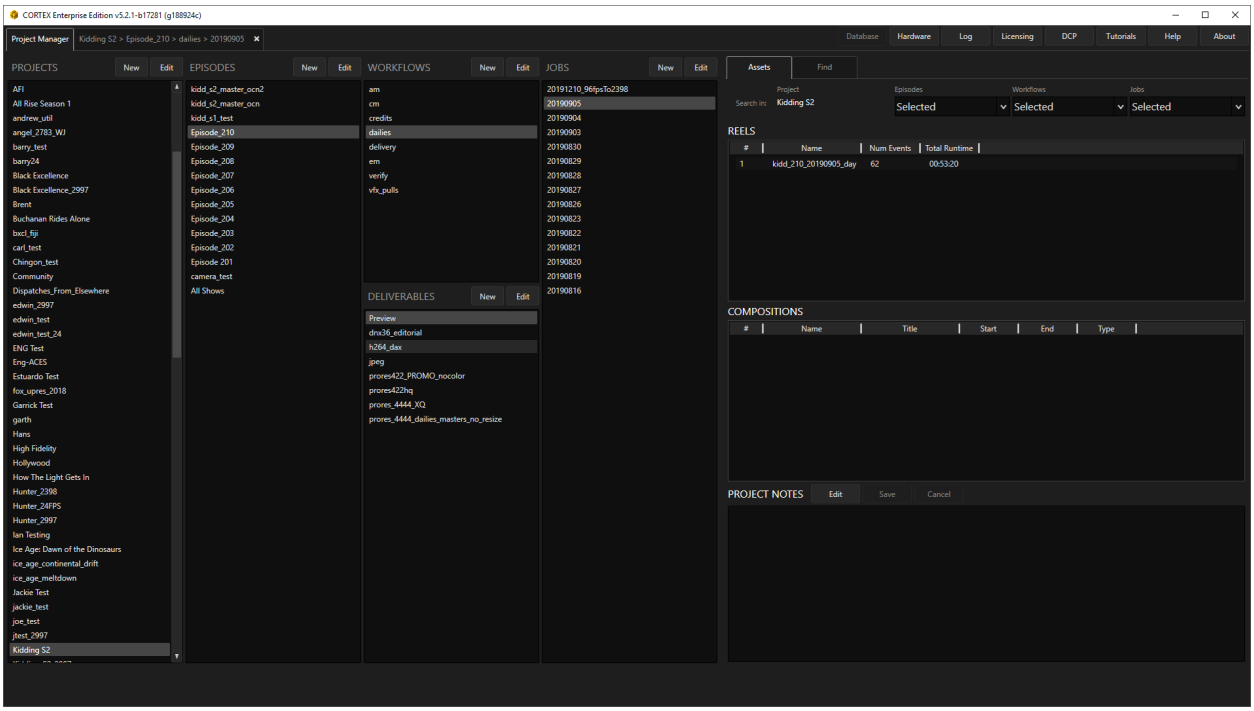
Description	Shortcut Keys
Go to Previous Clip in Master Clips Bin	E or Up Arrow when Clips Bin is focused
Go to Next Clip in Master Clips Bin	R or Down Arrow when Clips Bin is focused
Add Source Clip to Clip Reel	G
Mark In	I
Go to Mark In	Shift+I
Clear Mark In	Ctrl+I
Mark Out	O
Go to Mark Out	Shift+O
Clear Mark Out	Ctrl+O
Mark Clip or Shot	Z
Clear Mark In and Out for Source and Composition	Ctrl+Alt+I or O
Add Break	, (comma)
Clear Break	Ctrl+,
Go to Previous Break/Cut on Composition Timeline	E or Shift+S when composition is focused
Go to Next Break/Cut on Composition Timeline	R or Shift+F when composition is focused
Play Forward	V or Spacebar, VV for 2x speed, VVV for fast forward
Play from middle of clip	Shift+V
Play Reverse	X, XX for 2x speed, XXX for fast reverse
Go to middle of clip	Shift+X
Play limited to within composition segment	Ctrl+Shift+C
Stop	C or Spacebar
Jog forward by frame	F or Right Arrow
Jog reverse by frame	S or Left Arrow
Add Effect in Edit Tool or Dissolve in Color Tool	P
Mark Effect or Dissolve In	[
Mark Effect or Dissolve Out	]

Go to beginning of Next Effect/Dissolve	Shift+[
Go to beginning of Previous Effect/Dissolve	Shift+]
Delete Effect or Dissolve	Ctrl+P while located at beginning of effect/dissolve
Add Comment to composition timeline	Ctrl+Shift+O
Go to Next Comment	Ctrl+Shift+F
Go to Previous Comment	Ctrl+Shift+S

The Project Manager

The Project Manager is the starting point for using any of the CORTEX editions. The Project Manager allows you to define and organize projects, Workflows, Workflow Deliverables and corresponding Jobs. There are two Project types, Advanced and Basic, each serving a different purpose.

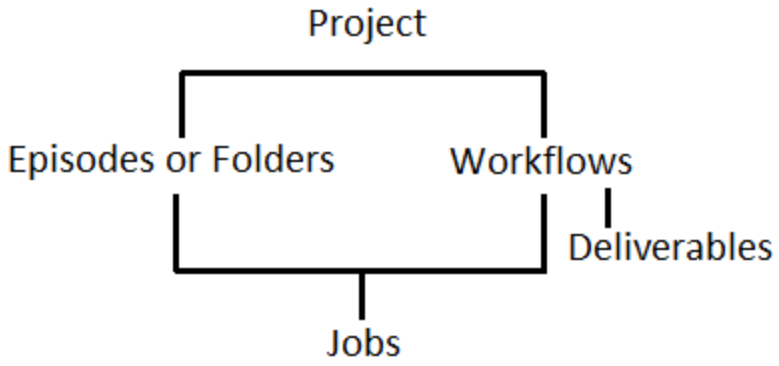
Advanced Project



Cortex's Advanced project manager is divided into 5 main sections as follows:

1. Projects
2. Episodes or Folders - determined by the project type, either Episodic or Monolithic.
3. Workflows
4. Deliverables
5. Jobs

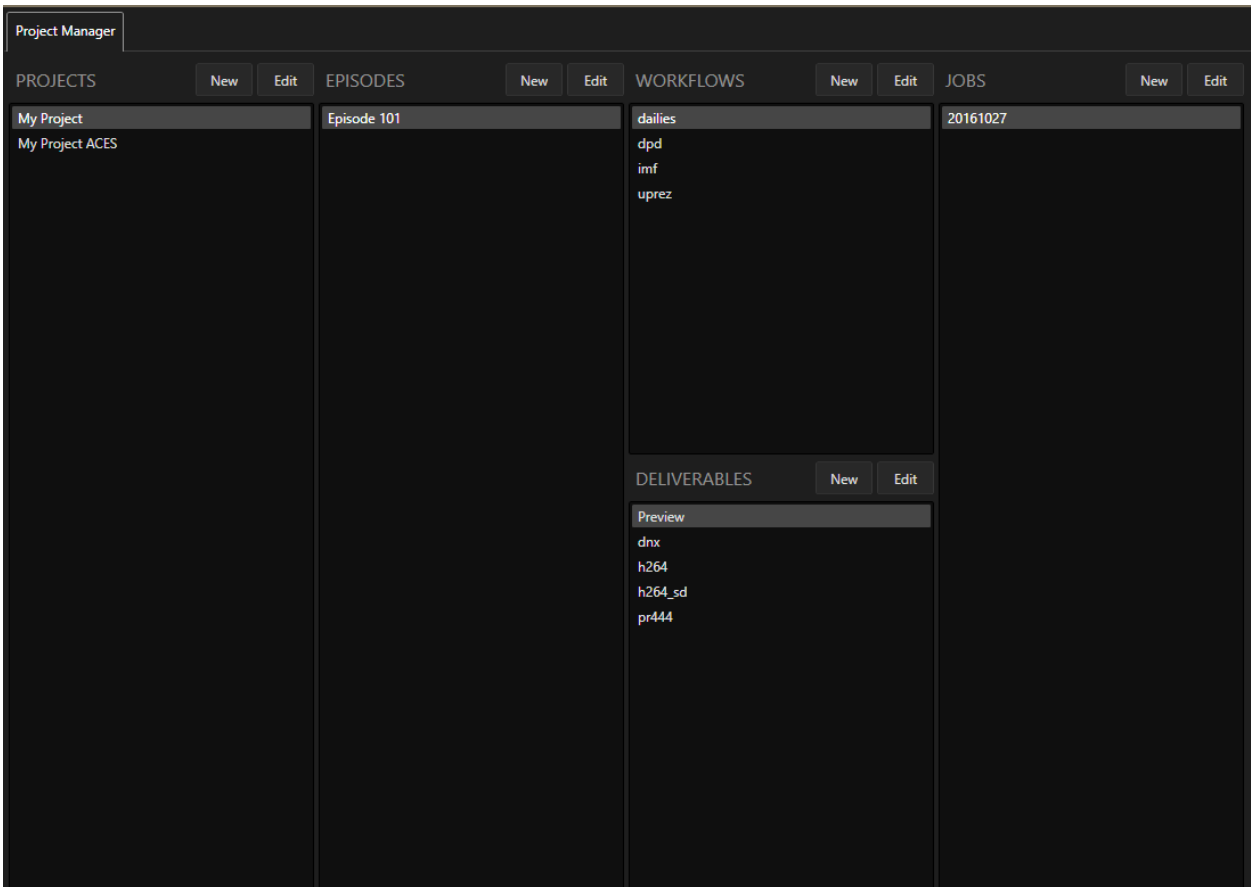
The Project hierarchy is as follows:



A Cortex Advanced Project normally corresponds to a TV show (Episodic) or Feature film (Monolithic). Projects can contain one or more Episodes for TV shows, or Folders for Feature films.

Each Advanced Project can contain one or more Workflows. A Workflow is a collection of Deliverables intended to be rendered for a specific stage of post production. For example, a Workflow called “Dailies” could possibly contain editorial, studio review, and mezzanine Deliverables, whereas a “Final Delivery” Workflow could contain Deliverable files such as an IMF or DCP.

Jobs are created under a combination of a Project, Episode/Folder, and Workflow. When a Job is ready to render, the render dialog will present the Deliverables associated with the Workflow as the first option. However, within any Job, all Workflows and their Deliverables are accessible as render options.

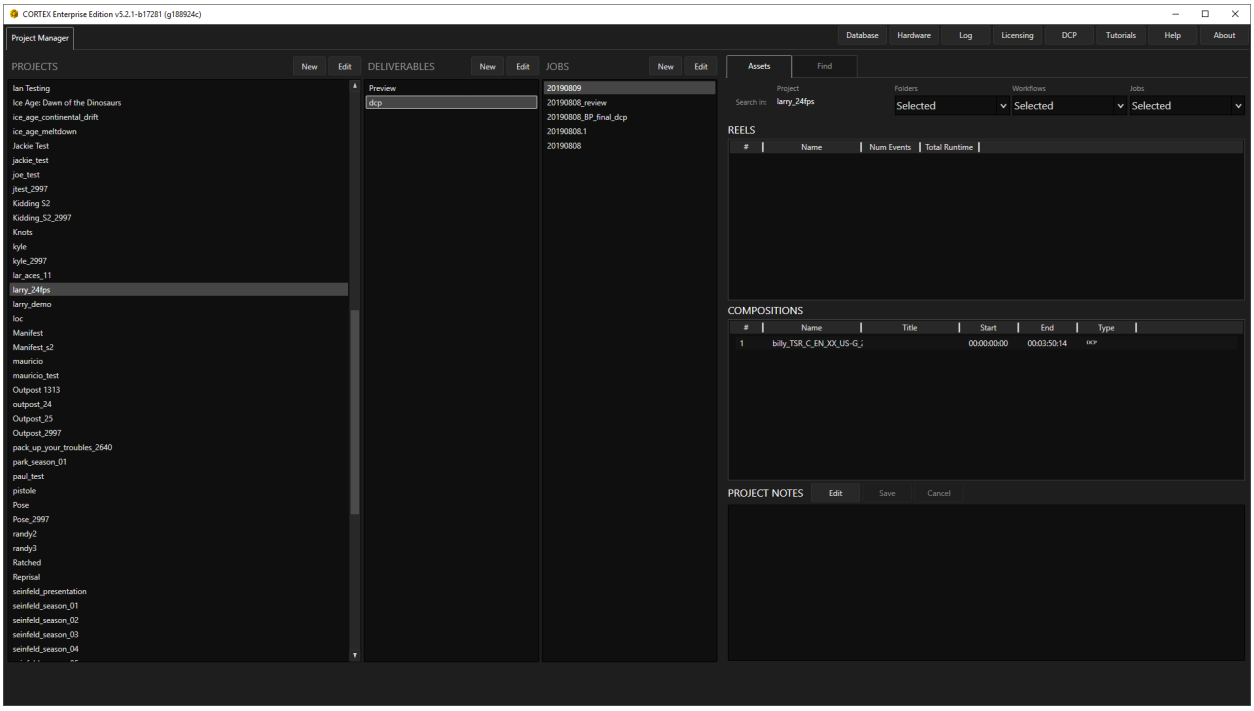


“My Project” has one Episode and four different Workflows. Each Workflow consists of a unique set of Deliverables. In the case of “dailies”, there are five Deliverables including the “Preview” default, which will be explained in the How to Create a Deliverable Configuration section below.

Basic Project

A Basic Project contains 3 main sections:

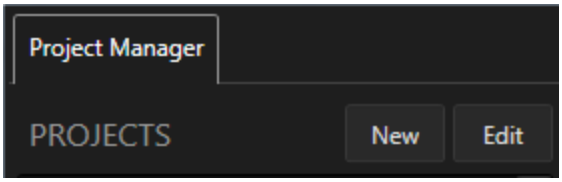
1. Projects
2. Deliverables
3. Jobs



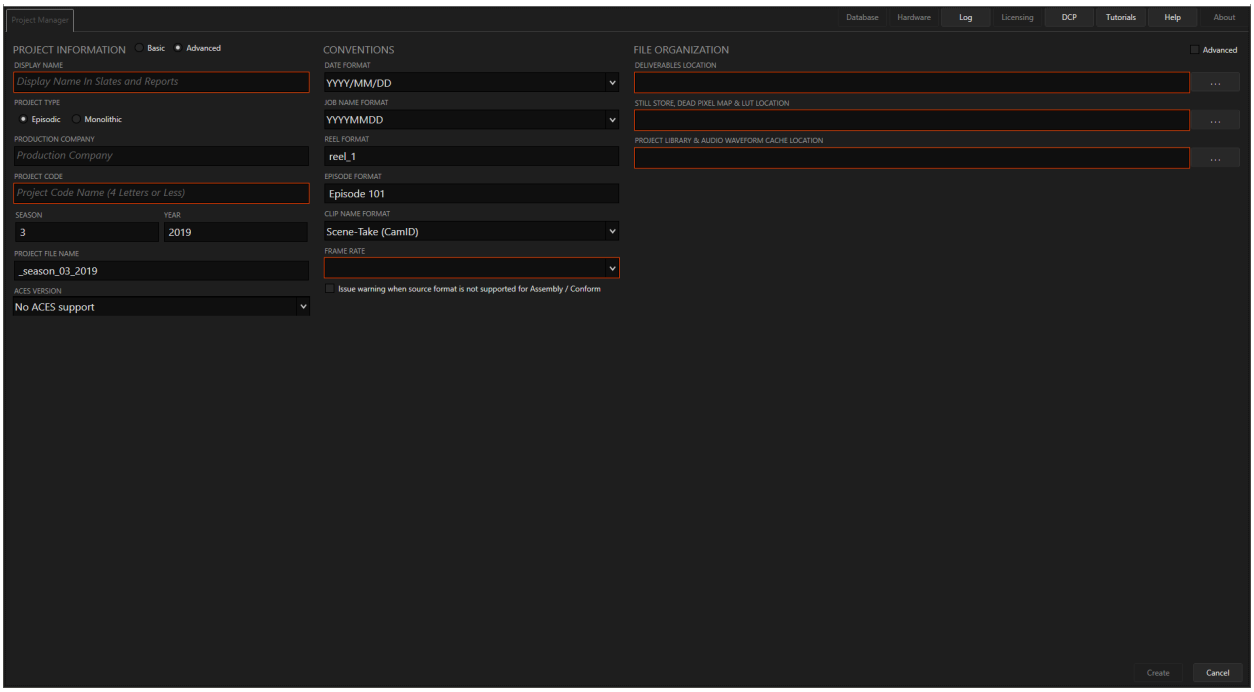
The Basic Project is used for simple, straight-forward file rendering, for example, IMFs and DCPs.

Creating a Project

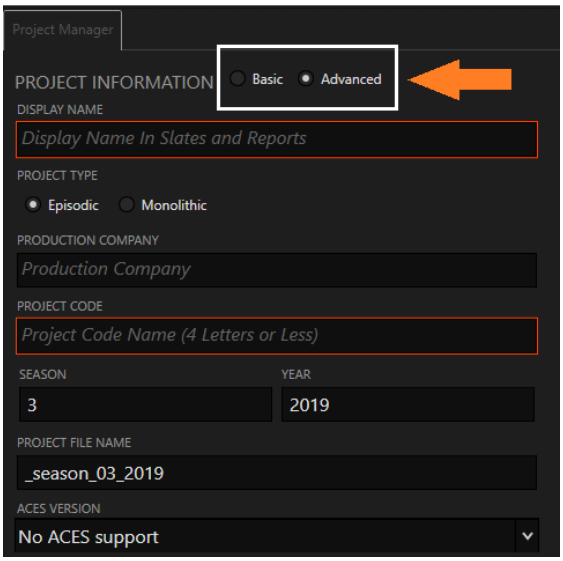
In the Project Manager tab, click the New button.



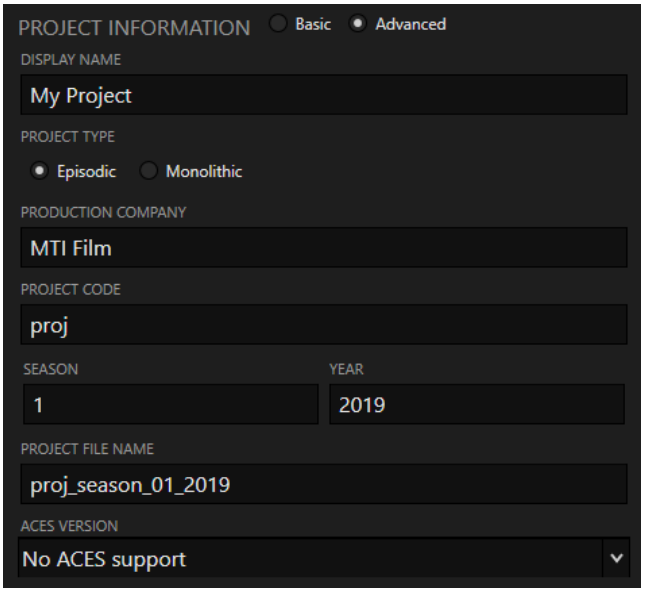
The following screen appears with three sections: Project Information, Conventions, File Organization. Fields outlined in red are required.



Choose your Project Type, Basic or Advanced.



Advanced Project Information



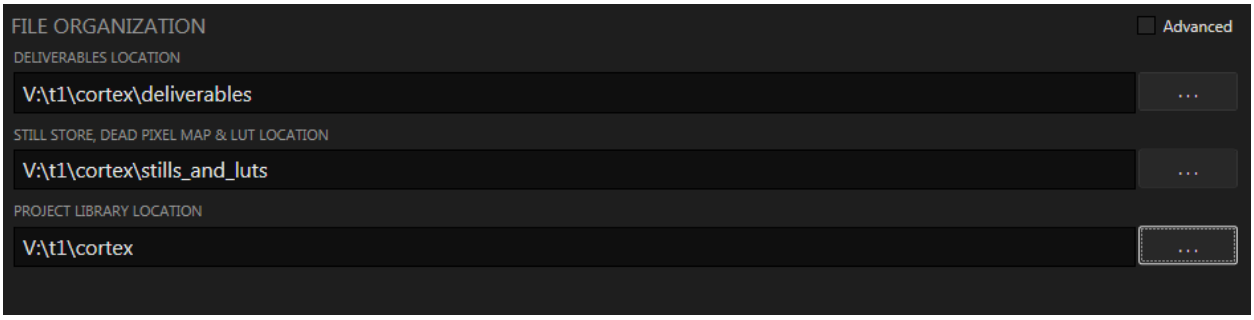
1. Use the Display Name field to enter the name of your project
2. Select the appropriate PROJECT TYPE: Episodic or Monolithic. If you choose Episodic, two additional fields appear below the Project Code: “Season” & “Year”
3. Enter the PRODUCTION COMPANY
4. Enter a PROJECT CODE (nickname)
5. For Episodic, enter SEASON number & YEAR
6. Based on the Project Code, a PROJECT FILE NAME will be created automatically
7. Determine whether the project will support ACES color space. An ACES project impacts the types of color space choices available for Deliverables and Color Tool options

Conventions

Cortex provides for default values to be entered into various fields throughout the application.

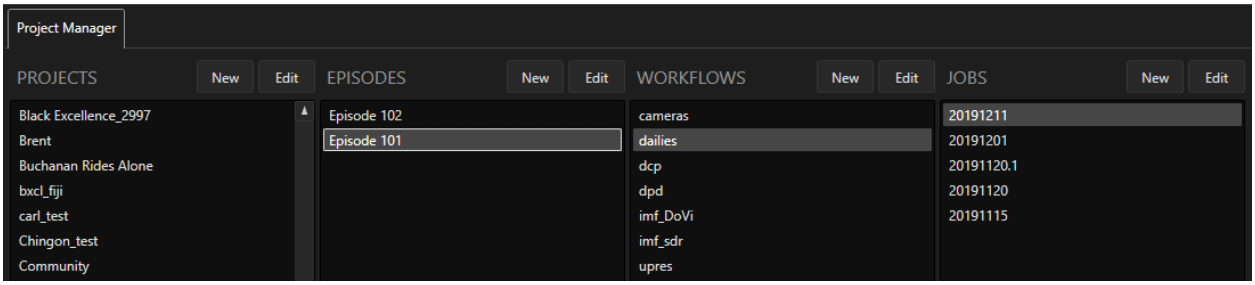
1. DATE FORMAT. In this field choose the date format that will be used throughout the application
2. JOB NAME FORMAT. This field determines how your Jobs will be named initially.
3. REEL FORMAT. Enter the desired formatting for when reels are created. If ending in a number, it will auto-increment per reel.
4. EPISODE FORMAT. For episodic job types, enter the desired formatting. If ending in a number, it will auto-increment per episode.
5. CLIP NAME FORMAT. Editors have preferences as to how their clips will be named in their bins. A variety of options are provided.
6. FRAME RATE. Enter the frame rate for the project. When enabled in the reel creation dialog, an optional warning appears when adding clips to reels that do not match the project frame rate. For example, if a 30 fps file is added to a 23.976 reel and the warning has been disabled, the result would be a file that plays back 25% slower than the original.

File Organization



The File Organization determines where you want your renders, Stills, LUTS, and Dead Pixel Maps to be created. The Advanced checkbox allows you to alter the Deliverables directory paths if desired.
Once you've finished entering all the Project information, click the Create button at the bottom right of the screen.

Creating Episodes, Workflows and Deliverables



Episodes or Folders

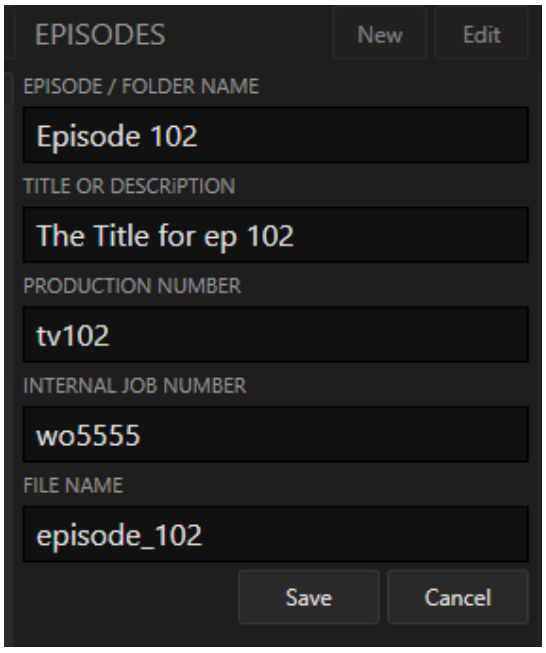
For Advanced projects, the second section header will be either Episodes or Folders depending on the chosen project type.

If the EPISODE/FOLDER NAME default ends in a number, the number will auto-increment each new episode/folder.

The TITLE or DESCRIPTION and PRODUCTION NUMBER fields are available as burn-ins (discussed later in the Deliverables section) and can be added to Deliverables or slates.

The INTERNAL JOB NUMBER is for reference only.

The FILE NAME reflects the folder that will be created as part of the directory path into which Deliverables will be rendered.

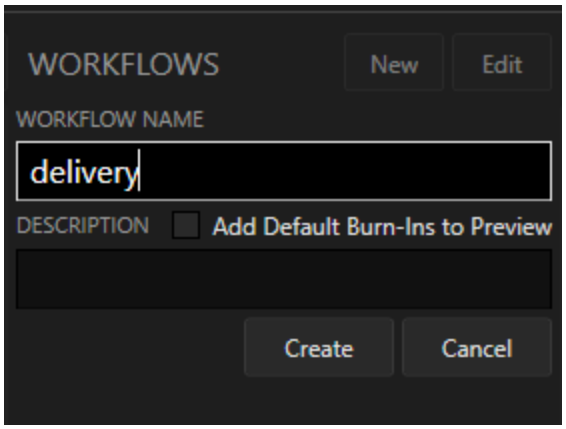


Workflows

A Workflow represents a stage of the Project's post production process and is a collection of specific Deliverables that pertain to it.

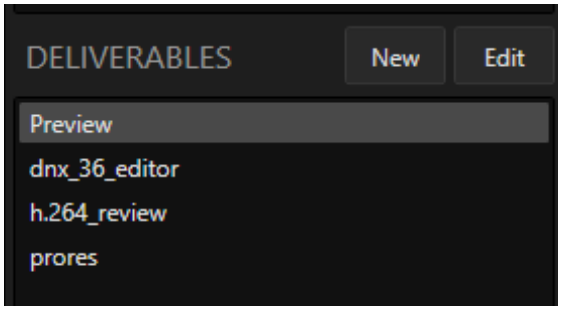
Enter the Workflow Name and, if desired, a description.

To use the default Burn-in for the Preview Deliverable, enable the checkbox.



Deliverables

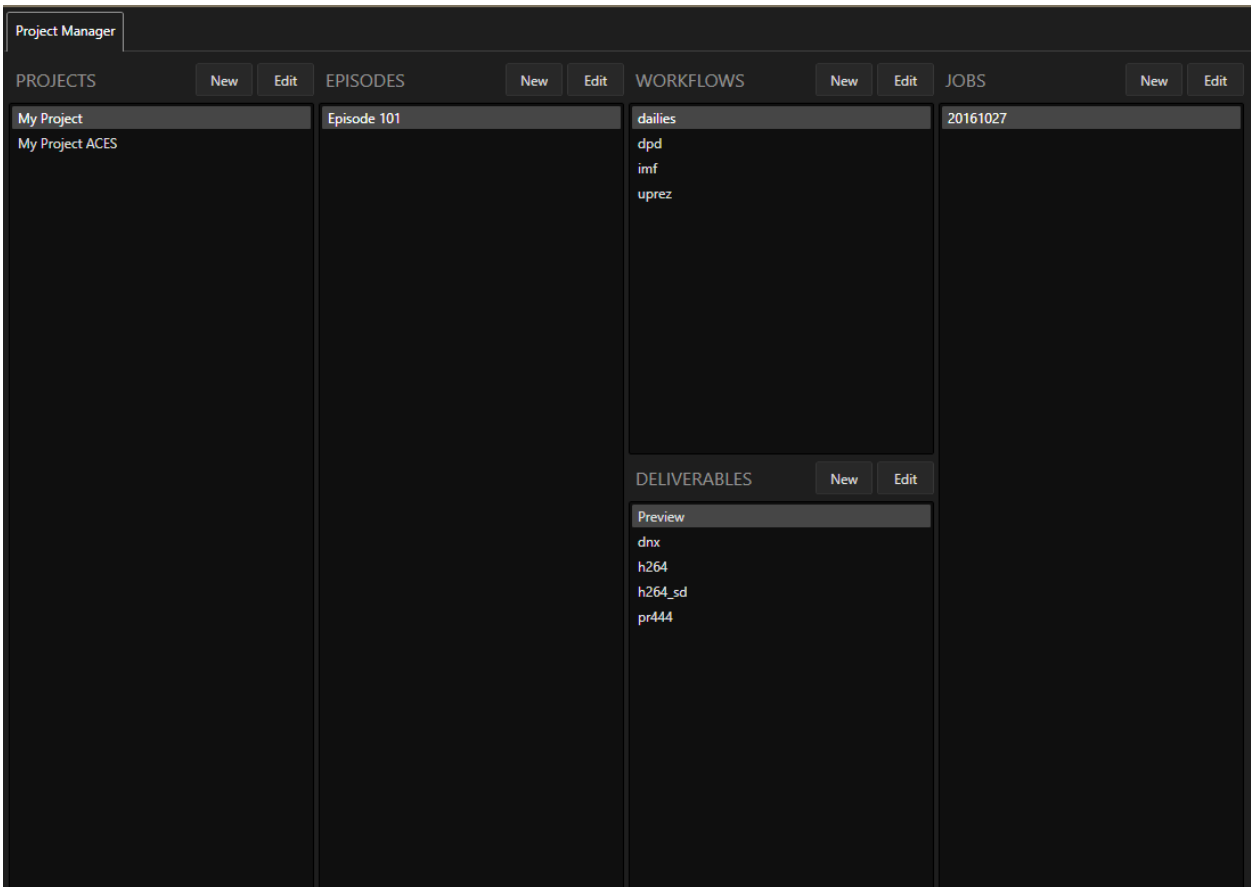
A Deliverable is associated with a Workflow and consists of a configuration of codec parameters that satisfies a specific delivery purpose, such as a H.264 file for customer review. The Preview Deliverable is used for viewing only and is created using basic properties, which can be modified if desired.



How to Create a Deliverable Configuration

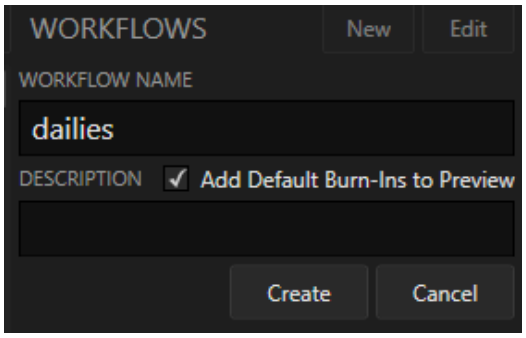
Deliverable Configuration Editor

The Configuration Editor is divided into four basic sections: Encoding, Color, Audio, and Burns Canvas.



The Preview Deliverable

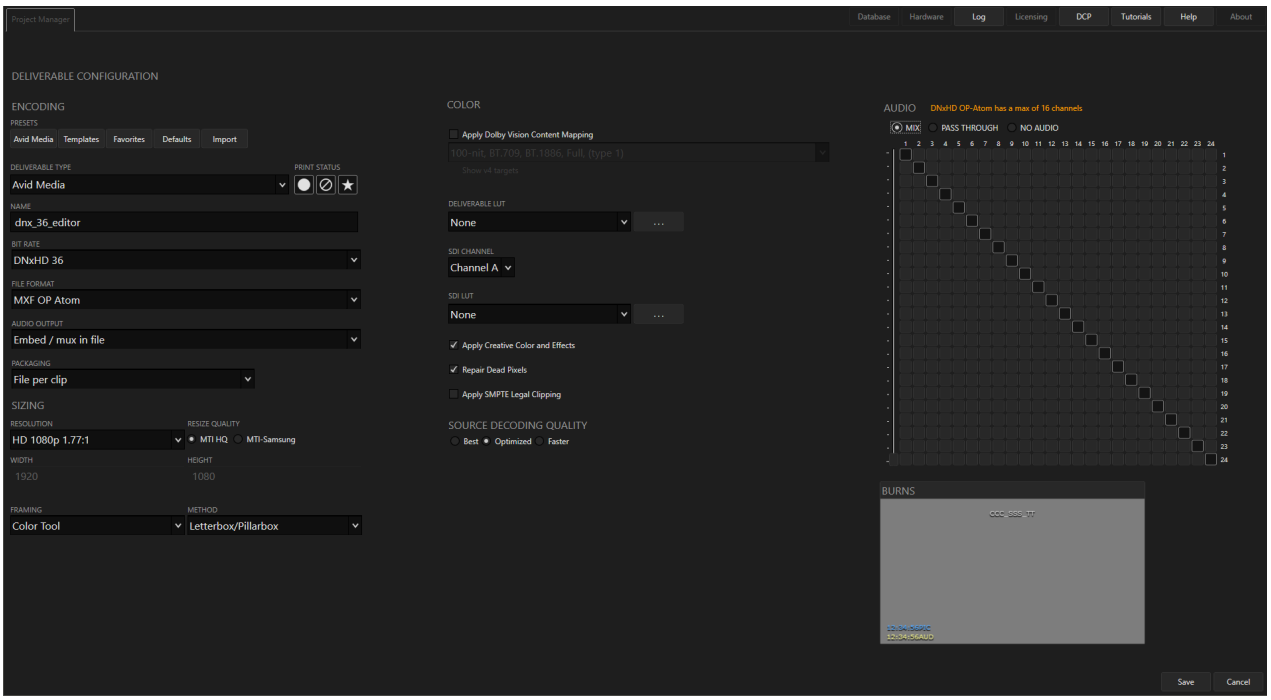
The Preview Deliverable is automatically created for each Workflow with default properties, which include
No Resize for picture, Pass Through for sound, and a standard set of graphical burn-ins if the Workflow checkbox for the burn-ins is enabled. It is designed to preview picture and sound as recorded. You can modify the Preview, but it can not be deleted or used for rendering.

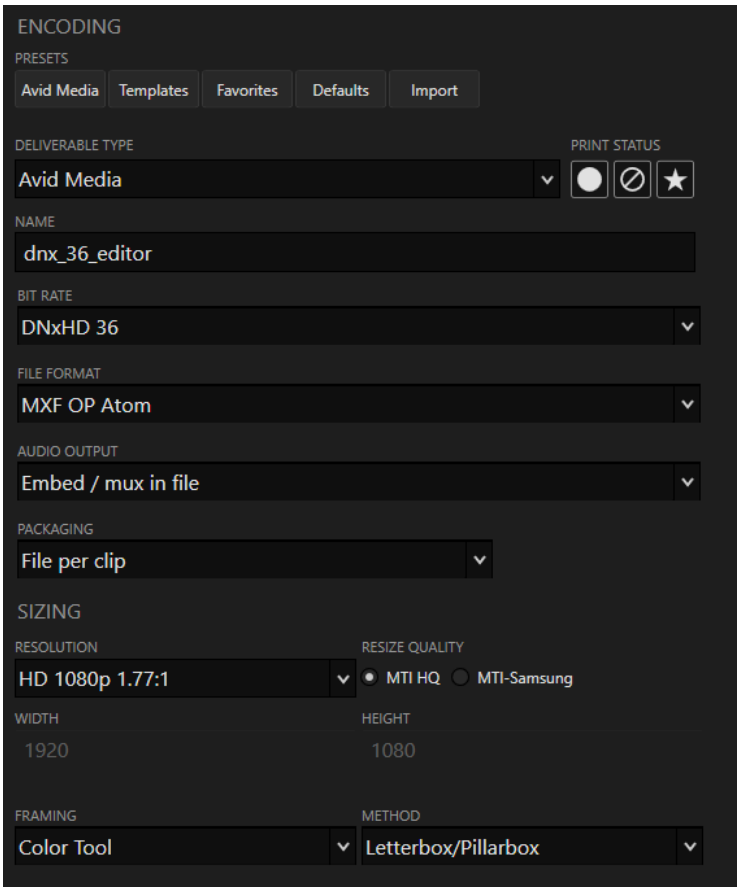


Encoding Section

In the Encoding section, all fields required for profiling and formatting the file are available.

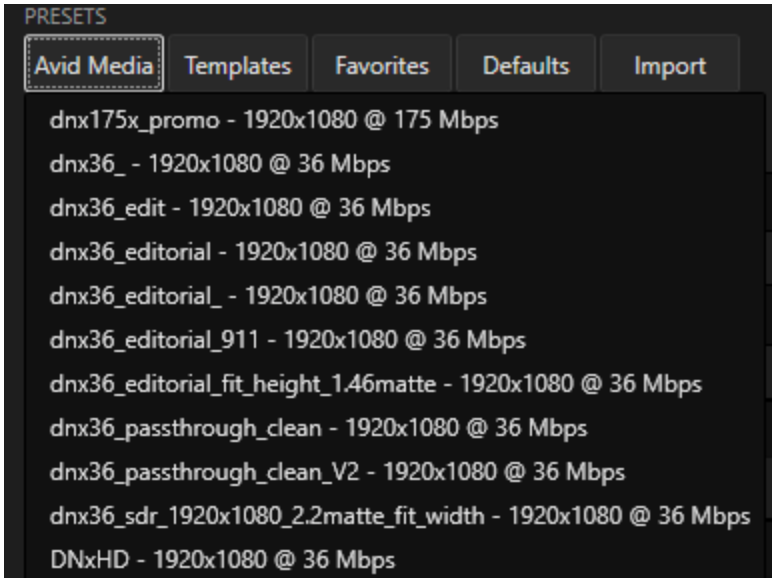
Note: If a codec is greyed out then a license must be purchased for it.





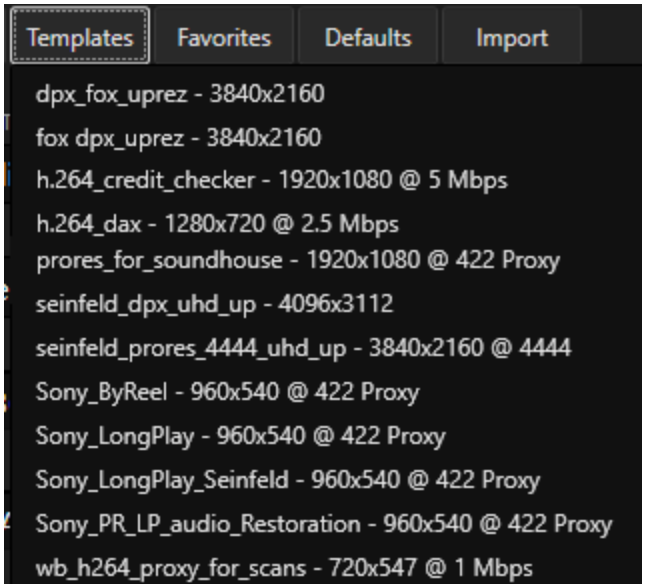
Presets

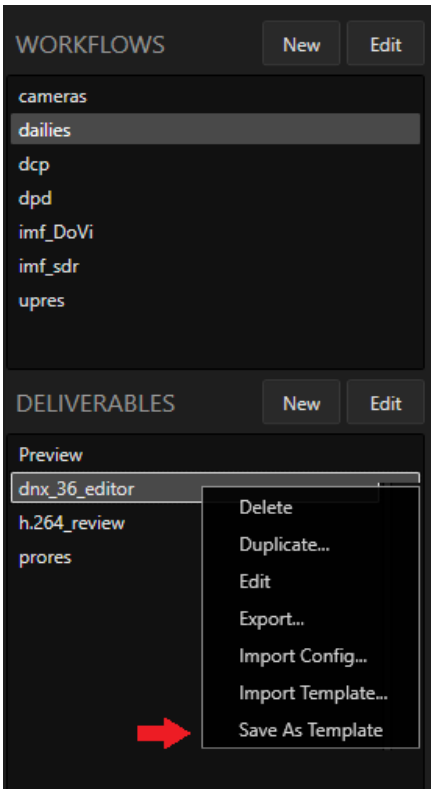
At the top of the Encoding Section are the Presets Drop-down buttons. The first button will be named and contain a quick view of the codecs last created for the selected “Deliverable Type”.



Templates

The Templates list is created by Right-clicking on a Deliverable in the Deliverables section and choosing “Save As Template” in the Context Menu. Other options include Exporting and Renaming Templates.



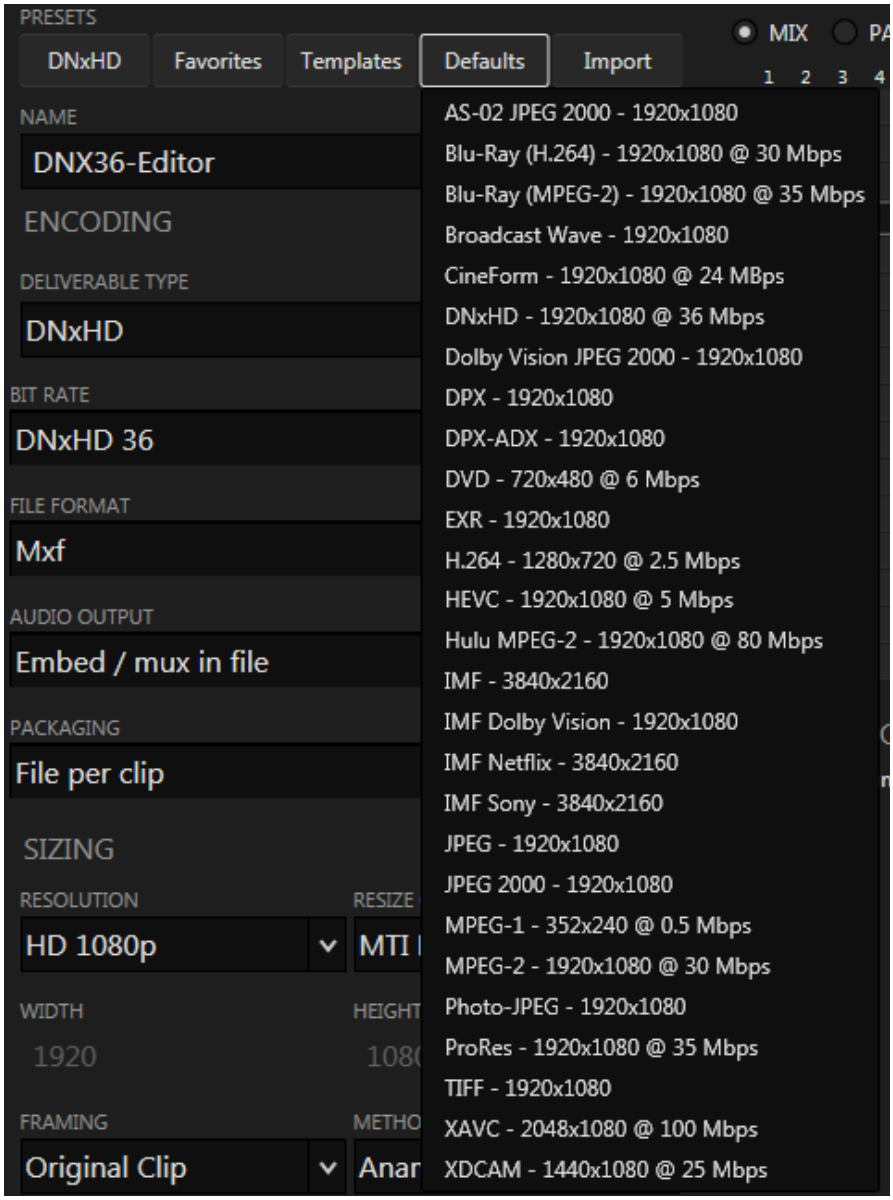


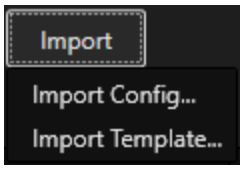
Favorites

Favorites consists of a list of user defined configurations tagged as “Favorite” from the Templates list. Right-click on the Template configuration and choose “Add to Favorites”.

Defaults

The Defaults provide a quick view of the most frequently used output codecs.





Import

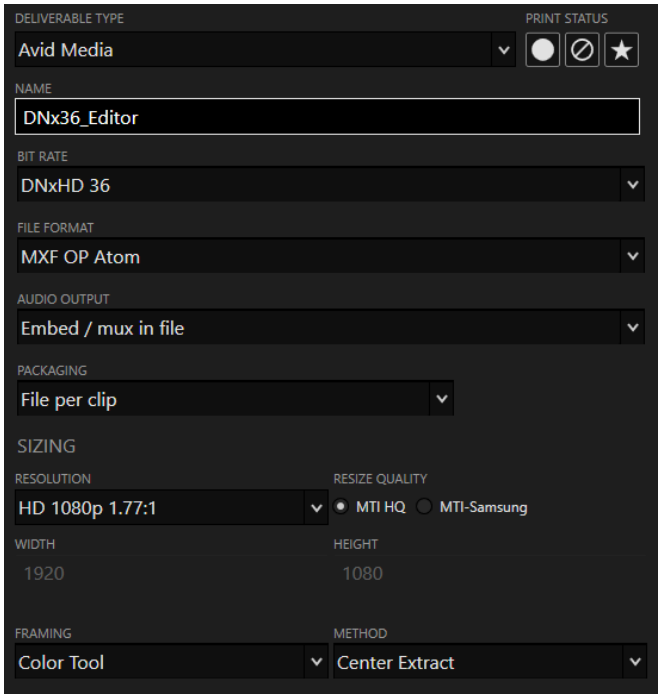
The Import button provides the option to import a configuration or template that was exported from a Cortex workstation not attached to the current database.

Encoding

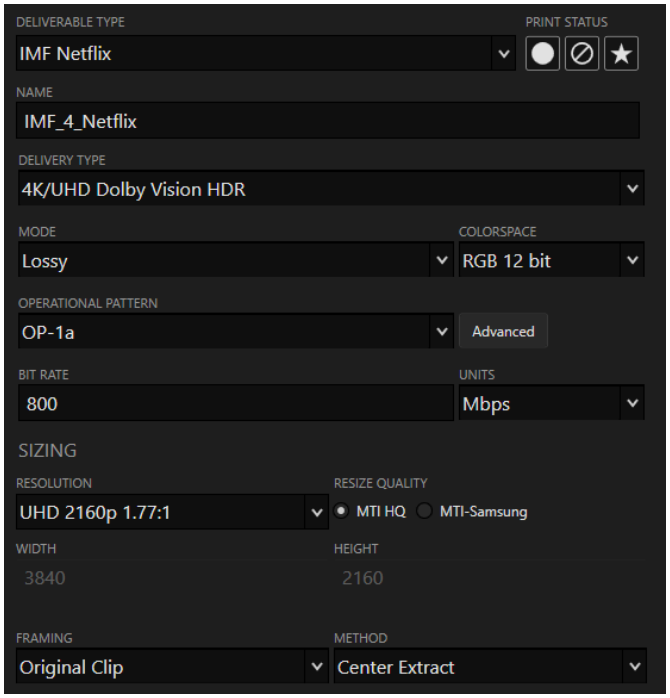
Fill in the fields as indicated:

DELIVERABLE TYPE. Select the Deliverable Type from the Drop-down list. The Deliverable Type determines the available encoding options.

NAME. Enter the name you wish to associate with the Deliverable. For example, DNx36_Editor would indicate that the Deliverable is intended for the edit room.



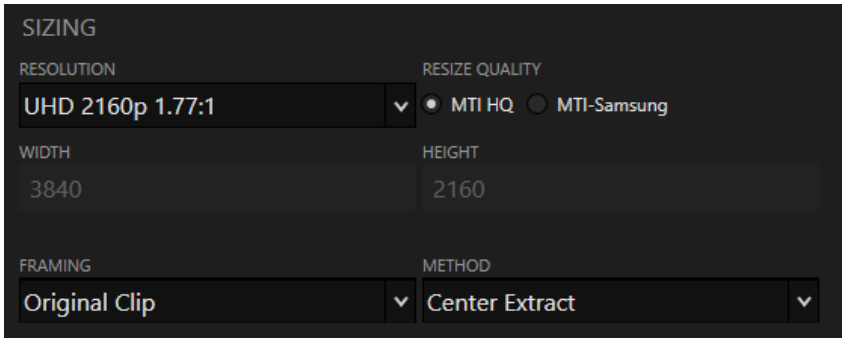
DNx36 encoding options



UHD IMF Netflix HDR encoding options

Sizing

In the Sizing section choose the RESOLUTION, RESIZE QUALITY, FRAMING, and framing METHOD. The choices for resolution are determined by the selected codec. If “Don’t Resize” is selected for resolution, the Resize Quality, Framing, and Method fields will be hidden. For Resize Quality, MTI HQ comes standard in Cortex. MTI-Samsung is included with Enterprise only.



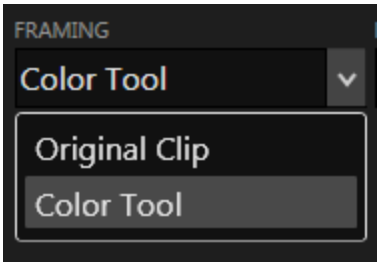
MTI HQ

MTI HQ provides a high quality up and down rescaler that can be used for projects requiring faster and higher throughput. MTI HQ can be used on frame and field-based media.

MTI-Samsung

MTI-Samsung is a frame-based rescaler that produces high quality results that requires more time for processing. MTI-Samsung has proven very successful for animation projects and is the preferred rescaler by several content owners. MTI-Samsung only works with frame-based media.

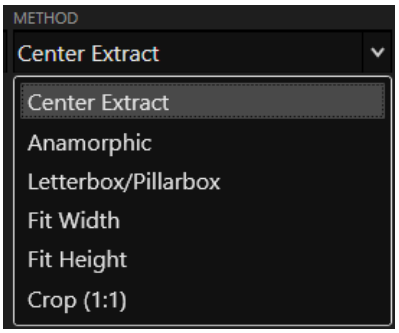
Framing



There are two choices to decide which framing settings will be used during the resizing of the Deliverable.

1. Original clip - If no change to the input framing is desired, choose this option. Cortex will resize the media for this Deliverable based on the original frame size and aspect ratio of the source clip.
2. Color Tool - This option allows use of the framing module in the Color Tool, which provides the ability to modify framing with Zoom, Vertical and Horizontal positioning, Flip for both horizontal and vertical directions, and Aspect.
    a. For Quibi projects, rotation is provided for clockwise and counterclockwise positioning.

Method



There are six choices for the method by which Cortex will resize media for a Deliverable:

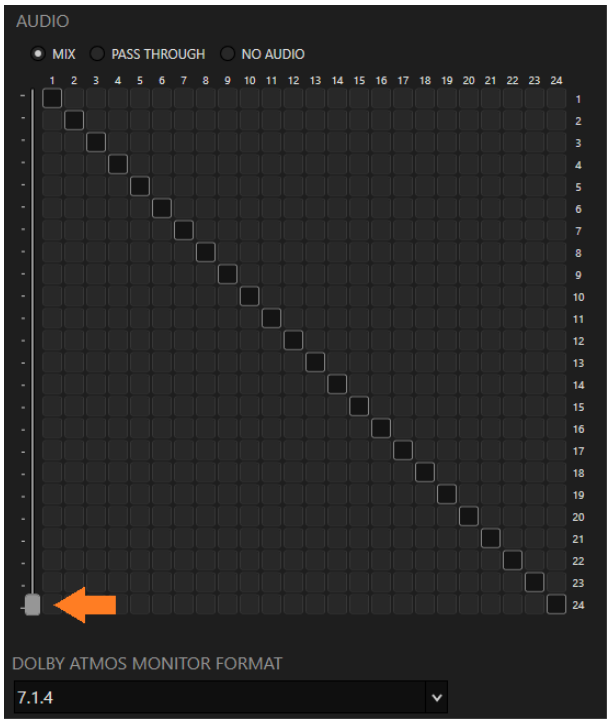
1. Center Extract - Cortex will extract an image based upon the Deliverable's aspect ratio using the source's center point.
2. Anamorphic - Cortex will compress or stretch the image to match the desired new Deliverable size.
3. Letterbox/Pillarbox - Cortex will add letterbox or pillarbox bars to the image to compensate if necessary for the new Deliverable size. This choice never crops the image.
4. Fit Width uses the sides of the source image and fits them to the Deliverable's sides
5. Fit Height uses the top and bottom of the source image and fits them to the Deliverable's top and bottom.
6. Crop (1:1) will calculate a horizontal and vertical pixel count in order to present a pixel to pixel view based upon the resolution of the target monitor's viewing area.

Method Example:

An example of how to use the framing Method to properly frame an anamorphic 2:39 image into a Deliverable with a 1:78 aspect ratio is to choose the Letterbox option. Cortex will automatically frame the picture into the 1:78 canvas within a letterbox with black on the top and bottom. Framing and Method are interactive so it is important to experiment with different combinations of source and Deliverable aspect ratios to fully understand the process of making correct choices.

Audio

The audio for each Deliverable can be configured uniquely. The Audio Mixer is a 24 by 24 matrix of Source Audio tracks along the top and Destination Audio tracks along the right-hand side. There are 3 available modes:



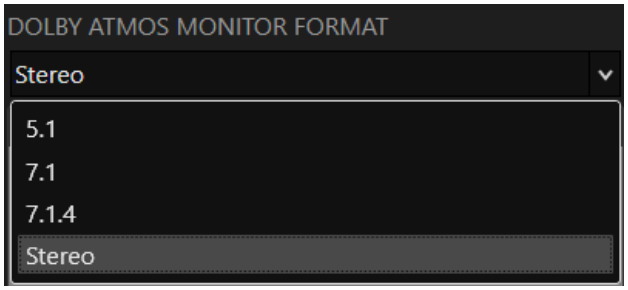
1. Mix - In Mix mode all channels are available. Use the handle located at the bottom left to eliminate or add tracks by sliding it up or down, or click on the track buttons you wish to silence.

2. Pass Through - Pass Through will pass the audio to the Deliverable as it was recorded on the source.

3. No Audio - No Audio will pass silence.

Once the Deliverable is fully configured, click the Create button located on the lower right.

Dolby Atmos®

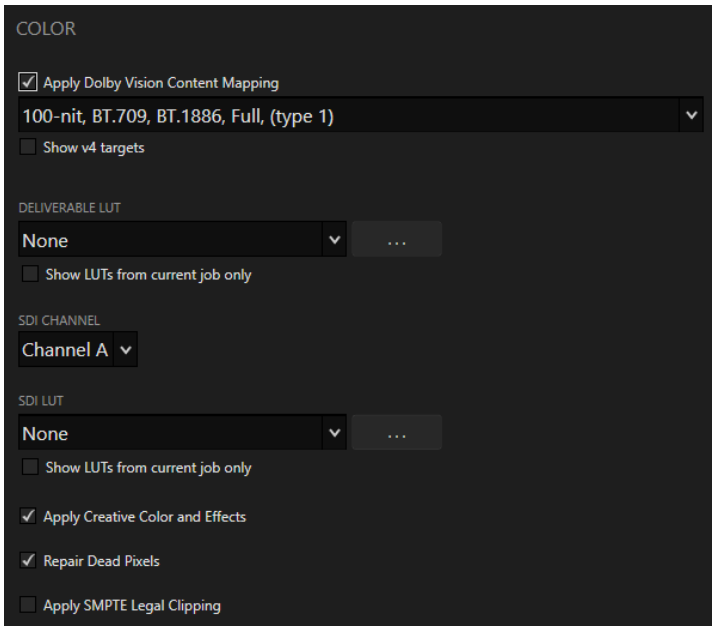


If your Cortex Enterprise edition is licensed for the Dolby Vision™ option, it will also be licensed for Dolby Atmos®. There are three Dolby Atmos® file types, all of which contain a series of potential Monitor Formats. The ADM BWF is essentially a broadcast wave file with Atmos metadata. The IAB MXF file is the Atmos bitstream wrapped in a MXF file, which is currently used for IMF creation. The DAMF is the Dolby Atmos® Master Format, consisting of 3 files. The one used for import is the .atmos file. Depending on the chosen Deliverable Type, a Monitor Format, derived from the file, can be assigned to it. Be careful to choose the Monitor Format that conforms to the number of channels the Deliverable Type supports.

For certain Deliverables, like an IMF, the Atmos file is simply passed through without the ability to configure it.

Color Section

The Color Section contains fields that impact the color pipeline of a Deliverable.
If the project is created with “No ACES Support”, there’s a choice for applying Dolby Vision™ content mapping for compositions containing Dolby Vision metadata, two LUT options and three color utility checkboxes.



Deliverable LUT

Apply a specific LUT that only affects the Deliverable’s color pipeline.

SDI LUT

Apply a LUT to the SDI color pipeline without affecting the color of the Deliverable.

SDI Channel

Assign an SDI Channel for video output. Cortex offers two SDI channels allowing for simultaneous streaming of two different deliverables such as Dolby Vision HDR and SDR signals. Note that this only works in concurrence with a video card with two SDI channels, such as a Aja Kona 5.

Apply Creative Color Correction

Enable this checkbox if you wish to render color decisions made in the Color Tool.

Repair Dead Pixels

For jobs where Dead Pixel Detection was processed, enable this checkbox to apply the corrections.

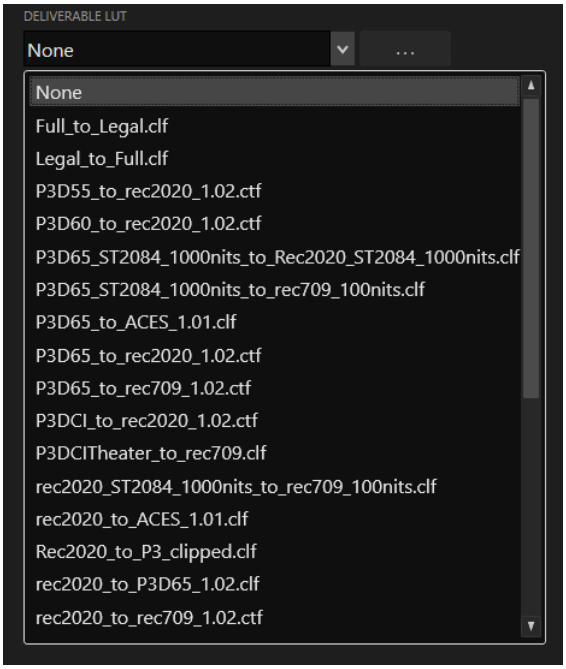
Apply SMPTE Legal Clipping

With this checkbox enabled, white and black values will be clipped to absolute SMPTE legal levels.

Note: Dead Pixel Correction is only available in the Enterprise edition of Cortex. QC and Dailies can detect dead pixels in both clips and compositions, but cannot render corrections. Cortex DIT and Cortex DIT+ can detect dead pixels in source clips only.

Included LUTs

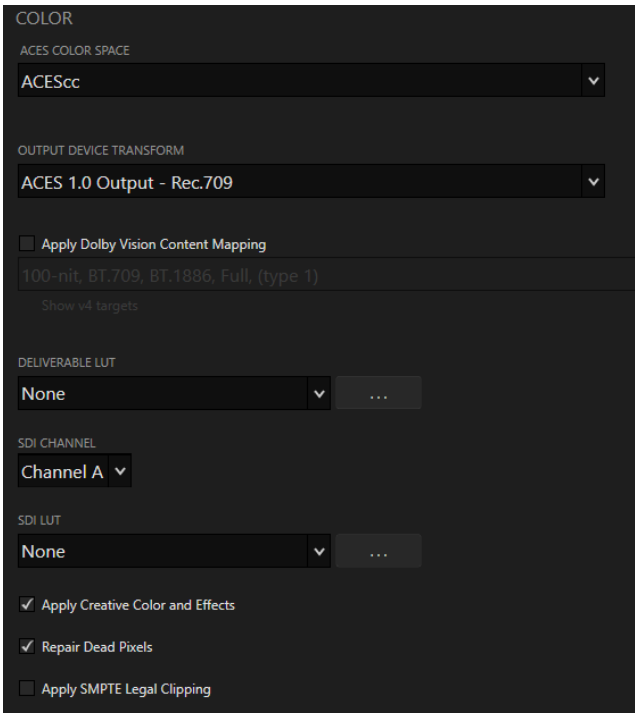
Cortex provides more than 25 different LUTs and color transforms.



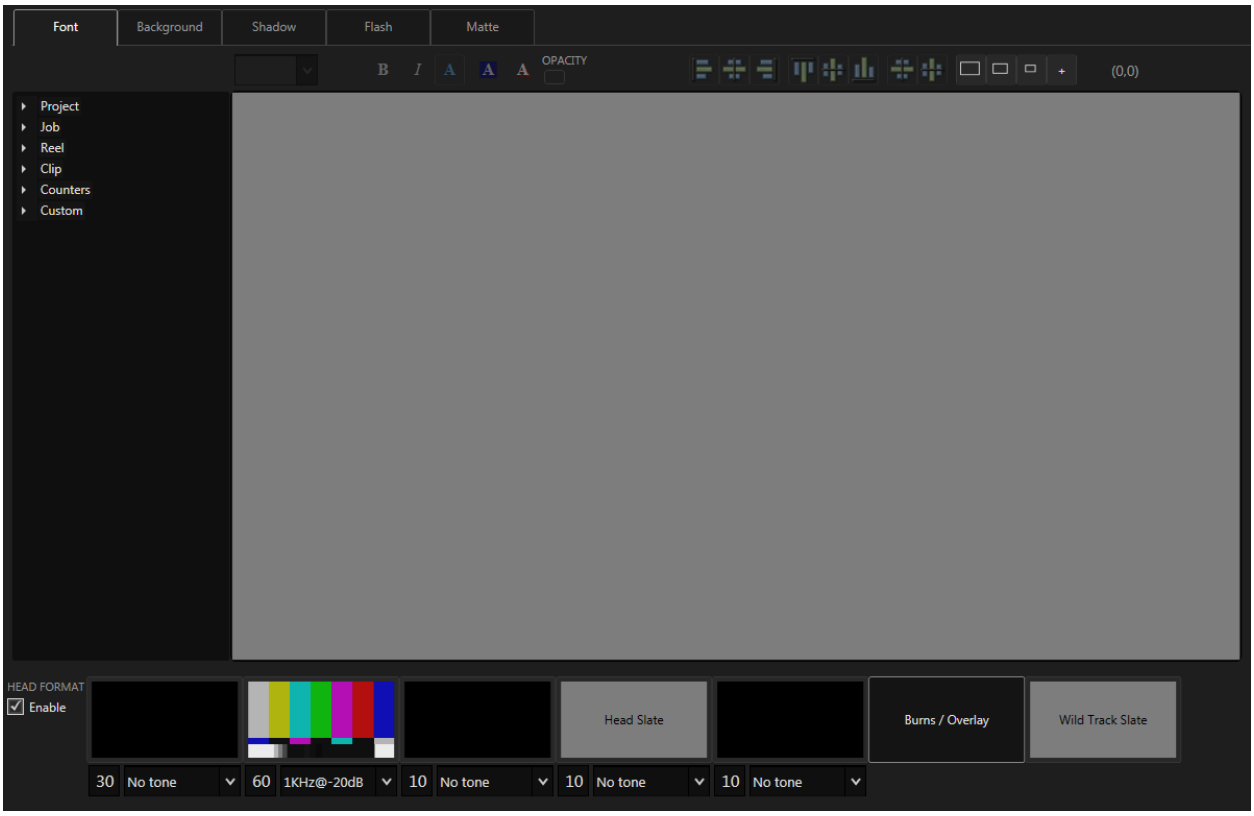
ACES

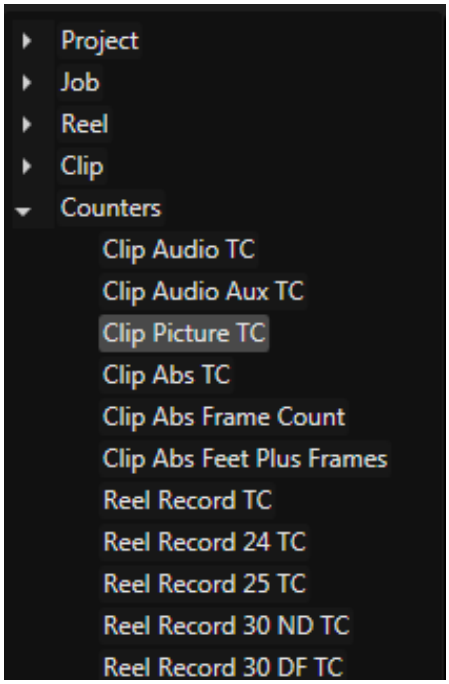
If the project is created with ACES Support, the ACES Colorspace and Output Device Transform fields are provided.

Cortex supports ACES versions 1.0 and 1.1 and all standard ACES Output Transforms.



Working with the Burns Canvas for Metadata





To access the Burn Canvas, click the small BURN alias in the lower right corner. The canvas will go to full screen.

If a Job is open and a source clip is selected, the picture will show up on the canvas. You can then use the SIZING METHOD drop-down field located on the lower right of the UI to select a framing method.

Most of the metadata fields available throughout the Cortex application can be “burned in” using the character sets available on the Canvas. Each Category, for example Counters, has a unique set of metadata burn-ins that can be placed onto the canvas. Click on the triangle immediately to the left of the Category to display the complete list.

To place a burn-in onto the canvas, left click on it and drag it to the desired position on the Canvas.

There are a number of ways to change the properties of a burn-in. The properties are as follows:

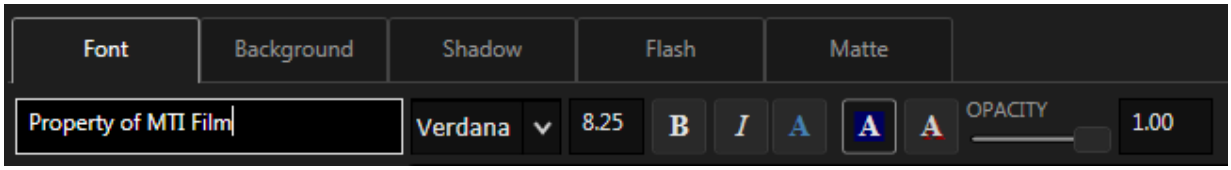
1. Font
2. Background
3. Shadow
4. Flash
5. Matte

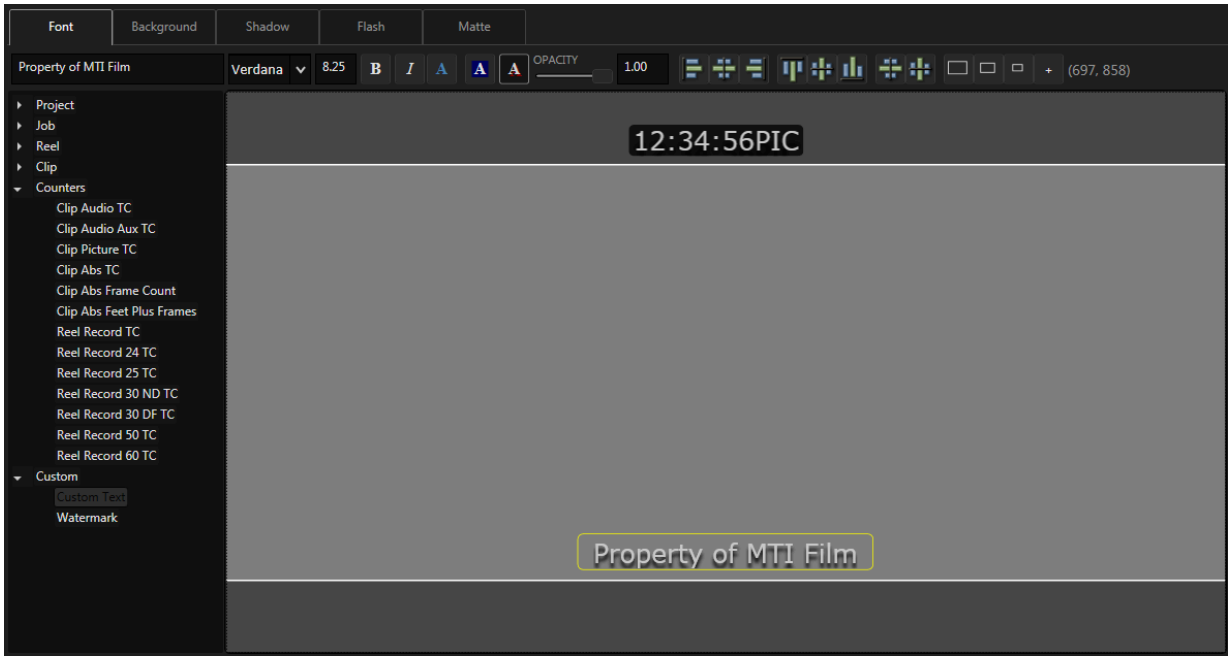
Once a burn-in is positioned on the canvas and selected (indicated by a yellow border) its properties can be modified. You can select one or more metadata burns to modify but at least one must be selected to affect a change.

Font

The Font tab contains variables such as style and size. It also has the ability to quickly add Background and Shadow properties with default values.

Dragging a “Custom Text” burn-in from the “Custom” category and typing into the text field will populate the burn-in with the entered text.

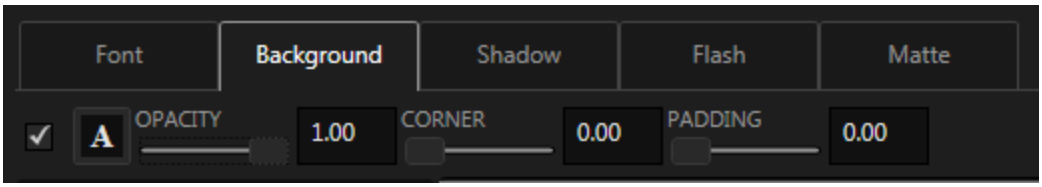




Use the alignment controls for centering and spacing horizontally and vertically.

For complete control of all variables of the burn-in property choose its corresponding tab:

Background



The Background property tab includes the following variables:

1. Color - Click the “A” button to open a color selection window.
2. Opacity
3. Corner - from angular to rounded.
4. Padding - the vertical size of the background.

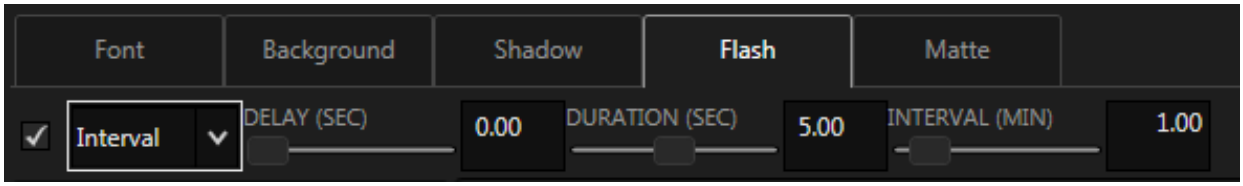
Shadow

The Shadow property tab includes the following variables:

1. Color - click the button to open a color selection window.
2. Opacity - use the slider to determine the transparency of the shadow
3. Blur - the degree the shadow is blurred
4. Depth - the distance from the font at which the shadow is applied
5. Angle - the position of the shadow relative to the font

Flash

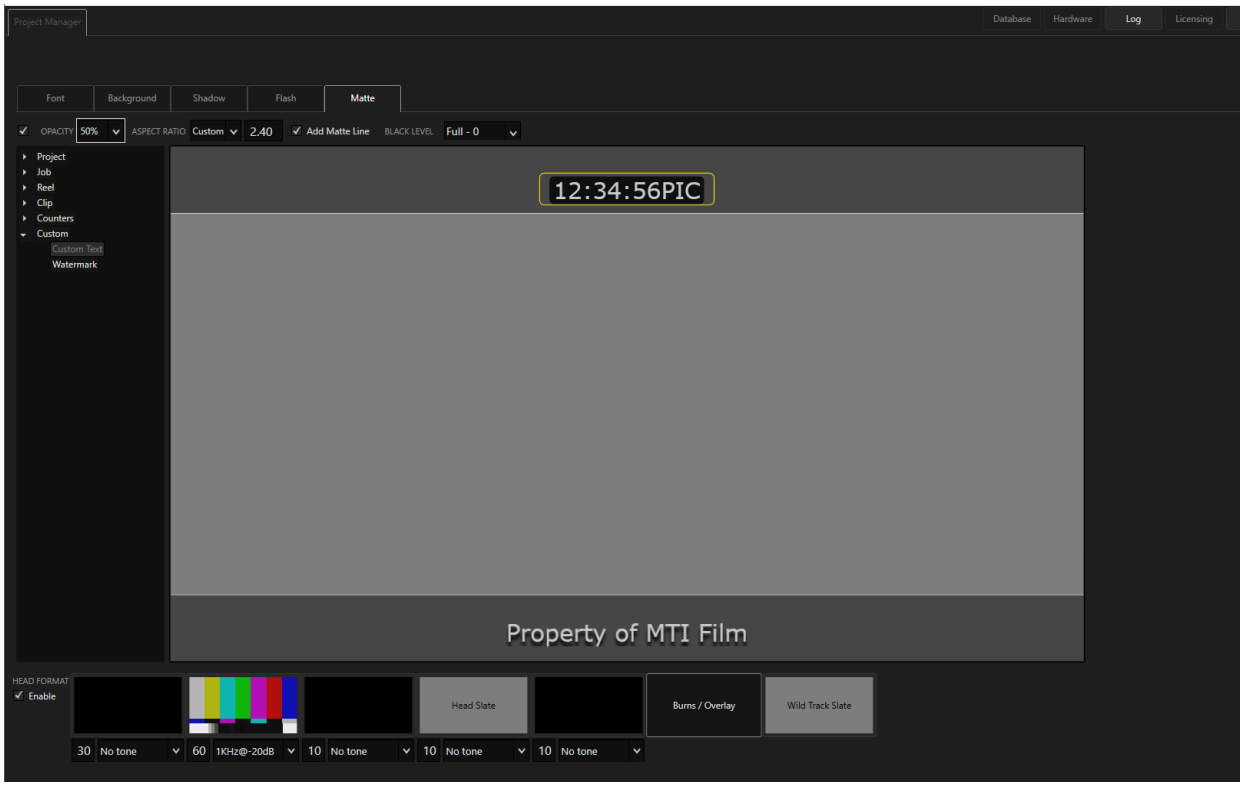
The Flash property tab controls the visibility of the burn-in. There are four possible visibility choices, each with a default duration, which can be adjusted.



1. Head - will flash at the head from the first frame of picture
2. Head and Tail - will flash at the head from the first frame of picture, and at the tail beginning at the frame calculated by the last frame of picture minus the assigned Duration.
3. Interval - will flash at the first frame of picture offset by the Delay value (default is 0 so it will be visible at the first frame of the clip); it will cut on and remain visible for the Duration, which defaults to 5 seconds, at intervals defined by the assigned value, which defaults to 1 minute.
4. Tail - will flash at the tail beginning at the frame calculated by the last frame of picture minus the assigned Duration.

Matte

The Matte property tab provides the ability to superimpose a graphical display of popular and custom aspect ratios with controls for transparency and whether to add a line at the matte edge.

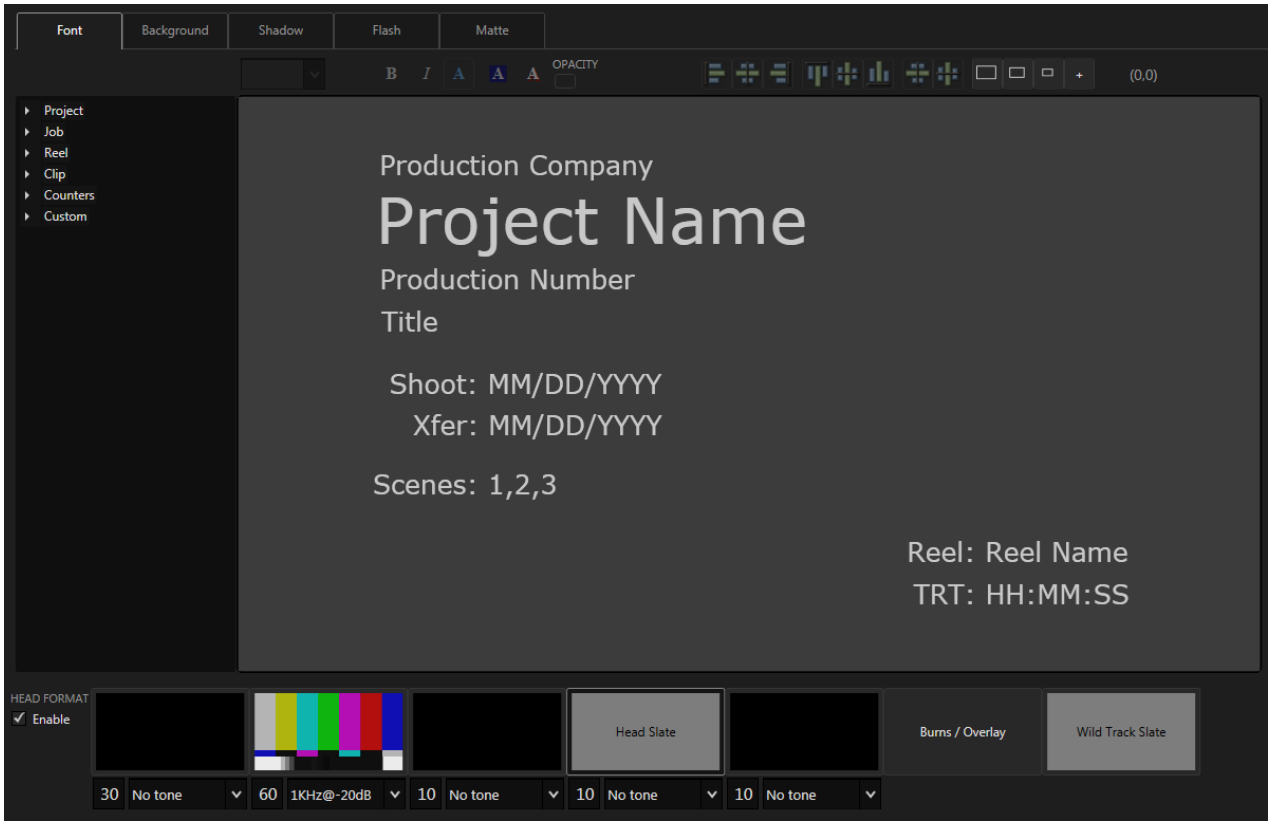


Head

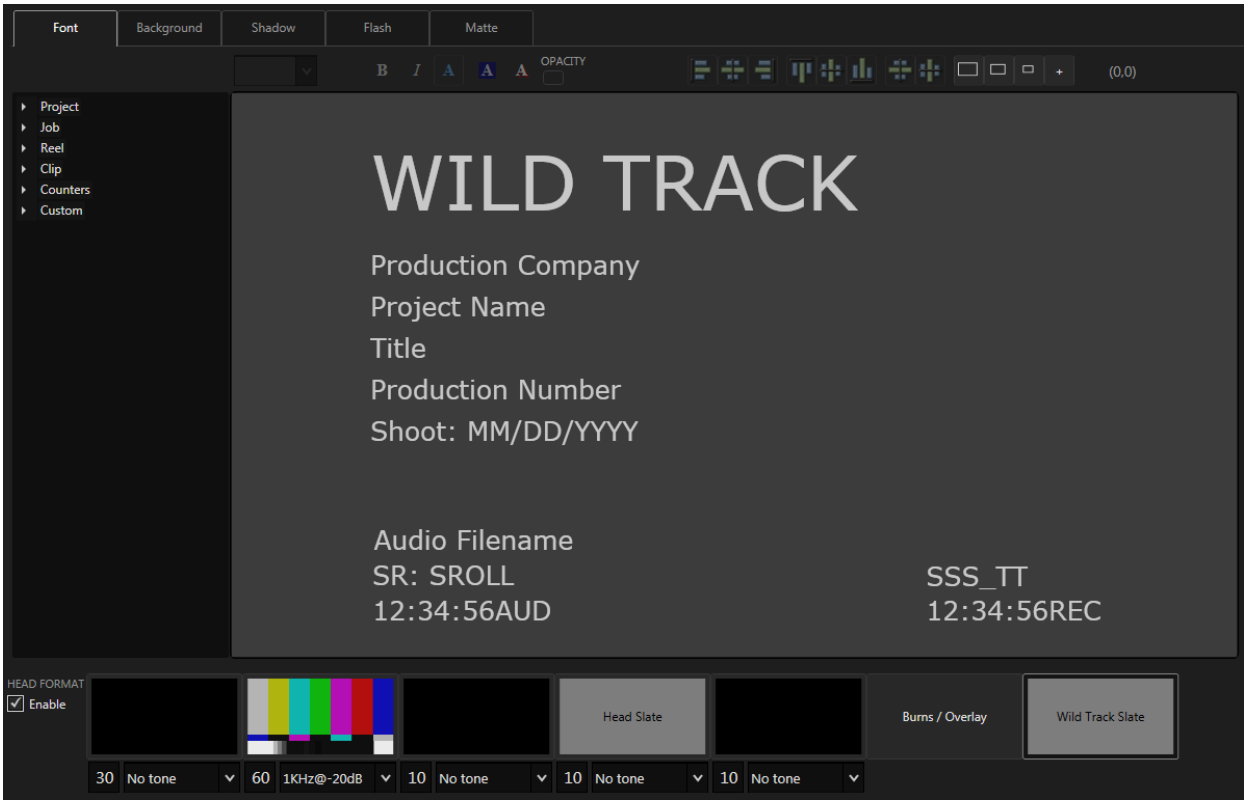
Format

For reels that are comprised of a single file (i.e. DVD), head formatting is often desired including bars, black, and slate. Enable the Head Format checkbox to define the duration of each segment by entering a value, in seconds, for each. To bypass a segment, enter 0.

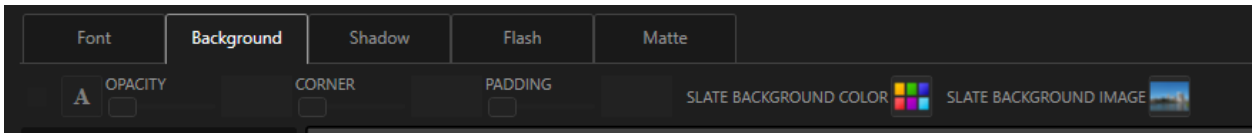
The Head Slate has a default configuration of burn-ins, which can be modified as desired.



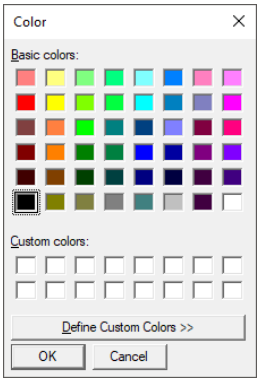
The Wild Track Slate has a default configuration, which can be modified as desired.



Changing the Background Color or Importing a Background Image for Slates



The Slate Background Color or Background Image can be changed by clicking their associated icon button. Clicking the Background Color button will open a color palette. Clicking the Background Image will open a browser for the image selection.

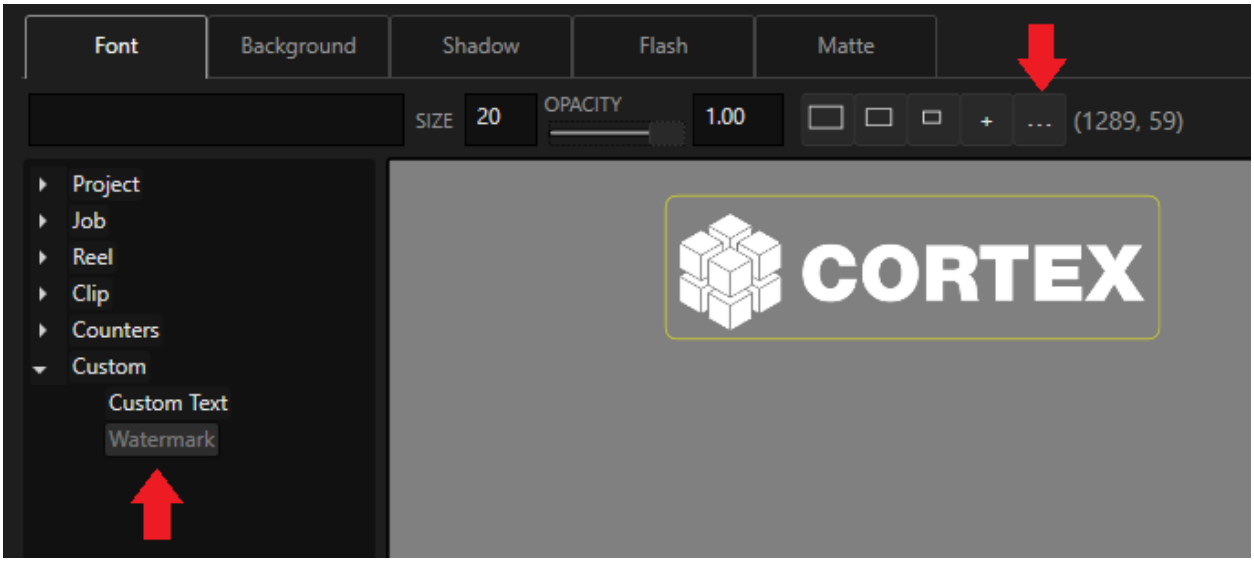


Click on the Burns/Overlay button to return to the current canvas configuration.

Adding a Watermark Graphic

To add a graphic, such as a logo:

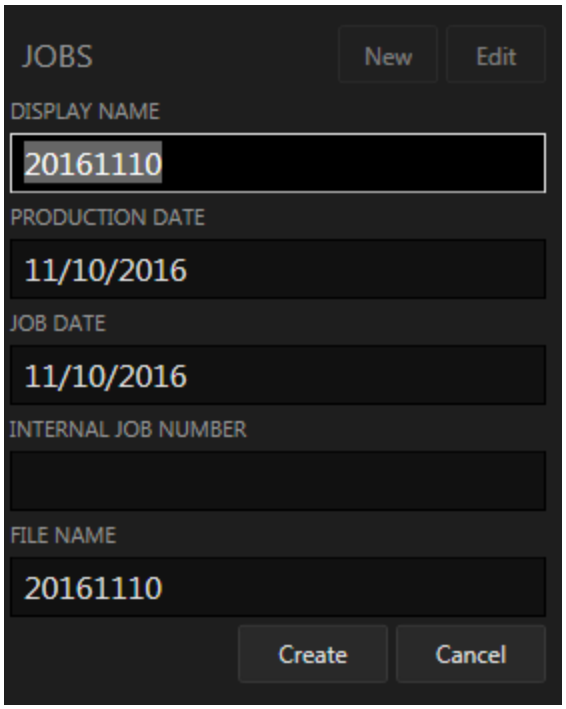
1. Click on the Watermark option under the Custom category.
2. Drag it onto the canvas. It will appear as the Cortex logo.
3. Click the … browse button on the Font tab. A browser window will open.
4. Choose your graphic file and click Open.
5. The Cortex Logo will change to your chosen graphic.



Once all the burns are in place and finalized, click the OK button on the lower right of the UI to save the layout.

Creating a Job

In the Jobs section of the project manager, click the New button



By default, a name is automatically created based upon the project convention default. You may change it to anything you wish.

Fill in the remaining fields as desired.

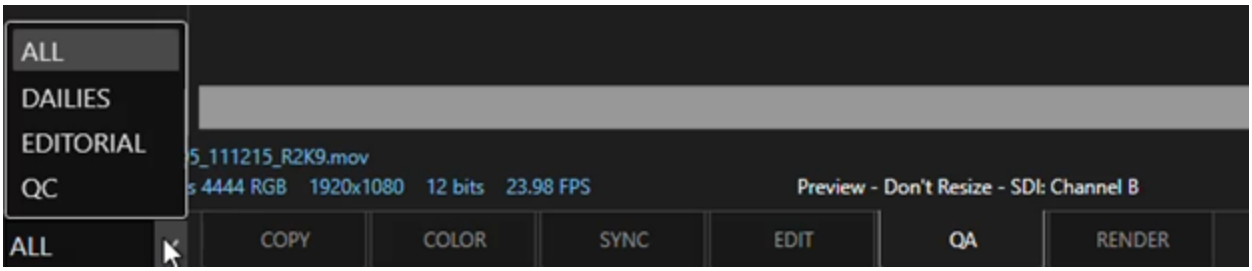
The FILE NAME folder for this Job will be automatically created based upon the Display Name and will be part of the Deliverable directory path.

Click Create and the new job will be loaded.

Workspaces

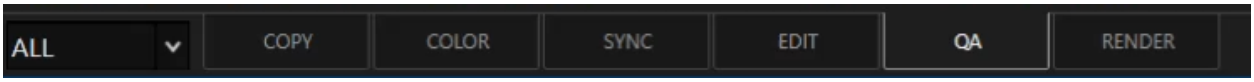
A Workspace determines the visibility and behavior of the tools necessary to perform functions related to the three major post-production tasks served by Cortex: Dailies, Editorial and Quality Control.

The workspaces can be found in the bottom left corner of the application in a drop-down menu where you can choose one of four options: ALL, DAILIES, EDITORIAL, and QC.



Cortex is comprised of 6 tools: COPY, COLOR, SYNC, EDIT, QA, and RENDER. Depending on which edition you are currently running, certain tools and functions may be limited or restricted. The following information is based on the Enterprise Edition, wherein all the tools, functions and rendering options are included. For a comprehensive look at which tools and functions are included in each Edition, please refer to the Cortex Editions page of the manual. Cortex Editions

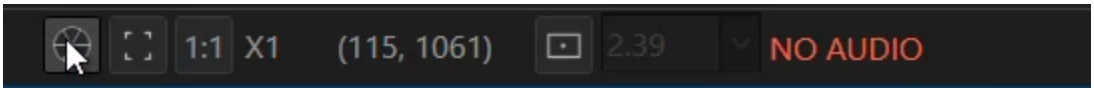
ALL



The All workspace enables the complete toolset in Cortex, making any task or function available to the operator. When in the Copy tool, you can choose one of three new tasks: Archive, Copy and MHL Verification. When in the Color, Sync, Edit, QA and Render Monitor Tools you can choose to create new reels in order to start a queue for file transcoding. When in the Edit Tool, you can create a variety of compositions, including DCP, IMF, and AS-11. Each composition has its own creation dialog that assists in determining the properties associated with the composition. As explained later, when in Hybrid Mode, The Color Tool can also create compositions.

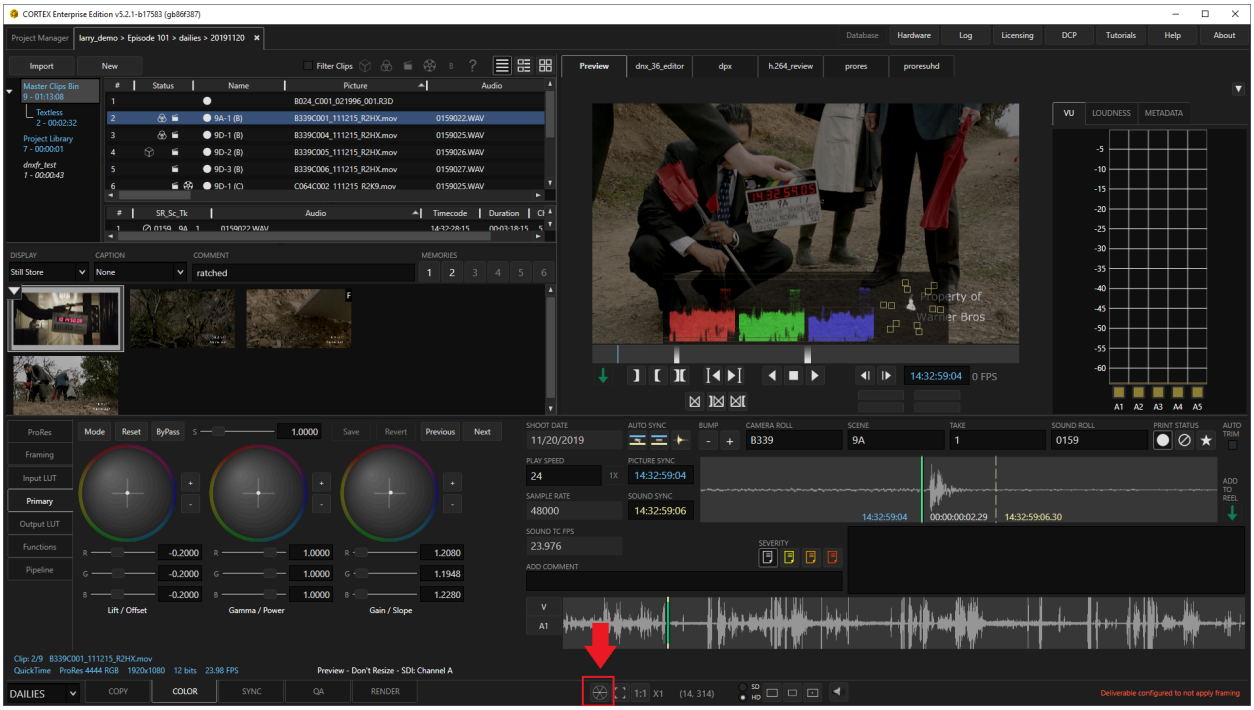
Dailies

The Dailies Workspace hides the Edit Tool, leaving only the tools required to complete daily operations. While in the **Color Tool**, the **Hybrid Mode** can be activated so the Color and Sync modules are accessible for concurrent syncing and coloring.



Pressing F12 or clicking the Vectorscope icon button at the bottom of the UI will activate the Hybrid Mode by relocating the Waveform/Vectorscope (WFM/VEC) to the Media Player and adding the required Sync Tool metadata fields in its place. Pressing F12 again cancels the Hybrid Mode.

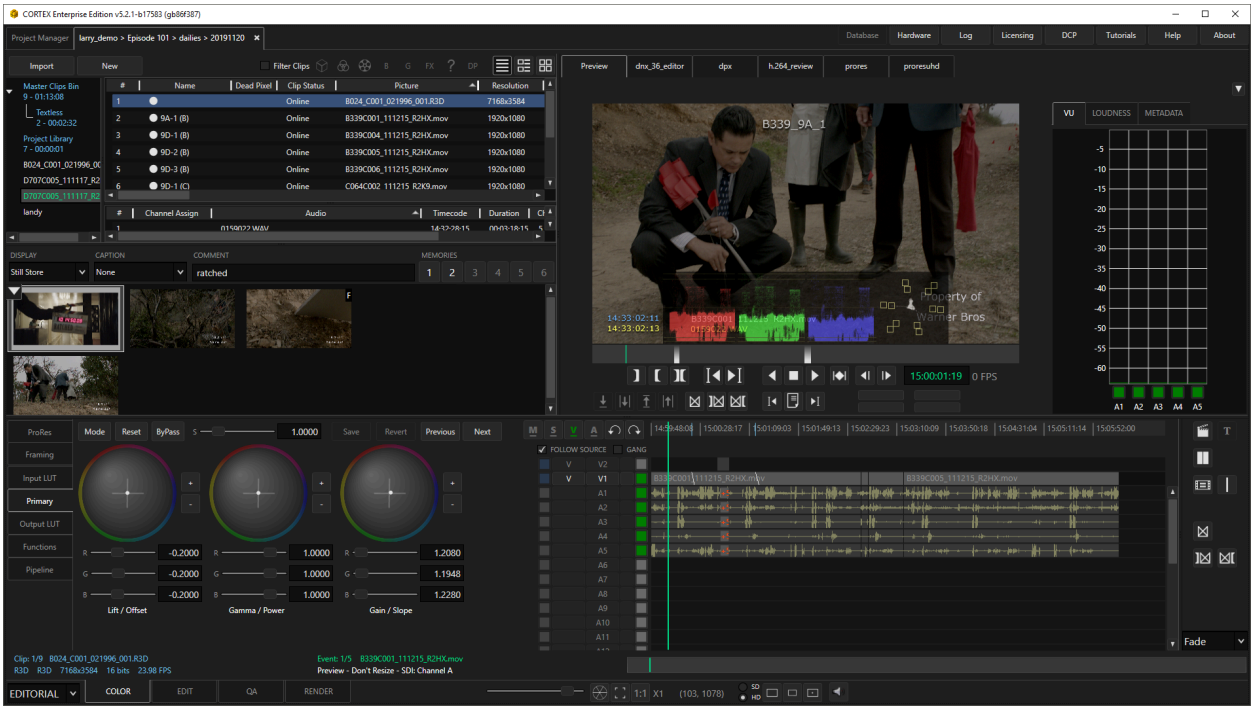
Pressing Shift+F12 hides the WFM/VEC during playback.
Ctrl+F12 toggles hide/show the WFM/VEC while in Hybrid Mode.
Ctrl+Shift+F12 unlocks and floats the WFM/VEC.



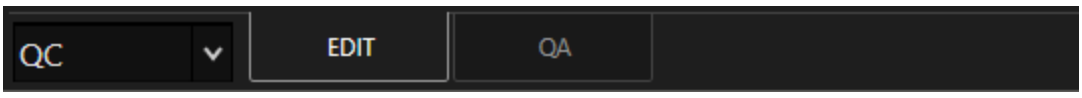
Editorial

The Editorial Workspace hides the Copy and Sync Tools, enabling only the Color, Edit, QA and Render Monitor Tools. In this workspace, while in the **Color tool,** a **Hybrid Mode** can be activated so both the Color modules and Edit Timeline are accessible. Pressing F12 or clicking the Vectorscope icon button will activate the Hybrid Mode. Pressing F12 again cancels the Hybrid Mode.

Pressing Alt+F12 cycles the WFM/VEC and the Mark Window from the Sync Tool
Pressing Shift+F12 hides the WFM/VEC during playback.
Ctrl+F12 toggles hide/show the WFM/VEC while in Hybrid Mode.
Ctrl+Shift+F12 unlocks and floats the WFM/VEC.



QC



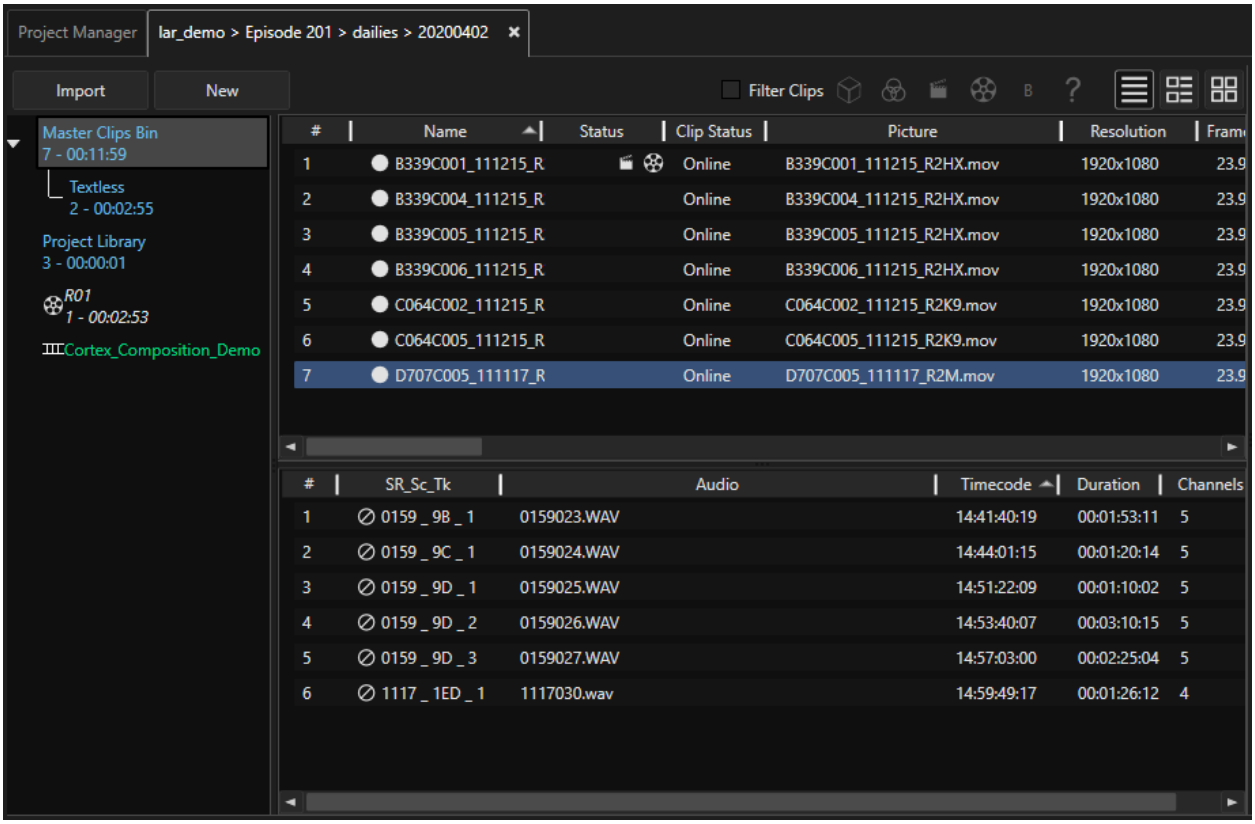
The QC workspace only enables the Edit and QA tools where one can perform a variety of tasks including Dead Pixel Detection and Correction, image and audio analysis, IMF and Dolby Vision™ validation and system performance evaluation.

The Parts of the UI

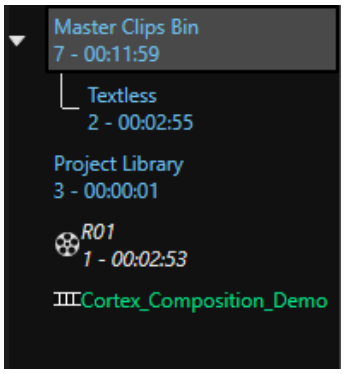
Each tool has its own distinct UI that accommodates its intended use. There are some common parts as per below:

The Master Clip Bin

The Master Clip Bin displays all picture clips. The Audio Bin is visible in the Sync and Edit tools.



The Bin Sidebar



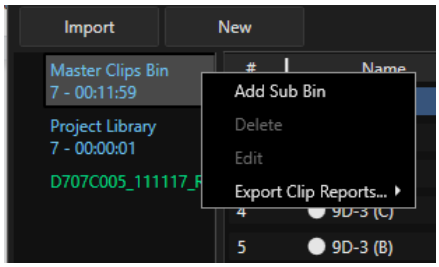
The Bin Sidebar changes the Bin View:

- **Master Clips Bin** - Displays the clips in current Job
- **Sub Bin** - Displays clips in the selected Sub Bin.
- **Project Library** - Displays all clips added to Project Library and any slates created in Corte**x.**
- **Reels** - All Reels in the current job are listed. Click on any Reel to change to Reel Bin view. The green highlighted Reel is the currently open and active Reel.
- **Files** - A list of Copy Task files in the Job and their Manifest verification status.
- **Copy Tasks** - All Copy Jobs will be listed here. Click on the Job to display a list of files that were copied during the Job.
- **Compositions** - All Compositions created in Cortex.

If focused on a composition or reel, pressing the Q or J keys switches to the Master Clips Bin. Pressing Q or J keys repeatedly cycles between the Master Clips Bin and the Project Library. If focused on the Master Clips Bin or Project Library, pressing the W or K keys switches to the Master Clips Bin. Pressing the W or K keys repeatedly cycles between Compositions.

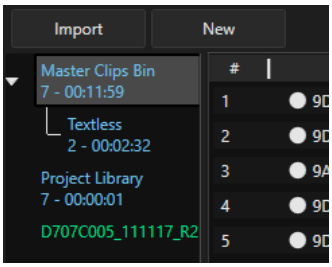
Sub-Bins

For organizing purposes, if you wish to segregate clips, you can create Sub-Bins.



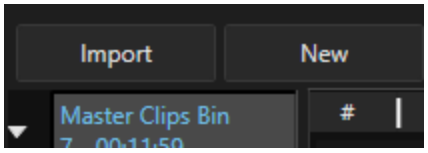
Right click on the Master Clips Bin and select: **Add Sub Bin**

Name the Bin, click Create, and drag clips into it.



You can create as many Sub-Bins as required and drag any type of clip into it including audio clips.

“New” Menus



In the Copy Tool, New:

- **Archive Task** - Create a job to archive all media contained inside the current job.
- **Copy Task** - Create a new copy job to copy media from a source to up to 3 destinations.
- **MHL Verify Task -** Verify MHL files

In the Color, Sync,and Render Monitor Tools, New:

- **Clips Reel** - Create a new Clips Reel for adding source clips for rendering
- **Composition Reel** - Create a new Composition Reel for adding composition events for rendering

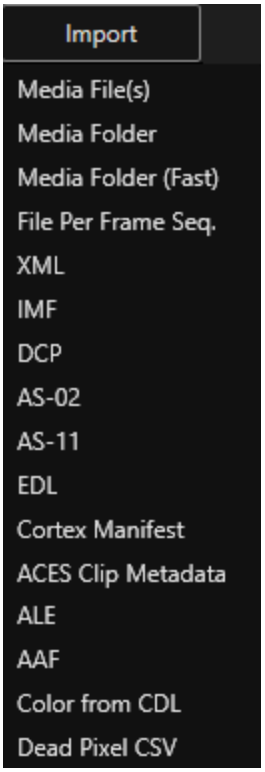
In the QA tool, New:

- **Composition Reel** - Create a new Composition Reel for adding composition events for rendering. This can be useful, for example, when used in conjunction with Dead Pixel Detection. After detecting and approving Dead Pixels for correction, if you only require certain shots to be rendered and you filter the event list by “Accepted Dead Pixels” you can add those events to a Composition Reel for rendering.

In the Edit Tool, New:

- **Composition** - Create a composition for editing in the Edit Tool
- **IMF Composition** - Create an IMF composition for assembly of an IMF Package
- **DCP Composition** - Create a DCP composition for either Interop or SMPTE DCPs
- **AS-11 Composition** - Create an AS-11 composition for assembly of an AS-11 Package
- **Composition Reel** - Create a new Composition Reel for adding composition events for rendering

Importing Media



For picture and audio media, you can drag media from their source folders into either of the bins. Cortex will then populate picture and audio media into their respective bins.

You can also **Import** media via a file browser for existing media on a storage network or create a **New Copy Task** to copy media from an external source to the storage network, which will automatically import into Cortex.#heading=h.z2zw24z5lmut

*NOTE: To learn about creating a **New Copy Task**, see the section on The Copy Tool*

"Import" Menu

- **Media File(s)** - Select specific file(s) to import into the Job
- **Media Folder** - Select an entire folder and all its subfolders to import into the Job
- **Media Folder (Fast)** - This mode is useful when a large amount of files need to be imported for VFX pulls, for example. It makes the import process faster since a "source extractor" is not applied.
- **File Per Frame Seq. -** Use this option to import file per frame sequence clips such as DPX, tiff, or Raw File sequences.
- **XML -** Import .xml files supported by Cortex including .cap, .tt and .ttml subtitle files for use in the edit tool with IMF or DCP Packages.
- **IMF** - Import an IMF package for QC and creating Supplementals.
- **AS-02** - Import an AS-02 package
- **AS-11 -** Import an AS-11 package
- **EDL** - Select an EDL to merge with a composition, or conform an edit with imported media.
- **Cortex Manifest** - Select a Cortex Manifest to relink and verify media files from jobs between systems (for example, a Manifest passed from on-set to post)
- **ACES Clip Metadata -** Here you can import ACES metadata, including color corrections and IDTs, for existing clips.
- **ALE** - Select an ALE to reconcile imported media
- **AAF** - Import an AAF sequence to conform with existing media. Currently supports cuts only.
- **Color from CDL** - CDL values are displayed as color bars in the **Imported CDLs** store in the color tool.
- **Dead Pixel CSV** - Import a CSV to locate and fix dead pixels.

Working with CORTEX Manifest Files

The CORTEX Manifest is a lightweight sidecar file that contains all the media and metadata information about a CORTEX Job. It can be passed between on-set and post installations to ensure complete coherence of media and other metadata.

The Manifest can be used in all job types whether for dailies, transcodes, compositions of all kinds including IMF, DCP, AS11, etc, and Dead Pixel Detection and Correction.

The Manifest file includes information about:

- Audio and Image files that have been copied or imported
- Checksum for verification
- LUT files applied
- CDL values of primary color correction applied
- Framing settings
- Synchronization points
- Scene/Take/Camera
- Comments & Discrepancies
- Edit markers (trim points)
- Dead Pixel Correction
- Compositions

Manifest files can be loaded into a CORTEX job first and then relinked to the underlying media or the media can be imported first and then traced back with a Manifest.

Creating a Manifest from a Job

A Manifest file can be created at any phase of a job. For example, a Manifest can be generated after Copy & Color or later after synching, Dead Pixel Detection, IMFs, DCPs, etc.

To create a Manifest file

1. Go to the Project Manager
2. Right-click on the Job name
3. Select Export Manifest
4. Choose a location and Save the file.
5. The file can now be emailed, shared via networked storage, sent via thumb drive or added to a shuttle drive.

Importing a Manifest and Relinking to Media

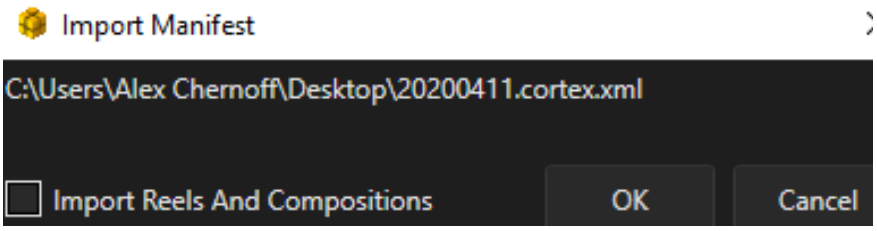
The purpose of the Manifest is to allow work to be done in one Cortex system and imported into another system that does not share the same storage. Using the Manifest will allow for the relinking of media and its corresponding metadata, recreating the exact same parameters and properties generated by the originating system.

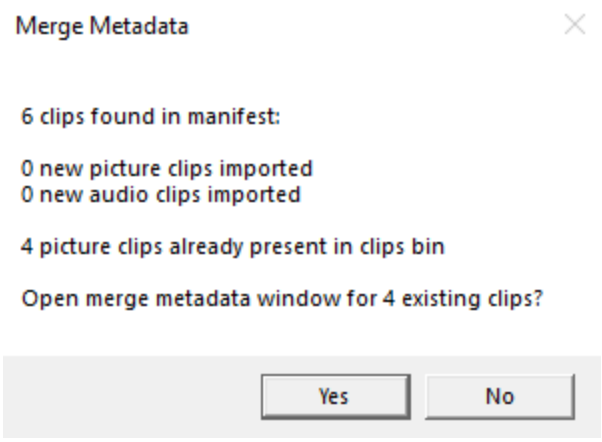
An example of this workflow would be dailies generated onset and then imported by facility for rendering and distribution.

To Import a Manifest

Dailies Workflow

1. Create or Open a Job
2. Import the corresponding media into the Master Clips Bin
3. Click Import and select Cortex Manifest
4. Browse to the file location and click Open
5. Disable Import Reels and Compositions and click OK

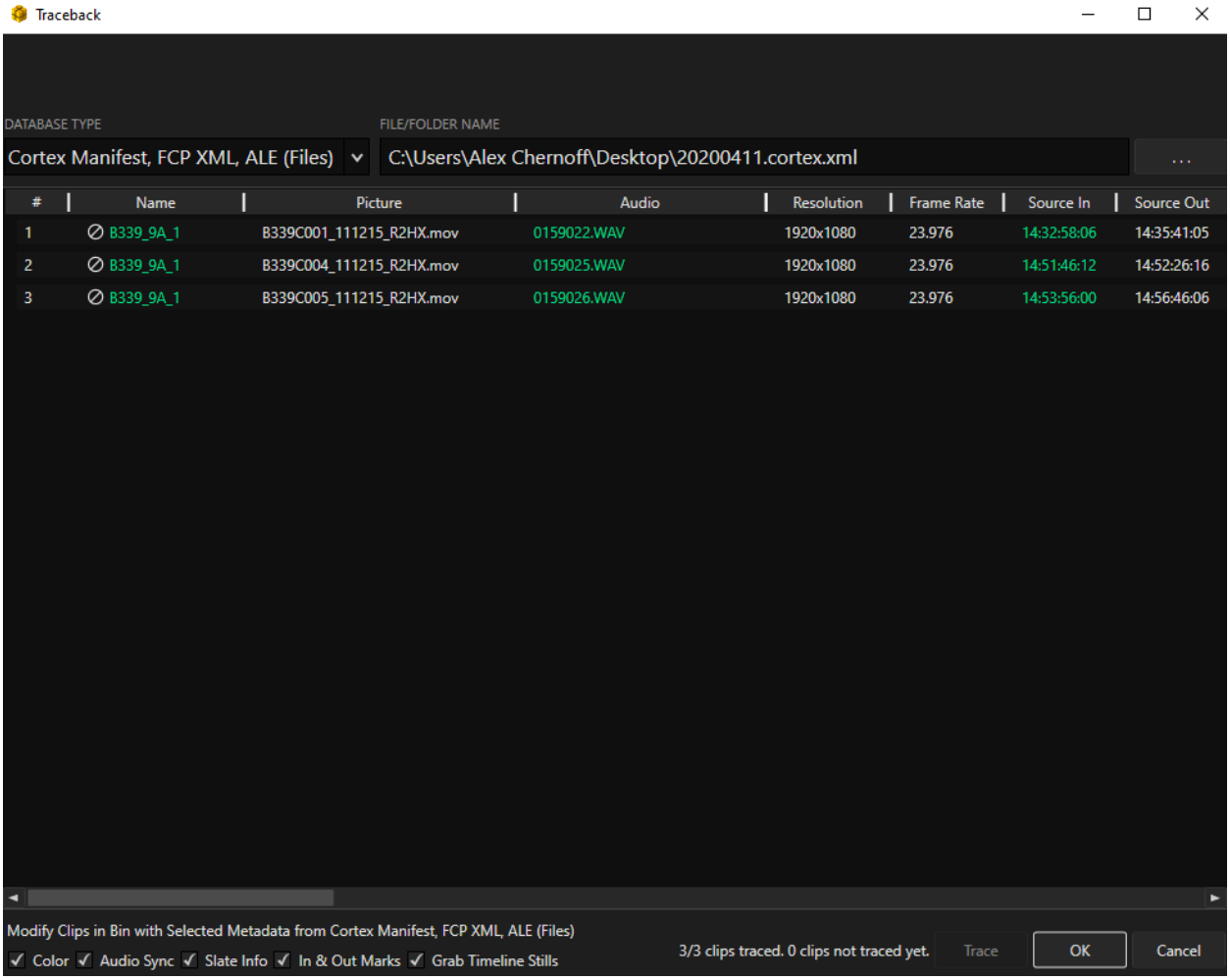




Cortex will instantly scan through the imported media, using the manifest to identify which clips are needed to merge with the metadata.

A list is generated indicating how many clips have been found. Click “Yes” to merge the clips with the metadata provided by the manifest.

This will prompt the Traceback tool to open with corresponding clips in the list.

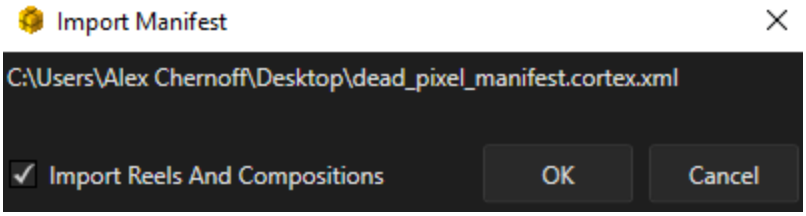


Click “OK” to merge the clips with the manifest metadata. Now, any clips that were synched and colored in the originating system will be migrated to the new system with color and proper synching, ready to be added to reels.

Composition Workflows

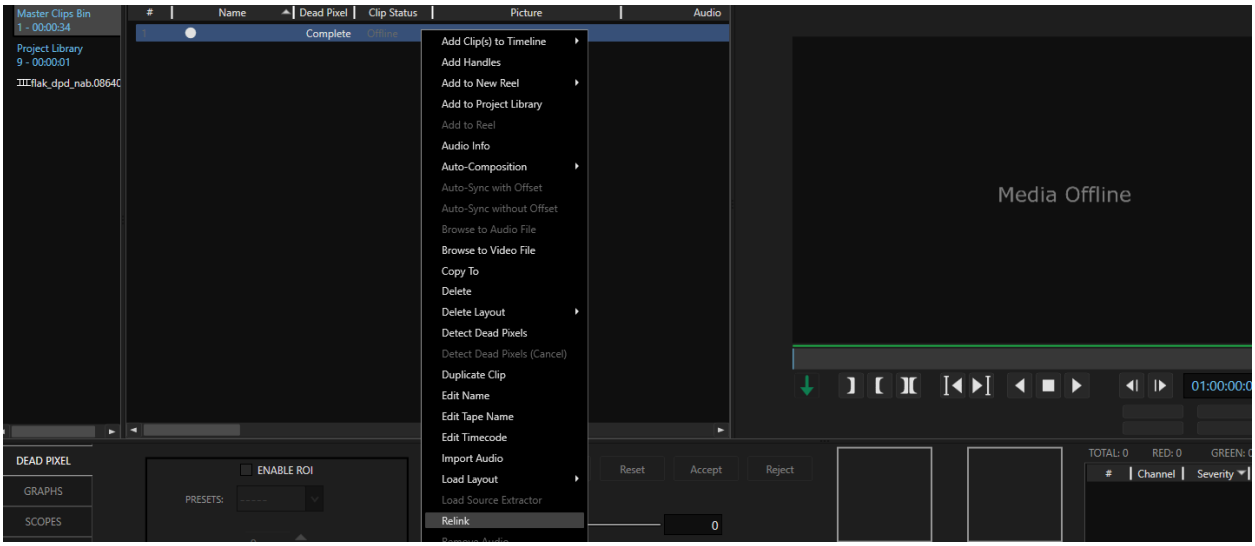
Composition workflows, such as Dead Pixel Detection or IMF creation, require a different order of operation regarding Cortex Manifests.

1. Create or Open Job
2. Click Import and select Cortex Manifest
3. Enable Import Reels and Compositions



The metadata for the clips will be imported along any compositions that were created, however, the media will be offline.

In the Master Clips Bin, highlight the media, right-click and select “Relink.”



Now the media will come online and work can resume. In the case of Dead Pixel Detection, click on the composition to reveal the detection from the originating system.

Clip Bin Views

The Clip Bin Offers three views of clips

1. Text - Detail listing of the clip/file metadata
2. List & Thumbnail- Thumbnail view with clip details
3. Thumbnails - Timeline thumbnail only view

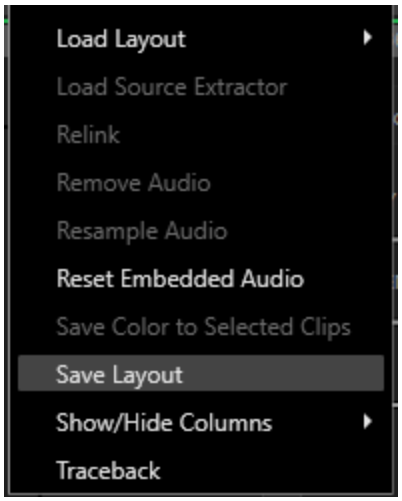
1 2 3

The Text View

Each clip is displayed in text as a line item. The available metadata, as shown on the right, are presented alphabetically and appear as columns of information in various orders depending on the "Layout" selected. Those with check marks will be visible in the view.

To determine the visibility of each column, right-click anywhere in the Master Clips Bin and select Show/Hide Columns in the Context Menu.

In Detail View, you can rearrange the order of columns and create custom layouts by clicking on a column header and then dragging and dropping it to a new location.

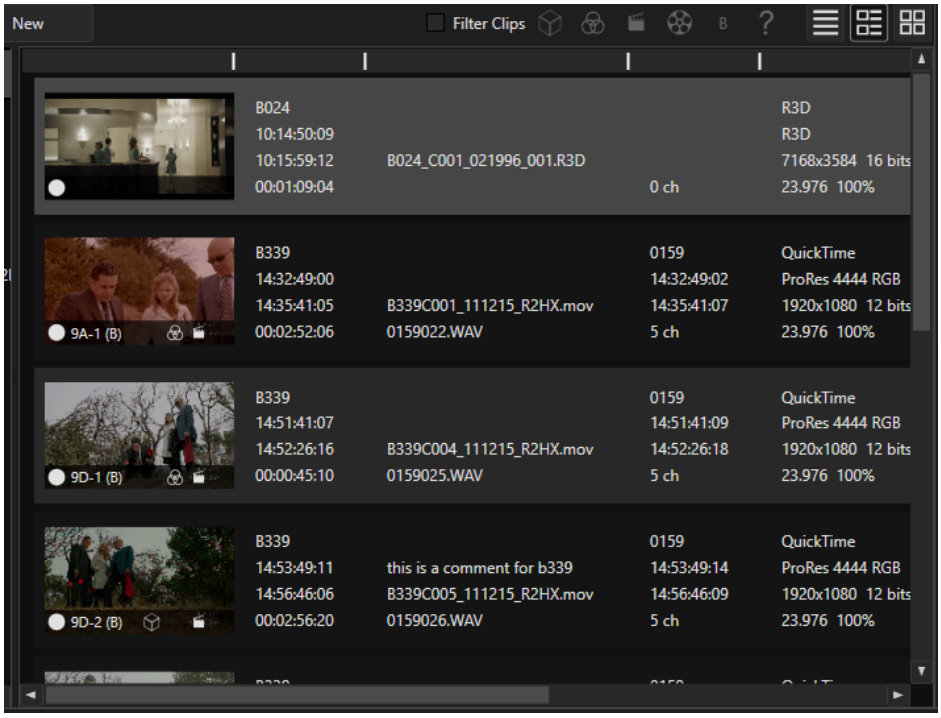


Load saved layouts by right-clicking and selecting Load Layout from the Context Menu.

Save and name layouts by right-clicking and selecting Save Layout from the Context Menu.

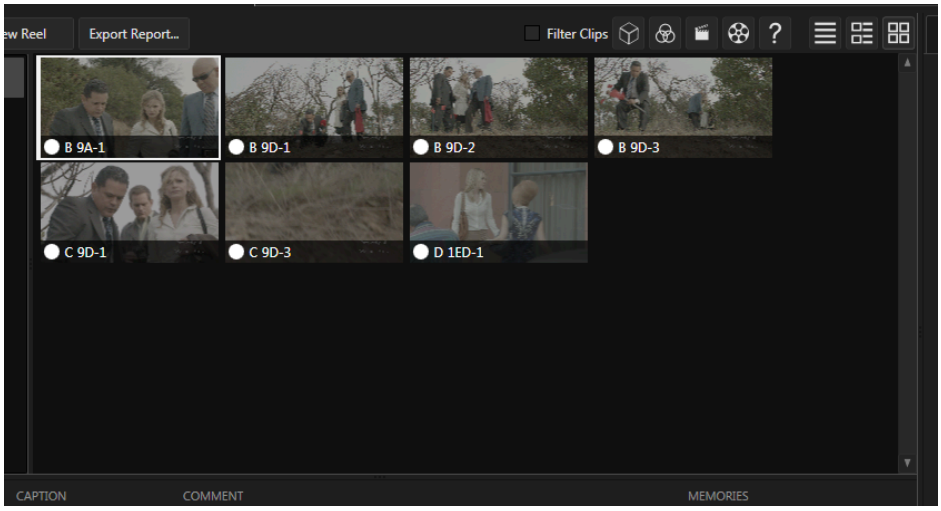
The List/Thumbnail View

Contains a thumbnail along with clip information.



The Thumbnail View

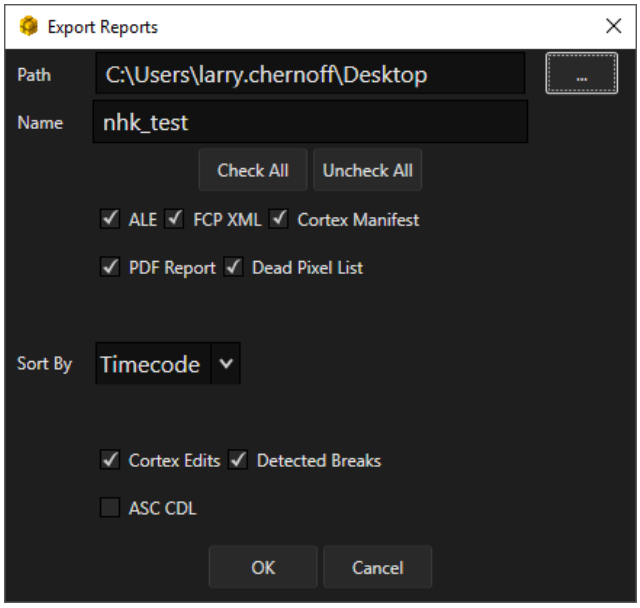
Displays thumbnails of each clip in a still-store mode with the Camera Roll Letter and Scene/Take metadata.



Exporting Reports

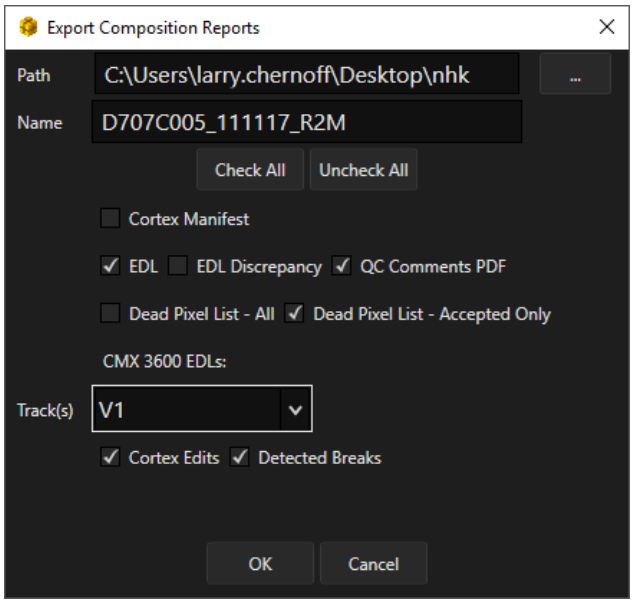
Right click on a reel or composition to export a variety of report types.

Export Reports For Reels

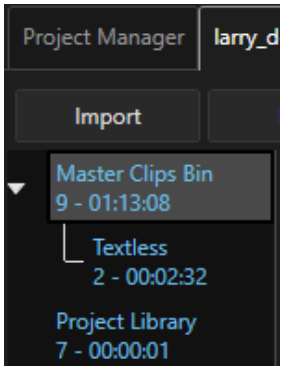


ALE / FCP XML	Avid and FCP metadata
Cortex Manifest	All related Job metadata
PDF Report	Formatted dailies report
Dead Pixel List	.csv of detected pixels
Cortex Edit/Breaks	EDL of composition events
ASC CDL	EDL of ASC CDL Values

Export Reports for Compositions



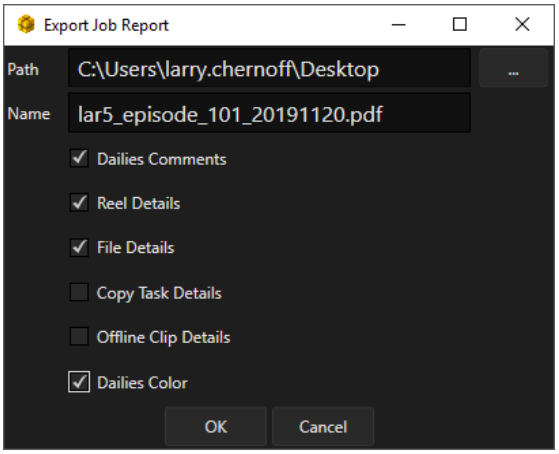
Cortex Manifest	All related Job metadata
EDL	EDL of composition events
EDL Discrepancy	EDL of found Discrepancies
Dead Pixel List	.csv of detected pixels
QC Comments PDF	Formatted QC Report
Cortex Edit/Breaks	EDL of composition events



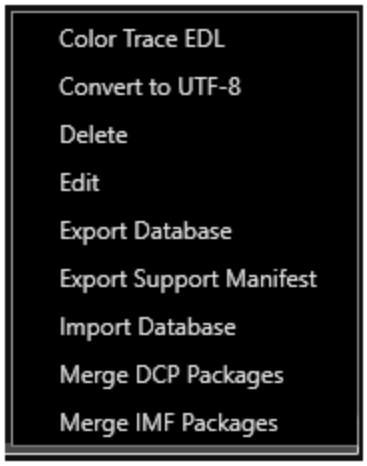
Export Reports for Job

Right click the Master Clips Bin to export a variety of reports related to the clips in the bin.

Or, you can right-click on the job record in the Project Manager for the report.



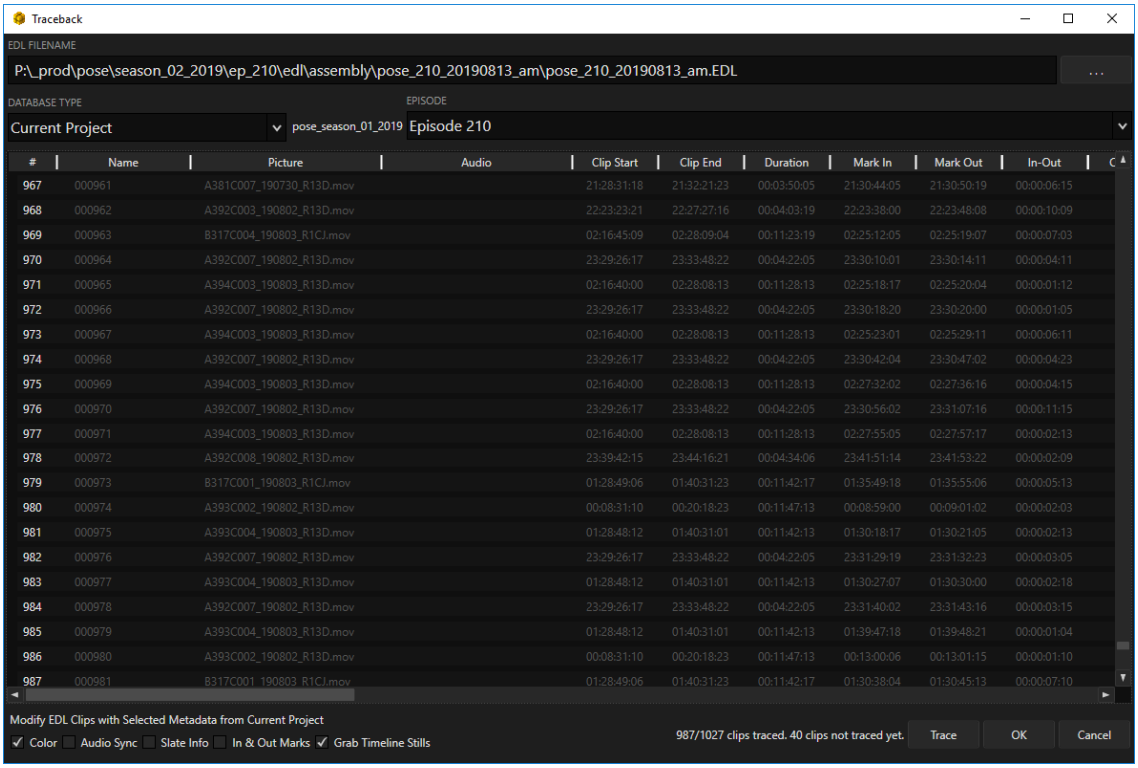
Project Actions and Reports



Color Trace EDL

When dailies color is processed through Cortex with ASC CDL values, either directly or through imported 3D LUTs, Cortex can trace the color values when an EDL with Tapenames is imported and traced through this utility.

1. In the Project Manager, Right click on the Project and choose Color Trace EDL
    a. A Windows explorer will open
2. Navigate to the EDL and Open it
    a. A Cortex Traceback Dialog will open
        i. Enter the “Database Type”
            1. Normally it will be the Current Project but other choices are available such as a folder of ALEs.
        ii. In the Episode field, choose All or a specific one



In the lower left of the UI, make sure the Color checkbox is enabled. In the lower right corner of the UI, click Trace. When the result is found, click OK. This will open a Windows Export window. Navigate to the directory you wish to save the new EDL that contains the ASC SOP values processed in the Color tool.

Convert to UTF-8 (Unicode Transformation Format - 8 bit)

If a project was created in standard ASCII, it can be converted in order to UTF-8 in order to support the expanded character library.

Delete

To delete a project click the Delete option.

Edit

To Edit a project click the Edit option.

Export Database

To export a database click the Export Database option

Export Support Manifest

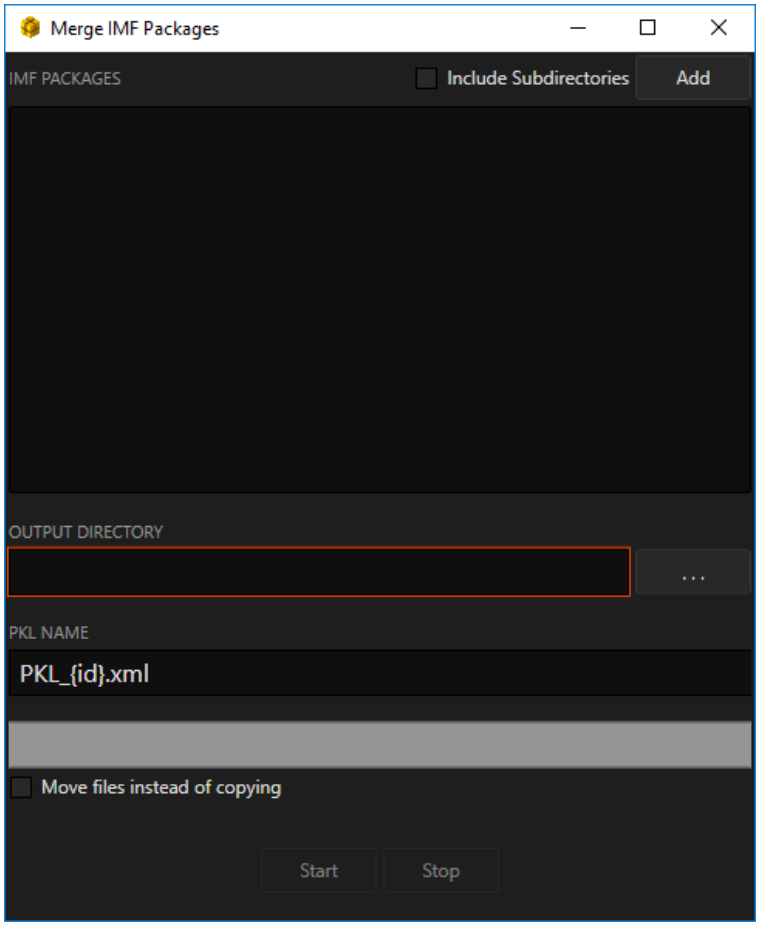
If requested by MTI Film's support team, this option generates a Manifest report of the project..

Import Database

Use this option to import a database from another Cortex system.

Merge DCP or Merge IMF Packages

To merge DCP or IMF packages, click the corresponding option:



1. The Merge DCP **or** IMF Packages Dialog Box appears.
2. Click the Add button to navigate to the DCP packages directories to be merged.
3. Click the … (browse) button to navigate to an output directory
4. If you wish to Move the files instead of copying them, enable the checkbox
5. When ready, click Start

Filtering and Sorting Source Clips

The Clip list can be filtered to hide or show clips that have already had a LUT applied, color correction applied, synchronized, added to a Reel, placed in a Bin, and offline. This is useful to ensure that no clips within a job are missed and to make viewing long lists of clips easier for the user.

To Filter:

1. Check the Filter checkbox to turn filtering on.
2. By default, all clips are shown. Toggle one or more filter buttons to hide or show the clip types.

Filter options:

 Hide Clips with LUTs applied

 Hide Clips with Color applied

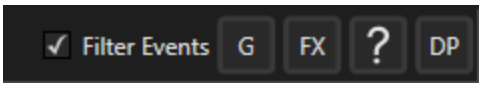
 Hide Clips Logged and Sync'd

 Hide Clips Added to a Reel(s)

 Hide Clips in Master Clips Bin that are also located in Sub-Bins

 Show Clips that are Offline

Filtering and Sorting Composition Events



It might be necessary to show certain types of events in a composition created by an imported EDL or natively in Cortex. When a composition is focused, the following buttons provide filtering options:

 Show EDL Gap Events (where the EDL has gaps in record time)

 Show EDL FX Events

 Show Events with Missing Media

 Show Events with Accepted Dead Pixels

Sorting

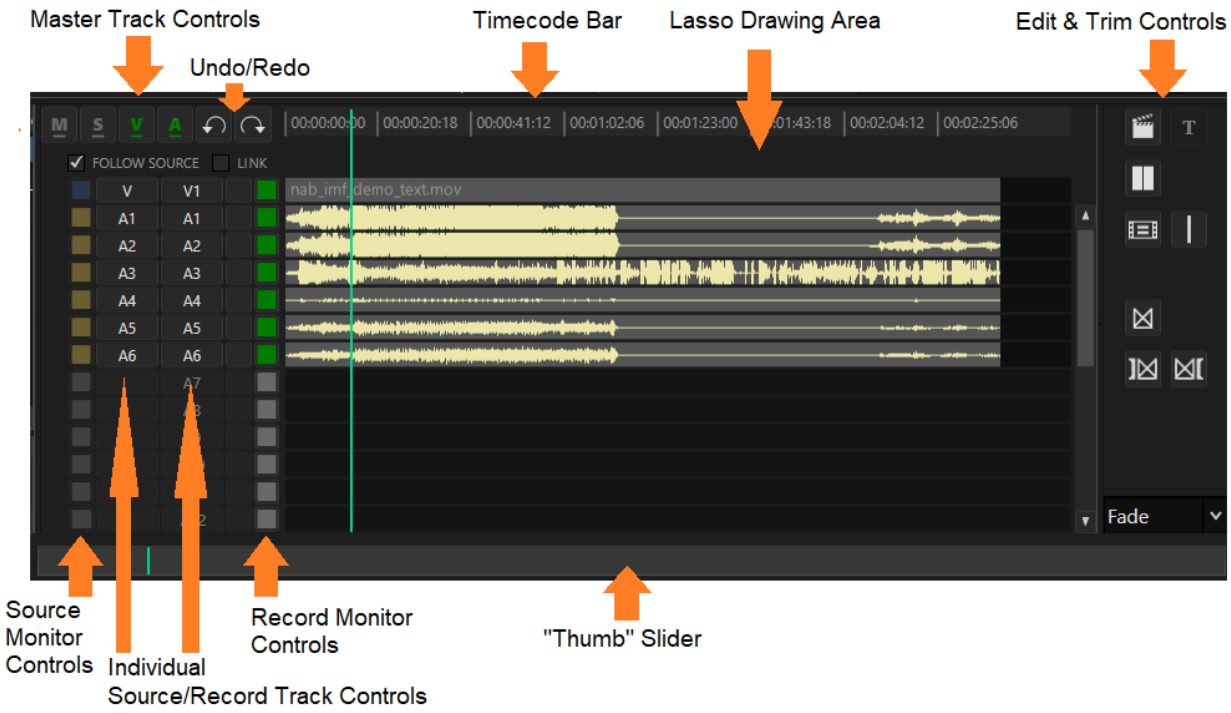
The Bin can be sorted on any column header, either ascending or descending, by clicking on the header.

The Timeline

The Timeline is displayed when a composition is created in a Job. There are three tools in which the Timeline is displayed, The Edit Tool, the Color Tool, and the QA Tool. In the Color and QA tools, only the video tracks are displayed; the audio tracks are hidden.

The Edit Tool Timeline

The Edit Tool timeline is comprised of several sections:



The Master Track Controls

The Master Track Controls provide a global method of enabling or disabling a track type. For example, if there are six audio tracks enabled and you wish to turn them all off, clicking the A button will toggle them off/on.

Adding a Metadata, Subtitle, or Video Track

In the Edit Tool, right-click anywhere on the composition to display the Context Menu and choose Add. Then from the extended menu choose which Track Type to add. Shift+clicking on the M, S, or V buttons will add the corresponding track.

The timeline contains 1 Metadata, up to 2 Subtitle, 1 Video, and up to 24 Audio tracks.

Follow Source

With Follow Source enabled, Cortex will automatically enable the Video and/or Audio Tracks contained in the source file. For polyphonic audio files, the number of tracks will be automatically enabled. For Monophonic files, pressing Ctrl and clicking on each file sequentially will number them in the order clicked. Follow Source is useful when simple assembly type editing is required.

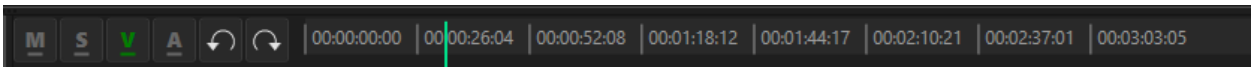
Link

When the Link checkbox is enabled, the Track and Monitor buttons switch together when either is clicked or Alt+Y is pressed.

Undo/Redo

Self explanatory. Just click. You can use Ctrl+Z to undo. The normal Windows Redo shortcut, Ctrl+Y, is not available in the Edit Tool since it is used for other commands.

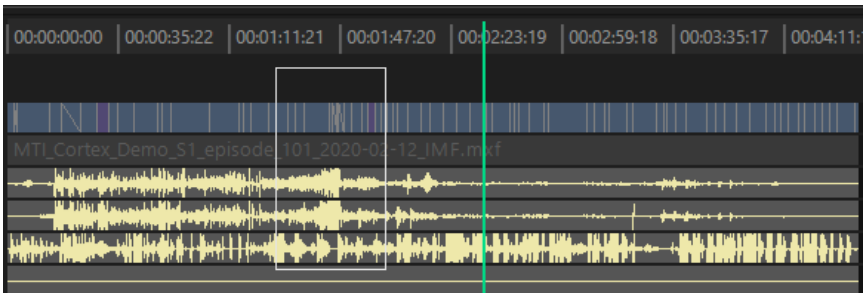
Timecode Bar

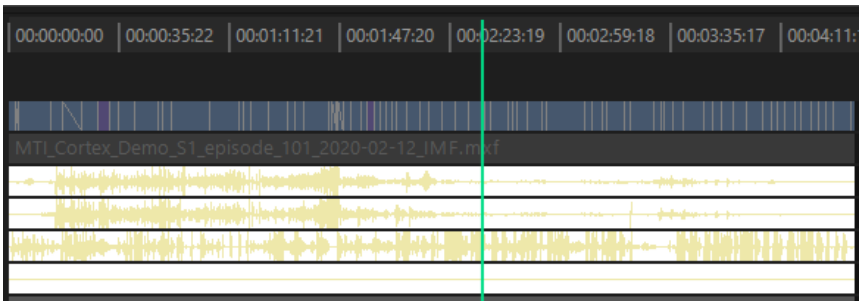


Use the Timecode Bar to scrub the timeline. Click and drag starting at any position.

Lasso Drawing Area

In order to select multiple tracks, enable the desired tracks and then click and drag a lasso from within the Lasso Drawing Area. In this example, only the audio tracks are enabled.





Edit and Trim Controls

Click the slate to open the Slate Generator
Click the T button to open the Subtitle luminance adjust slider

Click the Trim button to enable the Trim Modes.
Press Ctrl and click the Trim button to enable the Ripple Trim Mode

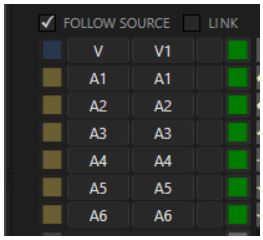
Click the Match button to invoke a match frame from either the source or record
Click the Break button to add a break. Press Ctrl and click to delete a break.

Click the Effect button to set an initial IN point for an effect.

Click the Mark Effect In button to modify the start point of an effect.
Click the Mark Effect Out button to set or modify the end point of an effect.
Note: In the Color Tool, the Effect buttons apply only to color dissolves.

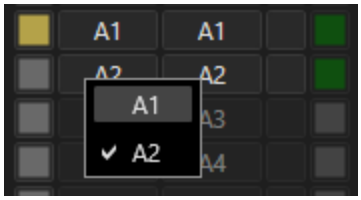
In Cortex v5.6, only Fades are supported. Future versions will include Dissolves, Wipes and Superimpositions.

Audio Source and Record Monitor Controls

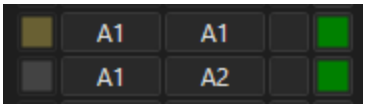


The yellow Source Monitor buttons control which source audio channels are monitored. The green Record Monitor buttons control which composition audio tracks are monitored. Click a button to toggle its state. Press Shift+click to toggle between isolating the monitor and enabling all monitors.

Individual Source/Record Track Controls



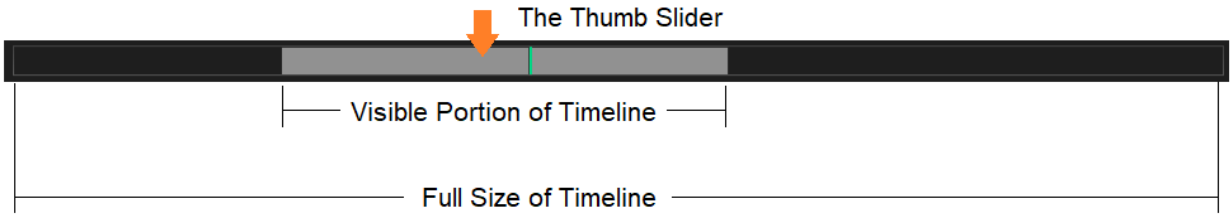
The track buttons on the left determine which source audio channel will be assigned to a record track on the right. Right clicking the source or record track button provides a list of available channels for assignment.



Clicking the Individual Record Track Control buttons determine which tracks will be affected by an edit decision. Click a track button to toggle its state. Press Shift+click to toggle between isolating the track and enabling all tracks containing media.

“Thumb” Slider

When the timeline is zoomed, the Thumb Slider, the lighter gray bar, determines which portion of the timeline is visible.

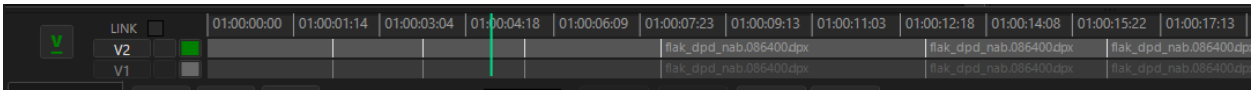


Click and drag the slider to move the timeline to the desired view.

You can also use the following commands:
Pressing Ctrl+Mousewheel Up will move the timeline upstream.
Pressing Ctrl+Mousewheel Down will move the timeline downstream.

The Color and QA Tool Timelines

Both Timelines consist of up to two video tracks. The audio tracks are hidden.



Editing and Monitoring Video Tracks

There are a few states that determine which video track is being monitored and which is actionable. Bear in mind that Cortex uses a hierarchical operation to determine which video track is being monitored with V2 taking priority when media exists on both tracks at the same timeline location.

V2 is visible and actionable if its track is selected and monitor is enabled.

Note: In order for both monitors to be enabled, the Link checkbox must be disabled.

V2 is not visible or actionable if its monitor is disabled.
If the V1 monitor is enabled, it will be visible but not actionable.

Note: When a monitor button is orange, that is an indication of a conflict between the visibility and actionability for the selected track.

If V1 is selected but its monitor is “blocked” by the V2 monitor, then V1 is neither visible or actionable and V2 is visible.

Zooming the Timeline

Using the Mouse wheel

To zoom the timeline, position the mouse cursor over any area of the timeline and move the mouse wheel up or down to zoom in or out respectively.
Double click any portion of the Thumb Slider bar area to size the timeline to full visibility.

Using the Keyboard

Press Shift+= to zoom in
Press Shift+ - (minus on the keyboard) to zoom out
Press Shift+Ctrl+ - (minus on the keyboard) to zoom out to the full extent of the timeline

Timeline Shortcut Keys

Function	Shortcut
Add Metadata Track	Shift+Click M button
Add Subtitle Track	Shift+Click S button
Enable/Disable Video Track(s)	Y
Add Video Track	Shift+Click V button
Enable/Disable Audio Track(s)	U
Switch Video Tracks - no state change for monitors	Ctrl+Y
Switch Video Tracks - monitor follows active track	Alt+Y
Enable/Disable active track's monitor	Shift+Y
Lock a track	Ctrl+Click Track button
Lock/Unlock all tracks	Ctrl+Shift+Click any track button
Enable the Gap Trim Function	Shift+T
Enable the Ripple Trim Function	Ctrl+T
Invoke Match frame on either source or record	M
Add a Break	, (comma) or click button
Delete a Break	Ctrl+, (comma) or button
Add Effect and set initial IN point	P
Modify Effect IN	[
Mark or Modify Effect OUT	]
Go to next Effect	Shift+]
Go to previous Effect	Shift+[
Delete Effect (must be at Effect IN location	Ctrl+P

Cortex Tools in Depth

The Copy Tool

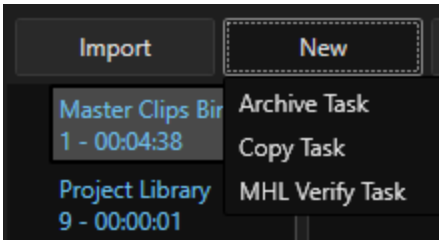
The Copy Tool serves as an interface for copying media from one source to up to three potential destinations with MD5 or xxHash verification. It allows for up to three copy tasks to run concurrently.

On set it would be used for offloading and backing up camera and audio cards throughout the day. In a facility, the Copy Tool can be used to transfer and backup media to and from shared storage, shuttle drives or LTFS LTO tapes, all while creating a full audit trail. It can also run Media Hash List (MHL) verification tasks.

The Copy Tool can also archive media contained in a job, copying to up to two destinations with a PDF Report. The report reflects a detailed list of the media along with corresponding thumbnails for each clip.

Using The Copy Tool

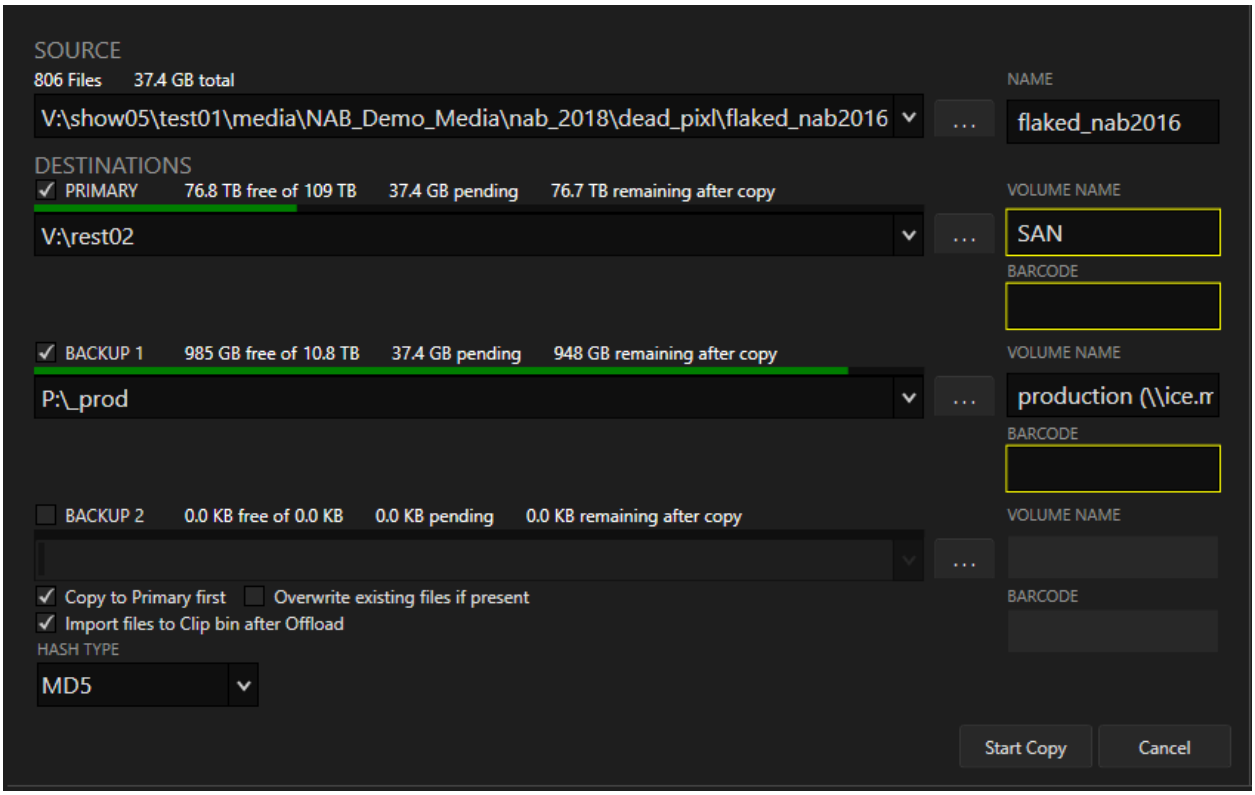
In a new Cortex Job, select the Copy Tool and click **New**.



From the Drop-down menu, choose **Copy Task.** Cortex will then open the Copy Task setup window.

Copy Task Setup

The Copy Task setup screen allows you to specify all the parameters of a copy task. Cortex keeps track of how many tasks are running, allowing up to 3 concurrently.



Destinations

Source - This is where the file path to the source media is entered using the ... (*ellipsis*) button

Destinations - This is where the Primary and Backup destinations are entered using the … button.

Primary - Typically the primary storage associated with a Cortex workstation

Backup 1 and Backup 2 - Additional copy/archive destinations

Volume Name - This unique identifier for destination drives, which defaults from the drive name, is used to record media storage in reports for later identification.

Barcode - The Barcode for destination drives can also be used to identify media storage, such as LTOs.

Options for a Copy Task

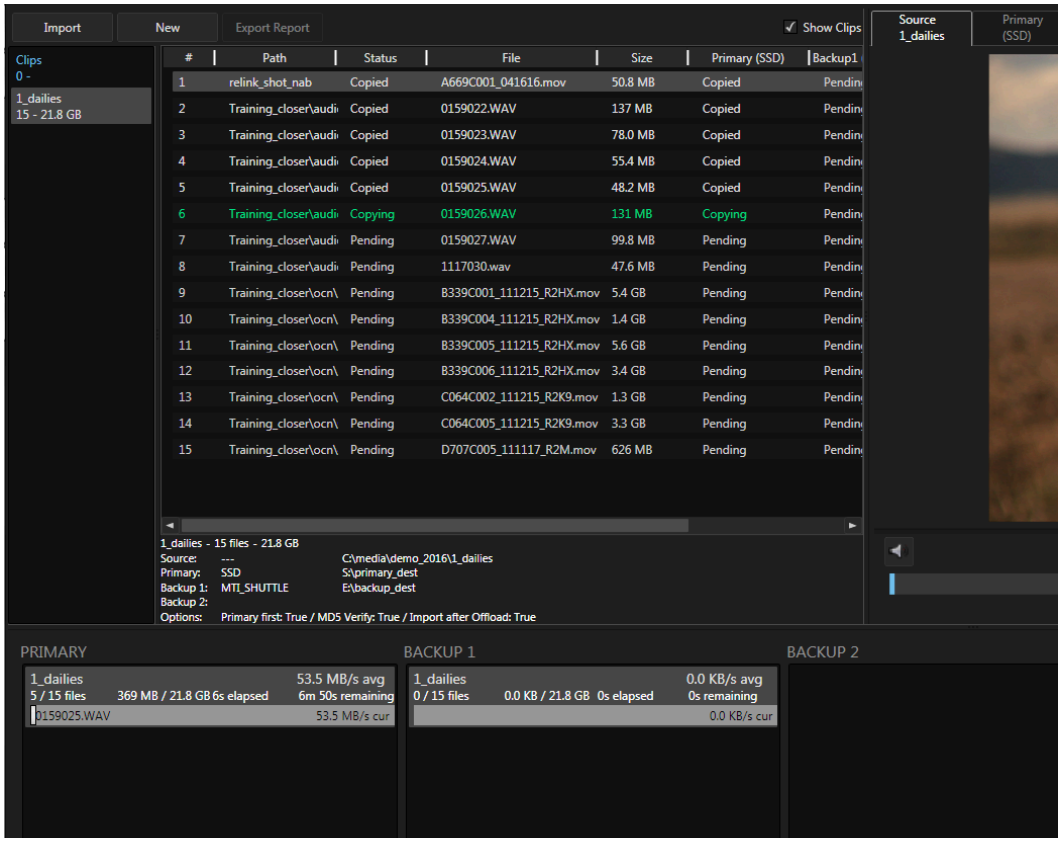
Copy to Primary First - When enabled, Cortex will copy media from Source to Primary first, then create the remaining backup copies using Primary as the source. Recommended for use on-set to free up cards.

Verify copies using MD5 or xxHash checksums - Verify copies with checksums (*recommended*)

Import files to Master Clips bin after Offload - When selected, loads copied files into the Master Clips Bin of the current job so work can proceed.

Copy Task Status

Once a Copy Task has been created, it will appear in the list in the left hand column. When selected, the copy & verify status of each individual file is displayed.



The overall status of each copy task is displayed in the columns at the bottom.

If “Import files to Clip Bin after Offload” has been enabled, you can switch to another tool as soon as the files are loaded and begin working while other copy tasks are running.

Copy Task Reports

You can generate a full accounting of the Copy Task results in PDF format:

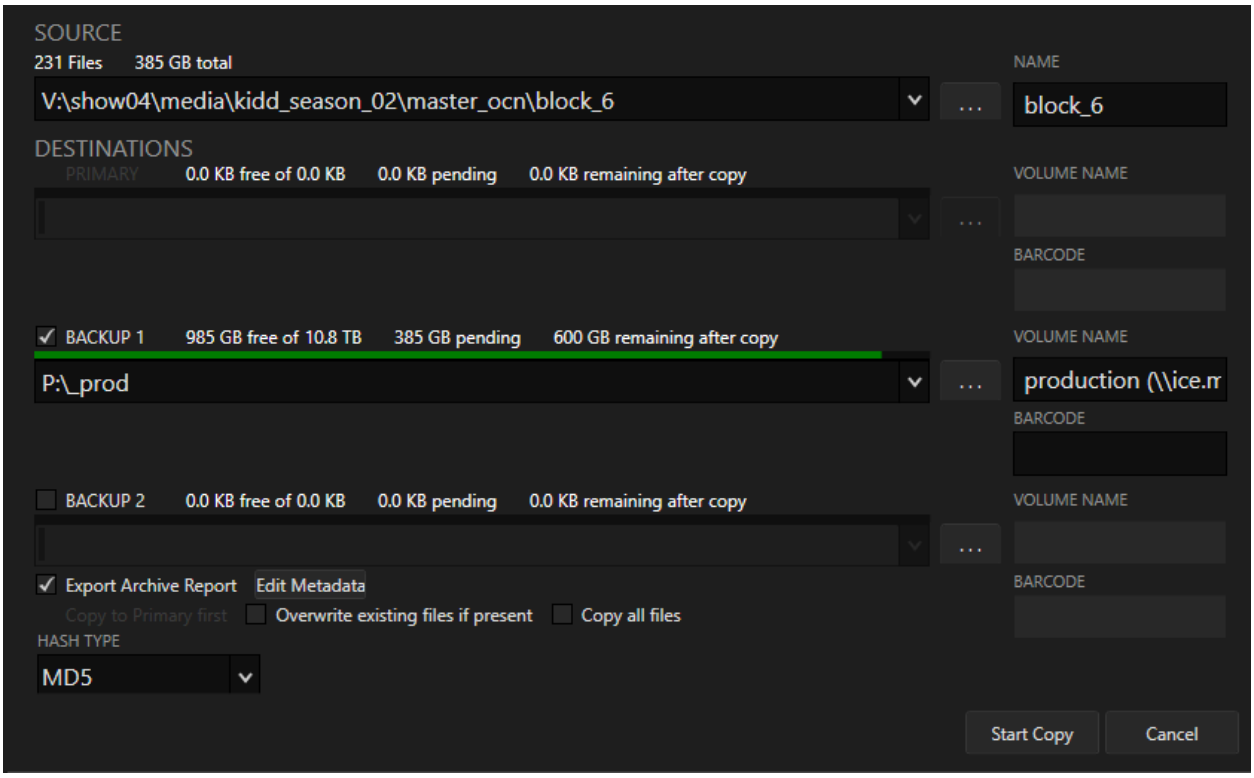
1. Select the Copy Task from the left Sidebar
2. Right click and choose **Export Report**
3. Select a File Path by clicking the … (browse) button
4. The default file name will be jobname.data.pdf, you can edit this if you wish
5. Click **OK**

Archive Tasks

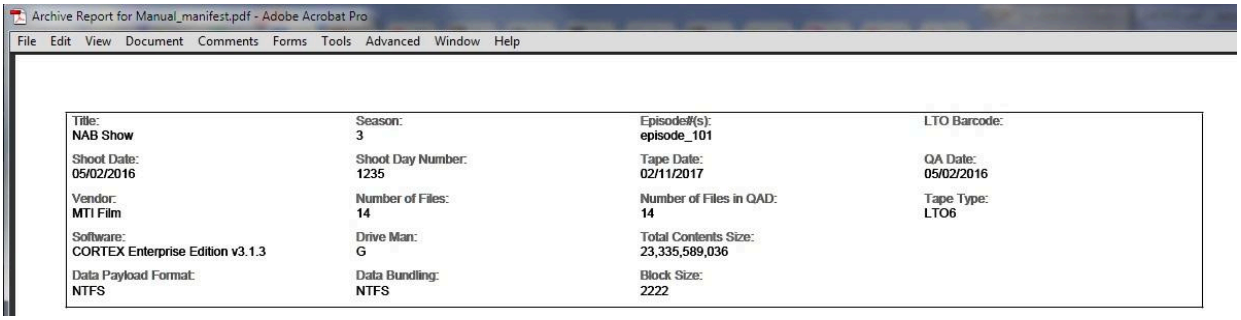
Similar in functionality to a Copy Task, the Archive Task archives media contained in an open Cortex Job. To archive all media in the current Cortex job click **New**. From the Drop-down, select **Archive Task.** Cortex will open the Archive Task setup window.

NOTE: An Archive Task can only be run when all media in a Job lives on the same volume.

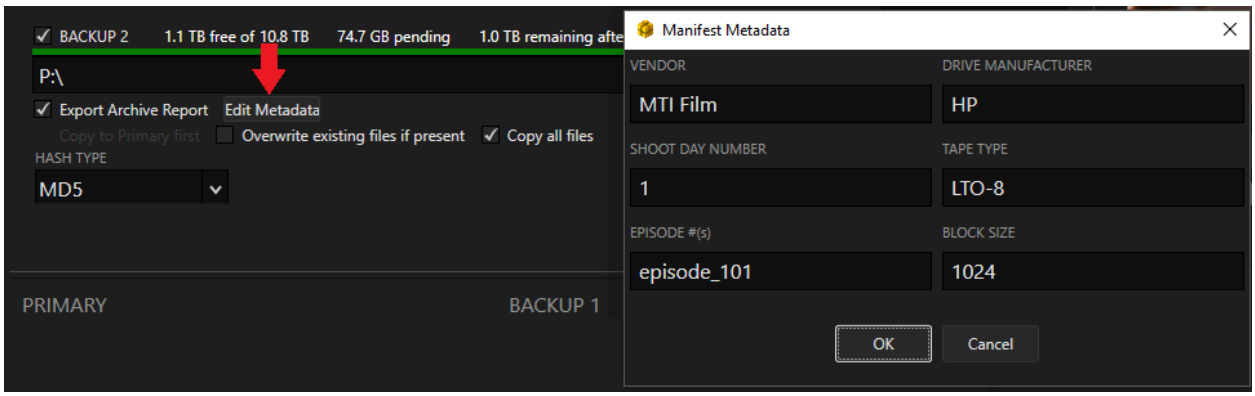
The Primary Destination option is automatically disabled to prevent the possibility of the Primary being used to copy to other destinations. Choose Backup 1 and/or Backup 2 destinations.



You have the option to export an Archive Report into the destination folder as well. Right click on the task and choose Export Report. The Archive Report is a PDF document listing all clips archived. It contains all relevant reporting data, including file and clip names, timecode, and thumbnail of each clip.



To make changes to certain header data within the Archive Task report, click Edit Metadata and fill in the customizable fields for items like Shoot Day, Tape Type or Episode Number.

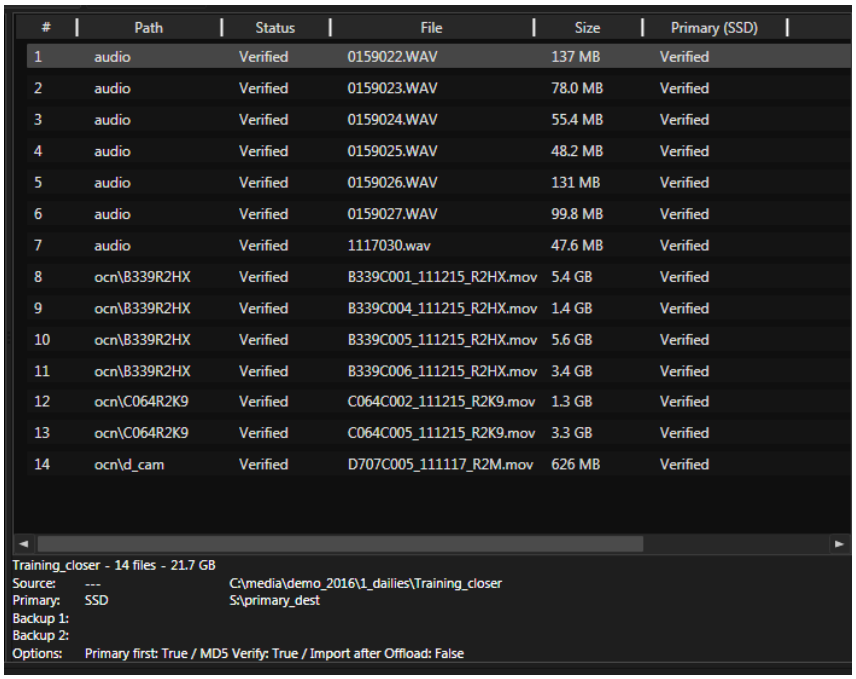


When the Archive Task is complete, Cortex will have copied relevant media and reports to the destination in a folder structure similar to the media's original source.

Verify Tasks

You can create a Verify Task to reconcile media that already exists within the Cortex workstation's network against a Cortex Manifest file.

In a job containing the existing media, import a corresponding Cortex Manifest. Then, in the Copy Tool, create a New Copy Task.
In the Source field, navigate to the source directory where the footage resides on your local storage. Disable the destination fields and leave them blank.



#	Path	Status	File	Size	Primary (SSD)
1	audio	Verified	0159022.WAV	137 MB	Verified
2	audio	Verified	0159023.WAV	78.0 MB	Verified
3	audio	Verified	0159024.WAV	55.4 MB	Verified
4	audio	Verified	0159025.WAV	48.2 MB	Verified
5	audio	Verified	0159026.WAV	131 MB	Verified
6	audio	Verified	0159027.WAV	99.8 MB	Verified
7	audio	Verified	1117030.wav	47.6 MB	Verified
8	ocn\B339R2HX	Verified	B339C001_111215_R2HX.mov	5.4 GB	Verified
9	ocn\B339R2HX	Verified	B339C004_111215_R2HX.mov	1.4 GB	Verified
10	ocn\B339R2HX	Verified	B339C005_111215_R2HX.mov	5.6 GB	Verified
11	ocn\B339R2HX	Verified	B339C006_111215_R2HX.mov	3.4 GB	Verified
12	ocn\C064R2K9	Verified	C064C002_111215_R2K9.mov	1.3 GB	Verified
13	ocn\C064R2K9	Verified	C064C005_111215_R2K9.mov	3.3 GB	Verified
14	ocn\d_cam	Verified	D707C005_111117_R2M.mov	626 MB	Verified

Training_closer - 14 files - 21.7 GB
Source: --- C:\media\demo_2016\1_dailies\Training_closer
Primary: SSD S:\primary_dest
Backup 1:
Backup 2:
Options: Primary first: True / MD5 Verify: True / Import after Offload: False

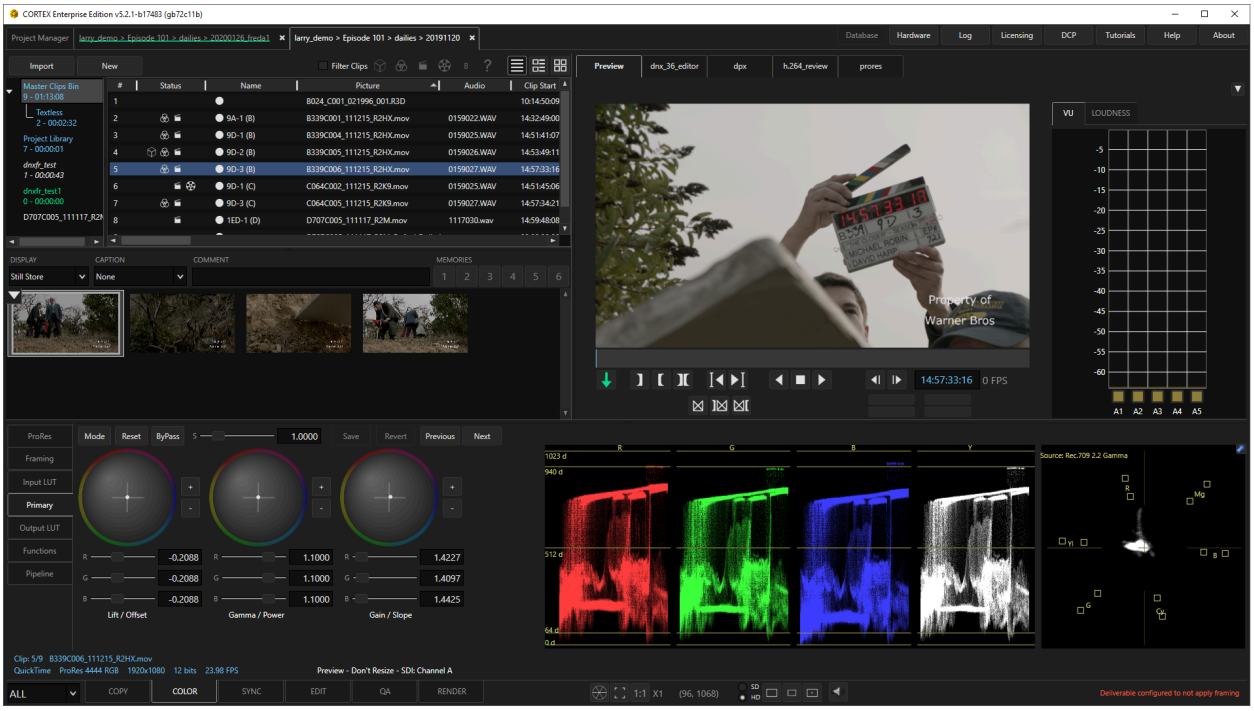
The Color Tool

The Color Tool provides an interface for setting or adjusting primary color correction, importing and applying LUTs and CDLs, framing, processing Dolby Vision™ Level 1 analysis, adding Grain or Aperture Correction effects, setting MTI-Samsung resizing parameters, managing looks via multiple still stores, and exporting color decisions via LUT, ASC CDL and/or stills.

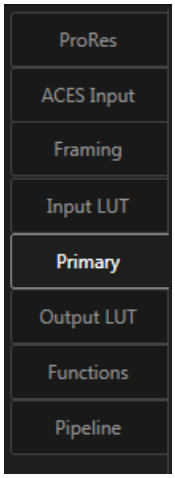
NOTE: Each project may demand a different configuration for monitoring color correction. Be sure to familiarize yourself with the Deliverables/Color Section

NOTE: Clips on "Closed" Clip Reels cannot be modified. Therefore, Cortex will block the "reuse" of a clip once it is added to a clips reel unless the reel is open or the clip is duplicated. Modifying a clip on an open reel, including changing In/Out marks, will cause the clip to be rerendered.

To access the Color tool, click the **Color** tab, or press the F2 key



Color Pipeline Tabs

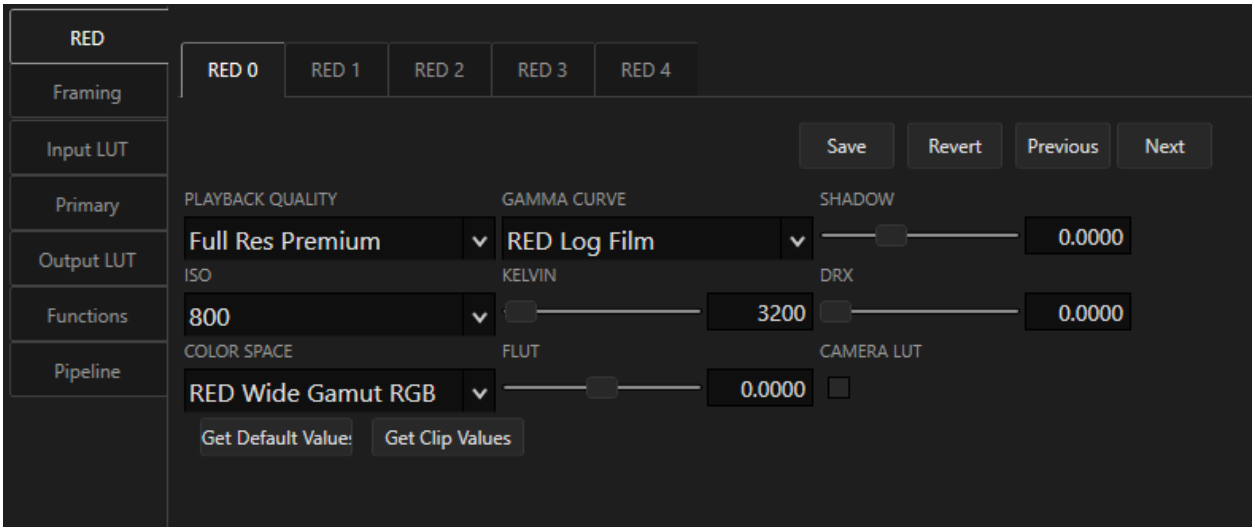


The Color Pipeline Tabs appear on the left side of the UI.

- **Camera** - Camera-specific settings when available
- **ACES Input** - Set clip ACES Input Device Transform (if working in an ACES project)
- **Framing** - Adjust image framing
- **Input LUT** - Select Input LUT
- **Primary** - Primary Color Correction tools
- **Output LUT** - Select clip-specific Output LUT
- **Functions-** Add Grain, add Aperture Correction, set MTI-Samsung resize parameters, and process Dolby Vision™ Level 1 analysis
- **Pipeline** - Viewall Color and Configuration settings

Camera Tab

The Camera Tab provides properties options related to the currently selected clip's camera source.

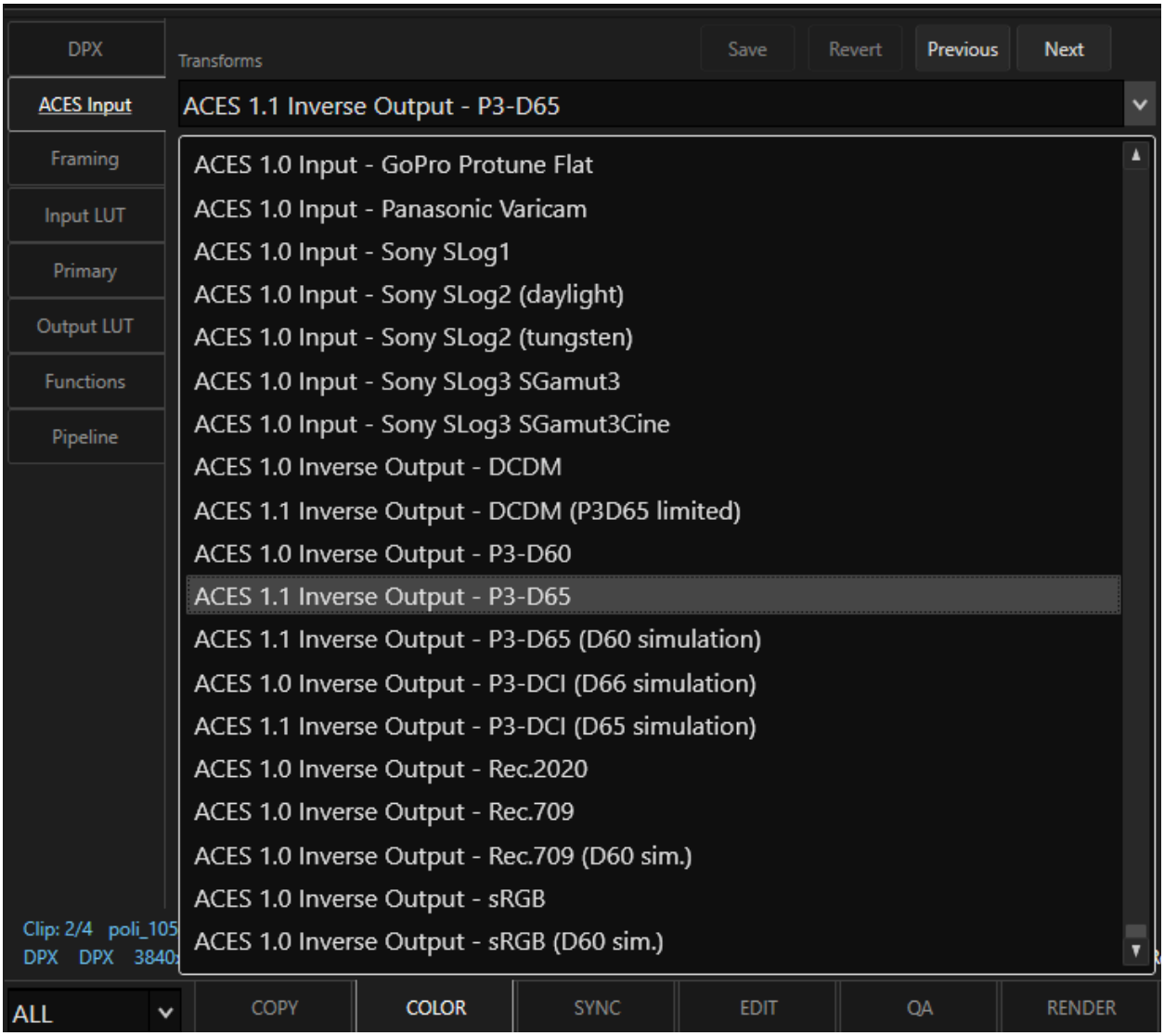


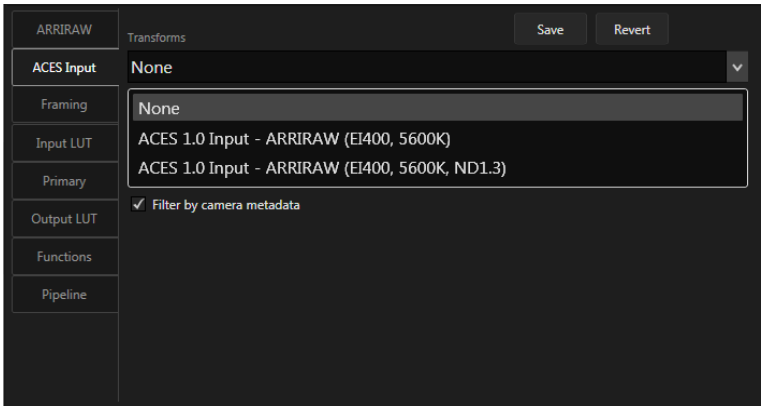
The Camera Tab label will change depending on the clip's camera source.

ACES Input Tab

Set the Input Device Transform (IDT) for your media.

Select the desired IDT from the Drop-down.





If using media that has a large number of available IDTs, use the Filter by Camera Metadata option to filter the list based on camera metadata in each clip. This should give you a smaller list of IDTs to choose from.

Note: RED files automatically apply an IDT provided by the RED SDK.

Framing

The framing tab provides all the necessary controls to modify the displayed dimensions of the media clip which include Zoom, Horizontal and Vertical positioning, and Aspect Ratio. In addition, Horizontal and Vertical Flip and Rotation.

Note: The Framing module is used to modify the framing of the picture and can be saved as a property of the clip. Zooming the picture with the mouse while hovering over the Media Player does not affect the output framing and is only used for viewing purposes.

Input LUT

From the Drop-down list, select an Input LUT to apply to the clip before Primary color correction from one previously used, from the Cortex provided LUTs, or by importing a new LUT.

Cortex comes standard with a set of typical LUTs for use with common camera and codec types.

Primary Tab

The Primary tab includes:

- A view of color parameters as they've been adjusted.
- GUI interface to adjust color parameters consisting of three color wheels that act as Lift(Offset), Gamma(Power), and Gain(Slope) controls, which are converted to ASC SOP CDL values for reporting via ALEs, CDLs, EDLs and Cortex Manifests.
- Saturation control
- Waveform and vectorscope displays.

Output LUT

From the Drop-down list, select an Output LUT to apply to the clip after Primary color correction from one previously used, from the Cortex provided LUTs, or by importing a new LUT.

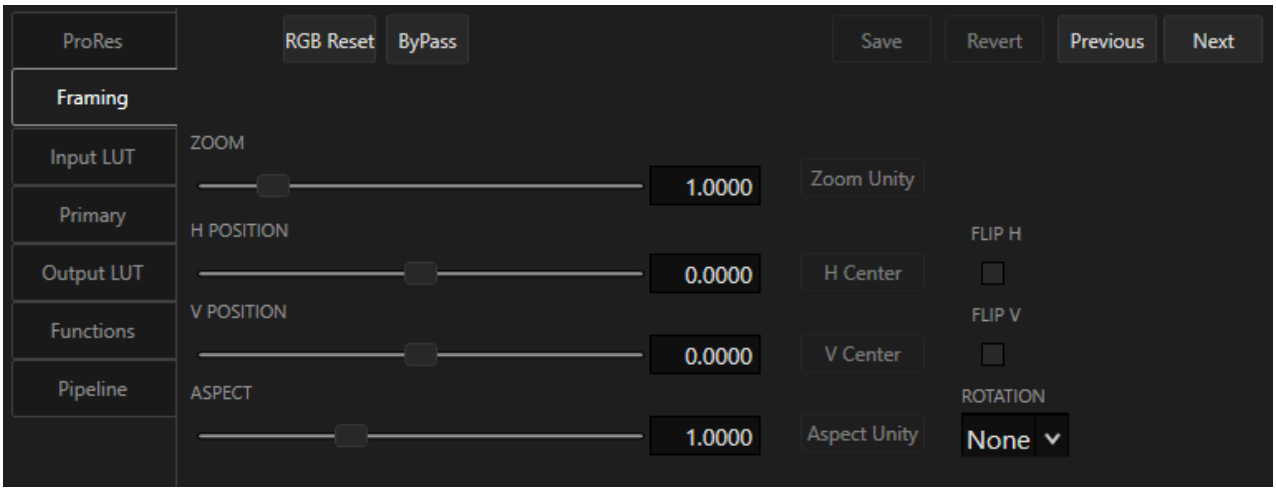
Functions

The Function tab provides options to add Film Grain or Aperture correction to the output. MTI-Samsung Upres settings can be adjusted if the Resize Quality ”MTI-Samsung” option has been applied to the active Deliverable. When a Dolby Vision™ composition is selected, Dolby Vision™ Level 1 analysis can be processed.

Pipeline

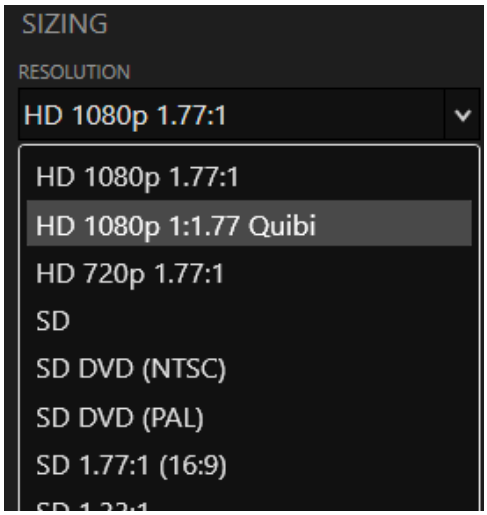
The pipeline tab displays all framing, color and function information applied to the active clip. It also displays, in Magenta, the current Deliverable configuration and any relevant metadata for the active clip.

Using the Framing Tool



Use the **ZOOM, H POSITION, V POSITION** and **ASPECT** sliders to adjust the framing of the active clip.
H Center, V Center and **Aspect Unity** will reset each of these parameters.
The **Flip H** and **Flip V** checkboxes will respectively flip the image horizontally and vertically.

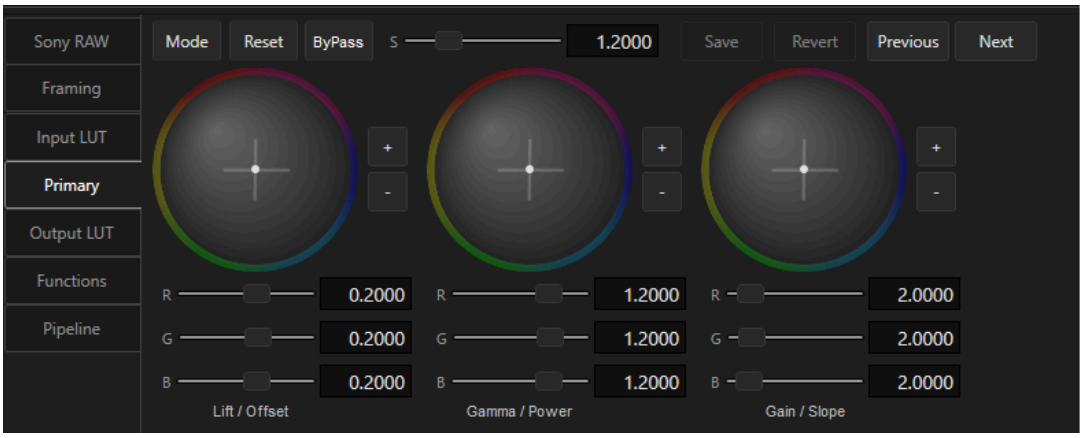
Quibi



In conjunction with the Deliverable’s Resolution, the framing tool can be used to frame 9x16 Quibi images using the Rotation function. The dropdown provides clockwise and counterclockwise rotation.

The Primary Color Corrector

Using the GUI to Color Correct



From left to right, the color wheels are represented as Lift, Gamma, and Gain or as ASC values of Offset, Power and Slope respectively. Using the mouse, click on any of the three color wheels and drag in the desired direction. Use the + and - buttons to raise or lower the values of each color component.

The three Individual sliders for each color component can be adjusted by left-clicking and dragging the slider or by clicking in the numeric box and using the up and down arrows to adjust values.

To toggle between the pending and existing color tool corrections press, hold and release the T key.
To revert all pending color tool settings to the existing correction press the A key.
To bypass pending color correction back to raw press, hold and release the 6 key.
To bypass pending color correction and LUTs back to raw press, hold and release the Shift+6 keys.
To reset existing color correction back to raw press the 5 key.
To reset existing color correction and LUTs back to raw press Shift+5.

Framing functions must be reset individually on the Framing tab.

What follows are keyboard shortcuts for the Color Tool. A complete list of shortcut keys will be found at the end of this tutorial section.

Saving Color Settings

To the current clip:

Press the Save Button or press Ctrl+S

To Multiple clips:

Using the settings on the current clip, select the span of clips you wish to apply the settings and click the Save button or press Ctrl+S. A Dialog Box will appear. Carefully enable those properties you wish to apply and click the Save button.

Using the Keyboard to Color Correct

You can also use the keyboard to color correct as follows:

Color Function	Shortcut Key	Description
Lift	1	Selects the Lift Color Wheel
Gamma	2	Selects the Gamma Color Wheel
Gain	3	Selects the Gain Color Wheel
Lift Color	1 - Press and Hold	Adjust Red - Up/Down arrows; Adjust Blue - Left/Right arrows
Gamma Color	2 - Press and Hold	Adjust Red - Up/Down arrows; Adjust Blue - Left/Right arrows
Gain Color	3 - Press and Hold	Adjust Red - Up/Down arrows; Adjust Blue - Left/Right arrows
Luminance	Alt + up/dn arrows	Click + or - buttons
Saturation	4	Adjusts the saturation value using the Up/Down Arrows. Enter to accept

Button	Shortcut Key	Description
Mode	~	Switches between Lift Gamma Gain and Printer Lites modes
Luminance	Ctrl+Shift+	Click + or - buttons
Reset	5	Reverts the primary correction settings to Unity
Shift+Reset	Shift+5	Reverts the primary correction and LUT settings to Unity
Bypass Primary	6	Bypass the primary color correction only - (Hold key down)
Bypass Primary/LUT	Shift+6	Bypass the primary color correction and LUT - (Hold key down)
Toggle Preview	T	Toggle between the pending and existing corrections - (Hold key down)
Save	Ctrl+S	Saves the current settings to the active clip
Revert	A	While previewing the pending settings, reverts to the last saved settings
Previous	8	Successively applies color and sizing settings of the Previous clip(s)
Shift+Previous	Shift+8	Successively applies only color settings of the Previous clip(s).
Ctrl+Previous	Ctrl+8	Shows correction menu for Previous clip(s) or segment(s)
Next	9	Successively applies color and sizing settings of the Next clip(s)
Shift+Next	Shift+9	Successively applies only color settings of the Next clip(s).
Ctrl+Next	Ctrl+9	Shows correction menu of the Next clip(s) or segment(s)

Dissolves

Dissolve Timeline

The Timeline Bar beneath the Media Player displays the location of dissolves for the active clip.

Cortex supports adding dissolves from one setting to another setting within the same clip.

To Create a Dissolve:

- Create settings for a clip.
- Navigate to the frame where the dissolve is to start
- Click the **Add Dissolve** button  or press the **P** key
- Navigate to the frame where the dissolve is to end
- Click the **Mark Dissolve Out** button  or press the **]** key
- Create new settings for the clip and review the dissolve

To Adjust the Length of a Dissolve:

Use the **Mark Dissolve In** button  (**[**)or **Mark Dissolve Out** button  (**]**)to adjust the Dissolve.

- If you Mark Dissolve In **before** the dissolve, it will lengthen the dissolve to the new mark
- If you Mark Dissolve In **within** the dissolve, it will shorten the dissolve to the new mark
- If you Mark Dissolve Out **after** the dissolve, it will lengthen the dissolve to the new mark
- If you Mark Dissolve Out **within** the dissolve, it will shorten the dissolve to the new mark

To Navigate Between Dissolves:

- Press Shift+Mark Dissolve In button or press Shift+**[** to navigate to the previous dissolve start
- Press Shift+Mark Dissolve Out button or press Shift+**]** to navigate to the next dissolve start

To Remove a Dissolve:

- Navigate to the beginning of the dissolve
- Press Ctrl+click Add Dissolve button  or press Ctrl+P

Notes

- *If you copy color from a clip with a dissolve, it will copy the first color correction only*
- *ALEs will export only the CDL values for the first color correction*
- *When you grab a still from a clip with a dissolve, it will grab the color correction for the frame currently located in the Media Player*

Printer Lights GUI Controls

The **RGB Sliders** adjust the Red, Green and Blue levels. A color-coded box indicates the active slider(s), which can be adjusted with the mouse wheel. Use the 1, 2, and 3 keys to select Red, Green, Blue respectively. The **+ and -** buttons gang the controls in their relative positions.

Image Stores

The Image Stores contain stills saved or imported by the user into Cortex. There are six different image stores, each serving a unique function.

The Six Image Stores

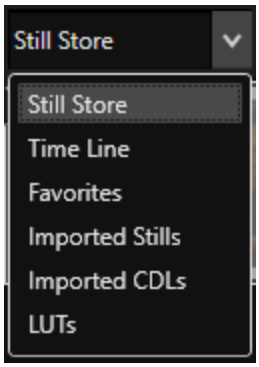
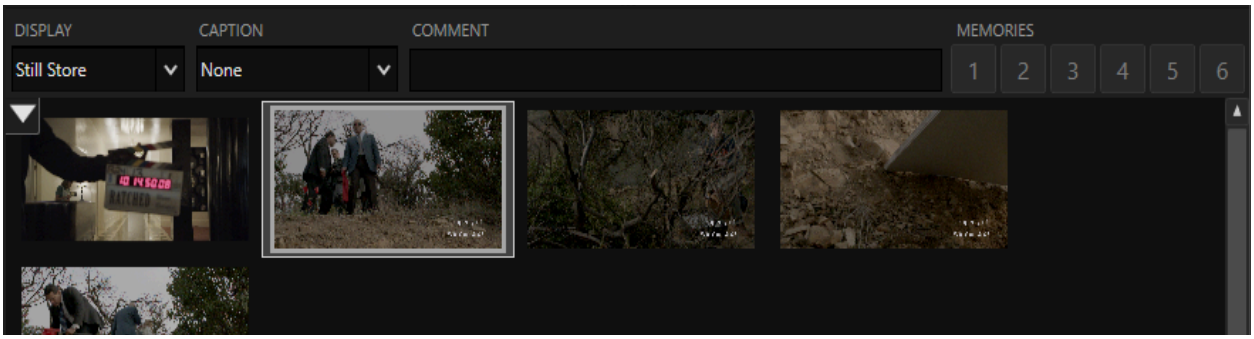


Image Store	Shortcut Key	Displays:
1. Still Store	;	Stills explicitly saved by user
2. Timeline	L	A still for each clip with current color decision
3. Favorites	‘	Stills saved to Faves list by user
4. Imported Stills	Shift+’	Imported Cortex Stills or 3rd party stills
5. Imported CDLs	Shift+’	Imported CDL Values as Bars thumbnails
6. LUTs	Shift+L	Imported LUTs as Bars thumbnails

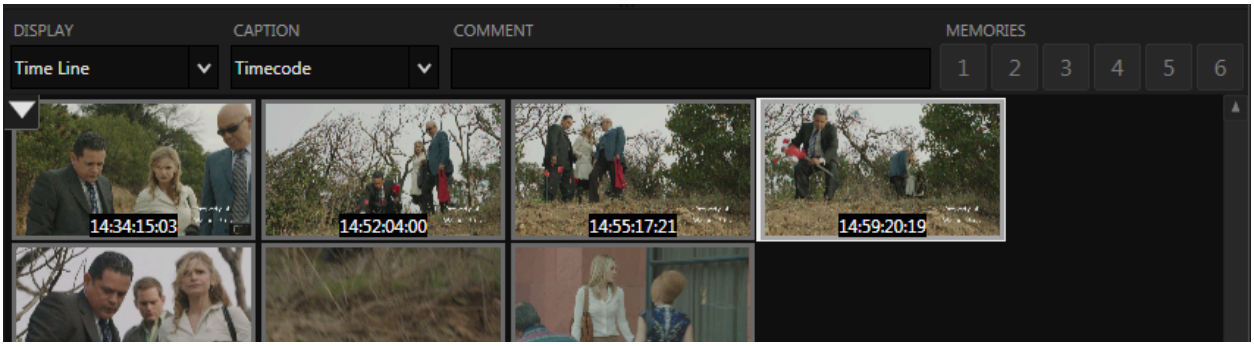
Still Store



Stills "grabbed" from clips during the course of color correction are automatically saved to the Still Store. All properties are saved with the still, which can be recalled later and applied to other clips. The stills can also be exported as jpegs or Cortex Stills. Cortex Stills can be imported into other non-networked Cortex hosts where all aspects of the properties saved in the still can be recalled and applied to clips.

To Grab the current clip's color settings to a still, press the **B** key or right-click the still and choose "Grab Still" from the Context Menu.

Timeline Store



The Timeline store displays a thumbnail, saved from the middle of each clip in the bin, with the currently applied color properties. As color tool properties are saved, the corresponding still will be updated with the revised properties. While all properties are saved to the still, framing changes will not be reflected in the thumbnail. ***Note:*** *By default, Cortex does not populate the Timeline store automatically since it is time consuming and, perhaps, not needed. To populate the Timeline store, right-click on and choose "Update Timeline Stills" from the Context Menu.*

Favorites Store

To use stills across multiple jobs in a project, the Favorites store is where user defined favorites are saved. To add (or remove) stills to the Favorites store, select the still(s) and press the keyboard **0** (zero) key or right-click on any still(s) and choose "Toggle Favorite".

A still marked as a favorite will have an F located against a black background in the upper righthand corner of the still. The Favorites Still Store defaults to filtering by Job but setting the Job Drop-down field to **All** shows all Favorites saved within the Project.

Imported Stills Store

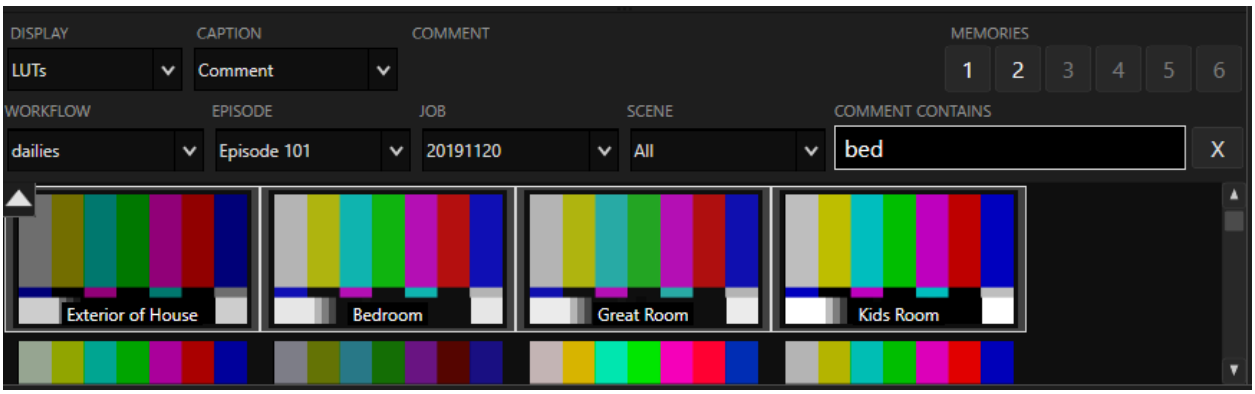
The Imported Stills store allows you to import stills from 3rd party or Cortex Stills exported by a Cortex host. 3rd party stills, such as jpegs, are used for reference only unless accompanied by corresponding LUTs or CDL values. Cortex Stills, which can be generated via any Cortex edition, will contain all saved color properties and, once imported, can be applied to any clip. Stills with color properties can be tagged as Favorites.

Importing Stills

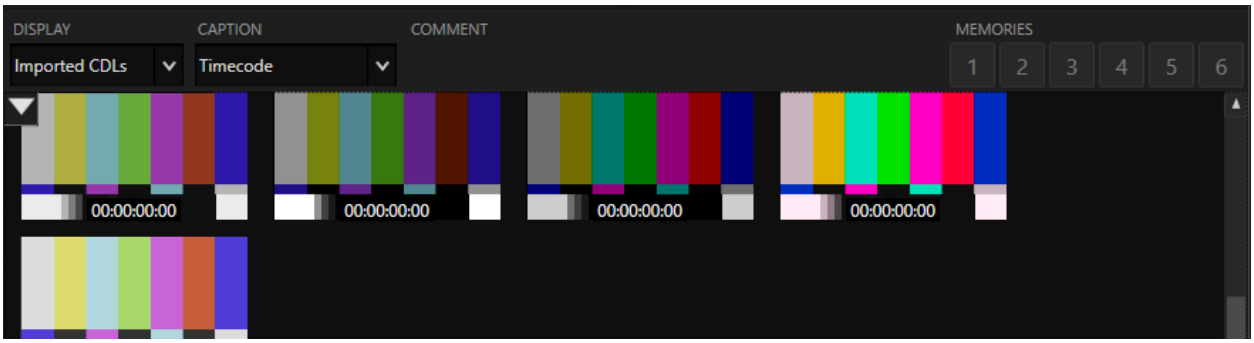
1. Right-click in any image store
    a. Select **Import Stills**... in the Context Menu. A Windows Browser will appear. Navigate to and select the stills to be imported and then click Open.
    File types supported include: bmp, Cortex Still, dpx, exr, jpeg, tiff.

LUTs Store

The LUT Store lets you access LUTs that have been imported into the Job. The Comment field can be used to apply a description, which can then be searched using the "COMMENT CONTAINS" field.



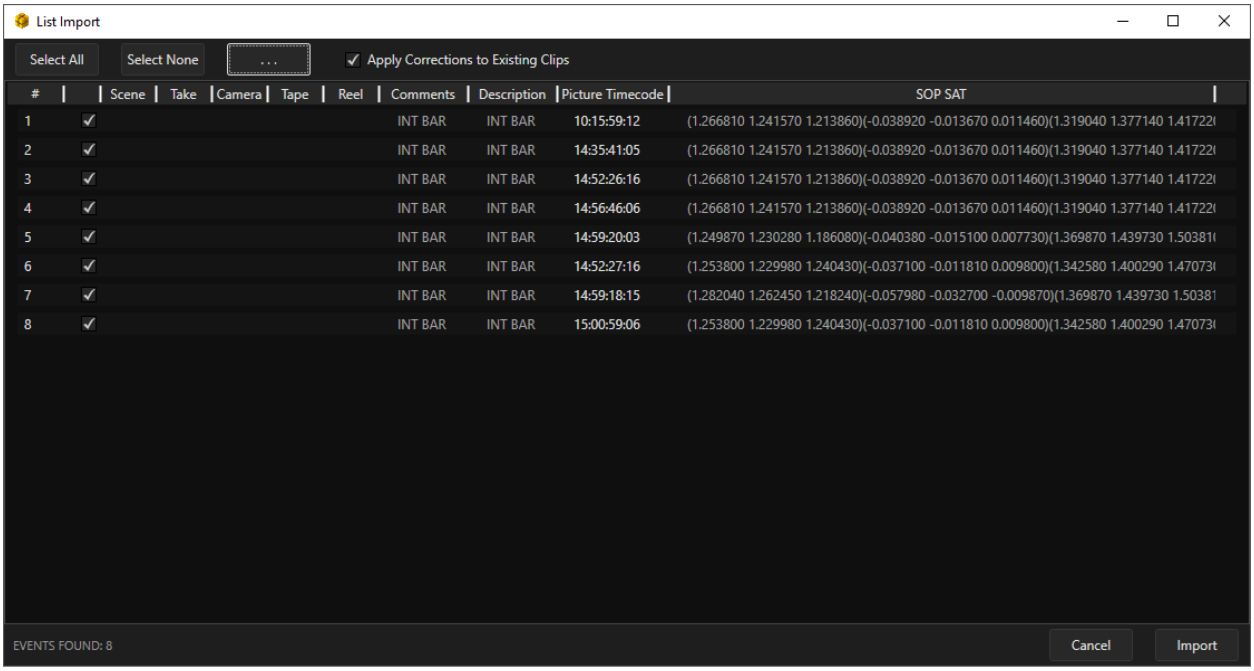
Imported CDLs Store



CDLs created by 3rd party or other Cortex hosts can be imported into Cortex and applied to their corresponding clips. All CDL values are displayed as color bars.

Importing CDL Values

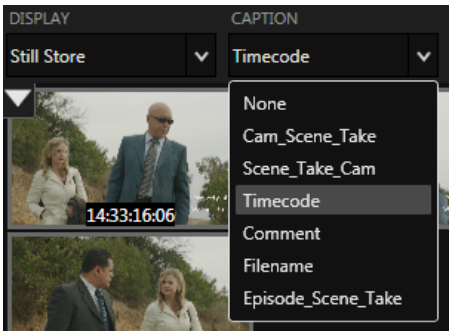
1. Right-click in any image store
    a. Select **Import Color From ALE/EDL/CDL...**
    b. The **List Import** window will open. Click **Browse (...).** A Windows Browser will appear. Navigate to and select the color line items to be imported and then click Open.
    c. Use the checkboxes to select/deselect which items to import
    d. If desired, use the checkbox to “Apply Corrections to Existing Clips”
    e. Click **Import**



If the “Apply Corrections to Existing Clips” is enabled, Cortex will attempt to match the CDL line items to their corresponding clips using the Picture Timecode, Tape Name, Scene/Take/Camera, or a combination. If no metadata is present for any of the fields, it will simply import the values.

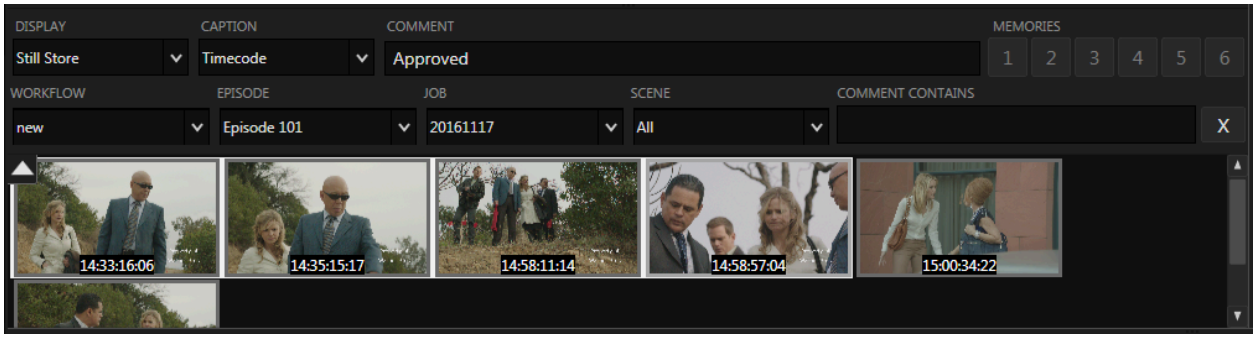
Stills can be displayed with a Caption for identification.
Caption options are:

- None
- Cam_Scene_Take
- Scene_Take_Cam
- Timecode
- Comment
- Filename
- Episode_Scene_Take



Stills are automatically sorted in the same sort order chosen for the clips bin.

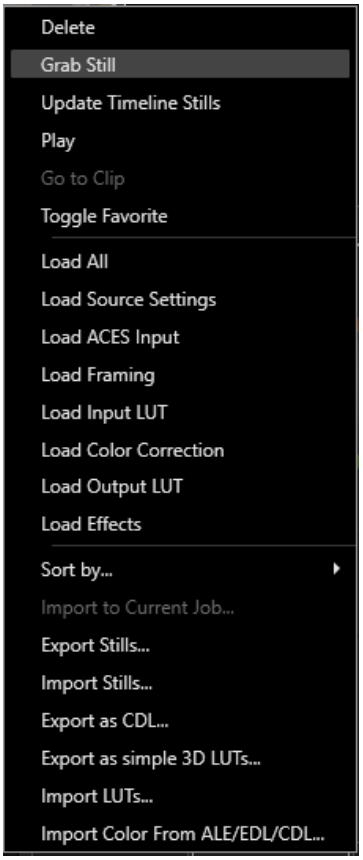
Filtering and Searching



You can access stills saved in other jobs for the selected image store using the Filter/Search feature. To toggle the Search bar, click the Down Arrow button on the left side of the still store. It will expose a series of fields by which you can filter a search. You can filter by **Workflow**, **Episode**, **Job**, and **Scene.** Using the **Comment Contains** field, you can search for a text string by entering any text and pressing Enter. For example, to search for Favorite stills, first select the Favorites still store and then enter search criteria as desired.

Saving and Recalling Stills

To save (Grab) the current clip's color settings to a still, press the **B** key or right-click the still and choose "Grab Still" from the Context Menu.
The still will appear in the Still Store.



To recall and load a still's color settings to another clip:

1. Select the clip to be colored
2. Press **N** or choose **Play** from the Context Menu
3. Navigate to the desired Still. Once you've found the desired Still, press **N** again to return to the active clip
4. Pres **Shift+N** or **Double Click** the still to load the color settings
5. Click **Ctrl+S** to save the color decision to the clip

To add a comment to a still:

1. Select the still
2. Type the comment in the comment box and press **ENTER**

To go to the clip of the selected still:

Note: Applies only to stills with corresponding clips in the current Job.

1. Select the still
2. Right click on the still and select "Go to Clip"
   or press **Alt**+Left click on the still
   or press **Ctrl+Shift+N**

Still Functions

There are a number of options for working with stills:

- **Double-click -** load color decisions from still into current clip

Right click for a Context Menu with the following options:

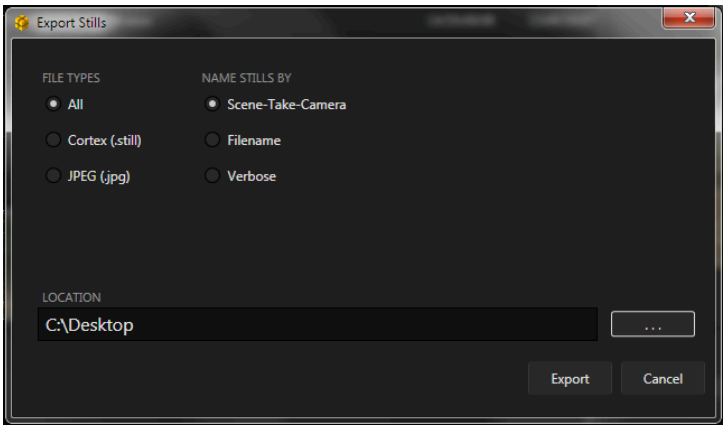
- **Grab Still** - grab a still of the color correction options on the current clip
- **Update Timeline Stills** - Refresh the stills within the Timeline store
- **Play** - Toggle between the selected still and the current clip within the Media Player.
- **Go To Clip** - load the corresponding clip the still was grabbed from
- **Toggle Favorite** - Add or remove from Favorites

- **Load All** - Load all color parameters related to this still. You can choose to selectively:
  - **Load Source Settings**
  - **Load Framing**
  - **Load Input LUT**
  - **Load Color Correction**
  - **Load Output LUT**
  - **Load Effects**

- **Import to Current Job** - Enabled when viewing stills from other Jobs via search/filter
- **Export Stills** - Export Cortex or JPEG stills from your active store.
- **Import Stills** - Import Cortex or JPEG stills to the **Imported Stills** store.
- **Import Color from ALE/EDL/CDL** - Import color decisions via ALE/EDL/CDL into the **Imported CDLs** Store
- **Delete** - Delete the selected still.

Exporting Stills

Stills can be exported from any Image Store, or via the Project Manager for the Still and Timeline stores.
In the desired Image Store, **select** the Still(s) you want to export, right-click and choose **Export Stills.**
When exporting stills from the Image Store,
Cortex provides the following options:



File Types - Which kind of Stills to export

- All - Export both types of stills
- Cortex (.still) - Export stills in a format readable by other Cortex systems
- JPEG (.jpg) - Export stills as standard JPEG files

Name Stills By - Select the file naming convention

- Scene-Take-Camera
- Filename
- Verbose (includes S/T/C and Filename info)

Exporting Stills via a Job in the Project Manager

To Export stills located in a job, right-click on the job in the Project manager and choose “Export Stills…”
Cortex provides options to export stills from:

- All (meaning both from the Still Store and Timeline Store)
- Still Store
- Timeline

Specify an output file location using the **Browse** button, then click **Export**.

Memories

You can save up to 6 color corrections by storing them in the Memories buffers.
Above the Still Stores are 6 buttons for saving user defined color corrections.

The Keyboard shortcuts are as follows:

Ctrl+Shift+Delete	Save MEM 1
Ctrl+Shift+End	Save MEM 2
Ctrl+Shift+PgDn	Save MEM 3
Ctrl+Shift+Insert	Save MEM 4
Ctrl+Shift+Home	Save MEM 5
Ctrl+Shift+PgUp	Save MEM 6
Shift+Delete	Recall MEM 1
Shift+End	Recall MEM 2
Shift+PgDn	Recall MEM 3
Shift+Insert	Recall MEM 4
Shift+Home	Recall MEM 5
Shift+PgUp	Recall MEM 6

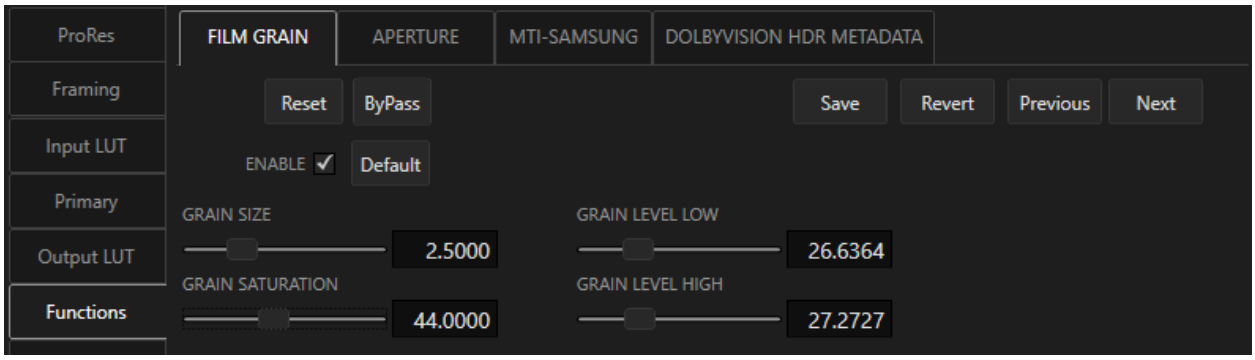
To use the mouse, replace the keys with the corresponding buttons.
If a Memory button position is unused, it will be Dim.
If a color correction has been saved to a button position it will be White.
The last recalled Memory will be Green.

The Functions Tab

The Functions tab provides modules to add grain, aperture correction, adjust settings for MTI-Samsung resizing, and processing of Dolby Vision™ Level 1 analysis.

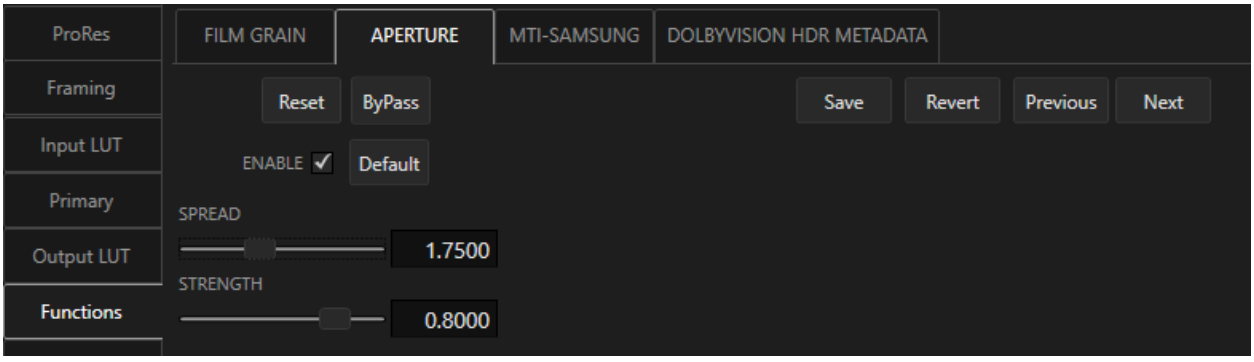
Note: Grain and Aperture Correction settings are "baked in" to Deliverables and do not carry as metadata in CDL files. However, they are passed on as metadata in Cortex Manifest Files.

Film Grain



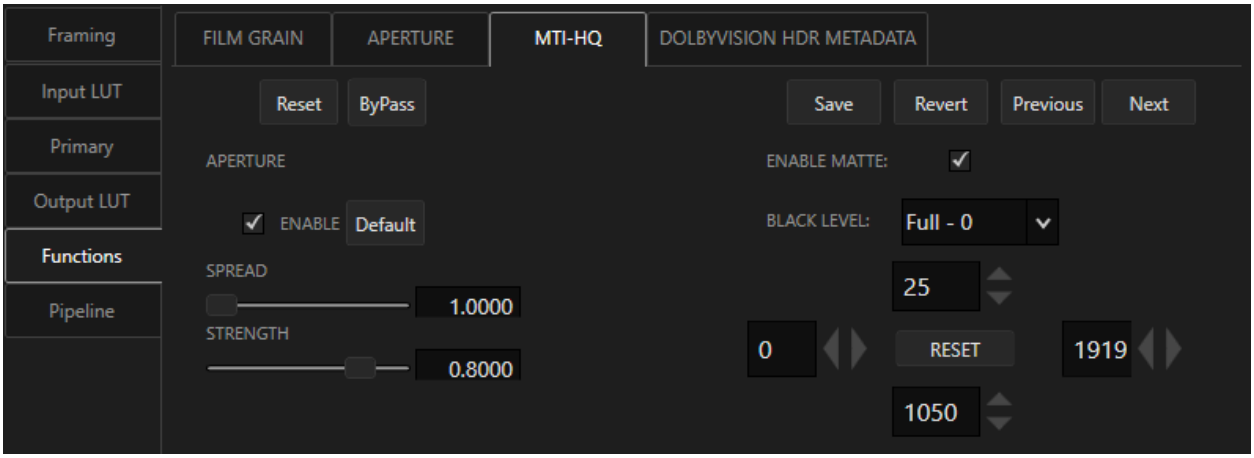
Grain Size	Create larger or smaller Grain
Grain Saturation	Color saturation of the grain
Grain Level Low	Make the grain more or less apparent in dark regions of the frame
Grain Level High	Make the grain more or less apparent in light regions of the frame

Aperture Correction Settings



Spread	Determines the amount of noise suppression
Strength	Determines the strength of edge detection

MTI HQ



If your Deliverable is set to resize using MTI HQ, the MTI HQ module will be available. MTI HQ supports progressive and interlaced frames.

The Aperture function is duplicated from the Aperture Tab and will be identical in both places. To enable

Matte Function for MTI HQ

When upscaling video that contains a letterbox or pillarbox matte, the matte line can be compromised by the rescaling. To avoid this, MTI HQ provides a matte replacement function.

1. Choose the Black Level; either Full-0 or Legal-64 per code values
2. Click on the arrow buttons to adjust the vertical or horizontal position of the matte
    a. Hold down the Shift button to increase the rate the matte moves

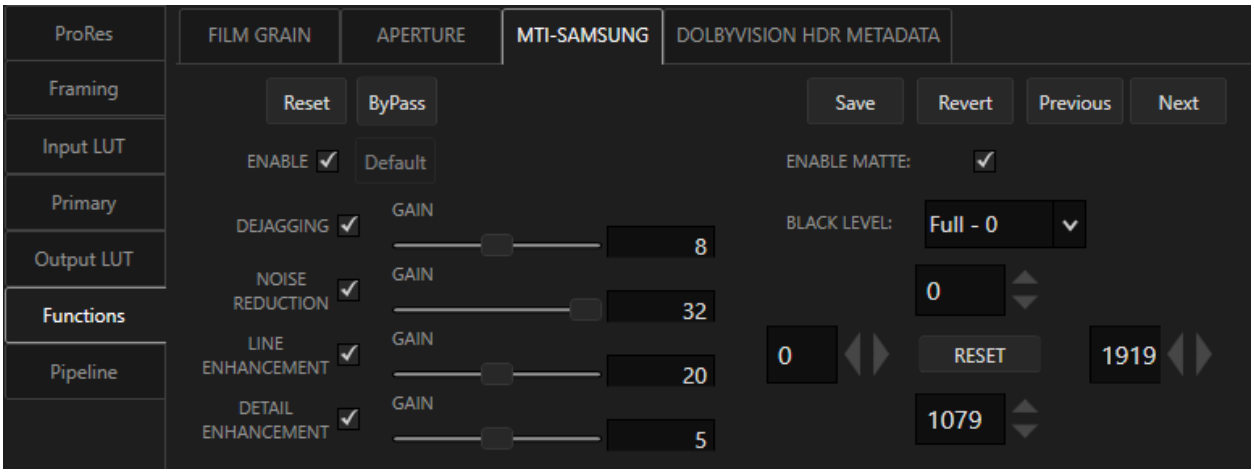
Note: For Preview purposes, the matte will be gray in order to show better the difference between the original matte and what will be the replacement. It will be rendered black according to the level setting.

3. Zoom in on the edge of the original matte
    a. Scroll the mouse wheel up to zoom and left click and drag to position the frame in the Media Player, or click the 1:1 button for a pixel to pixel view of the image
    b. Double click the image to return to full frame view

Make sure that the original matte is completely covered by the gray matte. Repeat the operation for all sides of the matte and then save the setting by clicking the Save button or pressing Ctrl+S.

Note: When used in a composition, the matte can be enabled or disabled on a shot by shot basis. For best results with MTI HQ, it is recommended to enable the default Aperture setting for all affected clips or composition shots.

MTI-Samsung



If your Deliverable is set to resize using MTI-Samsung, the MTI Samsung module will be available. MTI-Samsung only supports progressive frames. For interlaced frames, use MTI HQ.

Dejagging	Smooths aliasing
Noise Reduction	The default is the recommended setting
Line Enhancement	Particularly helpful for upresing animation
Detail Enhancement	Enhances the amount of detail brought out by the resizing

It is best to use an SDI monitor to observe the effect of settings changes. If no SDI monitor is available, use the 1:1 button  located at the bottom of the UI for a pixel to pixel view of the settings' effect.

Matte Function for MTI-Samsung

When upscaling video that contains a letterbox or pillarbox matte, the matte line can be compromised by the rescaling. To avoid this, MTI-Samsung provides a matte replacement function.

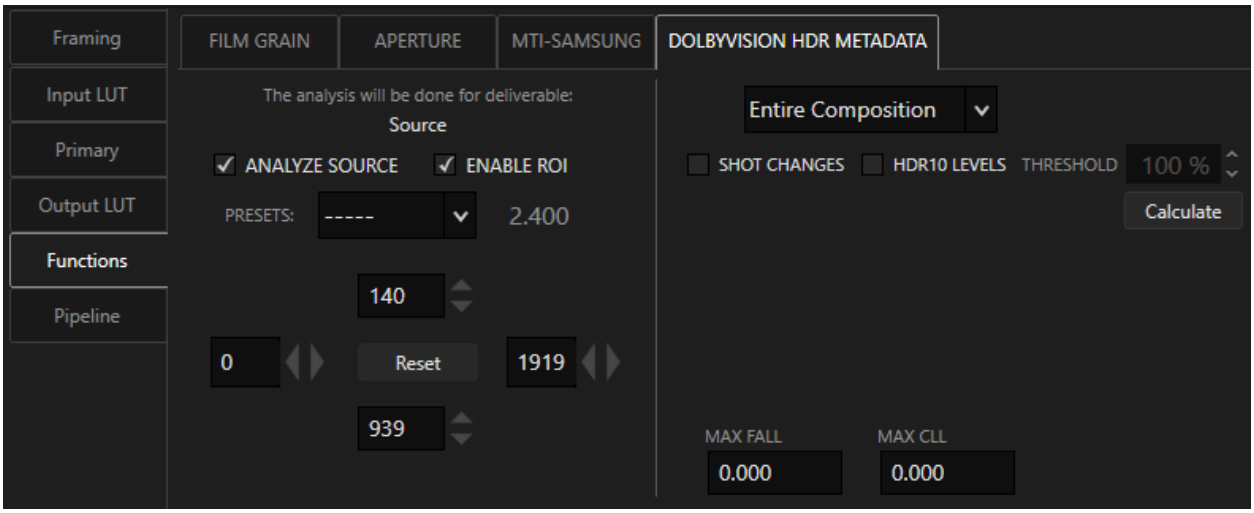
1. Choose the Black Level; either Full-0 or Legal-64 per code values
2. Click on the arrow buttons to adjust the vertical or horizontal position of the matte
    a. Hold down the Shift button to increase the rate the matte moves

Note: For Preview purposes, the matte will be gray in order to show better the difference between the original matte and what will be the replacement. It will be rendered black according to the level setting.

3. Zoom in on the edge of the original matte
    a. Scroll the mouse wheel up to zoom and left click and drag to position the frame in the Media Player, or click the 1:1 button for a pixel to pixel view of the image
    b. Double click the image to return to full frame view

Make sure that the original matte is completely covered by the gray matte. Repeat the operation for all sides of the matte and then save the setting by clicking the Save button or pressing Ctrl+S.

Creating Dolby Vision™ Level 1 HDR Metadata



Cortex Supports the processing of Level 1 Dolby Vision™ (DoVi) metadata. For example, if an HDR 10 master needs to be converted to DoVi there are different methods for doing that outside of Cortex, generally by tying up a color bay. With Cortex Enterprise, you can generate Level 1 DoVi metadata by using a Cortex created composition.

If you're not familiar with Cortex's Edit Tool, you should review it prior to this section since a composition is essential for processing Dolby Vision™ metadata. The Edit Tool

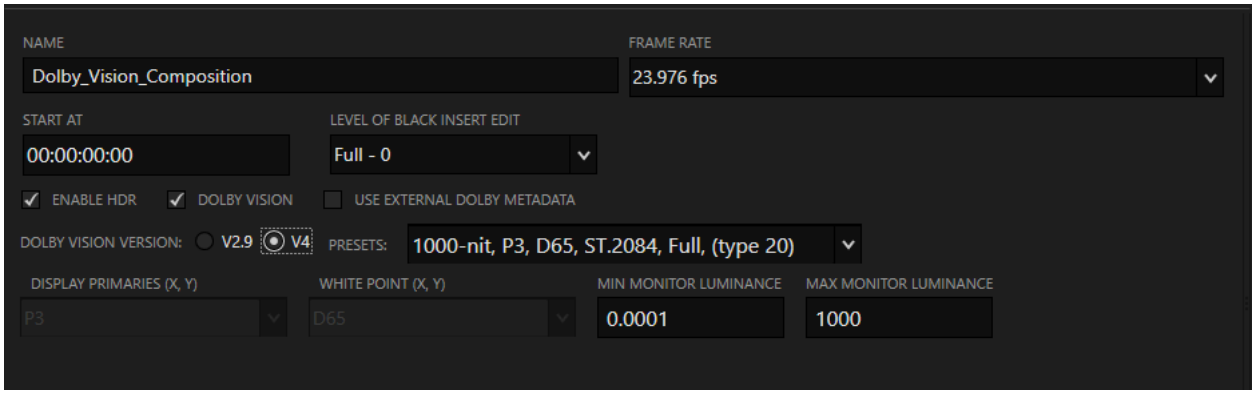
Follow the steps below to create a DoVi composition.

Edit Tool Steps for Creating a Dolby Vision™ Composition

1. In the Edit Tool, create a new composition by clicking the New button
2. Select “Composition” from the Drop-down menu

Note: For this tutorial, we will focus on a normal Composition rather than an IMF Composition since we’ll be covering IMF creation in the Edit Tool tutorial.

3. In the Create dialog, enter the timecode for the START AT field
4. Enter the Black Level, either Full-0 or Legal-64, for insert edits using the Shift+H command



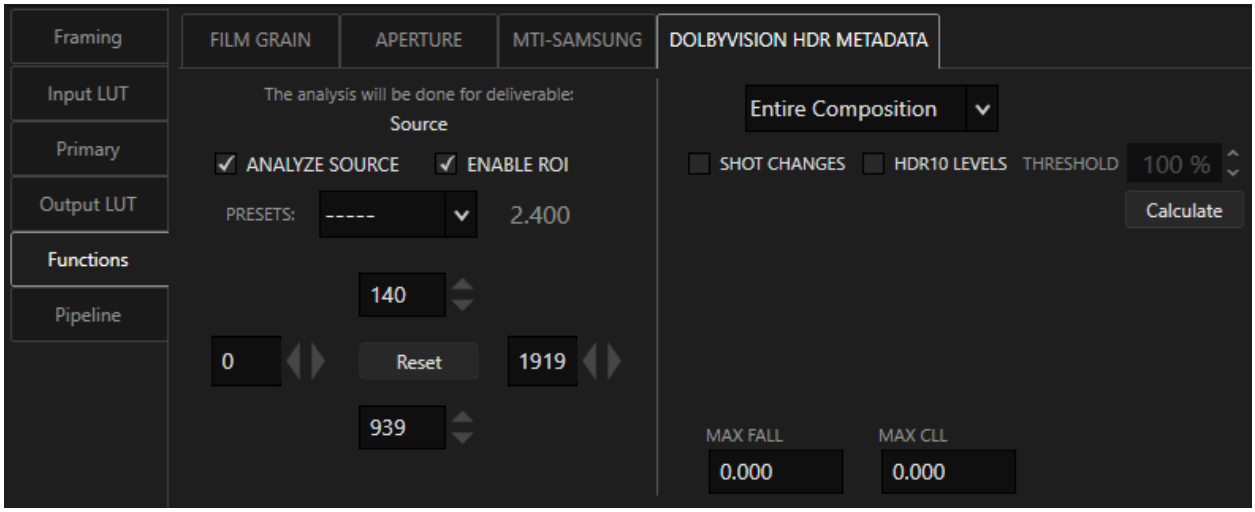
5. Check the ENABLE HDR and Dolby Vision™ checkboxes
6. Choose the DoVi version, either v2.9 or v4
7. From the PRESETS Drop-down field, choose which monitor type was used
8. If needed, modify the MIN and MAX Monitor Luminance fields
9. Click Create

Using the Edit Tool, create the composition. Right-click anywhere on the timeline to show the Context Menu and, if a corresponding EDL is available, select Merge EDL or the “Detect Shot Change” option if no EDL exists. If using the “Detect Shot Change” option, be sure to vet the cuts to ensure there are no false positives or negatives.

Color Tool Steps for Processing Dolby Vision™

Once the composition is ready and the cuts are vetted:

1. Switch to the Color Tool
2. Make sure the composition is selected and that the Metadata track (M) is visible though empty.
3. Choose the “DolbyVision HDR Metadata” tab

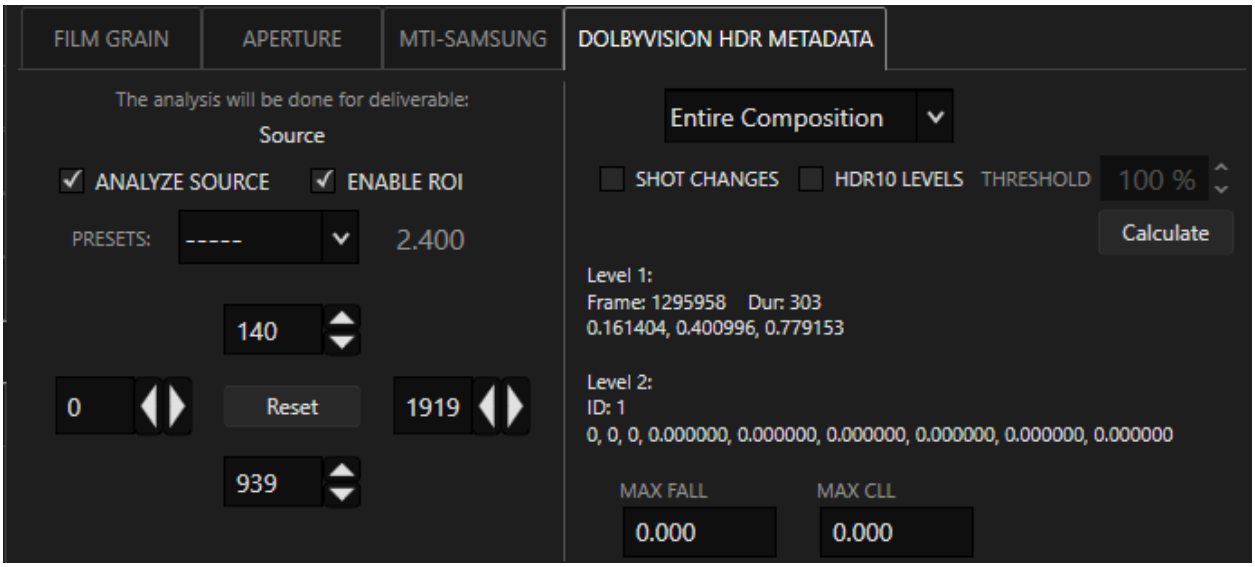


4. If you wish to Analyze the source media, enable the ANALYZE SOURCE checkbox. Disabling it will allow you to choose a specific Deliverable’s color pipeline for the analysis by selecting its Deliverable tab above the Media Player.
5. If the picture content contains a matte, the analysis must exclude the matte from the analysis. To exclude the matte from analysis:
    a. Check the ENABLE ROI checkbox and choose an aspect ratio from the PRESETS Drop-down list. An ROI with Red line boundaries will appear.
    b. As needed, adjust the boundaries of the ROI with the arrow buttons.
6. If no EDL was merged or shot detection was not run in the Edit Tool, enable the SHOT CHANGES checkbox. You will still have to vet the cuts after the analysis.
7. If you wish to generate and include HDR 10 metadata for MAX FALL and MAX CLL enable the HDR 10 LEVELS checkbox and enter a value for the THRESHOLD. The value entered serves as the percent of the total number of frames that will determine the MAX FALL and MAX CLL values. As an example, if the media contains 1000 frames and the threshold is set to 98%, 2% of the frames (20) with the highest values will be omitted from the final result.

Note: It is not necessary to include these values in a DoVi Deliverable but is available in the event HDR 10 Deliverables are required

8. Press Calculate

The Metadata track will turn purple and the analysis will begin. Once the analysis is complete, the metadata track will turn blue and the Level 1 values will be displayed on the right side of the module.



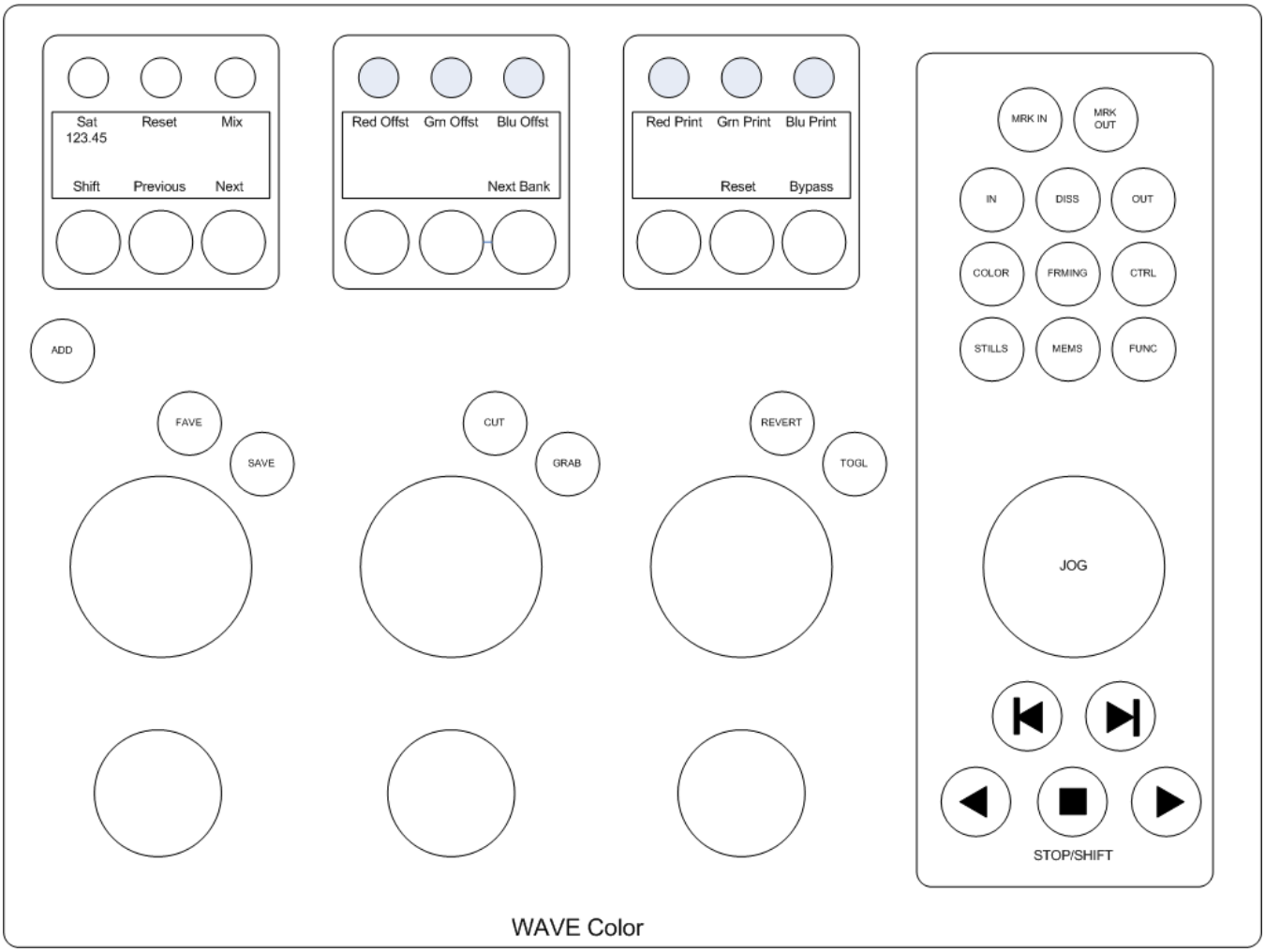
Note that Level 2 (Trims) are unaffected. Cortex does not support changing Level 2 and, therefore, does not require you to purchase a license issued by Dolby.

Pipeline Tab

To confirm all color, framing, LUT and Device Transform settings, click the Pipeline tab. This gives you a full list of the active clip's color tool and ACES settings (if applicable), based on the Deliverable configuration currently in the preview monitor.

The items colored magenta are found in the Deliverable configuration. To modify any of these settings, click the Edit Config button to open the configuration window for editing.

Wave Panel Button Functions



Wave Button Function	Qwerty Keyboard Equivalent
ADD	G - Add event to Clip Reel
SAVE	Ctrl+S - Save current color correction
MEMS	Please see Keyboard shortcuts
CUT	N - compare with current still
MODE	~ - Toggle Lift Gamma Gain/Printer Lights
GRAB	B - grab picture to Still Store
REVERT	A - Revert to saved color correction
TOGL	T - Toggle last two viewed color corrections
SCREEN	F11 - Toggle Full Screen/GUI
WFVS	F12 - Toggle Waveform and Vectorscope in Full Screen
MEMS	Show Mems menu
DISS	P - Add dissolve
GRAIN	F2 - Repeat to cycle to Grain Tool tab
COLOR	F2 - Repeat to cycle to Primary Tool tab
FRAMING	F2 - Repeat to cycle to Framing Tool tab
TIMLIN	L - Go to Timeline Still Store
LUTS	Ctrl+L - Go to LUTs still store
STILLS	; - Go to Still Store
FAVES	‘ Go to Faves Still Store
Imported Stills/CDLs	Shift+’ - Toggle Imported Stills/CDLs

Keyboard Shortcuts

For all Color shortcuts, use the top row keyboard numbers unless otherwise indicated

Navigation	Description
Q or J	Switch focus to Clips Bin
W or K	Switch focus to Composition
E or Up arrow	Go to previous clip or edit (when focused on composition)
R or Down arrow	Go to next clip or or edit (when focused on composition)
Shift + S	Go to previous edit (if focus is on clips bin, first press switches to composition)
Shift + F	Go to next edit (if focus is on clips bin, first press switches to composition)
X	Play reverse (press 2x or 3x for faster playback)
Shift + X	Go to center of selected clip
C	Stop
V	Play forward (press 2x or 3x for faster playback)
Shift + V	Play forward from middle of clip or segment
Ctrl + V	Loop Play from mark in to mark out
S	Step reverse one frame
F	Step forward one frame
Space Bar	Toggle Play/Stop
Composition Timeline	
Shift - (minus)	Zoom out timeline
Shift + (plus)	Zoom in timeline to cursor position
Ctrl + Shift - (minus)	Zoom out entire timeline
Mouse Wheel	Zoom timeline in/out while hovering mouse over timeline
Ctrl + Mouse Wheel	Scroll timeline left/right.

Marks	Description
I	Mark In
Shift + I	Go to Mark In
Ctrl + I	Clear Mark In
O	Mark Out
Shift + O	Go to Mark Out
Ctrl + O	Clear Mark Out
Alt+Shift+ I and O	Clear Mark In and Mark Out on both source and composition
Z	Mark entire clip or segment
Color Tool Commands	Description
FUNCTION KEYS	
F2 (Shift to reverse)	Select Color Tool and Cycle through Function Tabs
F11	Toggle Full Screen On/Off
F12	Toggle Waveform/Vectorscope and Sync fields or Timeline
Shift+F12	Move Waveform/Vectorscope to Media Player
Ctrl+F12	Turn off Waveform/Vectorscope in Media Player
Ctrl+Shift+F12	Undock and float Waveform/Vectorscope
ALT+F12	When in Editorial Hybrid - show sound Mark Window
ARROW KEYS *(Use Shift and Ctrl for greater/lesser increments)*	
Up arrow	Increase value when cursor is located in field box
Down arrow	Decrease value when cursor is located in field box
COLOR – Lift Gamma Gain Mode	
~	Toggle Lift Gamma Gain and Printer Lites modes
1	Select Lift; adjust luminance with up/down arrows
1 – Press and Hold	Select Lift; adjust red with up/down arrows; adjust blue with left/right arrows
Ctrl+1	Reset Lift
2	Select Gamma; adjust luminance with up/down arrows
2 – Press and Hold	Select Gamma; adjust red with up/down arrows; adjust blue with left/right arrows
Ctrl+2	Reset Gamma

3	Select Gain; adjust luminance with up/down arrows
3 – Press and Hold	Select Gain; adjust red with up/down arrows; adjust blue with left/right arrows
Ctrl+3	Reset Gain
4	Select Saturation; adjust with up/down arrows
Ctrl+4	Reset Saturation
COLOR – Printer Lites Mode	
~	Toggle Lift Gamma Gain and Printer Lites modes
1	Select Red channel
Ctrl+1	Reset Red channel
2	Select Green channel
Ctrl+2	Reset Green channel
3	Select Blue channel
Ctrl+3	Reset Blue channel
COLOR – COMMON COMMANDS	
4	Saturation
5	Reset all color to unity
SHIFT+5	Reset all color to unity and clear LUTs
6 – Press and hold	Bypass color correction except LUTs
Shift+6 – Press and hold	Bypass color correction and LUTs
8	Load all corrections of Previous clip(s) or segment(s)
SHIFT+8	Load color correction only of Previous clip(s) or segment(s)
Ctrl+8	Show correction menu for Previous clip(s) or segment(s)
9	Load all corrections for Next clip(s) or segment(s)
SHIFT+9	Load color correction only of Next clip(s) or segment(s)
Ctrl+9	Show correction menu for Next clip(s) or segment(s)
T	Toggle pending and existing corrections
A	Revert to saved correction and reject pending
Ctrl+S	Save Correction (Autosave occurs when another clip is selected)

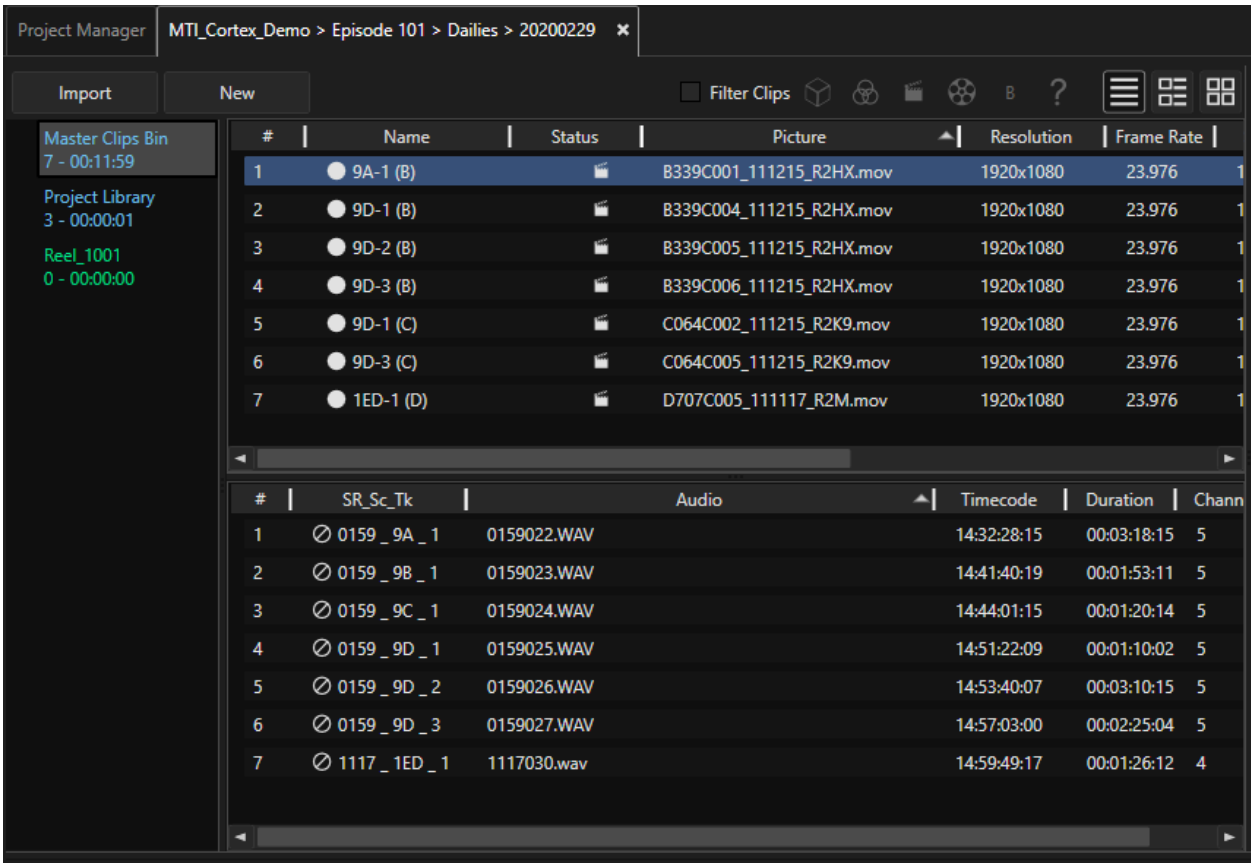
Ctrl+A	Select all clips or segments
STILL STORE	
B	Grab a still
N	Cut to still (toggle)
Shift+N	Load color settings from still
Ctrl+Shift+N	Go to clip of selected still
L	Select Timeline store
; (semicolon)	Select Still Store
‘ (apostrophe)	Select Faves store
Shift+‘ (apostrophe)	Toggle Imported Stills/Imported CDLs
Ctrl+L or Ctrl+‘(apostrophe)	Select LUTs store
0 (zero)	Toggle “Fave” status of selected still
DISSOLVES	
P	Add dissolve
[	Mark or Re-mark dissolve in
]	Mark or Re-mark dissolve out
Ctrl+P	Remove dissolve (cursor must be on or at beginning of the dissolve)

The Sync Tool

The Sync Tool is used predominantly to synchronize audio and picture for Dailies use. However, it can be used, for example, to synchronize a reel of a movie prior to its use in a DCP composition.

The basic operation of the tool is to import picture and corresponding audio into a Job, select a picture clip and use the Auto-Sync options. The tool also provides for manual syncing if needed.

The Master Clips Bin



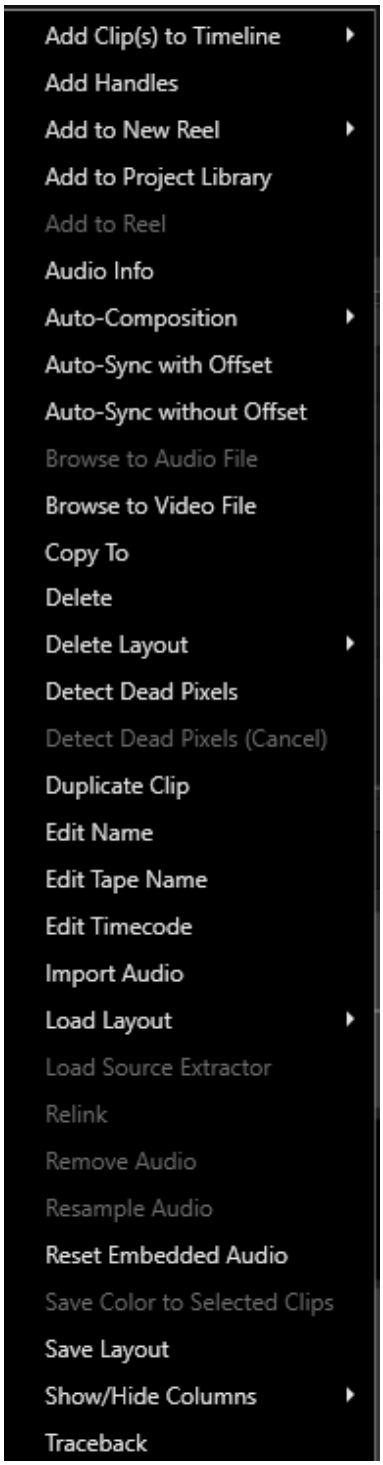
In the Sync Tool, the Master Clips Bin is divided in two sections, video and audio. When media is imported, Cortex places the media in their corresponding sections.

While Cortex allows for dailies operations to be done in any order. The following is a description of a typical dailies session.

1. Import picture and audio files
2. Using the Sync Tool, synchronize the audio to picture
    a. Double check sync and verify metata
    b. Create a Clips Reel
3. Color Correct (using Color Tool)
    a. Add clips to the reel and “Close” the reel when it is completed

If you have one workstation, you can continue working in the foreground while rendering in the background. With multiple workstations licensed for the Enterprise Edition, rendering can be distributed for greater efficiency if each workstation is attached to a central database server.

NOTE: Clips on “Closed” Clip Reels cannot be modified. Therefore, Cortex will block the “reuse” of a clips once it is added to a clips reel unless the reel is open or the clip is duplicated. Modifying a clip on an open reel, including changing In/Out marks, will cause the clip to be rerendered.

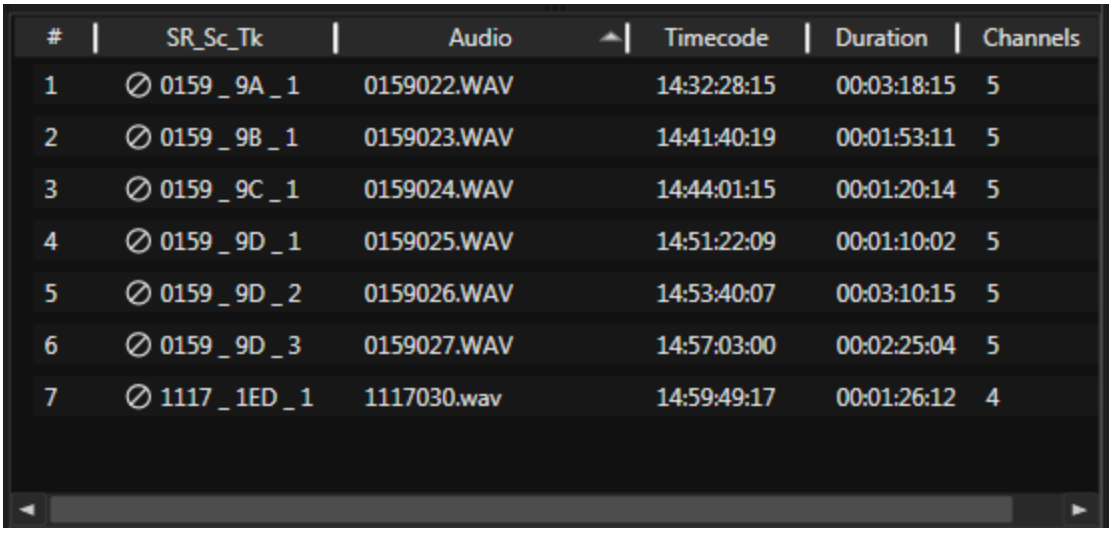


The highlighted options in yellow are NOT available in the Sync Tool:

Add Clip(s) to Timeline	Various options how to add clips to timeline
Add Handles	Add Handles to clips in reel prior to rendering
Add to New Reel	Add clips to newly created reel to be rendered
Add to Project Library	Add a clip(s) to the Project Library
Add to Reel	Add clip(s) to selected Reel
Audio Info	When available shows audio metadata
Auto-Composition	Create a composition using start TC and fps
Auto-Sync with Offset	Sync audio to pix using established offset
Auto-Sync without Offset	Sync audio to pix matching pix TC
Browse to Audio File	Open containing folder of audio
Browse to Video File	Open containing folder of video
Copy To	Open Copy Tool dialog for selected clip(s)
Delete	Delete selected clip(s)
Delete Layout	Delete a user defined bin Layout
Detect Dead Pixels	Show Dead Pixel Dialog (switch to QA Tool)
Detect Dead Pixels (cancel)	Cancel Detection processing
Duplicate Clip	Duplicate clip for alternate versions
Edit Name	Edit the clip name
Edit Tape Name	Edit the clip's Tape Name
Edit Timecode	Change the Frame rate of the clip
Import Audio	Import corresponding .wav file to pix clip
Load Layout	Load a user defined bin Layout
Load Source Extractor	After import Media Folder (fast), enable video
Relink	Relink media to new location after being moved
Remove Audio	Remove embedded audio from clip
Reset Embedded Audio	Reset embedded audio to clip after removal
Save Color to Selected Clips	In Color Tool save pending color to clips
Save Layout	Save user defined Layout
Show/Hide Columns	Toggle visibility of bin columns
Traceback	Open Traceback dialog for imported EDL

The Audio Bin

The audio bin displays all imported audio files that have not yet been synchronized.



#	SR_Sc_Tk	Audio	Timecode	Duration	Channels
1	⊘ 0159 _ 9A _ 1	0159022.WAV	14:32:28:15	00:03:18:15	5
2	⊘ 0159 _ 9B _ 1	0159023.WAV	14:41:40:19	00:01:53:11	5
3	⊘ 0159 _ 9C _ 1	0159024.WAV	14:44:01:15	00:01:20:14	5
4	⊘ 0159 _ 9D _ 1	0159025.WAV	14:51:22:09	00:01:10:02	5
5	⊘ 0159 _ 9D _ 2	0159026.WAV	14:53:40:07	00:03:10:15	5
6	⊘ 0159 _ 9D _ 3	0159027.WAV	14:57:03:00	00:02:25:04	5
7	⊘ 1117 _ 1ED _ 1	1117030.wav	14:59:49:17	00:01:26:12	4

Audio files are automatically added to the audio bin if they are located in a folder in the same directory path as the video media, otherwise import them separately.

If a video file has corresponding audio with identical start timecode, for example a finished master, you can add an audio file directly to a picture by right-clicking on the picture clip and selecting **Import Audio**. A browser will open allowing you to navigate to the audio file.

If the audio file is located within the same folder as the picture, it will automatically be synched to the clip as long as the two files have identical start timecodes. In the event the timecodes are not identical, the user can use the Sync Tool toolset.

Audio Metadata

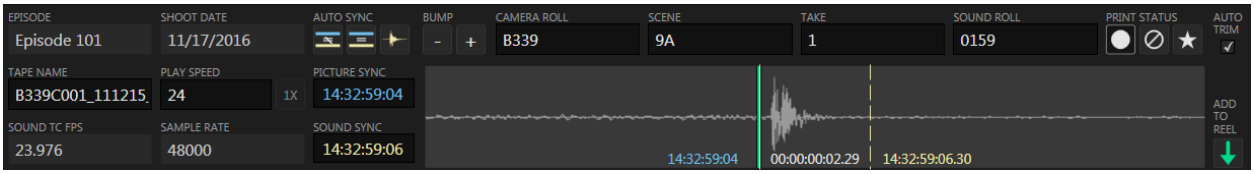
After import, the audio clip will be displayed with the following metadata

- **#** - Import order
- **SR_Sc_Tk** - Sound Roll/Scene/Take info & status. The symbol to the left indicates the clip's status- Circled, Excluded or Starred. Clips are Circled by default.
- **Audio** - Audio file name
- **Timecode** - Clip start timecode
- **Duration** - Clip duration
- **Channels** - Number of channels detected in the clip.

You can right-click each audio clip and select from the following options:

- **Audio Info** - Display audio file properties
- **Resample** - Make changes to the output frames per second and/or sample rate
- **Delete** - Remove the audio clip from the bin
- **Relink** - Relink missing media files by pointing to a new source folder.
- **Browse to Audio File** - Browse to the folder containing the selected source audio files
- **Edit Timecode** - Edit the start timecode and/or framerate of the audio clip.

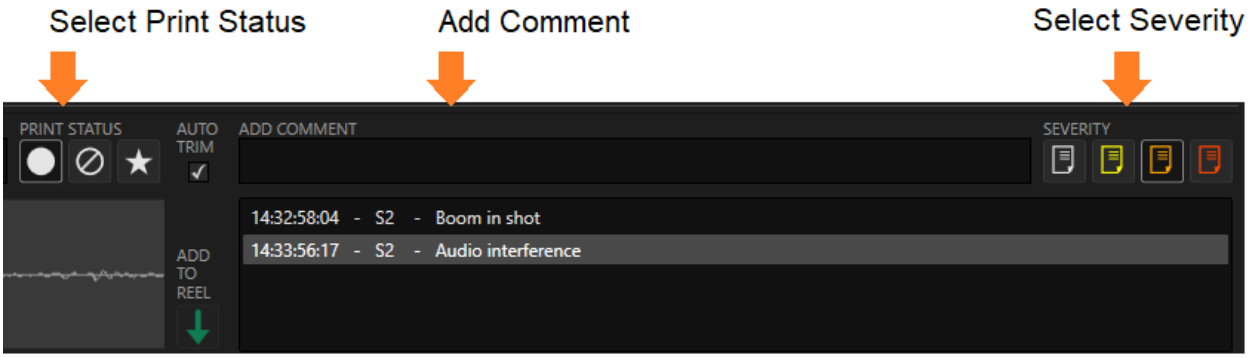
Metadata Input



Metadata will be automatically read from the video and audio files where available and can be modified by the user. If no metadata is available, press the Tab key to navigate to each metadata field and manually enter information. Pressing the Up and Down arrow keys will change the values in increments of one based on the last letter or number in the last entry. For example, if the take number of the last entry is 2, pressing the Up arrow will increase the value to 3.

Metadata Field	Source
Camera Roll	Video File
Scene	Audio File
Take	Audio File
Sound Roll	Audio file
Episode	Project Manager
Play Speed	Video File
Shoot Date	Project Manager
Tape Name	Video File
Sound TC FPS	Audio file
Sample Rate	Audio File

Additional Metadata entry



Users can also add additional metadata about a clip:

- **Print Status** - There are three options: Circled, Not Circled, or Starred. The user assigns a single Print Status to the clip. Whether a clip is added to a deliverable is determined by which print status options were enabled when the deliverable was created. For example, if a DNx36 deliverable has all three statuses enabled, all clips will be added to that deliverable for rendering. If, however, an H.264 only has Circled and Starred takes enabled, it will exclude any Not Circled clips.
- **Comment** - Add a comment at current timecode with specified severity (0-3).

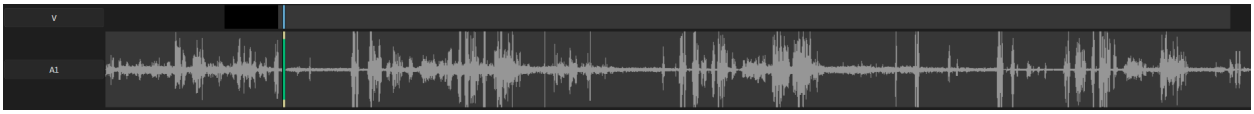
Modifying Multiple Clips

To modify multiple clips, hold the Shift key while clicking to select a span of clips, or hold the Ctrl key while clicking to individually add or remove clips from the selection. You can then modify the Camera Roll, Scene, Sound Roll, Print Status, and Comments fields. The Take field cannot be modified.

Synchronization Tools

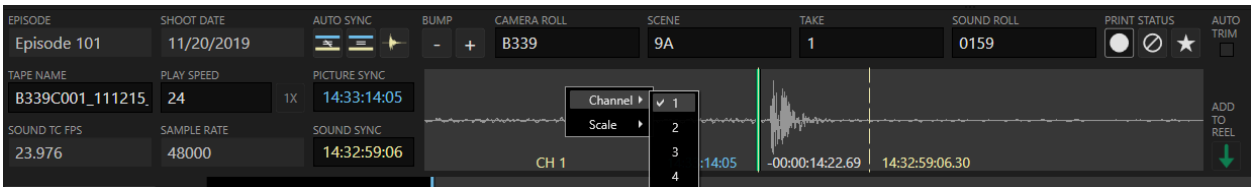
Timeline

The selected clip timeline consists of both Video and Audio tracks. The timeline represents the length of the Video clip and expands to include the full length of the synchronized audio when the audio is longer than the video.



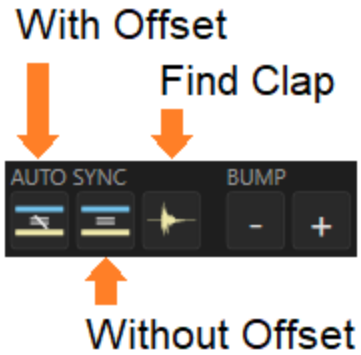
Once audio and video are synchronized, the tracks will be locked together during navigation.

Mark Window



The Mark Window provides a magnified view of 7 frames of the active area of the sound track where the user can mark the exact timecode position of the sync point to within a quarter frame. The video timecode is displayed in blue on the left of the Playhead and the audio timecode is displayed in yellow on the right. The Offset, meaning the difference between the video and audio timecodes, is displayed in white within the playhead, which begins at the serrated yellow line.

To change which audio channel is being displayed, right-click and choose from the extended menu.
The scale of the waveform can also be modified.



The Auto Sync buttons allow for Sync with Offset, Sync without Offset, and Find Clap within Mark Window. The Bump **-** and **+** buttons bump the audio by one frame. Hold the Ctrl key to bump a quarter frame.

Synchronizing Audio and Video

Auto-syncing a single clip

Auto-syncing a single clip uses the video timecode as a control against which Cortex scans the audio files for a matching timecode.

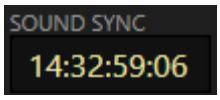
1. Select the video clip to be synchronized
2. Navigate to the slate close (clap) point (while it is not required, it is recommended)
3. Select an auto-sync option via the UI buttons or keyboard shortcuts
    a. Auto-sync with Offset (\ key) - uses the established timecode offset
    b. Auto-sync without Offset (Shift+\) - matches audio timecode to video timecode
4. If the clap waveform is visible in the Mark Window but off by a frame or more, click the Find Clap button or press the D key to auto-refine the sync. You can also just click on the Mark Window near the clap waveform. With either method, doing so will add a “Slate Icon”  to the clip Status column in the Master Clips Bin
5. If the sync is correct, you can add the clip to the Clips Reel by pressing the G key or clicking the Add to Clip Reel button  . If you want to color the clips prior to adding them to a reel, jump to the next clip with the R or Down arrow key in order to continue syncing. Later, as color is applied, you can add the clips to the reel one by one or group select them and add all at once.

Auto-syncing multiple clips

Auto-syncing multiple clips uses matching timecode or an established offset to define sync.

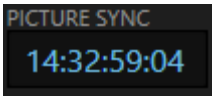
1. Select multiple clips using the Ctrl or SHIFT modifiers
2. Select an Auto-sync option via the UI buttons or keyboard shortcuts
    a. Auto-sync with Offset (\ key) - uses the established timecode offset
    b. Auto-sync without Offset (Shift+\) - matches audio timecode to video timecode
3. It is recommended to check the slate clap of each clip and click the Find Clap button or press the D key to auto-refine the sync. Doing so will add a "Slate Icon"  to the clip Status column in the Master Clips Bin indicating that the take has been checked.
4. If the sync is correct, you can add the clip to the Clips Reel by pressing the G key or clicking the Add to Clip Reel button  . If you want to color the clips prior to adding them to a reel, jump to the next clip with the R or Down arrow key in order to continue syncing. Later, as color is applied, you can add the clips to the reel one by one or group select them and add all at once.

Using Timecode to search for Audio Sync Points

1. Navigate to the desired picture sync frame
2. Press the * key on the Number Pad or click in the Sound Sync field 

3. Input the audio timecode value or enter a + or - before the timecode entry to trim the current position by the input value
4. Press Enter.

Using Timecode to search for Picture Sync Points

1. Navigate to the desired audio sync frame.
2. Press the / key on the Number Pad or click in the Picture Sync field 

3. Input the picture timecode value or enter a + or - before the timecode entry to trim the current position by the input value
4. Press Enter.

Adjusting Clip Synchronization

There are several methods to adjust the synchronization relationship of the picture and audio.

Adjusting audio sync against the current picture frame

1. Navigate to the desired picture frame.
2. Unlock the audio track timeline (U). The picture will remain frozen while the audio clip will be free to navigate.
3. Navigate through the audio until you find the desired sync point (probably a clap).
    a. While in Unlock (U) mode, you can also enter an audio timecode value directly into the Media Player timecode buffer using the number pad; just start typing the timecode, there's no need to click in the buffer.
4. To sync and re-lock the audio you can:
    a. Click in the Mark Window on the magnified waveform where desired
    b. Press the D key to resync to the detected clap waveform within the Mark Window
    c. Press the \ key to use the audio currently located at the playhead.

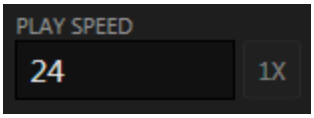
To cancel and return to the original sync relationship, press the U key again or press Esc.

Adjusting the picture sync against the current audio frame

1. Navigate to the desired audio frame
2. Unlock the picture track timeline (Y). The audio will remain frozen while the picture clip will be free to navigate
3. Navigate to the desired picture sync frame
    a. While in Unlock (Y) mode, you can also enter a picture timecode value directly into the Media Player timecode buffer using the number pad; just start typing the timecode, there's no need to click in the buffer.
4. Press the \ key to resync the picture at the current frame.

Changing Clip Play Speed

A clip's play speed can be altered by editing the FPS in the **PLAY SPEED** box. This will adjust playback in the Media Player and all Deliverables.



To return to a clip's original play speed, click the **1X** button.

Note: Play speed only affects the video, not the audio. Audio will play at its native speed.

In and Out Points

You can trim clips manually by using the **Mark In** and **Out** functions.

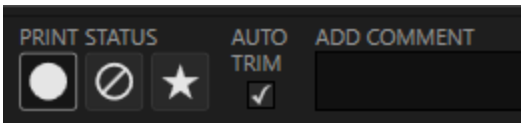
Note: Trimming clips in the Sync or Color tools can only be performed on clips in the Master Clips Bin prior to being added to a Reel.

To trim the head of a clip, navigate to the desired in point and press the **I** key, or click the In button.
To jump to the Mark In, press **Shift+I**.
To clear the Mark In, press **Ctrl+I**.
To trim the tail of a clip, navigate to the desired out point and press the **O** key, or click the Out button.
To jump to the Mark Out, press **Shift+O**.
To clear the Mark Out, press **Ctrl+O**.

To Mark the entire clip, press **Z** or click the **Mark In/Out** button.

AutoTrim

You can automatically trim the head of a clip based upon the sync point by enabling AutoTrim. Navigate to your sync point (usually a slate close) and press the **D** key to refine sync to this point. The head of the clip will be trimmed automatically to 1 second prior to the sync point.



Tail Sticks Syncing

For Tail Sticks:

1. Navigate to the tail stick
2. Press the \ key to sync the clip.
3. Press **Ctrl+D** to refine the tail stick sync if AutoTrim is enabled. This will ignore the AutoTrim option leaving the In-Point at the head of the clip.

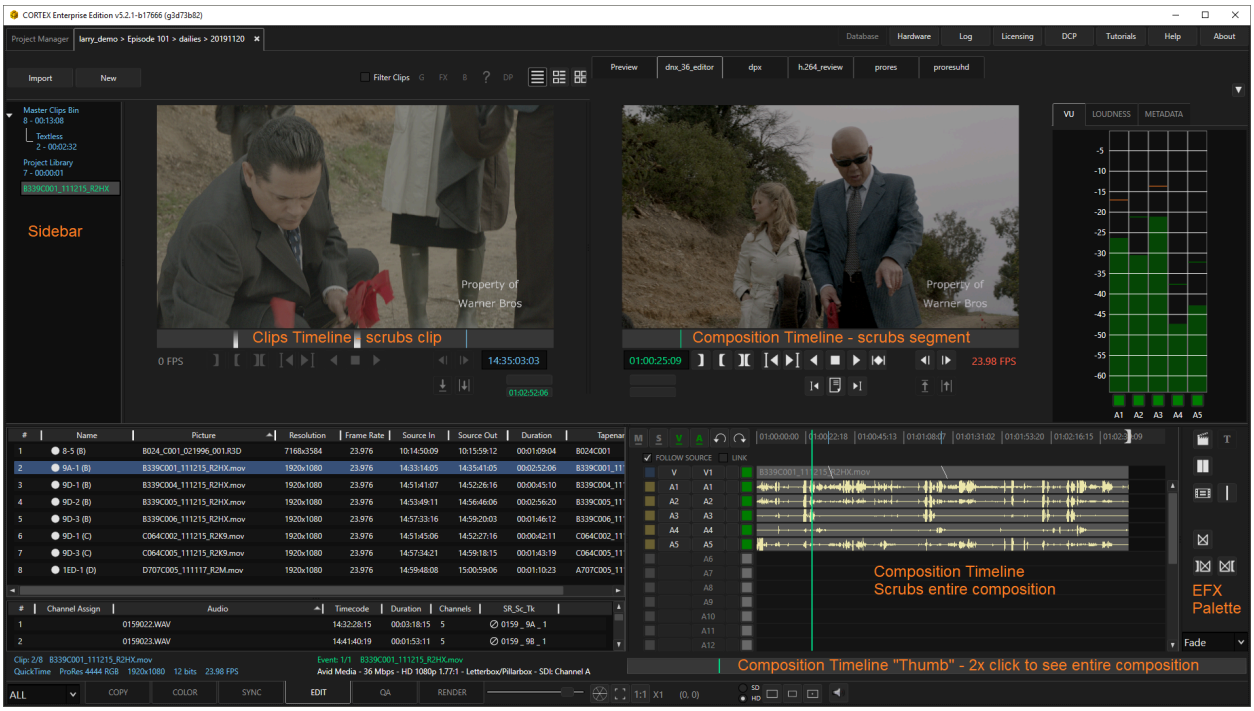
*Note: To modify the In point of a tail stick clip, navigate to the desired in-point and press the **I** key, or click the In button.*

Sync Tool Shortcut Keys

Shortcut Key	Function	Notes
I	Mark In	Shift + I: Go To Mark In Ctrl + I: Clear Mark In
O	Mark Out	Shift + O: Go To Mark Out Ctrl + O: Clear Mark Out
Y	Unlock Video Track	While unlocked, navigation keys move picture only
U	Unlock Audio Track	While unlocked, navigation keys move audio only
\	Auto-Sync with Offset	● When picture and audio are locked: Sync clip using picture and audio timecode difference from previous sync. ● When picture or audio are unlocked: Use current frame for sync point
SHIFT + \	Auto-Sync with No Offset	Sync clip with no timecode difference between picture and audio
D	Auto-detect peak waveform	Syncs the peak waveform in the Mark Window to the current picture frame.
SHIFT + D	Go to Sync Point	
Num Pad	Input clip timecode value	Locate and load a specific timecode position within all picture clips in bin.
/ + Num Pad	Input picture sync timecode	Locate and load a specific timecode position within all picture clips in bin and use it as a sync point.
* + Num Pad	Input sound sync timecode	Locate and load a specific timecode position within all audio clips in bin and use it as a sync point.
Enter	Cue to entered timecode	
Arrow Keys	Increase / Decrease	Increment values in the currently selected metadata field (ie Take 1 to Take 2)
Ctrl + 0	Set comment severity to 0	
Ctrl + 1	Set comment severity to 1	
Ctrl + 2	Set comment severity to 2	
Ctrl + 3	Set comment severity to 3	
Ctrl + 4	Set print status to Circled	
Ctrl + 5	Set print status to Excluded	(Uncircled or B-Neg)
Ctrl + 6	Set print status to Starred	

The Edit Tool

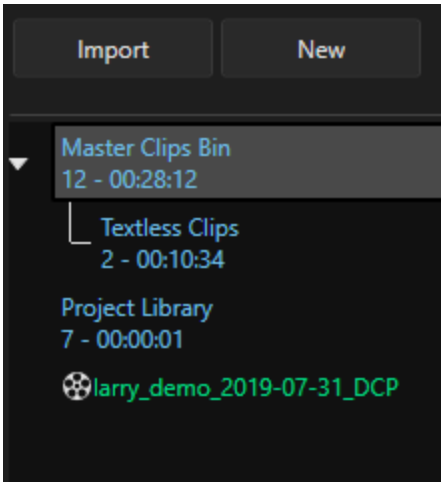
The Edit Tool is a non-linear editor consisting of media bins, a composition timeline and set of function tools that allow the user to perform editorial requirements where Overwrite, Insert, Lift, and Extract are needed. Also provided are a slate generator, trim functions, and video and audio fades.



Parts of the Edit Tool

The Sidebar

The Sidebar is where you'll access your media asset types:



- **Master Clips Bin -** All imported picture and audio media can be found in the Master Clips Bin.
    - Sub-Bins - Cortex provides for the creation of Sub-Bins where media can be moved for organizational purposes.

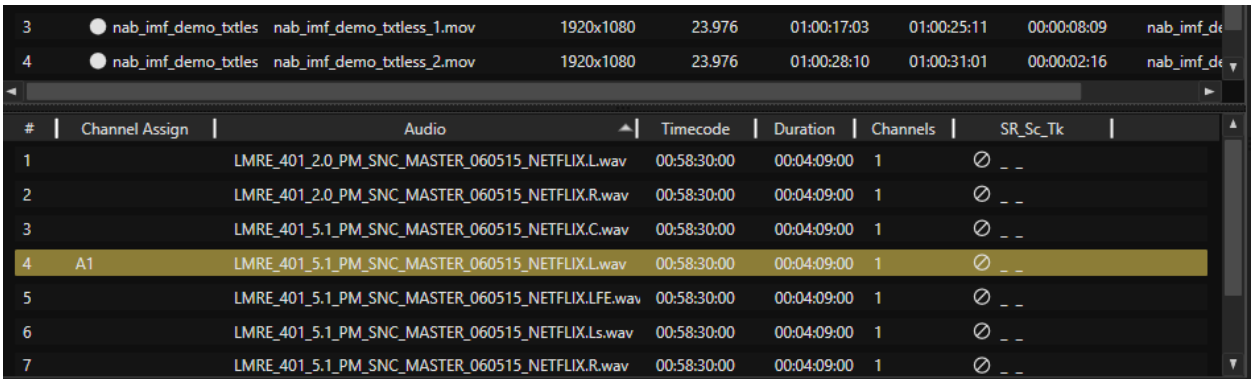
- **Project Library** - A bin containing regularly used media, available across Workflows and Jobs for easy access such as Bars, Black and Slates.

- **Compositions** - All compositions are listed below the Master Clips Bin and Project Library.

The Clips Bin(s)

After being imported in the Edit Tool, picture and audio clips are automatically placed in their corresponding bin.

The Audio Bin displays files that have not been previously synchronized to picture or noted as Wild-Track in the Sync Tool. Typically, only polyphonic files are synchronized in the Sync Tool. Monophonic files are edited in sync using the composition timeline.



3	nab_imf_demo_txtles	nab_imf_demo_txtless_1.mov	1920x1080	23.976	01:00:17:03	01:00:25:11	00:00:08:09	nab_imf_de
4	nab_imf_demo_txtles	nab_imf_demo_txtless_2.mov	1920x1080	23.976	01:00:28:10	01:00:31:01	00:00:02:16	nab_imf_de

#	Channel Assign	Audio	Timecode	Duration	Channels	SR_Sc_Tk
1		LMRE_401_2.0_PM_SNC_MASTER_060515_NETFLIX.L.wav	00:58:30:00	00:04:09:00	1	_ _
2		LMRE_401_2.0_PM_SNC_MASTER_060515_NETFLIX.R.wav	00:58:30:00	00:04:09:00	1	_ _
3		LMRE_401_5.1_PM_SNC_MASTER_060515_NETFLIX.C.wav	00:58:30:00	00:04:09:00	1	_ _
4	A1	LMRE_401_5.1_PM_SNC_MASTER_060515_NETFLIX.L.wav	00:58:30:00	00:04:09:00	1	_ _
5		LMRE_401_5.1_PM_SNC_MASTER_060515_NETFLIX.LFE.wav	00:58:30:00	00:04:09:00	1	_ _
6		LMRE_401_5.1_PM_SNC_MASTER_060515_NETFLIX.Ls.wav	00:58:30:00	00:04:09:00	1	_ _
7		LMRE_401_5.1_PM_SNC_MASTER_060515_NETFLIX.R.wav	00:58:30:00	00:04:09:00	1	_ _

When editing, source clips are generally always visible in the picture and audio bins. However, when working in a composition, you can choose to show the composition's picture edits as a list of events. Right click on the composition in the Sidebar and choose "Show Event List" in the Context Menu. When the event list is active, clicking on any event will jump the timeline playhead to that location. To go back to viewing source clips in the picture bin, right-click the composition again and choose "Hide Event List"

The Project Library

The Project Library provides a bin in which regularly used media can be stored and used across all Workflows and Jobs in a project. Each project can set a specific directory location for its Project Library during initial setup in the Project Manager. Be mindful that the directory location should be able to accommodate the speed of playback required for media placed in it.

Slates created in Cortex are automatically added to the Project Library. Imported media and still image clips must be manually saved to it. Right click on a clip and choose "Add to Project Library" from the Context Menu.

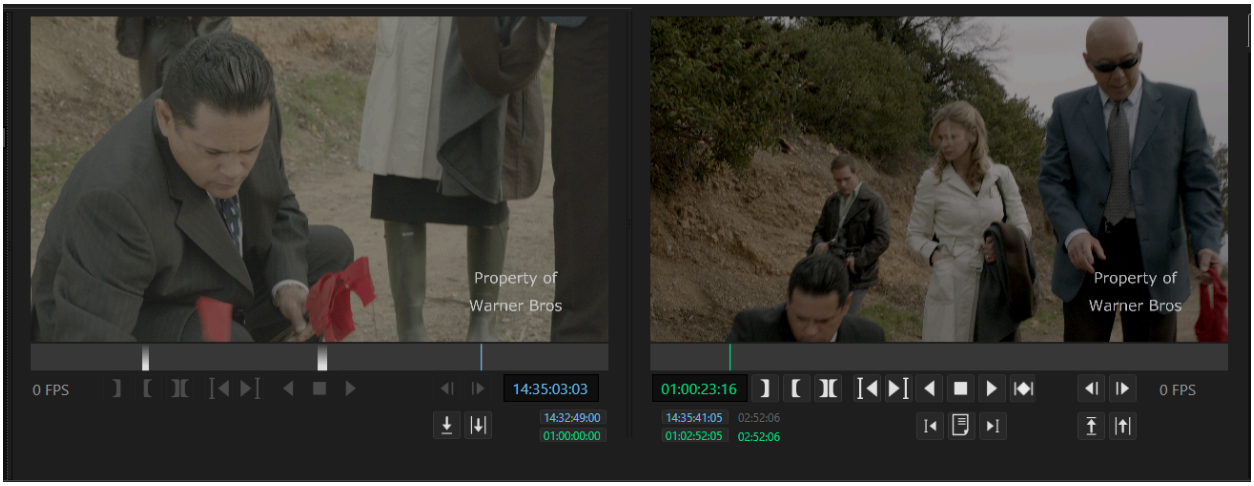
Compositions

When a composition is created it will be listed in the Sidebar beneath the clips bin and project library. Each newly created composition automatically becomes the active composition, displayed in green. To work in other compositions, choose them from the Sidebar.

To duplicate a composition, right-click on the composition in the Sidebar and select Duplicate.

The Media Players

The Edit Tool Media Players are set up for source and record (composition) displays. The left player displays the currently selected source clip; the right player displays the composition's current location.



Switching Focus between the Media Players

To switch focus from the Source to the Composition Media Player:

- Click the desired composition in the Sidebar. The navigation controls will be enabled.
- Press the **W** or **K** keys
- press **Shift**+**S** or **F**. If focus is currently on the Source Player, the first press will switch focus to the Composition Player. Subsequent presses will jump from one event to the other based upon which video and audio tracks are enabled.
- Click any blank space on the Composition timeline.
- Click on the image in the right side media player.

To switch focus from the Composition to the Source Media Player:

- Click on the Master Clips Bin in the Sidebar
- Press the **Q** or **J** keys
- Click on a picture or audio clip
- Click on the image in the left side media player

Note: Pressing the Q or J key repeatedly cycles between the Master Clips Bin and Project Library. Pressing the W or K key repeatedly cycles between Compositions.

Note: If there are gaps between media on the selected timeline track, pressing the E (previous) or R (next) keys will jump to the beginning and end of the next shot.

Navigation Controls

The Media Players provide controls for playback and navigation of their own timeline and for scrubbing. The Source Media Player font types are blue. The Composition Media Player font types are green.

The Source Media Player Controls

The Composition Media Player Controls

Button	Key	Description
	I Shift+ I - Go to, Ctrl+ I - Clear	Mark In Ctrl+Alt I - Clear In of Source & Comp
	O Shift+ O - Go to Ctrl+ O - Clear	Mark Out Ctrl+Alt I - Clear Out of Source & Comp
	Z	Mark Entire Clip
	E or Up Arrow or Shift+ S - Composition	Go to Previous Clip - Source Go to Previous Break - Composition
	R or Down Arrow or Shift+ F - Composition	Go to Next Clip - Source Go to Next Break - Composition
	X - Play Reverse 1x for real time	2x for 2x speed 3x for fast reverse
	C or Spacebar	Stop
	V or Spacebar - Play Forward 1x for real time	2x for 2x speed 3x for fast forward
For Composition	Ctrl+Shift+C	Segment Play
	S or Left Arrow	Jog to Previous Frame
	F or Right Arrow	Jog to Next Frame

Edit Command Buttons

Button	Key	Description
	G	Overwrite Edit to Timeline
	H	Insert Edit to Timeline
	, (comma) or Delete	Lift from Timeline
	/ on keyboard or Ctrl+ Delete	Extract from Timeline

Timeline Comments Buttons

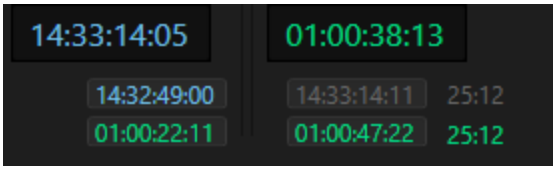
You can add and navigate comments on the composition timeline and then print out pdf reports.

Button	Key	Description
	Ctrl+Shift+S	Go to Previous Comment
	Ctrl+Shift+O	Add Comment
	Ctrl+Shift+F	Got to Next Comment

Timecode Position Registers

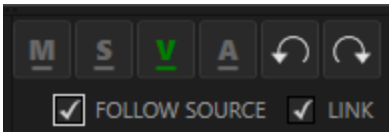
The timecode position display for a Source clip is blue.
The timecode position display for the Composition is green.
When an audio source clip is loaded, it will be yellow.

Timecode Mark Registers



Below the Timecode Position Registers are Timecode Mark Registers and their durations, displayed with corresponding colors.

Timeline Tracks Commands



The Timeline Tracks Commands buttons determine which tracks will be affected by an edit. If the track is enabled, it will be green.

Button	Key	Description
	Metadata Track	Used for Dolby Vision™ Metadata. Press Shift+M Button to add a track or right-click on the timeline and choose Add from menu
	Subtitle Track	Cortex allows for up to 2 Subtitle tracks. Press Shift+S Button to add a track or right-click on the timeline and choose Add from Context Menu
	Y - Video Track	Cortex allows for up to 2 video tracks. Press Shift+V Button to add a track or right-click on the timeline and choose Add from Context Menu
	U - Audio Track(s)	Cortex allows for up to 24 audio tracks. Ctrl+click any track to lock it or Ctrl+Shift+any M, S, V, or A track to lock out all tracks. Shift+Click on any track to enable only those tracks containing media.
	Ctrl+Z	Undo
	Ctrl+Y	Redo

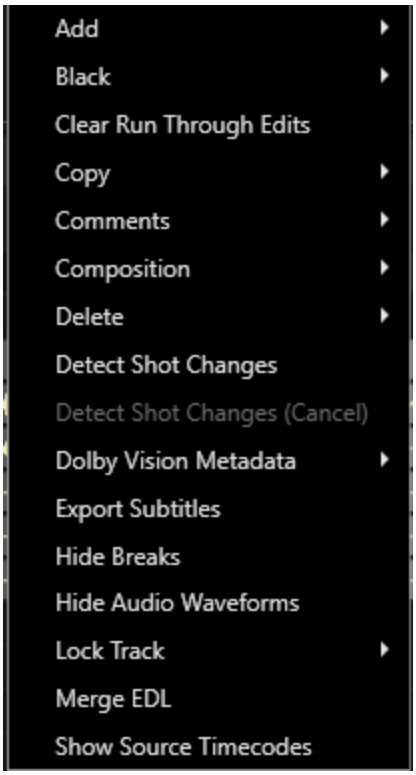
Follow Source Checkbox

If the Follow Source checkbox is enabled, Cortex will automatically enable the corresponding timeline track(s) depending on which source type is selected. For example, if a video-only clip is selected, CORTEX will automatically enable the active video track for editing and disable the rest.

Link Checkbox

The Link checkbox maintains the “actionable and visible” state of the selected video track, meaning that clicking on one or the other will automatically make both follow the click. If, for example, the timeline has two video tracks and the user clicks on a video track, it will be enabled for editing (actionable) and loaded in the player (visible).

Context Menu



Right clicking anywhere on the timeline will display the Context Menu. From there you can choose a function as follows:

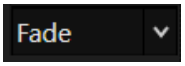
Function	Options
Add	Dolby Atmos Track Metadata Track Subtitle Track Video Track
Black	Full - 0, Legal - 64
Clear Run Through Edits	Will clear all run-through edits
Copy	Breaks Only (from V1 to V2) Breaks and Dead Pixels (from V1 to V2)
Comments	Add, Delete, Edit, Next, Previous
Composition	Create - Various composition types Delete Duplicate
Delete	Audio Track - Extended menu Dolby Atmos Track Metadata Track Subtitle Track Video Track
Detect Shot Changes	Invoke shot detection (Cancel)
Dolby Vision™ Metadata	Copy Breaks to Video Track Copy (metadata from highlighted shot) Establish Sync (between metadata and video tracks) Export… (metadata) Paste (metadata to highlighted shot)
Export Subtitles	Open Windows Browser for target
Hide/Show Breaks	Toggle on/off
Hide/Show Audio Waveforms (on Timeline)	Toggle on/off
Lock Tracks	Use extended menu
Merge EDL	From .edl to timeline
Show Source Timecodes	F8 for each enabled track

The EFX Palette

Under the Media Player is the EFX Palette, which contains buttons and controls for editing in Cortex.

Button	Key	Description
	n/a	Create slates, backgrounds, solid frames or Bars/Tone to be added into the Project Library
	n/a	Modify the luminance level of Subtitles
	Shift+ T Ctrl+ T	Invokes the ability to execute Gap Trims Invokes the ability to execute Ripple Trims
	M	Match Frame
	, (comma)	Add a manual Break to the composition
	P	Add Effect (Fade In or Out only in this version)
	[	Mark IN or modify the in point of the effect
	]	Mark Out or modify the out point of the effect

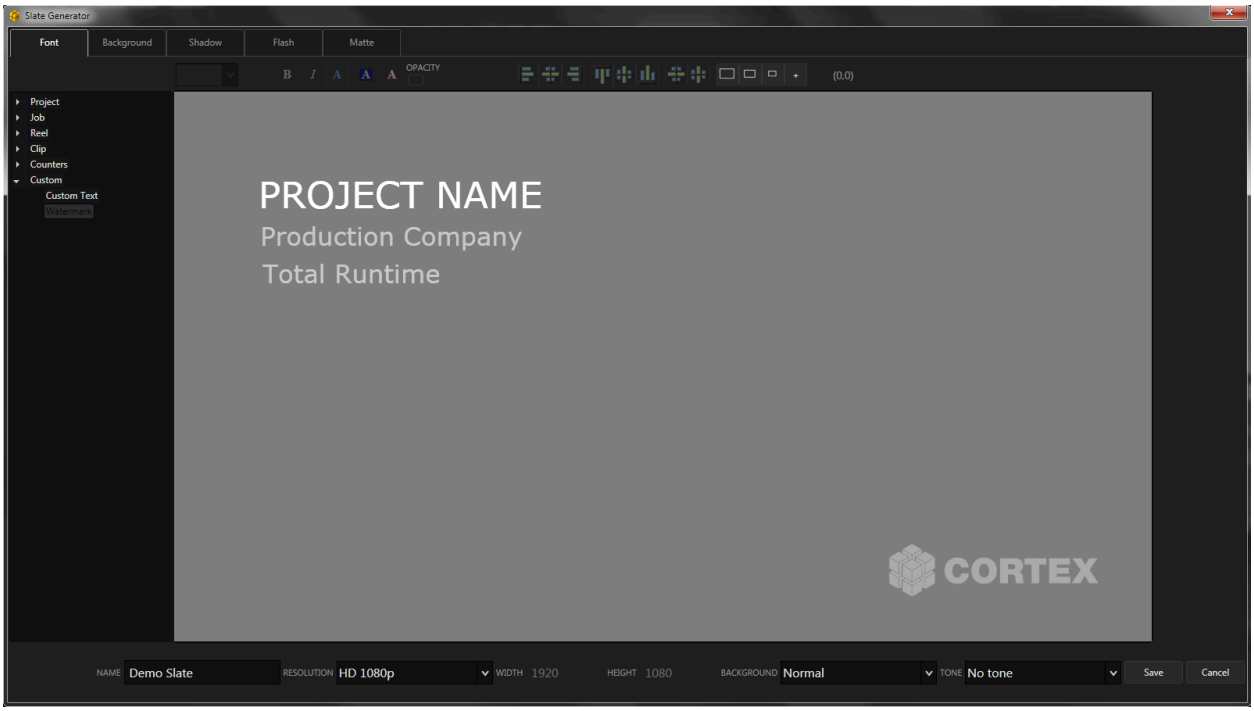
Effect Drop-down Field



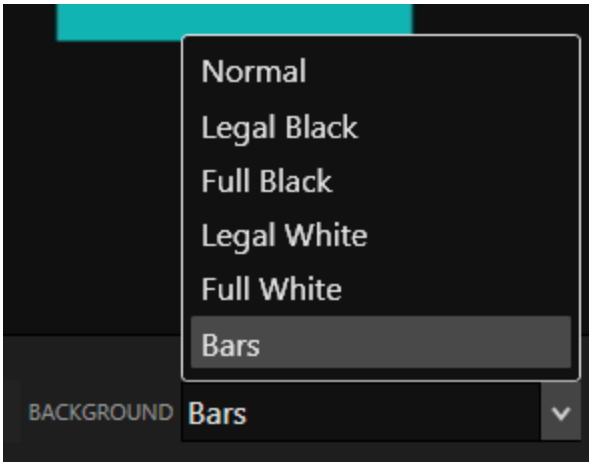
Currently contains the Fade Option for Fade In and Out. As more effects are added, such as video dissolves, wipes, and titling, they will be added to the drop-down.

The Slate Generator

To create a slate, click the Slate button on the Command Palette. 



In addition to generating slates, the Slate Generator can create background media such as legal and full black, legal and full white, and color bars, all of which can be or are automatically added to the Project Library for repeated use.



NOTE: The slate generator in the Edit Tool shares the same functionality and metadata fields as the slate generator in the Project Deliverable Configuration Window.

Set a name and a resolution for your slate and then choose its background type in the drop down field.

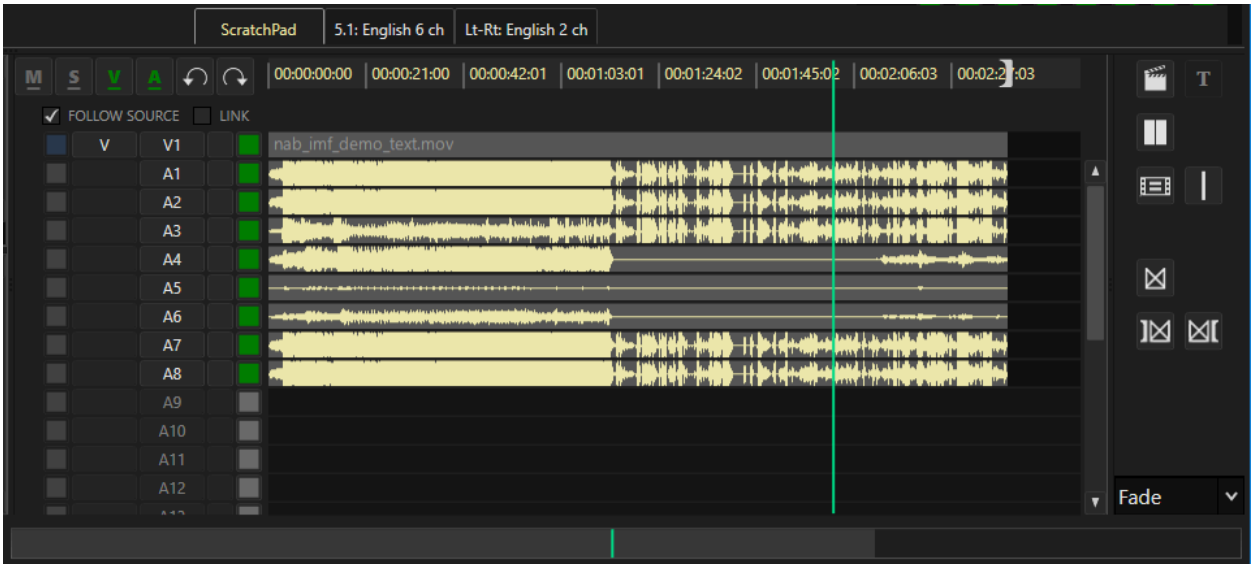
If you choose Normal, you can use the Background tab to determine the background color or insert an image file.

Once you've created your slate, Click Save and the slate will be automatically saved to the Project Library and loaded in the Media Player as a still frame. You can then set any duration for your slates when editing.

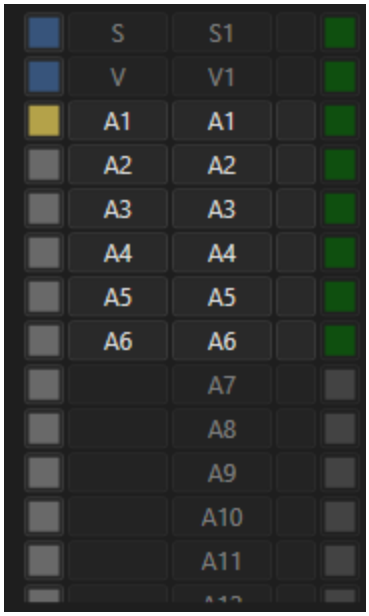
If you wish to edit or create another version of an existing slate, right-click on the desired slate and choose "Create New Slate from Existing" from the Context Menu. Make any changes you wish and then click Save.

Composition Timeline

In the Edit tool, the Composition Timeline provides for up to 2 video tracks, up to 24 audio tracks with a "ScratchPad" to assist in creating audio configurations, 2 subtitle tracks, and 1 metadata track used primarily for Dolby Vision™.

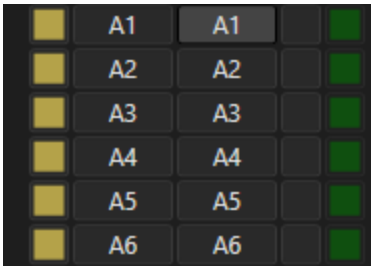


The Control Columns



The Control Columns are composed of Source and Composition Track and Monitor buttons. When enabled, the source audio monitor buttons are yellow and the composition buttons are green. When disabled, buttons are grey.

As per the example to the left, if a group of source monophonic audio clips are selected, only the first clip can be monitored.

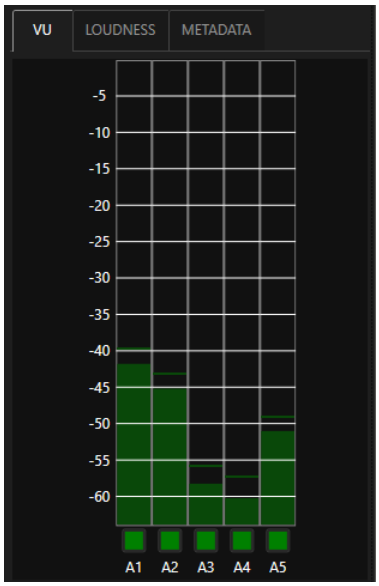


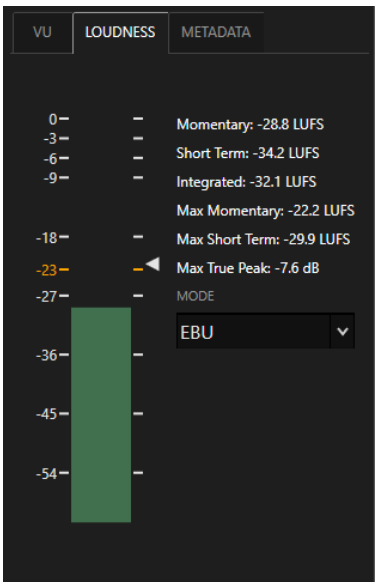
If a polyphonic audio clip is selected, channels are automatically assigned. Clicking an individual monitor button disables/enables monitoring.

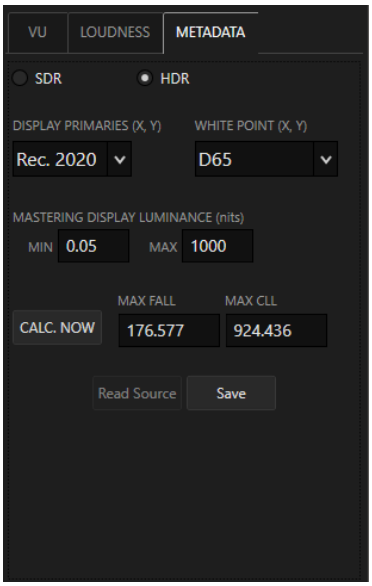
Shift clicking on a monitor button disables/enables all other monitor buttons leaving the clicked button enabled for either isolated or group monitoring.

To toggle the V1 or V2 Track on/off, click the Track button or press Y when the track is focused
To toggle the V1 or V2 monitor on/off, click the monitor button or press Shift+Y when the track is focused
To switch between V1 and V2 you can click on their respective Track button or press Ctrl+Shift+Y
To lock/unlock a track, Ctrl+click on its Track button
To lock/unlock all tracks, Ctrl+Shift+click on any Track button. You can also right-click on the timeline and choose "Lock Track" in the Context Menu.

The VU/Loudness/Metadata Tabs







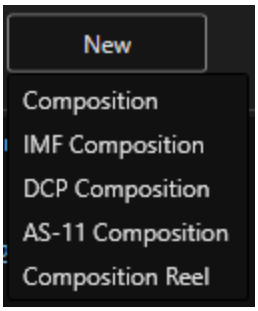
The VU meter automatically adjusts to display the number of tracks contained in either the source or composition.

Source tracks are displayed in yellow while the composition tracks are green.

The loudness meter dynamically updates the Momentary, Short Term, Integrated, Max Momentary, Max Short Term and Max True Peak in either EBU or ITU modes.

The Metadata tab displays HDR video metadata. For Dolby Vision™, the metadata is automatically loaded if derived from a DoVi xml file. For HDR10, you can manually enter criteria and then calculate the MaxFALL and MaxCLL values.

Creating a Composition

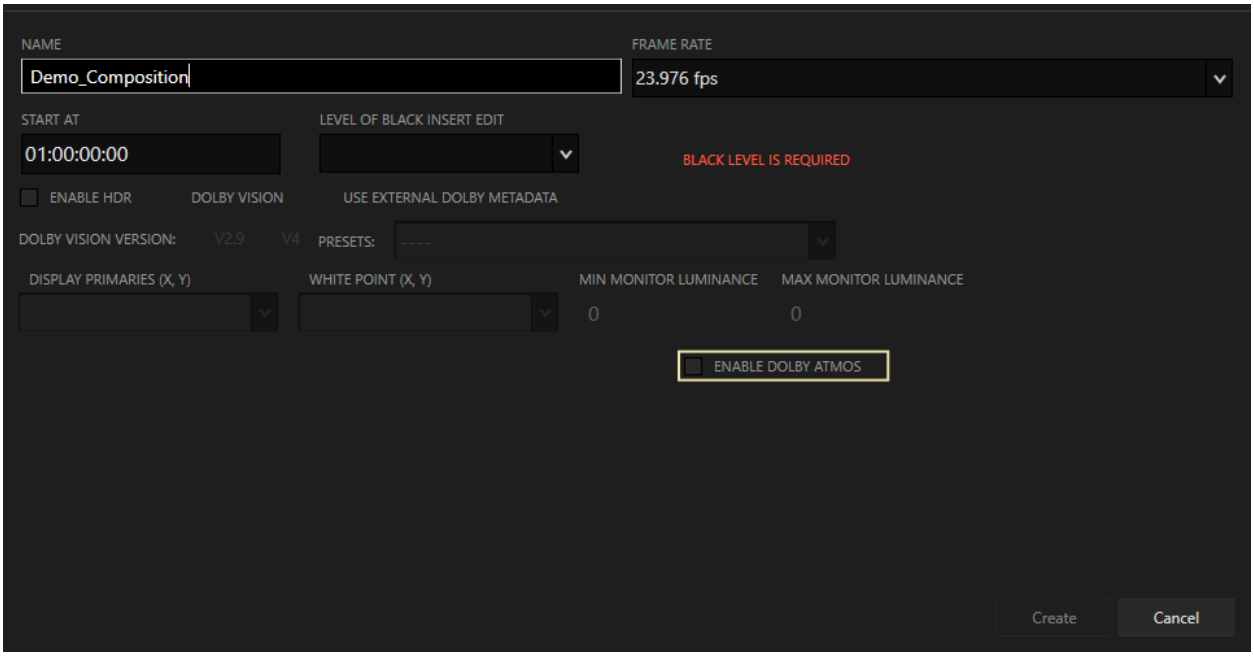


To create a new composition, click the **New** button at the top of the UI and choose which type of Composition to create from the Drop-down.

Type	Description
Composition	Any usual of editorial requirement
IMF Composition	With specific fields for IMF delivery
DCP Composition	With specific fields for DCP delivery
AS-11 Composition	With specific fields for AS-11 delivery
Composition Reel	Used to render individual segments of a composition

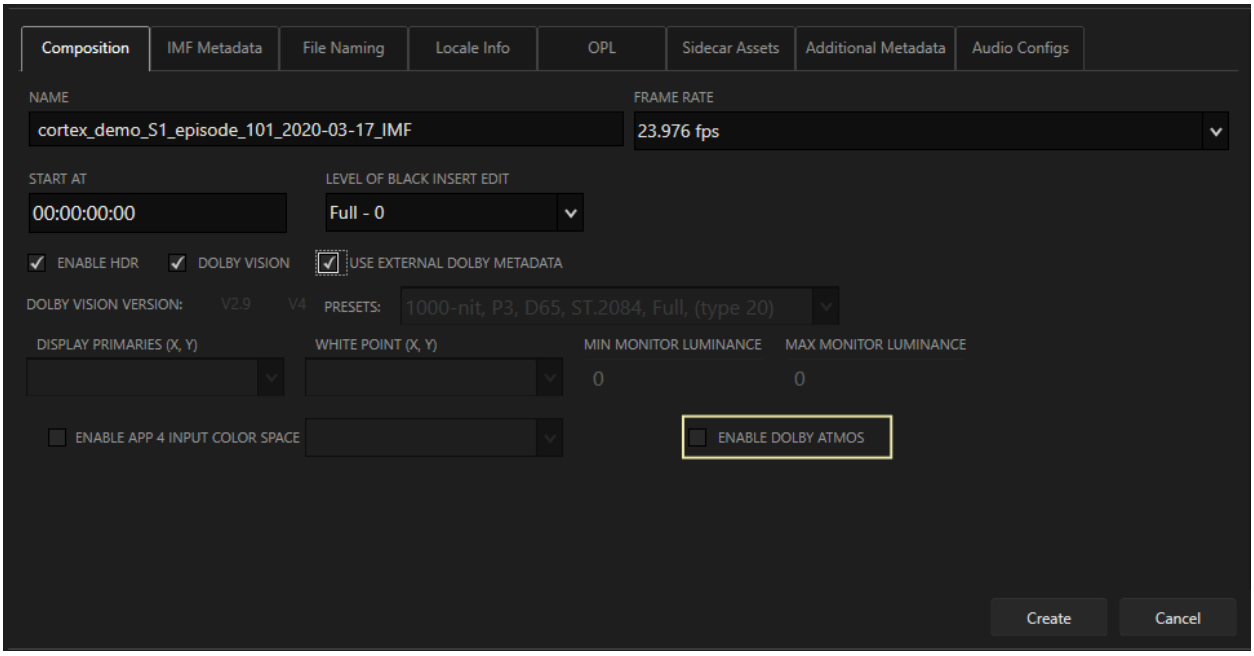
Composition

Use this option for simple modifications to a file; normal editorial tasks such as inserting or extracting black, revising slates, replacing shots, etc.



IMF Composition

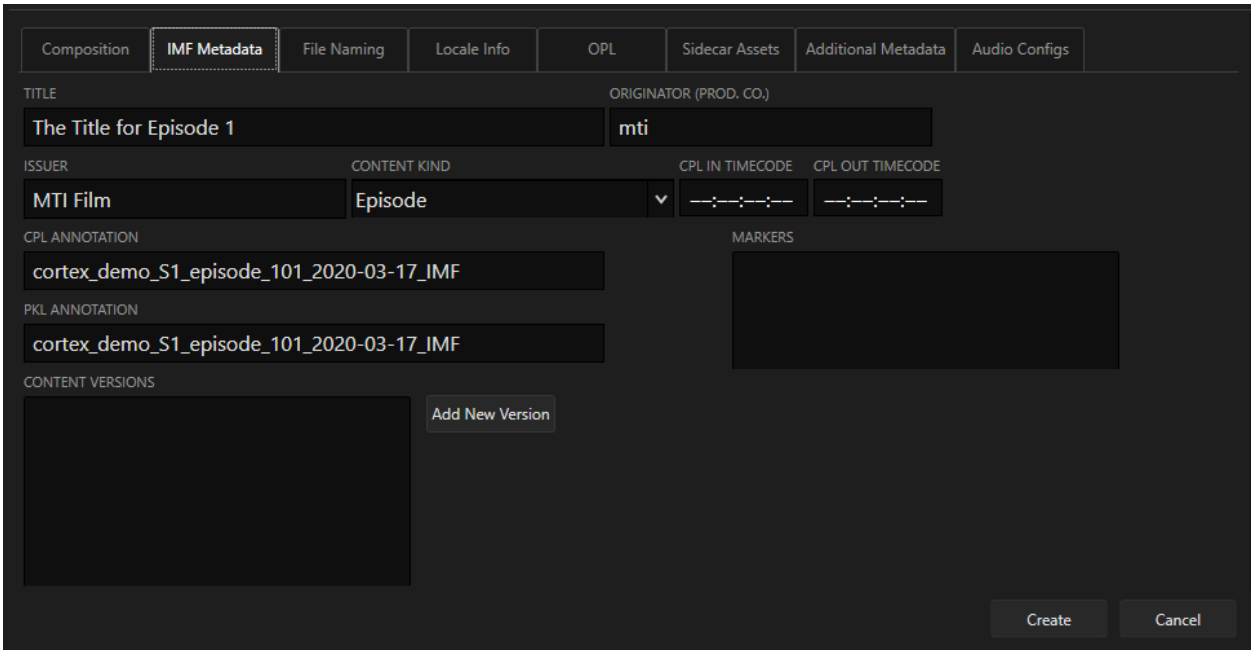
The IMF Composition shares a number of fields on the naming page with the simple Composition, however, there are additional tabs that can be used.



Composition Tab

1. Name - The name field is automatically inherited from the project name with an IMF extension. It can, of course, be changed to suit the particular delivery
2. Frame Rate - This is an important field. Bear in mind that the source media must match the composition's frame rate
3. Start At - Most IMF compositions start at 00:00:00:00, however, if there is a special requirement, modify it here
4. Level of Black Insert - If a black insertion is done using the keyboard command, Shift+H, this field determines the black level of that insert, either Full - 0 or Legal - 64
5. Enable HDR Checkbox - If the source is HDR, enable the checkbox
6. Dolby Vision™ Checkbox - If the source is accompanied by Dolby Vision™ metadata or will be processed through Cortex's Color Tool for Level 1 analysis, enable this checkbox
7. Use External Dolby Metadata Checkbox - If the media is accompanied by a Dolby Vision™ metadata generated by a third party color corrector, enable this checkbox.
8. Dolby Vision™ Version - If External Dolby Metadata is used, all remaining fields will be disabled. If, however, the composition will be processed through Cortex's Color Tool for Level 1 analysis, choose between V2.9 or V4. V4 allows for modification of the Min and Max Monitor Luminance
9. Enable APP 4 Input Color Space - If the IMF needs to be output in XYZ color space, use this field to define the input color space
10. Enable Dolby Atmos® - If the composition requires the use of Dolby Atmos®, enable this checkbox and Cortex will automatically provide a DA track in the composition timeline

IMF Metadata Tab



1. Title - For episodic TV, this field would describe the episode's title. For monolithic projects, the Name and Title can be the same.
2. Originator - Normally the Production Company or Studio
3. Issuer - Your company name
4. Content Kind - Choose from the options available in the dropdown list
5. CPL In and Out Timecode - If the desired content start and end is different from the start and end of the composition
6. CPL Annotation - If the CPL needs to be different from the Name
7. PKL Annotation - If the PKL needs to be different from the Name
8. Markers - If Markers were added to the composition, they are listed here. To add a Marker, press Ctrl+Shift+I and choose from the dropdown list
9. Content Version - Normally associated with the EIDR (Entertainment Identifier Registry) and describes the version of the media. For more information: https://eidr.org

File Naming Tab

1. CPL Name - Composition Playlist. In the event there is a need to modify the name, do it here
2. PKL Name - Packing List. In the event there is a need to modify the name, do it here
3. Image Track Name - Defaulted to Composition Name
4. Audio Track Name - Defaulted to Composition Name and includes the Audio Configuration and language
5. Subtitle Track Name - Defaulted to Composition Name

Locale Info Tab

Similar to DCPs, this information describes which locations the IMF will service

OPL Tab

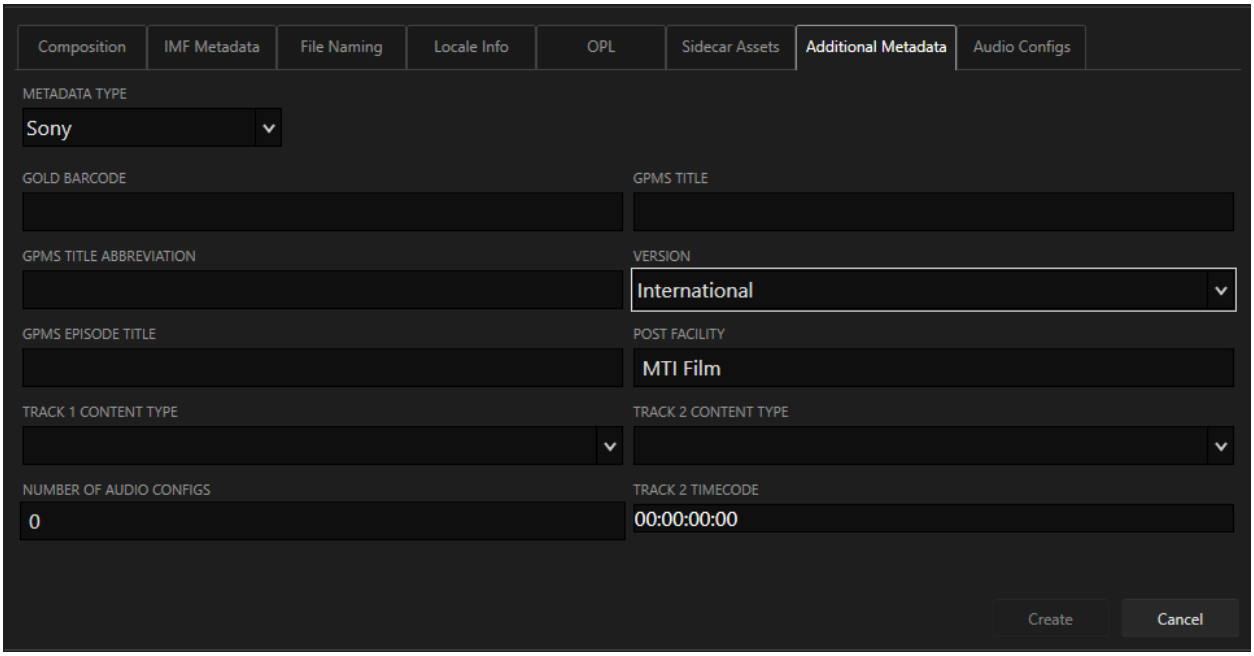
Output Profile List - A series of macro steps that determine the output from the IMF, for example, an H.264

Sidecar Assets

Used for any type of file type to be included in the packaging of the IMF

Additional Metadata Tab

At this time, this is only used for Sony. Fill in fields as required.



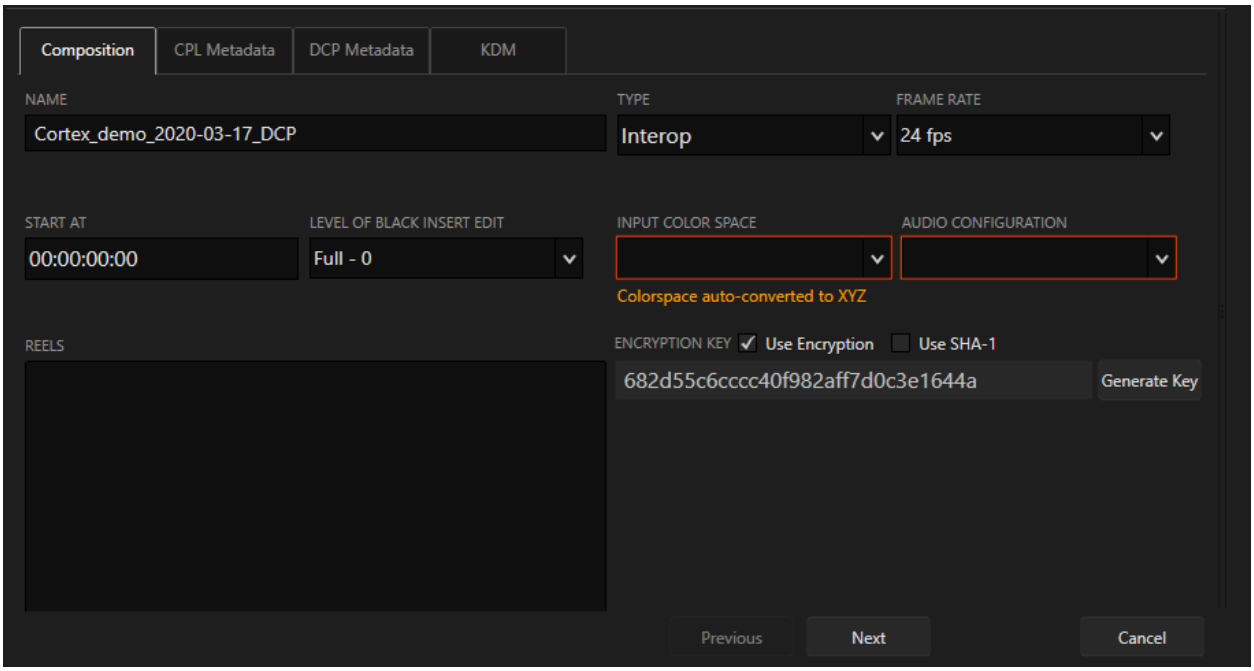
Audio Configs Tab

Displays the various audio configurations created for the IMF

DCP Composition

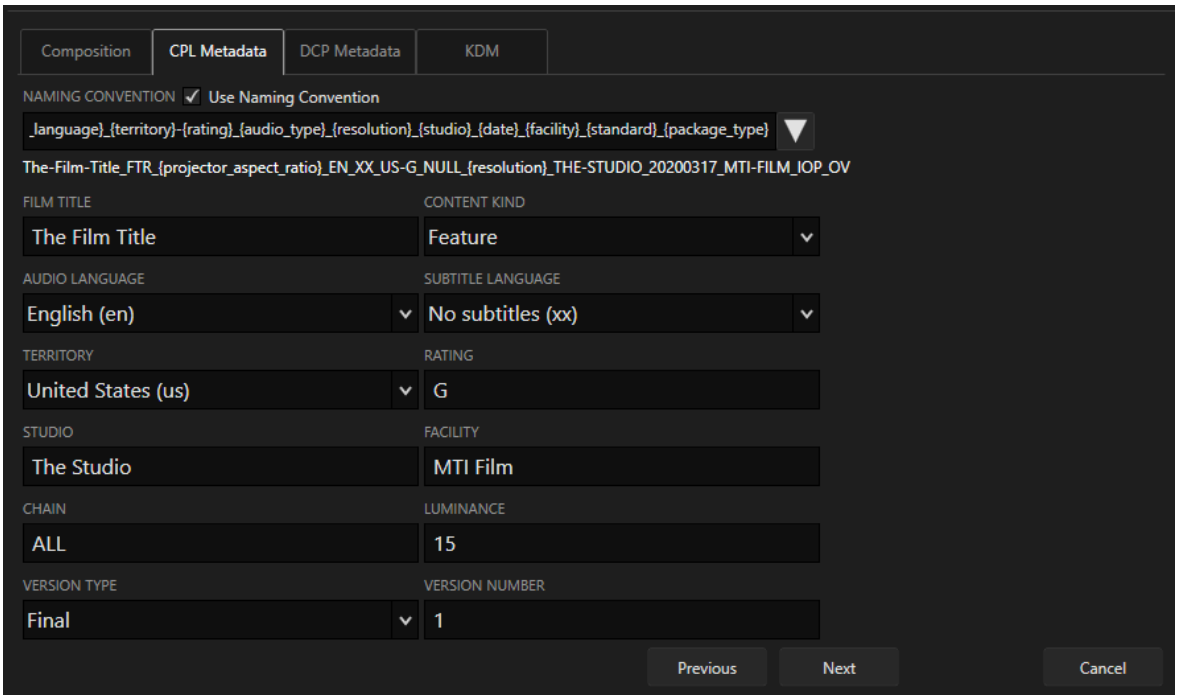
Cortex offers two types of DCP packages, Interop and SMPTE. DCP Compositions are easy to put together on the timeline and, generally, require edits that append each reel to the previous one.

Composition Tab



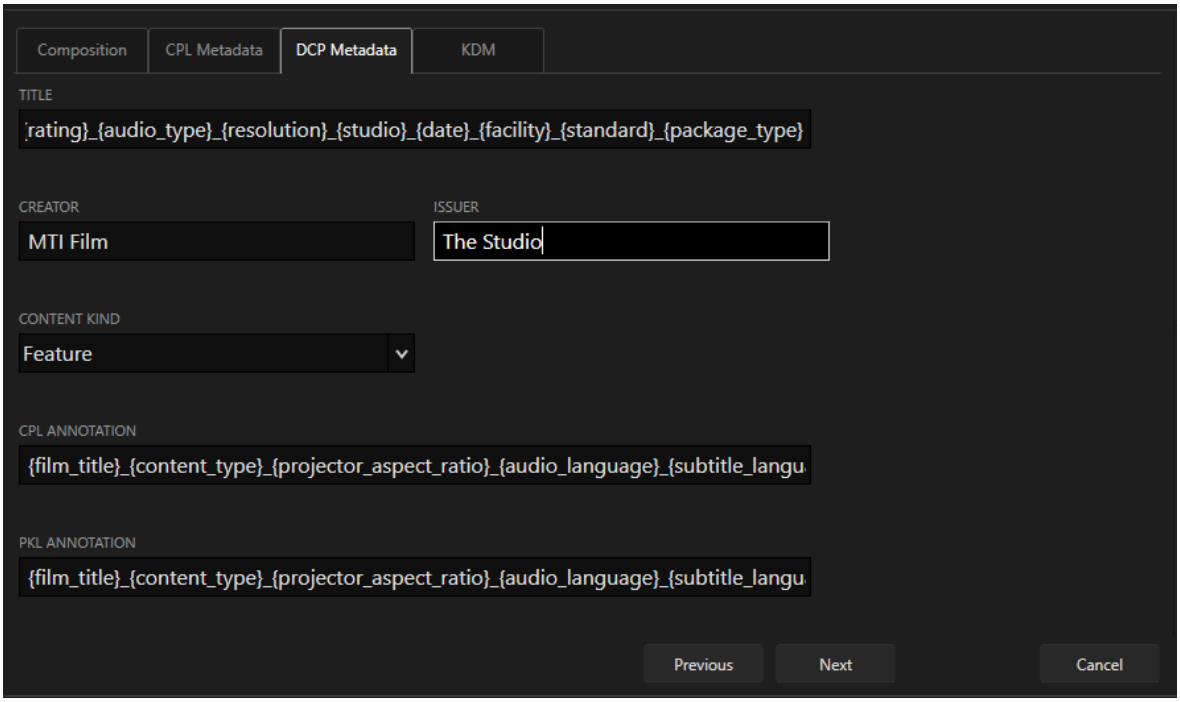
1. Name - The name is normally inherited from the project but can, of course, be changed
2. Type - Choose either Interop or SMPTE from the dropdown list
3. Frame Rate - This is an important field. Bear in mind that the source media must match the composition's frame rate
4. Start At - Most DCP compositions start at 00:00:00:00, however, if there is a special requirement, modify it here
5. Level of Black Insert Edit - If a black insertion is done using the keyboard command, Shift+H, this field determines the black level of that insert, either Full - 0 or Legal - 64
6. Input Color Space - Cortex provides the ability to automatically convert from any color space to the required XYZ color space. Enter the input color space from the drop down list
7. Audio Configuration - Choose from the dropdown list the audio configuration of the DCP mix
8. Encryption Key Checkbox - If Encryption is desired for the DCP, enable the checkbox and then use the KDM Tab to add KDM files. Cortex will also generate a KDM for playback for any workstation within the Cortex network. When the DCP is loaded on one of the Cortex networked workstations, the KDM will be validated and able to play back the DCP.
9. Use SHA-1 Checkbox - SHA-1 (short for Secure Hash Algorithm 1) is one of several cryptographic hash functions. SHA-1 is most often used to verify that a file has been unaltered. This is done by producing a checksum before the file has been transmitted, and then again once it reaches its destination.

CPL Metadata Tab



1. Use Naming Convention Checkbox - If enabled, as the other fields are filled in, Cortex will build a industry standard name for the DCP, which is displayed and updated as fields are entered
2. Film Title and balance of fields - fill as required. The luminance is for the screen luminance the content was mastered.

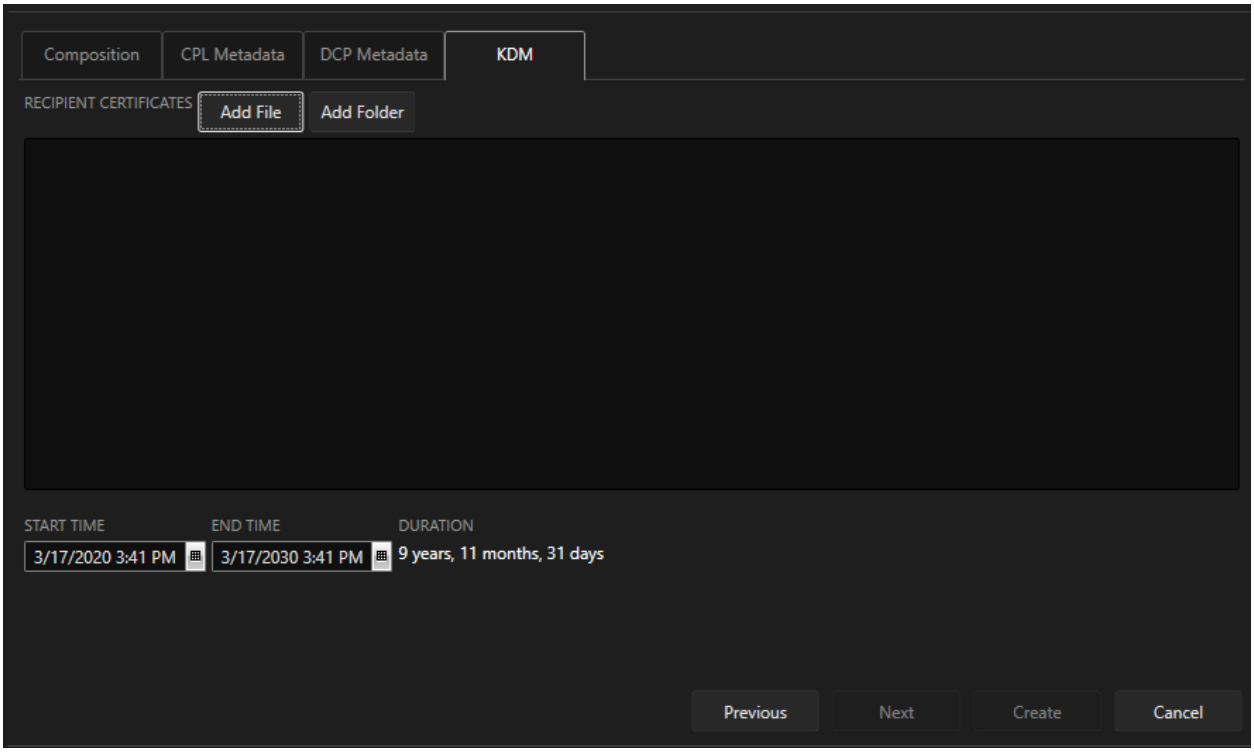
DCP Metadata Tab



1. Title - Essentially the same as the CPL Metadata Tab. Suggest to leave as is unless otherwise instructed
2. Creator - Your company name
3. Issuer - The production company
4. CPL Name - Composition Playlist. In the event there is a need to modify the name, do it here

5. PKL Name - Packing List. In the event there is a need to modify the name, do it here

KDM Tab



1. Add File Button - Add individual KDM files
2. Add Folder - Add KDM files found in a folder
3. Start/End Times - Automatically set for 10 years. Use the date fields to modify the duration

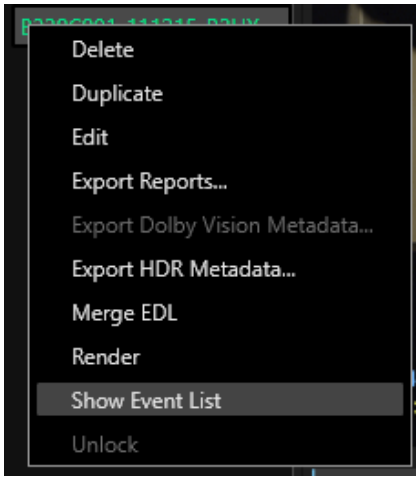
Note: If your workstation will be used to play a DCP from a third party source and requires that you send a KDM valid for your workstation, in the upper right hand corner of the UI is a button named DCP. Click the button and then Save the file to a location from which you can send it. Also, determine prior to saving whether a SHA-1 encryption is required and, if so, enable the checkbox.

AS-11 Composition

The initial metadata required for an AS-11 composition is simple. Name, frame rate, start timecode, Level of Black, and RDD6 filename. The RDD6 file would contain a Dolby Digital metadata and is optional to the composition. RDD stands for Registered Disclosure Document.

Composition Reel

A Composition Reel allows you to place segments (shots or “events”) of the composition into a reel for rendering. It has the same protocols as the Clip Reel but is intended to be used for compositions.



In the Edit Tool, the bins normally show the source clips regardless of whether the Master Bin or Composition is focused. The other tools automatically switch to the event list when the composition is focused.

To show the event list, right-click on the composition name in the Sidebar and select Show Event List in the Context Menu.

With the list showing, select events to be added to the Composition Reel and then right-click and choose:

1. Add selected to Comp Reel
2. Add Marked Events Range to Comp Reel

Events can be added one at a time, group selected, or within a marked range. When completed, right-click on the composition name and select Render in the Context Menu.

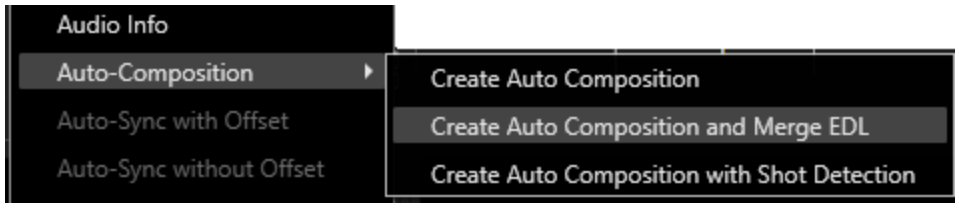
Auto Compositions

If a source file is an edited piece of content and you’d like to locate where those edits occur, there are three ways to do this:

1. With Shot Detection
2. Merging an EDL
3. Manually inserting Breaks at each edit point

An Auto-Composition automatically creates a composition using the source clip’s name, start and end timecodes, and frame rate. Creating an Auto Composition causes.

To create an Auto Composition:



Right click on the picture clip and select Auto-Composition. There are 3 choices in the extended menu:

1. Create Auto Composition - Cortex will insert the whole clip into a new composition
2. Create Auto Composition and Merge EDL - Cortex will open a browser window to locate the EDL
3. Create Auto Composition with Shot Detection - Cortex will insert the whole clip into a new composition and begin shot detection. Like any shot detection, the results might invoke false positives and negatives so please verify the breaks.

    a. To add a break - press the , (comma) key or click the Break button  in the EFX Palette
    b. To delete a break - press Ctrl +,(comma) or Ctrl + Break button

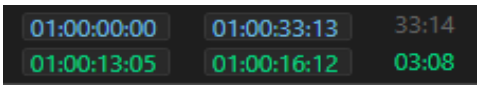
Both Shot Detection and Merge EDL options are always available by right-clicking on the composition timeline and selecting one of them.

Once you've created a new composition, editing in Cortex is a process similar to any nonlinear editing system you might be familiar with. Cortex supports 3 point and drag and drop editing with typical overwrite, insert, lift and extract functions. The Edit Tool in Cortex is designed to perform basic editorial functions in order to complete delivery specifications. As of version 5.6, the Edit Tool has successfully delivered all composition types with particular emphasis on IMF delivery.

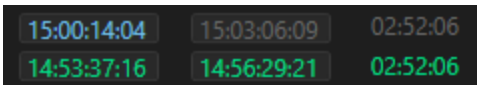
3 Point Editing

Using 3 point editing, below are examples of the logic used for marking source clips, in blue, and compositions, in green:

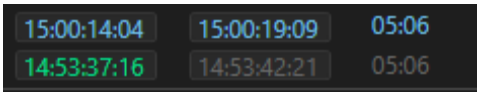
Note: When In and Out marks are present in both the source and composition timecode registers, the duration always defaults to the composition. If a timecode and/or duraton is displayed in grey, it means that the timecode and/or duration was calculated based on the other timecode registers' duration.



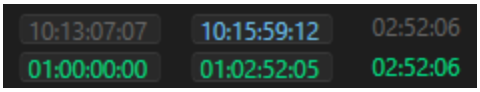
Both the source and composition In and Out are marked, therefore the composition takes precedence.



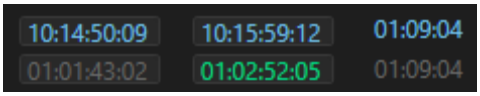
This represents a 3 point edit where the source Out mark is determined by the duration of the composition marks.



This represents a 3 point edit where the composition Out mark is determined by the duration of the source marks.

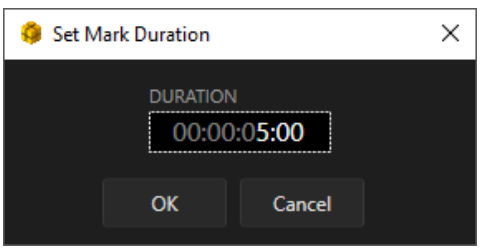


This represents a 3 point edit where the source In mark is determined by the duration of the composition marks.



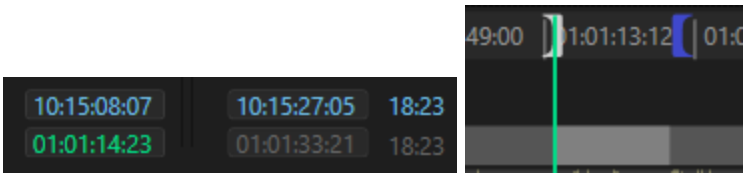
This represents a 3 point edit where the composition In mark is determined by the duration of the source marks.

Setting a Duration



To set a duration, press the * key on the number pad. An input window appears. Enter a value and press enter. To enter a value in frames press + before entering the number. To repeat the previously entered duration for the next edit press Shift+*

Whenever a 3 point edit calculates the in or out mark of either the clip or composition, a blue “phantom mark” will show the calculated position of the mark. In the below example, the source clip dictates the out point of the composition and, therefore, a blue mark indicates the calculated position of the mark.



Once the marks are set, use the following to perform a 3 point Overwrite or Insert edit:

Edit Commands

Button	Key	Description
	G	Overwrite Edit to Timeline
	H	Insert Edit to Timeline

Drag and Drop Editing

Dragging a clip from the Picture or audio bin is simple. If the Follow Source checkbox on the timeline is enabled, the tracks affected by the edit will be automatically enabled. If the Follow Source checkbox is disabled, enable the tracks to be affected by the edit before dragging.

When a marked range of a source clip is dragged to the timeline, the segment is represented as a grey bar that is sized relative to the current size of the timeline but is always, at least, perceptible. At a snap point it will turn blue for picture or yellow for audio, but you can drop at any timeline location.

Edit Snap Points include:

1. Marks
2. Breaks
3. Cuts
4. The Cursor

Drag and Dropping an Overwrite 3 Point Edit

To perform an Overwrite edit, mark the In and Out points required for the 3 point edit and then drag the source to the composition timeline:

1. You can “snap” the source In or Out to any Edit Snap Points as explained above
2. You can drop the source clip at any position on the timeline

Drag and Dropping an Insert 3 Point Edit

If you wish to Insert the clip and thereby “ripple” the existing media at the insertion point:

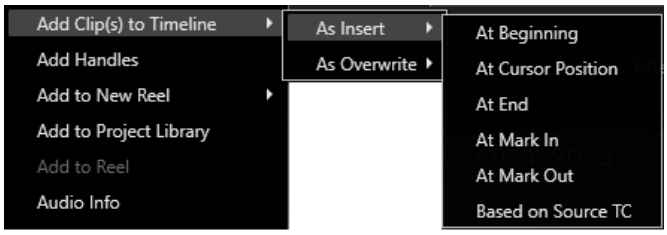
1. Drag the clip to the timeline
2. Press the **Ctrl** key
3. Drop the clip to the timeline

NOTE: After an edit is made using a shortcut key (G or H), the composition Mark In register is updated with the

previous out timecode +1. Using drag and drop does not update the register.

Adding Multiple Clips to the Timeline

There are several ways to add multiple clips to the timeline as an Overwrite or Insert Edit using Drag and Drop or the Context Menu selection. For Drag and Drop actions, you must snap to the position desired.
Right click on a selection of multiple clips to view the Add Clip(s) to Timeline context menu items.



1. At Beginning
2. At Cursor Position
3. At End
4. At Mark In
5. At Mark Out
6. Based on Source TC

When Dragging and Dropping Multiple Clips

If there are marks in and out on multiple source clips and they are dragged and dropped anywhere on the timeline, either snapped or not, their duration will be per the source marks.

If from the Context Menu:

Same as above except:

For At Mark in, the clips will always be front filled starting at the Mark In and beginning with the first clip selected.

For At Mark Out, the clips will always be backfilled starting at the Mark Out and beginning with the last clip selected.

For all cases for “Based on Source TC”:
Will always use the first marked frame of the source clip (or if unmarked – the first frame of the clip) and is placed at its corresponding composition location

For At the Beginning, At the Cursor Position, and At End:
The clips will always be front filled respecting the durations marked on each source.

If no marks on source: the full clip
If only a mark in, then starting at Mark In to the last frame of the clip
If only a mark out, then starting at the first frame of the clip and ending at mark out

Drag and Drop and then Shift

There is another way available through drag and drop only. For example, if there are three textless source clips that have the same mm:ss:ff timecode as the texted clips located in the composition and they need to be placed in sync as either a direct overwrite replacement or on a separate video track:

1. Place the composition timeline cursor at the timecode location of the first source clip
2. Select the three clips and drag/drop and then press Shift prior to snapping to the cursor
   The 3 clips will be located to their respective mm:ss:ff positions.

NOTE: The hour number is disregarded if the clips are snapped to the timeline cursor location

NOTE: After an edit is made, the composition Media Player is automatically focused for review.

Lift or Extract a Marked Range

If you want to remove a marked range of the composition, you can Lift or Extract it.

1. Lifting a range leaves black in its place creating a gap.
2. Extracting a range shifts everything that followed the extraction upstream filling the gap.

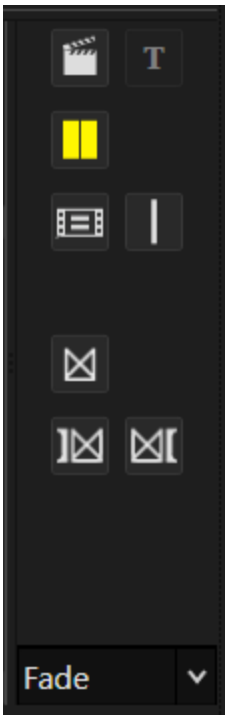
Once the marks are set, use the following to perform a Lift or Extract edit:

Lift and Extract Commands

	, (comma) or Delete	Lift from Timeline
	/ on keyboard or Ctrl+Delete	Extract from Timeline

Graphical Trim Types

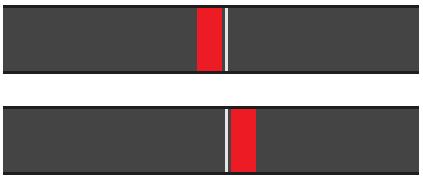
Trimming by clicking directly on the timeline and moving the edit points via dragging or by timecode or frames.
NOTE: To execute a Trim or Segment reposition, one of the Trim Modes must be enabled.

Gap Trim	**Ripple Trim**
	
To enable the Gap Trim mode, click the Trim button or press Shift+T. The Trim button icon will turn red indicating a Gap Trim is enabled. *To exit the Trim Mode, click the button again, press Shift+T again, or press Esc*	*There are two ways to enable Ripple Trim mode:* 1. *Press Ctrl+T or Ctrl+Click the Trim button* 2. *While in Gap Trim mode and **hovering over an edit**, press and hold Ctrl.* *To exit the Trim Mode, click the button again, press Shift+T again, or press Esc.*

NOTE: In general, with the Trim Mode enabled, a Left Click or a Modifier Key+Left Click and drag near the edit will initiate the trim, however you can also mouse-up after the click, which leaves the trim mode enabled. After mouse-up, an additional left click (without modifier) near the edit point will allow you to drag the trim too. To cancel the trim

1. *Press the Escape key*
2. *Click on the Lasso Area located above the video tracks*
3. *Press the Shift+T key or Ctrl+T key*
4. *Click the Trim button.*

Gap Trim



Gap Trims ensure that the overall length of affected timeline track(s) will not be modified by trimming.

If no gap exists between two adjacent segments, only an inward trim is permitted, which creates a gap equal to the trim value.

If a gap does exist, then an outward trim is permitted to overwrite the gap but is limited to the edit point of the adjacent segment or to the extent of the available source media content.

Executing a Gap Trim

By Dragging the Mouse Cursor

While hovering the mouse cursor on either side of the edit point, a red bar appears indicating the segment is ready to be trimmed.

You have two options to execute the trim with a **click and drag action:**

1. Left Click and drag the red bar. On mouse-up the trim is completed.
2. Left Click on the red bar and mouse-up. Left click again and drag. On mouse-up the trim is completed.

Using the Numeric Keypad

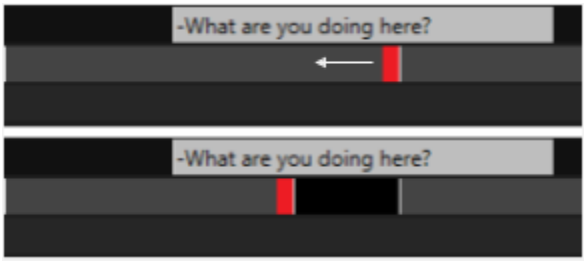
Left Click on one side of the edit and mouse-up. A red bar appears indicating the segment is ready to be trimmed. To trim by timecode press + or - followed by the value and then press Enter. To trim by frames press ++ or - - followed by the value and then press Enter. In both cases a Duration Dialog box will appear following a + or - entry.

Selecting Edit Points for Gap Trims on Multiple Tracks

Left Click on one side of an edit and mouse-up. A red bar appears on the side of the click.
Left Click on the same side of additional track edits to execute a gang trim.
Once a trim type and side(s) are chosen for the trim, the other trim types and sides are precluded from being enabled.
All edit points are trimmed equally.

Example Gap Trim

The following demonstrates an inward trim where a gap is created by the action.

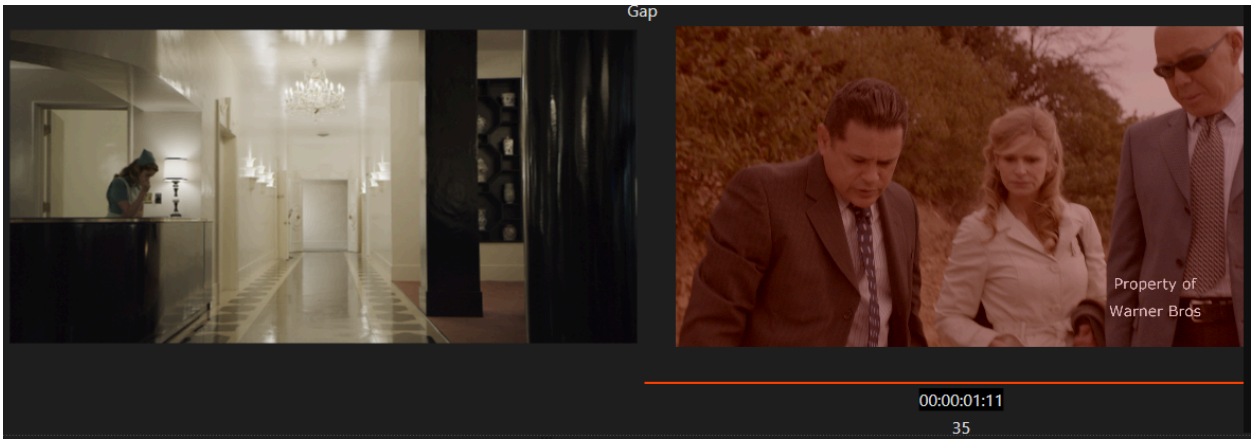


An inward trim creates a gap.

The trim will snap to any marker in its navigation path including audio edit points where tracks have been enabled.

Gap Trim View

We see a frozen image of the non-trimmed segment and a continuously updated image of the trimmed segment with the # of frames and timecode trimmed either + or -



Ripple Trim

Ripple Trims lengthen or shorten the head or tail of a segment, moving or "rippling" all downstream segments farther up or downstream based on the direction of the trim. The segments are rippled equal to the trim value.

There are two ways to enable Ripple Trim mode:

1. *Press Ctrl+T or Ctrl+Click the Trim button. The trim icon will turn yellow.*
2. *While in Gap Trim mode and **hovering over an edit**, press and hold Ctrl. Releasing the Ctrl button prior to left clicking will return the trim state to Gap Trim.*

Executing a Ripple Trim

By Dragging the Mouse Cursor

While pressing the Ctrl button and hovering the mouse cursor on either side of the edit point, a yellow bar appears indicating the segment is ready to be trimmed.

You have two options to execute the trim with a **click and drag action:**

1. Ctrl+Left Click and drag the yellow bar. On mouse-up the trim is completed.
2. Ctrl+Left Click on the yellow bar and mouse-up. Left click again and drag. On mouse-up the trim is completed.

Using the Numeric Keypad

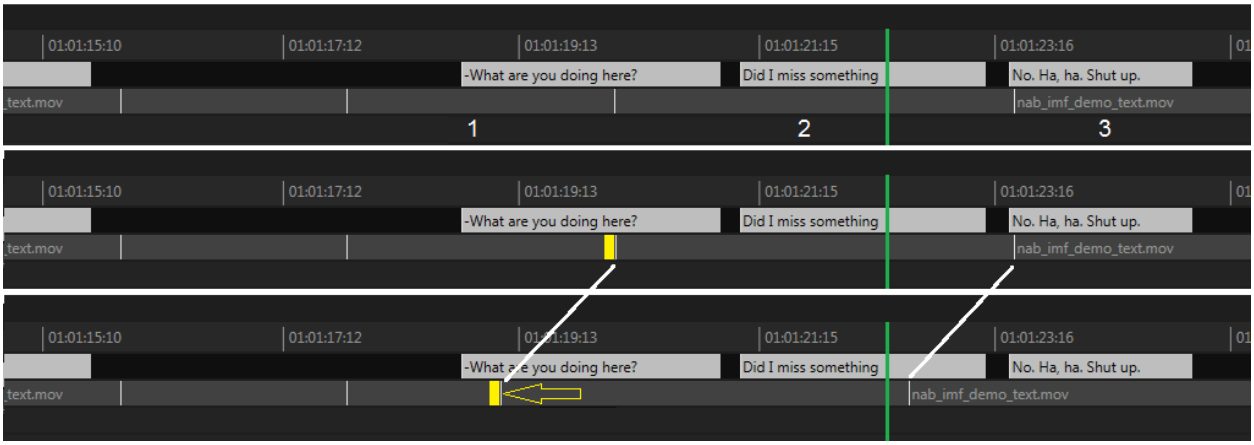
Ctrl+Left Click and mouse-up on one side of the edit. The yellow trim bar will remain enabled. To trim by timecode press + or - followed by the value and then press Enter. To trim by frames press ++ or - - followed by the value and then press Enter. In both cases a Duration Dialog box will appear following a + or - entry.

Selecting Edit Points for Ripple Trims on Multiple Tracks

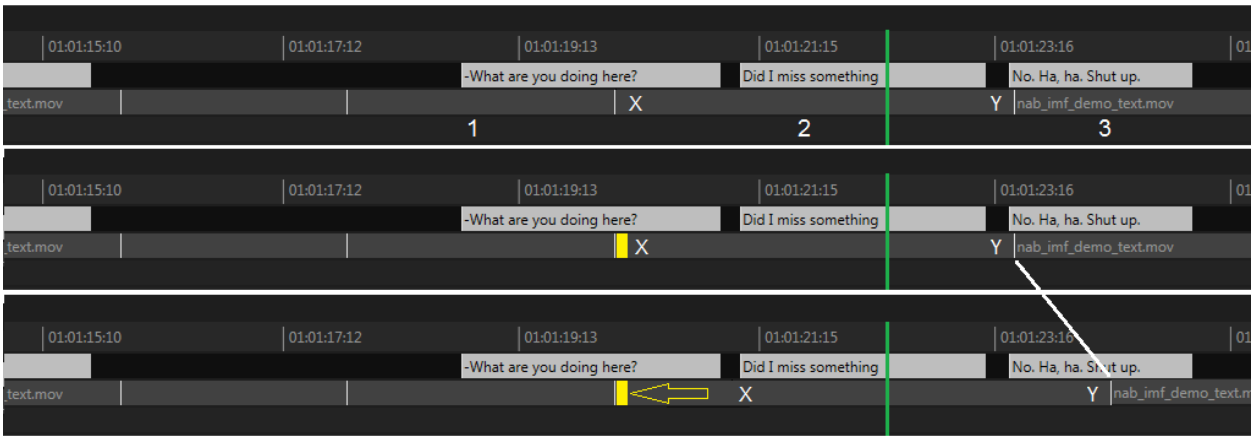
Ctrl+Left Click on one side of an edit and mouse-up. A yellow bar appears on the side of the click.
Ctrl+Left Click on the same side of additional edits to execute a gang trim.
Once a trim type and side(s) is chosen for the trim, the other trim types and sides are precluded from being enabled.
All edit points are trimmed equally.

Example Ripple Trim

In the following figure, segment 1 is being shortened at its tail, which ripples the downstream segments upstream by the amount of the trim.



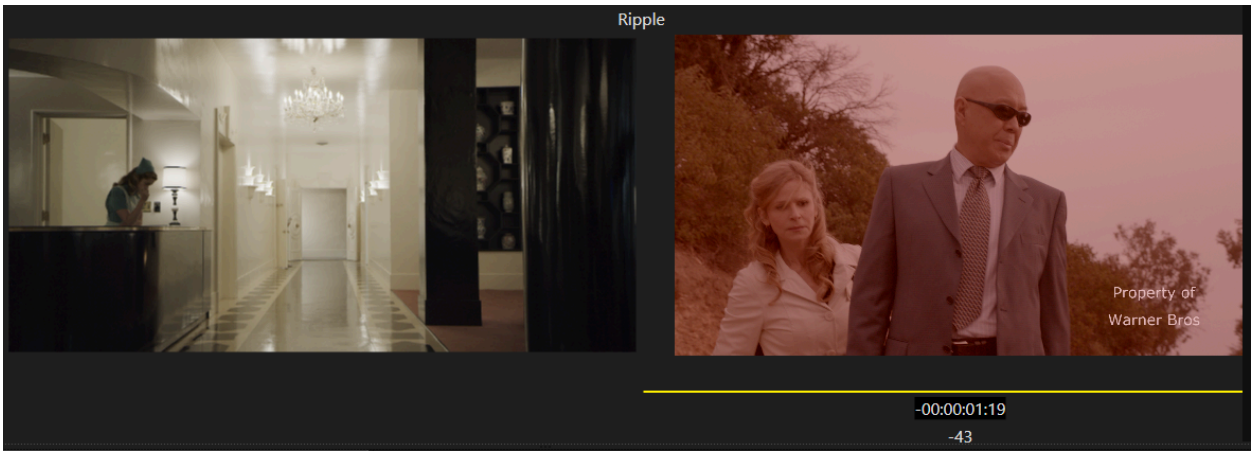
In the following figure, segment 2 is being lengthened at its head, which ripples the downstream segments farther downstream by the amount of the trim.



Note that the upstream segments have not moved. All ripple trims only affect downstream segments.

Ripple Trim View

We see a frozen image of the non-trimmed segment and a continuously updated image of the trimmed segment with the # of frames and timecode trimmed either + or -



Rolling Trim

A Rolling Trim moves the edit point between segments by trimming their respective sides by an equal number of frames thereby maintaining the overall duration of the affected timeline track(s); therefore adjacent segments remain untouched in position or length.

Executing the Rolling Trim

By Dragging the Mouse Cursor

While pressing the Shift button and hovering the mouse cursor on the edit point, a red bar appears on both sides of the edit indicating the segment is ready to be trimmed.

You have two options to execute the rolling trim with a **click and drag action:**

3. Shift+Left Click and drag the pair of red bars. On mouse-up the trim is completed.
4. Shift+ Left Click on the pair of red bars and mouse-up. Left click again and drag. On mouse-up the trim is completed.

Using the Numeric Keypad

Shift+Left Click on the edit and mouse-up. To trim by timecode press + or - followed by the value and then press Enter. To trim by frames press ++ or - - followed by the value and then press Enter. In both cases a Duration Dialog box will appear following a + or - entry.

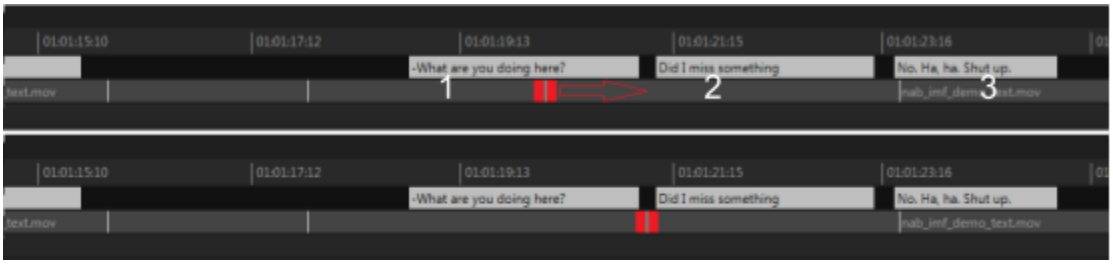
Selecting Edit Points for Rolling Trims on Multiple Tracks

Shift+Left Click on an edit and mouse-up. A red bar appears on both sides of the click.
Shift+Left Click on additional edits to execute a gang trim.
Once a trim type and side(s) are chosen for the trim, the other trim types and sides are precluded from being enabled.

All edit points are trimmed equally.

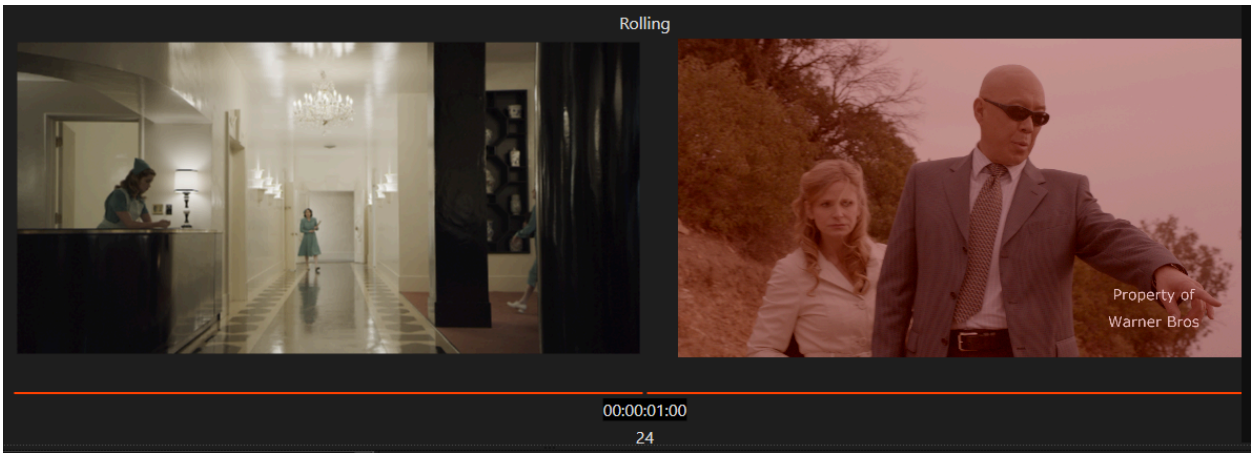
Example – Rolling Trim

In the following figure, segment 1 is being lengthened at its tail while segment 2 is trimmed and shortened by an equal amount at its head.



Rolling Trim View

We see continuously updated images of both sides of the trimmed segments with the # of frames or timecode trimmed either + or -



Slide Trim

A Slide Trim places a red trim bar at the tail of the adjacent upstream segment and at the head of the adjacent downstream segment, trimming these segments by an equal number of frames. Slide Trims do not change the overall length of the affected timeline track(s).

Executing the Slide Trim

By Dragging the Mouse Cursor

You have two options to execute the trim with a **click and drag action:**

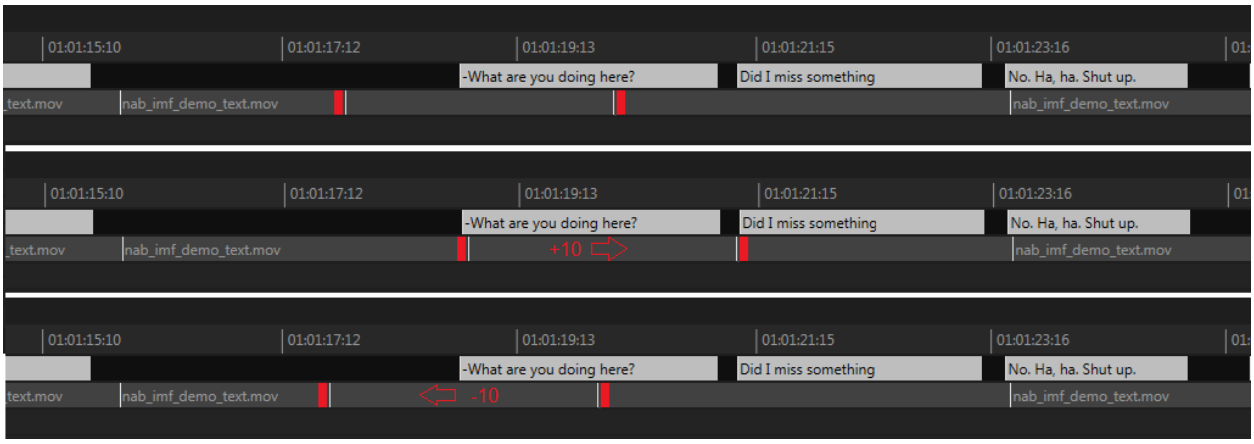
1. Alt+Left Click near the center and drag the pair of red bars. On mouse-up the trim is completed.
2. Alt+ Left Click near the center and mouse-up. Left click again and drag. On mouse-up the trim is completed.
    a. Dragging Left will trim -
    b. Dragging Right will trim +

Using the Numeric Keypad

Alt+Left Click near the center and mouse-up. To trim by timecode press + or - followed by the value and then press Enter. To trim by frames press ++ or - - followed by the value and then press Enter. In both cases a Duration Dialog box will appear following a + or - entry.

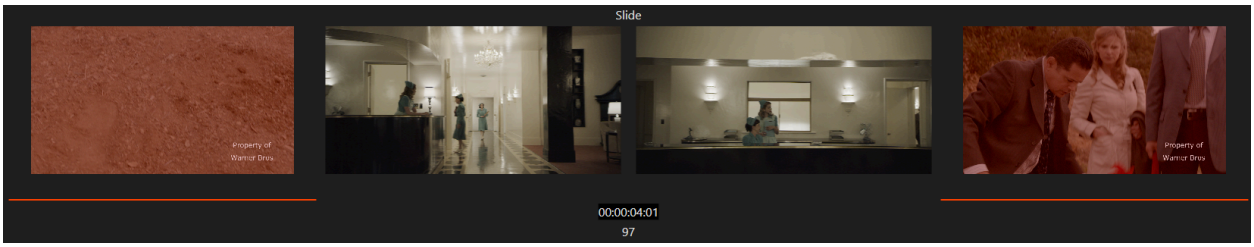
Example – Slide Trim

The adjacent segments are trimmed based upon the direction the selected segment is slid.



Slide Trim View

We see 4 monitors. The two sides of the trimmed segments are continuously updated while the segment being slid is frozen.



Slip Trim

A Slip Trim places a red trim bar at the head and tail of a single segment. The trim will "scroll" the head and tail of the segment leaving its timeline position fixed, therefore adjacent segments remain untouched in position or length.

Executing the Slip Trim

By Dragging the Mouse Cursor

You have two options to execute the trim with a **click and drag action:**

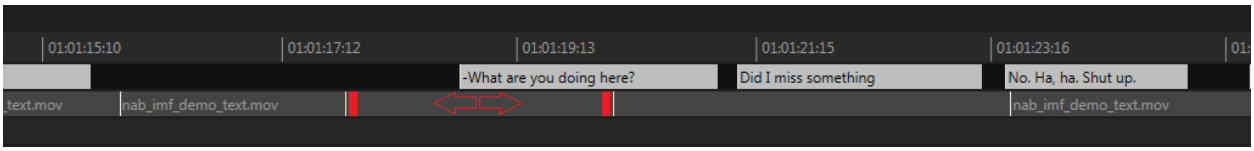
1. Shift+Alt+Left Click near the center and drag the pair of red bars. On mouse-up the trim is completed.
2. Shift+Alt+Left Click near the center and mouse-up. Left click again and drag. On mouse-up the trim is completed.
    a. Dragging Left will trim -
    b. Dragging Right will trim +

Using the Numeric Keypad

Shift+Alt+Left Click and mouse-up at or near the center of a segment. To trim by timecode press + or - followed by the value and then press Enter. To trim by frames press ++ or - - followed by the value and then press Enter. In both cases a Duration Dialog box will appear following a + or - entry.

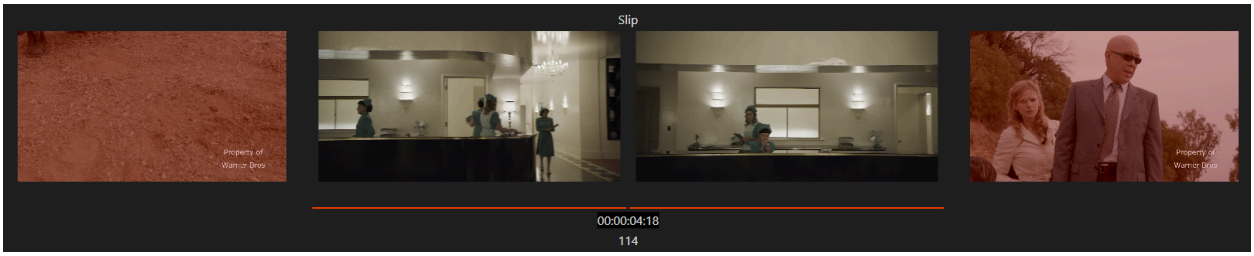
Example – Slip Trim.

Drag in either direction to slip the media within the existing break locations, or use the numeric keypad to input trim values.



Slip Trim View

We see both sides of the segment continuously updated while the last and first frame of the adjacent segments are frozen.



Selecting, Repositioning, and Deleting Segments

Clicking on a segment allows the user to reposition or delete the segment respecting the Gap/Overwrite and Ripple trim modes. To select a segment the track must be enabled; segments on locked tracks cannot be modified.

Selecting a single segment

Left clicking near the center of a segment will highlight and select the segment for repositioning or deleting. Left clicking again near the center of a single selected segment deselects the segment. Alternatively, press Esc.

Selecting multiple segments

1. To select additional segments after selecting the first segment, hold down the Shift key and Left click near the center of additional contiguous segments. Skipped segments will be included in the group selection if they are between the last two clicked segments.

2. Ctrl+Left click near the center to select individual segments that are not contiguous. Ctrl+Left click again near the center of selected segments to deselect them.

3. To select the current segment and the balance of upstream segments, press Ctrl+Shift+Click.

4. To select the current segment and the balance of downstream segments, press Ctrl+Alt+Click.

Repositioning Segments on the Same or to Like Tracks

Movement Behavior

As all segments are moved, their head or tail will snap to edit points on both video and audio tracks regardless of whether they are enabled or not, to marks in and out, and the cursor position.
Movements are completed on mouse-up regardless of whether the segment has been snapped or simply repositioned to a new location.

Repositioning a Segment In Gap Trim Mode

With your segment(s) selected as per above you have two options to execute the movement of the segment on the **same** track:

1. Left+Click near the center of the segment and drag in either direction.
2. To move by timecode press + or - followed by the value and then press Enter. To move by frames press ++ or - - followed by the value and then press Enter. In both cases a Duration Dialog box will appear following a + or - entry.

On mouse-up after the drag or entering a numeric trim value, the moved segment will overwrite the overlapped segment(s) leaving a gap in the area vacated by the moved segment.

Repositioning a Segment in Ripple Mode

With your segment(s) selected as per above you have two options to execute the movement of the segment on the **same** track:

1. Ctrl+Left+Click near the center of the segment and drag in either direction.
2. To move by timecode press + or - followed by the value and then press Enter. To move by frames press ++ or - - followed by the value and then press Enter. In both cases a Duration Dialog box will appear following a + or - entry.

On mouse-up or entering a numeric trim value and based upon the direction of the move, the head or tail of the moved segment determines the insertion point in the timeline track.

If the insertion is not located at an edit point then the insertion bifurcates the overlapped segment:

1. When moving a segment upstream (that is, toward the head of the timeline) then the point of bifurcation is determined by the head of the segment being moved.
2. When moving a segment downstream (toward the tail of the timeline) then the point of bifurcation is determined by the tail of the segment being moved.

If the segment being moved is relocated directly on an edit point then no bifurcation takes place:

1. If the segment is moved upstream and its head is relocated at an edit point then the segment is inserted, shifting the overlapped segment(s) downstream to fill the vacated space.
2. If the segment is moved downstream and its tail relocated at an edit point then the segment is inserted, shifting the overlapped segment(s) upstream to fill the vacated space.

In the above cases, the area vacated by the moved segment is shifted, therefore the overall length of the track is not altered.

Deleting Segments with or without a Ripple

To delete a segment without Rippling the timeline

1. Left Click near the center of the Segment and:
    a. Press the Lift key (**.** period key) or button  , or press the Delete key

To delete a segment with Rippling the timeline

1. Left Click near the center of the segment and:
    a. Press the Extract key (/ forward slash key) or button  , or press Ctrl+Delete

The Lasso Area and Selecting Multiple Tracks or Edit Points

The Neutral zone is the empty space in the timeline beneath the timecode track and above the media tracks. Clicking in the Lasso Area is equivalent to pressing the Escape key on the keyboard. It can also be used to initiate group selections by Left clicking and lassoing multiple segments or edit points.

Lassoing Segments

To select segments with a lasso:

Left Click and Drag across the desired segments. Any segment crossed in the path of the lasso will be selected. Once selected, they can be:

1. Moved in Gap or Ripple mode
2. Lifted or Extracted

Lassoing Edit Points

To select edit points with a lasso for Gap Trims:

Shift+Left Click and Drag across the desired segments.

1. If the lasso is drawn to the left of the edit point(s), a Gap Trim is initiated on the A side of the edits for all segments crossed in the path of the lasso.
2. If the lasso is drawn to the right of the edit point(s), a Gap Trim is initiated on the B side of the edits for all segments crossed in the path of the lasso.

To select edit points with a lasso for Rolling Trims:

Shift+Left Click and Drag across the desired edit points. If the lasso drawn crosses an edit point, a Rolling Trim is initiated.

To select edit points with a lasso for Ripple Trims:

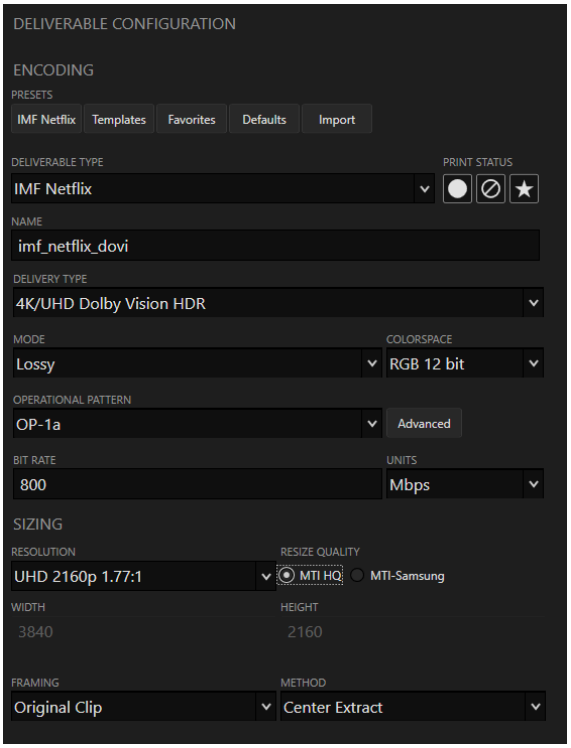
Ctrl+Left Click and Drag across the desired segments.

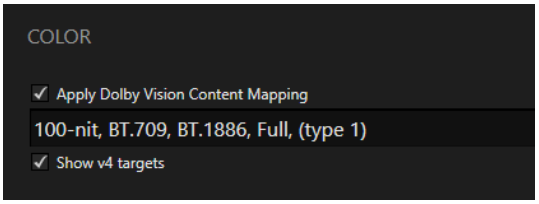
1. If the lasso is drawn to the left of the edit point(s), a Ripple Trim is initiated on the A side of the edits for all segments crossed in the path of the lasso.
2. If the lasso is drawn to the right of the edit point(s), a Ripple Trim is initiated on the B side of the edits for all segments crossed in the path of the lasso.

In all cases pressing escape or Left clicking in the Lasso Area will cancel the selection.

Creating a Dolby Vision™ / Dolby Atmos® Composition

Before creating a composition for both Dolby Vision™ (DoVi) and Dolby Atmos® (DoAt), make sure that you've created and configured the proper Deliverables, of which there should be, at least two; the IMF Deliverable Type and modifying the Preview to reflect the desired Content Mapping and Audio tracks to be monitored from the Atmos file.

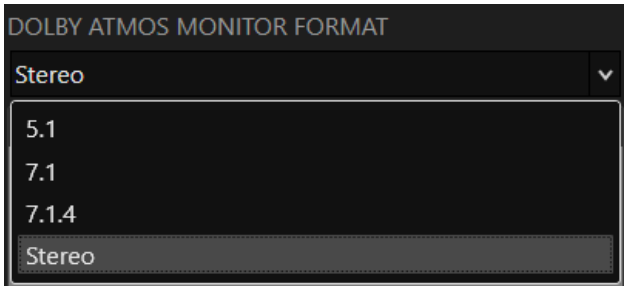


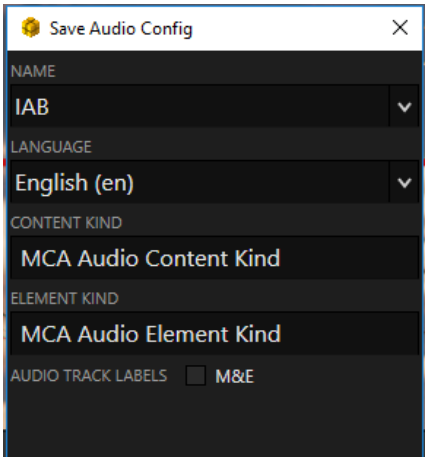


In the "Deliverable Type", Cortex provides a number of templates for various OTT and broadcasters/studios including Netflix, hulu, Fox, HBO, Sony, Apple, etc. The templates only require the "Delivery Type" entered and the balance of properties will be automatically filled.

Dolby Atmos®

If your Cortex Enterprise edition is licensed for the Dolby Vision™ option, it will also be licensed for Dolby Atmos®. There are three Atmos file types, all of which contain a series of potential Monitor Formats. The ADM (Audio Definition Model) BWF is essentially a broadcast wave file with Atmos metadata.

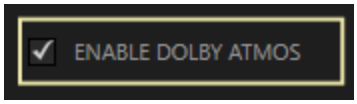




The IAB (Immersive Audio Bitstream) MXF file is the Atmos bitstream wrapped in a MXF file, which is used for IMF creation. The DAMF (Dolby Atmos® Master Format) consists of 3 files. The one used for import is the .atmos file.

When saving the audio configuration for an IMF with Dolby Atmos®, be sure to choose IAB as the configuration type.

Depending on the chosen Deliverable Type, a Monitor Format derived from the file can be assigned to it. Be careful to choose the Monitor Format that conforms to the number of channels the Deliverable Type supports. For IMFs, the Atmos file is simply passed through without the ability to configure it.

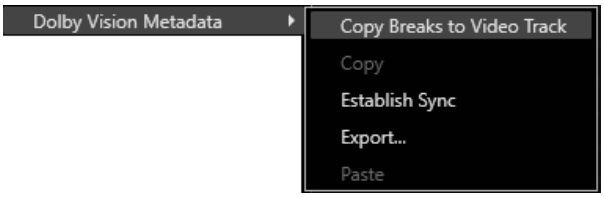


If the IMF Composition (refer to IMF Composition) has the Dolby Atmos® option enabled, a DA track is automatically added to the timeline.

<-- This is where the Atmos® track is placed.

Dolby Vision™ Metadata

When a Dolby Vision™ xml file is supplied, it is intended to be placed on the Metadata Track in sync with the master video file so that any Content Mapping will be displayed correctly.



To copy the breaks contained in the metadata track to the video track, right-click and choose Dolby Vision™ Metadata/Copy Breaks to Video Track from the context menu.

Cortex provides a method to ensure that the Metadata and other tracks remain in sync eliminating the risk of rendering the color metadata out of sync with the video. To Establish Sync between the tracks right-click and choose Dolby Vision™ Metadata/Establish Sync.
Orange diamonds appear after the track names.

Missing DoVi Metadata

If for any reason illegal or missing Level 1 metadata is present in the .xml file, it will display as a purple segment and also be listed in the GAP LIST of the SHOTS tab.

Double clicking on the Gap List event will jump the timeline to the related segment.

Three Methods of Fixing Bad Metadata

There are three ways to fix illegal or missing metadata.

1. Copy DoVi metadata from other similar segments
2. Use the Trim function to extend metadata from an adjacent segment
3. Use the Color Tool to analyze Level 1 content mapping

1. Copy Dolby Vision™ Metadata

By locating a segment that has similar color characteristics you can copy that metadata and then paste it to the segment with bad metadata.

Click on the good segment and press Ctrl+C or right-click on the timeline and choose:

Dolby Vision™ Metadata/Copy

Click on the bad segment and press Ctrl+V or right-click on the timeline and choose:

Dolby Vision™ Metadata/Paste

2.

2. Use the Trim Function to Extend Metadata from an Adjacent Segment

MTI Film holds a patent for editing metadata tracks as you would video or audio media tracks.

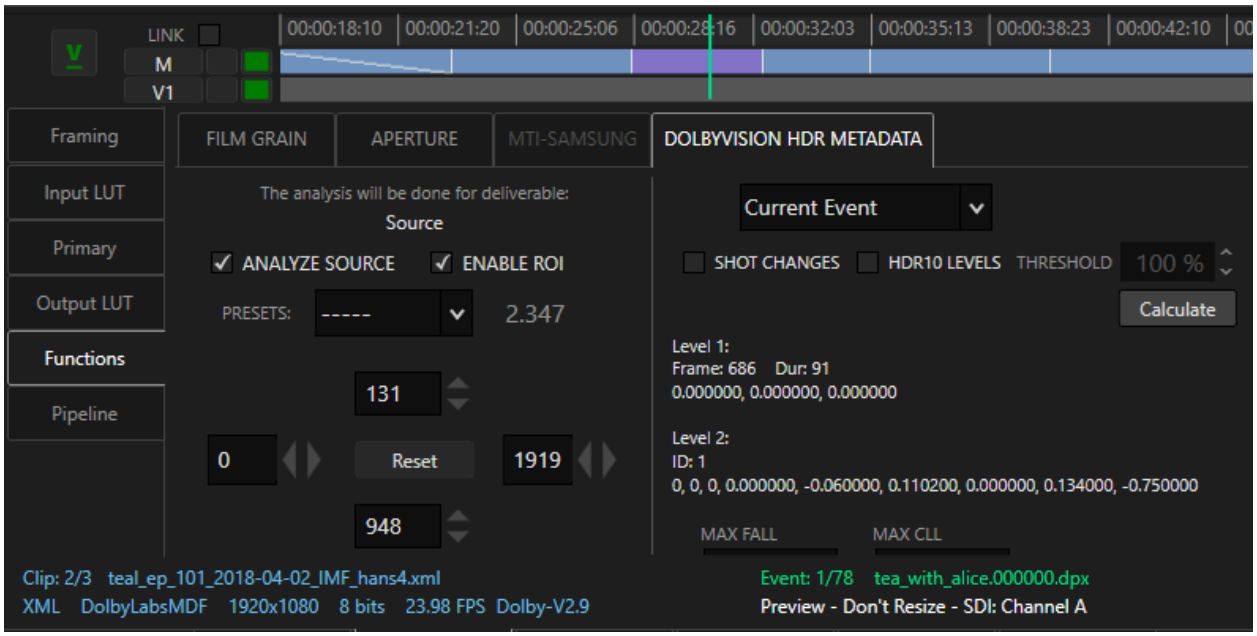
Shift+click on an edit to initiate a Rolling trim and then drag the trim to the end of the segment.

When you reach the break of the next segment,

mouse up and observe the two segments have become one

3. Use the Color Tool to Analyze Level 1 Content Mapping

In the Color Tool, select the tab for Functions/DolbyVision™ HDR Metadata.



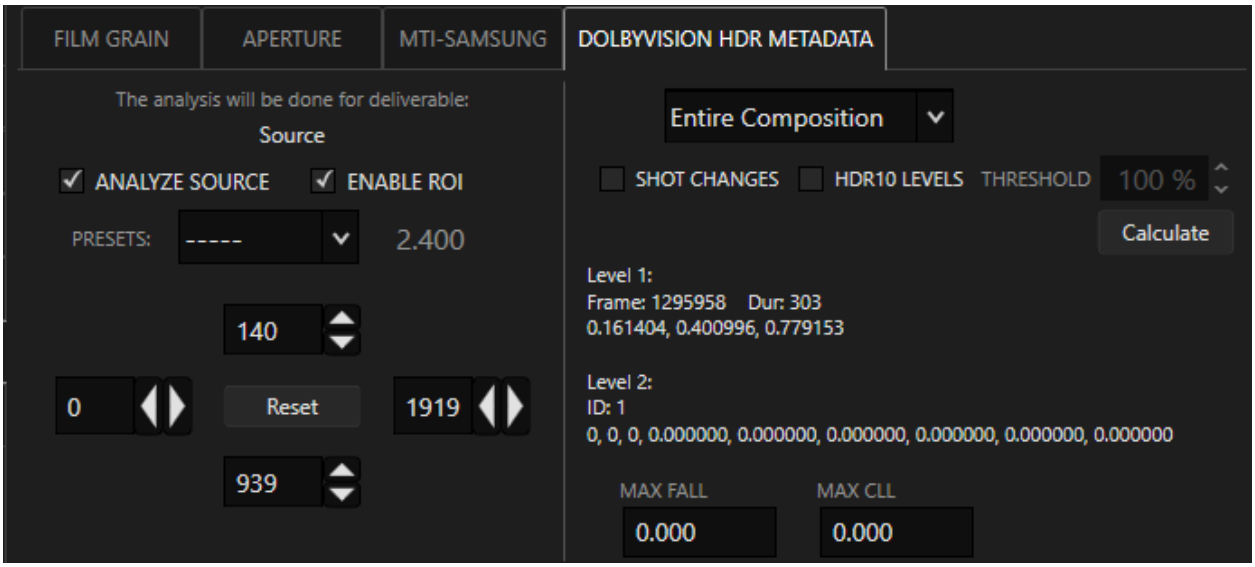
1. If you wish to Analyze the source media, enable the ANALYZE SOURCE checkbox. Disabling it will allow you to choose a specific Deliverable's color pipeline for the analysis by selecting its Deliverable tab above the Media Player.

2. If the picture content contains a matte, the analysis must exclude the matte from the analysis. To exclude the matte from analysis:
    a. Check the ENABLE ROI checkbox and choose an aspect ratio from the PRESETS Drop-down list. An ROI with Red line boundaries will appear.
    b. If needed, adjust the boundaries of the ROI with the arrow buttons.

3. With the timeline cursor located on the bad segment, select Current event in the Dropdown field located on the right panel

4. Press Calculate

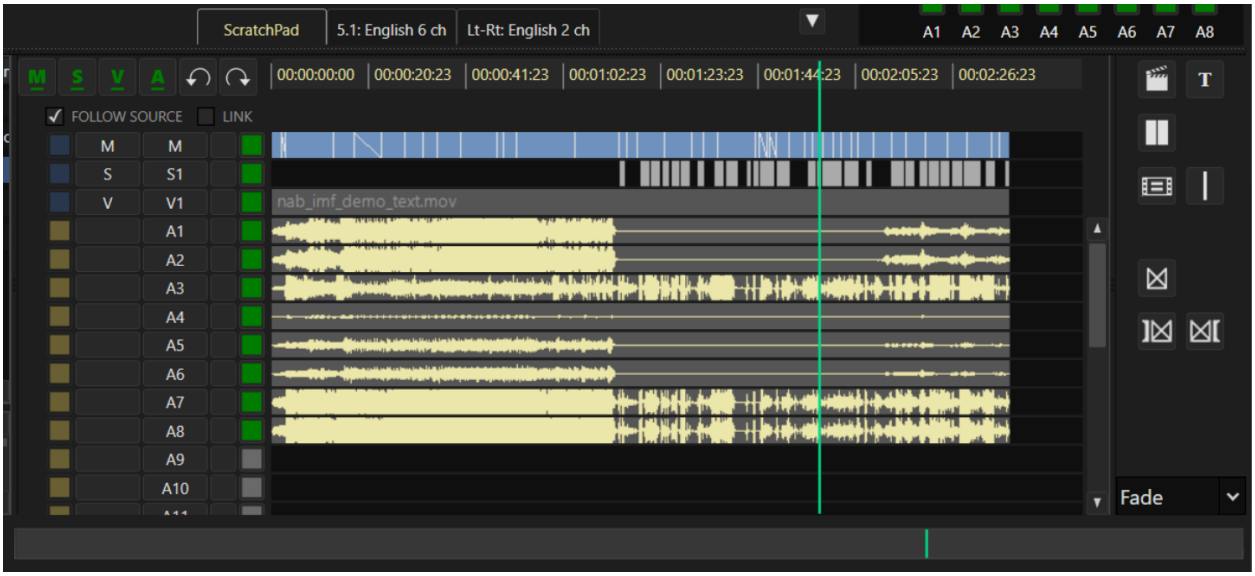
The Metadata track analysis will begin. Once the analysis is complete, the metadata track will turn blue and the Level 1 values will be displayed on the right side of the module.



Note that Level 2 (Trims) are unaffected. Cortex does not support changing Level 2 and, therefore, does not require you to purchase a license issued by Dolby.

ScratchPad Audio and Creating Audio Configurations for Compositions

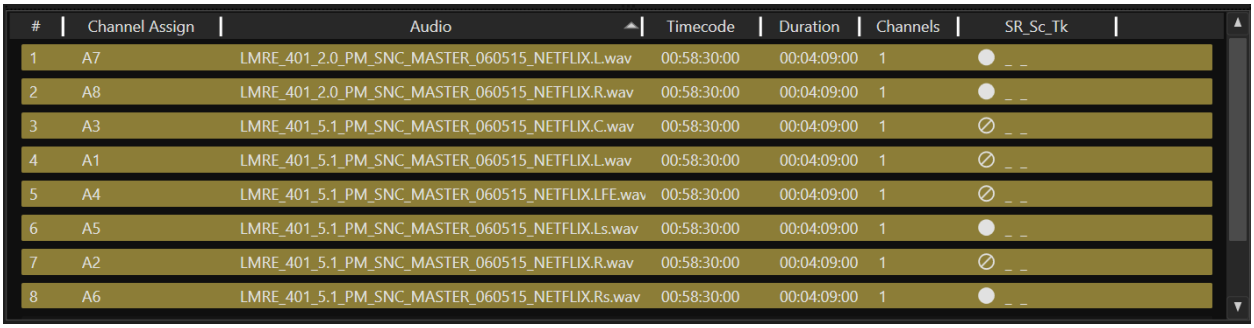
The ScratchPad is used to house all audio files required to create audio configurations for all composition types. For example, the mixes provided might include 5.1 and LTRT mixes that both have to be included in the render. In this case, there would be a need to organize the files in a manner that allows for synchronization and review.



In this illustration the ScratchPad contains a total of 8 audio tracks consisting of 5.1 and LTRT mixes. The 5.1 mix is on tracks A1 - A6 and the LTRT are on A7 and A8.

Adding Audio Tracks to the ScratchPad

To Add audio tracks to the timeline, if the files are monophonic, Ctrl+click on each channel of audio in the order you wish to populate the ScratchPad timeline. In the below example, the channel assignment order starts with #4 for the 5.1 mix and ends with #2 for the LTRT mix.



#	Channel Assign	Audio	Timecode	Duration	Channels	SR_Sc_Tk
1	A7	LMRE_401_2.0_PM_SNC_MASTER_060515_NETFLIX.L.wav	00:58:30:00	00:04:09:00	1	
2	A8	LMRE_401_2.0_PM_SNC_MASTER_060515_NETFLIX.R.wav	00:58:30:00	00:04:09:00	1	
3	A3	LMRE_401_5.1_PM_SNC_MASTER_060515_NETFLIX.C.wav	00:58:30:00	00:04:09:00	1	
4	A1	LMRE_401_5.1_PM_SNC_MASTER_060515_NETFLIX.L.wav	00:58:30:00	00:04:09:00	1	
5	A4	LMRE_401_5.1_PM_SNC_MASTER_060515_NETFLIX.LFE.wav	00:58:30:00	00:04:09:00	1	
6	A5	LMRE_401_5.1_PM_SNC_MASTER_060515_NETFLIX.Ls.wav	00:58:30:00	00:04:09:00	1	
7	A2	LMRE_401_5.1_PM_SNC_MASTER_060515_NETFLIX.R.wav	00:58:30:00	00:04:09:00	1	
8	A6	LMRE_401_5.1_PM_SNC_MASTER_060515_NETFLIX.Rs.wav	00:58:30:00	00:04:09:00	1	

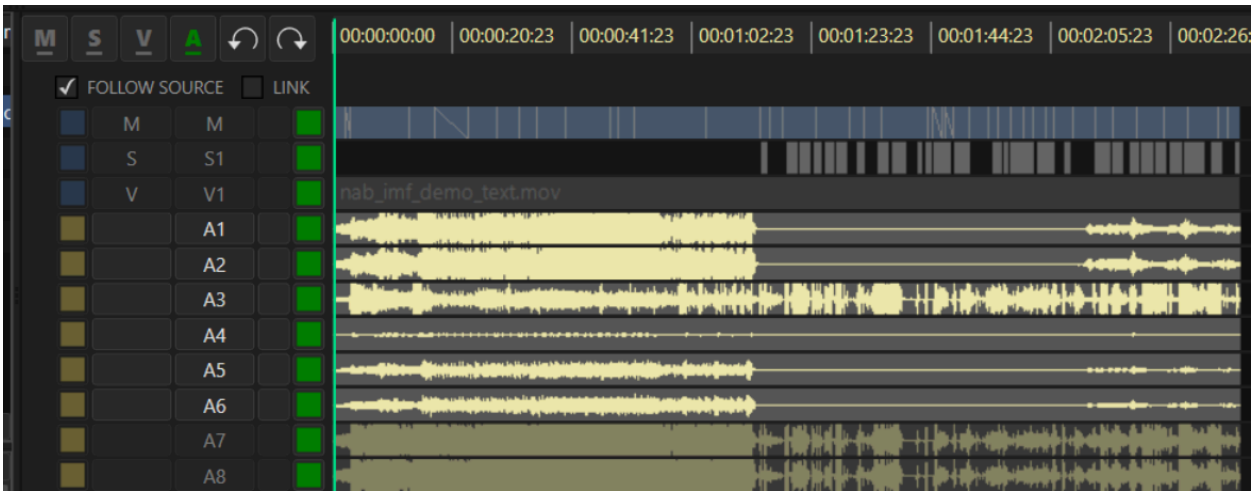
Follow these steps for monophonic “Stem” tracks:

1. Ctrl+click on each channel of audio in the order that you wish to populate the ScratchPad timeline. The first clicked track will be the one you can monitor (A1)
2. Add them to the ScratchPad Timeline
    a. Mark the In and Out points as a 3 point edit and either press the G key (Overwrite) or drag to the timeline
    b. If all the files begin at the same picture timecode location already edited to the timeline just drag them to the timeline; no marks needed

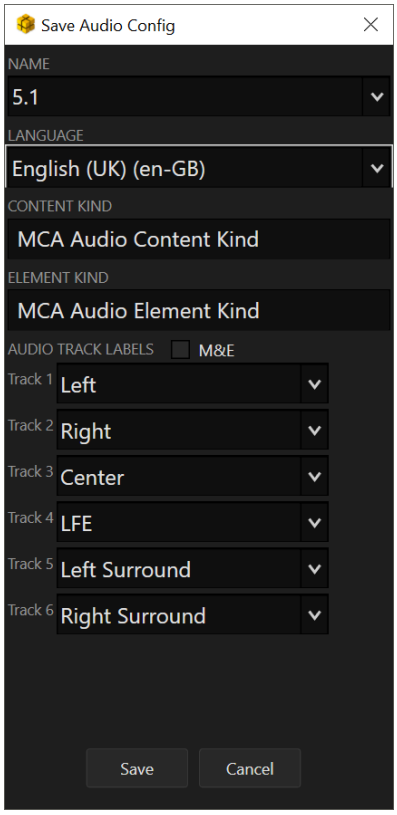
Saving Audio Configurations

For the 5.1 Mix:

1. Disable all but the 5.1 audio tracks (A1 - A6 in the example below)



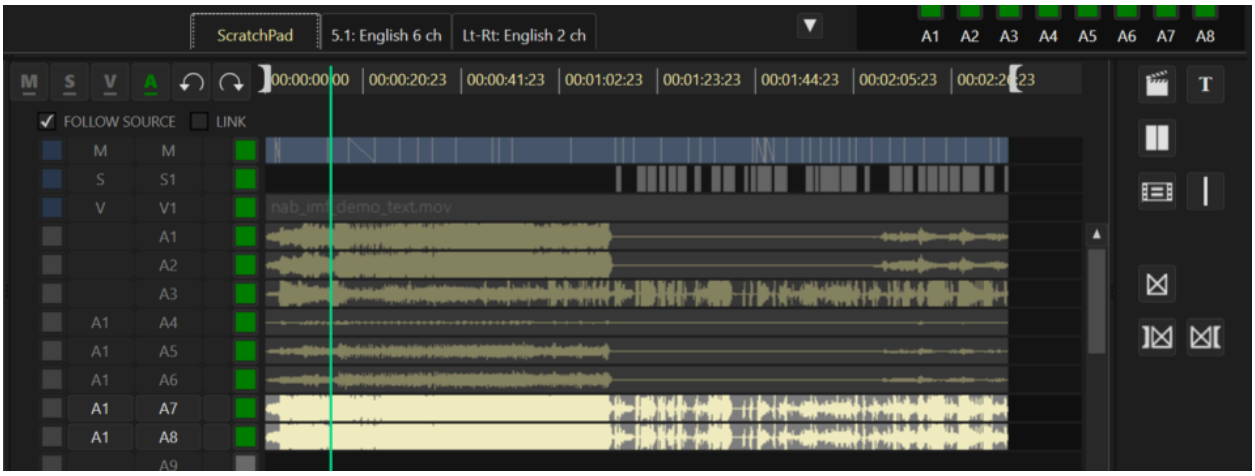
2. Press Ctrl+S or right-click on the timeline and choose Save Audio Config
3. A Dialog Box appears. Fill in the metadata and click Save



The Content Kind and the Element Kind must be filled in. Cortex uses the defaults MCA (Multi Channel Audio) Audio Content Kind and MCA Element Kind for that purpose. However, if the spec requires a different one, this is where you would enter it.

For the LTRT Mix:

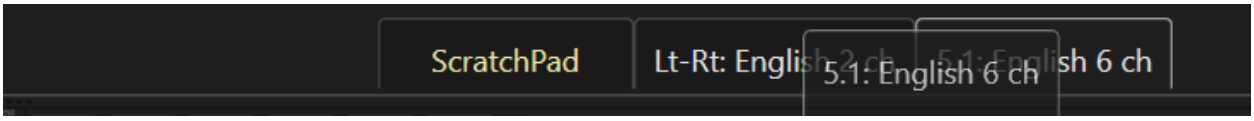
1. Disable all audio tracks and then enable tracks A7 and A8 (they will be rendered to tracks 1&2).
2. Press Ctrl+S or right-click on the timeline and choose Save Audio Config
3. A Dialog Box will appear. Fill in the needed metadata and click Save



For polyphonic wav files, channel assignments are normally automatically created, however, if there are two polyphonic files, after the first file is added to the timeline, the second file will automatically be assigned to A1 and A2. Disable those tracks and assign them to the desired ones, i.e. A7 and A8.

Move an Audio Configuration

If the configurations are created in an order that is not the desired one, you can click on the configuration tab and drag it to the proper position. For example if the LTRT was created prior to the 5.1 and it needs to be last, click on either tab and drag it to overlap the one to be replaced.

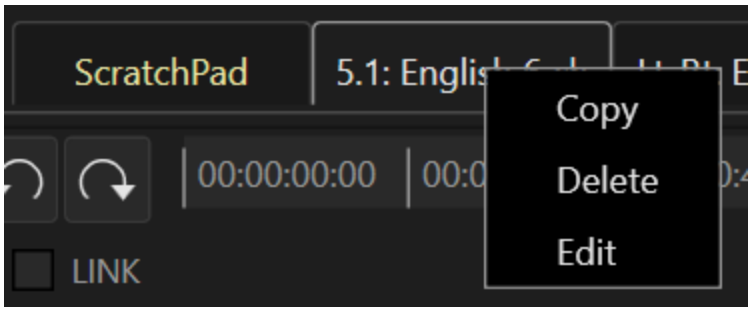


Once the config overlaps the one to be replaced, release the mouse button and the config will be moved.

Copy, Delete, or Edit an Audio Configuration

There are times when it is necessary to modify an audio configuration in order to change one aspect of it, for example its language.

To Copy an Audio Configuration



Right click on the desired audio configuration tab and select Copy.

The Audio Configuration dialog appears.

The “Language” field will be empty anticipating the modification, however you can edit any aspect of the dialog.
Click Save

To Delete an Audio Configuration

Right click on the desired audio configuration tab and select Delete.
A message box appears. Click the Yes or No response button

To Edit an Audio Configuration

Right click on the desired audio configuration and select Edit.
The Audio Configuration dialog appears. Make edits as required and then click Save.

Sync Loss Indicators

If video and audio files were synchronized in the Sync tool, and the synchronization between them is affected in the Edit Tool, a “sync loss indicator” is drawn in red on the affected tracks.

In all cases the indicator will suggest the trim action to resync the tracks.

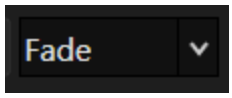
For example, if a +10 frame trim is executed at the head of a video segment causing a loss of sync, the indicator will be as follows:

Executing the suggested trim on the audio track(s) will resync the affected tracks.

Effects and Transitions

Adding Effects in the Edit Tool is similar to adding dissolves in the Color Tool.

In the EFX Palette be sure Fade is chosen in the Effect Dropdown field.
NOTE: In V5.6 only Fades are supported with more to be added in future releases.



Working With Fades

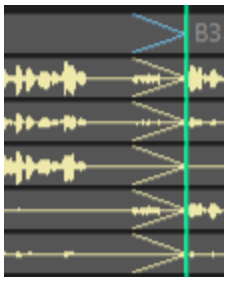
In compositions, you can add a Fade In or Fade Out to your clip.

To Create a Fade In:

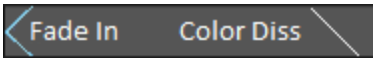
1. Navigate to the frame where you wish to **begin** the fade (usually the first frame of a segment)
2. Click the **Add Effect** button or press the **P** key
3. Navigate to the desired Out point for your fade (for a 16 frame fade-in enter +15, which will include the first frame for a total of 16)
    a. Click the **Mark Effect Out** button or press the **]** key
    b. To lengthen or shorten the fade, adjust the Mark Effect Out

To Create a Fade Out:

1. Navigate to the frame where you wish to **end** the fade (usually the last frame of a segment).
2. Click the **Add Effect** button or press the **P** key.
3. Navigate to the desired In point for your fade (for a 24 frame fade out enter -23, which will include the last frame for a total of 24)
    a. Click the **Mark Effect Out** button or press the **]** key.
    b. To lengthen or shorten the fade, adjust the Mark Effect In



Effect Symbols



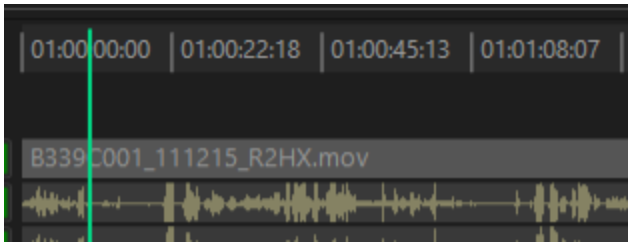
Fades In and Out are displayed as two blue diagonal lines beginning and ending at the center of the track respectively. Color Dissolves are white diagonal lines beginning at the top of the track and ending at the bottom.

To Delete an Effect

Go to the beginning or anywhere in the effect and press Ctrl+P

	P Ctrl+P	Add Effect (Fade In or Out only in this version) Delete Effect
	[Shift+[	Mark IN or modify the in point of the effect Go to Previous Effect
	] Shift+]	Mark OUT or modify the out point of the effect Go to Next Effect

Navigating the Timeline

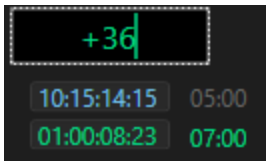


In addition to playing or jogging forward/reverse and jumping between breaks, you can use the Timecode Bar to scrub the timeline. Click anywhere on the Timecode Bar at the top of the timeline and the playhead will jump to that location. Drag up or downstream to scrub.

Searching a Timecode

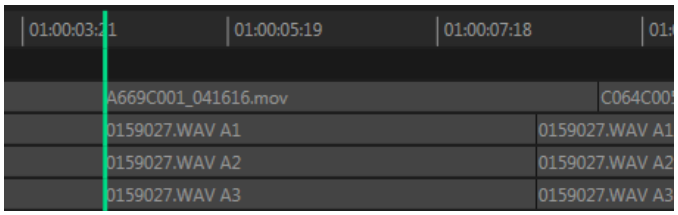
You can enter a timecode directly into the composition Timecode Position Field. Just start typing on the number pad and press enter to jump to the timecode location. Use the . (dot) key to enter leading or following 00s.

Moving by Timecode or Frames



To navigate by moving by timecode or frames use the + or - keys on the number pad. Pressing the plus or minus key once enters a timecode value. Pressing the plus or minus buttons twice enters a value in frames. Press enter and the cursor will jump by the input value.

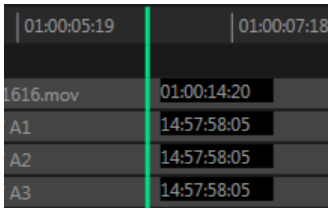
Jumping Edit by Edit



When focus is on the composition, the **E** and **R** or **UP** and **Down** arrow keys will jump to the next or previous edit points based on which tracks are enabled.

If the Media Player is focused on a clips bin, pressing Shift+S or Shift+F will initially switch focus to the composition. Subsequent presses will move in the desired direction edit by edit regardless of which tracks are enabled.

Showing Source Timecode in the Composition



To show/hide the timecode of source media contained in the composition, place the playhead at the desired position and press F8 or right-click and choose “Show Source Timecodes” in the Context Menu. When showing, pressing play will hide the timecodes.

Zooming the Timeline

There are several methods to zoom in or out of the timeline.

1. At the bottom of the UI there is a control bar that zooms in out of the timeline.  or
2. Hovering the mouse cursor over the timeline and scrolling the mouse wheel up or down will zoom in and out of the timeline based on the location of the mouse cursor.
3. Pressing Shift while scrolling the mouse wheel up or down will alter the height of the tracks.
4. Pressing Ctrl and scrolling the mouse wheel up or down will scroll the timeline up or downstream.
5. Pressing Shift and + or - on the keyboard will zoom in and out respectively.
6. Pressing Ctrl+Shift and - will fit the entire timeline in the composition window.

Double clicking anywhere on the Timeline Thumb/Slider located at the bottom of the screen will also fit the entire timeline in the composition window.

Matchframes

Using the Matchframe functions in Cortex are extremely helpful in finding specific corresponding source media used in the composition and vice versa. It can also be used to “trim” the head and tail of shots as opposed to using the graphical trim functions (explained earlier in Trim Types). The Matchframe command can be invoked by pressing the M key or clicking the Matchframe button in the EFX Palette.

For this section, the keyboard shortcuts will be referenced.

Simple Matchframe

With the composition focused and the Media Player sitting on the desired frame you wish to match, press M. This finds the corresponding source clip/frame and loads it in the Source Media Player. Conversely, if a clip has been used in the composition and the Matchframe command is invoked while focused on the source clip, the corresponding matchframe will be loaded in Composition Media Player.

NOTE: A simple matchframe leaves the timecode registers unchanged,

Lengthening the Tail of a Shot

To lengthen a shot while located at the last frame of a shot, press Shift+M. This will load the matching timecode values plus one frame into both the source and composition Mark In registers, leaving the Mark Out registers empty and ready for input. Focus is initially placed on the Source Media Player. After an out point is entered, an Overwrite or Insert edit can be performed.

Note: When inserting Black, you can use the Shift+H command on any and all tracks. It will automatically use the Black Level assigned when the composition was created. Set a Mark in and Out on the timeline, enable the tracks required and press Shift+H.

Lengthening the Head of a Shot as an Overwrite

To lengthen a shot as an overwrite edit while located at the first frame of a shot, press Ctrl+M. This will load the matching timecode values minus one frame into both the source and composition Mark Out registers, leaving the Mark In registers empty and ready for input. Focus is initially placed on the Source Media Player. After an In point is entered, an Overwrite edit can be performed.

Lengthening the Head of a Shot as an Insert

To lengthen a shot as an insert edit while located at the first frame of a shot, press Ctrl+Shift+M. This will load the matching timecode values minus one frame into both the source Mark Out and composition Mark In registers, leaving the other registers empty and ready for input. Focus is initially placed on the Source Media Player. After an additional mark is entered, an Insert edit can be performed.

Reversing a Jump Cut

To undo a jump cut, locate the composition timeline cursor at the jump cut. Then press Shift+M or Ctrl+M. The new marks present a marked range that will repair the jump cut. Then click the Insert button.

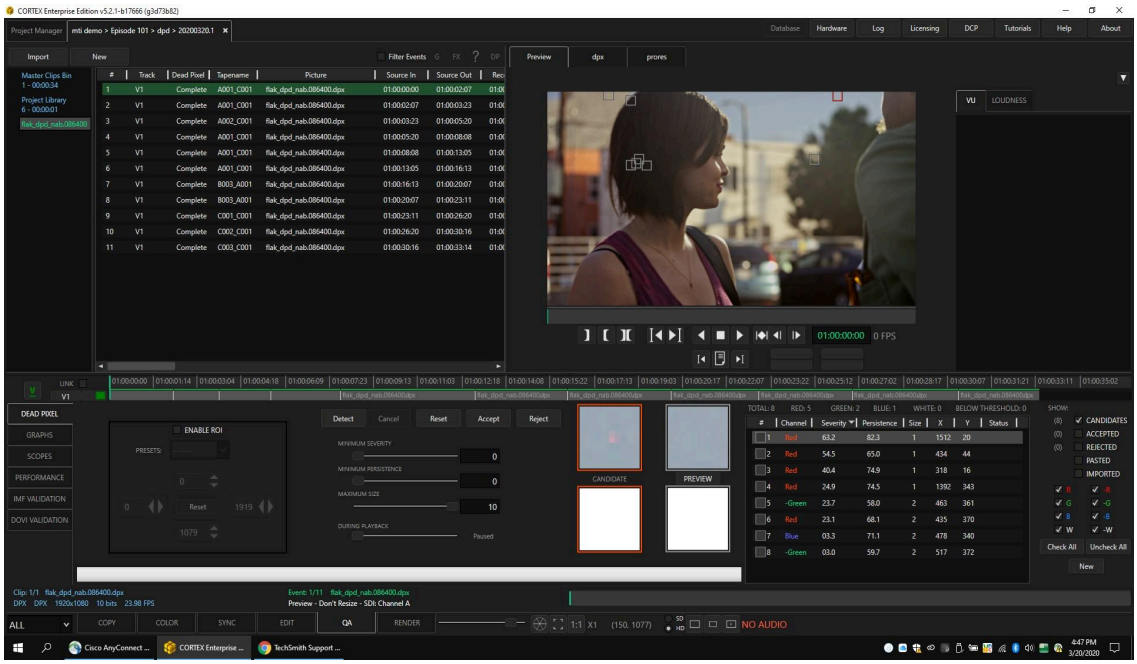
Run-throughs now appear on the timeline indicating an edit has been made where the adjacent timecodes are continuous. Run-throughs can be cleared individually by placing the timeline cursor on an edit point with a Run-through and pressing Ctrl+, (comma) or Ctrl+clicking the Add Edit button. To clear them all at once and with the timeline cursor located anywhere on the timeline you can:

1. Press Ctrl+Shift+,
2. Press Ctrl+Shift+Click the Add Edit button 
3. Right click on the timeline and select “Clear run through edits” from the Context Menu.

Edit Function Keys

Trim Types		
Gap/Overwrite Trim	Left Click & Drag	One sided trim
Ripple Trim	Ctrl+Left Click & Drag	One sided trim with ripple
Rolling Trim	Shift+Left Click & Drag	Two sided trim
Slide Trim	Alt+Left Click & Drag	Click near center of segment
Slip Trim	Shift+Alt+Left Click & Drag	Click near center of segment
Selecting Segments		
Select a single segment	Left Click	
Select additional segments	Shift+Left Click	Selects contiguous segments
Select additional segments	Ctrl+Left Click	For non-contiguous segments
Select current & upstream segments	Shift+Alt+Click	
Select current & downstream segments	Ctrl+Alt+Click	
Lasso Segments	From the Neutral Bar Lasso and Drag downward	
Repositioning Segments		
Reposition in Gap mode	Left Click & Drag to location	Segment overwrites and leaves a gap
Reposition with Ripple mode	Ctrl+Left Click & Drag to location	Segment Bifurcates overlapping segment area
Deleting Segments		
Delete a segment with Gap	Left Click and click Lift or press the Delete key	Deletes the segment and leaves a gap
Delete a segment with Ripple	Left Click and click Extract or press Ctrl+Delete	Deletes the segment and ripples downstream segments

The QA Tool



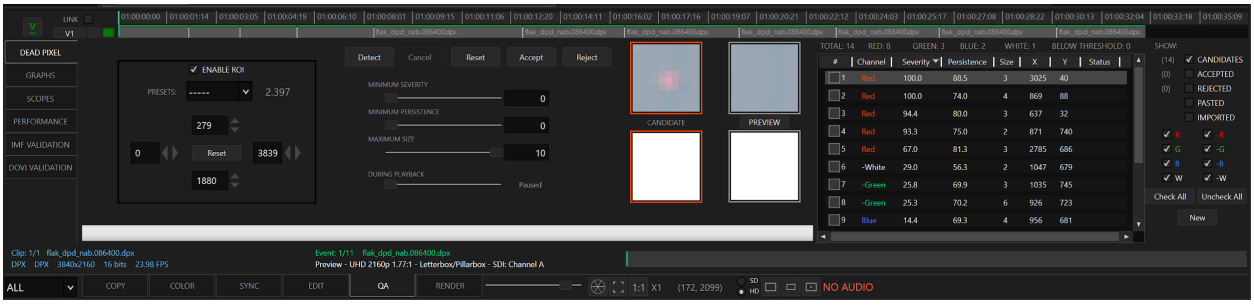
The QA Tool provides modules for:

1. Dead Pixel Detection and Correction
2. Graphical Data Analysis for:
    a. Video Levels
    b. Bit Rate
    c. Audio Levels
    d. Dead Pixels
3. Video Scopes
    a. Waveform with various scales
    b. Vectorscope
    c. Gamut Display
4. Audio Meters
    a. VU
    b. Loudness
5. System performance monitoring
6. IMF Photron Validation
7. Dolby Vision™ Metadata Validation.

Note: Dead Pixel Detection is available in all versions of Cortex. In the DIT editions only source clips can be detected. In the Enterprise, Dailies, and QC editions, source clips and compositions can be detected. Dead Pixel Correction is only available in the Enterprise edition.

The Dead Pixel Module

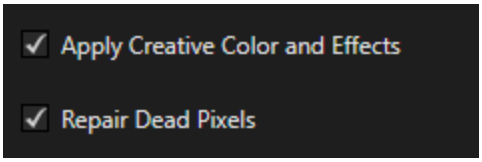
The Dead Pixel module provides the ability to detect and correct dead pixels found in picture media. Dead Pixels, sometimes referred to as “Stuck” pixels, are caused by defective spots of the camera image sensor. In digital cameras, defective pixels fail to *sense* light levels correctly, whereas defective pixels in LCDs fail to *reproduce* light levels correctly.



The Dead Pixel module can detect single-take camera files or compositions that contain edited material. As of version 5.6, Cortex can correct a third party detection with the importation of .csv files. For detection, we recommend using the highest quality version of the media in order to ensure the greatest level of accuracy.

Preparing Deliverables for Dead Pixel Correction

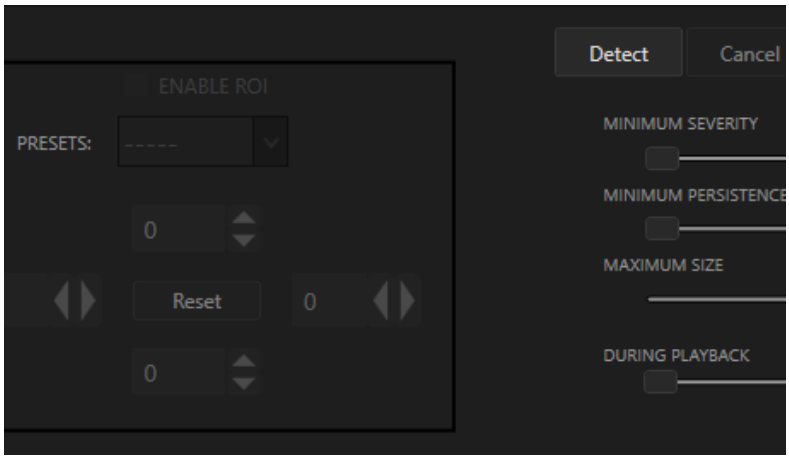
The Dead Pixel module uses the Preview deliverable color pipeline for its analysis and, therefore, must have the deliverable properties “Apply Creative Color and Effects” and “Repair Dead Pixels” enabled. The other deliverables should disable Apply Creative Color and Effects but leave Repair Dead Pixels enabled as explained below.



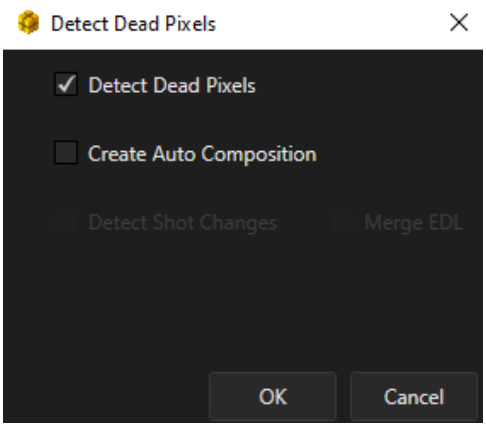
When detecting ungraded camera or HDR clips, it is recommended to increase the saturation of the clips prior to detection using the ColorTool. This enhances the detection process and increases the contrast of the dead pixels.

Preparing the Deliverables as instructed allows changes to saturation without ultimately affecting the image when rendering the Deliverables of choice.

Detecting a Single Camera Clip

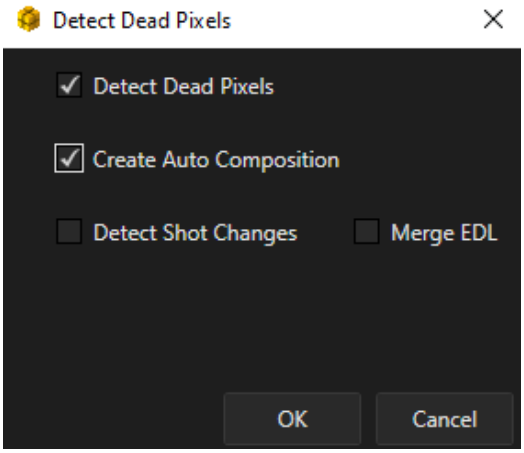


To initiate a detection, select the intended media and click the Detect button, found just below the Master Clips Bin.



If the selected clip is a single camera file, ensure that "Detect Dead Pixels" is checked and then click "OK."

Detecting Edited Media



If the media contains edits, you will need to create a composition by enabling "Create Auto Composition." There are two choices how edits are applied:

1. By merging an EDL
2. Using Cortex's shot detection algorithm.

It is recommended to use an EDL. This saves time by eliminating the need to detect and vette the edits.

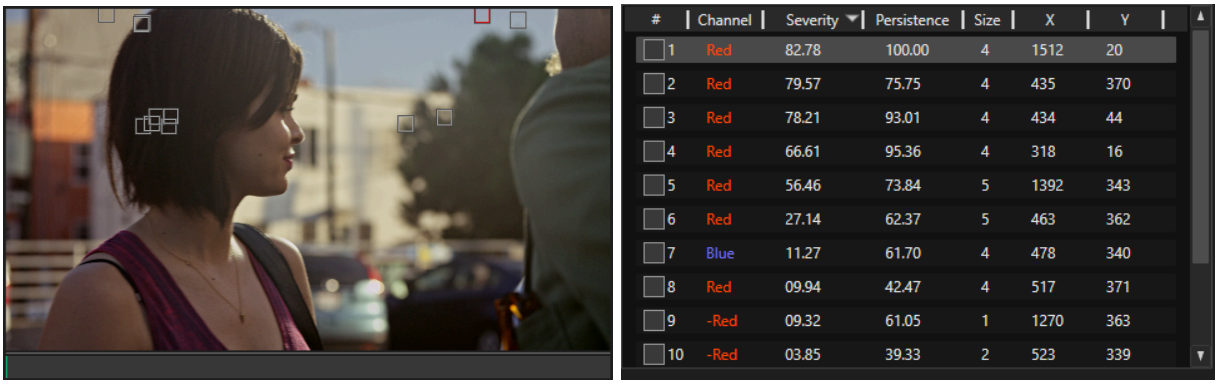
If you enable "Merge EDL," an explorer window will open. Navigate to and select the corresponding EDL. Once selected, the media will appear on a new composition timeline with the cuts in place.

If you click "Detect Shot Changes," the media is placed onto the timeline and the edit points appear as the shot detection progresses.

In either case, during pixel and/or shot detection, green progress bars appear above each shot on the timeline. Cortex detects all the shots in the composition simultaneously and refreshes every 30 seconds allowing work to begin while the detection continues in the background.

The Detection Workflow

As the detection progresses, Cortex generates a Dead Pixel List of “Candidates” for each shot. They are displayed in the Media Player contained in boxes.



#	Channel	Severity	Persistence	Size	X	Y
1	Red	82.78	100.00	4	1512	20
2	Red	79.57	75.75	4	435	370
3	Red	78.21	93.01	4	434	44
4	Red	66.61	95.36	4	318	16
5	Red	56.46	73.84	5	1392	343
6	Red	27.14	62.37	5	463	362
7	Blue	11.27	61.70	4	478	340
8	Red	09.94	42.47	4	517	371
9	-Red	09.32	61.05	1	1270	363
10	-Red	03.85	39.33	2	523	339

“Candidates” are pixels that Cortex has determined are likely dead. All pixels in the list are initially assigned Candidate status.

In the Dead Pixel List, pixels are displayed in rows with values or scores for their Color channel, Severity (or contrast), and Persistence (the visibility of the candidate in the shot), Size, X/Y coordinates, and Status.

In the Media Player, dead pixel candidates are displayed as boxes comprising two parts. a core and border.

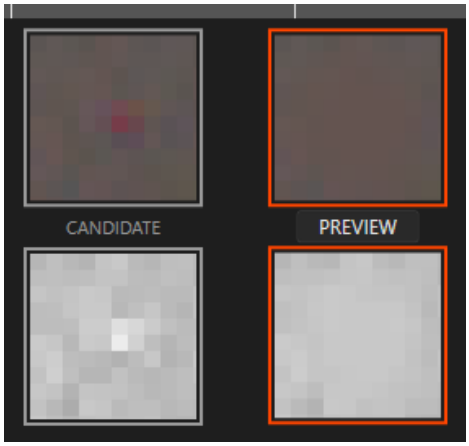
The core reflects the color channel of the dead pixel candidate as follows:

Red	-Red
Green	-Green
Blue	-Blue
White	-White

The border represents the status of the pixel:

Color	Status
Grey	Candidate
White	Accepted
Black	Rejected
Same color as the core	During Preview

Selecting a Pixel



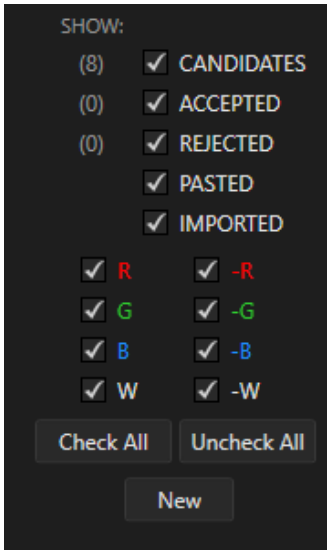
Pixels can be selected by left or right-clicking the center of the box or on the list item.

The selected pixel is displayed in two sets of magnified boxes. The left set of boxes shows the pixel defect before the fix. The top box is displayed in full RGB color. The bottom box is a black & white display of the pixel's affected color channel.

The right set of windows shows the pixel candidate after the Cortex fix.

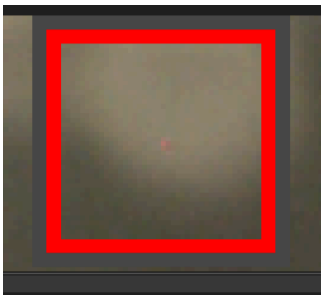
The Dead Pixel List can be filtered in several ways:

Checkboxes along the side of the UI can filter out pixels based upon their status (Candidate, Accepted, Rejected, Pasted or Imported). They can also be filtered from the list based on their color channel.



Using the sliders, Pixels can be filtered based on user-defined Minimum Severity and Persistence, and Maximum Size.

The number of pixels detected can potentially number 100 per shot. The filter sliders help eliminate pixels with low scores that are not visible to the eye and, therefore, are hidden to lessen screen clutter.



The mouse wheel is used to zoom in on the Media Player. Scrolling up zooms in, down zooms out. Holding Shift while scrolling, focuses the zoom on the selected pixel. Double clicking on the Media Player returns the display to the full frame view.

Repeatedly pressing the T key or clicking the PREVIEW button toggles a preview of the fix before and after.

Segment Play

The “Segment Play” button instructs Cortex to only play up to the end of the current segment, rather than move into subsequent segments. You can select this play mode by clicking the button or by pressing Ctrl+Shift+C. The current segment will be colored orange indicating Segment Play is active.

Segment Play mode is helpful when trying to determine the status of a pixel since it limits the cursor to the current shot, preventing the cursor from moving to the next shot where another pixel would be automatically selected. You can, however, still jump to the beginning of the next and previous shots using the corresponding navigation functions.

Assigning Status

As stated, every detected pixel defect is assigned a default status of “Candidate”. The user determines which candidates will be Accepted, Rejected, Copied/Pasted, Imported, or left as a Candidate.

Accepted pixels are added to the database for rendering the repairs. Rejected pixels are filtered from the render. Pixels that are Pasted inherit the status of the copied pixels.

Automatic Status Rippling

By x/y coordinates

Since dead pixels are an inherent camera sensor defect, they tend to repeat throughout a composition of edited content based on repetition of camera use. With this in mind, when a status is assigned to a pixel, Cortex ripples through the timeline and automatically assigns the same status to pixels with matching x/y coordinates. This expedites the approval process, saving time in the manual operation of dead pixel detection.

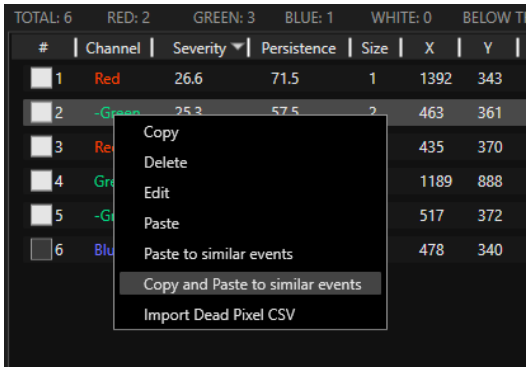
By Tapename

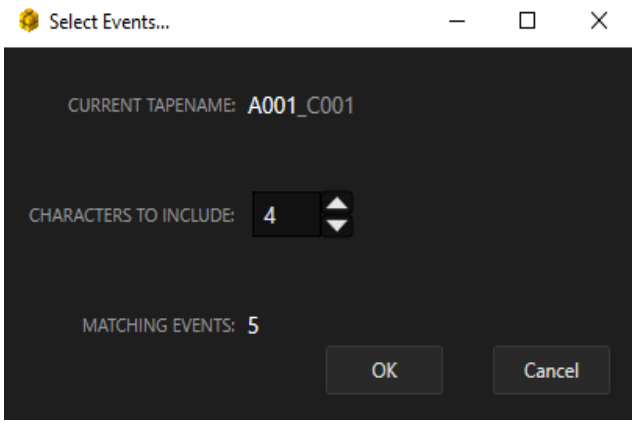
#	Track	Dead Pixel	Tapename	Picture
1	V1	Complete	A001_C001	flak_dpd_nab.086400.dpx
2	V1	Complete	A001_C001	flak_dpd_nab.086400.dpx
3	V1	Complete	A002_C001	flak_dpd_nab.086400.dpx
4	V1	Complete	A001_C001	flak_dpd_nab.086400.dpx
5	V1	Complete	A001_C001	flak_dpd_nab.086400.dpx
6	V1	Complete	A001_C001	flak_dpd_nab.086400.dpx
7	V1	Complete	B003_A001	flak_dpd_nab.086400.dpx
8	V1	Complete	B003_A001	flak_dpd_nab.086400.dpx
9	V1	Complete	C001_C001	flak_dpd_nab.086400.dpx
10	V1	Complete	C002_C001	flak_dpd_nab.086400.dpx
11	V1	Complete	C003_C001	flak_dpd_nab.086400.dpx

During the course of the workflow, the user may observe a Candidate present in one shot, however, missing from a similar shot captured by the same camera.

If an EDL was merged to the composition, the “Tapename” column can identify the camera source for each event in the composition. Another method of automating status assignment is to use the Copy and Paste to Similar Events function.

With the pixel you intend to copy selected, right-click on the Media Player or in the List view and choose, “Copy and paste to similar events.”





The Select Events Dialog Box opens. Using the up and down buttons, choose how many characters are included in the search criteria for matching camera rolls. For example, if 4 characters are included, Cortex will paste the pixel record to all events captured in the camera roll.

Copying and Pasting a Pixel Record

If needed, a pixel record can be copied from one shot and pasted to another. Right click on the pixel record and choose “Copy” from the context menu. Navigate to the shot you wish to paste in and then right-click and choose paste. The pasted pixel has the identical status to the copied pixel.

Deleting a Pixel Record

To delete a pixel record, right-click on it and choose Delete from the context menu.

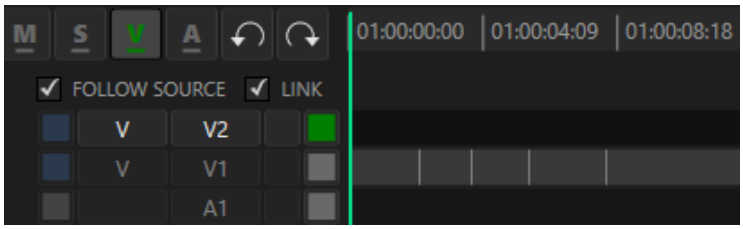
Editing a Pixel Record

At times it might be necessary to edit the metadata, such as its x and y coordinates. Right click on the pixel and choose Edit from the context menu. Modify the property and click Okay.

Copying and Pasting Dead Pixel Records to New Media

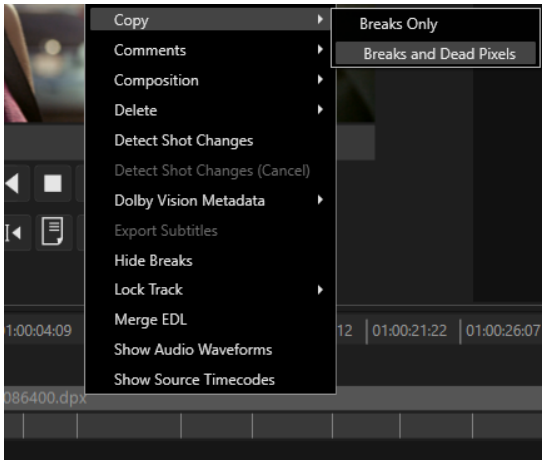
In the event that you have media that matches a composition that has already been detected, Cortex allows for copying the original Dead Pixel Detection to the newly imported media. For example, if detection has been processed on a Color Master, and it is required to commit those decisions to the Assembly Master, Cortex provides the ability to do so using the Edit and QA tools.

Note: The media needs to match cut for cut and is pixel accurate in both resolution and aspect ratio to the original media.



In the Edit Tool, import the new media. Add a video layer to the existing composition and edit the new media to V2.

Be sure that the media was cut in accurately by toggling the green Monitor button next to V2, turning the layer off and on to reveal V1.



With the new media on the timeline, right-click and choose “Copy/Breaks and Dead Pixels” from the context menu. The dead pixel detection and breaks from V1 to V2 are copied.

Once complete, rendering can begin for the new media.

Importing A Dead Pixel CSV Provided by a Third Party QC

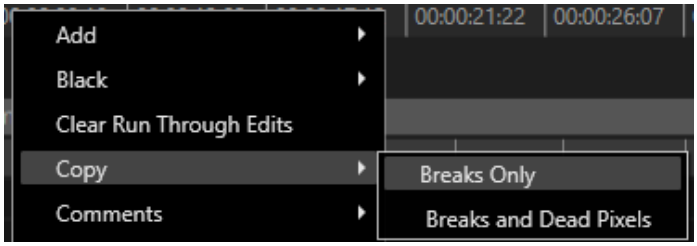
In the case where third party QC departments have run detection, either using Cortex or another application, Cortex can import a properly formatted .csv file that directs the software to the x/y coordinates of the detected pixels. Once the file is imported, Cortex can then render the corrections to the required deliverables.

Note: The .csv file needs to be properly formatted and will only work if the media is pixel accurate in resolution to the original detected media.

	A	B	C	D
1	File_Name	X	Y	RecordStartTimecode
2	80213572 – Demo: Season 1: Pilot - 101	272	1469	00:00:00:15
3	80213572 – Demo: Season 1: Pilot - 101	272	1468	00:00:01:07
4	80213572 – Demo: Season 1: Pilot - 101	304	1224	00:00:02:23
5	80213572 – Demo: Season 1: Pilot - 101	272	1468	00:00:04:17
6	80213572 – Demo: Season 1: Pilot - 101	272	1469	00:00:04:17
7	80213572 – Demo: Season 1: Pilot - 101	272	1469	00:00:07:02
8	80213572 – Demo: Season 1: Pilot - 101	272	1469	00:00:07:02
9	80213572 – Demo: Season 1: Pilot - 101	304	1224	00:00:09:12
10	80213572 – Demo: Season 1: Pilot - 101	523	772	00:00:13:22
11	80213572 – Demo: Season 1: Pilot - 101	523	772	00:00:13:22
12	80213572 – Demo: Season 1: Pilot - 101	516	632	00:00:18:11
13	80213572 – Demo: Season 1: Pilot - 101	516	632	00:00:21:11
14	80213572 – Demo: Season 1: Pilot - 101	3284	608	00:00:24:22

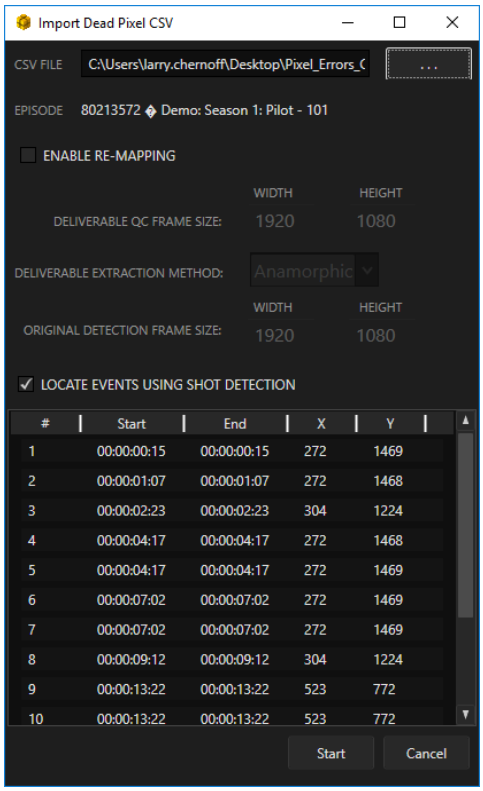
For 3rd party .csv files, the file structure must follow this example

Using the original media that rendered the media used by the QC company to generate its report, create a composition that starts and ends at the exact same timecode or, if an existing composition exists on V1, consider placing the same clip on V2 and copying the breaks if present. This will isolate the imported pixel detections onto V2 and later allow rendering only the affected shots.



In the Edit Tool, add the media to V2, right-click on the timeline and choose “Copy/Breaks Only” from the context menu.

The breaks from V1 are copied to V2. If no cuts are present on the timeline, the import dialog provides the option to detect the shot changes surrounding the reported timecode.



Click the Import button or right-click in the Dead Pixel List and choose "(Import) Dead Pixel CSV" from the context menu. The Import Dead Pixel CSV dialogue window opens. Navigate to and select the provided .csv file.

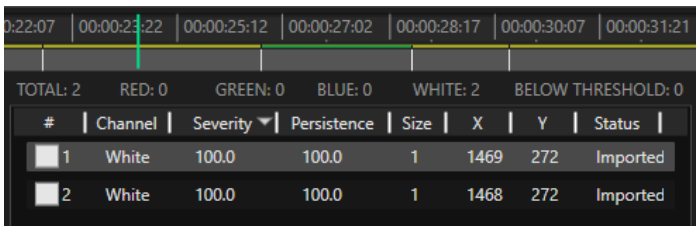
Once the .csv file is opened, Cortex will load a list of dead pixels with the Start and End timecodes as well as x/y coordinates.

If the list was generated using the properly formatted 3rd party .csv, the start and end timecodes will be identical. If the list was generated by Cortex and breaks were located on the timeline, the timecodes will be from the start of a shot to its end.

If no breaks are present on the composition timeline, enable the "LOCATE EVENTS USING SHOT DETECTION" check box.

If no remapping of the x/y coordinates are required, click "Start" to initiate the import process. If the edit breaks were already present, the import will be almost instantaneous. If Shot Detection is required, more time is needed.

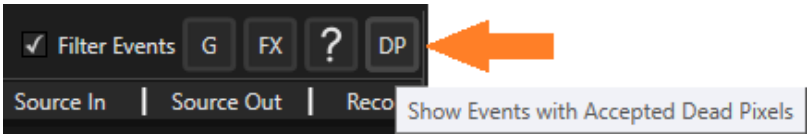
Once complete, the timeline will populate yellow lines above the segments where pixels have been imported. If shot detection was used, the edit breaks will also appear.



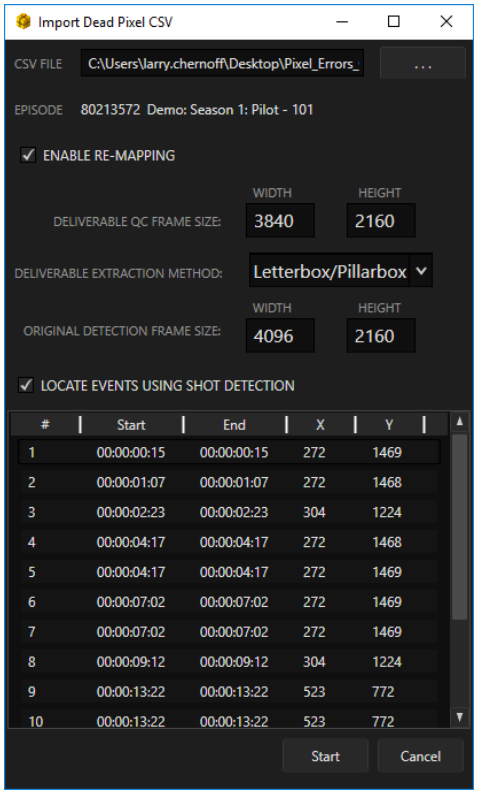
Above each segment is either a green or yellow line. The yellow lines indicate shots that have imported pixels versus green lines that indicate pixels detected by Cortex.

Filtering Events with Imported Pixels

Imported Pixels are automatically assigned Accepted status. To render only the shots that contain the newly imported pixels, while focused on the composition, enable the Filter Events checkbox and click the DP button. This will present the events that only contain Accepted dead pixels.



Remapping X/Y Coordinates



If the frame size of the media used to generate the x/y coordinates of the imported list differs from the frames size of the media in the composition used for the original detection then the imported x/y coordinates will need to be remapped. For example, a Master DPX frame size of 4096x2160 was used in a composition to generate a 3840x2160 IMF that was QC'ed by a third party. The QC generates a list of x/y coordinates that require correction but, of course, the original Master DPX files require new coordinates that map properly to their frame size.

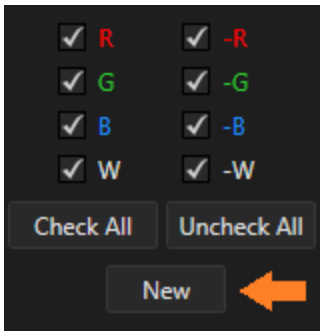
Steps to Remapping x/y Coordinates

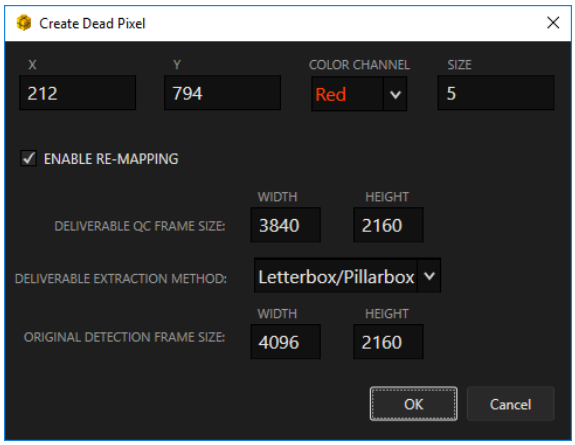
1. Enable the RE-MAPPING checkbox
2. Enter the frame size of the media used by the QC house
3. Enter the type of extraction method used to create the QC media
4. Enter the frame size of the media in the original composition

The coordinates will be remapped upon import.

Manually Creating a New Pixel

At times it might be necessary to create a dead pixel that Cortex does not detect but is reported by QC. To create a new Pixel record, click the New button.





A dialog box will open. Enter the x/y coordinates, a color channel (which can be any color in this case) and a size, which can be left at 1 if unknown.
The created pixel will automatically be given Accepted status.

If remapping is required, enable the checkbox and input the corresponding metadata as explained above.

Rendering Corrected Dead Pixels

Depending on the workflow requirements, the user can now choose to render a file of the entire composition or only the shots needing correction.

Rendering the Whole Composition

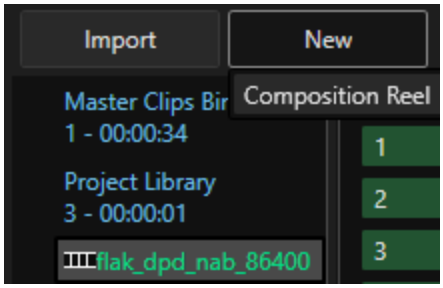
To render the entire composition, right-click on the composition name in the Sidebar and choose “Render”. (Learn more here Rendering a Composition)

Rendering Filtered Events

By filtering, as described on the previous page, Cortex provides the ability to render only the shots that contain Accepted Dead Pixels. This can be especially useful with image sequences (i.e. dpx, tiff, exr) where the objective is to replace the frames that have been corrected.

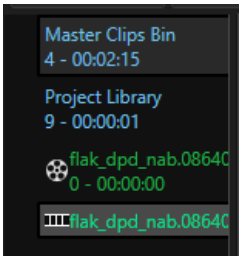
Create a Composition Reel

A Composition Reel is used to render specific segments of a composition versus the entire composition. Click the “New” button and choose “Composition Reel”.



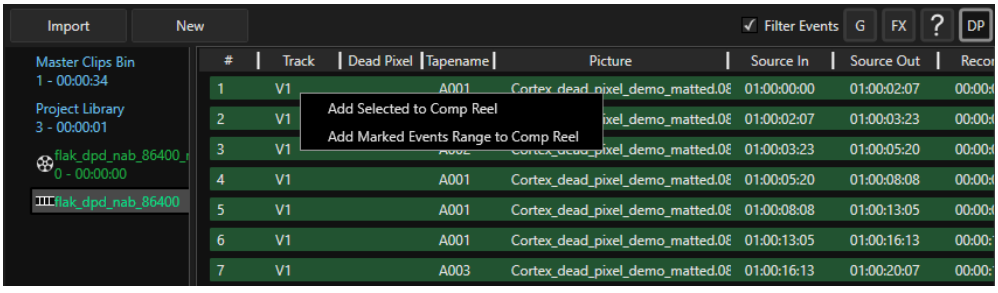
(Learn more here Creating a Clips or Composition Reel)

This prompts the Create Reel dialog box to open where the reel is named and other metadata is added. Choose “Source” in the Timecode field to preserve the original timecode of the source media and click create.



The reel is placed above the corresponding composition.

With the filtered events showing, select the shots in the list to be rendered. Right click and choose “Add Selected to Comp Reel”. Rendering begins immediately as clips are added.



Like Clip Reels, close the reel to complete the render.

For immediate access to the rendered file, switch to the Render Monitor Tool and, in the Completed column, right-click on the completed render task and select “Open Containing Folder.”

Dead Pixel Module Function Keys

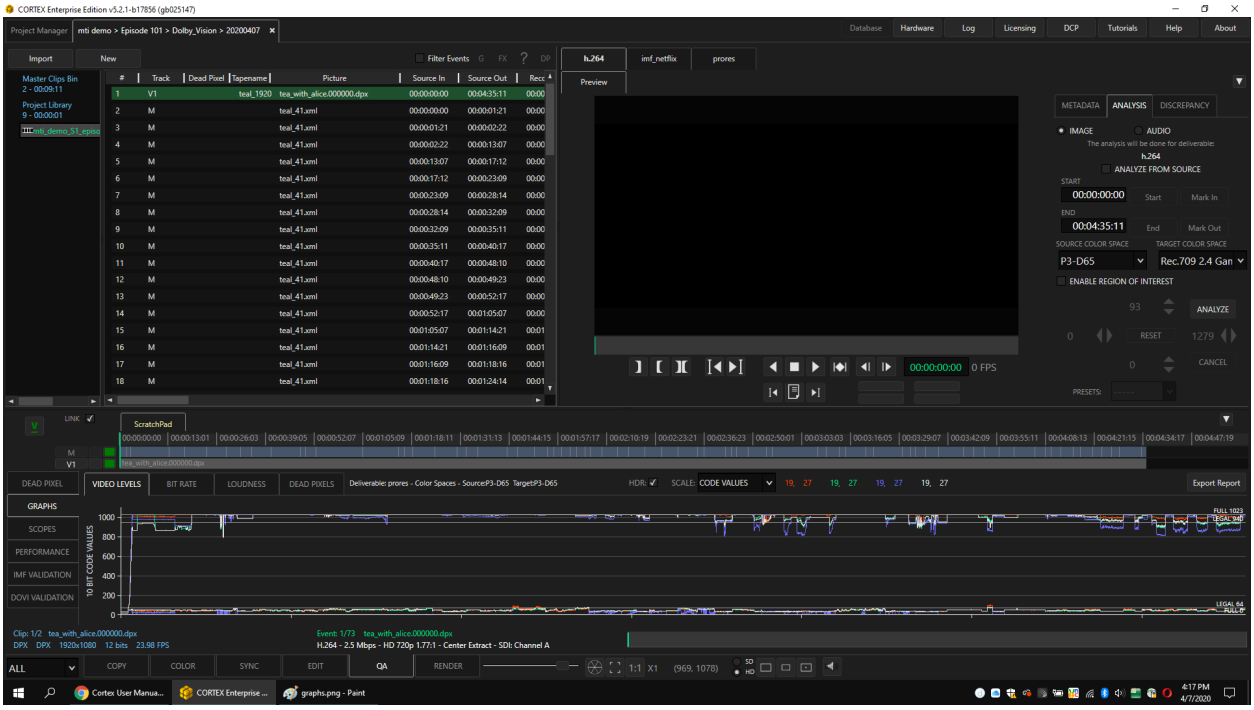
Left Mouse Button	Select dead pixel.
Right Mouse Button	Select dead pixel and edit/delete.
Ctrl+Shift+Left Mouse Button	Add new dead pixel at mouse cursor position.
G	Accept selected pixel(s) and ripple to all matching X/Y locations.
Shift + G	Accept visible pixel(s) in the Player for the current event only.
Ctrl + Shift + G	Accept selected pixel(s) for the current event only.
A	Reject selected pixel(s) and ripple to all matching X/Y locations.
Shift + A	Reject visible pixel(s) in the Player for the current event only.
Ctrl + Shift + A	Reject selected pixel(s) for the current event only.
0	Reset selected pixel(s) and ripple to all matching X/Y locations.
Shift + 0	Reset visible pixel(s) in the Player for the current event only.
Ctrl + Shift + 0	Reset selected pixel(s) for the current event only.
Ctrl + A	Select all events in composition.
Alt + A	Select all dead pixels in list.
Ctrl + C	Copy selected dead pixel(s).
Ctrl + V	Paste copied dead pixel(s).
Ctrl + Shift + V	Select and copy all pixels in list and paste to matching events.
1	Toggle Candidates filter
2	Toggle Accepted filter
3	Toggle Rejected filter
4	Toggle Pasted filter
5	Toggle Imported filter
6	Toggle +Red dead pixel candidates filter
7	Toggle +Green dead pixel candidates filter
8	Toggle +Blue dead pixel candidates filter

9	Toggle +White dead pixel candidates filter
Shift + 6	Toggle -Red dead pixel candidates filter
Shift + 7	Toggle -Green dead pixel candidates filter
Shift + 8	Toggle -Blue dead pixel candidates filter
Shift + 9	Toggle -White dead pixel candidates filter
Tab	Tab to Confidence and Severity value fields
Enter	Return value

The Graphs Module

In the QA tab, Cortex provides image and audio data analysis tools with graphical reports of the results. These reports can then be distributed through PDF. You can choose to analyze media based on the following:

- Video Levels (HDR and SDR)
- Bit Rate
- Loudness
- Dead Pixels



Video Analysis

Cortex allows the user to analyze video from a composition for both SDR and HDR material. The analysis can be done straight from the source material or filtered through a color pipeline configured in a deliverable. Once analysis is complete a graphical report will be generated and displayed below the timeline where the user can choose to see:

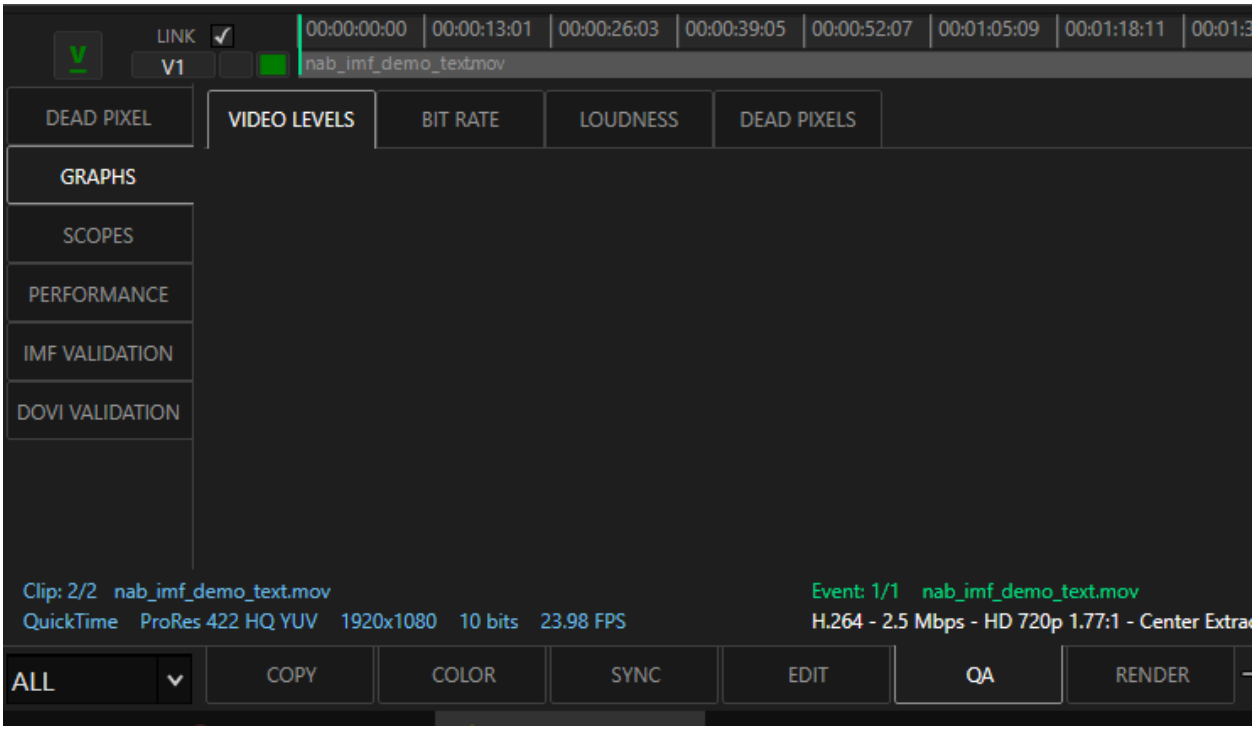
- Video Levels
  - Code Values
  - IRE Values
  - Nits Max FLL/CLL(HDR only)
  - Nits Min/Max(HDR only)

- Bit Rate read in mbps

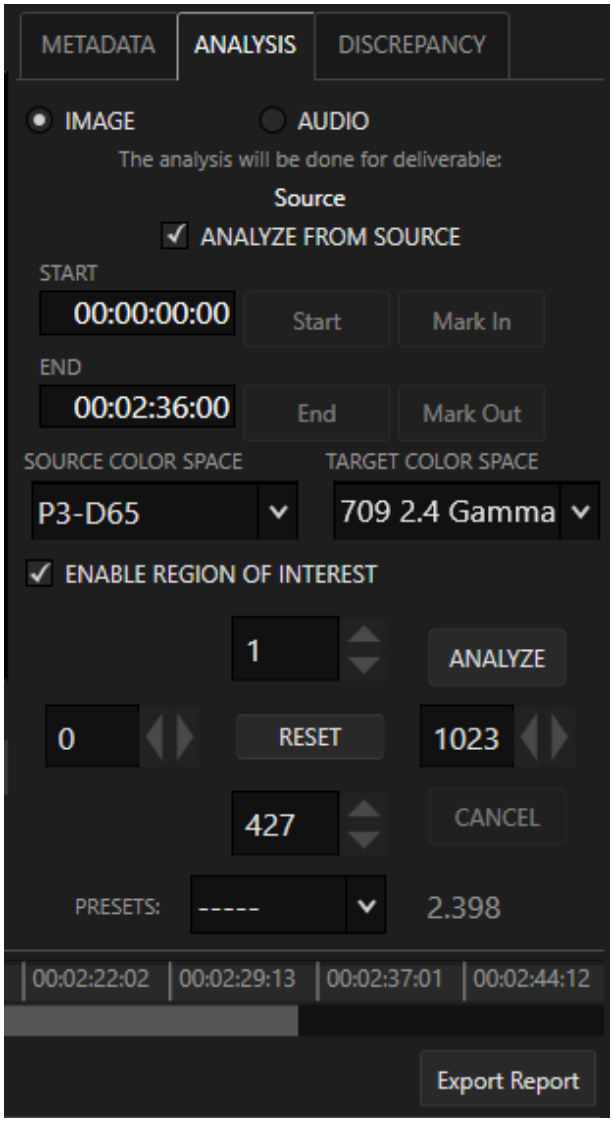
SDR Analysis

To begin an analysis, a composition must be created in the Edit Tool. For a comprehensive explanation of how to create a composition in the Edit Tool, refer to Creating a Composition.

With media in place on the timeline, you are now ready for image analysis. Switch to the QA Tool and select the GRAPHS module.



Click the ANALYSIS Tab in the upper right corner of the GUI to see all the analysis options.



Enable the IMAGE radio button.

To analyze the media without any influence by deliverable configurations or color pipelines, enable ANALYZE FROM SOURCE. This ensures that LUTs or Creative Color Corrections permitted by a deliverable will be ignored.

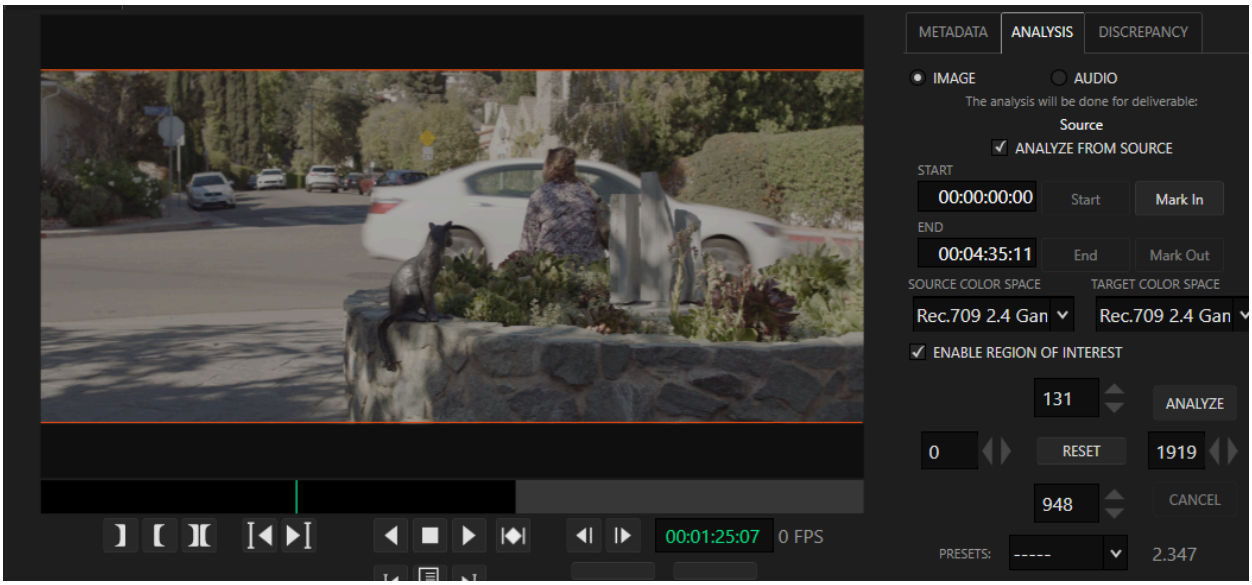
If it is required to use a color pipeline permitted by a deliverable, leave ANALYZE FROM SOURCE disabled and select the deliverable required for the analysis. For example, if the source material has a signal in full range blacks, but an analysis with legal range blacks is wanted, select a configuration with a FULL_to_LEGAL lut.

The analysis will default with the in and out timecodes of the entire sequence. If only a section of the video requires analysis, mark the in and/or out range on the timeline and click the Mark In and/or Mark Out buttons to exclude the balance of the composition from the analysis.

Select the SOURCE COLOR SPACE and the TARGET COLOR SPACE. The SOURCE COLOR SPACE should always match the color space in which the material was mastered in. However, the TARGET COLOR SPACE may vary, depending on the target display for which the analysis is intended.

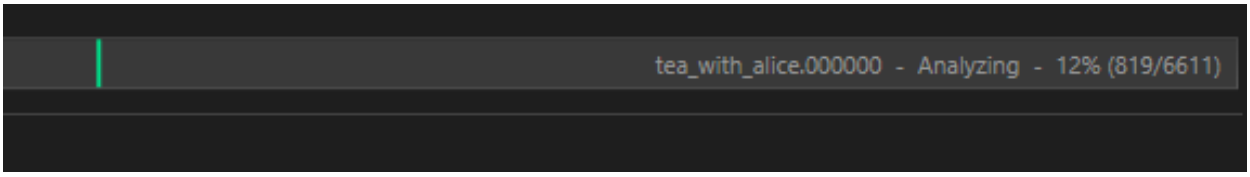
If the TARGET COLOR SPACE differs from the SOURCE COLOR SPACE, Cortex will provide the timecodes where the video falls outside of the gamut of the TARGET COLOR SPACE.

If the video has a matte that needs to be excluded from the analysis, click ENABLE REGION OF INTEREST. Then select from several aspect ratio presets or use the arrows to create a custom ROI. Red lines will appear on the Video Player to represent the portion of video that will be excluded.

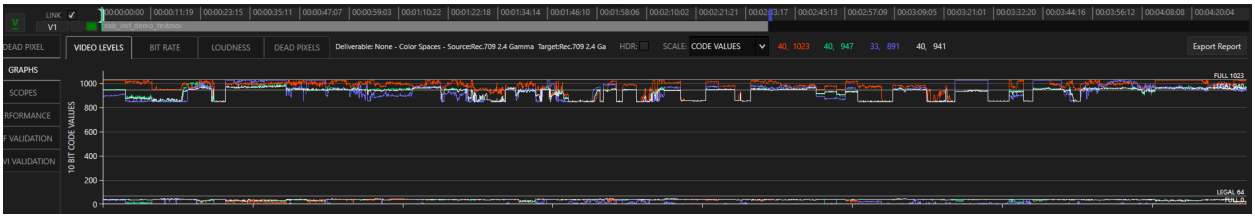


Example of an ROI set to 2.35

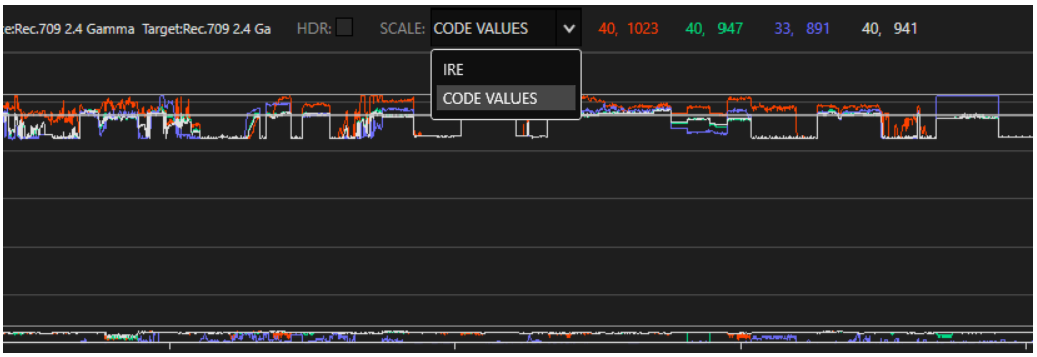
Once finished filling in the parameters, click ANALYZE to initiate processing. The progres of the analysis is reported in the bottom right corner of the GUI.



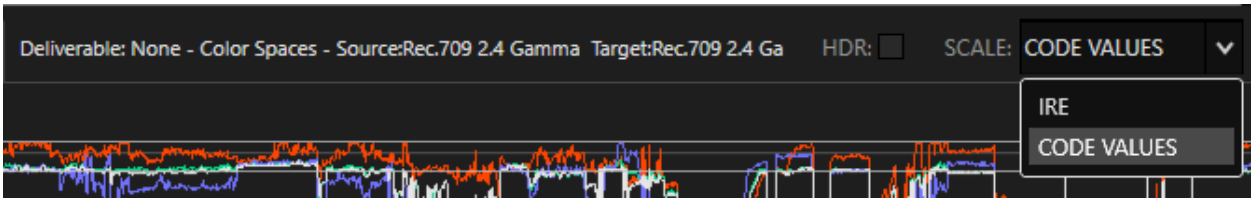
When the analysis is complete, a graph will appear underneath the timeline.



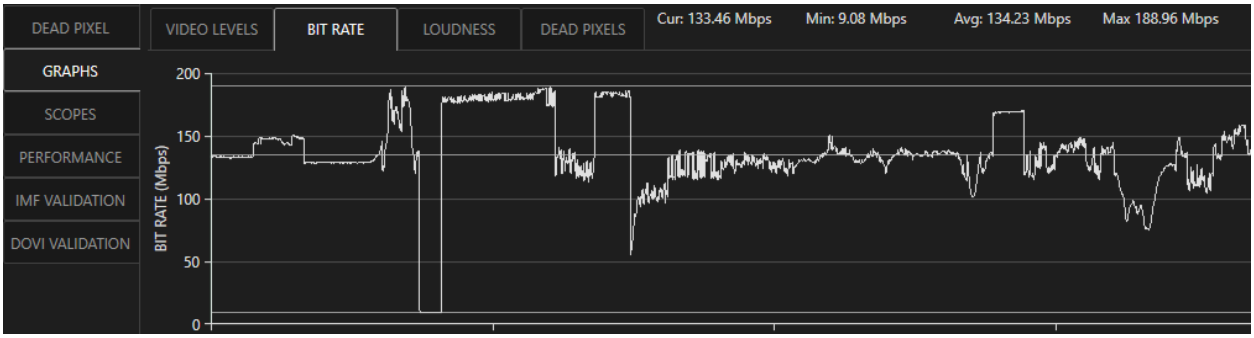
For SDR analysis, choose to view in either IRE or CODE VALUES. As the playhead moves along the timeline min/max values for the Red, Green Blue channels as well as luminance will present themselves for the frame you're parked on.



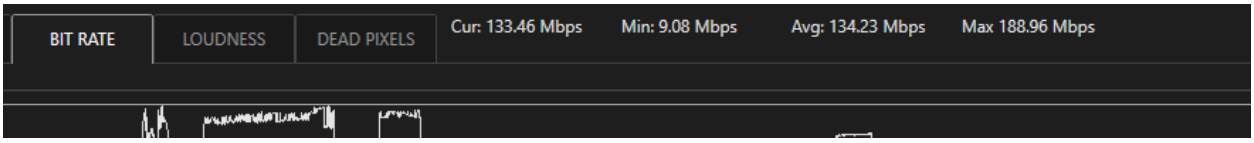
Above the graphs, the deliverable that was selected while running the analysis is displayed. If ANALYZE FROM SOURCE was enabled this will say NONE. The SOURCE COLOR SPACE and TARGET COLOR SPACE are also shown.



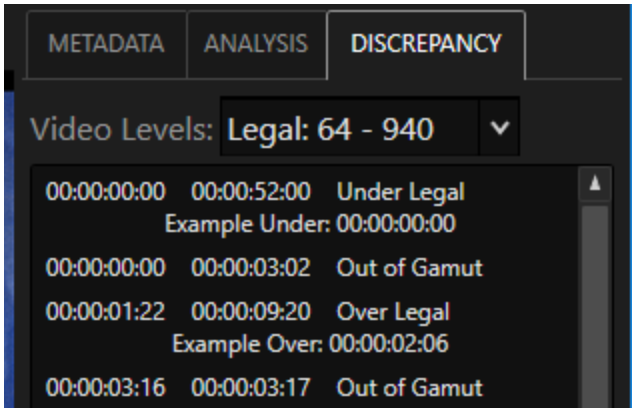
Cortex also offers a graph of the Bit Rate of your file. Select the BIT RATE tab next to the VIDEO LEVELS tab to display this graph.



Along with the graphical representation of the bit rate variances, Cortex provides numerical readouts of the Current, Minimum, Maximum and Average bit rate. These readouts are found directly above the graph in the Bit Rate tab.



For a list of discrepancies found during the ANALYSIS return to the upper right corner of the GUI. Select the DISCREPANCY tab to display a list of timecodes where the signal is out of the range.



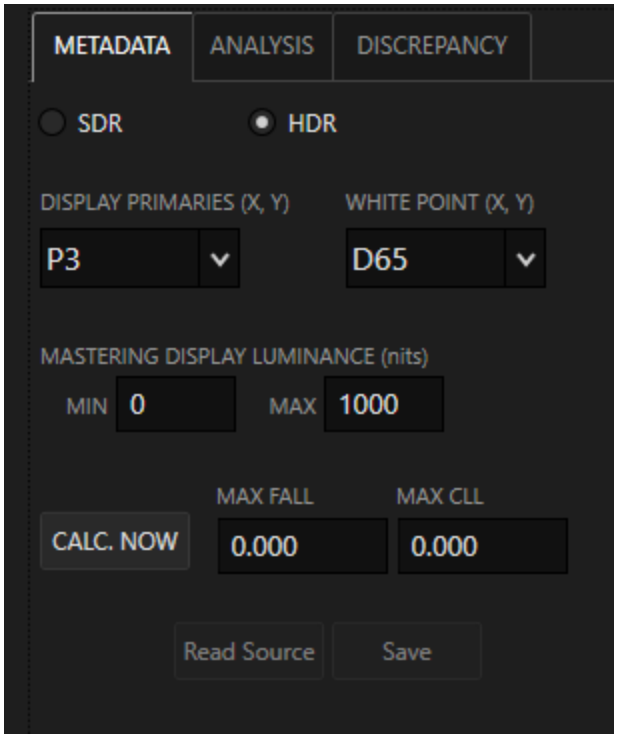
In the Video Levels dropdown field, choose the target range of the analysis. Choices include
FULL: 0-1023 or LEGAL: 64-940

The list of timecodes shows where the signal goes over or under the Video Level or Out of Gamut.

Double Click on an event in the list and the Playhead goes to the timecode on the Composition.

HDR Analysis

Running an analysis on HDR material is similar to the SDR process, however, there are few more options available that are pertinent to an HDR signal.

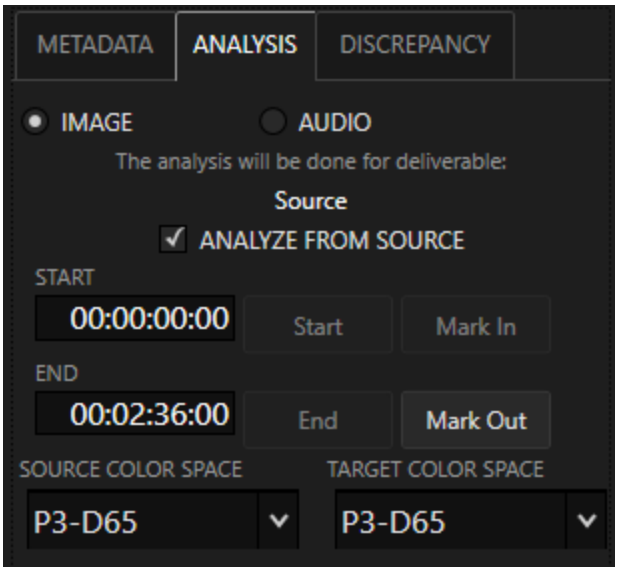


When creating a composition, be sure to select the HDR mode in the METADATA tab for the mastering parameters:

- Display Primaries
- White Point
- Min/Max Mastering Display Luminance

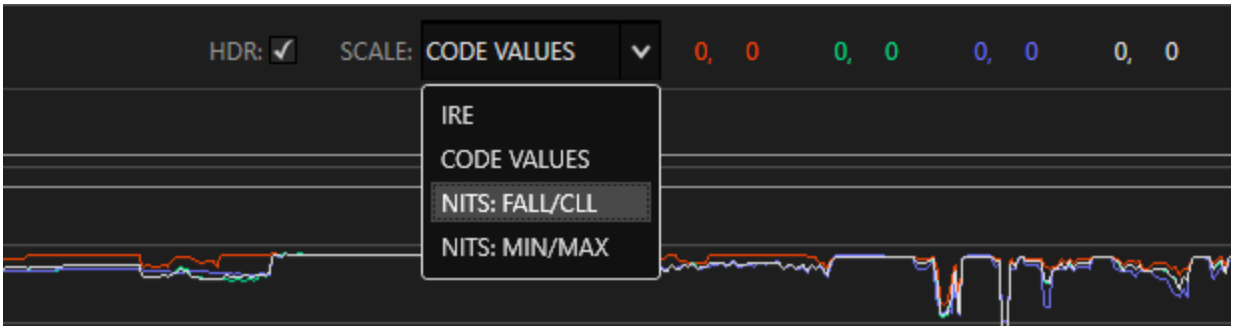
If the media is Dolby Vision, its metadata xml file will automatically populate these fields.

If desired, Cortex can also calculate the MaxFall and MaxCLL separate from the overall analysis.

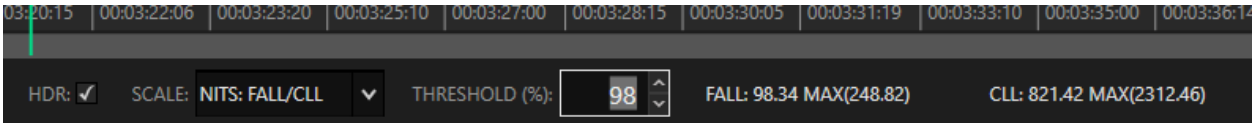


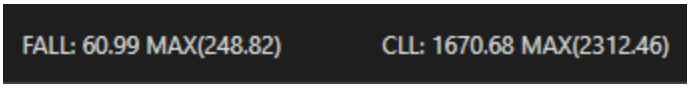
Like SDR video, choose the SOURCE COLOR SPACE and TARGET COLOR SPACE. Enable an ROI if needed and mark the range on the timeline intended for analysis.

Graphs will appear below the timeline once the analysis is finished. When HDR mode is enabled, Cortex expands the scale options to include NITs: FALL/CLL and NITs: MIN/MAX



Select NITs: FALL/CLL to display the graph and values for these scales.





The FALL values represent the average light level of a single frame. The CLL values represent the maximum light values of a single pixel.

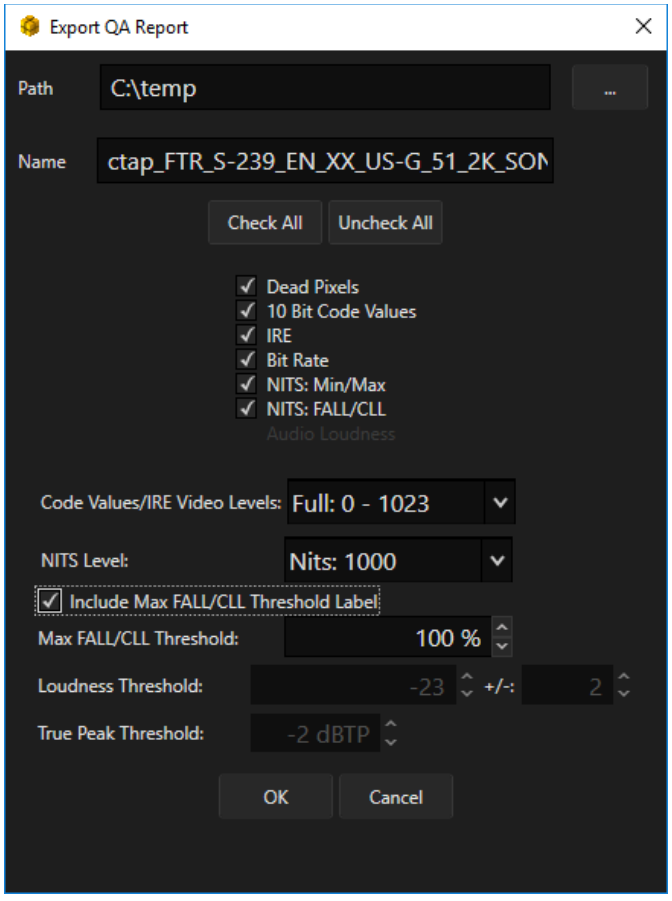
Both FALL and CLL have two numerical readouts. The numbers on the left represent values of the current frame. The parenthetical numbers on the right represent the maximum values of the composition. Accordingly, when you scrub through the composition, the numbers on the left will change while the numbers on the right will remain the same. You can, however, reduce the numbers on the right by lowering the threshold. This will tell Cortex to ignore the percentage light level above that threshold.

Select NITs Min/Max to display the graph and values for these scales.

The values here represent the minimum and maximum nit levels for each color channel and overall luminance of a particular frame. As you scrub through the timeline, these values will change respectively.

The user can now export PDF reports of the different graphs included in a Cortex Image Analysis. To do this, click the EXPORT REPORTS button found above the graph on the right side of the GUI.

This will prompt a dialogue box for the selection of graphs to include and thresholds to be set for the PDF report.



Click the ellipsis button next to “Path” to navigate to where the PDF should be saved.

Enable the checkboxes of the graphs to include in the PDF.

Choose the range.
FULL: 0-1023 or Legal: 64-940.
Set the NITS LEVEL. For SDR, NITS LEVEL can be ignored as it is irrelevant to an SDR signal.

If desired, enable the Max FALL/CLL Threshold and set it using the spinbox.

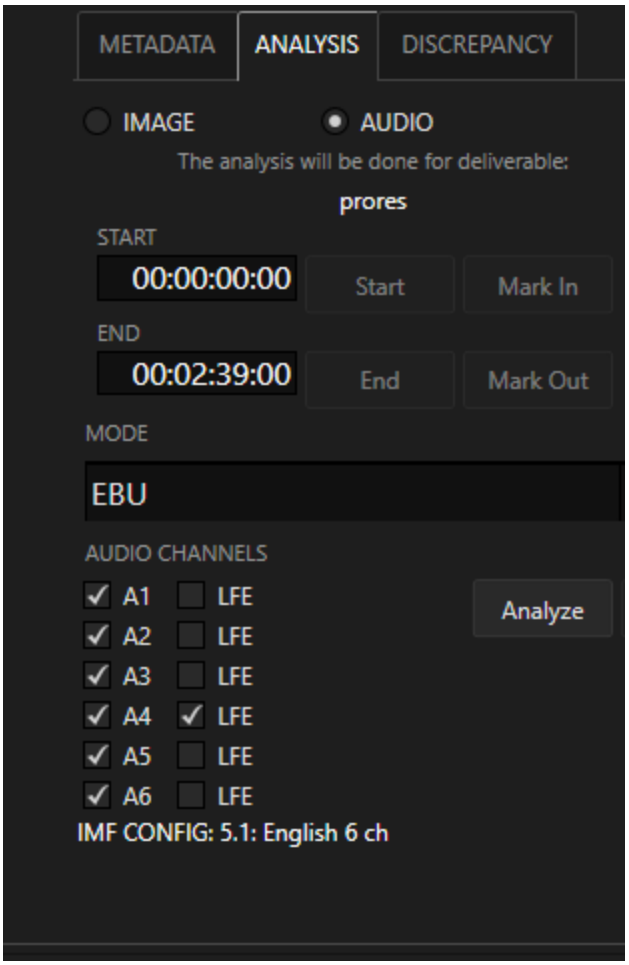
Click “OK” to generate and save the PDF.

The report will include a discrepancy list for excursions above or below these thresholds.

Audio Analysis

Cortex offers audio data analysis based on the two Loudness standards for broadcast television; EBU(European Broadcast Union) and ITU(International Telecommunications Union) Like Image analysis, this can be accomplished from any type of composition.

To start an Audio analysis, click on the QA tab and choose the GRAPHS module. Return to the upper right section of the GUI and select the ANALYSIS tab.



Click “AUDIO” to reveal the audio options in the ANALYSIS tool.

In most compositions, the Audio analysis will be done based on the deliverable configuration selected before the analysis. The audio configuration inside the deliverable will instruct Cortex as to how the channels are mapped.

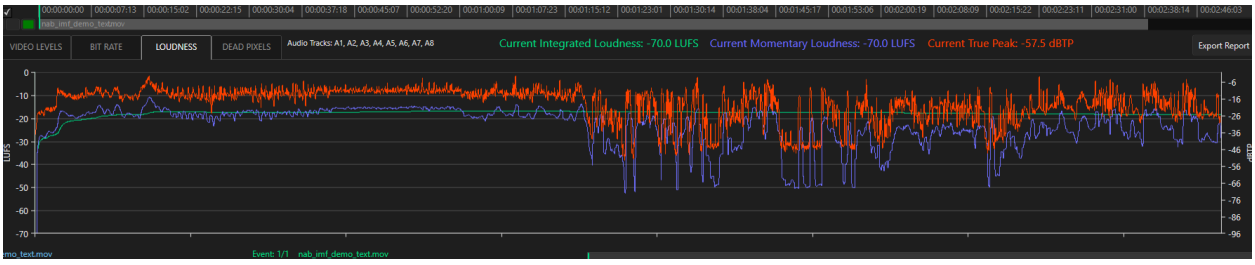
In an IMF composition, select from one of the saved Audio Configurations or the Scratchpad.

In the MODE drop down menu, choose which Broadcast Standard Cortex should use to analyze.

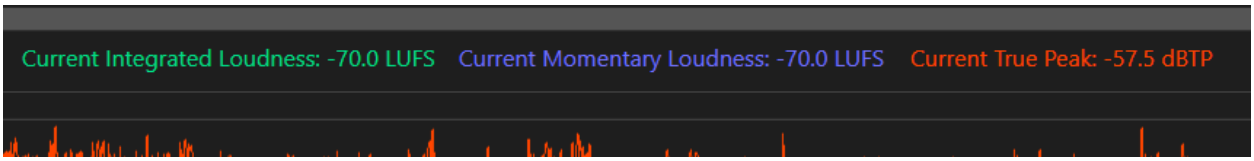
Click “LFE” next to the channel number where the LFE (Low Frequency Effects) has been placed. Cortex will ignore this channel in the analysis.

Click “Analyze.” Follow the progress in the bottom right corner of the GUI.

Once Complete, the graph will appear below the timeline.

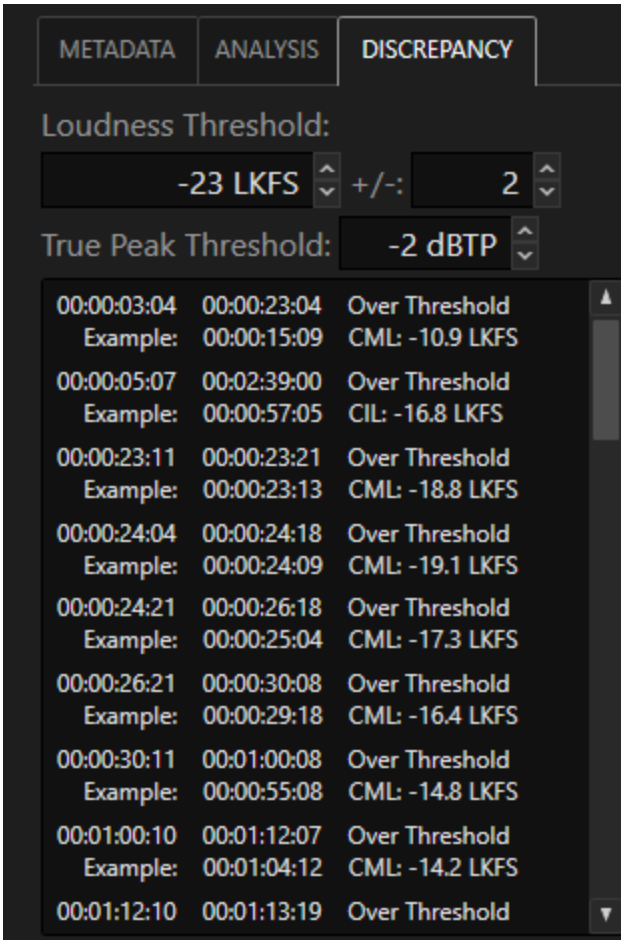


Cortex provides numerical readouts for the channels selected for analysis. The readouts are given in LUFS or LKFS, depending on the Broadcast standard chosen, and Decibels for the True Peak. Scrubbing through the timeline will change these values respectively. The three standards reported are the following:



1. Current Integrated Loudness(LUFS or LKFS)
2. Current Momentary Loudness(LUFS or LKFS)
3. Current True Peak(dBTP)

To reveal loudness excursions, select the DISCREPANCY tab next to the ANALYSIS tab.



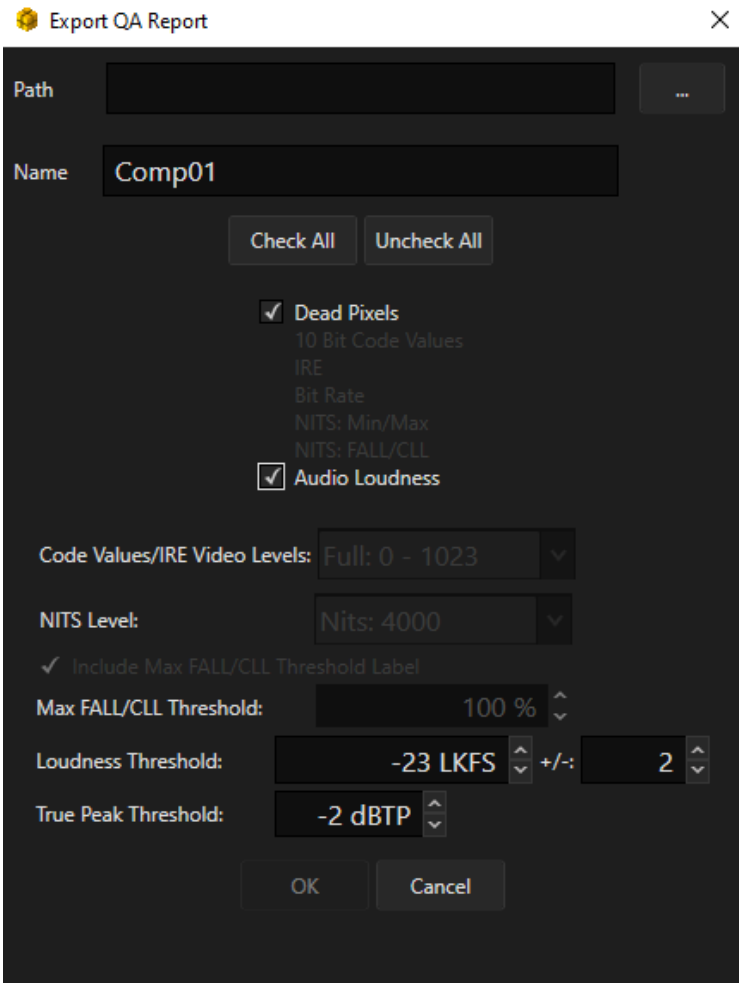
Set the loudness and true peak thresholds. These values will vary depending on the broadcast company or streaming platform and will be provided by them.

The Loudness Threshold comes with a target value and +/- range of what is acceptable from that target.

The True Peak Threshold is a single value and any excursion beyond it will be reported as a discrepancy.

Double click on an event in the list and the playhead goes to the timecode on the composition.

Click “Export Report” to generate a PDF of this graph.



Select a path to place the PDF on the Cortex system.

Enable “Audio Loudness” to allow the audio options for the paperwork. This will activate the loudness and true peak thresholds.

For these fields, fill in the standards provided by the broadcast company.

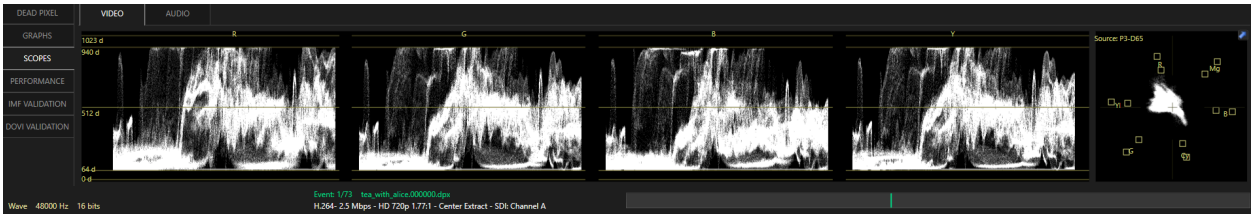
Click “OK” to save the document to the determined path.

Scopes Module

As part of its QA toolset, Cortex provides several types of video and audio scopes. The video scopes read HDR and SDR signals as well as the full range of gamut options, including ACES support. The audio scopes include a VU Meter as well as a loudness scope.

Video Scopes

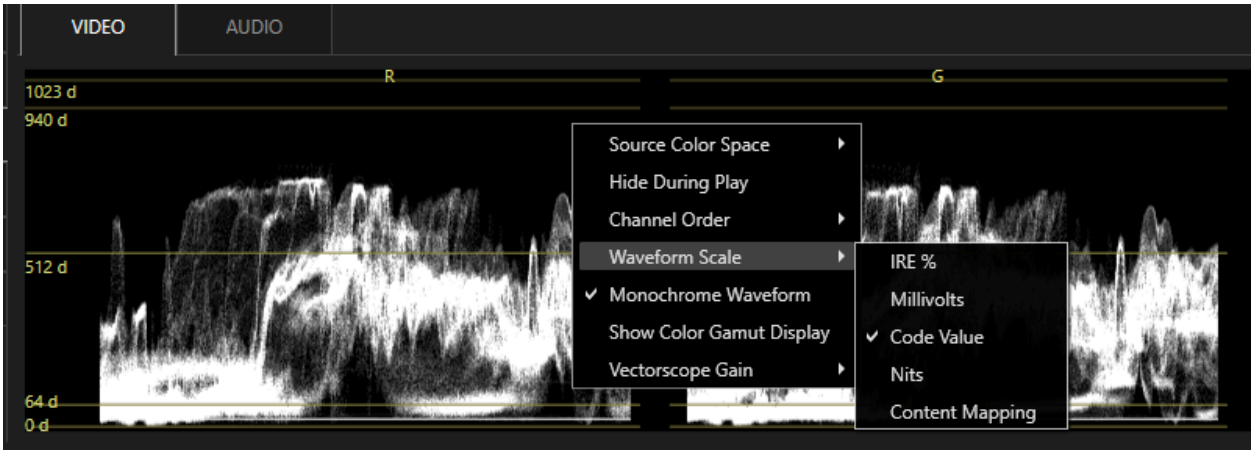
Select the Video tab in the SCOPES module to reveal the Video Scopes.



The waveform scale reads the signal in RGB as well as luminance represented by Y. The Scope on the right can be viewed as either a vector scope or gamut display.

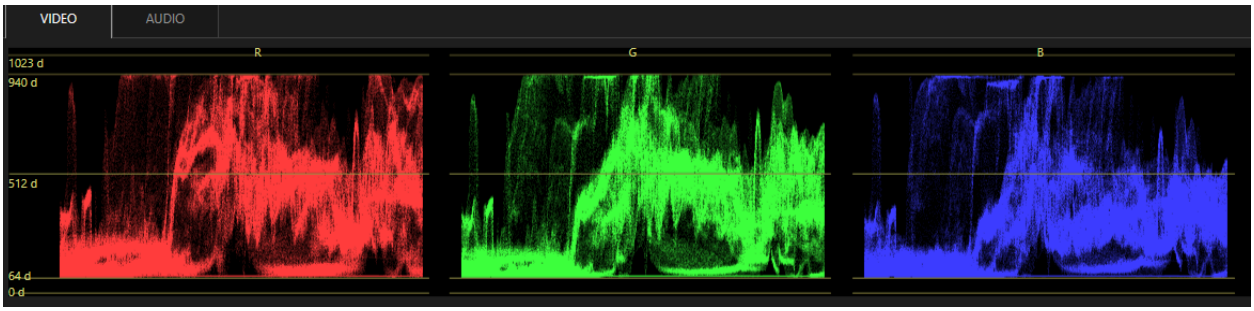
Waveform Scope

Right click on the waveform and choose Waveform Scale to reveal the reticle options for the scope. Choose from the following options:



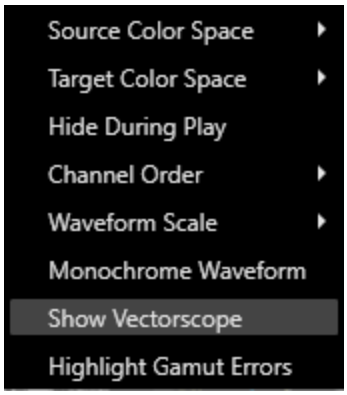
1. IRE %
2. Millivolts
3. Code Values (reticles include Full and SMTPE range)
4. Nits(For HDR signals only)

Uncheck the Monochrome Waveform to view the Channels in their respective colors

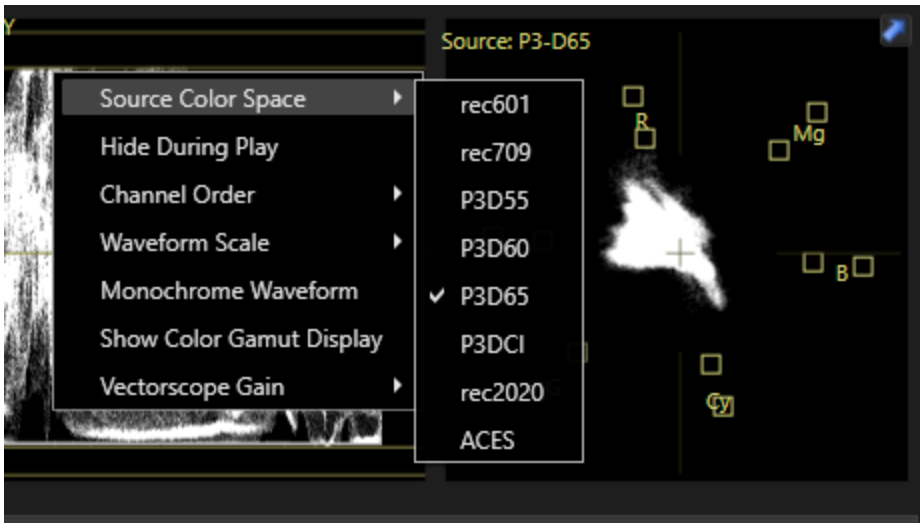


Vector and Gamut Display Scopes

To switch from the Gamut Display to the Vectoscope, right-click and select Show Vectorscope

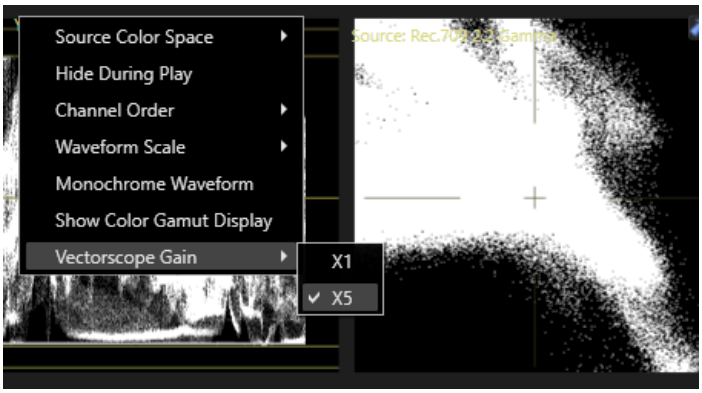


When the Gamut Display is on, the option will change to Show Vectorscope and vice versa.

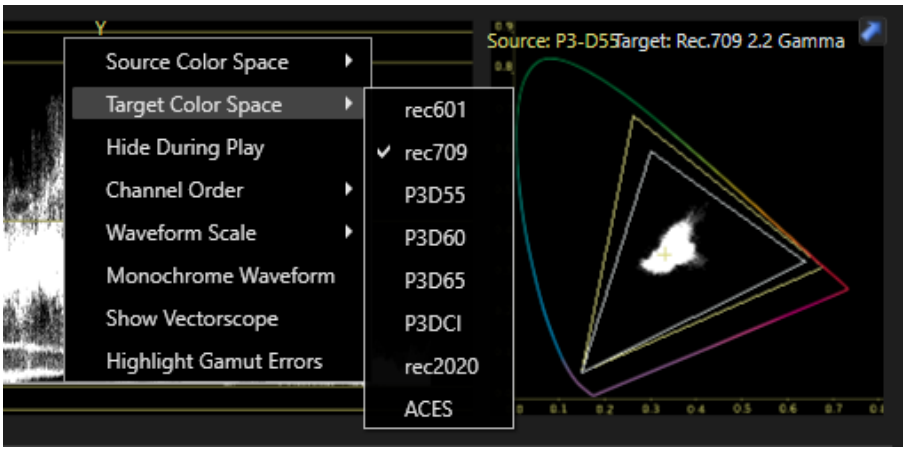


With the vectorscope now active, choose the Source Color Space. The signal will move along with the reticles to reflect the color space.

To magnify the vectorscope right-click and select Vector Gain and choose x5.

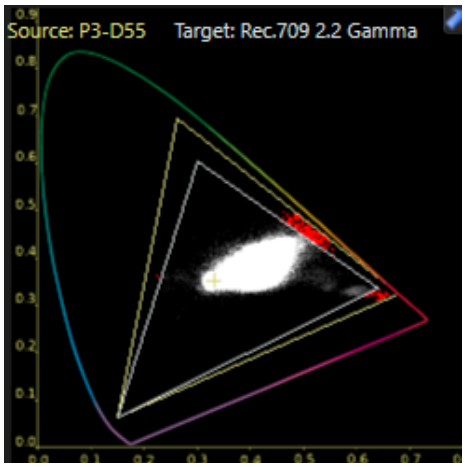


To show the Gamut Display. right-click and select Show Gamut Display. When the Gamut Display is active, options for Target Color Space and Highlight Gamut Errors are added.



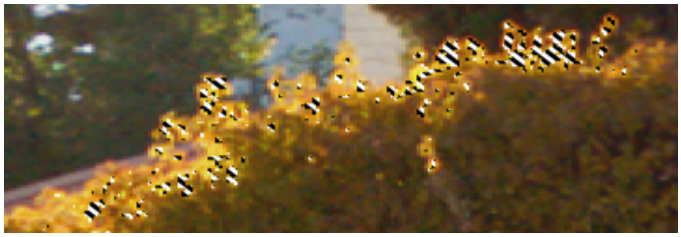
Adding the Target Color Space allows the Gamut Display to expose where the signal falls out of the gamut for the different display primaires.

The Source Color Space will always match the color space in which the media was mastered in.



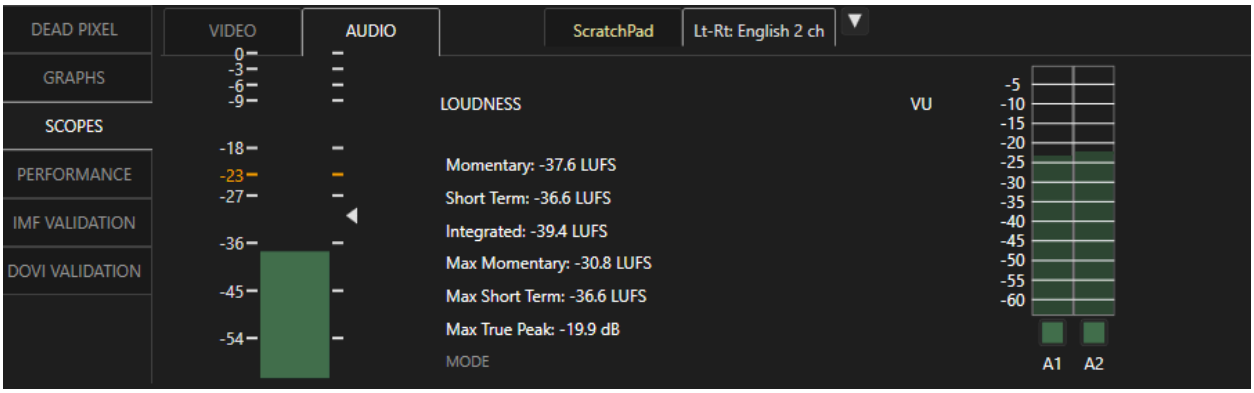
The Target Color Space will vary depending on the display the media will be viewed on.

When the signal falls out of the gamut of the Target Color Space, the excursions will be highlighted in red on the Gamut Display Scope. Right click and select “Highlight Gamut Errors” to display the excursions as a Zebra pattern in the Media Player.



Audio Scopes

Select the Audio Tab in the SCOPES module to display the Audio Scopes.

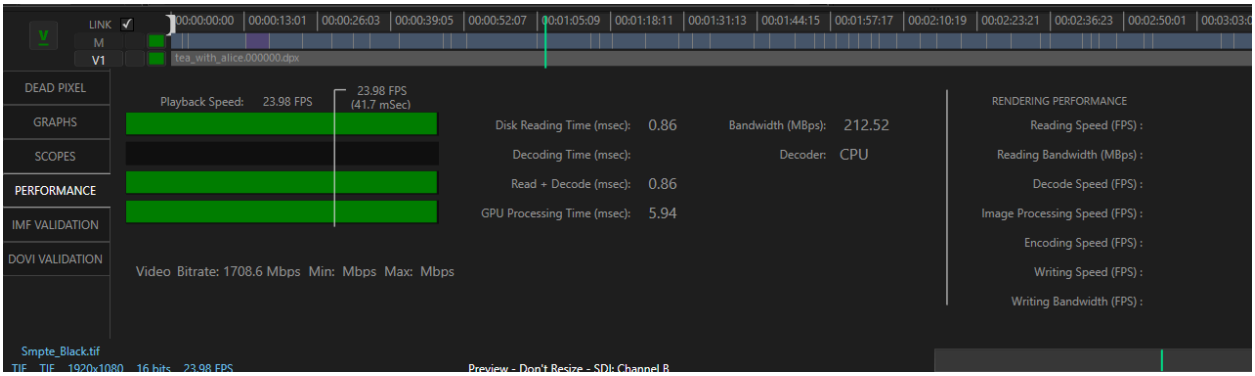


On the left is the Loudness meter and the right a VU meter. The VU meter displays the number of channels included in the selected Deliverable.

In a composition, the ScratchPad and a drop down of all the saved audio configurations appear above the scopes. From there, select the audio configuration to meter.

Performance Module

In the Performance Module, Cortex provides live readouts and meters of the system performance.



On the left is the playback speed. A healthy system will show green bars during playback. Red bars indicate a bottleneck in one of 4 areas:

1. Disk Reading Time
2. Decoding Time
3. Read and Decode time
4. CPU or GPU processing time

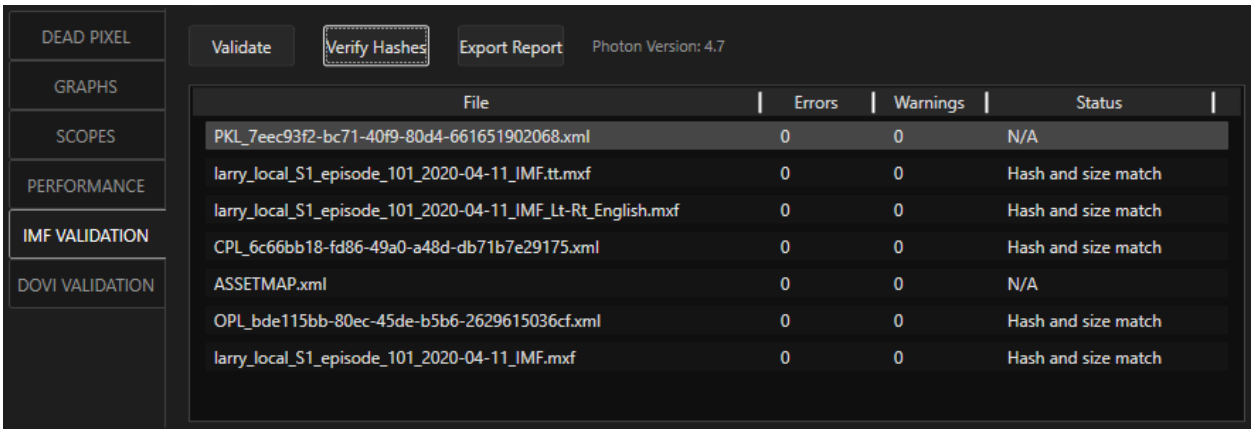
The numerical readouts to the right of the graph express the values in milliseconds. These graphs and readouts can assist in diagnosing system problems and hardware related issues.

On the right, Cortex displays RENDERING PERFORMANCE expressed in FPS(Frames per second) or MBps (Megabytes per second) in the following categories:

1. Reading Speed(FPS)
2. Reading Bandwidth (MBps)
3. Decode Speed(FPS)
4. Image Processing Speed(FPS)
5. Encoding speed(FPS)
6. Writing Speed(FPS)
7. Writing Bandwidth(FPS)

IMF Validation

The IMF Validation module confirms that an IMF package conforms to the SMPTE standard.
Using Photon, an open source validator from Netflix, the IMF Validator module confirms the presence of all required MXF, XML and CPL files, verifies elements based on hashes created during rendering, and allows the user to export a PDF report of the validation status and errors for the IMF package.



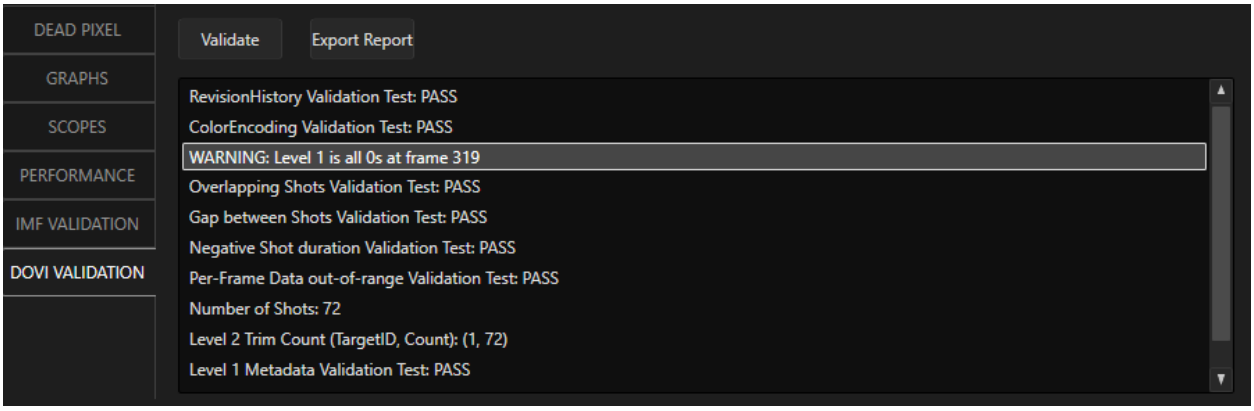
Steps to IMF Validation

1. Select the IMF to be validated
2. Click the Validate button
3. Check the messages if any after processing
4. Click the Verify Hashes button
5. If desired, click the Export Report button

Dolby Vision™ Metadata Validation

The DOVI Validation module confirms the Dolby Vision™ metadata provided in the XML by a color corrector. Using Metafier, a validator from Dolby Laboratories, the DoVi Validation verifies a list of specifications and reports on a Pass or Fail basis and alerts to warnings.

DOVI Validation can be performed on a composition prior to render or on imported delivery files such as an IMF package.



Steps to DOVI Validation

1. Select the composition or file to Validate
2. Click the Validate button
3. Check the list for Pass or Fails
4. If Desired, click Export Report to generate a PDF of the Validation

In the example above, the Dolby Vision Metadata passes all requirements, however, reports a warning regarding “0” values in Level 1.

Rendering and the Render Monitor Tool

Before beginning this tutorial, please review the following section: First a Few Definitions

Definitions Worth Repeating

Events, Segments, or Shots

A Composition is a grouping of clips that have been organized into a timeline continuity. Clips contained in the timeline are interchangeably defined as Events, Segments, or Shots, which refer to either a whole or part of a clip. The Composition icon is placed before the composition name in the Sidebar.

File per Clip

Any Deliverable that has its "Packaging" property set to File per clip will begin rendering clips immediately upon being added to the reel. If the clip is modified while the reel is still "Open", the clip will be automatically re-rendered.

File per Reel

A few deliverable types require the whole reel rendered once it is "Closed" to ensure its complete continuity. This means that every clip intended to be in the reel has been added and that the reel is closed by the user.

Clips Reel

A Clips Reel is a collection of one or more clips intended to be transcoded to one or more Deliverables. Clips added to the reel can be assigned a Print Status.

Composition Reel

The Composition Reel is a collection of one or more composition events. All events added to the reel will be rendered.

Open Reel

An Open Reel is one where clips are still being added to it or where clips contained in it require modification. In order for a clip in a reel to be modified, the reel must be open. If the reel is closed, the clip can be "Duplicated" for modification leaving the one contained in the reel as is. Reels can be reopened if there is a need to modify a clip. Once modified, the clip will be automatically re-rendered.

Closed Reel

A Closed Reel precludes any changes to be made to any clip contained in the reel. If the reel is closed and a clip that is contained in the reel is selected, all tool modules are disabled including Marks In/Out.

Note: The difference between rendering a Composition Reel and a Composition is that a reel is created prior to rendering in order to include individual segments added by the user to render Deliverables that have predetermined audio configurations. Rendering the Composition, without a reel, renders it based upon the whole timeline with the option to choose from audio configurations created in the composition.

Render Methods

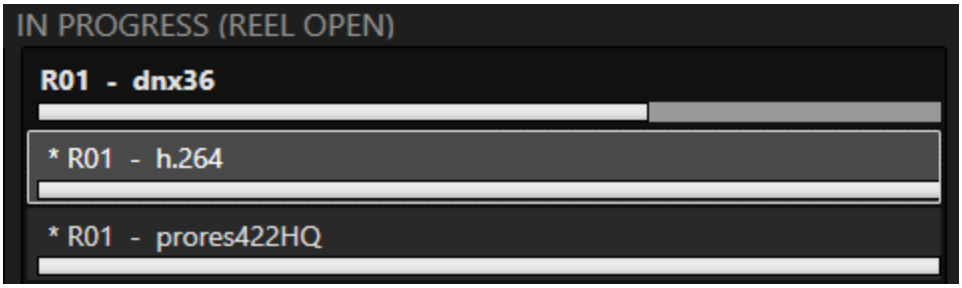
There are two methods of rendering files for Clips and Composition Reels and Compositions:

One to One Render

One to One renders one source to one Deliverable at a time. In a multiple Cortex Enterprise workstation environment using a shared database, clips added to a reel will be distributed for rendering by Cortex to available workstations on the shared network.

One to Many Render

One to Many renders one source to many Deliverables simultaneously on a single machine. When viewed in the Render Monitor Tool, each Deliverable of the Many group will have an asterisk in front of it. Clips Reels and Composition Reels are capable of One to Many Renders. For Compositions One to Many is possible but only the Deliverable Configurations can be used for audio processing; the Scratch-Track or any audio configuration created in the edit tool can not be used in a One to Many render.

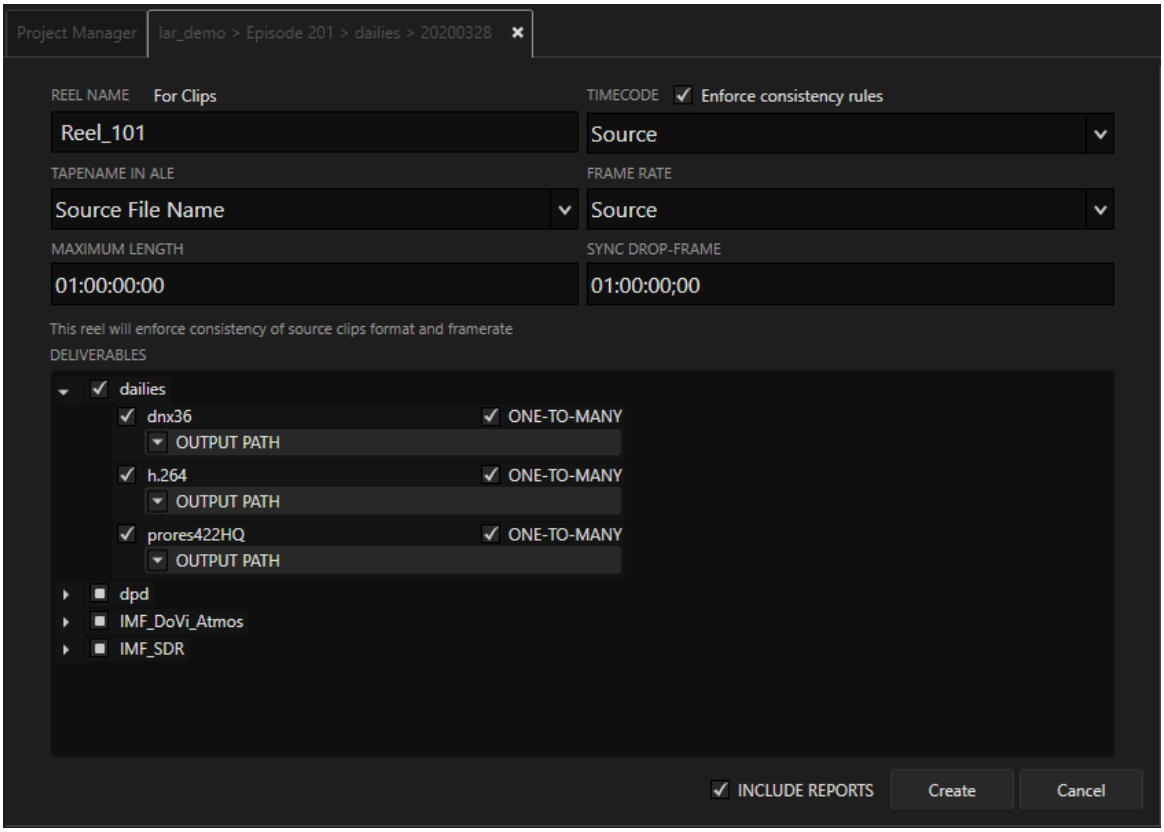


There are some Deliverables that are incompatible with one to many. For example:

1. IMF
2. DCP
3. File Per Reel Deliverables if the deliverable is DNx op Atom.mxf - The checkbox is automatically disabled

Creating a Clips Reel or Composition Reel

Click the New button in the Color, Sync or Render Monitor Tools and select Clips or Composition Reel. The Edit Tool and QA Tool can only create Composition Reels.



Fill the fields as needed:

- **Reel Name**
  - Fill in the name of the reel.
  - It must be unique and not a duplicate of a previously created reel.

- **Enforce consistency rules**
  - When enabled, this ensures that the reel will be consistent with the Project's frame rate. Cortex also ensures that the frame rate of clips added to the reel match the Project frame rate and warns that a mismatched clip cannot be added.
  - If left unchecked, Cortex allows for reels to be created that do not match the Project frame rate. Clips added to the reel are then rendered at the frame rate consistent with the reel's frame rate setting, which is set in the Frame Rate field dropdown menu.

- **Timecode**
  - If "Source" is selected, the source timecode will be applied to the rendered file.
  - If "Continuous" is selected, additional fields are displayed as explained later.

- **Tapename in ALE**
    - There are three choices
        - Source File Name - defaults for Source timecode reels
        - Record Reel Name - defaults for Continuous timecode reels
        - Source Tape Name - used when a source file was derived from a videotape

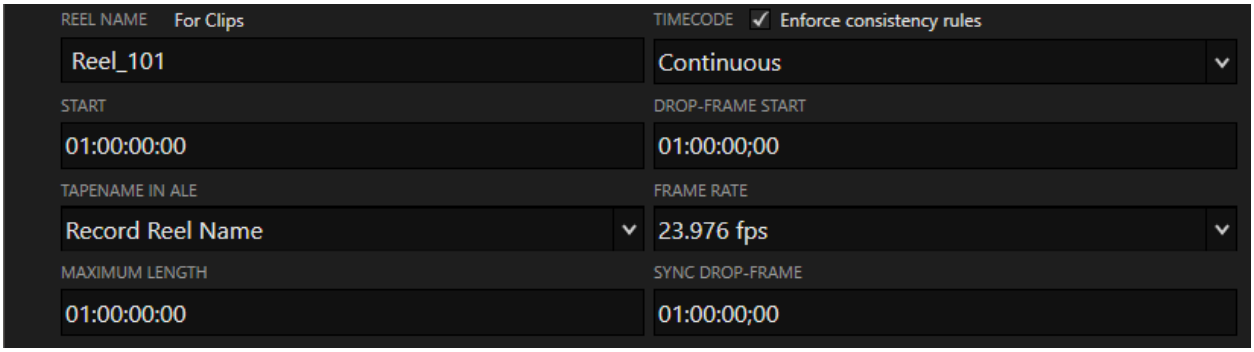
- **Frame Rate**
    - If the Enforce consistency rules checkbox is enabled and the Timecode field is set to “Source”, the Frame Rate field is automatically set to the only choice, “Source”.
    - If the Enforce consistency rules checkbox is disabled, the Frame Rate field will be automatically set to the Project’s frame rate, however, it can be changed to any choice allowed in the dropdown menu.

- **Maximum Length**
    - This is defaulted to 1 hour but can be modified. A 1 hour reel is recommended particularly for a Deliverable that is profiled as File per Reel since all clips must be rendered at once in order to assure the continuity of the reel. This also assures that the Deliverable can be copied or uploaded in a timely manner so that any receiving party can begin viewing or processing as needed.

- **Sync Drop Frame**
    - This field sets the relationship between Non-Drop and Drop Frame synchronization of time. It is recommended that this field be left at 1:00:00;00 for Clips Reels.

Any warnings or instructions are placed above the Deliverables section of the Dialog Box.

Continuous Timecode Reels



The general purpose of a Continuous Timecode Reel is to create a mezzanine master file(s) for any file type that does not easily integrate into the post workflow. For example, videos created on phones, oddball cameras, or other such devices that have no timecode at all or where the format of the video needs to be harmonized to the file types of the project.

For this purpose, it is recommended that the mezzanine file be created and rendered first and then used as a source for other derivative files to be used in the post workflow.

If the “Enforce consistency rules” checkbox is enabled, the Frame Rate field will default to the Project’s frame rate. When disabled, any frame rate in the field’s dropdown menu can be chosen.

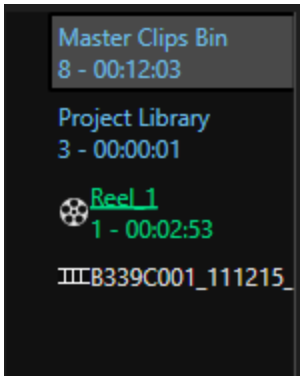
The “Start” field dictates the start timecode of the rendered file.
The Drop Frame Start sets the relationship between Non-Drop and Drop frame timecode start frames.

Determining One to One and One to Many Renders

In the above example, the h.264 is excluded from the group since it was profiled as a File per Reel Deliverable.
Enable the One-To-Many checkboxes as desired and decide whether you wish to
“Include Reports”. Press Create when ready.

Once a Reel is created, it will appear in the Sidebar with a Reel Icon. 

When the reel is active it is displayed green. For Deliverables that are profiled as File per Clip, add clips as they are finalized by pressing the G key or clicking the Add to Clips Reel button located on the source Media Player. Rendering begins immediately.



Rendering Compositions are discussed later in Rendering a Composition

While rendering, the name and Deliverable tabs are underlined in Green.

Selecting a Deliverable tab displays the contents of the reel in the Master Clips Bin.

The Render Monitor Tool

Switch to the Render Monitor Tool to view the progress of the rendering.
The Render Monitor Tool consists of 4 columns:

Disabled	If a deliverable is disabled, it is moved to this column
In Progress (Reel Open)	When a reel is created, its Deliverables are first moved to this column
In Progress (Reel Closed	After the reel is closed, its Deliverables moves to this column
Completed	After completion, the reel is moved to the Completed column

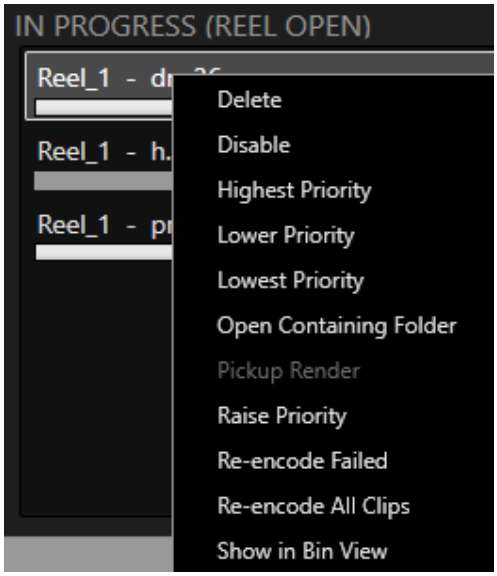
An abbreviated render progress is also displayed in the lower right corner of every tool.

Closing a Reel

When a reel is ready to be closed, right-click on the reel name in the Sidebar and choose “Close” from the context menu or click the “Close” button at the top of the UI above the Master Clips Bin. The reel and its Deliverables will move from the column, “In Progress (Reel Open)” to the column, “In Progress (Reel Closed)”. When rendering is complete the reel will move the Completed column.

Selecting Deliverables in the Render Monitor Tool

In any of the columns, right-click on a single or group selection of Deliverables to display a context menu.



A variety of options are available

- **Delete**. Three are three options
  a. Delete the Deliverable(s) from the list but leave the directory folder(s)
  b. Delete the Deliverable(s) from the list and its corresponding directory folder(s)
  c. Cancel

- **Disable** - disables the selected Deliverable(s) and places them in the Disabled column for later action

- **Highest Priority**
  a. If One to One - Raíses the selected Deliverable to the highest priority for rendering
  b. If One to Many - Raises all in the many-group regardless of which Deliverable is selected

- **Lower Priority**
  c. If One to One - Lowers the selected Deliverable priority by one position for rendering
  d. If One to Many - Lowers all in the many-group by one position regardless of which Deliverable is selected

- **Open Containing Folder**
  a. Works the same for both One to One and One to Many rendering
  b. If more than one Deliverable is selected, it opens all directories

- **Pickup Render** - Works for any “file per frame” render (i.e. DPX) and is especially useful to insert a single shot into a previously rendered clip or composition. For example, if a single shot needs to be replaced in a composition, right-click on the Deliverable and choose Pickup Render:
  a. A Render Composition dialog opens
  b. If a Mark In and Mark Out exist click the Mark In and Mark Out buttons
  c. The marks will appear in the Start and End timecode registers
  d. Choose which video tracks from which to render in the Render Video Track dropdown menu
  e. Enable or disable the Include Reports checkbox
  f. Click Ok

The files are then rendered overwriting existing files.

- **Raise Priority**
    a. If One to One - Raises the selected Deliverable priority by one position for rendering
    b. If One to Many - Raises all in the many-group by one position regardless of which Deliverable is selected

- **Re-Encode Failed**
    a. Re-encodes any failed clips for both One to One and One to Many Deliverables

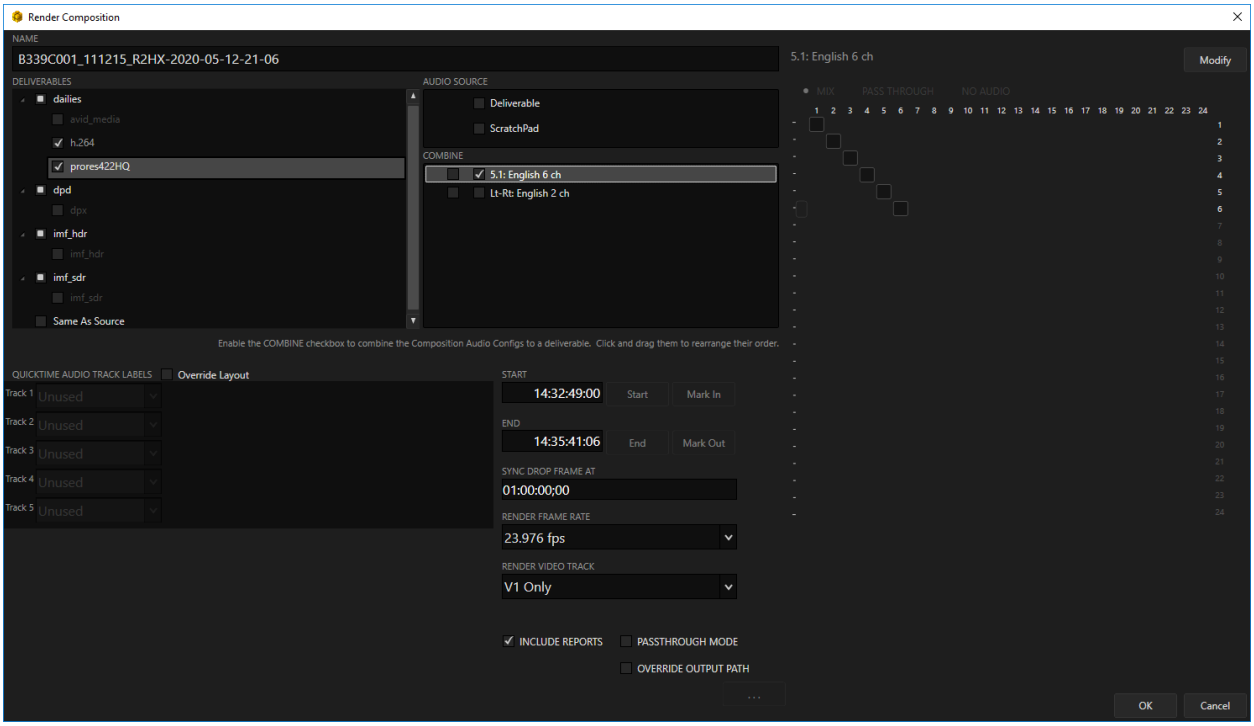
- **Re-Encode All Clips**
    a. Re-encodes all clips in selected Deliverable(s)

- **Show in Bin View**
    a. For this option, only one Deliverable can be selected.
    b. If more than one deliverable is selected, the option is disabled.

Rendering a Composition

To Render a Composition right-click on the composition in the Sidebar and select Render.

The Render Composition Dialog Box



The Render Composition Dialog box consists of three basic sections: Deliverables, Audio Sources, and Audio Mixer.

Enable the Deliverables to be rendered. Each Deliverable can be rendered with one or more audio mixes found in the Audio Source section. To determine which audio mix(es) will be rendered with the Deliverable:

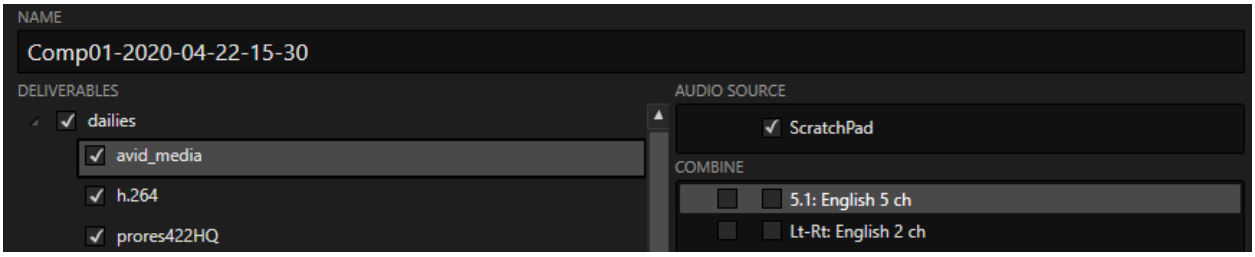
1. Click on the Deliverable
2. Enable the mix checkboxes to be included in the render
3. If there are more than one mix available, the Combine checkbox will be available.
    - To combine mixes to a single render, enable the desired Combine checkboxes.

If the Combine checkbox is left disabled, Cortex will render each mix separately to a new Deliverable file.

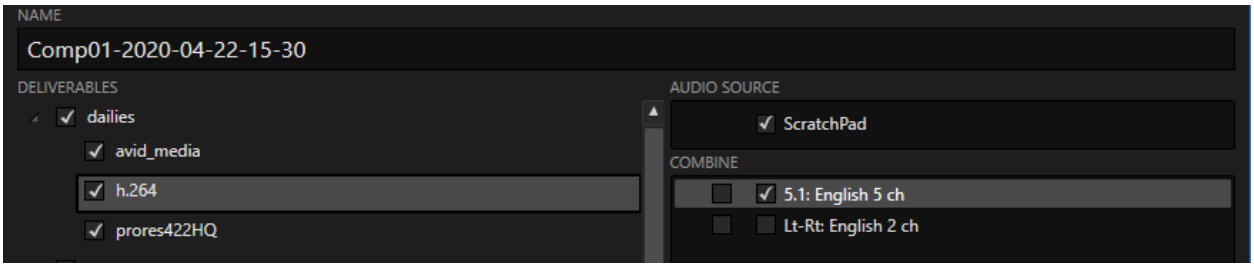
After choosing the Deliverable and Audio Mix(es), it is possible to modify each of the Audio Mixes using the mixer. The modification is temporary and only applies to the current render(s). Click the Modify button and adjust the mixer matrix as required.

Note: The ScratchPad audio cannot be combined with other mixes and is rendered separately.

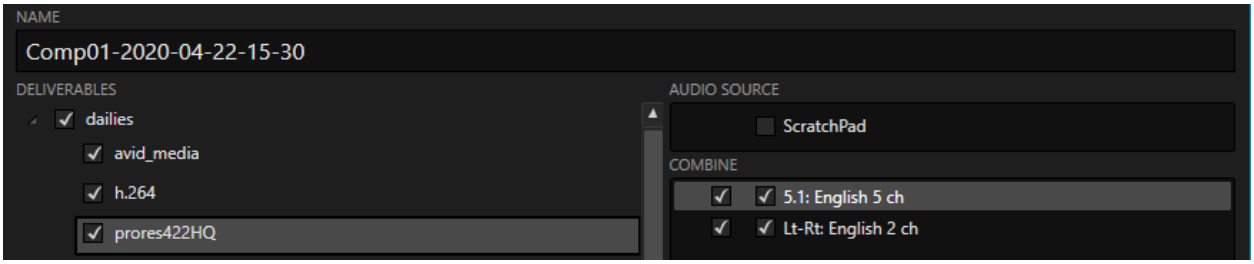
In the following figure, the avid_media Deliverable is selected and only the ScratchPad mix will be rendered.



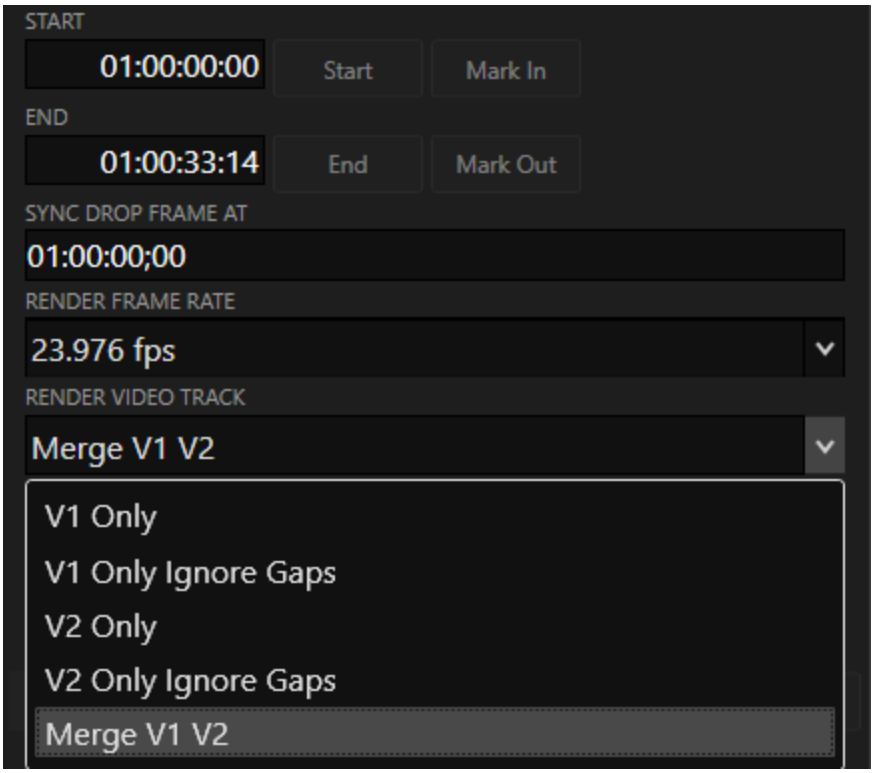
In this figure, the h.264 Deliverable will be rendered twice separately, once with the ScratchPad and once with the 5.1 English mix.



In this figure, the prores422HQ Deliverable will be rendered once combining the 5.1 and LtRt mixes.



By default, the Start and End timecodes of the composition are entered in the corresponding fields. If a Mark In and/or Mark Out are present on the composition, you can choose to use them as start or end times for the render by clicking their respective buttons. You can also manually enter In and Out points for rendering.



Enter the timecode for the “Sync Drop Frame At” field. Normally left at the 01:00:00;00 default.
Choose the “Render Frame Rate”, which defaults to the project frame rate.
If there is more than one video track in the composition, a number of options are presented in the “Render Video Track” field. Choose the one in the dropdown menu that best suits the required render.

If there are Gaps in the video track, Cortex can ignore those gaps and jump to the next filled video segment.

Quicktime Audio Track Labels

If required, use the dropdown menu to label the tracks contained in a rendered Quicktime file. Enable the Override Layout checkbox and choose from a comprehensive list of labels provided by Apple.

Cortex User Manual

Version 5.6

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Thank you for choosing to learn about Cortex.

For Additional information, requesting help and accessing our knowledge base, you can access MTI Film's Support resources by registering on our Forum at forum.mtifilm.com, which also includes the most up-to-date version of the software.

Check for the latest MTI Film CORTEX news and product info at: https://www.mtifilm.com